

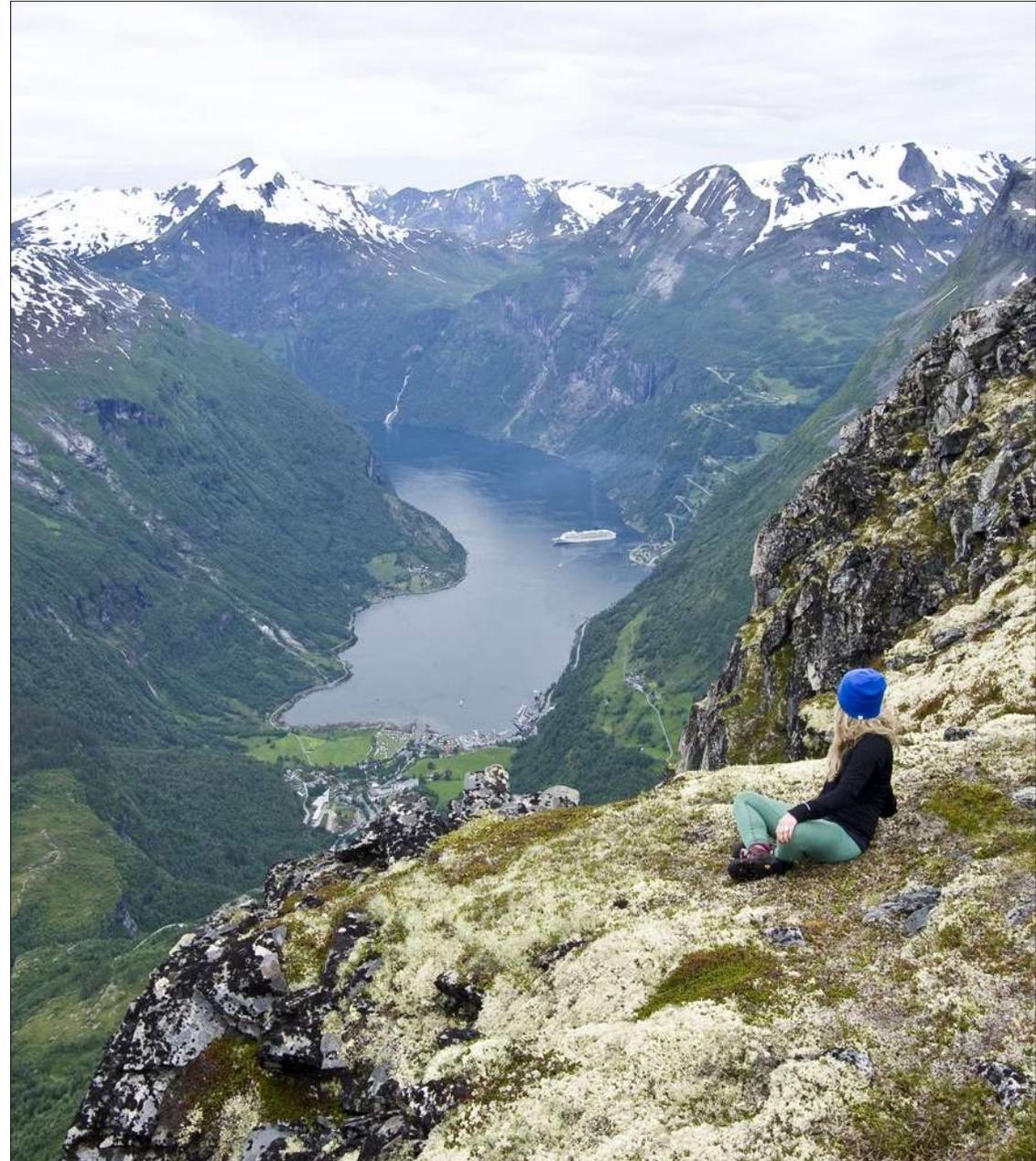


Bridget White

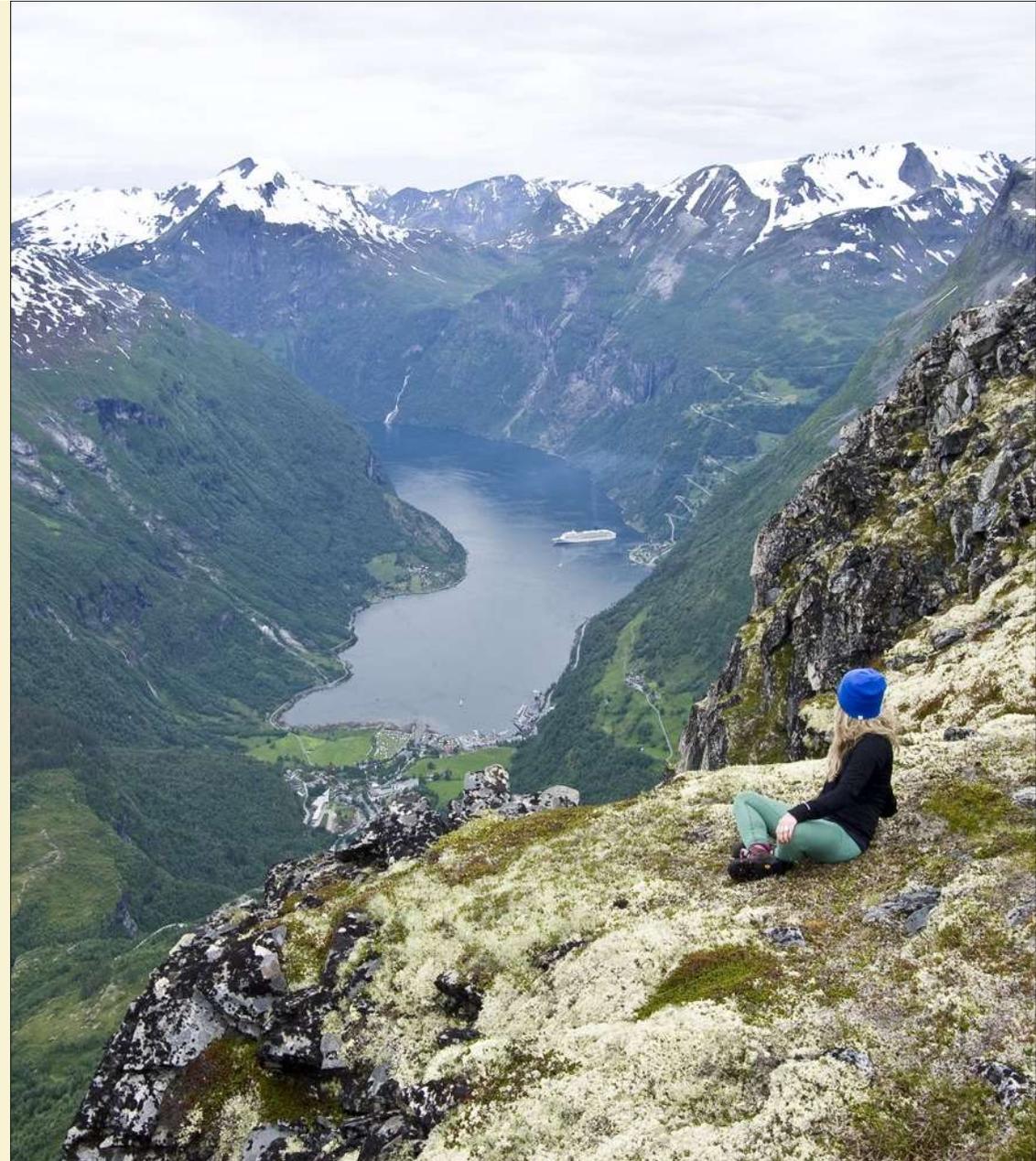
---

Senior Associate  
**Warren and Mahoney**

Senior Architect, BIM Director  
**Nordic Office of Architecture**



**Flydalsjuvet**  
Geiranger, Norway





**Valdresflye**  
Jotunheimen, Norway

**Nordmarka**  
Oslo, Norway





**400+**

People

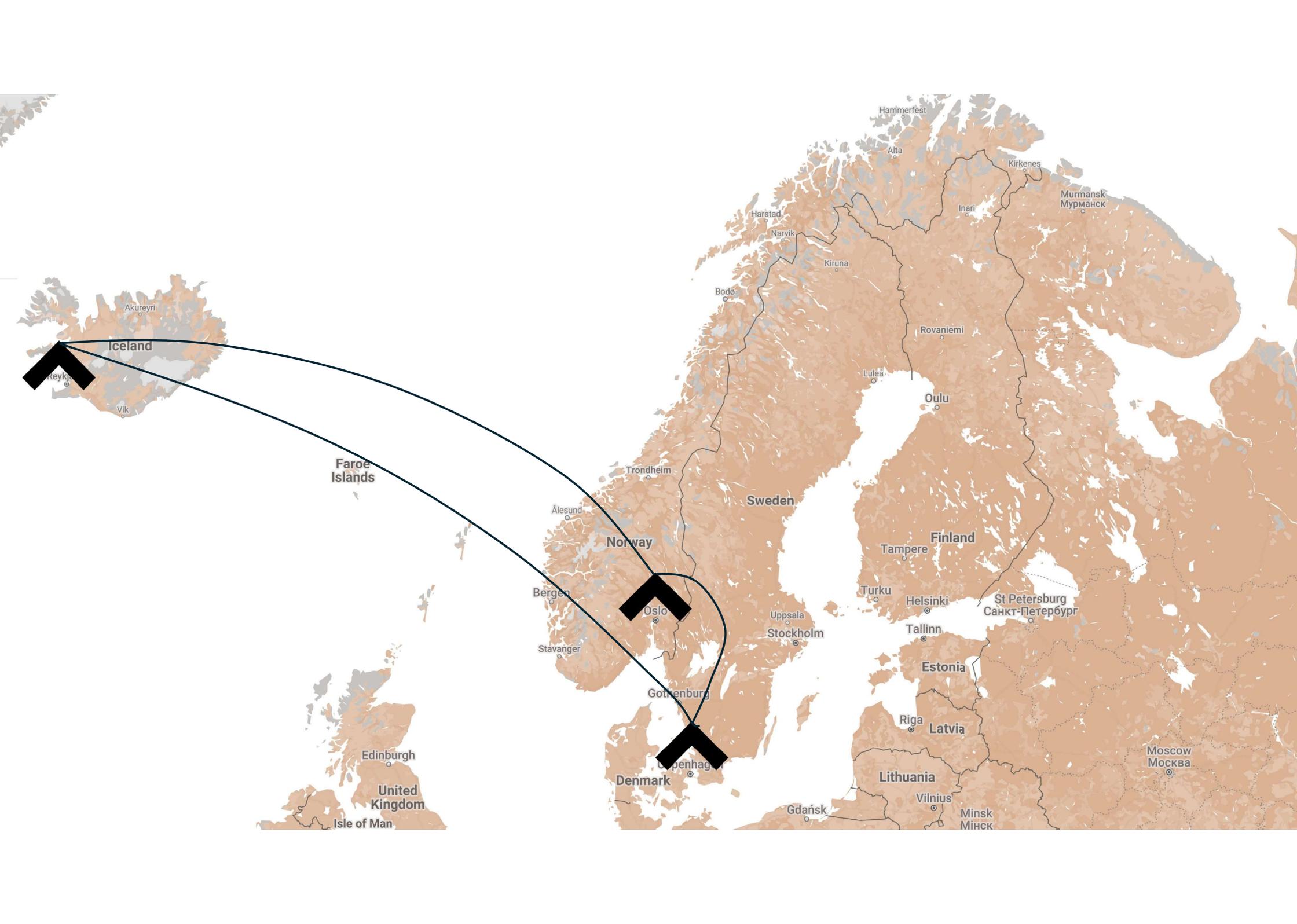
**30+**

Nationalities

**5**

Offices

Nordic  
Office of  
Architecture



Faroe Islands

Norway

Sweden

Finland

Denmark

Lithuania

United Kingdom

Isle of Man

Iceland

Bergen

Oslo

Stavanger

Gotenburg

Ålesund

Trondheim

Stockholm

Uppsala

Turku

Helsinki

Tallinn

St Petersburg  
Санкт-Петербург

Estonia

Riga

Latvia

Moscow  
Москва

Vilnius

Minsk  
Мінск

Gdańsk

Hammerfest

Alta

Kirkenes

Murmansk  
Мурманск

Harstad

Narvik

Kiruna

Bodø

Rovaniemi

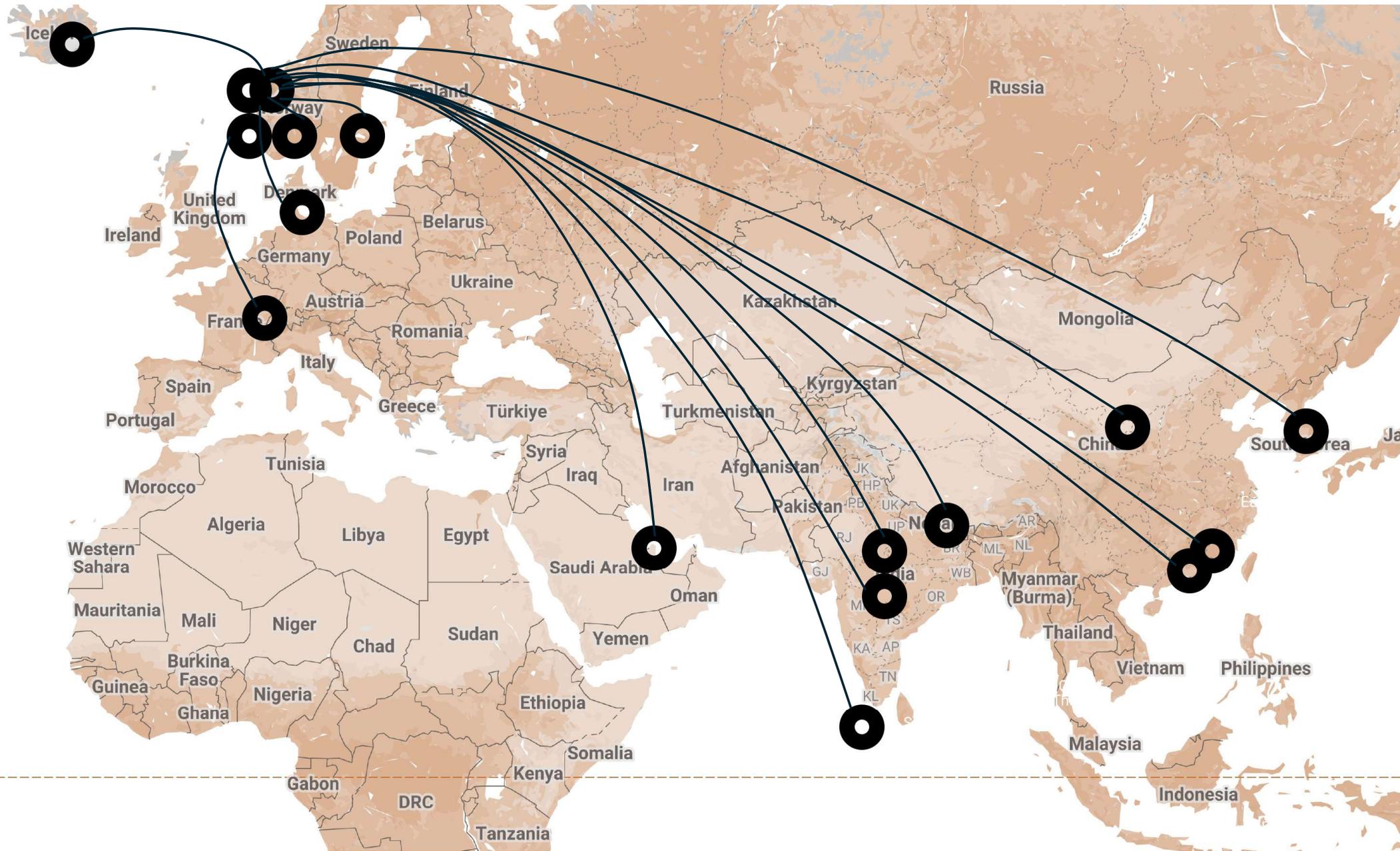
Luleå

Oulu

Reykjavik

Akureyri

Vik



**Moonstone Retreat**  
Bodø, Norway



Nordic  
Office of  
Architecture



**Fagerli school and kindergarten**  
Larvik, Norway



Nordic  
Office of  
Architecture



Nordic  
Office of  
Architecture

# Dehli Noida International airport

New Delhi, India





“Den beste maten å fortelle en historie på er å inkludere andre mens historien skapes”

Norconsult digitaltransformasjon

# Stavanger University Hospital





In Norway centralised healthcare works.  
Should the NHS follow suit?

*Ole Tjomsland and Stein Bruland*

Data and evidence  
hospitals provides  
health experts argu



## From Centralization to Decentralization, and Back: Norwegian Health Care in a Nordic Perspective

[Jon Magnussen](#) & [Pål E. Martinussen](#)

Chapter

**281** Accesses | **1** [Citations](#)

### Abstract

---

In the Nordic countries, health care is an integral part of what is often termed the Scandinavian (or Nordic) model of the welfare state (Esping-Andersen 1990). Thus, health

# 200,000 jobs threatened by Norway oil industry crisis

## Pain of job losses acute in Stavanger

August 24, 2016

Two years after the oil and offshore industry seriously started slashing jobs, the sharp pain of job losses is now really striking many of those out of work and their families. Unemployment benefits are running out for workers laid off in the early rounds of job cuts, while a crisis center in Stavanger is reporting a worrisome rise in cases of domestic violence.

"Lots of people are uncertain now about



since 2014 has exposed the full extent of the dependence on oil and gas. In response, the ruling elites worldwide, are seeking to roll back working class.



# Client

---



Nordic  
Office of  
Architecture

**AART** / archi  
tects

**SLA**  
Urbanity | Strategy | Landscape

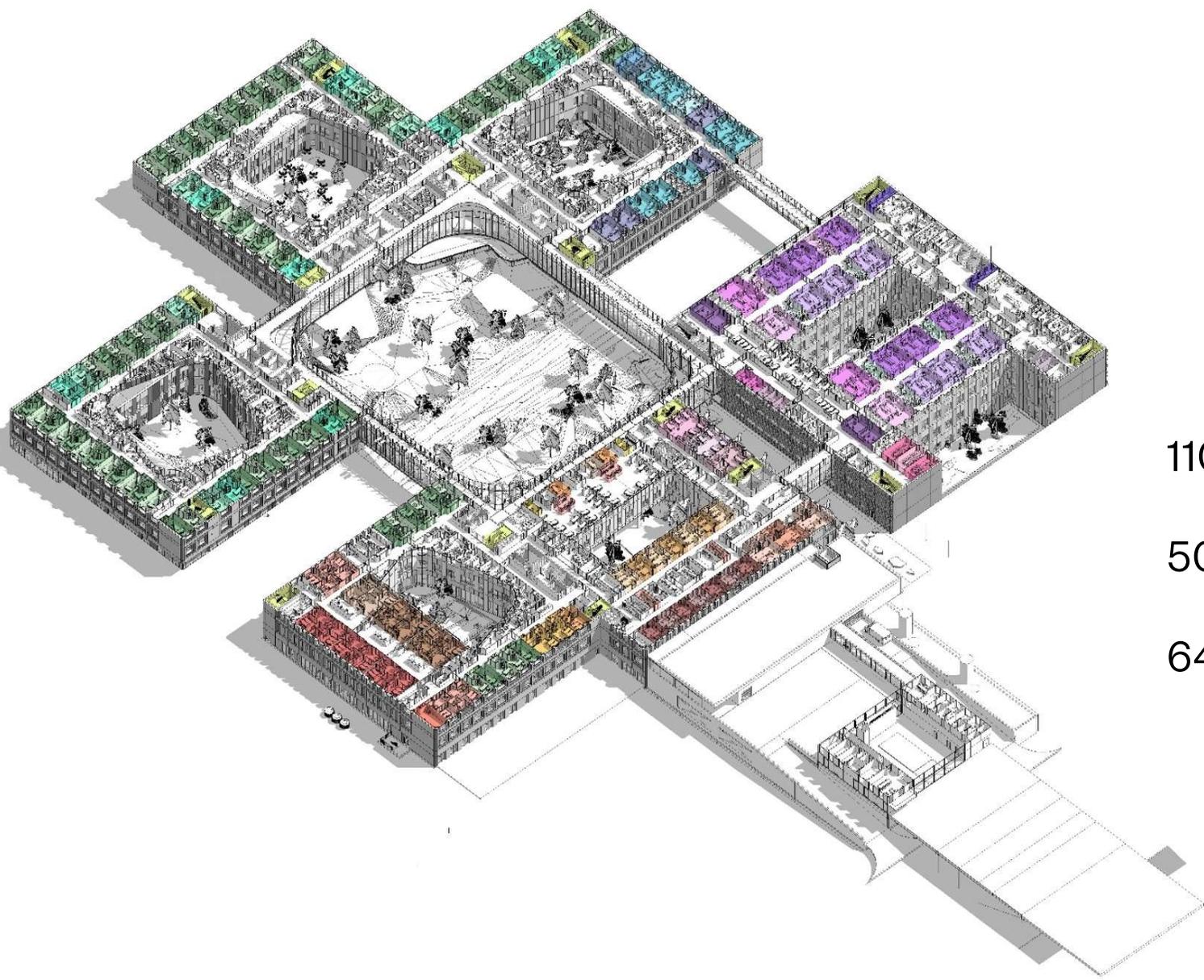
**COWI**

 **AAS-JAKOBSEN**

 Bryden Wood

---

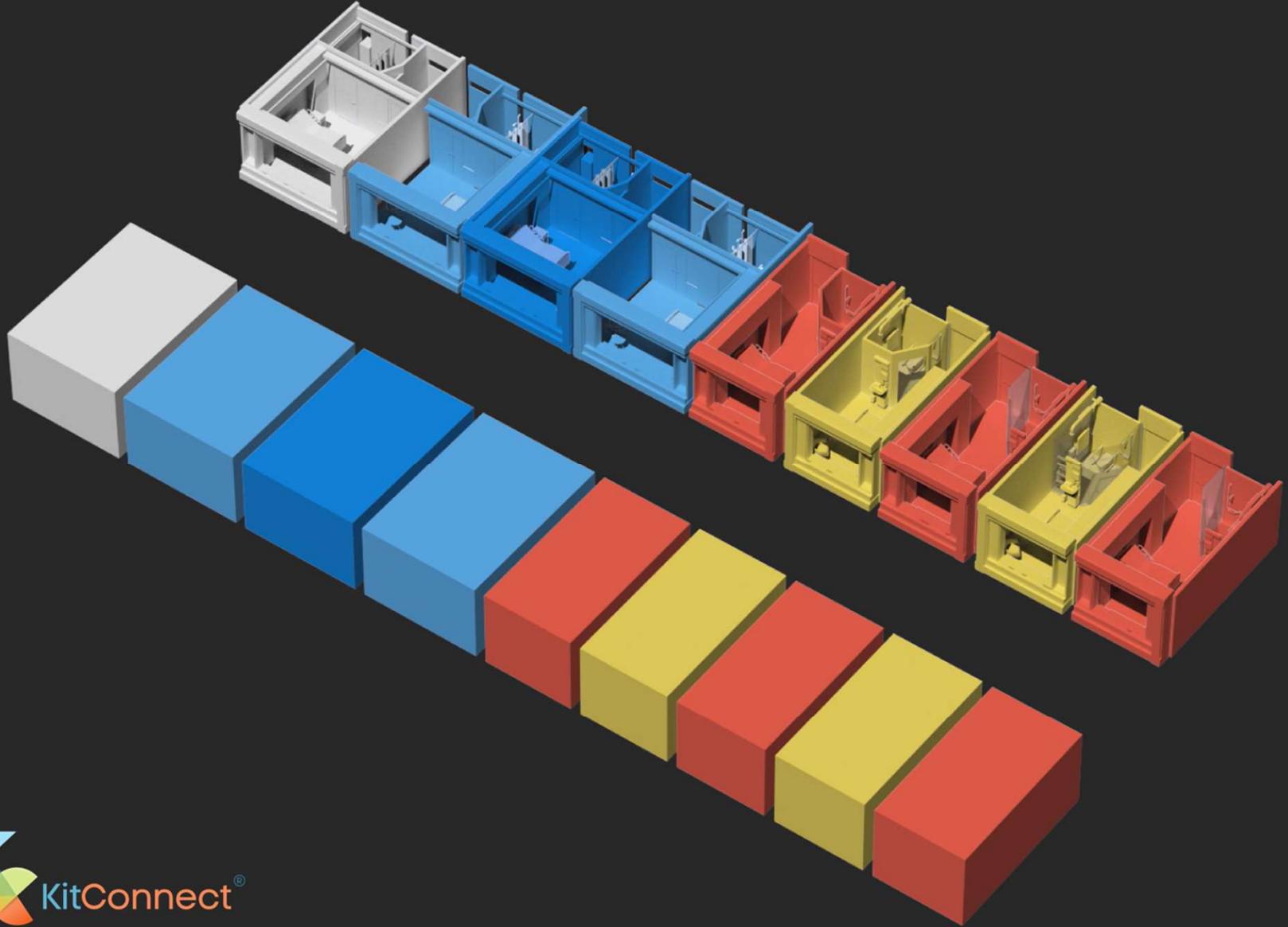
# Team

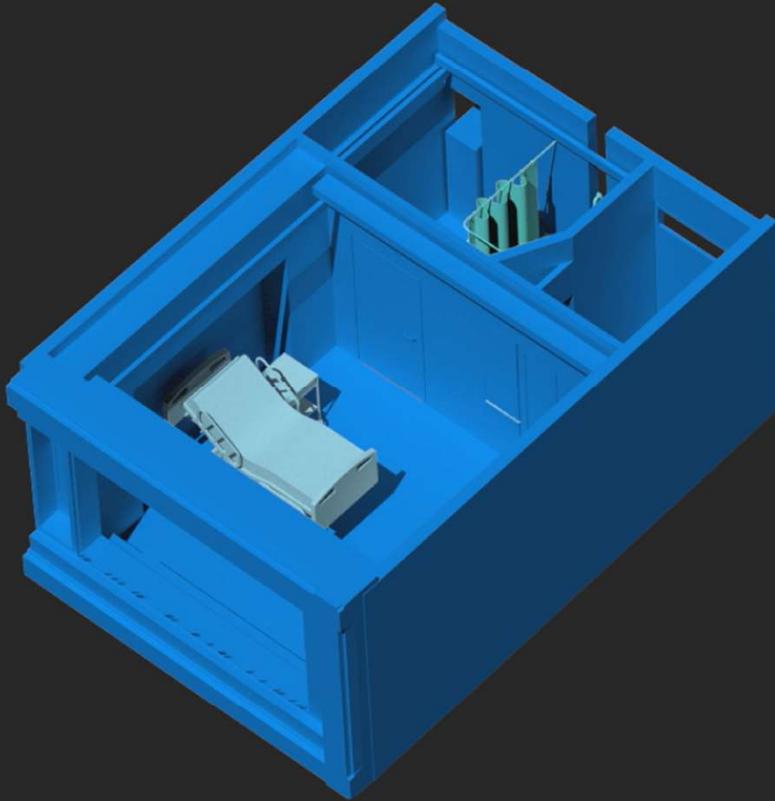


110 000 m<sup>2</sup>

50 000 m<sup>2</sup> facades

640 bedrooms with ensuite



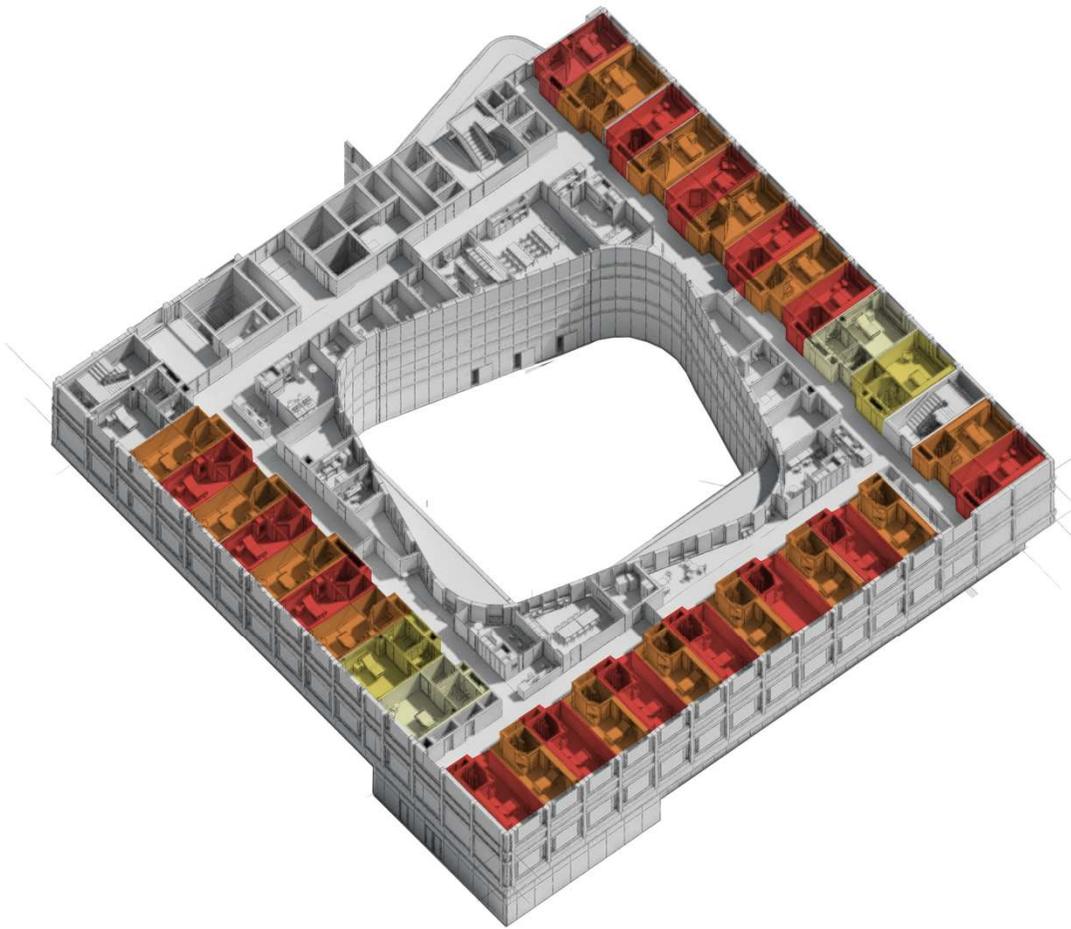


## 8X7-2L-003

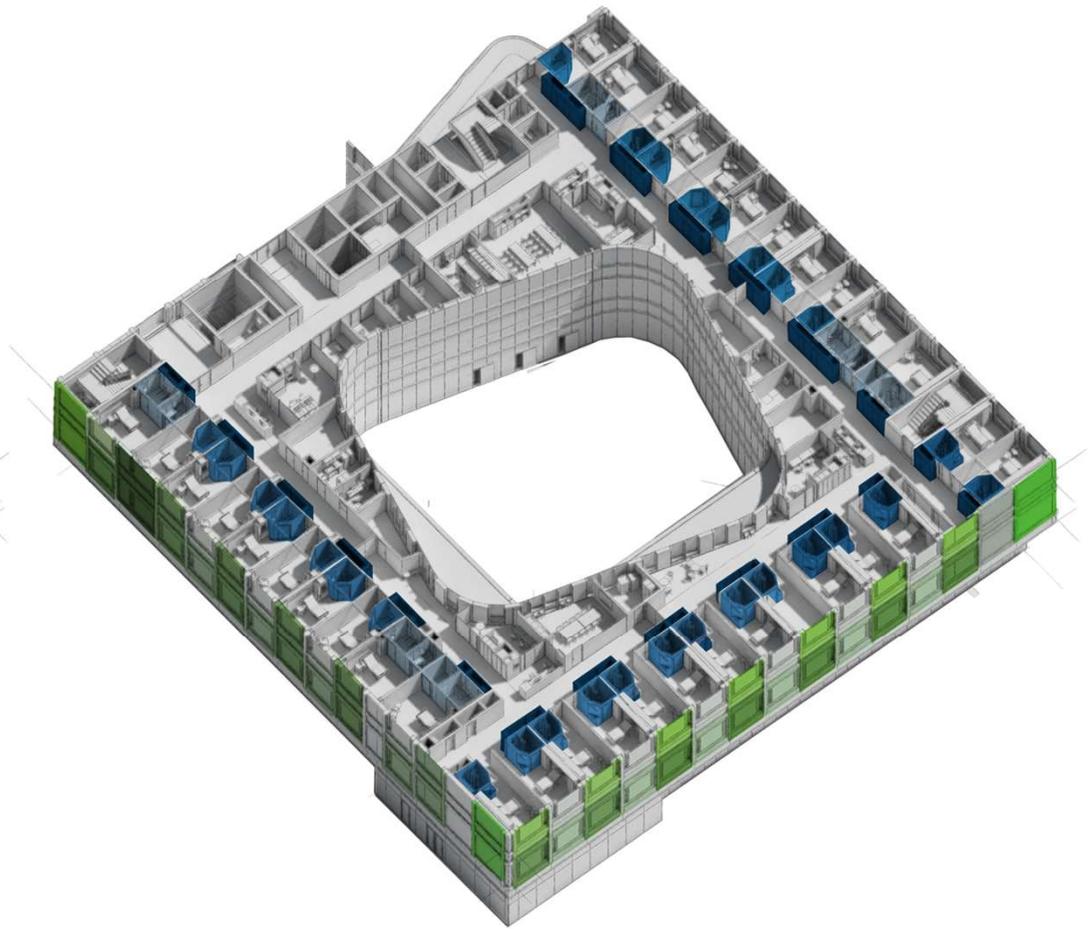
### ROOM MODULE

Second Type  
Left Orientation

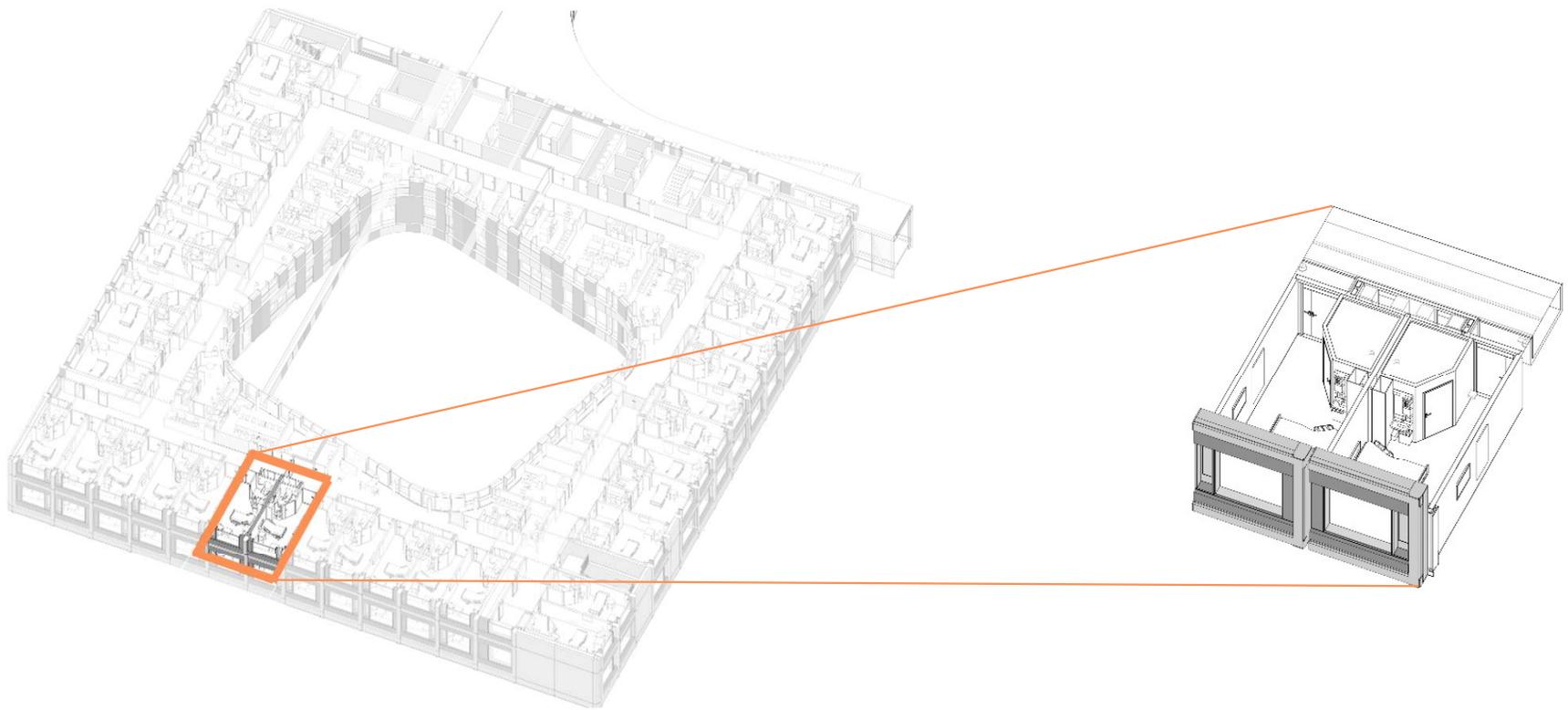
BATHROOM MODULE RIGHT	COUNT	BB1.AR.001
Wall 1 (Switch Panel)	65	
Wall 2 (Door)	78	8D1.A.R.001
Wall 3 (Vanity Unit 1 Patient Care-Right)	12	8S1.A.R.001
Wall 4 (Vanity Unit 4 Bathroom-Right)	41	8S4.A.R.001
Wall 5 (Toilet and shower)	78	H-01D
Ceiling (Component)	93	H-01D
Floor		
Ceiling Height 2400 mm		
VANITY UNIT 1-PATIENT	I	BB1.AR.001
Medium washbasin with overflow 56X42	19	315.01.019
Mirror smal wall-mounted 300x1000	45	279.06.004
Light fixture cassette	55	273.02.045
Backplate 600X2100	27	273.02.055
Waste Dispenser	21	279.09.127
Small Cabinet	52	011.13.021
Soap Dispenser	94	273.02.005
Other Dispenser	27	273.02.002



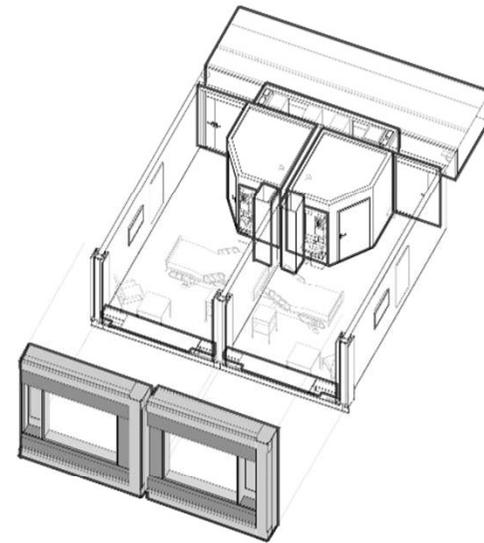
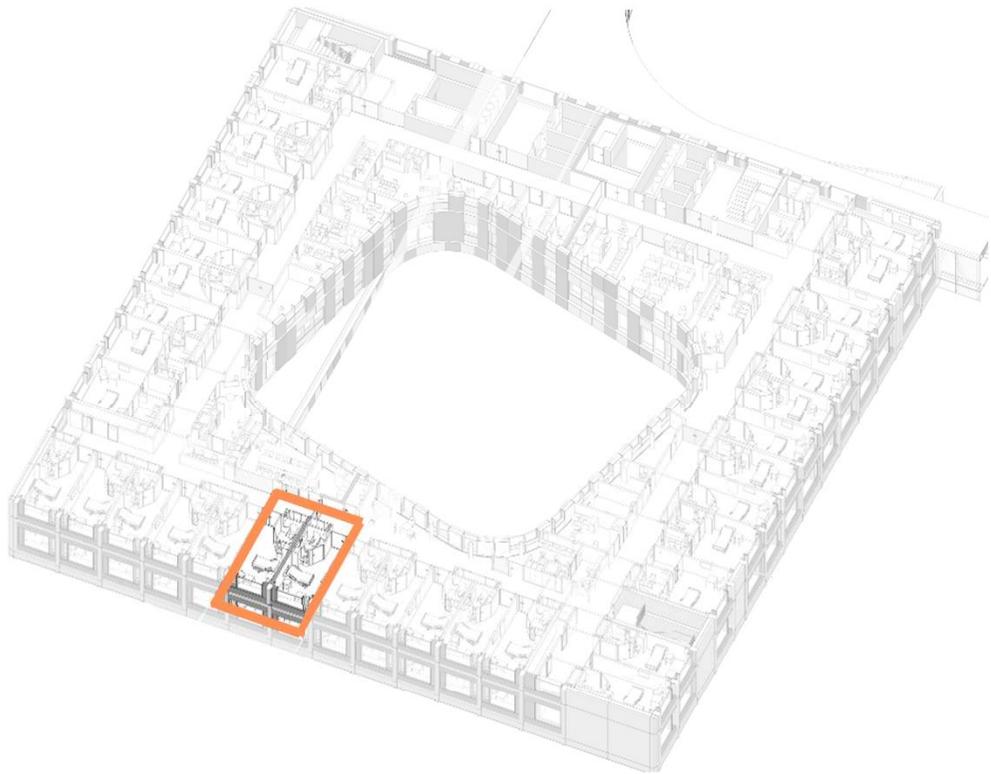
single discipline



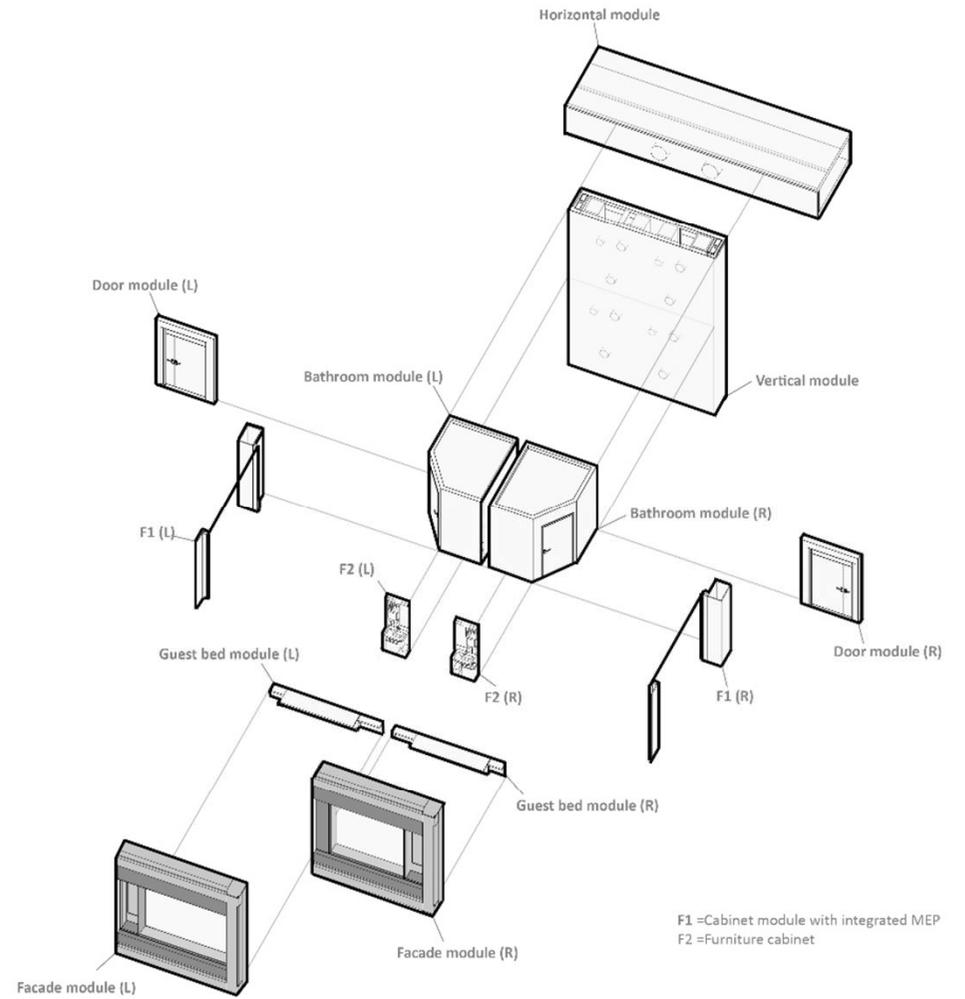
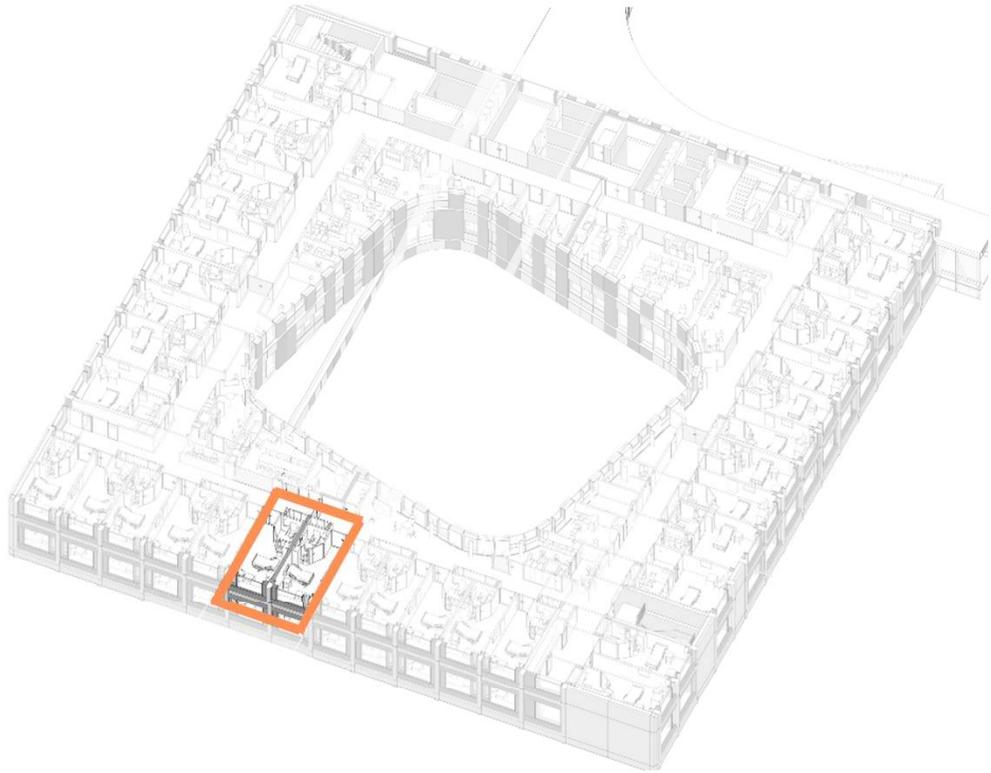
cross discipline



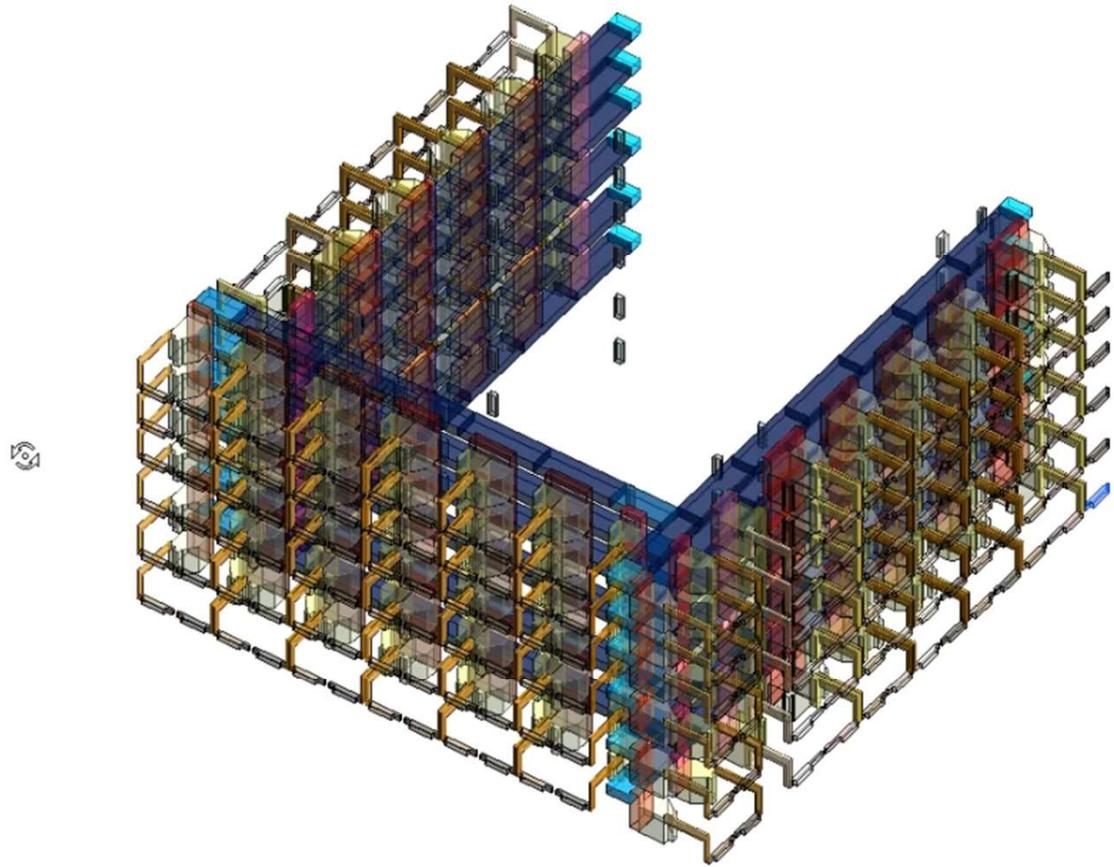
Configeration design



Configeration design



# Configuration design



Placeholder technology

Temporary Hide/Isolate

### Auto Mapper

1 2 3 4 Restart

Mapping is created and we are ready to place all remaining elements.

Place all



  
Nordic  
Office of  
Architecture

# Industrialised BIM

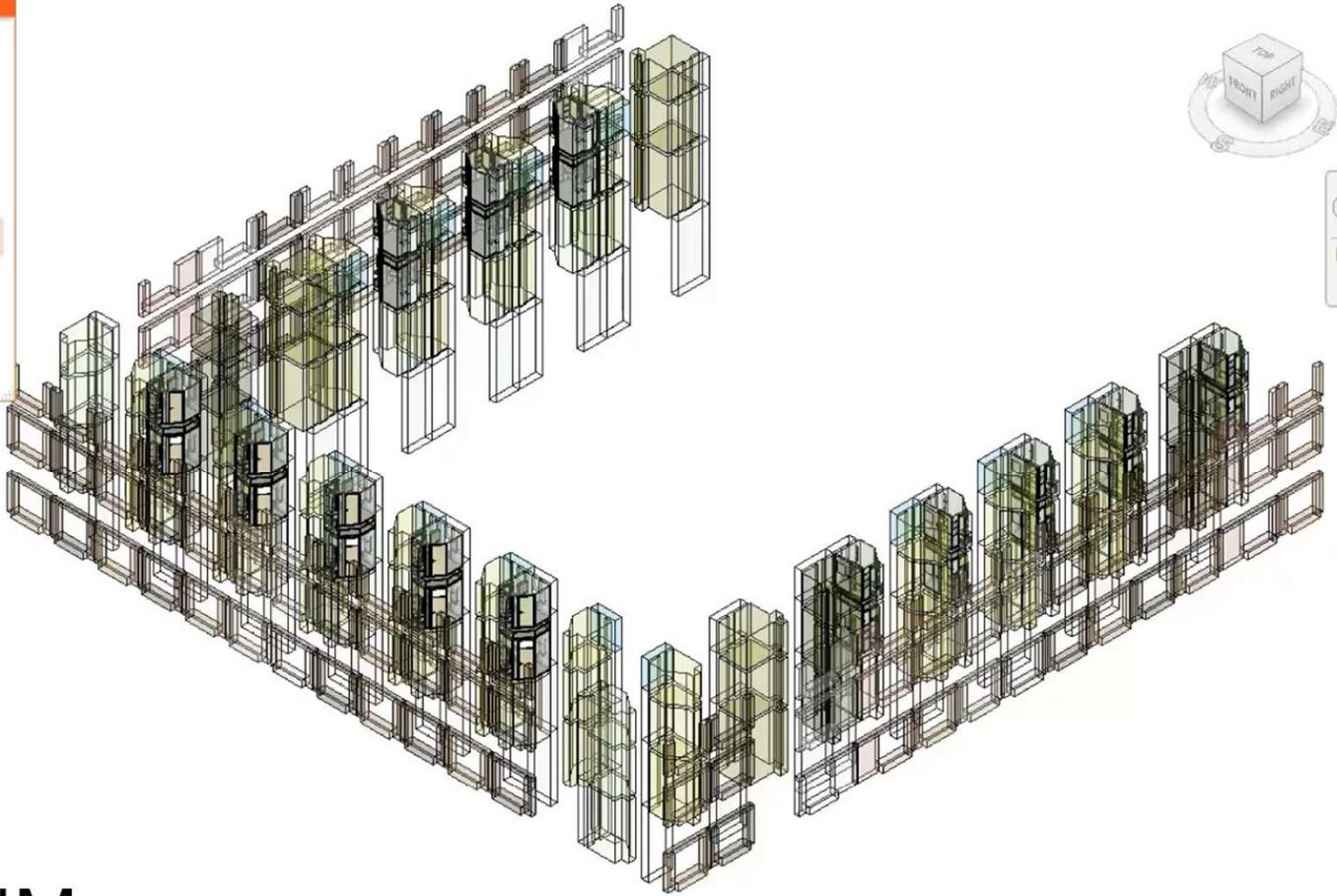
**COWI**

**Auto Mapper**

1 2 3 4 **Restart**

Mapping is created and we are ready to place all remaining elements.

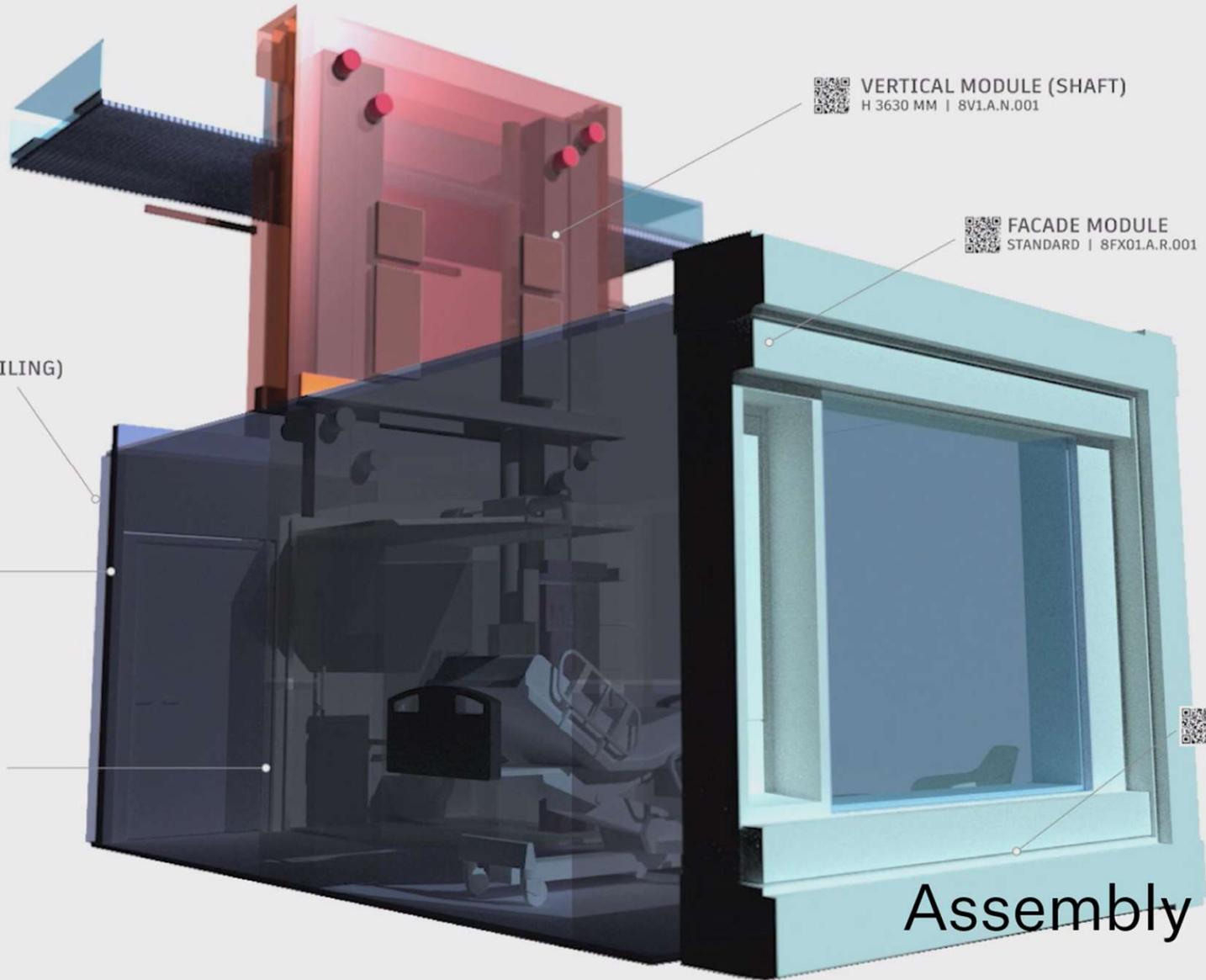
Place all



Nordic  
Office of  
Architecture

# Industrialised BIM

**COWI**



 VERTICAL MODULE (SHAFT)  
H 3630 MM | 8V1.A.N.001

 FACADE MODULE  
STANDARD | 8FX01.A.R.001

 HORIZONTAL MODULE (CEILING)  
W 2200 x L 7200 x H 930 MM  
8H1.A.N.001

 DOOR MODULE LEFT  
H 2400 MM | 8D1.A.L.001

 BATHROOM MODULE LEFT  
H 2400 MM | 8B1.A.L.001

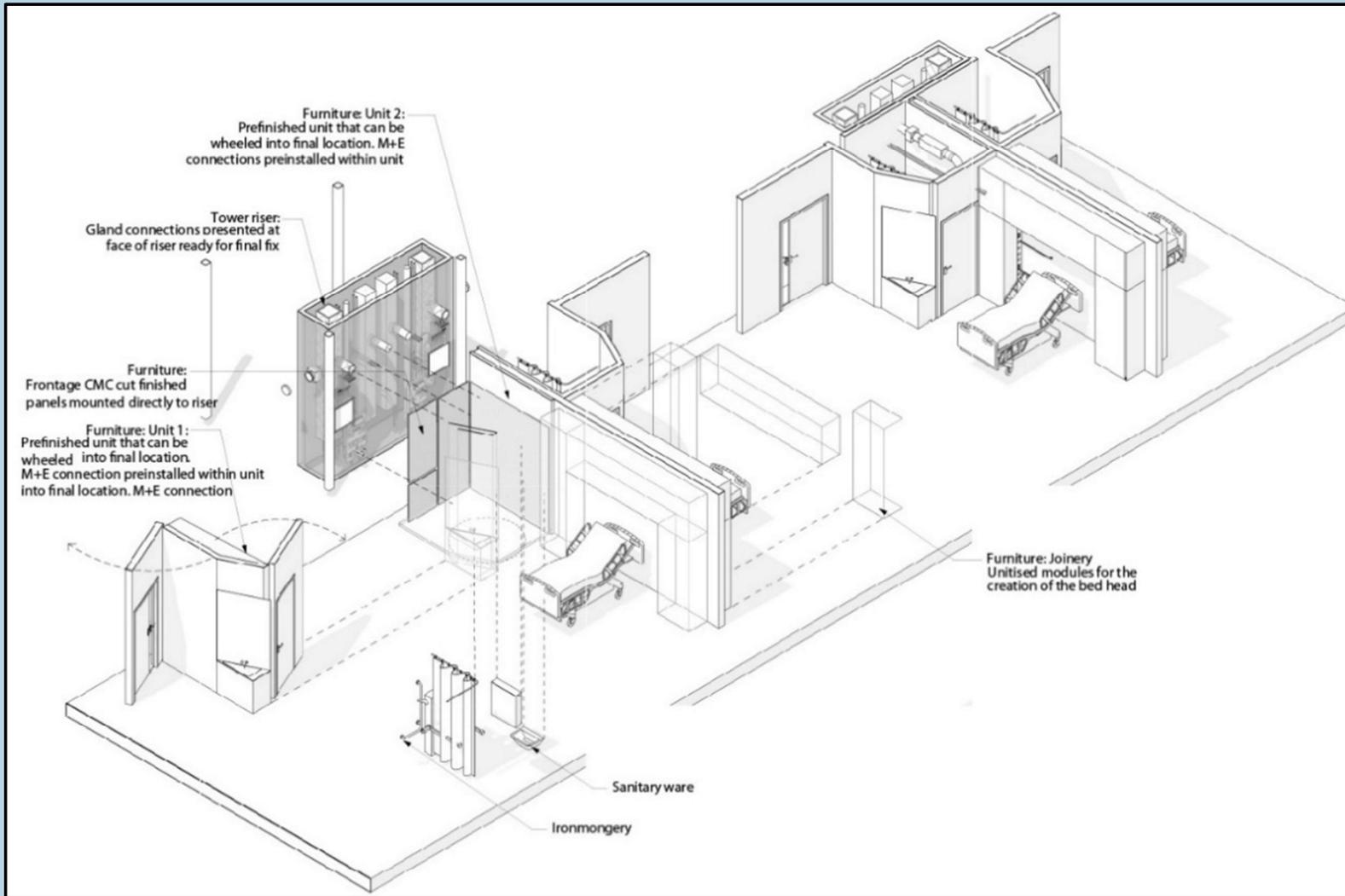
 WINDOW BED LEFT  
STANDARD | 8FX01.A.R.001

Assembly concept





Assembly concept



Actual assembly



Nordic  
Office of  
Architecture

Bathroom module

Info

(ARK-Bygg B) Wall.6.701

Relations	Classification	Hyperlinks
Identification	Location	Issues
Quantities	Material	
Pset_WallCommon		SUS Felles

Property	Value
Byggetrinn	BT 1
<b>SUS_Prefabgruppe</b>	<b>8B1.A.R.001</b>
Bygningsdelsnummer	242

Built in bed module

Properties

Basic Wall  
13 Gips stender 100mm

Walls (2) Edit Type

Top Extension Distance 0.0

Room Bounding

Related to Mass

Text

IfcName

Info tag 2\_CW

Dato enterprisescript

Structural

Enable Analytical Mo...

Structural Usage Non-bearing

Dimensions

Utsp. mål\_H

Fuge vertikal (CW)

Fuge horisontal (CW)

Length

Area

Volume

Analytical Model

Liste

Identity Data

Image

Comments

Mark

Tekniskprinsipper - V...

Underbakken Vegg

Lydkrav

Brannkrav EI 30

NTI\_FaceOrientation

SUS\_Byggnummer 23

SUS\_Prefabgruppe

SUS\_Projektfase

SUS\_Entrepise

SUS\_Byggetiltak

SUS\_Nivaa 23.03

SUS\_Ferdighetsgrad

Beskrivelse lokalisering

SHN\_Kontroll 23.0301

SUS\_Lydtiltak

SUS\_Branniltak

SUS\_Revisjon

Workset ARK\_Bygg 23

Edited by

Design Option Main Model

Phasing

Status

Phase Created Byggetrinn 1

Phase Demolished None

FC Parameters

IfcName

Visibility

Optional

Other

BSNProsesLOD

BSNProsesStatusCode

Brann-justert vegg

Lyd-justert vegg

INFO

Furniture.6.1539

Identification	Location	Quantities	Material	Relations	Classification	Hyperlinks
Pset_FurnitureTypeCommon		Pset_ProductRequirements		Pset_QuantityTakeOff		
NOBSN_TFM		NOSHN_Process		NOSUS_ARK		NOSUS_Felles

Property	Value
SHN_Kontrakt	K2701
SHN_Kontroll	71.0302



Nordic  
Office of  
Architecture

<http://www.bggm.no/>

<https://byggfaktanyheter.no/>



Bathroom module





Built in bed module









**The Hill**  
Warren and Mahoney





“For å lykkes med ombruk i industriell skala  
må vi samarbeid på tvers i byggenæringen”

Brede Stokland, Architect + CEO, Tvinn Solutions

# Digitizing a circular future: Design for refurbishment and reuse



Nordic  
Office of  
Architecture



Tvinn  
Solutions

ScanToBIM 



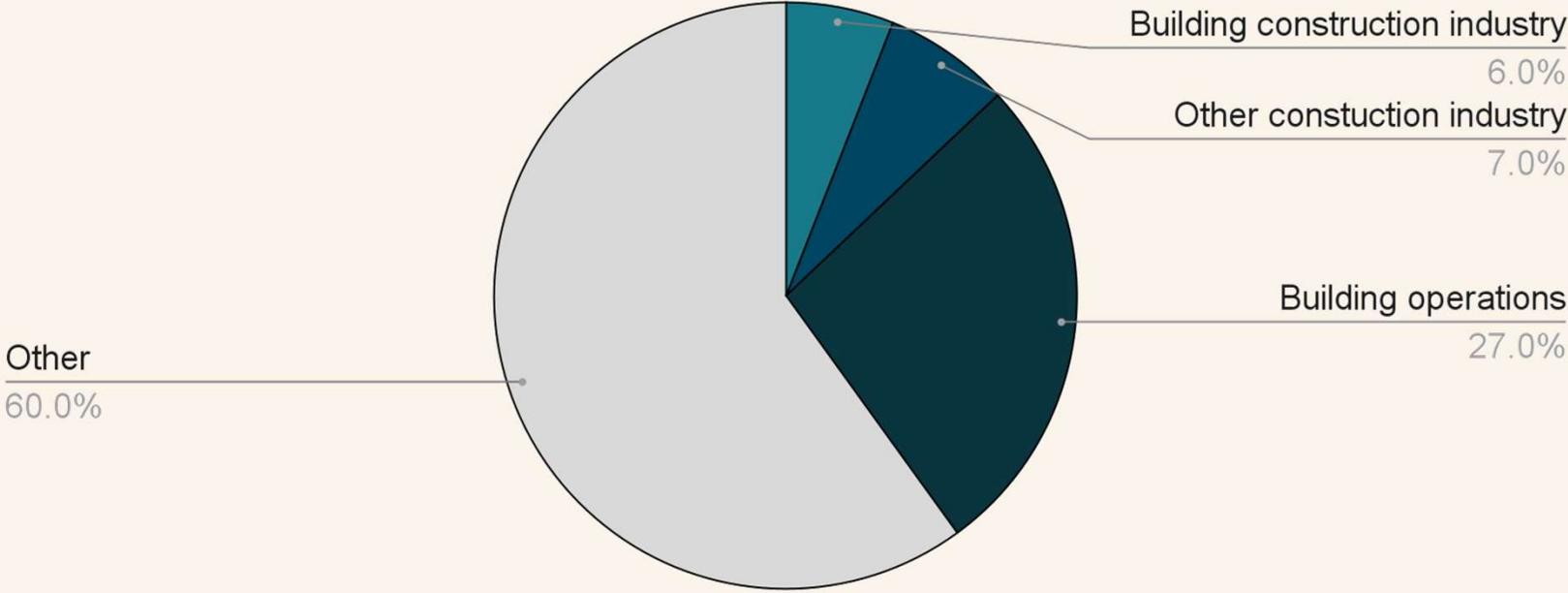


**22000**  
per year

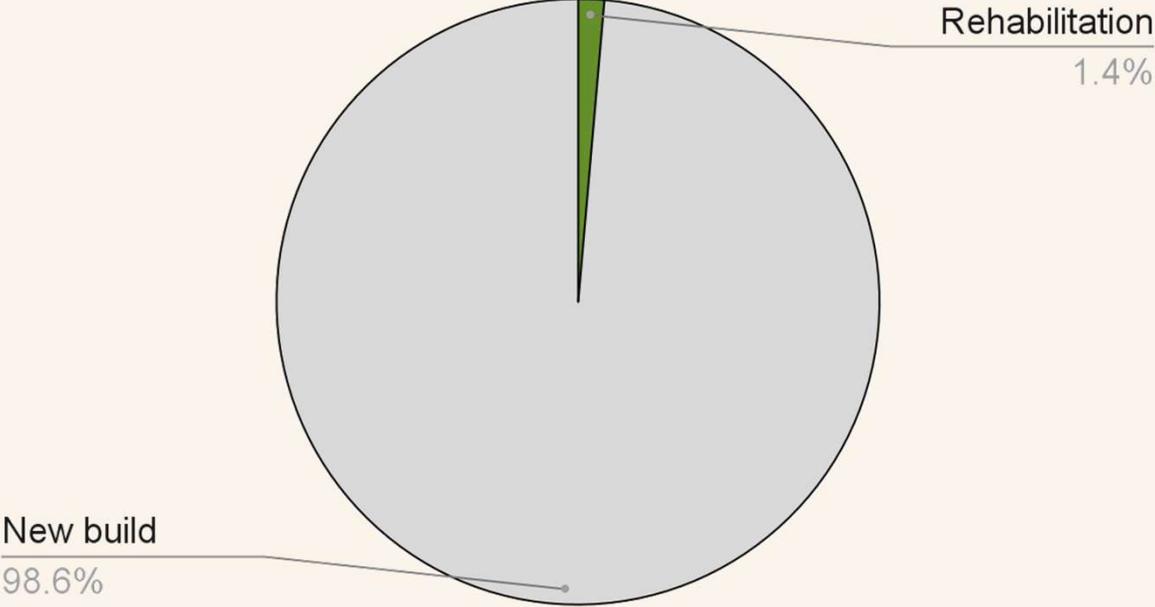


*Statistics Norway*

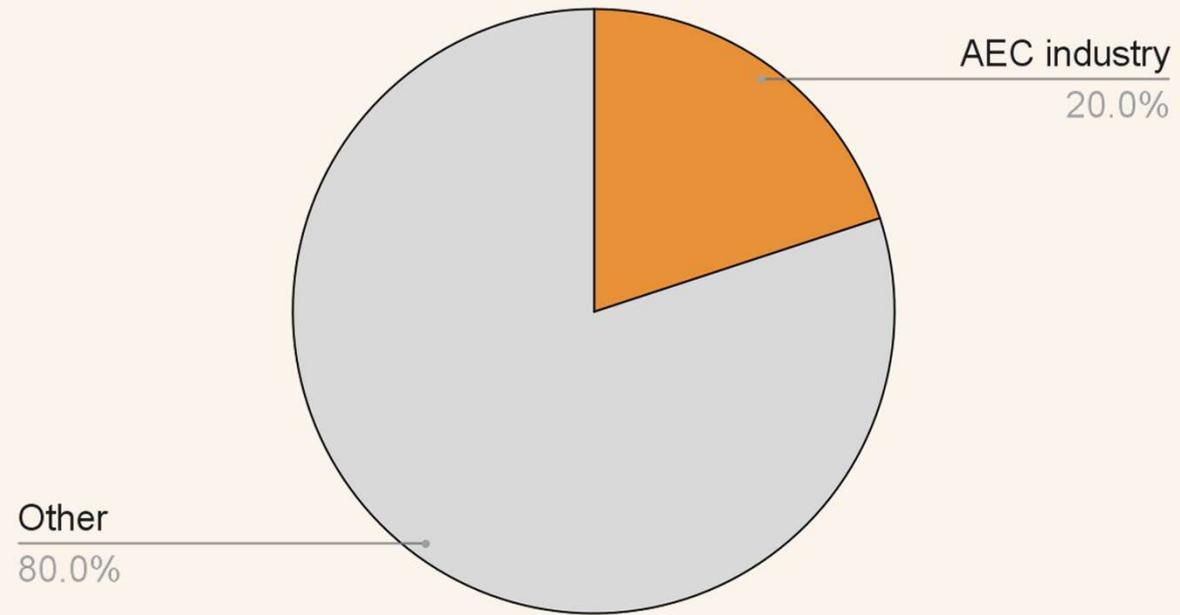
# Annual CO2 Emissions - Global



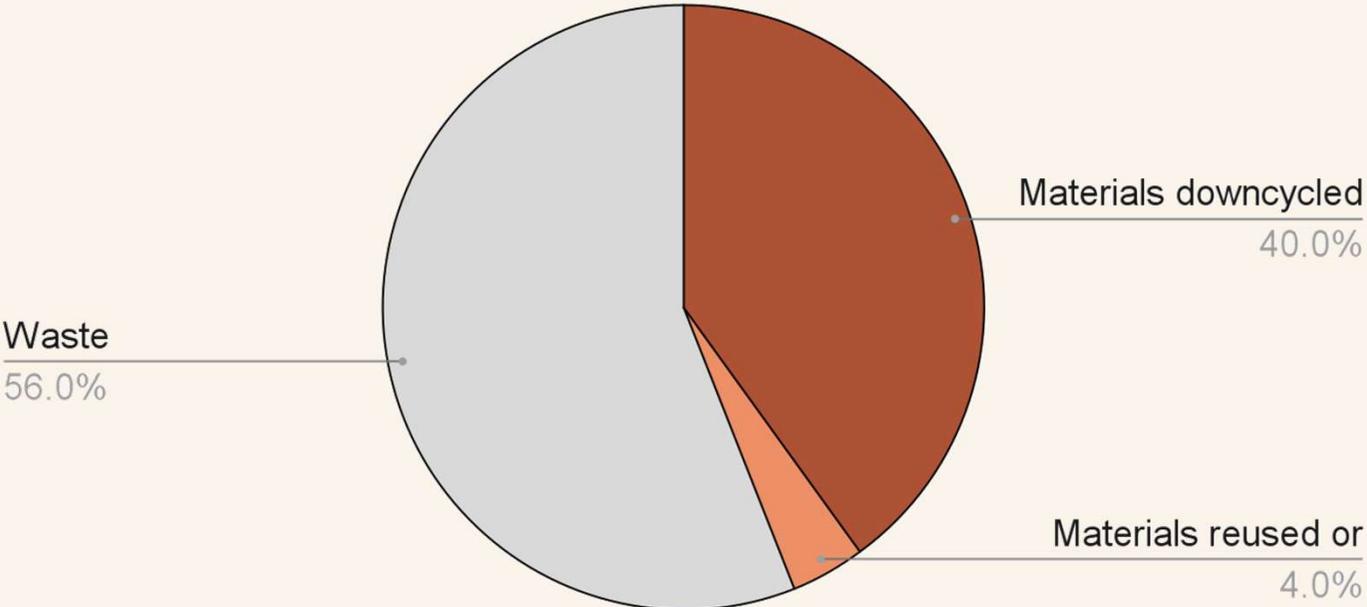
# Rehab vs New build - Norway



## Waste production Norway



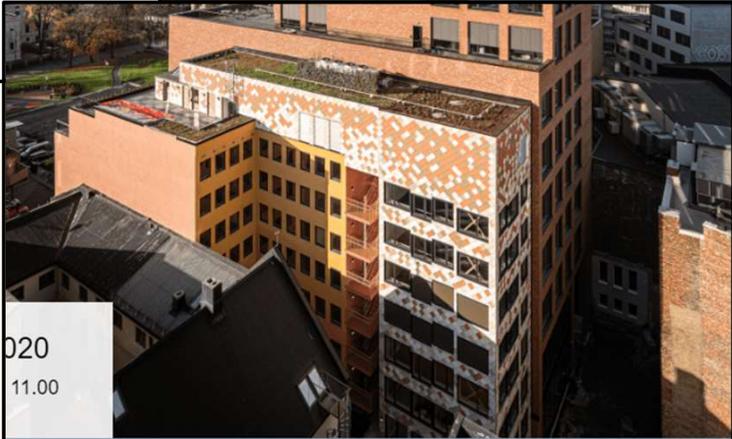
# Material use after demo



# Veidekke: Establishing a company for circular solutions



Loopfront provides a holistic platform for reuse of furniture, fixtures and building materials



020  
11.00

FutureBuilt anbefaler:  
Ombruk av byggevarer –  
et brukerperspektiv

-  Trøndelag fylkeskommune  
Trööndelagen fylhkentjielte
-  TRONDHEIM KOMMUNE  
Tråanten tjielte
-  Oslo Oslobygg KF
-  NTNU
-  Direktoratet for forvaltning  
og økonomistyring

 | Tvinn Solutions

**LPO**

Nordic  
Office of  
Architecture

**Ratio**

**VEIDEKKE**

**A\_LA3**



**AFRY**  
AF PÖYRY

MATERIA

**MOLLER  
EIENDOM**



Tvinn Solutions

Nordic  
Office of  
Architecture

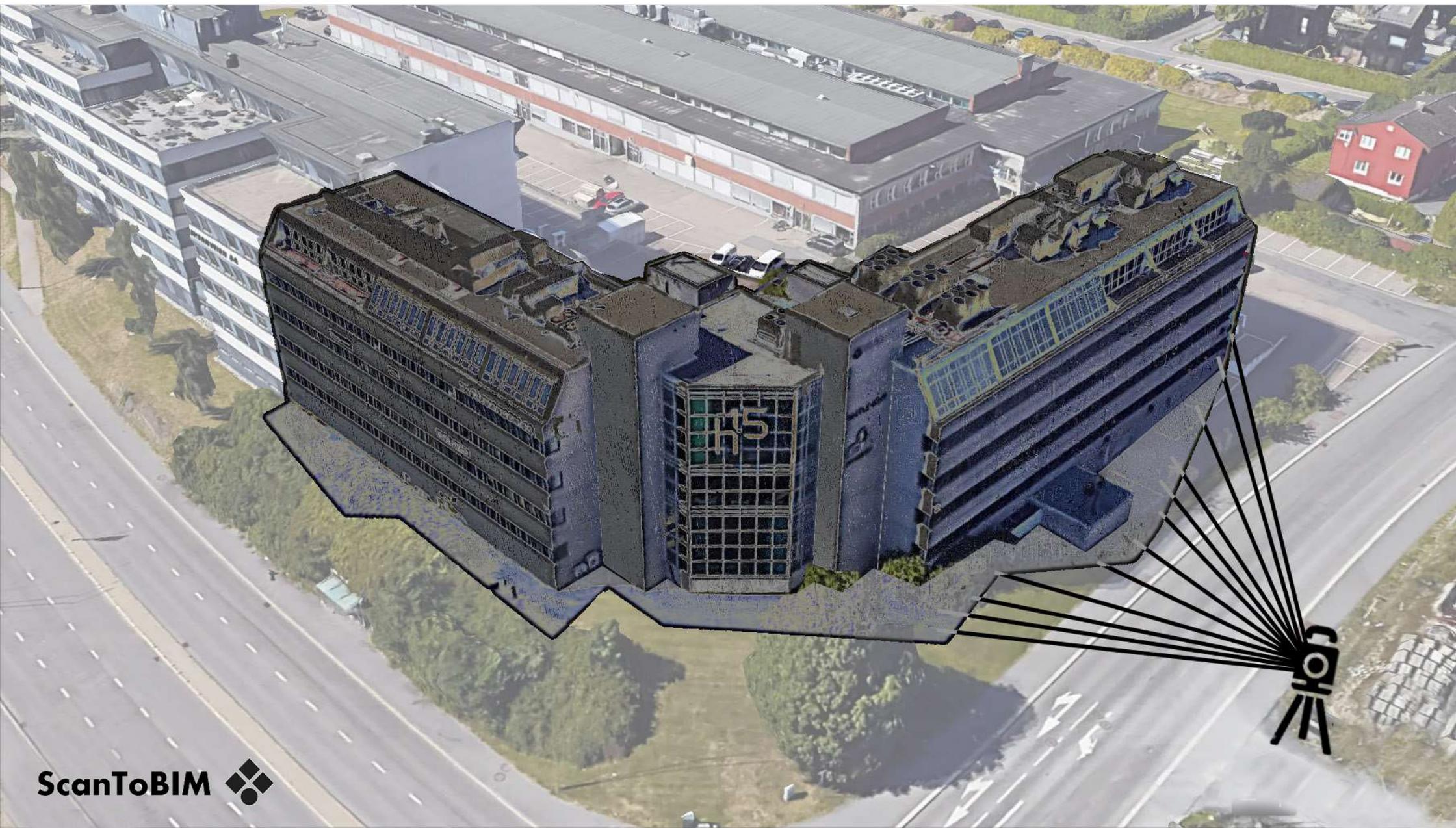




Tvinn Solutions

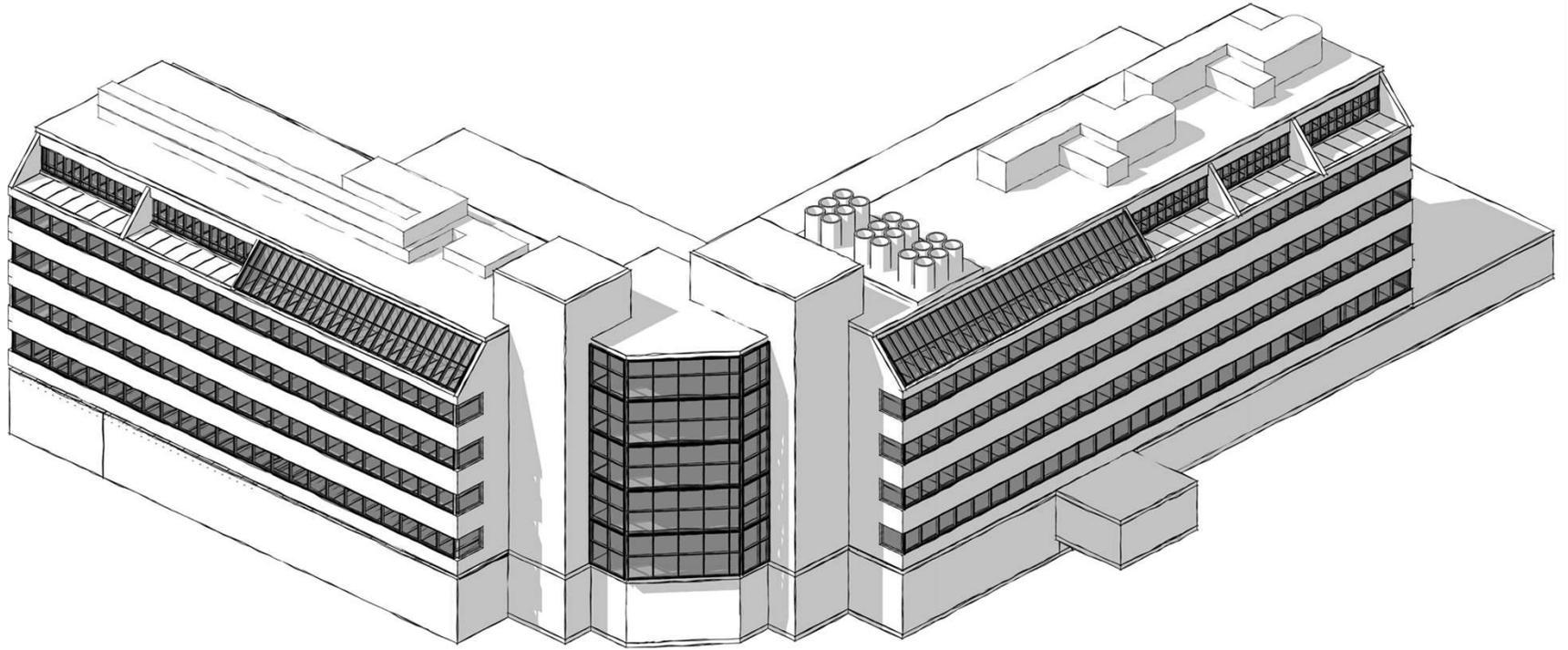
Nordic  
Office of  
Architecture

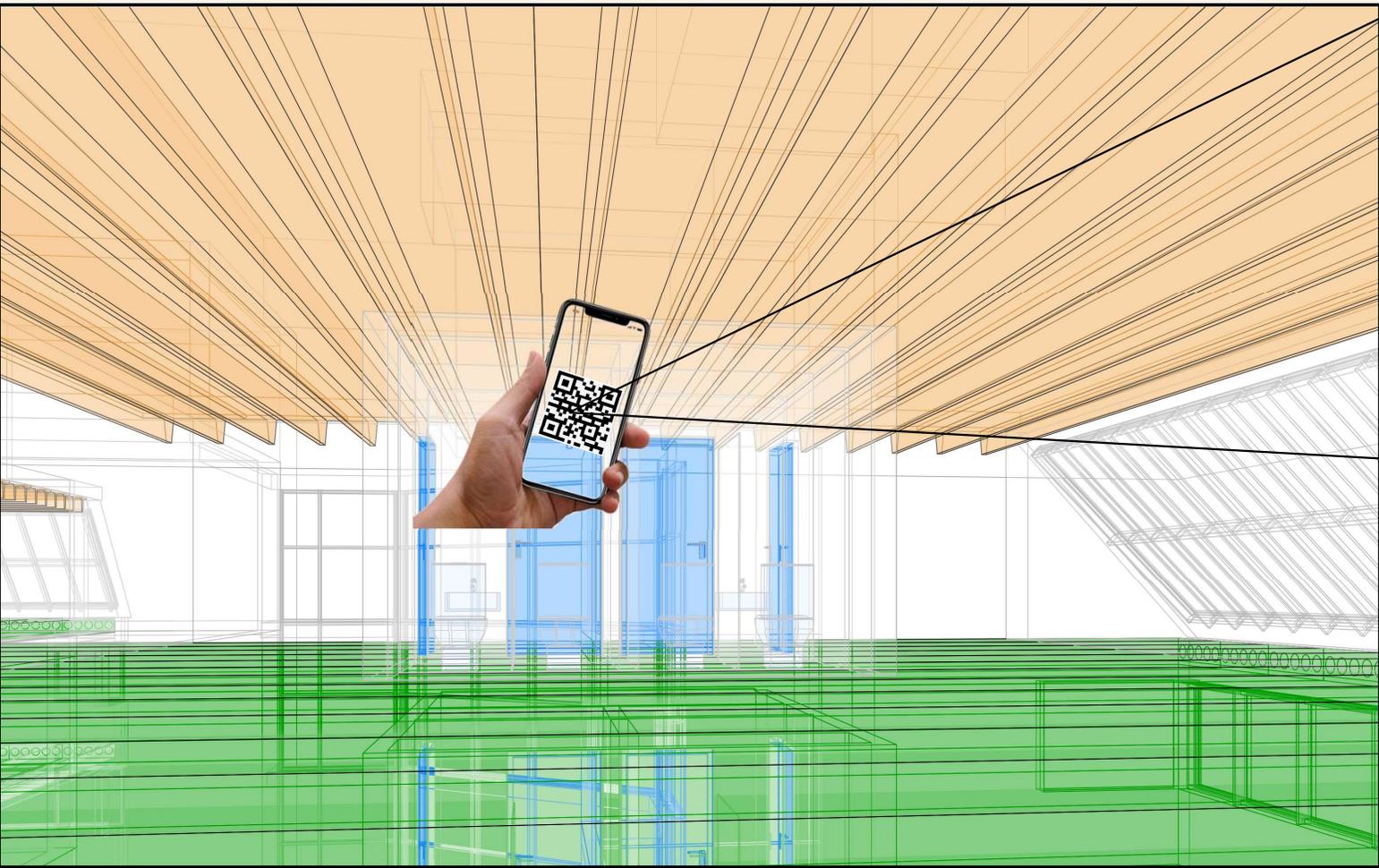




ScanToBIM





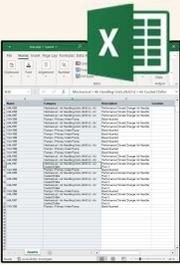


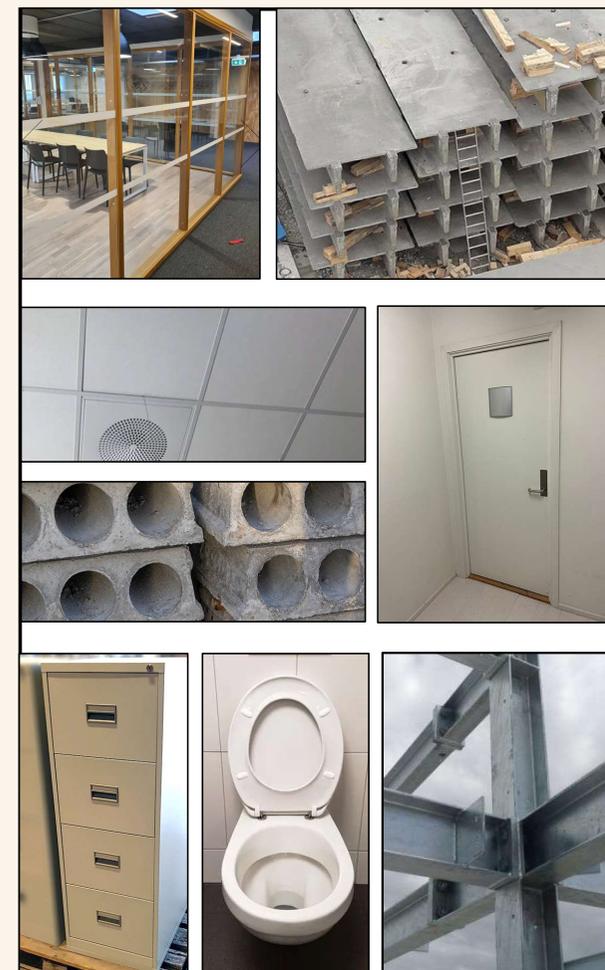
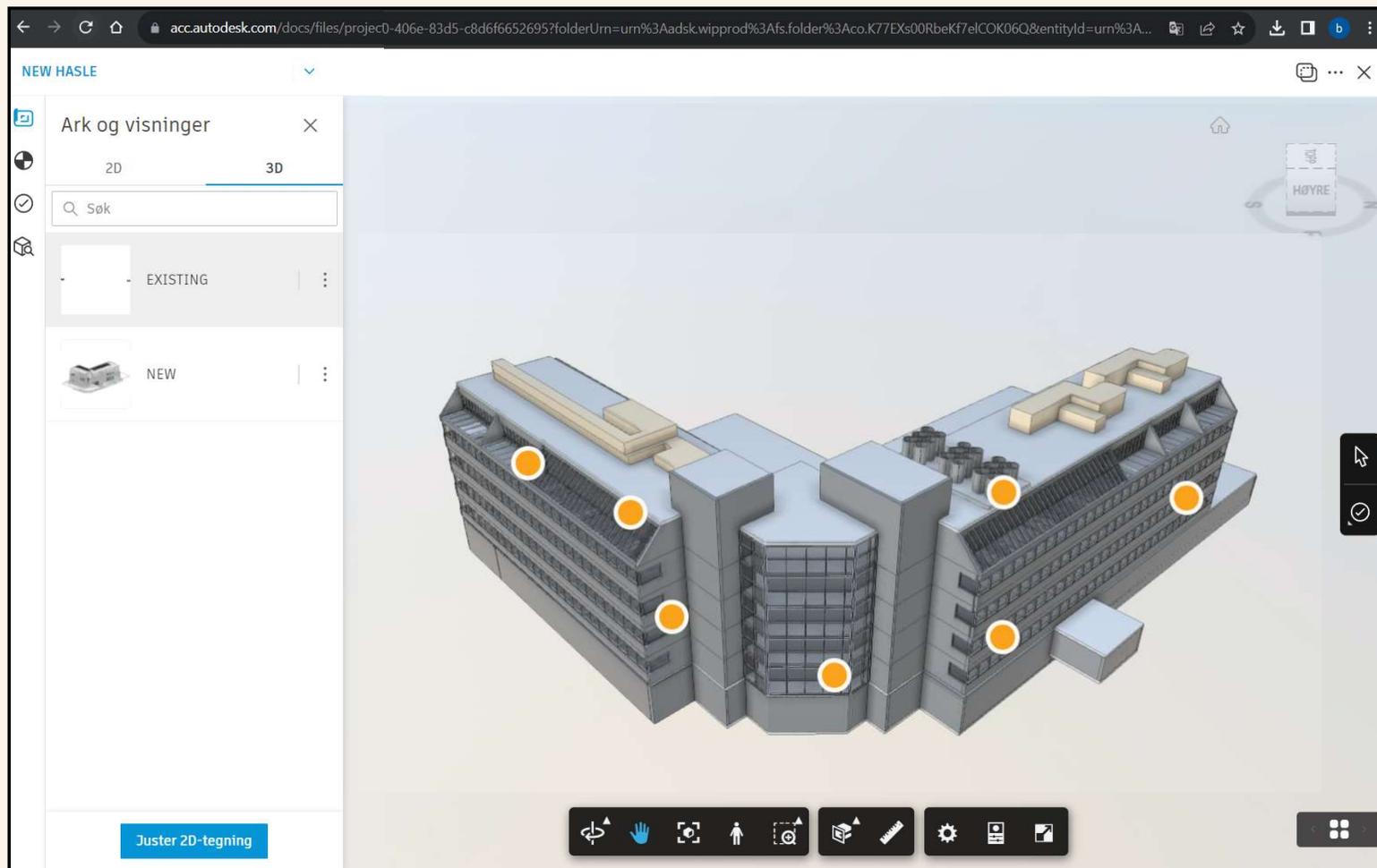
Laminate door 32pcs  
1090 x 2090mm

+ Model

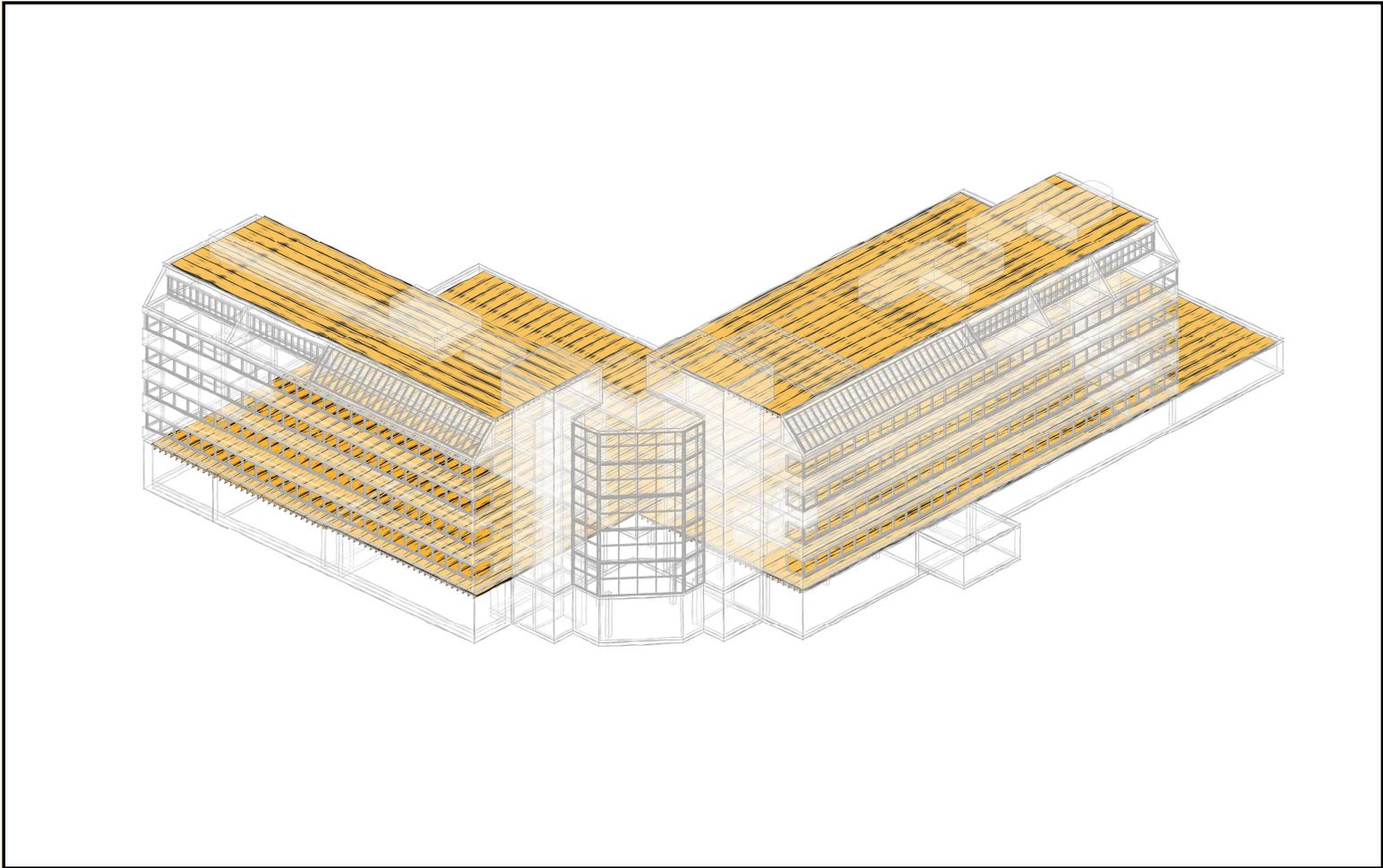
- Favorite

 Tvinn  
Solutions

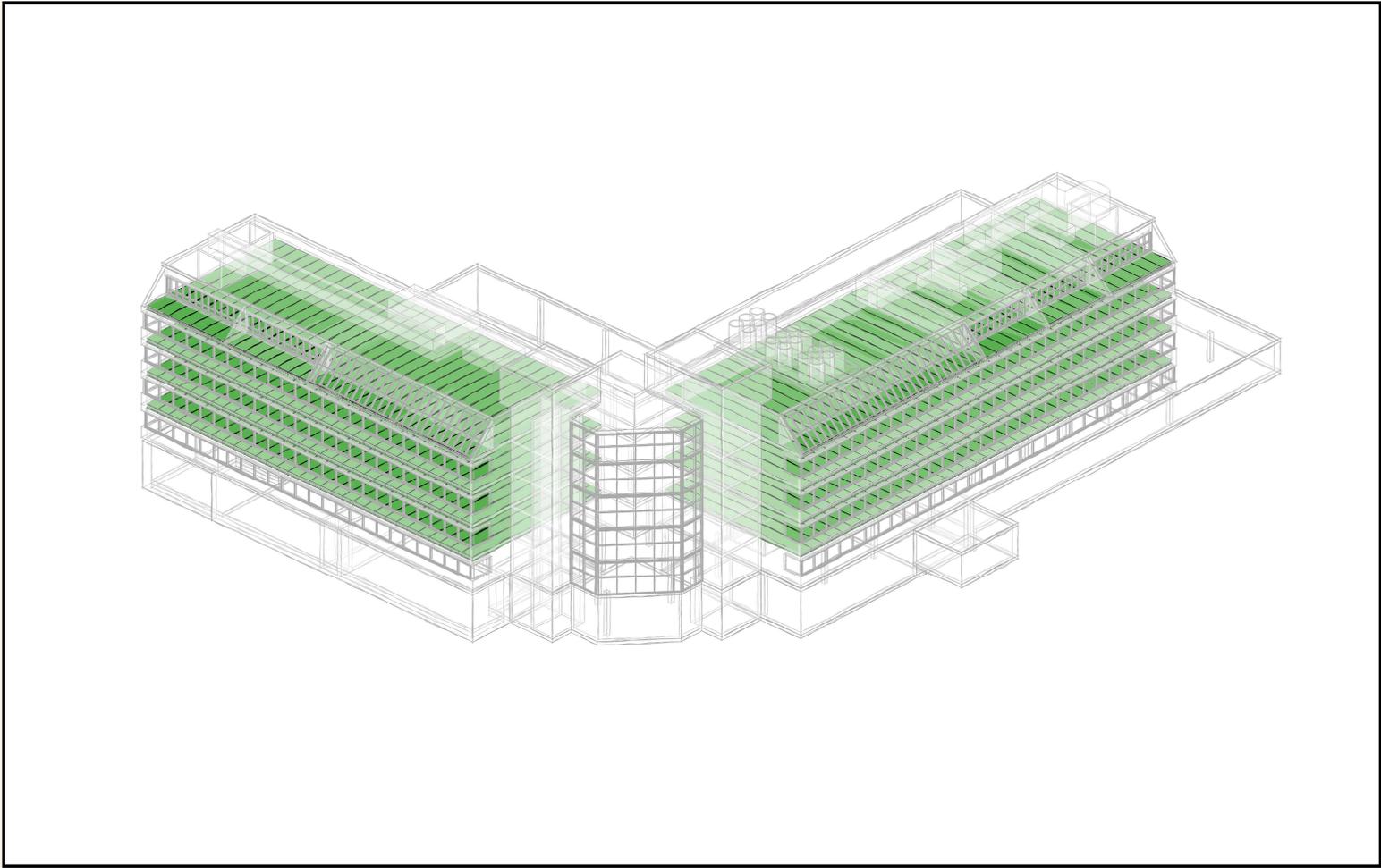




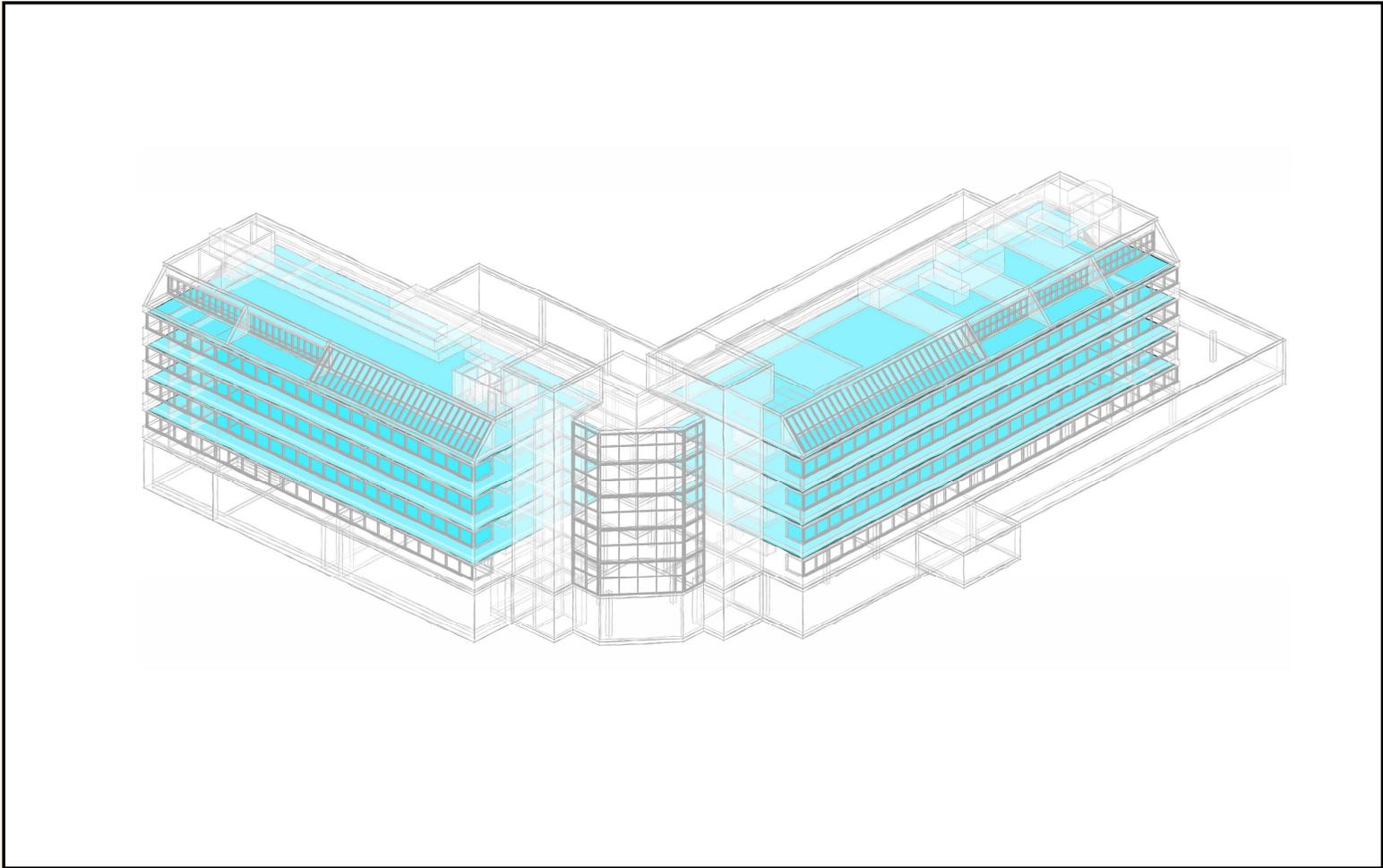
Every project party into the same digital platform



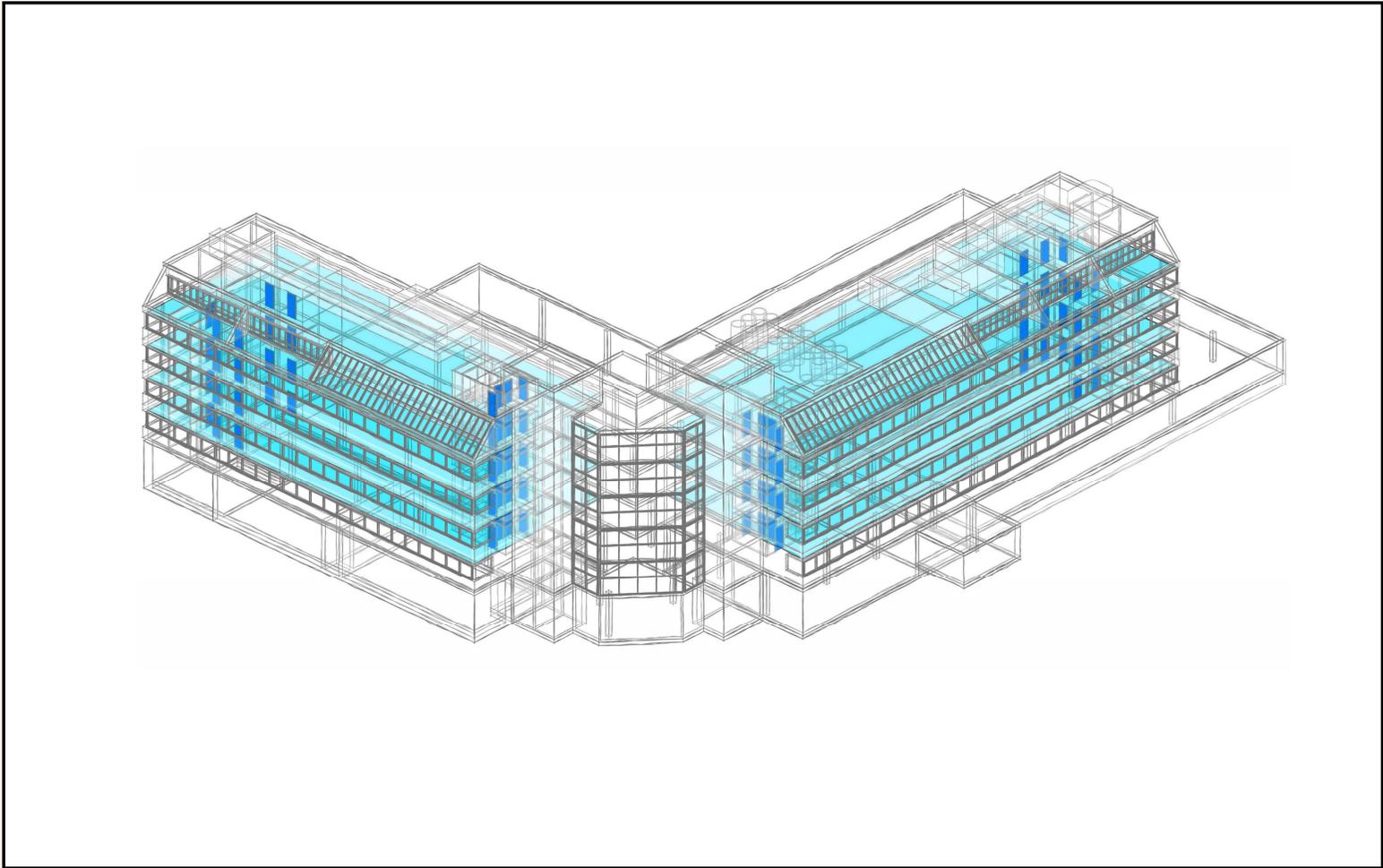
DT Slabs



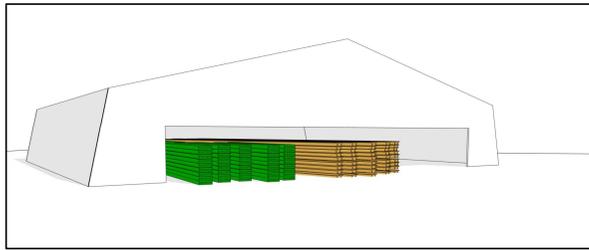
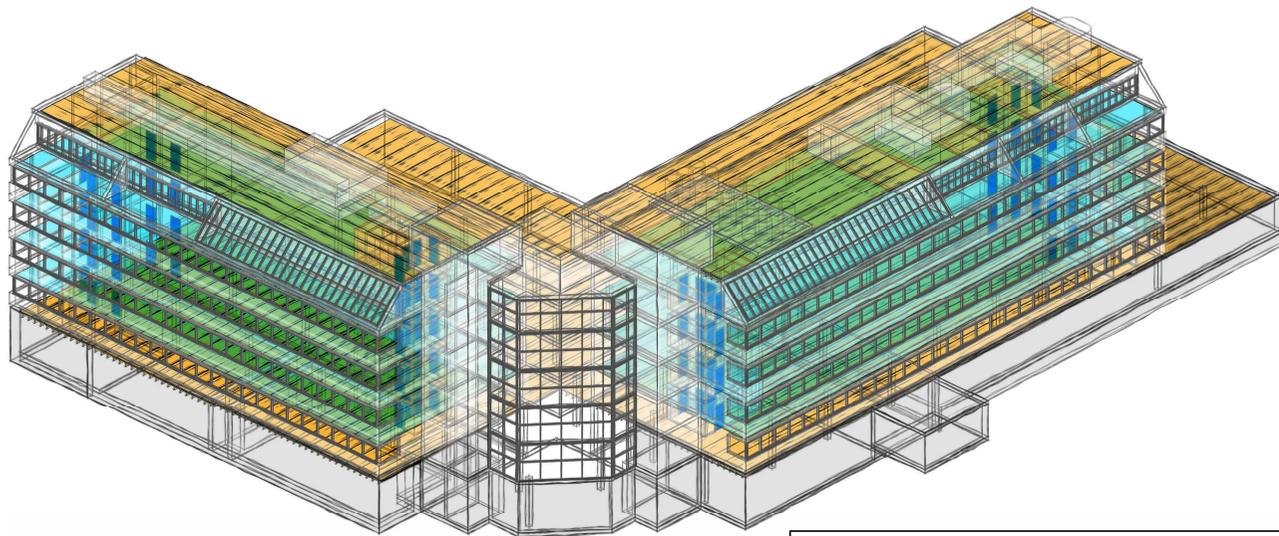
Hollowcore slabs



System ceilings



Furniture, toilets, single steel elements, doors, system walls



▼ Reuse

● Mapping 1

● Mapping 2

● Confirmation

● Disassembled

● Confirmation after disassembly

● Selected for use in project

● Storage

● Released

● Installed

Status parameters

Autodesk Revit 2023.1 - NE

File Architecture Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins Enscape™ Quantification Issues Datasmith Environment Kit Connect [N] Accelerate [N] Architecture [N] Site & Landscaping

Modify View Templates Visibility/ Graphics Show Hidden Lines Cloud Rendering 3D Section Callout Plan Views Drafting View Schedules Sheet View Switch Windows Close Inactive Tab Tile Views User Interface

Select Graphics Presentation Create Sheet Composition Windows



Properties

3D View

3D View: BREDE THIS ONE - NEW Edit Type

Graphics

View Scale	Custom
Scale Value 1:	220
Detail Level	Medium
Parts Visibility	Show Both
Detail Number	1
Rotation on Sheet	None
Visibility/Graphics Overrides	Edit...
Graphic Display Options	Edit...
Discipline	Architectural
Show Hidden Lines	By Discipline
Default Analysis Display Sty...	None
Show Grids	Edit...
Visible In Option	all
Sun Path	<input type="checkbox"/>

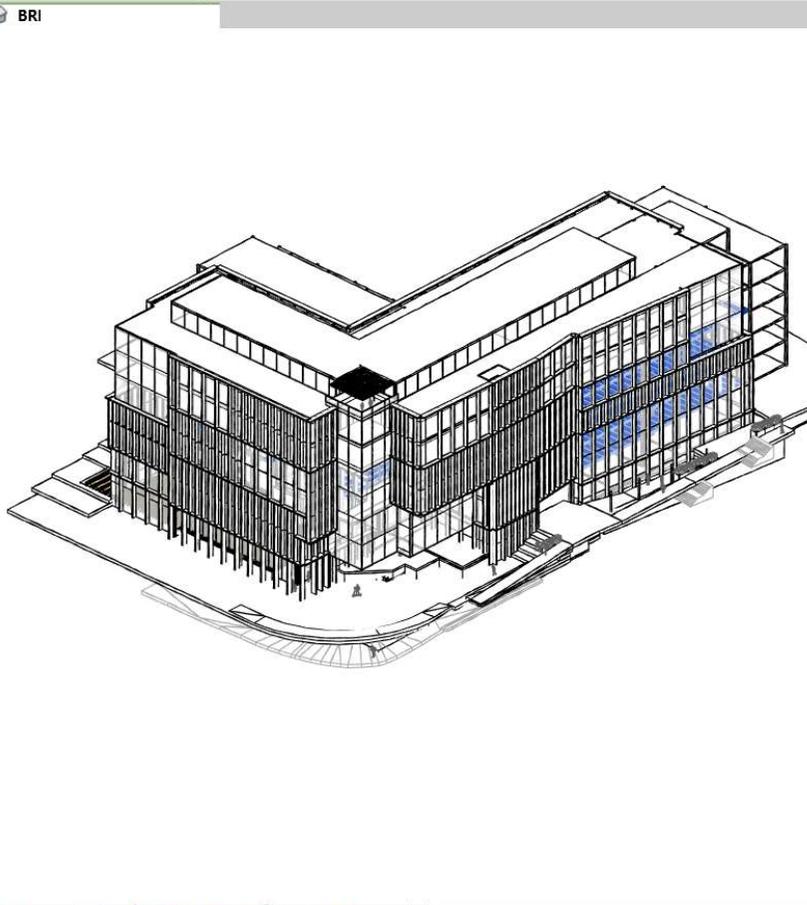
Extents

Crop View	<input type="checkbox"/>
Crop Region Visible	<input type="checkbox"/>
Annotation Crop	<input type="checkbox"/>
Far Clip Active	<input type="checkbox"/>
Far Clip Offset	304800.0
Scope Box	None
Section Box	<input type="checkbox"/>

Camera

Rendering Settings	Edit...
Locked Orientation	<input checked="" type="checkbox"/>
Projection Mode	Orthographic
Eye Elevation	117068.1
Target Elevation	78694.1

Properties help Apply



Tvinn

← → PROJECTS EXPLORE FIND AND REPLACE RESERVATIONS LOG OUT

Categories

- All
- Beams
- Columns
- Covering
- Doors
- Ducts
- Furniture
- new\_other
- Other
- Windows

Filters

Favorites

Provider: All

Color: All

Primary Material: All

**Hollowcore 266 pcs**  
1200 x 19500mm

+ Model + Favorite

**System ceiling 2588m2**  
600 x 600 mm

+ Model - Favorite

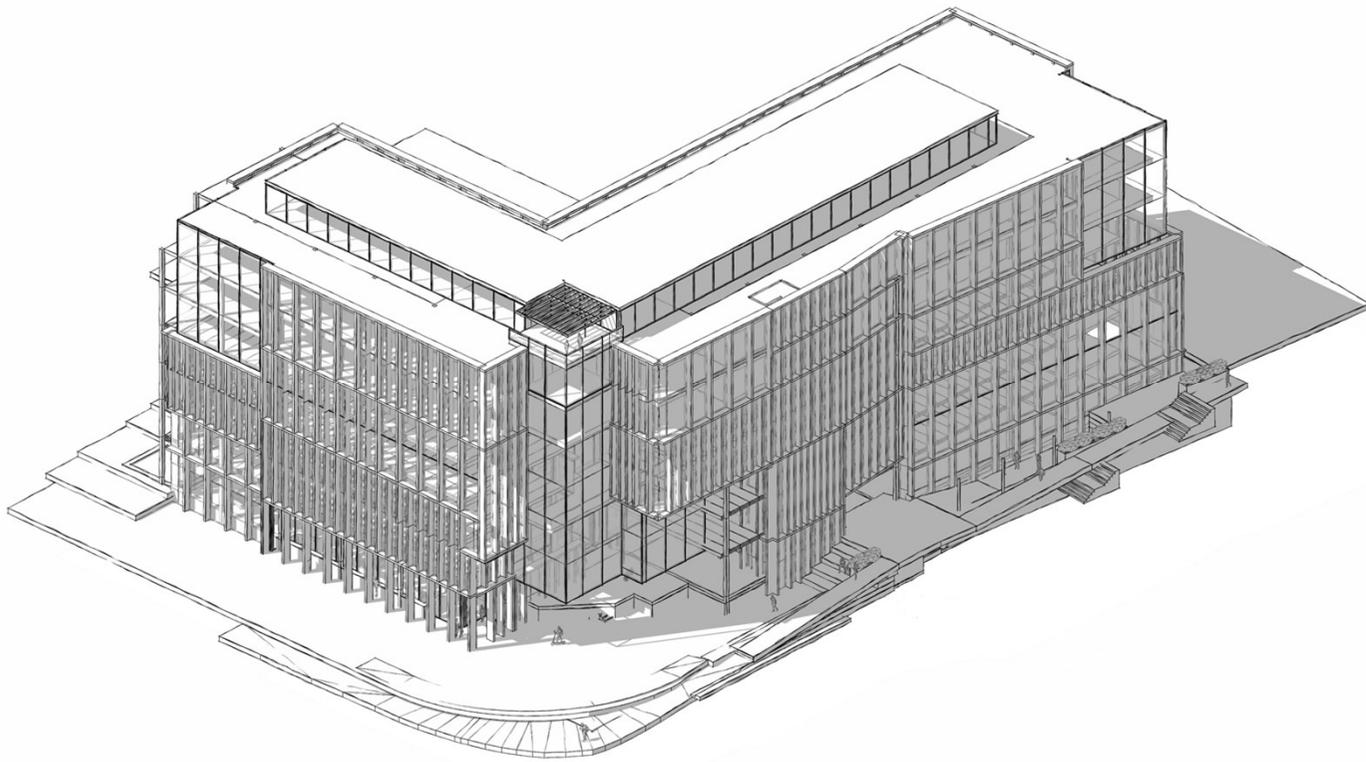
**DT Slabs 173 pcs**  
1200 x 23500mm

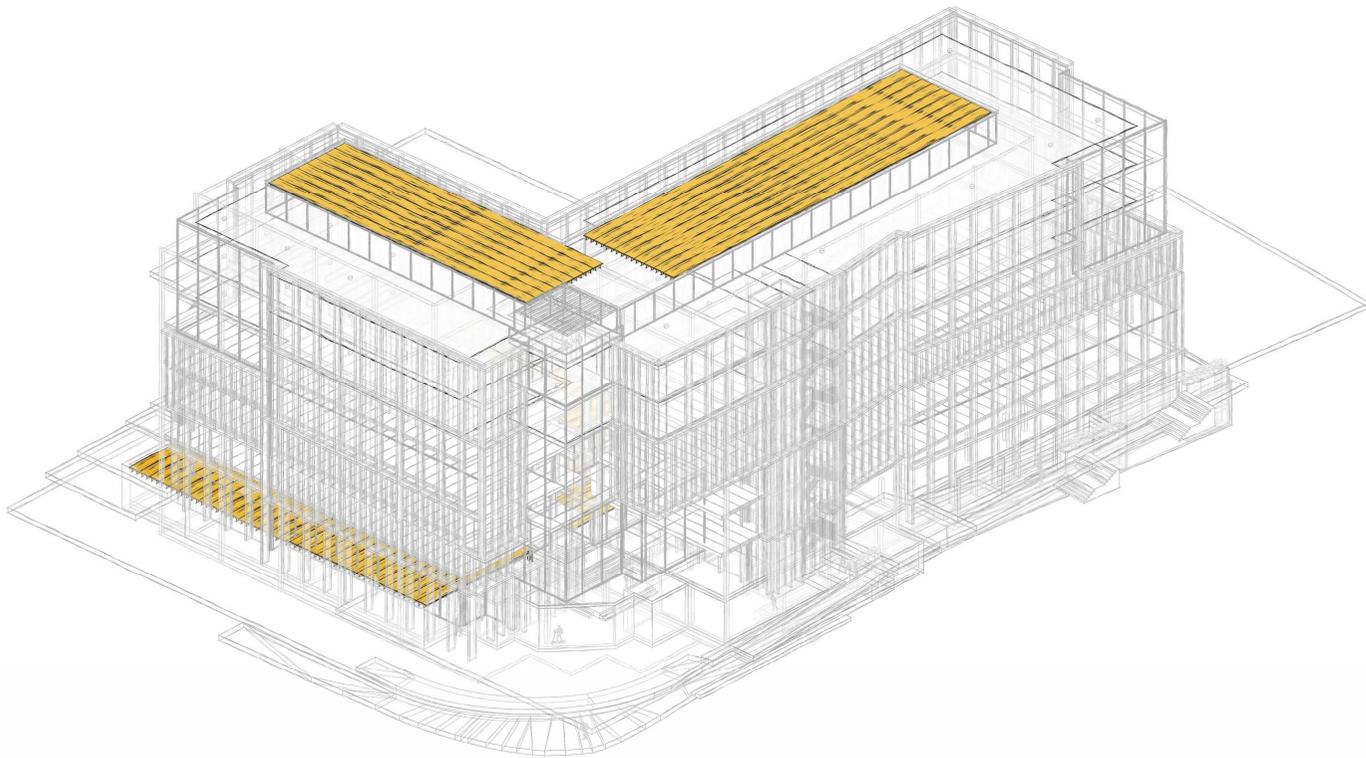
+ Model - Favorite

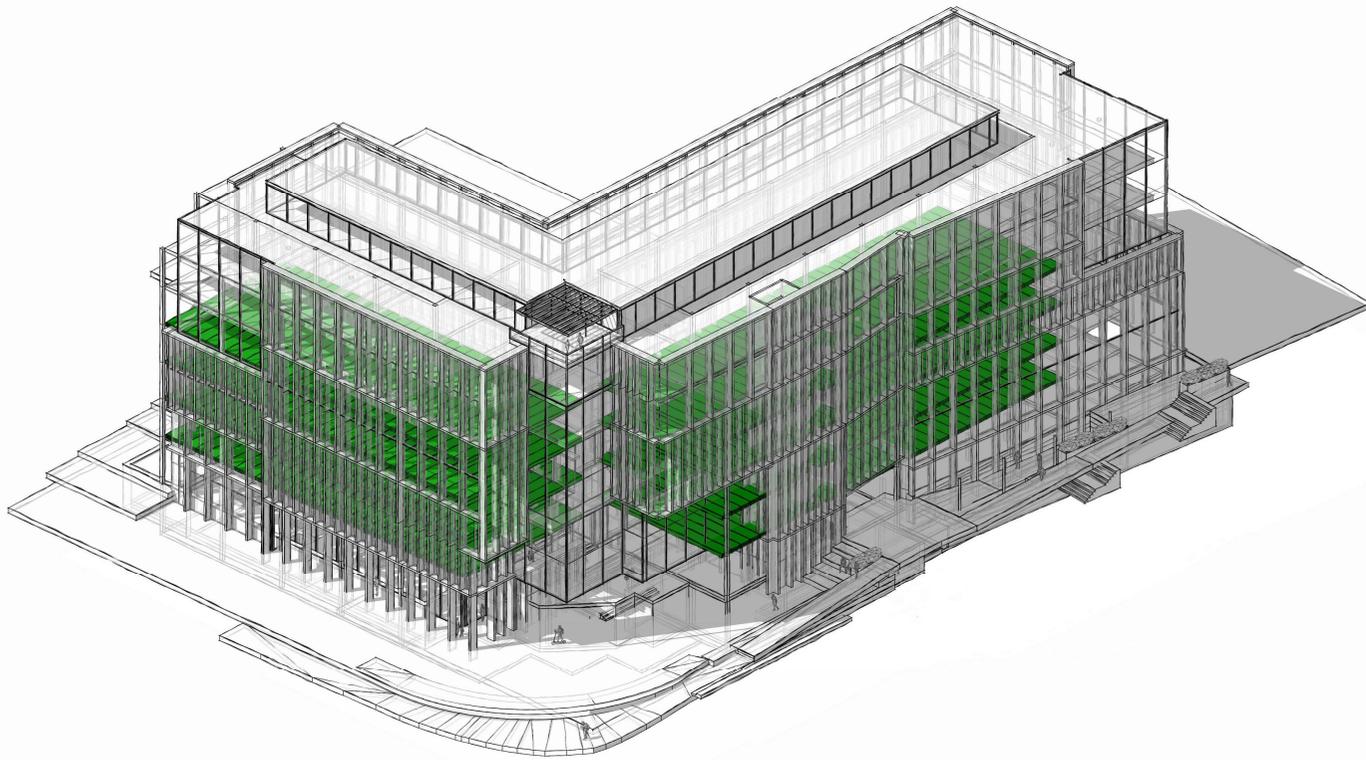
**Archive cabinet 52 pcs**  
400 x 600 x 1200mm

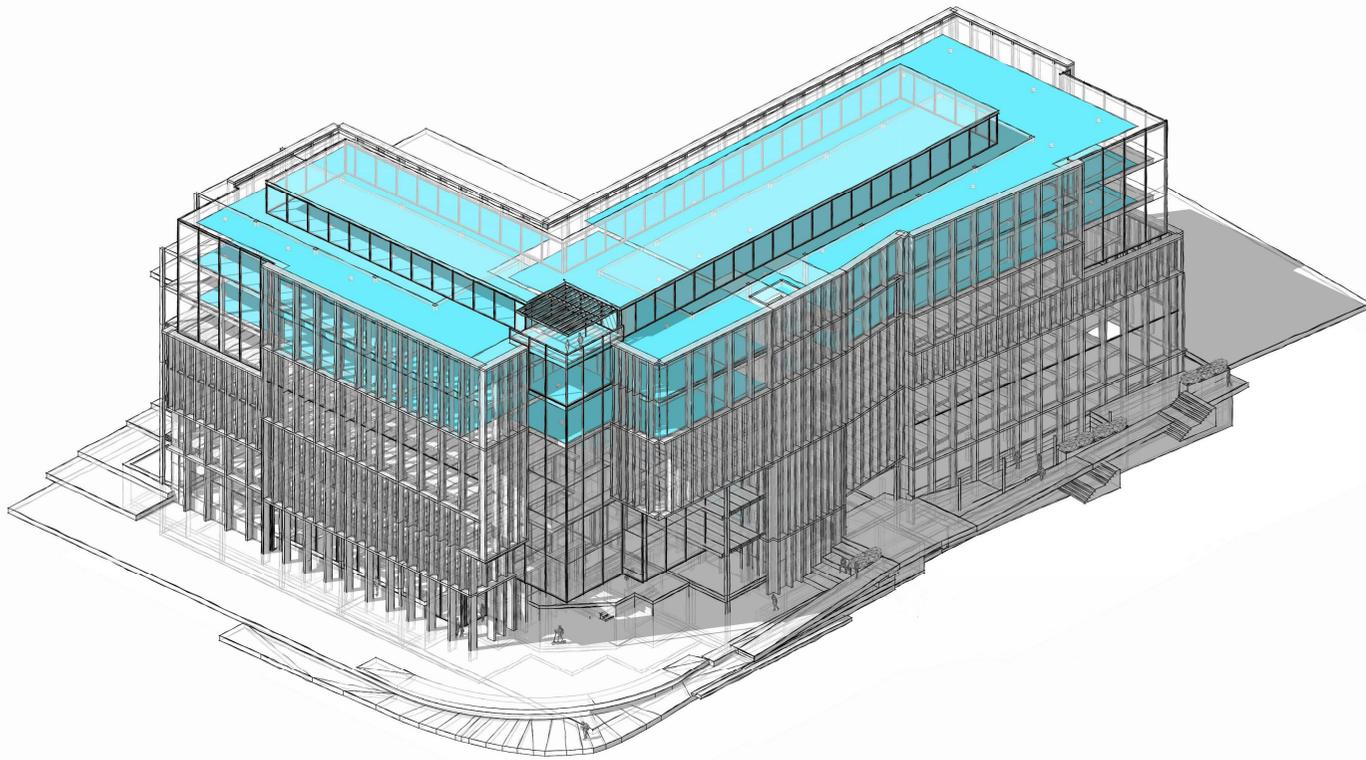
+ Model + Favorite

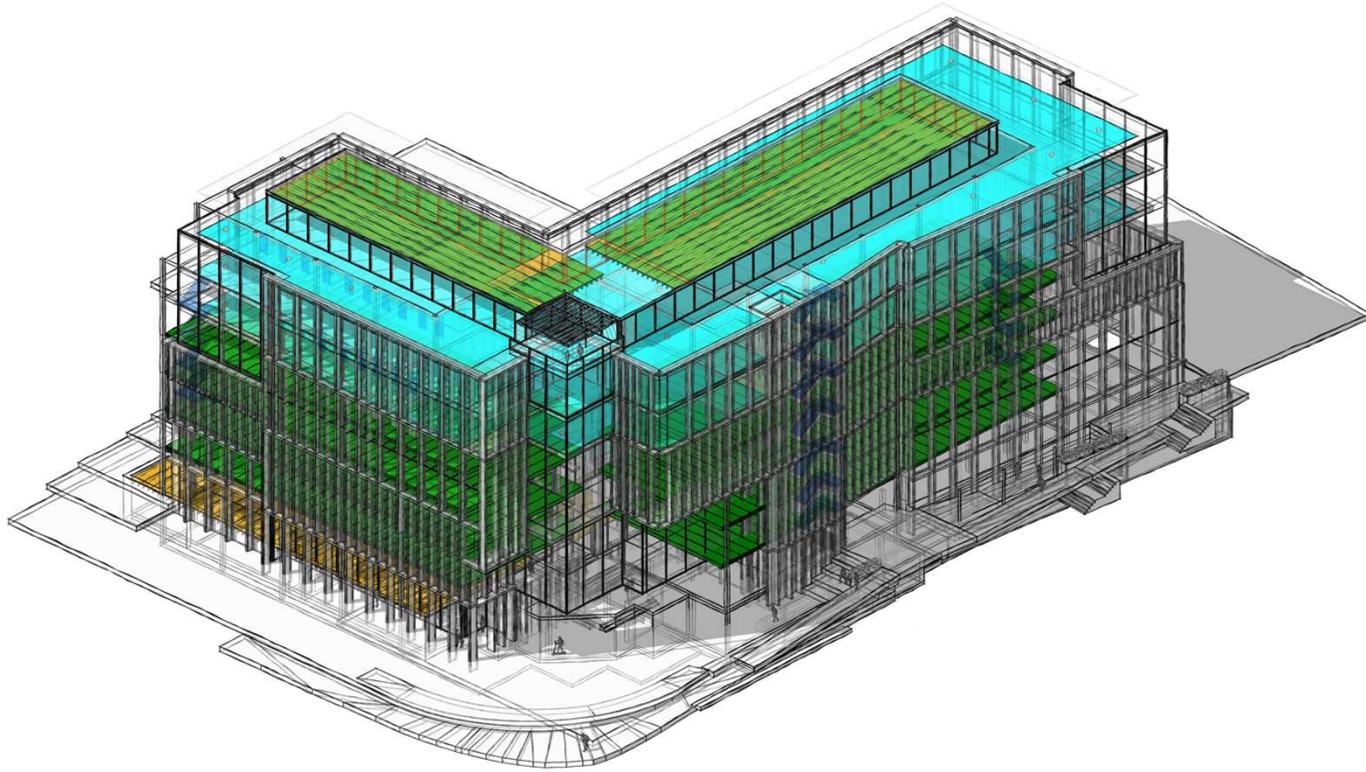
Design with reuse – library from donor building or marketplace

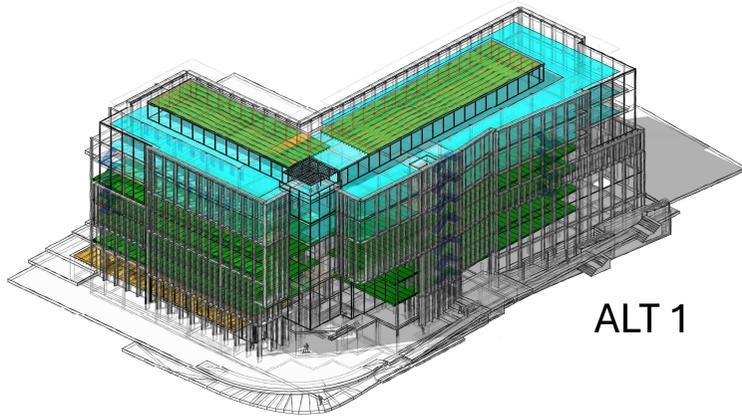








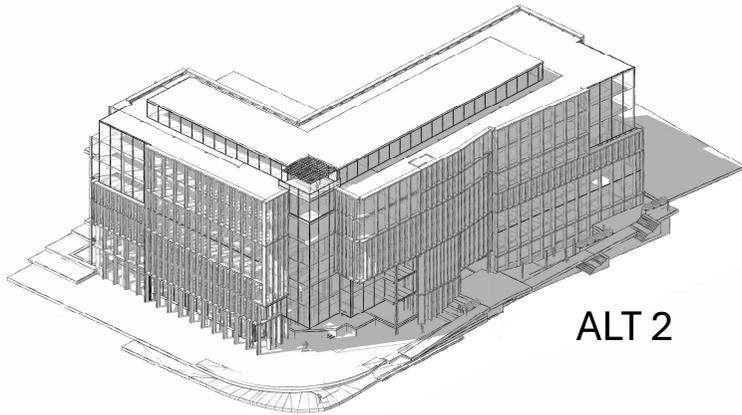




ALT 1

225kg CO<sub>2</sub>e/m<sup>2</sup>

CO<sub>2</sub>e = 3 150 000kg

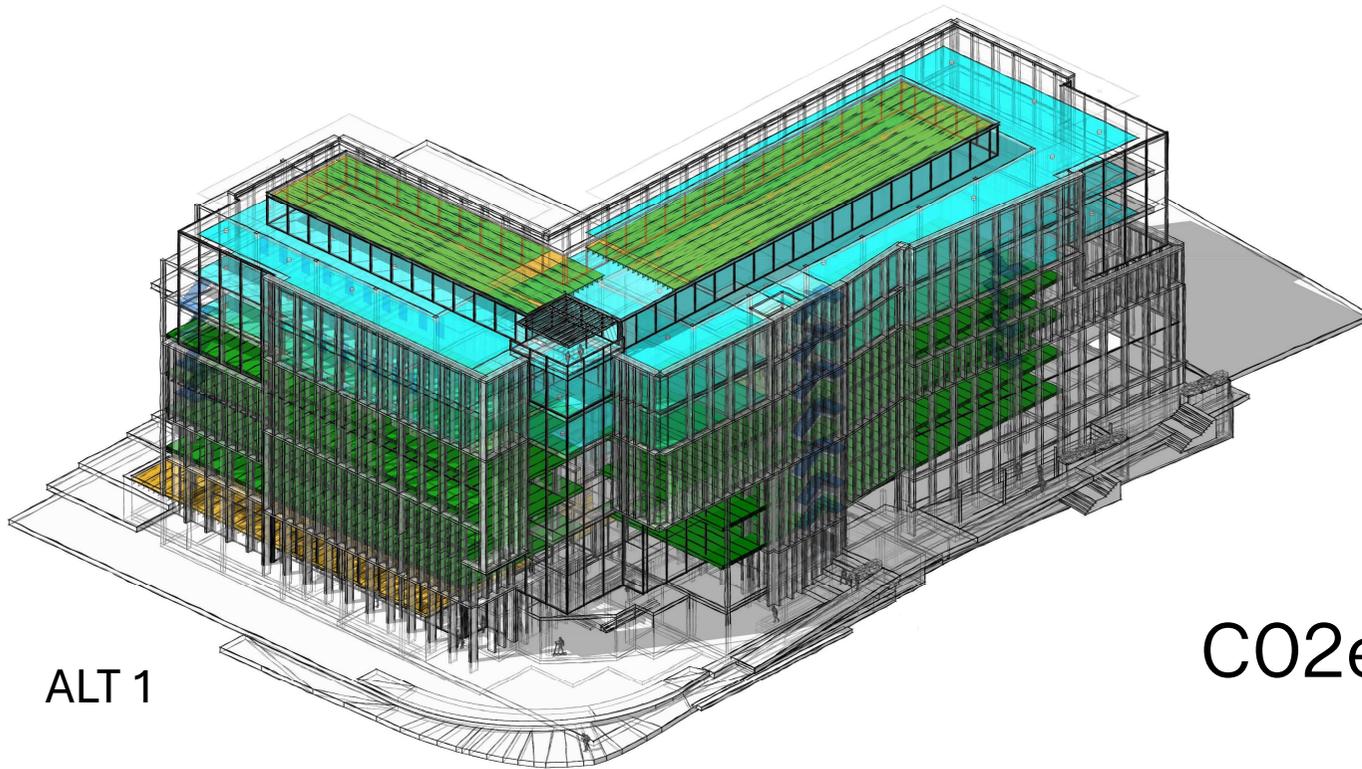


ALT 2

405kg CO<sub>2</sub>e/m<sup>2</sup>

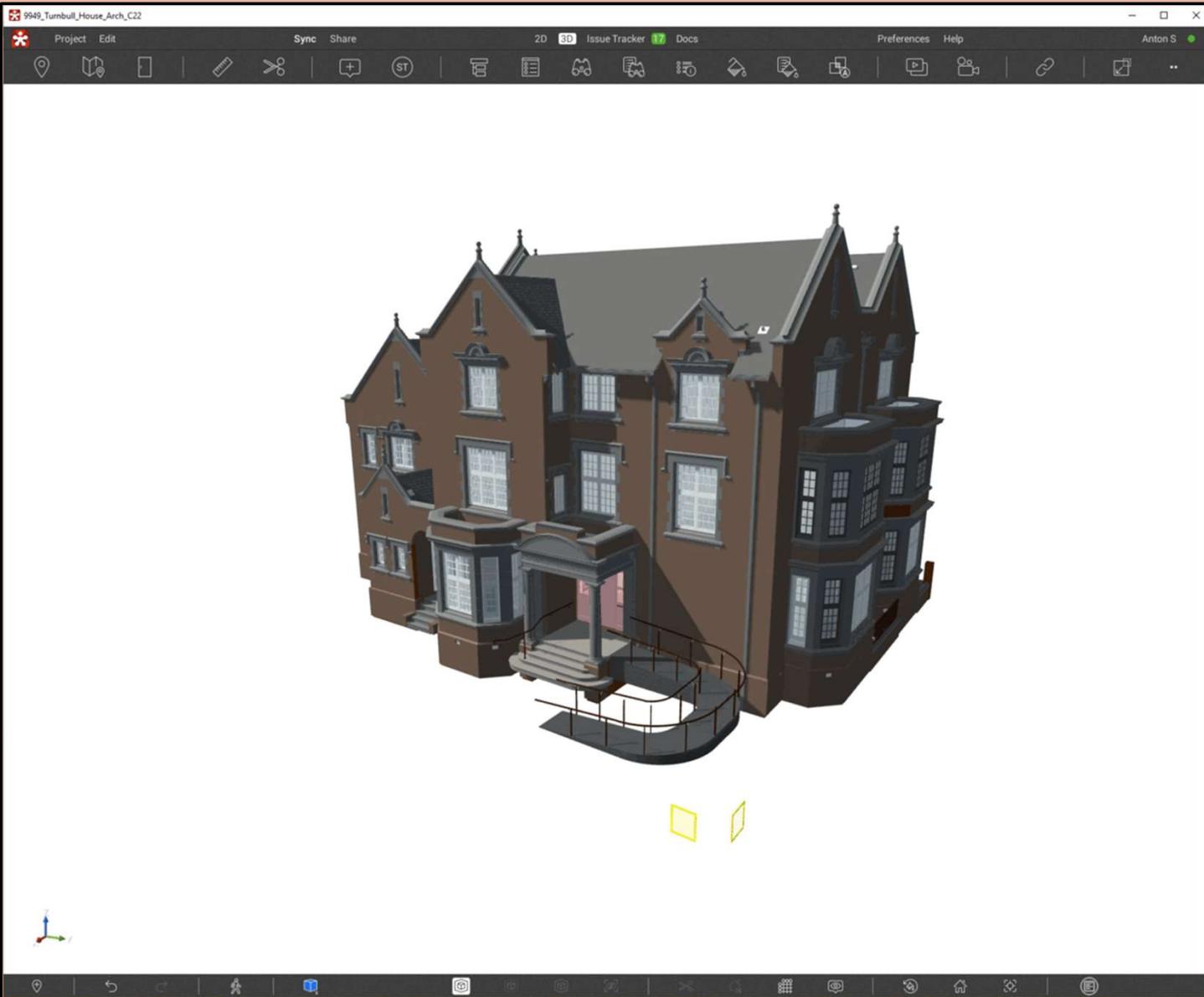
CO<sub>2</sub>e = 5 670 000kg

14 000m<sup>2</sup>



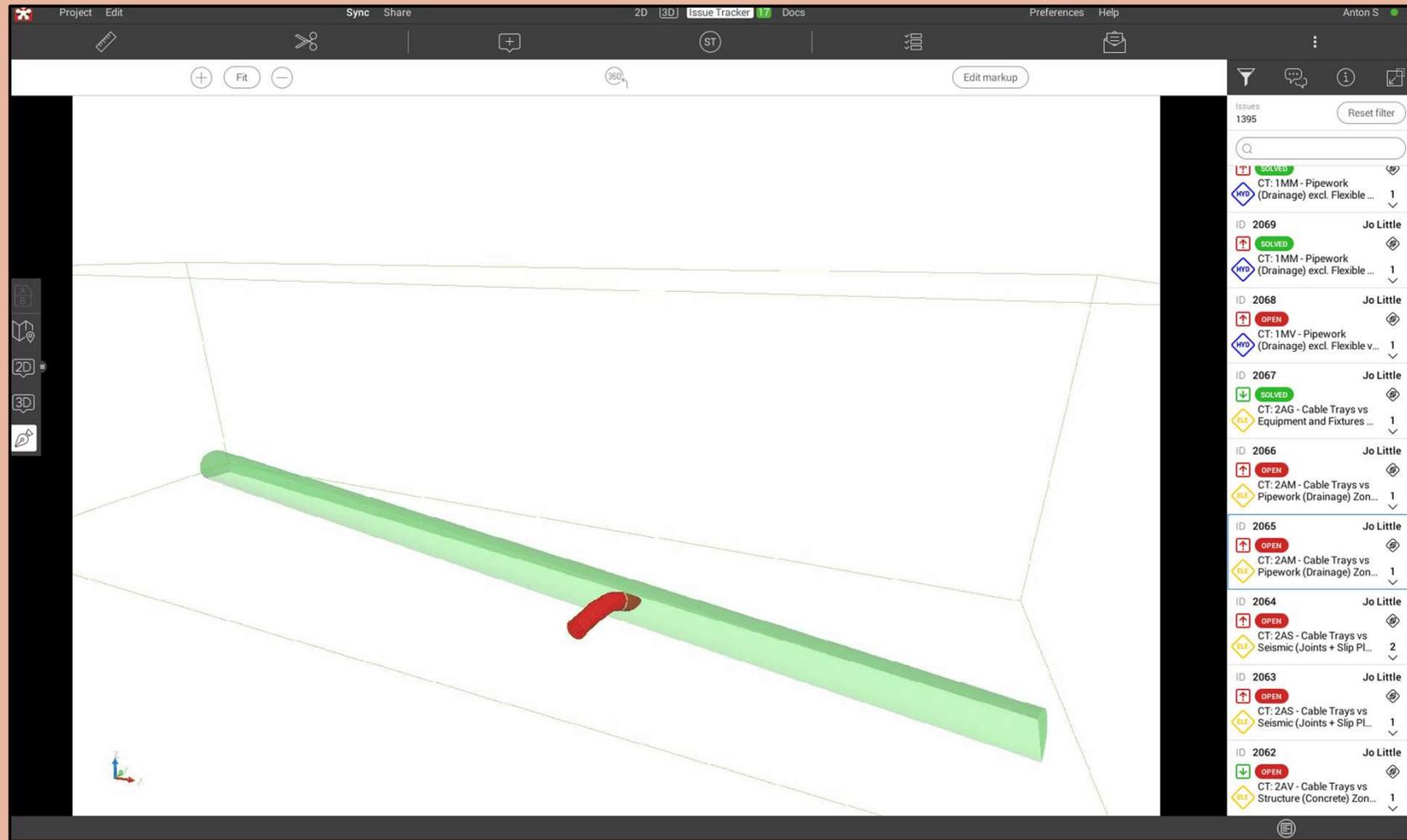
ALT 1

  
CO<sub>2</sub>e = 2 520 000kg



**Advanced BIM**  
Warren and Mahoney





**Advanced BIM**  
Warren and Mahoney

Frustration is an opportunity for innovation

**Bridget White**  
Bridget.White@WarrenandMahoney.com

