

A grayscale topographic map of Europe. A specific region in Central Europe, encompassing parts of Germany, Poland, and the Czech Republic, is highlighted with a thick black outline. The map shows detailed terrain features, including mountain ranges and river networks.

# ADAPTIVE RESILIENCE

|THE ADDED VALUE TO A CHANGING WORLD|

|ILIJANA R. MITEVA|

**Mentor team:**

**First mentor:** Fransje Hooimeijer

**Second mentor:** Marcin Dabrowski



# Bandung Metropolitan Area

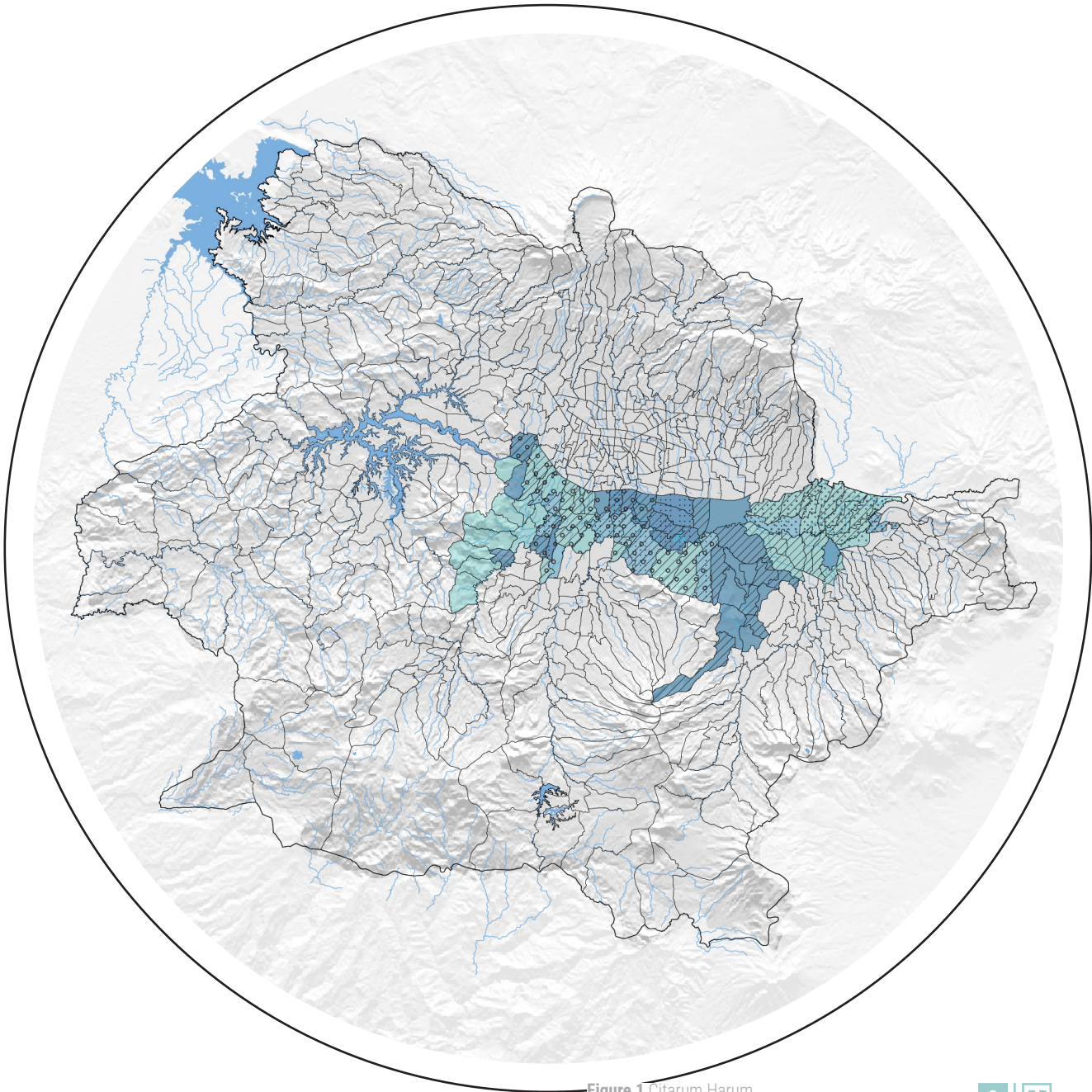


Figure 1 Citarum Harum  
Source: Martin Muljana



# Bandung Metropolitan Area

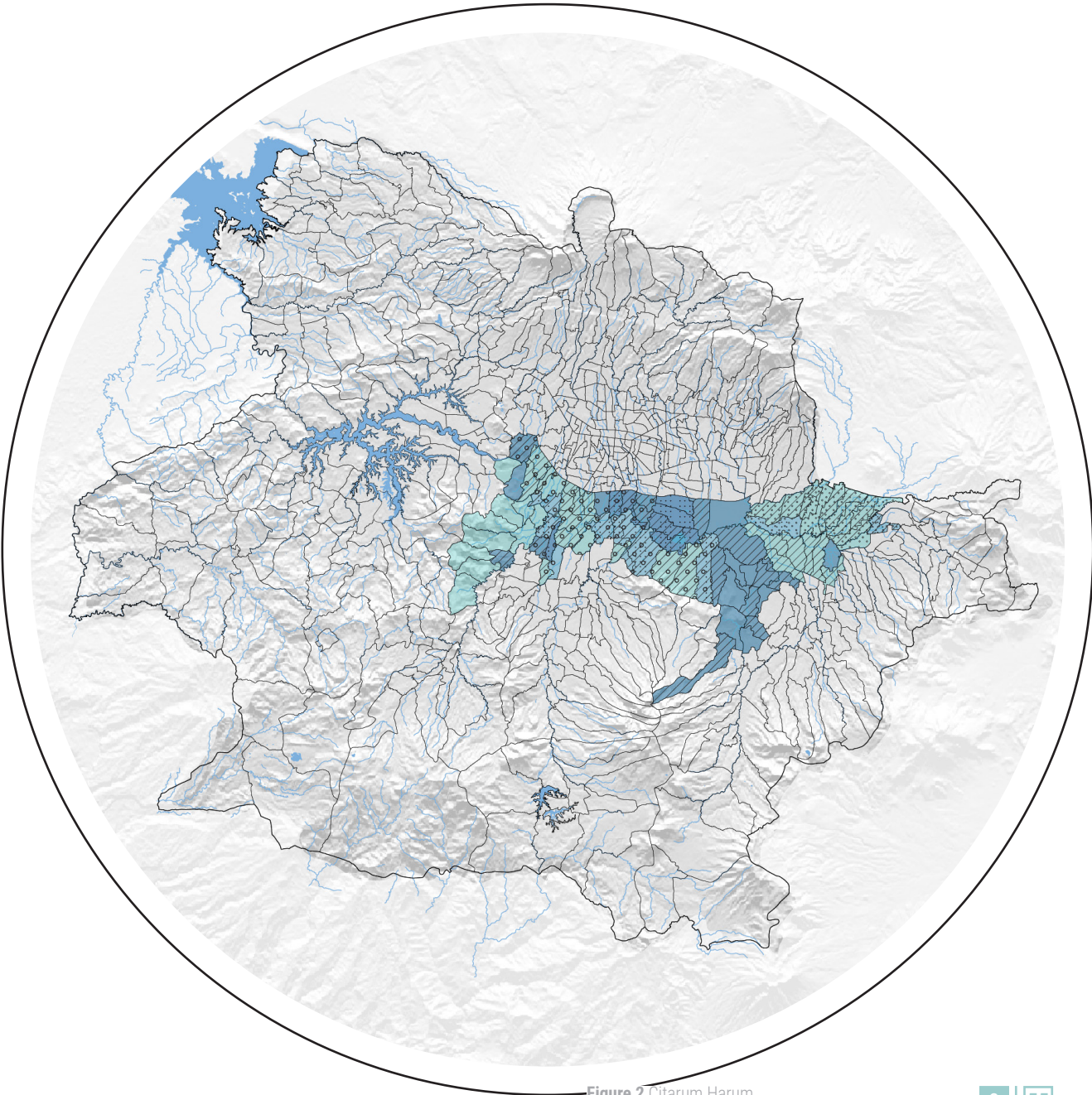


Figure 2 Citarum Harum  
Source: Martin Muljana











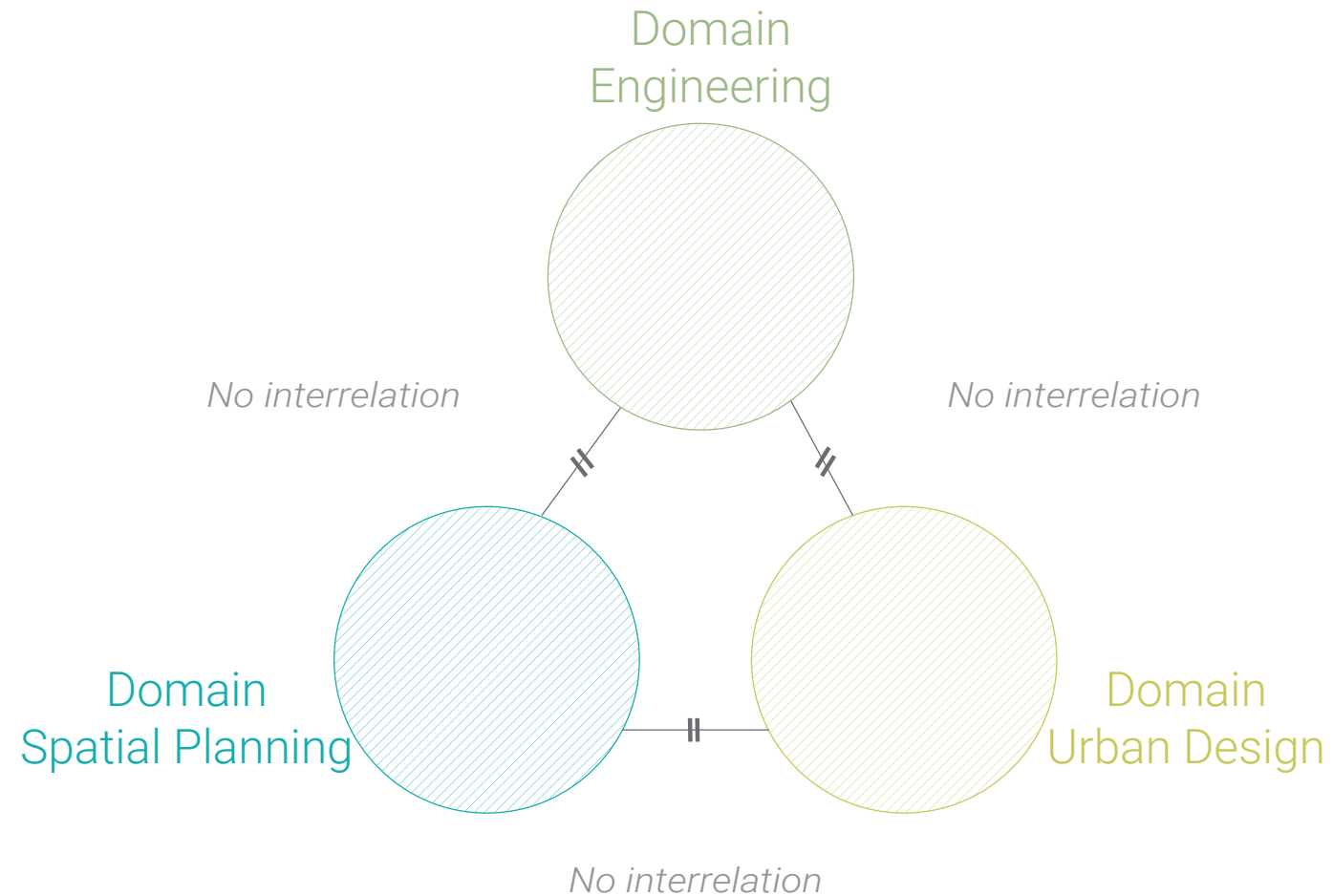




Why is there a difference between intentions and reality?

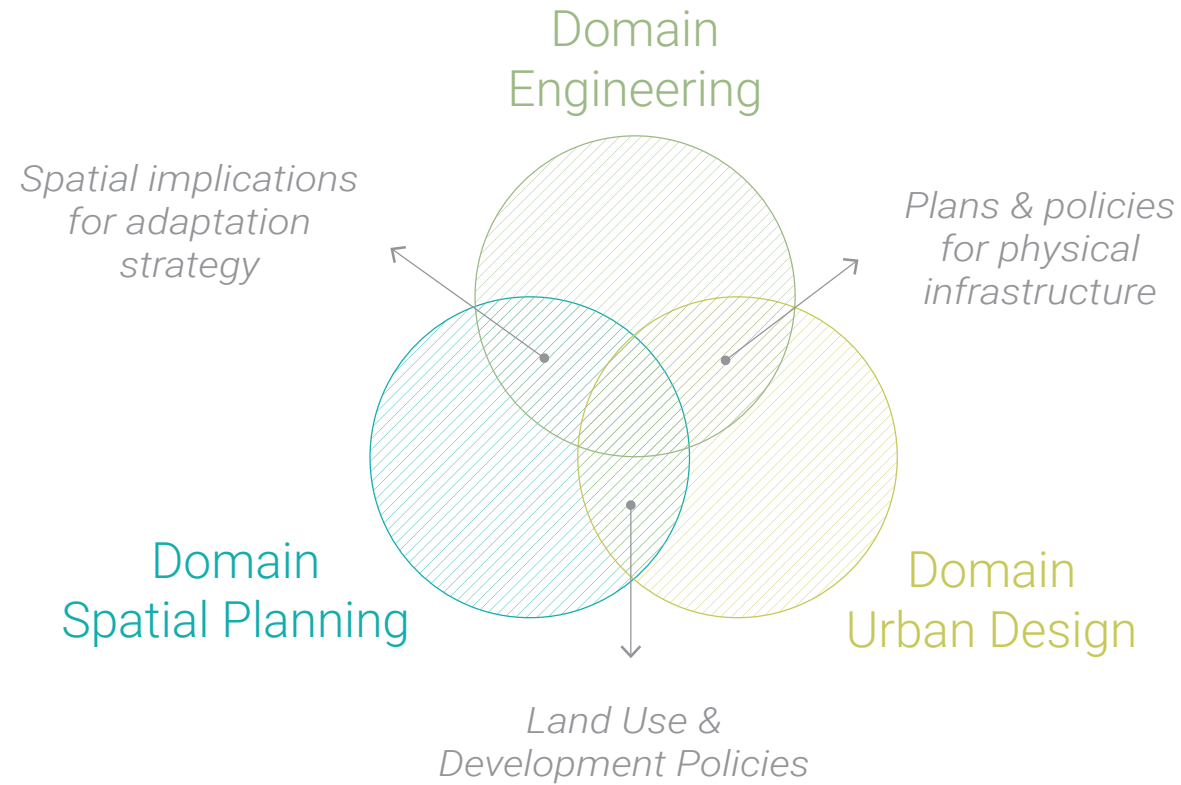


# Current Model of Building Resiliency in the Urban Realm





# Conceptual Model of Building Resiliency in the Urban Realm





















# Research Question

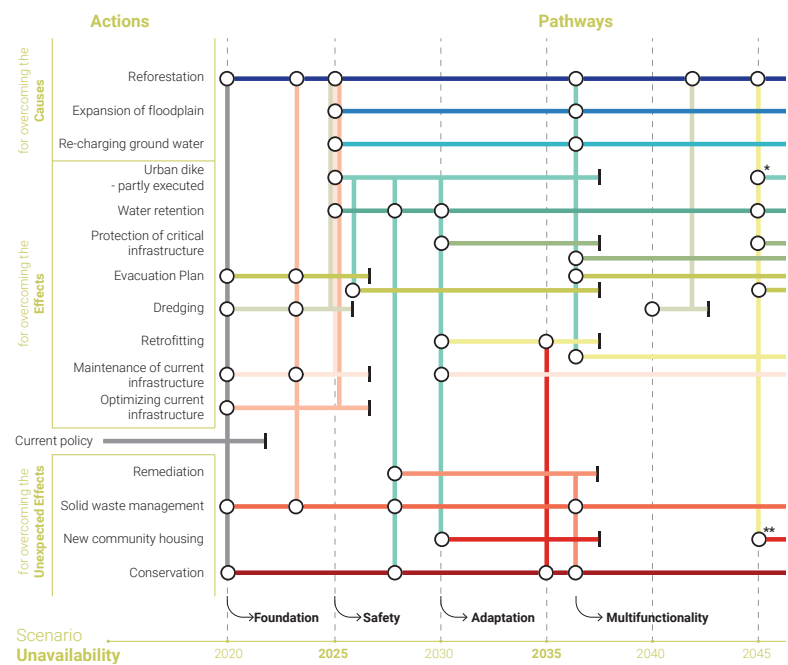
How can the flood risk adaptation strategies overcome both the physical and social vulnerabilities while sustaining healthy and just urban environments in Bandung?

# Answer



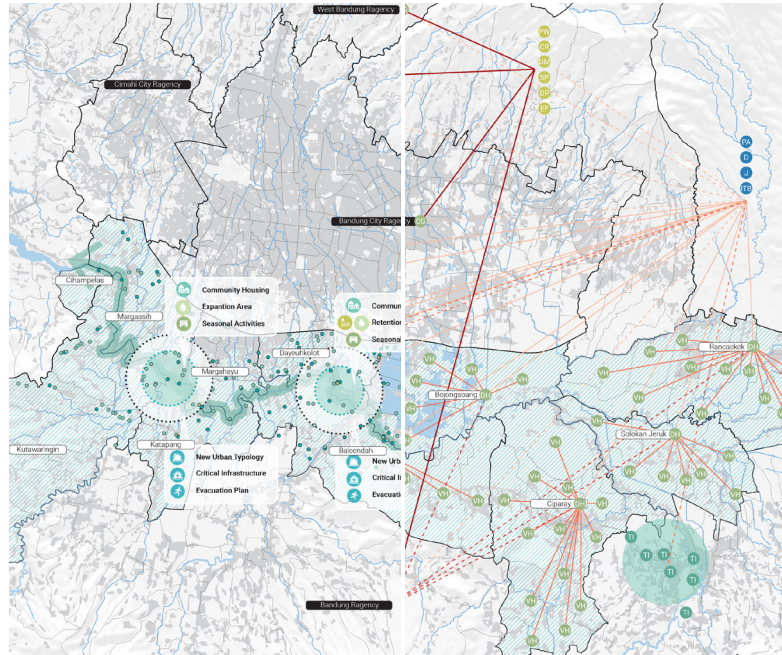
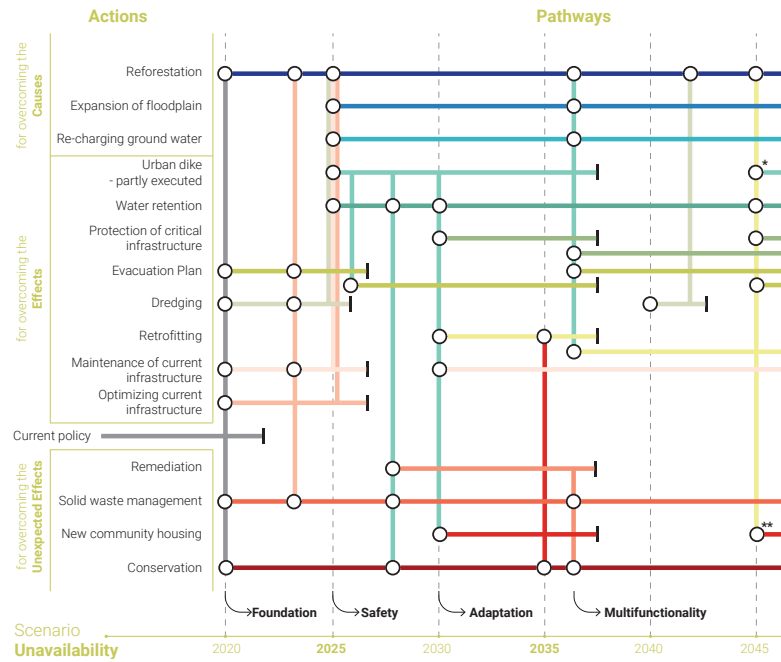
# Answer

## Planning



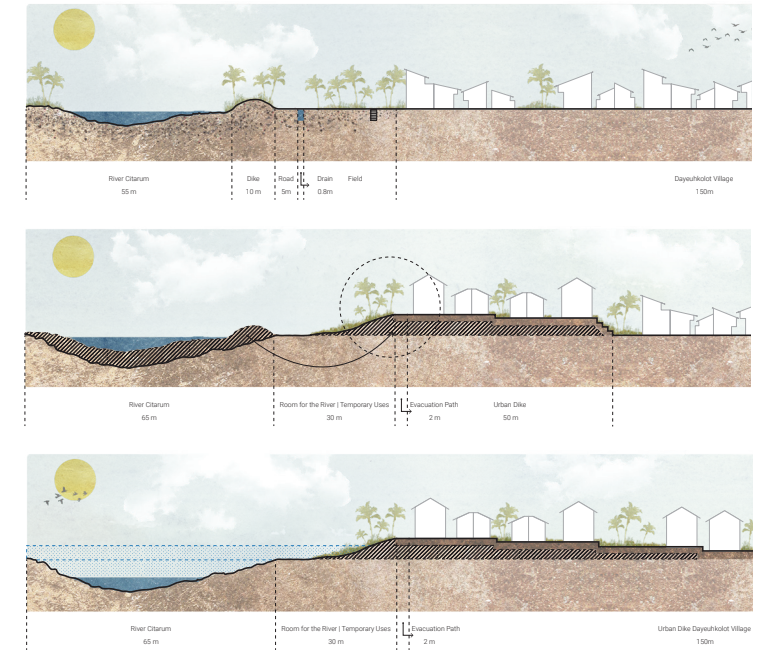
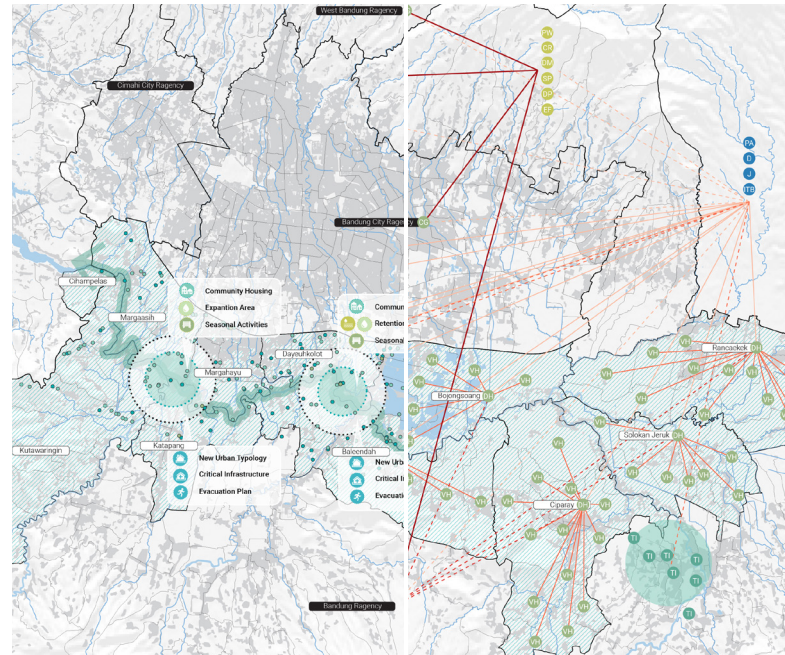
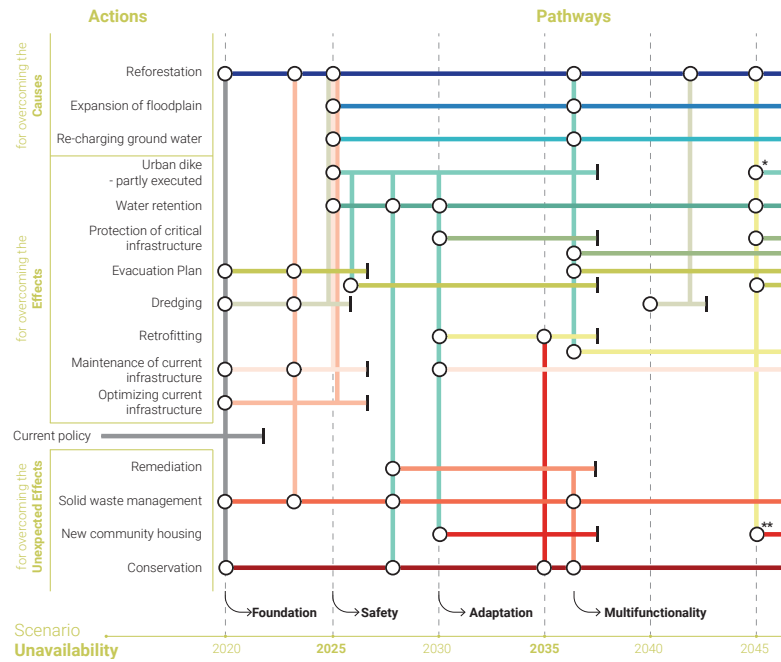
## Answer

Planning → Strategy

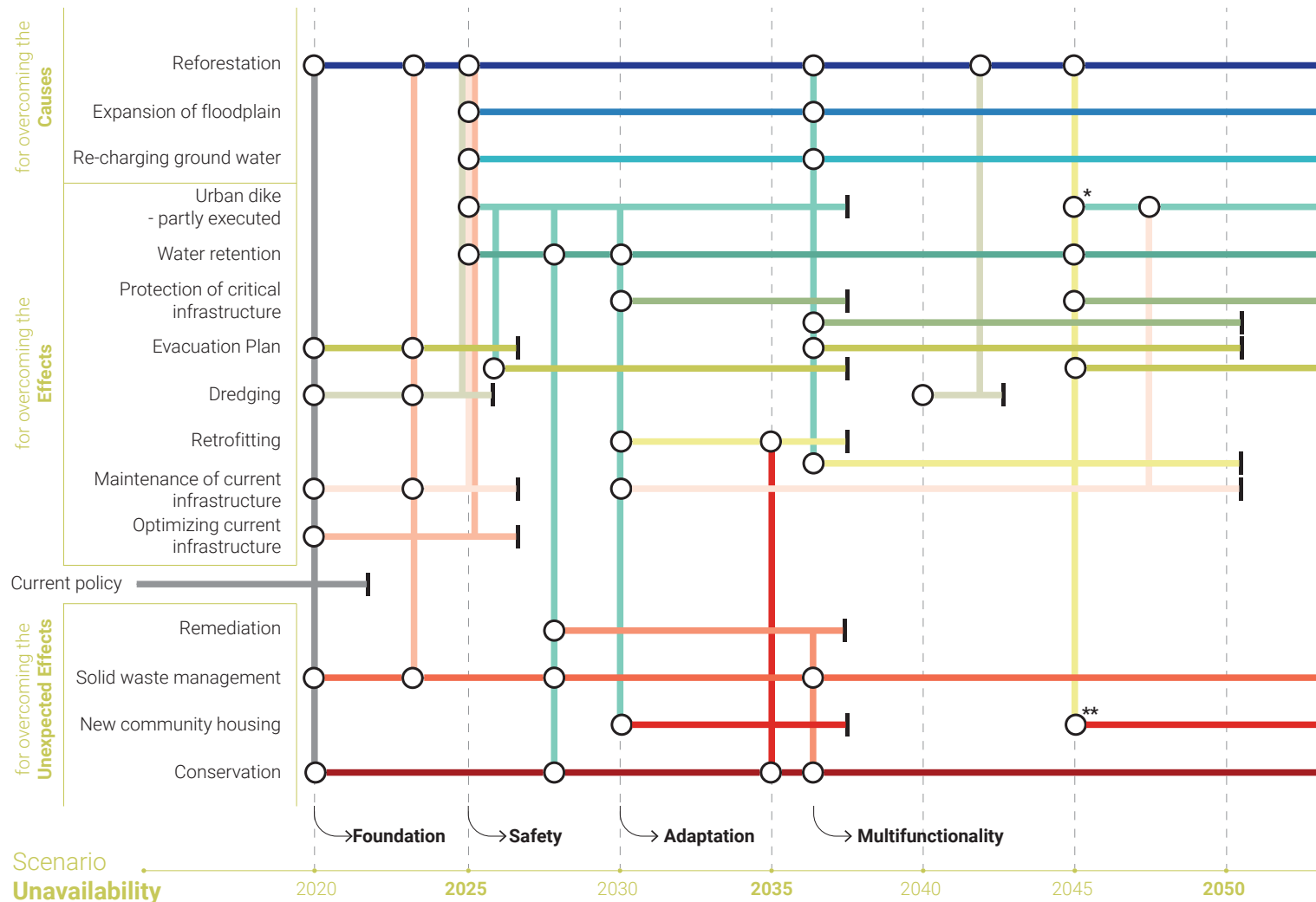




## Answer



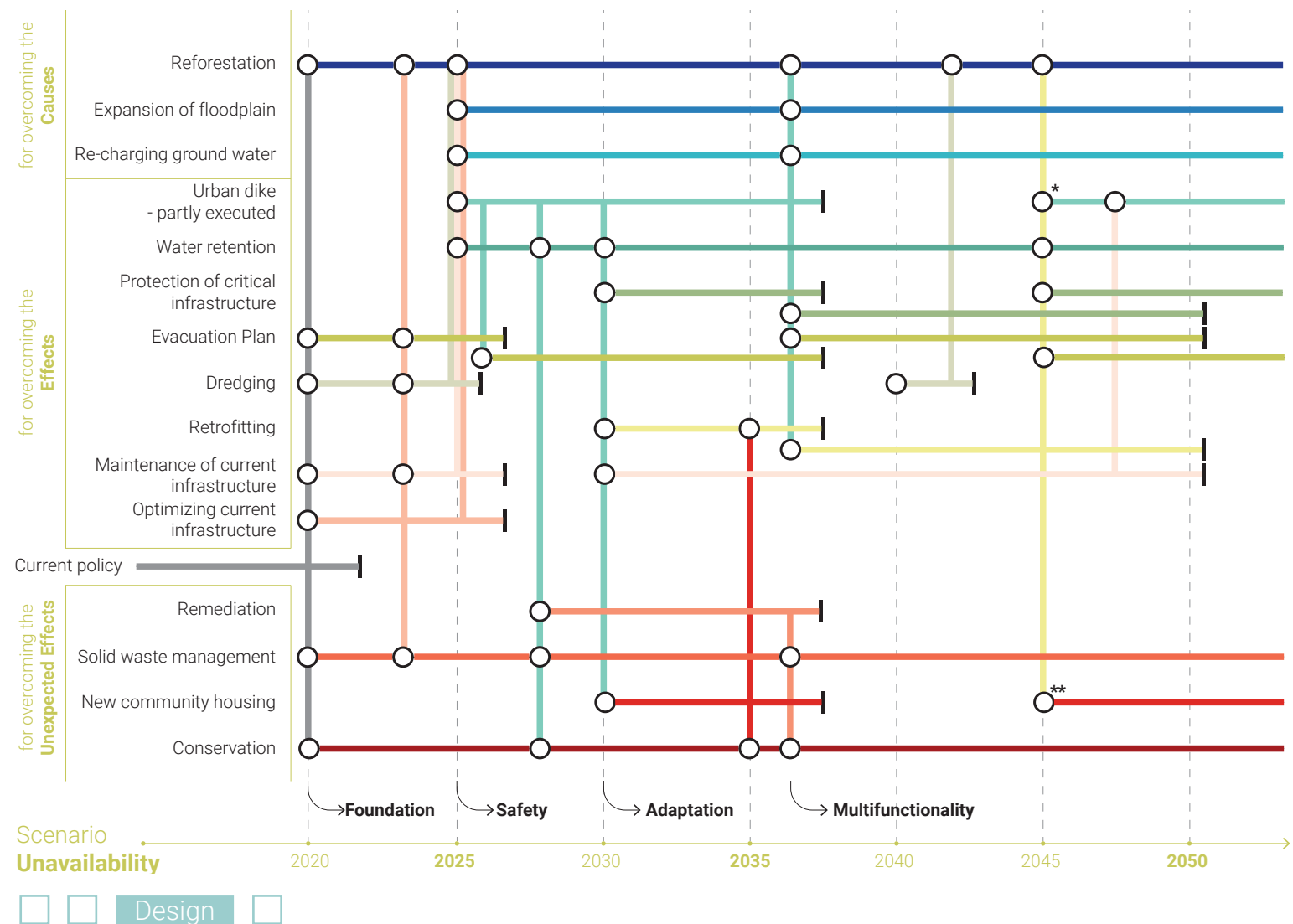
# Dynamic Adaptive Policy Pathways



- Dealing with uncertainty
- Flexibility and adaptation in configuring new types of spatial conditions
- Accommodates future changes in the system
- Allows creating long term planning, thus avoiding lock-in situations
- Uses assembly of measures, which benefit from each other or replace one another

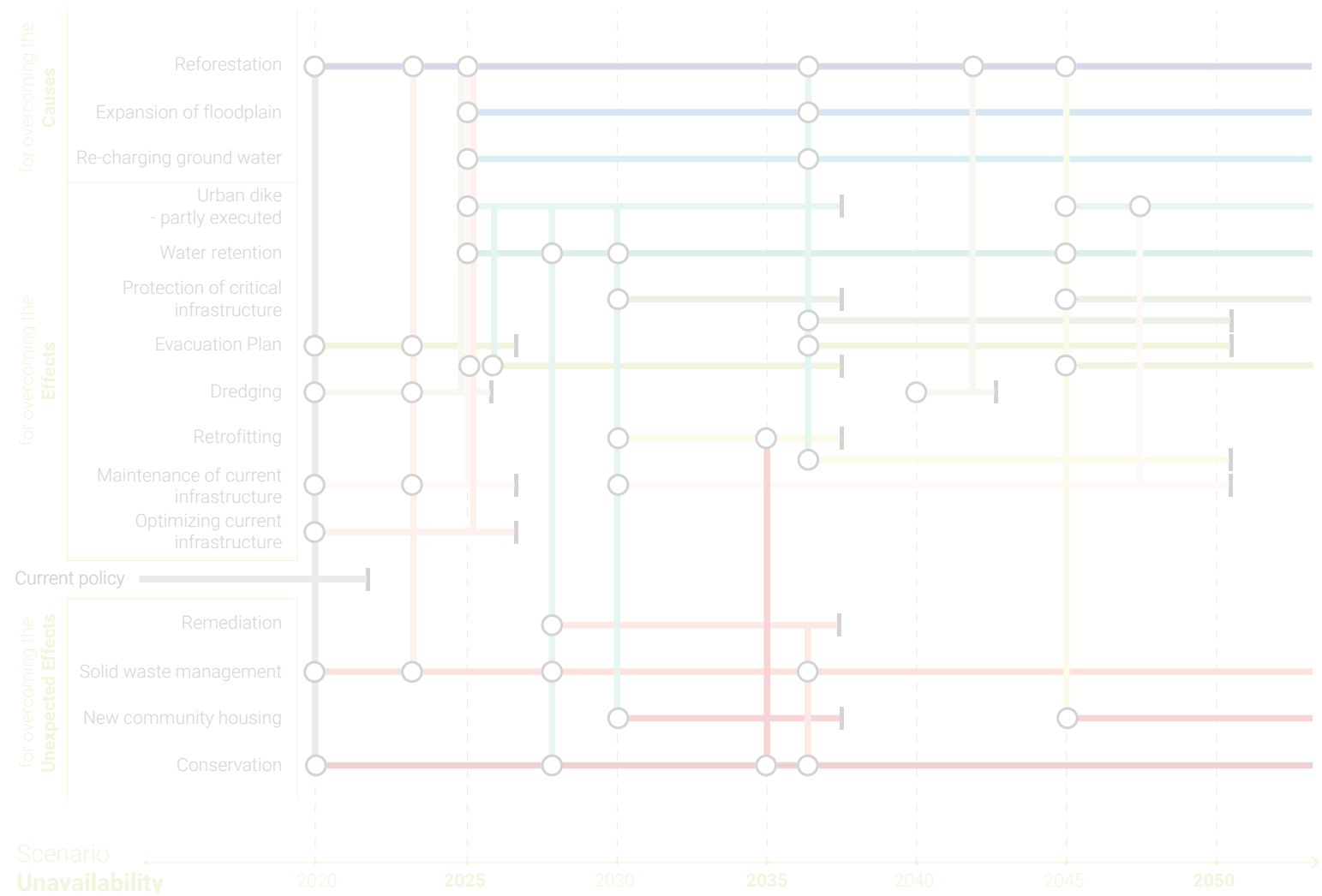


# Dynamic Adaptive Policy Pathways



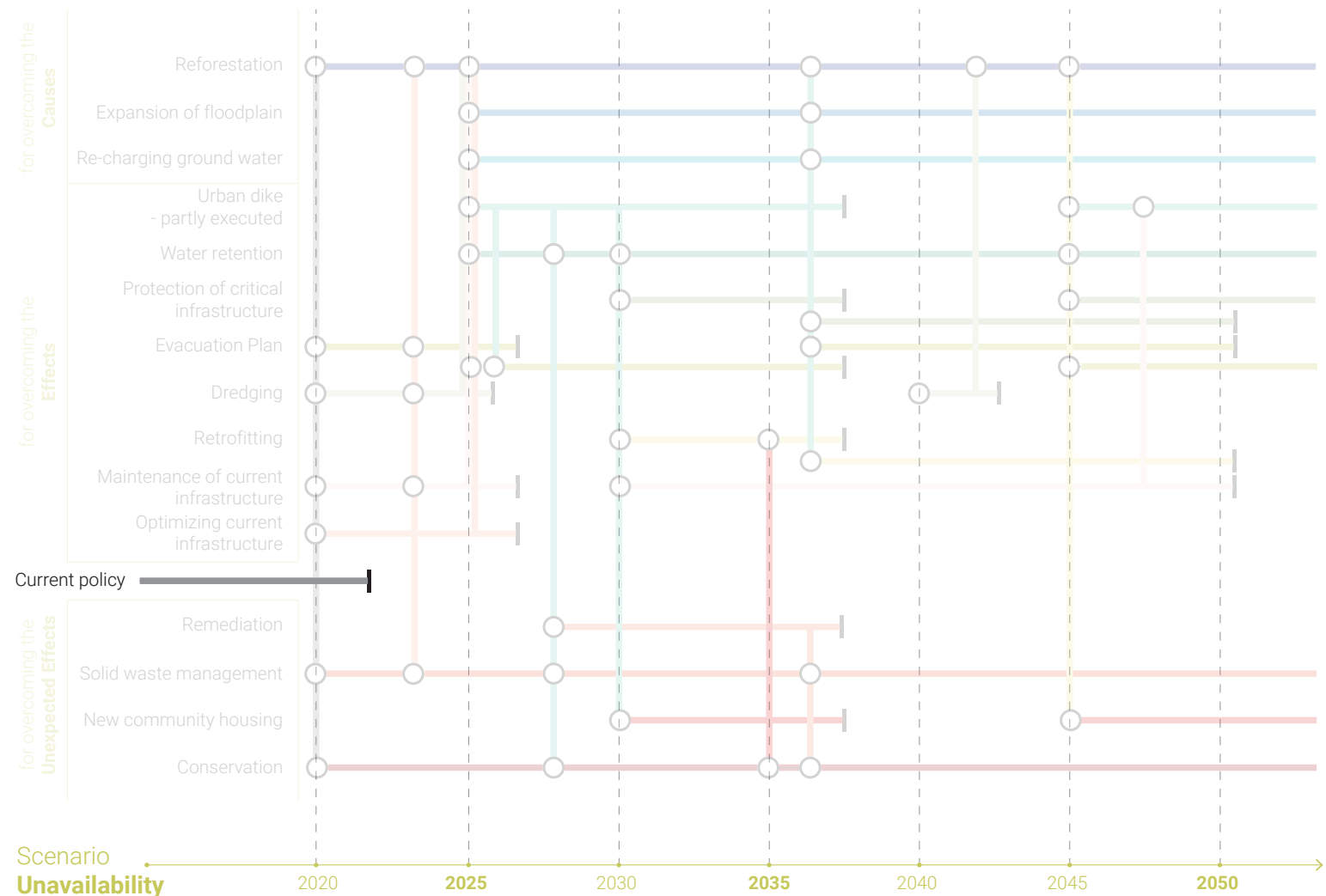
“[...] the Indonesian Ministry of Public Works has established management planning for the Citarum watershed but, so far, management of this watershed has tended to be **only partially carried out** (only in certain sectors) owing to a **lack of mutual understanding among the relevant stakeholders**. It is likely that the **absence of common principles** that accommodate the interests of all parties is a factor behind this situation. In addition, **the relevant stakeholders do not as yet properly understand such notions as adopting an ecosystem (landscape) approach** as the basis for watershed rehabilitation. Water managers need to recognize more clearly that there are additional, but no less critical, issues beyond the watershed itself—issues of a sociological, ecological, and also political nature.”

# How does DAPP work?



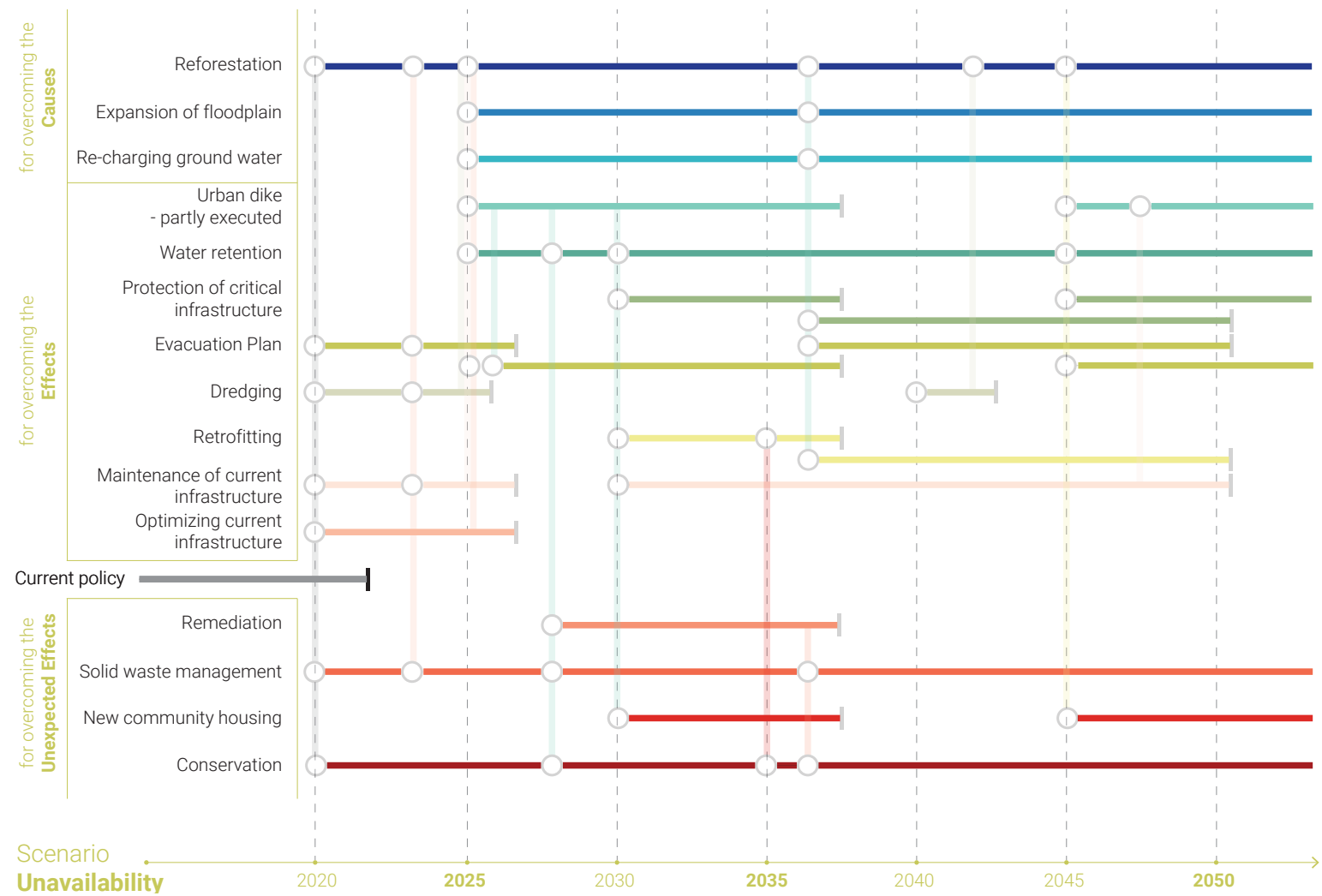


# How does DAPP work?



Starting point - End goal

# How does DAPP work?

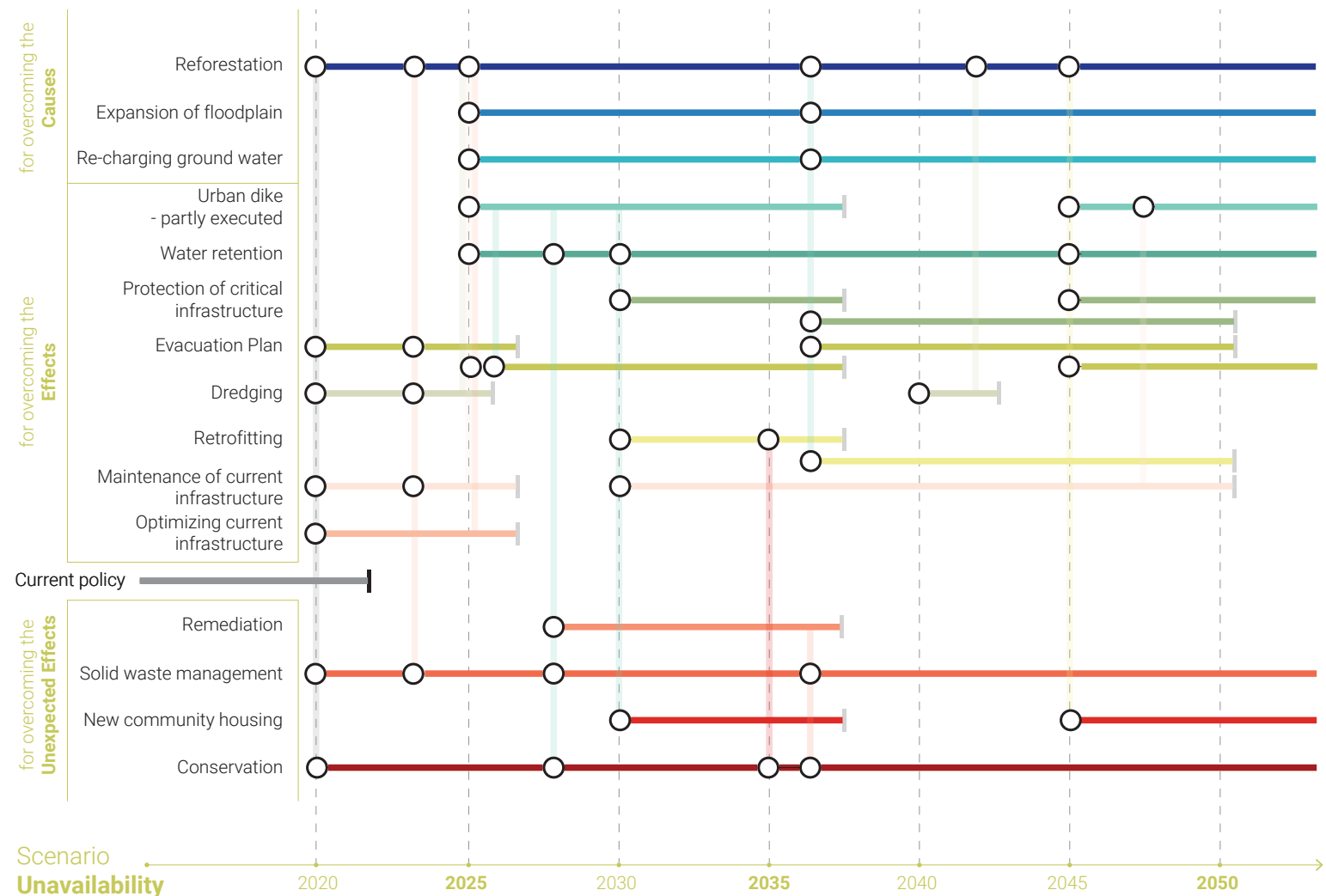


Starting point - End goal

Actions



# How does DAPP work?

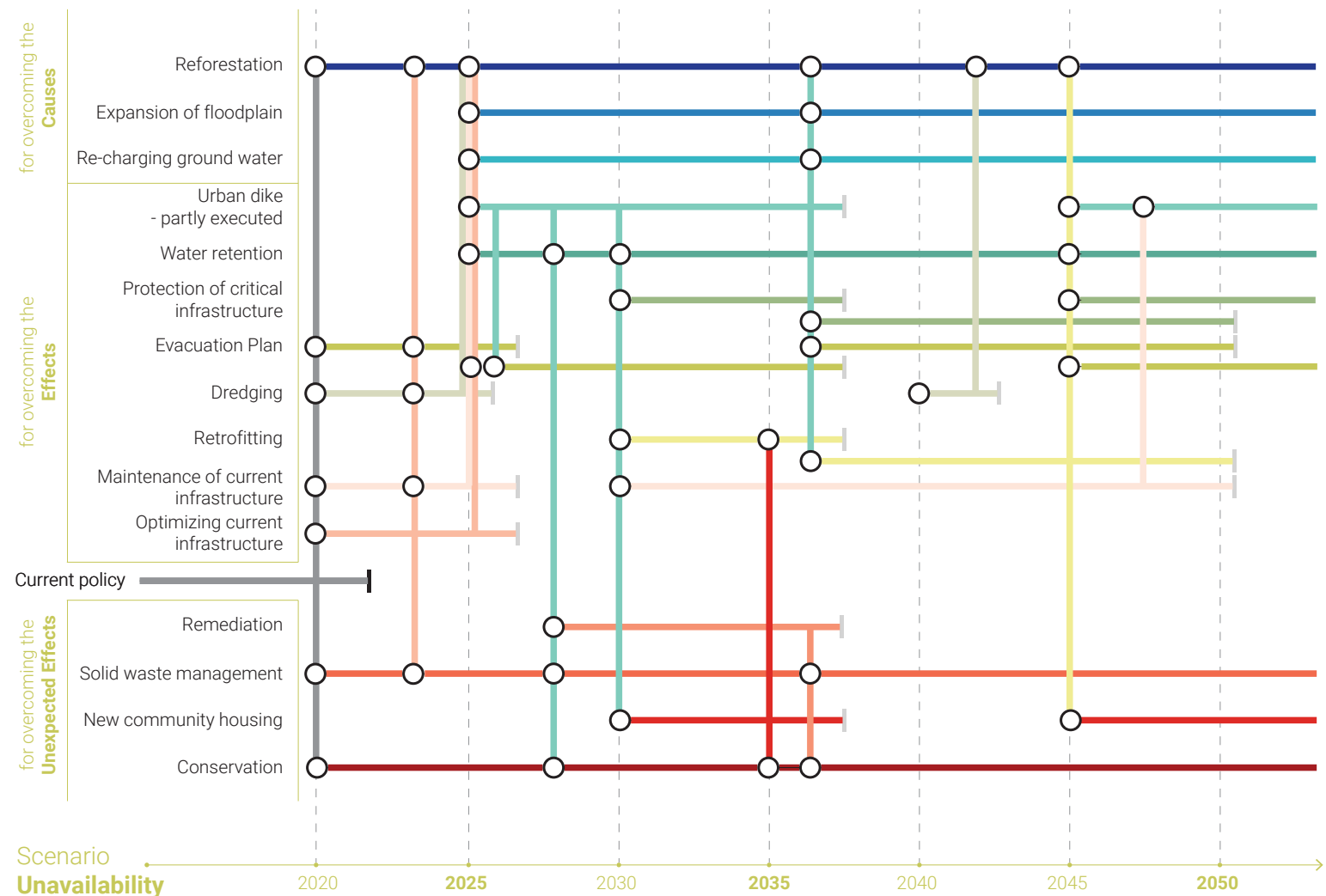


Starting point - End goal

Actions

Transfer Stations

# How does DAPP work?



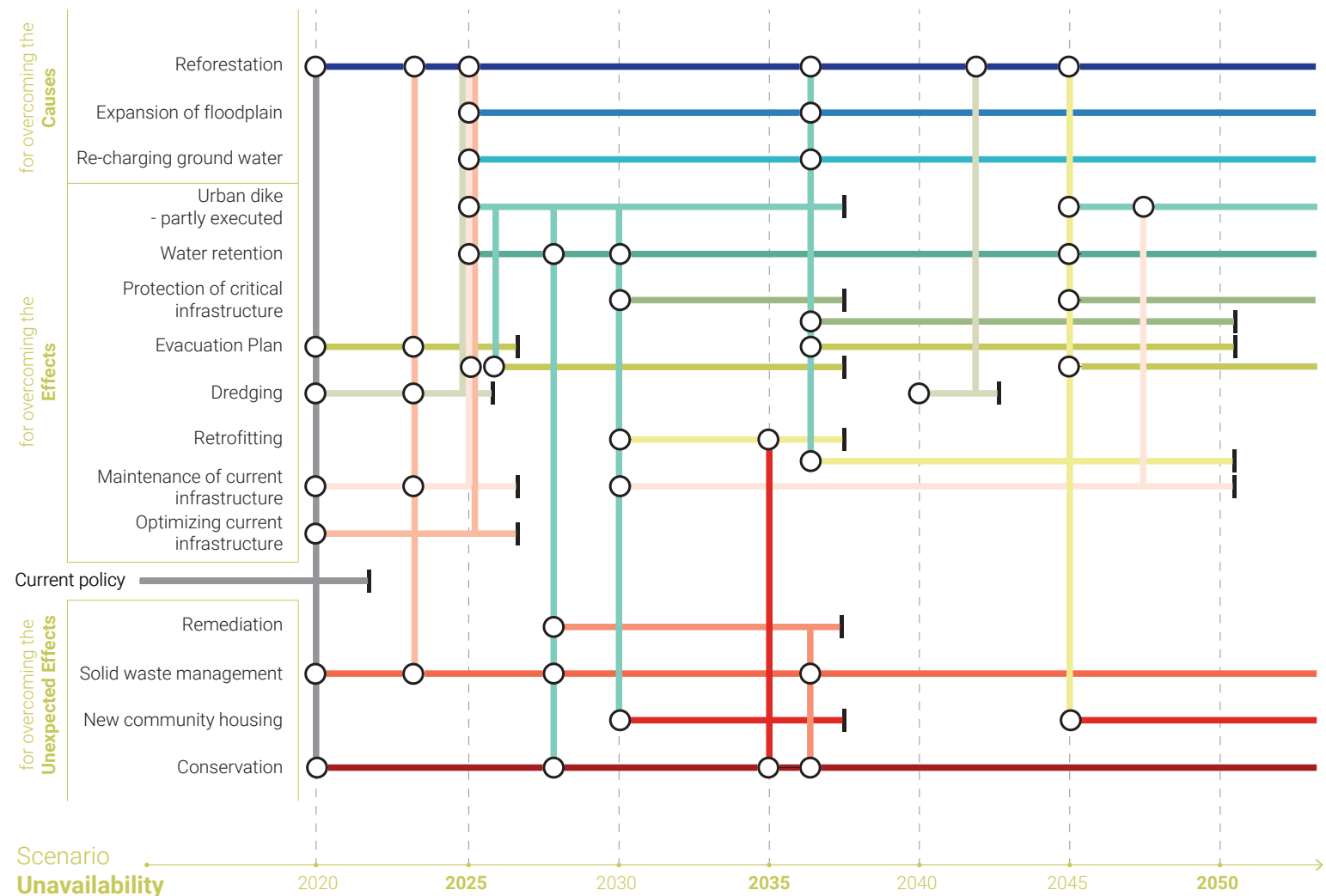
Starting point - End goal

Actions

Transfer Stations



# How does DAPP work?



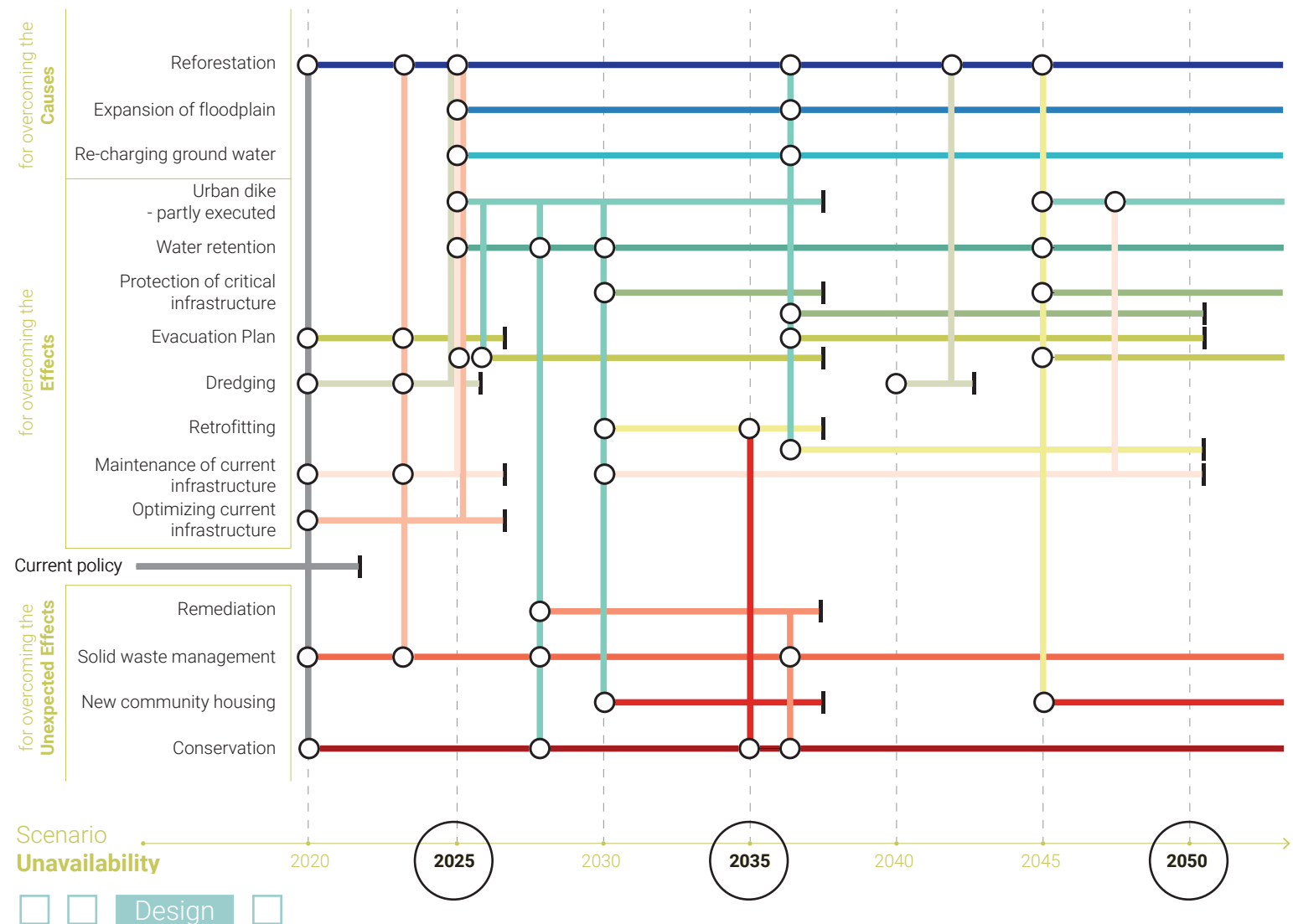
Starting point - End goal

Actions

Transfer Stations

Adaptation tipping points

# How does DAPP work?



Starting point - End goal

Actions

Transfer Stations

Adaptation tipping points

Scenario tipping points



# How does DAPP work?

- **Flood event on the first 5 year return period, resulting in damaged and destroyed properties.**
- Steady population growth and internal migration to urbanized areas.
- The current infrastructure and policy setting cannot sustain the changes in the systems, thus is not meeting the needs and objectives of the society.



2025

- Climate change is gradually increasing temperatures creating higher possibilities for extreme rainfalls.
- **Population increases double in the metropolitan area, resulting in shortage of housing.**
- The significant changes in the systems terminate many undertaken actions due to incomplete defence and housing infrastructure.



2035

- Extreme weather conditions continue, resulting in demand for more areas of water storage and delay.
- The rise in the urban population results in emerging informal settlements in vulnerable areas.
- **The changes in the systems are so big that if there is not a change in the scenario, the goal of the plan would not be reached.**



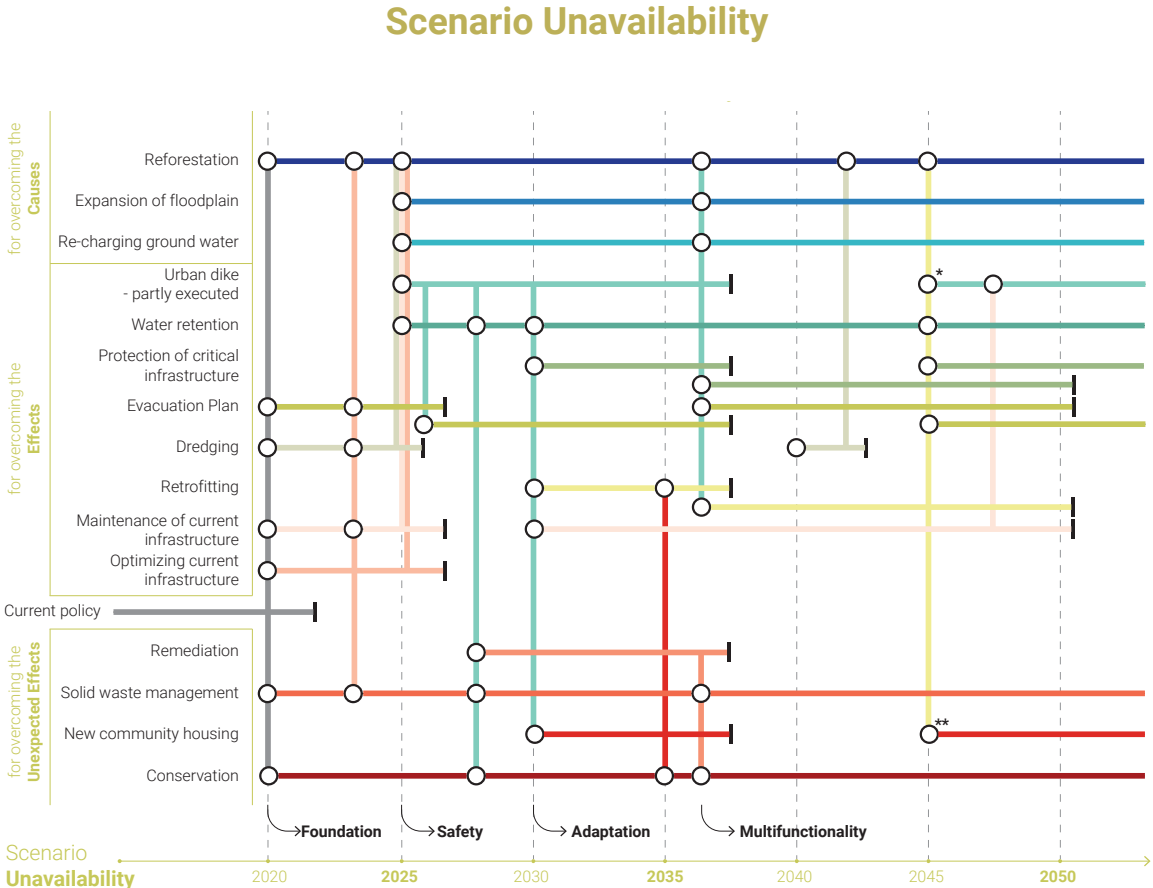
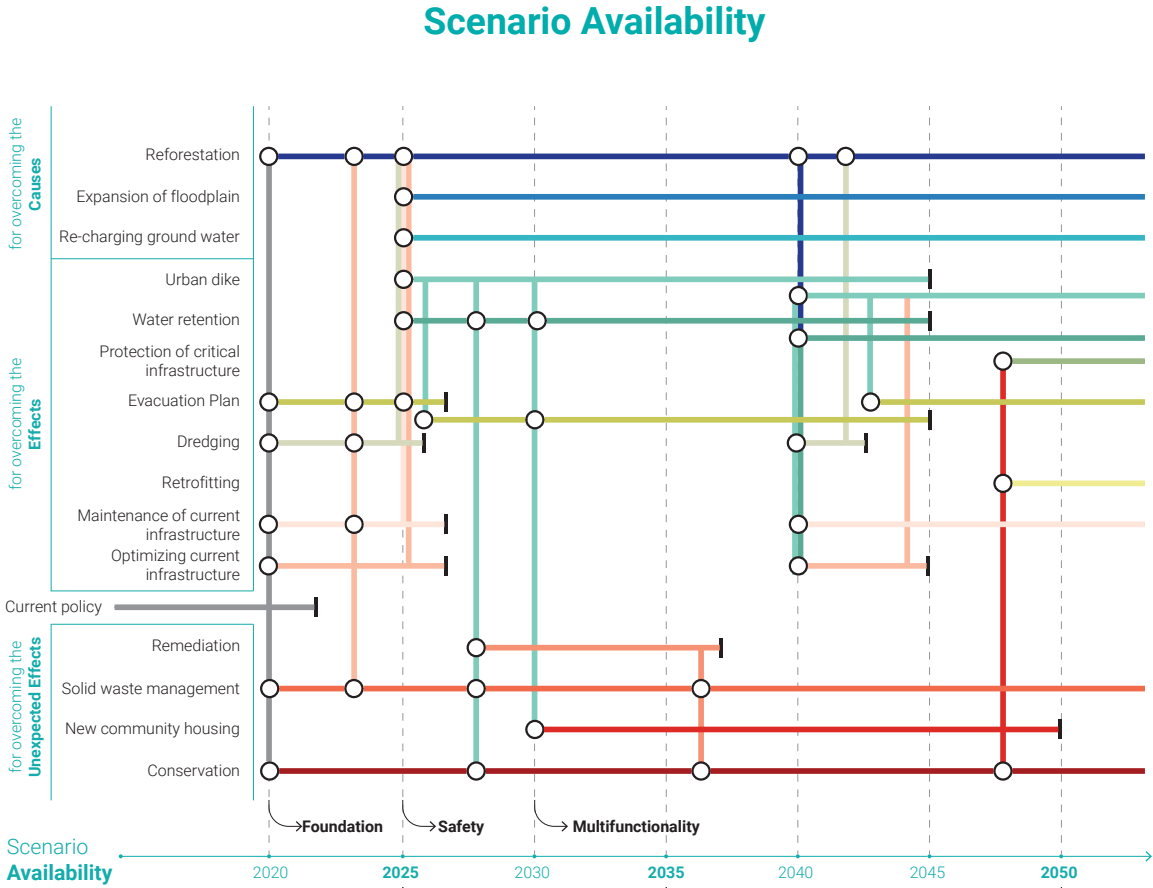
2050

Scenario tipping points

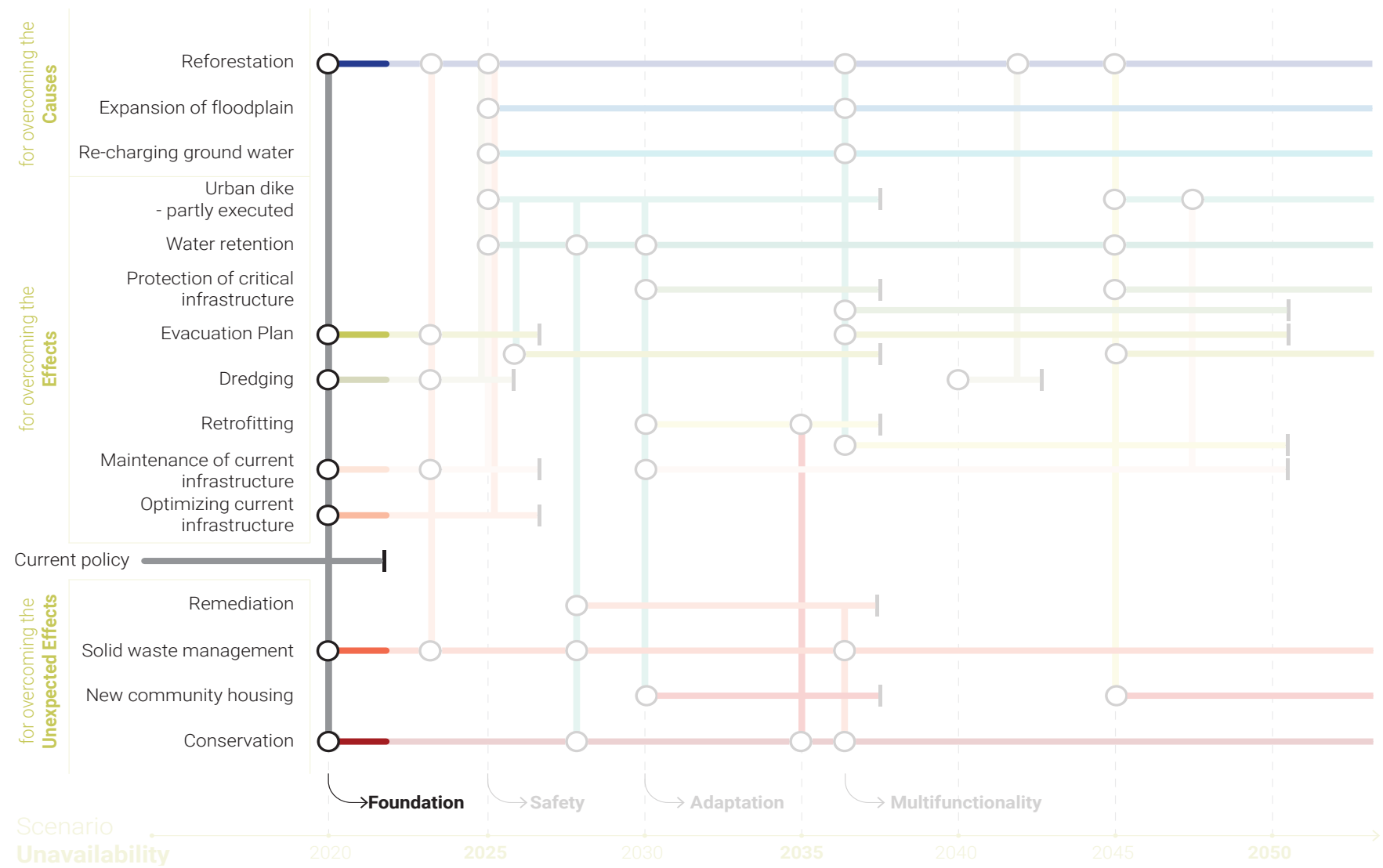
Let's go on a ride!



# Scenarios

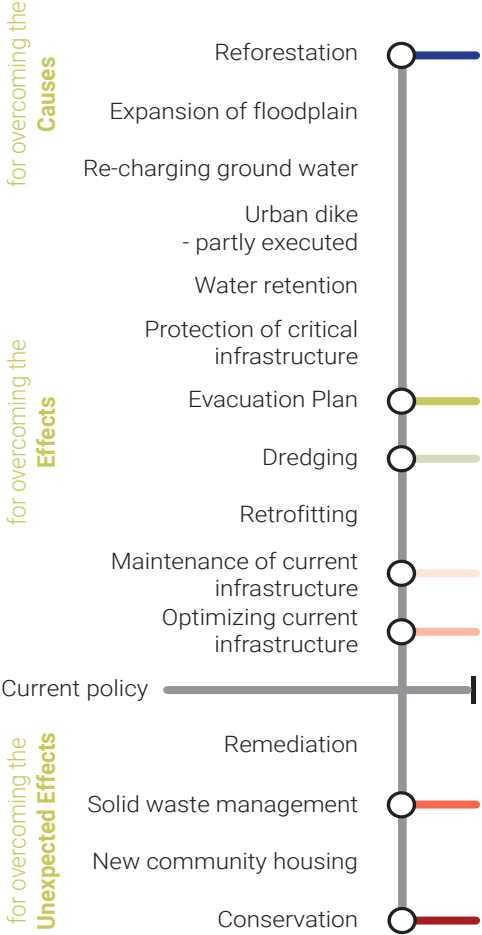


# “Foundation”



Analysis

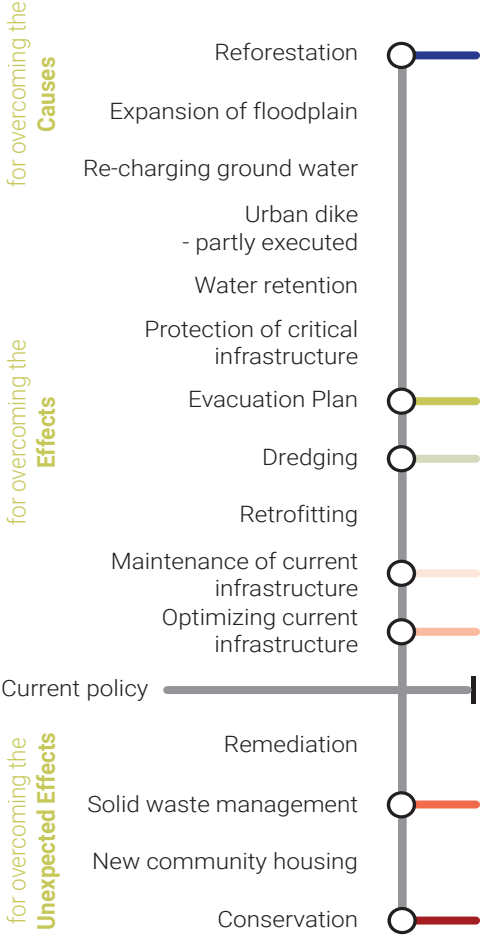
# “Foundation”





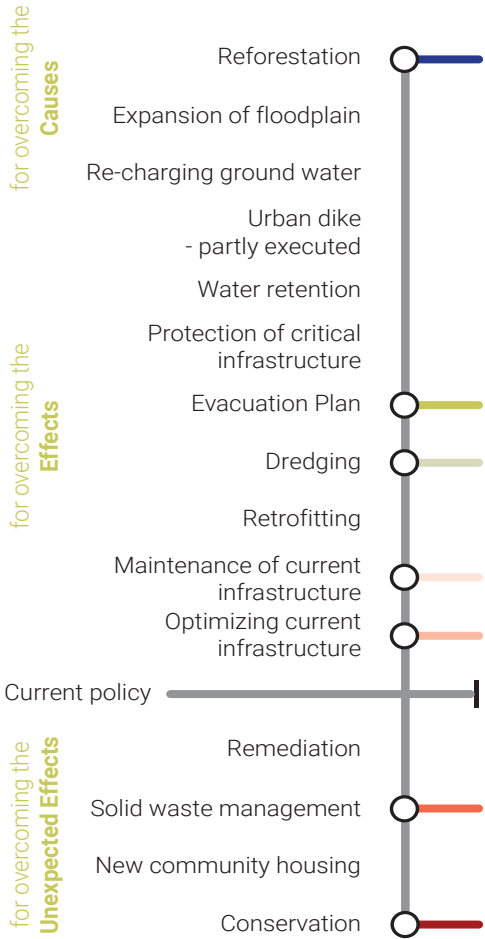
# Analysis

## “Foundation”



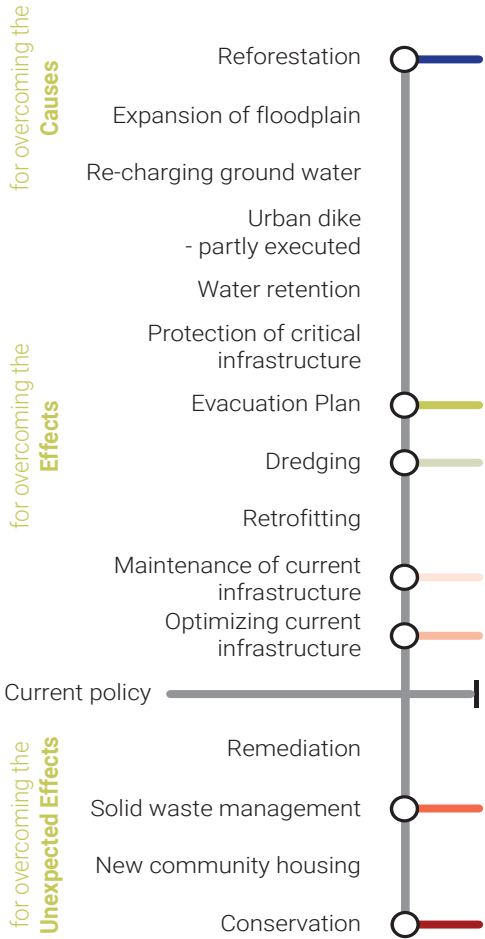
# Analysis

## “Foundation”



# Analysis

## “Foundation”





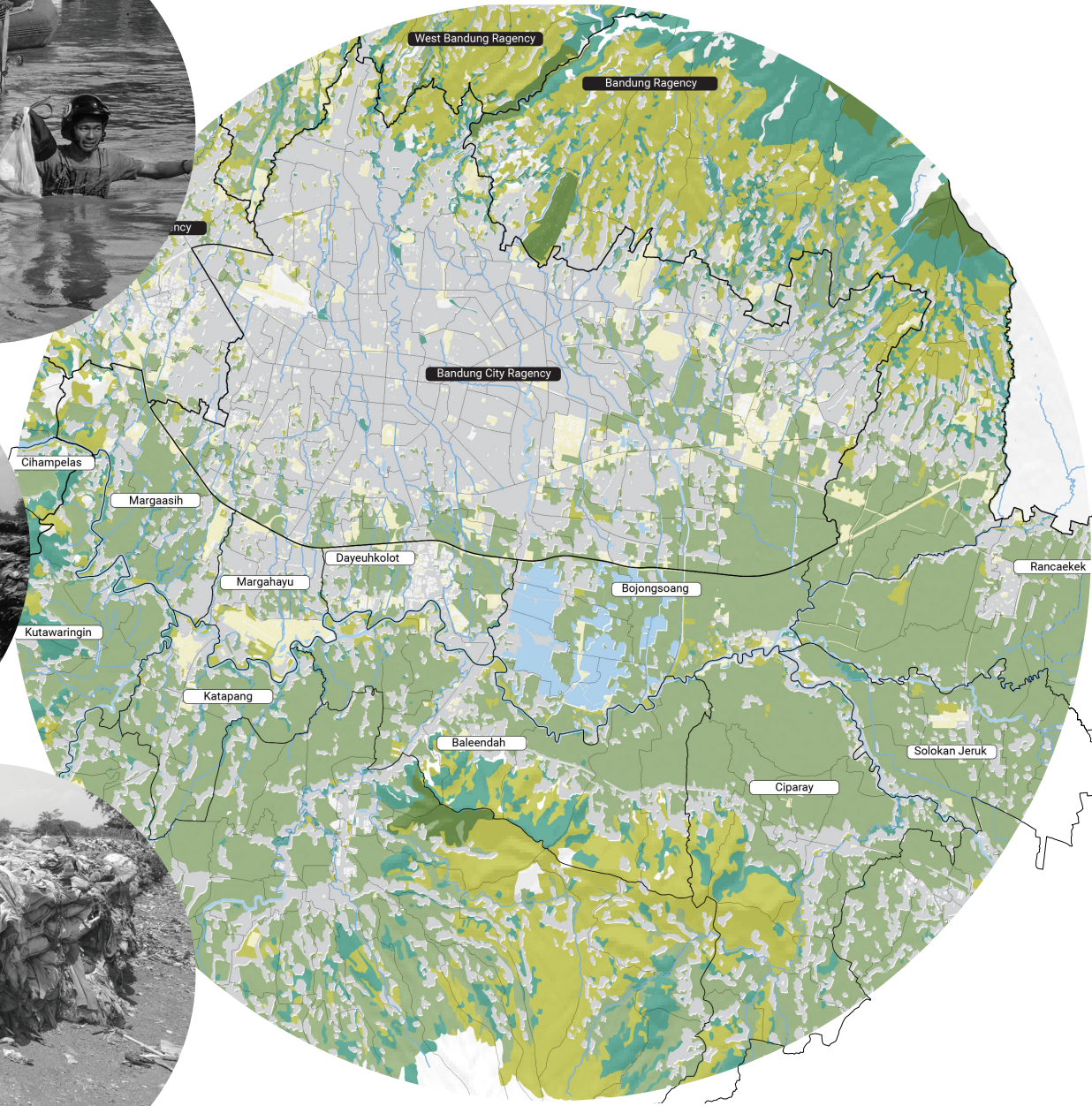
Analysis  
“Foundation”

for overcoming the  
Causes

for overcoming the  
Effects

for overcoming the  
Unexpected Effects

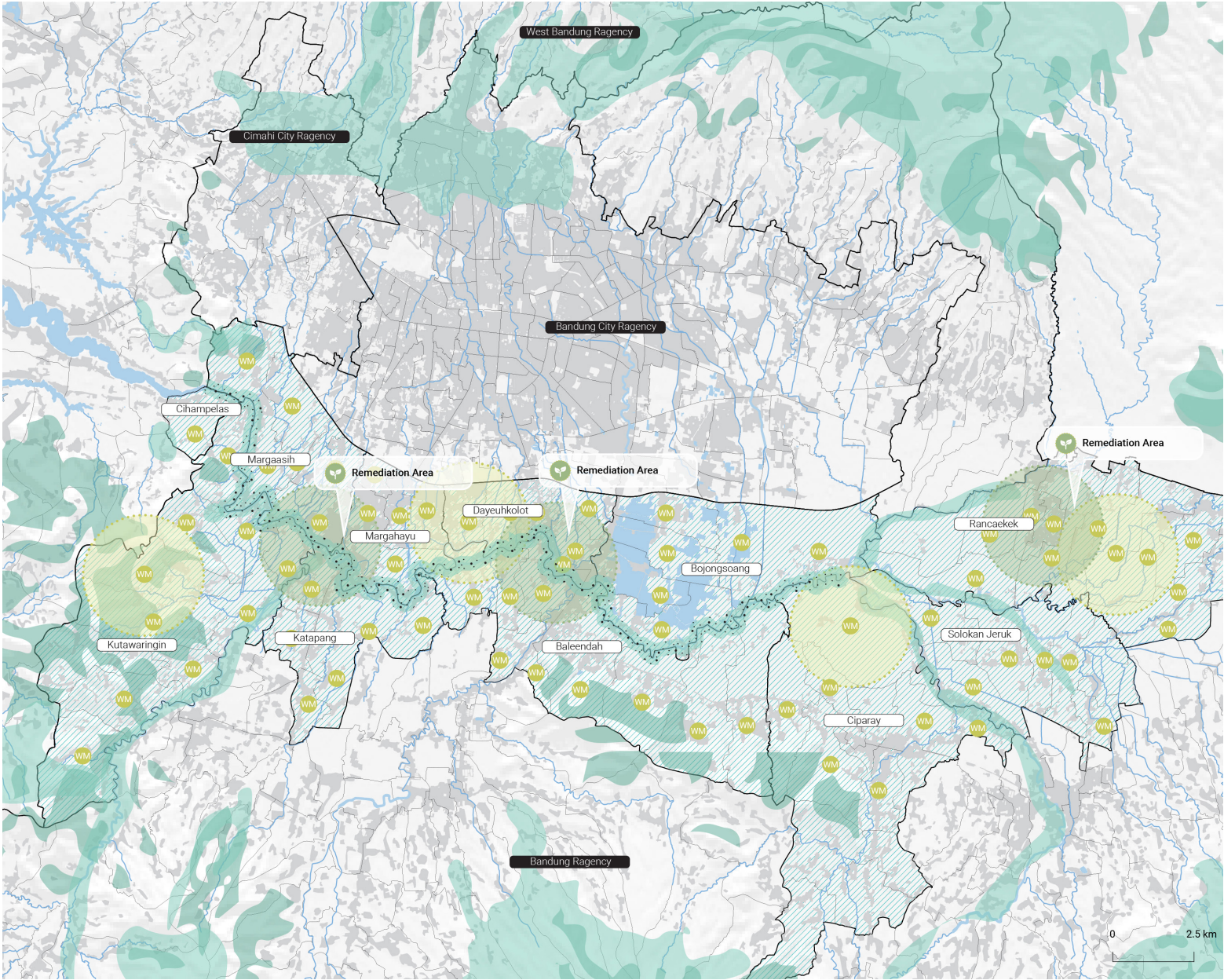
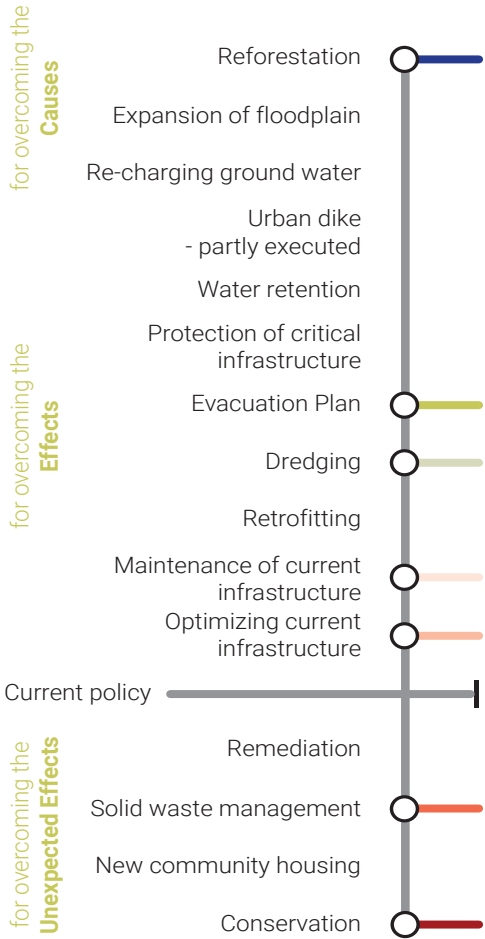
- Reforestation
- Expansion of floodplain
- Re-charging ground water
- Urban dike  
- partly executed
- Water retention
- Protection of critical  
infrastructure
- Evacuation Plan
- Dredging
- Retrofitting
- Maintenance of current  
infrastructure
- Optimizing current  
infrastructure
- Current policy
- Remediation
- Solid waste management
- New community housing
- Conservation





# Spatial Perspective

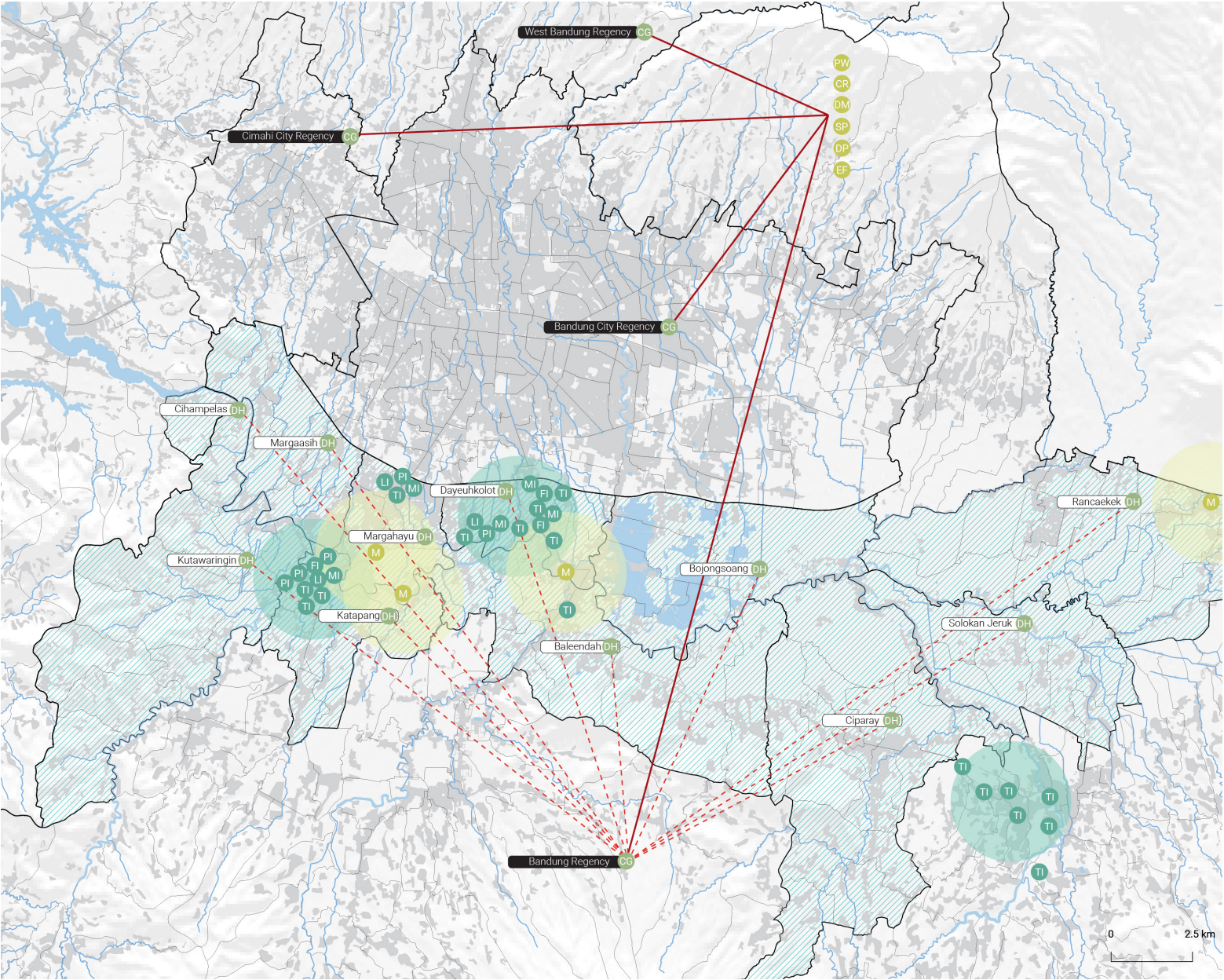
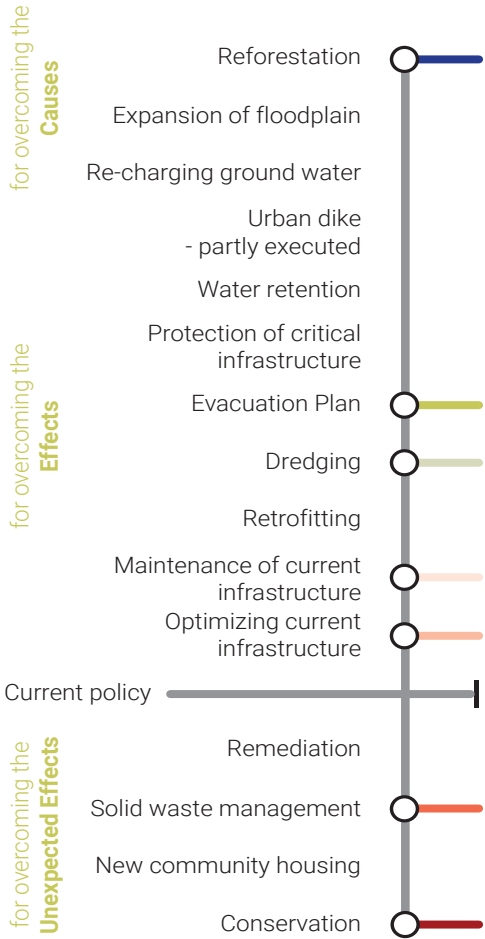
## “Foundation”





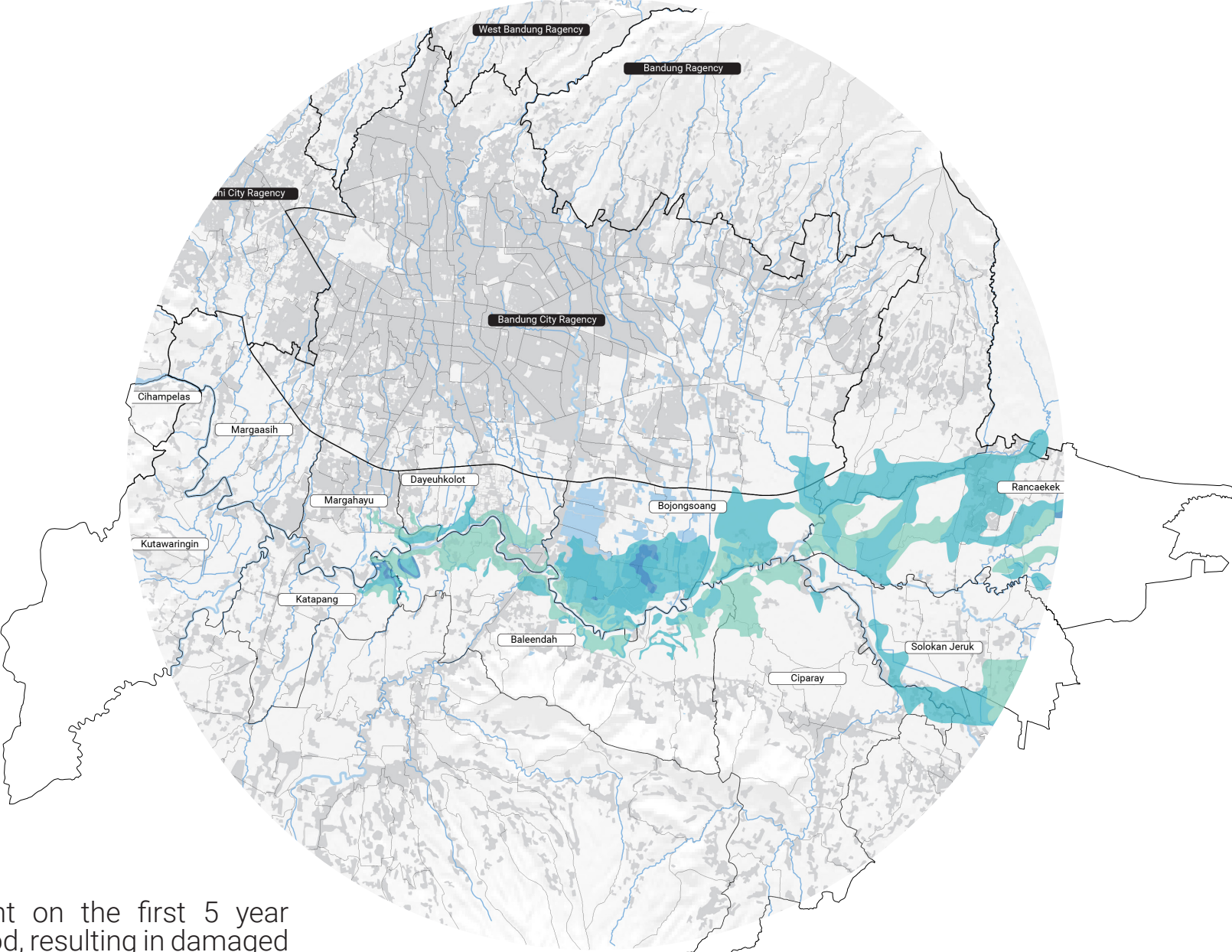
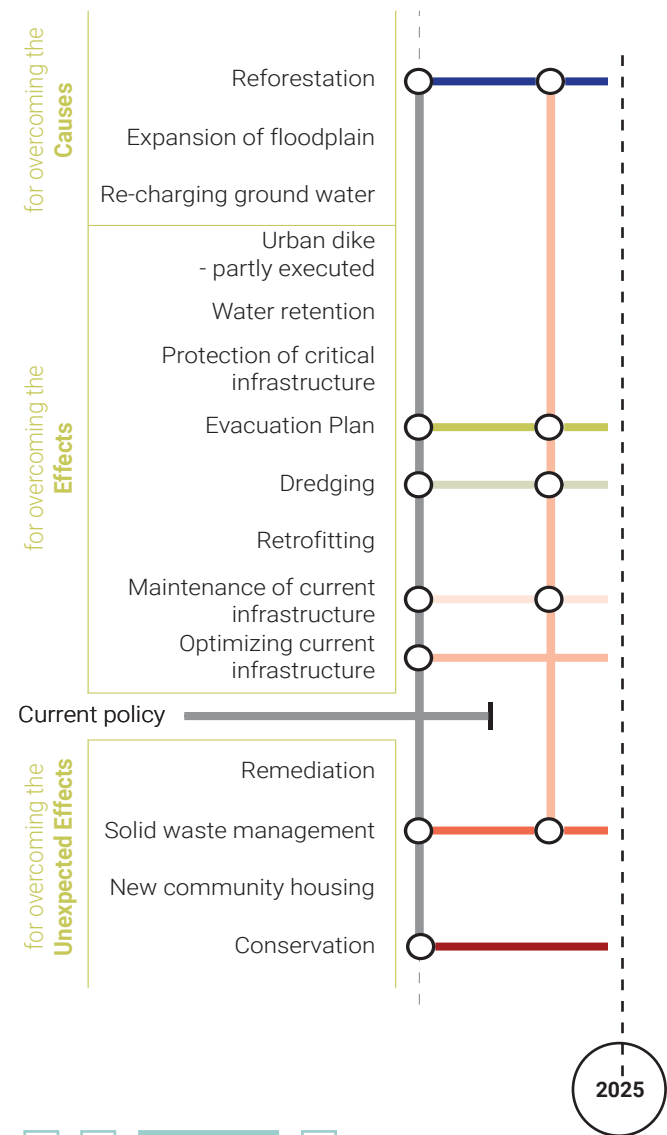
# Stakeholder Involvement

## “Foundation”





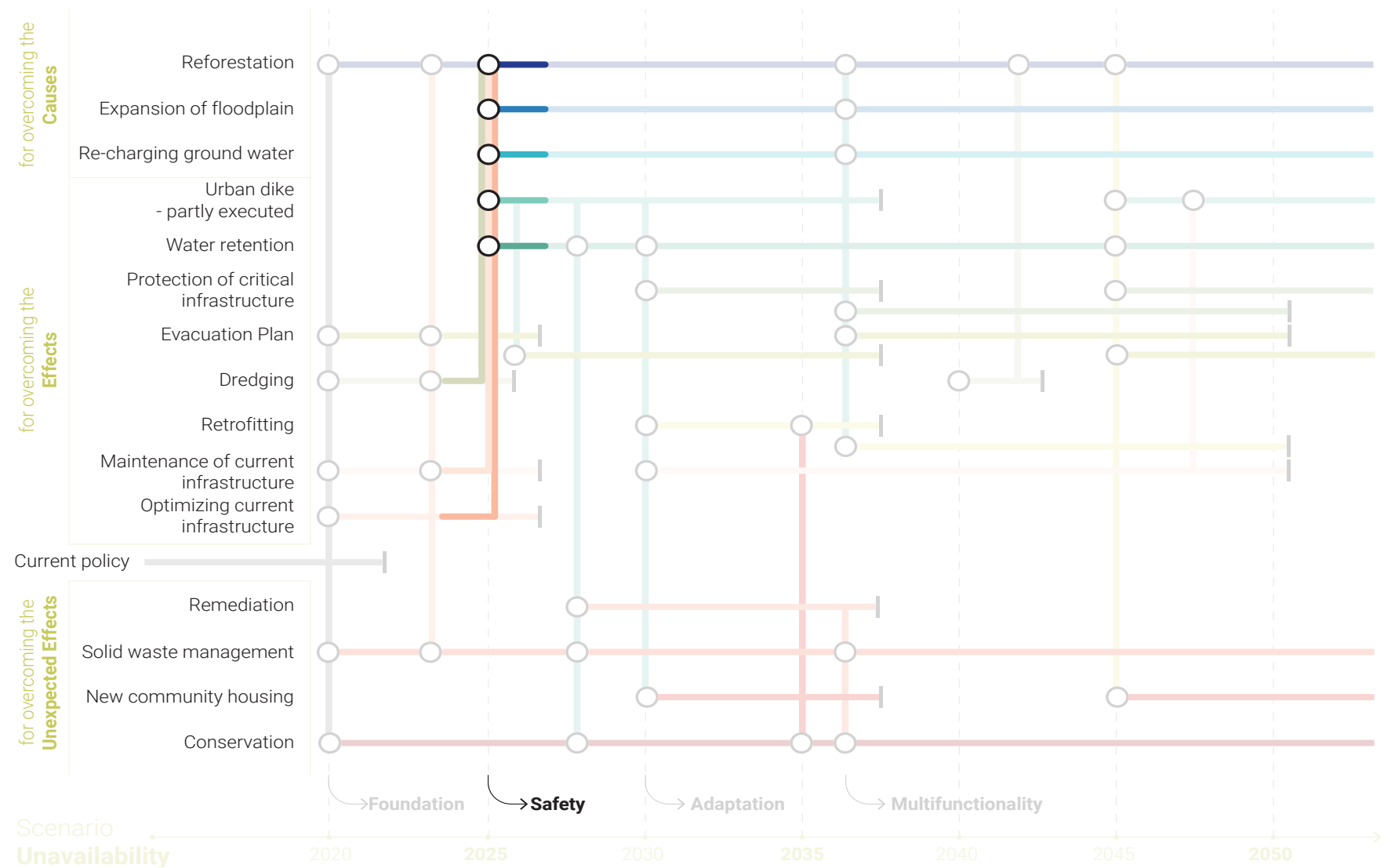
# Tipping point 1



Flood event on the first 5 year return period, resulting in damaged and destroyed properties.



# “Safety”



Analysis  
“Safety”

for overcoming the  
Causes

Reforestation

Expansion of floodplain

Re-charging ground water

Urban dike  
- partly executed

Water retention

for overcoming the  
Effects

Protection of critical  
infrastructure

Evacuation Plan

Dredging

Retrofitting

Maintenance of current  
infrastructure

Optimizing current  
infrastructure

Current policy

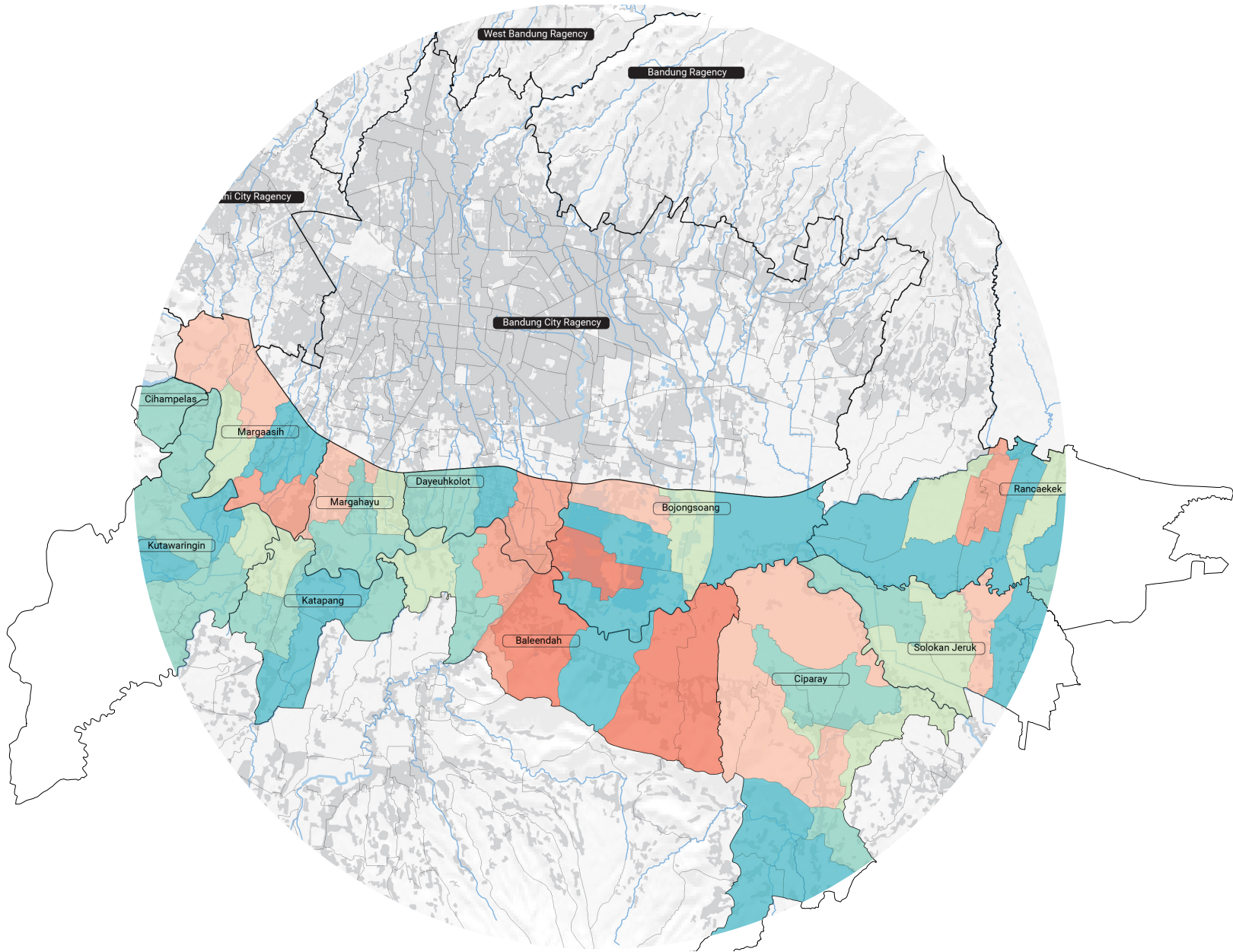
for overcoming the  
Unexpected Effects

Remediation

Solid waste management

New community housing

Conservation



Analysis  
“Safety”

for overcoming the  
Causes

- Reforestation
- Expansion of floodplain
- Re-charging ground water
- Urban dike  
- partly executed
- Water retention

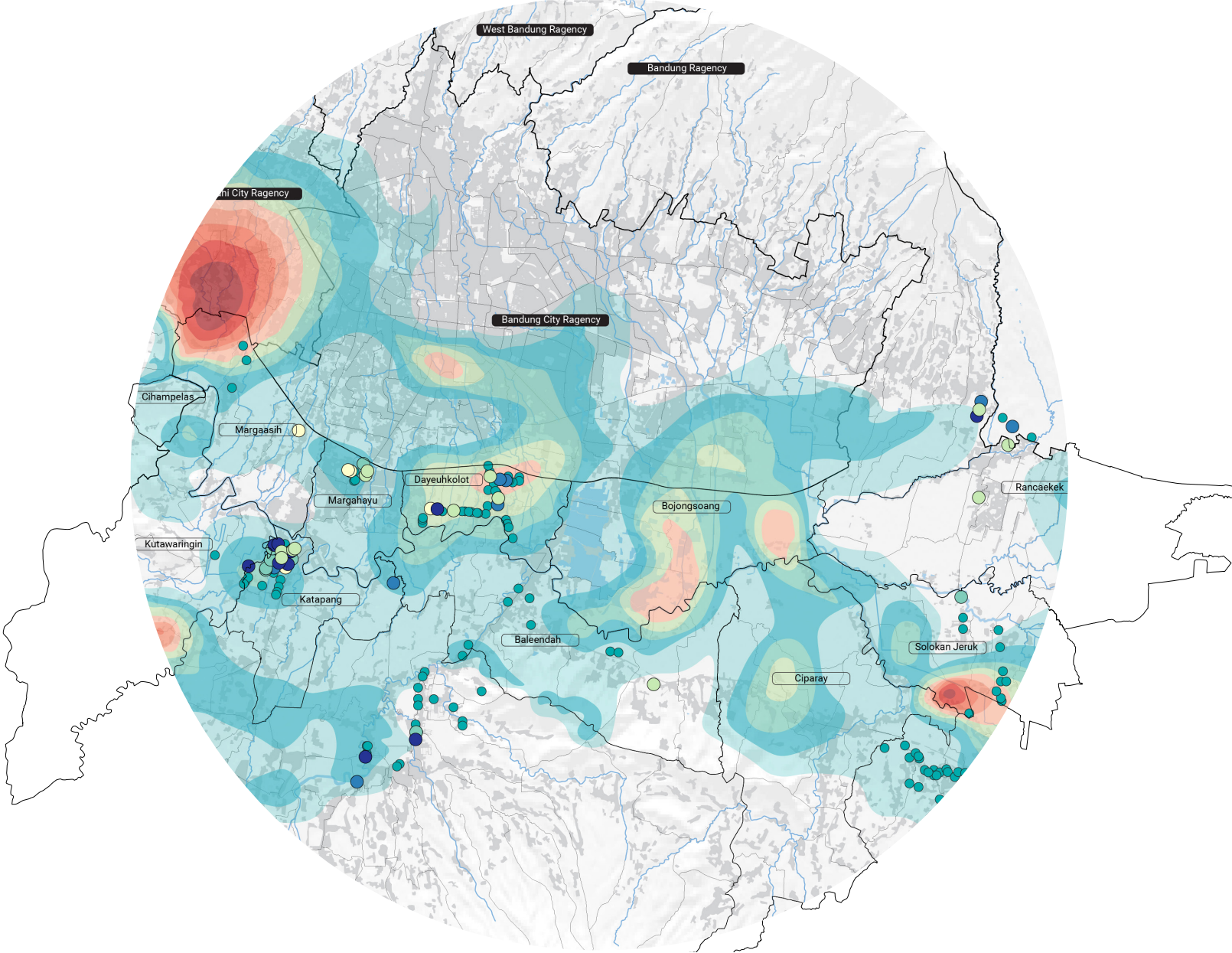
for overcoming the  
Effects

- Protection of critical infrastructure
- Evacuation Plan
- Dredging
- Retrofitting
- Maintenance of current infrastructure
- Optimizing current infrastructure

Current policy

for overcoming the  
Unexpected Effects

- Remediation
- Solid waste management
- New community housing
- Conservation





# Spatial Perspective “Safety”

for overcoming the Causes

- Reforestation
- Expansion of floodplain
- Re-charging ground water
- Urban dike - partly executed
- Water retention

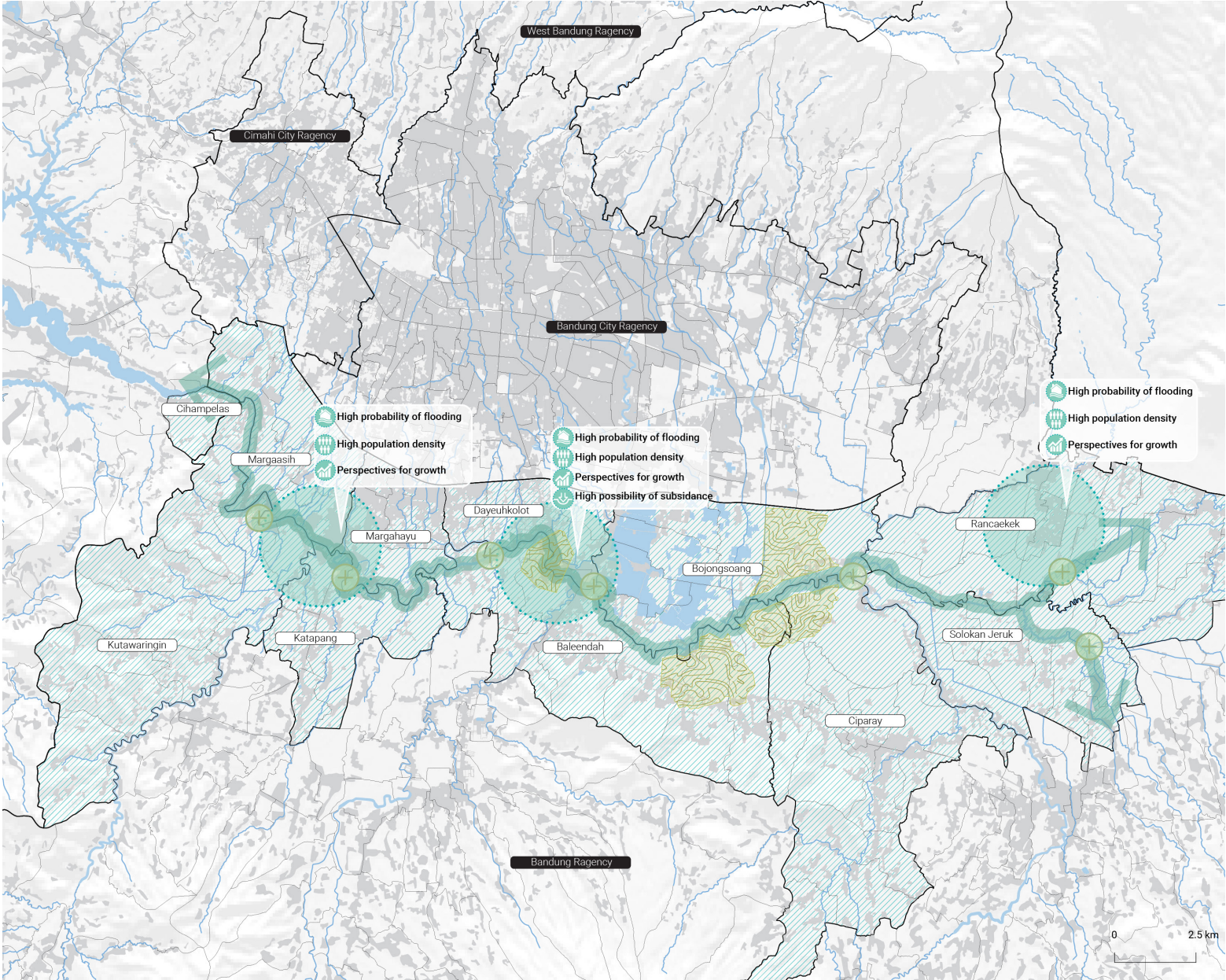
for overcoming the Effects

- Protection of critical infrastructure
- Evacuation Plan
- Dredging
- Retrofitting
- Maintenance of current infrastructure
- Optimizing current infrastructure

Current policy

- Remediation
- Solid waste management
- New community housing
- Conservation

for overcoming the Unexpected Effects





# Design “Safety”

for overcoming the  
Causes

- Reforestation
- Expansion of floodplain
- Re-charging ground water
- Urban dike  
- partly executed
- Water retention

for overcoming the  
Effects

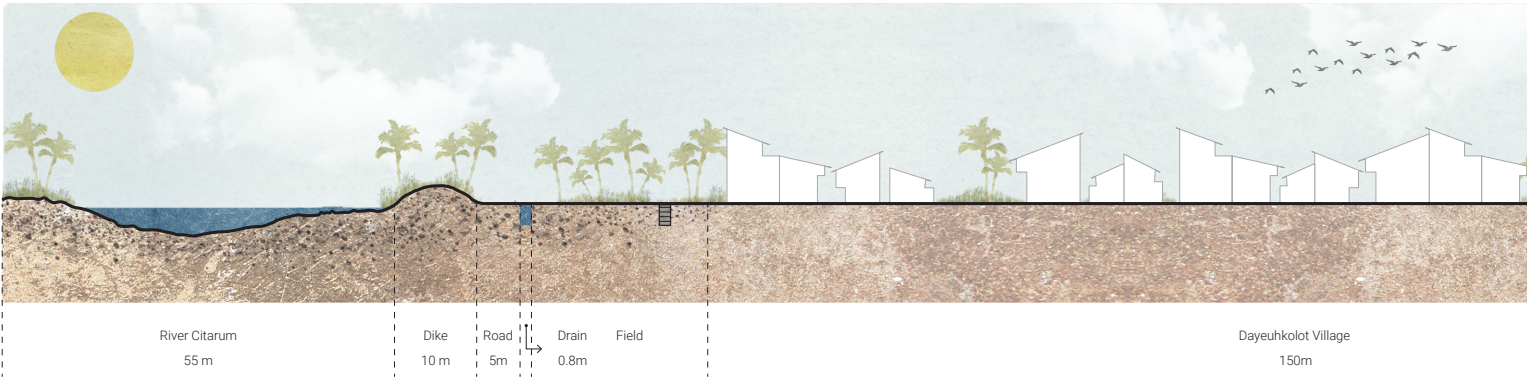
- Protection of critical infrastructure
- Evacuation Plan
- Dredging
- Retrofitting
- Maintenance of current infrastructure
- Optimizing current infrastructure

Current policy

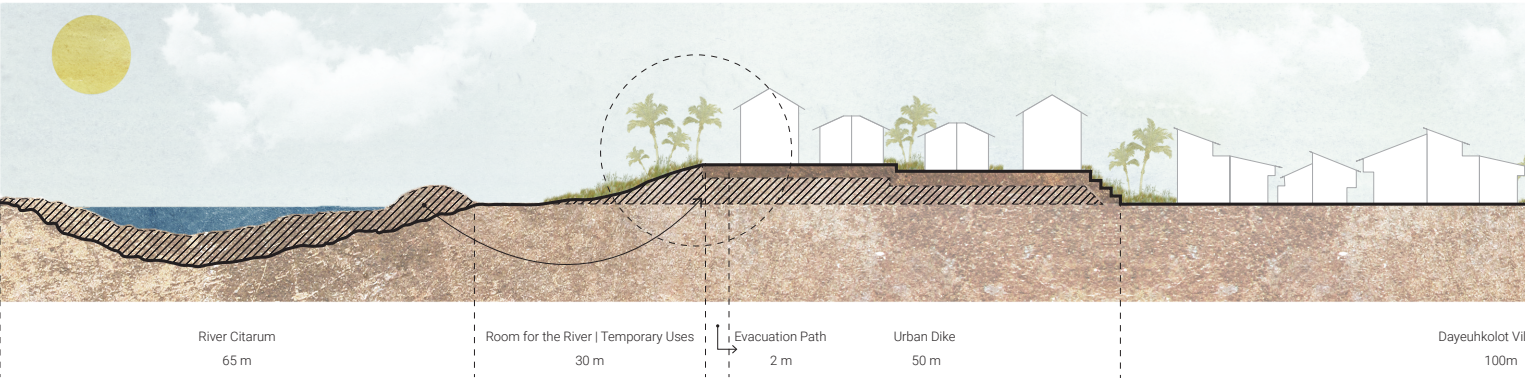
for overcoming the  
Unexpected Effects

- Remediation
- Solid waste management
- New community housing
- Conservation

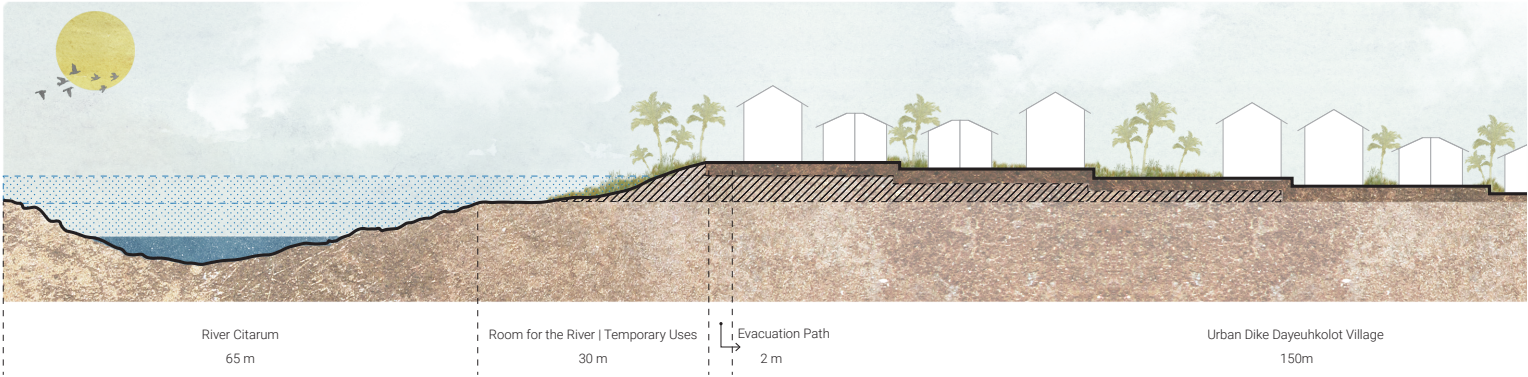
CURRENT SITUATION



INTERMEDIATE STAGE

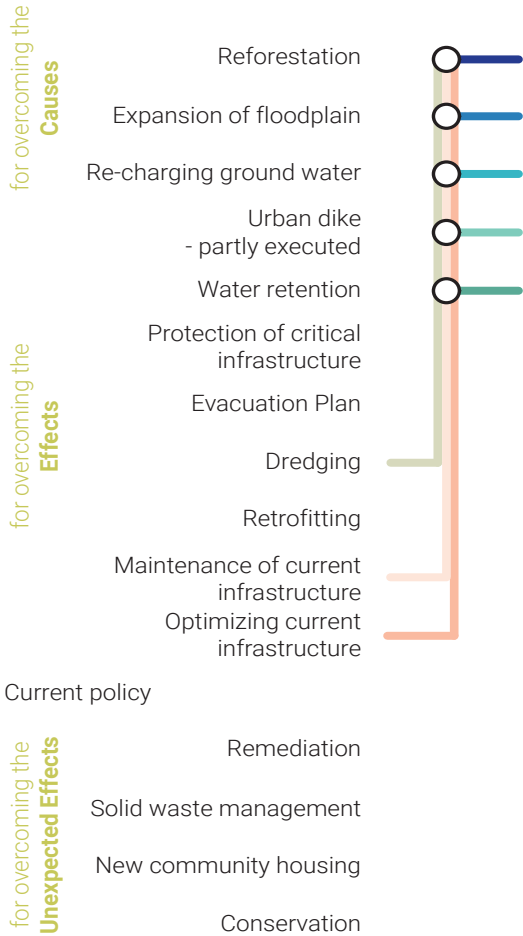


FULL EXTEND DEVELOPMENT





# Impression “Urban Dike” “Safety”





# Stakeholder Involvement

## “Safety”

for overcoming the  
Causes

Reforestation



Expansion of floodplain



Re-charging ground water



Urban dike  
- partly executed



Water retention



for overcoming the  
Effects

Protection of critical  
infrastructure

Evacuation Plan

Dredging

Retrofitting

Maintenance of current  
infrastructure

Optimizing current  
infrastructure

Current policy

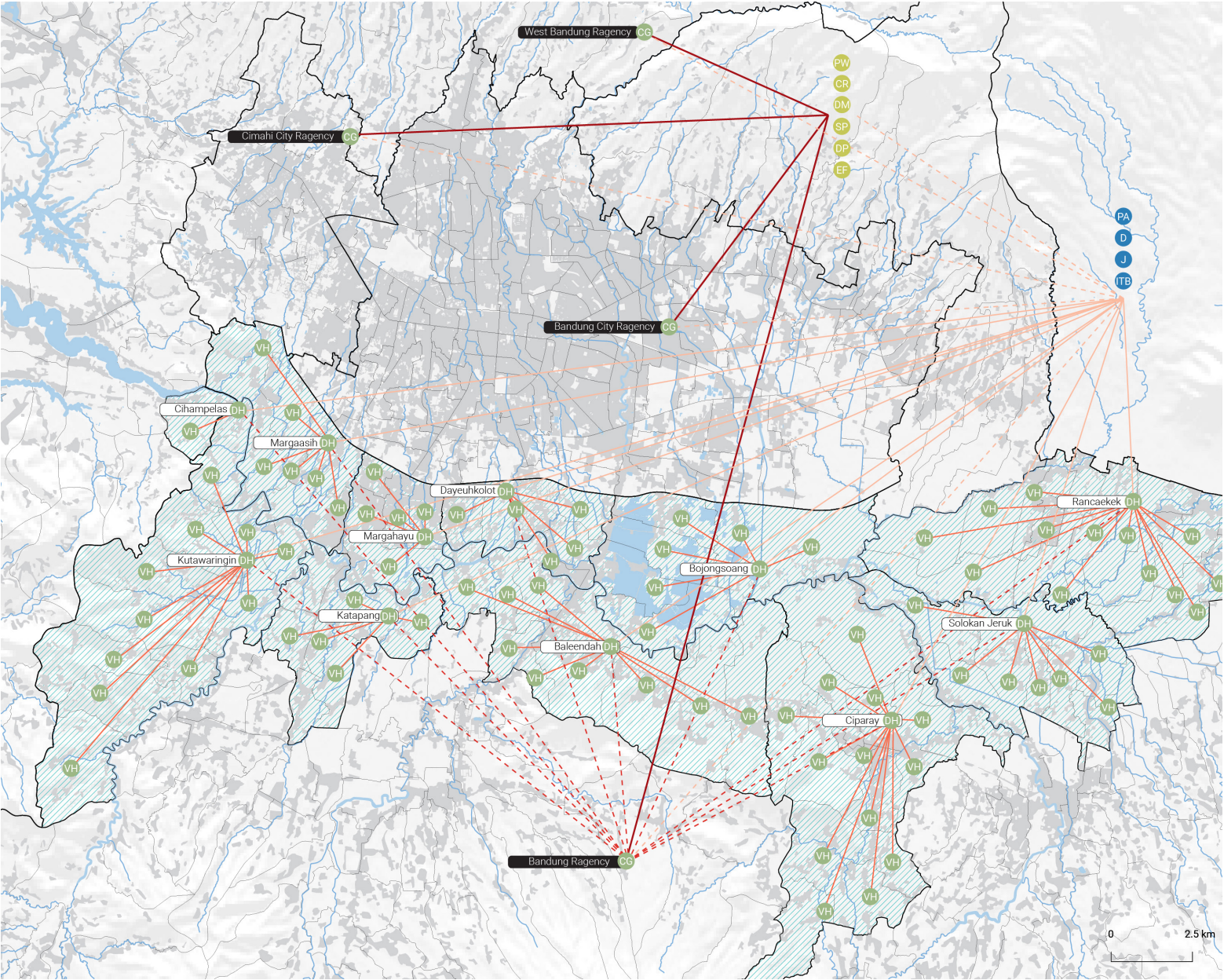
Remediation

Solid waste management

New community housing

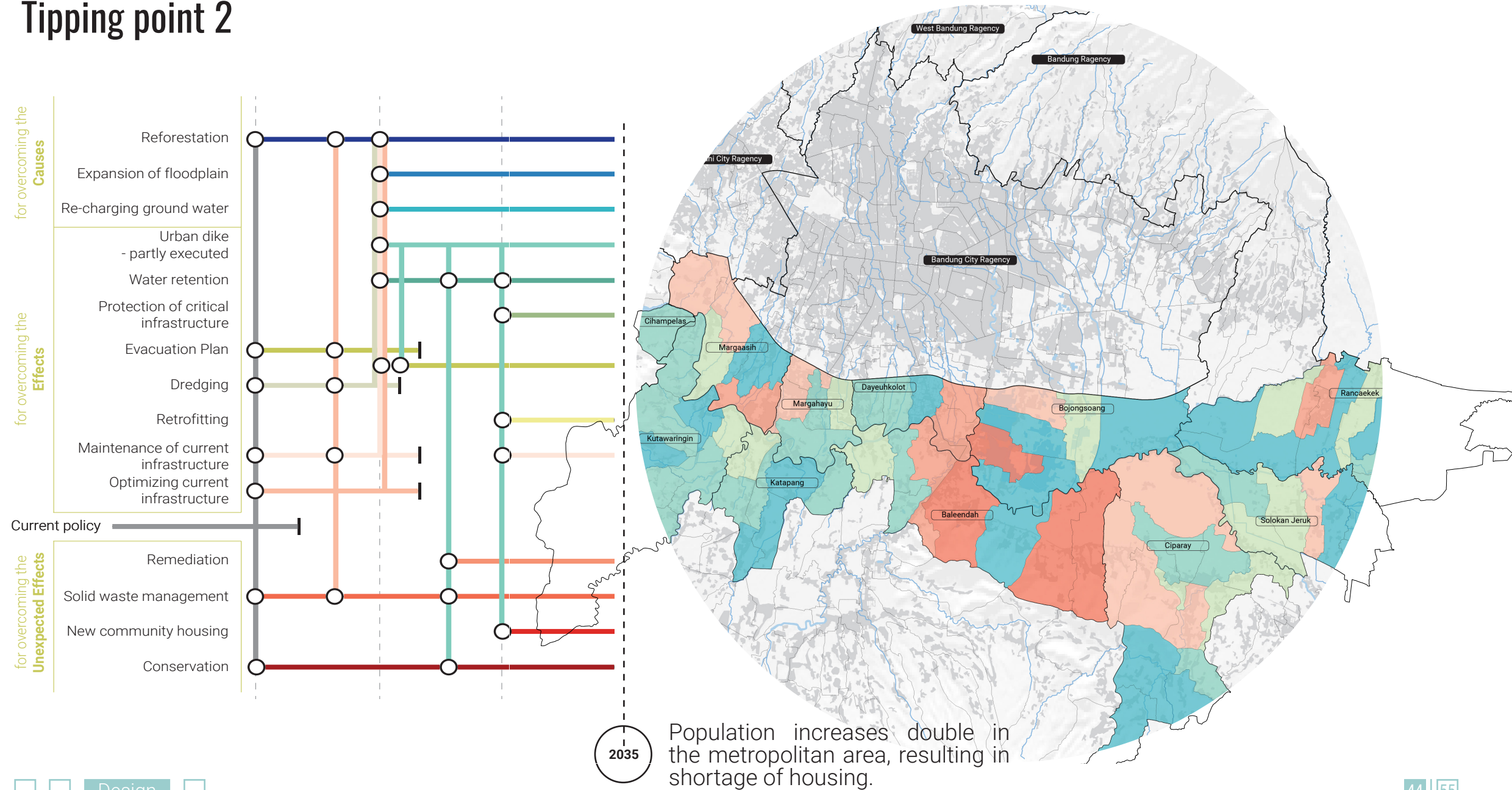
Conservation

for overcoming the  
Unexpected Effects

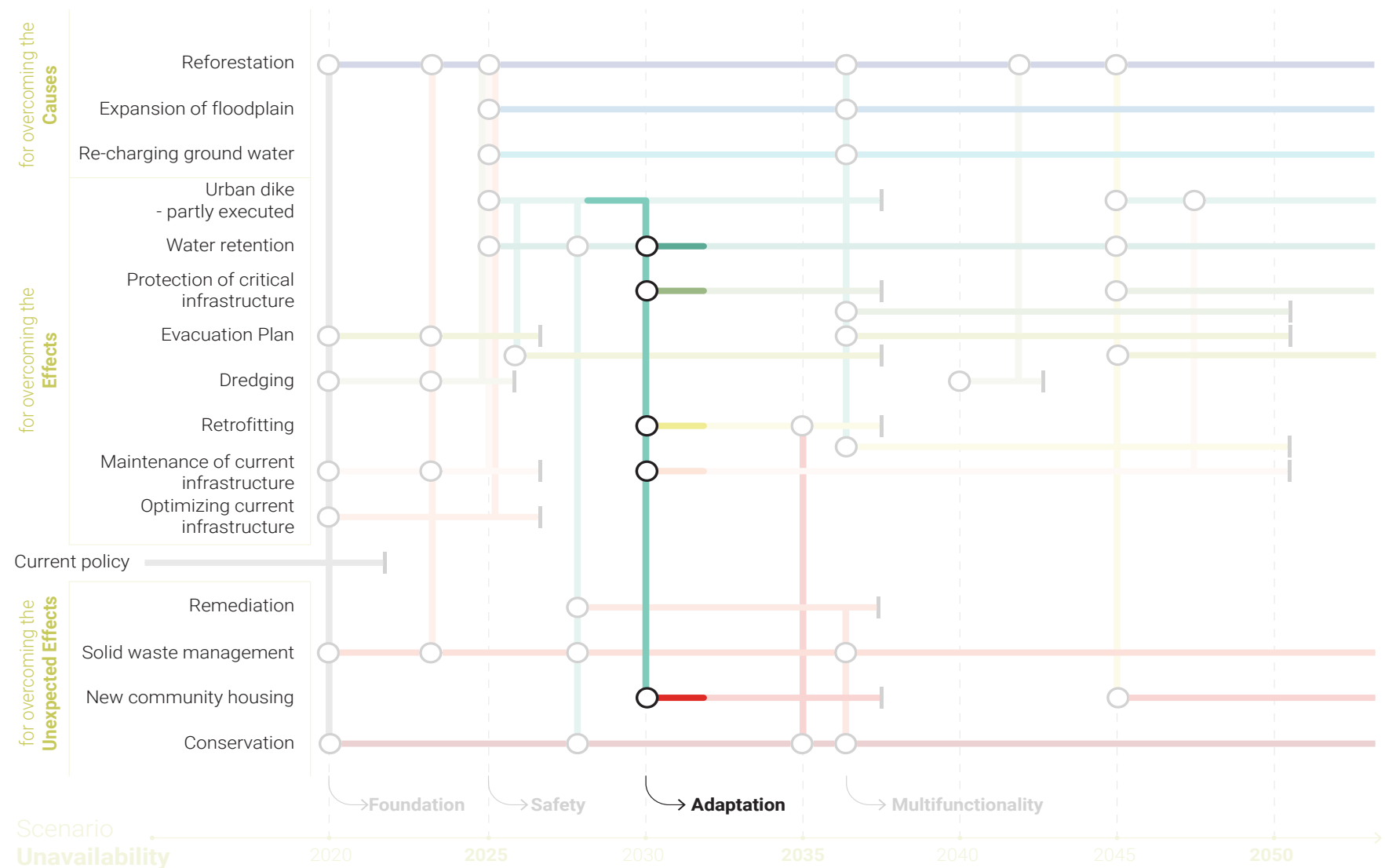




# Tipping point 2



# “Adaptation”





# Spatial Perspective

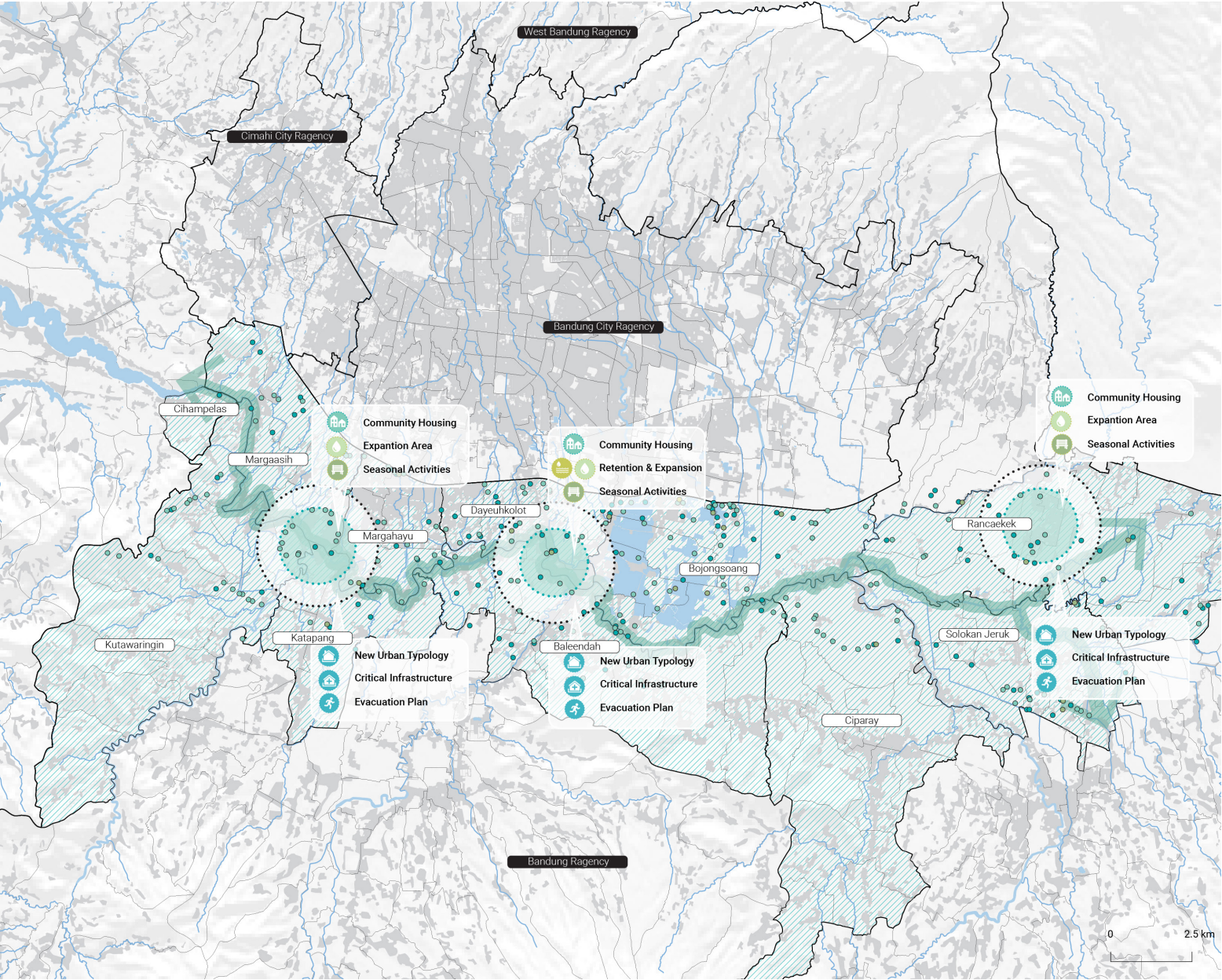
## “Adaptation”

for overcoming the  
**Causes**

for overcoming the  
**Effects**

for overcoming the  
**Unexpected Effects**

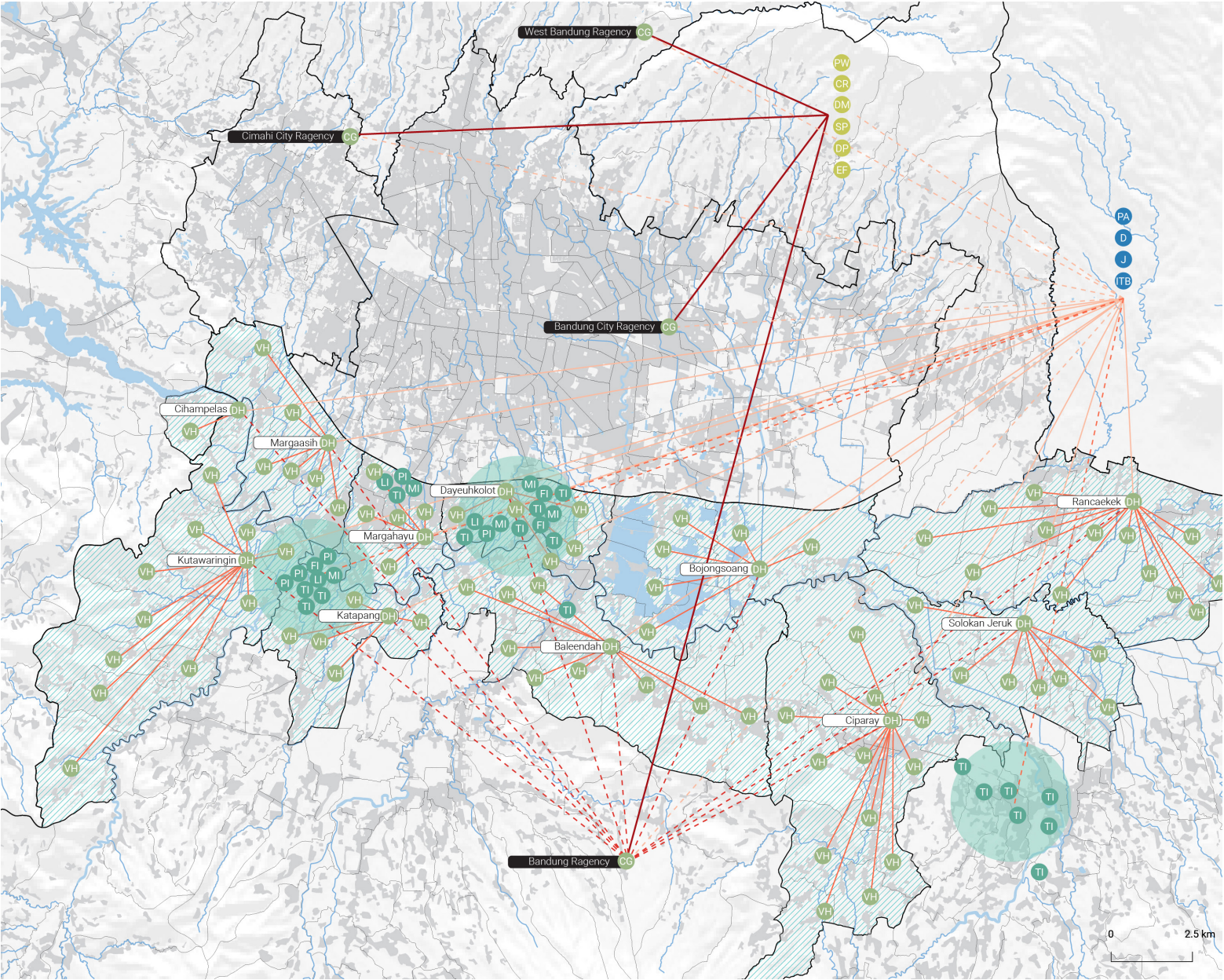
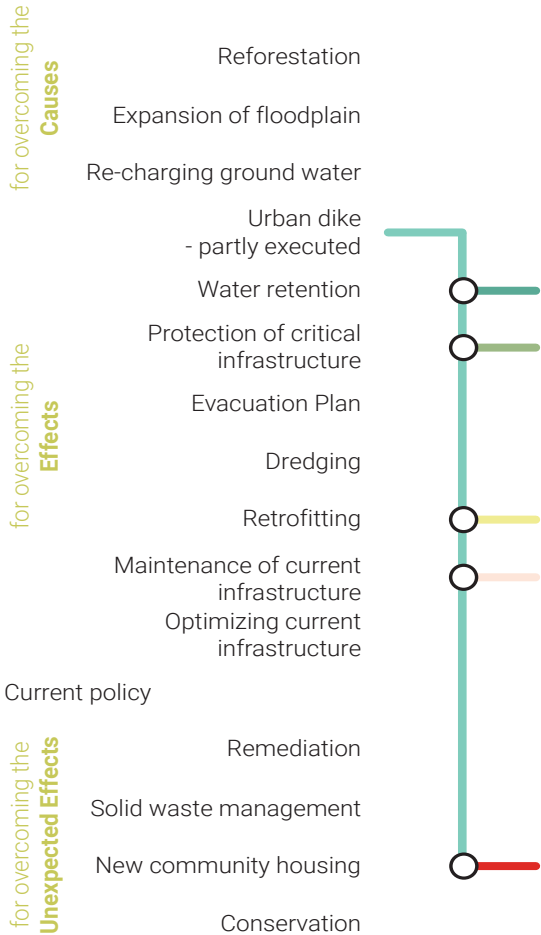
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- Expansion of floodplain
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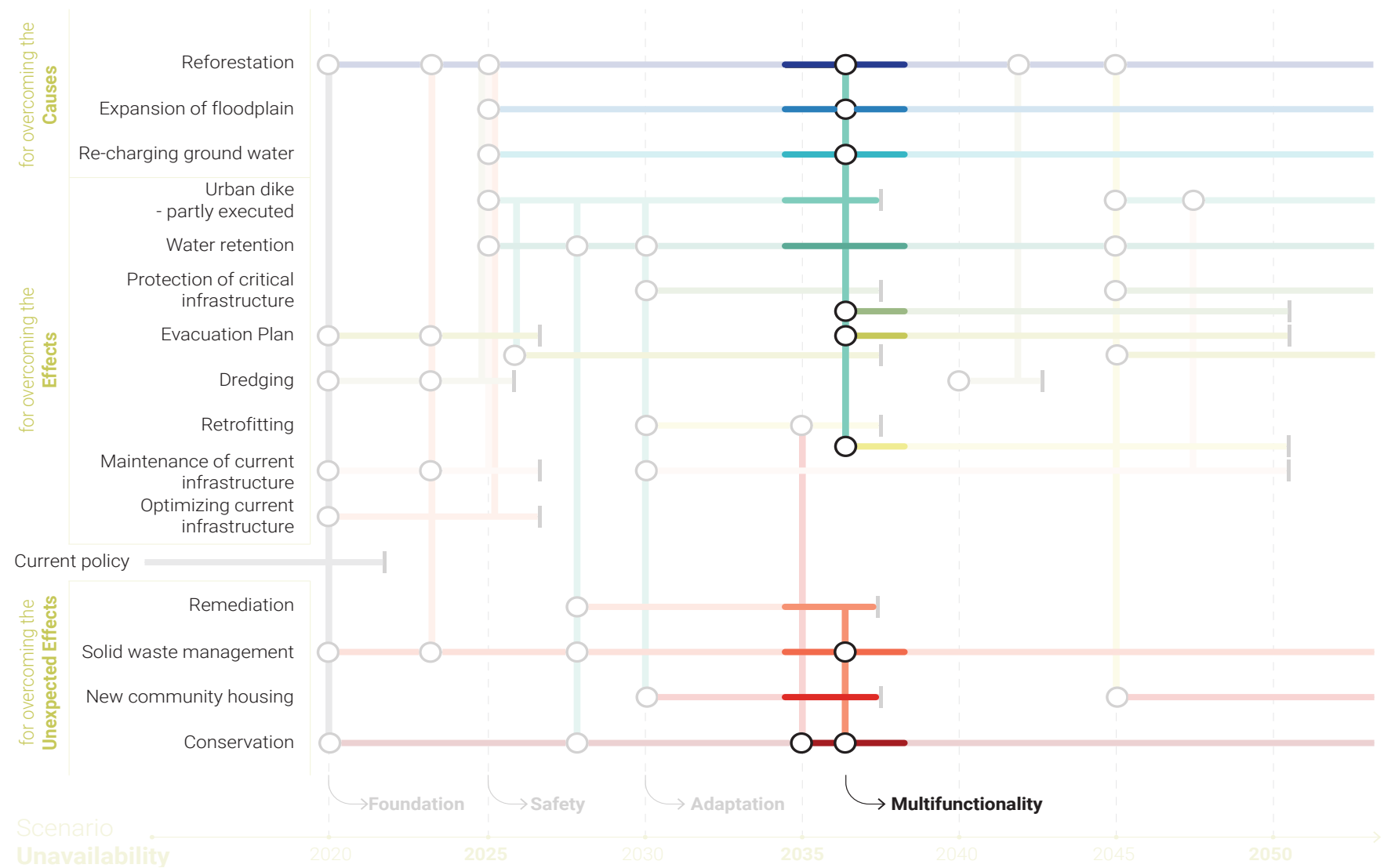


# Stakeholder Involvement

## “Adaptation”



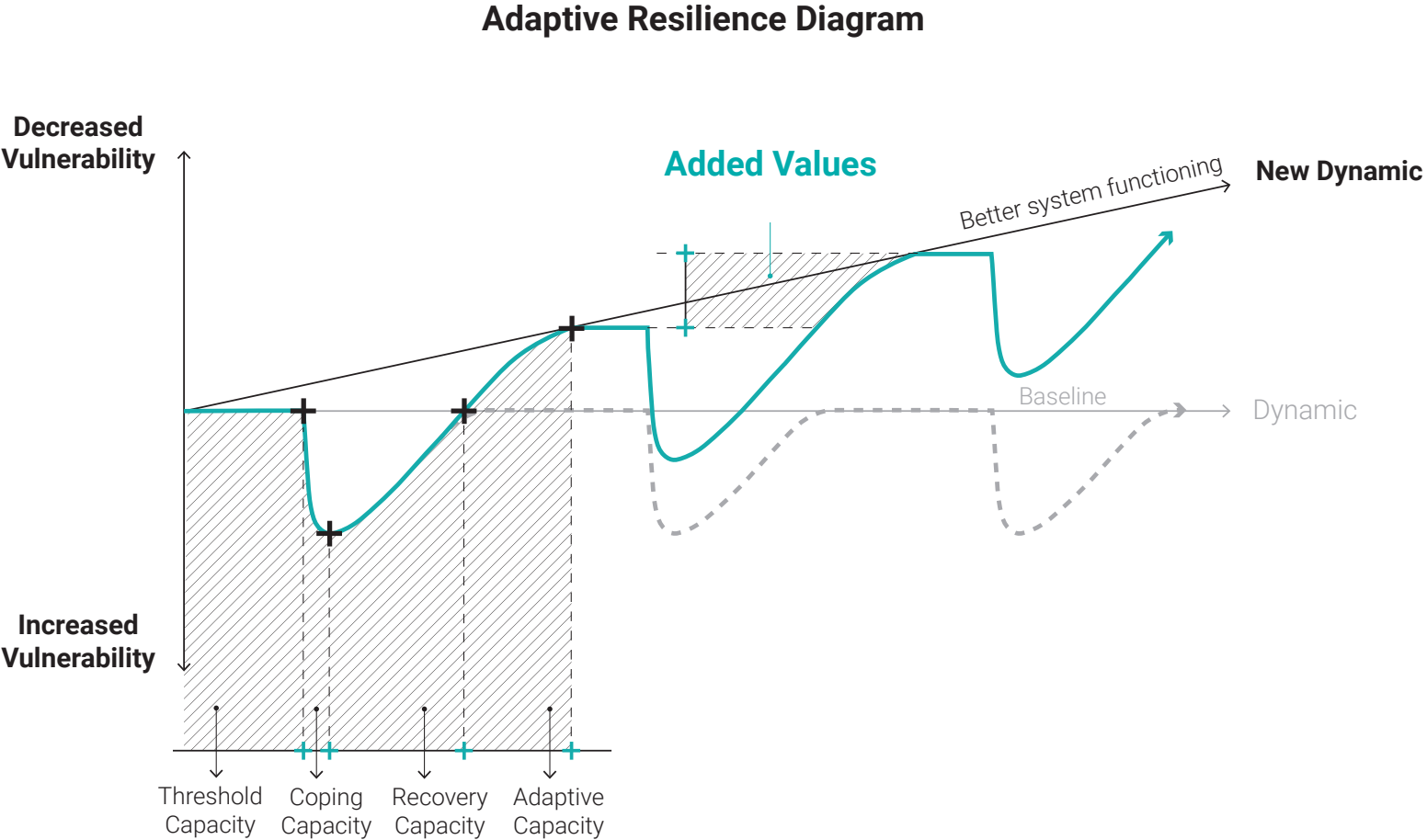
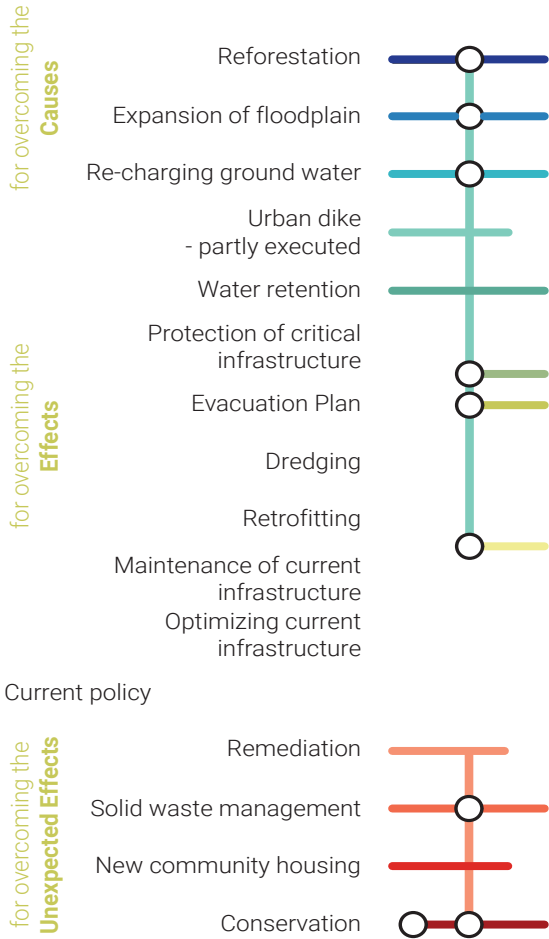
# “Multifunctionality”





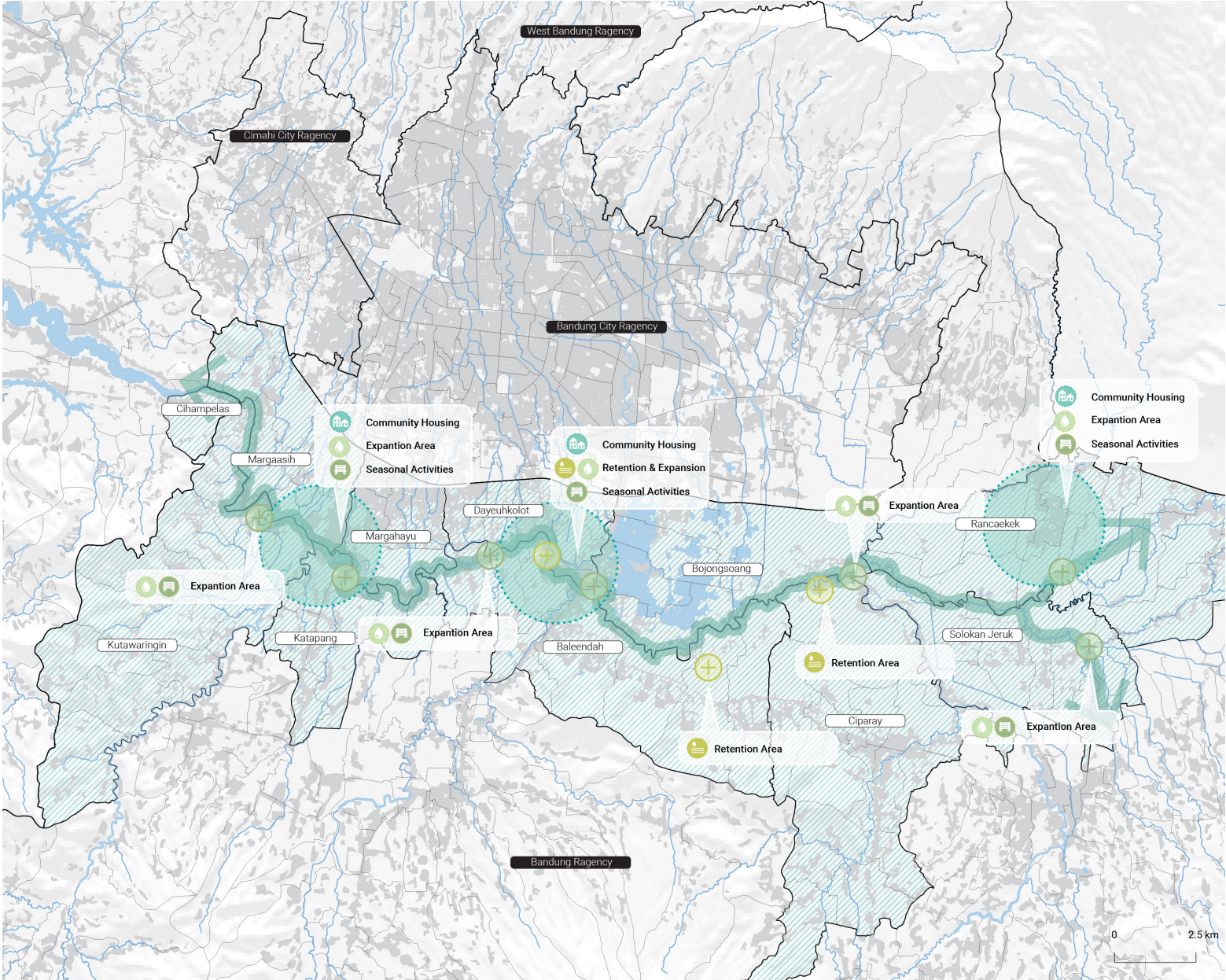
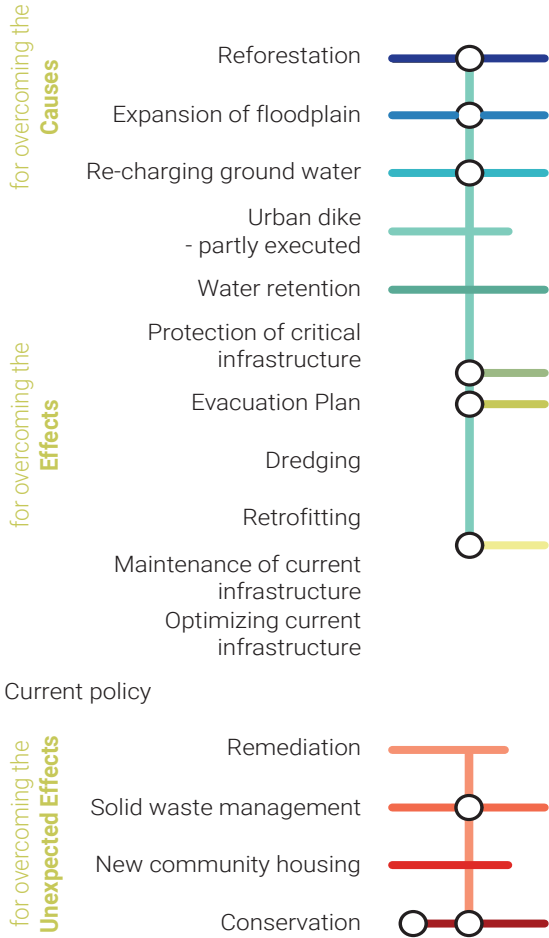
# Analysis

## “Multifunctionality”



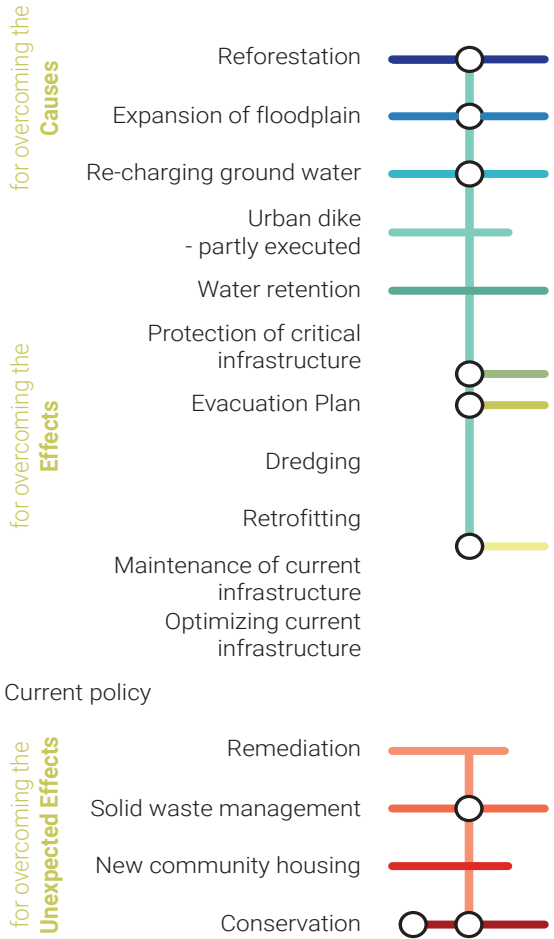
# Spatial Perspective

## “Multifunctionality”





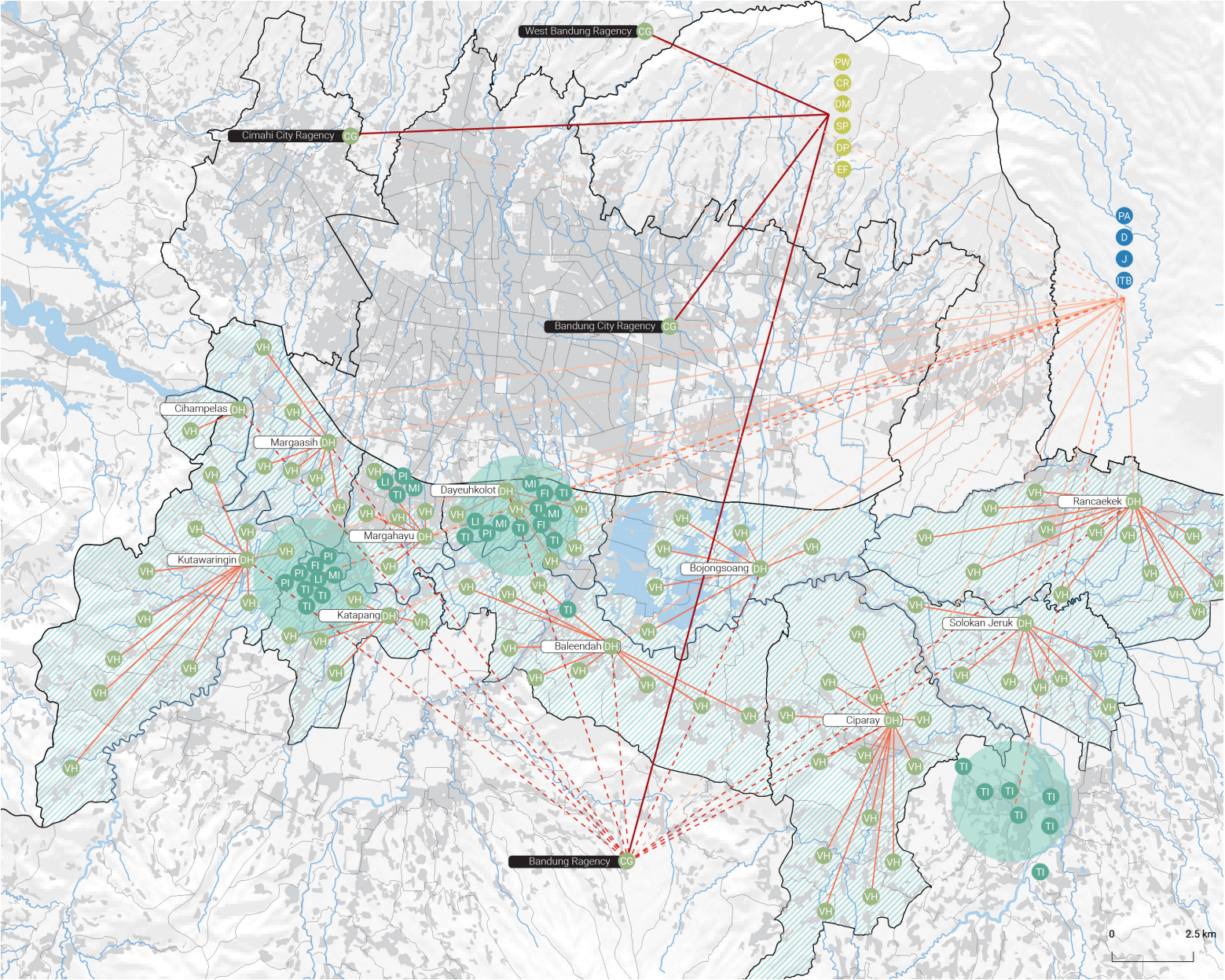
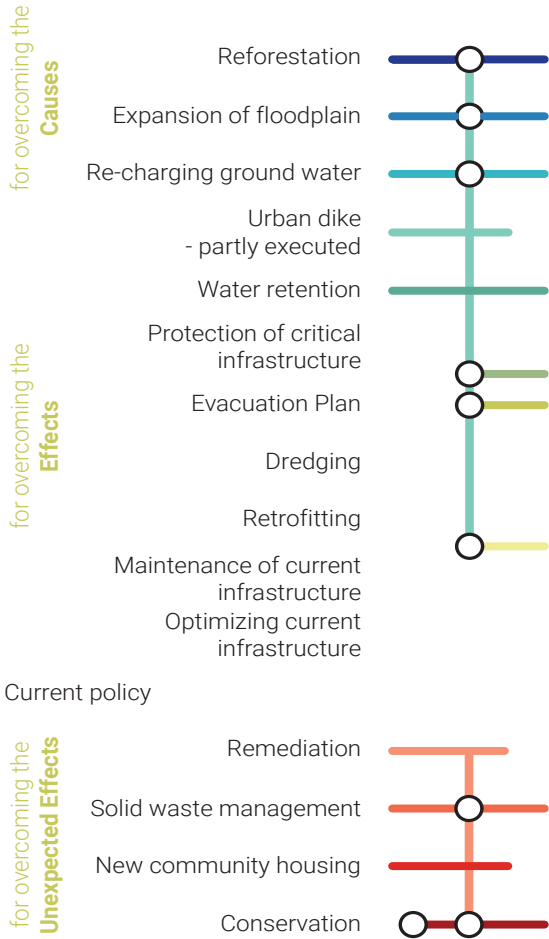
# Impression “Room for the river” “Multifunctionality”



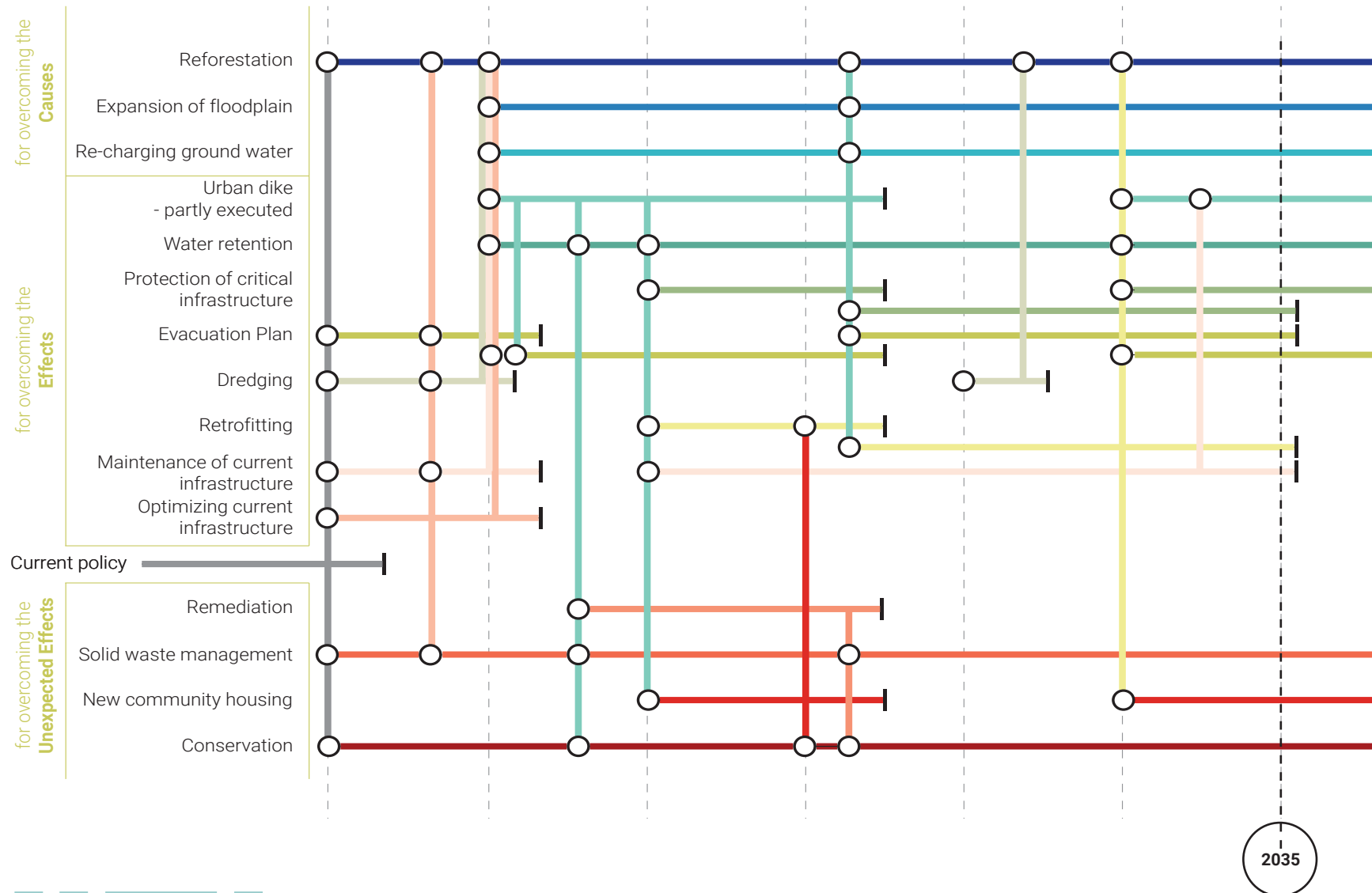


# Stakeholder Involvement

## “Multifunctionality”



# Tipping point 3



- Extreme weather conditions continue, resulting in demand for more areas of water storage and delay.
- The rise in the urban population results in emerging informal settlements in vulnerable areas.
- **The changes in the systems are so big that if there is not a change in the scenario, there will be a need of an additional action “retreat”.**



# Conclusions and Discussion

- The project as a showcase
- Building on adaptive thinking
- Make planning and decision making conversational
- Create paths towards stakeholder involvement





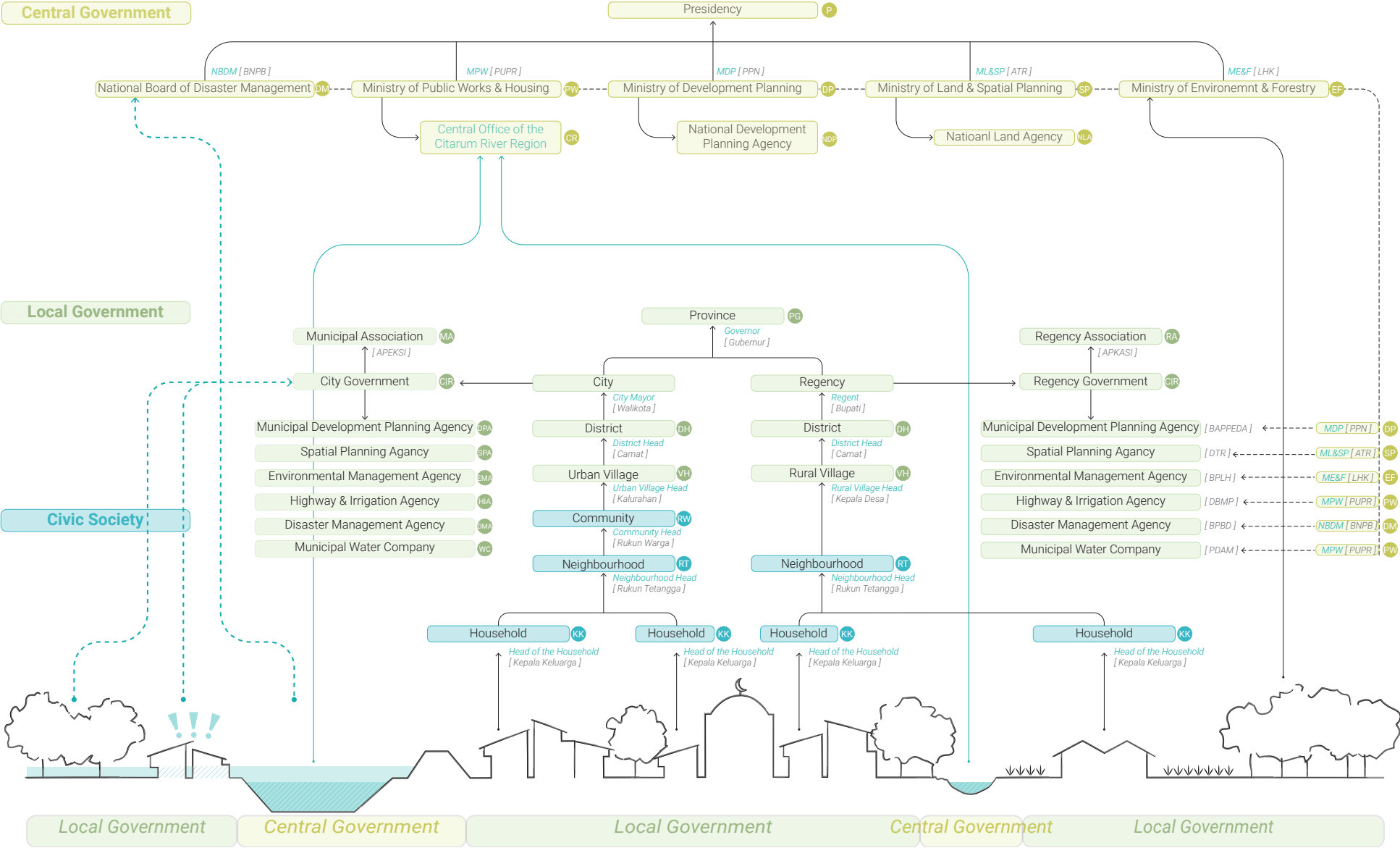
**Thank you !**  
**Terima kasih!**







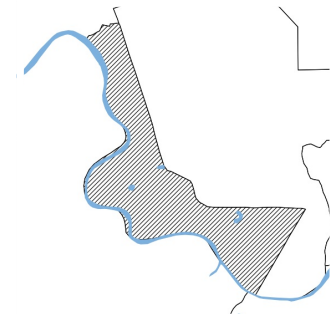
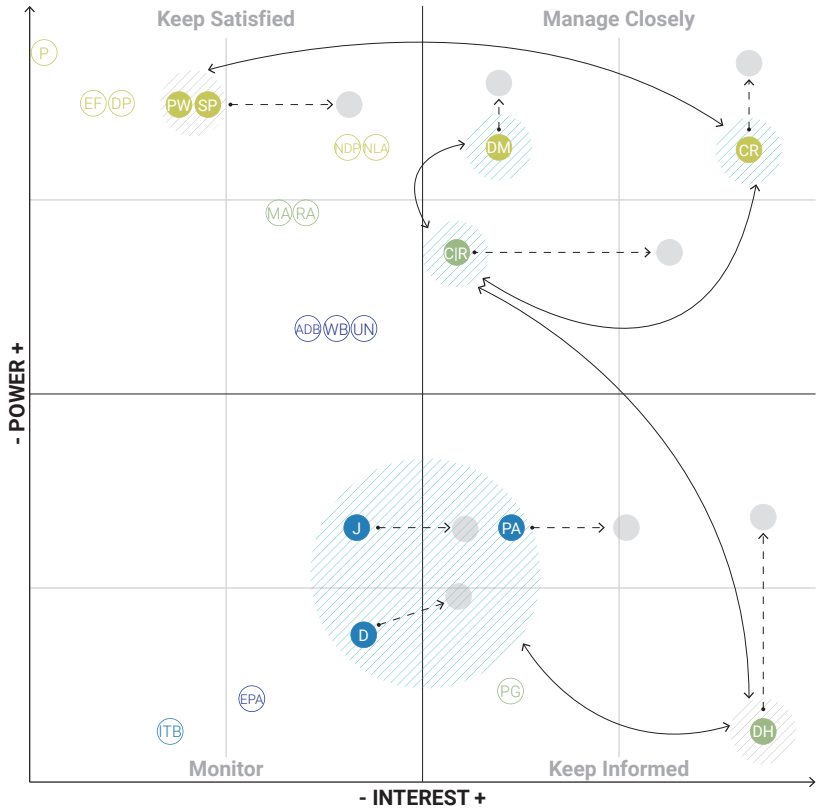
# Stakeholder Analysis



# Power - Interest Grid

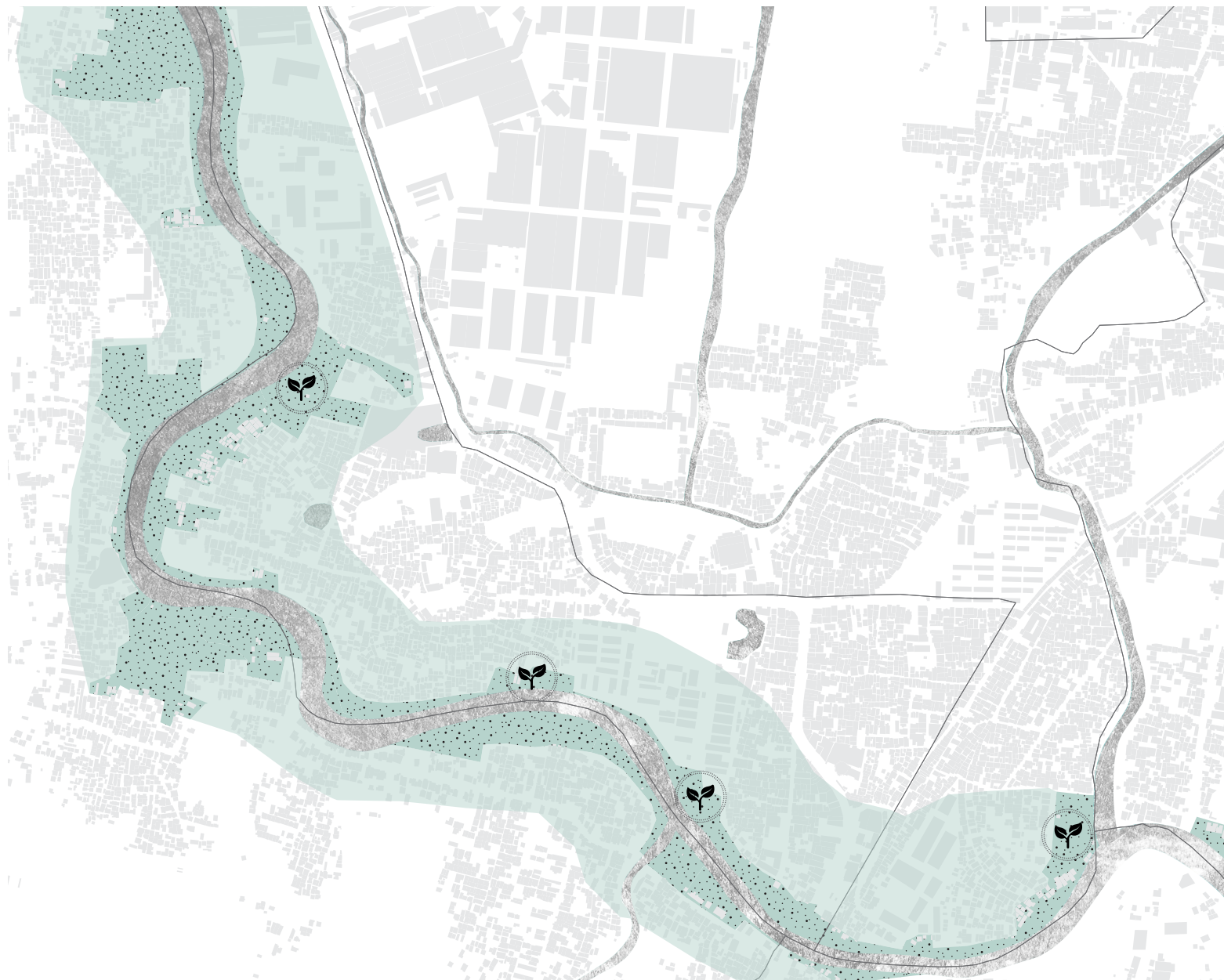


- PW** PW Ministry of Public Works
- CR** CR Central Office of Citarum River Region
- DM** DM National Board of Disaster Management
- SP** SP Ministry of Land & Spatial Planning
- CIR** CIR City / Regency Government
- DH** DH District Head
- PA** PA PusAir
- D** D Deltares
- J** J JICA
- NA** NA Key Stakeholder **Supporter**
- NA** NA Key Stakeholder **Blocker**
- NA** NA Neutral Stakeholder
- Grey Circle** Grey Circle Desired State
- Arrow** Arrow Connections



- CR** CR Central Office of Citarum River Region
- M** M Military
- VH** VH Urban/Rural Village Head
- TI** TI Textile Industry
- RW** RW Community Heads [ RW ]
- RT** RT Neighborhood Heads [ RT ]
- KK** KK Household Heads [ KK ]
- PA** PA PusAir
- D** D Deltares
- J** J JICA
- ITB** ITB Bandung Institute of Technology
- NA** NA Key Stakeholder **Supporter**
- NA** NA Key Stakeholder **Blocker**
- NA** NA Neutral Stakeholder
- Grey Circle** Grey Circle Desired State
- Arrow** Arrow Connections



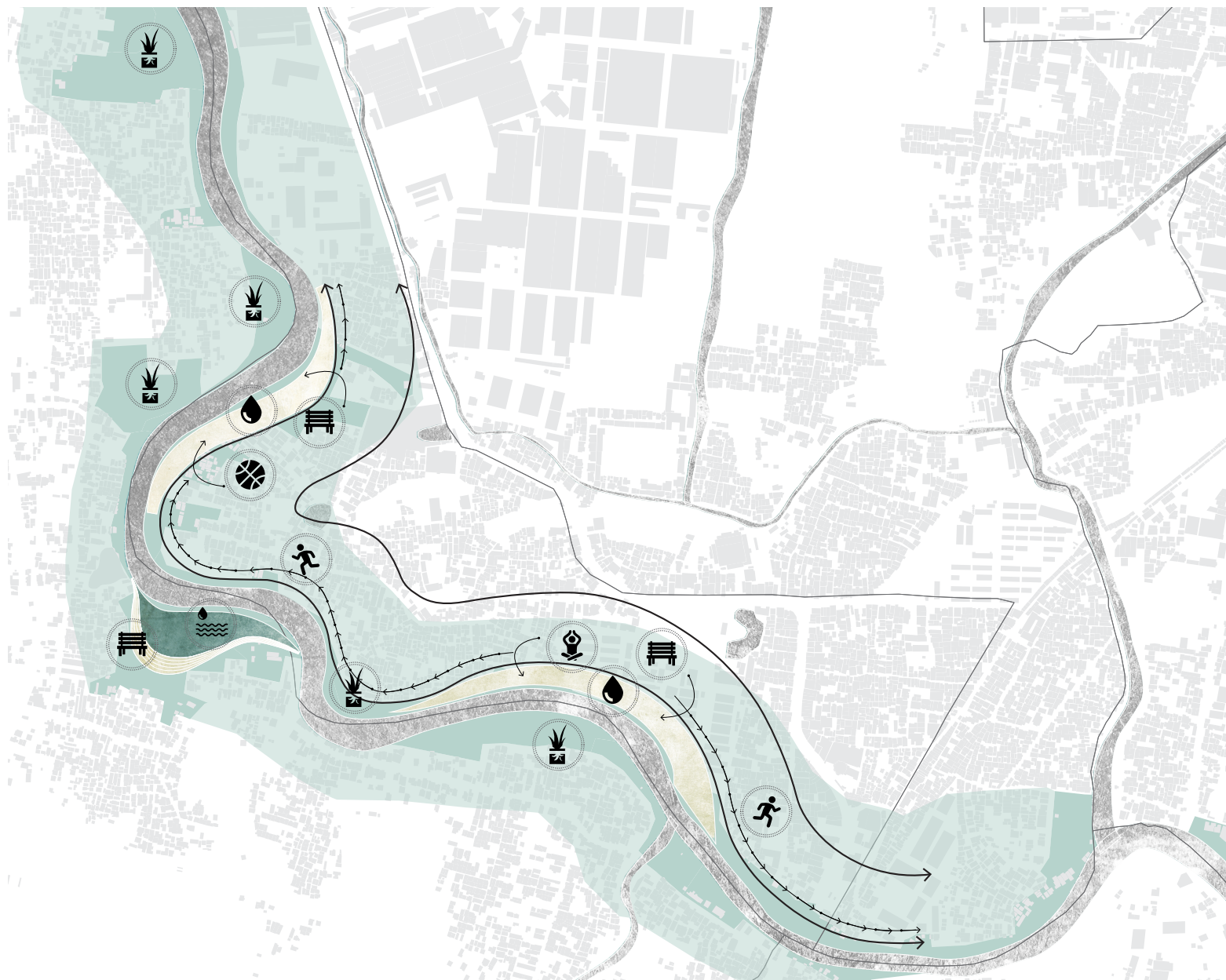


# “Foundation”

Focusing on the **origin of the problem** by building upon **institutional preparedness** and **social involvement**

## Legend

- Urbanized Areas
- Water Bodies
- Solid Waste Management
- Sand Cover
- Remediation Zones



# “Safety”

Creating **safe and healthy** urban environments grounded in **local knowledge** and **professional expertise**

## Legend

- Urbanized Areas
- Water Bodies
- Urban Dike
- Retention Pond
- Purifying Plants
- Room for the River
- Temporary Park Area
- Temporary Activities
- Temporary Sport
- Evacuation Route





## “Multifunctionality”

Establishing a **framework for the informality** by  
providing to the **basic human rights**