



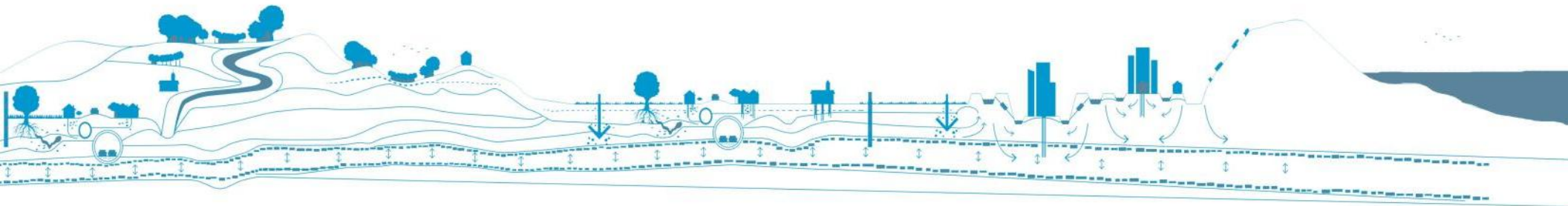
*symposium* bodem breed  
*expertise*  
bodem en ondergrond

# Welkom bij het 28<sup>e</sup> Symposium Bodem Breed

*Hèt netwerk event van de bodem en ondergrond*



# Intelligent gebruik van de ondergrond ter verbetering van de ruimtelijke kwaliteit (kennis)



Fransje Hooimeijer

# Partituur van stedelijke ontwikkeling

symposium

bodem breed

expertise  
bodem en ondergrond

## Symphony No. 9 in D Minor, Op. 125

*Presto, d. = 120.*

Flauti. *ff*

Oboi. *ff*

Clarineti in B. *ff*

Fagotti. *ff*

Contrafagotti. *ff*

*Presto, d. = 120.*

Corni in D. *ff*

Corni in B. *ff*

Trombe in D. *ff*

Timpani in D. A. *ff*

*Presto, d. = 120.*

Violino I.

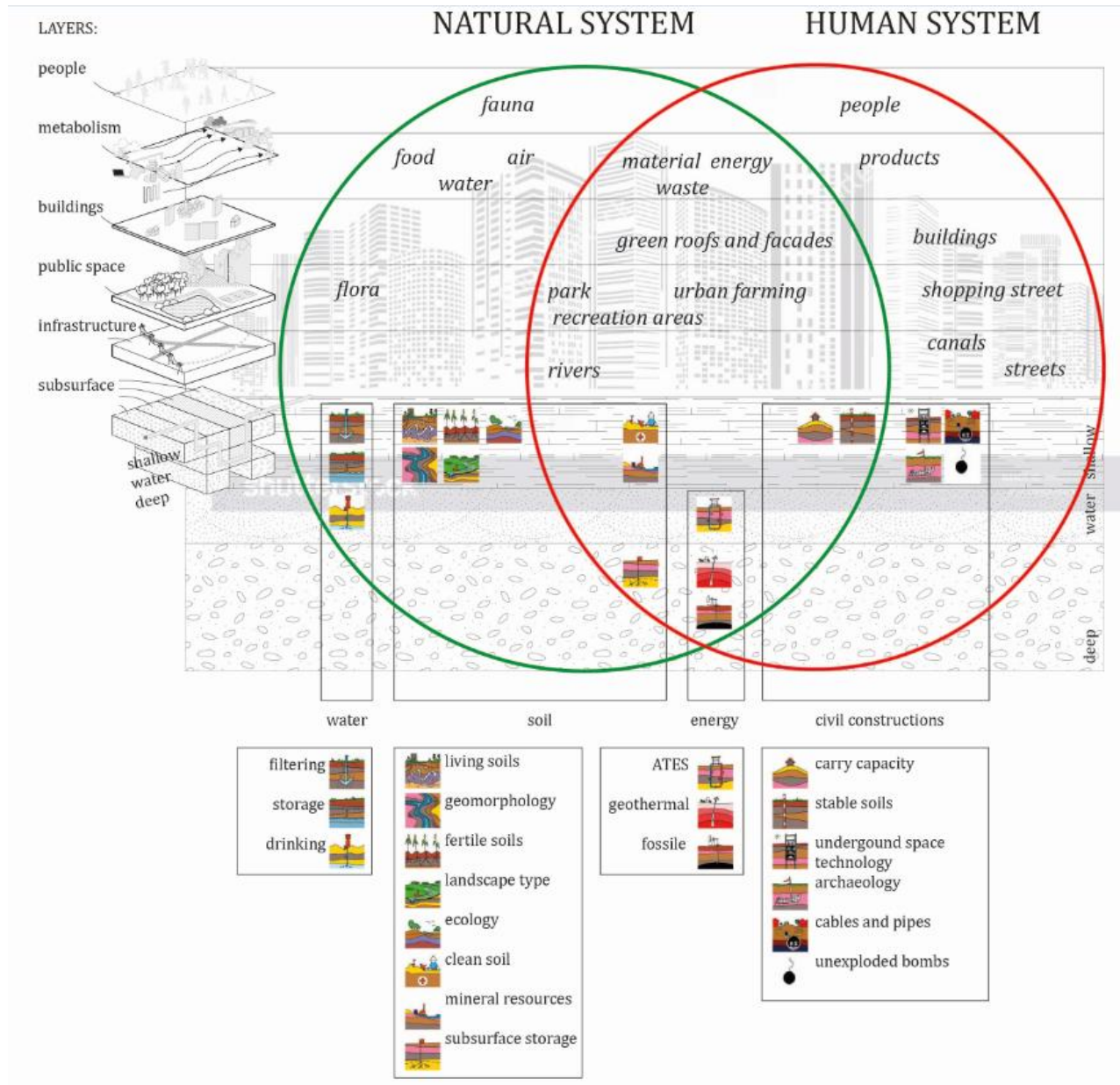
Violino II.

Viola.

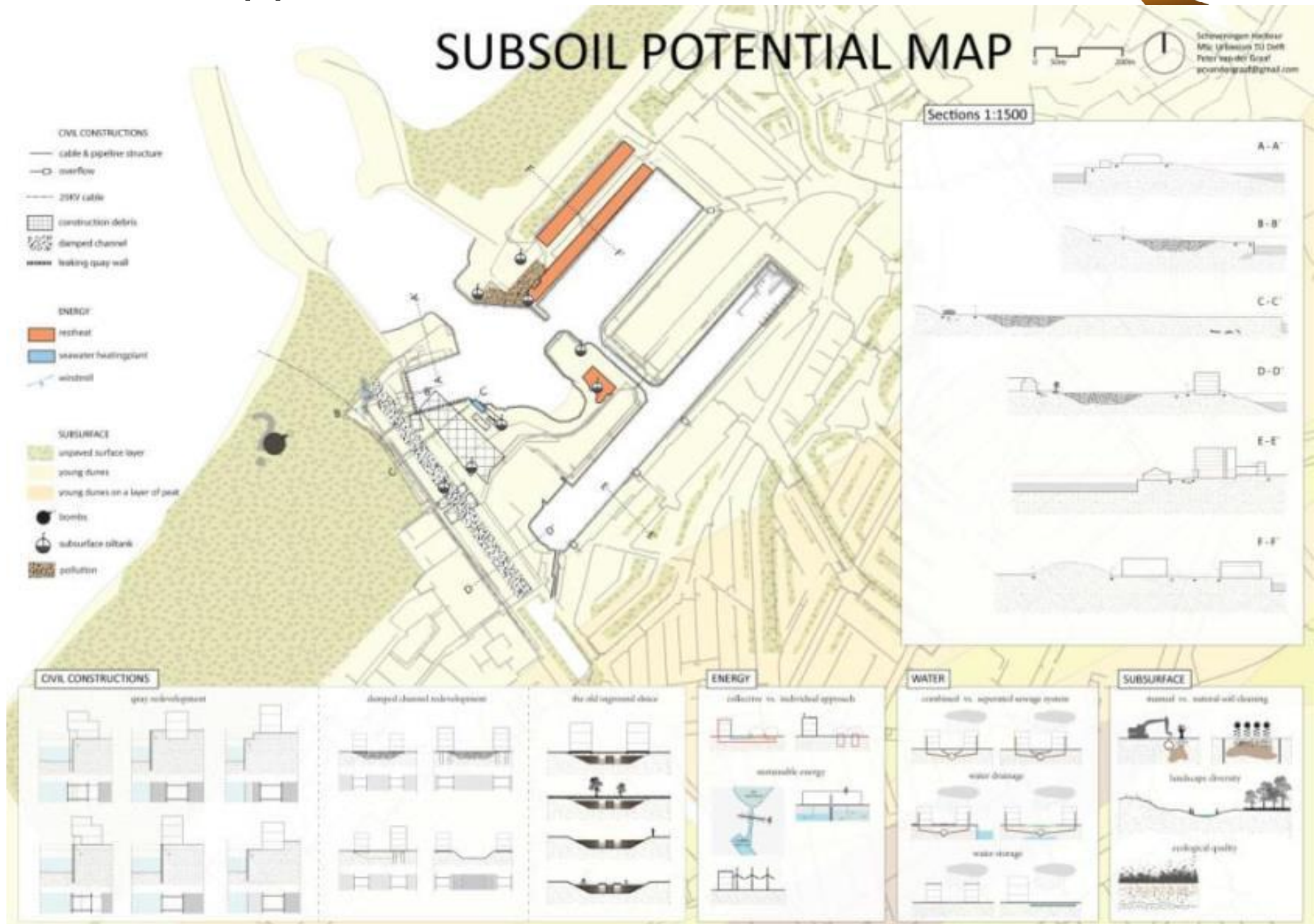
Violoncello e Basso.

This image shows a page from a musical score for Beethoven's Symphony No. 9 in D Minor, Op. 125. The score is written for a full orchestra. The woodwind section includes Flutes, Oboes, Clarinets in B-flat, Bassoons, and Contrabassoons. The brass section includes Cornets in D and B-flat, Trumpets in D, and Timpani in D. The string section includes Violins I and II, Viola, and Violoncello and Bass. The tempo is marked 'Presto, d. = 120.' and the dynamic is 'ff' (fortissimo). The score is written in D minor and 4/4 time. The page shows measures 1 through 10 of the first movement.

# Complexiteit van het integreren van systemen



# Integreren van informatie in het ontwerpproces





# Ontwerpen met de informatie

variant 1

preserving subsoil conditions



variant 2

exploiting subsoil conditions

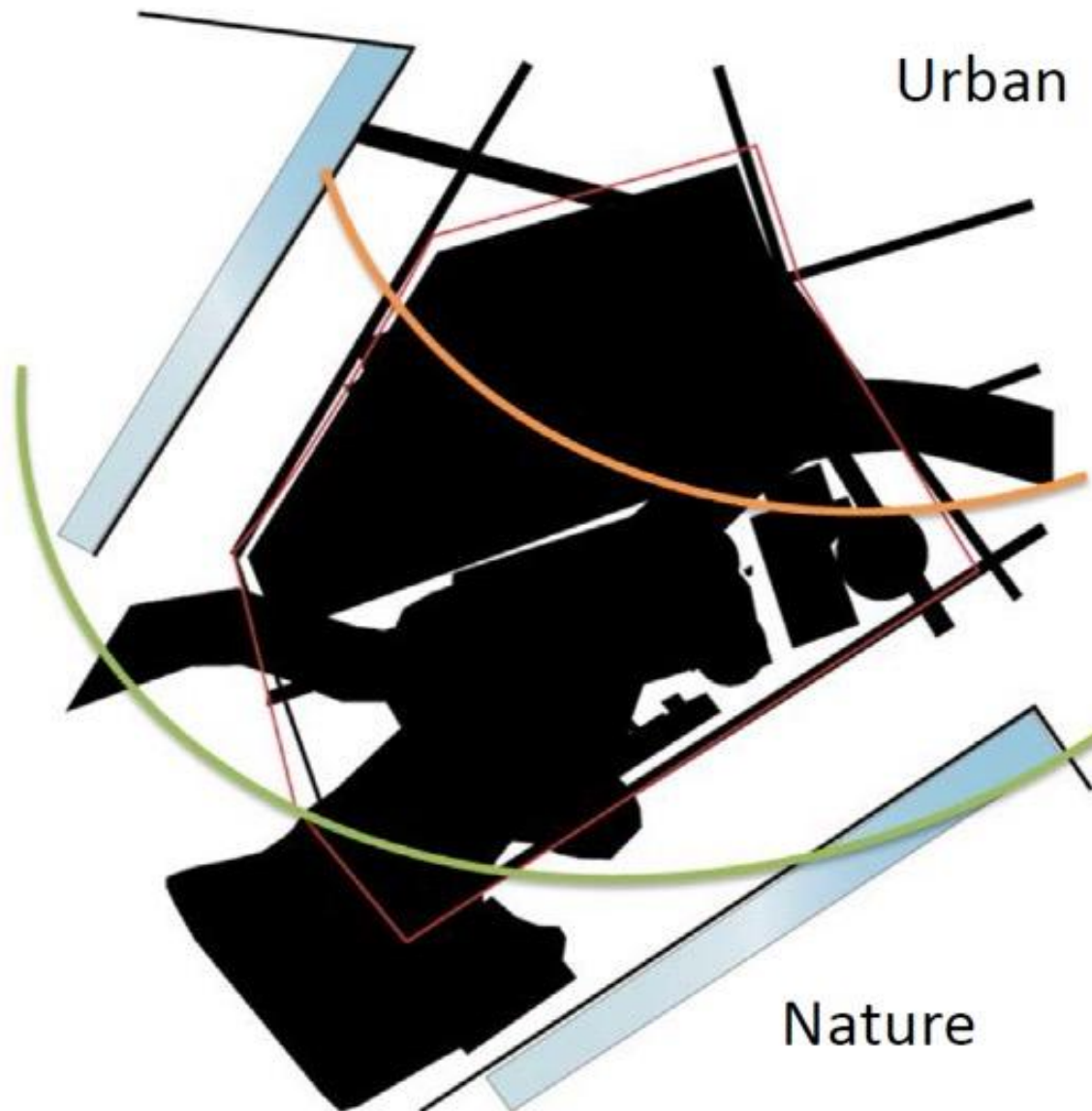


variant 3

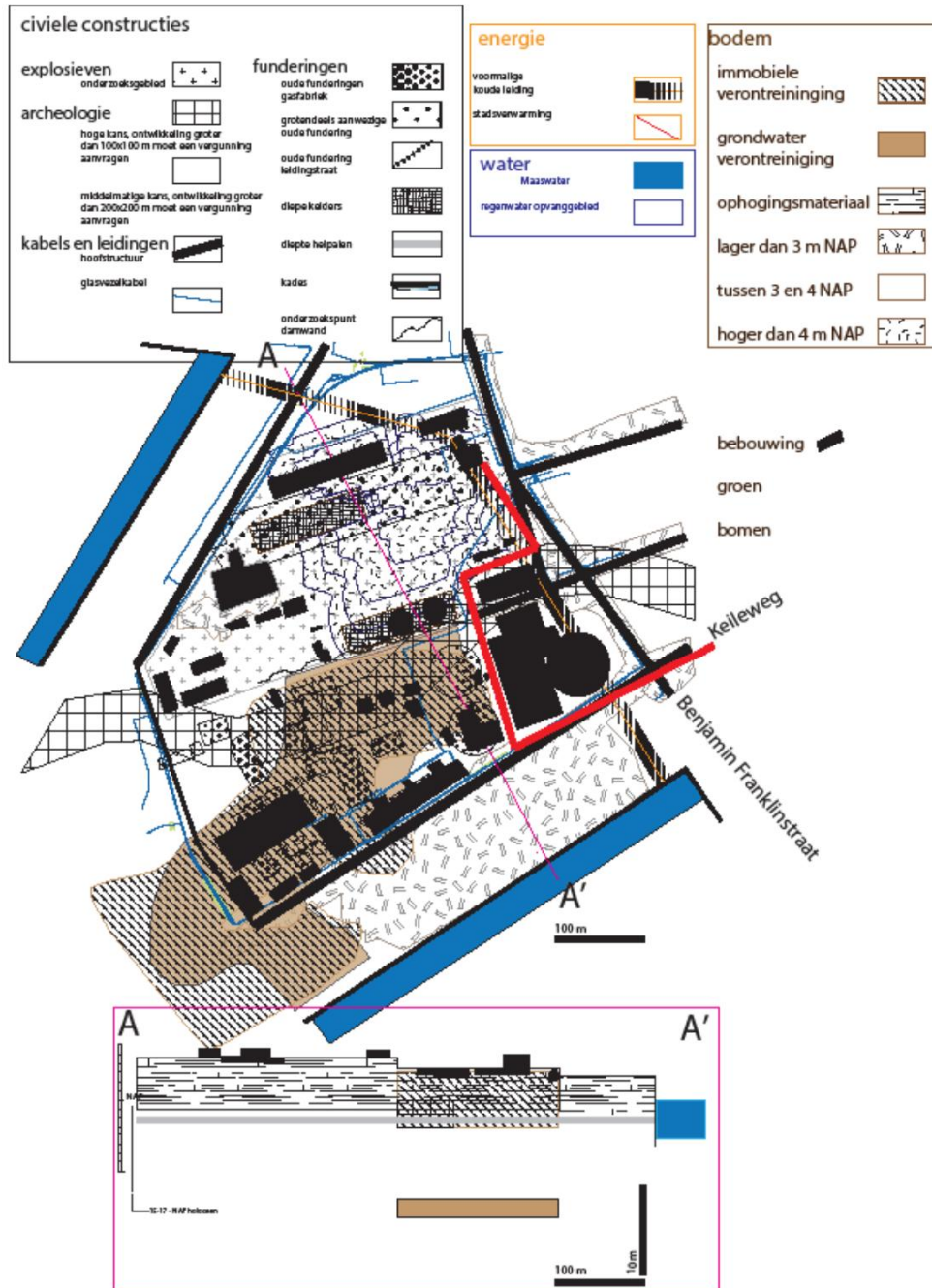
preservation and exploitation



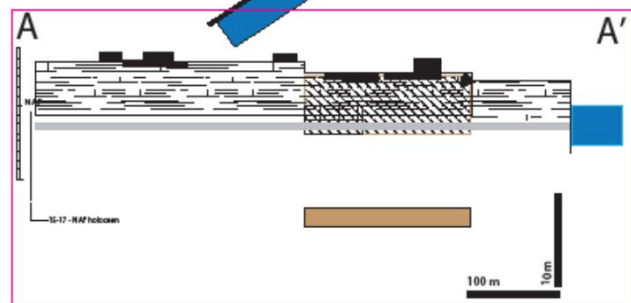
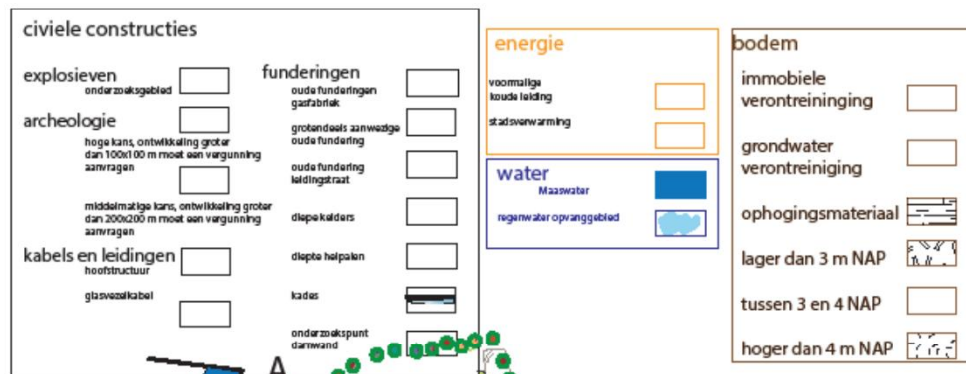
# Impactkaart



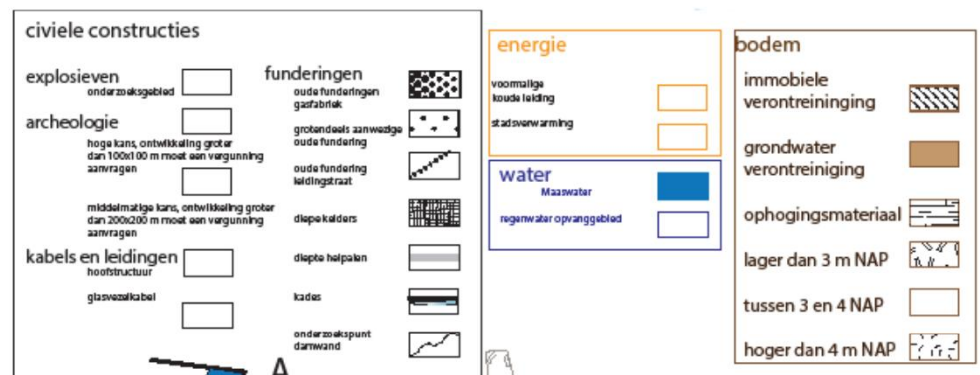
# Belang van de dynamische legenda





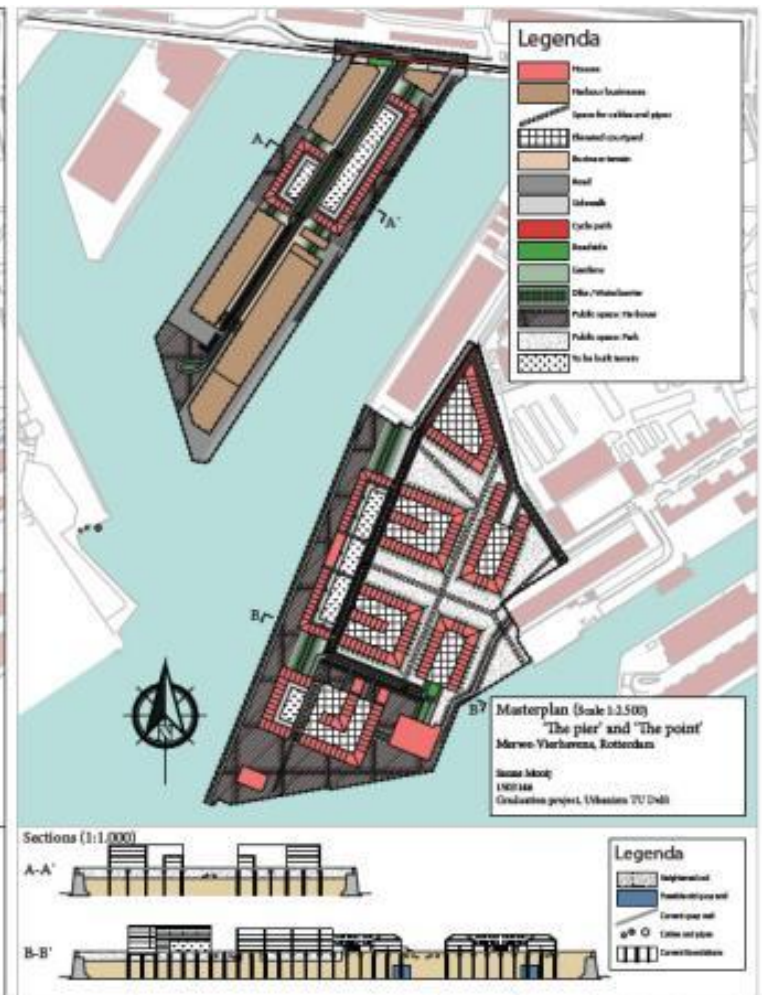
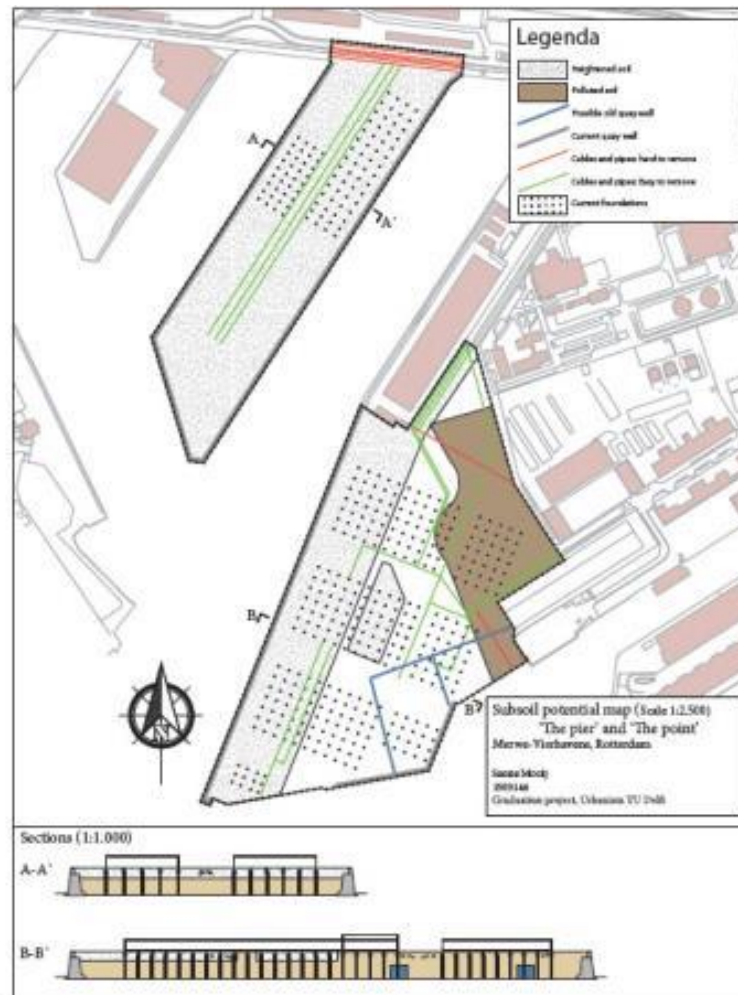


Water & hoogte



Funderingen, vervuiling en hoogte

# Bestemmen met de informatie





# Taal van de stedelijk watermanager

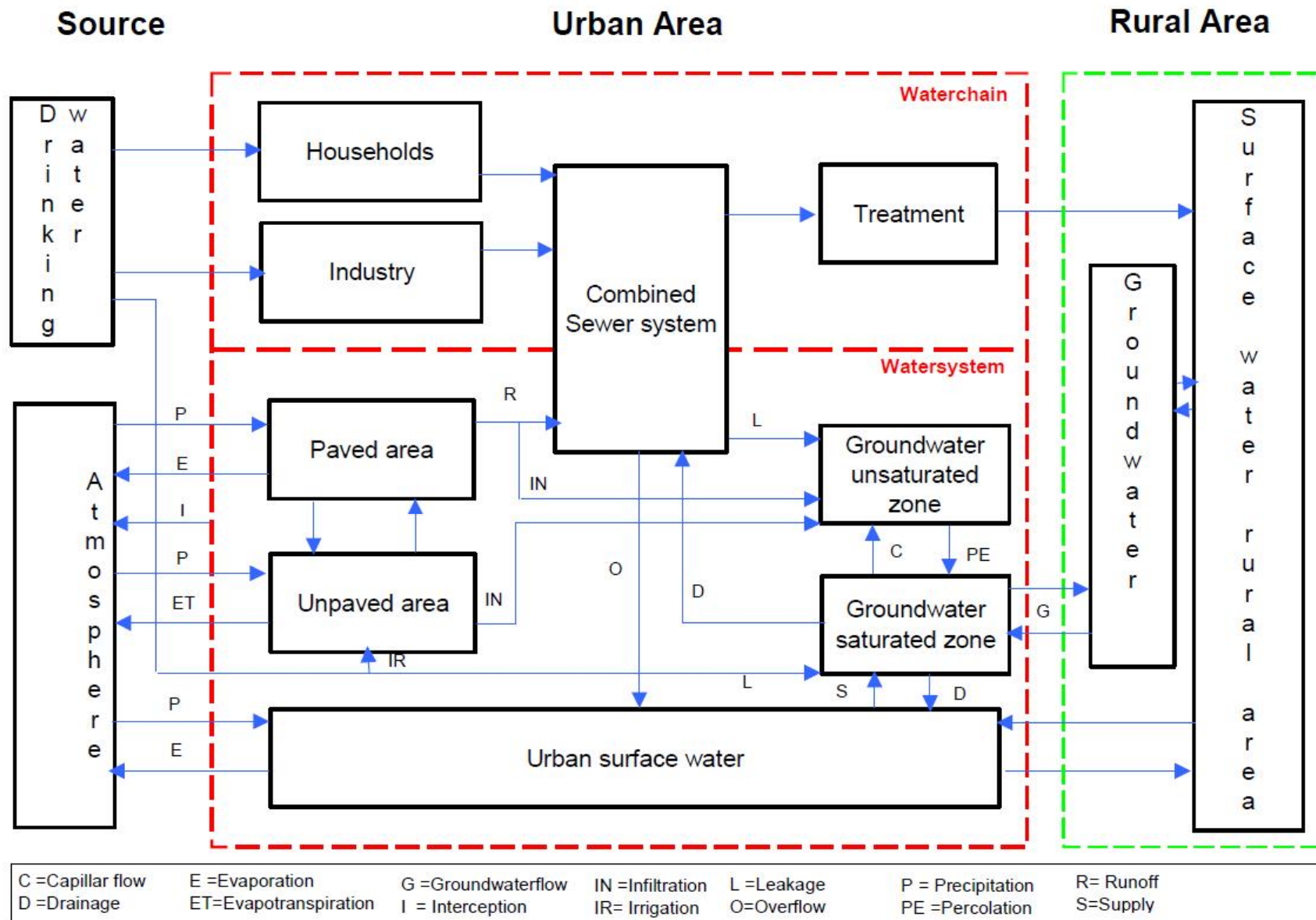
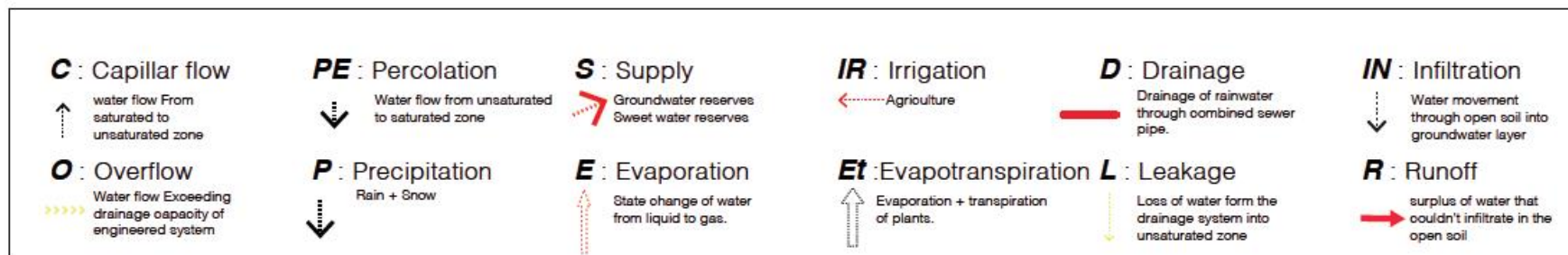
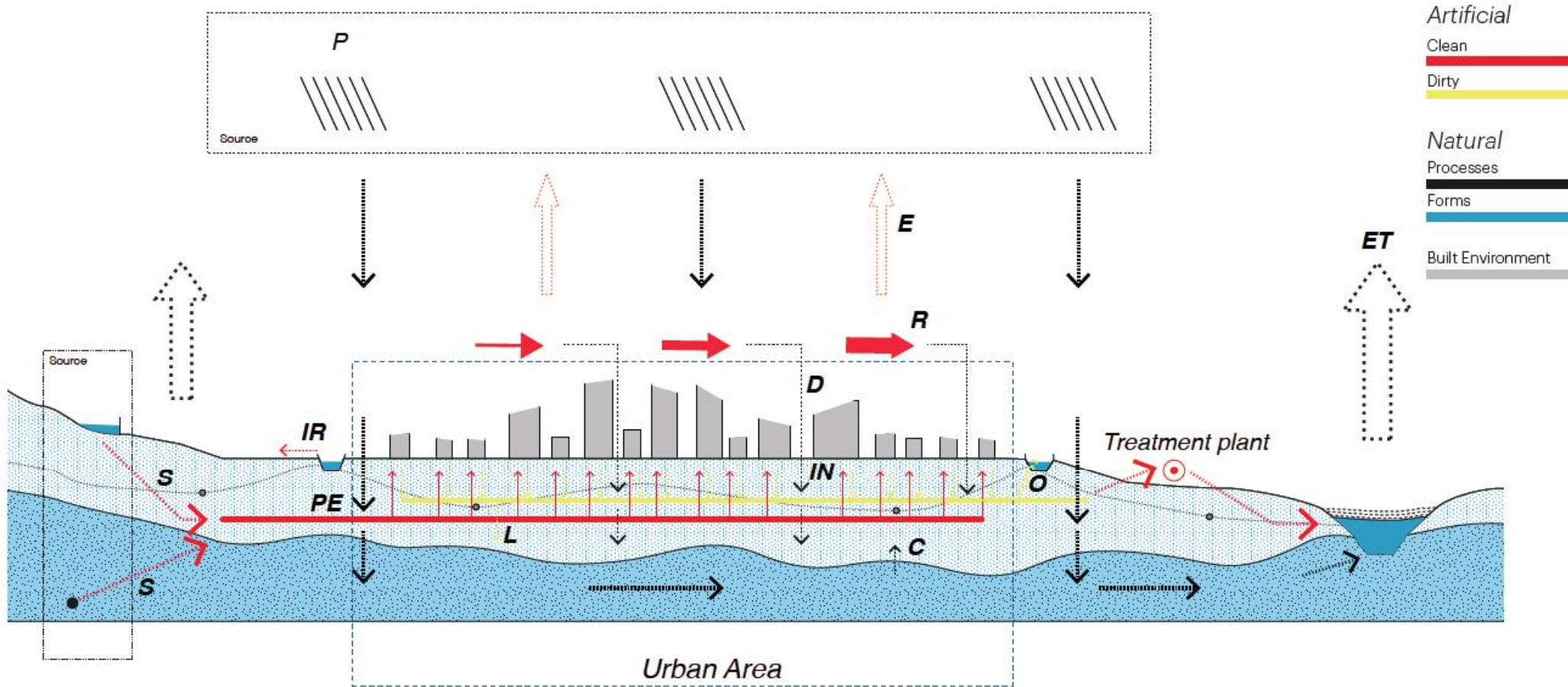


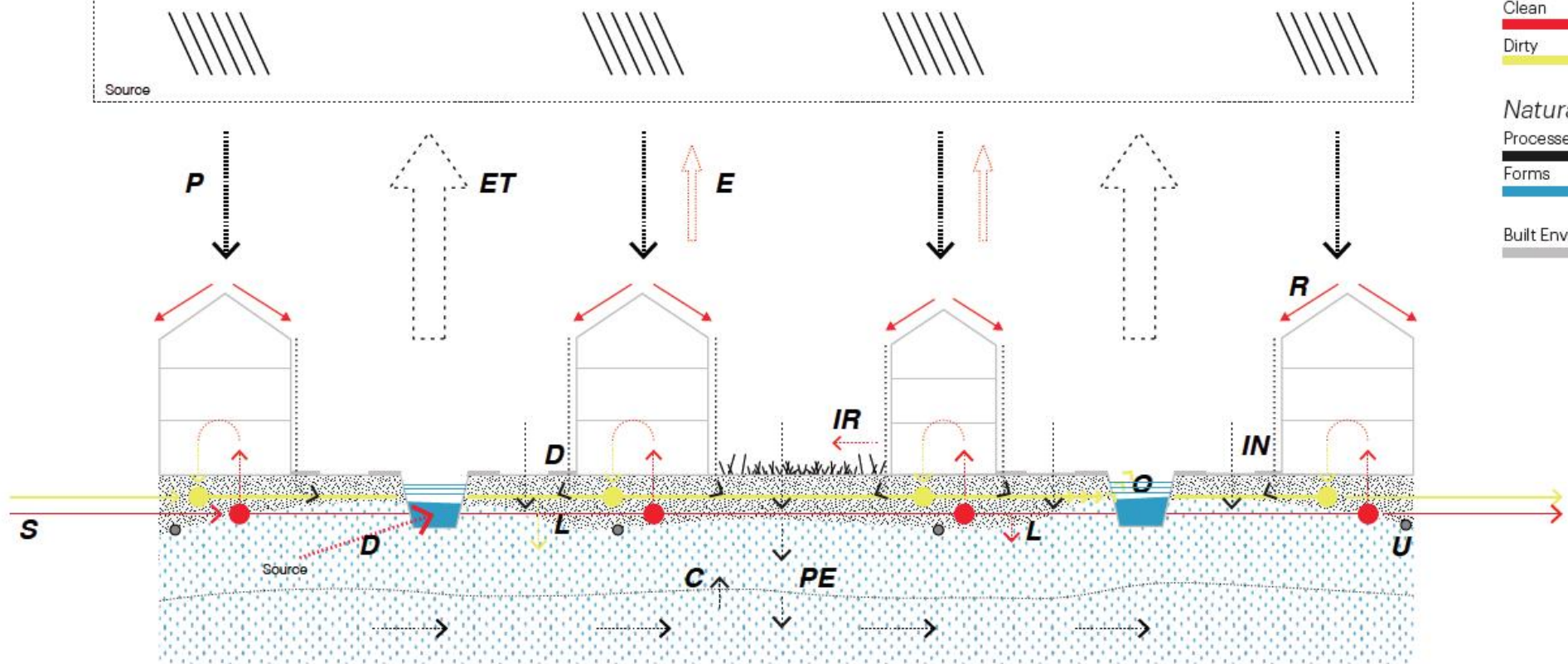
Figure 4-2: Schematisation of the urban water system with a combined sewer system



# Visualiseren van data



# P Door de schalen heen



**U** : Underground drainage

**C** : Capillar flow

water flow From saturated to unsaturated zone

**O** : Overflow

Water flow Exceeding drainage capacity of engineered system

**PE** : Percolation

Water flow from unsaturated to saturated zone

**P** : Precipitation

Rain + Snow

**S** : Supply

Groundwater reserves Sweet water reserves

**E** : Evaporation

State change of water from liquid to gas.

**IR** : Irrigation

Agriculture

**Et** : Evapotranspiration

Evaporation + transpiration of plants.

**D** : Drainage

Drainage of rainwater / groundwater through combined sewer pipe / surface water.

**L** : Leakage

Loss of water form the drainage system into unsaturated zone

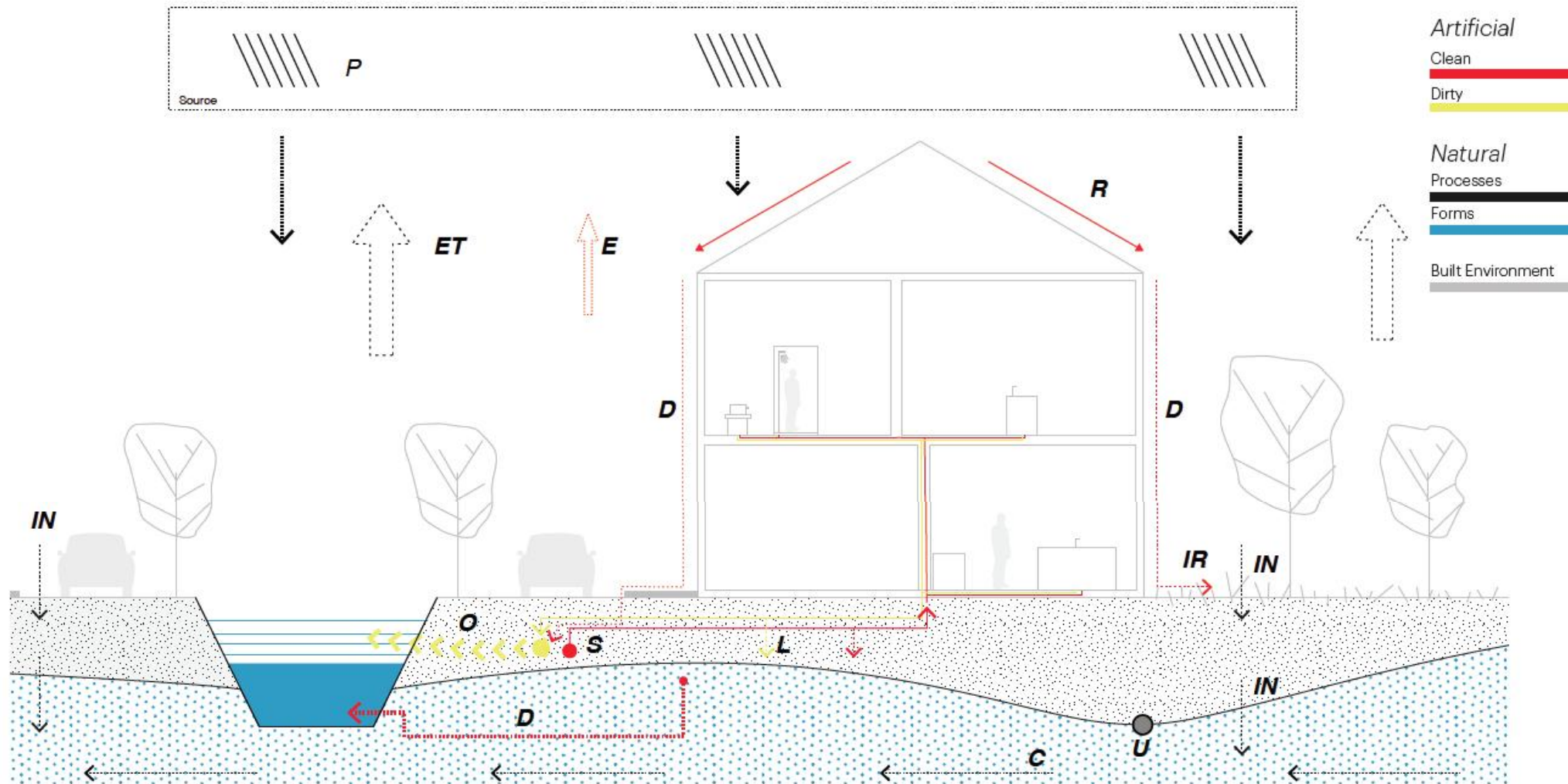
**IN** : Infiltration

Water movement through open soil into groundwater layer

**R** : Runoff

surplus of water that couldn't infiltrate in the open soil

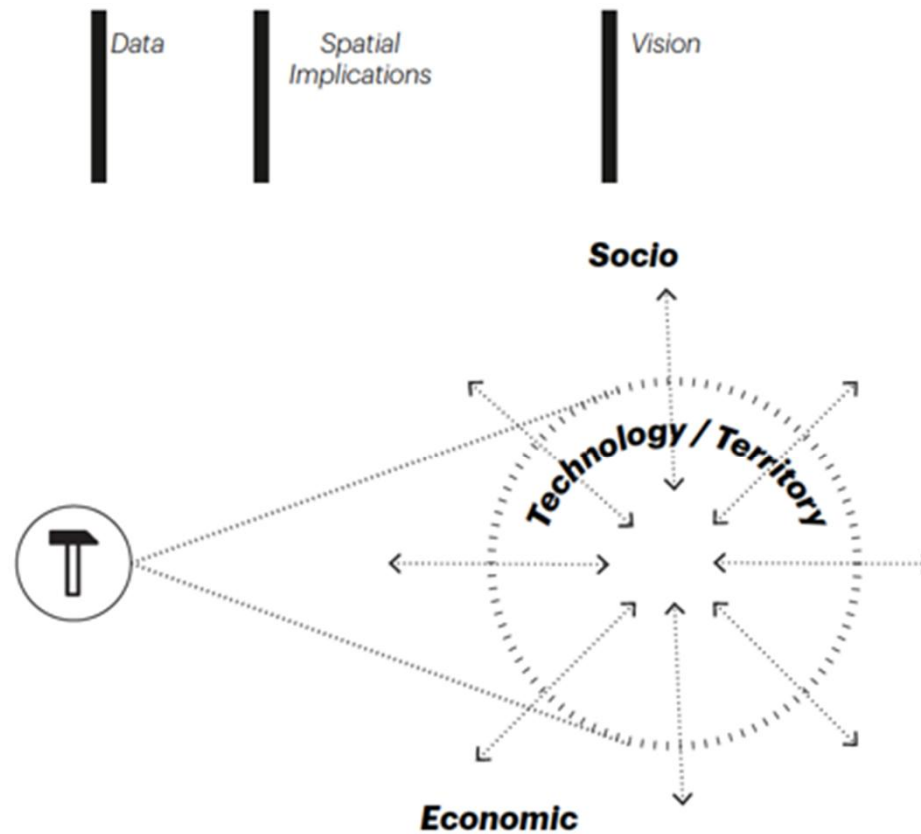


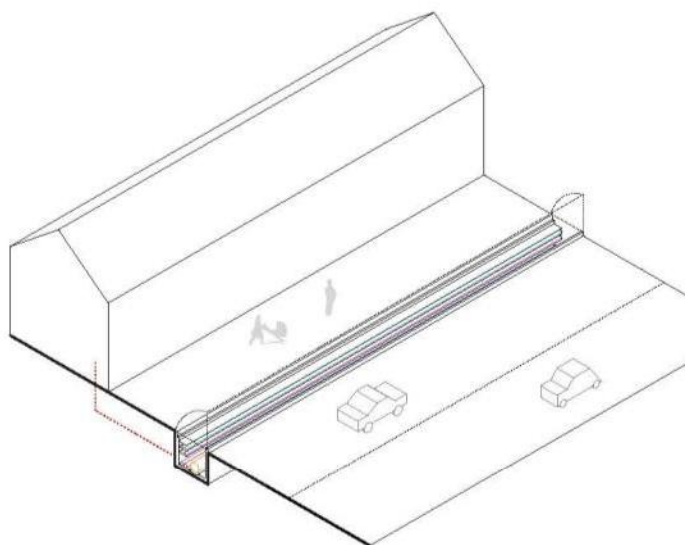


|                                                                                    |                                                                          |                                                                     |                                                                          |                                                                                         |                                                                                     |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>C</b> : Capillar flow<br>water flow From saturated to unsaturated zone          | <b>PE</b> : Percolation<br>Water flow from unsaturated to saturated zone | <b>S</b> : Supply<br>Groundwater reserves<br>Sweet water reserves   | <b>IR</b> : Irrigation<br>Agriculture                                    | <b>D</b> : Drainage<br>Drainage of rainwater / groundwater through combined sewer pipe. | <b>IN</b> : Infiltration<br>Water movement through open soil into groundwater layer |
| <b>O</b> : Overflow<br>Water flow Exceeding drainage capacity of engineered system | <b>P</b> : Precipitation<br>Rain + Snow                                  | <b>E</b> : Evaporation<br>State change of water from liquid to gas. | <b>Et</b> : Evapotranspiration<br>Evaporation + transpiration of plants. | <b>L</b> : Leakage<br>Loss of water form the drainage system into unsaturated zone      | <b>R</b> : Runoff<br>surplus of water that couldn't infiltrate in the open soil     |



# Van data naar visie

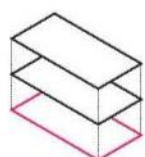




Densification



Facts



Surface

Subsurface

Public / Private



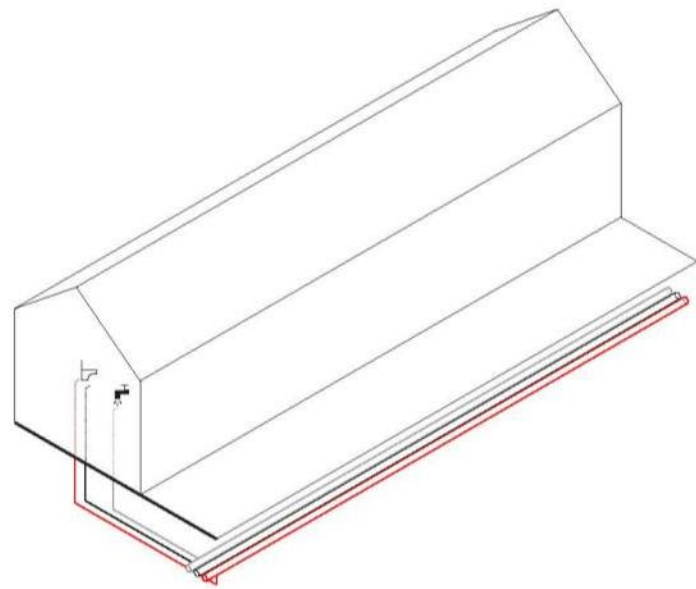
# Densification



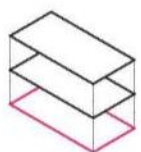
# Shrinkage



Local Treatment  
Source Separation



## Facts



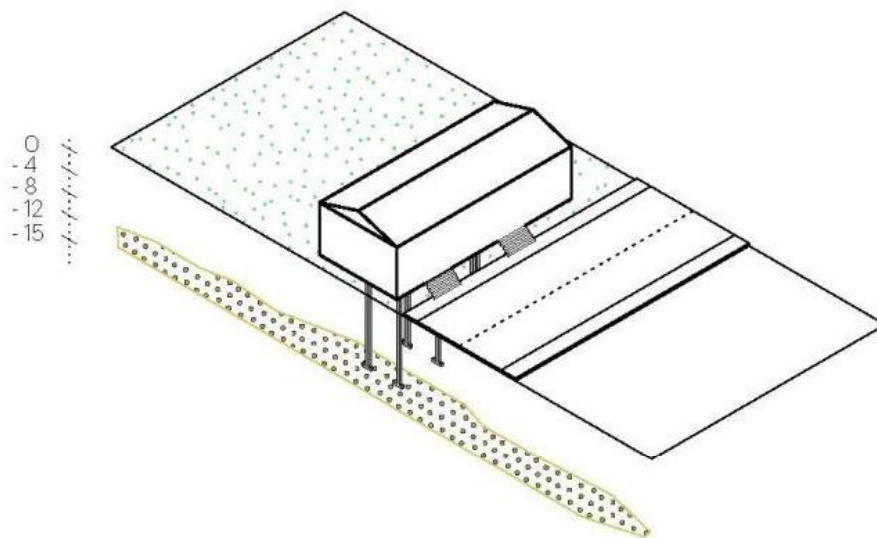
Surface

Subsurface

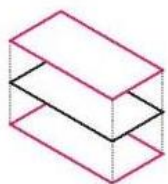
Public / Private







### Facts



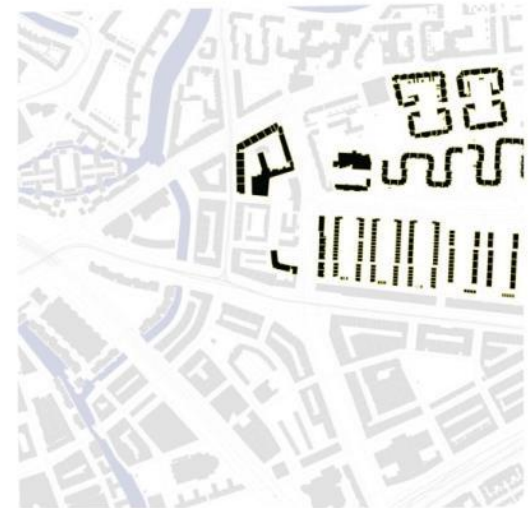
Surface

Subsurface

Public / Privat

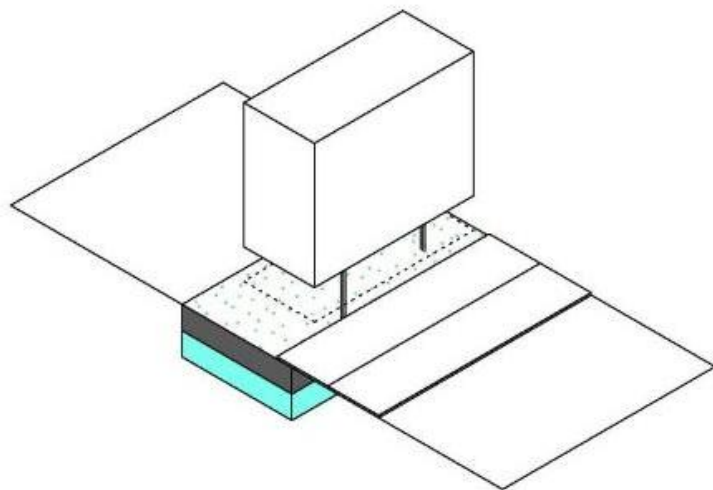


### Densification



### Shrinkage





Facts



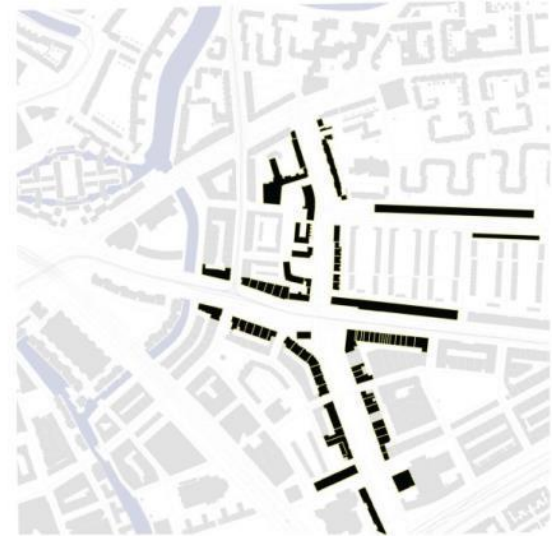
Surface

Subsurface

Public / Private

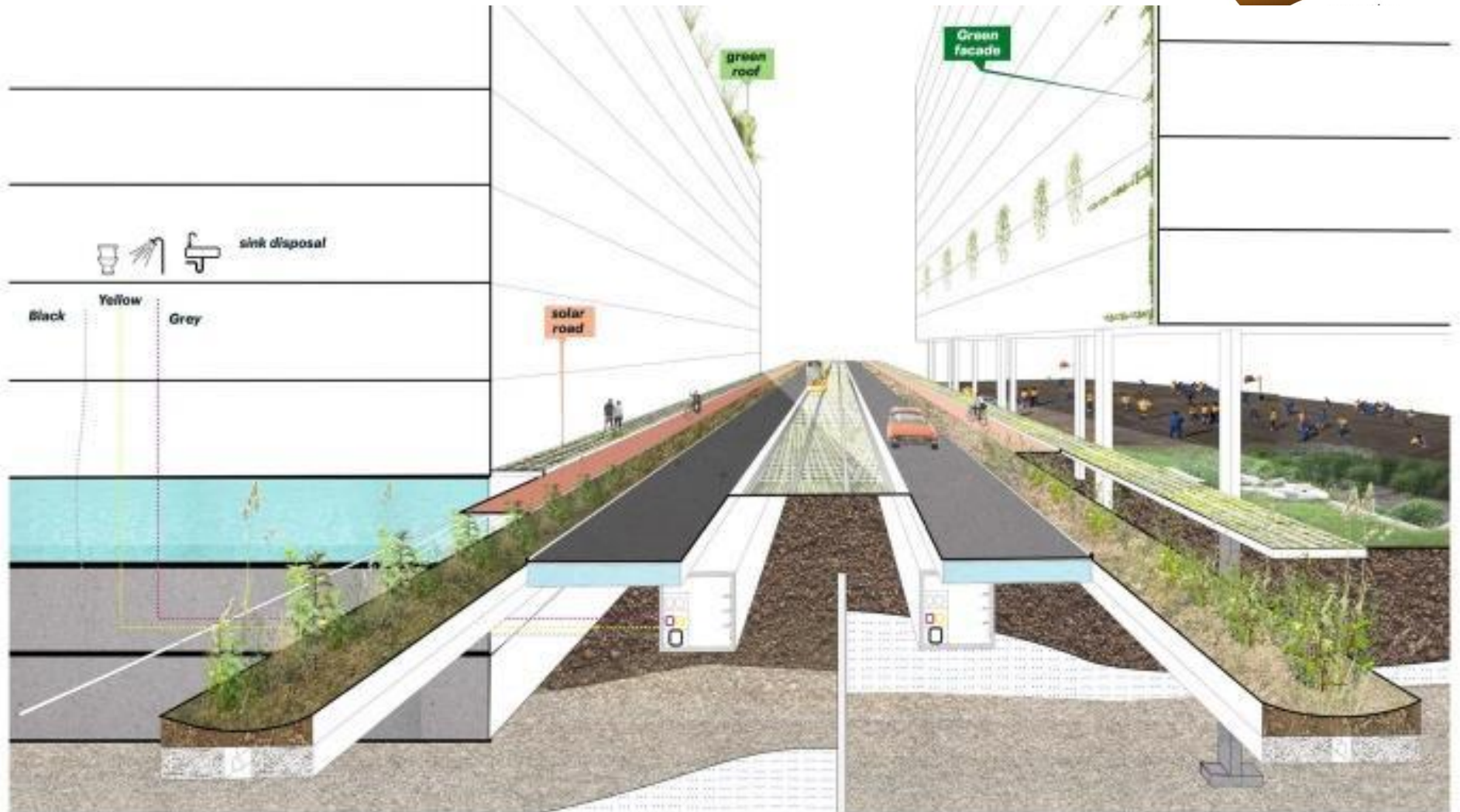


Densification

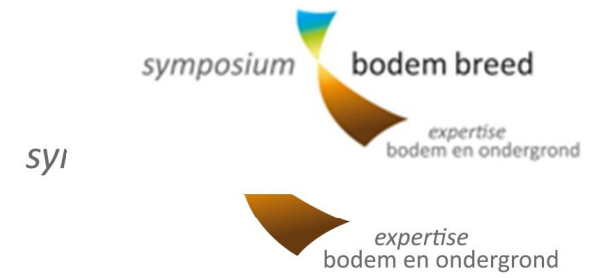


Shrinkage









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