

# MACHINIC UTOPIAS, AUTOMATED FUTURES

SCENARIOS OF POTENTIAL  
AUTOMATED FUTURES IN WESTLAND

GRACE ABOU JAOUDEH | MSC. 4 | P5

FIRST ADVISOR. DR. VICTOR MUÑOZ SANZ | SECOND ADVISOR. DIPL.ING. ULF HACKAUF | DEPARTMENT OF URBANISM





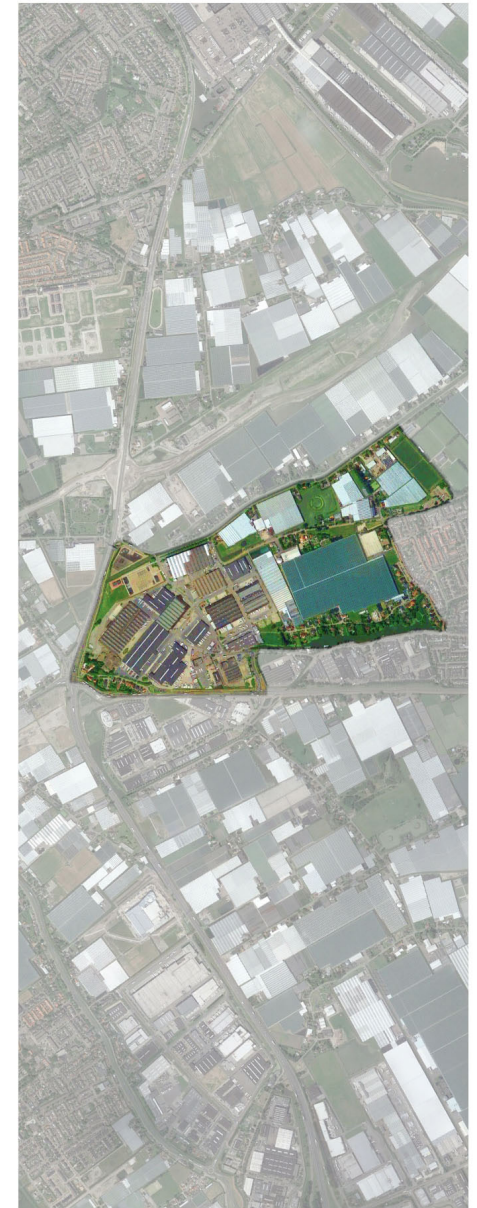
2004



2007



2009



2016



# 1

**GREENPORT WESTLAND &  
MUNICIPAL VISION**

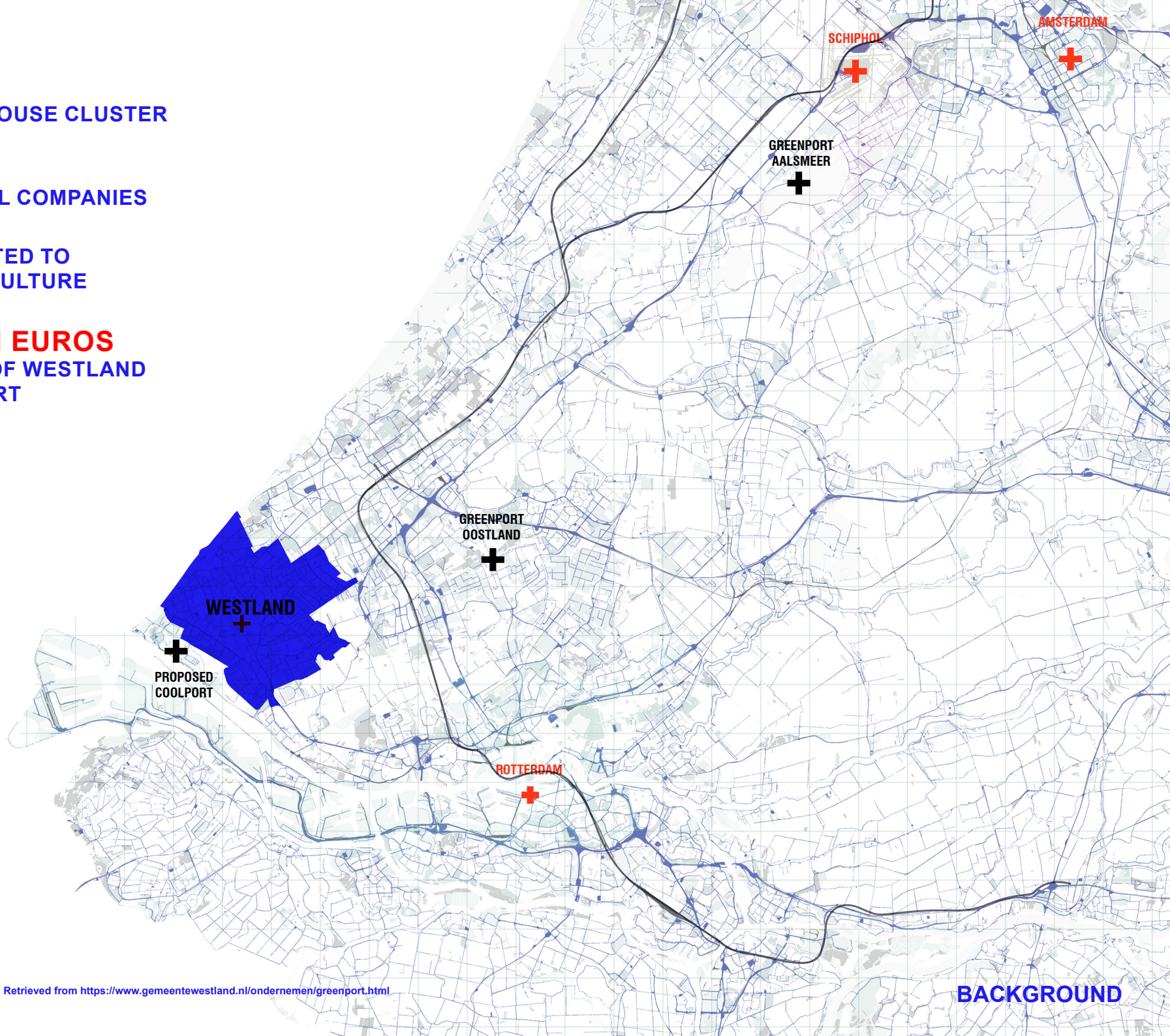


**LARGEST** GREENHOUSE CLUSTER  
IN THE NETHERLANDS

**+700** HORTICULTURAL COMPANIES

**60,000 JOBS** RELATED TO  
GREENHOUSE HORTICULTURE

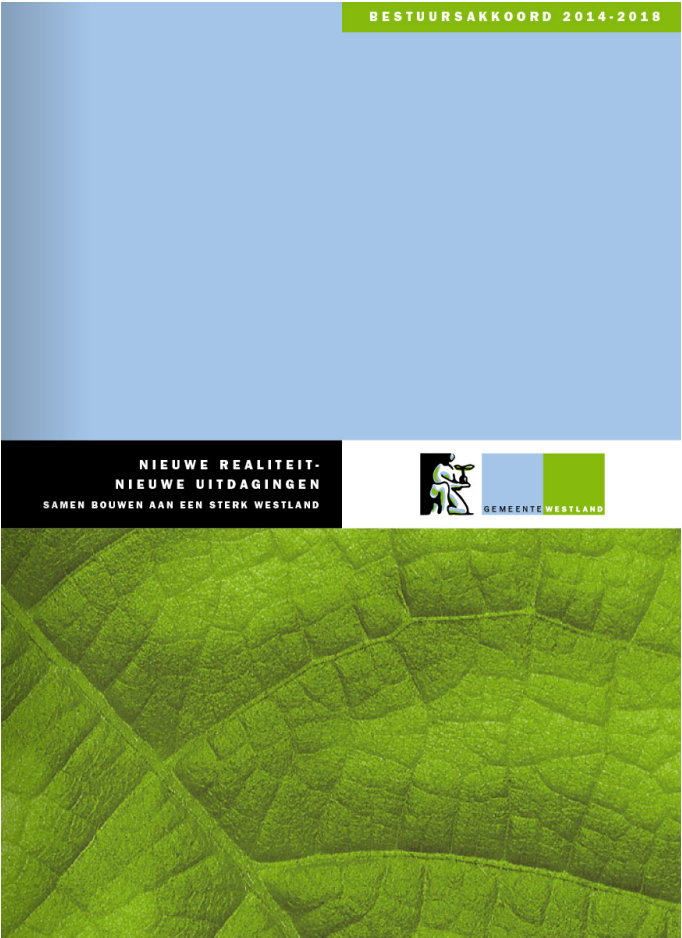
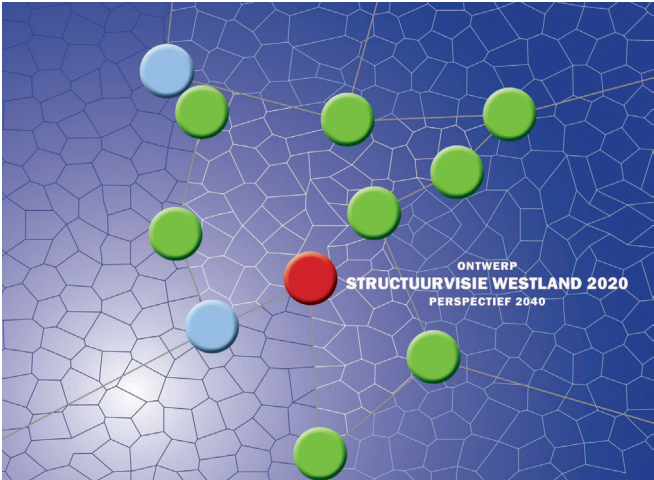
**2,417,000,000 MLN EUROS**  
PRODUCTION VALUE OF WESTLAND  
OOSTLAND GREENPORT



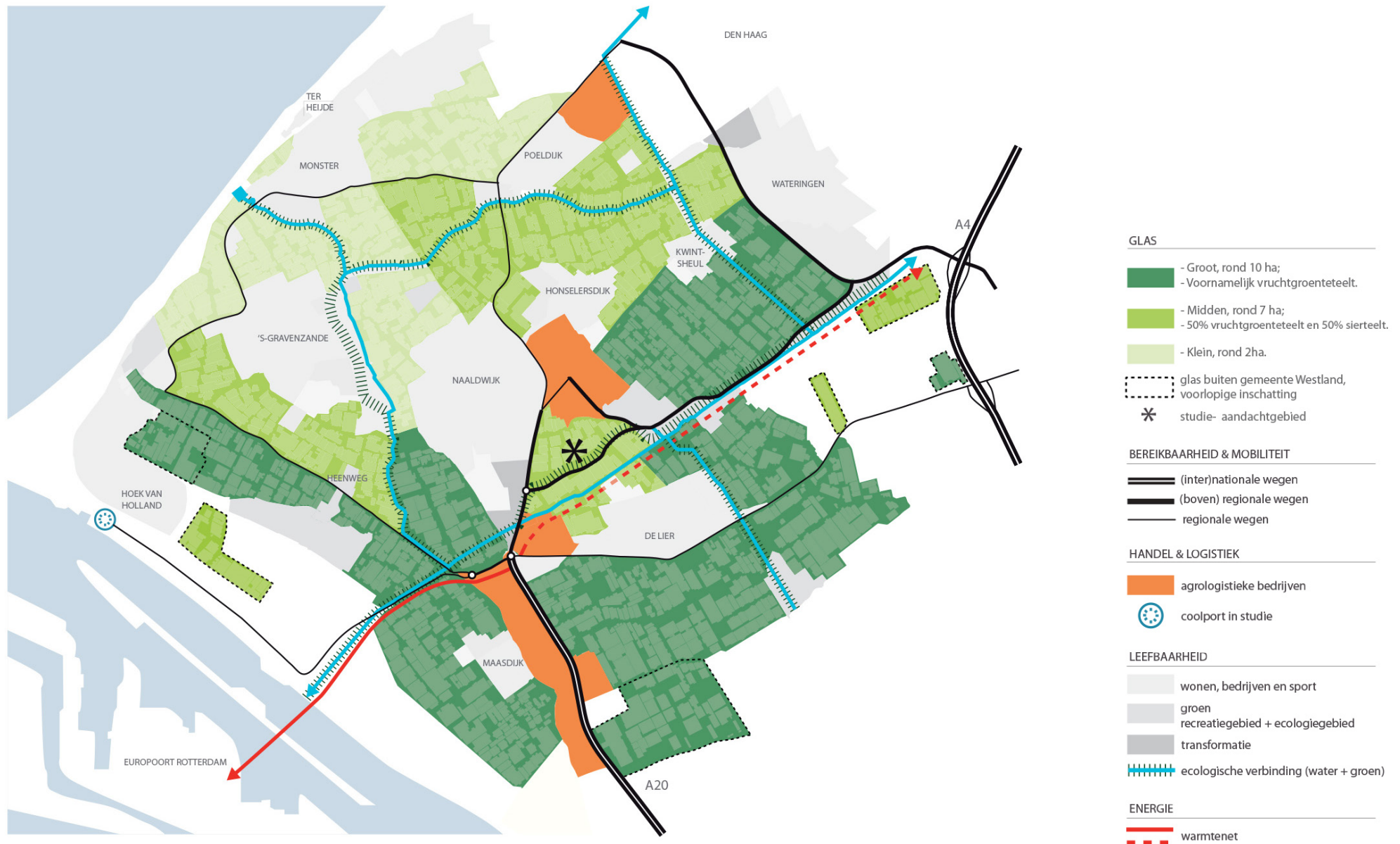


**Ruimtelijke verdien capaciteiten  
Greenport Westland-Oostland**

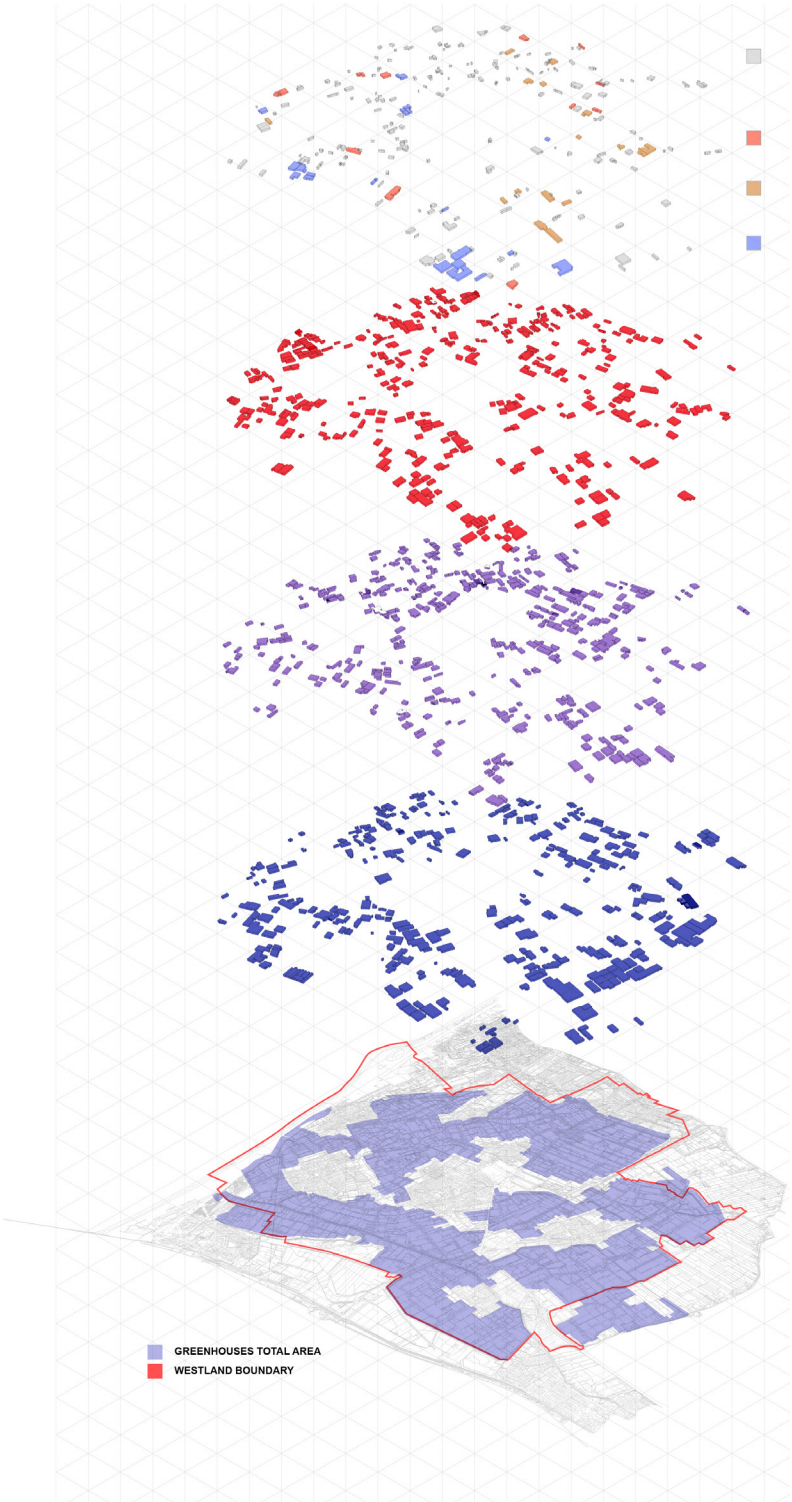
Greenport Westland-Oostland | Province Zuid-Holland | Gemeente Westland  
LEI Wageningen UR | BVR Adviseurs | Van Bergen Kolpa Architecten











RESEARCH, BROKEN, EMPTY STORAGE	31 HA
MIXED	31 HA
SEED	42 HA
BREEDING	70 HA

CUT FLOWERS 839 HA

POTTED PLANTS 750 HA

VEGETABLES 1047 HA

WESTLAND TOTAL AREA.	9058 HA
TOTAL PRODUCTIVE AREA.	5237 HA
PERCENTAGE PRODUCTIVE AREA	58%
TOTAL GREENHOUSE AREA.	3251 HA







**INCREASING  
PRODUCTION**



**INCREASING  
MARKET SHARES**



**REDUCING  
LABOR COSTS**



**ACCESSIBILITY**  
ENHANCING ACCESSIBILITY,  
FLOW AND CONNECTIVITY



**REDUCING PRO-  
DUCTION COSTS**



**EXPANDING  
GREENHOUSES**



**EXPANDING  
GREENHOUSES**



**PRODUCT DIVERSITY**  
DIVERSITY AND VARIETY OF  
PRODUCTS



**COMPETITION**  
MAINTAINING COMPETITION IN  
THE MARKET



**DIFFERENTIATING  
PRODUCTS**



**RENEWABLES**  
REDUCING ENERGY AND  
WATER COSTS BY SHIFTING  
TO SUSTAINABLE PRACTICES

COMMON GOALS



**ACCESSIBILITY**  
ENHANCING ACCESSIBILITY,  
FLOW AND CONNECTIVITY



**RENEWABLES**  
ACCELERATE ENERGY TRANSITION AND SHIFTING TO RENEWABLE RESOURCES



**LEADING POSITION**  
MAINTAINING THE GREENPORTS' LEADING POSITION



**DIFFERENTIATING PRODUCTS**



**INCREASING PRODUCTION**



**BUNDLING ACTIVITIES**



**LIVABILITY**  
AND ENHANCING LIVEABILITY  
AND SUSTAINABILITY



**AGRIBUSINESS AREAS**  
ACCELERATE ENERGY TRANSITION AND SHIFTING TO RENEWABLE RESOURCES



**INNOVATION**  
STRENGTHENING KNOWLEDGE AND INNOVATION



**GREEN + BLUE INFRASTRUCTURE**  
IMPROVING ECOLOGICAL CORRIDORS AND GREENBLUE INFRASTRUCTURE



**SOCIAL COHESION**  
MAINTAINING SOCIAL COHESION AND IDENTITY



**PRODUCT DIVERSITY**  
DIVERSITY AND VARIETY OF PRODUCTS

BOTH



**EXPANDING GREENHOUSES**



**REDUCING PRODUCTION COSTS**



**MODERNIZING AND RESTRUCTURING OF GREENHOUSES**

CONFLICTING GOALS



**REDUCING LABOR COSTS**



**INCREASING MARKET SHARES**



**INCREASING HOUSING STOCK**

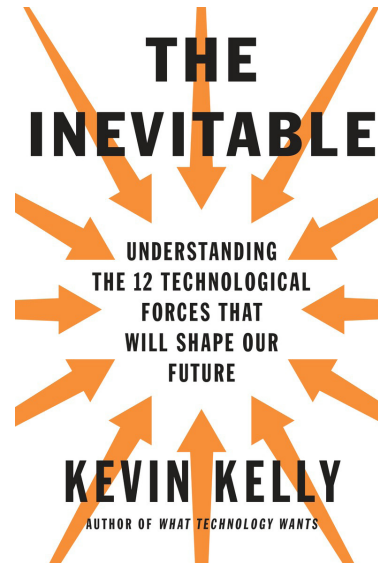
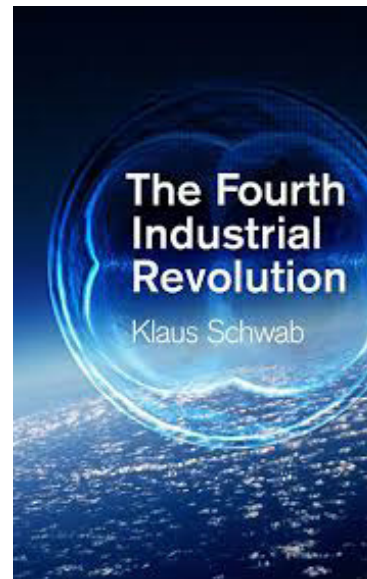
COMMON GOALS    MUNICIPAL GOALS    GROWERS' GOALS



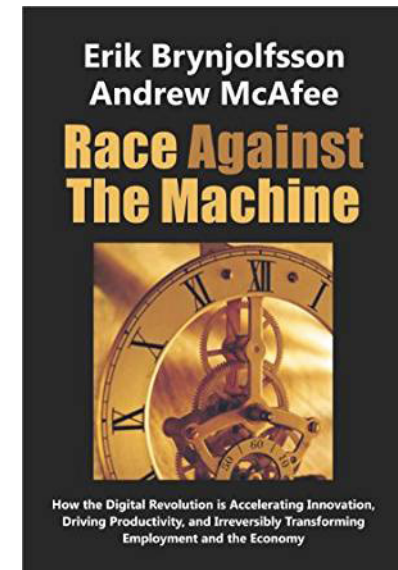
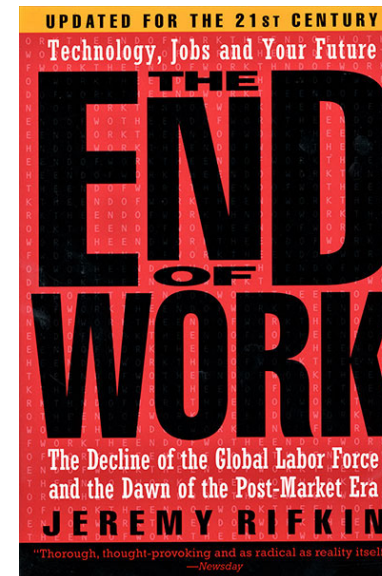
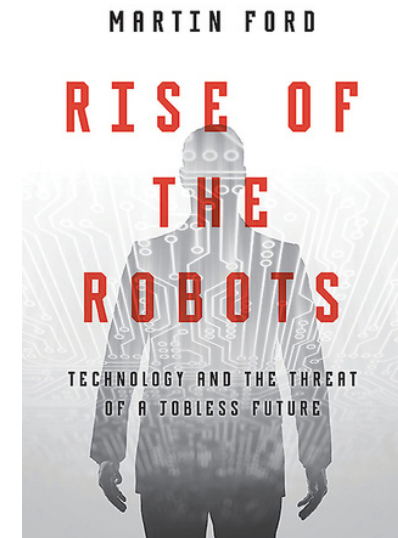
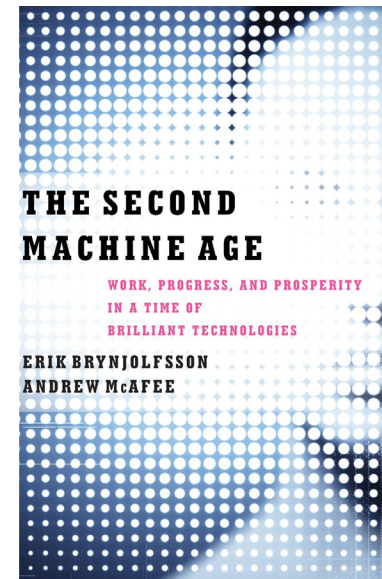
# 2

**THE GREAT DECOUPLING**

## PROPONENTS

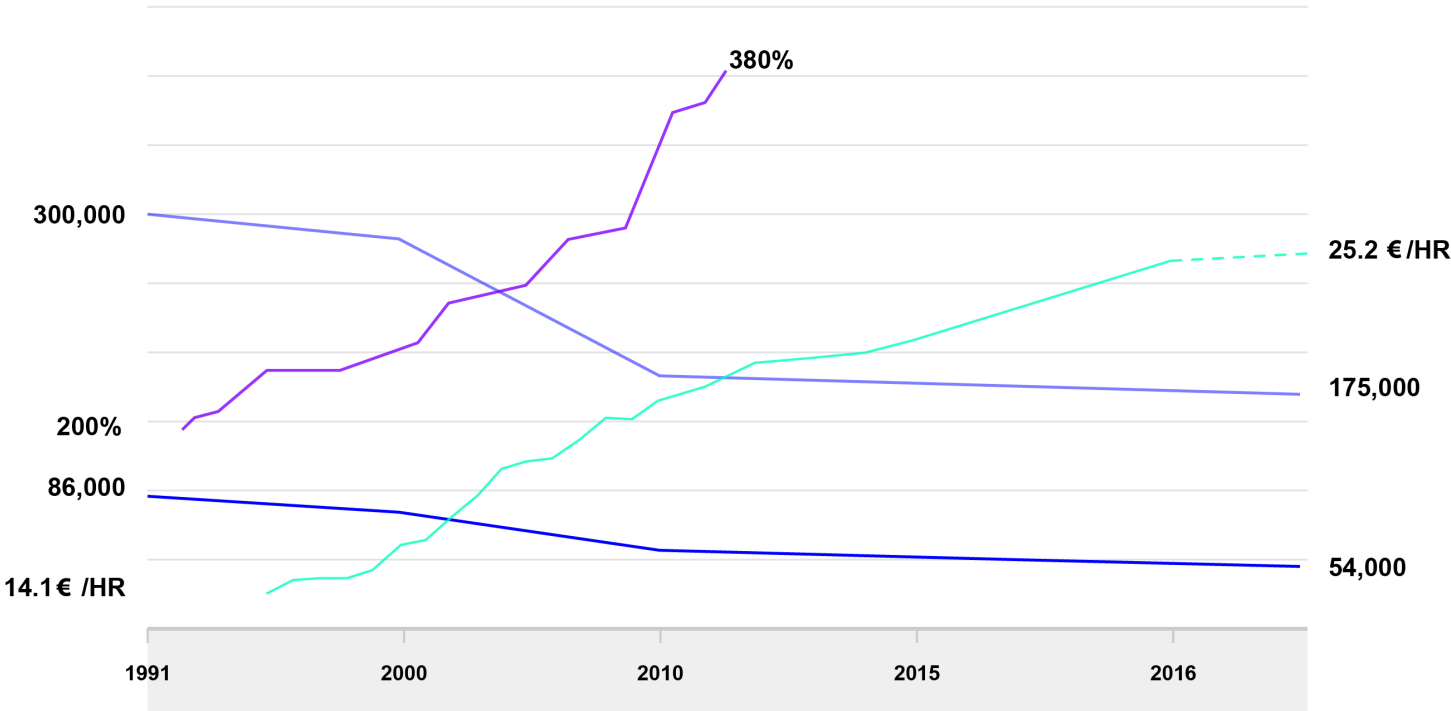


## OPPONENTS





DECOUPLING | LABOR VS. PRODUCTIVITY



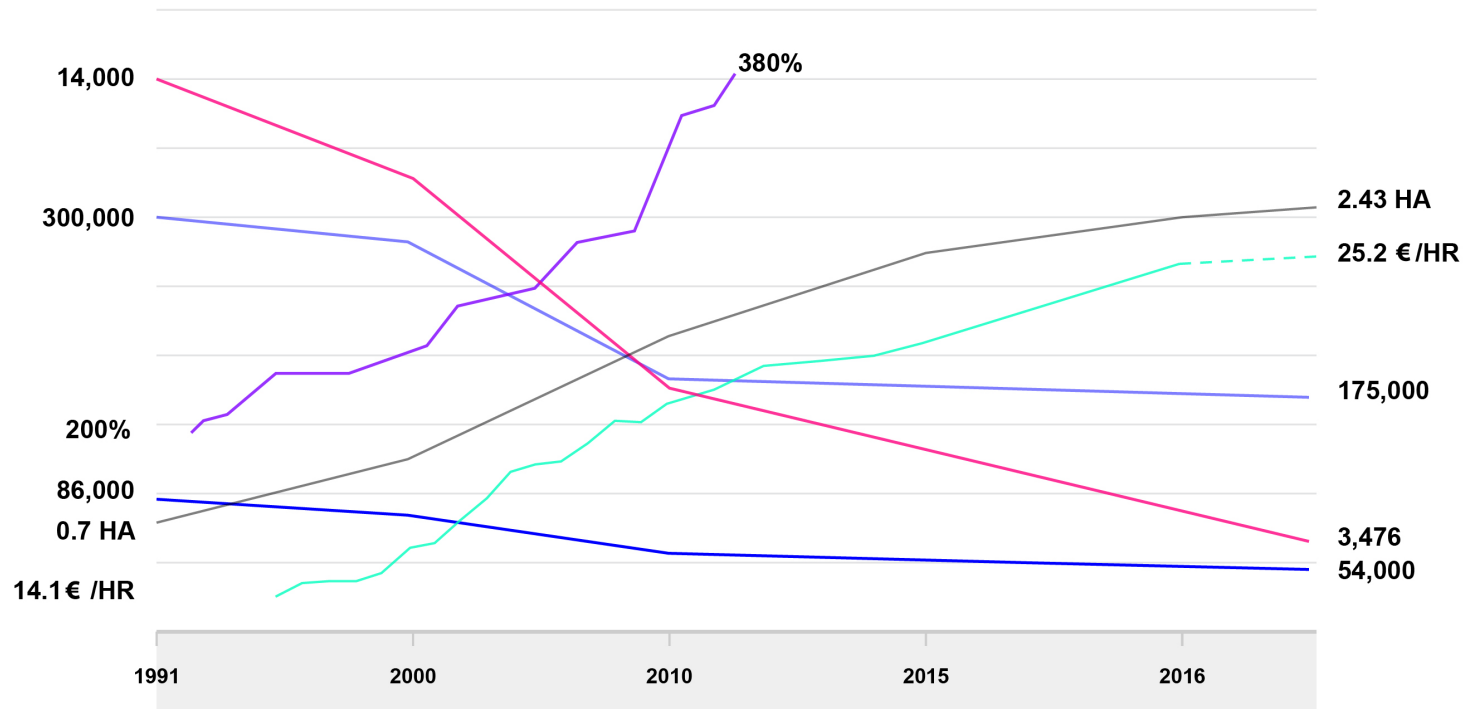
EMPLOYMENT IN THE AGRICULTURE SECTOR

- FAMILY EMPLOYMENT
- NON FAMILY EMPLOYMENT

- PRODUCTION\*
- LABOR COSTS PER WORKING HOUR

THE GREAT DECOUPLING IN THE DUTCH AGRICULTURE SECTOR

## DECOUPLING | SPACE VS. OWNERSHIP



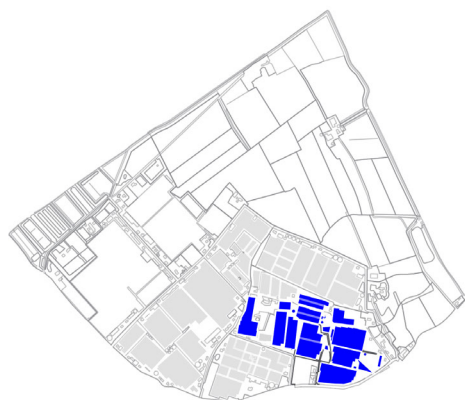
### EMPLOYMENT IN THE AGRICULTURE SECTOR

■ FAMILY EMPLOYMENT  
■ NON FAMILY EMPLOYMENT

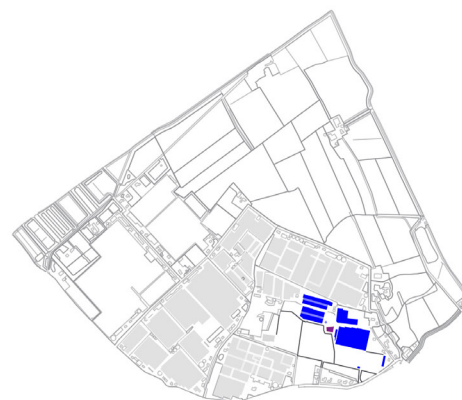
■ PRODUCTION\*  
■ LABOR COSTS PER WORKING HOUR

■ NUMBER OF GREENHOUSES  
■ AVERAGE SIZE OF COMMERCIAL GREENHOUSE

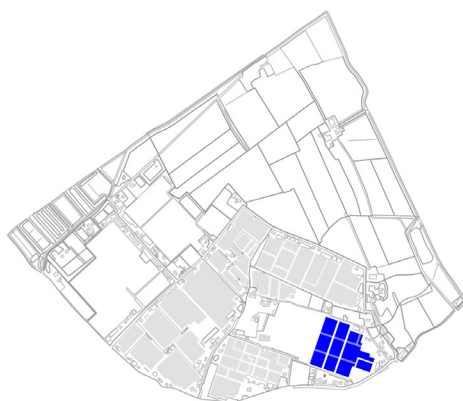
## THE GREAT DECOUPLING IN THE DUTCH AGRICULTURE SECTOR



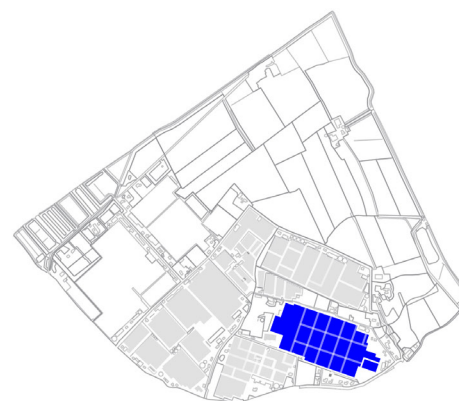
**2005**



**2009**



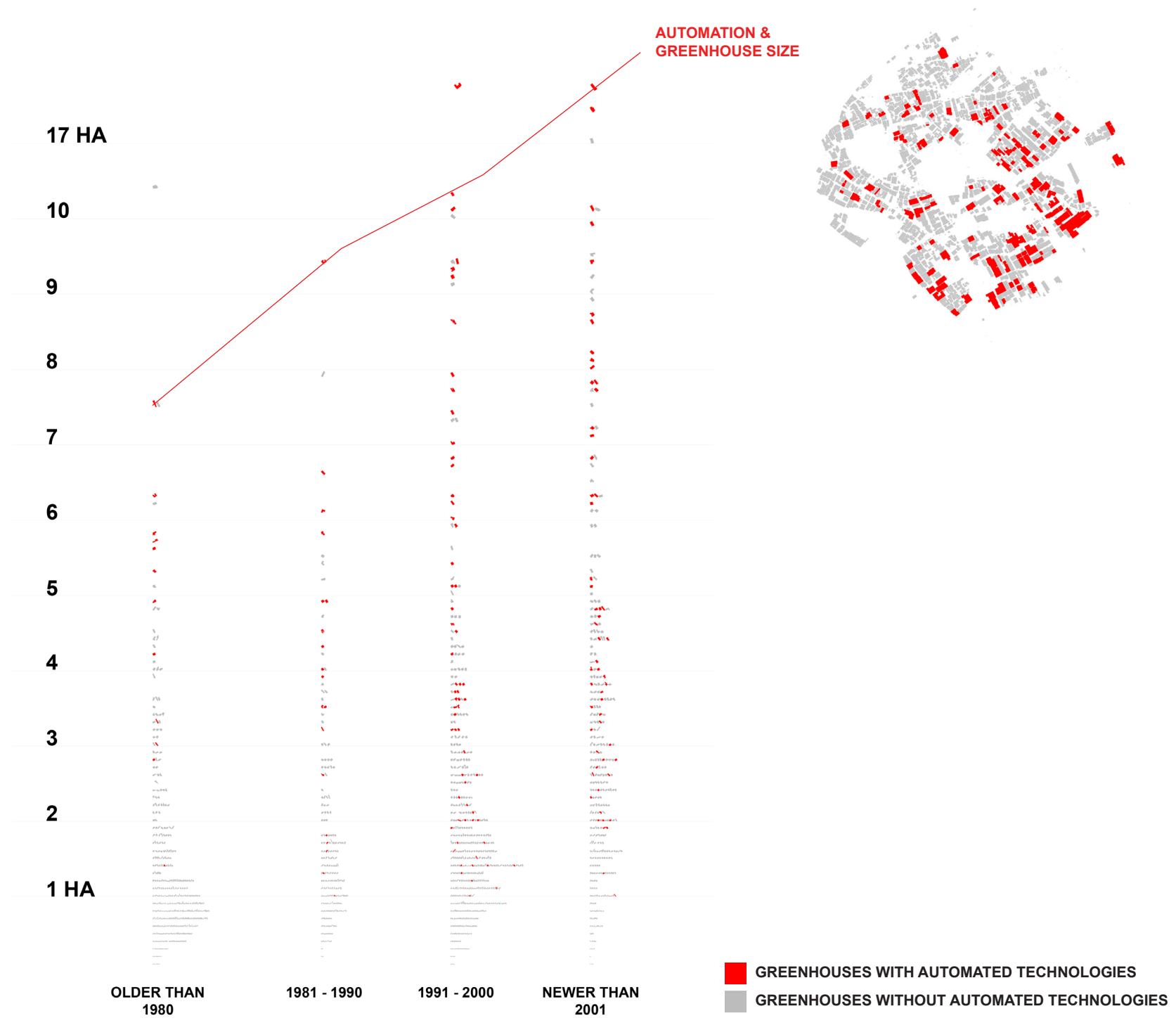
**2013**



**2016**

**CONSOLIDATION OF LAND & GREENHOUSES**



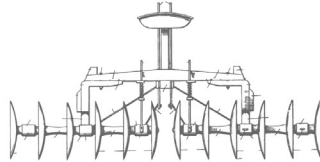


**GREENHOUSE SIZE & AUTOMATION VS. TIME**

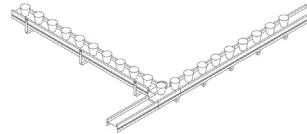
## TECHNOLOGIES



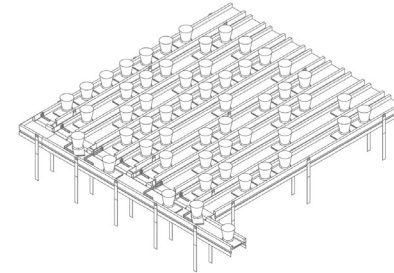
SPADING FORK



DISK HARROW



CONVEYOR BELTS



AUTOMATED SORTING  
SYSTEMS

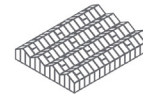
## GREENHOUSE SIZE & TYPE



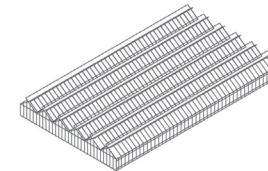
FRAME AGAINST  
BRICK WALL



VINERY



HEATED GLASSHOUSE  
COMPLEX



HI-TECH VENLO  
GREENHOUSE

## GROWTH OF HORTICULTURAL CLUSTER



TIME



## COMMON GOALS



**ACCESSIBILITY**  
ENHANCING ACCESSIBILITY,  
FLOW AND CONNECTIVITY



**RENEWABLES**  
ACCELERATE ENERGY TRANSITION  
AND SHIFTING TO RENEWABLE RESOURCES



**LEADING POSITION**  
MAINTAINING THE GREEN-  
PORTS' LEADING POSITION



**DIFFERENTIATING  
PRODUCTS**



**INCREASING  
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**PRODUCT DIVERSITY**  
DIVERSITY AND VARIETY OF  
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**EXPANDING  
GREENHOUSES**



**REDUCING  
PRODUCTION COSTS**



**MODERNIZING AND  
RESTRUCTURING OF  
GREENHOUSES**

## CONFLICTING GOALS



**REDUCING  
LABOR COSTS**



**INCREASING  
MARKET SHARES**



**INCREASING  
HOUSING STOCK**



COMMON GOALS



MUNICIPAL GOALS



GROWERS' GOALS



NEGATIVE EFFECTS



NO COLOR CHANGES = POSITIVE EFFECTS



NEUTRAL EFFECTS

In the context of **greenhouse automation**, how could **spatial strategy and design** affect technological, productive, and socio-economic processes to conduce **Westland** to **sustainable modes of urbanization**?



# 3

## METHODOLOGY

## BACKGROUND

AUTOMATION TAKES  
COMMAND

## ANALYSIS

ANALYTICAL MAPPING  
OF WESTLAND & ITS  
CONTEXT

## INTERVIEWS

STAKEHOLDERS'  
INTERVIEWS

## REVIEW

REVIEW OF MUNICIPAL  
DOCUMENTS, VISION &  
POLICIES

## RESEARCH QUESTION

### PHASE 1

#### BACKGROUND

AUTOMATION  
TAKES  
COMMAND

- DEFINITION OF AUTOMATION
- INDUSTRIAL & TECHNOLOGICAL REVOLUTIONS:  
BRIEF HISTORY OF INDUSTRIAL REVOLUTION  
AND AUTOMATION
- THE DUTCH AGRICULTURAL DECOUPLING:  
DISASSOCIATION BETWEEN JOB  
OPPORTUNITIES & PRODUCTION IN THE  
DUTCH AGRICULTURAL SECTOR
- THE ONGOING DEBATE ON AUTOMATION:  
SOCIO-ECONOMIC IMPLICATIONS
- SPATIAL IMPLICATIONS:  
DETROIT AND PARIS AS CASE STUDIES
- POLICY RECOMMENDATIONS FOR  
A FUTURE WITH AUTOMATION
- URBAN DESIGNERS AS SPATIAL  
AGENTS OF CHANGE IN A CONTEXT OF  
TECHNOLOGICAL SHIFT

#### ANALYSIS

ANALYTICAL  
MAPPING OF  
WESTLAND &  
ITS CONTEXT

- VERTICAL CONSOLIDATION:  
SWOT ANALYSIS OF WESTLAND SQ 1
- MORE FOR LESS: SPATIAL IMPLICATIONS  
OF AUTOMATION ON WESTLAND SQ 2
- FLOWS & EXCHANGES: OPPORTUNITIES  
IN WESTLAND'S CONTEXT
- LOCAL & INTERNATIONAL SHIFTS
- TRENDS IN HORTICULTURAL  
PRODUCTION
- SOCIO-ECONOMIC TRENDS IN  
WESTLAND & THE NETHERLANDS
- TECHNOLOGICAL TREND

#### INTERVIEW

STAKEHOLDERS'  
INTERVIEWS

- GROWERS' GOALS & VALUES
- UNDERSTANDING HOW THE PRODUCTION  
PROCESS DIFFERS PER PLANT TYPE
- DOCUMENTING TECHNOLOGIES AND  
AUTOMATED MACHINERY IN THE CLUSTER

#### REVIEW

REVIEW OF  
MUNICIPAL  
DOCUMENTS,  
VISION, &  
POLICIES

- VISION'S GOALS & VALUES
- STRATEGIC FRAMEWORK &  
IMPLEMENTATION

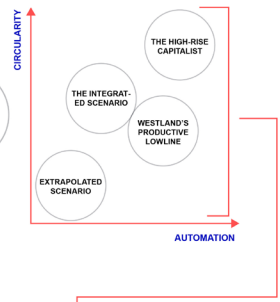
#### RESEARCH QUESTION

IN THE CONTEXT OF GREENHOUSE TECHNOLOGIES, HOW  
COULD SPATIAL STRATEGY AND DESIGN AFFECT TECHNO-  
LOGICAL, PRODUCTIVE, AND SOCIO-ECONOMIC PROCESS-  
ES TO CONDUCE WESTLAND TO SUSTAINABLE MODES OF  
URBANIZATION?

### PHASE 2

#### SCENARIOS

FOUR NEW  
FUTURES FOR  
WESTLAND



NEW GOALS, VALUES,  
AND STAKEHOLDERS  
ARE DERIVED FROM  
THE SCENARIOS

#### VISION

SECOND  
MACHINE AGE: A  
NEW READING  
FOR WESTLAND

THE VISION PROPOSES A NEW  
FRAMEWORK AND CONSISTS  
OF A NEW READING FOR THE  
TERRITORY

#### STRATEGY

THE SPLIT:  
NEW STRATEGY  
FOR WESTLAND

NEW OVERALL STRATEGY &  
PROGRAM PROPOSE FLIPPING  
PRODUCTIVE AREAS IN THE  
NORTH TO THE SOUTH, A REC-  
REATIONAL NORTH VS. A PRO-  
DUCTIVE SOUTH

TER HEIJDE -  
MAASDIJK-ABC  
WESTLAND -  
HONDERLAND

SELECTED PILOT  
PROJECTS

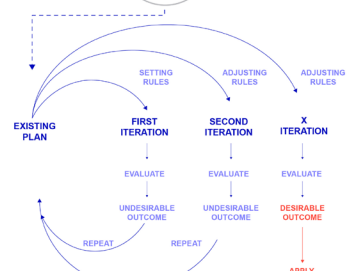
### PHASE 3

#### ITERATIVE DESIGN METHOD

#### URBAN DESIGN

TER HEIJDE -  
MAASDIJK-ABC  
WESTLAND -  
HONDERLAND

A DETAILED ANALYSIS &  
INVENTORY OF THE SE-  
LECTED AREAS



## SCENARIOS

FOUR SCENARIOS FOR  
WESTLAND IN THE CON-  
TEXT OF AUTOMATION

## VISION

SECOND MACHINE AGE:  
A NEW READING FOR  
WESTLAND

## STRATEGY

THE SPLIT: NEW  
STRATEGY FOR  
WESTLAND

PILOT PROJECTS  
SELECTION

## URBAN DESIGN

TER HEIJDE - MAASDIJK  
& ABC WESTLAND -  
HONDERLAND

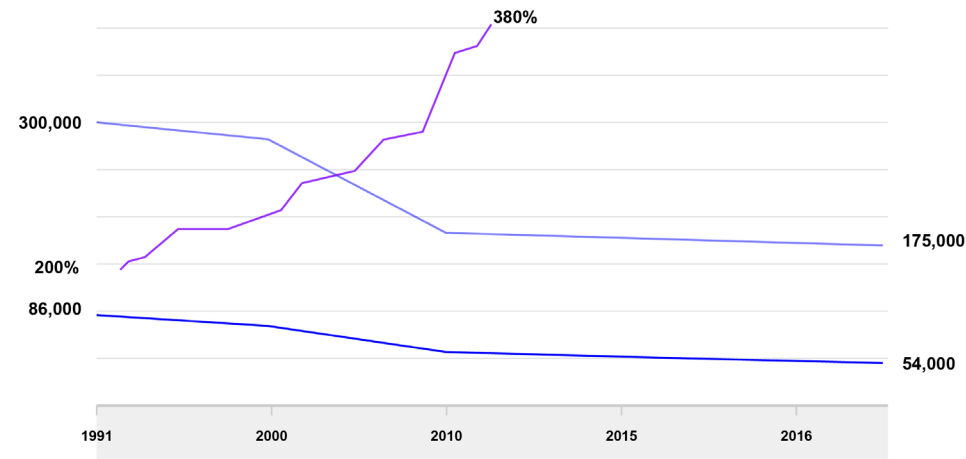
## METHODOLOGY

# 4

## SCENARIOS

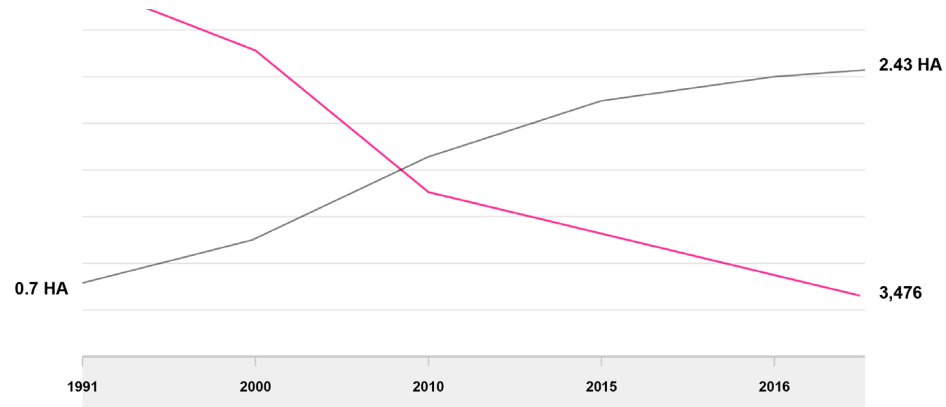


## TRENDS



■ FAMILY EMPLOYMENT  
■ NON FAMILY EMPLOYMENT

■ PRODUCTION\*



■ NUMBER OF GREENHOUSES  
■ AVERAGE SIZE OF COMMERCIAL GREENHOUSE

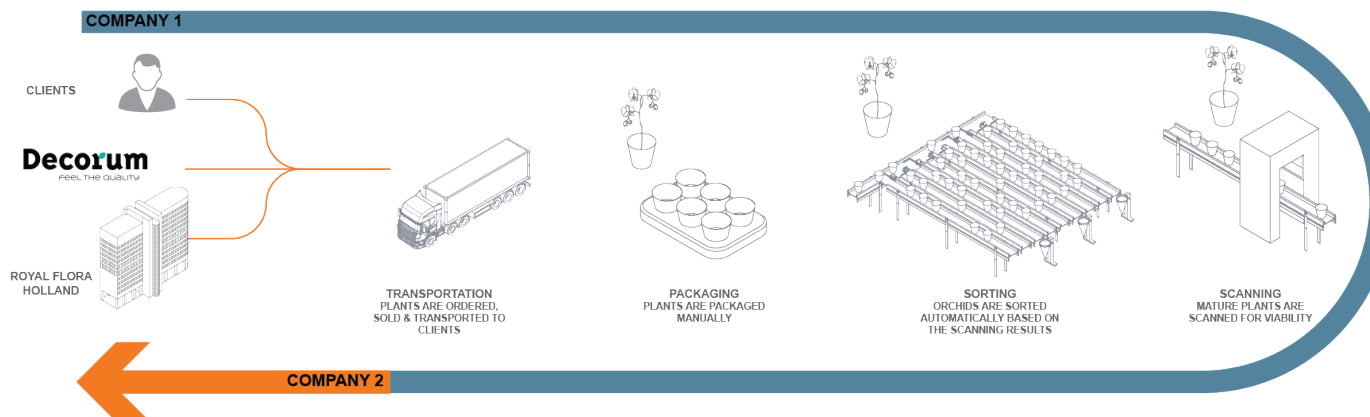
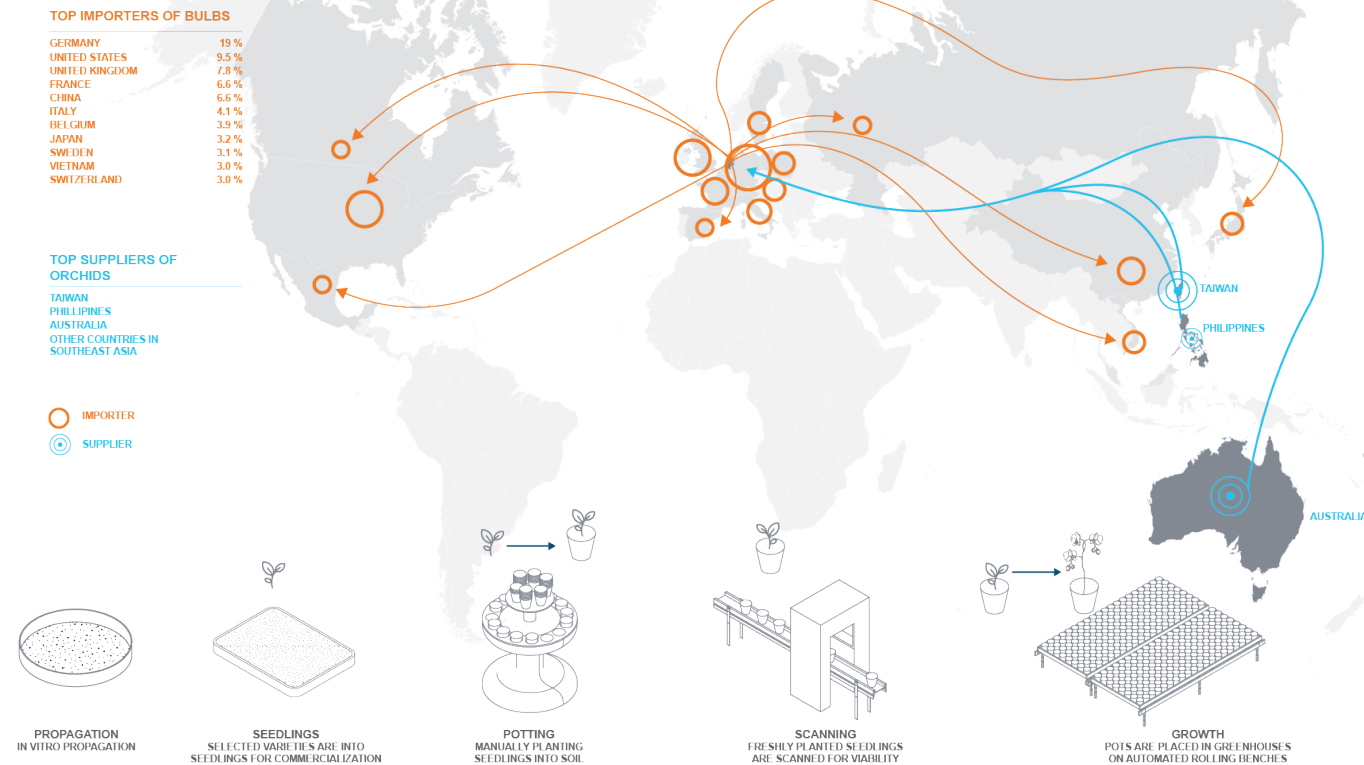
SOURCE. van den Berg, M., Gircour, R., Jaarsma, M., Ramaekers, P., Salazar, G., Voncken, R., & Walthouwer, M. (2016). *CBS Internationalisation Monitor 2016 II*. The Hague: Statistics Netherlands.



**2nd** place for the Netherlands in the ranking of largest agricultural exporters in the world

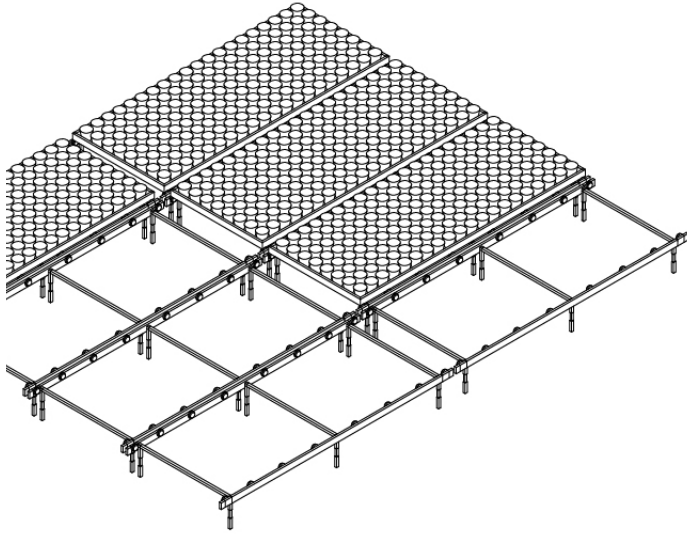
**8.3** billion euros worth of flowers and plants exported in 2015

## OCHIDS PRODUCTION IN WESTLAND & GLOBAL DISTRIBUTION

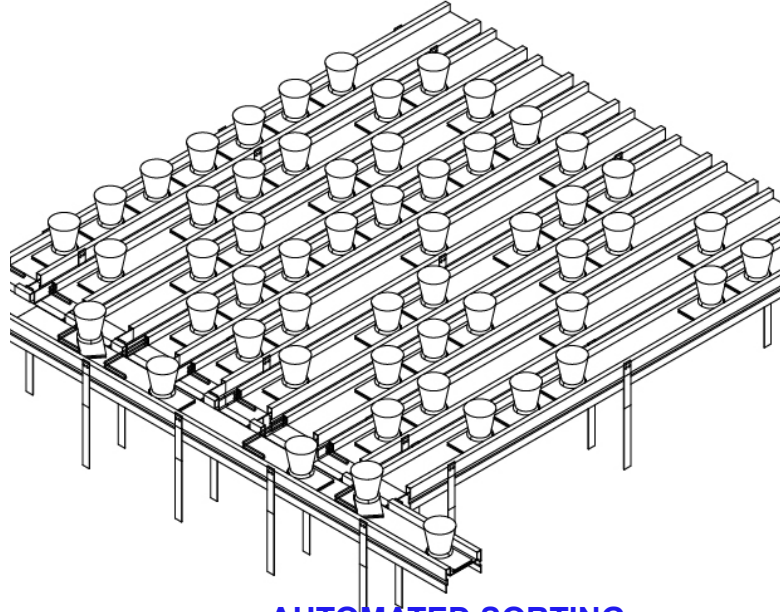


SOURCE: The Observatory of Economic Complexity. (2016). Where does the Netherlands export Bulbs and Roots to? Retrieved from [https://atlas.media.mit.edu/en/visualize/tree\\_maps/hs92/export/nld/show/0601/2016/](https://atlas.media.mit.edu/en/visualize/tree_maps/hs92/export/nld/show/0601/2016/)

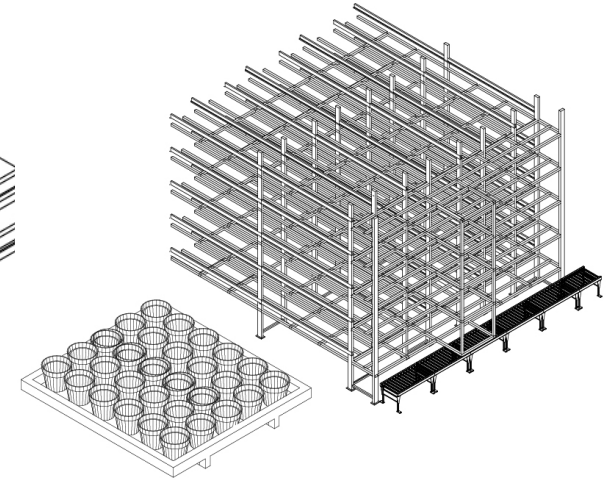




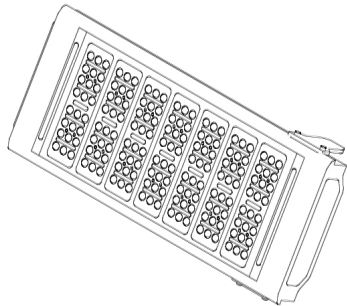
ROLLING BENCHES WITH  
AUTOMATED SHUTTLES



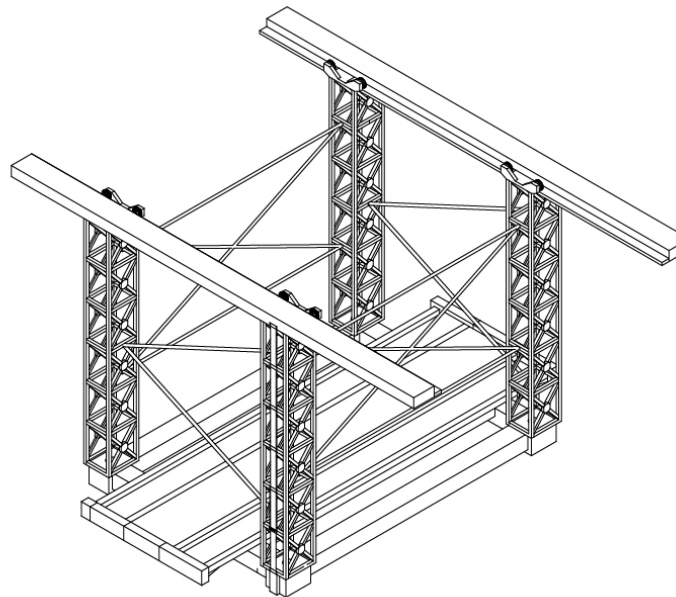
AUTOMATED SORTING  
SYSTEM



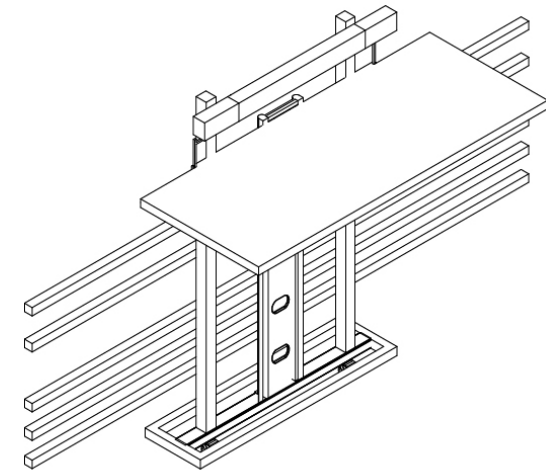
AUTOMATED VERTICAL  
CULTIVATION SYSTEM



LED LIGHTS



3D OVERHEAD CRANE



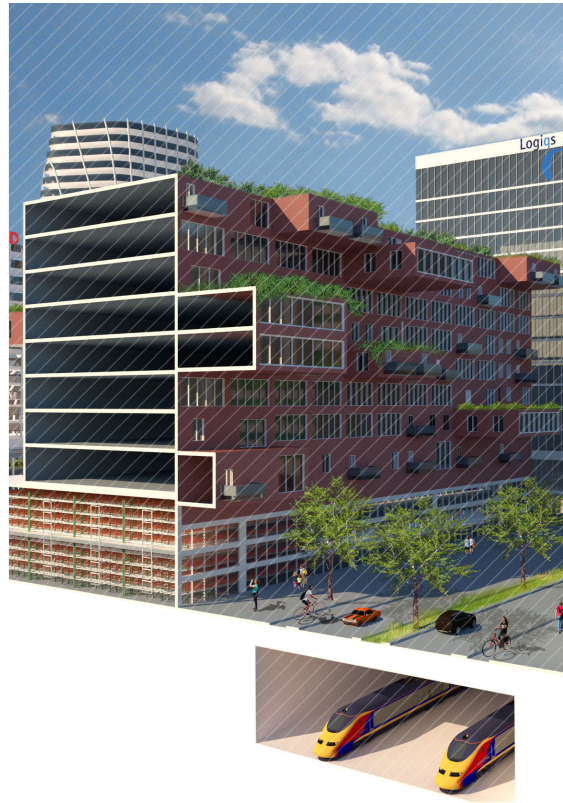
WALL-MOUNTED CRANE  
TECHNOLOGIES



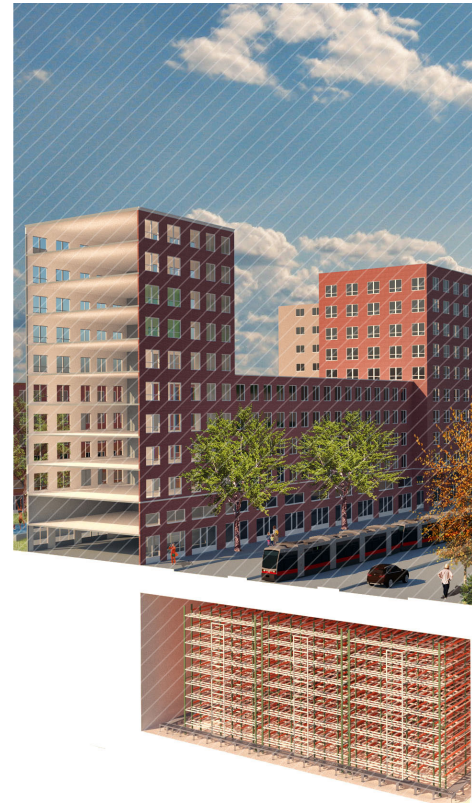
## EXTRAPOLATED SCENARIOS



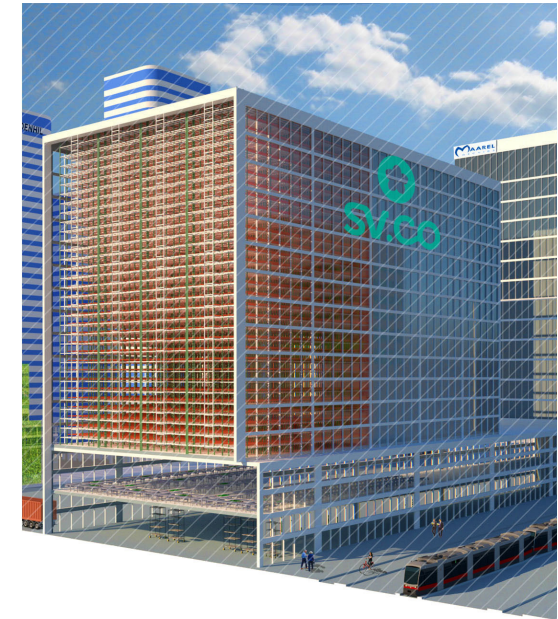
## INTEGRATED SCENARIOS



## THE WESTLAND'S PRODUCTIVE LOWLINE



## THE HIGH-RISE CAPITALIST



# TIME HORIZON | 2040



**EXTRAPOLATED  
SCENARIO**



MINIMUM AUTOMATION  
PARTIALLY CIRCULAR  
DIVERSIFIED CULTIVATION



**WESTLAND'S  
LOWLINE  
SCENARIO** ►

ABOVE GROUND

◀ **INTEGRATED  
SCENARIO**



**HIGH RISE  
CAPITALIST  
SCENARIO**



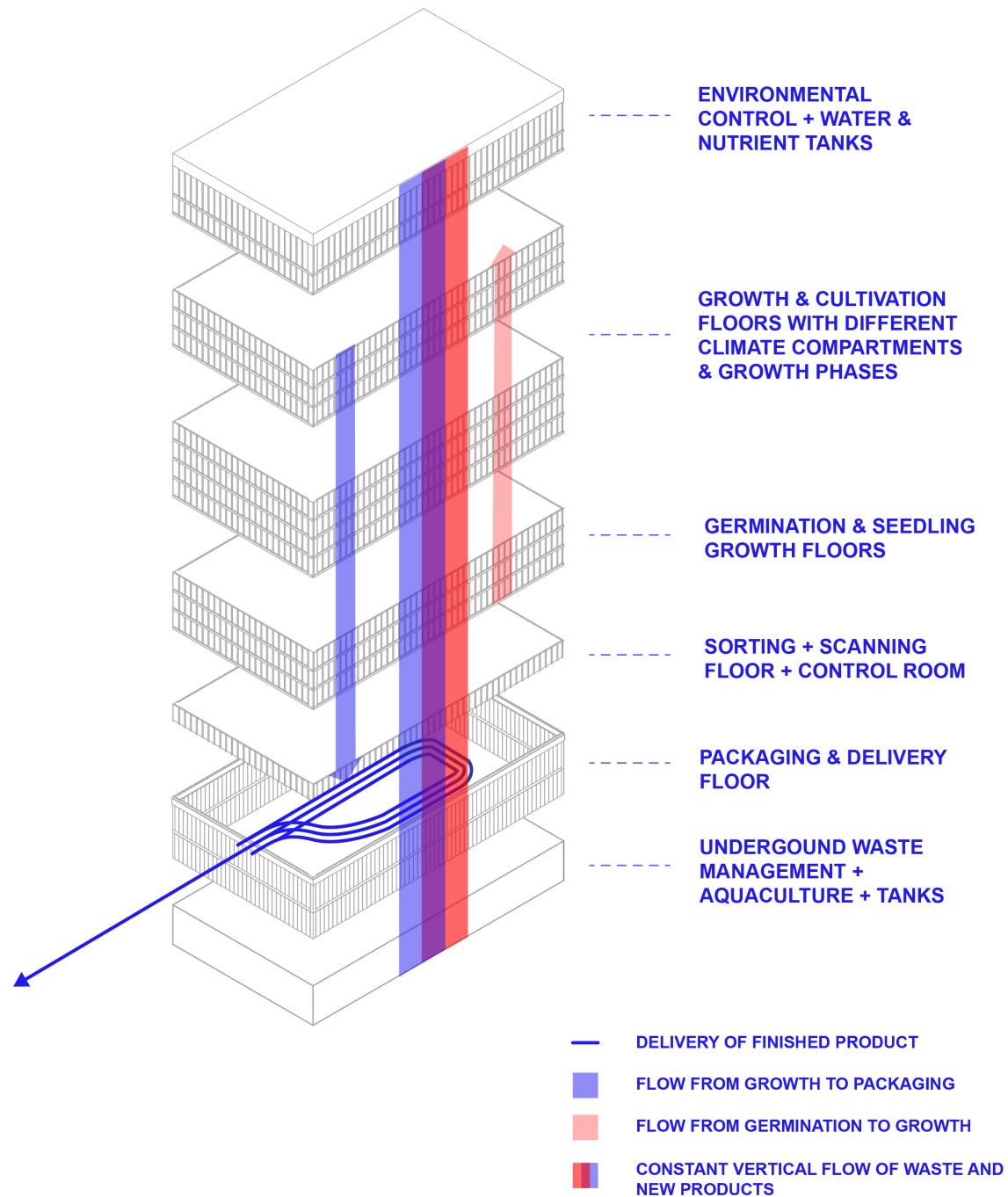
MAXIMUM AUTOMATION  
FULLY CIRCULAR  
SPECIALIZED CULTIVATION



UNDERGROUND





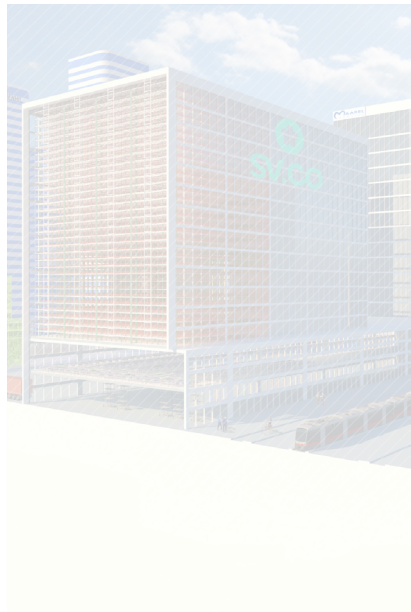




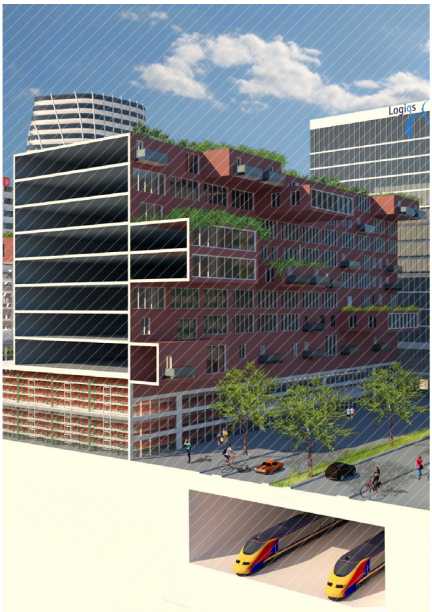
EXTRAPOLATED  
SCENARIO



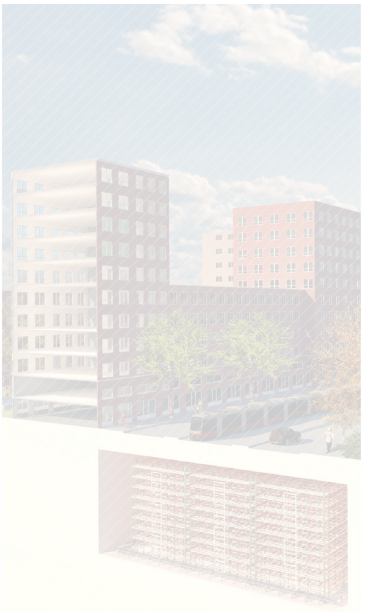
THE HIGH-RISE  
CAPITALIST



THE INTEGRATED  
SCENARIO



THE WESTLAND'S  
PRODUCTIVE LOWLINE



COMMON GOALS



**ACCESSIBILITY**  
ENHANCING ACCESSIBILITY,  
FLOW AND CONNECTIVITY



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ACCELERATE ENERGY TRANSITION  
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HOUSING STOCK**

COMMON GOALS MUNICIPAL GOALS GROWERS' GOALS  
NEGATIVE EFFECTS NO COLOR CHANGES = POSITIVE EFFECTS NEUTRAL EFFECTS

SUMMARY





Source. NL Jobs (n.d). Impressions. [Image file]. Retrieved from <https://www.nl-jobs.com/impressions>  
van der Tol, J. (2017). Het was goed weer op de tweede dag van het Varen Corso. [Image file]. Retrieved from <https://www.omroep-west.nl/nieuws/3337281/Corso-blaast-route-Den-Haag-af-maar-knelpunten-liggen-daar-juist-niet>

MISSING PARAMETERS IN MUNICIPAL VISION





**ECONOMIC  
STABILITY**  
MONOTONOUS ECONOMY  
BASED ON HORITICULTURAL  
PRODUCTION



**MARKET  
RESILIENCE**



**COMPETITIVENESS**

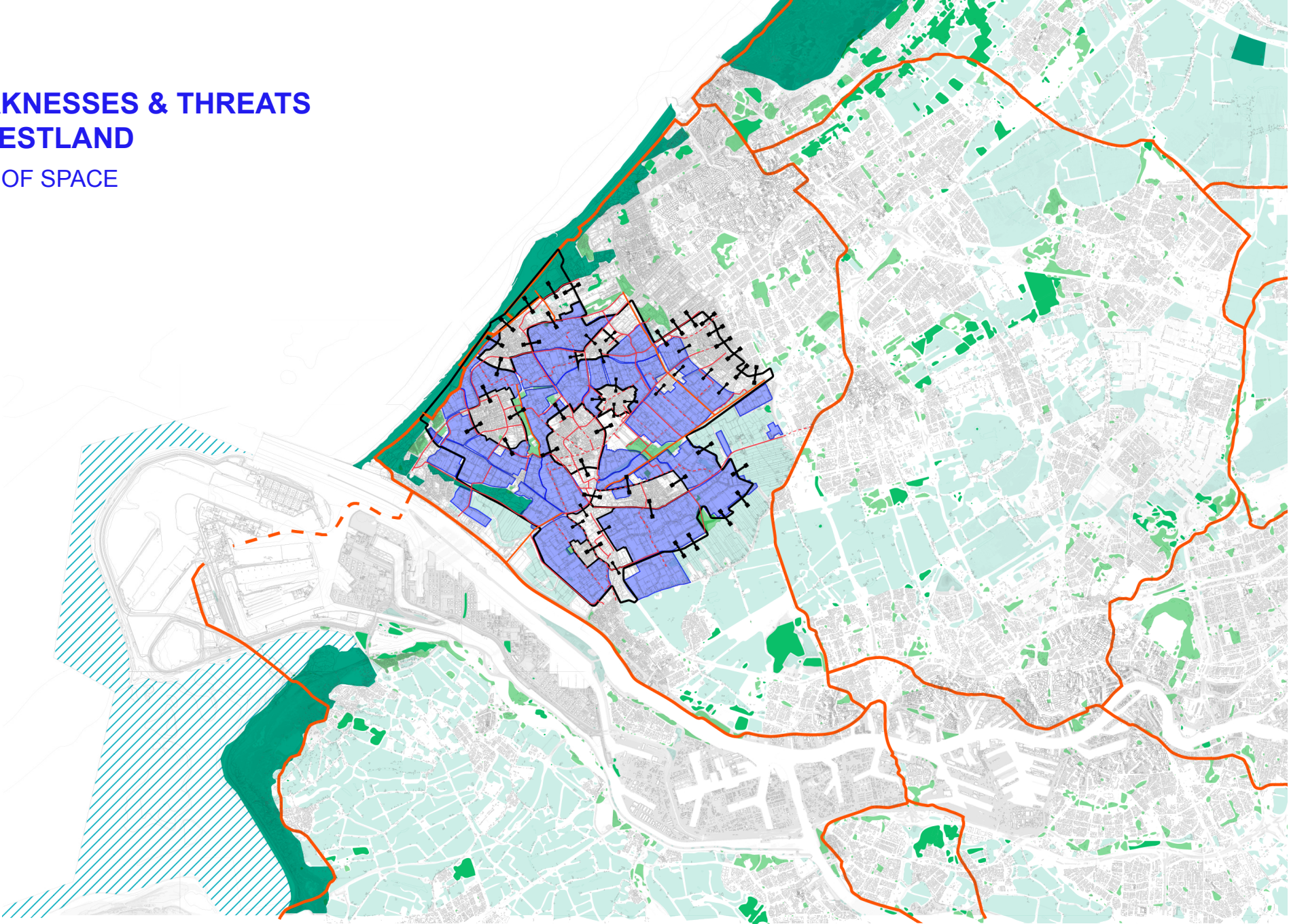
# 5











**CHALLENGES & POTENTIALS OF  
WESTLAND & SURROUNDING AREA**



# WEAKNESSES & THREATS IN WESTLAND

LACK OF SPACE

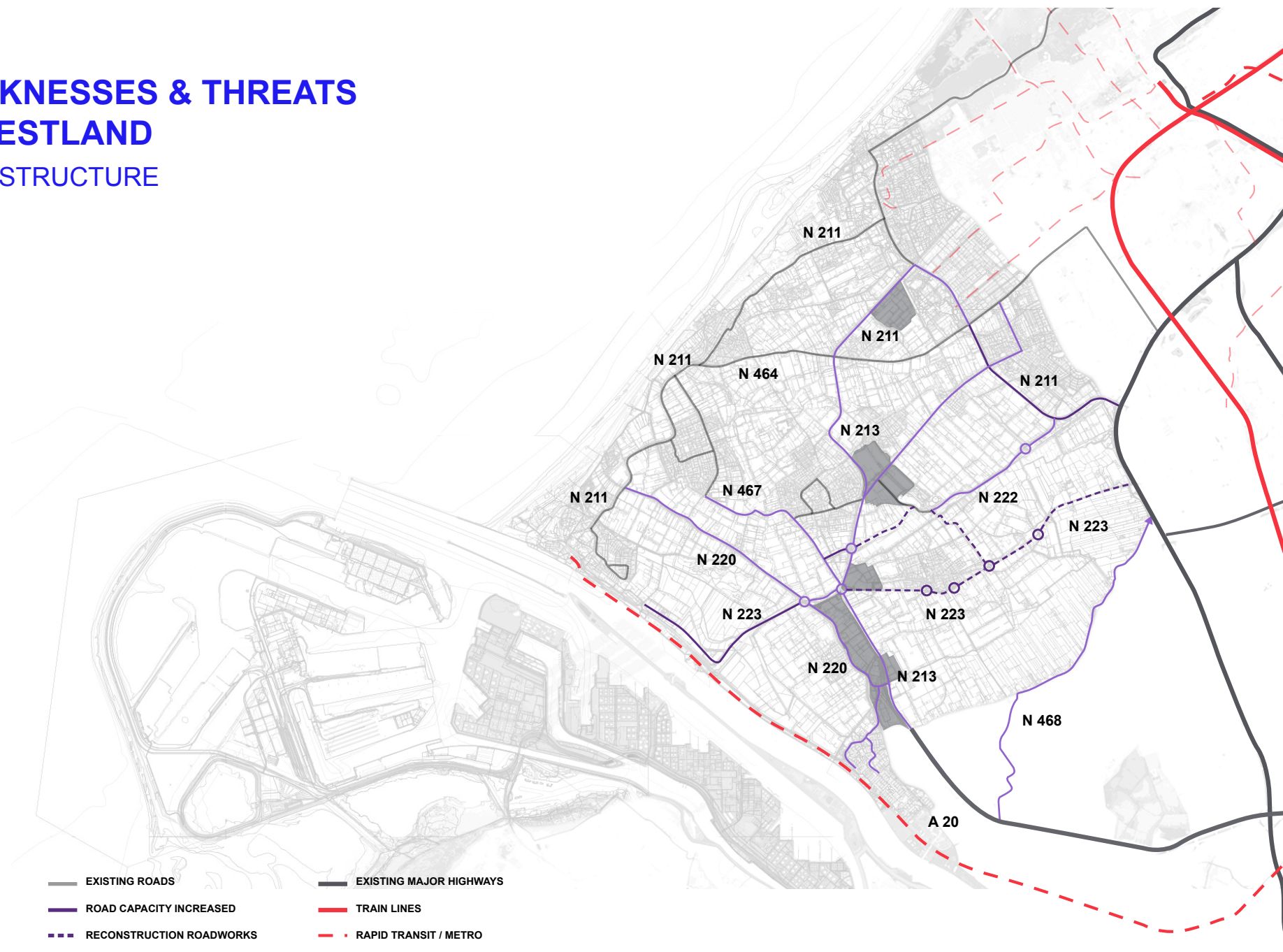


- |                                                                                                                        |                                                                                                                         |                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
|  NATURA 2000   BIRDS DIRECTIVE SITE |  NATIONAL BICYCLE NETWORK            |  RECREATIONAL BICYCLE NETWORK IN WESTLAND |
|  NATURA 2000 PROTECTED SITES        |  DISCONNECTION   FERRY USED TO CROSS |  BICYCLE LANES                            |
|  AGRICULTURE USES                   |                                                                                                                         |  BICYCLE STRIPS                           |
|  FOREST                             |                                                                                                                         |                                                                                                                               |
|  PARKS & RECREATIONAL USES          |                                                                                                                         |                                                                                                                               |

SOURCES: FIETSPLATFORM (DUTCH CYCLING PLATFORM) (2013). RETRIEVED FROM [HTTPS://WWW.FIETSPLATFORM.NL/UPLOADS/FIETSPLATFORM\\_AND\\_THE\\_DUTCH\\_NATIONAL\\_CYCLE\\_NETWORK\\_2013.PDF](https://www.fietsplatform.nl/uploads/fietsplatform_and_the_dutch_national_cycle_network_2013.pdf)  
MUST STEDERBOUW (2015). GEBIEDSFOTO WESTLAND - OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS. AUTHOR  
NATURA 2000 (2012). NATURA 2000 NETWORK SITES. RETRIEVED FROM [HTTP://NATURA2000.EEA.EU/](http://natura2000.eea.europa.eu/)  
FROM VIEWER (2012). CBS BESTAND BOEDINGEN. RETRIEVED FROM [HTTP://FROMVIEWER.CBR.NL/](http://fromviewer.cbr.nl/)  
TOP10NL AUTOCAD MAPS (2017). RETRIEVED FROM [HTTPS://SITES.GOOGLE.COM/A/G-TUEFLT.NL/TOP10NL-2017/](https://sites.google.com/a/g-tuelft.nl/top10nl-2017/)



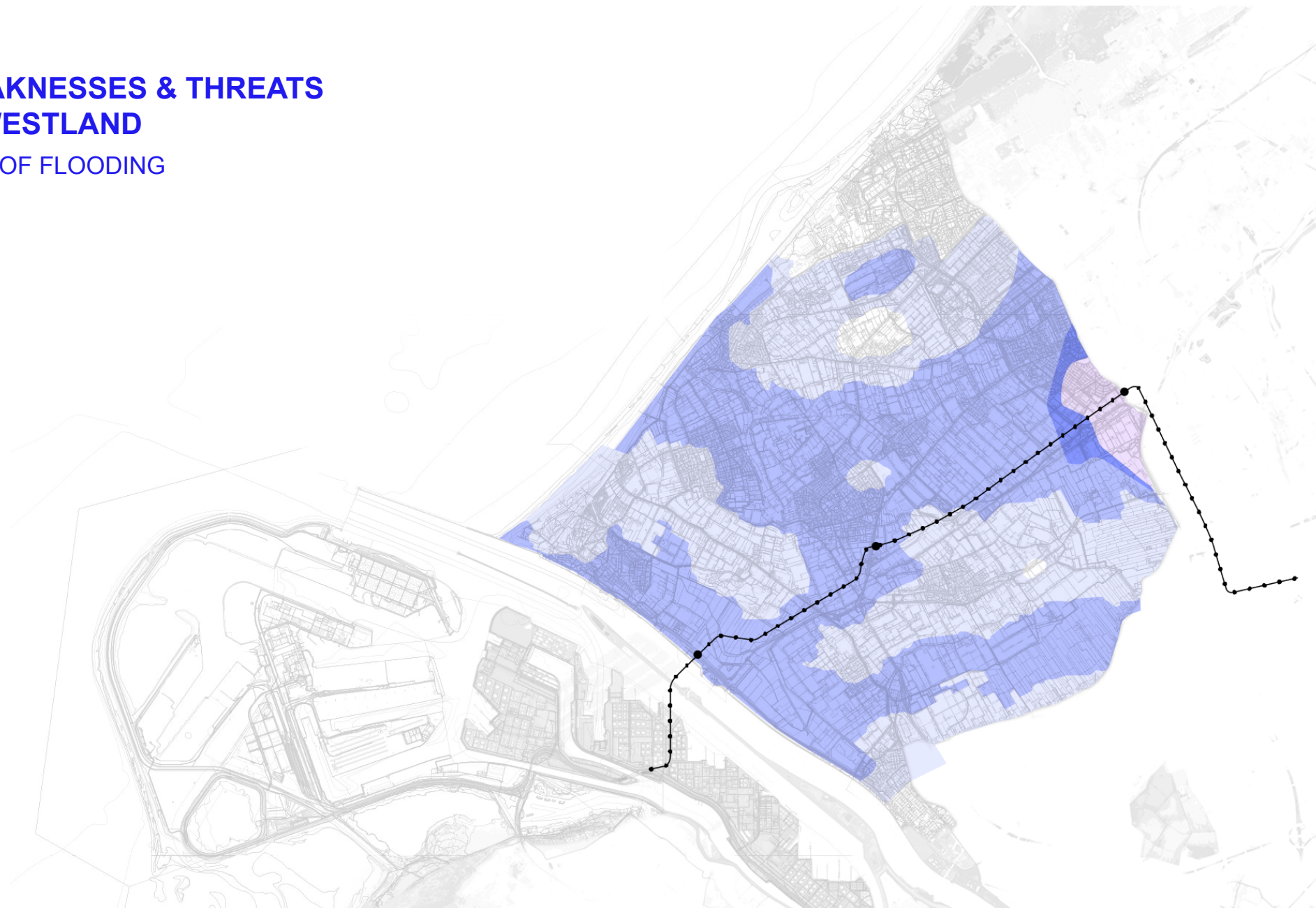
# WEAKNESSES & THREATS IN WESTLAND INFRASTRUCTURE



SOURCES: MUST STEDEBOUW (2015). GEBIEDSFOTO WESTLAND – OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS: AUTHOR.  
 GOEDBLOED, B., VAN DER HOEVEN, D., SASTROWITOMO, E., GROOTSCHOLTEN, E., COLOMBO, F., KOOLS, J., RAAP, K., VERTON, M., RIDDER, N., VERBON, P., LENTING, W., HOFSTEDE, W., WITSON, P.P. (2016). WERKBOEK WESTLAND: RUIMTELIJK ECONOMISCHE STRATEGIE  
 GREENPORT 3.0 HOT - SATELLIET INFRA-ENERGIE-RUIMTE. RETRIEVED FROM [HTTPS://WWW.GEMEENTEWESTLAND.NL/FILEADMIN/DOCUMENTEN/ONDERNEMEN/WERKBOEK\\_WESTLAND\\_OKT16\\_DEF.PDF](https://www.gemeentewestland.nl/fileadmin/documenten/ondernemen/werkboek_westland_okt16_def.pdf)

# WEAKNESSES & THREATS IN WESTLAND

## RISK OF FLOODING



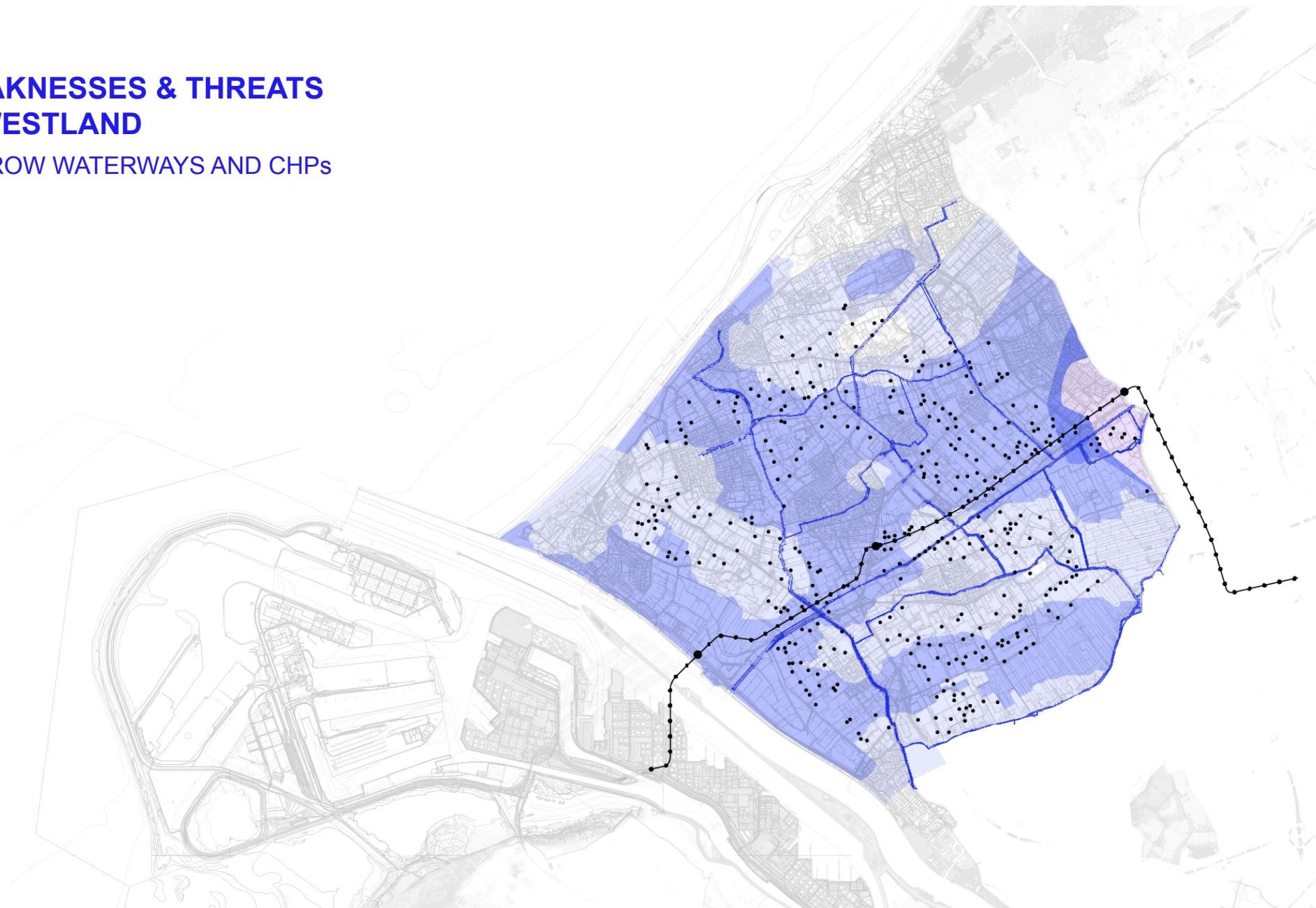
- MINIMAL INFILTRATION SYSTEM
- SMALL INFILTRATION SYSTEM
- MEDIUM INFILTRATION SYSTEM
- LARGE INFILTRATION SYSTEM
- SOIL EROSION RISK

SOURCES: MUST STEDEBOUW (2015). GEBIEDSFOTO WESTLAND – OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS: AUTHOR.  
GOEDBLOED, B., VAN DER HOEVEN, D., SASTROWITOMO, E., GROOTSCHOLTEN, E., COLOMBO, F., KOOLS, J., RAAP, K., VERTON, M., RIDDER, N., VERBON, P., LENTING, W., HOFSTEDE, W., WITSON, P.P. (2016). WERKBOEK WESTLAND: RUIMTELIJK ECONOMISCHE STRATEGIE  
GREENPORT 3.0 HOT - SATELLIET INFRA-ENERGIE-RUIMTE. RETRIEVED FROM [HTTPS://WWW.GEMEENTEWESTLAND.NL/FILEADMIN/DOCUMENTEN/ONDERNEMEN/WERKBOEK\\_WESTLAND\\_OKT16\\_DEF.PDF](https://www.gemeentewestland.nl/fileadmin/documenten/ondernemen/werkboek_westland_okt16_def.pdf)



# WEAKNESSES & THREATS IN WESTLAND

## NARROW WATERWAYS AND CHPs



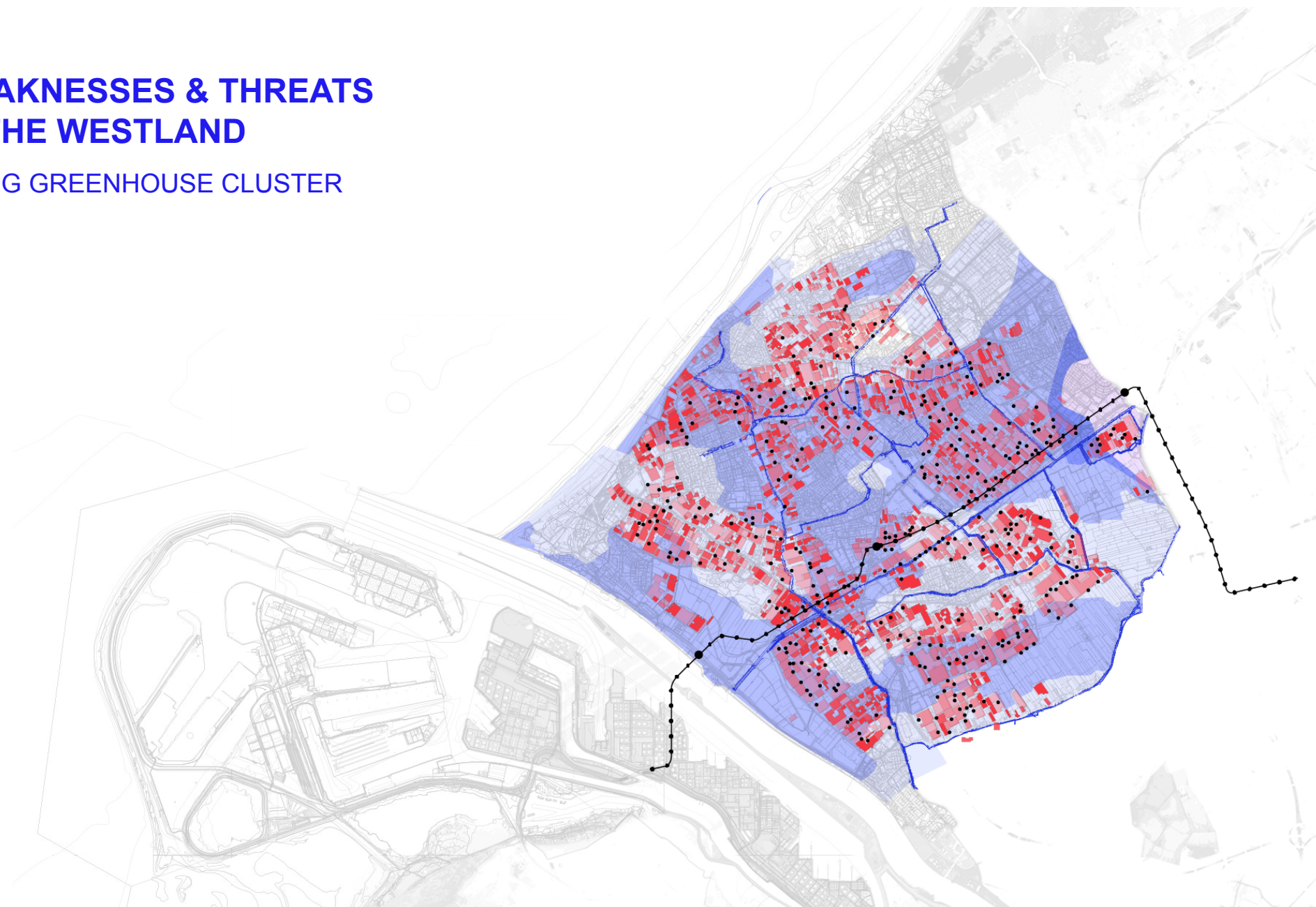
- MINIMAL INFILTRATION SYSTEM
- SMALL INFILTRATION SYSTEM
- MEDIUM INFILTRATION SYSTEM
- LARGE INFILTRATION SYSTEM
- SOIL EROSION RISK

SOURCES: MUST STEDEBOUW (2015). GEBIEDSFOTO WESTLAND – OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS: AUTHOR.  
GOEDBLOED, B., VAN DER HOEVEN, D., SASTROWITOMO, E., GROOTSCHOLTEN, E., COLOMBO, F., KOOLS, J., RAAP, K., VERTON, M., RIDDER, N., VERBON, P., LENTING, W., HOFSTEDE, W., WITSON, P.P. (2016). WERKBOEK WESTLAND: RUIMTELIJK ECONOMISCHE STRATEGIE  
GREENPORT 3.0 HOT - SATELLIET INFRA-ENERGIE-RUIMTE. RETRIEVED FROM [HTTPS://WWW.GEMEENTEWESTLAND.NL/FILEADMIN/DOCUMENTEN/ONDERNEMEN/WERKBOEK\\_WESTLAND\\_OKT16\\_DEF.PDF](https://www.gemeentewestland.nl/fileadmin/documenten/ondernemen/werkboek_westland_okt16_def.pdf)



# WEAKNESSES & THREATS IN THE WESTLAND

## AGING GREENHOUSE CLUSTER



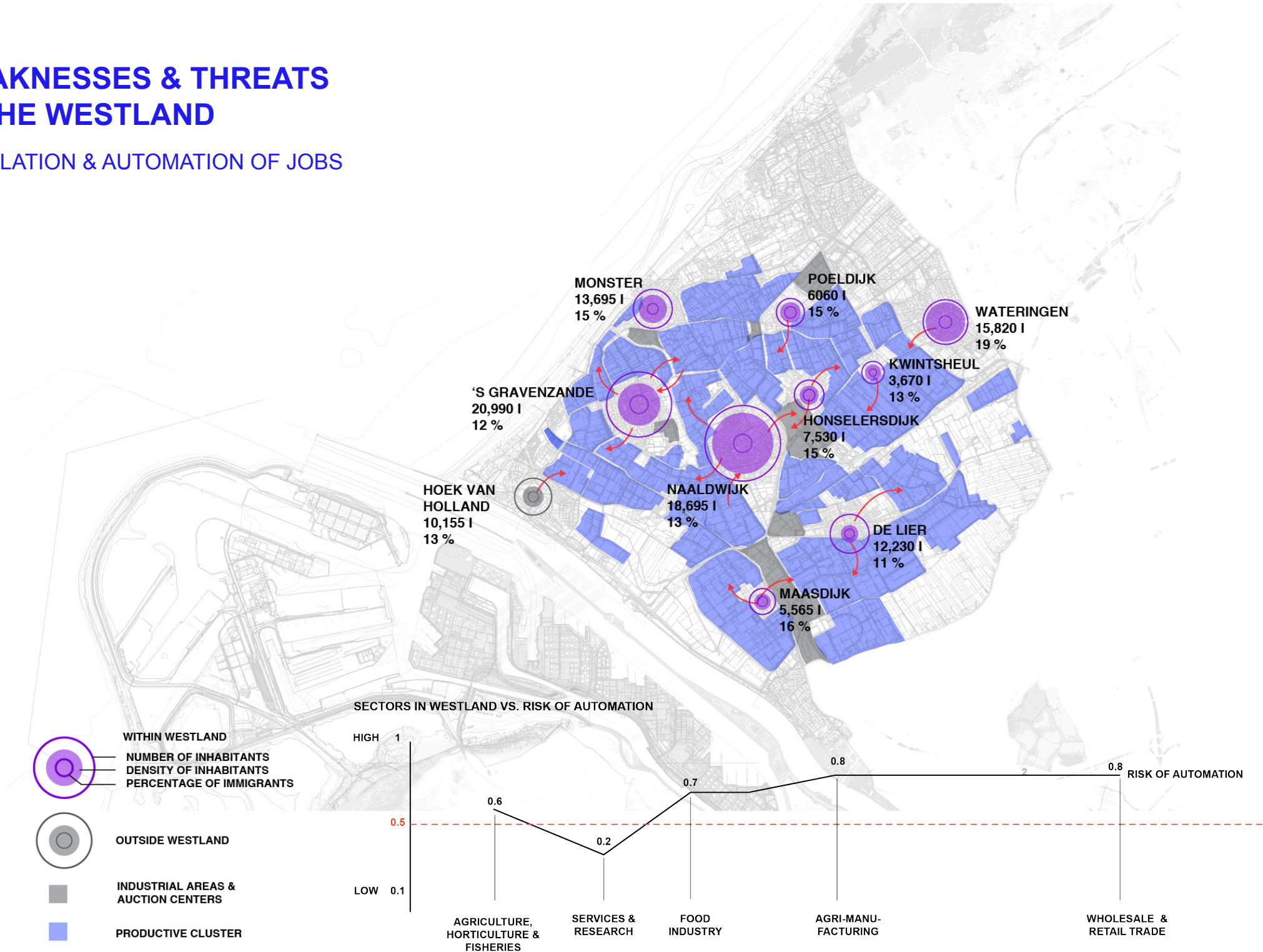
- MINIMAL INFILTRATION SYSTEM
- SMALL INFILTRATION SYSTEM
- MEDIUM INFILTRATION SYSTEM
- LARGE INFILTRATION SYSTEM
- SOIL EROSION RISK

- BEFORE 1980 (AGE OF GREENHOUSES)
- BETWEEN 1980 - 1990
- BETWEEN 1990 - 2000
- AFTER 2000

SOURCES: MUST STEDEBOUW (2015). GEBIEDSFOTO WESTLAND – OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS: AUTHOR.  
GOEDBLOED, B., VAN DER HOEVEN, D., SASTROWITOMO, E., GROOTSCHOLTEN, E., COLOMBO, F., KOOLS, J., RAAP, K., VERTON, M., RIDDER, N., VERBON, P., LENTING, W., HOFSTEDE, W., WITSON, P.P. (2016). WERKBOEK WESTLAND: RUIMTELIJK ECONOMISCHE STRATEGIE  
GREENPORT 3.0 HOT - SATELLIET INFRA-ENERGIE-RUIMTE. RETRIEVED FROM [HTTPS://WWW.GEMEENTEWESTLAND.NL/FILEADMIN/DOCUMENTEN/ONDERNEMEN/WERKBOEK\\_WESTLAND\\_OKT16\\_DEF.PDF](https://www.gemeentewestland.nl/fileadmin/documenten/ondernemen/werkboek_westland_okt16_def.pdf)

# WEAKNESSES & THREATS IN THE WESTLAND

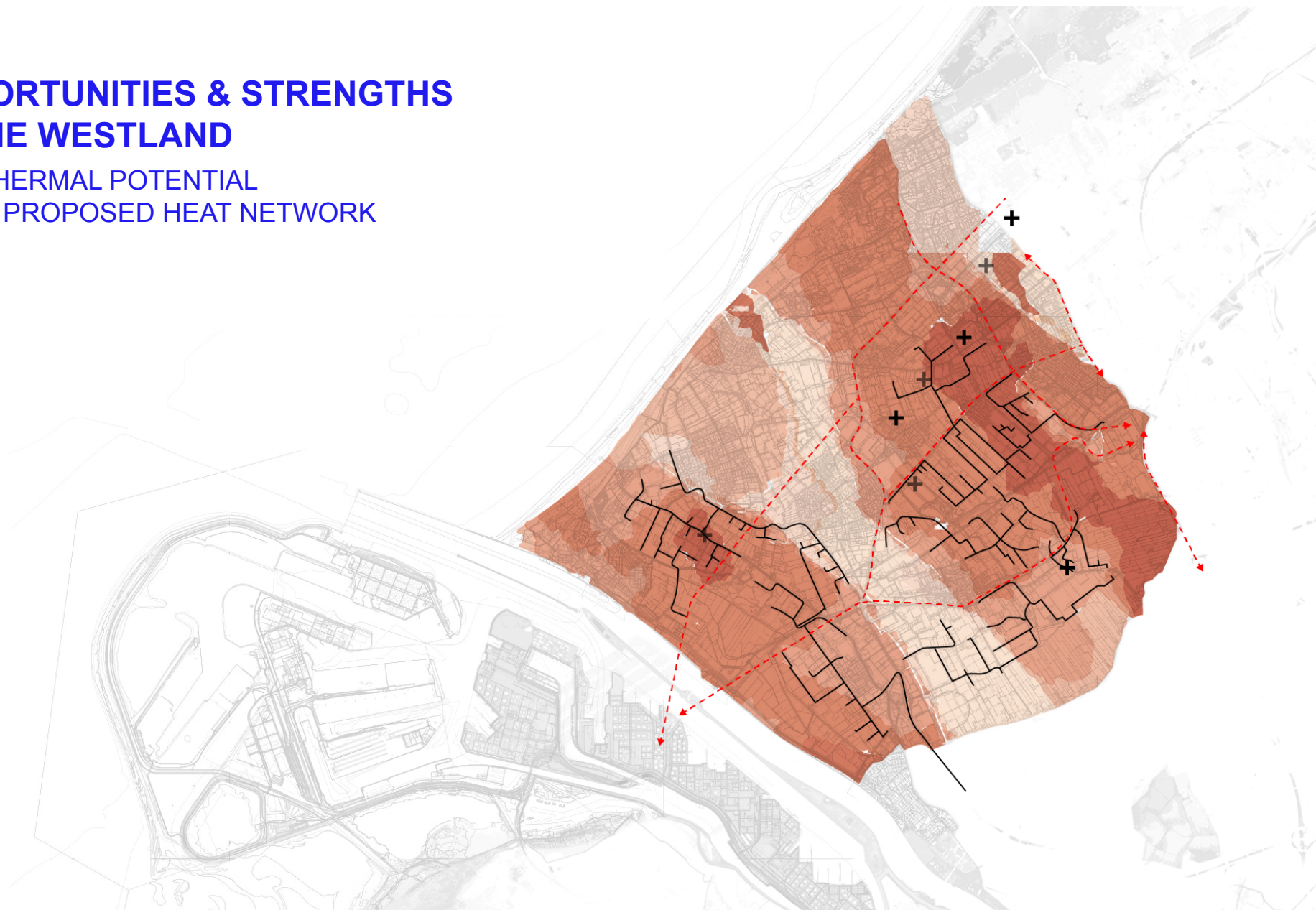
## POPULATION & AUTOMATION OF JOBS





# OPPORTUNITIES & STRENGTHS IN THE WESTLAND

GEOTHERMAL POTENTIAL  
CO<sub>2</sub> & PROPOSED HEAT NETWORK



+ POSSIBLE GEOTHERMAL SOURCE

+ GEOTHERMAL SOURCE

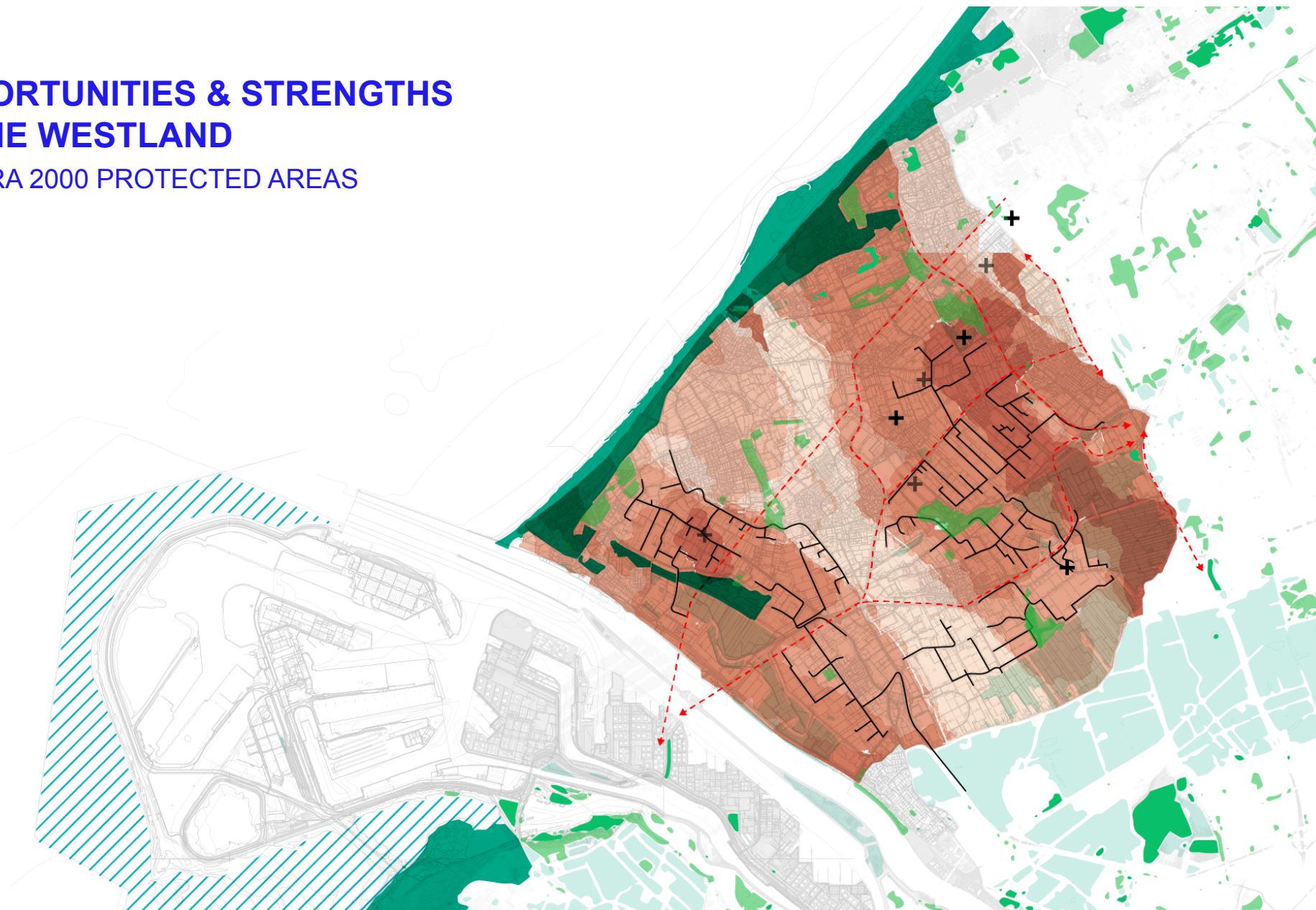
--- PROPOSED HEATING SYSTEM

LOW HIGH  
GEOTHERMAL POTENTIAL

SOURCES. MUST STEDEBOUW (2015). GEBIEDSFOTO WESTLAND – OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS: AUTHOR.  
GOEDBLOED, B., VAN DER HOEVEN, D., SASTROWITOMO, E., GROOTSCHOLTEN, E., COLOMBO, F., KOOLS, J., RAAP, K., VERTON, M., RIDDER, N., VERBON, P., LENTING, W., HOFSTEDE, W., WITSON, P.P. (2016). WERKBOEK WESTLAND: RUIMTELIJK ECONOMISCHE STRATEGIE GREENPORT 3.0 HOT - SATELLIET INFRA-ENERGIE-RUIMTE. RETRIEVED FROM [HTTPS://WWW.GEMEENTEWESTLAND.NL/FILEADMIN/DOCUMENTEN/ONDERNEMEN/WERKBOEK\\_WESTLAND\\_OKT16\\_DEF.PDF](https://www.gemeentewestland.nl/fileadmin/documenten/ondernemen/werkboek_westland_okt16_def.pdf)

# OPPORTUNITIES & STRENGTHS IN THE WESTLAND

## NATURA 2000 PROTECTED AREAS



+ POSSIBLE GEOTHERMAL SOURCE

+ GEOTHERMAL SOURCE

--- PROPOSED HEATING SYSTEM

LOW HIGH  
GEOTHERMAL POTENTIAL

/// NATURA 2000 | BIRDS DIRECTIVE SITE

■ NATURA 2000 PROTECTED SITES

■ AGRICULTURE USES

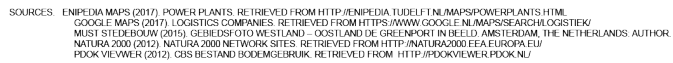
■ FOREST

■ PARKS & RECREATIONAL USES

SOURCES. MUST STEDEBOUW (2015). GEBIEDSFOTO WESTLAND – OOSTLAND DE GREENPORT IN BEELD. AMSTERDAM, THE NETHERLANDS: AUTHOR.  
GOEDBLOED, B., VAN DER HOEVEN, D., SASTROWITOMO, E., GROOTSCHOLTEN, E., COLOMBO, F., KOOLS, J., RAAP, K., VERTON, M., RIDDER, N., VERBON, P., LENTING, W., HOFSTEDE, W., WITSON, P.P. (2016). WERKBOEK WESTLAND: RUIMTELIJK ECONOMISCHE STRATEGIE GREENPORT 3.0 HOT - SATELLIET INFRA-ENERGIE-RUIMTE. RETRIEVED FROM [HTTPS://WWW.GEMEENTEWESTLAND.NL/FILEADMIN/DOCUMENTEN/ONDERNEMEN/WERKBOEK\\_WESTLAND\\_OKT16\\_DEF.PDF](https://www.gemeentewestland.nl/fileadmin/documenten/ondernemen/werkboek_westland_okt16_def.pdf)

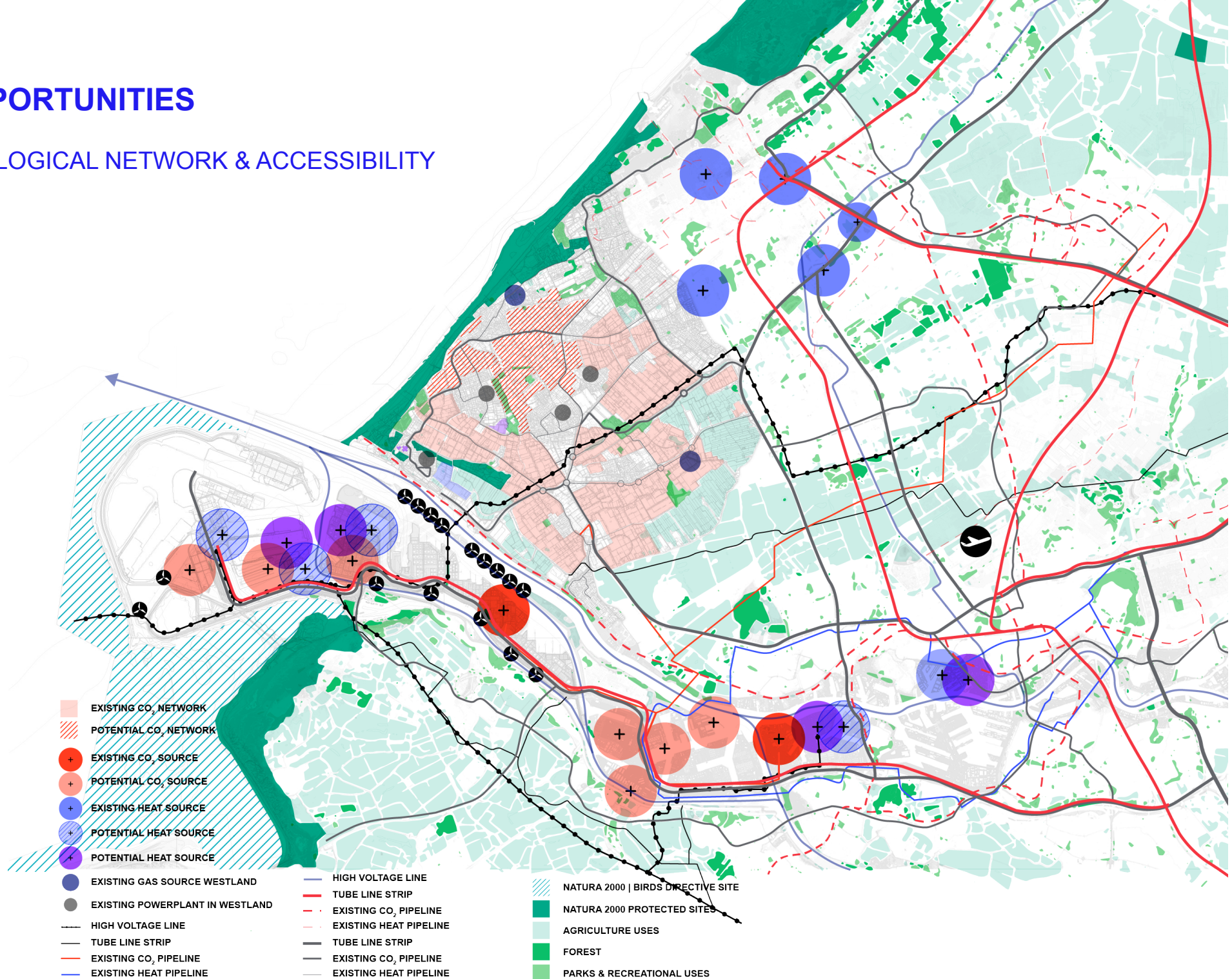


# INDUSTRIES PORT OF ROTTERDAM



# OPPORTUNITIES

## ECOLOGICAL NETWORK & ACCESSIBILITY

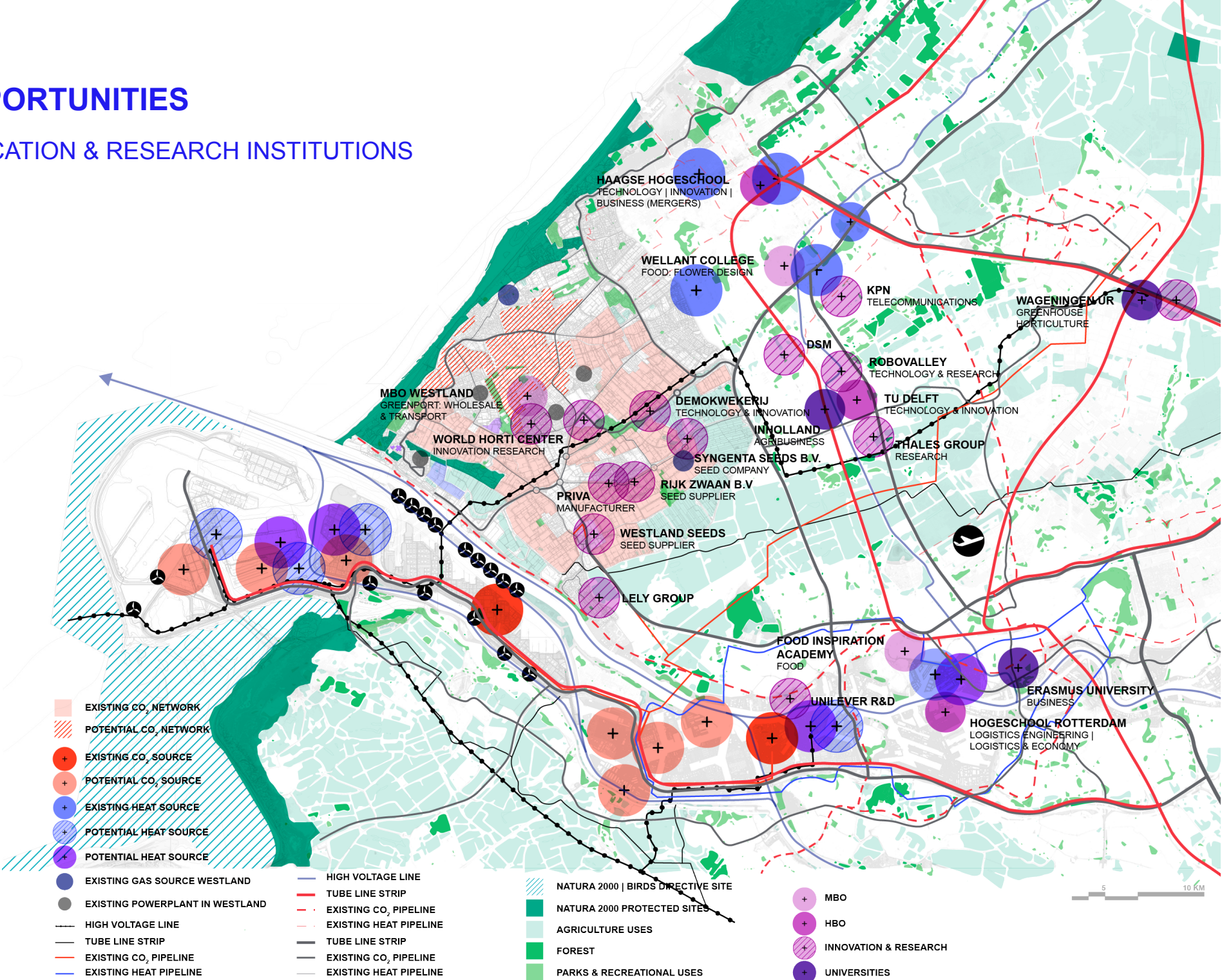


SOURCES: ENIPEDIA MAPS (2017). POWER PLANTS. RETRIEVED FROM [HTTP://ENIPEDIA.TUelft.nl/maps/powerplants.html](http://enipedia.tuelft.nl/maps/powerplants.html).  
 GOOGLE MAPS (2017). LOGISTICS COMPANIES. RETRIEVED FROM [HTTPS://WWW.GOOGLE.NL/MApS/SEARCH/LOGISTIEK/](https://www.google.nl/maps/search/logistiek/mist-studebouw)  
 MUST STUDEBOUW (2015). GEBOEDSFTO WESTLAND - OOSTLAND DE GREENPORT IN BELD. AMSTERDAM, THE NETHERLANDS. AUTHOR.  
 NATURA 2000 (2012). NATURA 2000 NETWORK SITES. RETRIEVED FROM [HTTP://NATURA2000.EEA.EUROPA.EU/](http://natura2000.eea.europa.eu/)  
 POKK VIEWWER (2012). CBS BESTAND BOEDMGEbruik. RETRIEVED FROM [HTTP://POOKVIEWER.POOK.NL/](http://pookviewer.pook.nl/)



# OPPORTUNITIES

## EDUCATION & RESEARCH INSTITUTIONS

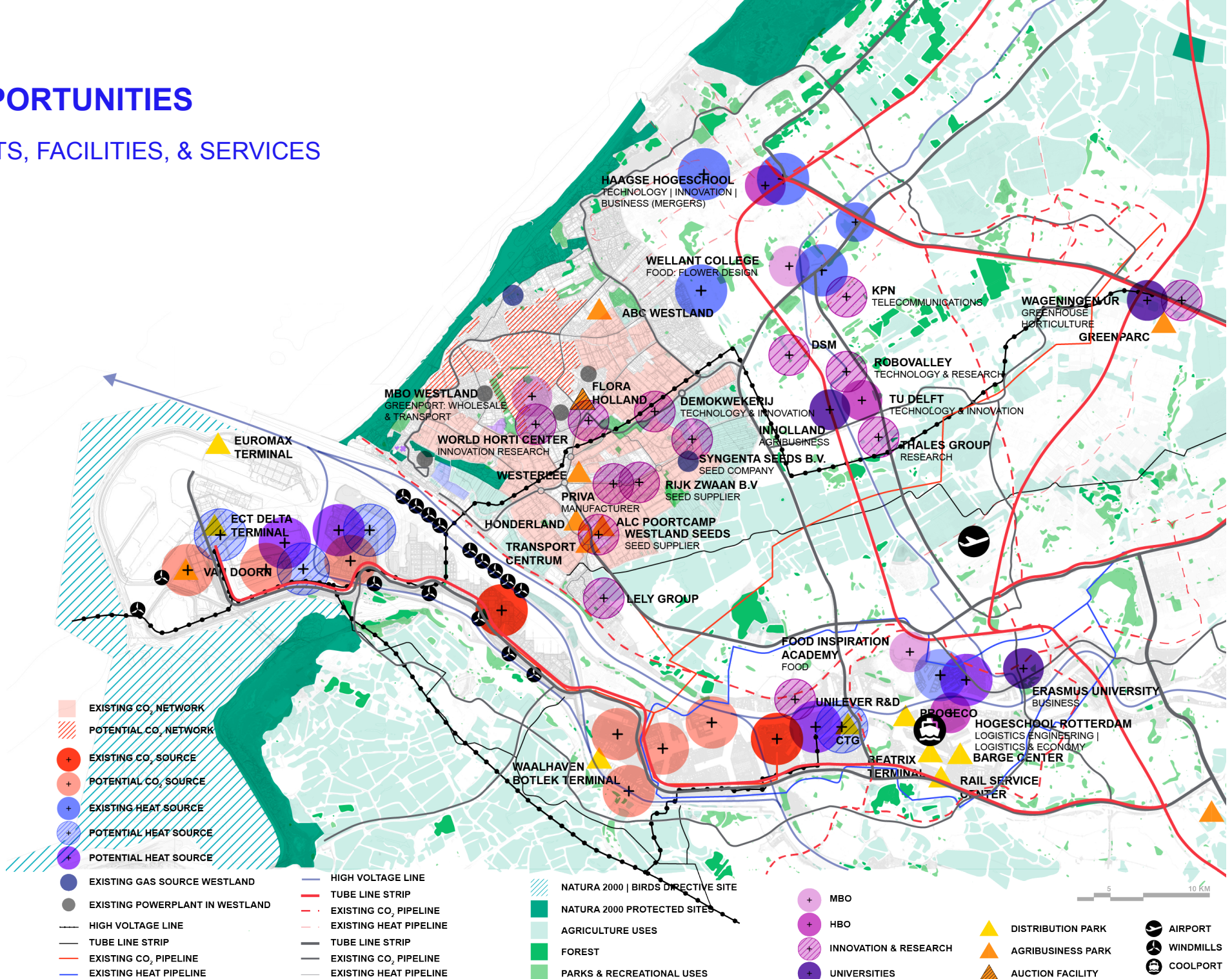


SOURCES: ENIPEDIA MAPS (2017). POWER PLANTS. RETRIEVED FROM [HTTP://ENIPEDIA.TUDELFT.NL/MAPS/POWERPLANTS.HTML](http://enipedia.tuelft.nl/maps/powerplants.html).  
GOOGLE MAPS (2017). LOGISTICS COMPANIES. RETRIEVED FROM [HTTPS://WWW.GOOGLE.NL/MAPS/SEARCH/LOGISTIEK/](https://www.google.nl/maps/search/logistiek/mist%20studebouw).  
MIST STUDEBOUW (2015). GEBOEDSFOOT WESTLAND - OOSTLAND DE GREENPORT IN BELD. AMSTERDAM, THE NETHERLANDS. AUTHOR.  
NATURA 2000 (2012). NATURA 2000 NETWORK SITES. RETRIEVED FROM [HTTP://NATURA2000.EEA.EUROPA.EU/](http://natura2000.eea.europa.eu/).  
POOK VEEWER (2012). CBS BESTAND BOODEMBEGRUIK. RETRIEVED FROM [HTTP://POOKVIEWER.POOK.NL/](http://pookviewer.pook.nl/).



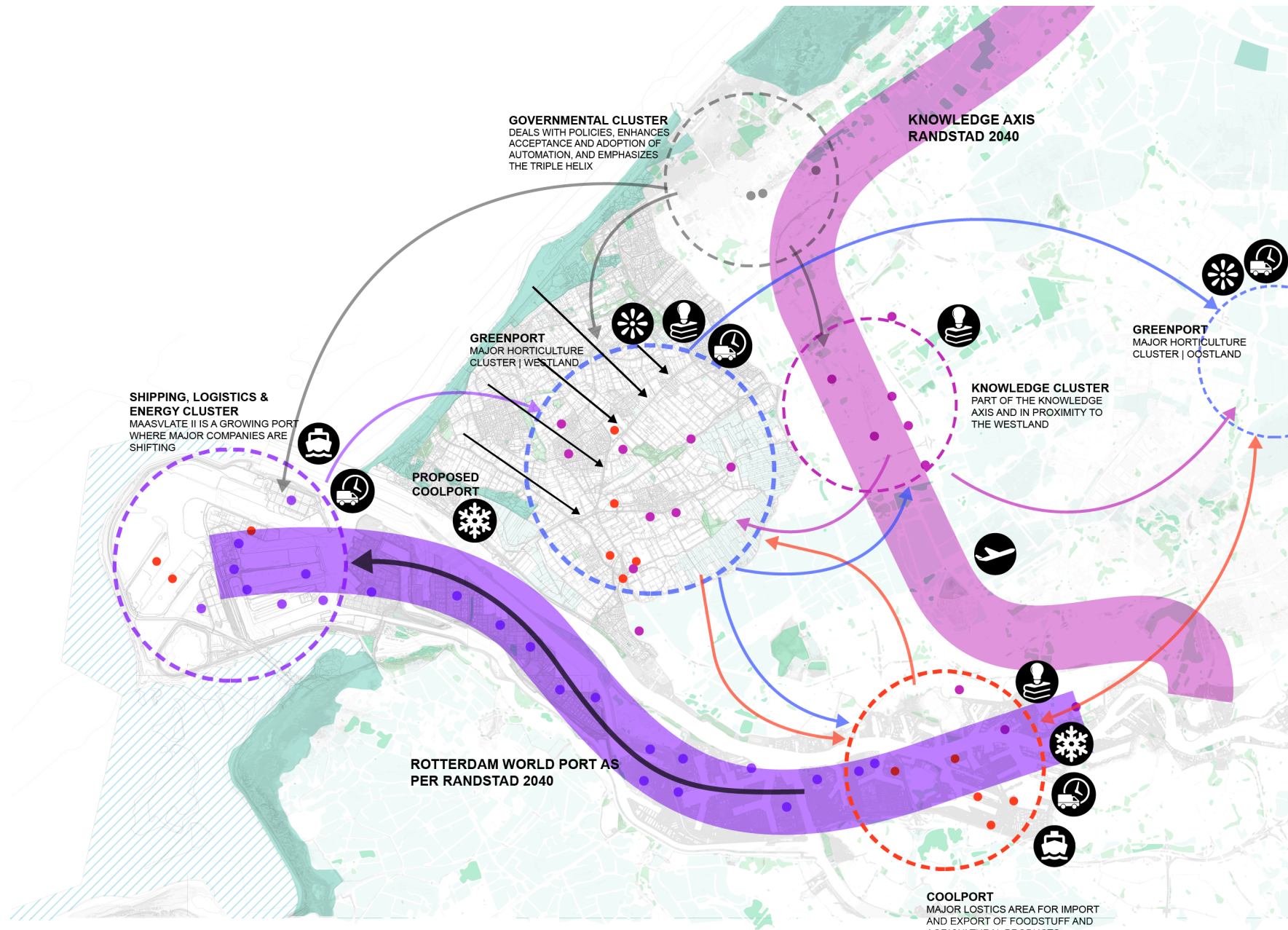
# OPPORTUNITIES

## PORTS, FACILITIES, & SERVICES



SOURCES: ENIPEDIA MAPS (2017). POWER PLANTS. RETRIEVED FROM [HTTP://ENIPEDIA.TUDEF.TU.NL/MAPS/POWERPLANTS.HTML](http://enipedia.tuelf.nl/maps/powerplants.html).  
GOOGLE MAPS (2017). LOGISTICS COMPANIES. RETRIEVED FROM [HTTPS://WWW.GOOGLE.NL/MAPS/SEARCH/LOGISTIEK/MUST%20STUDEBOUW](https://www.google.nl/maps/search/logistiek/must%20studebouw).  
NATURA 2000 (2012). NATURA 2000 NETWORK SITES. RETRIEVED FROM [HTTP://NATURA2000.FEA.EUROPA.EU/](http://natura2000.fea.europa.eu/).  
POOK VEEWER (2012). CBS BESTAND BOODEMGEBRUIK. RETRIEVED FROM [HTTP://POOKVIEWER.POOK.NL/](http://pookviewer.pook.nl/).





6

VISION





### **INTEGRATION**

INTEGRATION OF IMMI-GRANTS, RESIDENTS & NEW-COMERS



### **ENVIRONMENTALISM**



### **HEALTHY CITIES**



### **ECONOMIC + SOCIAL DIVERSITY**



### **EQUAL OPPORTUNITIES** BETWEEN IMMIGRANTS, RESIDENTS & NEW-COMERS



### **SOCIAL ENGAGEMENT + INCLUSIVNESS**



### **COMMUNITY RESILIENCE**



### **INNOVATION**



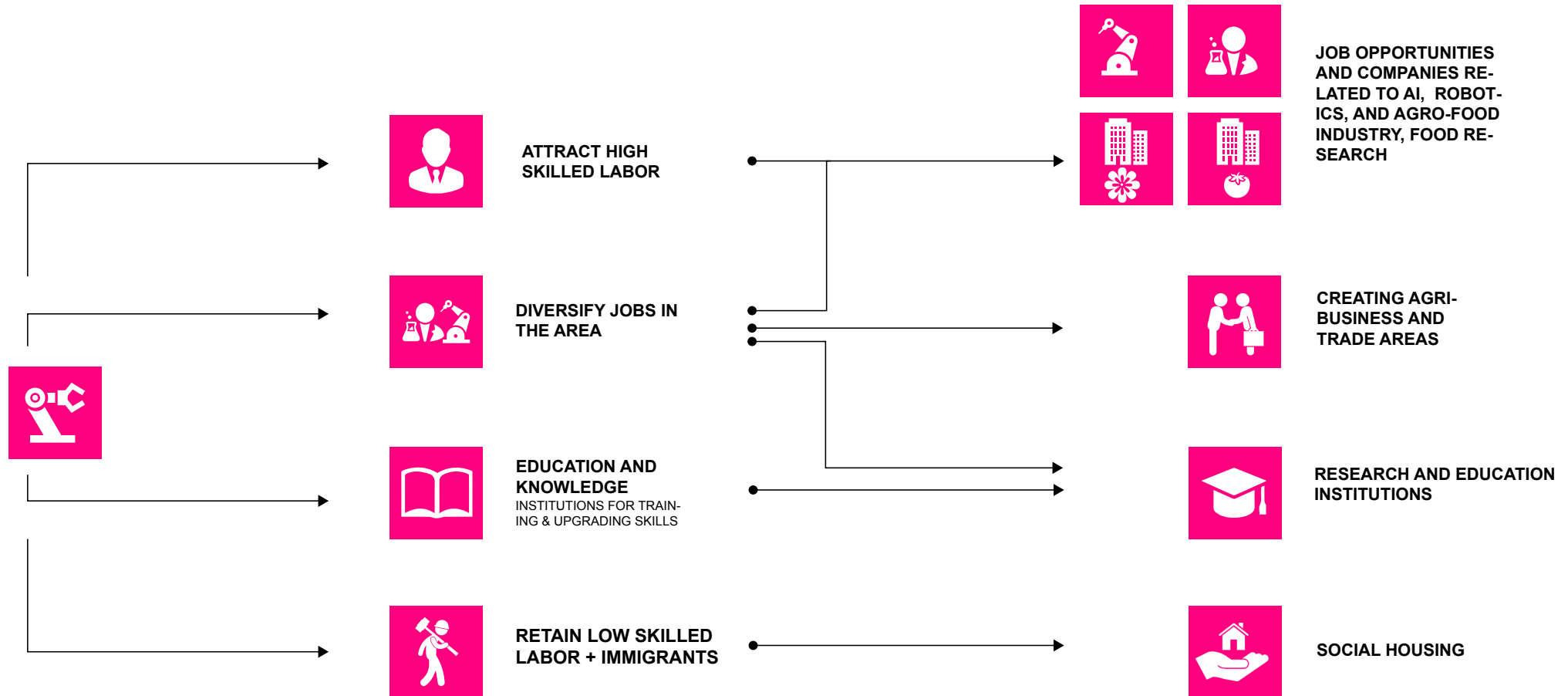
### **EQUAL PAY + EQUITY**



 **COMMON GOALS**

 **PROPOSED GOALS**

**PROPOSED GOALS**



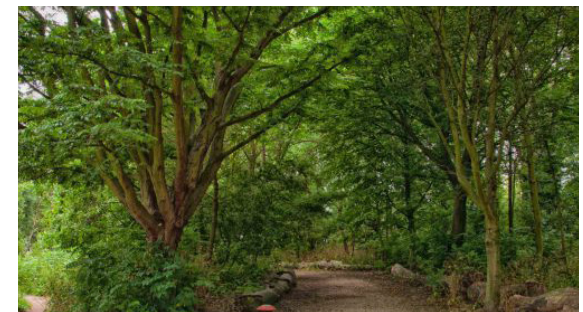
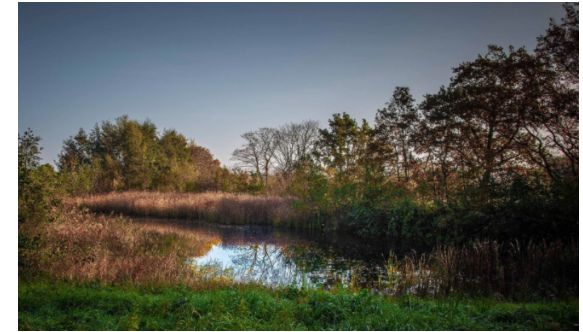




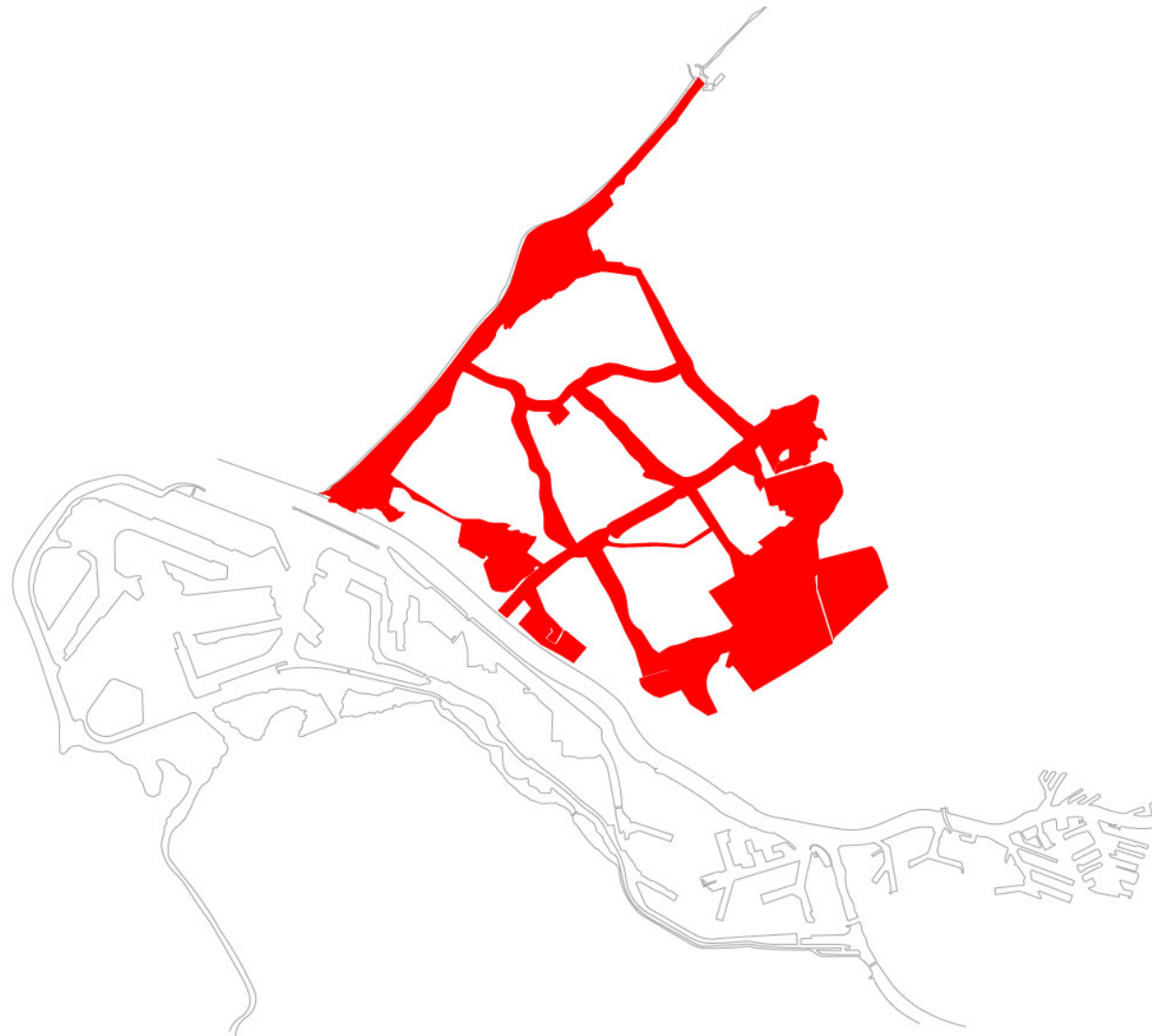








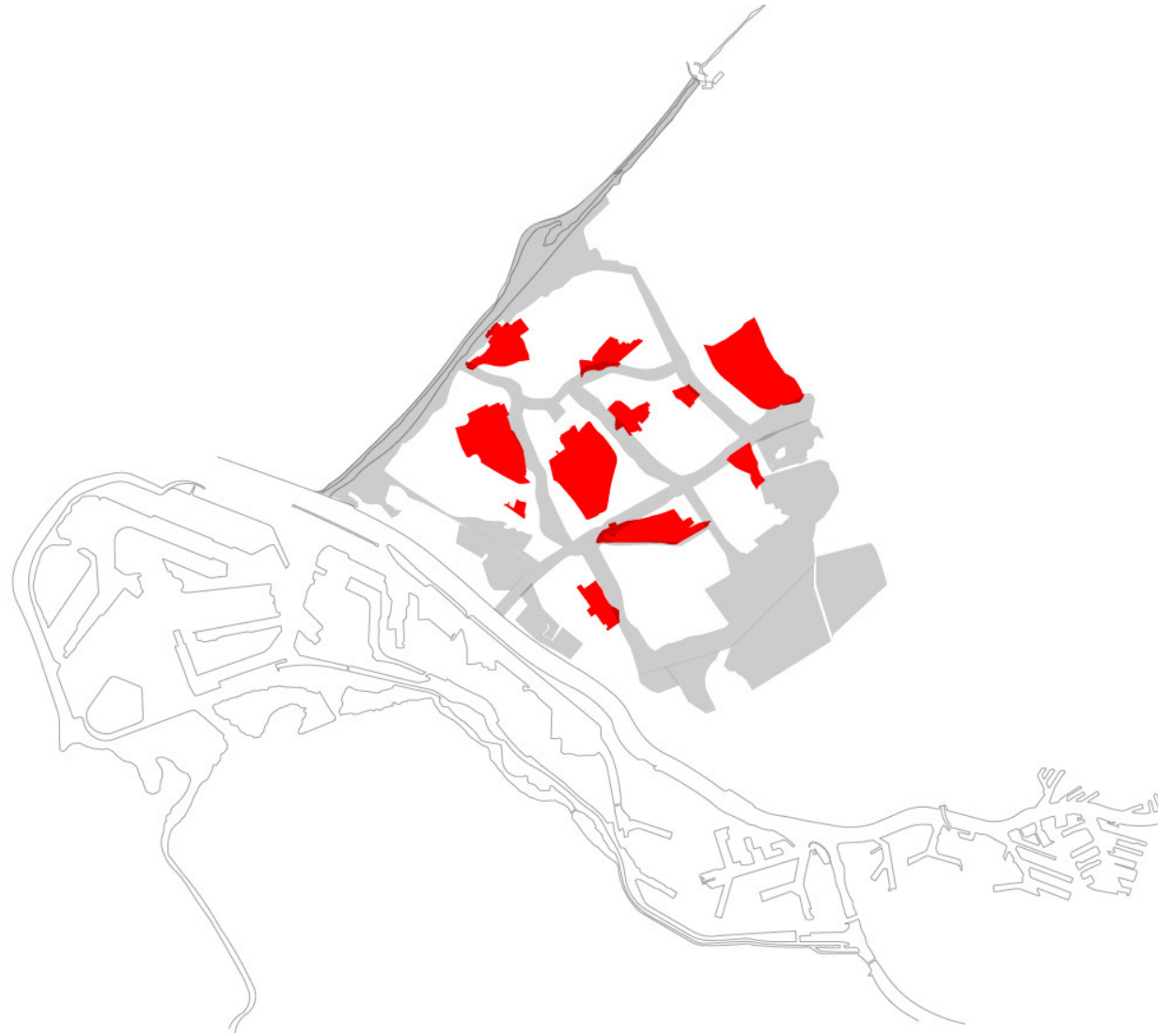






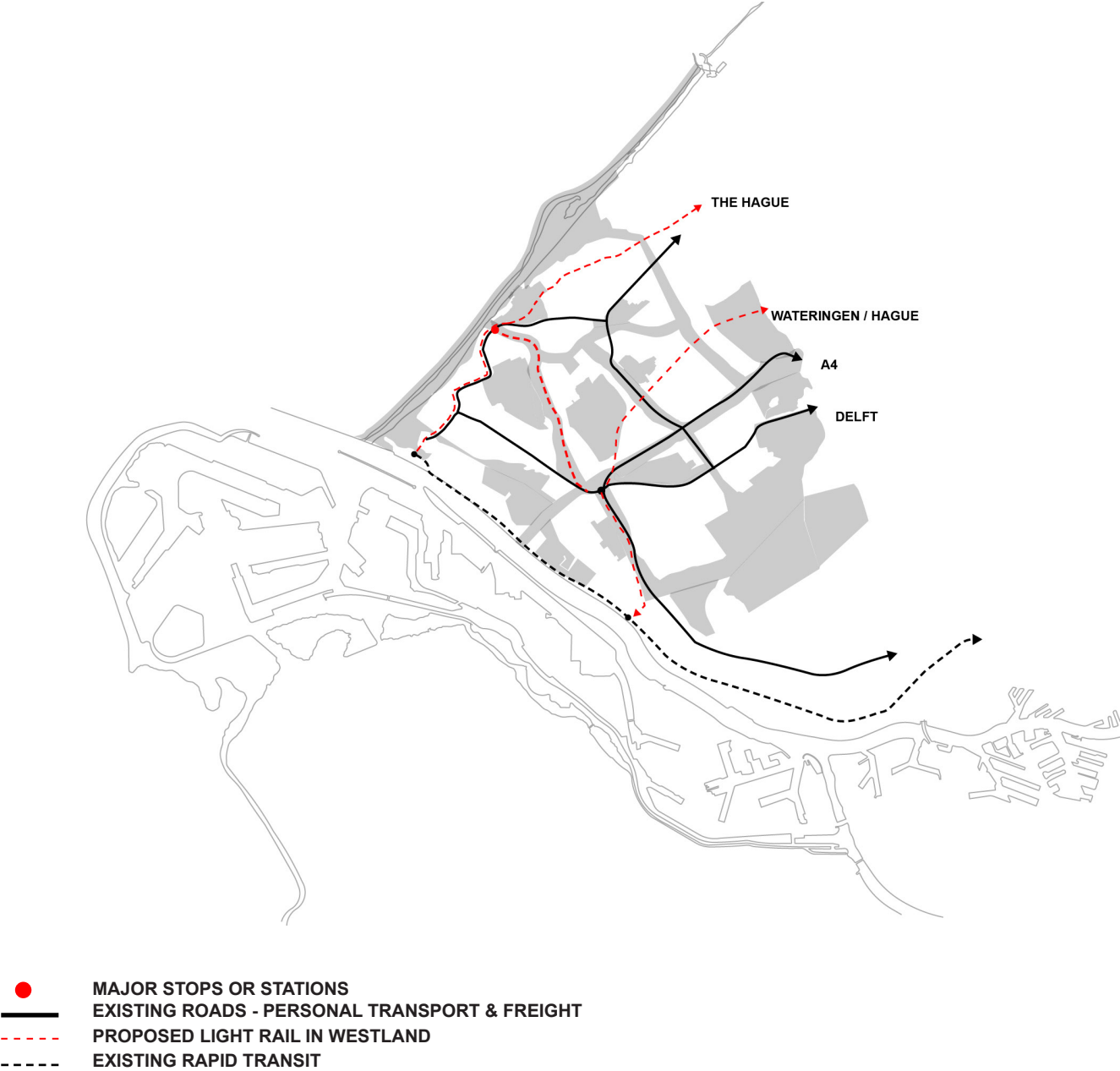












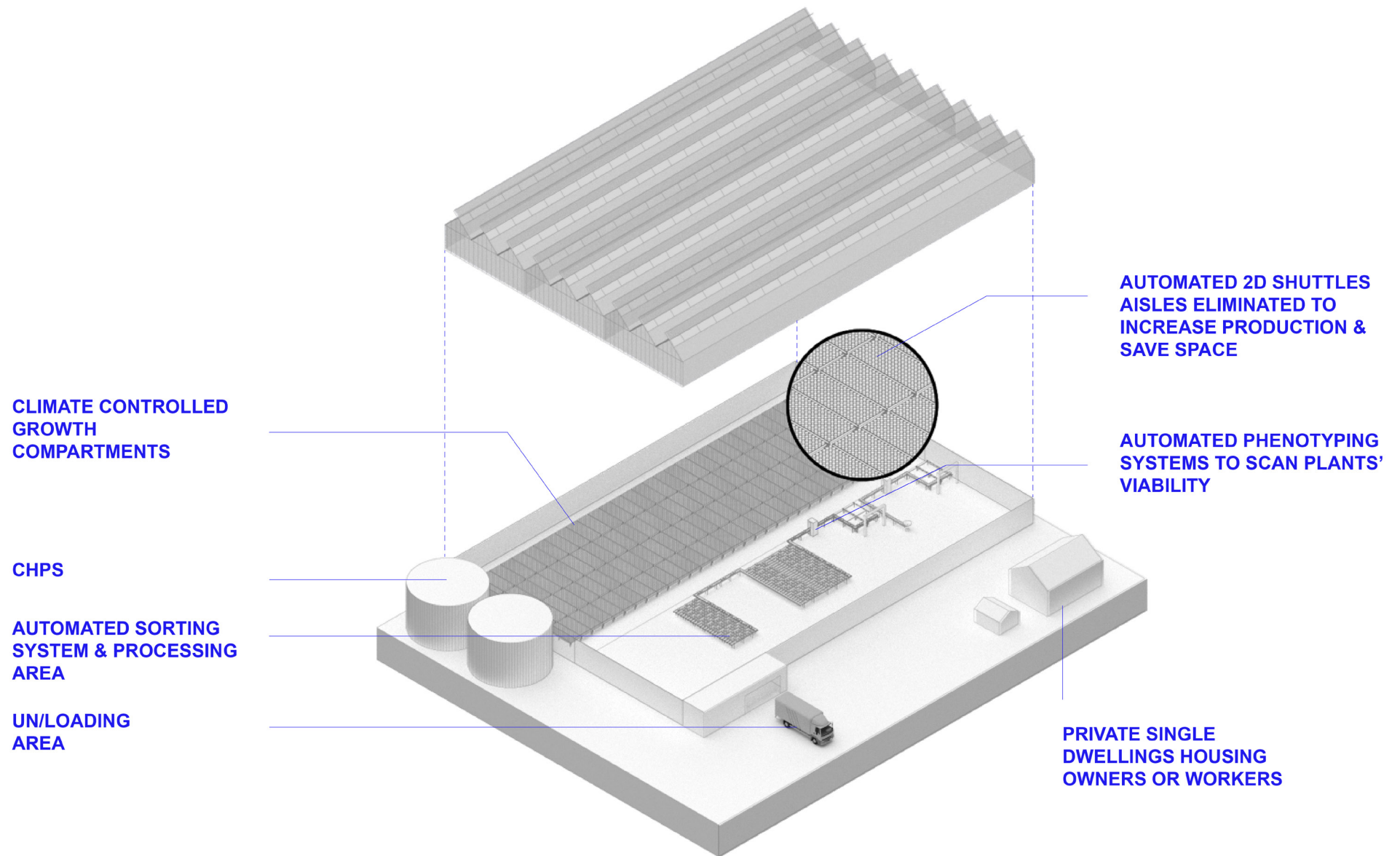














Source. Locatelli, L. (2017). Furrows of artificial light lend an otherworldly aura to Westland, the greenhouse capital of the Netherlands. Climate-controlled farms such as these grow crops around the clock and in every kind of weather. [Image]. Retrieved from <https://www.nationalgeographic.com/magazine/2017/09/holland-agriculture-sustainable-farming/>

**INEFFICIENT USE OF SPACE**

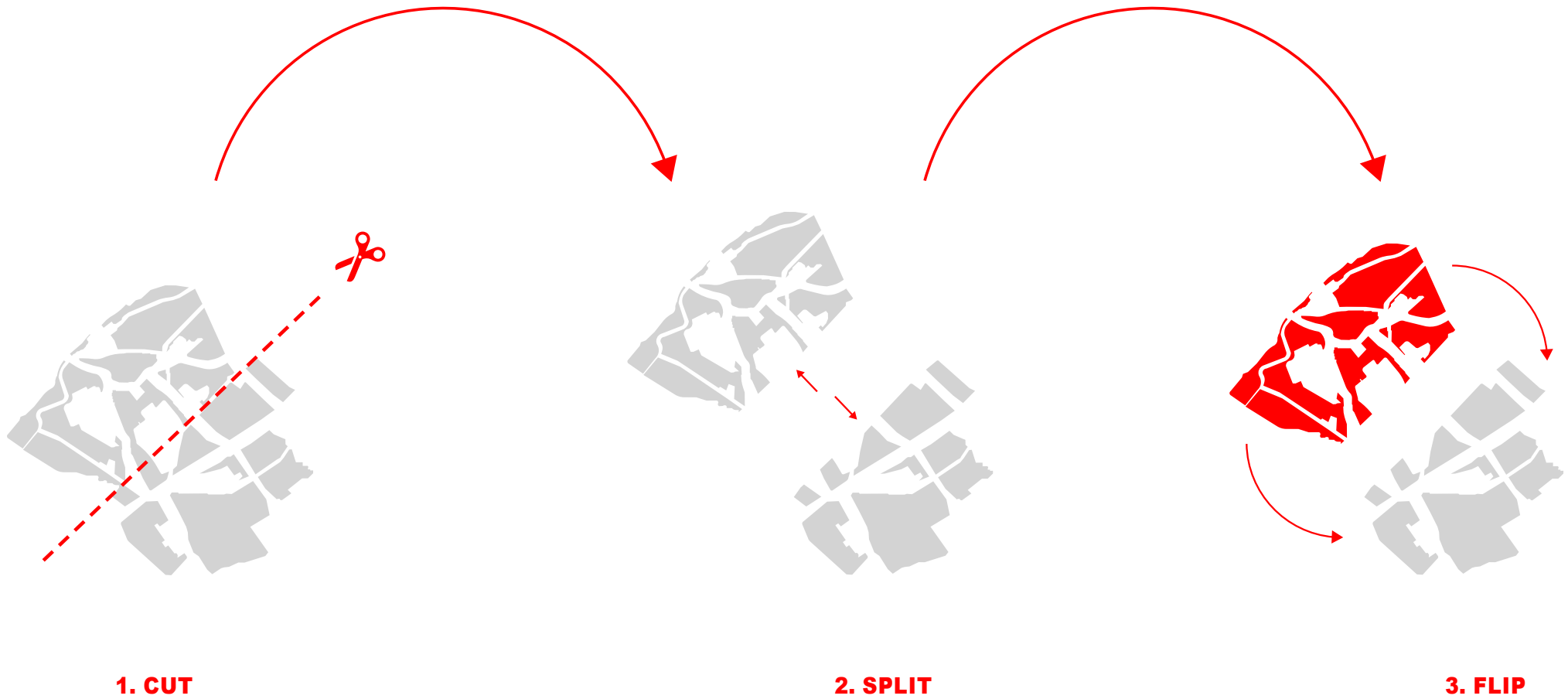


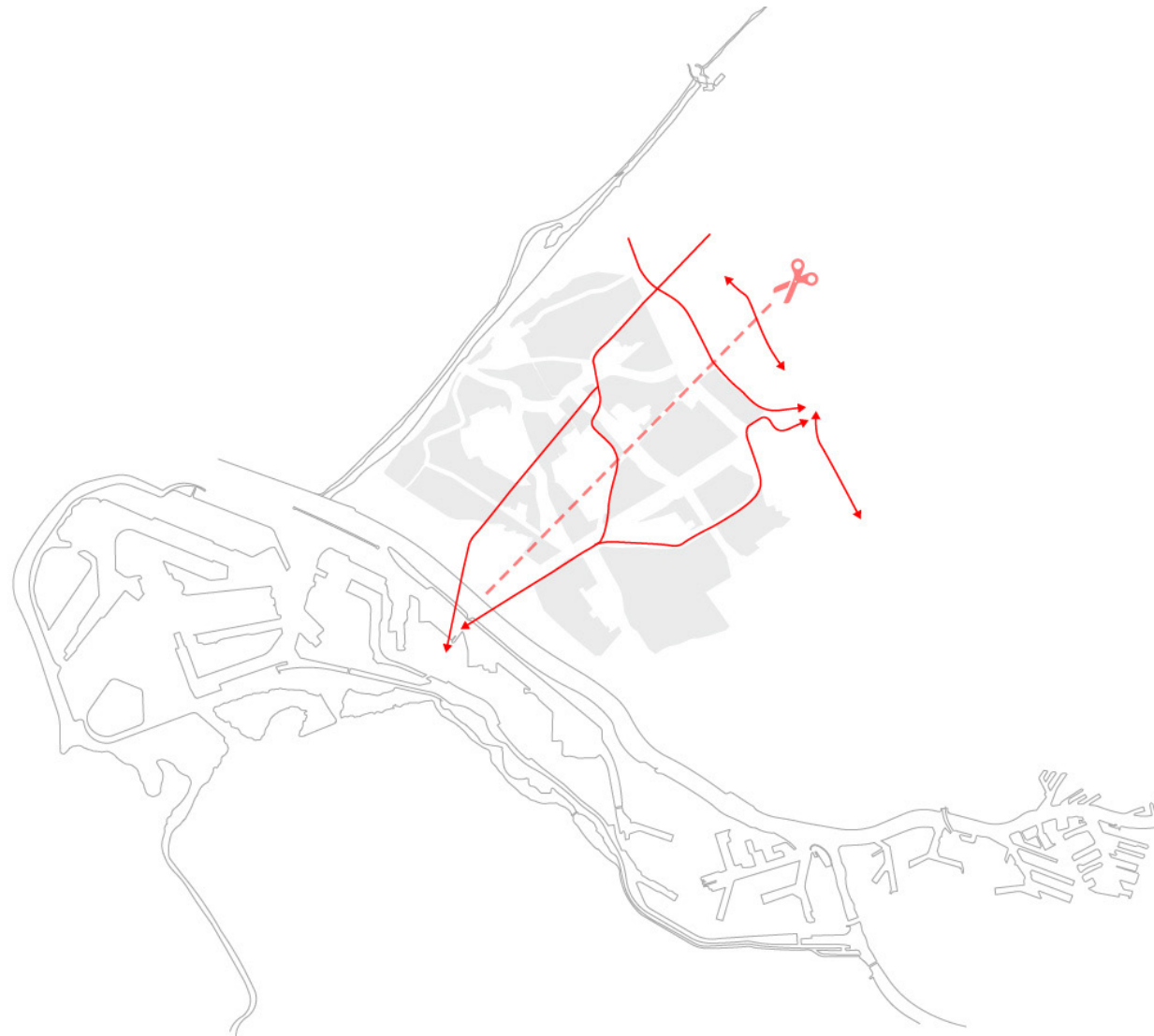
7

STRATEGY

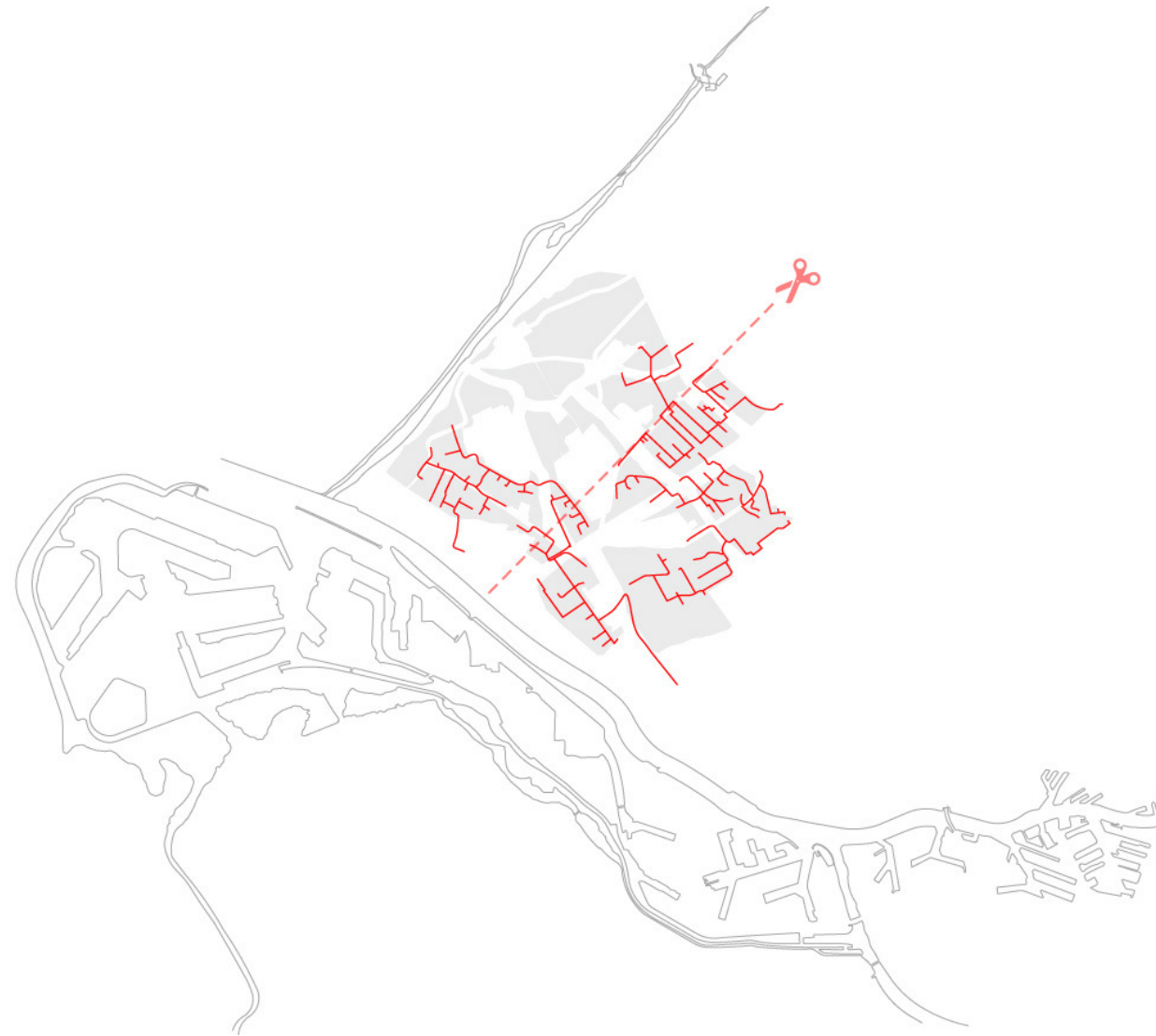




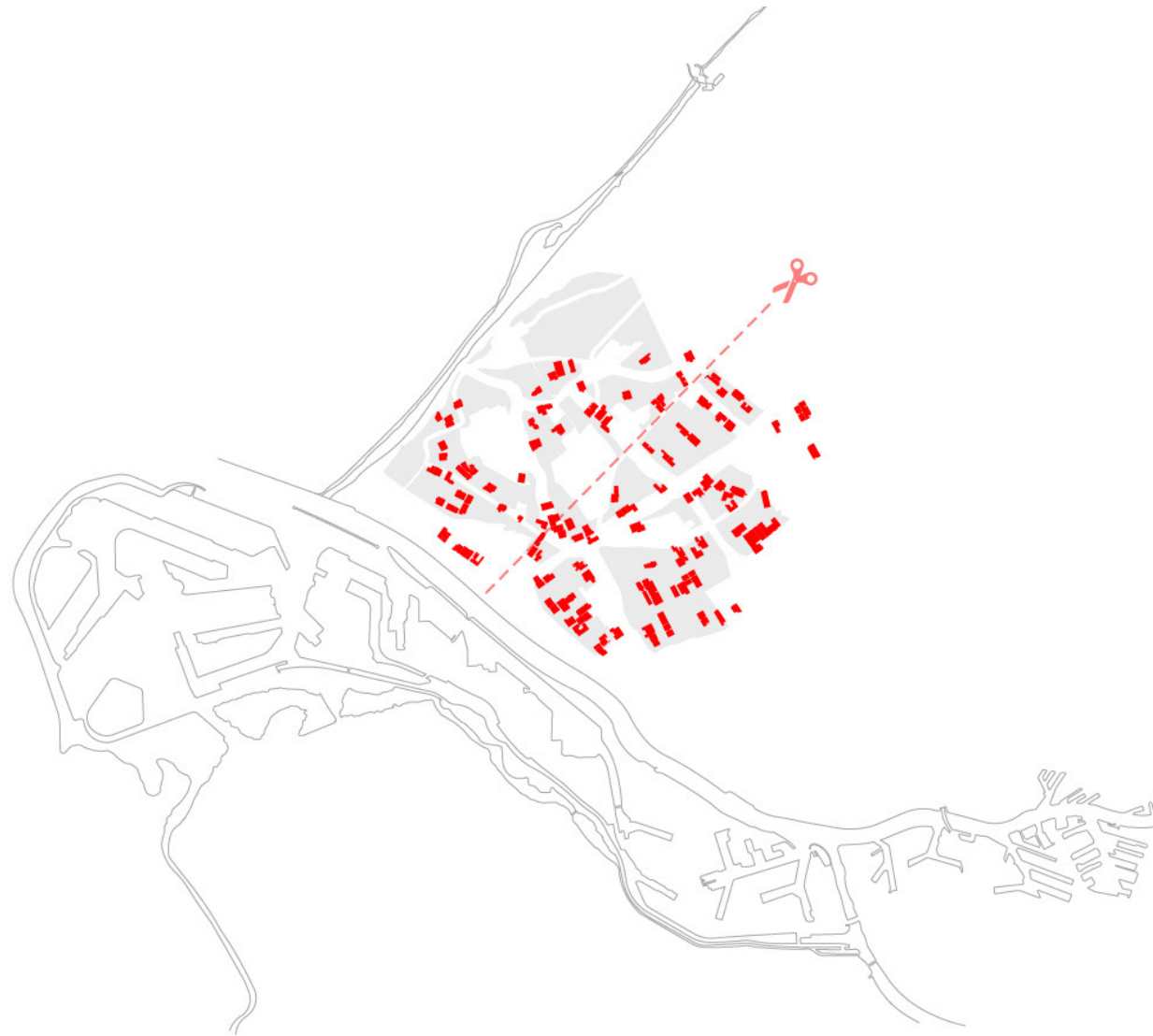




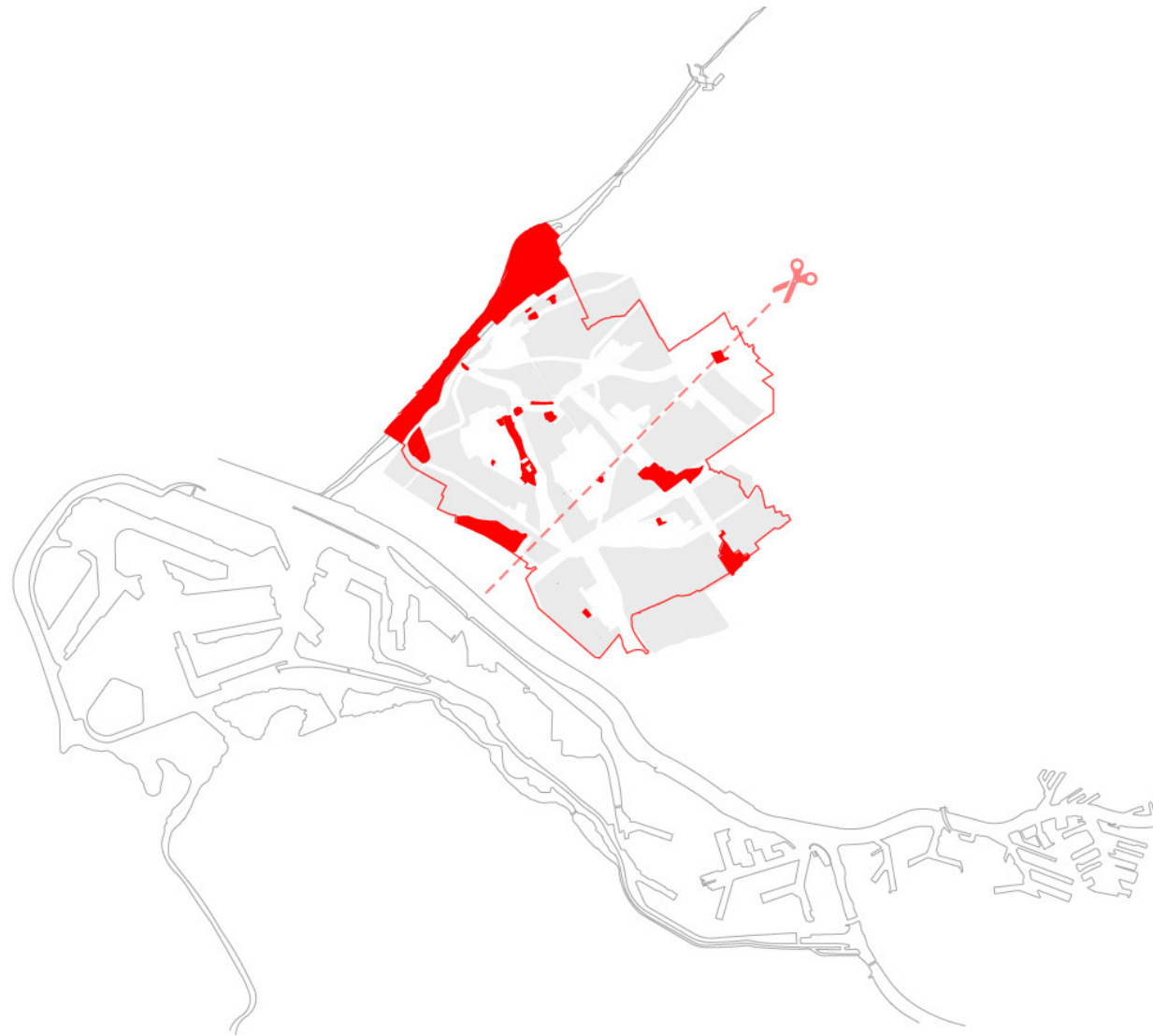








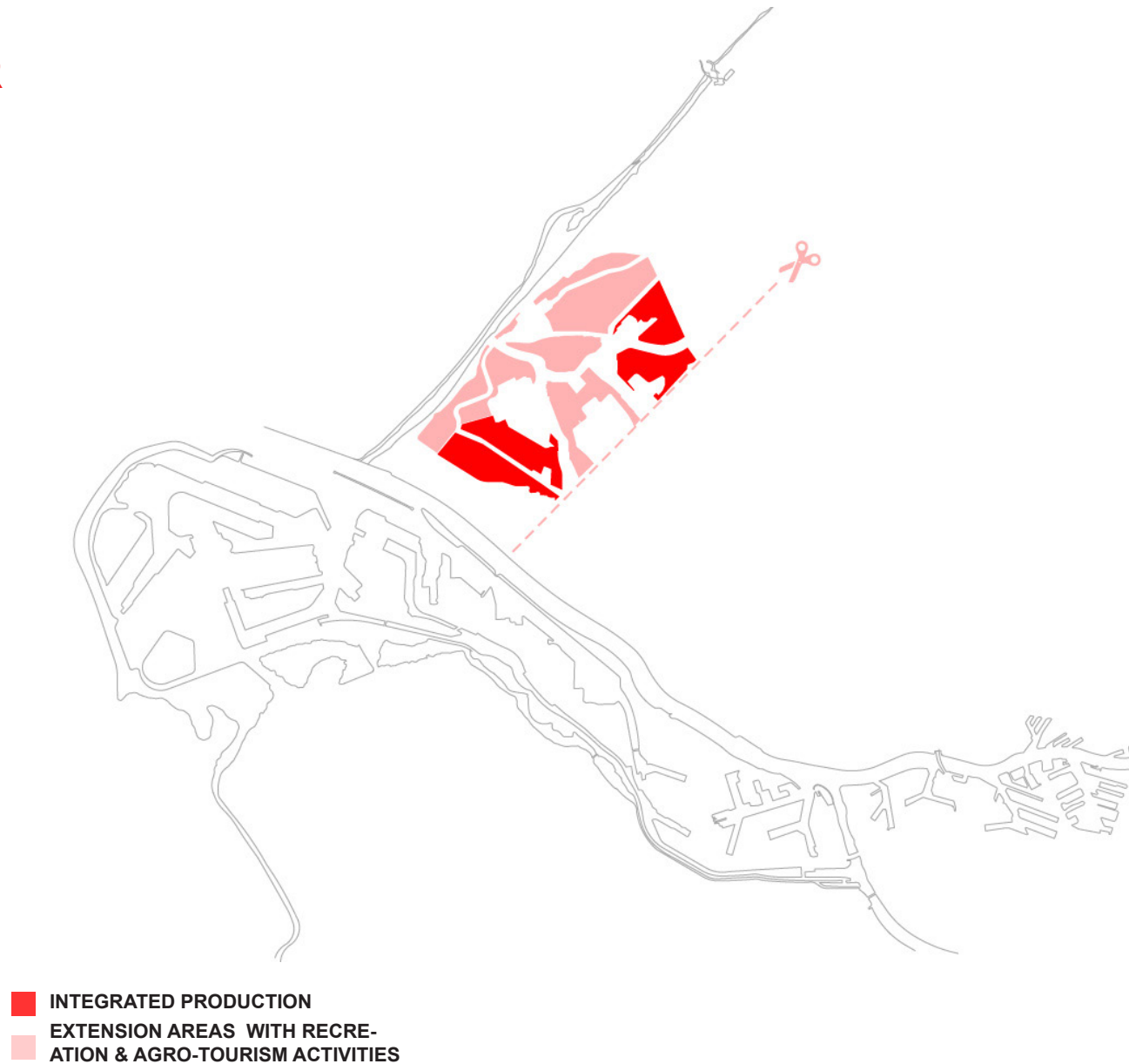






# LEISURE

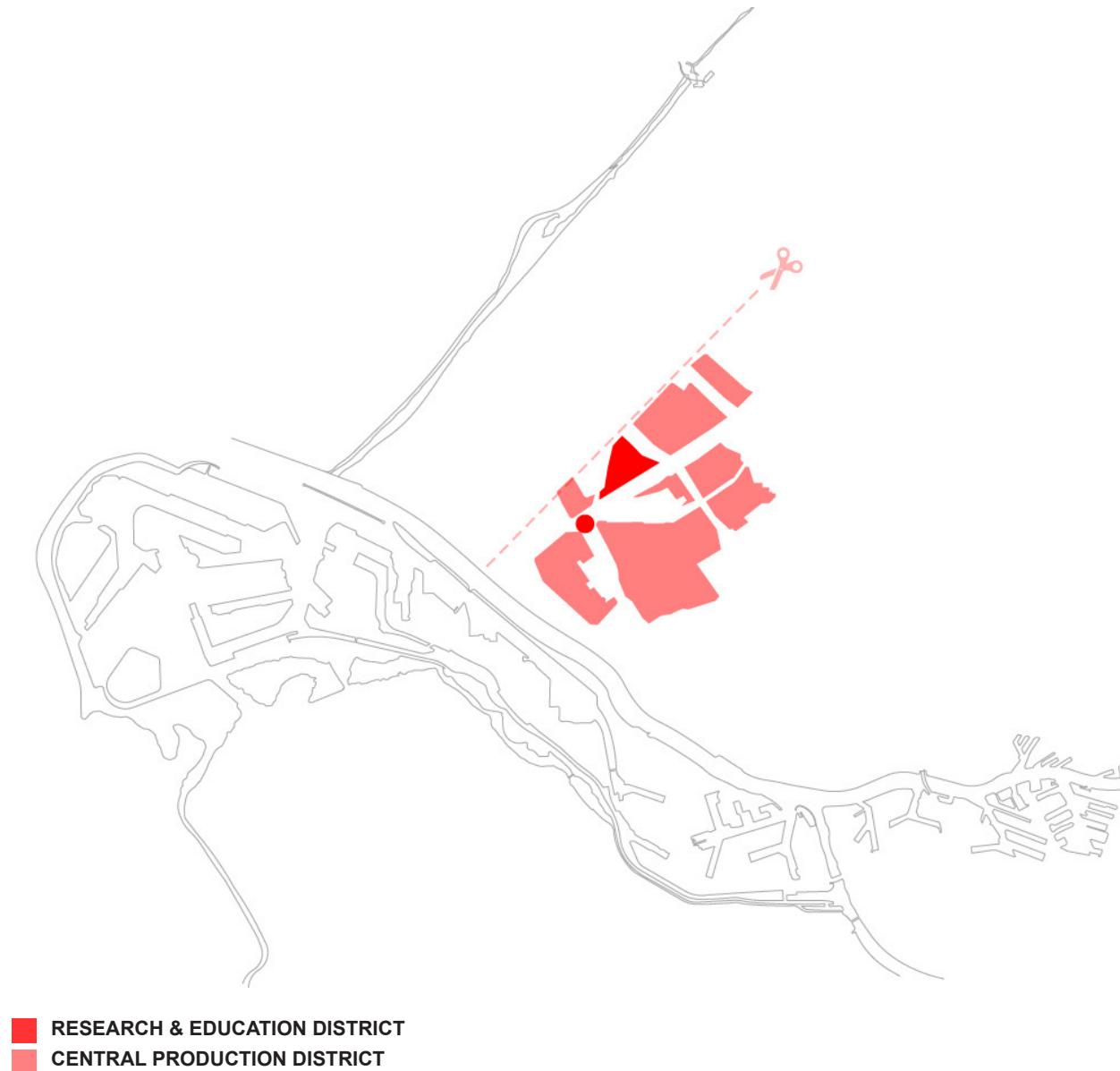
## CIVILIZED TAKEOVER

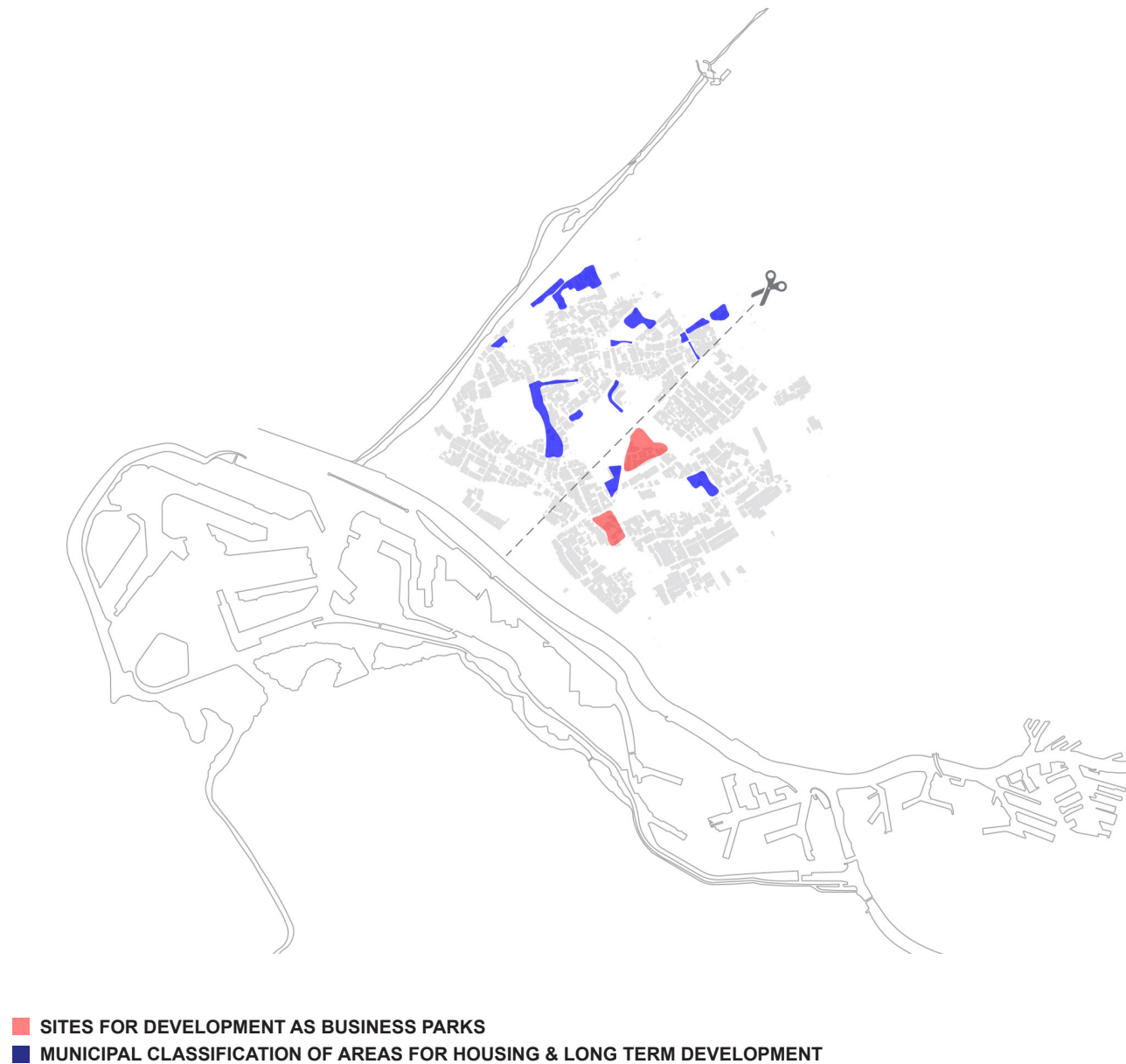


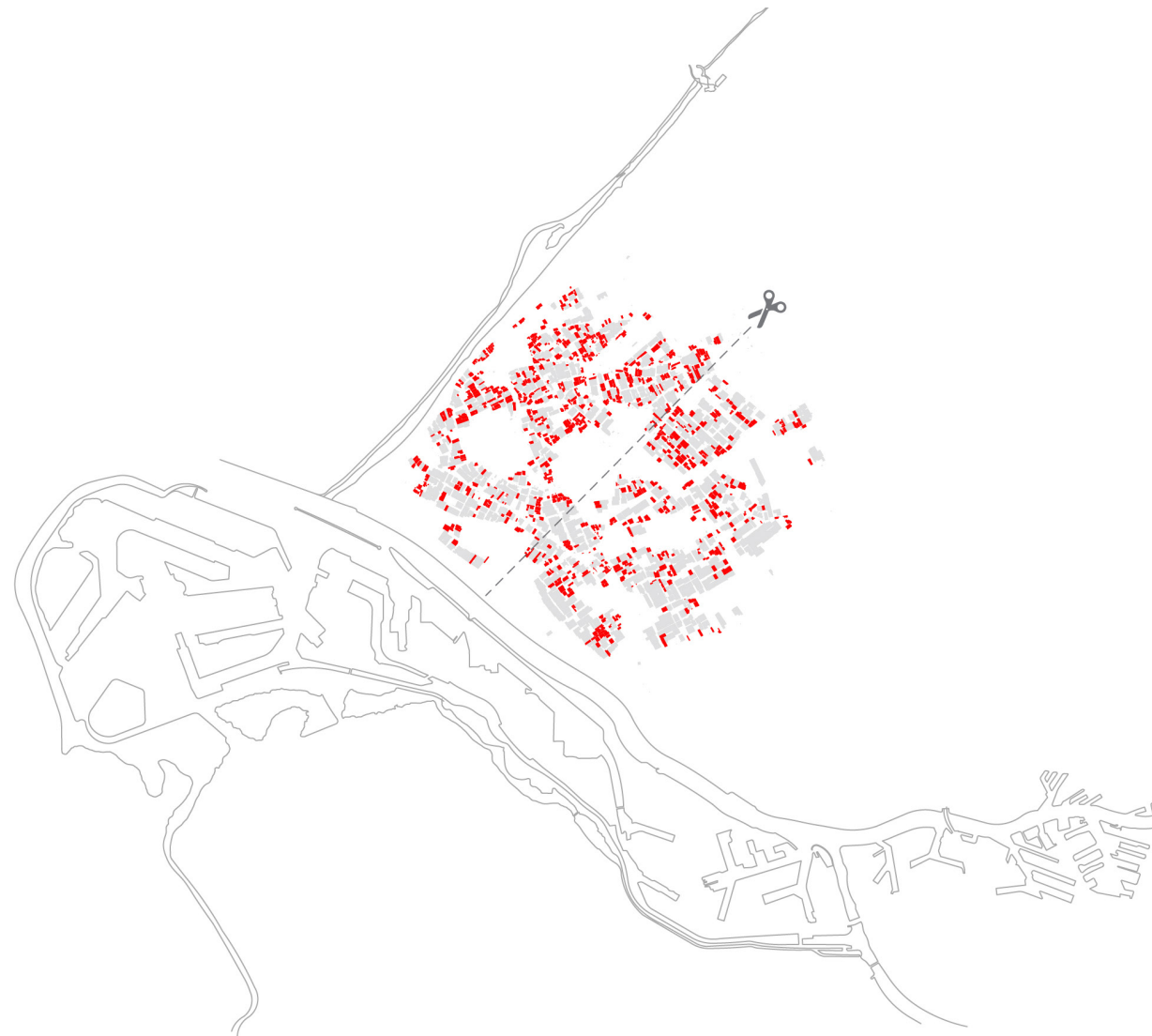


# WORK

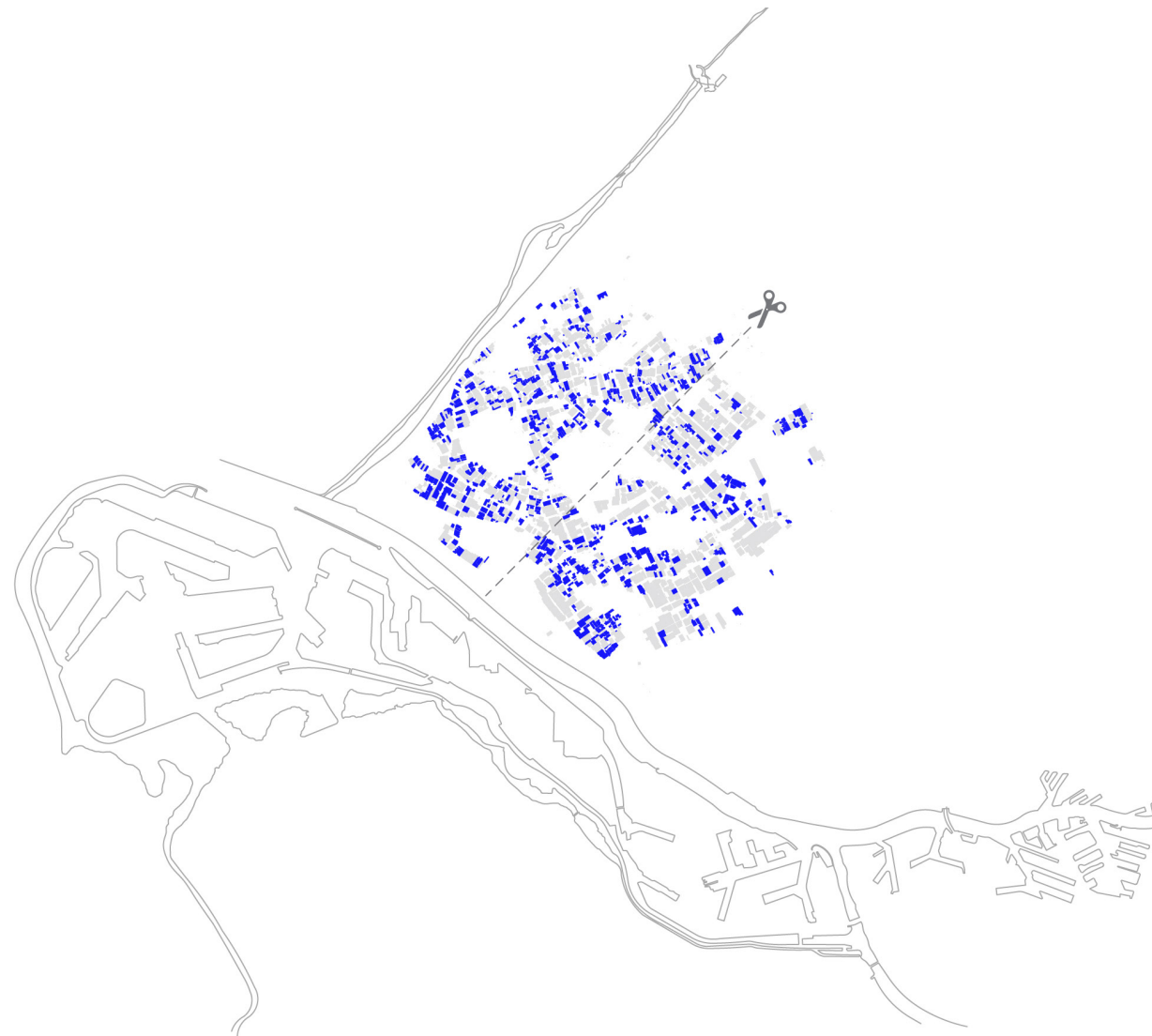
## THE MEGA-MACHINE

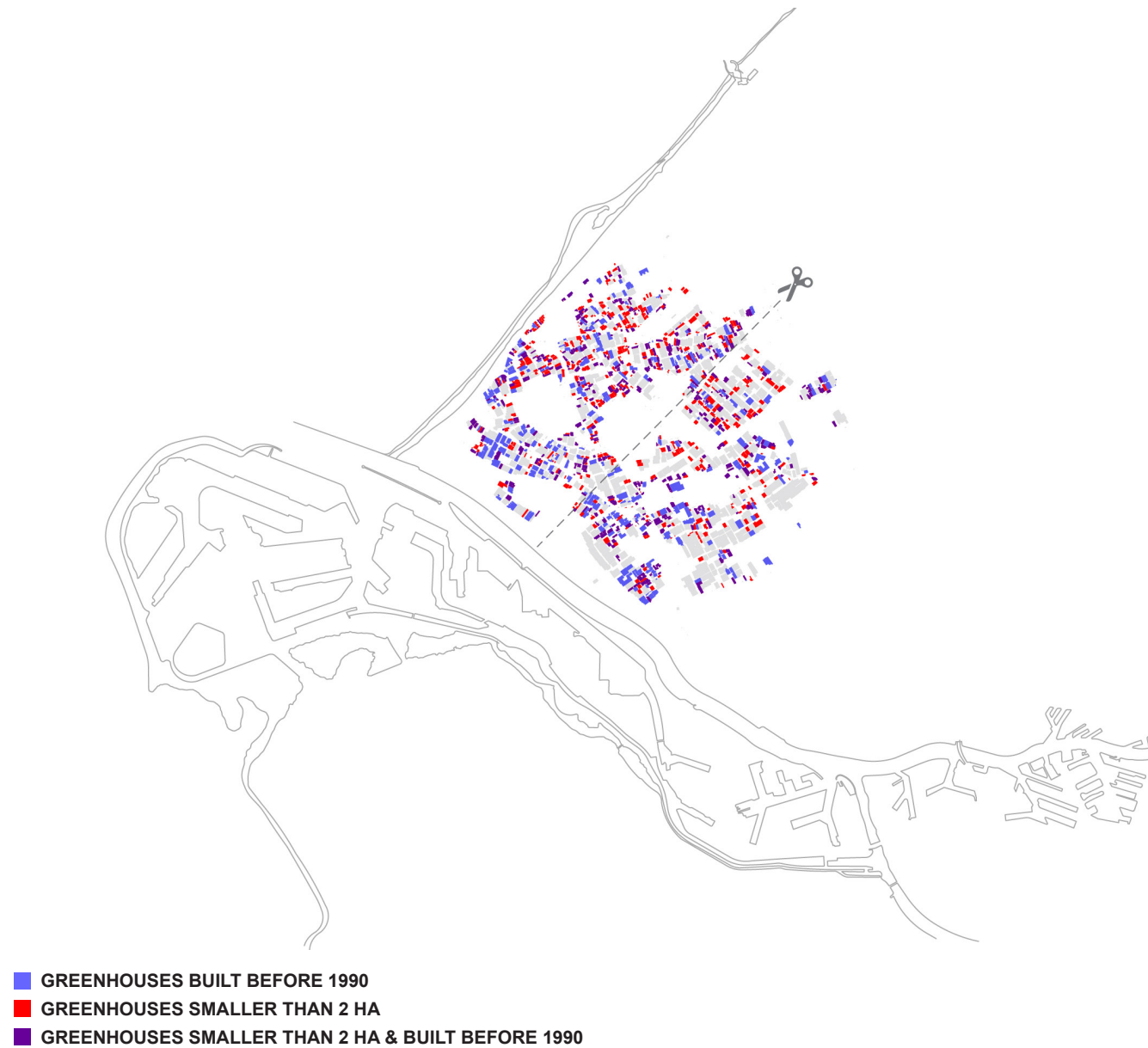










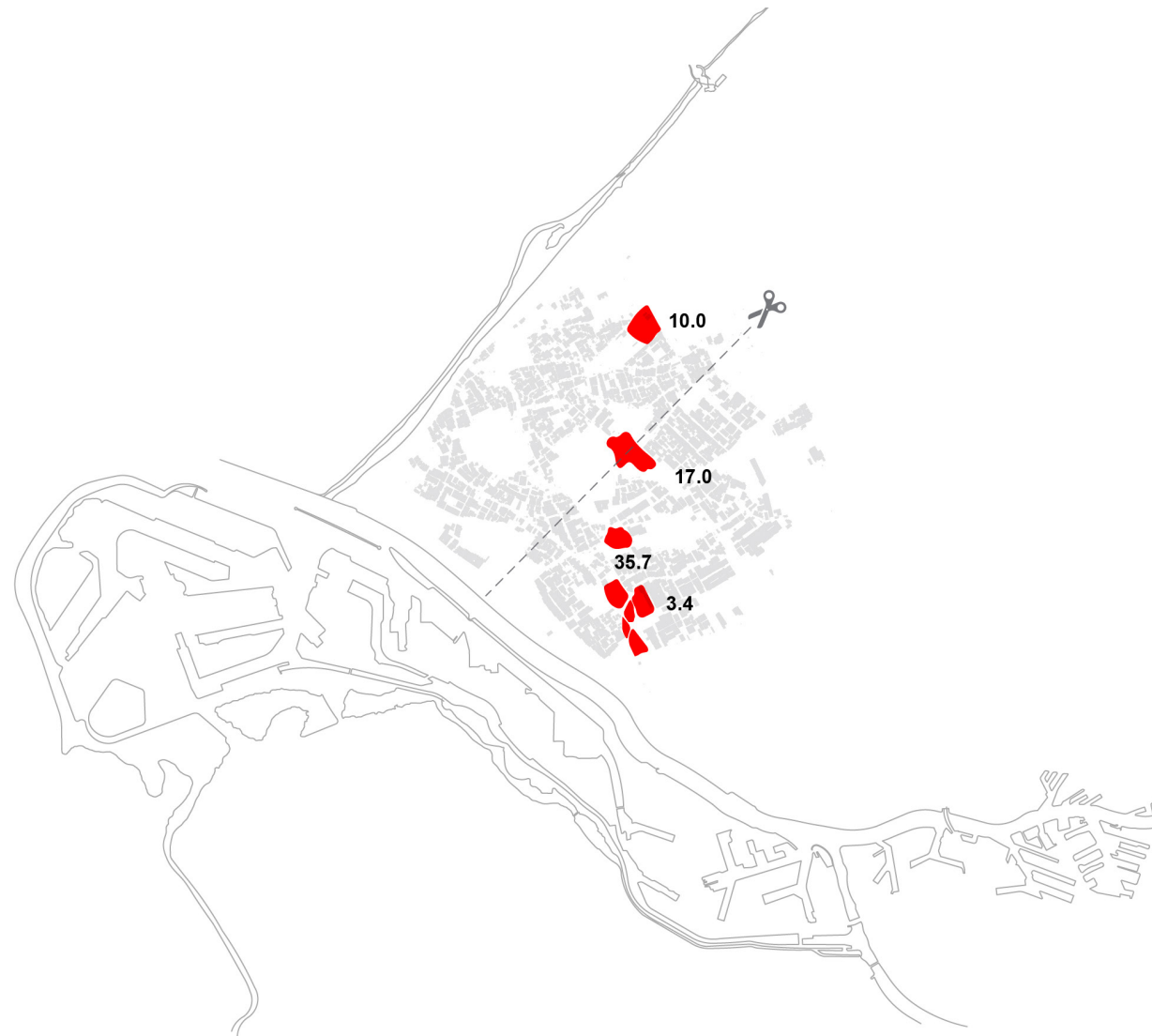


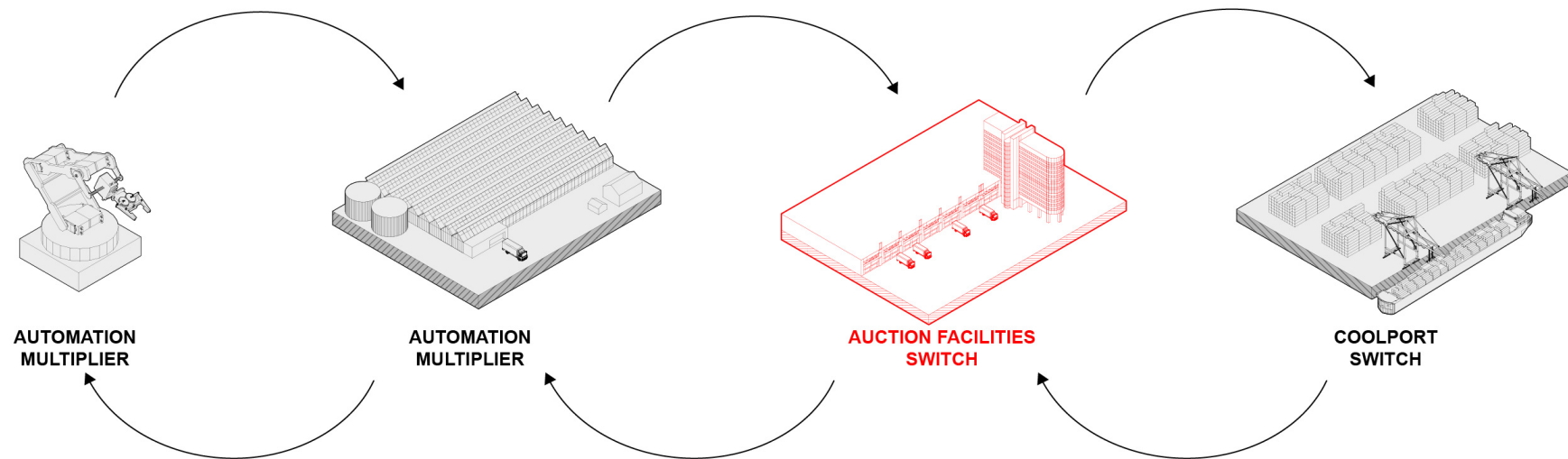
**GREENHOUSES SMALLER THAN 2 HA & BUILT BEFORE 1990**



AREAS WITH GREENHOUSES SMALLER THAN 2 HA & BUILT BEFORE 1990

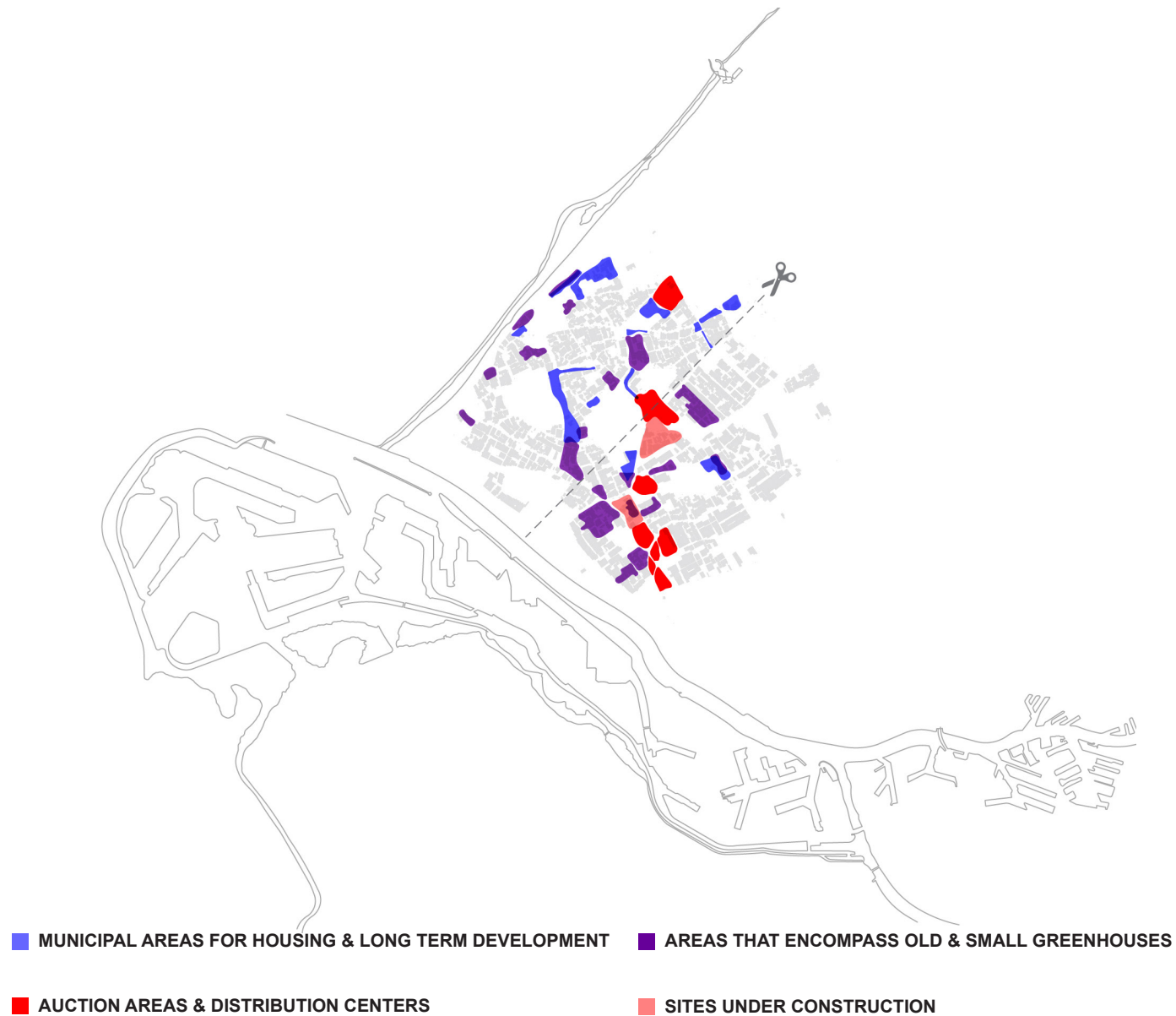






“...we do not consider moving to another area as we are keen to staying near Flora Holland.”

Robert Stolker – Deliflor

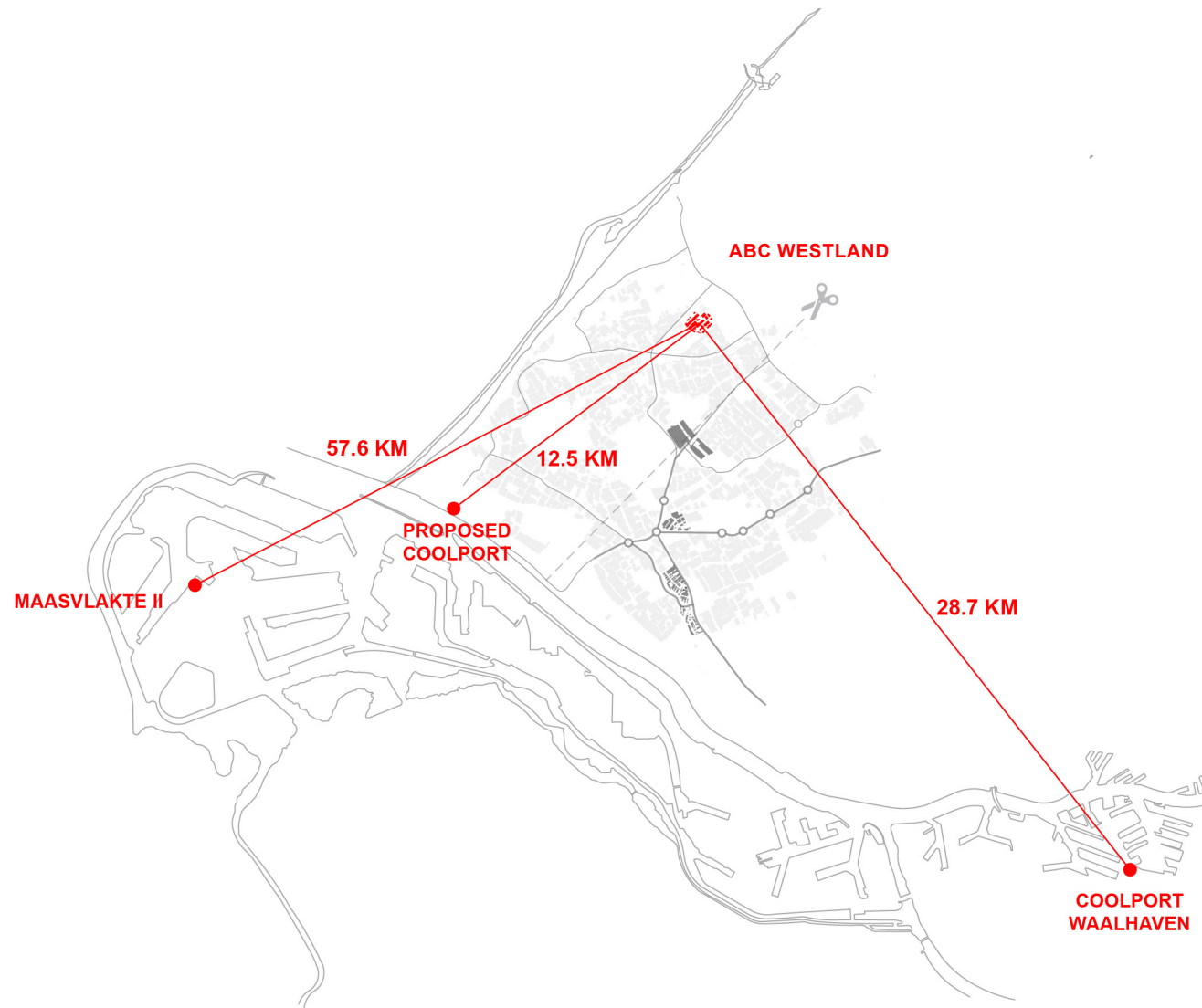


## OVERALL POTENTIAL PILOT PROJECTS



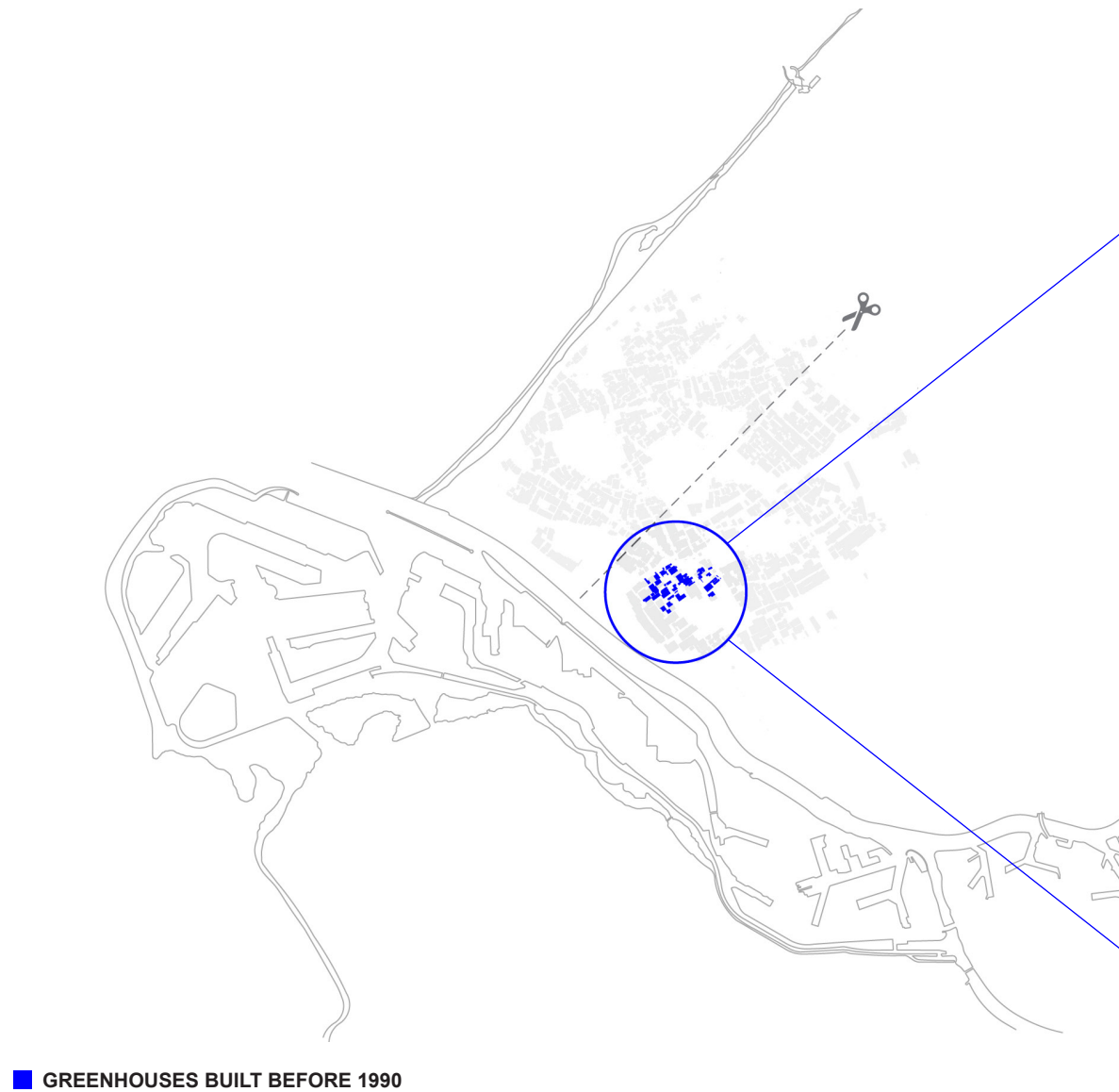






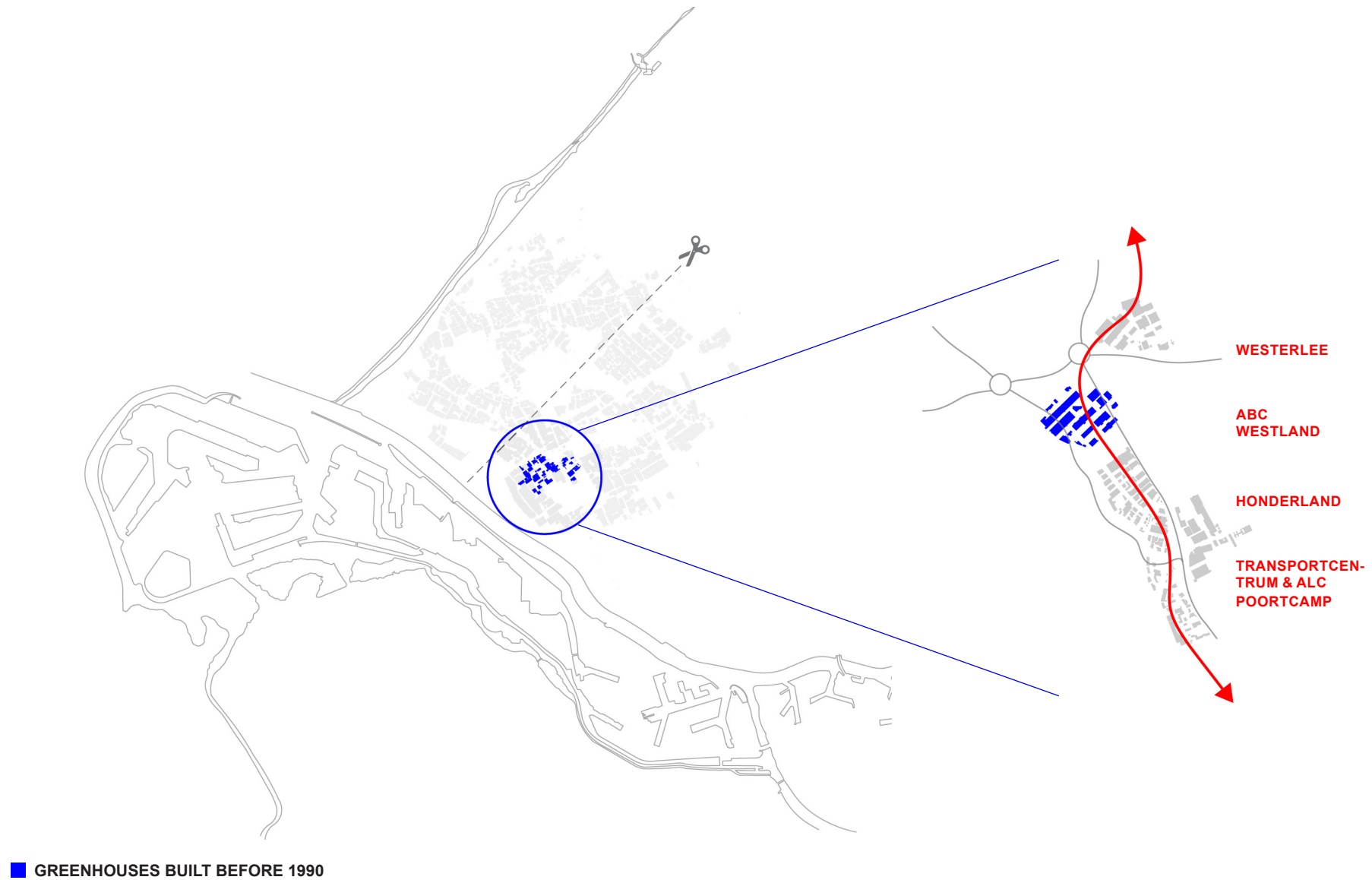


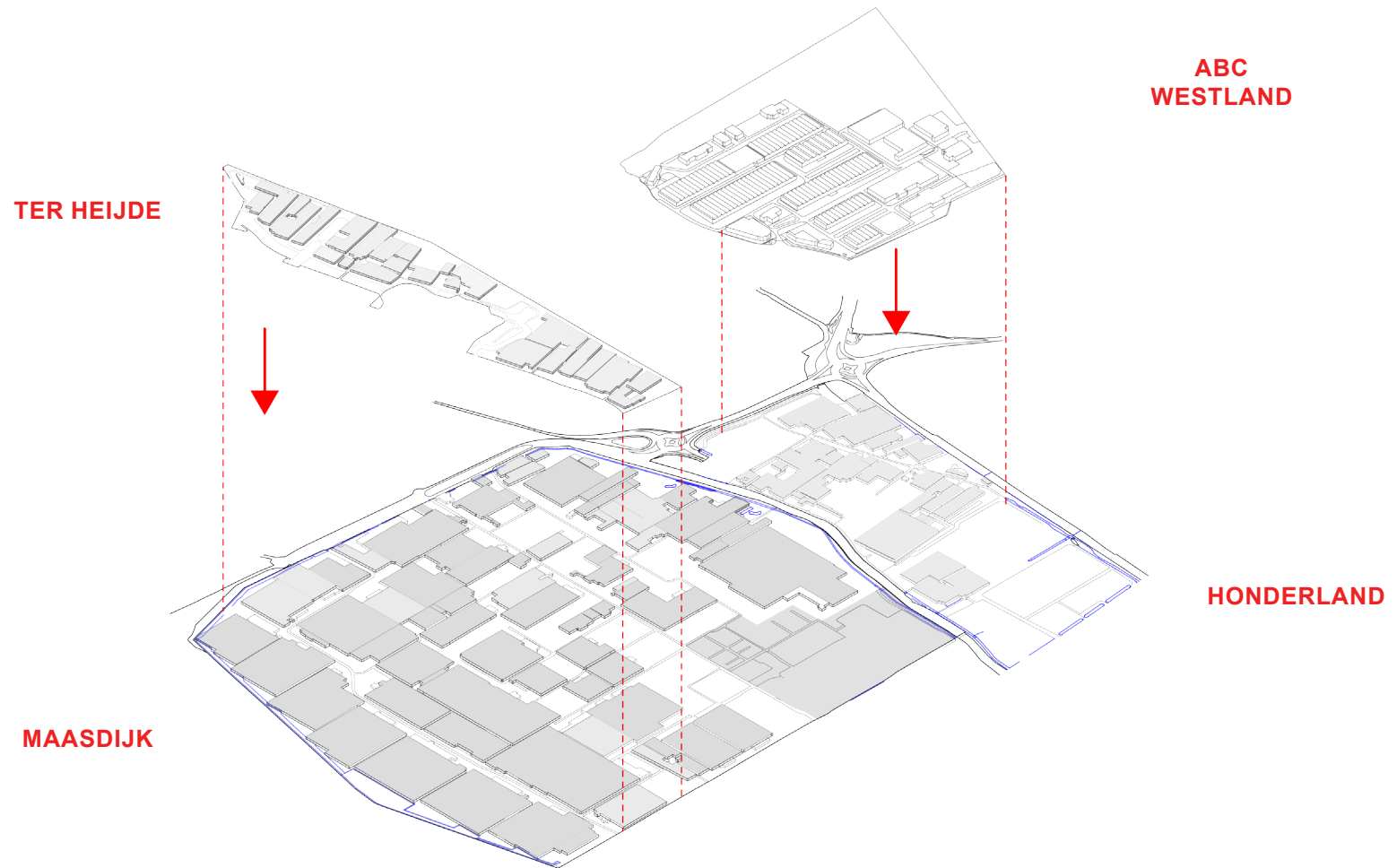


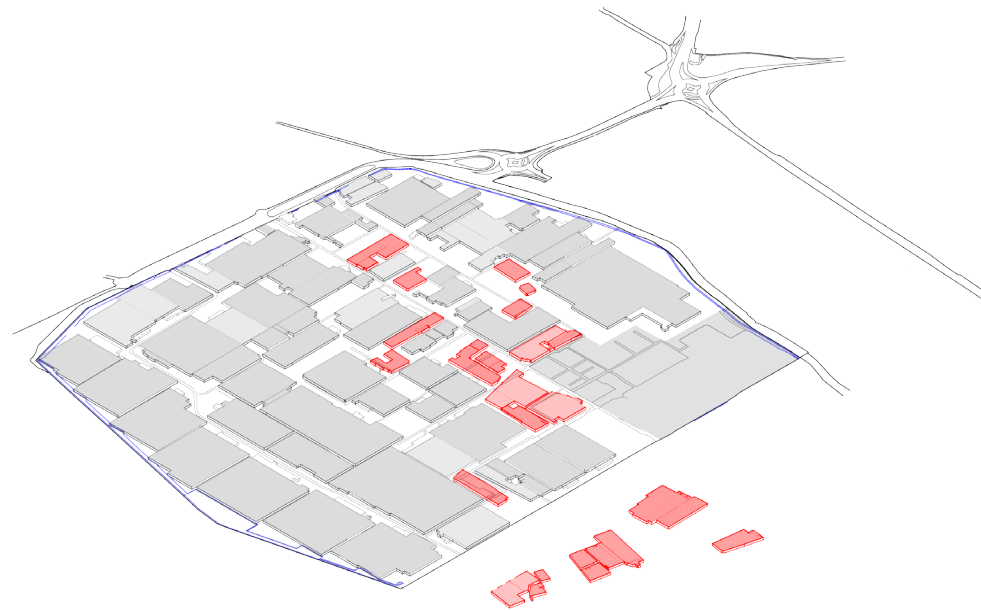










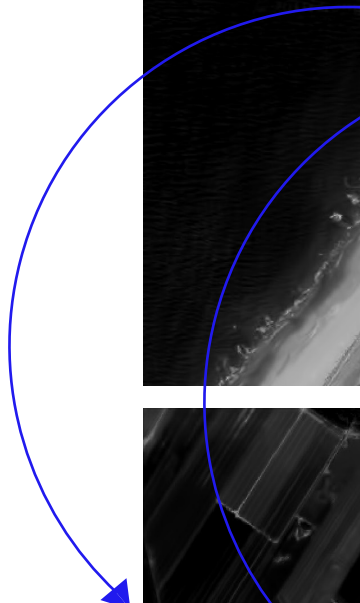




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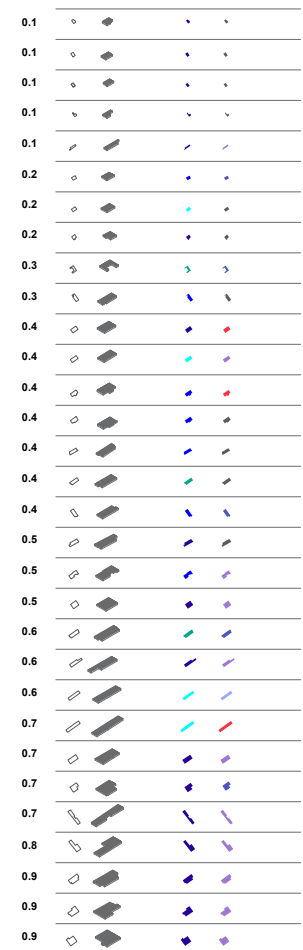
**PILOT PROJECT: TER HEIJDE MAASDIJK**

# TER HEIJDE

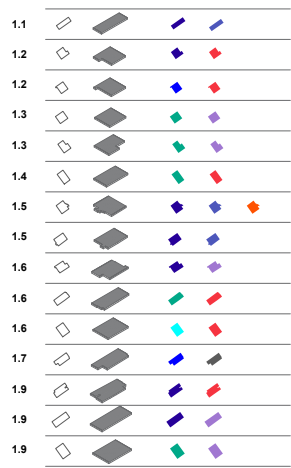


# MAASDIJK

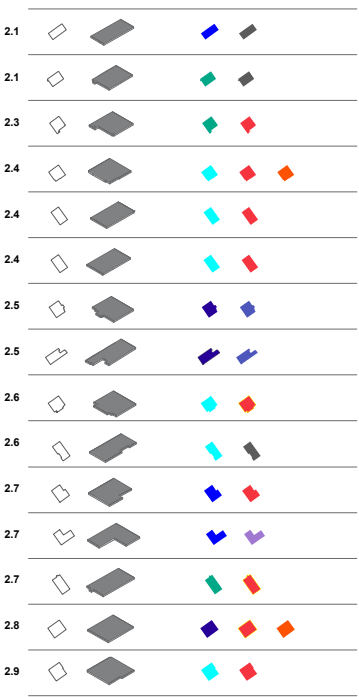
0.1 - 0.9 HA



1.0 - 1.9 HA



2.0 - 2.9 HA



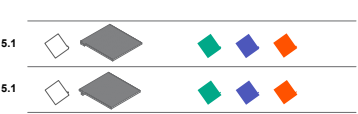
3.0 HA



4.0 - 4.9 HA



5.0 - 5.1 HA



6.7 HA



8.9 HA



9.4 HA



YEAR OF ESTABLISHMENT

- OLDER THAN 1980
- 1981 - 1990
- 1991 - 2000
- AFTER 2001

TYPE OF CULTIVATION

- CUTFLOWERS
- POTTED PLANTS
- VEGETABLES
- SEEDLINGS / RESEARCH

AUTOMATION

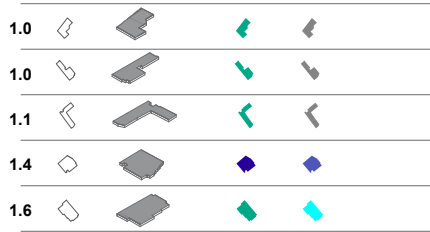
- GREENHOUSE WITH AUTOMATED TECHNOLOGY



# 0.1 - 0.9 HA



# 1.0 - 1.9 HA



# 2.3 HA



YEAR OF ESTABLISHMENT

- Older than 1980
- 1981 - 1990
- 1991 - 2000
- After 2001

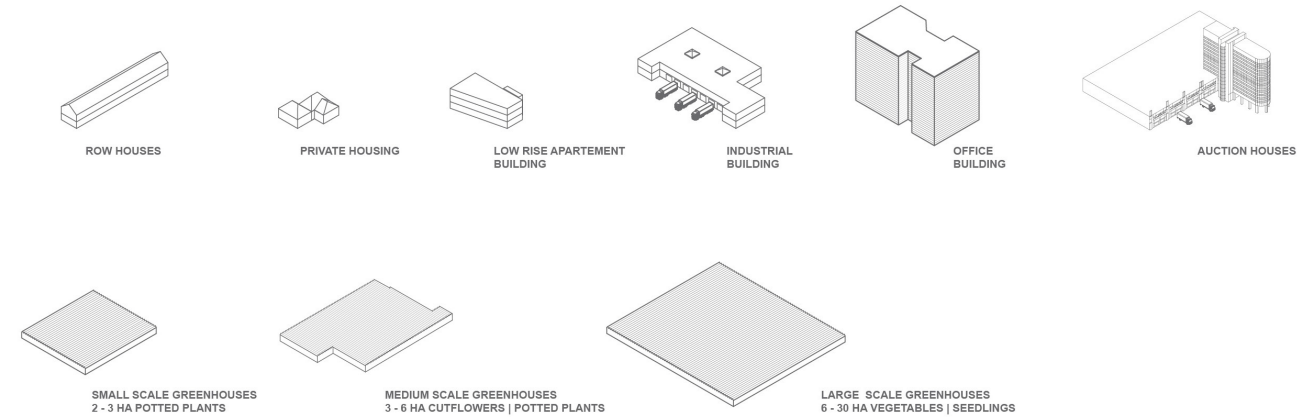
TYPE OF CULTIVATION

- Cutflowers
- Potted plants
- Vegetables
- Seedlings / Research
- Unknown

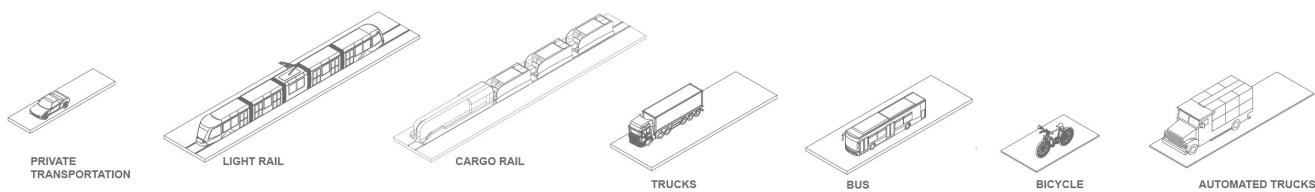
AUTOMATION

- Cutflowers

OCCUPATION



TRANSPORTATION



RESOURCES



RECREATION



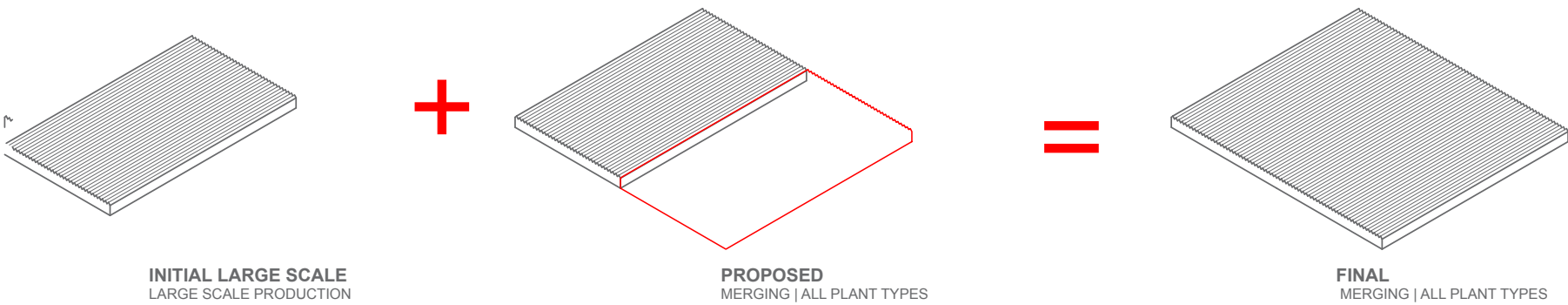
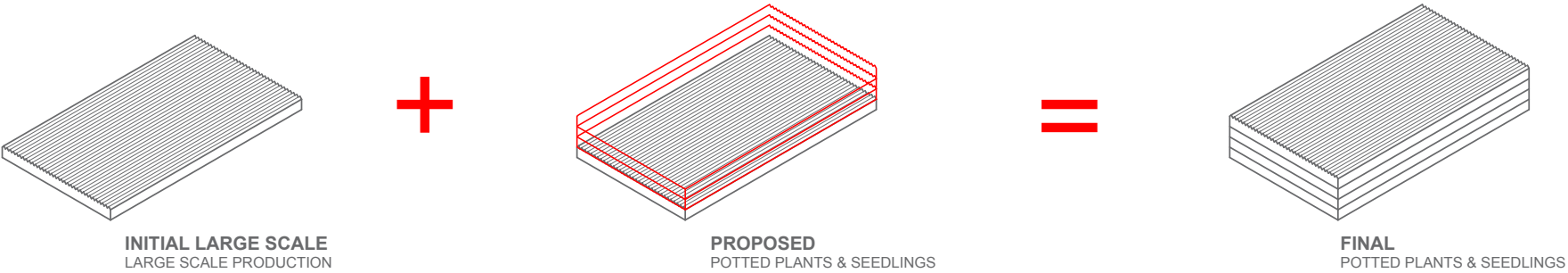
**GREENHOUSE**

**X**

**GREENHOUSE**



GREENHOUSES



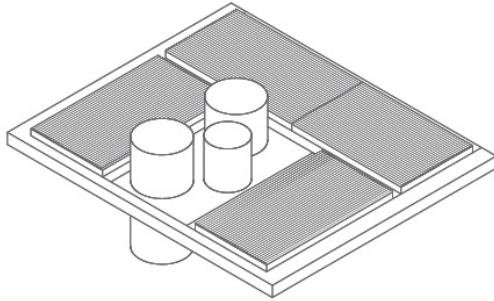
# GREENHOUSE

X

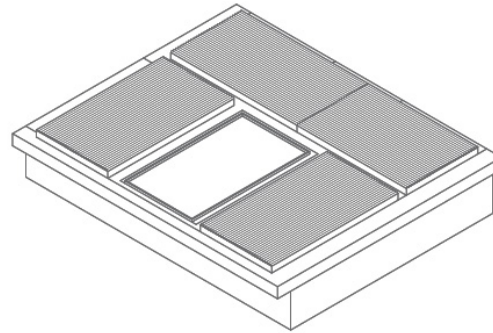
(RESOURCES

+

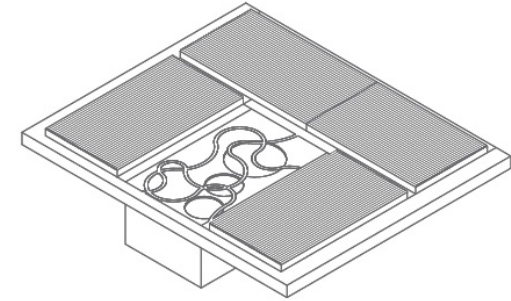
RECREATION)



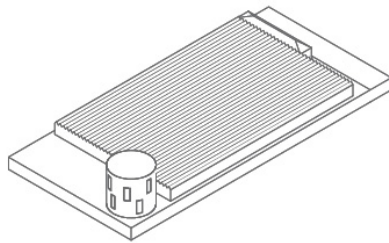
**COMMON RESOURCES**  
COMMON CO<sub>2</sub>, HEAT & ENERGY  
STRUCTURES FROM SUSTAIN-  
ABLE RESOURCES



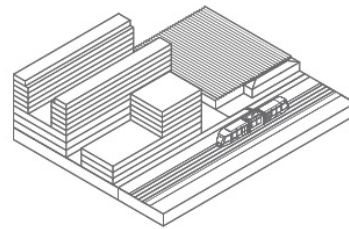
**COMMON RESOURCES**  
UNDERGROUND WATER  
RESERVOIRS



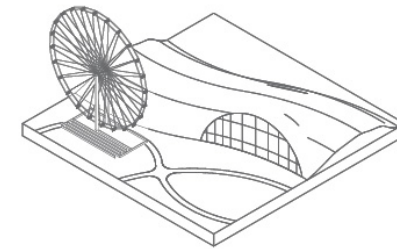
**COMMON RECREATIONAL  
SPACES**  
WITH UNDERGROUND WATER  
STORAGE



**COMMON RECREATIONAL  
SPACES**  
TRANSFORM UNSUSTAINABLE  
COMPONENTS TO OPPORTUNIS-  
TIC ELEMENTS



**COMMON INFRASTRUC-  
TURAL ELEMENTS**  
CARGOTRAMS TO TRANSPORT  
PRODUCTS + LIGHT RAIL FOR  
PUBLIC TRANSPORT



**COMMON RECREATIONAL  
SPACES**  
TRANSFORM THE COASTAL AREA  
FROM A PRODUCTIVE SPACE TO  
A RECREATIONAL AREA



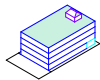
# GREENHOUSE

X

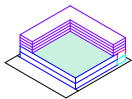
# LIVING

X

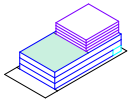
# OPEN SPACES



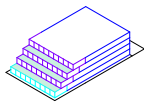
**THE ELITIST**  
VERTICAL TYPOLOGY



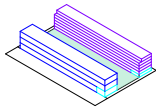
**L SHAPE**  
VERTICAL TYPOLOGY



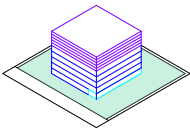
**NEW HIGH RISE**  
VERTICAL TYPOLOGY



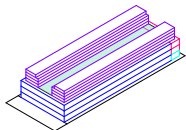
**STAIRS**  
VERTICAL TYPOLOGY



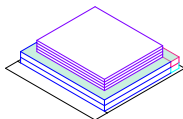
**BARS**  
VERTICAL TYPOLOGY



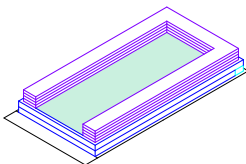
**DOUBLE**  
VERTICAL TYPOLOGY



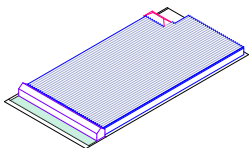
**AZTEC**  
VERTICAL TYPOLOGY



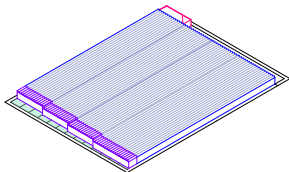
**TOWER**  
VERTICAL TYPOLOGY



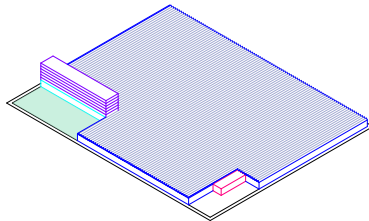
**U SHAPE**  
VERTICAL TYPOLOGY



**ROW PRODUCTION**  
HORIZONTAL TYPOLOGY

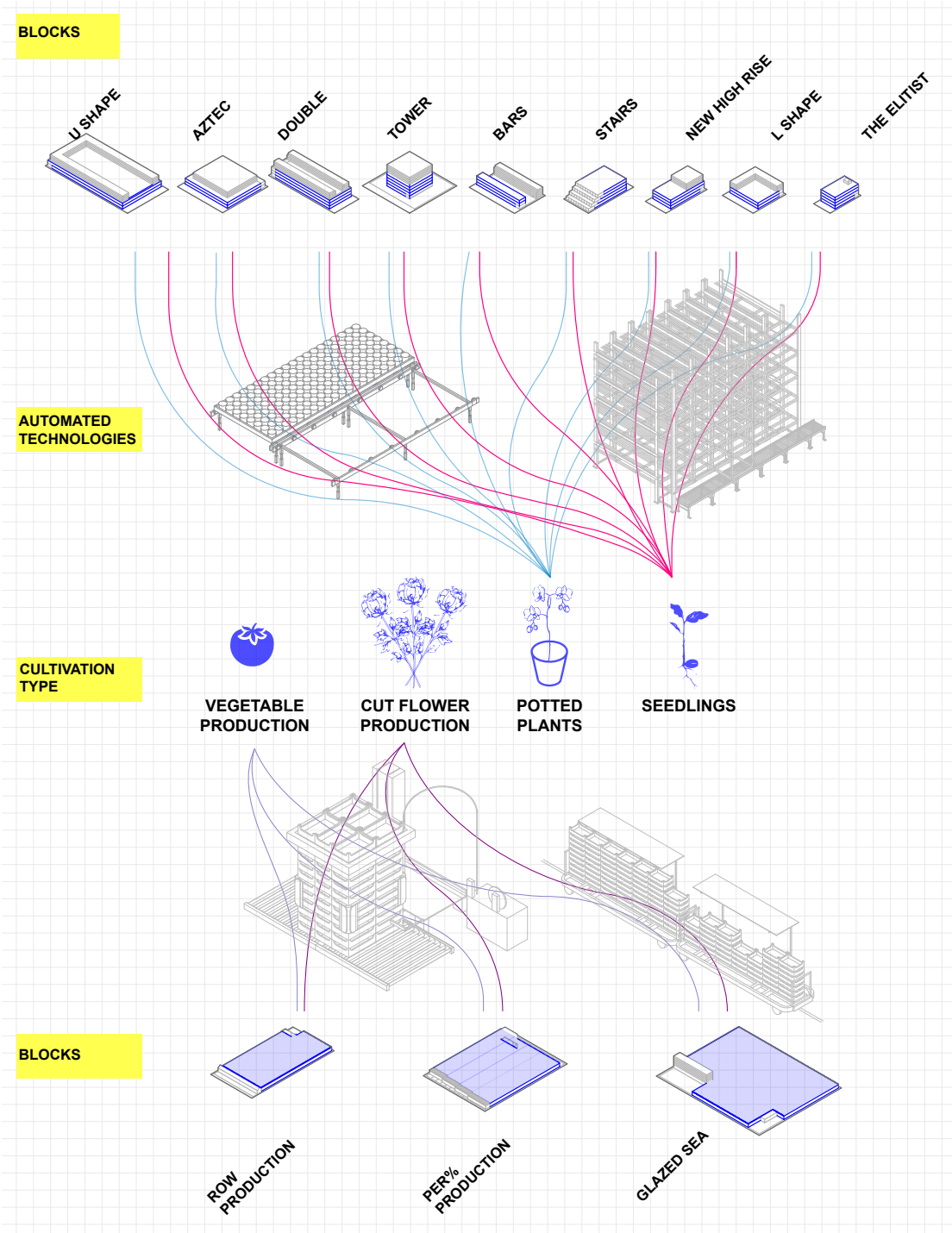


**PER% PRODUCTION**  
HORIZONTAL TYPOLOGY



**GLAZED SEA**  
HORIZONTAL TYPOLOGY

- PRODUCTION PREMISES
- RESIDENTIAL PREMISES
- SHOPS
- COMMERCIAL PREMISES
- OPEN SPACES





**GREENHOUSE**

**X**

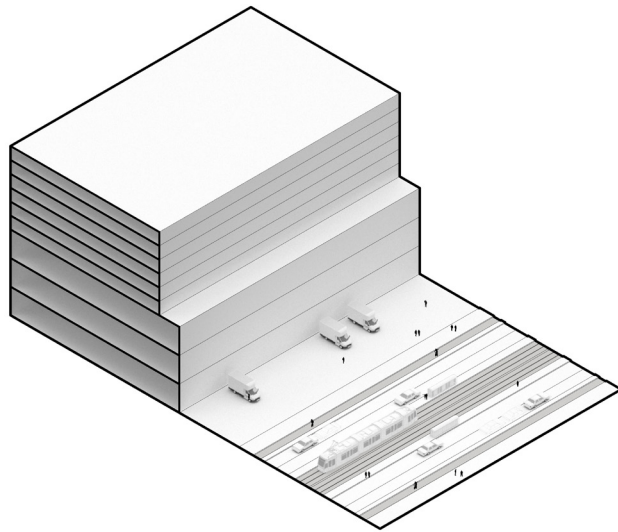
**HOUSING**

**X**

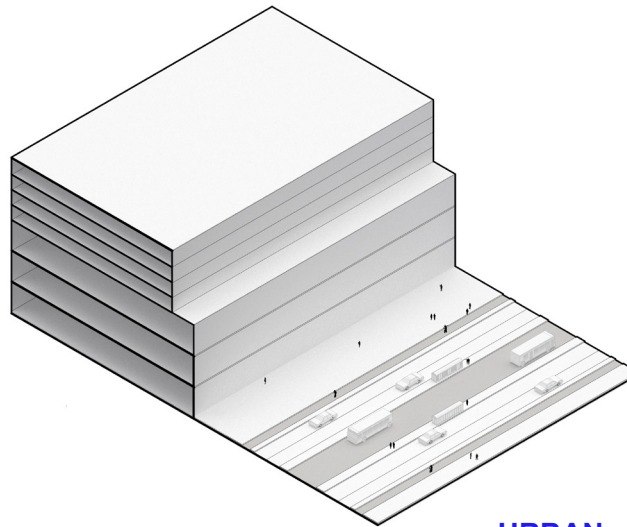
**OPEN SPACES**

**X**

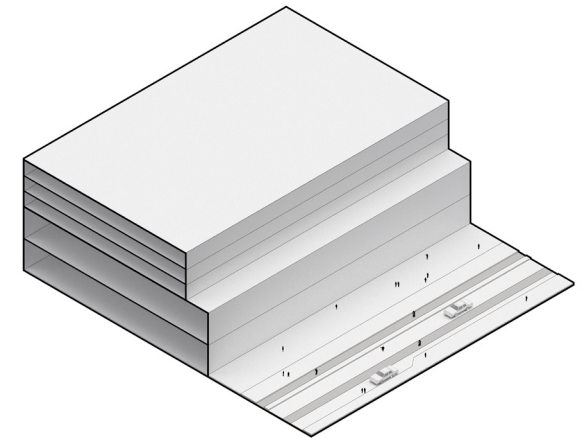
**NETWORKS**



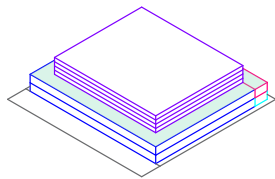
**FUNCTIONAL  
STREET**



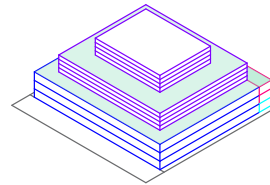
**URBAN  
STREET**



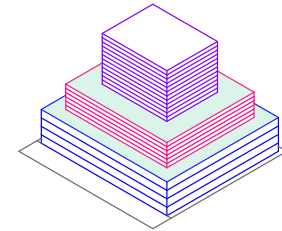
**RESIDENTIAL  
STREET**



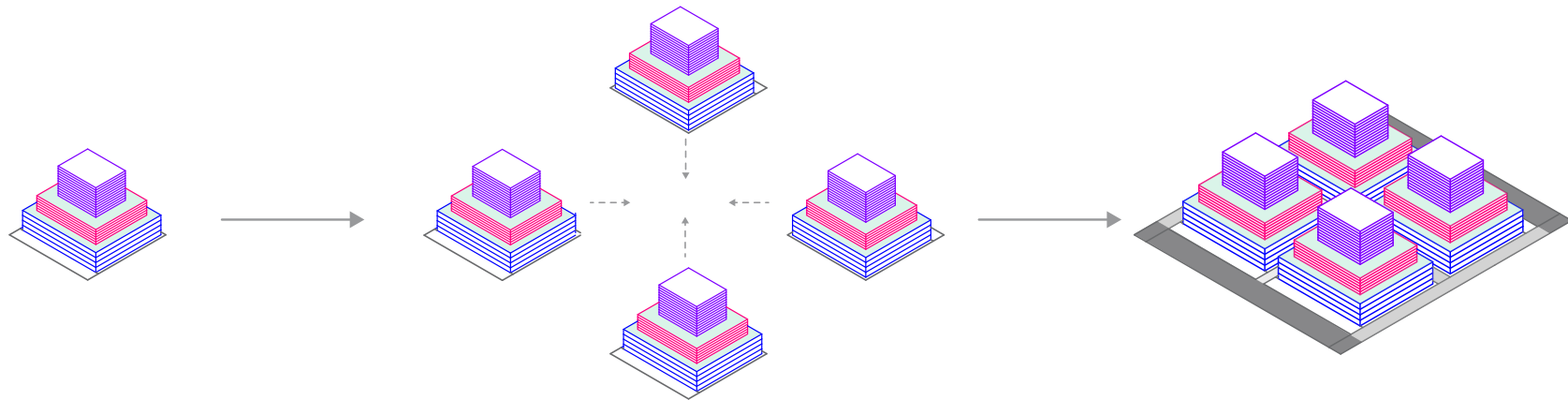
LOW DENSITY



MEDIUM DENSITY



HIGH DENSITY

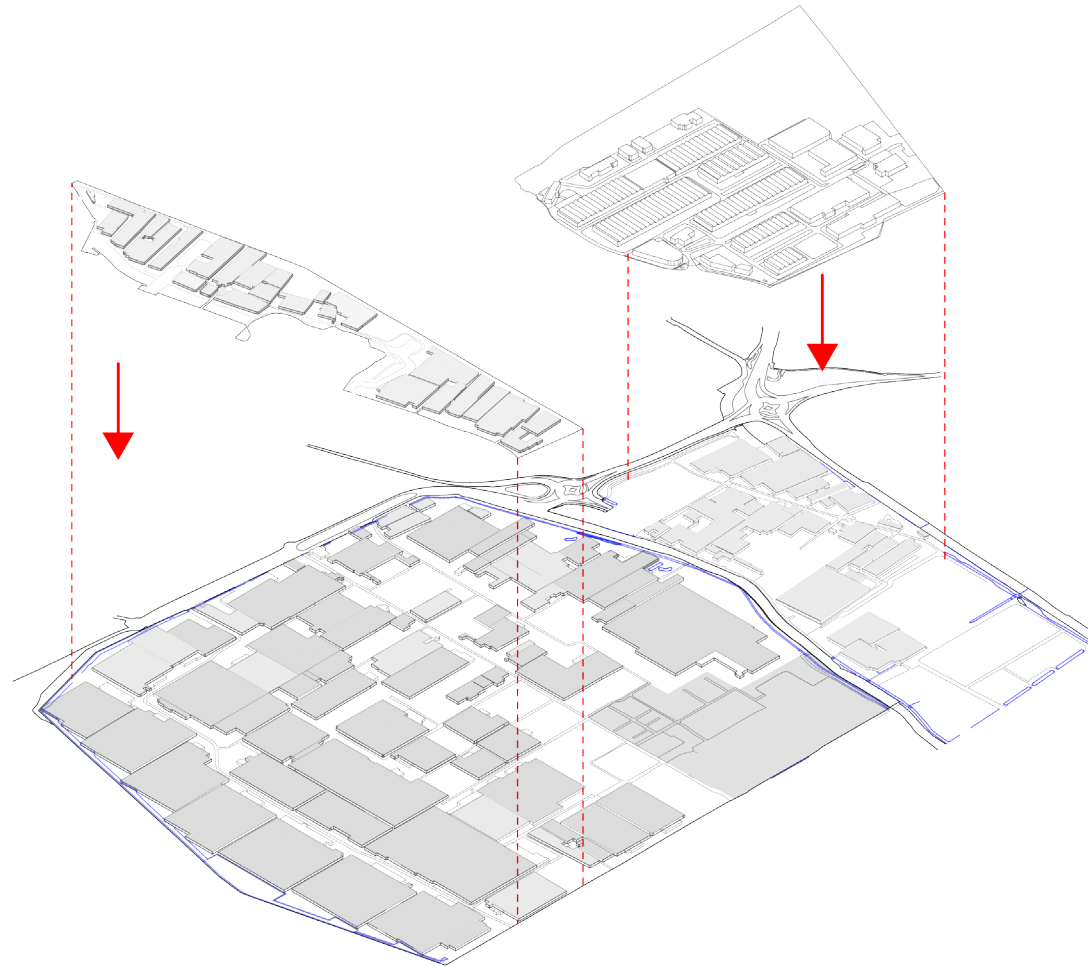


- PRODUCTION PREMISES
- RESIDENTIAL PREMISES
- SHOPS
- COMMERCIAL PREMISES
- OPEN SPACES

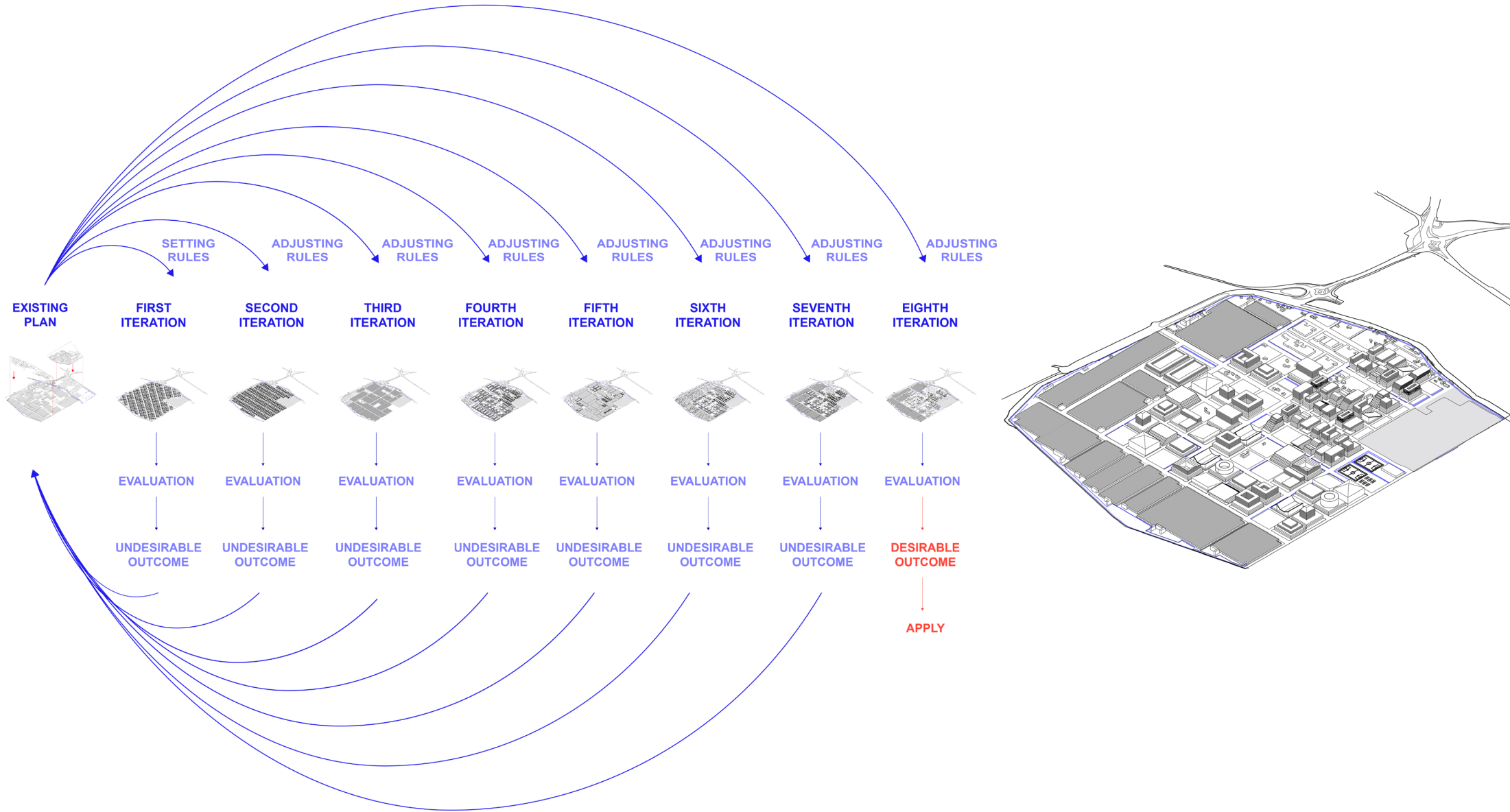
- LOGISTICAL ROADS
- URBAN ROADS
- RESIDENTIAL ROADS



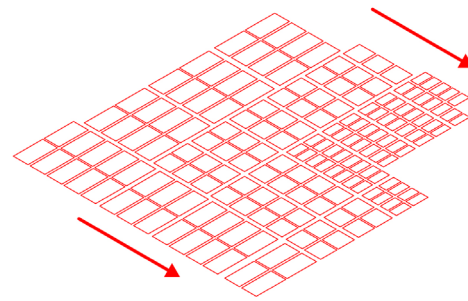
HOW CAN **EXISTING**  
**GREENHOUSES IN**  
**TER HEIJDE FIT** IN  
**MAASDIJK NORTH**  
**WHILE TRANSFORMING THE LATTER INTO A MORE**  
**LIVABLE & SUSTAIN-**  
**ABLE URBAN** AREA?



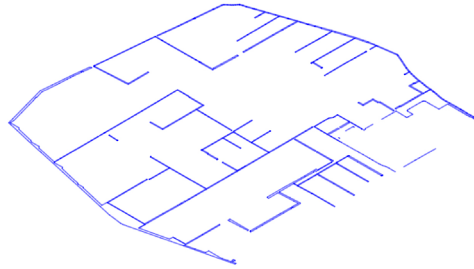
**MOVING NORTHERN SITES TO SOUTHERN SITES**



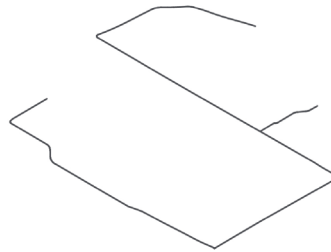




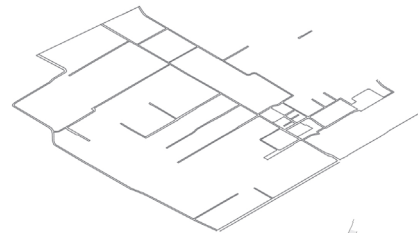
PROPOSED GRID



EXISTING BLUE INFRASTRUCTURE



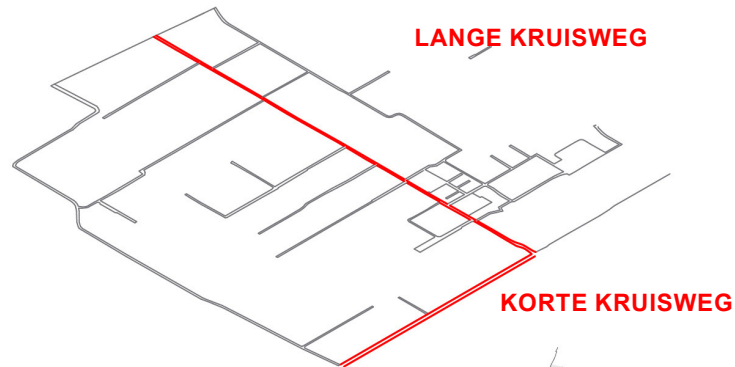
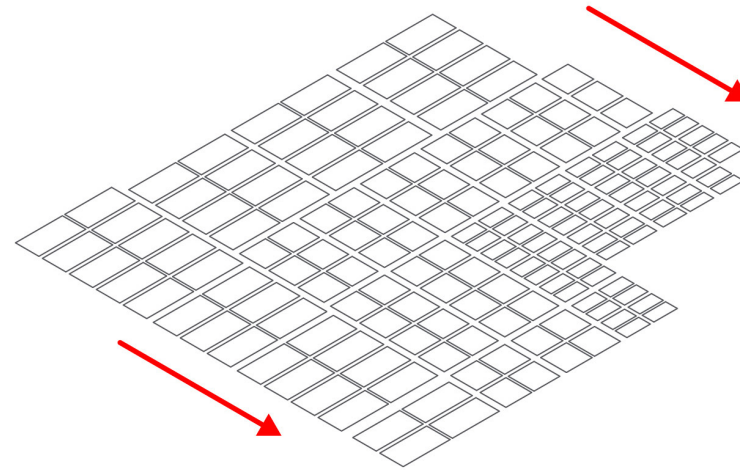
EXISTING CO<sub>2</sub> NETWORK



EXISTING ROAD NETWORK



EXISTING PLAN



EXISTING ROAD NETWORK

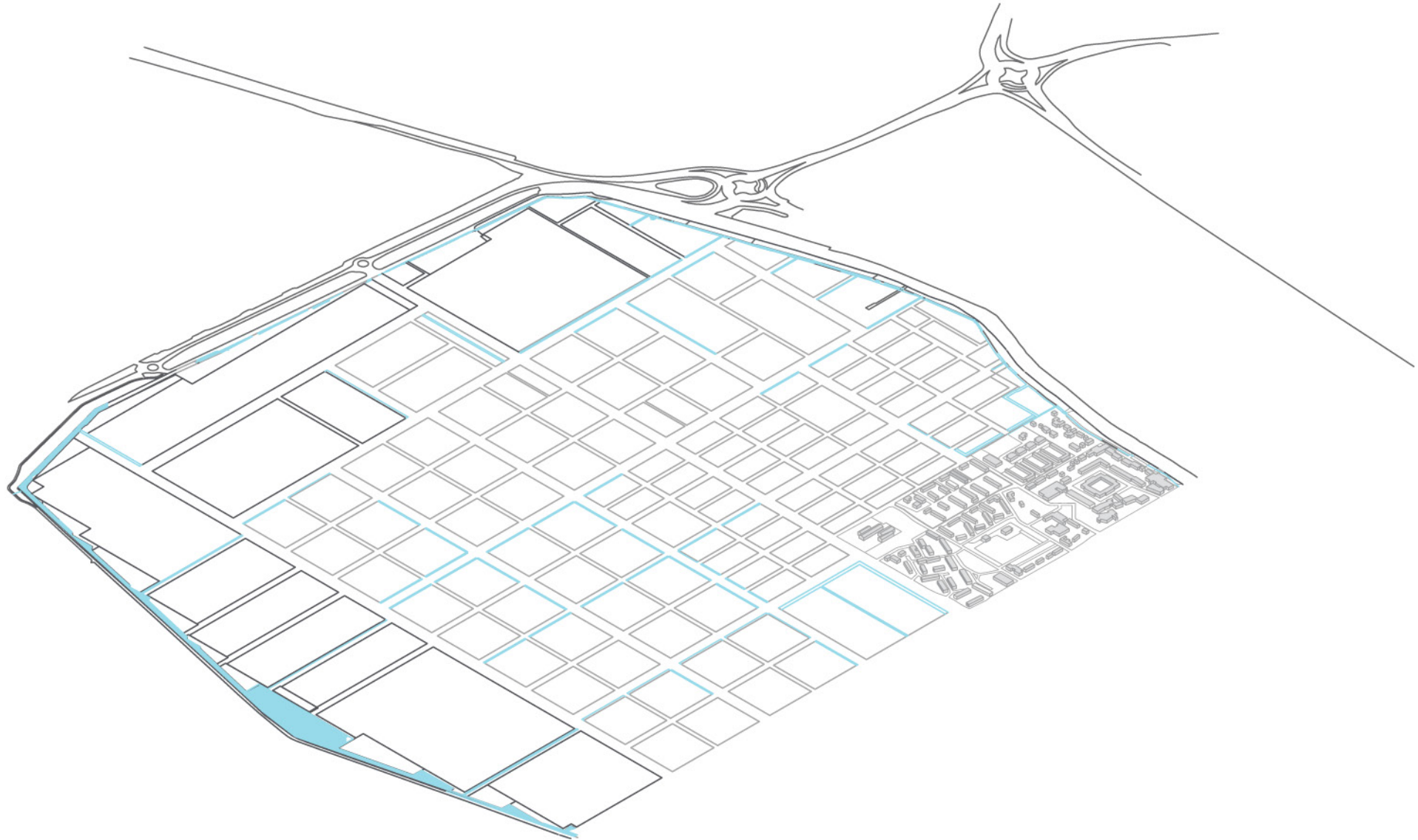


EXISTING PLAN

ECOLOGICAL PERFORMANCE

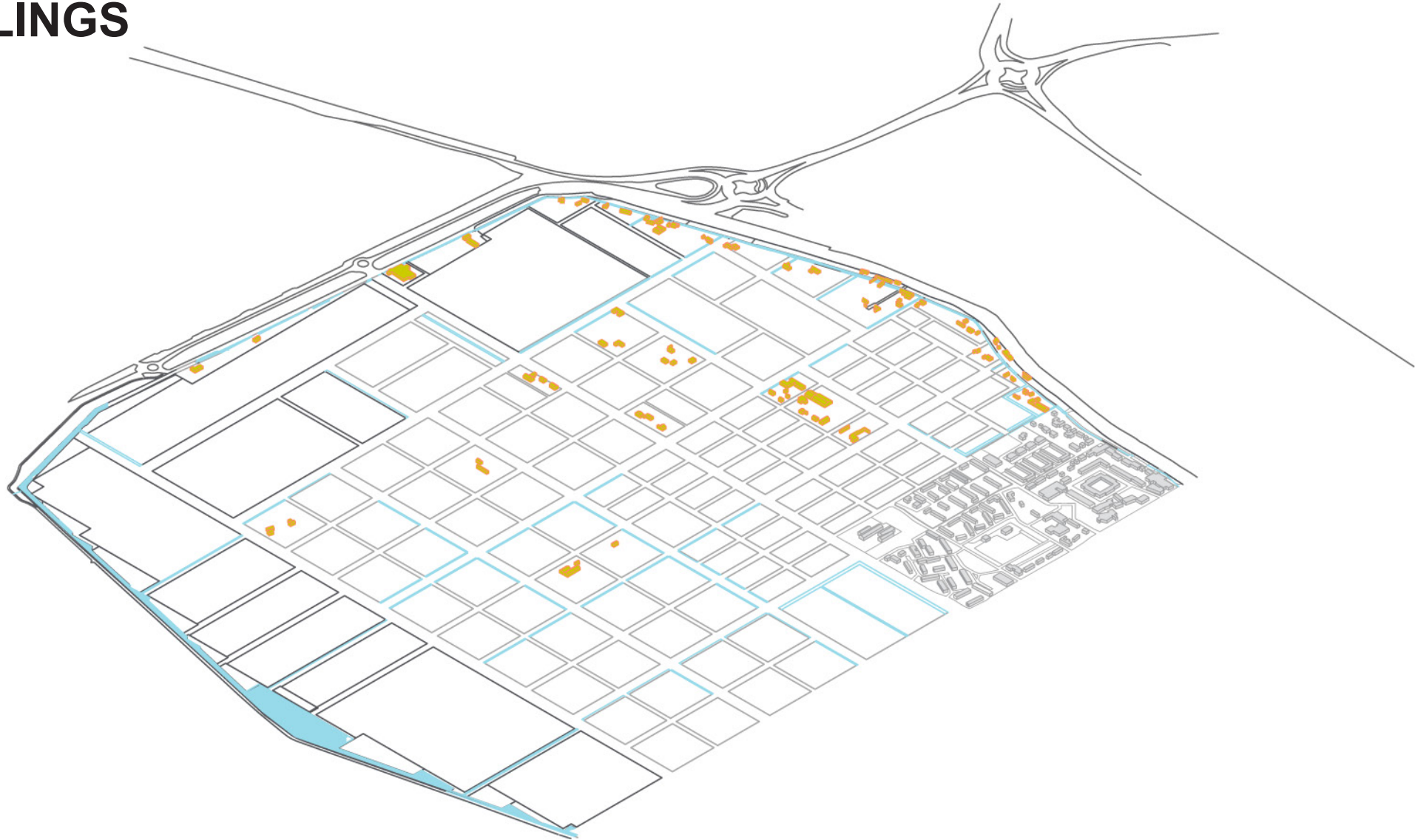
# 01

## PROPOSED GRID



# 02

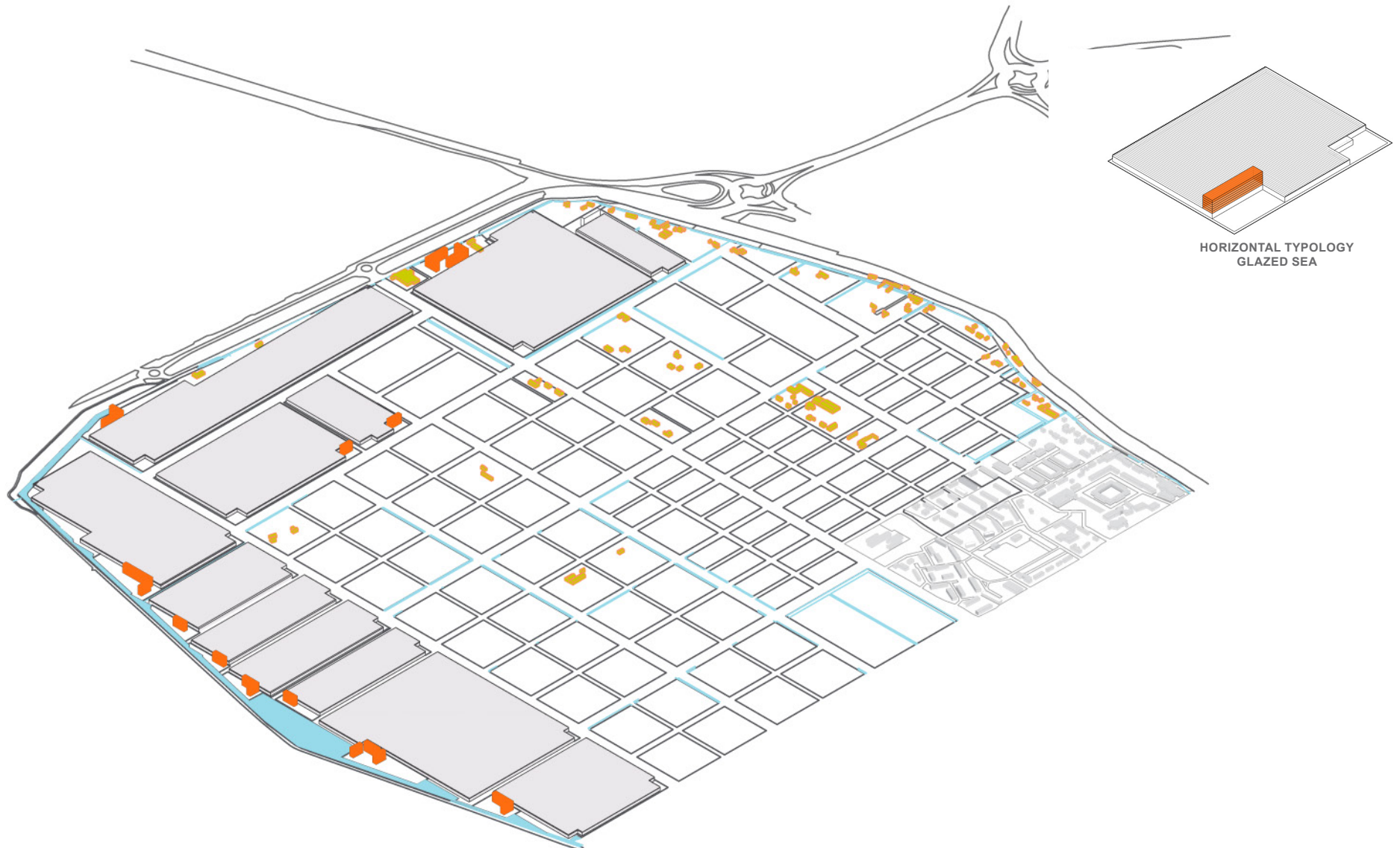
## EXISTING SINGLE DWELLINGS





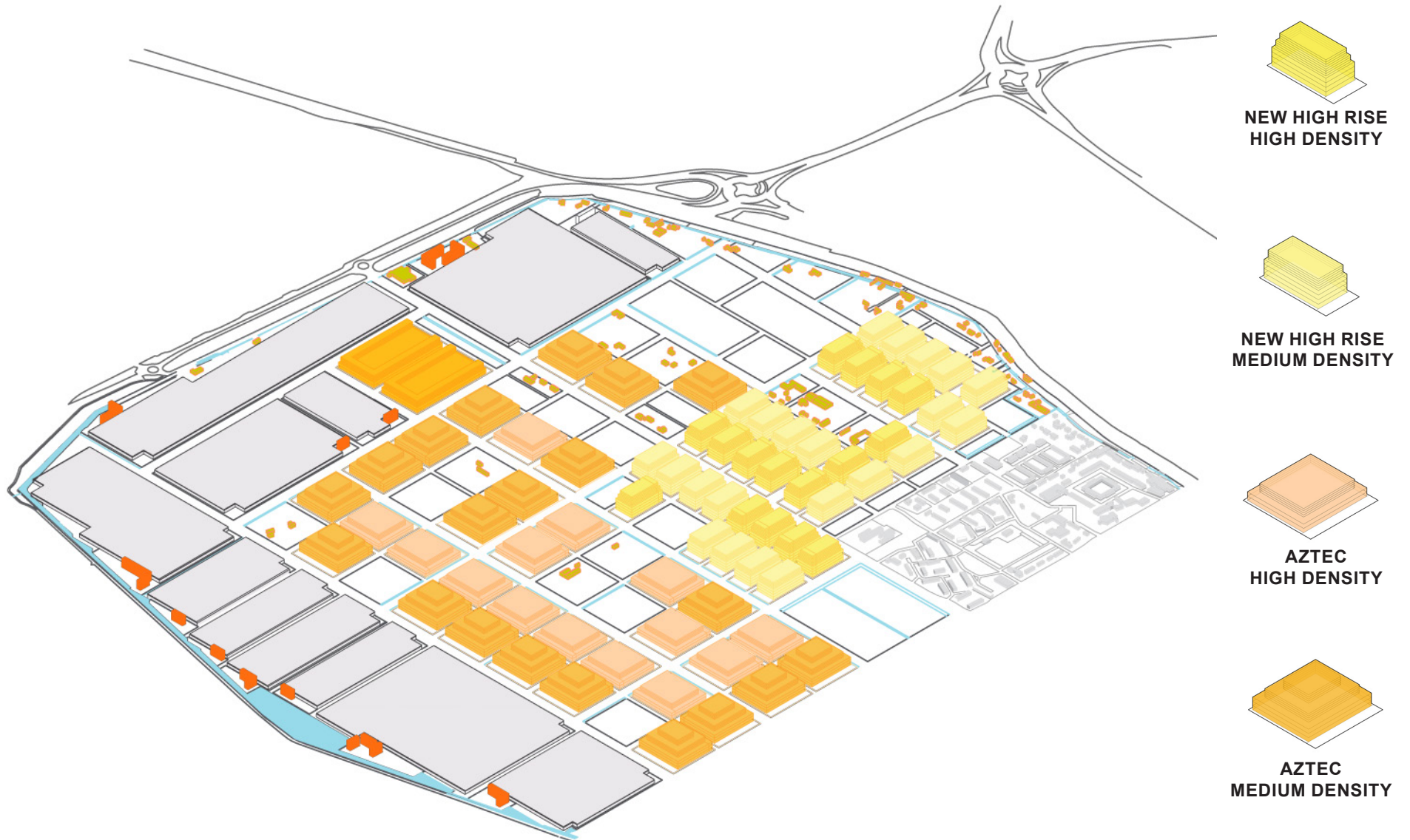
# 03

## HORIZONTAL TYPOLOGIES



# 04

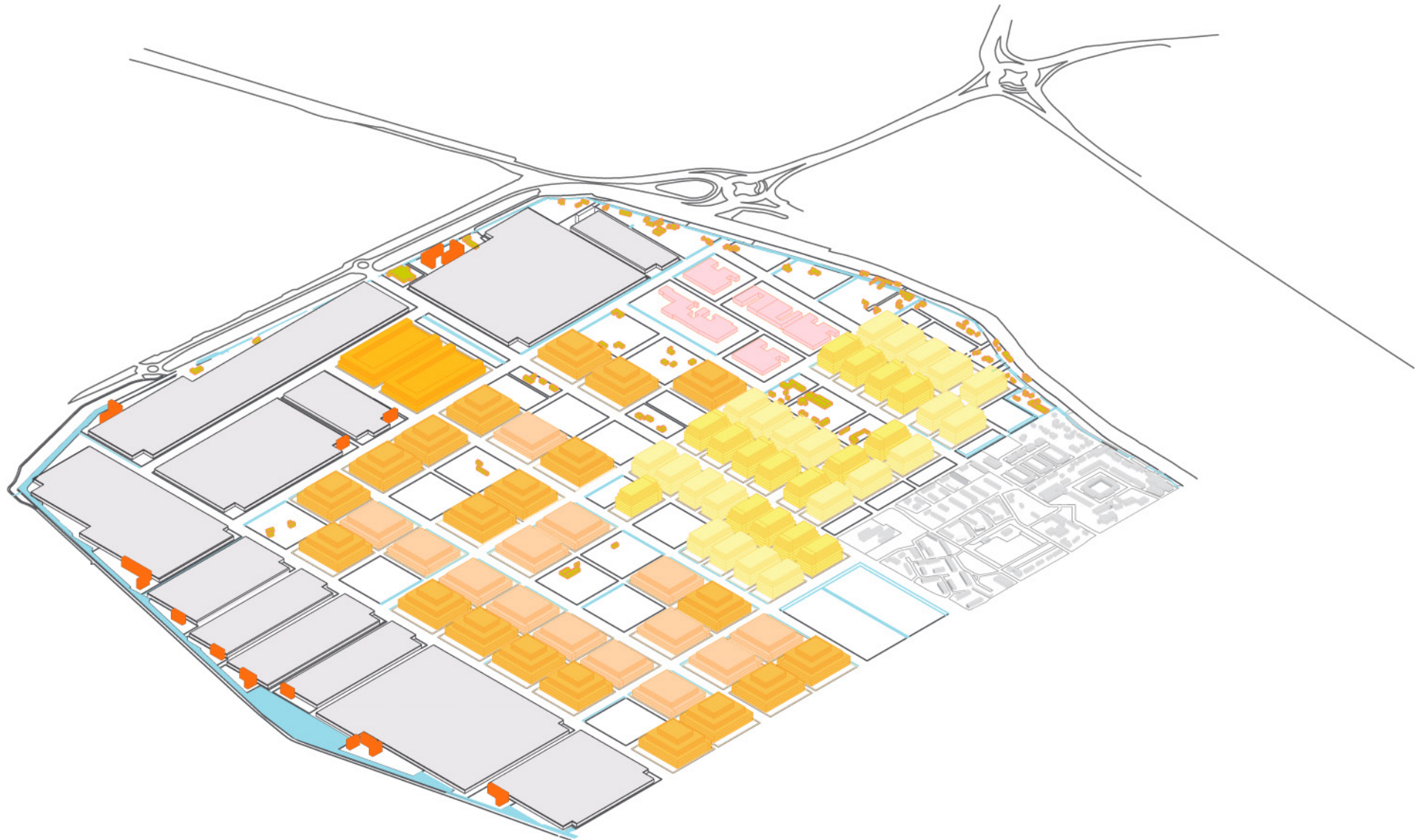
## VERTICAL TYPOLOGIES





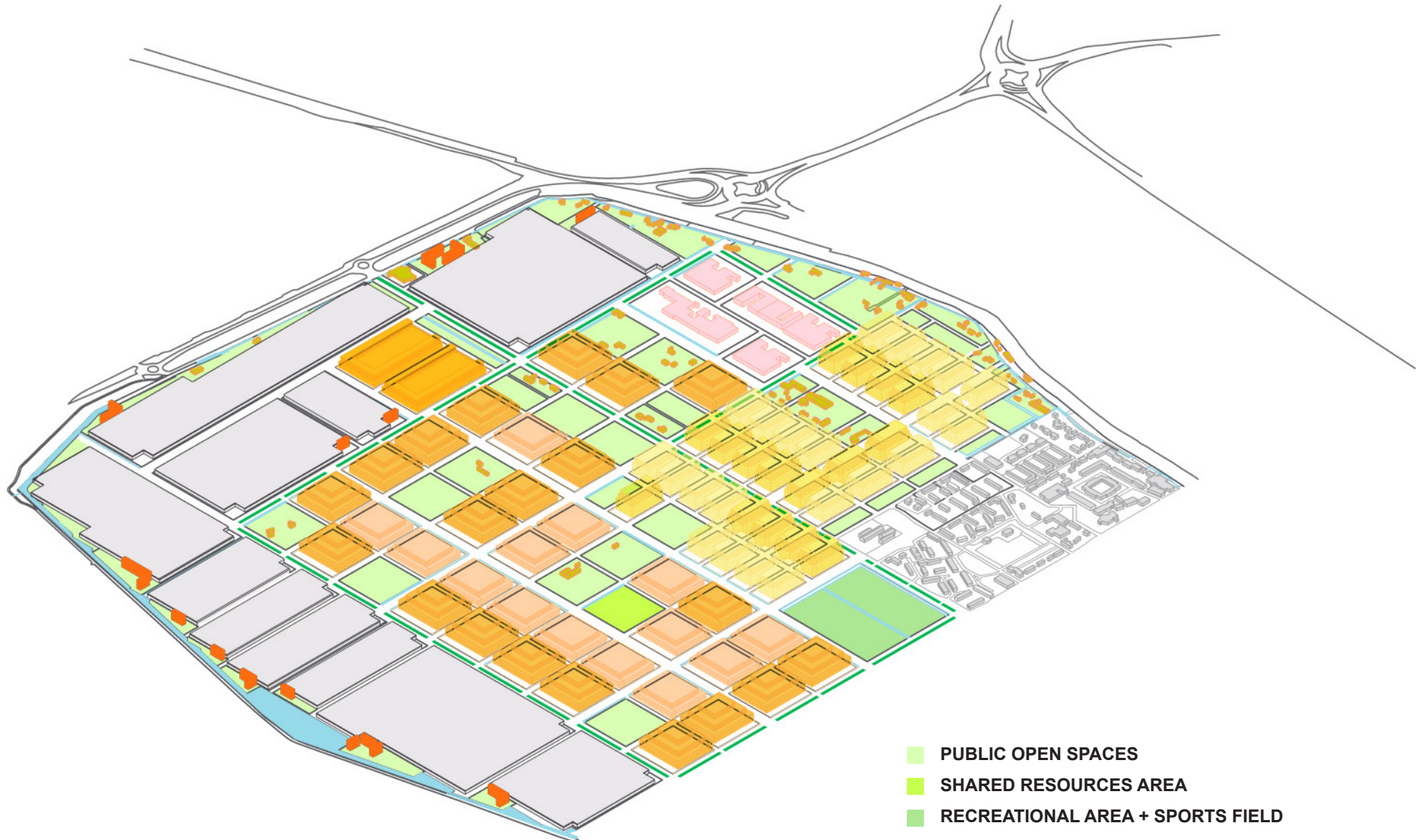
# 05

## INDUSTRIAL AREA



# 06

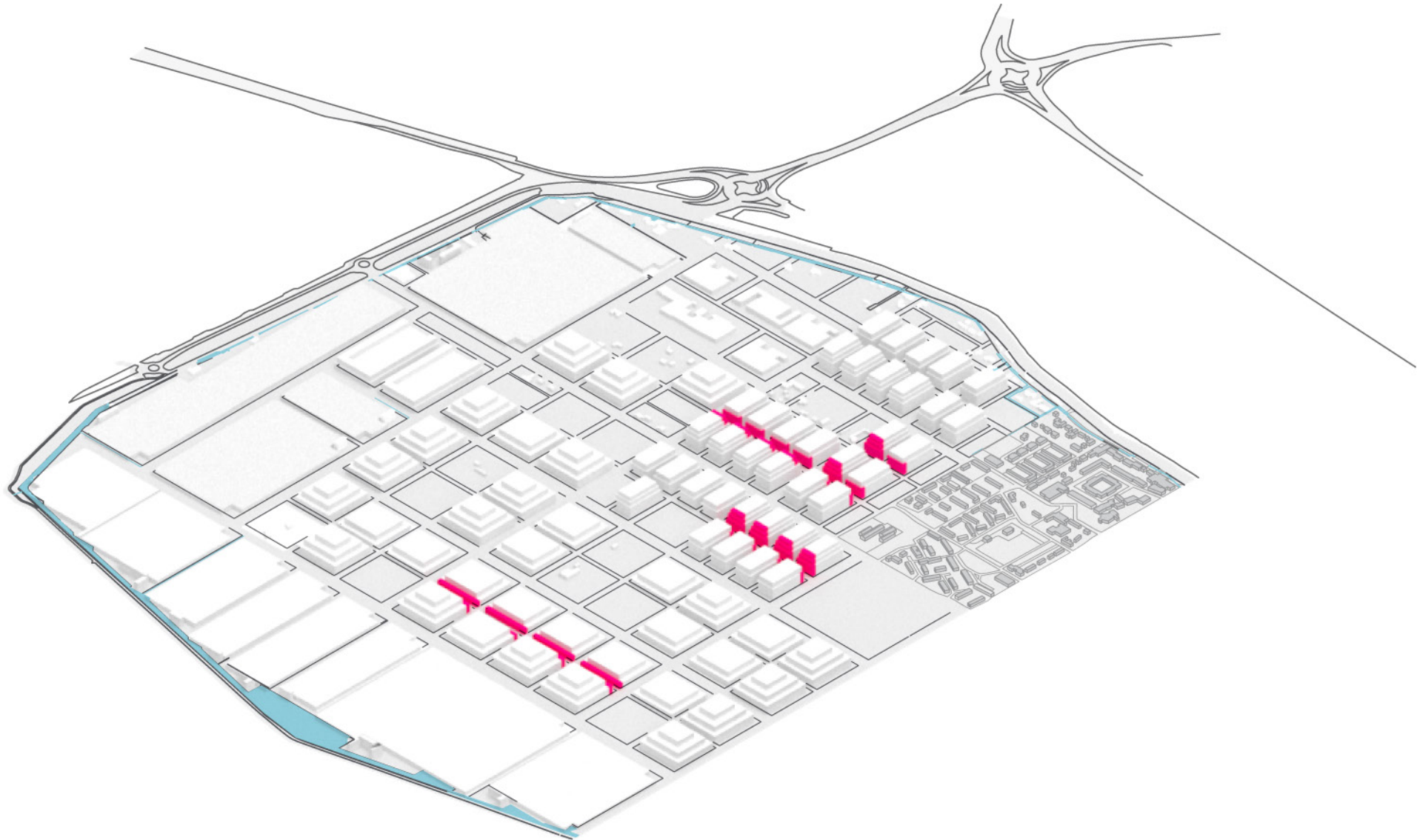
## OPEN SPACES





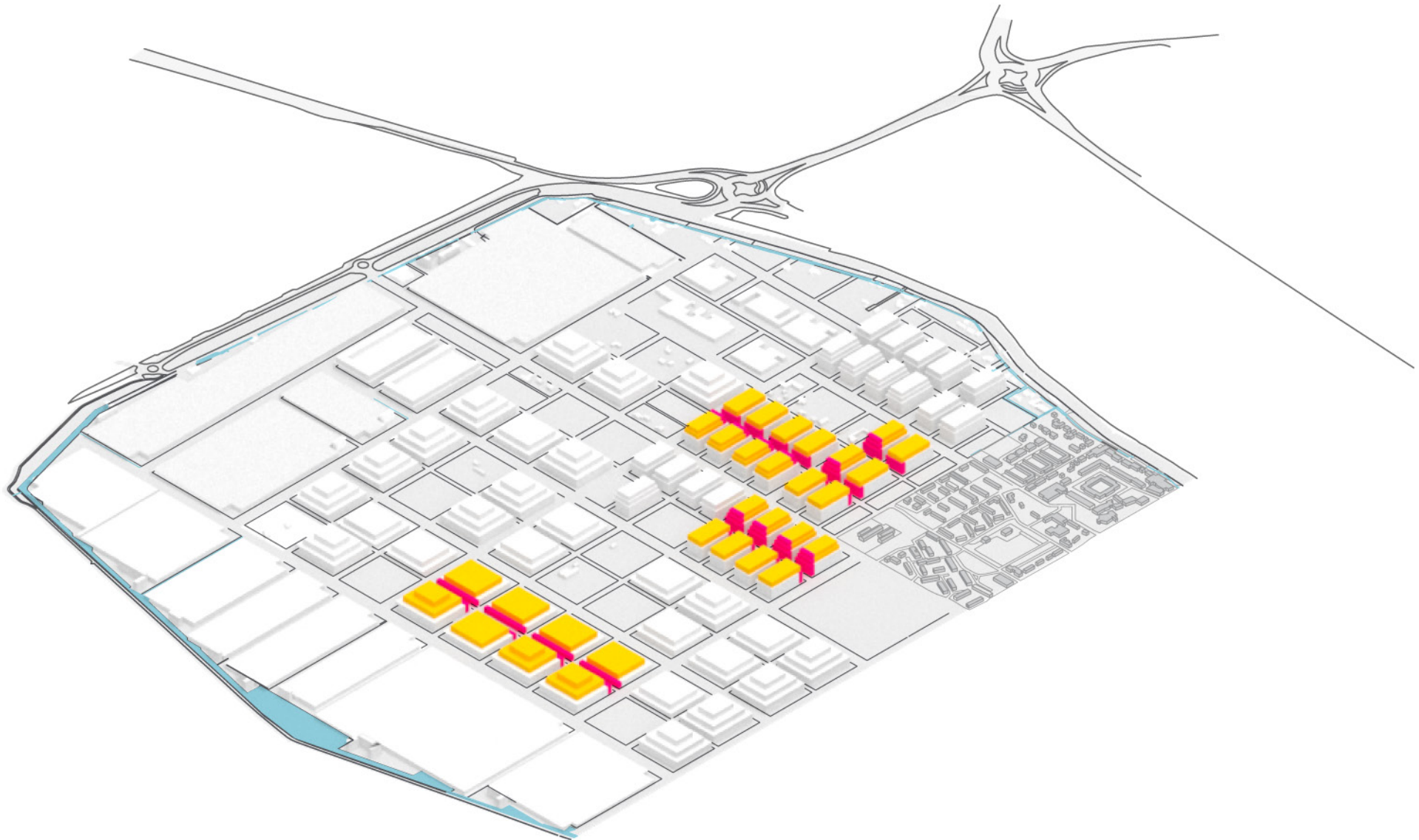


## COMMERCIAL AREAS



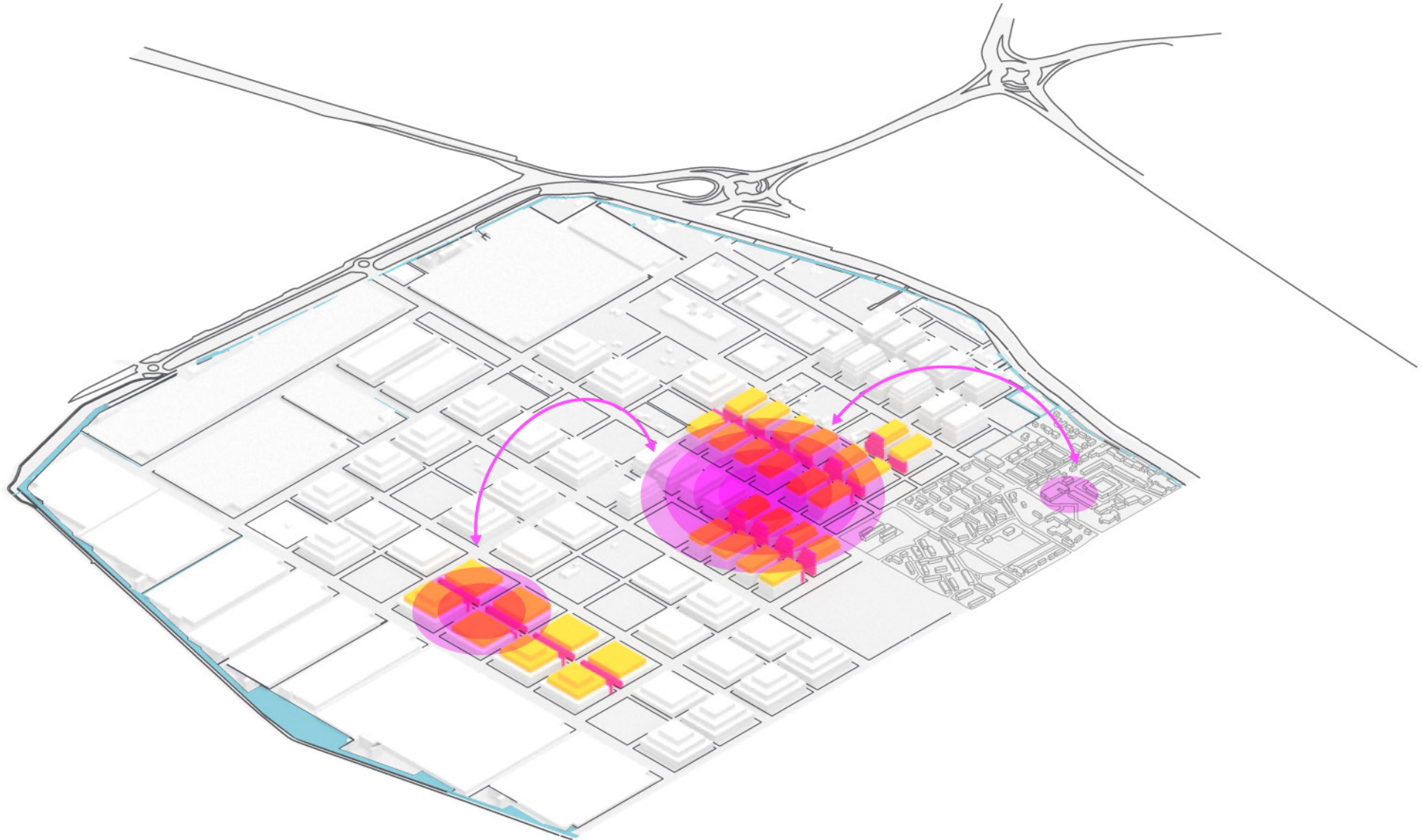


## HIGH DENSITY RESIDENTIAL AREAS





## CENTRAL AREAS

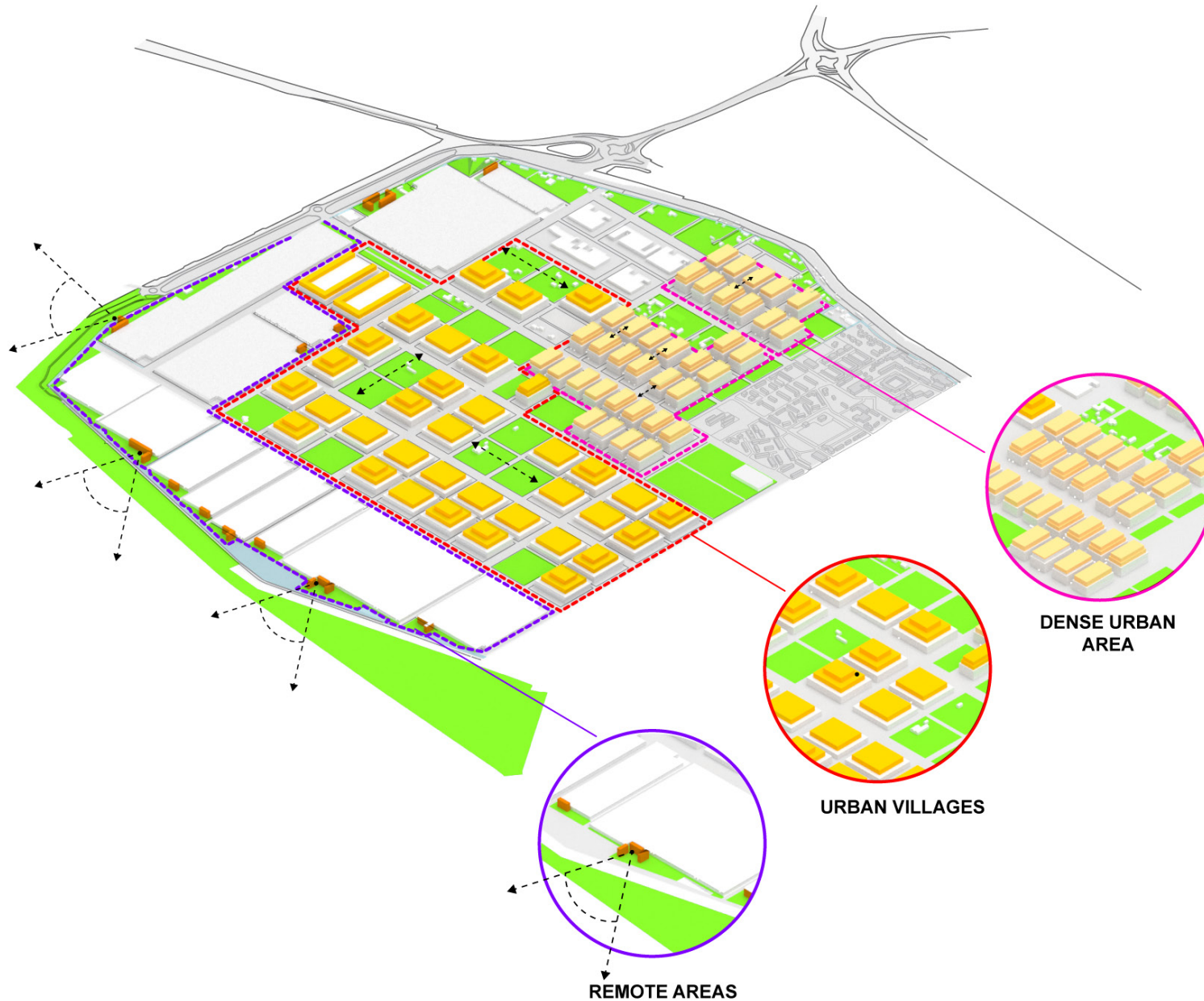




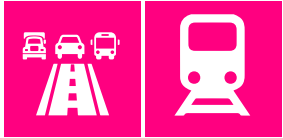


## NEW MIXED-USE TYPOLOGIES

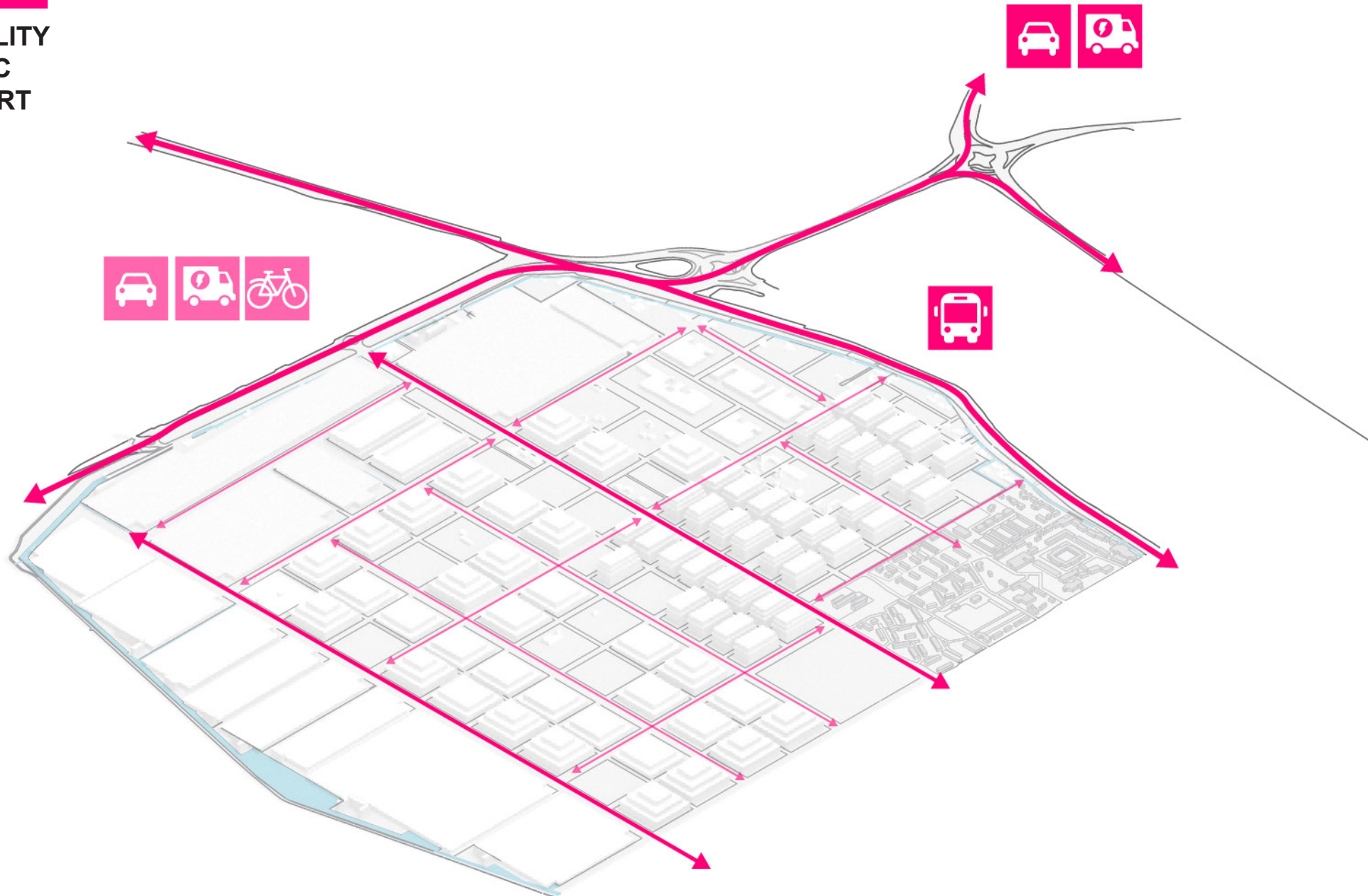
**10,072 I / km<sup>2</sup> ≥ 9951 I / km<sup>2</sup>**  
**PROPOSED VS. IJBURG**

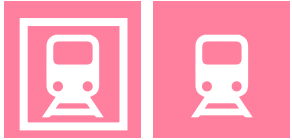




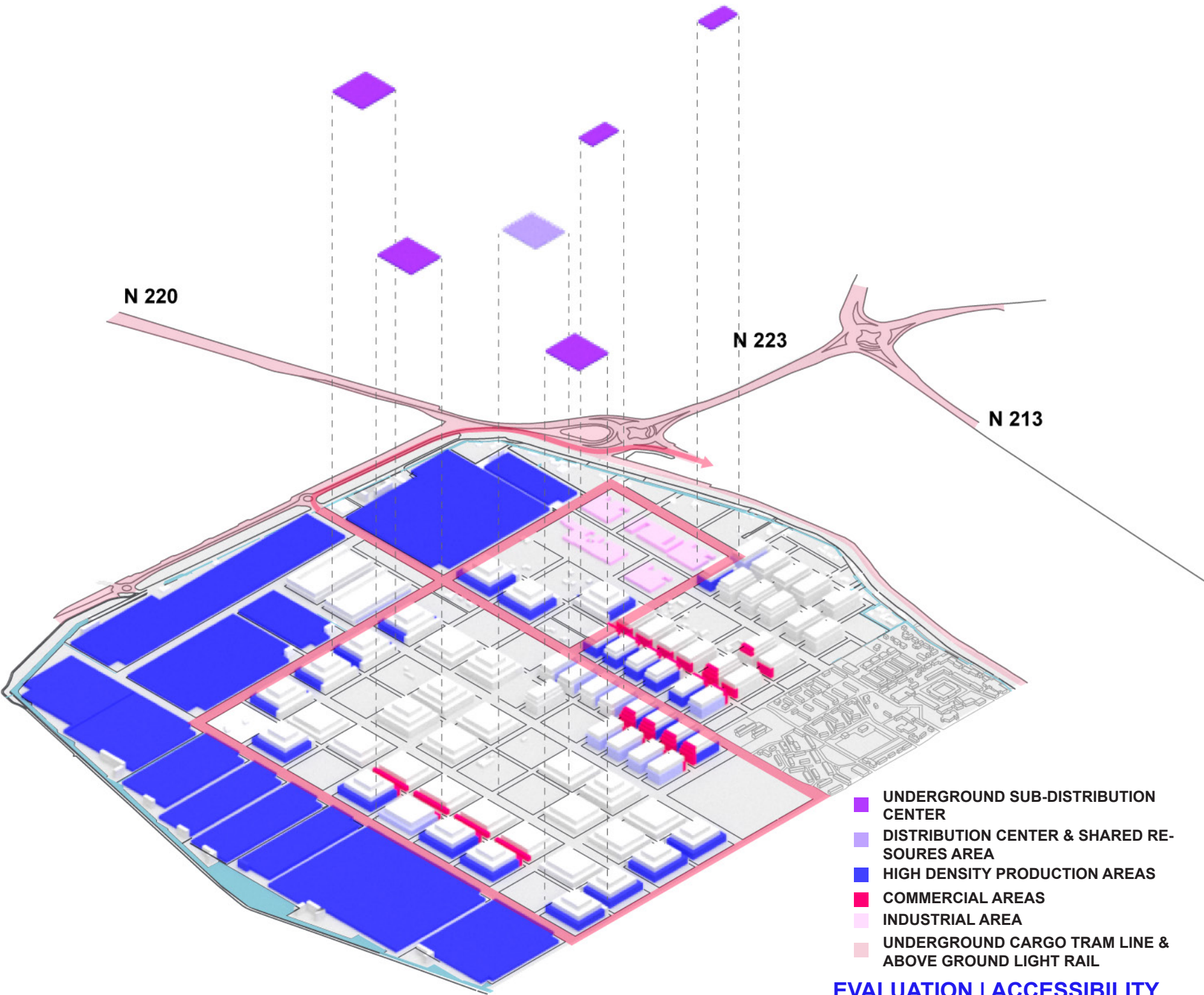


## ACCESSIBILITY & PUBLIC TRANSPORT



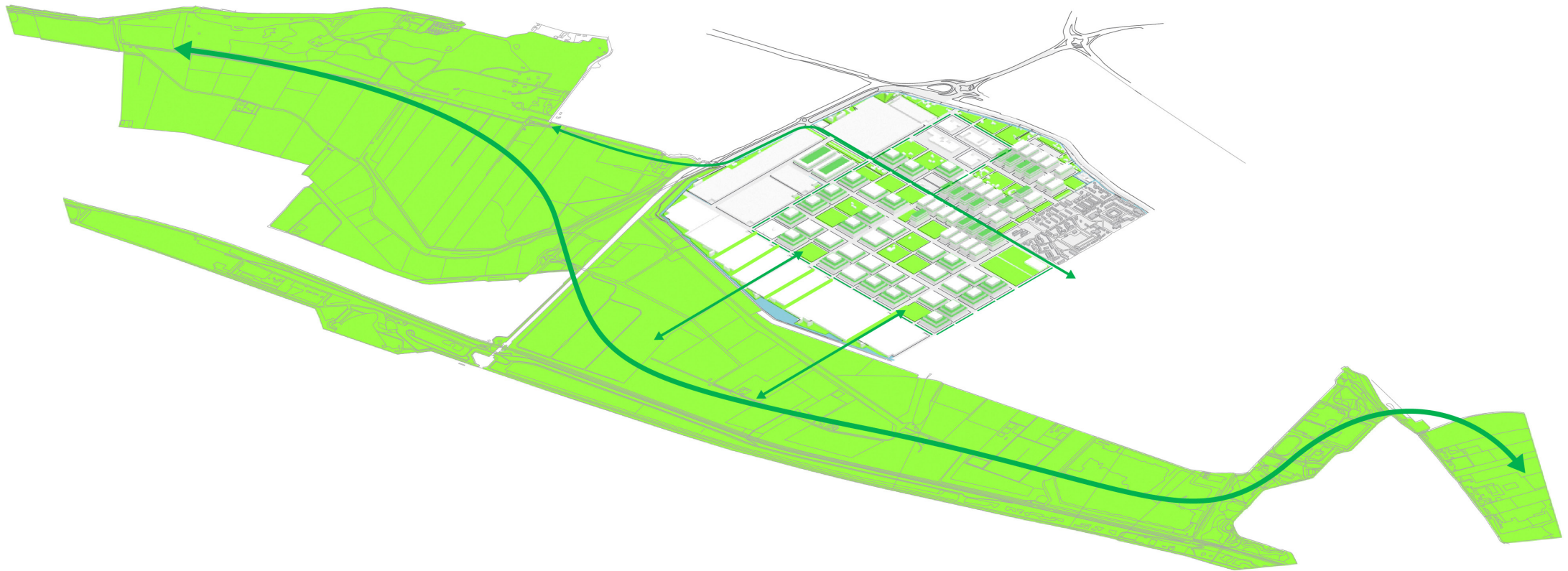


**UNDERGROUND  
CARGO TRAM &  
PUBLIC LIGHT  
RAIL NETWORK**

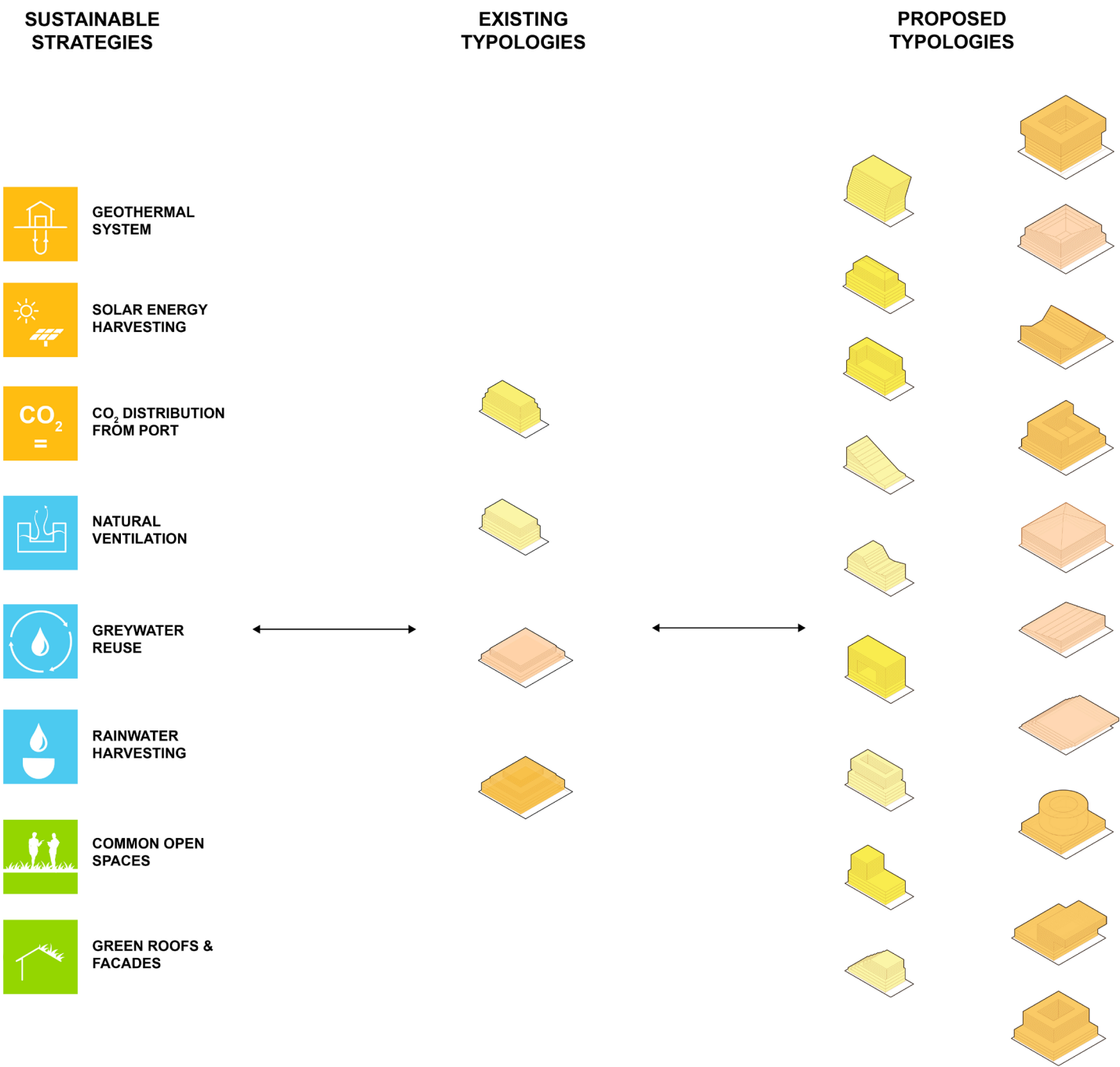




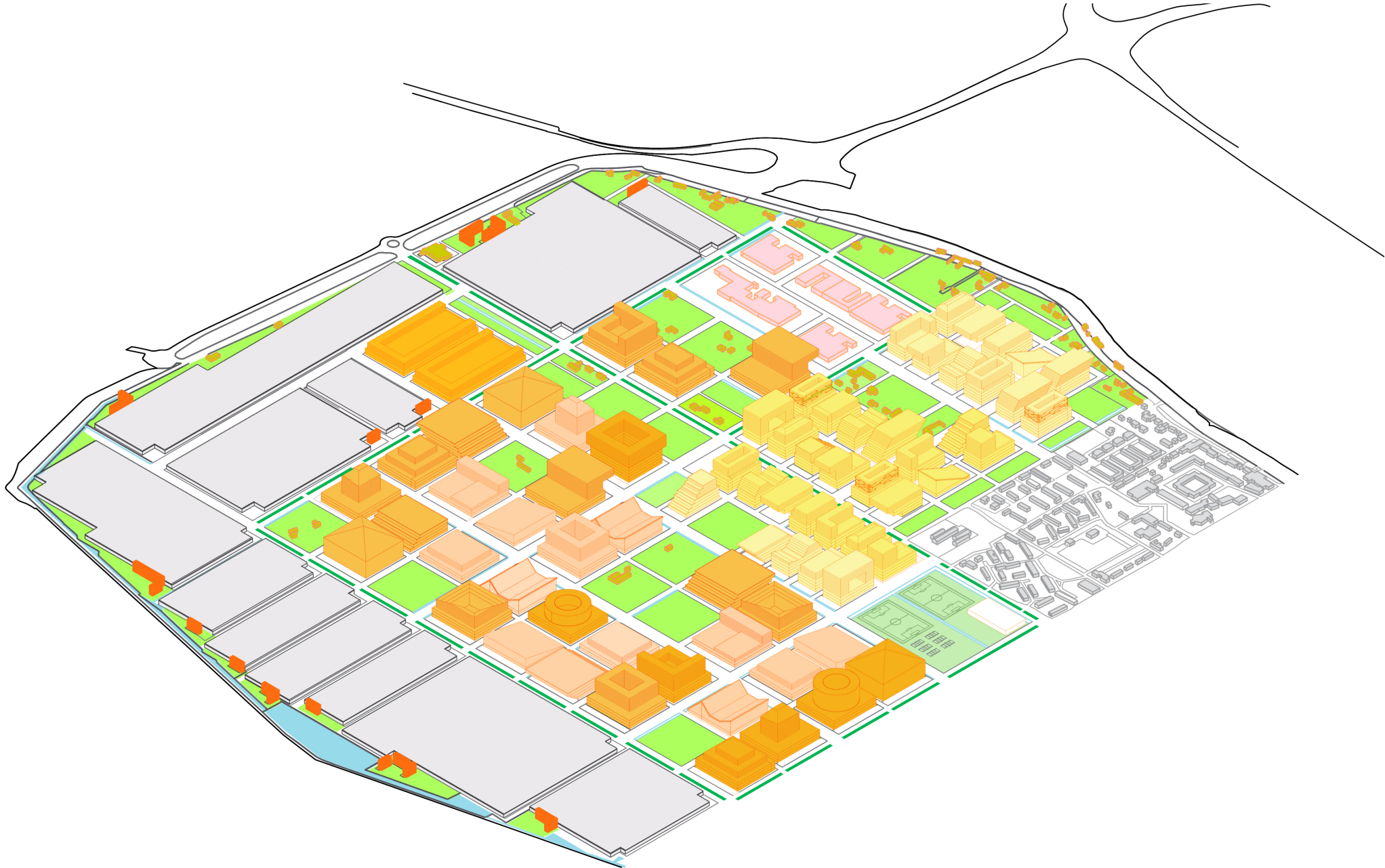
## ECOLOGICAL CORRIDORS











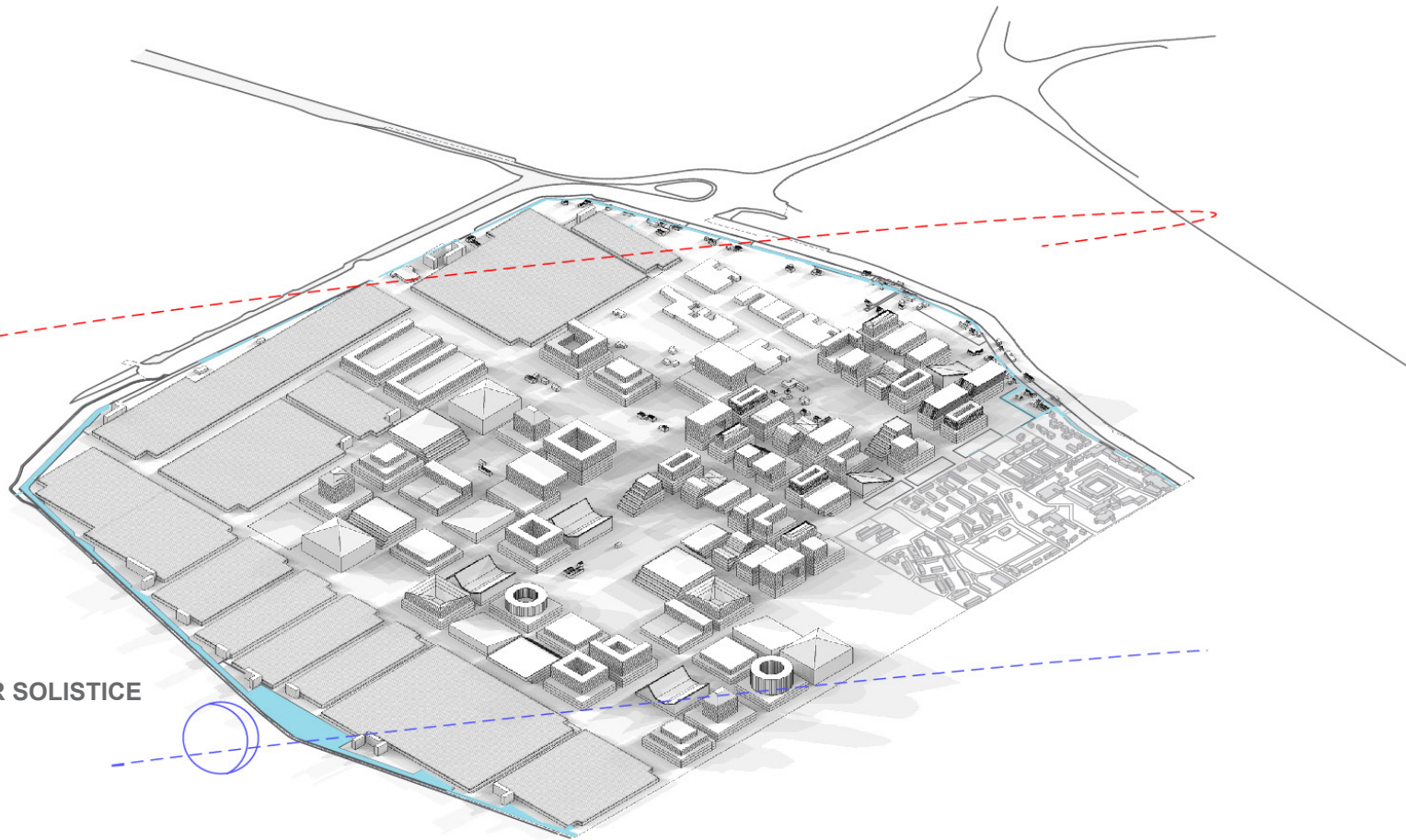


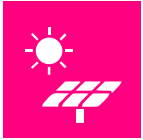
## RENEWABLES

SUMMER SOLISTICE

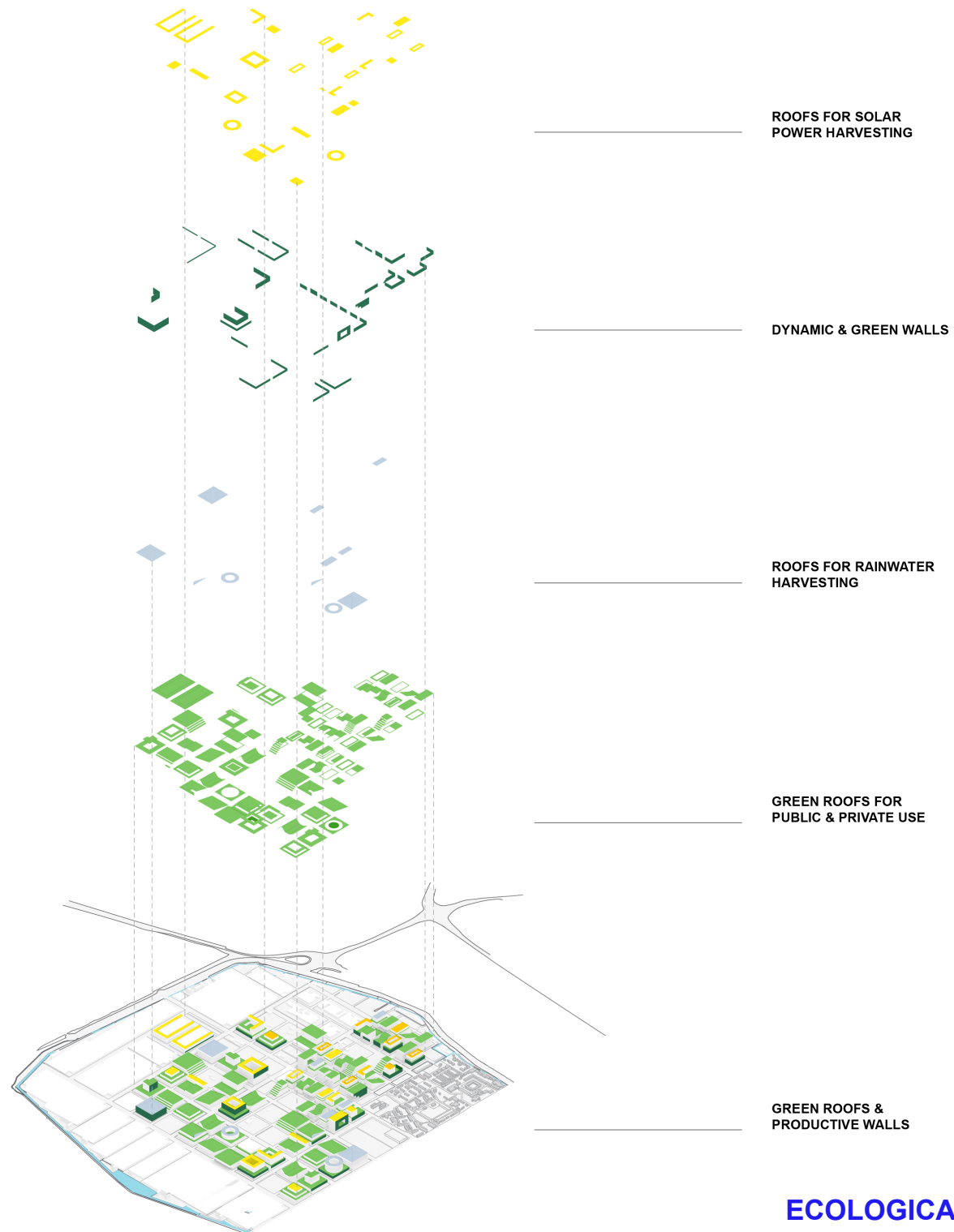


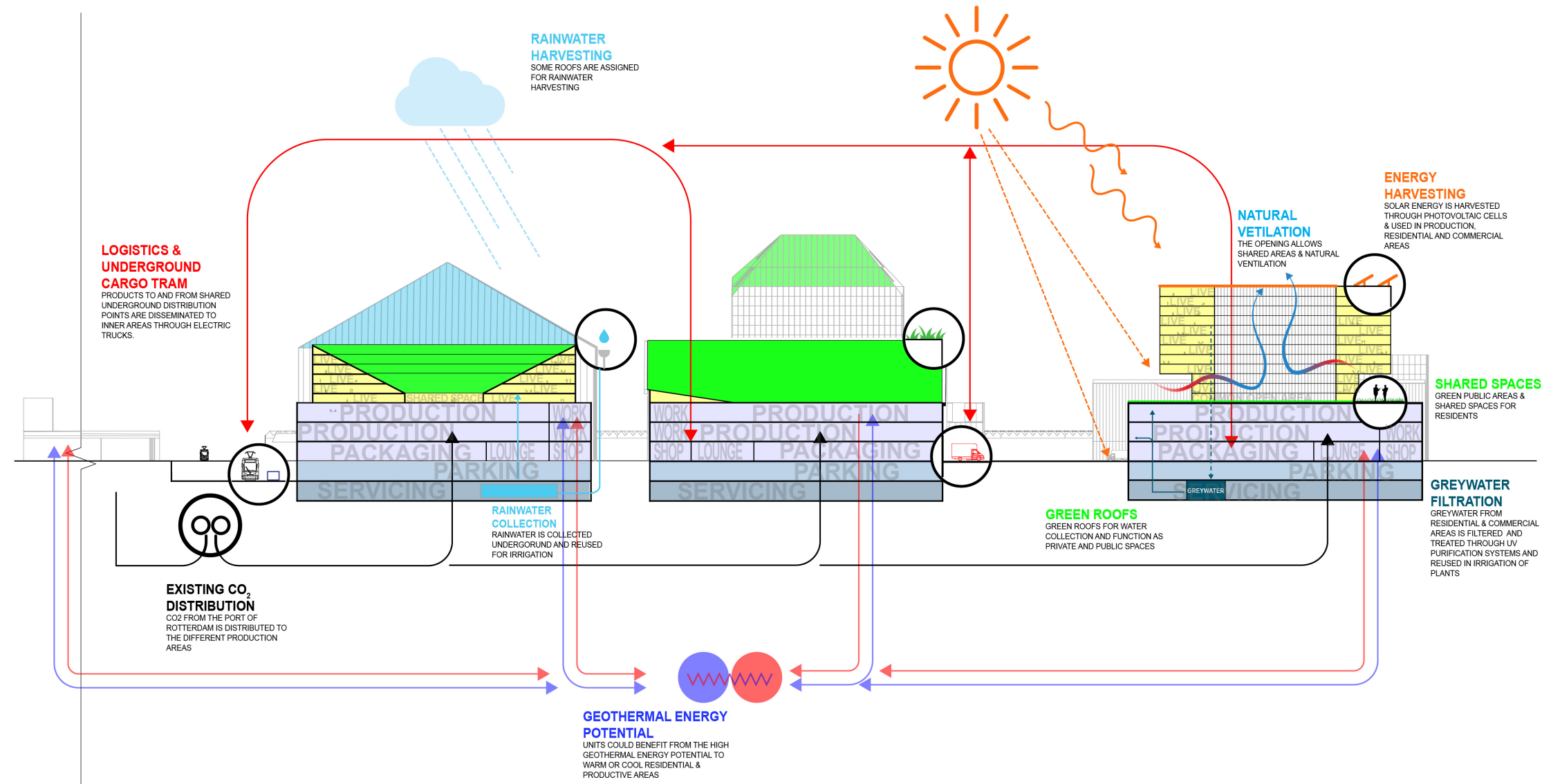
WINTER SOLISTICE





## SUSTAINABILITY























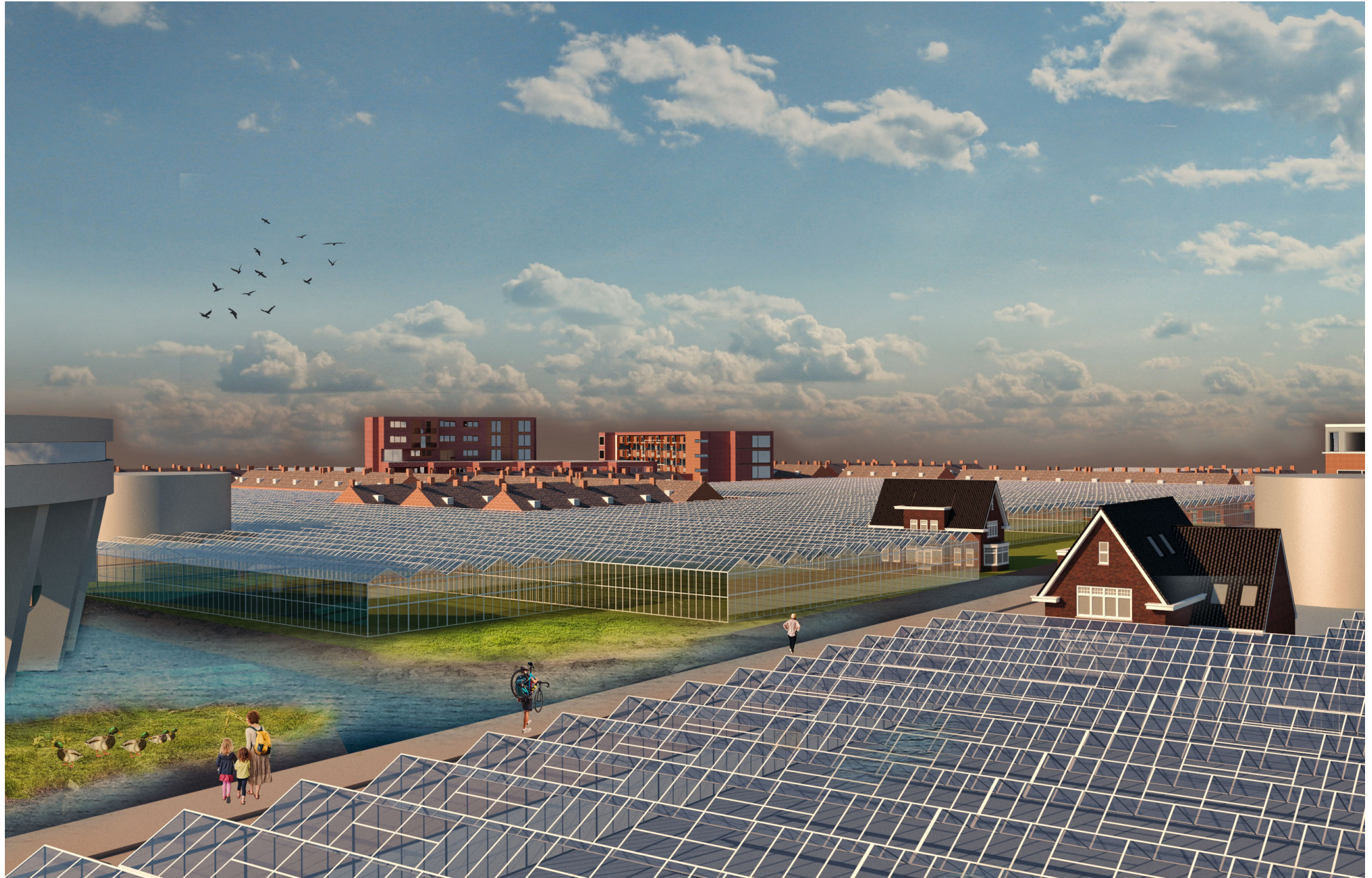
# 9

## SUMMARY

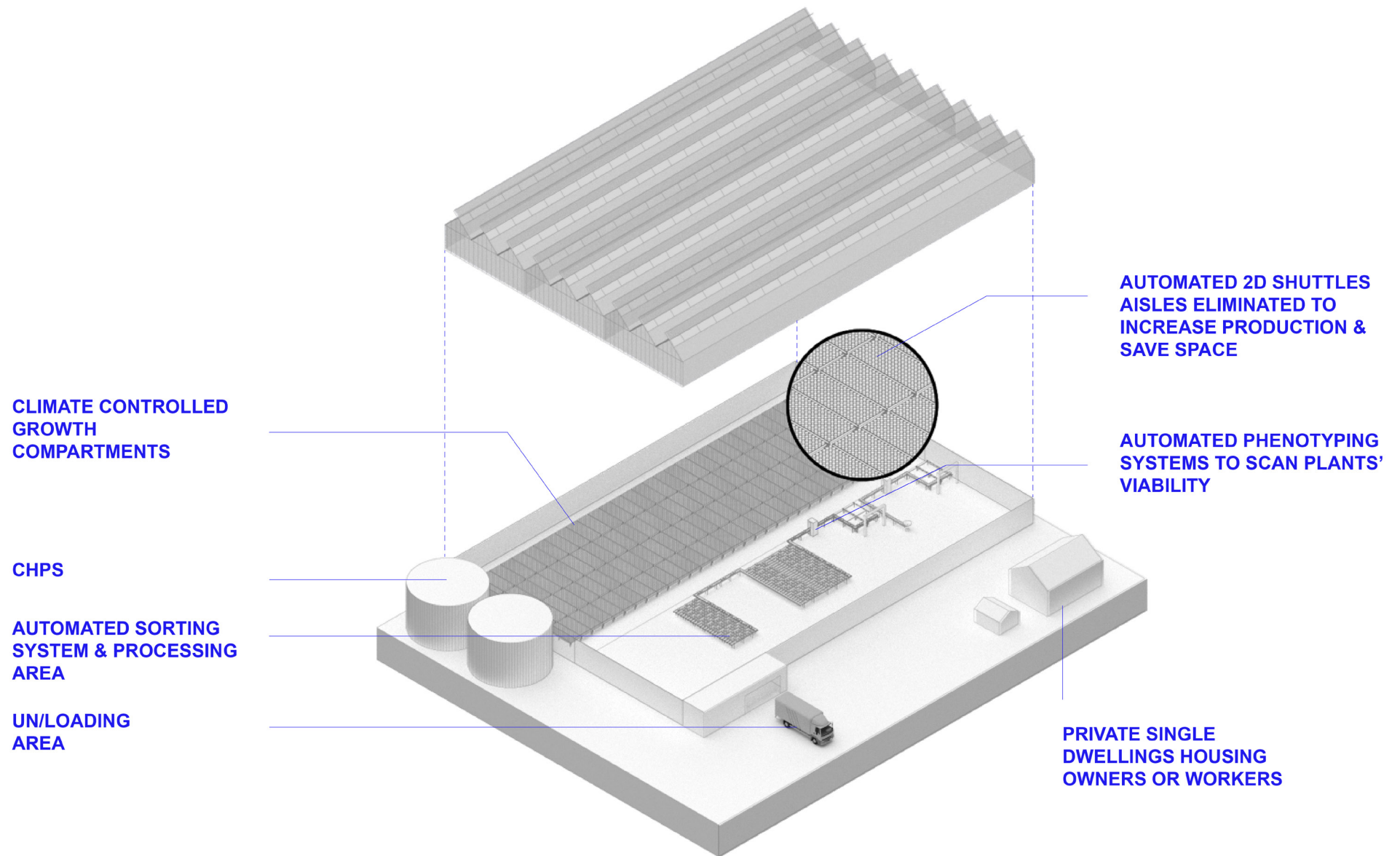


Source. Locatelli, L. (2017). Furrows of artificial light lend an otherworldly aura to Westland, the greenhouse capital of the Netherlands. Climate-controlled farms such as these grow crops around the clock and in every kind of weather. [Image]. Retrieved from <https://www.nationalgeographic.com/magazine/2017/09/holland-agriculture-sustainable-farming/>

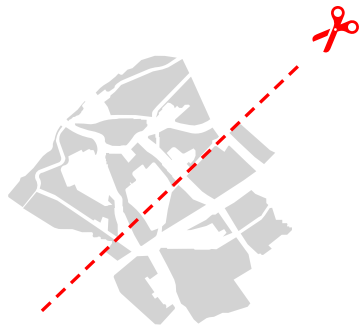




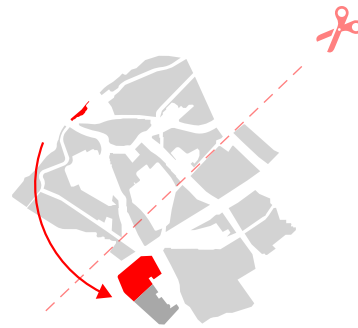




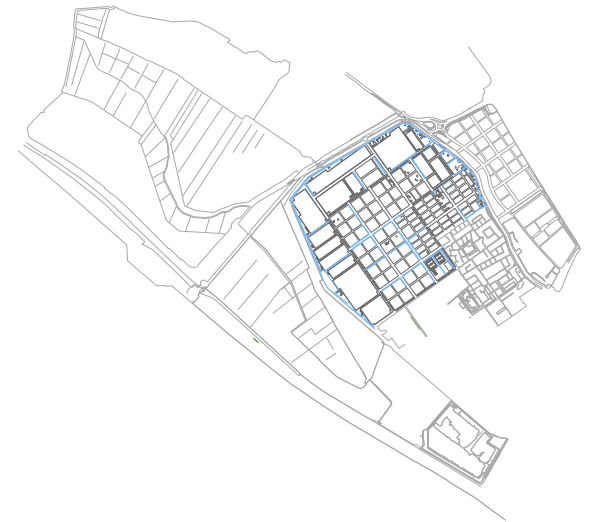




OVERALL STRATEGY



PILOT PROJECTS



DESIGN

