

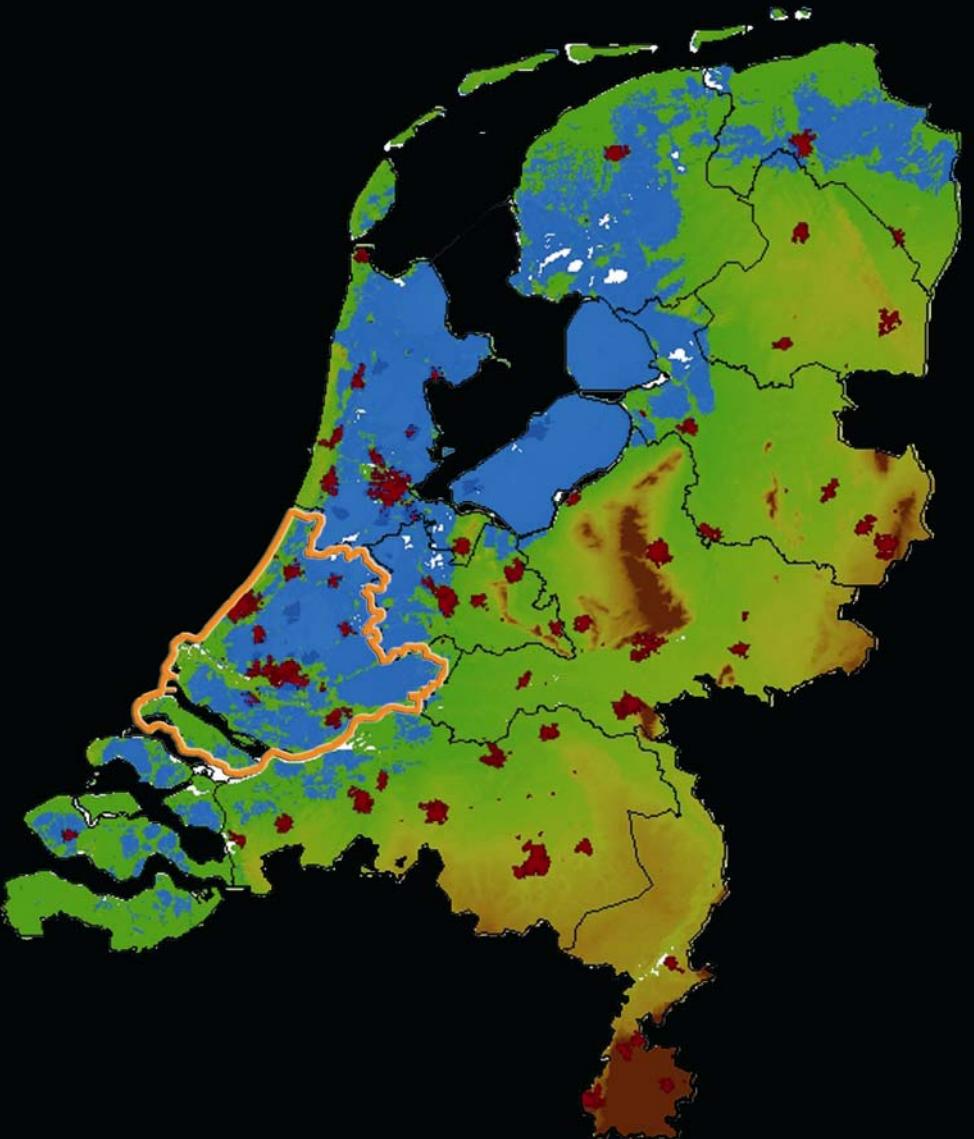
towards a climate proof development of one
of the deepest polders in the Netherlands

Adaptation Lab Zuidplas Polder

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Alterra-Wageningen
University

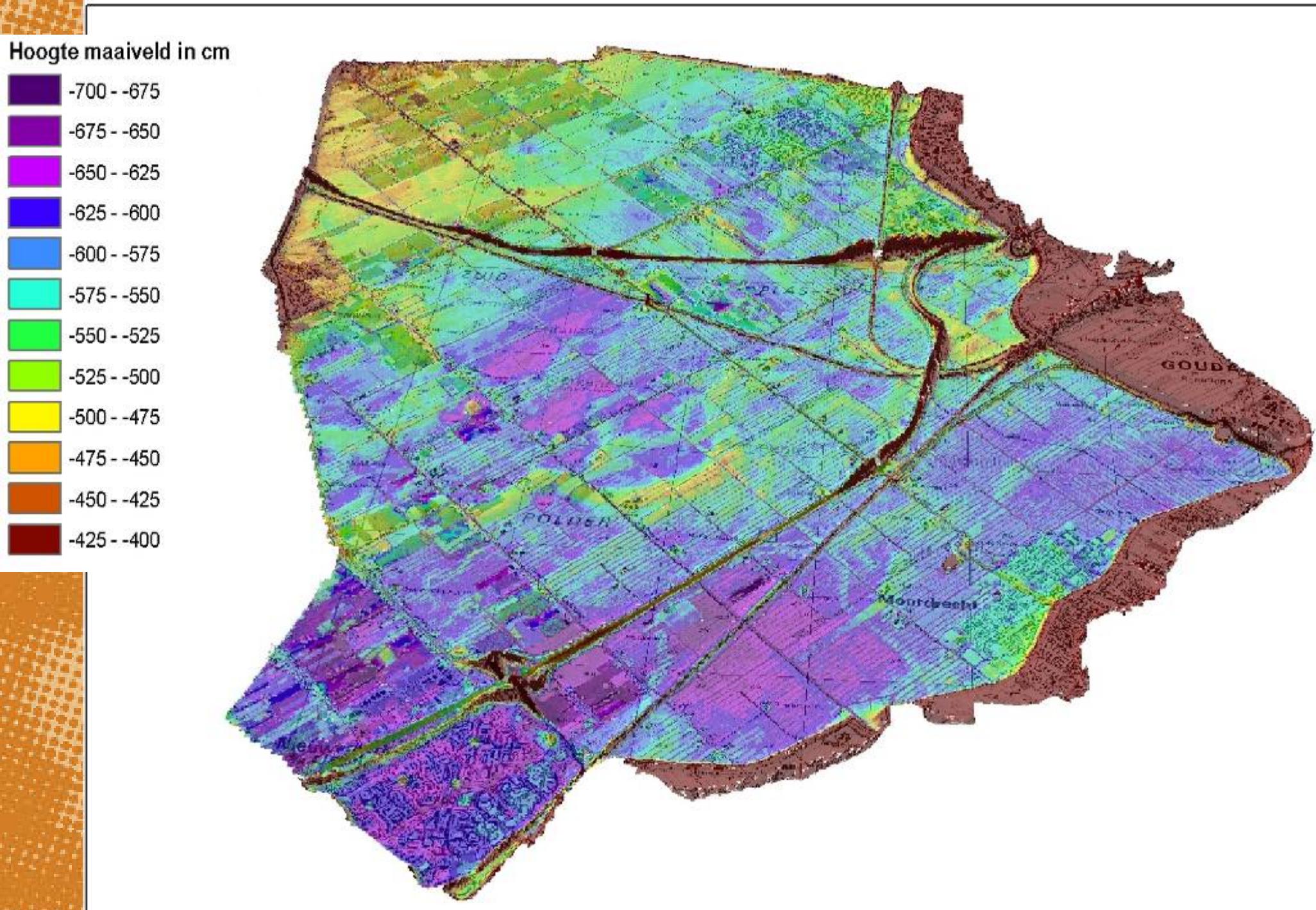


15.000 – 30.000 Houses
280 ha Greenhouses - Horticulture
110 ha Industrial
400 ha nature and recreation



Location

Province of South Holland



Political pressure

Hotspot

Klimaatverandering: PvdA twijfelt aan bouwen in Zuidplaspolder
donderdag 22 maart 2007

De PvdA twijfelt of er massaal woningen moeten worden gebouwd in de Zuidplaspolder bij Gouda. Volgens de regeringspartij is het tijd de plannen voor 20.000 tot 30.000 woningen (tot 2020) in dit diepste putje van Nederland te heroverwegen vanwege de klimaatverandering. „In Nederland worden grote bouwplannen in de planstudiefase zelden afgeschoten. Het adagium is beter iets dan niets. Wij hebben liever niets dan iets slechts”, aldus PvdA-Tweede Kamerlid Roos Vermeij in het vakblad Cobouw van woensdag. Wegens de discussie over het klimaat, het water en de extra bescherming die bepaalde gebieden nodig hebben, „Is het bij nader inzien wel verstandig of moeten we de plannen nog eens tegen het licht houden?”. (Bron: ANP)

Lees het hele artikel

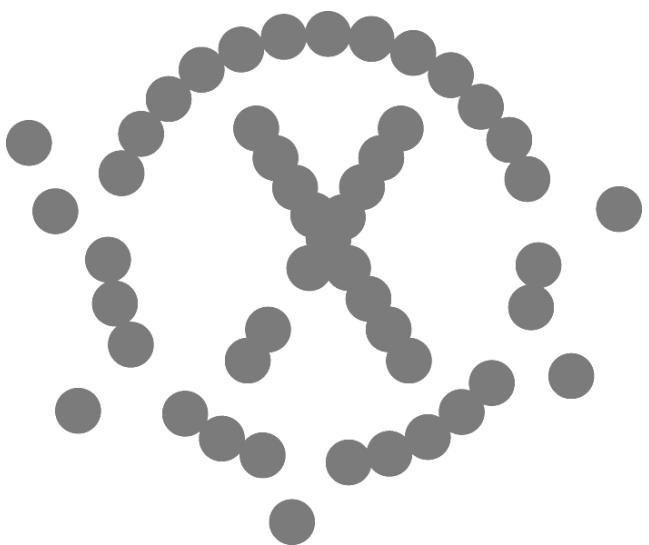
Bouwen op het laagste punt

Dit weekend kreeg ik de stelling voorgelegd: ‘alles overwege...’ Wij zijn het eens met deze stelling, D66 vindt het onverstandig te bouwen terwijl het grondwater verder zal stijgen en de bodem verder zal inklinken. In Zuid-Holland staan het behoud van natuur- en watergebieden en een schoon milieu de combinatie van te weinig woningen, toenemende economische bedrijvigheid en steeds volgebouwd. Dat gebeurt nu te snel en te makkelijk. Woningbouw en bedrijventerreinen zijn nodig, maar D66 kiest ervoor om eerst naar slimmere oplossingen te zoeken. Ook voor bedrijventerreinen moet eerst gekozen worden voor het aanleggen van nieuwe bedrijfsterreinen. Het bebouwen van de Zuidplaspolder gaat ten koste van de natuur. D66 vindt dat een slechte zaak. Economische groei is belangrijk, maar onze welvaart kan nu eenmaal niet zonder welzijn. En natuur is een belangrijke pijler voor het welzijn van alle Zuid-Hollanders. Wat ons betrifft biedt de Zuidplaspolder een unieke locatie om verder te ontwikkelen tot een natuurgebied met veel water, waarin gefietst en gewandeld kan worden.

- Lab for science and policy interaction
- Within the Government of the province of South Holland, cofinanced by the CCsP programme
- www.xplorelab.nl



Xplorelab



-Hotspot Zuidplaspolder:
*National programme of
Climate Changes Spatial Planning*

Second opinion on the Zuidplas plans



HOW CAN WE EVALUATE COSTS AND BENEFITS?

ALTERNATIVES An economic cost-benefit study focuses on valuing the environmental effects of climate adaptation in the area. At least three alternatives are evaluated: Reference situation, Baseline, and Damage reduction.

COSTS Adapting to climate change has associated costs, e.g. for flood protection, infrastructure, climate damage costs, landscape fragmentation, and ecosystem loss.

MCA Multi-criteria analysis (MCA) is performed to analyze the effectiveness of adaptation measures, to incorporate non-priced effects of adaptation, and to check if the ranking of alternatives depends on the method used.

BENEFITS Adapting to climate change has also benefits, e.g. reduced risk of flooding, increased connectivity, the development of new nature and water areas and reduced energy demand.

RISK ZONING The polder can be divided in separate areas according to the level of protection against floods. The level of protection is given to the unpopulated areas as well. These areas are given the highest level of protection.

GREEK RIDGES Deposition of sand and sediment on peat land can cause the land to subside. New houses can be built on more stable parts of the creek ridges. This reduces the exposure to floods and heavy rainfall.

FLOOD RISK Simulations of floods occurring from the sea, major rivers and smaller streams results in vulnerability maps. By adding potential damage to these maps risk maps are defined.

HEAVY RAINFALL Frequency and intensity of heavy rainfall events will increase. The Global Climate Model (GCM) is used to calculate inundation levels and potential damage resulting in ranges of damage costs.

WATER BUFFER Areas for freshwater storage can be built. This is useful in case of drought. The irreversibility of (peat) soils pose a challenge in the design of the storage area. Breaking up of the soils may result in the release of saline groundwater affecting the buffer.

ESCAPE ROUTES Infrastructure should be built on older to adapt to escape routes. At the same time dividing the polder into smaller ecological zones. Another option is to protect existing infrastructure from floods through the construction of dams.

WATER QUALITY Sea level rise increases a seepage flux of brackish water into the polder by 4.5%. Salt intrusion from rivers leads to a salt load of 30%. Periods of freshwater shortage may occur. Adaptation measures must be planned in such a way that it facilitates the migration of species.

ECOLOGY Temperature rise leads to increasing migration of species. The development of new nature (300 ha) in the Zuidplaspolder will be planned in such a way that it facilitates the migration of species.

WHAT ARE THE IMPACTS OF CLIMATE CHANGES?

Xplorelab
CLIMATE CHANGES SPATIAL PLANNING

Hotspot Zuidplaspolder

ELEVATION LEVEL

>> NL | ELEVATION MAP OF THE NETHERLANDS: MOST OF SOUTH HOLLAND IS BELOW SEA LEVEL

>> ZH | ELEVATION MAP OF SOUTH HOLLAND: THE ZUIDPLASPOOLDER IS THE DEEPEST POLDER OF THE COUNTRY

>> ZZP | ELEVATION MAP OF THE ZUIDPLASPOOLDER: THE NORTH PART OF THE POLDER IS ABOUT 2 M HIGHER THAN THE SOUTH PART

SPATIAL PLANNING

>> NL | SPATIAL POLICY AT THE NATIONAL LEVEL: THE ZUIDPLASPOOLDER IS ASSIGNED FOR URBAN DEVELOPMENT, GREENHOUSE AND BUSINESS DEVELOPMENT

>> ZH | SPATIAL POLICY AT PROVINCIAL LEVEL: SOUTH HOLLAND AND THE ZUIDPLASPOOLDER

>> ZZP | MASTERPLAN OF THE ZUIDPLASPOOLDER (ZSP) DEVELOPED BY THE JOINT MUNICIPALITIES, THE WATER BOARD AND THE PROVINCE

CLIMATE CHANGES

Global climate models
Regional climate models for Europe
Dutch historic measurement series

Change of global mean temperature and air circulation above Europe
Influence global mean temperature and air circulation on the Netherlands

Sea level rise and change in wind

Scenarios for the Netherlands
G+, G, W+, W

Scenarios | CLIMATE SCENARIOS FOR THE NETHERLANDS (KNMI, 2006)

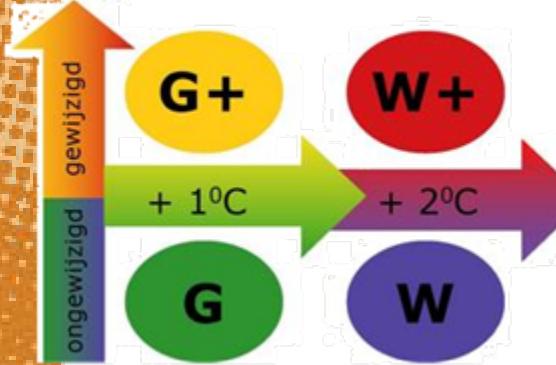
Scenarios | SCENARIOS USED IN THIS STUDY TO IDENTIFY REGIONAL/LOCAL CLIMATE CHANGE IMPACTS



= THE ZUIDPLASPOOLDER CLIMATE PROOF?

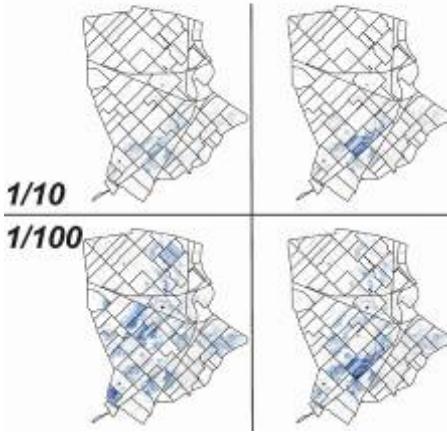
provincie HOLLAND

Luchtstromingspatronen



KNMI'06 W-Scenario

ZPP ISP



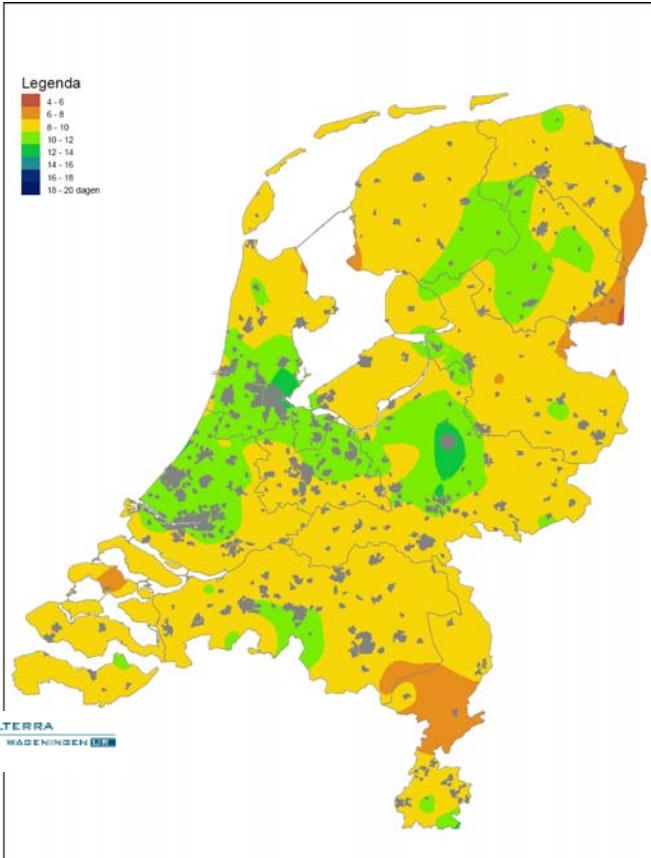
AUTOREFERENTIE

Storm water

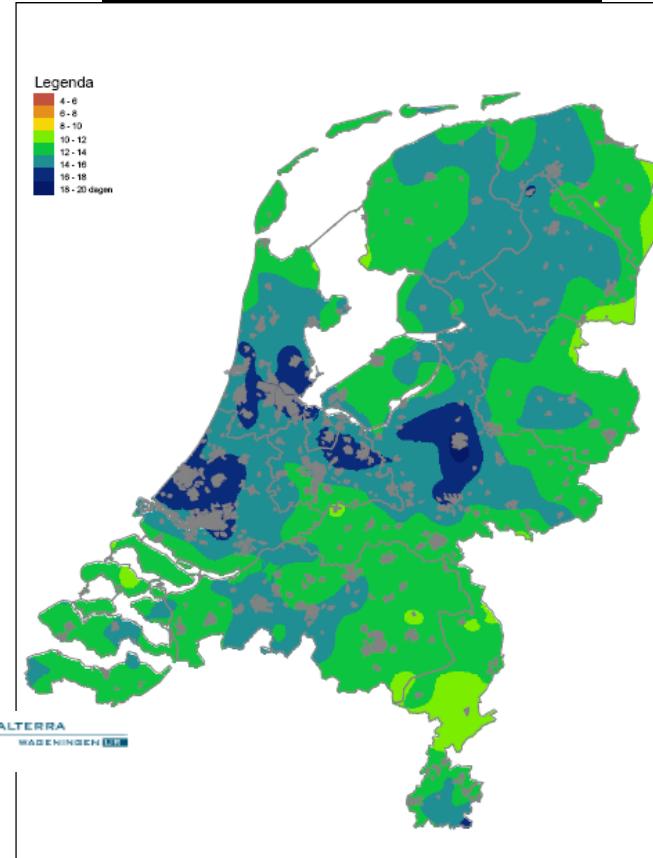
Peakrain summer:	2050	2100
Midden WB21	+10%	+20%
KNMI-06 Gematigd	+13%	+27%
KNMI-06 Gematigd +	+5%	+10%
KNMI-06 Warm	+27%	+54% +54%
KNMI-06 Warm +	+10%	+20%

Peak rainfall

(av. # days/yr with > 15 mm rain)



Current situation

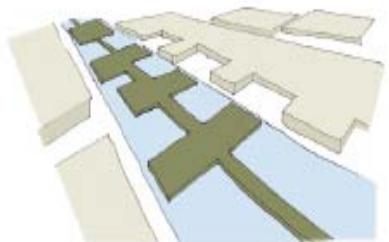


KNMI W-scenario 2100

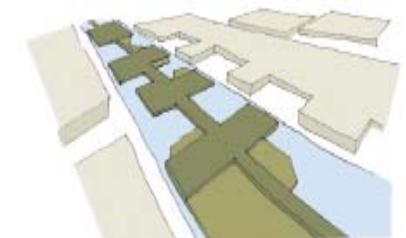
Design

housing
with water storage

Impressie verschillende maaiveldniveaus



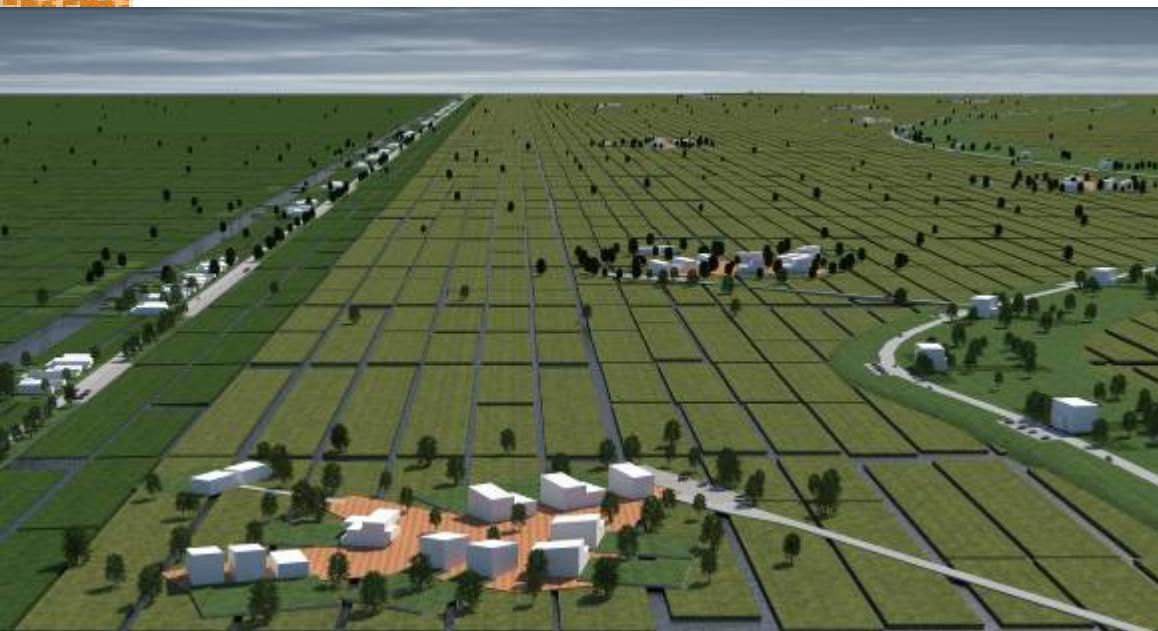
Situatie bij een peilstijging groter dan 0,5 m
(herhalingstijd > 100 jaar)



Situatie bij een peilstijging tot 0,5 m
(herhalingstijd 25 jaar)

Situatie zonder peilstijging

Provincie Zuid-Holland

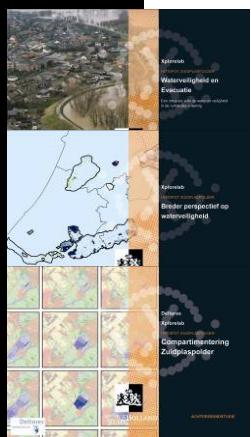
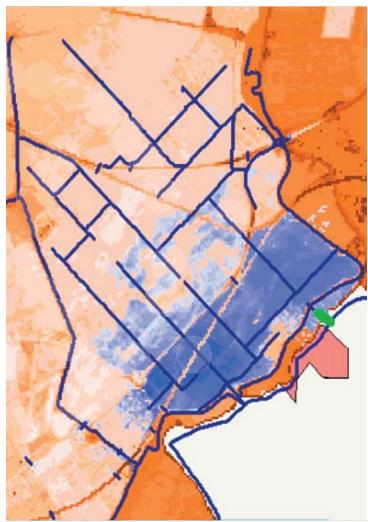
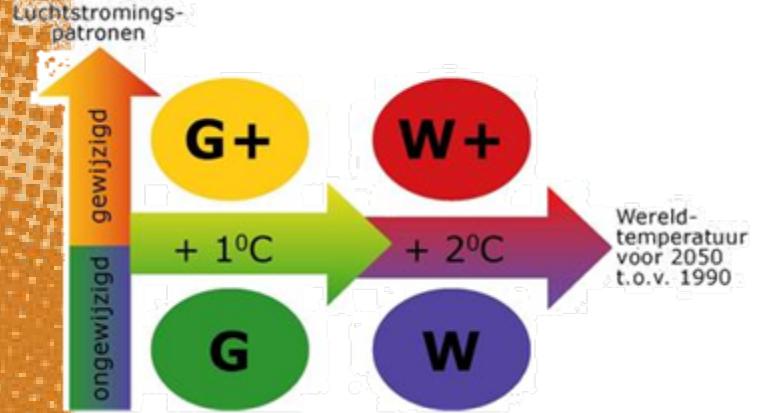


Design

'Floating houses', water storage



Xplorelab | provincie Zuid-Holland



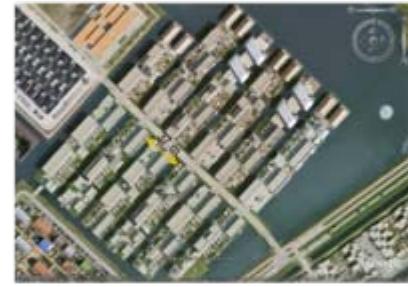
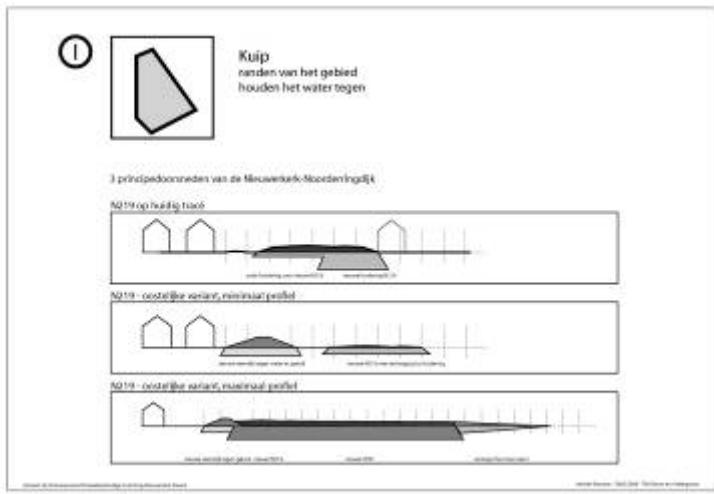
Flood Safety

Sea level rise:	2050	2100
Midden WB21	+20 cm	+50 cm
KNMI-06 Gematigd	+15 – 25 cm	+ 35 – 60 cm
KNMI-06 Gematigd +		
KNMI-06 Warm	+ 20 – 35 cm	+ 40 – 85 cm
KNMI-06 Warm +		

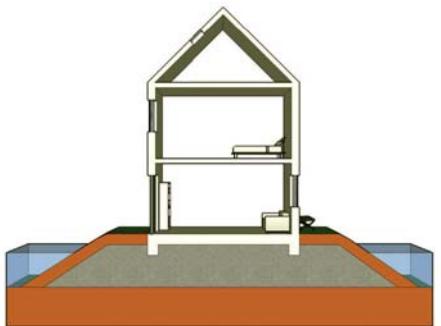
Storm Surge Barrier 1954



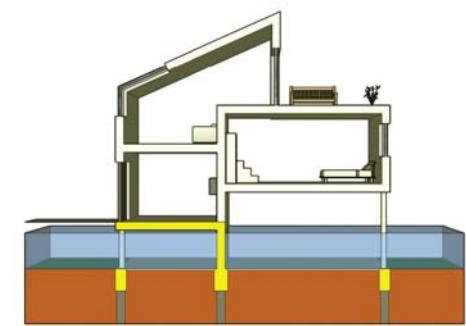
Design: Alternative ways of building preparation, flood compartments



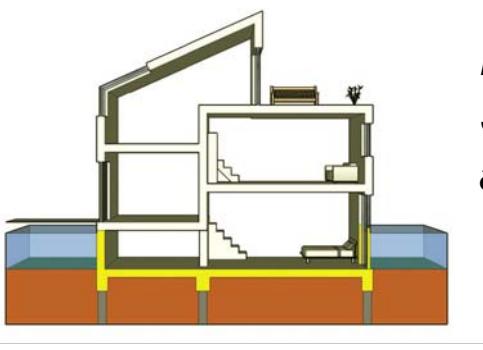
nd



raise: Terp



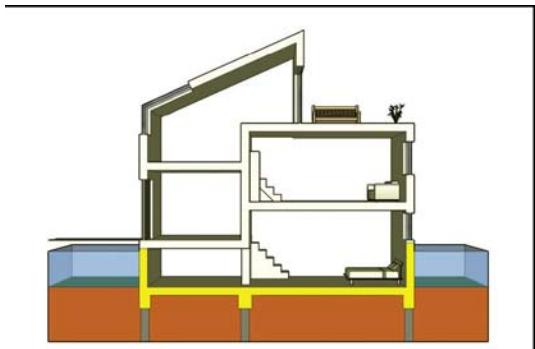
*Wetproof:
splitlevelhouse*



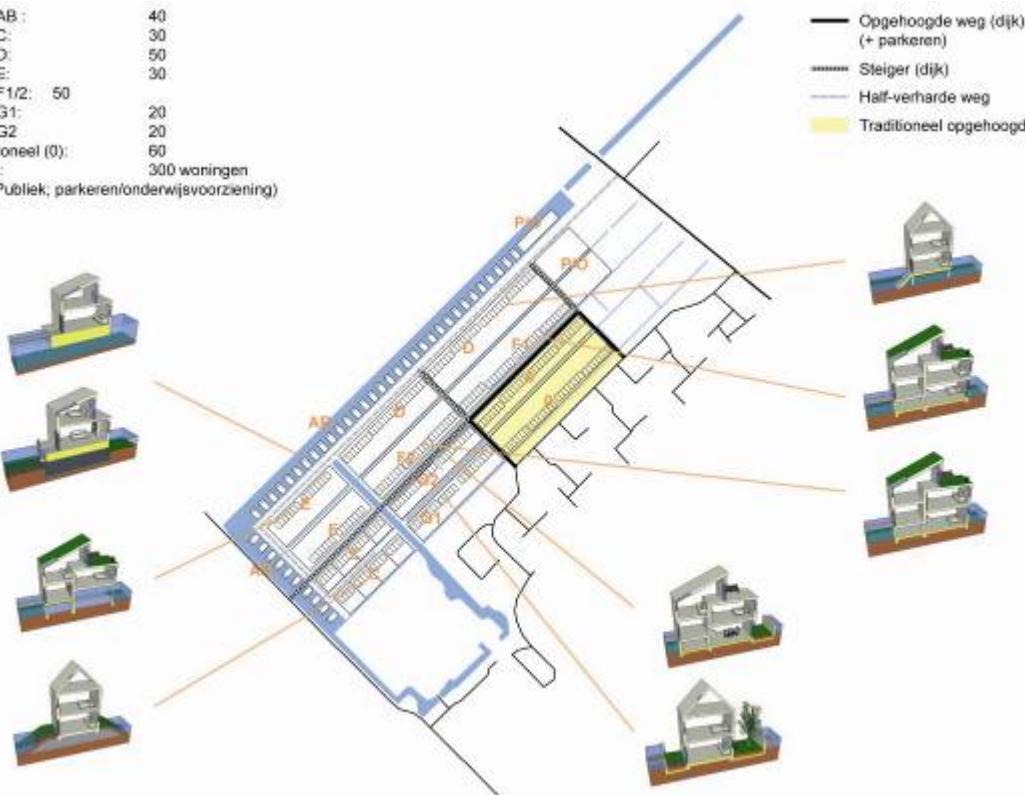
*Dryproof:
Splitlevel with
aquariumglass*

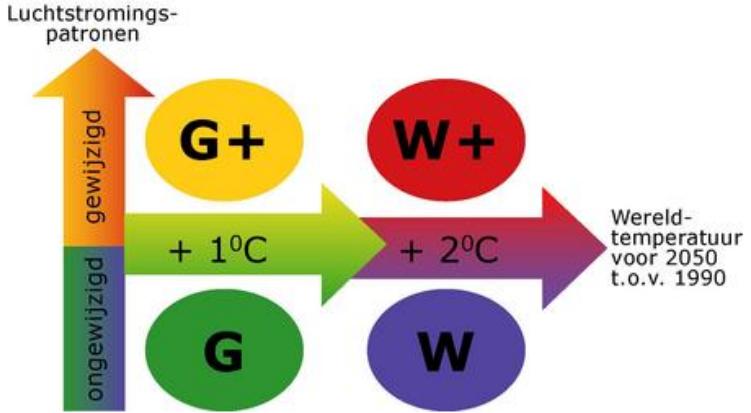
Type AB :	40
Type C:	30
Type D:	50
Type E:	30
Type F1/2:	50
Type G1:	20
Type G2	20
Traditioneel (0):	60
Totaal:	300 woningen
P/O (Publiek; parkeren/onderwijsvoorziening)	

Design: Water proof housing



*Dryproof: Splitlevel with
waterproof walls*





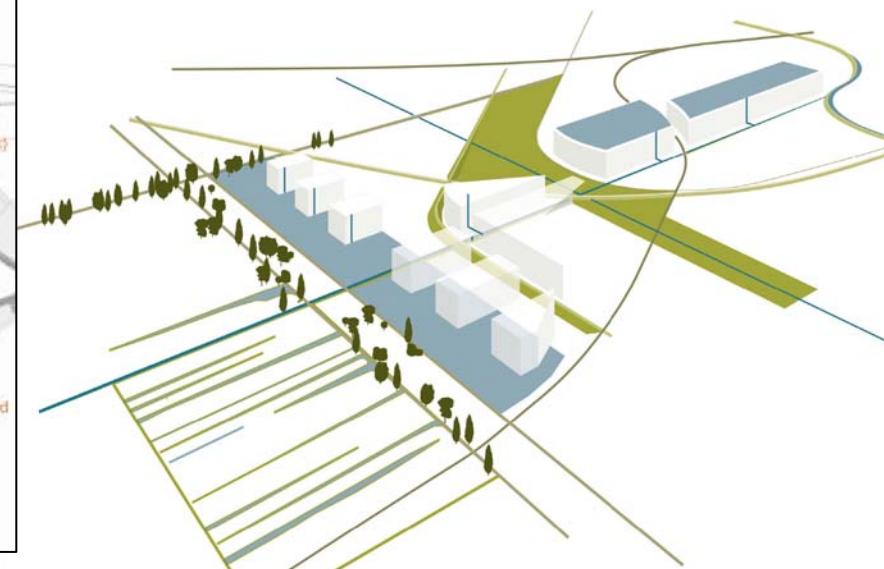
Drought: fresh water deficits

Rain deficit summer:	2050	2100
Midden WB21	+ 1%	-
KNMI-06 Gematigd	+ 3%	+ 6 %
KNMI-06 Gematigd +	- 10 %	- 19 %
KNMI-06 Warm	+ 6 %	+ 12 %
KNMI-06 Warm +	- 19 %	- 38 %

Nature and water storage



Measures for a climate resilient nature and water storage



Cost Benefit Analysis



Adaptation options	Nett present value (in mln €)
Water storage in urban area	-20
Alternative building preparations and flood compartments	28
Flood proof houses	-20
Additional nature/wetland areas	50

Results presented to the Dutch minister for Housing and the Environment



3 June 2009: 24 milion euros
extra for a climate proof ZPP

- An Adaptation Lab brings Science-Policy together
- Cyclic approach to Impact and Design
- Close to the planning and policy making world
- Include market parties (developers, building engineers)
- Visualizations
- Interdisciplinary
- Leave the ‘predict then act’ principle: adaptation is not reached through more data alone

Lessons learned

