Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Johannes Bohn

MSc Thesis



Local Hero

Rethinking Urban Transformation towards a Local Micro-Economy

Chapters

I Problem Identification 3

II Exploration 21

III Conceptualisation 30

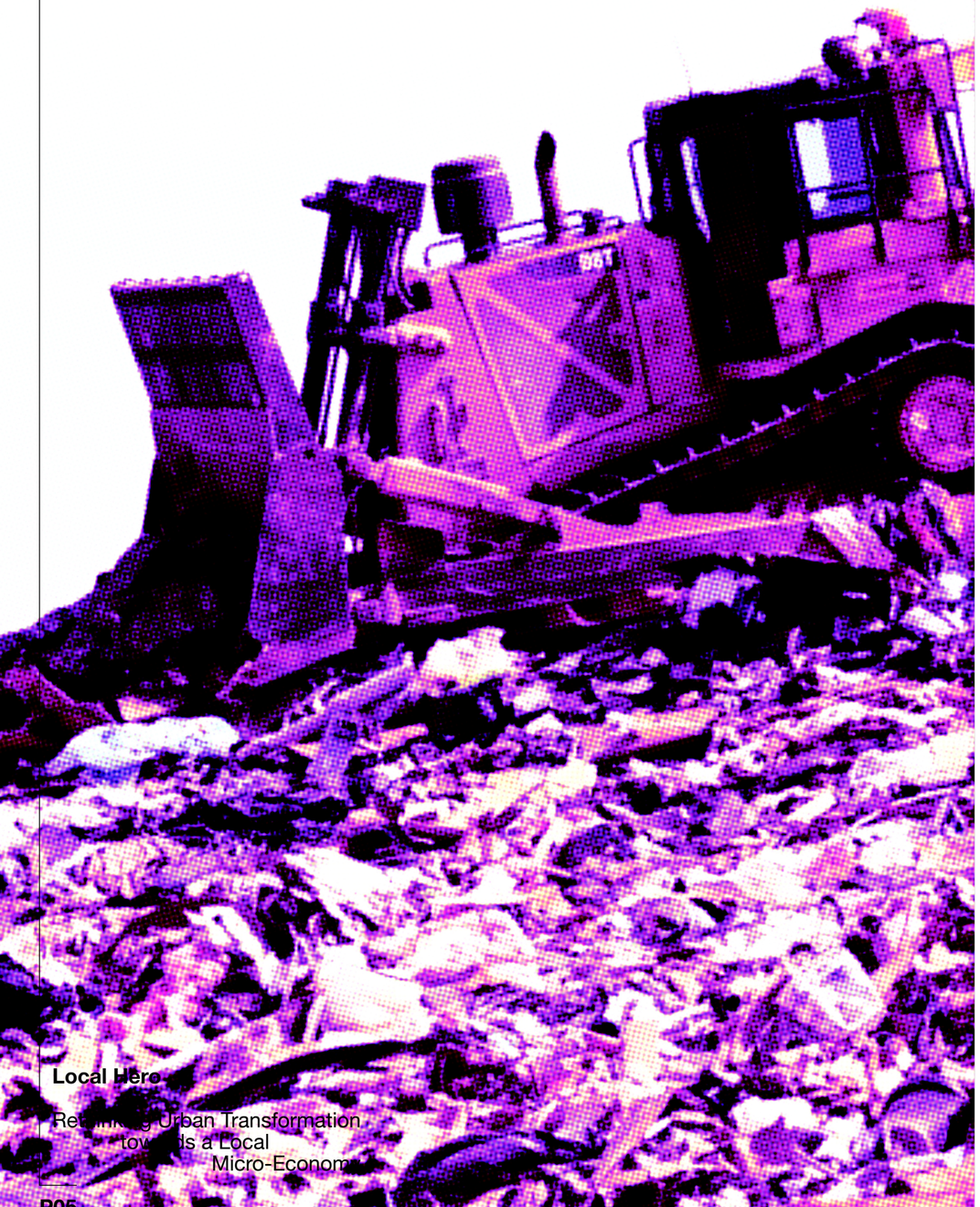
IV Design 49

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

I Problem Identification





A. A Global Issue



Local Hero

Rethinking Urban Transformation towards a Local Micro-Economy

Thomas Offermans
Paddy Tomassen
Pieter Stoutjesdijk



EU: 36.0%
Netherlands: 41.6%

Demolition instead of Renovation/Conversion

Lack of Demountability

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Small Scale

Big Scale

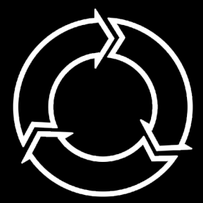
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

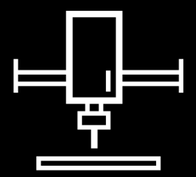
New Responsibilites



Acknowledge the Potential of Existing Buildings



Design for Disassembly and Reuse



Make Use of State-of-the-Art Digital Fabrication Methods

Local He

Rethinking n Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

B. A Local Issue

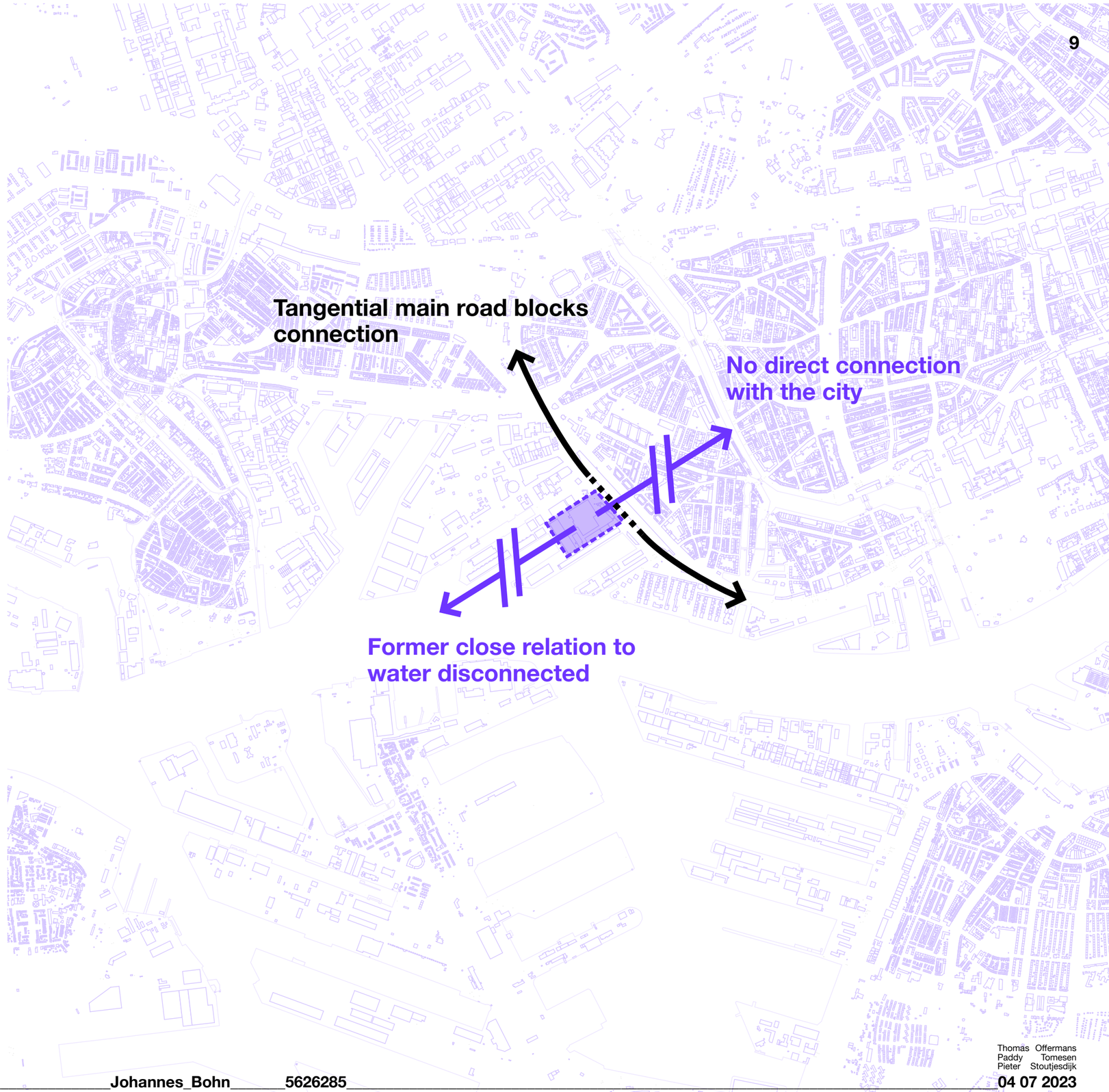


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

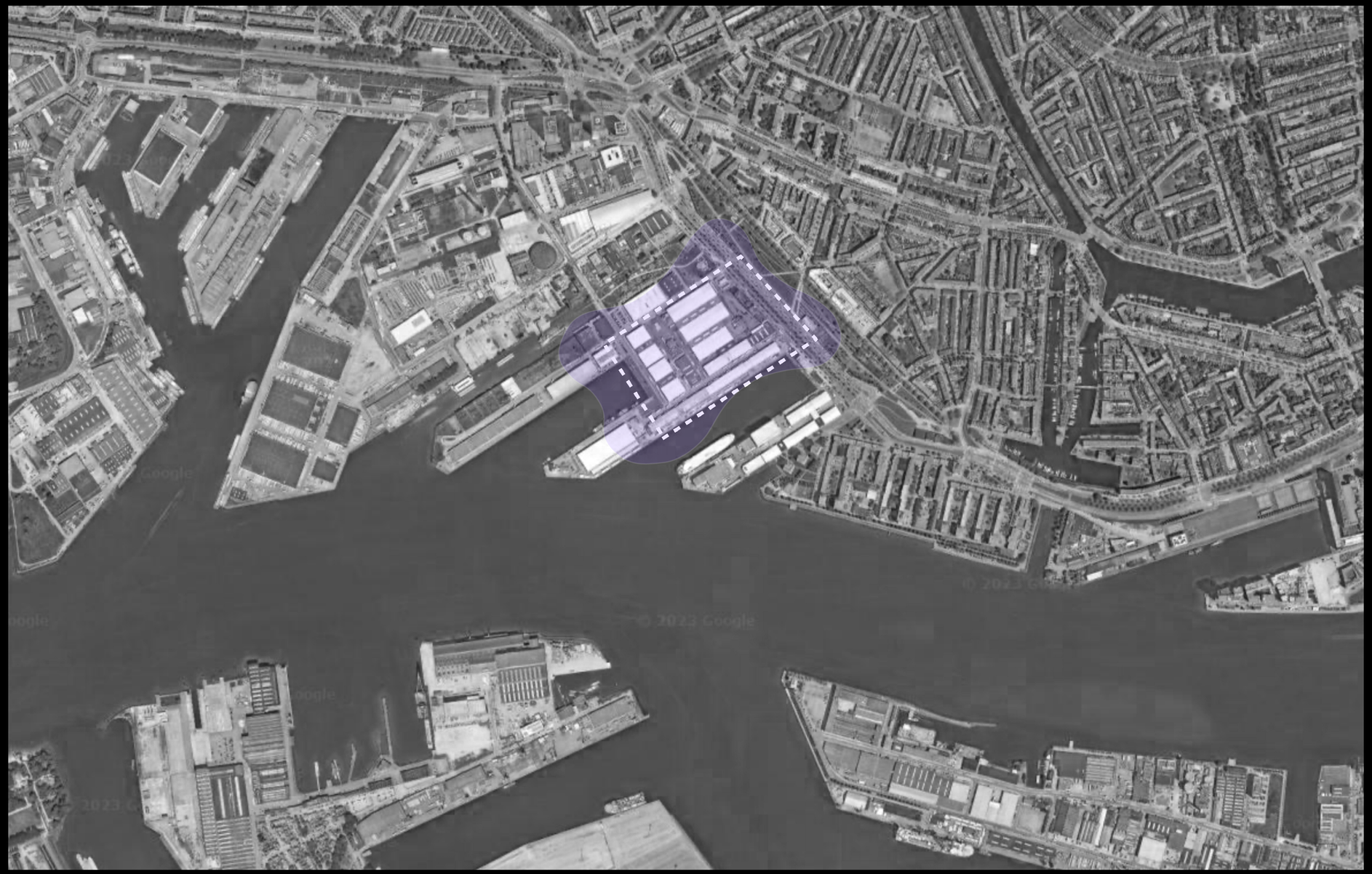
Current Situation



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

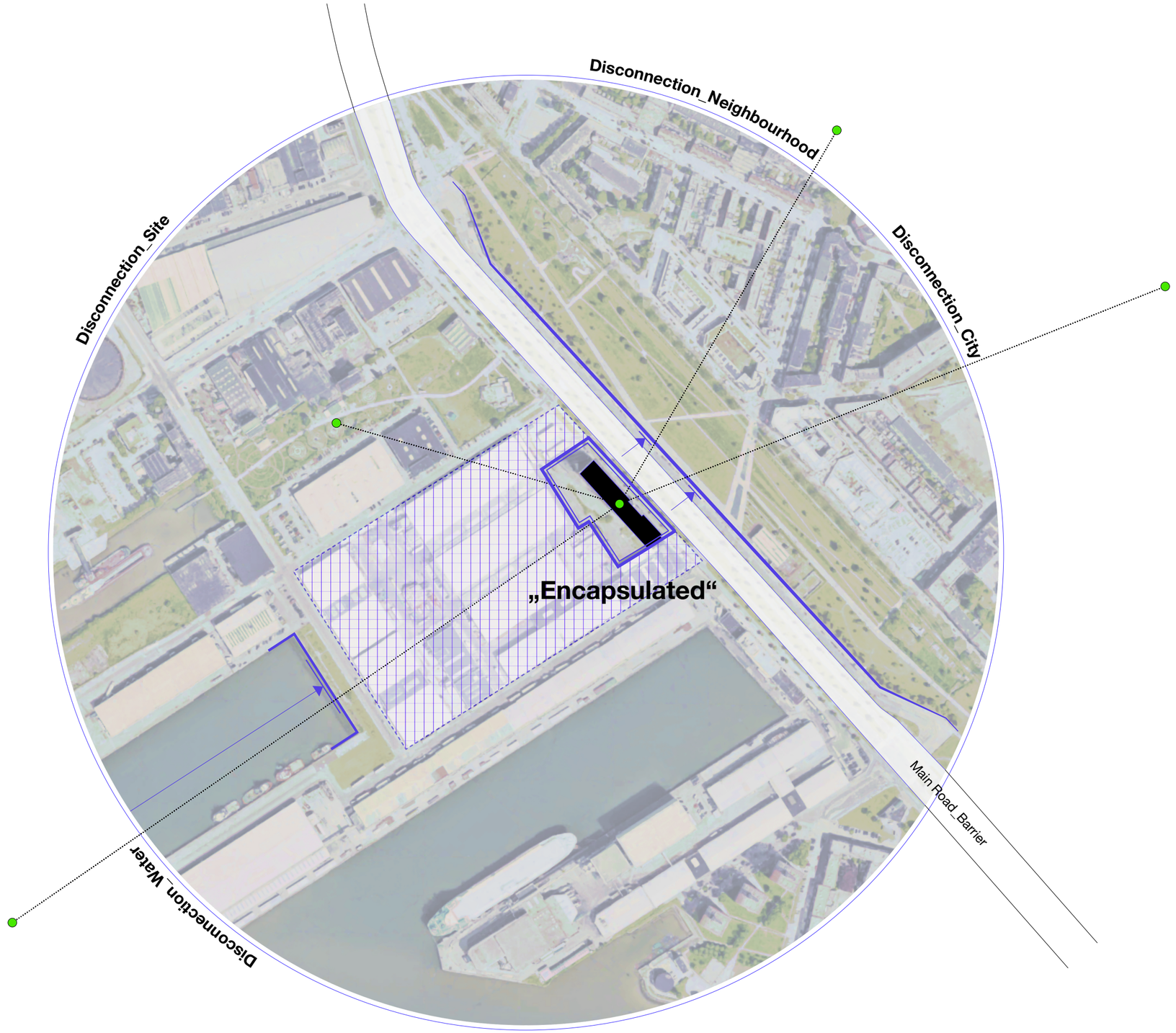


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Current Situation



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Historic Vierhaven

Water Side



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Historic Vierhaven

Land Side



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

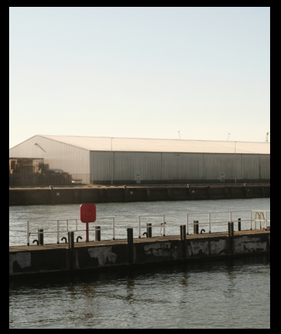
Around the Site























Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Dis-
connection



View from Nieuwe Maas



View from Vertrekhal Oranjelijn



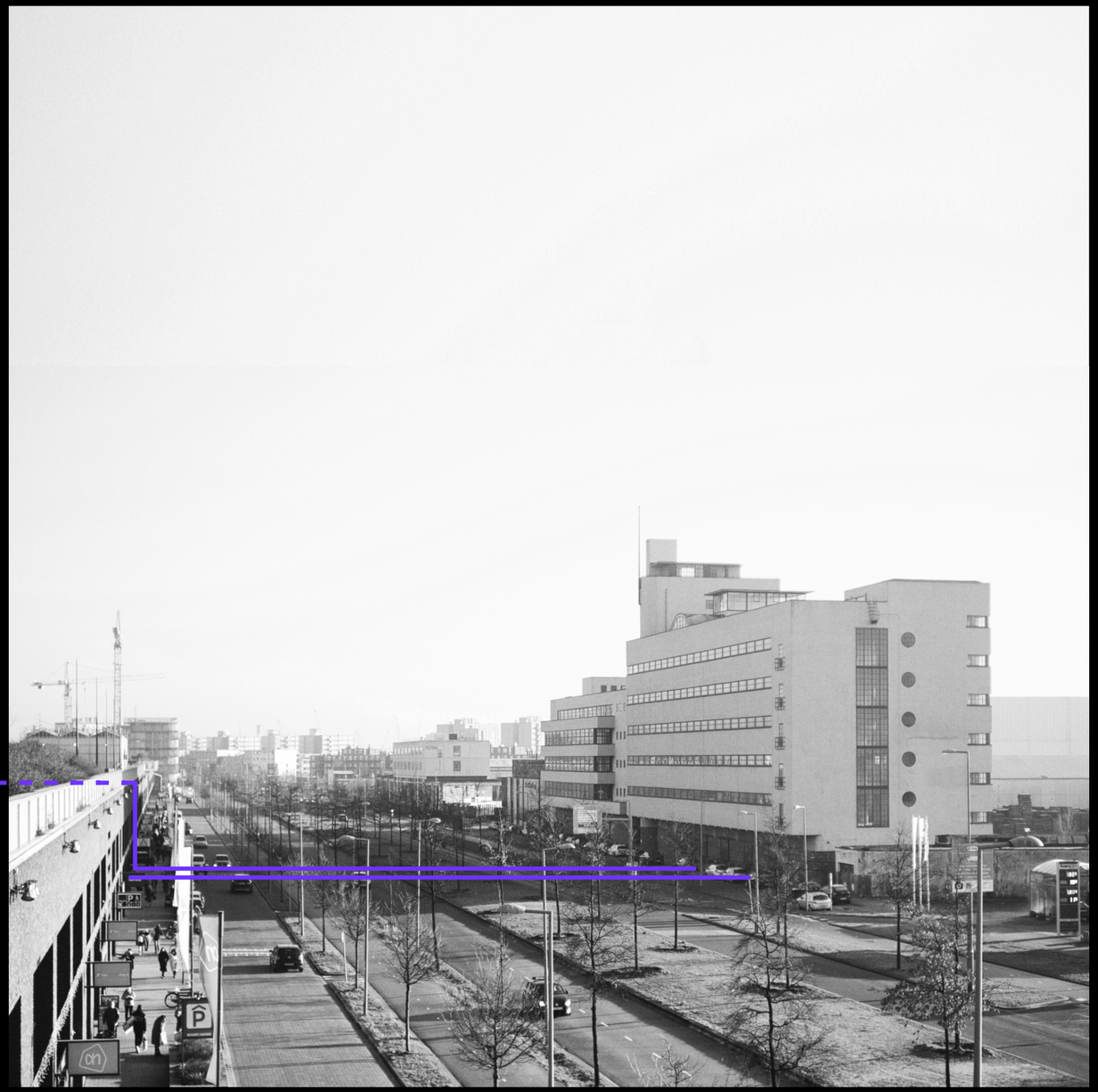
View from Lekstraat - HaKa visible in Second Row

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Dis-connection



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

The Historic HaKa













Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

The HaKa Today







Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy








Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy



Local Issue

Global Issue

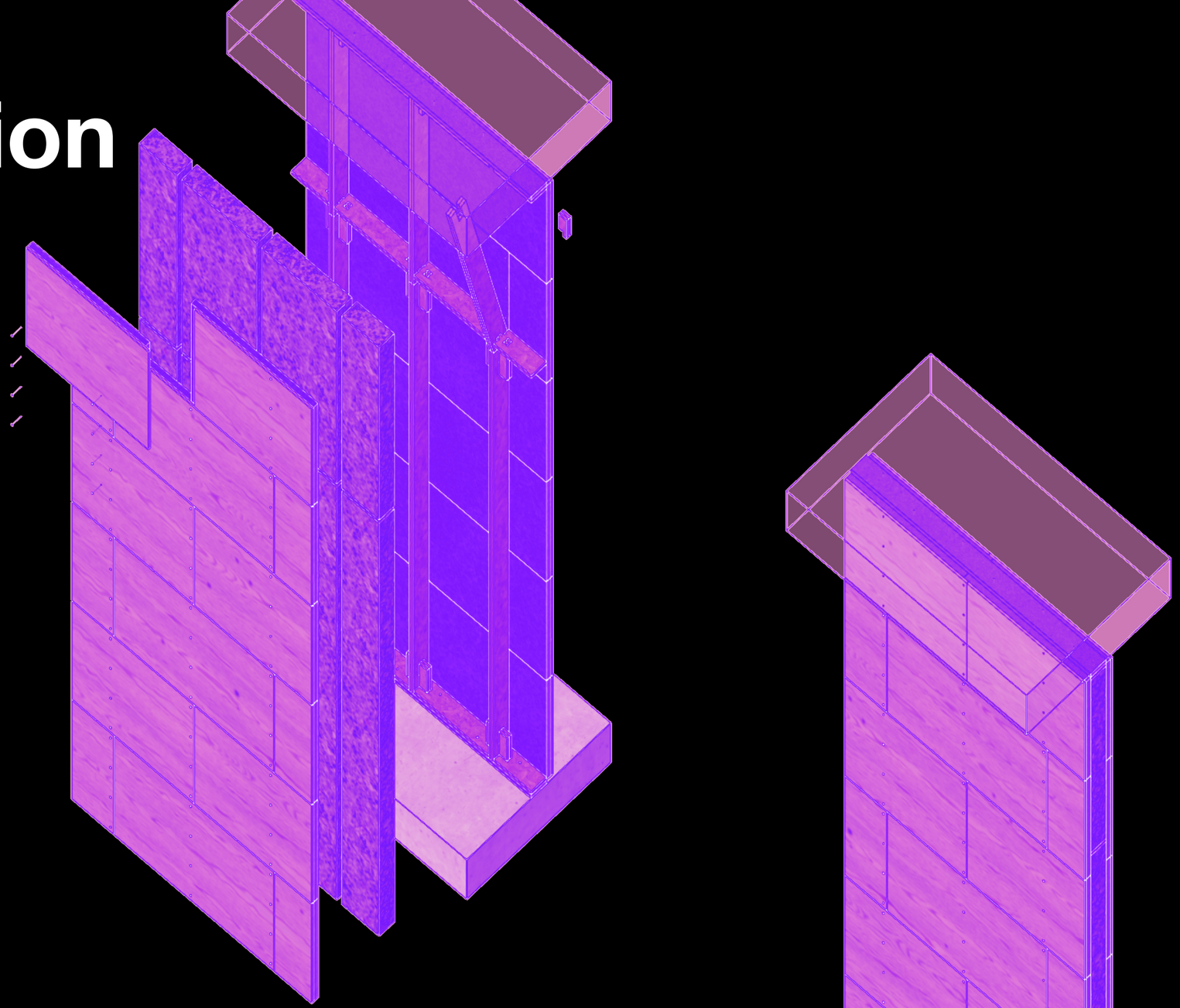


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

II Exploration

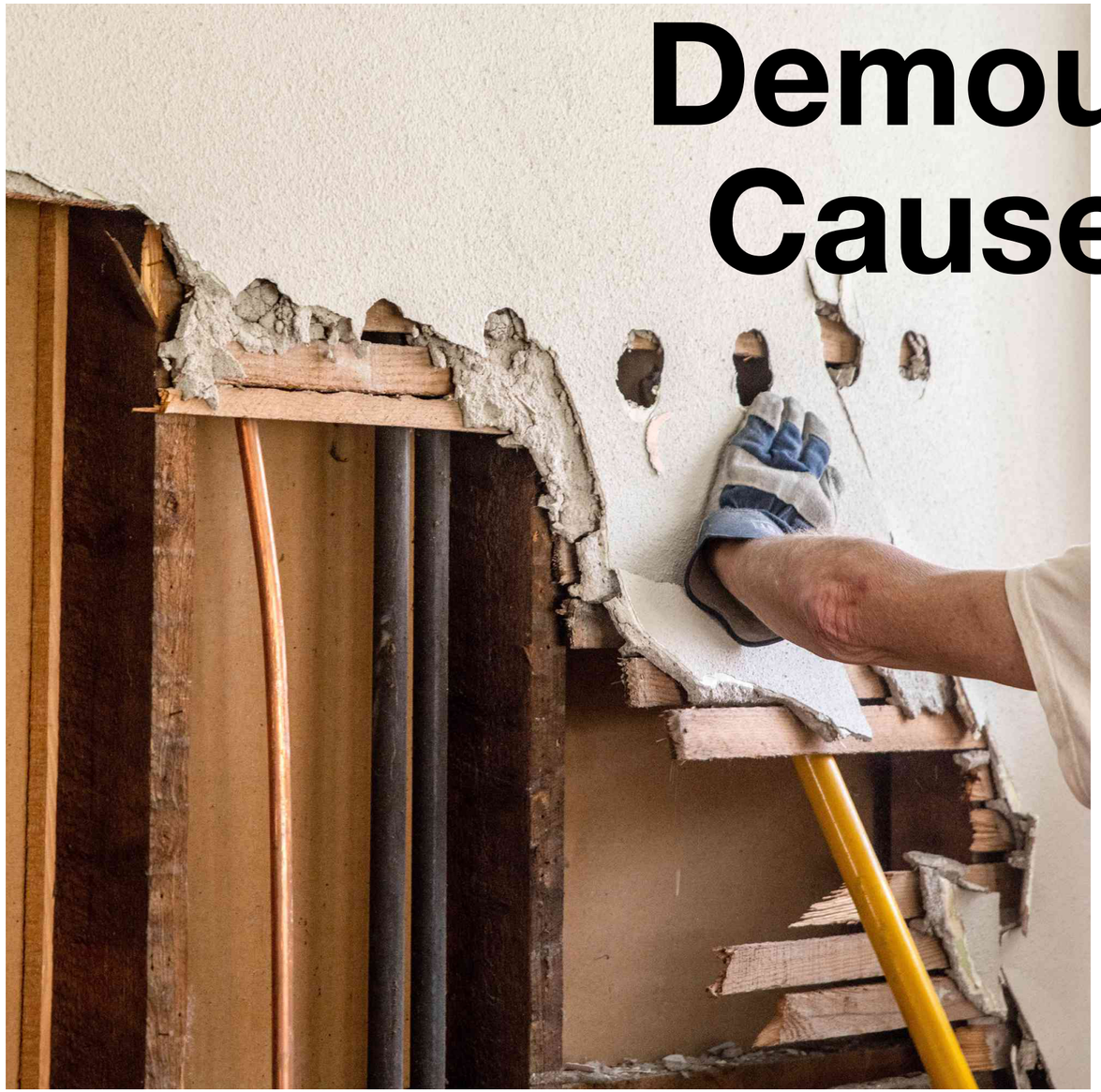


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Lack of Demountability Causes Waste



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Global Issue



Responsibilites

Acknowledge the Potential of Existing Buildings

Design for Disassembly and Reuse

Make Use of State-of-the-Art Digital Fabrication Methods

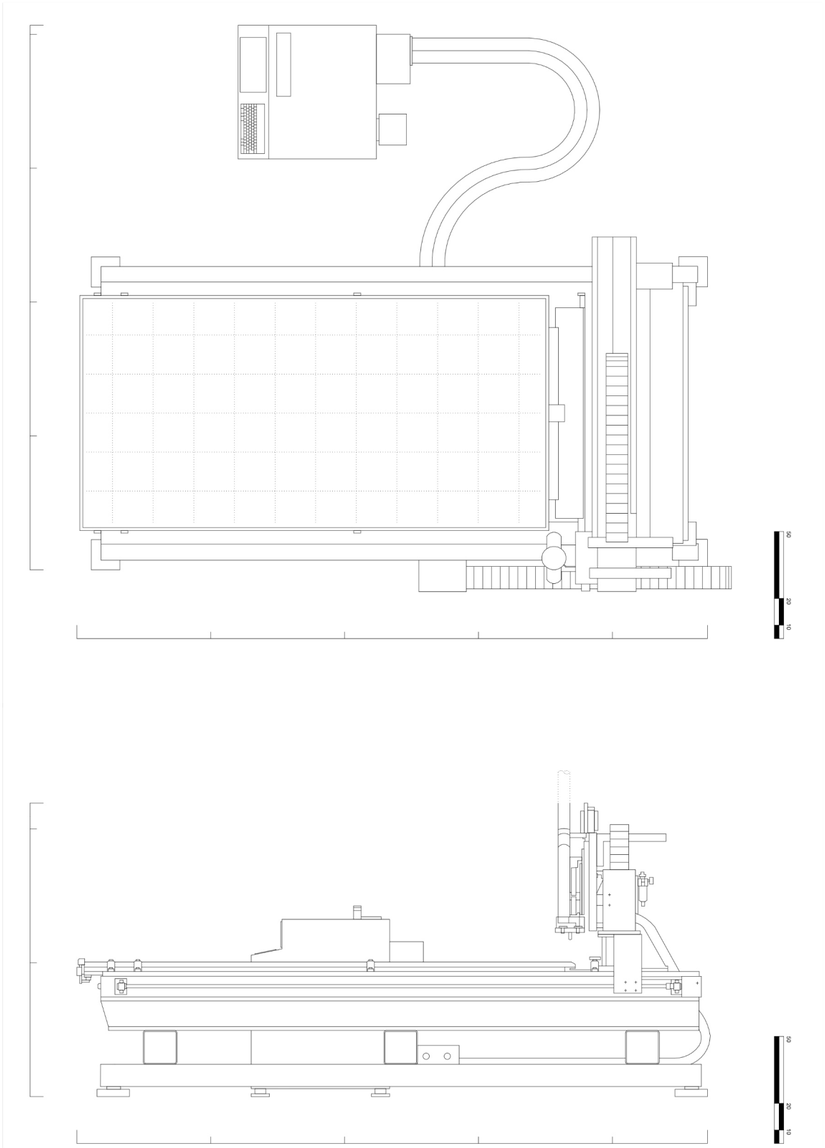
? Research Topic

Application of CNC Milling for Demountable Wall Systems

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk





Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Johannes_Bohn 5626285

THEORETICAL FRAMEWORK

I Design for Disassembly

Design for Disassembly is the design of buildings to facilitate future changes and dismantlement (in part or whole) for recovery of systems, components and materials.

II Digital Fabrication

Digital fabrication describes a design and manufacturing workflow where digital data directly drives manufacturing equipment to form various part geometries.

Methods



LITERATURE STUDY

MARKET ANALYSIS

CASE STUDY ASSESSMENT

Literature Study Findings

GENERAL ADVANTAGES OF CNC MILLING ARE …

… High Precision and Versatility

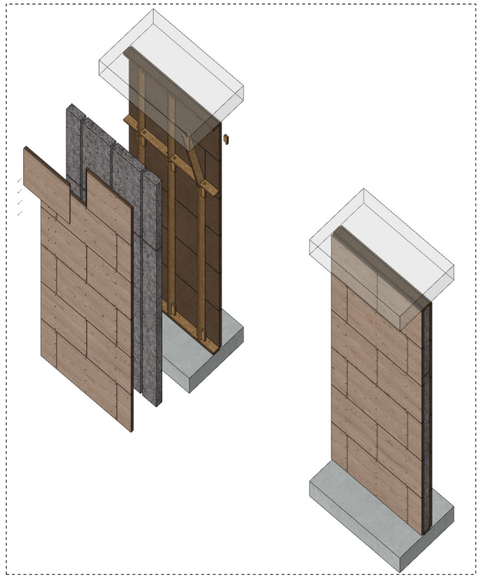
… File-to-Factory Production

… Locational Independence of Production

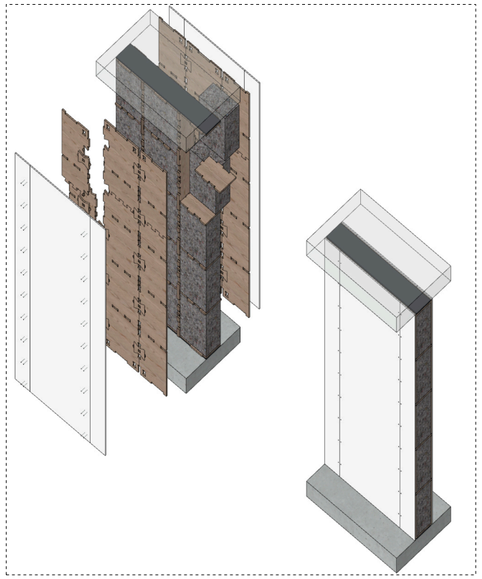
POTENTIAL OF CNC MILLING FOR DEMOUNTABLE PARTITION WALLS IS …

…the Connection of Components without Fasteners due to High Mashining Precision

Demountable Partition Wall Systems



CNC-Fabricated





Not CNC-Fabricated



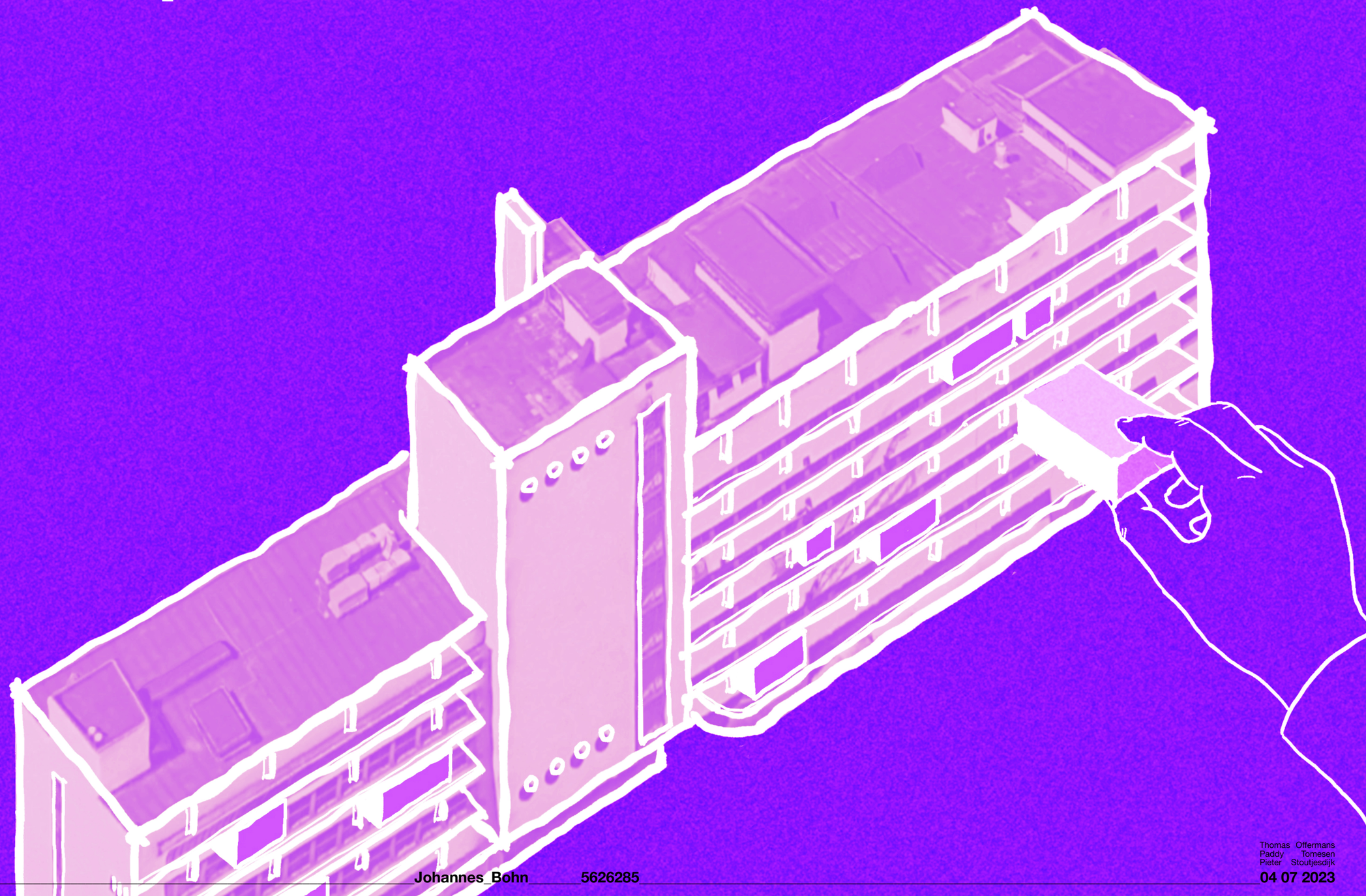
Key Lessons

I **By implementing CNC milling into the production of demountable partition wall systems, an improvement in ease of assembly and disassembly can be achieved.**

II **CNC milling enables high manufacturing precision, so that component connections are possible without fasteners.**

III **File-to-factory and production in Fab-Lab workshops using CNC milling stimulate personal manufacturing and mass customisation.**

III Conceptualisation



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Towards A Local Micro-Economy

Concepts


In-House CNC Production


Harvest & reuse

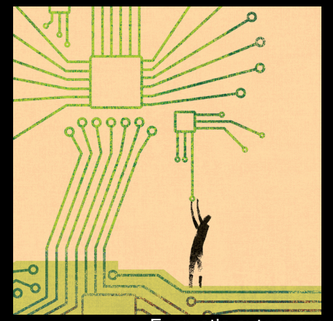

Urban farming


Creatives & makers


Productive garden

M4H ROTTERDAM
Neighborhood network


Local material flow


Energetic autonomy


Identity

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

1 Urban Concept

Concepts

In-House CNC Production

Harvest & reuse

Urban farming

Creatives & makers

Productive garden

M4H ROTTERDAM
Neighborhood network

Local material flow

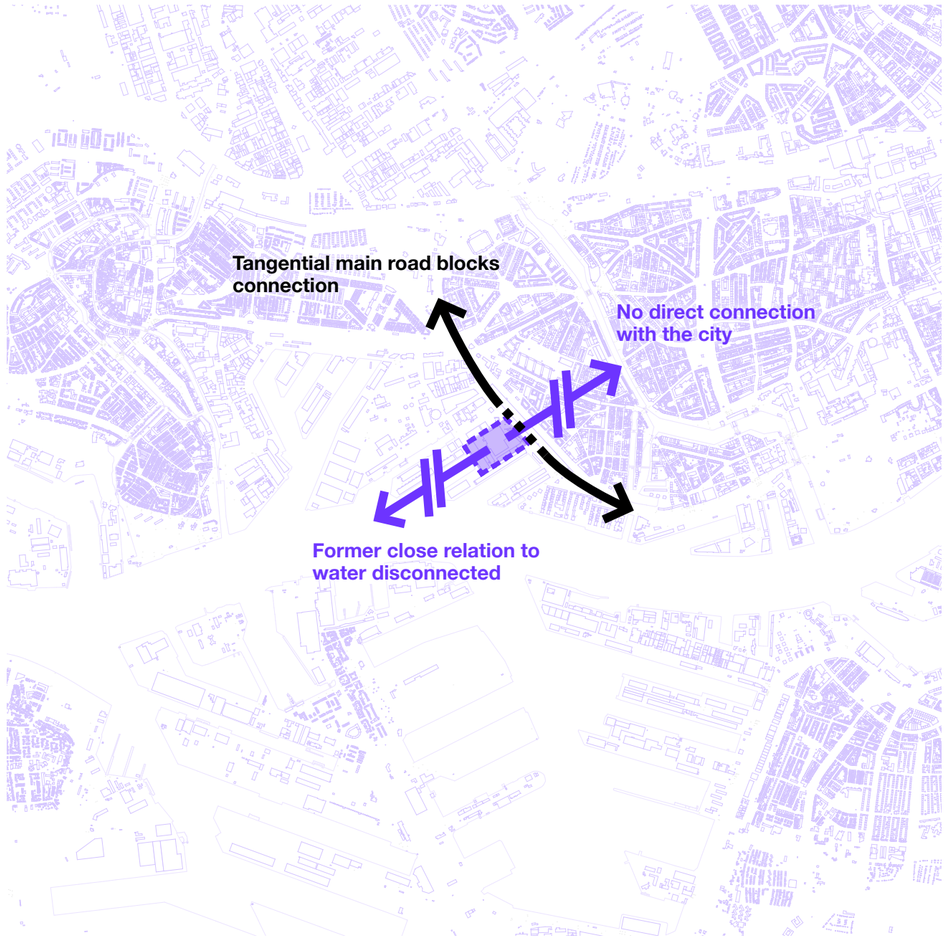
Energetic autonomy


Identity

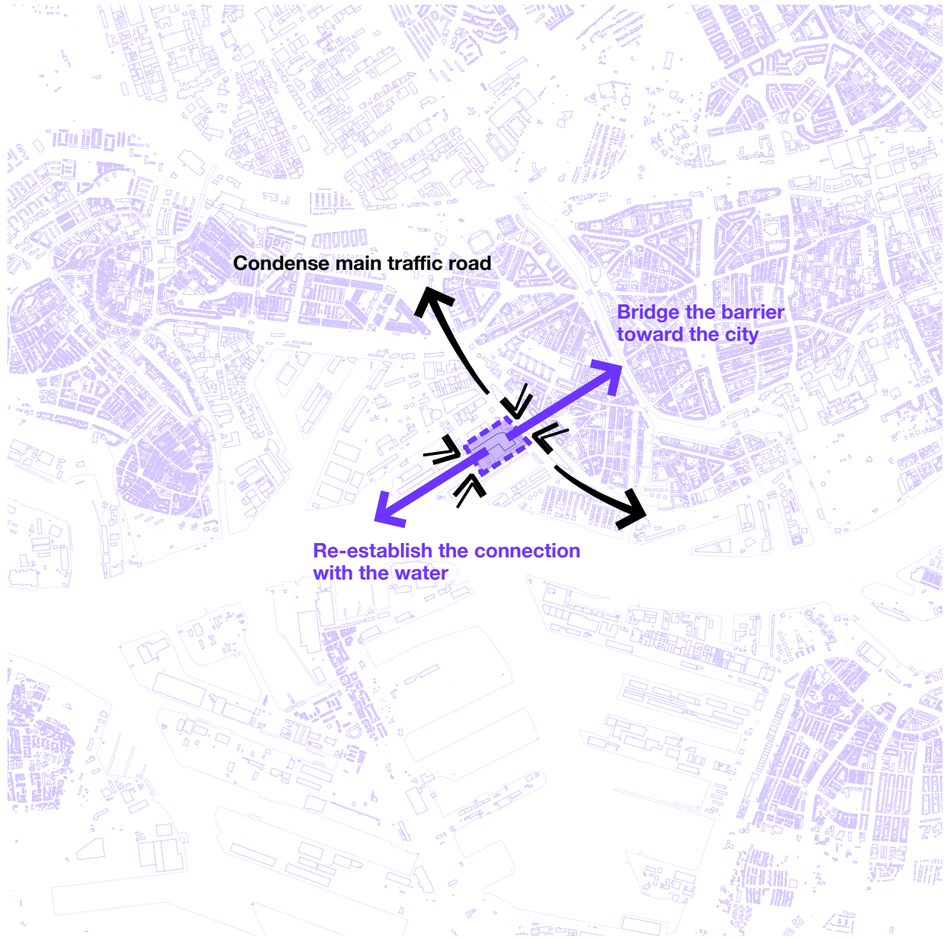
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Today



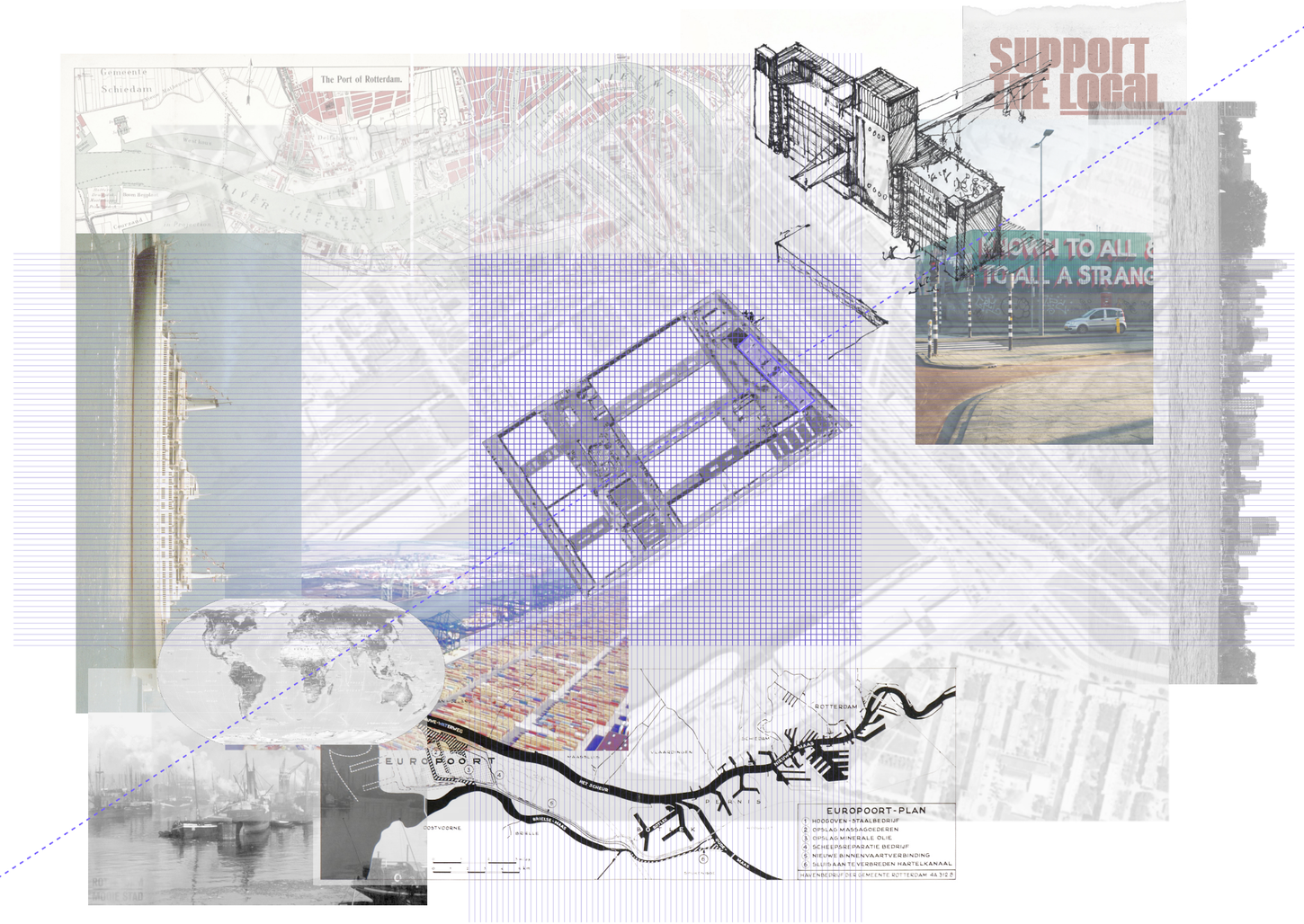
Future Vision

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

LAND
LOCAL

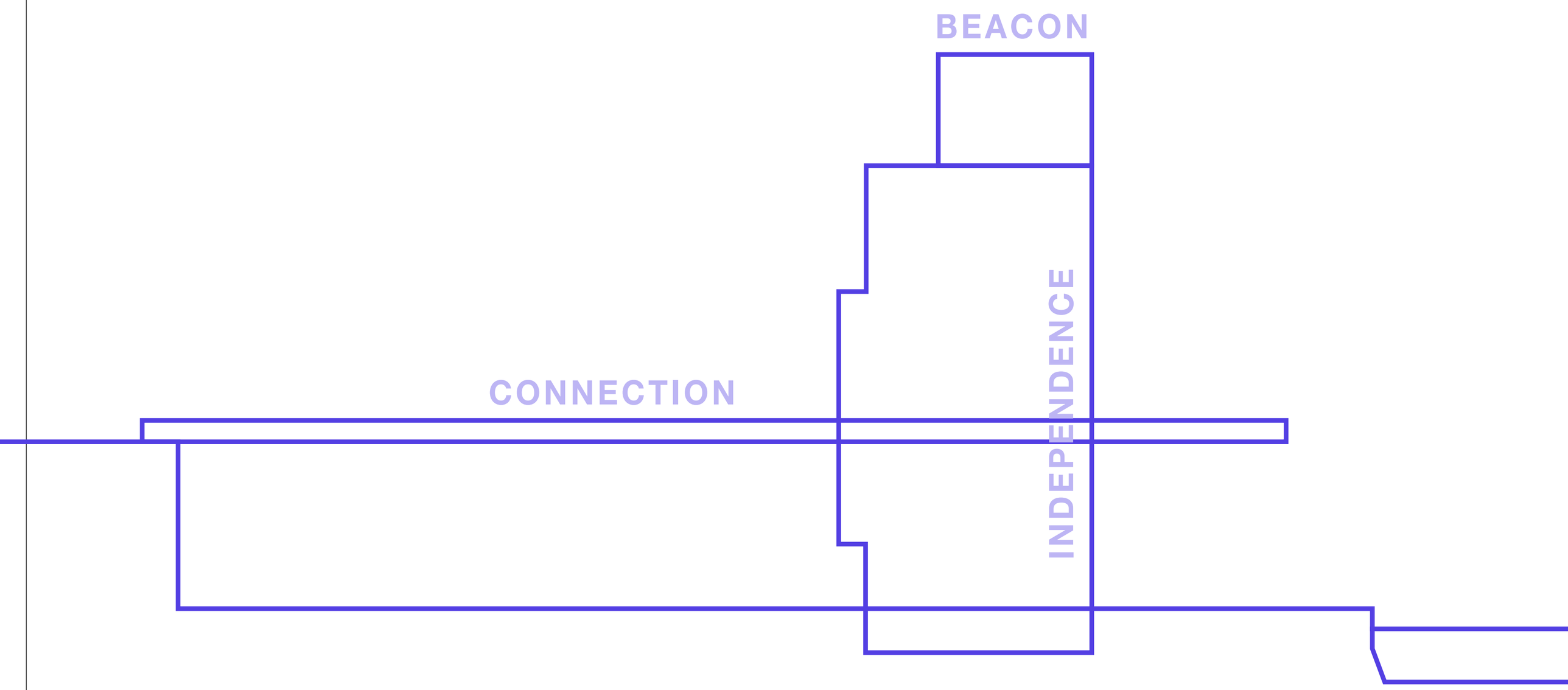


WATER
GLOBAL

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

2 Processes and Local Material Flows

Concepts


In-House CNC Production


Harvest & reuse


Urban farming

Creatives & makers


Productive garden

Neighborhood network


Local material flow

Energetic autonomy

Identity

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

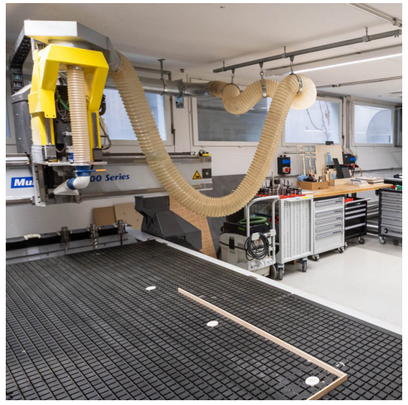
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Hierarchy Principle



I.

Reusing components harvested from demounted warehouses



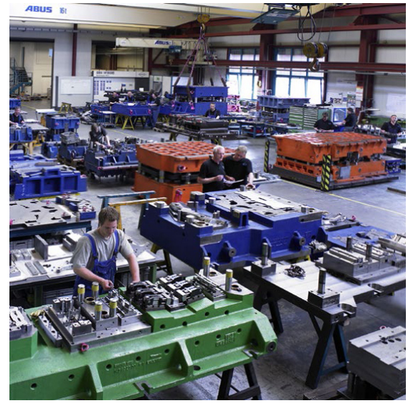
II.

In-house CNC production of components



III.

Harvested materials and components from renovations



IV.

Producing new components

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Site as Material Bank













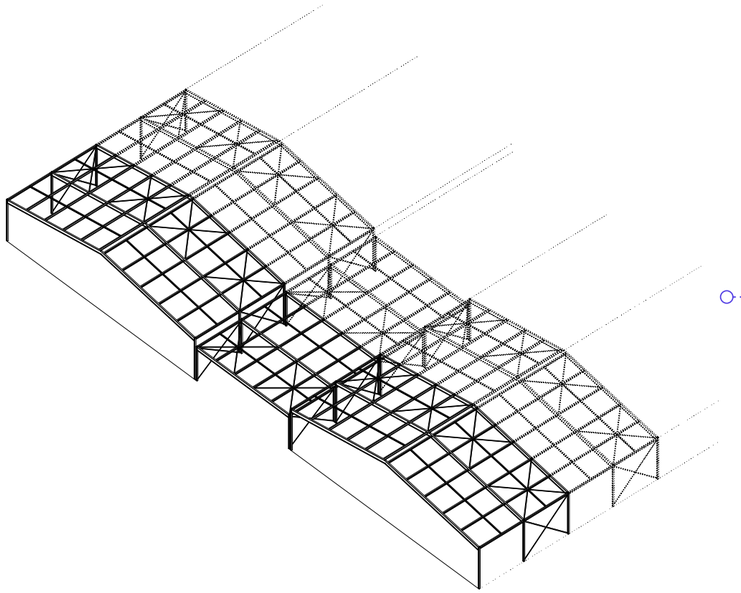


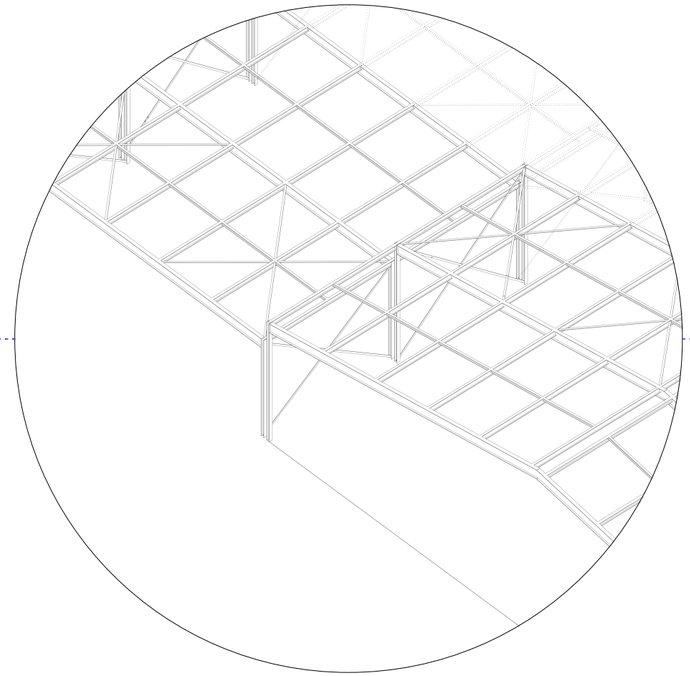


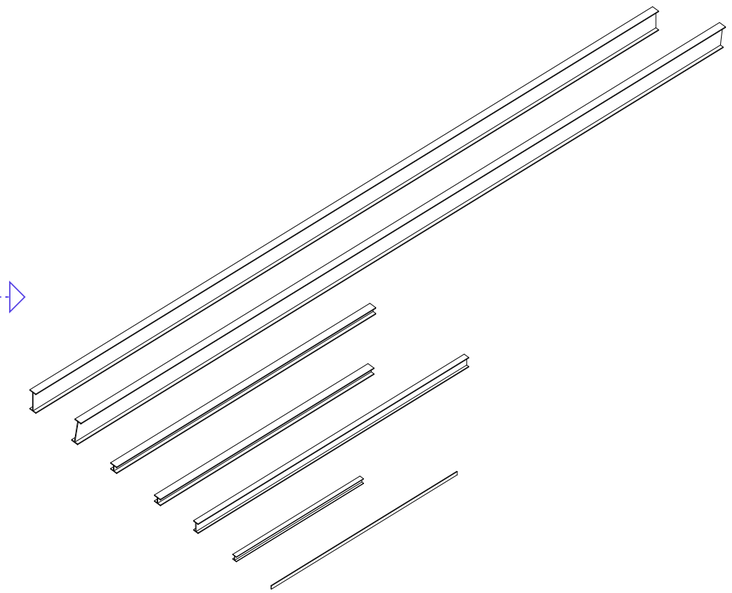
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



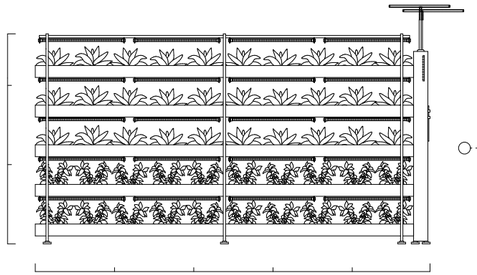


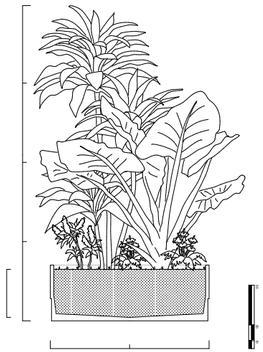


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

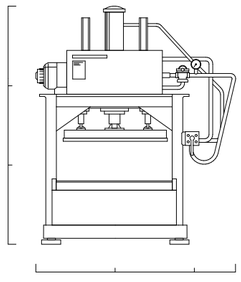
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

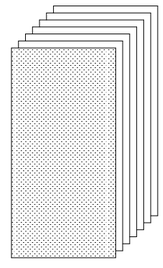


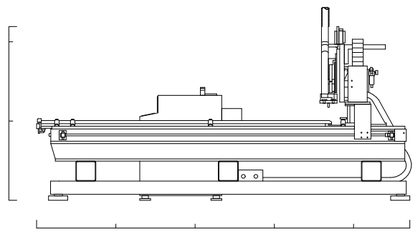


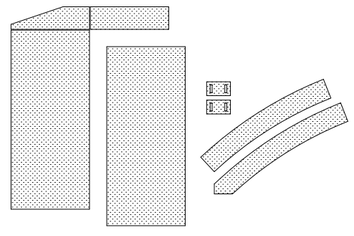
Retrieving Fibrous Waste

// Preparation
Grinding, Cleaning, Drying







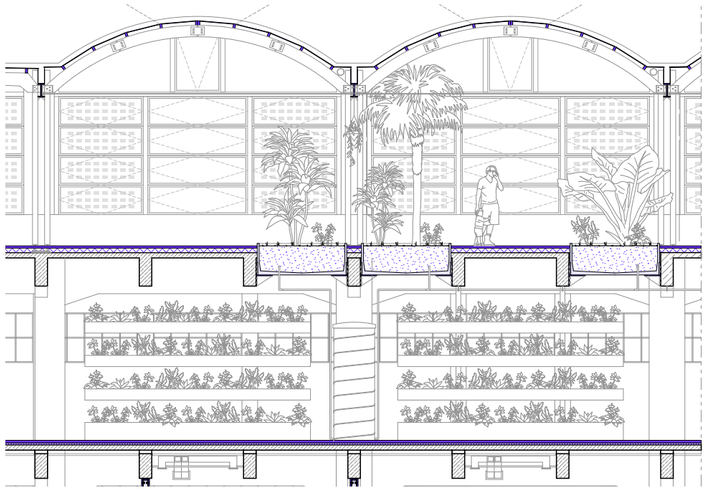


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

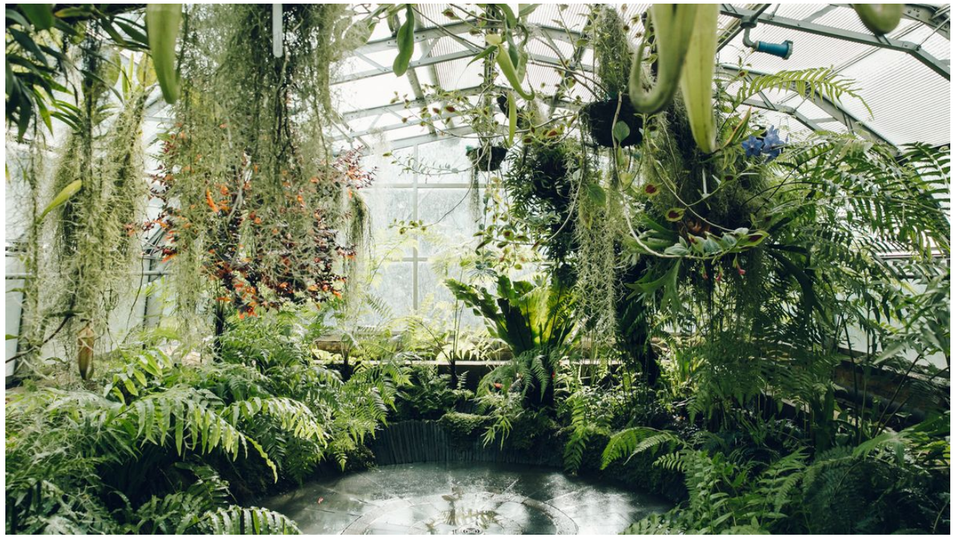
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

The Greenhouse









Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

3 Flexibility and User Involvement

Concepts


In-House CNC Production

Harvest & reuse

Urban farming


Creatives & makers

Productive garden

Neighborhood network

Local material flow

Energetic autonomy

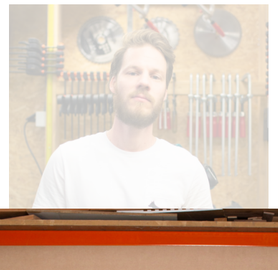
Identity

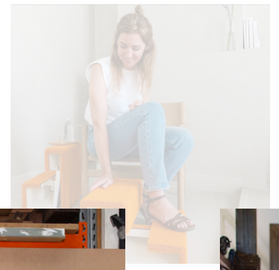
Local Hero

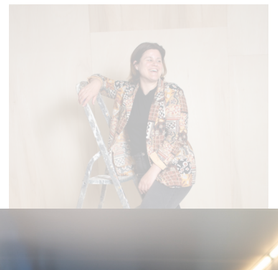
Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

















De Vakwerkers / Furniture Designers



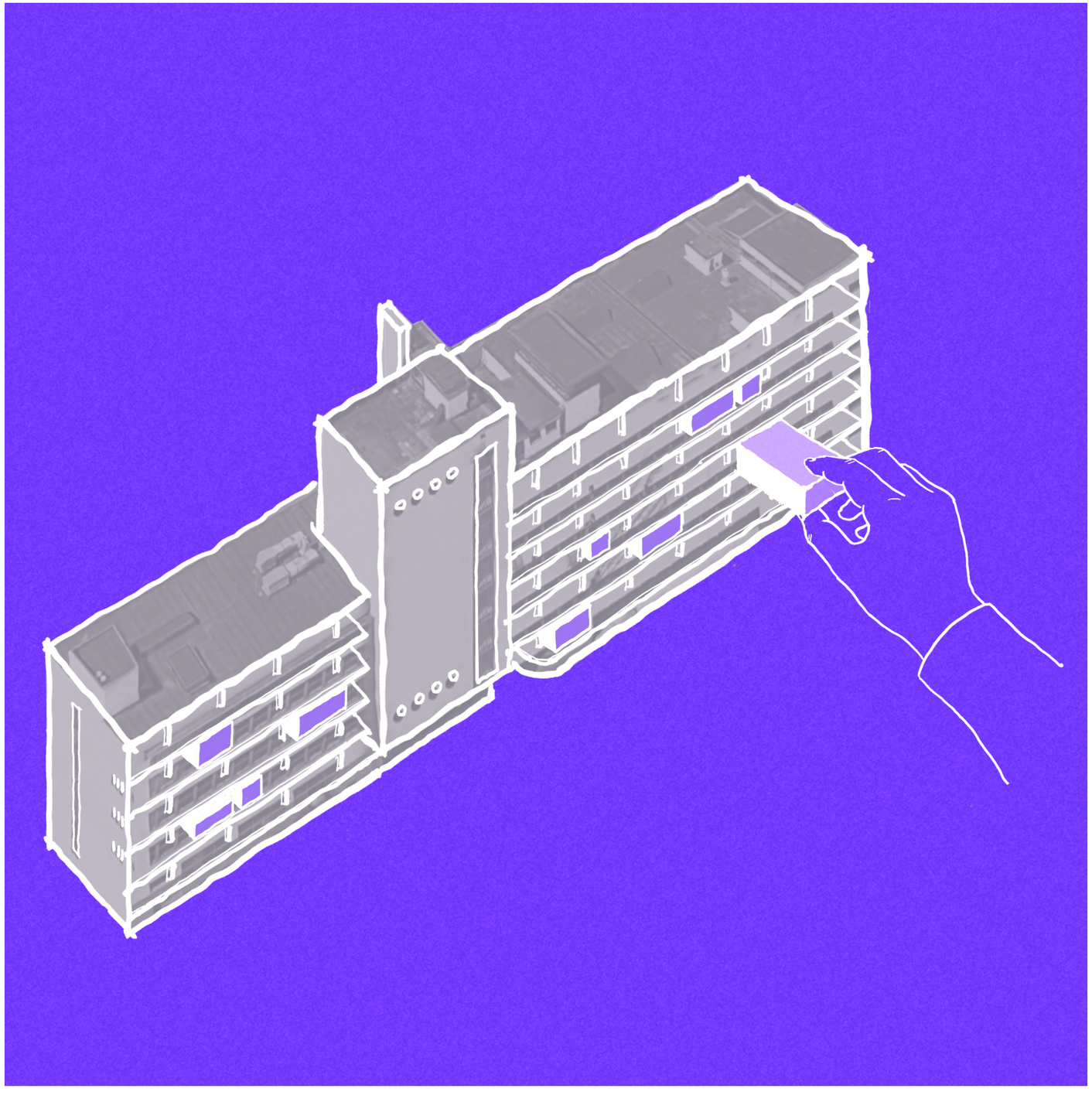
Leafy / Urban Farmers



Linda from ttottrotterdam / Interior Designer

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

4 Energetic Autonomy

Concepts

In-House CNC Production

Harvest & reuse

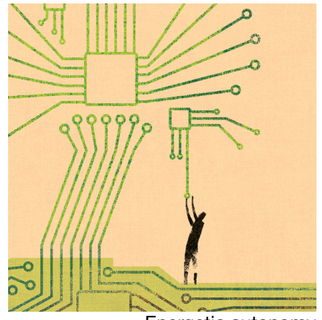
Urban farming

Creatives & makers

Productive garden

Neighborhood network

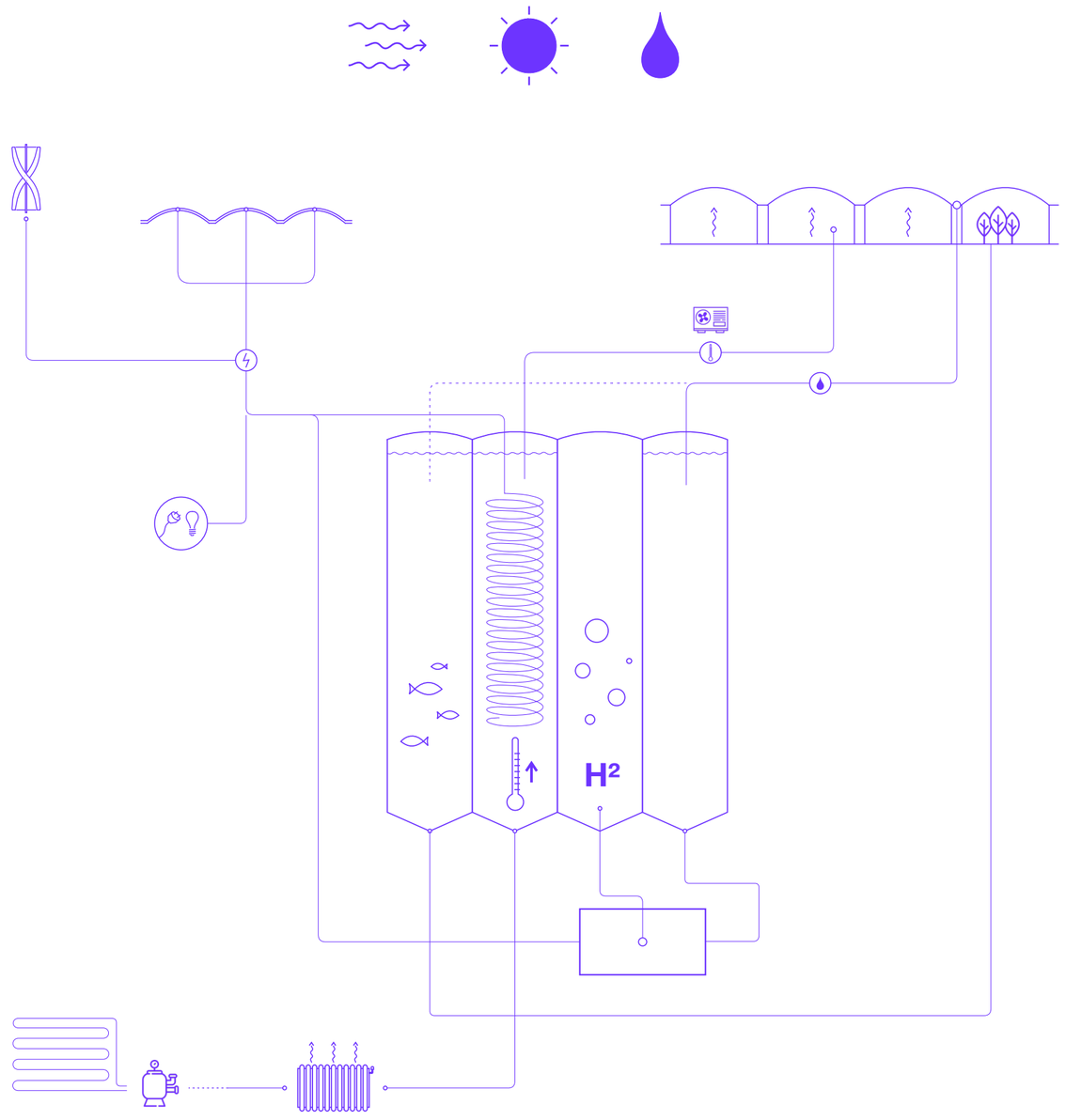
Local material flow


Energetic autonomy

Identity

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

5 Icon / Key Figure

Concepts

In-House CNC Production


Harvest & reuse

Urban farming

Creatives & makers

Productive garden

Neighborhood network

Local material flow

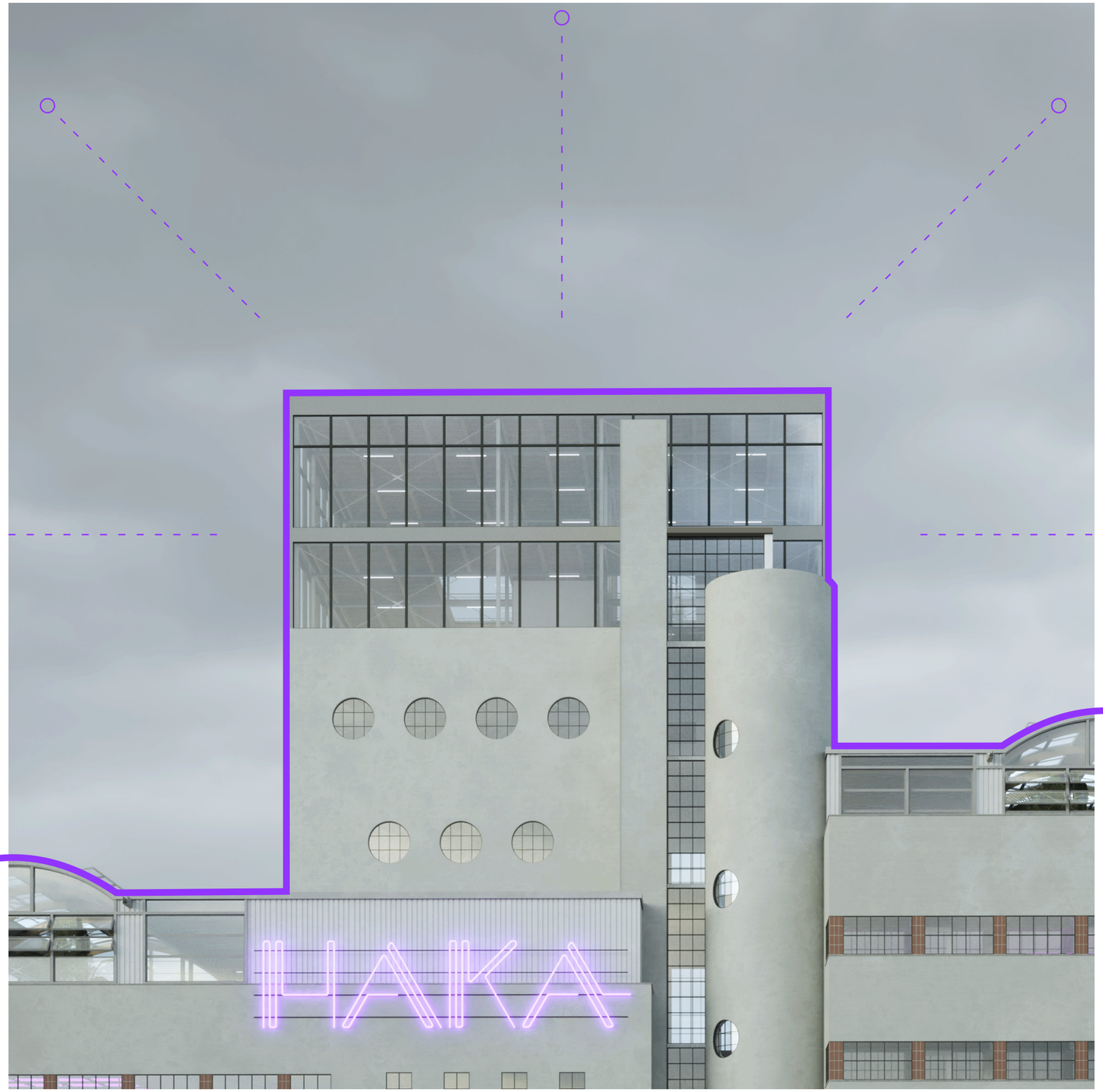
Energetic autonomy


Identity

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

IV Design



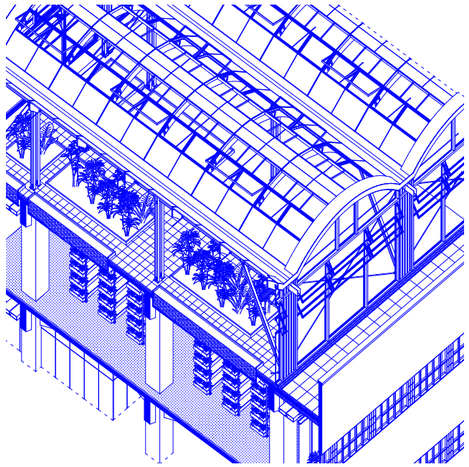
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

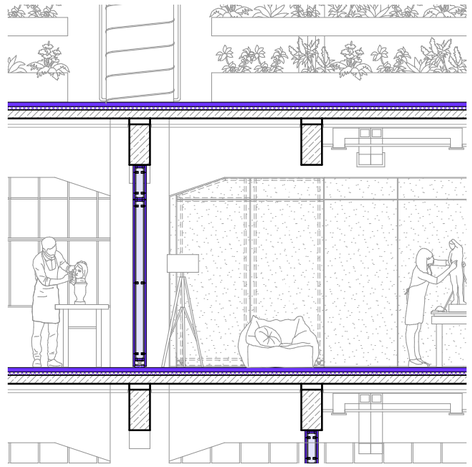
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Part One
Urban Transformation



Part Two
Building Addition



Part Three
System for the Existing

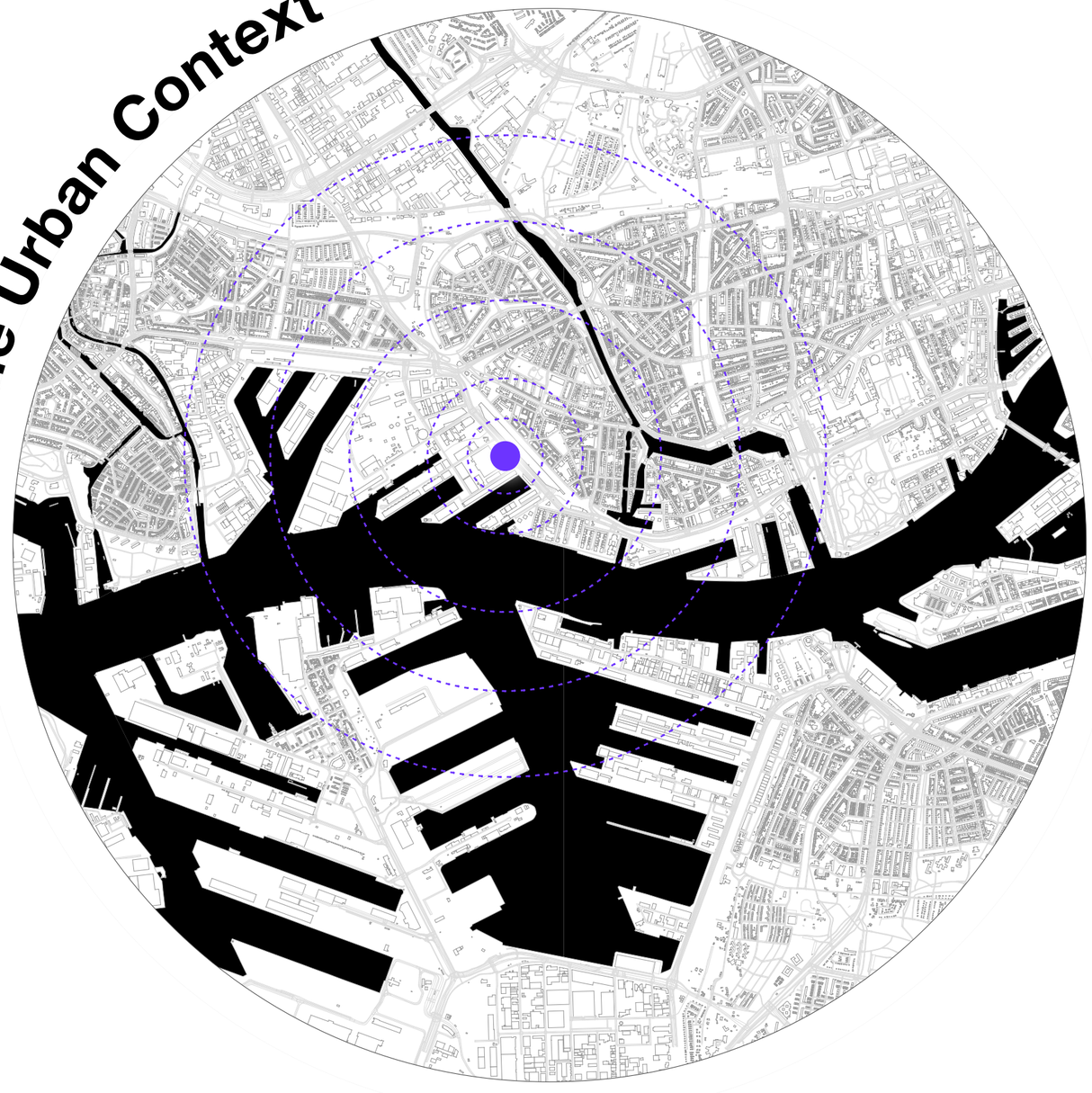
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Part One
Urban Transformation

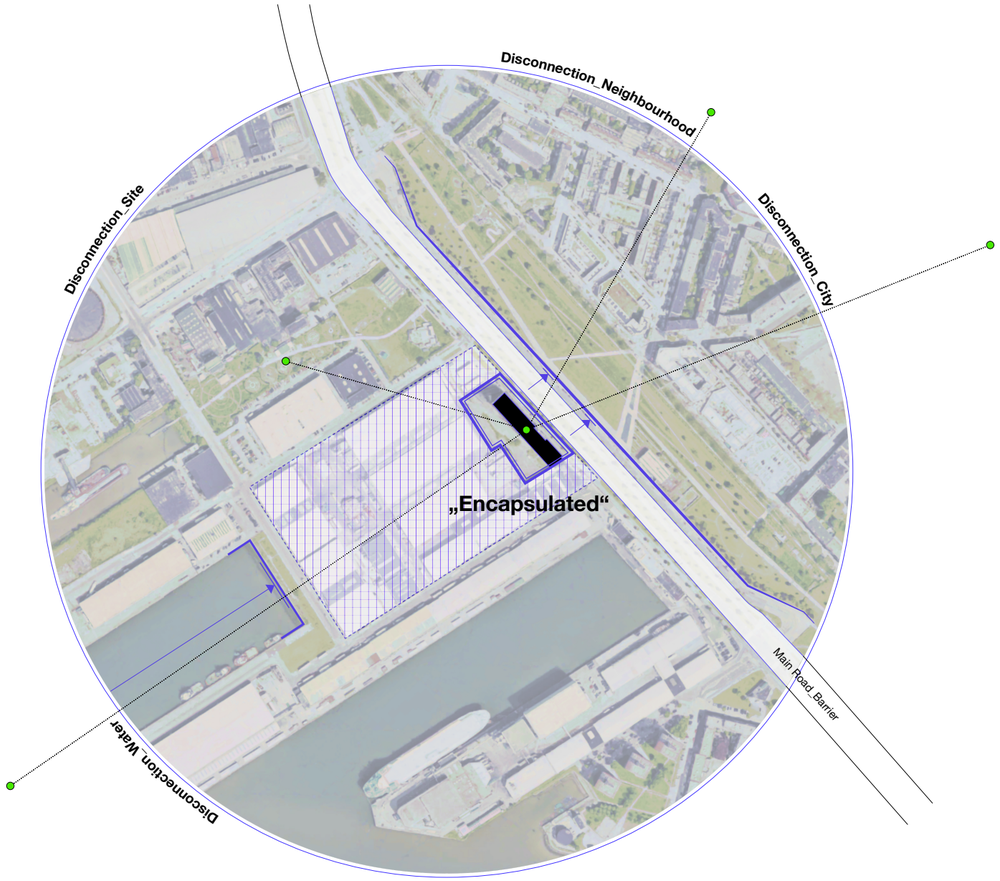
The Urban Context



Local Hero

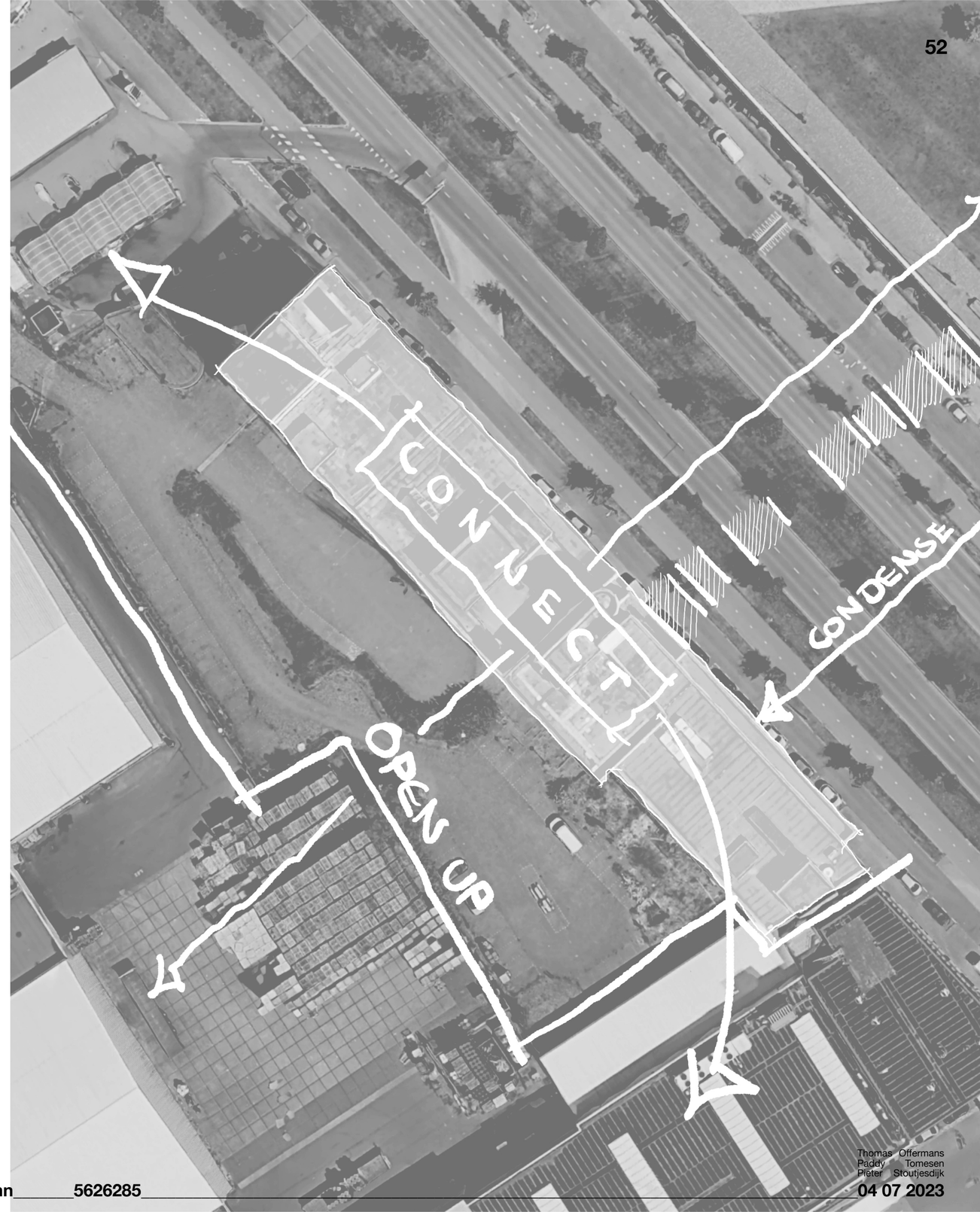
Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

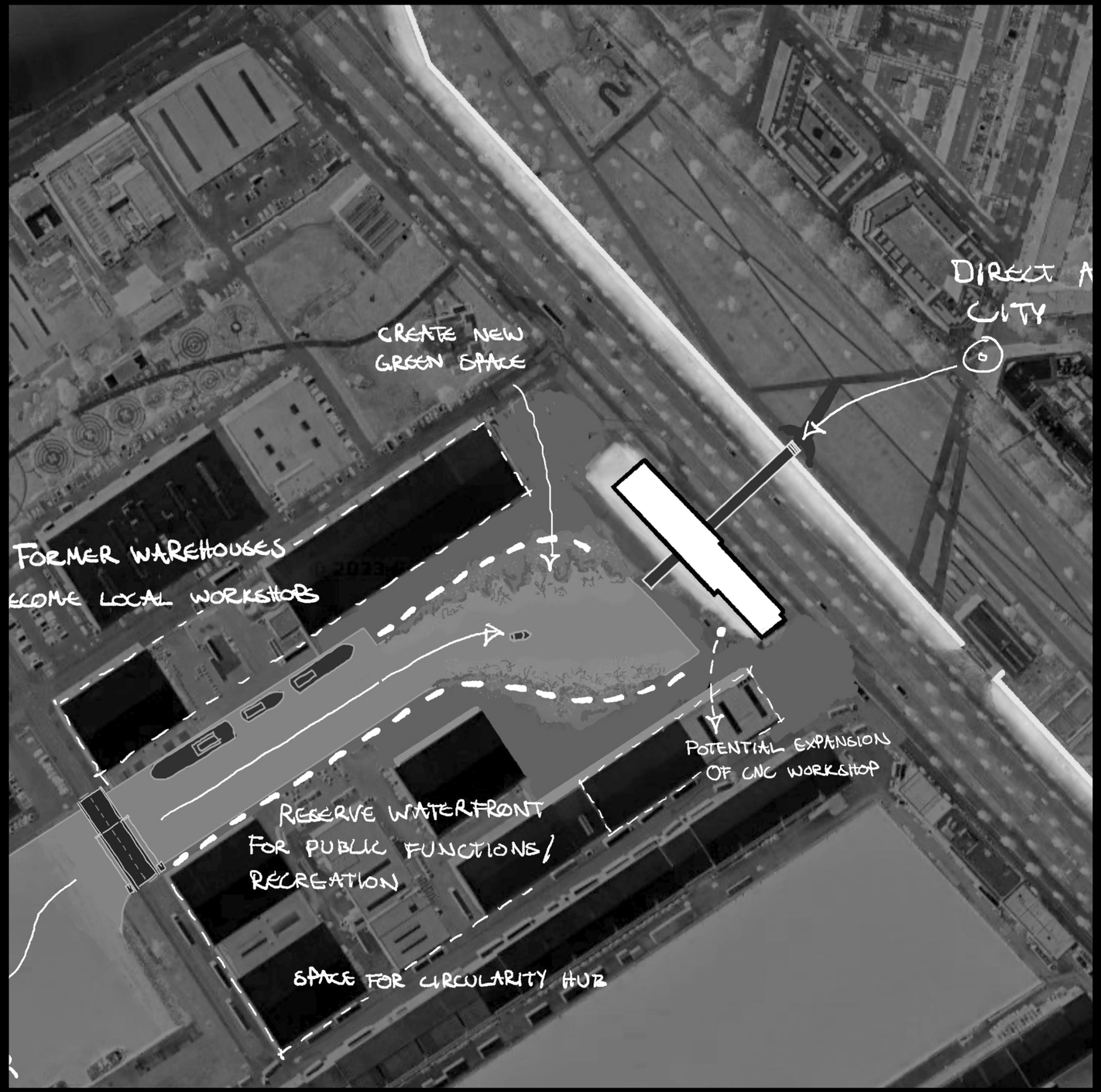


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy



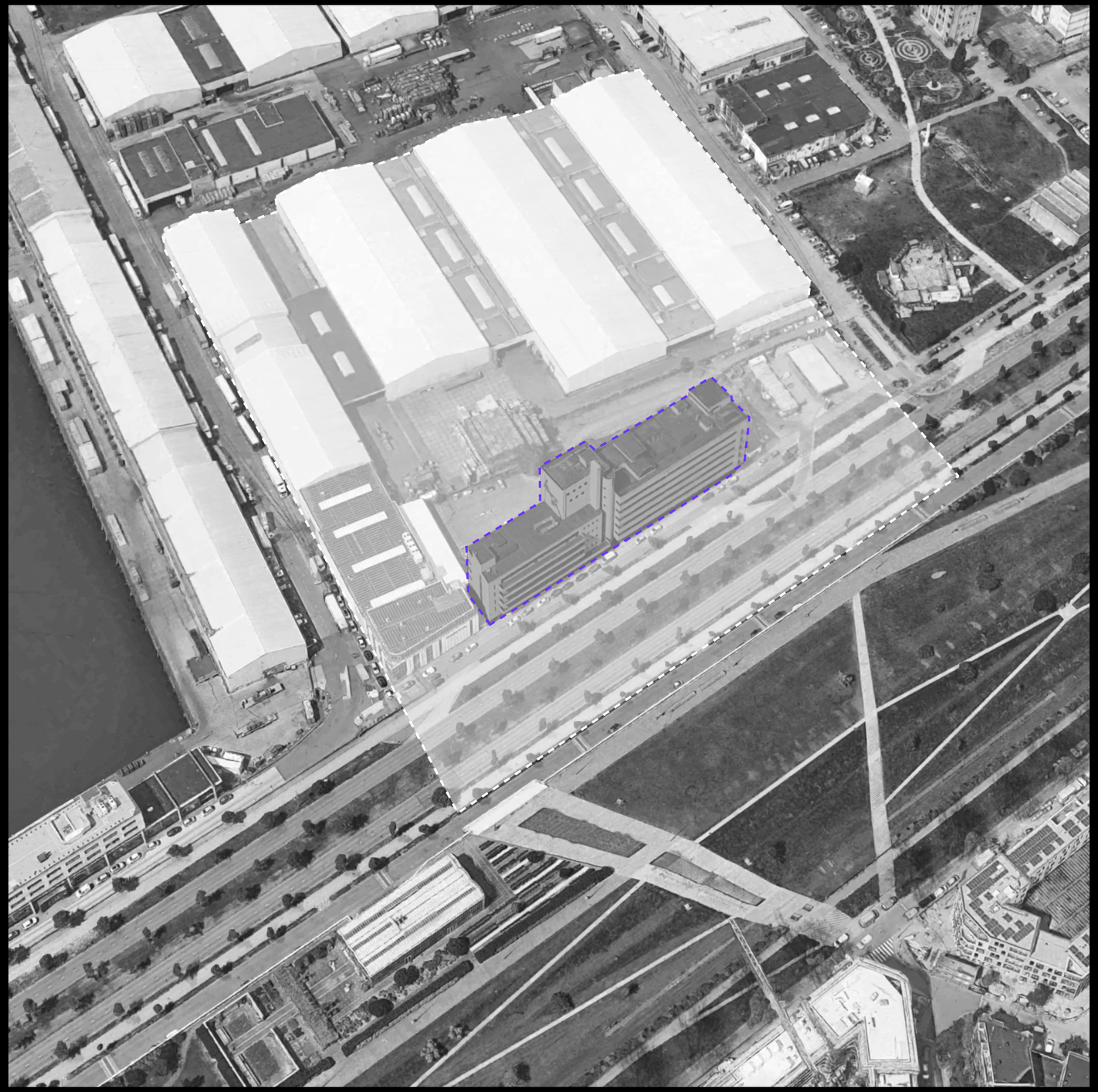
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

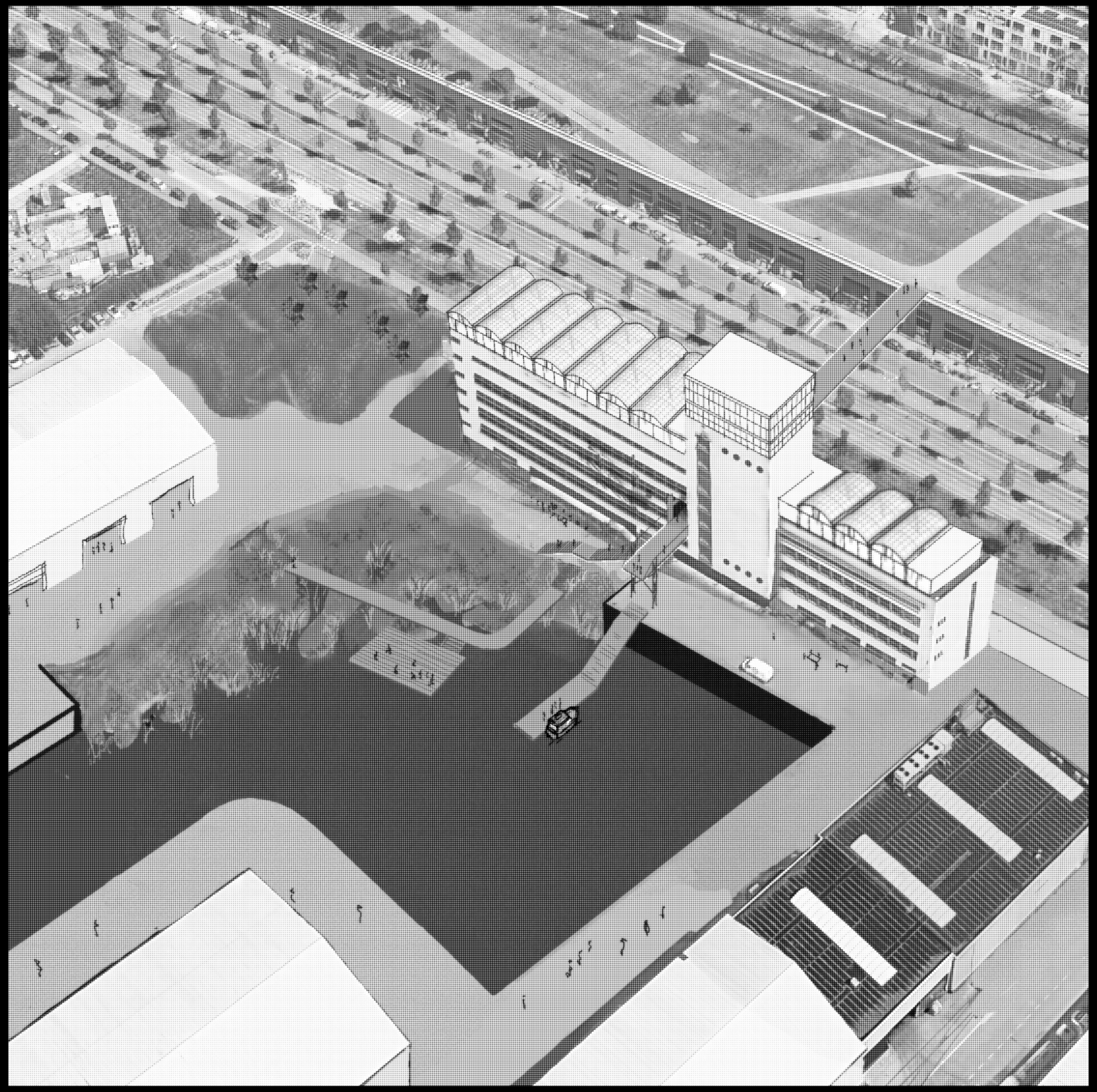
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

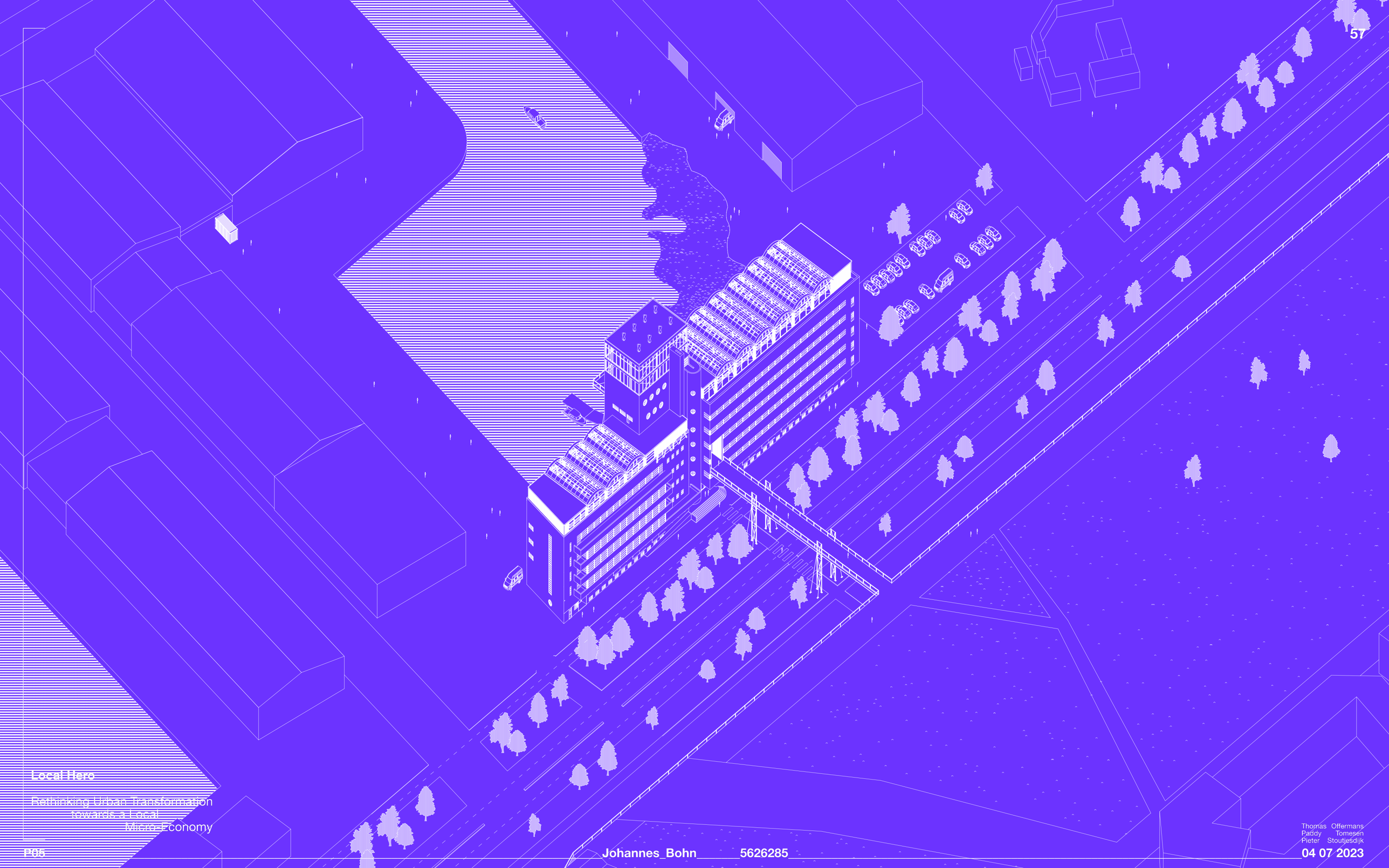
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation towards a Local Micro-Economy

Johannes_Bohn 5626285

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

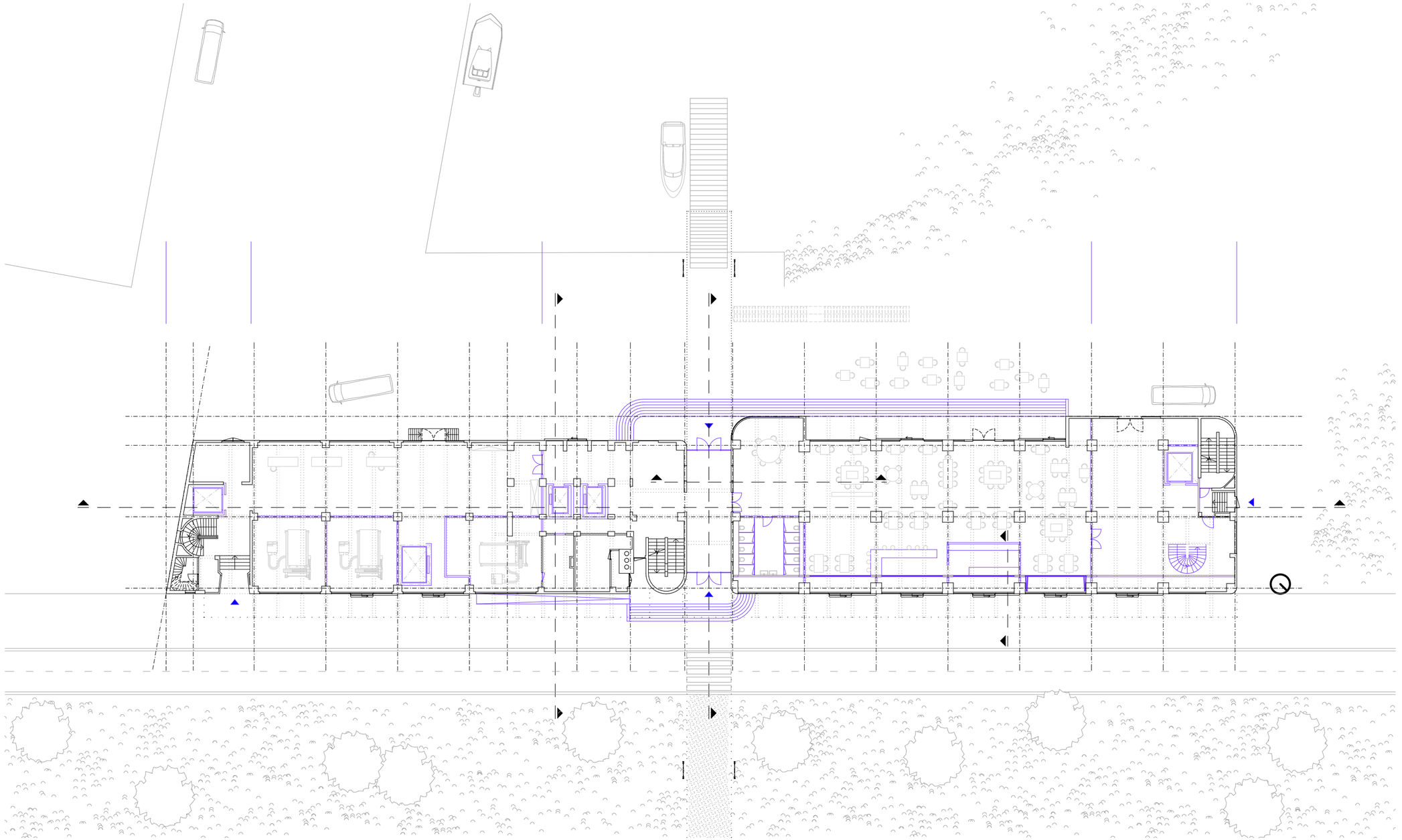
04 07 2023



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

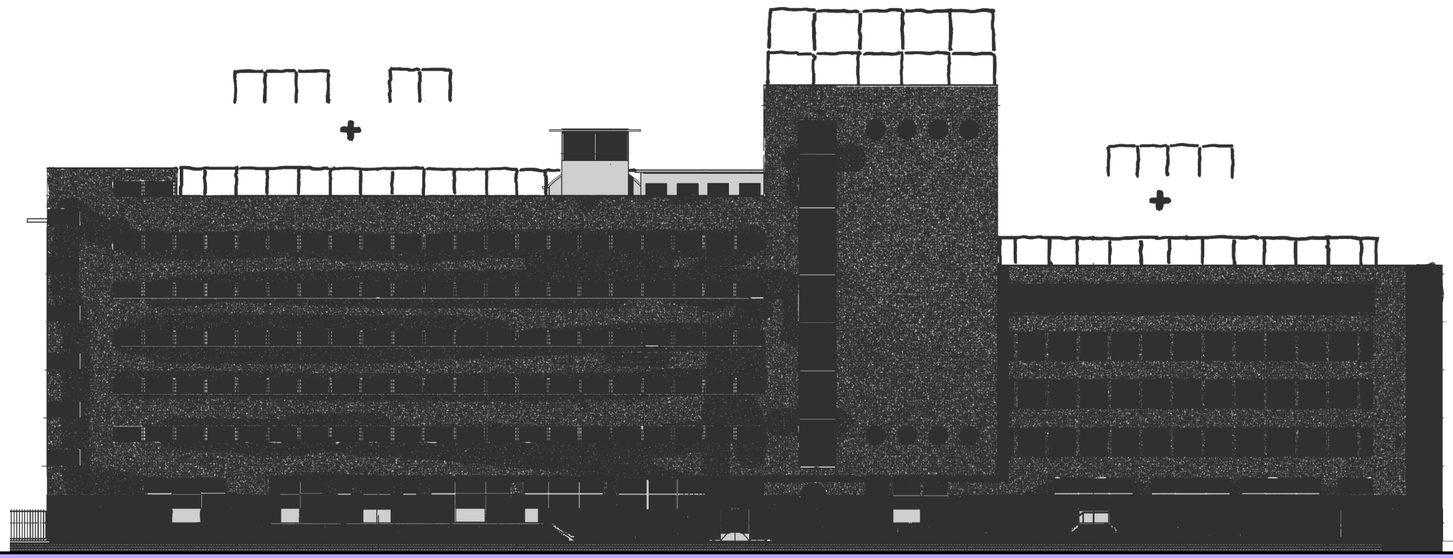


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Part Two
Building Addition

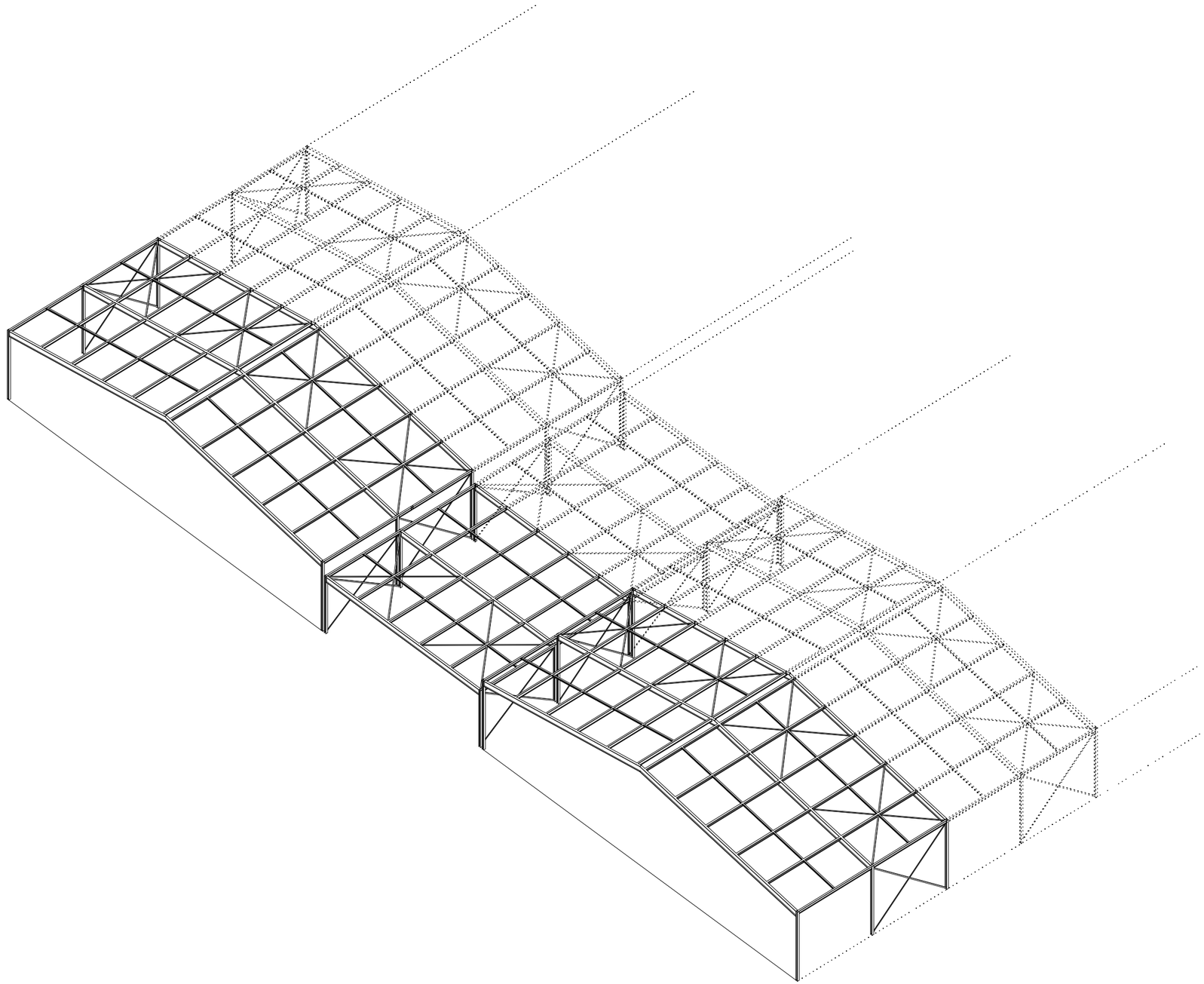


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

What the Site Provides

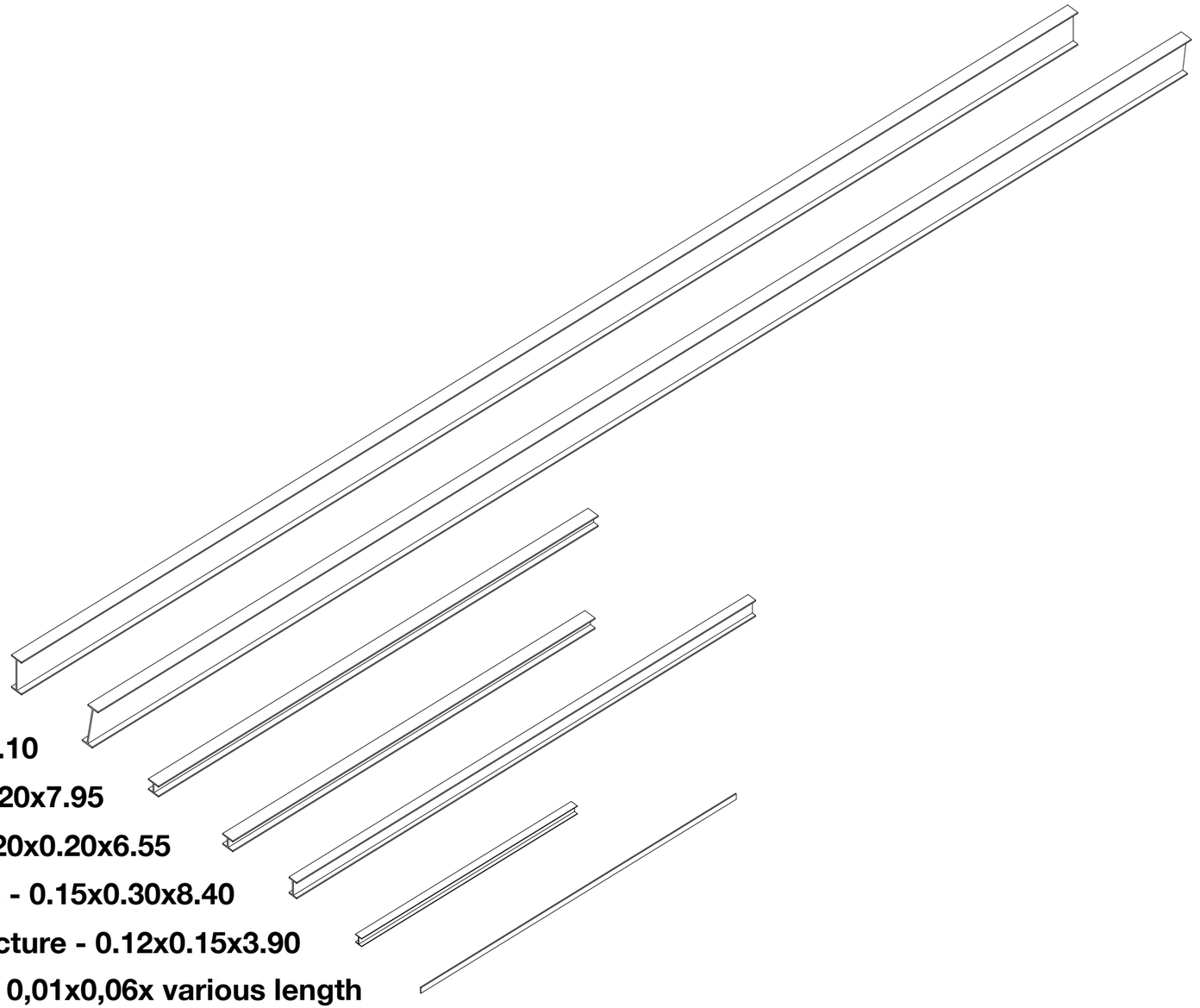


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

What the Site Provides



Primary Roof Structure - 0.20x0.60x19.80

Primary Roof Structure - 0.20x0.60x19.10

Vertical Support - 0.20x0.20x7.95

Vertical Support - 0.20x0.20x6.55

Secondary Structure - 0.15x0.30x8.40

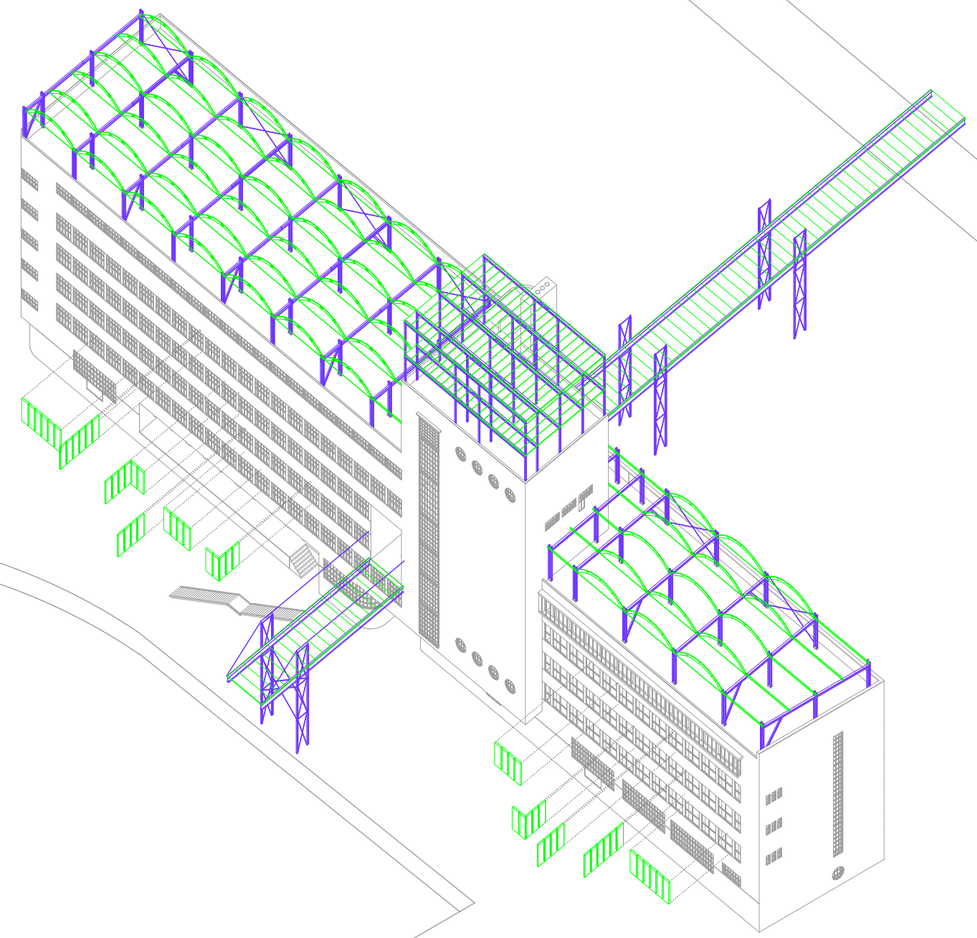
Tertiary Structure - 0.12x0.15x3.90

Bracing - 0,01x0,06x various length

Reused Steel vs New Steel

Embodied CO^2 for all steel structures:

~ 107.492 kg CO^2 not emitted because of reuse



Local Hero

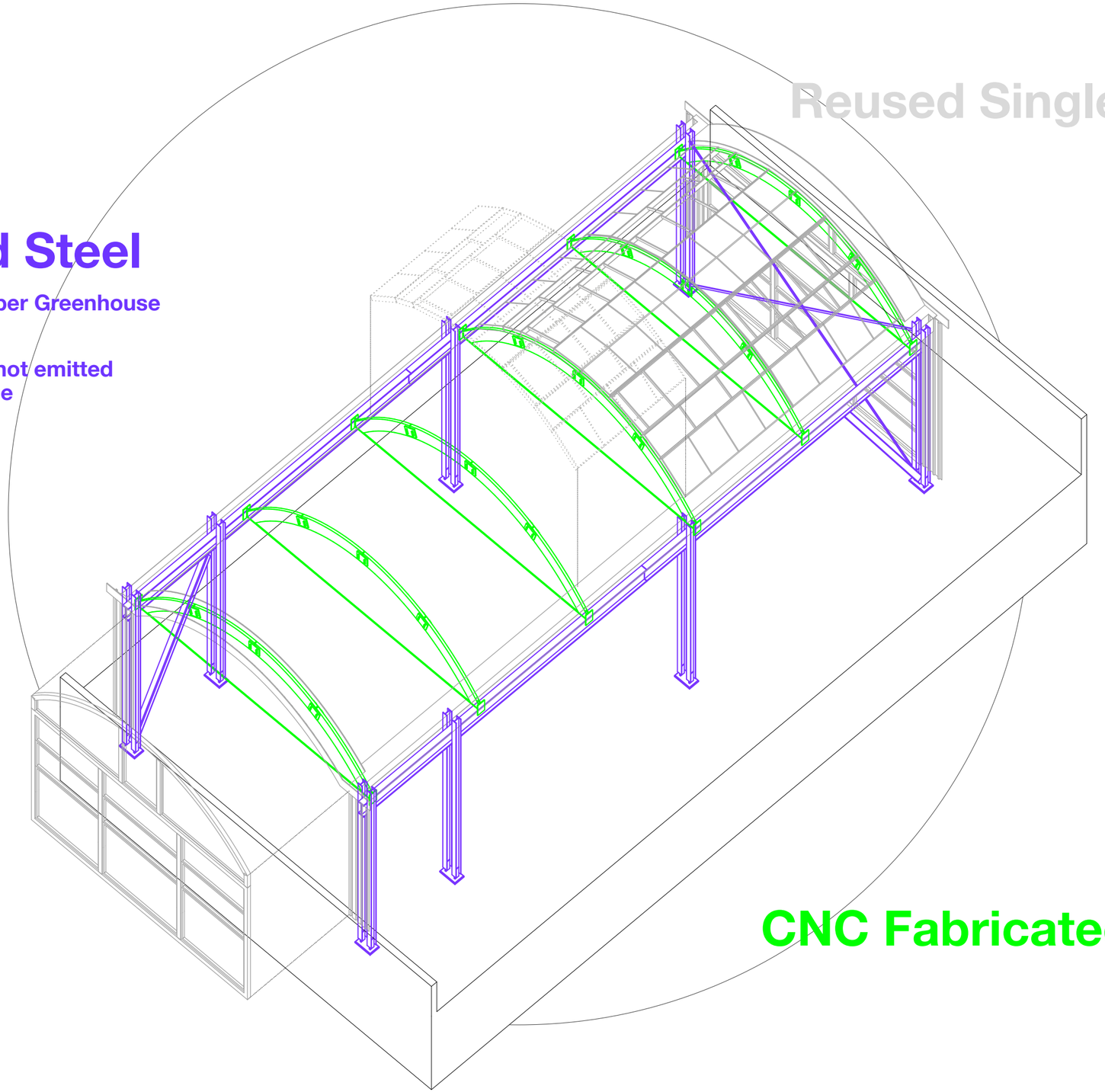
Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Reused Steel

Embodied CO^2 per Greenhouse Segment:

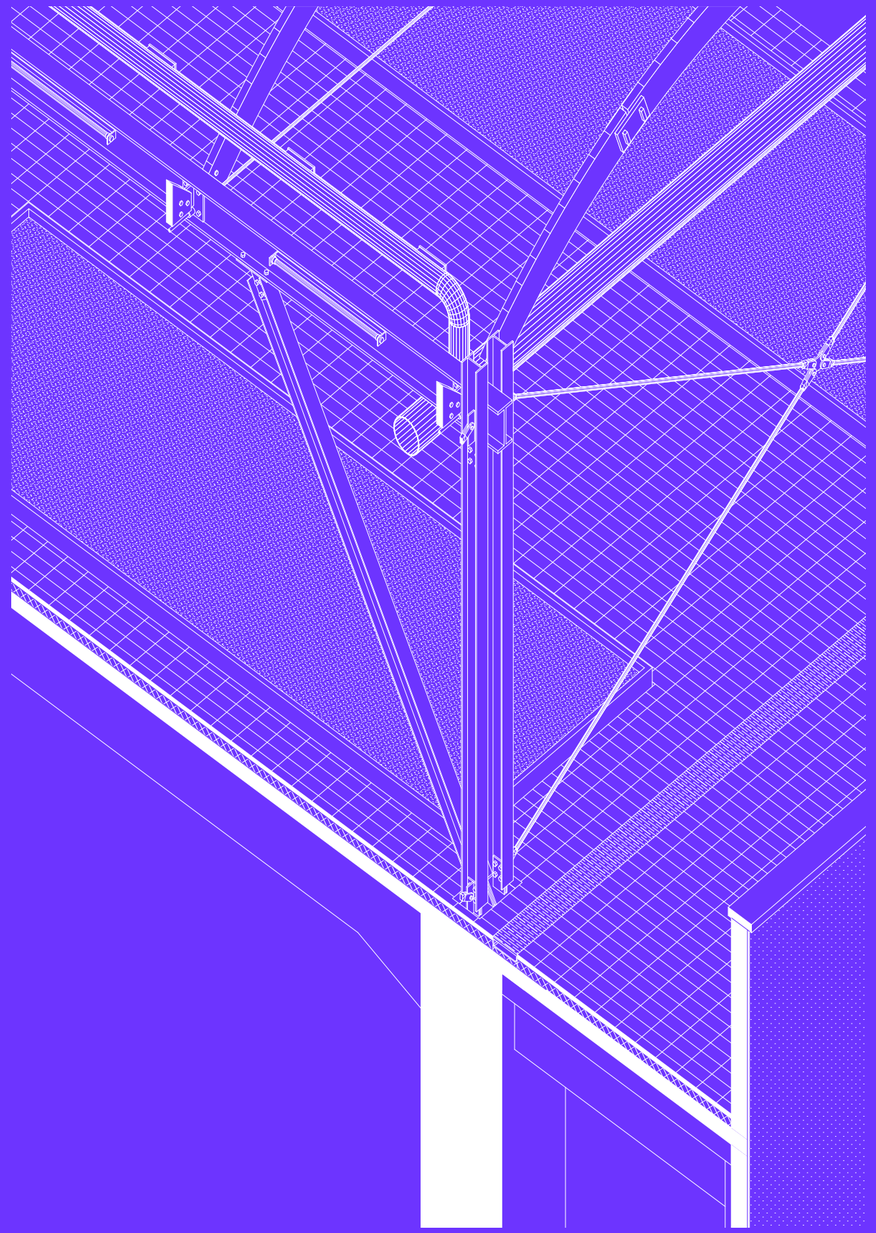
~ 7.700 kg CO^2 not emitted because of reuse

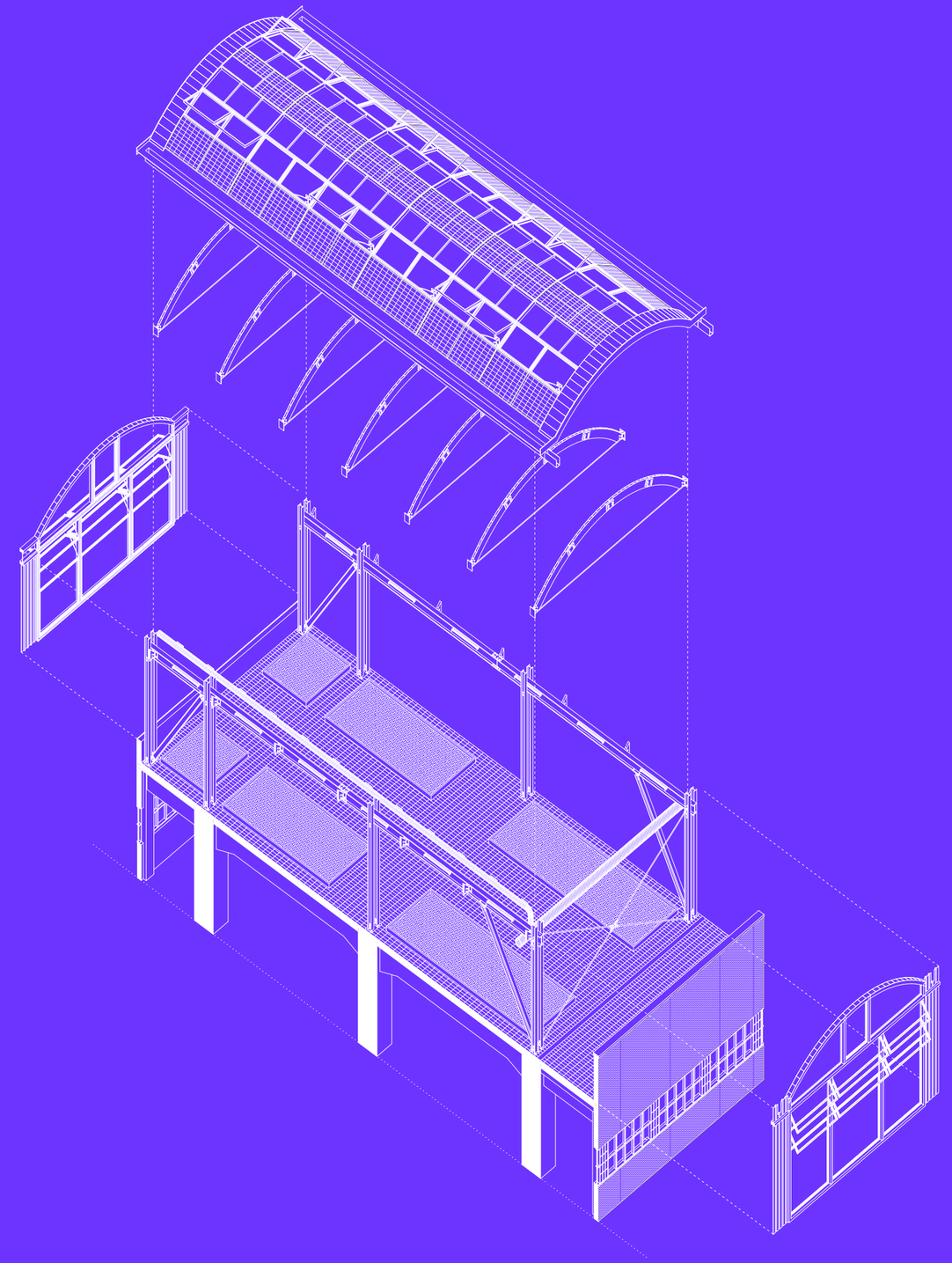


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

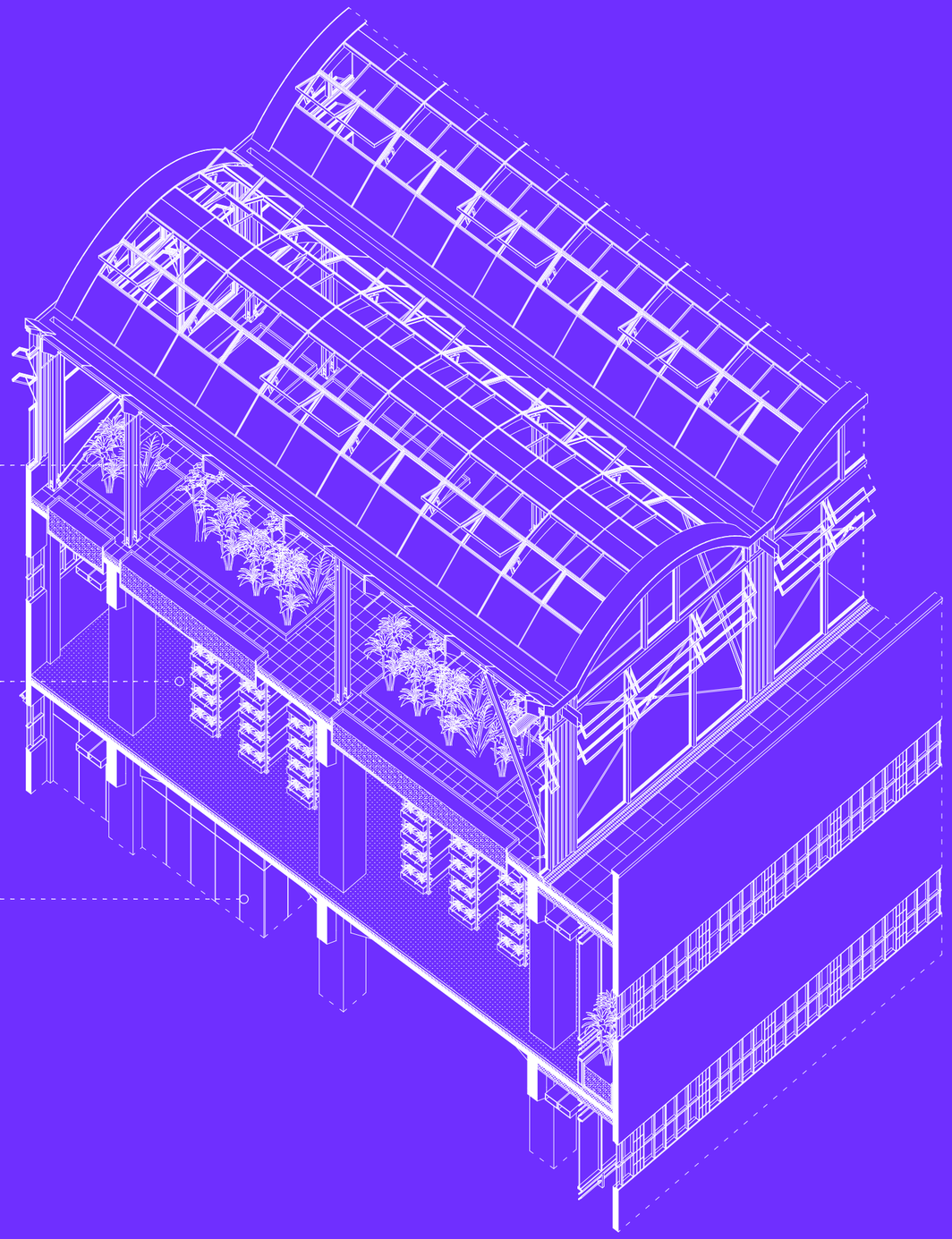




Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

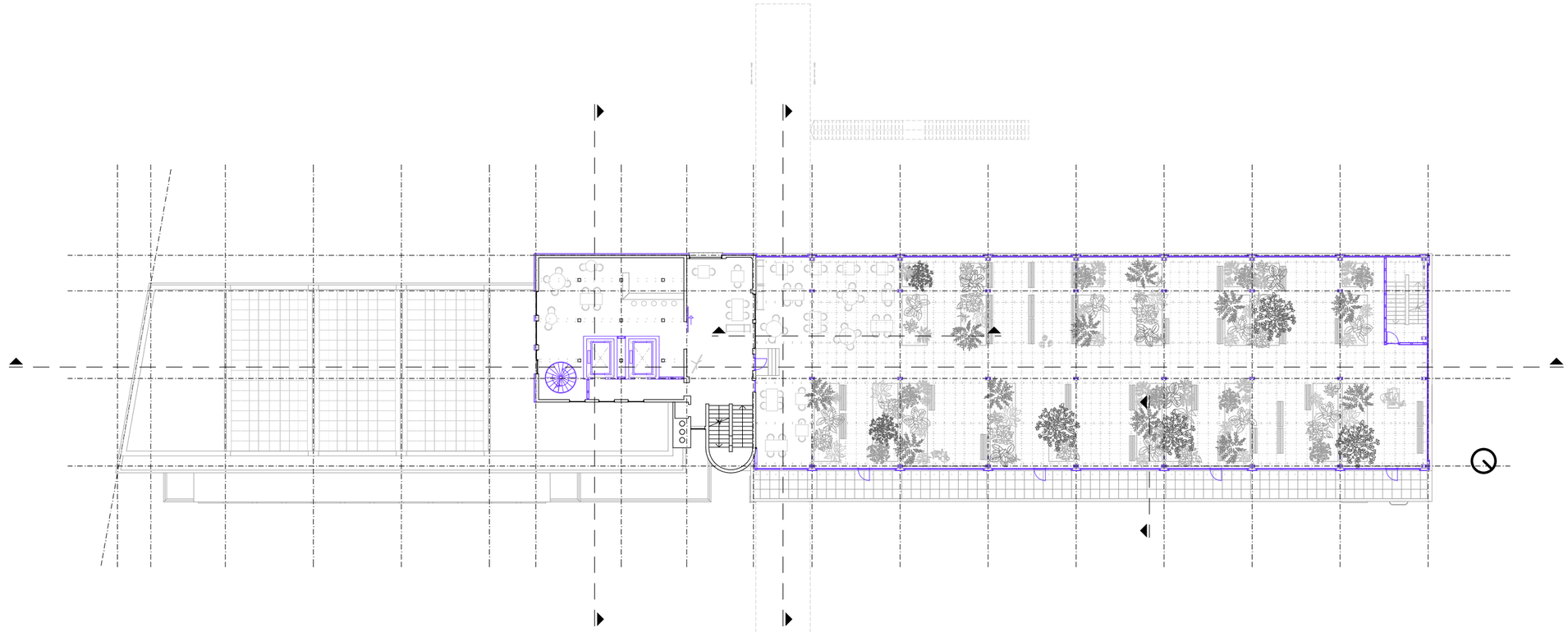
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

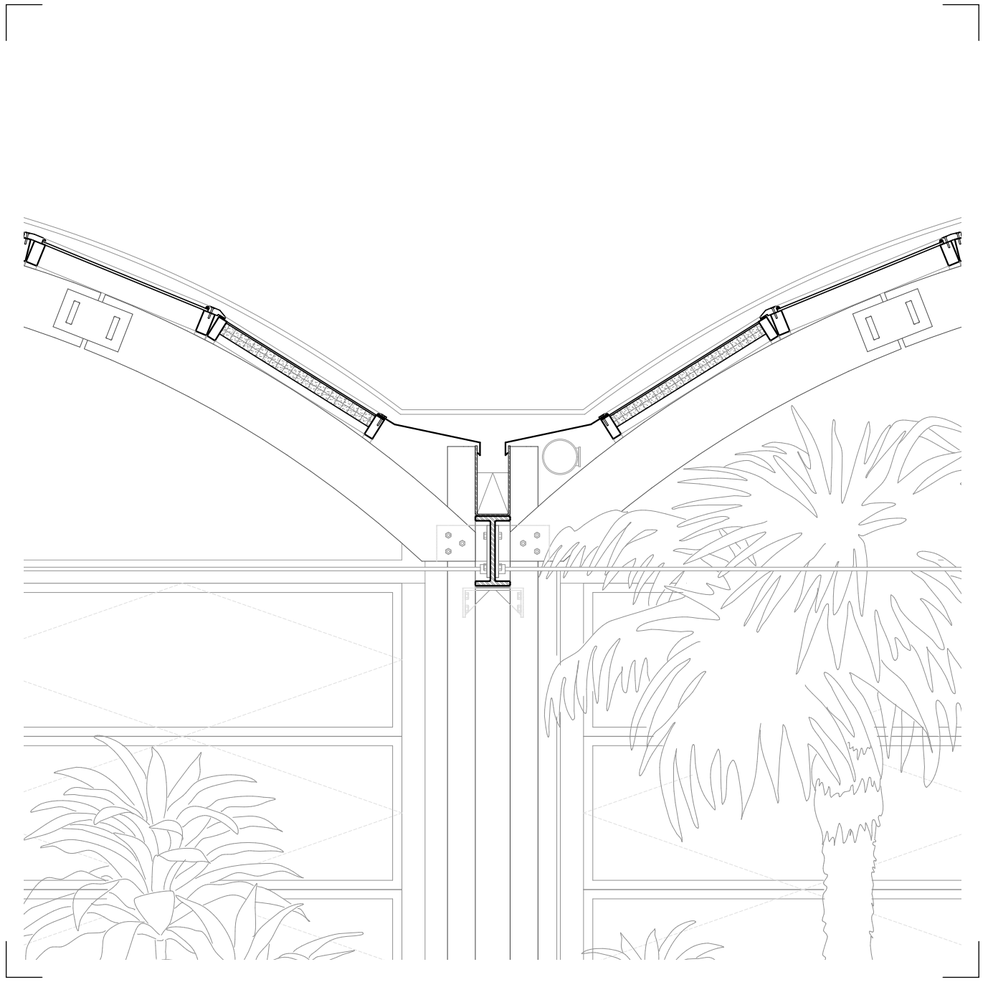
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

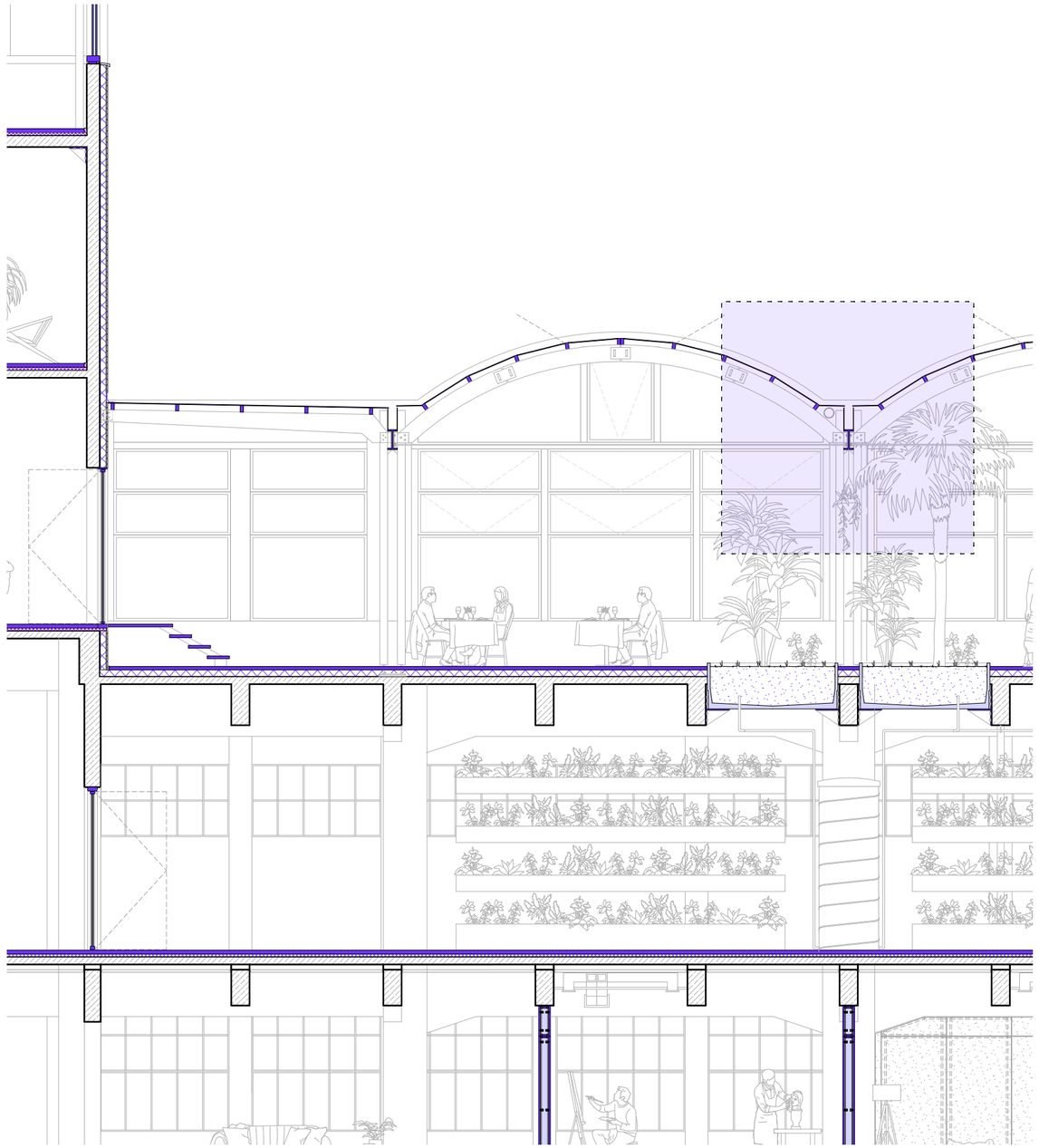


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk





Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

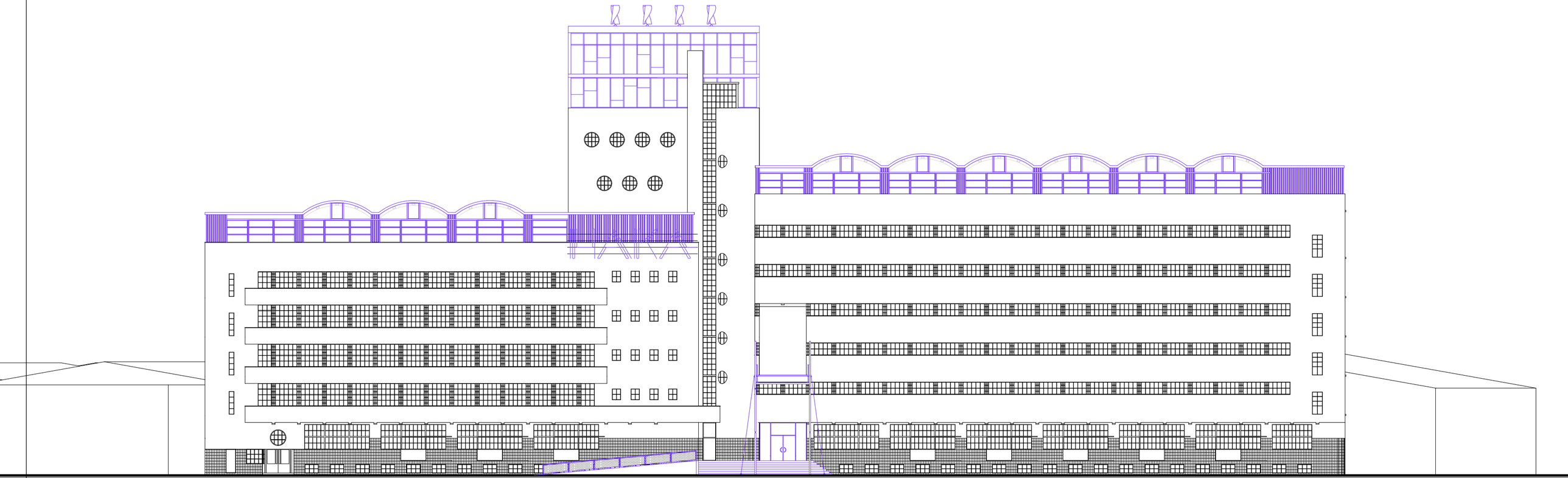
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

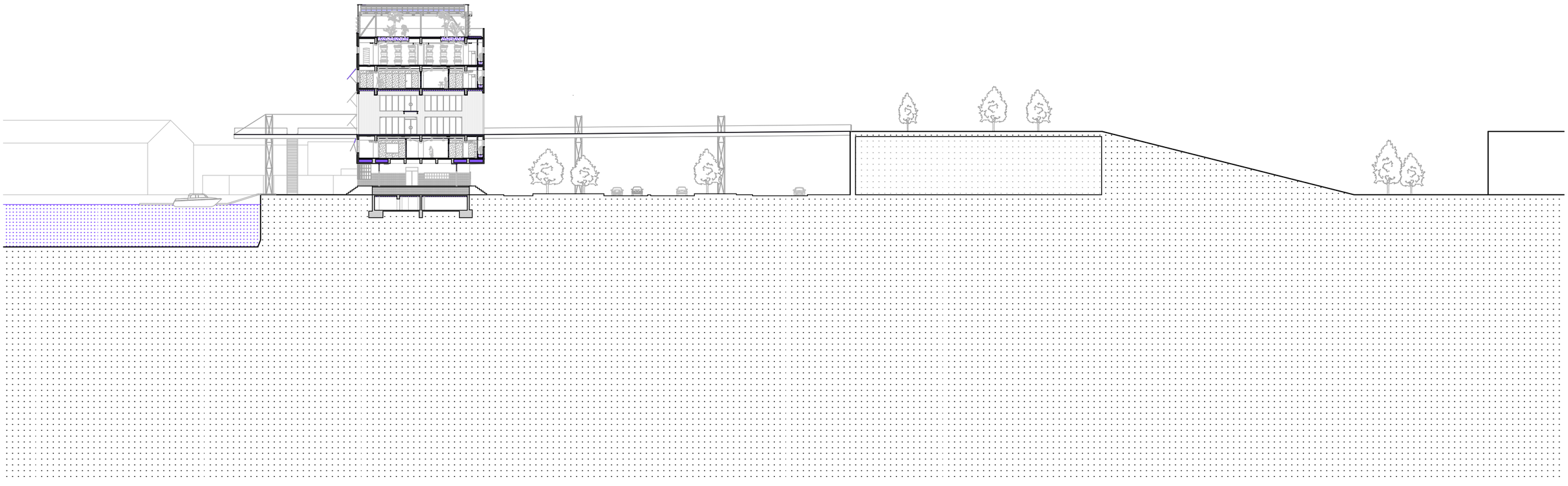
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

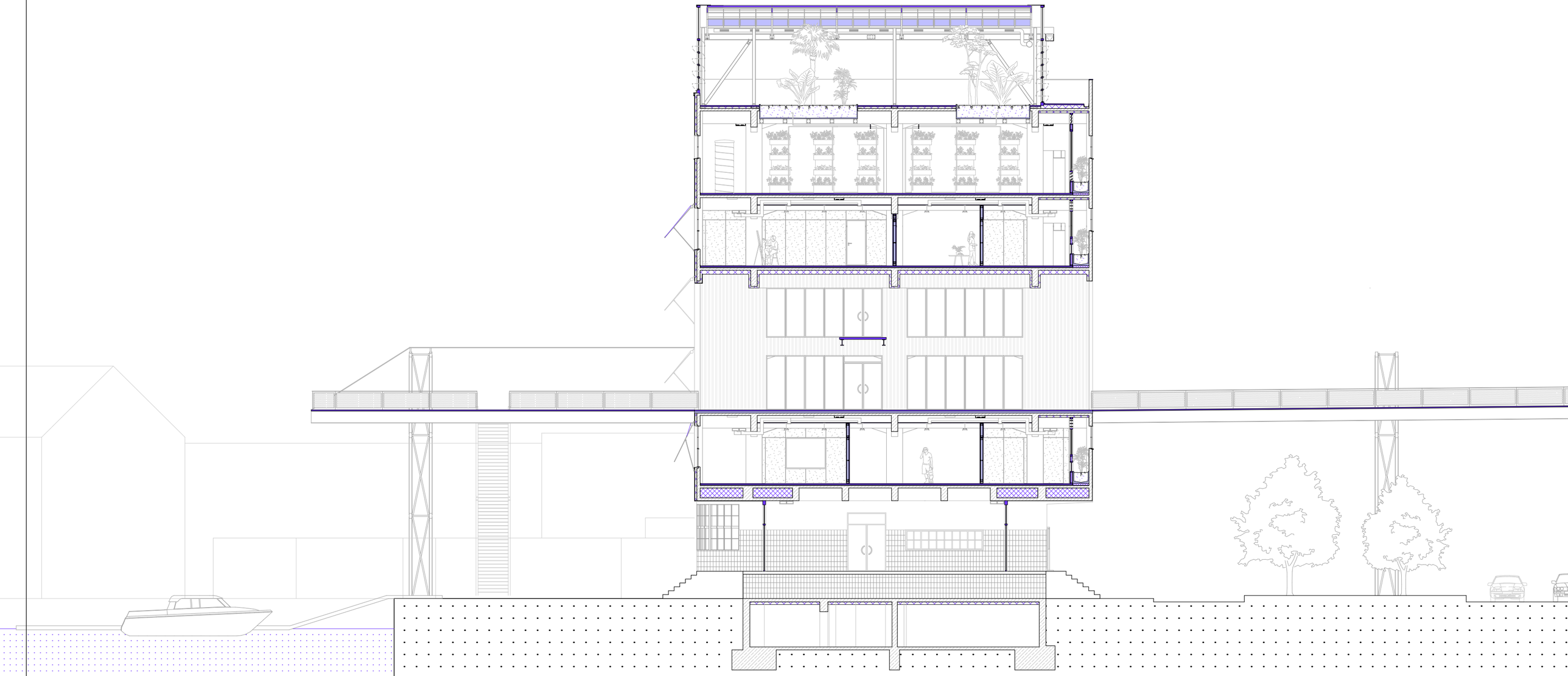
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

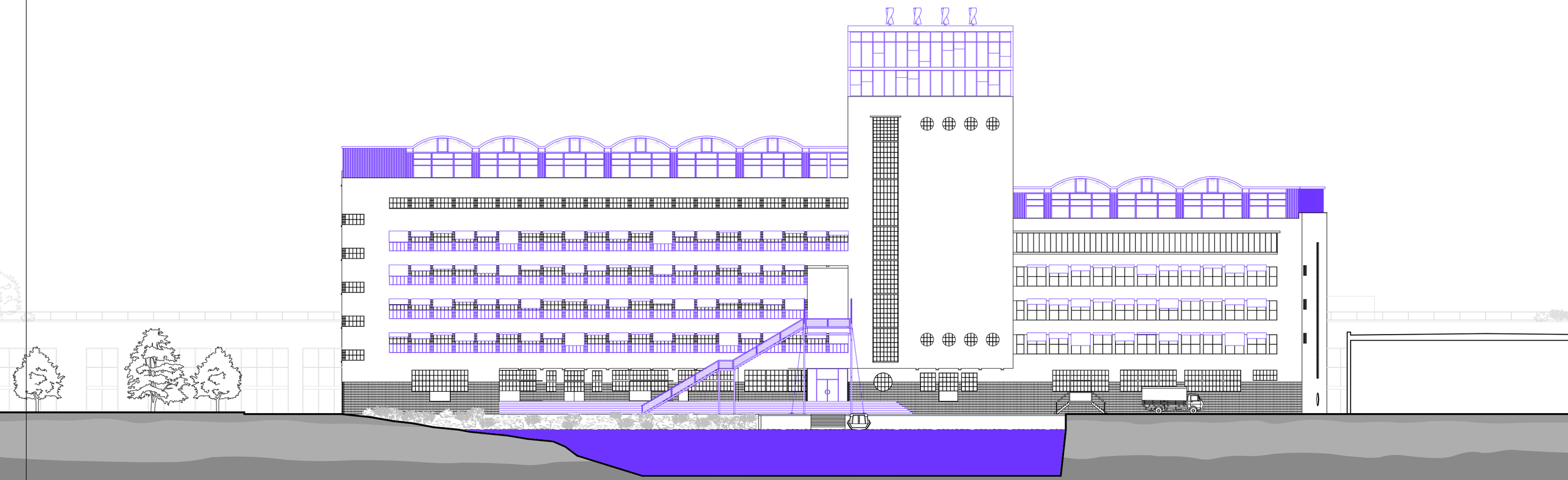
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

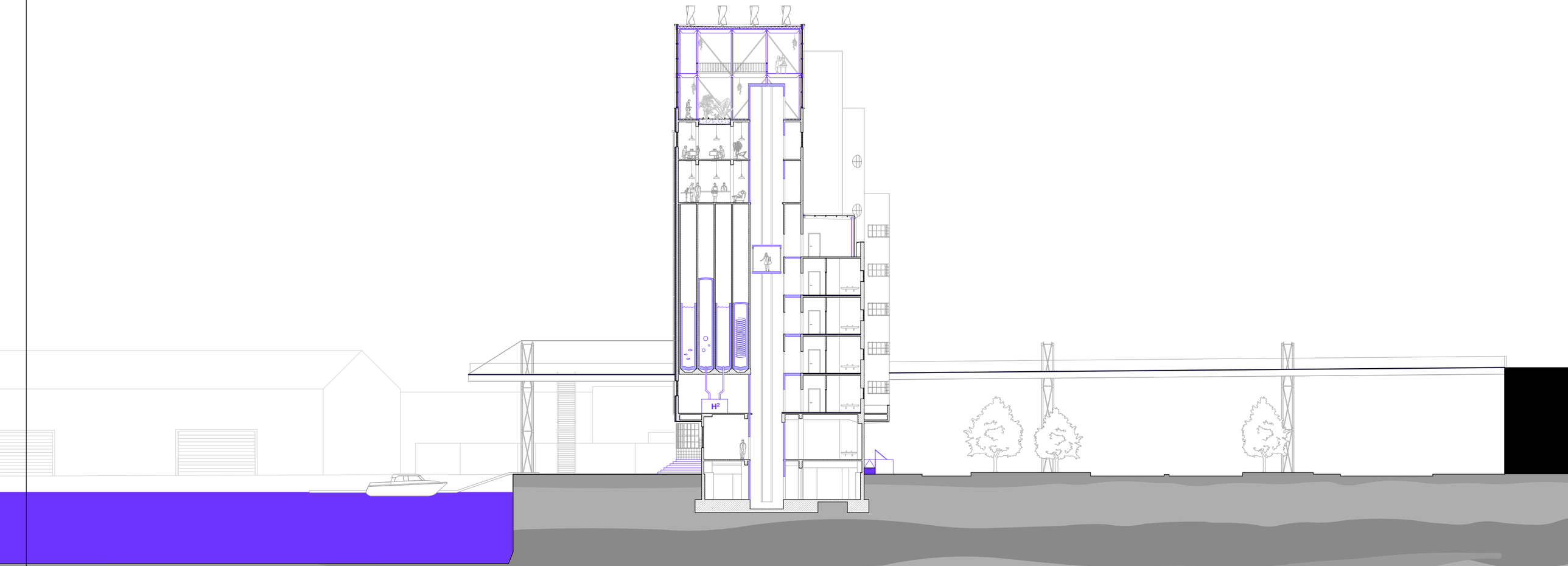
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

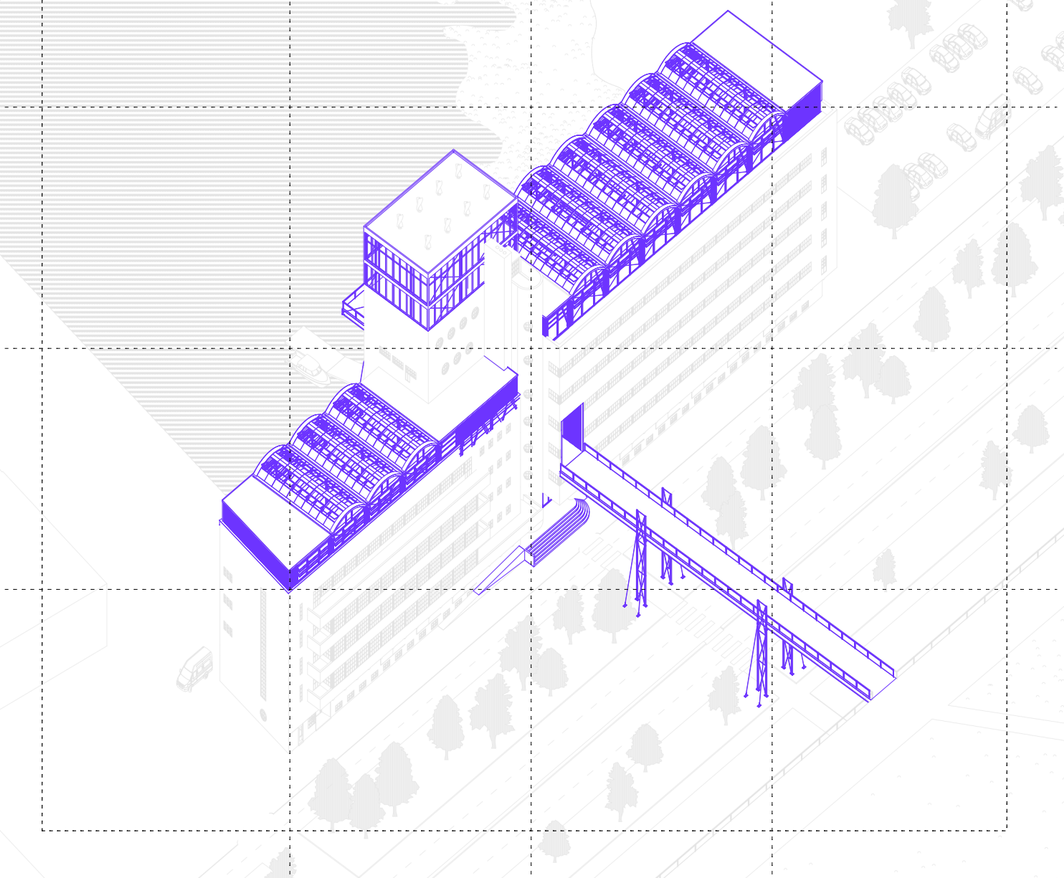


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

New Building Additions +

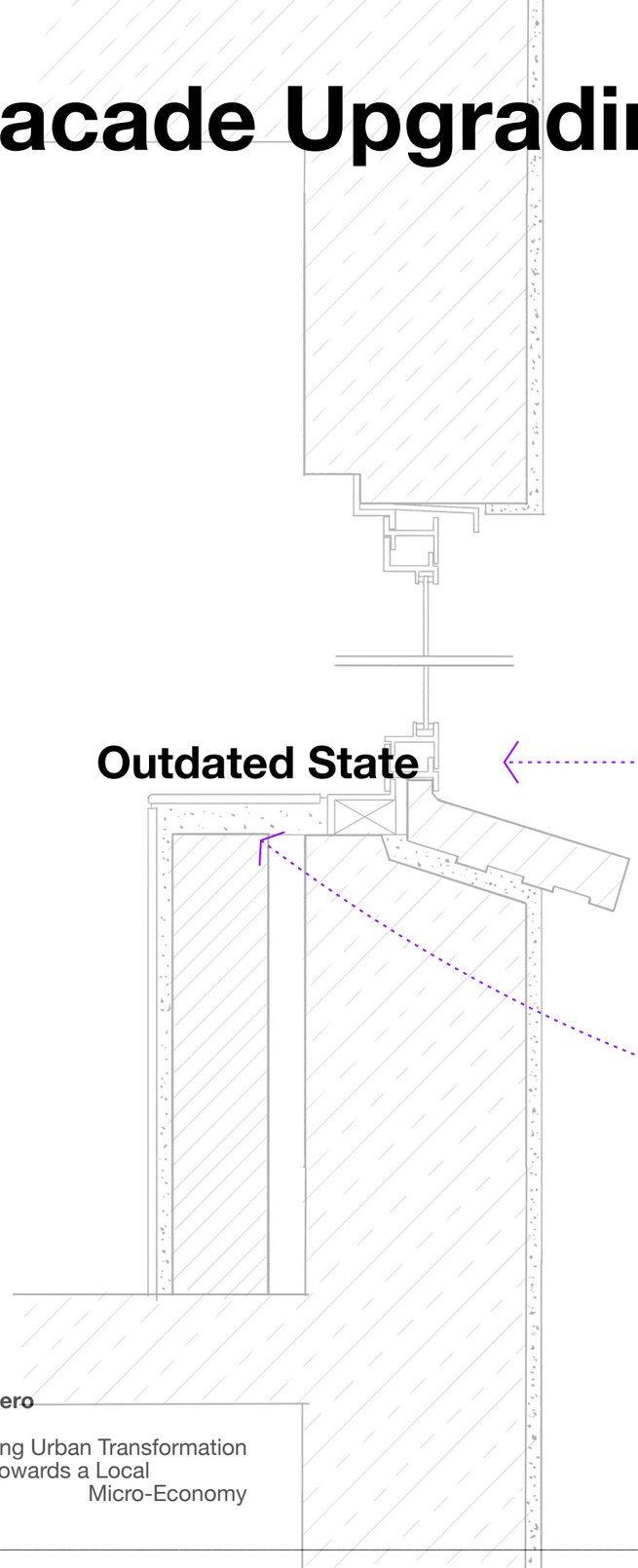


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Facade Upgrading



Outdated State

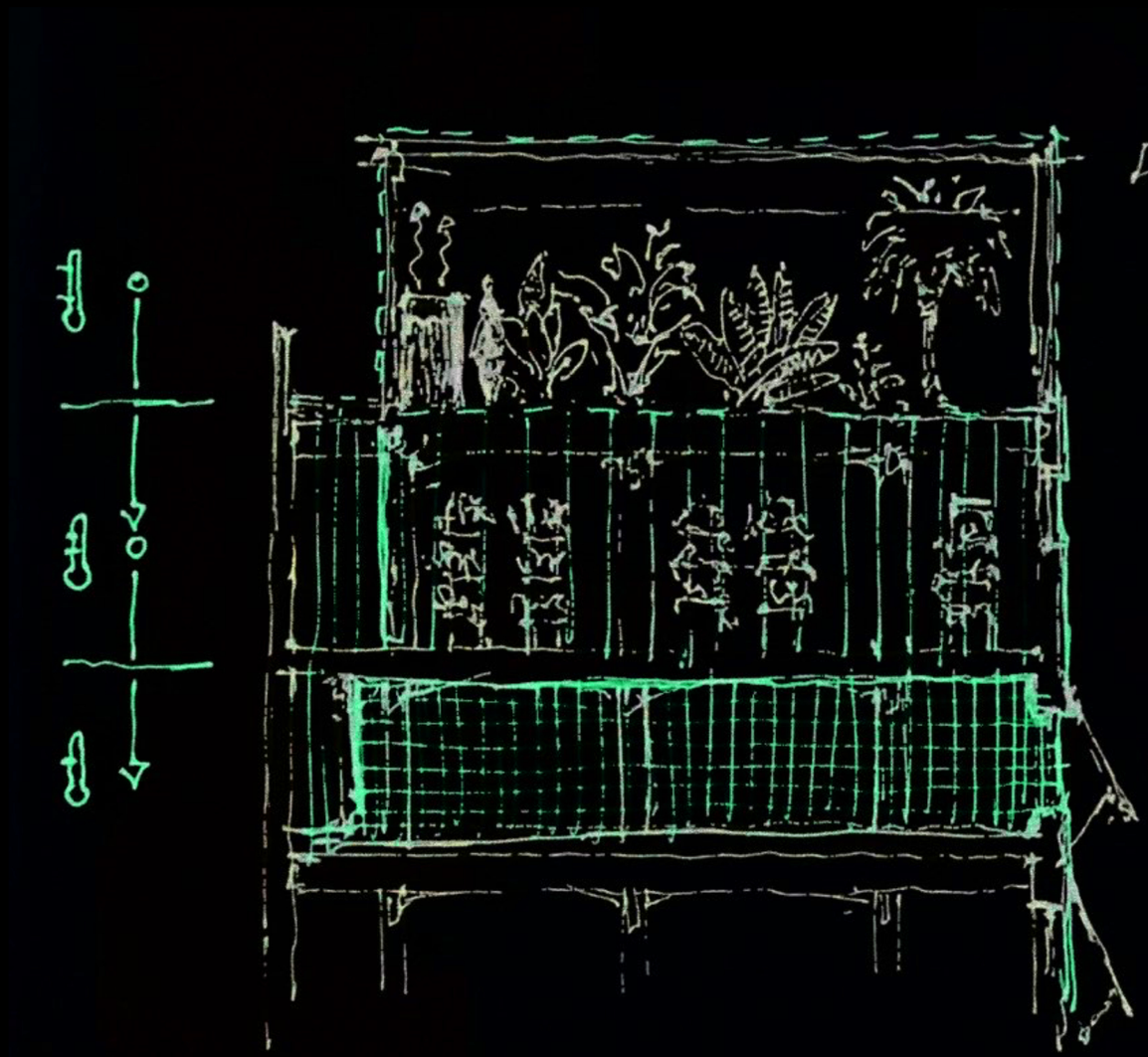
The Building

Characteristic Facade



CONFLICT

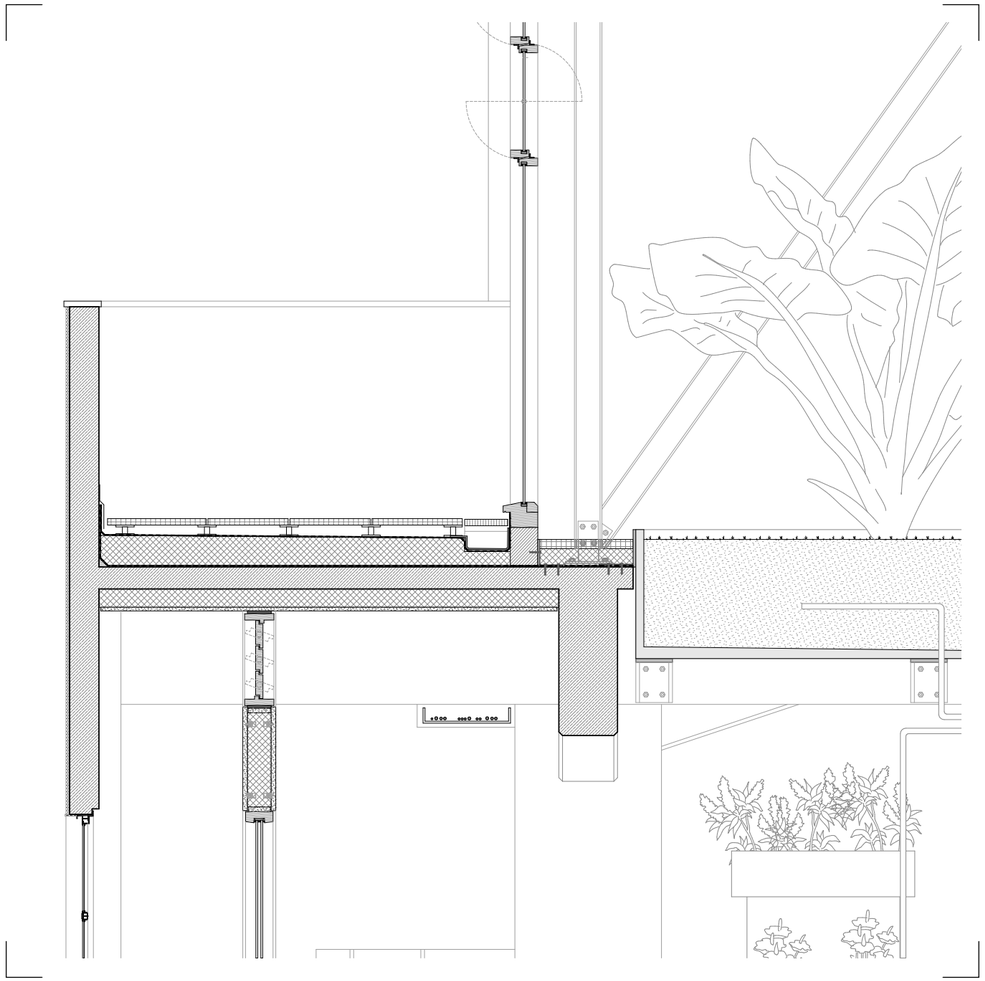
Buffer as a Solution

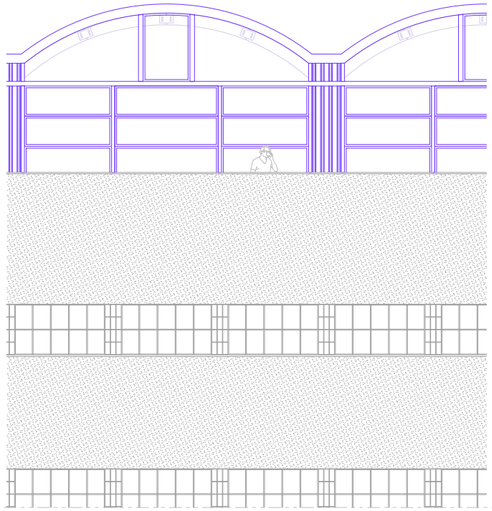


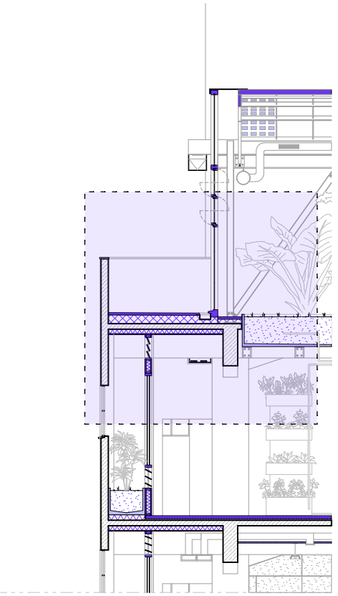
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



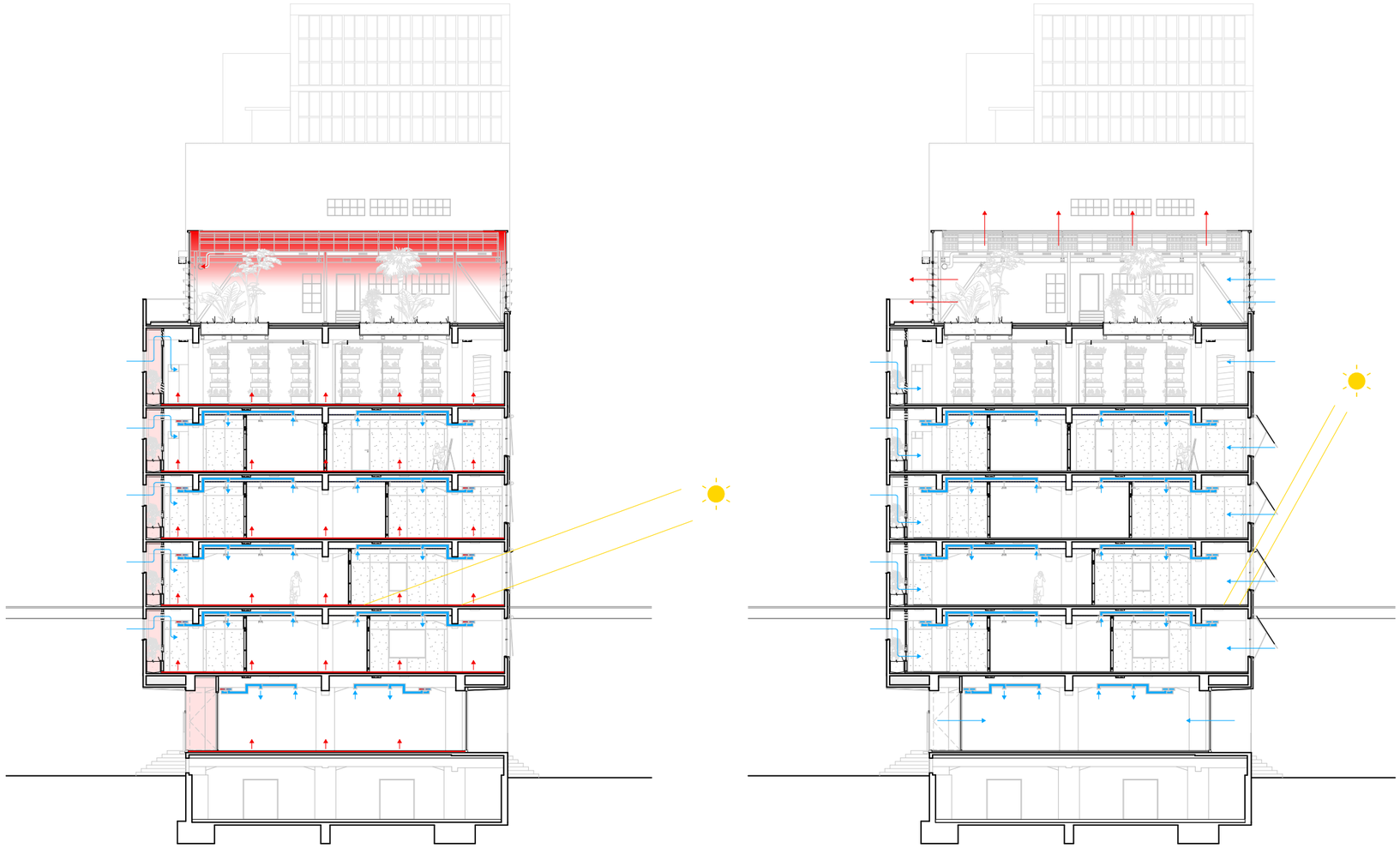




Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Winter

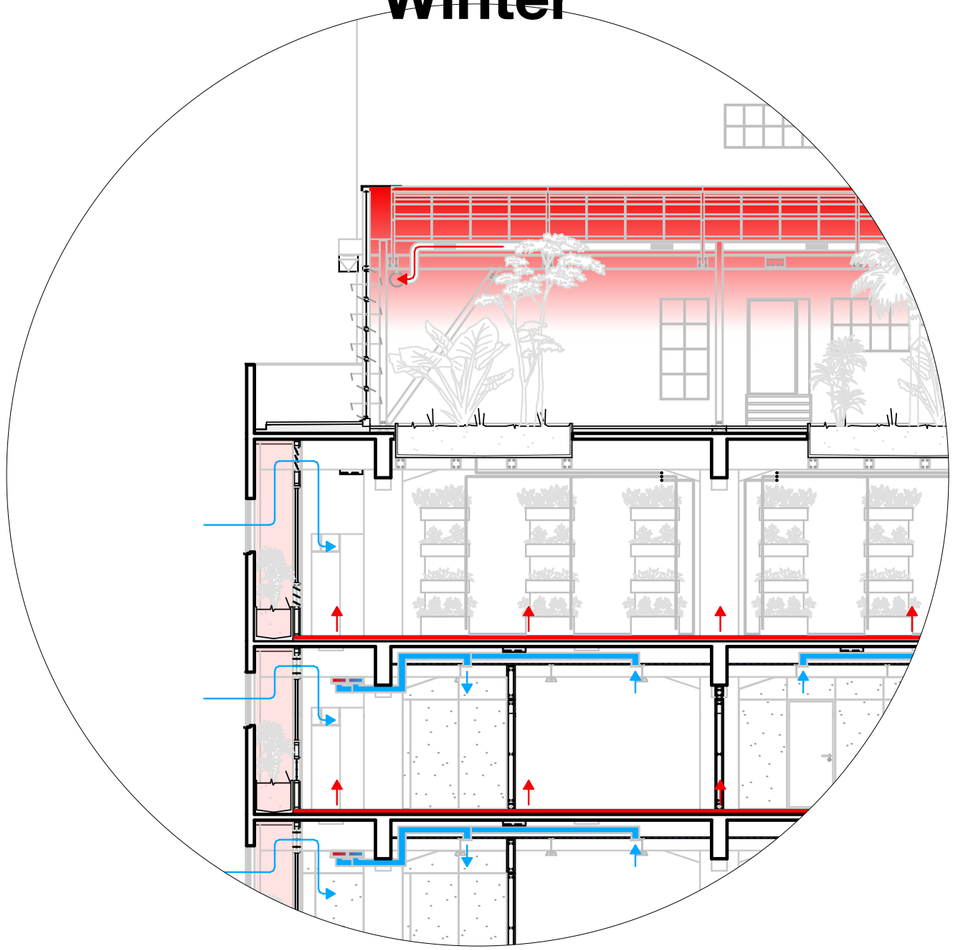
Summer

Local Hero

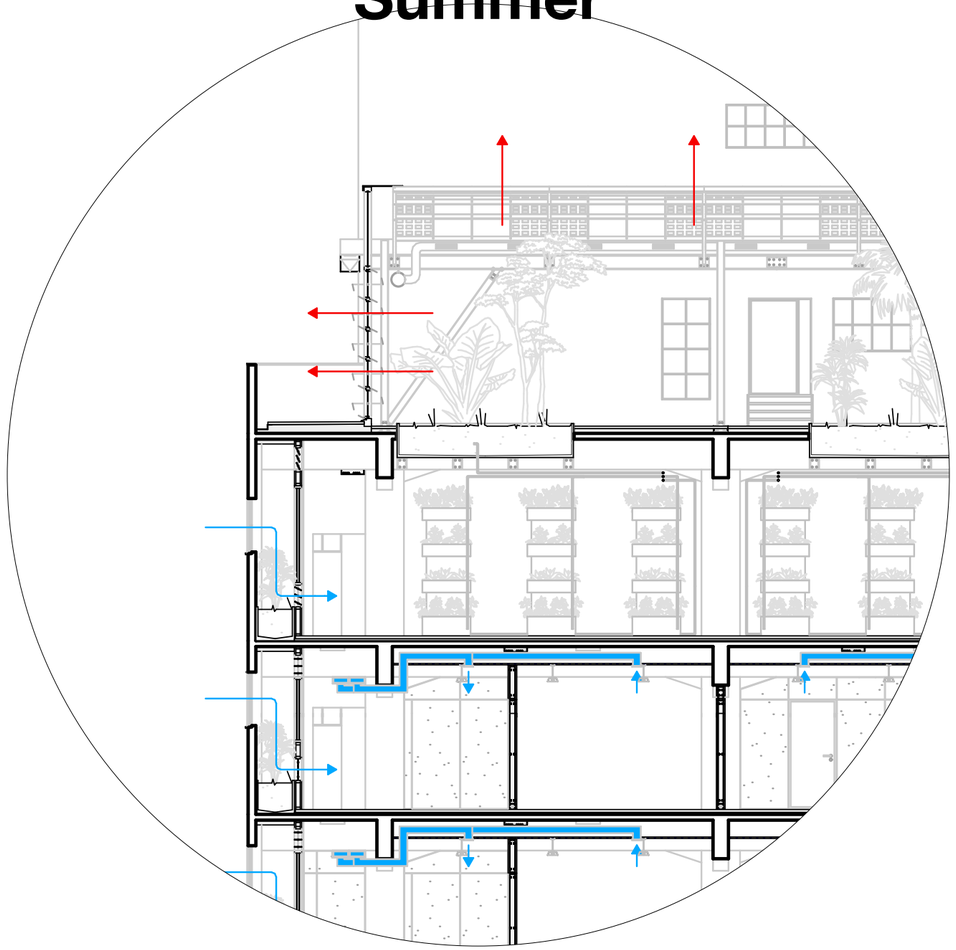
Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Winter



Summer



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

- ~ 900m² of Solar Panels on the entire Roof
- Avg. Hours of Sunshine throughout the Year: 4,7h
- Solar Panel Efficiency: 27%

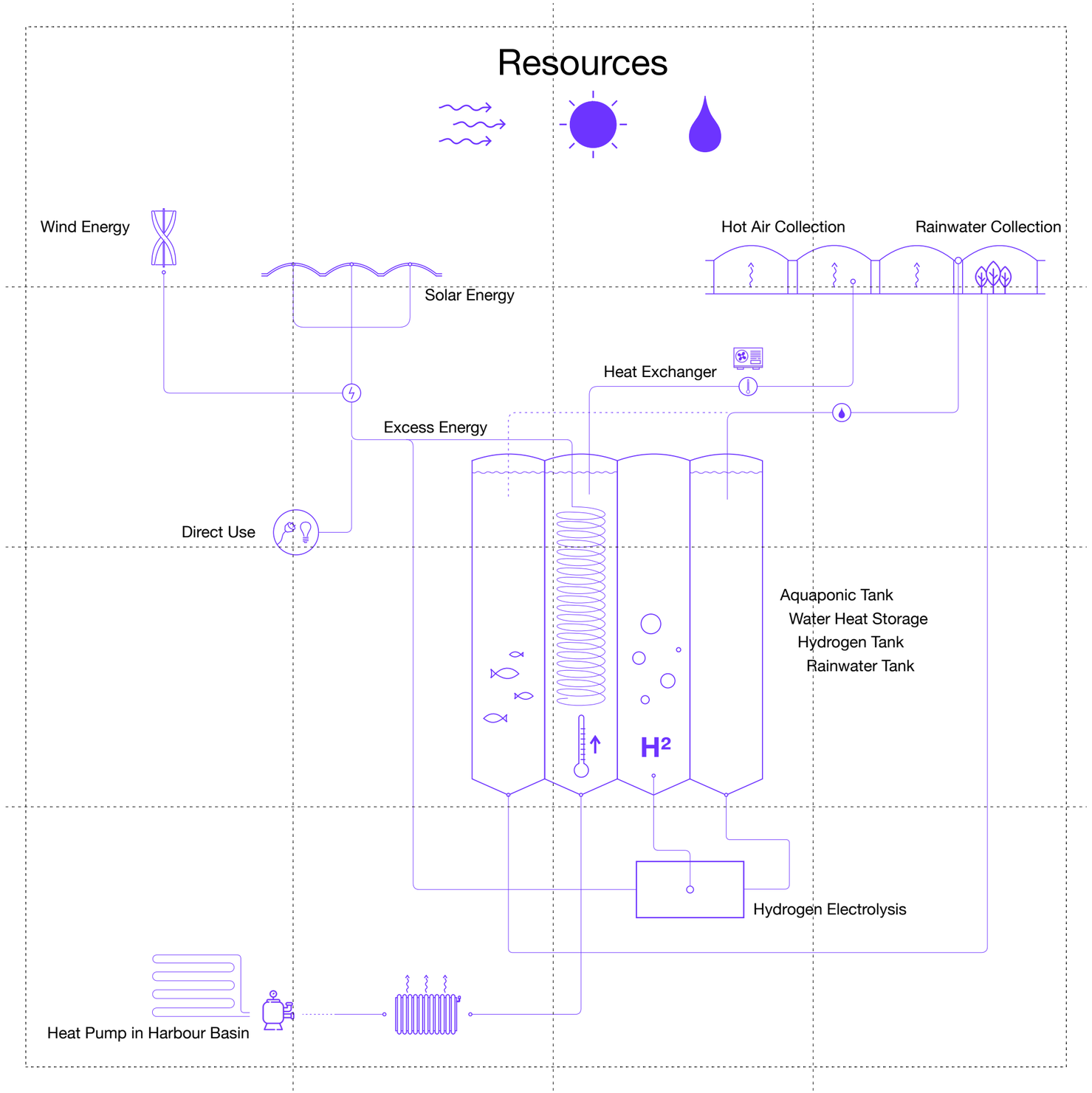
— 1.142,1 kWh / day
— 416.866 kWh / year (Solar Energy)

- 8 Wind Turbines (7kW Capacity)
- Avg. Wind Speed: 18 km/h
- Height of Installation: ~ 41m

— 15.000 kWh / Year / Unit
— 120.000 kWh / Year (Wind Energy)

- Total Generated Energy: 536.866 kWh / Year
- Estimated Energy Consumption: 480.000 kWh /Year

— Total Overshoot: 56.866 kWh

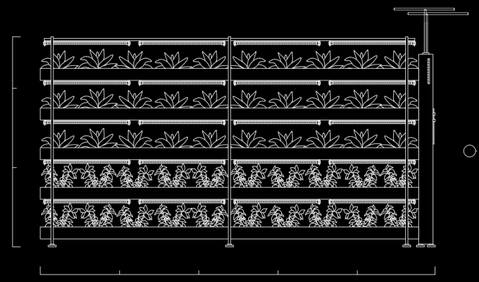


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

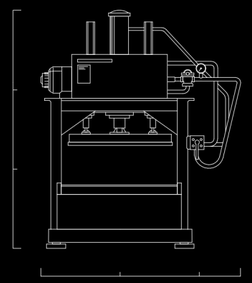
Part Three
System for the Existing

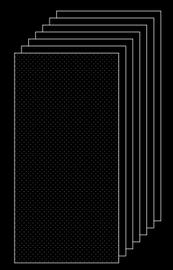


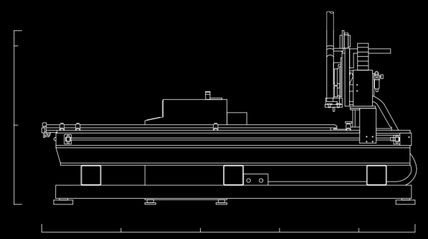


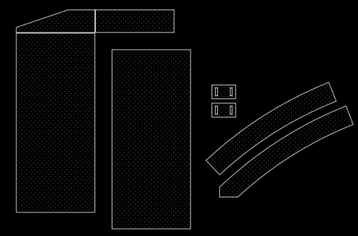
Retrieving Fibrous Waste

// Preparation
Grinding, Cleaning, Drying







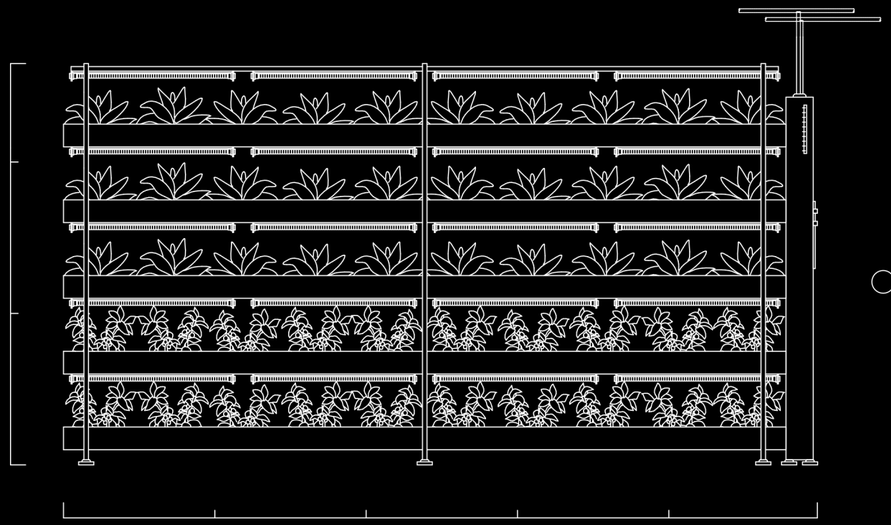


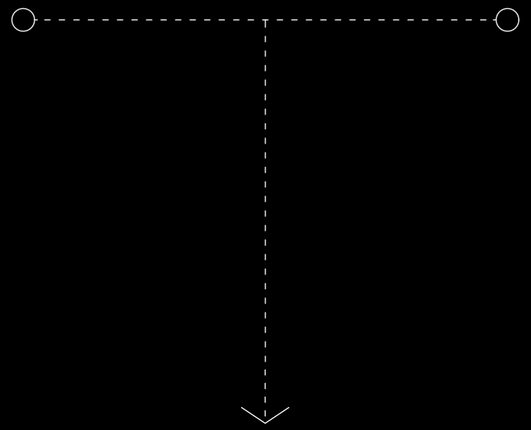
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

Material Provider







Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

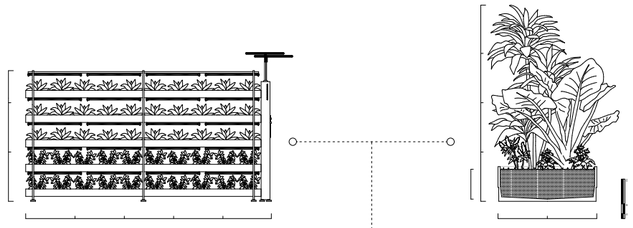




Local Hero

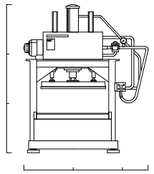
Rethinking Urban Transformation
towards a Local
Micro-Economy

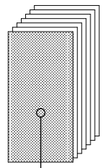
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

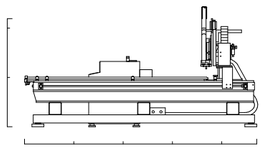


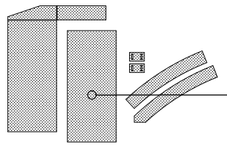
Retrieving Fibrous Waste

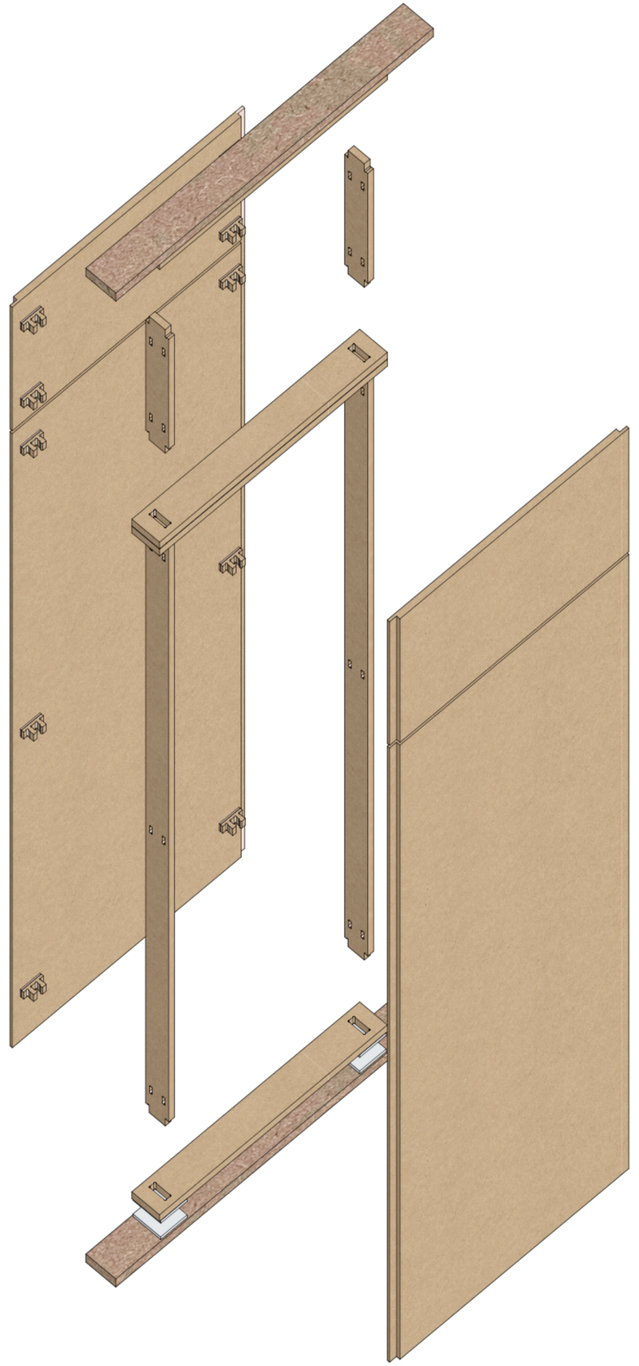
// Preparation
Grinding, Cleaning, Drying









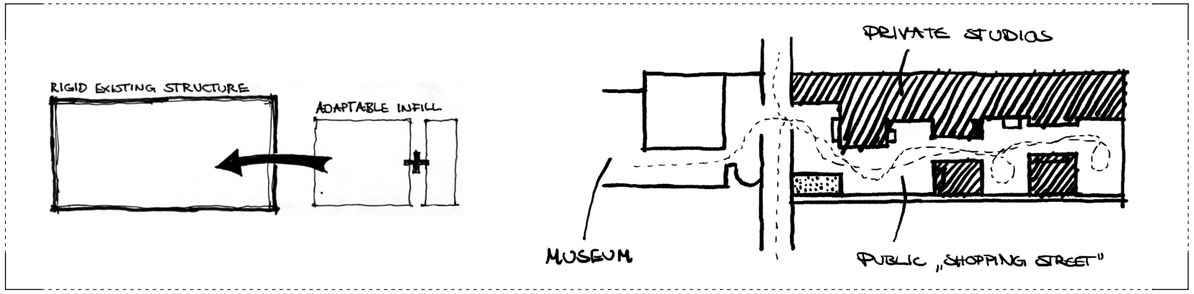


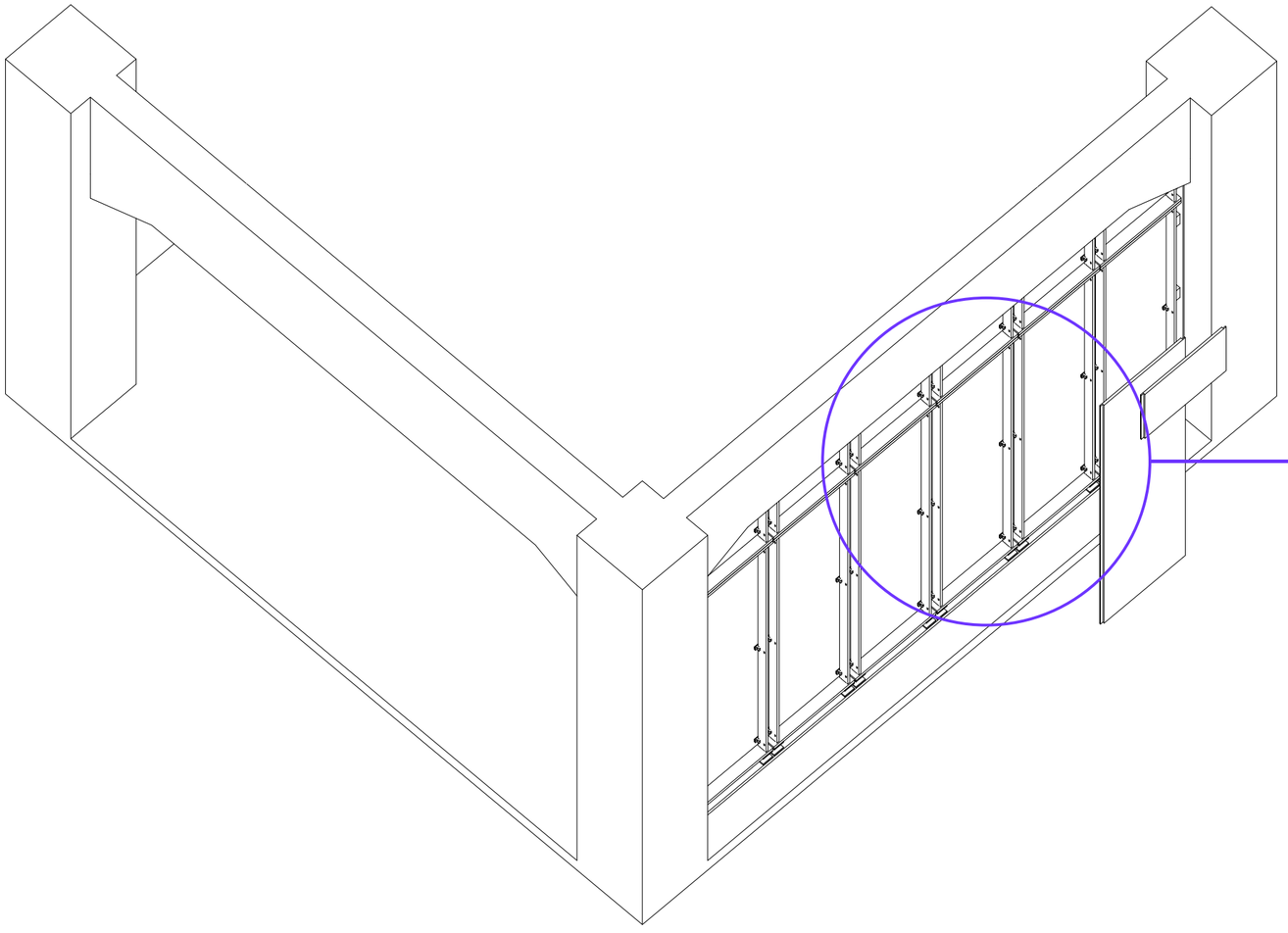


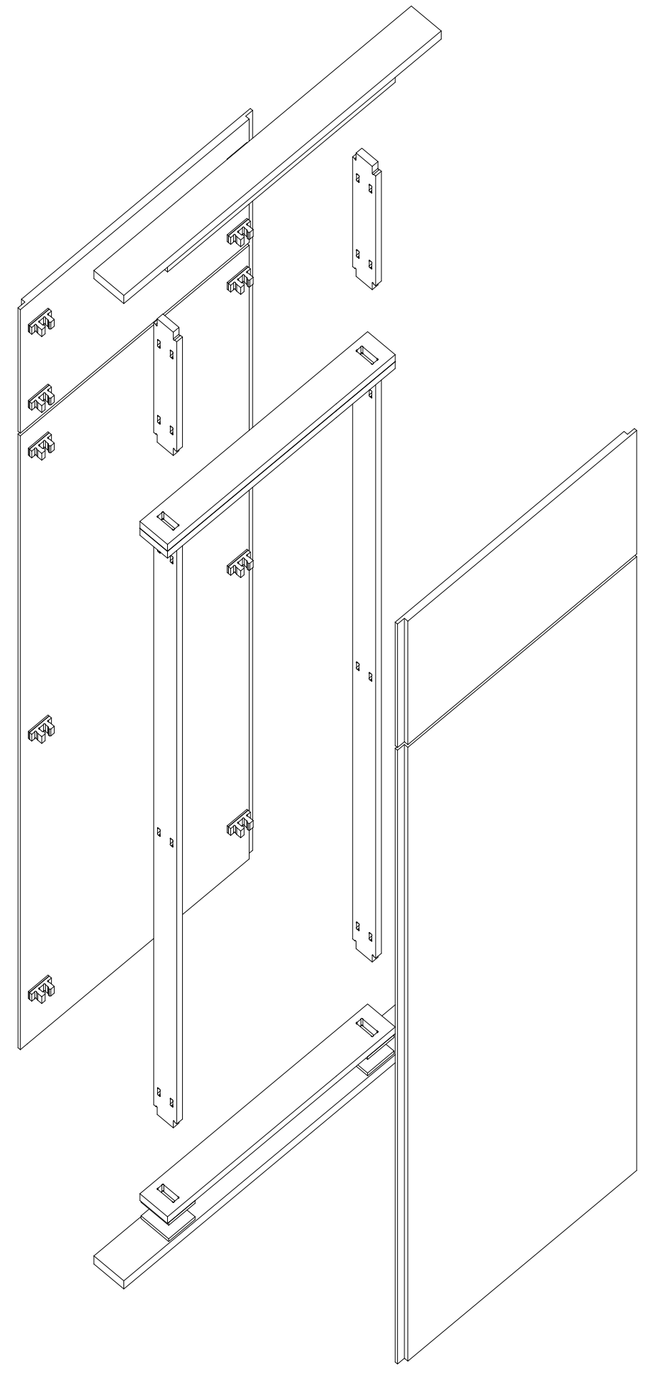
Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk





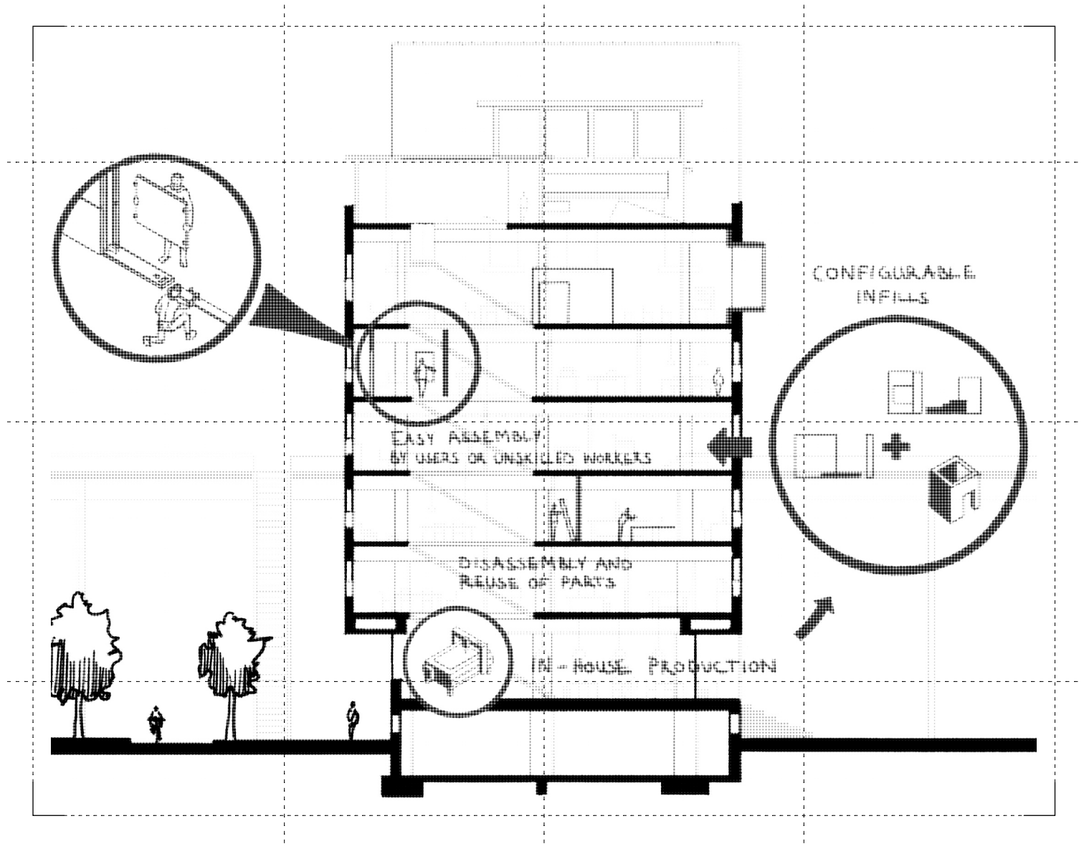


Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

For an infill system to be adaptable to changing user needs, it is required to be...



I___demountable

II___easy to construct

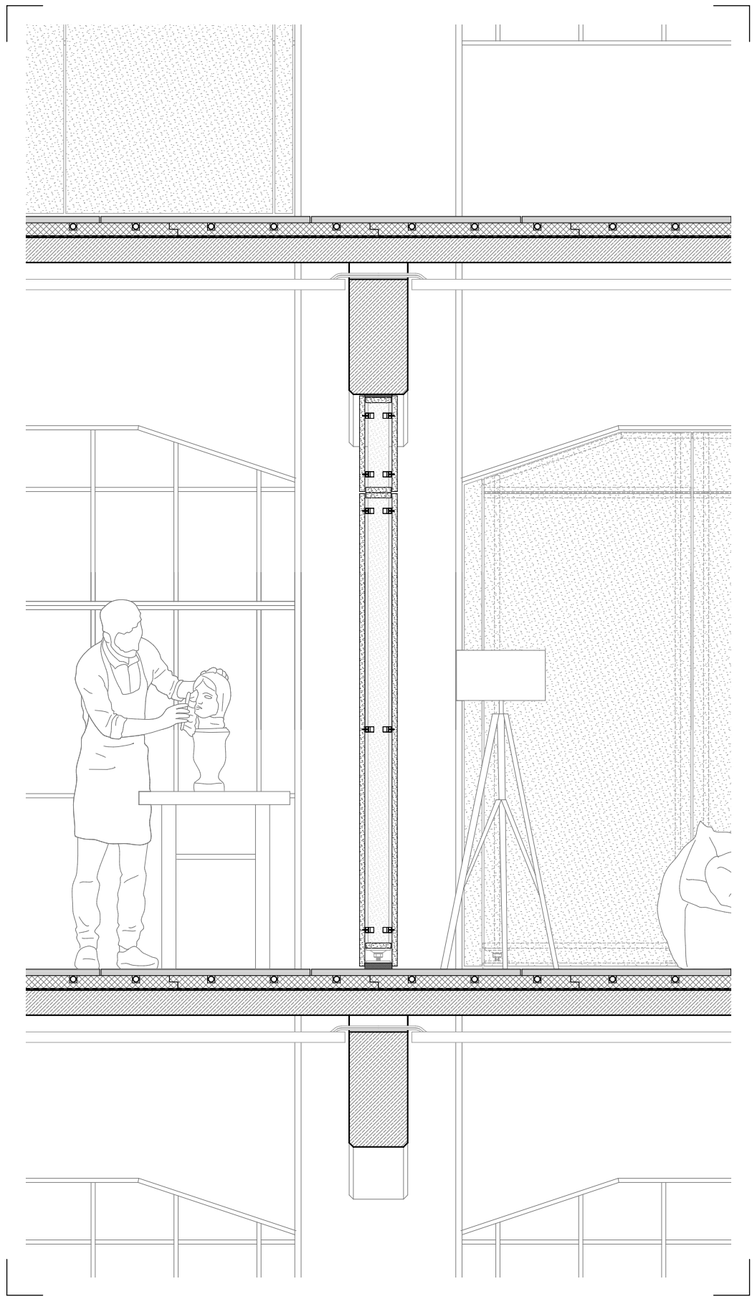
III__open source and accessible

IV__produced in-house

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

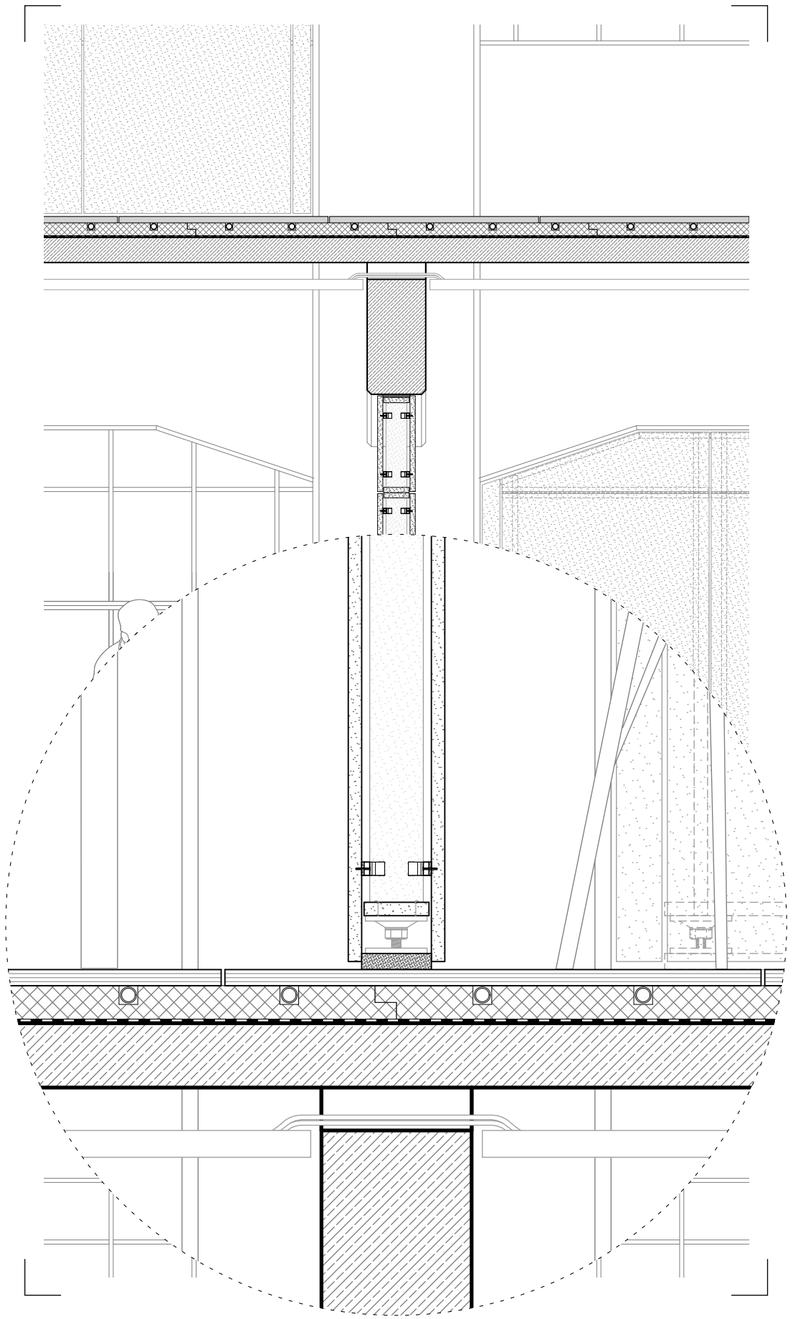




Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk

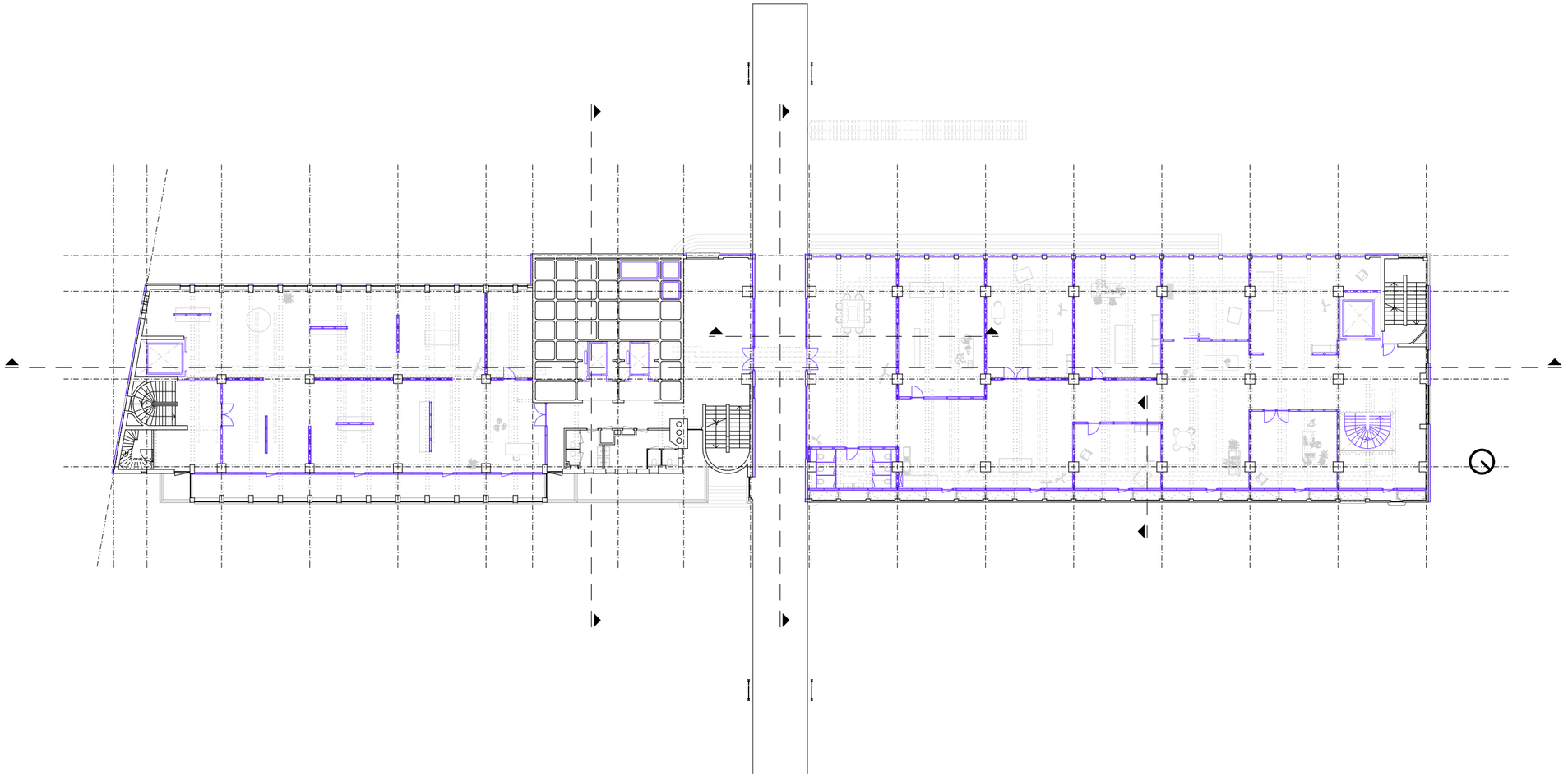




Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

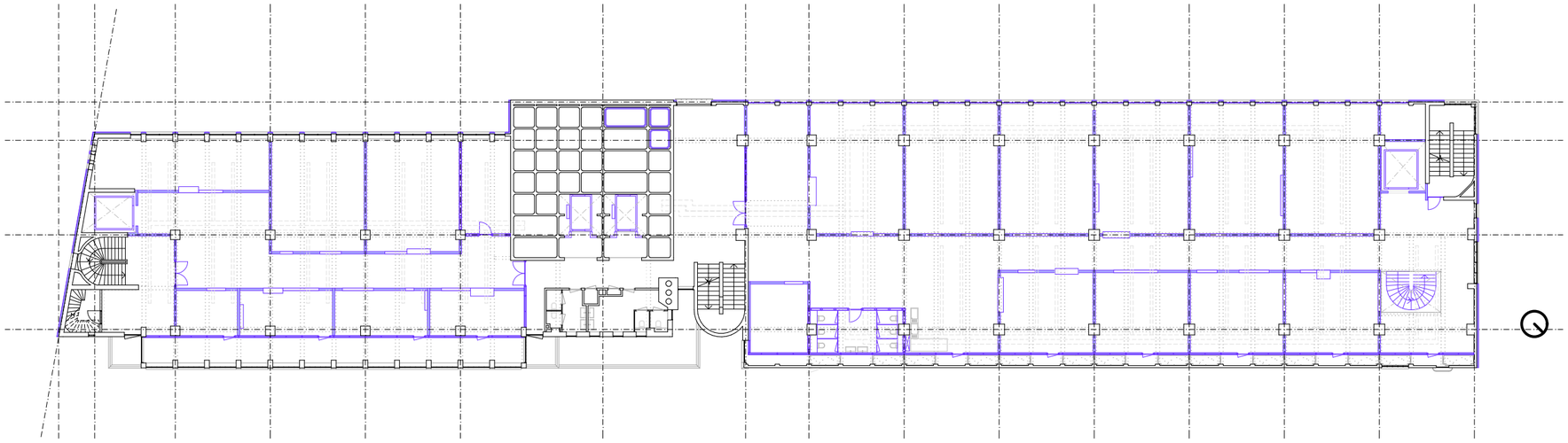
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

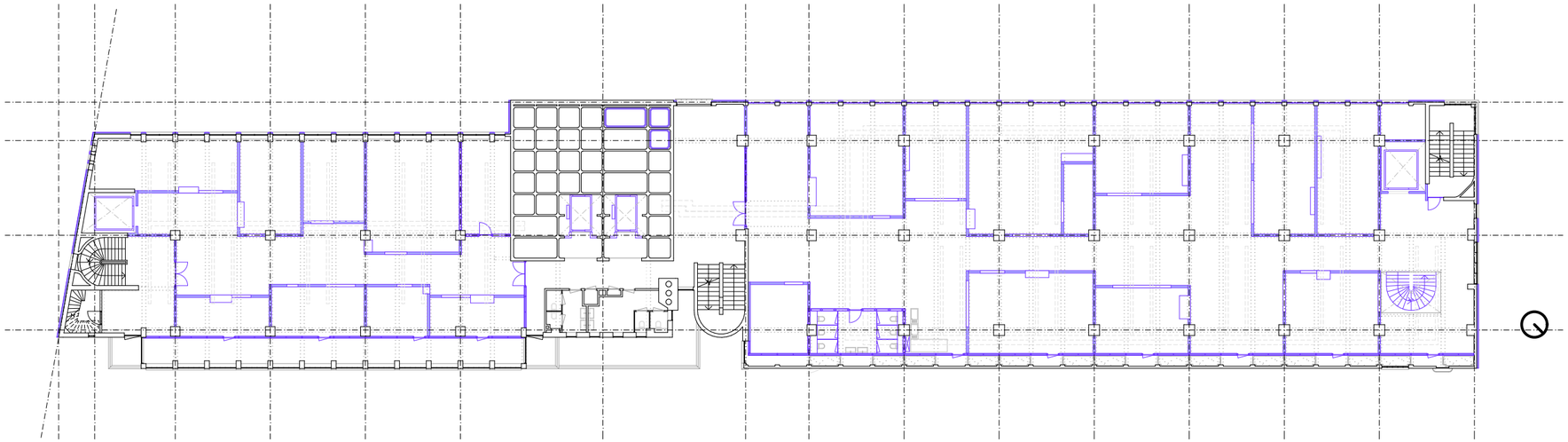
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

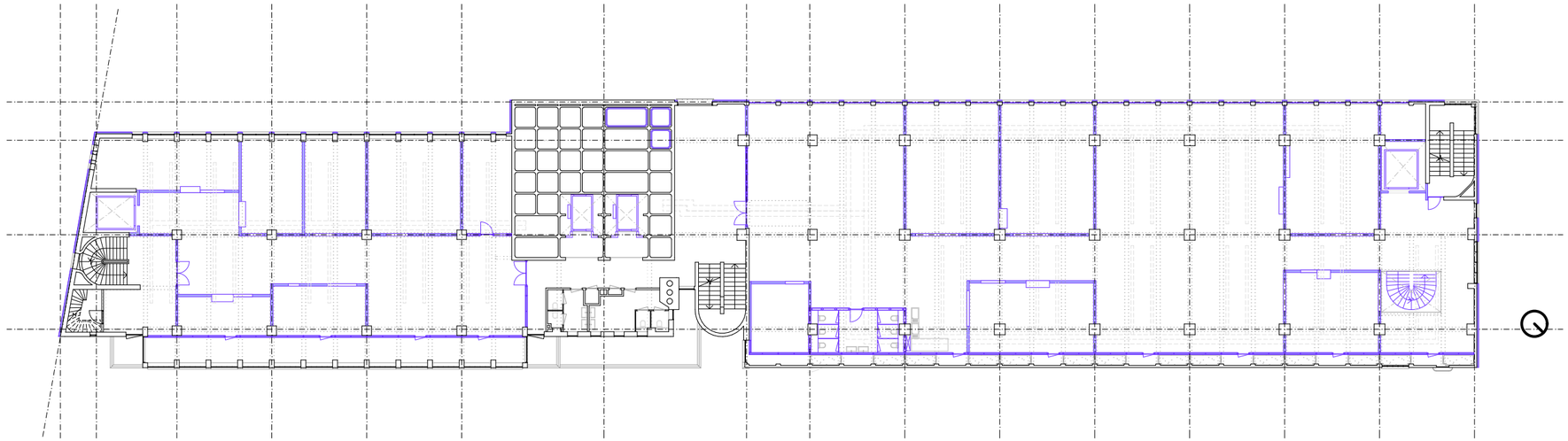
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

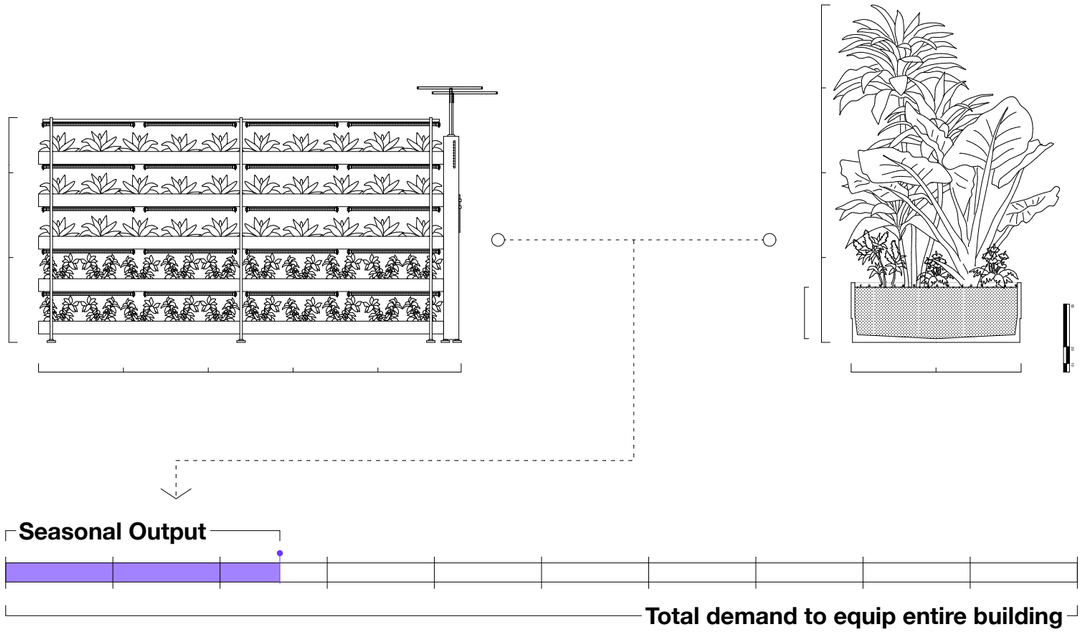
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



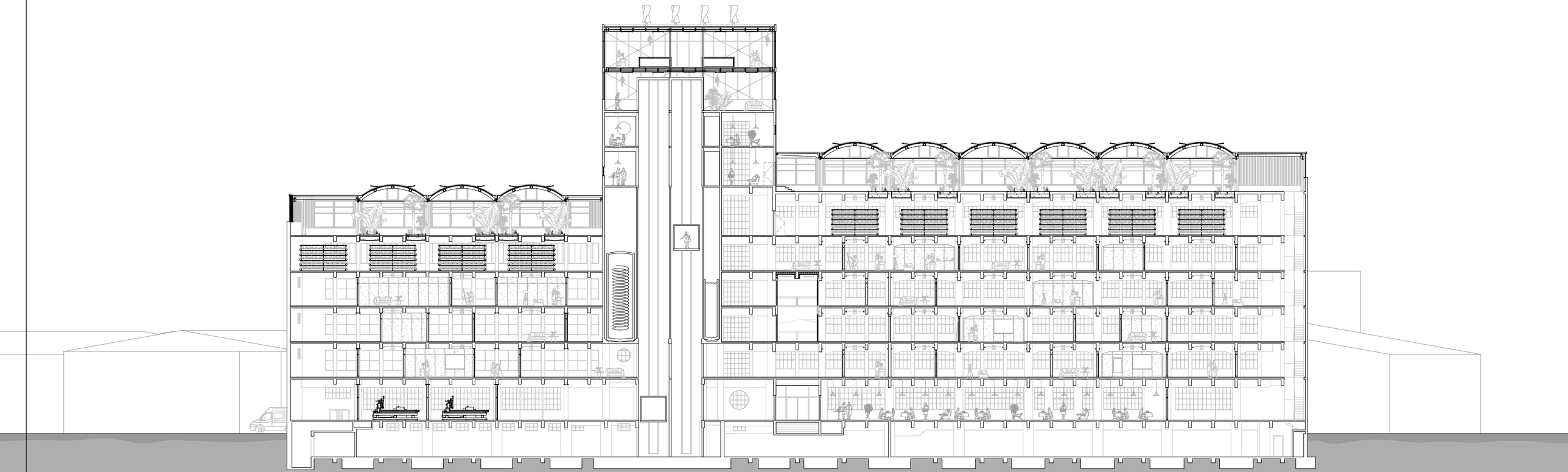
...a growing process, the buidling slowly evolves and is subject to permanent change.



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

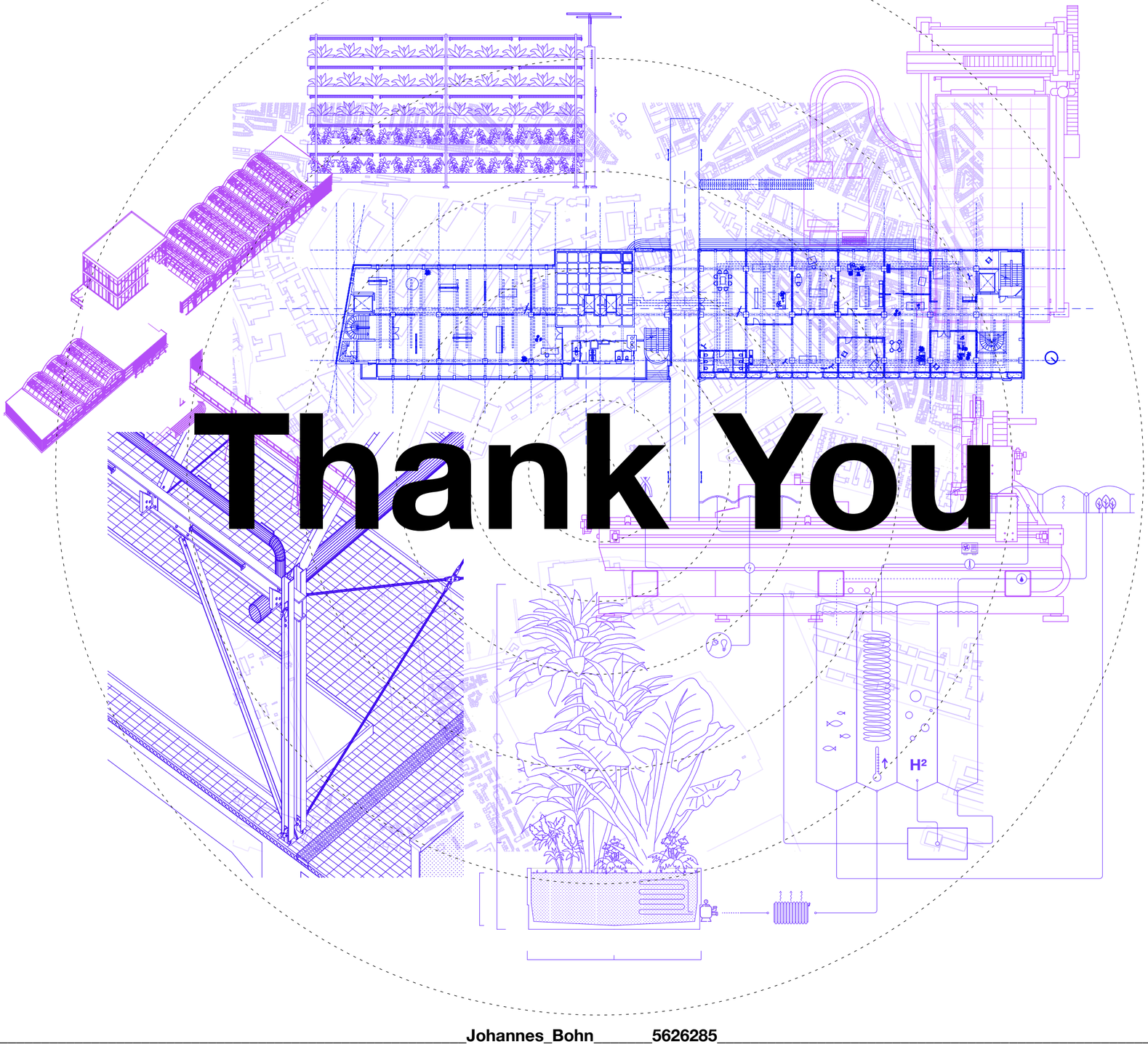
Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk



Thank You

Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk







Local Hero

Rethinking Urban Transformation
towards a Local
Micro-Economy

Thomas Offermans
Paddy Tomesen
Pieter Stoutjesdijk