Faculty of Architecture and Urbanism
National University of Tucumán

FINAL DEGREE PROJECT

SYNERGY

Intermodal hub for transport and culture

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ARRIVA
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PROLOGUE

I begin by contemplating my city from afar—my Tucumán, the cradle of Argentine independence. I reflect on it through the lens of the highly structured cities of the country where I currently find myself (France, November 2024)—the land of liberty, equality, and fraternity; the land of a revolution that marked history and left a blueprint for so many nations to replicate.

Around 1816, Argentine independence was born inside a small white house with blue doors. Today, that very house stands at the epicenter of a daily earthquake: the act of inhabiting and moving through the metropolitan area of Tucumán.

From home to the garden and back; from home to school and back; from home to work; from home to work and to the university; from home to work, to the university, to the gym, to the theater, to meet with friends, and, once again, back home.

These journeys might seem simple, at times, if we look at a map and trace practical lines of interurban routes, or if we all owned our own cars—flying cars, of course, because the streets could never withstand the density, let alone the simultaneity of it all. They might also seem simple with an efficient transit system, but the years pass and nothing changes. Will cars fly before this is solved?

I remember a day in 2022, a day like many others, when I had to walk ten blocks just to catch the bus to work. I waited twenty minutes for it to arrive, traveled another fifteen or twenty to my destination, and then walked the rest of the way to the office.

Upon leaving work, I had to head to the university for my classes. I waited for forty minutes in a freezing June; I finally boarded the bus and traveled for at least thirty minutes more. The seats weren’t exactly comfortable, but let’s not dwell on minor details—like that one time the driver slammed on the brakes, the entire window pane fell right on top of me, and together with the other passengers, we hoisted it back into place.

I arrived, but not at the university—it was just the transfer stop, where I waited for roughly thirty more minutes, sitting on the doorstep of a house because there was never any infrastructure to shelter the wait. The bus finally came; quite close to my destination, it broke down, and once again, I had to waste time waiting to change vehicles. I arrived late to class, which, at the end of the day, is no great tragedy if it happens once in a while. But it happened constantly, and it didn't always have to do with my talent for leaving with only minutes to spare.

The journey back home that night was a similar "periplus": two more buses, each with its respective waiting time and preceding walk. I remember that day vividly because it was the first time I could put into words a specific sensation: "I am not the master of my own time." And I cried. It sounds almost funny now, but I cried out of sheer exhaustion, out of frustration, out of being enslaved by a mobility system that only looks at profitability. I once read that societies are truly happy when their citizens possess the freedom to move equitably. How profoundly true. To me, this is the primordial foundation of the right to the city. A few months ago, I leapt into the adventure of coming to work in France while writing my thesis. I already had a few ideas sketched out for an intermodal public transport project—a project where the train that cuts through Tucumán, the one I used to run outside to wave at as a little girl, reclaimed its significance and was empowered by new tracks.

Yet, none of the ideas I had felt like enough, while others seemed excessive. In a way, I was searching for a design that could guarantee that version of me—the Belén who wept—that one day, she would finally be in control of her own time. And to allow so many others to reclaim that dream, too.

In control of our own mobility, collectively. In control of our own city.



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1. INTRODUCTION

Project Description

The proposal seeks to address the inefficiency, imbalance, and fragmentation of the public transportation system in the Tucumán Metropolitan Area (AMeT).

Expanding its vision toward the provincial and national context, it implements a roadmap toward a new interjurisdictional, intermodal, and comprehensive mobility model that positions the metropolitan area as a hub for the Argentine Northwest (NOA).

The guiding concept proposes a TRANSPORTATION NETWORK SYSTEM where intermodality—achieved through long and medium-distance trains, subways, metropolitan trams, restructured bus routes with trunk and feeder lines, and a public bicycle network with qualified pedestrian nodes—empowers citizens to be masters of their own time. This axis is complemented by the symbiosis of an ACTIVITY NETWORK that enhances and encourages permanence within collective infrastructures.

The expected impact aims to reduce travel and waiting times, improve environmental and economic efficiency, diversify the range of available transportation modes, and foster a sense of civic ownership and citizen empowerment regarding metropolitan mobility.

Concurrently, the proposal understands mobility as a structuring factor of the territory and a key tool to mitigate socio-spatial inequalities, stimulate the local economy, and guarantee equitable access to the educational, employment, and cultural opportunities that the city offers.

At the architectural scale, the project proposes that the Intermodal Hub should not be an isolated technical object, but rather a "Common Place" (Lugar Común).

Following European trends, it understands that to guarantee a safe and vibrant operation, the infrastructure must provide a hybrid programmatic offer that includes culture, commerce, and services.

This mixture of uses ensures "natural surveillance" (Jane Jacobs), where the constant presence of people engaging in diverse activities eliminates blind spots and the perception of insecurity typically associated with the current railway vacancies.



Timeline

1857 — 1st railway network (Buenos Aires). Expansion into the province's interior.

1870 — Expansion to Rosario and Córdoba. Commencement of works on the Córdoba - Tucumán line.

1876 — rrival of the railway in Tucumán. Central Northern Railway (Ferrocarril Central Norte).

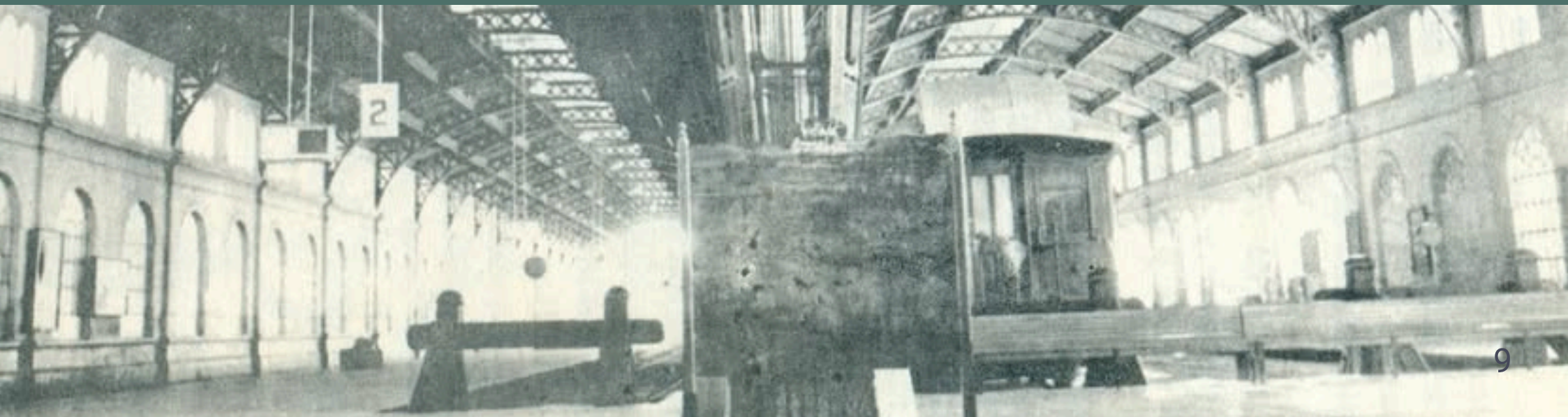
1894 — Expansion of the Central Argentine Railway (Ferrocarril Central Argentino) to Bolivia.

1930 — Emergence of the tramway as a mode of collective mobility.

Profitability limit. Deterioration and lack of infrastructure maintenance.

1933 — Roca-Runciman Pact. Operation of railways by British capital.

BOOM PERIOD



Nationalization of the railways. State investment. Completion of branch lines. Economic independence.

Military dictatorship. Beginning of the period of instability.

Larkin Plan. Ideas of "system modernization and rationalization." Abandonment of 33% of the existing rail network.

Disappearance of the tramway. Consolidation of the bus as the primary mode of collective transport

Military dictatorship. Closure of sugar mills in Tucumán.

Privatization of a large portion of the system. Closure of specific lines.

Urban and interurban bus lines operate under concessions and routes established between the 1990s and 2000s..

1946 | **1955** | **1958** | **1966** | **1990 - ACTUALIDAD**

GOLDEN AGE

DECLINE - PRIVATIZATION





Current Challenges

The Tucumán Metropolitan Area (AMeT) has grown in an organic and fragmented manner, accumulating urban and institutional challenges that directly impact daily quality of life.

Prominent among these are urban barriers, a lack of green infrastructure, inadequate sidewalk conditions, deteriorated and congested streets, localized micro-dumps, and an inefficient public transportation system characterized by obsolete routes, low frequencies, high fares, and poorly maintained fleets.

Since the 1990s, various studies and plans have attempted to address metropolitan mobility, but the absence of inter-municipal coordination and a unified legal framework has prevented sustained action.

This fragmentation has shaped an inequitable, polluting system that forces dependency on private vehicles for those who can afford them, deepening territorial inequalities and triggering a severe decline in public transit ridership.

As documented in academic studies by architects Inés González Alvo and Marta Casares, this reality is equally evident across local news media and provincial public forums.

Furthermore, crossing municipal borders on foot or by bicycle is often hazardous. Many of these peripheral zones are degraded—interrupted by vacant lots, neglected railway layouts, the river, canals, or waste dumps—completely lacking accessibility or safety conditions. This absence of continuity in public space discourages active mobility and reinforces urban exclusion.

Over time, the urban mobility experience for most commuters began to depend purely on chance: "waiting to see when the bus might show up." Consequently, with the emergence of ride-hailing apps a few years ago, many turned to private transport to regain their freedom of movement, even for distances that could easily be walkable.

Compounding this challenge is the imperative need to reintroduce the railway as the great structuring axis of the territory. The recovery of the train must not be understood merely as a technical upgrade, but as a catalyst for urban vitality capable of transforming the municipalities it traverses.

By implementing a system that reinstates the train as a daily mode of transport, the railway reclaims its historical role as a federal and provincial connector.

This transforms old railway "scars" into corridors of economic and social development, restoring predictability, safety, and dignity to the travel time of Tucumán's citizens.

IN SUMMARY

The challenge lies in rethinking mobility as a structuring territorial policy capable of simultaneously addressing long, medium, and short distances through the precise integration of diverse transportation modes.

Compounding this challenge is the imperative need to reintroduce the railway as the backbone of the system, leveraging the positive environmental impact generated by the adaptive reuse of its existing layout.

General Objective

To transform the urban fragmentation and mobility crisis of the Tucumán Metropolitan Area (AMeT) through the implementation of a hierarchical Intermodal Mobility System (SMI) that reclaims the railway layout as a structuring axis, guarantees regional 15-minute connectivity, and recualifies degraded public space under a paradigm of circular and democratizing urbanism.

...under a paradigm of circular and democratizing urbanism.

Specific Objectives

1 MOBILITY AND CONNECTIVITY DIMENSION

- Guarantee high-speed transport
- Establish a hierarchical transit system
- Reclaim and optimize existing infrastructure

2 URBAN DIMENSION

- Urban transparency / permeability
- Consolidate a green corridor
- Promote a mixture of uses (mixed-use development)

3 ARCHITECTURAL DIMENSION

- Design the station as a community gathering anchor
- Create covered public space
- Revalue architectural heritage




SALA DE ENSAYO
DE BAILARINES

2. PROVINCIAL SCALE

Provincial Mobility Analysis

Road Infrastructure

The routes with the highest passenger flows are those connecting the primary urban and tourist centers. Key highways include:

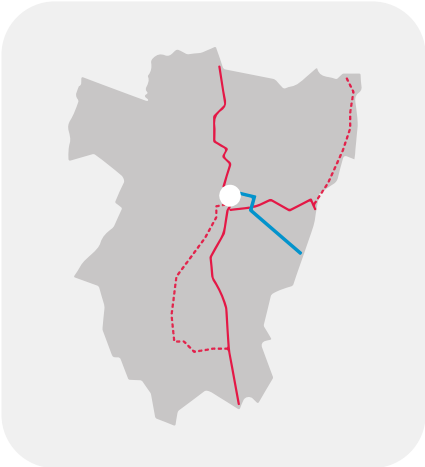


- **National Route 38 (RN38):** This main artery traverses Tucumán from south to north, passing through cities such as La Cocha, Juan Bautista Alberdi, Aguilares, Concepción, Monteros, and Famaillá before arriving at San Miguel de Tucumán.

- **National Route 9 (RN9):** Although its alignment runs parallel to RN38, RN9 is equally vital to Tucumán's connectivity, particularly along the section linking San Miguel de Tucumán with the northern municipalities of the province and the neighboring province of Salta

Railway Infrastructure

Tucumán's railway infrastructure is among the most significant in the Argentine Northwest (NOA), both due to its historical legacy and its logistics and production potential.



The main lines running through the province are:

- **General Belgrano Railway**: (Standard gauge) network that traverses northern Argentina, including Tucumán. It serves as a vital corridor for agricultural and industrial freight transport, though it currently contains abandoned sections.

- **General Bartolomé Mitre Railway:** A broad-gauge network connecting San Miguel de Tucumán with Buenos Aires and other central and northern provinces. It actively operates long-distance passenger services.





How do people commute across the province?

For daily commuting within the province for work or educational purposes, the population predominantly relies on private vehicles and long-distance rural bus lines. Motorcycles are also widely used and informal transit agents.

It is crucial to highlight that, due to policies deregulating long and medium-distance automotive transport, private operators hold greater autonomy in determining schedules, routes, and fares without state oversight or regulatory control. This lack of intervention acts as a significant barrier for Tucumán's citizens, who depend entirely on these services to move freely across the territory.

Trancas — **SMT**

By Car: **1 hour**
By Rural Bus: **1 hour 20 minutes**

Concepción — **SMT**

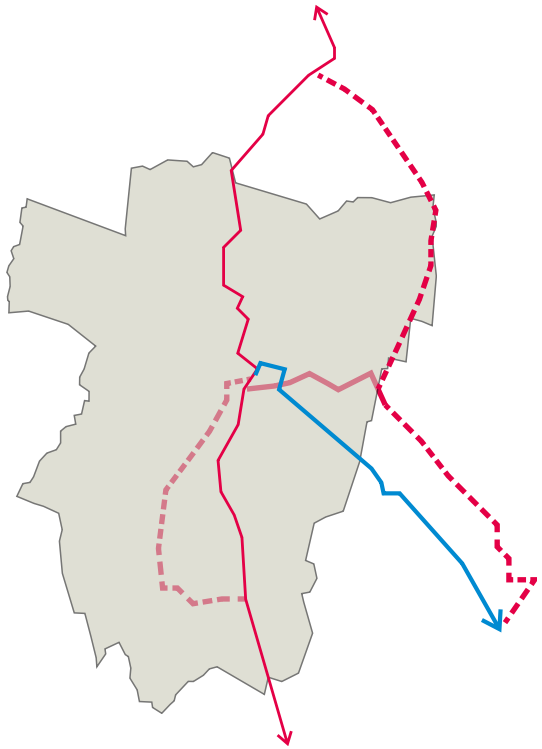
By Car: **1 hour 10 minutes**
By Rural Bus: **2 hours**

Alberdi — **SMT**

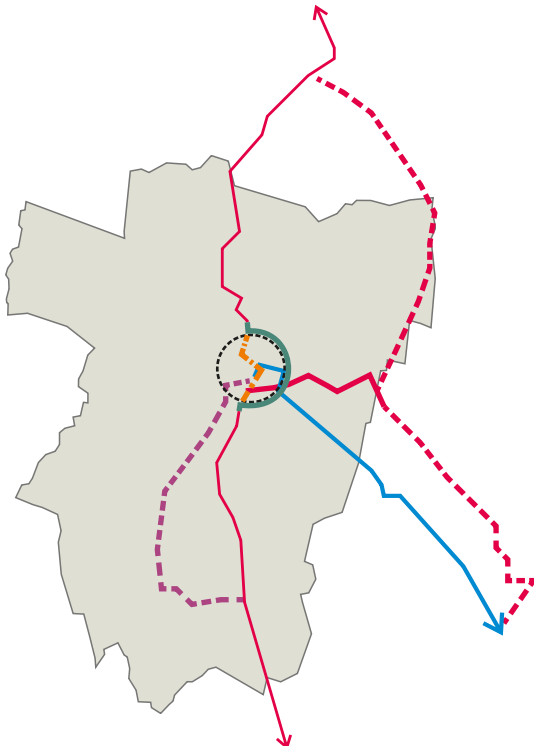
By Car: **1 hour 20 minutes**
By Rural Bus: **2 hours**

SMT: San Miguel de Tucumán
(the province's primary urban core)

Railway Recovery Project



Active branch lines - General Belgrano Line (Freight Rail)
National Long-Distance Passenger Service
Disused branch lines from General Belgrano line
(Aligned with historically productive cities)



Active branch lines - General Belgrano Line (Freight Rail)
National Long-Distance Passenger Service

New Provincial Line - Adaptive reuse of disused layouts:
Reactivating abandoned tracks to establish a brand-new regional transit line.
Functional freight rail bypass
Repurposing the urban Belgrano Cargas layout

2. METROPOLITAN SCALE

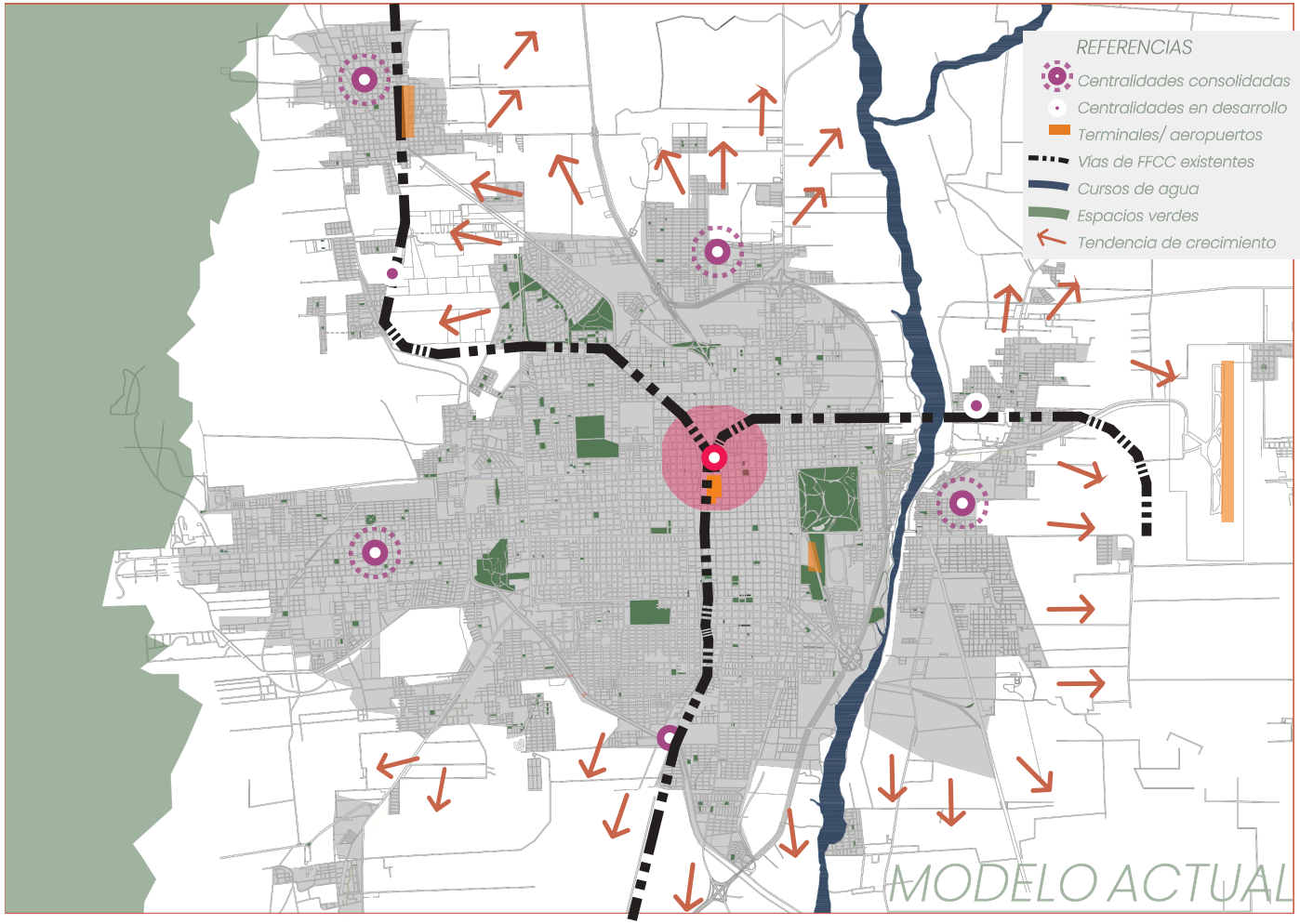
Metropolitan Mobility Analysis (AMeT)

The Tucumán Metropolitan Area operates under a markedly radial and centralized connectivity model, where the primary mobility flows originating from peripheral municipalities—such as Tafí Viejo, Yerba Buena, Las Talitas, El Manantial, San Pablo, and Banda del Río Salí—converge directly into the micro-center of San Miguel de Tucumán.

Access to this condensed urban core is limited to a public bus transit system characterized by obsolete, exclusive, and inefficient services, or to private vehicles, taxis, and motorcycles.

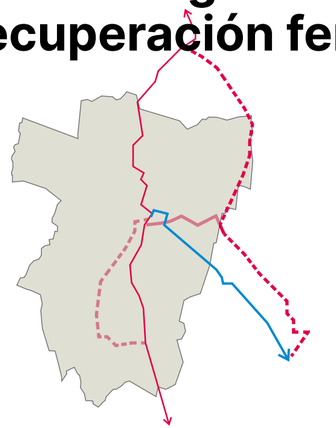
This unbalanced modal dependency triggers extreme vehicular saturation, while severely impacting the quality of life and time management of those who lack access to private transport.

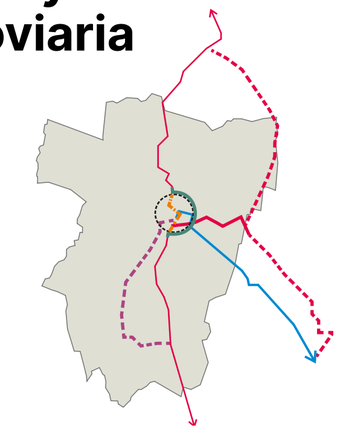
The structural complexity of the metropolitan area is further compounded by the persistence of historical railway layouts within its interior. Suffering from a lack of maintenance and operating exclusively for freight transport, these lines generate severe traffic conflicts and deep fractures within the urban dynamic



Concurrently, territorial analysis reveals a pronounced deficit of green spaces relative to the surface area of densely populated urban land. Mapping the region clearly exposes aggressive outward expansion trends, which coexist with fully consolidated urban nodes. Because accessing these peripheral sub-centers via public transit is significantly more difficult than reaching the core of SMT, they represent a key scenario to be unlocked and strengthened through strategic intervention.

Escala Regional: Proyecto de recuperación ferroviaria

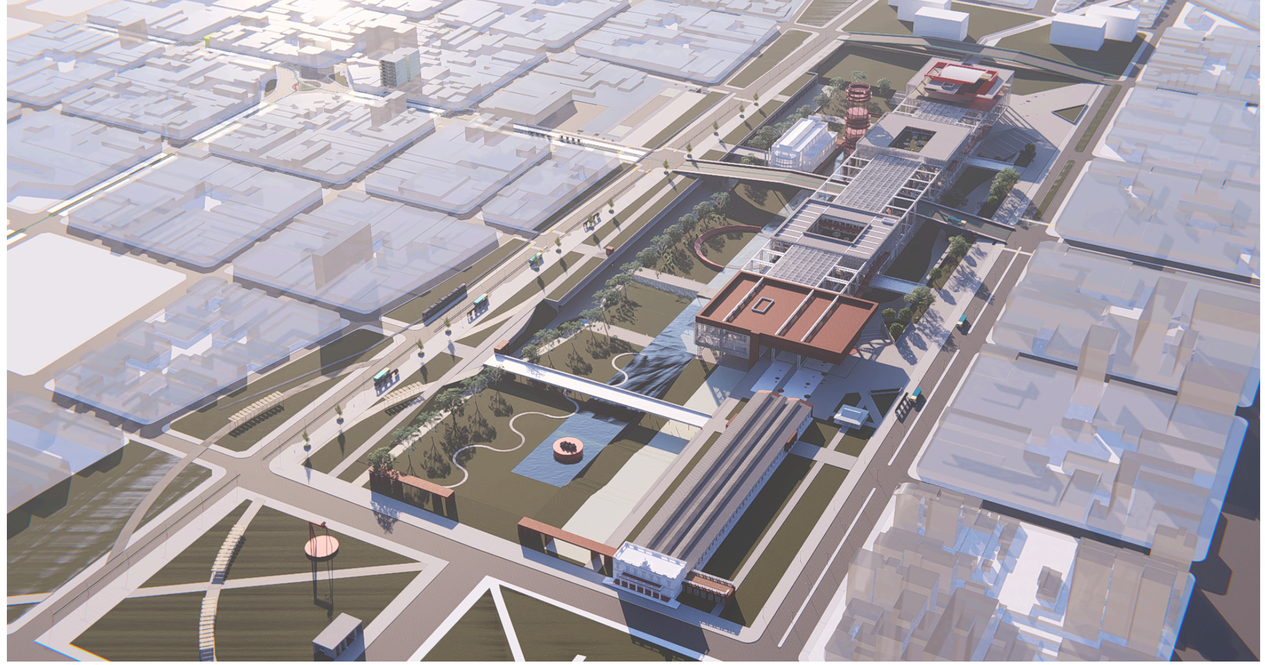




RAMALES EN USO LINEA GRAL. BELGRANO (TREN DE CARGAS)
RAMALES EN DESUSO LINEA GRAL. BELGRANO
RAMAL SERVICIO NACIONAL DE PASAJEROS DE LARGA DISTANCIA

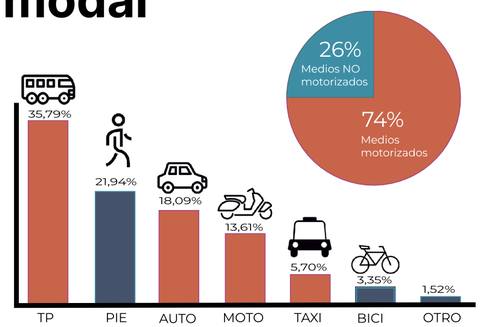
RAMALES EN USO LINEA GRAL. BELGRANO (TREN DE CARGAS)
RAMAL SERVICIO NACIONAL DE PASAJEROS DE LARGA DISTANCIA

NUEVA LINEA PROVINCIAL- RE-UTILIZACIÓN DE TRAZADO EN DESUSO
DESVÍO FUNCIONAL DE RECORRIDO DE TREN CARGUERO
RE-FUNCIONALIZAR EL TRAZADO BELGRANO= CARÁCTER METROPOLITANO.



Escala Metropolitana: Proyecto de conectividad intermodal







Potenciar la interconexión entre centralidades.



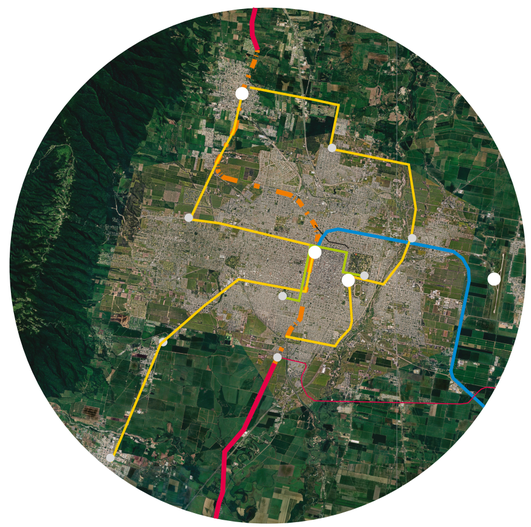
Proyección de nodos intercambiadores multimodales.



Utilizar la infraestructura de transporte actual y conectarla.



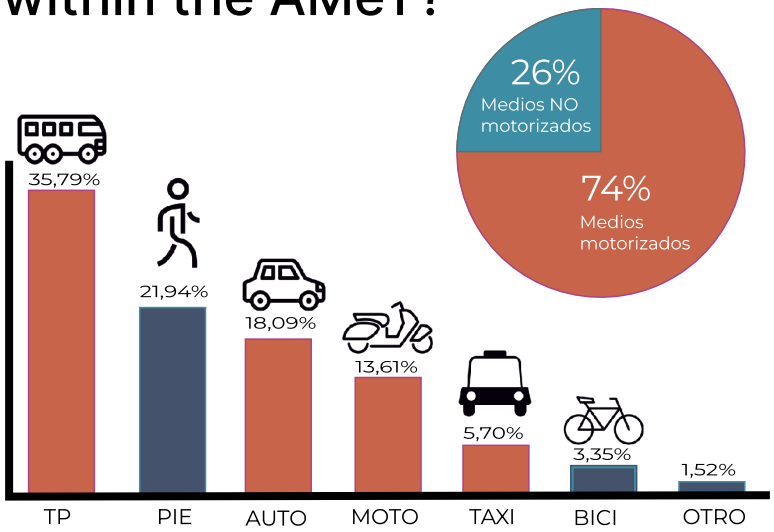
Conectar las instituciones universitarias.





Connectivity Matrix

How do people commute within the AMeT?



Public passenger transit is the most widely used mode of transportation for the population moving across the metropolitan area.

The second most prevalent mode is pedestrian travel (accounting strictly for trips exceeding 400 meters, which implies that a significant portion of daily proximity-based trips is excluded from the data), followed by private automobiles in third place.

Furthermore, this analysis is intersected by gender inequalities regarding access to private vehicles. This disparity reveals that the primary dynamics of movement —public transit and walking—are predominantly utilized by women and social minorities.

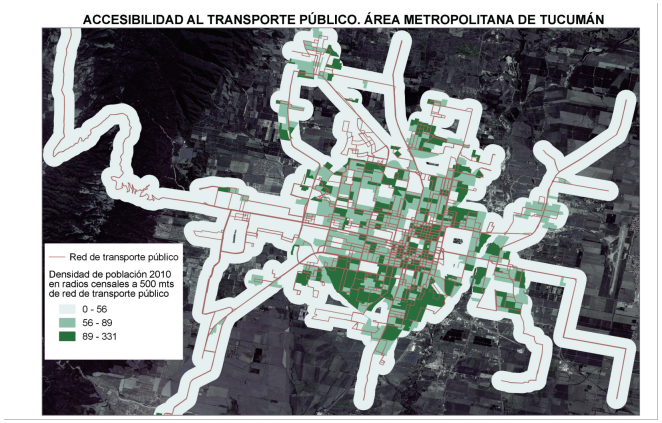
Why do people commute within the AMeT?



The vast majority of trips are motivated by education and employment, and to a lesser extent, by shopping, social life, and leisure activities.

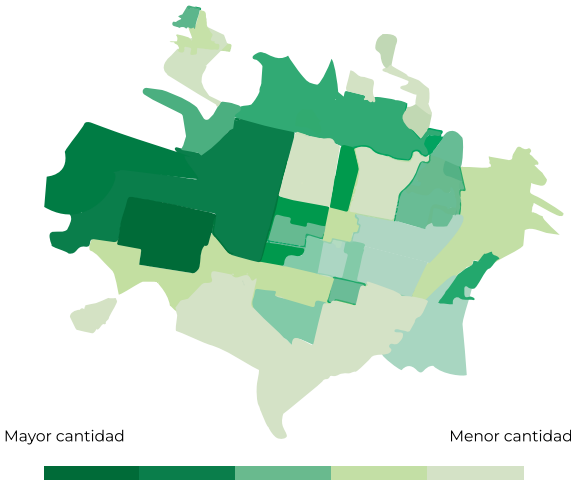
Paradoxically, the lower-income sectors are those who commute most frequently to the city center for daily shopping. Due to their economic inability to purchase goods with future projections, they rely on a day-to-day economy, making these mandatory daily trips primarily on foot or via public transit.

Connectivity Matrix



Public Transit Accessibility within the AMeT

It reaches 89.9% of the population, yet exhibits severe connectivity deficits toward the EAST. Although the network technically covers the territory, commuting demands multiple transfers, resulting in excessive travel times and high financial costs.



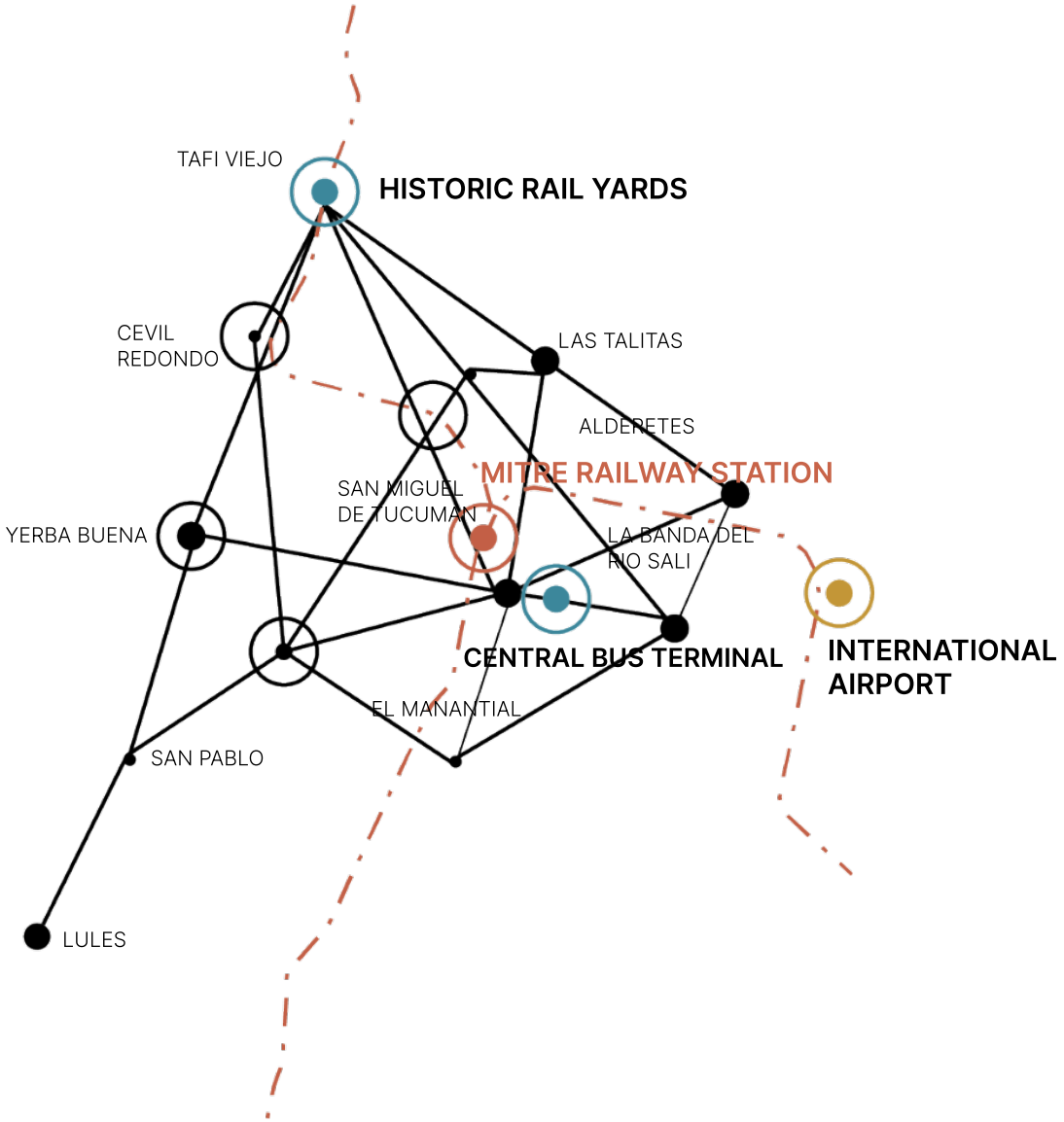
Vehicle Ownership per Household

There is a higher concentration of automobiles in the WEST, where the highest-income sector is localized. There is 1 vehicle for every 13 people, and the average vehicle ownership rate per household stands at 0.32.

THE NETWORK DOES NOT FUNCTION AS AN INTEGRATED OR GRID-BASED SYSTEM; INSTEAD, TRANSIT ROUTES ARE DICTATED BY CORPORATE PROFITABILITY RATHER THAN SOCIAL NEED.

OVER 70% OF HOUSEHOLDS DO NOT OWN AN AUTOMOBILE, WHEREAS A MERE 4% POSSESS TWO OR MORE VEHICLES.

Intermodal Connectivity Project



Comparative Commute Time Studies:
Travel times were calculated based on distance and average operational speeds.

Tafí Viejo — San Pablo

By Car: 35 min
By Bus: 2h 02min
SUBTE (Metro): 21 min (± 5 min)

Tafí Viejo — UNT

By Car: 26 min
By Bus: 1h 44min
SUBTE (Metro): 14 min (± 5 min)

My primary objective was to conceptualize an integrated transit system wherein the core motivations for travel—education and employment—are multiplied, enhanced, and cross-pollinated. The project operates on the "irreducible minimum" that travel times must inherently favor the user, even when factoring in multi-modal transfers.

"OWNING OUR OWN TIME."

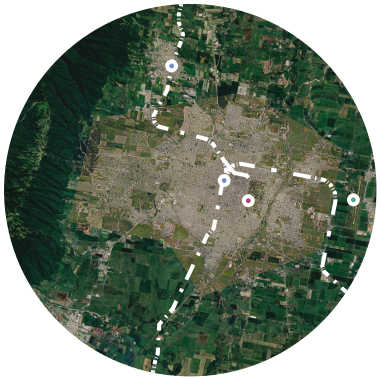
Strategic Intentions for the Current Scenario



Enhancing connectivity between urban centers.



Proposing multimodal transit hubs



Leveraging and interconnecting existing infrastructure.



Linking university campuses and institutions.

Intermodal Mobility System

BACKBONE NETWORK

The network is composed of three distinct railway systems operating at different territorial scales:

1. National Passenger Rail
2. High-Speed Metropolitan Metro / Regional Express
3. Historic Tramway

NATIONAL PASSENGER RAIL:

Objective: Preserving and leveraging macro-scale connectivity at the national and regional levels to catalyze and boost tourism.

HIGH-SPEED METROPOLITAN METRO

Objective: The proposal performs a strategic "urban stitching" of the newly emerging regional sub-centers. By implementing spaced-out stations (fewer stops), the system covers longer distances at higher operational speeds, allowing passengers to cross the entire AMeT in minimal time.

HISTORIC METROPOLITAN TRAMWAY:

This initiative stems from leveraging the existing infrastructure of the Belgrano Cargas railway, which cuts through the city and presents a unique opportunity to elevate the urban mobility experience.

Reusing and upgrading this alignment—currently perceived as a major urban barrier—would allow it to be transformed into a vital organizing axis serving the entire metropolitan area.

In parallel to the rail corridor, trunk BRT lines (Metrobuses) are projected to complete the network, extending coverage to municipalities and communes that sit outside the railway alignment.

These lines could be developed using exclusive bus lanes or dedicated, transit-only transitways.



FEEDER AND PROXIMITY NETWORKS

FEEDER AND PROXIMITY NETWORKS: BUS RAPID TRANSIT, STANDARD BUSES, BICYCLES, AND PEDESTRIANS.

The trunk lines are fed by a network of BRT systems operating on dedicated lanes and are complemented by local feeder networks. These secondary networks integrate municipal buses, public bike-sharing systems, and secure pedestrian corridors.

The objective is to establish a "proximity landscape", ensuring that every resident within the municipality can access a transit stop or station without traveling long distances, thereby promoting comfortable, sustainable, and accessible daily mobility.



4. MESO-SCALE

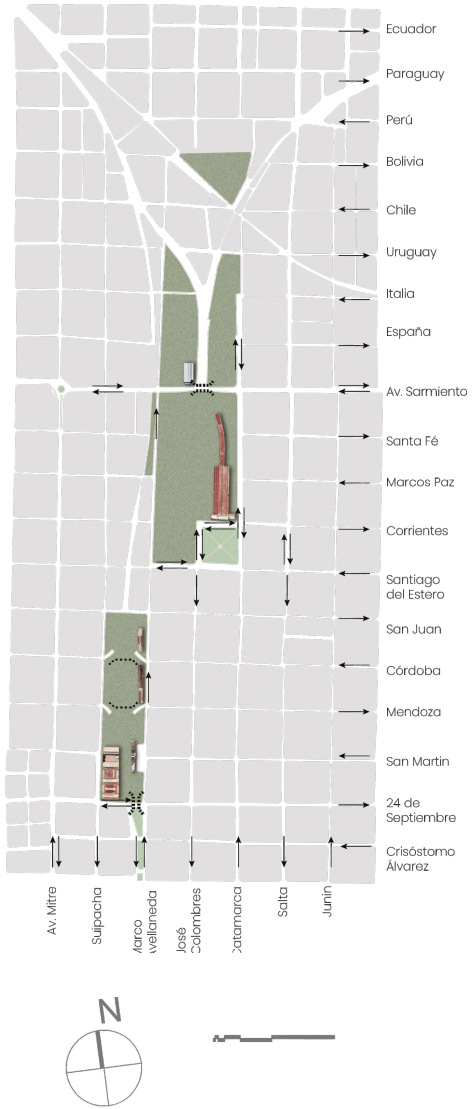
Intervention Area

The intervention area sits at a pivotal urban junction in San Miguel de Tucumán—specifically on the grounds belonging to the Mitre Railway and its strategic intersection with the Belgrano Cargas line.

Historically, this railway enclave has functioned as an **"iron belt,"** heavily constraining the city's morphology and spatial continuity.

The proposal seeks to transform **this infrastructural barrier into a vital urban connector,** seamlessly stitching the fractured fabric through the strategic introduction of high-quality public space.





Adjacent urban landscapes















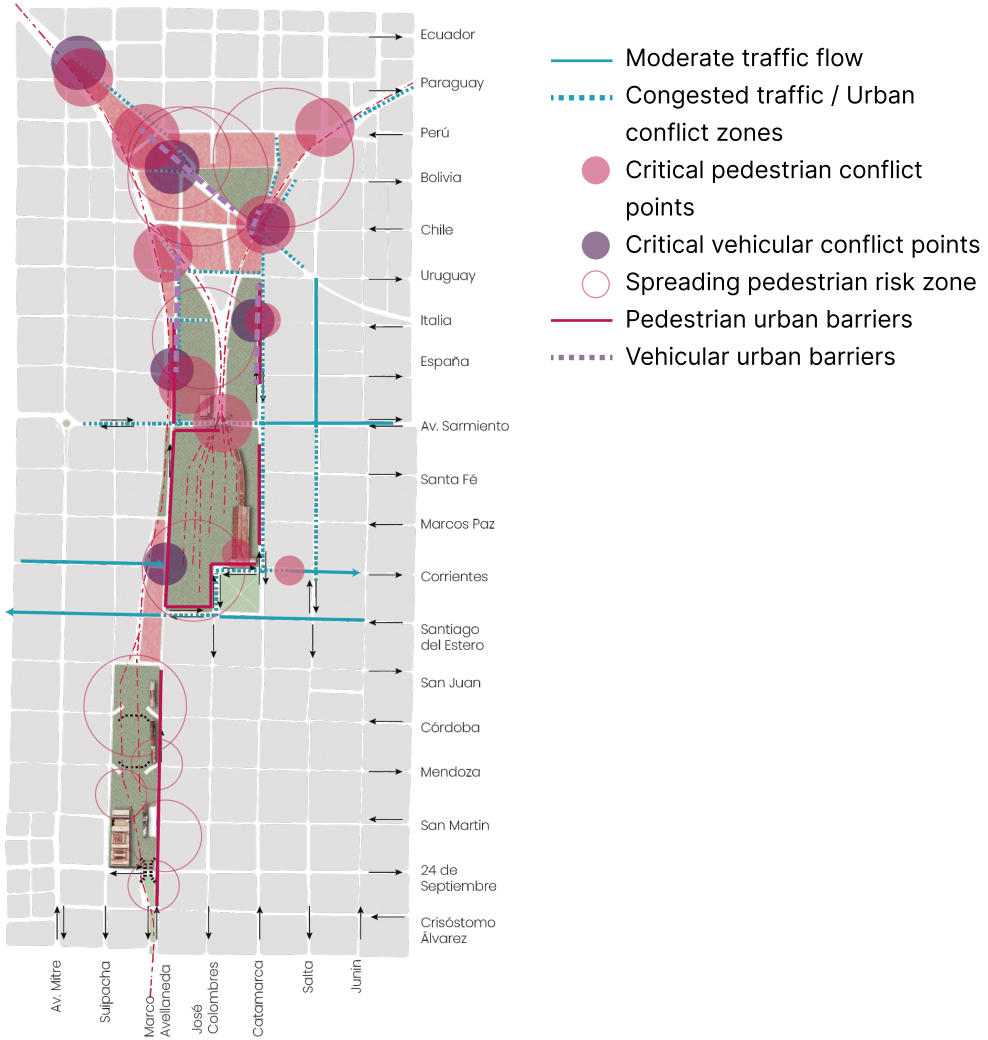


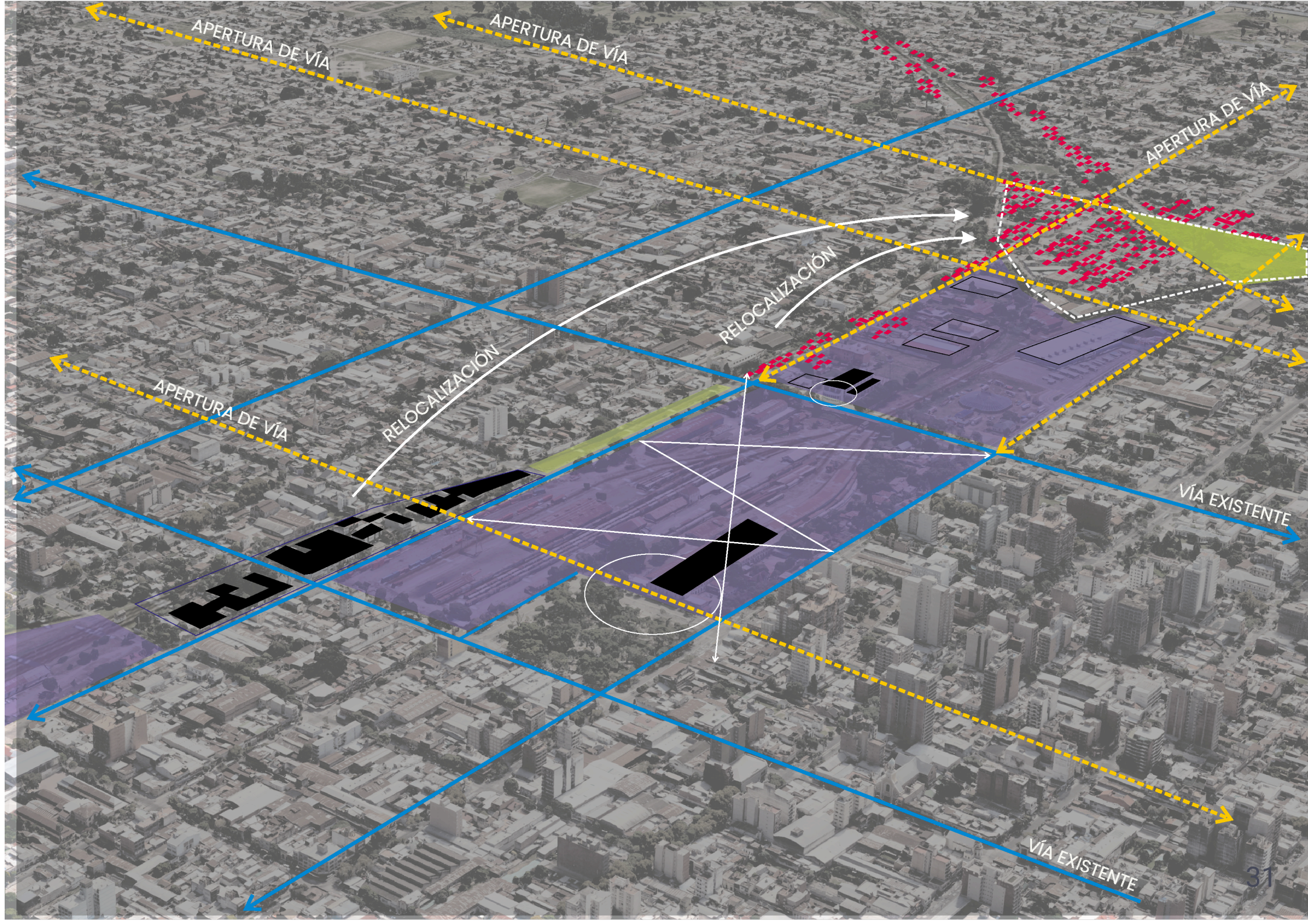
Current situation

Diagnostic

An empirical analysis of the neighborhoods, road layouts, and urban sectors surrounding the railway quadrant reveals the following structural liabilities:

- **Fractured Urban Fabric:** The city grid physically ruptures when encountering extensive urban voids. These vacant lands have become sites for low-quality informal settlements that lack basic structural services and adequate housing conditions, while presenting severe safety hazards due to active freight train operations.
- **Pedestrian Infrastructure Barriers** The inability to safely cross this massive railway territory generates acute spatial segregation. Pedestrians are forced to either walk excessive distances to bypass the perimeter or rely entirely on motorized transit for short-distance proximity trips.
- **The Sarmiento Avenue Bridge Bottleneck:** This critical overpass suffers from severe vehicular congestion while failing to provide a safe, dignified, or accessible environment for pedestrian crossings.
- **Miscalibrated Road Networks:** Local streets are abruptly converted into two-way thoroughfares in an attempt to alleviate local circulation. Paradoxically, this ad-hoc restructuring induces further traffic gridlock and destabilizes the surrounding urban layout.




APERTURA DE VÍA
APERTURA DE VÍA
APERTURA DE VÍA
APERTURA DE VÍA
RELOCALIZACIÓN
RELOCALIZACIÓN
VÍA EXISTENTE
VÍA EXISTENTE

Proposed Scenario

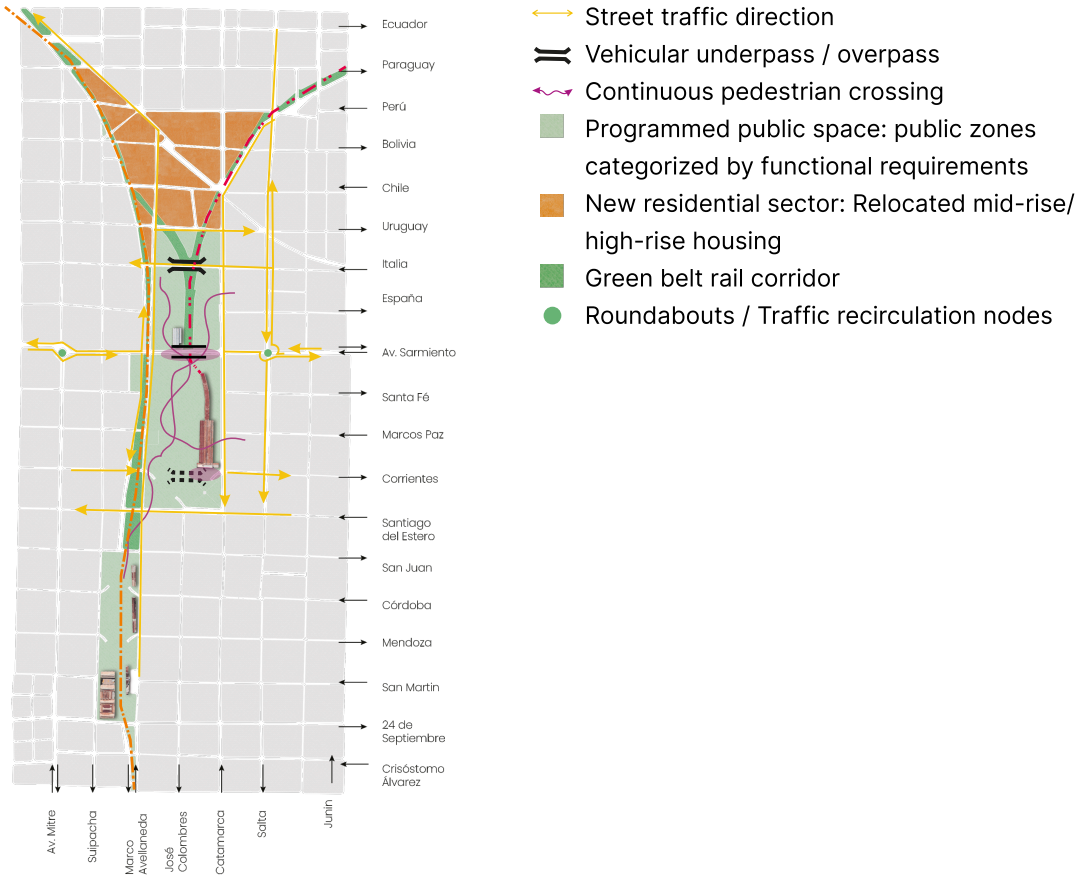
Proposals

- **Site Re-ordering and Urban Connectivity:** The proposal reorganizes the sector by introducing new traffic channels and fluid crossing points across the railway layout, effectively dissolving the existing urban barriers.

- To achieve an **optimized traffic-calming scenario**, the proposal preserves the Sarmiento Avenue bridge while relieving its vehicular volume through the introduction of a roundabout. Vehicles are dynamically rerouted toward a new infrastructure network of underpasses and overpasses (bridges and tunnels) strategically distributed around the multimodal hub.

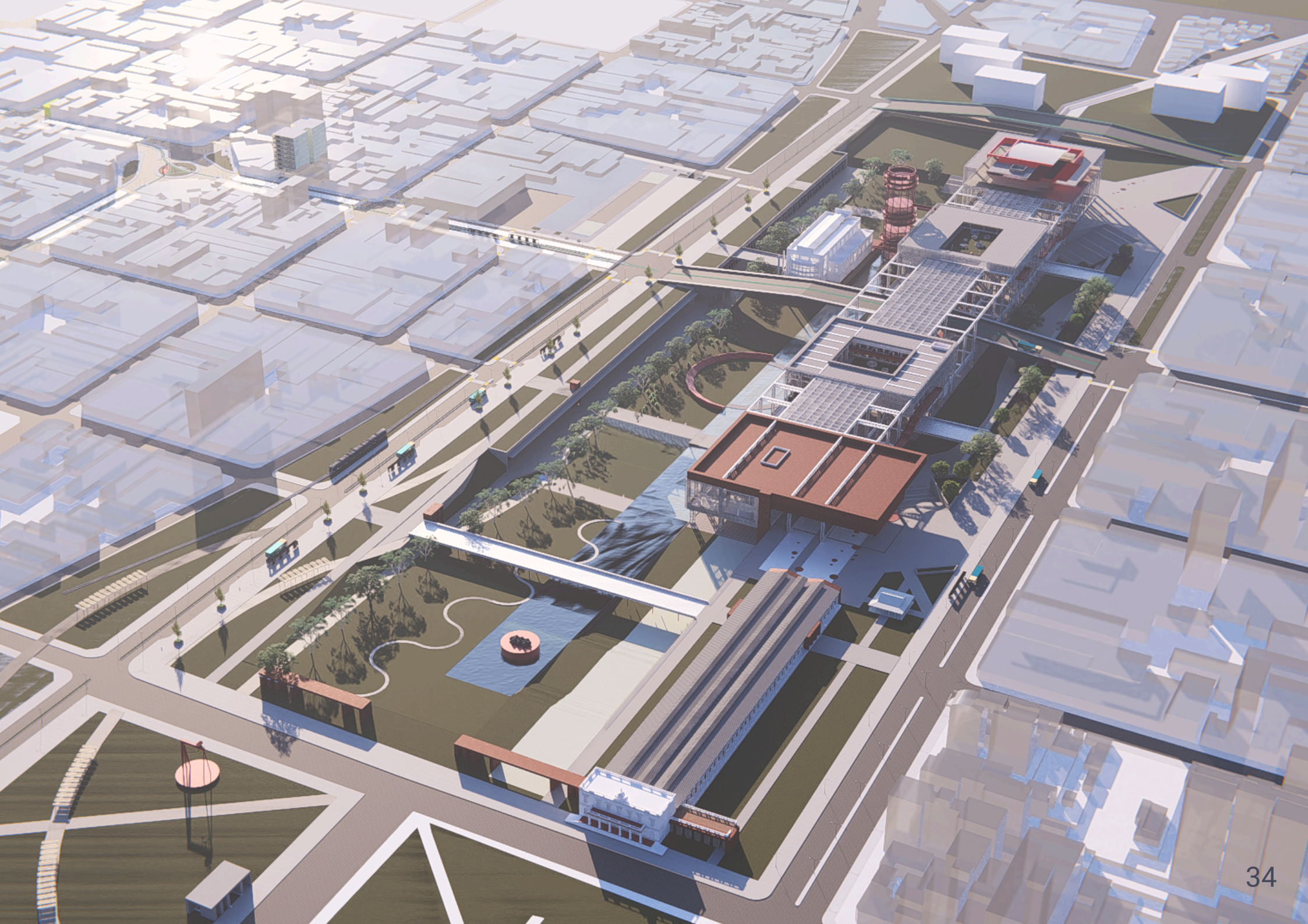
- **Land Use Redefinition:** The project unlocks the territory through the generation of high-potential vacant urban land and the integration of new transit-oriented residential zones.

- **Active Pedestrian Fluidity:** The design fosters continuous pedestrian movement by deploying a programmatic ring of activities around the railway layout, seamlessly guaranteeing neighborhood cross-connectivity.





TPN: Long-Distance Passenger Rail - National
TRAM: Metropolitan Tramway: Adaptive Reuse & Activation of the Belgrano Network
RER: Underground Express Metro / High-Speed Regional Rail
MB 1: Urban BRT 1 - Lomas de Tafí / América Ave. / University Campus (Quinta Agronómica- Faculty of Exact Sciences and design)
MB 2: Urban BRT 2 - Yerba Buena Residential / Maternity Hospital / Downtown
MB 3: Urban BRT 3 - University Campus (Quinta Agronómica- Faculty of Exact Sciences and design) / Downtown / University Campus- Faculty of Philosophy and Letters
MB 4: Urban BRT 4 - Las Talitas / Downtown



5. MICRO-SCALE

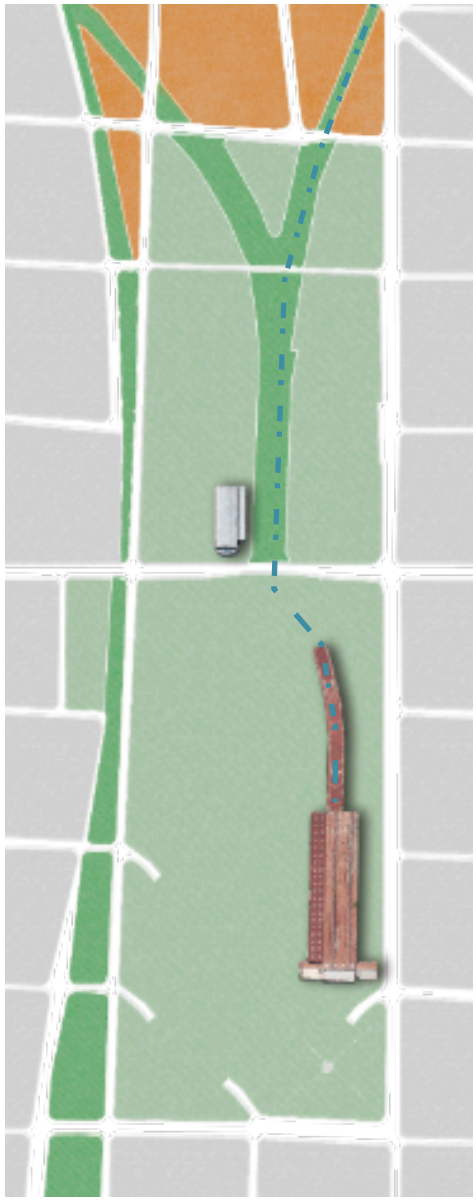
Intervention Area

The project site encompasses the grounds of the Mitre Railway, which currently accommodate the long-distance passenger station, workshop zones, and operational warehouses. Several of these structures hold significant heritage value, such as the historic Power Plant (la Usina), which now serves as the School of Fine Arts of the National University of Tucumán (UNT).

The site contains a substantial amount of underutilized and abandoned land, resulting in urban blight and security concerns. **Furthermore, the area is cut through by the Sarmiento Avenue bridge and fragmented by the dead ends of multiple streets.** These elements transform the railway grounds into a **severe physical barrier** that completely obstructs critical cross-connectivity.







Intermodal Transportation Hub

WHY A HUB AND NOT A STATION?

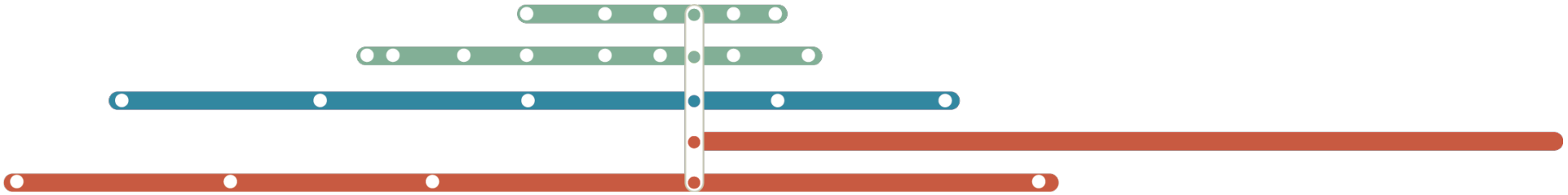
Because a **hub is an active, transformative central node**. It is not merely a place of transit, but an integrative space for civic gathering—a space that bridges mobility with the urban fabric, public spaces, economic activity, and daily life.

Unlike a conventional station, **a hub possesses the capacity to activate, connect, and regenerate its surroundings.** A hub looks outward at its environment and transforms it.

WHAT IS ITS OBJECTIVE?

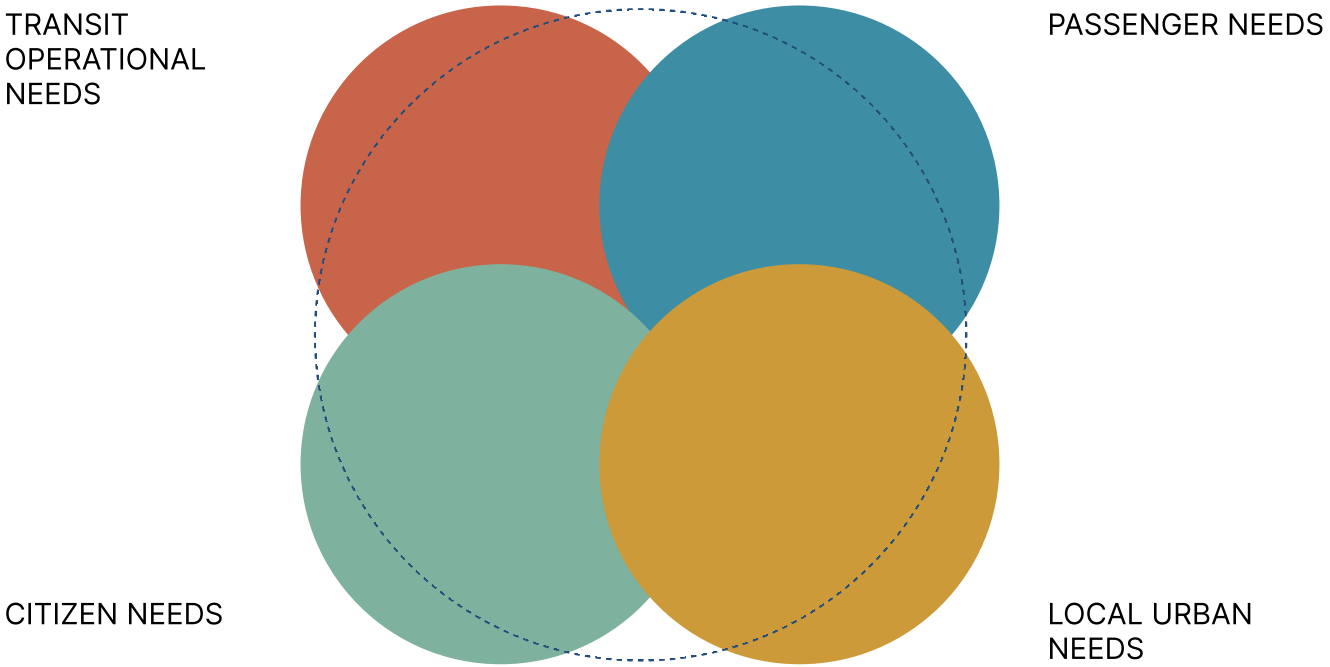
The **primary objective** of the project is **to reconfigure a strategically high-value urban void into an active, accessible, and articulating space.**

It aims to amplify sustainable mobility while elevating the travel experience and its surroundings through a human, playful, inclusive, and innovative perspective.



Relationship Diagram

WHAT ARE THE NEEDS OF THE TERRITORY, THE PROJECT, THE PASSENGERS, AND THE CITIZENS?



Dimensionamiento

Dimensionamiento

NECESIDADES	Cantidad / Unidad	m2 necesarios	TOTAL m2
NECESIDADES DE OPERATIVIDAD			
Llegada de vías férreas: NACIONAL	ACTUAL	4950	4950
Llegada de vías férreas: REGIONAL (TTR) calculo operacional	8000 por franja horaria + personas en espera: 10.000	30.000m2	
TTR anden			
TTR hall de embarque			
Llegada de una línea subterránea de metro REM		500 m2 de andenes	
REM hall de embarque	500 p/2min	800 m2 de hall + circulaciones	
Llegada de 2 líneas de Tranvía	2 paradas	120m2 (60c/u)	
ESTACIONAMIENTOS	1000 plazas	30.000m2	
Área para personal de control de seguridad y tickets		100m2	
MANTENIMIENTO Y ADMINISTRACION			
Taller de reparación provisoria - Andenes para maniobras		2.000 m2	
Espacios de guardado	50m2 por deposito	150 m2	
Sala de reuniones	10-20 personas	2 m2/persona = 40 m2	
Oficinas de administración	15 empleados	6 m2/persona = 90 m2	
Archivo		30m2	
Cocina para personal	10	2 m2/persona = 20 m2	
Baños para personal con vestuario	10	3 m2/persona = 30 m2	2330 m2

NECESIDADES	Cantidad / Unidad	m2 necesarios	TOTAL m2
NECESIDADES DE PASAJEROS			
Áreas de ingreso			
Hall de recibimiento			
Hall de embarque		Según operacion	
Pasillos repartidores		800m2	
Baños públicos	7 módulos para 300/500 personas de 40m2	280 m2	
Áreas de atención al público			
Boleterías / Sala enfermería / urgencias	5 boleterías distribuidas de 10/12 m2	50/60 m2	
Punto de información de la estación	2x15 m2 c/u	30 m2	
Punto de información turística	1	20 m2	
Urgencias	1	30 m2	
AREAS DE COMERCIOS			
Patio de comidas: cafeterías, mesas libres, stands y locales gastronómicos			
Área de entretenimiento			
Coworking / espera Premium		80/100 m2	
Cajero automático		30m2	
Servicio de lockers		50/70 m2	150/200 m2
NECESIDADES URBANAS LOCALES			**4000**
EL POLO ES UN BUEN VECINO: plazas vecinales			
FUNCIÓN COMPLEMENTARIA 1			
FUNCIÓN COMPLEMENTARIA 2			

Design-Driven Urban Demand

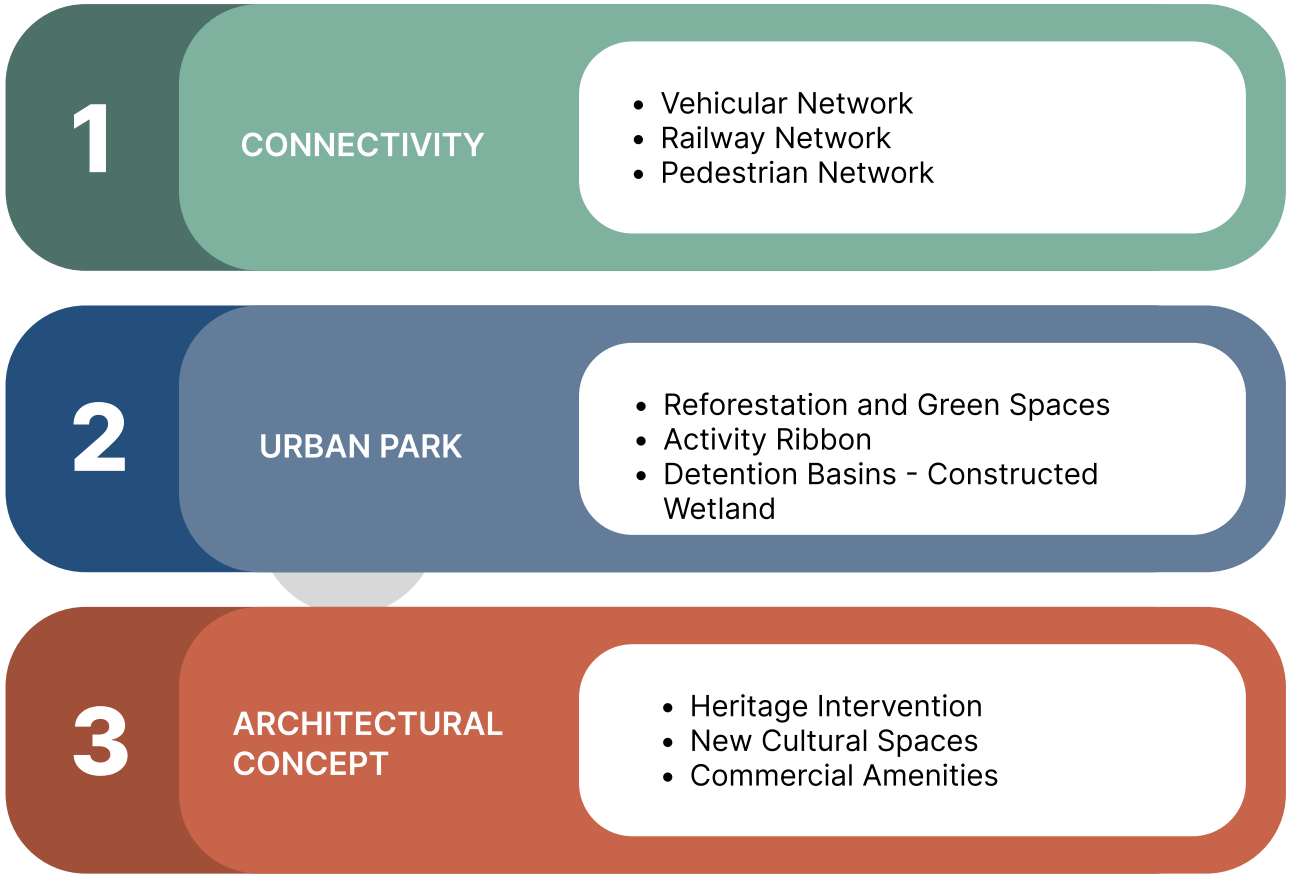
The system

It is addressed through an **integrated system composed of interconnected subsystems**. In this framework, architecture and landscape cease to be isolated entities, transforming instead into a dynamic articulation mechanism.

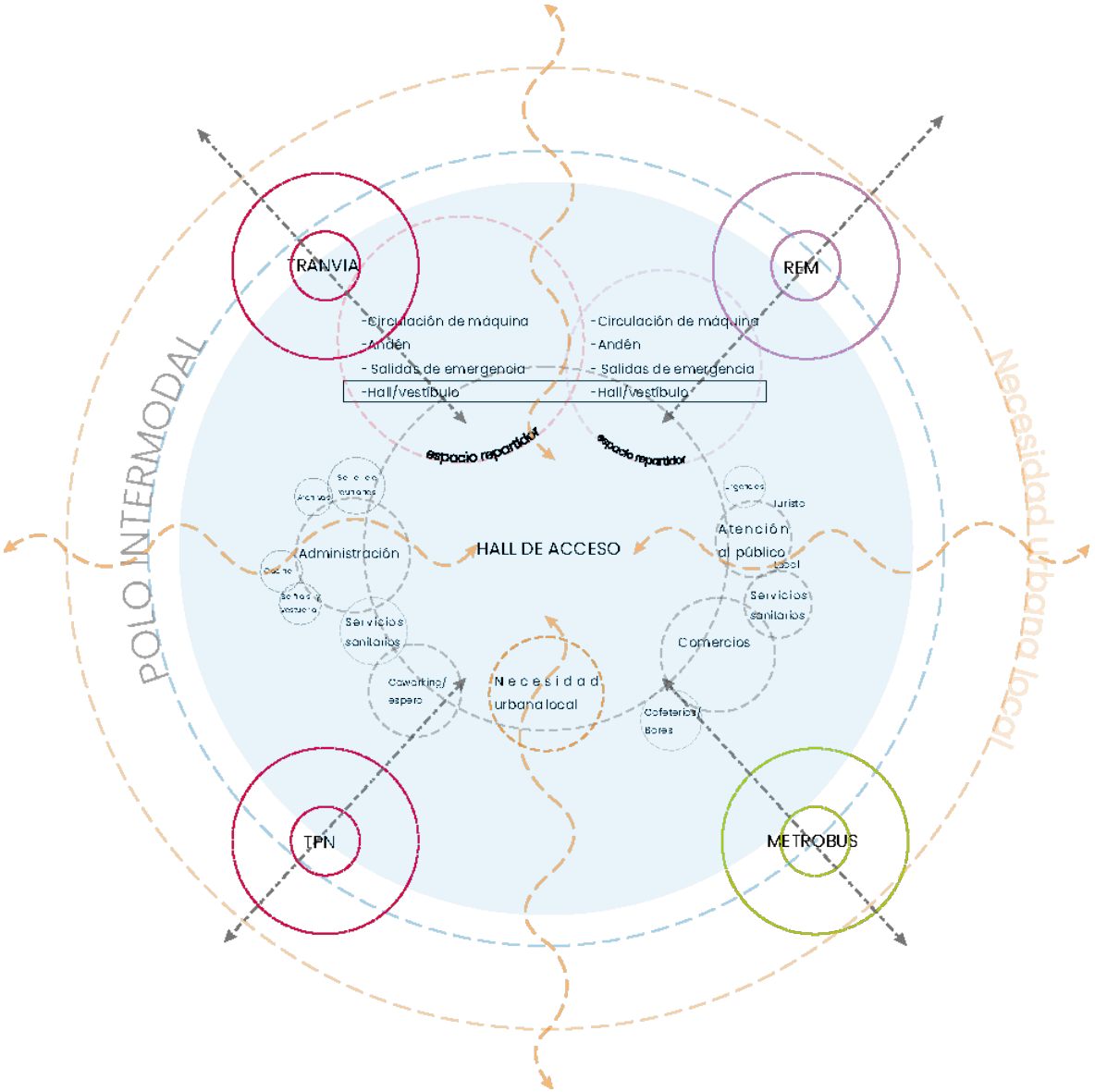
This landscape infrastructure acts as the connective tissue between the consolidated city and new social flows, guaranteeing a fluid transition.

“Architecture is where people meet.”

Subsystem



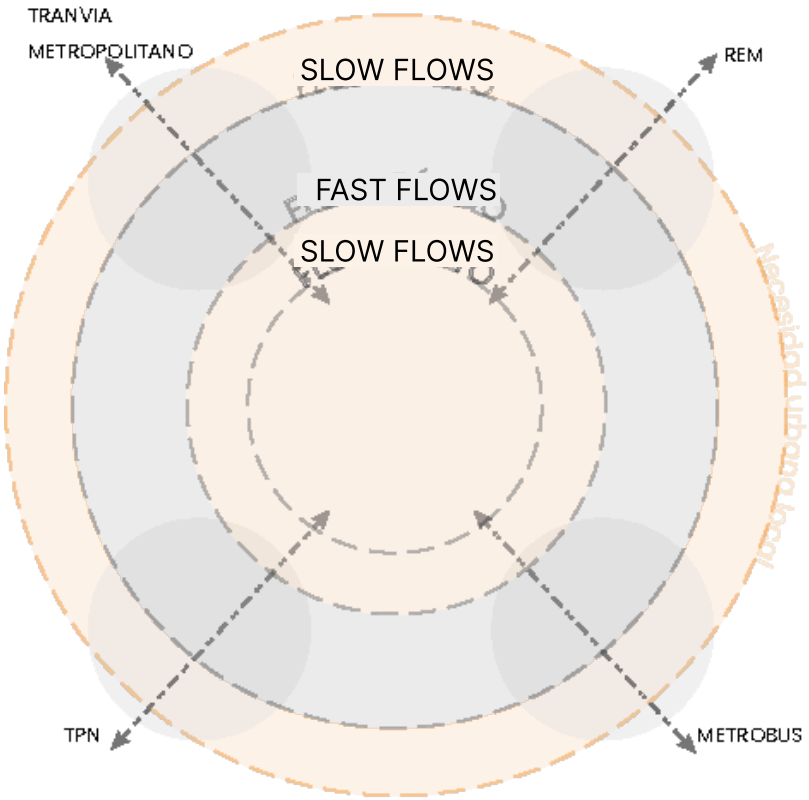
Bubble Diagram

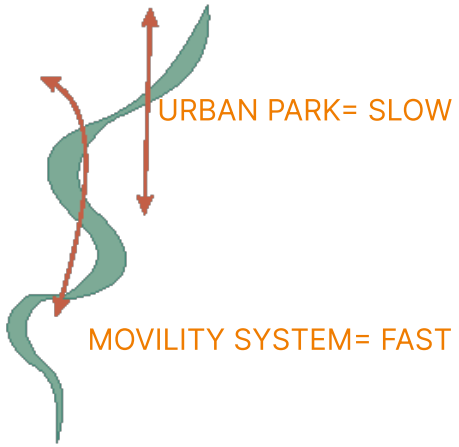


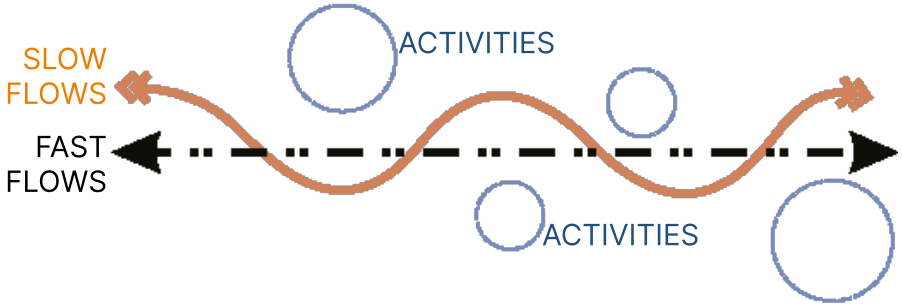
Flow Diagram

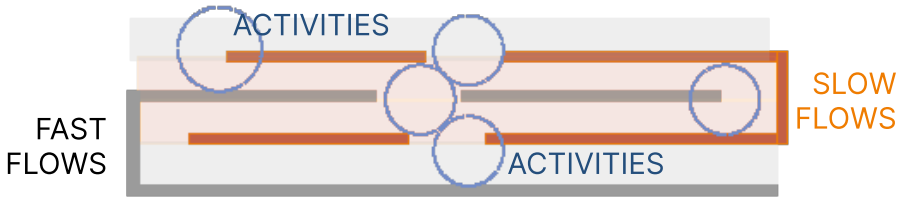
Because this project operates across different scales with diverse mobility objectives, organizing them and studying their relationships required dividing them into two distinct categories:

SLOW FLOWS = SOFT PROGRAMMING = GATHERING AND LEISURE
FAST FLOWS = HARD PROGRAMMING = TRAINS AND TRANSIT









Design Guidelines

The Search for the Non-Existent Archetype

We, the people of Tucumán, deserve a station with a distinct personality—one that champions the idea of transformation and allows us to feel socially and collectively surprised. This is something, moreover, to which we are completely unaccustomed.

Where do our daily interactions take place? In the streets, at roofless stops waiting for the bus, in bars, inside the occasional private shopping mall, or in public squares. But we, as Tucumanos, are not used to having public infrastructure designed for daily social connection.

I therefore encountered a profound challenge: the search for an archetype that, until now, has been completely non-existent in our context. Along with it came something even more challenging: the need for the project to possess an adapted identity. It must not be perceived as an alien space, but as one of invitation and shelter.

A place that brings us together and makes us feel like Tucumanos, regardless of social background. A space capable of embracing our diverse realities, inviting you to stay for a few moments at the end of the day before returning home. A promenade.

Thus, I find that approaching the human scale today is no longer merely a matter of low ceiling heights, but of gestures that evoke the feeling of home.

In that pursuit, I have taken into consideration how deeply important it is for us to find the shade of a tree to share “mates” in the square, or the transitional gallery of our homes to gather with family. It is our inherent need to seek protection from the Tucumán heat outdoors, yet without isolating ourselves from a natural connection—from a sudden gust of cool wind, or from watching the day gently fade away at sunset.



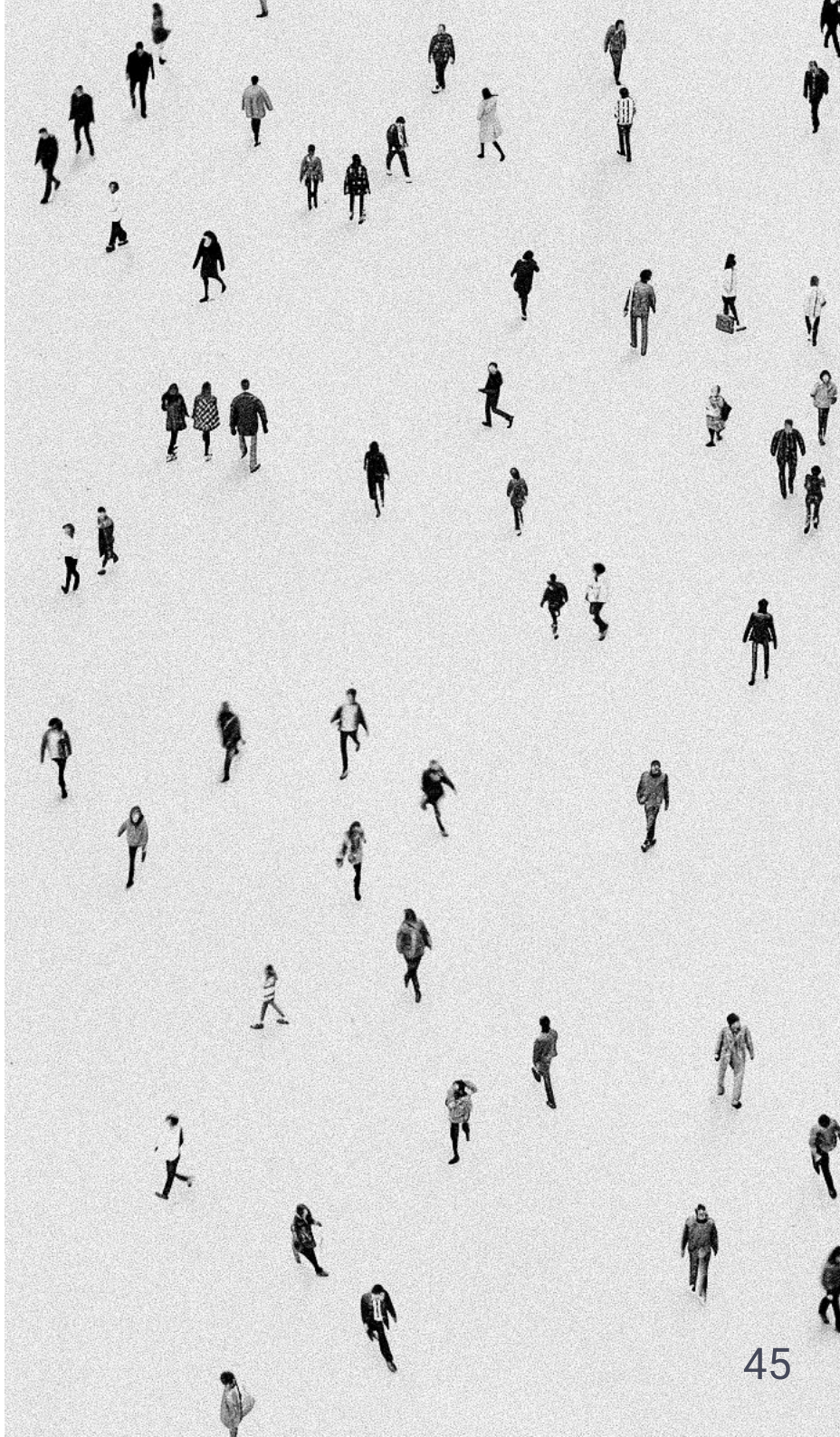



HIPODROMO


MOVIMIENTO

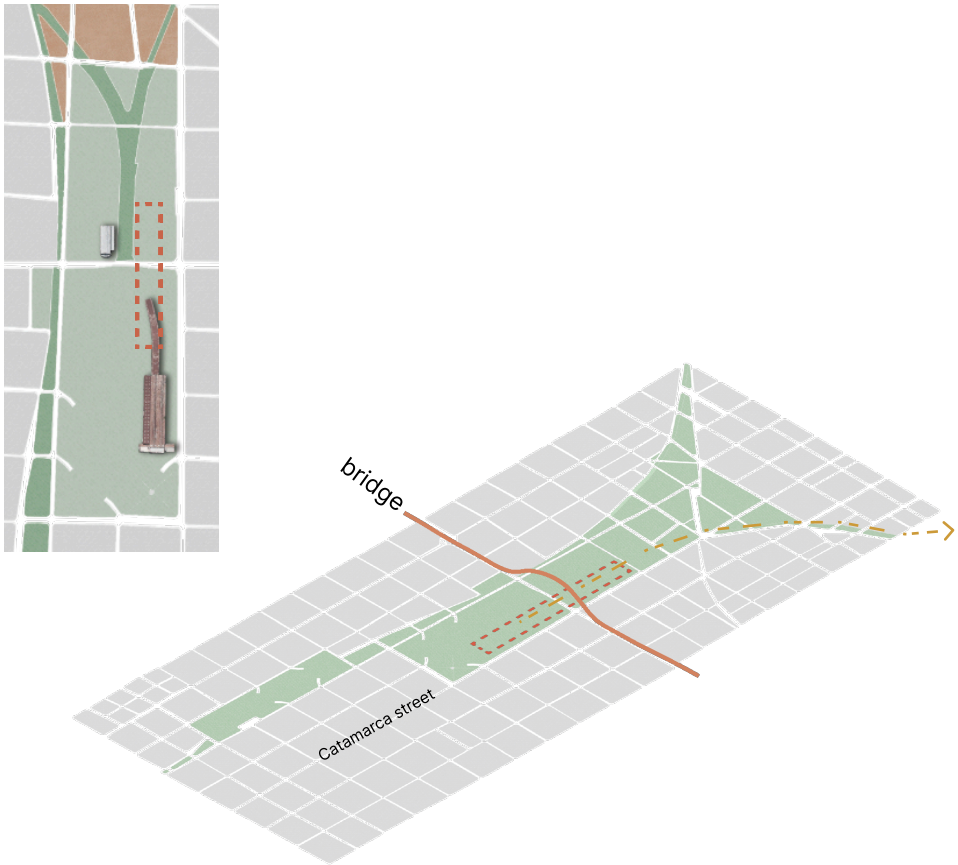
Core Design Imperatives

- GENERATE SHELTERED PUBLIC SPACE
- AN INVITATION TO INHABIT THE STATION—TO LINGER AND BELONG
- TRANSFORM A SPATIAL "BARRIER" INTO A SITE OF SEAMLESS URBAN CONTINUITY
- DEMOCRATIZE PUBLIC SPACE THROUGH ACTIVE, PLAYFUL, AND SENSORY ACTIVATION
- EVOKE THE SPATIAL SENSATION OF BEING SHELTERED BENEATH A CANOPY OF TREES
- DELIVER A MULTI-SCALAR URBAN INFRASTRUCTURE: REACHING METROPOLITAN, REGIONAL, AND NATIONAL DIMENSIONS



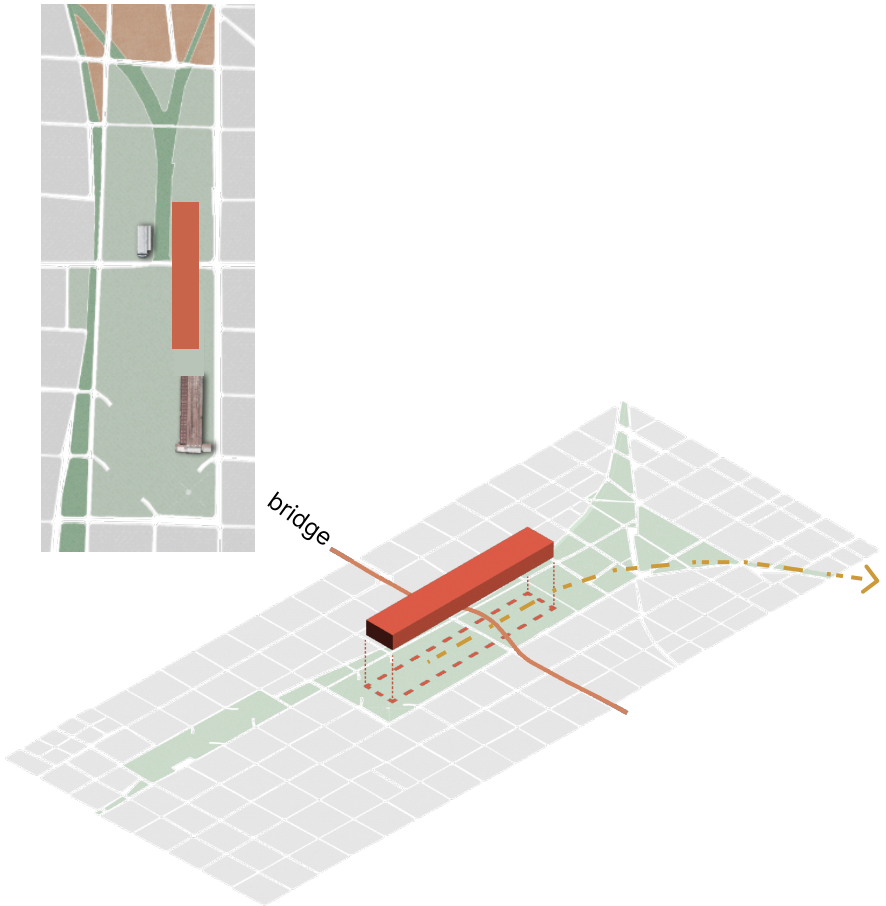
The Design Process

Site Integration



The intervention seeks to guarantee a massive green expanse by positioning the architectural object along the railway tracks. The building settles closer to Catamarca Street, a profile that aligns with the historic station and remains in close proximity to the city center.

Building Typology



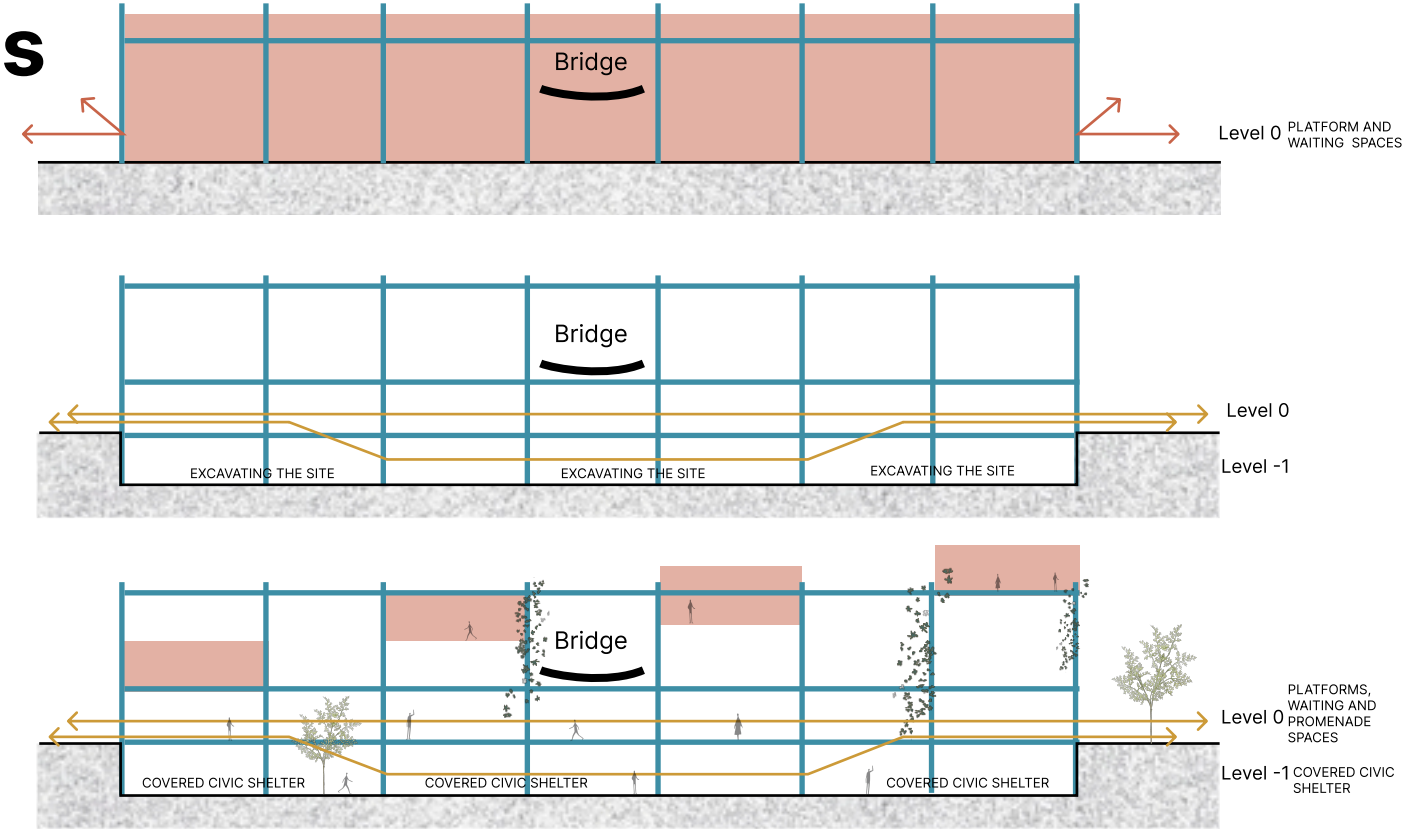
LINEAR BAR Typology. Selected to provide containment to the platforms and to respond directly to the morphology of the site.

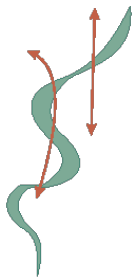
The Design Process

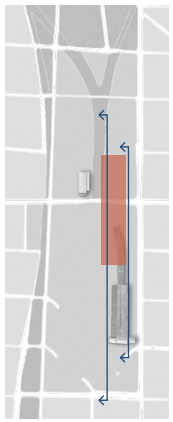
The Theory of the Void

My starting point was to consider how a new train station and its platform structure could stop being a barrier and instead transform into a space open to the city, both visually and functionally. To envision this large-scale infrastructure, studying the 'Theory of the Void' was key.

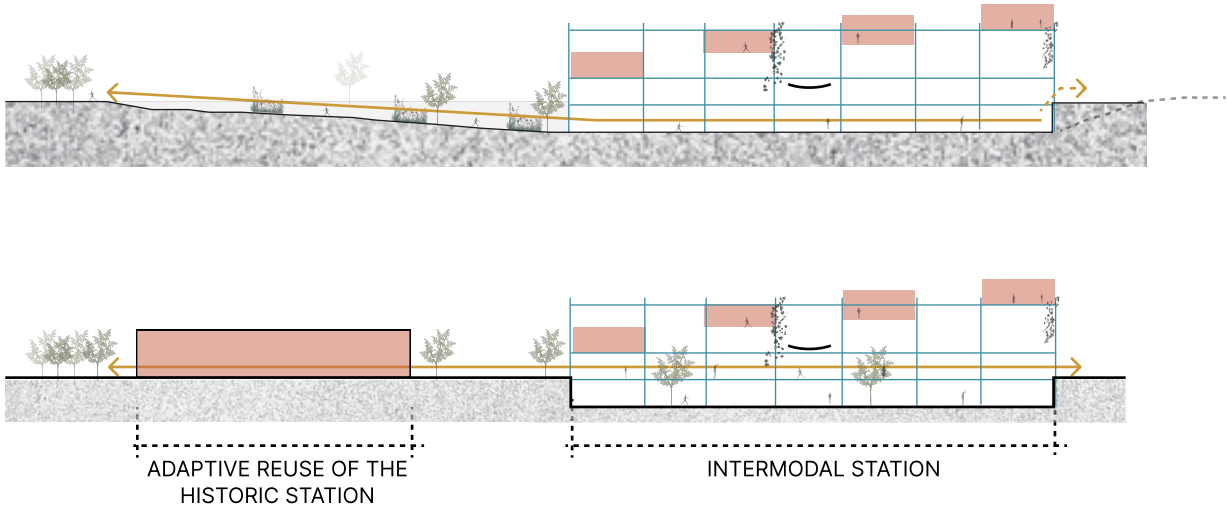
As a result, the initial idea of a compact, linear bar —which also incorporates the Sarmiento Avenue Bridge—was transformed into a large, voided, and flexible structure capable of hosting multiple functions. This shift aligned with my intention to create a gathering point rather than a simple transit place. Under this logic, each void becomes an opportunity for public appropriation, transforming the entire pedestrian pathway alongside the platforms at ground level into true urban plazas within the station itself.



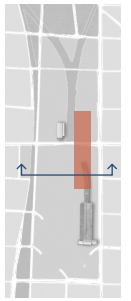




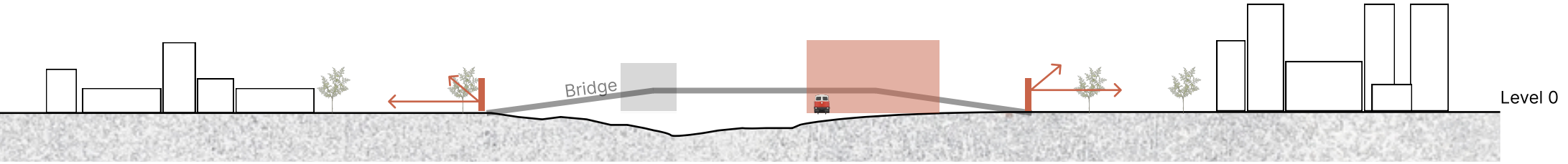
- Solids
- The Spatial Framework of the Void

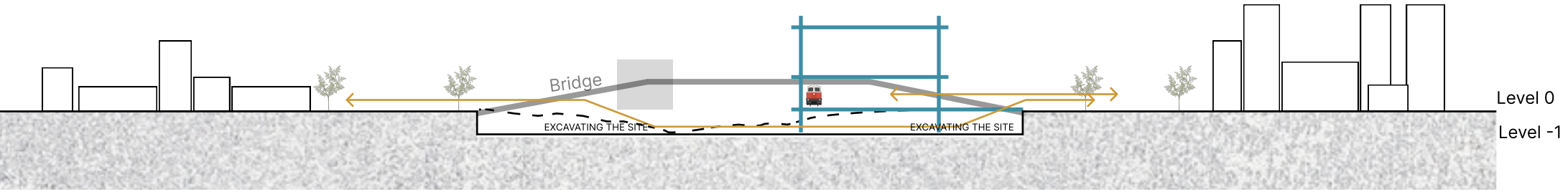


The Design Process The Theory of the Void

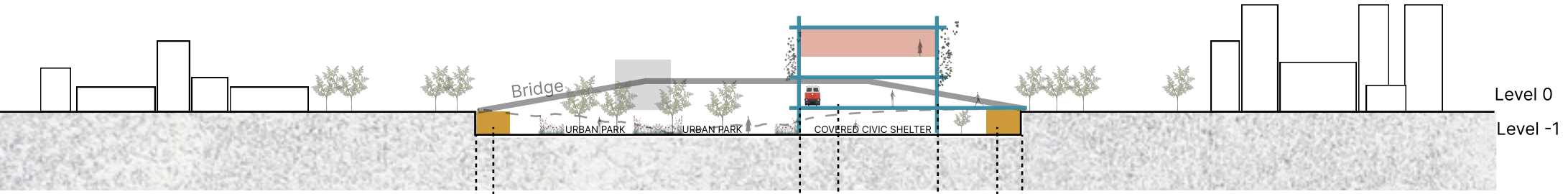


- Solids
- The Spatial Framework of the Void





Topographic leveling at the lowest point





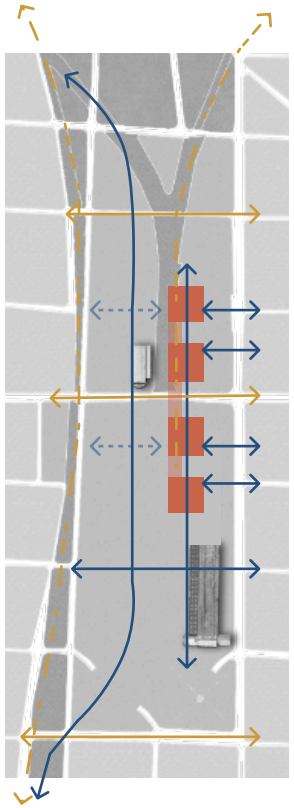
URBAN PARK AND COVERED CIVIC SHELTER

The Design Process

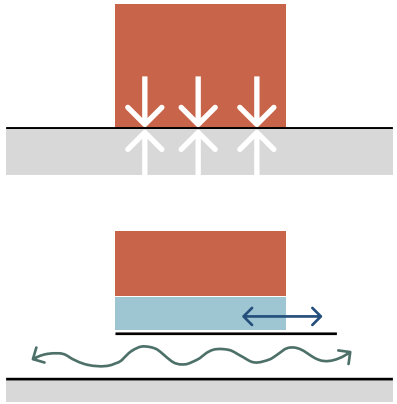
The Theory of the Void

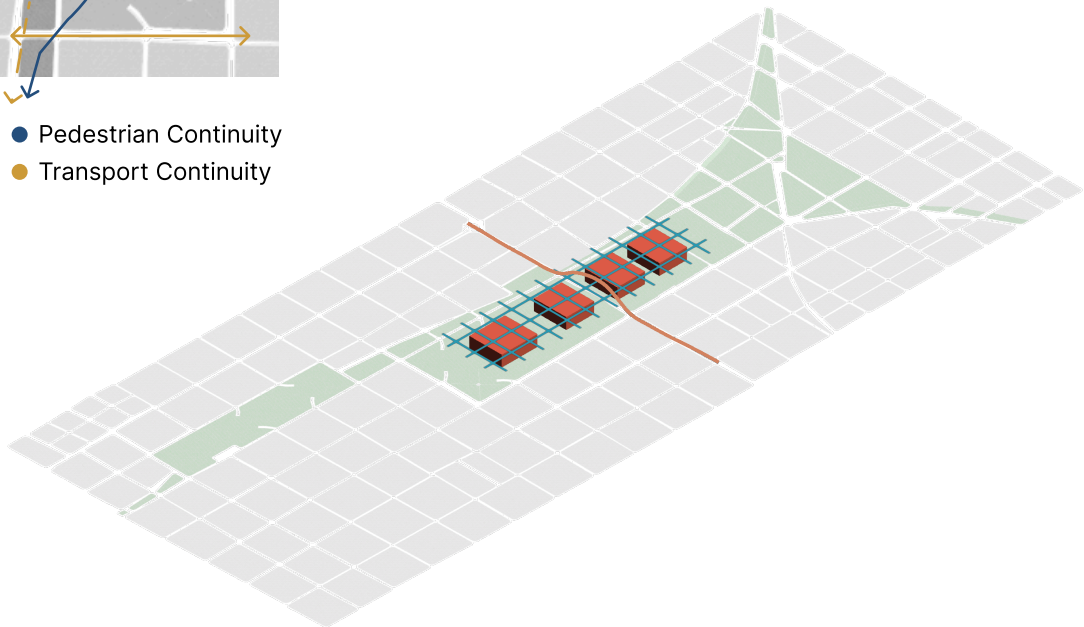
Voids are deployed to "make room"—to offer and unlock new connections for the citizens.

They are the non-spaces through which the bonds and continuity of daily activities occur. This operation is performed on the linear bar along both the vertical and horizontal axes.



- Pedestrian Continuity
- Transport Continuity



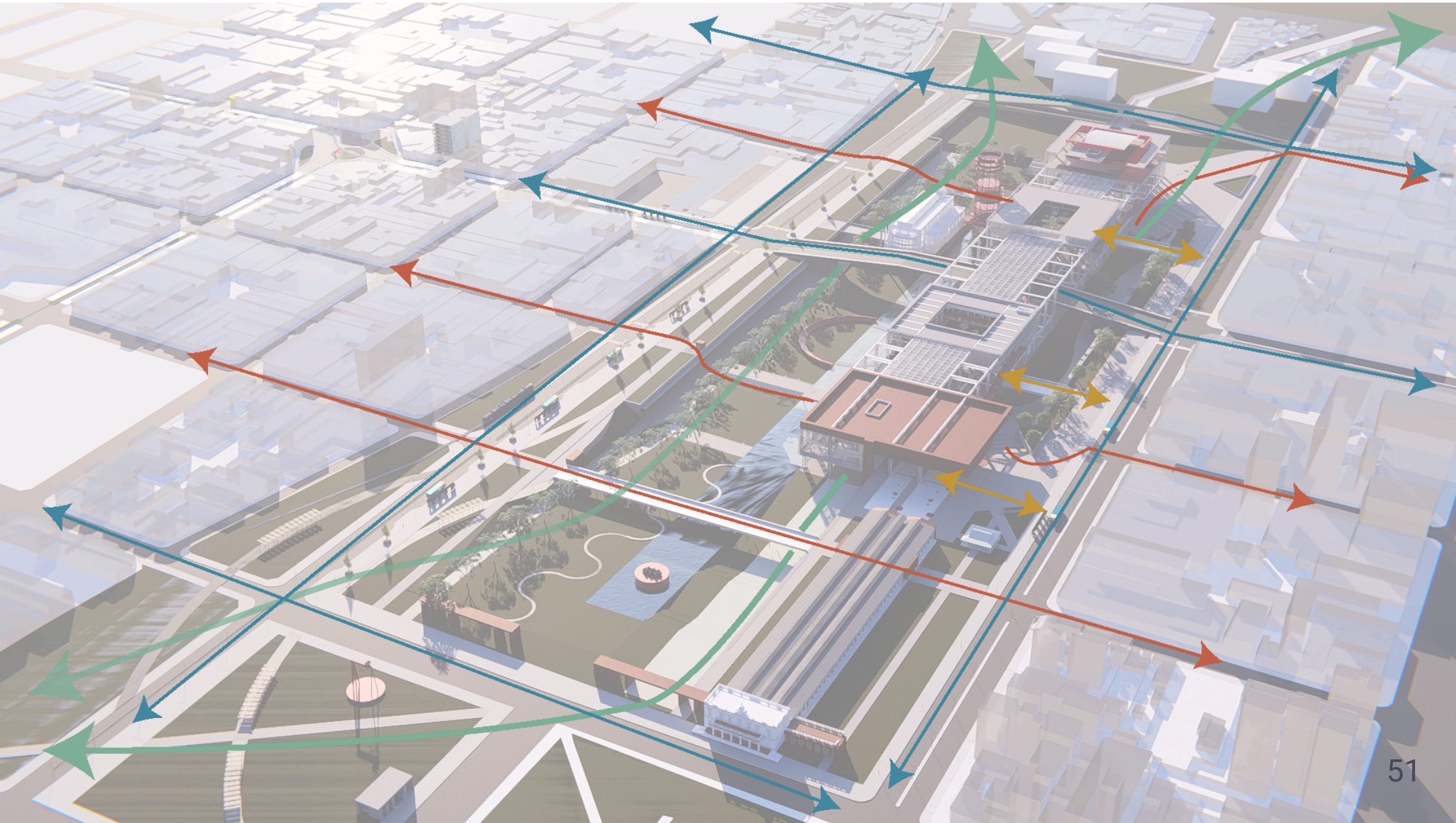


“An abrupt repulsion implies aborting the habitual procedures of design.”

Rem Koolhaas (1995).

Urban Integration

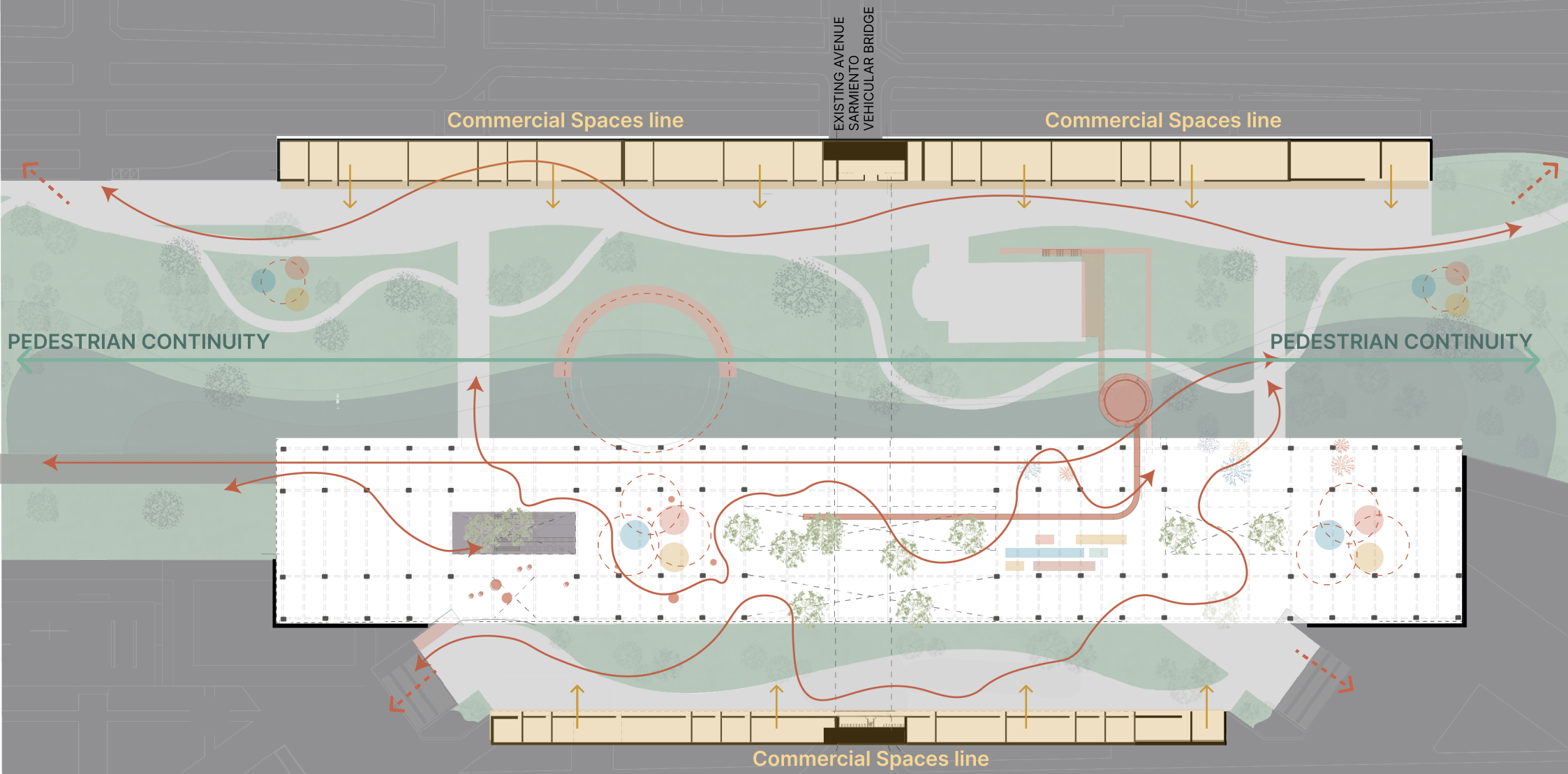
URBAN-PEDESTRIAN LINKAGES
ARCHITECTURAL-PEDESTRIAN LINKAGES
PARK & ACTIVITY LINKAGES
VEHICULAR LINKAGES



Urban Integration

LEVEL -1

STAIRS UP TO LEVEL 0

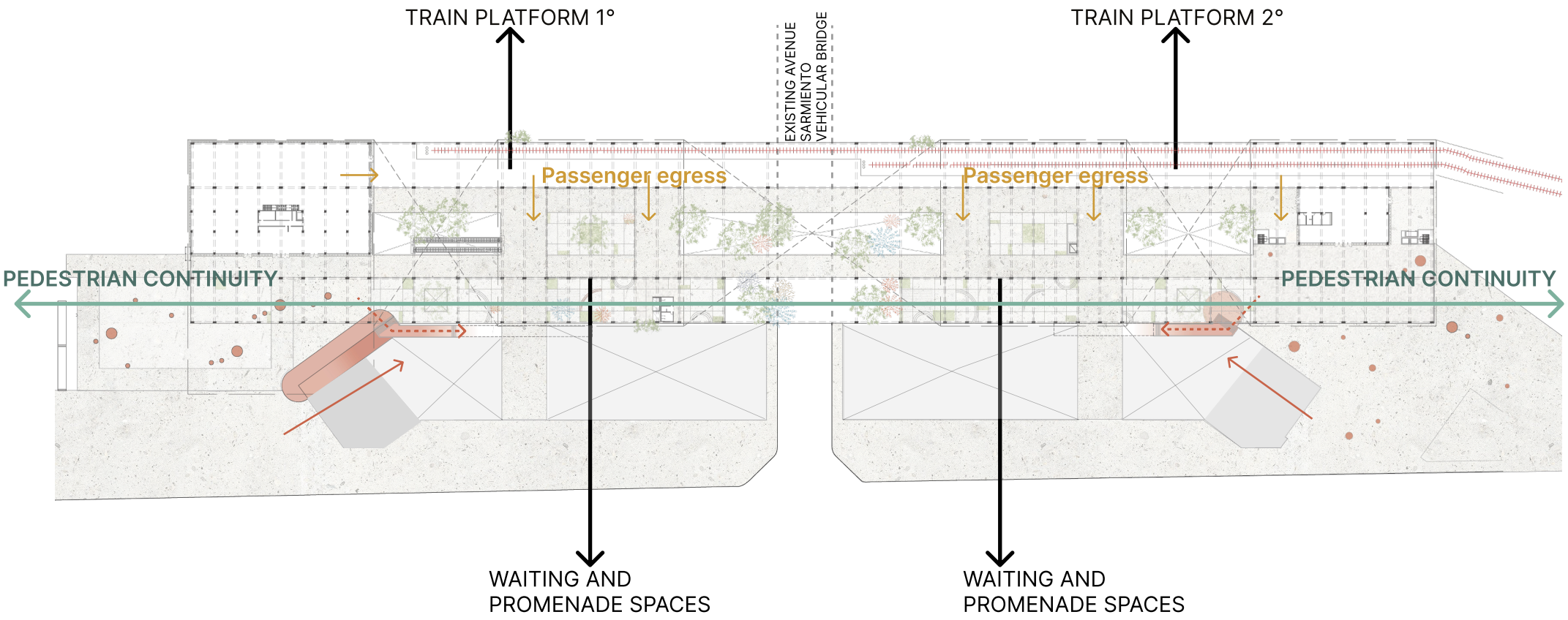


Versatile spaces for indoor and outdoor recreation and movement

Recreational Activities - Continuity between the green park and the covered park

Commercial line to guarantee constant activity in the park

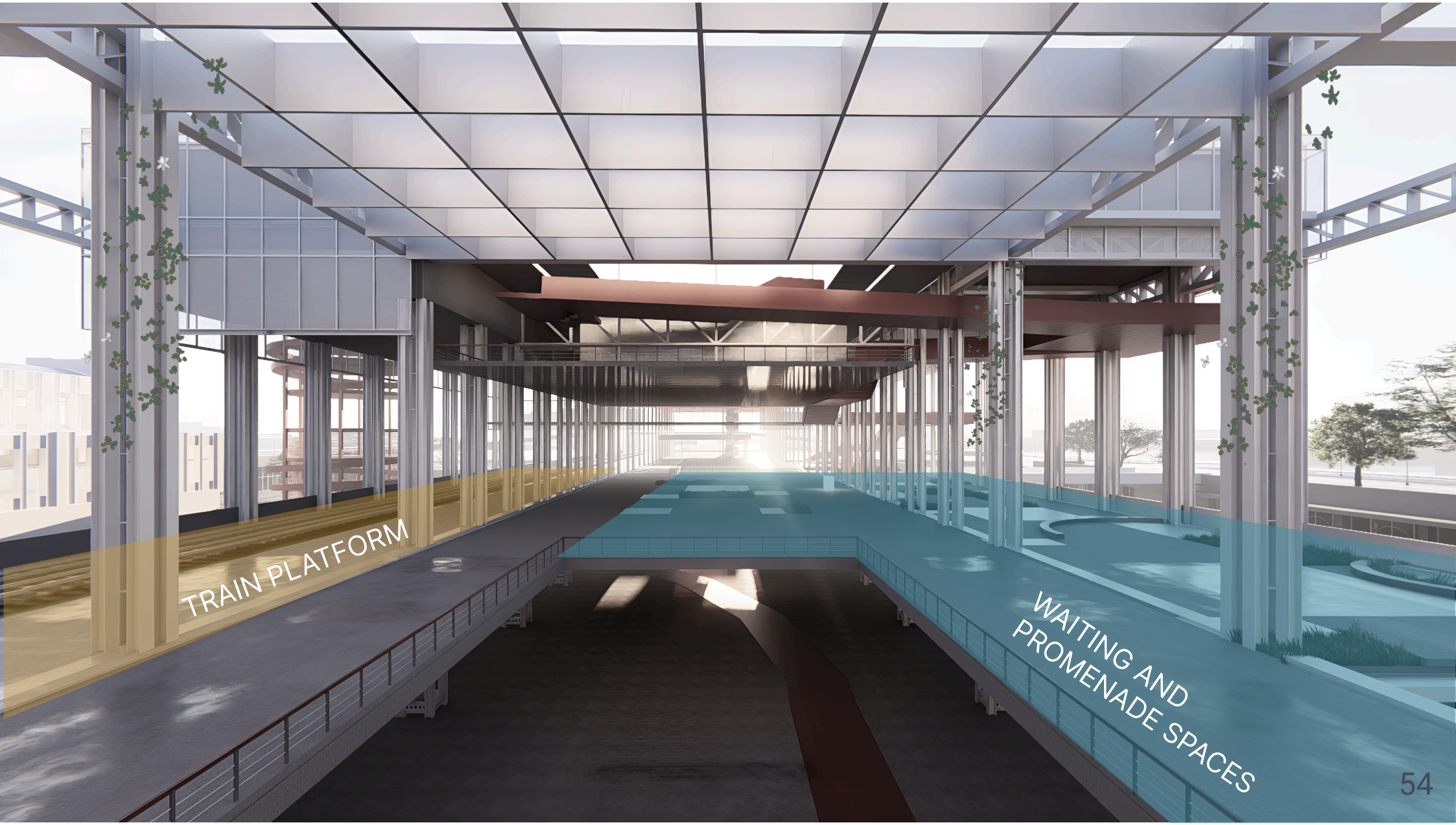
Urban Integration



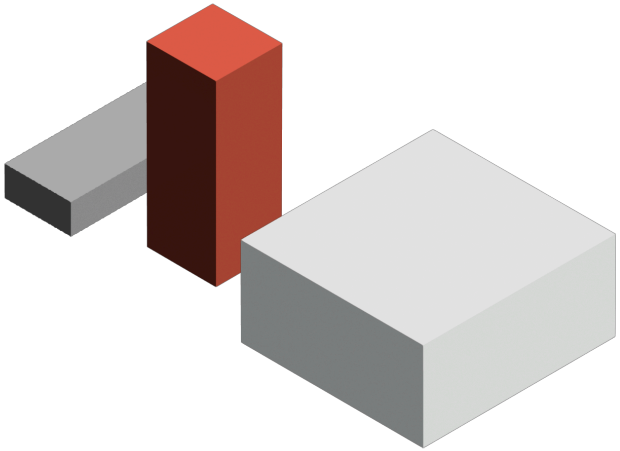
LEVEL 0

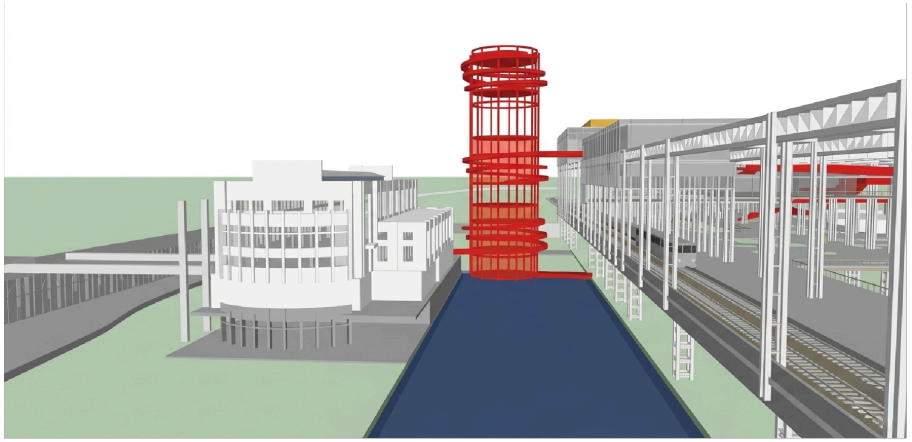
STAIRS DOWN TO URBAN PARK

STAIRS UP TO CULTURAL USES

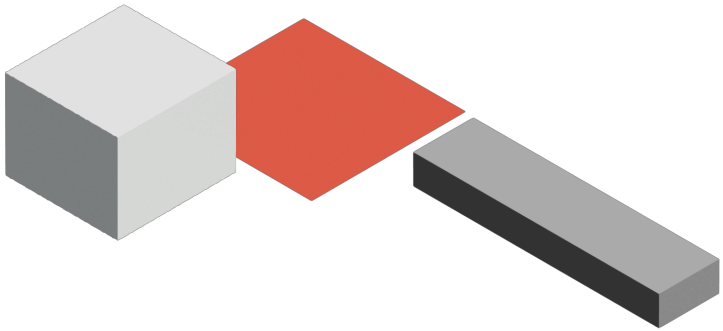

TRAIN PLATFORM
WAITING AND
PROMENADE SPACES

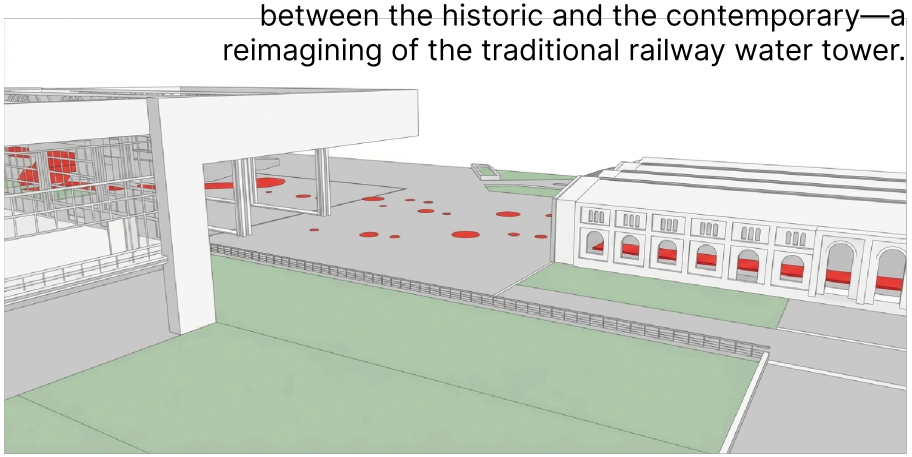
Connection to the Heritage Environment





An articulating vertical element acting as a bridge between the historic and the contemporary—a reimagining of the traditional railway water tower.





The Void as a Respectful Response: An articulating paved plaza that generates and guides pedestrian flows between the historic station and the new hub.

Playful Stitches: Connectivity and Leisure

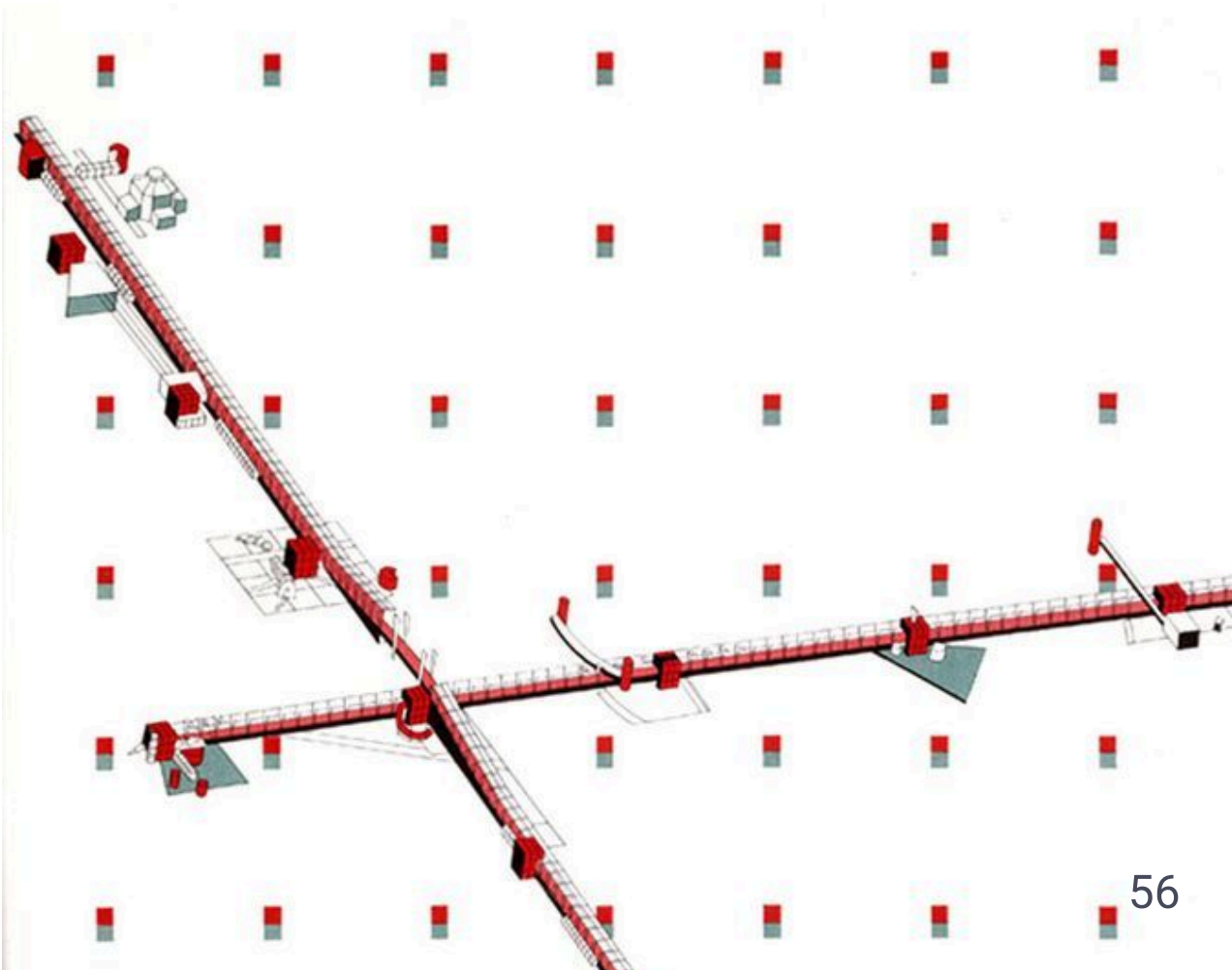
> "Architecture is a thing of art, a phenomenon of the emotions, lying outside questions of construction and beyond them. The purpose of construction is to make things hold together; of architecture to move us."
>
> **Le Corbusier (1923) "Vers une architecture".**

Linkage and Promenade Strategy

The project adopts an **urban and programmatic "stitching" strategy** inspired by the playful design language of the **Parc de la Villette**. This reference translates into a system of formal operations deployed across multiple scales—from the urban park down to the architectural detail—ensuring a unified scalar logic throughout the entire intervention.

To mitigate the vast scale of the railway site and foster community appropriation, the project leverages the strategic repetition of a **tripartite system: points, lines, and areas.**

This visual code does not manifest continuously, but rather **rhythmically**, echoing across both the horizontal plane (groundwork and landscape) and the vertical plane (tectonic and structural elements).

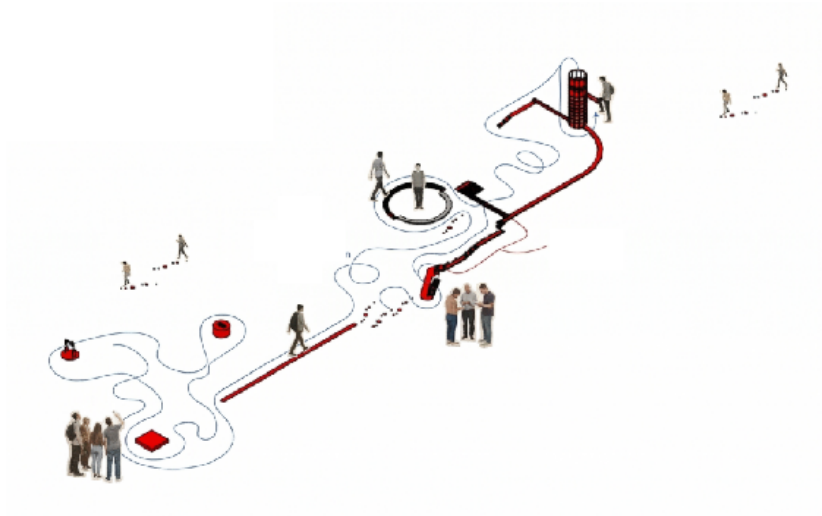


Playful Stitches: Connectivity and Leisure

Connectivity Through Color

The strategic use of the color red acts as the project's cohesive thread:

- **Identidad Visual:** Genera un contraste cromático que jerarquiza los nodos de actividad.
- **Invitación al Recorrido:** Funciona como un dispositivo de orientación que vincula visualmente el espacio público con el edificio.
- **Fluidez Espacial:** Desdibuja el límite entre el parque y la arquitectura, invitando al usuario a una transición orgánica entre ambas escalas.





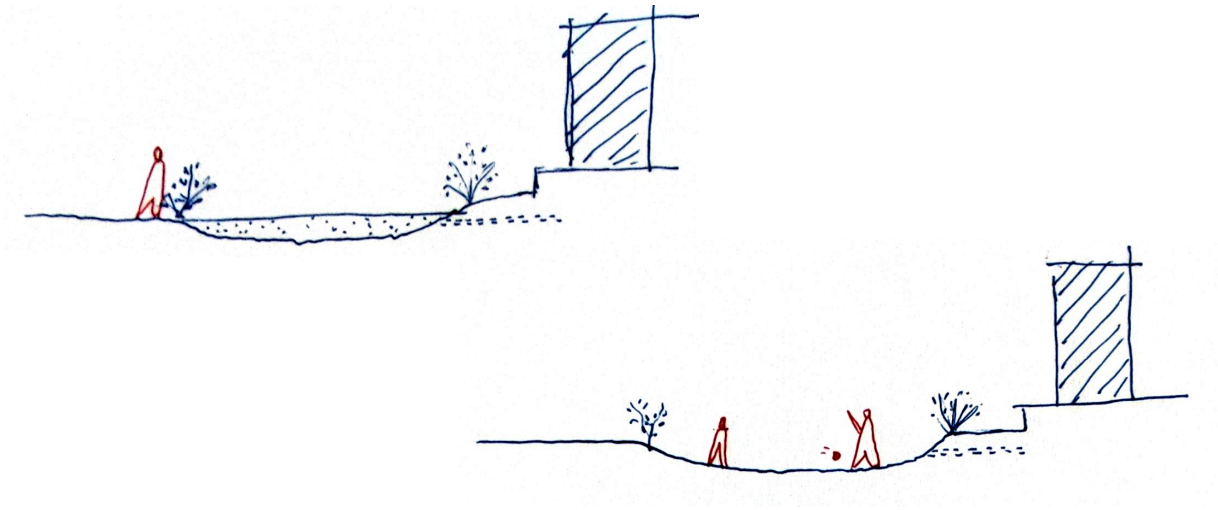


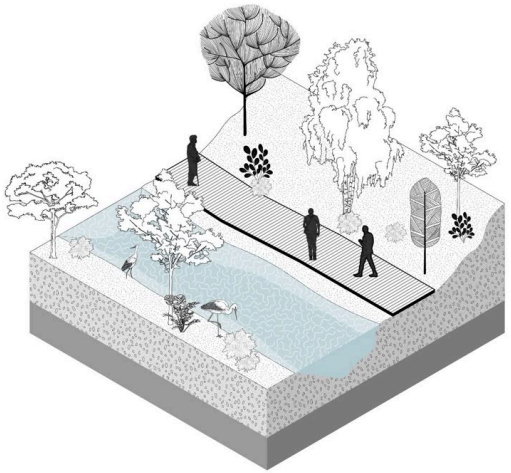
Water Integration

Controlled Flooding

A system of controlled flooding is projected across the park as an evocative urban-architectural strategy.

This approach unlocks the simultaneity of programs within a resilient infrastructure that integrates water into its spaces, promoting both community play and addressing the city's critical stormwater drainage demands.











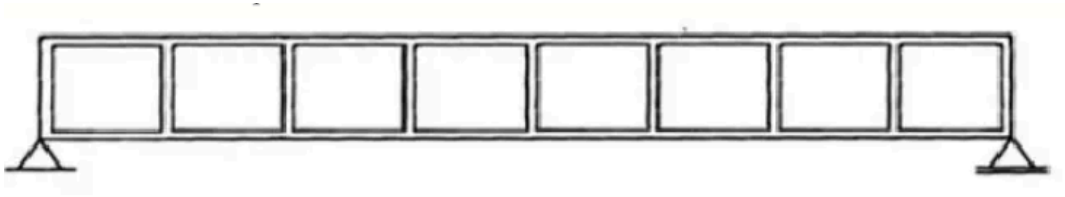
Structural System Selection

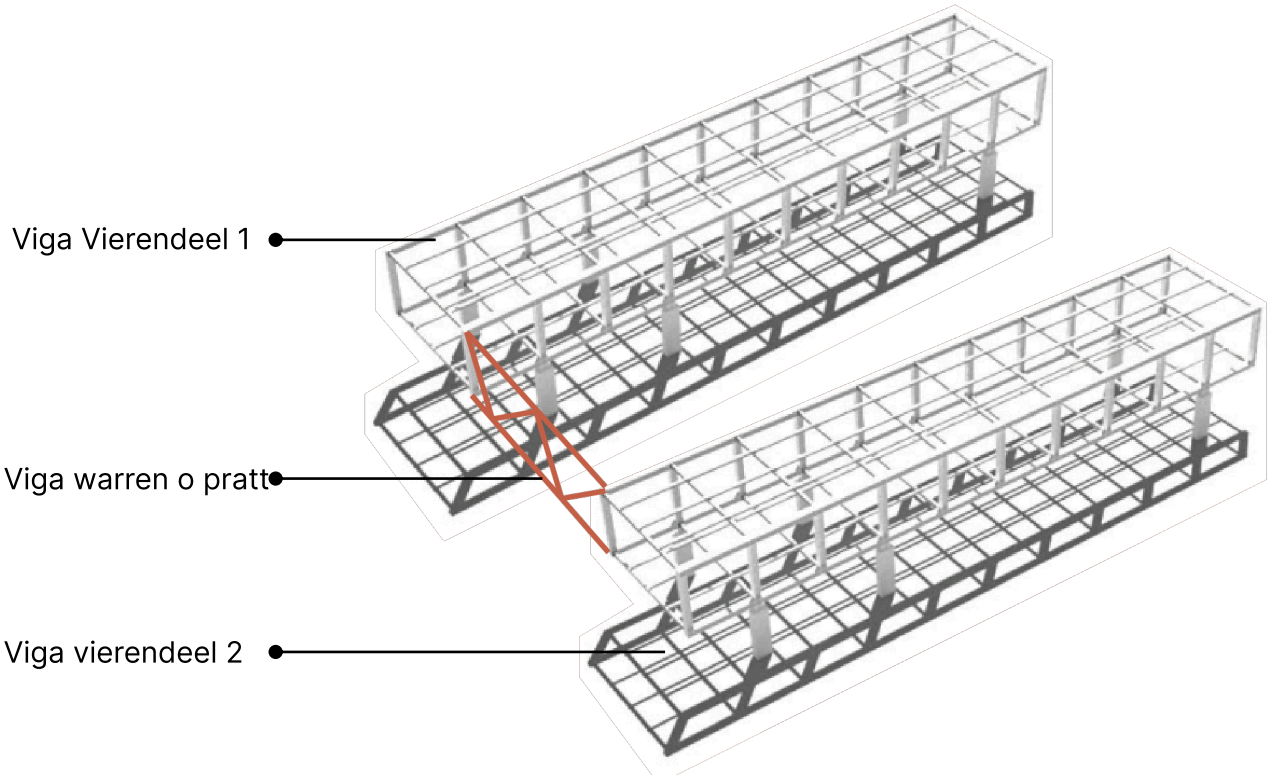
Vierendeel Trusses

The Vierendeel truss is a structural framework characterized by an orthogonal geometry. It is an open-web girder composed of a series of **horizontal chords and rigid vertical members** that securely connect the upper and lower chords without the use of diagonal bracing. This truss type is specifically deployed to span large distances and can be constructed using either structural steel or reinforced concrete. It is classified as a transition structure, as it allows for extensive column-free spans while efficiently transferring loads from the upper floors.

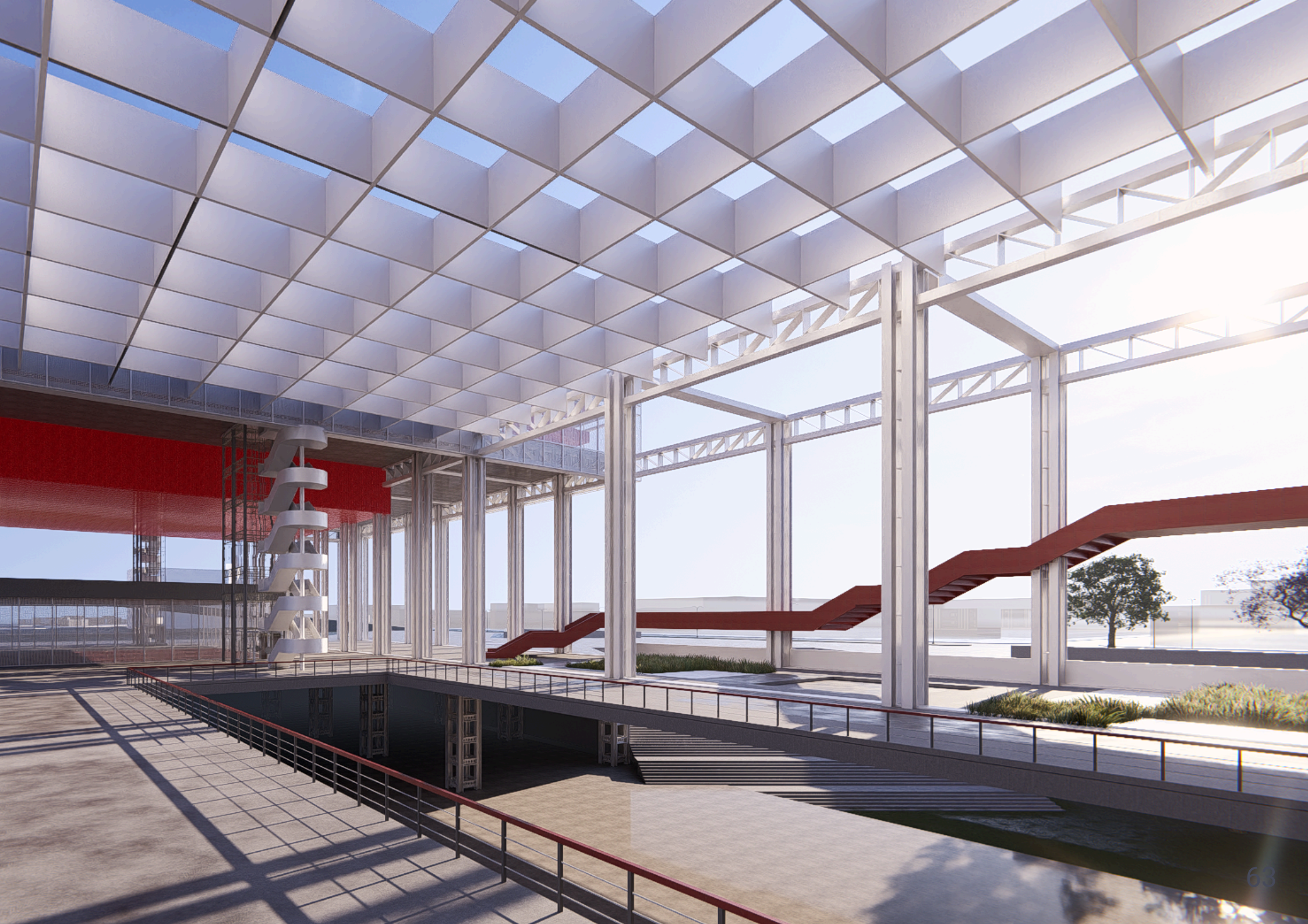
To function correctly without diagonal elements, the absolute key to its performance lies in the extreme rigidity of its **joints.**

In structural steel configurations, this stiffness is achieved through full-penetration welds or by incorporating steel gusset plates within the interior corners of the joints, thereby increasing the cross-sectional area to resist shear forces and bending moments.







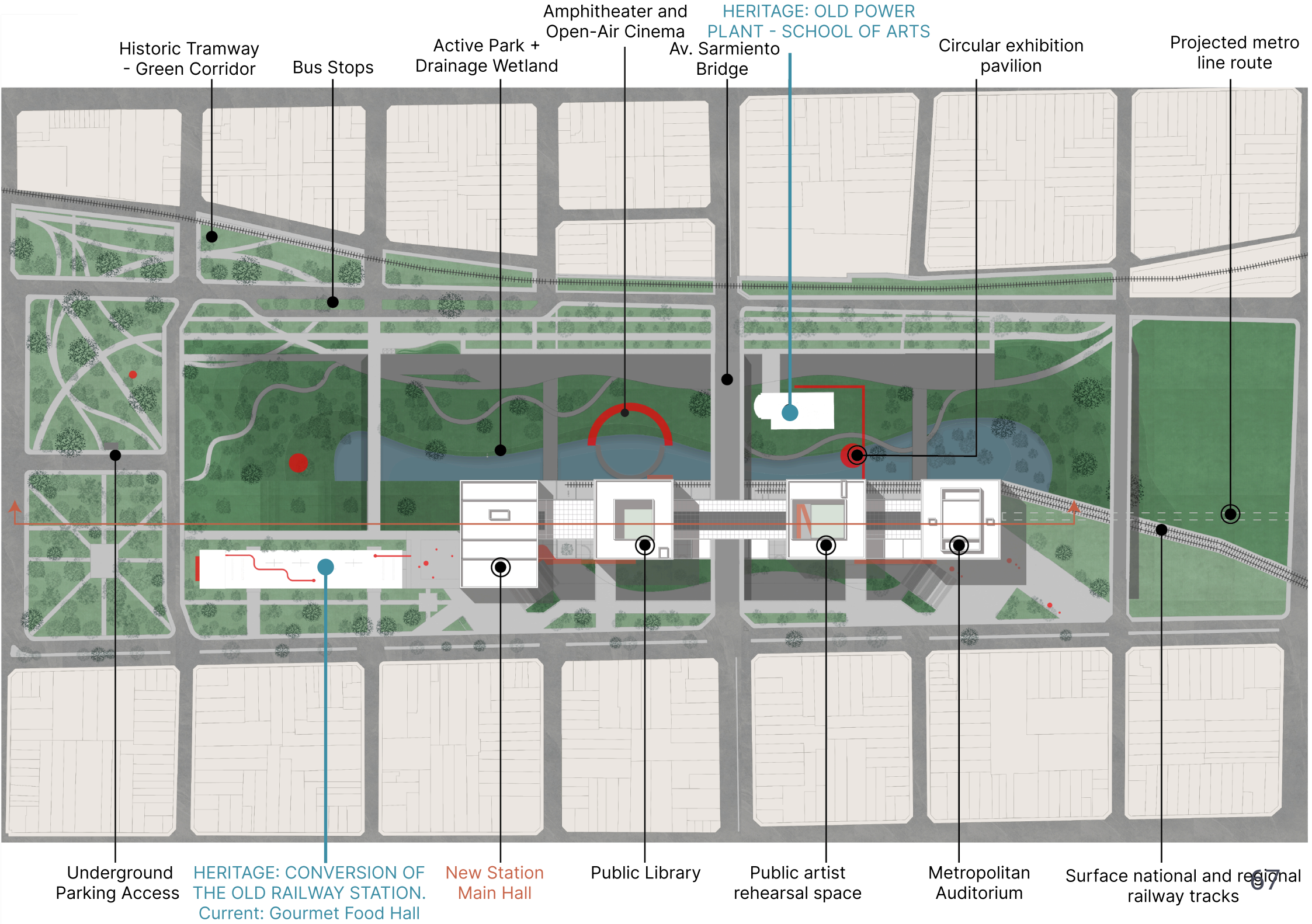


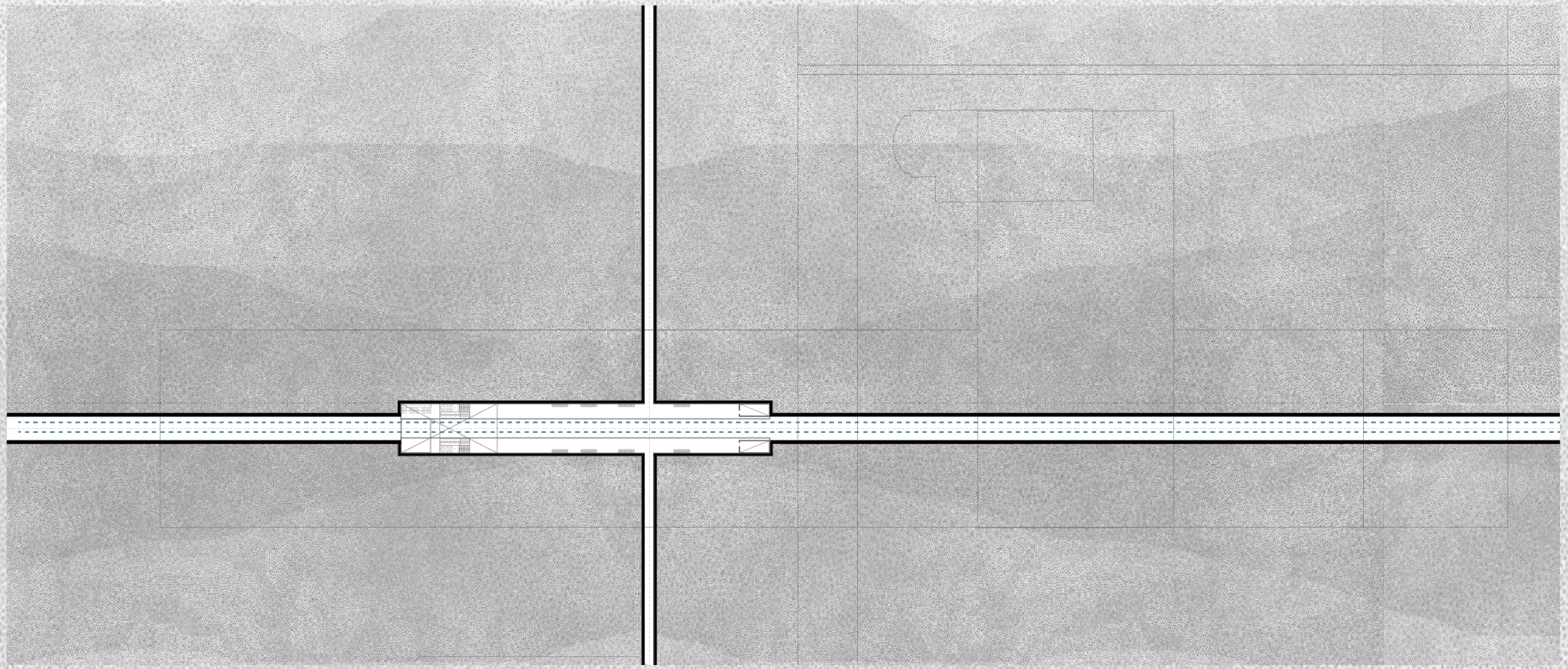
6. PLANIMETRÍA



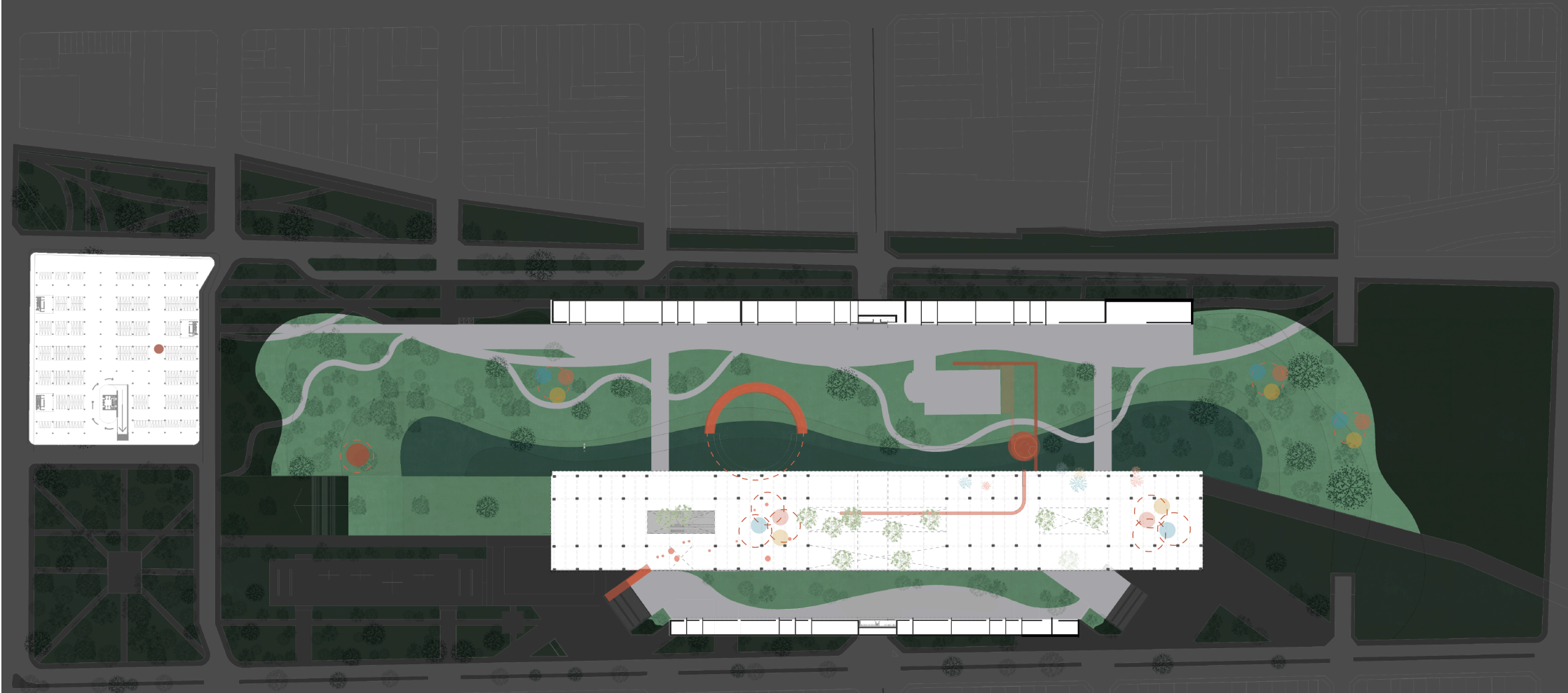


PLANTA DE TECHOS
ESCALA 1:4Z000

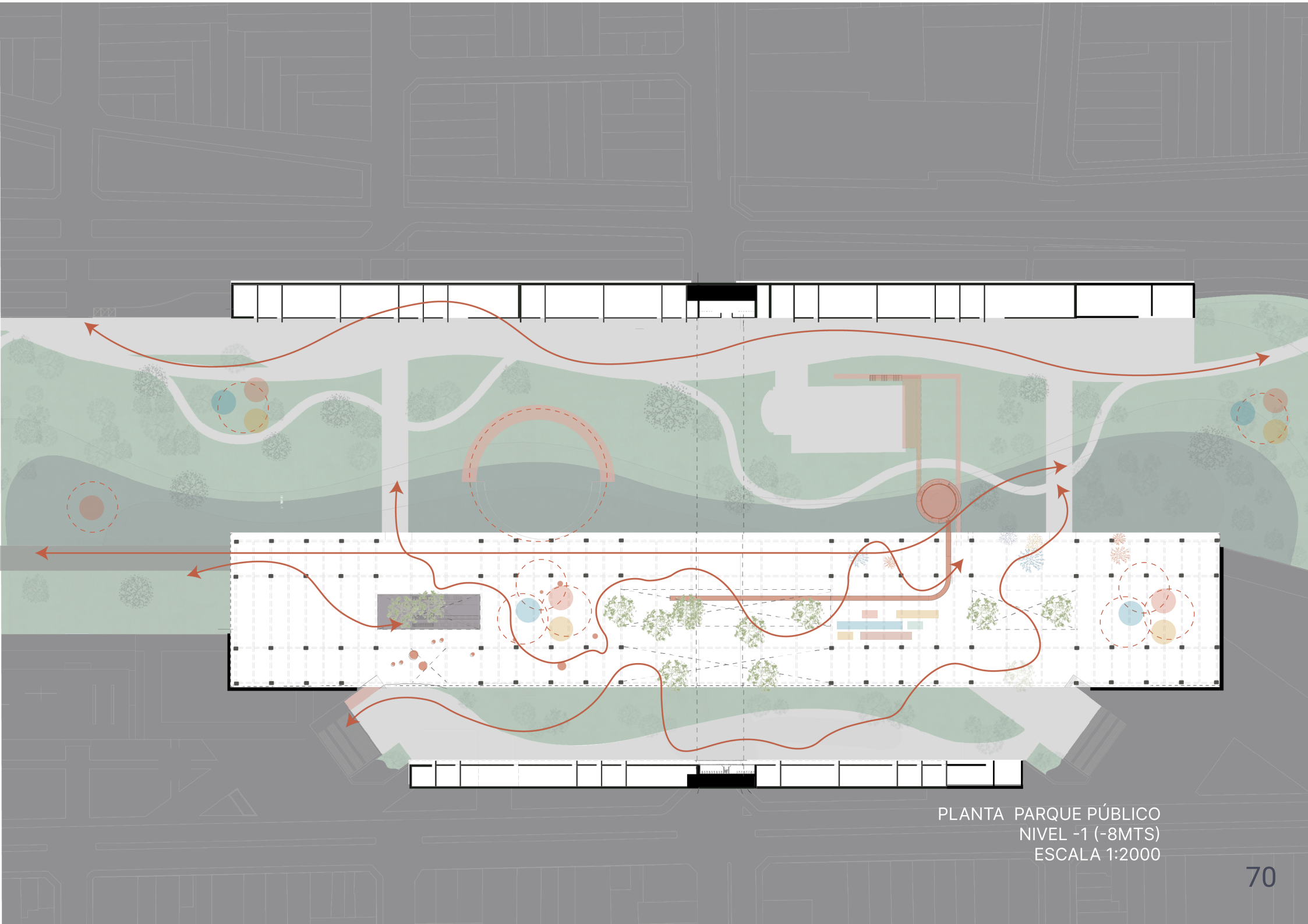

Historic Tramway - Green Corridor
Bus Stops
Active Park + Drainage Wetland
Amphitheater and Open-Air Cinema
Av. Sarmiento Bridge
HERITAGE: OLD POWER PLANT - SCHOOL OF ARTS
Circular exhibition pavilion
Projected metro line route
Underground Parking Access
HERITAGE: CONVERSION OF THE OLD RAILWAY STATION. Current: Gourmet Food Hall
New Station Main Hall
Public Library
Public artist rehearsal space
Metropolitan Auditorium
Surface national and regional railway tracks



PLANTA TREN
SUBTERRÁNEO
ESCALA 1:2000



PLANTA PARQUE PÚBLICO
NIVEL -1 (-8MTS)
ESCALA 1:4000



PLANTA PARQUE PÚBLICO
NIVEL -1 (-8MTS)
ESCALA 1:2000



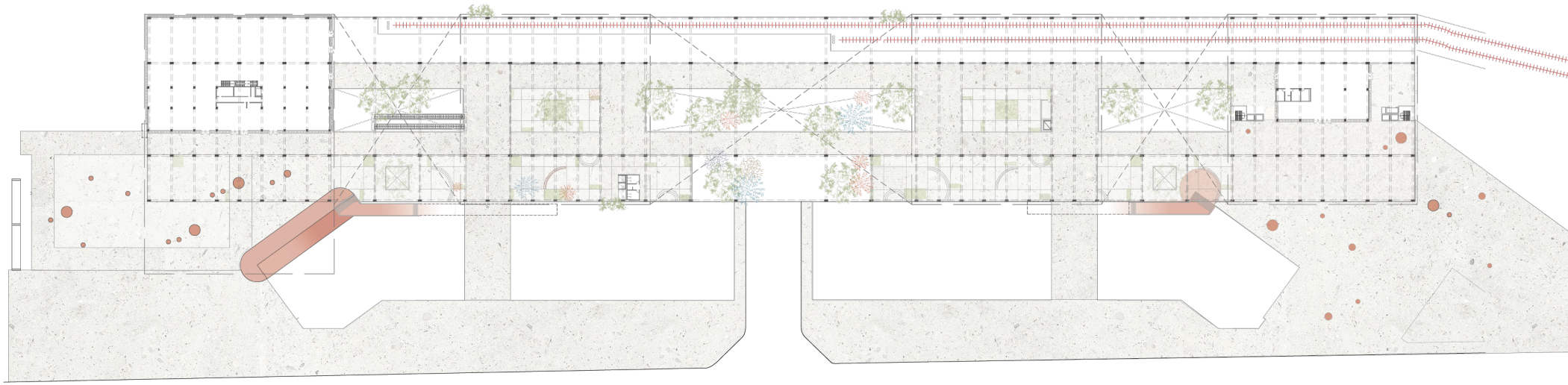




"Every time we design a building, we think about how people will use it... Architecture is the way people can be together in space. In this sense, our work carries a heavy responsibility."

Kazuyo Sejima(2010)











"Architecture is not for buildings, it is for the city. Public space is the place where the citizen recognizes themselves as such."
PAULO MENDES DA ROCHA

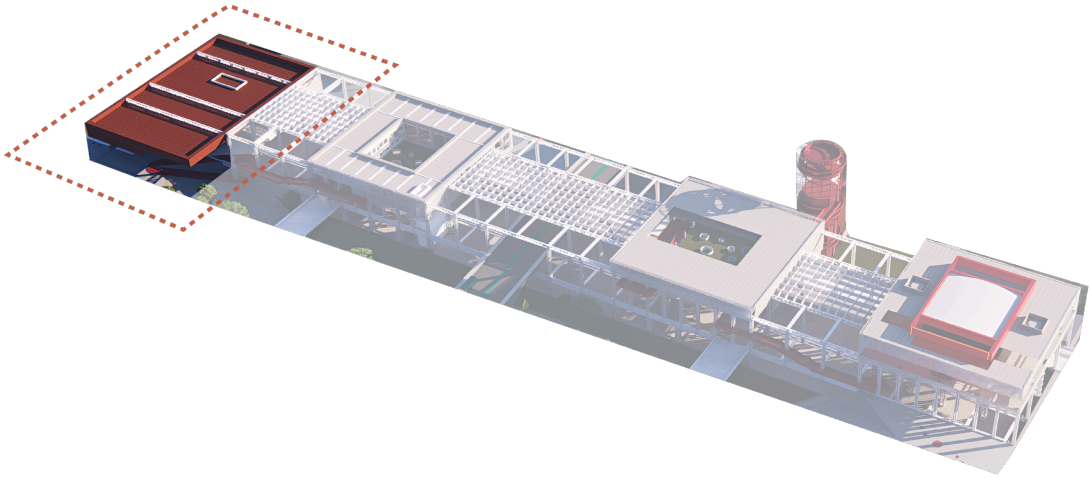
"Architecture is an opinion. The architect's job is to create spaces where people can meet and create their own story."
LINA BO BARDI (1994)

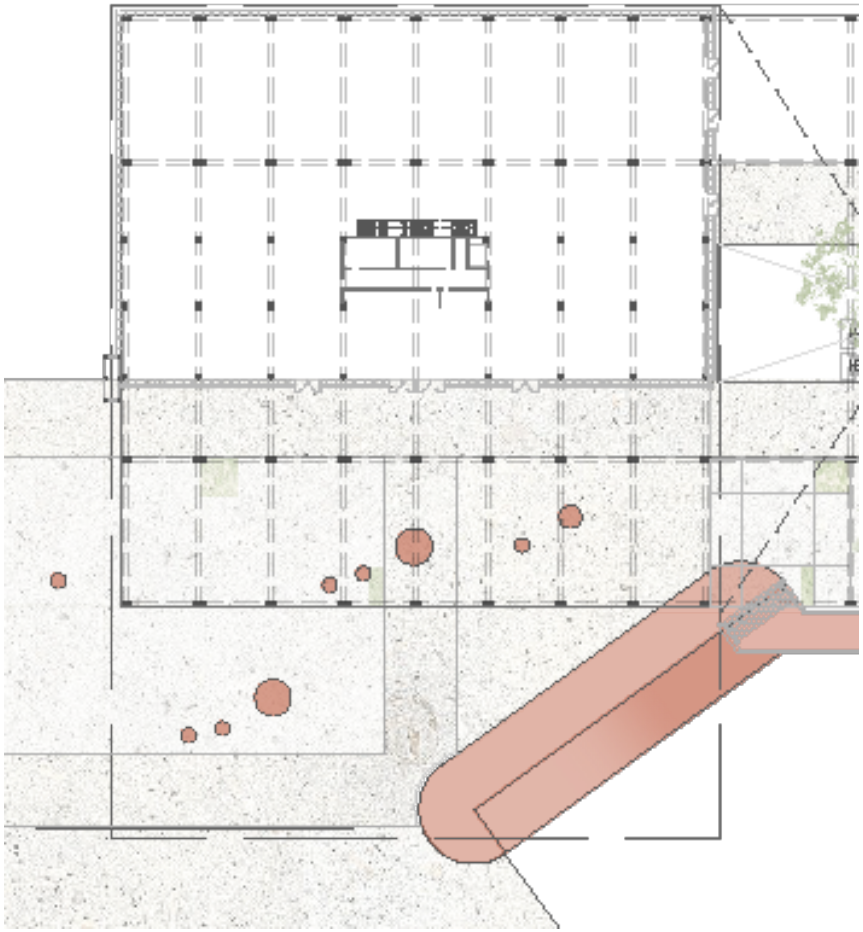
Functional Module: MAIN ENTRANCE HALL + OFFICES

The Rail Operational Hub

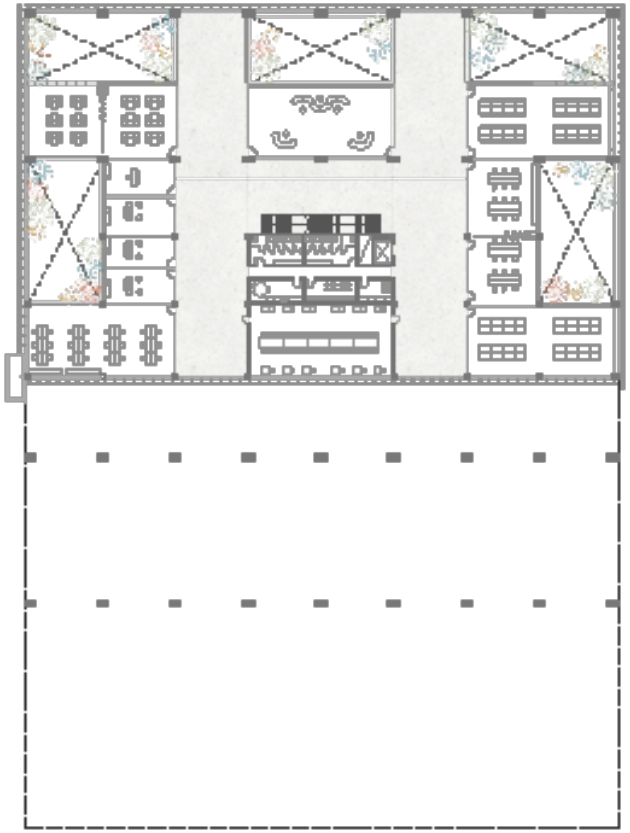
The new station comprises two enclosed halls designated as indoor waiting areas, positioned at each terminal end of the linear building, with open, public, and green waiting spaces integrated between them. However, this specific module assumes greater significance due to its spatial hierarchy as a welcoming and articulating threshold between the historic station and the contemporary hub, connected via a paved civic plaza and the morphological extrusion of the roof structure, which dynamically "opens up to welcome and invite." Its height aligns precisely with the maximum elevation of the historic station, establishing a strong contextual relationship.

The exterior of this module, anchored to the ground floor (Level 0), invites users to explore the rest of the cultural complex while offering an immediate, clear vista of the station's hard transit operations, effectively separating the flows of gathering from those of transit. Internally, the module is strictly dedicated to transportation logistics, accommodating waiting areas, ticket offices, an information hub, public amenities, and a first-floor level reserved for administrative offices, control, and monitoring operations.

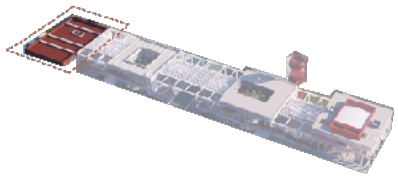


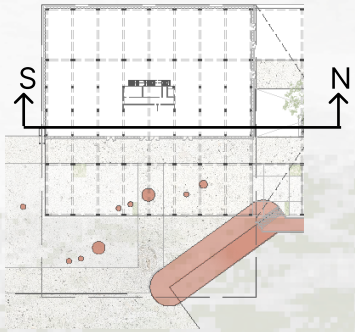


MÓDULO HALL
Planta 0
ESCALA 1:750



MÓDULO HALL
Primera planta
ESCALA 1:750





MÓDULO HALL
CORTE N-S
escala 1:750






ANDÉN 3
ESPERA

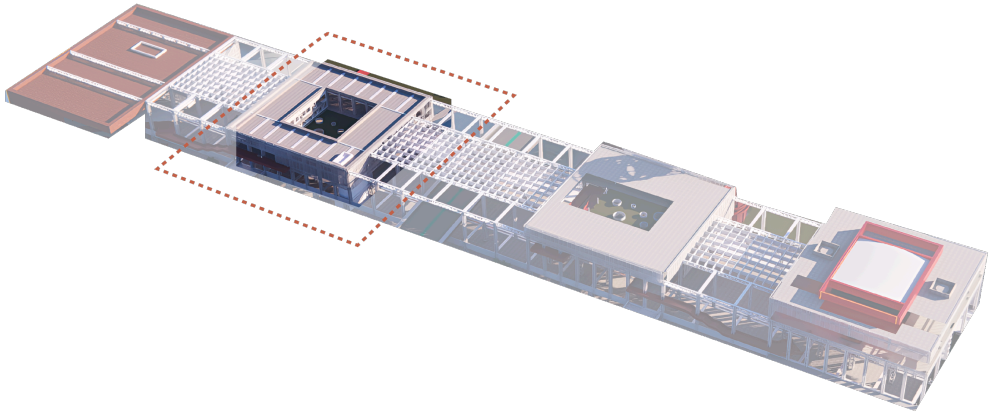
Functional Module: PUBLIC LIBRARY

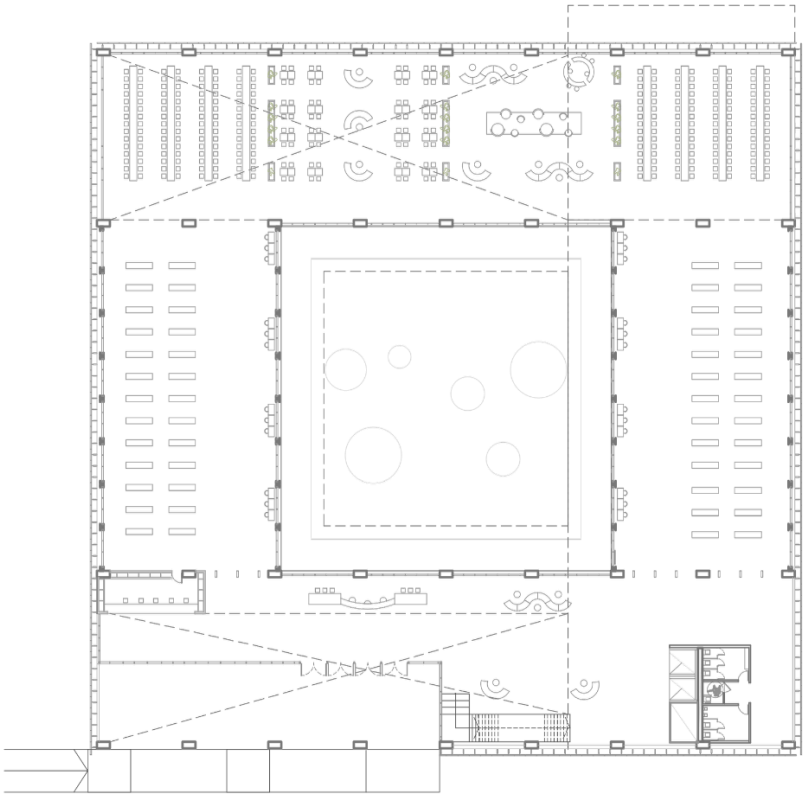
Cultural Anchor

The library module, like all the cultural spaces, is conceived as a built volume inserted into the large open grid—a structure that serves both as a catalyst for public activities and as a train station.

Access is granted through a grand staircase, whose distinct color invites users to join the promenade while framing public activities along its path, culminating in an elevated viewpoint.

The module is organized around a central courtyard to ensure optimal natural daylighting for the reading rooms, which are wrapped in a performance skin to filter and control the light. It comprises two levels: a library floor featuring book stacks, reading, and co-working areas; and a dedicated floor for audiovisual media suites and research spaces.

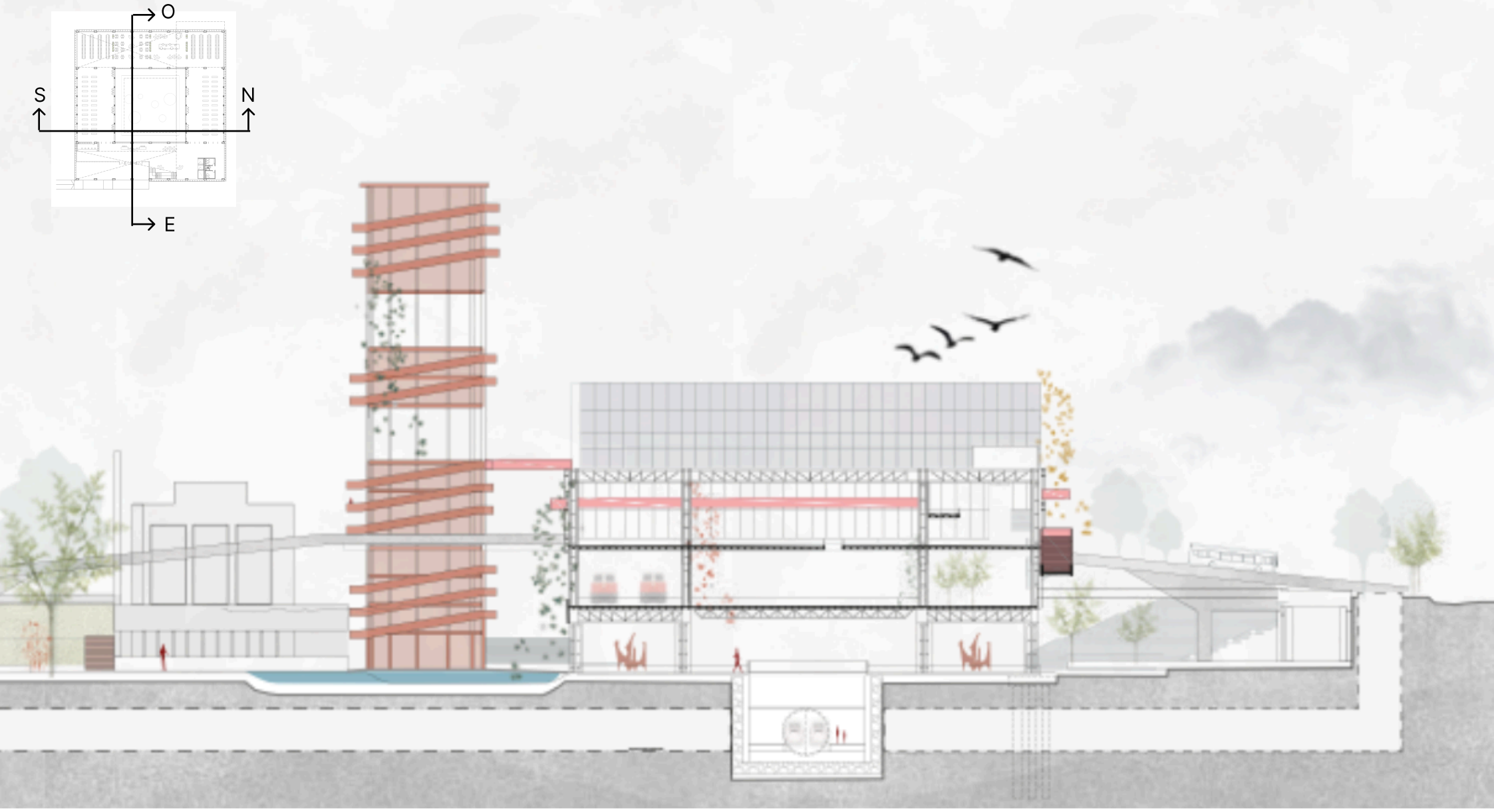




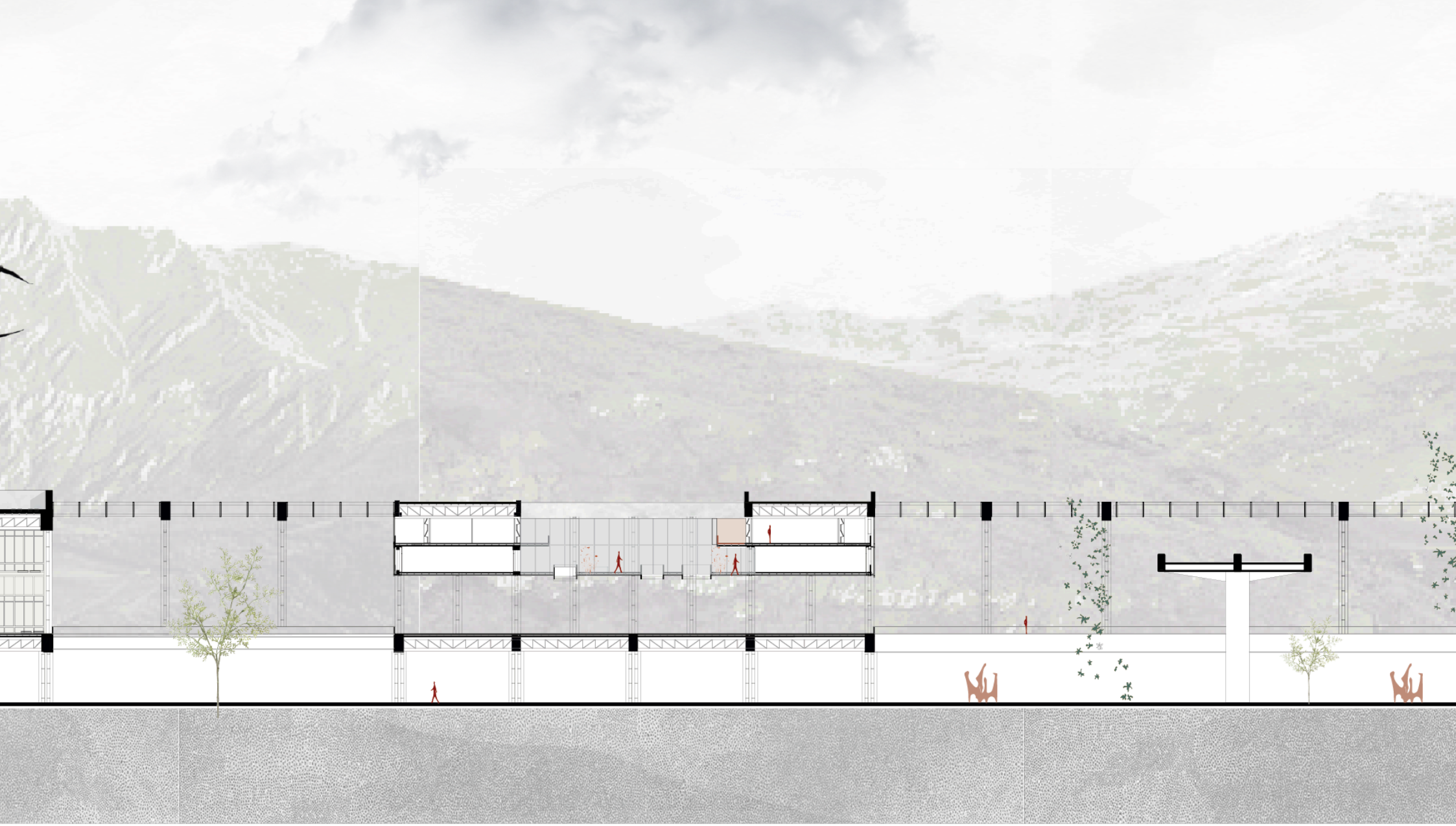
LIBRARY MODULE
FIRST FLOOR +8m
SCALE 1:750



LIBRARY MODULE
SECOND FLOOR
SCALE 1:750



LIBRARY MODULE
E-W SECTION
SCALE 1:750



LIBRARY MODULE
N-S SECTION
SCALE 1:750



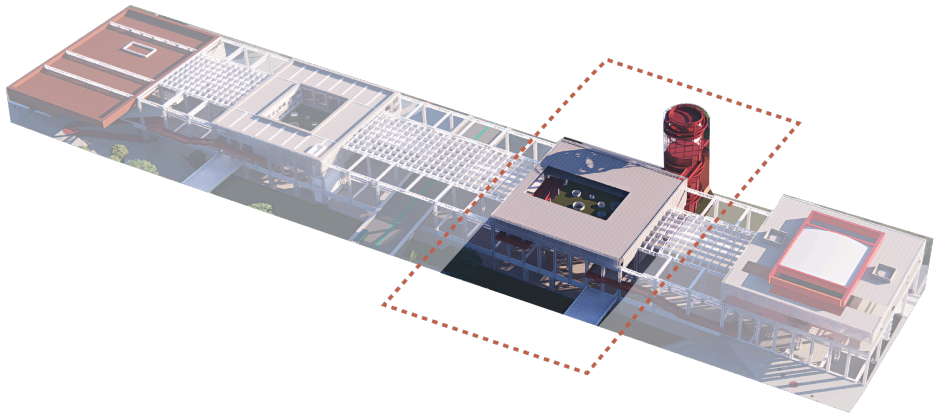


Functional Module: REHEARSAL STUDIOS + EXHIBITION PAVILION

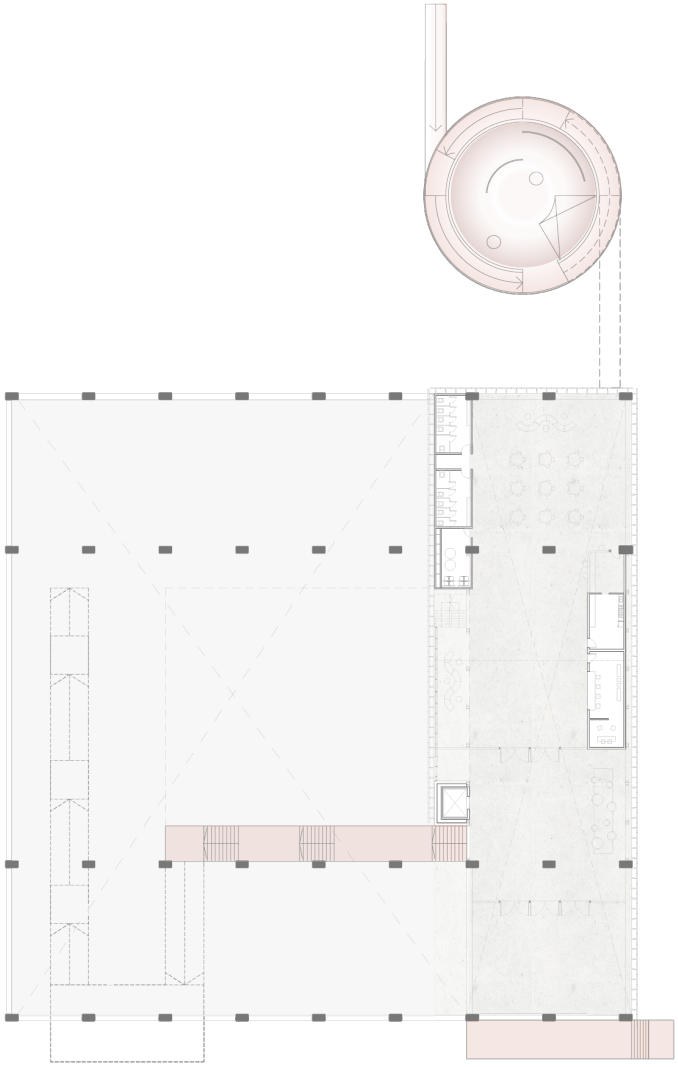
Cultural Anchor & Heritage Linkage

Due to its strategic proximity to the School of Arts located within the "Usina" heritage building, this module capitalizes on the opportunity to introduce multi-disciplinary artistic rehearsal and creation studios (encompassing painting, music, dance, and theater). By pairing these spaces with dedicated exhibition areas, the project deploys a playful methodology designed to bridge the arts and the local community. The core intent is to seamlessly blend spaces of artistic creation to function as a "living pavilion"—a highly permeable, performative workspace that the public can freely wander through and observe.

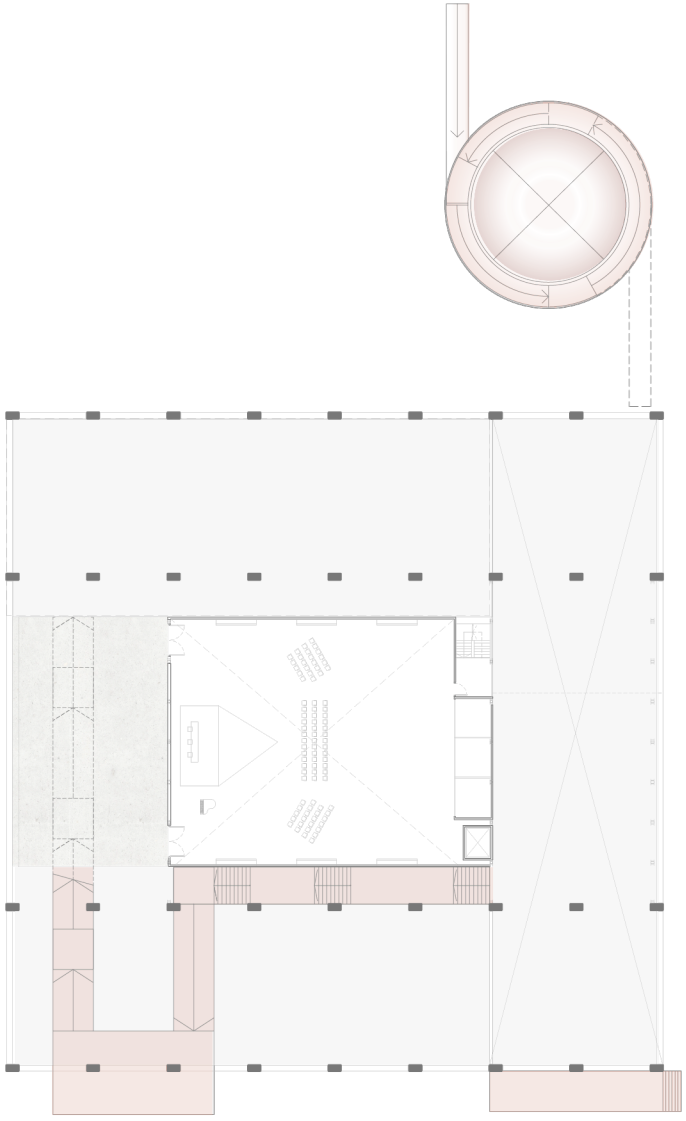
To achieve this programmatic blend, a dedicated rehearsal module for artists is integrated within The Linear Volume, seamlessly paired with a public viewing promenade that is visually guided by the color red. This path articulates outwardly from the functional module, connecting to a prominent vertical element nicknamed "the spiral cylinder" (El Rulero), which features a continuous helical circulation hosting exhibition galleries and culminating in an elevated viewpoint. Designed as a dual-access promenade, citizens can choose their own trajectory: they can enter from the historic Usina, ascend through the spiral tower, and flow directly into the rehearsal module, or traverse the sequence in the opposite direction—completely at the citizen's own pace and choice



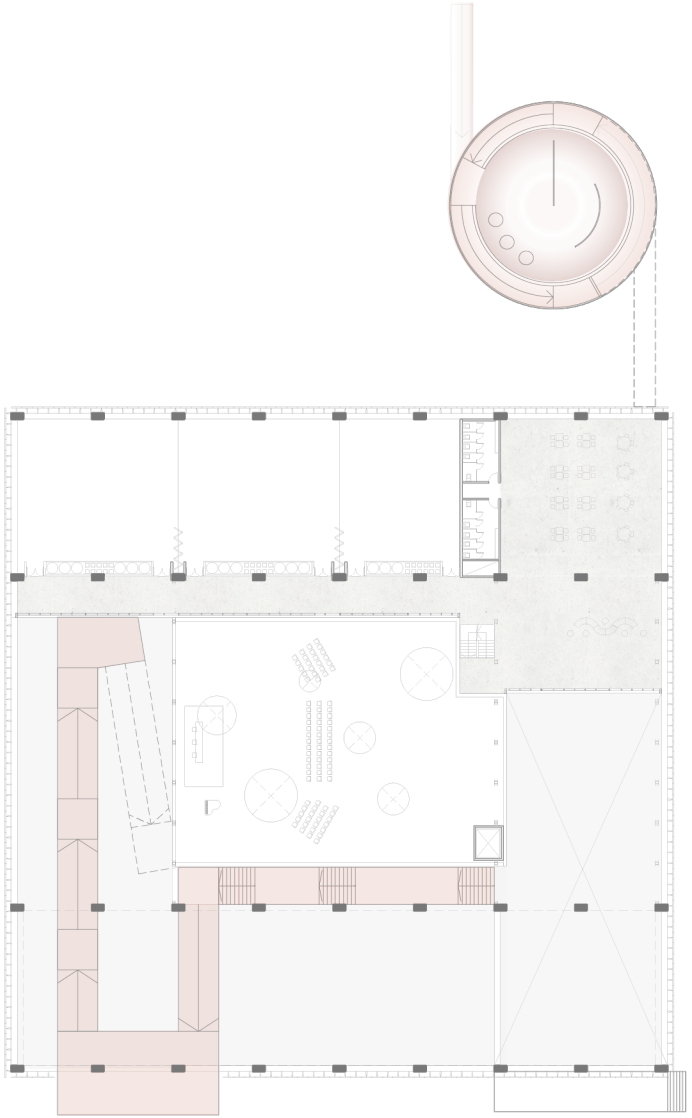
The rehearsal module operates through a dual-circulation system designed to coexist seamlessly: a private interior flow reserved exclusively for the artists, and a colored, highly visible public path tailored for general observation. At its architectural center, the module features a primary, double-height main rehearsal hall.



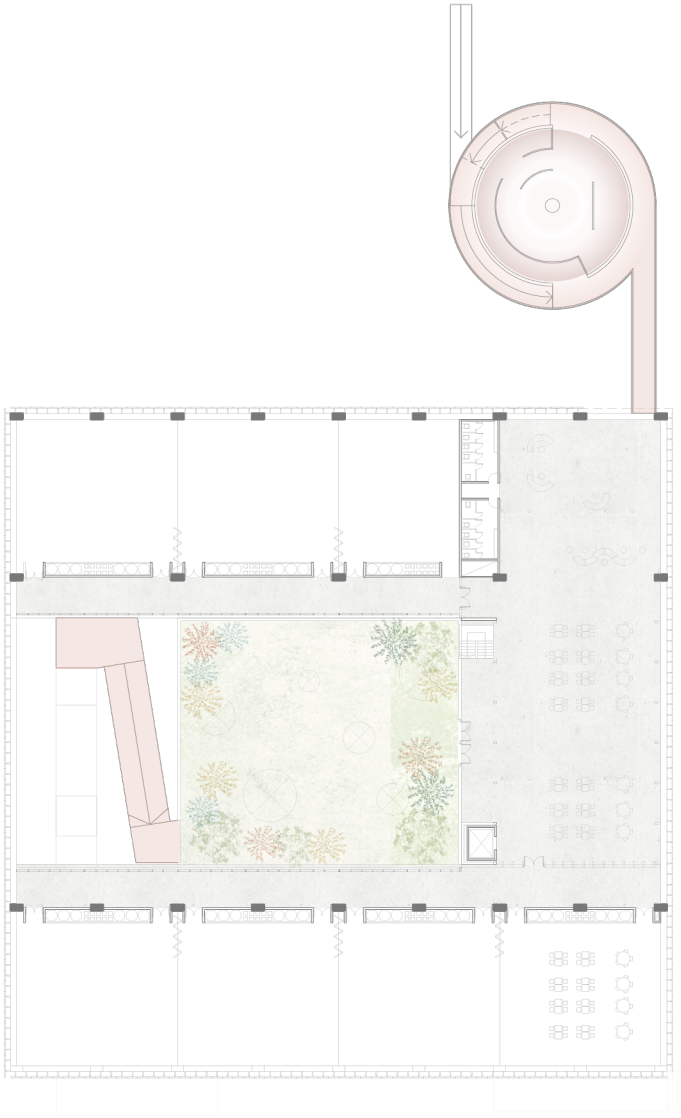
REHEARSAL ROOMS MODULE
FIRST FLOOR
SCALE 1:750



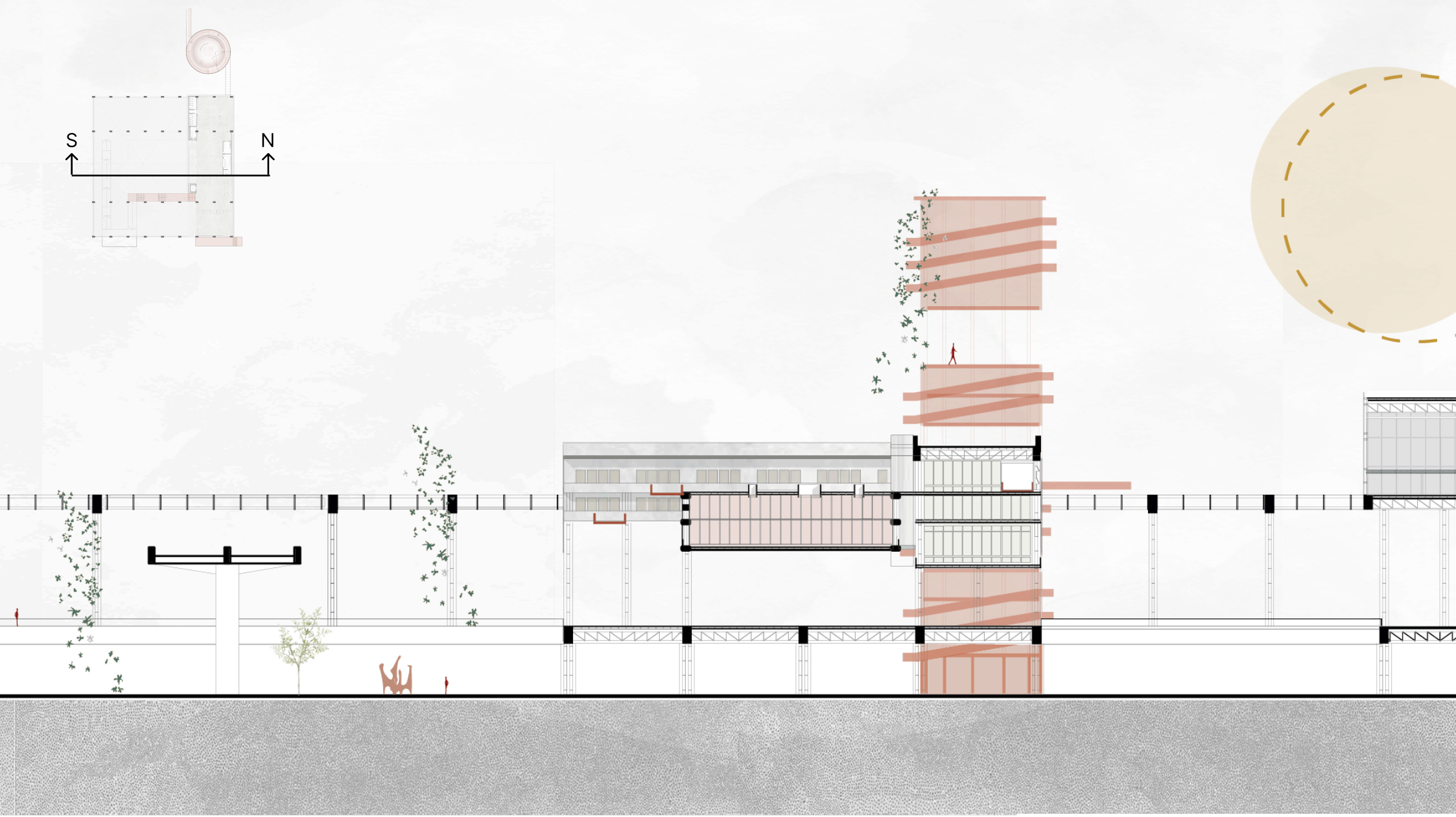
REHEARSAL ROOMS MODULE
MEZZANINE
SCALE 1:750



REHEARSAL ROOMS MODULE
SECOND FLOOR
SCALE 1:750



REHEARSAL ROOMS MODULE
THIRD FLOOR
SCALE 1:750



REHEARSAL ROOMS MODULE
N-S SECTION
SCALE 1:750

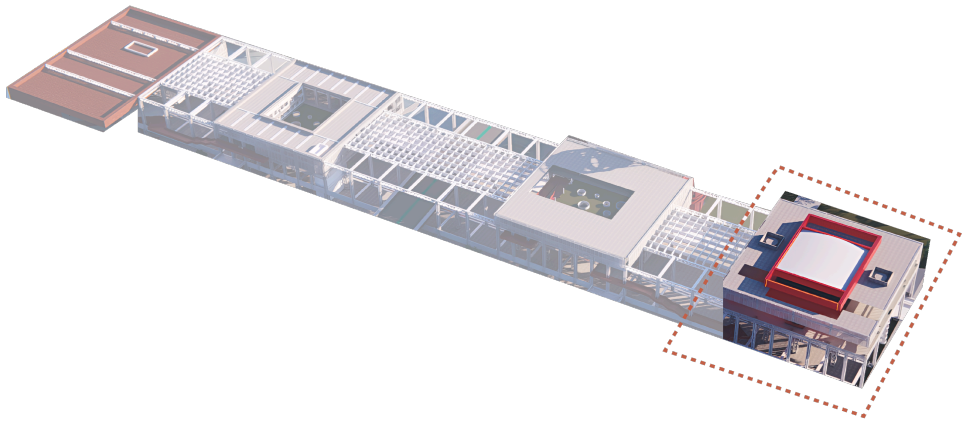

SALA DE ENSAYO
DE BAILARINES

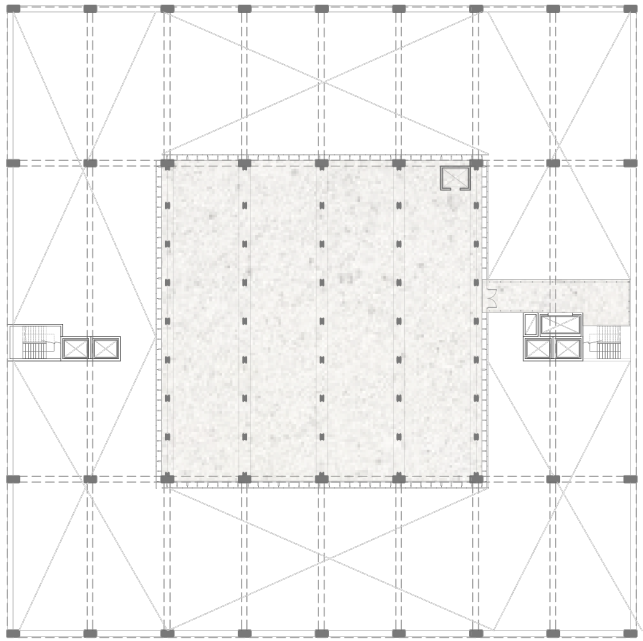

ICE

Functional Module: METROPOLITAN AUDITORIUM

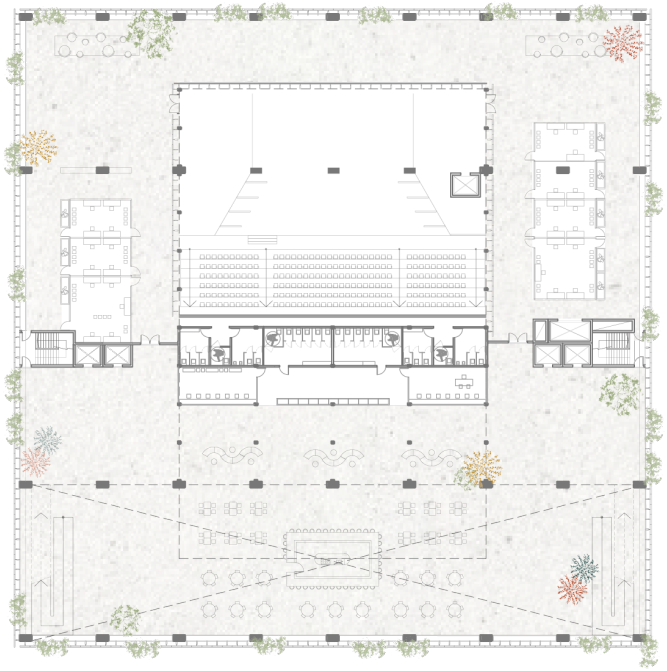
Cultural Anchor

Cultural Anchor // The auditorium is the module featuring the greatest elevation from the ground plane, presenting a volume that appears to float within itself. Access is provided via two lateral circulation cores that lead directly into the foyer—a gathering space equipped with a café, ticket offices, and a double-height visual promenade that houses the ramps leading up to the main auditorium hall. Positioned in clear programmatic contrast to the foyer is a private back-of-house sector dedicated to dressing rooms and staff operations.
The auditorium functions as a centralized core, flanked on either side by open-plan pavilions designed for complementary exhibitions and waiting areas.
Furthermore, in section, the interstitial spaces generated beneath the raked auditorium seating are strategically repurposed to accommodate a multi-purpose hall (SUM).
The auditorium is materialized through a translucent skin designed to leverage both lighting and color, creating the sensory experience of a weightless, floating volume.

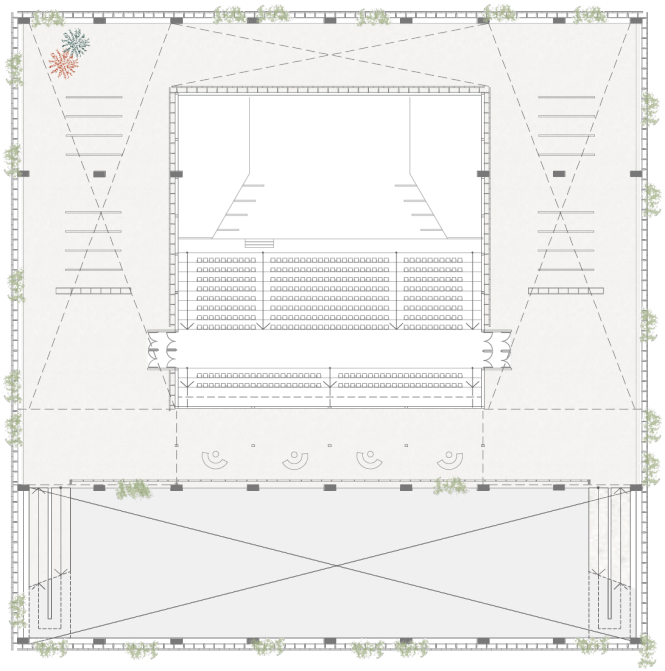




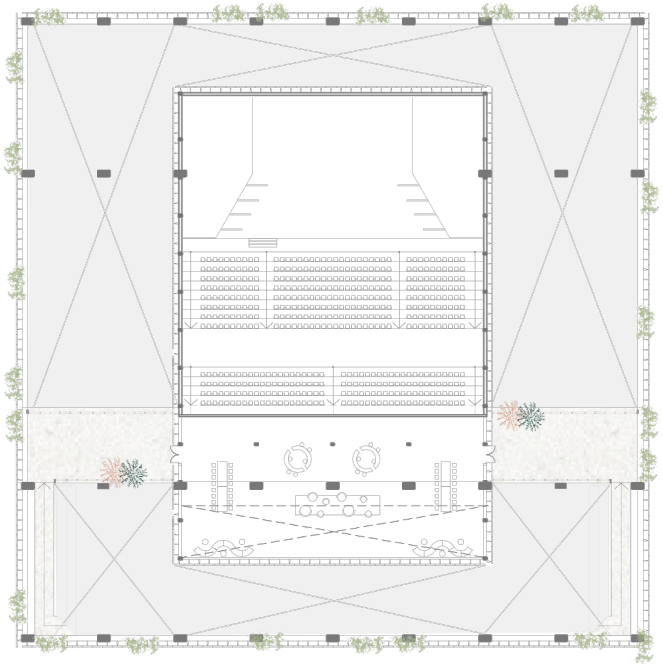
AUDITORIUM MODULE
RAISED FLOOR
SCALE 1:750



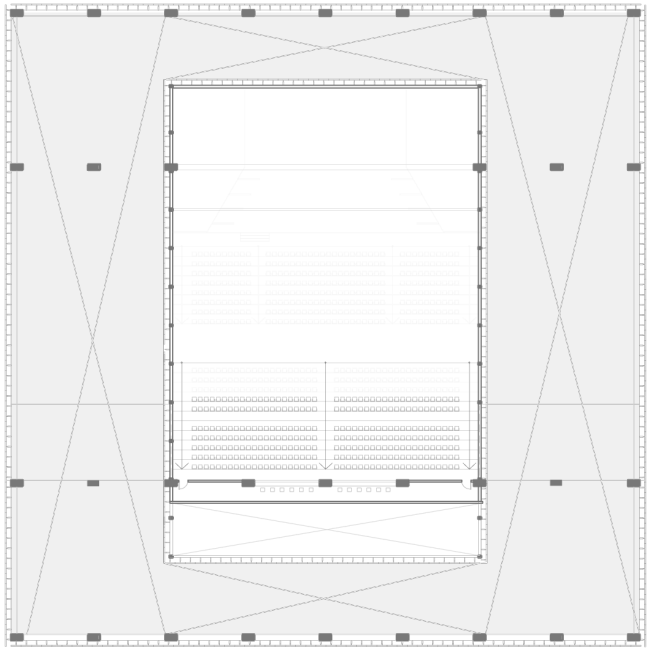
AUDITORIUM MODULE
FIRST FLOOR
SCALE 1:750



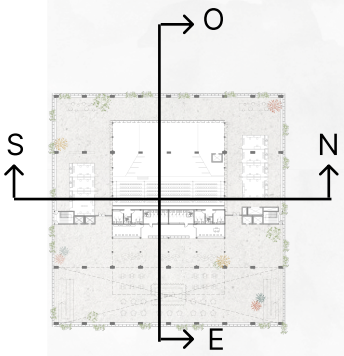
AUDITORIUM MODULE
SECOND FLOOR
SCALE 1:750

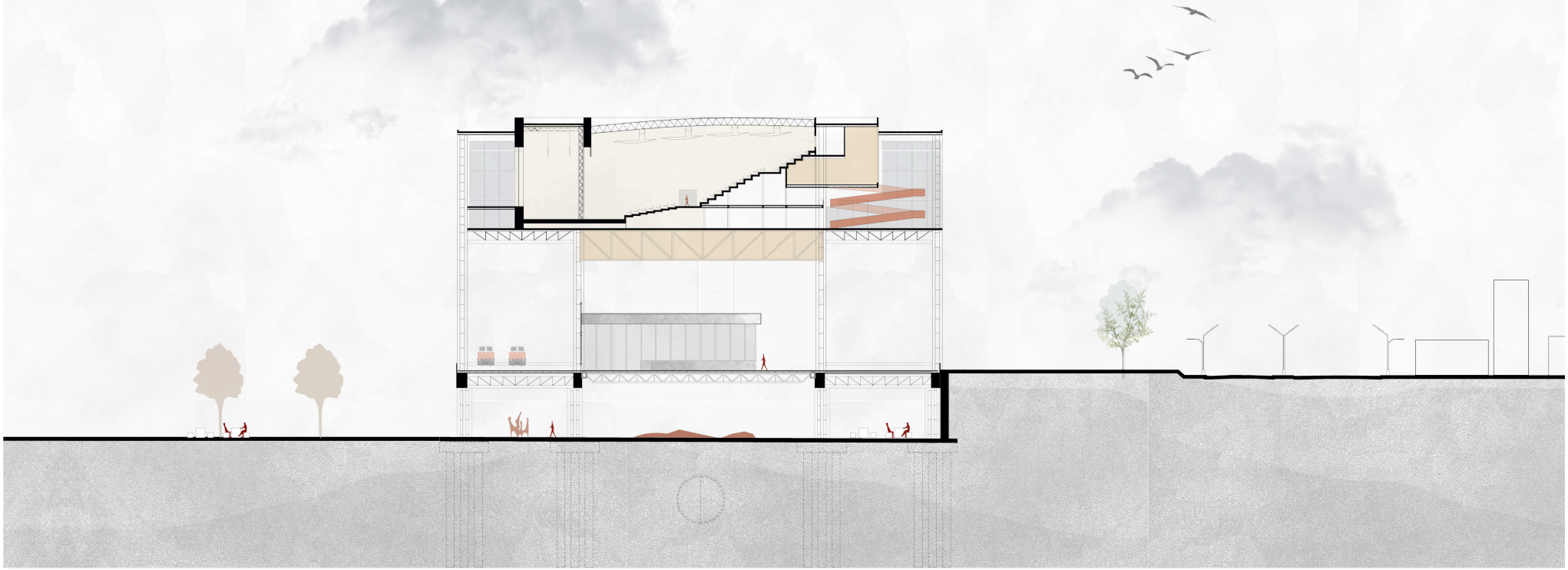


AUDITORIUM MODULE
THIRD FLOOR
SCALE 1:750

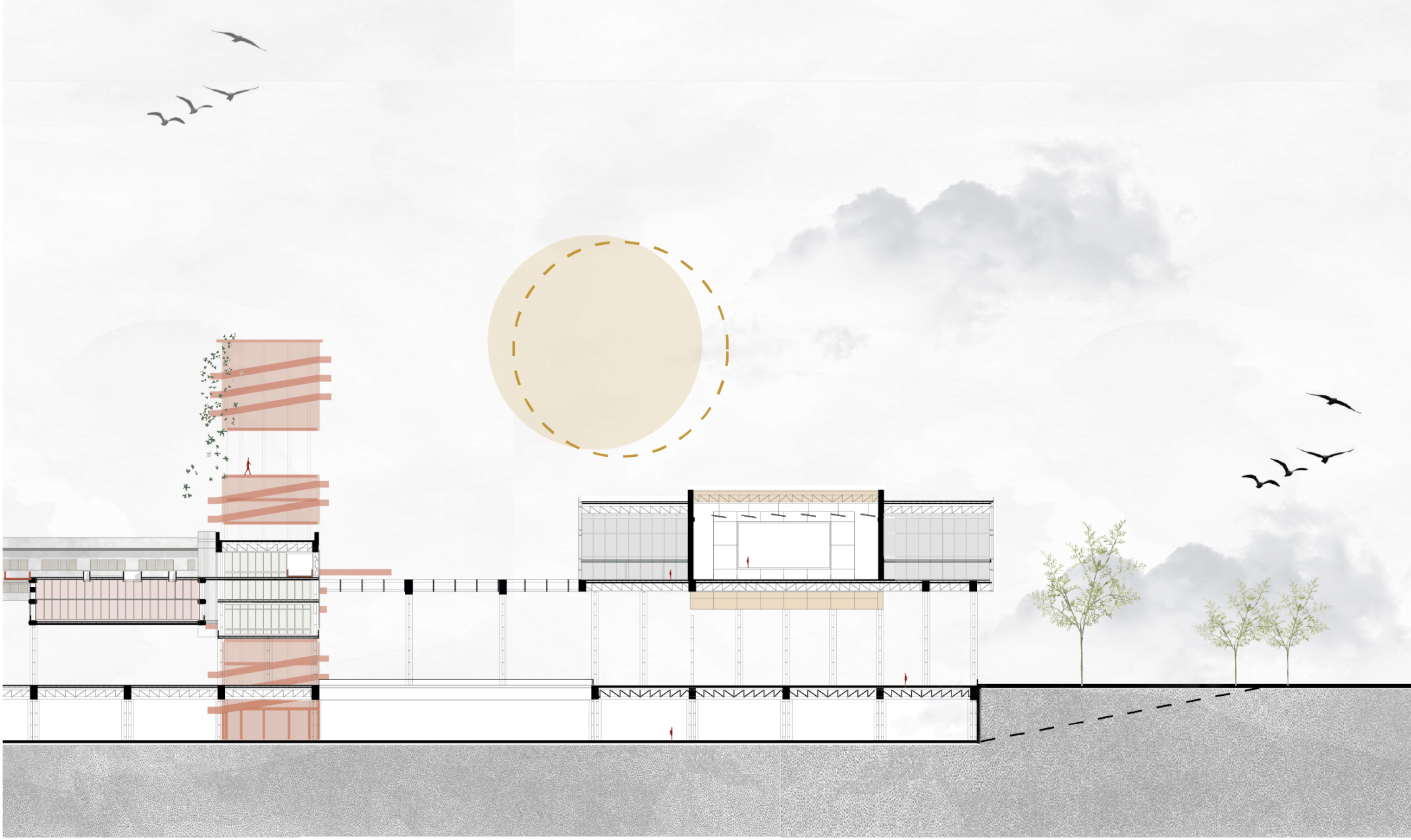


AUDITORIUM MODULE
FOURTH FLOOR
SCALE 1:750





AUDITORIUM MODULE
W-E SECTION
SCALE 1:750



AUDITORIUM MODULE
N-S SECTION
SCALE 1:750

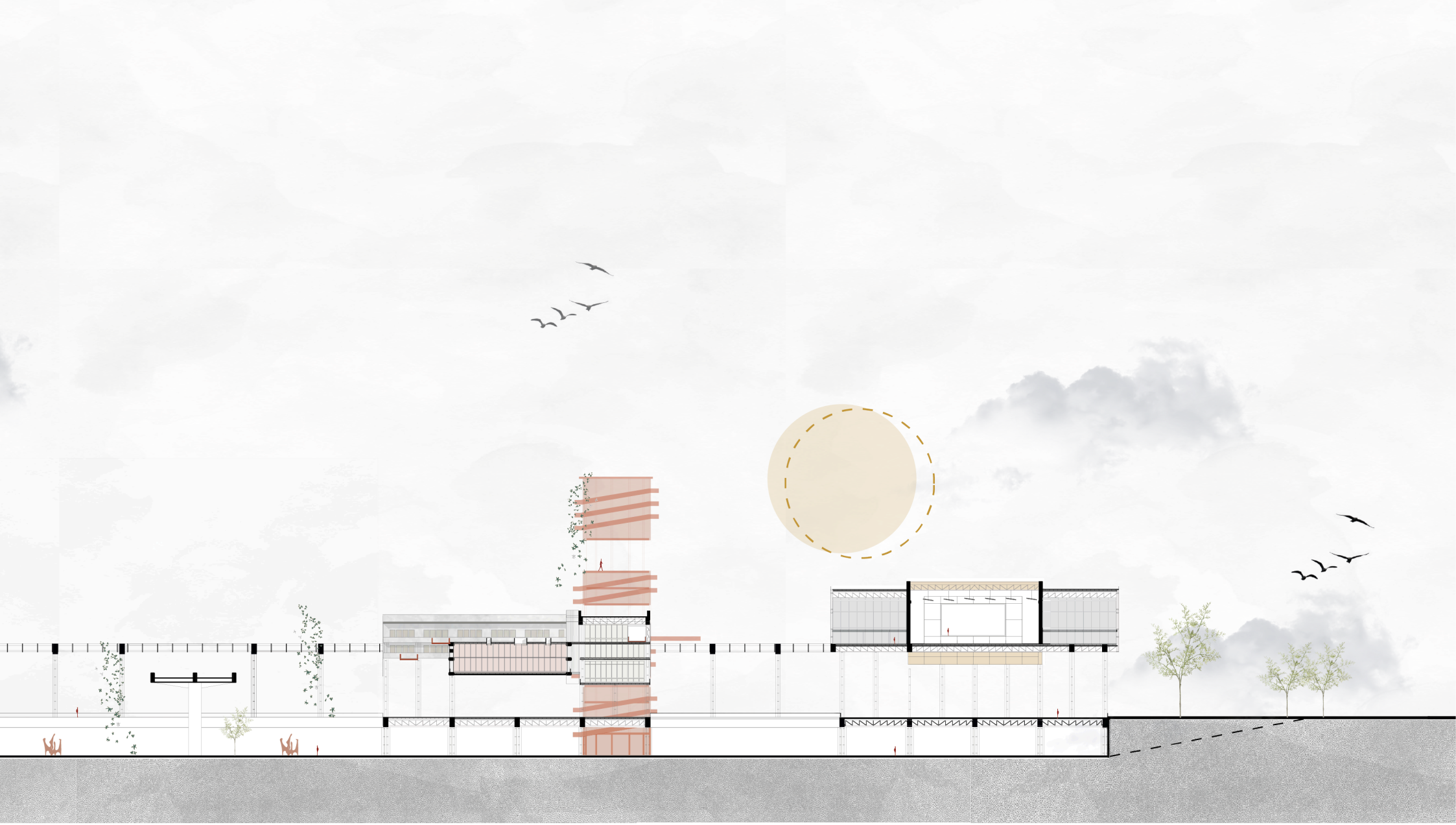



Lounge Bar

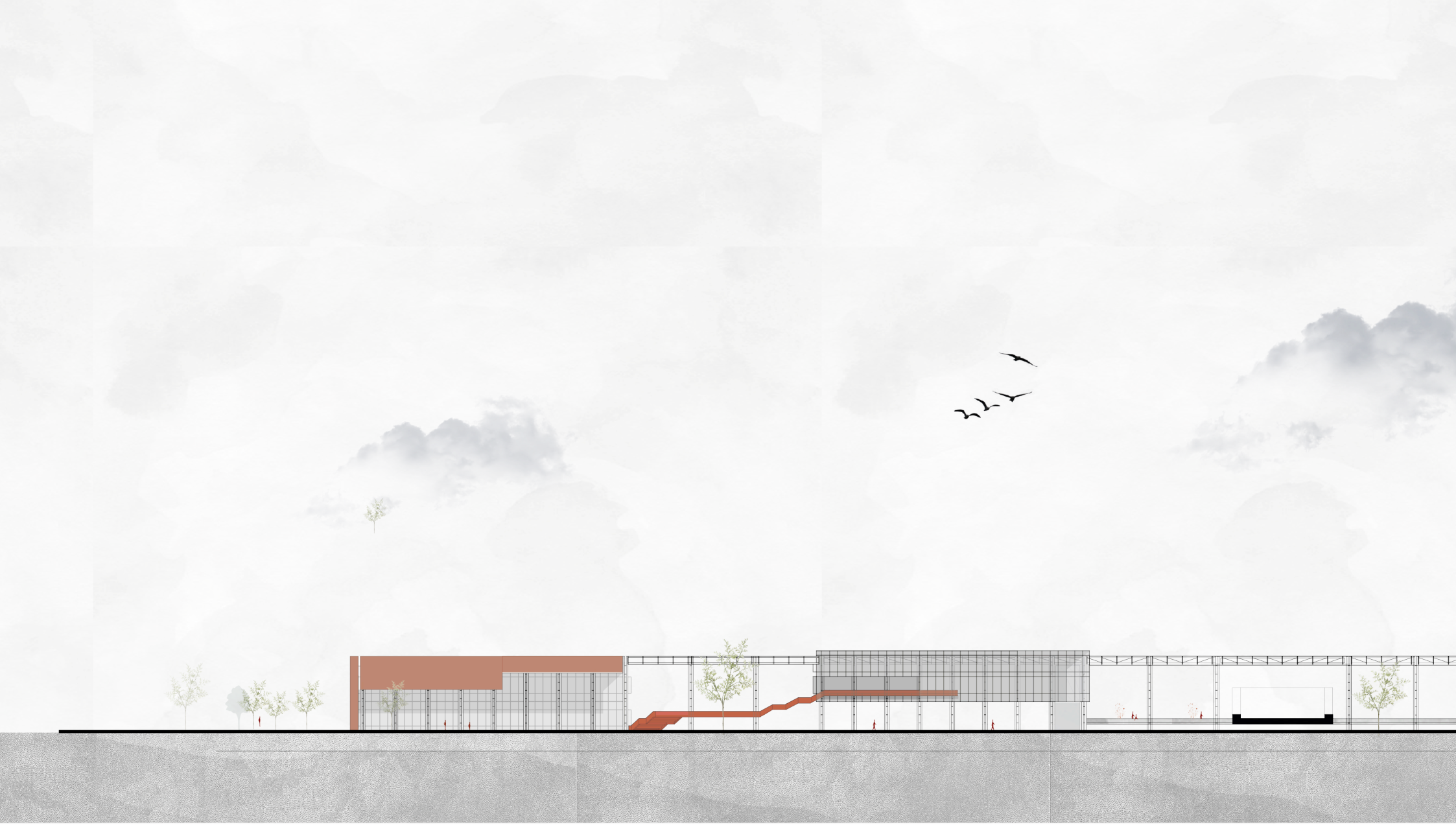


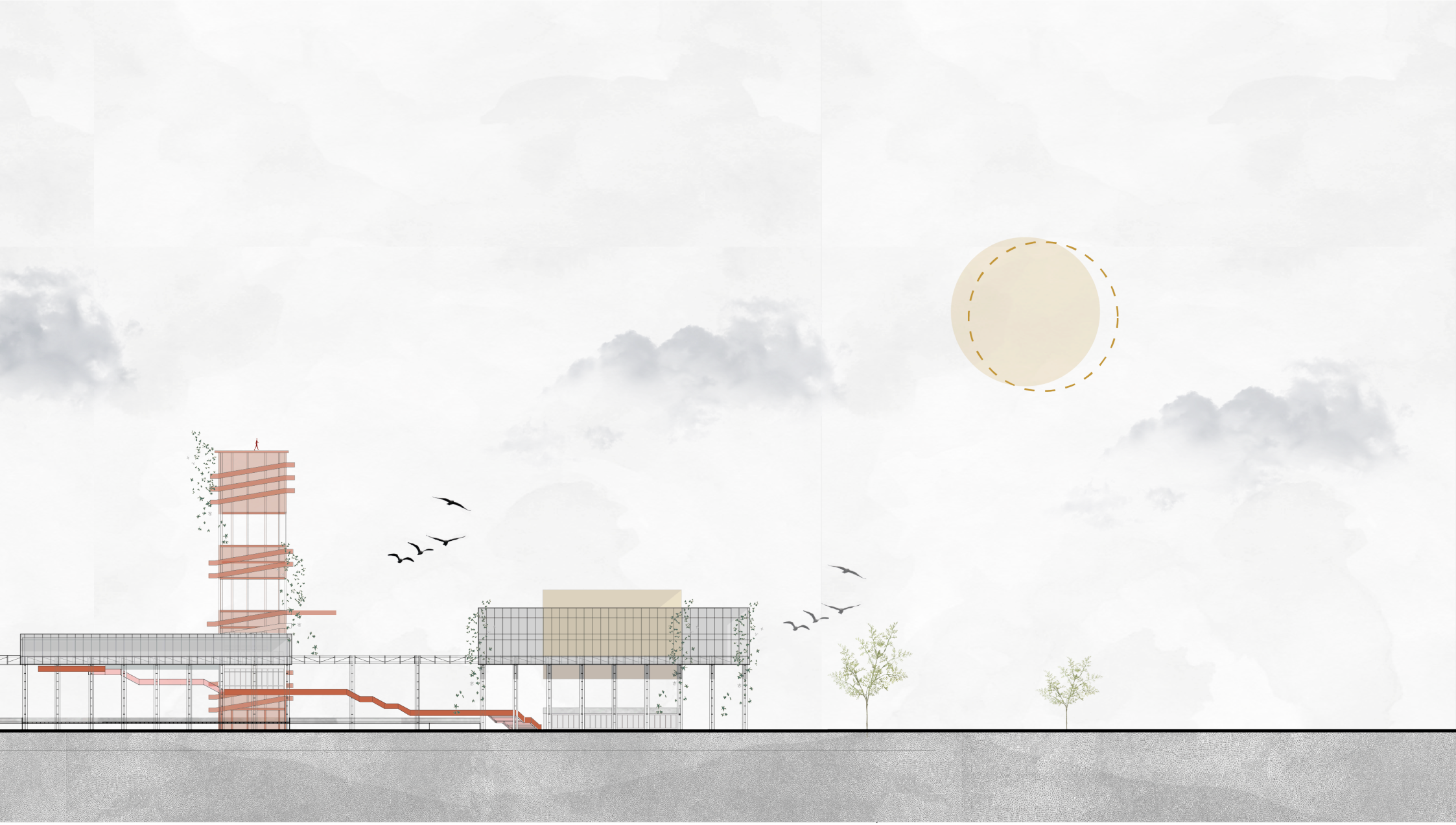






LONGITUDINAL SECTION
N-S SECTION
SCALE 1:2000



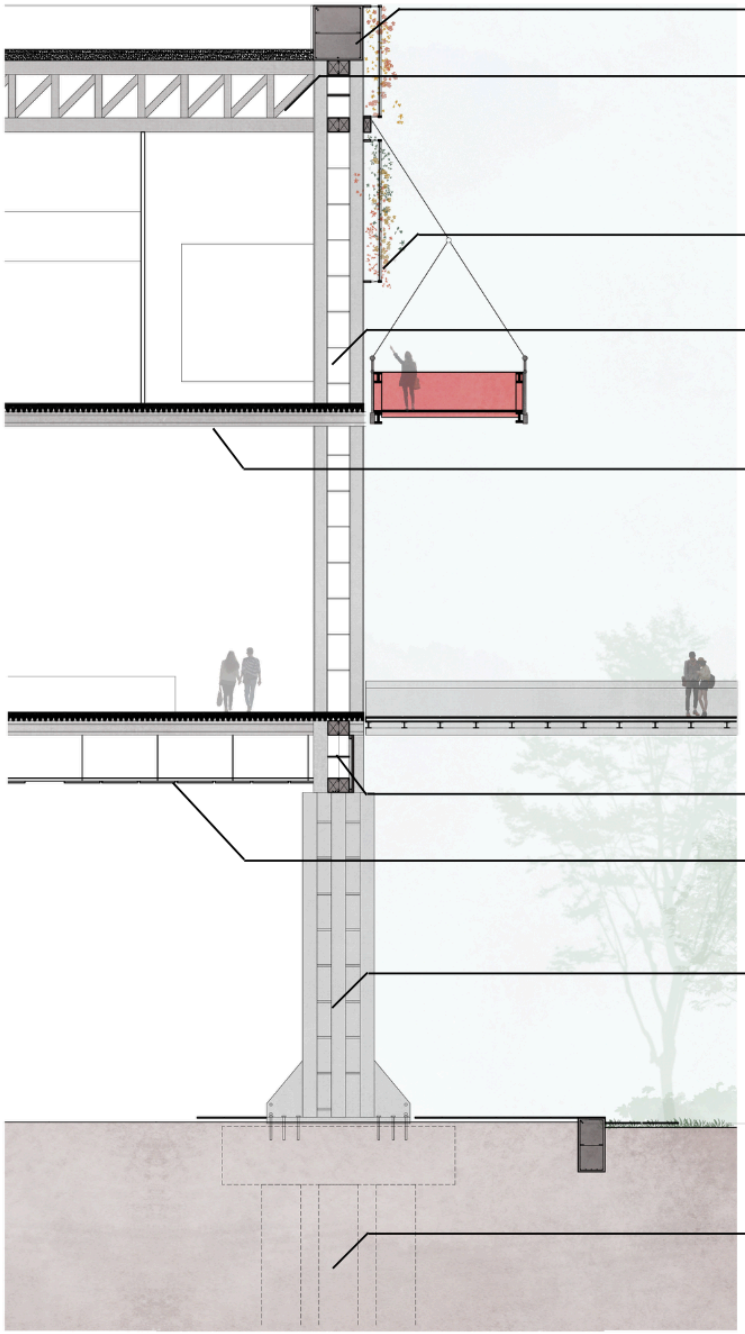


CATAMARCA STREET FACADE
N-S DIRECTION
SCALE 1:2000


ARRIVA



Construction Detail



Apretada de H° A° (1:2:3).

Estructura resistente del techo: VIGA RETICULADA METALICA compuesta por perfiles laminados en caliente "C" vinculados por soldadura tipo cordon.

Cerramiento: chapa perforada de 5mm.

Estructura resistente: COLUMNA METALICA compuesta por perfiles laminado en caliente "T" vinculados por soldadura tipo cordon.

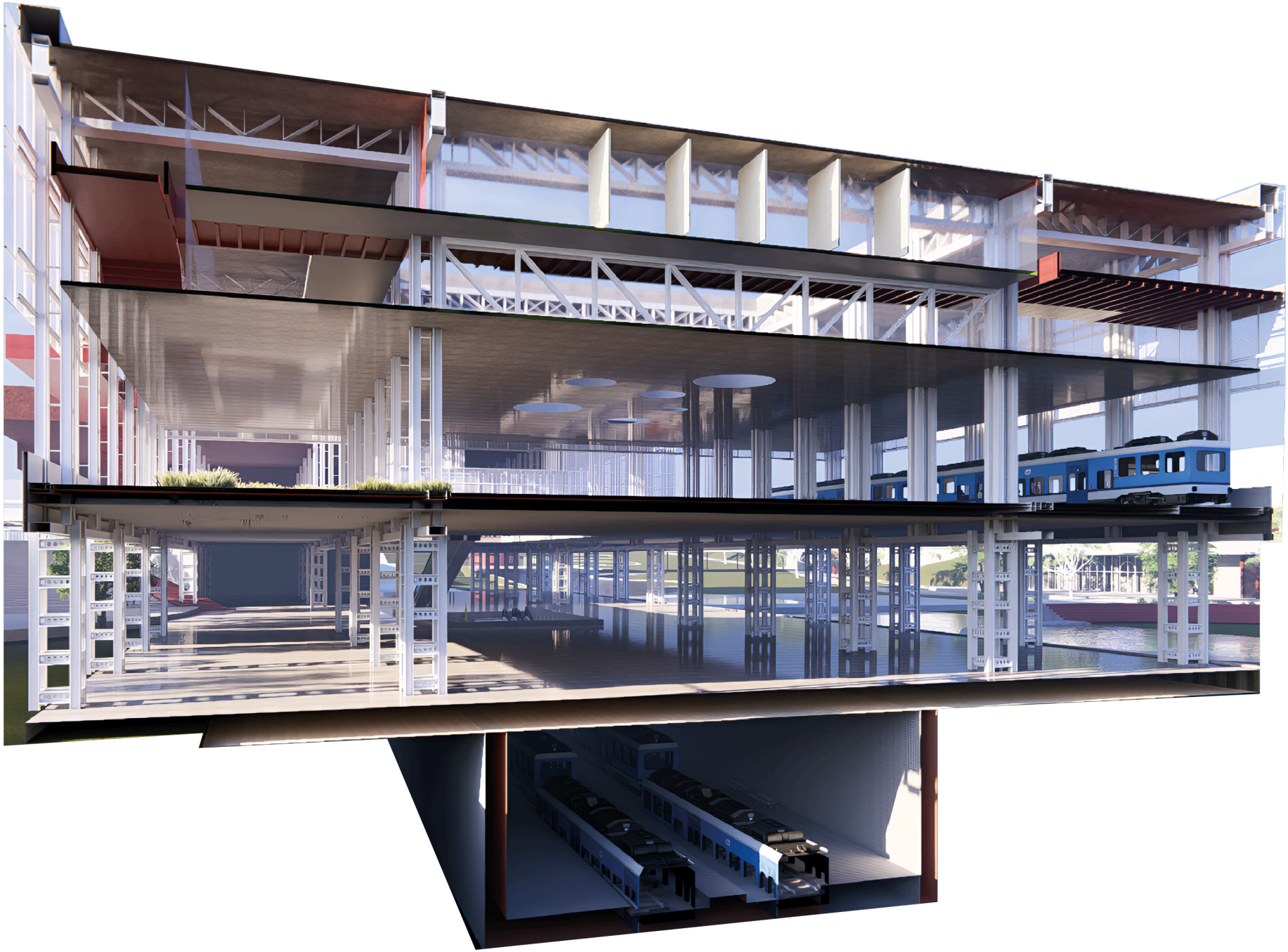
Estructura resistente del entrepiso: STEEL DECK/LOSA CERO.

Estructura resistente del edificio: VIGA VIERENDEEL.

Cielorraso metalico lineal.

Estructura resistente del eficio: COLUMNA METALICA compuesta por perfiles laminado en caliente "T" vinculados por soldadura tipo cordon.

Sistema de fundacion: PILOTES DE H° A°.

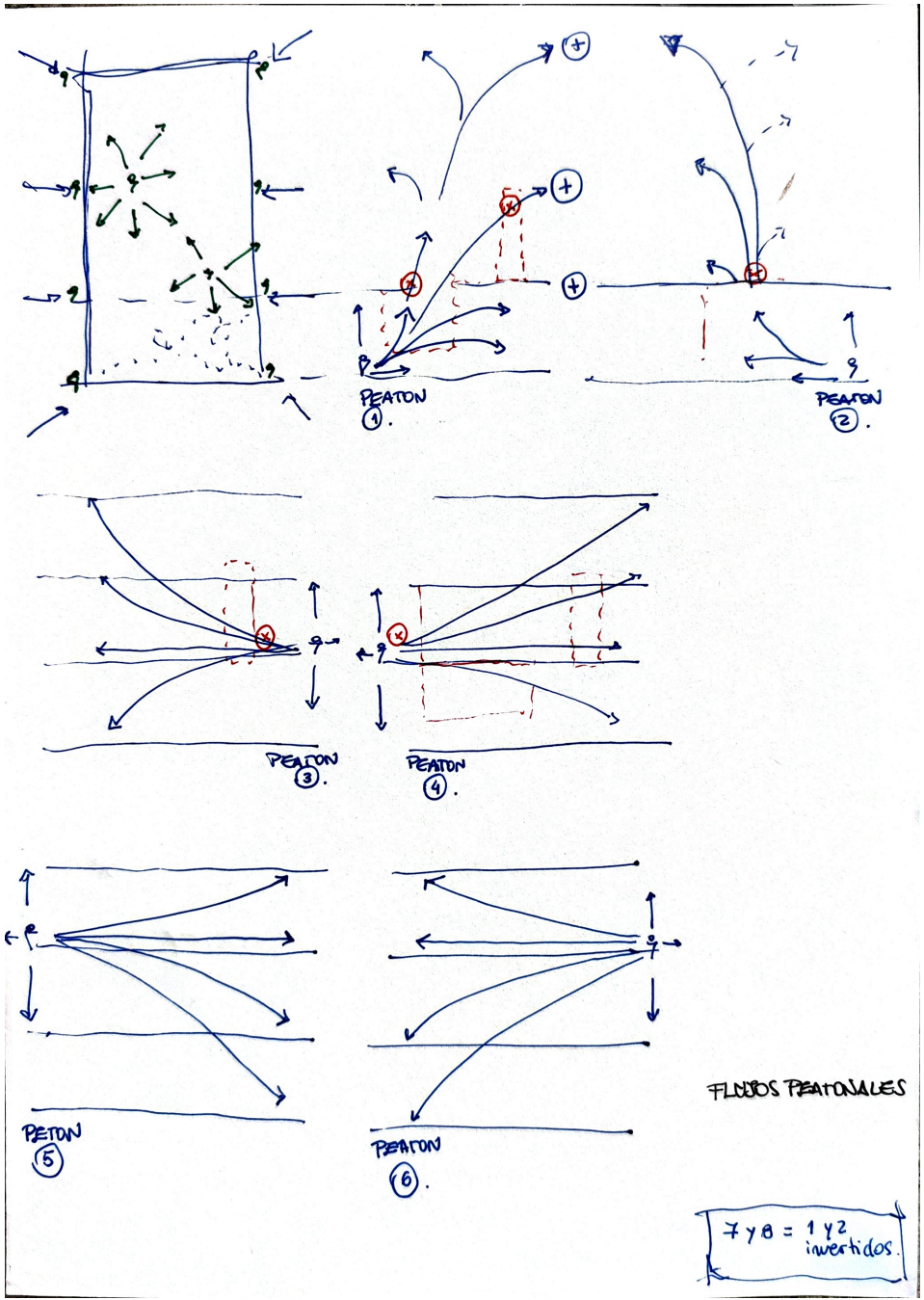


7. APPENDIX

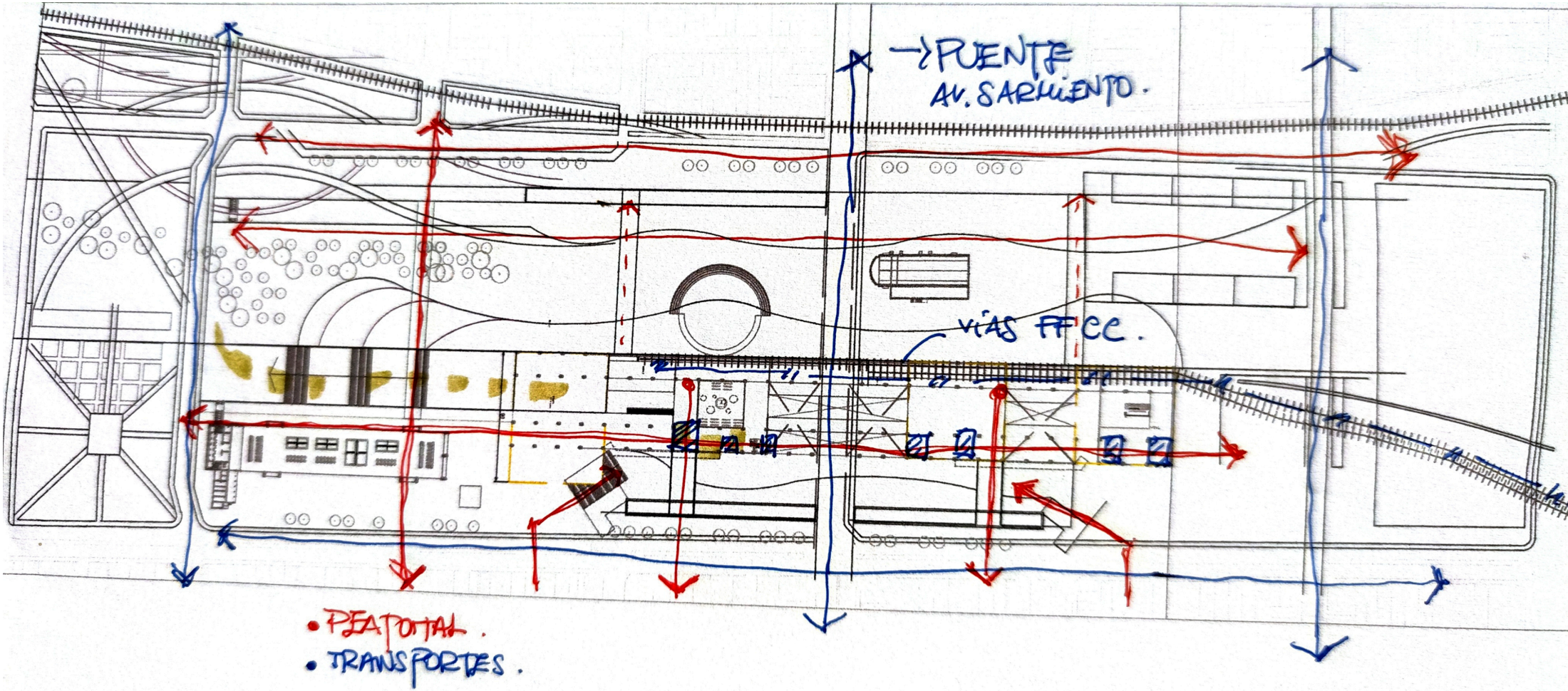
Mesoscale Analysis drawing

Movement Possibilities





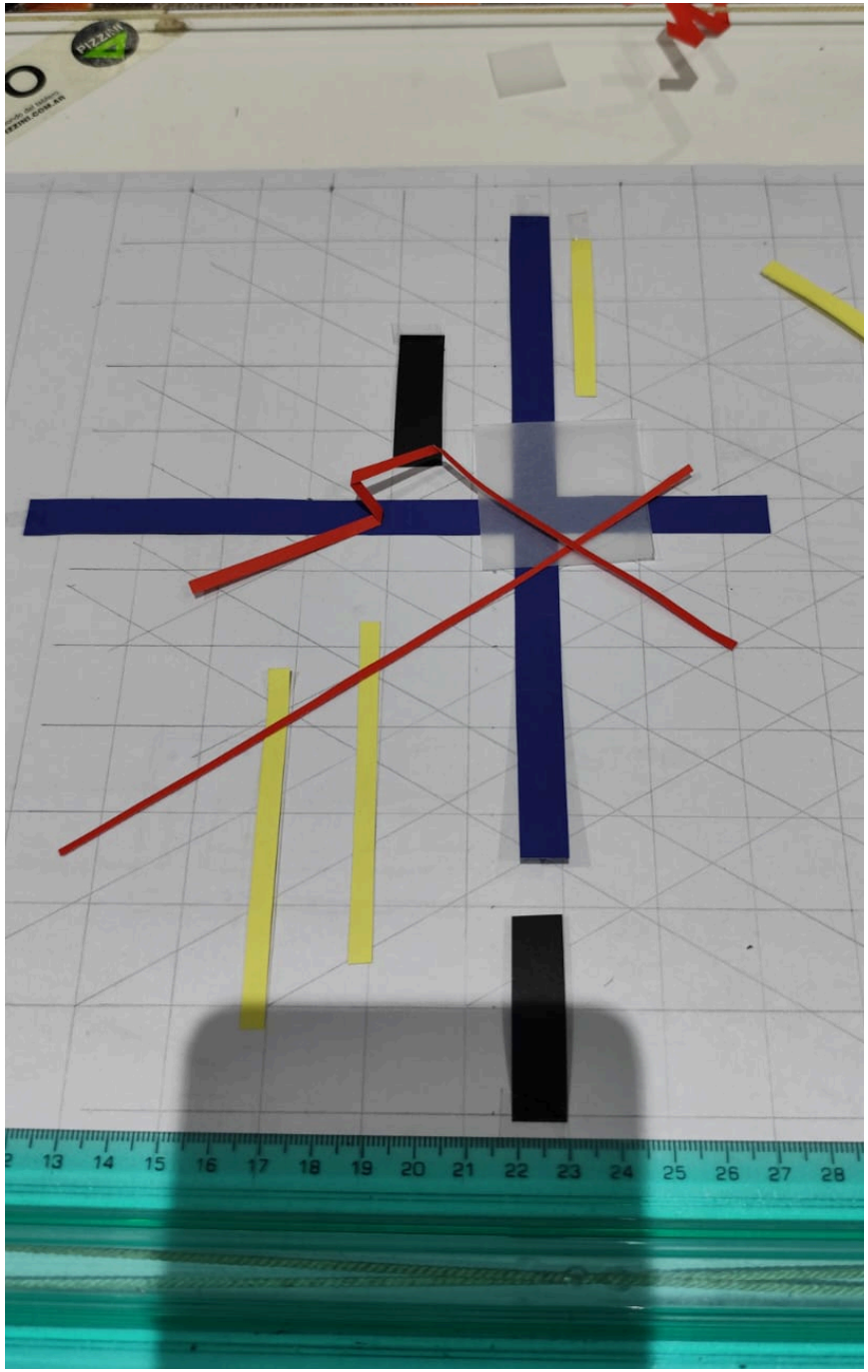
Flow Simplification



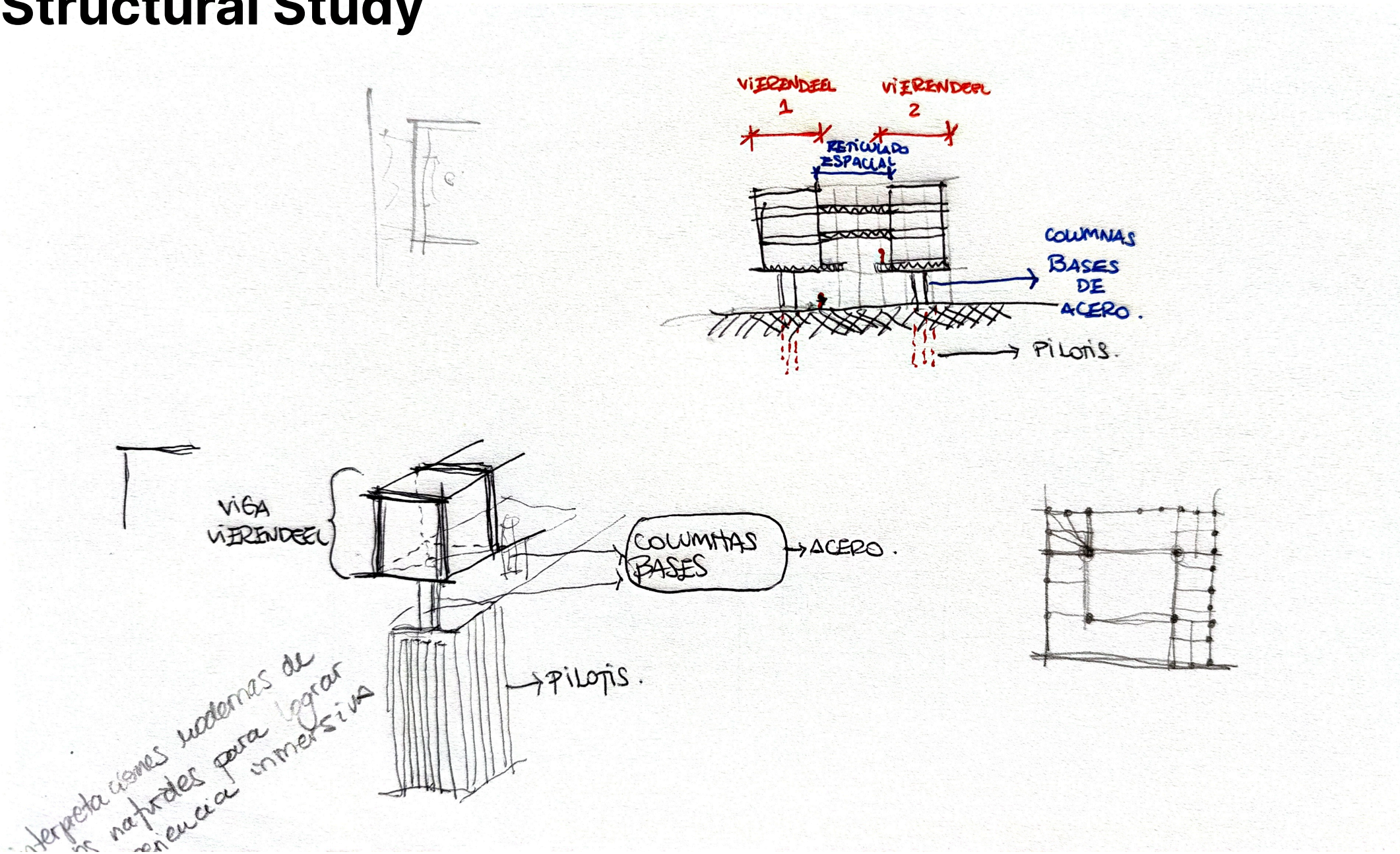
Methodological Tools

SITE STUDY

EXPLORATIONS OF SPATIAL CONNECTIONS



Structural Study



Dimensioning Justifications

TRT- TREN REGIONAL TUCUMANO

San Miguel de Tucumán, como capital provincial, concentra una parte significativa de las oportunidades laborales, educativas y de servicios. Aunque no todos los habitantes de la provincia se trasladan diariamente a la capital, es de público conocimiento que un porcentaje lo hace por motivos laborales o educativos.

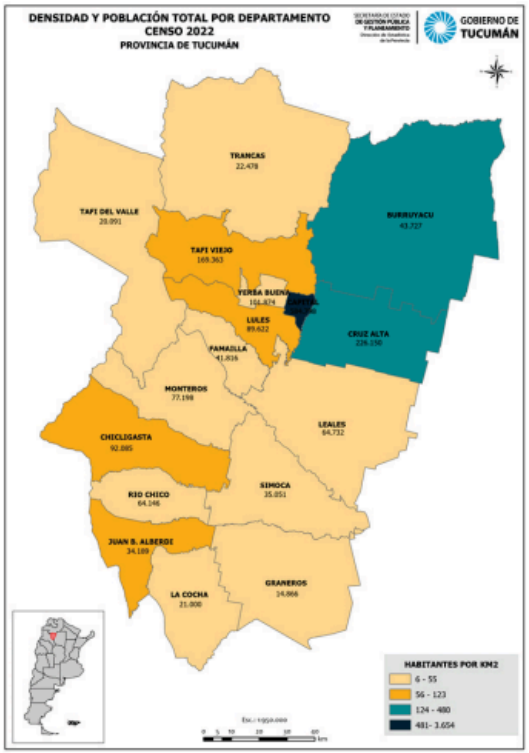
TREN A NIVEL- TRT

Si estimamos que aproximadamente el 10% de la población total realiza viajes diarios a San Miguel de Tucumán por motivos laborales, tendríamos:

1.731.820 x 0.10 = 173.182 personas

Sin embargo no todas ellas realizarian el viaje en tren, pudiendo optar por buses rurales o vehiculo propio. O bien, no se dirigirían directamente a San Miguel de Tucumán, pudiendo descender en otras estaciones rurales.

Por tanto se estima una captación de un 20% del total, trasladando aproximadamente 34.600 personas por día, en flujos de viaje sur-centro / norte- centro. En 4 franjas horarias, dando un aproximado de 34.600 / 4 = 8.650 pasajeros por tren



Dimensioning Justifications

SUBTERRANEO DE ALTA VELOCIDAD METROPOLITANO -REM

Según el artículo, en 2024 se registraron aproximadamente 3,5 millones de viajes diarios en el AMeT, de los cuales solo 160.000 se realizaron en ómnibus, representando menos del 10% del total. Hace 15 años, el 35% de los viajes se efectuaban en colectivo, lo que indica una disminución significativa en el uso del transporte público tradicional. La ciudad creció, demográfica y territorialmente, y por el contrario, se ha disminuido el uso del transporte público y ha crecido la utilización de medios de transporte privados e informales y motocicletas.



LA GACETA

Sociedad > Estilo de vida

En lo que va del año, menos de un 10% de tucumanos usa el ómnibus

Hace 15 años, un 35% de los habitantes del área metropolitana de la provincia se trasladada en colectivo. Una centralidad que ya no existe.

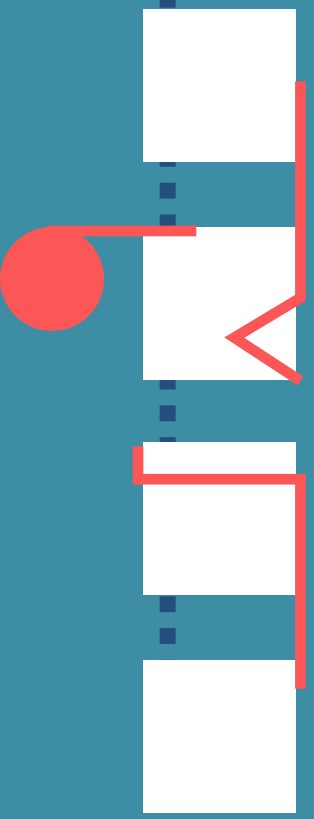
METRO- REM

Si se logra captar incluso un 10% de los viajes diarios actuales, esto equivaldría a 350.000 pasajeros diarios.

Se prevee que en hora pico, se podrían desplazar hasta 45.000 pasajeros por hora intercambiando municipalidades del AMeT. Teniendo en cuenta que en este proyecto, no toda la demanda del AMeT será absorbida por el metro, al ser un sistema intermodal donde tranvías, buses y bicis públicas completan la red. **El metro debe cubrir los flujos más intensos y distantes, es decir, los ejes estructurantes intermunicipales rápidos, y dejar los tramos finos y de cercanía a modos complementarios.**

Considerando una captación del 8% al 10% de los viajes diarios del AMeT, **se estima que el sistema de metro transportará aproximadamente 300.000 pasajeros diarios,** con una demanda de hasta 37.500 pasajeros por hora en sentido pico. **Para atender esta demanda, la red operará con trenes de 6 coches, cada uno con capacidad para 200 a 220 pasajeros. Con una frecuencia de 1 tren cada 2 minutos**, se requerirá una flota de 70 trenes (420 coches), incluyendo unidades de reserva.

La estación en el sector REM fue dimensionada para un aforo de hasta 1.250 pasajeros por tren (2 personas/m2), con una rotación de un tren cada 2 minutos. En condiciones pico, **el andén central debe alojar hasta 500 personas simultáneamente, por lo que se proyectan 250 m² por andén, por sentido.**



This project is born from a profound passion and the conviction that imagining a better, more just, and livable city is the first step toward building it. -

THANK YOU!

2026