

Inward

The silence is within

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- chair of landscape architecture

Studio coordinator: Birgit Hausleitner.

Inward reflects a direction towards the inside;
The withdrawal of the mind in order to retreat.

To

the man

with the
drums

Which is

my

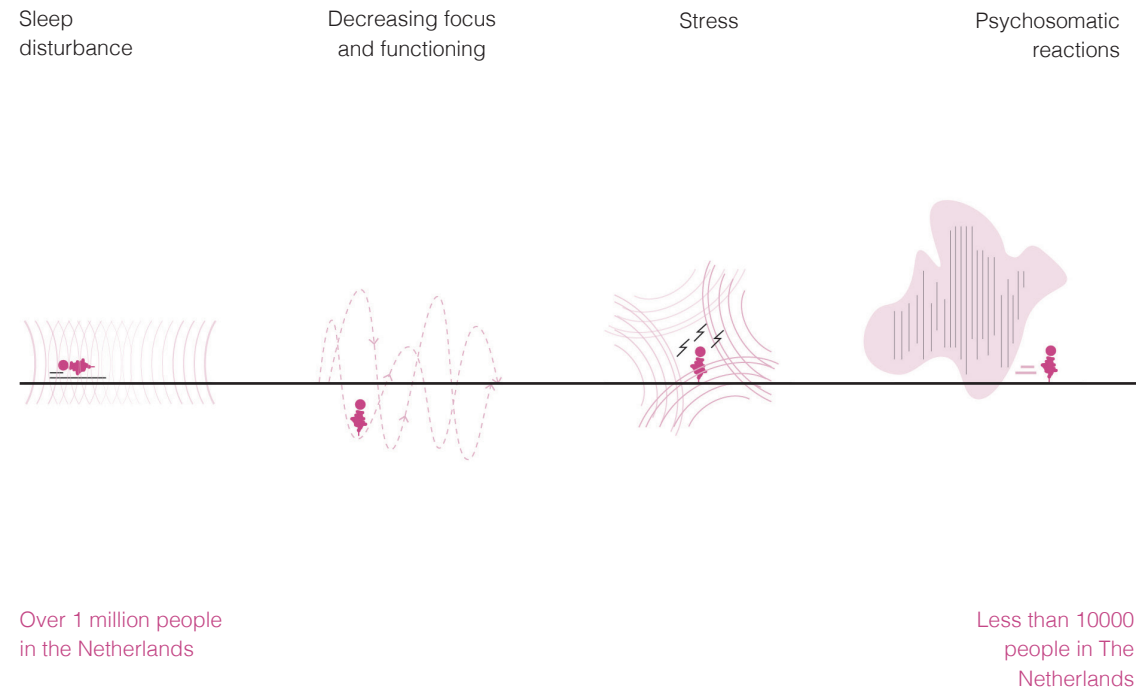
*n
e
i
g
h
b
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r*

How many times have you put your earplugs in,
headphones on, or closed the window?
...to cancel noise.

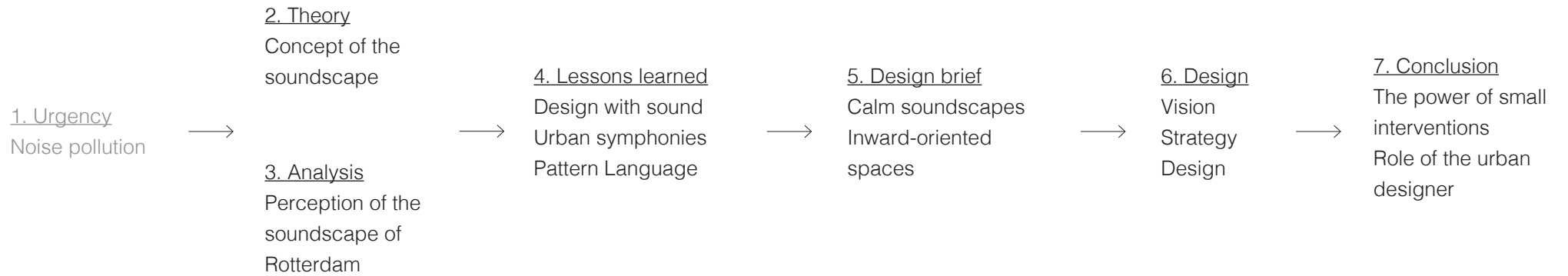
How often do you hear the birds singing, the wind
whispering over roofs, the leaves crackling under your
shoes?
...to seek for sounds

Which one you do prefer?

**Sounds play a major role
in the perception of the
environment we live in.**



Effects of noise pollution on the psychological well-being in the Netherlands. (Numbers and effects based on Castro, R., & Carvalhais, M., 2014, p.281; GGD Rotterdam-Rijnmond, 2014; Rtl Nieuws, 2020; van Poll, 2020).



2

Theory

The soundscape

The soundscape is...

An environment focusing on the perception of sound. Hereby, natural acoustic sounds are main source of sound, designed in a holistic way (Soundscape Design, 2020).

Such as birds, water and wind

The soundscape is...

An environment focusing on the perception of sound. Hereby, natural acoustic sounds are main source of sound, designed in a holistic way (Soundscape Design, 2020).

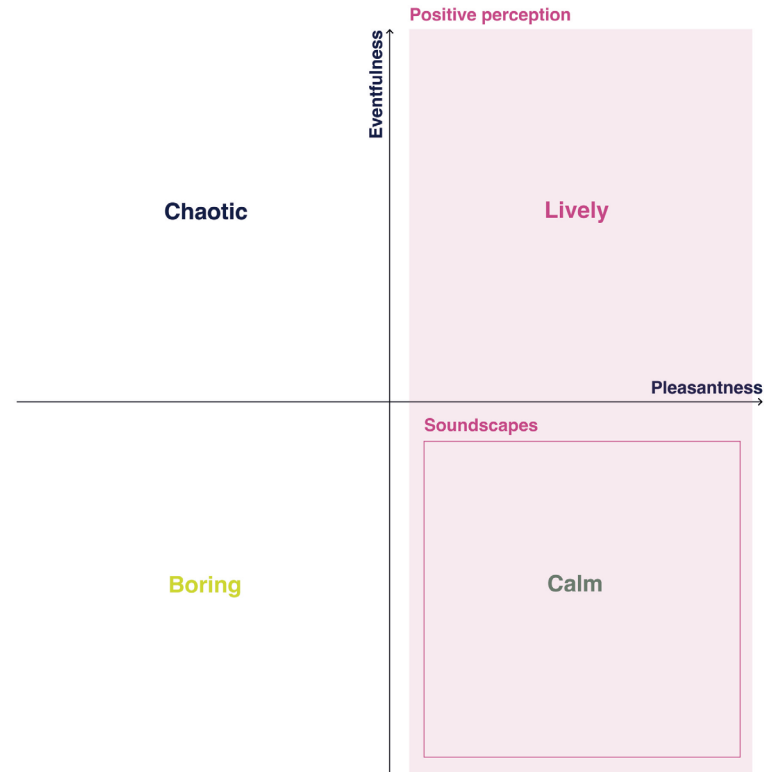
The soundscape is...

An environment focusing on the perception of sound. Hereby, natural acoustic sounds are main source of sound, designed in a holistic way (Soundscape Design, 2020).

Designing the whole atmosphere; Sounds of nature co-operate with other sounds.



Quadrant of soundscapes (Interpret by author (2022), based on van den Bosch, K., & Andringa, T. (2014)) and Russell, J. A., (1988).



Quadrant of soundscapes (Interpret by author (2022), based on van den Bosch, K., & Andringa, T. (2014)) and Russell, J. A., (1988).

- 1 | Focus on natural sound
The healing effect of the place and thereby the value of the places to withdraw.

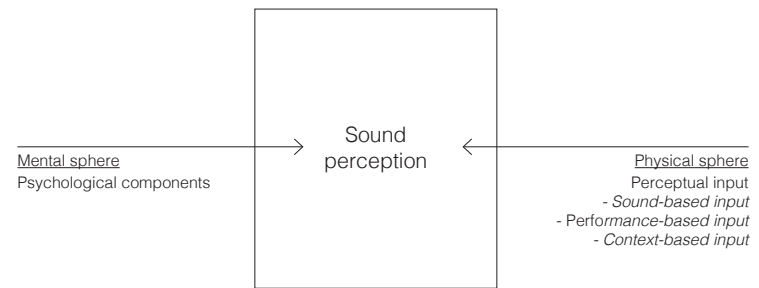
- 2 | Decrease mechanical sounds
Reduce, block or overrule mechanical sounds, from ventilation and vehicles.

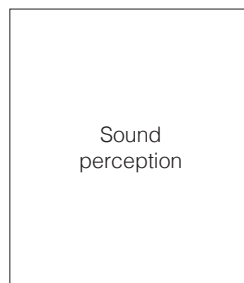
- 3 | Variety in the urban landscape
A mix in the four atmospheres and their interactions

3

Analysis

Perception of the soundscape of
Rotterdam





62 recordings in

Between 0.16 and 7.12 minutes

11 interviews

with citizens

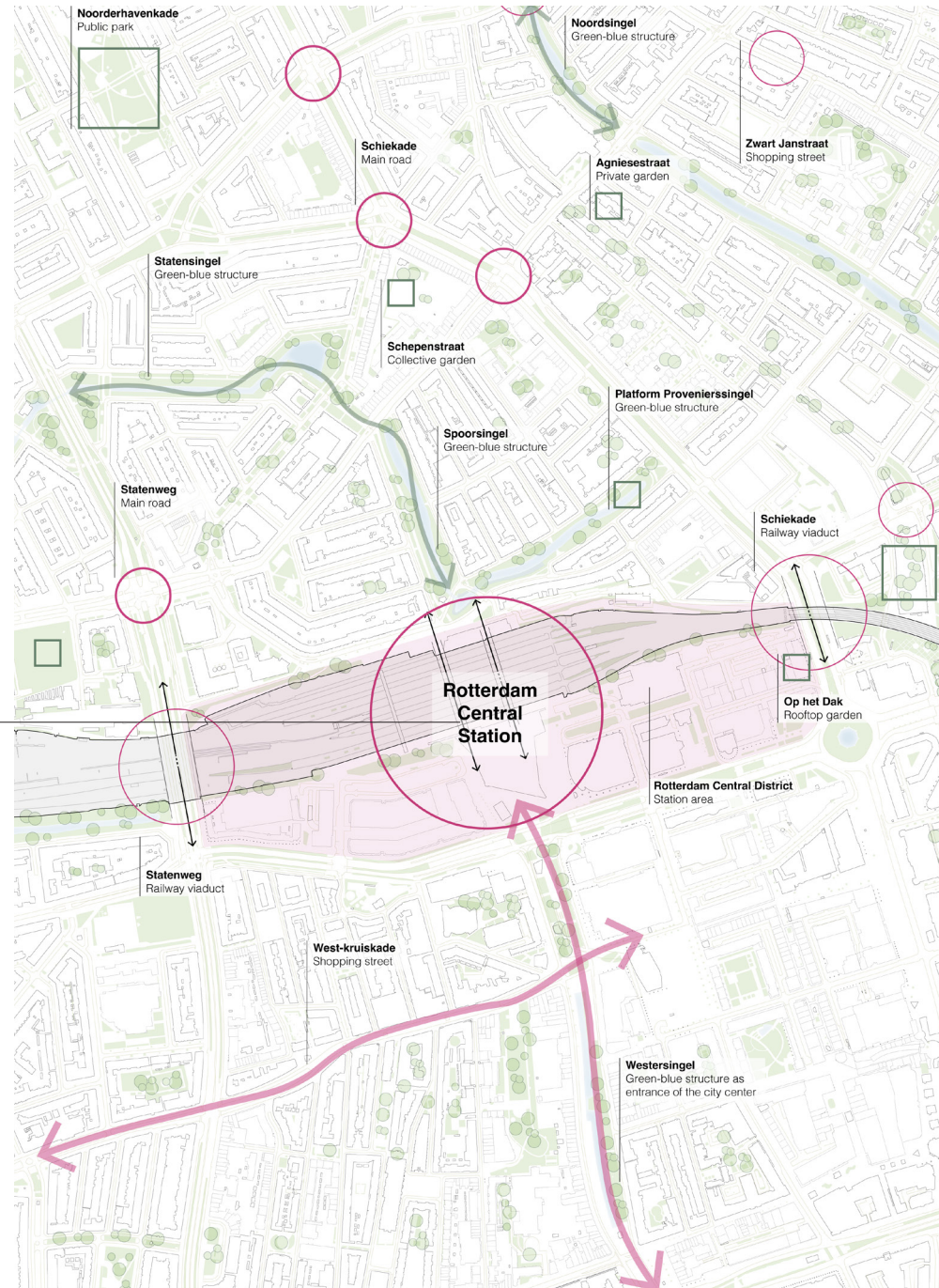
50+ location visits

and

4 site visits

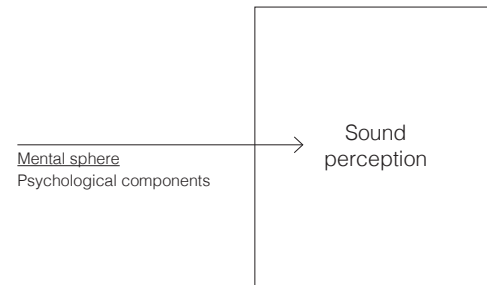
to residential blocks in the
project area

Where do you find spaces to retreat and
what are the spaces you perceive as noise?



City center
 Retreat: No spaces
 Noise: The central district and main corridors

North
 Retreat: Spaces within building blocks
 Noise: Cross-overs | interaction with sound



6 calls with sound experts

Between 1 hour and 1,5 hour

1 sound-sensitive person

Who cannot filter stimuli
of senses

1 sound therapist

Who helps people
with sight difficulties

and

4 blind experts

That focus on the sense of sound

The exposure to sound becomes noise when the cacophony of sounds becomes a chaotic interplay
This has to with overstimulation, based on your perception.

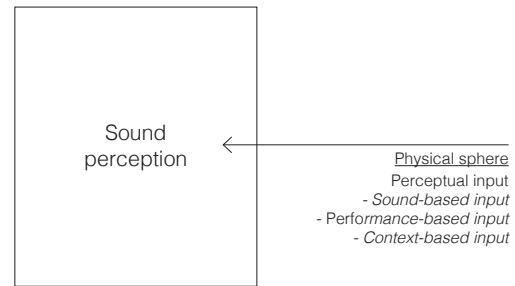
Contrast Continuity Variation Expectation Control Exposure Distance Time

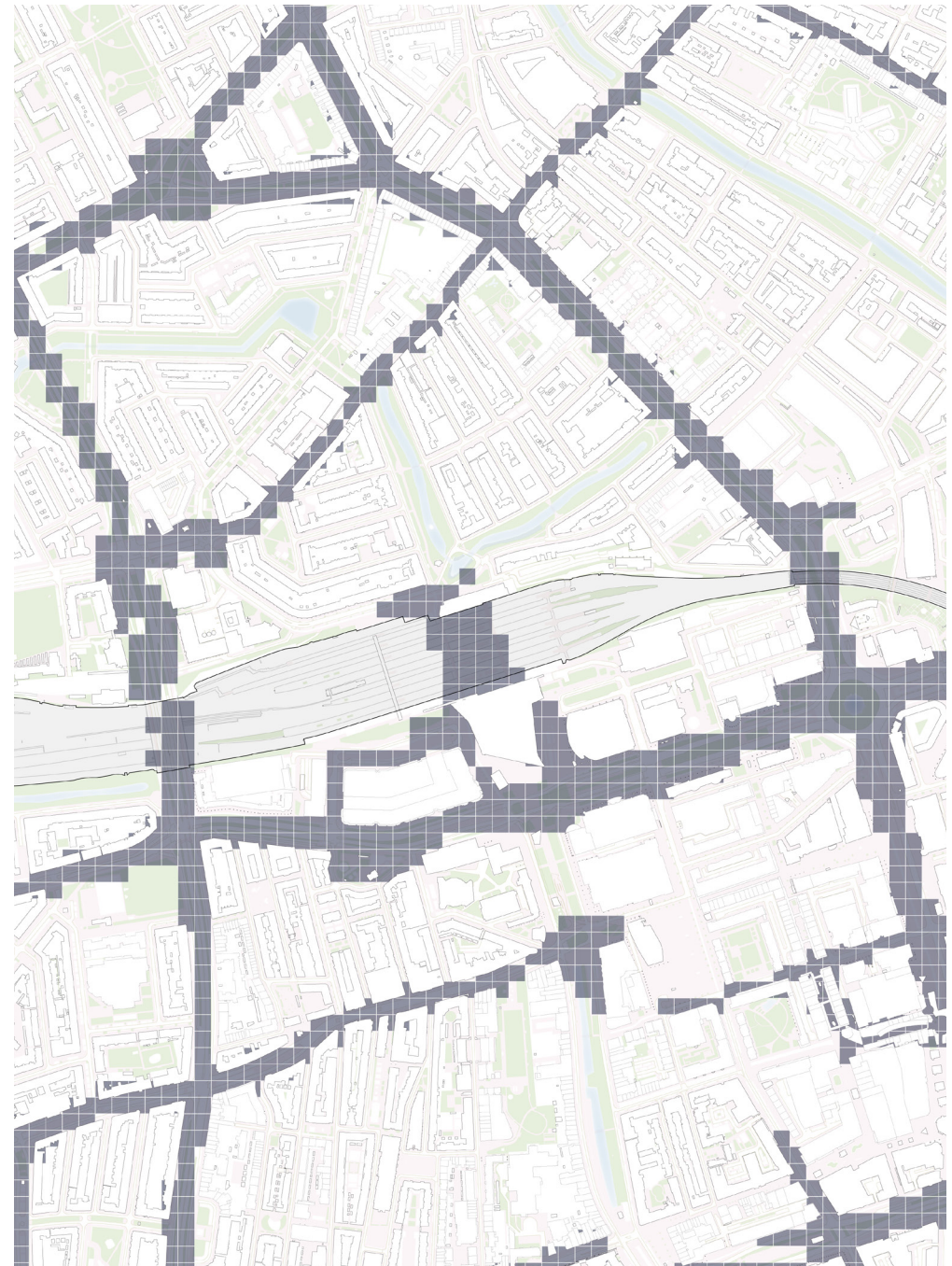
Contrast Continuity Variation Expectation Control Exposure Distance Time

Variety in the urban landscape | Transitions and access

Reducing mechanical sounds | Use and perception of space

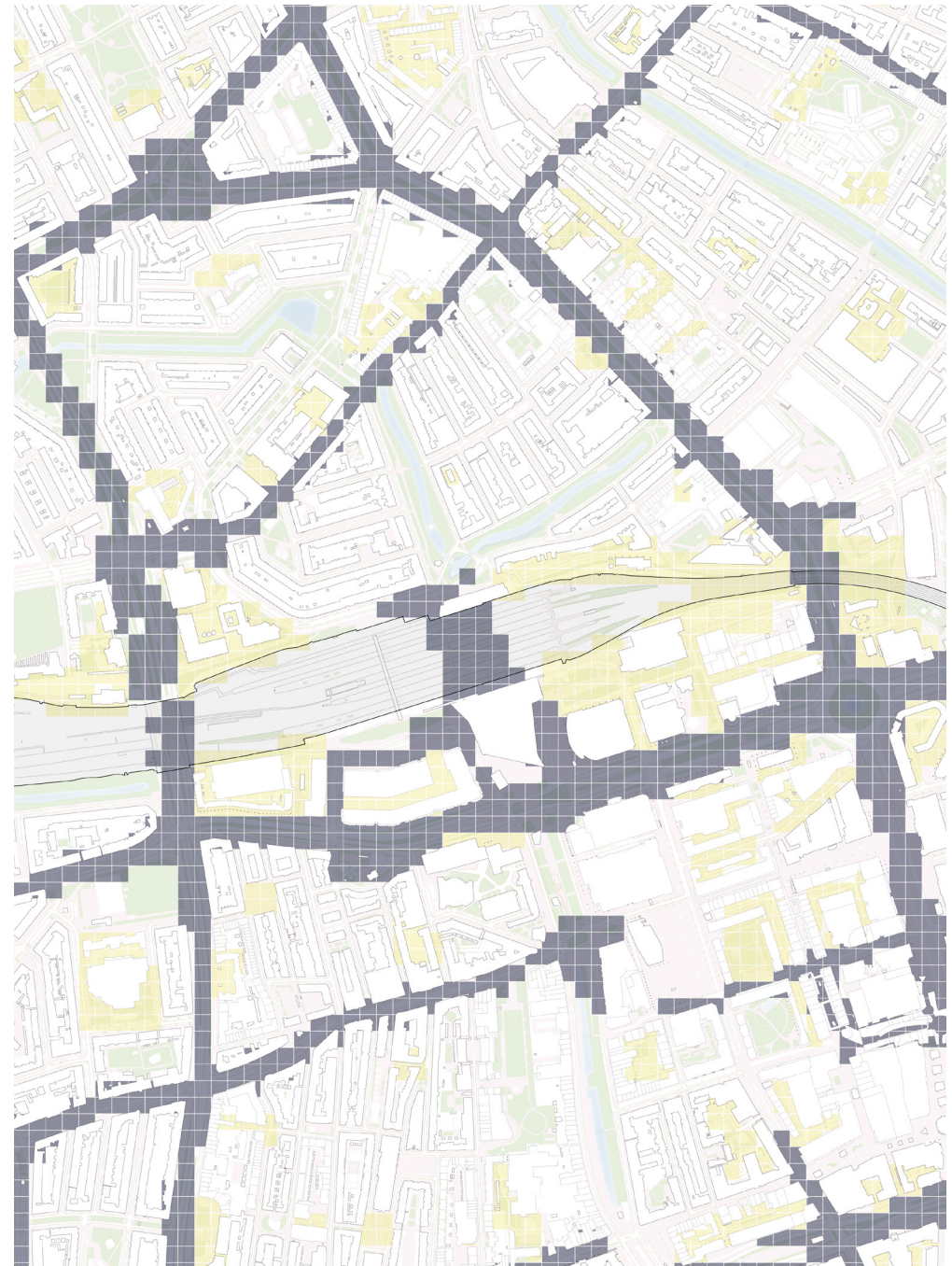
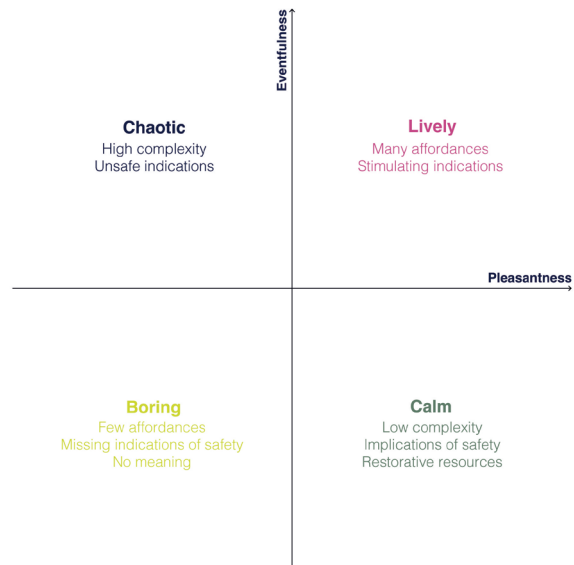
Attracting natural sounds | Healing effect of sound





Quadrant of soundscapes (Interpret by author (2022), based on van den Bosch, K., & Andringa, T. (2014)) and Russell, J. A., (1988).

Atmospheres in Rotterdam (Author, 2022).



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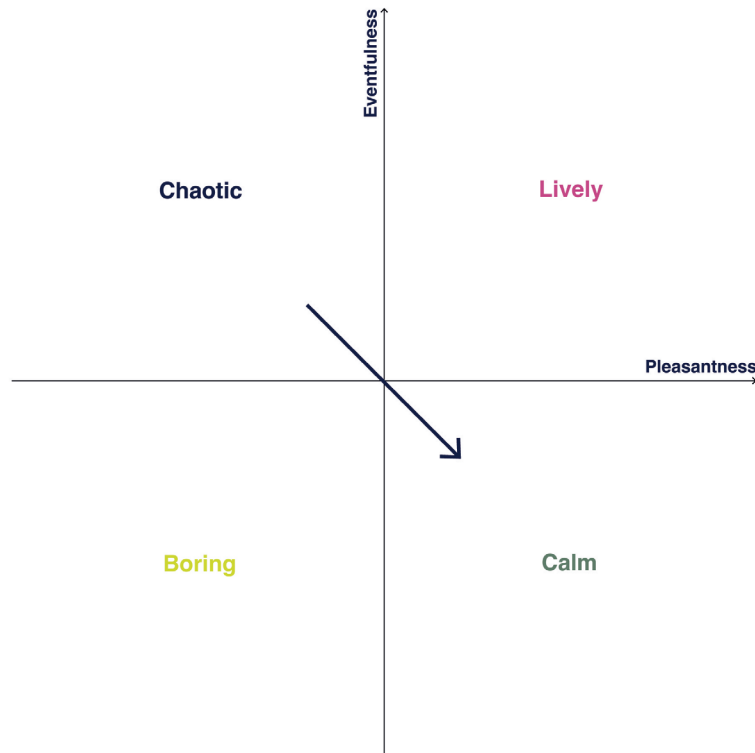
Quadrant of soundscapes (Interpret by author (2022), based on van den Bosch, K., & Andringa, T. (2014)) and Russell, J. A., (1988).

Atmospheres in Rotterdam (Author, 2022).

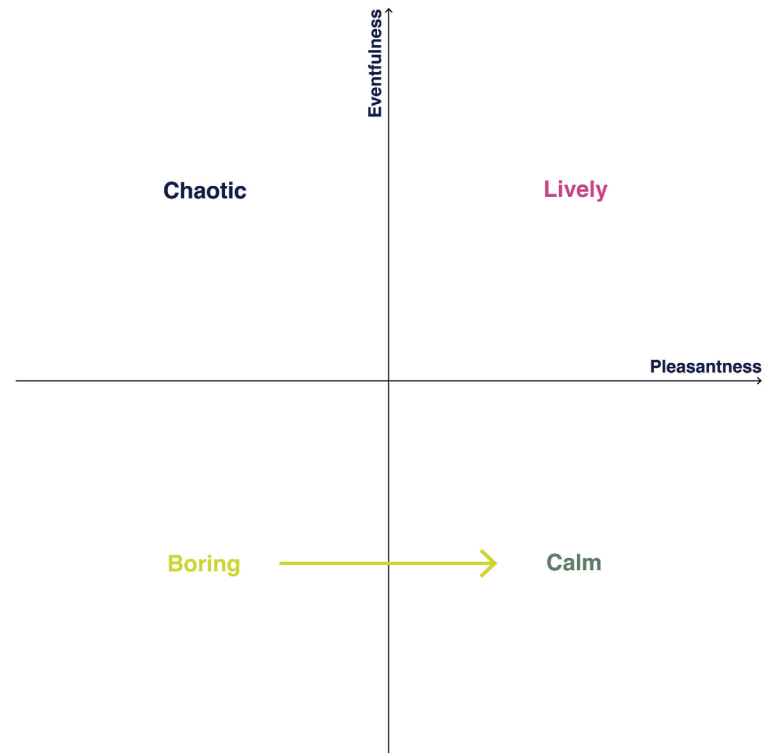


Quadrant of soundscapes (Interpret by author (2022), based on van den Bosch, K., & Andringa, T. (2014)) and Russell, J. A., (1988).

Atmospheres in Rotterdam (Author, 2022).



The **chaotic** spaces will be accepted more when having **calm escapes**



The **boring** spaces should be **transformed** into **calm** spaces to improve its intensity without creating crowdedness



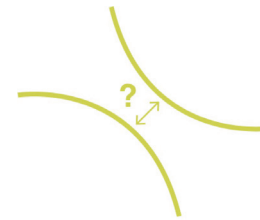
Disbalance

There is a misbalance between the vibrance (lively and chaotic) and silence (calm and boring)



Urban cacophonies

The urbanization leads, at this moment, to noise pollution and a decreasing psychological well-being in stead of symphonies.



Knowledge gap

There is a gap between psychology (the mental sphere) and urban design (the physical sphere)

4

Lessons learned

Pattern Language

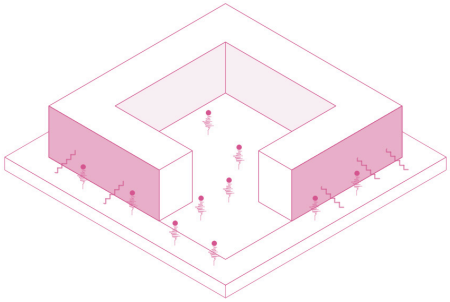
Design with sound

Urban symphonies

Mental sphere
Contrast →

1BC The sounding barrier
Hypothesis
Explanation of the effects and functioning of the relation space-sound-perception

Designing with urban form
Guidelines how to design with this pattern.

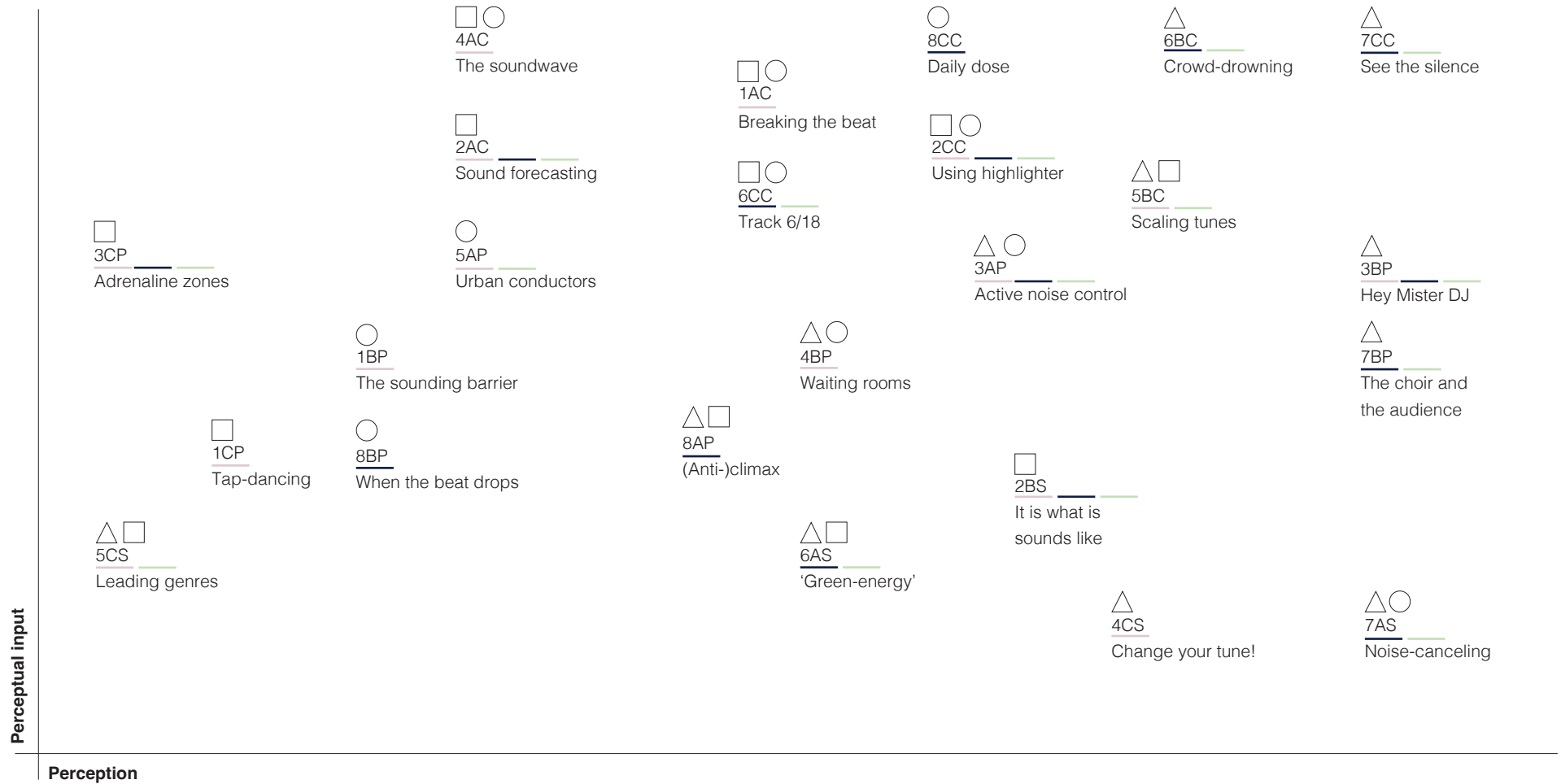


Relations
1CP/2CC/3AP/3BS/5AP/6BC/7BP/7CC/8BP

Sources
(Castro, R. & Carvalhais, M., 2014) (Griliner, K. & Hellström, B., 2019, p.34,78,84)

← Physical sphere
Urban form

Indications for **designing**
with variables of sound





△ **Associative**



□ **Intervening**



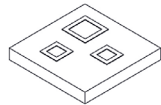
○ **Facilitative**

The scales | Soundscapes

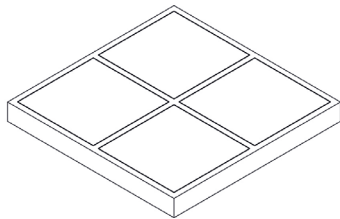
Rhythm



Melody

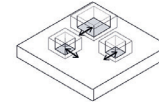


Genre

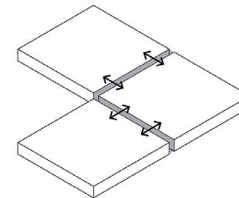


The elements | Soundtransitions

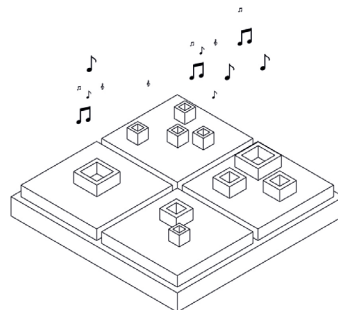
Dynamics



Dynamics



Urban symphony







5

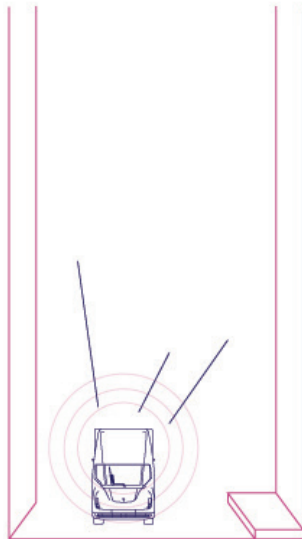
Design brief

Calm soundscapes

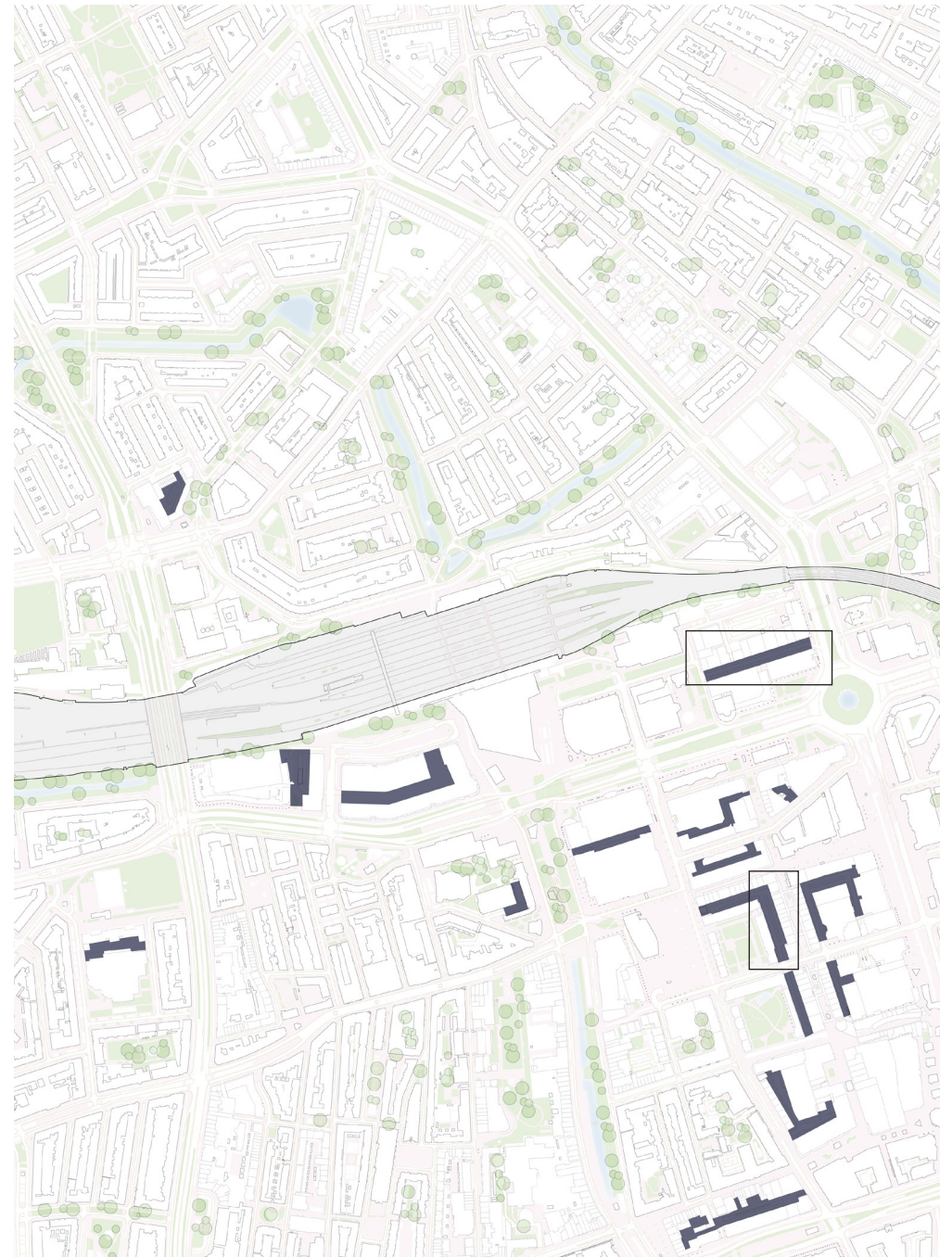
Inward-oriented spaces

Inward reflects a direction towards the inside;
1 | The withdrawal of the mind in order to retreat and
2 | The architectural form of inner spaces; supposing
a healing territory of community within the urban scape.

You can interpret it as the physical | pause | in the auditory landscape.



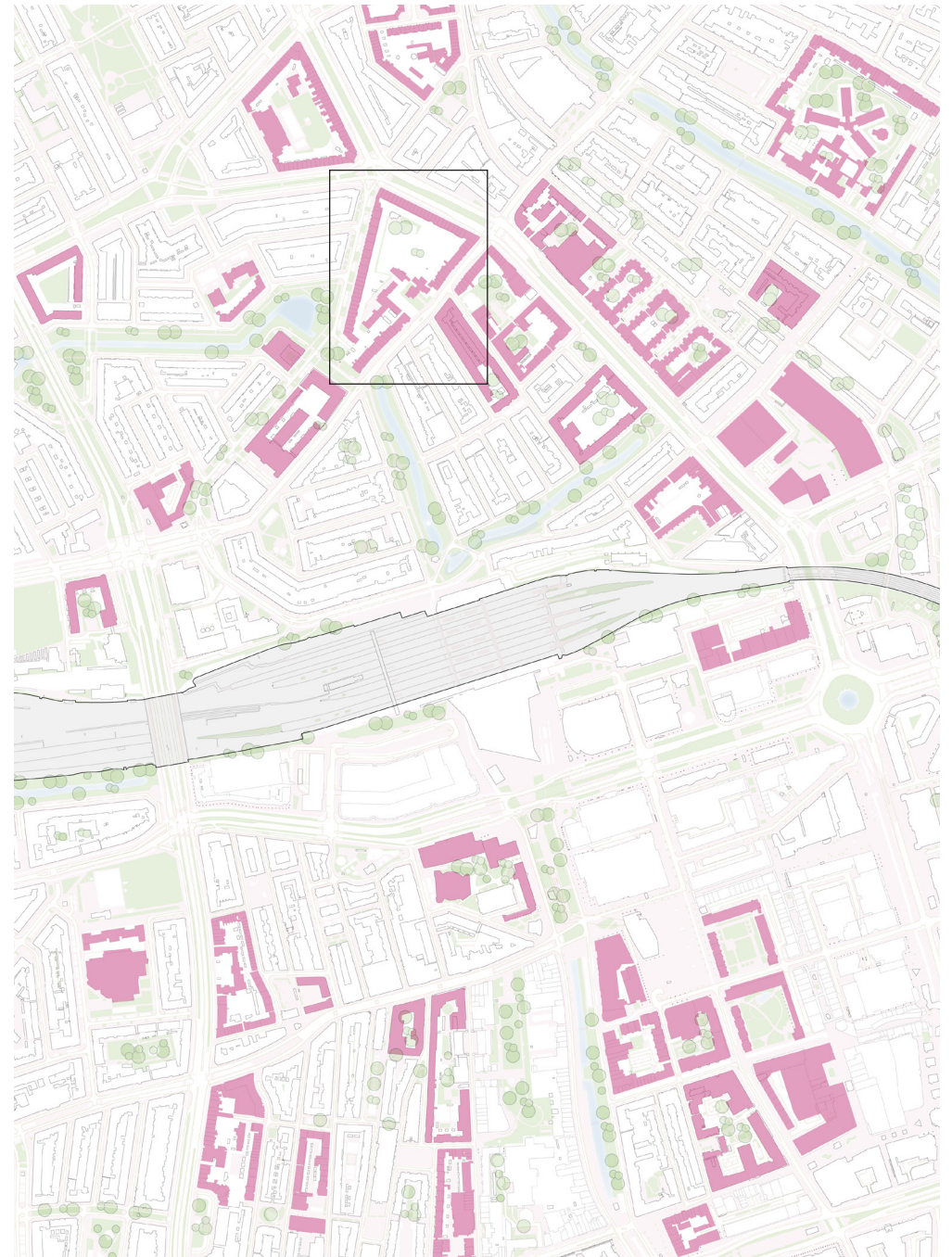
Expedition street







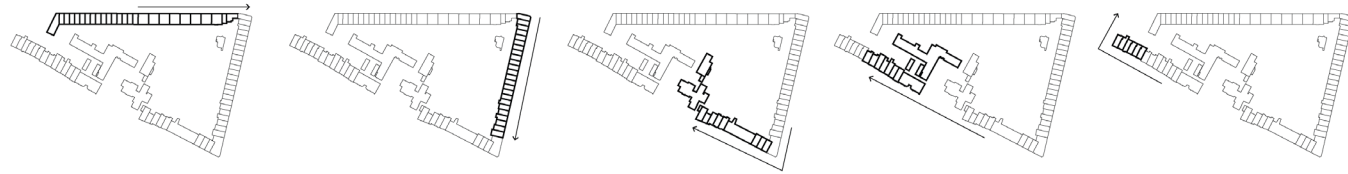
Courtyard





Schepenstraat
Friday, 2 pm
Sunny, 12 degrees
Dominant sounds: Cars and scooters
Background sounds: Wind and voices
Rec. 6.51 minutes

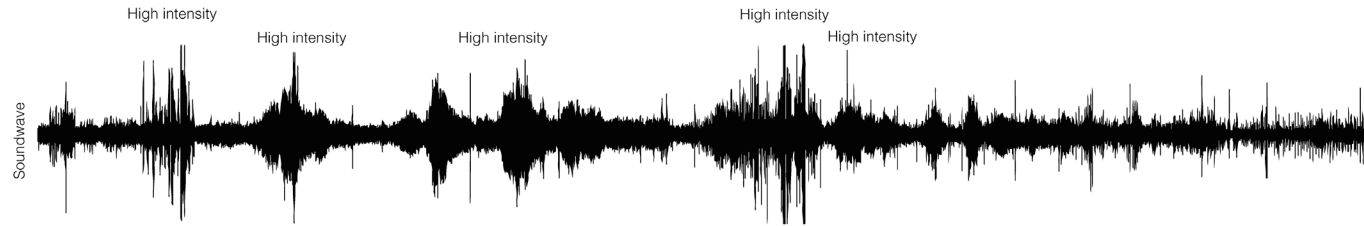
Urban block



Photo's



Soundwave

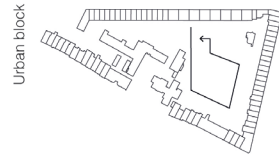


Sounds

Tot ik wakker schrik van
OPRUKKENDE SCOOTERS
& STEMMEN van stoere jongens
Ze zingen nachten vol in verlaten straten
op weg naar huis.



Schepenstraat
Friday, 2 pm
Sunny, 12 degrees
Dominant sounds: Cars and scooters
Background sounds: Wind and voices
Rec. 0.40 minutes



Photo's



Soundwave



Sounds

Ge'tik Ge'tik
tennis tot het donker.
het *d o m m e l* me de nacht in.
Waar tussen
Neergetaalde
schuttingen en muren
een spontaan gesprek begint.

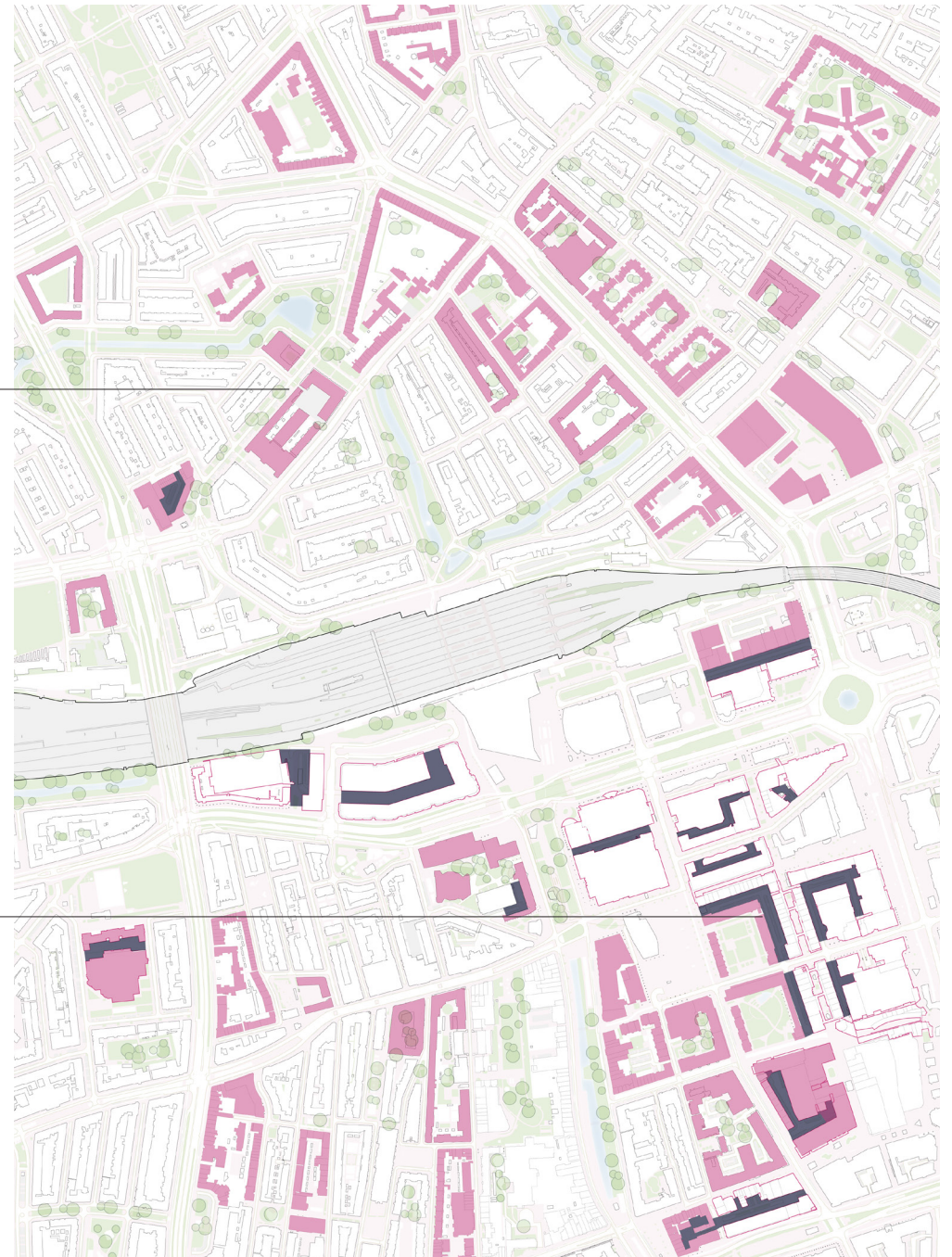


Rotterdam Noord
Territories of silence

A calm soundscape within a territory of silence should always have a gradual transition to another calm soundscape

Rotterdam city center
Urban escapes

A louder structure should always have a calm escape to retreat



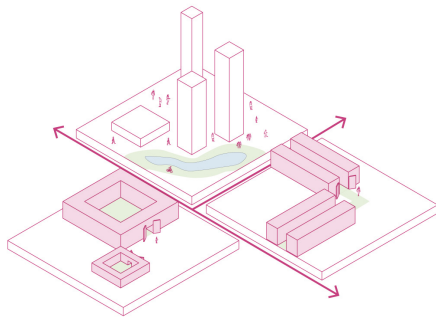
6

Intervention

Vision: Surrounding Rotterdam Central Station

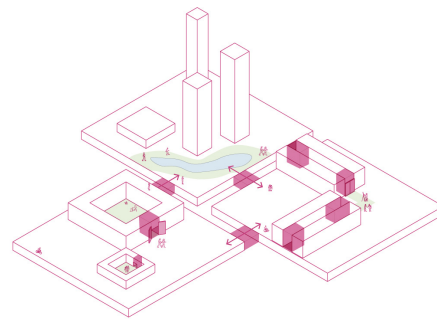
Strategy: The whisperroutes in Noord

Design: The urban escape in the city center



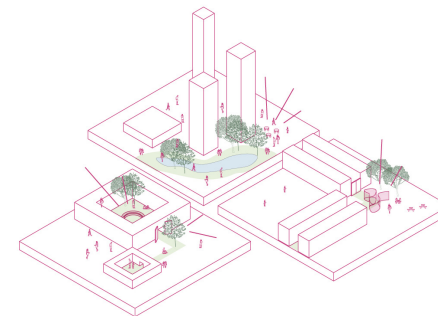
Spaces to retreat

New calm soundscapes within the existing urban structure and emphasize existing hidden spots in a subtle way.



Smooth sound transitions

Contrast between calm spaces and lively spaces by access and materialization.



Re-adjust perception

Vegetation, expectation, and variety in sounds to improve mental state and emphasize calmness.

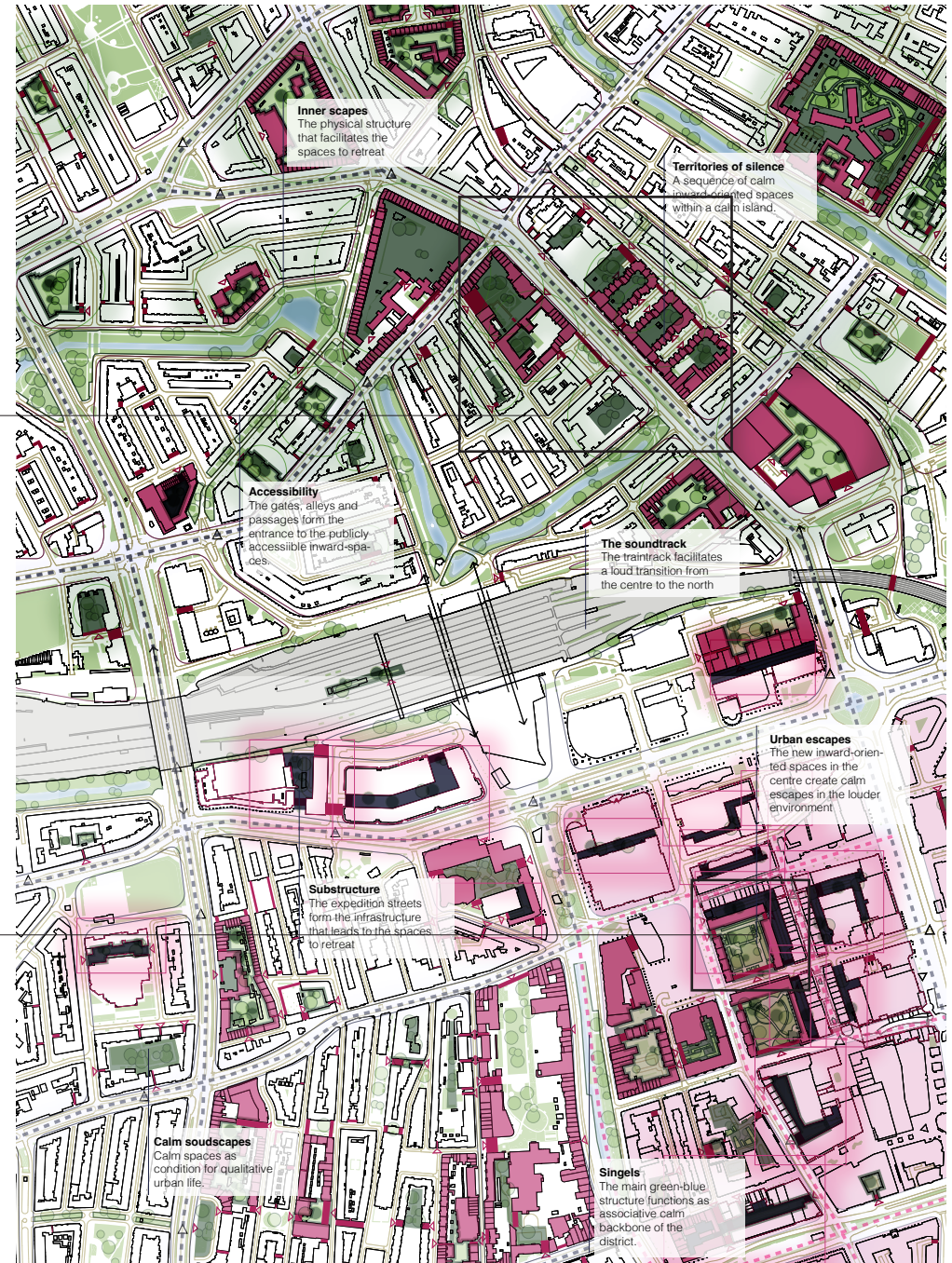
North

A cluster of inward oriented spaces separated by the main street Schiekade

City center

A silent island within a louder soundscape; the expedition street and the public courtyard

-  Traintrack
-  Crossovers traintrack
-  Existing green structures
-  Existing inward-oriented space
-  New inward-oriented space
-  Courtyards
-  Expedition streets
-  Buildings surrounding the expedition street
-  Sound transition
-  Entrance
-  Territories of silence
-  Urban escapes
-  Sounding islands
-  Main roads in between the islands
-  Main pedestrian roads



Inner scapes
The physical structure that facilitates the spaces to retreat

Territories of silence
A sequence of calm inward-oriented spaces within a calm island.

Accessibility
The gates, alleys and passages form the entrance to the publicly accessible inward-spaces.

The soundtrack
The traintrack facilitates a loud transition from the centre to the north

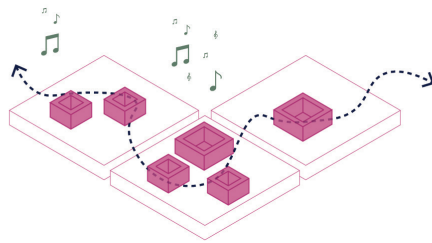
Urban escapes
The new inward-oriented spaces in the centre create calm escapes in the louder environment

Substructure
The expedition streets form the infrastructure that leads to the spaces to retreat

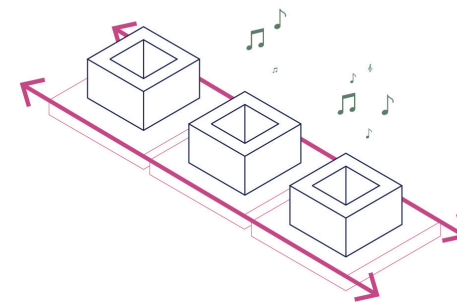
Calm soundscapes
Calm spaces as condition for qualitative urban life.

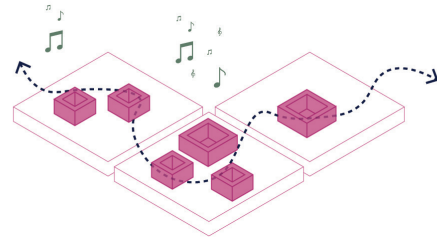
Singels
The main green-blue structure functions as associative calm backbone of the district.

Northern area
Connecting silent spaces
By creating a network of transitions



City centre
Creating silent spaces
By connecting sub-structures

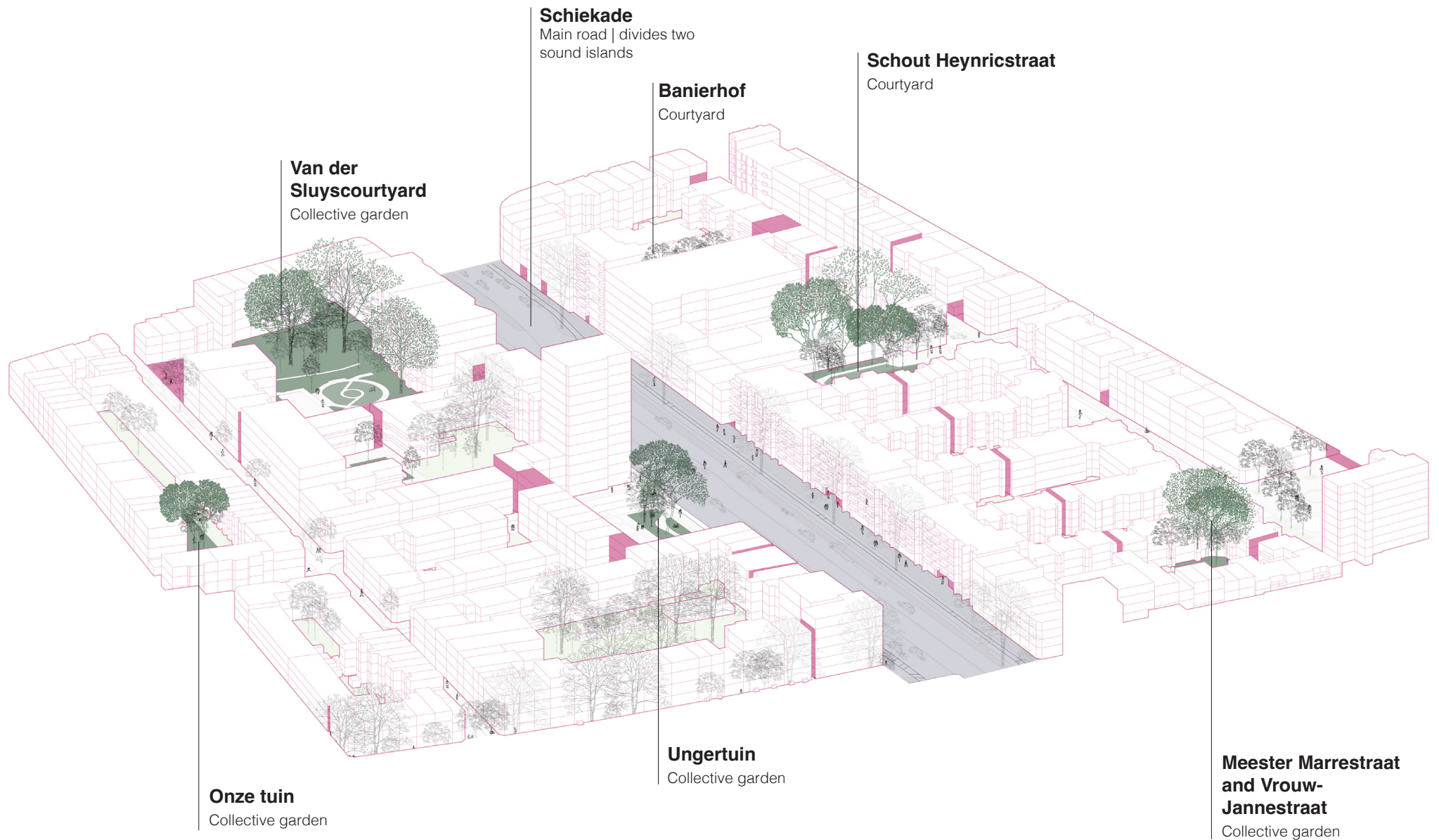




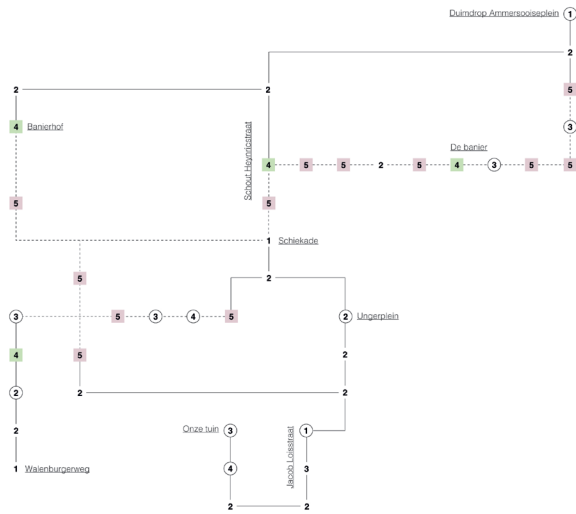
7

Intervention

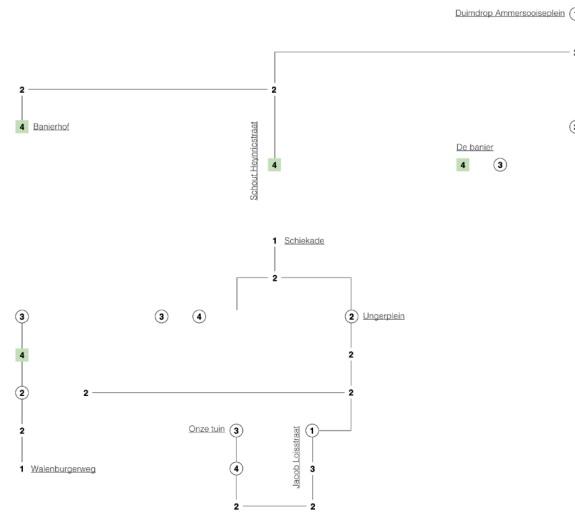
Rotterdam North and
her whisperroutes



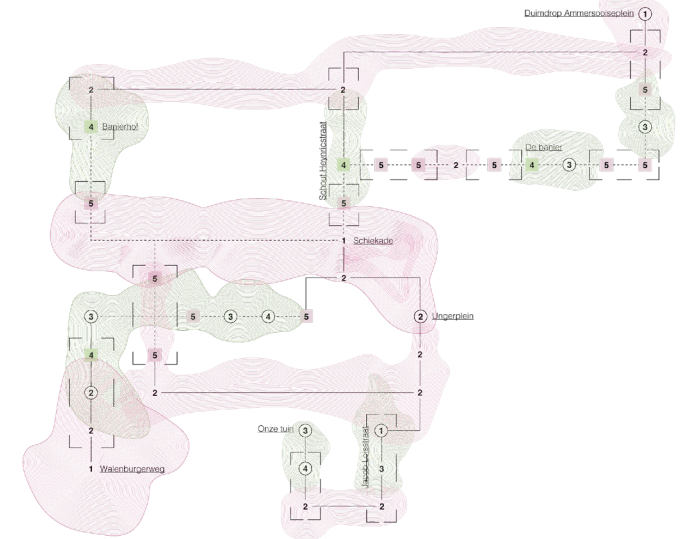




Phychical reach



Perceived reach



Sounding reach

The transitions from public to private create barriers to visit the inward-oriented scapes

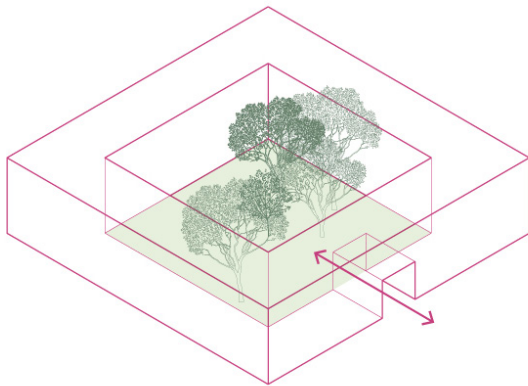
- 1 | The lack of a feeling of safety
- 2 | The inability to hear calm sounds or to see where it comes from

The whisperroute is not a route from
A to B, but instead a concentration of
epiphanies

Designing in a subtle way; the power of the courtyards is that they do not scream for attention

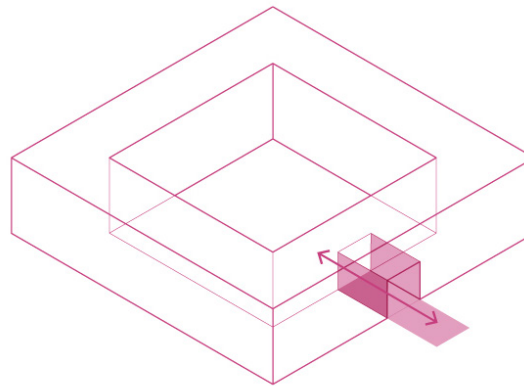
The whisperroute is not a route from A to B, but instead a concentration of epiphanies

The value of inward-oriented spaces is realized the moment you hear (or see) them; you think that you discover a space by accident, while actually this is designed.



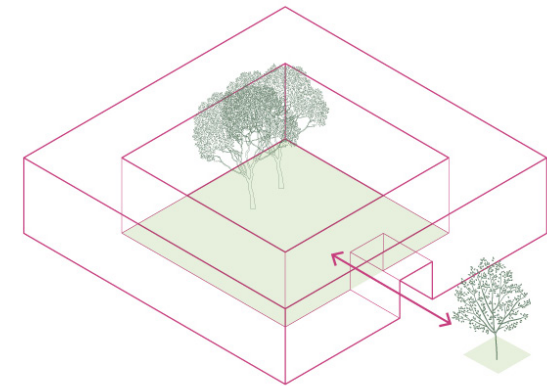
Draw attention

Use the gates and parking terrains as the physical connection towards the inward-oriented space.



Variety in material

Emphasize sound transition and routing by changing the material or continuing the material.

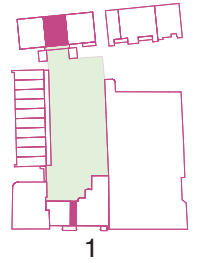


Seeing green

Improve the perception of sound by adding vegetation (Seeing) vegetation increases sounds of nature and the association of a positive perception.

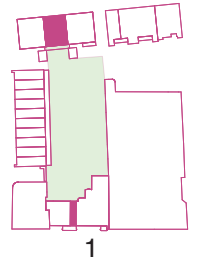


1 | Banierhof



The Schiekade is too loud to overrule the mechanical sounds and the entrance is very narrow.

1 | Banierhof



Green facade

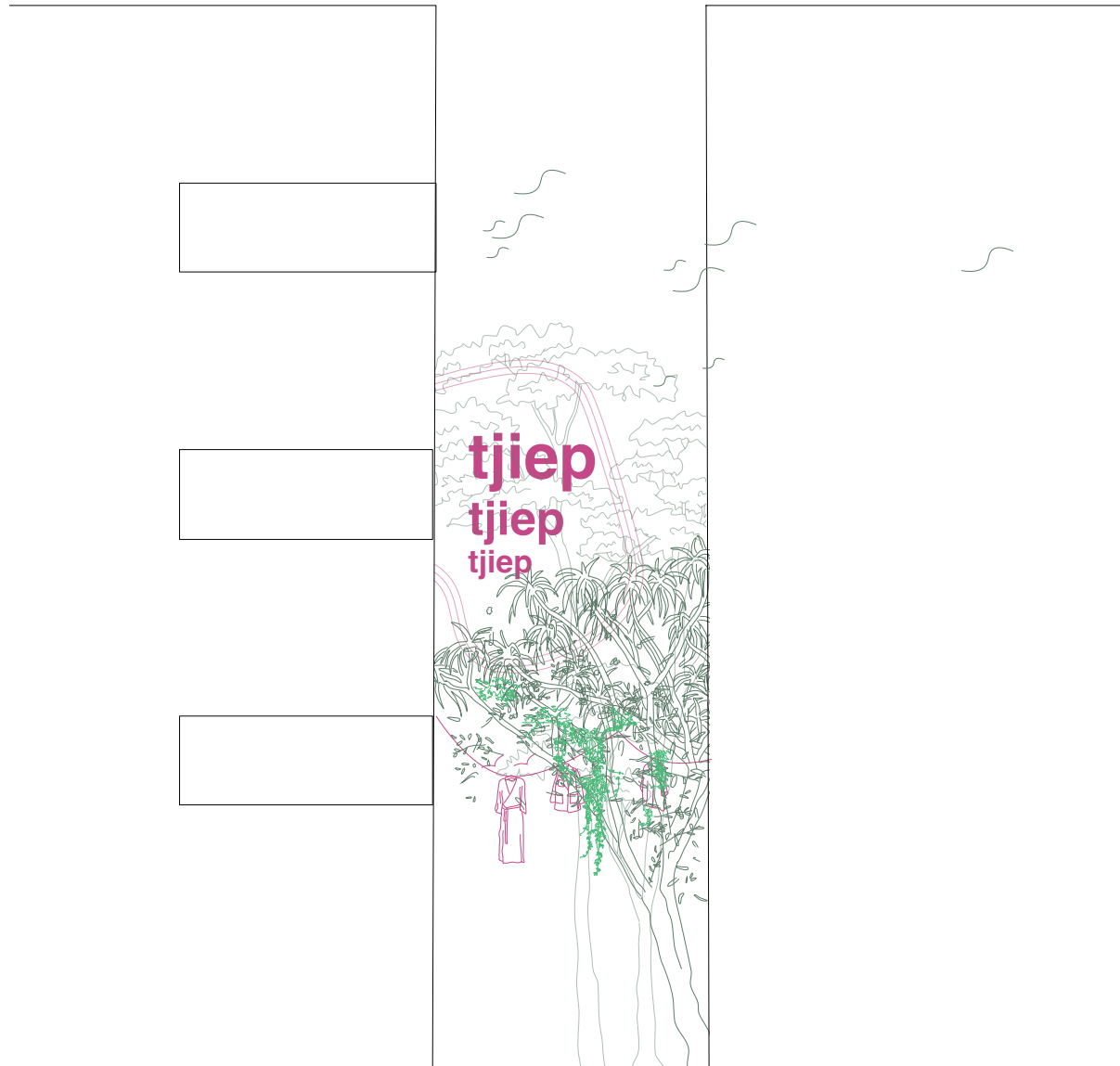
Places to sit

Vegetation



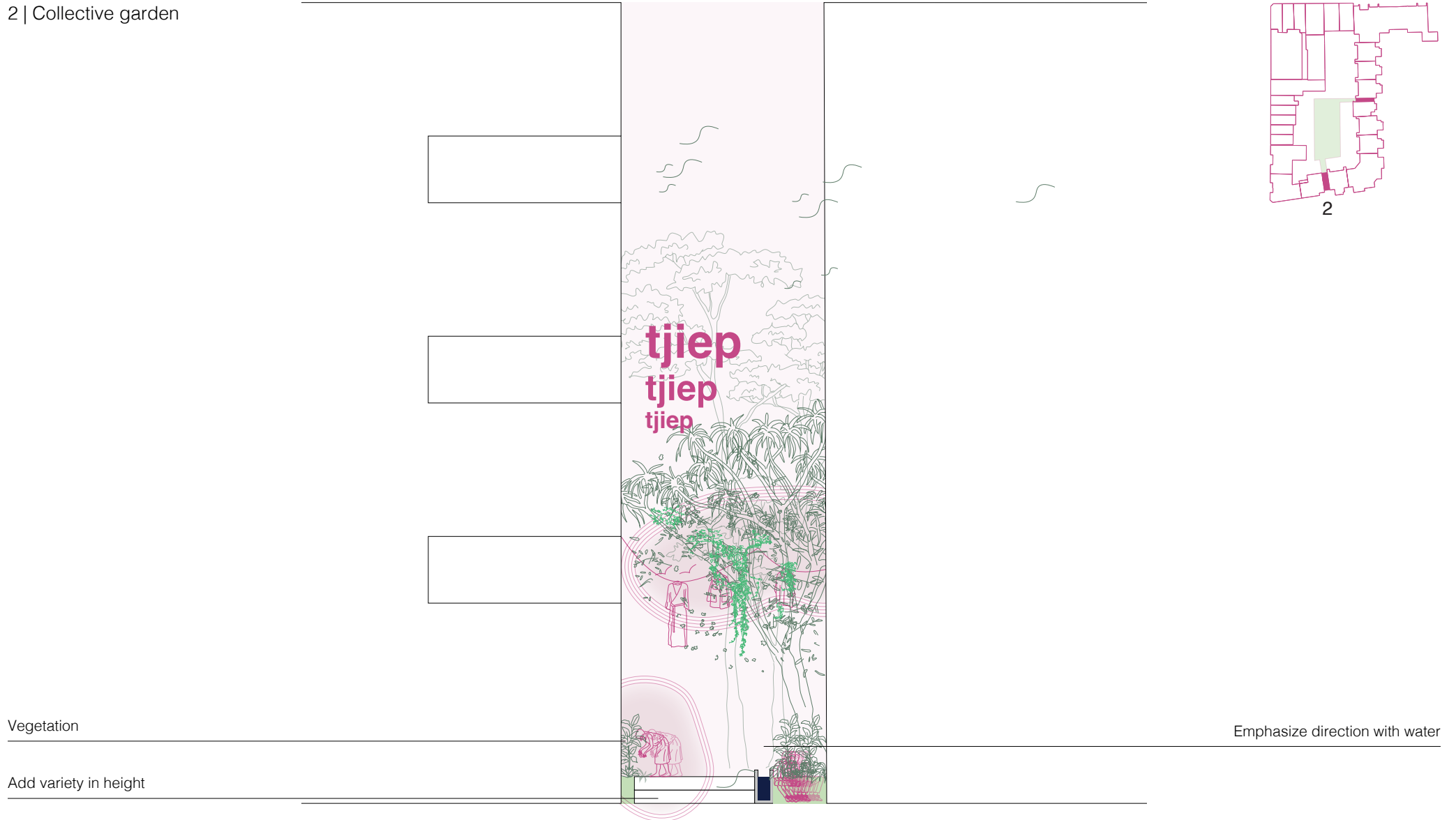
Seeing green and changing the texture helps to emphasize an entrance to a calm space.

2 | Collective garden



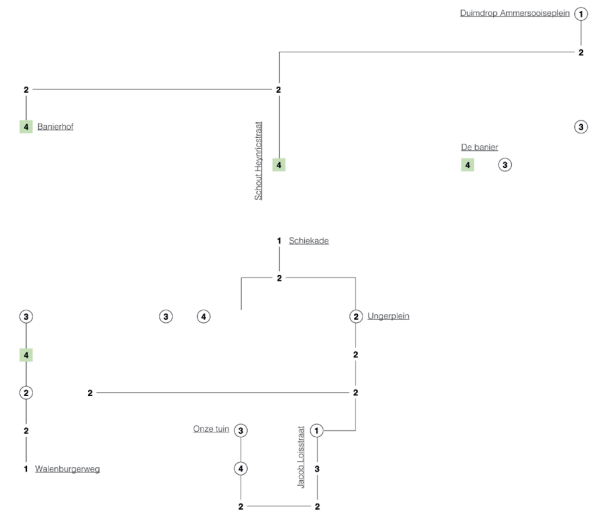
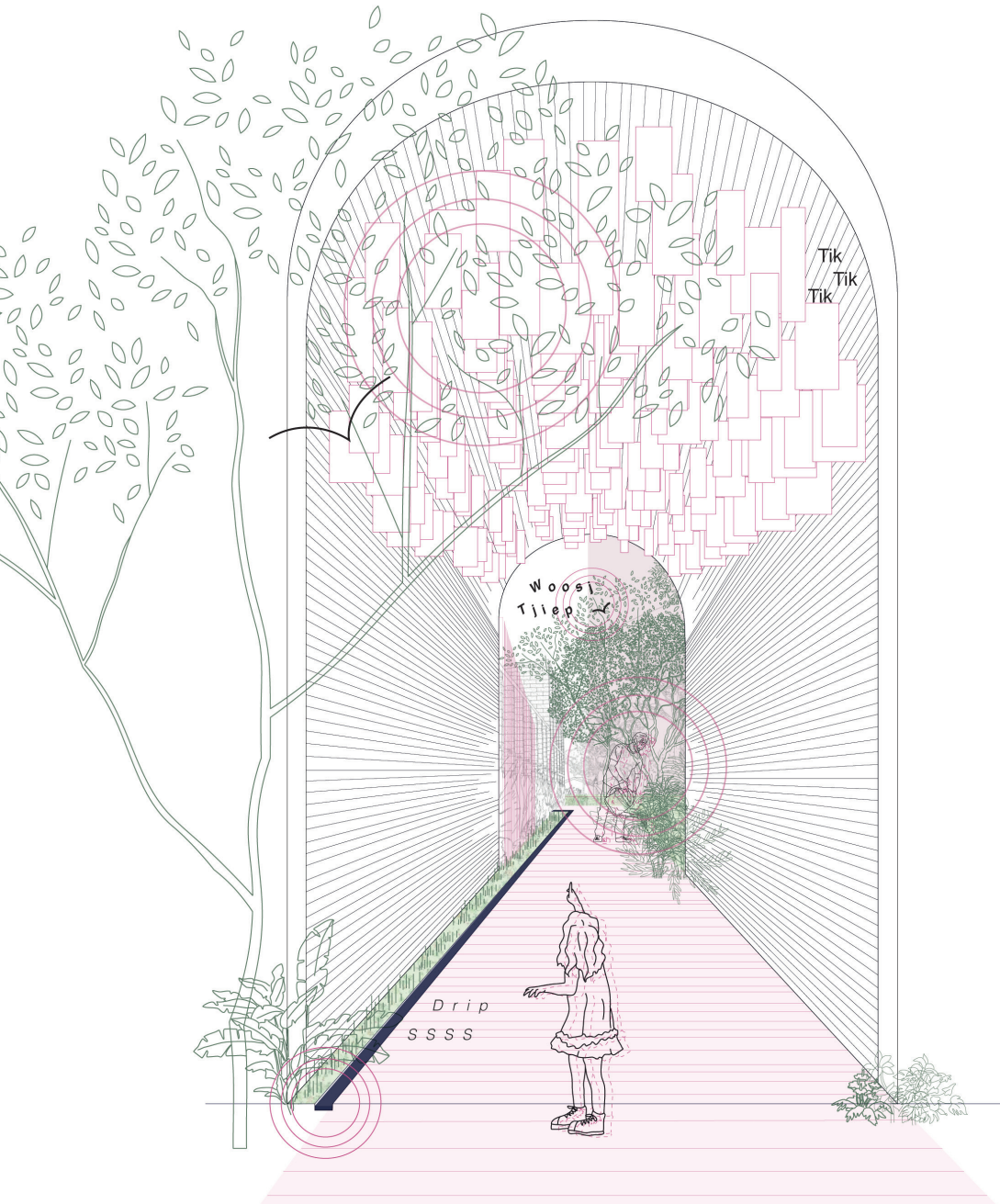
In the alley, the sounds are strongly directed and echo a lot.

2 | Collective garden

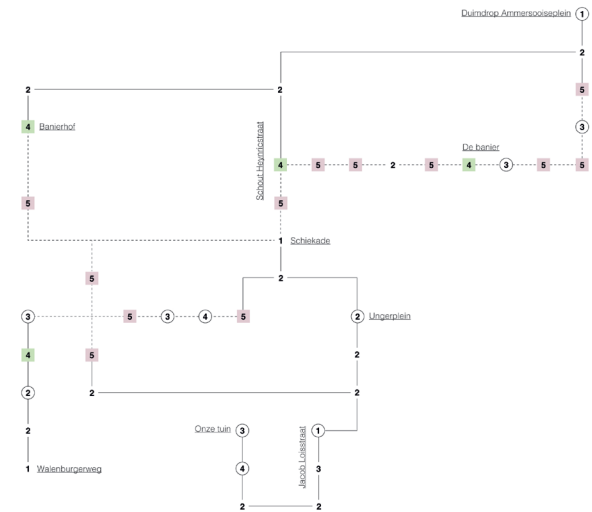


When implementing a small waterway the direction of sound becomes hearable even as the direction you should walk to (in order to visit the calm space).

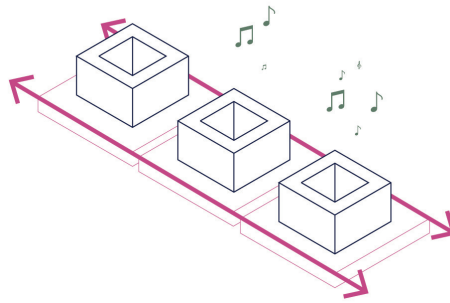
After redesigning the alley
Location: From Vrouw Jannestraat to Meester
Marrestraat via collective garden
(Author, 2022)



By extending the sounding reach, the perceived route becomes the physical reach



Which opens up the whole calm substructure behind it.



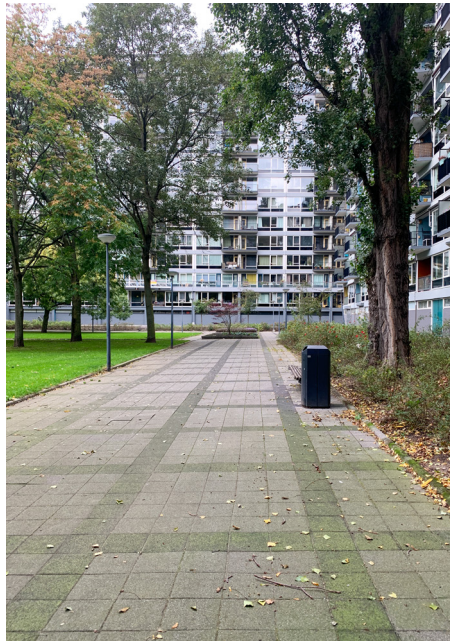
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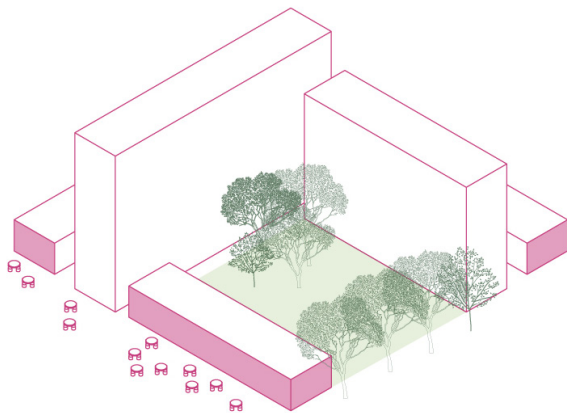
Intervention

The Lijnbaan Ensemble
as urban escape



The Lijnbaan ensemble seems to be a forgotten island within the louder structure.

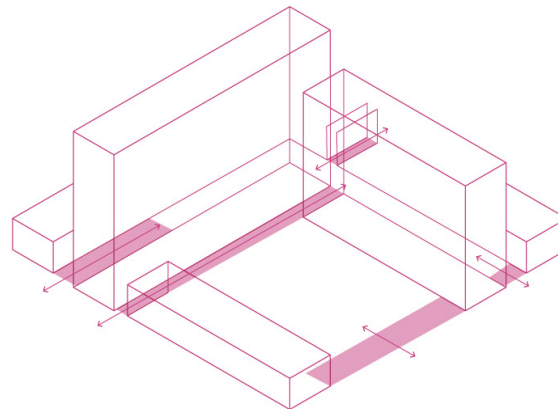




Keep current qualities

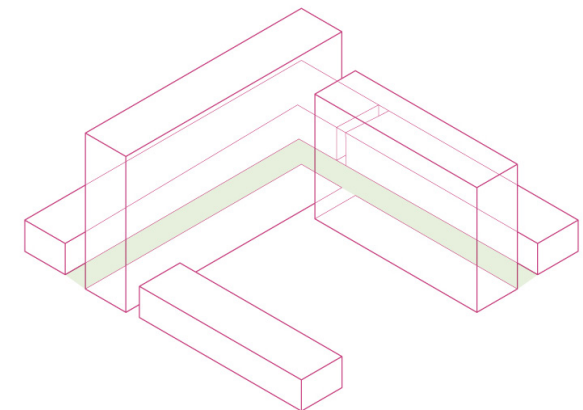
Functions (lively atmosphere)

Trees (calm atmosphere)



Connect atmospheres

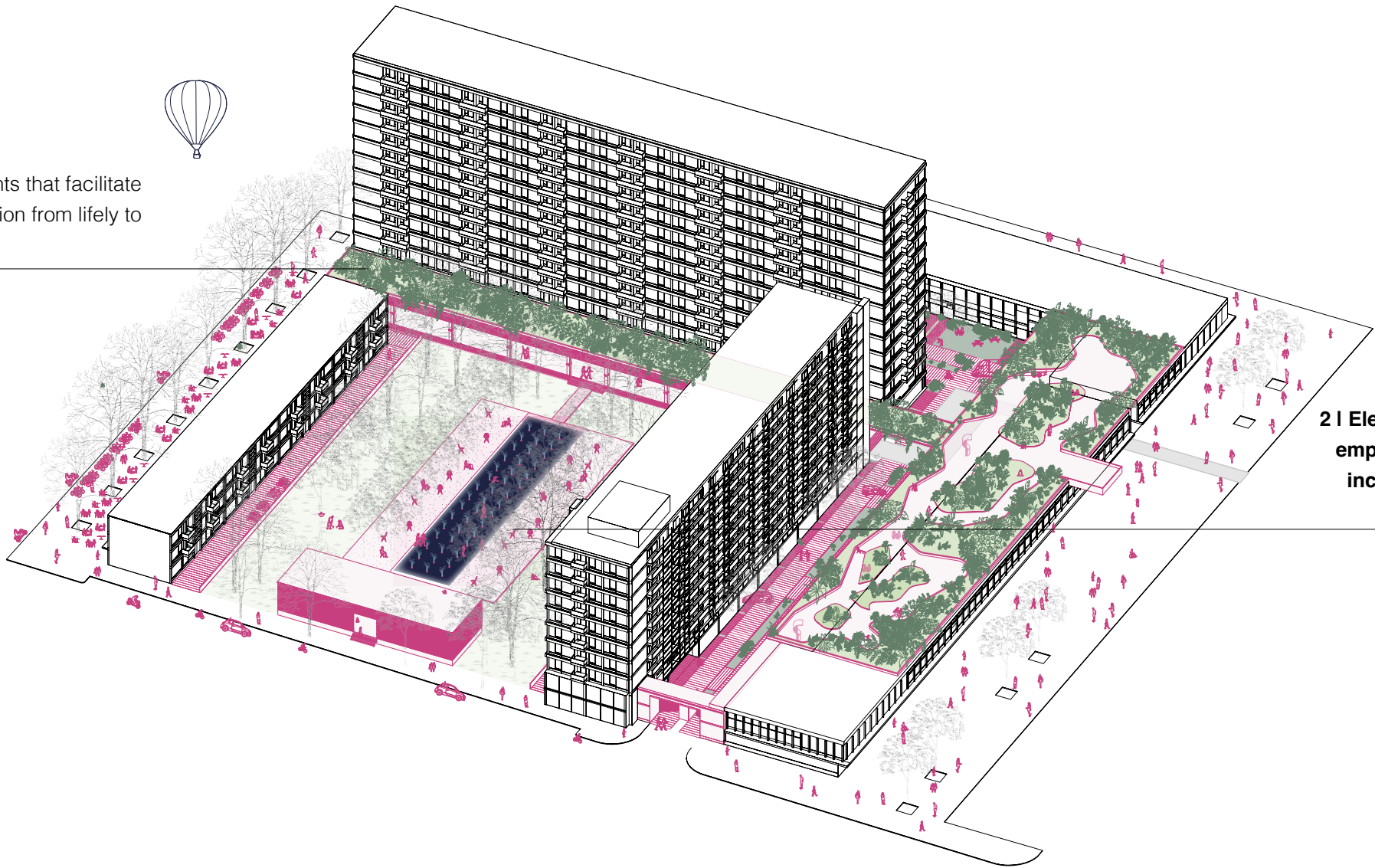
By creating transitions and access.



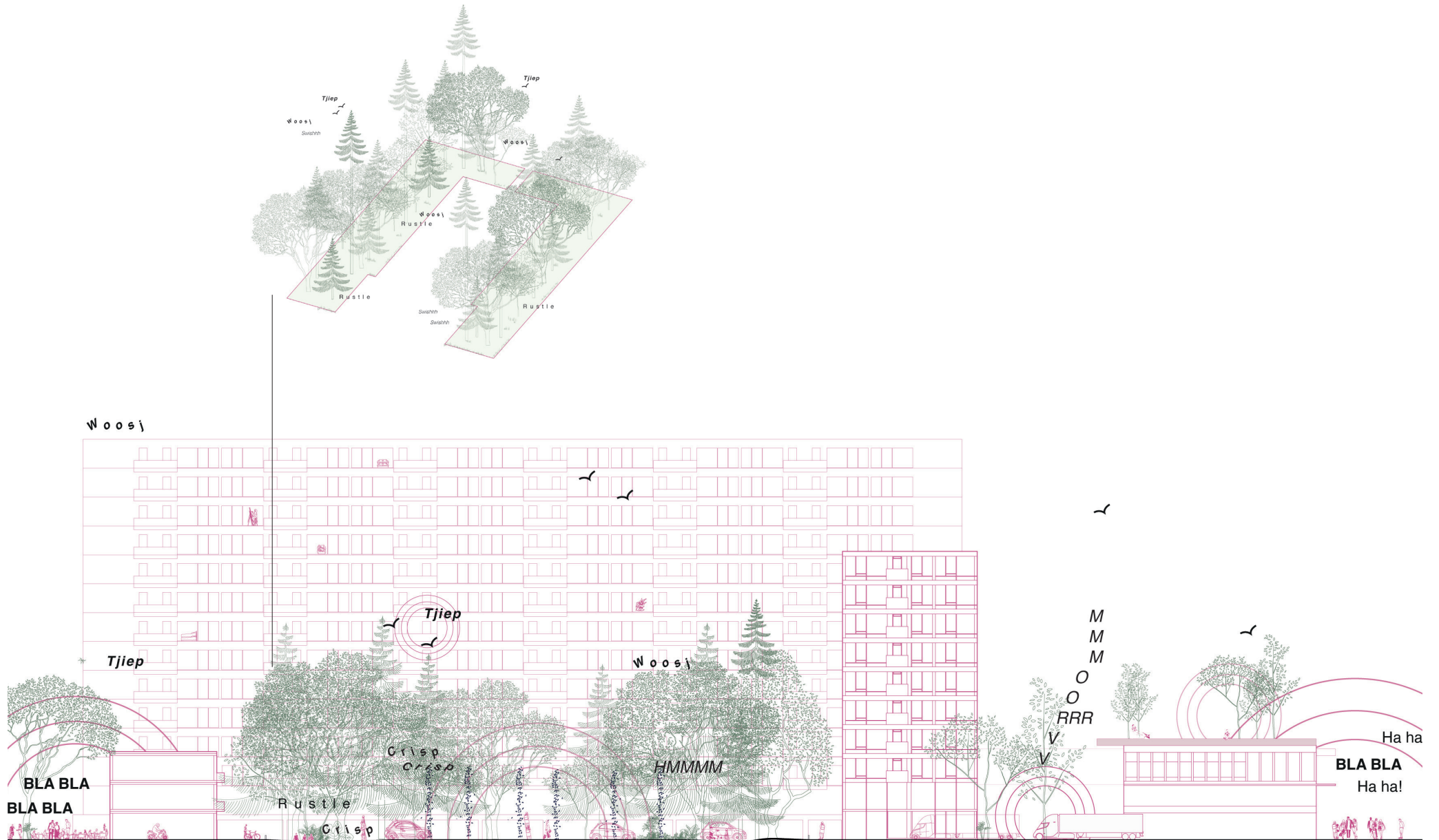
Emphasize sounding dualities

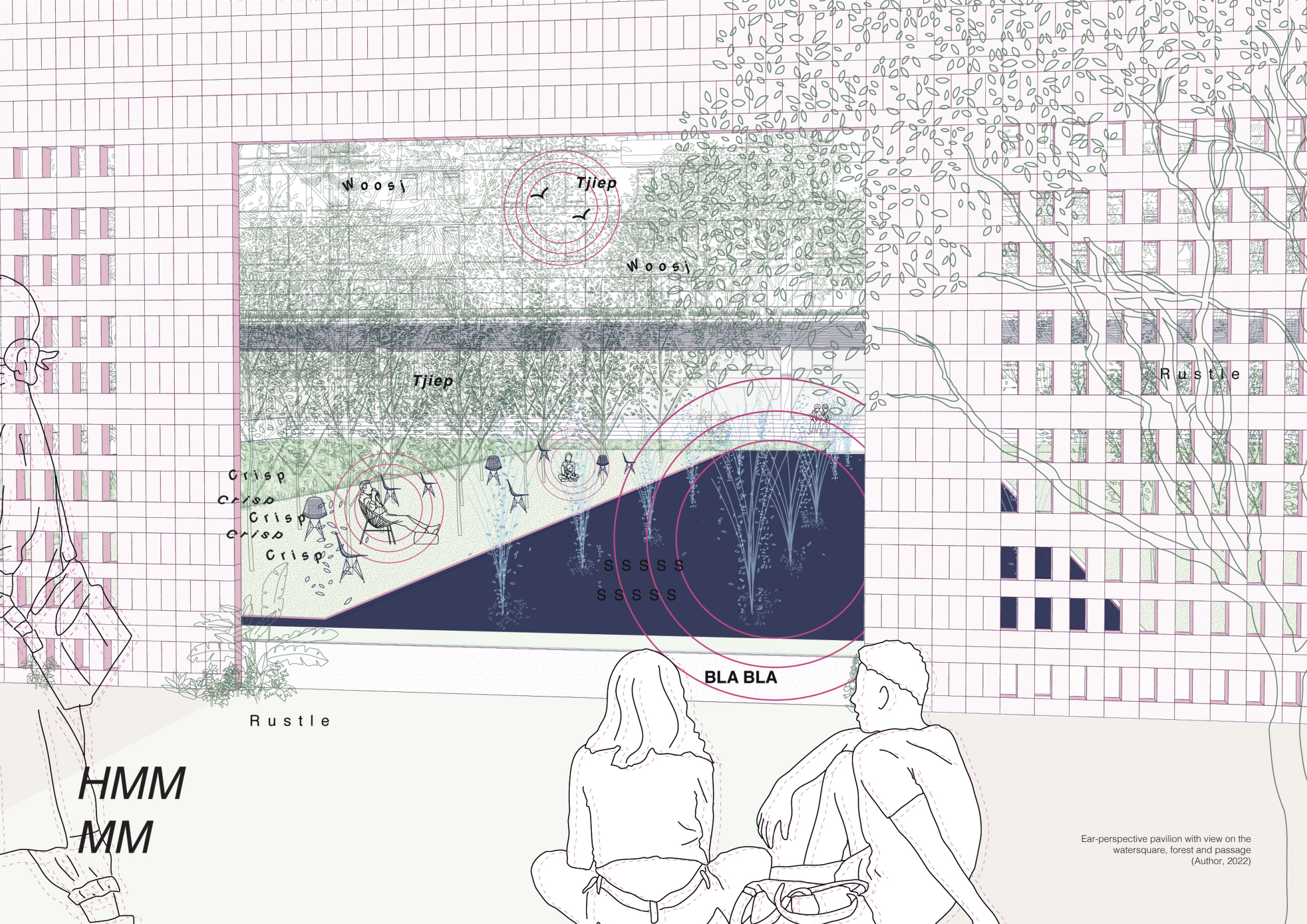
By creating a calm structure next to the lively structure, connected by the expedition streets.

1 | Elements that facilitate the transition from lively to calm



2 | Elements that emphasize and increase calm sounds





Woosi

Tjiej

Woosi

Tjiej

Rustle

Crisp
Crisp
Crisp
Crisp
Crisp

SSSSS
SSSSS

BLA BLA

Rustle

HMM
MM

Ear-perspective pavilion with view on the watersquare, forest and passage (Author, 2022)

9

Conclusion

The bigger picture

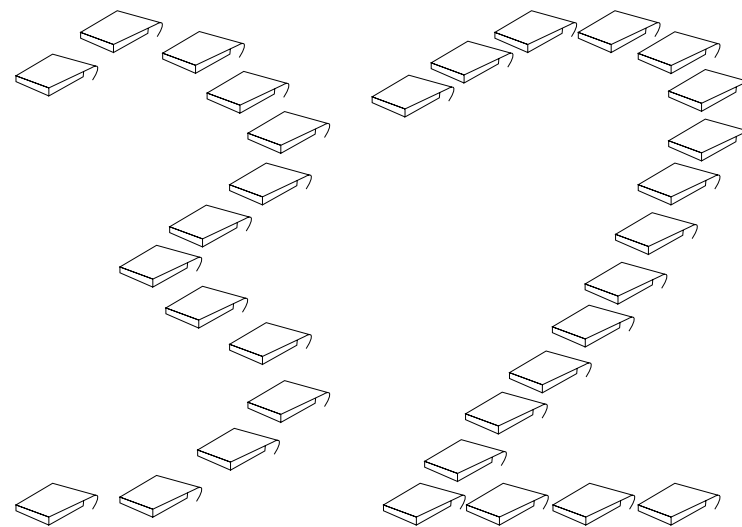
Silent routes

The role of the urban designer



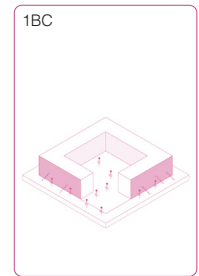




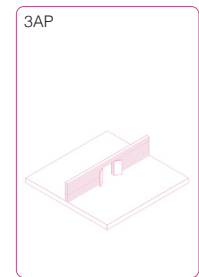


The new calm structure is
32 times the size of Rotterdam
Central station

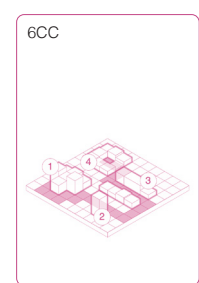
Route 1: Exploring contrast



Route 2: Whisperroutes in North



Route 3: Silent escapes in the shopping centre



The routes of the calm substructure (Author, 2022)



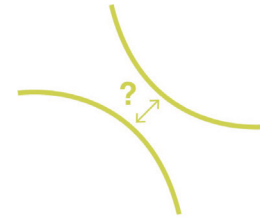
Disbalance

Finding balance in the composition and gradience of vibrance and silence.



Urbanization

Turning the consequences of **urbanization into opportunities** for changing living environments.



Knowledge gap

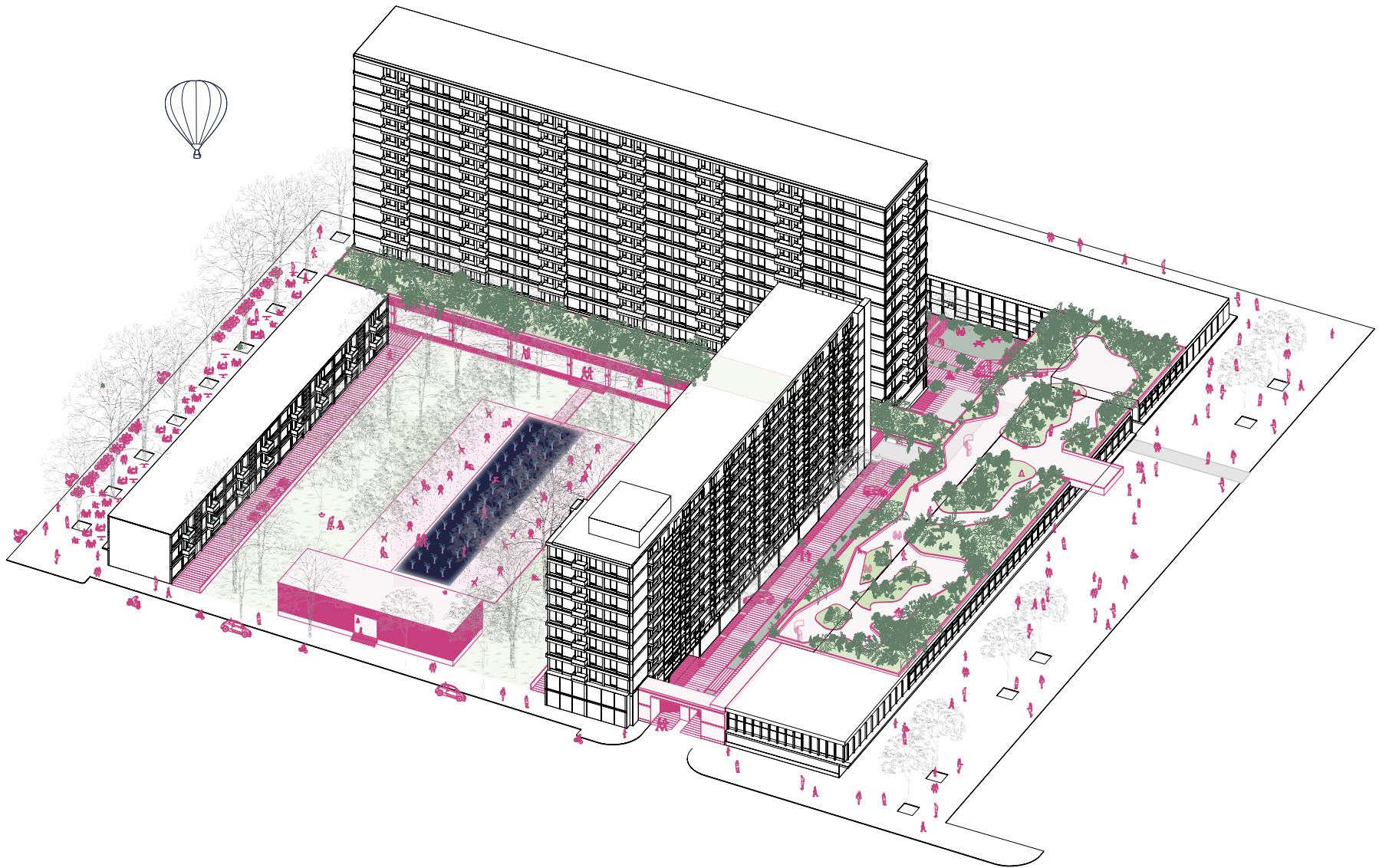
Decrease the gap between psychology and urban design, focussing on sound. And thereby improve the psychological well-being by urban design.

‘Studying the
environment without
listening to it is like
studying film with the sound
turned off’

(Bernie Krause, 2022)

Inward
The silence is within

Anne van den Berg



Research aims

Variety in the urban landscape | Transitions and access

Reducing mechanical sounds | Use and perception of space

Attracting natural sounds | Healing effect of sound

Design principles i.r.t. scale

Work with the current urban structure | District scale

Create diversity in sound (levels) | District to island scale

Improve the spatial organization | Island scale

Use the inward-oriented space | Island to block scale

Focus on qualitative sounds | Block scale

Design steps

Pattern set: Contrast, continuity

Pattern set: Variation

Pattern set: Expectation, control

Pattern set: Exposure, distance

Pattern set: Time



1 \ There is always a place
...and a little bit of music. There is always a place where you can find or create a calm oasis. Look at the empty spaces in the city, like the alleys, the unused parking lots, and all the other spaces that seem to be left-over. There is a beautiful word for that: Terrain vague or Wanderspace.



4 \ Work through the scales
Make sure the soundscape is approached on multiple scales. Considering the context is important to understand how the inward-oriented space will function on the ear-perspective and what role it plays in the network of the calm atmosphere.



7 \ Create a network
Compose a network of calm, inward-oriented spaces that together create a silent structure within the vibrant city.



10 \ Design welcoming entrances
Highlight the transition towards the calm soundscape by choosing different materials, adding vegetation, and taking into account social safety and publicness.



13 \ Let the city bloom
Vegetation and water add to an association of calmness. Therefore, it attracts natural sounds such as waving leaves and singing birds. These sounds are perceived as positive and help to retreat.



2 \ Go searching for the substructure
Don't look for a route from A to B, but let yourself be led by a sub-structure towards scapes of calmness.



5 \ Surprise on purpose
Adding high contrast will create cognitive dissonance. This is because the transition was not expected. This can be done at strategic positions within the urban network to improve perceptual surprises!



8 \ Buffer sounds
Sound should be buffered within the walls! Use the L, O, or U form of urban block to keep the sounds of nature inside and to block the mechanical sounds from outside.



11 \ Keep the scapes hidden
The quality of the inward-oriented scape lies in its ability to be hidden. The 'coincidental' discovery enhances the perceptual experience and is appropriate for use in louder urban environments.



14 \ Set time limits
Not everything has to be accessible at every moment. In order to improve the right behavior, desired sounds, and social safety, it is better to (temporarily) close some inward-oriented spaces. When the sun rises again and the city becomes louder, the gates can be opened as well.



3 \ Consider what contrast you want
Location, location, location. Consider the level of contrast based on the position in the city, the embeddedness of building blocks, the urban form and access. In this way, you know if the place will be part of the territory of silence or function as an urban escape.



6 \ Add soundmarks
Make people aware of the sound. As a result, consider expectations and whether to work against or emphasize them. Besides, using sound as an element of interaction or an art piece can improve this.



9 \ Improve the sequence
Work within the sounding island with a sequence from public to private. By putting things in sequence, a transition in sound can be contained, and it emphasizes expectation, acceptance, and readability.

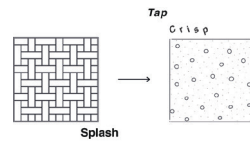


12 \ Think smaller
The small things mean the most... also when you look at the hidden space, it doesn't have to be big to get attention. Furthermore, it is the smallness that is beneficial for the calm inward-orientes soundscape.



15 \ Work with different textures and materials
Every texture makes another sound. You can use this to add contrast, to highlight a sound transition or emphasize a certain atmosphere. Here, materials and textures are used to mark sound.

Urban Escapes | High contrast



□
Change the pavement
 On the other hand, you can also change the pavement in order to emphasize the changing soundscape.



○
Add a door or fence
 This element blocks sounds and creates a more contrasting sound transition



□
Add a (permanent) function
 Add a public function in the inward-oriented space or transition to add variety in sounds. This improves readability of space and expectation of sound and time.



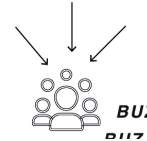
□
Make it an event
 The transition can be a scape where sometimes the contrast is high and sometimes not by, for example, an event. This adds surprises to the route and improves the perception.



□
Place a soundmark
 Add a central sound element that creates sounds in itself. Hereby other sounds are drawn to the background



△
Invisible hearable
 When the sounds are loud enough, people will be curious to visit the scape behind it or will keep away. Work with louder elements, such as waterfalls to facilitate this.

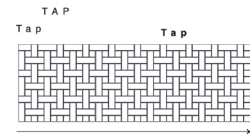


△ □
Cluster sound
 Clustering sounds limits the spread of sounds over a broader area. When implementing, for example, a terrace, it becomes readable that the sounds cluster at these locations and changes people's behavior.



△
Make it an artwork
 Art can create awareness of sound, brings variety and be work as an interaction between people and sounds. This creates control over sound, or a surprising element during the transition, which both lead to a more positive perception.

Territories of silence | Low contrast



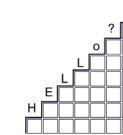
□
Follow the pavement
 Extending the material used in the inward-oriented space creates a visible connection, but also a continuous sound, which feels as a logic shift in the urban landscape.



△
Add a view
 Improves acceptance of sound by making it visual. Mainly natural elements, as trees, can help with this.



△
Plant a tree
 Trees attract natural sounds from wind and birds, but also lead to higher acceptance of sound and thereby the transition



○
Work with height
 Changing the ear-level changes the perceived sounds. Work with staircases, variety in floor levels and depth in the landscape.

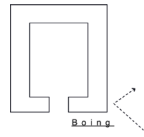
- △ Associative
- Intervening
- Facilitative

Contrast depending on context



Vegetation

Vegetation attracts animals, absorbs sounds and is associated with a positive perception. Adding vegetation can thereby improve the perceived transition of sound.



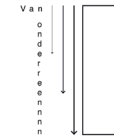
Enclose

By enclosing the area, the sound heard during the transition will change a lot. This, because the enclosing forces a certain direction, blocks other sounds and increases the sounds within by reflection.



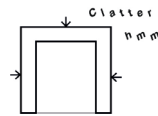
Drop water

Water can reflect sound, which increases the amount of sound, but also provides a calm perception. To overshadow unwanted, water can help to improve the soundtransition.



Move it vertically

The facades are great to absorb sound, reflect sound or create sound. Use plants, texture and variety in materials to create different soundperceptions.



Soundshelters

Add a roof! Pavilions guide sounds in a certain direction and filter sounds from outside. Thereby, the sounds occurring within create echo. Hereby it becomes clear, the element emphasizes a change in sound.



Move with the wind

Add elements that respond to the weather, such as trees and vegetation, but also artinstallation as elements that jingle by the wind



Let it rain

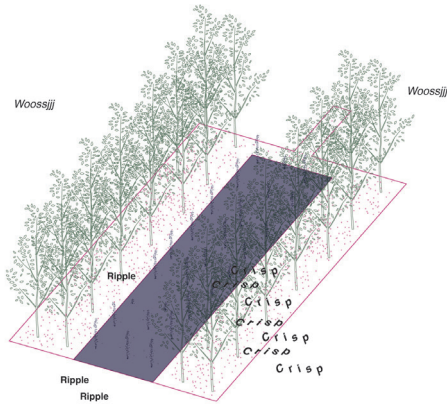
Elements as passage's, pavilions and other canopies can work with weather circumstances as well. The roofs create an unique sound when it is raining or when the wind goes through the elements. This adds a temporary transition of sound within the permanent transitionmovement.



Work with passage's

Next to the pavilion, a passage leads sounds (and people) in a certain direction. Thereby, the sounds inside create echo and hold 'certain' sounds. People can recognize the transition as they are walking to the other side of the passage.

- △ Associative
- Intervening
- Facilitative



03 | The watersquare

Sound: Sound of calm water

Impact: Stimulating

Level of contrast: High

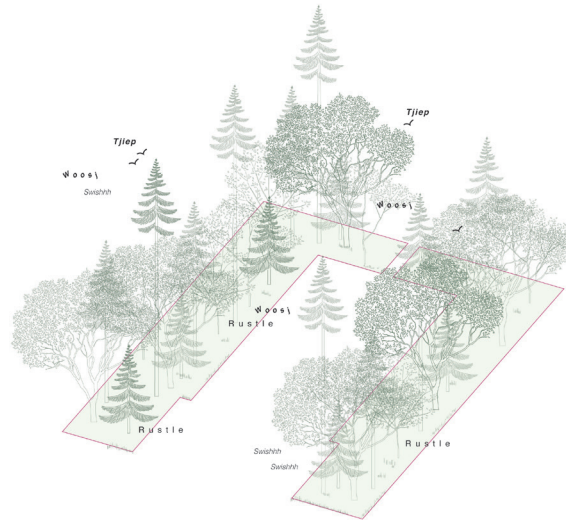
Material: Water sprinklers, tile.

Design with sound

- 1 | Adding sounds of water by sprinklers
- 2 | Emphasizing material by walking on the wet surface

Connected patterns

1CC, 3BP, 7AS, 7BP



04 | The forest

Sound: Foggy

Impact: Damping, absorbing

Level of contrast: Low

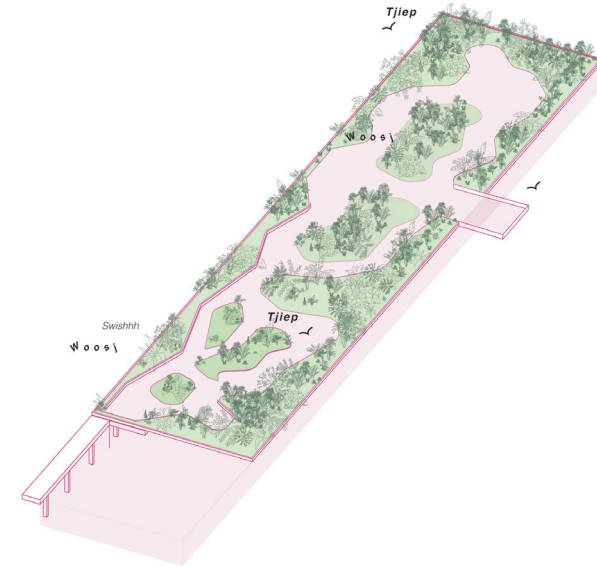
Material: Dense tall trees: pine trees and plane trees

Design with sound

- 1 | Blocking sound by height of the trees
- 2 | Adding sounds by attracting animals
- 3 | Association of calmness

Connected patterns

5AC, 6AS, 7CC



07 | The rooftop garden

Sound: Sounds of nature

Impact: Reverberation

Level of contrast: High

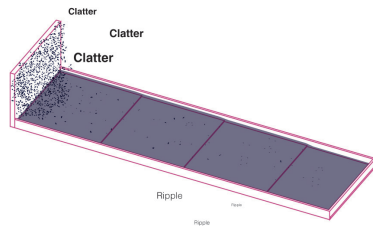
Material: Wooden chips, concrete and diverse low to high vegetation

Design with sound

- 1 | Blocking sound by vegetation
- 2 | Adding sound animals
- 3 | Emphasizing sound (seating point)

Connected patterns

1AC, 2AC, 6BC, 7BP



Q1 | The waterwall

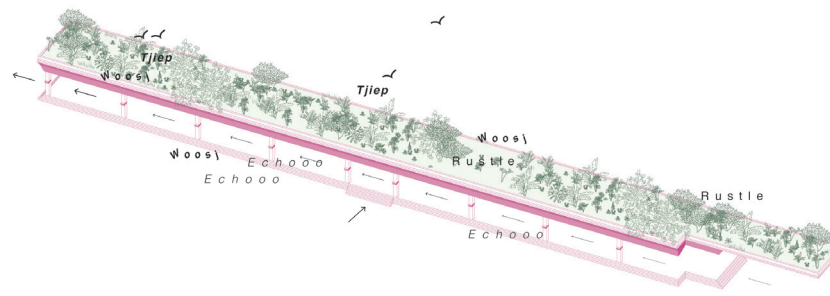
Sound: Clattering water
 Impact: Overruling
 Level of contrast: High
 Material: Water, smooth pavement

Design with sound

- 1 | Blocking sound from Schouwburgpein
- 2 | Adding sounds of water
- 3 | Water associate with calmness

Connected patterns

1AC, 3CP, 4AC, 4CP



Q2 | The passage

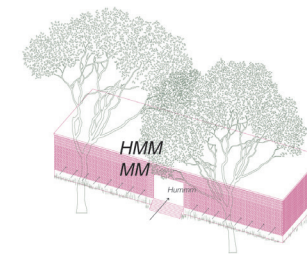
Sound: Humming echo
 Impact: Reflecting
 Level of contrast: Low
 Material: Concrete pavement and low dense plants on the roof

Design with sound

- 1 | Blocking sound from surrounding spaces
- 2 | Emphasizing the direction of sound

Connected patterns

1CP, 5AC, 6CC



Q6 | The pavillion

Sound: Humming echo
 Impact: Overruling
 Level of contrast: Medium
 Material: Bricks | Block pattern with shifting holes in it.

Design with sound

- 1 | Blocking sound by its building volume
- 2 | Emphasizing echo

Connected patterns

4BP, 6CC, 7AS



Q8 | The expedition gate

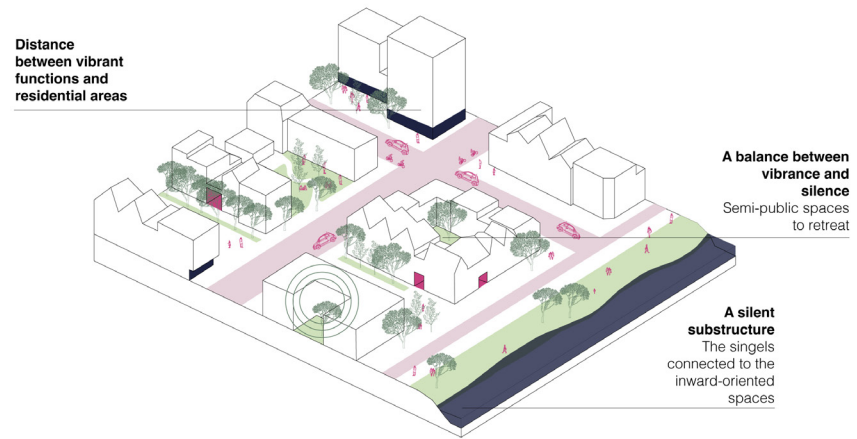
Sound: No sound
 Impact: Demping, blocking
 Level of contrast: High
 Material: Steel and bricks

Design with sound

- 1 | Blocking sound by its fence and wall
- 2 | Adding sound by opening the fence

Connected patterns

1AC, 2CC, 4CS



Contrast and materialization



Control and publicness



Time and daily life

If the city lives in a dream, make sure:

- 1 | New pavement is silent, in order to reduce sounds.
- 2 | Louder functions are not positioned in residential areas or are limited to a certain time.
- 3 | The inward-oriented spaces are locked during evenings and night, to preserve the sleeping quality.