

# POST-SPARTACUSPLAN

Exploring the future possibilities of innovative public transportation  
for spatial and mobility transition in Belgian Limburg

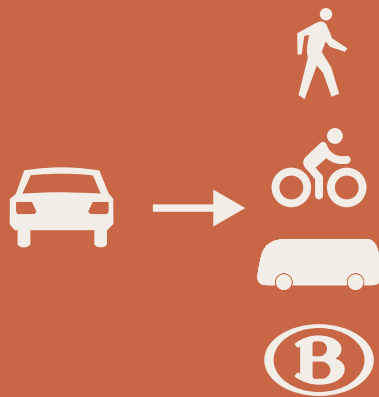




# **MOBILITY TRANSITION**

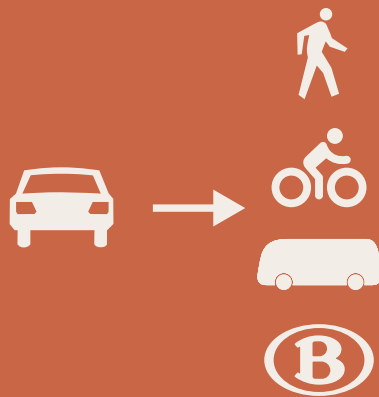
# **SPATIAL TRANSITION**

## MOBILITY TRANSITION



## SPATIAL TRANSITION

## MOBILITY TRANSITION



## SPATIAL TRANSITION





# AMSTERDAM



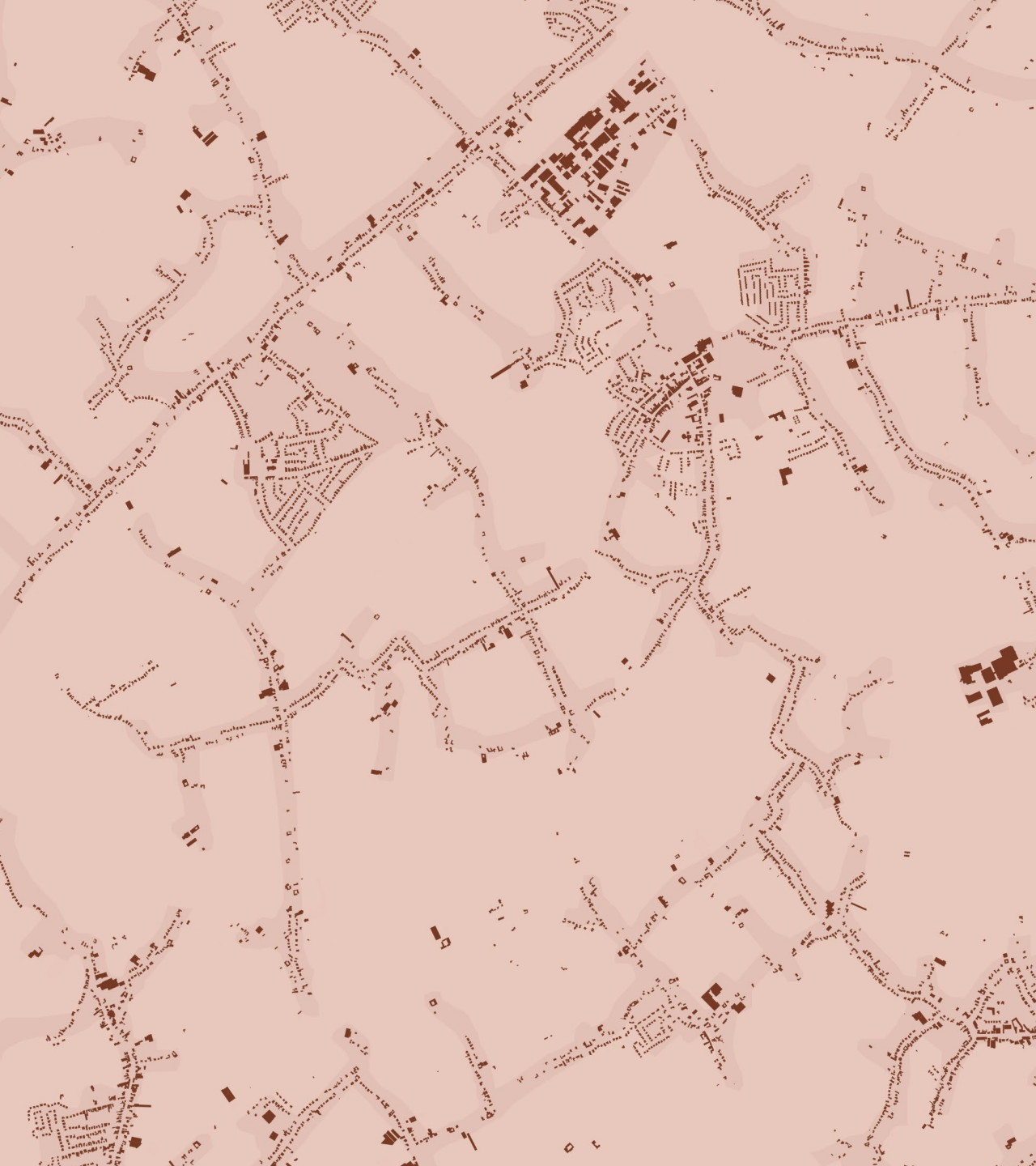
# BRUSSELS



# QUARTIER BLEU, HASSELT







PISMAN ET AL.

## PREFERENCES ON HOUSING TYPES IN BELGIUM

 *SUBURBAN* 95 % DETACHED SINGLE-UNIT

 *URBAN* 38 % DETACHED SINGLE-UNIT

## PREFERENCE IN CURRENT COMMUNITY

 *SUBURBAN* 80 %

 *URBAN* 31 %





# LOMBARDY, ITALY



VINTAGE CARVER

what  
we talk  
about

when  
we talk  
about

Limburg *love*



# CONTEXT

VERTREK			
UUR			SPOOR
0 9 5 8	HASSELT	DIRECT	1
1 1 2 7	ECAUSSINNES CARRIERES	OMNIBUS	3
1 4 3 6	LIEGE-GUILLEMIN	OMNIBUS	5
1 5 5 5	POPERINGE VIA KORTRIJK	HALF-DIRECT	2
1 6 4 3	VERVIERS-CENTRAL	DIRECT	1
1 7 0 8	ANTWERPEN C	OMNIBUS	6
1 7 4 9	CLABECQ VIA VIRGINAL	SEMI-DIRECT	5
1 8 1 4	RONSE	OMNIBUS	3

CONTEXT

THEORY &  
APPROACH

IMMOBILITY

NEW MODEL  
OF BRT

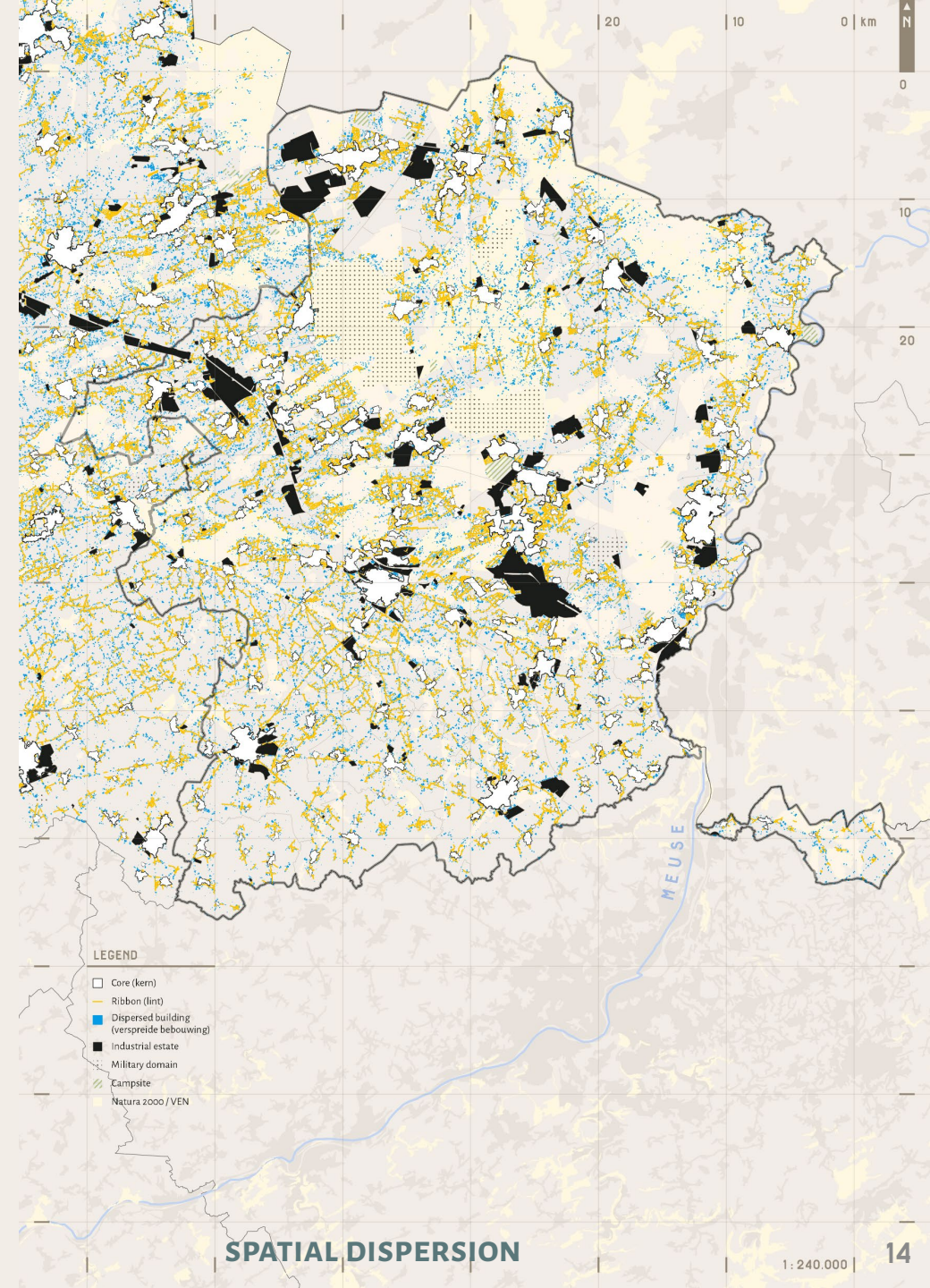
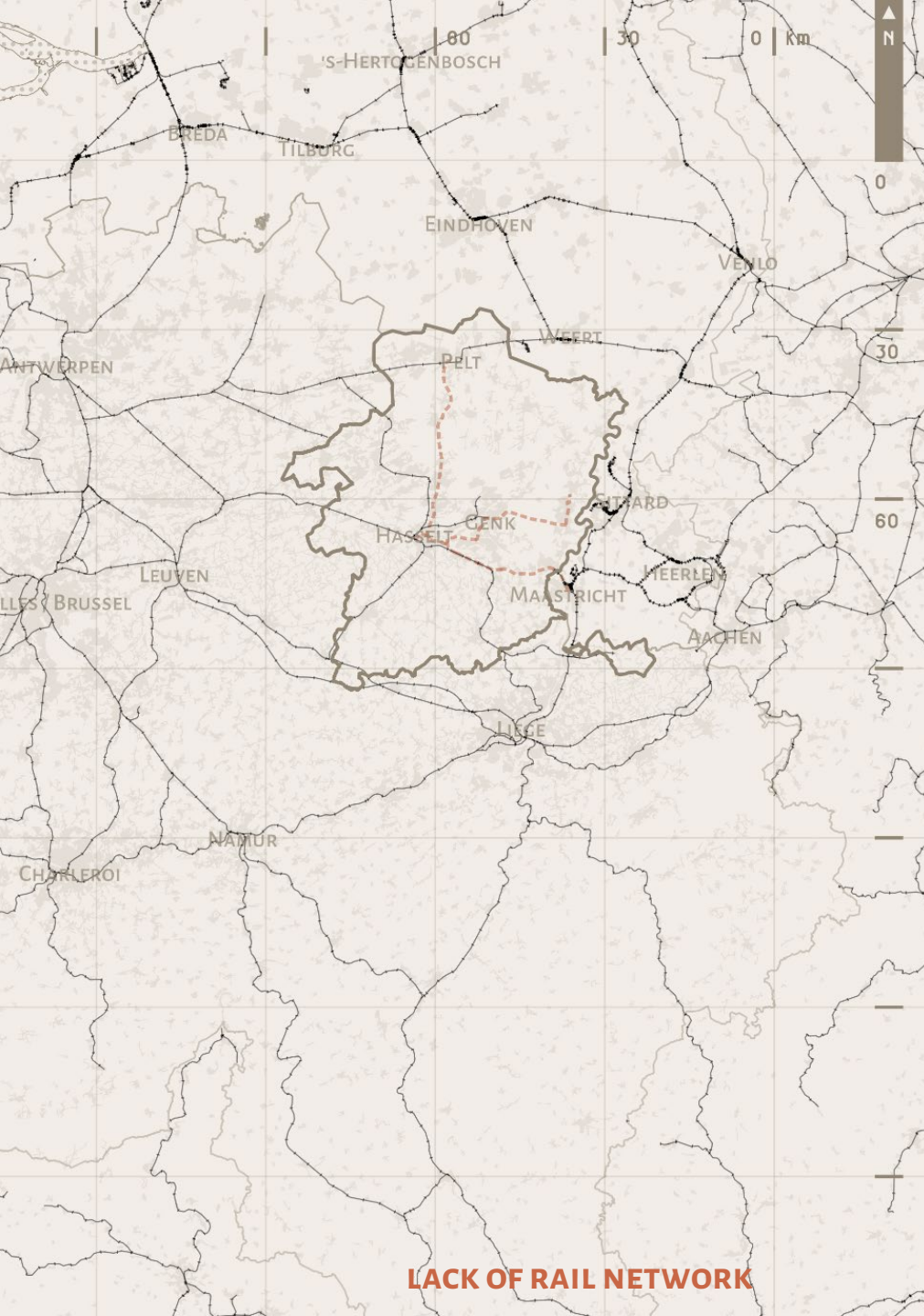
VISION

DESIGN TOOLS

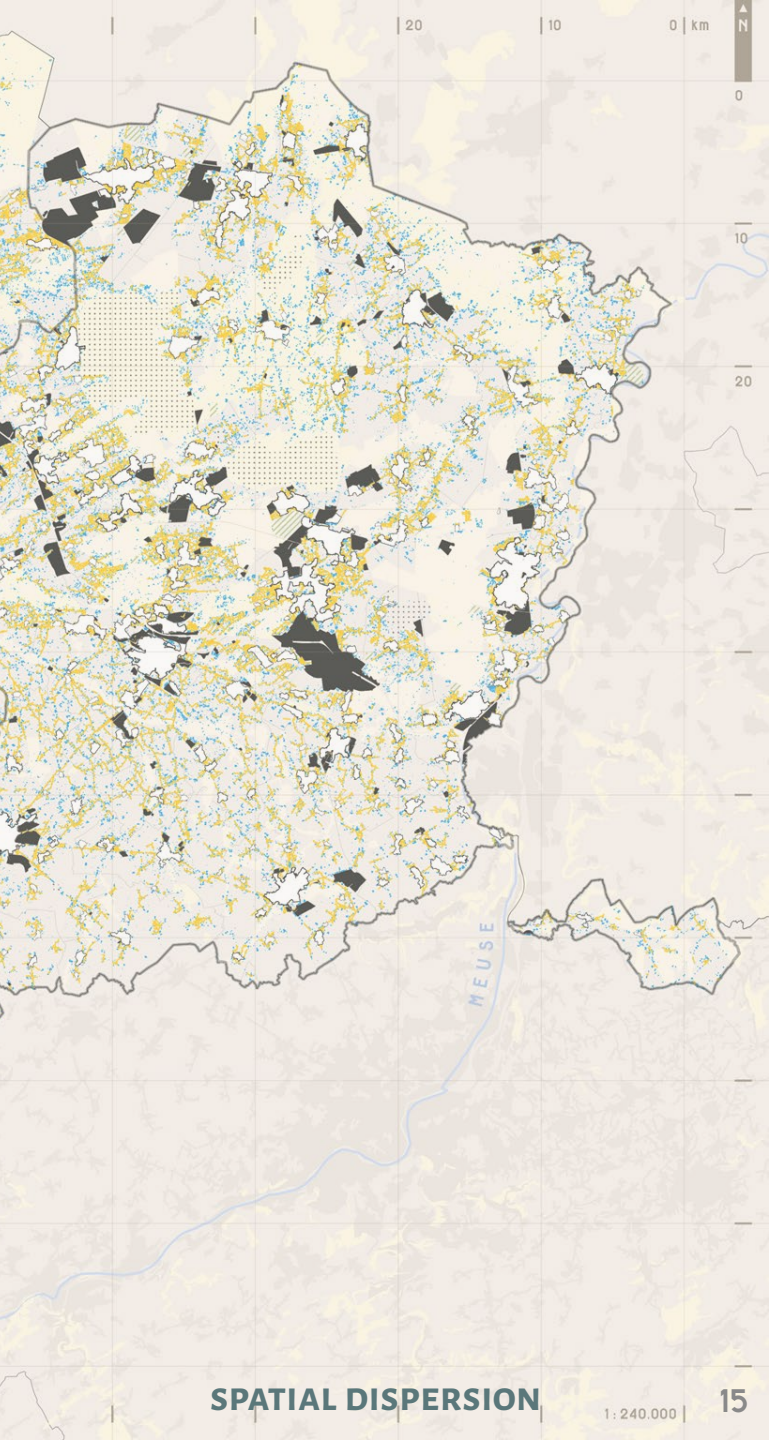
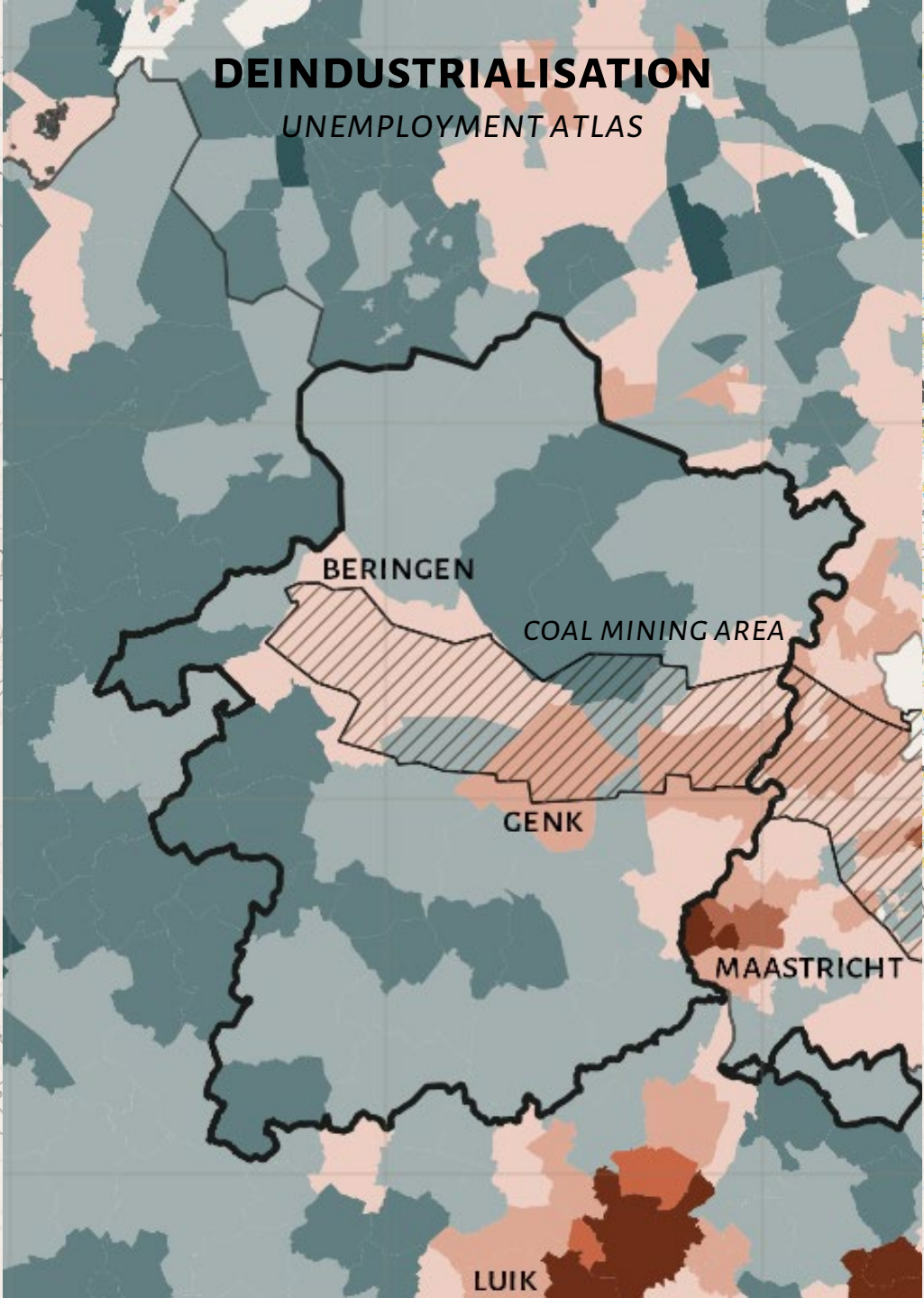
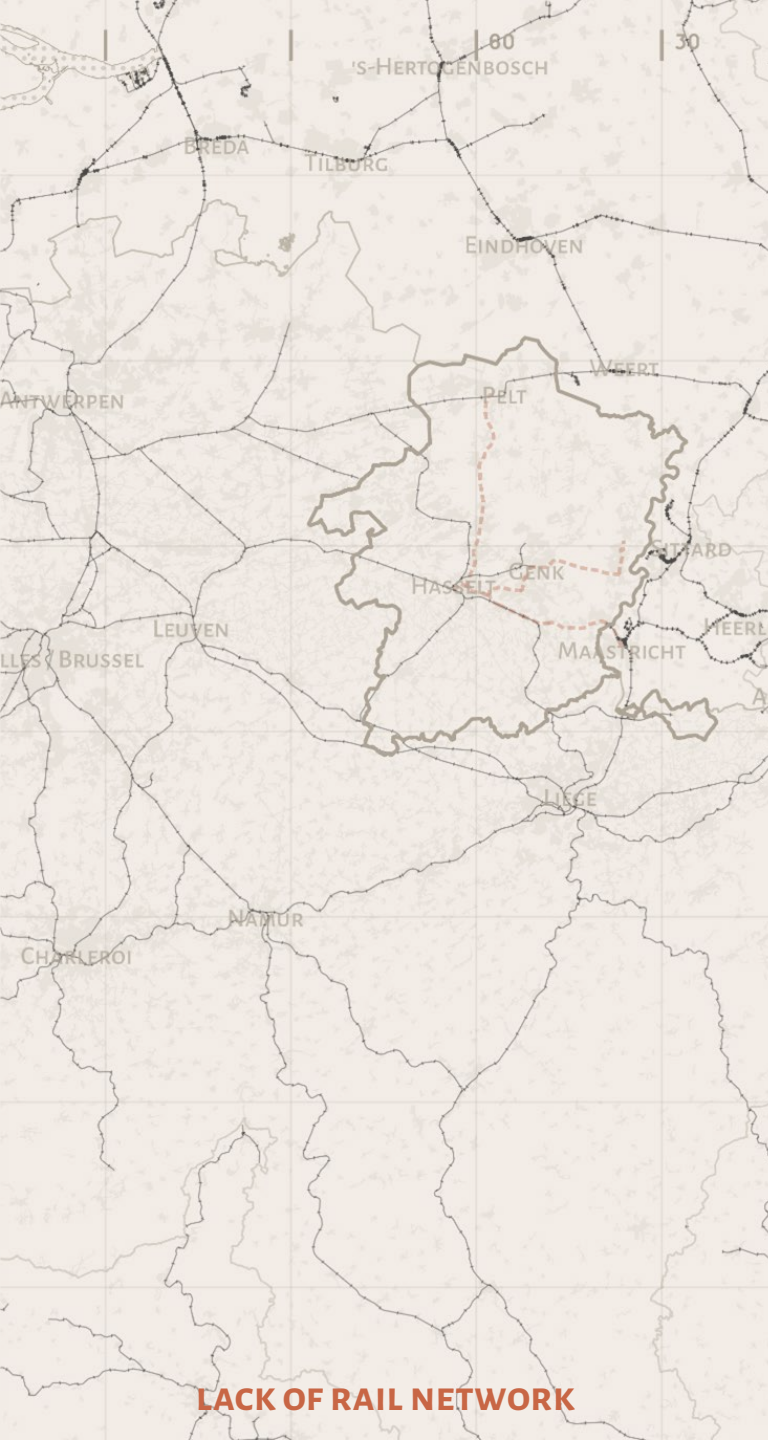
APPLICATION &  
TESTING

CONCLUSION



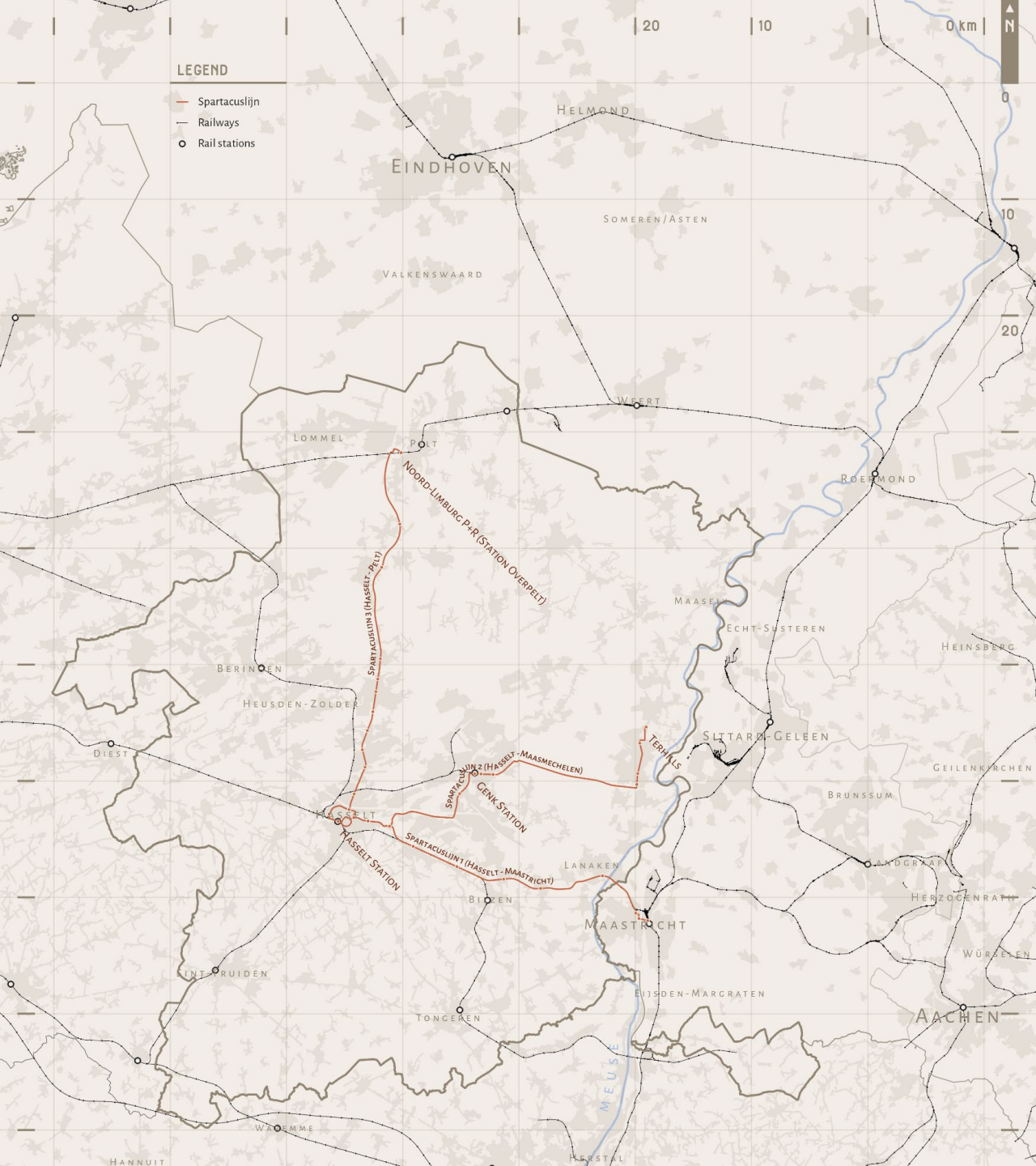












## SPARTACUSPLAN

Transportation plan of Belgian Limburg  
From 2004; still ongoing

Largest BRT project of Europe,  
3 Spartacuslijn BRT routes  
99 km of full dedicated busway



Trambus as vehicle:  
issues with low speed



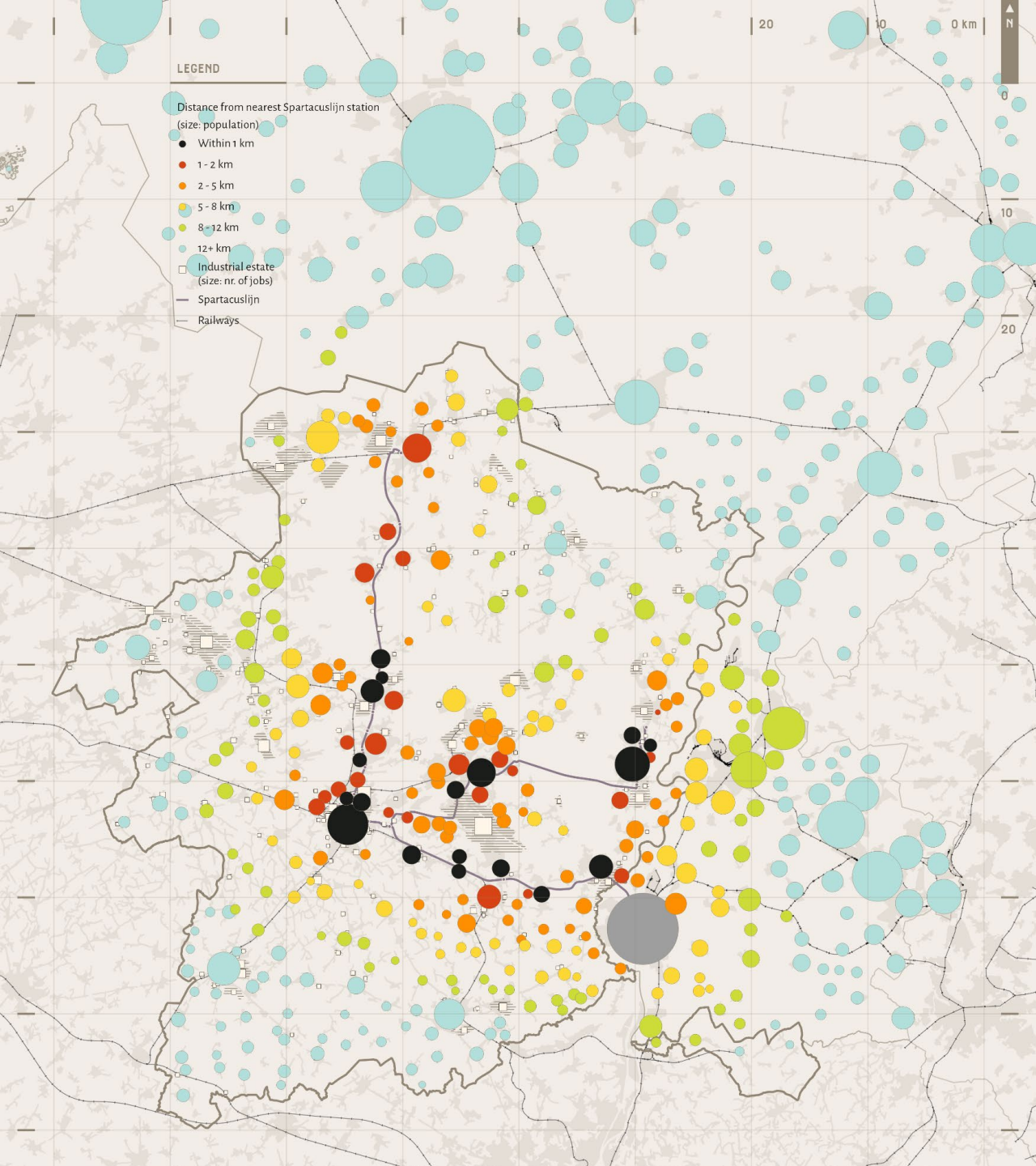
# BRUSSELS



# QUARTIER BLEU, HASSELT







## SPARTACUSPLAN

3 isolated lines for Poly-centric region  
The directly served areas (black)  
vs. areas served in distance (other colours)

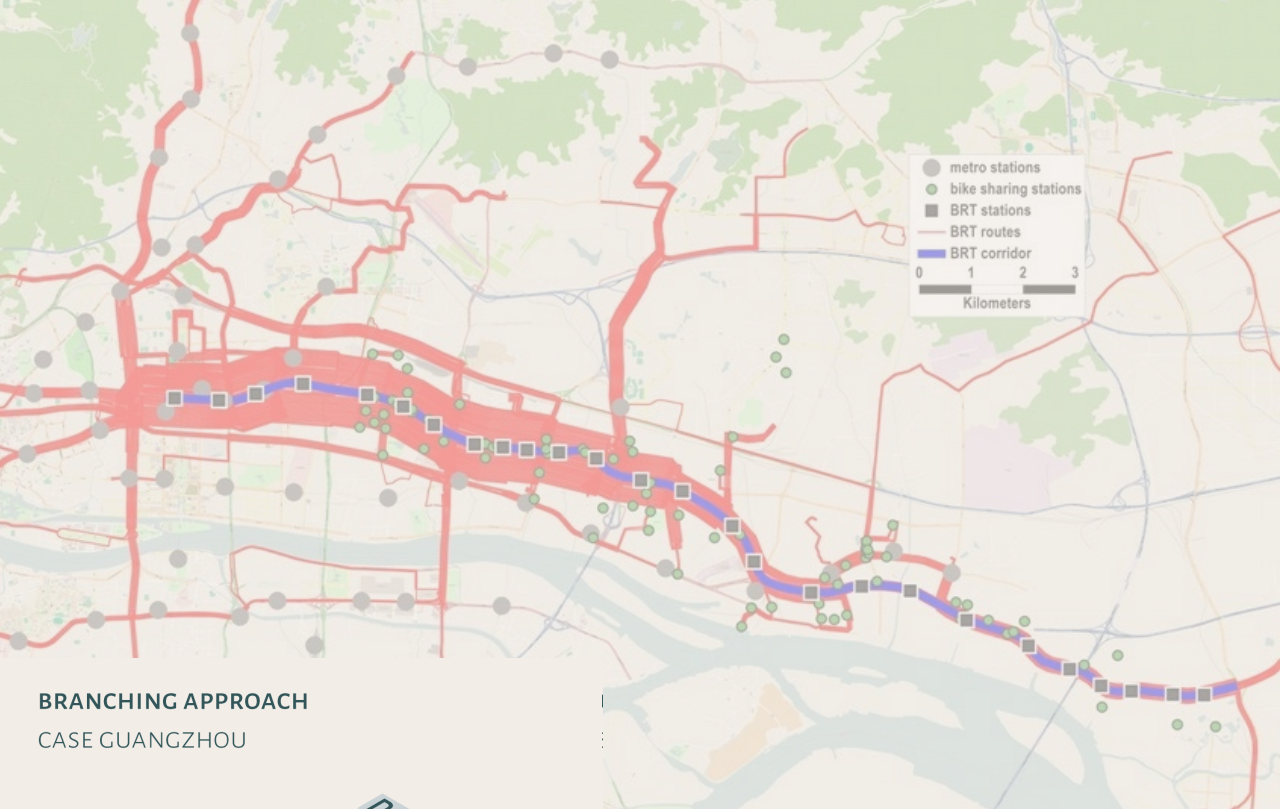
SPATIAL DISPERSION

Dispersed pattern of development  
in all scales:  
difficulties in providing coverage  
with limited stops and lines, as  
planned in original Spartacusplan

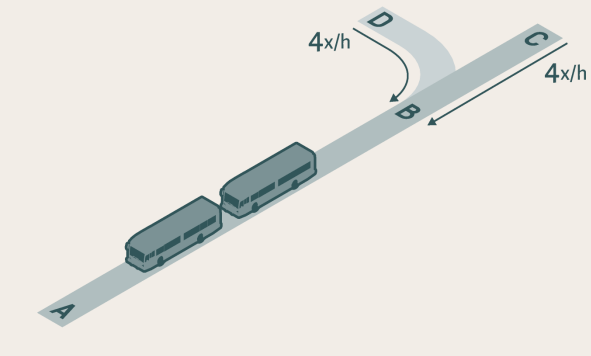


DISPERSED  
SETTLEMENTS





**BRANCHING APPROACH**  
CASE GUANGZHOU



## BRANCHING LINES?

Case Guangzhou:  
Branching service to provide  
Point-to-point service around the BRT  
corridor

High-capacity service using smaller  
vehicles running frequently

# DEMAND AND VEHICLE SETTINGS



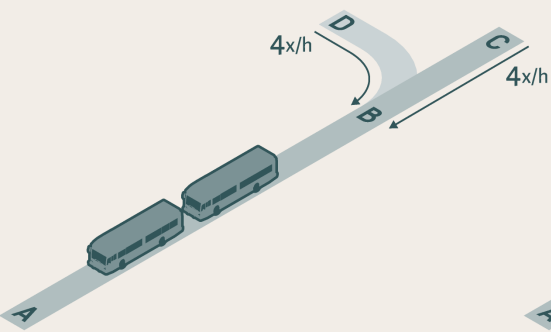
## BRANCHING LINES?

Problem of high operating costs in High-income countries for High-frequent branching services remain;

Potential solution through automation

# THE BRT DILLEMA

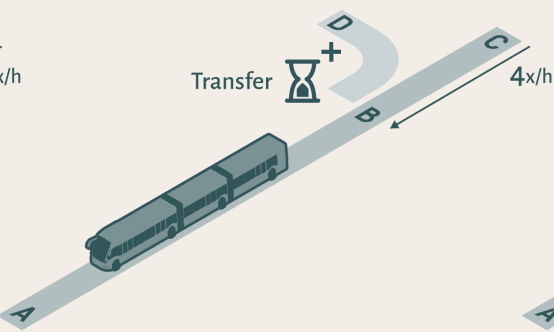
BRANCHING APPROACH  
CASE GUANGZHOU



PERSONNEL COSTS  
●●●●

TRAVEL TIME (A - D)  
●○○○

ISOLATED APPROACH  
CASE TRAMBUS LIMBURG

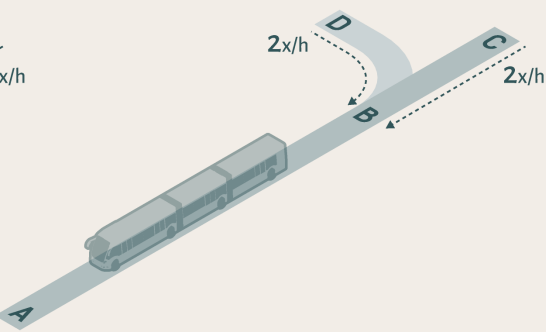


PERSONNEL COSTS  
●●●○

TRAVEL TIME (A - D)  
●●●●

\*INCL. TRANSFER BUFFER + WAITING TIME

LOW-FREQUENCY APPROACH  
HYPOTHETICAL



PERSONNEL COSTS  
●○○○

TRAVEL TIME (A - D)  
●●●○

\*INCL. EXTRA WAITING TIME

## THE DISILLUSIONMENT OF AUTONOMOUS VEHICLE

### SAE LEVELS OF DRIVING AUTOMATION

SAE INTERNATIONAL (2021)

	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
HUMAN DRIVER	Human supervision required constantly			Human intervention required if the feature requests	Human supervision not required	
DRIVING TASK	Human driver must drive even when driver support features are engaged			Human driver does not drive when automated driving features are engaged, regardless of the driver sitting in the "driver's seat"		
	DRIVER SUPPORT FEATURES			AUTOMATED DRIVING FEATURES		
FEATURES	Limited to warnings and assistance	Steering or brake / acceleration support	Steering and brake / acceleration support	Able to drive the vehicle under limited conditions; will not operate unless all required conditions are met	Able to drive the vehicle under all conditions	
CAPABILITIES						
FEATURE EXAMPLES	Automatic emergency braking, blind spot warning, lane departure warning	Lane centering OR adaptive cruise control	Lane centering AND adaptive cruise control at the same time	Traffic jam chauffeur	Local driverless taxi, autonomous bus in BRT lane  * Pedal / steering can be removed	Same as level 4, but feature can drive everywhere in all conditions

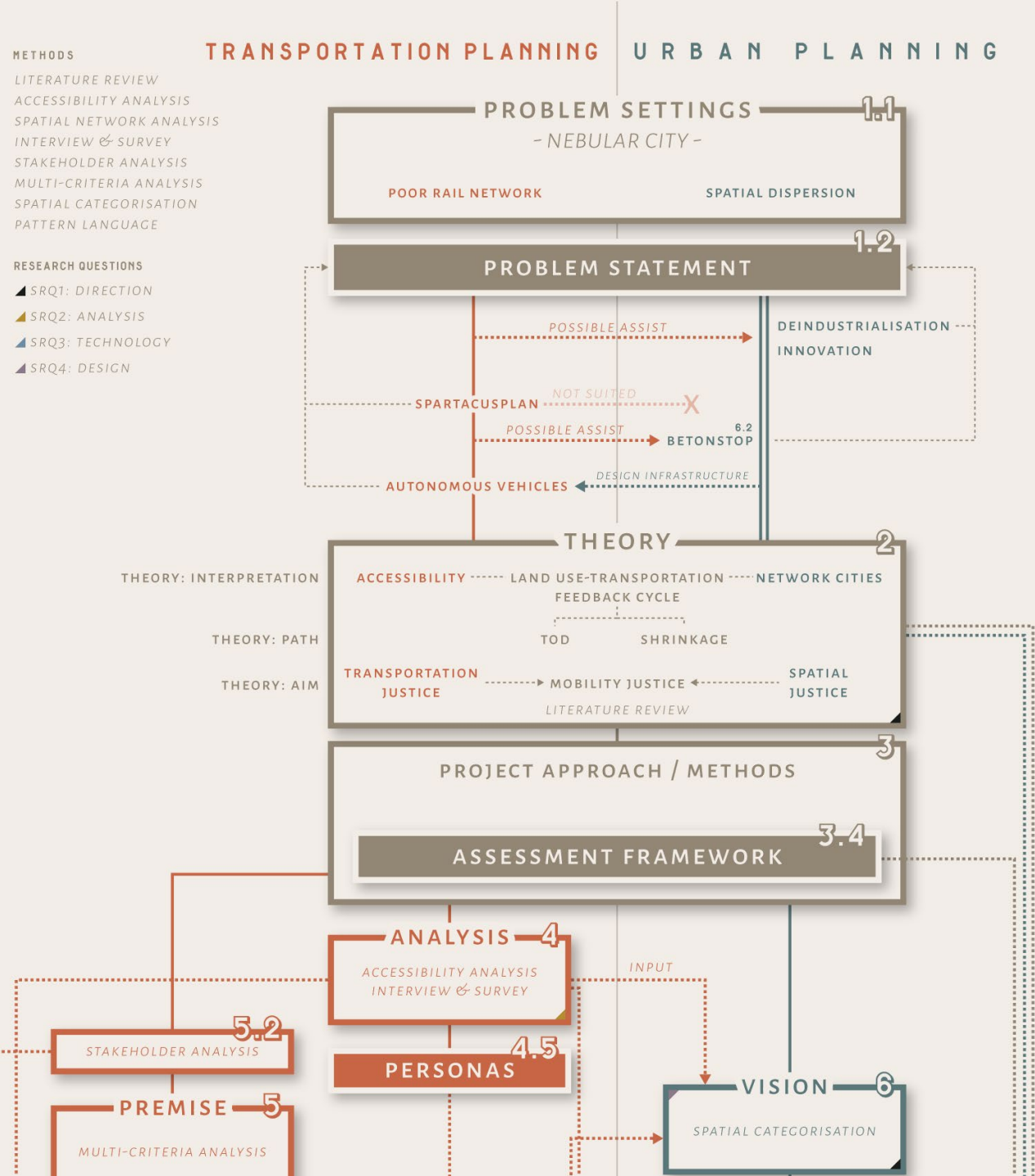
Massive disinvestment from autonomous vehicles in 2022;

Promised level-5 autonomous driving (autonomous driving in all situations) unrealistic in near future

Realisable autonomous vehicle technology in limited automation only within dedicated, tailor-made infrastructure

RESEARCH AIM

- Proposing **alternative model of BRT** for Spartacusplan
- Realisation until **2030**
- Using achievable level of **vehicle automation**
- Can tackle challenges of **spatial transition**
- Approaching from the interplay of both **transportation planning and urban planning**





# THEORY AND APPROACH

CONTEXT

THEORY &  
APPROACH

IMMOBILITY

NEW MODEL  
OF BRT

VISION

DESIGN TOOLS

APPLICATION &  
TESTING

CONCLUSION

## THEORY

### **Starting Point:**

What are people of the countryside like?

### **Polarised solutions:**

What can be done?  
(what are the possible solutions?)

### **Theoretical Aim:**

What should we aim for?



## THEORY

### **Starting Point:**

What are people of the countryside like?



### **Sedentarism:**

Strong attachment to current community

### **Polarised solutions:**

What can be done?  
(what are the possible solutions?)

### **Theoretical Aim:**

What should we aim for?

## THEORY

### Starting Point:

What are people of the countryside like?

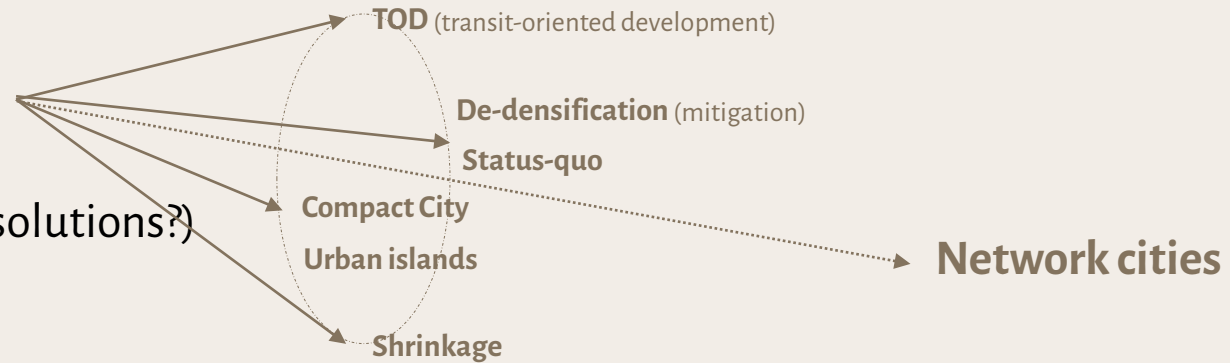


### Sedentarism:

Strong attachment to current community

### Polarised solutions:

What can be done?  
(what are the possible solutions?)



### Theoretical Aim:

What should we aim for?

## THEORY

### Starting Point:

What are people of the countryside like?

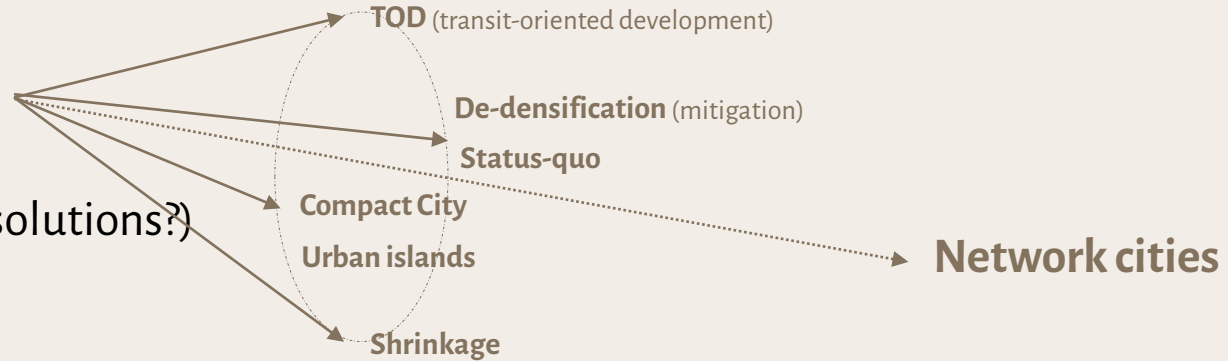


### Sedentarism:

Strong attachment to current community

### Polarised solutions:

What can be done?  
(what are the possible solutions?)



### Theoretical Aim:

What should we aim for?



### Mobility justice:

Reading mobility through lens of justice



## APPROACH



**AMBITIOUS, COMPACT CITY**  
THE "IDEAL OPTION":  
FOCUS ON URBAN FORM CHANGES

**IDEALISTIC RADICAL TRANSFORMATION**  
INTRODUCING DENSE URBAN NEIGHBOURHOODS AS  
A SOLUTION FOR DISPERSION: TURBULENT WITH HIGH  
RISKS & NEGLECTING COUNTRYSIDE FOR DECADES TO COME

**ALL-IN-ONE PLACE CREATION**  
EVERY AMENITIES, EVERY ACTIVITIES CREATED  
IN THE PLACE

**AUTONOMOUS VEHICLES**  
RELYING ONLY ON THE CAPABILITY OF THE VEHICLE:  
SOMEDAY THEY MIGHT BE ABLE TO OPERATE  
EVERYWHERE, ANYTIME

**NETWORK CITY:**  
FOCUS ON ACCESSIBILITY AND CONNECTION,  
INSTEAD OF RADICAL URBAN FORM CHANGES

**SEMI-AUTOMATION WITH SUPPORTING INFRASTRUCTURE**  
INSTEAD OF RELYING ONLY ON VEHICLE'S CAPABILITIES,  
INFRASTRUCTURES SUPPORTING THE APPLICATION OF SEMI-  
AUTOMATION TECHNOLOGIES SHOULD GO HAND-IN-HAND

**INTEGRATING TRANSPORT & SPATIAL PLANNING**  
CONNECT DIFFERENT PLACES WITH DIFFERENT CHARACTERS,  
AMENITIES, AND POTENTIAL: CREATE NETWORK OF INTERDEPENDENT PLACES

**GRADUAL TRANSFORMATION:**  
FLEXIBLE, TEMPORAL APPROACH COMBINING PLANNED SHRINKAGE AND  
STRENGTHENING OF CORES: MINIMISED RISKS AND GUARANTEEING THE LIVELIHOOD  
IN THE COUNTRYSIDE THROUGH THE TRANSITION

**BUSINESS-AS-USUAL, NEBUULAR CITY**  
THE "EASY OPTION"

**NO TRANSITION: LEGACY DEVELOPMENT**  
REACTIVE AND DETRIMENTAL

**NO AMENITIES, NO PLACENESS**  
MINIMAL CAPACITY AND CONSIDERATION  
FOR AMENITIES AND ACTIVITIES

**CONVENTIONAL VEHICLES**  
EXISTING CASES ONLY: USE TRAMBUS,  
BECAUSE VILVOORDE IS ALREADY USING IT

# IMMOBILITY ANALYSIS

CONTEXT

THEORY &  
APPROACH

IMMOBILITY

NEW MODEL  
OF BRT

VISION

DESIGN TOOLS

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TESTING

CONCLUSION

GENK  
KM. 42.920

## METHOD

*Accessibility analysis*



*Commuting pattern analysis*



*Interviews and fieldworks*



*Online survey*



**Persona creation**



12:29

openbaar vervoer duurt echter te lang, waardoor het niet haalbaar is.

Voorbeeld 4: U wilt een avondje uit in Antwerpen in plaats van naar het café bij u in de buurt. U kunt echter uw auto niet gebruiken als u van plan bent een glaasje te drinken en na 21 uur is er geen openbaar vervoer meer.

Ja ☒

Nee ☐

← →

Uitgevoerd met Qualtrics [↗](#)

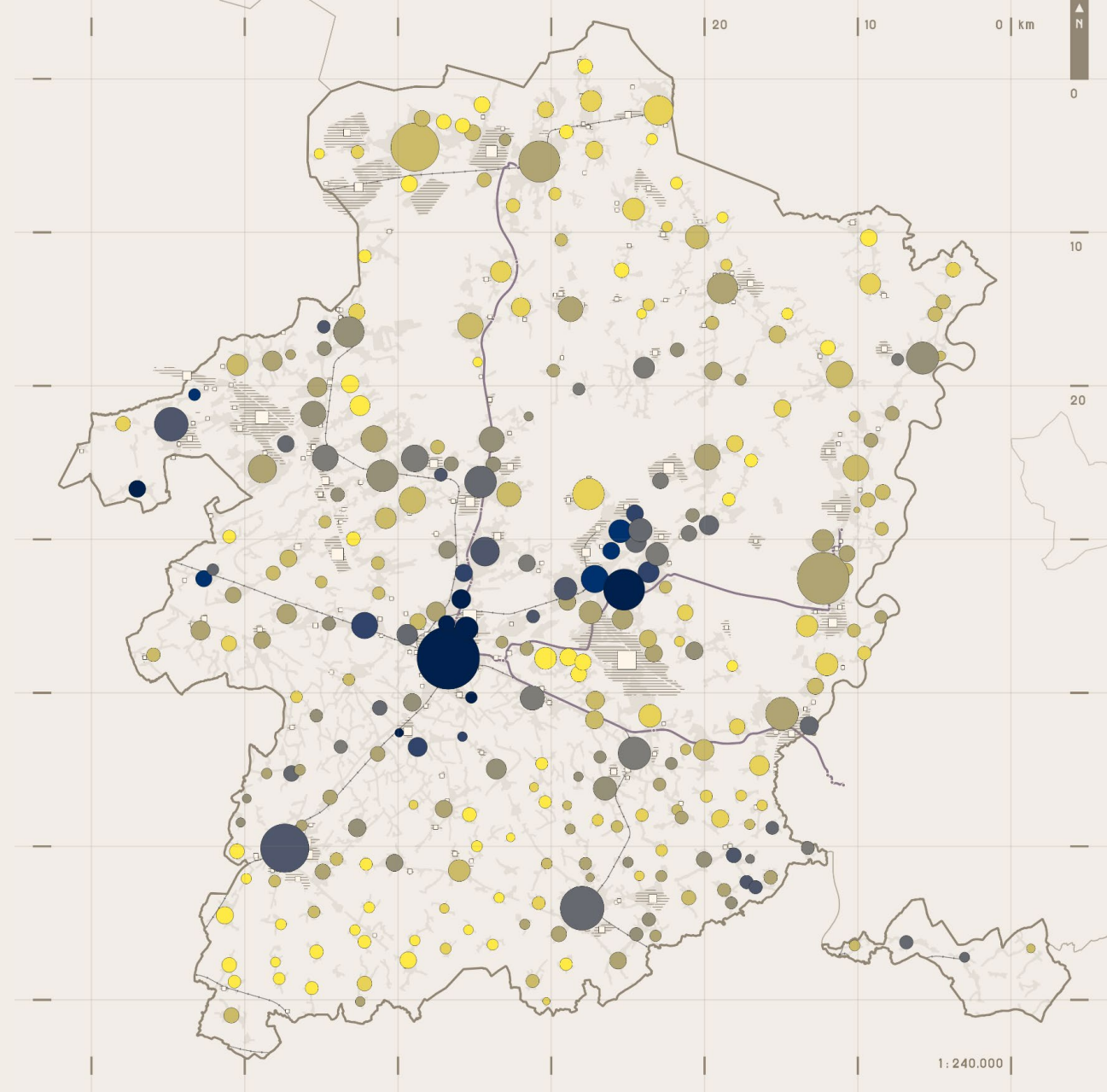
Beveiligd met reCAPTCHA: [Privacy](#) [↗](#) en [Voorwaarden](#) [↗](#)



## IMMOBILITY PATTERNS

**Immobility from spatial remoteness**  
lacking public transportation across the countryside, regardless of the present issues with urban forms (both ribbons, dispersed buildings, and cores)

**Immobility from poly-centricity:**  
having non-central destinations that require extreme time burden due to transfer.

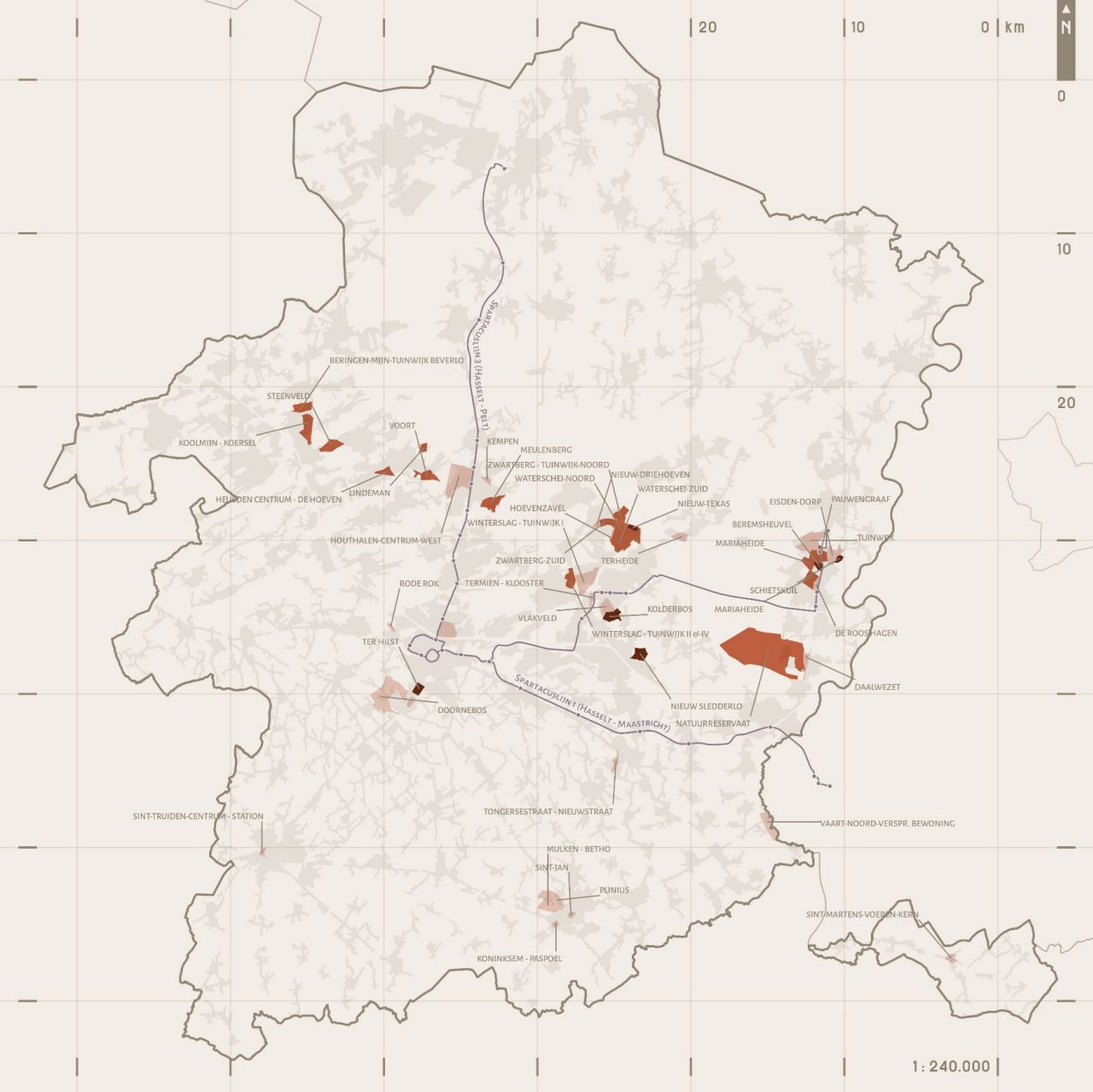


*Current accessibility per cores*

# IMMOBILITY PATTERNS

**Immobility from with social exclusion, poverty, and discrimination**  
worsening transportation poverty through exclusion from opportunities

**Immobility from lacking access to cars**  
both permanently or temporarily;  
applies per different family members



Neighbourhoods with socioeconomic difficulties

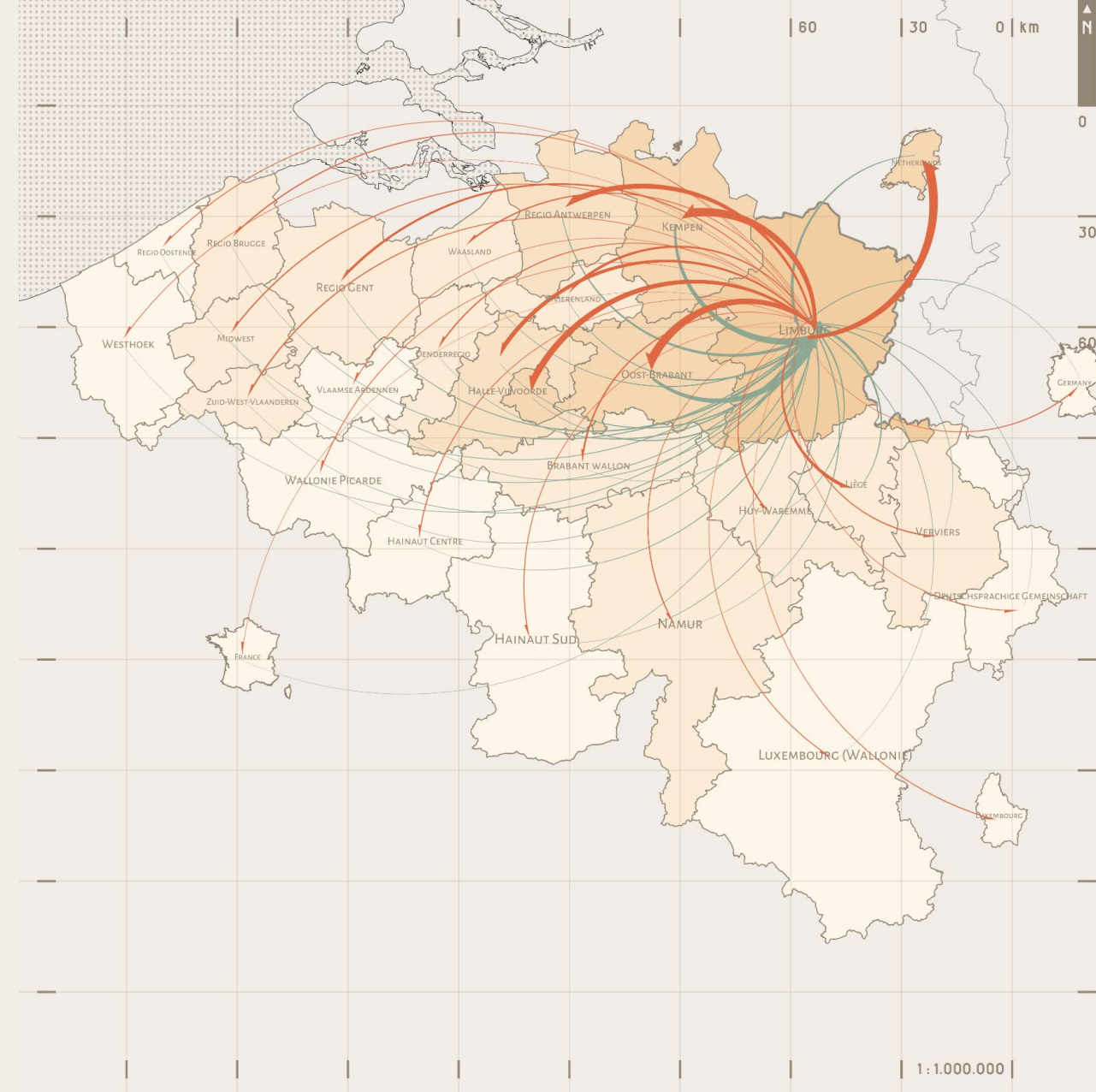
## IMMOBILITY PATTERNS

## Immobility from dependents

## Duty of bringing family members or other dependents to destinations

# Immobility from travelling across national borders on public transport

## limited public transportation crossing borders



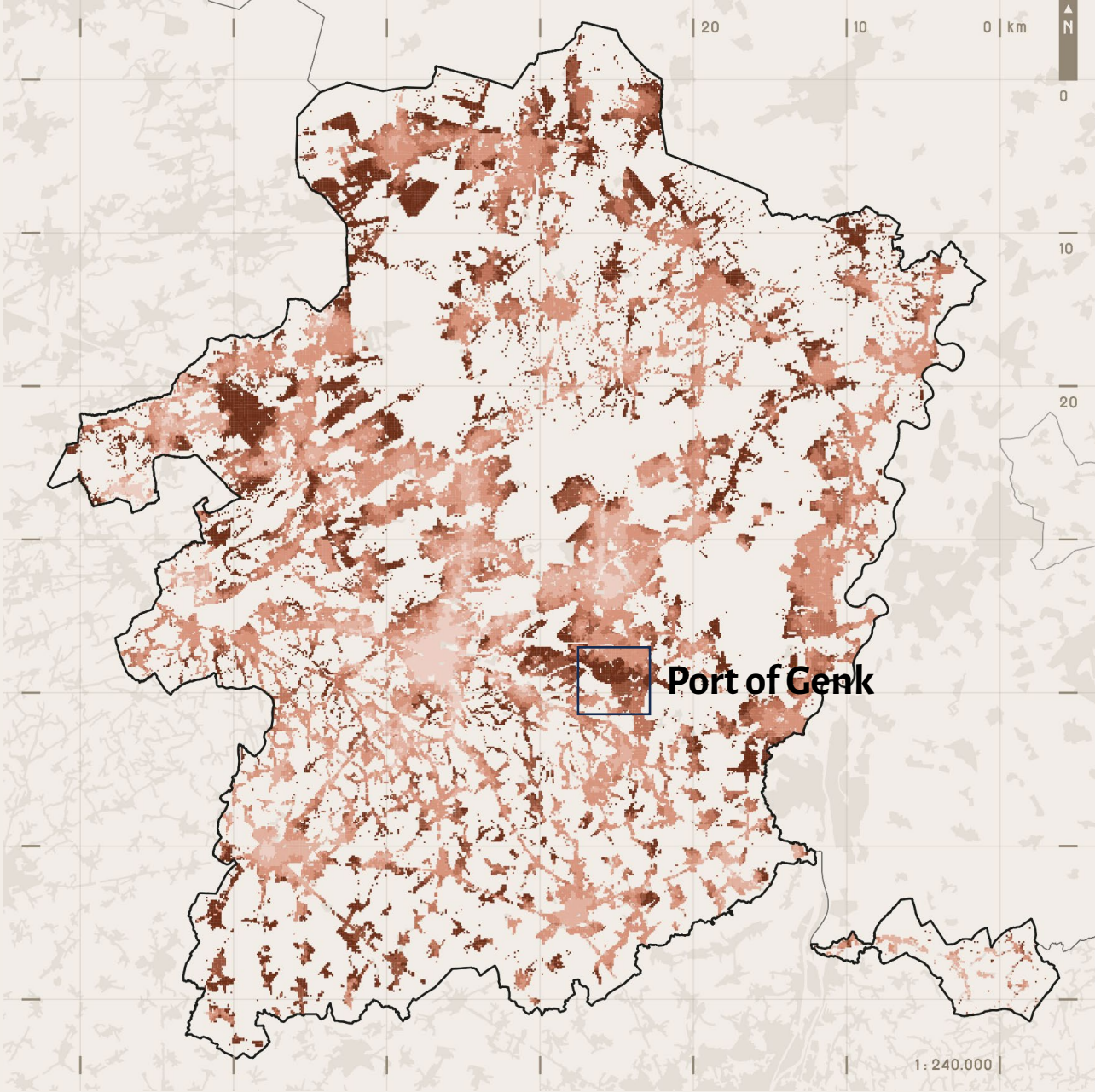
### Commute between Limburg and neighbouring regions



**IMMOBILITY PATTERNS:  
INDUSTRY**

**Discrepancy between employment opportunities and people**  
Lacklustre public transportation offer to major employment cores

**Immobility of ideas and talent**  
lack of good connection and network between innovative industries



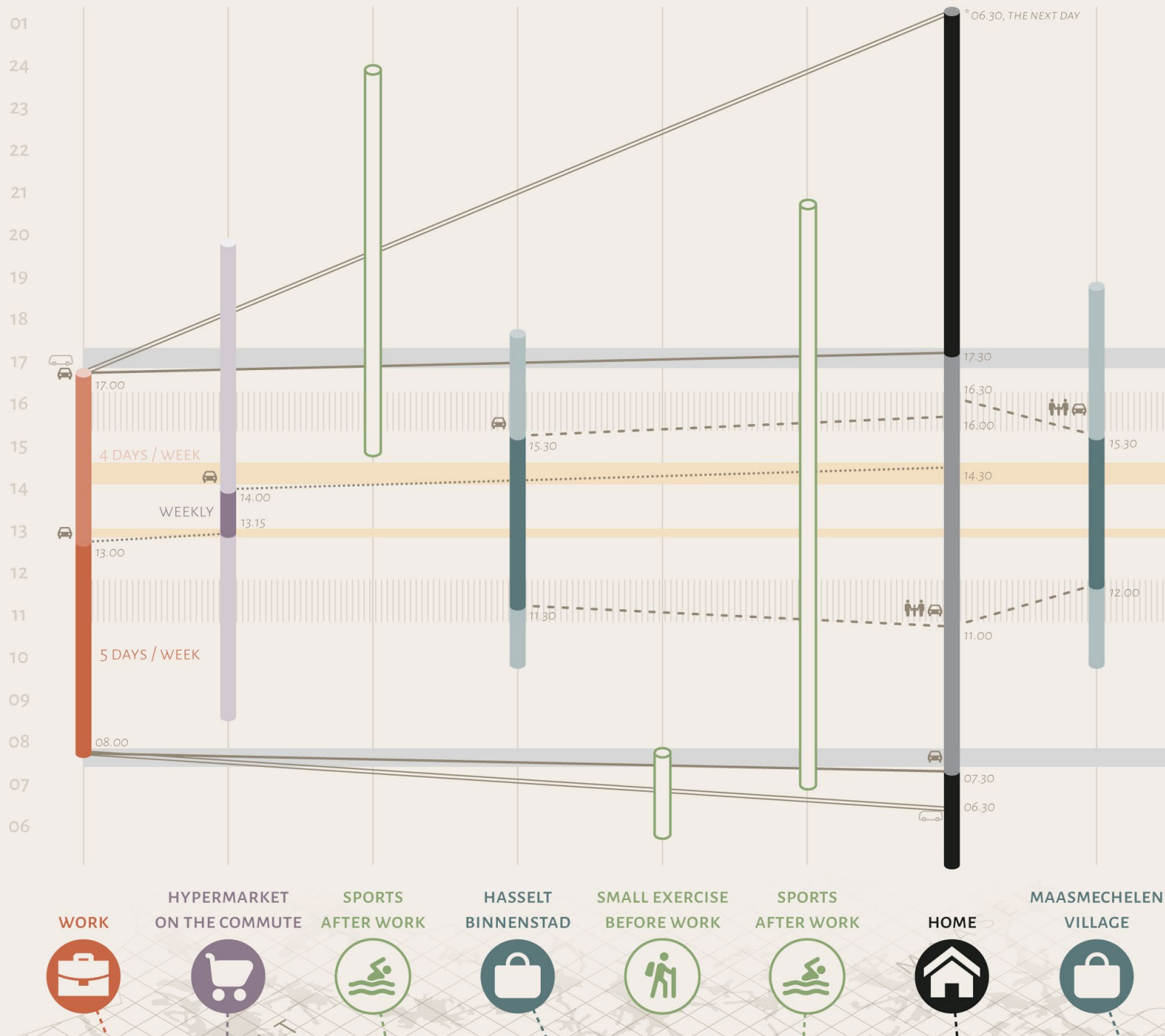
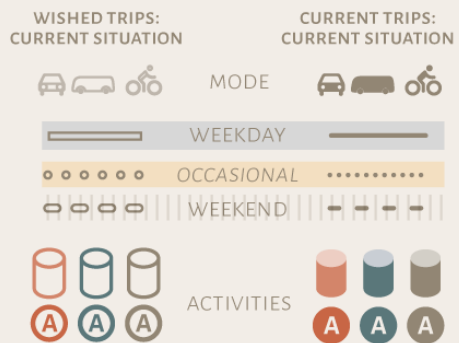
*Map of current accessibility on public transportation*

## PERSONA A

Local countryside  
car commuter

No apparent immobility;  
control group

Wishes on combining  
sports and free time  
activities in the commute



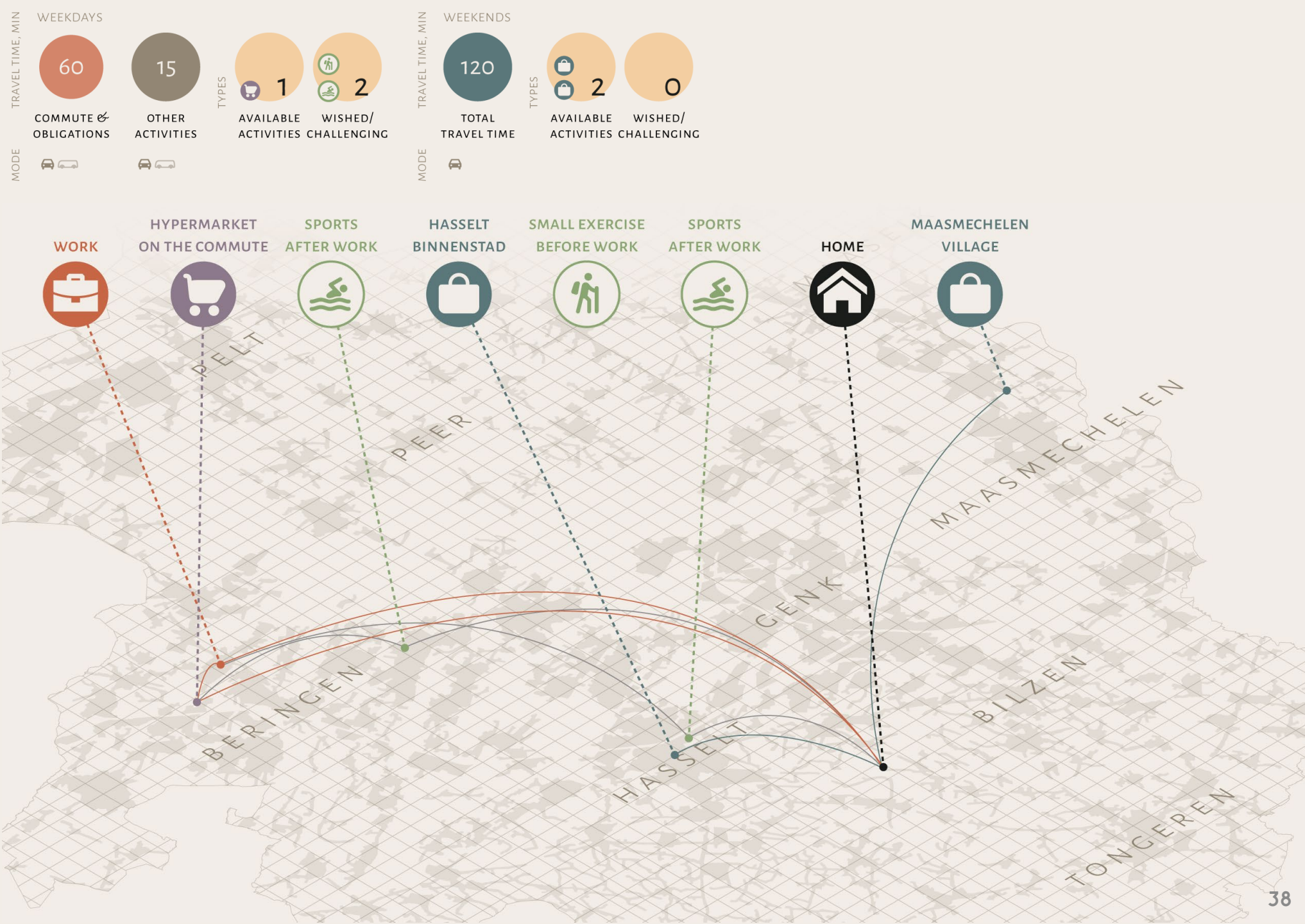


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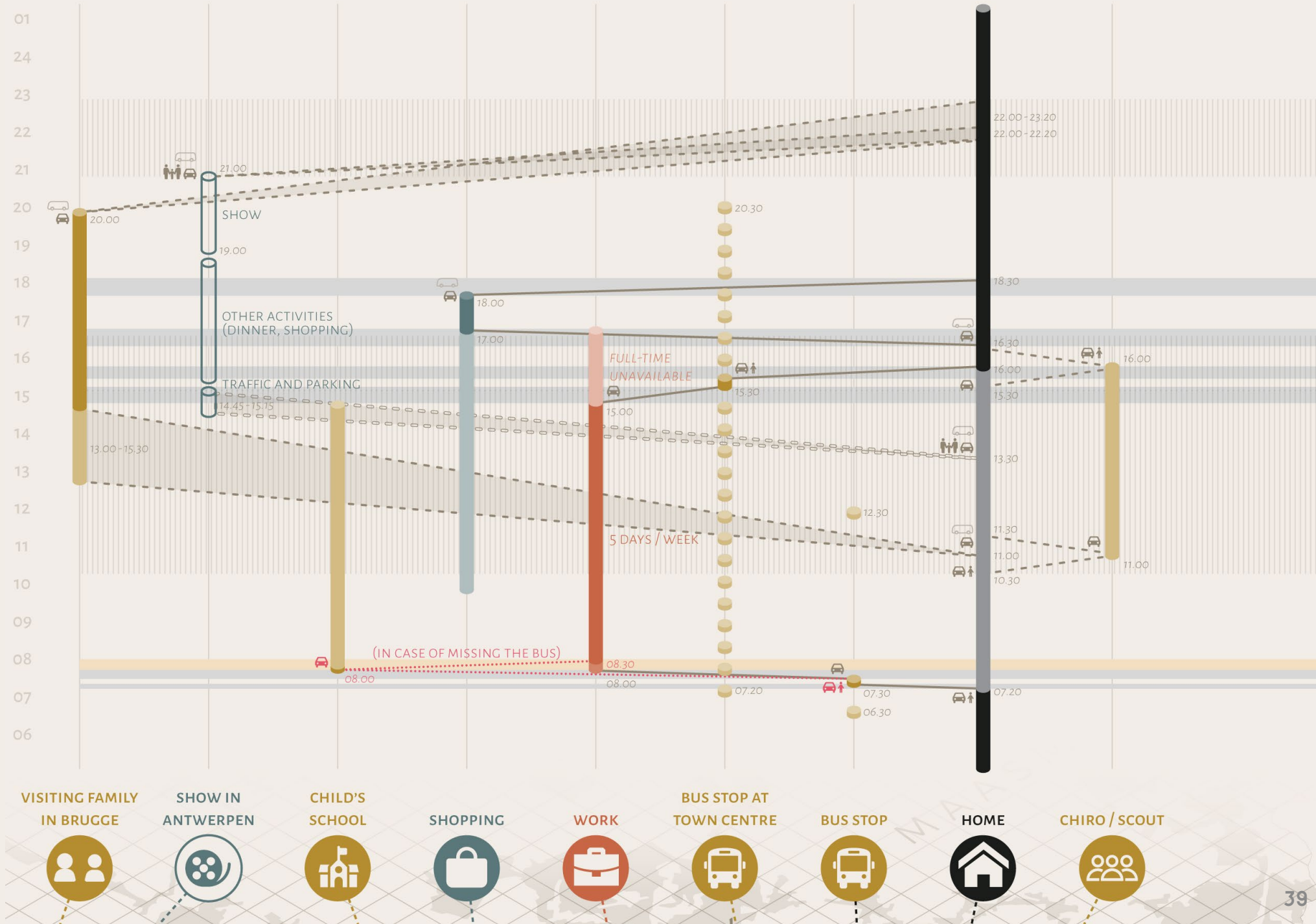
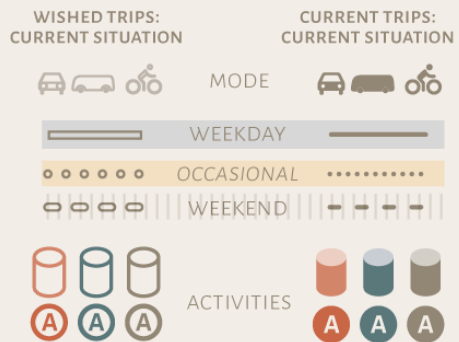


## PERSONA B

Transplanted car commuter  
with child fostering tasks

Limitation of career  
opportunity due to lack of  
accessibility for kids

Bus connection present,  
but due to infrequent  
service (2x day) the risk of  
missing the bus affects  
Career opportunity

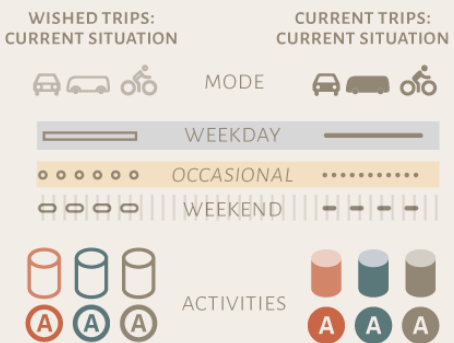


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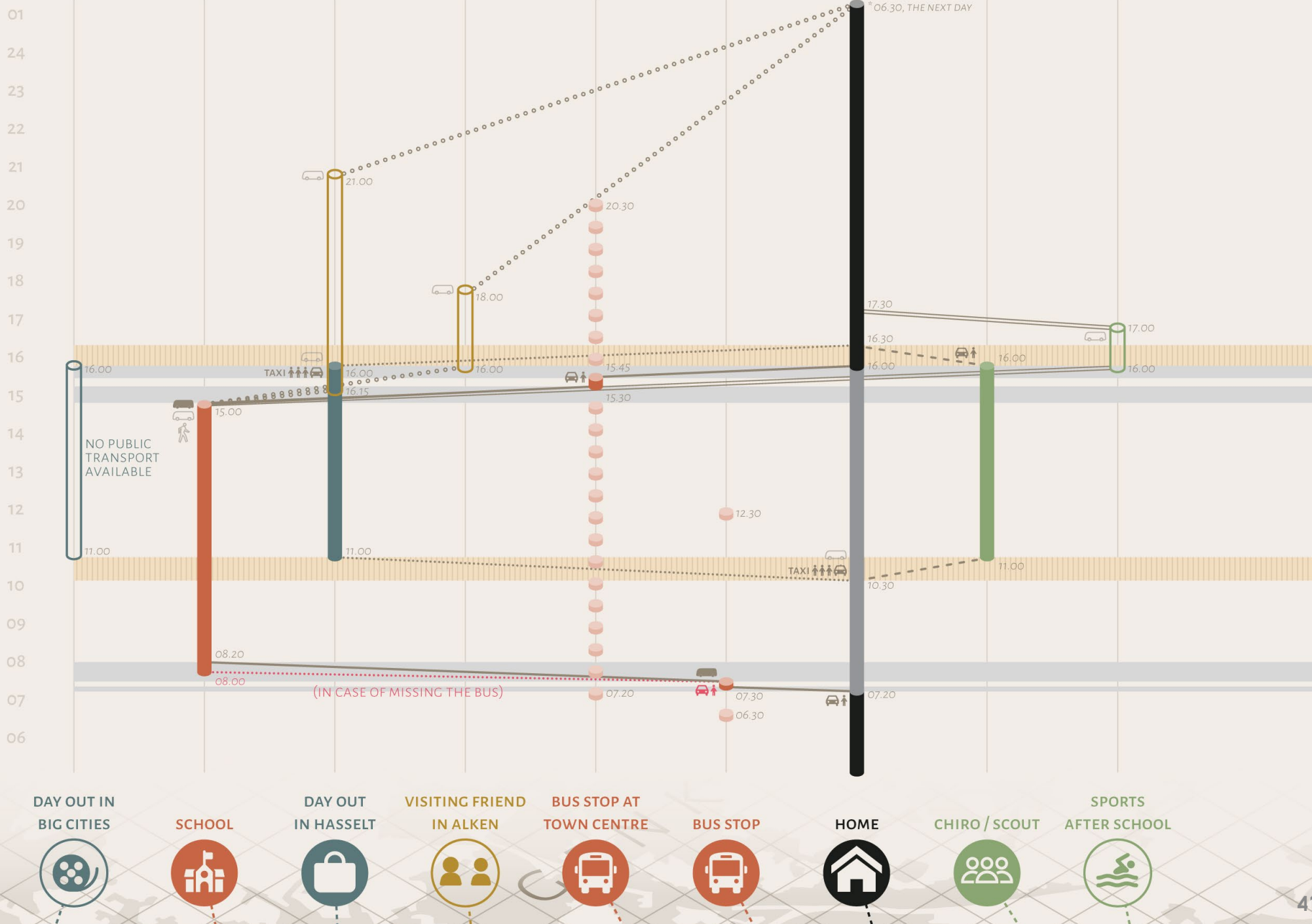
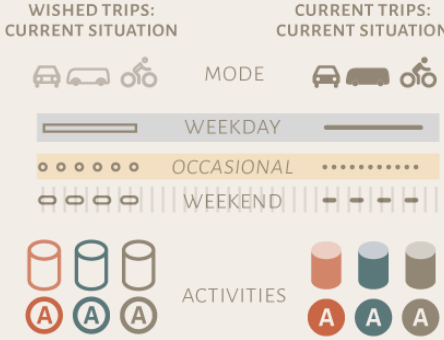




PERSONA C

Countryside youth

Limitation of activities outside of home and school; limited autonomy and learning / development opportunities

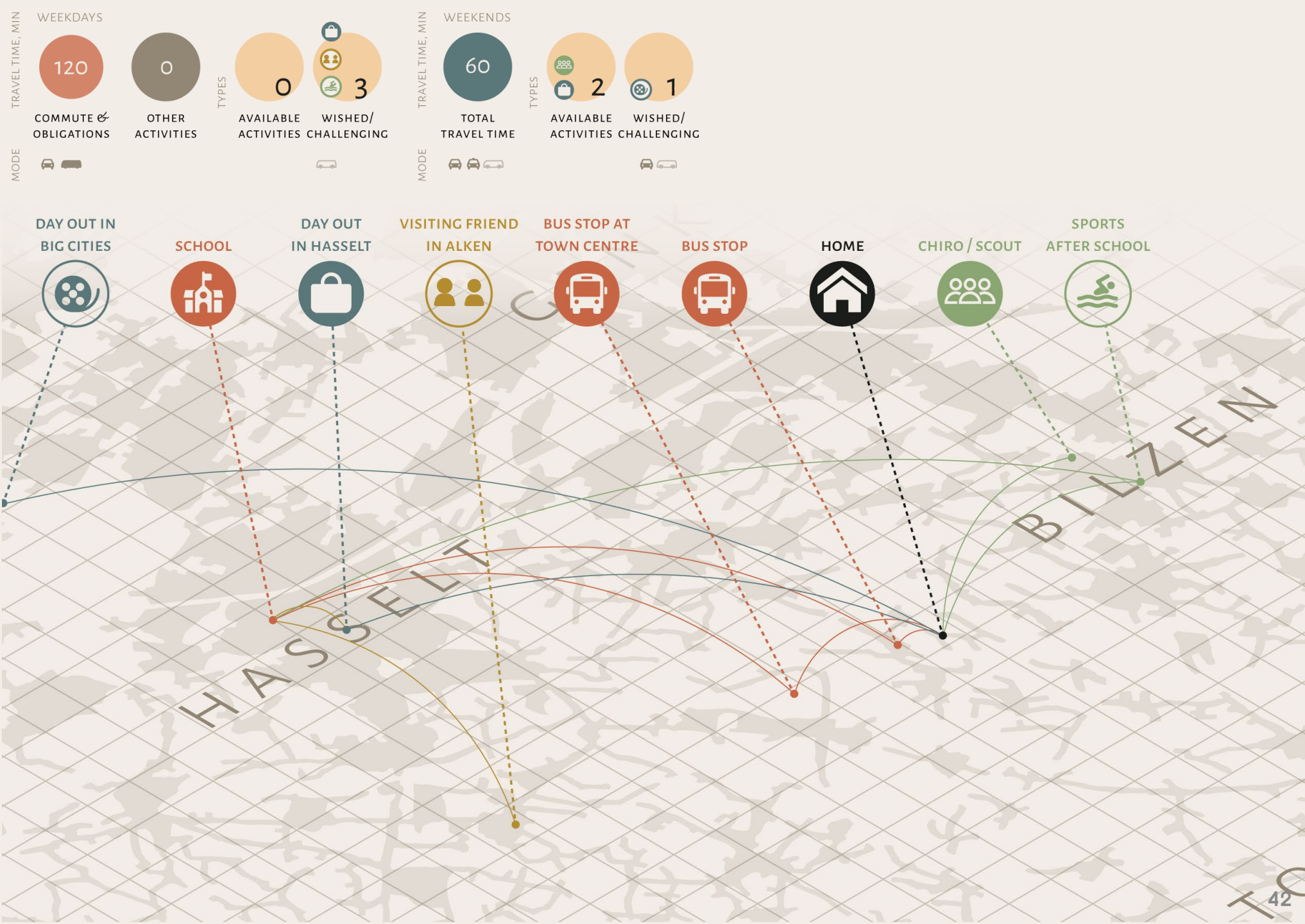




## PERSONA C

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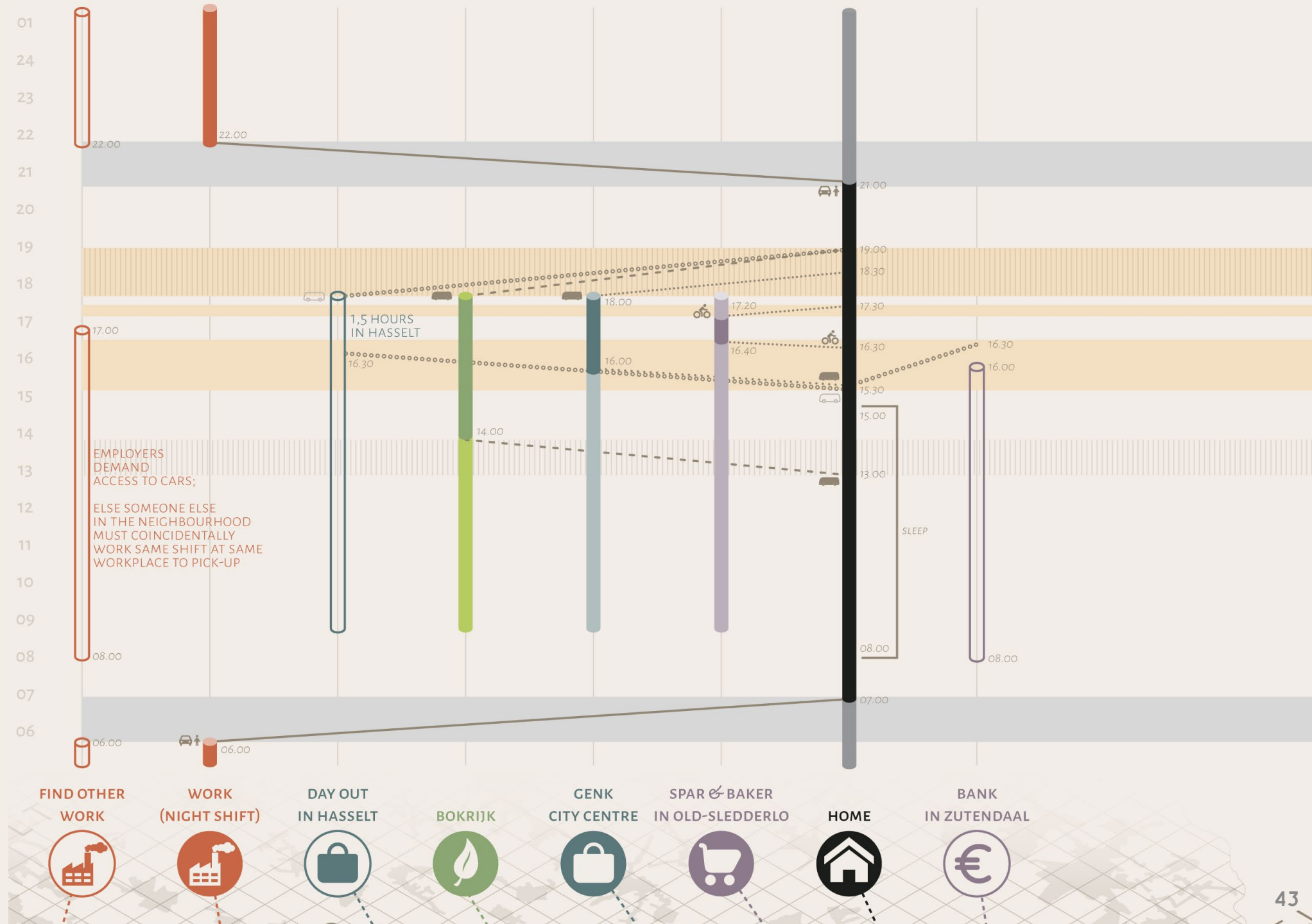
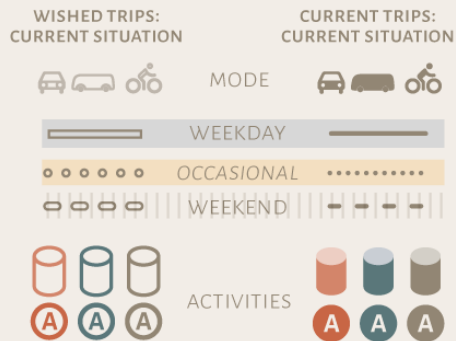


## PERSONA D

Blue-collar urban resident  
with migration background

Shift work incompatible  
with existing transit offer  
(07h – 20h)

Lack of access to cars limit  
employment  
opportunities to places  
where the neighbours  
work same shifts



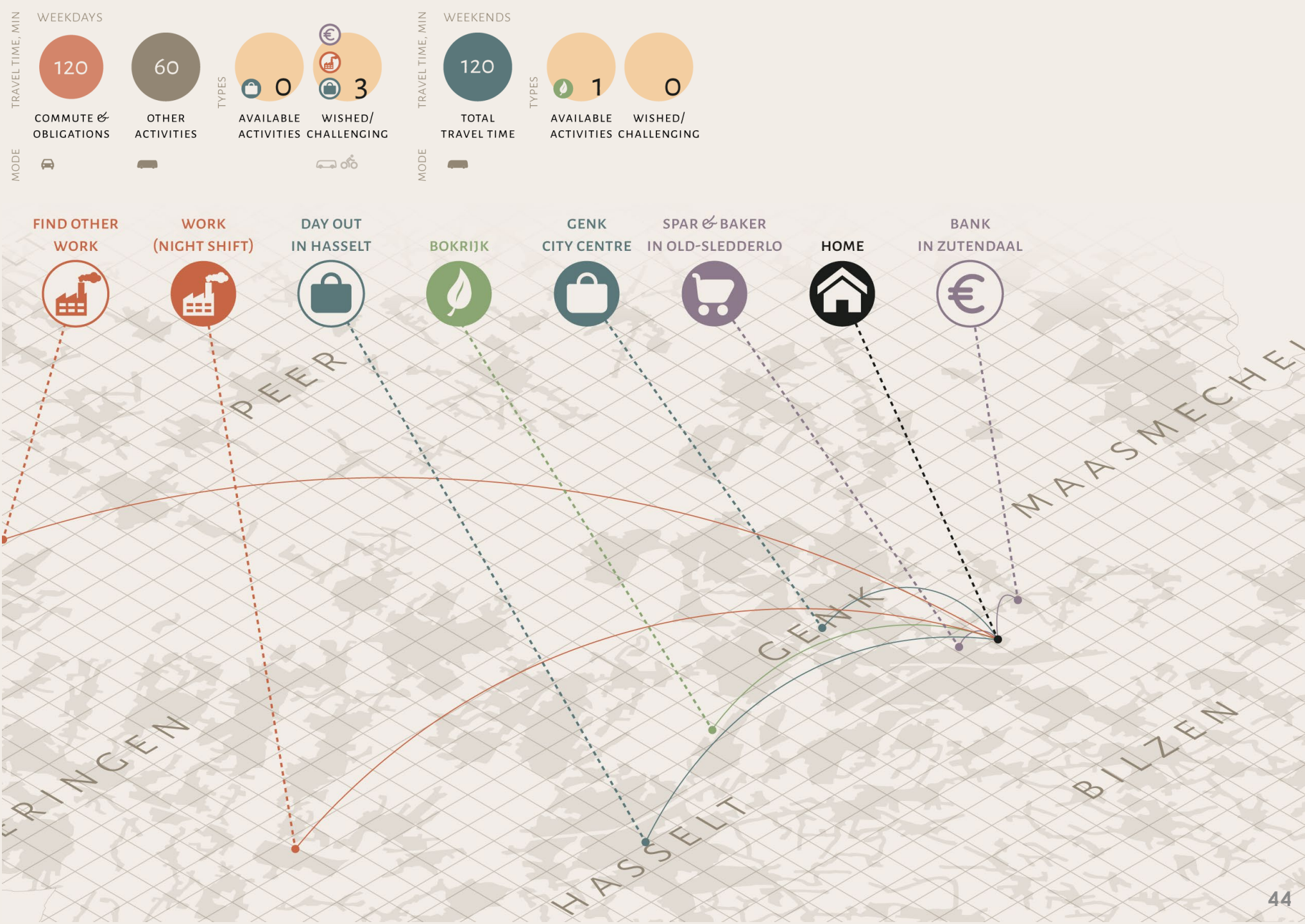


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# THE NEW MODEL OF BRT

CONTEXT

THEORY &  
APPROACH

IMMOBILITY

**NEW MODEL  
OF BRT**

VISION

DESIGN TOOLS

APPLICATION &  
TESTING

CONCLUSION

## METHOD

Multi-criteria analysis for deciding the ideal mix of BRT elements and level of automation technologies

The higher level of automation would mean higher accessibility benefit and infrastructure requirements; creating the trade-off relation

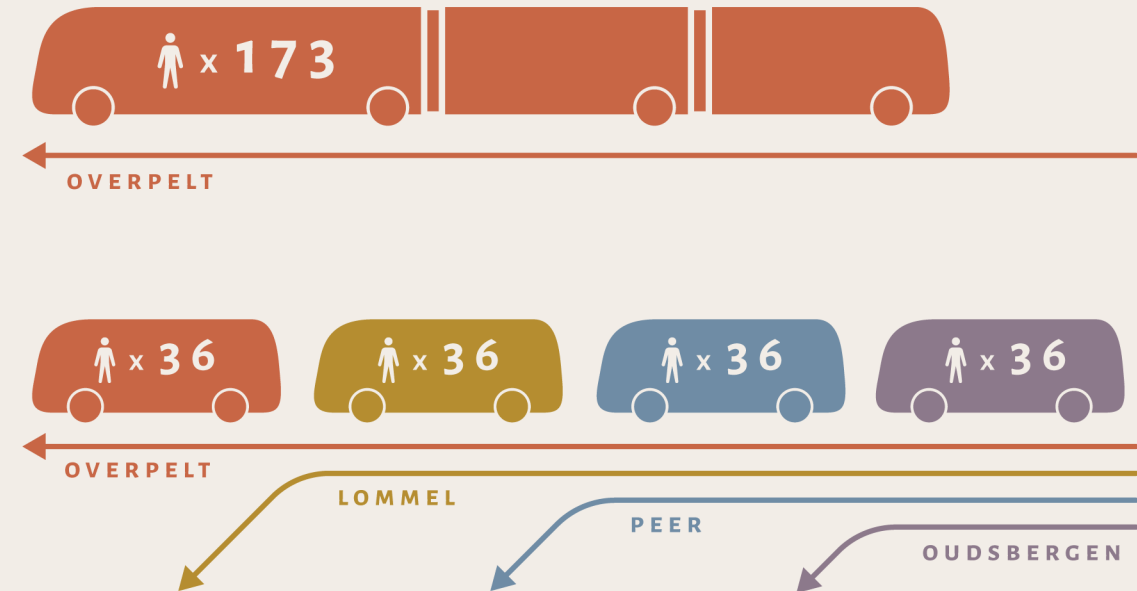


## HYPOTHESIS

Large vehicle of the original Trambus can be divided into multiple vehicles

Small vehicles can be dispersed into the dispersed settlements via branch services

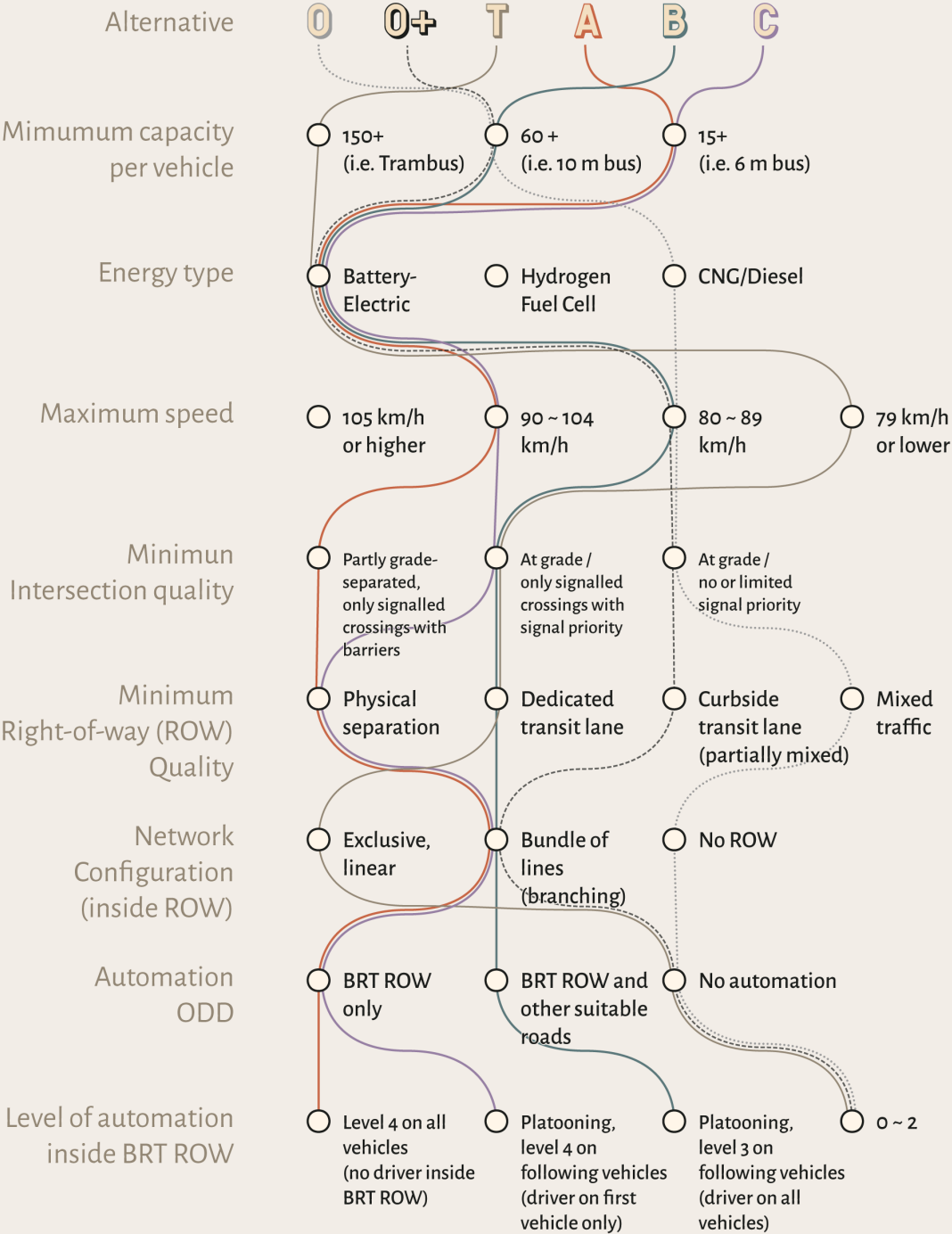
The operating costs can be reduced through automation inside BRT corridor





# ALTERNATIVES

- A**  
High-tech alternative; complete driverless operation in BRT corridor
- B**  
Low-tech alternative; no driverless technology would be applied
- C**  
Middle ground, dispersed; vehicles form a platoon of multiple vehicles, but the driver on the first vehicle remain.
- T**  
Current Spartacusplan with Trambus
- O+**  
Express bus along existing roads
- O**  
No intervention made



## CRITERIA

Criteria	Criteria Weight	Sub-criteria	Unit	+/-	Sub-criteria weight
Suitability	20%	Space unavailability for Spartacuslijn ROW	kilometres	-	90%
		Areas in Natura 2000 & VEN	square kilometres	-	10%
Accessibility	50%	Location-based accessibility measurement (UrbanAccess)	Number of jobs	+	100%
Cost	20%	Personnel hours	Hours	-	67%
		Energy costs	€	-	33%
Environmental Impact	10%	Sound pollution zones, built-up	Square kilometres	-	10%
		CO2 emission	g/km	-	90%

## CRITERIA

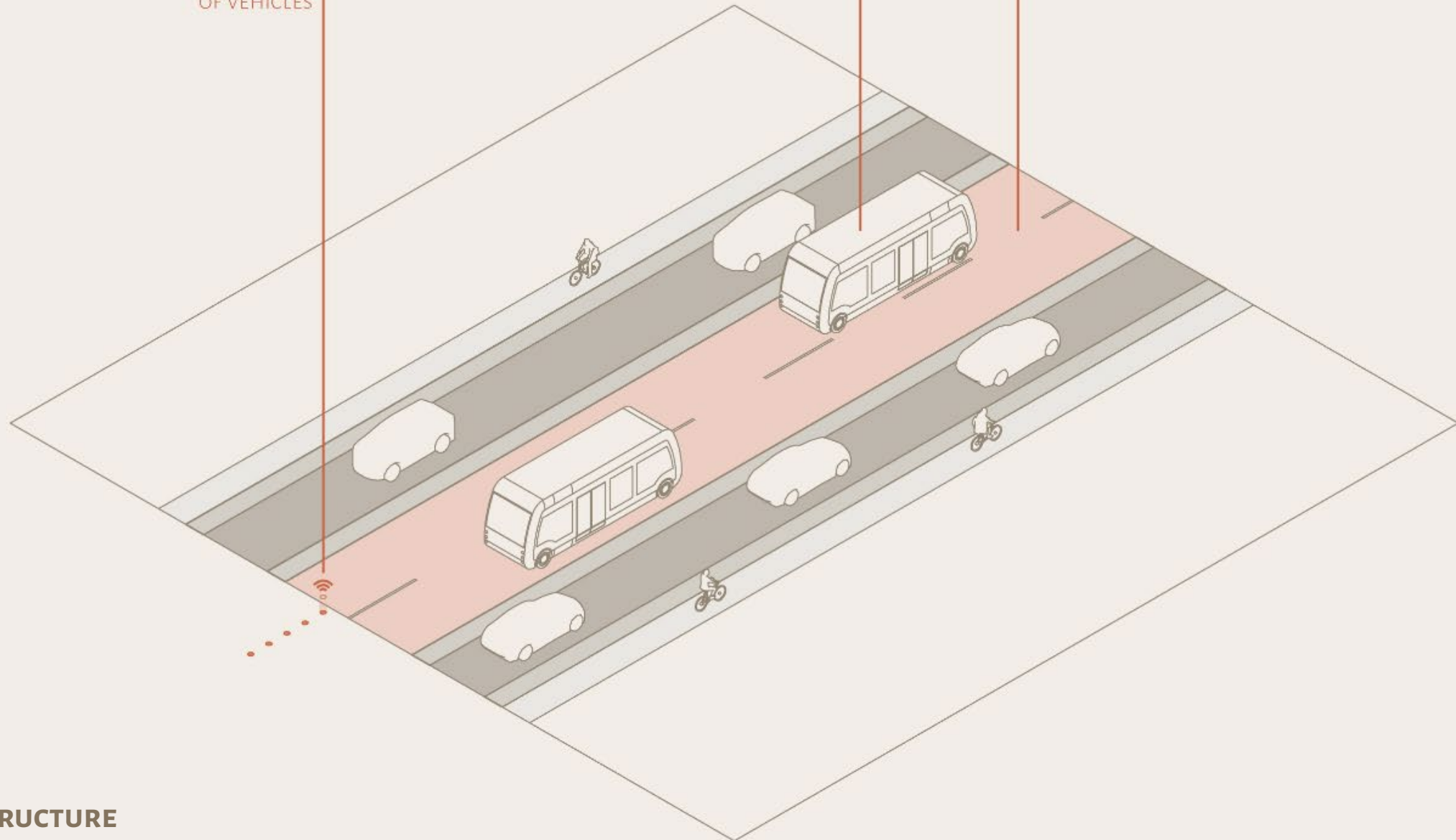
Criteria	Sub-criteria	o	o+	Tramibus	A	B	C
Suitability	Space unavailability for Spartacuslijn ROW	1	0,45	0,89	0	0,89	0,87
	Areas in Natura 2000 & VEN	1	0,77	0,99	0	0,99	0,69
Accessibility	Location-based accessibility measurement (UrbanAccess)	0	0,6	0,59	1	0,67	0,85
Cost	Personnel hours	1	0,57	0,56	0,98	0	0,11
	Energy costs	0,4	1	0,97	0	0,51	0
Environmental Impact	Sound pollution zones, built-up	1	1	0	0	0	0
	CO2 emission	0	1	1	1	1	1
		0,38	0,635	0,703	<b>0,737</b>	0,632	0,704



INSTALL MAGNETIC, OPTICAL, OR  
OTHER VEHICLE GUIDING SYSTEM  
TO ASSIST ACCURATE LOCATING  
OF VEHICLES

STANDARDISE VEHICLE:  
IDEALLY USING SINGLE TYPE  
OF VEHICLE FOR WHOLE SYSTEM

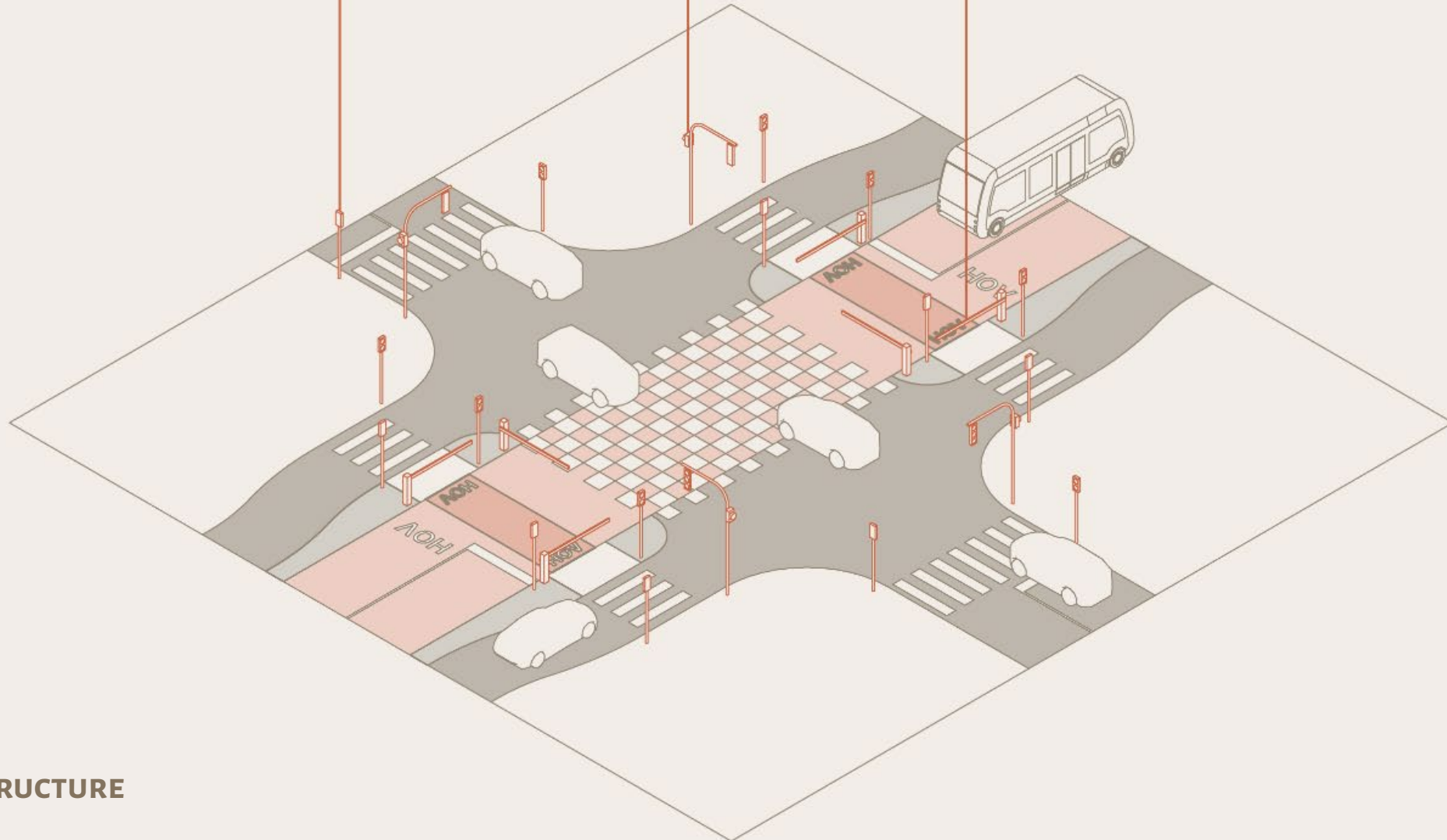
HORIZONTAL SEPARATION  
(MIN. 0,5 METRE)



ALL  
SIGNALLED  
INTERSECTION

SUPPORTING  
ROADSIDE SENSORS FOR  
PEDESTRIAN DETECTION

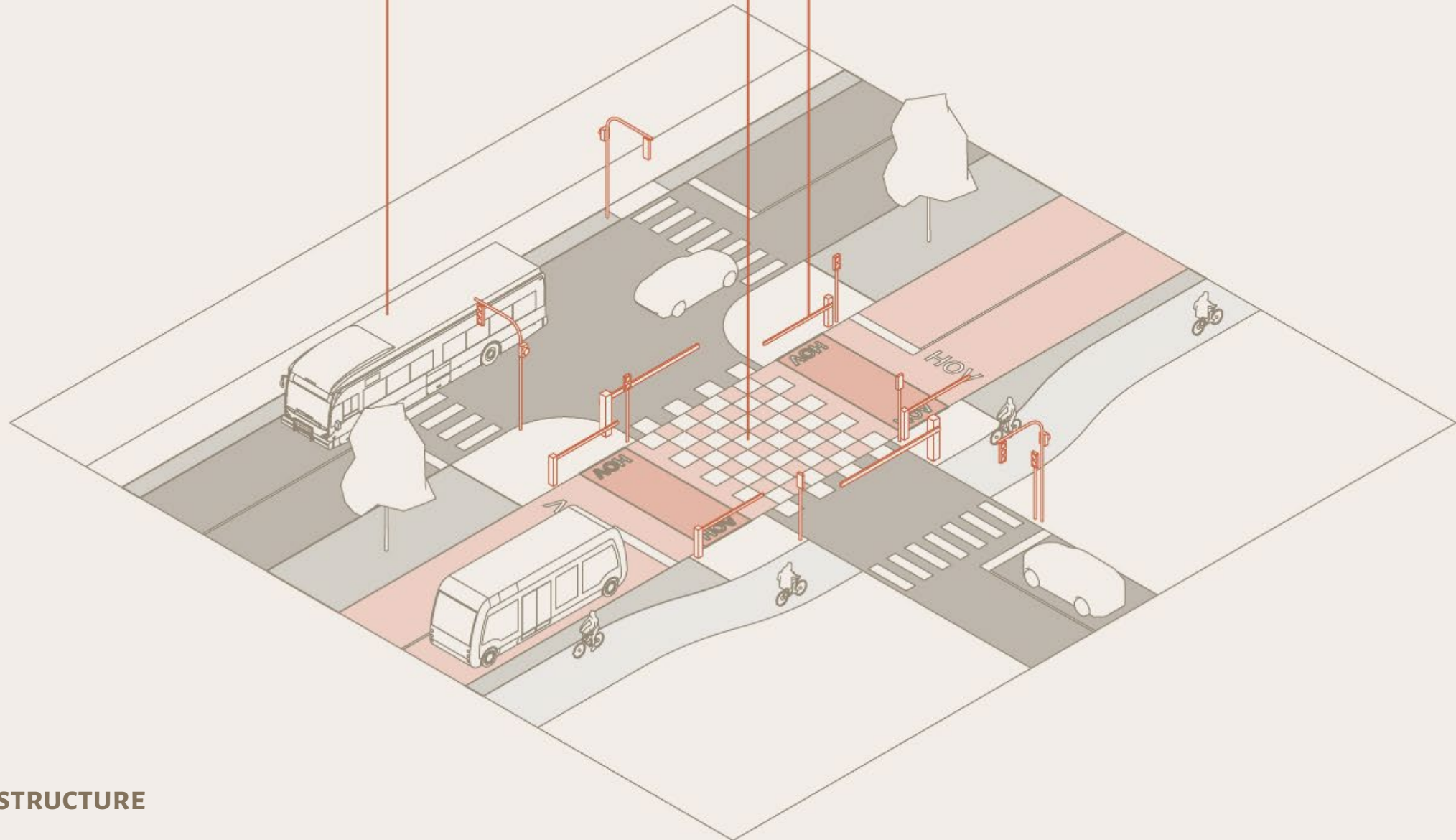
BARRIER FOR ALL CROSSINGS  
WITH OTHER TRAFFIC



INTEGRATE EXISTING BUS LINES  
AS BRT SERVICE; IF NOT POSSIBLE,  
SEPARATE HUMAN-DRIVEN  
BUSES FROM BRT ROW

MAKE BRT CORRIDOR  
VISIBLE FOR OTHER  
ROAD USERS

BARRIER FOR ALL CROSSINGS  
WITH OTHER TRAFFIC



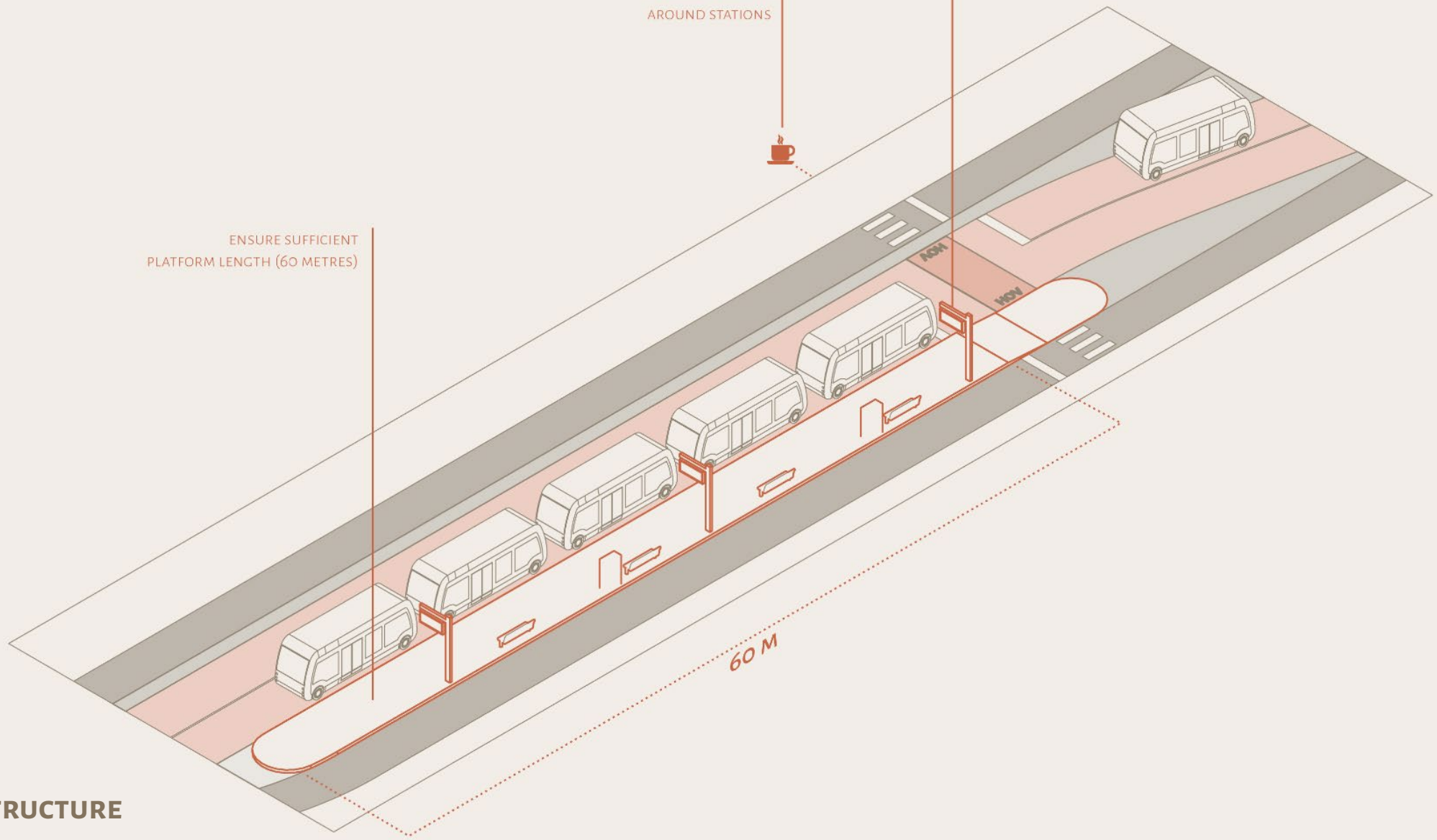


32	2 MIN	43	2 MIN	21	2 MIN
28	2 MIN	31	2 MIN	22	5 MIN
32		28		43	
				31	
				21	

PASSENGER INFORMATION FOR  
EACH ROUTE'S STOPPING POSITION

AMENITY FOR  
WAITING DRIVERS  
AROUND STATIONS

ENSURE SUFFICIENT  
PLATFORM LENGTH (60 METRES)



# VISION

CONTEXT

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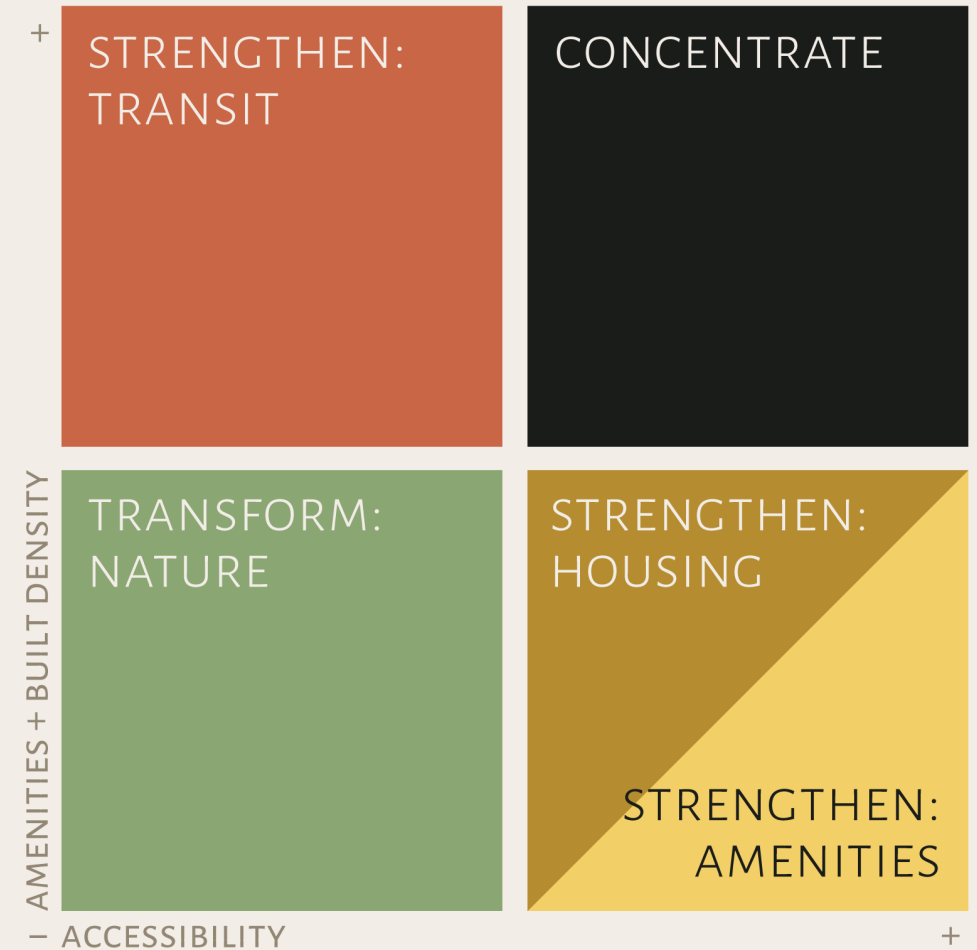
## METHOD

Categorisation of potential of location in Limburg, based on multiple metrics including:

- Accessibility
- Amenities
- Housing density
- Core/Ribbon/Dispersed building types
- Function mix
- (Y/N)Spartacuslijn stop, Coherent open space area

### Concentrate

Concentrate types are areas to just keep it as it is; generally located in city centers, where often no intervention is required





TYPES AND STRATEGY

Strengthen:Transit

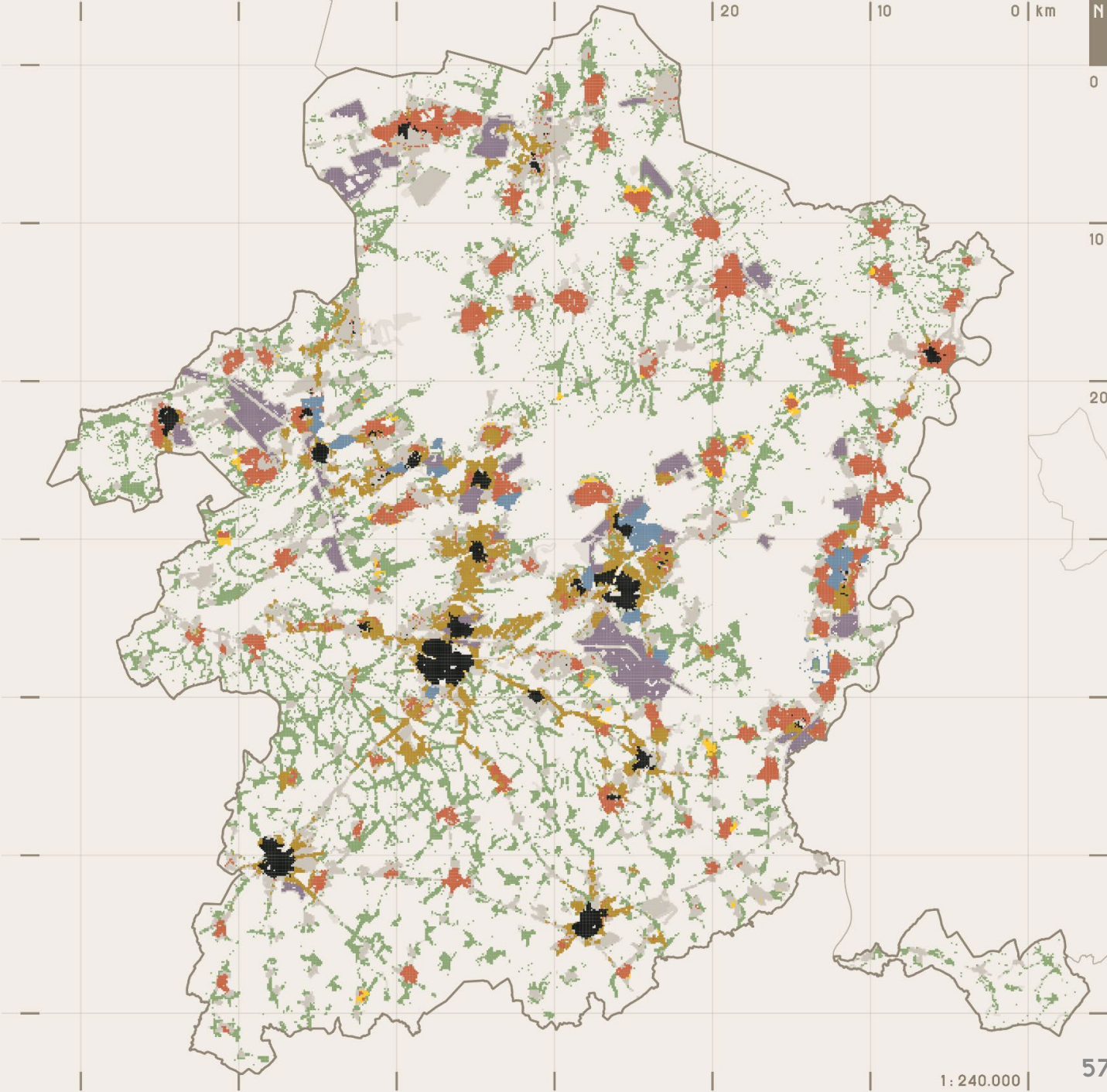
Areas where accessibility is lacking; BRT service will be focused by means of branch services, aim to become Strengthen:Housing types

Strengthen:Amenities

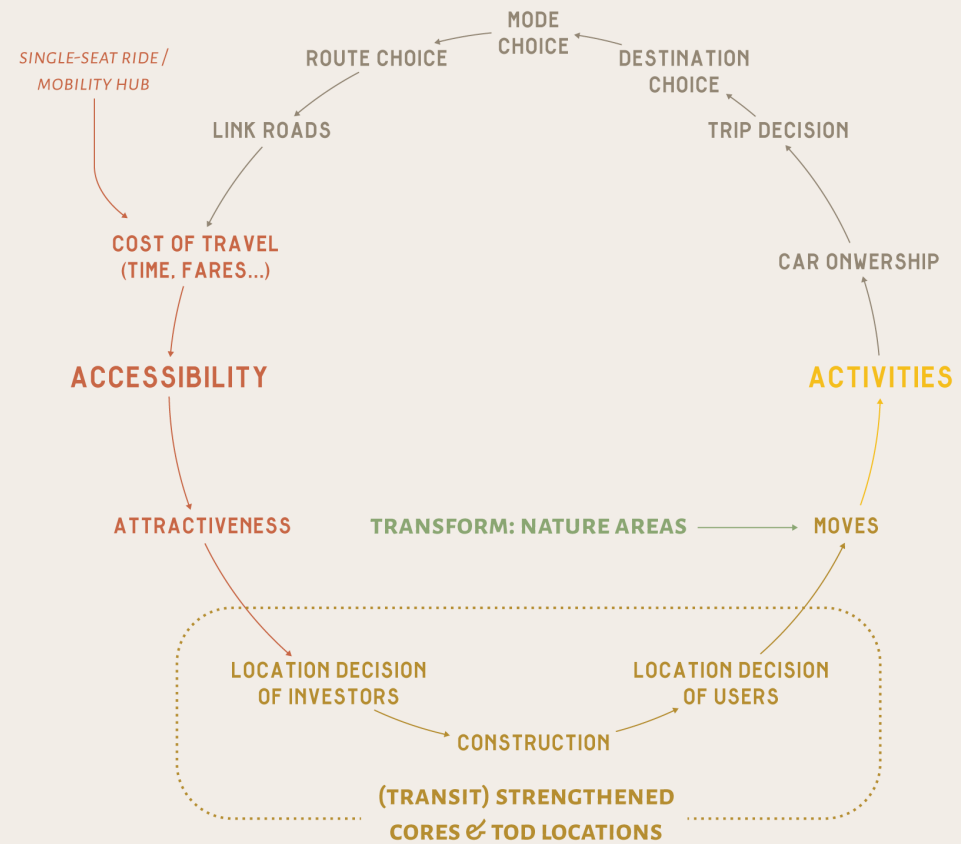
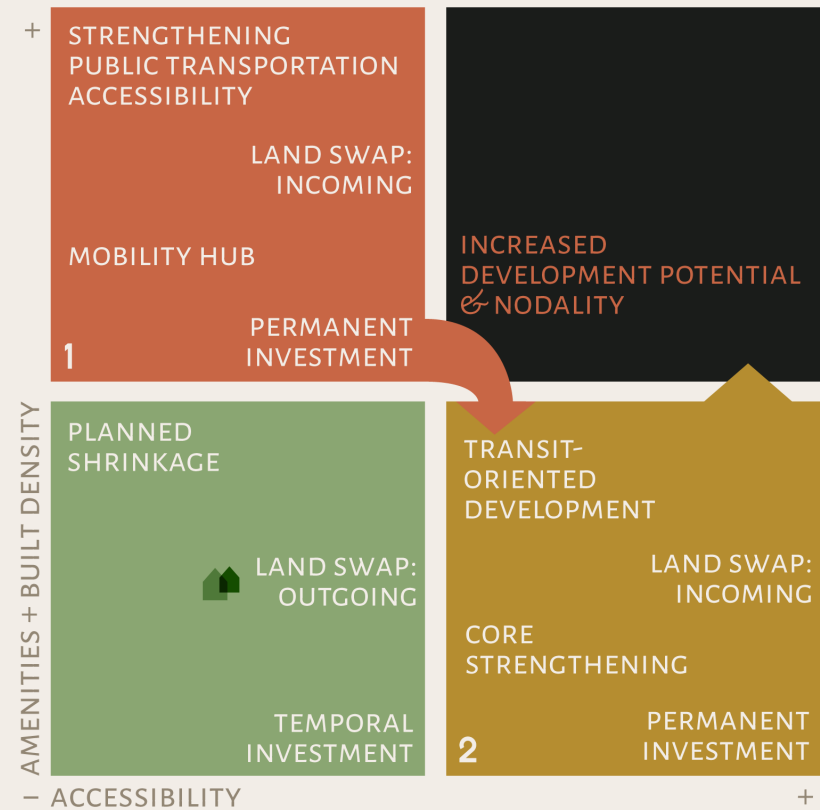
Amenity provision focus; limited locations (Eigenbilzen)

LEGEND

- SPATIAL TYPES
- Concentrate
  - Strengthen: Housing
  - Strengthen: Transit
  - Strengthen: Amenities
  - Transform: Nature
  - Empower: Socioeconomic
  - Industrial Transition
  - Unclassified



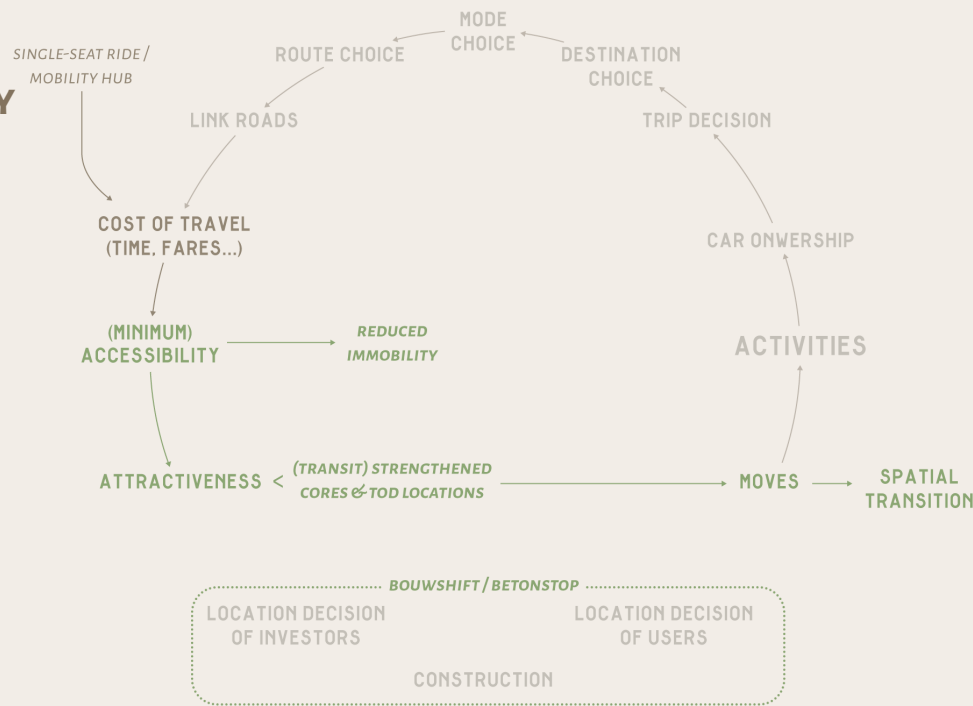
# Types and Strategy



## Strengthen:Housing

Can be developed into alternative housing for countryside residents; already well-connected and less developed for housing, or transformed from Strengthen:Transit and Strengthen: Amenities types

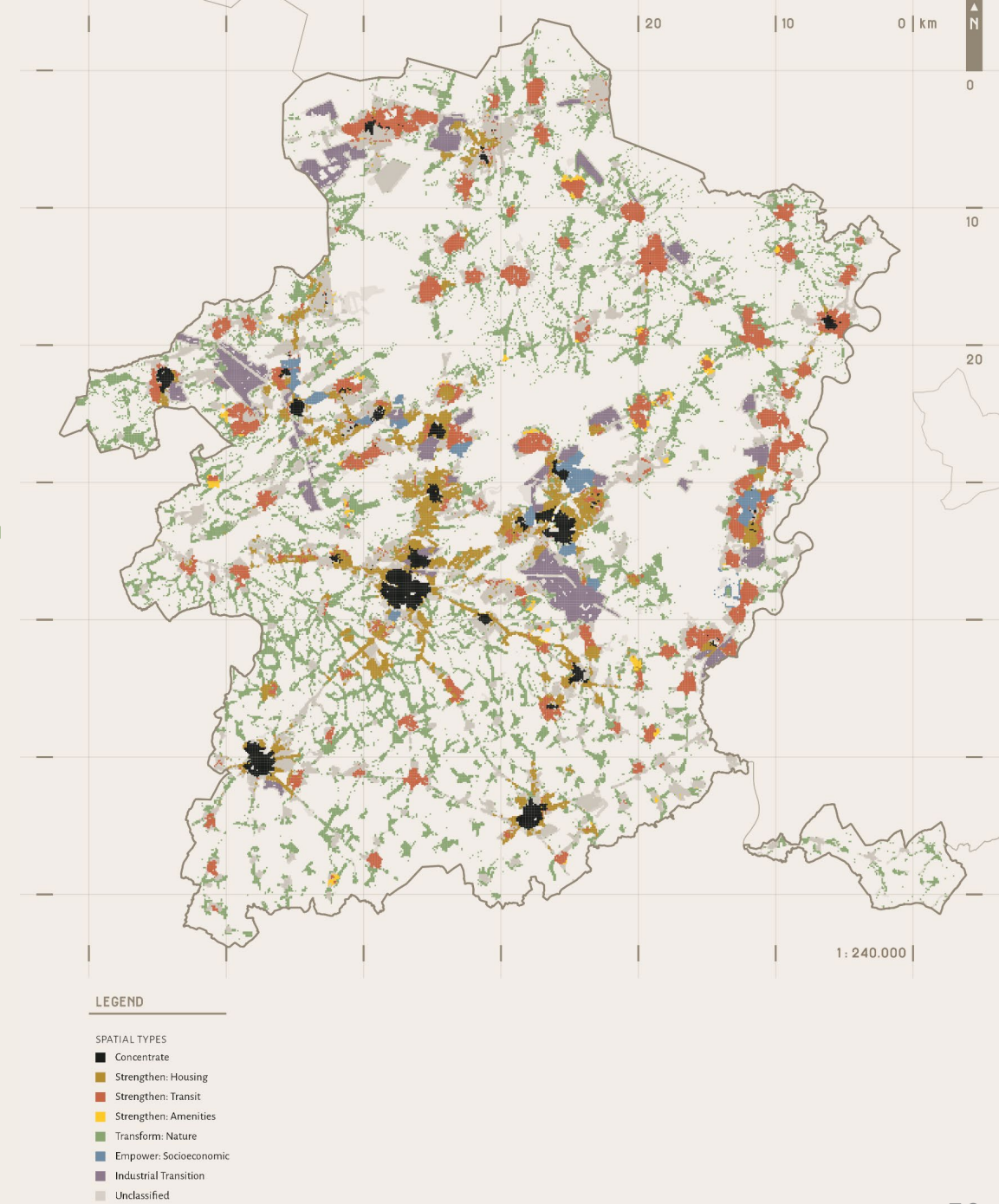
TYPES AND STRATEGY



Transform:Nature

Cause of fragmentation of open space; further expansion blocked with existing policy tools

Gradually attract residents into  
Strengthen housing areas  
voluntarily





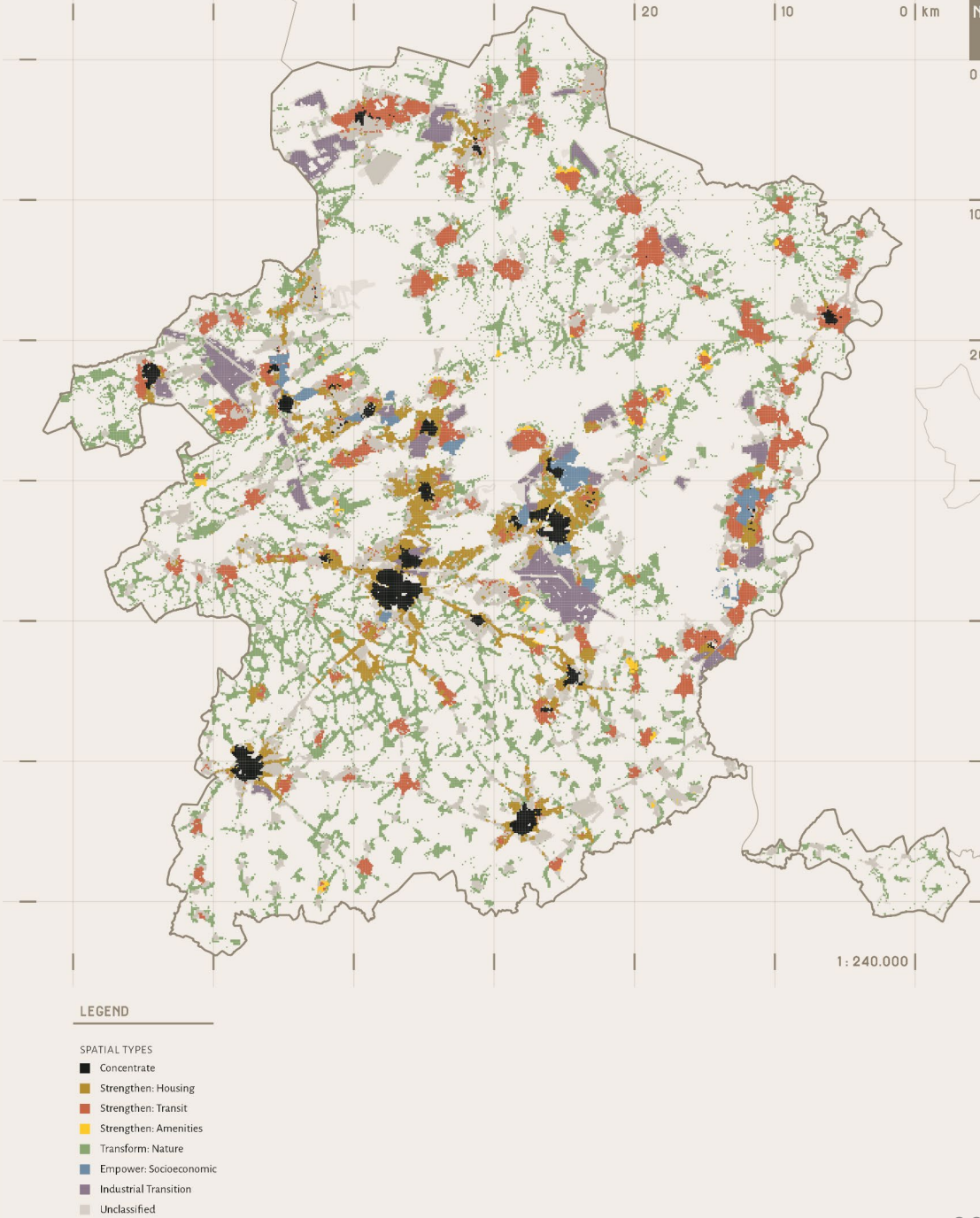
TYPES AND STRATEGY

Empower

Impoverished areas to provide economic opportunities

Industrial transition

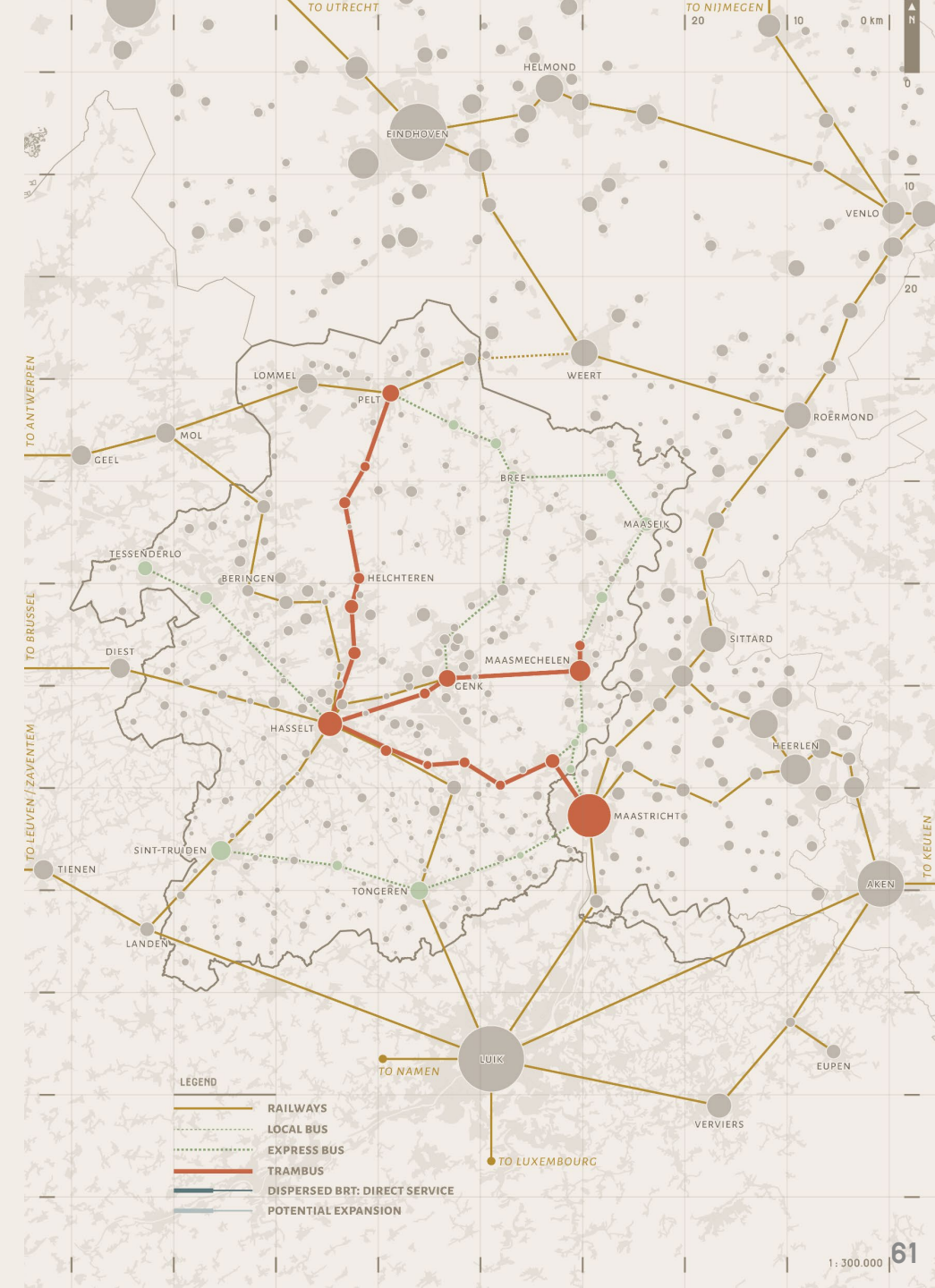
Promote innovation and industrial transition



## SYNTHESIS

Current Spartacusplan and its pathways can only create alternative housing in bigger cities (Concentrate), or  
Strengthen:Housing areas; limiting capacity for spatial transition

**Concentrate**  
**Strengthen:Housing**





## SYNTHESIS

New BRT model can supply the transit service to small cores across the province (Strengthen:Transit)

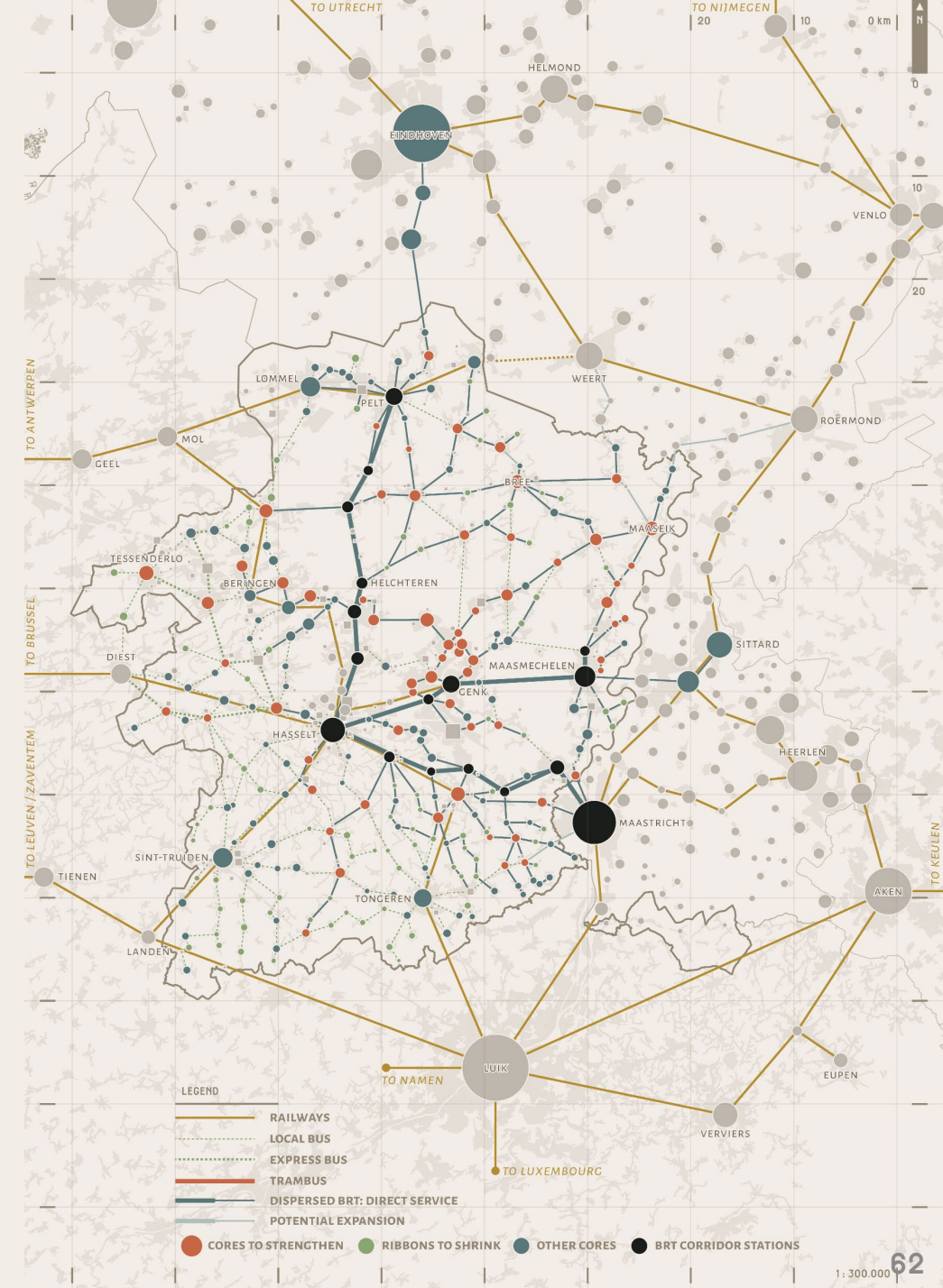
Attractive for countryside residents: closer to their original community, more capacity to create less denser developments similar to what most countryside residents are used to

### Concentrate

**Strengthen:Housing**

**Strengthen:Transit**

**Strengthen:Amenities**





## SYNTHESIS

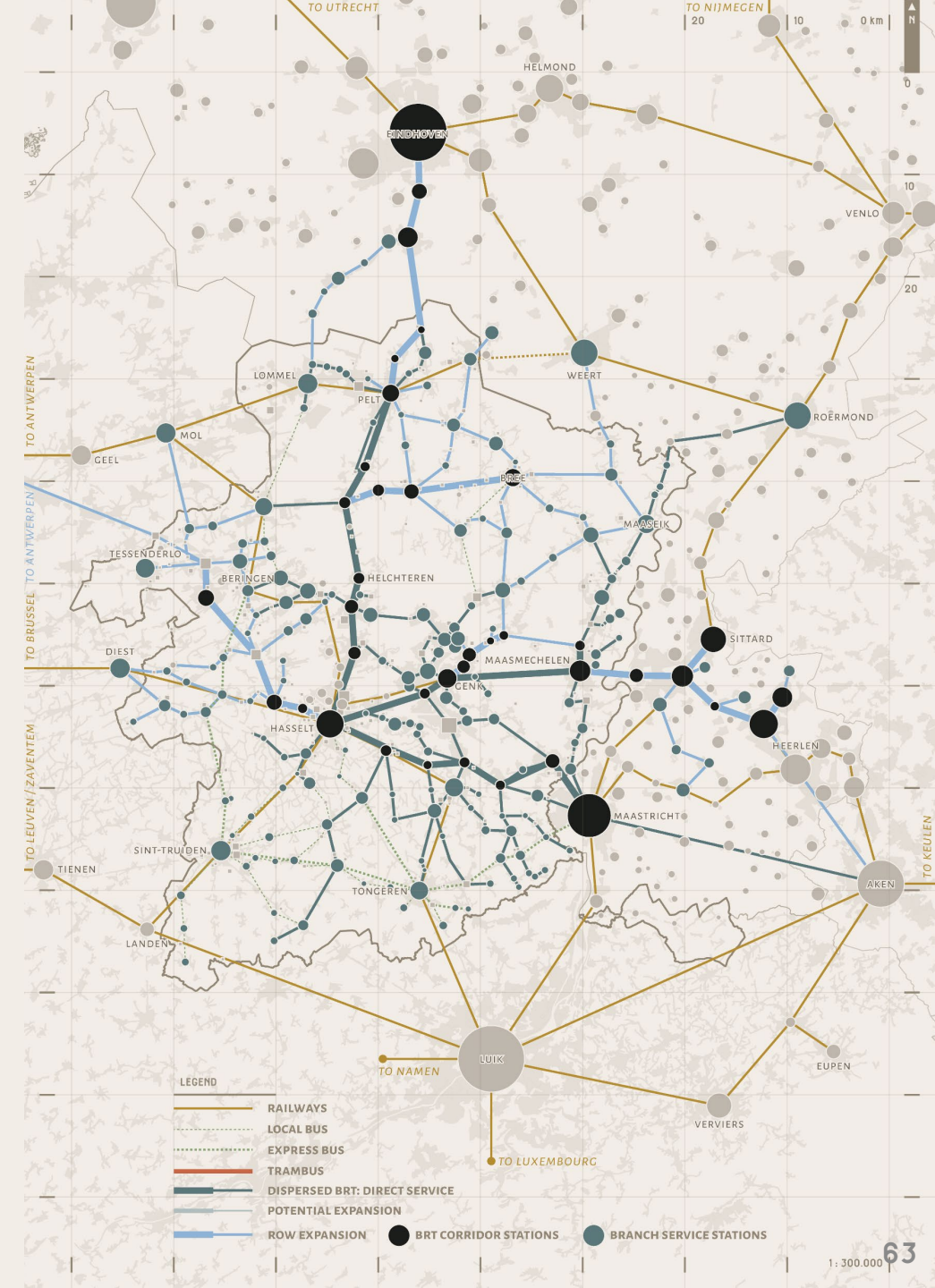
After the transition is finished, the transit service can be gradually pulled from the dispersed settlements; shifting focus onto healthy villages cores and more cross-border destinations

**Concentrate**

**Strengthen:Housing**

**Strengthen:Transit**

**Strengthen:Amenities**





CONTEXT

THEORY &  
APPROACH

IMMOBILITY

NEW MODEL  
OF BRT

VISION

**DESIGN TOOLS**

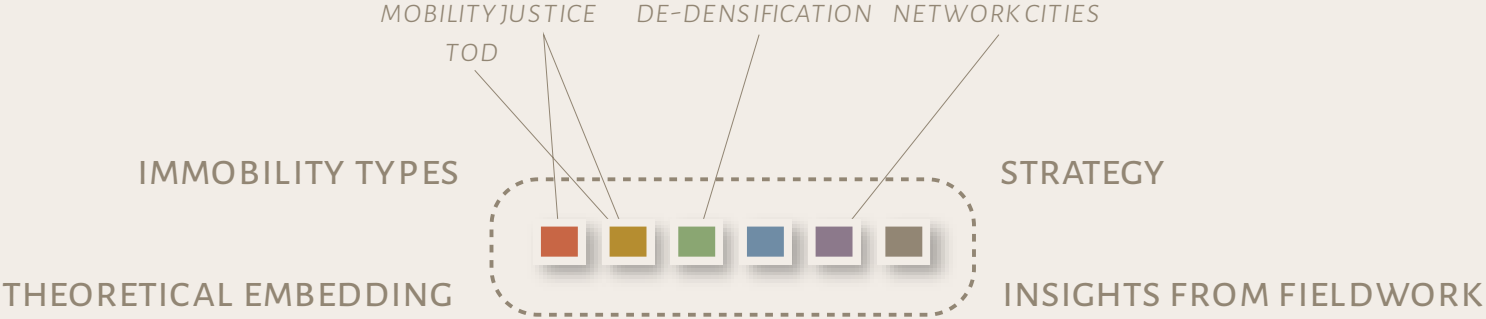
APPLICATION &  
TESTING

CONCLUSION

# DESIGN TOOLS

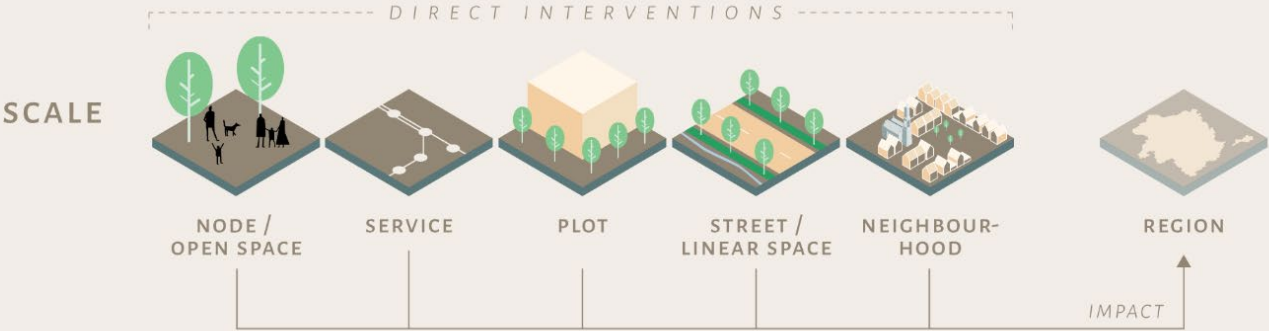


PATTERN LANGUAGE



- PATTERN TYPES  
PER SPATIAL FRAMEWORK
- M** ALL: MOBILITY INTEGRATION
  - S** STRENGTHEN (HOUSING / TRANSIT / AMENITIES)
  - T** TRANSFORM (NATURE)
  - E** EMPOWER (SOCIOECONOMIC)
  - I** INDUSTRIAL TRANSITION

- STAKEHOLDERS
- GOVERNMENTS & MUNICIPALITIES
  - TRANSPORT COMPANIES
  - PRIVATE PARTIES & RESIDENTS





# PATTERN LANGUAGE

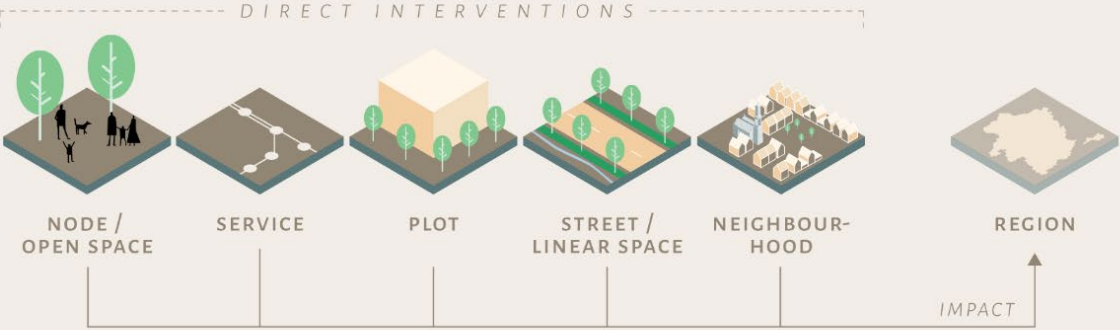
## PATTERN TYPES PER SPATIAL FRAMEWORK

- M** ALL: MOBILITY INTEGRATION
- S** STRENGTHEN (HOUSING / TRANSIT / AMENITIES)
- T** TRANSFORM (NATURE)
- E** EMPOWER (SOCIOECONOMIC)
- I** INDUSTRIAL TRANSITION

## STAKEHOLDERS

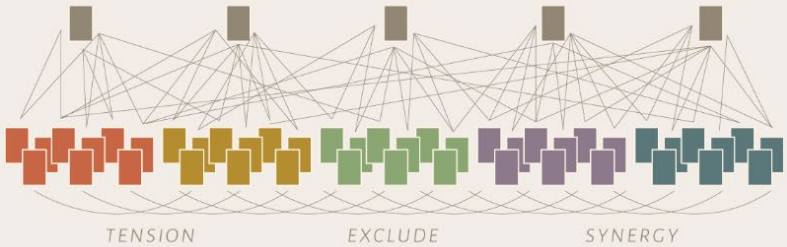
- GOVERNMENTS & MUNICIPALITIES
- TRANSPORT COMPANIES
- PRIVATE PARTIES & RESIDENTS

## SCALE



## PRINCIPLES

## ACTION PATTERNS



## IMPACT PARAMETERS

- |                            |   |
|----------------------------|---|
| <b>AC</b> ACCESSIBILITY    | <b>MM</b> MULTI-MODAL INTEGRATION           |
| <b>AA</b> AMENITIES ACCESS | <b>HD</b> HINDRANCE                         |
| <b>BB</b> BUILT FOOTPRINT  | <b>LC</b> LANDSCAPE COHERENCE               |
| <b>SC</b> SOCIAL COHESION  | <b>EO</b> ECONOMIC OPPORTUNITIES            |
| <b>AN</b> ACC. NATURE      | <b>PS</b> PERMEABLE SURFACES                |
| <b>SE</b> GREEN SPACE      | <b>EG</b> ENERGY PRODUCTION / USE REDUCTION |

PATTERN LANGUAGE

IMPACT PARAMETERS

ACMMAA SC EO

T2

PLOT

TEMPORAL

### REPURPOSING STRUCTURES LEFT BEHIND

After the house is left unoccupied, due to the result of land swap or vacancy, if the building structure left behind is located next to transit stops, the structure can be temporarily not demolished and repurposed to other uses. For example, the garden can be a small-scale mobility hub where you can park your bike, the bedroom will be a charging station for e-bikes, the garage is now used for the neighbourhood shared car, the living room as a town hall or a local food hub.

LINKS

T1,T3,T5,T6,T7

SCALE  
TEMPORAL / PERMANENT  
STAKEHOLDERS

NAME

DESCRIPTION

ICONS

LINKED PATTERNS





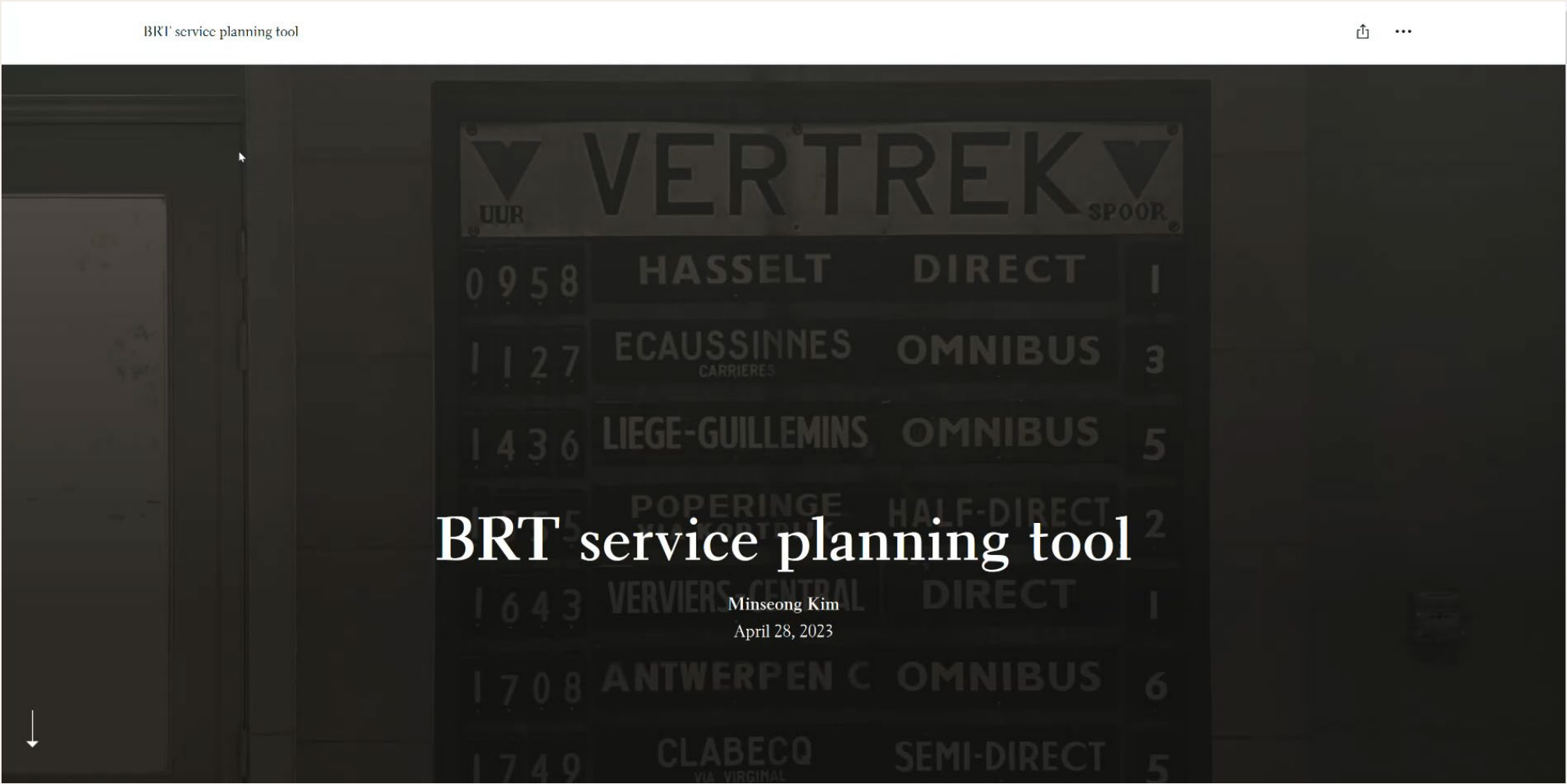
## TRANSIT SERVICE PLANNING

For public transportation service planning, principle patterns are made with pattern language; action patterns are replaced with each possible destinations

Each principle patterns can be applied in the service design process by prioritizing certain parameters, like number of jobs or income level of the location.



TRANSIT SERVICE  
PLANNING





# APPLICATION AND TESTING

CONTEXT

THEORY &  
APPROACH

IMMOBILITY

NEW MODEL  
OF BRT

VISION

DESIGN TOOLS

**APPLICATION &  
TESTING**

CONCLUSION



## TESTING LOCATIONS

To test the patterns proposed and see how the public transport and spatial interventions (urban design) can synergise and inform each other, design exercise applying the patterns on 4 testing locations were conducted, representing each spatial framework types

BOSDEL-NOORD



NIEUW-SLEDDERLO



PEER



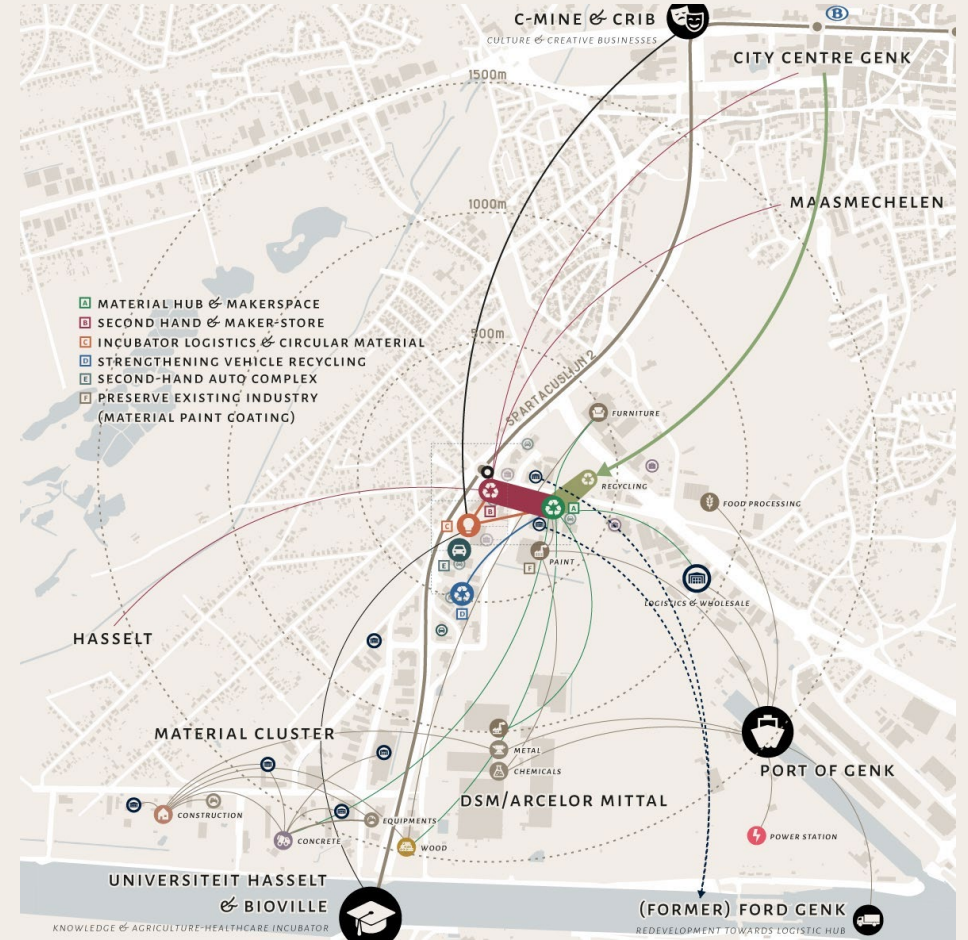
ROMERSHOVEN



## BOSDEL-NOORD

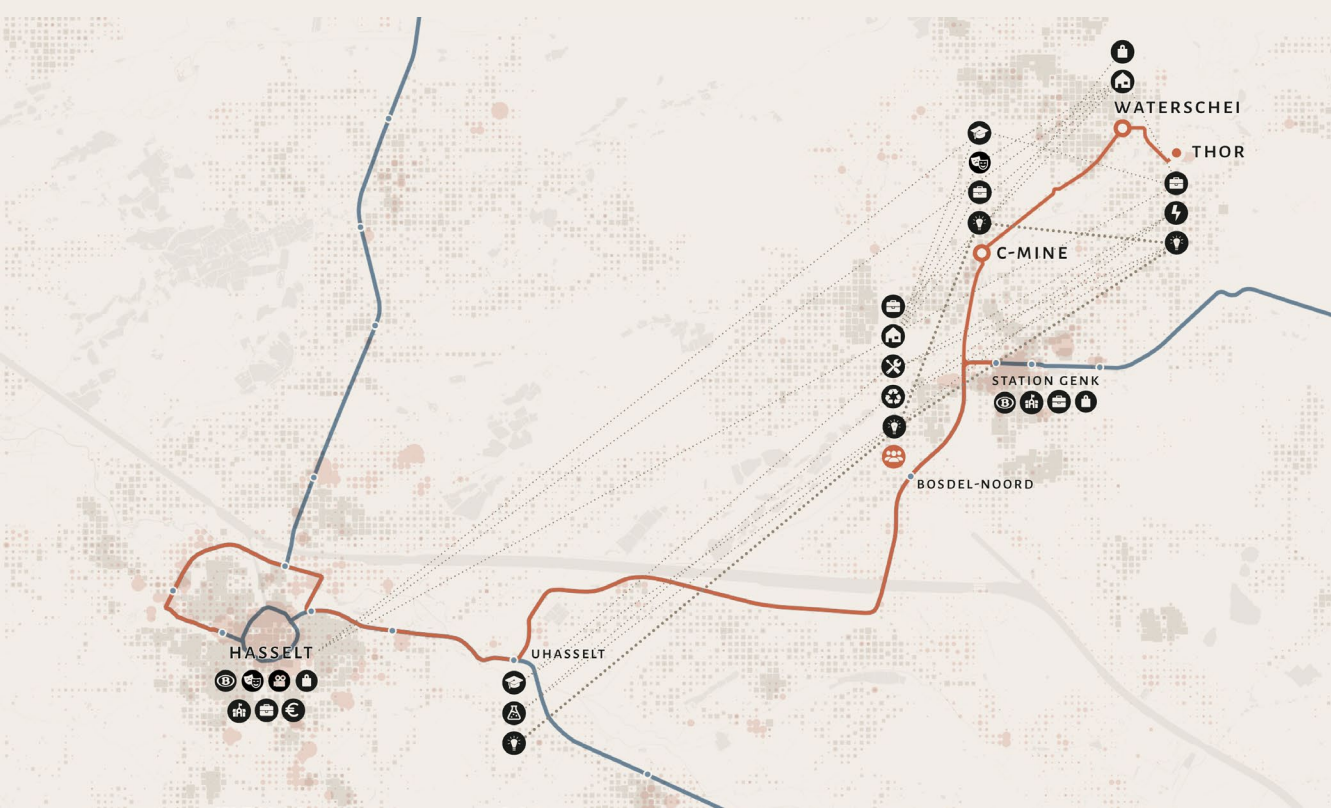


Closest industrial location from Genk city centre;  
direct surroundings occupied by car dealerships,  
building material stores, containerpark, and second  
hand stores



Material hub, second-hand economy, and incubator  
for logistics & circular material sector focusing on  
front-end application





## BOSDEL-NOORD: TRANSIT SOLUTION



**MP1**  
SERVICE

### FROM RADIAL NETWORKS TO POINT-TO-POINT NETWORKS

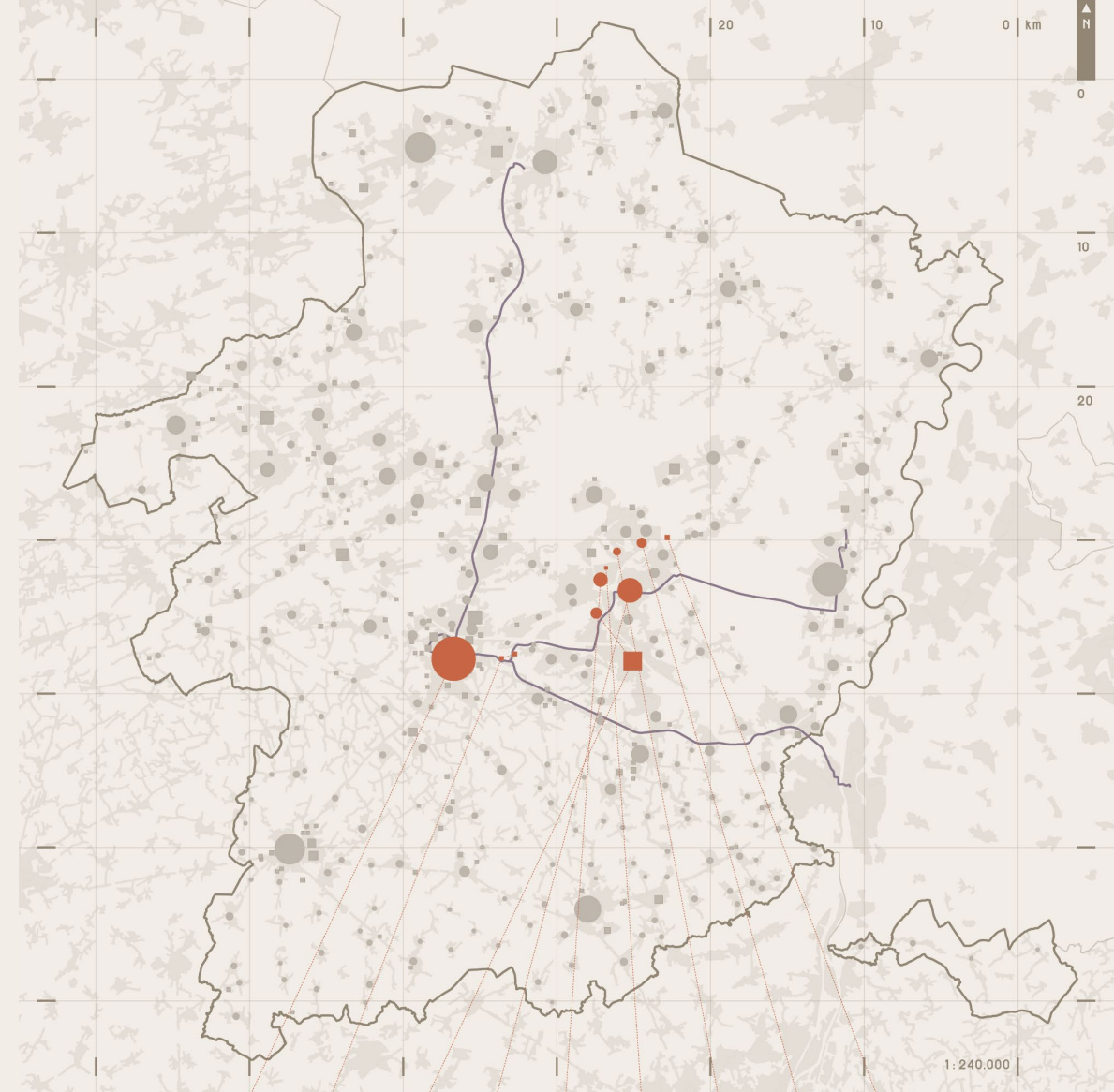
Instead of letting people transfer on certain locations, try to directly connect the points of demand.



**MP6**  
SERVICE

### SINGLE-SEAT RIDE

For areas typed as strengthen areas, provide a single-seat ride to major destinations as much as possible.





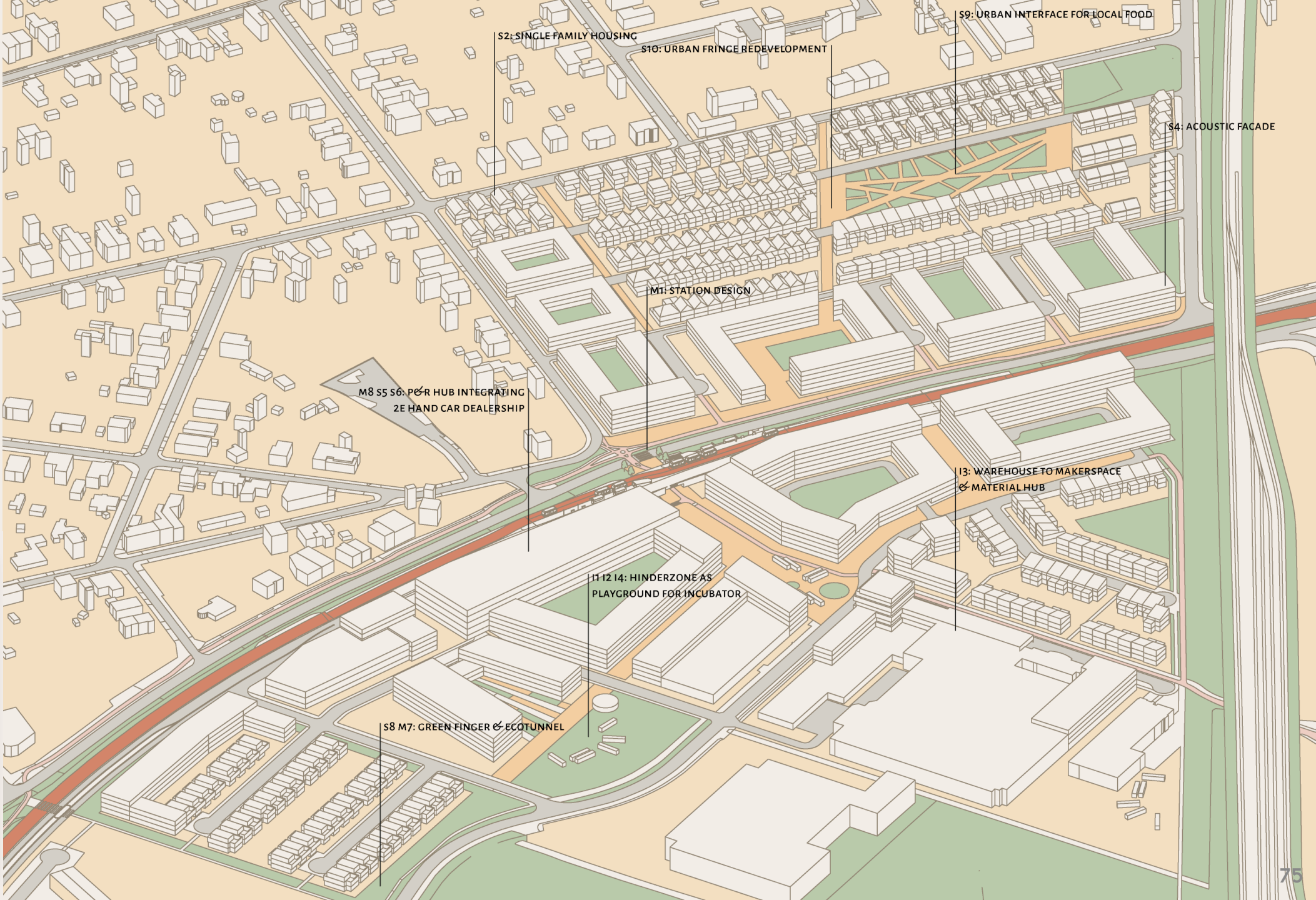
BOSDEL-NOORD:  
HOUSING SUPPLY

AA BB SC  
S2  
PLOT  
PERMANENT  
🏠🚗👤

DIVERSE HOUSING TYPE

The types of housing supplied should be diverse, from alonstanding houses to apartments – in order to accommodate diverse needs and made attractive to countryside dwellers, which should settle closer to transit through land swap.

LINKS  
P12 T2



**BOSDEL-NOORD:  
FLEXIBLE PLOTS**

BB

S12

PLOT  
TEMPORAL

**ADAPTABLE DENSIFICATION**

When completely re-developing parts of the area through densification, the urban design should be able to withstand the changes if parts of the plots become unavailable for development. Therefore a good plan for long-term transformation should be designed, with possible adjustments in mind.

LINKS

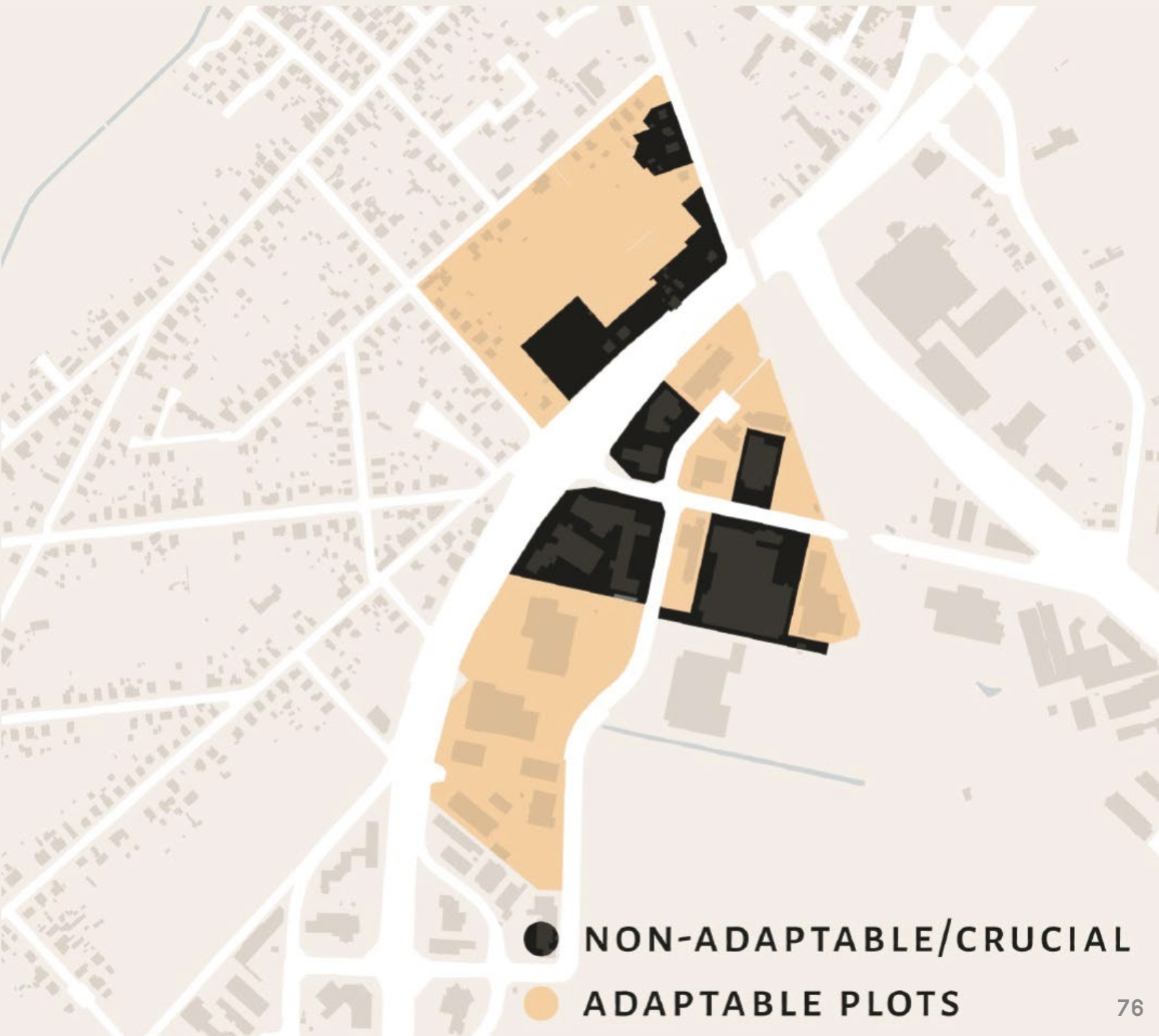
P4 P5 S4 S6 I2

BB SC

P4

**STARTING FROM  
EXISTING URBAN FABRIC**

Instead of large-scale redevelopments, start with small-scale developments. If large-scale redevelopment is done, then make sure it can adapt if some locations are not available.



● NON-ADAPTABLE/CRUCIAL  
● ADAPTABLE PLOTS











**S7**

ACTIVATING PLINTHS  
AROUND STATION ACCESS  
AND PUBLIC SPACE

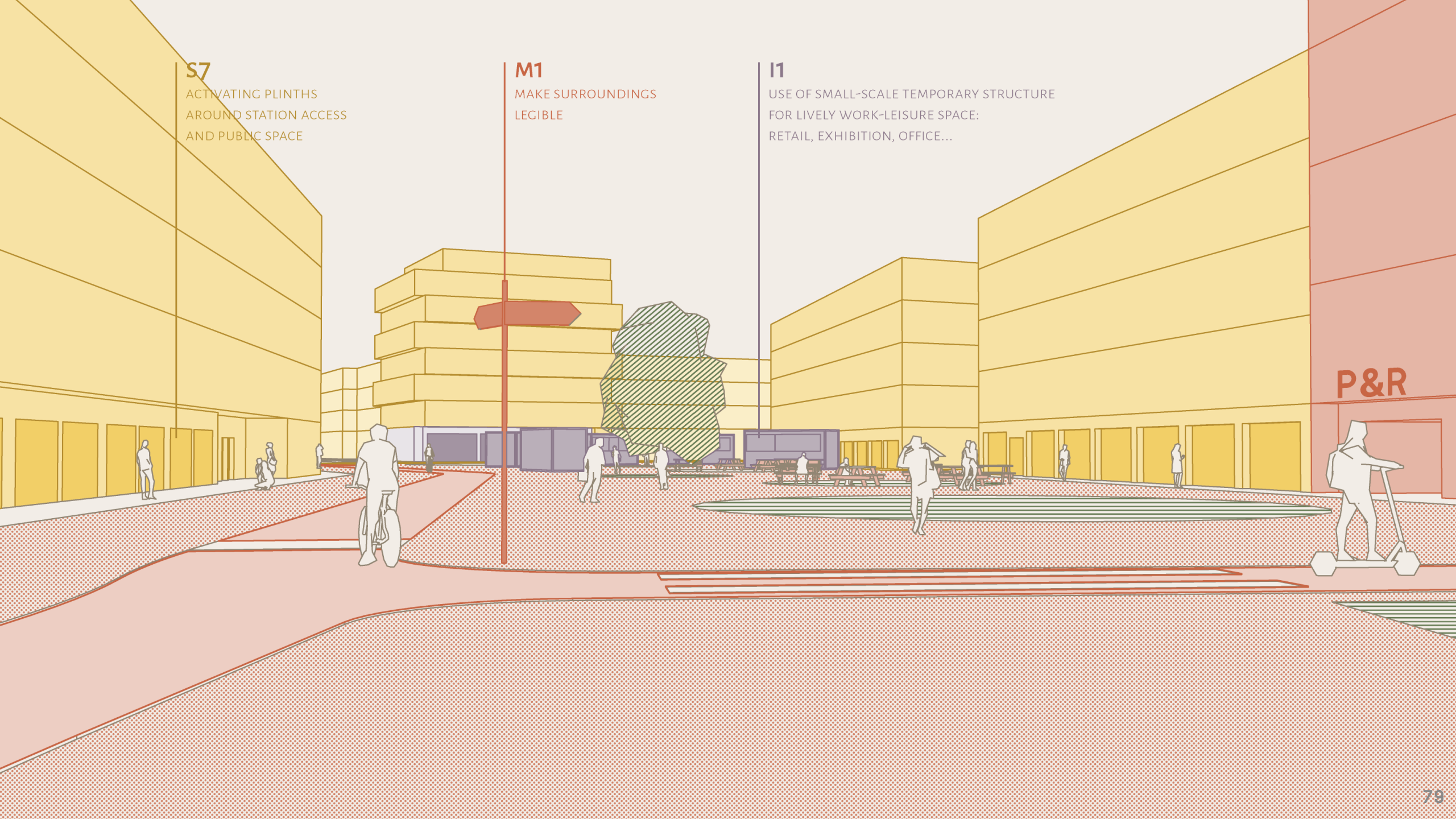
**M1**

MAKE SURROUNDINGS  
LEGIBLE

**I1**

USE OF SMALL-SCALE TEMPORARY STRUCTURE  
FOR LIVELY WORK-LEISURE SPACE:  
RETAIL, EXHIBITION, OFFICE...

**P&R**



**BOSDEL-NOORD:  
EVALUATION**

**Spatial dispersion**

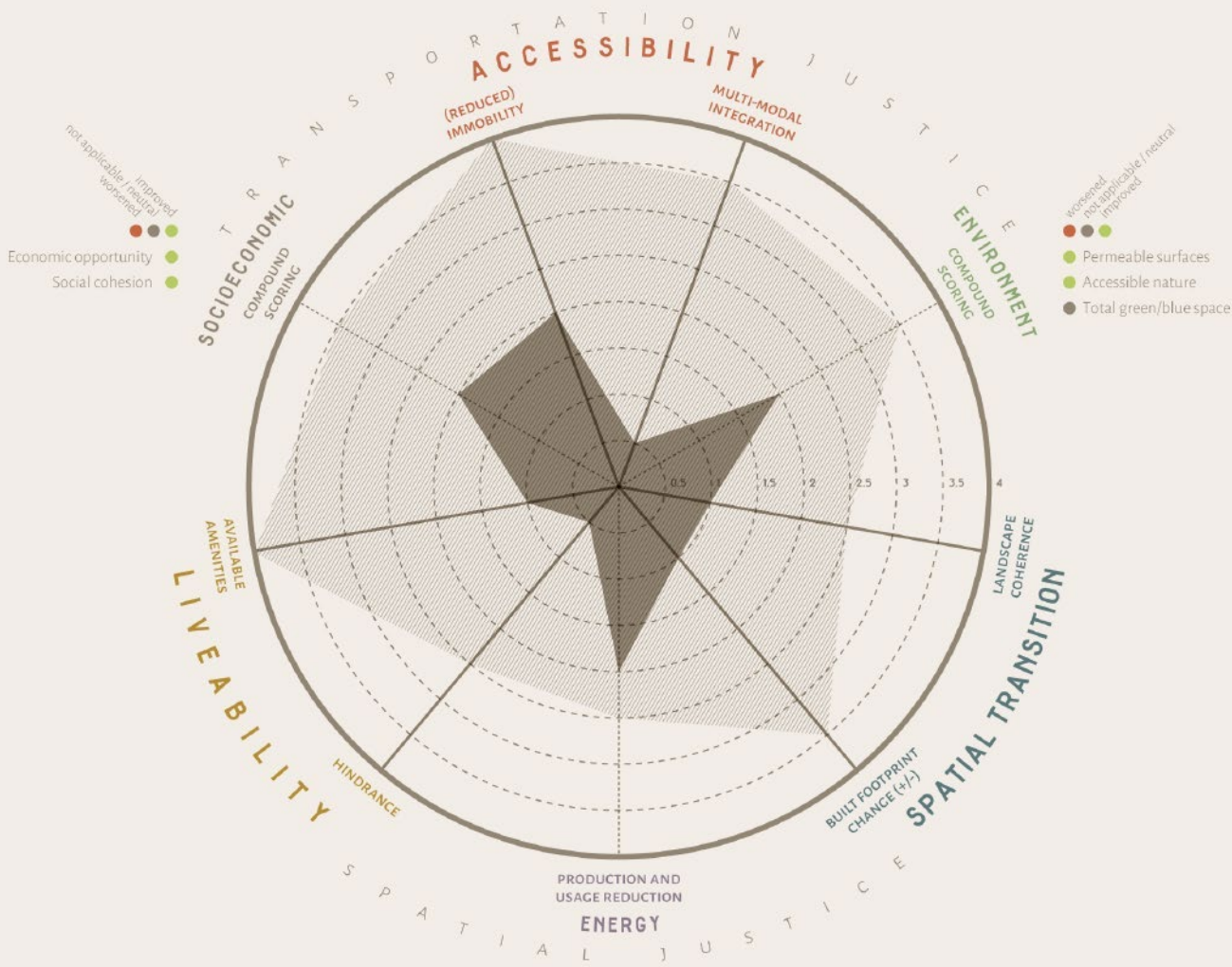
The synergy of urban design and the proposed line provides positive effects by being the magnet for the dispersed settlements of Nebular city: it attracts the dispersed households by offering attractive, well-connected living environment at the cost of slightly reduced density.

**Deindustrialisation & Innovation**

The synergy of urban design and the proposed line can accelerate innovation by creating attractive working areas, which are well-connected with other industries, creatives, and knowledge institutions.

**Spartacusplan & Mobility**

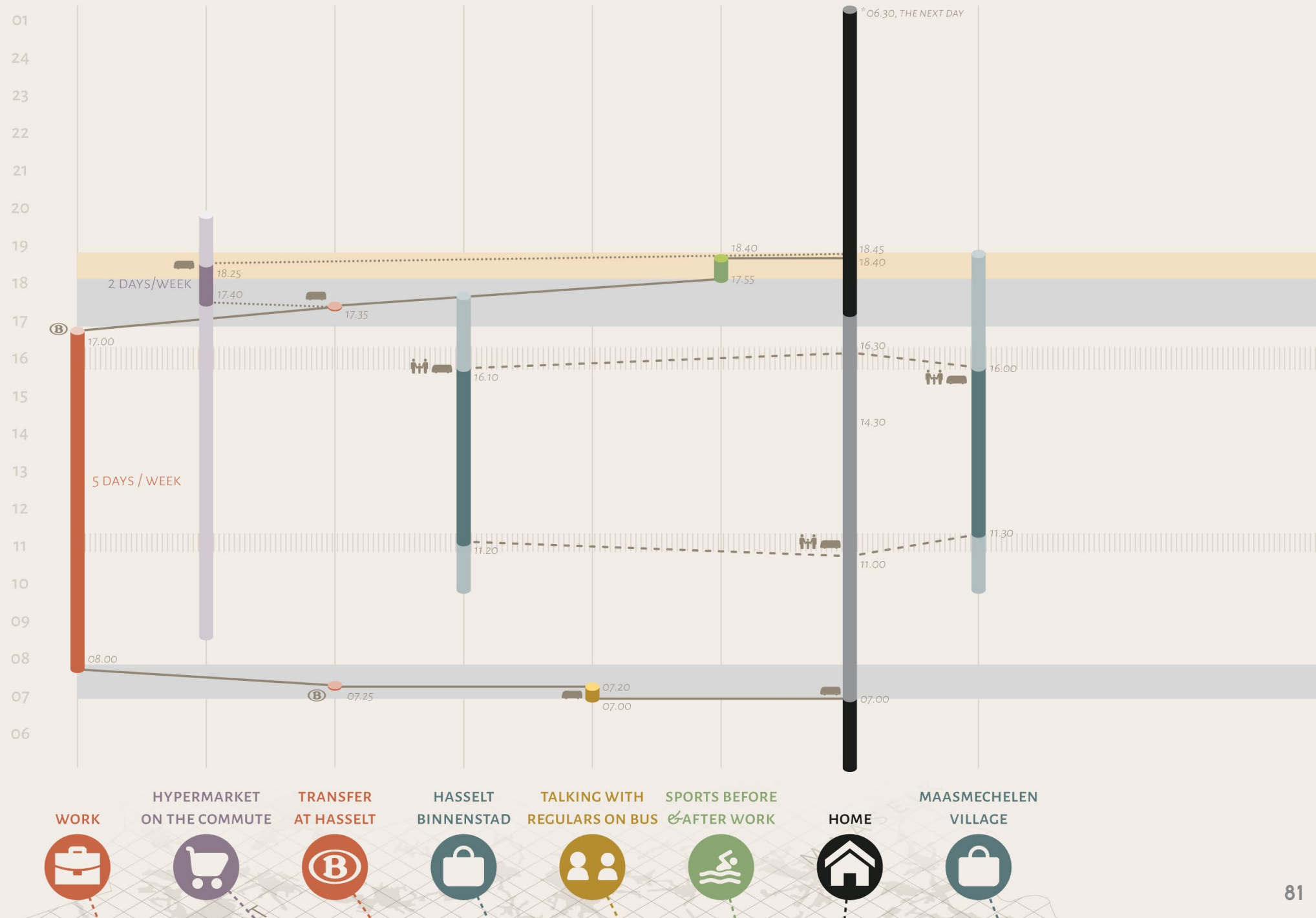
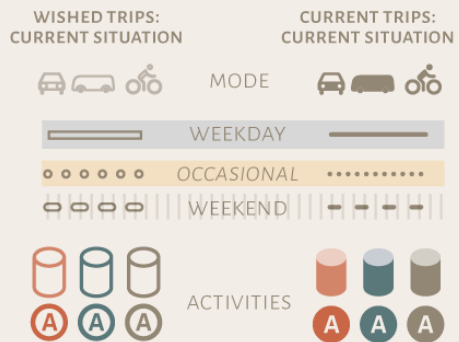
The urban design indirectly benefits the transportation issues by providing more passenger base through development and mobility hub. The proposed line can connect relatively disadvantaged area with potential employments.





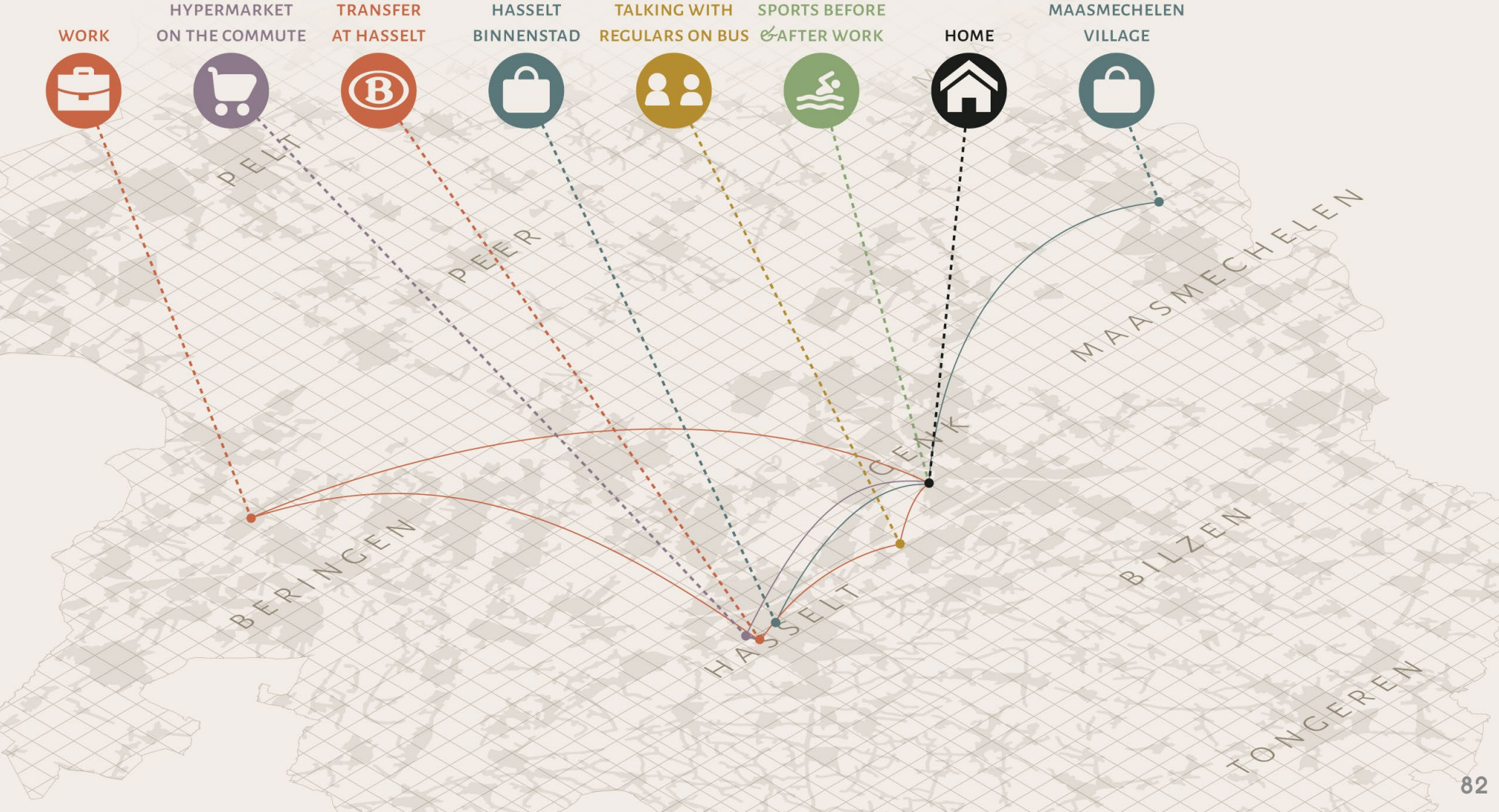
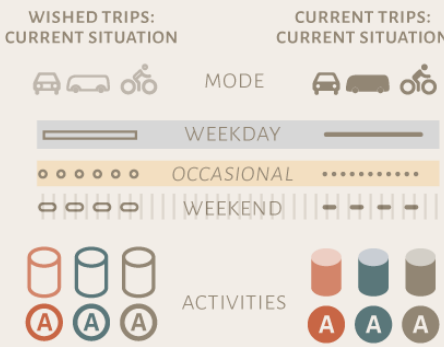
## PERSONA A

Although he spends longer time commuting on bus than car, but now he can now do more activities during the commute, and also connect with other people.



PERSONA A

Although he spends longer time commuting on bus than car, but now he can now do more activities during the commute, and also connect with other people.

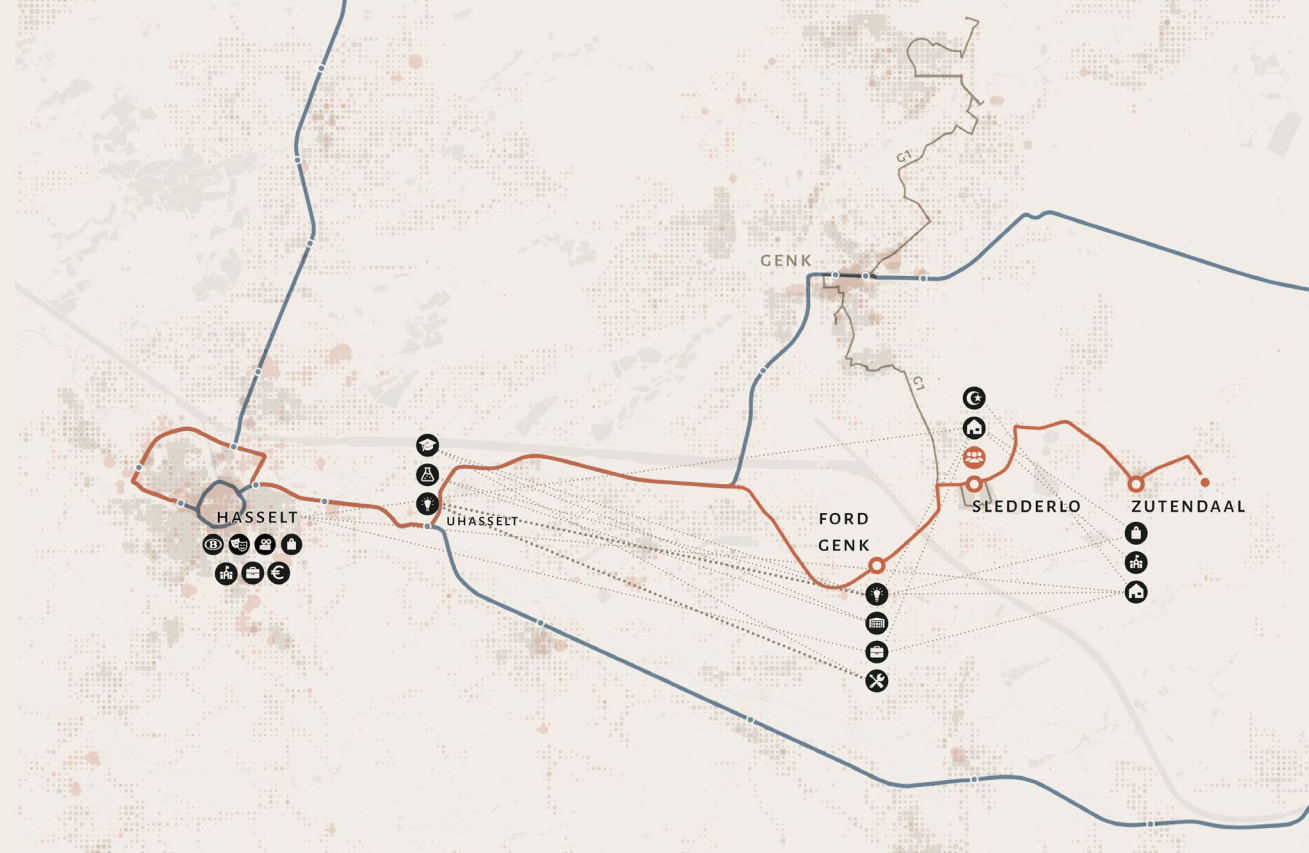




NIEUW-SLEDDERLO







## NIEUW-SLEDDERLO: TRANSIT SOLUTION

AC MM AA SC EO

**MP2**  
SERVICE

**REFLECT THE NEEDS OF EVERYONE**

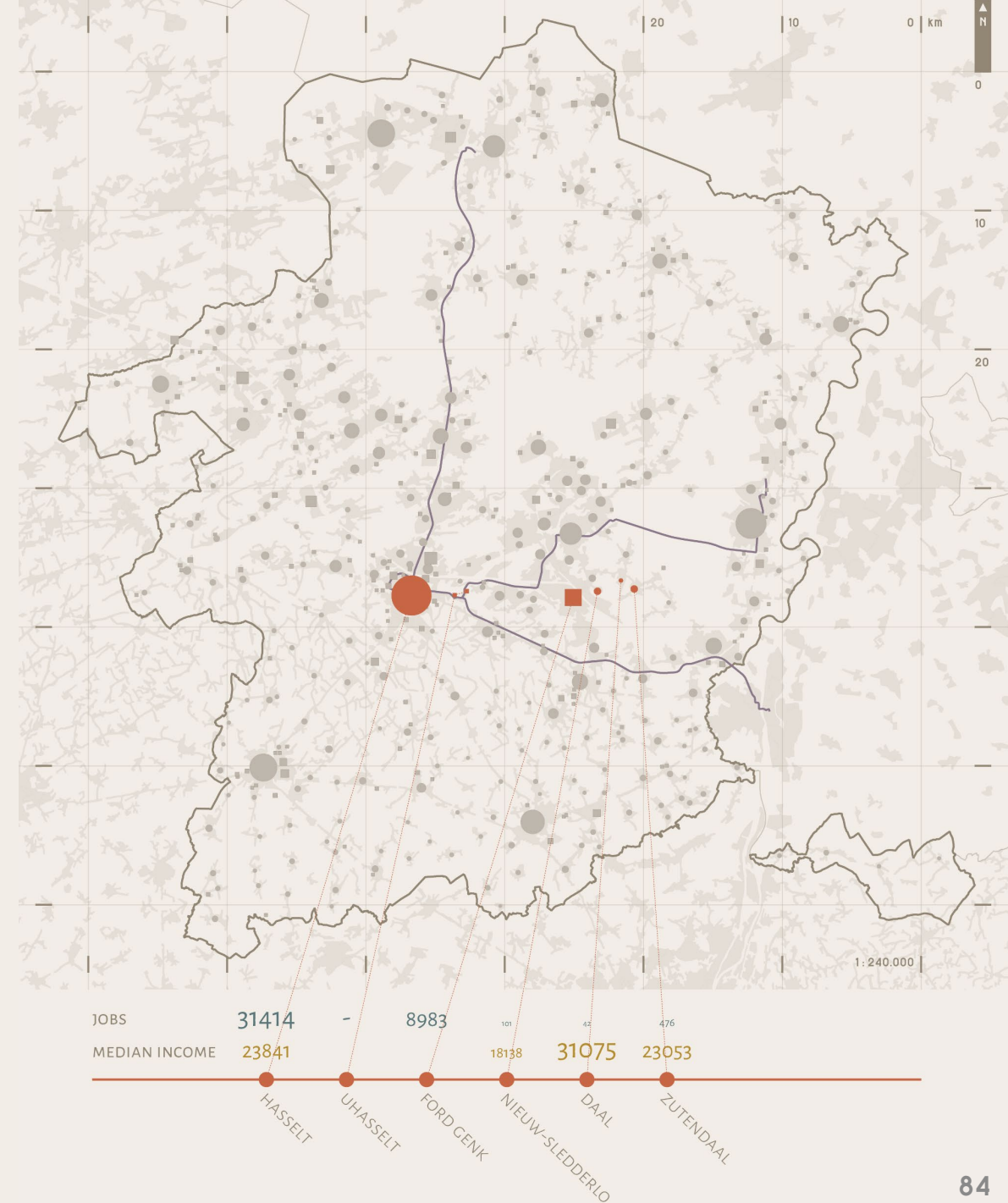
Take the travel needs of elderly, migrants, children, women, and other groups, not just 9 – 5 commuters.

AC SC

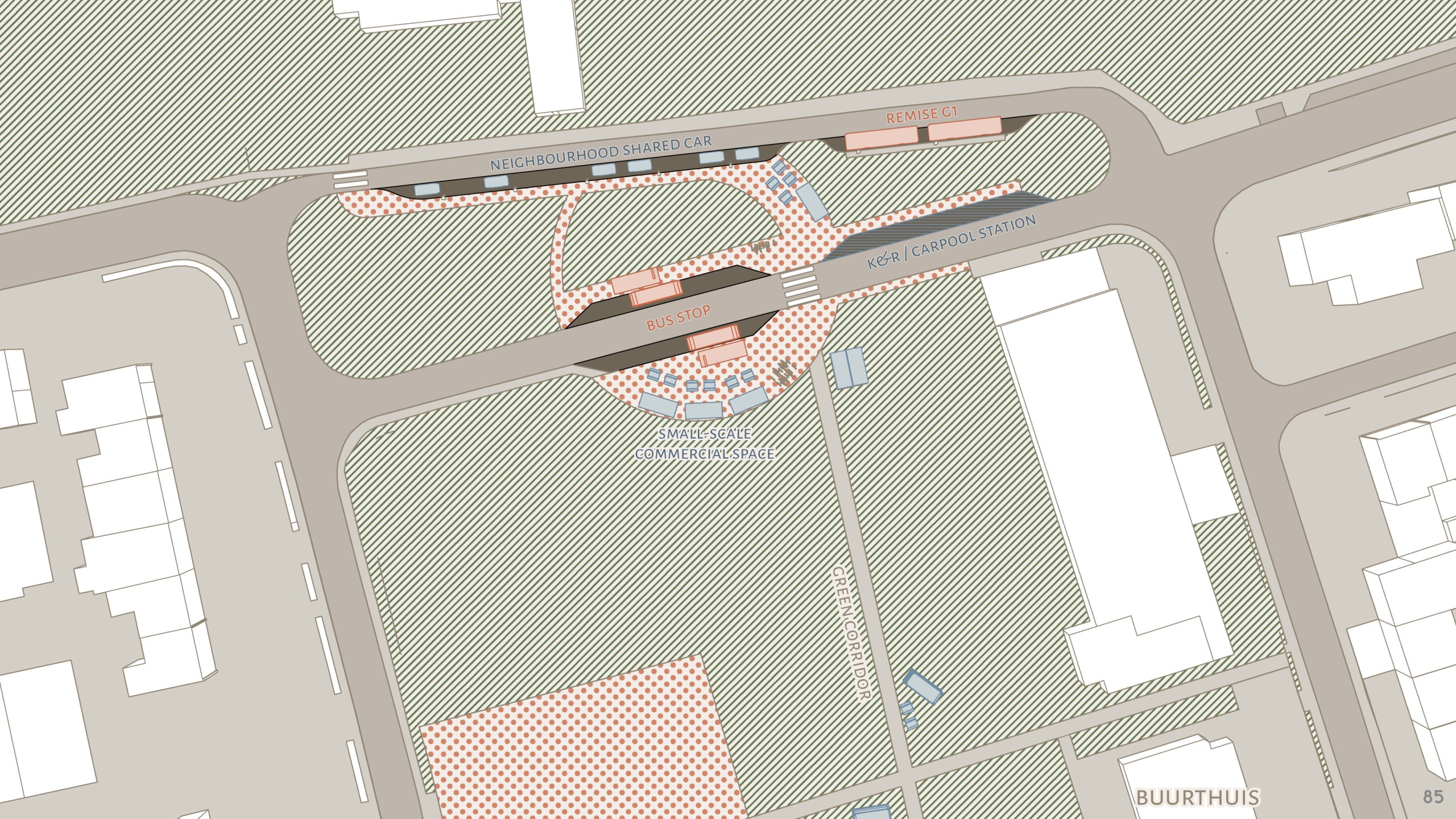
**MP4**  
SERVICE

**ACCESSIBILITY AS A MEANS OF RESTORATIVE JUSTICE**

Use public transportation to heal the damages done for the historically marginalised people.







NEIGHBOURHOOD SHARED CAR

REMISE G1

K&R / CARPOOL STATION

BUS STOP

SMALL-SCALE  
COMMERCIAL SPACE

GREEN CORRIDOR

BUURTHUIS

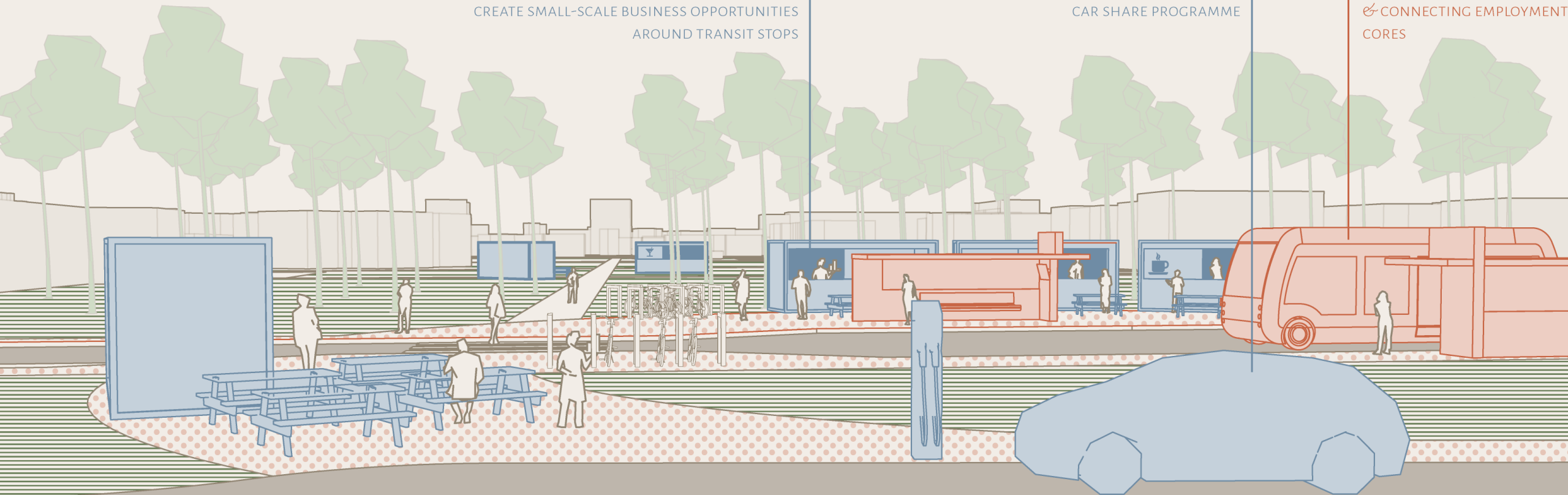
## E4

MODULAR, TEMPORARY STRUCTURES  
CREATE SMALL-SCALE BUSINESS OPPORTUNITIES  
AROUND TRANSIT STOPS

## E2

NEIGHBOURHOOD  
CAR SHARE PROGRAMME

TRANSIT BRINGING  
POTENTIAL CUSTOMERS  
& CONNECTING EMPLOYMENT  
CORES





NIEUW-SLEDDERLO:  
EVALUATION

Spatial dispersion

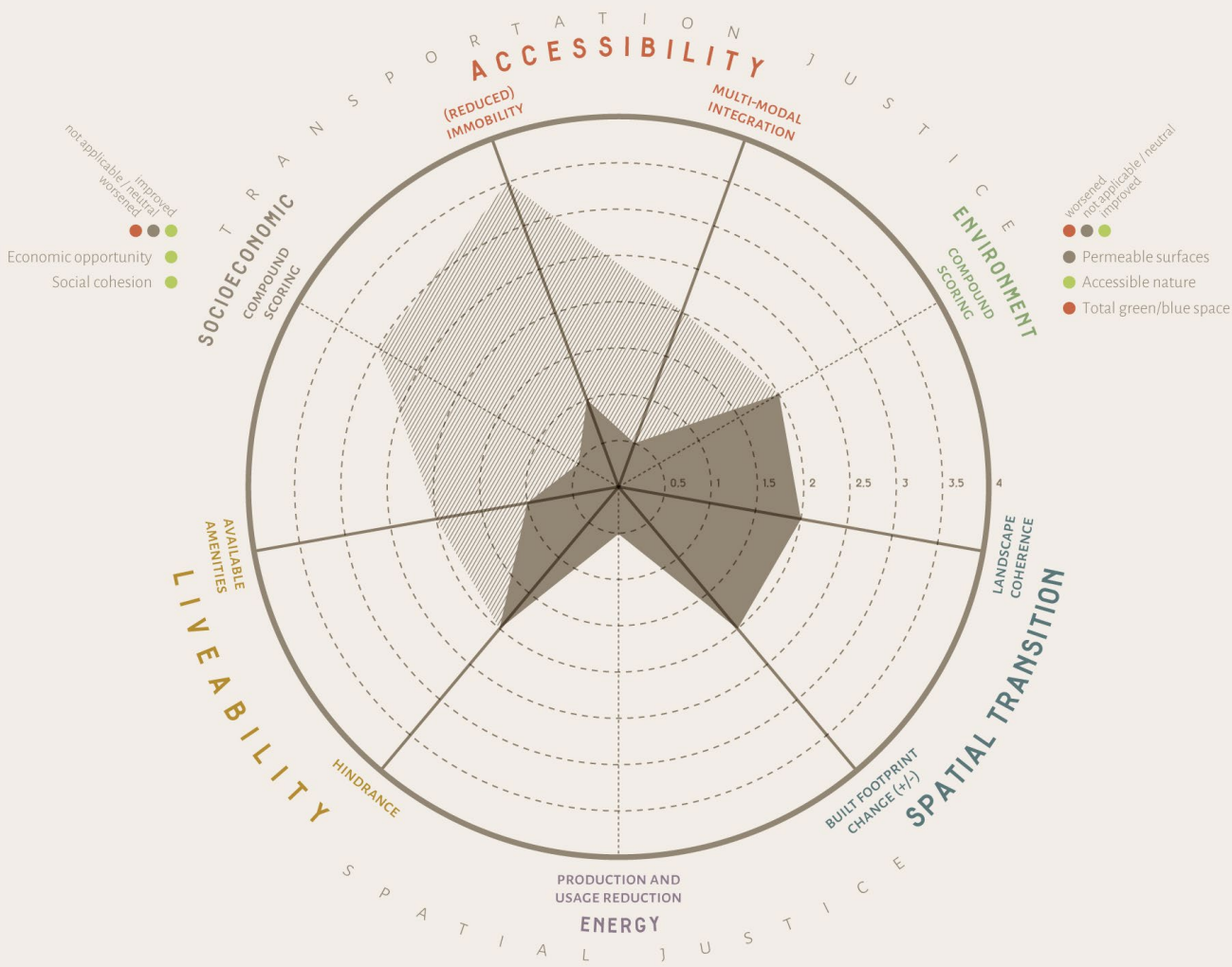
It was not the aim of both transportation and urban design exercise.

Deindustrialisation & Innovation

The urban design with the help from transportation planning, can create opportunities for small-scale, local businesses in Sledderlo, compensating the gap left by the closure of nearby Ford Genk.

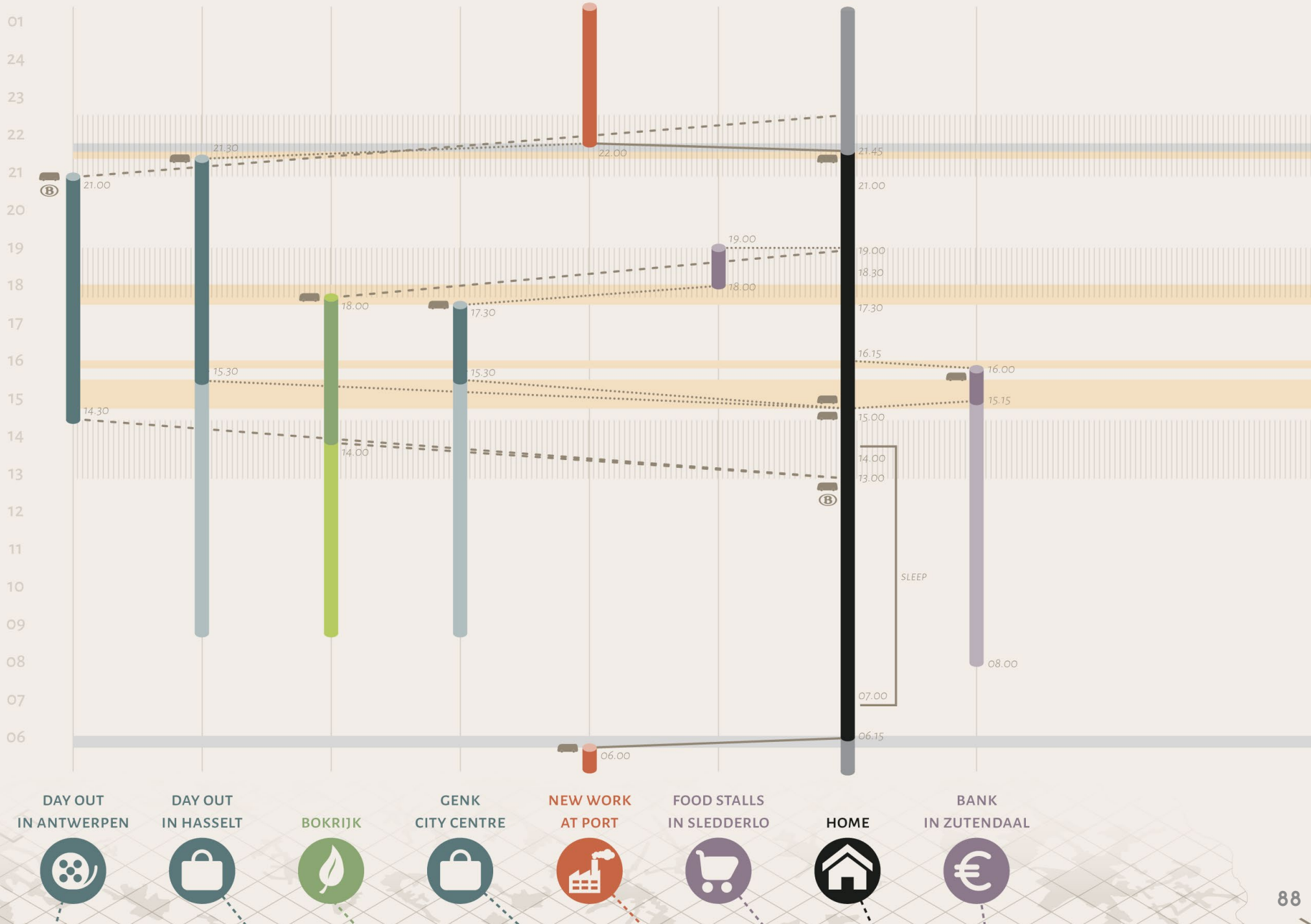
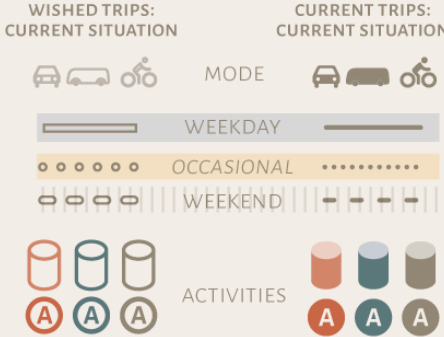
Spartacusplan & Mobility

The urban design provides space for shared cars and carpool, along with creation of new activities along the line. The proposed line can connect disadvantaged areas with potential employments.



PERSONA D

Transit allowing finding a new work in Port of Genk;  
With more activities available, his every day life becomes vibrant.

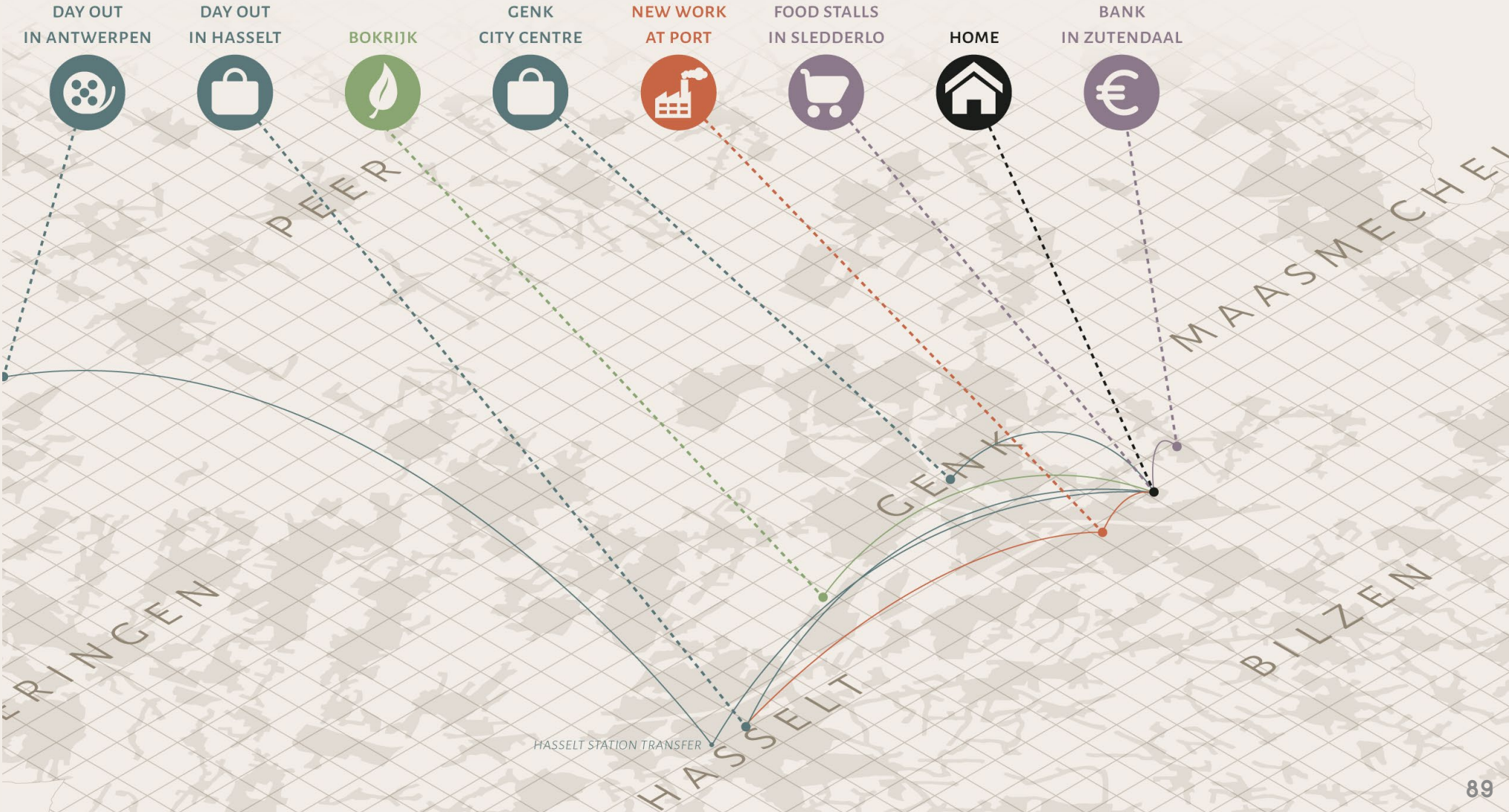




PERSONA D



Transit allowing finding a new work in Port of Genk; With more activities available, his every day life becomes vibrant.

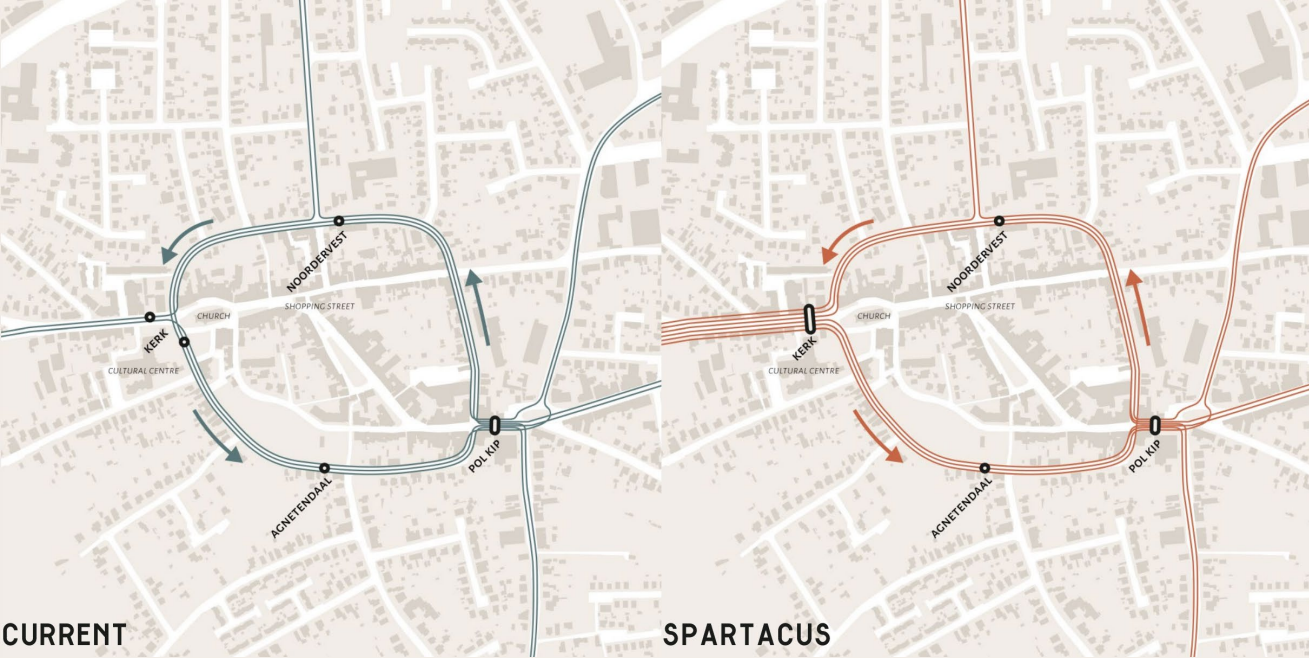




## PEER







## PEER: TRANSIT SOLUTION

AC

BB

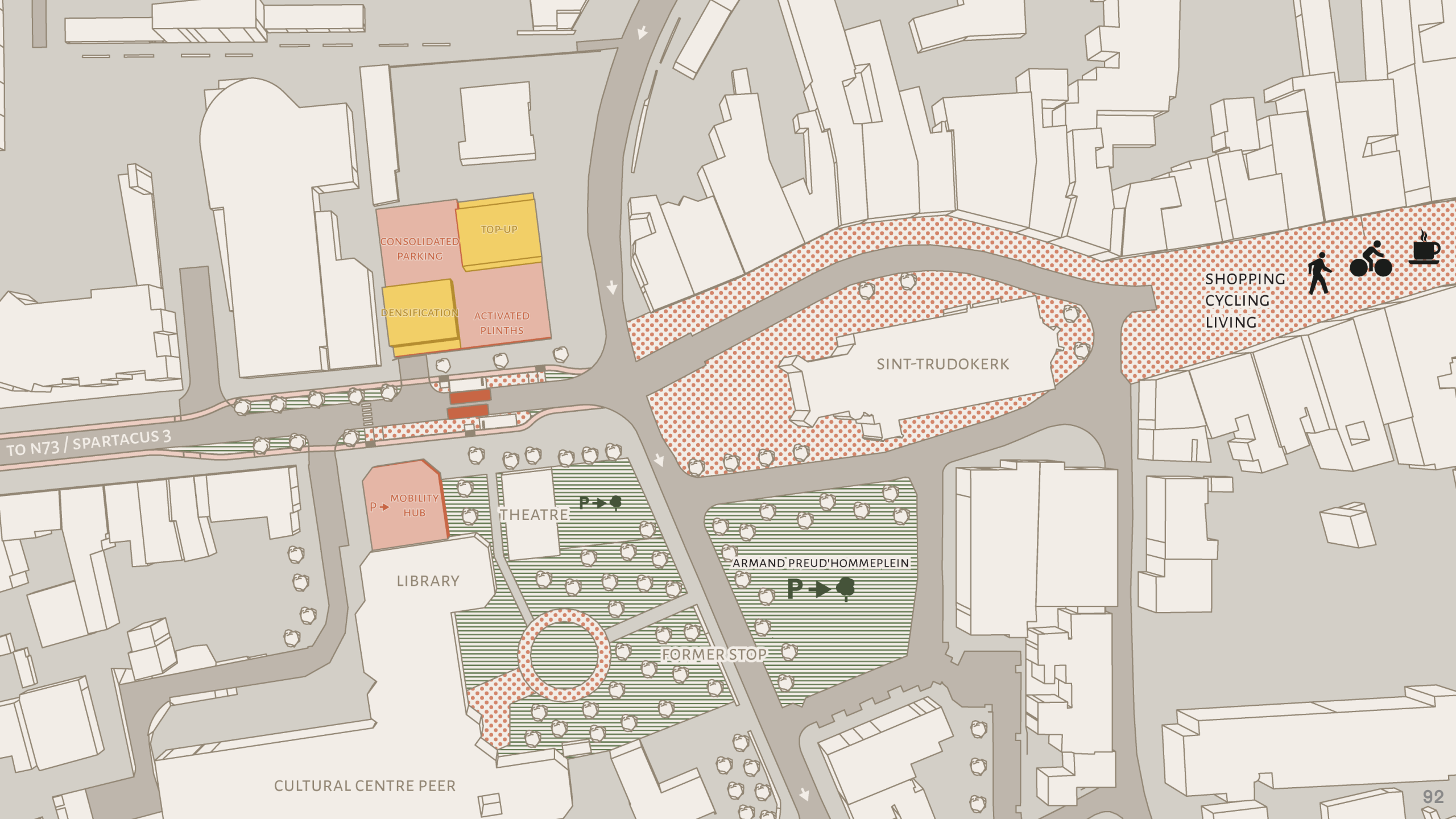
MP6

SERVICE

**SINGLE-SEAT RIDE**

For areas typed as strengthen areas, provide a single-seat ride to major destinations as much as possible.





CONSOLIDATED  
PARKING

TOP-UP

DENSIFICATION

ACTIVATED  
PLINTHS

TO N73 / SPARTACUS 3

P → MOBILITY  
HUB

LIBRARY

THEATRE

P →

ARMAND PREUD'HOMMEPLEIN

P →

FORMER STOP

SHOPPING  
CYCLING  
LIVING



CULTURAL CENTRE PEER



## S5 S13

CONSOLIDATION OF  
SCATTERED PARKING SPACE  
WITH CONVERSION-READY  
PARKING BUILDING

PARKING

## S7

ACTIVATED PLINTHS  
AROUND STOPS

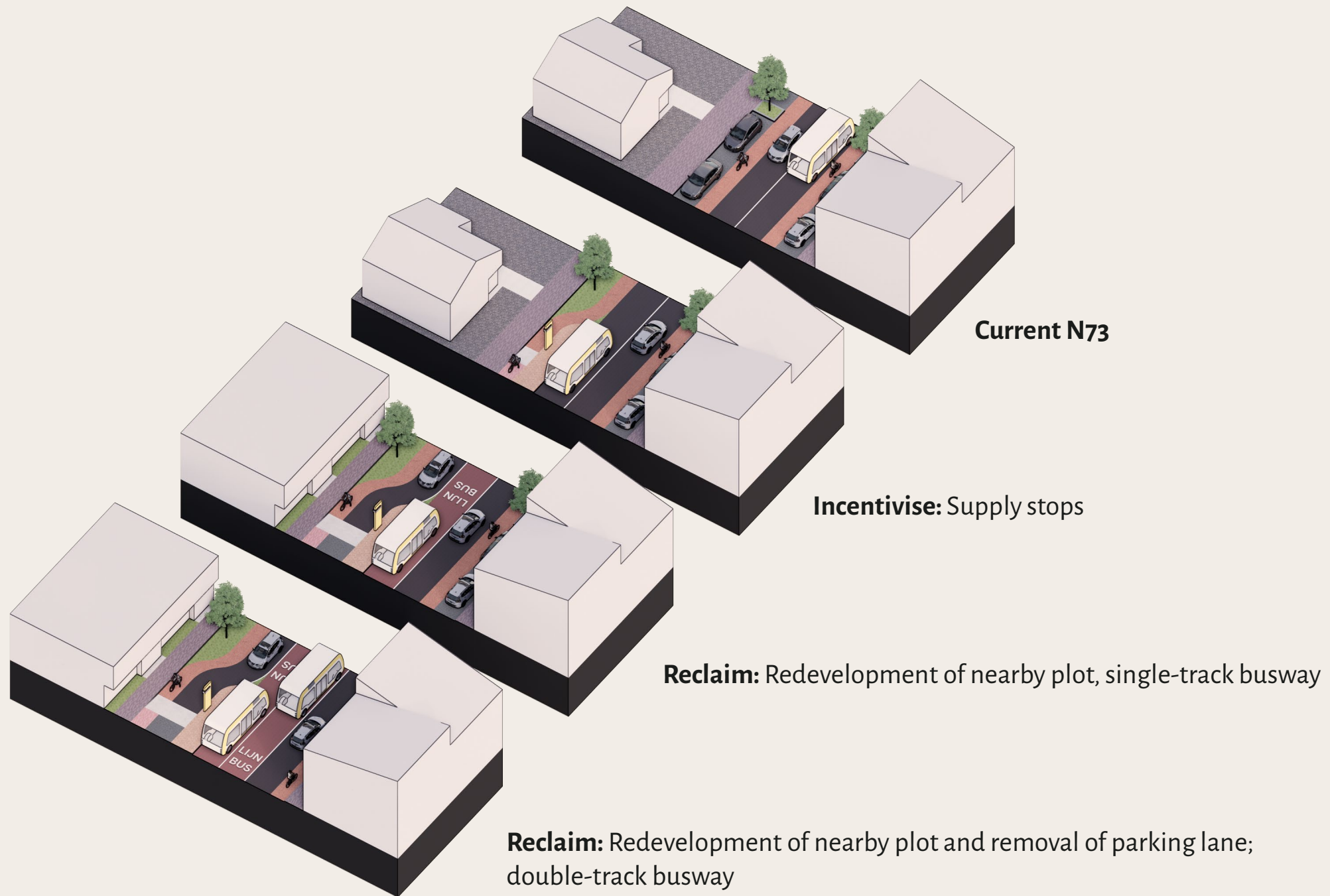
## P2

MAKE OTHER PLATFORMS AND NEARBY  
FACILITIES VISIBLE AND EASY TO NAVIGATE

## M8

CONSOLIDATING  
NEARBY BUILDING  
WITH WAITING SPACE  
FOR TRANSIT

LIBRARY  
WAITING SPACE



## PEER: EVALUATION

### Spatial dispersion

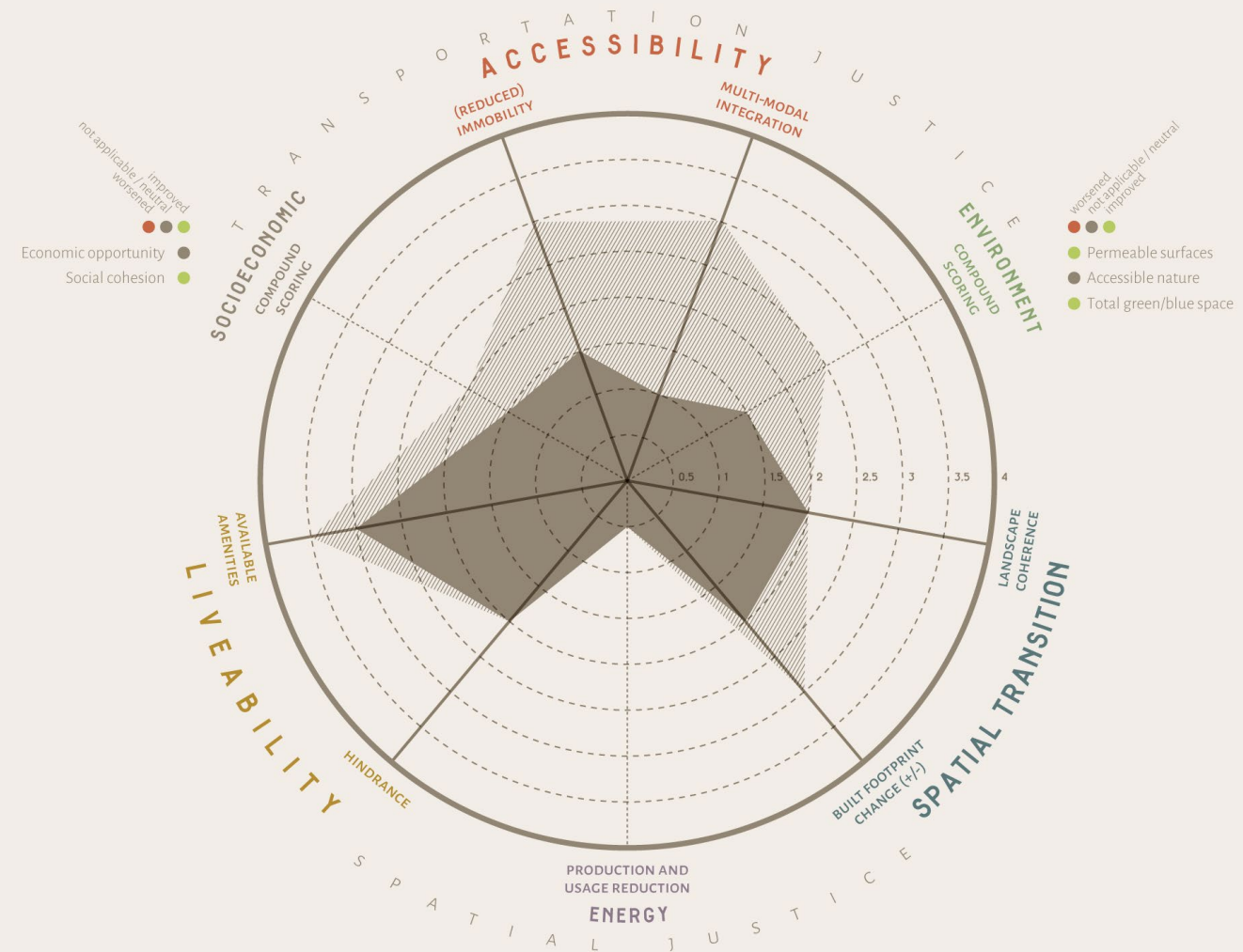
The synergy of urban design and the transit intervention provides positive result for spatial transition by improving the densification potential and connectivity in the small towns, ultimately improving the attractiveness for development. This alleviates the burden of spatial transition from cities, and can provide more familiar and attractive alternative for countryside residents.

### Deindustrialisation & Innovation

It was not the aim of both transportation and urban design exercise.

### Spartacusplan & Mobility

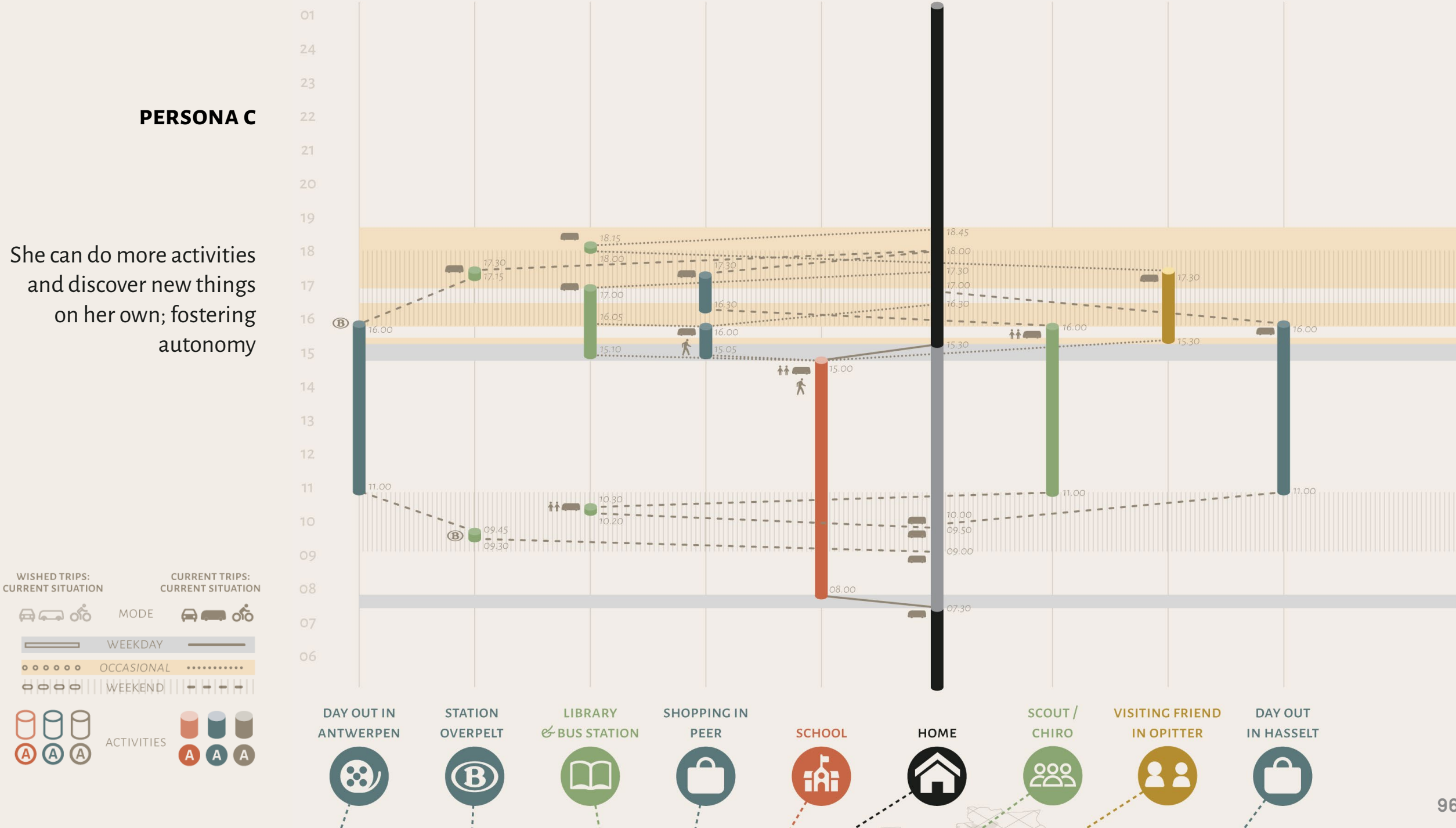
The urban design exercise offers possible expansion of Spartacuslijn ROW, which can further improve the transportation in Limburg, and can increase the capacity to tackle immobility.





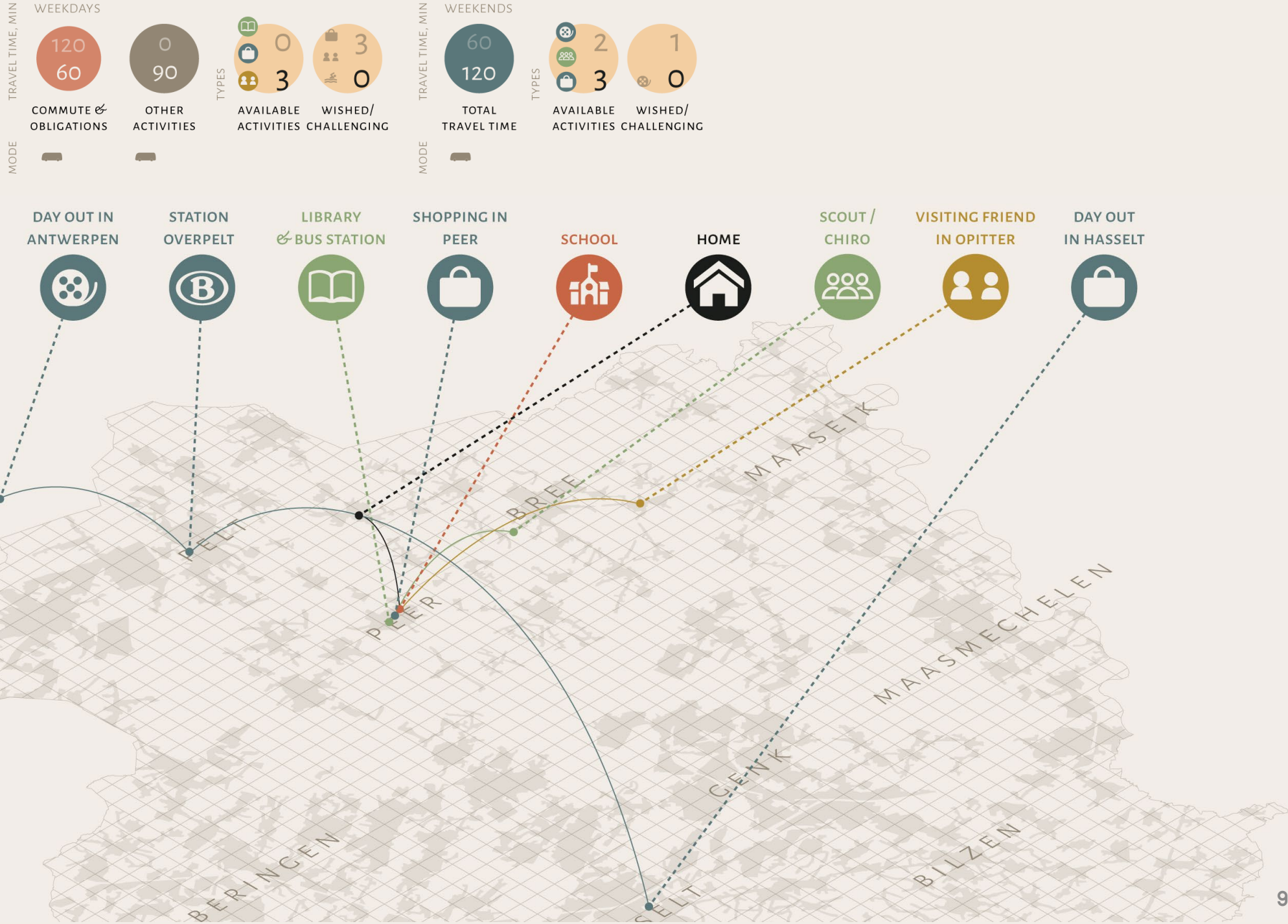
PERSONA C

She can do more activities and discover new things on her own; fostering autonomy



PERSONA C

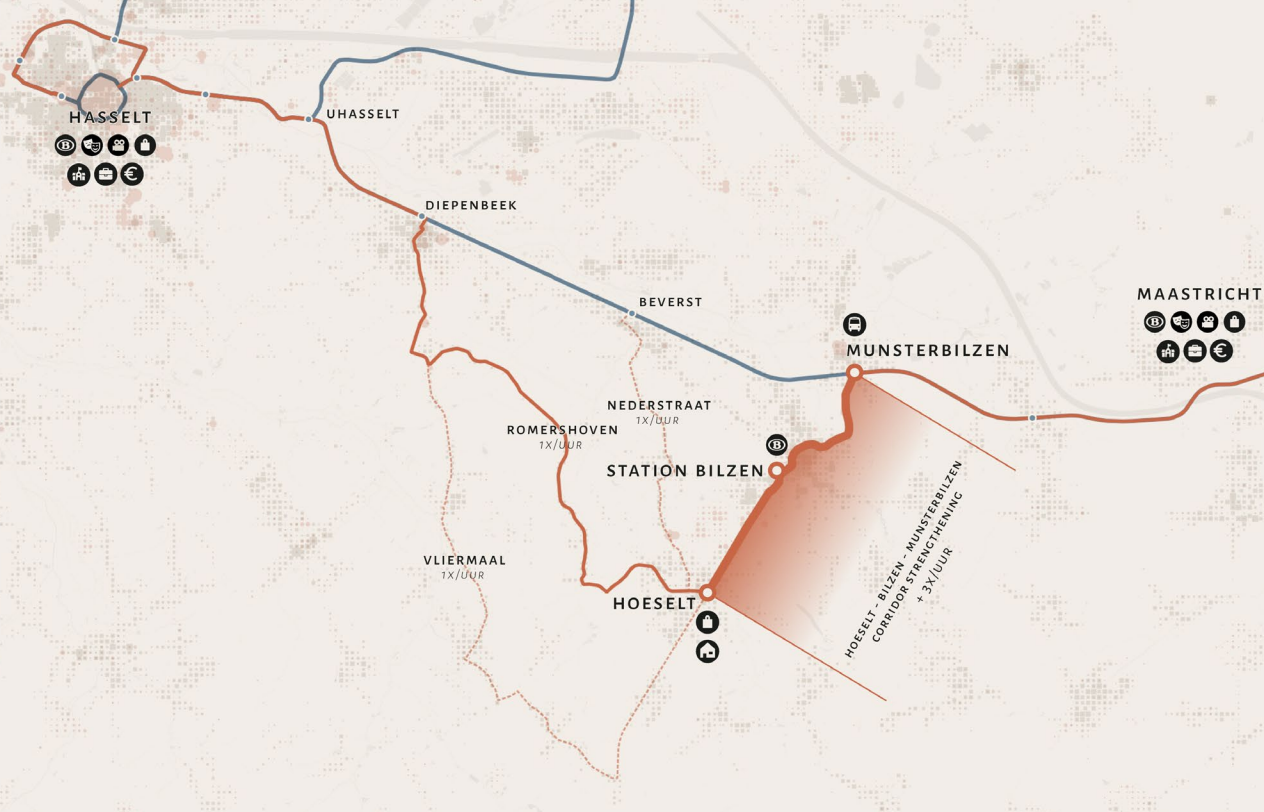
She can do more activities and discover new things on her own; fostering autonomy



## ROMERSHOVEN







## NIEUW-SLEDDERLO: TRANSIT SOLUTION

**MP5 SERVICE**

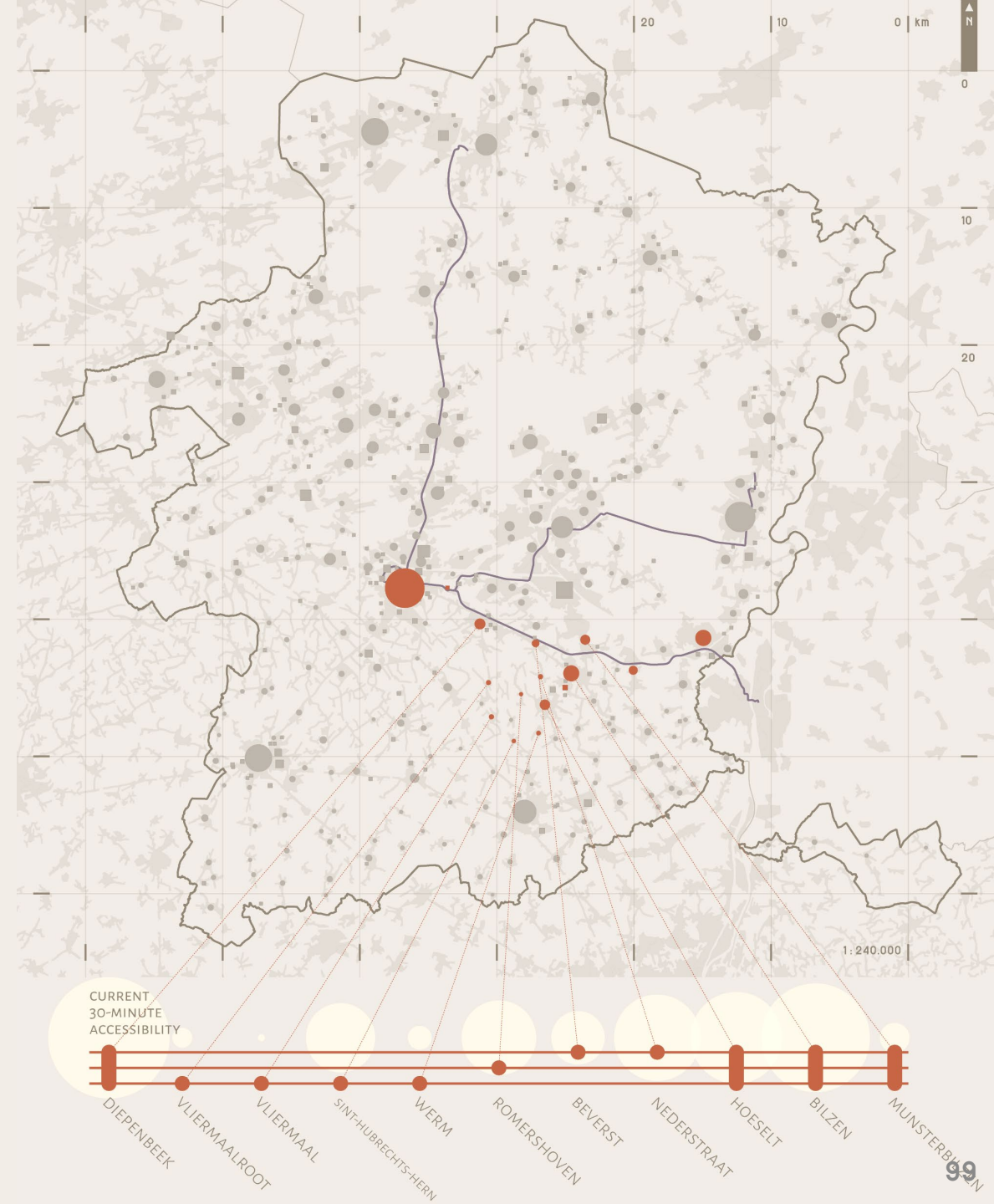
**BUNDLING BRANCH SERVICES**

If a section of the corridor has higher demand, than create multiple lines that serves surrounding areas and also the high-demand corridor.

**MP3 SERVICE**

**PRIORITISE UNDERSERVED AREAS**

Prioritise serving the less accessible areas should be prioritised, even if it means prioritising it more than areas where you can expect higher ridership.



## M9

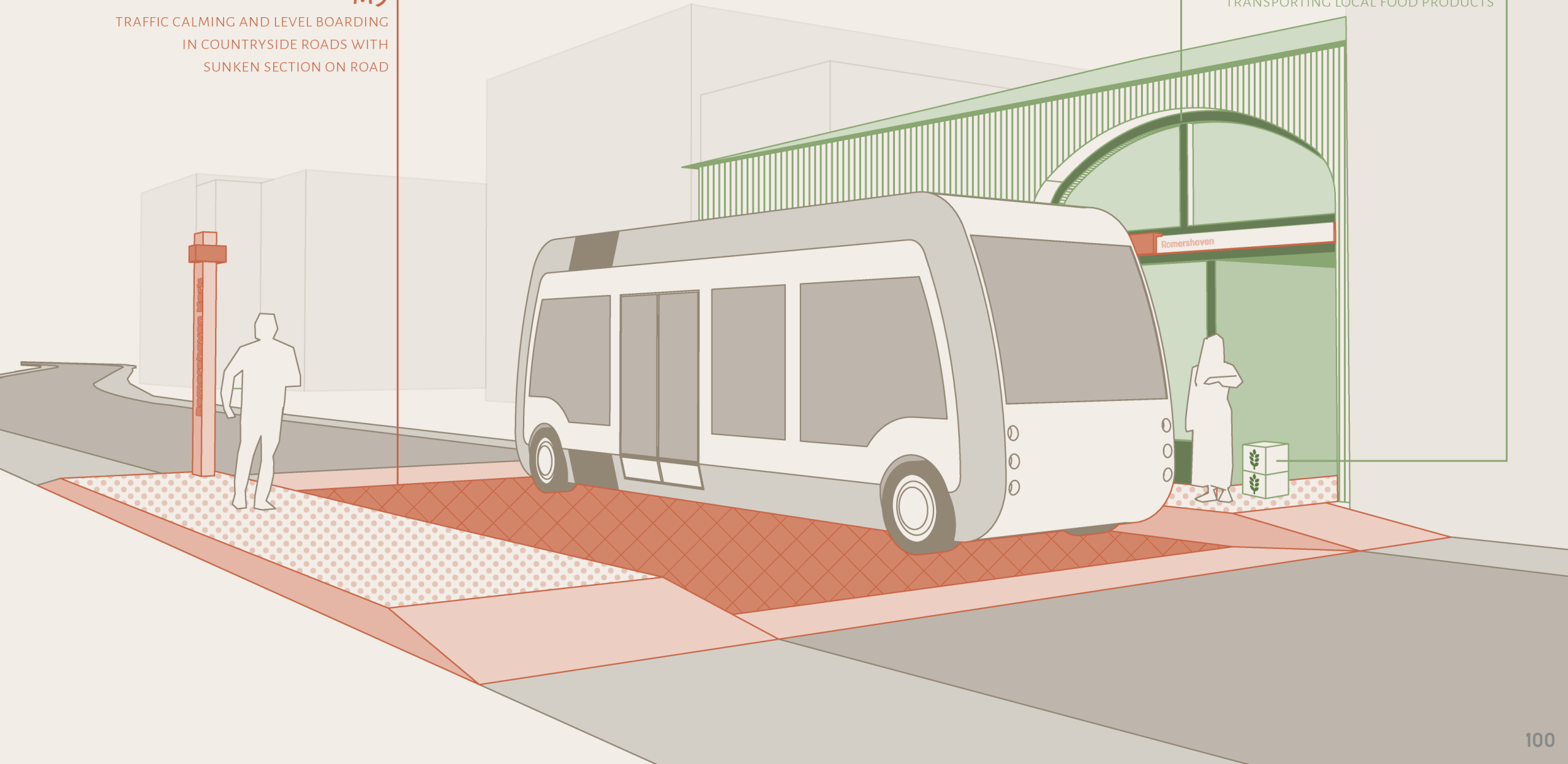
TRAFFIC CALMING AND LEVEL BOARDING  
IN COUNTRYSIDE ROADS WITH  
SUNKEN SECTION ON ROAD

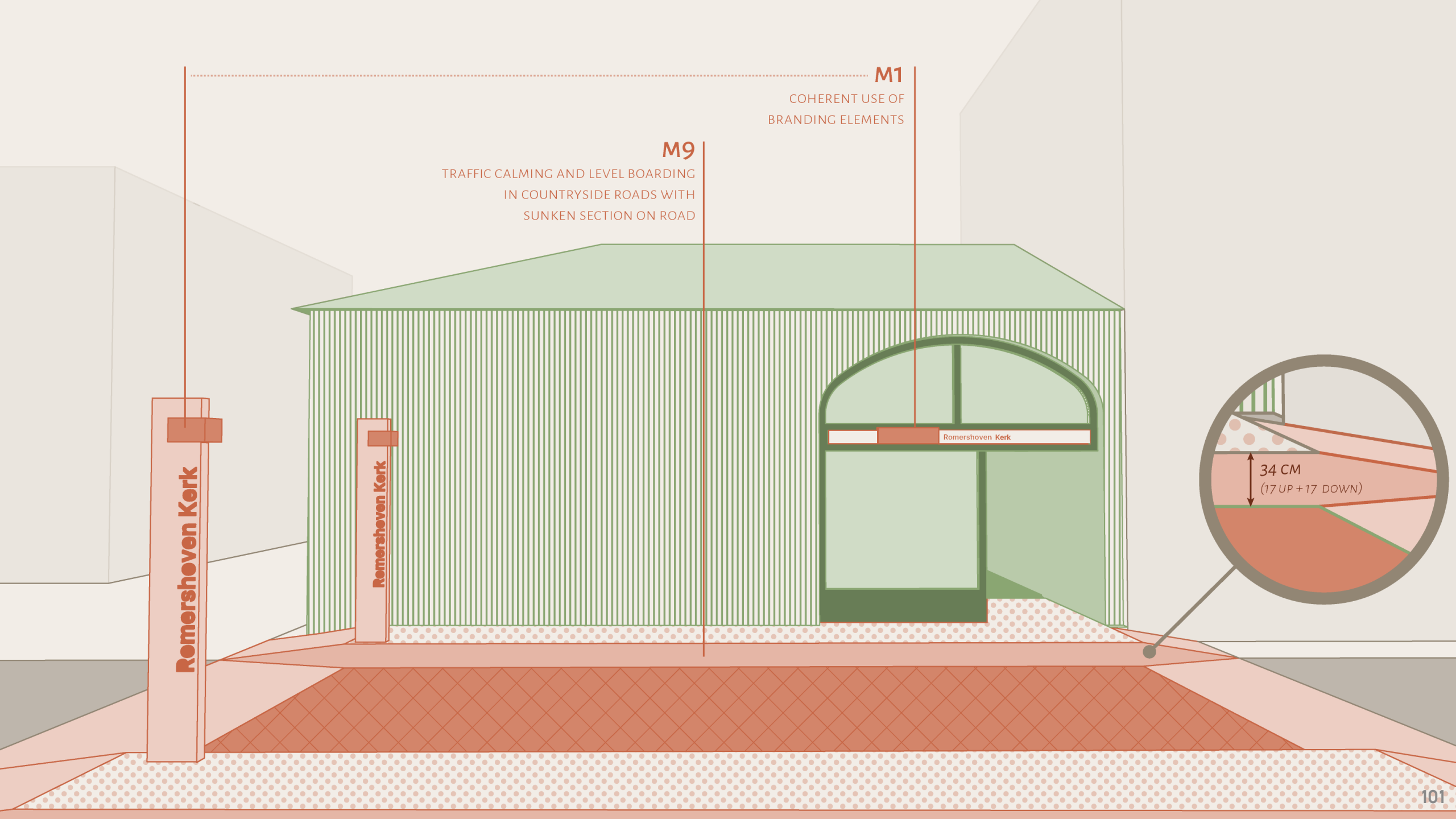
## T2 T5

REPURPOSING LEFT-BEHIND BUILDINGS  
AS MOBILITY HUB & WAITING LOUNGE

## T7

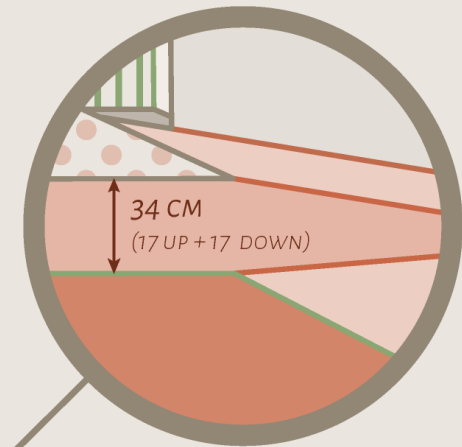
INTEGRATING SMALL-SCALE  
LOGISTICS FOR OFF-PEAK SERVICE:  
TRANSPORTING LOCAL FOOD PRODUCTS





**M1**  
COHERENT USE OF  
BRANDING ELEMENTS

**M9**  
TRAFFIC CALMING AND LEVEL BOARDING  
IN COUNTRYSIDE ROADS WITH  
SUNKEN SECTION ON ROAD







T5

COMMUNAL SPACE  
AND BUS WAITING LOUNGE

T3

ELECTRICITY STORAGE  
AND E-BIKE CHARGING

T2 T6

INTEGRATE SURROUNDING  
AGRICULTURAL LANDSCAPE  
WITH LOCAL FOOD HUB

M4 M10 T1

USING LEFT BEHIND PLOTS AS  
GATEWAY / SHORTCUT TO  
NATURE AND OTHER RIBBONS

T2

BICYCLE PARKING  
ON THE REPURPOSED  
BUILDING



## T4

SUPPLY ABANDONED PLOTS  
AS 1-EURO FARMLAND  
FOR NEARBY RESIDENTS

ROMERSHOVEN:  
EVALUATION

Spatial dispersion

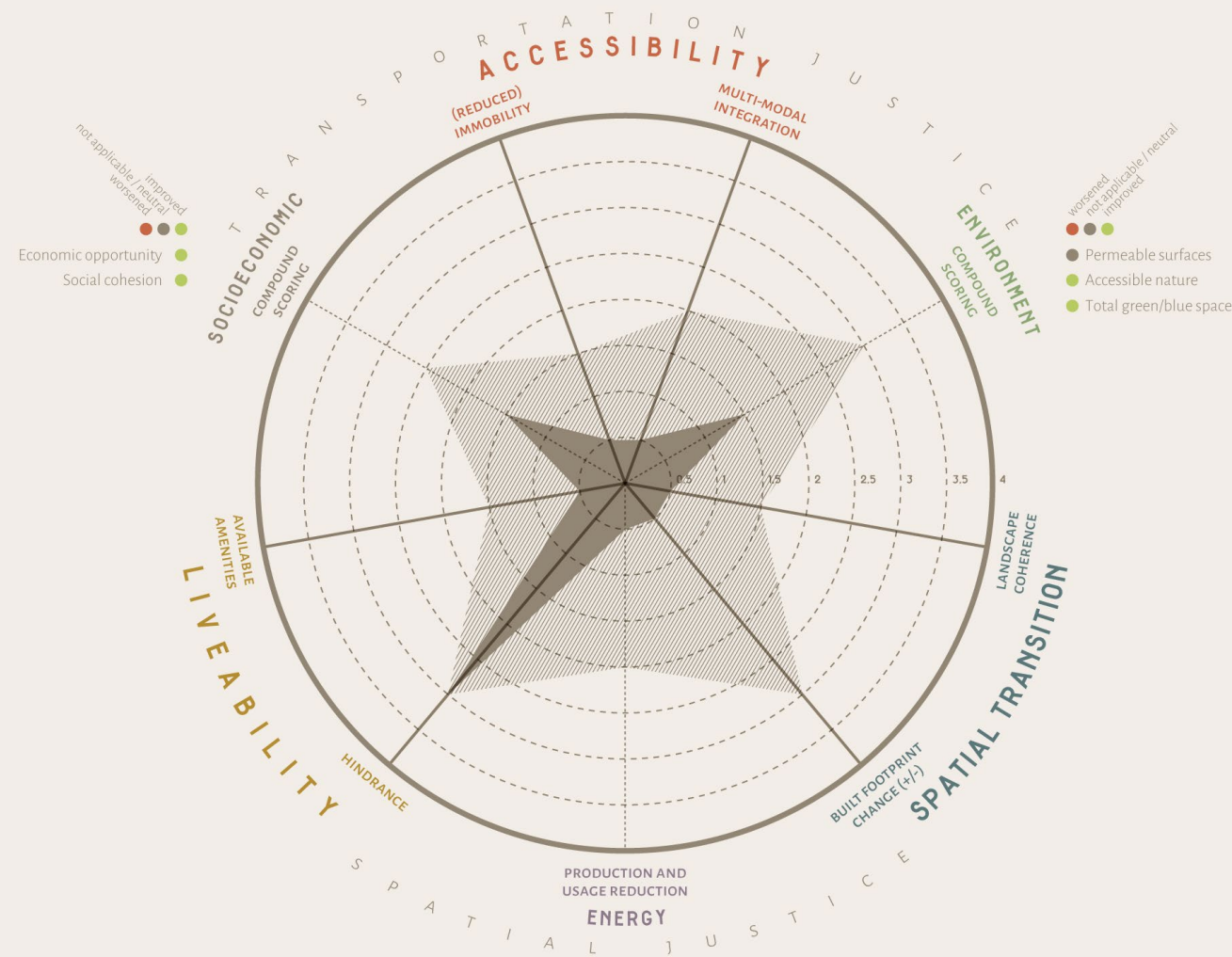
The urban design and the proposed line provides does not directly provide positive effects on the spatial transition, as its purpose is to remedy the impacts on the existing residents. However, the message from not leaving the residents behind and ensuring service for those in countryside regardless would provide legitimacy for the institutions in spatial transition (Rocco et al., 2021).

Deindustrialisation & Innovation

It was not the aim of both transportation and urban design exercise.

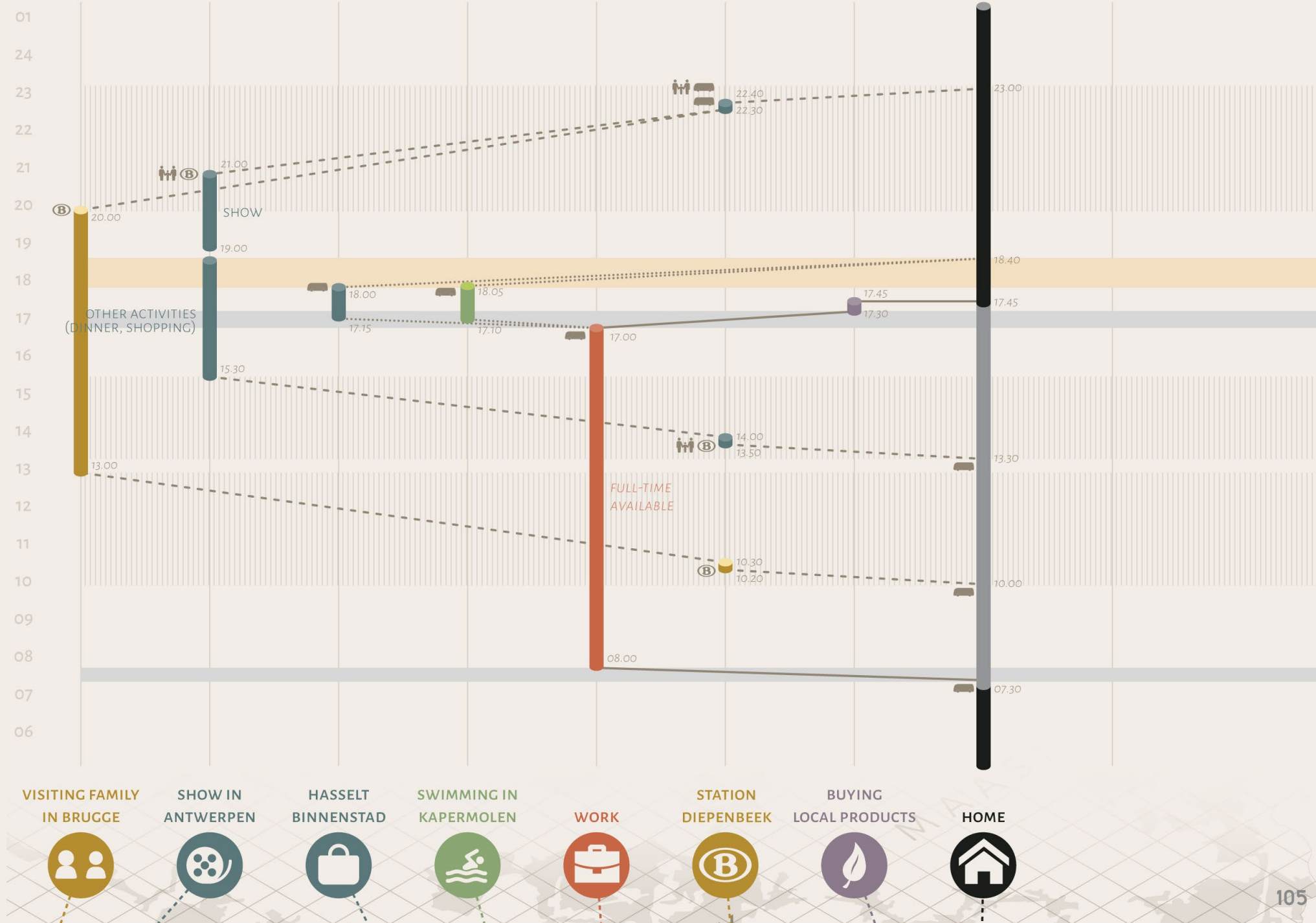
Spartacusplan & Mobility

The urban design exercise sets the area’s activity centred around public transportation, facilitating modal shift and improving the financial feasibility. Moreover, the significant improvements in immobility issues in the countryside is also aligned with the principles of mobility justice.



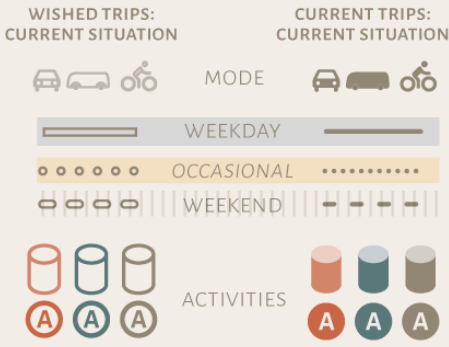
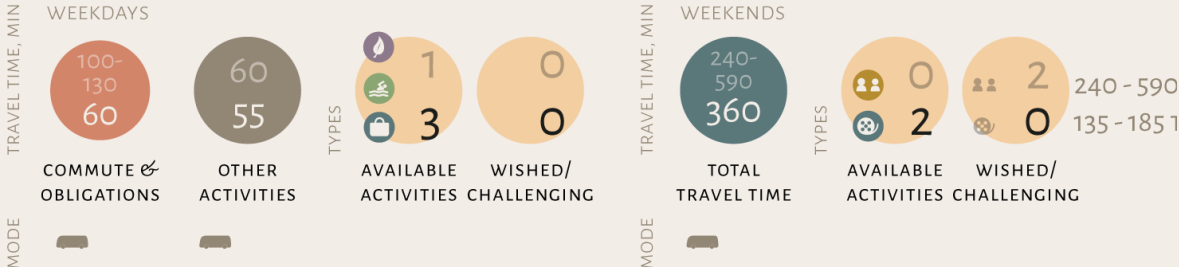


Resolving immobility for  
the kids also solved  
immobility of parent



PERSONA B

Resolving immobility for the kids also solved immobility of parent

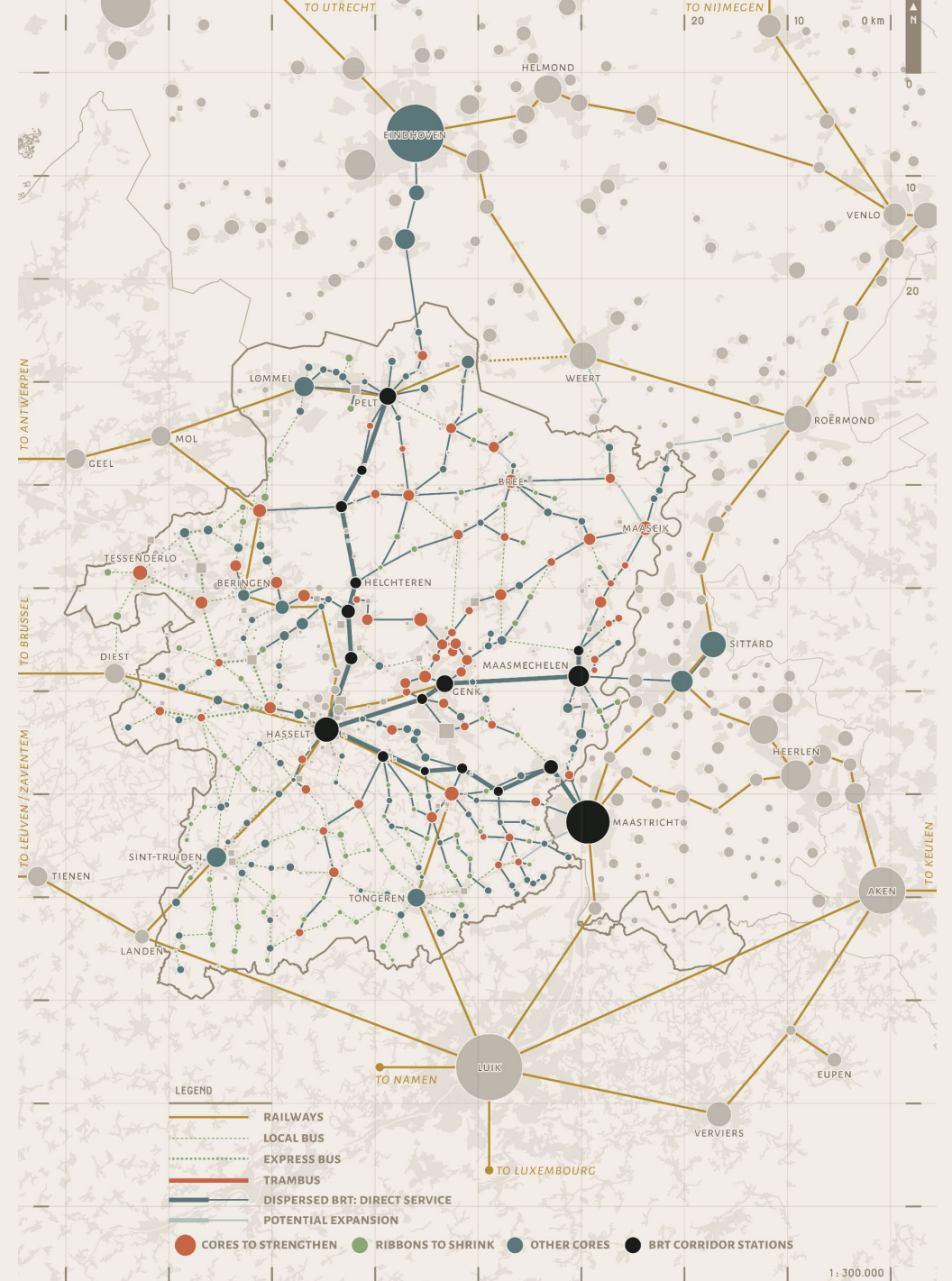
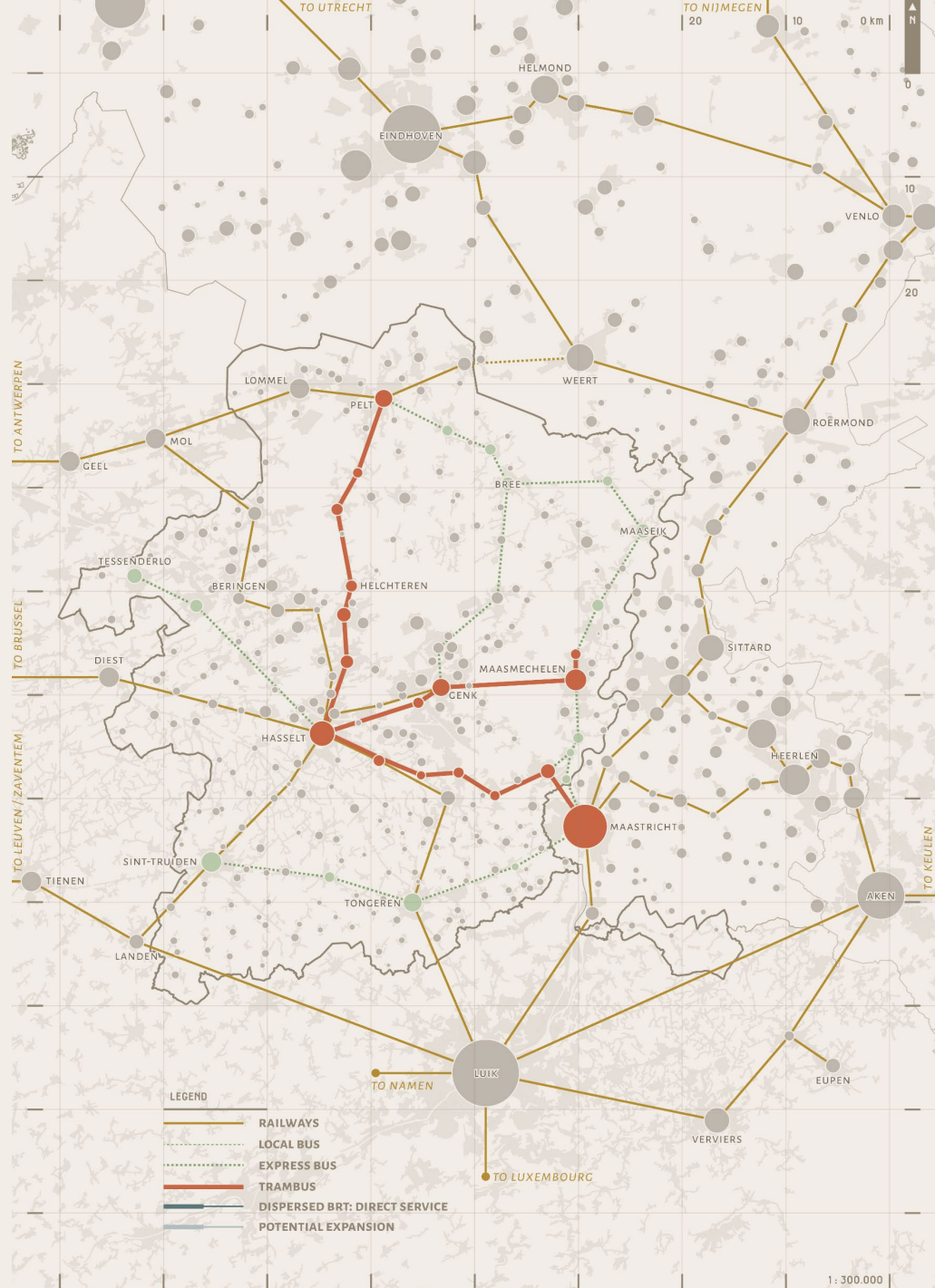


## CONCLUSIONS

The main research question:

*“How can innovative transportation technologies help implement an equitable and sustainable transport network suited for Belgian Limburg that can catalyse the spatial transition?”*





# END OF THE LINE

