

Improved Collaboration with Revit and BIM 360 Design

Marius Alnes

Structural Engineer / BIM Coordinator



Learning Objectives

- Learn how to publish 3D models from Revit to BIM 360 Design Collaboration
- Learn how to use the timeline in BIM 360 Design to consume and create packages to share with other design teams
- Learn how to use BIM 360 Docs to track changes in models and drawings, and how to use them to communicate
- Learn how to create issues in BIM 360 Docs to add tasks to project members

Class summary

- This class will demonstrate how BIM360 Document Management and BIM 360 Design are being used to communicate and to collaborate in the cloud.
- The class will show workflows and tips and tricks, using an ongoing project as an example.



About the speaker

Marius Alnes – Norconsult

- Structural Engineer and BIM Coordinator at Norconsult
- Over 13 years of experience in the industry, from small to large scale multidisciplinary projects.
- Revit and Cloud collaboration enthusiast



Marius Alnes



@m_alnes

Norconsult

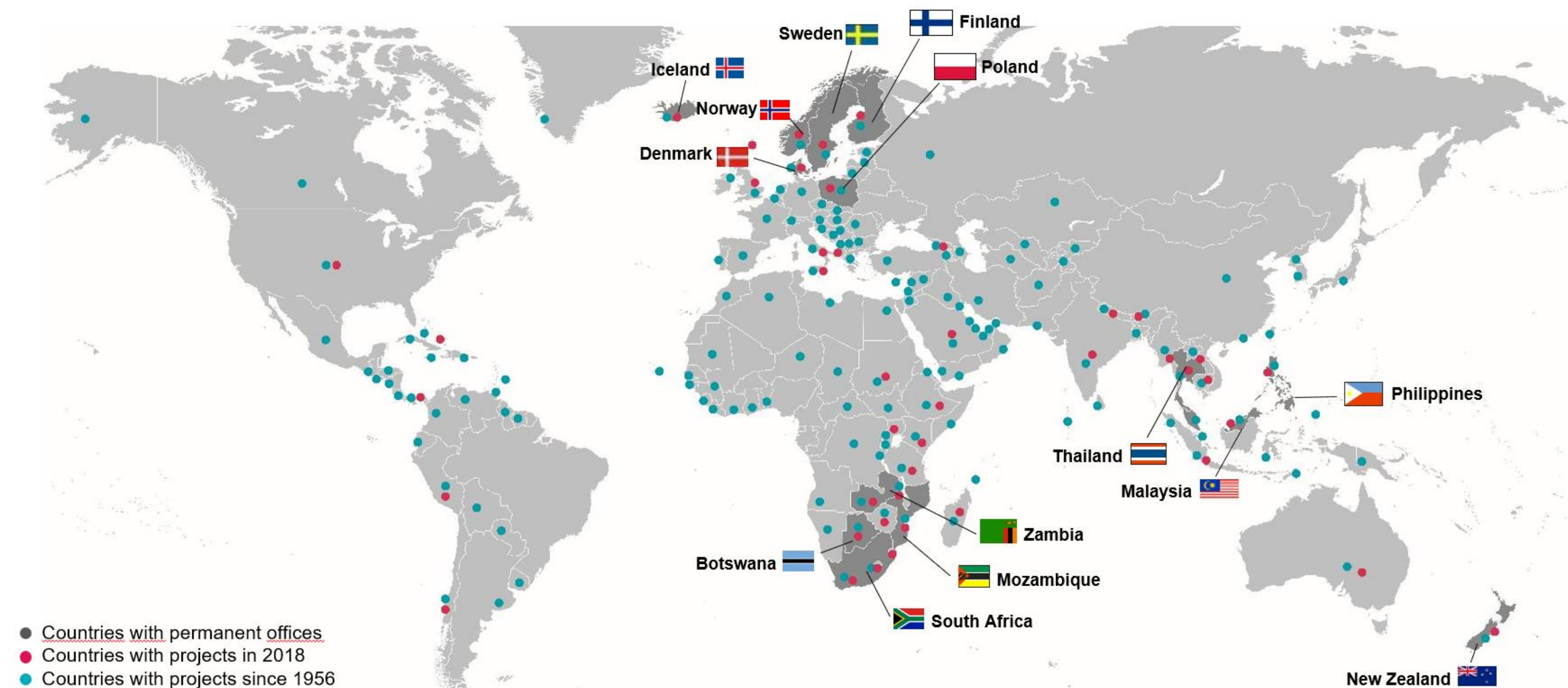
Norconsult is Norway's largest and one of the Nordic region's leading interdisciplinary consultancy firms, with activities spanning several continents.

Through innovative and targeted advice, we contribute to a sustainable society.

Key Figures

- 3 800 Employees
- 101 Offices
- 11 Business areas
- 20 000 Projects
- 5,3 Billion NOK revenues*
- 44 Countries in which we have projects

*Per. 31.12.2018



Norconsult

Business Areas

Architecture



Buildings



Energy



Industry



IT



Environment



Oil and Gas



Planning



Transport



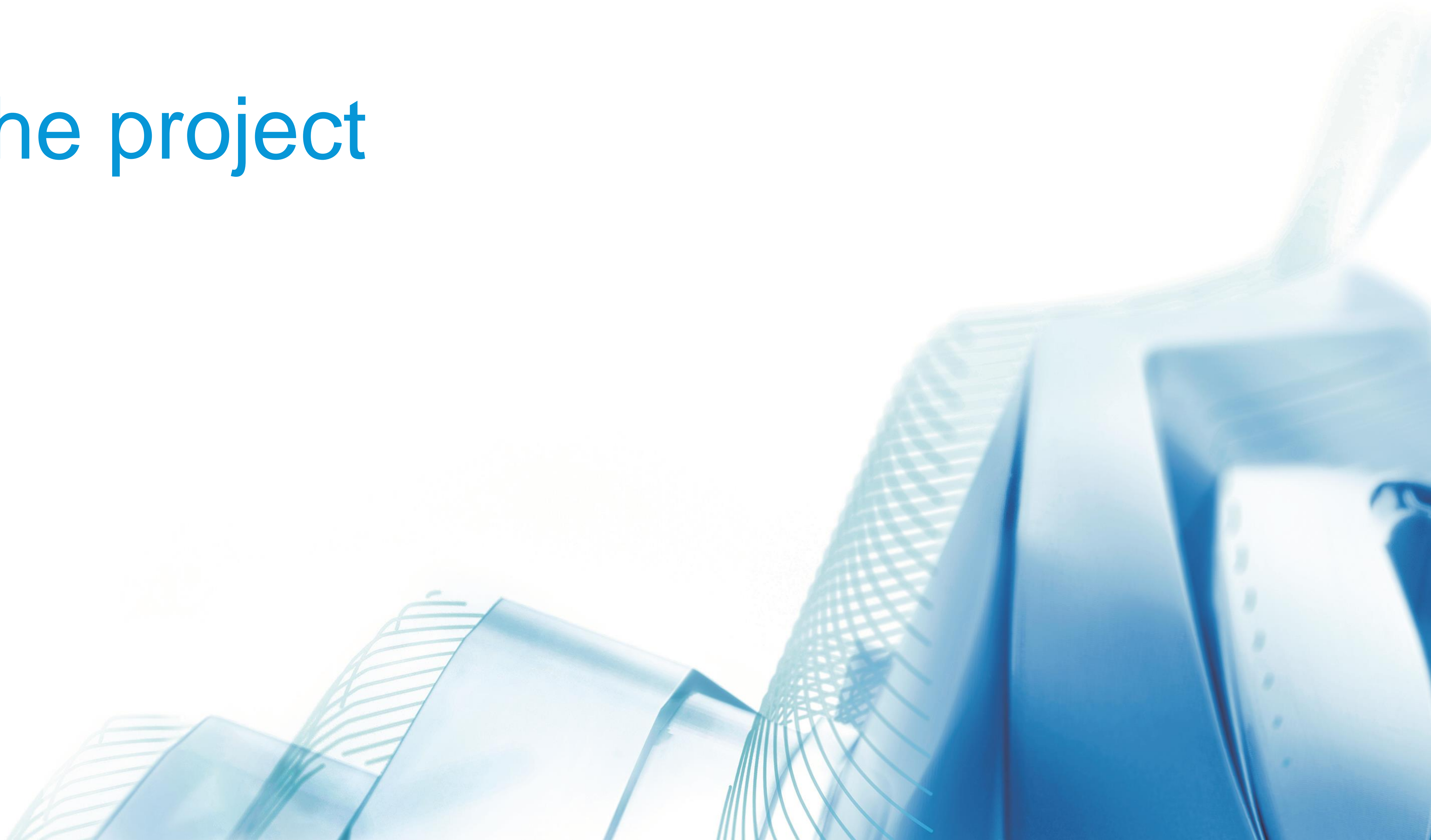
Risk Management



Water



The project



The project

- 5 500 sqm indoor water park, with 5 swimming pools, slides, diwing tower.
- 4 000 sqm residential building consisting of 35 apartments.
- Connected to existing parking facilities in the mountain.
- Built in old-town city centre.
- Finished December 2020.
- Contractor Veidekke ASA

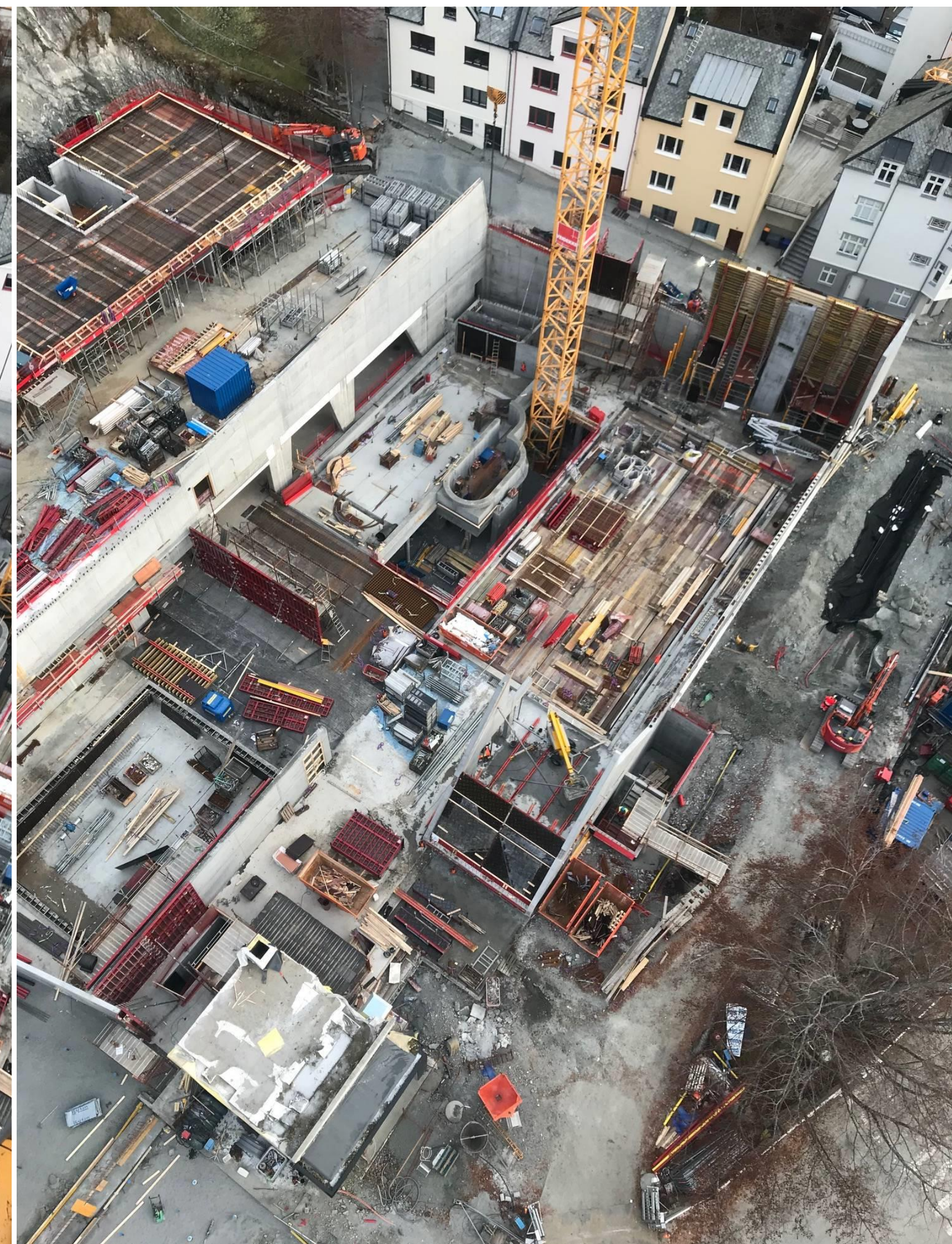
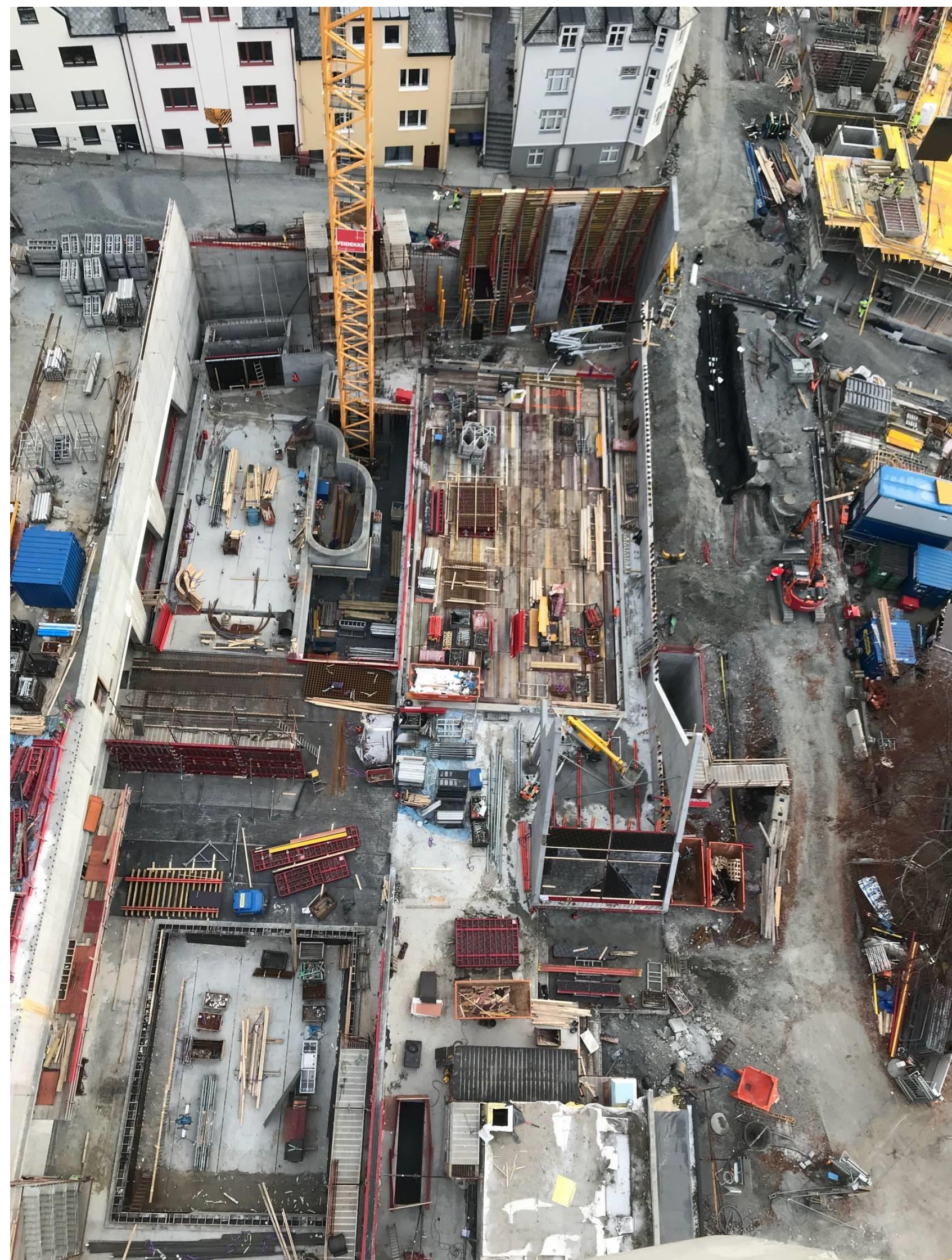




The project



In site pictures



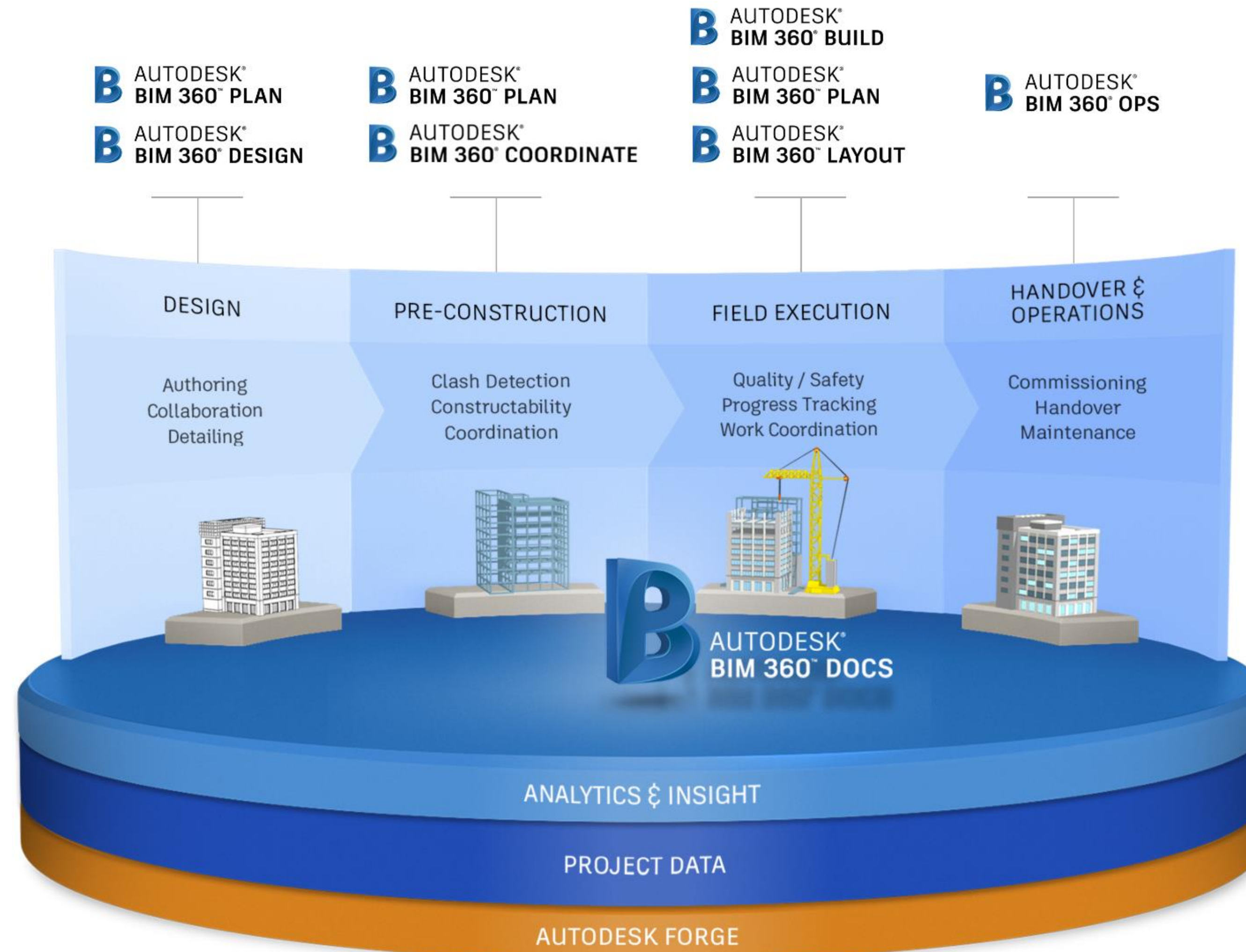
In site pictures



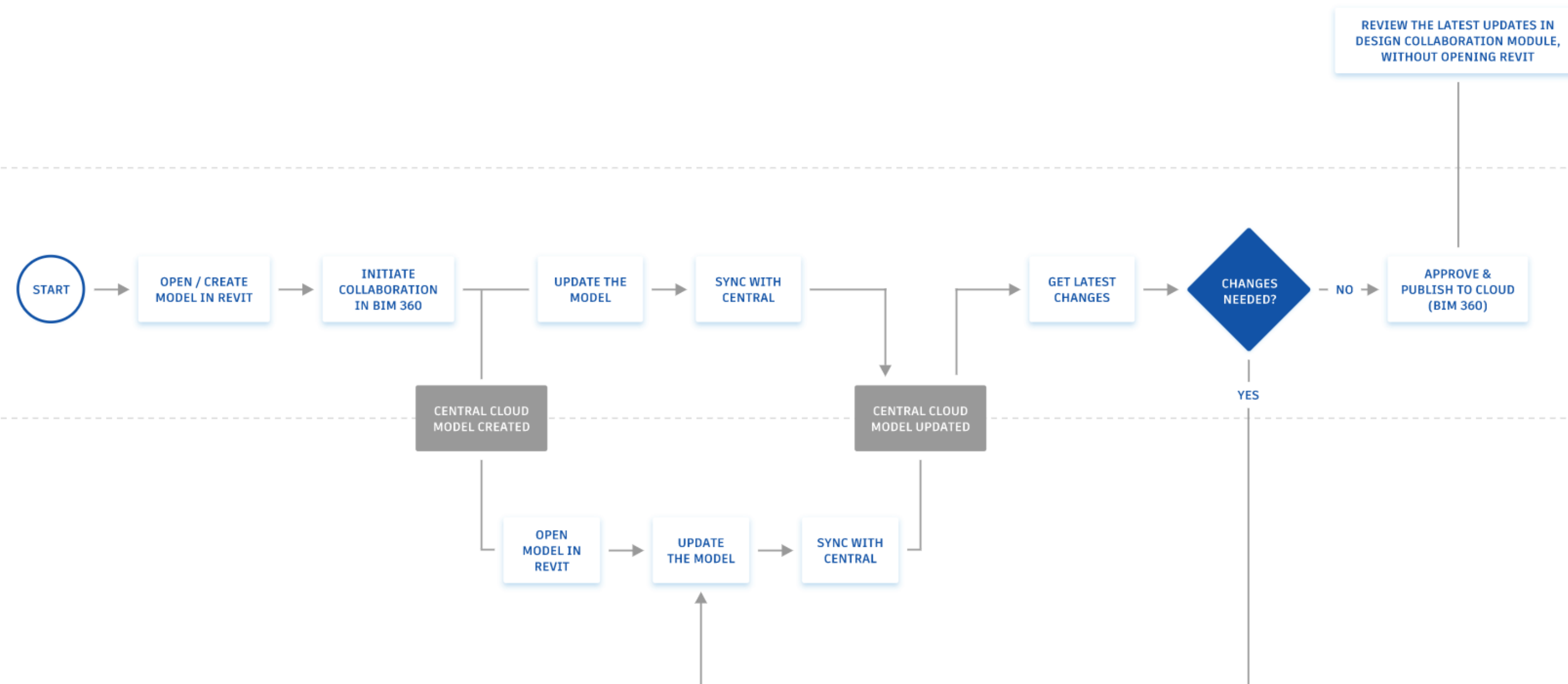
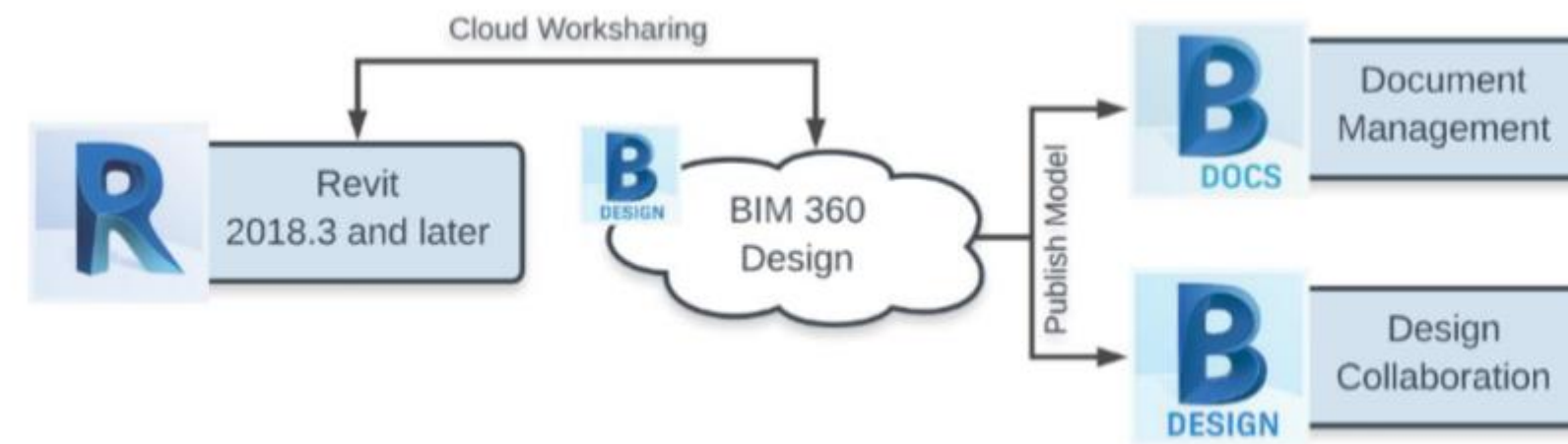
Overview



The BIM 360 cloud software



Revit Cloud Worksharing



BIM 360 in Norconsult

1000

LICENSES

132

ACTIVE PROJECTS

956

ACTIVE USERS

164

COMPANIES

BIM360 Project Startup

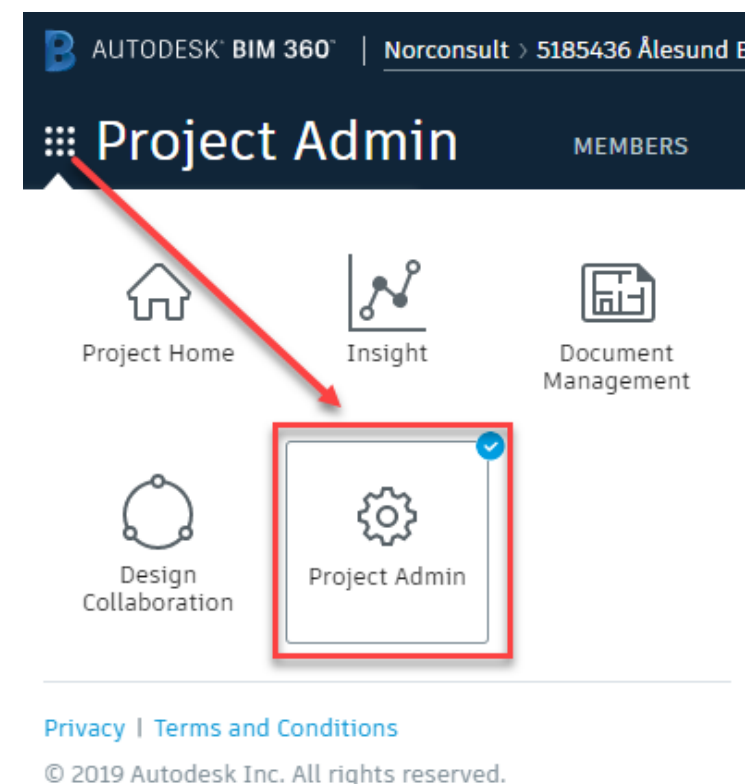


How do I access Revit Cloud Worksharing?

- Revit subscription (Revit 2017 or later)
- BIM 360 Design Subscription
- Access to Revit Cloud worksharing service (Set up by Contract Managers or Software Coordinators)
- A BIM 360 Docs account
- Invitation to at least one BIM360 Docs project

First things first!

- Set up a folder structure in BIM 360 Document Management.
- Invite project members to the project.
- Add folder permissions to members.



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Project Admin

MEMBERS COMPANIES SERVICES PROFILE

Project Members
Project Members lists all members of your project. This list includes pending members who have been invited to services but not yet activated their accounts as well as inactive members who were disabled by an account admin.

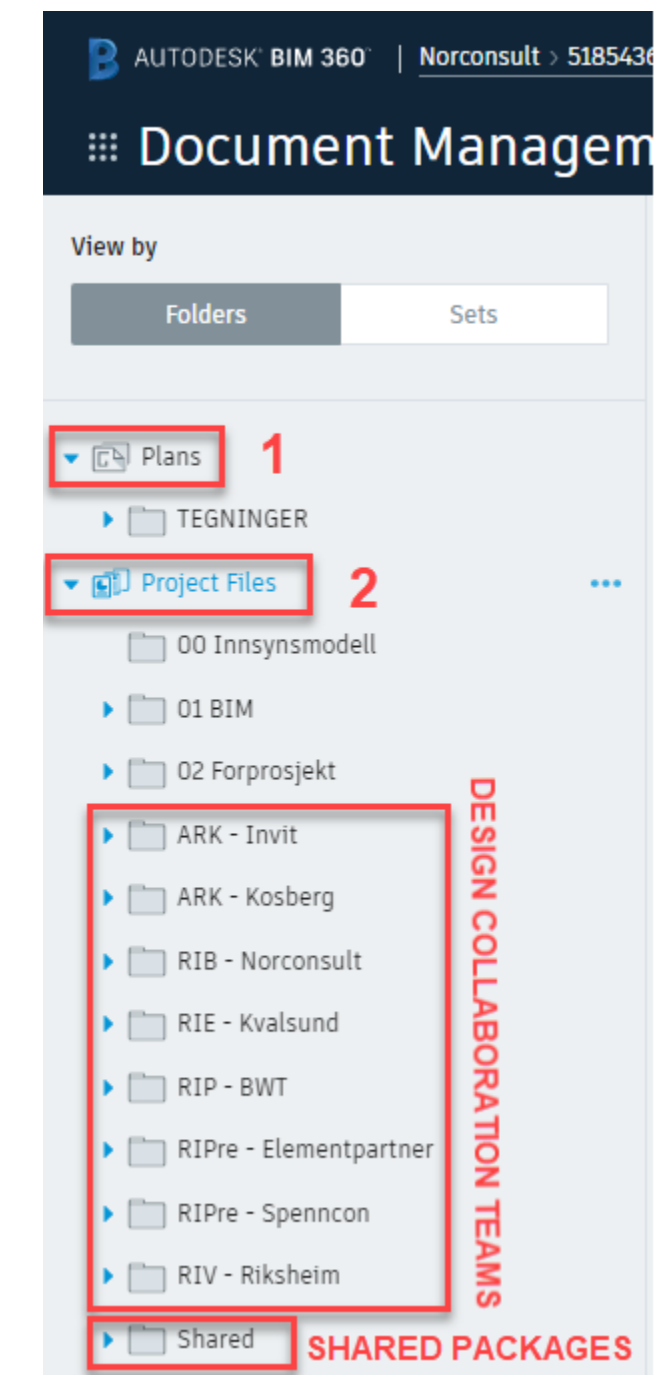
[Add](#)

<input type="checkbox"/>	Name	Status	Email	Company	Role	Project Admin			
<input type="checkbox"/>	AR	Active		Norconsult AS	Inspector				
<input type="checkbox"/>	BJ	Active		EL 24 AS	Subcontractor				
<input type="checkbox"/>		Active		Multiconsult AS	Engineer				
<input type="checkbox"/>	CM	Active		Spenncon AS	Engineer				
<input type="checkbox"/>	CN	Active		Norconsult AS	Civil Engineer				
<input type="checkbox"/>	CM	Active		BWT	Designer				
<input type="checkbox"/>	CL	Active		Spenncon AS	Engineer				

Filters

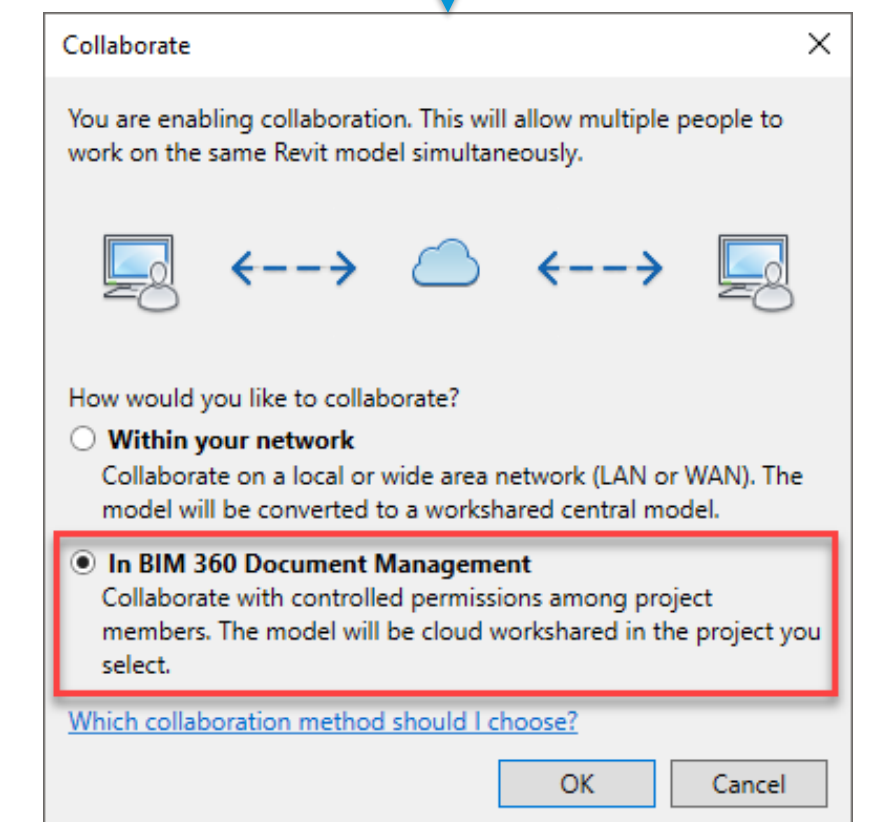
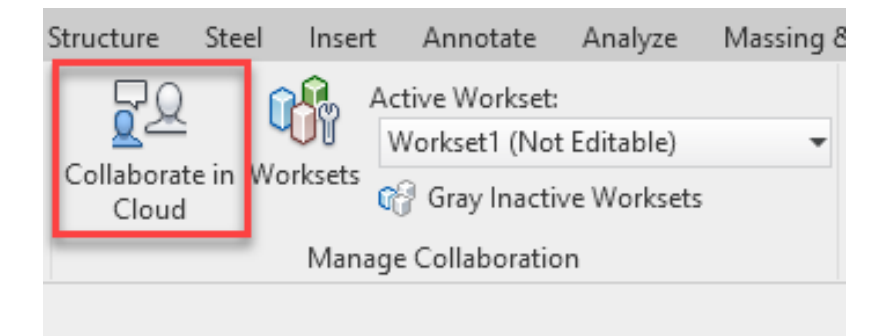
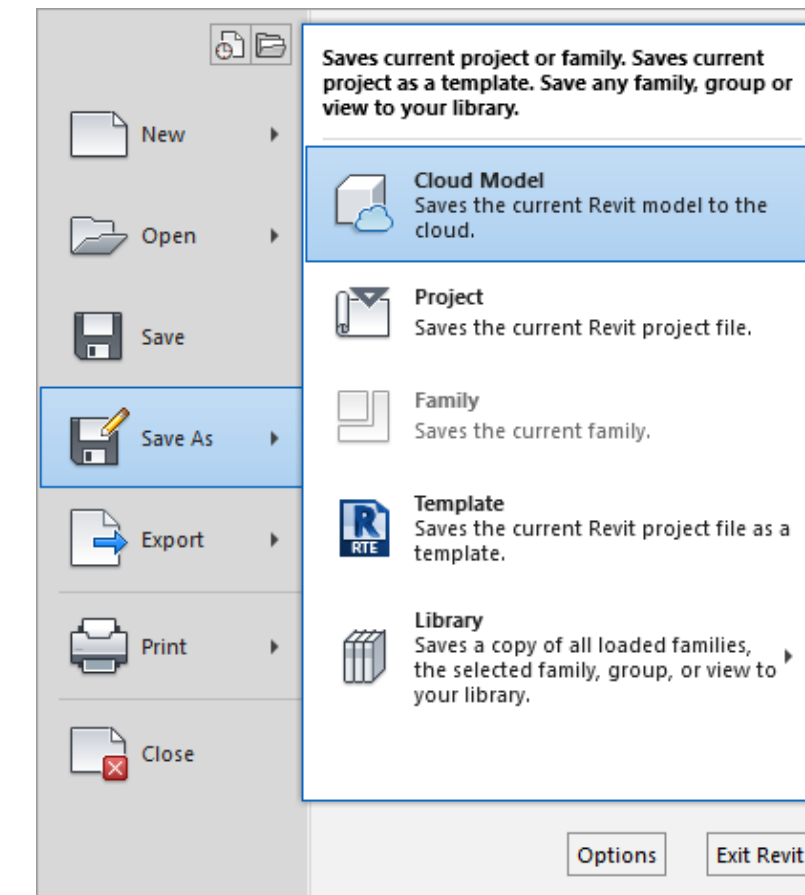
SERVICE

- Insight 5
- Document M... 60
- Design Colla... 33

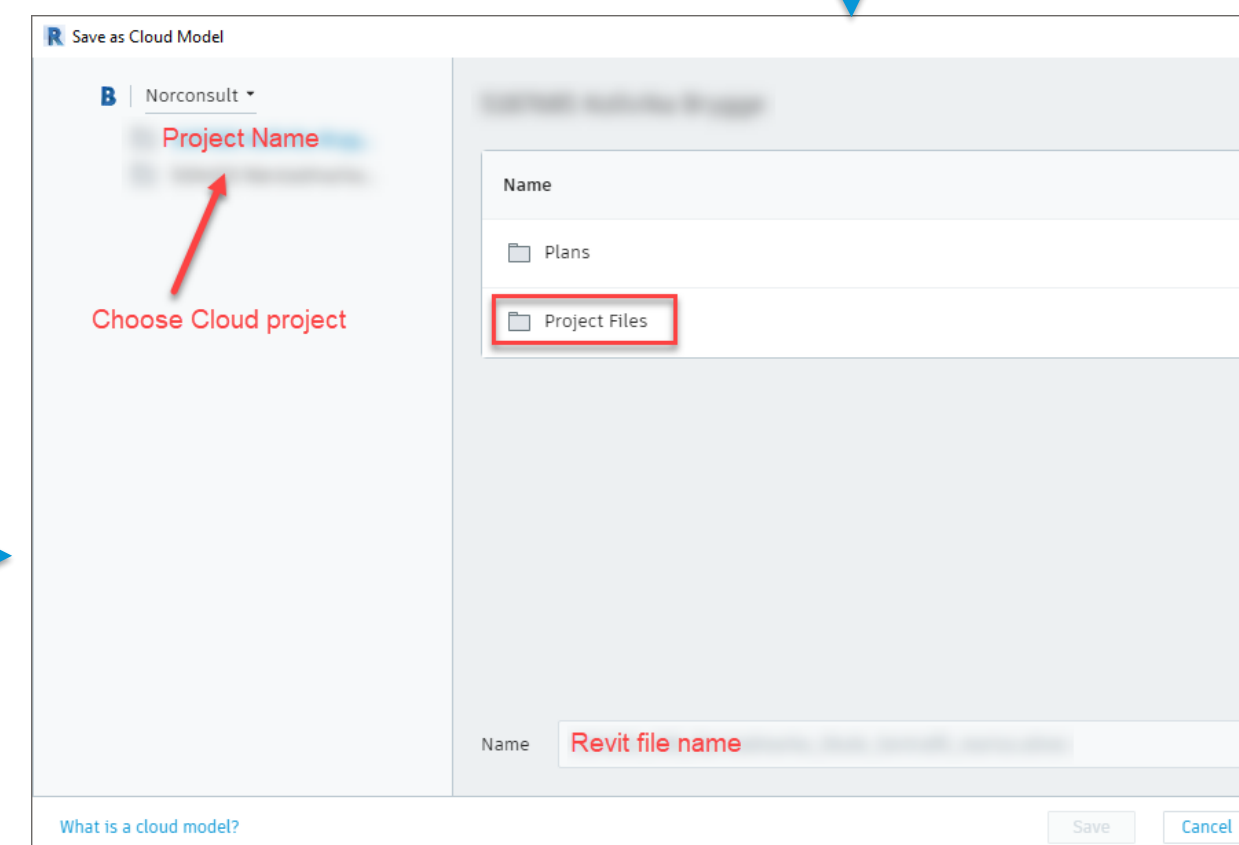


Starting Cloud Worksharing

- Either create a new Revit file or use an existing project file.
- It's possible to save non-workshared files to the cloud for viewing and collaboration purposes.
- Only workshared files can be used in Design Collaboration.



Worksharing must be enabled to use Design Collaboration

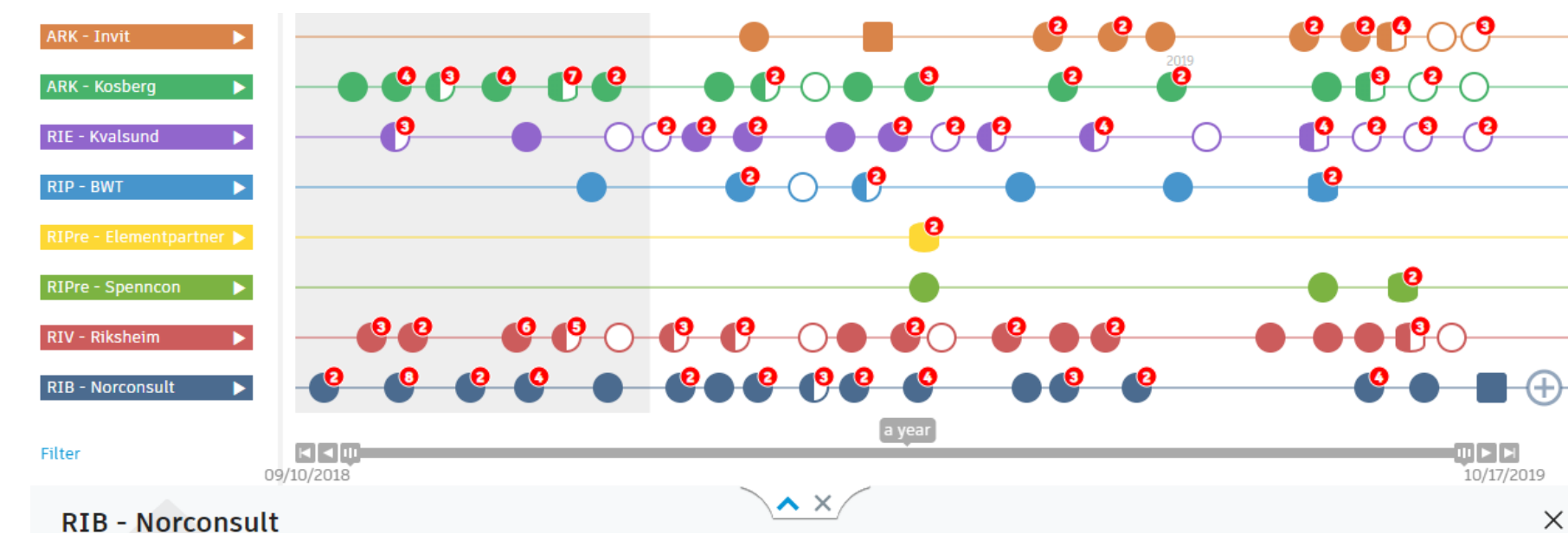
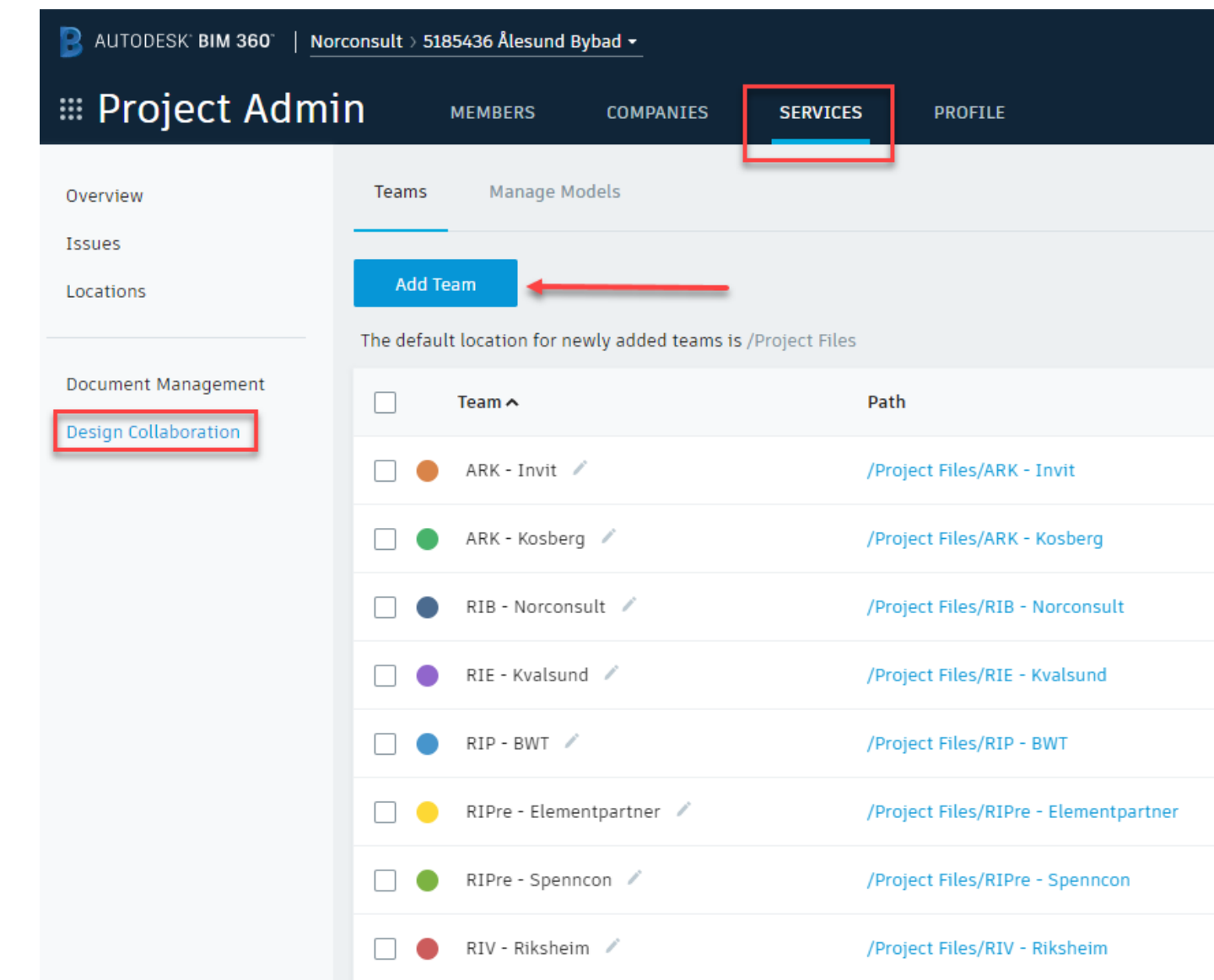


BIM360 Design Collaboration



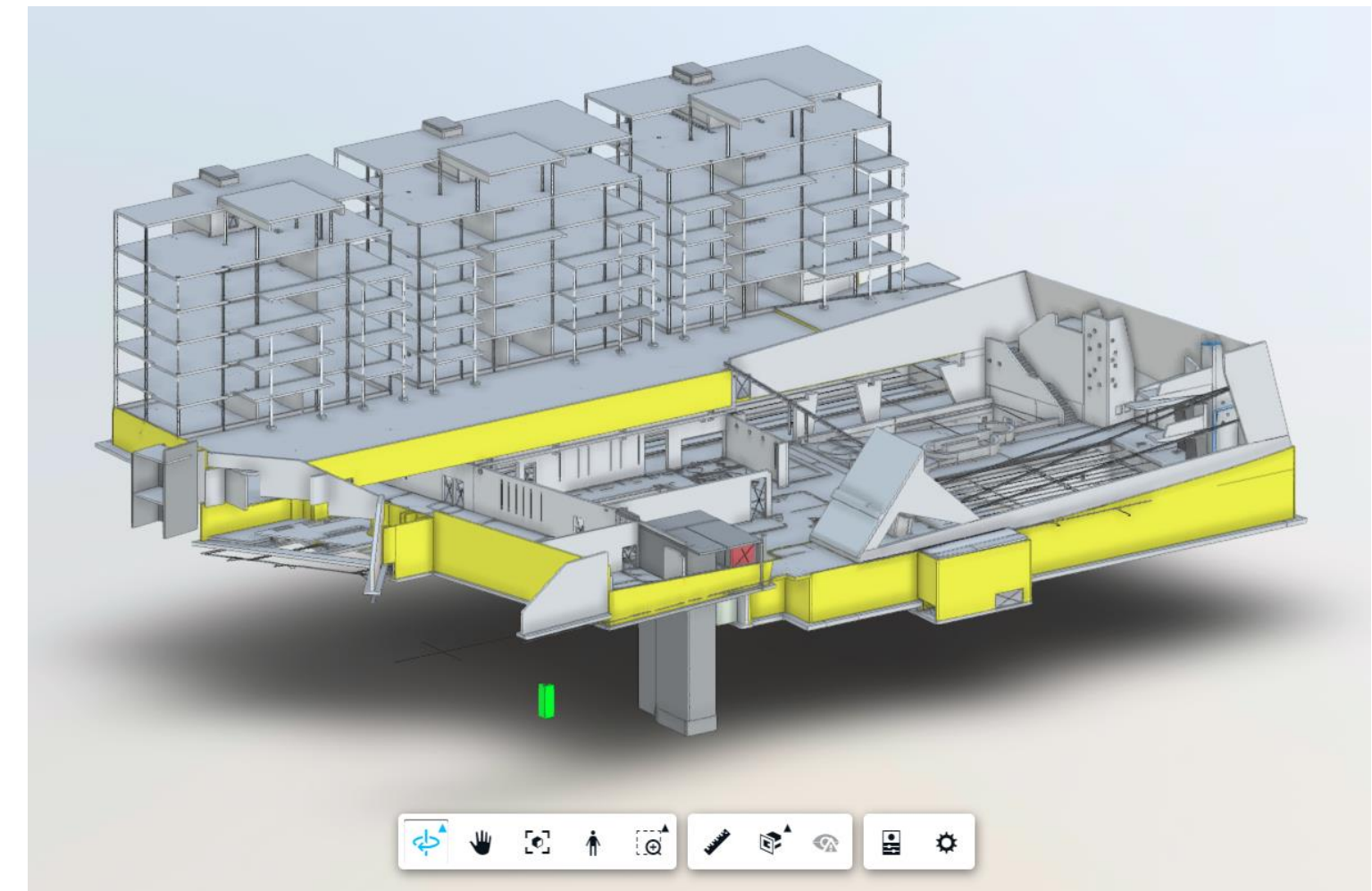
Adding design teams in BIM 360 Design

- BIM 360 Design teams must be added in the project admin menu in BIM 360.
- Linking the team file-path to the folder with the Revit central file in BIM 360 Docs.
- Teams get their own team space in BIM 360 Design Collaboration.
- The timeline in BIM 360 Design shows a line for each team created.



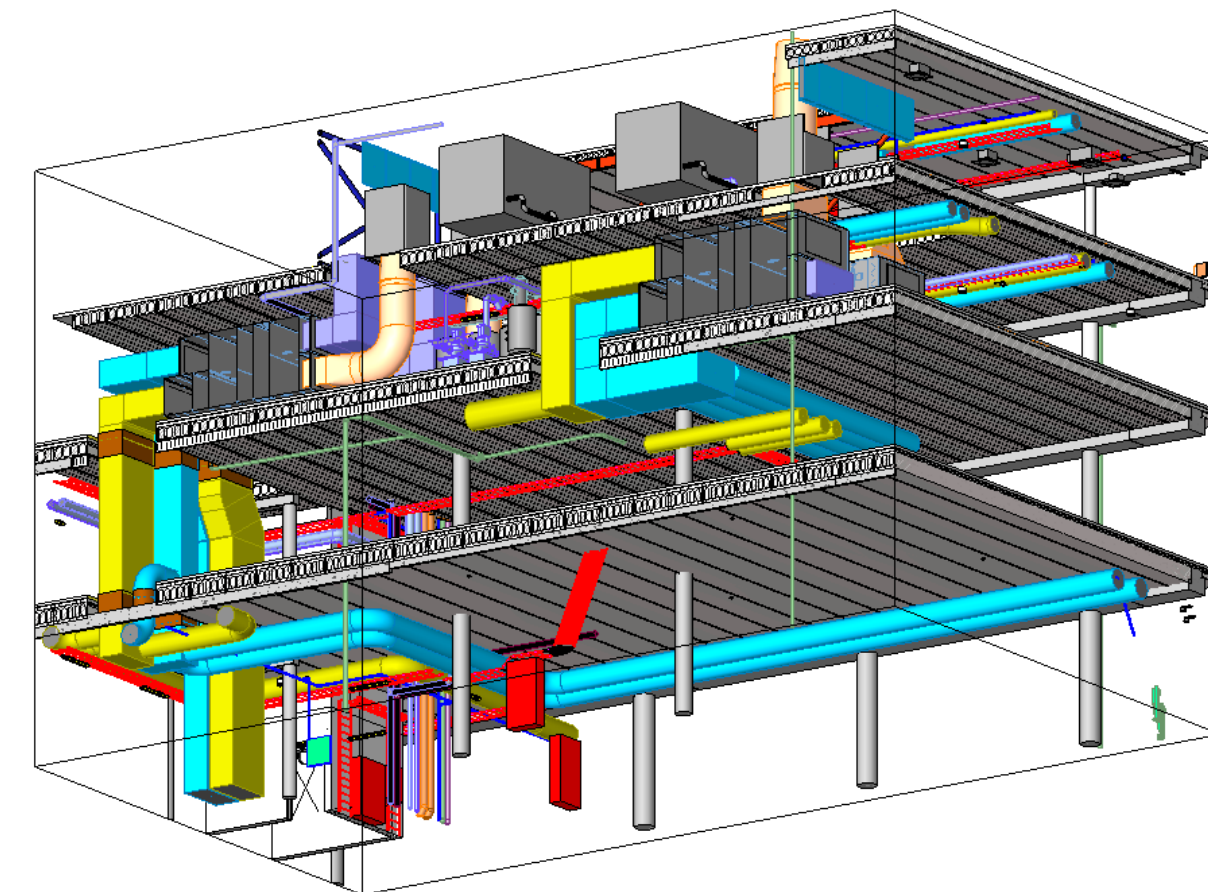
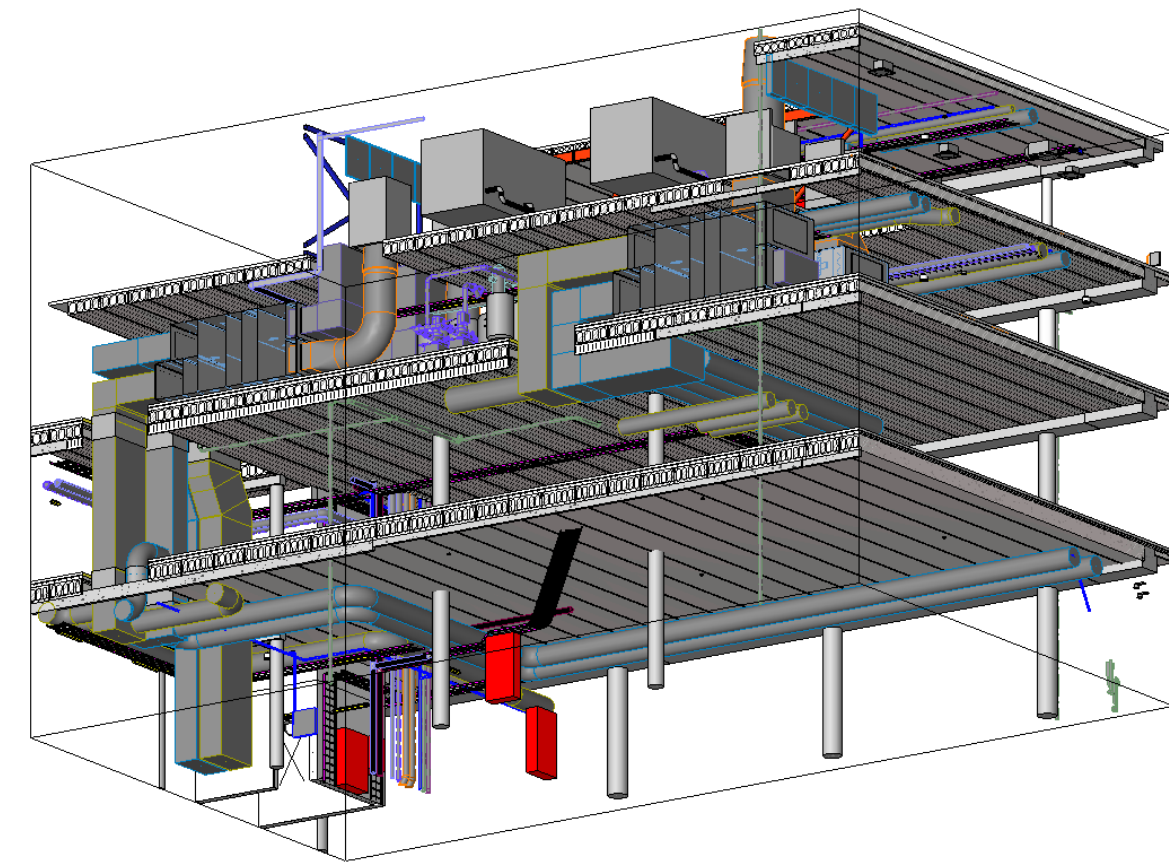
Setting up views to publish

- Setting up views to be published with the model helps track changes in the model.
- Atleast one 3D-view of all components in the Revit model should be uploaded every time.
- 3D-views of detailed areas can be very useful.
- Add 2D-plans and 2D-sections to support the 3D-views.
- Think about what you want to show to the rest of the design group!
- Add view templates when you got the views exactly the way you want.



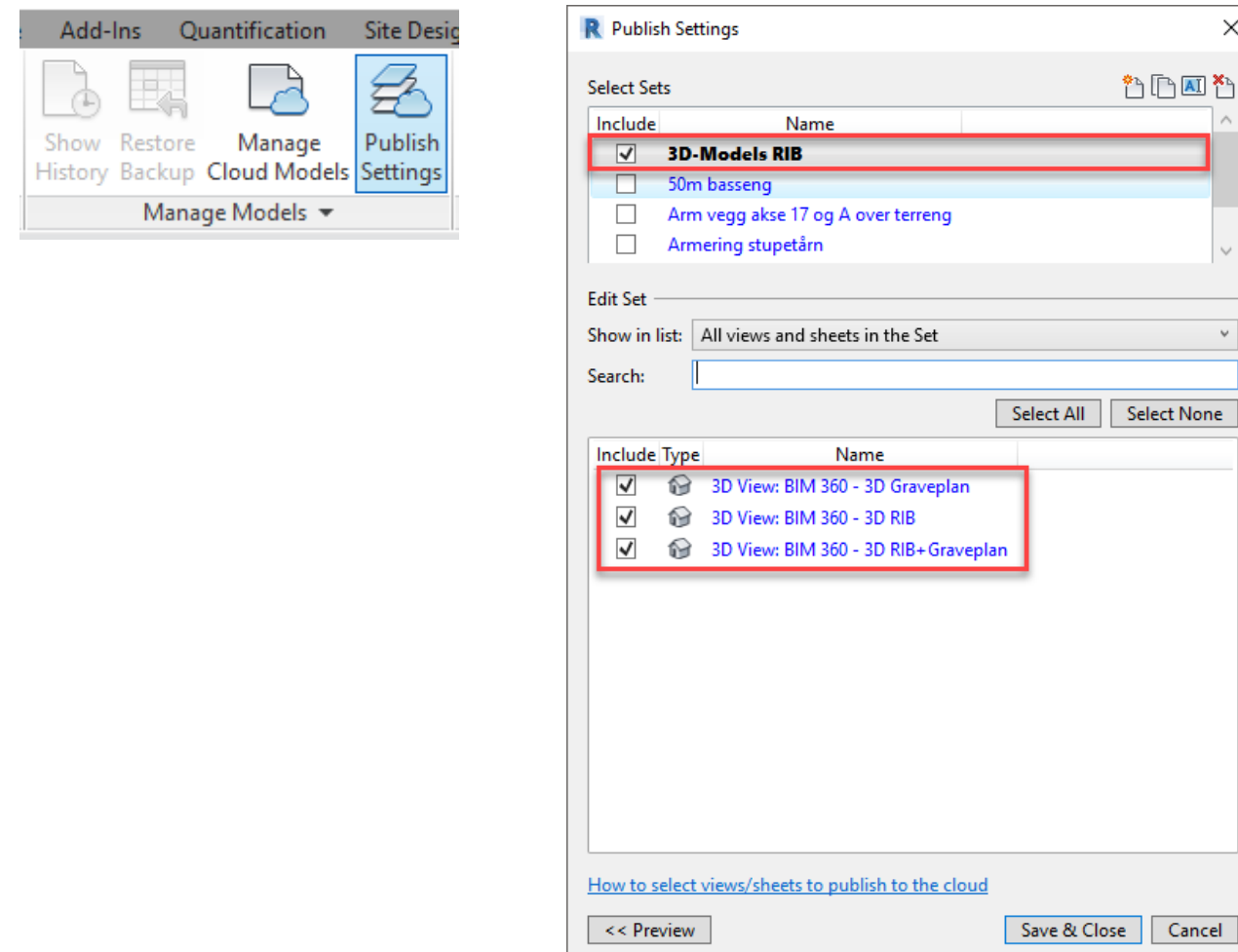
Setting up views to publish

- Possible to publish views containing linked Revit files.
- **The linked Revit files must be workshared.**
- Colors on objects from technical disciplines.
- Use «By linked view» in Visibility Graphics in the linked file.
- Tell the MEP engineers to set up views you can borrow.

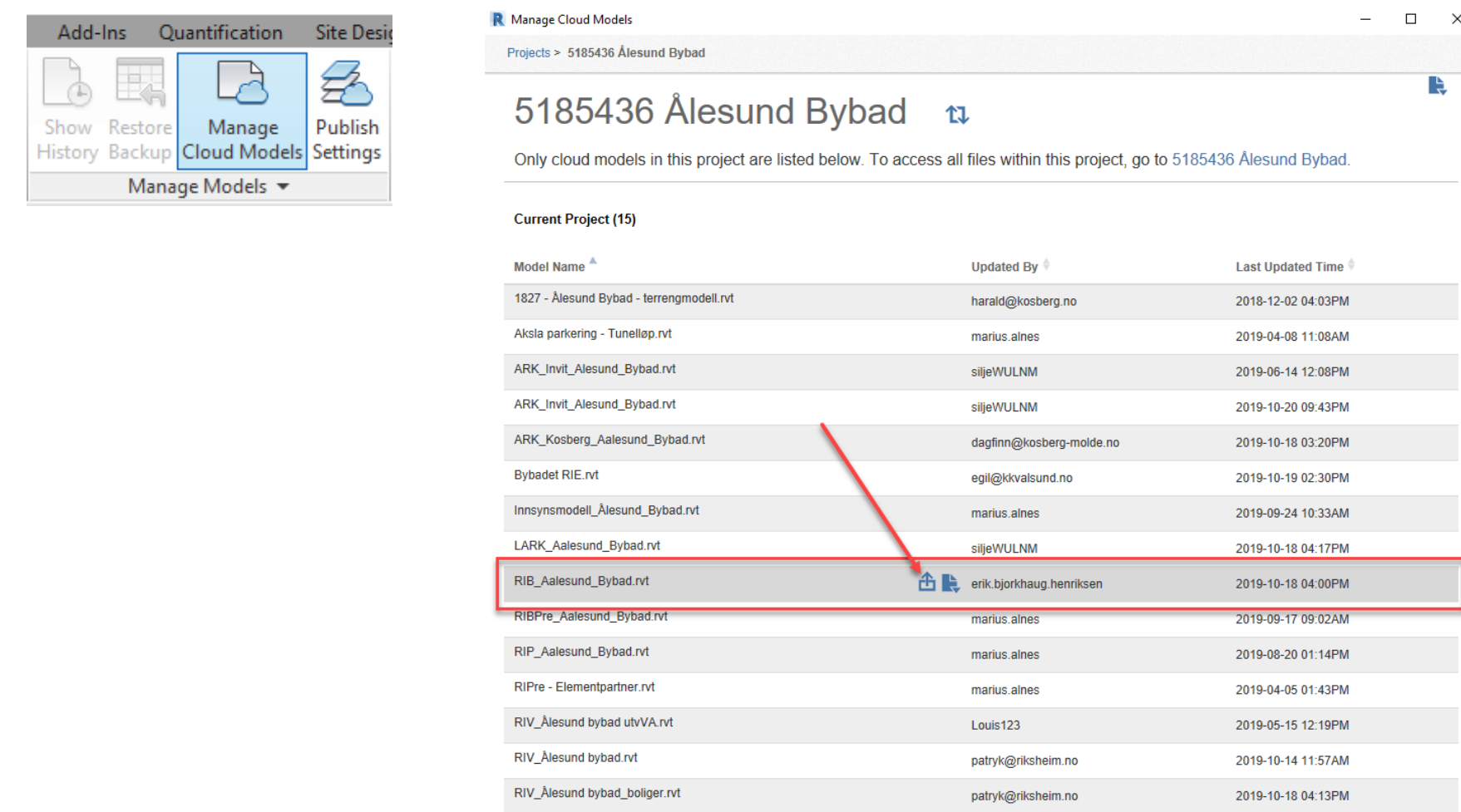


Publishing views and models to BIM 360

- Make a set in Publish settings and add the views and/or sheets you want to include in that set. It is possible to publish multiple sets.
- Remember to synchronize to central after setting up the views!
- Go to Manage Cloud Models to publish the model and views.
- Publishing is done by a 1-click process!

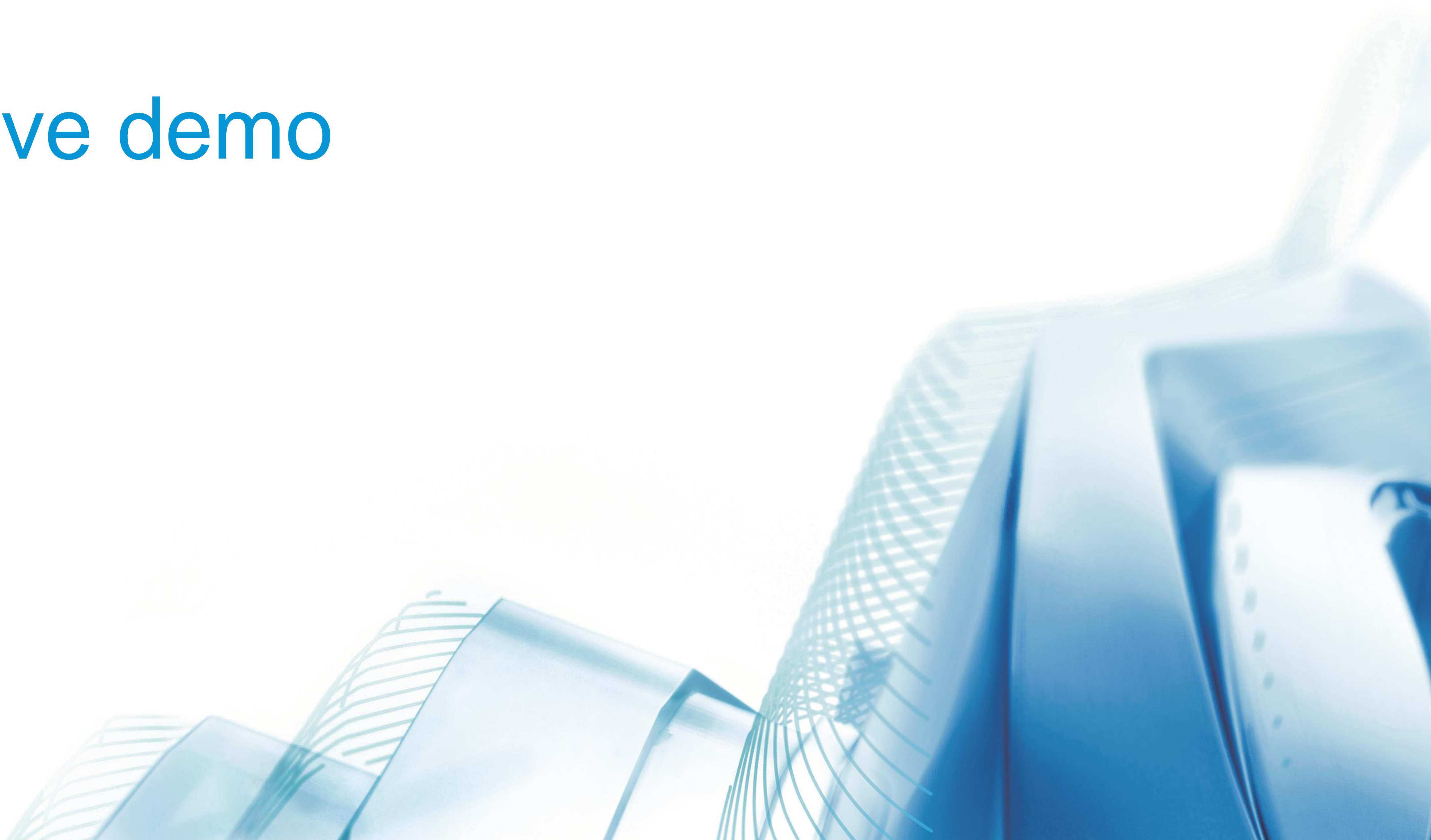


Setting up views



Publishing the views

Live demo



BIM 360 Design Team Space

- In the team space in BIM 360 Design Collaboration, the published views can be explored by anyone in the team.
- Team members who don't have Revit are able to track changes in the model before it gets shared with the rest of the design teams.

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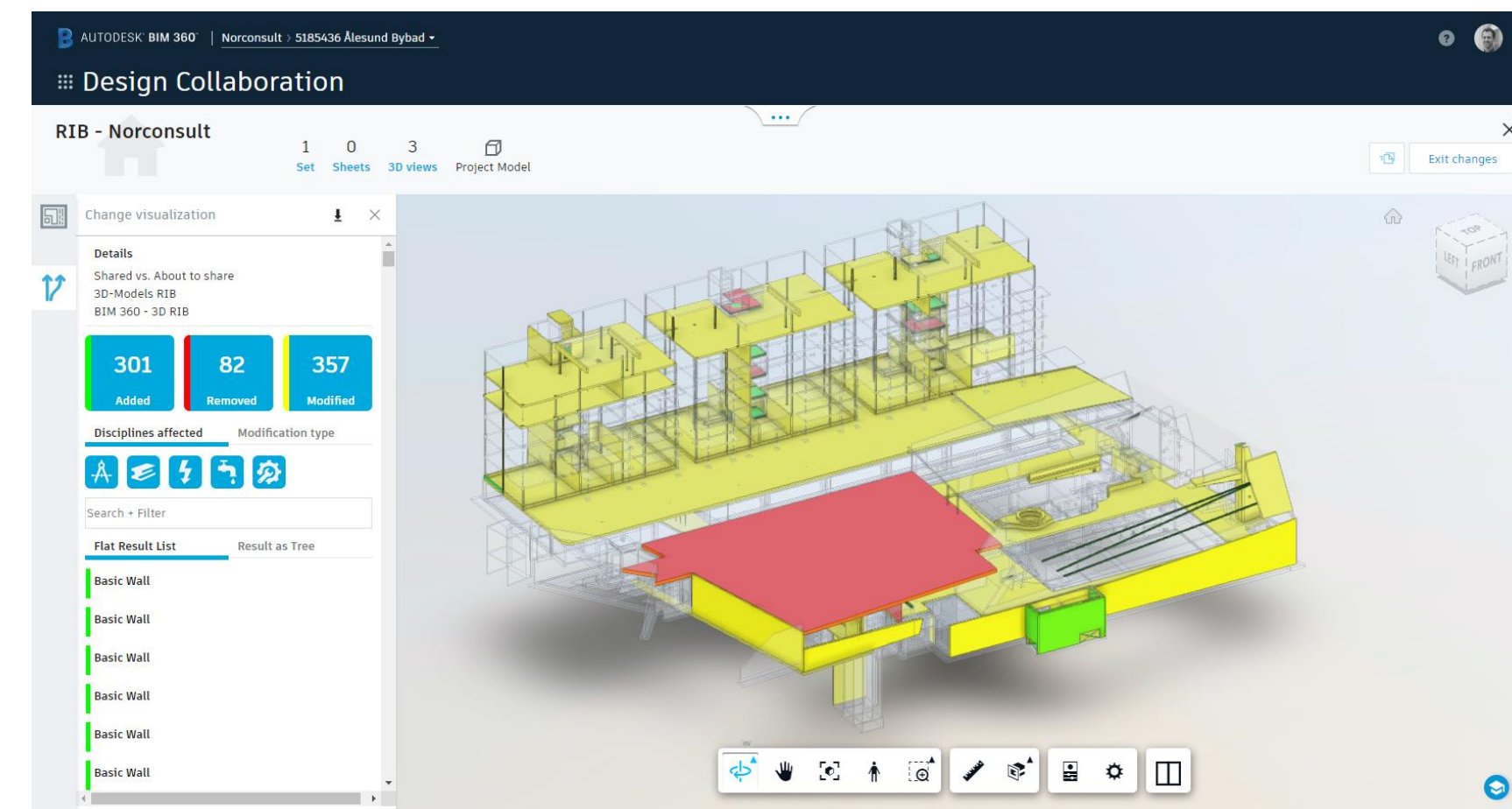
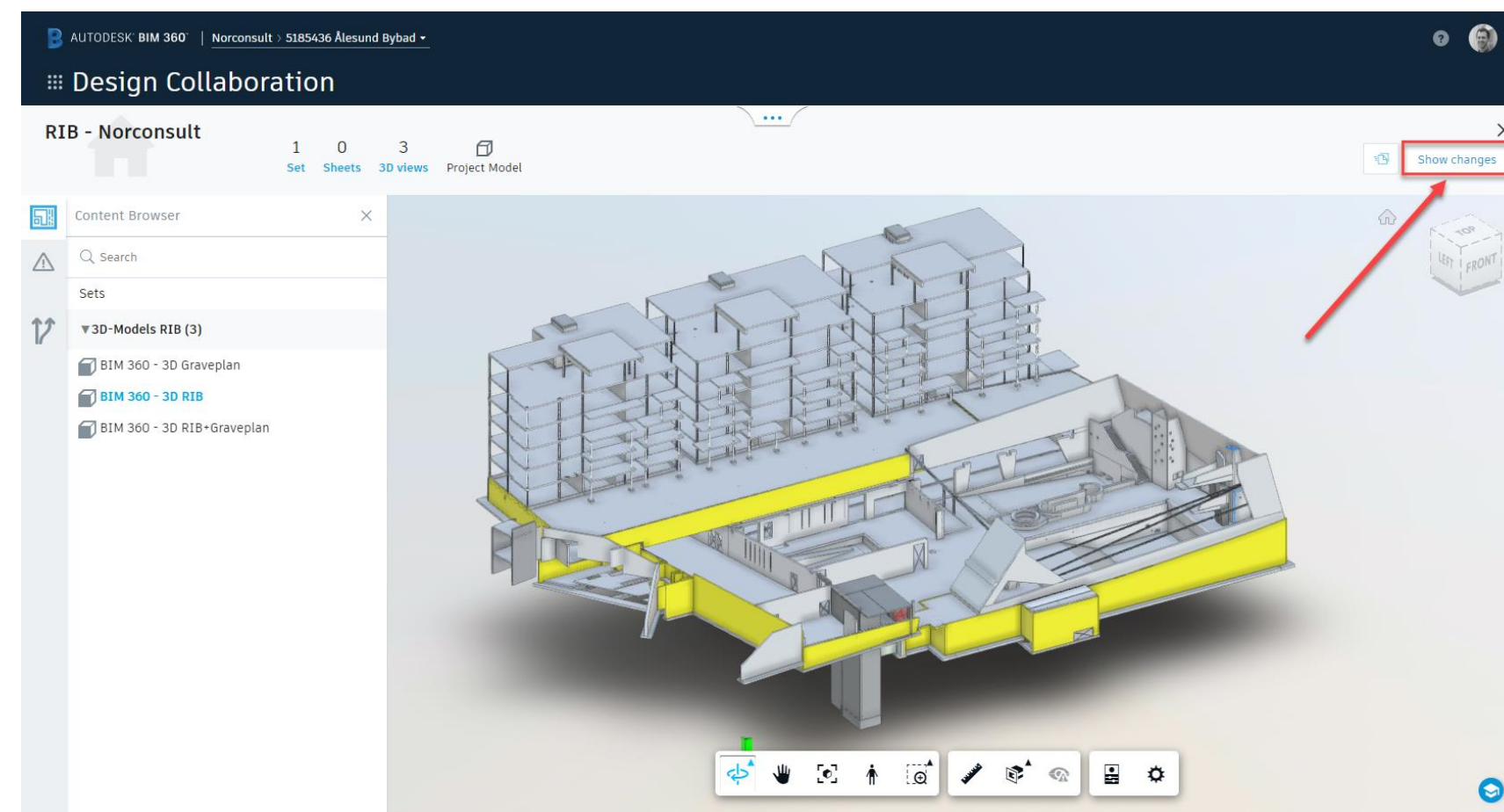
Design Collaboration

RIB - Norconsult
TEAM

1 Set 0 Sheets 3 3D views Project Model

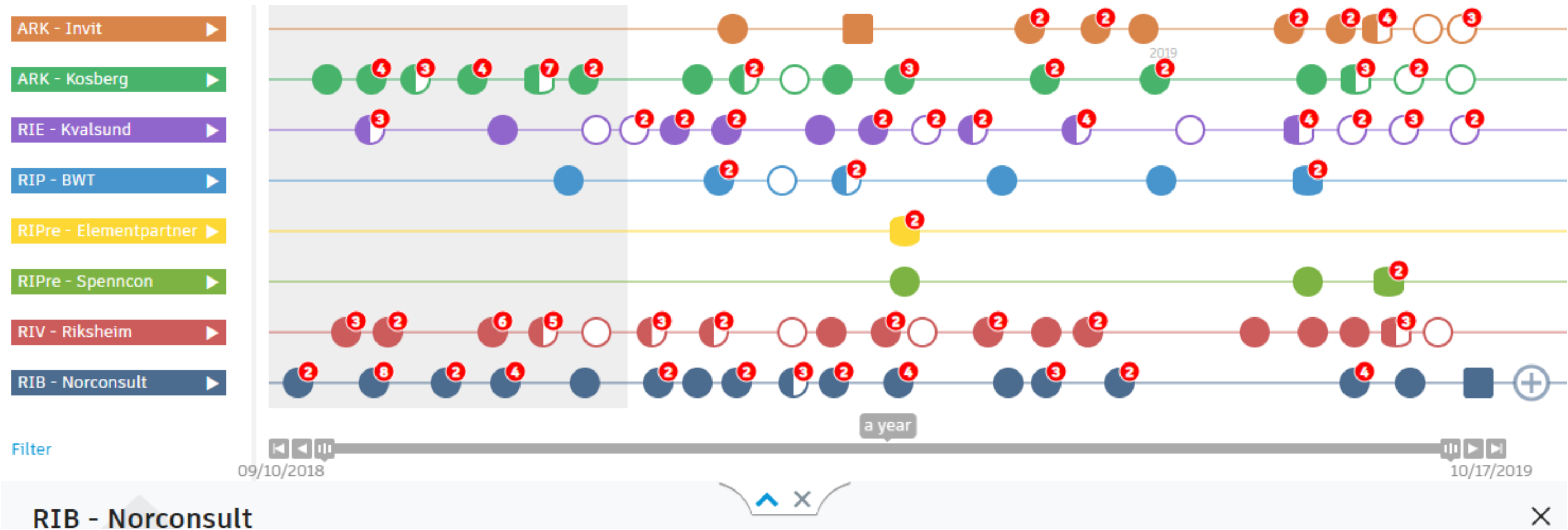
Search Update to latest Weekly on Thursday @ 17:00

Sets	Published model with views and/or sheets.	Sheets	3D views	Update date
3D-Models RIB		0	3	Oct 17, 2019 5:49 PM



BIM360 Design Timeline

- The timeline gives an overview of the models that have been shared in the project.
- Published models and new packages by your own team.
- Shared packages from other teams
- Consumed packages from other teams.
- Filter is available to hide/show different type of models.



Node Type	Description
	An empty circle on another team's line represents a package that has been shared, but not consumed by your team.
	A filled circle on another team's line represents a package that your team has consumed.
	A filled circle on your team's line represents a package you have shared.
	A dotted-line circle on your team's line represents the start of a new package that you haven't shared yet.
	A numbered badge with a circle represents a cluster of packages. The two-tone color means some have been consumed, some have not. Click or zoom to expand the cluster.
	A numbered badge with an empty circle represents multiple packages that haven't been consumed. Click or zoom to expand.
	A numbered badge with a filled circle represents multiple packages that have been consumed. Click or zoom to expand.
	A square represents a model uploaded to the team folder in Document Management.
	A numbered badge with a square represents a cluster of models. Click or zoom to expand.
	A numbered badge with a hybrid square and circle shape represents a cluster of models and packages. Click or zoom to expand.
	A numbered badge with a hybrid square and circle shape represents a cluster of models and packages. The two-tone color means some have been consumed, some have not. Click or zoom to expand the cluster.
	The plus node allows you to create a new package to share your team's work.

Create and share a package

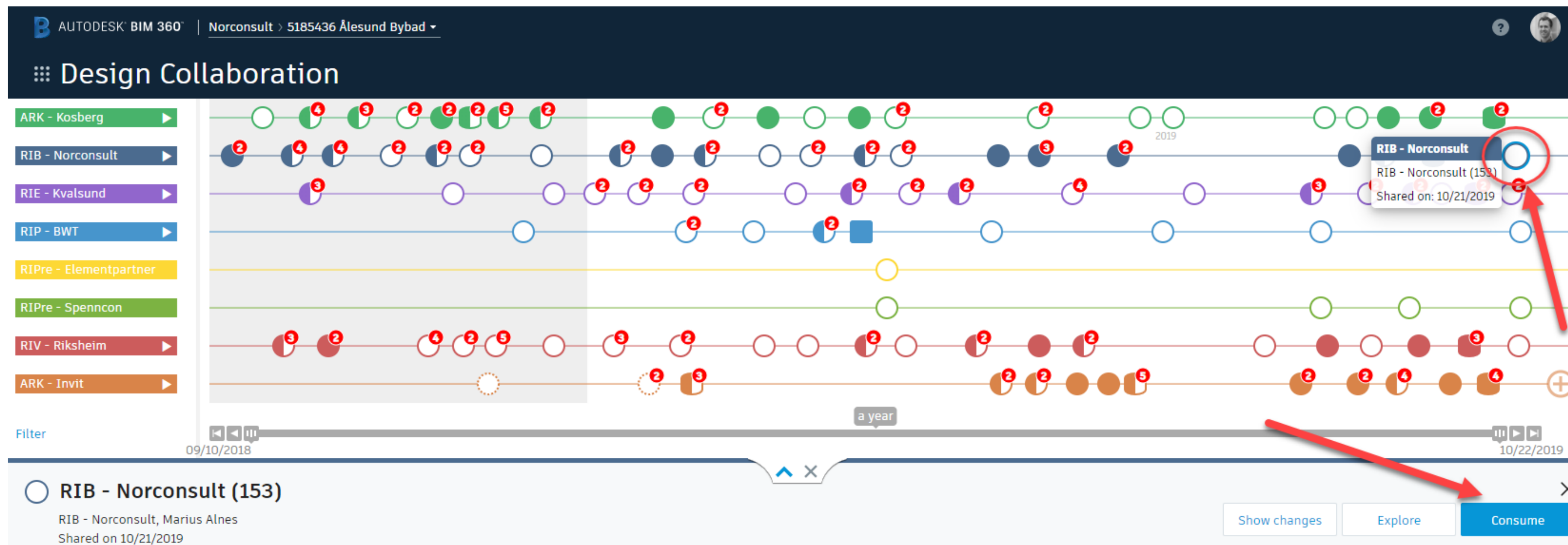
The screenshots illustrate the process of creating and sharing a package in the Autodesk BIM 360 Design Collaboration environment. The interface shows the project 'RIB - Norconsult (153)' with a 3D model of a building. The 'Content Browser' on the left lists the sets and models included in the package. The 'Share' button is highlighted in the top right corner of the main view. A red arrow points to the 'Share' button in the top right corner of the main view.

The bottom screenshot shows a timeline view of the package's history. The timeline displays the package's status over time, with a red box highlighting the 'RIB - Norconsult' package and a red arrow pointing to the 'Share' button. The timeline also shows the package's status as 'NEW SHARED PACKAGE'.

PS. Remember to write a description of the package before shared!

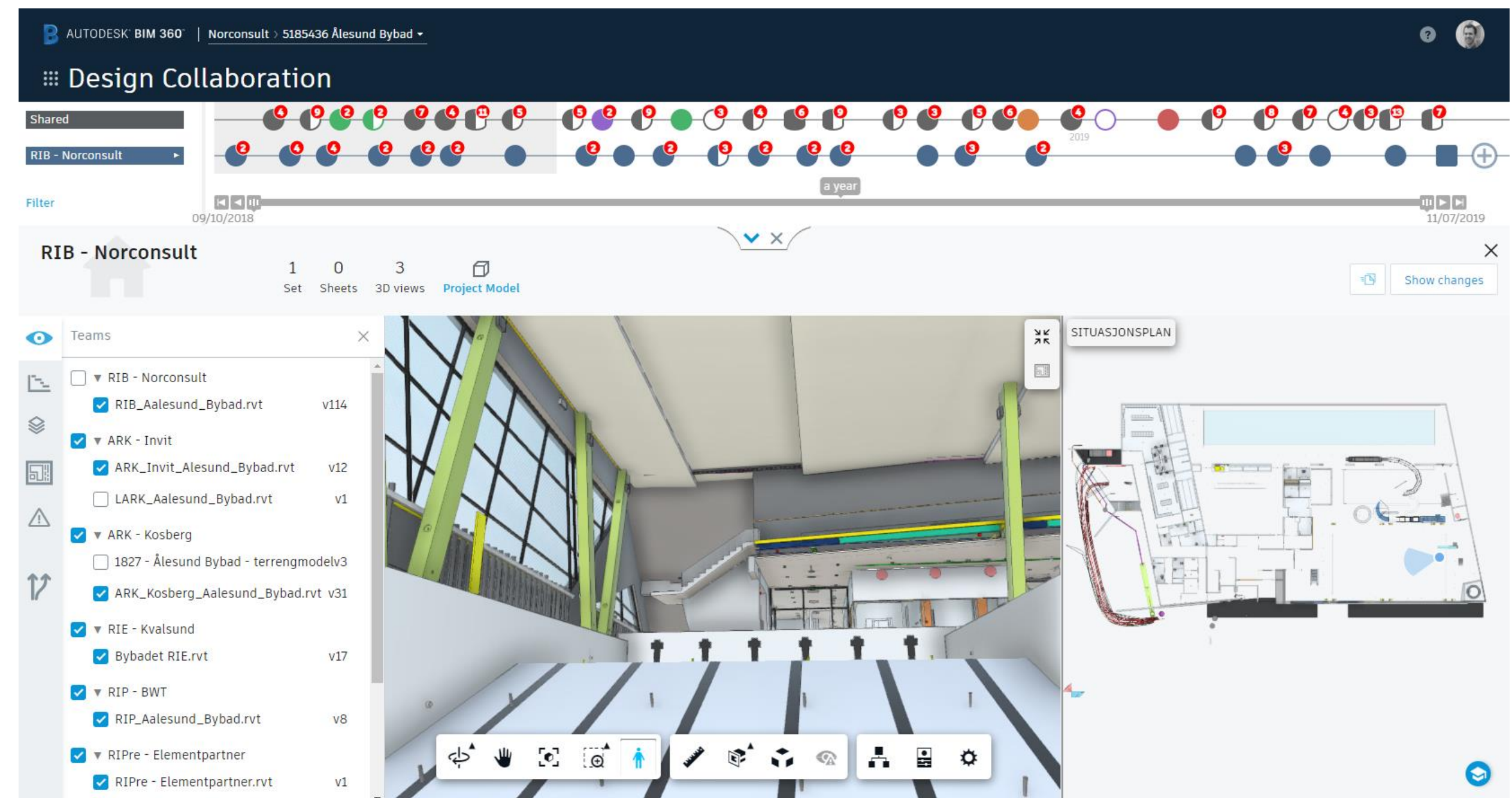
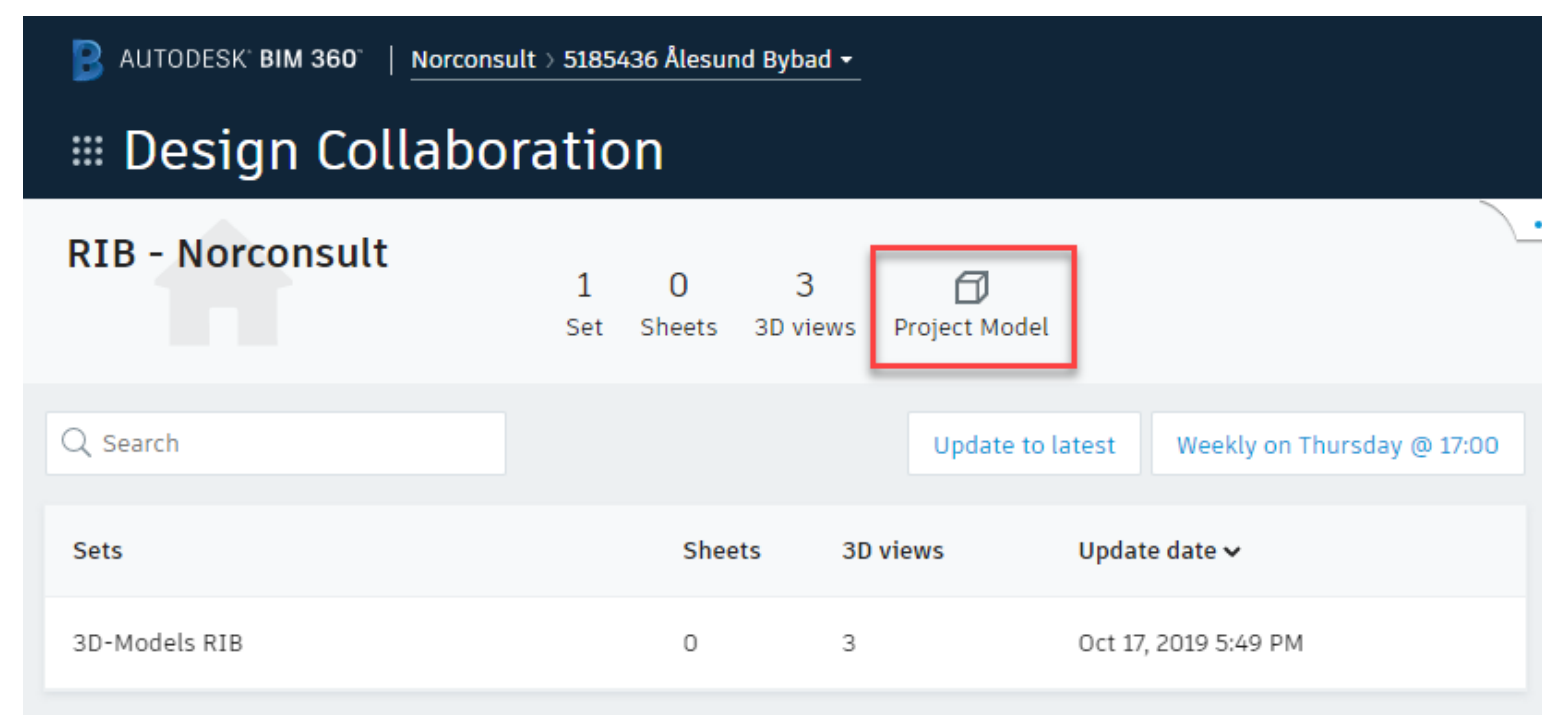
Consume packages

- Consuming packages is very easy and is done by clicking on the package you want to consume in the timeline.
- Remember to explore the model you want to consume and use the «show changes» button to see what's been changed in the model.

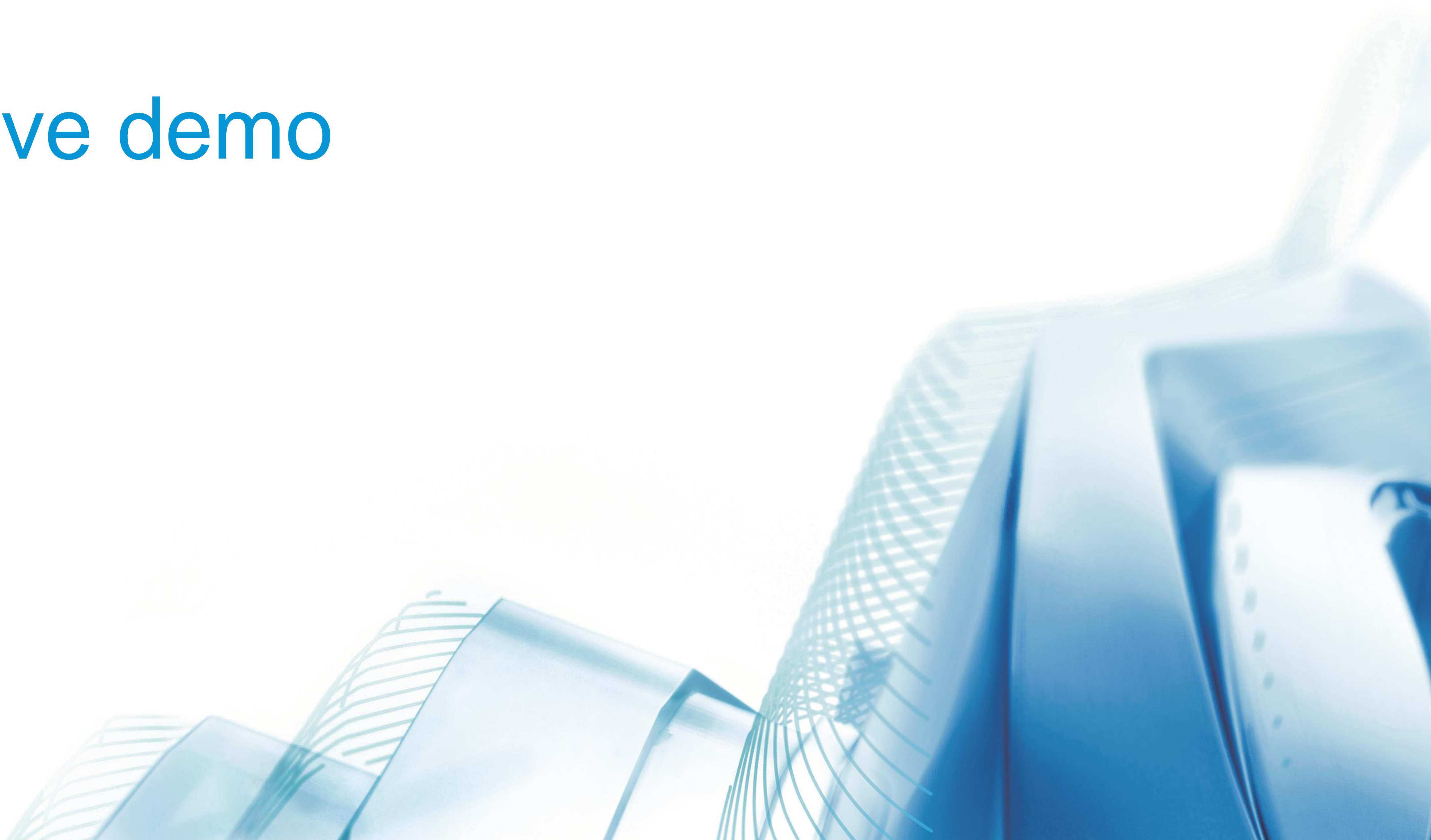


The project Model

- A multidisciplinary model which contains the latest published model for the specific team, and all the consumed models from the other teams.
- A «live» model that can be used in the design process, besides Revit itself.
- All the models must share the same site when published. If not, the models will not be placed correctly.



Live demo

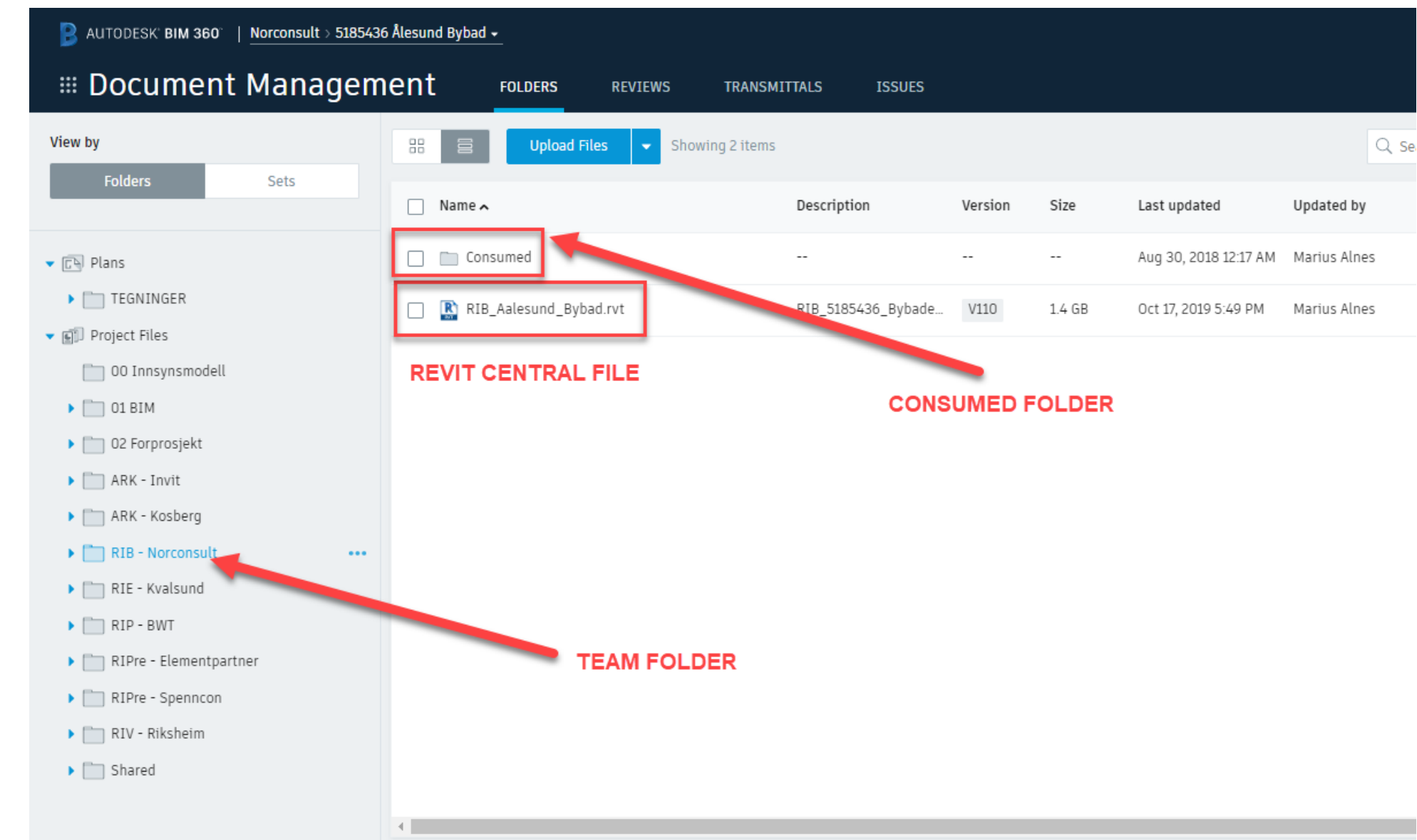


Workflow with IFC-files

1. Add a team in BIM 360 Design to have a folder to store the model in.
2. Open the IFC-file in Revit.
3. Check the file for errors.
4. Activate worksharing of the model and save it to the team folder in the cloud.
5. Go to the Design Collaboration module and create a package and share it on the timeline with the rest of the teams.
6. When an updated IFC-model are received, the central file in the design folder must be deleted before repeating point 2-5.
7. The files in the Shared Folder will be updated, so the version history of the model will be taken care of.

Linking Revit files to your project

- Each team has their own folder for storing central files.
- Revit workshared files should be linked in through the teams consumed folder.
- Consumed models from other teams are stored in the consumed folder in BIM 360 Docs.
- When a new model are consumed, the Revit file in the consumed folder are overwritten, and links are being updated in the Revit project.



Collaboration attitude!

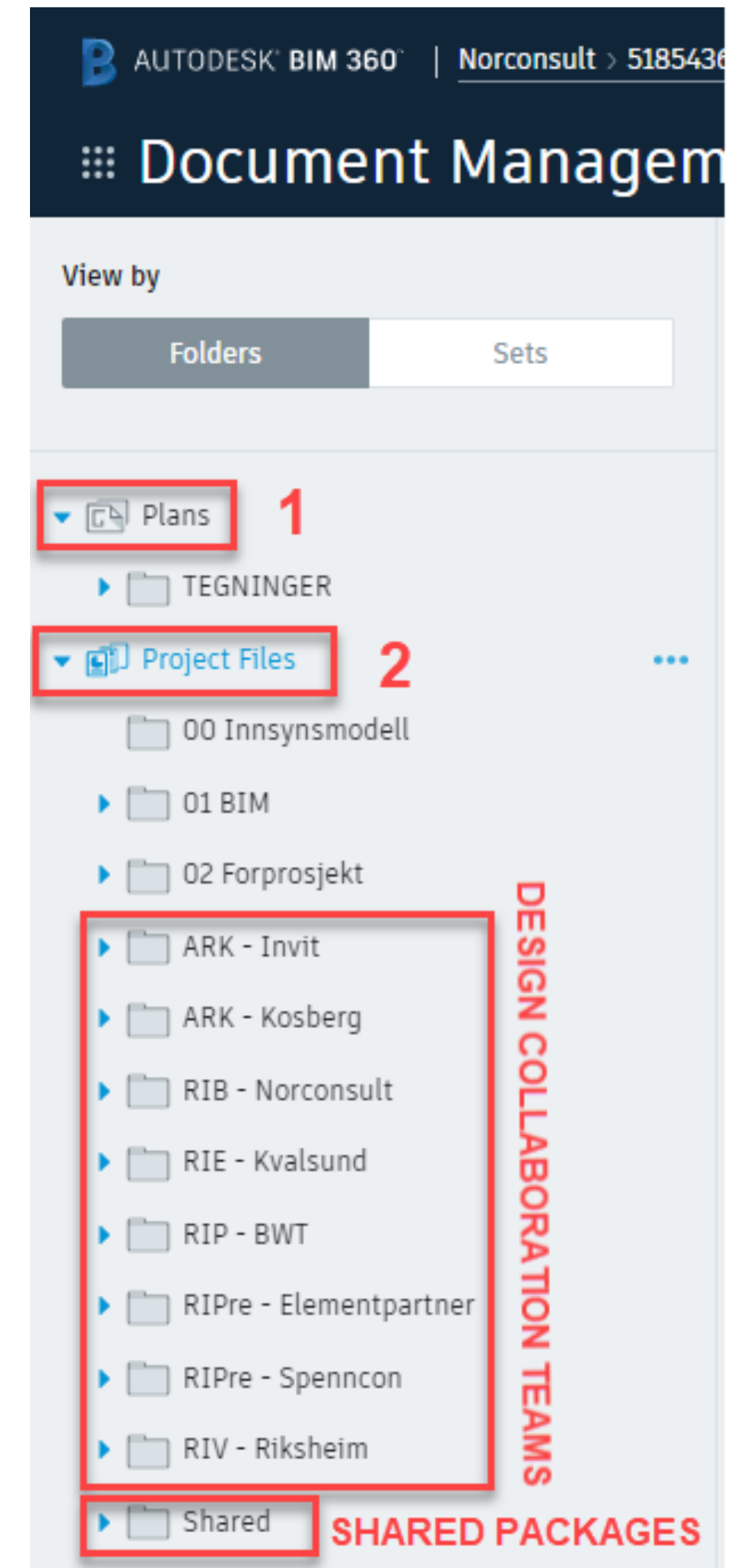


BIM 360 Document Management



BIM 360 Docs Folders

- Plans Folder
 - Use the Plans folder to manage, download, review, and publish the latest set of construction documents in both 2D and 3D formats. This is the digital equivalent to the printed set of contract drawings for the project.
 - Workshared models should not be initiated to the plans folder!
- Project Files Folder
 - Use the Project Files folder for any project document, including design data and all other document types. For example, photos, reports, schedules, budgets, requirements documents, etc
 - The folder are used for storing Revit central files for design collaboration.

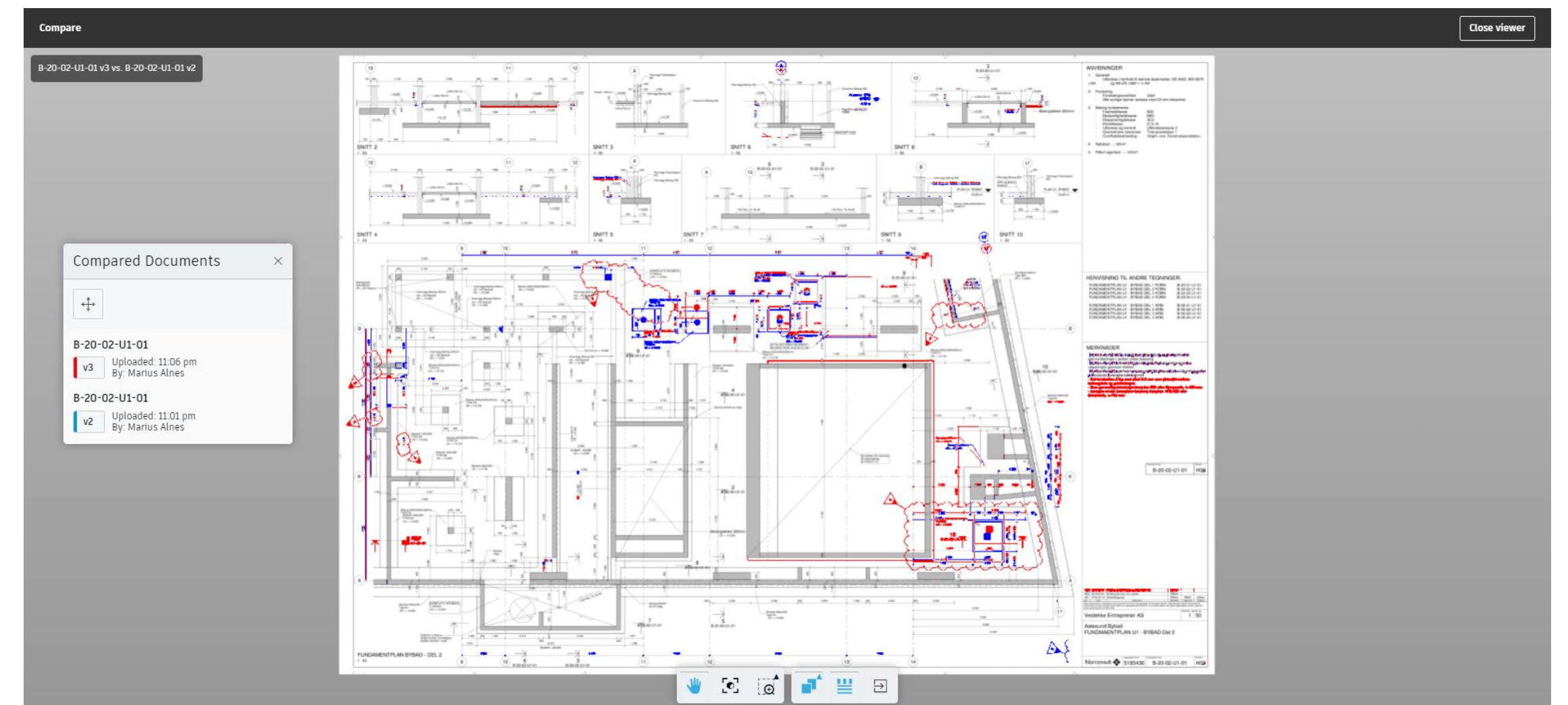
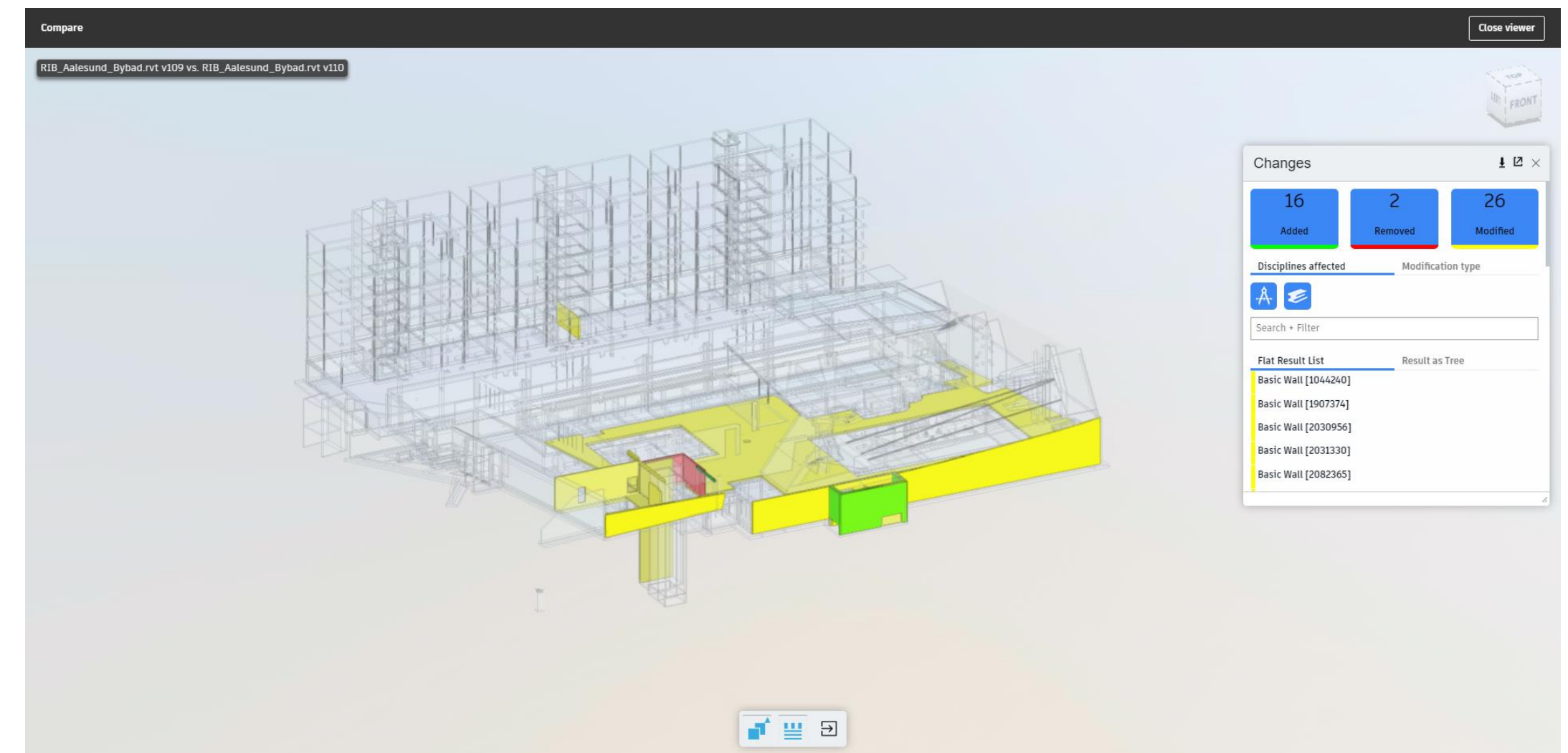


Project Coordination Model

- Alternative 1
 - BIM 360 Coordinate. This module can bring together multi discipline models in shared coordination spaces and run clash detection test on them.
- Alternative 2
 - Linking all the Revit models in the project to an empty Revit file and enable worksharing.
- Alternative 3
 - Use a Navisworks file and upload it to a folder in BIM 360 Docs.

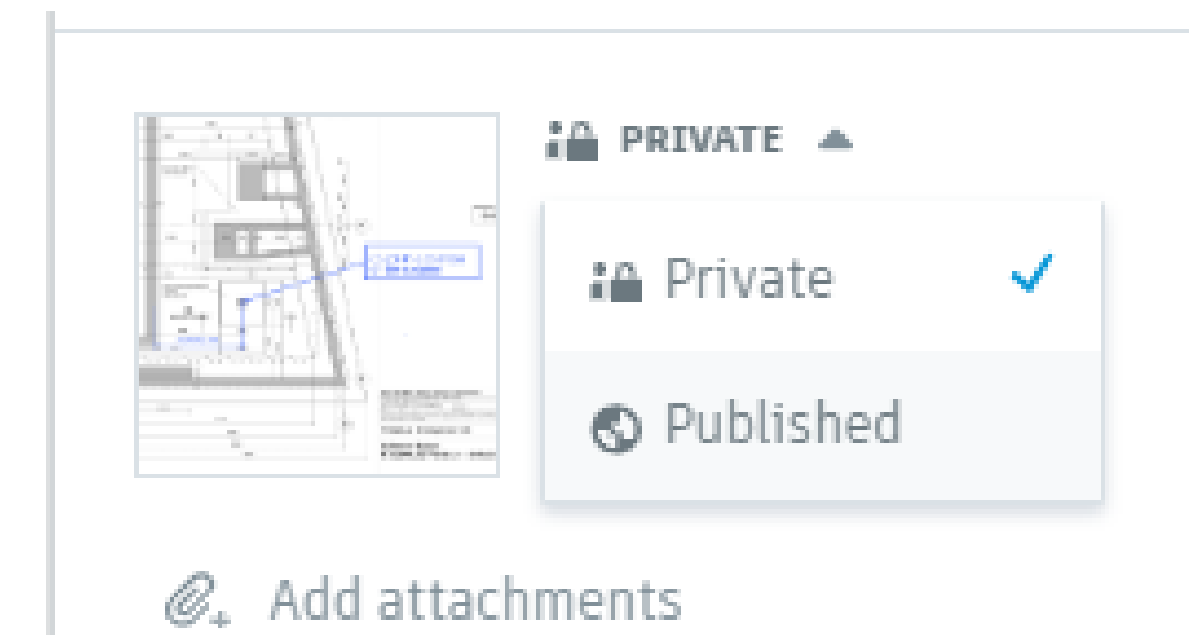
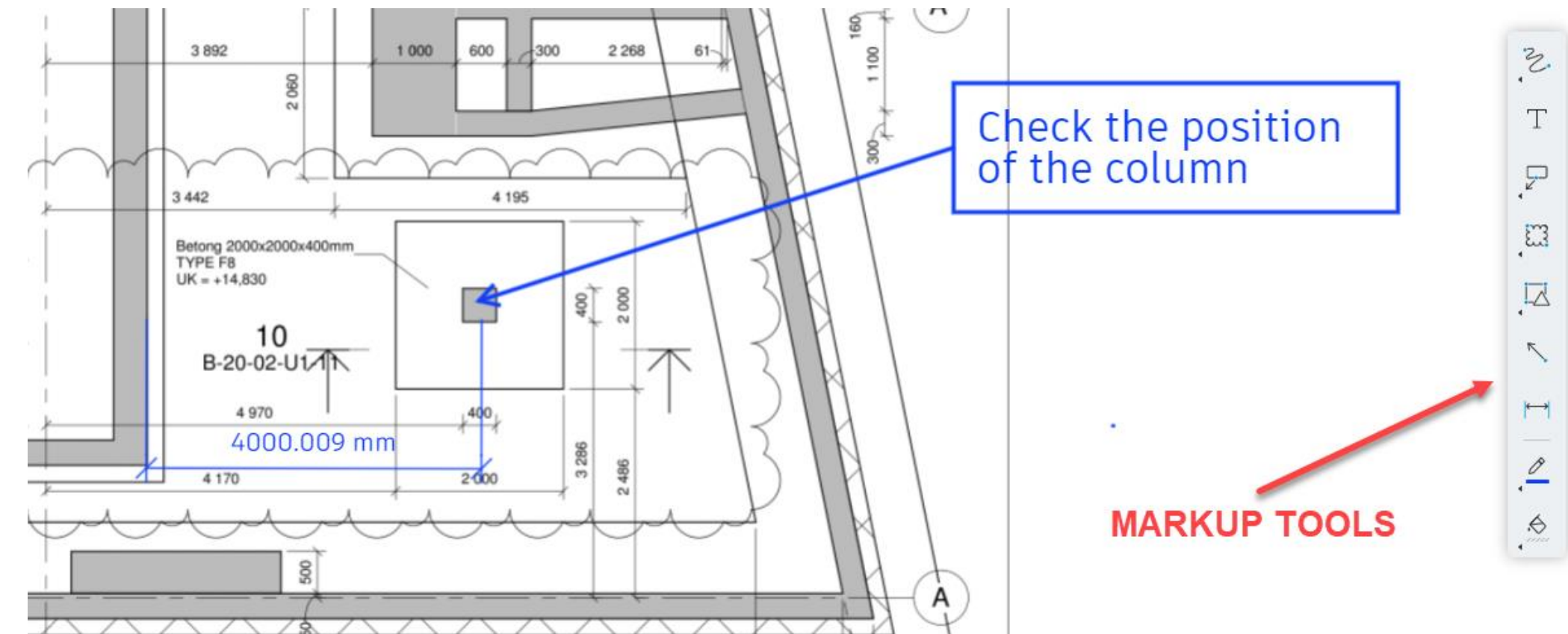
Track changes in models, drawings and documents

- Same functionality to track changes in models as in BIM 360 Design.
- Even PDF-documents can be compared to see what changes have been made.



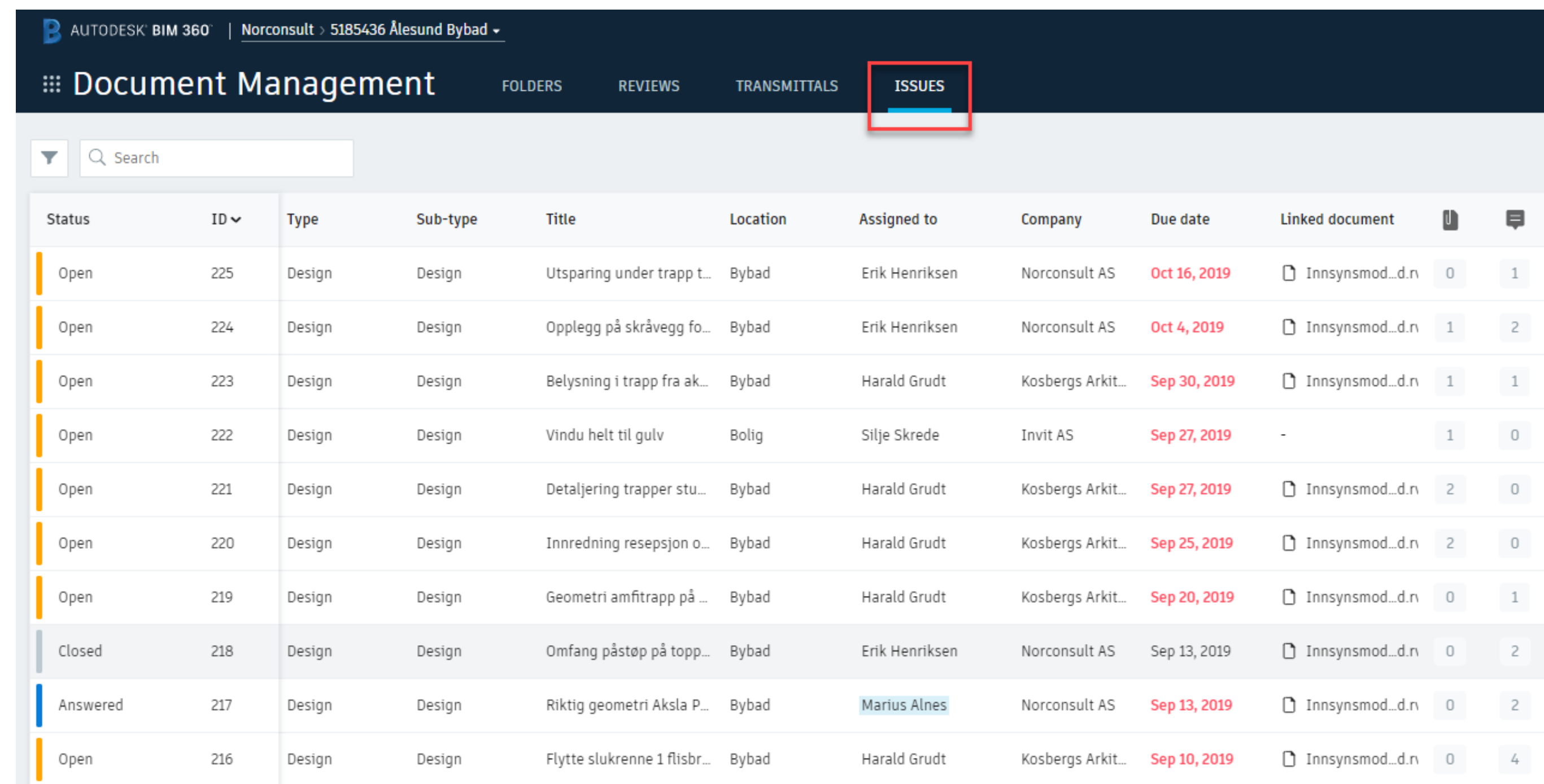
Markups

- Markups can be added to any type of viewable document.
- Markups can either be private or published.
- Ability to add attachments from any folders in Docs.



Project Issues

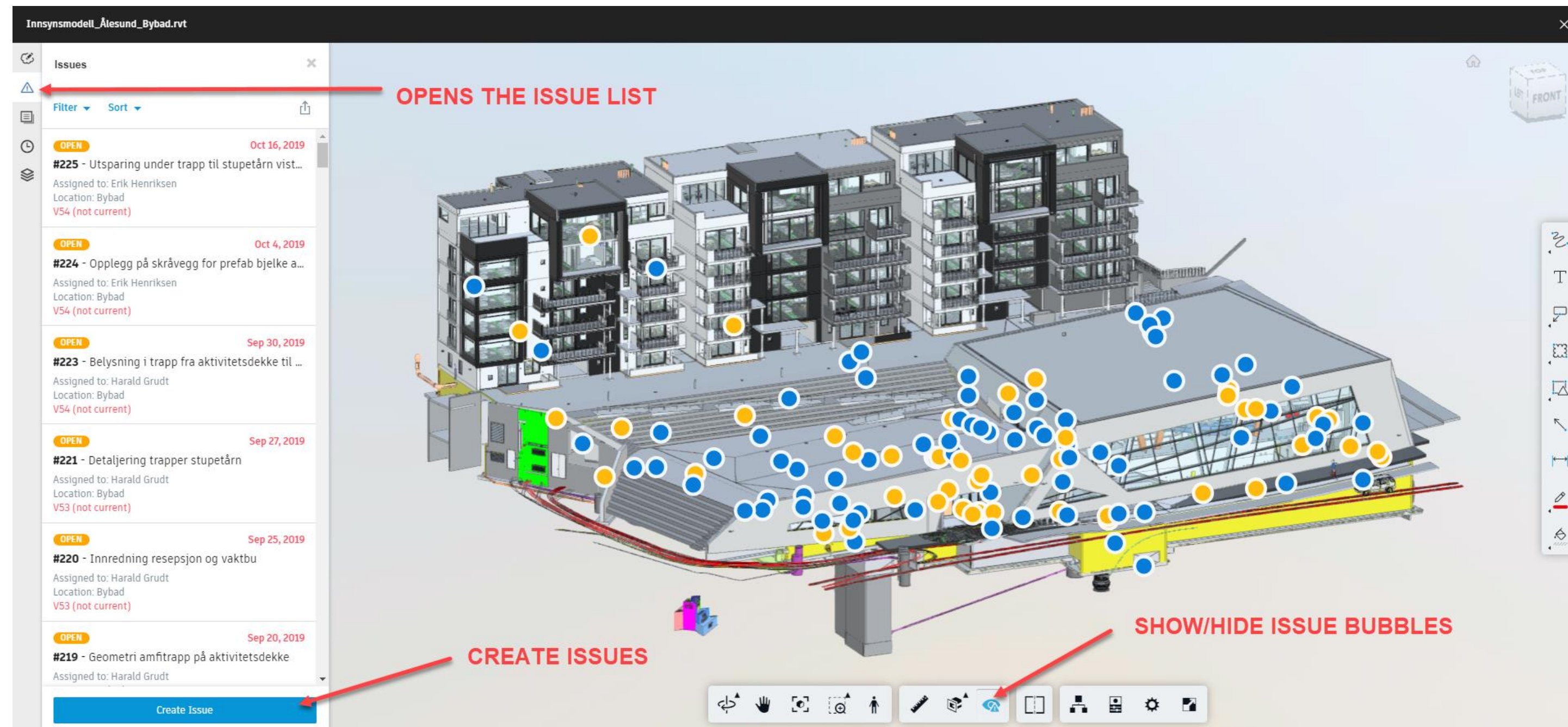
- The best tool for a successful project collaboration!
- Project issues gets stored at one place.
- Easy for project members to view and create.
- Full project history are stored.
- #Noneedforemails



AUTODESK BIM 360 Norconsult 5185436 Ålesund Bybad											
Document Management											
FOLDERS REVIEWS TRANSMITTALS ISSUES											
▼ Search											
Status	ID ▼	Type	Sub-type	Title	Location	Assigned to	Company	Due date	Linked document		
Open	225	Design	Design	Utsparing under trapp t...	Bybad	Erik Henriksen	Norconsult AS	Oct 16, 2019	Innsynsmod...d.n	0	1
Open	224	Design	Design	Opplegg på skråvegg fo...	Bybad	Erik Henriksen	Norconsult AS	Oct 4, 2019	Innsynsmod...d.n	1	2
Open	223	Design	Design	Belysning i trapp fra ak...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 30, 2019	Innsynsmod...d.n	1	1
Open	222	Design	Design	Vindu helt til gulv	Bolig	Silje Skrede	Invit AS	Sep 27, 2019	-	1	0
Open	221	Design	Design	Detaljering trapper stu...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 27, 2019	Innsynsmod...d.n	2	0
Open	220	Design	Design	Innredning resepsjon o...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 25, 2019	Innsynsmod...d.n	2	0
Open	219	Design	Design	Geometri amfitrapp på ...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 20, 2019	Innsynsmod...d.n	0	1
Closed	218	Design	Design	Omfang påstøp på topp...	Bybad	Erik Henriksen	Norconsult AS	Sep 13, 2019	Innsynsmod...d.n	0	2
Answered	217	Design	Design	Riktig geometri Aksla P...	Bybad	Marius Alnes	Norconsult AS	Sep 13, 2019	Innsynsmod...d.n	0	2
Open	216	Design	Design	Flytte slukrenne 1 flisbr...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 10, 2019	Innsynsmod...d.n	0	4

Project Issues

- Issues can be created in models, drawings and other documents.
- Smart to use a common coordination model to adress model issues in.
- Use the issue list or navigate through the model.



Project Issues

- Assign issues to project members or project companies
- Set a due date for the issue
- Attachments can be added to issues.
- All activity are logged in the issue.
- Remember to change the issue to answered.
- Ability to tag other persons than the person who is assigned to the issue.

The screenshot shows the 'Issue #224' details page. At the top, there's an orange header with 'Issue #224' and an 'OPEN' button. Below the header, there are tabs for 'DETAILS', 'ATTACHMENTS', and 'ACTIVITY'. The 'DETAILS' tab is active. The main content area shows the issue title 'Opplegg på skråvegg for prefab bjelke akse I' and its creation info: 'Created by Solgunn Gudmundset (Veidekke Entreprenør AS) on Sep 27, 2019'. Below this, there's a table with fields: 'Assigned to' (Erik Henriksen), 'Due Date' (Oct 4, 2019), 'Location' (Bybad), 'Location Details' (Unspecified), 'Linked document' (Innsynsmodell_Ålesund_Bybad.rvt [V54]), 'Type' (Design), 'Owner' (Solgunn Gudmundset), and 'Root Cause' (Unspecified). At the bottom, there's a 'Description' section with text about a revision and a 'Response' section with 'Unspecified'.

The screenshot shows the 'Issue #224' activity page. At the top, there's an orange header with 'Issue #224' and an 'OPEN' button, with a red arrow pointing to it. Below the header, there are tabs for 'DETAILS', 'ATTACHMENTS', and 'ACTIVITY'. The 'ACTIVITY' tab is active. The main content area shows a list of activities. The first activity is 'Description' with a 'Show' link. The second activity is 'Assigned to Erik Henriksen'. The third activity is 'Location Bybad'. The fourth activity is 'Due Date Oct 4, 2019'. The fifth activity is 'Issue Owner Solgunn Gudmundset'. Below these, there's a list of comments. The first comment is from 'Solgunn Gudmundset' on 'Sep 27, 12:54 PM' with the text '@Nils-Marius Riise @Harald Grudt'. The second comment is from 'Solgunn Gudmundset' on 'Sep 27, 12:58 PM' with the text 'Uploaded a file' and a file attachment '190927 Skisse detaljer Spenncn issue 224.docx'. The third comment is from 'Solgunn Gudmundset' on 'Sep 27, 12:59 PM' with the text 'Description was changed' and a 'Show' link. The fourth comment is from 'Solgunn Gudmundset' on 'Oct 25, 10:23 AM' with the text '@Erik Henriksen Er dette nå ok?'. At the bottom, there's a comment input field with a placeholder 'Add a comment, use '@' to mention...'.

Project Issues

- Filter issues on type, status or persons who are assigned to the issue
- Export issue reports in pdf or csv format.

Export

PDF report

CSV report

Create Issue

Search

Filters

Type

Select a type

Status

Select a status

Location

Select a location

Assigned to

Select a user, role, or company

Due Date

Choose date

Root cause

Select a root cause

Created by

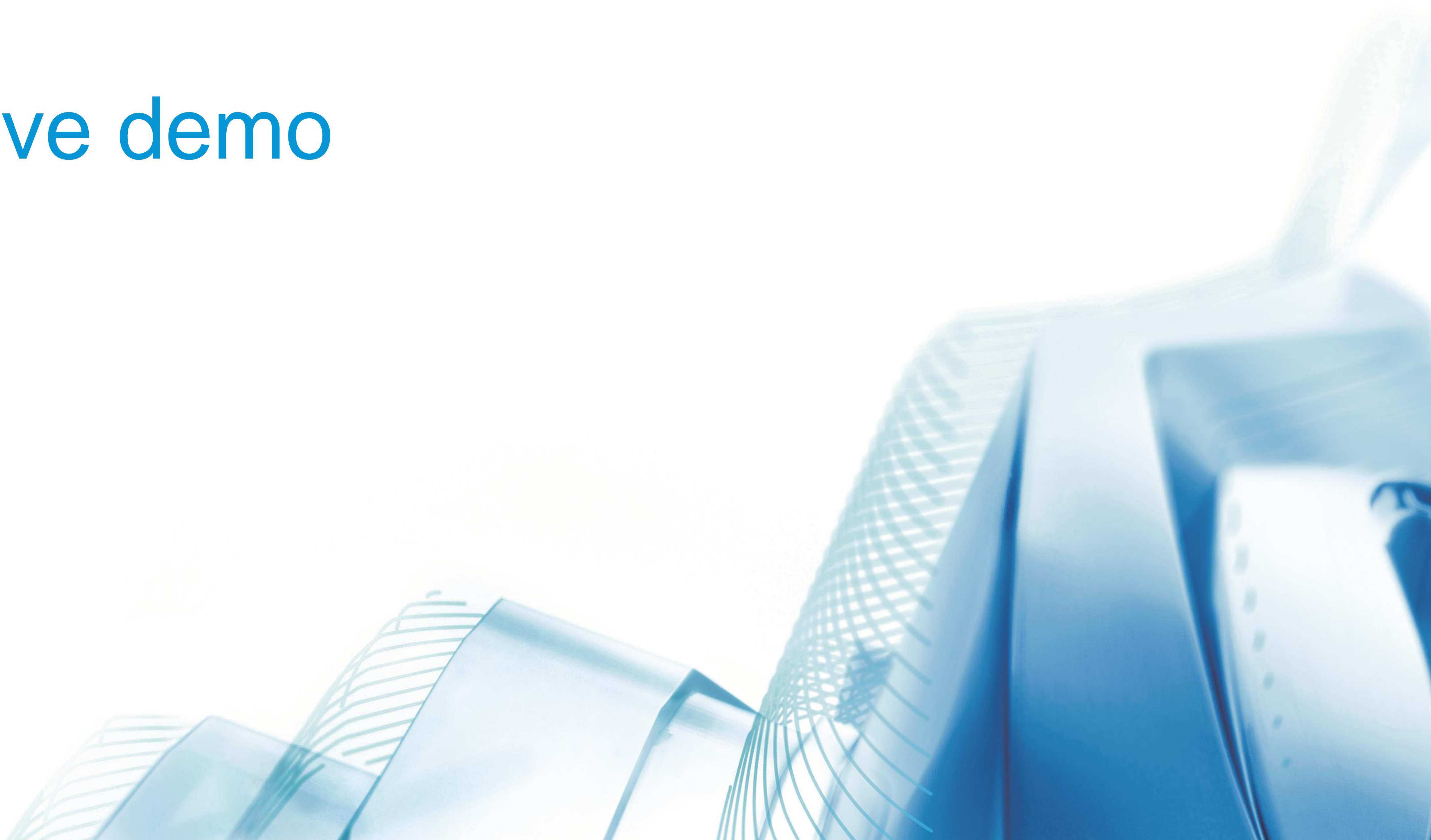
Select a user

Created on

Choose date

ID	Type	Sub-type	Title	Location	Assigned to	Company	Due date	Linked document		
226	Design	Design	Ønsker vegg mellom sø...	Bybad	Harald Grudt	Kosbergs Arkit...	Oct 31, 2019	Innsynsmod...d.n	1	0
225	Design	Design	Utsparing under trapp t...	Bybad	Erik Henriksen	Norconsult AS	Oct 16, 2019	Innsynsmod...d.n	0	1
224	Design	Design	Opplegg på skråvegg fo...	Bybad	Erik Henriksen	Norconsult AS	Oct 4, 2019	Innsynsmod...d.n	1	2
223	Design	Design	Belysning i trapp fra ak...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 30, 2019	Innsynsmod...d.n	1	1
222	Design	Design	Vindu helt til gulv	Bolig	Silje Skrede	Invit AS	Sep 27, 2019	-	1	0
221	Design	Design	Detaljering trapper stu...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 27, 2019	Innsynsmod...d.n	2	0
220	Design	Design	Innredning resepsjon o...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 25, 2019	Innsynsmod...d.n	2	0
219	Design	Design	Geometri amftrapp på ...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 20, 2019	Innsynsmod...d.n	0	1
218	Design	Design	Omfang påstøp på topp...	Bybad	Erik Henriksen	Norconsult AS	Sep 13, 2019	Innsynsmod...d.n	0	2
217	Design	Design	Riktig geometri Aksla P...	Bybad	Marius Alnes	Norconsult AS	Sep 13, 2019	Innsynsmod...d.n	0	2
216	Design	Design	Flytte slukrenne 1 flisbr...	Bybad	Harald Grudt	Kosbergs Arkit...	Sep 10, 2019	Innsynsmod...d.n	0	4
215	Design	Design	Aspirasjonsanlegg deta...	Bybad	Egil Henriksen	Kvalsund Ingen...	Sep 13, 2019	Innsynsmod...d.n	1	3

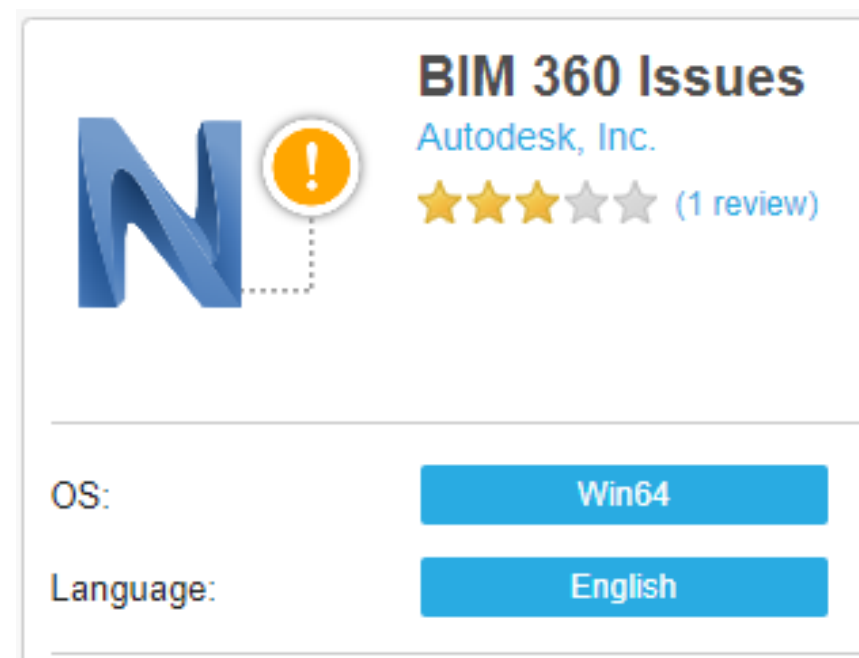
Live demo



Navisworks and BIM 360 issues

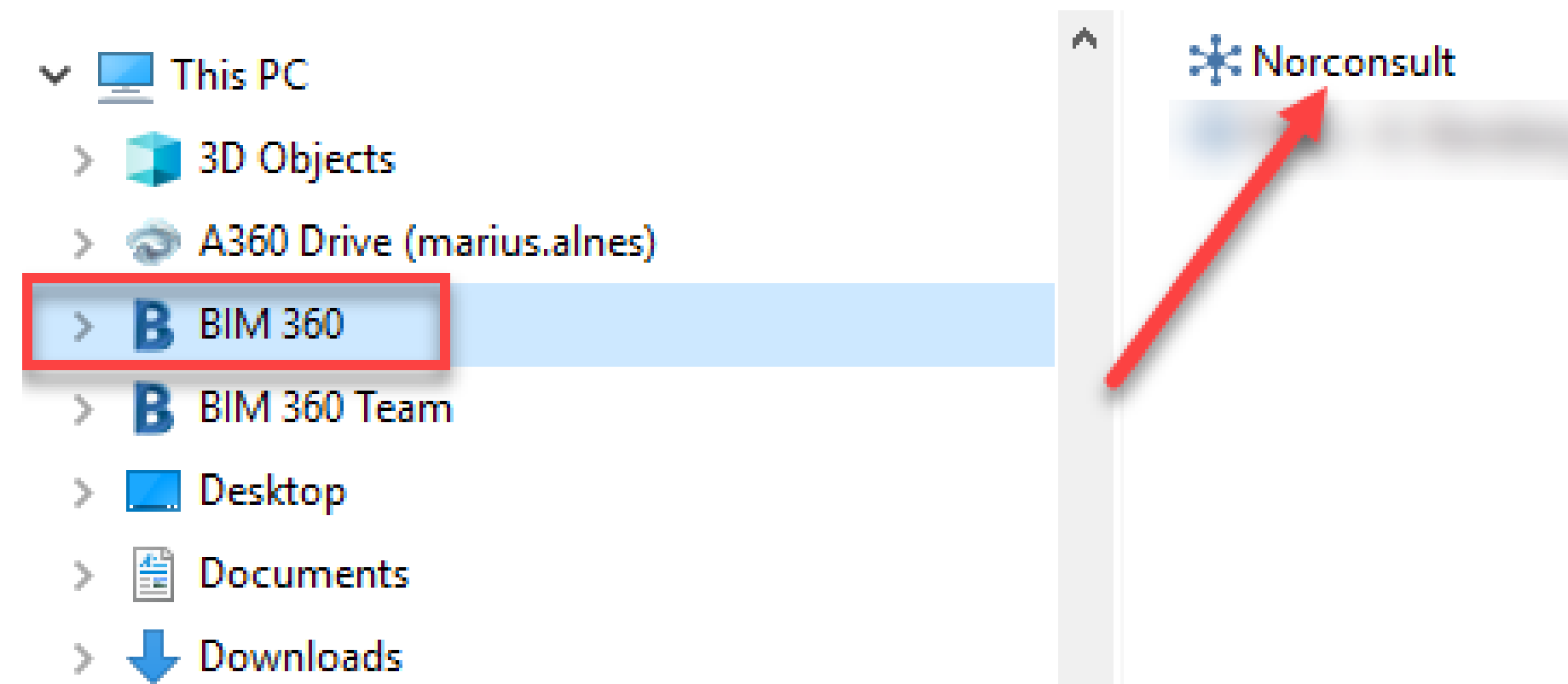
- Ability to add issues in coordination models in Navisworks.
- Issues are synchronized to the cloud, and back to the desktop version of Navisworks.
- Free app!

 AUTODESK APP STORE



Desktop Connector

- Possible to link in dwg, IFC and non-workshared Revit files stored in BIM 360 to a Revit project.
- Can add and remove files through the desktop explorer.



Questions?



Session feedback

- Your feedback is important. Fill out the class survey
- Use the AU mobile app or fill out a class survey online.
- Give feedback after each session,



Strongly agree ☐

Agree ☒

Disagree ☐

Strongly disagree ☐



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