System analysis, Source-Path-Receptor approach

Project KIJK (water authority HHSK)

The flood protection assignment

- Nearly 60% of The Netherlands is vulnerable to flooding
- Most of Dutch population in that area
- Climate change and land subsidence
- Flood Protection Programme (the execution department of the Delta programme) keeps The Netherlands safe
- Project KIJK is one the 300 projects

Source (1)

- Tidal river connected to North Sea
- Wind
- Precipitation in the area or upstream with high discharge
- Climate change worsens effects
- Land subsidence 1,1 cm/yr

Source (2)

Floodplains (2,1km)
By using the strength of floodplains in calculating the safety of the dike.

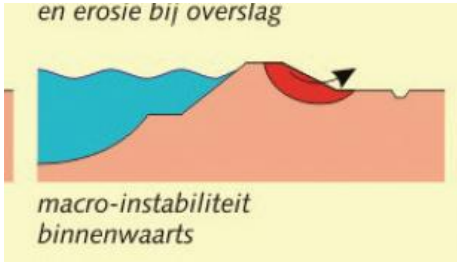
Dike
Next to traditional solutions, innovative techniques (like nails) or advanced calculation tools are possible.

The Hollandse IJssel
By lowering the maximum water level by closing the Storm Surge Barrier earlier in time when extreme weather is predicted.

Storm Surge Barrier
By optimizing the failure probability of the Barrier.

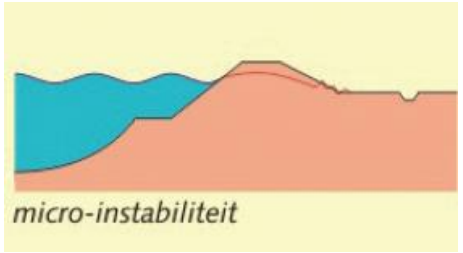
Polder
By minimizing the impact of a flooding (water retention area) or by reinforcing a secondary flood protection.

Pathway (1)



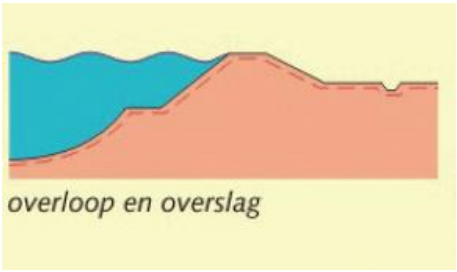
landward macro-instability

riverward macro-instability

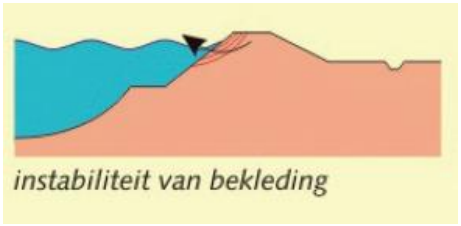


micro-instability

Failure mechanisms project KIJK



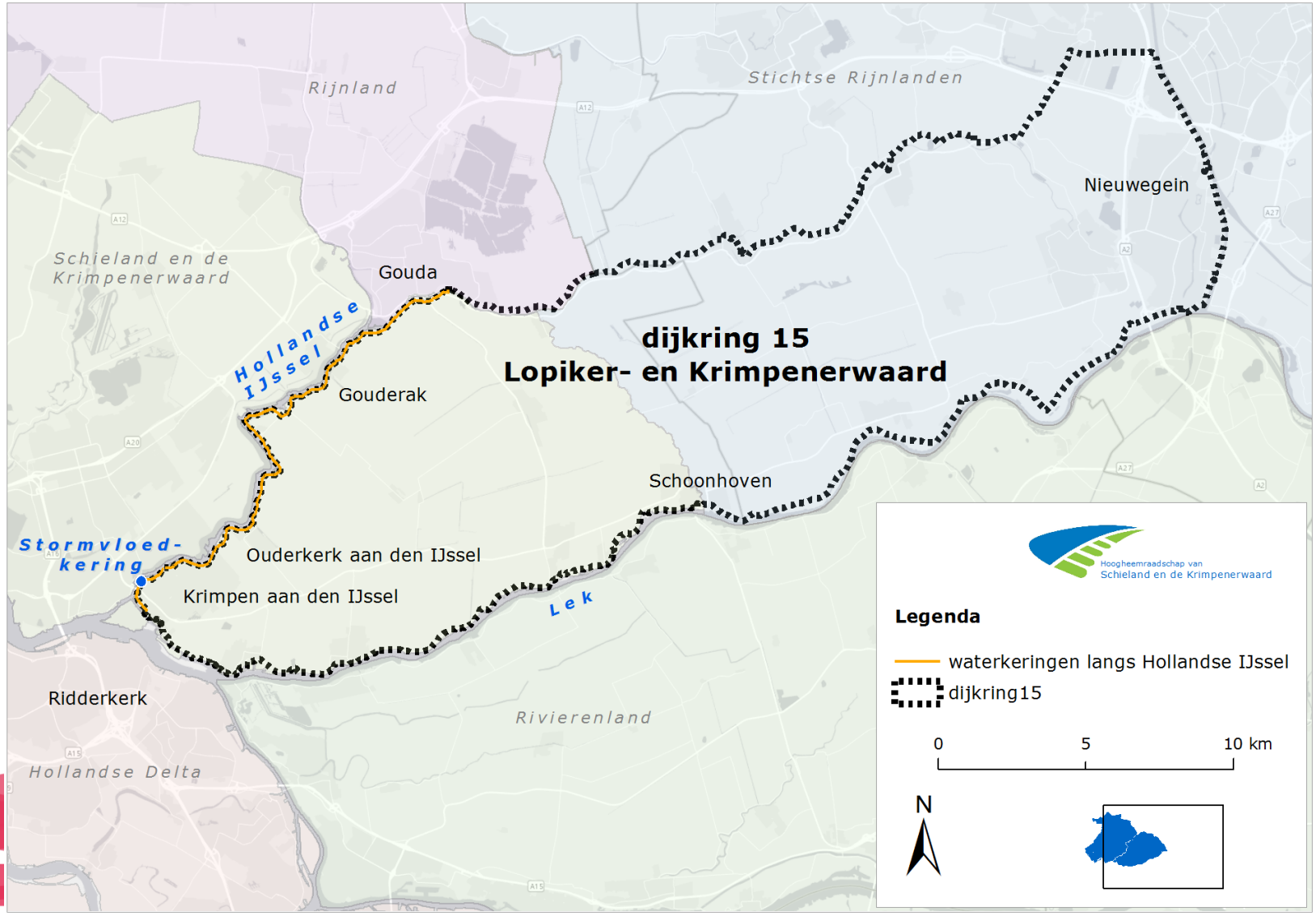
wave overtopping and wave run-up



revetment instability (top soil layer)

floodplain instability

Receptor (1)


Rijnland
Stichtse Rijnlanden
Nieuwegein
Schieland en de Krimpenerwaard
Gouda
Hollandse IJssel
dijkring 15
Lopiker- en Krimpenerwaard
Gouderak
Schoonhoven
Stormvloed-kering
Ouderkerk aan den IJssel
Krimpen aan den IJssel
Lek
Ridderkerk
Rivierenland
Hollandse Delta
Hoogheemraadschap van Schieland en de Krimpenerwaard
Legenda
waterkeringen langs Hollandse IJssel
dijkring15
0
5
10 km
N

Receptor (2)

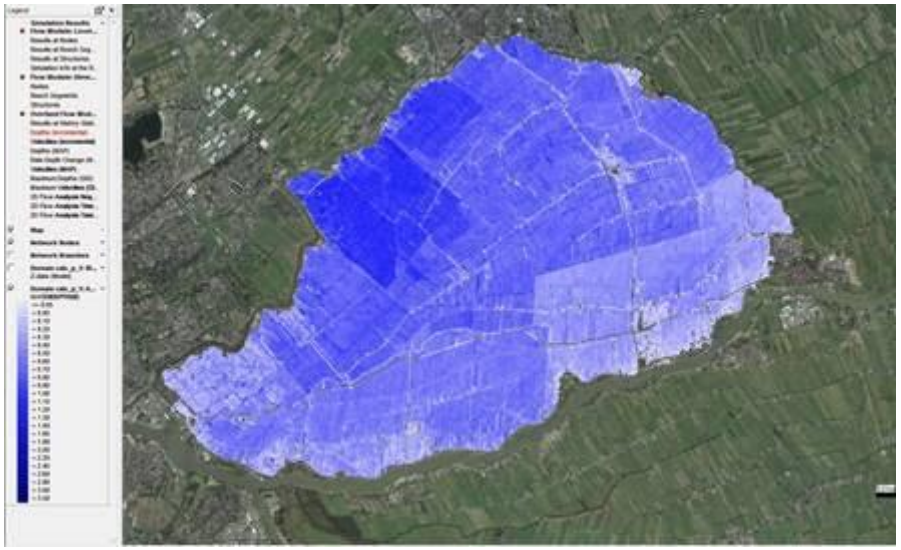
Flood protection assignment

- Total of 10,15 km (red line)

Human environment

- 740 buildings
- 3 villages
- Many monuments
- Heavy traffic

Receptor (3)



This means…