

Presented at the FIG Working Week 2016,
May 2-6, 2016 in Christchurch, New Zealand

BIM to Construction Site

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FIG Working Week 2016

CHRISTCHURCH, NEW ZEALAND 2-6 MAY 2016

Recovery

from disaster

Organised by



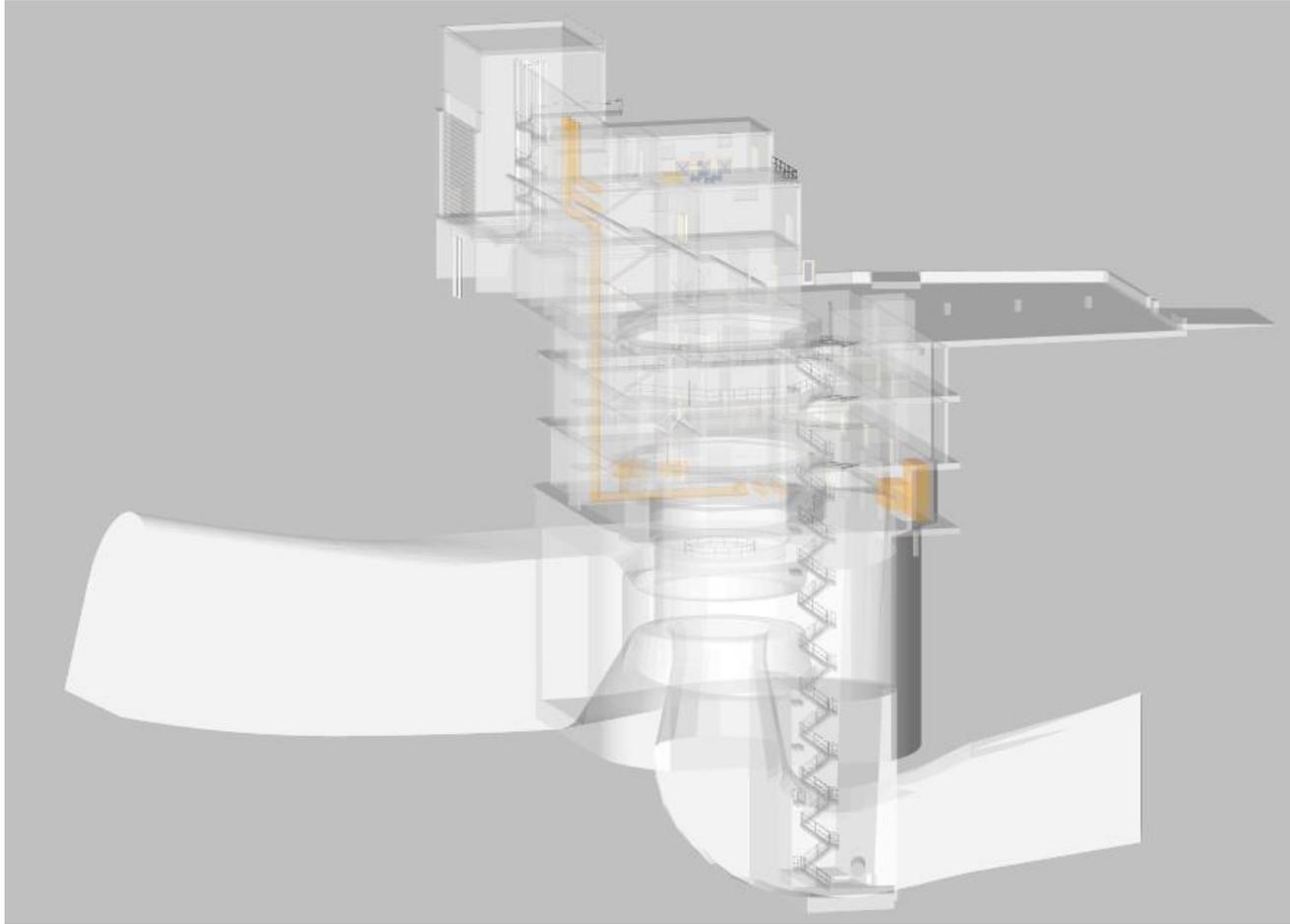
Platinum Partners



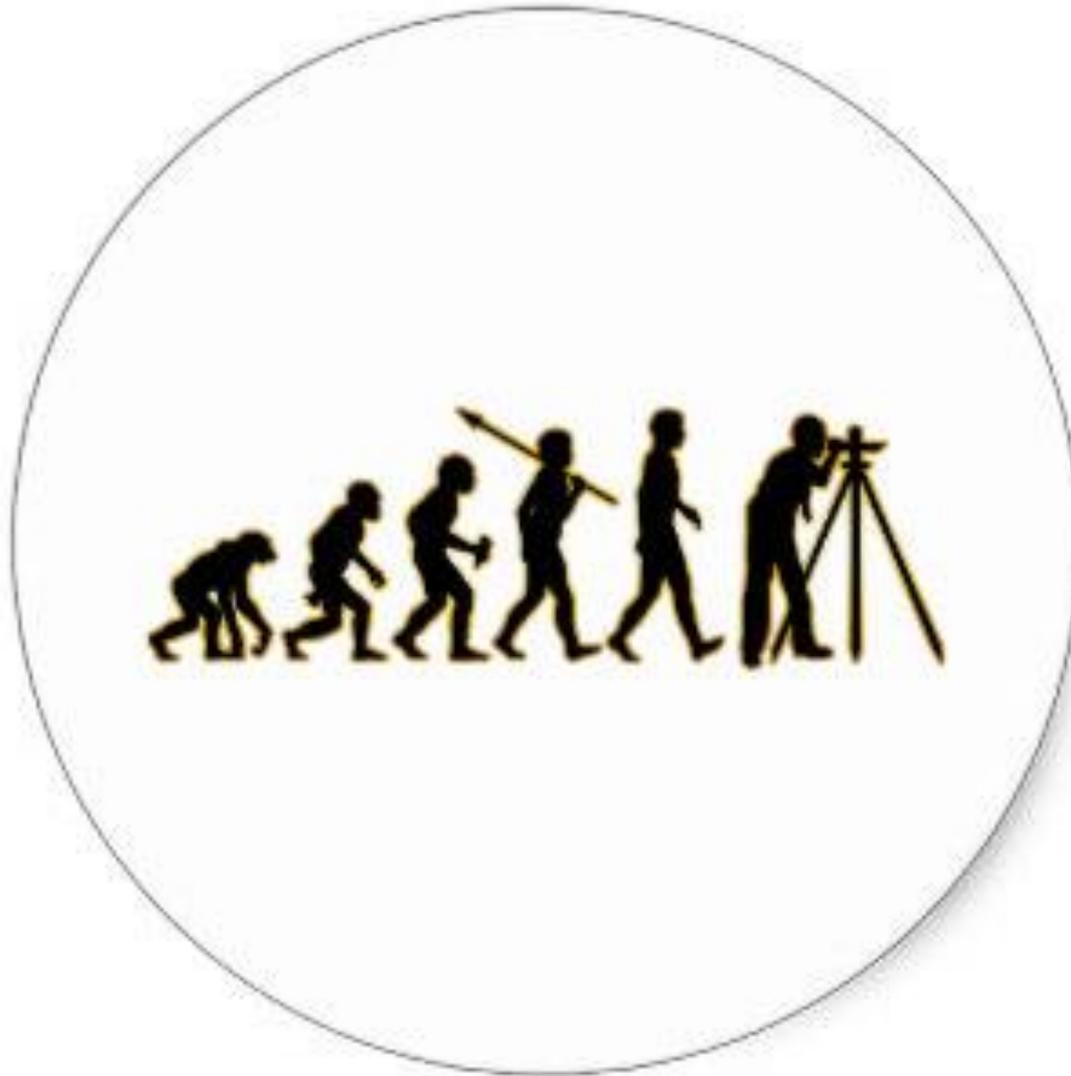
Diamond Partner



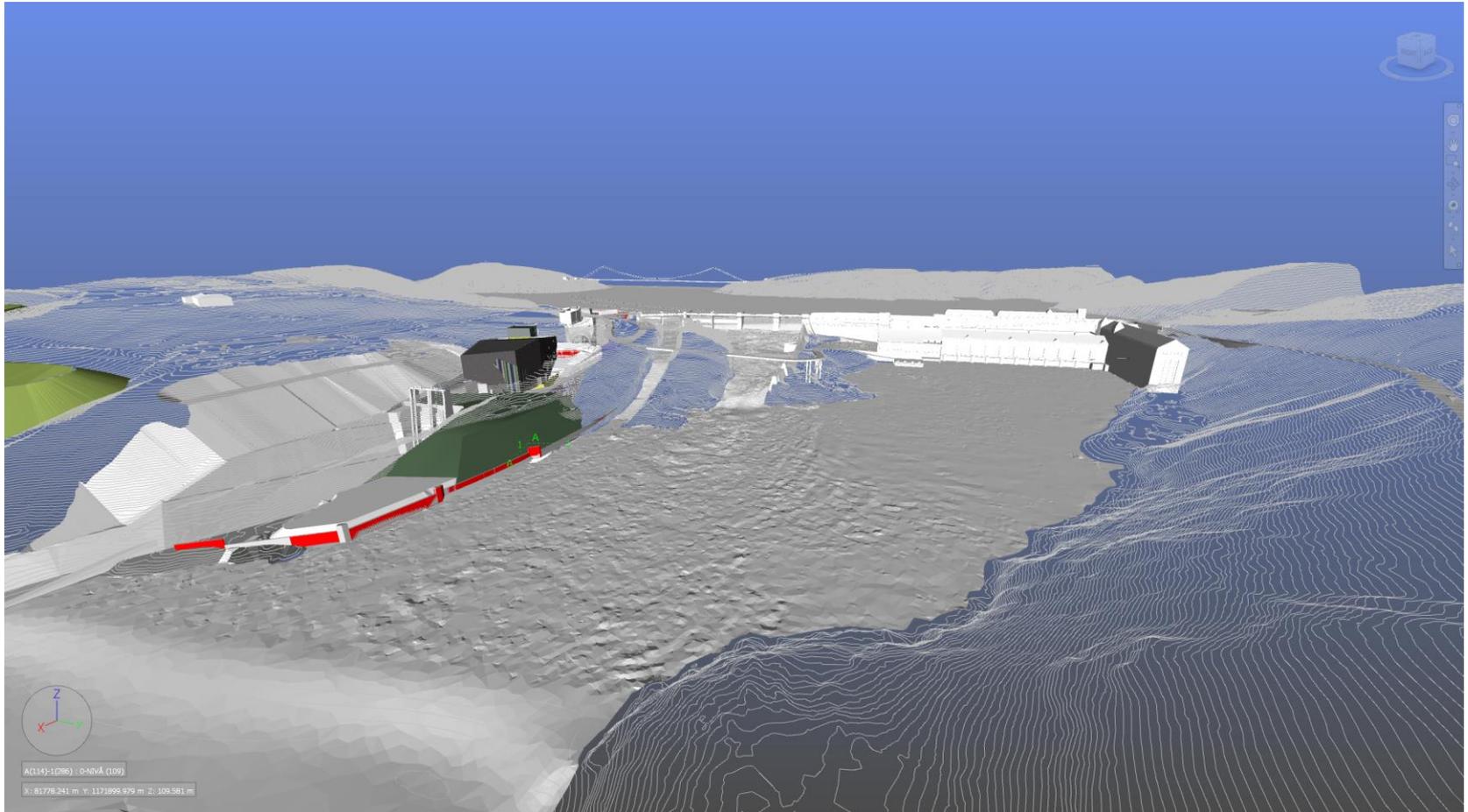
What is BIM without surveying engineers?



Surveying engineers should take a new step



In order to build we need a solid foundation

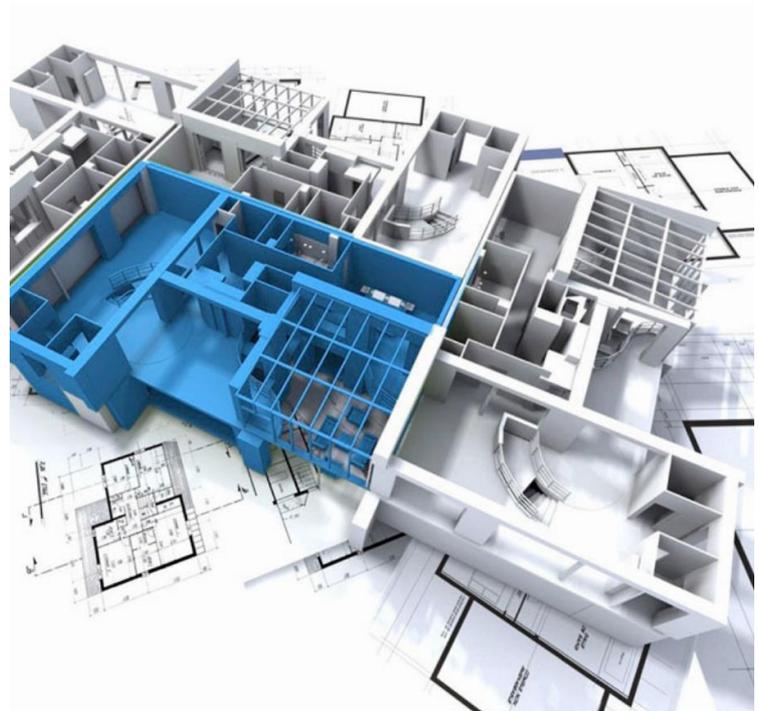


The contribution of a surveyor on BIM projects

- establishment of a good starting point for all projects
- accurate documentation of space and structures
- optimized work processes
- seamless integration between field and office for
 - improved collaboration
 - better time and risk management
 - avoid waste of time and resources
 - avoid mistakes and unnecessary costs

BIM in Norconsult

- Overall BIM Strategy
- BIM as tool for engineering
- BIM at the construction site
- BIM as basis for FM
- Benefits of employing BIM



Overall BIM strategy in Norconsult

- Norconsult shall employ **BIM on all projects**
- Investment on both **BIM Tech** and **BIM Team**
- Development of **standardized work processes**, which are documented in the company **BIM manuals**
- **Separate models** for every discipline during processing
- **Combination** of models from all disciplines in the **collaboration environment**
- **Interdisciplinary control** inside collaboration environment
- All BIM **models include built-in information about quantities** and can be used in all stages of a project

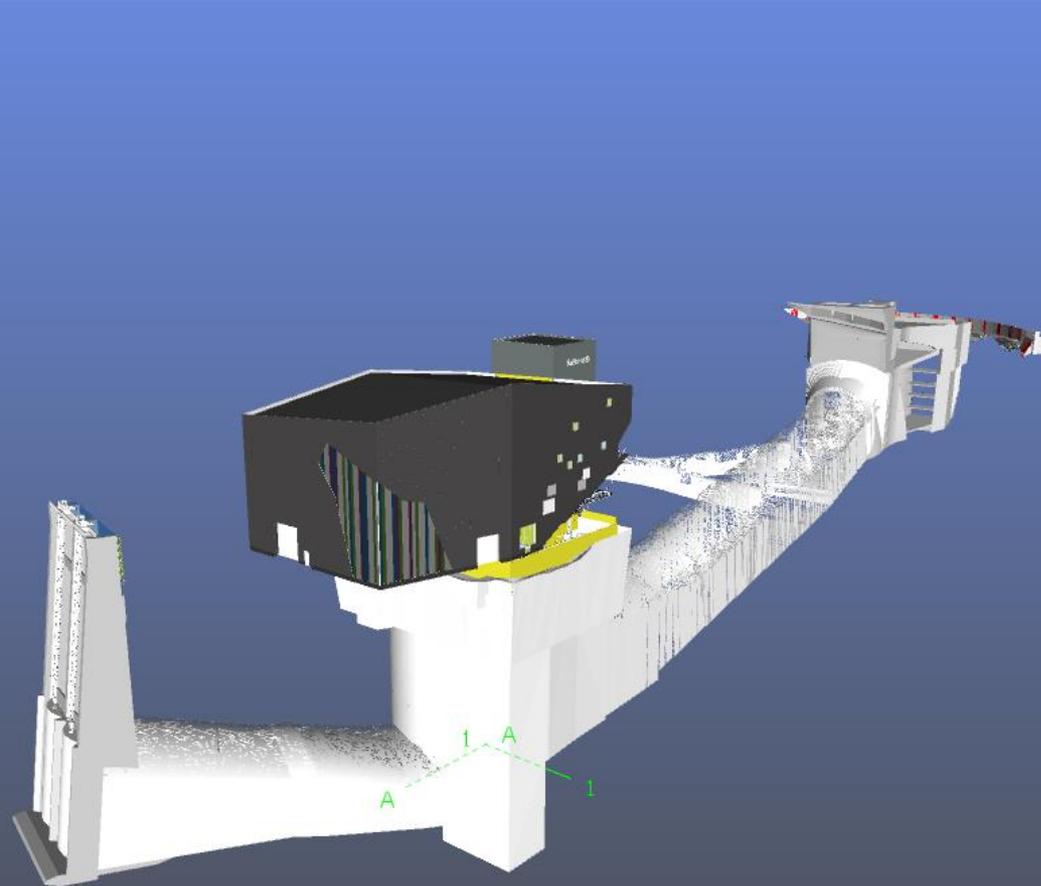
Project description:

- New hydropower plant
- The biggest of its kind
- Entirely designed in 3D as a BIM model
- A Completely Paperless Project
- 1 sq Km Project Area
- Aerial and terrestrial Laser Scanning, Aerial and Ground image data, GIS data, Geodetic, geological and seismic surveys all employed for the initial documentation.

New Concept Design



New Concept Design



A(115)-1(133) : 0-NIVÅ (89)

X: 81653.776 m Y: 1171810.064 m Z: 89.654 m

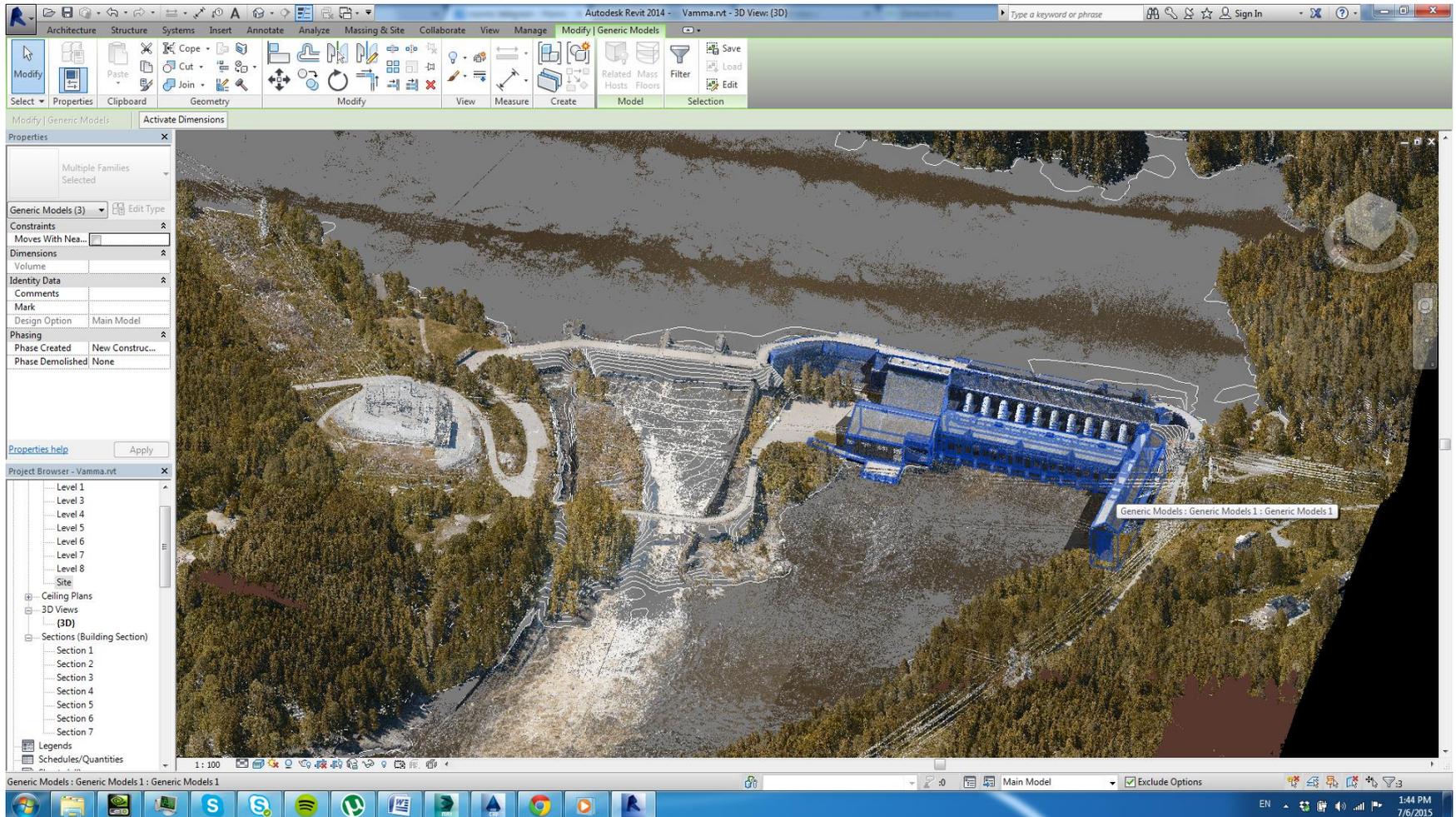
Bringing BIM into the construction site

- Establishment of a geodetic network
- Capture and modelling of terrain
- Scanning and modelling of existing structures and infrastructure
- Development, evaluation and optimization of concept in BIM
- Continuous monitoring of construction progress
- Update the «as built» model
- Continuous control of costs and quantities(5D BIM)

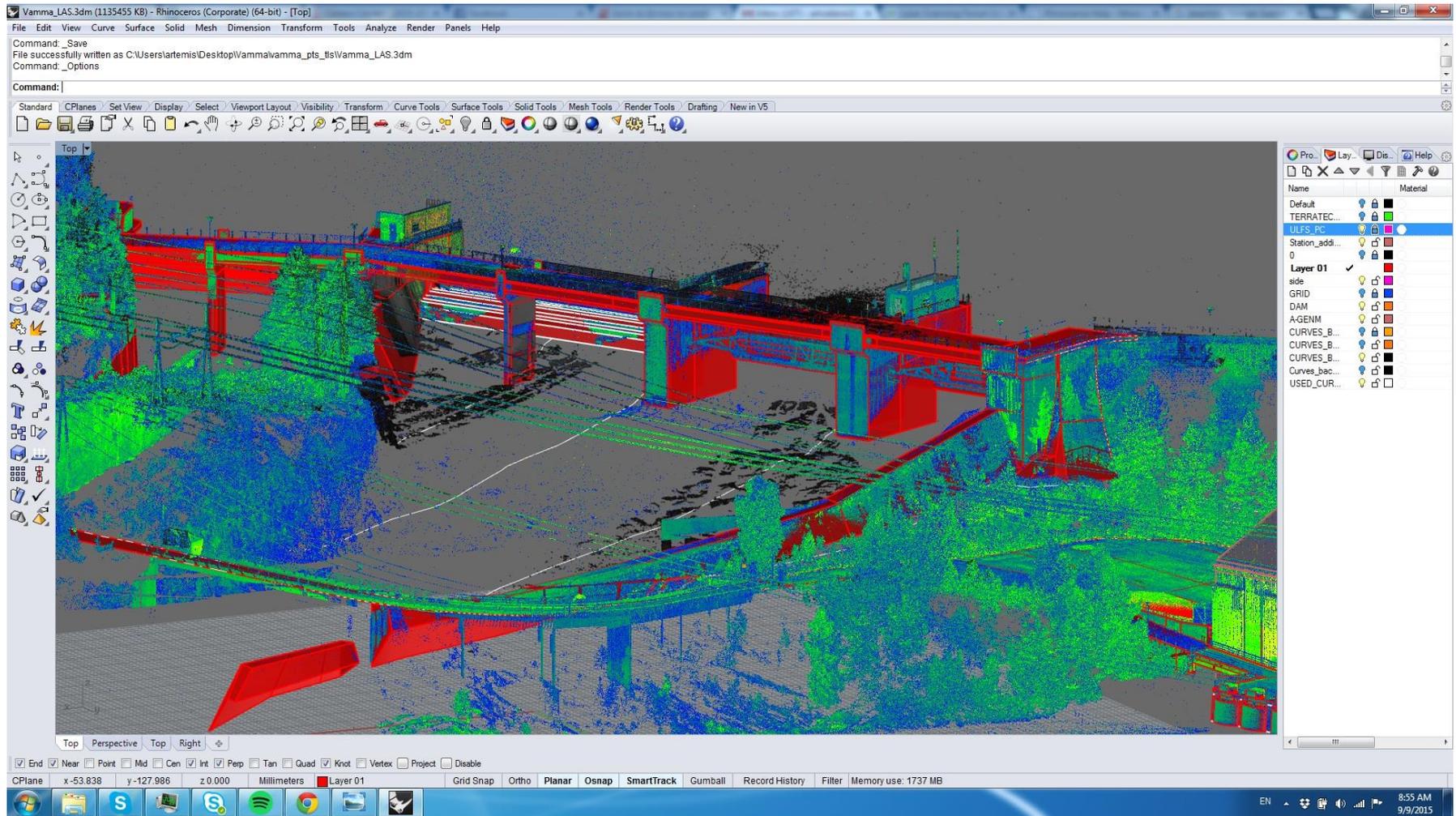
Project area documentation



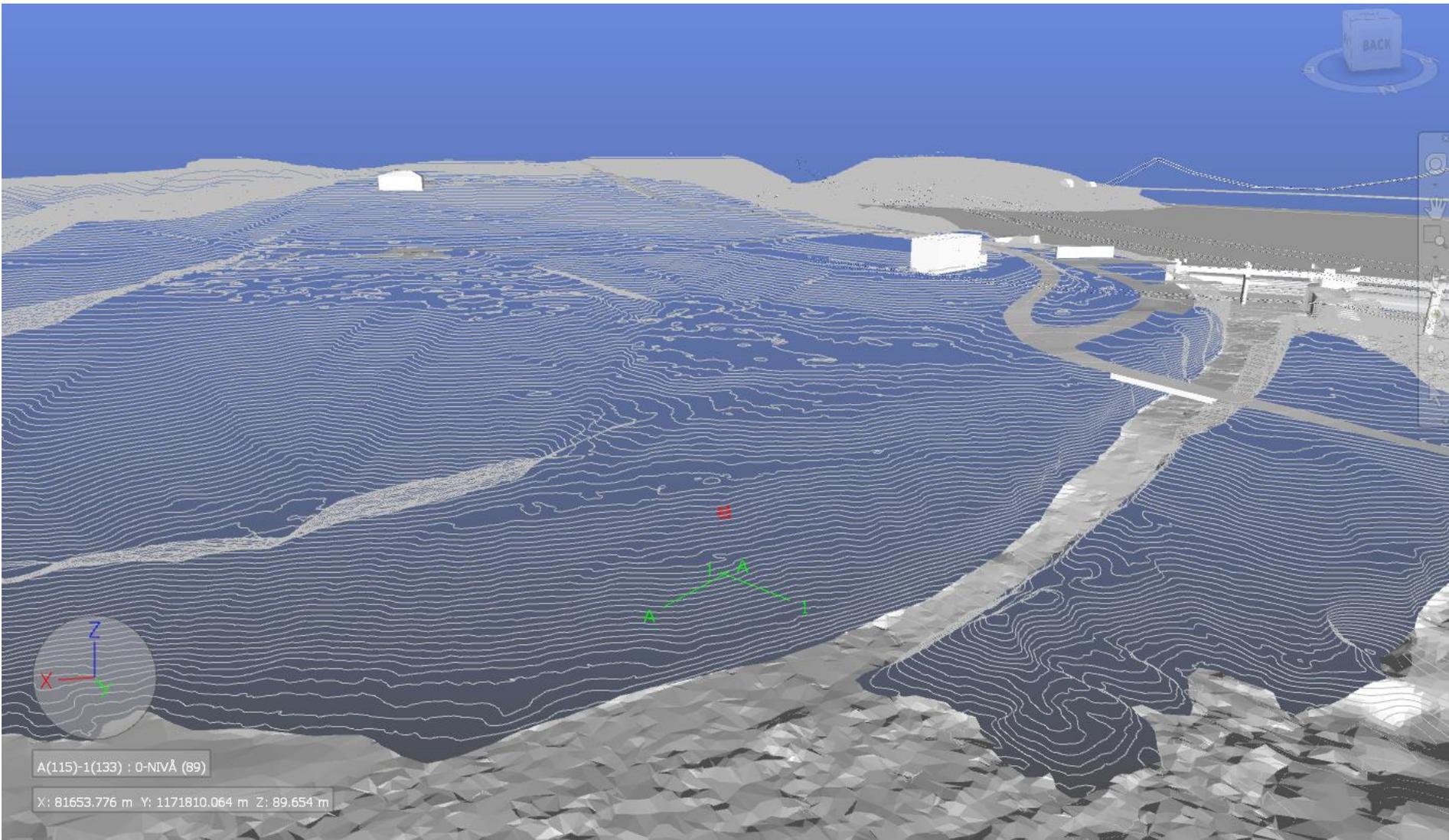
Project area documentation



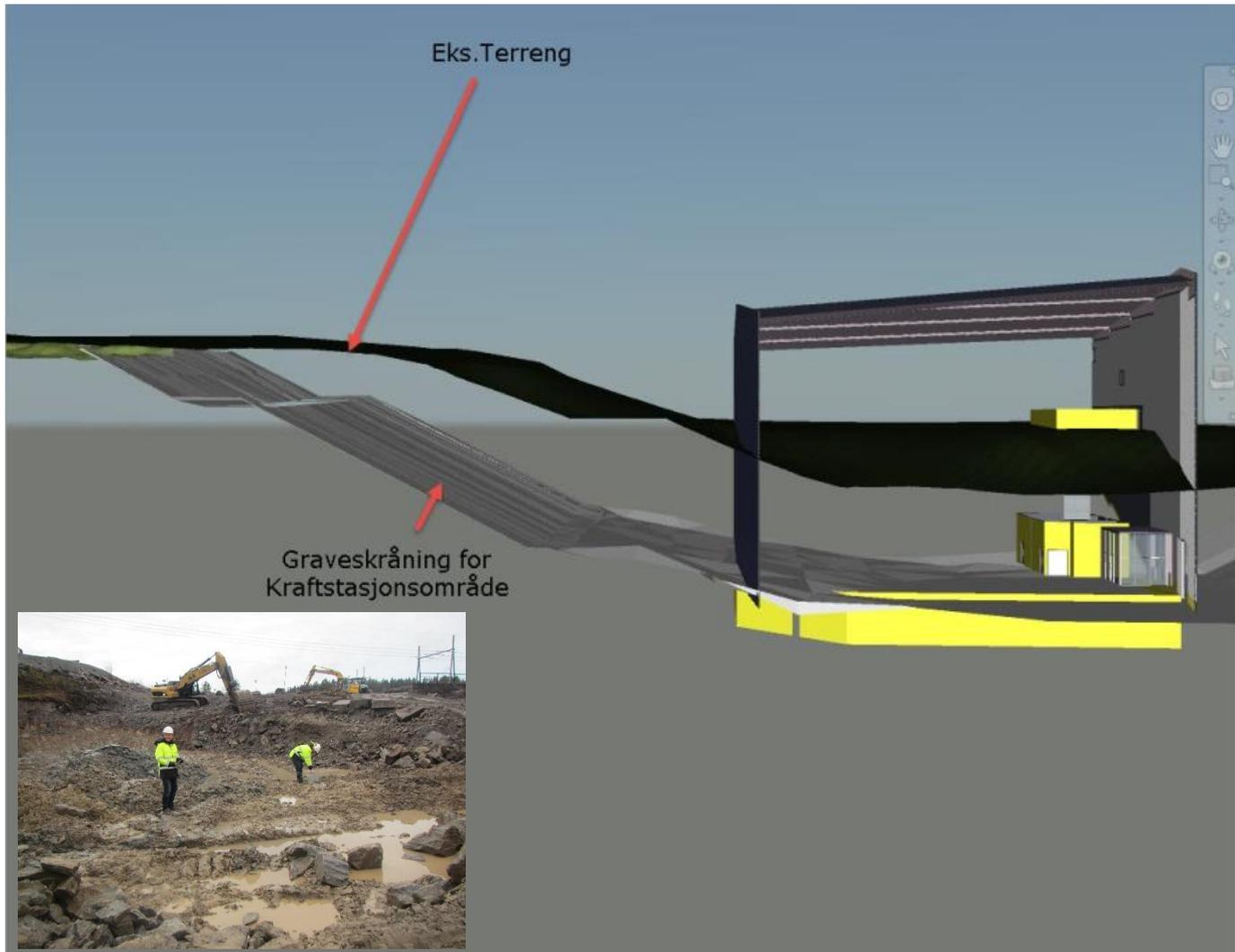
Project area documentation



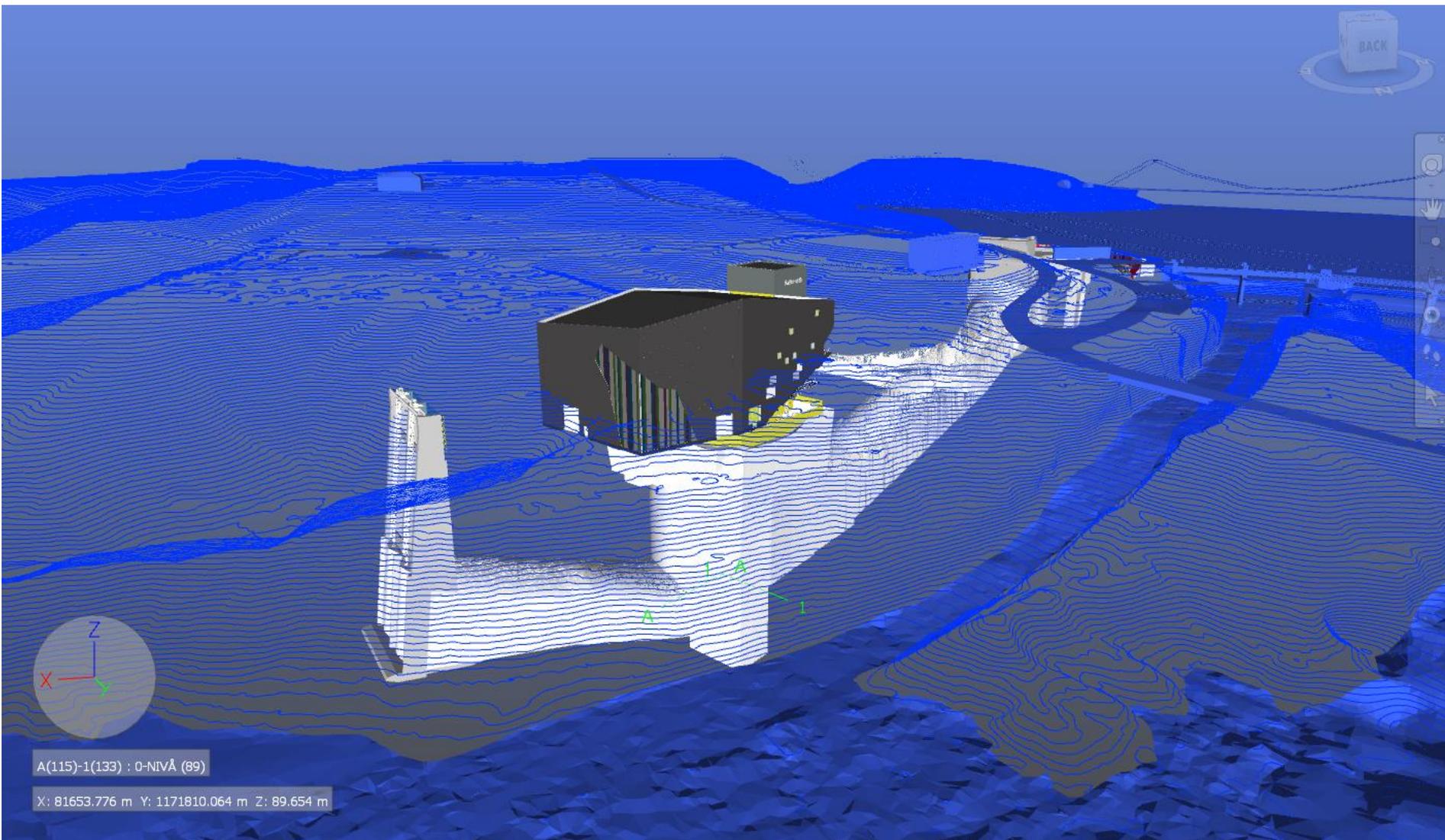
Project area documentation



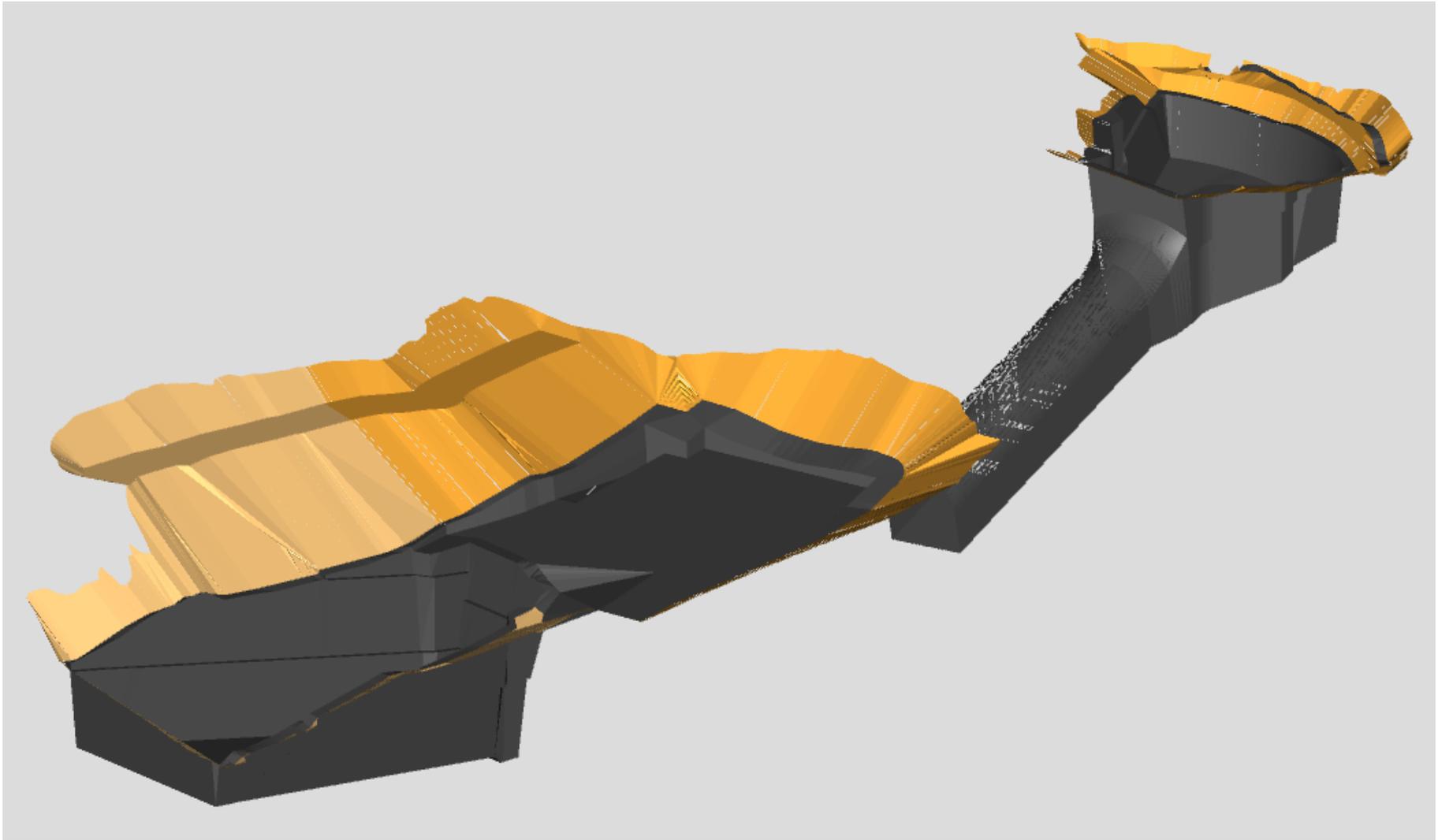
Project area documentation



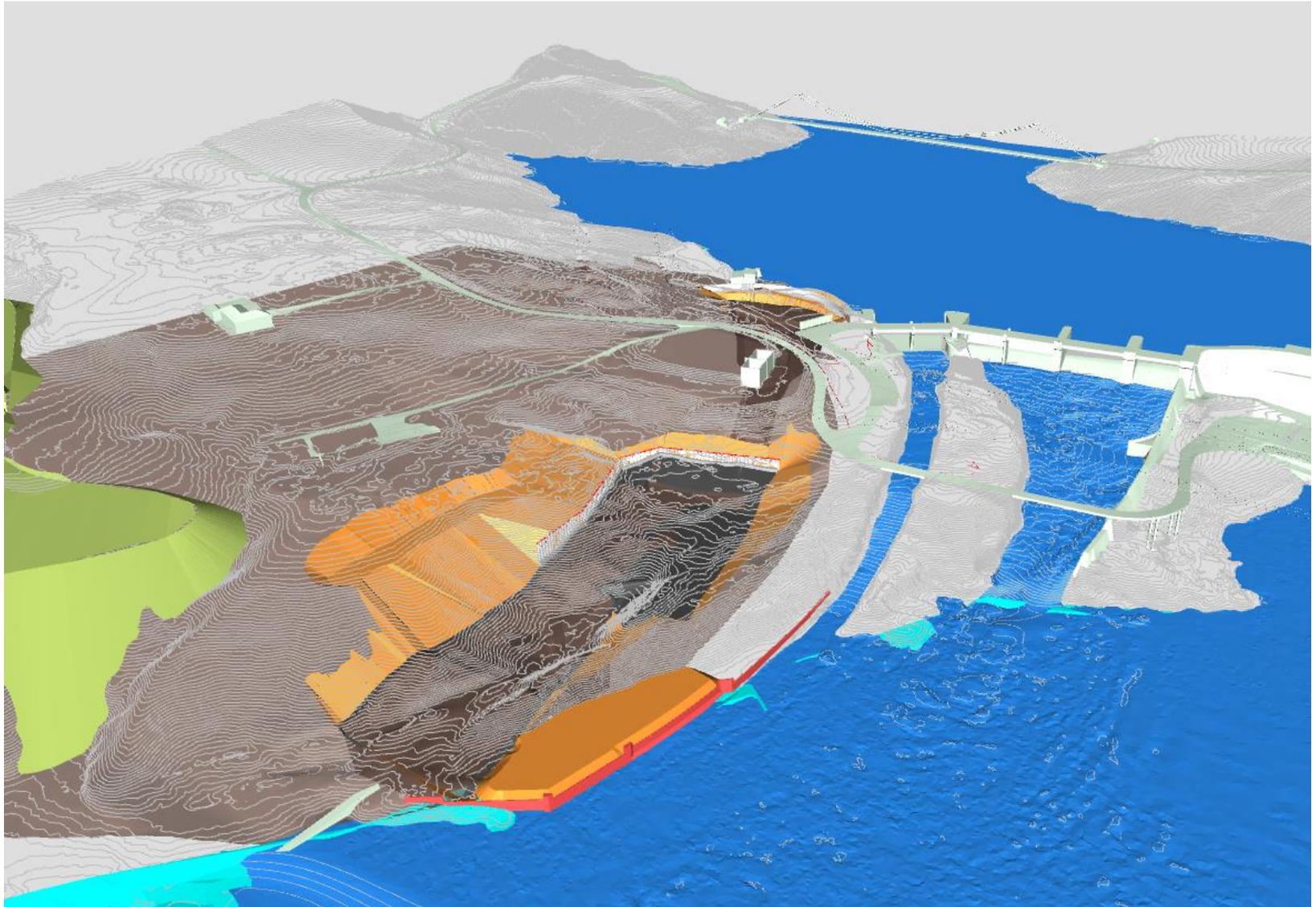
Field and design integration



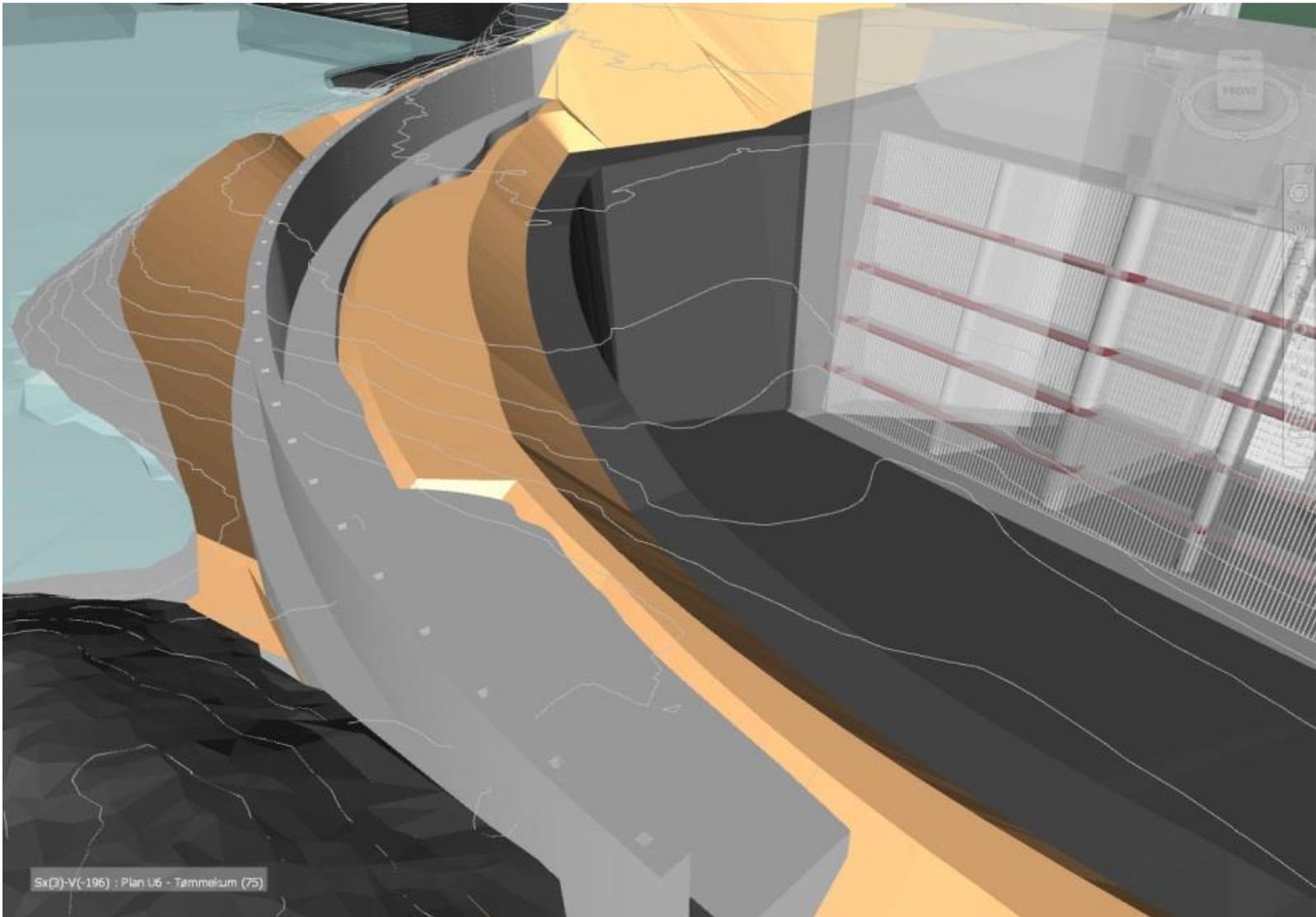
Design and construction integration



Field and Construction integration



Interdisciplinary collaboration



Integration between Model and "Bills of quantities"

The screenshot displays a software interface for project management and quantity takeoff. The main window is titled "ISY G-prog Beskrivelse, Utvidet versjon - [Vamma 12...]" and contains several panes:

- Left Pane (Kontoplan):** A hierarchical tree view showing the project structure. The selected item is "05 Betongarbeider" (Concrete work).
- Center Pane (Lepner):** A table listing items with columns for "Lepner", "Kode", "Tekst", "Mengde", and "Flagg". Item 17 is highlighted:

| Lepner | Kode | Tekst | Mengde | Flagg |
|--------|-----------|---|----------|----------------|
| 14 | L88.1013 | FORSKALING AV UTSPARINGER Forskalingsoverflate: ... | 1 | stk |
| 15 | LMI.1913 | INNSTØPNINGSGODS Type: Skilokre stigeinnn Faststap... | 40 | stk |
| 16 | LMI.1813A | INNSTØPNINGSGODS Type: Rørv Faststapingsmetode: S... | 80 | stk |
| 17 | LBI.7113A | FORSKALING AV HVELV/SKALL Forskalingsoverflate: G... | 1 100,00 | m ² |
| 18 | LMI.1813 | INNSTØPNINGSGODS Type: Rørv Faststapingsmetode: S... | 100 | stk |
| 19 | L83.203A | FORSKALING AV SLISS Forskalingsoverflate: Valgfri Ulf... | 18,00 | m |
| 20 | LMI.1113 | INNSTØPNINGSGODS Type: Bolter Faststapingsmetode:... | 50 | stk |
| 21 | LMI.5913 | INNSTØPNINGSGODS Type: Anleggs... | 2 | stk |
| 22 | L83.203A | FORSKALING AV SLISS Forskalingsoverflate: Valgfri Ulf... | 90,00 | m |
| 23 | LMI.1113 | INNSTØPNINGSGODS Type: Bolter Faststapingsmetode:... | 340 | stk |
| 24 | LMI.5913A | INNSTØPNINGSGODS Type: Anleggs... | 2 | stk |
| 25 | LBI.4113A | FORSKALING AV VEGG Forskalingsoverflate: Glatt Fors... | 230,00 | m ² |
| 26 | L88.21903 | FORSKALING AV STENG - LENGDE Type konstruksjon: ... | 16,00 | m |
| 27 | L88.4033A | SPESELL FORSKALING AV STØPEKØTTER Forskalingsoverflate: ... | 45,00 | m |
- Bottom Center Pane (Norconsult AS):** A detailed view of item 17, showing a table with columns "Postnr", "NS-kode/Firmakode/Spesifikasjon", "Enh.", "Mengde", "Pris", and "Sl.".

| Postnr | NS-kode/Firmakode/Spesifikasjon | Enh. | Mengde | Pris | Sl. |
|------------|--|----------------|---------|------|-----|
| 05.06.2.17 | LBI.7113A FORSKALING AV HVELV/SKALL Areal forskaling Forskalingsoverflate: Glatt Forskalingstype: Krum forskaling Utførelse og kontroll: Utførelsesklasse 3 | m ² | 1100,00 | 0,00 | |
- Right Pane (IFC plot):** A 3D model of a building structure, showing a complex, multi-level design with various rooms and corridors.

Integration of Information

"ELEMENT" = INFORMASJONSFANE MED ISY PARAMETERE OG ANNET RELEVANT. LOKALISERT NOEN GANGER OVER SELVE ELEMENTET I SELECTION TREE (ET NIVÅ OVER).

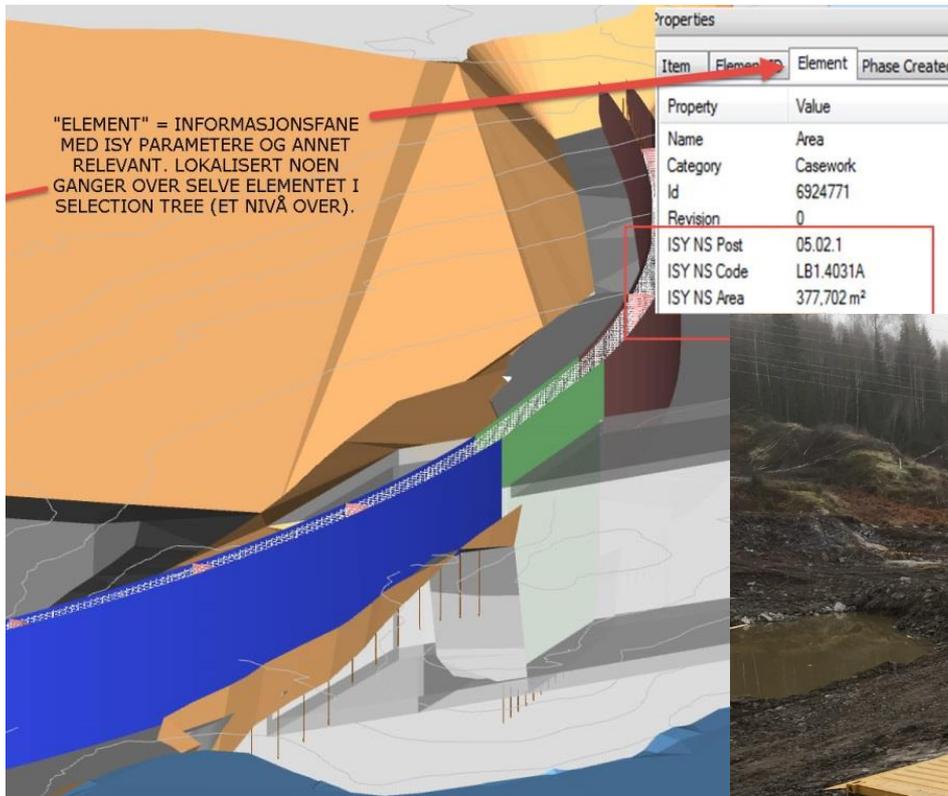
| Property | Value |
|-------------|------------------------|
| Name | Area |
| Category | Casework |
| Id | 6924771 |
| Revision | 0 |
| ISY NS Post | 05.02.1 |
| ISY NS Code | LB1.4031A |
| ISY NS Area | 377.702 m ² |

ALLE ISY PARAMETERE ER GENERERT AV NORCONSULT. NÅ ER FORSKALING OG BETONG TILFØRT INTELLIGENS DIREKTE FRA MENGDELISTE.

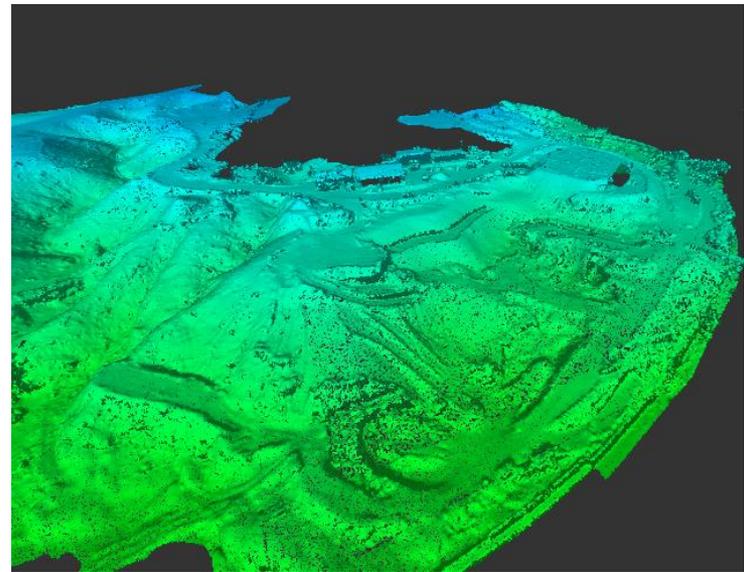
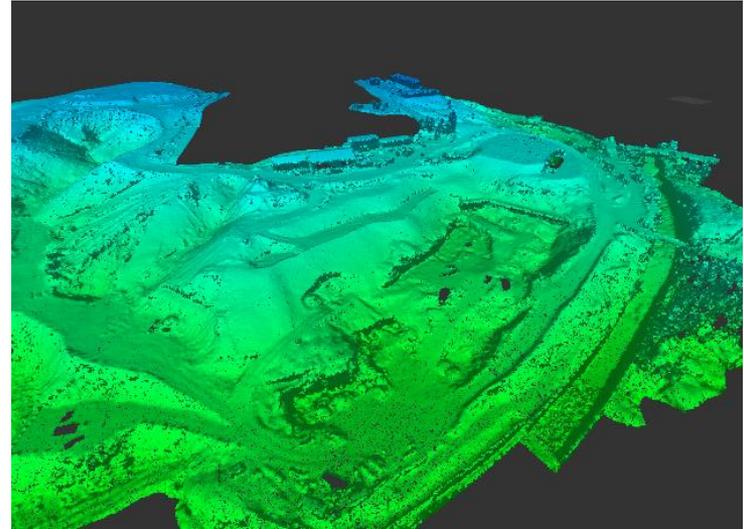
From Design to construction



From Design to construction



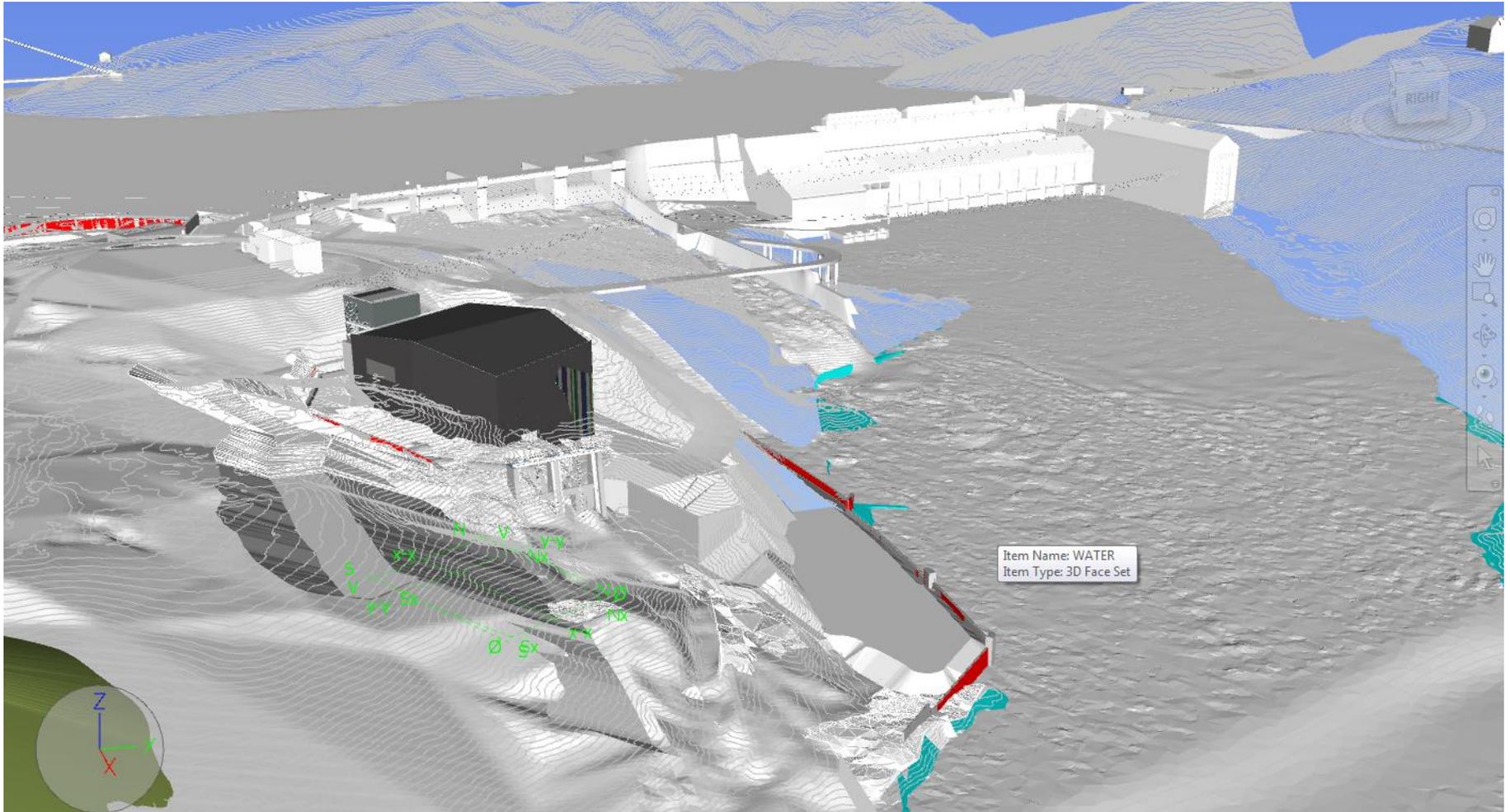
Monitoring of Construction progress



Monitoring of Construction progress



Update to As-Built status

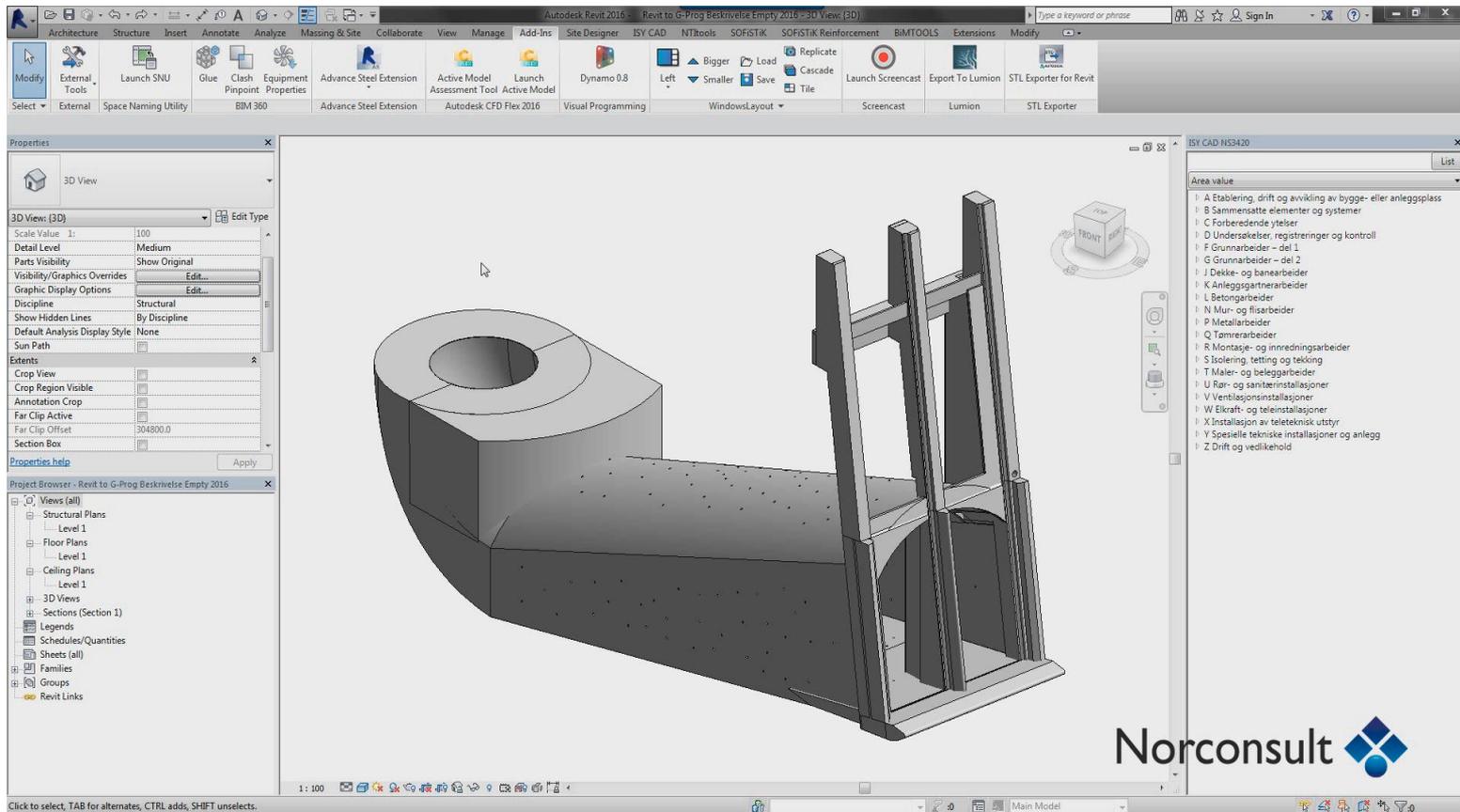


BIM in Norconsult

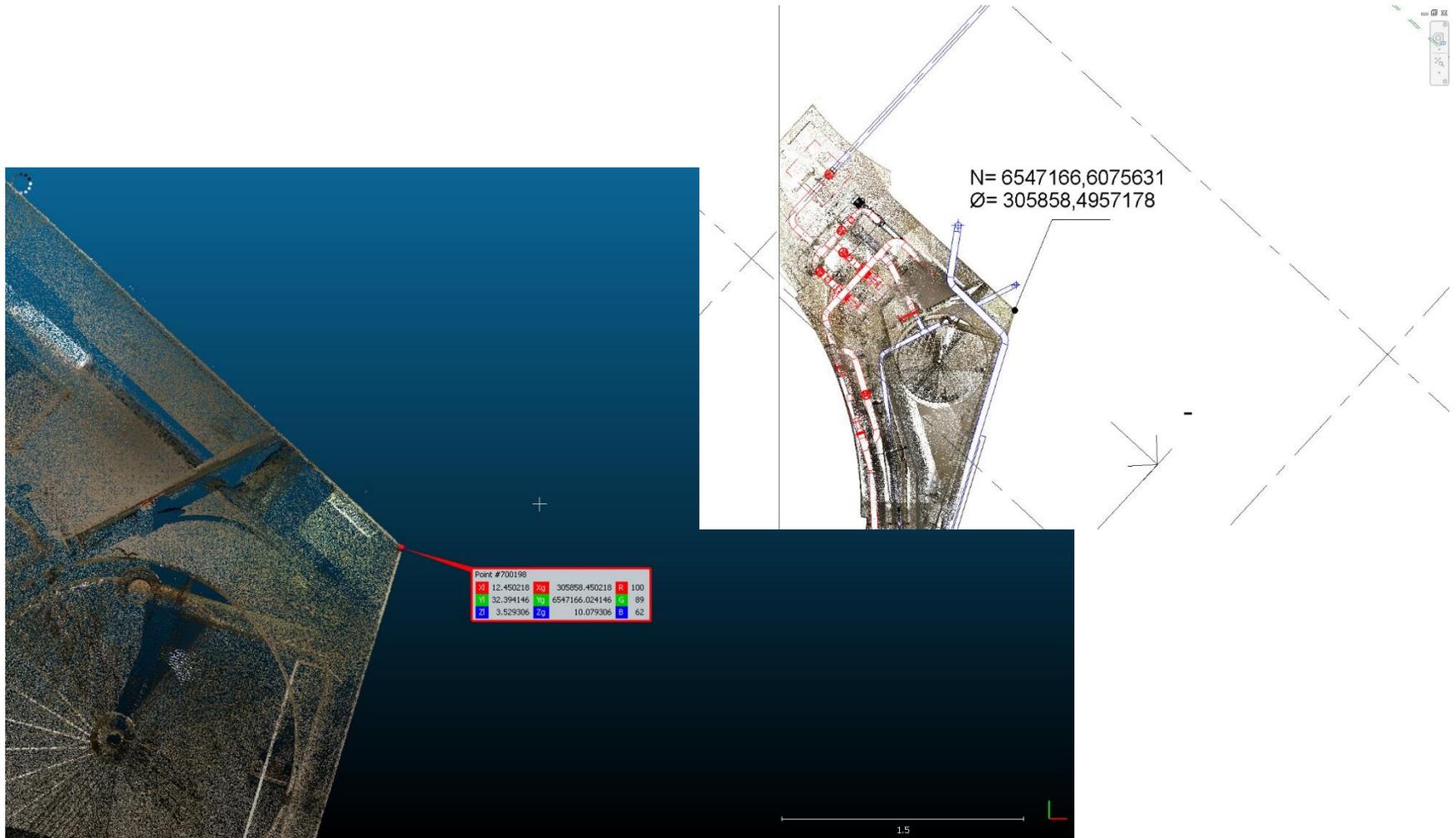


PROCESS REVIEW AND FEEDBACK

Quality Checked Data



Quality Checked Data



Conclusions

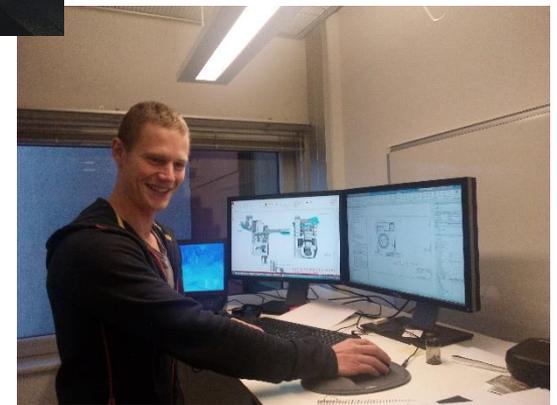
BIM to Construction site benefits

- Paperless construction
- Surveying based on the BIM model
- Navigation in the BIM model on portable devices
- Connection between objects in BIM model and codes on the bill of quantities
- Connection between elements of BIM model and available documentation
- Prefabrication of re-reinforcement and various elements based on the BIM model
- Direct quality check by import of field data into collaboration model
- «As built» information integrated into the BIM model
- Control of quantities and costs based on BIM
- Scheduling and audits in BIM
- ...

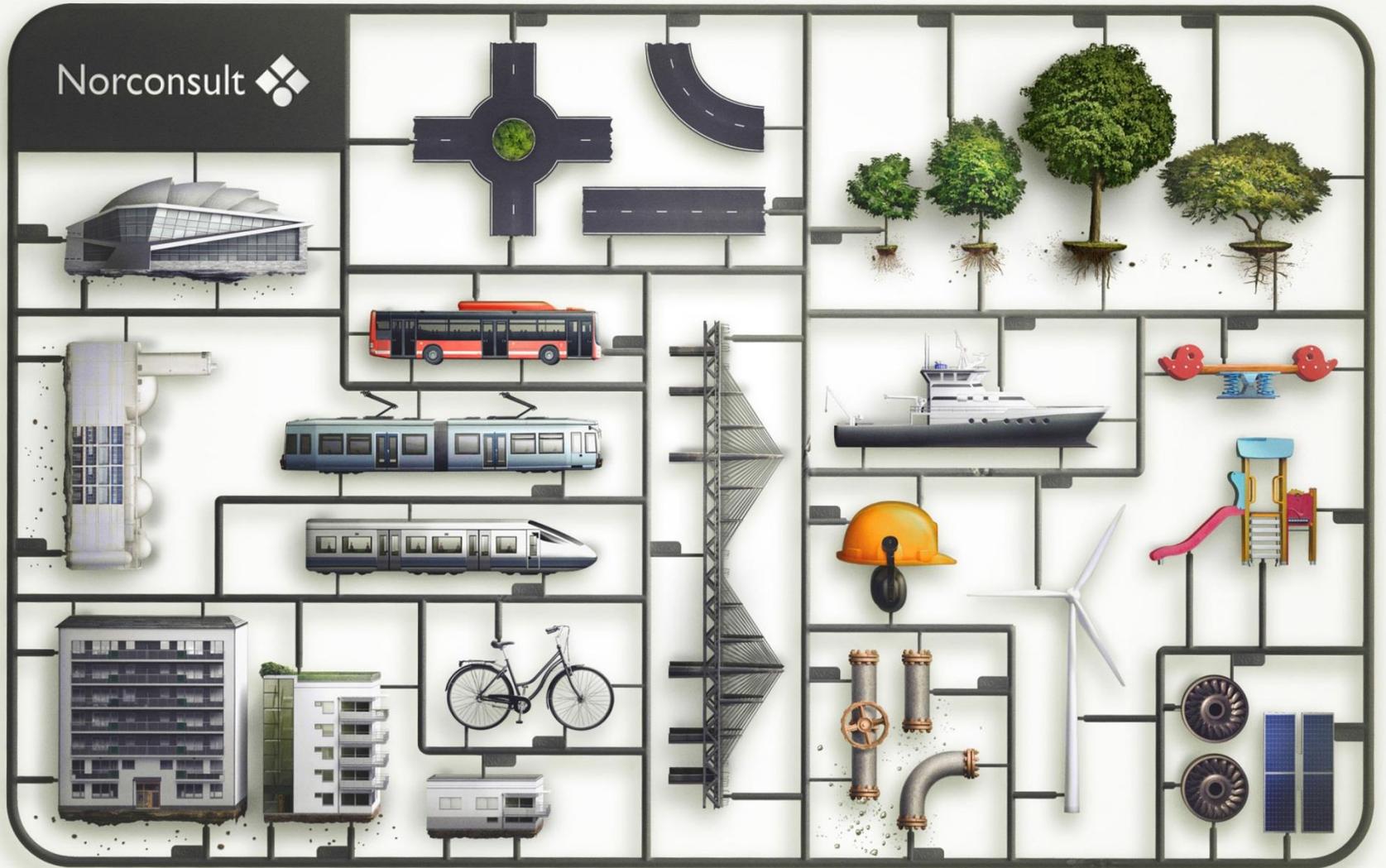
And a bit of BIM fun



We certainly feel inspired! How about you?



Norconsult



Thank you