The line in the landscape.

Exploring the social and spatial opportunities of implementing innovative high speed railroad technology in the formation of transport flowscapes in the Netherlands.

Giordana Credendino, 4703251

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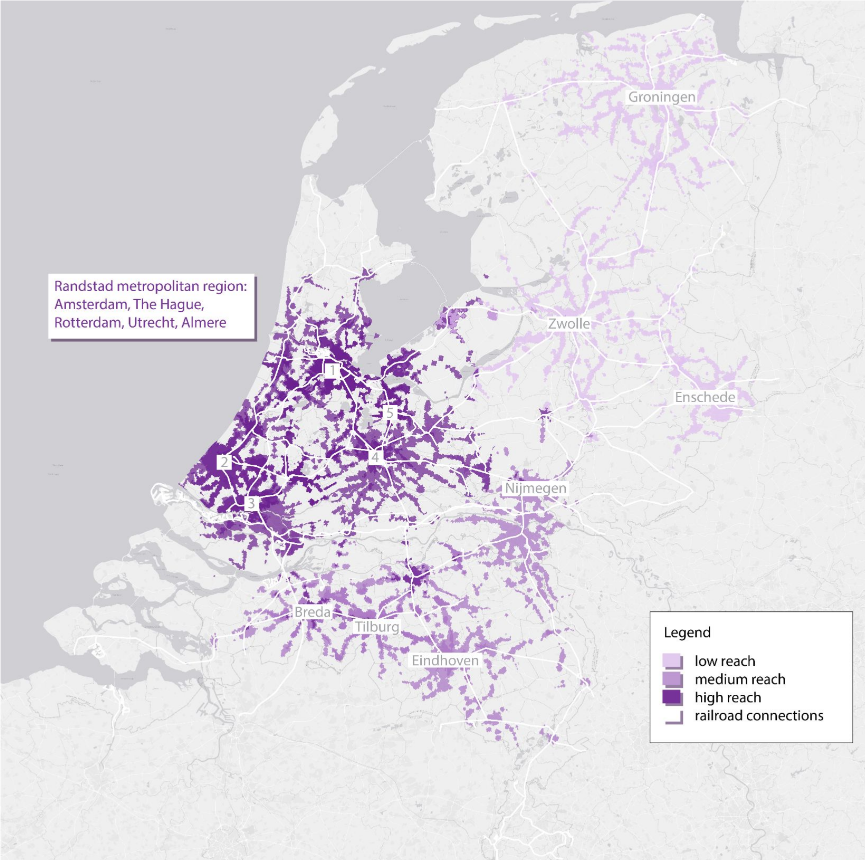
Art and Technology

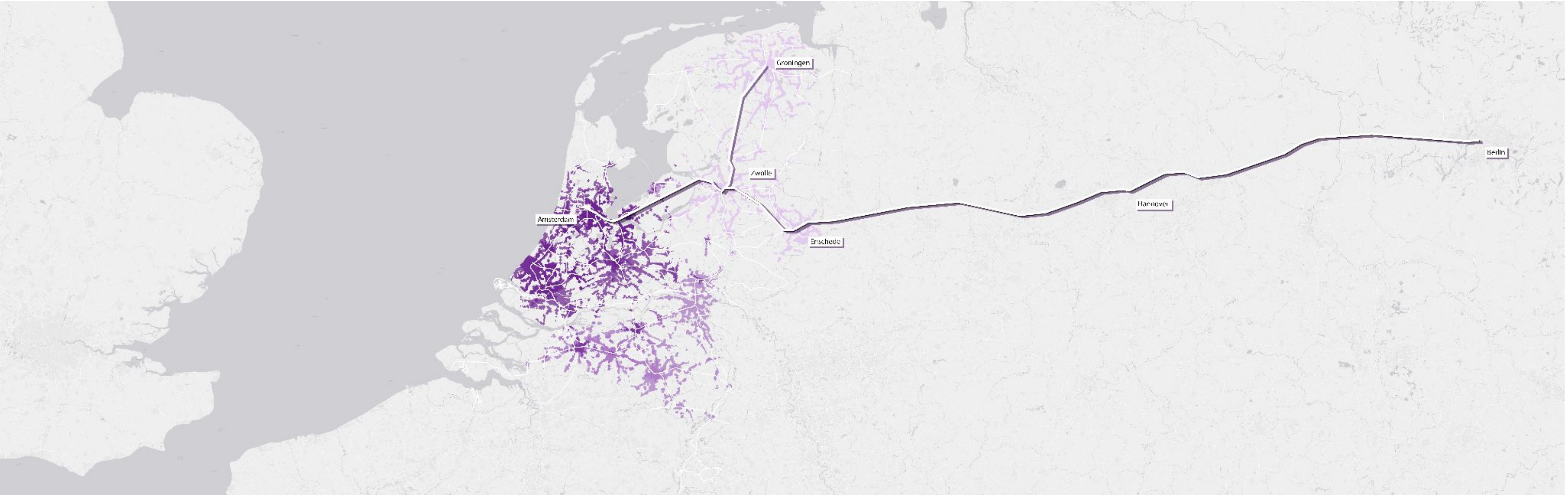
Exploring innovative technology solutions to resolve spatial and social issues

Gap



Gap in commuting system in the north of the netherlands

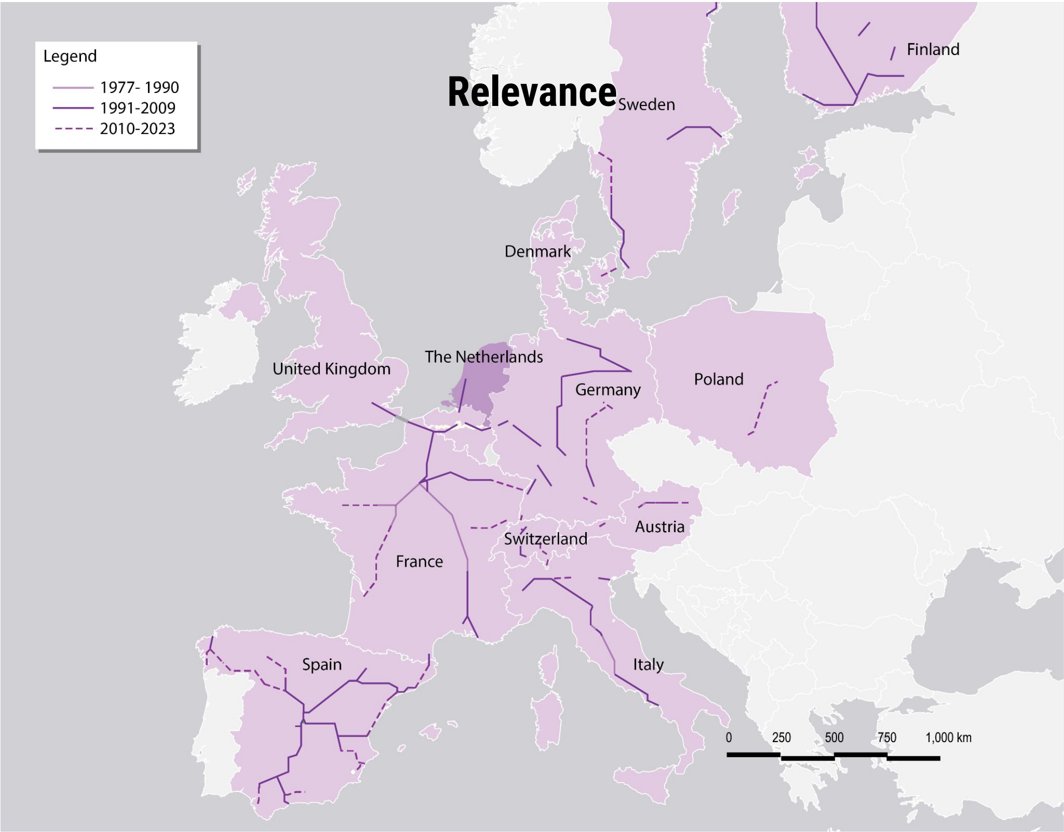
Opportunity

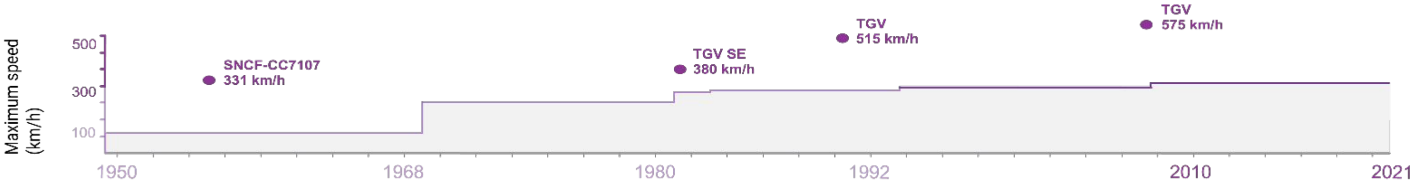


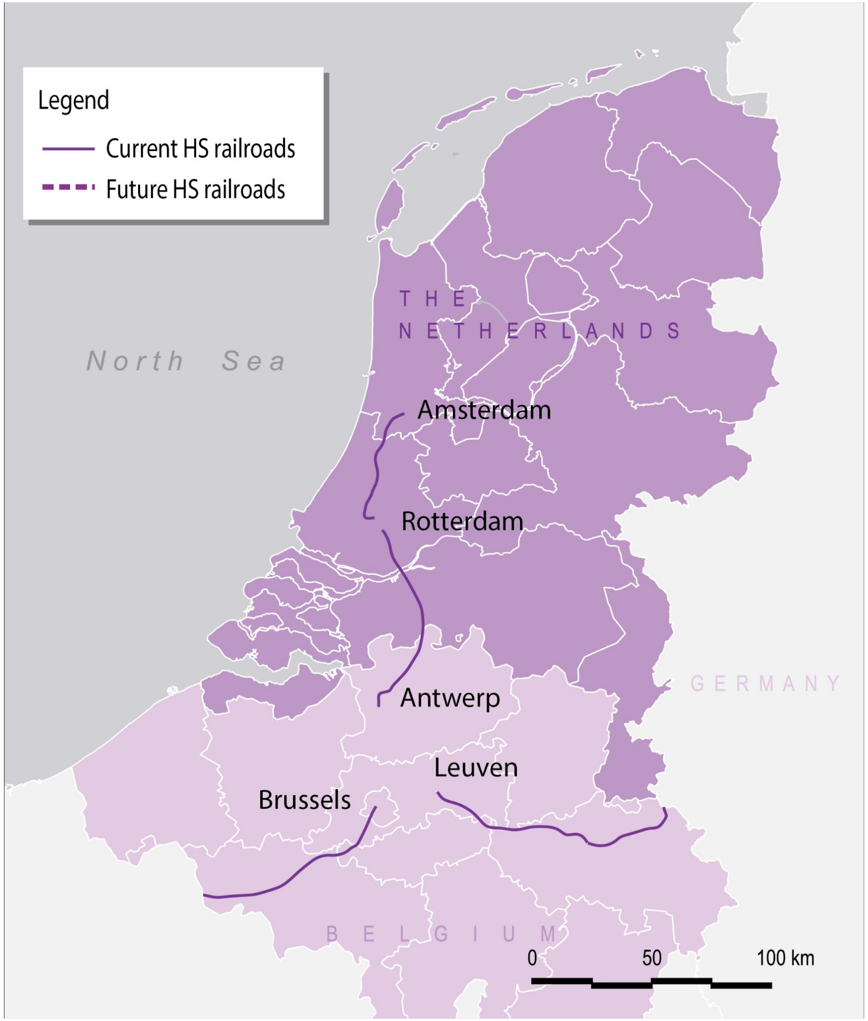
Create a new train connection from the Randstad to the north and east of the country

Opening conversation on national and international sustainable travels on high speed railroad

Relevance

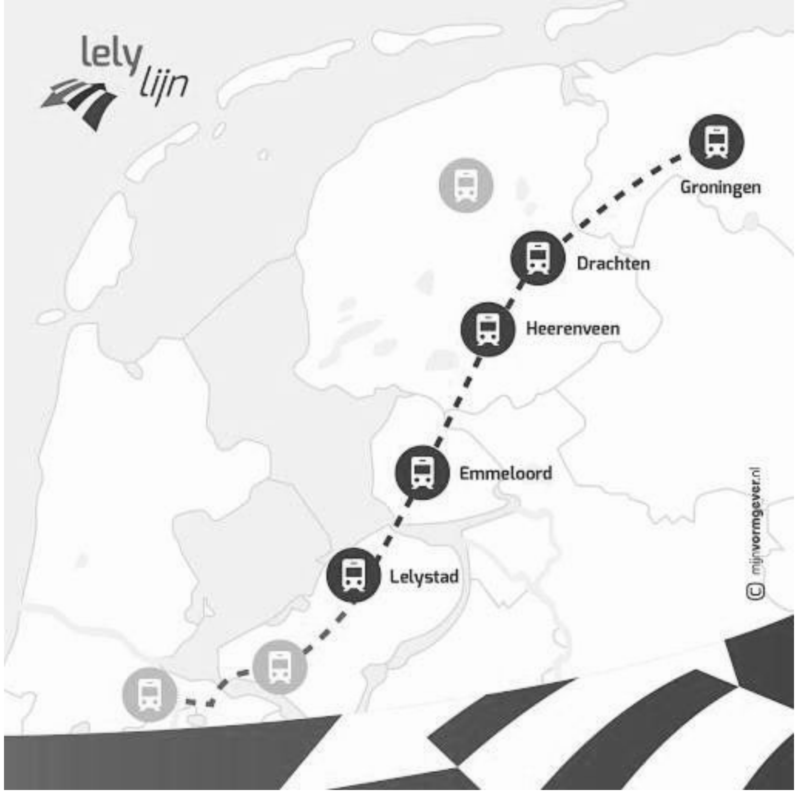

Legend
1977- 1990
1991-2009
2010-2023
Finland
Sweden
Denmark
The Netherlands
United Kingdom
Germany
Poland
Austria
Switzerland
France
Spain
Italy
0
250
500
750
1,000 km


Maximum speed (km/h)
500
300
100
SNCF-CC7107
331 km/h
TGV SE
380 km/h
TGV
515 km/h
TGV
575 km/h
1950
1968
1980
1992
2010
2021


Legend
Current HS railroads
Future HS railroads
North Sea
THE NETHERLANDS
Amsterdam
Rotterdam
Antwerp
Leuven
Brussels
GERMANY
BELGIUM
0
50
100 km

Eurostar's London-Amsterdam trains to be suspended for almost a year from 2024

Link?

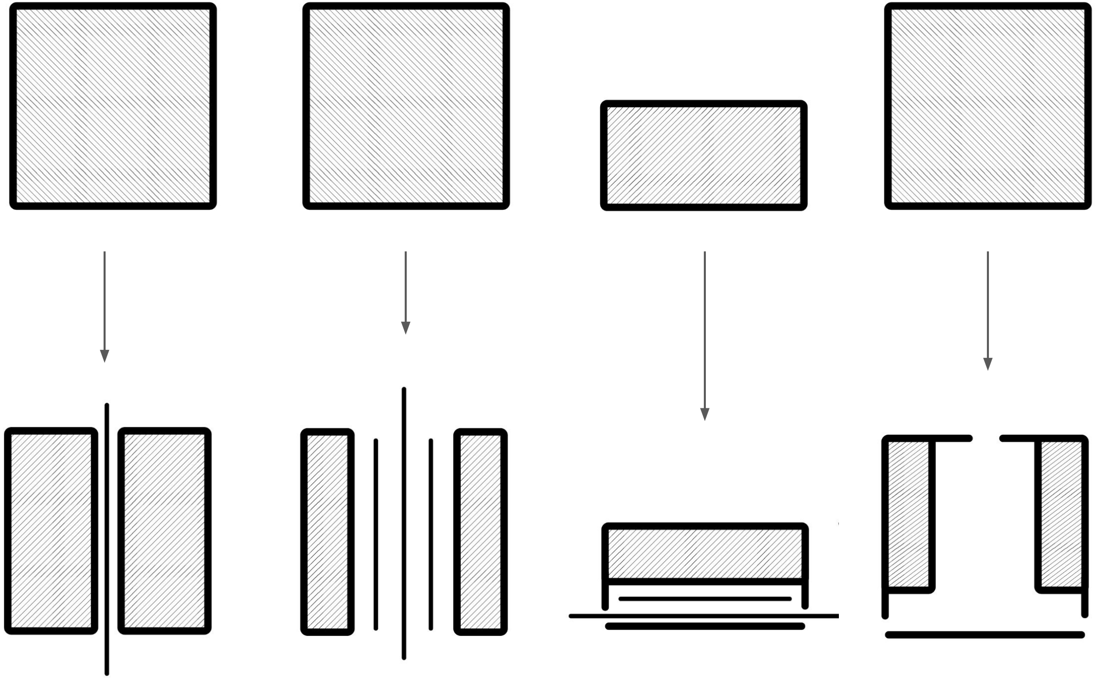


New connection proposed by the government, travel time saving of 30 minutes by 2030..?

Barrier

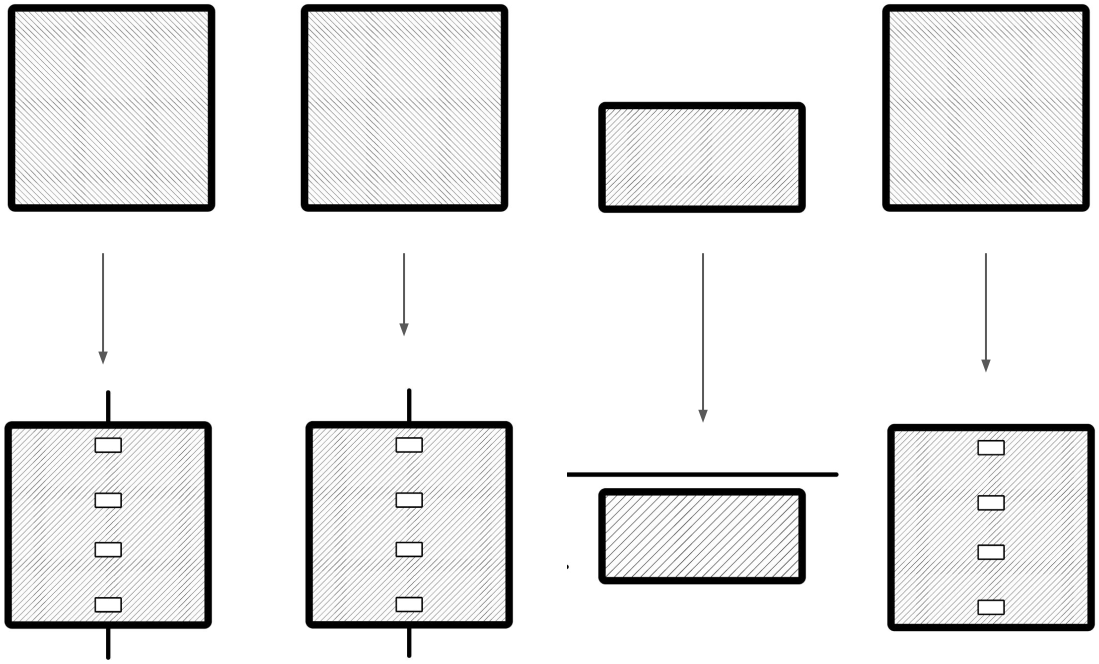
Railroads come with dikes, gates, and poles

Cut in the Landscape



The landscape becomes separated, fragmented and finally dissipated

Line in the Landscape



The landscape remains a unique system

Twin TGV: Viaduct d’Avignon (FR)

date: 1999

design by: Michel Virlogeux and Jean-François Blassel.

characteristics:

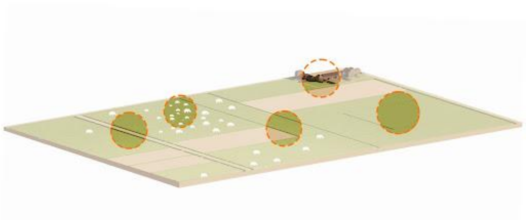
- ❏ Sarge spans (50m to 100m)
- ❏ Slightly curved span resembling an ancient arched viaduct
- ❏ Built 40m every month, 3 years to build 1.5km

(http://happypontist.blogspot.com/2014/11/french-bridges-4-tgv-viaduct-avignon.html)

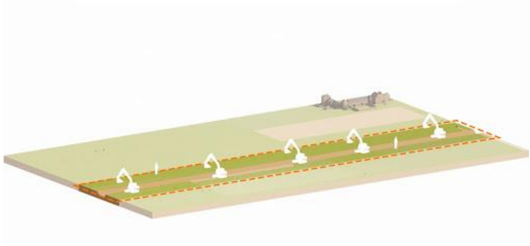
Current technology

HS2 using a similar technology to build the UK's longest railway viaduct (3.5km)
(https://www.newcivilengineer.com/latest/closer-look-at-700t-bridge-building-machine-behind-hs2s-colne-valley-viaduct-07-06-2022/)

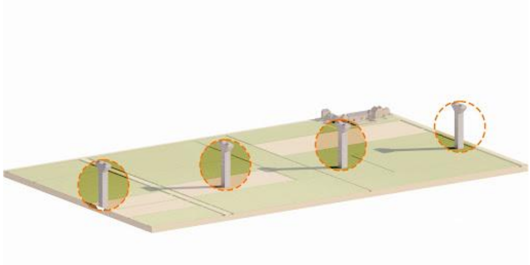
Future technology



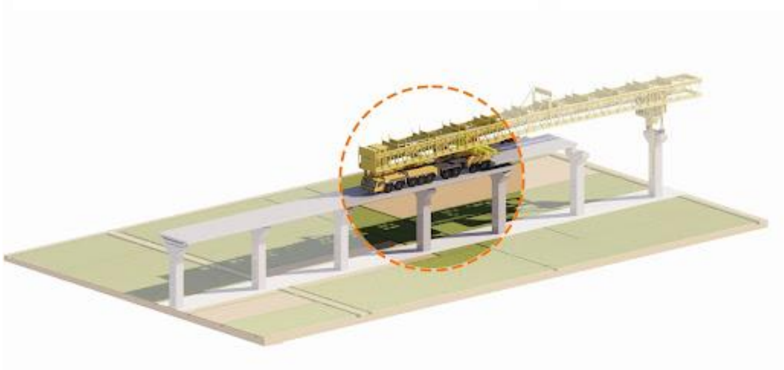
Minimal land acquisition

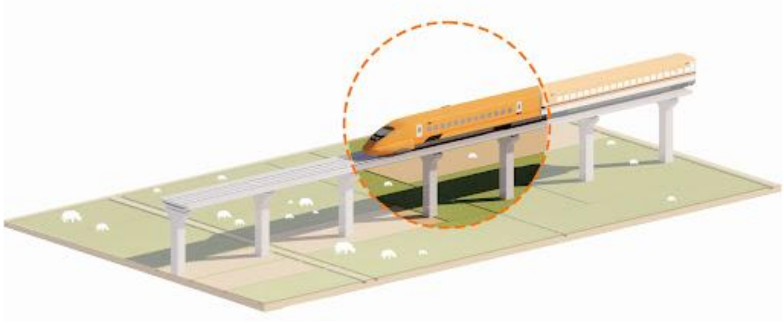


Minimal digging



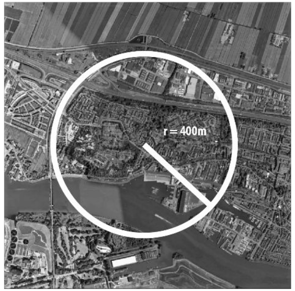
Minimal land invasion



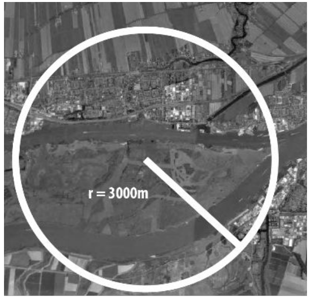


The overpass railroad is assembled and allows for a connected landscape, 30% reduction in time on site

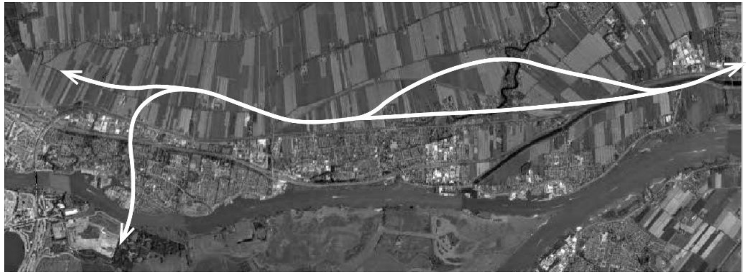
Spatial implications



Outer city typology



Landscape line typology



France			Germany			
Line Type	V_{max} (km/h)	R_{min} (m)	Line Type	V_{max}/V_H (km/h)		R_{min} (m)
				Passenger train	Freight train	
Southeast line	270∗	4000 (3200)	Wurzburg–Hanover Mannheim–Stuttgart	250	80	7000 (5100)
TGV Atlantique	300	4000 (3400)	Berlin–Hanover	250	80	4400

Modules need to be straight and very minimal curves can be present

Social implications

Landscape technologies are seen as invasive and are often socially rejected (https://intercongreen.com/2009/09/08/renewable-energy-battles-for-new-sites/)

What are the social and spatial opportunities of implementing an overpass railroad technology within the Dutch cultural landscape?

Duality

Intangible and perceptual

What are the social and spatial opportunities of implementing an overpass railroad technology within the Dutch cultural landscape?

Tangible and technical

Duality

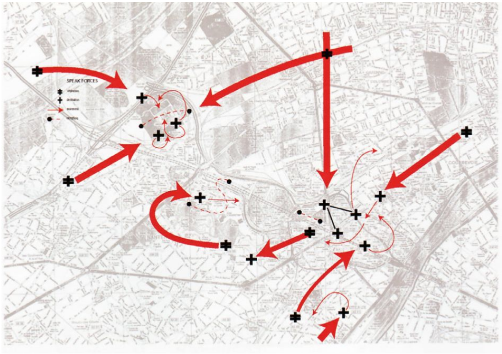
Human scale

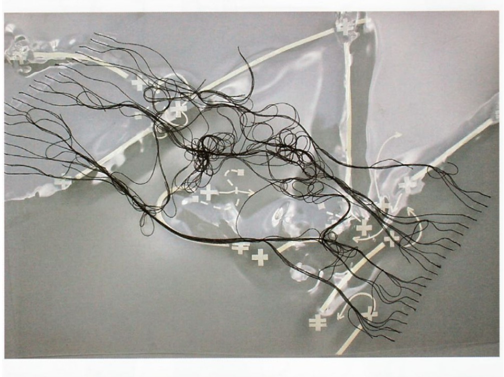
What are the social and spatial opportunities of implementing an overpass railroad technology within the Dutch cultural landscape?

Landscape scale

Landscape scale - tangible and technical

Flowscapes framework

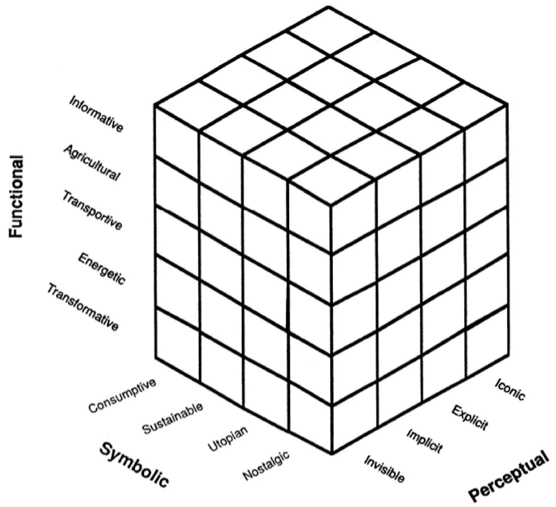


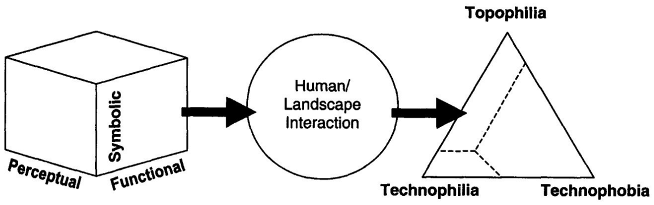


From single purpose infrastructure to operative landscape structure

Human scale - intangible and perceptual

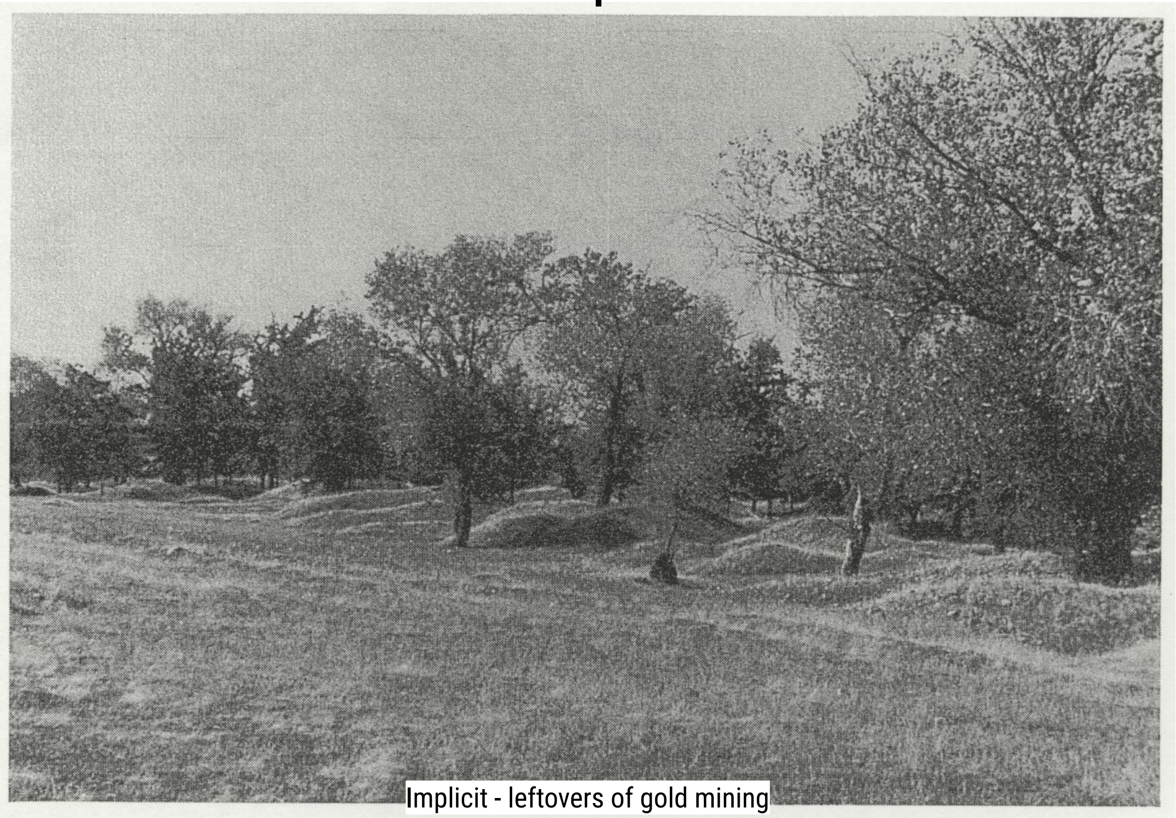
Three Dimensions of Meaning framework





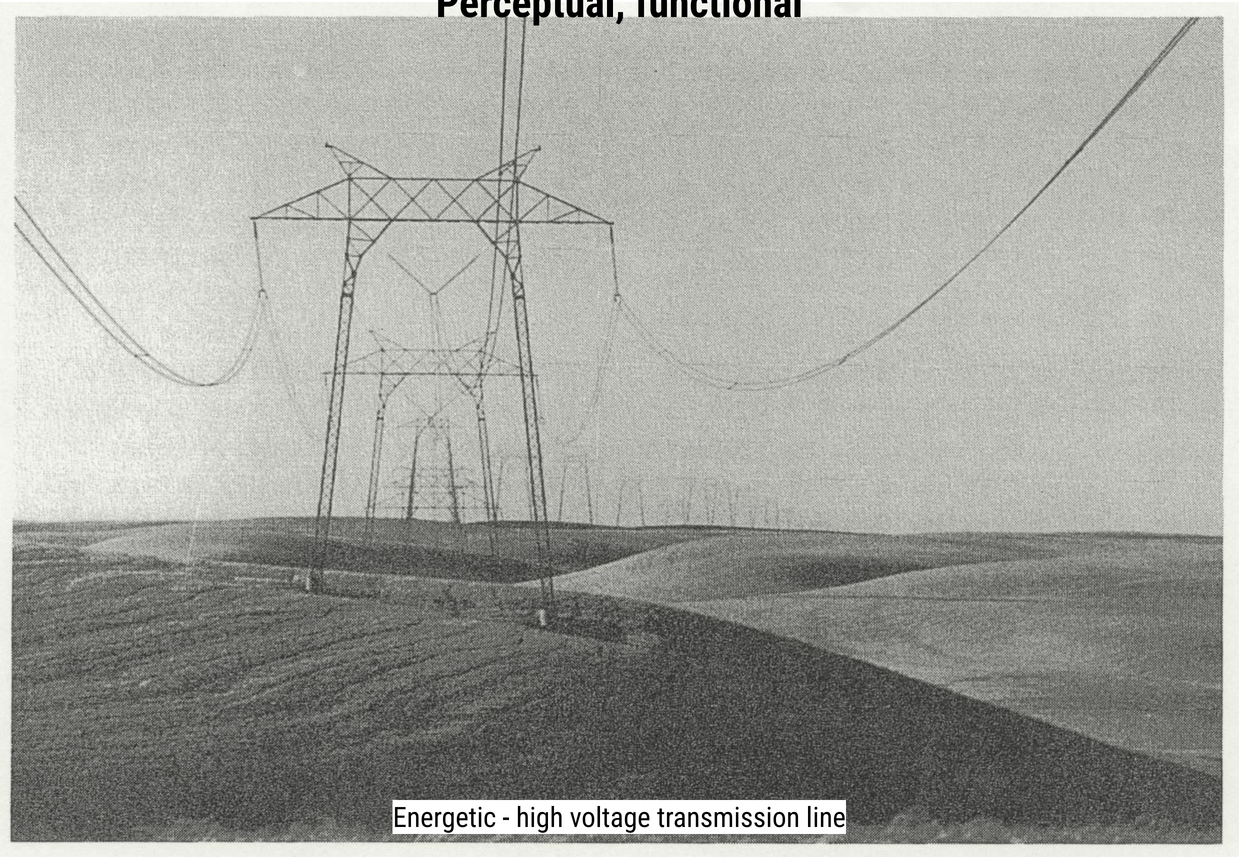
People read landscape technology based on perception, function and symbolism, they interact with it and then form opinions of topophilia, technophilia and technophobia.

Perceptual



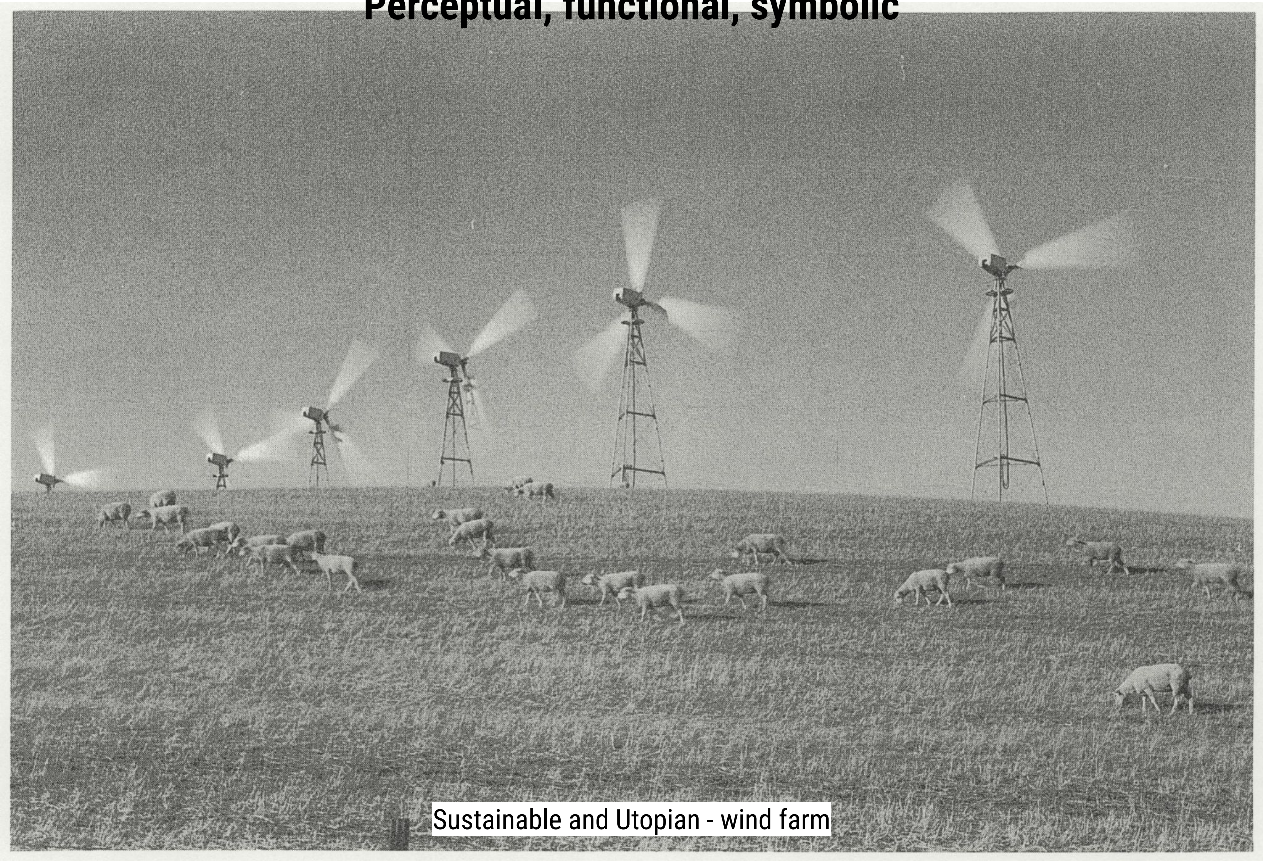
Implicit - leftovers of gold mining

Perceptual, functional



Energetic - high voltage transmission line

Perceptual, functional, symbolic



Sustainable and Utopian - wind farm

“A technological or utilitarian landscape is perceived at many simultaneous levels: as color, texture, form and pattern; as a specific functional entity; and as a symbol of higher, abstract ideas.” R. Thayer

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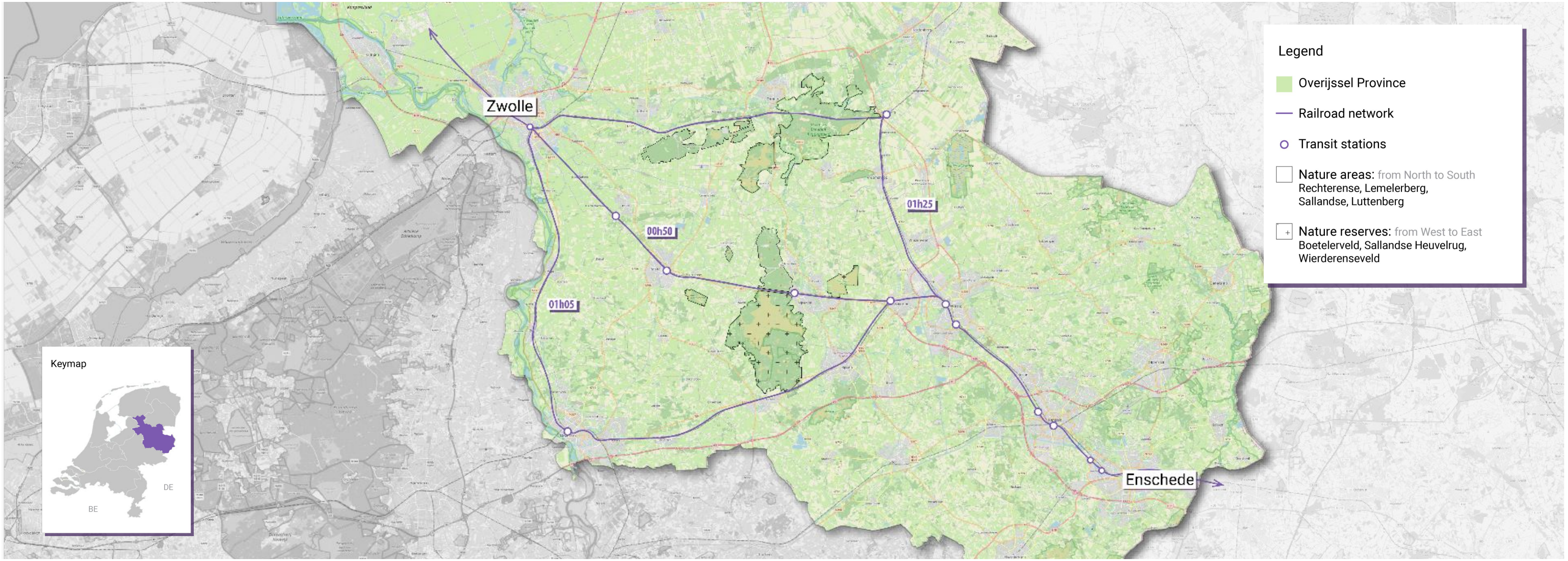
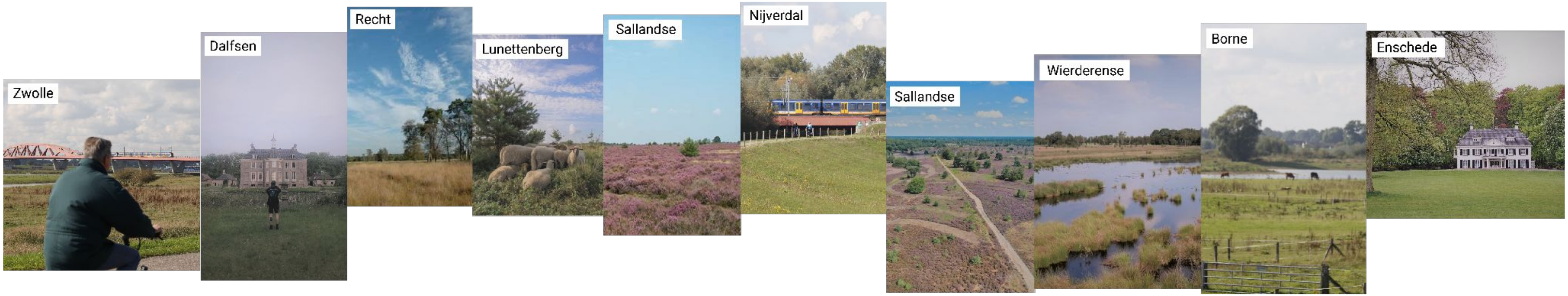
Overijssel by train



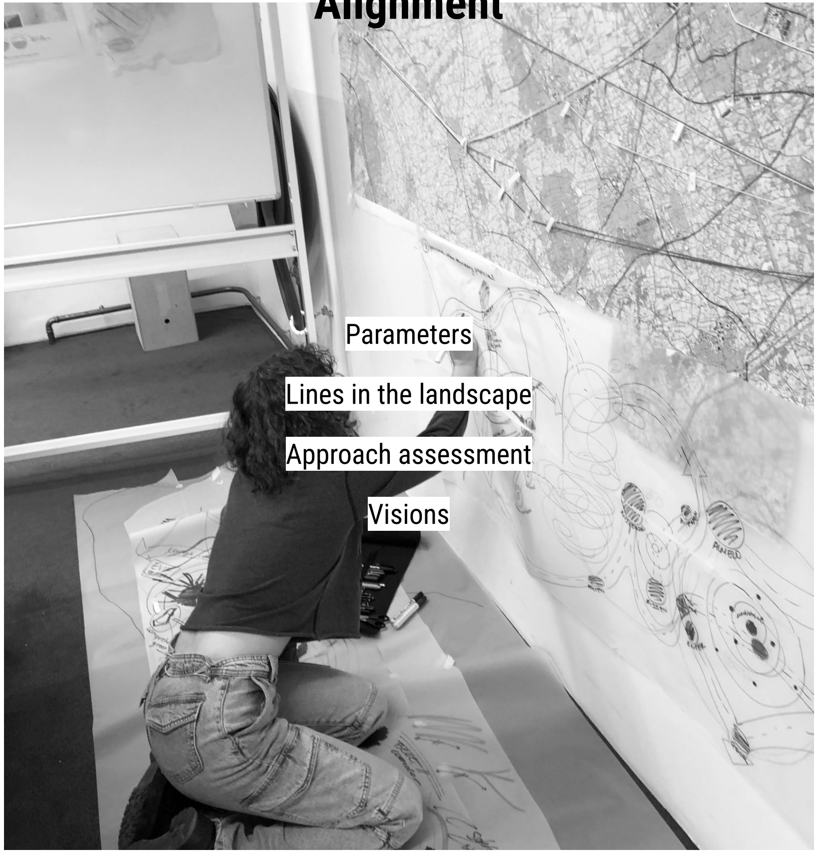
Landscape boundaries dictated by the railroad alignment

Overijssel by train



Landscape boundaries dictated by the railroad alignment

Alignment



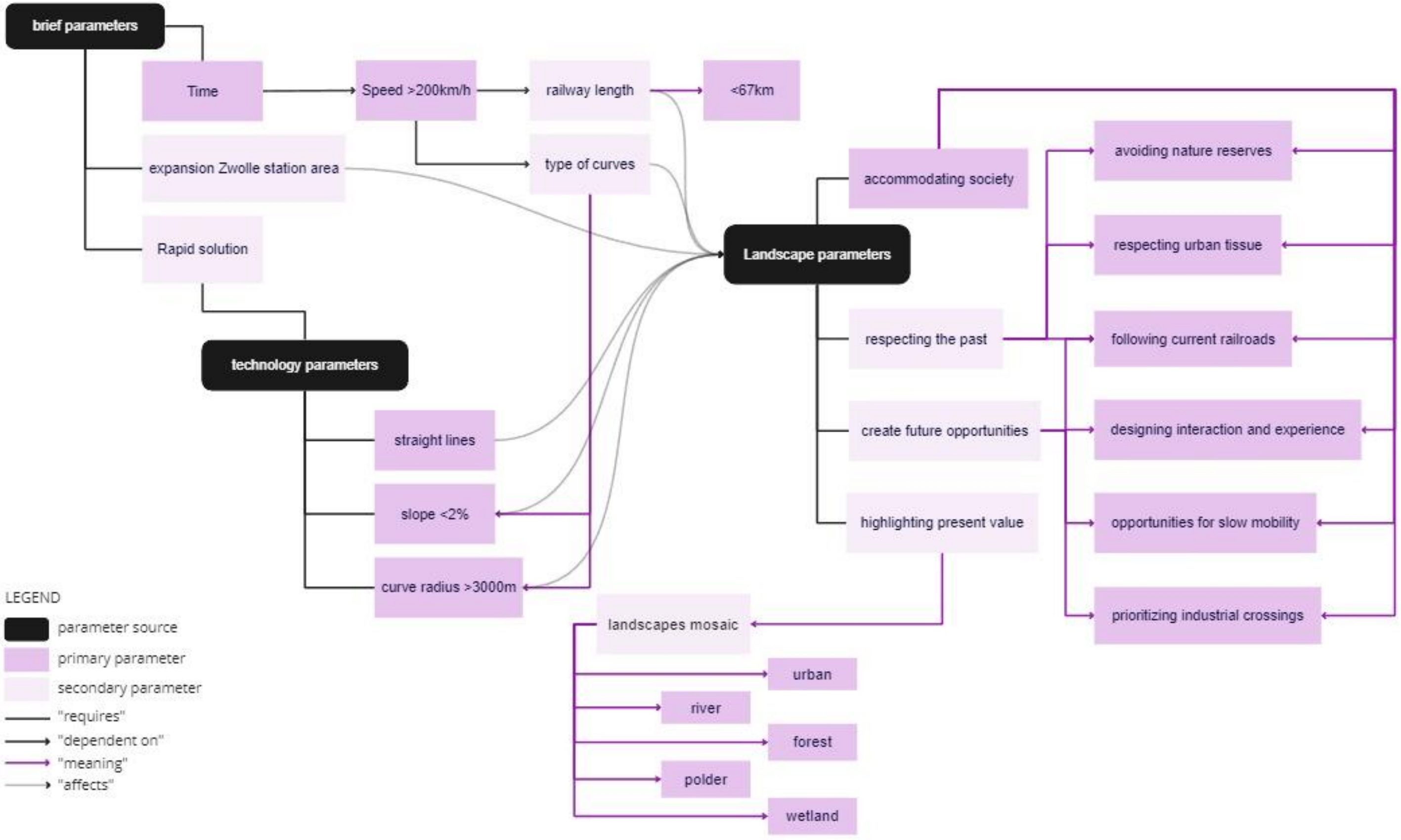
Parameters

Lines in the landscape

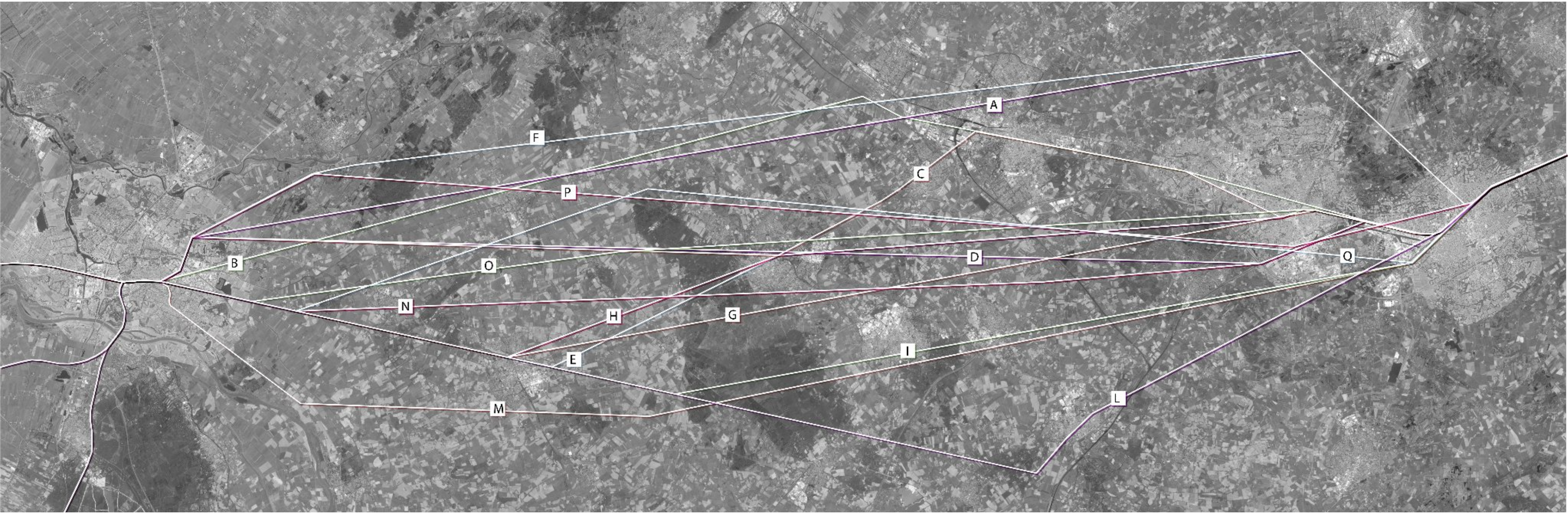
Approach assessment

Visions

Parameters


brief parameters
Time
Speed >200km/h
railway length
<67km
type of curves
expansion Zwolle station area
Rapid solution
technology parameters
straight lines
slope <2%
curve radius >3000m
Landscape parameters
accommodating society
respecting the past
create future opportunities
highlighting present value
avoiding nature reserves
respecting urban tissue
following current railroads
designing interaction and experience
opportunities for slow mobility
prioritizing industrial crossings
landscapes mosaic
urban
river
forest
polder
wetland
LEGEND
parameter source
primary parameter
secondary parameter
"requires"
"dependent on"
"meaning"
"affects"

Lines in the landscape



14 lines drawn to fit requirements from the parameter creation

Landscape investigation

Industry, function and infrastructure

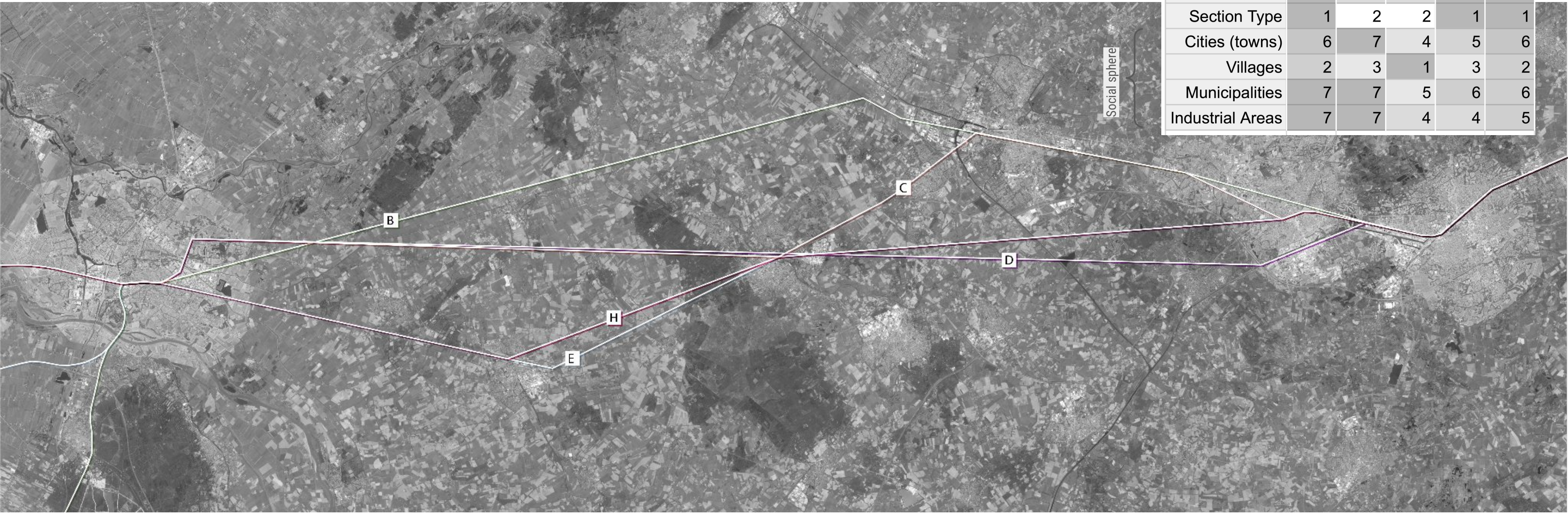
Approach assessment

	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
Time	16.62	20.02	21.06	17.5	26.54	18.68	23.4	24.72	19.56	21.54	18.72	17.48	18.5	18.46	17.44
Total Distance	66	65	65	61	64	67	65	64	62	67	65	62	63	65	64
D (250kmh)	63	48	44	50	21	57	35	28	44	46	53	52	50	54	56
D (120kmh)	3	17	21	11	43	10	30	36	18	21	12	10	13	11	8
New Nooks	3	2	3	2	2	3	2	2	3	3	3	4	3	2	3
Max pumb	0	0	30	30	0	50	60	0	55	55	55	30	40	0	25
Section Type	1	1	2	2	1	2	2	1	2	2	2	2	2	1	2
Cities (towns)	3	6	7	4	5	4	5	6	6	4	2	5	4	5	3
Villages	3	2	3	1	3	4	2	2	3	4	3	2	3	3	4
Municipalities	4	7	7	5	6	7	6	6	7	5	4	6	7	7	7
Industrial Areas	2	7	7	4	4	2	4	5	5	3	1	3	4	2	3

Parameters are translated into 11 assessment fields in the matrix

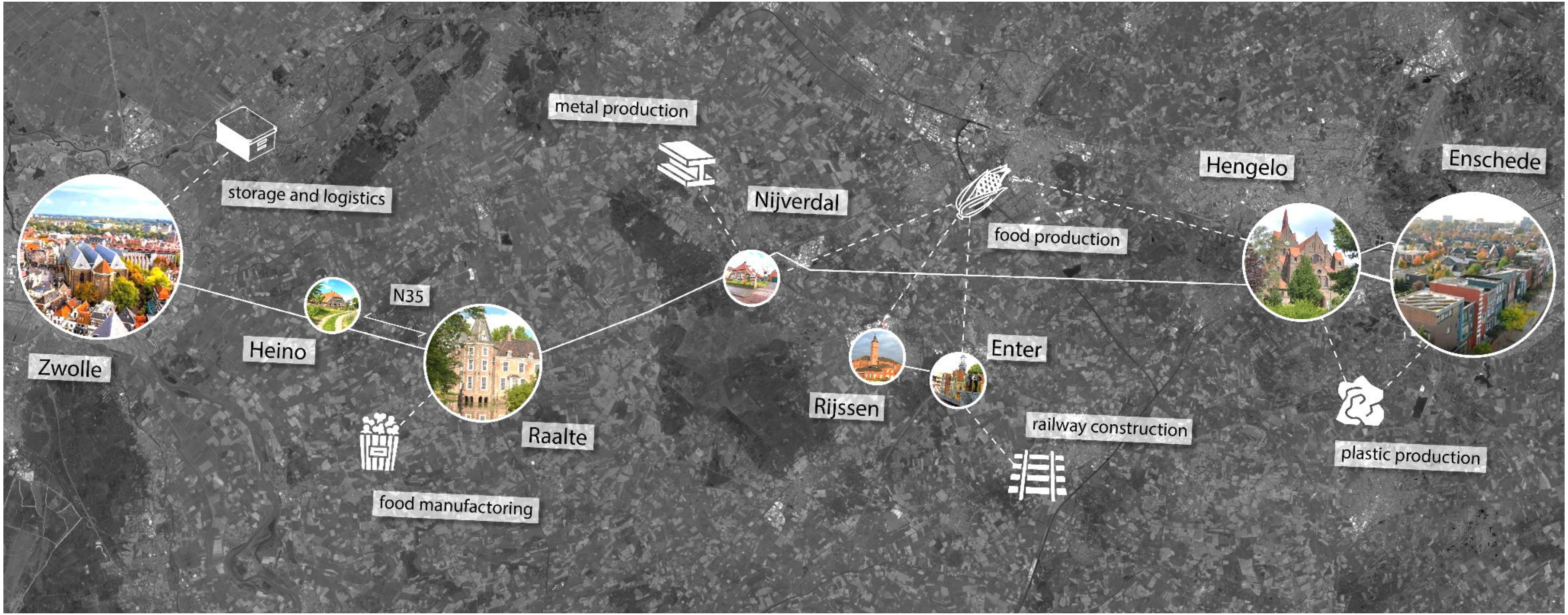
Gentle approach

	B	C	D	E	H
Time	20.02	21.06	17.5	26.54	24.72
Total Distance	65	65	61	64	64
D (250kmh)	48	44	50	21	28
D (120kmh)	17	21	11	43	36
New Nooks	2	3	2	2	2
Max pumb	0	30	30	0	0
Section Type	1	2	2	1	1
Cities (towns)	6	7	4	5	6
Villages	2	3	1	3	2
Municipalities	7	7	5	6	6
Industrial Areas	7	7	4	4	5



Lines that score high on the social integration parameters

Gentle approach

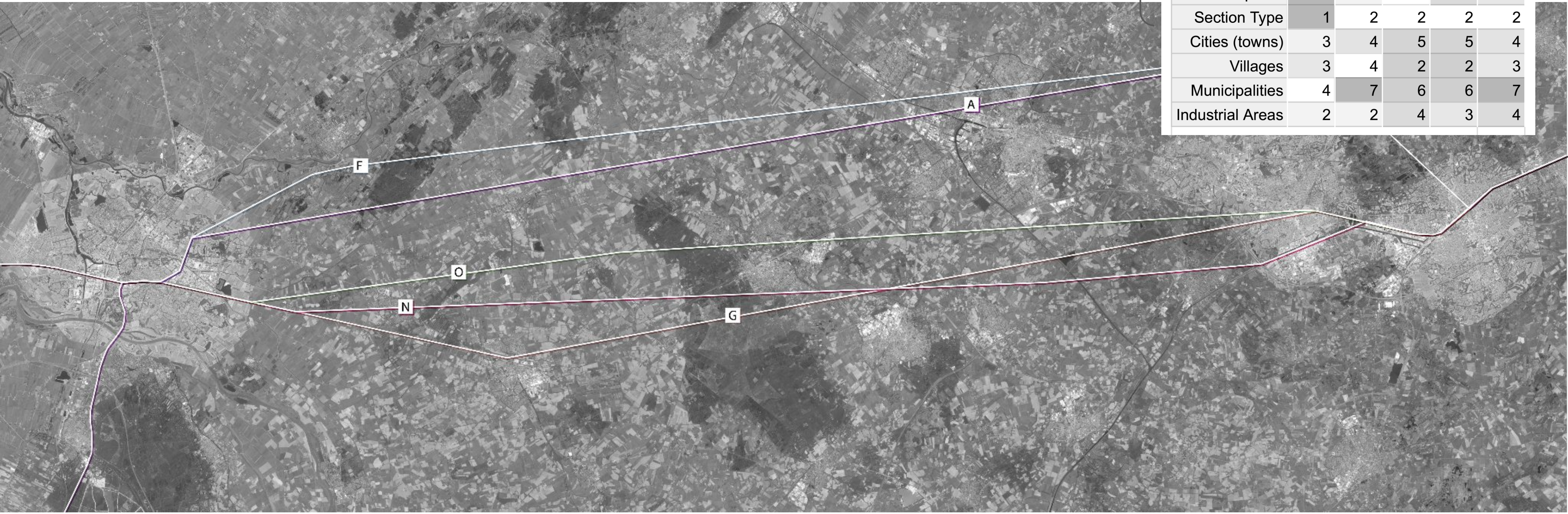


Construction network - social opportunities

Bold approach

Technical application

	A	F	G	N	O
Time	16.62	18.68	23.4	17.48	18.5
Total Distance	66	67	65	62	63
D (250kmh)	63	57	35	52	50
D (120kmh)	3	10	30	10	13
New Nooks	3	3	2	4	3
Max pumb	0	50	60	30	40
Section Type	1	2	2	2	2
Cities (towns)	3	4	5	5	4
Villages	3	4	2	2	3
Municipalities	4	7	6	6	7
Industrial Areas	2	2	4	3	4

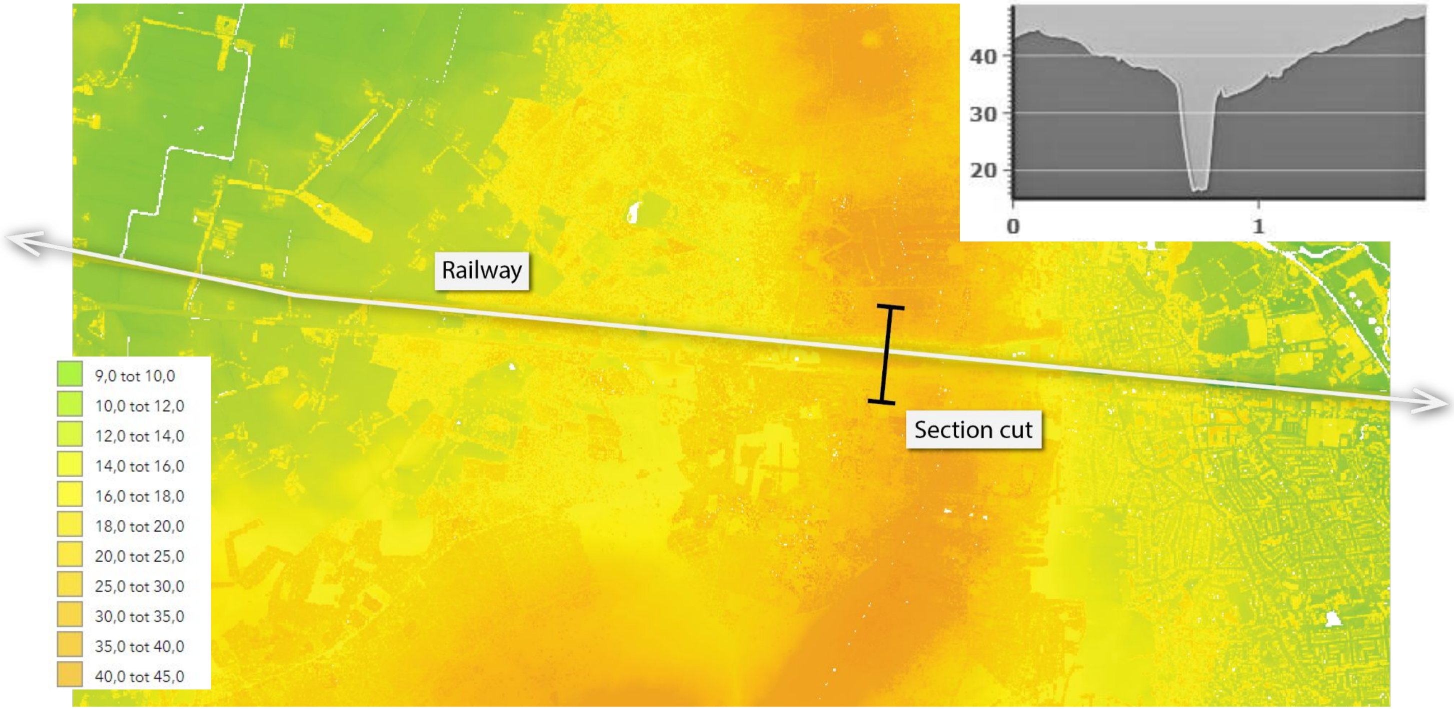


Lines that score high on the technical implementation parameters

Sallandse Heuvelrug National Park

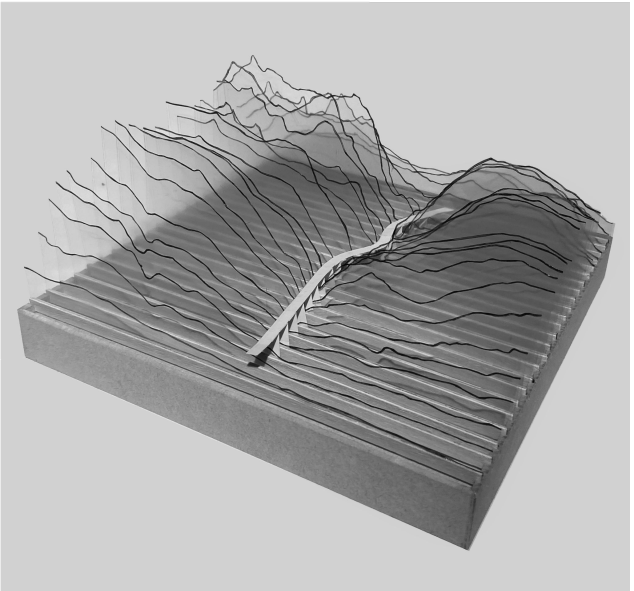
Hilly forest and heathland landscape (https://www.sallandseheuvelrug.nl/, https://www.google.nl/maps/)

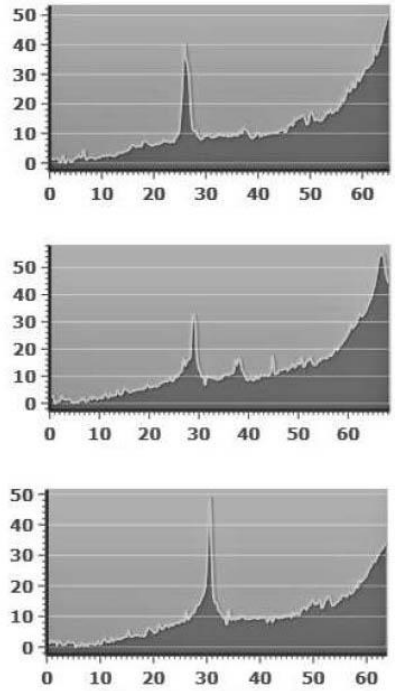
Cut in the landscape



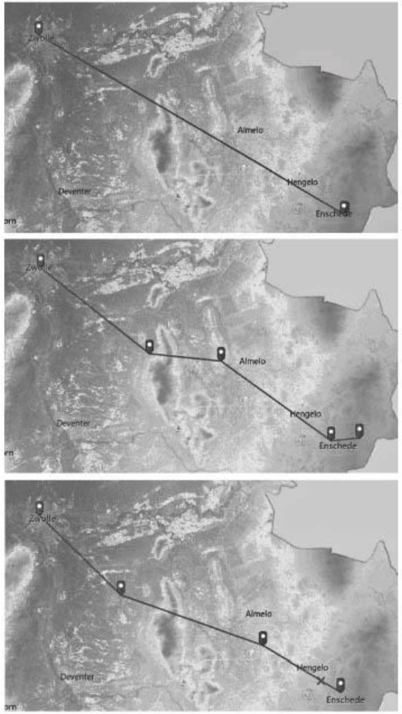
Ground Relief (https://ahn.arcgisonline.nl/ahnviewer/)

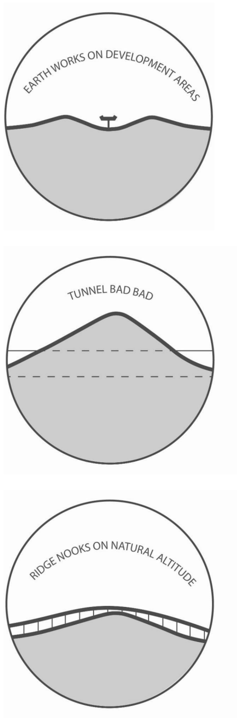
Line in the landscape?





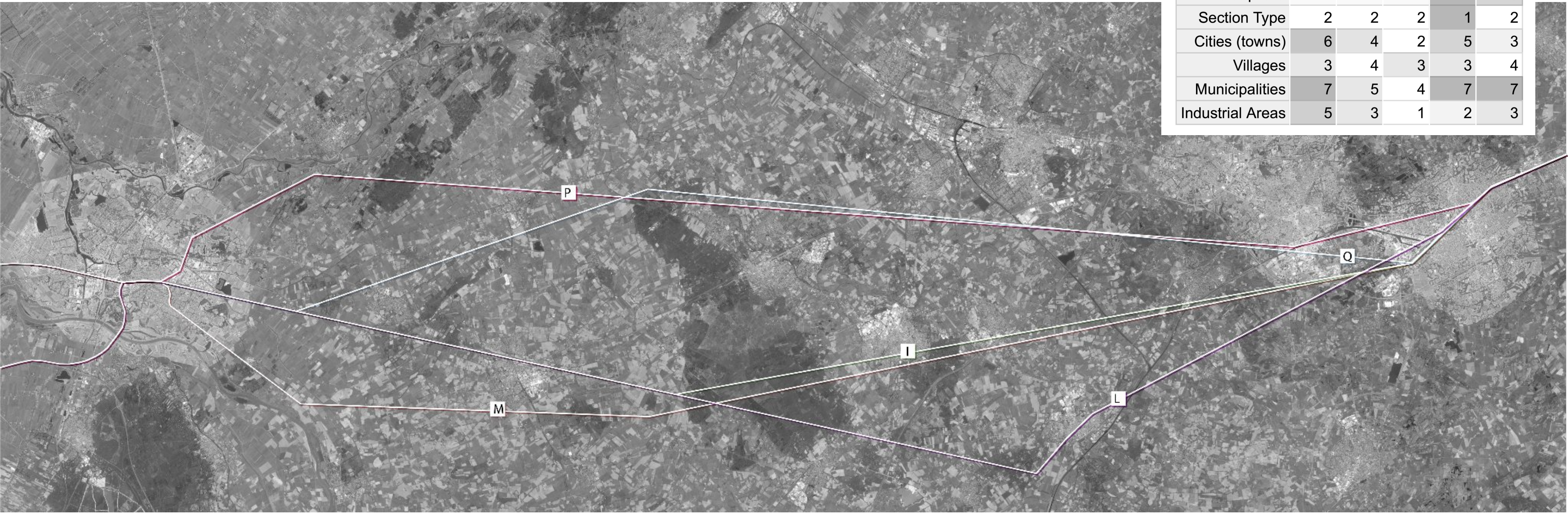
x = distance in kilometers
y = altitude in meters





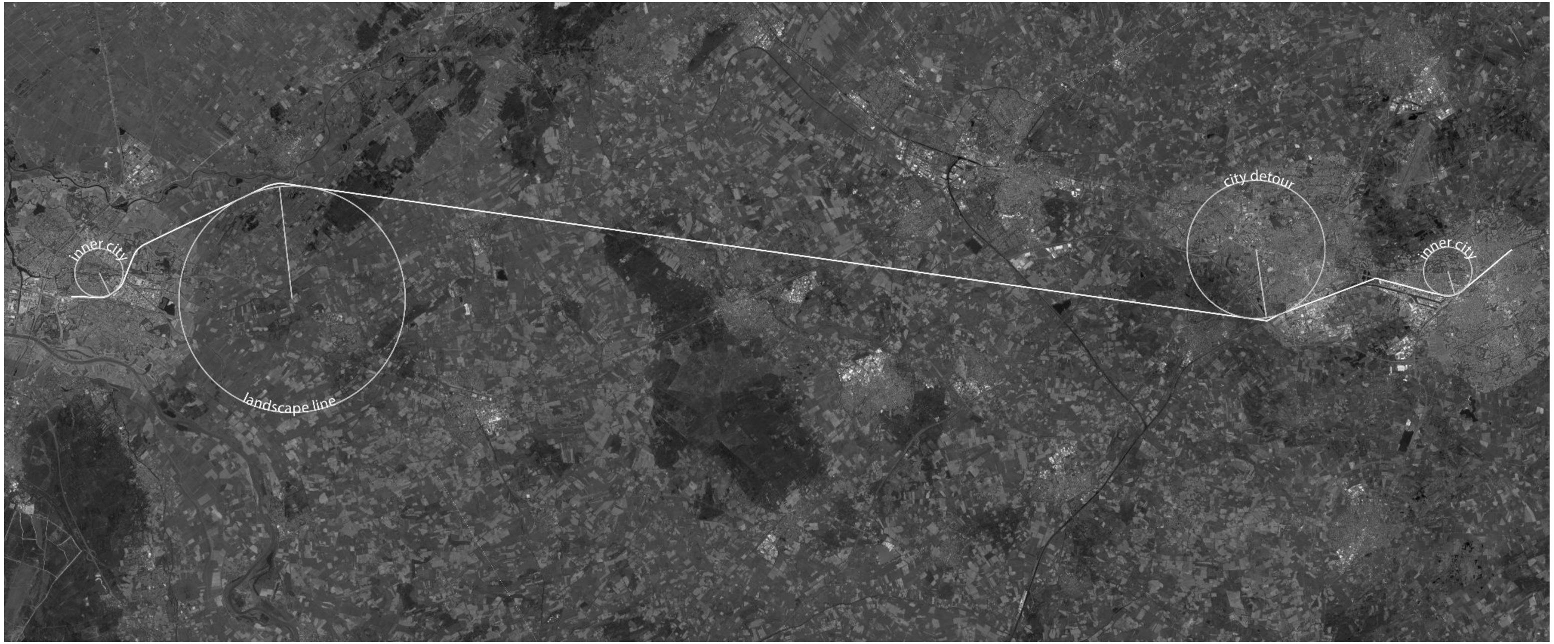
Tangent approach

	I	L	M	P	Q
Time	19.56	21.54	18.72	18.46	17.44
Total Distance	62	67	65	65	64
D (250kmh)	44	46	53	54	56
D (120kmh)	18	21	12	11	8
New Nooks	3	3	3	2	3
Max pumb	55	55	55	0	25
Section Type	2	2	2	1	2
Cities (towns)	6	4	2	5	3
Villages	3	4	3	3	4
Municipalities	7	5	4	7	7
Industrial Areas	5	3	1	2	3



Lines that score high on a varied range of parameters

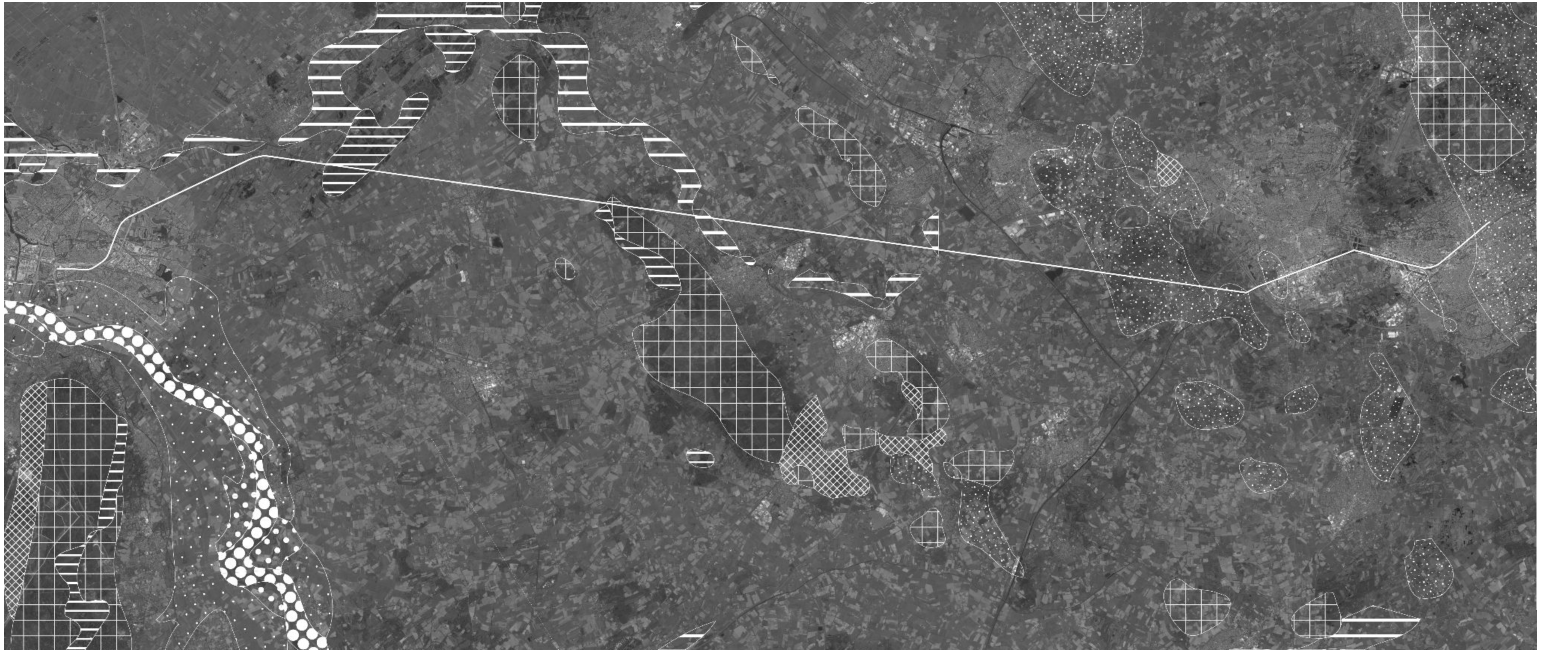
Tangent approach



	P
Time	18.7
Total Distance	66
D (250kmh)	55
D (120kmh)	11
New Curves	3
Curve 1 speed	220
Curve 2 speed	220
Curve 3 speed	220
Curve 4 speed	220
AV curve speed	220
Max bump	0
Section Type	1
Cities (towns)	5
Villages	3
Cuts	0
Industrial Areas	5

Exploration of alignment P - tangent line in the landscape

Geological mosaic



Marine clay and sand deposits

Fluvial glacial deposits

Boulder clay

Stream deposits

River ridges deposits

Fine grain sand and peat

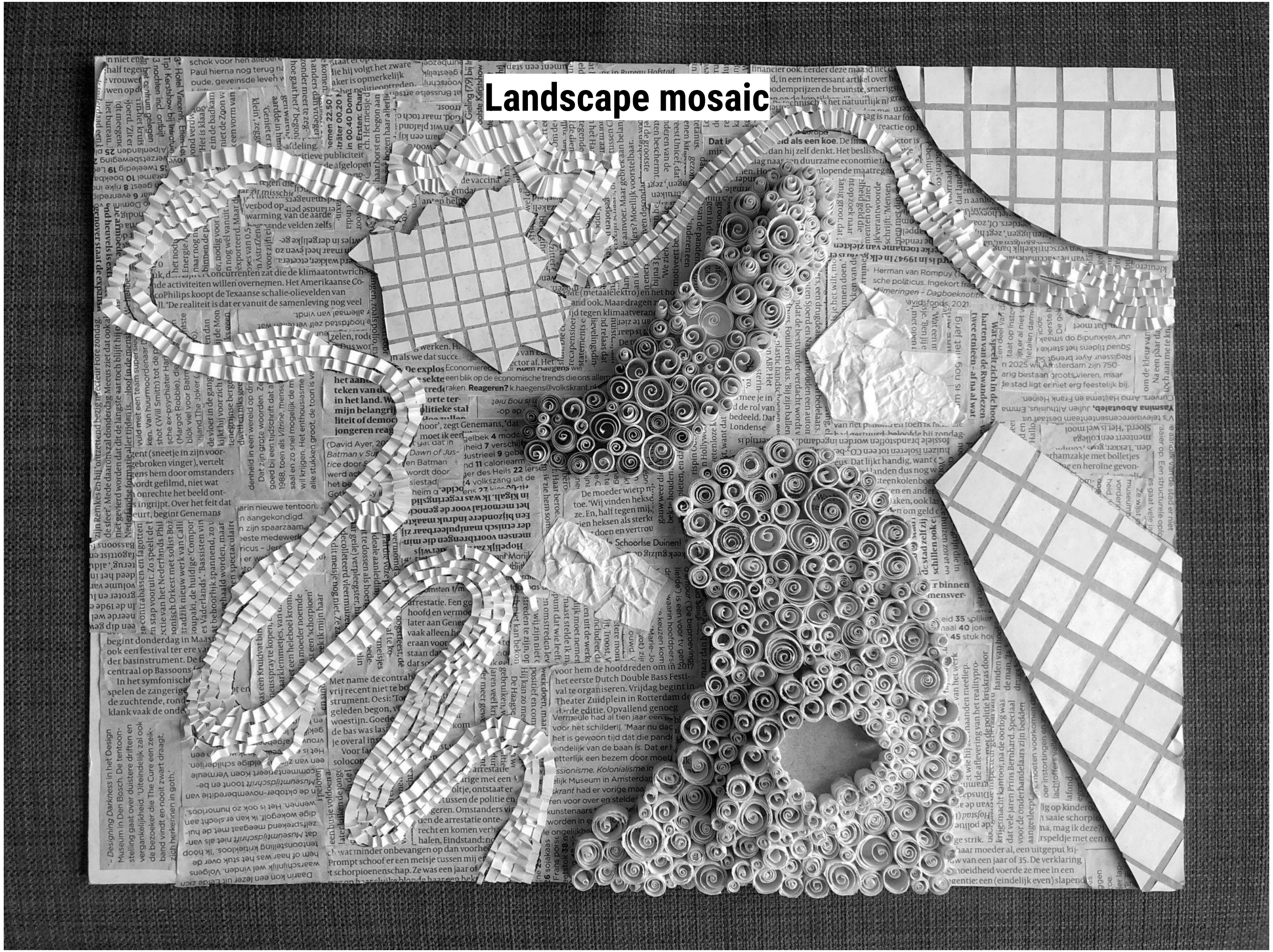
Sand and peat deposits

Sandy stream belts deposits

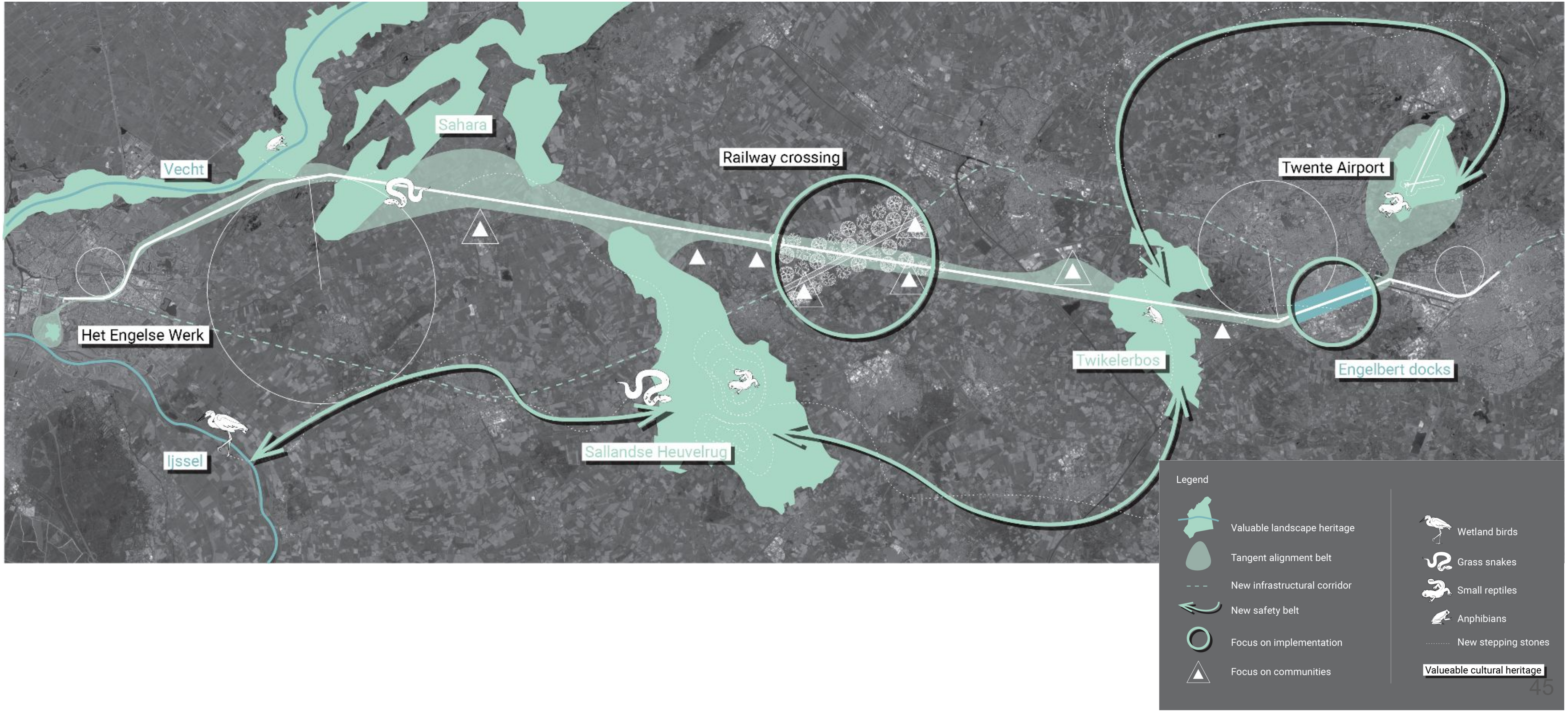
More stable

Less stable

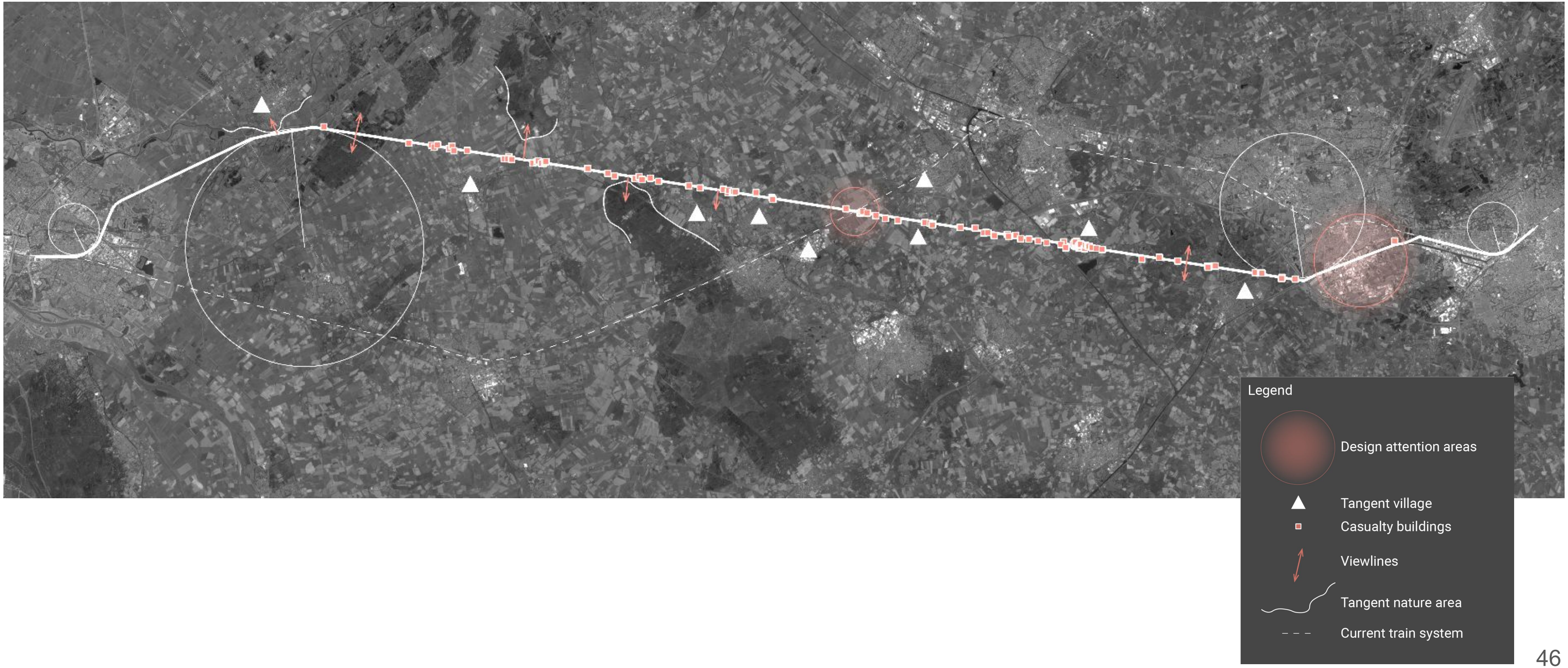
Landscape mosaic



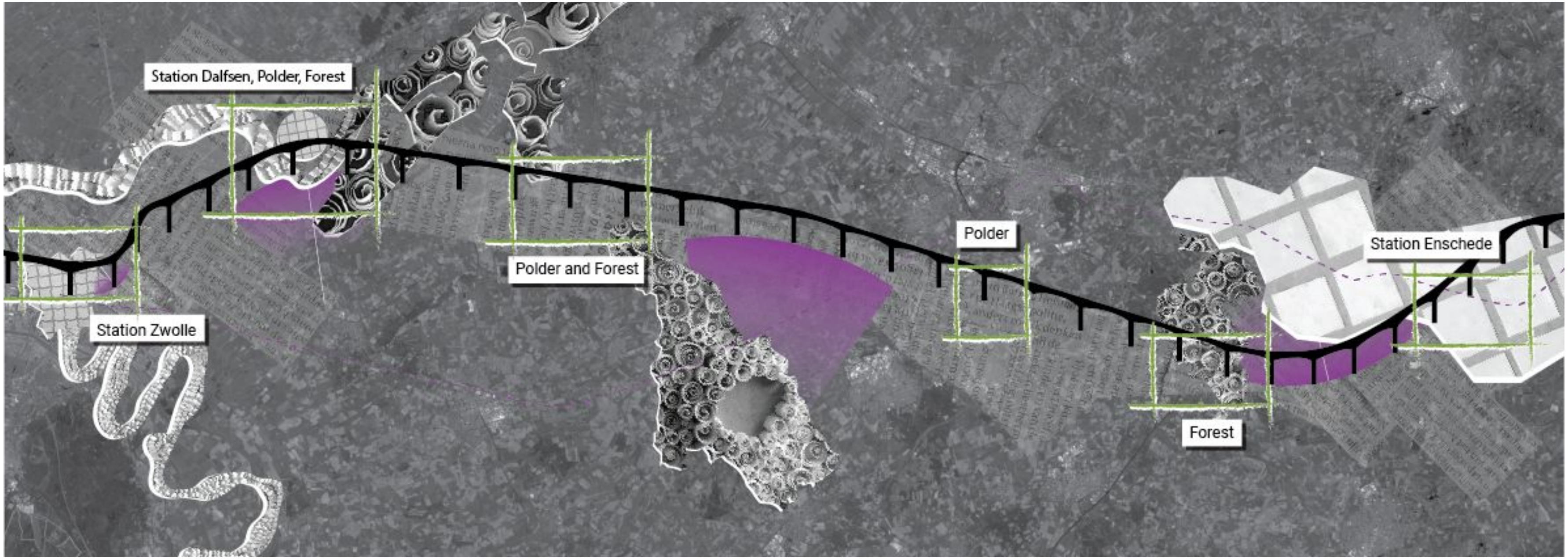
Landscape connection



Tangible network

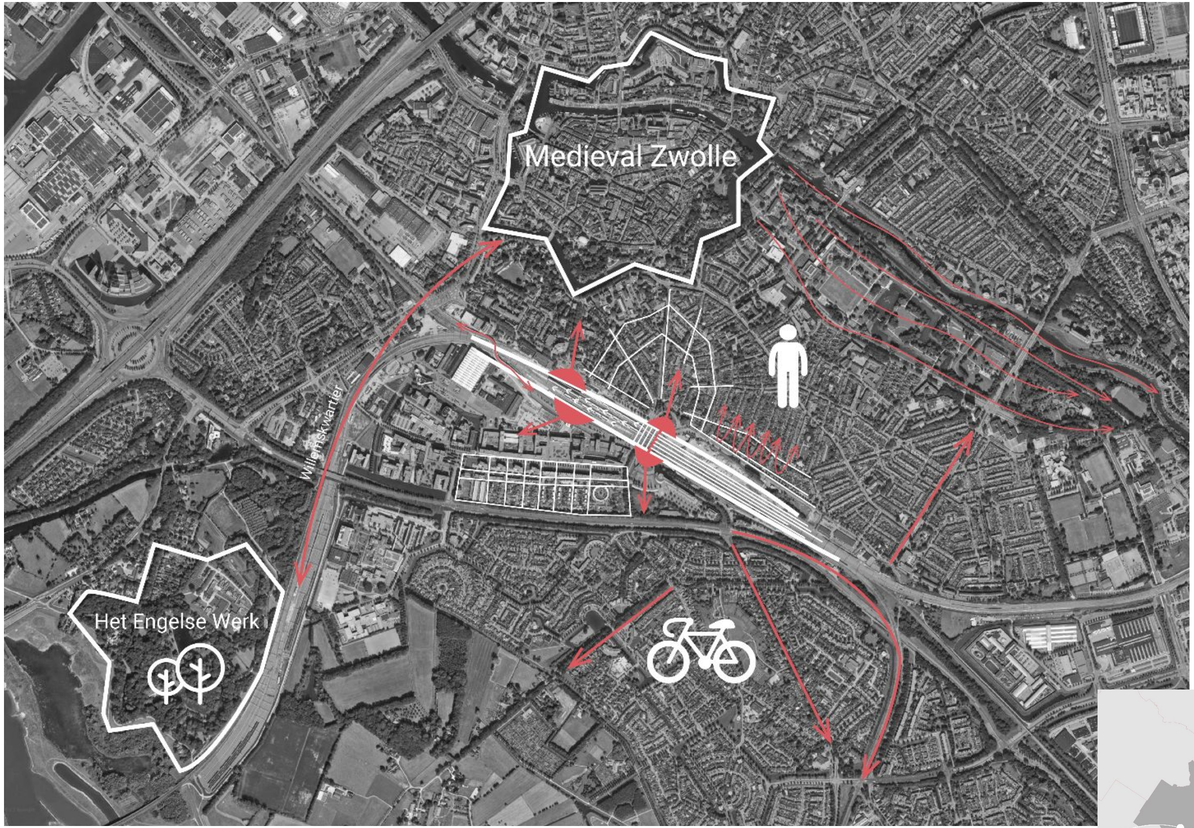


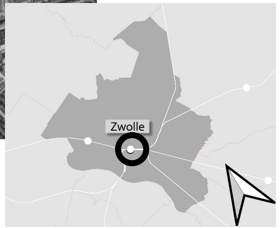
Mosaic implementation



Implementation

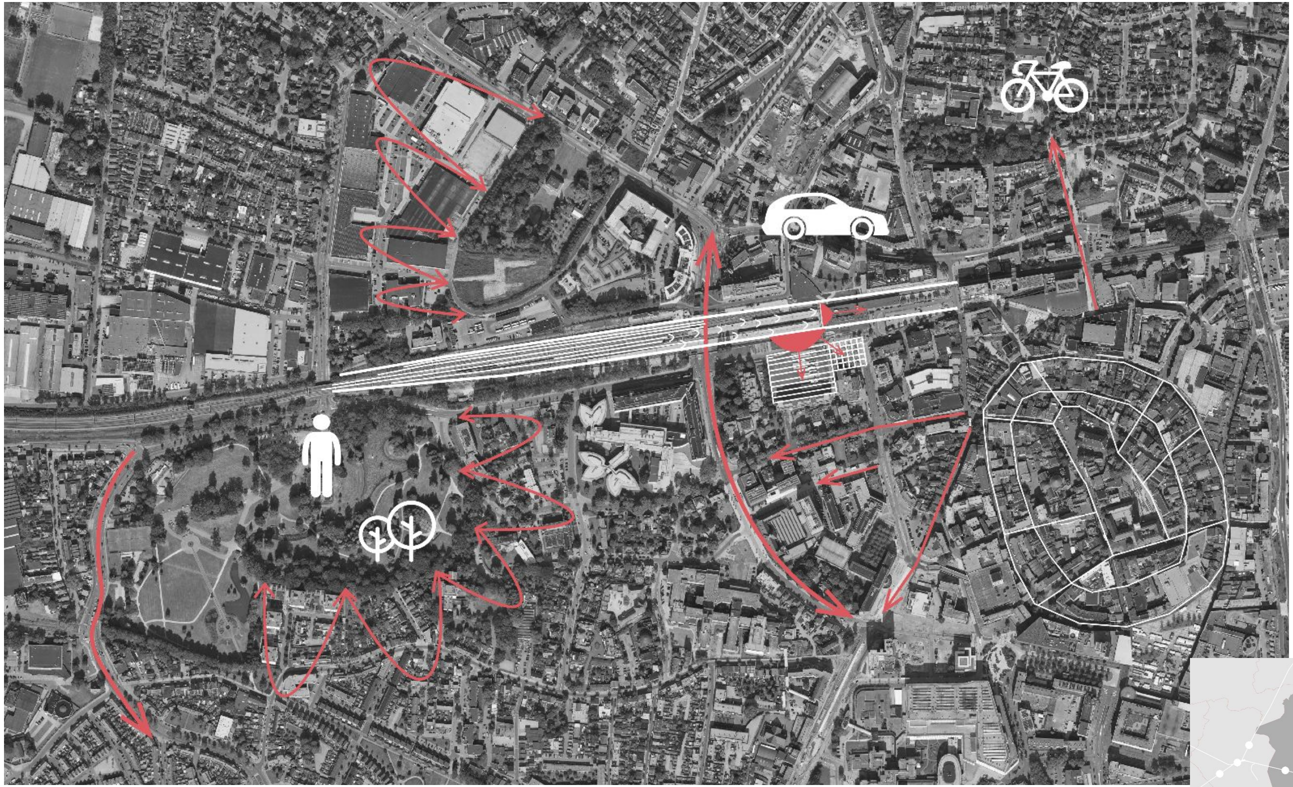
Zwolle station area

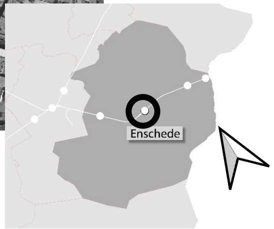




Strong separation, opposing flows and structures

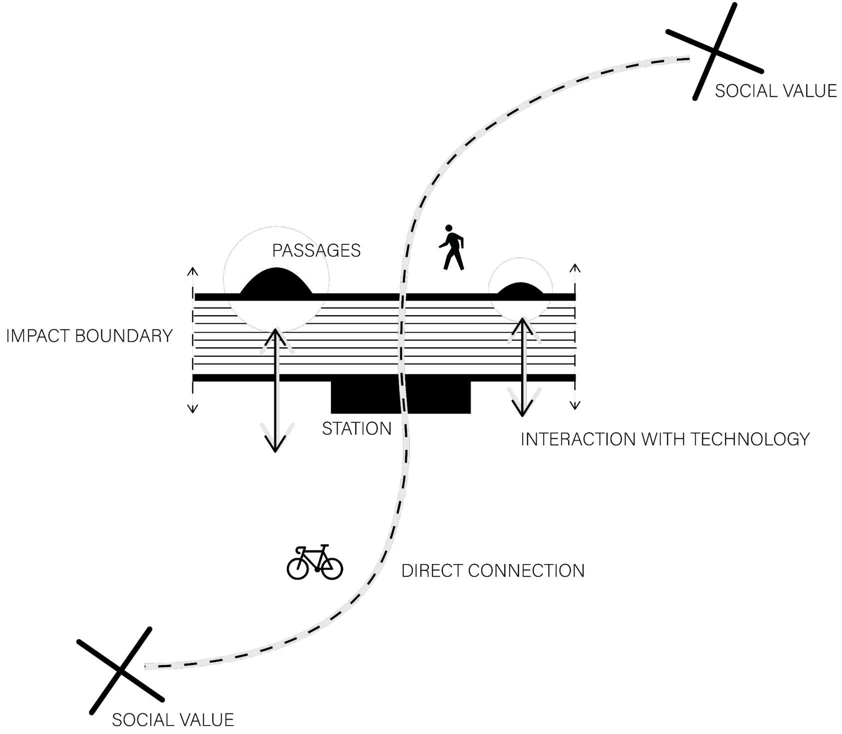
Enschede station area





Strong separation, opposing flows and structures, and little pedestrian accessibility

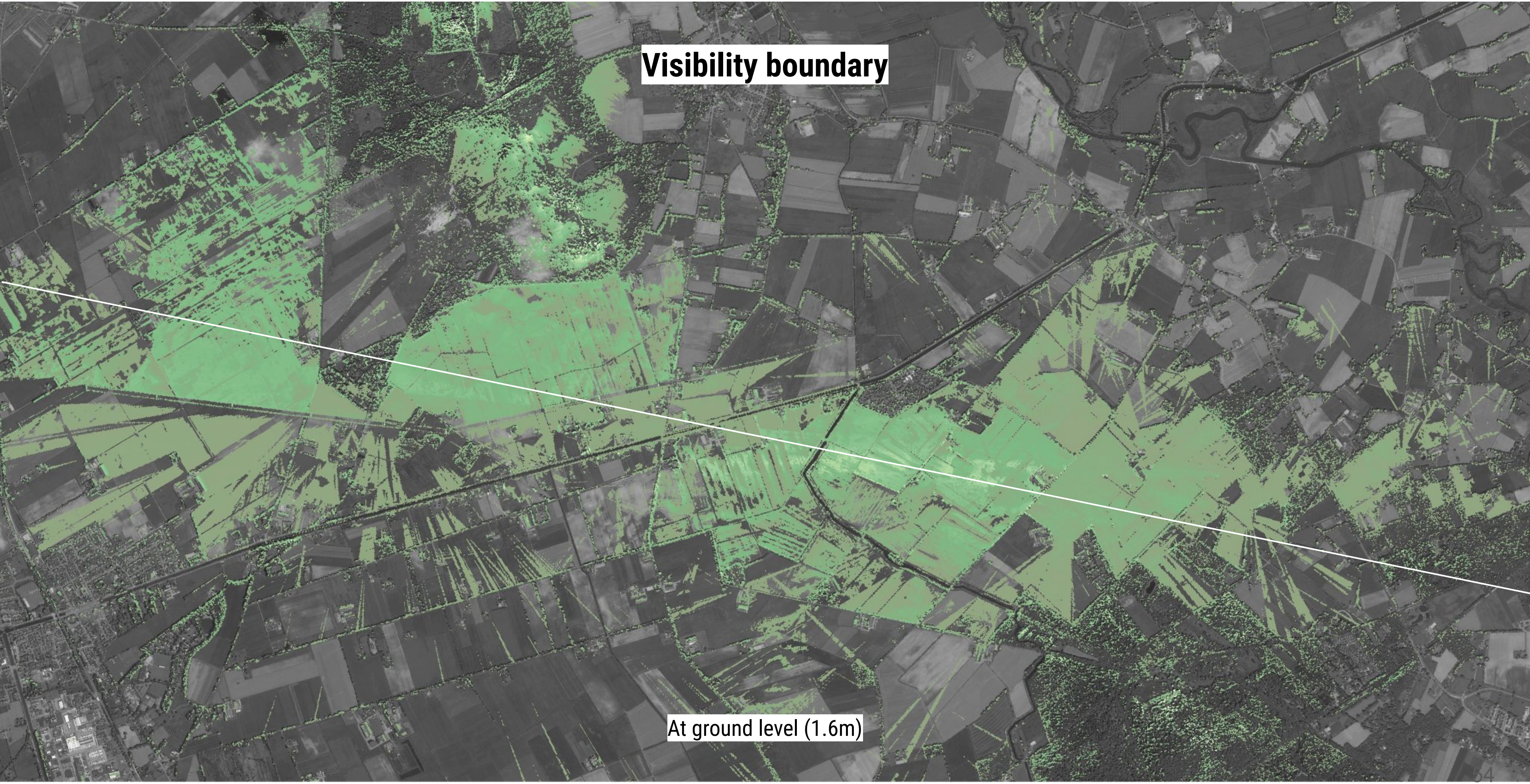
Station area principle



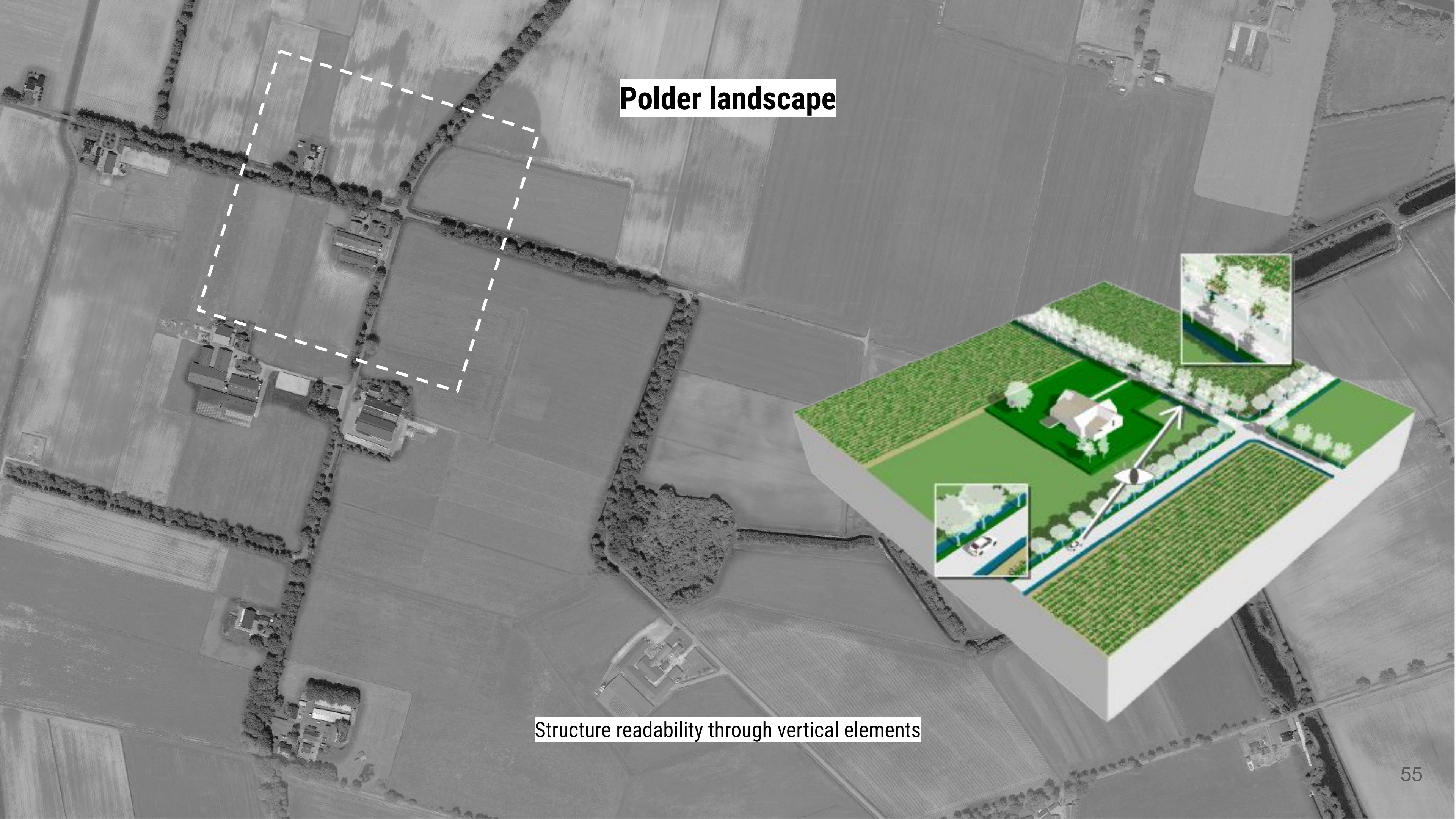
Integrating the station area as social function, allowing open access to the landscape

"A technological or utilitarian landscape is perceived at many simultaneous levels: as **color**, **texture**, **form** and **pattern**; as a specific **functional** entity; and as a **symbol** of higher, abstract ideas." R. Thayer


Polder landscape
Visibility

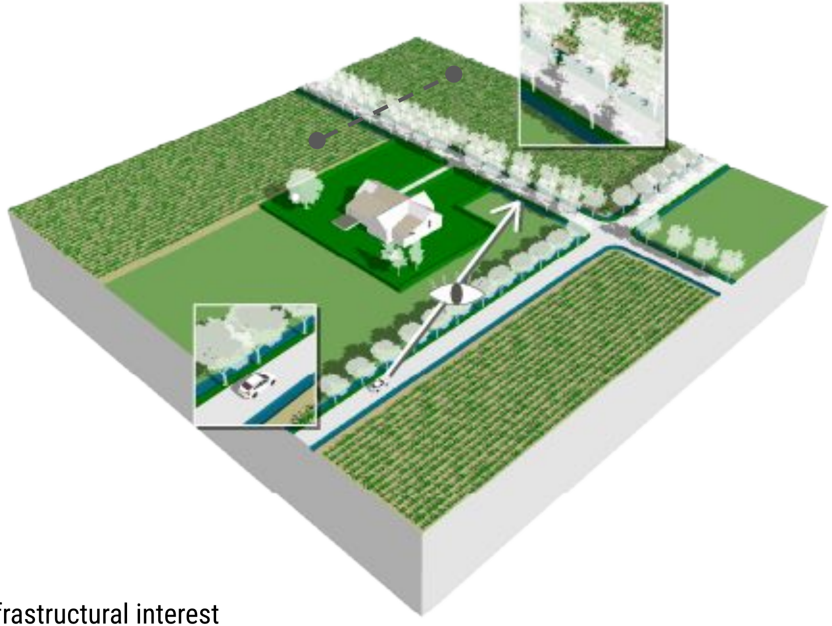

Visibility boundary
At ground level (1.6m)

Polder landscape



Structure readability through vertical elements

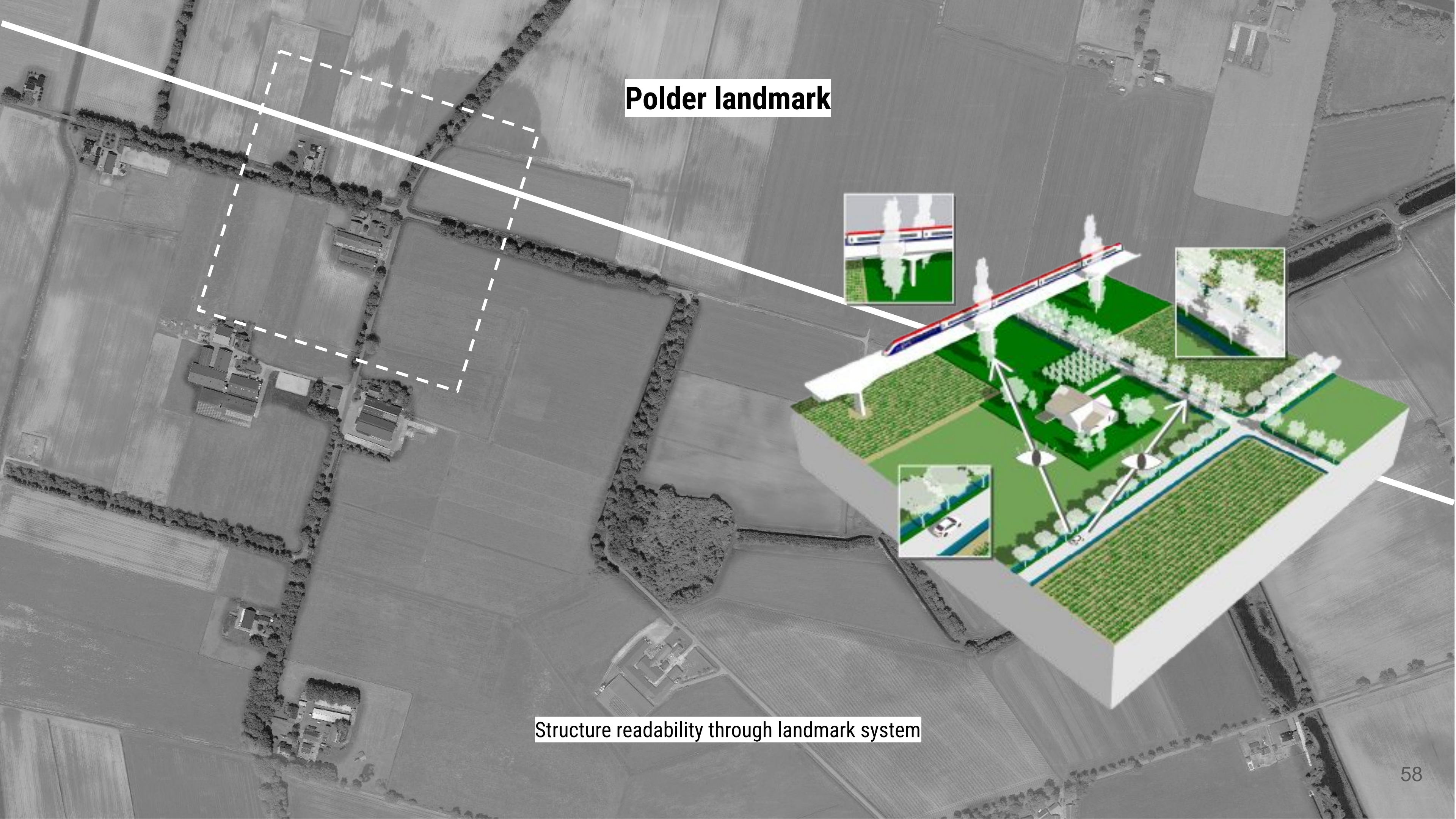
Polder landscape



Tree corridors indicate areas of infrastructural interest

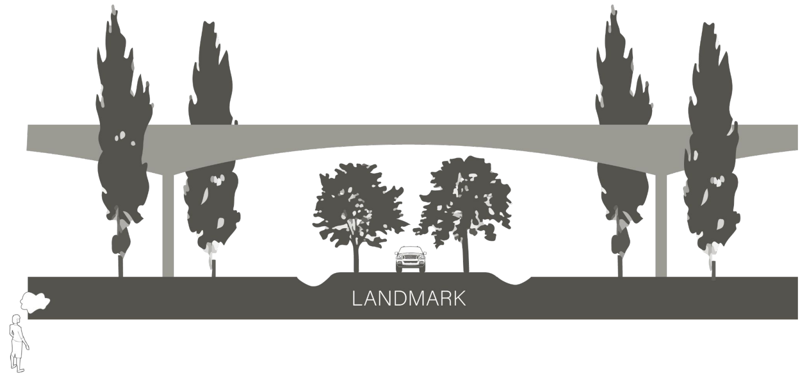

Visibility boundary
At landscape line level (13m)

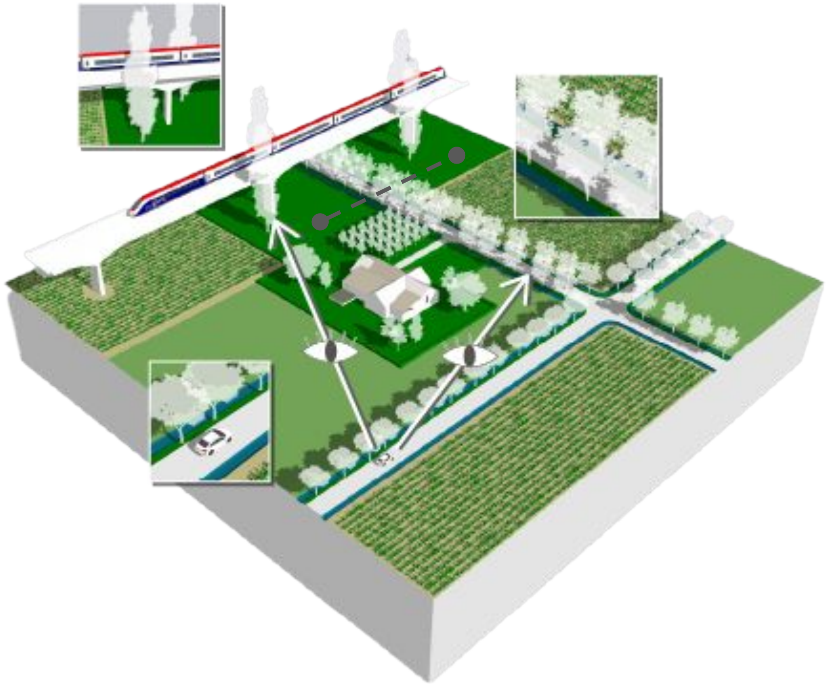
Polder landmark



Structure readability through landmark system

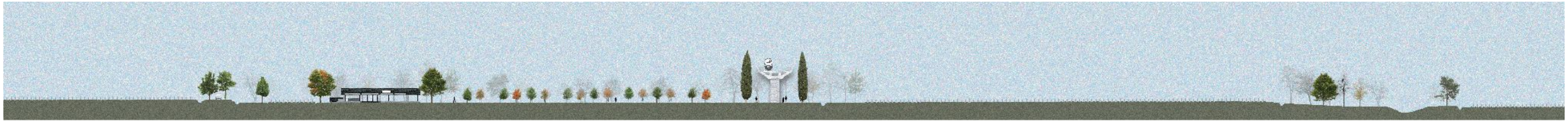
Polder landmark

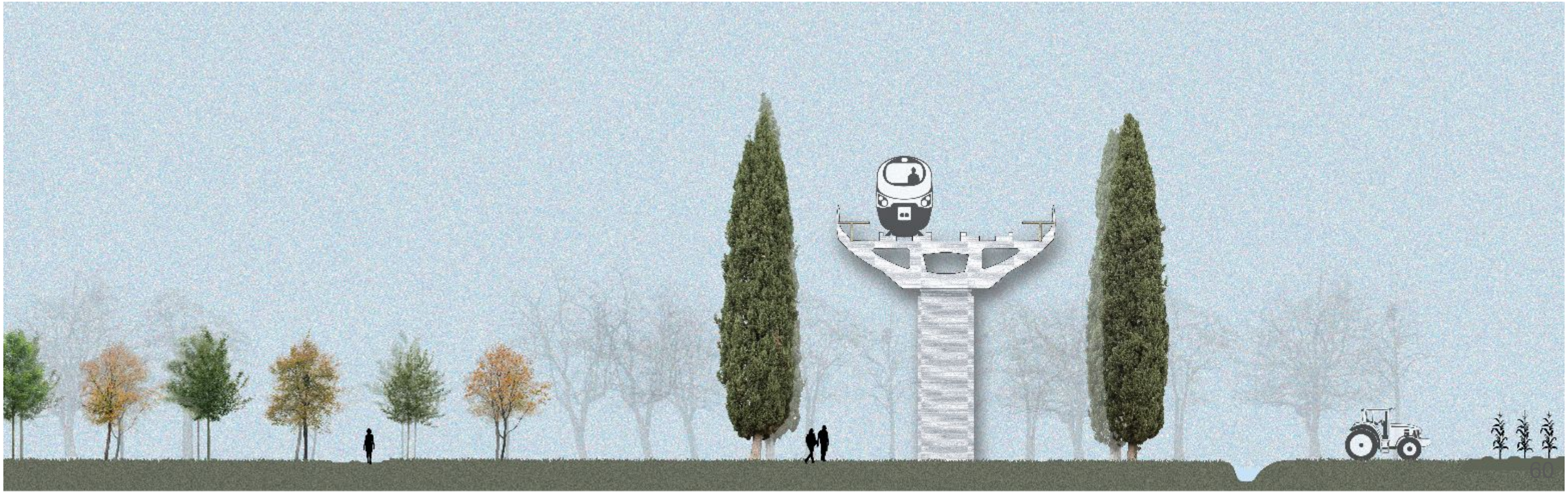




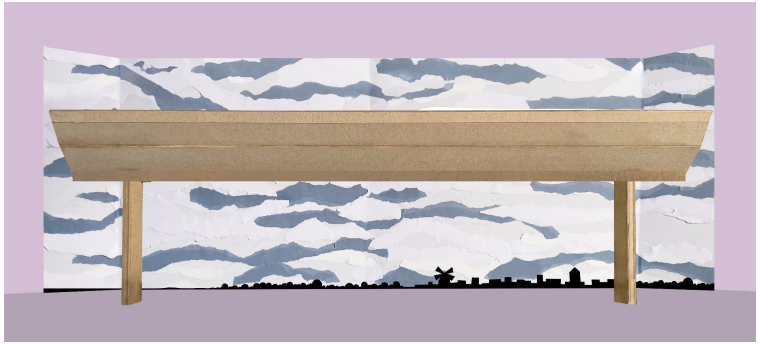
Cypress landmark indicates area of social interest

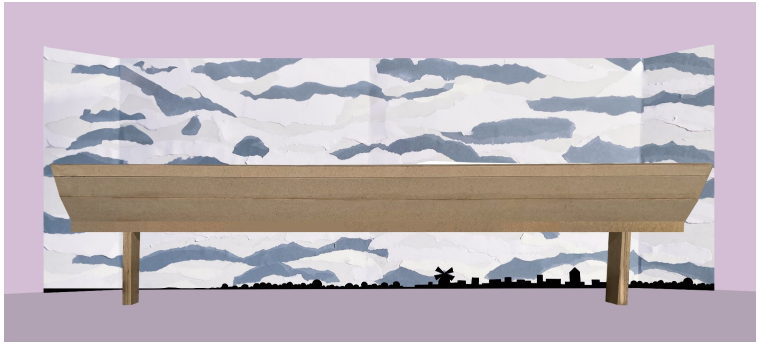
The line as a landmark

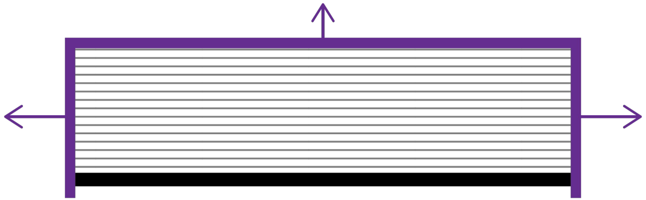


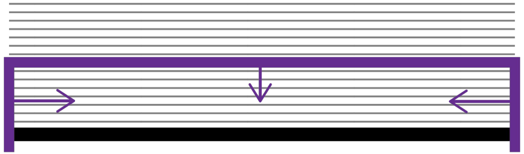


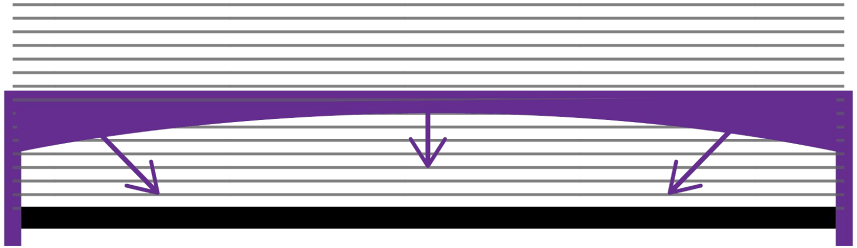
Highlighting horizontality









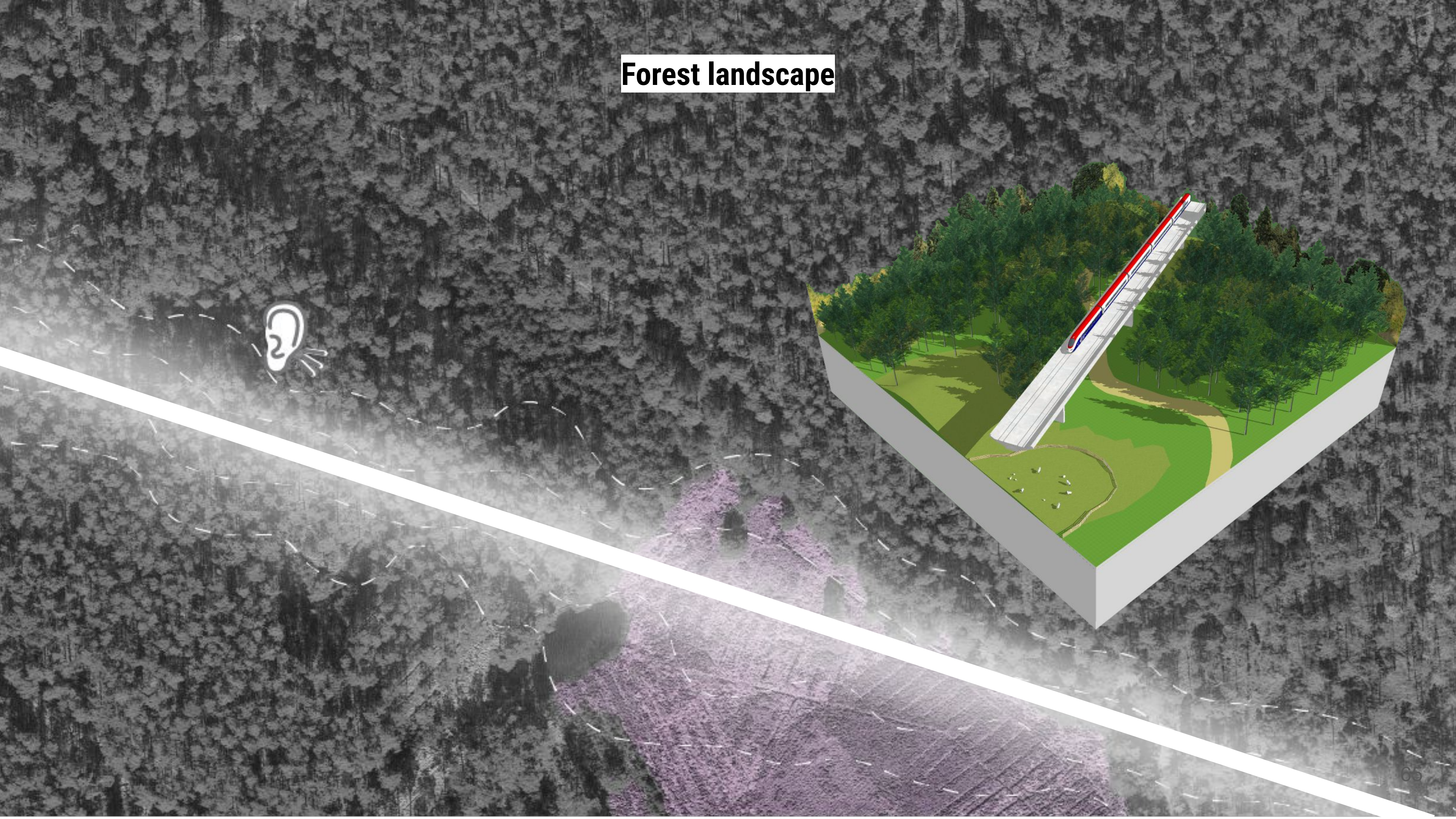


Polder landscape principle

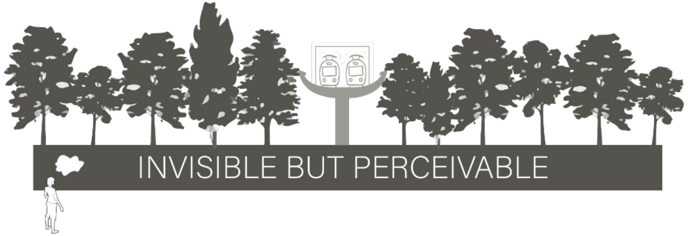
Forest landscape

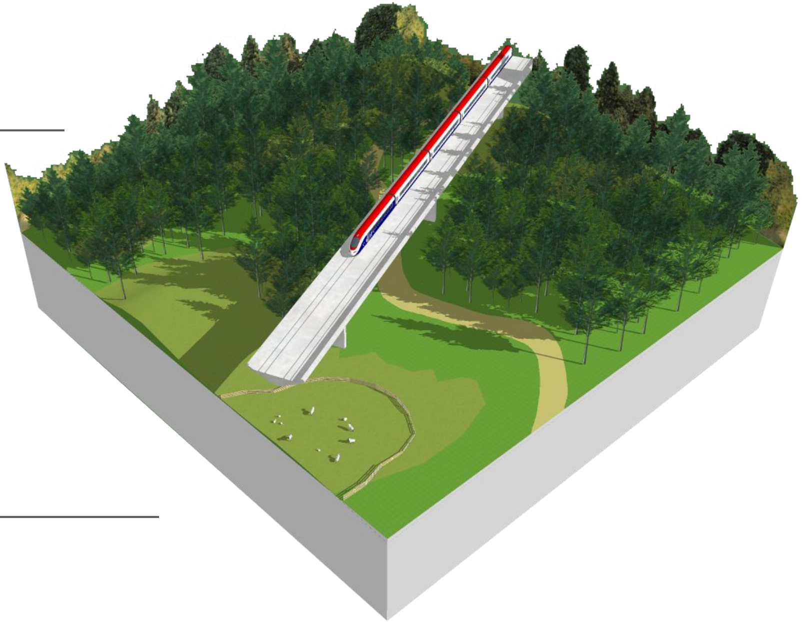
Quiet
(picture of the Rechterense veld forest)

Forest landscape



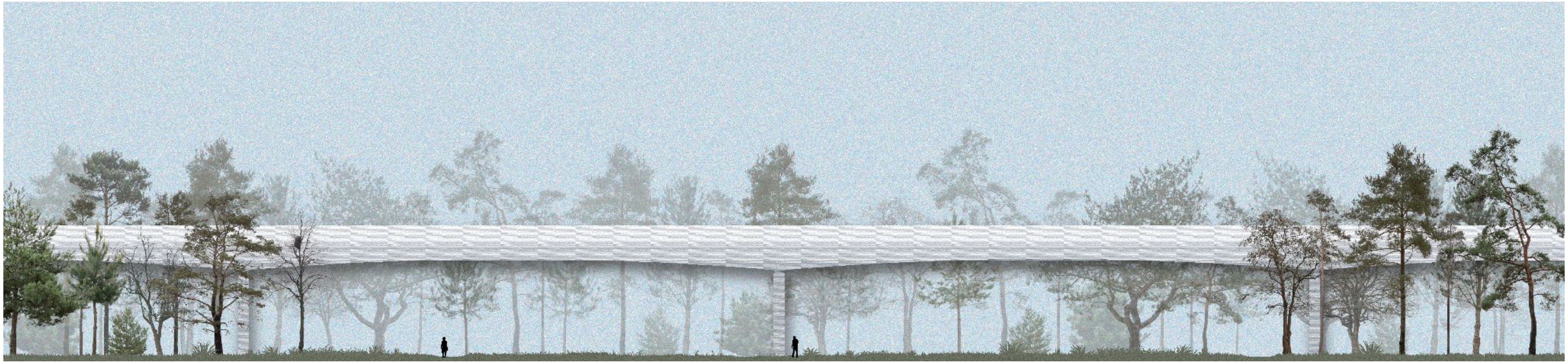
Forest landscape



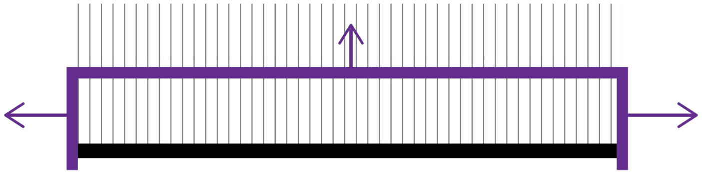


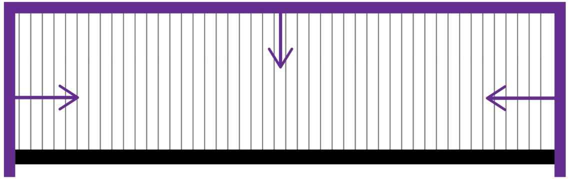
The contrast between forest and open field highlights the scale of the park

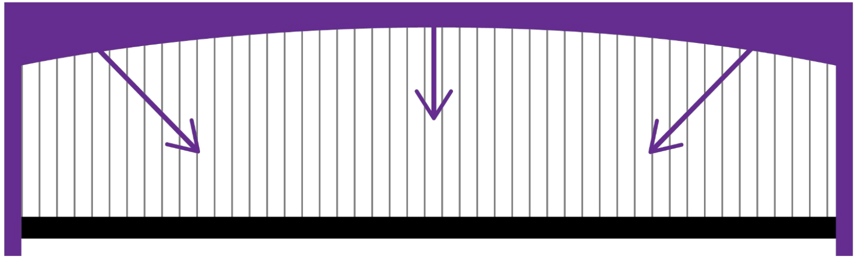
The line as a narrative



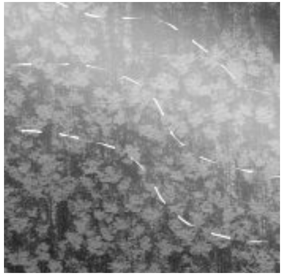
Highlighting verticality

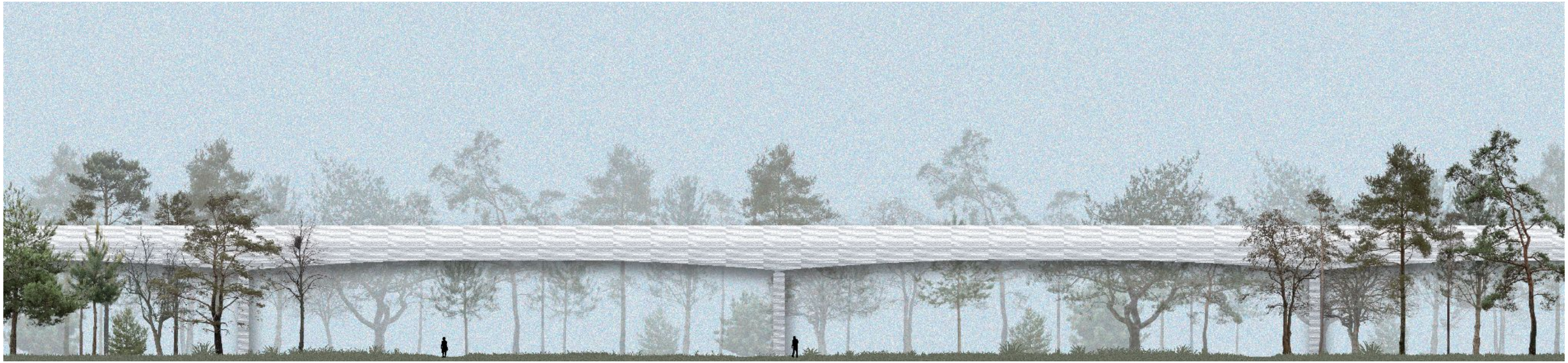






Forest landscape principle



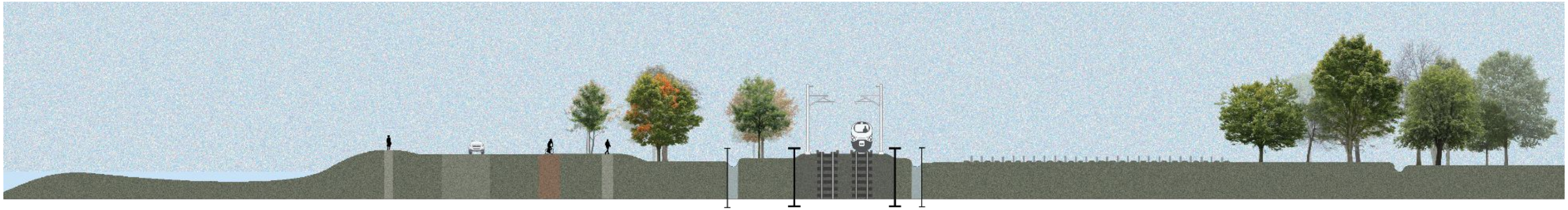


Mosaic landscape

Dynamic but split

Dalfsen's barrier

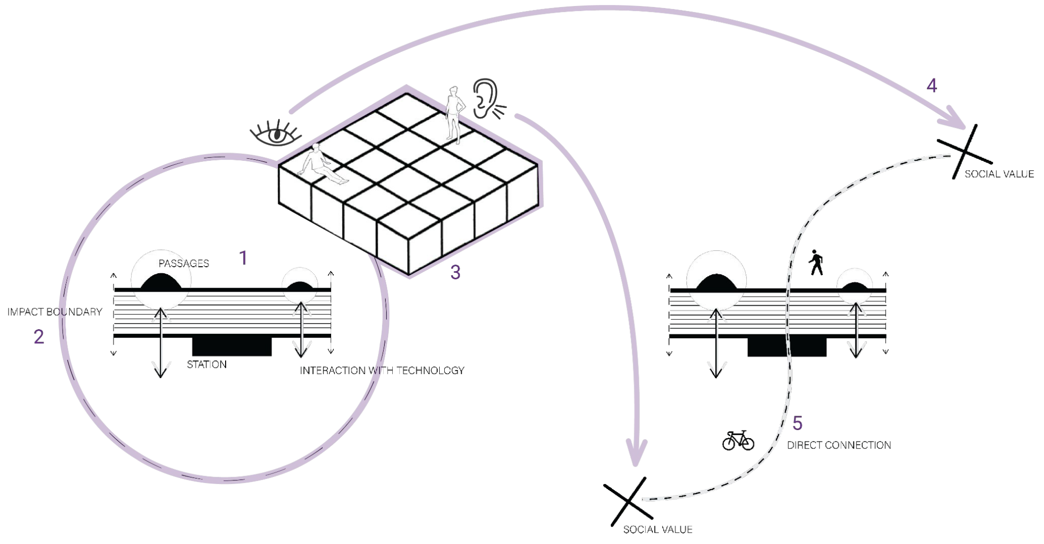
RAILROAD BARRIER

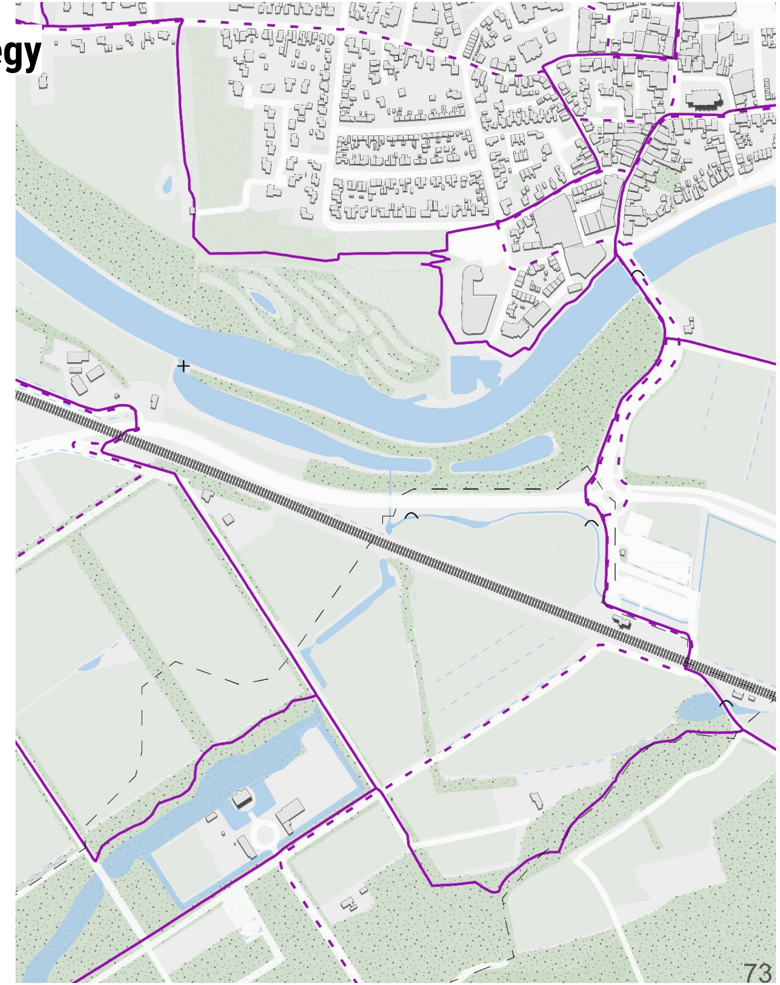


Implementation strategy

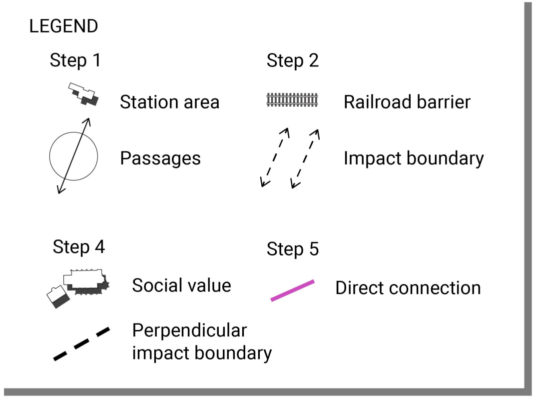
LEGEND

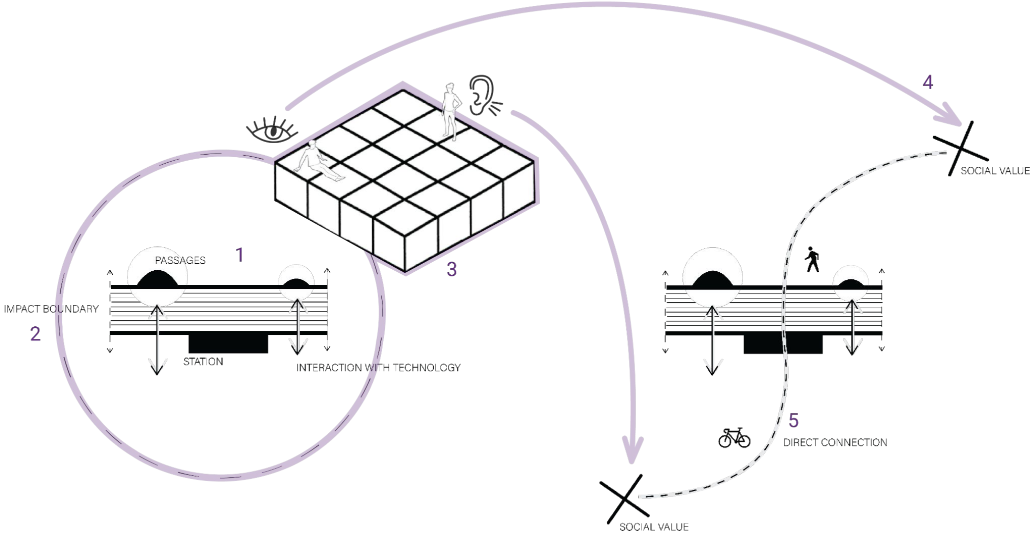
- Roads
- Buildings
- Hard ground
- Lawned grass
- Ground vegetation
- Trees
- Bycicle route
- Pedestrian route
- Water bodies
- Underground water connection
- Water system
- Wier
- Bridge

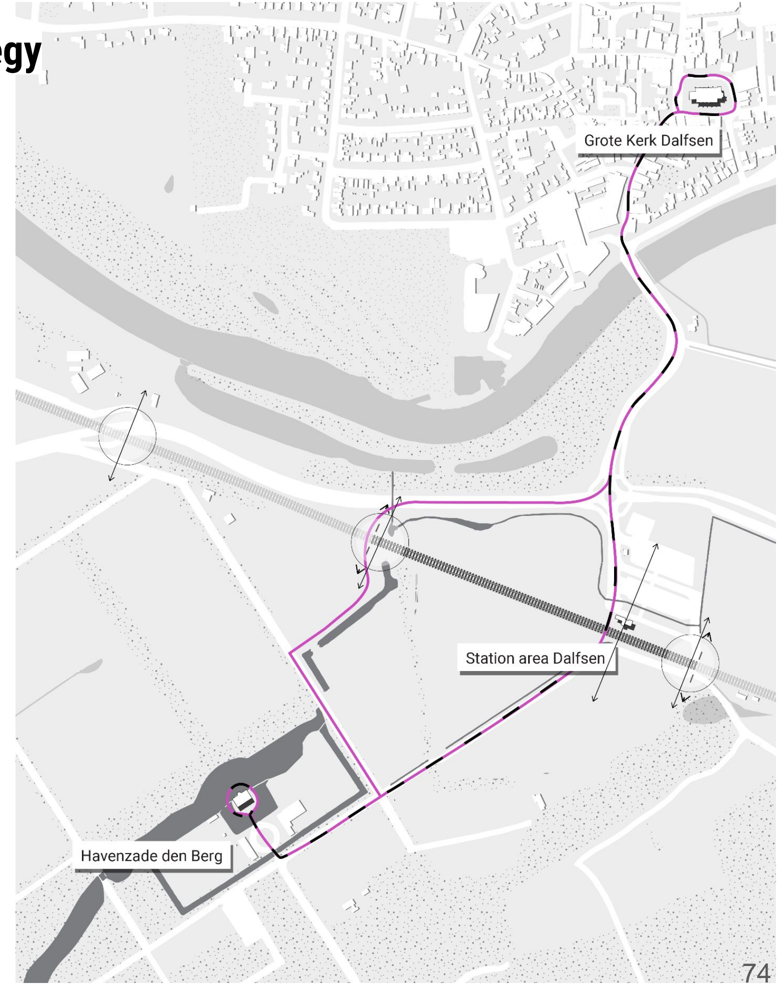


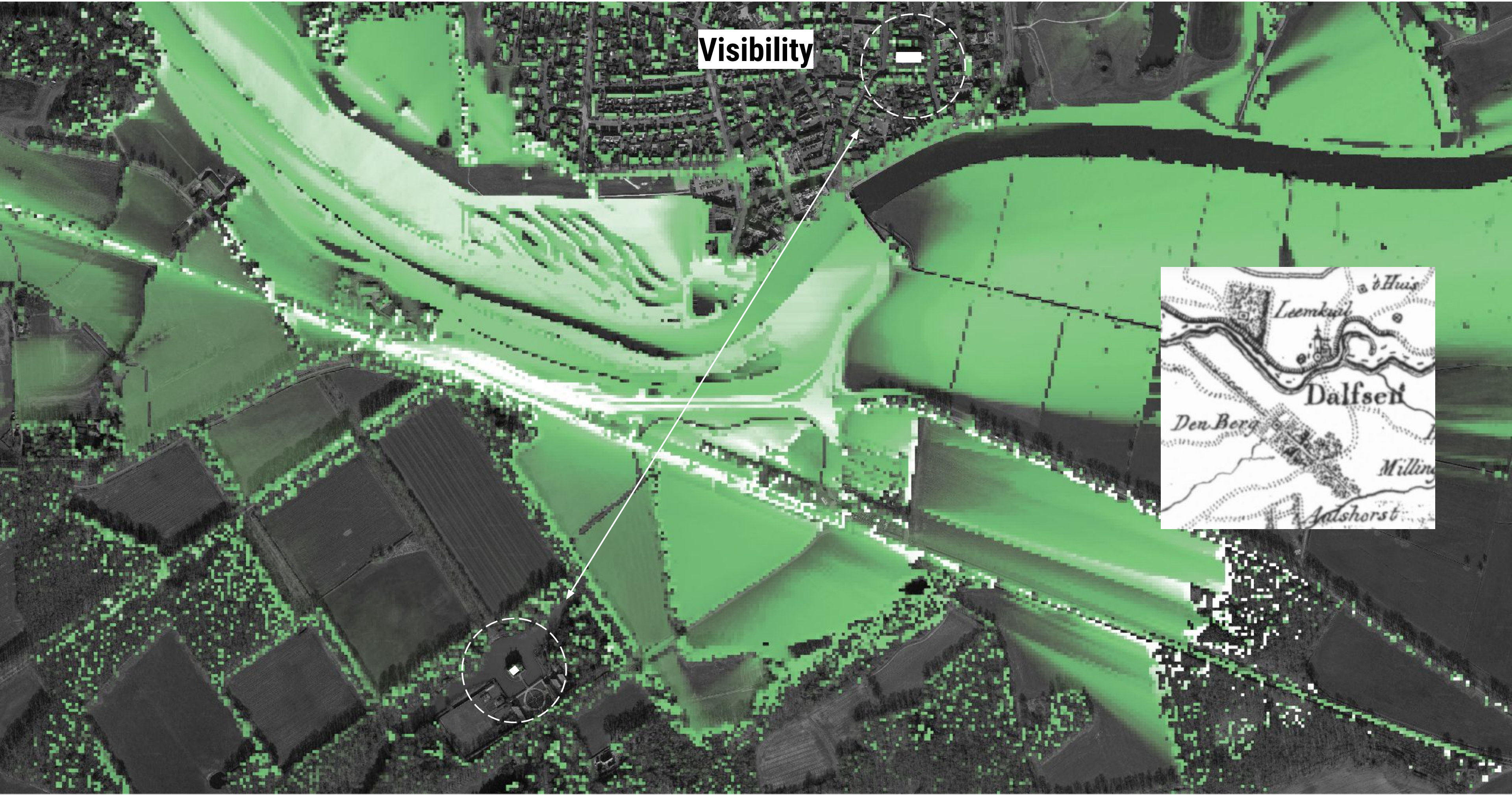


Implementation strategy








Visibility
'tHuis
Leemkuil
Dalfsen
Den Berg
Milling
Aalshorst

Implementation strategy

LEGEND

Step 1

Station area

Passages

Step 2

Railroad barrier

Impact boundary

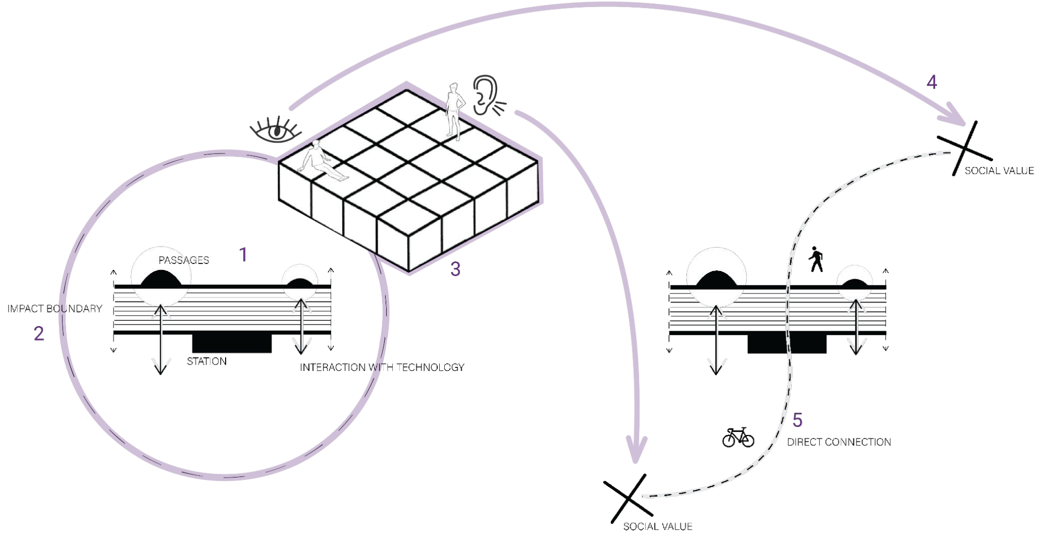
Step 4

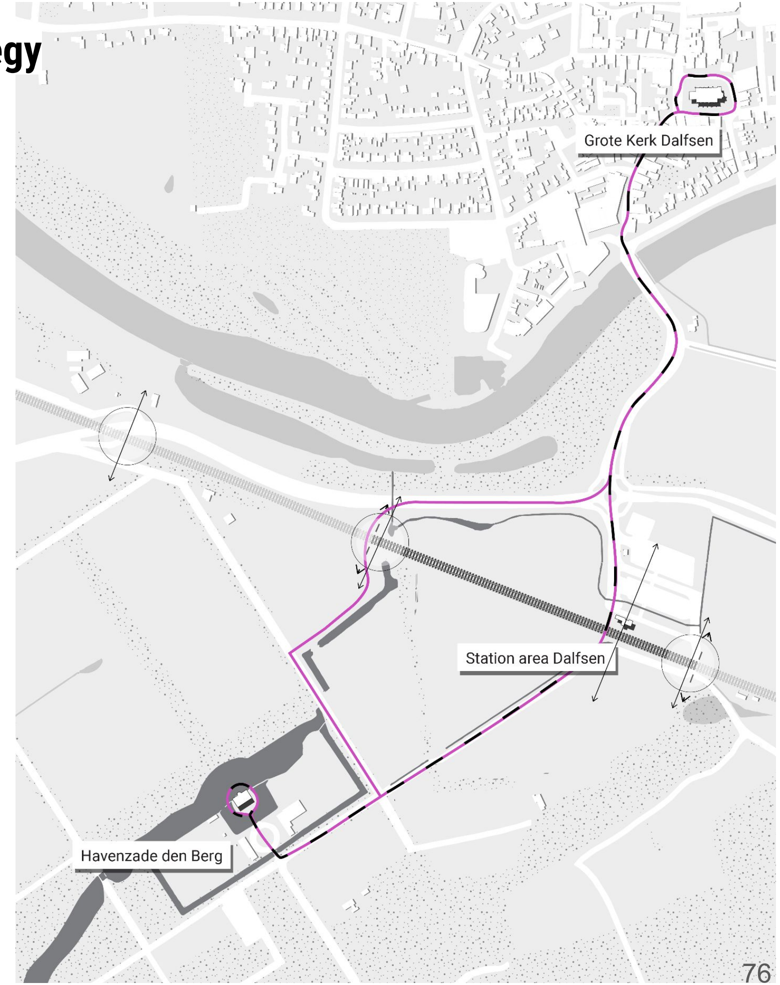
Social value

Perpendicular impact boundary

Step 5

Direct connection





LEGEND

Area of interest

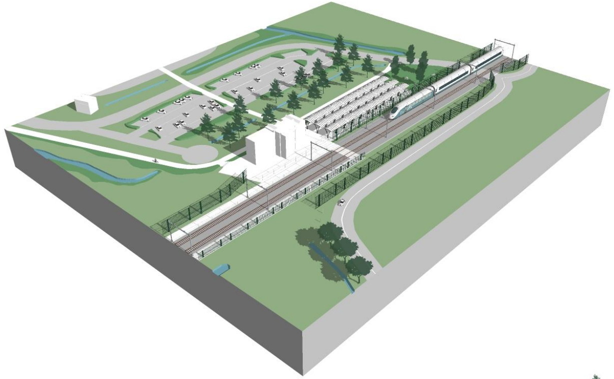
Node of interest

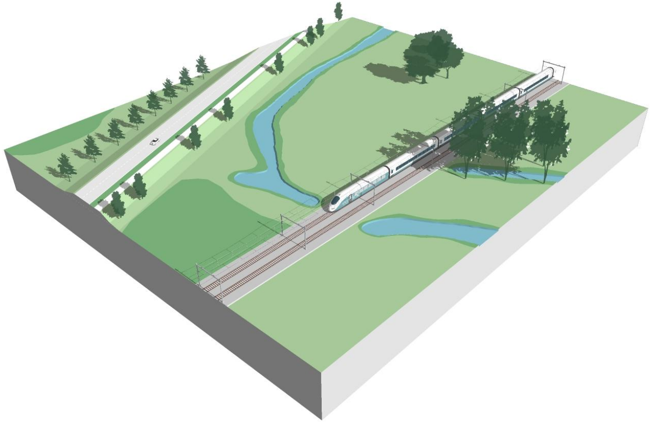
Redirected traffic

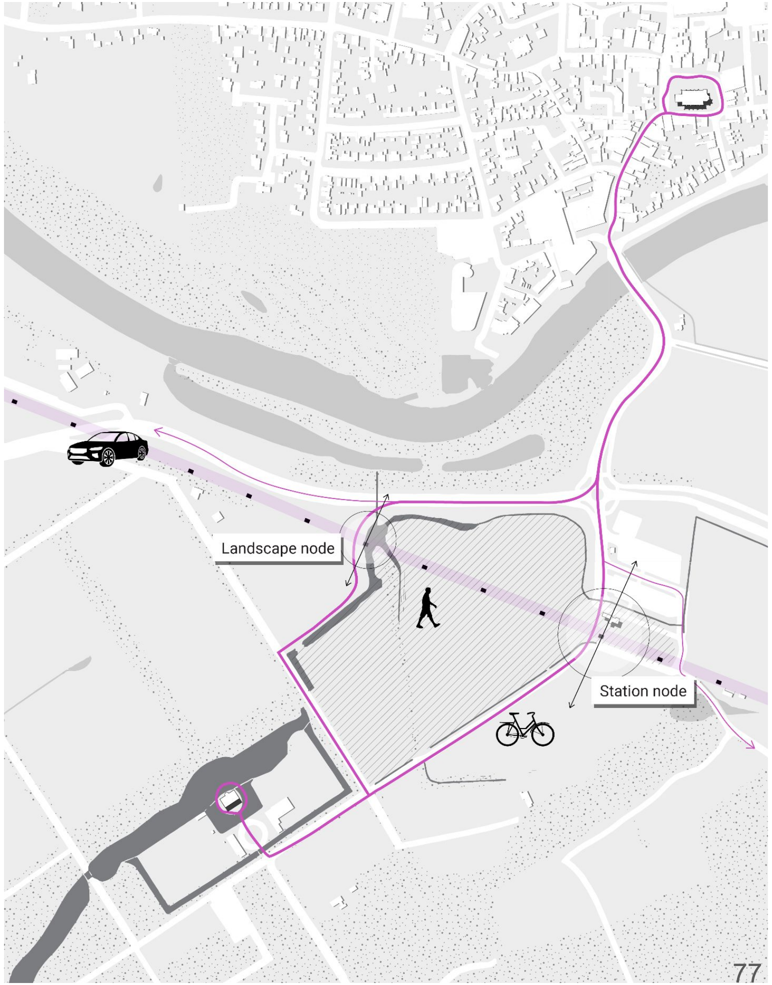
Pedestrian access

Unmotorized access

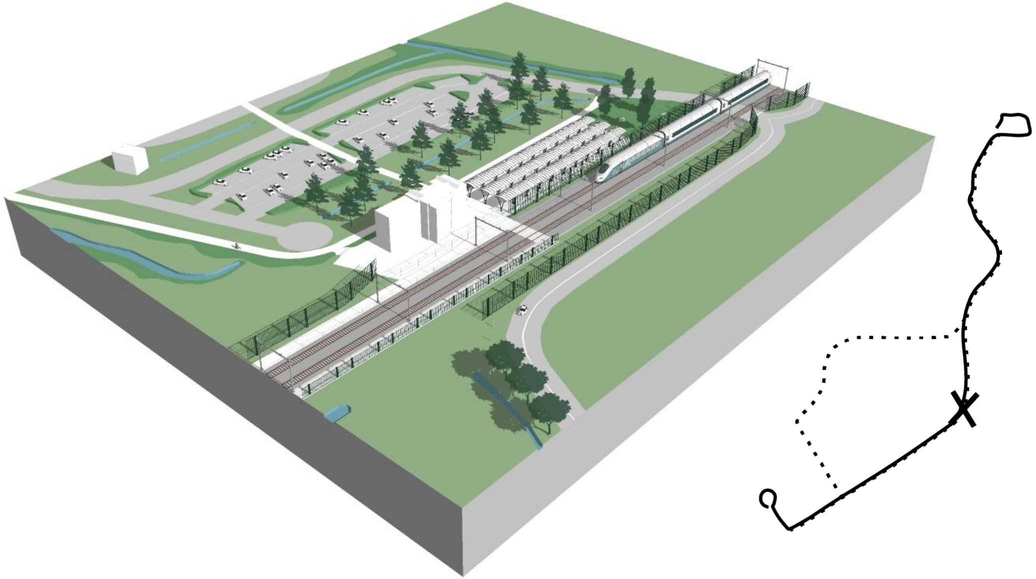
Motorized access



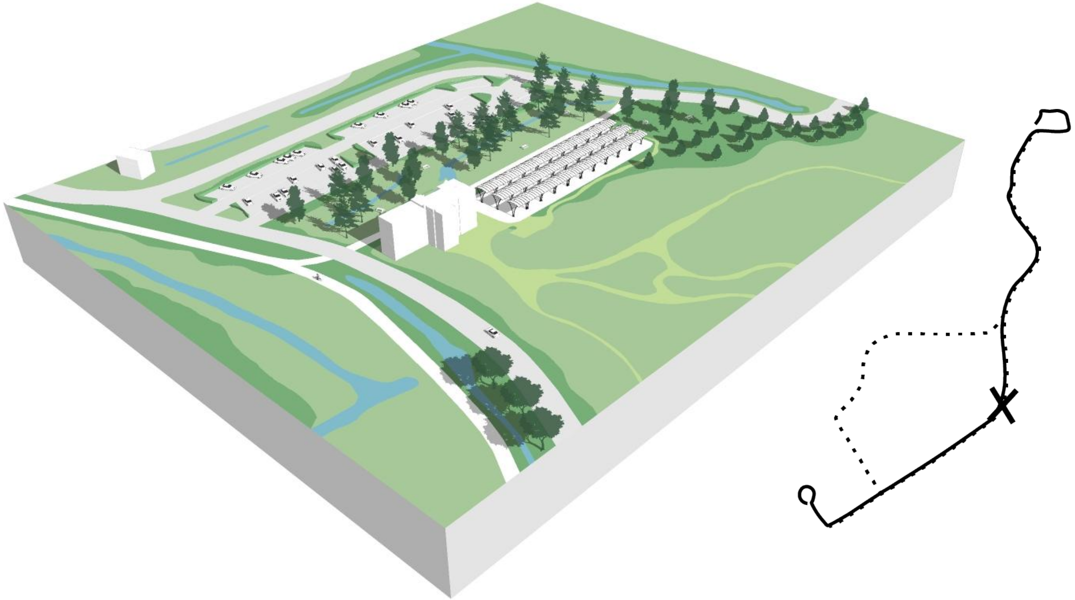


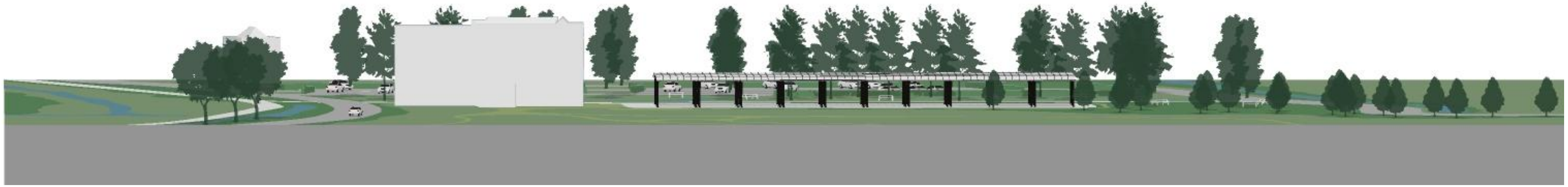


Station node

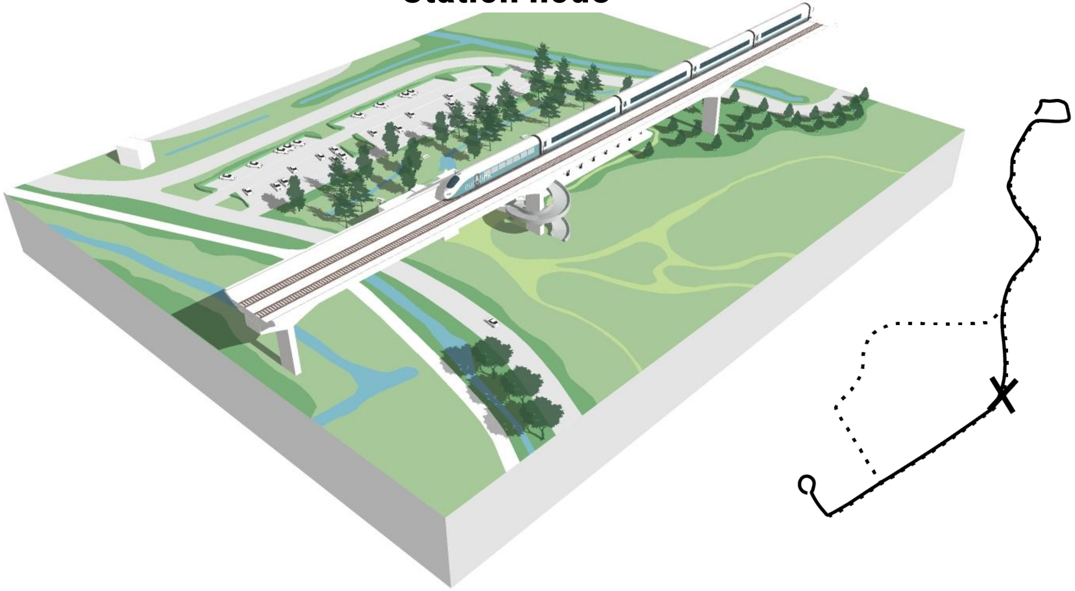


Station node

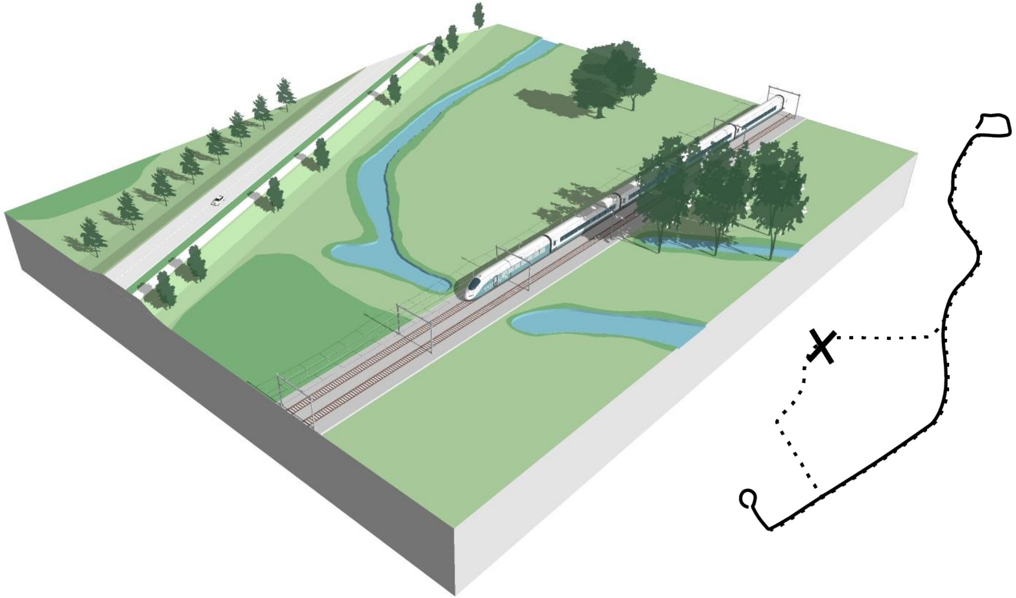




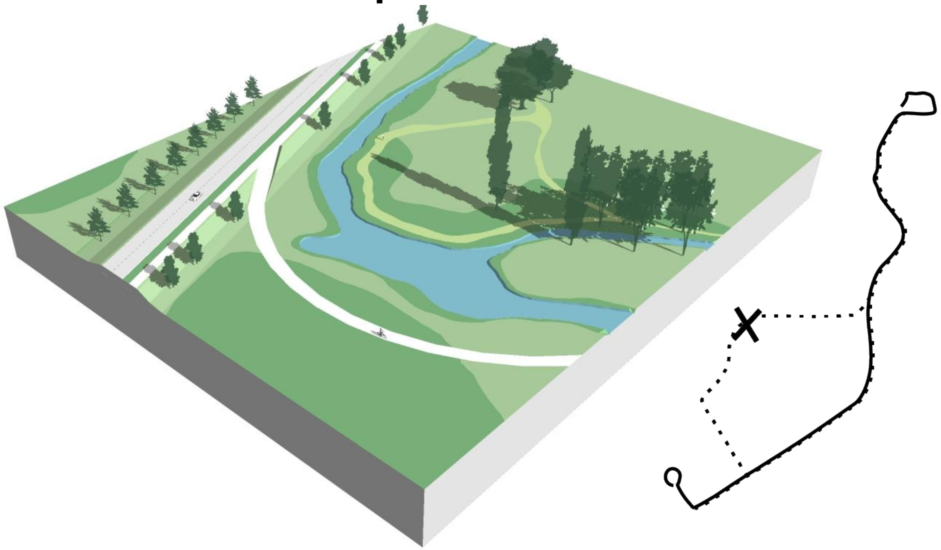
Station node

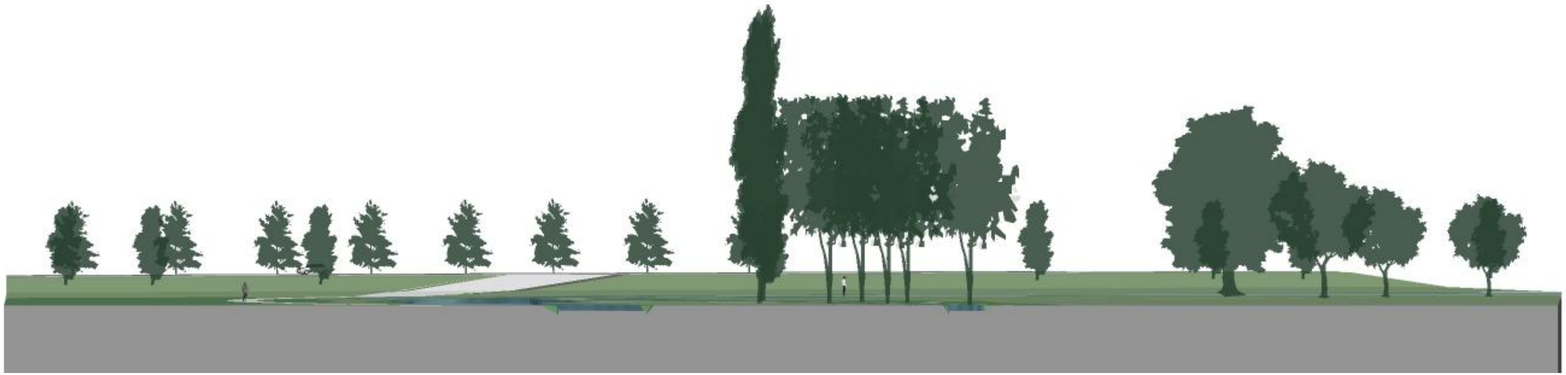


Landscape node

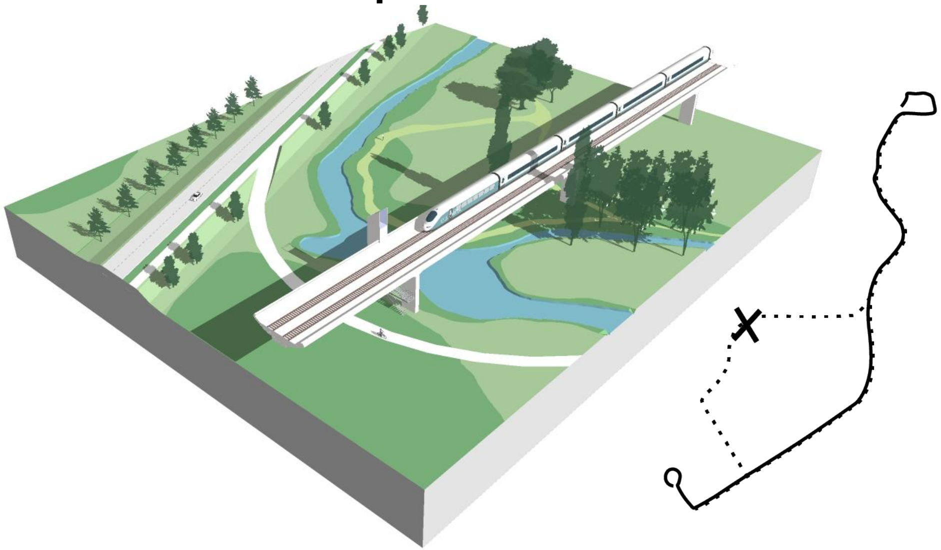


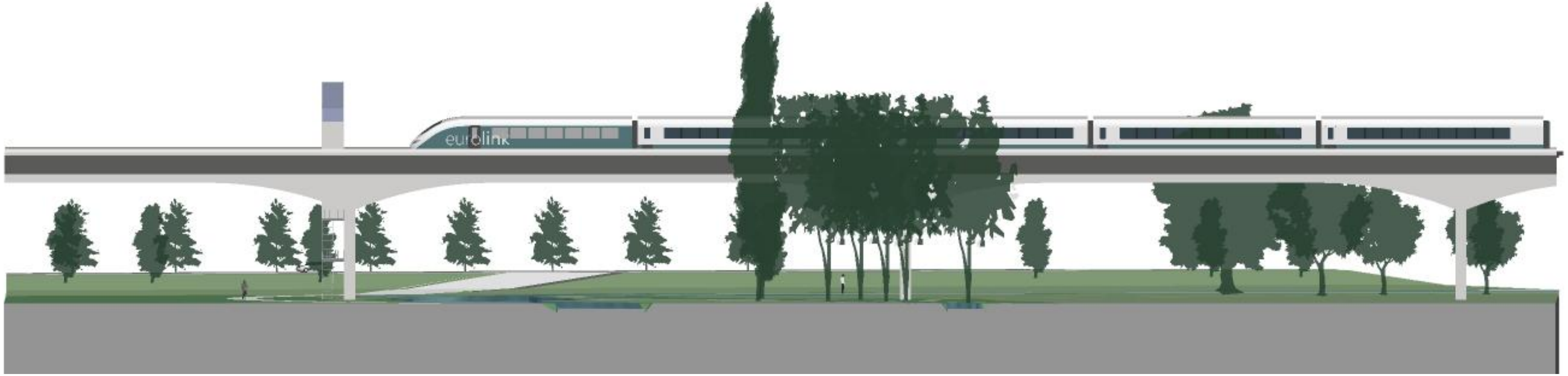
Landscape node

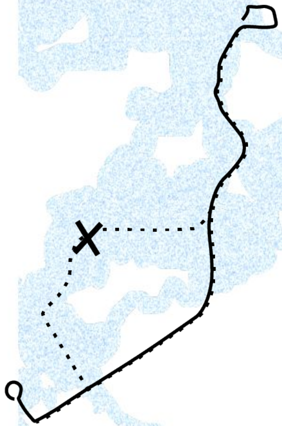




Landscape node







The line in the landscape

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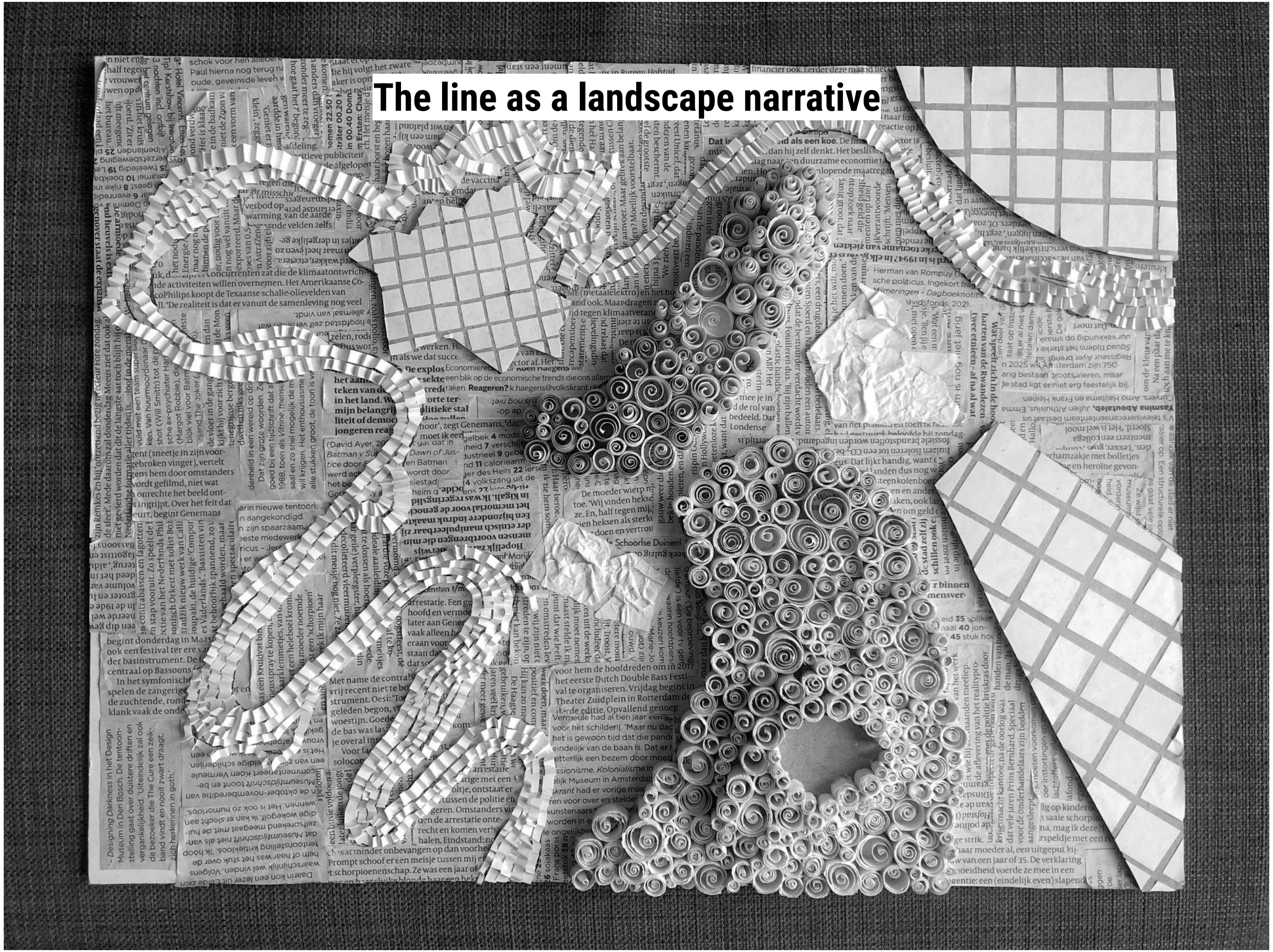
The line as a landscape narrative

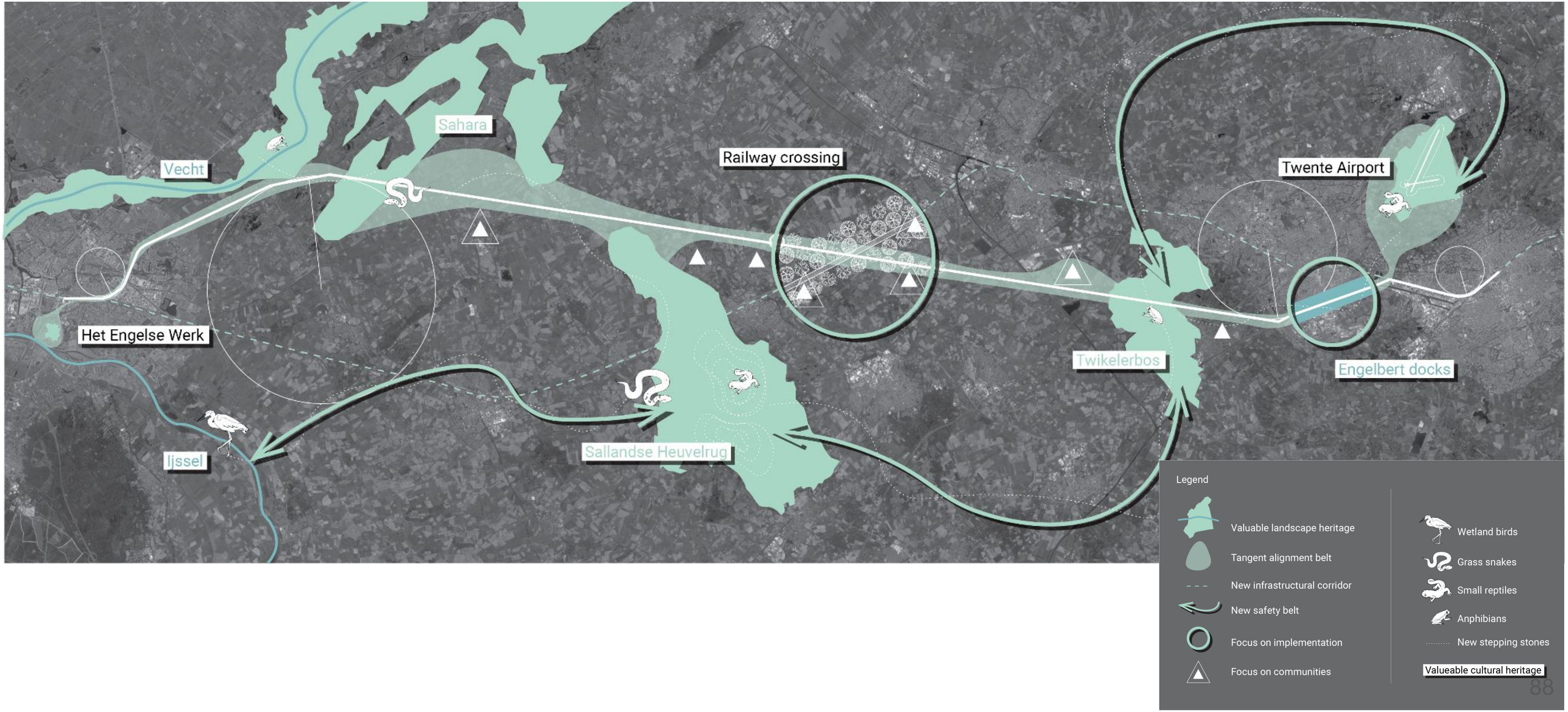
The line as a landscape connector

The line as a landmark

The line as a landscape narrative



The line as a landscape connector



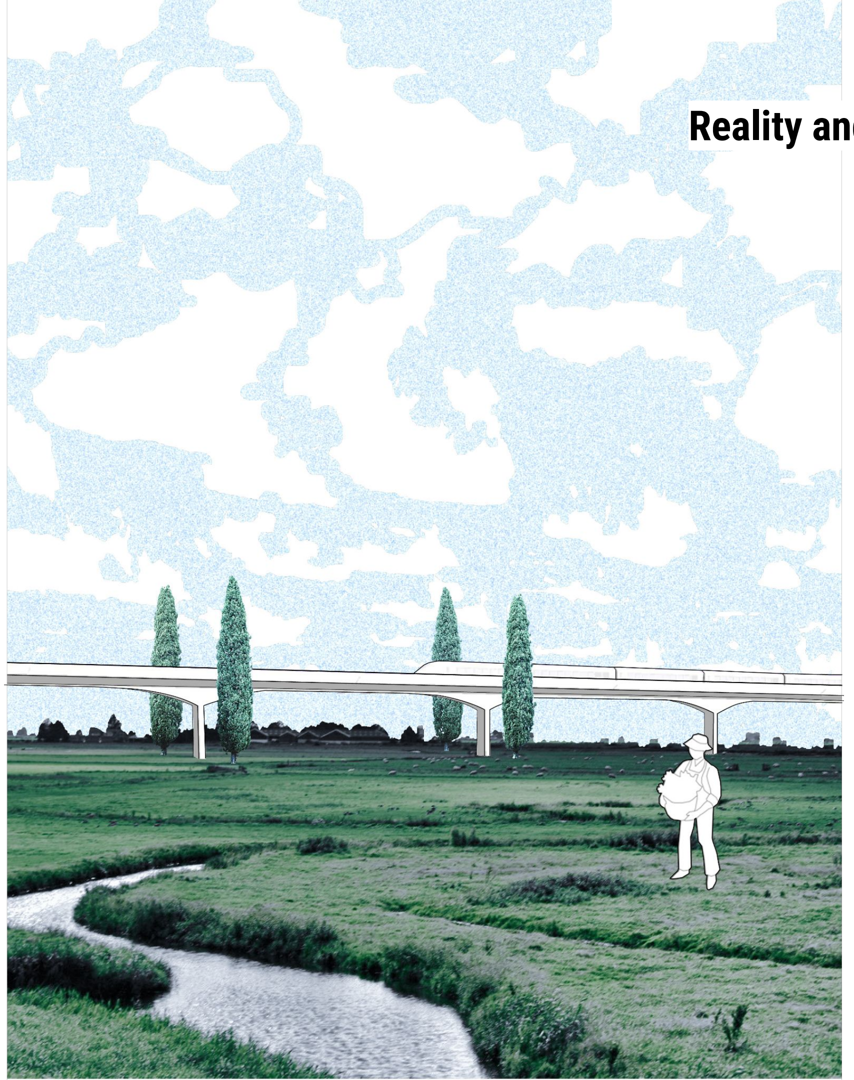
The line as a landmark

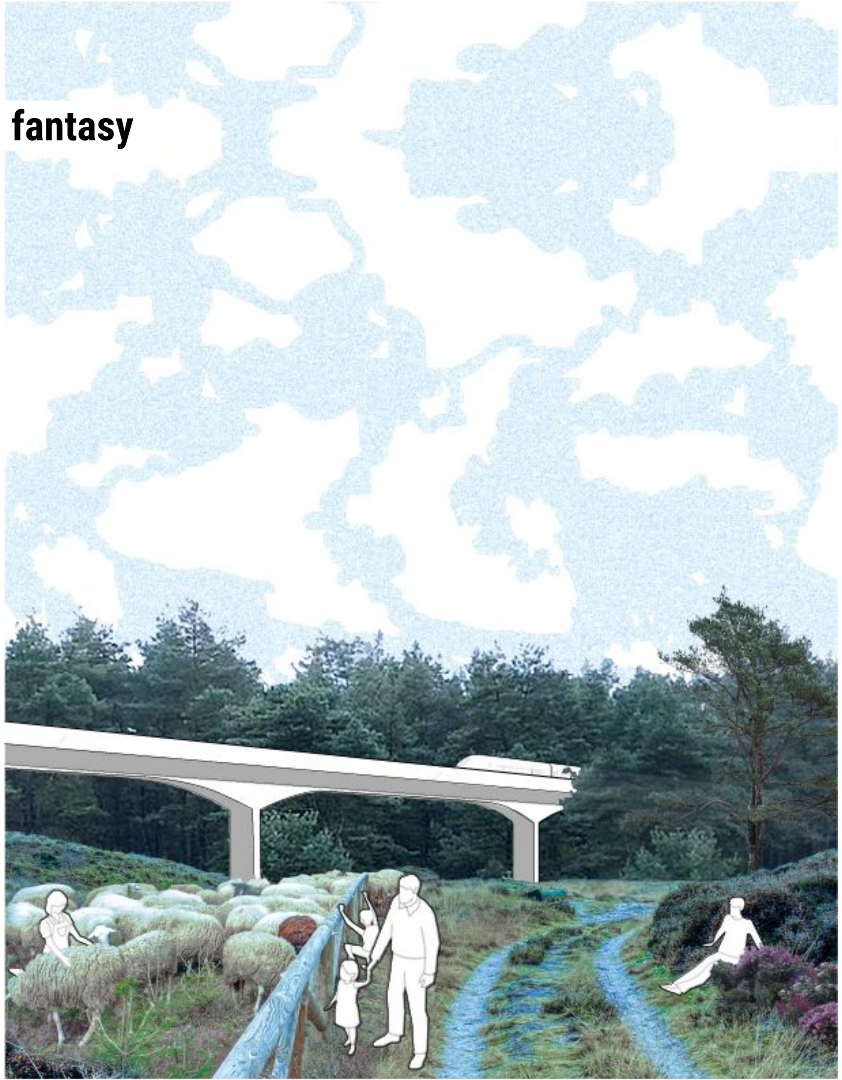
The duality of research and design

A project between reality and fantasy

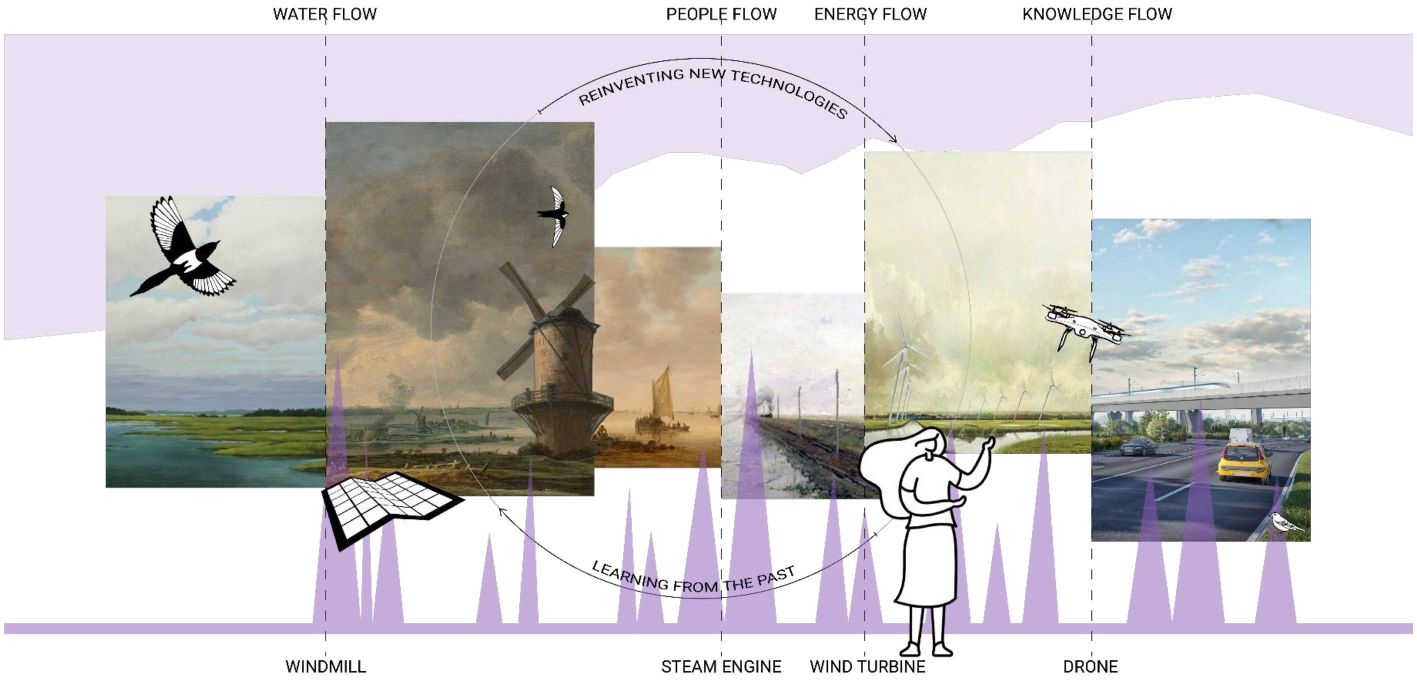
Landscape technology through art

Reality and fantasy

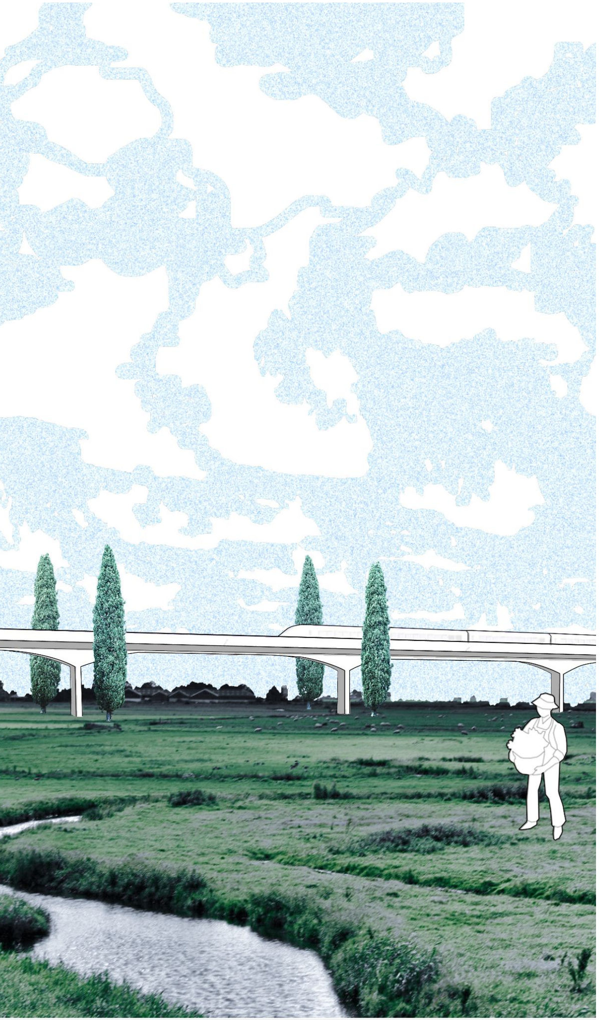


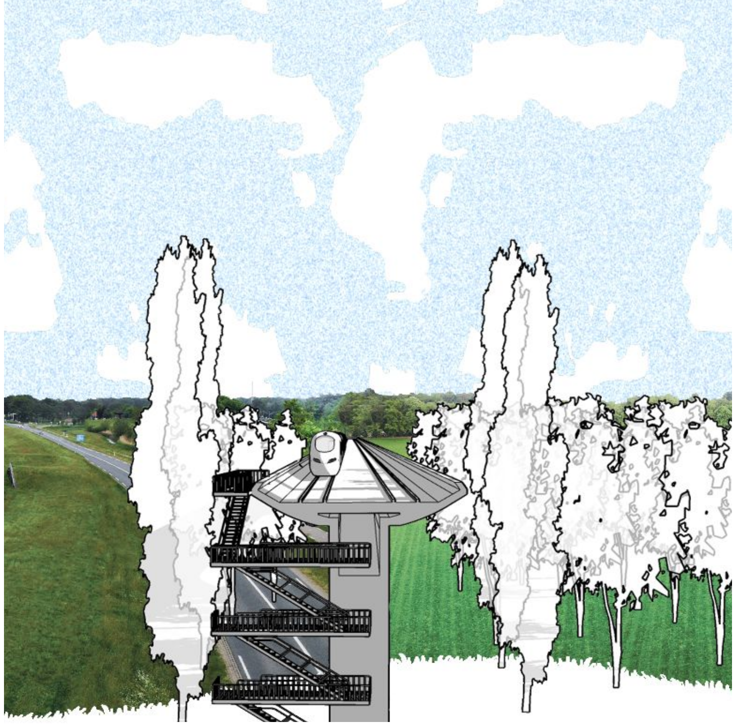


Landscape technology through art



Questions?





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