

VDC for everyone

Case examples of implementing VDC
at Ny Ellebjerg Concourse Hall,
Copenhagen

VDC for everyone

The Project

Modelling/ Coordination

Site Model

4D Visualizations

As-built Scanning

VDC for the construction site

The Project

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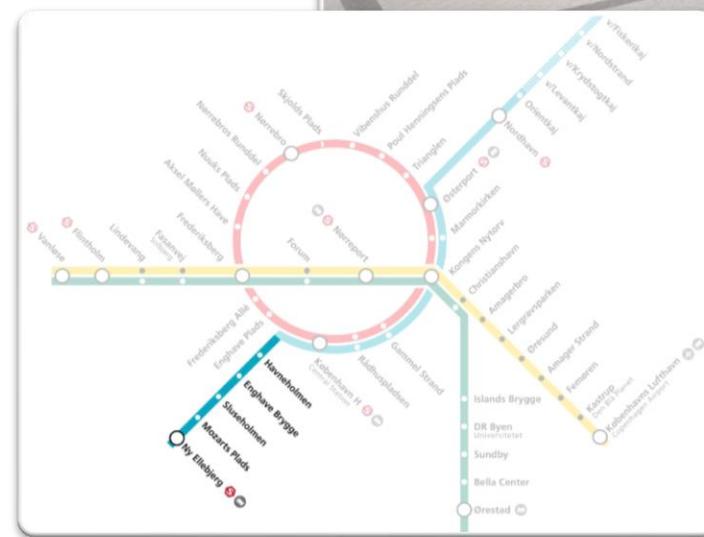
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The Project

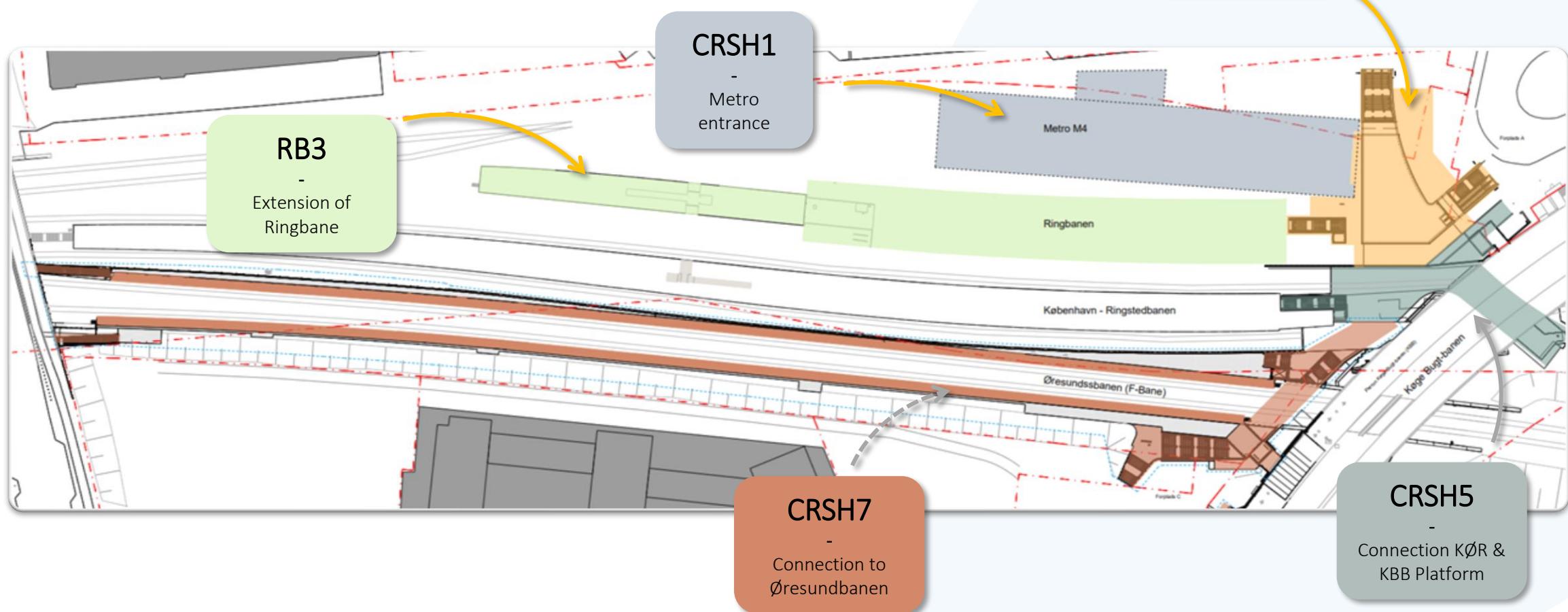
The purpose of CRSH6 is to establish a concourse hall in the area of the future Ny Ellebjerg station in Copenhagen serving as an underground connection between

- Sydhavn (southern harbor) metro,
- Ringbanen (RB, S-train),
- Køge Bugt banen (KBB, train),
- København-Ringsted regional train (KØR),
- and the bus terminal.

The project is a critical one in terms of the overall completion of the southern harbor branch of the metro in Copenhagen.



The Project



The Project



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RAMBOLL



**GOTTLIEB
PALUDAN**
ARCHITECTS

The Project

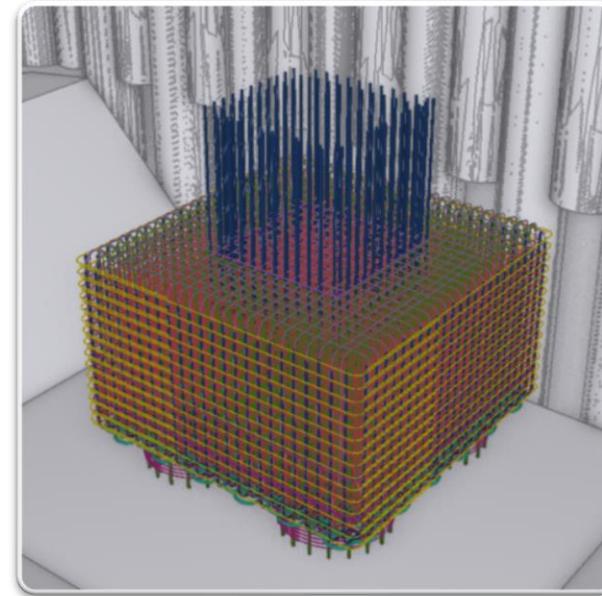
Facts

Over 30.000 passengers a day
Similar number of passengers
as the Central station of
Copenhagen

6 individual projects
will complete the final
station

3600 m³ low carbon concrete
=338 t CO₂e saving (approx.
16% compared to
conventional concrete)

Will be called København
Syd (Copenhagen South)
by completion



49 uplift anchors to
avoid a floating
metro station



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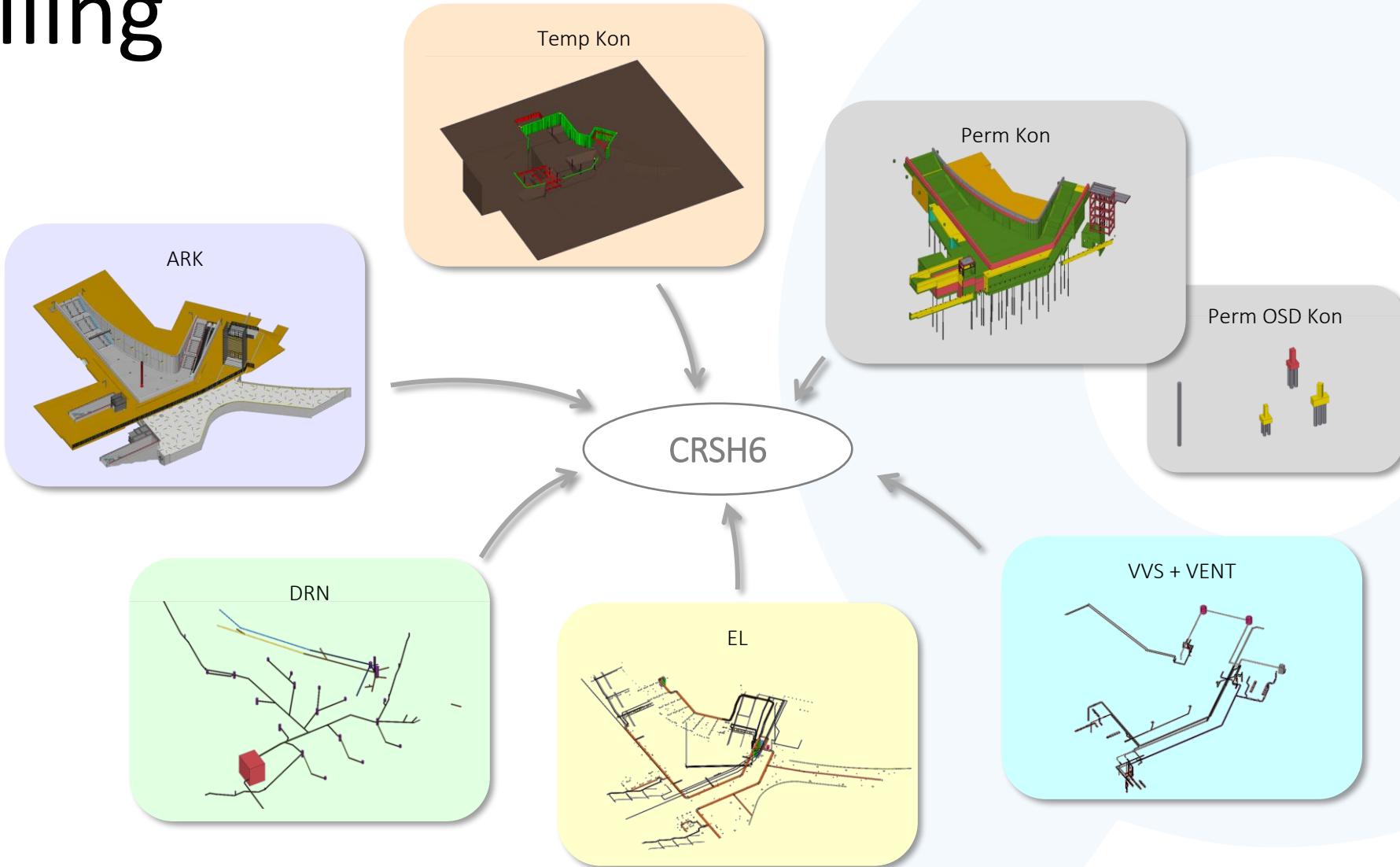
Modelling/ Coordination

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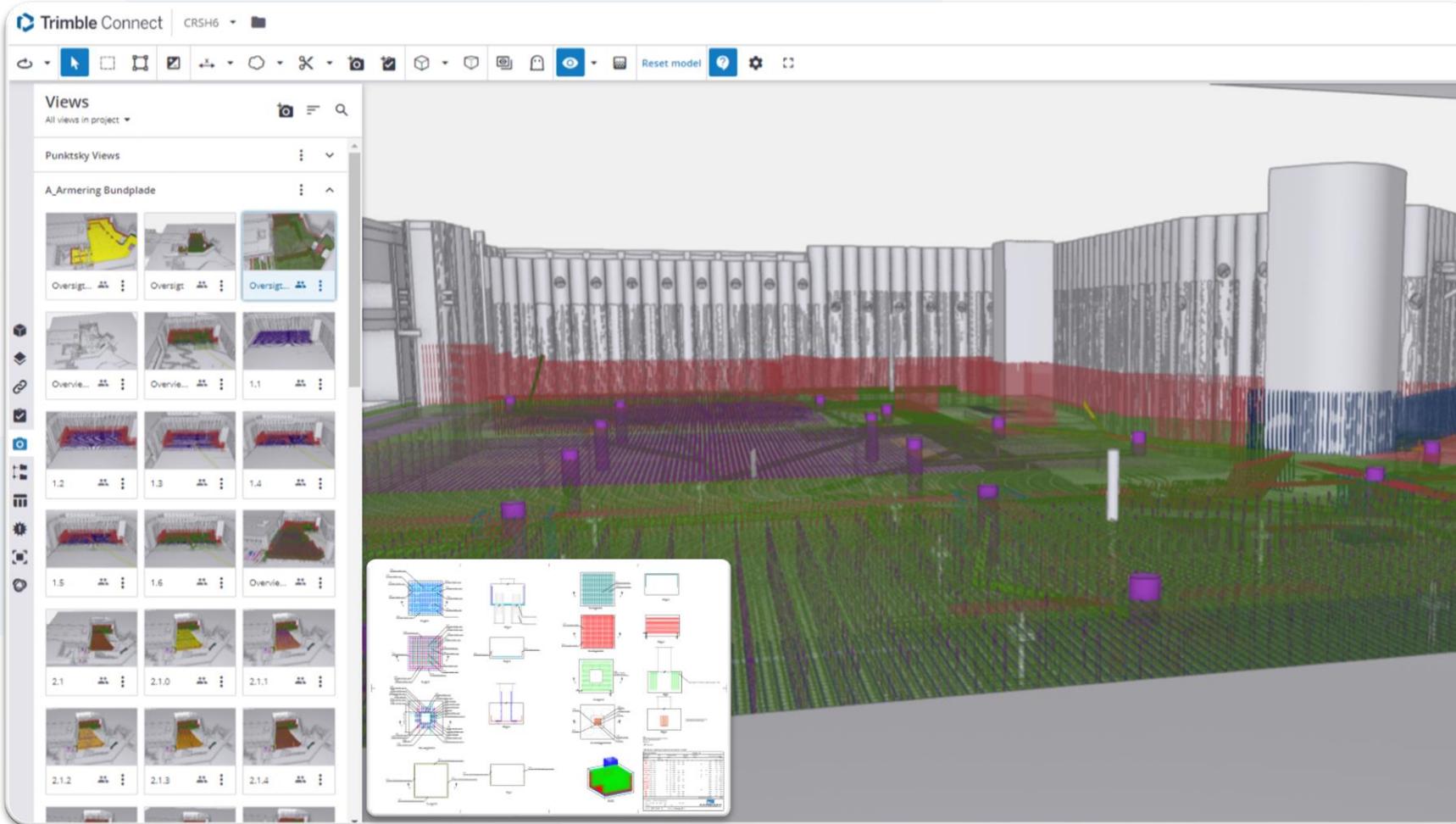
Modelling



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Modelling

Digital reinforcement



3D Reinforcement detailing based on
2D drawings from the Consultant

- Constructability
- Quality Assurance in 3D
- Coordination with other disciplines in 3D
- All quantities are available and reliable
- Generation of working drawings and cut and bend lists from 3D reinforcement model
- Sequencing the working steps
- Link to related drawings and documents to the 3D objects

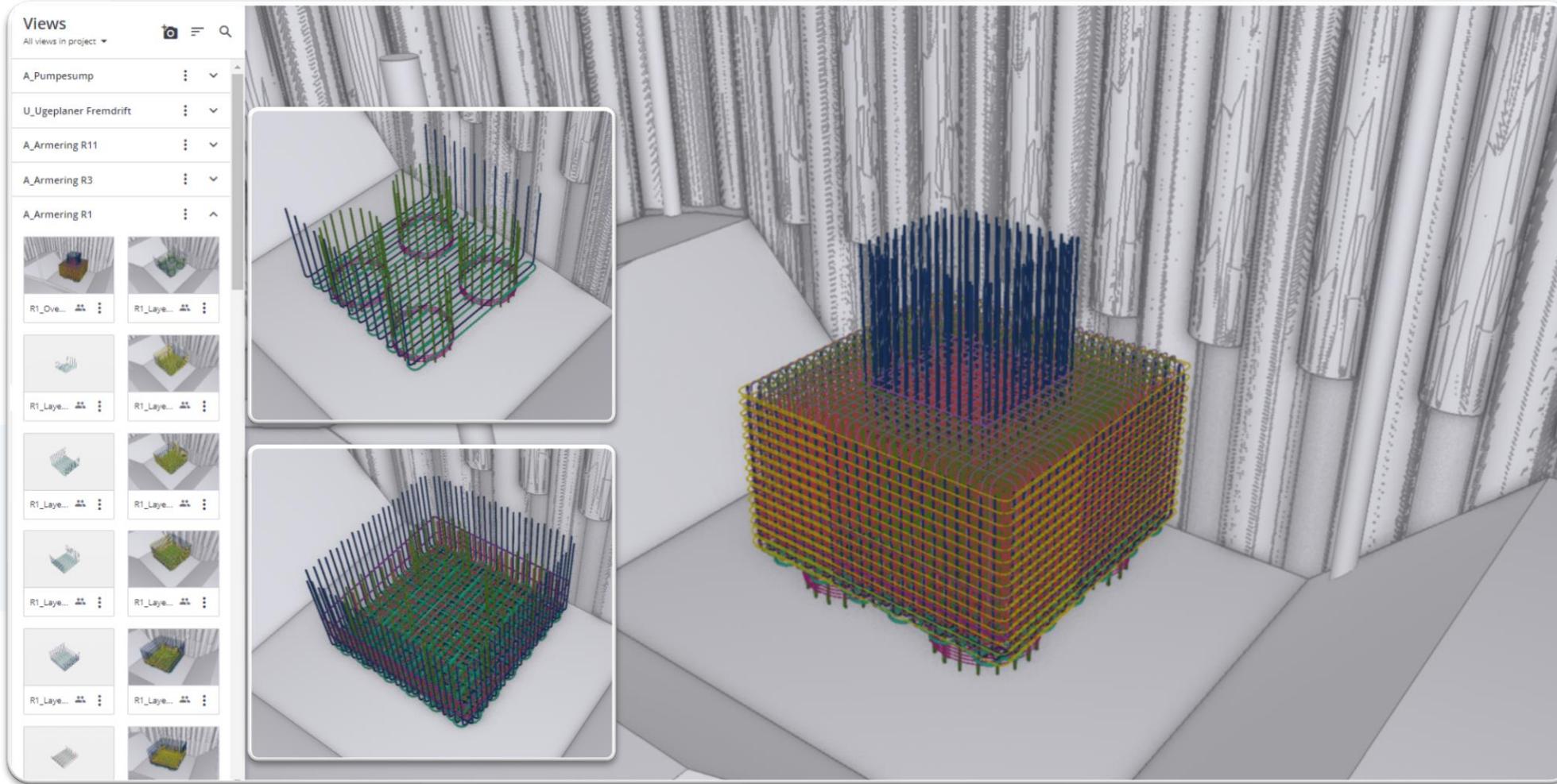


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Reinforcement Sequence

Foundation R1

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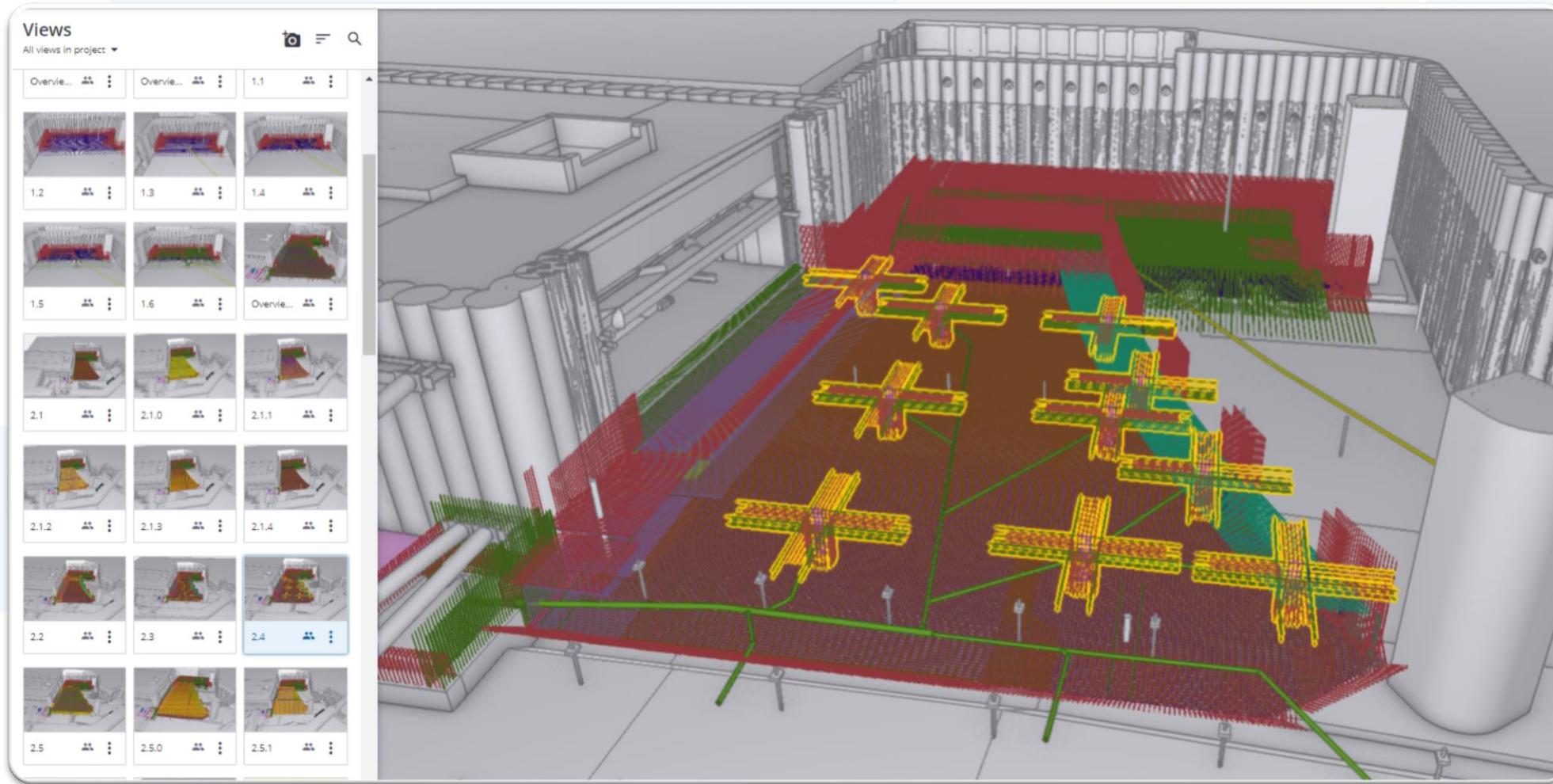


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Reinforcement Sequence

Main slab

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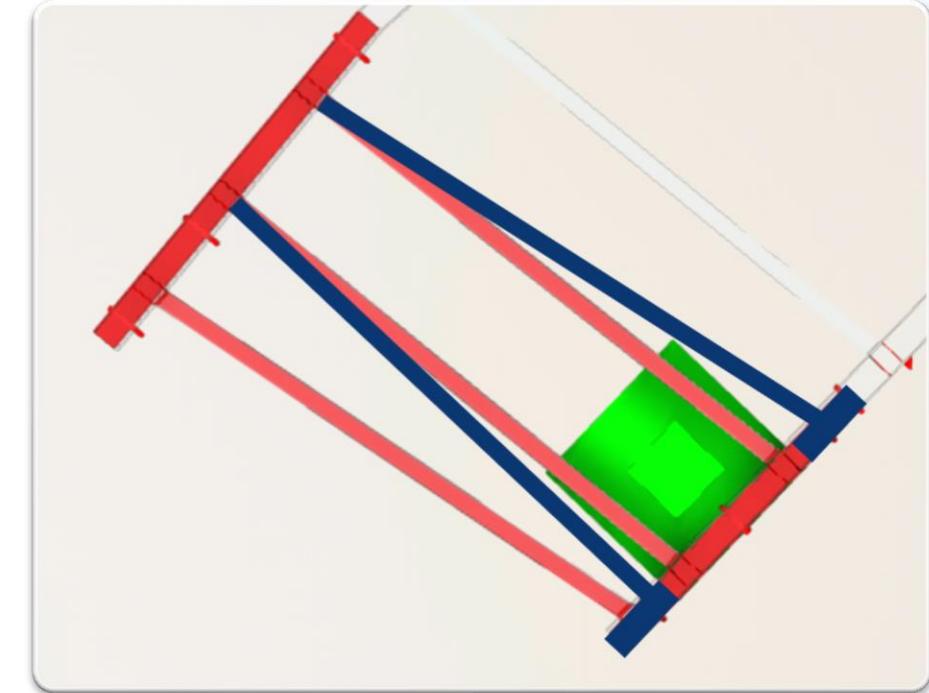
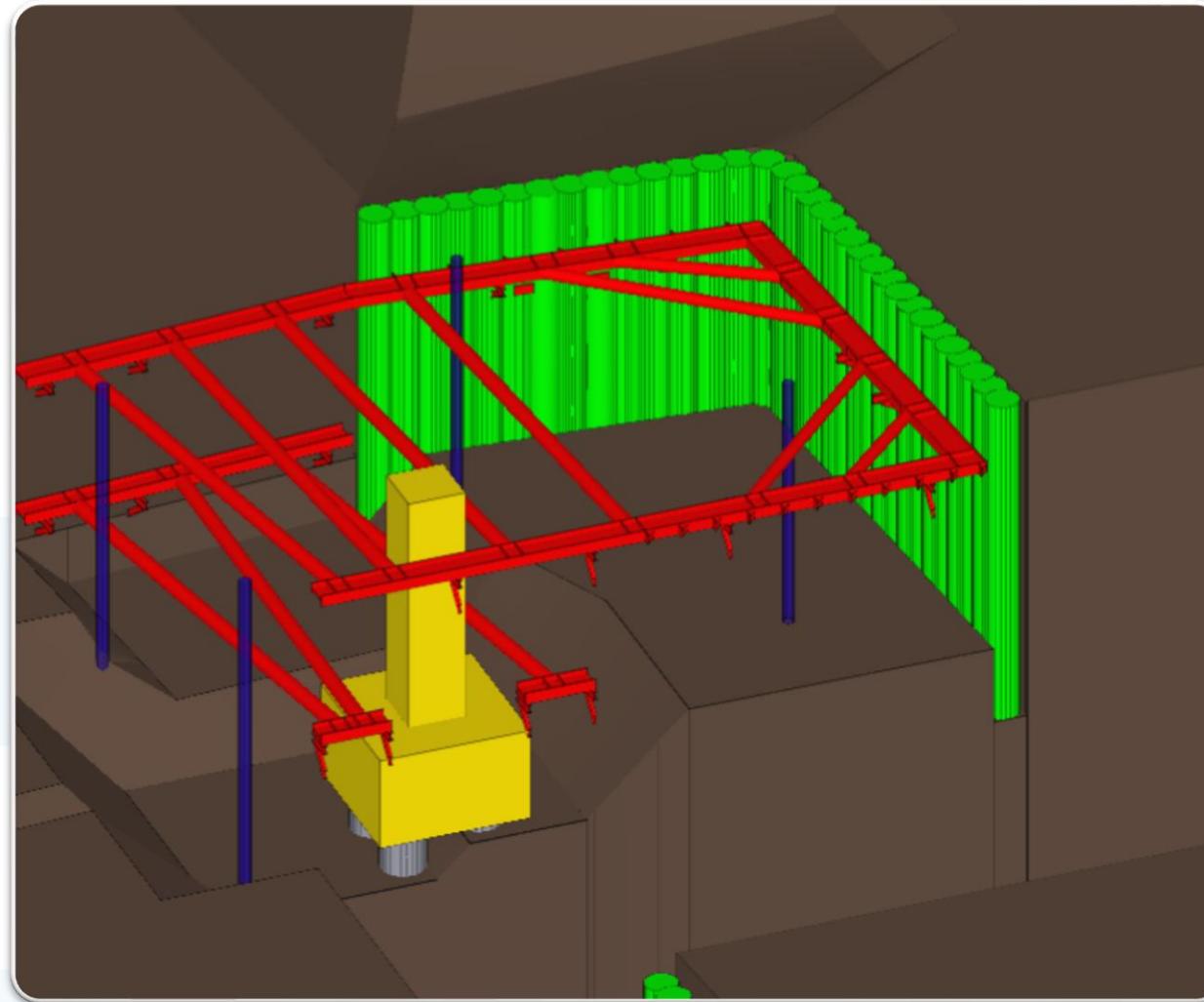


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Modelling

Constructability & Quality Assurance

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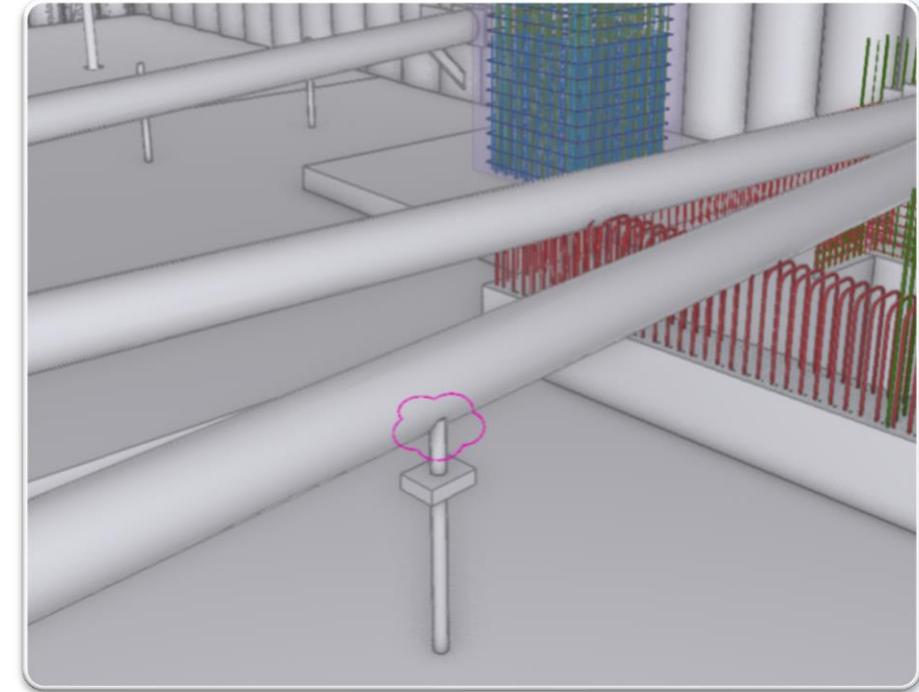
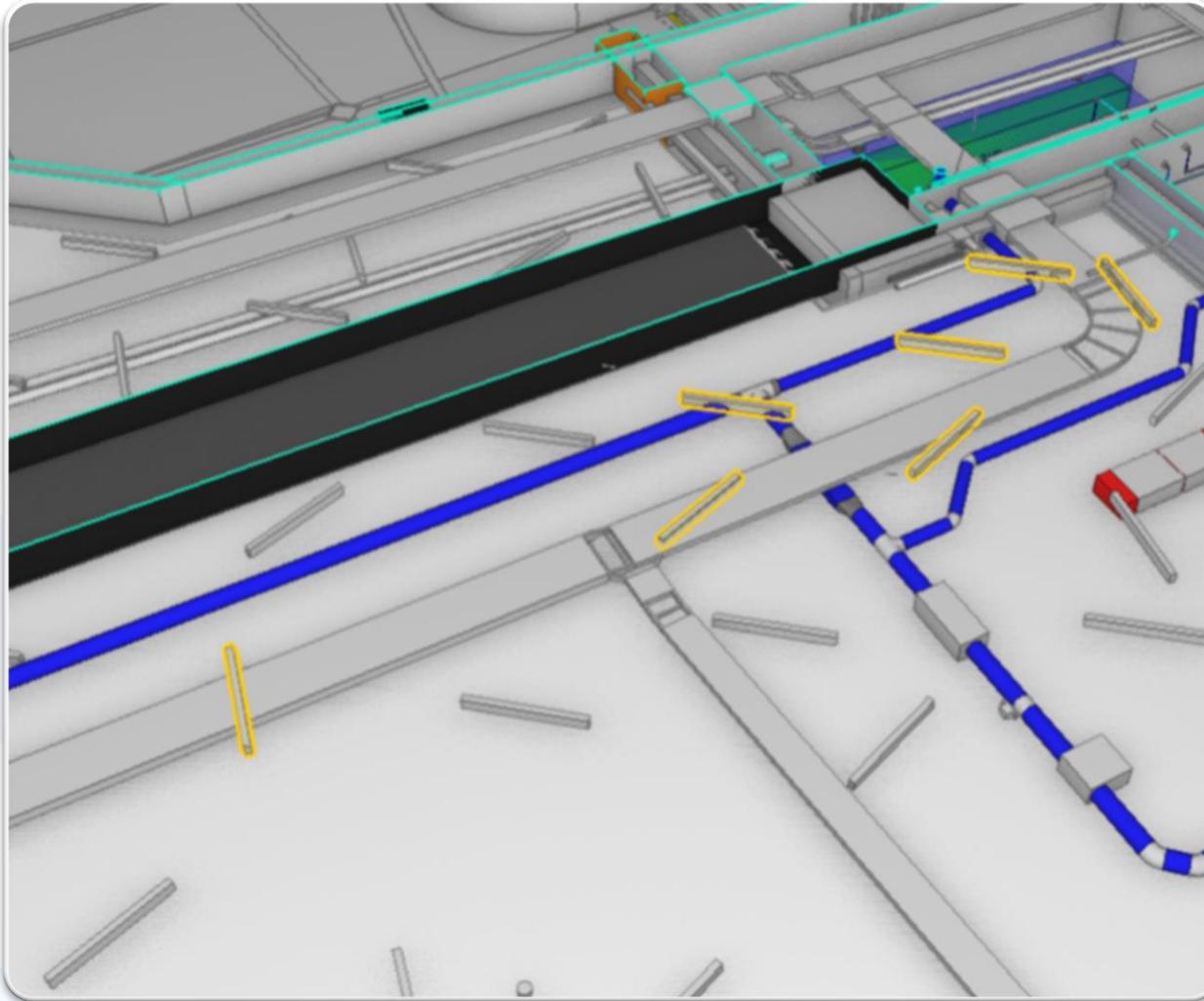


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Model Coordination

Constructability & Quality Assurance

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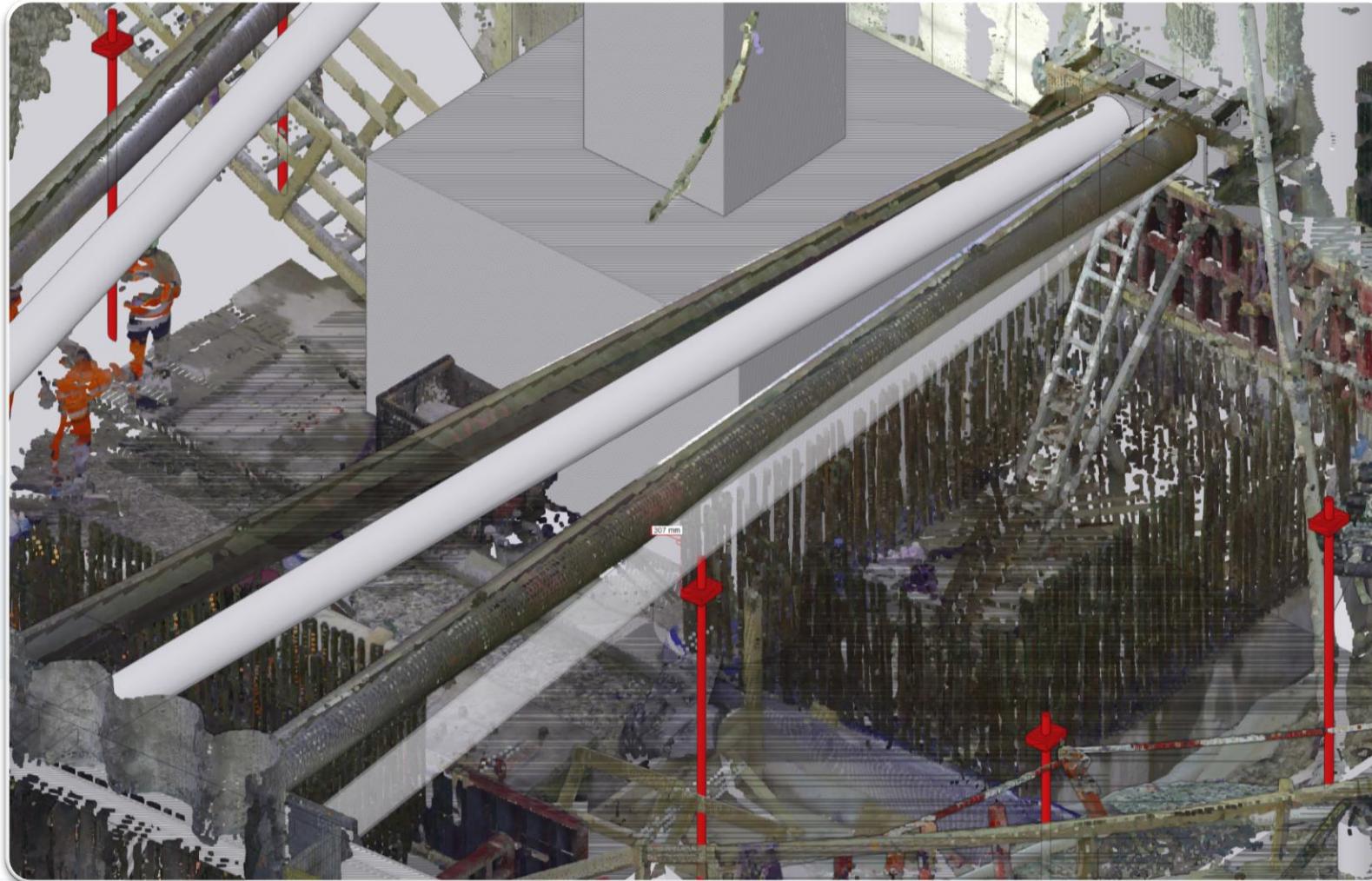


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Model Coordination

Constructability & Quality Assurance

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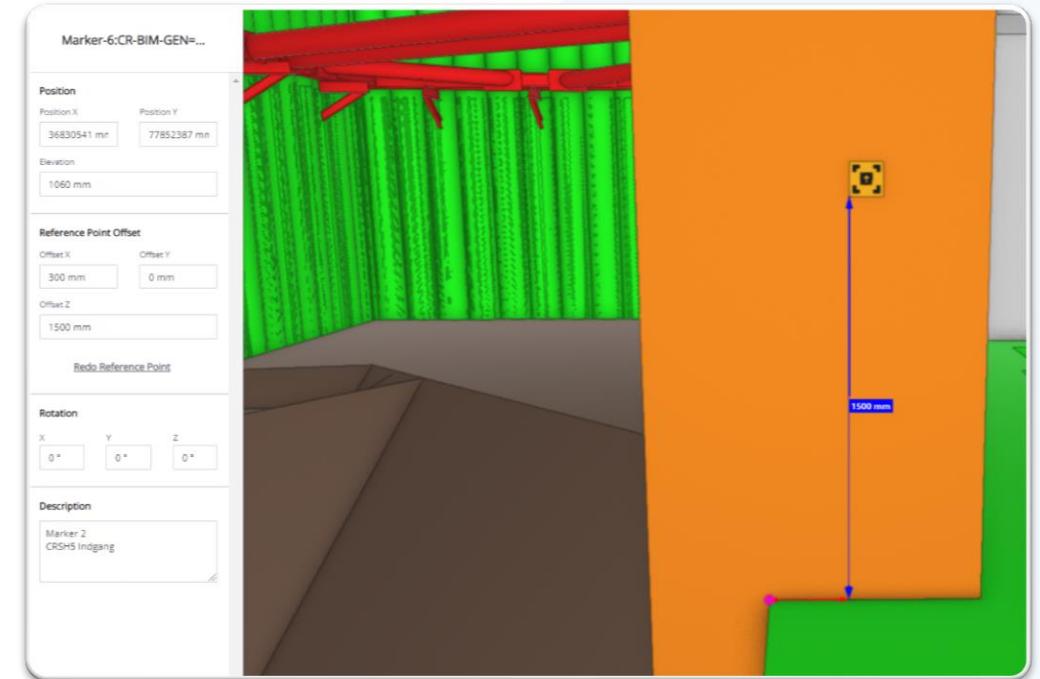
- Clash as planned
- Luckily no clash as executed



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Augmented Reality

Comparison of As-planned with As-built



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Augmented Reality

Purpose at Ny Ellebjerg

- BIM on the construction site
- Visualization of upcoming work steps
- Visualization of complex areas (e.g. reinforcement layers)
- Visual identification of problems (across disciplines)
- Interdisciplinary review of the project in later phases
- Comparison of As-built with As-planned



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Site Model

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Site Model

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- Simple tool to generate 3D constructions sites even for low tech people
- Accessible for everyone as 3D model via web-application and printed 2D drawings

Site planning and coordination

- Access route
- Safety information
- Equipment (Cranes, Container, Shed village, etc.)
- Work areas - Material areas
- Follows construction site development
- Updated weekly



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Site Model development

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Week 05 2023

Week 42 2022



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4D Visualizations

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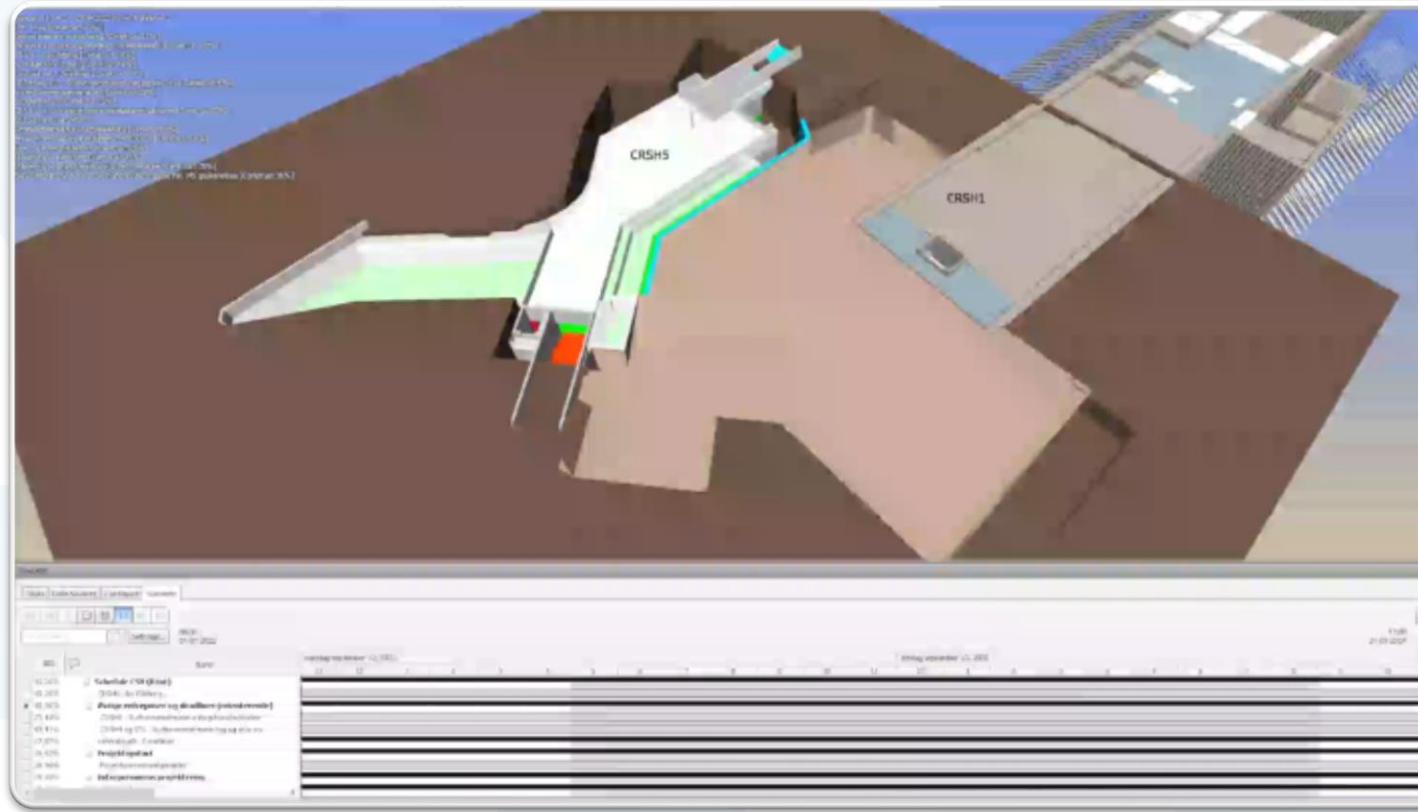


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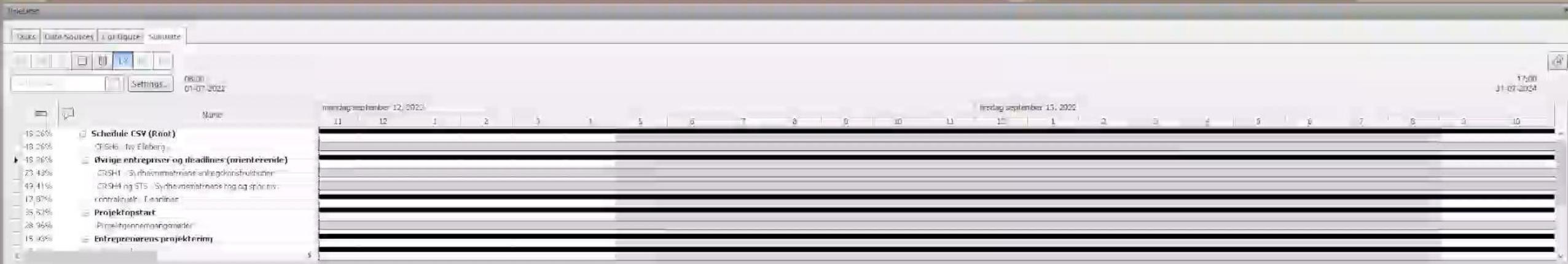
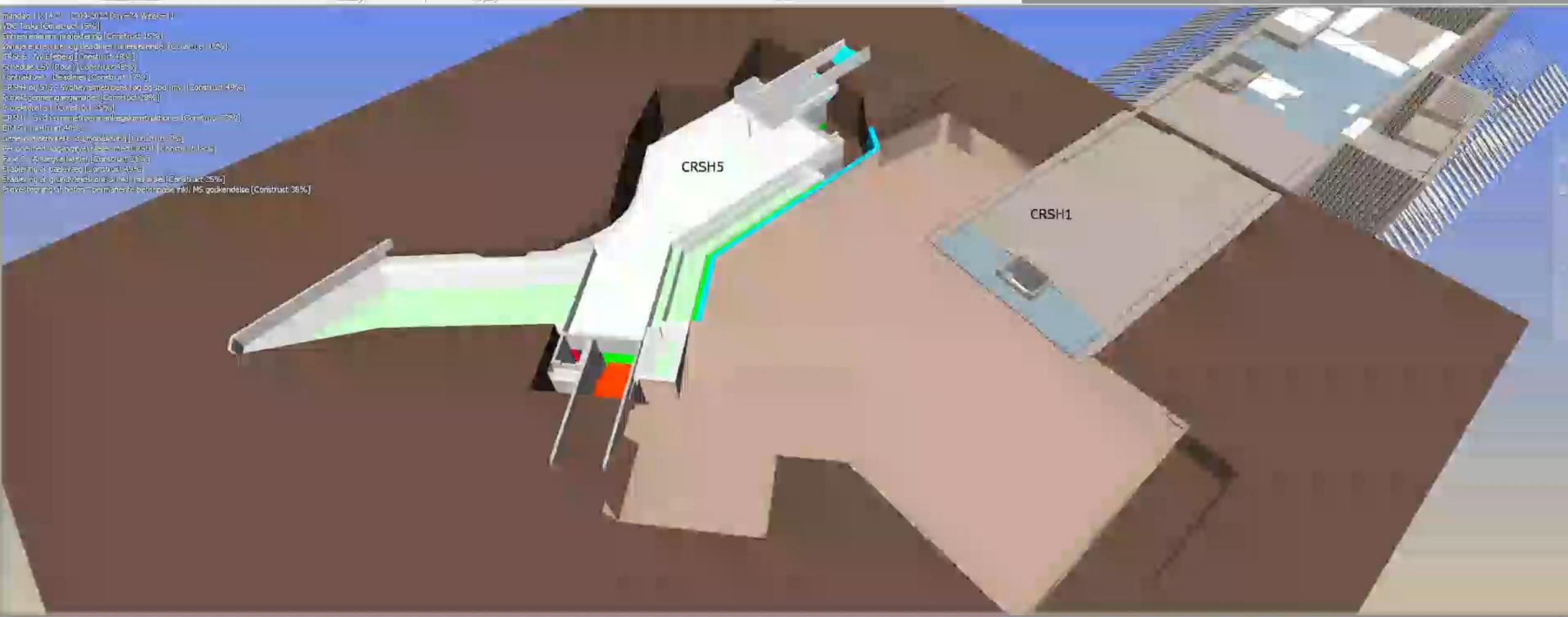
Visualizing the Main Schedule

4D Simulation

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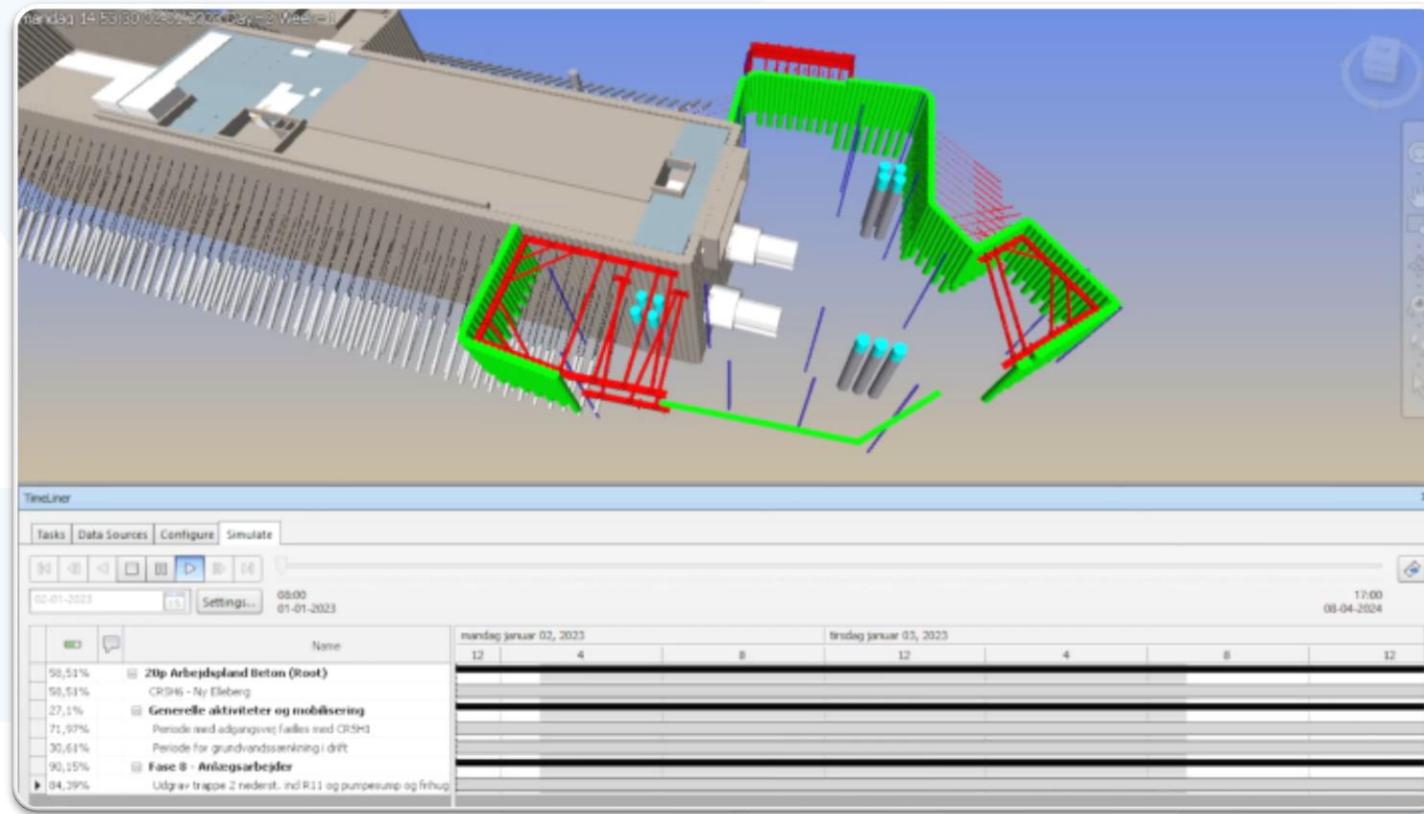
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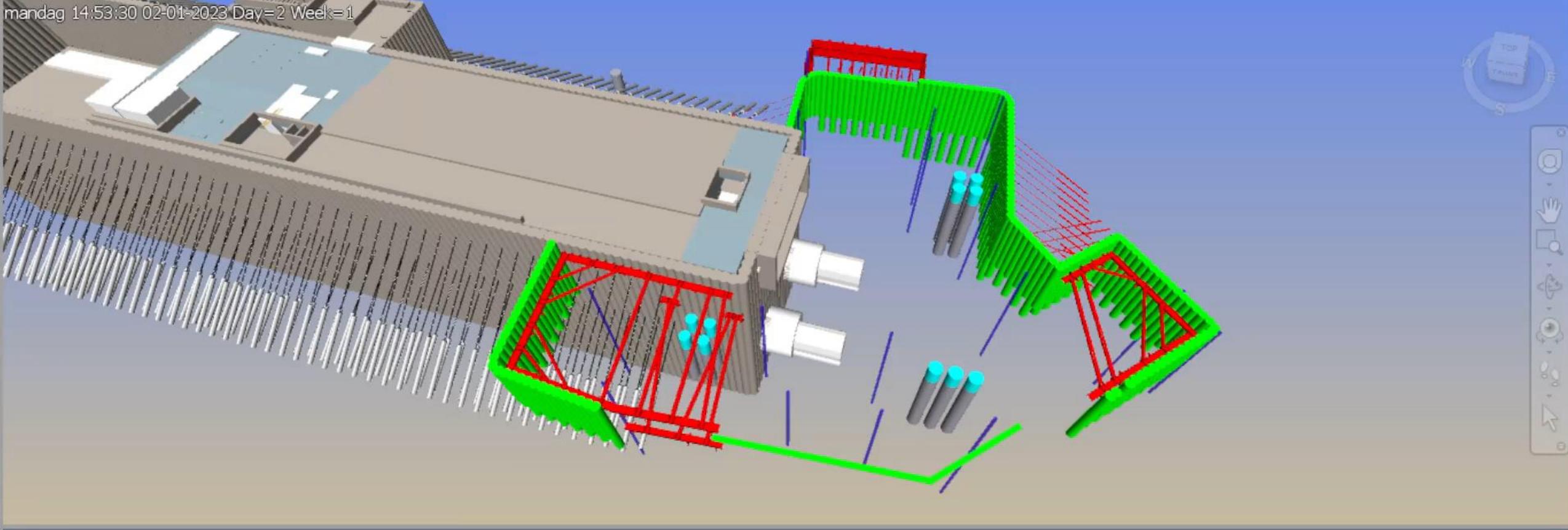
Acceleration of the concrete project

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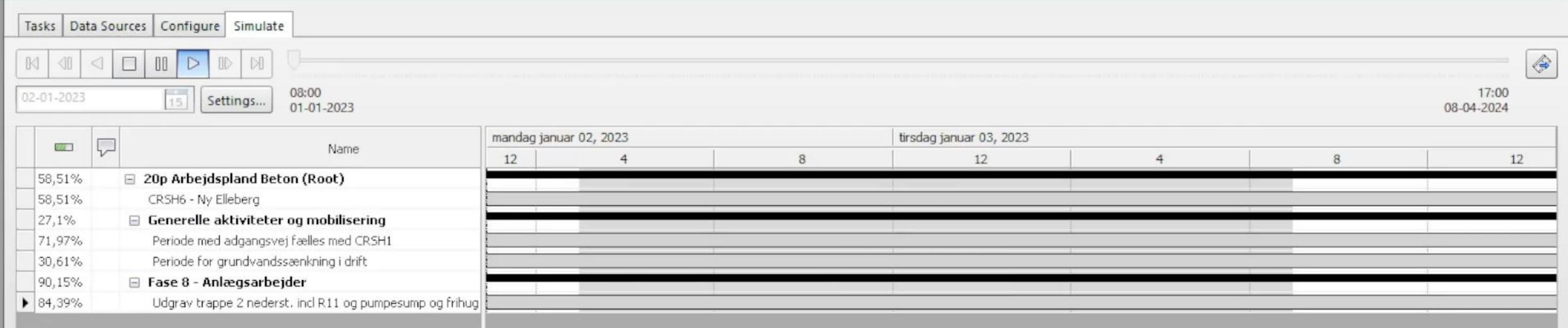
4D Simulation as a visual support tool for the concrete sequence



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TimeLiner



Web-based 4D

Accessible on site



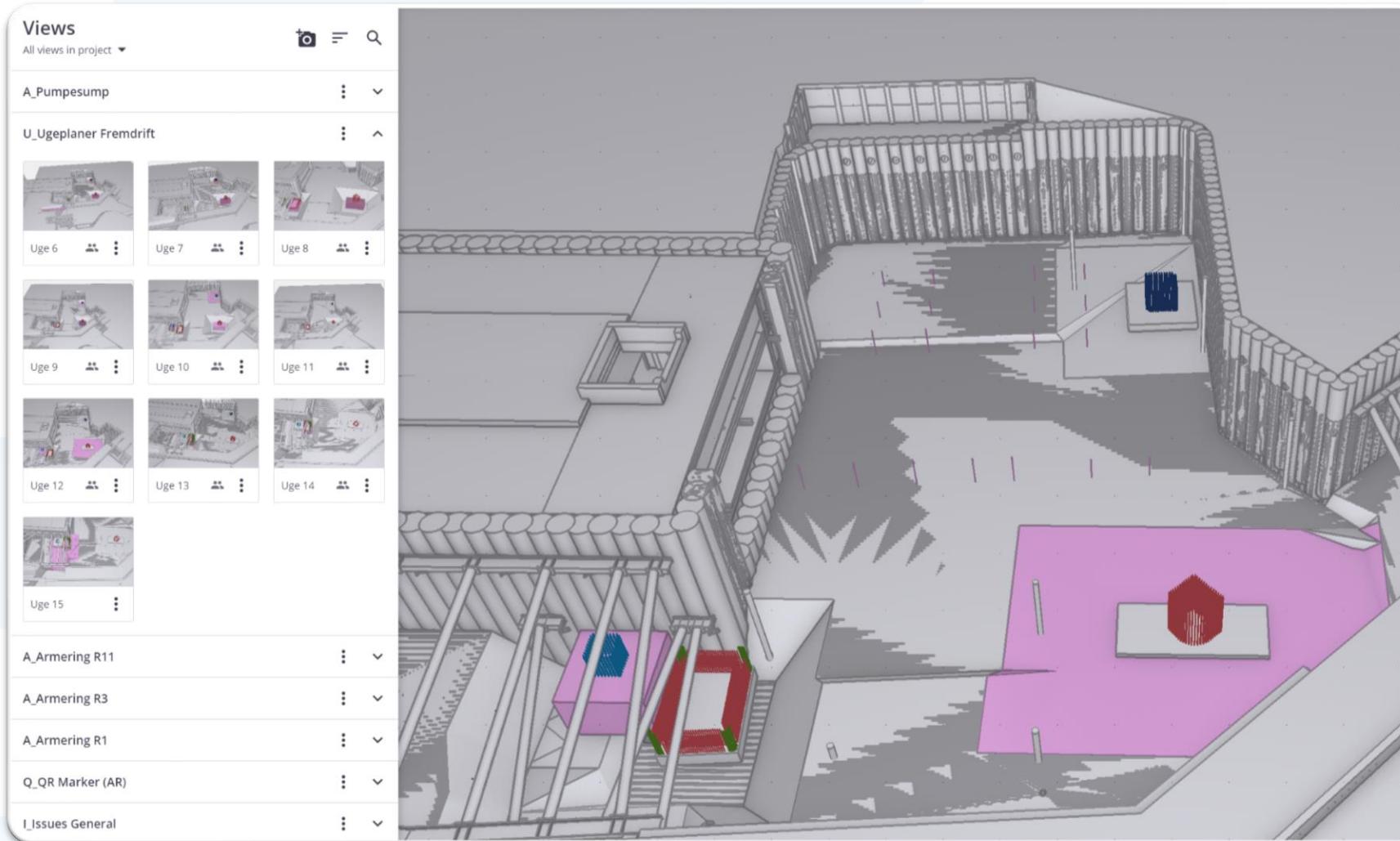
- Accessible for everyone via browser
- Interdisciplinary and simple interaction with the simulation that is based on a 3D viewer
- Current activities are shown both with baseline and actual information
- Semi-automatic update of the app as schedule and/or models change



6 Weeks Plan

Weekly visualization of the 6 week plan in 3D

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- Short-term detail planning of the upcoming construction activities
- Interdisciplinary coordination
- Visual clash and constructability check



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As-built Scanning

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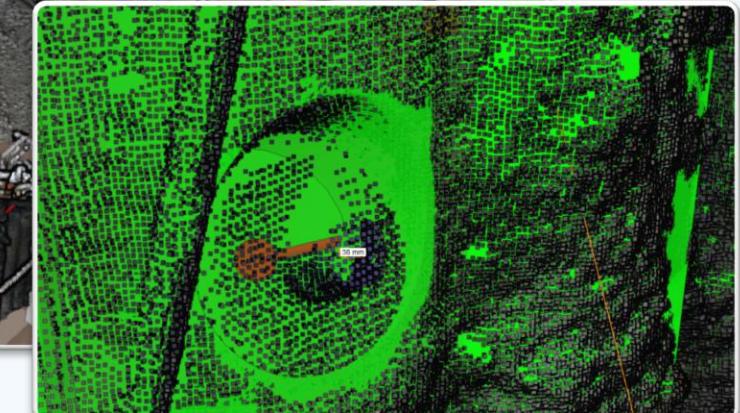
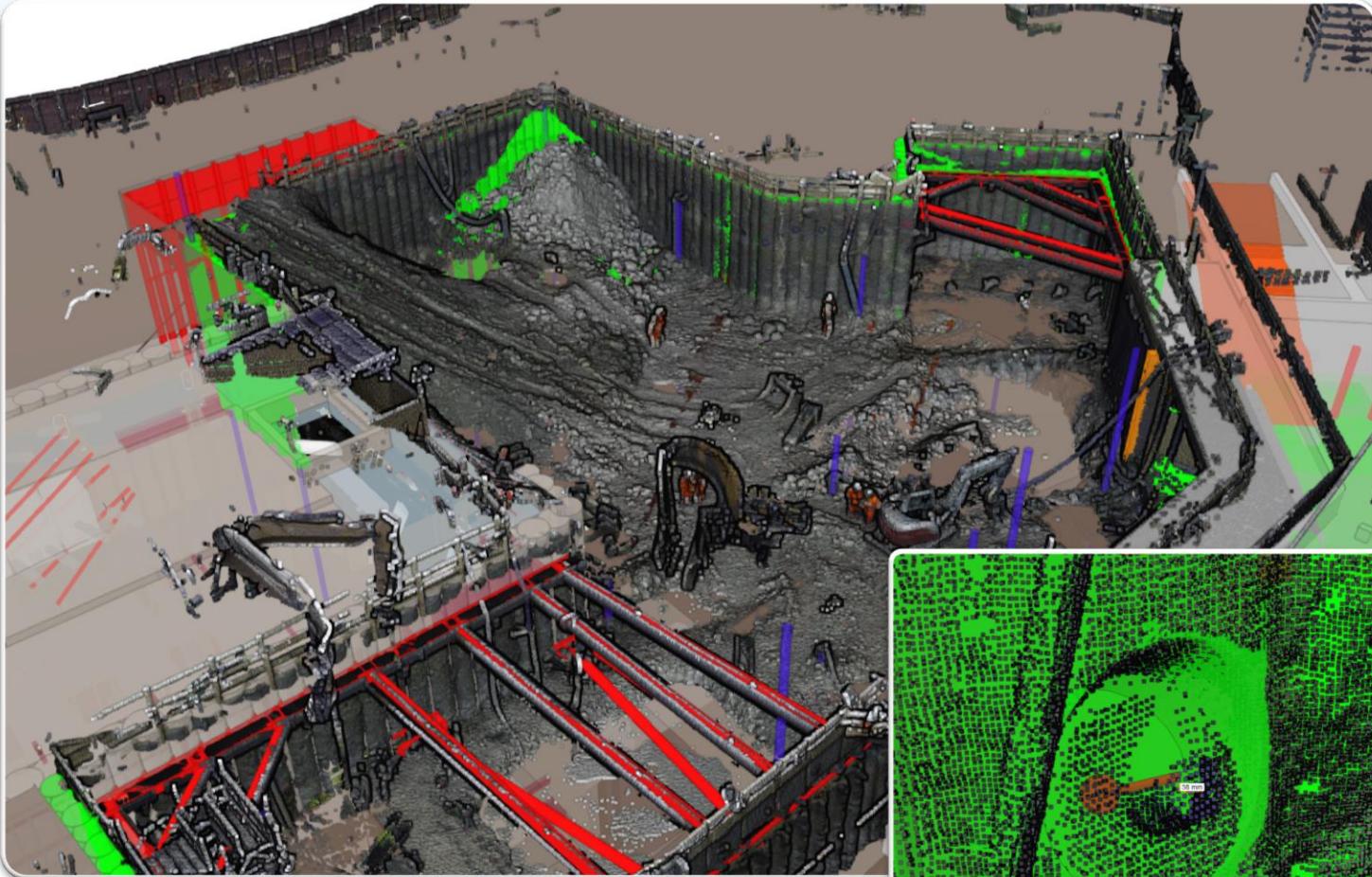
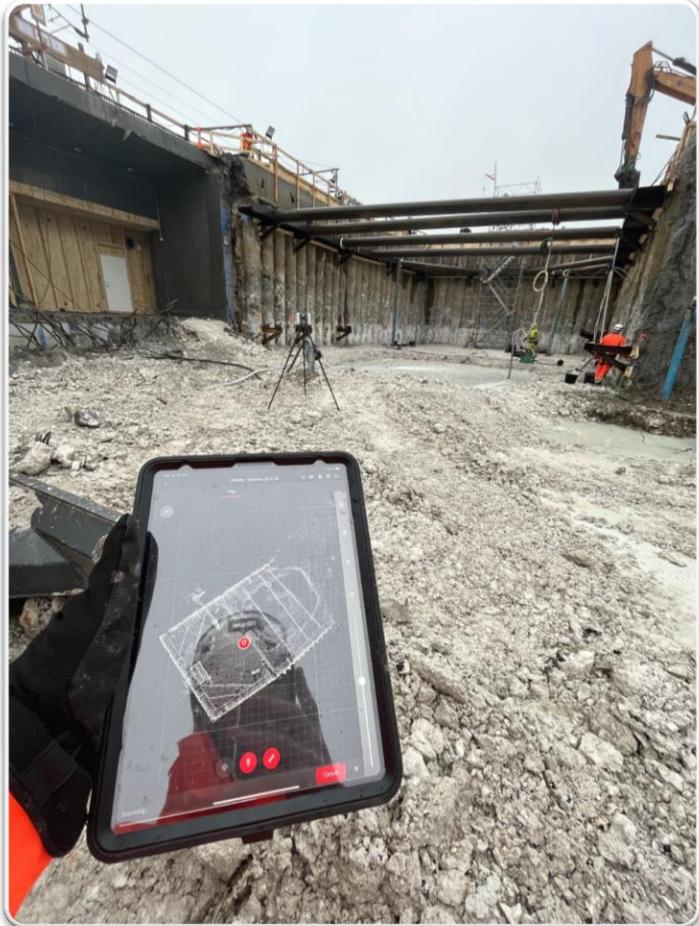


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Scan / Pointcloud

Registration of As-built

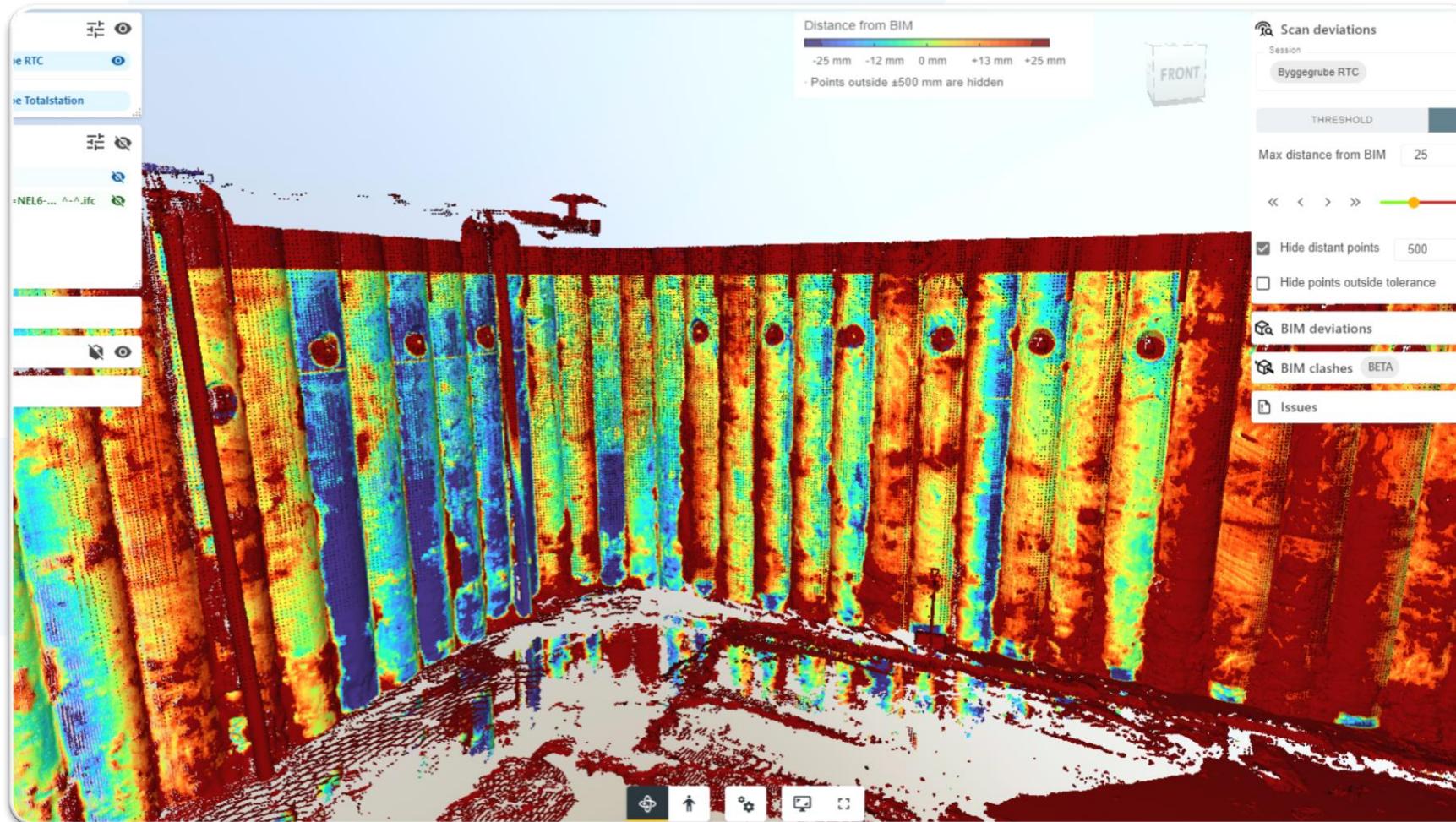
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As built documentation

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BIM-Scan deviation



- Deviation between as planned and as built
- Heatmap visualizing deviation regarding tolerances
- Issues (out-of-tolerance) are found and necessary measures can be planned
- As-built documentation

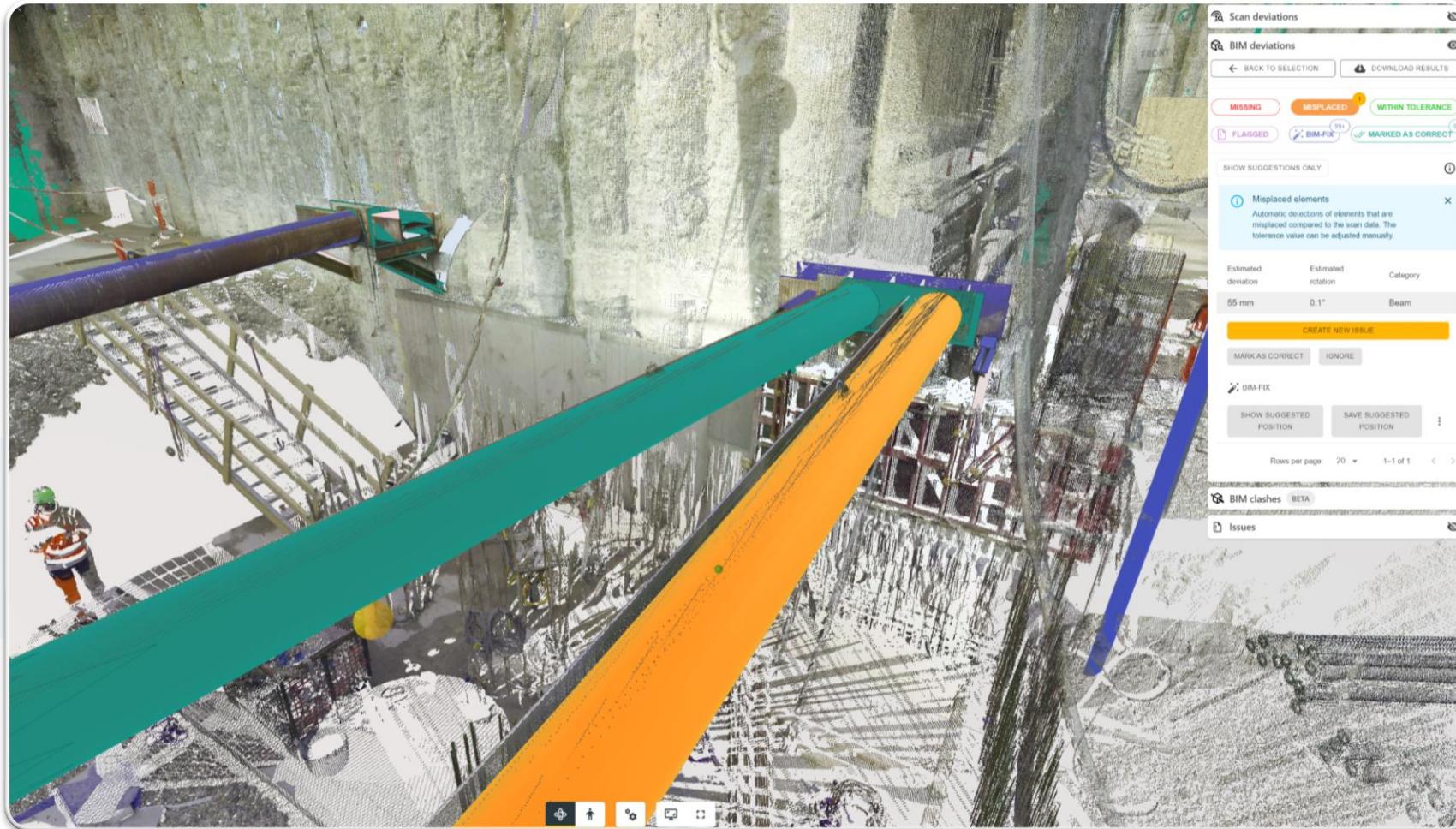


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As built documentation

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BIM-Scan deviation



- As-built modification
- Generation of a BIM deviation report with all modifications
- Export as as-built IFC model

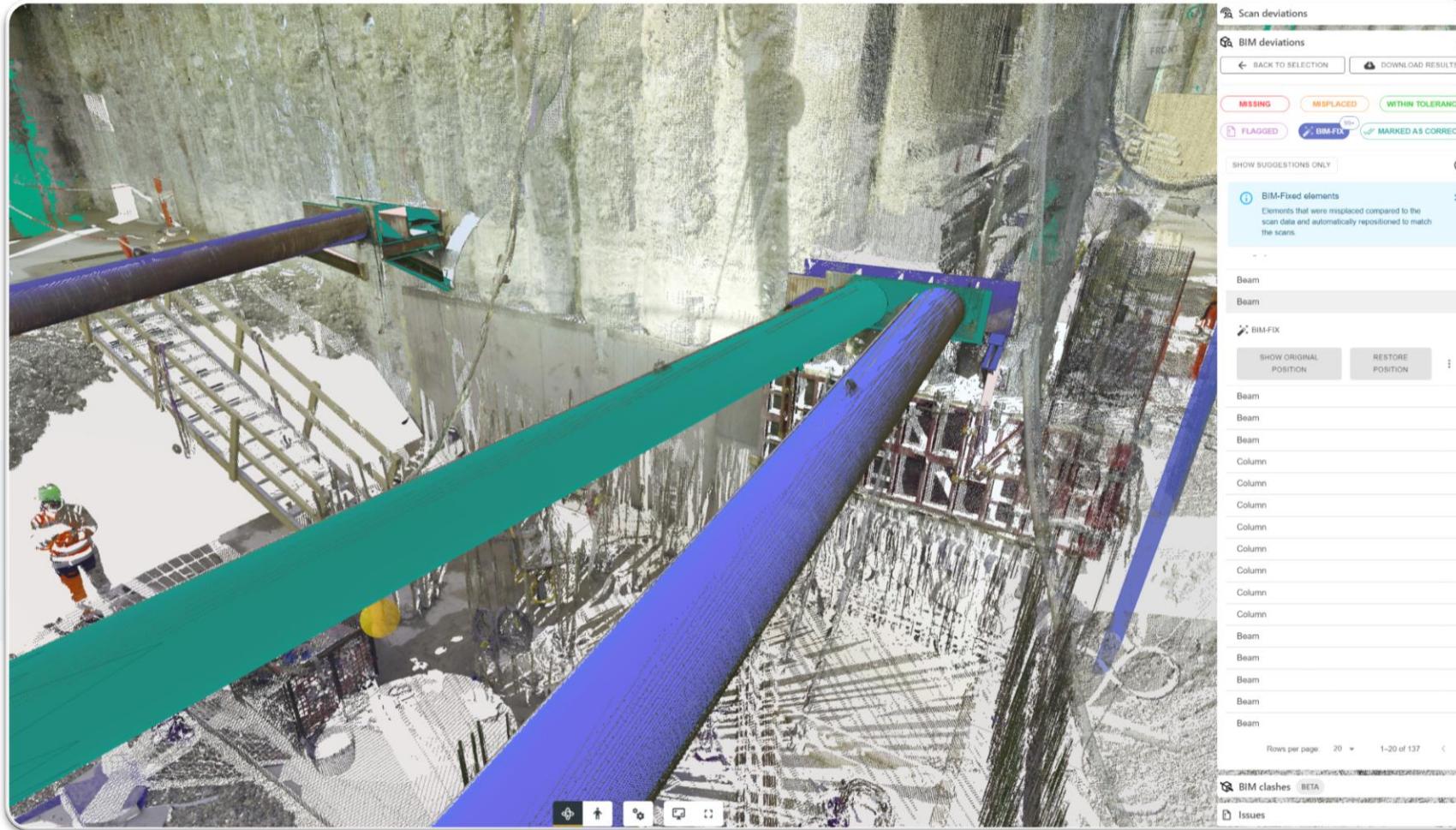


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As built documentation

BIM-Scan deviation

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- As-built modification
- Generation of a BIM deviation report with all modifications
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VDC for the construction site

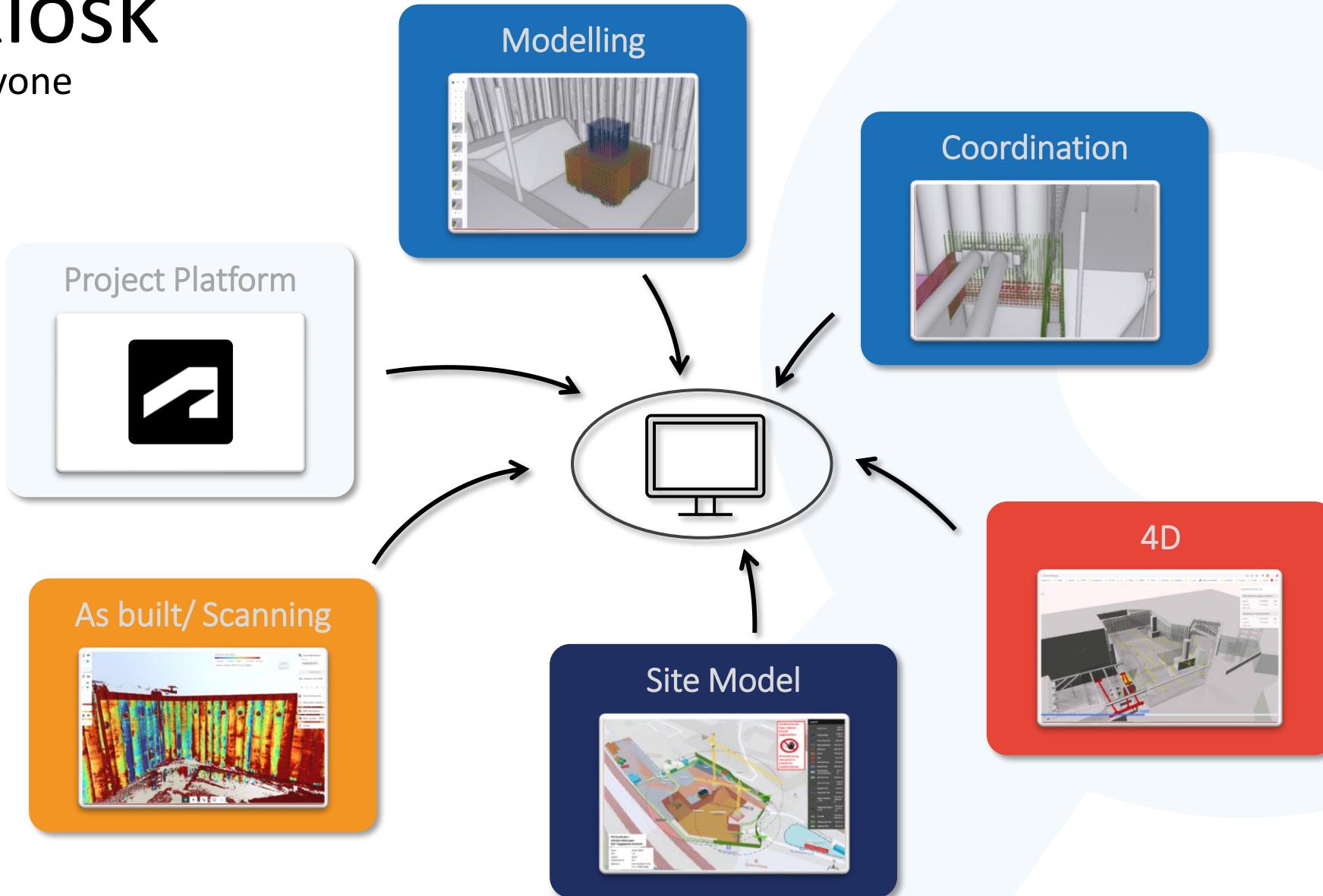
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BIM Kiosk

VDC for everyone



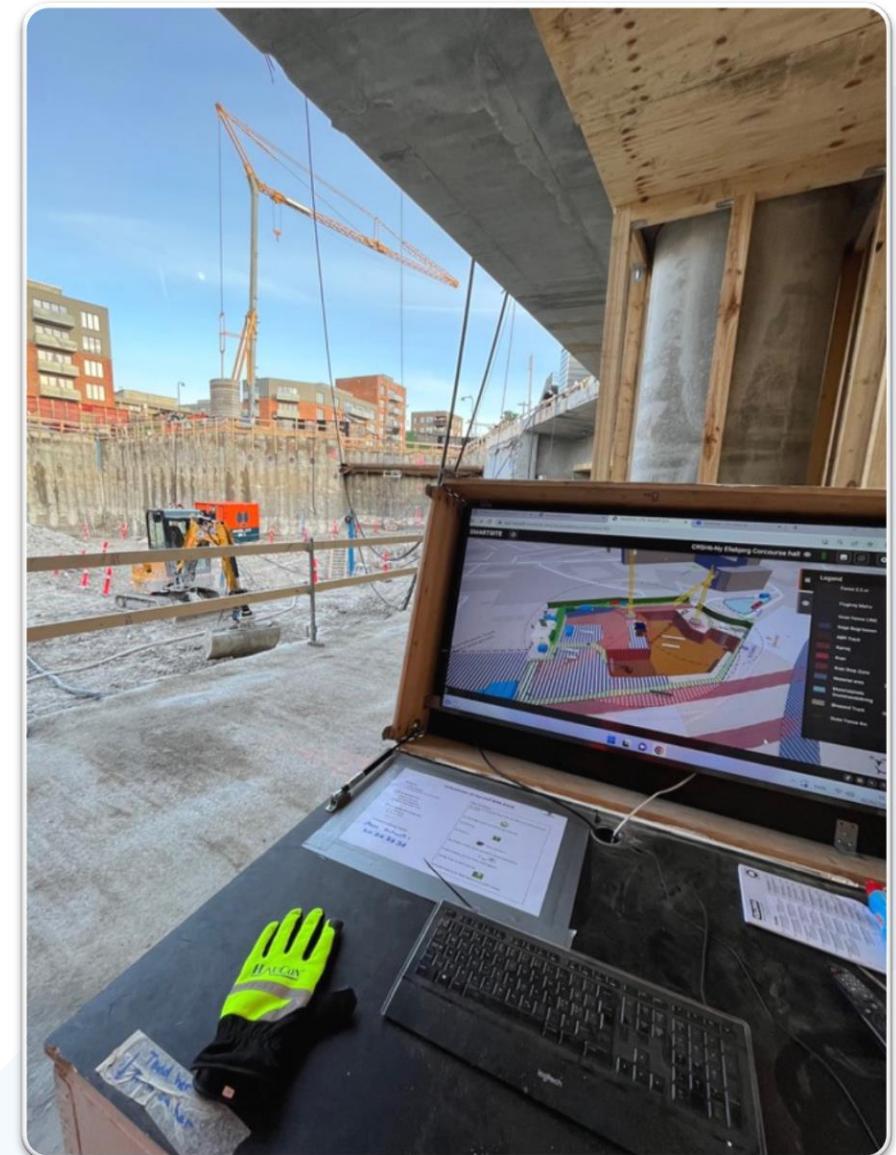
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BIM Kiosk

Hidden camera 😊



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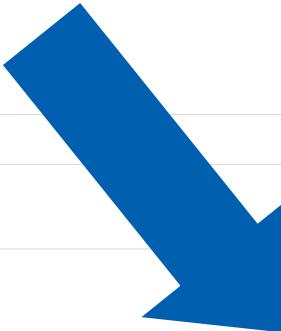
BIM Kiosk

Usage analysis

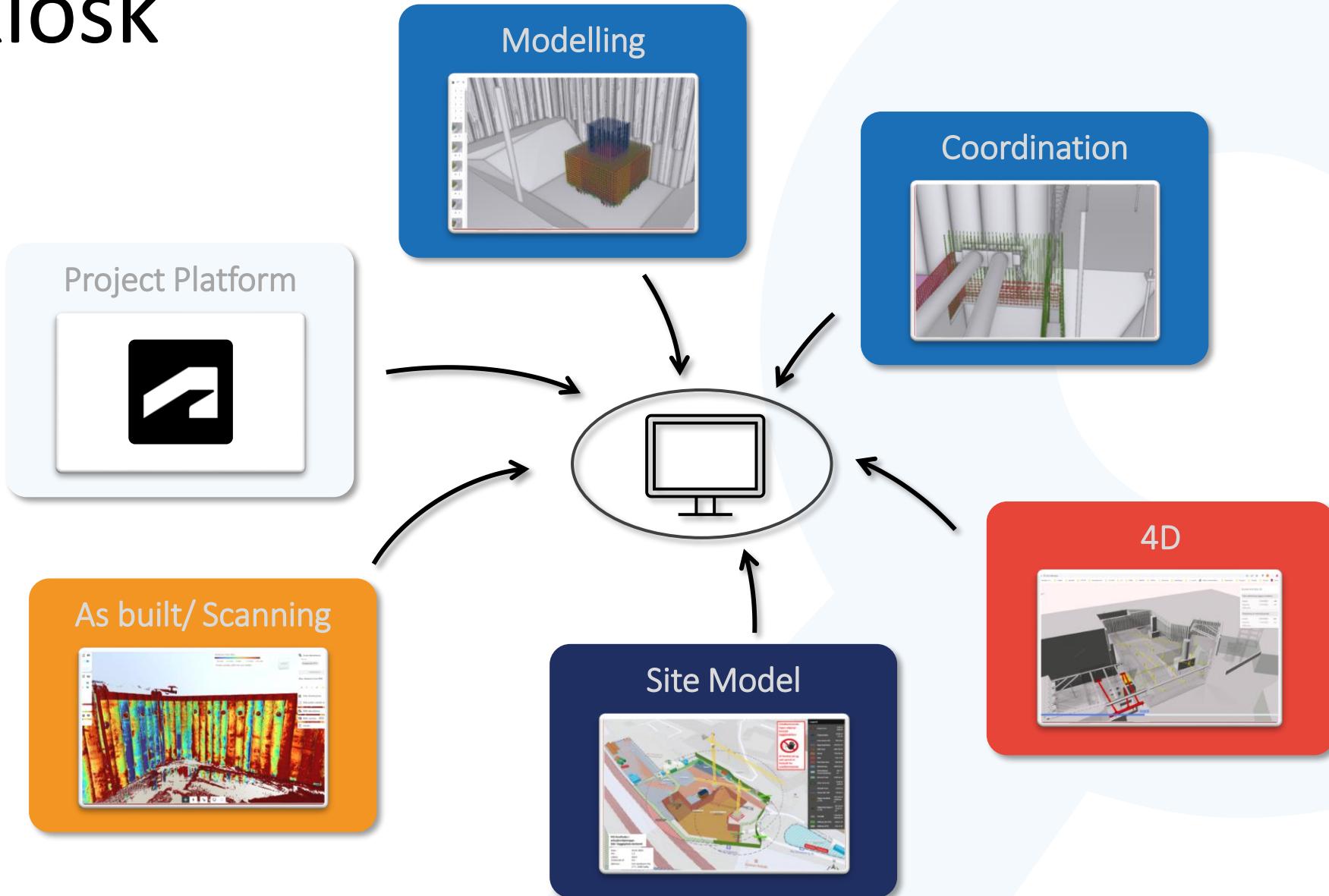
20.06.2023



Start of the main slab
reinforcement work



BIM Kiosk



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