A Barrier Building Complex

Living Over The Sea

Delta Interventions Studio, Architecture
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Index

• Context
  • Fascination
  • Design
What we suffered

A new inlet cut across coastal Mantoloking, New Jersey by Hurricane Sandy
What we appreciated
What we want to do for it

Civil engineering proposals
Risk Reduction System for the whole watershed

Multi-purpose dike + new inlet + barriers
New Inlet 500m Wide

Multi-purpose dike

Inlet for more water exchange during normal conditions

Storm surge barriers (Close during storms)

New Inlet 500m Wide
Index

- Context
- Fascination
- Design
Rain, Steam, and Speed - The Great Western Railway
1844, Joseph Mallord William Turner
What is the relationship between civil engineering, architecture and waterfront?

• How does civil engineering give influence to architecture and vice versa?

Ancient Rome; Agrippina Landing with the Ashes of Germanicus
1839, Joseph Mallord William Turner
Research Questions

- What is the relationship between CIVIL ENGINEERING, ARCHITECTURE, and WATERFRONT?

- How to REBUILD THE CONNECTIONS for different needs?
- How do CIVIL ENGINEERING and ARCHITECTURE influence each other?
- What is the typical difference between OUTER BARRIER and INNER BAY?
  - How to INTEGRATE these three aspects?
The Four Elements
From Rational to Poetic
Surge Barriers — **Structure/Defense**

- Thames
- Eastern Scheldt
- Ramspol
- Hull
• Bridges — Path/Traffic
- Buildings—Dwellings
Sea — Platform
Habitable Bridges Typology Studies

From Medieval Times To The Eighteenth Century

Activity

Low

High Activity

Defence

Monumental

Dwellings

Platform

Traffic

The bridges of these two time periods mostly had the purpose for defence and trading. They had less interface with the water and more internal "street" lives which were embraced by the buildings. They sometimes had openings in the middle.

The forms of this periods were mostly symmetrical. The buildings were seperately built on the structures, but people would take into considerations of the accordance to the piles and arches.

Monumental / Religious?
Index

• Context
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New Inlet 500m Wide

Storm surge barriers (Close during storms)

Inlet for more water exchange during normal conditions

Multi-purpose dike

New Inlet 500m Wide
Original condition

Single Houses

Parking

Beach

Federal Own Land
Current Road System

Bridge

Main Roads
New inlet

Inlet
500m
From Rational to Poetic
• Civil engineering

• Surge barrier
• Civil engineering + Transportation

• Surge barrier + Bridges
• Civil engineering + Transportation + Architecture

• Surge barrier + Bridges + Buildings
- Civil engineering + Transportation + Architecture + Nature

- Surge barrier + Bridges + Buildings + Sea
• Barrier – Repeating Sluices
• Traffic
• Building
• Waterfront
Symmetric Arch
Repeating Sluices
What is the relationship between civil engineering, architecture and waterfront?

• What is the critical difference between inner-bay area and the outer-dike beaches?
Scale comparison

- Case study: Eastern Scheldt storm surge barrier

- Water Depth
  - Eastern Scheldt: 14m
  - Jamaica Bay New Inlet: 4m

- Sea floor
Case study: Eastern Scheldt storm surge barrier

Scale comparison

- Water Depth
  - Eastern Scheldt: 14m
  - Jamaica Bay New Inlet: 4m

- Altitude
  - Eastern Scheldt: 11.5m
  - Jamaica Bay New Inlet: 3m
Scale comparison
Scale comparison

1500 m

35m
10m

500 m

16m
3m

Eastern Scheldt

Jamaica Bay
New Inlet
• Barrier
• Traffic – **Separated Speeds**
• Building
• Waterfront
Paths of three speeds

**FAST**
--- Passing through: Fast driving

**MEDIUM**
--- Sightseeing: Slow driving, Biking, Jogging

**SLOW**
--- Wandering: Slow biking, Walking, Riding

**0 SPEED**
--- Staying: Sitting, Swimming, Fishing, Napping
30s

3min~30min

1h~3h
Two connections
One Connection (Barrier)
Fast Speed Bridge
- Barrier
- Traffic
- Buildings – Outside and Inside
- Waterfront
Target groups:

- Residents (365 days/year)
- Short stay tourists (holiday seasons)
- Local people (weekends)
- Function users (shopping, swimming, sailing, sightseeing)
- Passers-by (less than 1 hour)

They come here for what?

The Sea View
Target groups:
- Residents: (365 days/year)
- Short stay tourists: (holiday seasons)
- Local people: (weekends)
- Passers-by: (less than 1 hours)

They come here for what?

The Sea View
Programs

- Regular units
  - Parking Garage: 10000 m²
  - Retail shops: 10600 m²
  - Apartments: 12960 m²
  - Public “windows”: 5000 m²
  - Supplementary functions: 1000 m²

- Free spaces
  - Waterfront spaces
  - Recreational center
  - Barrier Museum
  - Free routes
  - Rooftop space: 18000 m²
Programs

- **Regular units**: Parking Garage 10000 m², Retail shops 10600 m², Apartments 12960 m², Public “windows” 5000 m², Supplementary functions 1000 m²

- **Free spaces**: Waterfront spaces, Recreational center, Barrier Museum, Free routes, Rooftop space 18000 m²
Strong repetition – Section study
Outside and inside

- Sea level limits

- 500-year flood level +5.79m
- 100-year flood level +3.96m
- High tide +1.89m
- ±0
- Sea floor -4m
Outside and inside

- The gestures:

Defensive
Outside and inside

- The gestures:
Outside and inside

“Peace through strength”
Waterfront
Apartments
Open side
Commercials
Traffic layer
Closed Side

Sea

500-year flood level +5.79m
100-year flood level +3.96m
High tide +1.89m
±0.00m

Sea floor
Core extended from sluice

Truss for 15m span

Separating wall
Outside and inside
The choices of windows – Outer sea side
Outer seaside - Double façade
Outer seaside - Double façade
Outer seaside - Double façade
Outer seaside - Double façade
The choices of windows – Inner bay side

- First layer
The choices of windows – Inner bay side

- Second layer
The choices of windows – Inner bay side

- Third layer
• Barrier
• Traffic
• Building

• Waterfront design – Natural Curves
Waterfront

Possibilities: How to connect the two sides
Waterfront

Possibilities: How to connect the two sides
Change of the depth
What is the relationship between civil engineering, architecture and waterfront?

• What are the integrated parts of these three aspects?
PV Cell Roof
Thank you!