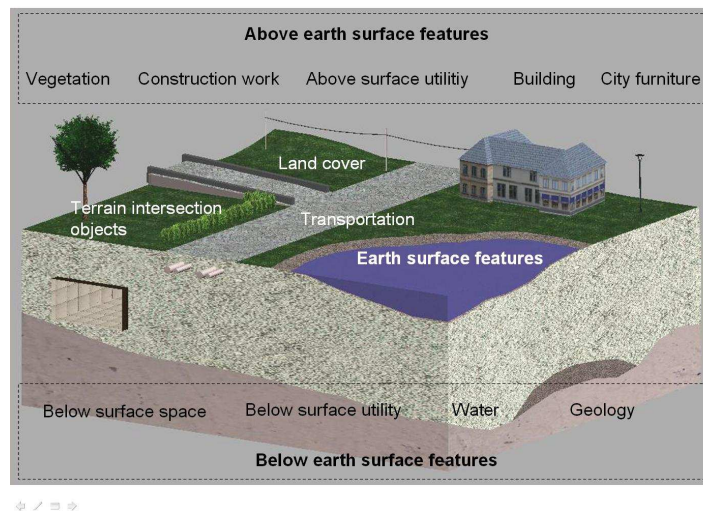


Design of an integrated 3D information model

Suggestions for an information model for representation of 3D geographic features



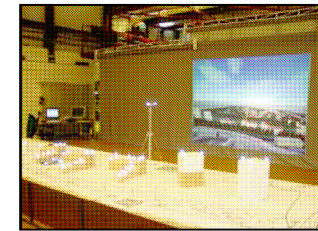
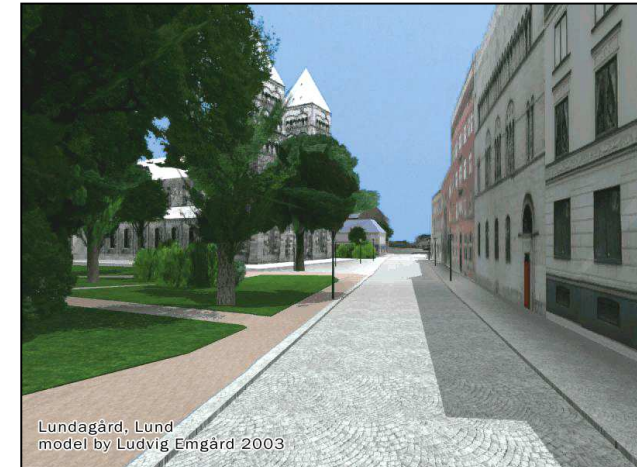
UDMS07, Stuttgart

Ludvig Engård & Sisi Zlatanova

January 8, 2008

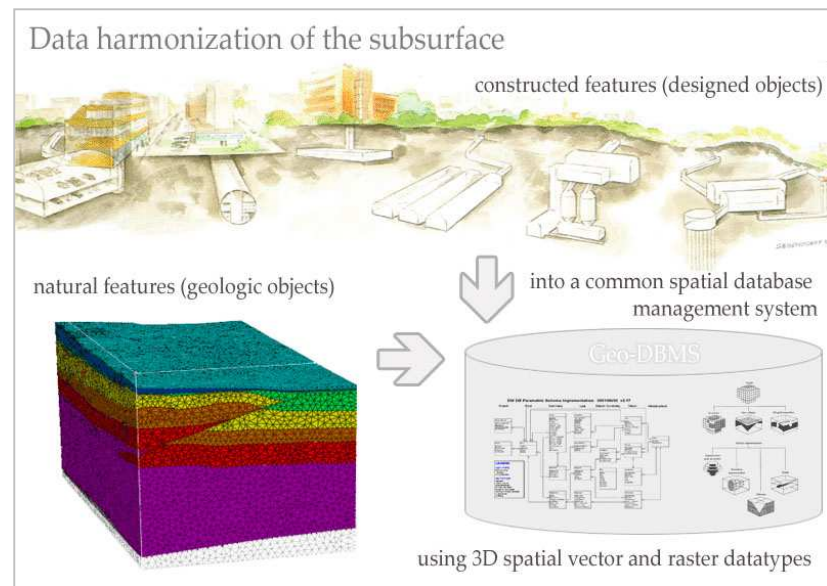
Ludvig Emgård

- M.Sc in Land surveying specialised in GIS technology, Lund, Sweden.
- Master Thesis about 3D GIS in 2003
- Currently 3D GIS consultant at SWECO in Scandinavia since 2003
- Joined Sisi Zlatanova and Delft GIST group in february 2007.



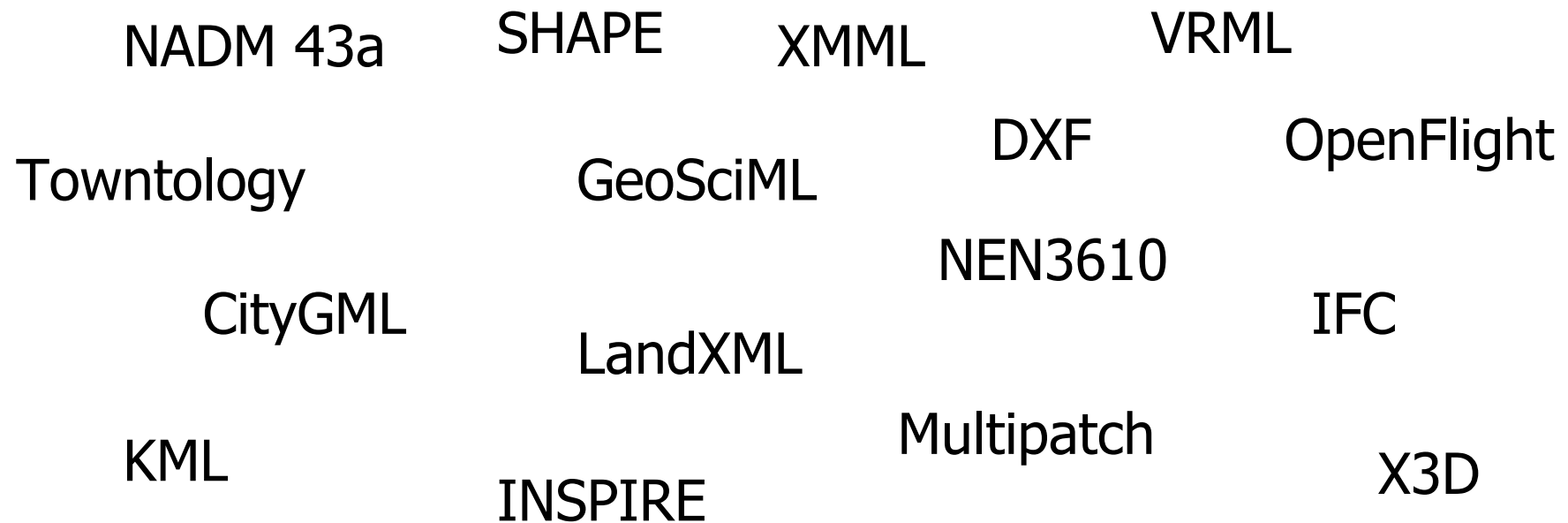
Research topics

- Harmonized information model for subsurface features
- 3D data integration of subsurface features in the CityGML information model



Data integration problems

- The integration of subsurface features, the digital terrain model and features on the terrain remains a problem to be solved (Kolbe & Gröger 2003)



Why a 3D information model?

- The existing formats and data models are often domain specific.
- The geometry representation is mostly two-dimensional
- Many models miss semantics

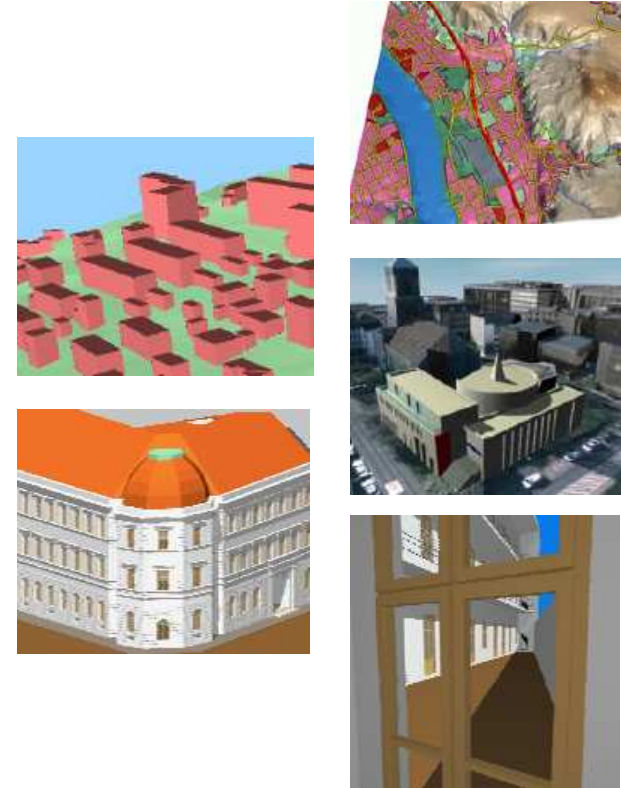


CityGML

- Application independent information model
- Well-described thematic semantic approach for 3D city modelling

Problems

- Misses subsurface features
- Sparse relations between geometries

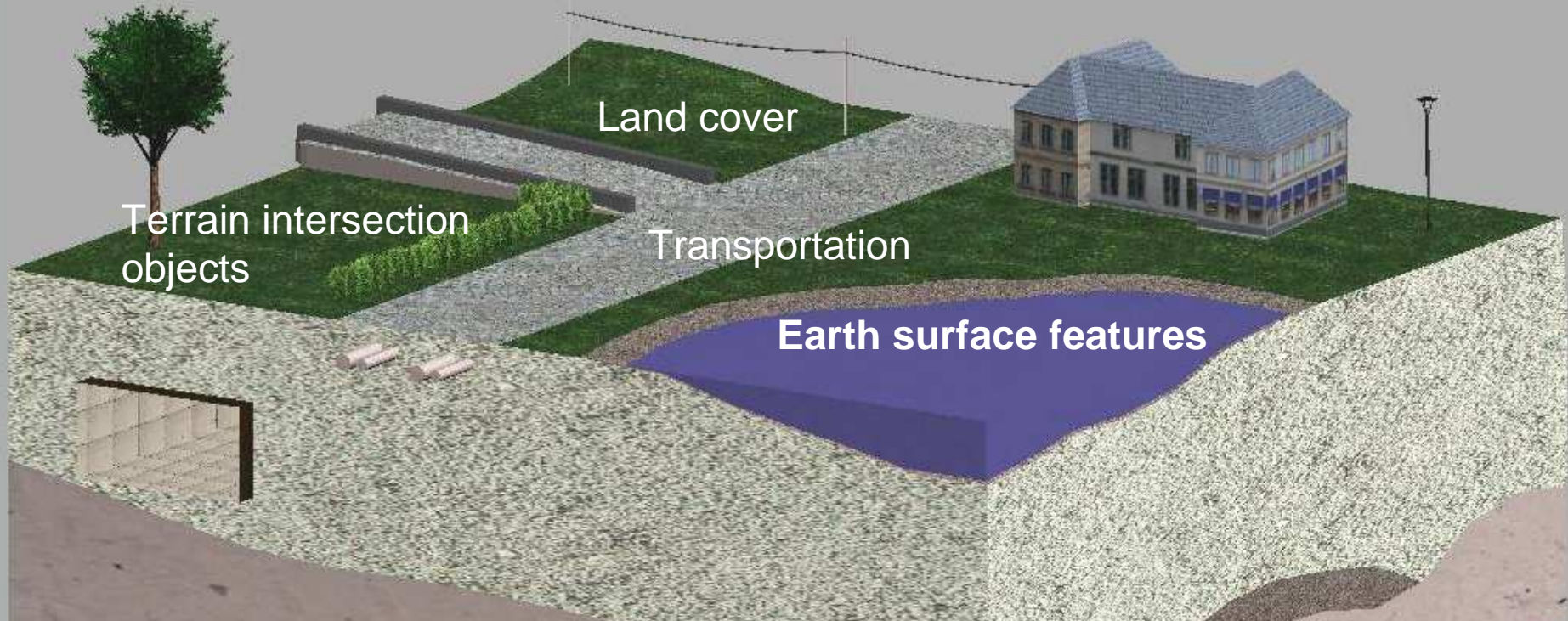


Problem1:

Model missing subsurface features

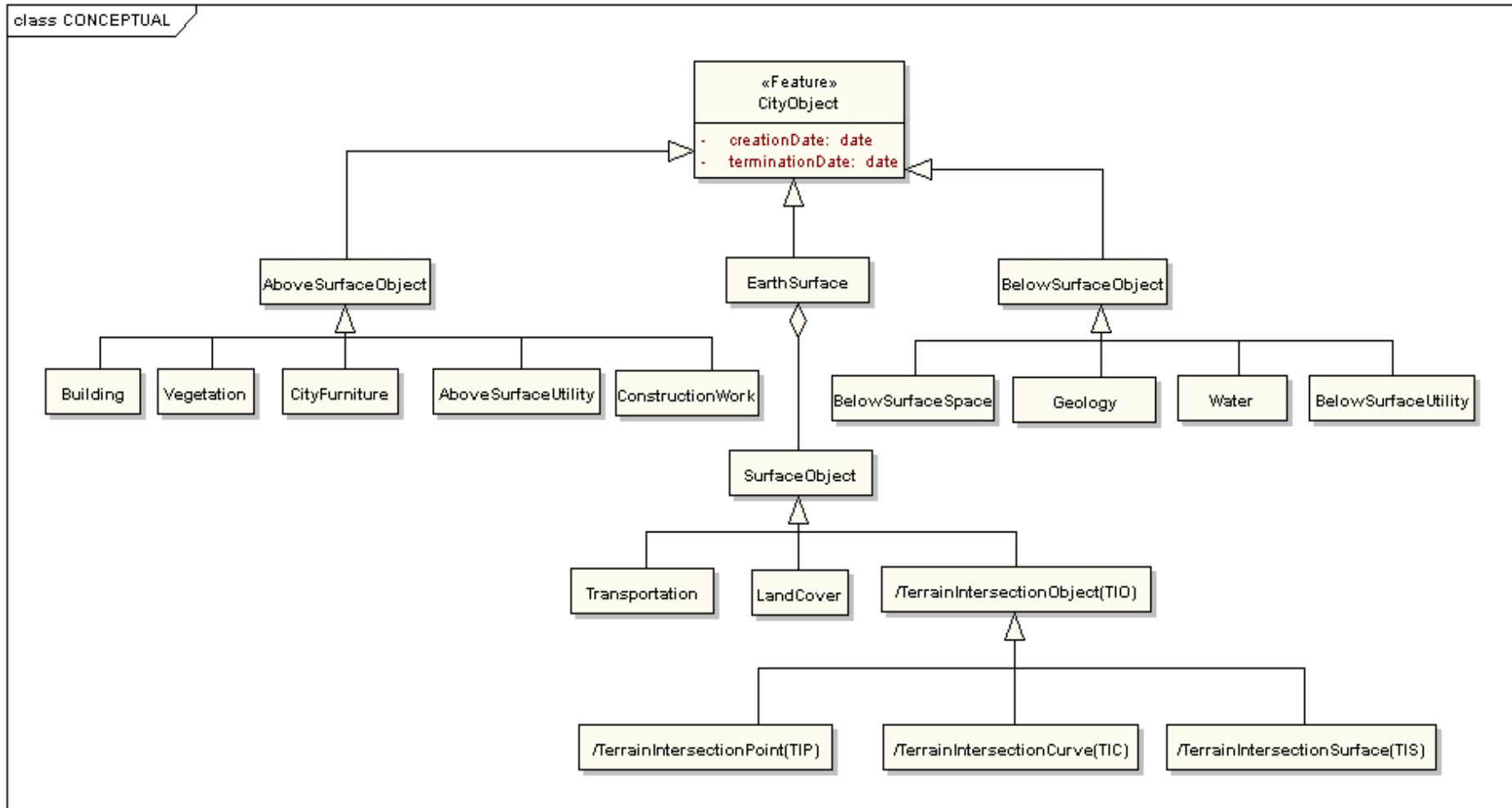
Above earth surface features

Vegetation Construction work Above surface utility Building City furniture



Below surface space Below surface utility Water Geology

Below earth surface features



Problem2:

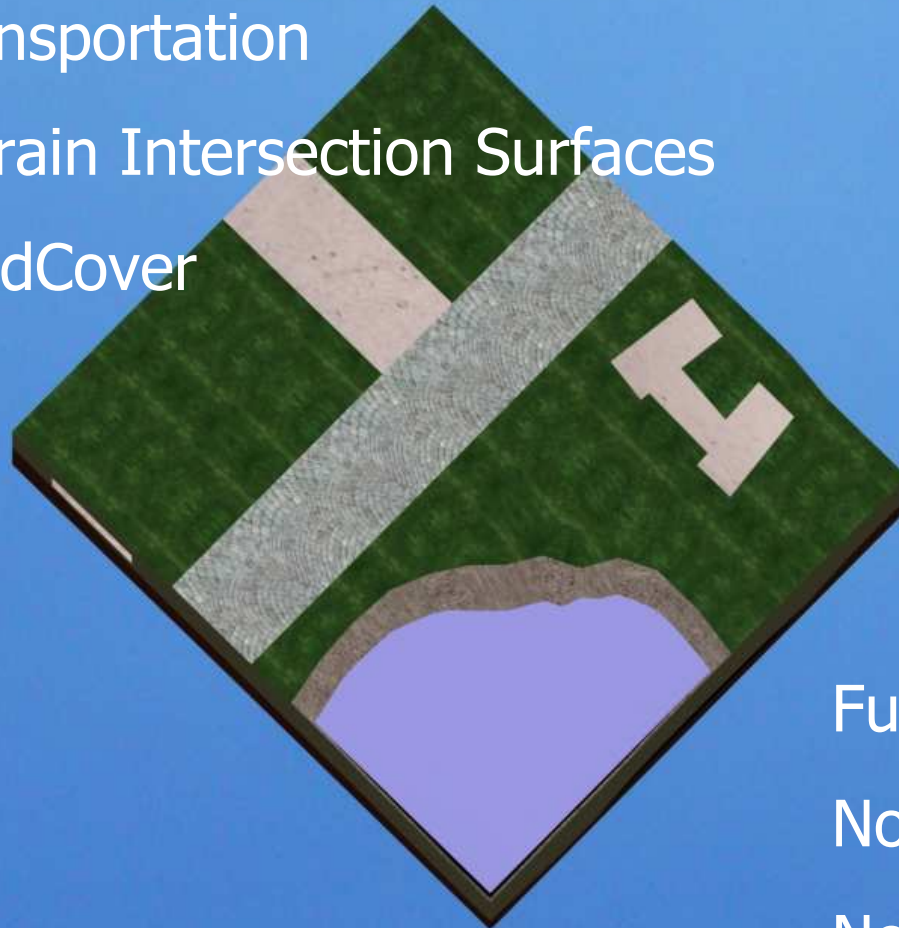
Sparse relations between geometries

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Earth Surface

- Transportation
- Terrain Intersection Surfaces
- LandCover

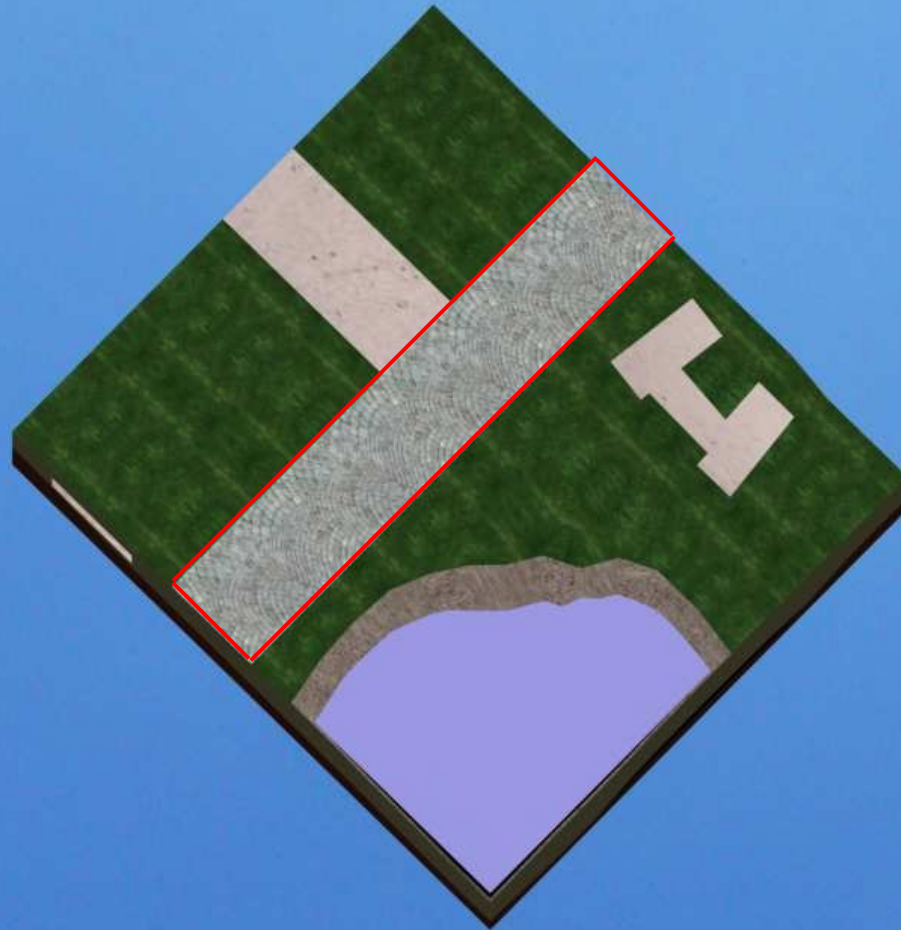


Full partition

No overlap

No holes

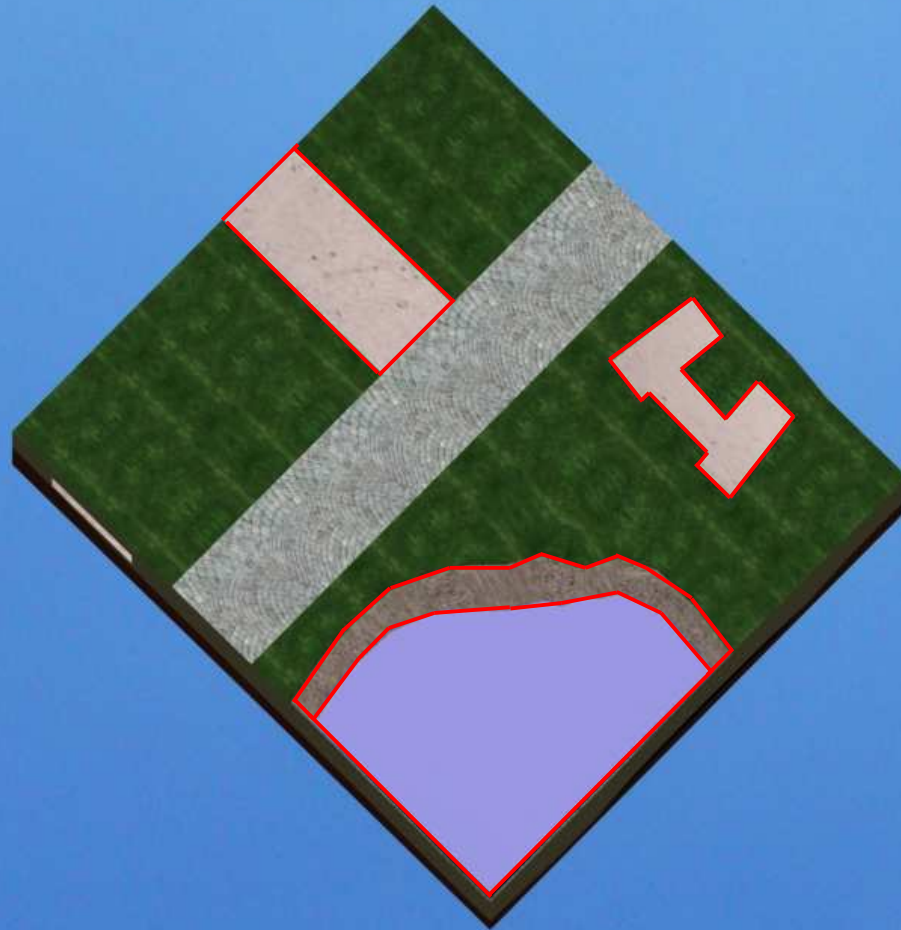
Transportation



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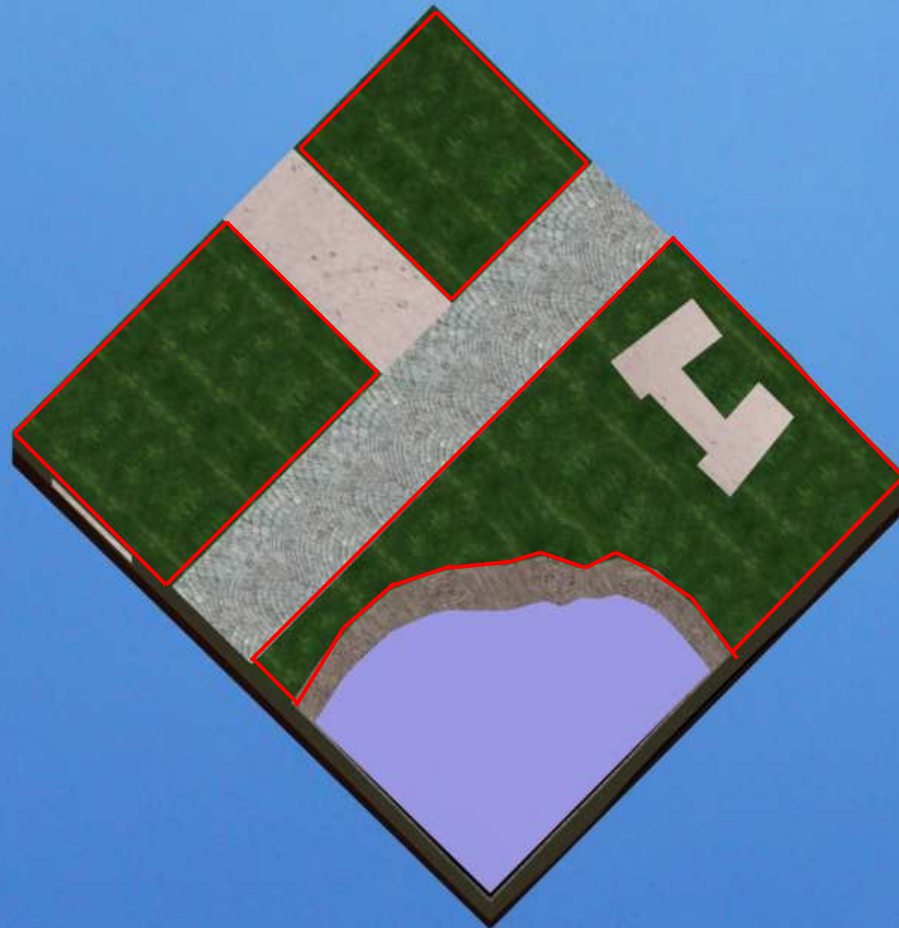
Terrain intersection surfaces (TIS)



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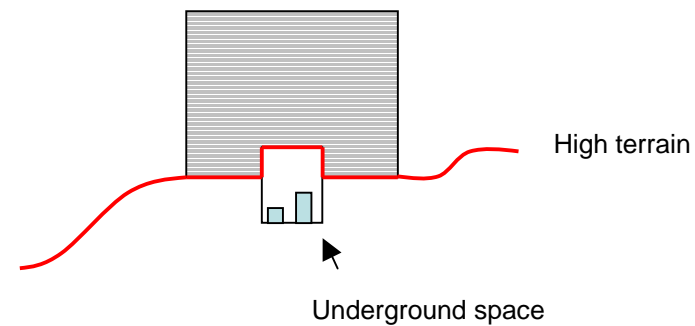
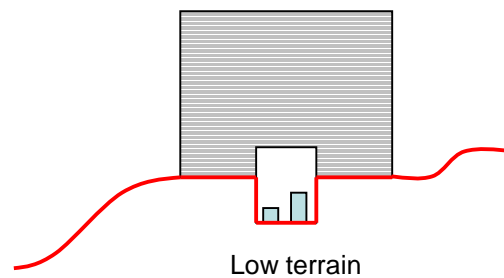
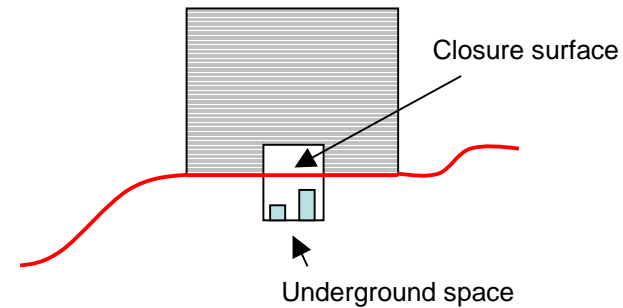
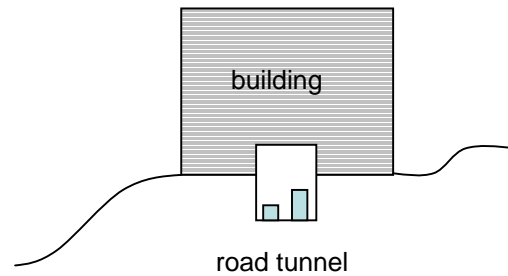
LandCover



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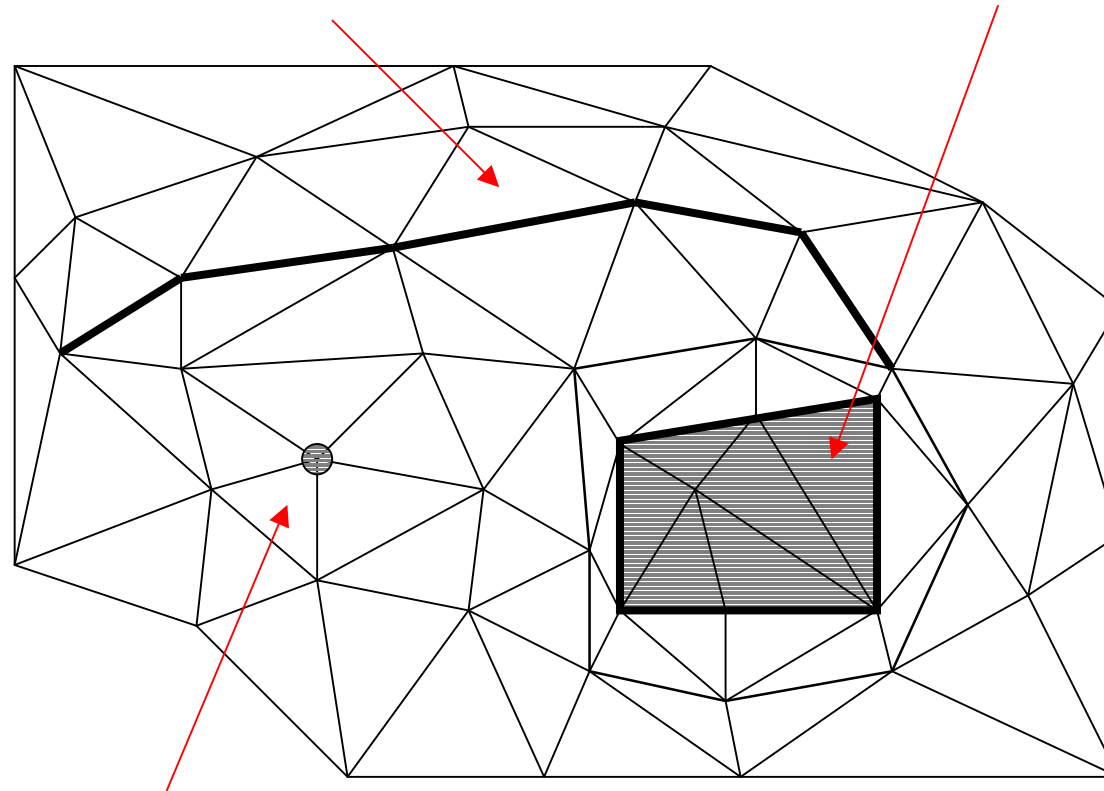
14

Complex situation -> choose!

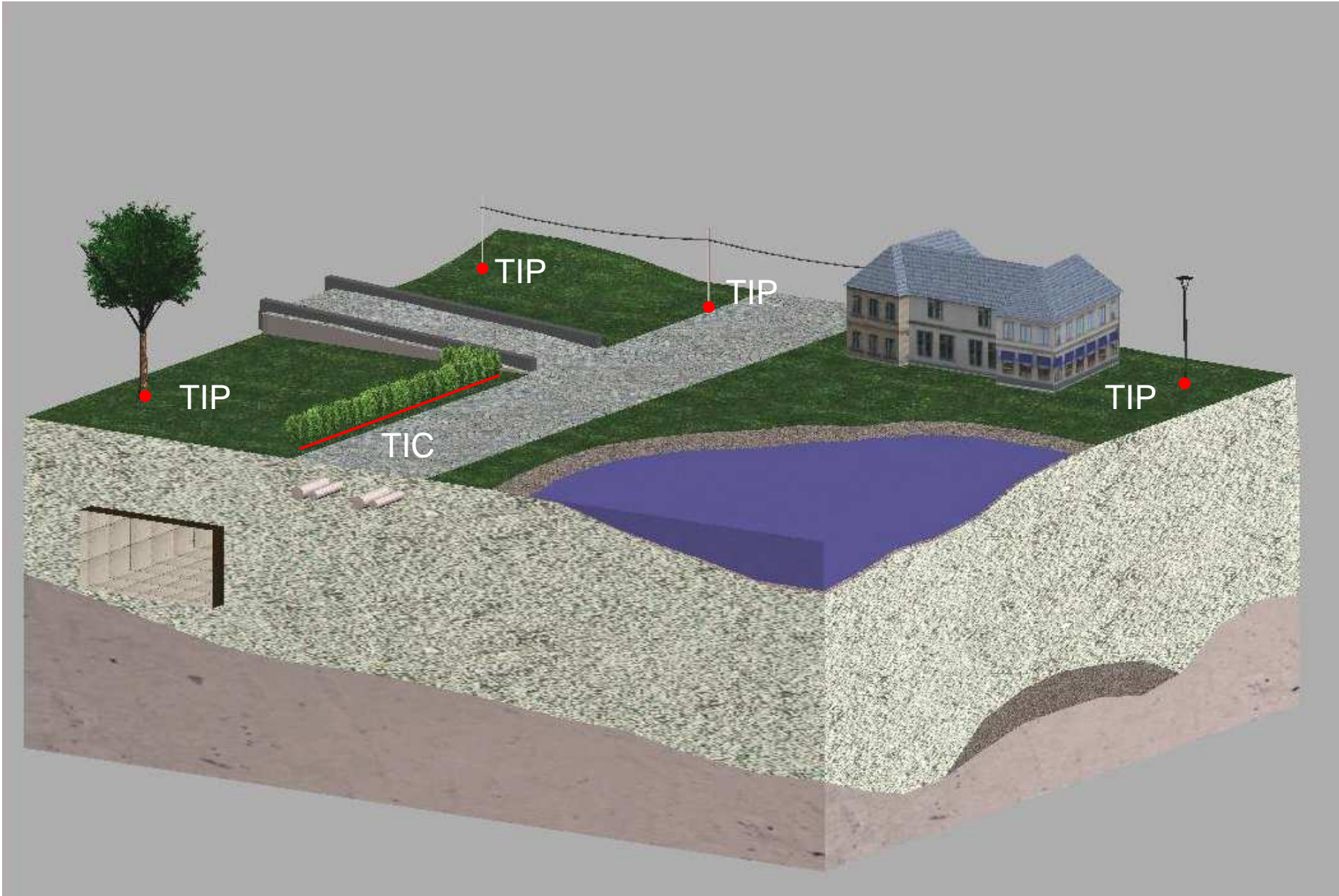


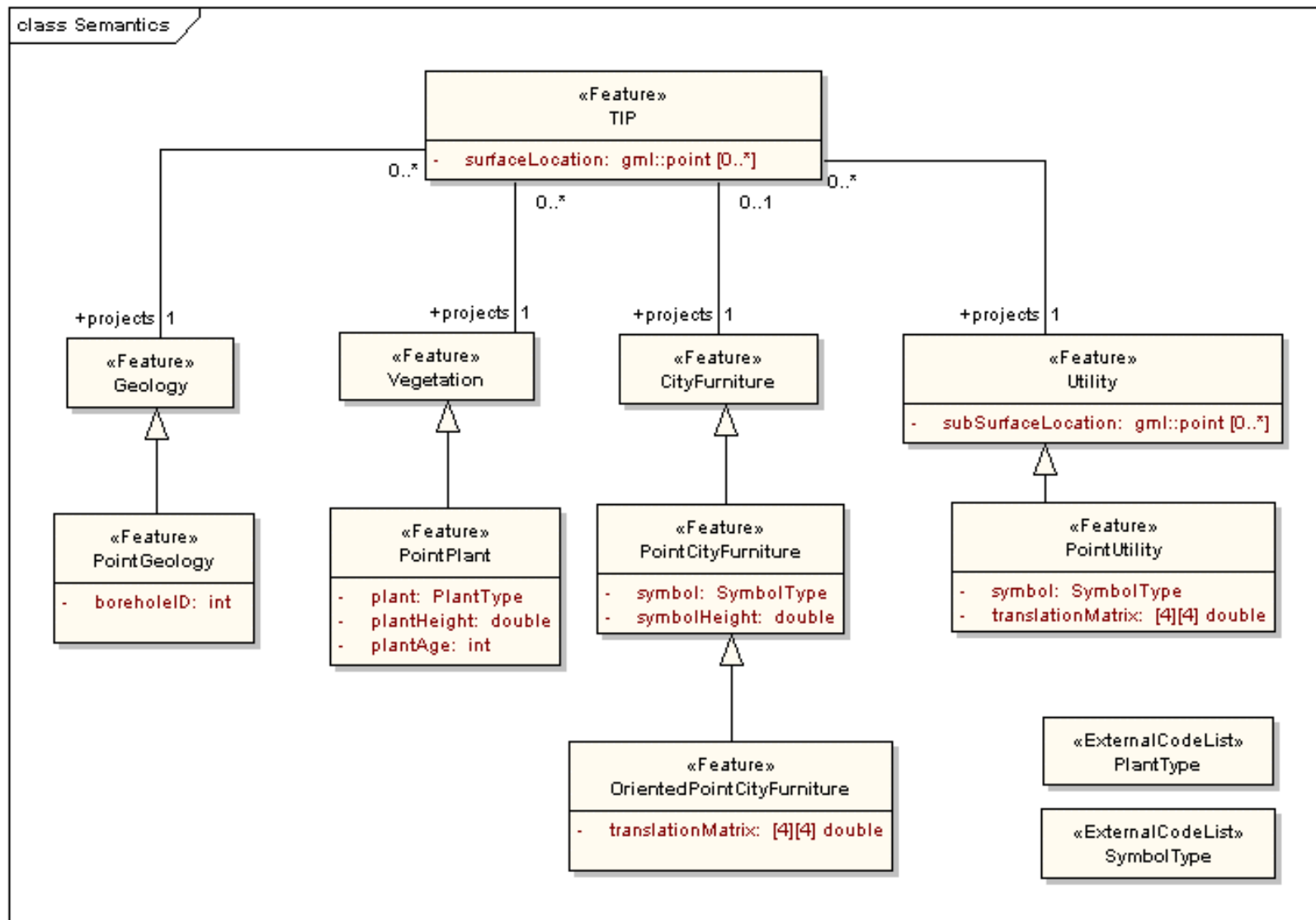
Terrain Intersection Curve (TIC)

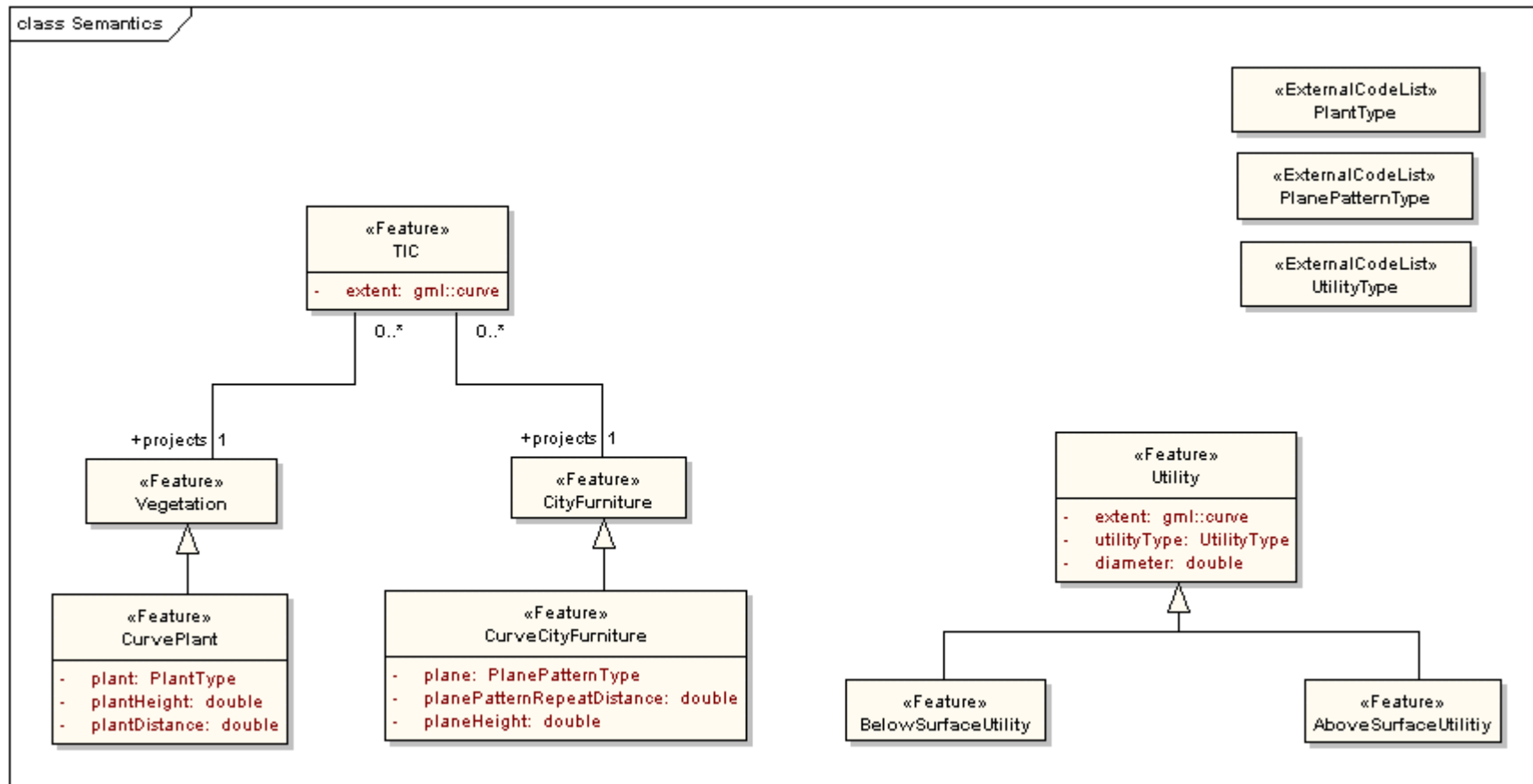
Terrain Intersection Surface (TIS)

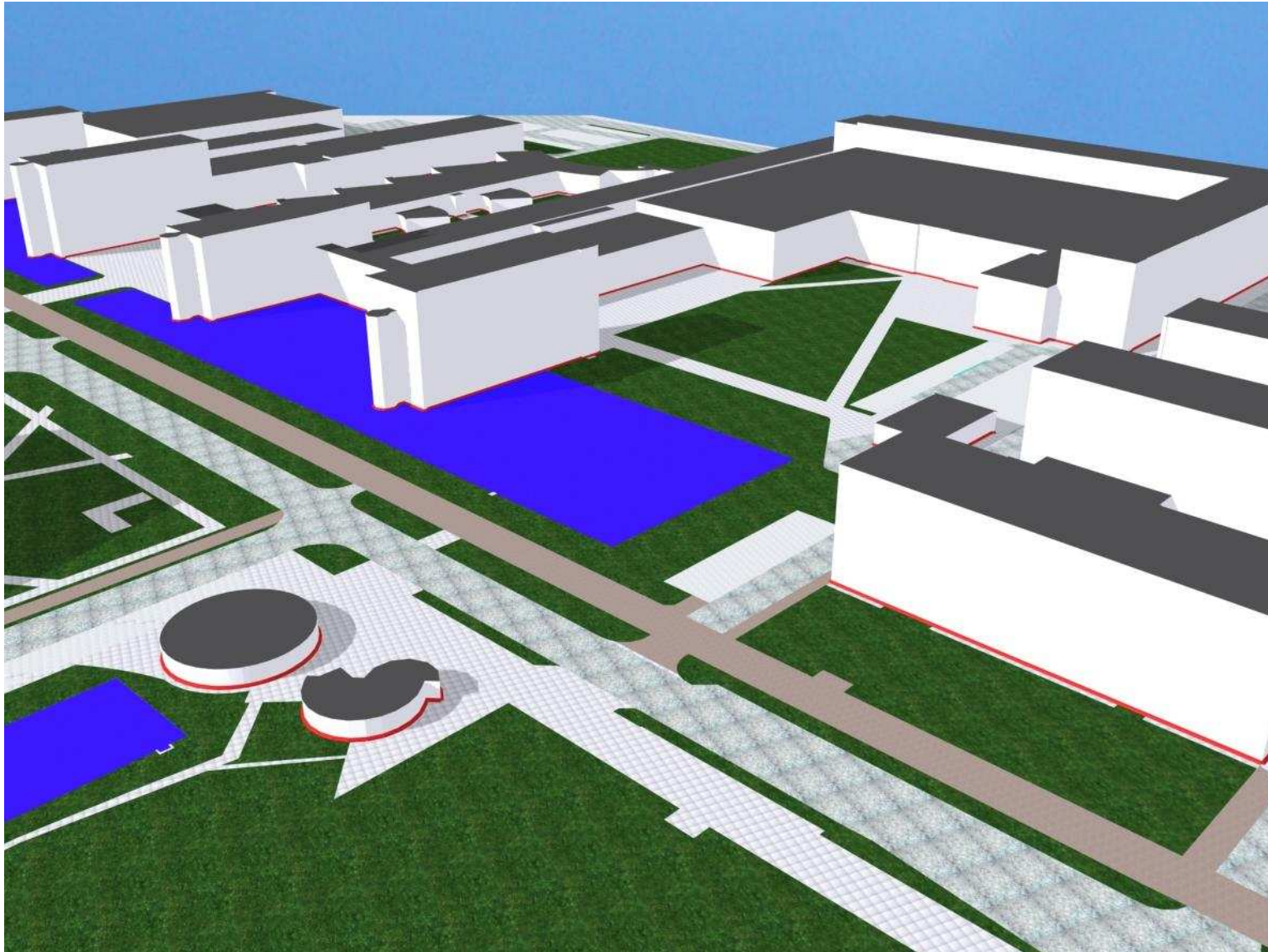


Terrain Intersection Point (TIP)



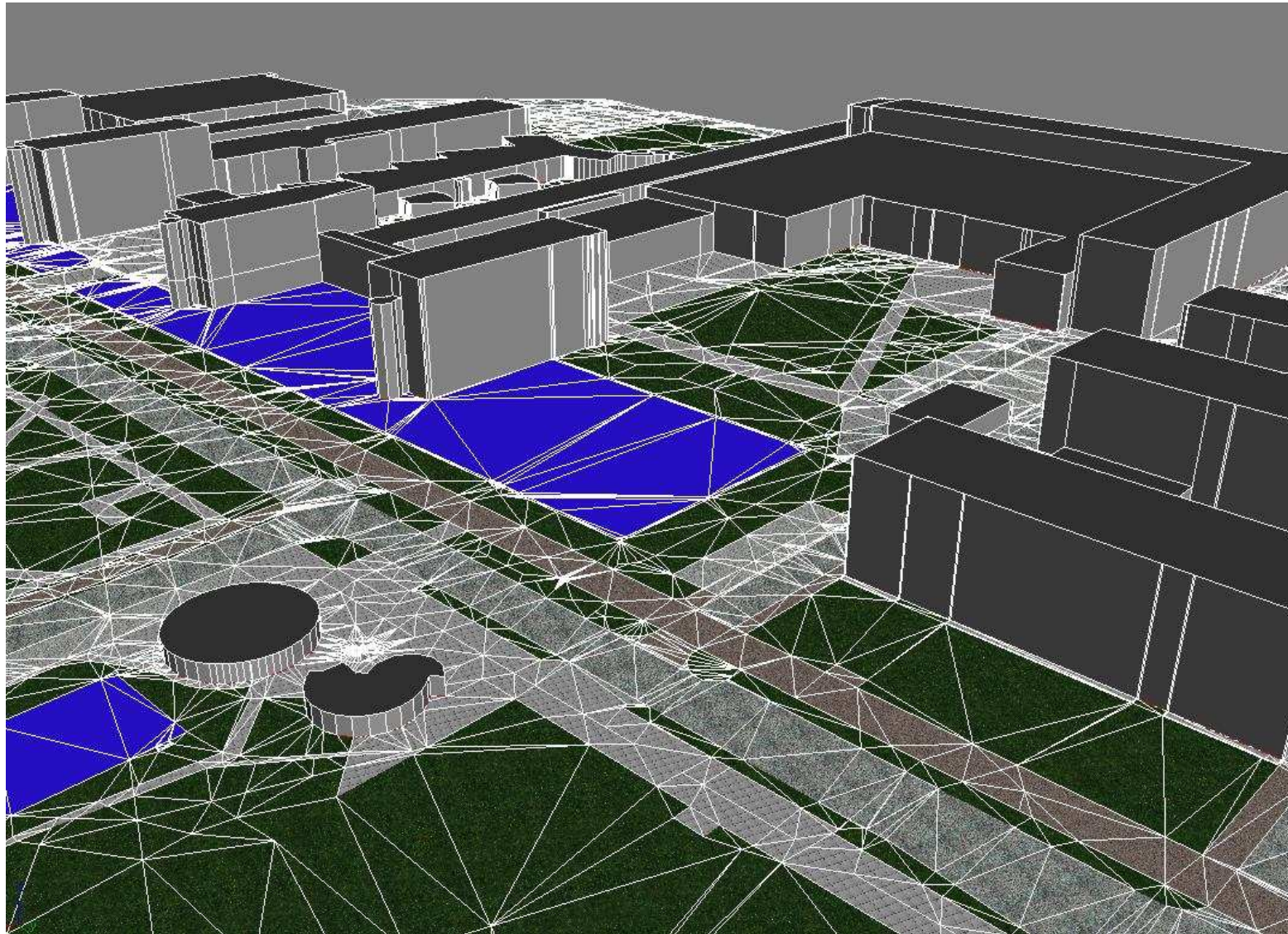






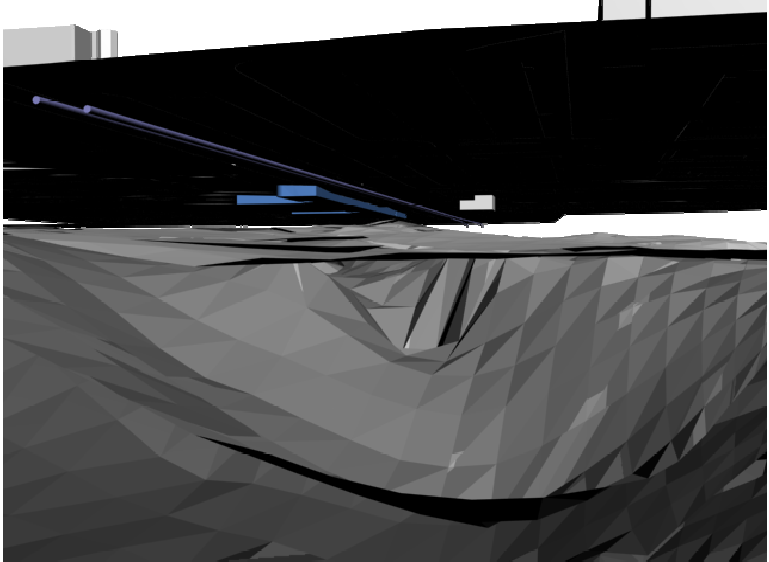
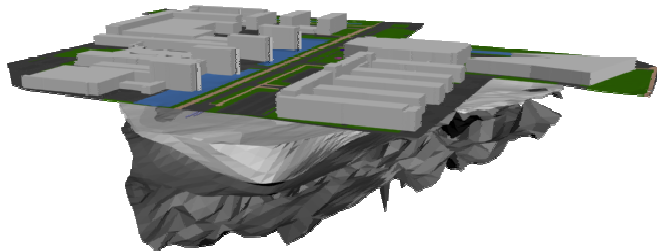
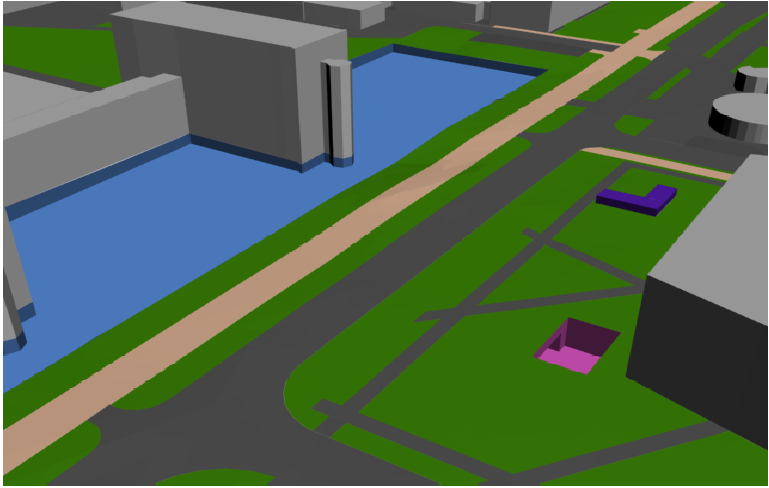
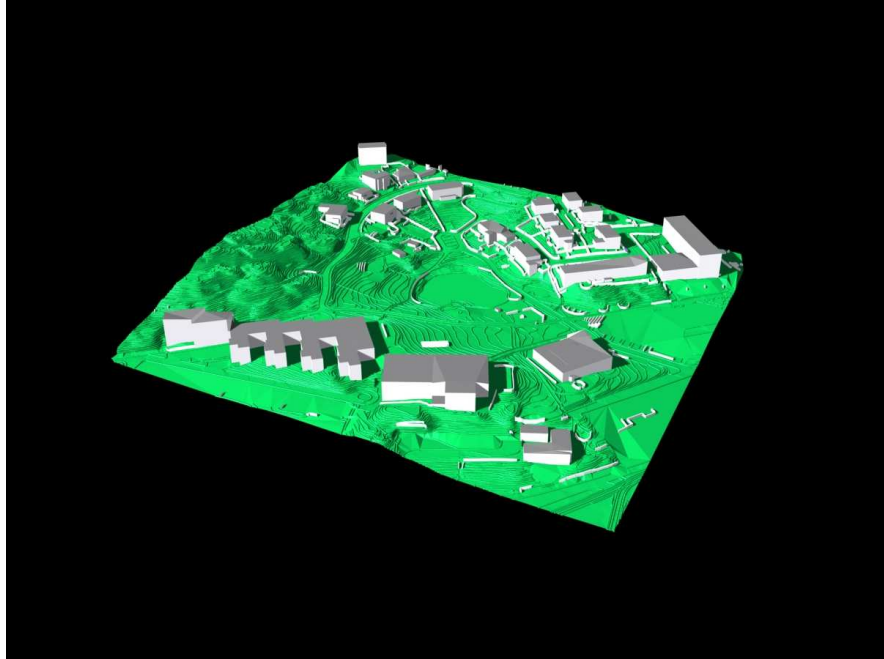
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3DIM summary

- Division of feature classes into above, below and on the surface
- Definition of general classes for the subsurface
- Full partition of the earth surface model
- Stronger integrity/relation between earth surface model and objects above and below: terrain intersection objects

3DIM future plans

- Further development concerning classifications of features and their properties
- More elaborated definition of semantic hierarchy of features based on semantic relations
- Definition of a rule based framework for the semantic-geometric relations

Questions?

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