ECOLOGICAL REMEDIATION

AN URBAN LANDSCAPE STRATEGY FOR GUANAJUATO

DAVID ALDANA TRUJILLO
5095018

ECOLOGICAL REMEDIATION

INTRO / ANALYSIS / EXPLORATION / DESIGN / CONCLUSION

INTRO

Photo by: NASA

Photo by: NASA

Photo by: Nick van den Berg

Photo by: Naja Bertolt Jensen

Photo by: Nick van den Berg

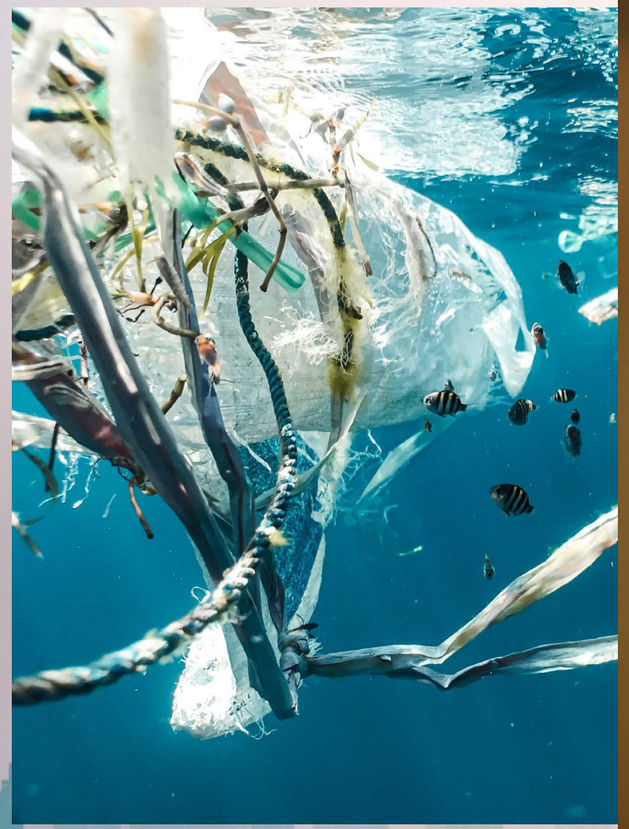

Photo by: Chris LeBoutillier

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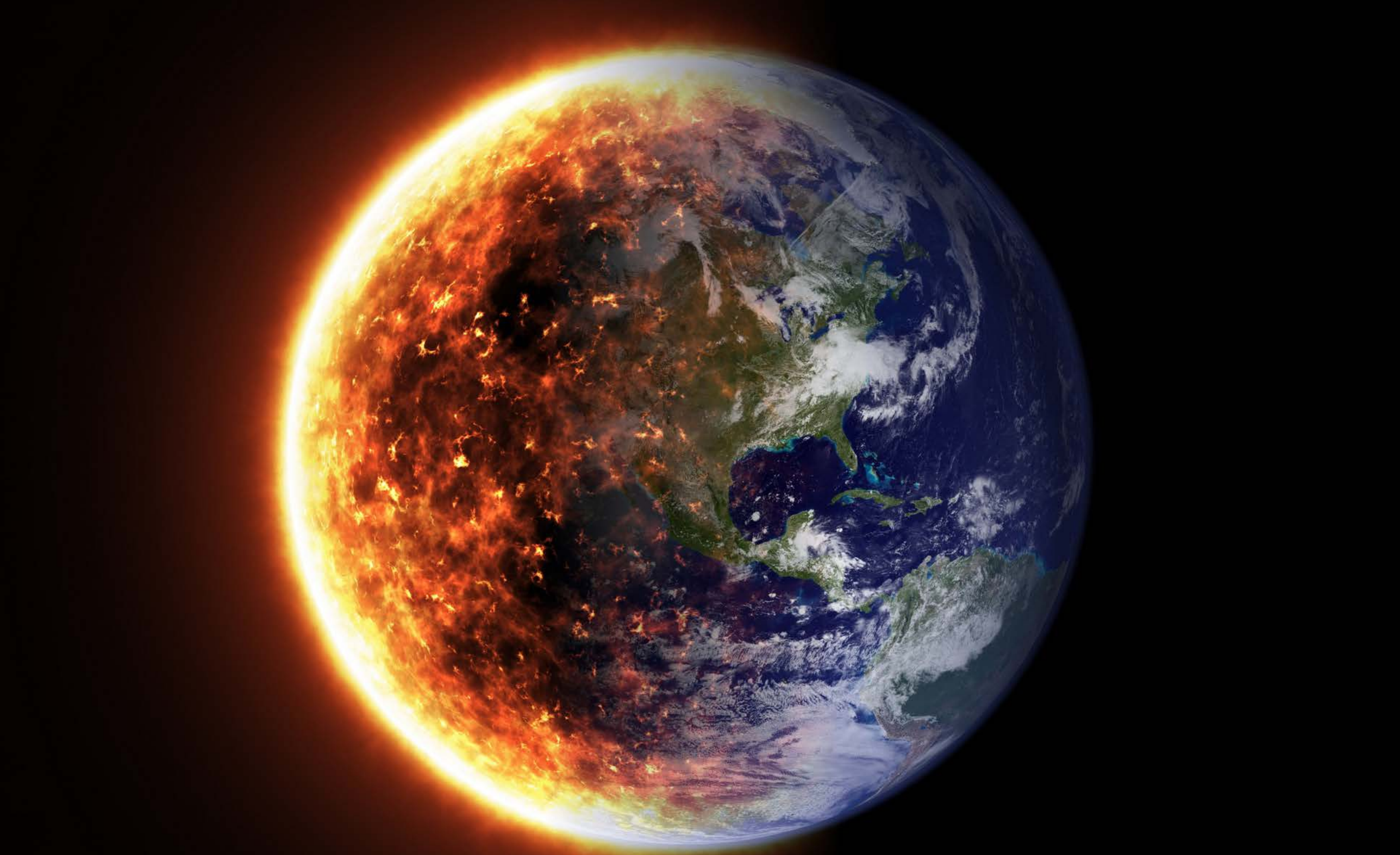

WE!

Photo by: Rhett A. Butler
https://rainforests.mongabay.com/amazon/amazon_destruction.html

Photo by Author

1/3

Photo by : ISTOCK.COM, VAARA
https://www.the-scientist.com/news-opinion/deforestation-tied-to-changes-in-disease-dynamics-65406

Photo by: Ulet Ifansasti / Greenpeace
https://www.greenpeace.org.au/what-we-do/protecting-forests/threats/

Photo by: Francois Savigny

Photo by: Alfie Photography

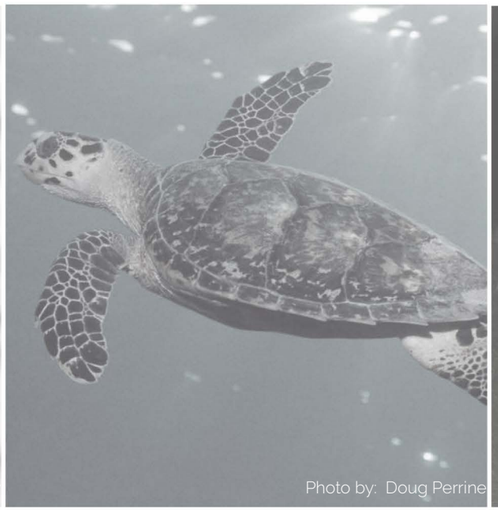
Photo by: Doug Perrine

Photo by: Anup Shah

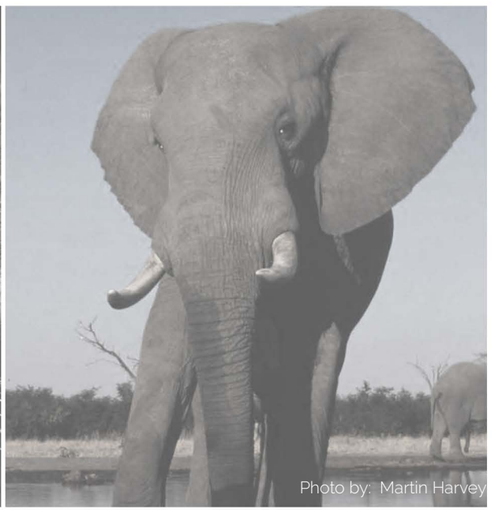
Photo by: Martin Harvey

Photo by: Richard Barrett

Photo by: Zig Koch

Photo by: [illegible] Corral

Photo by: David Lawson

Photo by: William Burrad-Lucas

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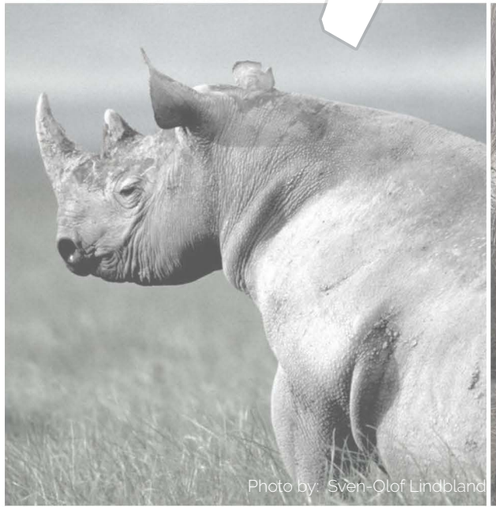


Photo by: Sven-Olof Lindblad

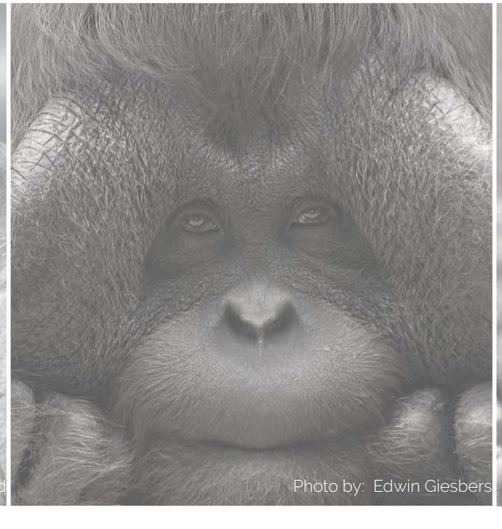


Photo by: Edwin Giesbers

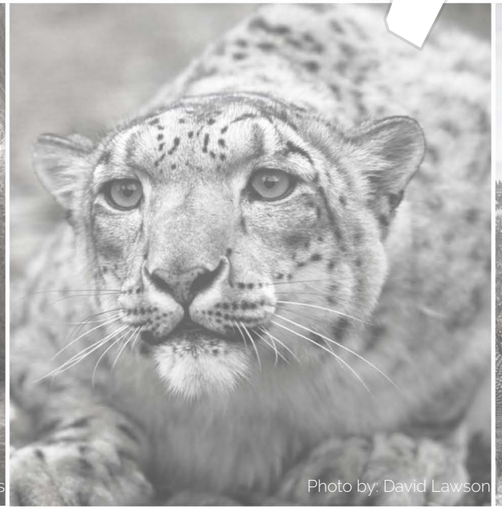


Photo by: David Lawson

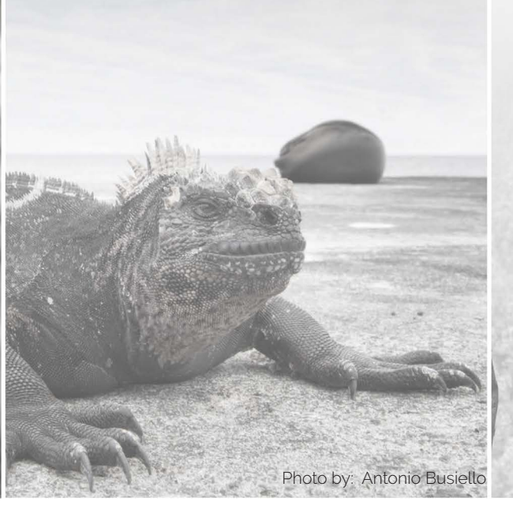
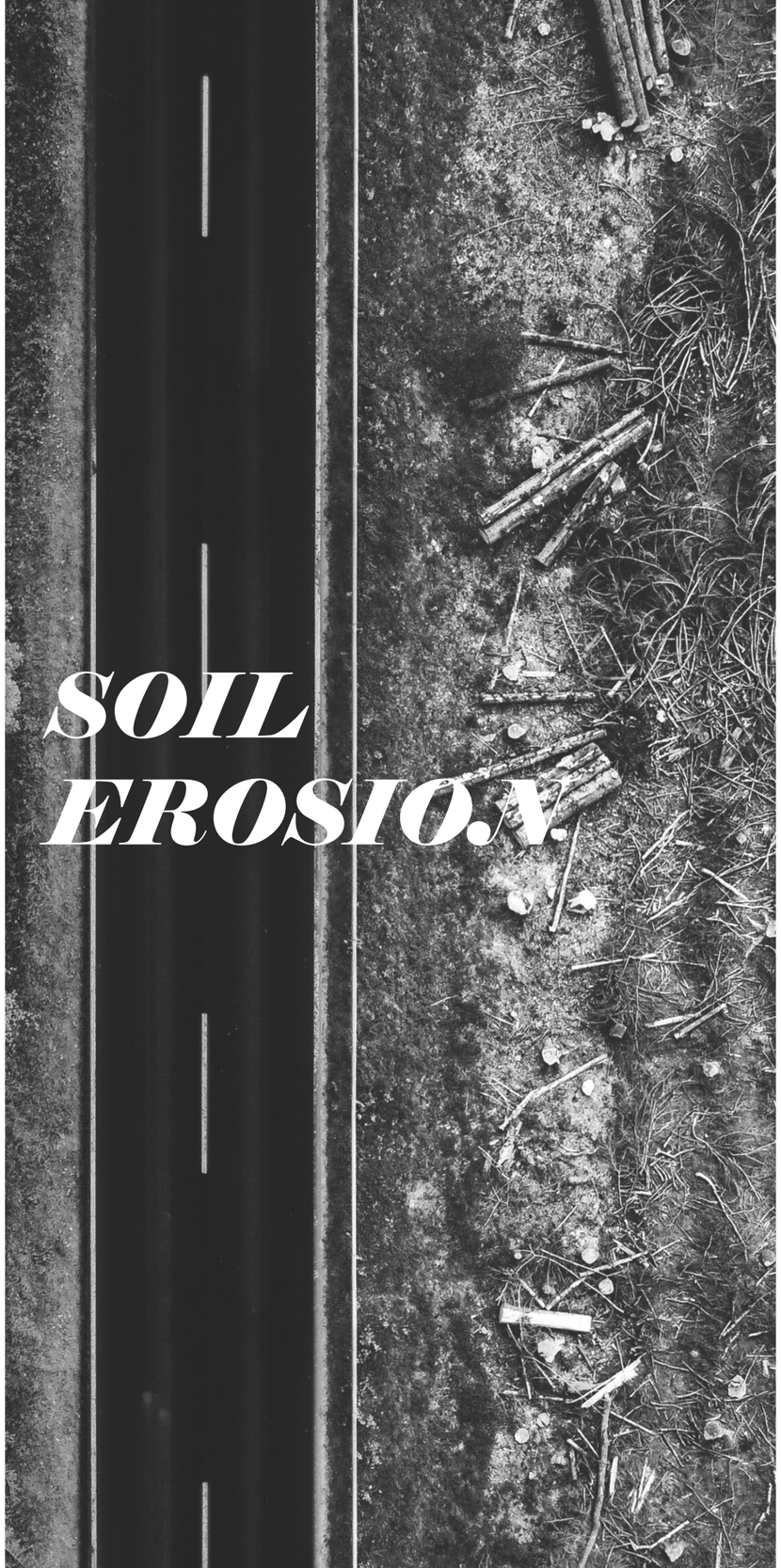
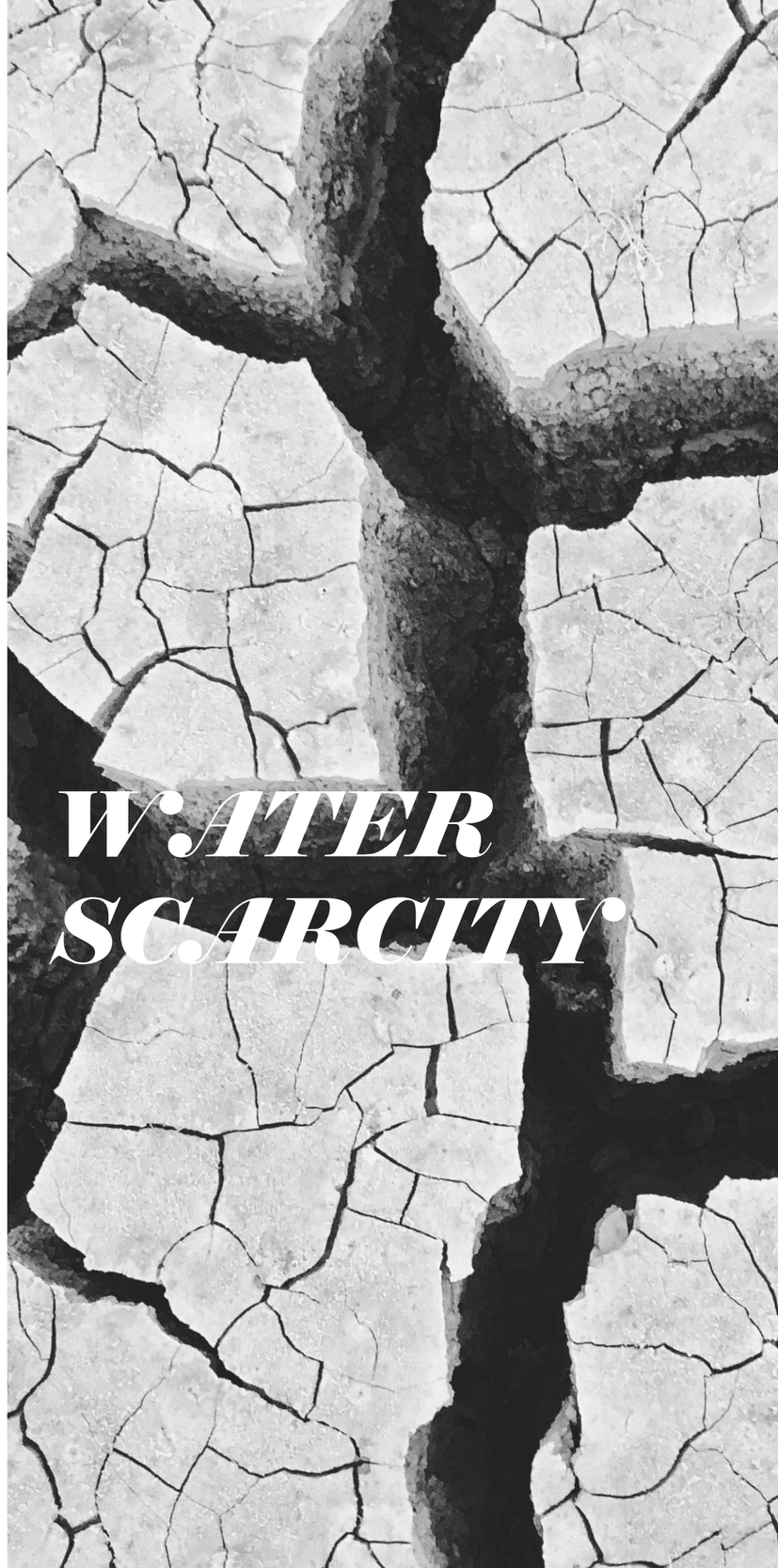


Photo by: Antonio Busiello

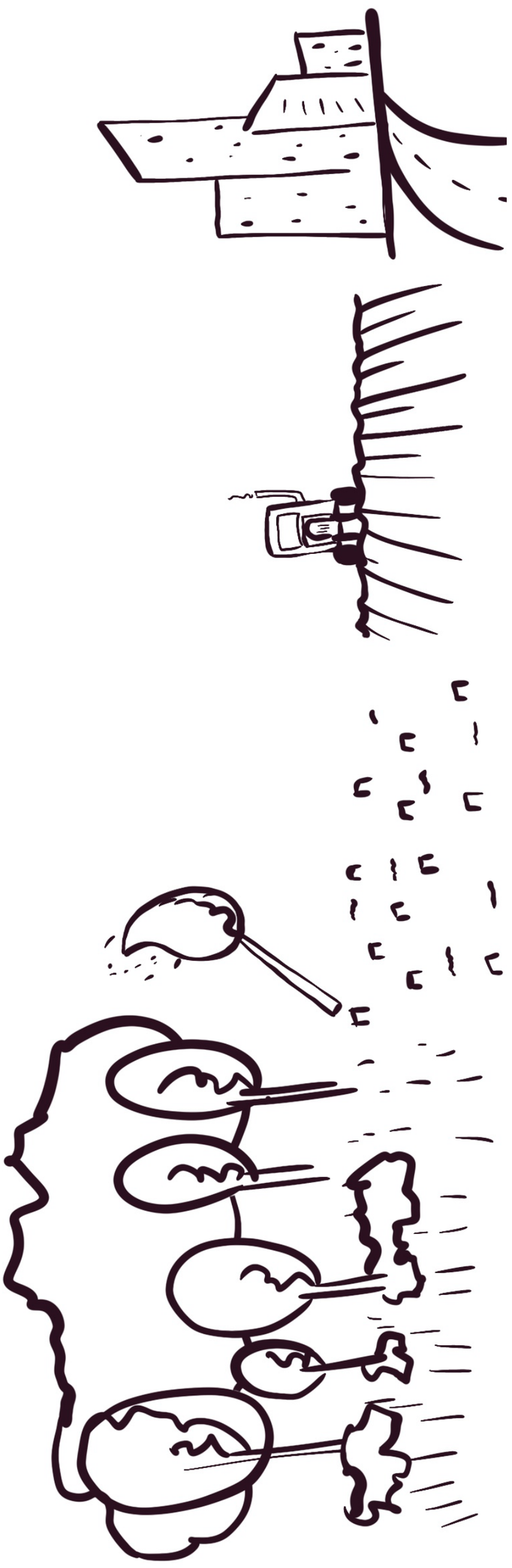
Photo by: Juan Carlos Munoz

AIR
POLLUTION


SOIL
EROSION


WATER
SCARCITY

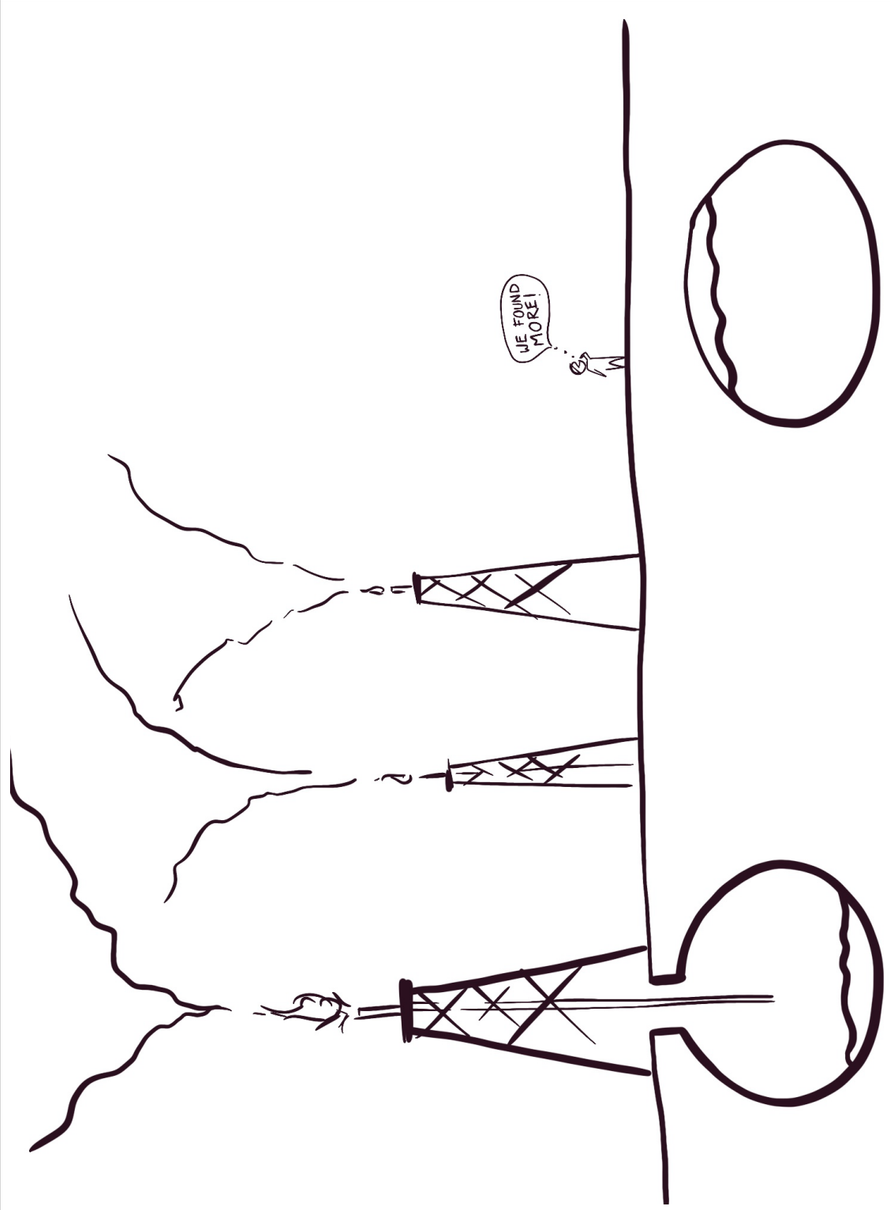
WHY?



HERE WE BUILD
PLOGRESS

HE FOUND
MORE!

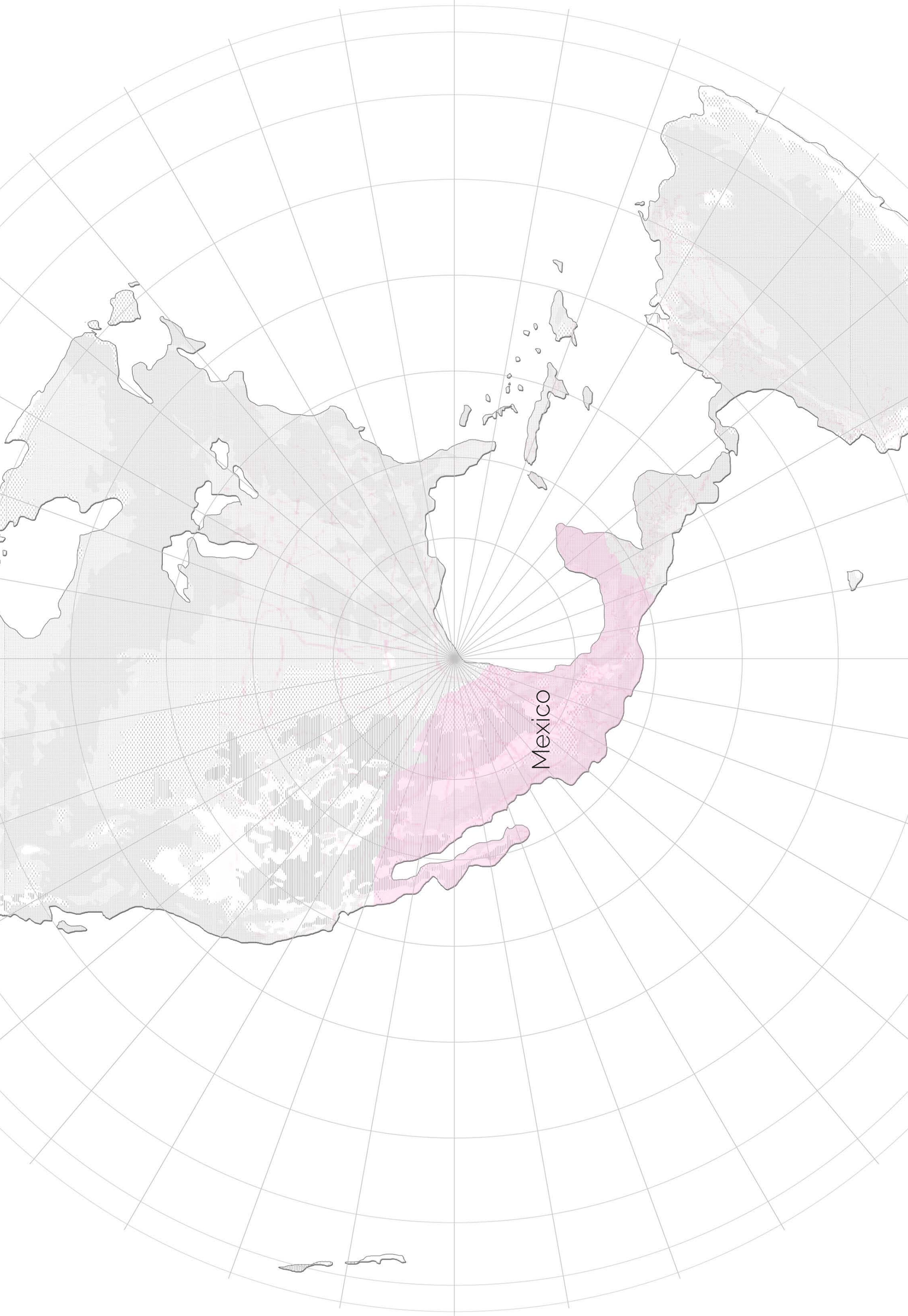
HERE WE BUILD
PLAYGROUNDS

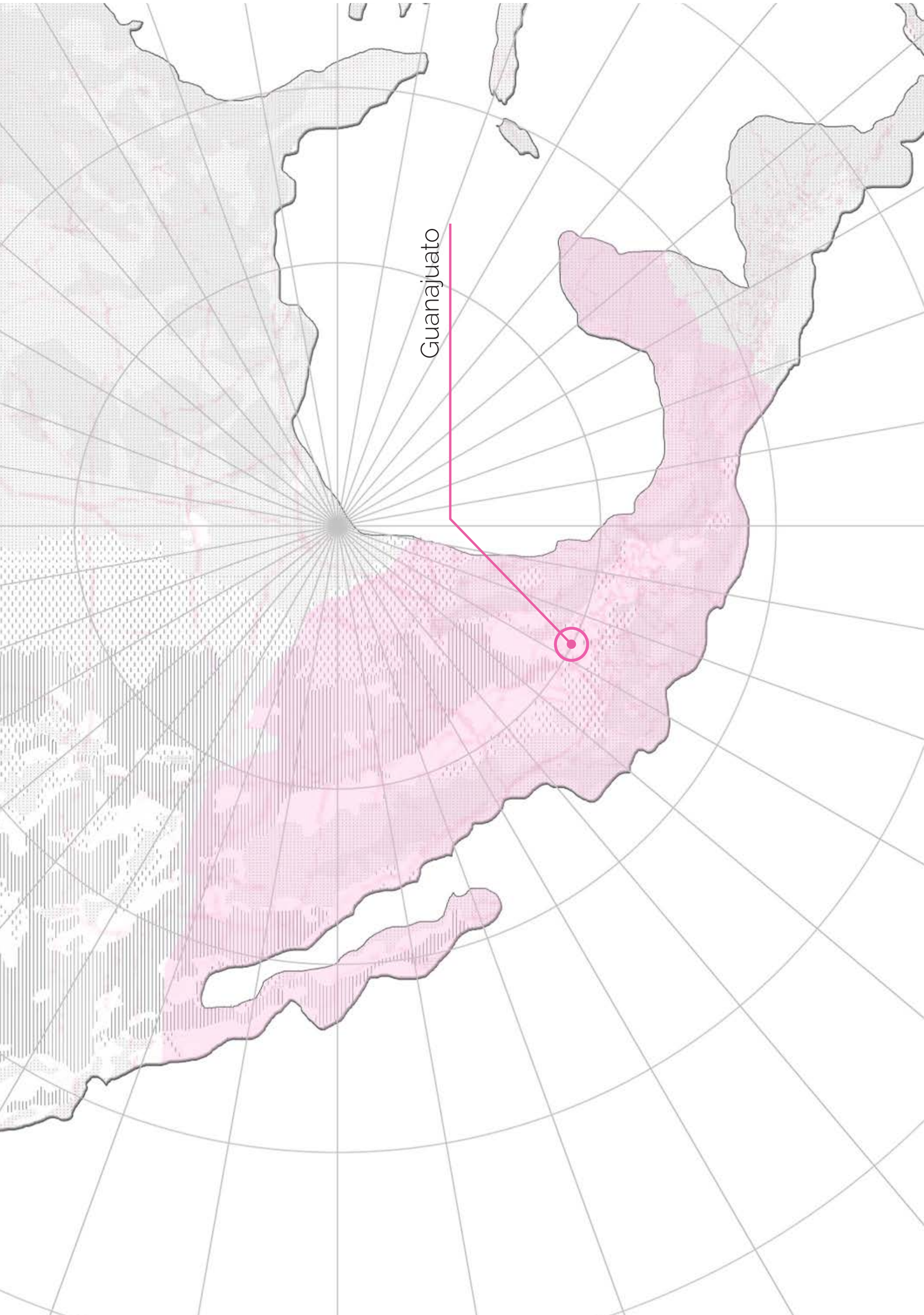

WE FOUND MORE!

WE FOUND MORE!

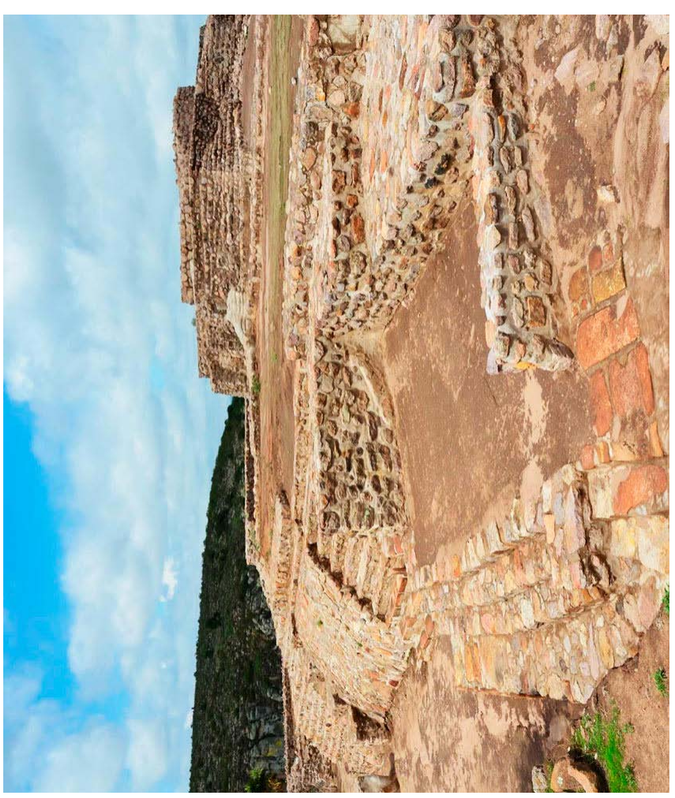
HERE WE BUILD PROGRESS

PROJECT LOCATION


Mexico


Guanajuato

HISTORIC RELEVANCE



Guanajuato

Creator: Thomas Chamberlin

San Miguel de Allende

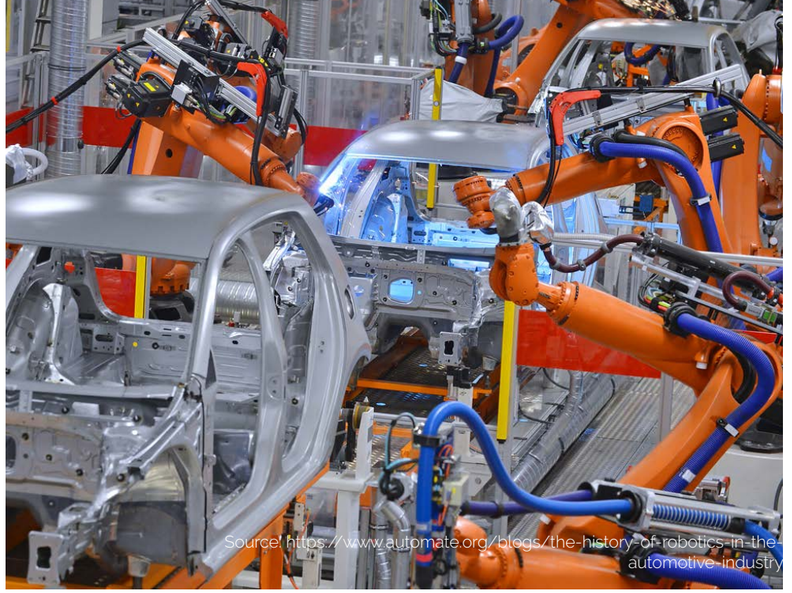
Dolores Hidalgo

Creator: Skystudio

COLONIAL CITIES + RICH ARCHITECTURE

Refinery

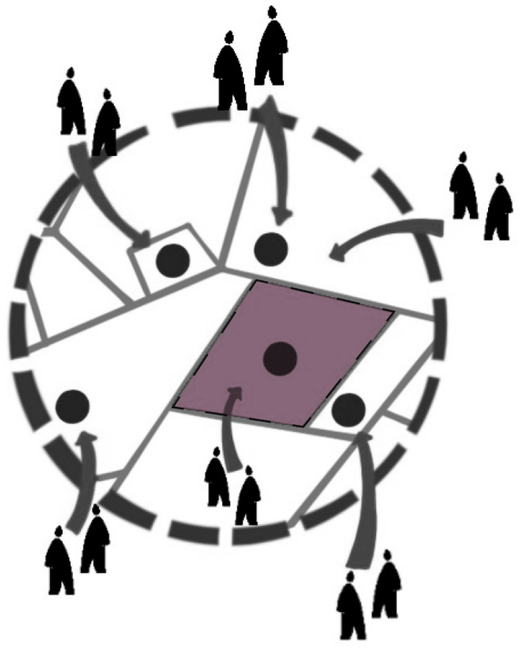
Shoe & Leather



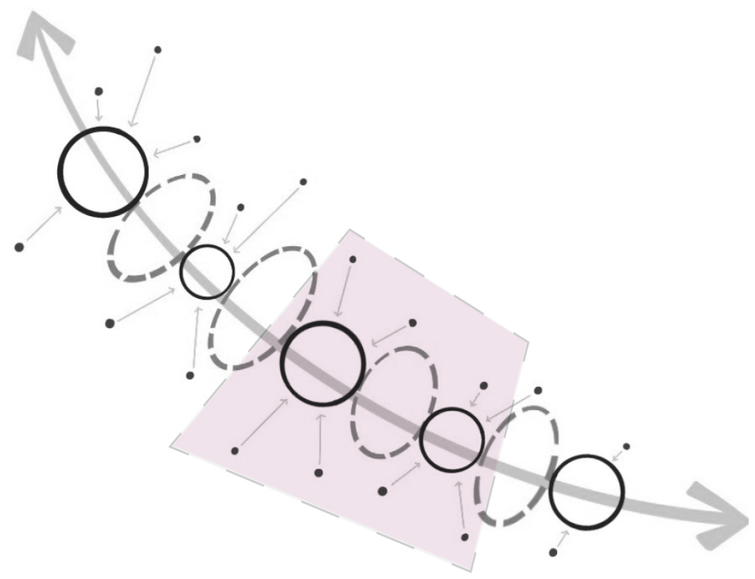
Automobile Manufacturing

INDUSTRIAL HUB

Guanajuato



Migration Trends from Other States



Central Corridor Guanajuato

5 Major Cities

POPULATION INCREASE

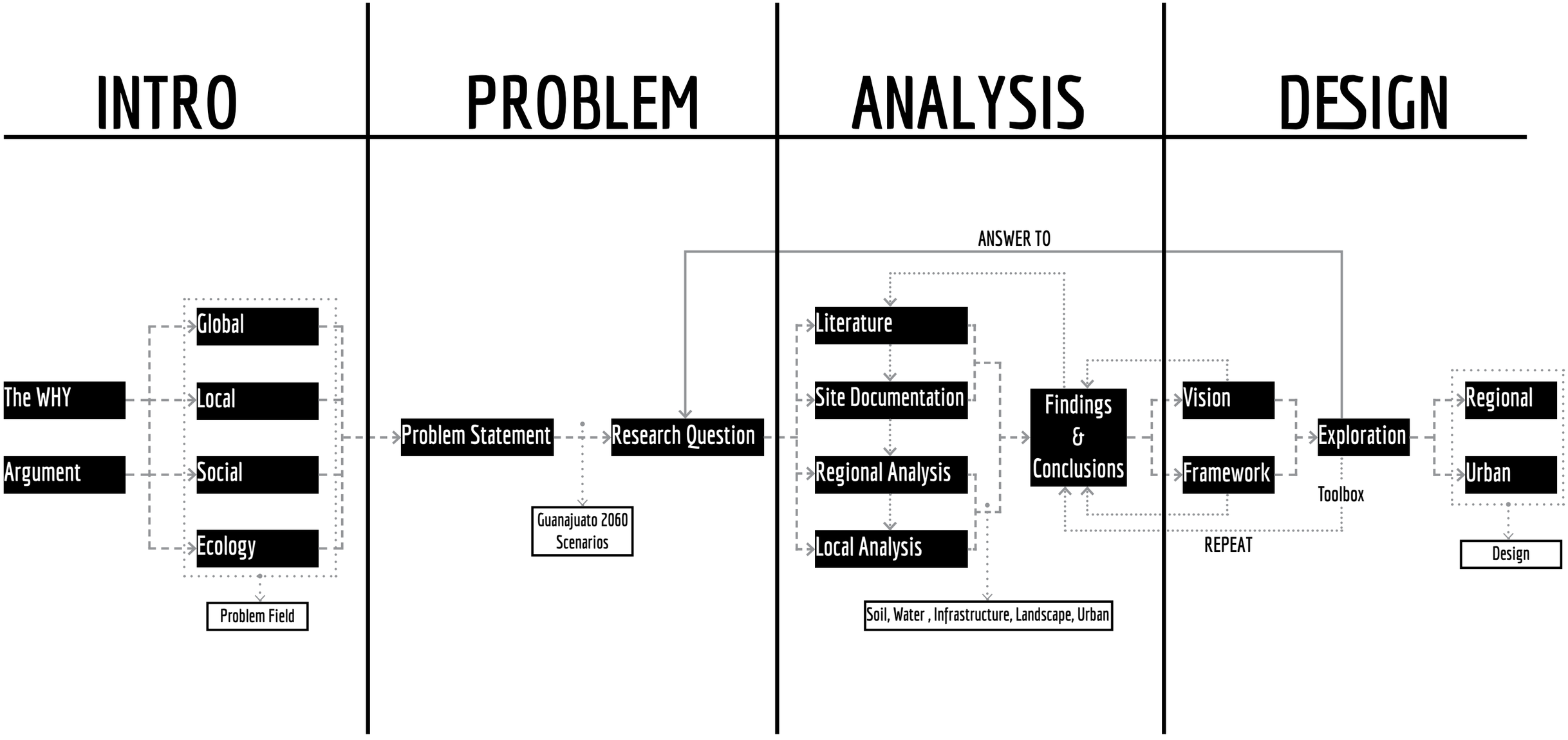
GUANAJUATO has modified its geomorphological landscape, transforming it through **URBANIZATION, INDUSTRIALIZATION & AGRICULTURE.**

This has caused **INCREASE IN POPULATION ,** that in combination with the lack of urban planning have lowered the **QUALITY OF LIFE** in urban areas and have resulted in **SOIL EROSION, WATER SCARCITY, DEFORESTATION & SPECIES EXTINCTION.**

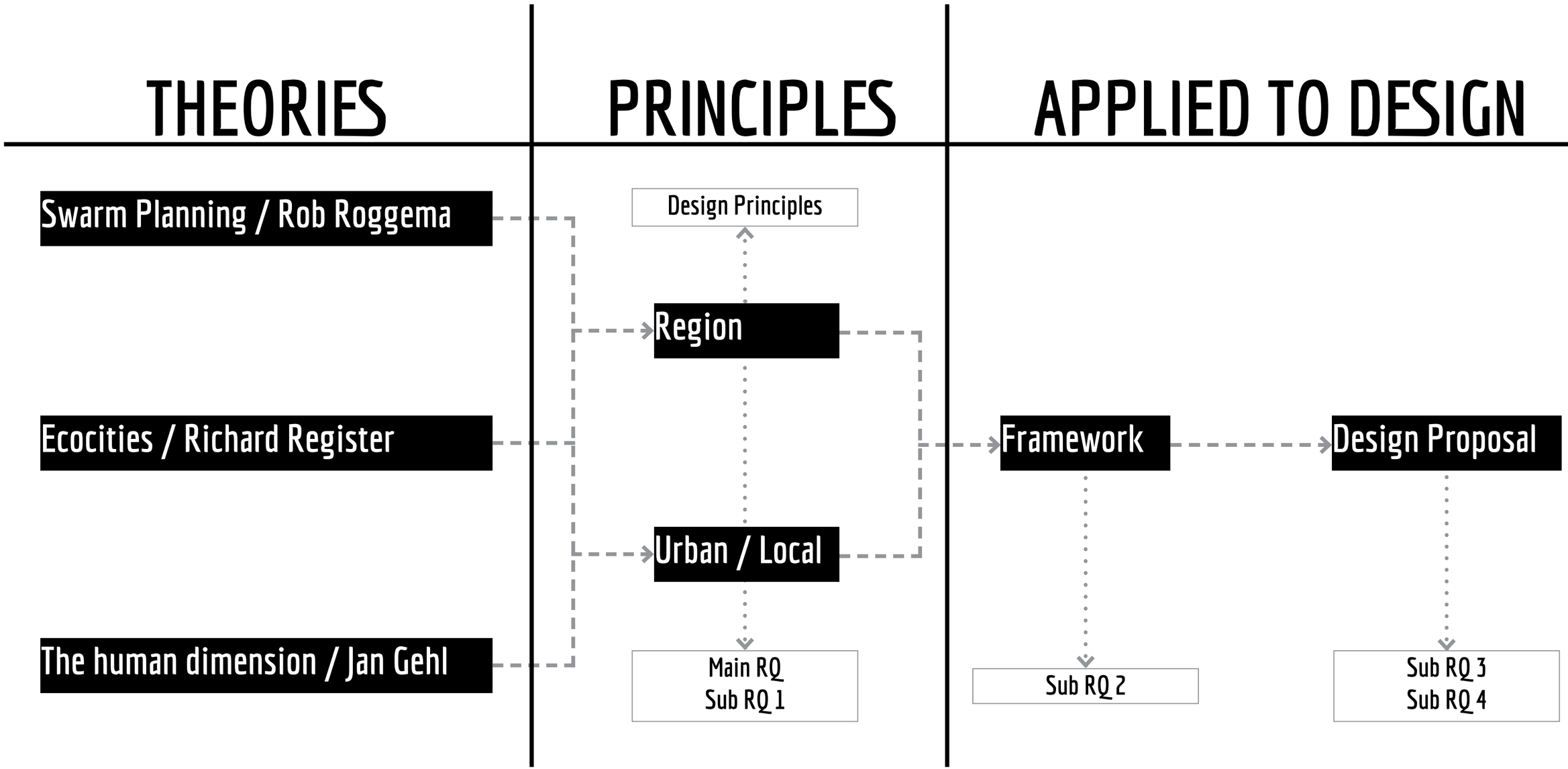
PROBLEM STATEMENT

What is an urban and ecological **REGENERATION STRATEGY** to **RESTORE** social and environmental issues caused by **ANTHROPOGENIC PRACTICES** in order to transition into a **BIODIVERSE** and **SUSTAINABLE** urban landscape?

MAIN RESEARCH QUESTION



RESEARCH FRAMEWORK



THEORY & FRAMING

ANALYSIS + DESIGN

Swarm Planning / Rob Roggema

Ecocities / Richard Register

The human dimension / Jan Gehl

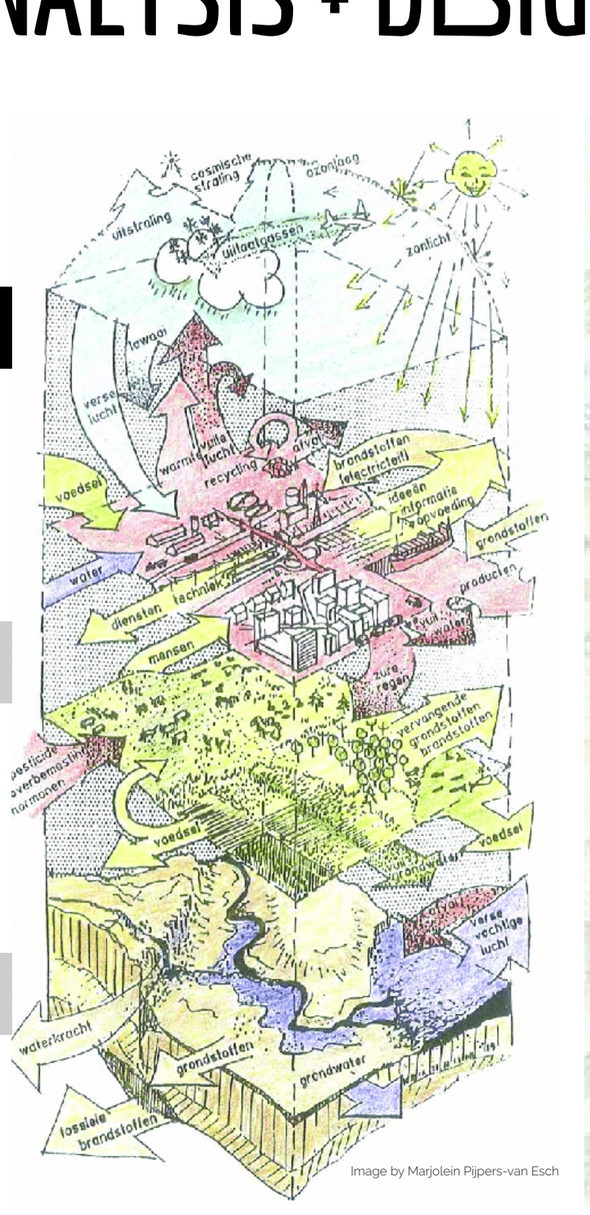
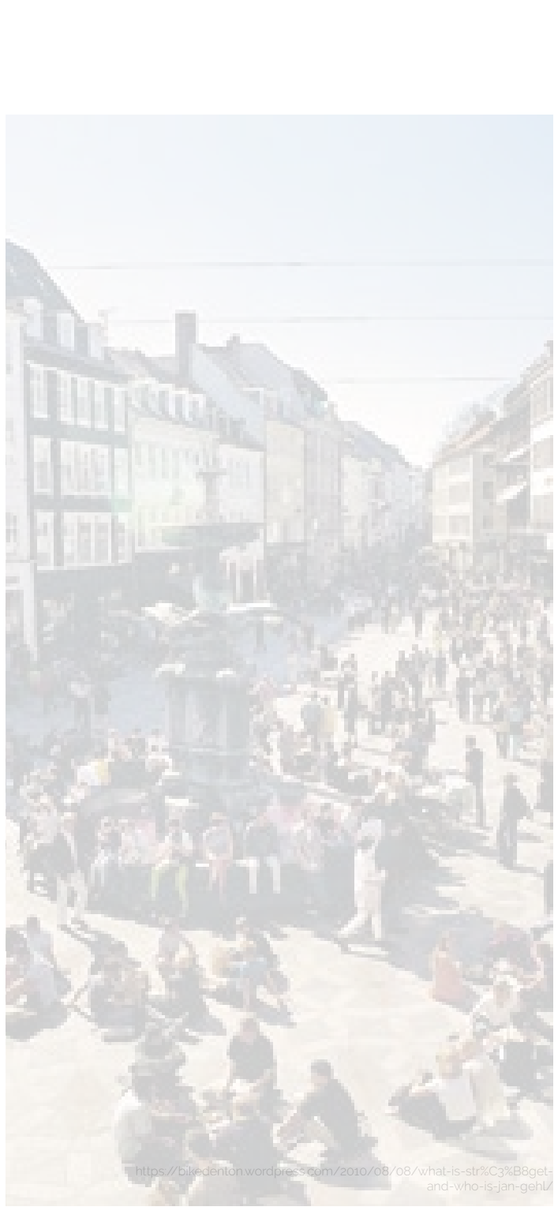


Image by Marjolein Pijpers-van Esch

Source: https://www.filmsforaction.org/news/the-ecocity-visions-of-richard-register-how-to-retrofit-your-downtown-for-true-sustainability/



https://bikedenton.wordpress.com/2010/08/08/what-is-str%C3%B8get-and-who-is-jan-gehl/

THEORY & FRAMING

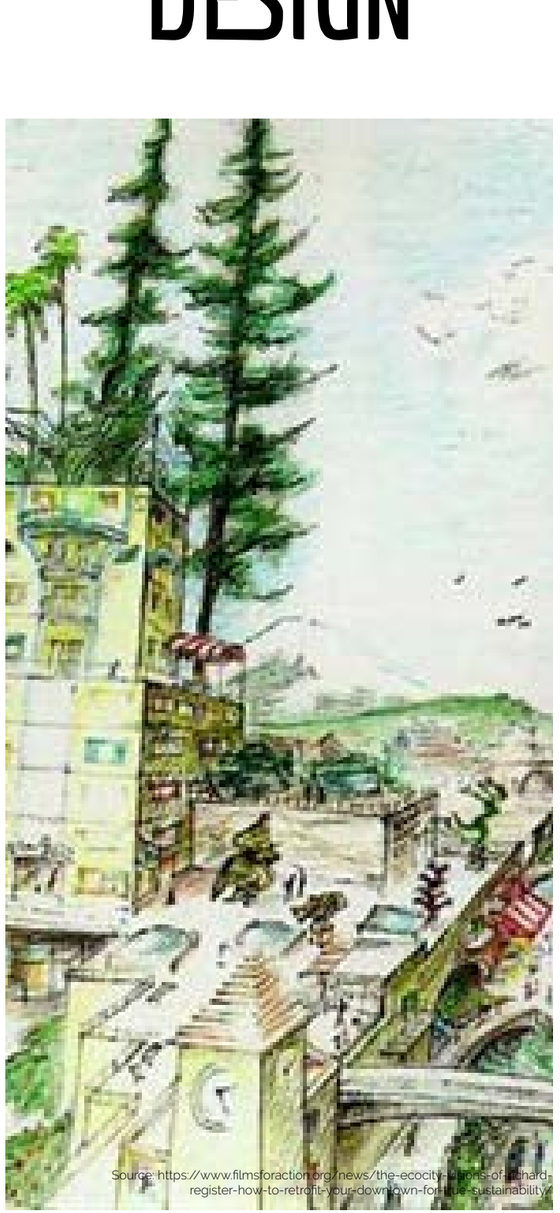
DESIGN

Swarm Planning / Rob Roggema

Ecocities / Richard Register

The human dimension / Jan Gehl

Image by Marjolein Pijpers-van Esch



Source: https://www.filmsforaction.org/news/the-ecocity-legacy-of-richard-register-how-to-retrofit-your-downtown-for-true-sustainability/

https://bike-denton.wordpress.com/2010/08/08/what-is-str%C3%B8get-and-who-is-jan-gehl/

THEORY & FRAMING

DESIGN

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The human dimension / Jan Gehl

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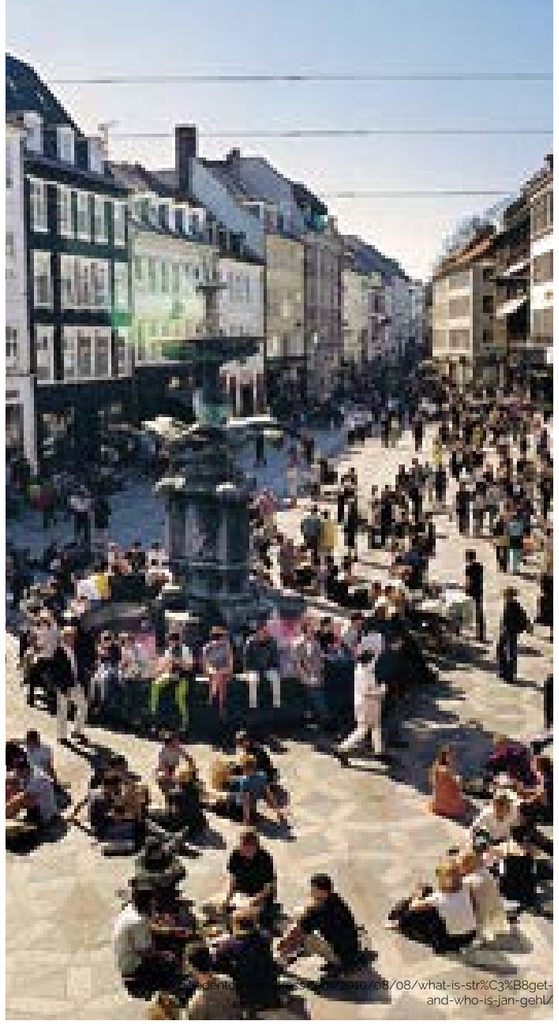
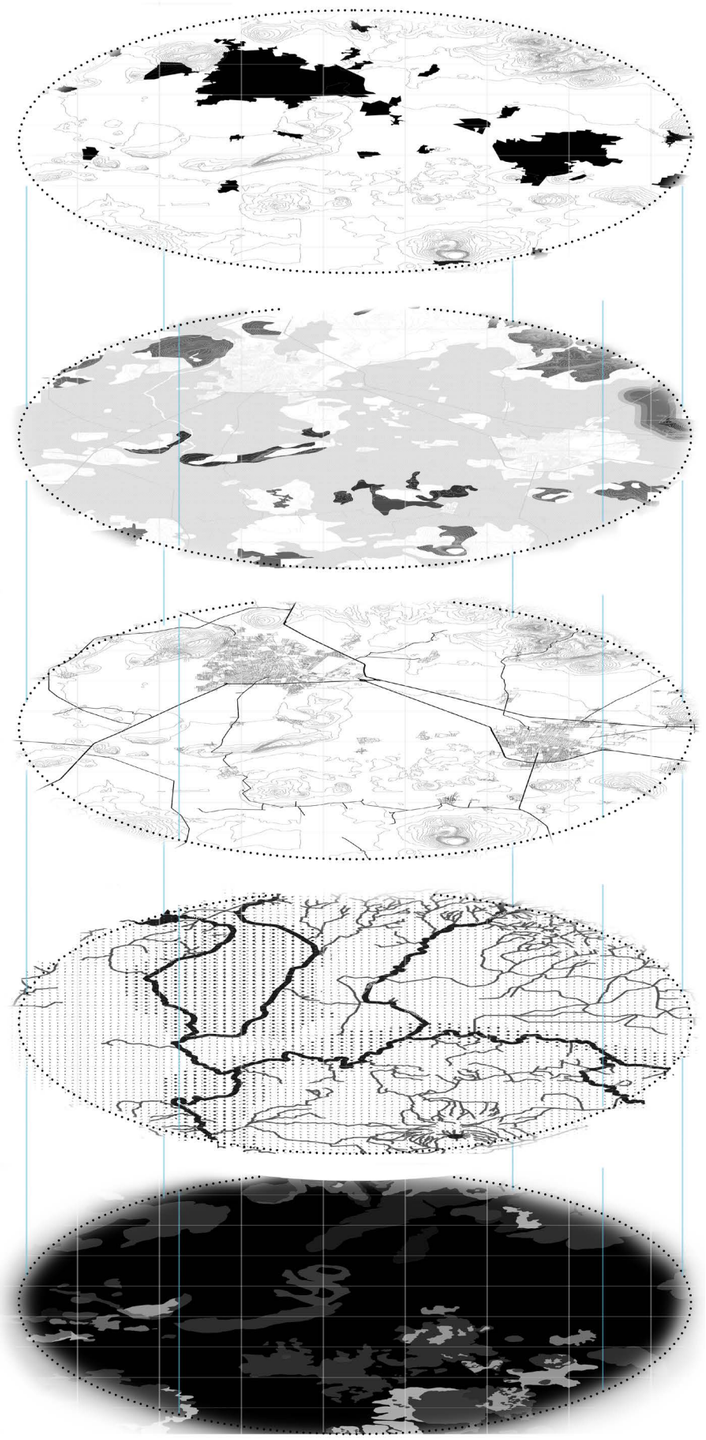


Source: https://www.[illegible]2010/08/08/what-is-str%C3%B8get-and-who-is-jan-gehl/

THEORY & FRAMING

ANALYSIS

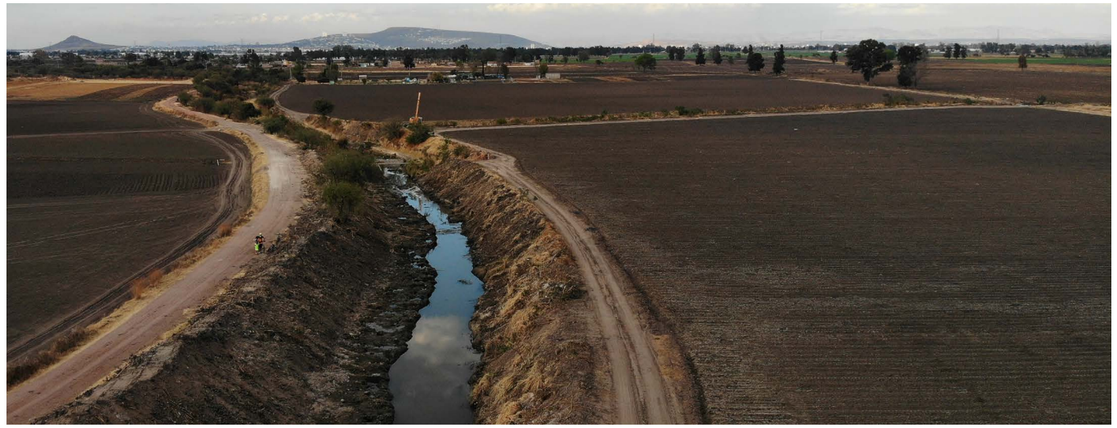
URBAN LANDSCAPE INFRASTRUCTURE WATER SOIL

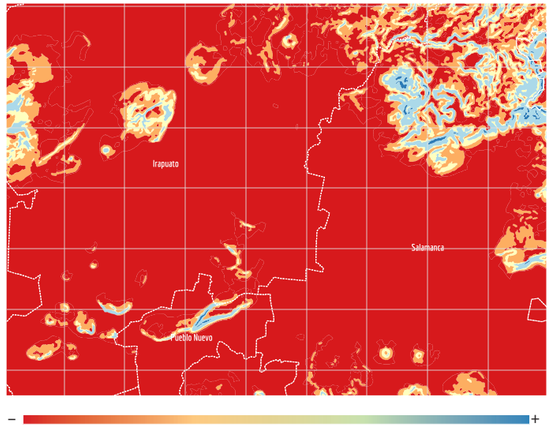


N

LAYERS

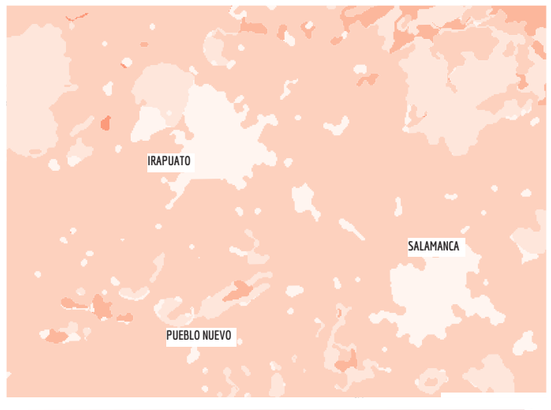
Current Condition



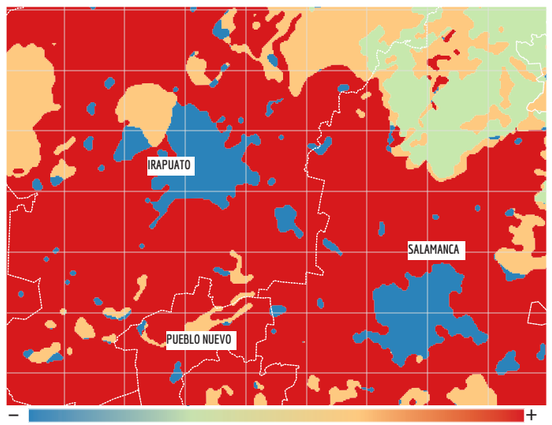


Problem

- Erosion



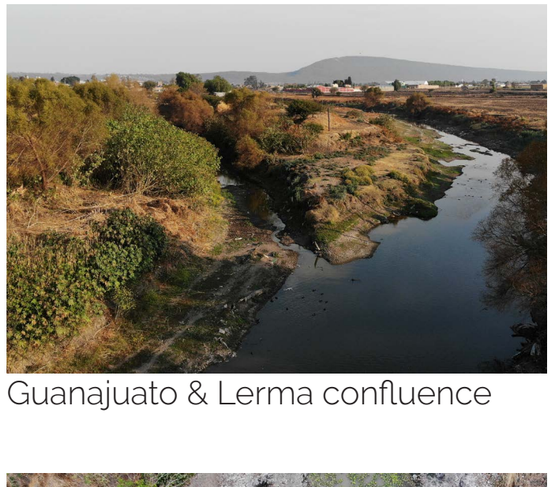
- Soil Quality



- Compaction Risk

SOIL

Current Condition

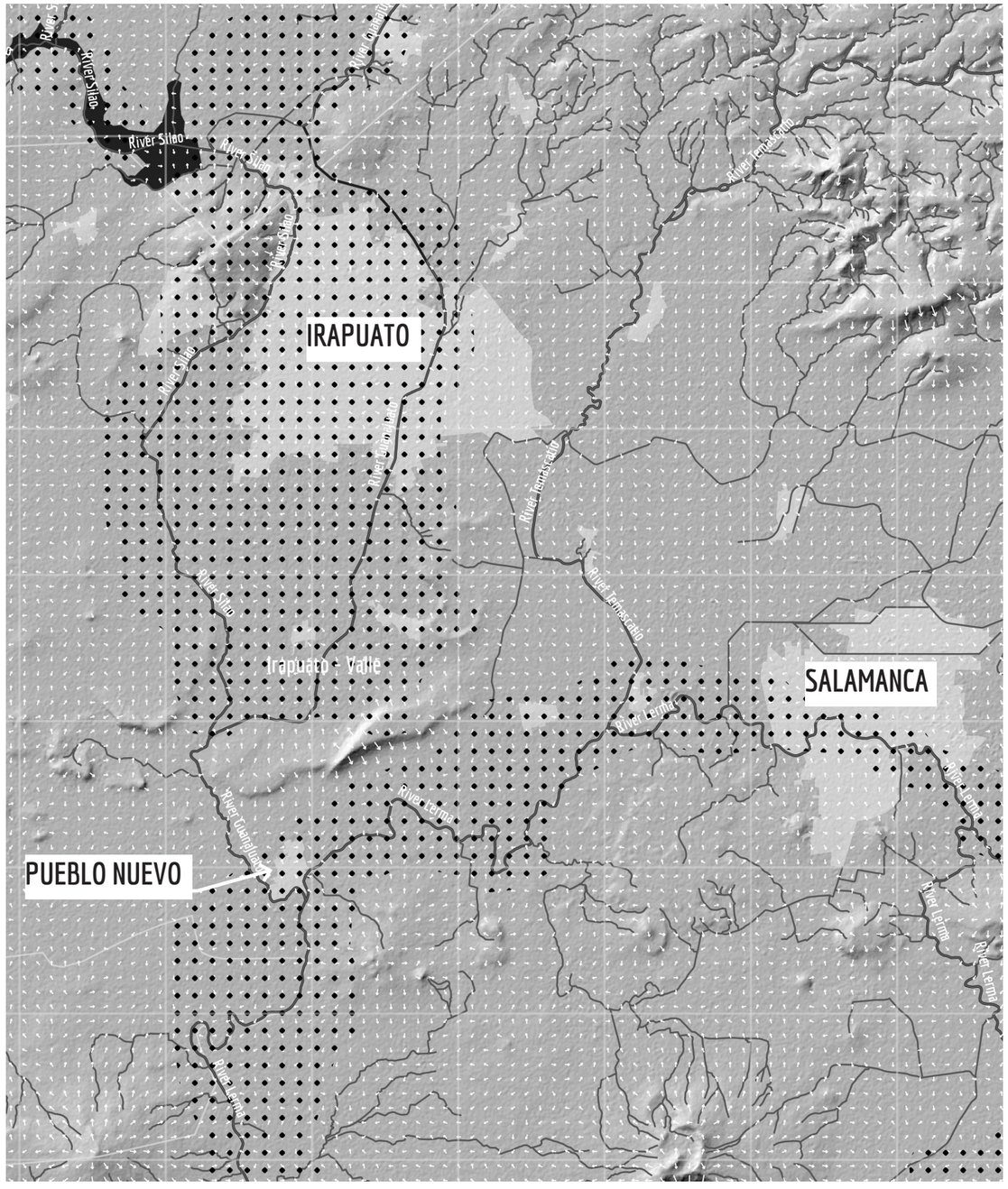


Guanajuato & Lerma confluence

Silao River immediate surroundings

Landscape around Silao River

Water System


River Silao
River Silao
River Silao

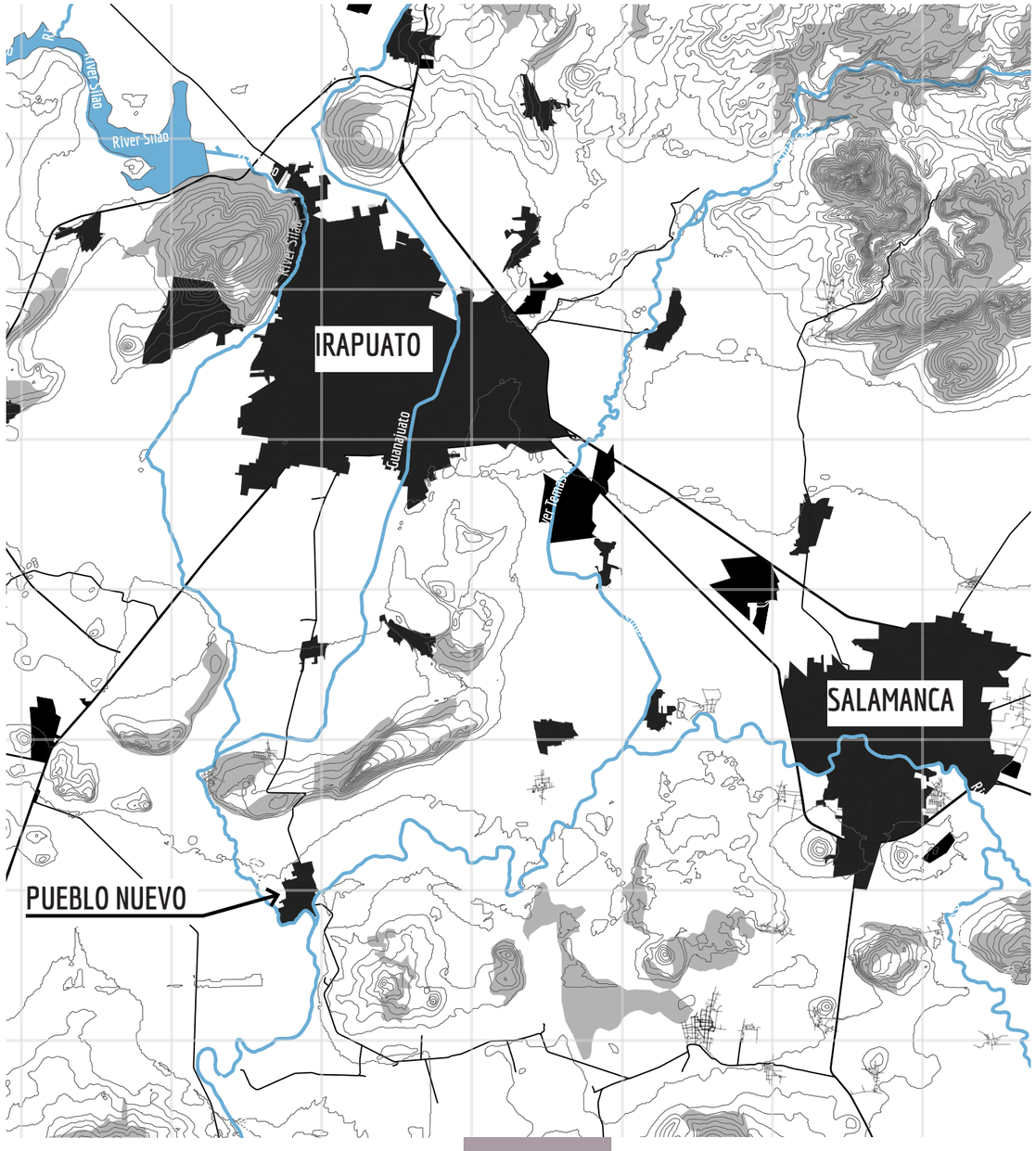
Current Condition

Industrial Corridor / Highway

Rural Roads

Dirt Roads

Regional Infrastructure



Problem

- Motorized Vehicles
- Sustainable Mass Transport
- Disconnector

INFRASTRUCTURE

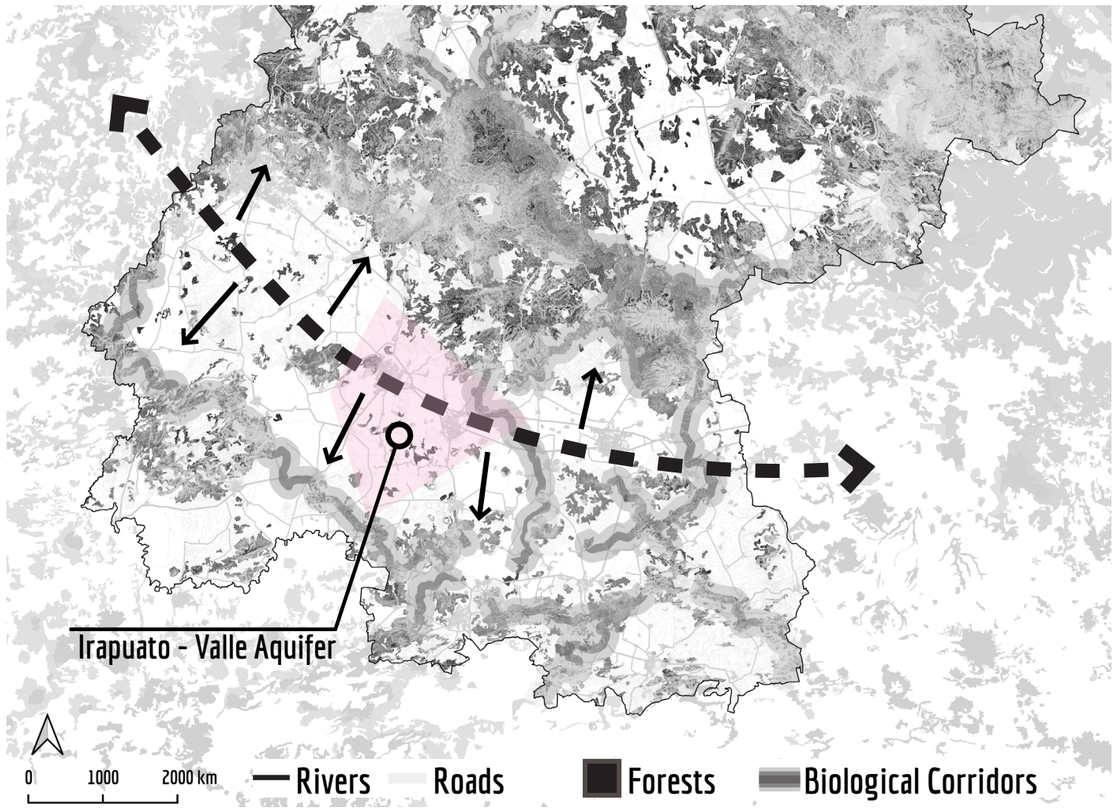
Current Condition

Landscape gradients

Lack of biodiversity / monoculture

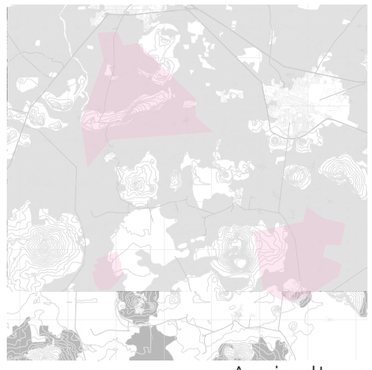
Agriculture / predominant landscape

Current Landscape



Forests

Biological Corridors



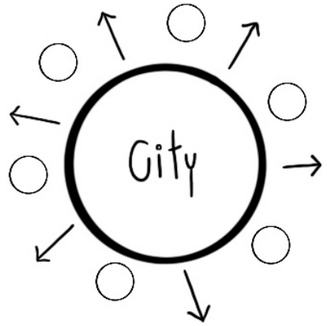
Agriculture

Problem

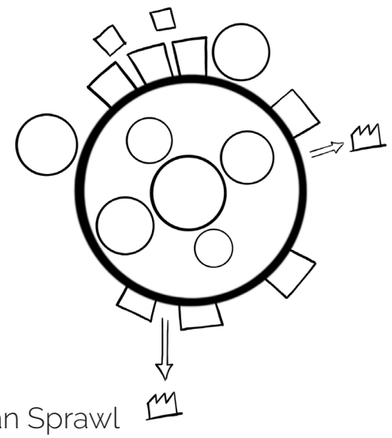
- Deforestation
- Monoculture
- Disconnected Biological Corridors

LANDSCAPE

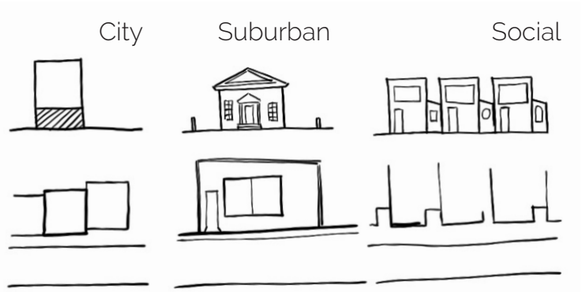
Current Condition



Expansion from over population

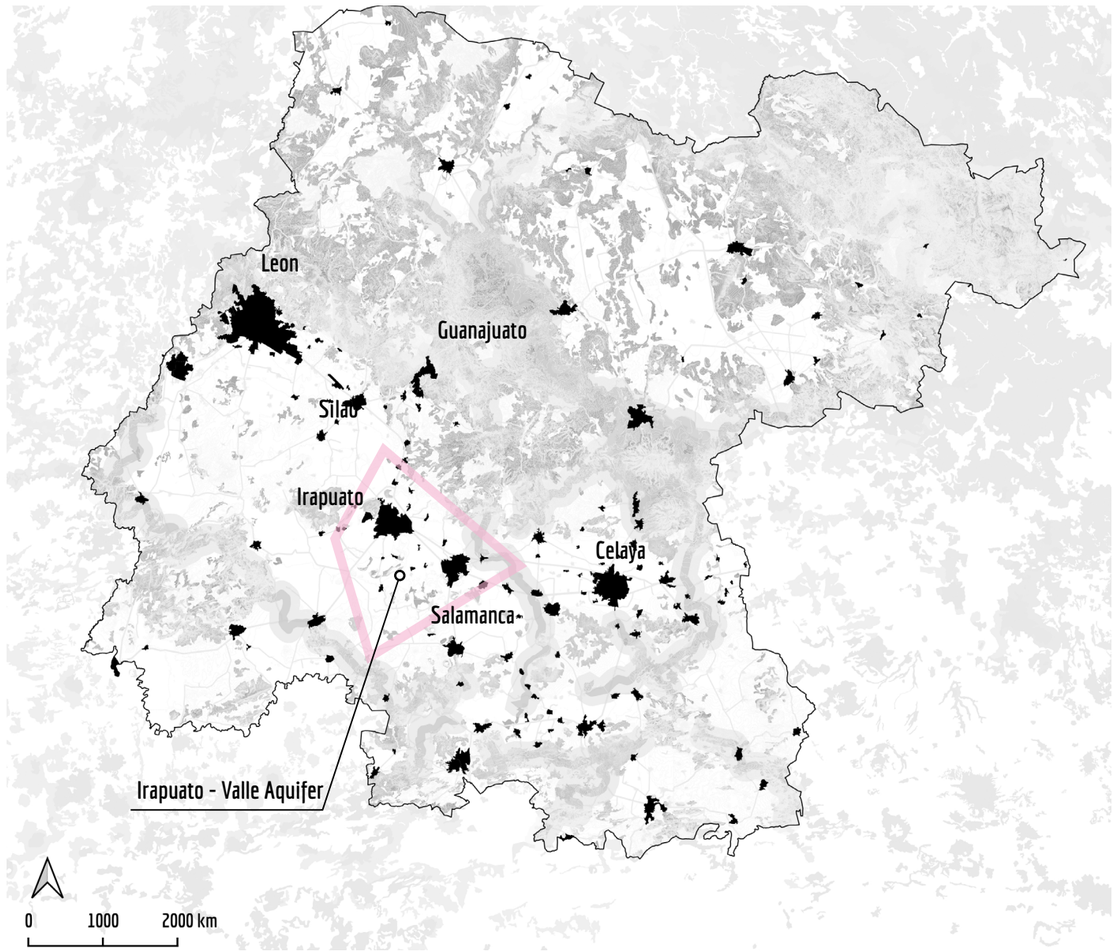


Urban Sprawl

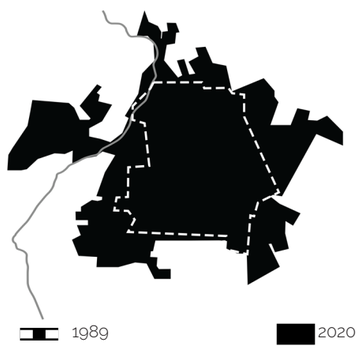


Housing Typologies

Urban Structure



Irapuato



Salamanca

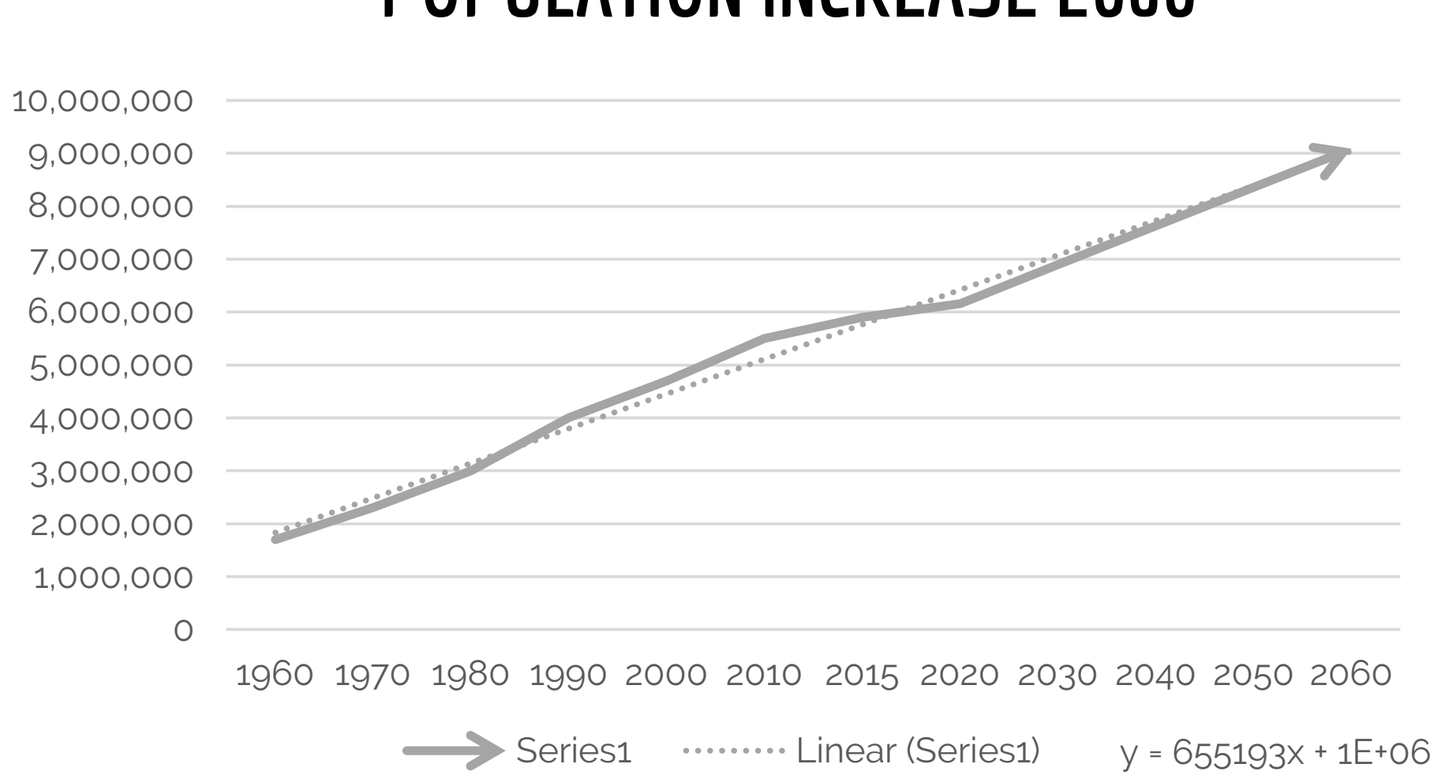
Pueblo Nuevo

Problem

- Urban Sprawl
- Population Increase
- Spatial Justice

URBAN

EXPLORATION



3,000,000 people

PROJECTIONS

From

153 urban areas

only

5 absorb population

PROJECTIONS

1. LEON
2. SILAO
3. IRAPUATO
4.SALAMANCA
5. CELAYA

BECAUSE

WHAT IF?

Existing Cities

Expansion

Industry

Agriculture

Forest

FROM

balance

species thrive

fix nature

shift in living

Symbiotic urban landscape

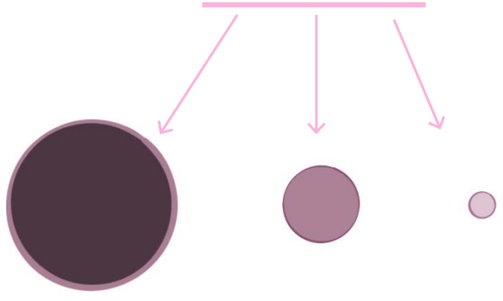
INTO

From

153 *urban areas*

↓

3,000,000 *people*

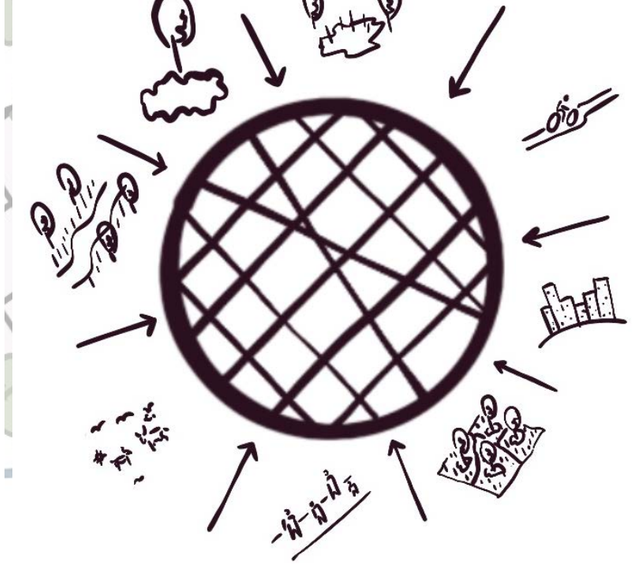


all *absorb population*

URBAN STRATEGY

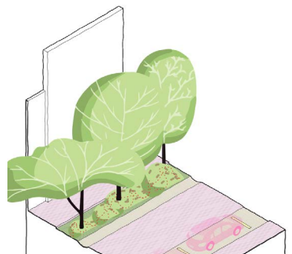
Balance

Biodiverse

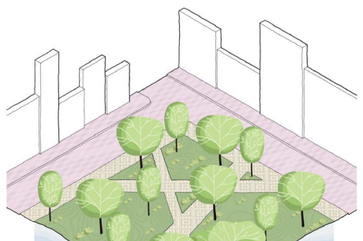


Inclusive

SUSTAINABLE REDEVELOPMENTS



Enhanced Streetscape

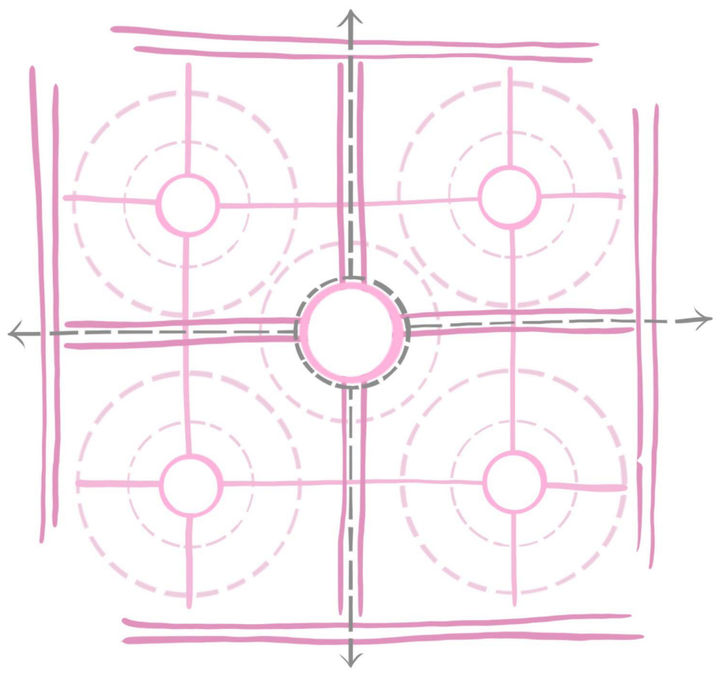


Biodiverse Spaces & Water Retention

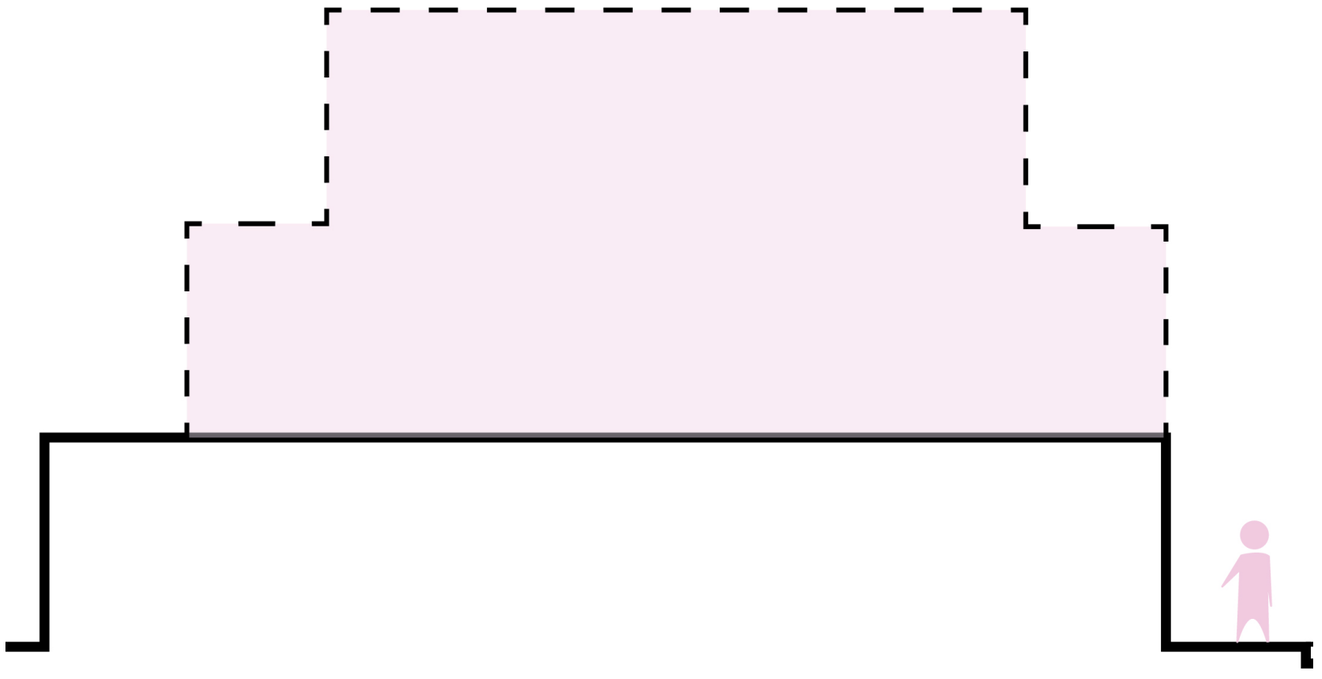
Zoning & Mix Functions

Retention & Infiltration Capaciy

Sustainable Features

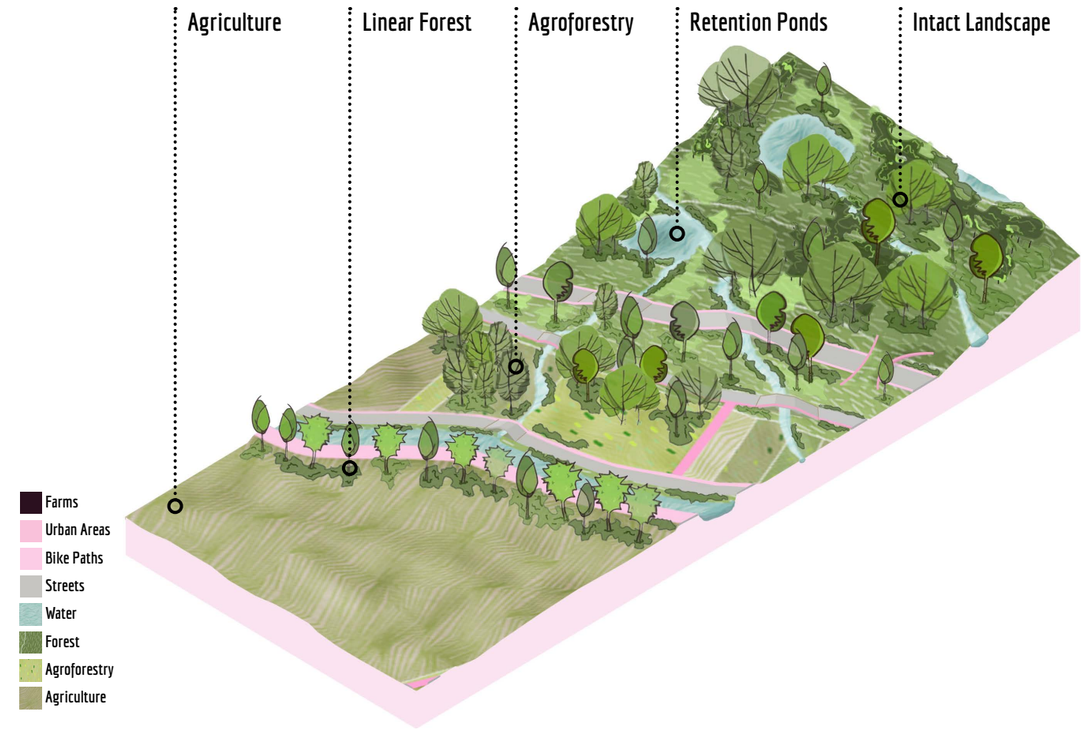


Modify town structure

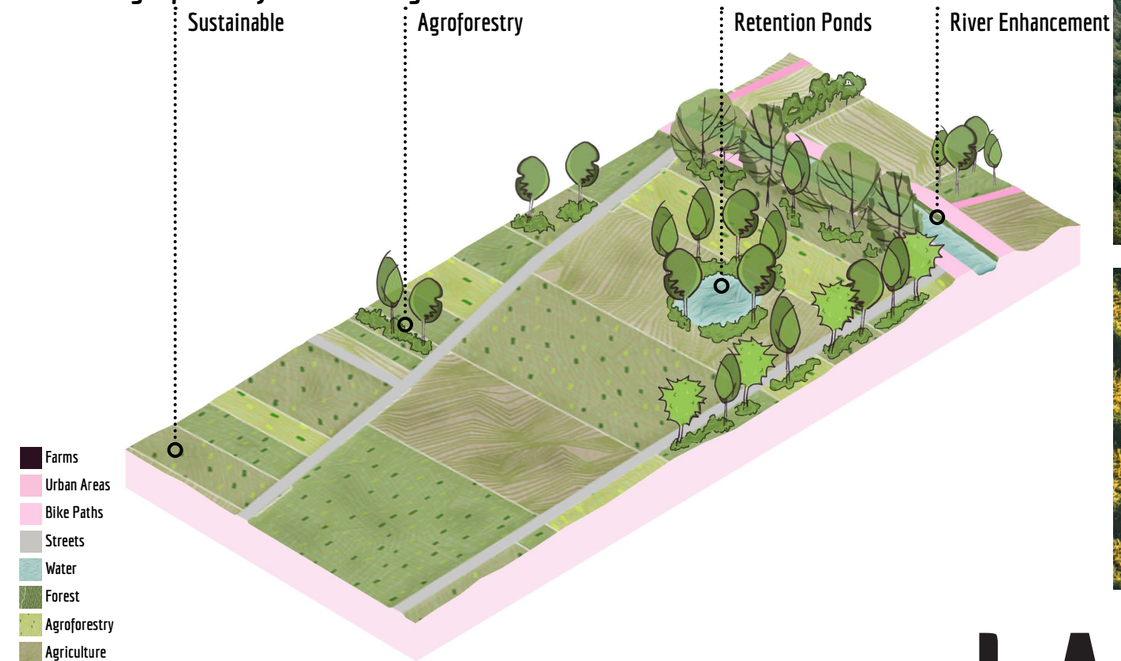


Vertical density

50% POPULATION INCREASE IN CITIES



Forest - Agroforestry - River - Agriculture



River - Agroforestry - Water Retention - Agriculture

LANDSCAPE STRATEGY

DESIGN

URBAN

LANDSCAPE

REGIONAL STRATEGY

SOIL

- Agricultural zonification
- Introducing agroforestry
- Need Of Biodiverse Landscape
- **Increase Carbon Fixation**
- **Increase In Soil Quality**
- Self Sustaining Landscape
- Native Balanced Ecosystem

WATER

- **Retention**
- **Filter**
- **Infiltration**
- Reincorporate Into The System.
- Flood Areas as Oportunity Retention Areas

INFRASTRUCTURE

- **Sustainable Mobility Methods**
- Ecological Integration
- Enhance Biodiversity
- Connected Landscapes for Species
- **Biological Corridors**

LANDSCAPE

- **Enhancement of Forests, Scrublands and Grasslands**
- Development of Biological Corridors
- Wild Life Connectors
- **Biodiversity**
- **Restablish Native Ecosystems**

URBAN

- **Compact Cities**
- **Sustainable Cities**
- Variety of Mobility Options
- Quality Public Spaces
- Quality Dwelings
- **Healthy Cities**
- Increase in Program
- Biodiverse Cities
- **Spatial Justice**

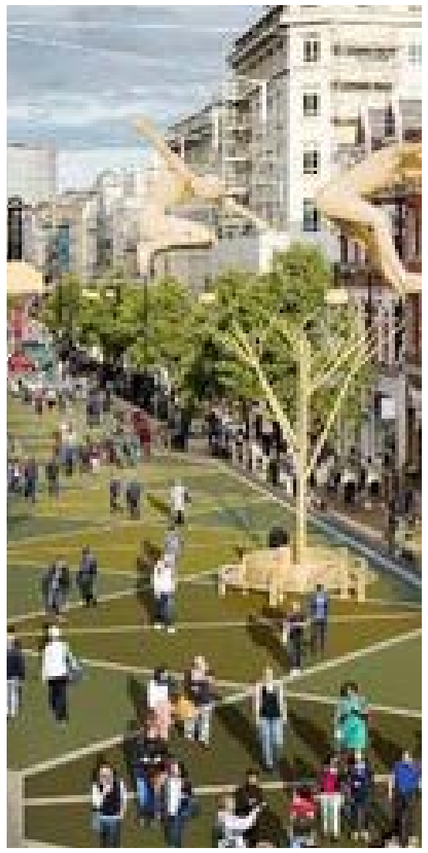
DESIGN AIMS

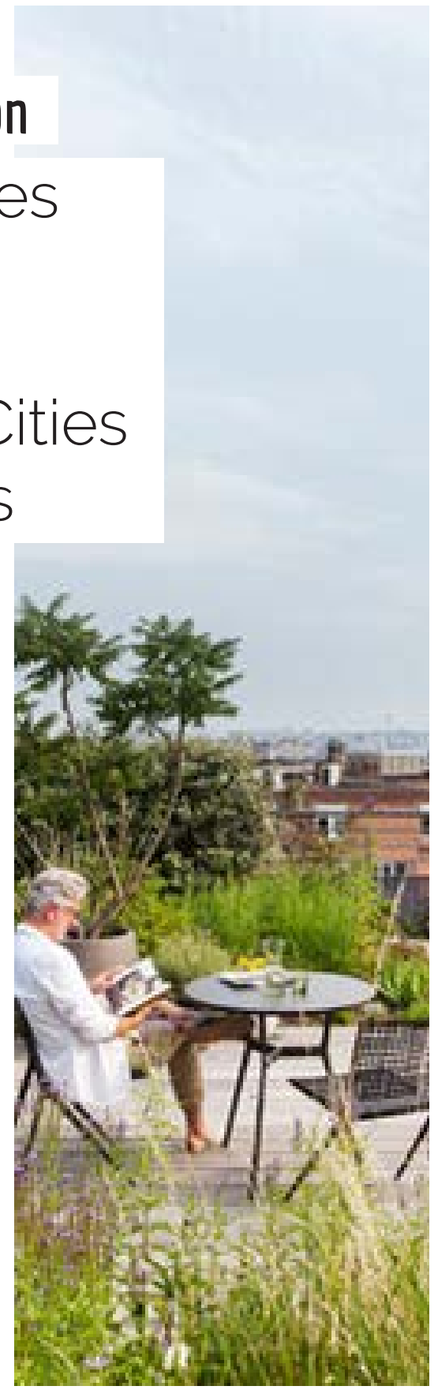
Ecocities

- Proximity
- Water Strategies
- Community Participation
- Restoring Biodiversity

The Human Dimension

- Compact Cities
- Lively Cities
- Safe Cities
- Sustainable Cities
- Healthy Cities





DESIGN PRINCIPLES

Irapuato

Salamanca

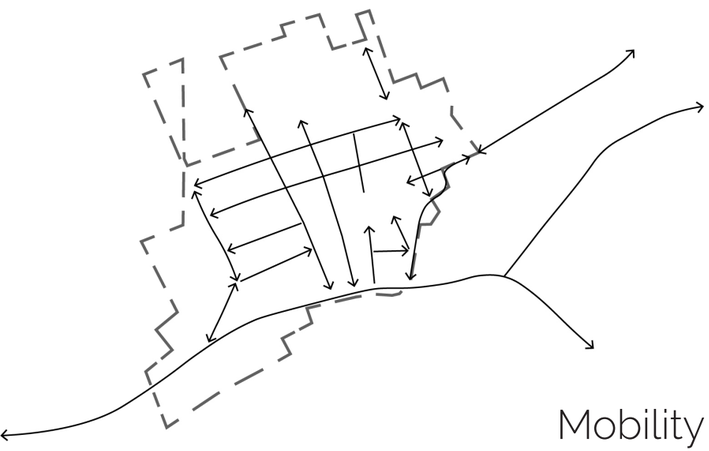
2. Landscape Intervention

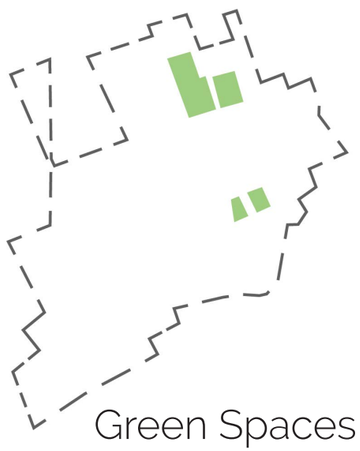
1. Urban Intervention

Pueblo Nuevo

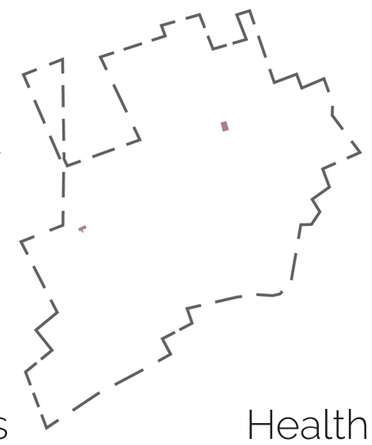
AREA OF FOCUS/DESIGN

URBAN

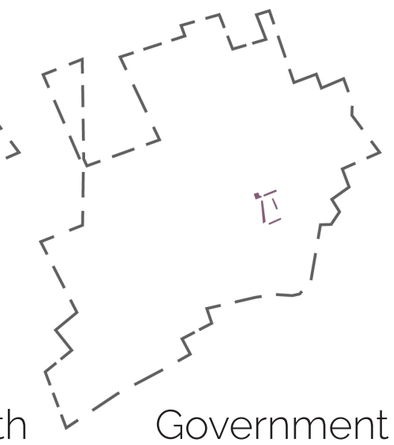




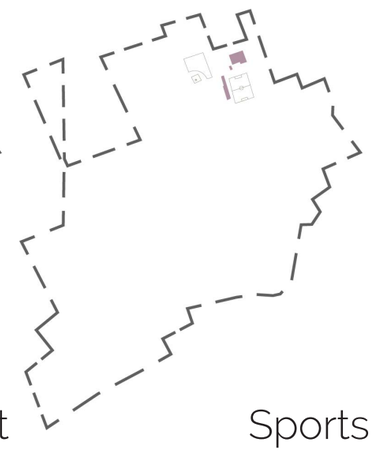
Mobility



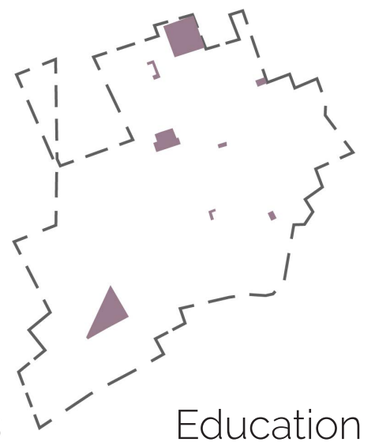
Green Spaces



Health



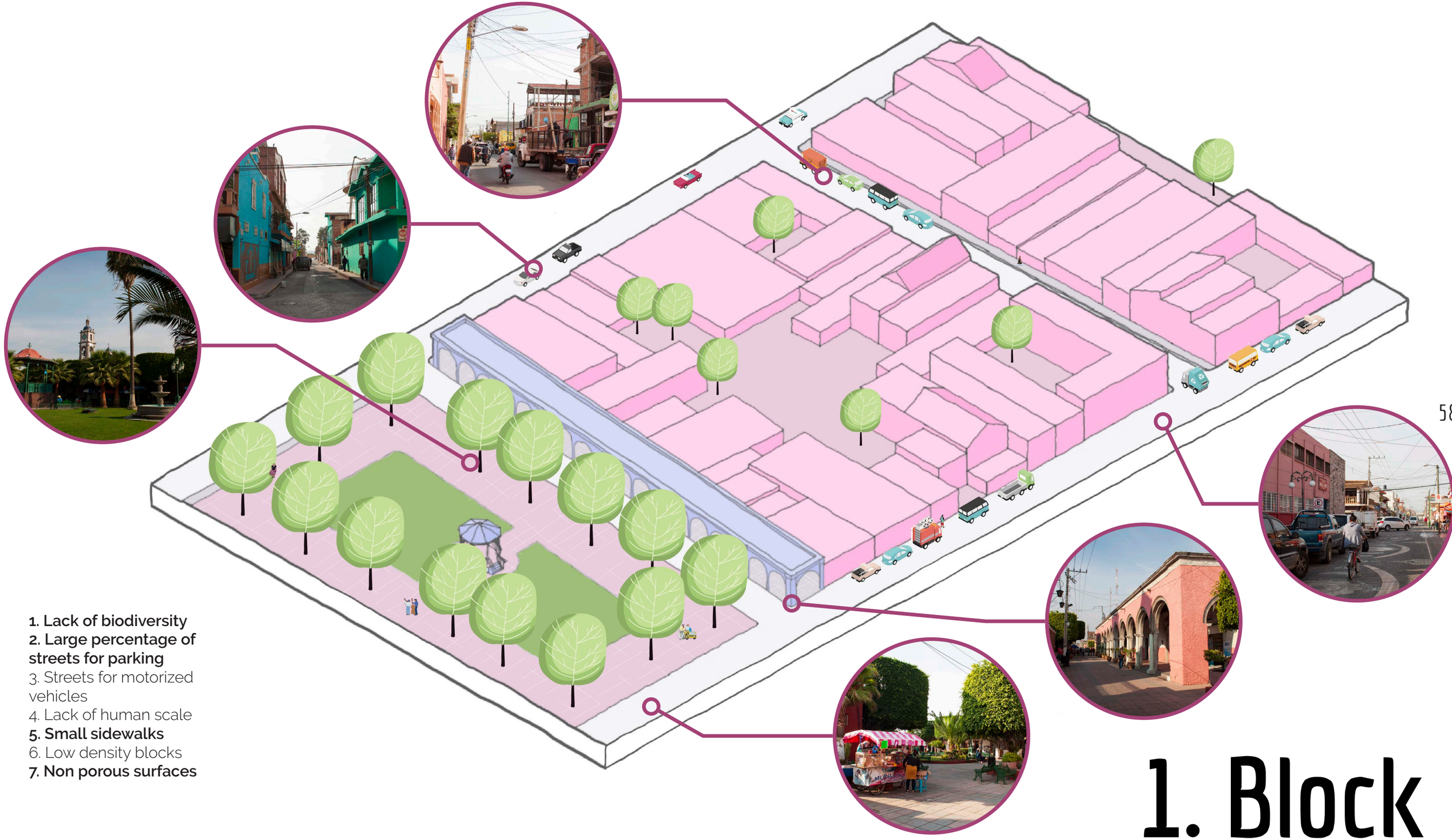
Government



Sports

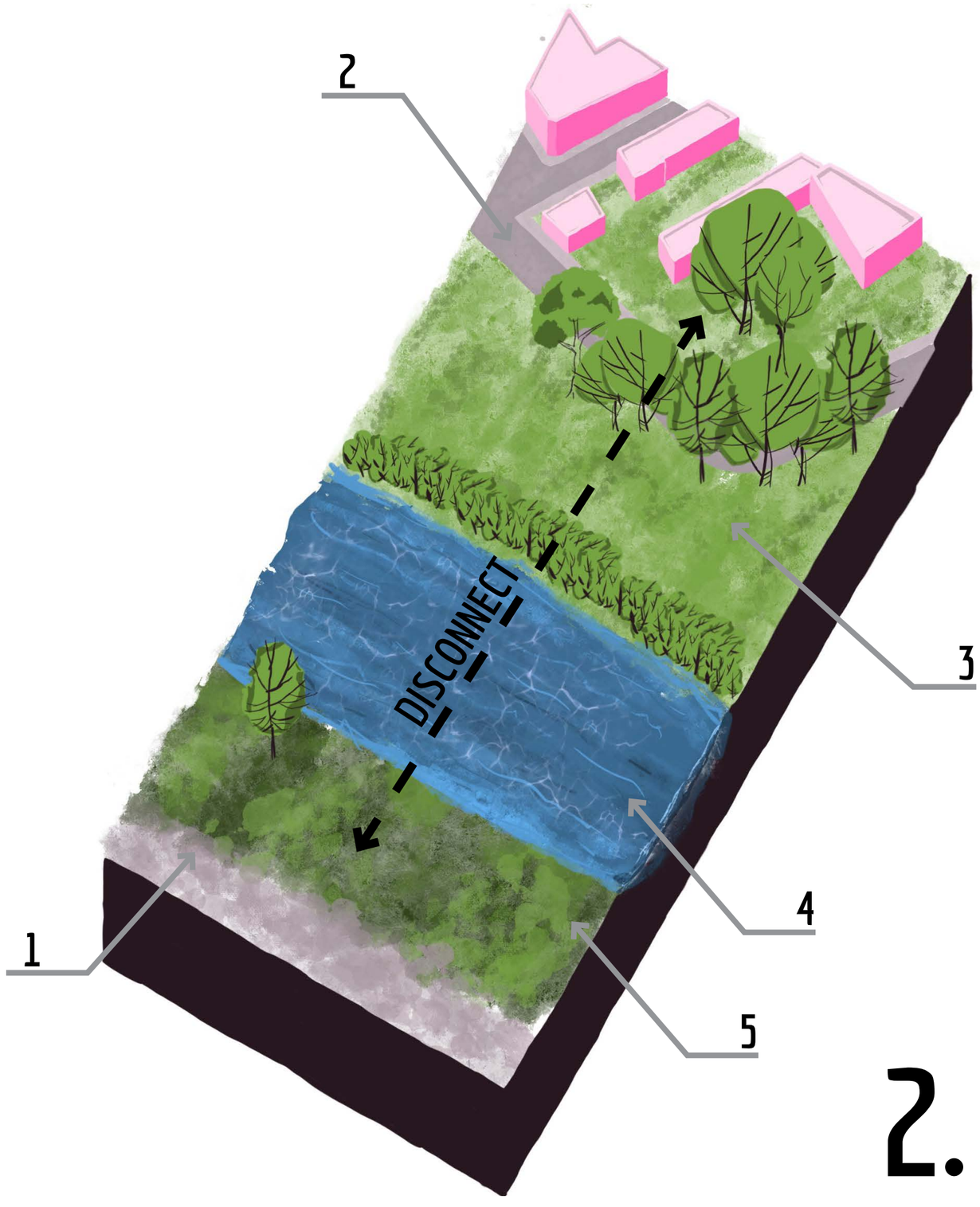
Education

CURRENT - PUEBLO NUEVO



1. **Lack of biodiversity**
2. **Large percentage of streets for parking**
3. Streets for motorized vehicles
4. Lack of human scale
5. **Small sidewalks**
6. Low density blocks
7. **Non porous surfaces**

1. Block



1. Eroded agricultural soil

2. Paved streets with no greenery

3. Lack of trees variety

4. Polluted water

5. Lack of human & animal interaction

2. City Edge

SUSTAINABLE ECOCITIES

BIODIVERSITY

MOBILITY

INFILTRATION

PERMEABILITY

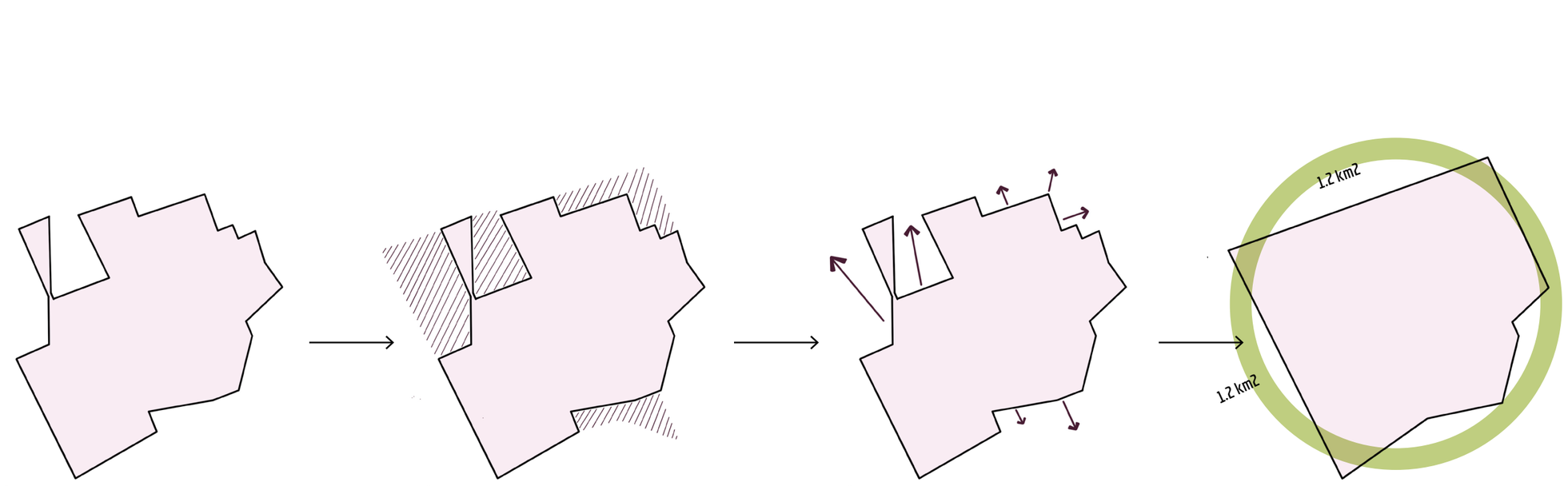
WHAT IS TACKLED?

URBAN DESIGN

Strategy

- Utilize low quality areas for urban expansion with a max of 2km2
- Increase of 50% on population

How?



Current Footprint 0.8 km2 Locate low quality urban spaces Expansion New Footprint 1.2 km2

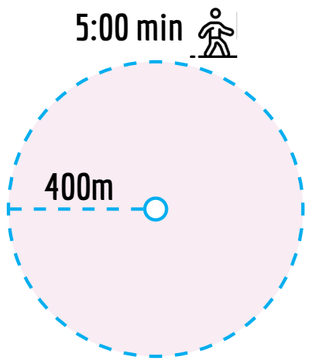
WHY?

- Take advantage of low quality spaces
- Make Space for population increase
- Clear edge between city and nature
- Lack of greenery & biodiversity

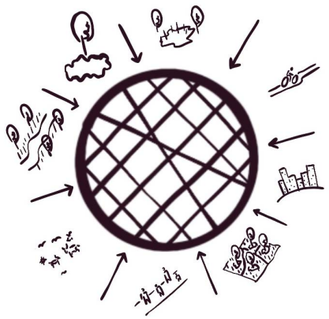
CITY EXPANSION STRATEGY

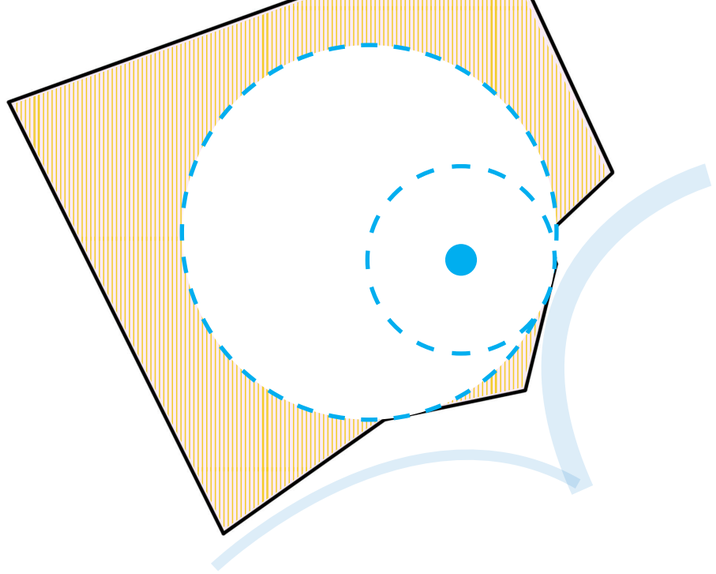
Strategy

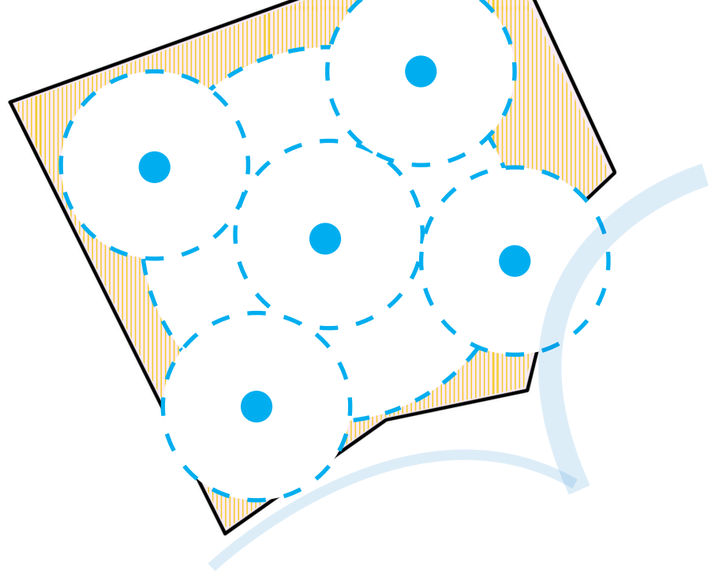
- Compact 5 minute city
- Vertical Densification
- Increase of public spaces
- Pedestrian accessibility



How?







WHY?

- Lack of space for pedestrians
- Accessibility
-
- Low density town
- Population absorption
-
- Lack of green public spaces

Current

Proposed

5 MINUTE NEIGHBORHOODS

Strategy

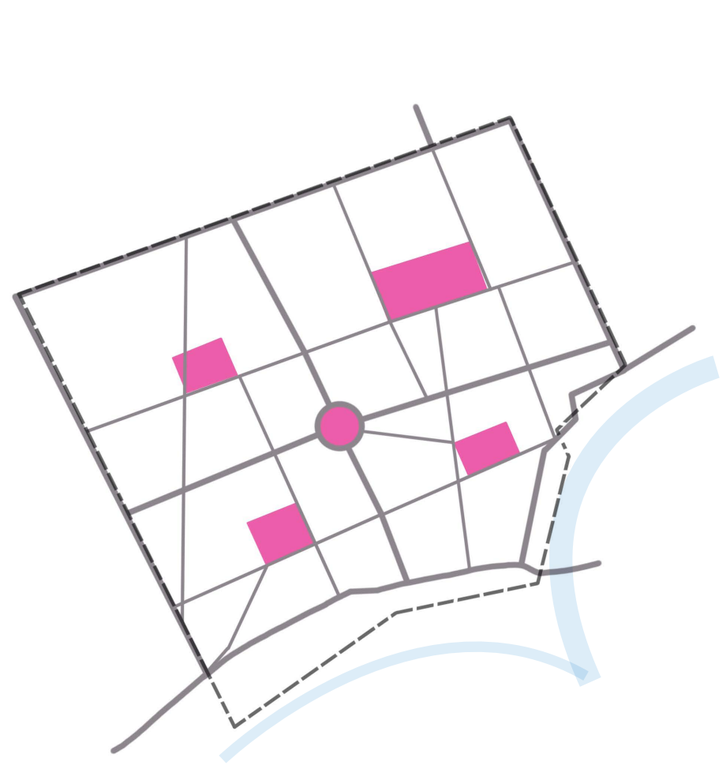
- Increase public spaces
- Provide gathering and comunity centers
- Quadrant strategy with nature nodes
- Permeability and water retention

WHY?

- Lack of space for pedestrians
- Excess of non porous surfaces
-
- Lack of green public spaces
- Lack of water infiltration

How?

Current



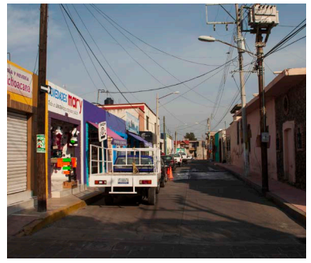
Proposed

INCREASE OF PUBLIC SPACES

Strategy

How?

- Restricted car use
- Pedestrianism
- Improvement of streets for people and biodiversity
- Parking lots in perifery



WHY?

- Lack of space for pedestrians
- Car parking on streets account for a 40% of the street
- Lack of biodiversity on the streets
- Lack of connectivity
- Pollution created by vehicles
- Excess of non porous streets

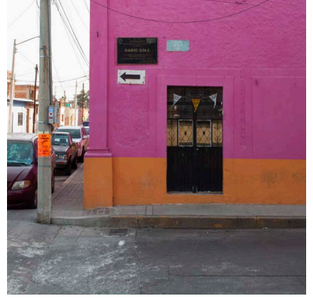
Current

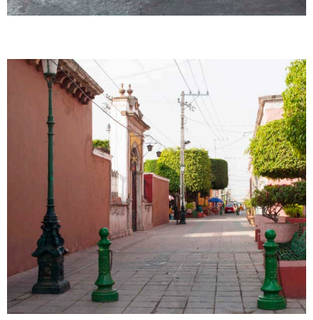
Proposed

REDUCE MOTORIZED STREETS

Strategy

- Pedestrianism
- Soft mobility streets
- Straigt connectivity corridors to central nodes



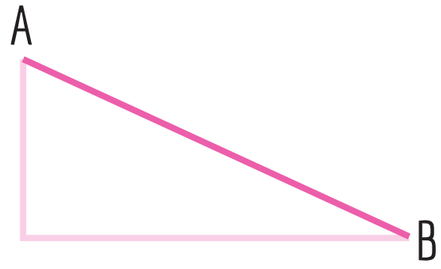


WHY?

- Lack of space for pedestrians
- Lack of biodiversity on the streets
- Lack of connectivity
- Excess of non porous streets
- Low quality sidewalks

How?

Current



Proposed

INCREASE SOFT MOBILITY

Strategy

- Increase of mixed use
- Increase of commercial and office space
- Quadrants as independent economic hubs

WHY?

- Mixed use and commercial spaces are located only along one part of the city

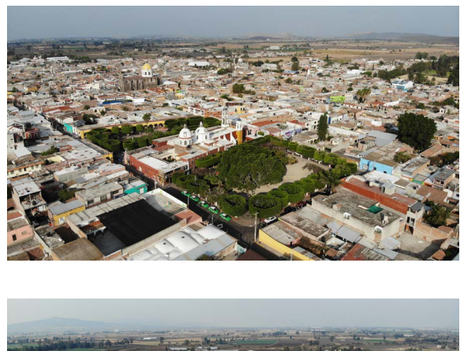
How?

Current

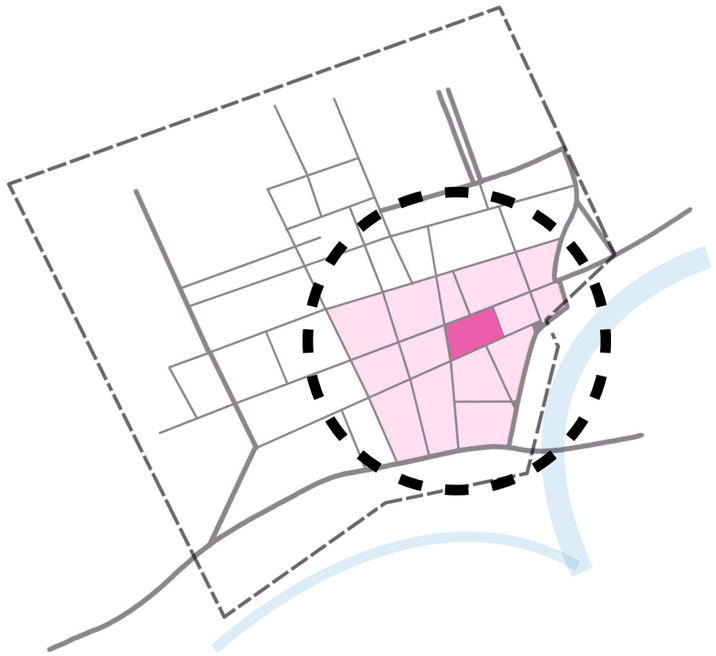
Proposed

INCREASE OF MIXED USE

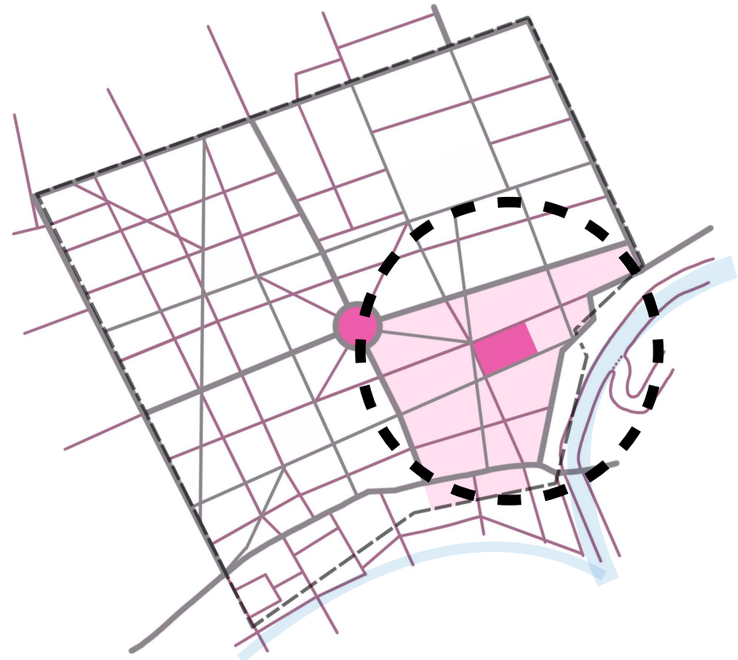
Existing



Example area of city



Current

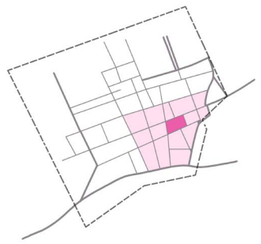


Proposed

VISION FOR QUADRANT

Strategy

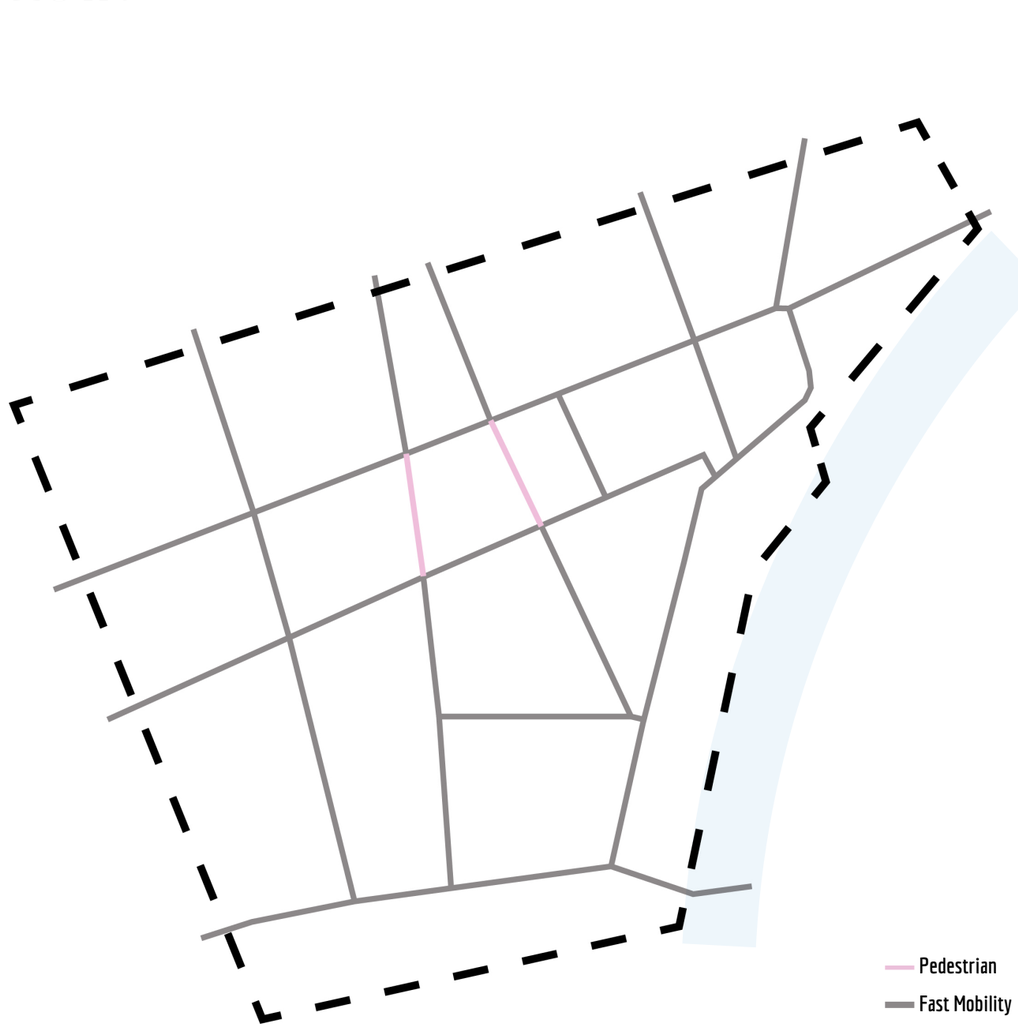
- Increase of pedestrian streets
- Implementation of soft mobility streets
- Redistribution of street section



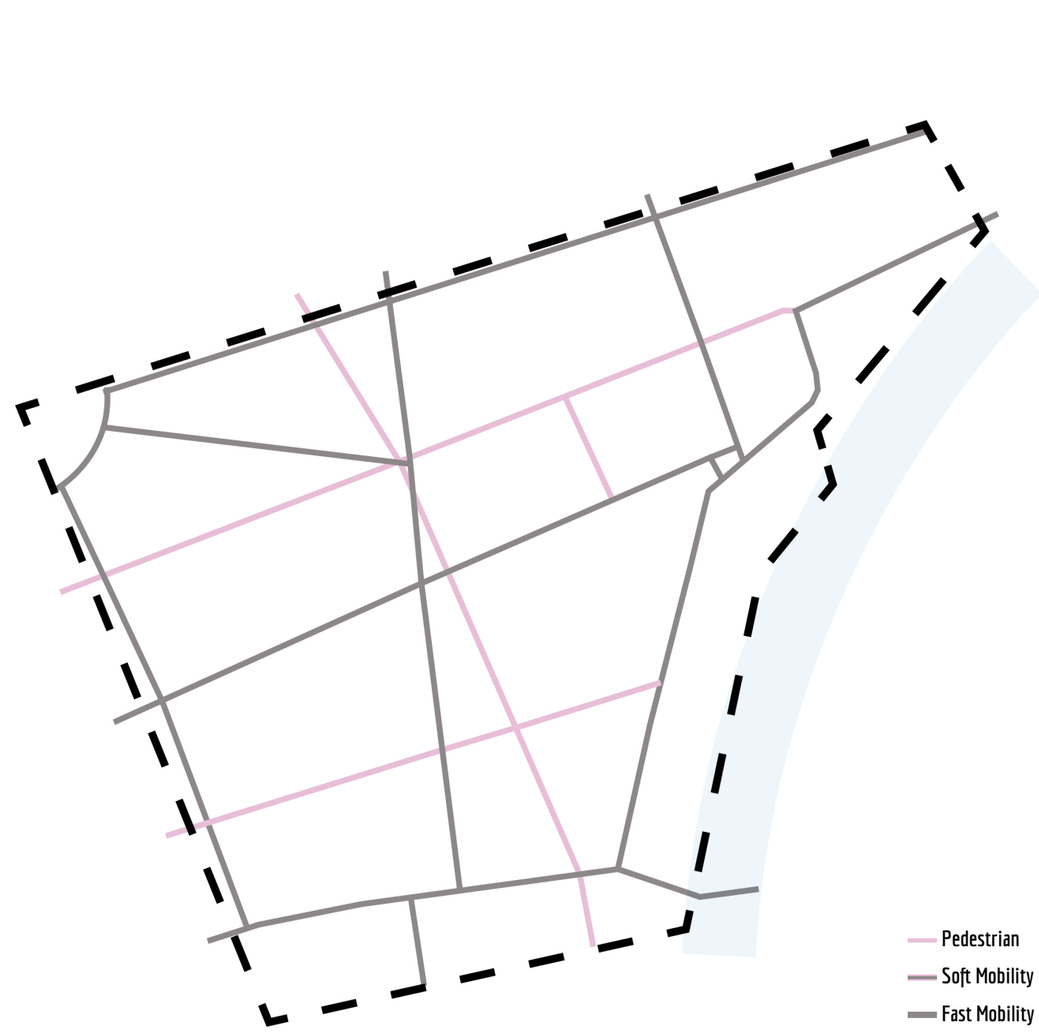
WHY?

- Streets are in its majority for motorized vehicles
- Excess of non porous surfaces
- Small and interrupted sidewalks

How?



Current

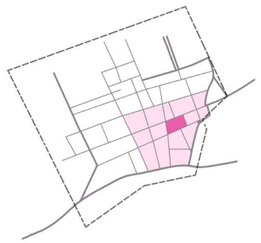


Proposed

INCREASE OF MOBILITY VARIETY

Strategy

- Increase of mixed use
- Increase of commercial and office space
- Quadrants as independent economic hubs



WHY?

- Mixed use and commercial spaces are located only along one part of the city
- Lack of services

How?

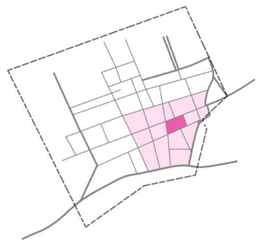
Current

Proposed

INCREASE OF FUNCTIONS

Strategy

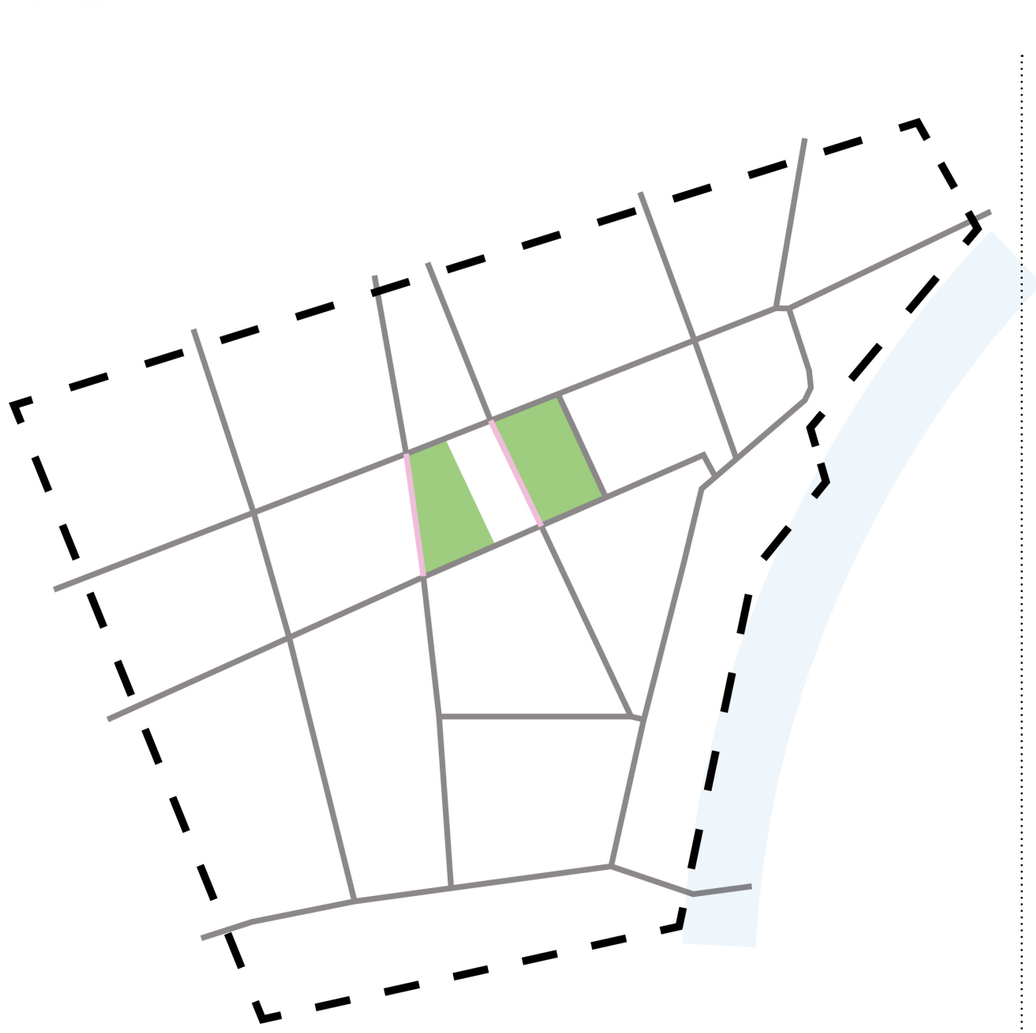
- Increase public spaces
- Depave existing green public spaces
- Incorporate squares for continuous green corridors
- Green belt as a boundary for expansion control



WHY?

- Lack of public spaces
- Lack of greenery
- Low interaction with nature
- Excess non porous surfaces

How?



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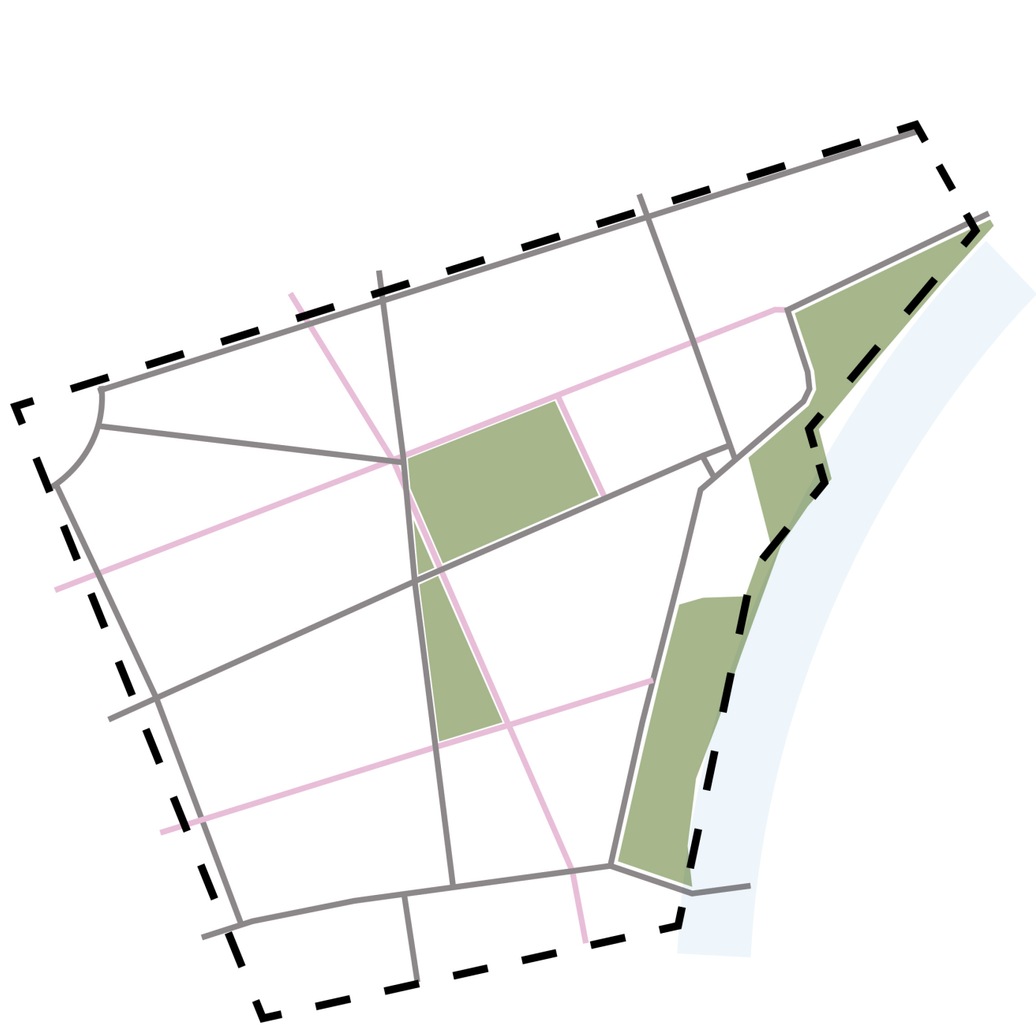
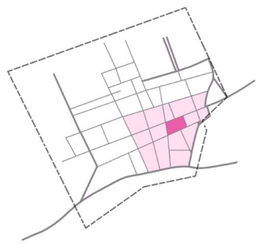


Proposed

INCREASE GREEN PUBLIC SPACES

Strategy

- Increase of mixed use
- Increase of commercial and office space
- Quadrants as independent economic hubs

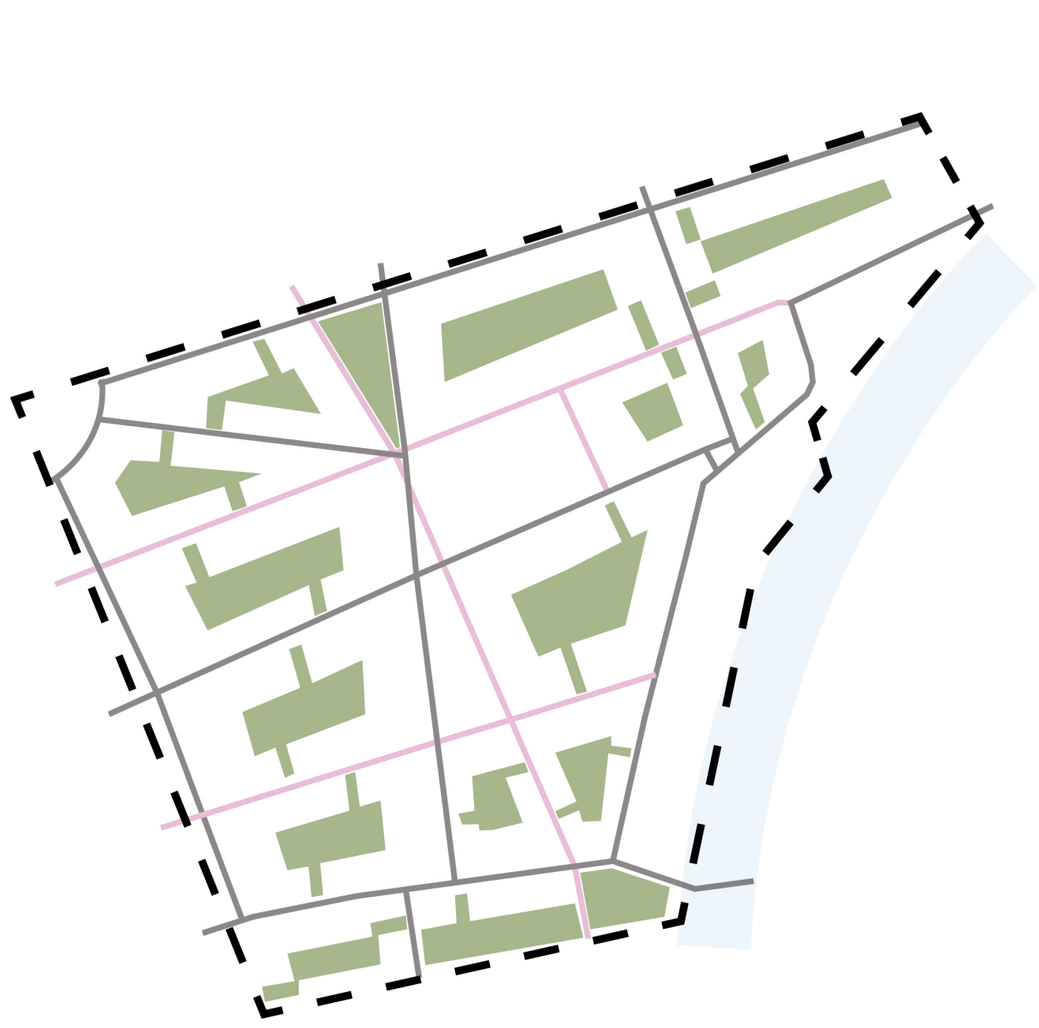


WHY?

- Mixed use and commercial spaces are located only along one part of the city

How?

Current

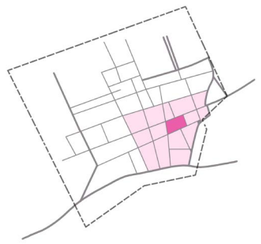


Proposed

MODIFICATION OF COURTYARDS

Strategy

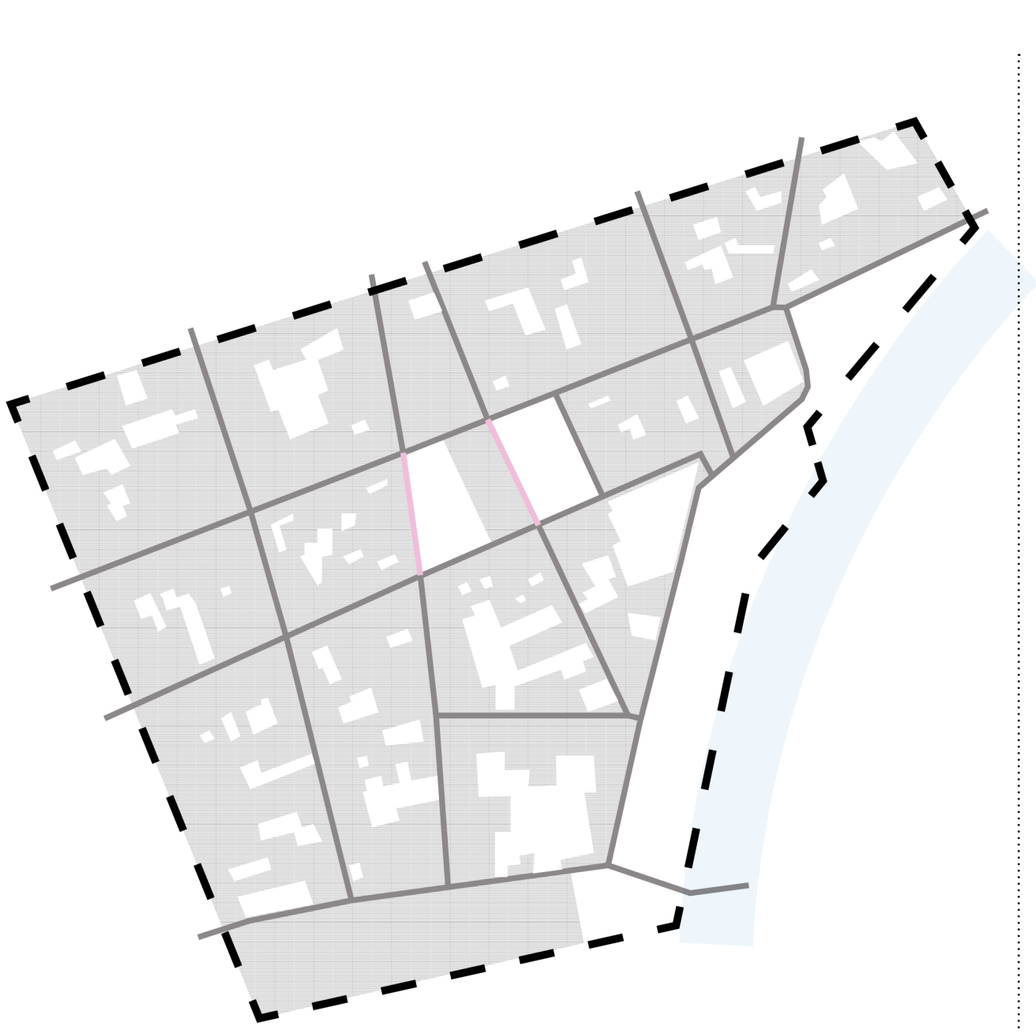
- Vertical densification
- Population absorption
- Zoning for priority areas



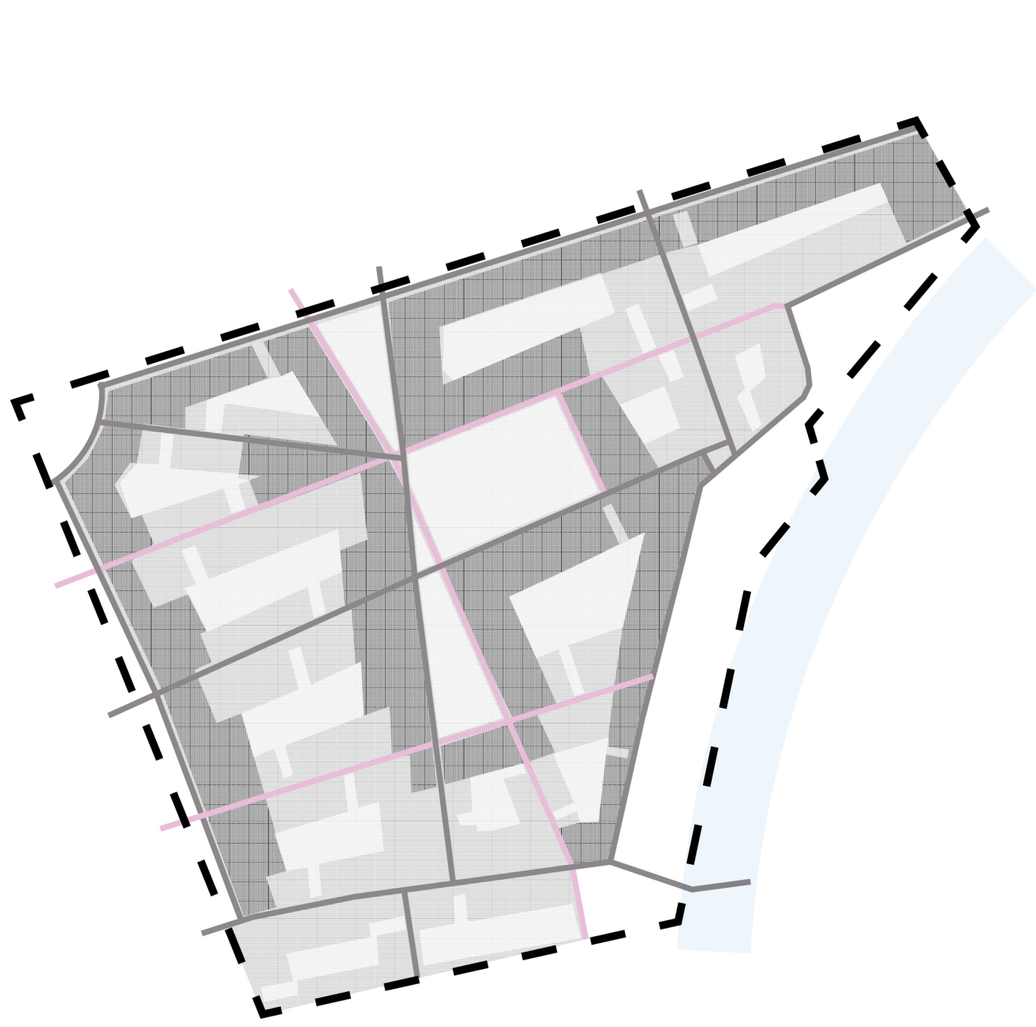
WHY?

- Low density buildings
- Poor quality of open spaces
- Lack of zoning

How?



Current



Proposed

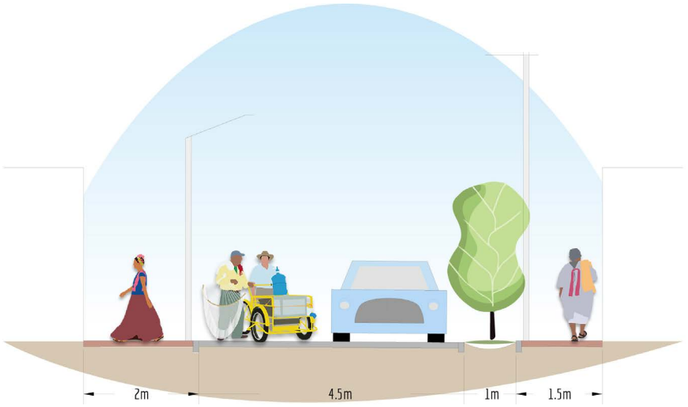
DENSIFICATION ZONING STRATEGY

BLOCK VISION - AREA OF FOCUS

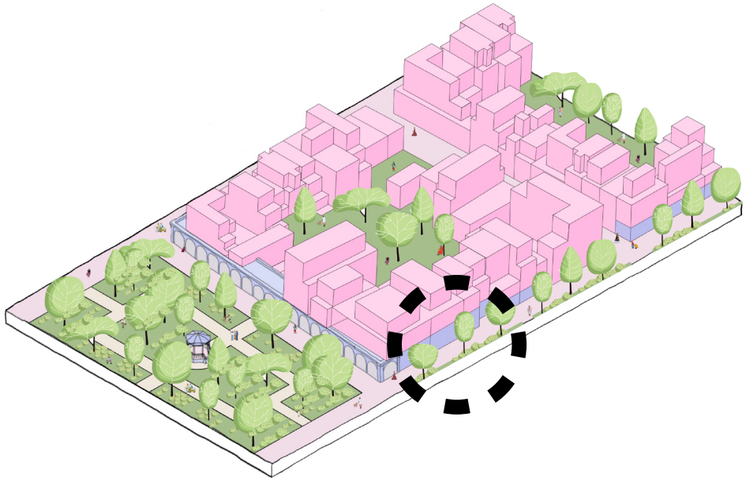
PROPOSED BLOCK

Current

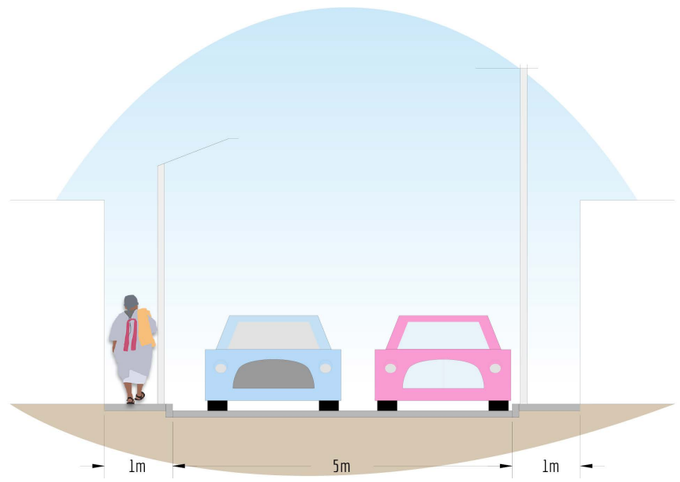
WIDE STREET



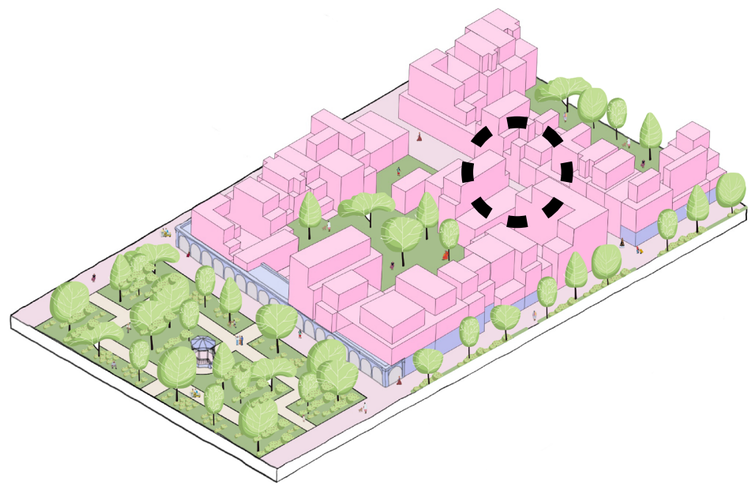
Proposed



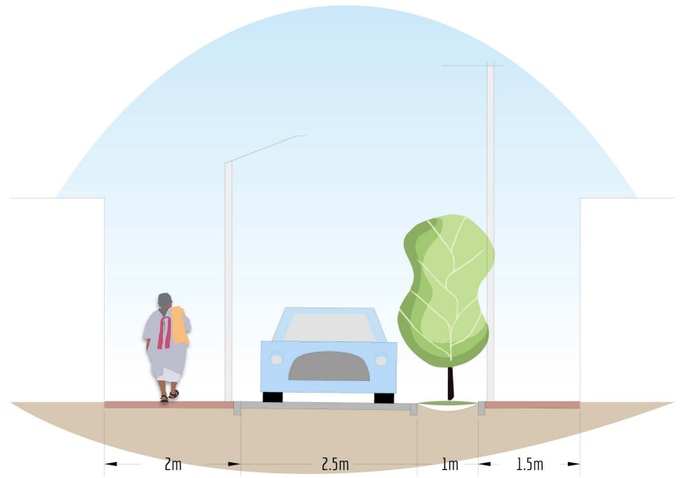
WIDE STREET



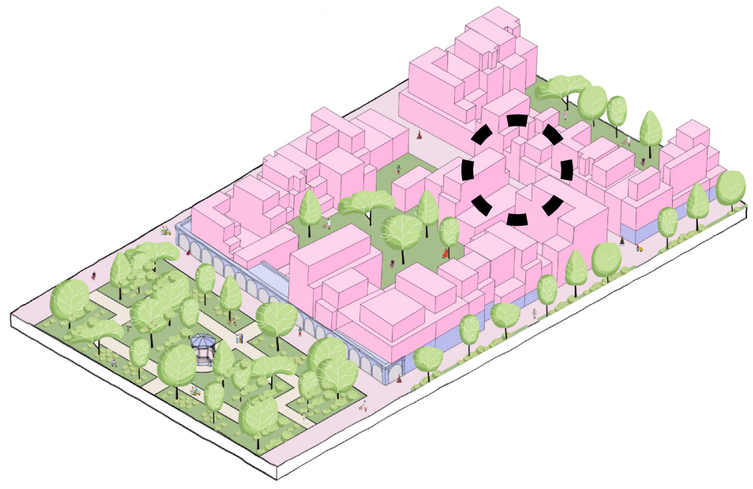
Current



NARROW STREET



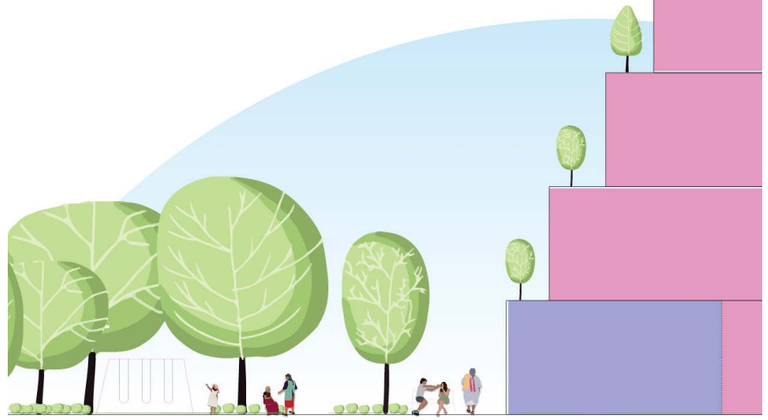
Proposed



NARROW STREET

Current

PUBLIC SPACE



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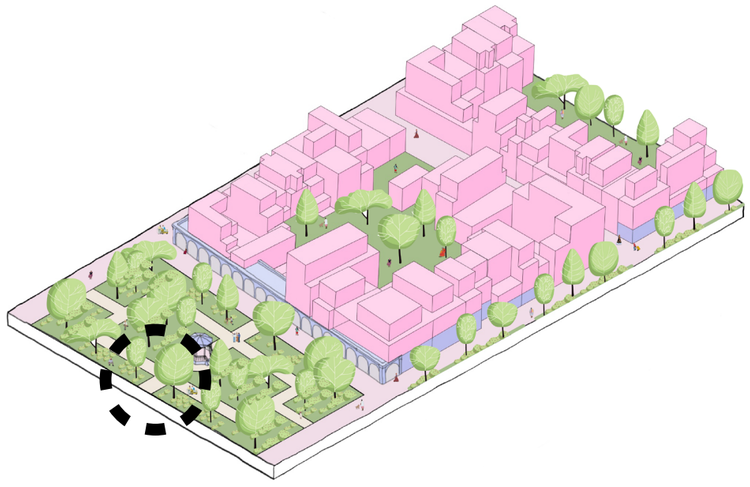


PUBLIC SPACE

LANDSCAPE

BIODIVERSE LANDSCAPE

MOBILITY FOR ALL SPECIES

ENHANCEMENT OF SYSTEM

REMEDIATION OF SOIL

WHAT IS TACKLED?

PUEBLO NUEVO

AREA OF FOCUS

Current

Proposed

AREA OF FOCUS

1. CURRENT LANDSCAPE

2. WATER RETENTION

3. SOIL REMEDIATION

4. REFORESTATION

5. AGRICULTURE & MOBILITY

1

2

3

4

PUEBLO NUEVO

1. FOREST
2. AGRICUTURE
3. RIVER EDGE
4. CITY EDGE

AREA OF FOCUS

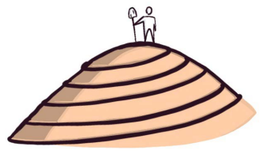
1

PUEBLO NUEVO

1. FOREST

Strategy

Retention Ponds



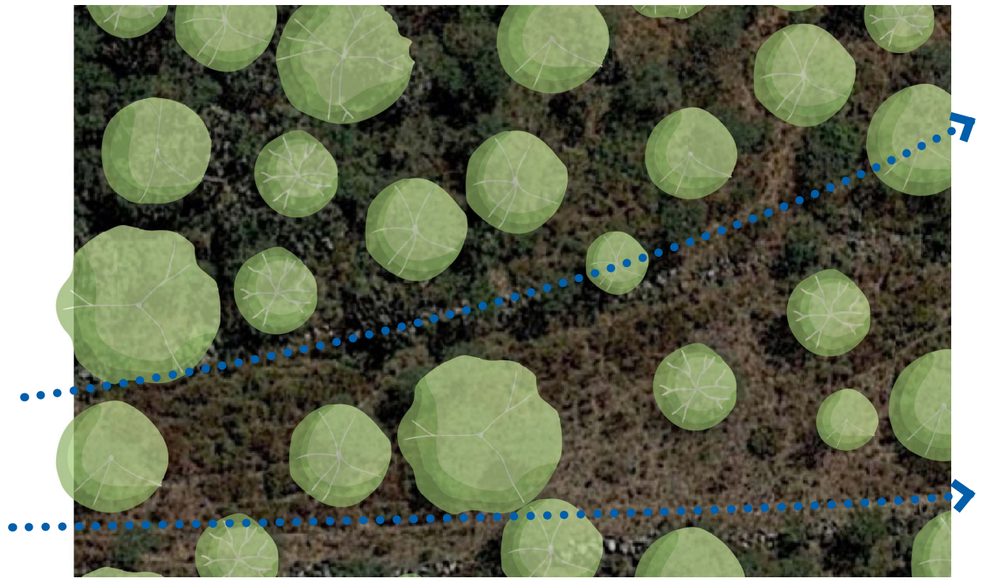
Erosion & Runoff Control

Forest Species Variation

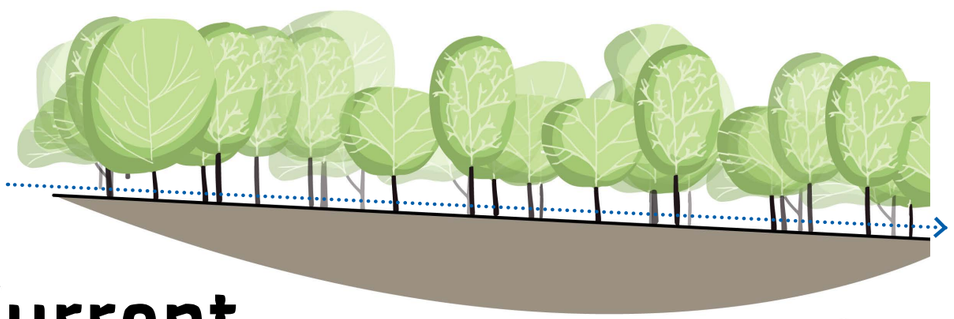
WHY?

- Biodiversity only located on hills
- Lack of water retention
- Soil water retention capacity

How?

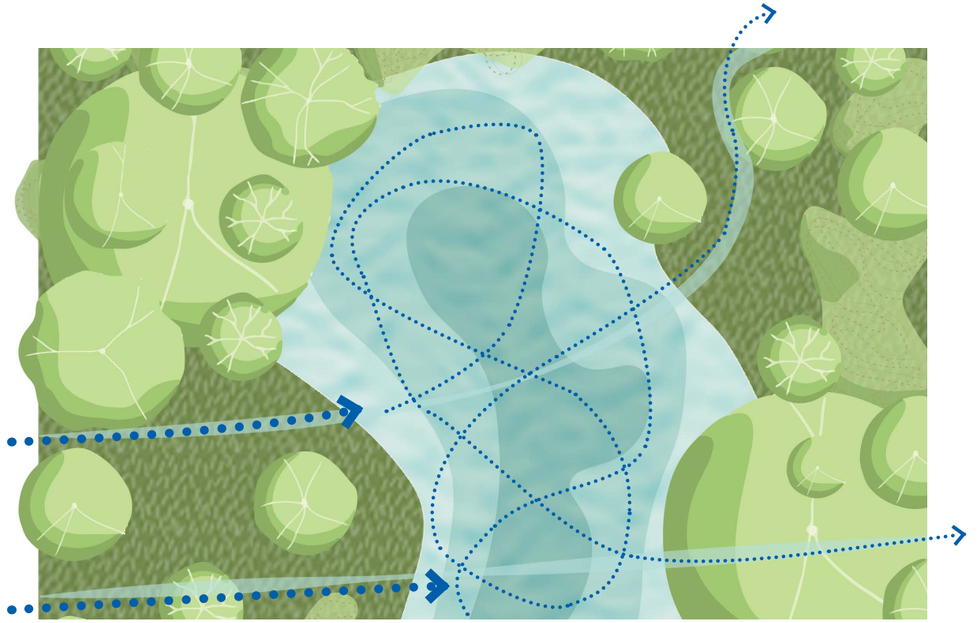


Plan



Section

Current



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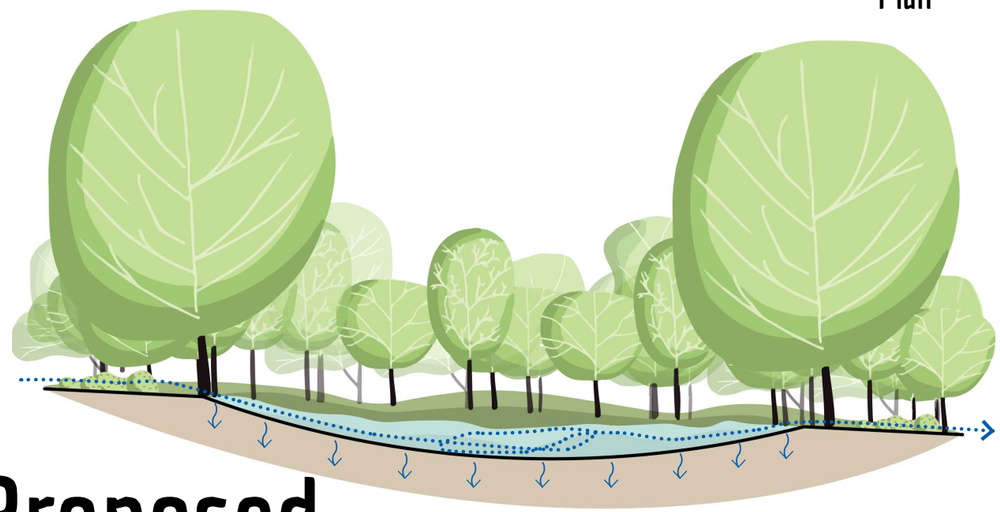


Section

Proposed

1. FOREST

Current

Proposed

1. FOREST

2

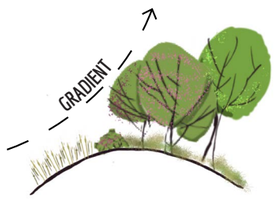
PUEBLO NUEVO

2. AGRICULTURE

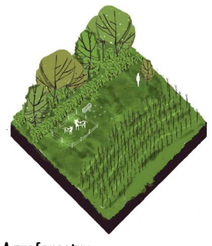
Strategy

Retention Ponds

Soil Restoration



Species Variety



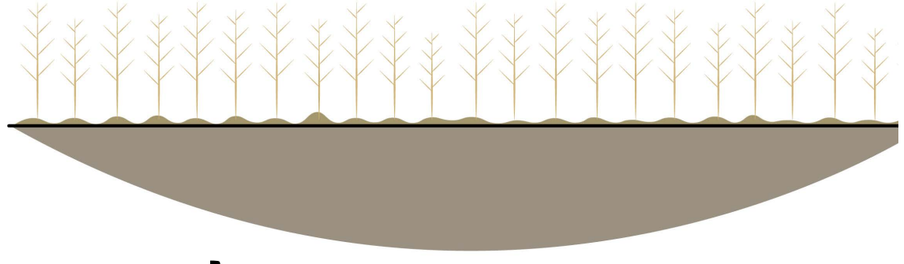
Agroforestry

WHY?

- Soil compaction
- Water availability
- Evaporation & Run off control

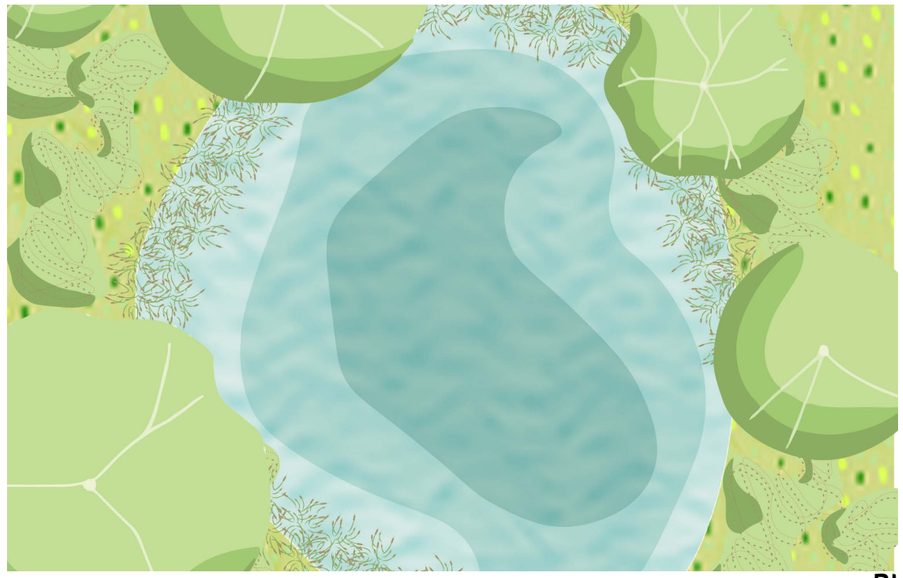
How?

Plan

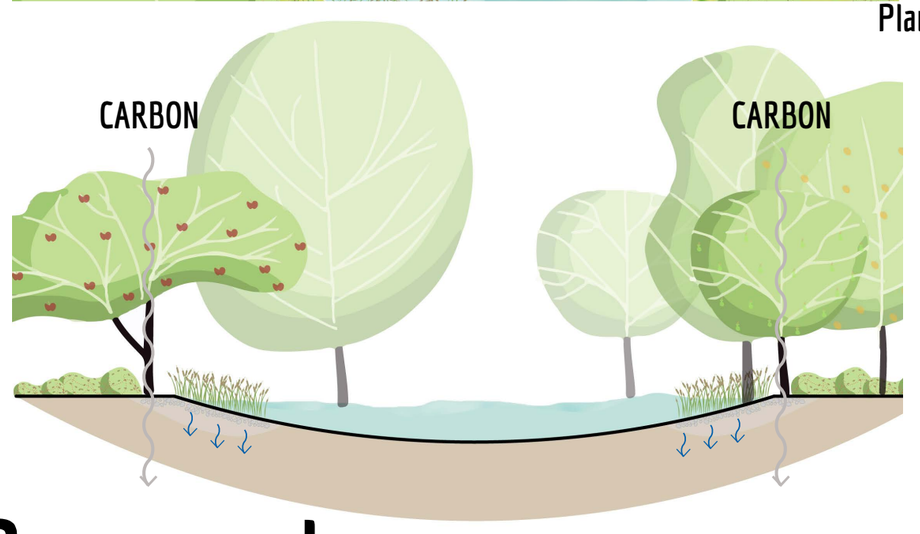


Section

Current



Plan



Section

Proposed

2. AGRICULTURE

Current

Proposed

2. AGRICULTURE

3

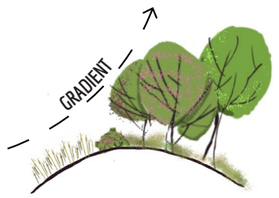
PUEBLO NUEVO

3. RIVER EDGE

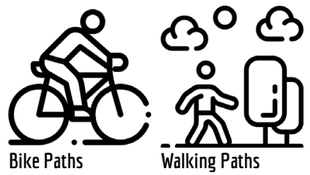
Strategy

Biological Corridors

Enhancement of water system



Species Variety



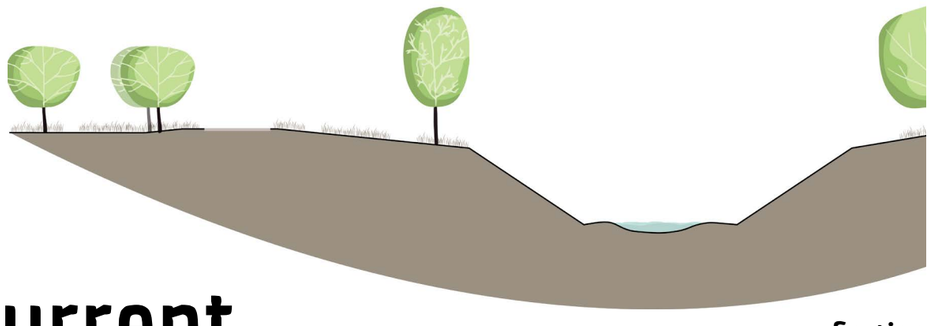
Bike Paths Walking Paths

WHY?

- Lack of biodiversity
- Disconnection of biological corridors
- Potential for slow mobility

How?

Plan



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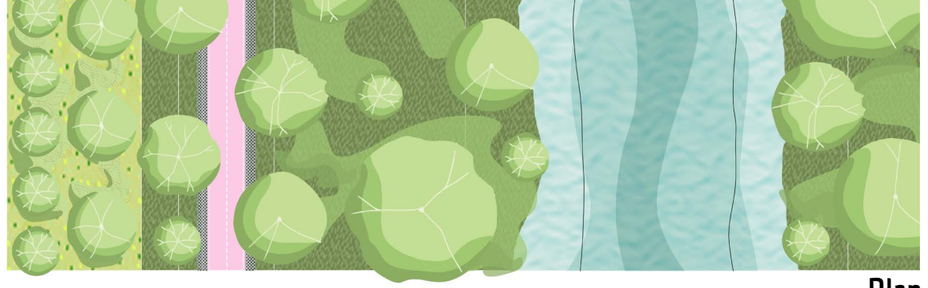
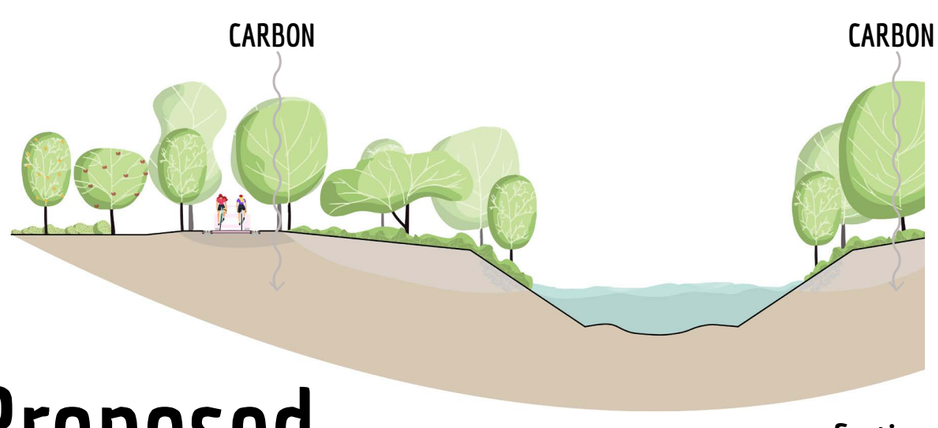
Current



Plan



Section

Proposed

3. RIVER EDGE

Current

Proposed

3. RIVER EDGE

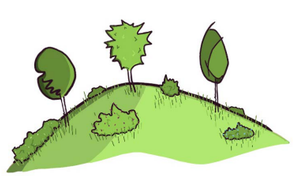
4

PUEBLO NUEVO

4. CITY EDGE

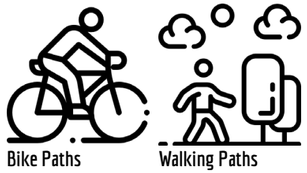
Strategy

Intact Landscapes



Reforestation

Inclusive Cities



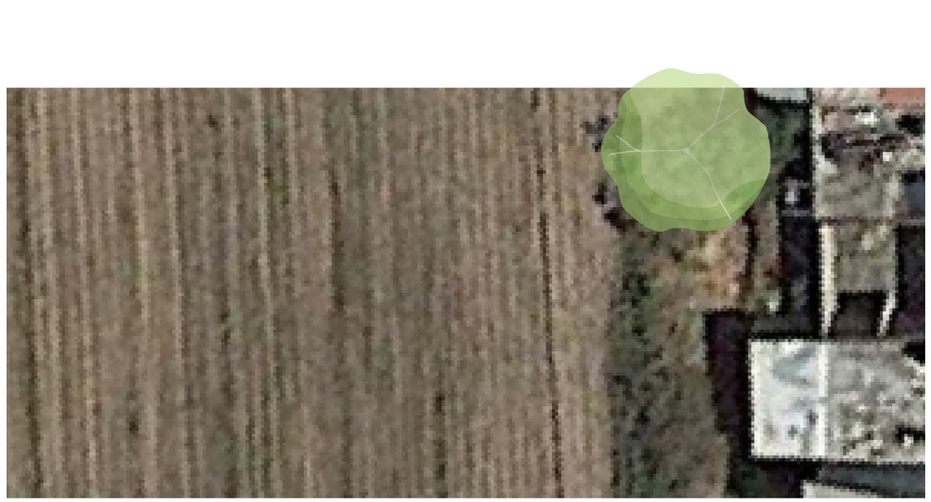
Bike Paths

Walking Paths

WHY?

- Lack of biodiversity
- Disconnection of biological corridors
- Potential for slow mobility

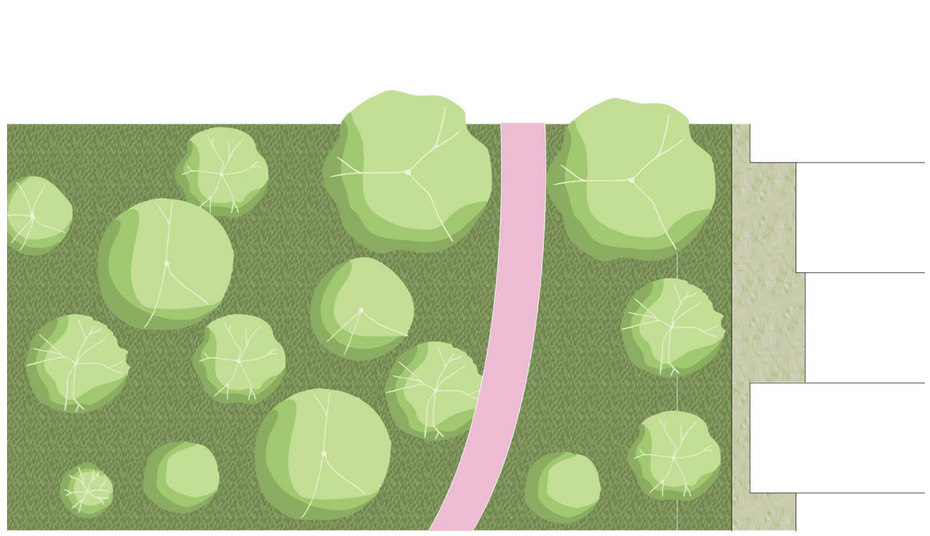
How?



Plan

Section

Current



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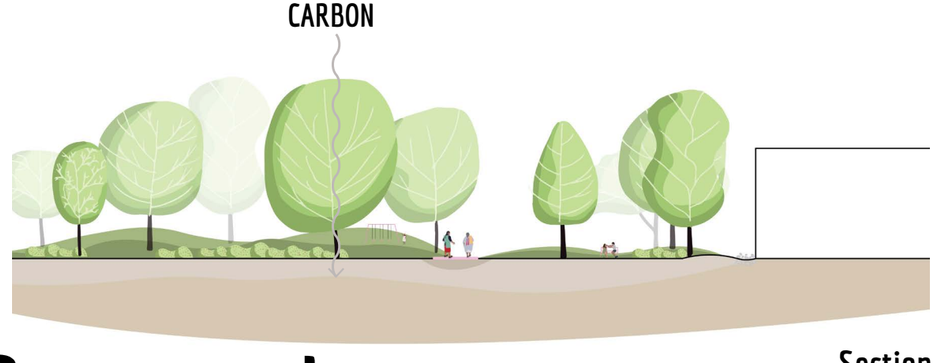
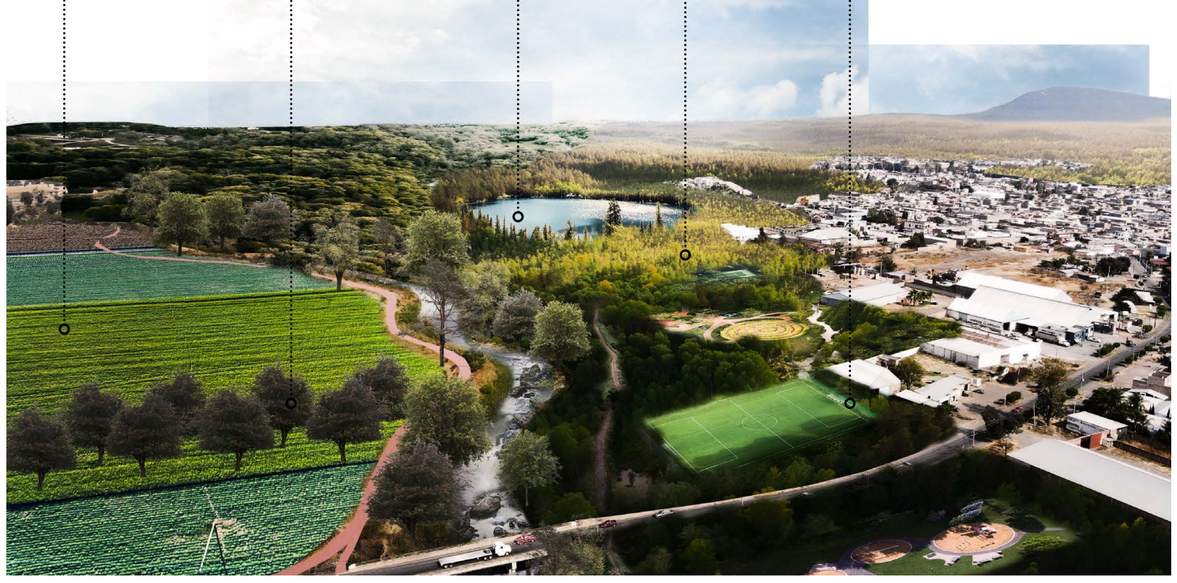


Section

Proposed

4. CITY EDGE

Current



Proposed

4. CITY EDGE

REGIONAL STRATEGY

URBAN

LANDSCAPE

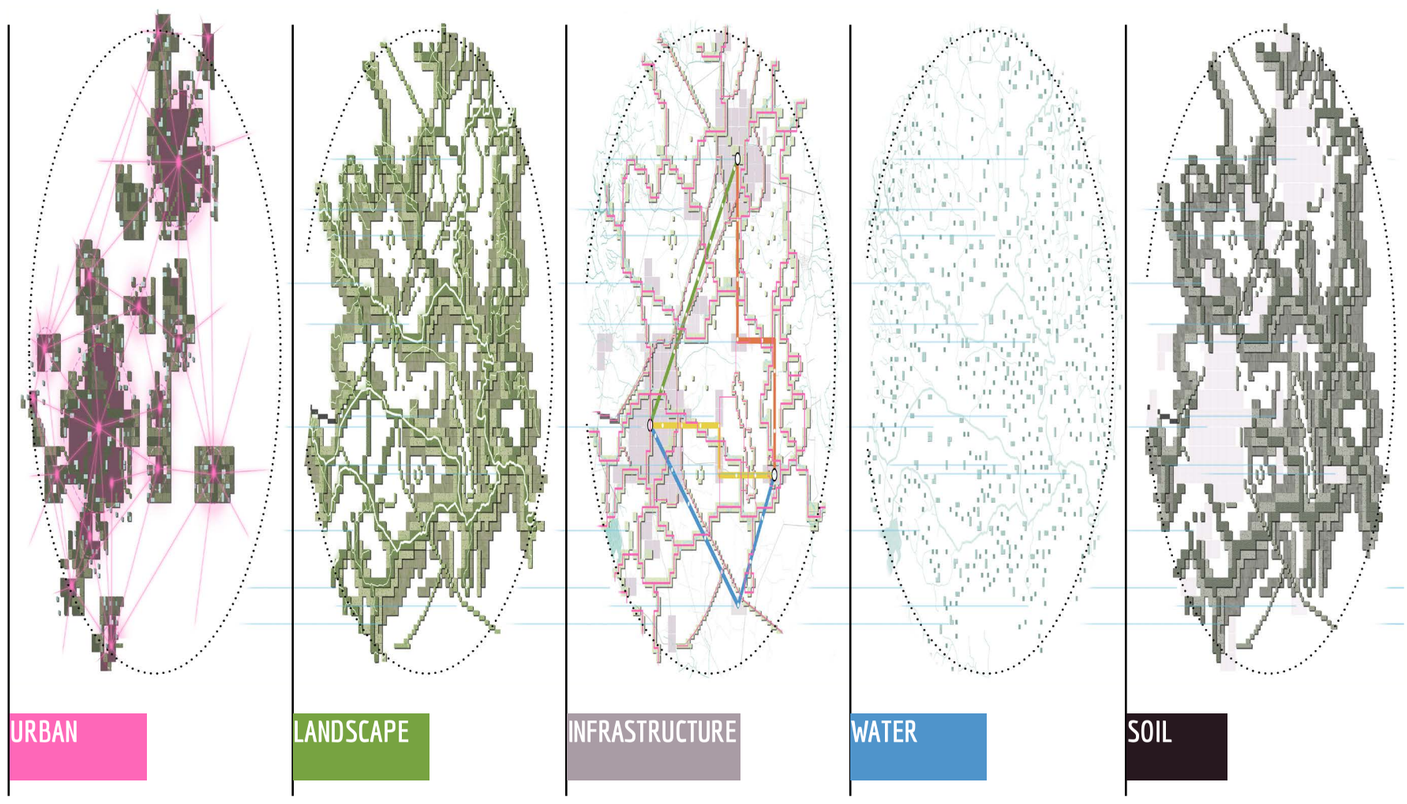
INFRASTRUCTURE

WATER

SOIL

105
CURRENT

PROPOSED



CONCLUSION

What is an urban and ecological **REGENERATION STRATEGY** to **RESTORE** social and environmental issues caused by **ANTHROPOGENIC PRACTICES** in order to transition into a **BIODIVERSE** and **SUSTAINABLE** urban landscape?

MAIN RESEARCH QUESTION

[ANSWER TO **MAIN RQ**]

- HEALTHY PEOPLE
- LIVELY BIODIVERSITY
- COMMUNITIES - ACTIVE - SAFE
- RETURN OF HUMAN SCALE
- ECONOMIC GROWTH
- HIGHER QUALITY OF LIVING

URBAN CONCLUSIONS

- QUANTITY AND QUALITY OF WATER
- REGAIN LOST VEGETATION
- REINCORPORATION OF SPECIES
- RICH SOIL QUALITY
- REESTABLISHED ECOSYSTEM & NATURAL CYCLES
- HIGH QUALITY PRODUCE
- HEALTHY ENVIRONMENT

LANDSCAPE CONCLUSIONS

- BIODIVERSE URBAN LANDSCAPE
- BALANCE WITH NATURE
- NETWORK OF ECOCITIES
- HIGHER LIVING STANDARDS

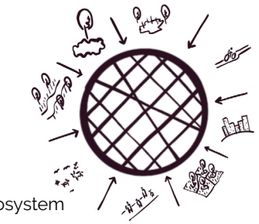
REGION CONCLUSIONS

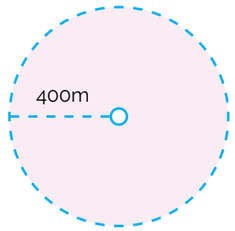
		ANNIHILATION	UNHEALTHY	REMEDIATION	RESTORATION	HEALTHY	BALANCE	SYMBIOSIS
URBAN	COMPACT CITY	Urban Sprawl - Constant Expansion			Contained cities			Compact cities
	MOBILITY	Unsustainable, Individual, Lack of Variety			Sustainable Transport - Increase of soft mobility			Sustainable mass transport - Soft mobility as the main option for mobility
	LIVING	Segregation, Lack of services, Low Quality			Integration, Some services, Good quality			Unified city, All services, Premium quality
	LANDSCAPE	Lack of greenery & Biodiversity			Incorporation of greenery			City as a living ecosystem
LANDSCAPE	REFORESTATION	Increase in Deforestation			Reforestation			Vast forests
	BIO CORRIDORS	Elimination of biological corridors			Continuation of biological corridors			Free mobility for all species
	GRADIENTS	Monoculture			Varied species			Diverse and balanced landscape
	BIODIVERSITY	Annihilation of species			Reappearance of native species			Strong biodiversity
INFRASTRUCTURE	MOBILITY OPTIONS	No options in mobility			Options in mobility			Sustainable and varied mobility
	CONNECTIONS	Increase in human and animal disconnections			Increase in human and animal connections			Network of integrated connections
	ECO INTEGRATION	Elimination of ecology			Restoration			Integrated ecological infrastructure
WATER	QUALITY	Low quality - Polluted			Higher quality - Somewhat clean			Best quality - Clean
	QUANTITY	Scarce			Availability			Vast
	FLOOD AREAS	Problematic			Opportunity			Wetlands & Ponds
	REINCORPORATION	Polluted or inexistent			Reincorporation strategies			Natural filtration - reincorporation system
SOIL	CARBON FIXATION	No fixation			Mid fixation			High fixation
	SOIL QUALITY	Infertile , Eroded, Compacted			Restoration strategy			Best quality
	LAND USE	Monocultures, Uneven			Variety of land uses			Highly diverse land use

FRAMEWORK
TRANSFERABLE LESSONS

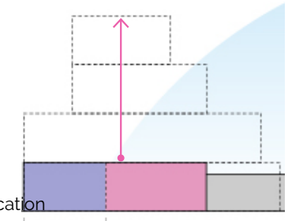
TOOLBOX
TRANSFERABLE LESSONS

URBAN


City as an Ecosystem

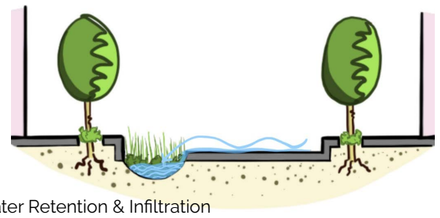


5 Minute City

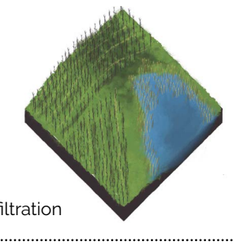

Vertical Densification

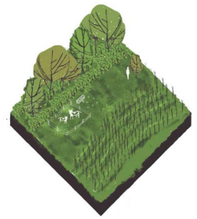
Green and Blue Features

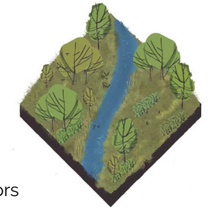
Streets for All


Water Retention & Infiltration

LANDSCAPE


Retention & Infiltration


Agroforestry


Biological Corridors

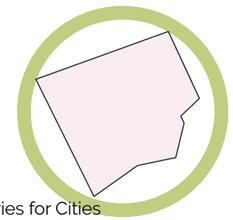
Species Variety

Intact Nature

Immersion in Nature

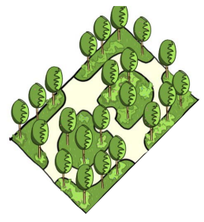
REGION

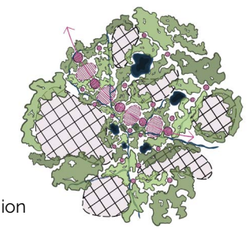
Balanced Population Distribution


Green Boundaries for Cities

Anthropogenic and Ecological Justice

Independent Economies


Public Spaces


Symbiotic Region

URBAN

- POLICY
- INCENTIVES
- KNOWLEDGE
- PEOPLE

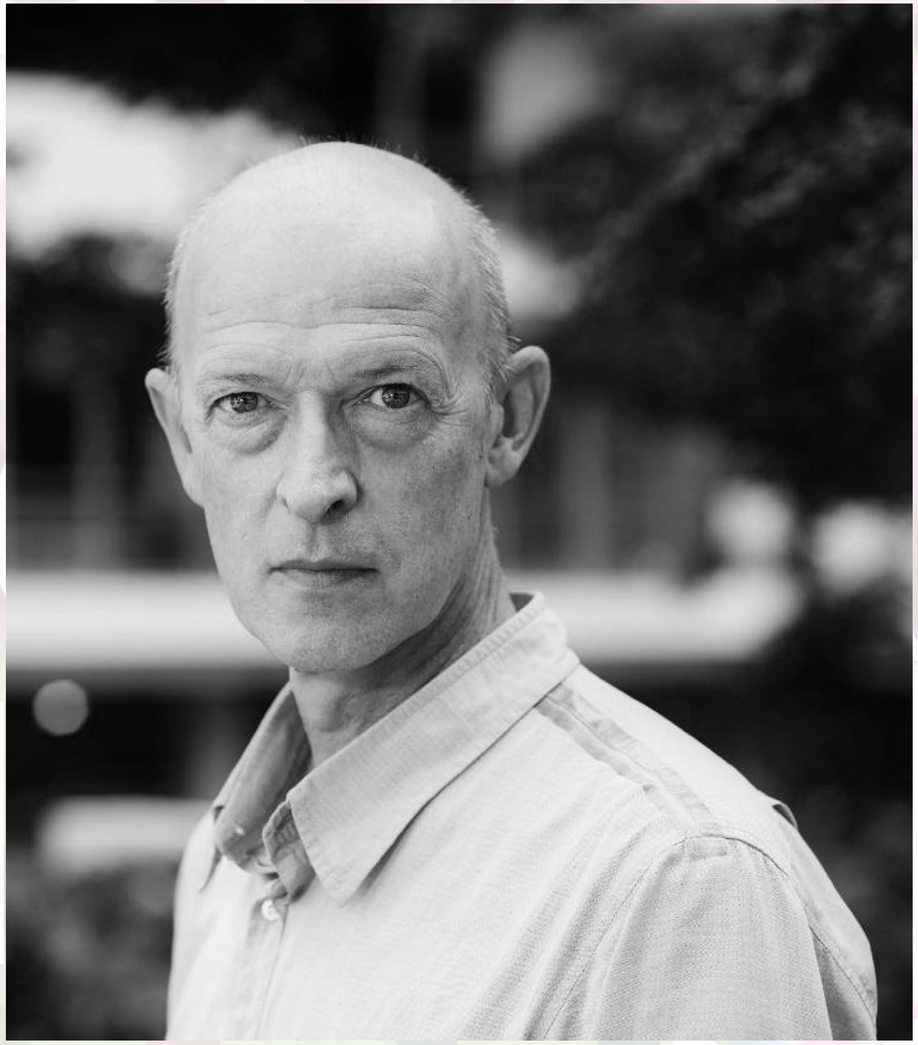
LANDSCAPE

- INCENTIVES
- AGRICULTURE
- KNOWLEDGE
- EXPERIMENTATION

IMPLICATIONS

THANK YOU ALL!

FIRST MENTOR: **NICO TILLIE**



SECOND MENTOR: **RIENTS DIJKSTRA**

THANK YOU!