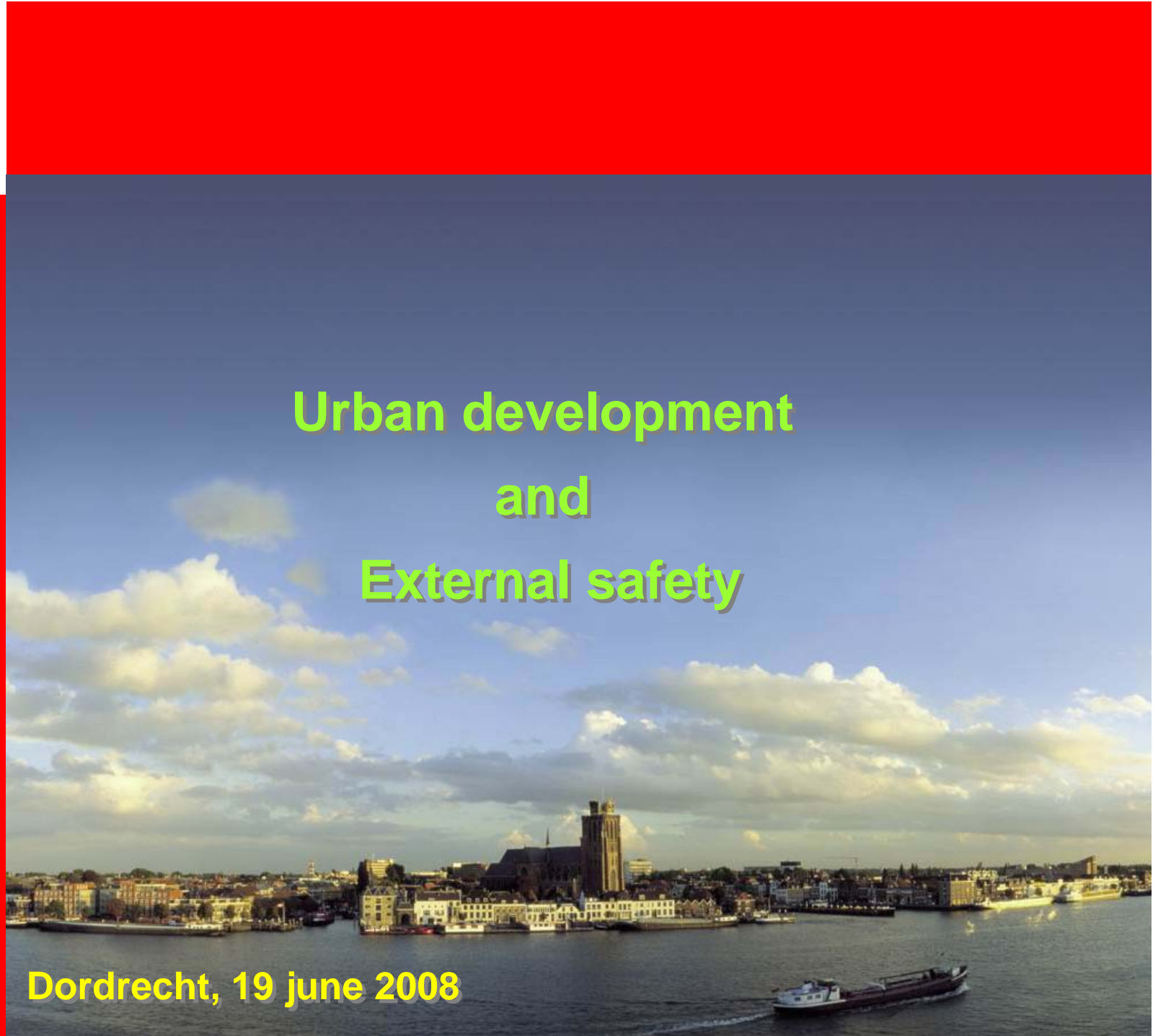


Dordrecht



# Urban development and External safety

**Dordrecht, 19 June 2008**





## Introduction: Dordrecht

- Largest city of the Drechtstedenregion
- Dordrecht :120,000 inhabitants
- Drechtstedenregion: 250,000 inhabitants in total
- Oldest city of Holland (dates from 1220)

Dordrecht



## Historical centre of Dordrecht





Dordrecht





## **Dordrecht: junction of infrastructure**

- **Roads:**
  - **A16 (Antwerpen – Gent, Zuid-Europa)**
  - **N3 (Tunnel bypass for dangerous goods)**
- **railroads**
  - **Rotterdam Germany / Belgium**
- **Waterways**
  - **Rotterdam Germany / Belgium**

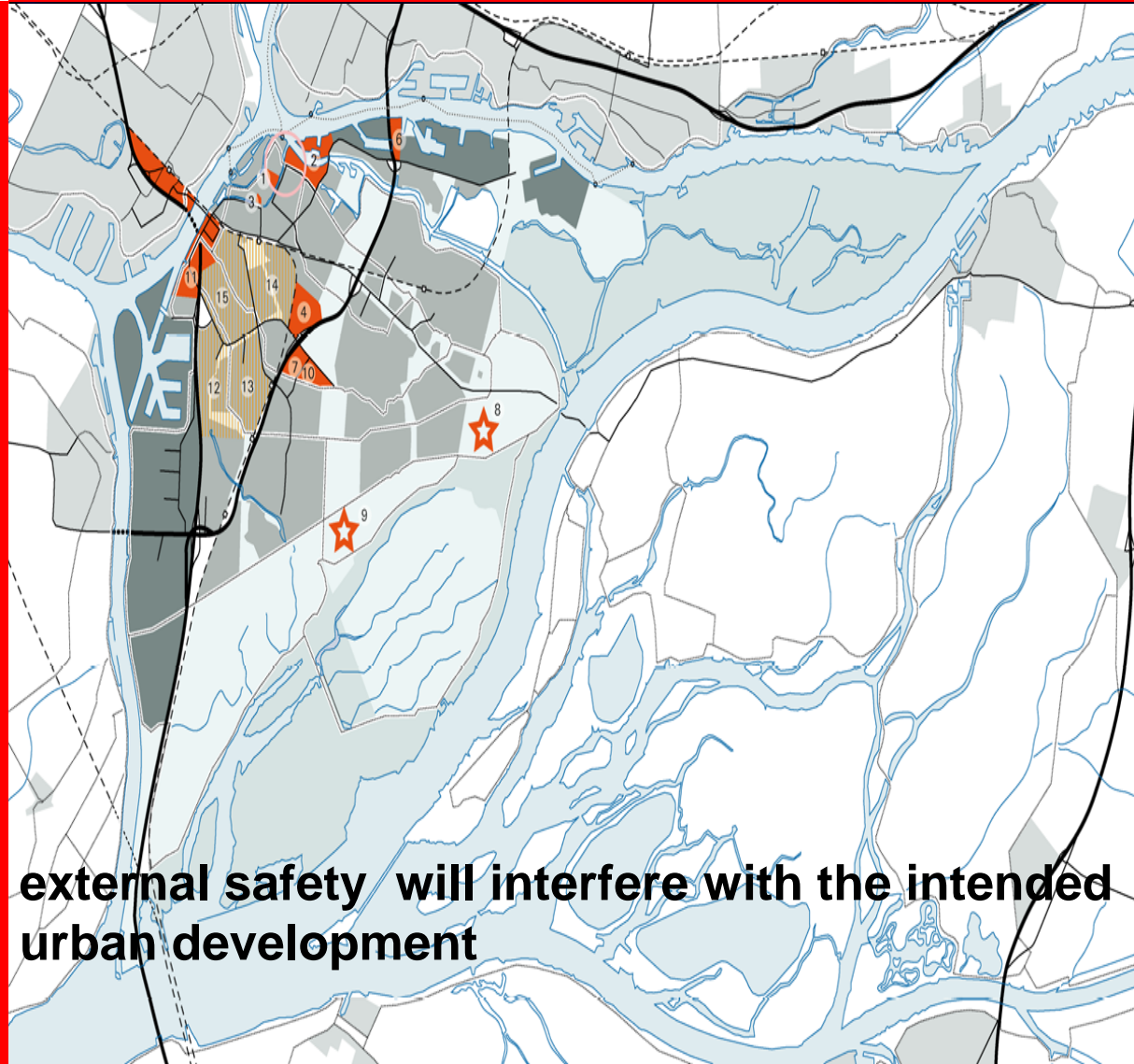


## Ambitions Dordrecht/Drechtsteden

- Economic, intensive and sustainable use of the available space
- Compact urban areas with high quality living environments
- Reinforcement of the economical potential
- Improvement of environmental conditions
  - External safety
  - Air pollution
  - Noise pollution



# Dordrecht 2020



- BRUISENDE BINNENSTAD
  1. Hofkwartier
  2. Wantijplein
  3. Achterom/Bagijnhof
- Nieuw Rondje Dordrecht  
Openbare parkeergarages??
- STERKE KENNISECONOMIE
  4. Leerpark
  5. Topinstituut Waterbouw en Ecologi  
Andere kansen voor hoger onderwijs?
- LEISURE ECONOMIE
  6. Oostpoort met stadion en bioscoop
  7. Sportboulevard
  8. Knoop in 't Land
  9. Knoop Schenkeldijk
- STERK ZORGCLUSTER
  10. Gezondheidspark  
Woonzorgservicezones
- NIEUW ZAKELIJK  
DRECHTSTEDENCENTRUM
  11. Maasterras
- KRACHTIGE PRACHTWIJKEN
  12. Wielwijk
  13. Crabbhof
  14. Nieuw-Krispijn
  15. Oud-Krispijn

**external safety will interfere with the intended urban development**





# Impressions of the intended development







## Ambitions for External Safety

- **Zoning of infrastructure**
  - Water: 25 meters
  - Road (N3): 80 meters
  - railroad: 50 meter
- **Societal Risc**
  - as low as reasonbly achiveble (ALARA)
  - Differend risk levels for differend places
    - City centre
    - Intermediate area's
    - Suburban area's



# Ambitions for External Safety

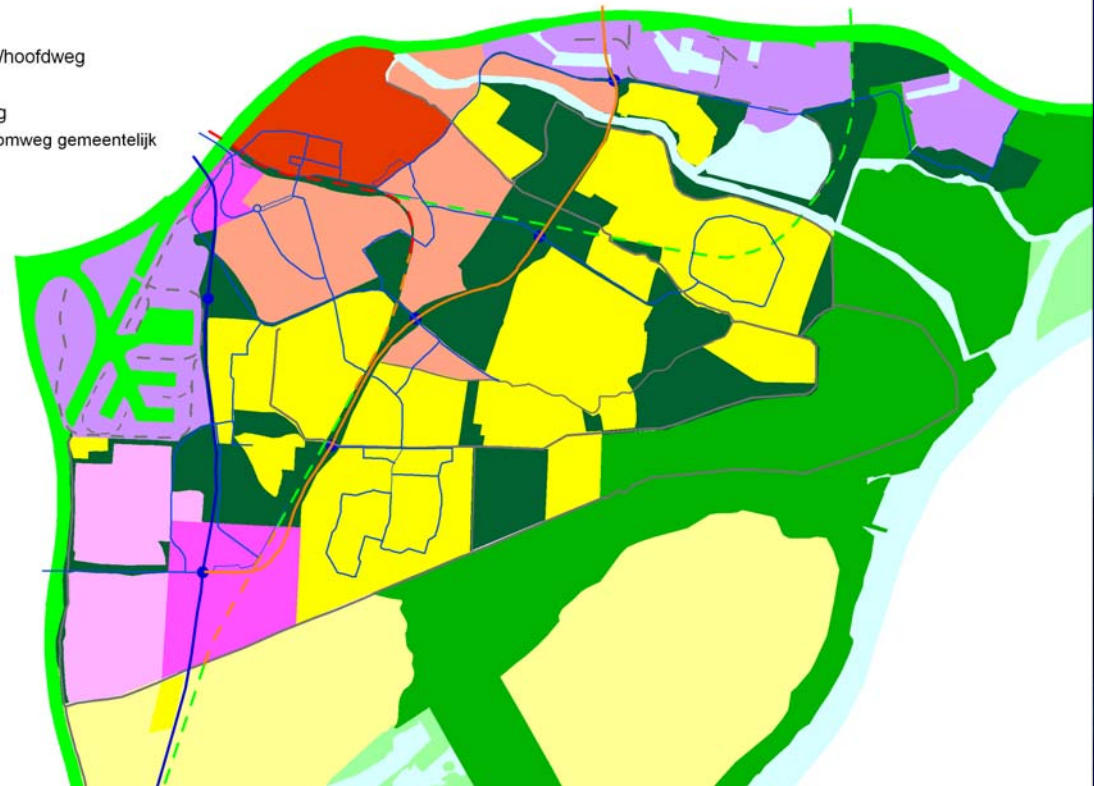
## Differend risk levels for differend places

### Legenda

- |                       |                            |
|-----------------------|----------------------------|
| Centrum wonen         | Kantoren                   |
| Stedelijk wonen       | Bedrijven                  |
| Suburbaan wonen       | Industrie                  |
| Stedelijk groen       | Snelweg/hoofdweg           |
| Buitenstedelijk groen | Spoor                      |
| Agrarisch gebied      | Stadsring                  |
| Natuurgebied          | Doorstroomweg gemeentelijk |

### Legenda externe veiligheid

- |                     |
|---------------------|
| $0 < gr \leq 0,5$   |
| $0,5 < gr \leq 2,0$ |
| $2,0 < gr$          |



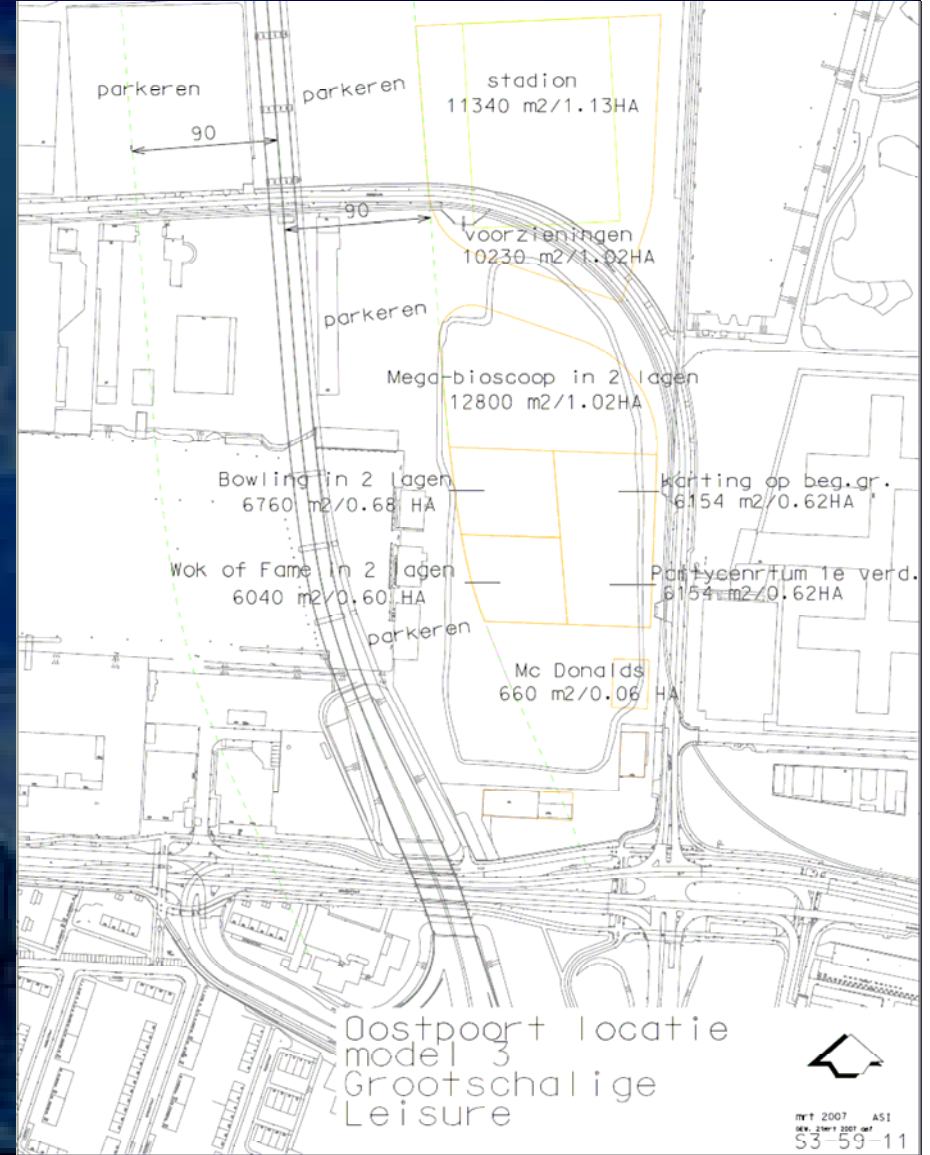
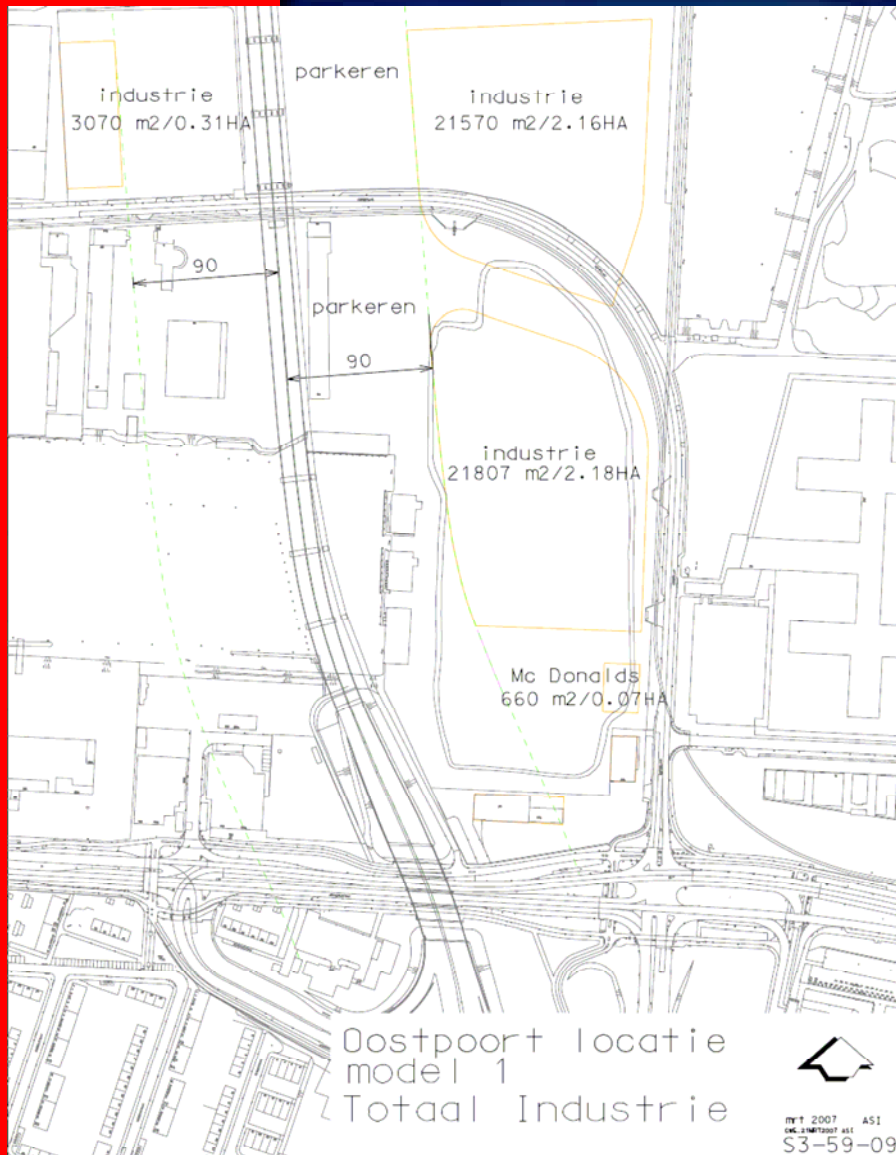


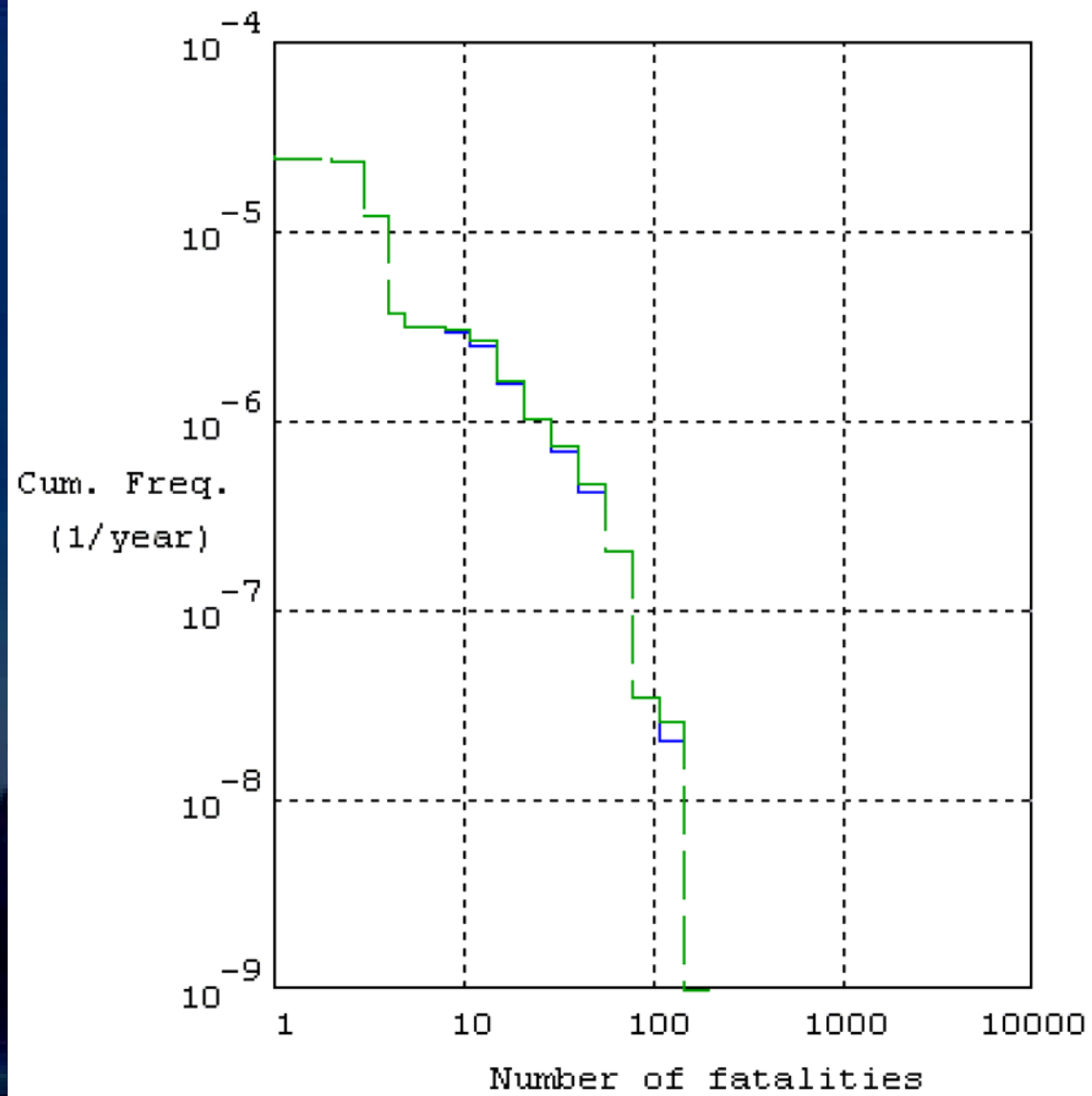
# Use of risk-assessment in urban development

## Comparison of different spatial models











# Restructuring The Educational Park (Leerpark)



Situation 2000





## Objectives Leerpark

- Improvement of the spatial quality of the Leerpark area
- Intensify the use of the Leerpark area
- Improvement of the safety situation



## Program: Leerpark

- **65.000m<sup>2</sup> educational institutions**
- **27.000m<sup>2</sup> commercial properties**
- **250 houses**

## Investment

- **€200 miljoen (totaal)**



## Improvement of the safety situation <sup>(1)</sup>

- **reducing the risks of transport of dangerous goods to an tolerable level by spatial planning:**
- **Individual risk**
  - **No buildings within 10-6 contour**
    - **Oversized zoning N3: 80 meters (including space for future transport)**
    - **Oversized zoning the railroad 50 meters (including space for future transport)**
  - **Replacing the level crossing by a tunnel**





## Improvement of the safety situation (2)

- **Societal risk**

- Reduction of Societal risk levels by using risk assessment in spatial planning
  - Assessment of different spatial designs
- Replacing the level crossing by a tunnel
- Removing a school near the N3



## Improvement of the safety situation (3)

- **Other measures**

- Improvement accessibility (rail-)road
- Improvement capacity fire brigade:
  - Reduction of intervention time
  - Fire engines
  - Sufficient water supply
- Excluding vulnerable objects within 200 meters from railroad (hospitals, homes for elderly, kindergarten)
- SMS alert for inhabitants Leerpark
- Buildings adapted to some scenarios:
  - Fire
  - Toxic releases

# Improvement of the safety situation (4)

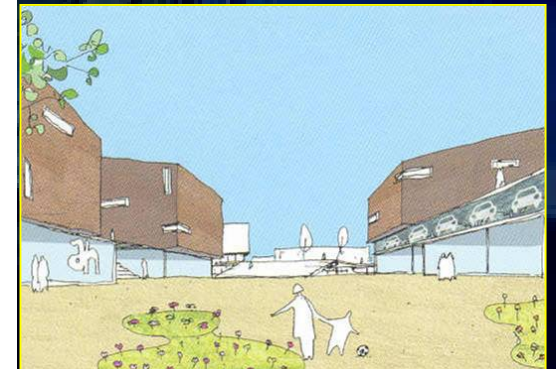
## Design principle



# Leerpark 2010



**impressions**

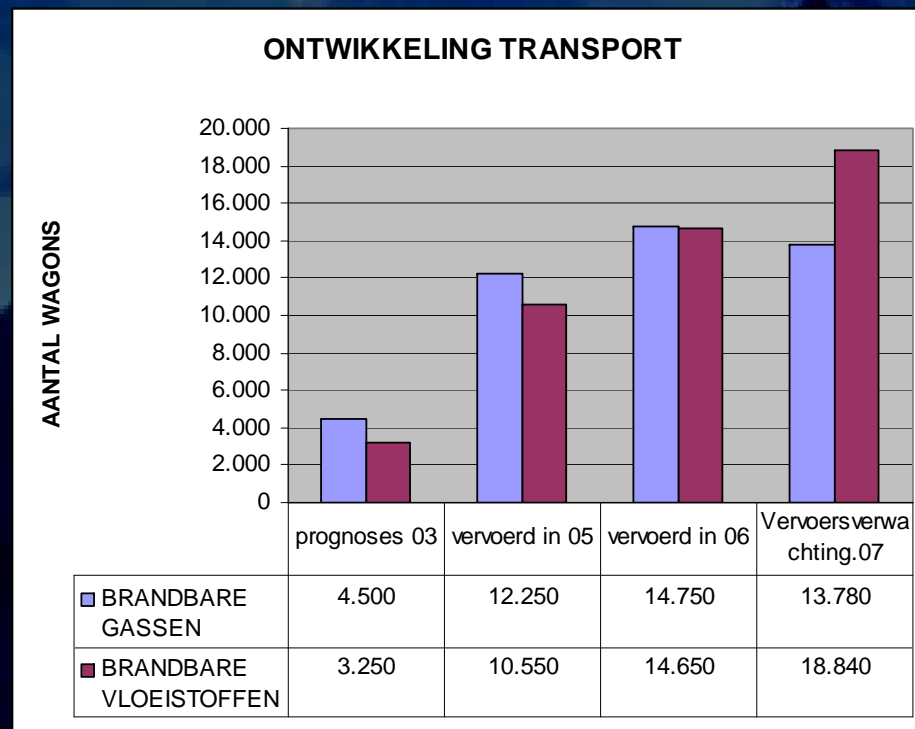






## Difficulties

- **Insufficient zoning railroad**
  - **caused by unexpected growth of transport**





## The future

- **“Short term” measures**
  - Better train safety systems
  - Slower train speed (<40km/h)
  - Reduce chance BLEVE by altering train composition
  - Improved spatial planning by using risk-assessment
- **Long term measure**
  - a separate dedicated goods transport line avoiding the urban area (port of Rotterdam – Antwerp)