BADHUIS MARINETERREIN

Re-imagining combined energy production & bathhouse as contributing to valuable urban social space

Fallon Walton

aE Intecture - Graduation
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Tutors:
Roel van der Pas (Design)
Jan Jongert (Research)
Mauro Parravincini (Building Tech.)
Context
Bathhouse
Objective
Technical Research
Design
Marineterrein, Amsterdam
Marineterrein, Amsterdam
Marineterrein, Amsterdam
Marineterrein, Amsterdam

Demands

• Public space, year-round activity
• Re-connect with surrounding urban fabric
• Draw on historical identity of site & connection to water
• Include smart energy infrastructure
• Gradual growth, to adapt to future needs of society
Opportunities

- Refuge and quietness within city
- Reclaim green public space
- Intersection point between disconnected neighbourhoods
- Inventory of existing buildings
- Play a role in improving current urban social & sustainability issues
Sustainable Issues

• Untapped potential of food waste as energy
• Recovery & processing of organic residues using innovative applications
• High density of residents & restaurants
Het Parool

Drukte in de binnenstad kan paniek veroorzaken

Op plekken als de Kalverstraat dreigt "overbevolking". © ANP

De sociale cohesie in Amsterdam staat onder druk, blijkt uit een rapport van de politie. Ook dreigt 'overbevolking': zoveel mensen bijeen dat paniek kan ontstaan.

DOOR: MAARTEN VAN DUN 1 OKTOBER 2016, 07:00

nrc.nl

‘De stad zag de gevaren niet op tijd’

Interview Hoogleraar Jan van der Borg. Toerisme levend, ook veel op, zegt hoogleraar Jan van der Borg. Maar bewoners profiteren er te weinig van.

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Context

Bathhouse

Objective

Technical Research

Design
Evolution of the Bathhouse

Antiquity
1 Century BC

Hygiene Movement
+/-1911

Contemporary Spa Culture
+/-1980
Typical Procession

Baths of Caracalla, Rome
212 AD
Architectural Features

Columns

Introvert

Tiles

Light
Social Relevance
Context  Bathhouse  Objective  Technical Research  Design
Design Question

How can the integration of energy production from food waste and a public bathhouse become a cohesive design?

How can it facilitate social connections on the Marineterrein & accommodate future visions for the site?

Technical Question

How can the flows of food waste, energy, and water be locally managed and integrated into the design of a public bathhouse?
Context | Bathhouse | Objective | Technical Research | Design
Part 1

Existing Flows
- Waste
- Energy
- Water

Part 2

Integration & Optimization of Flows in Bathhouse
- Waste
- Energy
- Water

Part 3

Integration of Techniques & Spatial Implication for Bathhouse
Large Scale Urban Impact of Implemented Research

Reference for Design
Existing Flows

Waste

North Sea Canal

AEB

Marineterrein

10 km

5 km

1 km

1 Resident = 92kg Organic Waste

25% Organic Waste

25% Waste

Organic Waste

Households

Marineterrein
Existing Flows
Energy

North Sea Canal

10 km

5 km

1 km

Marineterrein

AEB

NUON

Households

85% Non-Renewable

Existing Flows

Energy

North Sea Canal

10 km

5 km

1 km

Marineterrein

AEB

NUON

Households

85% Non-Renewable
Existing Flows

Water

Marineterrein

North Sea Canal

WWTP

AEB

NUON

Existing Flows
Proposed Techniques

Food Waste

1000 kg = 720 kWh + 370 kg

Food Waste
Energy
Natural Fertilizer

Anaerobic Digestion
Proposed Technique

Energy

$$1\text{m}^2 = 500\text{kWh} \left(300\text{kWh} + 200\text{kWh}\right)$$

Transportation

Consumption

Reduction & Recovery
Proposed Technique

Water

1m² = 30L

& optimized use of rainwater

Constructed Wetland
Design

- Site
- Intervention
- Bathhouse
- Flows
- Flexible Use
Schematic Volume
Existing
Schematic Volume
Proposed
Structure

cross-bracing acts as portal frame

carbon fibre reinforcement

mini-piling: cast in-situ needle beam
Bathhouse
Thermal Zones

Level 3

Level 2

Level 1

Level 0
Bathhouse
Conceptual Plan

view to surrounding

[ HOT ] [ WARM ] [ COLD ]

view to surrounding
Section D-D’

Unprogrammed Space
270m²

Unprogrammed Space
475m²

Unprogrammed Space
265m²

Unprogrammed Space
475m²

Changeroom
Showers
Service & Technical Room

Pool Hall
Greenhouse

25°C

Café & Bathhouse
Frontdesk

Restaurant
Kitchen

Service & Natural Fertilizer Pick-up

Machine Hall
Lobby

Harbour Bath
Floating Sauna

Floating Sauna

Bathhouse
Large Sauna
60-90°C

Cold Pool
14°C

Steam
41°C

Sauna
70-90°C

Showers & Foot Baths

28-30°C

40°C

35°C

30°C

Level 1
Level 2
Level 3
Level 0

1:250
Bathhouse
Facade & Structure
Bathhouse
Facade Design

Bruno Morassutti & Enzo Mari
Domus, 1965.
Bathhouse
Pool Hall
Bath, England
Pool Hall | Greenhouse
Facade & Structure
Food Waste

1. Boat Drop-off
2. Carrier
3. Waste Bunker
4. Digester
5. Biogas
6. Fertilizer
7. Agriculture Industry
Food Waste Collection Map

Required Energy: 1.1 million kWh/yr
Required Food Waste: 2 million kg/yr
22,000 residents or 225 restaurants
Design

- Site
- Intervention
- Bathhouse
- Flows
- Flexible Use
Public & Unprogrammed Space

Level 4 (roof)

Level 3

Level 2

Level 1

Level 0

- Bathhouse
- Public
- Unprogrammed
Flexible Use

Office Space

Artist Atelier

Wellness Studio

DJ/Podcast Booth
Unprogrammed Space 270m²

Unprogrammed Space 475m²

Unprogrammed Space 265m²

Changeroom

Showers

Service & Technical Room

Pool Hall 28-38°C

Greenhouse 25°C

Café & Bathhouse

Frontdesk

Restaurant

Kitchen

Service & Natural Fertilizer Pick-up

Machine Hall & Lobby

Café & Bathhouse Frontdesk

Level 1

Level 2

Level 3

Level 0

Ground Plan
Public Space
Exposition
Public Space
Market
Public Space
Party
Public Space
Unoccupied
Energy
Bathhouse Climate System
Energy
Pool Hall | Greenhouse
Climate System