



**Ilperveld Integraal**



Provincie  
Noord-Holland



Gemeente Landsmeer

# **Ilperveld**

## **Implementing sustainable aftercare in the former landfill Ilperveld, Landsmeer, The Netherlands**

*M.J.M. Rozing (Bodemzorg),  
C. Vrouwdeunt/M. Hensens (Province Noord-Holland)*

***Conference Natural Cap 21 april 2011***





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## Programme

### **Caroline Vrouwdeunt/Michel Hensens:**

- Introduction to the project
- Challenges and Complexity
- Results – Lessons Learned



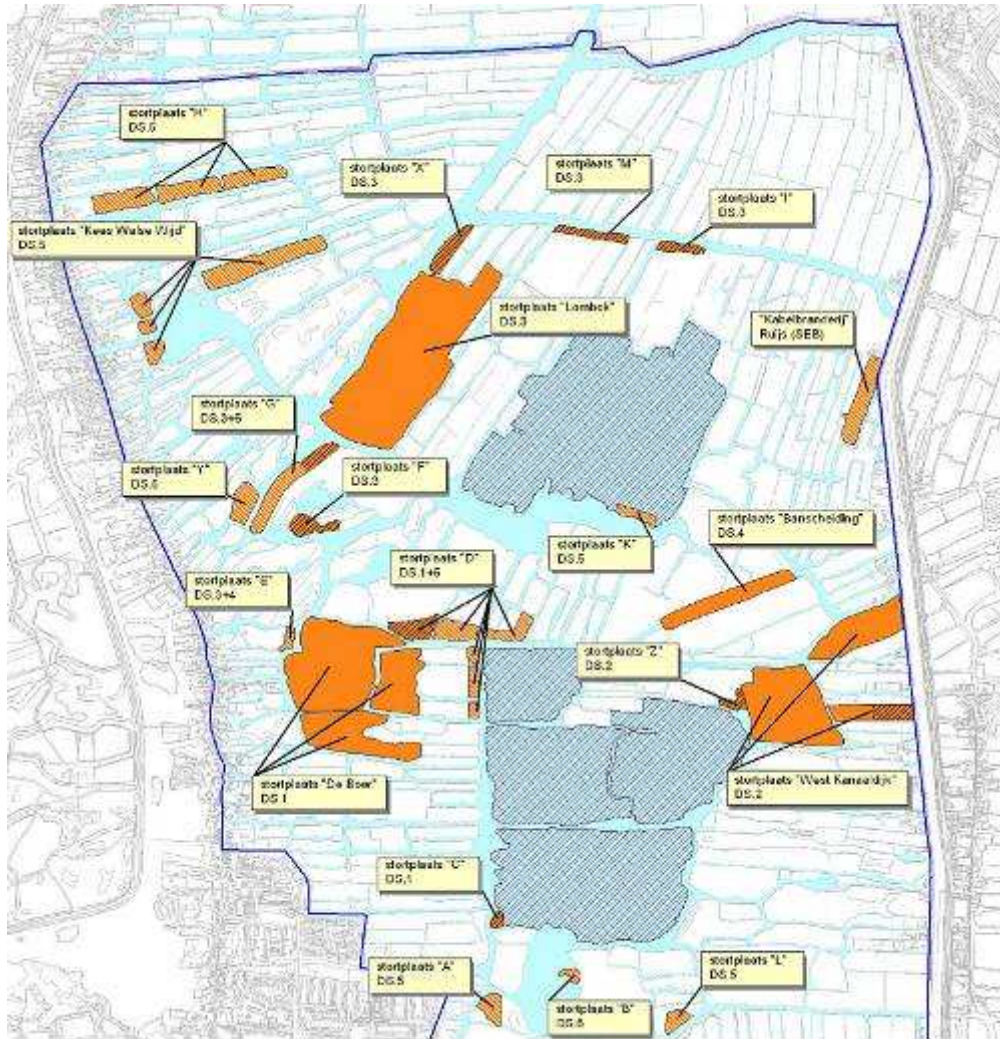
### **Marcel Rozing:**

- Aftercare



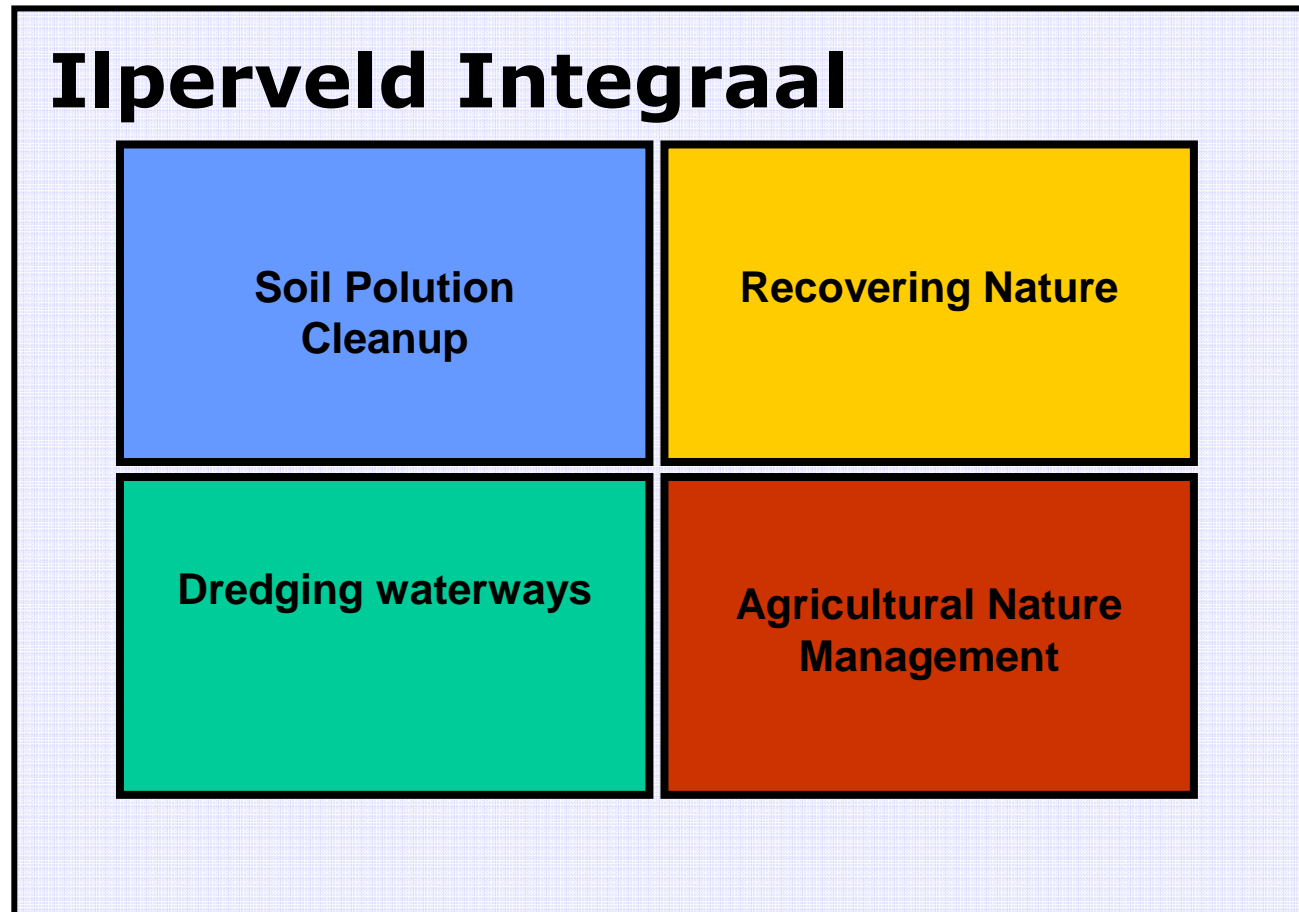


# IJperveld Integraal



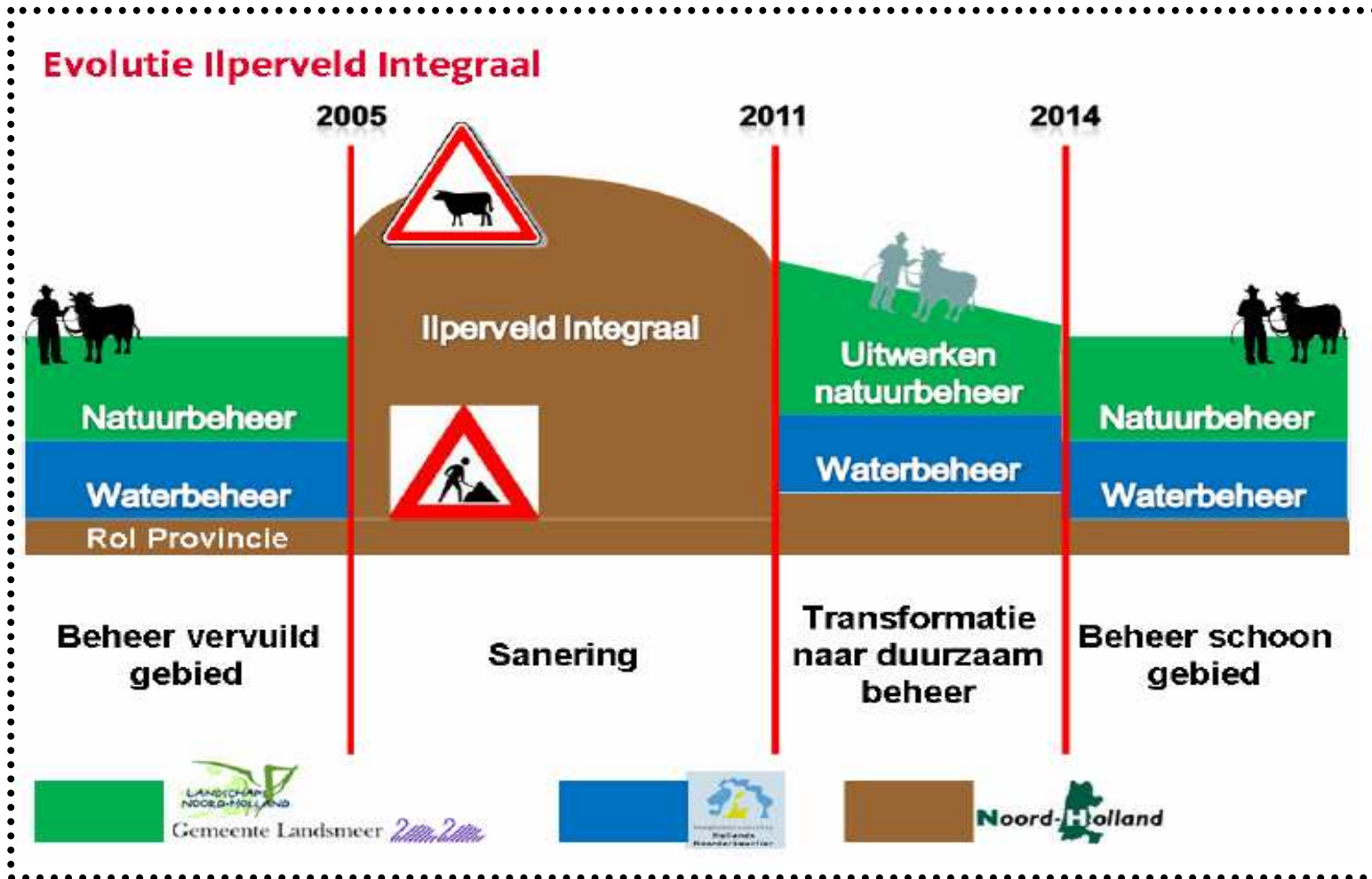


# The project goals – integrated approach





## Projectevolutie

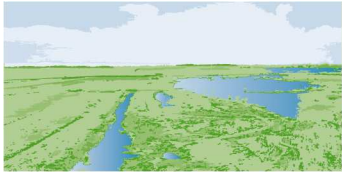




## Technical challenges in soil cleanup

- Landfills with unknown content
- Polluted soils around landfills
- Asbestos
- Polluted sediments
- Undeep water due to sediments
- Non-polluted sediments
- Delicate ecological balance
- Soil rich in nutrients
- Former salt marsh, now brakish water





# Ilperveld Integraal





**Ilperveld Integraal**



Provincie  
Noord-Holland



**1963**



**WASTE**



# Ilperveld Integraal

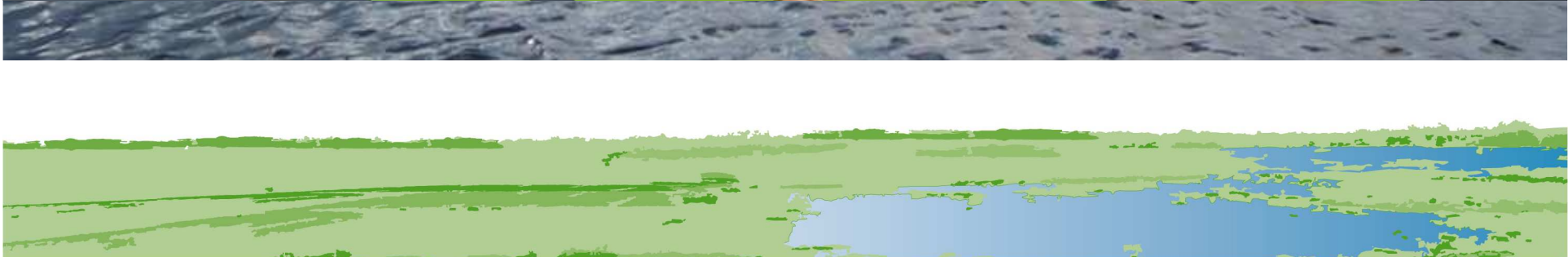




Ilperveld Integraal



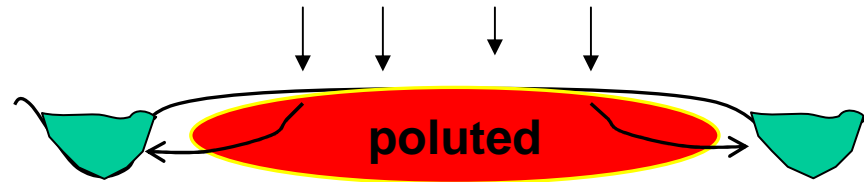
# Nature



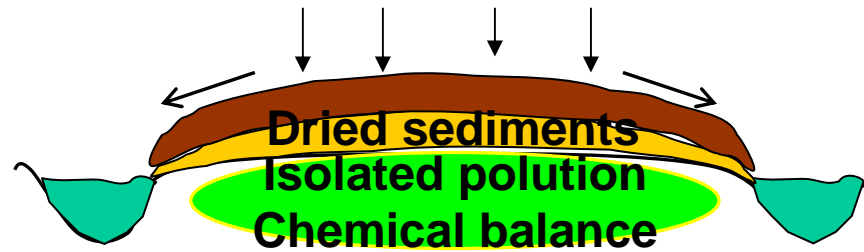


# Method of isolation

**Before**



**After**





# Ilperveld Integraal





# Ilperveld Integraal





# Ilperveld Integraal



2007



# Ilperveld Integraal



2009





# Ilperveld Integraal





# Ilperveld Integraal





# Ilperveld Integraal





# Ilperveld Integraal





# Ilperveld Integraal





## **Project complexity**

- Social Project
- Soil pollution cleanup within the boundaries of nature conservation





## Results and Lessons Learned

- End user at the design table
  - agricultural nature management integral part of process through participation of Landschap N-H, enduser
- Budgetting the Project including Aftercare, Management and Maintenance after project delivery





# Organisation Aftercare Marcel Rozing

- Province Noord-Holland - Authority
  - Bodemzorg – Aftercare organisation
  - Landschap Noord-Holland – Agricultural and nature management
  - Hollands Noorderkwartier – Waterboard
- fixed in Aftercare plan





# Aftercare plan

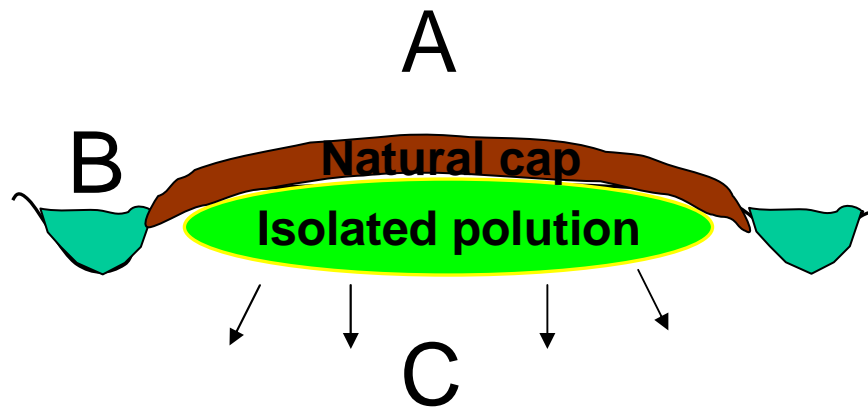
## *Main Goal:*

Maintenance of the aftercare measures  
to prevent for human  
and ecological risks





# Aftercare measures



- A. Natural cap – human and ecological exposure
- B. Bank protection – influence surface water
- C. Migration of groundwater pollution and chemical balance





# Hypotheses

A. Exposure risks are prevented by natural cap

Aftercare :

- measurements of thickness of natural cap layer
- Maintenance of the natural cap layer





# Hypotheses

**B.** Influence on surface water is prevented by bank protection



Aftercare :

- Regular inspections of the bank protection
- Inspection of bank erosion (also under water level)





# Hypotheses

C. Migration of groundwater pollution will not take place

Aftercare :

- No measures
- Monitoring groundwater quality
- Control of the chemical balance (anoxic)





## Aftercare has focus on preventing risks

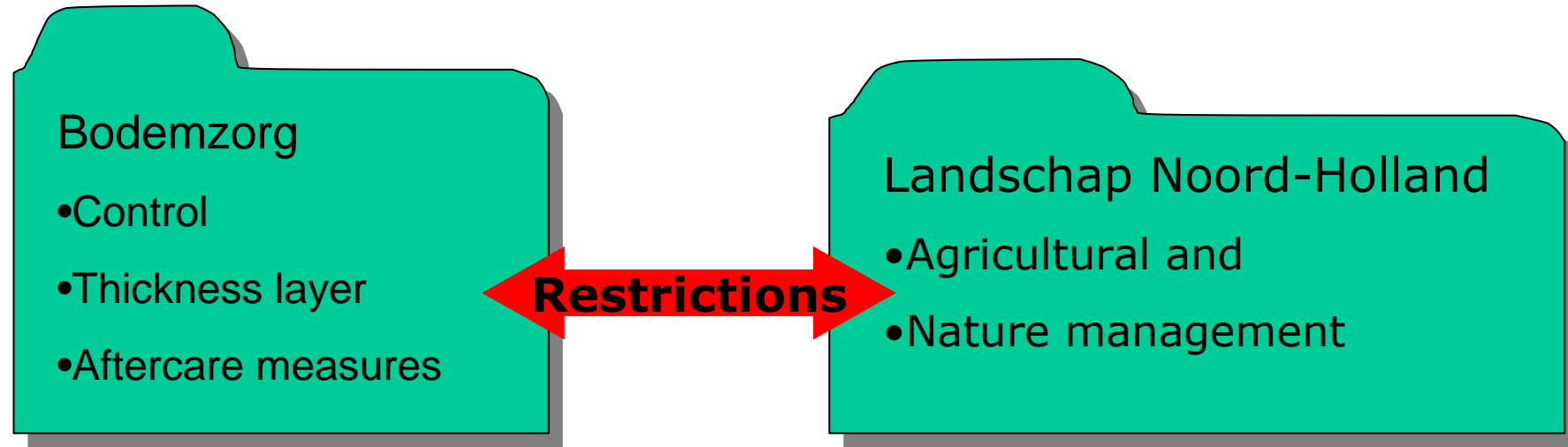
Inspections and measurements are necessary to notice risks in time

→ *measures can be made in time*

Risks are also prevented by :

- Maintenance
- Restrictions towards the use of the location





- Restrictions made for depth of digging or groundwaterlevel
- Landschap Noord-Holland is free in their agricultural and nature management within this restrictions



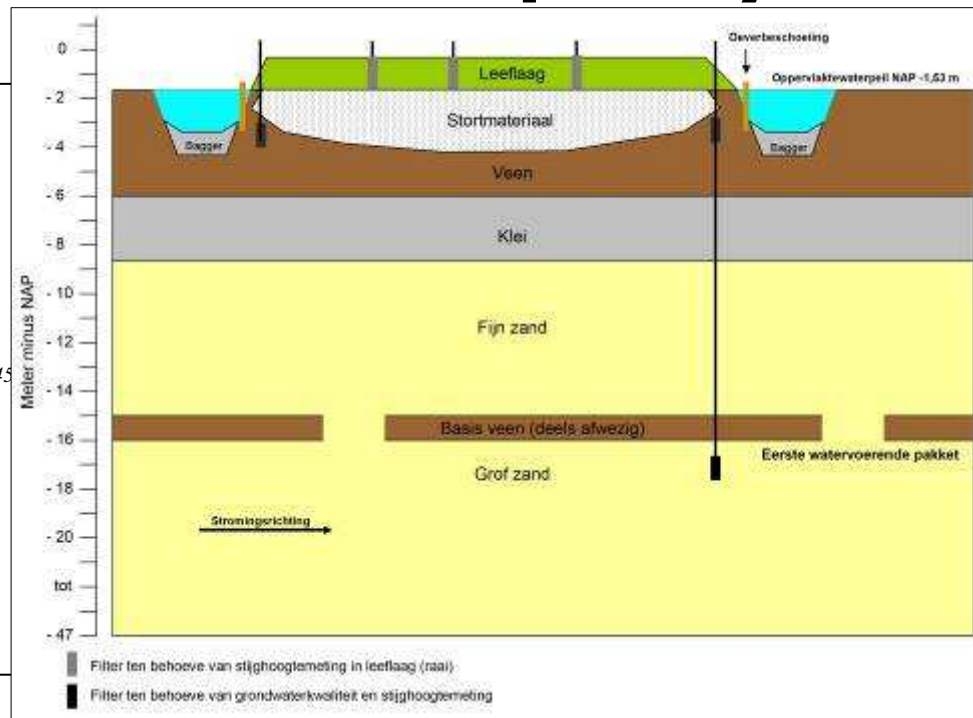
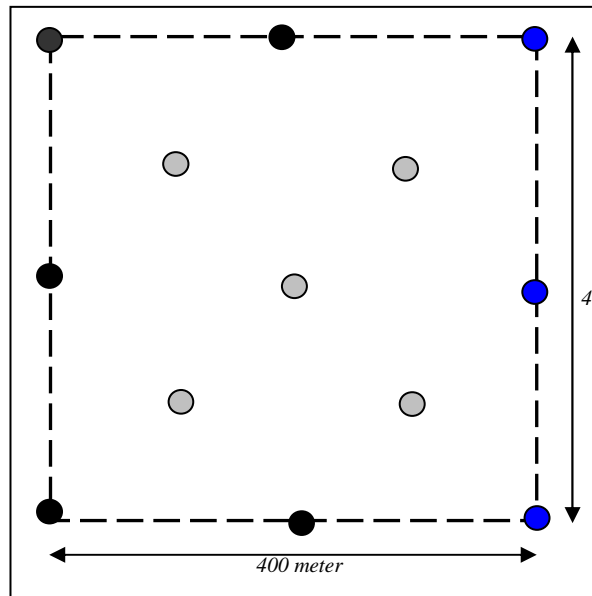


# Measurement thickness natural cap





# Monitoring groundwater quality



- Process in natural cap/influence on aquifer
- broad range of analysis (macro/micro)

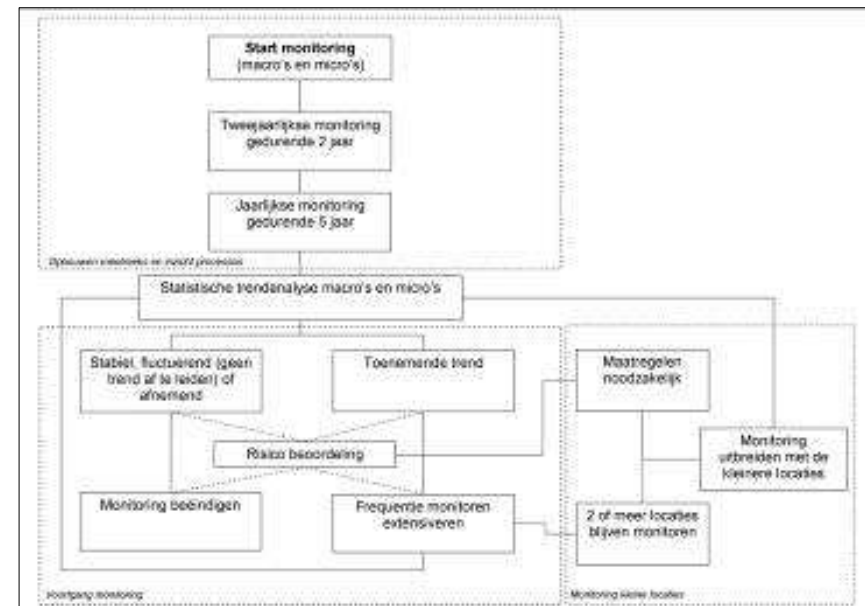




# Decision models

Made for different aspects:

- Ending of monitoring
- Monitoring on the small locations
- Need for suppletion of the layer
- Handling calamities





# Sustainable aftercare

