

GeoBIM – a tool for optimal use of geotechnical data

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The TRUST logo features the word "TRUST" in large, bold, dark grey letters. Below the letters are stylized, overlapping green hills. A horizontal line runs across the middle of the hills, separating the ground surface from the underground structure. The text "Transparent Underground Structure" is written in a smaller, dark grey font below this line. The entire logo is set against a background of green silhouettes of a city skyline, trees, and a hot air balloon.

TRUST

Transparent Underground Structure

Who am I?

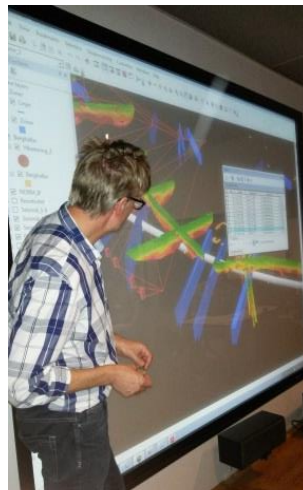
- Civil engineer Lund University, Sweden, 1990
- PhD Geotechnics/Geophysics 2001
- Consultant , Tyréns field geophysics 2002
- Head of Tyréns Geo department 2006

- Enthusiastic about
 - Combining different data for best geo model
 - Geophysics
 - Visualization of geo data
 - Well organized data



Many different actors

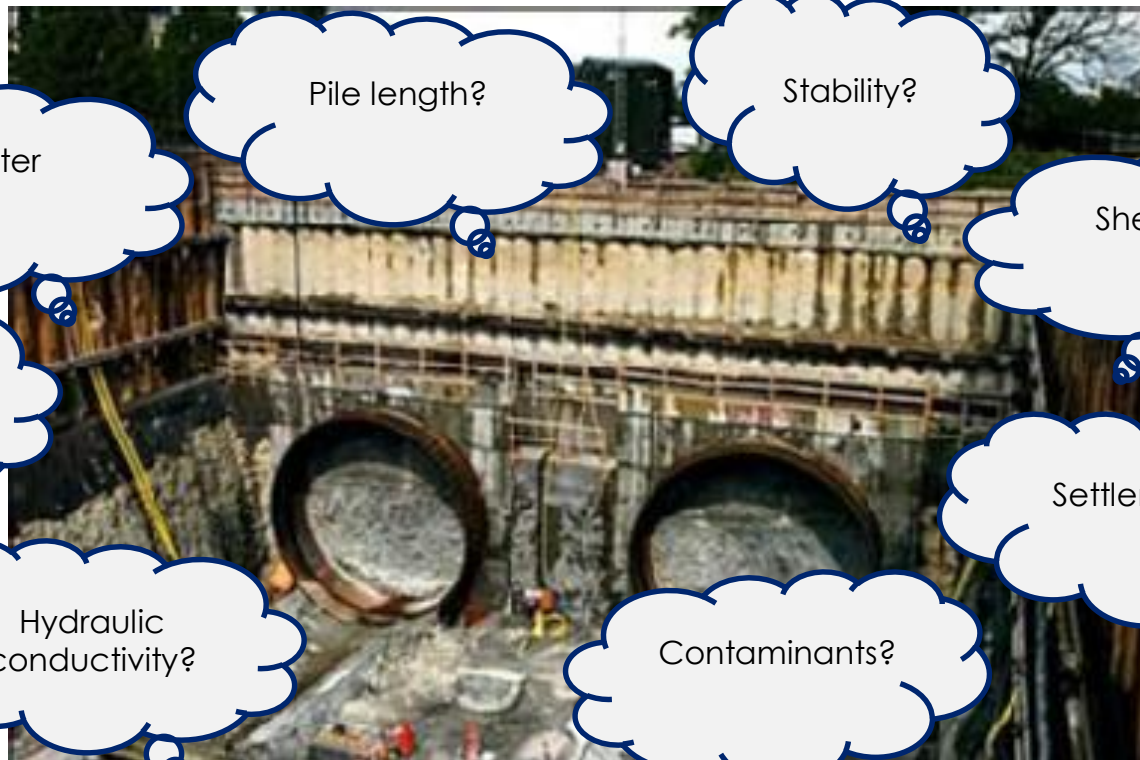
- Hydrogeologists
- Geotechnical engineers
- Contaminated soil specialists
- Other engineering disciplines
- Society in general
- Contractors
- Authorities
- Clients
- Politicians
- Media



Samråd
 18:00-20:00
 Hålanda Bygdegård
 2014-02-26
 Väg 1978,
 delen Verle -
 Gräfsnäs



Different needs.... Different capacity



Groundwater lowering?

Pile length?

Stability?

Sheet pile anchor levels?

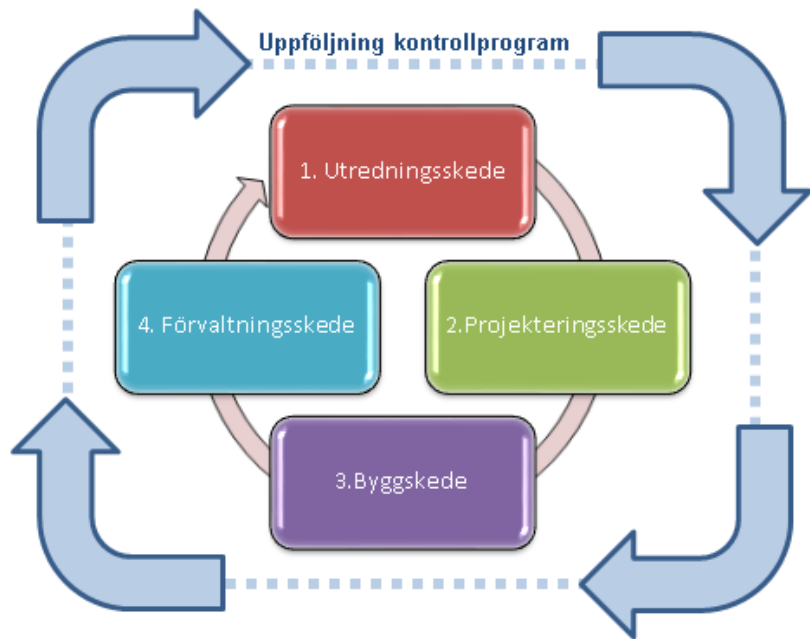
Vibrations?

Hydraulic conductivity?

Settlements?

Contaminants?

From field to long time administration



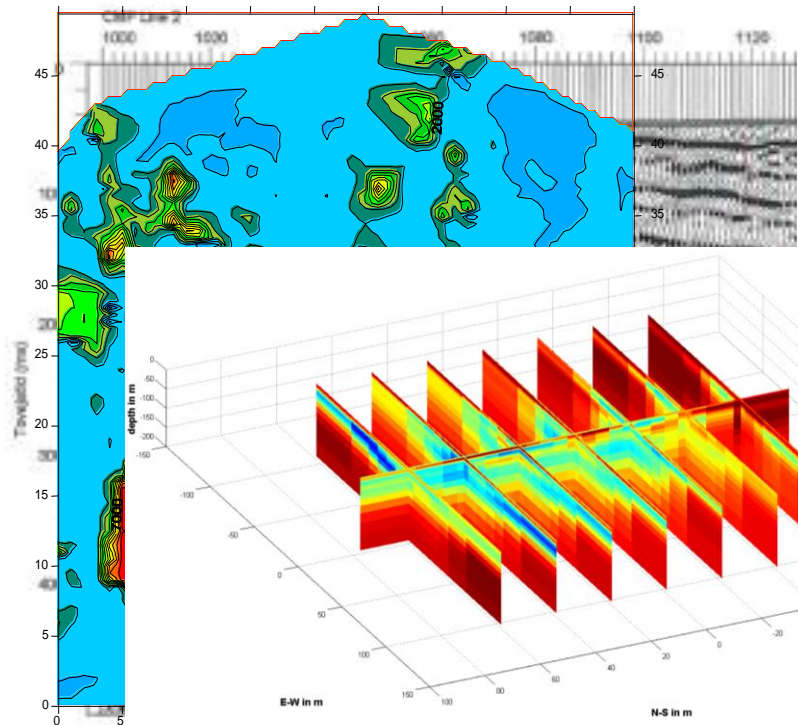
Today authorities lose data:

- Bypass Stockholm

Data GONE!

- Hallandsås 2 x 8 km railway tunnel

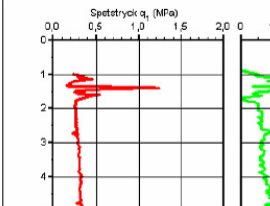
This is geo data



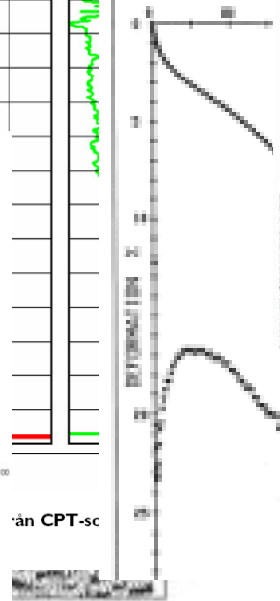
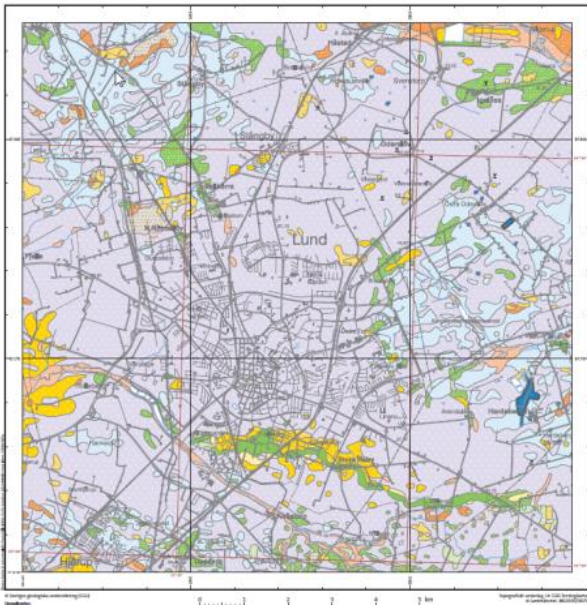
READING CPT 700
600

CPT-sondering utförd enligt EN

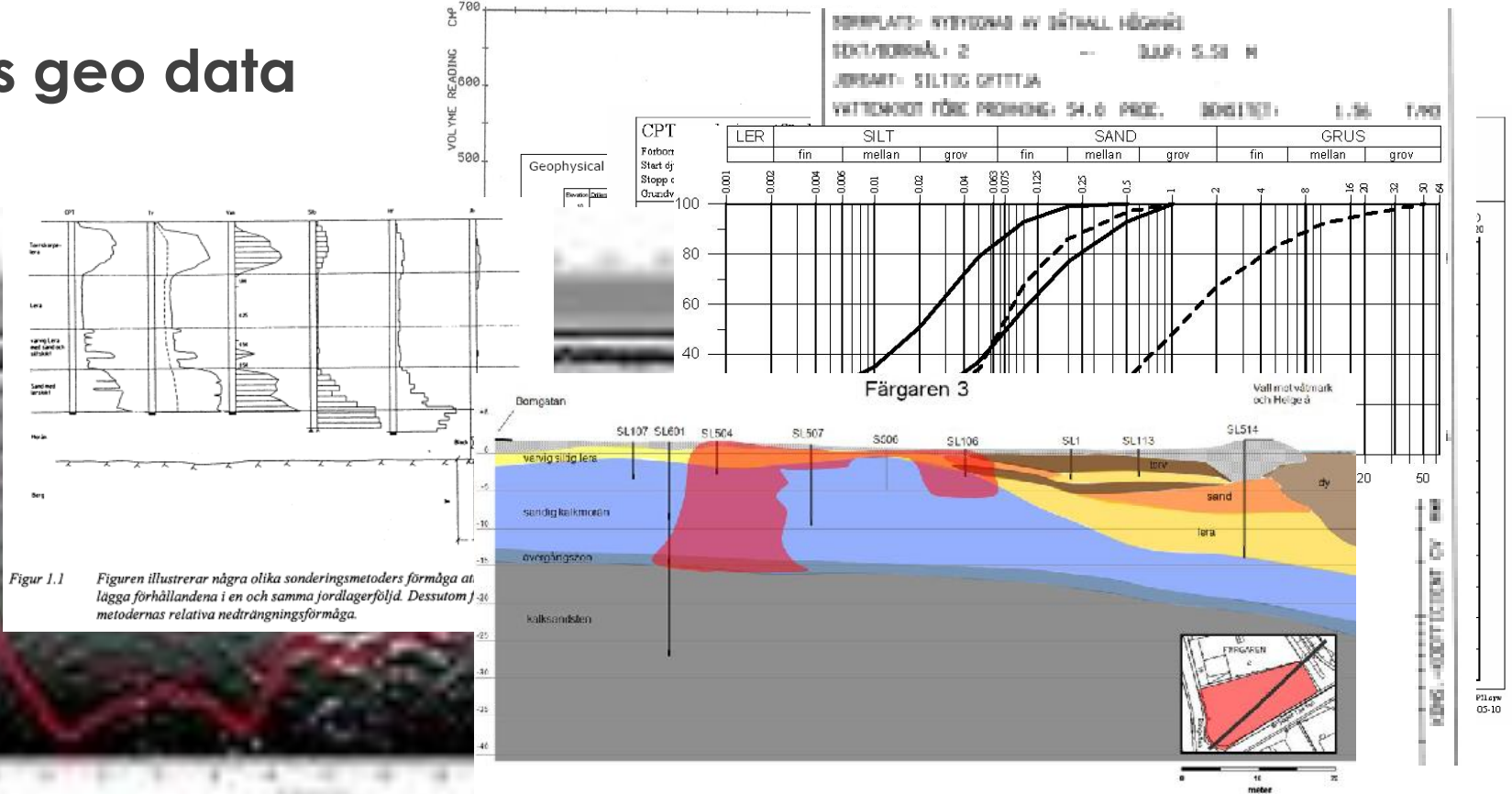
Förbohrningsdjup	1,00 m	Referens	
Start djup	1,00 m	Nivå vid	
Stopp djup	13,82 m	Förbohrs	
Grundvattennivå	1,00 m	Geometri	



BRANPLAT: KTH
EDU-NORMÅL 2
JORDART: SILTIG
VATTENRIGT FÖRE
ÖBONDET NO 2
PROFUND: 28.8
NOT-HAST: 6.68



This is geo data



Figur 1.1 Figuren illustrerar några olika sonderingsmetoders förmåga att lägga förhållandena i en och samma jordlagerföljd. Dessutom jämför metodernas relativa nedträngningsförmåga.

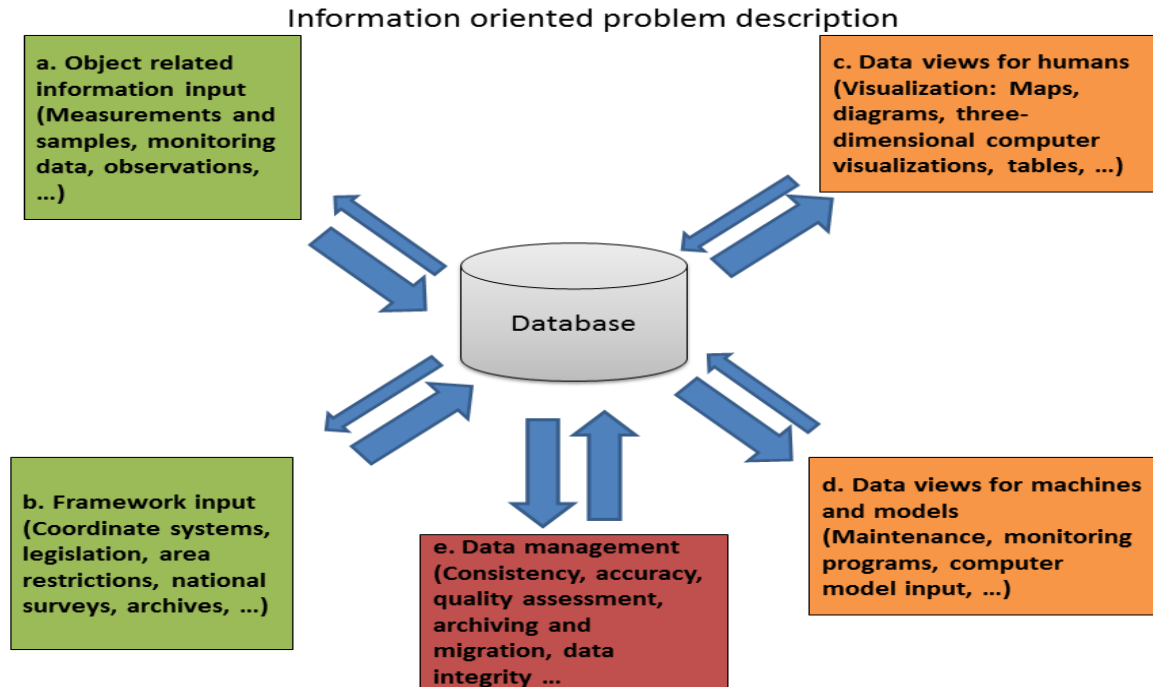
Why complicated?

- Many different data formats
 - AGS data format (handle many but not all data types)
 - in Sweden approx 10 methods (AutoCAD / GeoSuite)
- Lack of standards
- Specific software handle specific data
- No software can handle all data types

- Still a lot of manual work



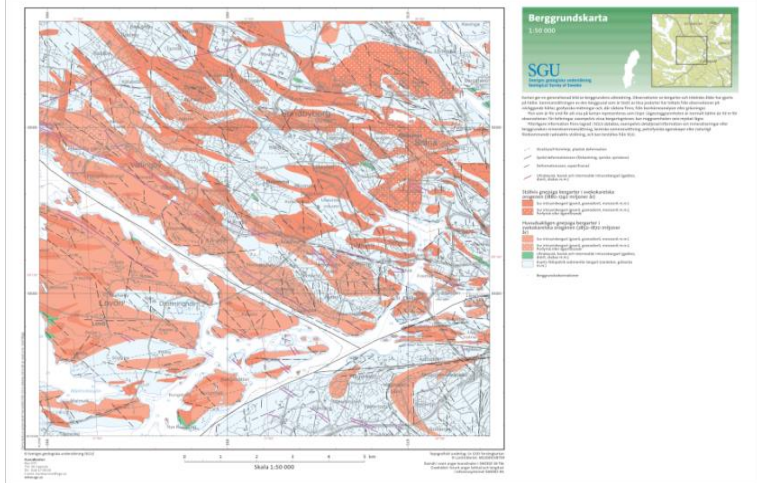
GeoBIM concept needed



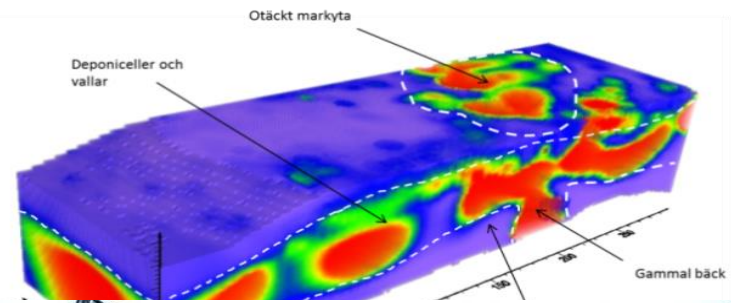
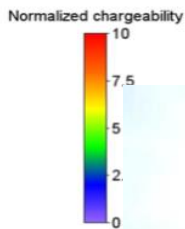
GeoBIM concept needed



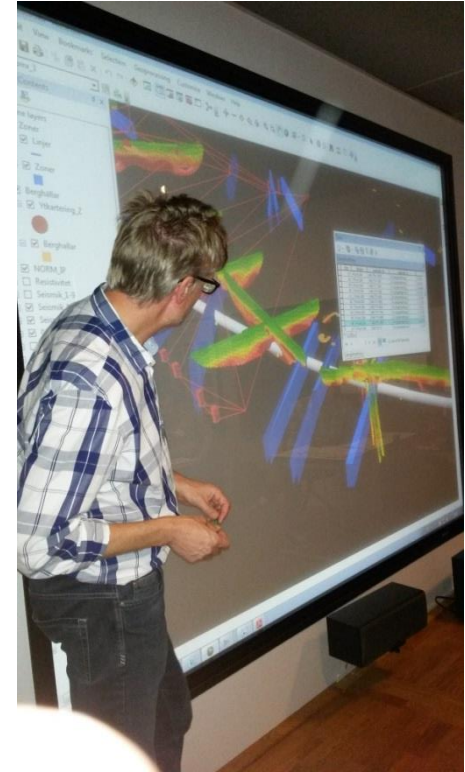
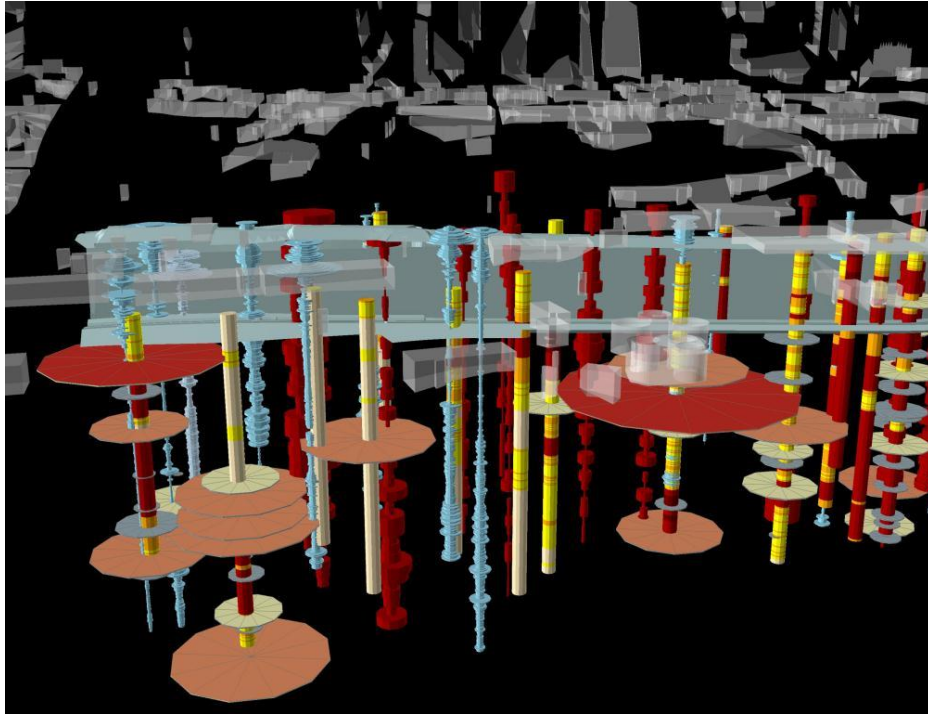
h oriente



**data management
consistency, accuracy,
quality assessment,
planning and
operation, data
integrity ...**



It could be like this



... or like this...

ESS – European Spallation Source

Lund, Sweden

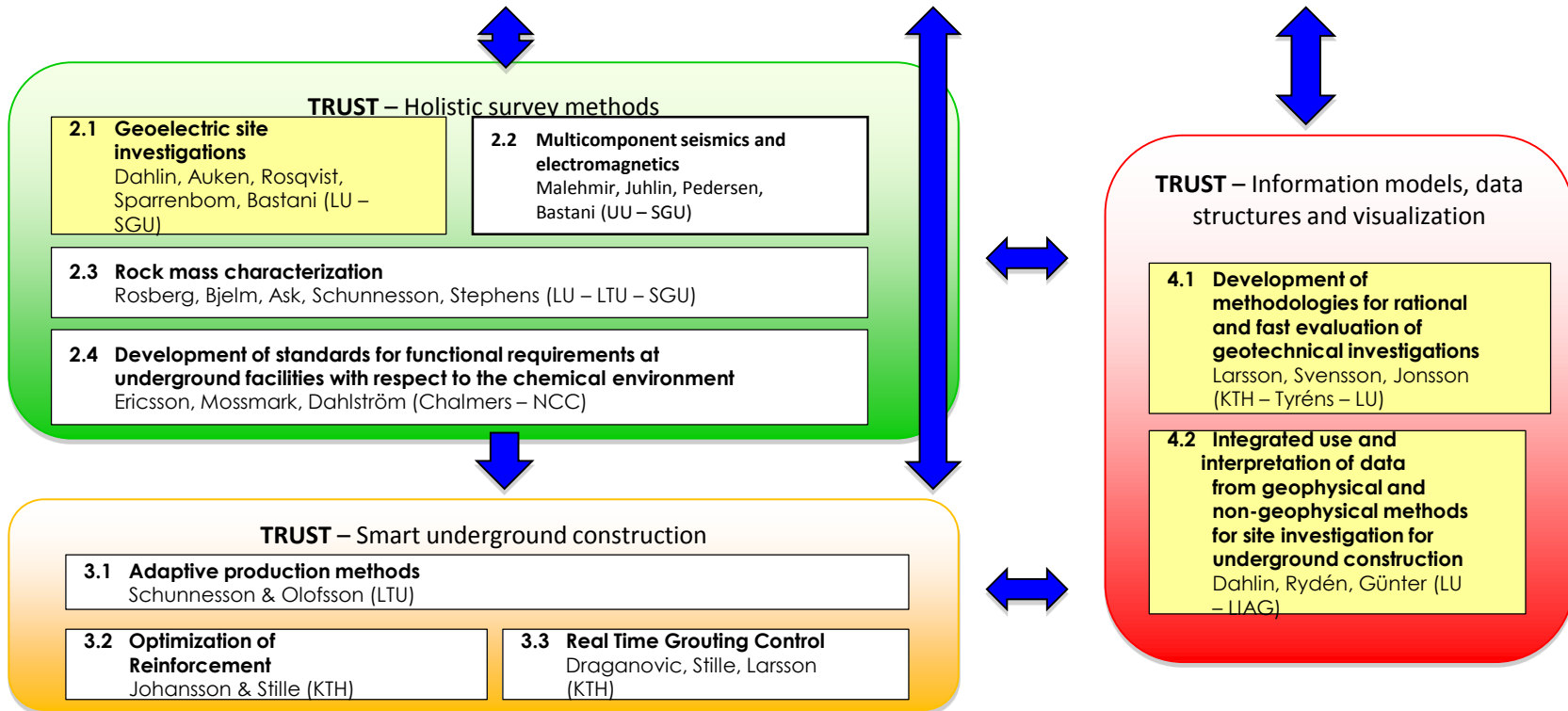


TRUST

Transparent Underground Structure

TRUST – Coordination, dissemination & innovation

1. Transparent Underground Structure (TRUST) – Management
Ask, Dahlin, Kadefors, Larsson, Mahleimir (LTU – LU – Chalmers – KTH – UU)

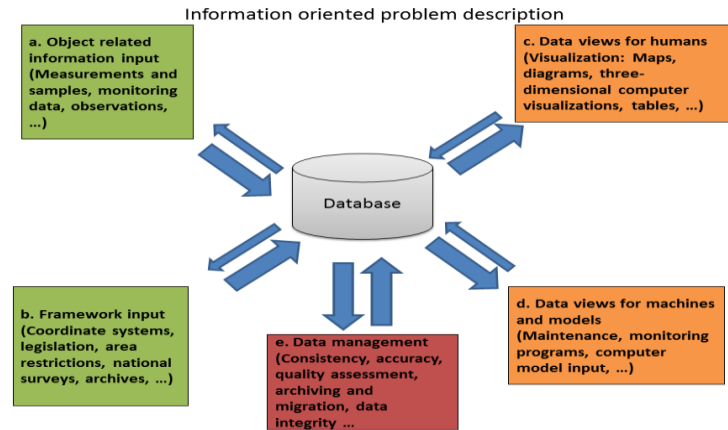
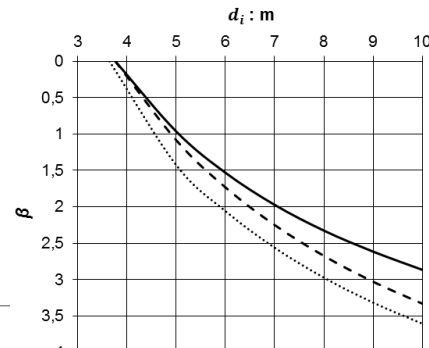


4.1 Development of methodologies for rational and fast evaluation of geotechnical investigations
Larsson, Svensson, Jonsson (KTH – Tyréns – LU)

4.2 Integrated use and interpretation of data from geophysical and non-geophysical methods for site investigation for underground construction
Dahlin, Rydén, Günter (LU – ILAG)

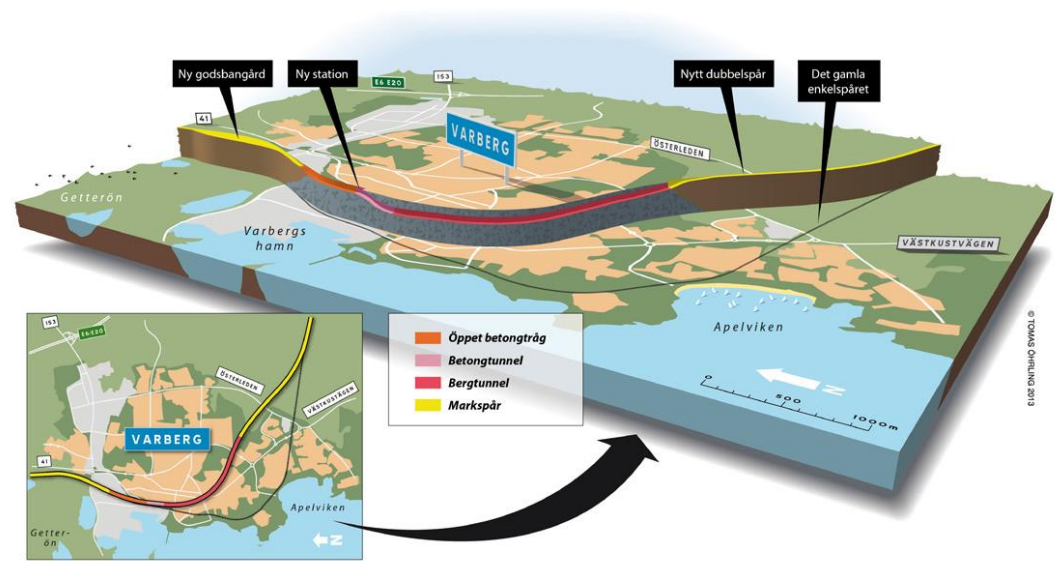
TRUST 4.1 Developing GeoBIM

- Handling ALL geo related data and methods in Infrastructure process
- All data saved with a value of uncertainty
- Make data accessible for all needs/applications
- Visualizing data crucial



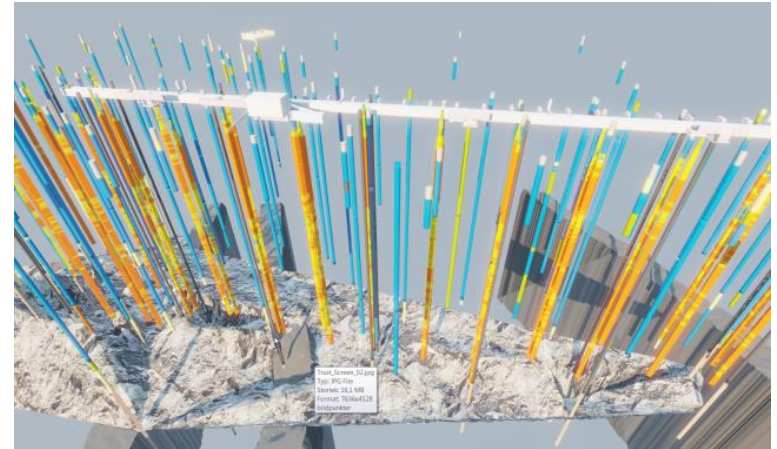
Varberg railway tunnel

- Geophysics visualized in Varberg tunnel

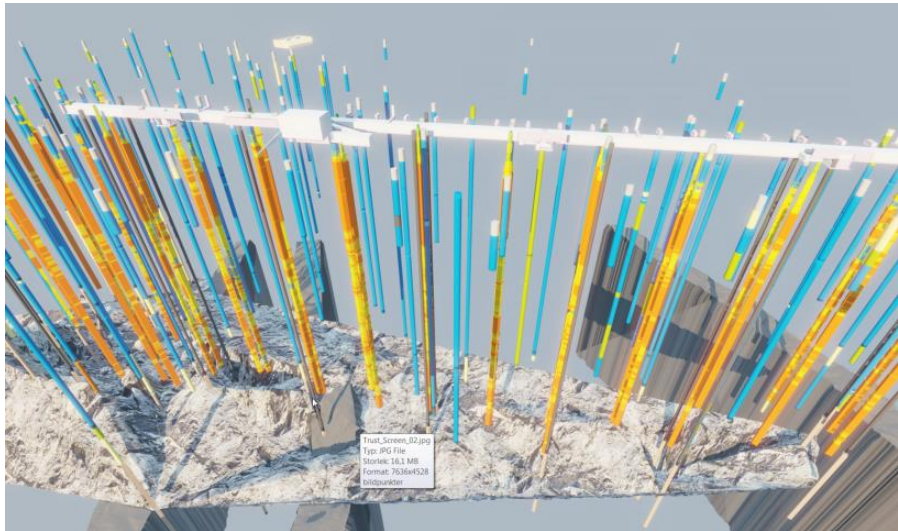


Powerful visualization of GeoBIM

- Large projects – a lot of data
- No tools in geotechnical industry convenient for visualization
- Use cores from computer game industry for real time visualization in 3D

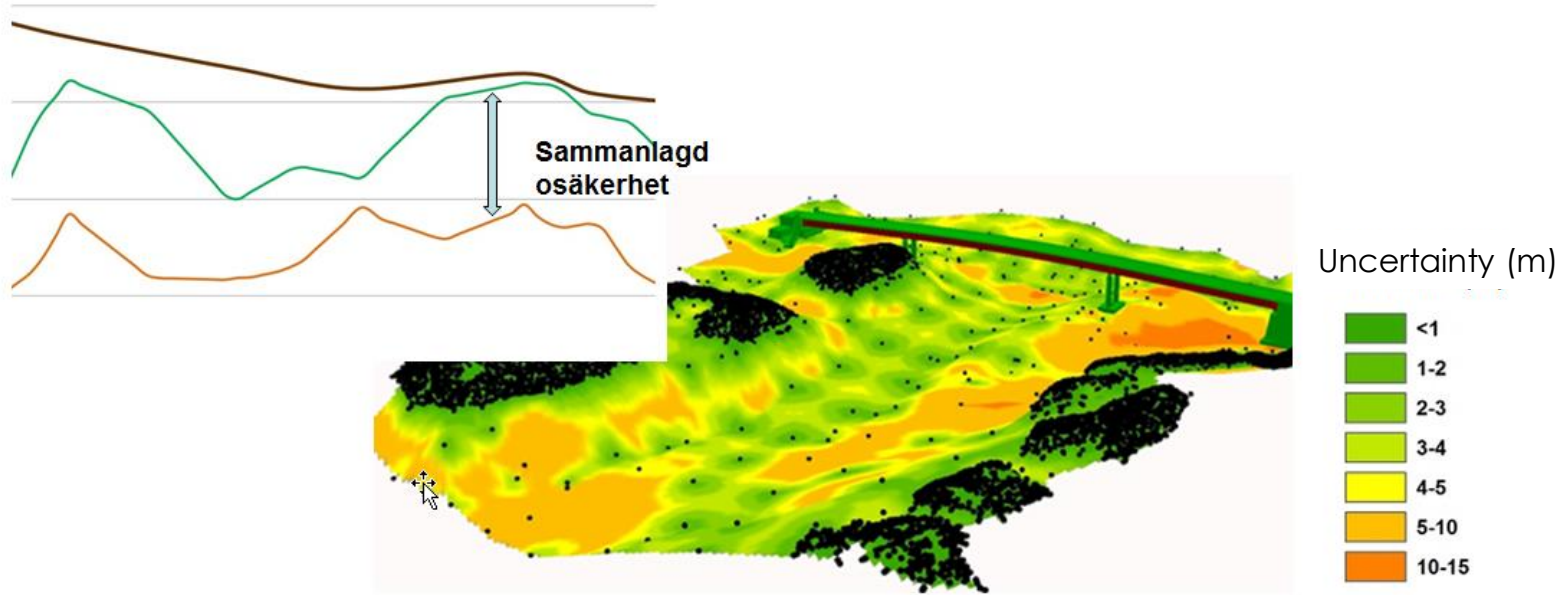


Example European Spallation Source (ESS)





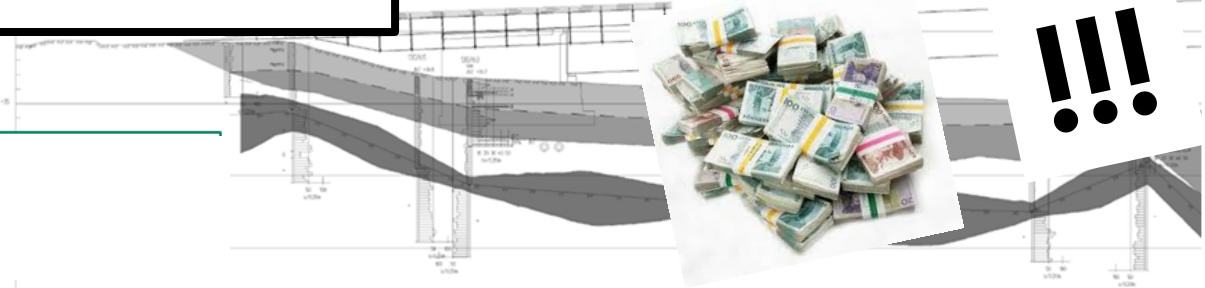
Model of uncertainty





Uncertainty model in tender and contract

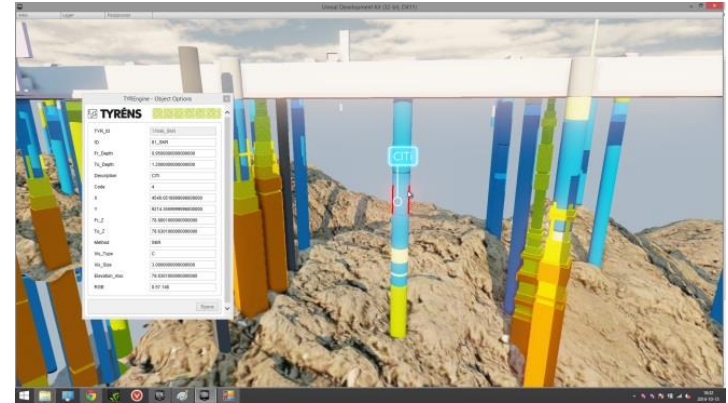
A well defined uncertainty model makes the bedrock model much more useful



With a well defined uncertainty model... ..
the **risk** is defined and could be **shared**

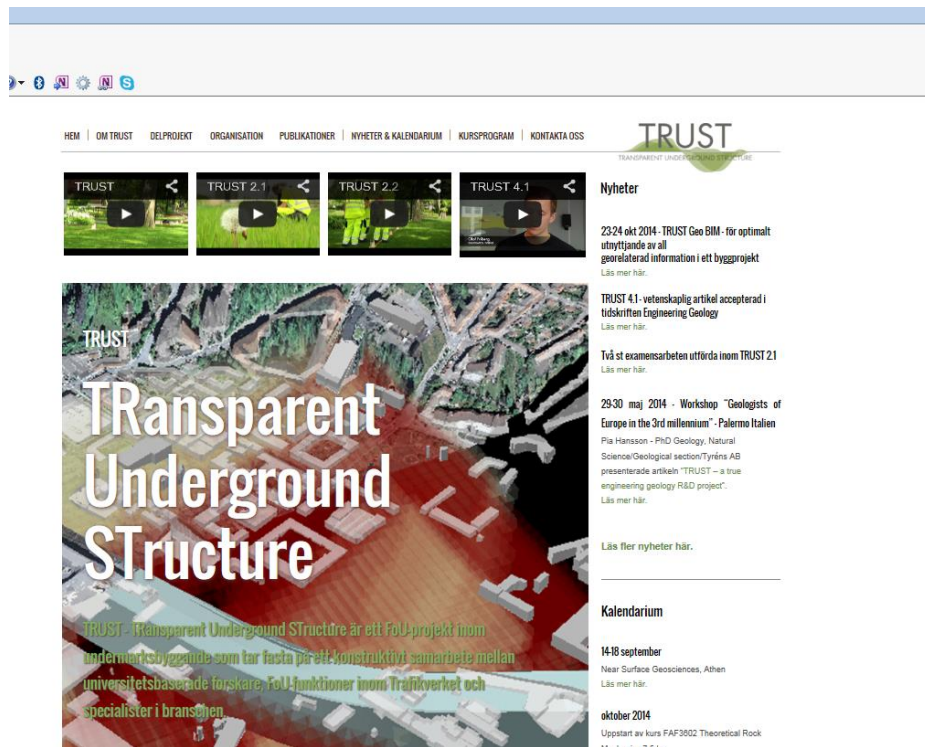
Conclusions

- Many actors – different needs
 - Data often lost
 - A need for data format standard
 - A need for the Geo-BIM concept
-
- Powerful visualization a fantastic COMMUNICATION tool
-
- Uncertainty model – saves a lot of claims and money



Want to know more?

- mats.svensson@tyrens.se
- www.trust-geoinfra.se



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TRUST
TRANSPARENT UNDERGROUND STRUCTURE

Nyheter

23-24 okt 2014 - TRUST Geo BIM - för optimalt utnyttjande av all georelaterad information i ett byggprojekt
Läs mer här.

TRUST 4.1 - vetenskaplig artikel accepterad i tidskriften Engineering Geology
Läs mer här.

Två st examensarbeten utförda inom TRUST 2.1
Läs mer här.

29-30 maj 2014 - Workshop "Geologists of Europe in the 3rd millennium" - Palermo Italien
Pia Hansson - PhD Geology, Natural Science/Geological section/Tyréns AB presenterade artikeln "TRUST - a true engineering geology R&D project".
Läs mer här.

Läs fler nyheter här.

Kalendarium

14-18 september
Near Surface Geosciences, Athen
Läs mer här.

oktober 2014
Uppstart av kurs FAF3002 Theoretical Rock
Läs mer här.

TRUST - Transparent Underground Structure är ett FoU-projekt inom undermarksbyggnad som tar fasta på ett konstruktivt samarbete mellan universitetsbaserade forskare, FoU-funktioner inom Trafikverket och specialister i branschen.

Thank you

www.trust-geoinfra.se

