PATHWAYS

for CLIMATE-ADAPTIVE

HAVEN-STAD

P5

P5 Lisa Lieftink | 05-11-2021

Urbanism

First mentor: Ir. Kristel Aalbers

Second mentor: Dr.Ir. Verena Balz

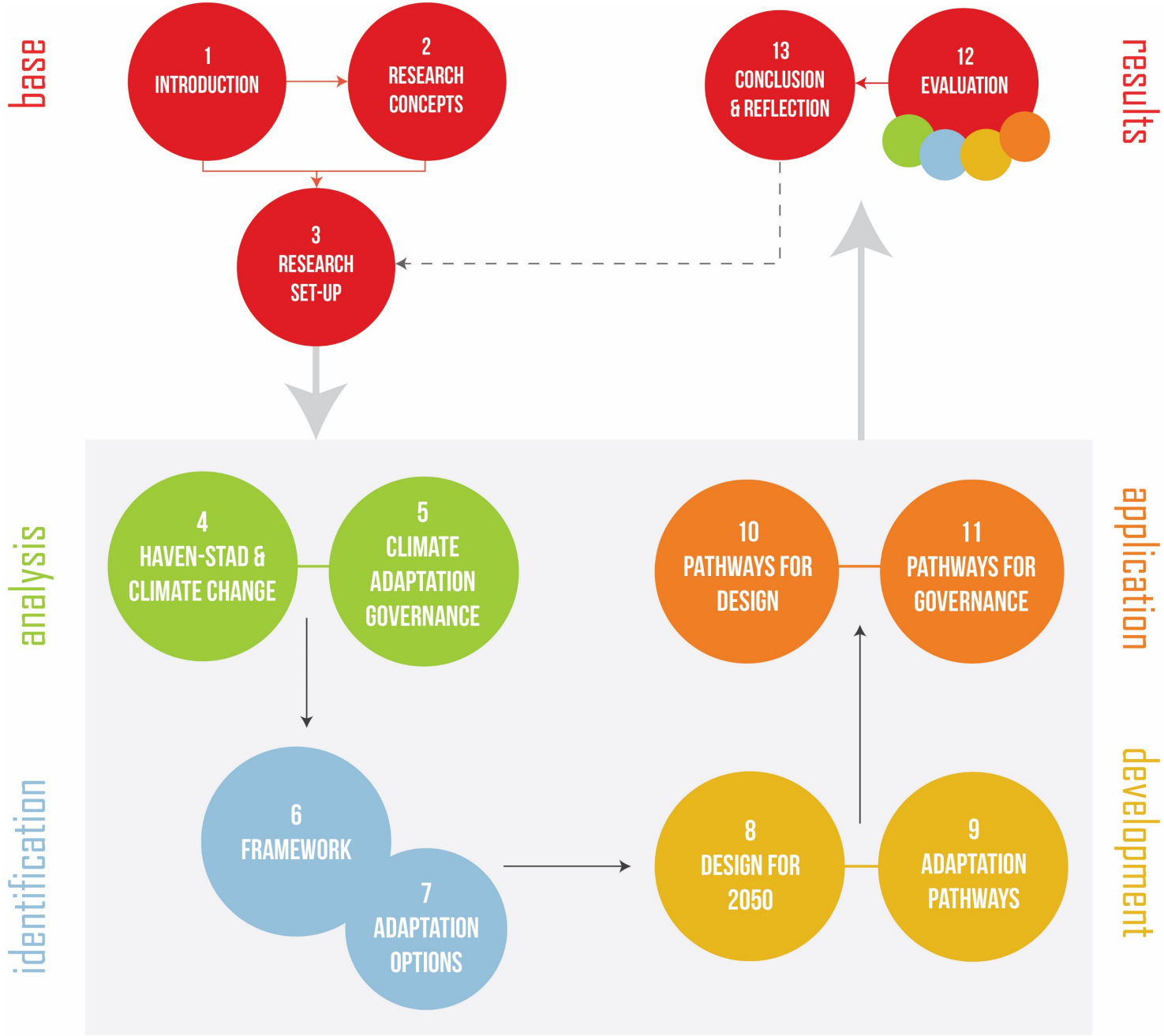
Water Management

First mentor: Dr.Ir. Martine Rutten

Second mentor: Dr. Erik Mostert

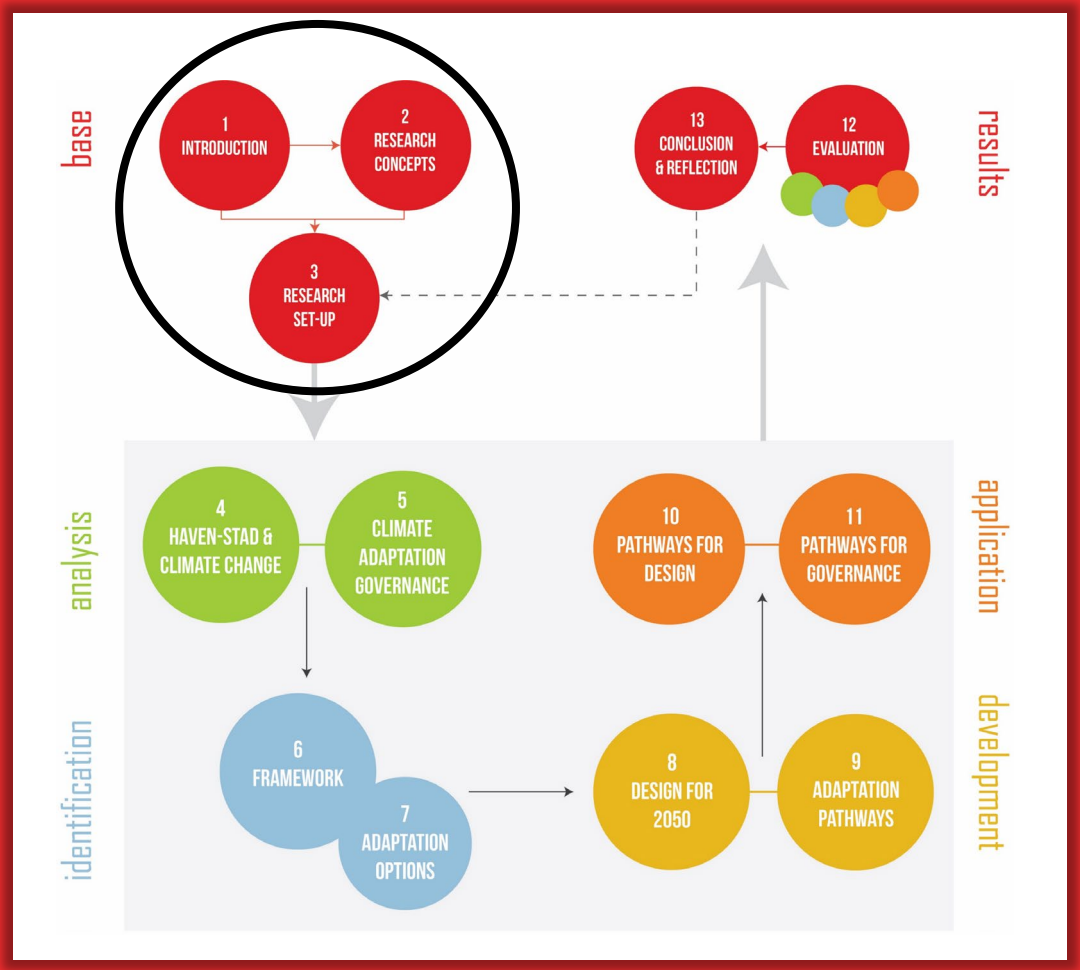
Waternet

Supervisor: Kasper Spaan MSc.

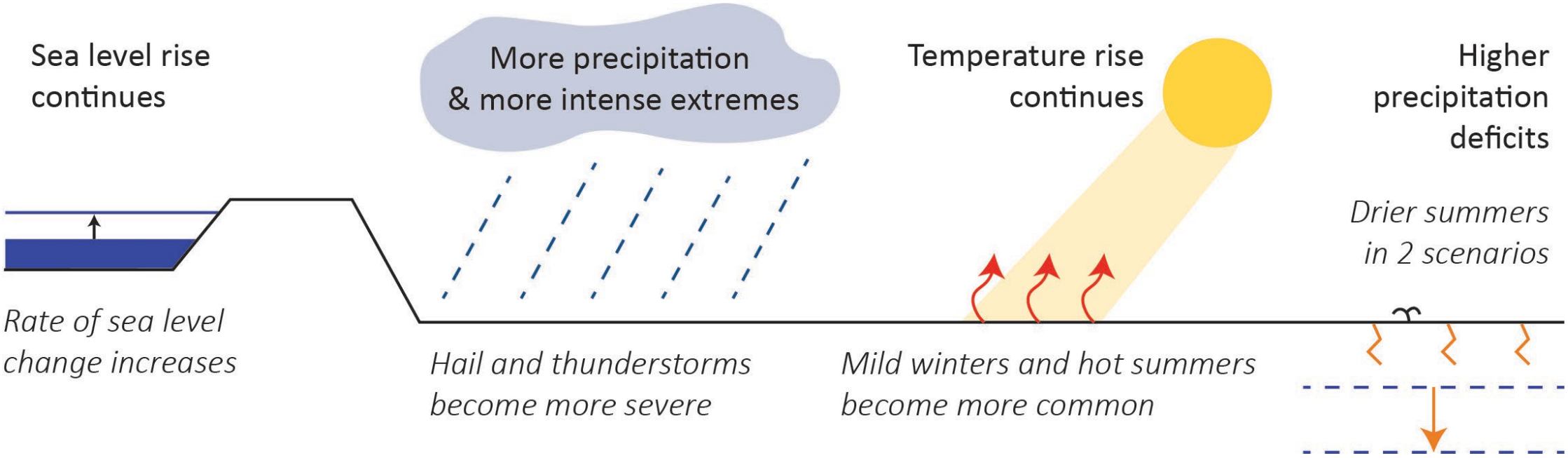

base
1 INTRODUCTION
2 RESEARCH CONCEPTS
3 RESEARCH SET-UP
results
13 CONCLUSION & REFLECTION
12 EVALUATION
analysis
4 HAVEN-STAD & CLIMATE CHANGE
5 CLIMATE ADAPTATION GOVERNANCE
application
10 PATHWAYS FOR DESIGN
11 PATHWAYS FOR GOVERNANCE
identification
6 FRAMEWORK
7 ADAPTATION OPTIONS
development
8 DESIGN FOR 2050
9 ADAPTATION PATHWAYS

BASE

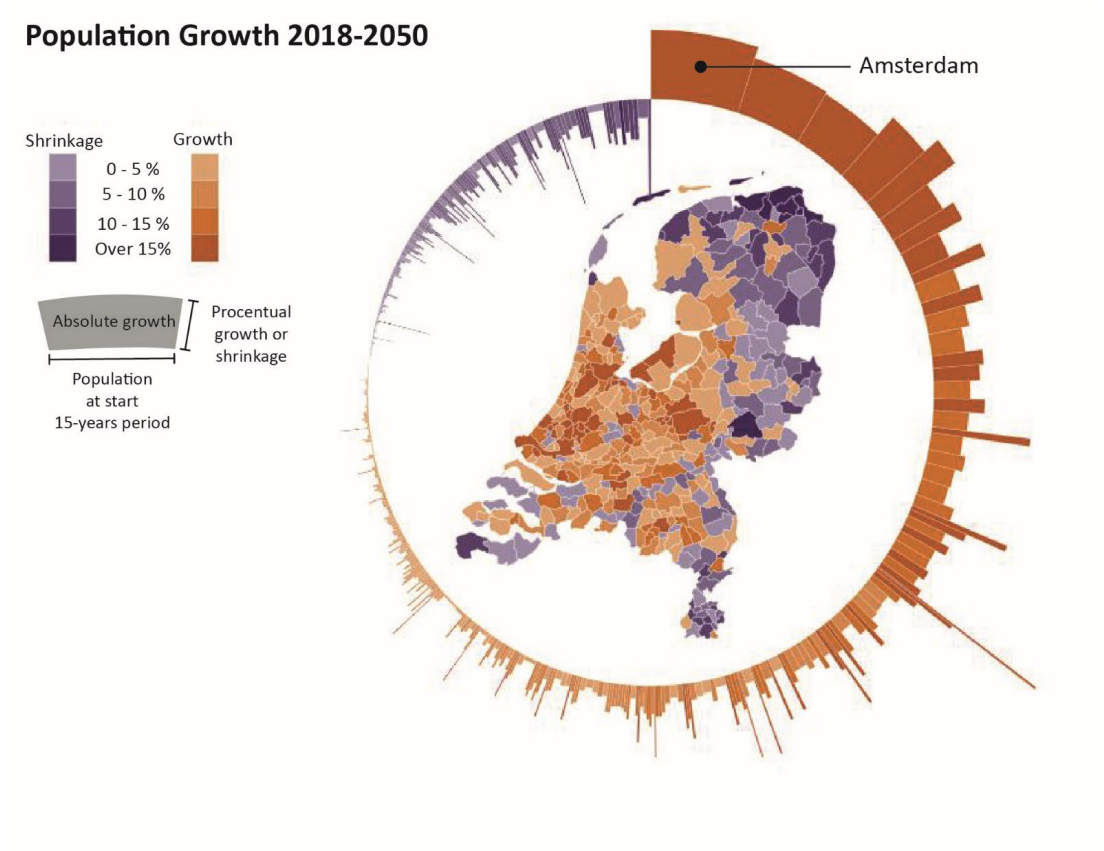
What is the problem?
Which concepts are used?
What is the project about?



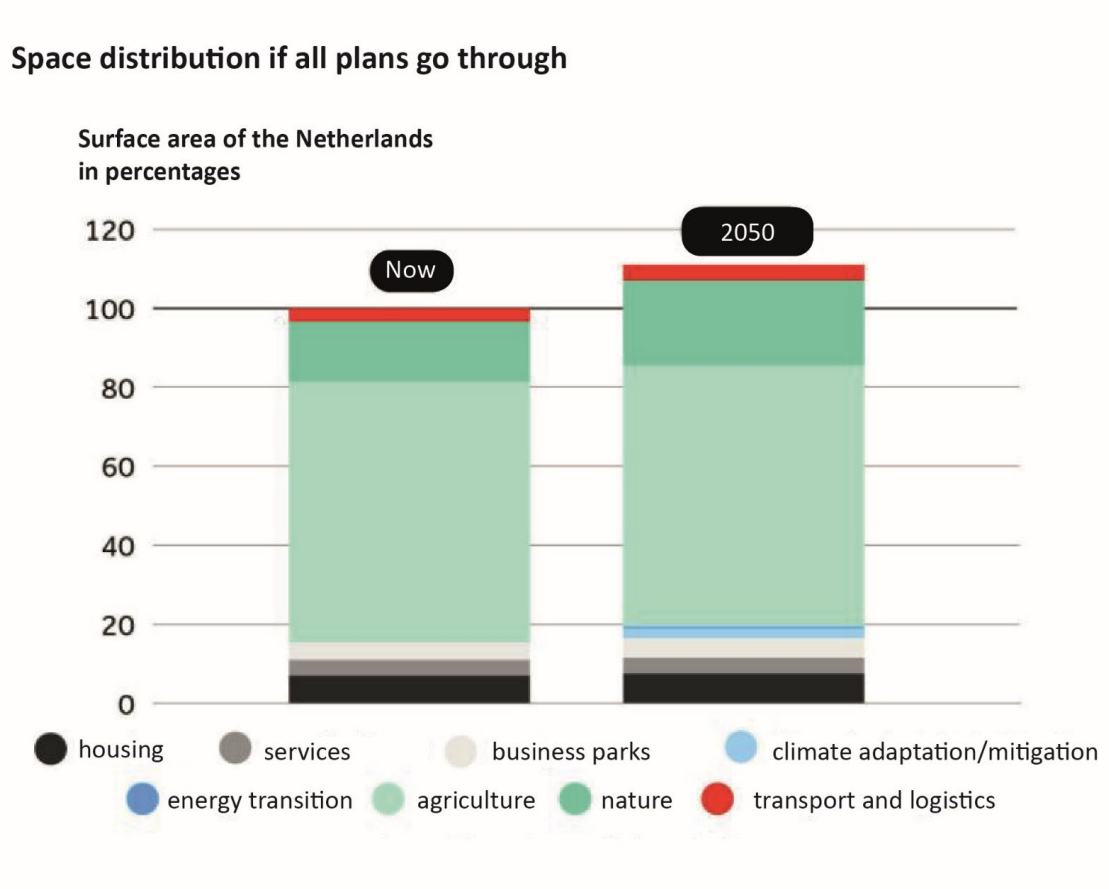
Trend 1: Climate Change



Trend 2: Higher Building Densities



PBL & CBS (2019)



NOS Nieuws (2020)

Climate Change Adaptation

Increased climate risk

→

Climate change adaptation

'the process of adjustment in natural or human systems to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities' (IPCC, 2018, p.542).

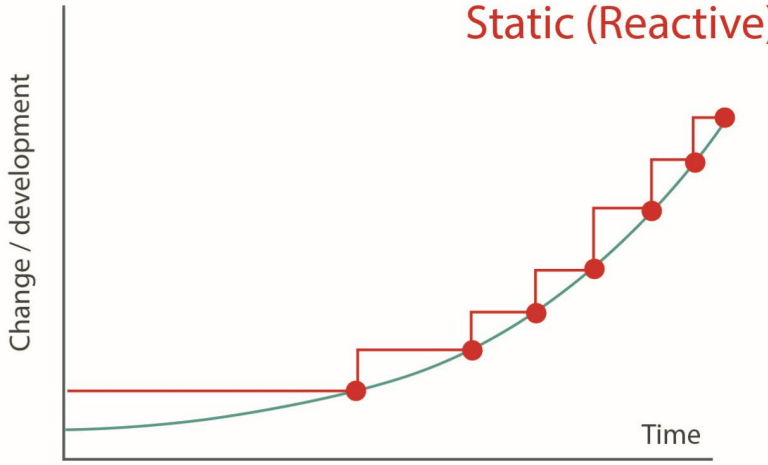
Mismatch

Climate Adaptation Task

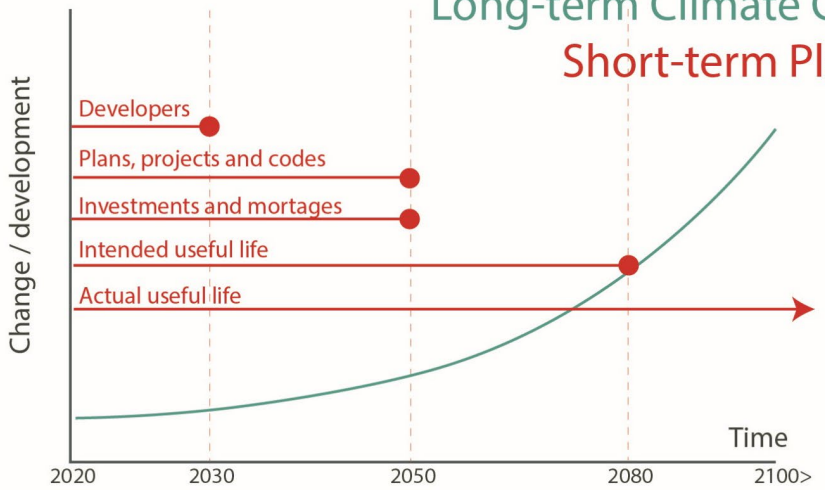
&

Current Spatial Design & -Planning

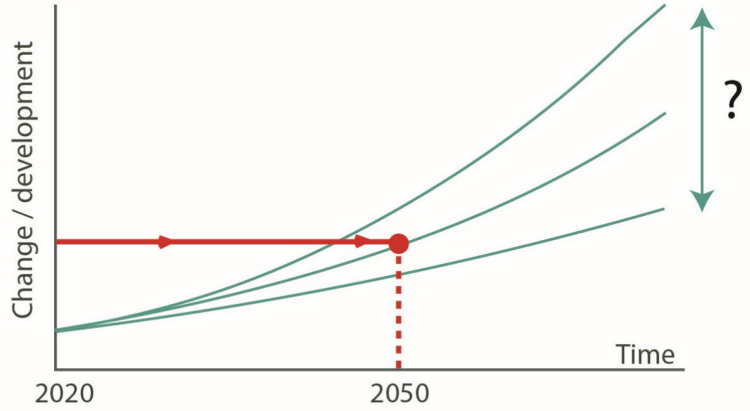
Dynamic Climate
Static (Reactive) Planning



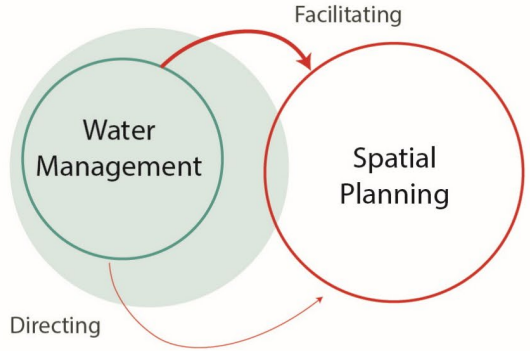
Long-term Climate Change
Short-term Planning



Uncertainty in Climate Change
One or a couple of futures



Growing Importance of Water
Lack of Integration with Planning



Climate Adaptation Planning

Supporting approaches:

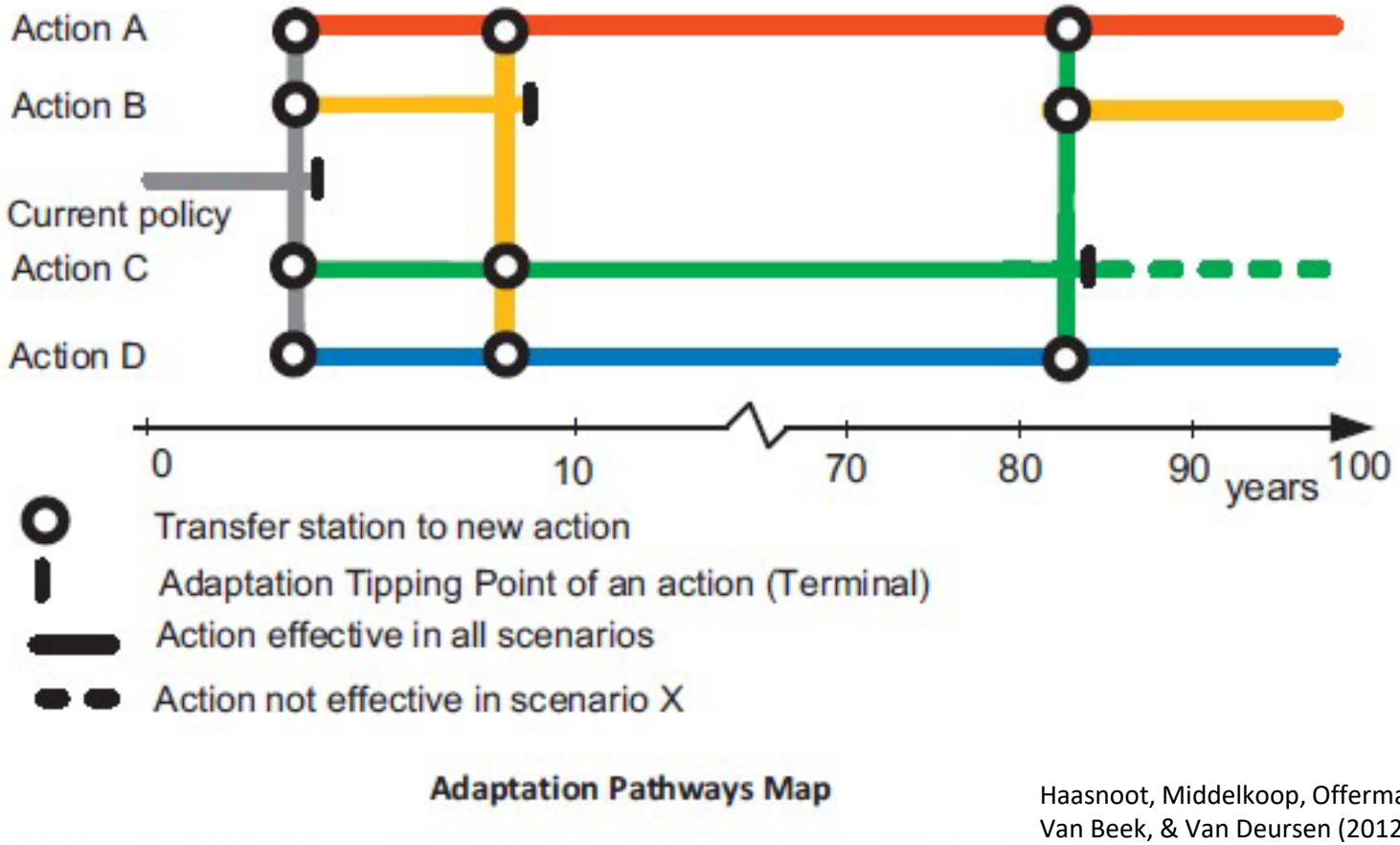
More flexibility and pro-activity

Longer time horizons

Working with uncertainties

Integration of water in spatial design & -planning

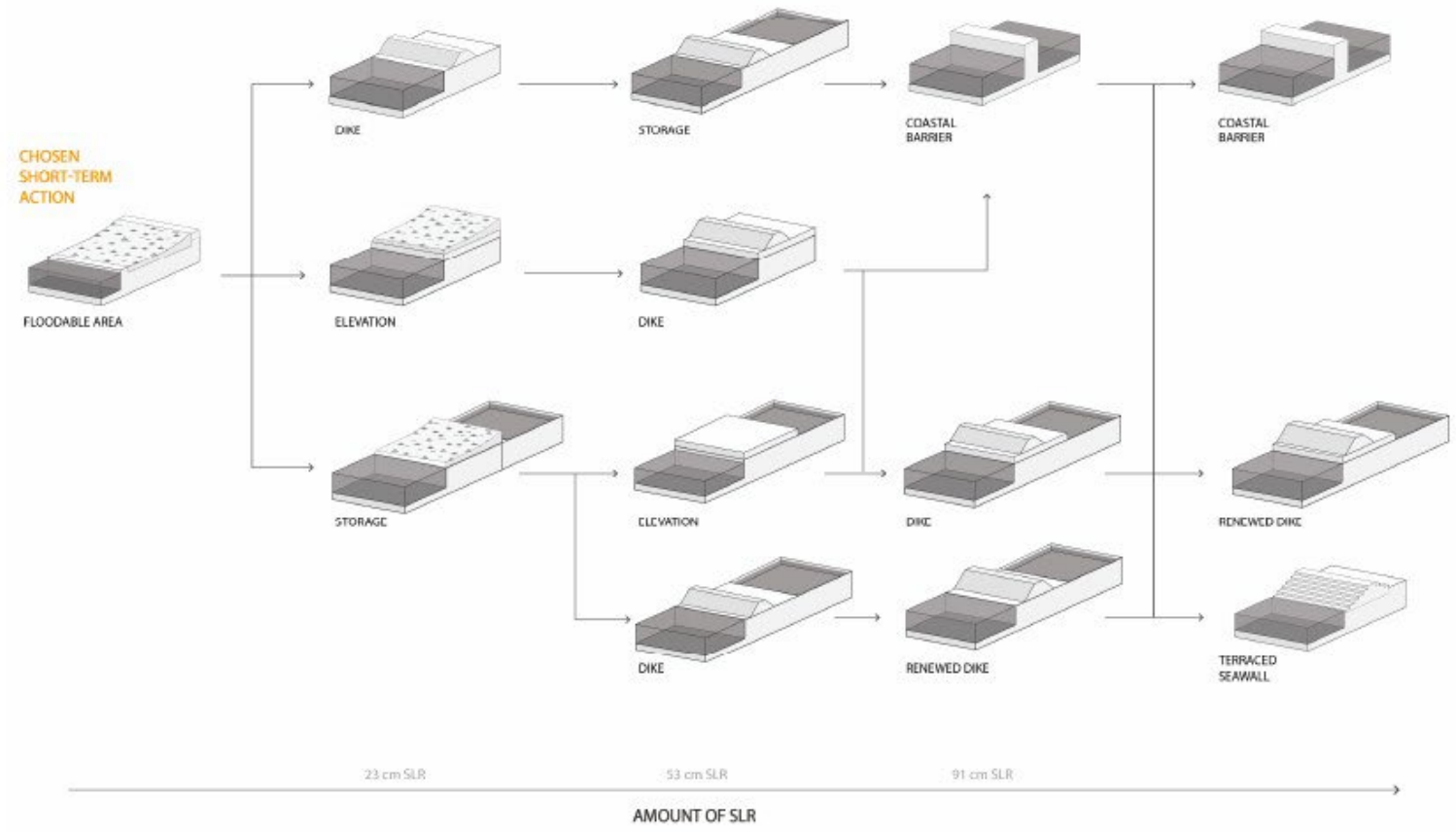
Adaptive Policy Pathways



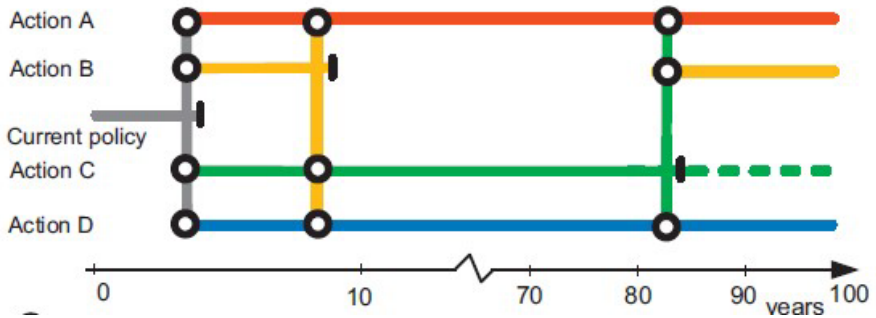
Adaptation Pathways Map

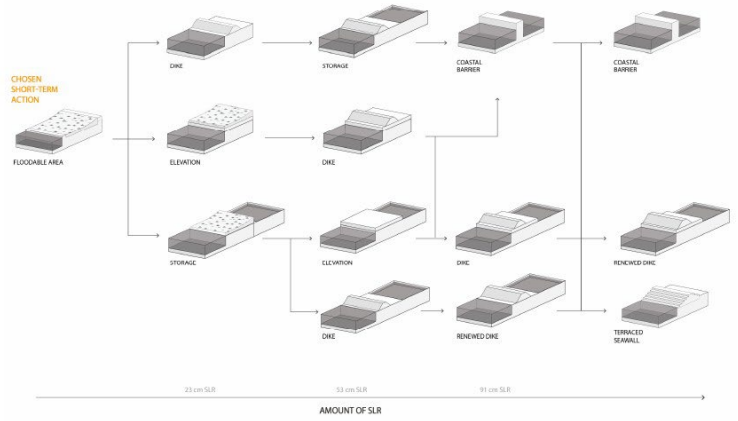
Haasnoot, Middelkoop, Offermans, Van Beek, & Van Deursen (2012)

Spatial Adaptive Pathways



Zandvoort, Kooijmans, Kirshen, & Van den Brink (2019)

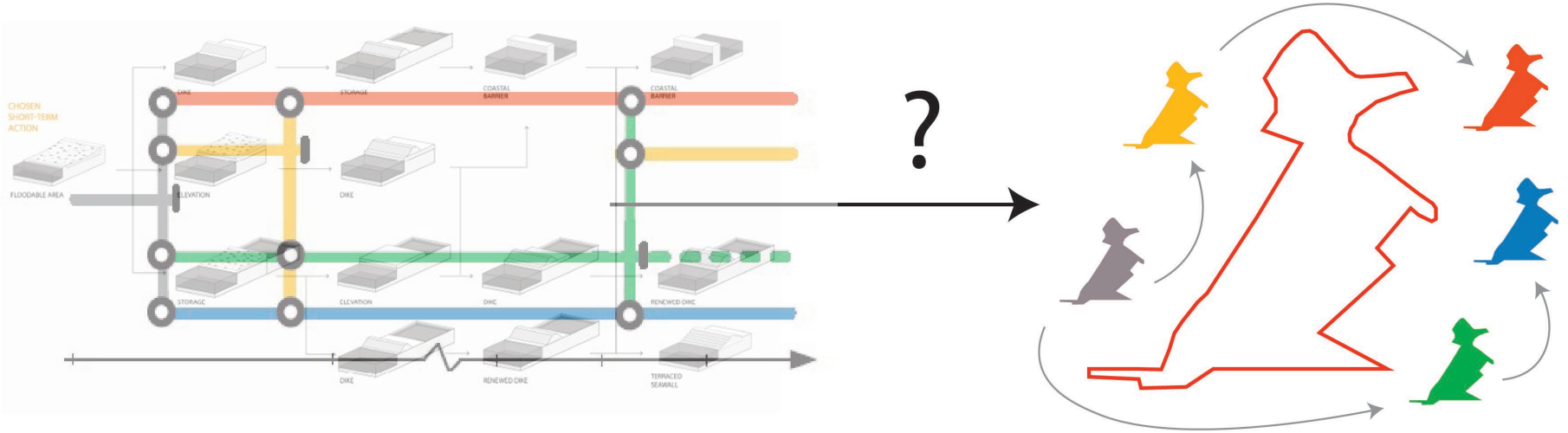




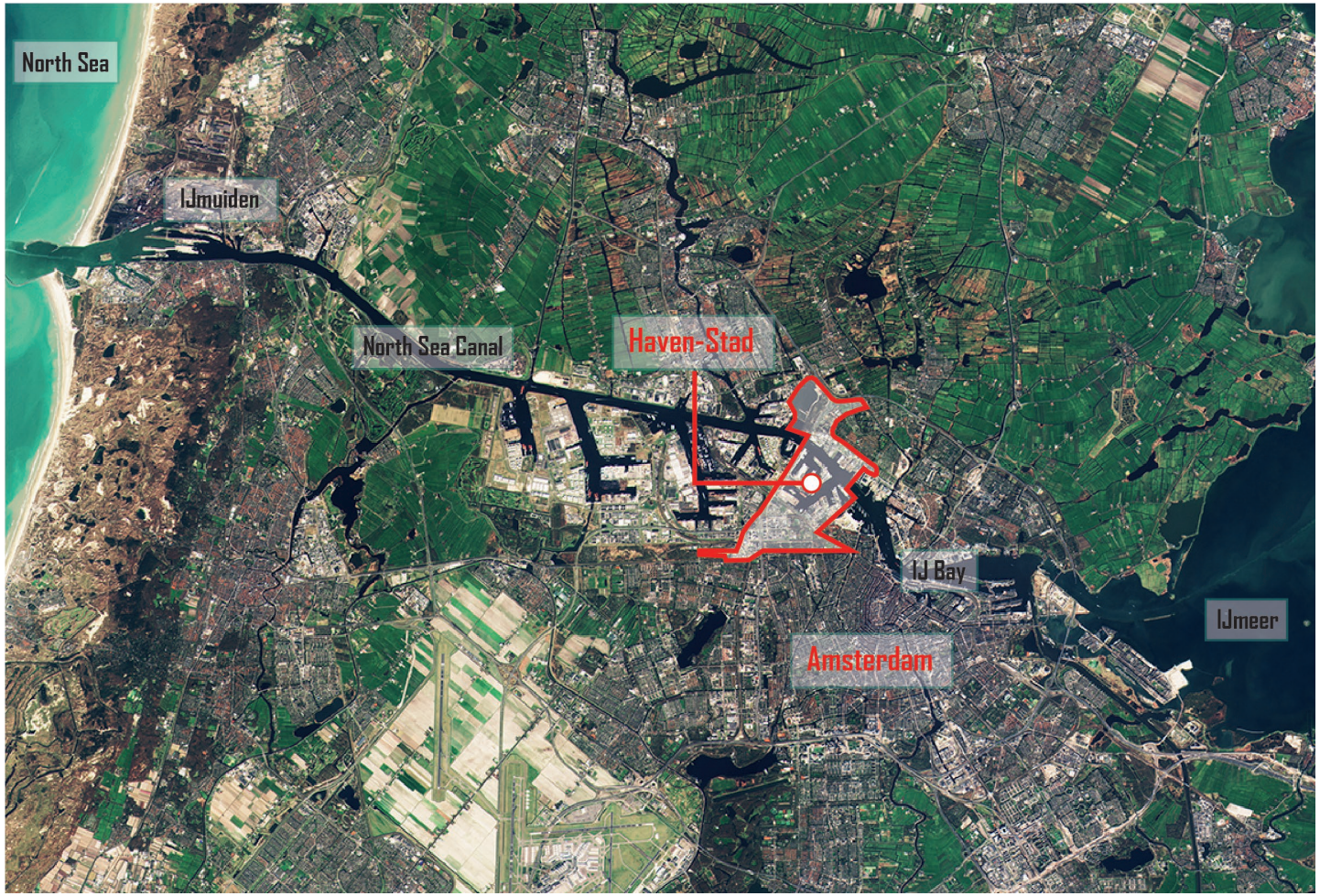
Spatial Adaptive Policy Pathways (SAPP) approach

Research Question

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

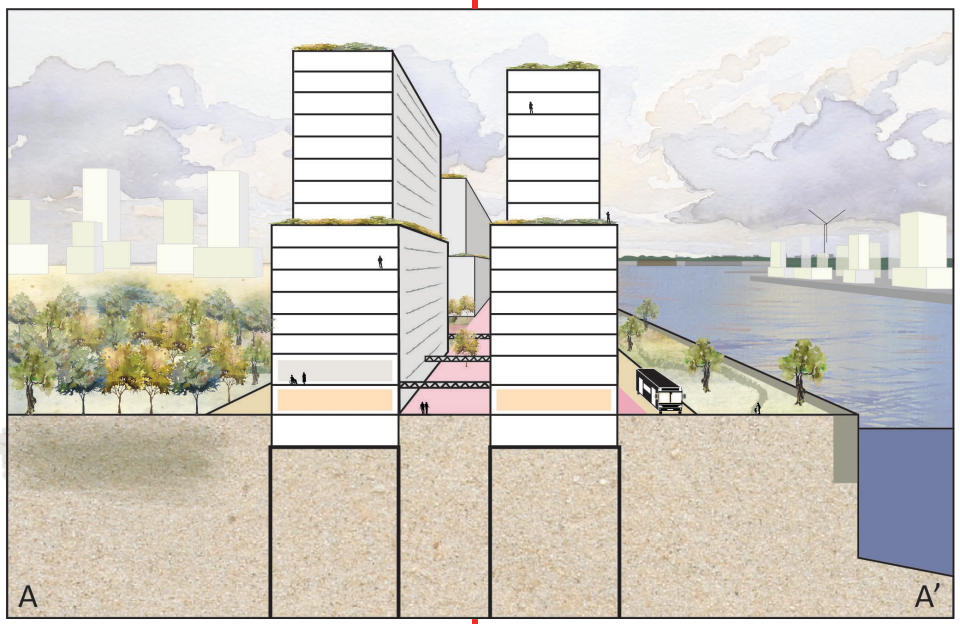


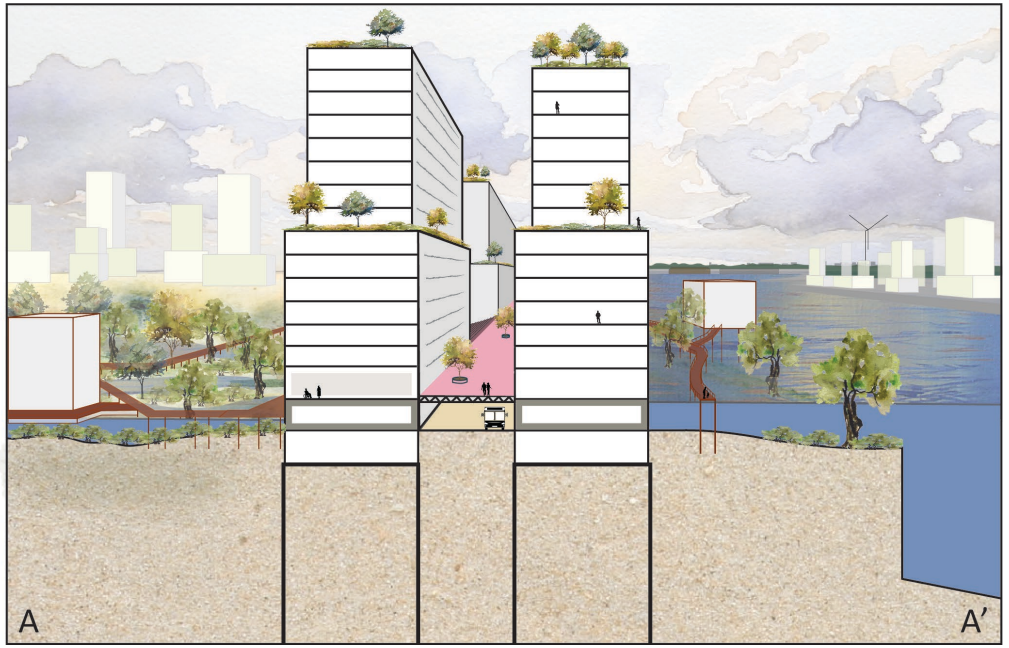
Case-Study: Haven-Stad, Amsterdam

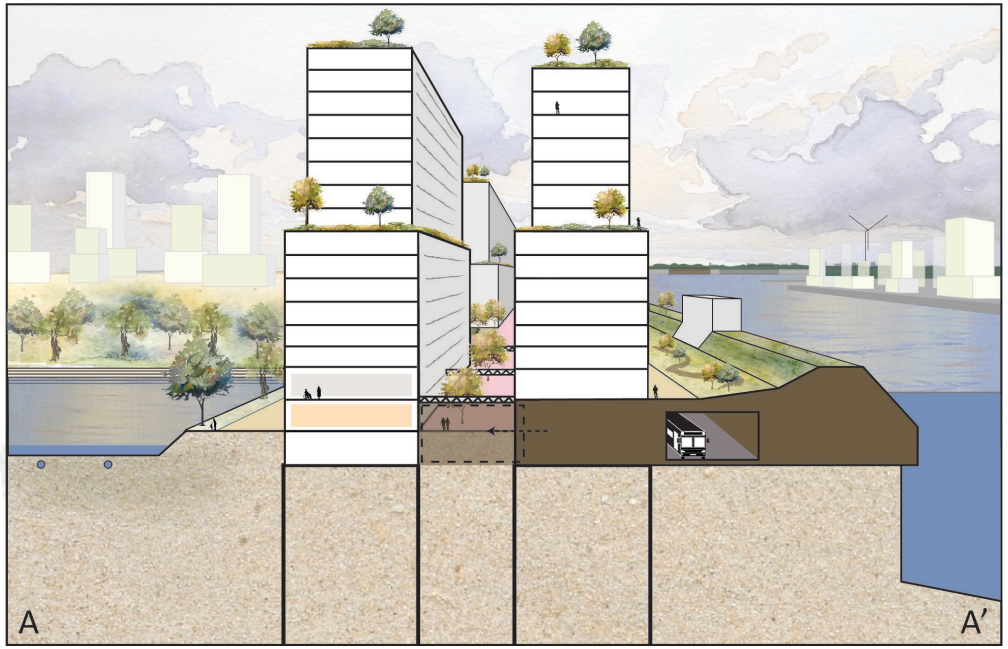


Background: ESA (2017)

BASE







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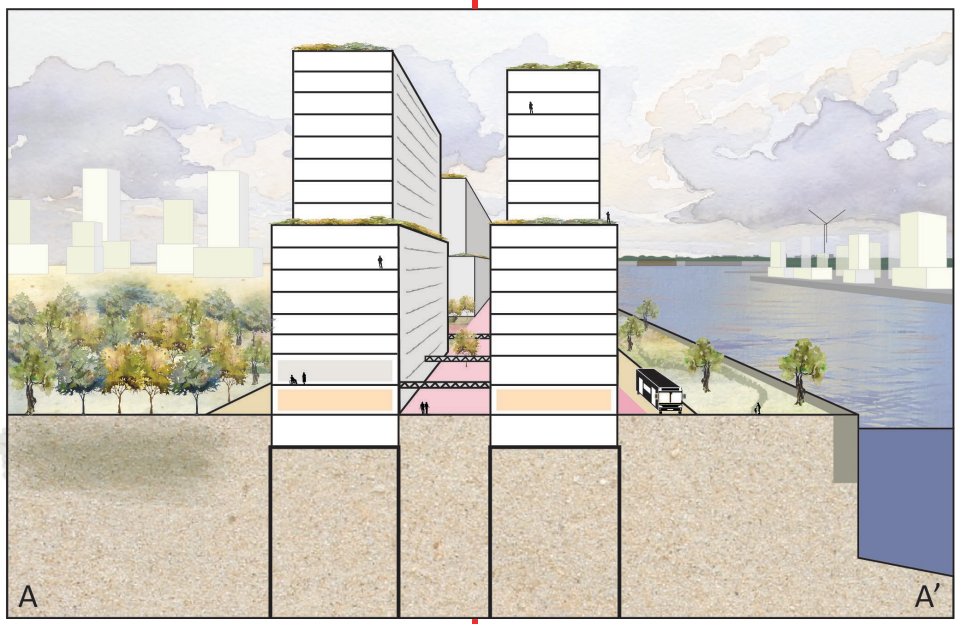
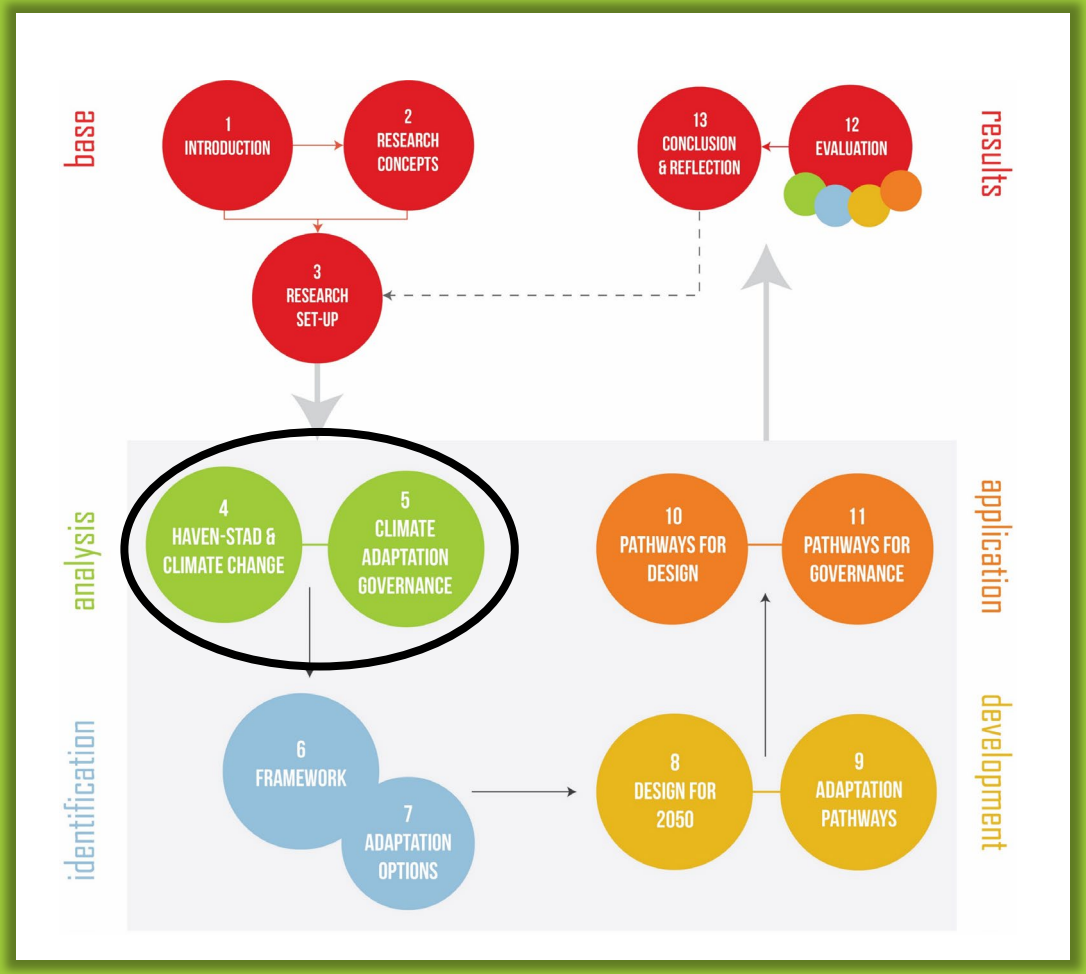


Klunder Architecten (n.d.)

Waterschap Rivierenland (2020)

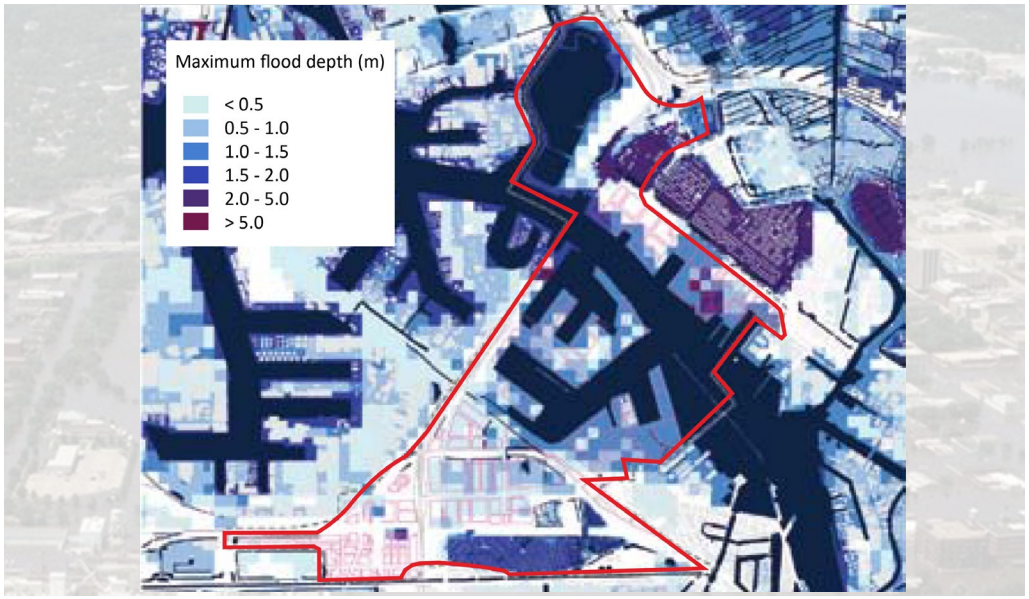
ANALYSIS

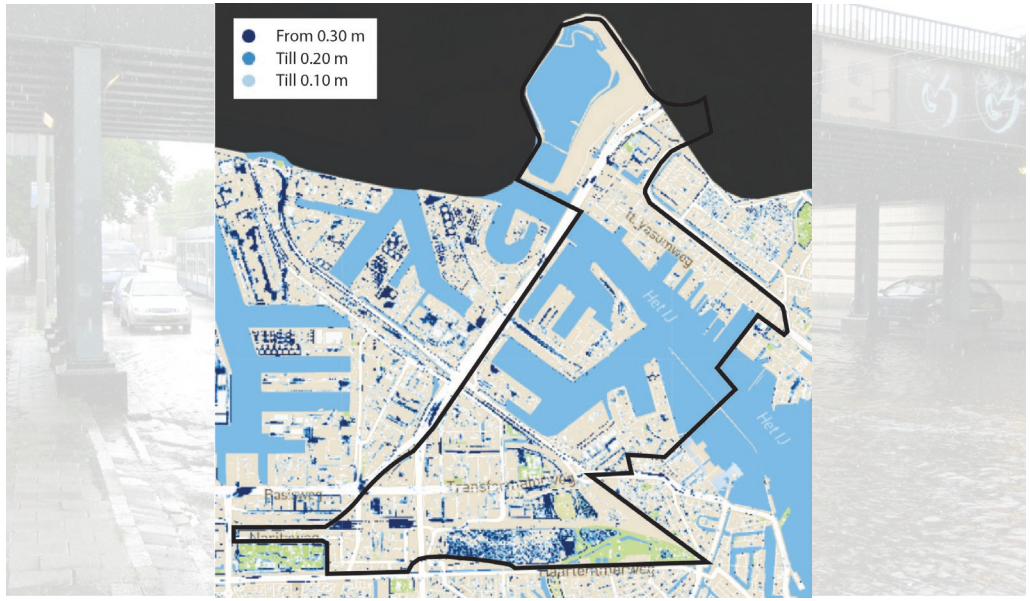
Which analyses are needed to get a comprehensive view of the climate adaptation task?

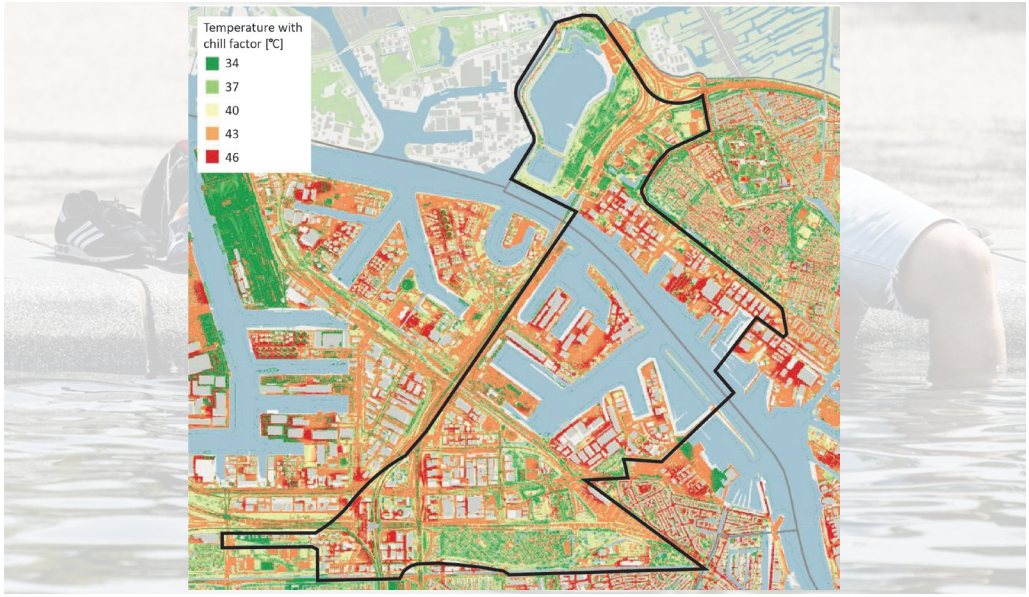


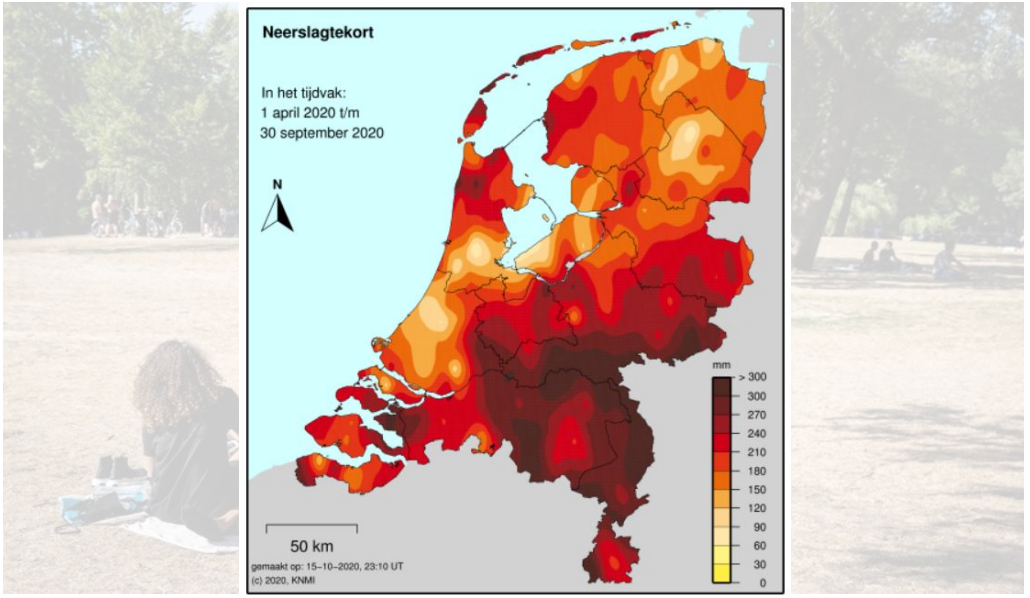
Fluvial flooding: The associated press (n.d.) - Pluvial flooding: NRC (2008) - Heat: RTL Nieuws (2019) - Drought: Mol (2018)

ANALYSIS



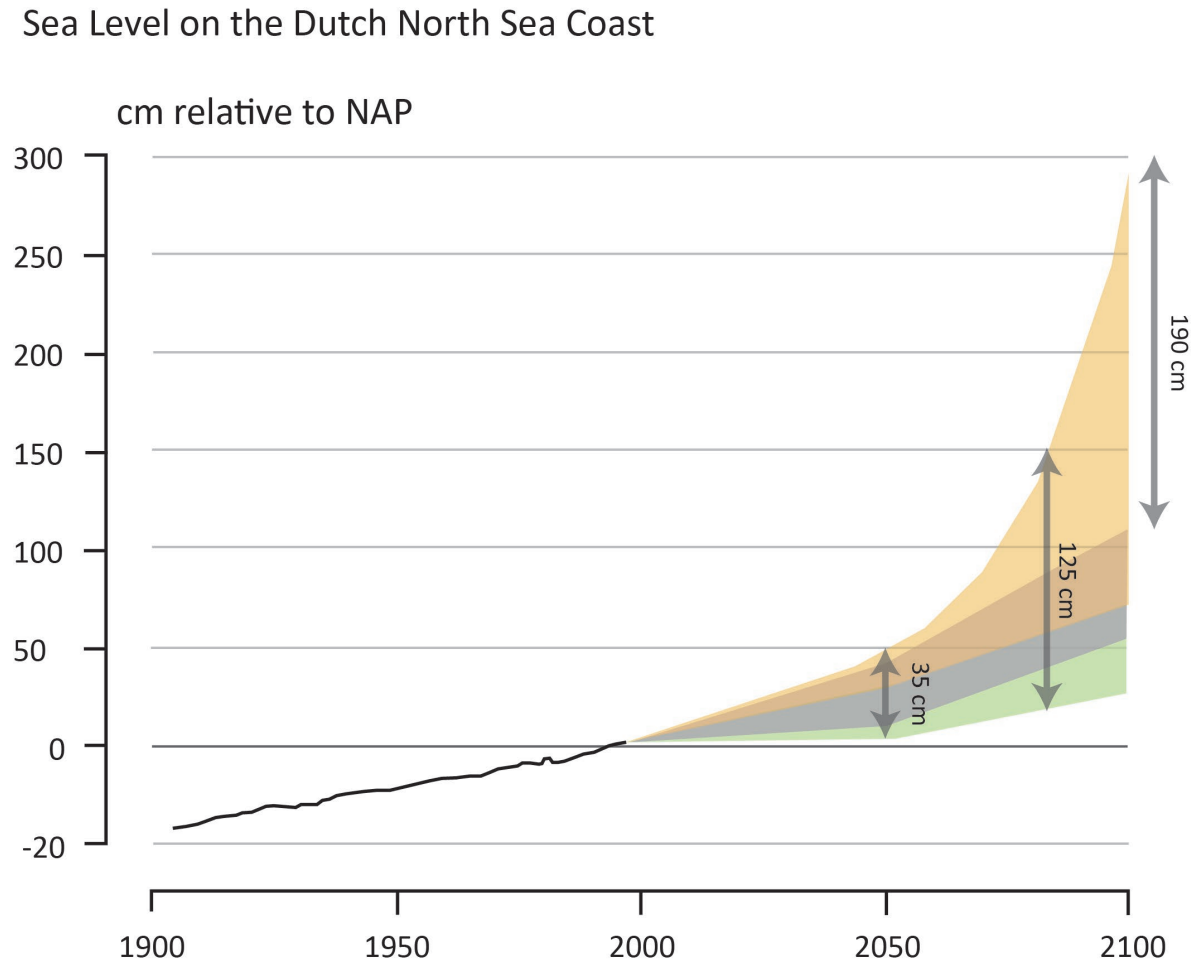






Fluvial flooding: Defacto Stedenbouw & RHDHV (2021)- Pluvial flooding: Waterschap AGV & BOWA (n.d.) - Heat: Gemeente Amsterdam (n.d.) - Drought: KNMI (n.d.)

Uncertainty



Adapted from: Defacto Stedenbouw & RHDHV (2021).

Climate Adaptation Governance

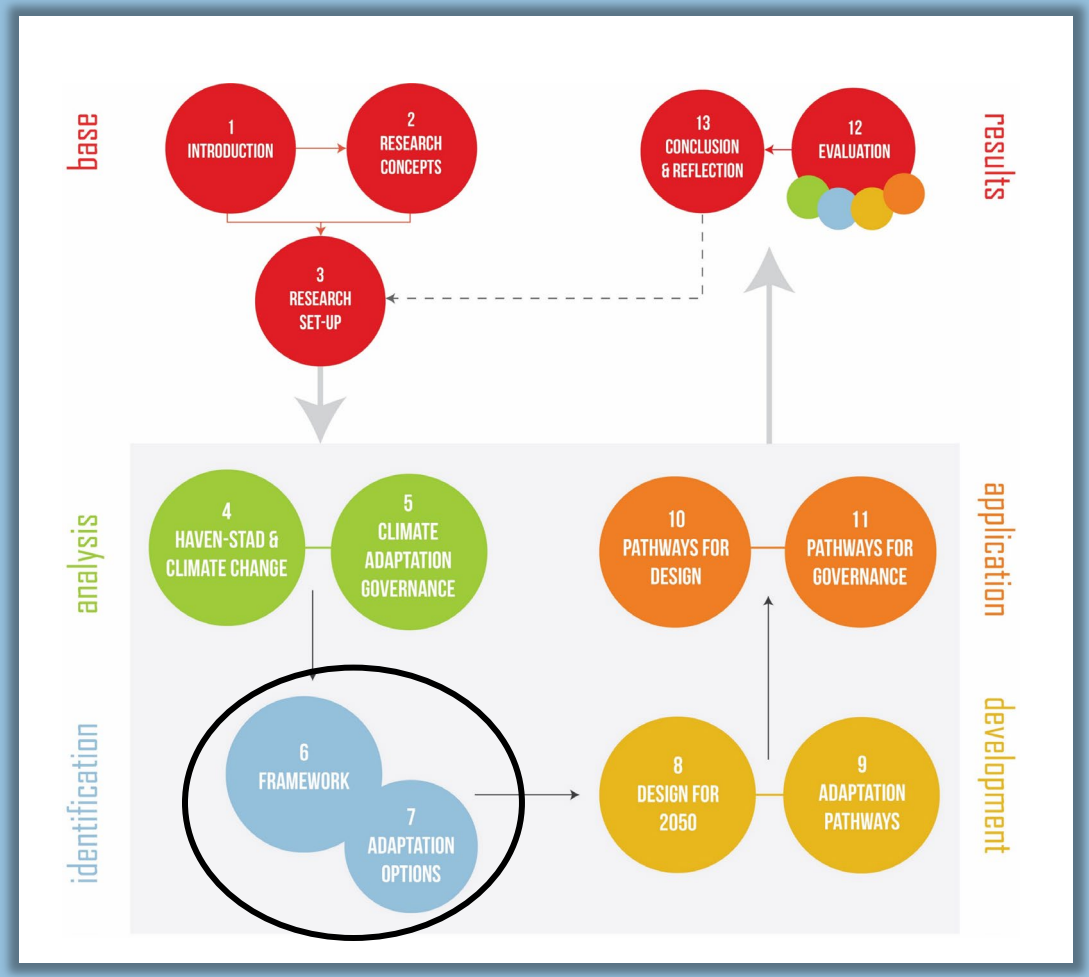
Demands
Cope with uncertainties and ignorance
Customized, flexible, and adjustable
Consultation and interaction
Integral assessment

Van Buuren & Teisman (2010)

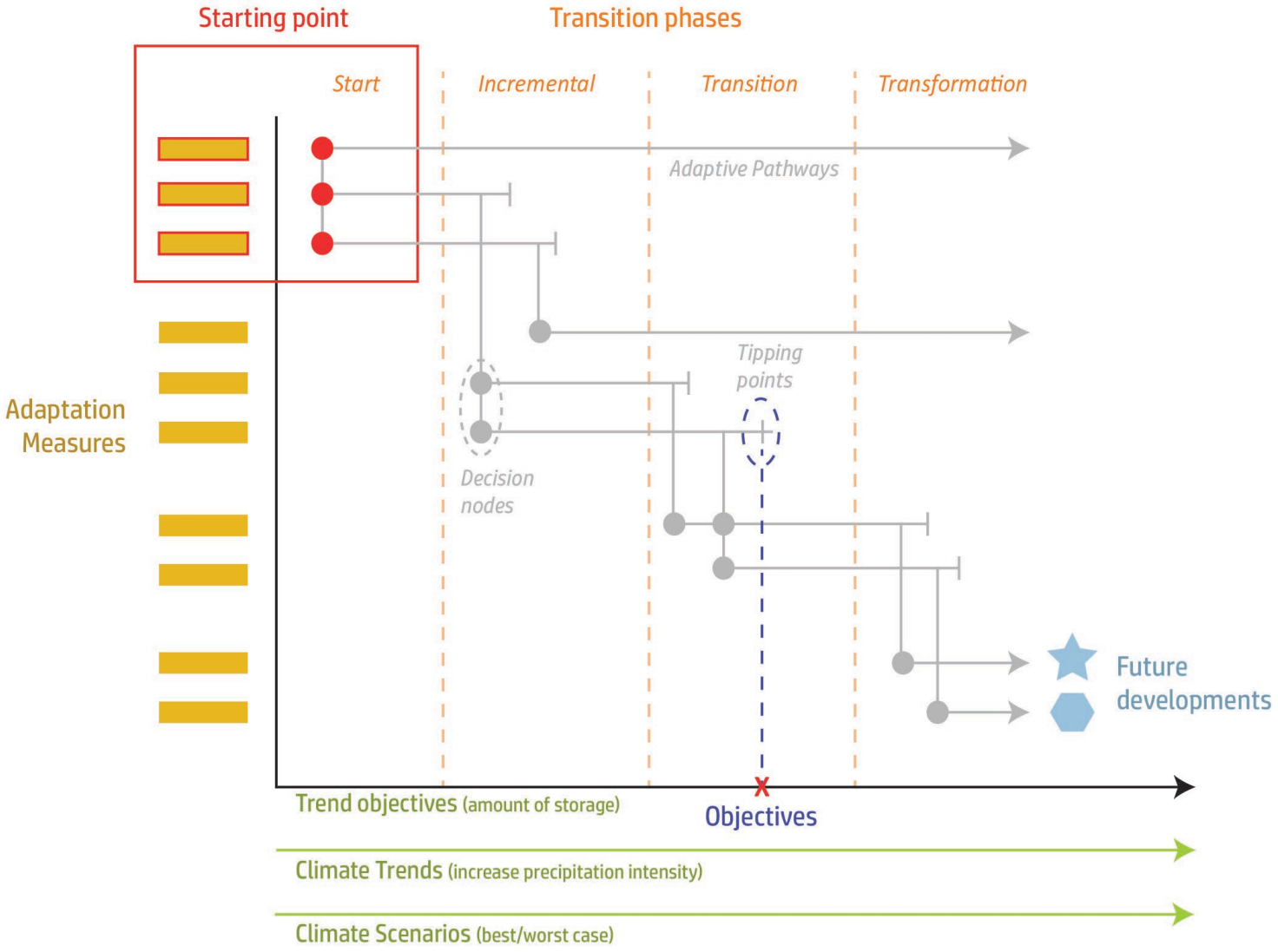
Spatial Adaptive Policy Pathways as instrument

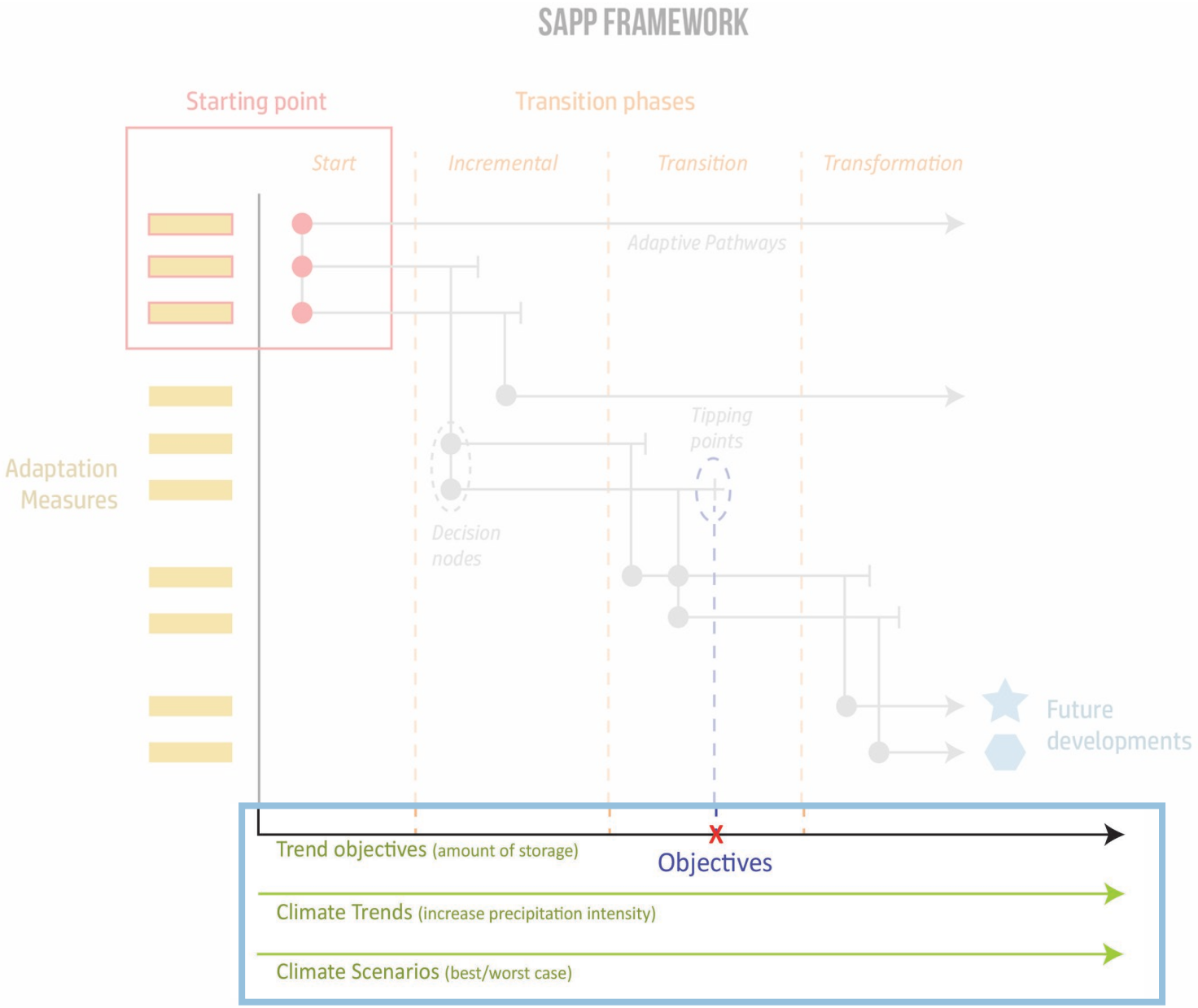
IDENTIFICATION

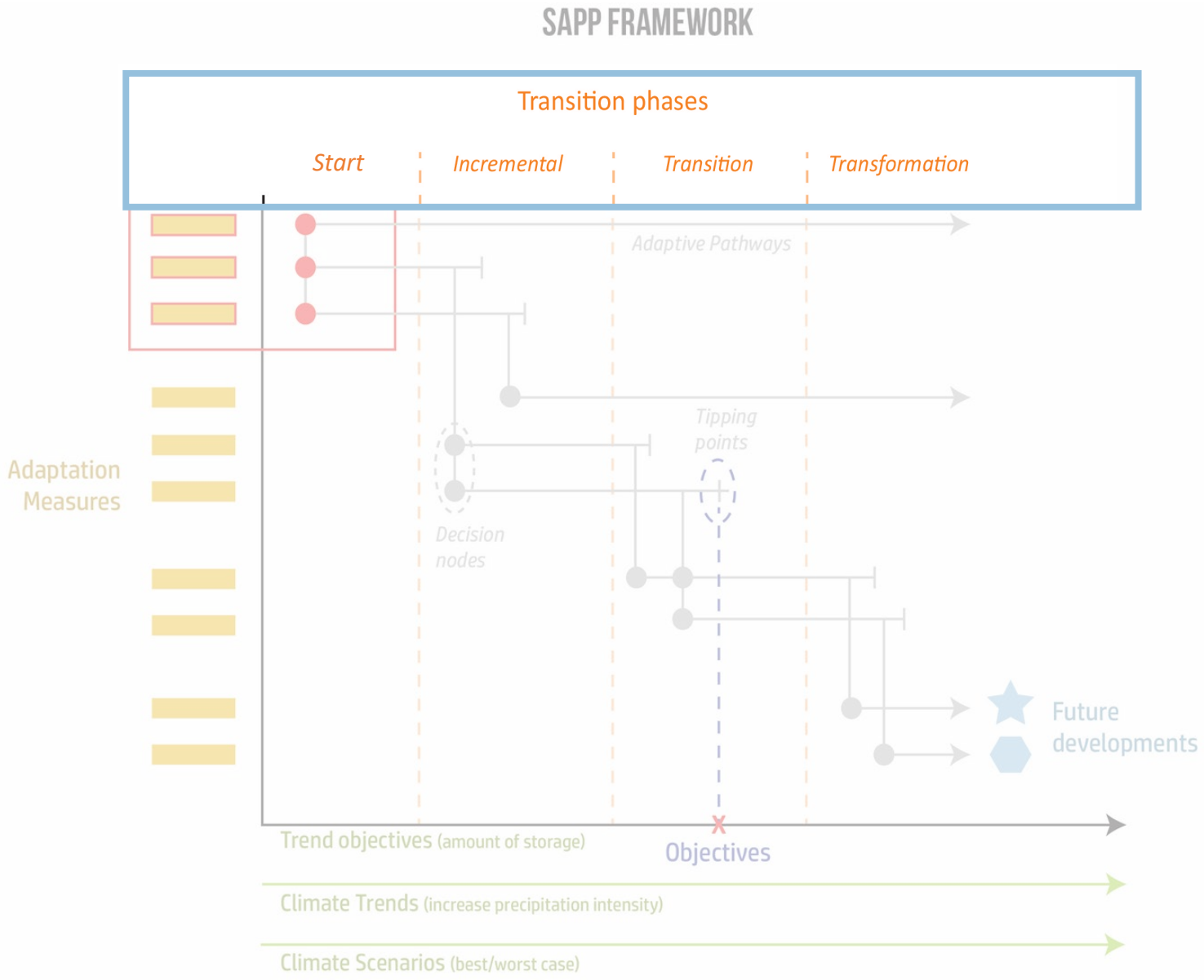
What are the key components needed for the development of Spatial Adaptive Policy Pathways?



SAPP FRAMEWORK




SAPP FRAMEWORK
Starting point
Transition phases
Start
Incremental
Transition
Transformation
Adaptive Pathways
Tipping points
Decision nodes
Adaptation Measures
Future developments
Trend objectives (amount of storage)
Objectives
Climate Trends (increase precipitation intensity)
Climate Scenarios (best/worst case)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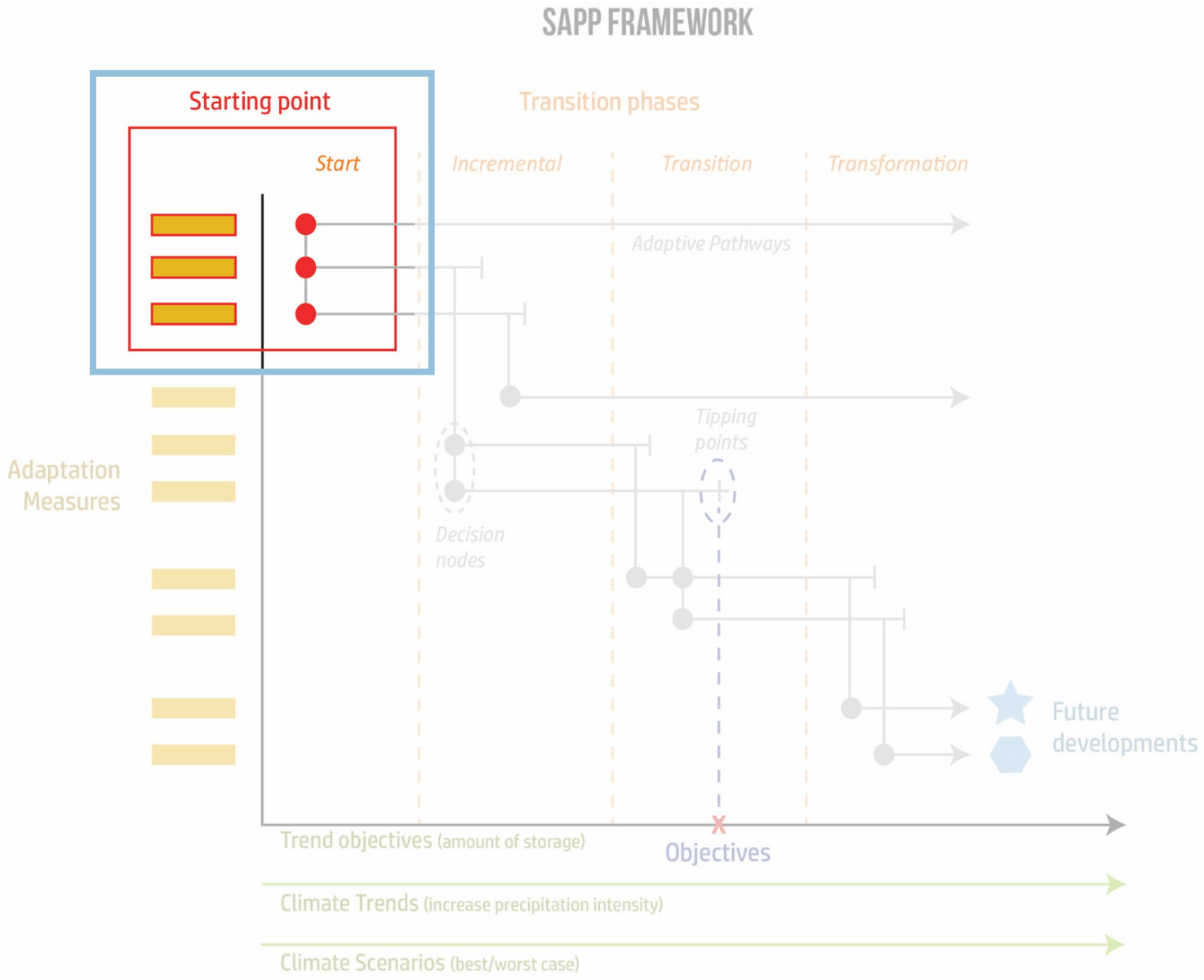
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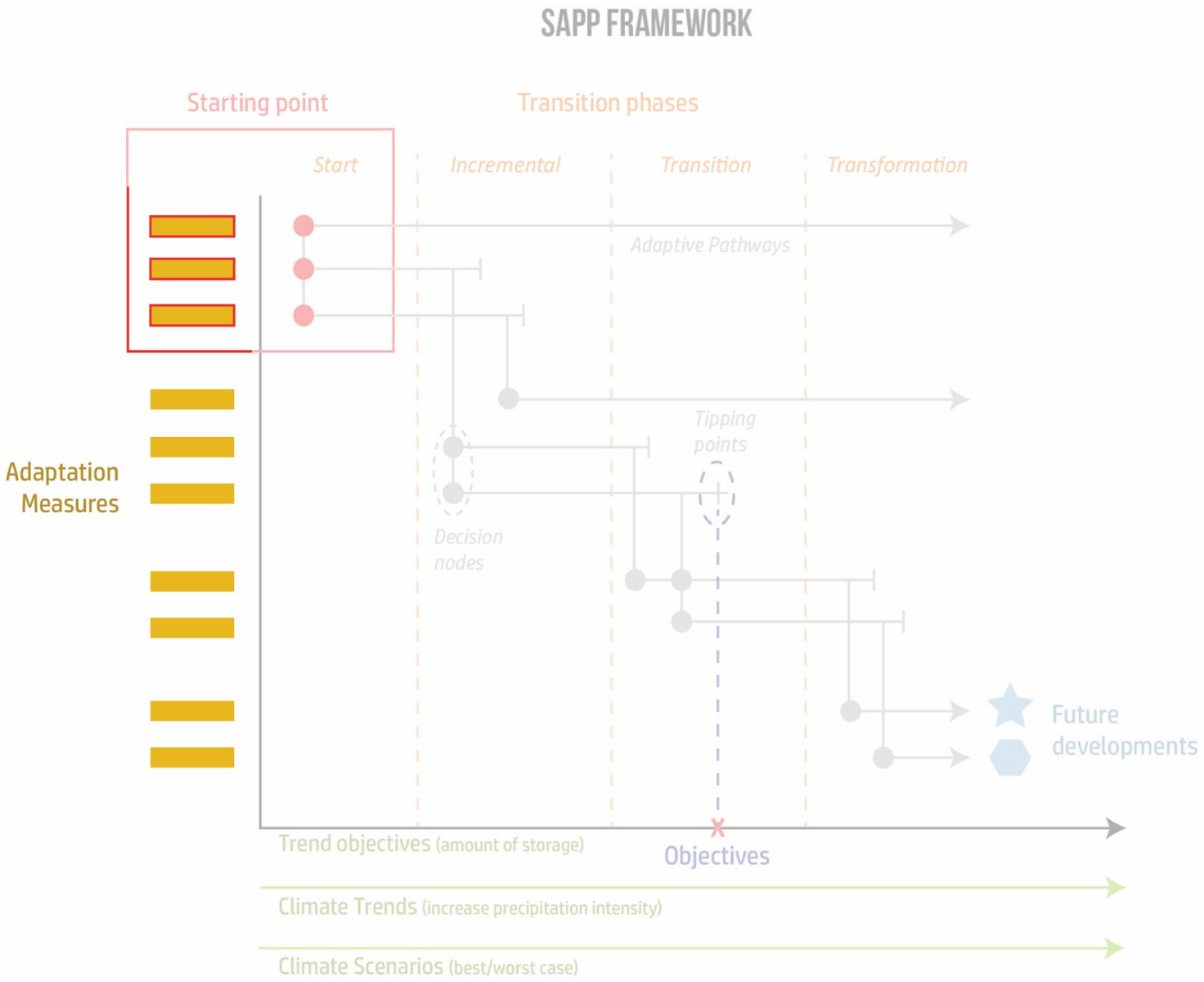
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Climate Trends (increase precipitation intensity)
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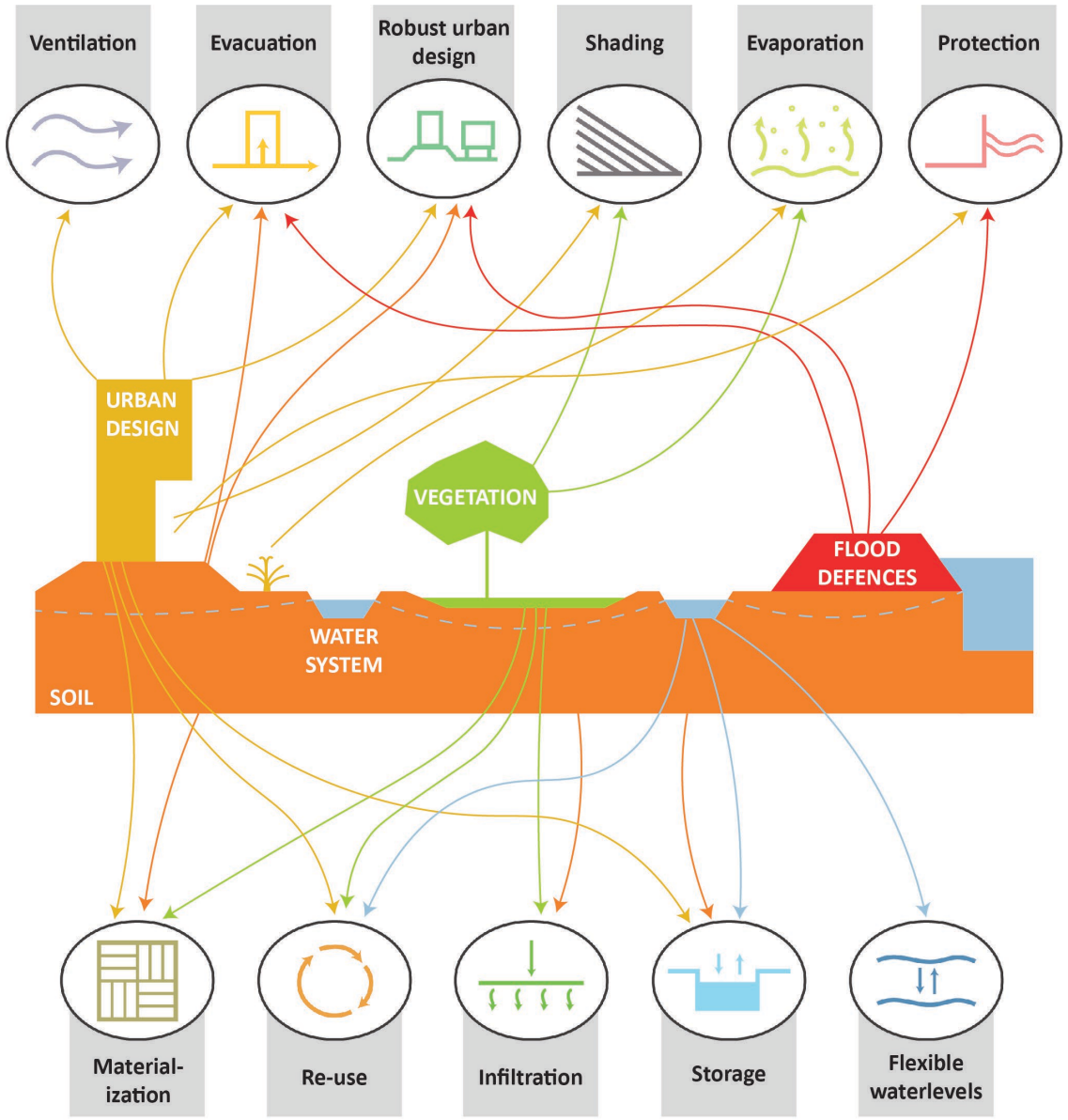
Adaptation Principles

Design Layers

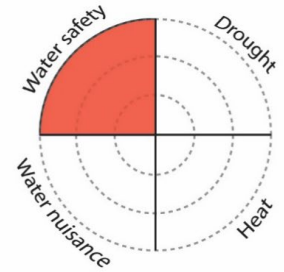


Adaptation Tiles

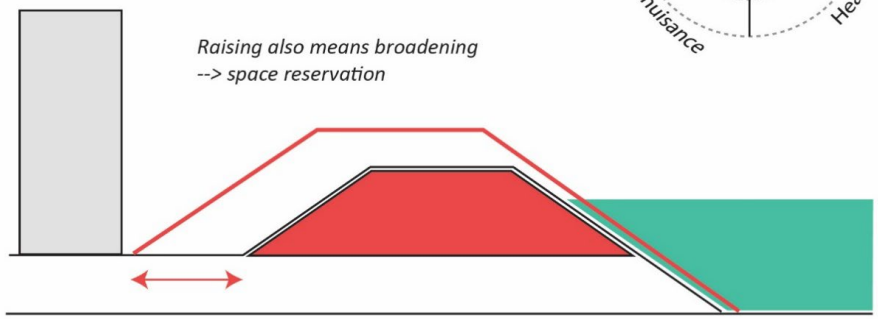
Design Layer: Flood Defences & Calamities

FLOOD DEFENCES & CALAMITIES

F3. DIKE



Raising also means broadening
--> space reservation



GENERAL		TIME			
Scale:	Region	**Realisation:**	2-4 years	**Payback period:**	>20 years
Type:	Robust	**Monitoring:**	periodic		

ORGANISATION

Investment costs: High (+)

Actors: public private civil local regional national

Sectors: water management spatial planning

Collaborations

Public — Public-private — Private

Decentral — Central

Sectoral — Integral

Policies

Public investment: Low — High

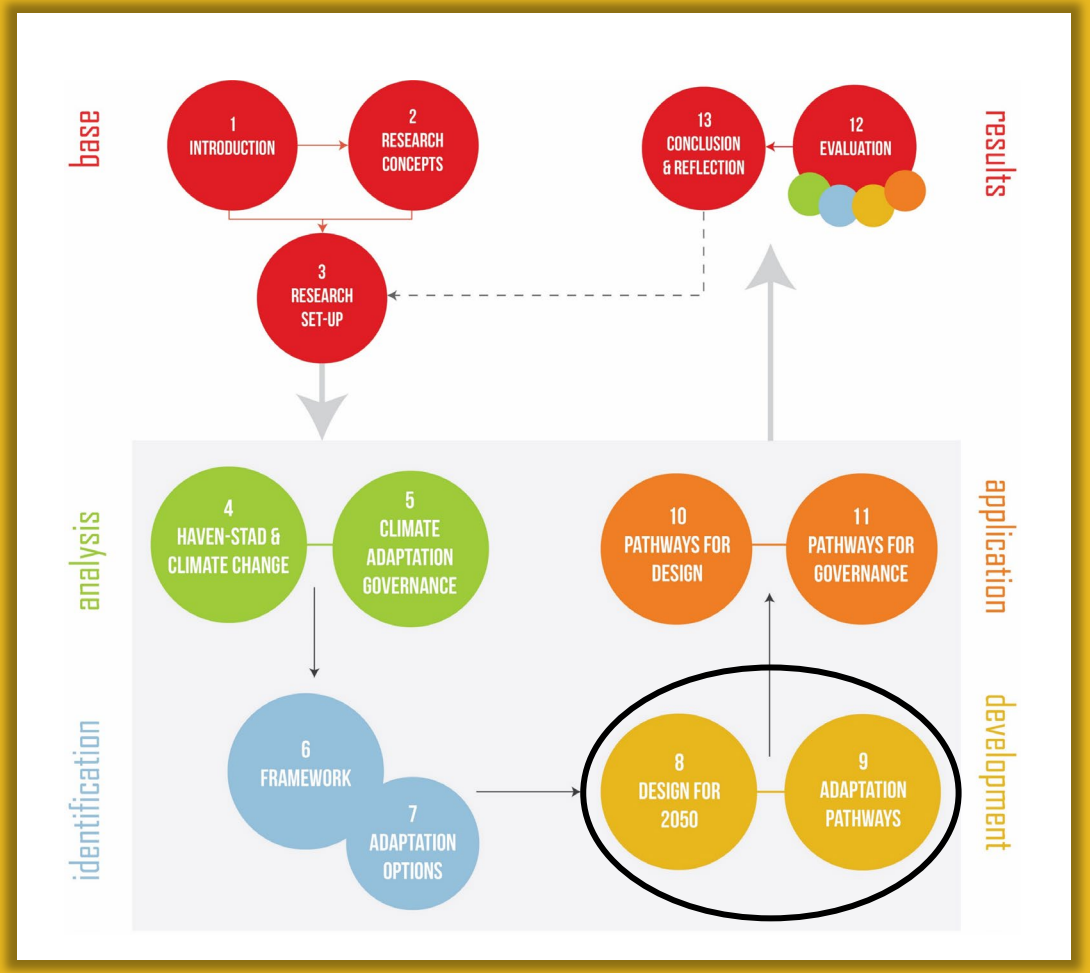
Private investment: Low — High

Regulations/agreements needed: Low — High

ADAPTATION PRINCIPLE(S):

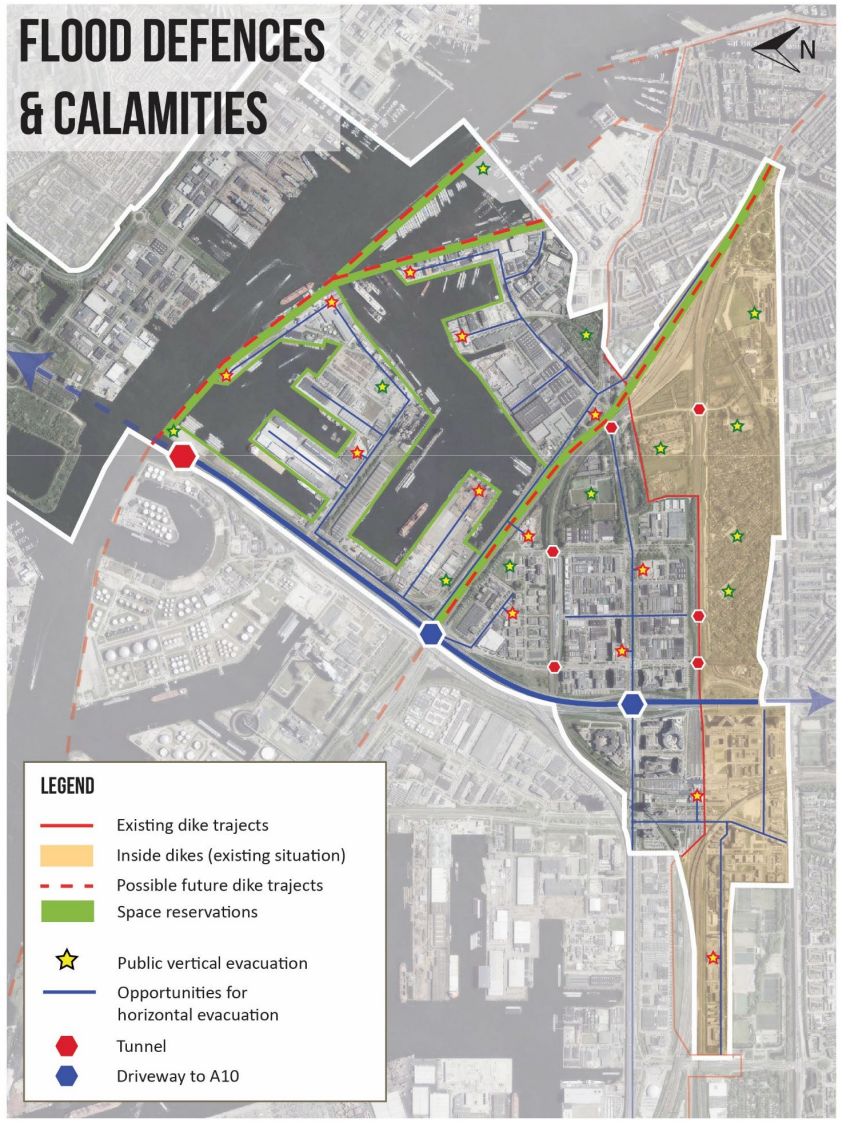
Principle: Protection

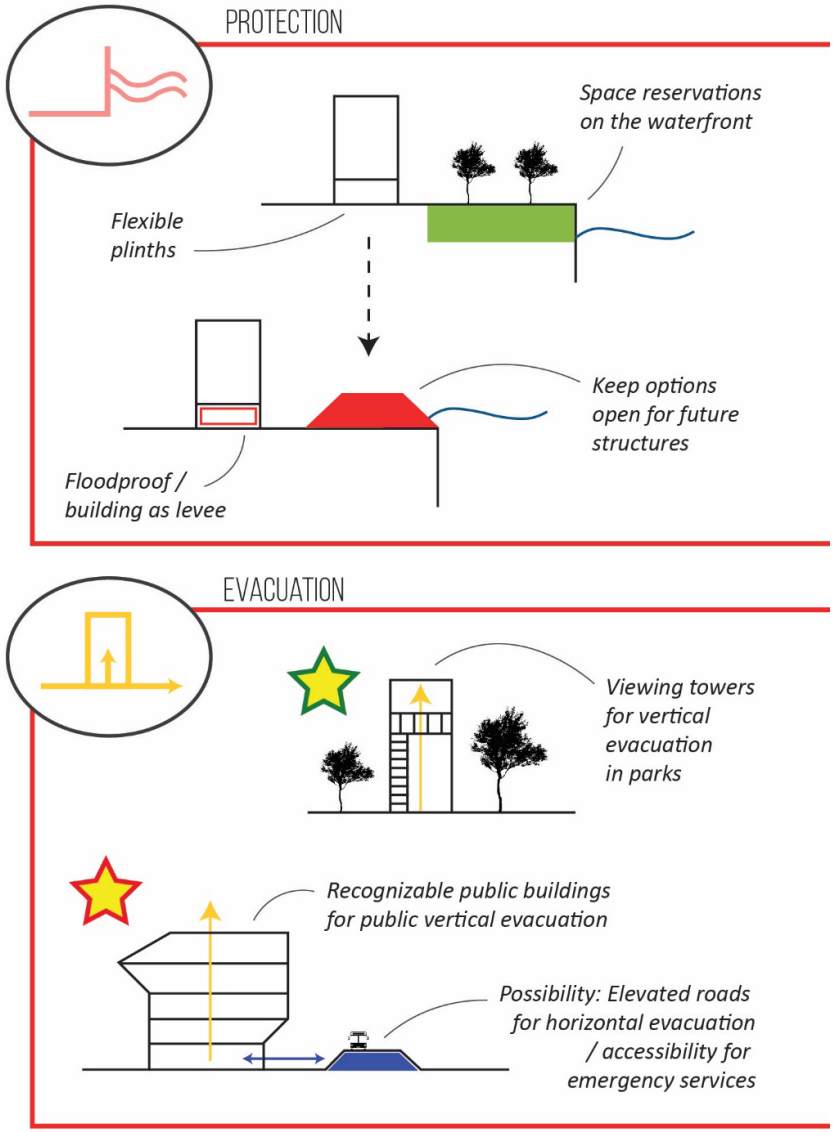
DEVELOPMENT



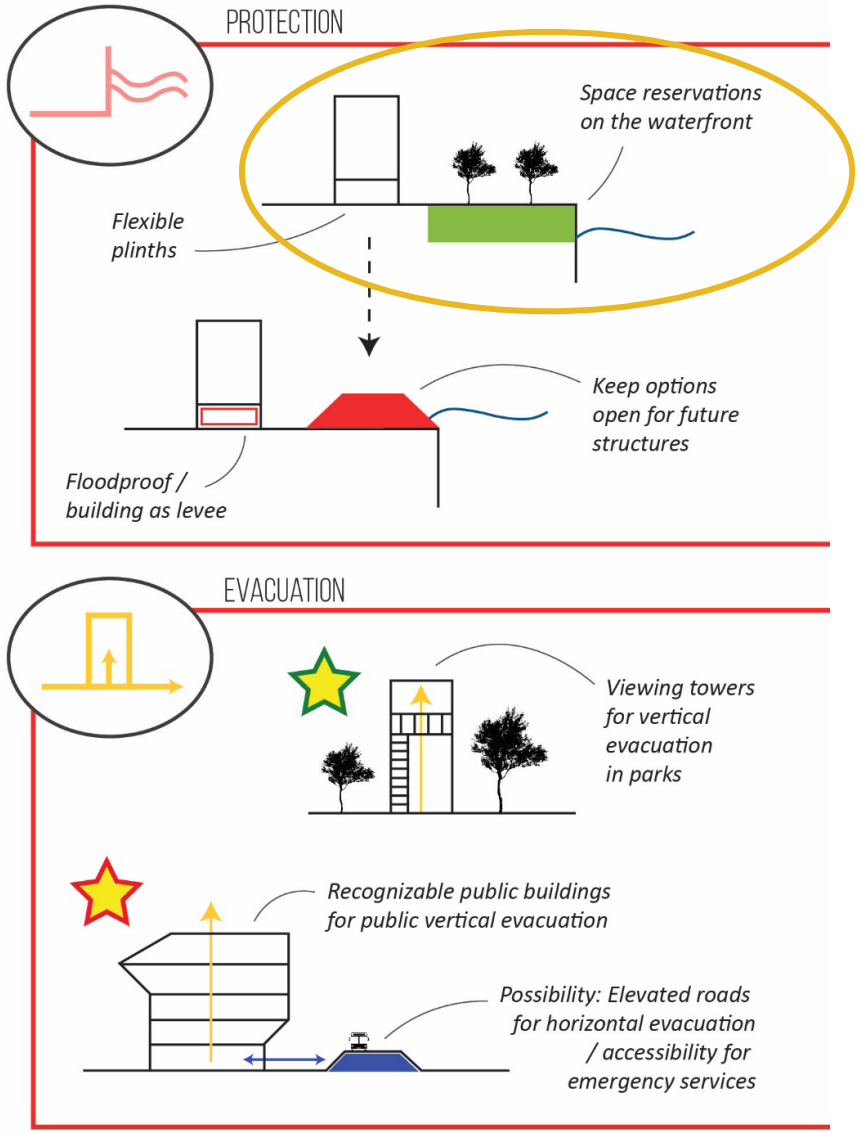
How can Spatial Adaptive Policy Pathways be developed for climate adaptation planning?

Exploration Space

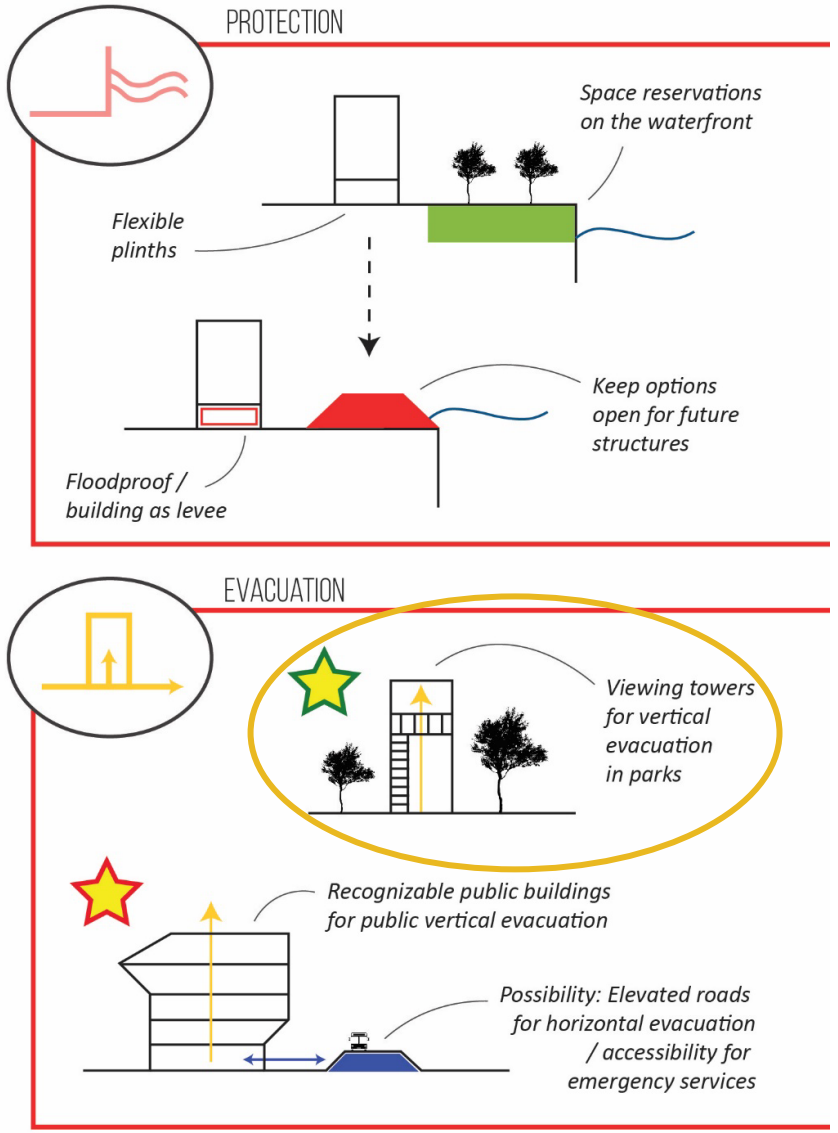




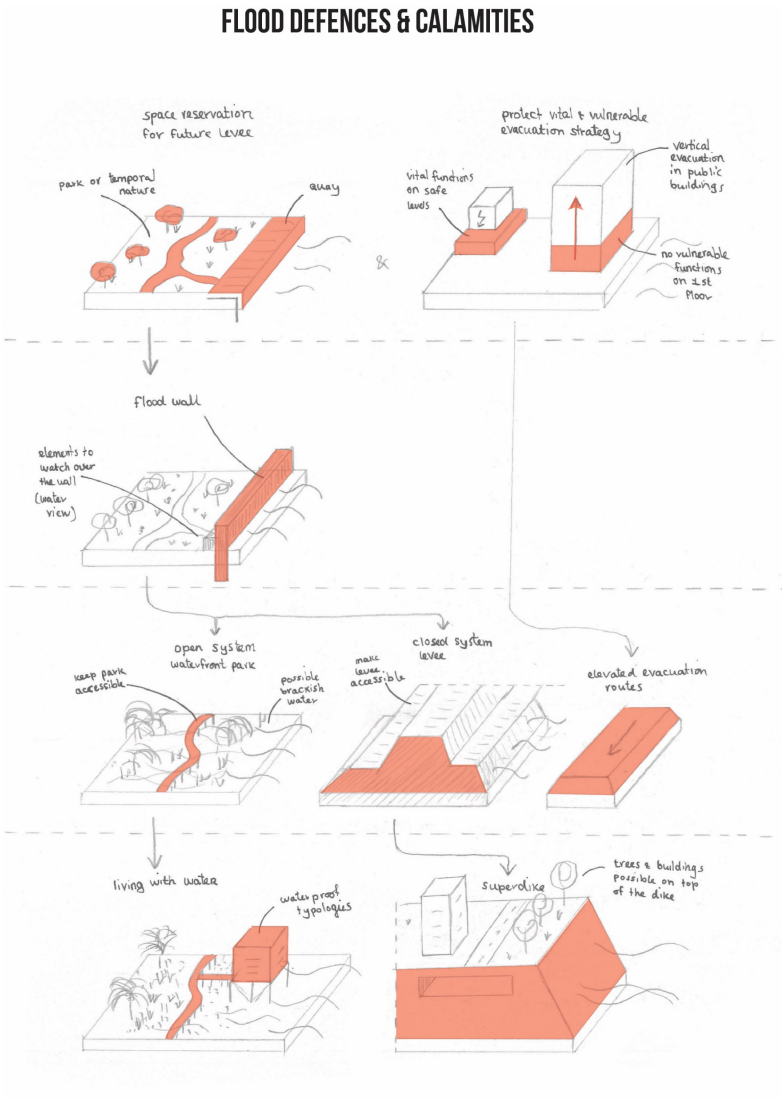
OKRA (2011)


PROTECTION
Space reservations
on the waterfront
Flexible
plinths
Keep options
open for future
structures
Floodproof /
building as levee
EVACUATION
Viewing towers
for vertical
evacuation
in parks
Recognizable public buildings
for public vertical evacuation
Possibility: Elevated roads
for horizontal evacuation
/ accessibility for
emergency services

Visit Zuid-Limburg (2021)



Conceptual Pathways



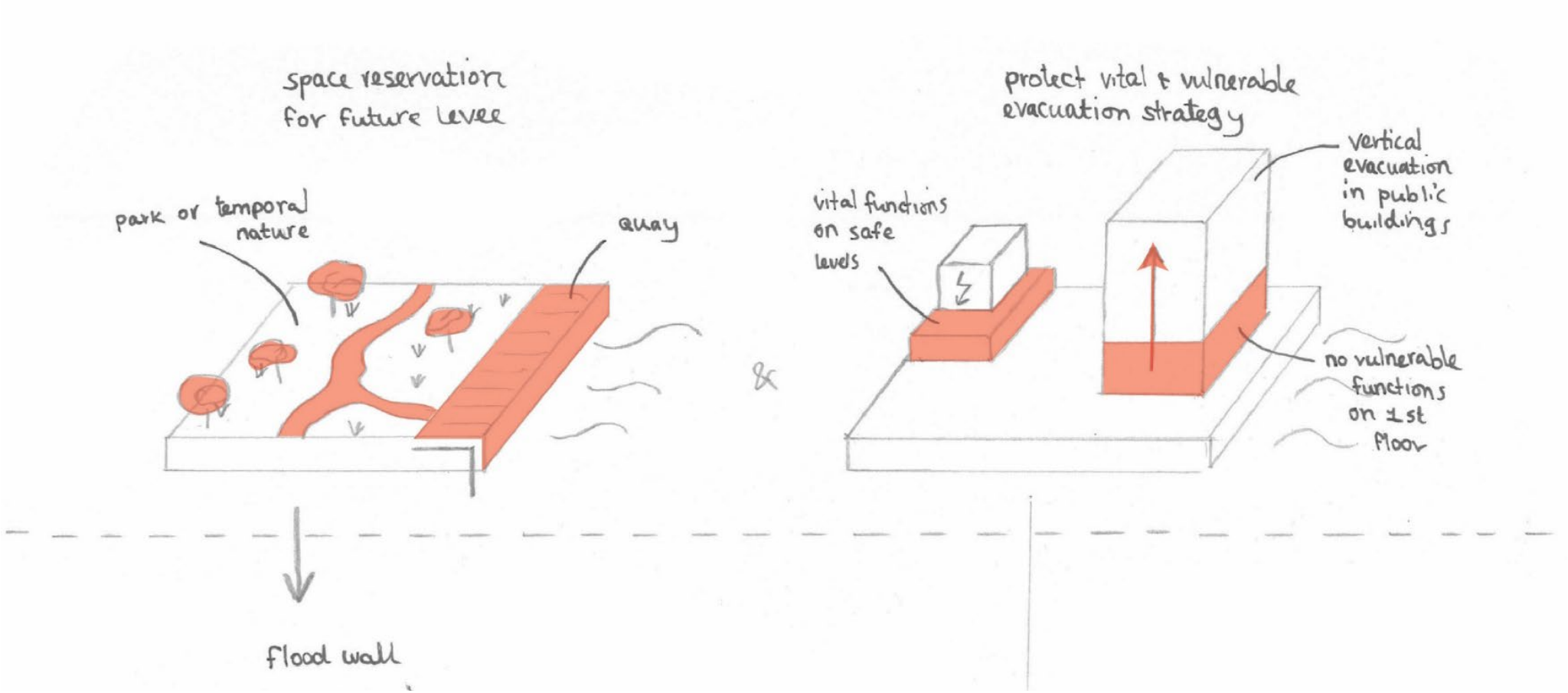
Start phase

Incremental phase

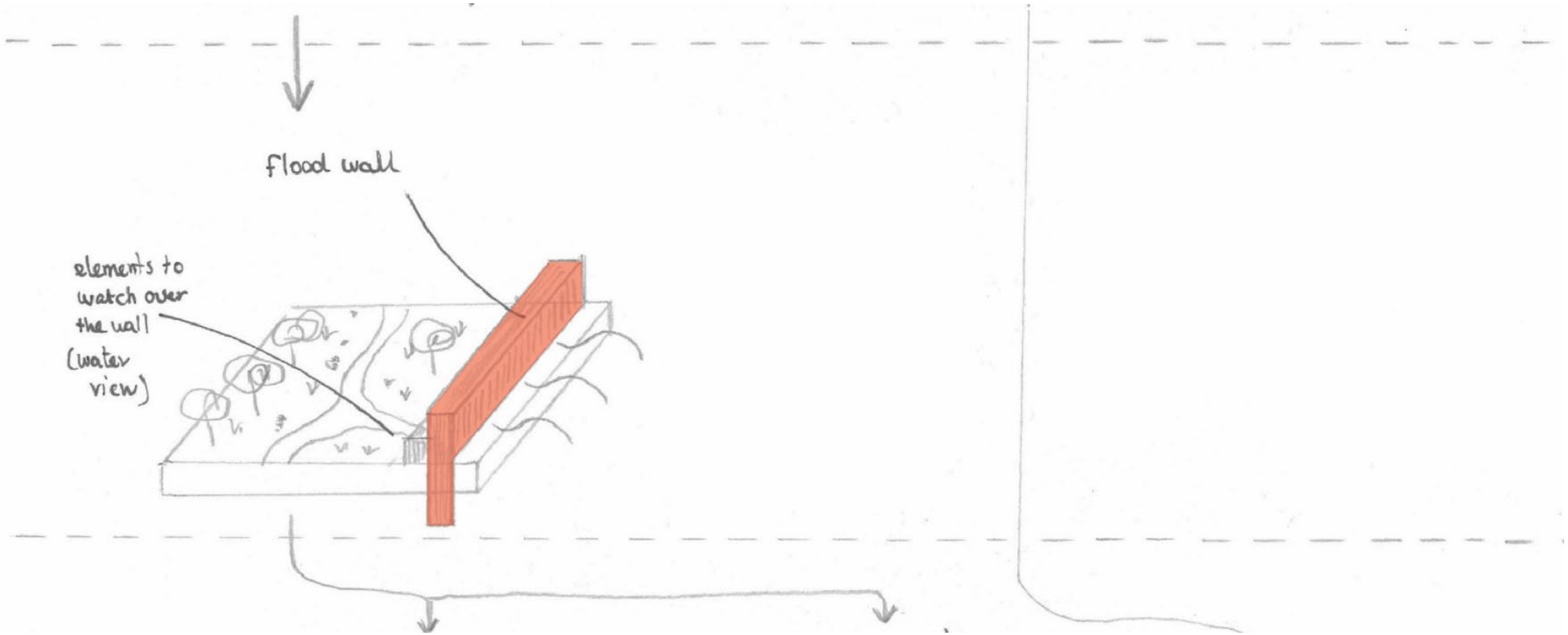
Transition phase

Transformation phase

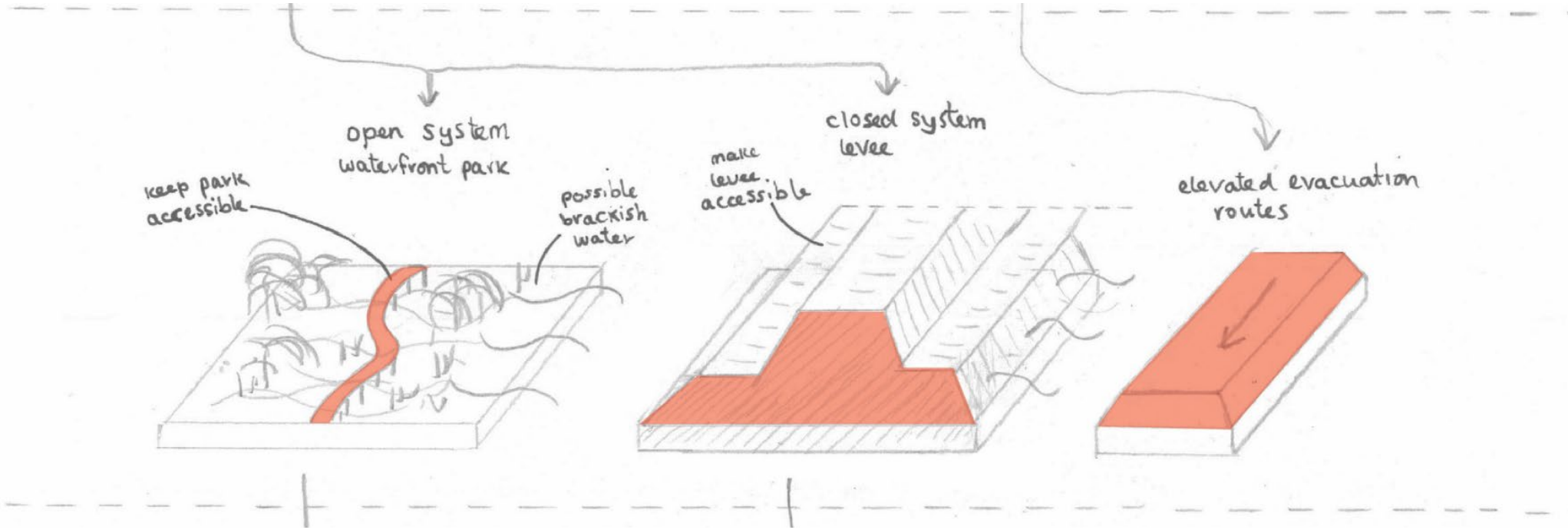
Start phase


space reservation
for future levee
park or temporal nature
quay
flood wall
&
protect vital & vulnerable
evacuation strategy
vital functions on safe levels
vertical evacuation in public buildings
no vulnerable functions on 1st floor

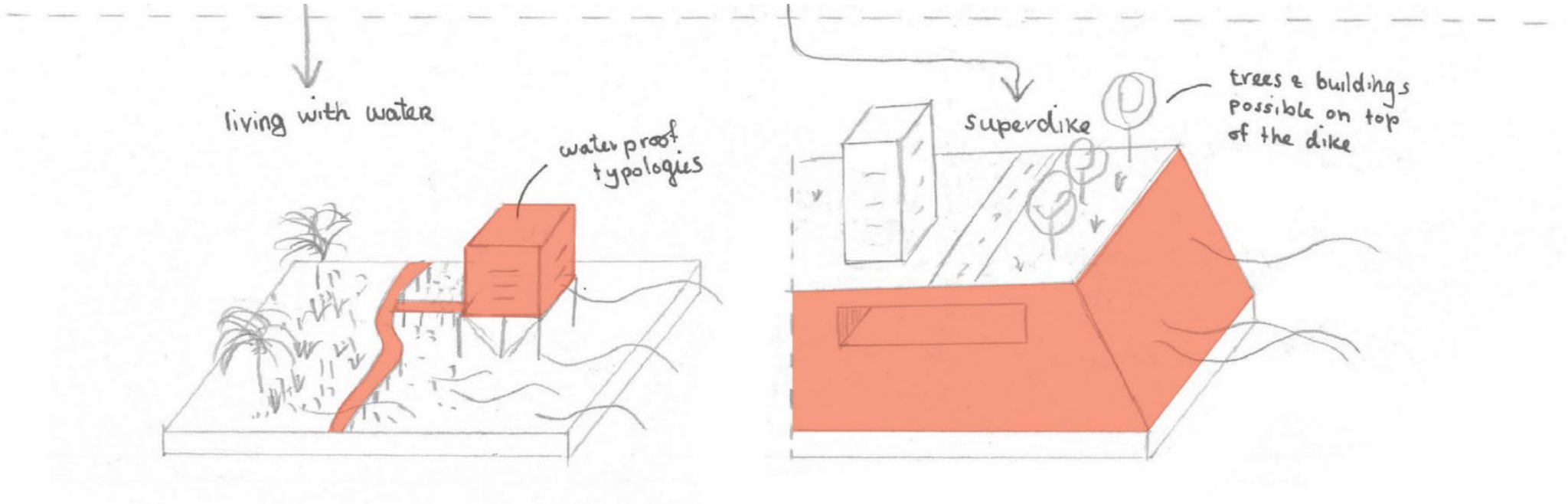
Incremental phase



Transition phase



Transformation phase



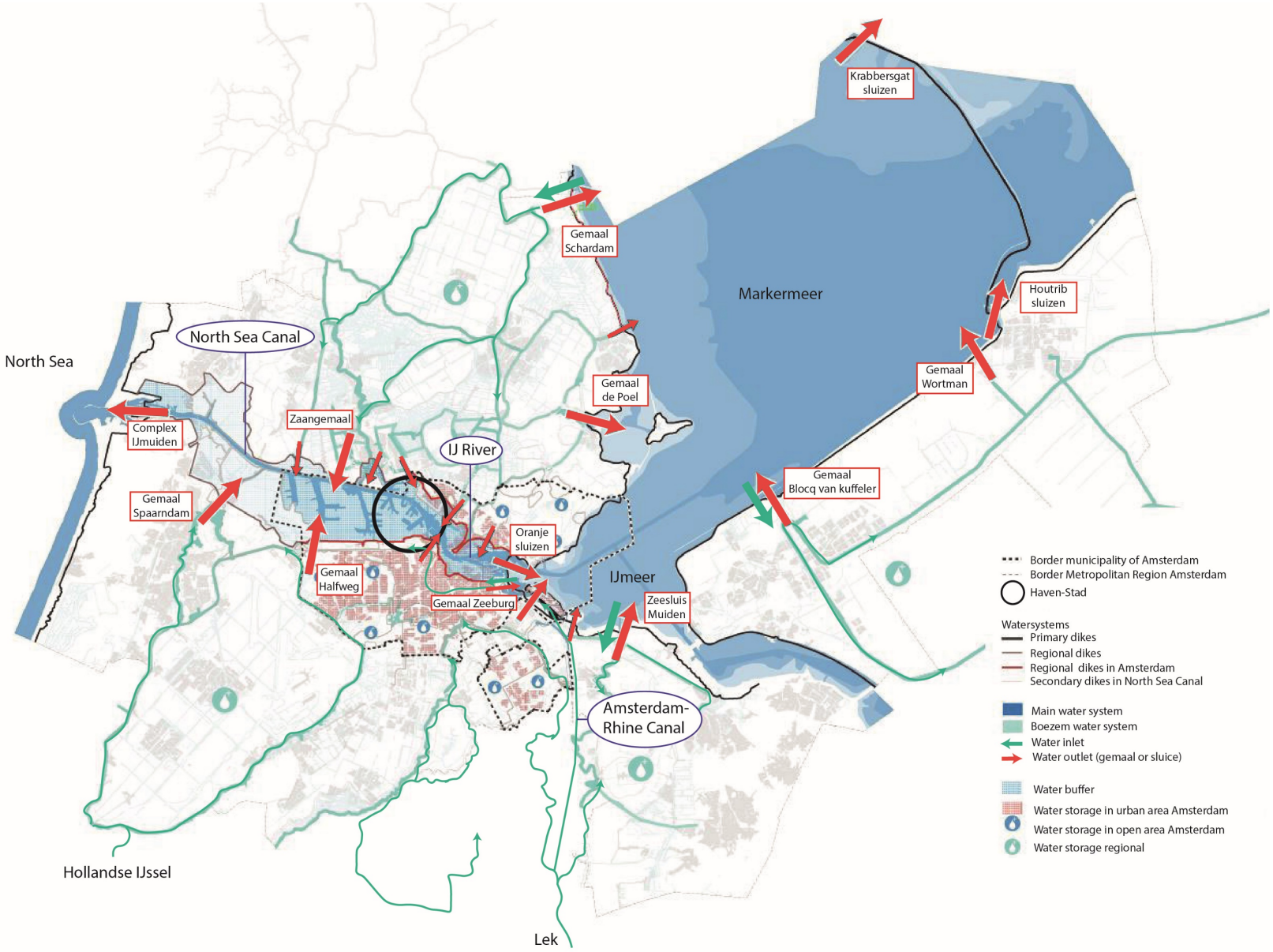
FLUVIAL FLOODING

HARBORS

COENHAVEN WATERFRONT

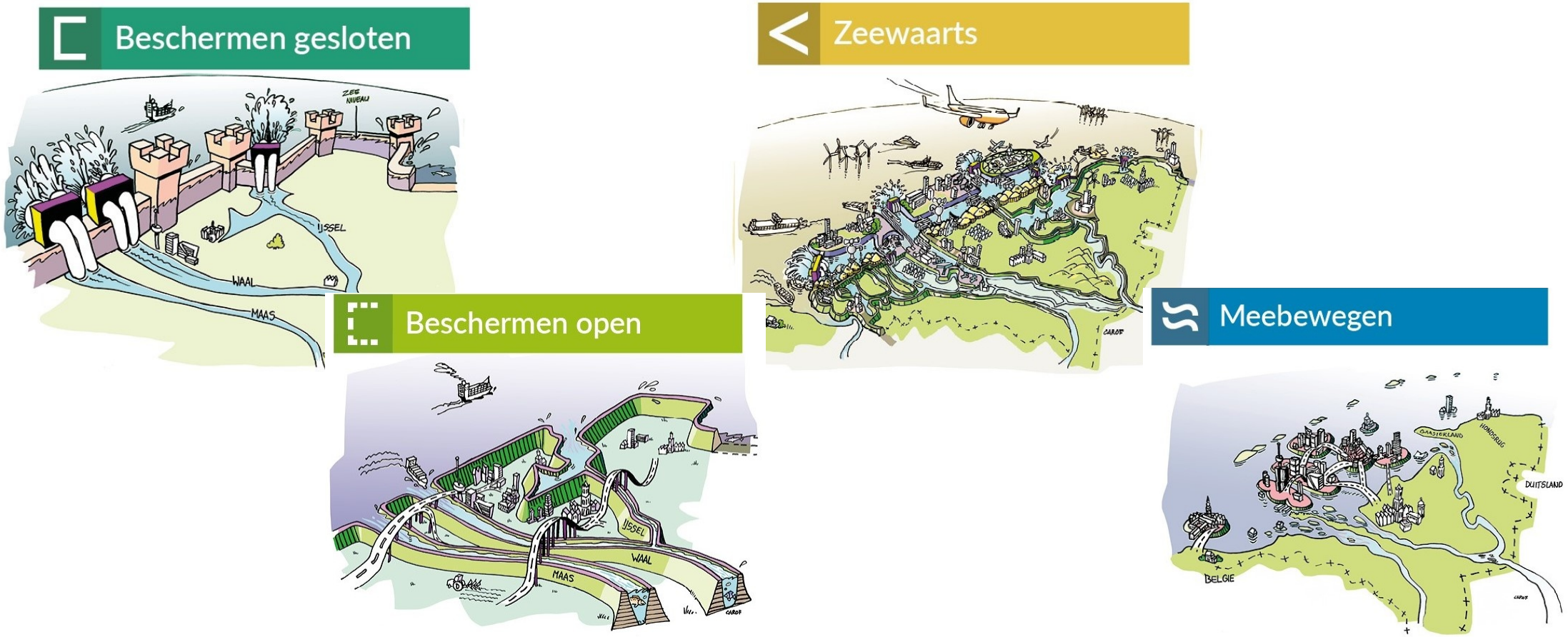
Gemeente Amsterdam (n.d.)

DEVELOPMENT



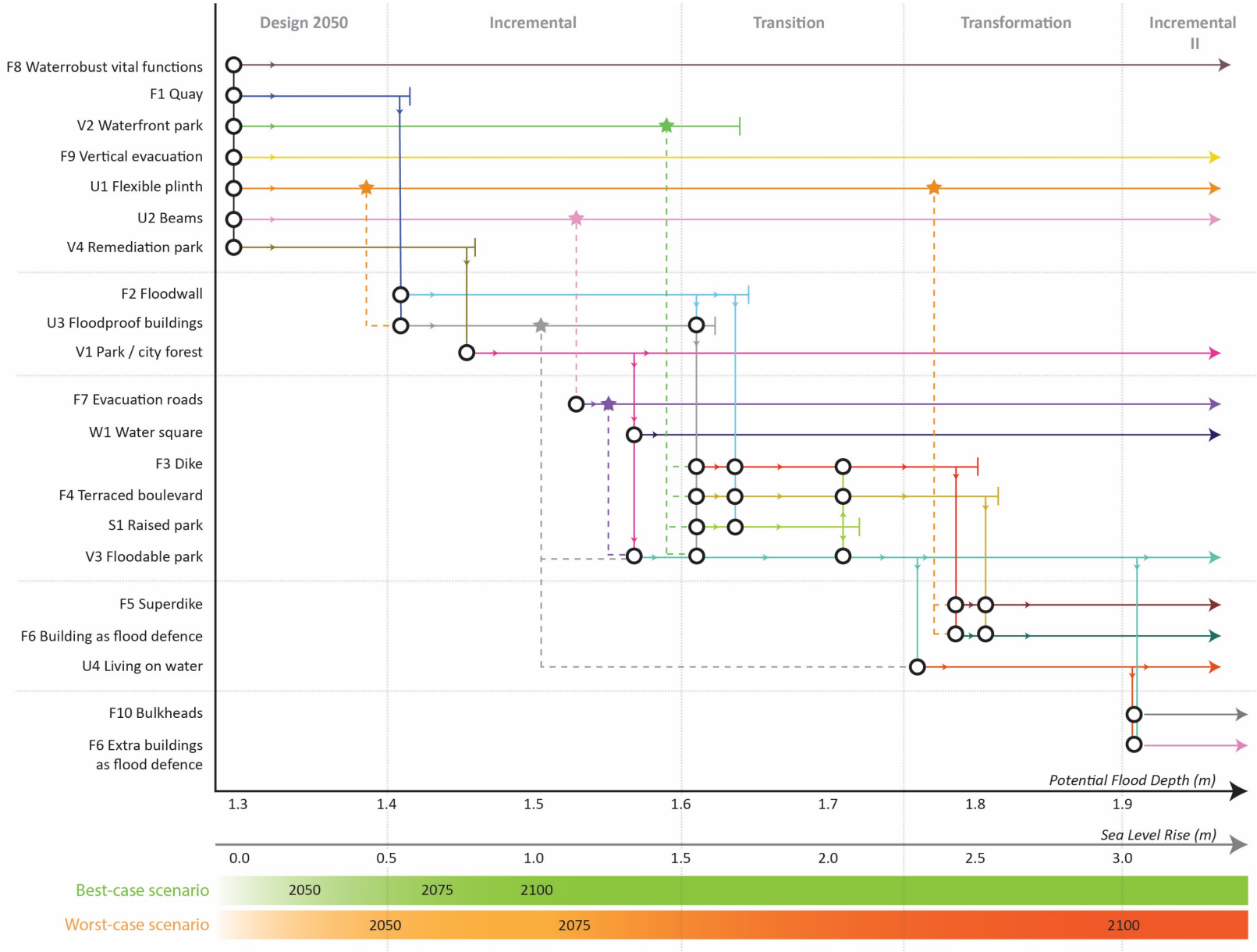
Adapted from: Defacto
Stedenbouw et al. (2020)

National Delta Strategy

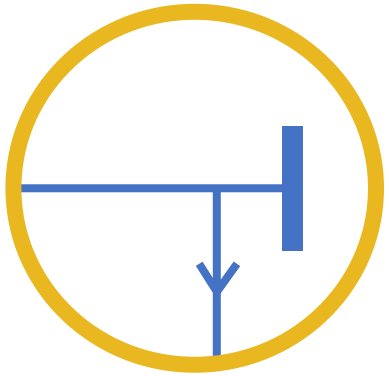


Haasnoot, Diermanse, Kwadijk, De Winter, & Winter (2019)

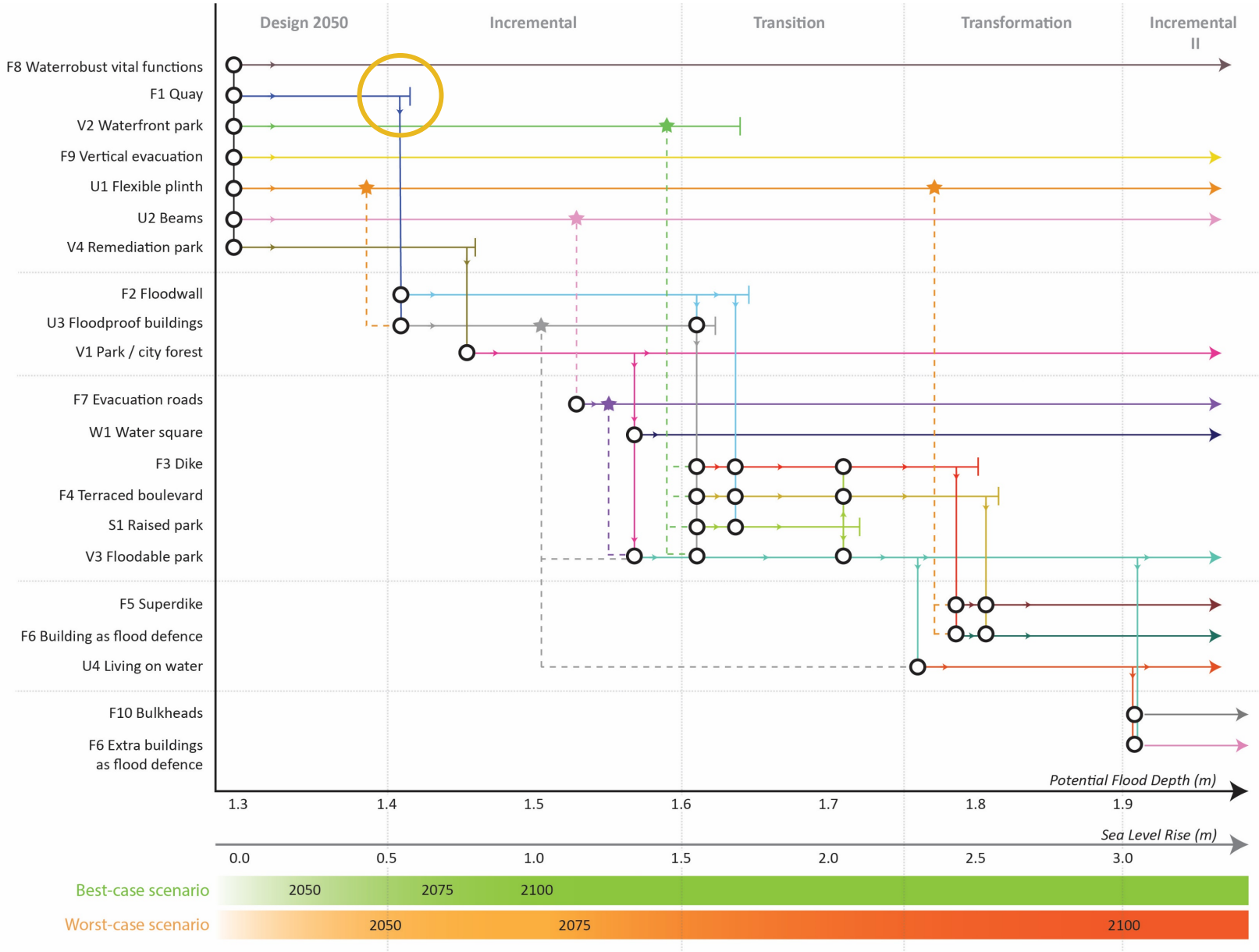
SAPP Map
Coenhaven



SAPP Map
Coenhaven



Tipping point
Quay



SAPP Map
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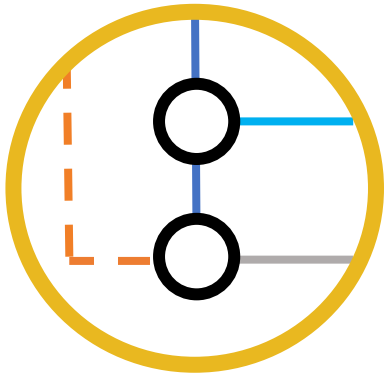
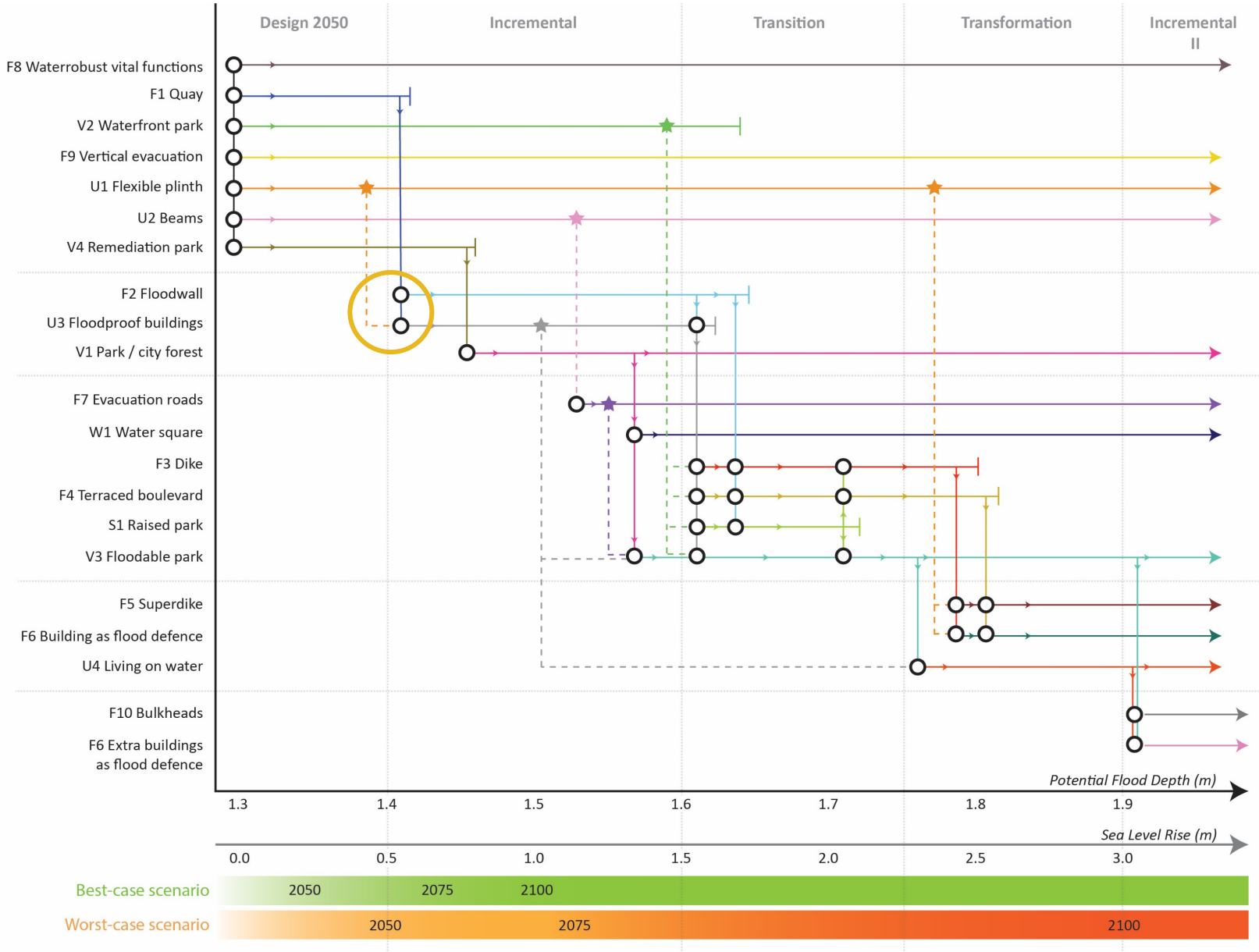
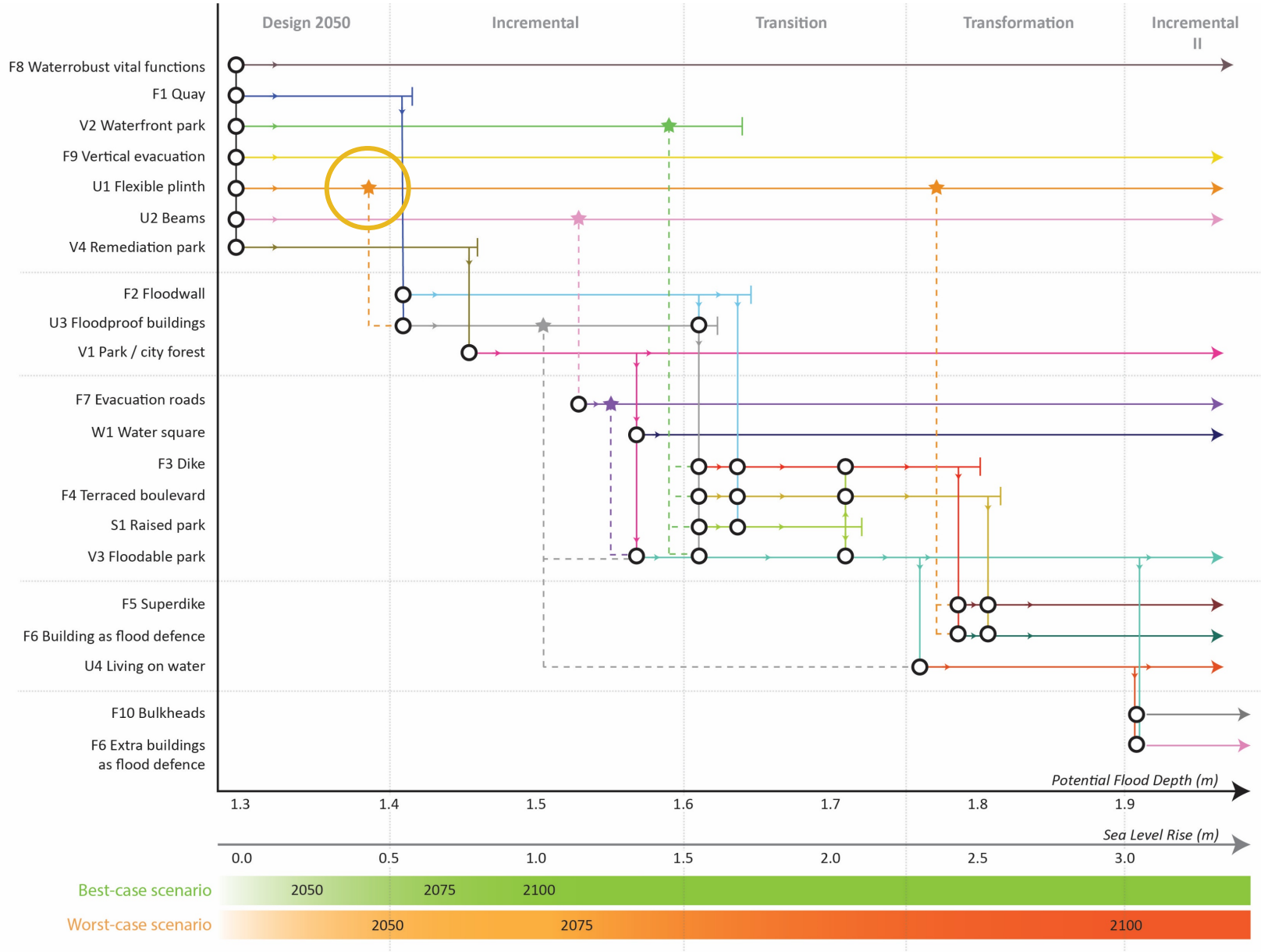


Floodwall or Floodproof buildings

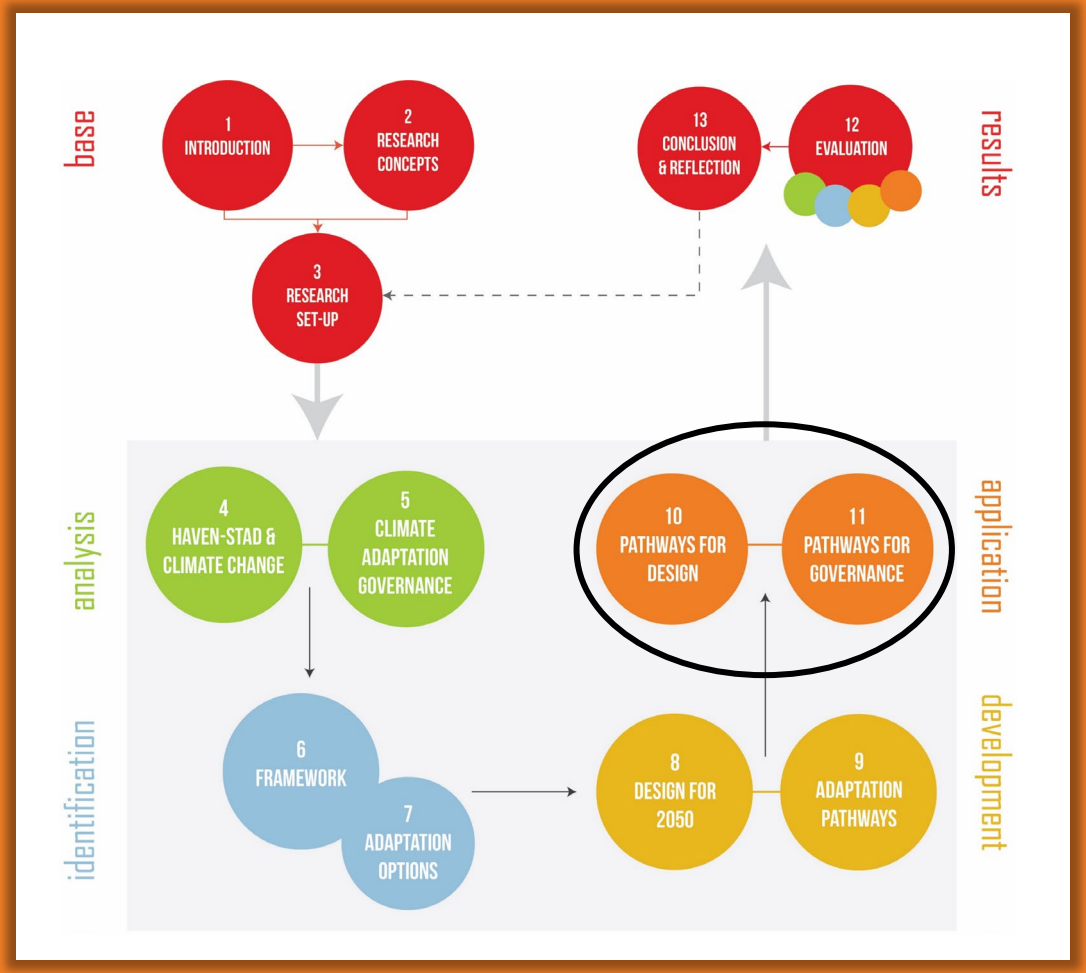


SAPP Map
Coenhaven

Requirement
Flexible plinth

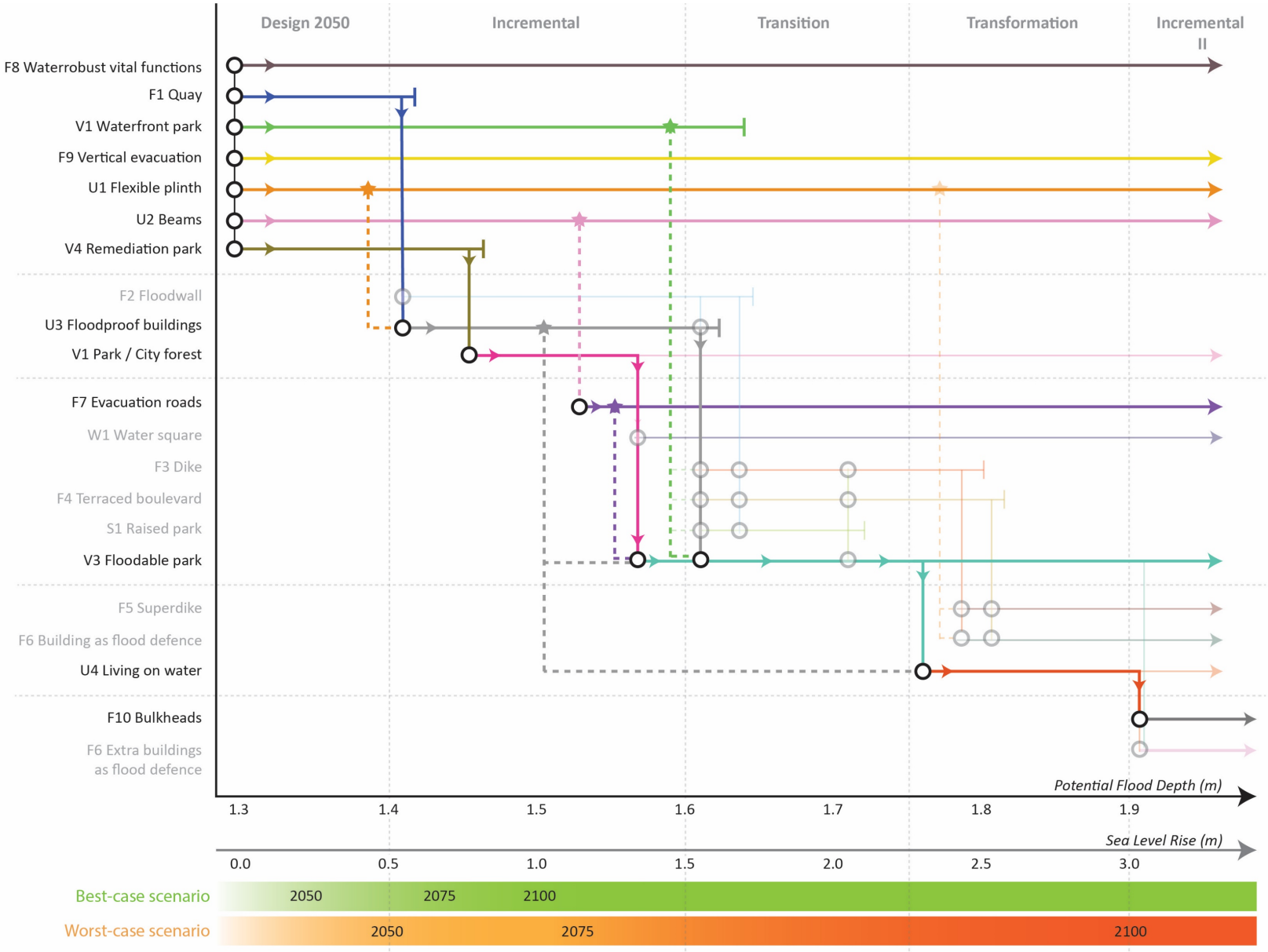


APPLICATION

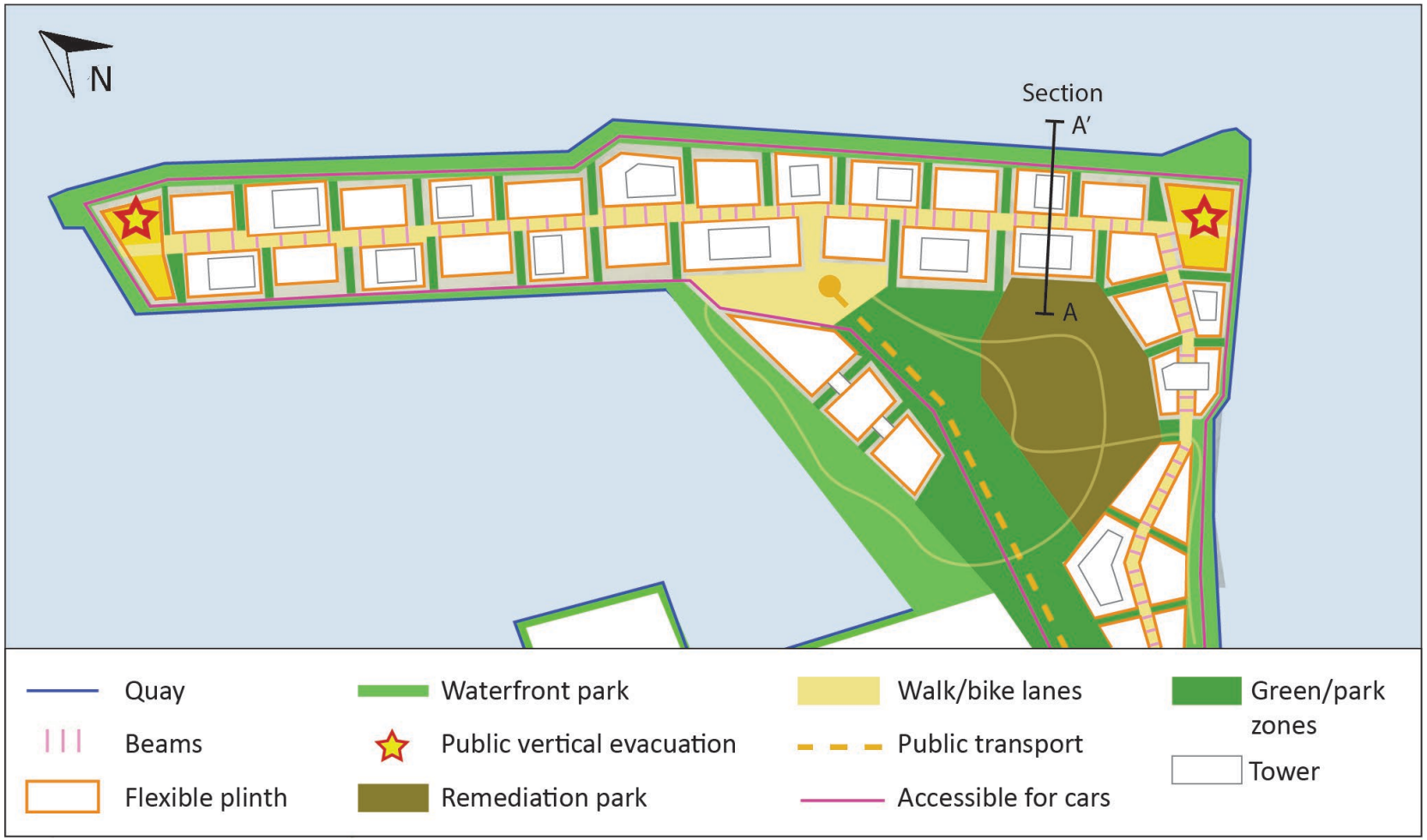


How can Spatial Adaptive Policy Pathways be used to support design and governance for climate adaptation planning?

‘Living with water’ future



Implementation in the Coenhaven



Design 2050

F8 Waterrobust vital functions

F1 Quay

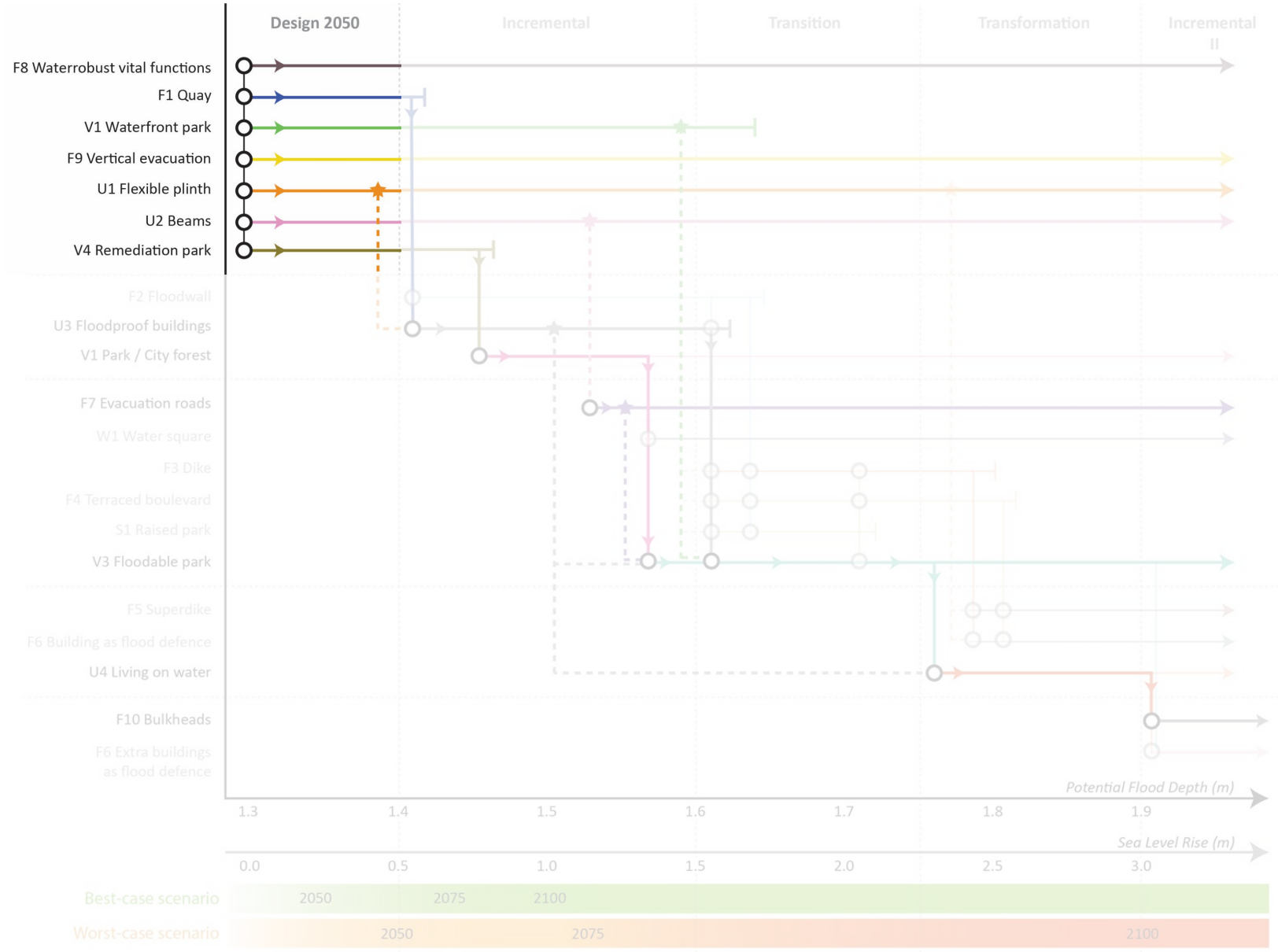
V1 Waterfront park

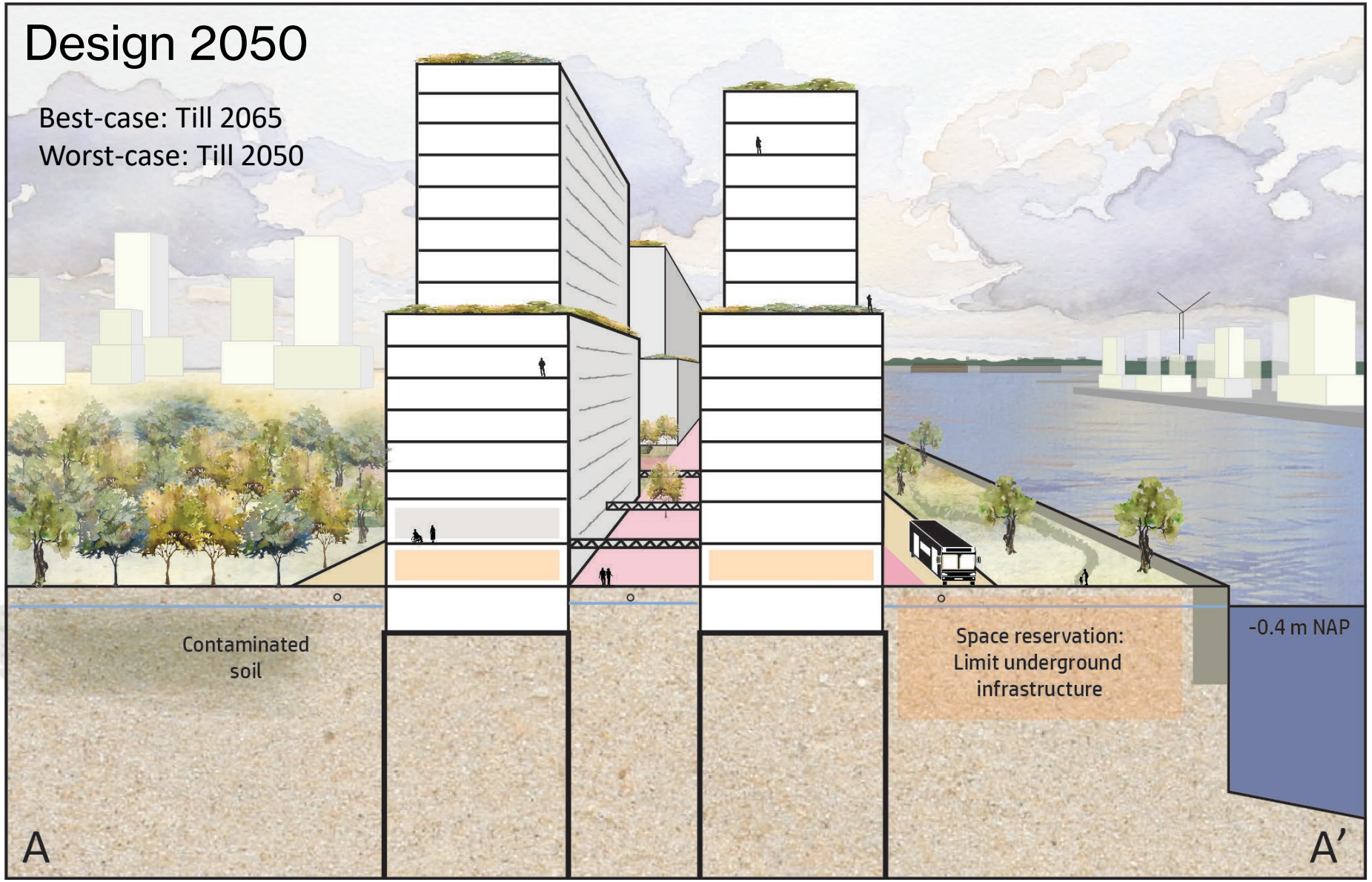
F9 Vertical evacuation

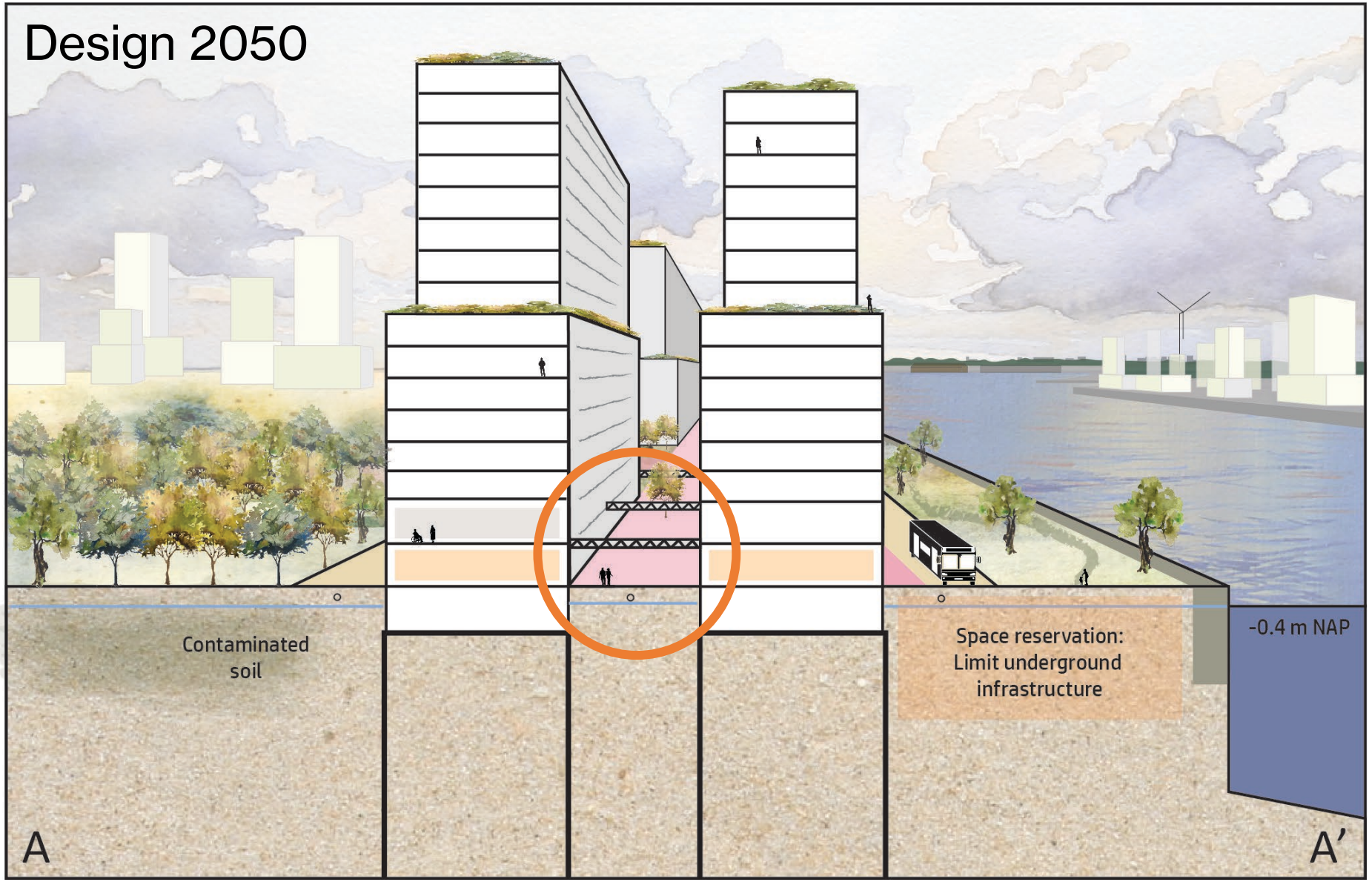
U1 Flexible plinth

U2 Beams

V4 Remediation park




Design 2050
Best-case: Till 2065
Worst-case: Till 2050
Contaminated soil
Space reservation: Limit underground infrastructure
-0.4 m NAP
A
A'


Design 2050
Contaminated soil
Space reservation: Limit underground infrastructure
-0.4 m NAP
A
A'

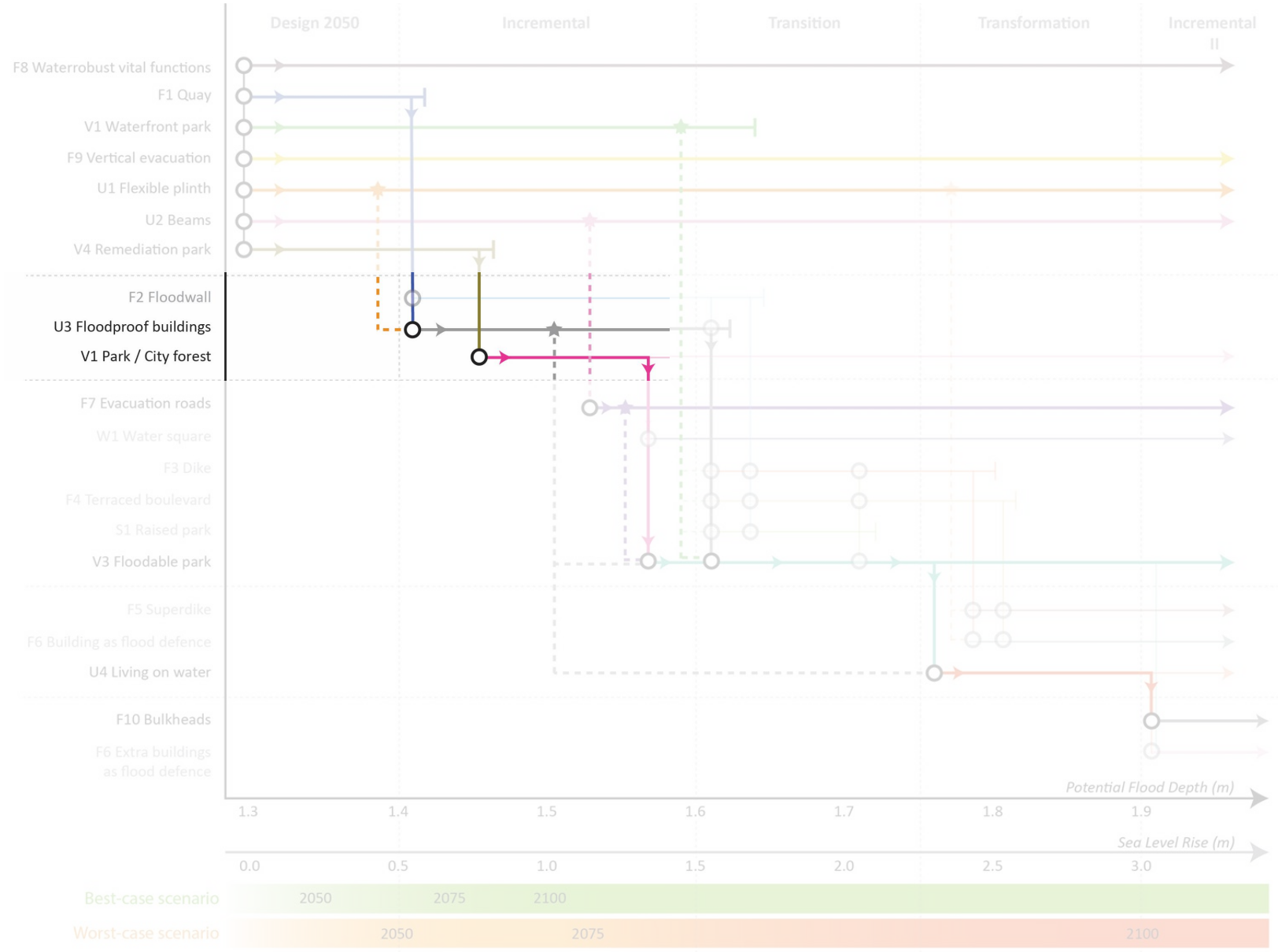
Design 2050

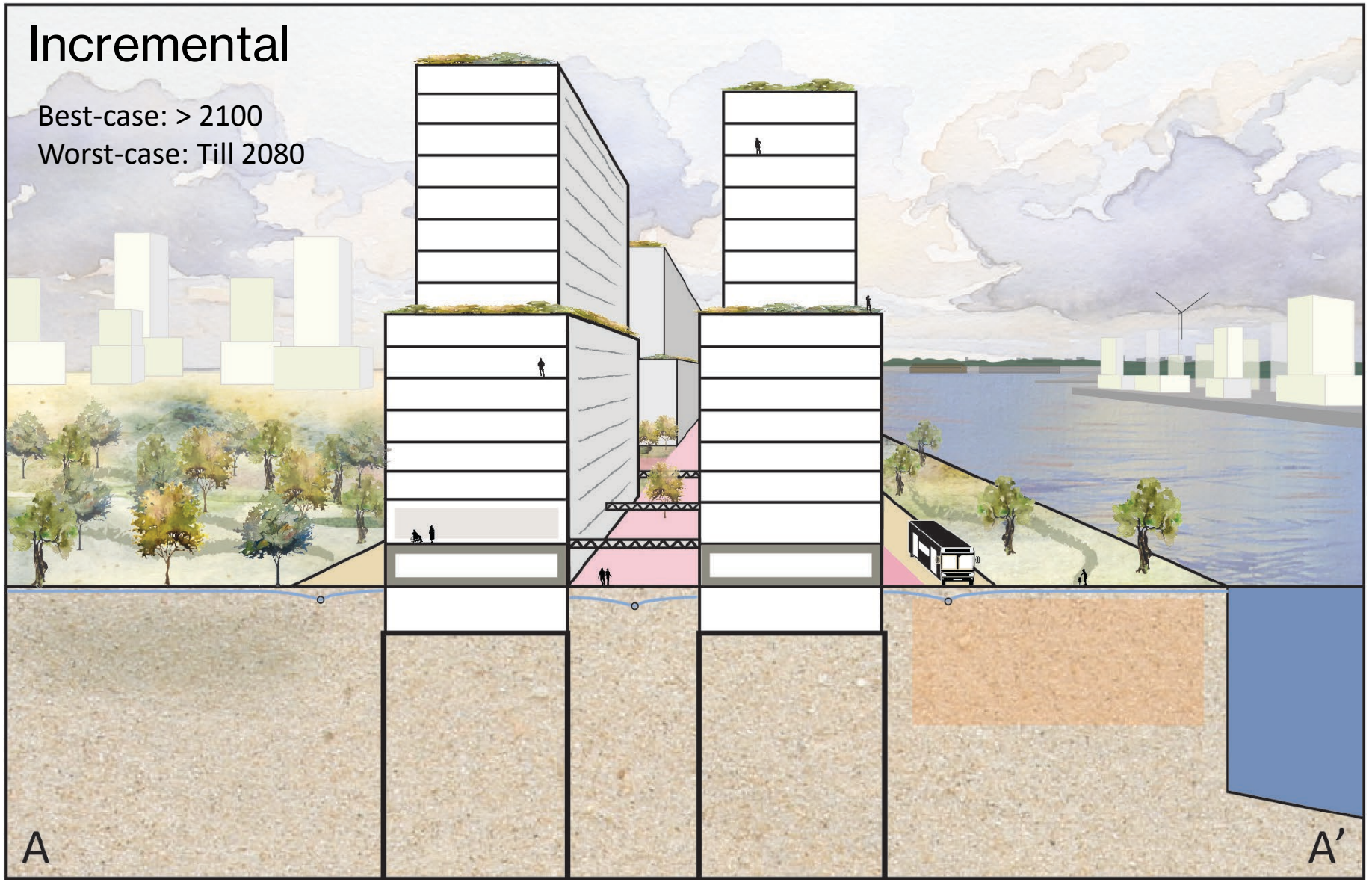
Incremental

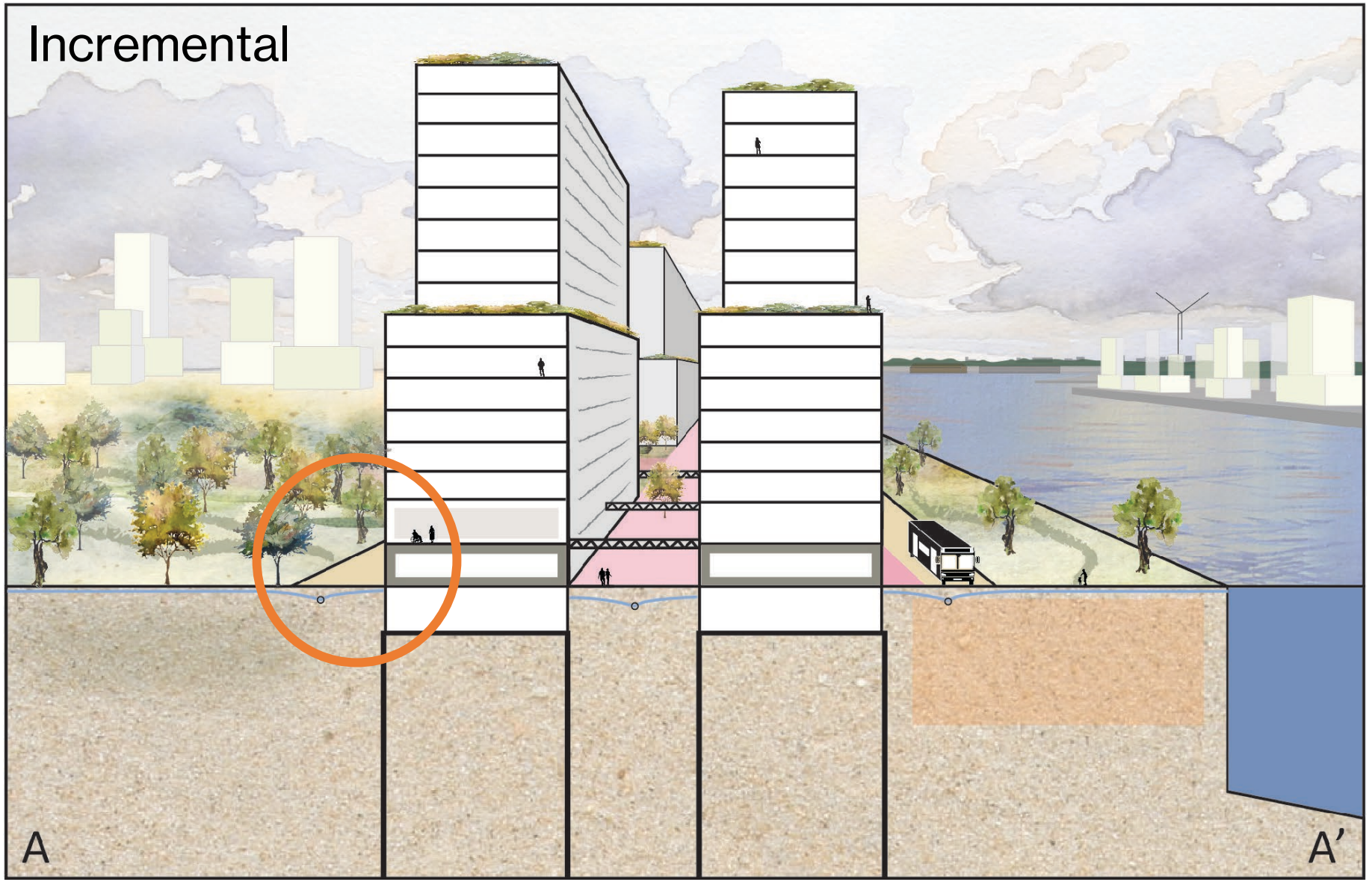
F2 Floodwall

U3 Floodproof buildings

V1 Park / City forest




Incremental
Best-case: > 2100
Worst-case: Till 2080
A
A’


Incremental
A
A’

Incremental

Transition

F7 Evacuation roads

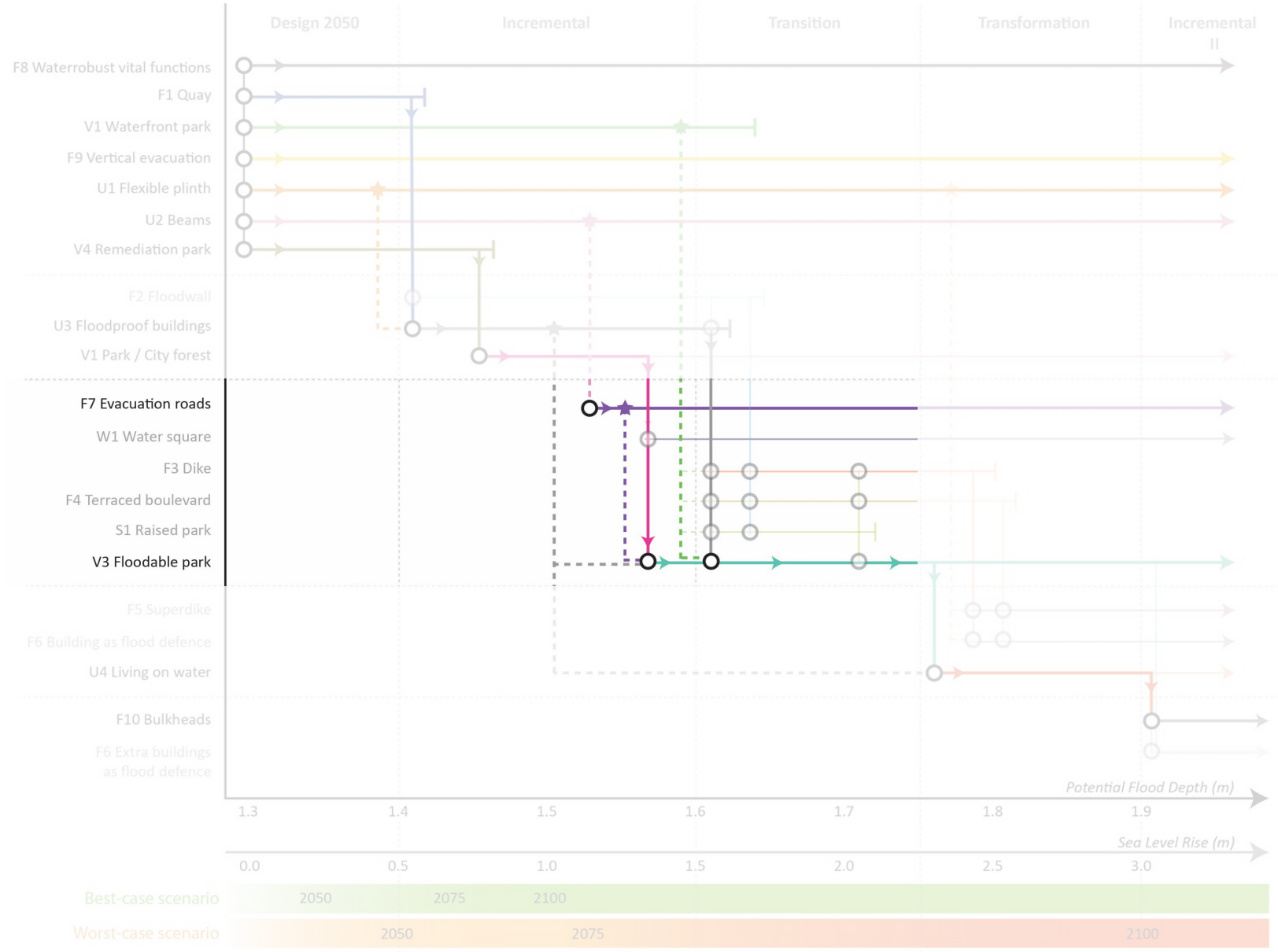
W1 Water square

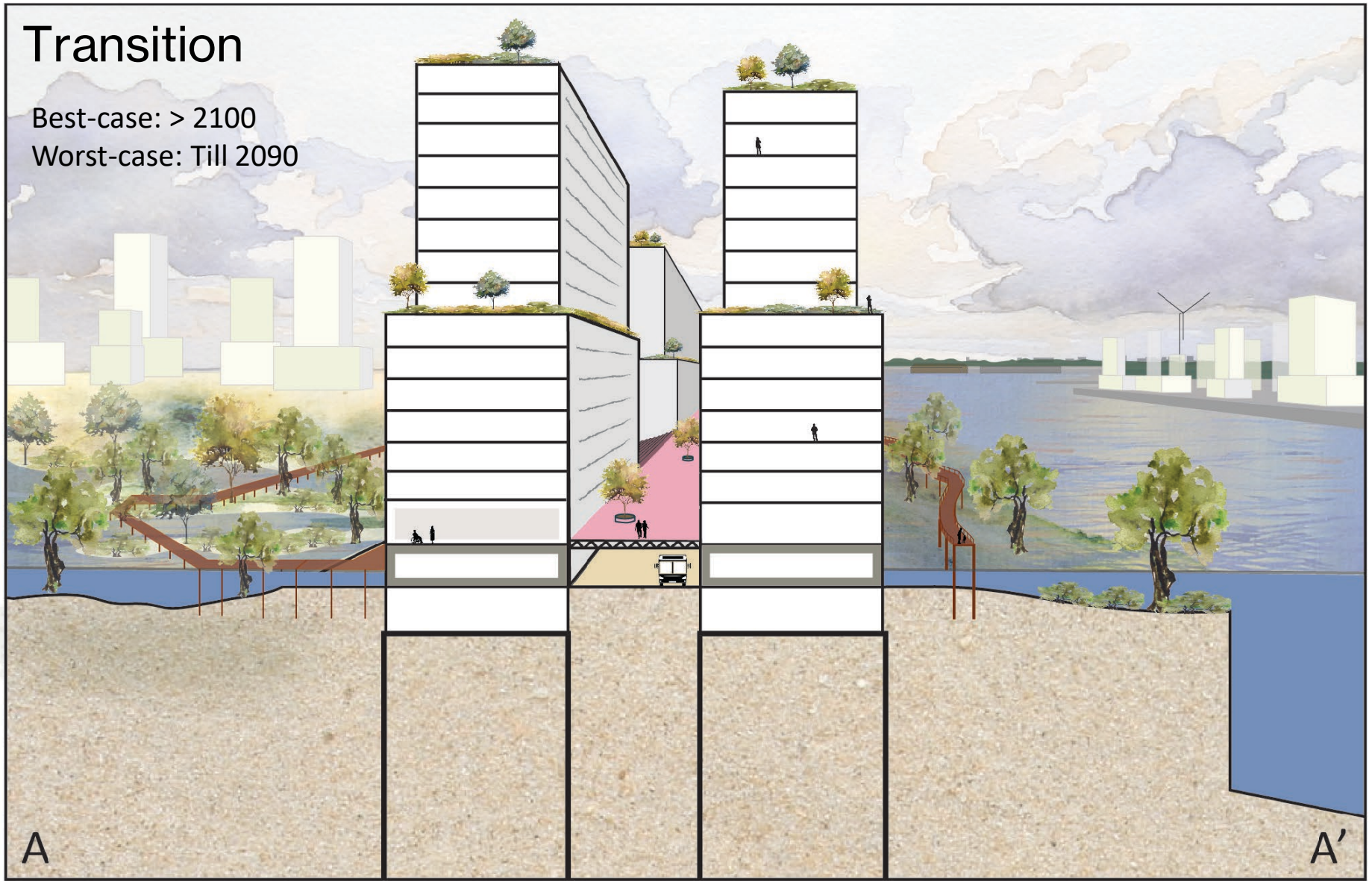
F3 Dike

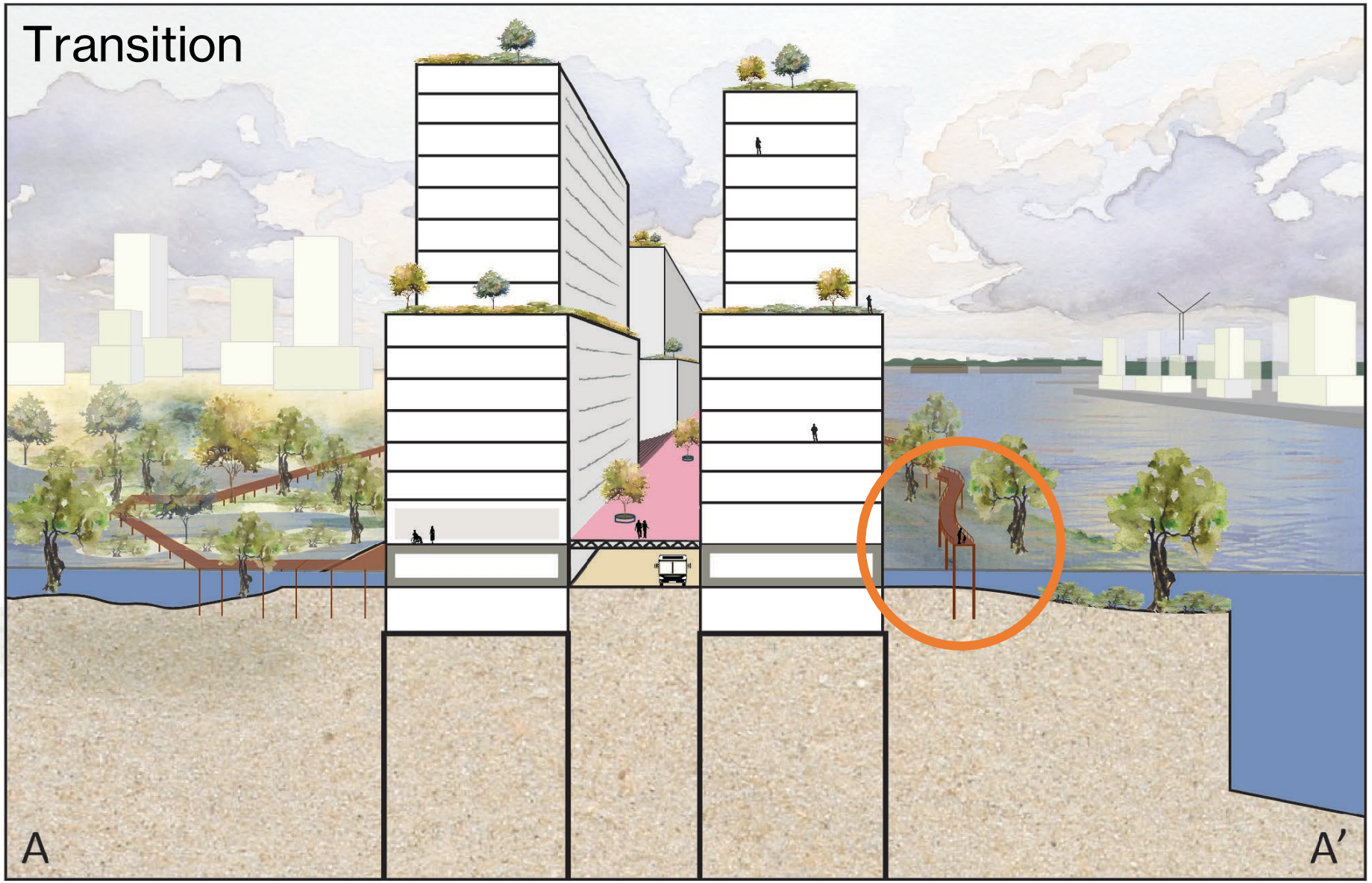
F4 Terraced boulevard

S1 Raised park

V3 Floodable park




Transition
Best-case: > 2100
Worst-case: Till 2090
A
A’


Transition
A
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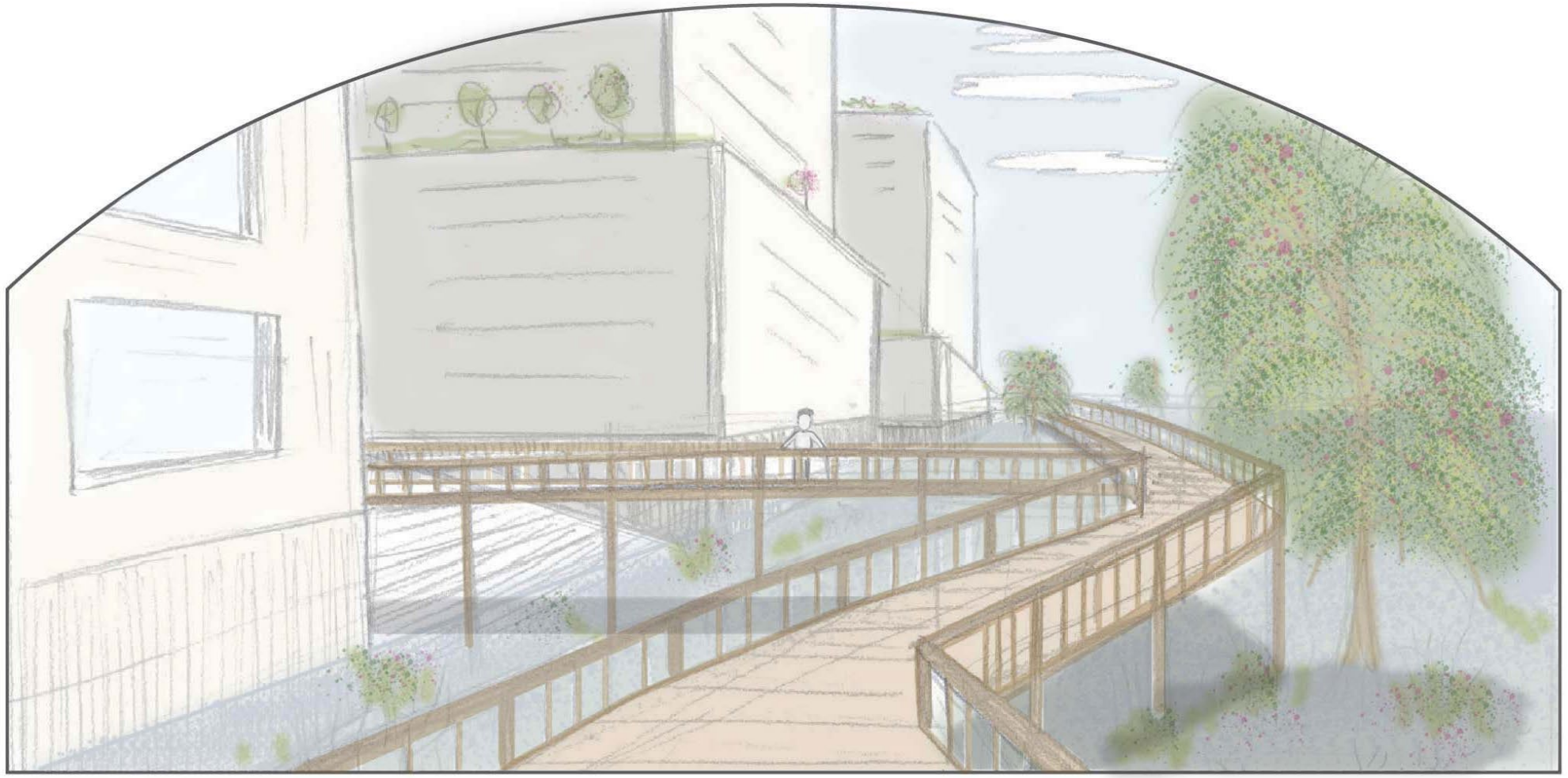
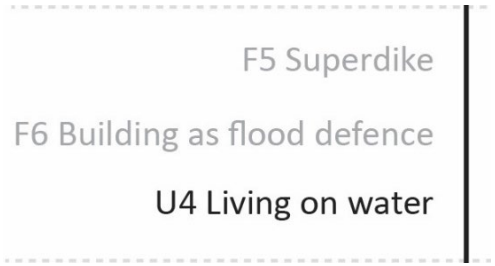
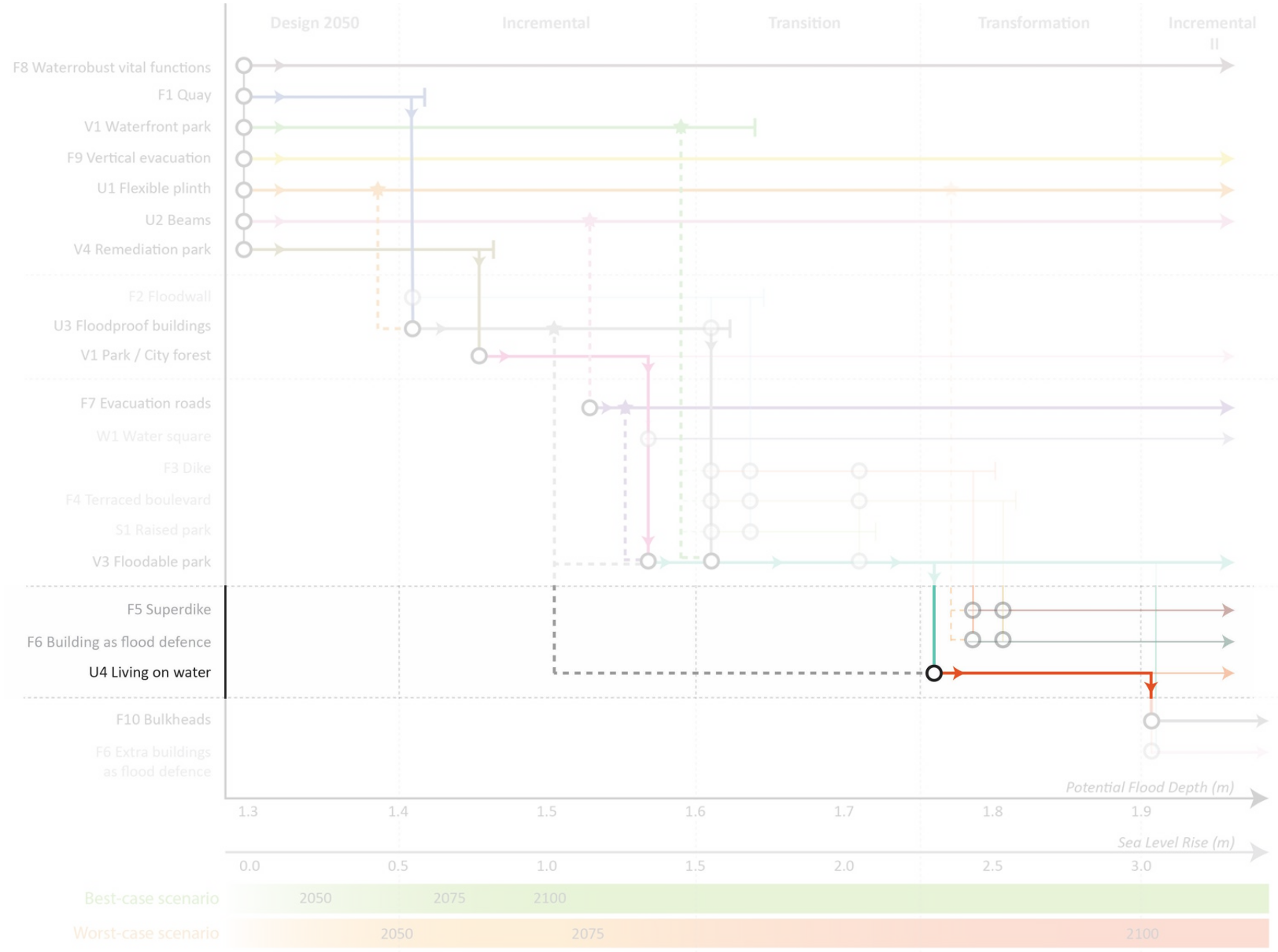
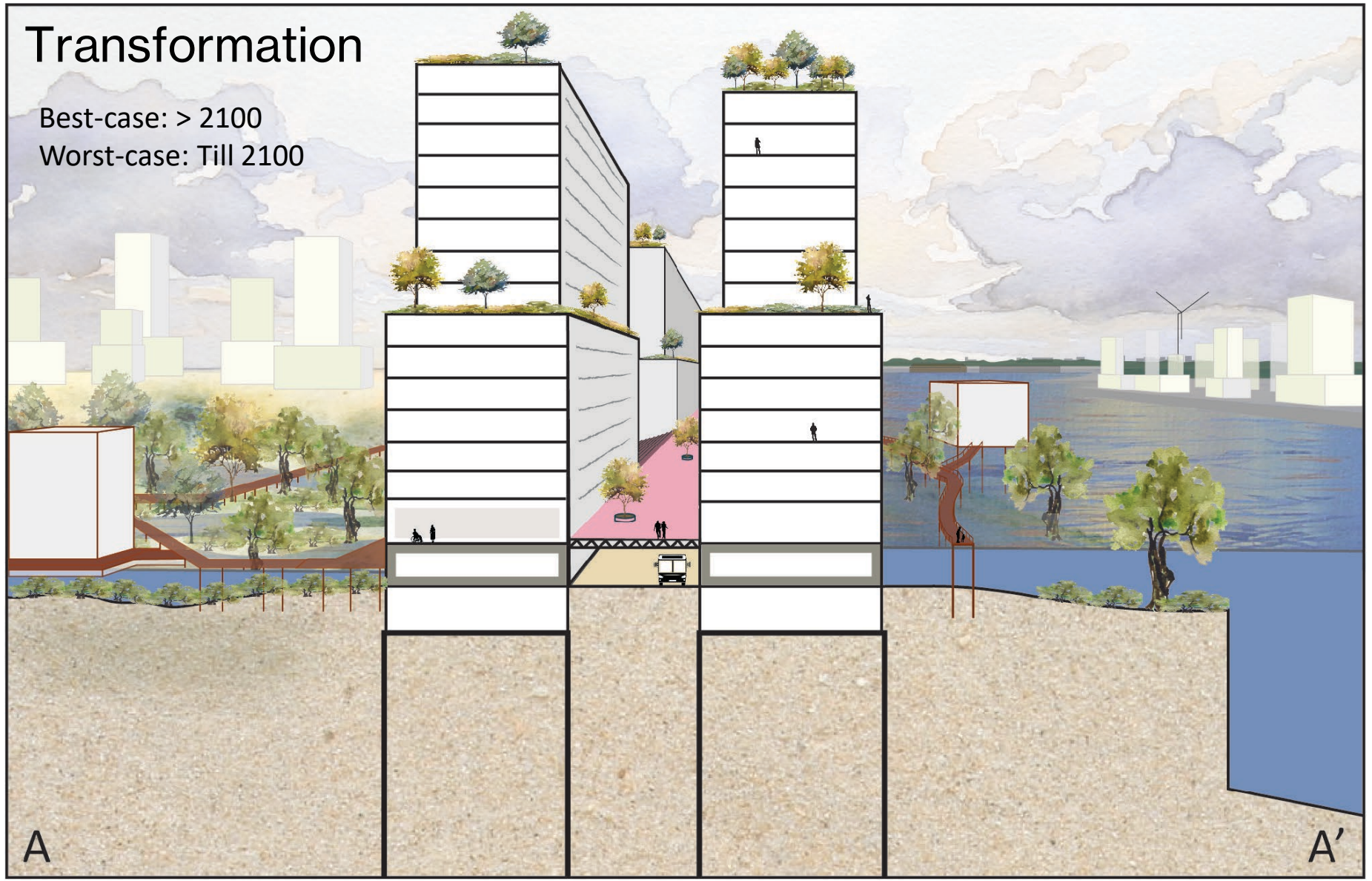
Transition

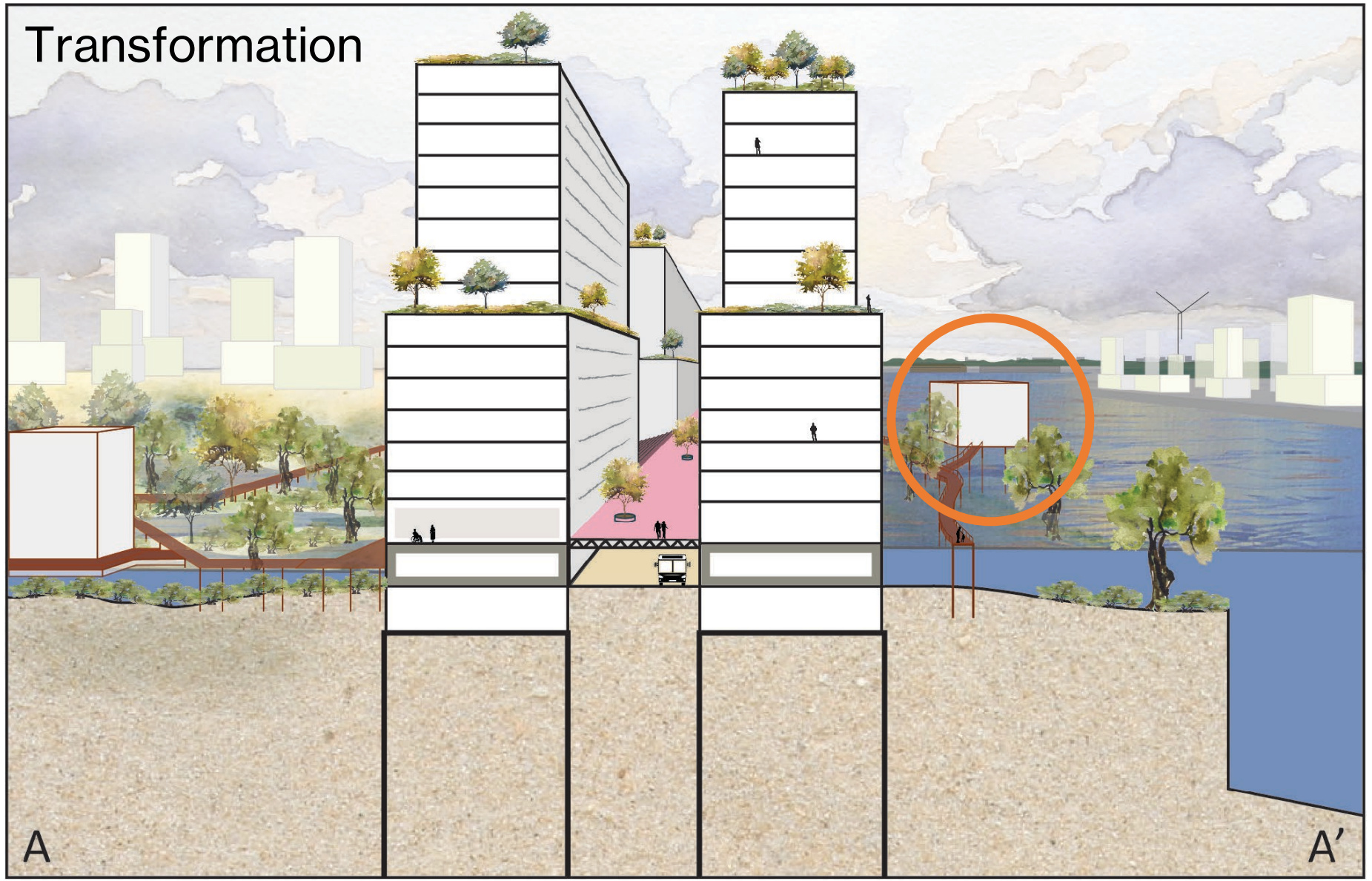


Transformation






Transformation
Best-case: > 2100
Worst-case: Till 2100
A
A'


Transformation
A
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Transformation

Pathways for Design

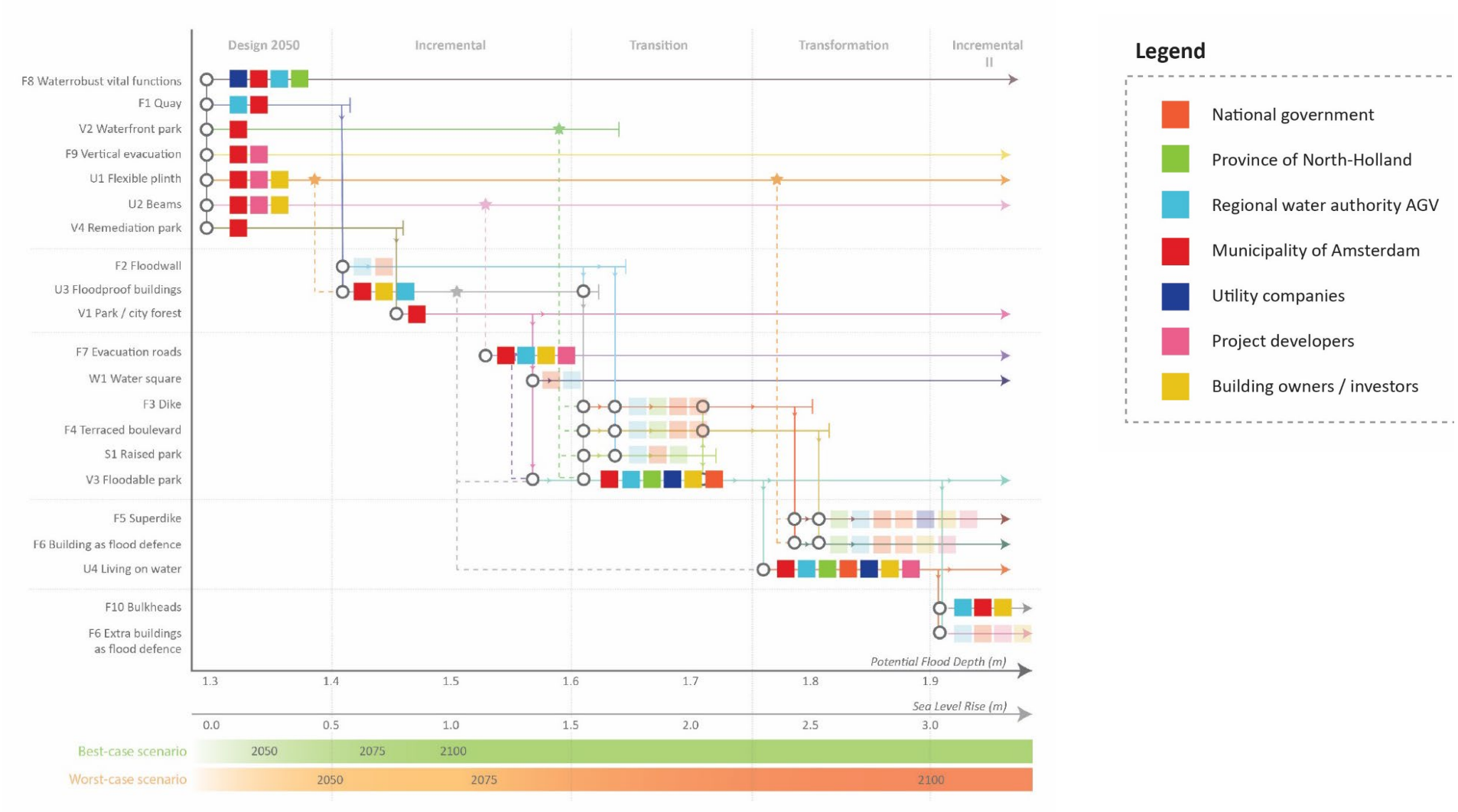
New way of thinking about design

Linking short-term & long-term

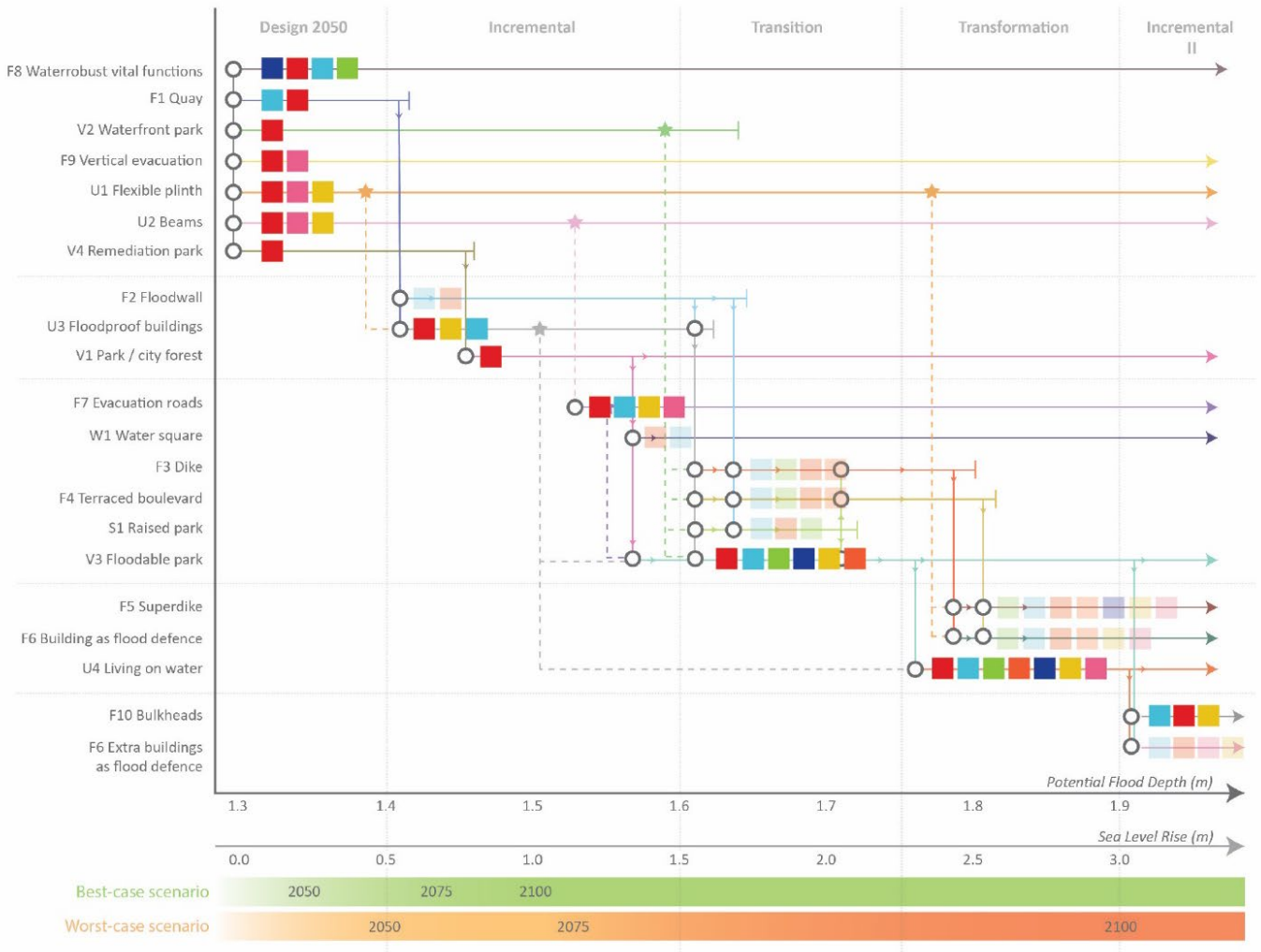
Climate-adaptive initial design

Arguments for design

Pathways for Governance



Pathways for Governance



Public → Public-private

Sectoral → More integral

Central → Central + Decentral

Fixed → Flexible processes/agreements

Pathways for Governance

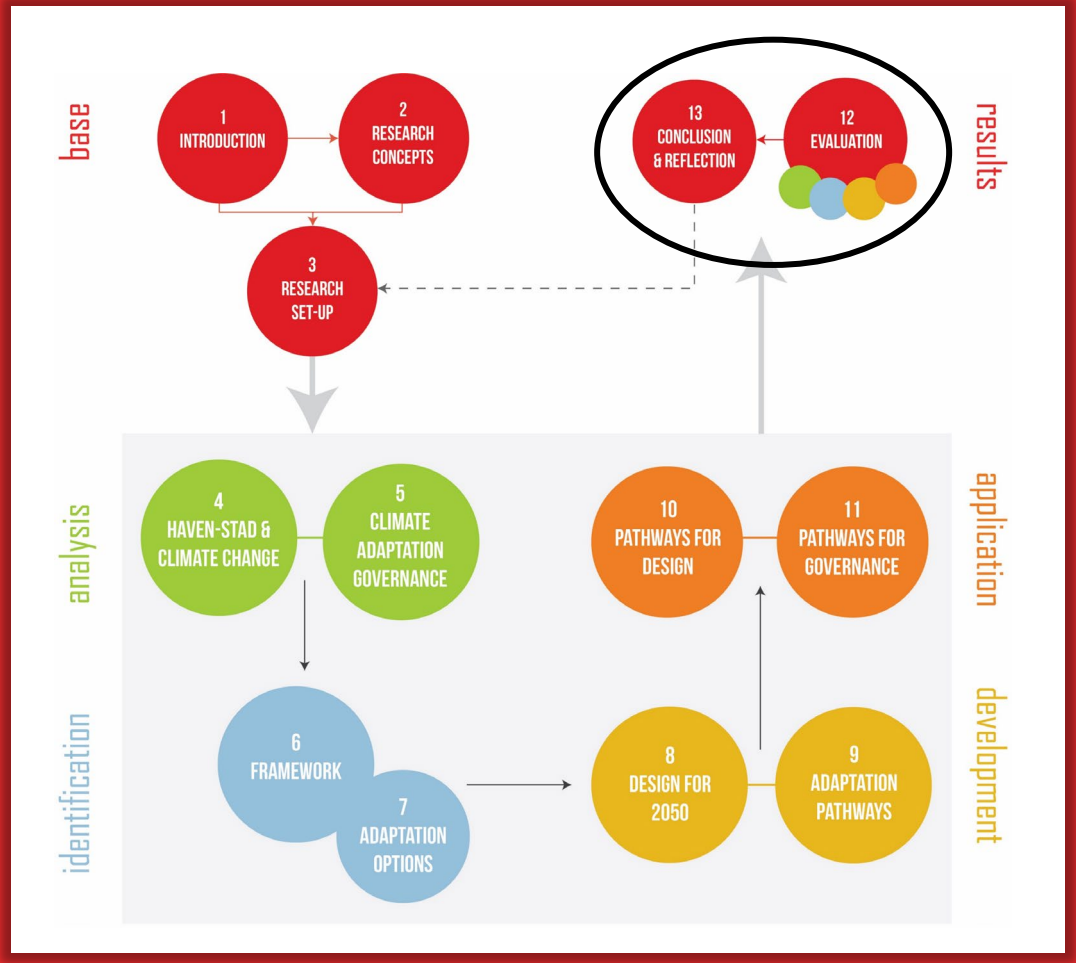
Support thinking about different futures & requirements for governance

Address future options and governance challenges

Initiate dialogue about current governance

Transparency

RESULTS



What can be learned from the process and outputs?

Evaluation

Support for adaptive thinking and planning

Step-by-step plan and flexible framework

Basis for a dialogue about the short-term and long-term future of an area

Evaluation

+

Customizable framework with structuring elements

Spatial- and governance elaboration

Evaluation

+

Customizable framework with structuring elements

Spatial- and governance elaboration

-

Limited space on the SAPP map

Limited ability to integrate themes and scales

Periodic updating needed

Conclusion

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

Conclusion

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

Brings forward an adaptive planning paradigm

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Provides a customizable framework and stimulates design exploration

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Provides a customizable framework and stimulates design exploration

Brings together design and governance aspects

Conclusion

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

Brings forward an adaptive planning paradigm

Provides a customizable framework and stimulates design exploration

Brings together design and governance aspects

Supports the development of climate-adaptive designs

Conclusion

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

Brings forward an adaptive planning paradigm

Provides a customizable framework and stimulates design exploration

Brings together design and governance aspects

Supports the development of climate-adaptive designs

Addresses options, consequences, and future governance challenges

Conclusion

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

But it needs further exploration and development:

In different case studies and in practice

On different scales and on the integration of scales

On the integration of the four climate stresses

By multidisciplinary teams, multi-actor processes

Conclusion

How can the Spatial Adaptive Policy Pathways approach support climate adaptation planning for new urban areas in the Netherlands?

Potential to support climate adaptation planning

Generate a discussion about the current way of working

Offers a new way of looking at the ever-changing city and climate

Thank you for listening!

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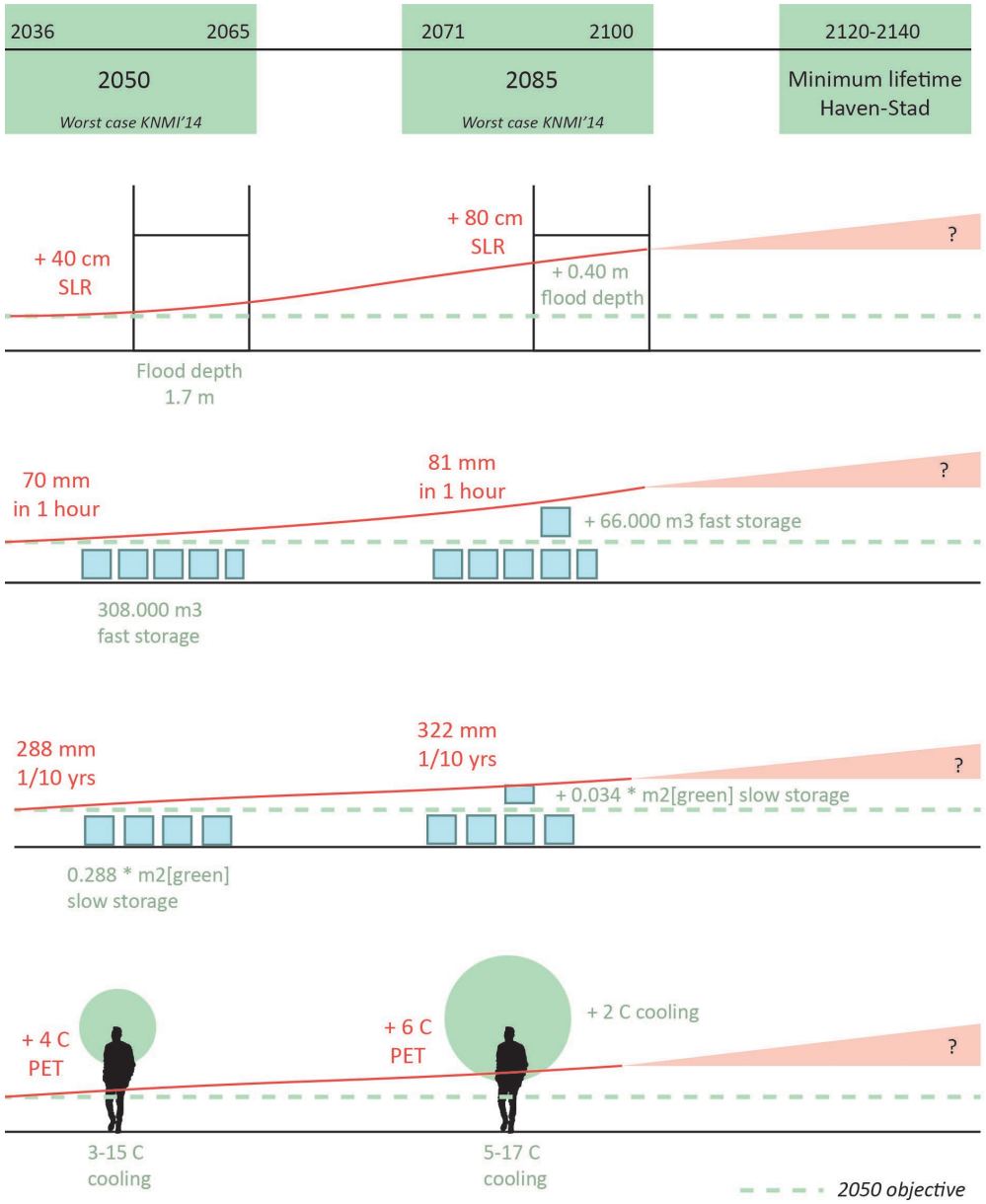
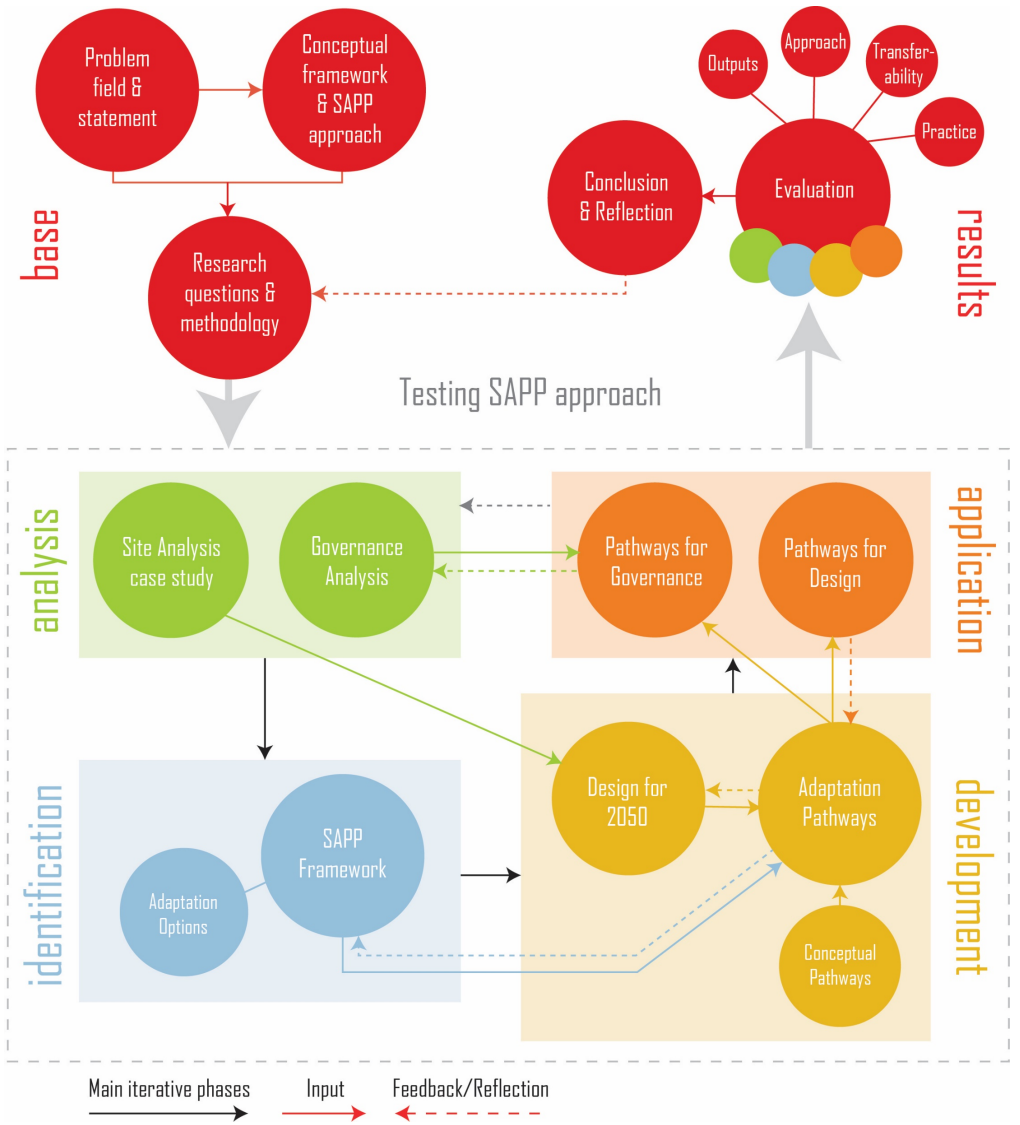
Changing objectives

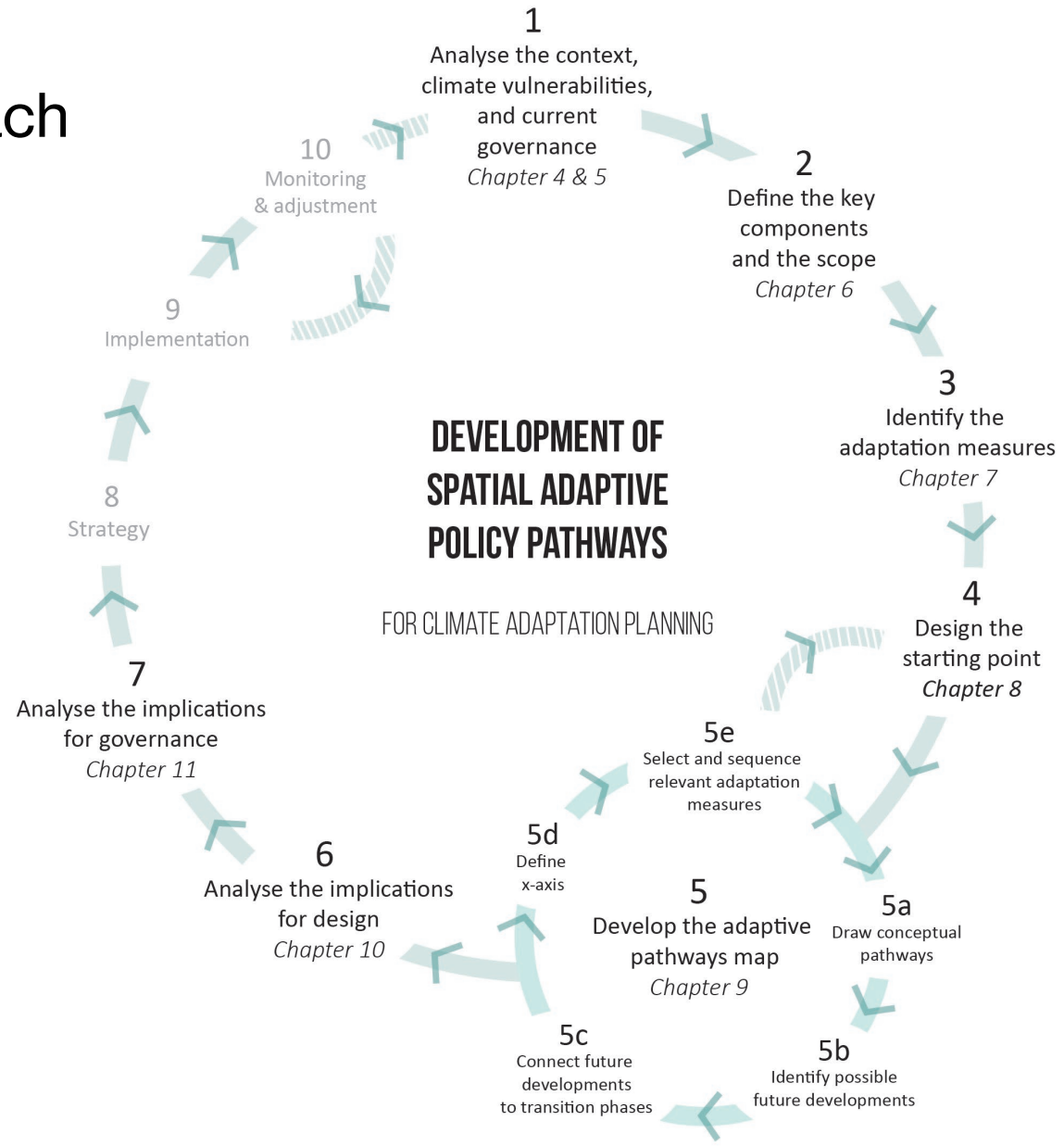


Research Approach & Methods

- Literature review & Document analysis
- Observation & Participation
- Interviews
- Mapping
- Research by Design

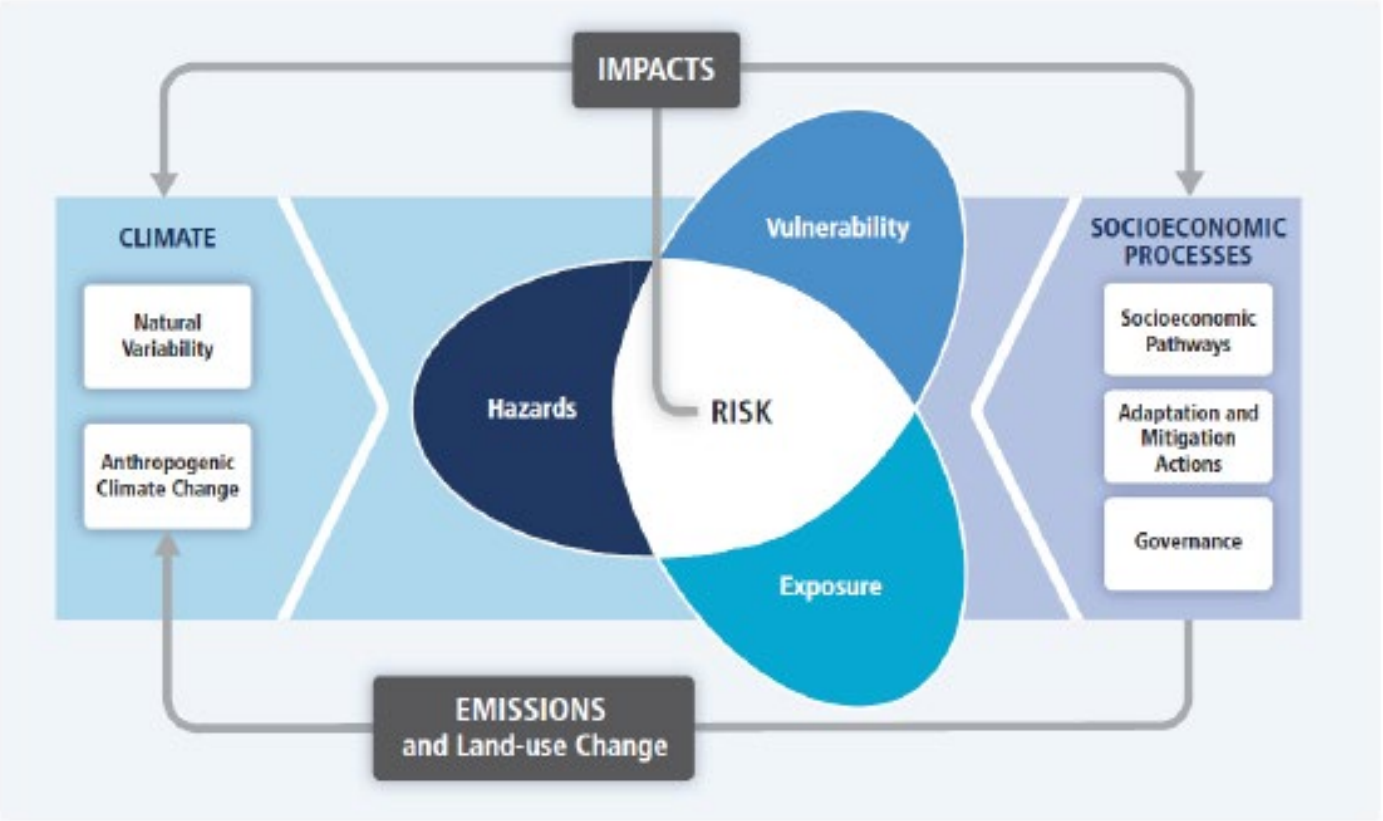


SAPP Approach



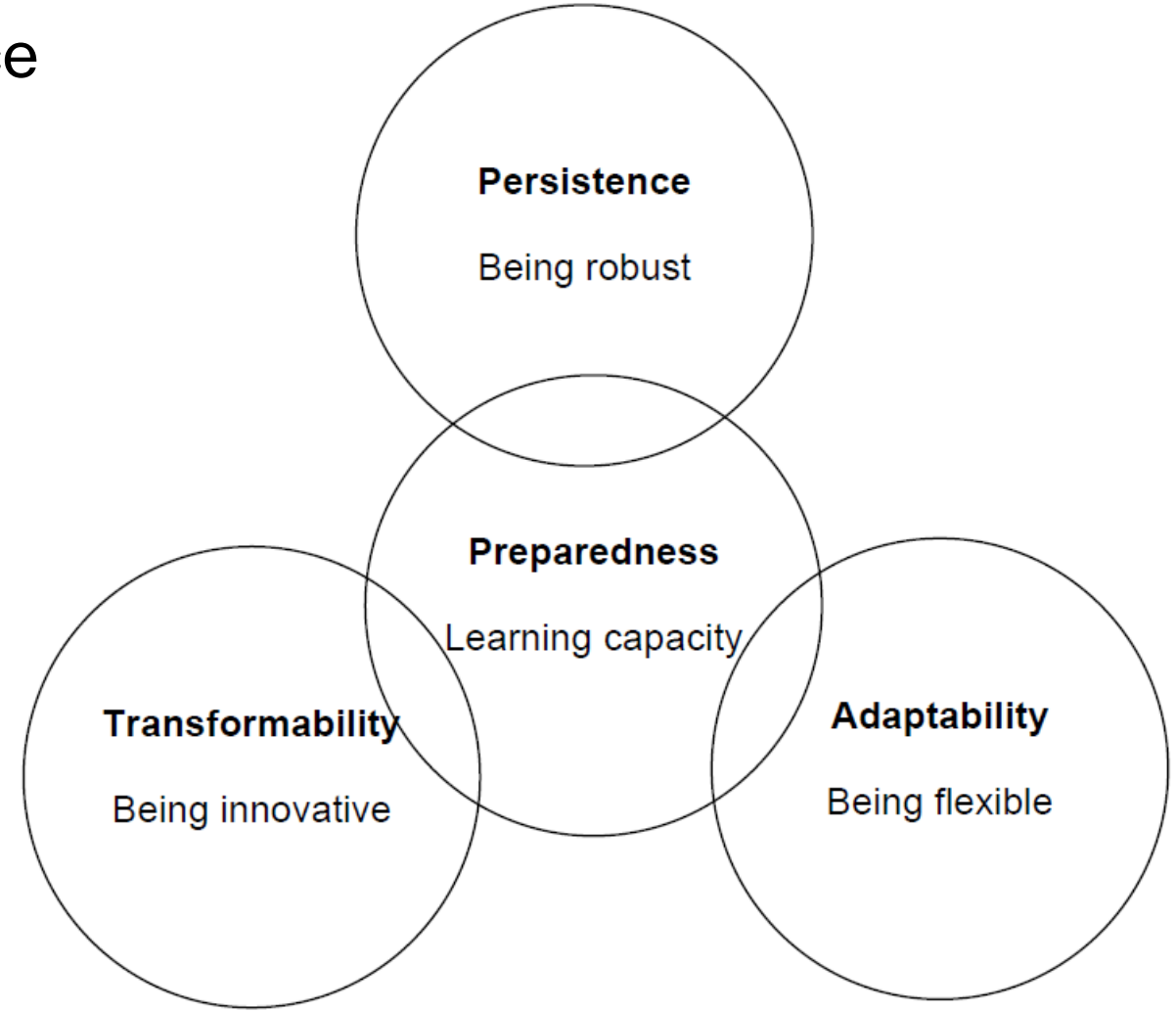
Inspired by: Haasnoot et al. (2013)

Climate Risk



IPCC (2014)

Climate Resilience



Davoudi, Brooks, & Mehmood (2013)

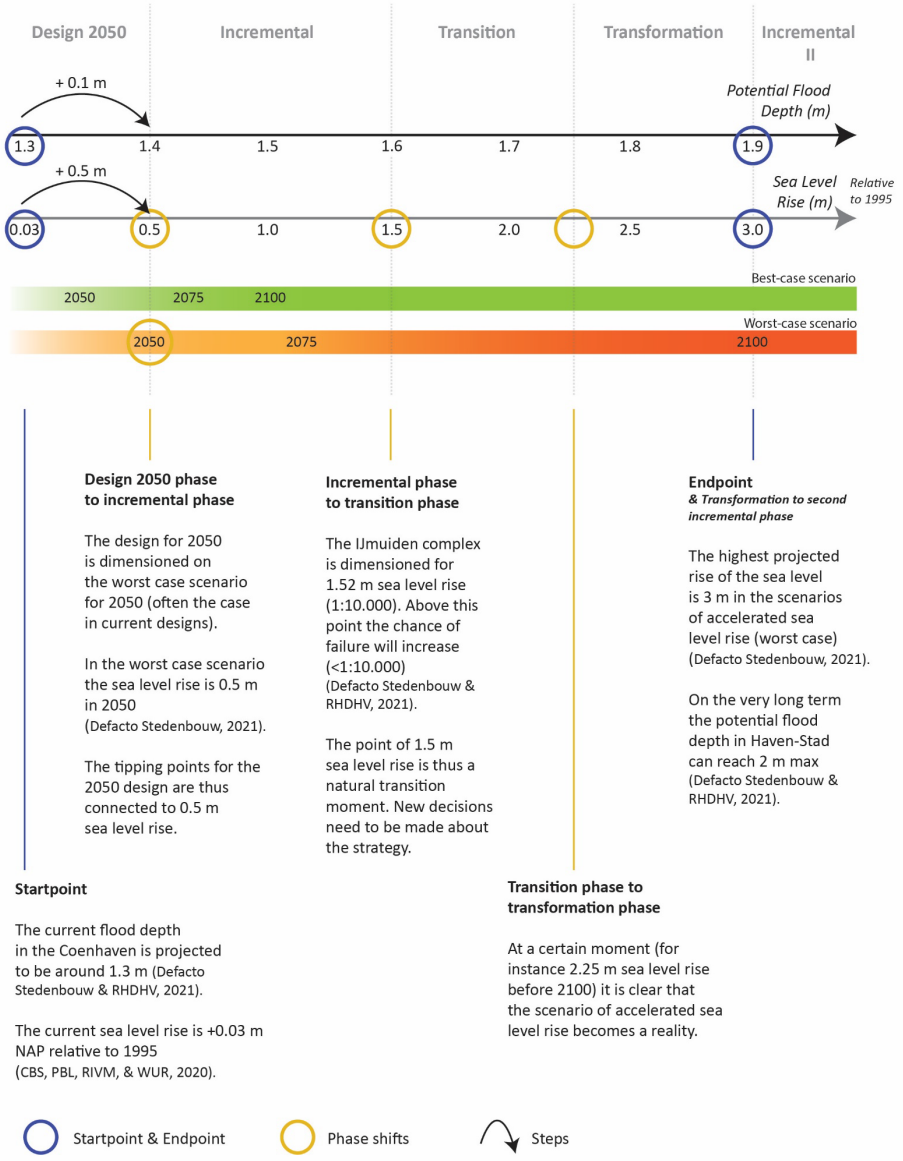
Governance analysis

- Uncertainty – deal with uncertainties
- Contentiousness – urgency, consultation & interaction
- Multiplicity – scales & disciplines, integral assessment
- Complexity – customized, flexible, adjustable policy

Suggestions for improvement:

- A longer time horizon
- More flexibility designs and processes
- More integration organizations
- A shared task (public+private, all levels)
- More national direction
- More clarity about costs, acceptable risks, and responsibilities

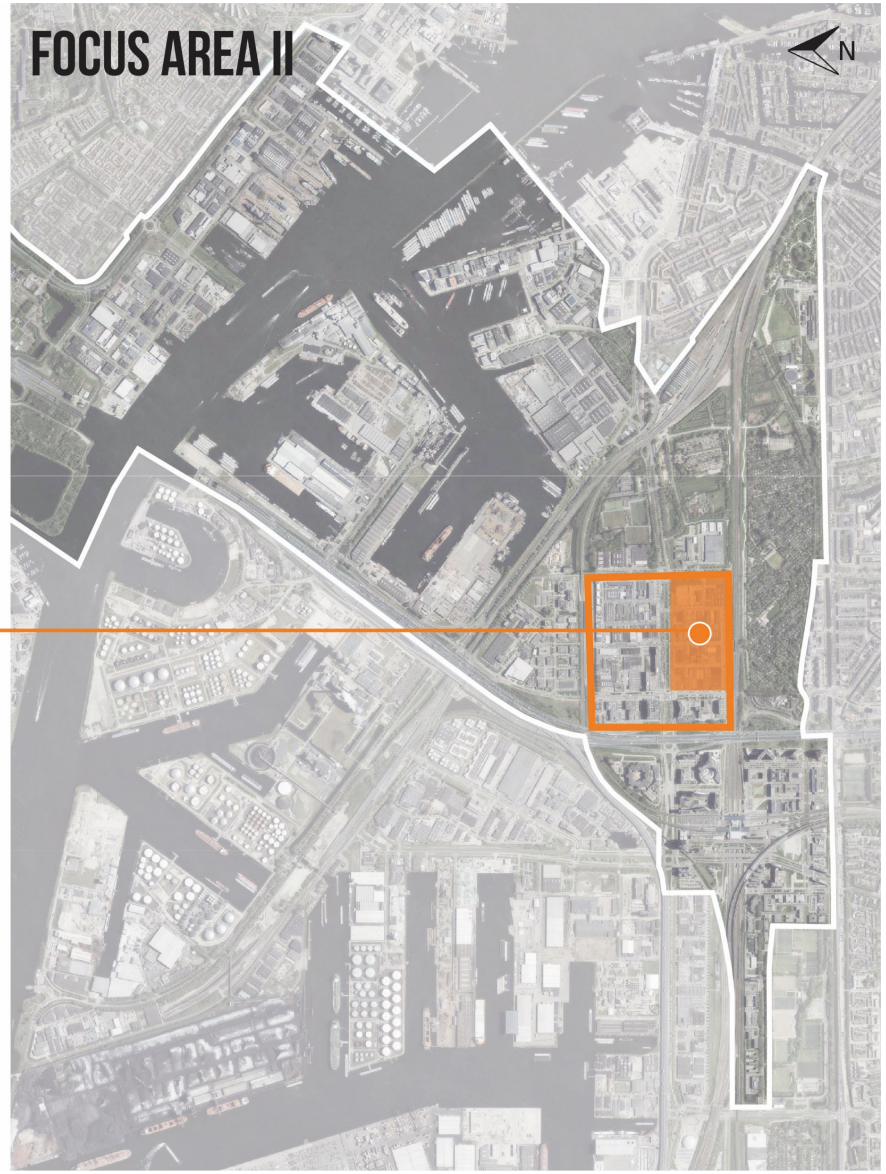
X-axis Coenhaven



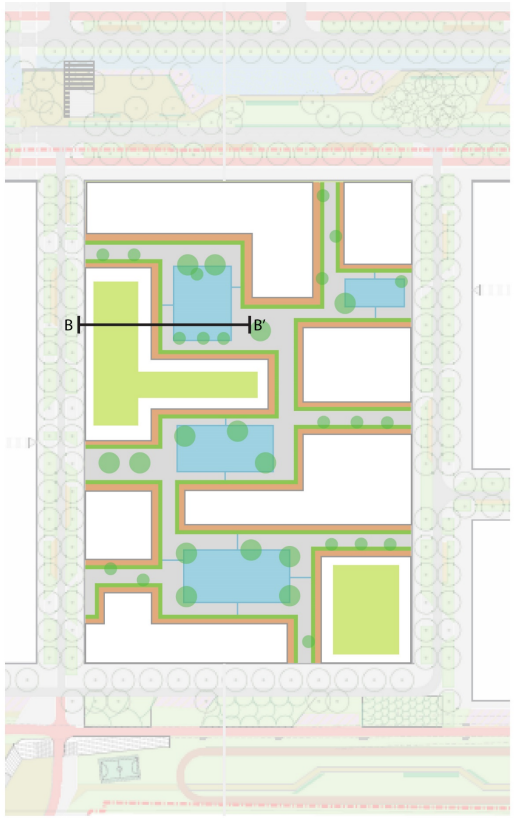
Sloterdijk I South

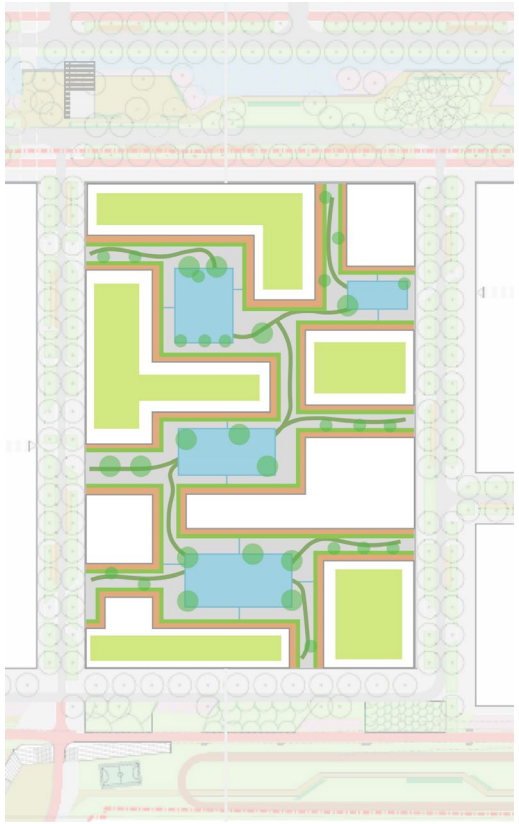
- Second focus area
  Pluvial flooding

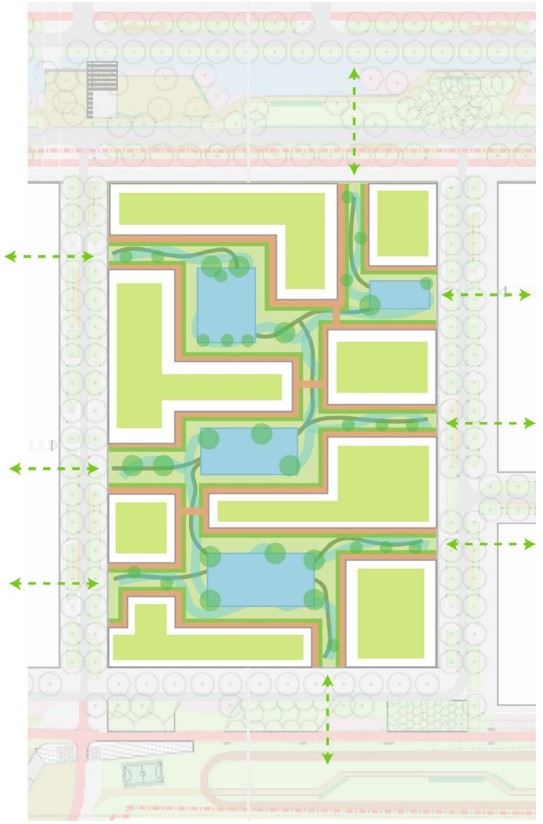
Gemeente Amsterdam (n.d.)

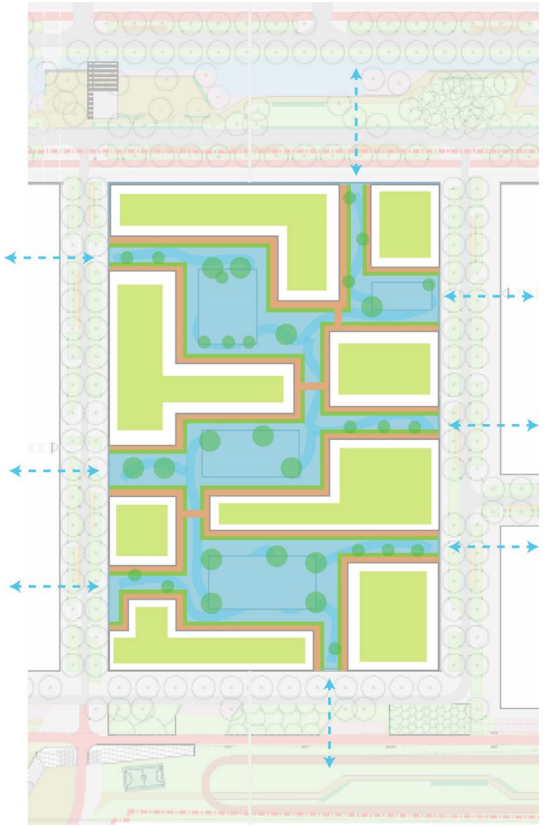


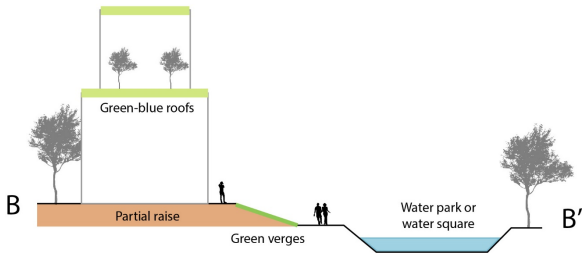
Sloterdijk I South











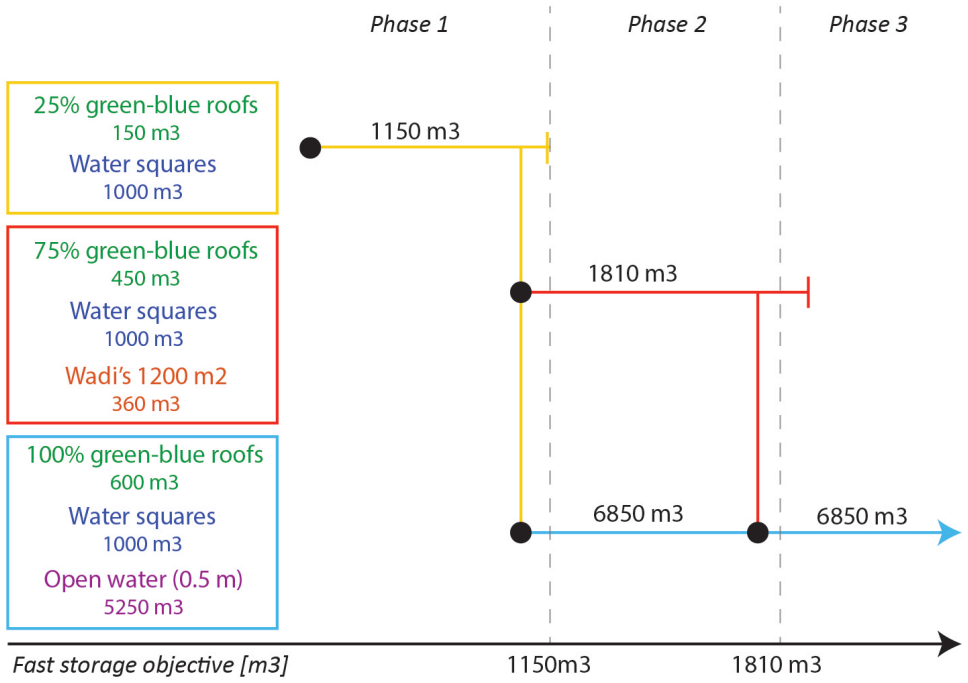
Sloterdijk I South - differences

- Design of starting point – more detailed plans municipality
- Link between climate objective & climate trend – more direct (m3)
- Future perspective – more vague, but less need for transition phases
- Defining the endpoint – 1/100 1 hour rainstorm is only 80 mm/h worst case 2085
- Combination of measures – single and combinations on y-axis (next slide)

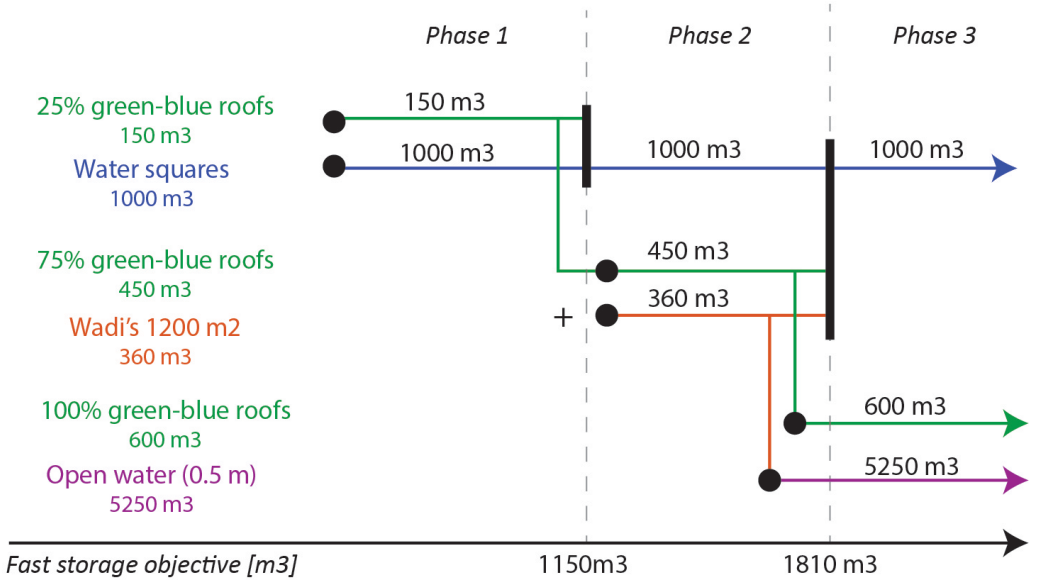
Gemeente Amsterdam (n.d.)

Sloterdijk I South

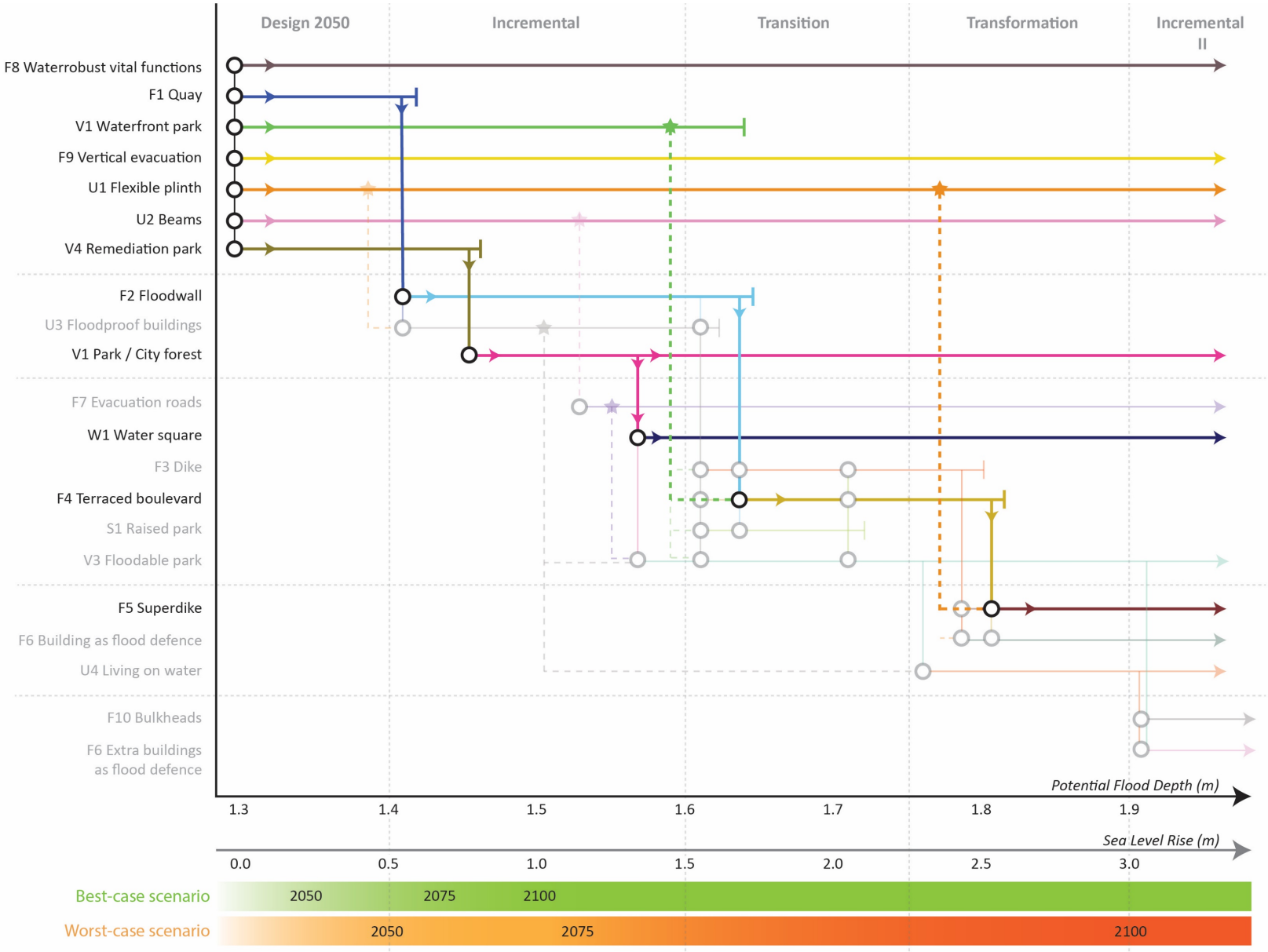
Option A: Packages



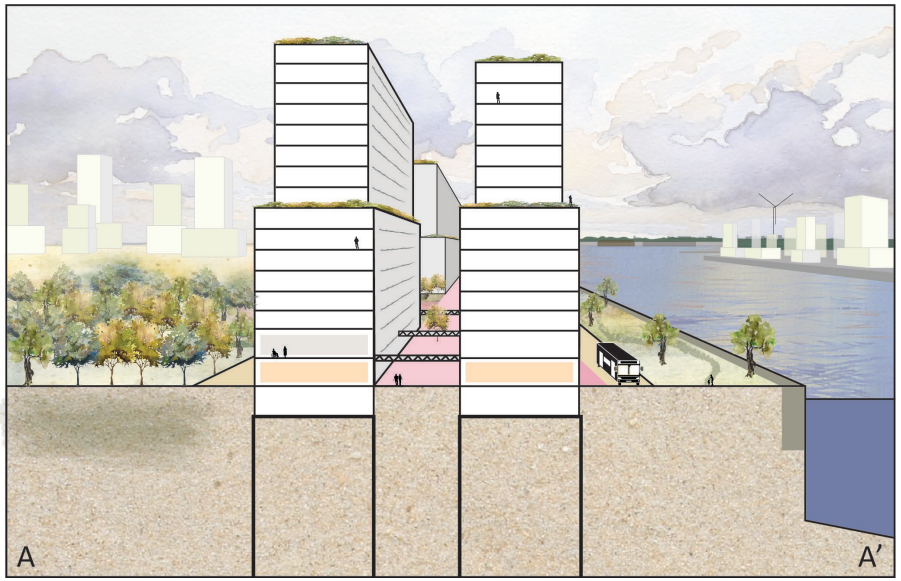
Option B: Vertical addition and shared tipping point

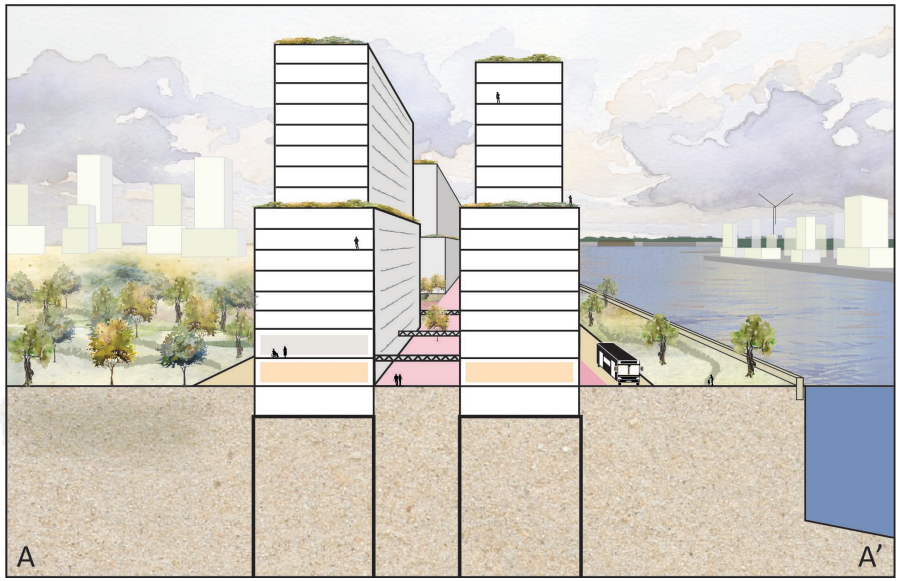


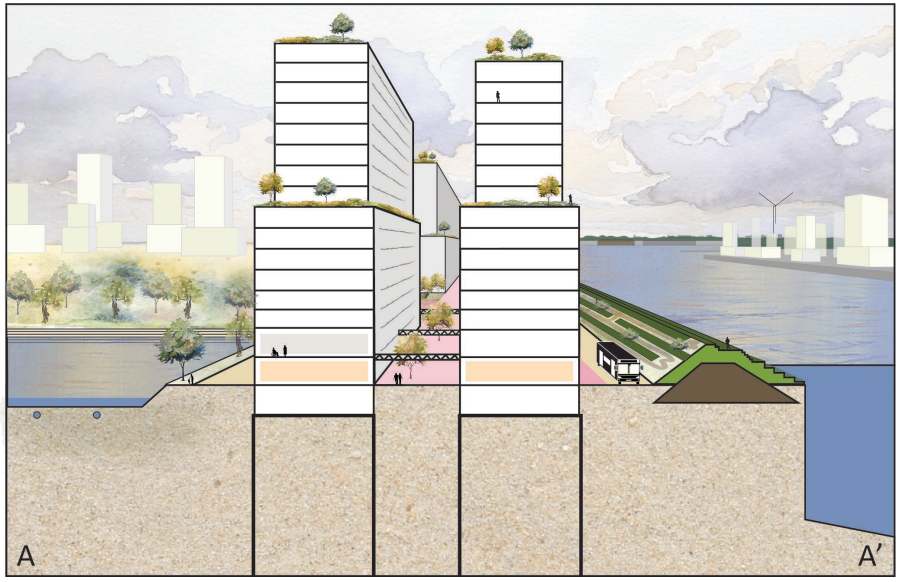
‘Protective’ future

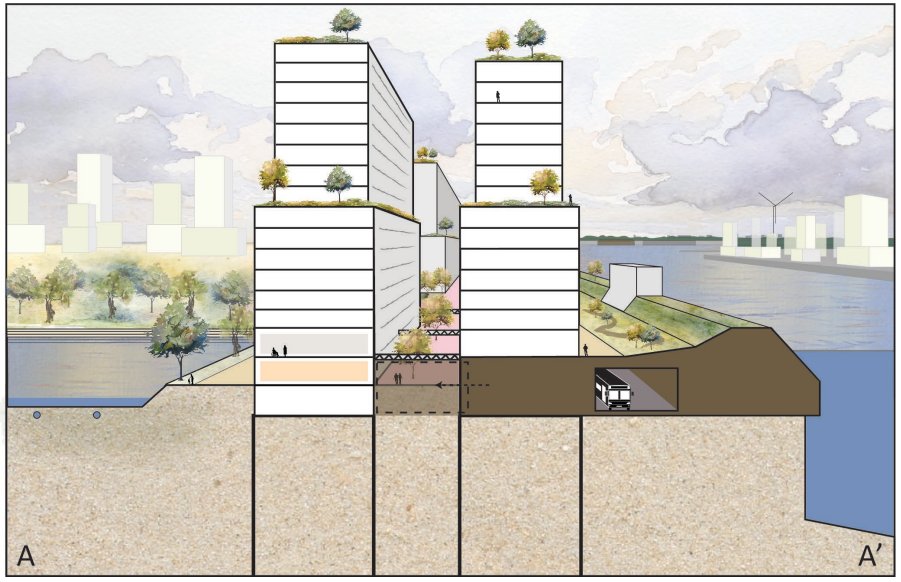


‘Protective’ future

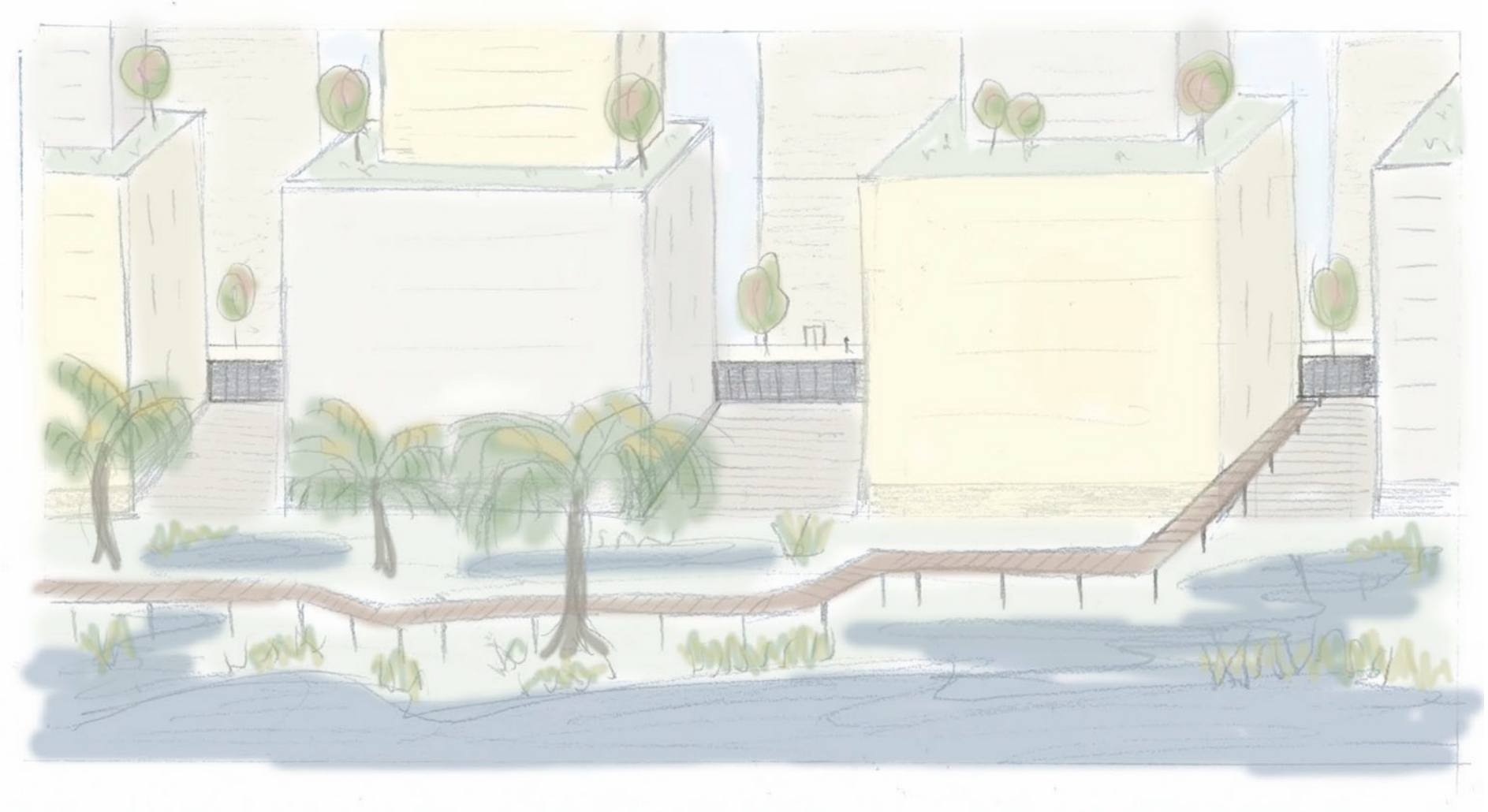








Incremental II



Differences with other approaches

- Combination design and governance
- Integration urbanism and water management
- New components
  - Design layers + adaptation principles
  - Transition phases
  - Requirement measures (legend)
- Combination of scales
- Different pathways at the same time

Transferability

- Existing built environment – include inhabitants
- Other spatial scales – regional/city
- Other time scales
- Other locations
- Other sectors/themes – transition challenges

SAPP in practice

- Multidisciplinary team
- Environmental visions & development plans
- Can take more time & needs integration with other themes