Urban Regeneration: What’s Next?

Making the Typical Remarkable

Koog-Zaandijk Industrial Redevelopment
Making the Typical Remarkable

Introduction
Location
Assignment
Problem Statement

Research
Research Topic
Urban Research

Urban Design
Master Plan

Architectural Design
Design Strategies
Functions
Interventions

Making
Construction
Façade Design
Climate Systems
Materialisation

Conclusions
Conclusion and Impressions

Contents

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Koog-Zaandijk Industrial Redevelopment
Making the Typical Remarkable

TU Delft Research

Hollands Noorderkwartier
22 Station Location

Koog-Zaandijk Industrial Redevelopment

Introduction
Research
Urban Design
Architectural Design
Making
Conclusions
Making the Typical Remarkable

Koog-Zaandijk Industrial Redevelopment

Introduction

Research

Urban Design

Architectural Design

Making

Conclusions

Zaandijk

Koog aan de Zaan

Zaandam Kogerveld

Wormer

Krommenie

Koog-Zaandijk

Koog Bloemwijk

Zaandam Westwatering*

Krommenie Oost Transfer*

Krommenie-Assendelft

Krommenie Oost | Transfer*

Wormerveer

Zaandam Westwatering*

Koog-Zaandijk

Zaanstad Research Area

800 Radiuses

5 Station Locations

2 Hypothetical Location

Koog-Zaandijk Industrial Redevelopment
**Koog-Zaandijk area**

Former Cacao de Zaan factory now part of the American multinational ADM company

Built in 1911 as chocolate factory

Reformed in 1916 to semi-finished products
Problem Statement

Connection to Amsterdam: Zaanstad acts as suburb of Amsterdam
Problem Statement

Intensification of the Railways

Intensification of the railway line in 2028: HOV Amsterdam - Alkmaar

2010

2028

to Amsterdam

to Alkmaar

Zaanstreek

Goed bereikbaar per

30 minuten  15 minuten  12 minuten  50 minuten
Problem Statement

Drop in reachability of the station

<table>
<thead>
<tr>
<th>Location</th>
<th>1970</th>
<th>2000</th>
<th>2010</th>
<th>2030 (?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krommenie-Assendelft</td>
<td>1770</td>
<td>2113</td>
<td>2856</td>
<td></td>
</tr>
<tr>
<td>Wormerveer</td>
<td>2402</td>
<td>2402</td>
<td>2402</td>
<td></td>
</tr>
<tr>
<td>Koog-Zaandijk</td>
<td>2525</td>
<td>2829</td>
<td>2829</td>
<td></td>
</tr>
<tr>
<td>Koog Bloemwijk</td>
<td>2159</td>
<td>4299</td>
<td>4299</td>
<td></td>
</tr>
<tr>
<td>Zaandam</td>
<td>3626</td>
<td>3844</td>
<td>3844</td>
<td></td>
</tr>
<tr>
<td>Zaandam Kogerveld</td>
<td>2602</td>
<td>2602</td>
<td>2602</td>
<td></td>
</tr>
</tbody>
</table>

Less people live near the stations. Households:
Problem Statement

**Separated village**
Railway is a Barrier
ADM is a Barrier

**Growing industry**
Factory was part of the villages
ADM is at the limits of expanding

**No actors within research location**
Zaanse Schans is an actor for the entire Zaanstreek
From the station

**Industrial Heritage**
Design Strategies
Functions
Interventions

**Densification**
Falling number of dwellers near station
Densify within industrial areas
Densification of the Railways

Can the industrial heritage be an actor for the redevelopment of the area and reintegrate the location with the villages?
Choise of Location

Character per Station area

- Krommenie-Assendelft
  - Education
- Hypothetical station North
  - Industry/ Sports
- Wormerveer
  - Retail, Horeca, Industrial Heritage, Sports
- Koog Zaandijk
  - Industry/ Sports/ Zaanse Schans
- Koog Bloemwijk
  - Living
- Zaandam Kogerveld
  - Healthcare/ Sports
- Hypothetical station South
  - Living/ Sports/ Verkade
- Zaandam
  - Retail and business

Koog-Zaandijk Industrial Redevelopment
Urban Masterplan

Analysis of the area and the appropriate densification per area
Urban Masterplan

Analysis of the area and the appropriate densification per area
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Introduction
Research
Urban Design
Architectural Design
Making
Conclusions

Development
1675
Development
1775
Development

1900
Development
1935
Development

1975-now
Introduction Research Urban Design Architectural Design Making Conclusions

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Koog-Zaandijk Industrial Redevelopment

Functions Urban Design Urban Design
Buildings for Demolition

Removal of the building would ‘alter’ the genius loci of the location?

redevelopment possible without restructuring the construction?

Façade able to support a new function without redevelopment?
Strategies

Urban design strategies for determining the build mass

- Opening up Barriers
- Connecting East and West through the area
- Creating Clear Edges
- Decreasing fabric grain size
- Creating Public Spaces
Role of the Station

Main element in the master plan but mainly functionally designed
Urban Design

1:1000 Master Plan

Koog-Zaandijk Industrial Redevelopment
Architectural Assignment

Powder Factory

Drawing ~1965
Architectural Assignment

Current Condition
Architectural Assignment

Current Approach
Architecture

Typical Dutch chocolate process

Normally chocolate museums skip or shorten this part of the process
**Construction**

Design stages and corresponding load capacity

<table>
<thead>
<tr>
<th>Load Capacity</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>25kN/m²</td>
<td>25kN/m²</td>
<td>25kN/m²</td>
<td>25kN/m²</td>
</tr>
<tr>
<td>4kN/m²</td>
<td>4kN/m²</td>
<td>4kN/m²</td>
<td>4kN/m²</td>
</tr>
<tr>
<td>10kN/m²</td>
<td>10kN/m²</td>
<td>10kN/m²</td>
<td>10kN/m²</td>
</tr>
</tbody>
</table>
Construction

Current Situation:
Slab load-bearing scheme
4-way carrying concrete
What should the building represent?

Current building shape
What should the building represent?

Internal museum space
What should the building represent?

Internal differentiation (void)
What should the building represent?

Building as part of the exhibition
Route

Route through building

Ground Floor

1st - 4th Floor

5th Floor

Bistro / Restaurant

Chocolate Store

Entrance

Private Supporting Functions

Public Supporting Functions

Circulation

Large Exhibition Space

Small Exhibition Space

Observation and Small Exhibition

Skylight

Roof

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Impression

Interior of the central museum void
Ground Floor
First Floor
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Stages of Making

Second Floor
Third Floor
Fourth Floor

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Introduction  Research  Urban Design  Architectural Design  Making  Conclusions

Stages of Making
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Koog-Zaandijk Industrial Redevelopment

Roof
Factory Building
Second Part
(1935/1980)
Façade
(1955-1965)
Additonal Extensions
(1969-now)
Stripping Building to Pure Typical Form

the building now has too little original façades left to re-use

missing façade elements either remake or replace
Stripping to Construction
Creating Voids

removing construction from the large void
Add Concrete Floor
Add New Construction
Add Stairs and Elevators
Add Roof Beams
New Construction
Add Redesigned Façade
Inner Columns
Add Redesigned Façade
Outer Columns
Add Redesigned Façade
Column Covers and Bricks
Add Redesigned Façade
Prefab 3D Elements
Add Roof Edge
Add New Façade
Add Roofs
Add Blinds
**Impression**

Interior of the first floor with the ground floor stairs inside the space
Impression

Main stairs in the building extension
Structure

Correlation between existing and extension
Construction

Elements within the building

Rectangular Profile 250x450
Extension 0-5th

Rectangular Profile 250x350
Extension 5th

DIN 22

DIN 22 flanged

DIN 28

DIN 22 | K160
400x400

1st Floor

K160
400x400

Ground Floor

K160
500x500

Ground Floor
Construction

Construction scheme and alterations for stability

Existing Concrete Wall

Concrete 400x400 (outer)
Concrete 500x500 (inner)

Concrete 400x400 with inner DIN22 (220x220)

DIN22 (220x220)

DIN22 (220x220)

DIN22 (220x220)

New Concrete Wall (200mm) only on 1st-4th Floor

Existing Concrete Wall (200mm)
Relation to the Building

Existing façade redesign: based on the current façade with a more clear architectural scheme
Relation to the Building

Extension:
based on half the width of the construction and height of the redesigned windows
Impression

North-West facing the market
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Making

Introduction Research Urban Design Architectural Design Making

Conditioning

Facade in corresponding proportions with the original design

With this building method meeting new regulations is possible

Façade Design

Current Situation

Window

11.995 m² total
10.264 m² glass (U = 0.7)
1.7307 m² aluminium (U = 1.8)
U = 0.859 (U = 1.65 admitted as of 1-1-2013)

Wall

Rm 0.04 / 0.85 = 0.047
Rc 0.085 / 0.8 = 0.106
Rin. resol 0.21 / 0.018 = 11.667
Rsteel 0.016 / 50 = 0.0003
R 11.8203
Rc ((11.82+0.13+0.04) / (1+0.05) - 0.13 - 0.04
Rc 11.249
Rtot 0.13 + 11.249 + 0.04 = 11.419
U 1 / 11.419 = 0.0876

~Rc 6.298

Final Façade Design

Rm_lam 0.1811 (13.8651 m²)
Rm_merge 0.464 (6.2959 m²)
Rm_beton 0.33/1.9 = 0.1737 (0.9425 m²)

Rn 0.11898 + 0.13841 + 0.00776 = 0.26515

Rc 0.2844

Rtot 0.13 + 0.2844 + 0.04 = 0.4544

U 1 / 0.4544 = 2.2
Conditioning

Automated Sun Shading
**Conditioning**

Automated shading for the museum

Individually operable or automatic shading for the dwellings

<table>
<thead>
<tr>
<th>Tripple Glazing ZTA = 60%</th>
<th>Blinds with froster glas</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U=0.6$</td>
<td>Light is admitted but defused, heat outside</td>
</tr>
</tbody>
</table>

**Façade Design**

- **Normal Position**
- **Shading and Reflecting**
- **Maximum Light Admittance | Winter**
- **Maximum Shading | Summer**
**Construction**

Extension:
Steel frame in grid with the window frames visible from inside hidden from outside
Axonometric

Build up of main elements in refurbished façade
Axonometric

Build up of Extension Roof
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Introduction

Research

Urban Design

Architectural Design

Making

Conclusions

Verticle Details

Resedigned Façade

Existing

Redesigned

Detail floors 2-4
Verticle Details

Resedigned Façade
Verticle Details

Extension South
Verticle Details

Extension South
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Verticle Details

Extension East

Detail regular
Verticle Details

Extension East

Detail roof
Verticle Details

Extension East

Existing

Detail skylight

Existing-Extension

Detail roof - façade
Climate System

Cross section of the dwellings

Sources are with 200m distance
Section

Cross section

Ventilation

Fabric air ducts
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Introduction

Research

Urban Design

Architectural Design

Making

Conclusions

Section

Cross section

Rain

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Climate Systems
Making the Typical Remarkable

Introduction

Urban Design

Architectural Design

Making

Conclusions

Section

Cross section

Sun shading
Section

Cross section: Summer

Cooling

Cooling through floor heating system on 1st-3rd floors, mechanical top cooling via 4th floor ventilation ducts
Climate System

Cross Section: Winter

Heating

Museum: floor heating ducts in cement layer
Climate System

Longitudinal Section

Ventilation

Mechanical ventilation via:

Dwellings: local outlets

Museum: fabric ventilation ducts
Climate System

Longitudinal Section: Winter

Sun shading
Climate System

Longitudinal Section

Rain
Climate System

Longitudinal Section: Summer

Cooling

Dwellings: air conditioning via mechanical ventilation
Museum: floor heating ducts used for cooling in cement layer
Climate System

Longitudinal Section: Winter

Heating

Dwellings: 'dry' elevated floor heating system
Museum: floor heating ducts in cement layer
Impression

East elevation from the park
Impression

South elevation from the hotel

Questions?