PAVILIONS IN THE WOODS
THE UNINTENDED BEAUTY OF DEALING WITH EXPLOSIVES
IMPRESSIONS OF HEMBRUG
OF HEMBRUG

RECY - EXPLORATION - UNEXPECTANCY
DECAY - RUINS - WILD NATURE
- WILD NATURE
Fig. 1.1 Zones of Hembrug

1. FOREST
2. PRODUCTION ZONE
3. WATERFRONT

Main zones

Sub zones

PRODUCTION OF WEAPONS
PRODUCTION OF AMMUNITON
PRODUCTION OF MUNITION
TEST AREA
PLOTS IN THE WOODS
CAFE SOUTH

POST-WAR FOREST
SECTOR PARK
WATERFRONT FORMAL

PLOTS IN THE WOODS
1. Forest Zone
- Natural environment / spacious
- Contrast/transition
- Small scale

2. Production Zone
- High diversity
- Clustering of buildings
- Presence of the main structures/sight lines

3. Waterfront
- Monuments / iconic
- Greenery along quay
- Parallel to the Noordzee Kanaal

Hembrug area
- Unique area and military heritage
- Made public in 2003
- Situated between zaandam and Amsterdam

Fig. 1.2 Production zone
Fig. 1.3 Waterfront
Fig. 1.4 Hembrug terrain
Fig. 1.5 Plofbos
THE PAVILIONS IN THE WOODS
IN THE WOODS
ANALYSIS / CULTURAL VALUES
02 ANALYSIS

“How did practical military design yield unintended qualities of a forest -village?”

What was the design approach by Hembrug?

What are the characteristic traits of Plofbos?
ALYSIS

"How did practical military design yield unintended qualities of a forest-village in Plofbos?"

What was the design approach behind the planning of Hembrug?

What are the characteristic traits of Plofbos and how did they come into existence?
Fig. 2.1 Canal system as fire compartments

Fig. 2.2 Earth walls to sustain blast impact

Fig. 2.3 Pipelines providing steam to heat the buildings, instead of flammable gas

THE FUNCTIONAL ASSETS
NAL ASSESTS

Fig. 1.6 Directing potential

Fig. 1.7 Tree lanes for camouflage

Fig. 1.8 Blast radius

Blast radius 20m
Lightning catchers

Pipelines

Open Space

Trees
Elements

Creeks

Earthen walls

Path / Sequences / Sight lines

Bridge
Monuments
Anno 1900

Hidden behind
greenery

Open space in
between buildings

Arced roof

Shell roofs
Anno 1950

Paths through forest

Wild foliage

De Grote Boerderij
FARM’S AND SHELL-ROOFS

1900’s series
GRADUATION PLAN
1.3 **Target group**

With better health care, advanced medicine, and increased technology, we as a population can become much older. On top of that has come the strong influx of baby boomers now in their elderly stage. Many of them require assistance and care. Care in such an amount we as a society can’t cope with. Fewer people need to take care of more. This requires intelligent interventions of which architecture can be of assistance with. It should help to make it possible for elderly people to live on their own for a longer period of time, so they require less assistance. However, another aspect especially elderly people deal with is loneliness and therefore their mental well-being.

The Pavilions in the woods, with its natural atmosphere offers an ideal environment for the aging elder. Living in a natural environment could improve the overall well-being of the individual, opposed to living in an urban environment. Yet, especially elderly, suffer from loneliness, fear or depression. These problems demand another solution from the transformation on a bigger scale of program that deal with the mental well-being of the individual. It can be contested by hosting communal activities for the elderly, as well as to stimulate them to exercise and to do communal activities such as gardening, bike rides or hikes through the forest. However, all these activities need to be organized and taken care of, so who is going to put in the effort? Another growing problem in the Netherlands is the huge housing shortage, especially in the Randstad. Mostly young starters are not able to afford an acceptable house. Within the two major cities Zaanstad and Amsterdam, Hembrug could offer an interesting alternative for those seeking a house. With the former mentioned elderly target group in mind, it is the idea to mix these young starters, families, and individuals together with the elderly. Together they will form a community, where people will focus on participation, hosting communal activities and help their elder neighbours. Whether it be small chores such as

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“Expected growth towards 2.6 million elderly above 75 in the Netherlands by 2040 (double as of today).”
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NU.NL - Article post: 9th of January 2019

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Demographic growth in the Netherlands

Self-reliance
Self-reliance is the ability of the elder to function independently and is in control of his/her daily life.

Centraal Bureau Statistiek, accessed on dec. 6th, 2018

https://www.ouderenfonds.nl/activiteiten/eenzaamheid
“How can the existing buildings of the Plofbos be transformed sustainably, where elderly can live more independently and which stimulates the settlement of a self-sustaining community?”
QUESTION

How did practical military design yield unintended qualities of a forest-village in Plofbos?

"How can the existing buildings of the Plofbos be transformed sustainably, where elderly can live more independently and which stimulates the settlement of a self-sufficient community?"
1.5 Program

Program definition

- ELDER, 65+
- FAMILY
- SINGLE ADULTS

ARTISANS’ WORKSHOP
- DRAWING,
- PAINTING,
- TAILORING,
- KNITTING,
- POTTERY,
- WOODWORK,
- FABLAB

CONTEMPLATION HALL
- COMMUNAL GATHERING
- MENTAL REFLECTIONING
- LECTURES
- WEDDINGS
- MEMORIAL SERVICES
- ART EXHIBITIONS

MIXED RESIDENCES

KANGAROO-HOUSING
ARTISANS’ WORKSHOP
- DRAWING,
- PAINTING,
- TAILORING,
- KNITTING,
- POTTERY,
- WOODWORK,
- FABLAB

GIARTRIC DOCTOR

READING

ARTISANS’ WORKSHOP
- DRAWING,
- PAINTING,
- TAILORING,
- KNITTING,
- POTTERY,
- WOODWORK,
- FABLAB
04 MASTERPLAN
1.7 **Position**

Design approach Pavilions in the woods

<table>
<thead>
<tr>
<th>Taets</th>
<th>Demolish</th>
<th>Preserve</th>
<th>Repair</th>
<th>Infill</th>
</tr>
</thead>
</table>

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Strategy for the Plofbos between fill Intervention Re-interpretation

Level of transformation
CREATING PLACES / LETTING PLACES BE
CREATING PLACES / LETTING PLACES BE

LETTING PLACES BE
1.9 The course of Hembrug

1900-2000

AGE OF MILITARY SAFETY

ARCHITECTURE
- SHELL-ROOF STRUCTURES
- SMALL SCALE
- FRAGMENTED
- RHYTHM OF GRID
- FORMAL OR EFFICIENT

NATURE
- CANALS (fire compartments)
- TREES (camouflage, shock-waves and natural cooling)
- EARTHEN WALLS (protect storage from explosives)
- OPEN SPACE (risk reduction)

ELEMENTS
- LIGHTNING CATCHERS
- PIPELINES
- WATER TANK

What was...
INTENDED DESIGN
- Practical
- Military
- Efficiency

What is...
UNINTENDED QUALITIES
- Natural
- Scenic
- Experience
AGE OF ECOLOGICAL AND SOCIETAL RESPONSIBILITY

ARCHITECTURE
- Elderly-proof typologies
- Communal facilities
- Medical assistance
- Small-scale ecological sight on green light
- Historical rhythm of orientation in-between space

NATURE
- Diversity of spaces (transition)
- Scents of the landscapes (memory stimulation)
- Trees
- Trail
- Benches
- Bridges
- Meeting points

ELEMENTS
- Pipeline energy network
- Re-use of grey water
- Solar gathering
- Heat storage
- Thermal comfort

What will be...
SUSTAINABLE INTERVENTIONS

Elderly proof
Self-supportive
Community
Ecological

1900
1950
2040
4.1 Kangaroo housing

Fig. 3.3 Schematic “care” according to the Kangaroo housing principle
Fig. 6.20 Concrete formwork

Fig. 6.21 Brick curtain wall

Fig. 6.22 Hollow drainage

Fig. 6.23 “Hollow” roof shells for drainage
4.1 Kangaroo housing

Base foundation of the existing situation

Adding a split level
Voids to pass on light to the lower levels

Further height differences for visual relations between the residences and pass on more light
4.1 Kangaroo housing

Two houses under one roof

Upper floor apartment for younger generation
110m²

Ground bound residence for elder occupant
100m²

Public control between younger generation (upstairs) and elderly (ground floor) through openings around circulation spots or voids (mainly kitchen and living)
Ground bound residence for elder occupant

100m

Upper floor apartment for younger generation

110m

Living room

Kitchen

Hallway

Stairwell

Patio

Balcony

Two houses under one roof

Public control between younger generation (upstairs) and elderly (ground floor) through openings around circulation spots or voids (mainly kitchen and living)
LACK OF SOCIAL INTERACTION

PRIVATE INFORMATION
ACOUSTIC BARRIERS
VISUAL RELATIONSHIPS (MOVEMENT/LIGHT)
PROVOCATION OF INTERACTION
VS
ANALOGUE CONTROL
STRUCTURE
Laminated timber beam bears the new load

Wooden column anchored into the existing foundation
CUTTING OPEN EXISTING WALL
Welded flange attached to an IPE180
2 - OPENABLE WHEN APPLICABLE

3 - FULLY OPEN; NO BORDER BETWEEN ZONING
THE KANGAROO HOUSING CONCEPT APPLICABLE TO MULTIPLE SHELL-ROOFED MODULES
KANGAROO HOUSING

THE KANGAROO HOUSING CONCEPT APPLICABLE TO MULTIPLE SHELL-ROOFED MODULES
05 THE CONTEMPLATION HALL
Contemplation Hall along the Draaibank
Lane of trees
Compactness
Transition zones “Border of trees”
Light; Scents/colour

Touch; tall grasses

Tall, wild, spacious woods. Undefined trail

“Lifted”; Umfassungs Weg
1.15 Contemplation Hall

Reflective roof coating
Ceiling Paint with a Granutale structure, reflecting more light particles.
DESCENDED CEILINGS
LECTURES
DINNER/
COMMUNAL GATHERING
DINNER/COMMUNAL GATHERING
FEAST/ORCHESTRY
CELEBRATION
1.16 Rain water principle/ shadow vegetation

Rainwater is eventually distributed back to the existing canals.

Height differences result in the sound of raindrops during cloudbursts.

- Fargesia robusta ‘Pingwu’
- Acorus gramineus ‘Ogon’
Directing accumulated rainwater within existing gutter.

Rain water distributes equally over the mounted green facade.

- ACORUS GRAMINEUS 'VARIEGATUM'
- FERN 'POLYSTICHIUM'

Monnikskap (Aconitum)
Longkruid (Pulmonaria)
Elfenbloem (Epimedium)
Kruipend zenegroen (Ajuga reptans)
Gebroken hartje (Dicentra)
Kerstroos (Helleborus orientalis)
Varen (Polystichum)
Hartlelie (Hosta)
Kaukasisch vergeet-me-nietje (Brunnera)
Salomonszegel (Polygonatum)
WALLFLORE FLEX
MATERIALISATION

REDUCED ACOUSTIC REVERBERATION

FLOOR HEATING

Stretch metal finishing  Floor heating/Stone tile finish  Room-dividing curtain
MATERIALISATION

INCREASED ACOUSTIC REVERB

Rusted corten steel
Brown brickwork gray seam
Natural stone (antracite)
How did practical military design yield unintended qualities of a forest-village?

“How can the existing buildings of the Plofbos be transformed sustainably, where elderly can live more independently and which stimulates the settlement of a self-sustaining community?”
QUESTION

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“How can the existing buildings of the Plofbos be transformed sustainably, where elderly can live more independently and which stimulates the settlement of a self-sufficient community?”
1.17 Program

Program definition

- ARTISANS’ WORKSHOP
  - DRAWING,
  - PAINTING,
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  - MEMORIAL SERVICES
  - ART EXHIBITIONS
- MIXED RESIDENCES
- KANGAROO-HOUSING

ELDER, 65+
FAMILY
SINGLE ADULTS
CAFE/RESTAURANT
- HORECA
- MUSIC
- YOGA/TAI-CHI
- READING
- ORGANISING EVENTS

ARTISANS’ WORKSHOP

READING

CONTEMPLATION HALL
- COMMUNAL GATHERING
- MENTAL REFLECTIONING
- LECTURES
- WEDDINGS
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- ART EXHIBITIONS

GIARTRIC DOCTOR

KANGAROO-HOUSING

GARDENING

FAMILY RESIDENCES

- COMMUNAL GATHERING
- MENTAL REFLECTIONING
- LECTURES
- WEDDINGS
- MEMORIAL SERVICES
- ART EXHIBITIONS
Collective solar gathering

Central Heat pump installation (Ketelcentrale Hembrug)

Kangaroo residence

Heat exchanging unit

Heat pump

Electrical heating boiler

Insulated water network through Hembrug Ø200mm

Heat exchanger

COLLECTIVE SOLAR GATHERING

Solar electricity collected through collective roof surfaces on Hembrug

Water storage

(Winter)

Water storage

Collective solar gathering

Heat acumulated during summer

Collector solar gathering

Central Heat pump installation (Ketelcentrale Hembrug)

Kangaroo residence

Heat exchanging unit

Heat pump

Electrical heating boiler

Insulated water network through Hembrug Ø200mm

Heat exchanger

COLLECTIVE SOLAR GATHERING

Solar electricity collected through collective roof surfaces on Hembrug

Water storage

(Winter)

Water storage
Water storage heat accumulated during summer.

Collective solar gathering

Central heat pump installation (Ketelcentrale Hembrug)

Kangaroo residence

Heat exchanging unit

Heat pump

Hot water used by floor heating + radiators

Insulated water network trough Hembrug Ø200mm

Electrical heating boiler

Heat exchanger
Insulation from the inside. Target: $R_c$ between 4/5 m$^2$K/W
Service block including:
- Heat recovery unit (air treatment unit) (600x800x800)
- Electronic heating boiler
Floor heating

in combination with hot air heating

Communal gathering (toevoer):
Bezettingsgraad 180m² / 3,3 = 54 personen
Ventilatieluchthoeveelheid: 216 dm³/s
Toelaatbaar geluidsniveau: 2 m/s
omzetten naar m³/s 0,216 m³/s

0,216 / 2 = 0,108 m²
= 1080 cm²

π x straal² = 1080
1080 / π = 344
Straal luchtkanaal: √344 = 18,5 cm

Diameter: = 37 cm
A site that initially acted as a production zone of explosive material and military test location, now houses a large Black box in the hearth of the Hembrug terrain. During the construction in 1991, earthen walls, canals and trees were replaced for a practical production hall. However, the activity in this building only operated until 2003, when the Hembrug terrain closed its operations. The building has not been in use until January 2014 when a variety of project developers transformed the former production hall into an Art and Event Hall. Up to today the building facilitates the most diverse events, from design fairs, multi-day company events, product presentations, car shows, conferences, fashion shows, and staff parties, to intimate get-togethers, atmospheric dinners, meetings, lunches, concerts and television recordings. Divided over three unique buildings that are connected through a glazed walkway, the Taets Art and Event park totally combine 10,000 square meters of floor space area. Combined with the open space in between the three units, Taets offers the opportunity to provide event space for up to 7,000 to 12,000 persons.
Observations Taets Black Box (building 1).
- Spacious interior, therefore highly practical for event based activities.
- Steel load bearing structure and metallic façades material potentially re-useable.
- The Black Box disturbs the structure of the northern part of Hembrug (free standing buildings at a distance from each other, surrounded by forest and sometimes earthen walls).
- Both scale and architecture do not fit in with the context.
- Architectural layering of the Black Box is incoherent with the surrounding ensembles.
- Low cultural historical significance.
1.18 **Morphological density 2050**
Afval Energie Bedrijf (AEB)
Fig. 6.24 Roof principle: slated roof (580mm h.o.h.)

Fig. 6.25 Structural wall thickness

Fig. 6.26 'Amsterdamse paalfundering'
1.19 **Reflection room**

Phototropism
The growth of an organism in response to a light stimulus. (Greek; “tropos”: turning)

Humans respond to light both physically and mentally. We orient our vision and move towards brighter spaces by nature.
BORDER OF ROTATED STRUCTURES
DEVIATION FROM ORTHOGONAL GRID PLANNING
ROTATED STRUCTURES
WILD FOLIAGE
HIDDEN, SECLUDED PLOTS

IDYLLIC HEART
HISTORIC MONUMENTS
ORNAMENTED BRICKWORK ARCHITECTURE
CANALS AND BRIDGES
HEART OF THE ENSEMBLE

TRANSITION ZONE
CONTRAST FROM INDUSTRIAL ATMOSPHERE
STRUCTURED PATTERNS OF TREES

THE LADDER
DENSE
COMPACT
LARGE SCALE STRUCTURES

THE WATERFRONT
FORMAL, PRESTIGIOUS ARCHITECTURE
FACE OF THE NORTH-SEA CANAL
1.20 Sequences

INTO PLOFBOSS

STRUCTURES VS NATURE

LANE OF TREES

TOWARDS THE EXIT

INTO THE FOREST
Earthen wall/shell roof

Head of the Axis

Compactness

Nature vs Taets

Head of the Axis

Into Noordzeekanaal
Design situation old

Height accent in the Plofbos
Loss of character
Design situation new