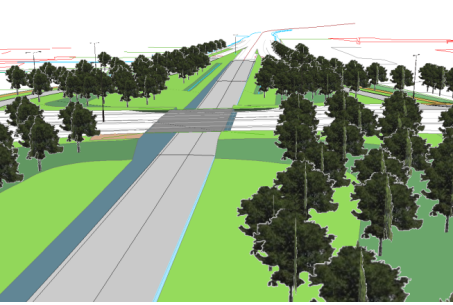


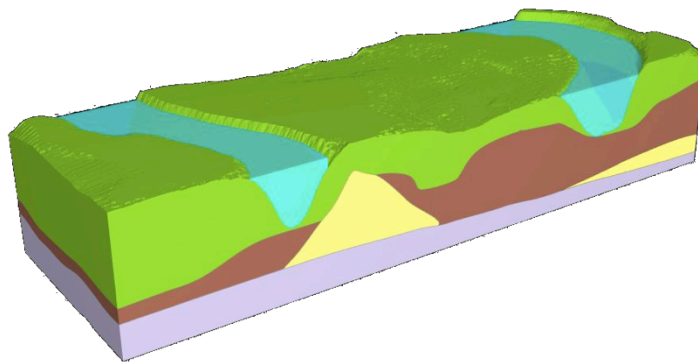
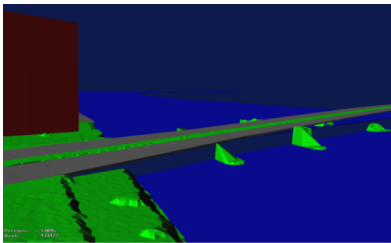
# ITC Visit to 3D Geoinformation Group

- Welcome and overview 3D developments in NL, Jantien Stoter
- 3D validation and repair, Hugo Ledoux
- Point clouds: 3D Medial Axis Transform, Ravi Peters
- Navigation for first responders among moving obstacles, Zhiyong Wang
- Indoor Semantic Modeling to Support Path-Finding, Liu Liu



# 3D Developments in the Netherlands

**Prof dr Jantien Stoter**



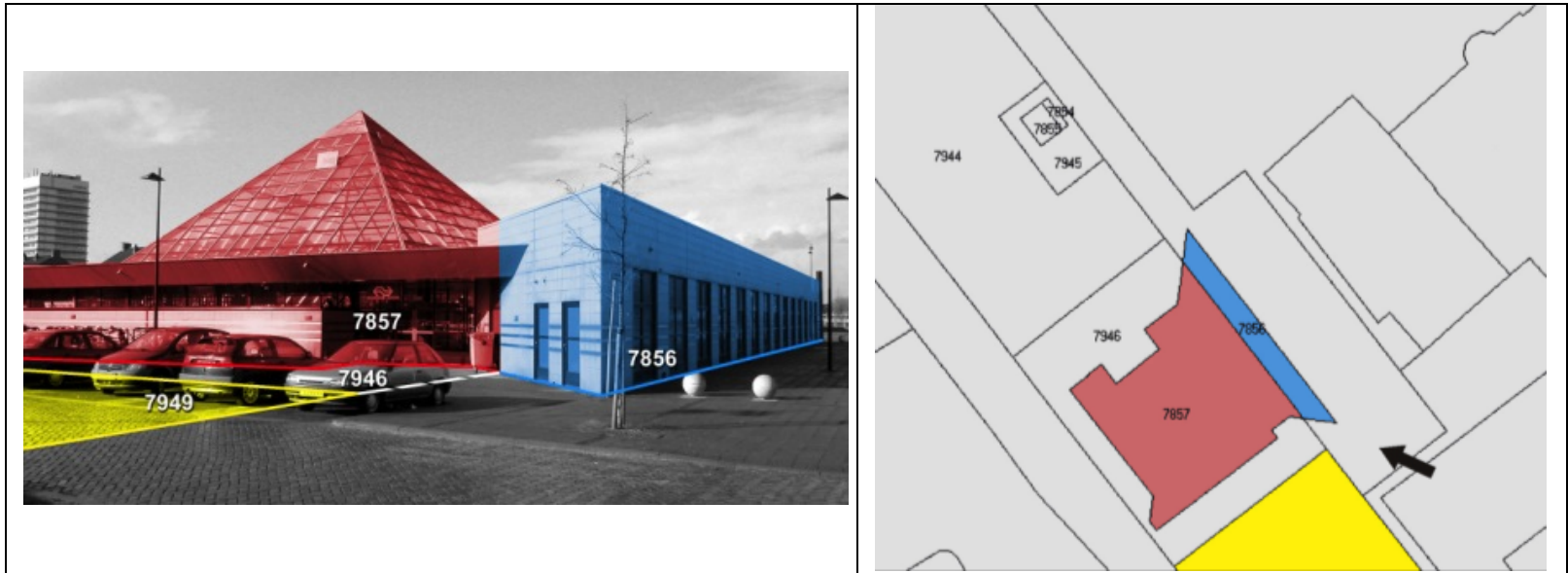
# 3D Developments in the Netherlands

- **3D cadastre**
- 3D standard large scale topography
- Nationwide 3D data reconstruction
- 3D community NL

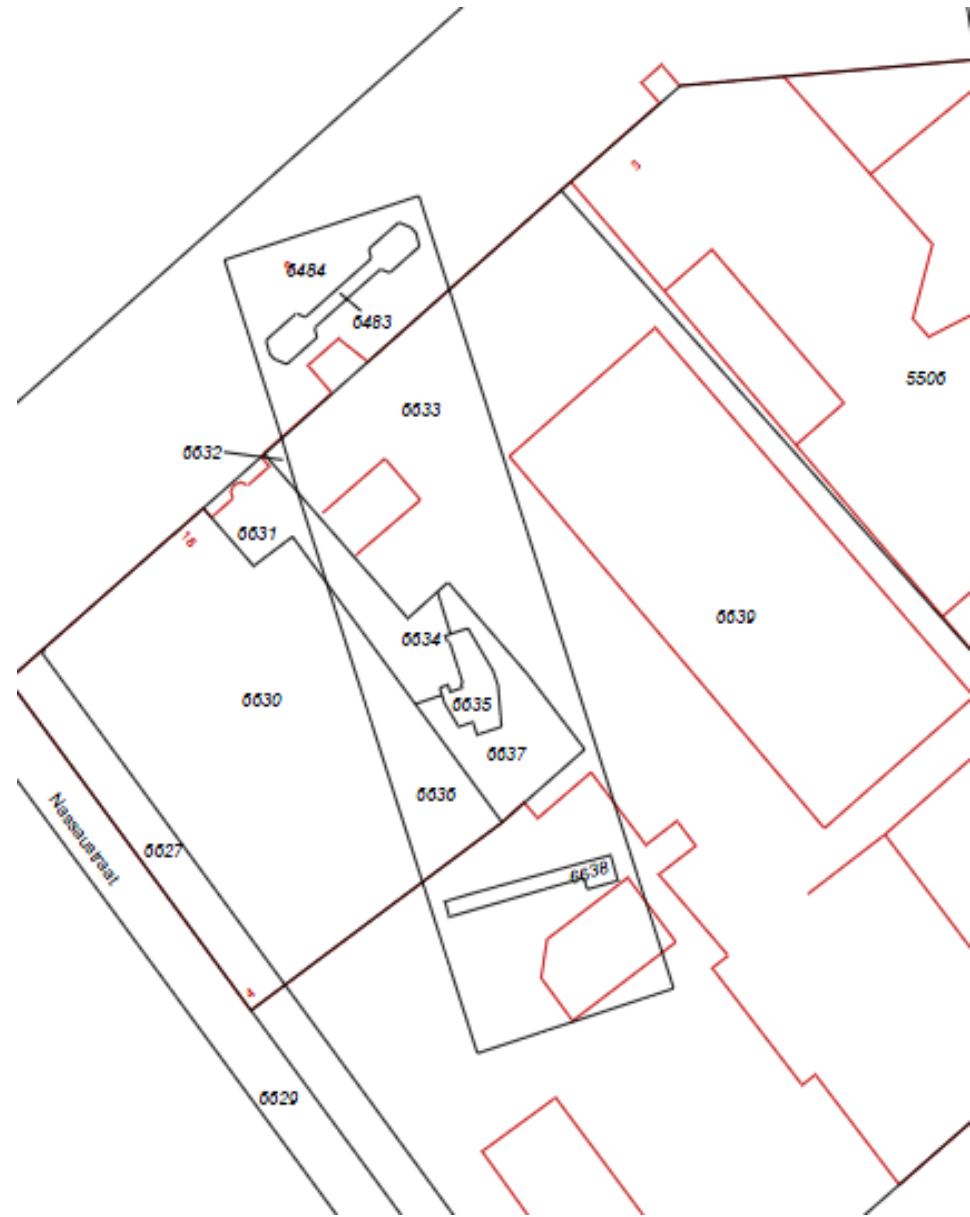


# Ownership registration in The Netherlands

- Main registration entity is 2D parcel
- Although it is possible to establish property rights with 3D boundaries



# Case 2

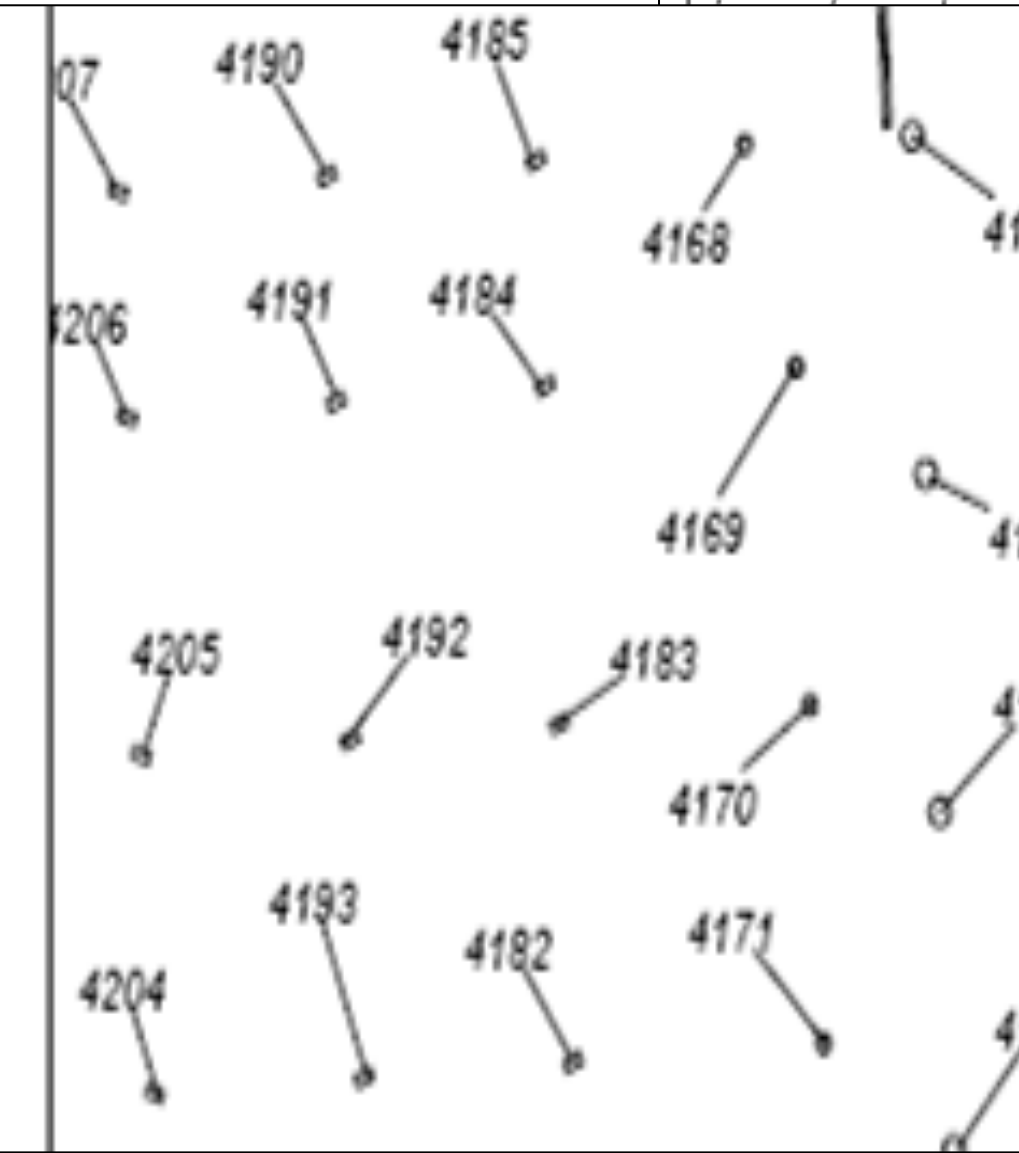
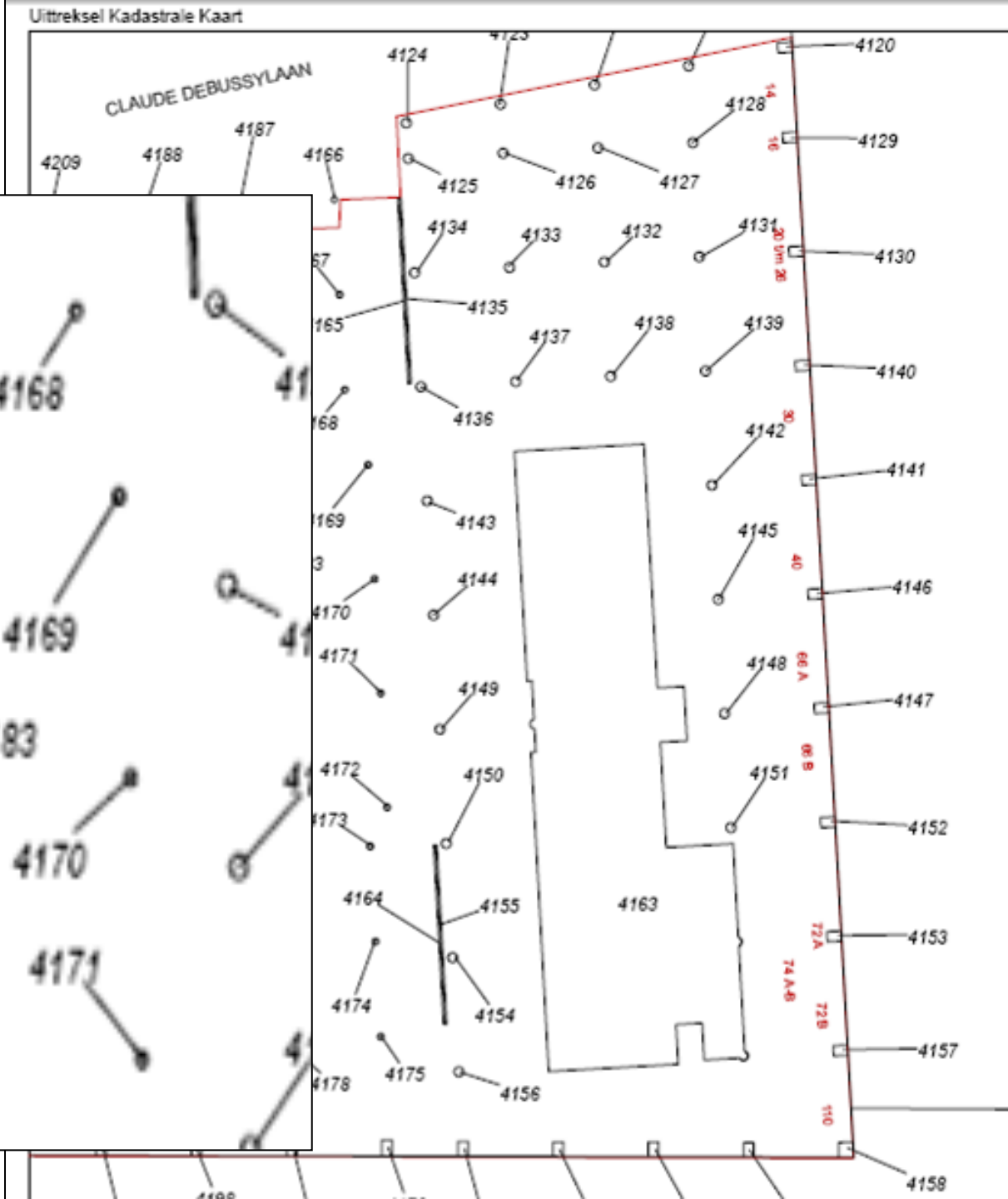


# Case 2

- One object, superficies
- Parcel fragmentation

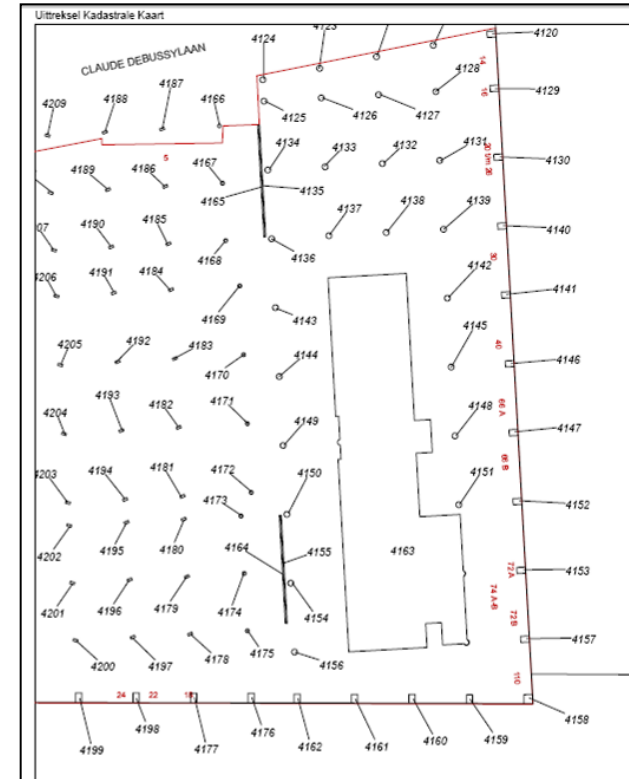


# Case 3



# Case 3

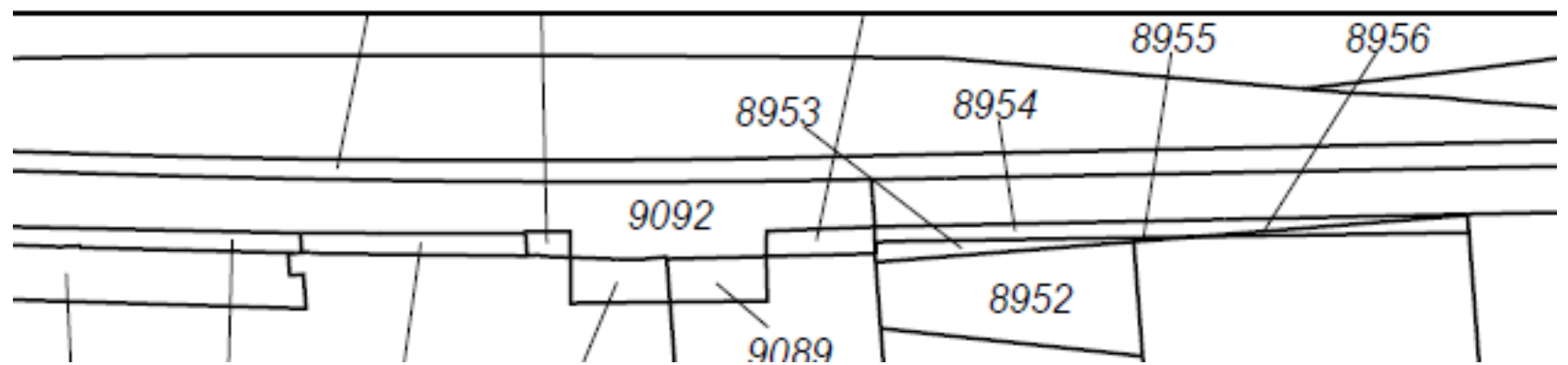
- Land by municipality
- Two 3D objects, **long lease**:
  1. Parking garage
  2. Office tower on 80 pillars
- Note again **parcel fragmentation**





# Case 4

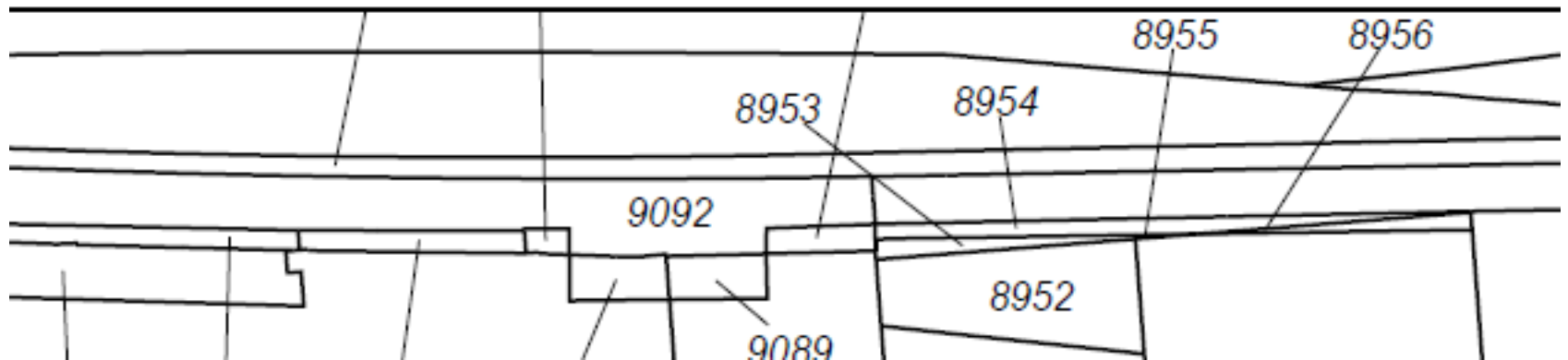
Uittreksel Kadastrale Kaart



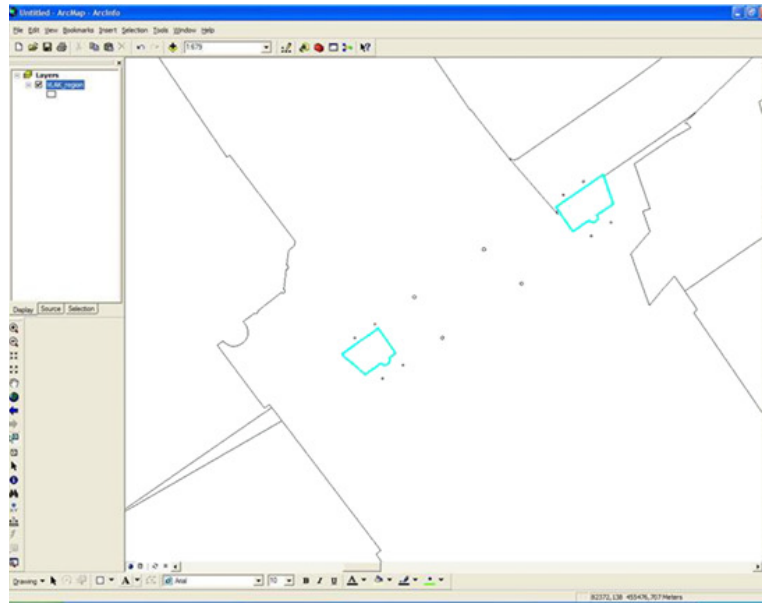
# Case 4

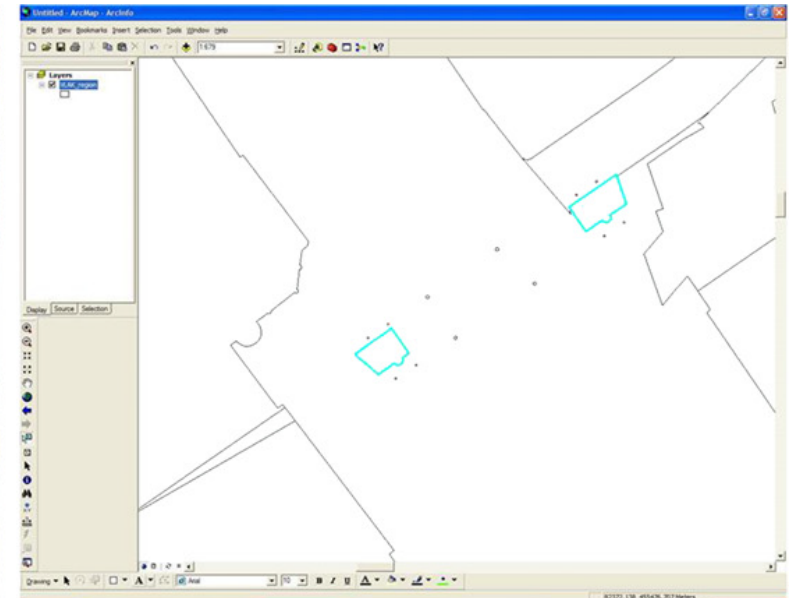


Uittreksel Kadastrale Kaart



# Case 5





Floor 0



**SPITZLE BRÜCKENWEG 4**  
**WIRTSCHAFTS ZONE Aachenring 1**

Scale: 1:1000  
 Date: 12.12.2018  
 Project: ...  
 Drawing: ...  
 Status: ...

Legend:  
 [Symbol] RECHENKABELE  
 [Symbol] KABELKANALE  
 [Symbol] KABELKABELE

Floor 1



**SPITZLE BRÜCKENWEG 4**  
**WIRTSCHAFTS ZONE Aachenring 1**

Scale: 1:1000  
 Date: 12.12.2018  
 Project: ...  
 Drawing: ...  
 Status: ...

Legend:  
 [Symbol] RECHENKABELE  
 [Symbol] KABELKANALE  
 [Symbol] KABELKABELE

Floor 2



**SPITZLE BRÜCKENWEG 4**  
**WIRTSCHAFTS ZONE Aachenring 1**

Scale: 1:1000  
 Date: 12.12.2018  
 Project: ...  
 Drawing: ...  
 Status: ...

Legend:  
 [Symbol] RECHENKABELE  
 [Symbol] KABELKANALE  
 [Symbol] KABELKABELE

Floor 3



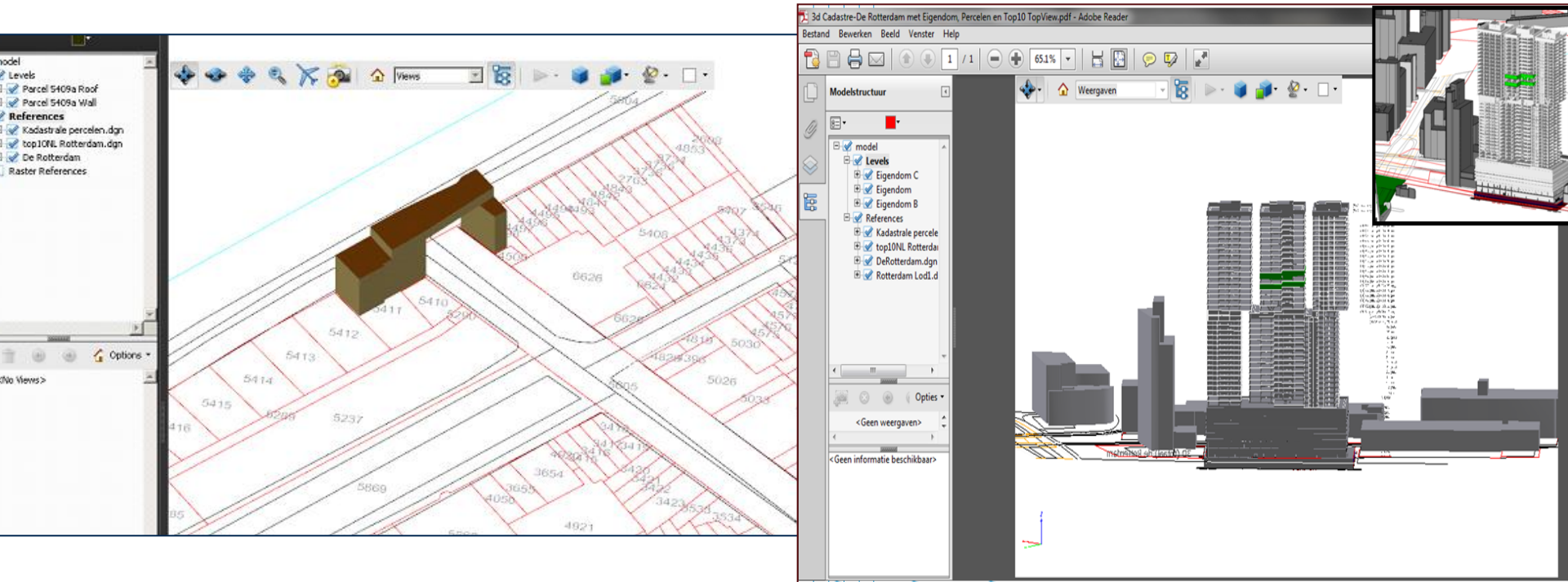
**SPITZLE BRÜCKENWEG 4**  
**WIRTSCHAFTS ZONE Aachenring 1**

Scale: 1:1000  
 Date: 12.12.2018  
 Project: ...  
 Drawing: ...  
 Status: ...

Legend:  
 [Symbol] RECHENKABELE  
 [Symbol] KABELKANALE  
 [Symbol] KABELKABELE

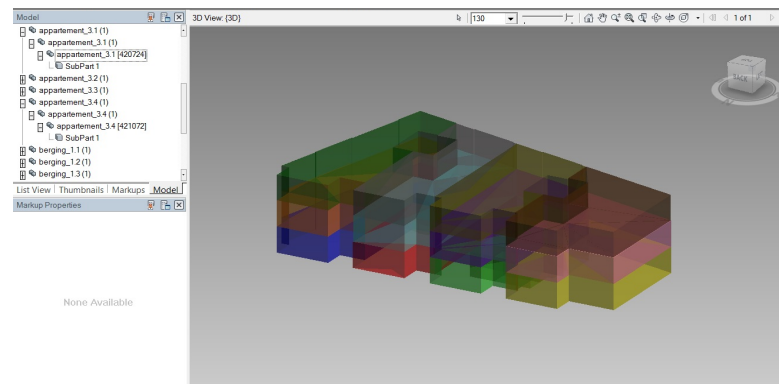
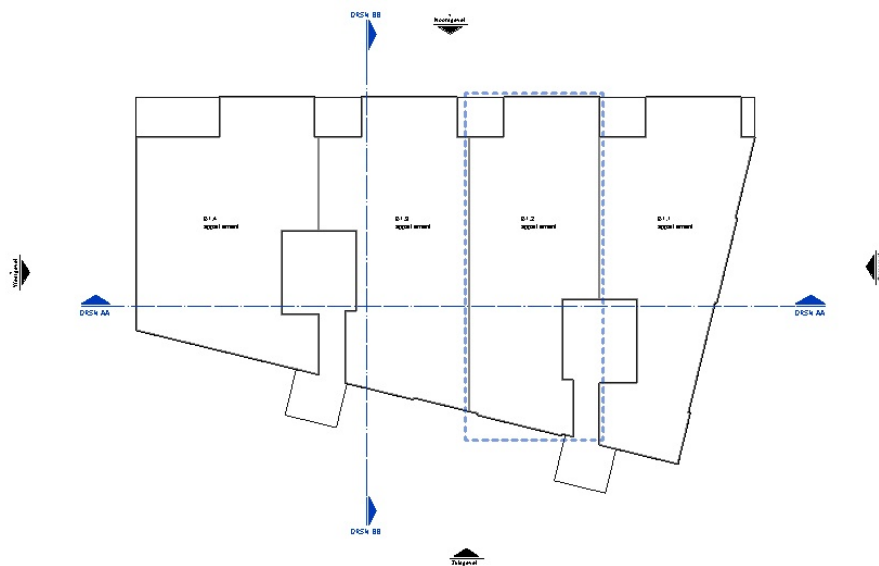
# 3D cadastre in NL

- Principle: refuse “fragmented parcel creation”
- Require a registration of 3D representation that reflects the space to which right applies
- **3D PDF**





B0.4 appartement		B0.3 appartement	B0.2 appartement		B0.1 appartement
B2.4 appartement		B2.3 appartement	B2.2 appartement		B2.1 appartement
B1.4 appartement		B1.3 appartement	B1.2 appartement		B1.1 appartement
		B3.3 berging	B2.3 berging	B0.2 berging	B1.2 berging



# First official 3D registration in preparation





# 3D Developments in the Netherlands

- 3D cadastre
- **3D standard large scale topography**
- Nationwide 3D data reconstruction
- 3D community NL

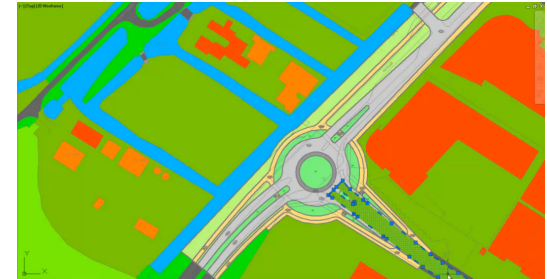


# National 3D standard

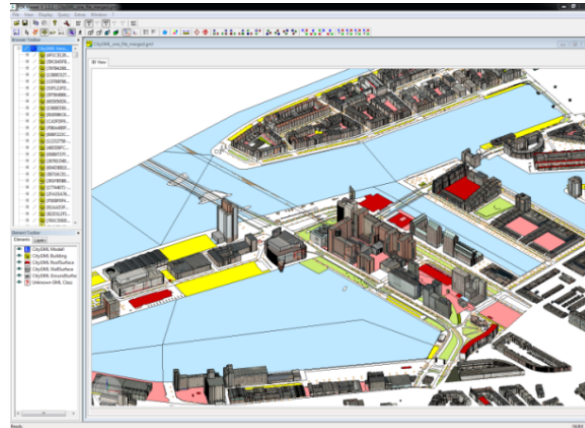
Integration of:

## 1. 2D Information Model Geography (IMGeo)

- roads, water, land use/land cover, bridges, tunnels

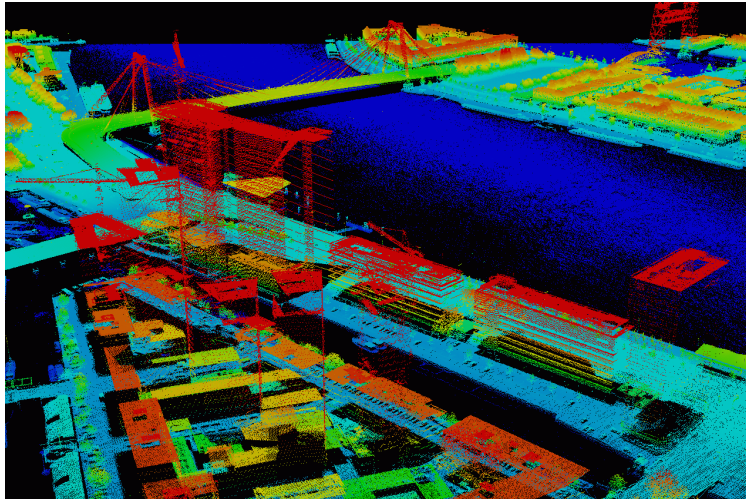


## 2. CityGML



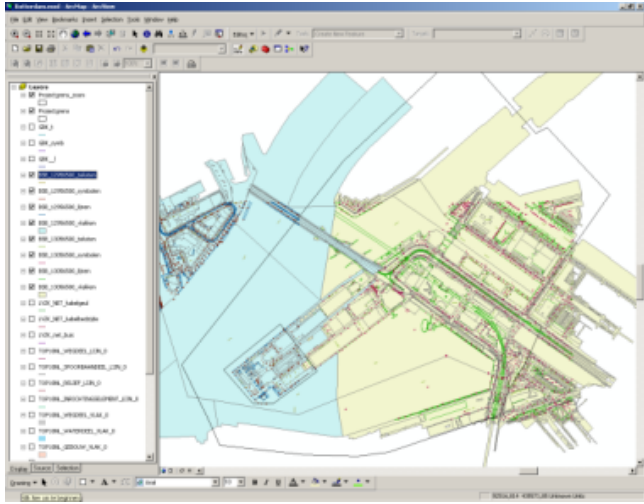


# FME workbench: automated 3D data reconstruction



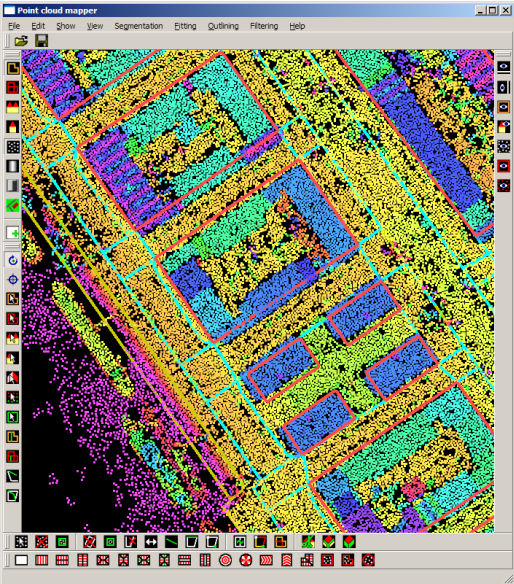
AHN2

+

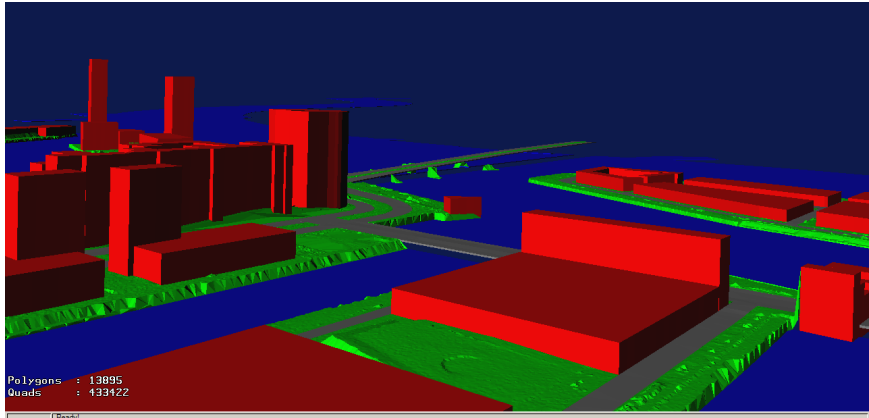


2D IMGeo

=



3D IMGeo



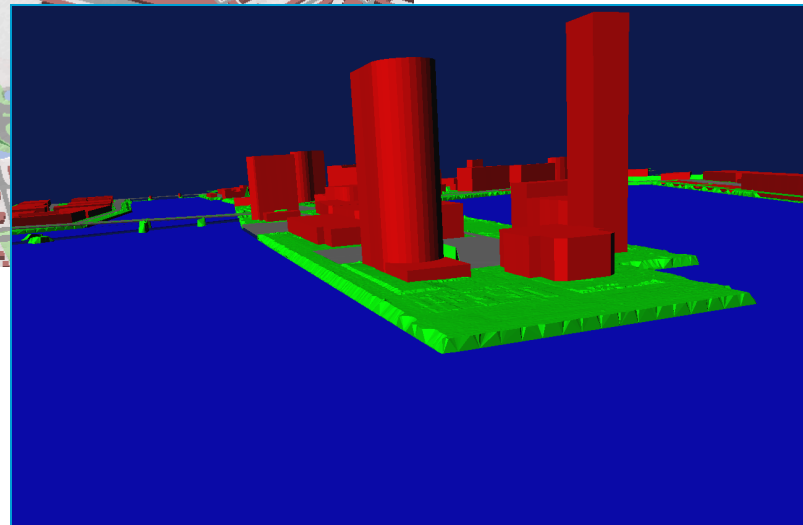
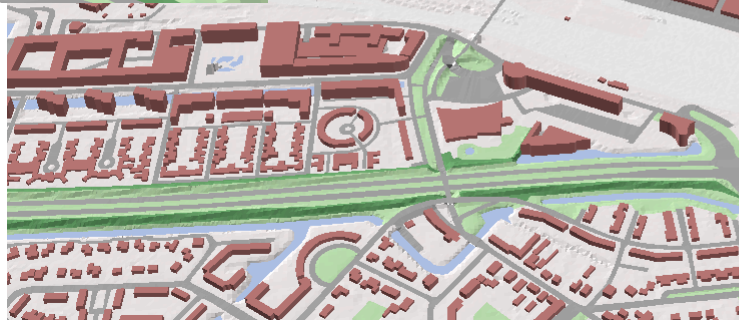
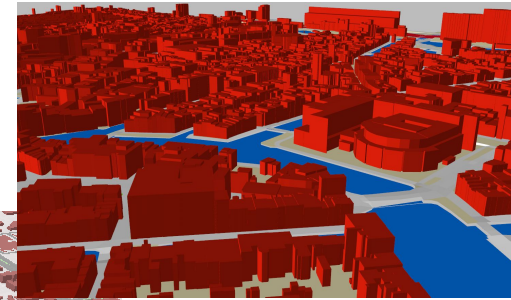
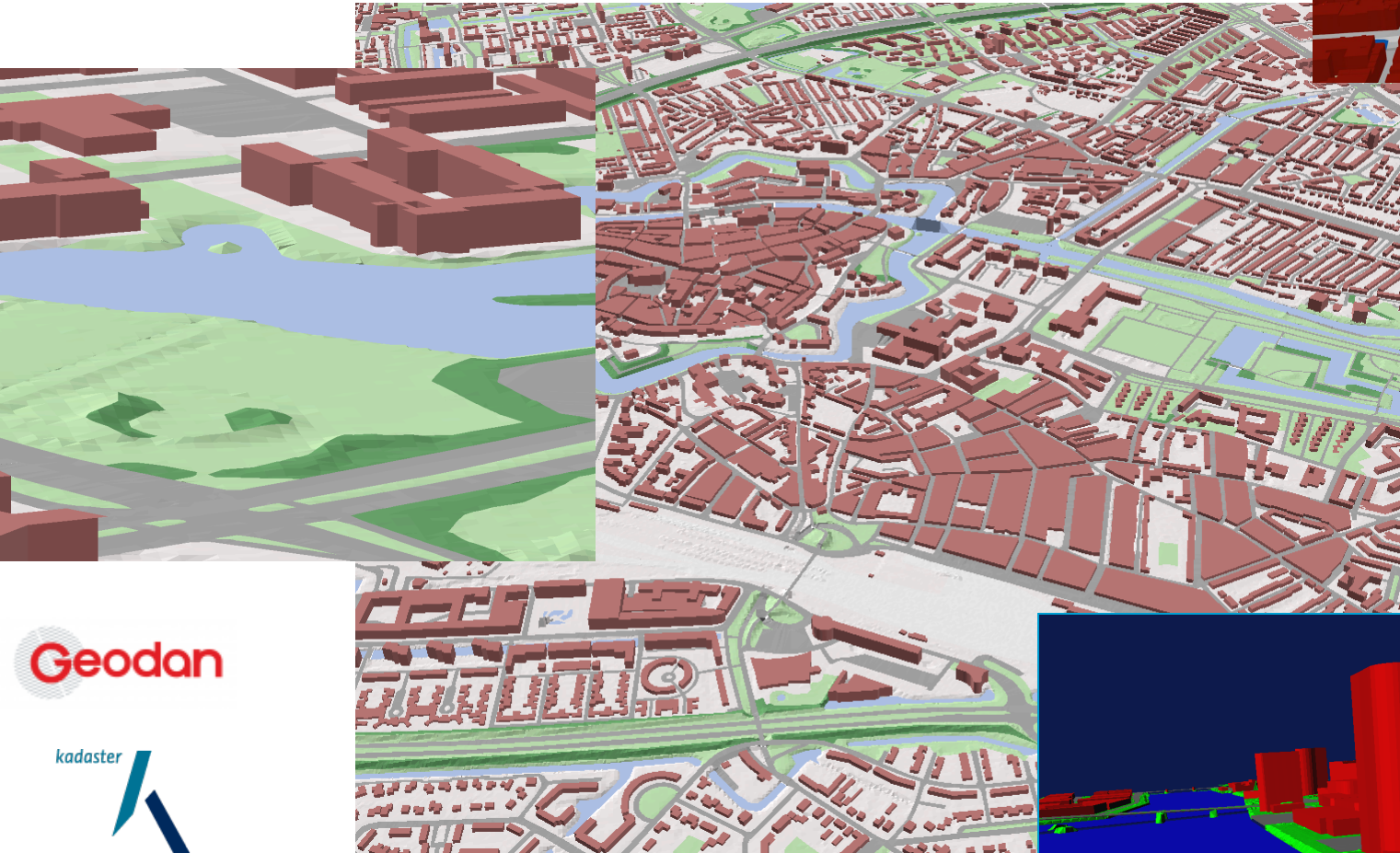
Polygons : 13895  
Quads : 433422

# 3D Developments in the Netherlands

- 3D cadastre
- 3D standard large scale
- **Nationwide 3D data**
- 3D community NL



# 3D TOP10NL



Geodan

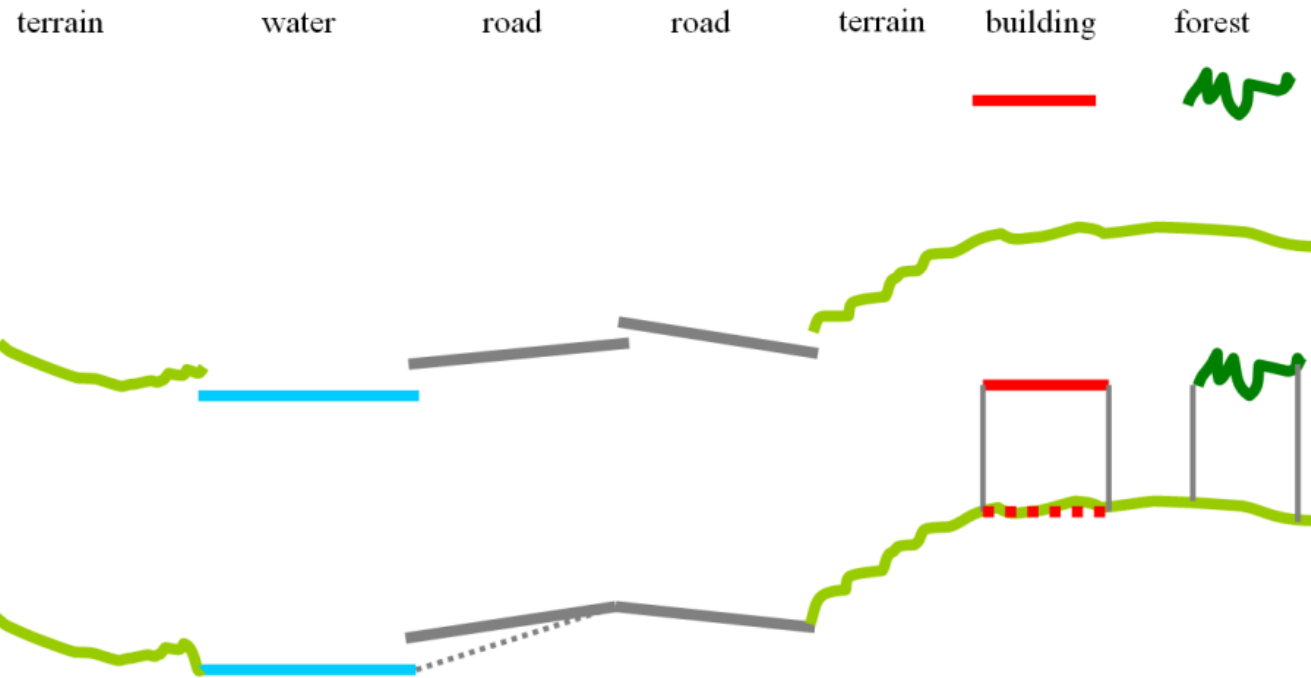


UNIVERSITY OF TWENTE.



con•terra

Adjusted Open Source tools of (Oude Elberink and Vosselman, 2009a; 2009b; Oude Elberink et al, 2013)



Step 1

Step 2





## Minister Kamp maakt kennis met 3D-kaart van Nederland

[Nieuwsberichten](#)

[Nieuws via RSS  
storingpagina](#)

[Nieuws via RSS](#)



GEPUBLICEERD: 20 NOVEMBER 2014

Op het ECP-jaarcongres is de ontwikkeling van de 3D-kaart van Nederland gepresenteerd in aanwezigheid van minister Kamp van Economische Zaken.

[✉ verstuur deze pagina](#)

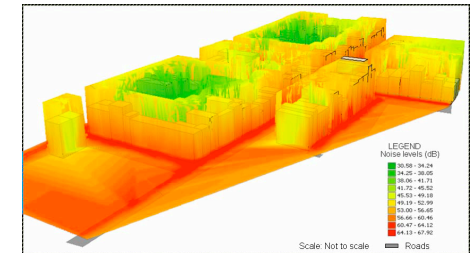
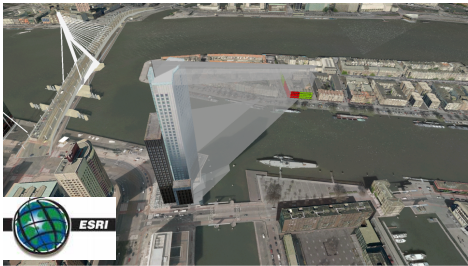
Tijdens het ECP-jaarcongres is de ontwikkeling van de 3D-kaart van Nederland gepresenteerd. Samen met overheden, bedrijfsleven en wetenschap heeft het Kadaster de afgelopen jaren hard gewerkt om deze mijlpaal te bereiken. De 3D-kaart is op 20 november gepresenteerd met behulp van de 3D-bril Oculus Rift, in aanwezigheid van minister Kamp van Economische Zaken. De 3D-kaart is landsdekkend, schaal 1:10.000.

### Beleids effecten verbeelden

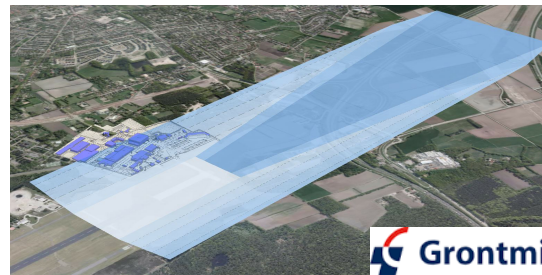
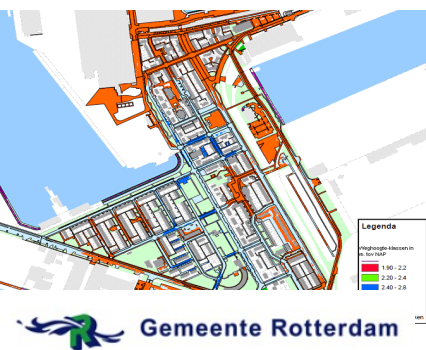
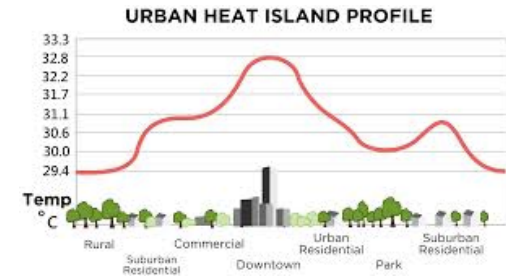
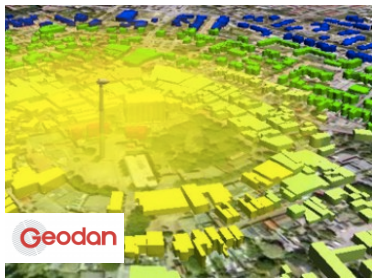
In een 3D-kaart kun je weergeven wat zich onder, op én boven de grond bevindt.

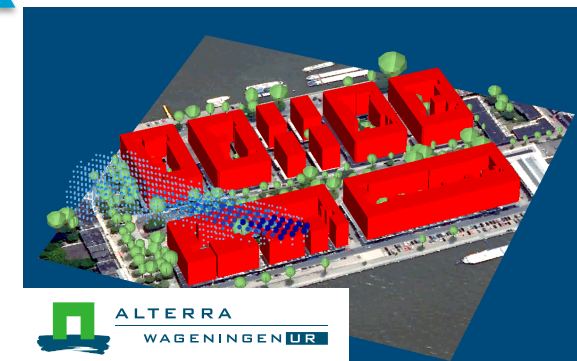
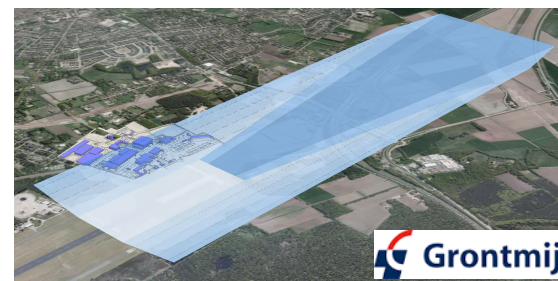
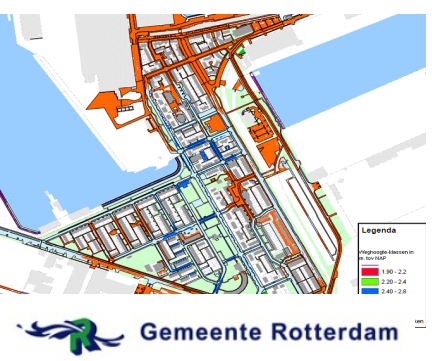
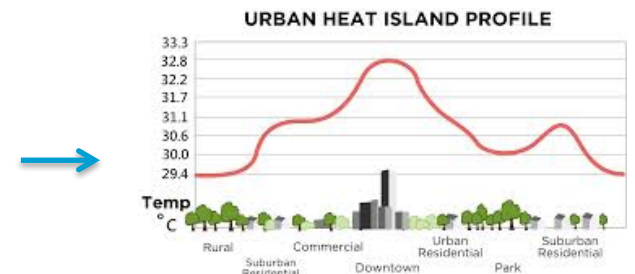
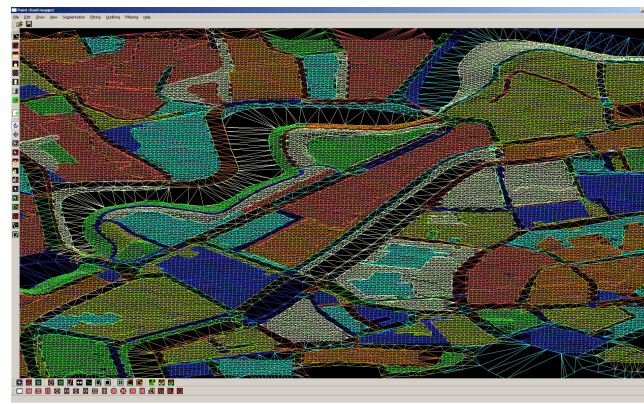
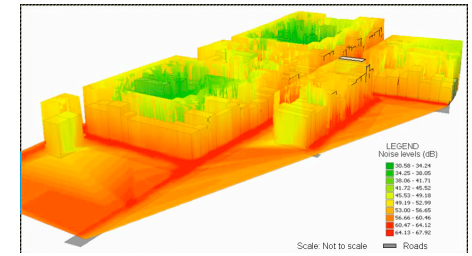
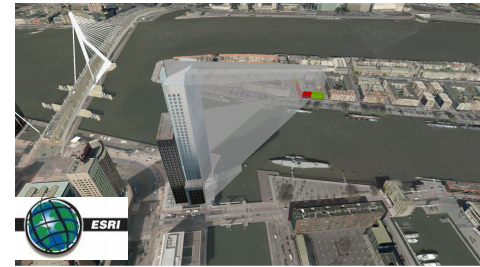






- 3D is ad hoc, project based
- Too expensive
- Potentials are not being used





# 3D for environmental modelling



Nieuwe technologie mogelijk maken



netherlands eScience center



Den Haag



hoogheemraad Hollands Noorderkwart



Gemeente Rotterdam

Nelen & Schuurmans



# 3D Developments in the Netherlands

- 3D cadastre
- 3D standard large scale
- Nationwide 3D data
- **3D community NL**



# 3D SIG NL

- Community in the Netherlands
- Aim: to push 3D developments in several domains
- LinkedIn Group (> 650 members)
- Meetings
- Collaboration projects, examples:
  - 3D standard large scale
  - Nationwide 3D data reconstruction
  - Bridging construction&design and GIS world
  - 3D cadastre
  - 3D validation and repair
  - etc



# Breakthrough 3D: academia, universities, industry



# Breakthrough 3D

- 3D and laws
- 3D standards
- 3D base data
- 3D dissemination and access
- 3D and safety
- 3D acquisition
- 3D urban design and environmental modelling
- 3D energy
- 3D buildings and constructions
- 3D water
- 3D gaming
- 3D soil movements
- 3D research and education





Thank you for your attention!

[j.e.stoter@tudelft.nl](mailto:j.e.stoter@tudelft.nl)

[Jantien.stoter@tudelft.nl](mailto:Jantien.stoter@tudelft.nl)

[j.stoter@geonovum.nl](mailto:j.stoter@geonovum.nl)



# 3D SIG NL

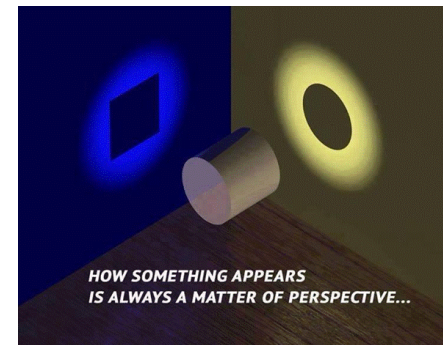
- **3D standard large scale**
- Nationwide 3D data reconstruction
- Bridging construction&design and GIS world
- 3D cadastre
- 3D in other domains



# BIM GIS



# CB-NL



- Different domains; different perspectives
- Should acknowledge differences
- CB-NL: harmonisation of definitions
  - digital description of generic, re-usable concepts:
    - Physical objects and functional spaces
    - The entire lifecycle: Design, Construction, Maintenance, GIS
    - Free to use in any way (open standard)
    - Will be mandated by big public clients

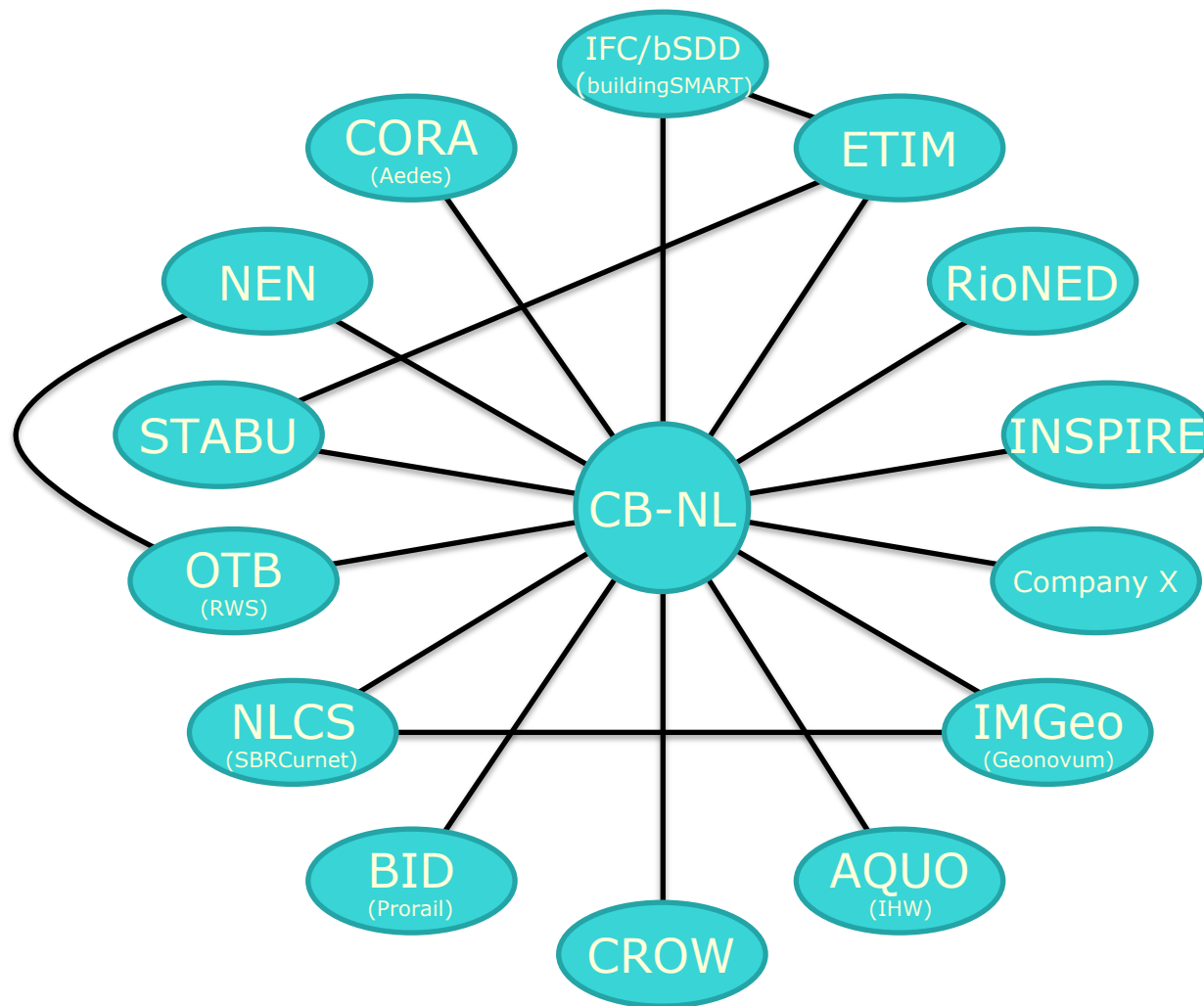


# Concept Library-NL is a BIR-Initiative

- The BIR (Dutch Building Information Council) is a national platform which includes:
  - Public clients
  - Contractors
  - Engineering
  - MEP
  - Architects

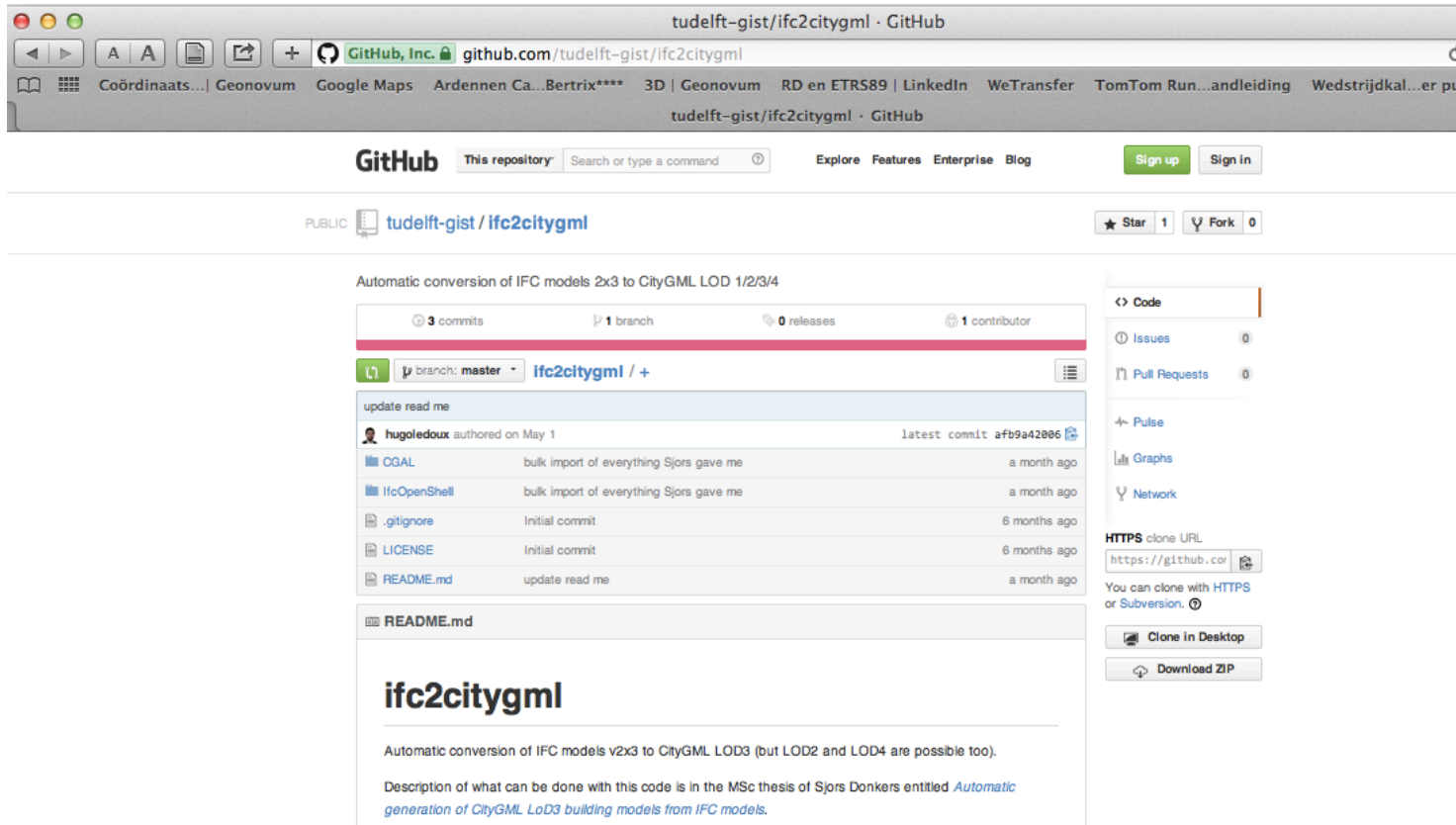


# Polder model



# Automated conversion from LOD3 to IFC

- Automatic generation of CityGML LoD3 building models from IFC models, *Msc Thesis, Sjors Donkers*
- Code available as open source:
  - <https://github.com/tudelft-gist/ifc2citygml>



The screenshot shows a web browser window displaying the GitHub repository page for `tudelft-gist/ifc2citygml`. The browser's address bar shows the URL `github.com/tudelft-gist/ifc2citygml`. The repository page includes the following elements:

- Repository Information:** PUBLIC, `tudelft-gist / ifc2citygml`, 1 Star, 0 Forks.
- Repository Description:** Automatic conversion of IFC models 2x3 to CityGML LOD 1/2/3/4.
- Commit History:** 3 commits, 1 branch, 0 releases, 1 contributor. The latest commit is by `hugoledoux` on May 1, with the message "update read me".
- Files:** A list of files including `CGAL`, `IfcOpenShell`, `.gitignore`, `LICENSE`, and `README.md`.
- README.md Content:**

**ifc2citygml**

Automatic conversion of IFC models v2x3 to CityGML LOD3 (but LOD2 and LOD4 are possible too).

Description of what can be done with this code is in the MSc thesis of Sjors Donkers entitled *Automatic generation of CityGML LoD3 building models from IFC models*.
- Right Sidebar:** Code, Issues (0), Pull Requests (0), Pulse, Graphs, Network, HTTPS clone URL (`https://github.com`), Clone in Desktop, Download ZIP.

# 3D SIG NL

- 3D standard large scale
- Nationwide 3D data reconstruction
- Bridging construction&design and GIS world
- 3D cadastre
- **3D in other domains**





# 3D extensions in other domain models (in development)

- Utilities



- Environmental Planning (noise, spatial planning, ..)



- .....



Thank you for your attention!

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[Jantien.stoter@tudelft.nl](mailto:Jantien.stoter@tudelft.nl)

[j.stoter@geonovum.nl](mailto:j.stoter@geonovum.nl)

