



Autodesk Model Coordination for Design and Construction Streamlines Process

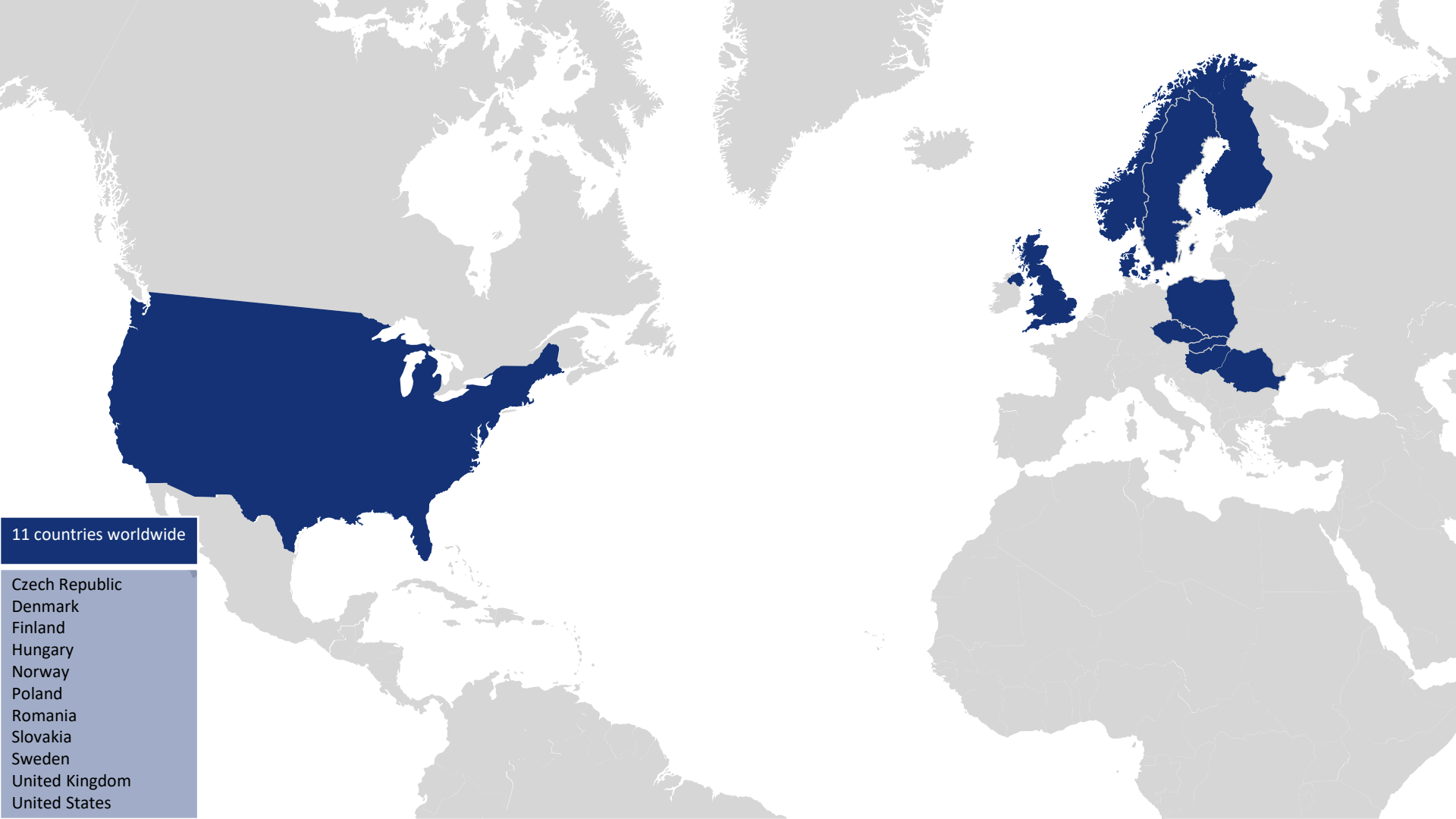
A fully cloud-based workflow

Edwin Bailey

[linkedin.com/in/edwin-bailey](https://www.linkedin.com/in/edwin-bailey)

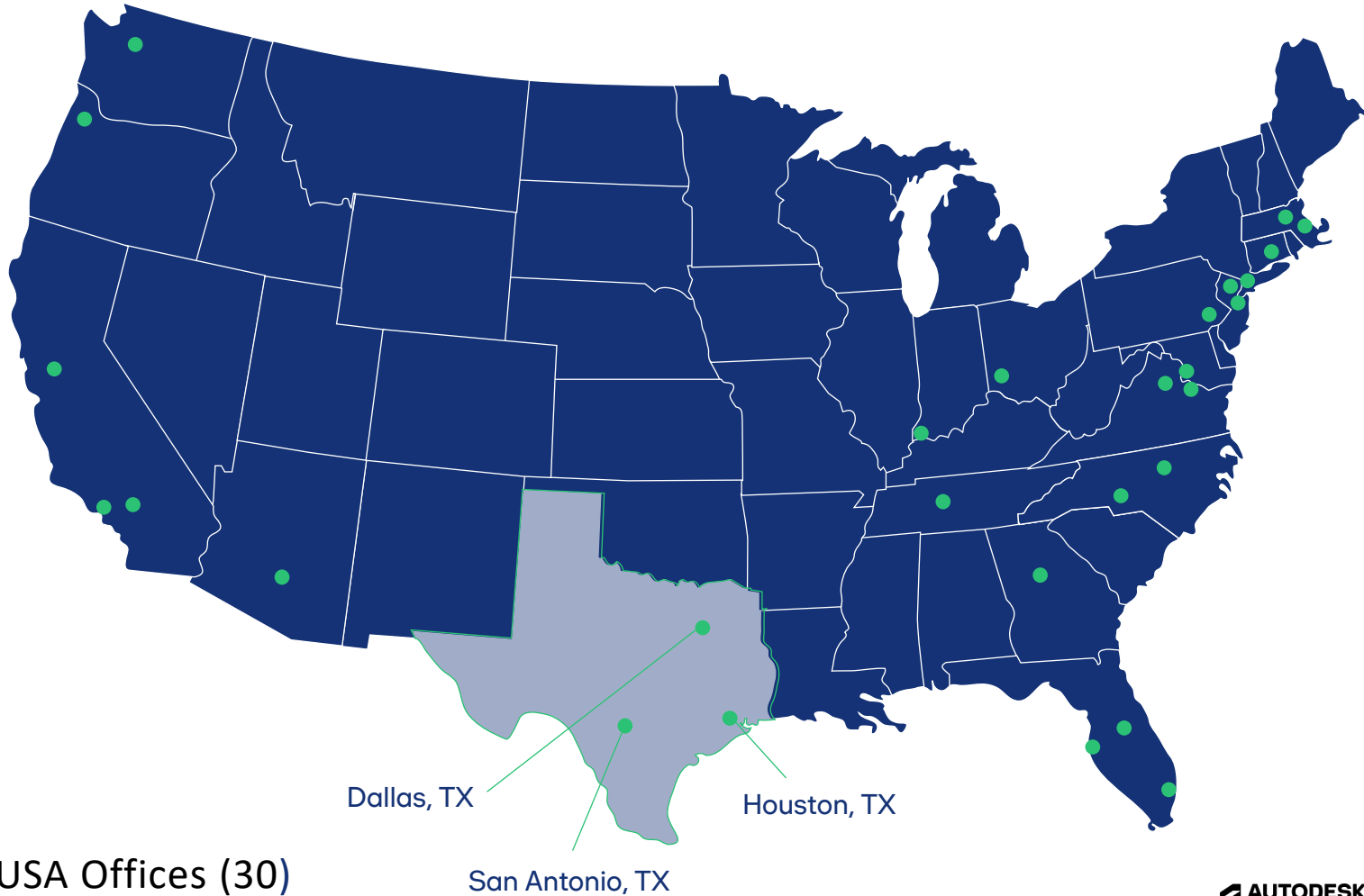
The image shows a modern building facade with a series of white, vertical, slatted panels that create a rhythmic, textured pattern. The panels are slightly angled, giving a sense of depth. The Skanska logo is prominently displayed in the center in a bold, dark blue, sans-serif font. To the right, a portion of a dark grey or black panel is visible, contrasting with the white slats. In the bottom left corner, there is a small, green, leafy plant. The overall lighting is bright and even, suggesting a clear day.

SKANSKA

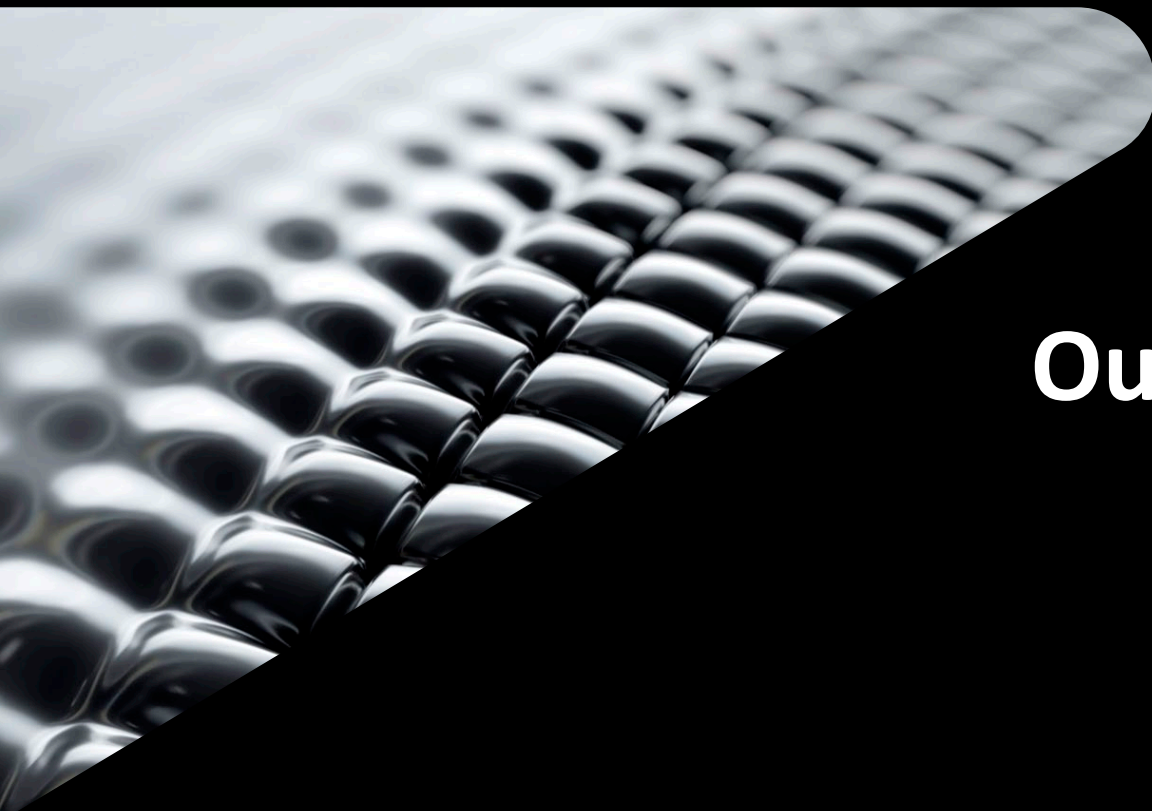


11 countries worldwide

- Czech Republic
- Denmark
- Finland
- Hungary
- Norway
- Poland
- Romania
- Slovakia
- Sweden
- United Kingdom
- United States



Skanska USA Offices (30)

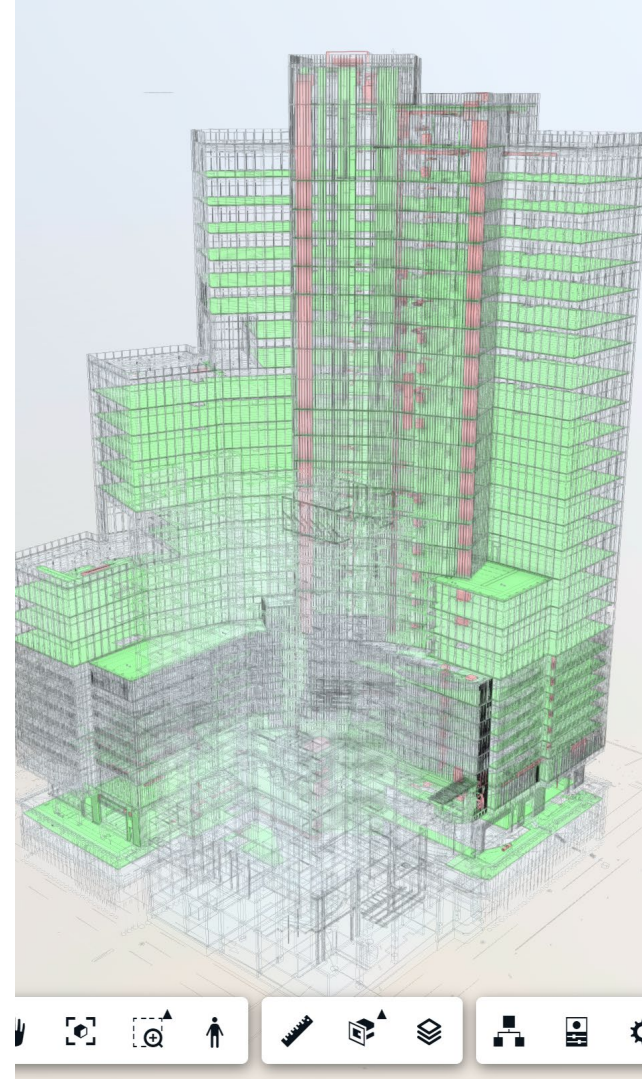


Our journey in the Cloud

Beta and Beyond

Benefits of Cloud-Based Model Coordination

- **Constantly updated information**
 - Team members can update their discipline models at any time.
 - Updated and combined models creates better coordination.
- **Increased stakeholder participation**
 - Earlier constructability reviews.
 - Easier to use/learn than a desktop application.
 - You don't have to be an expert to navigate the 3D models.
- **Enhanced Communication**
 - Auto-generate issue reports.
 - Email notifications.
 - Instant message – like communication for issues.
 - See and resolve assigned issues in Revit.



Models - Autodesk Model Coord

acc.autodesk.com/model/models/projects/328d659c-811c-4290-a270-f2cd18b0eed1/model-set/fcb935de-cef4-4080-b991-2e93bbbb89f8

AUTODESK Construction Cloud

Model Coordination

Models

Clashes

Views

Meetings

Reports

Members

Settings

TX - TAMU Mays School of Business Addition

Edwin Bailey

Model Coordination Intro

Search for models

Models	Contributor	Last updated	
MECH_MAYS_ADDITION_2021.rvt - BIM360 DUCT	Edwin Bailey Skanska USB	26 Apr 2022 16:22	1848
MECH_MAYS_ADDITION_2021.rvt - BIM360 PIPE	Edwin Bailey Skanska USB	26 Apr 2022 16:22	376
ELEC_MAYS_ADDITION_2021.rvt - BIM360 ELEC	Edwin Bailey Skanska USB	26 Apr 2022 15:25	381
PLBG_MAYS_ADDITION_2021.rvt - BIM360-PLBG	Edwin Bailey Skanska USB	26 Apr 2022 15:13	1030
PLBG_MAYS_ADDITION_2021.rvt - BIM360-PLBG FIRE	Edwin Bailey Skanska USB	26 Apr 2022 15:13	60
STRUC_02_3279_BEC_ADDI...rvt - BIM360-STRUCTURE	Edwin Bailey Skanska USB	26 Apr 2022 15:01	860
ARCH_02_3279_BEC_ADDIT...vt - MODEL EXPORT ARCH	Edwin Bailey Skanska USB	26 Apr 2022 14:58	1321

Showing 7 of 7 models.

Design Models

Last clash check 26 Apr 2022 16:33

All models

My models

Clashes with my models

Filters

Contributor

Select...

Company

Select...

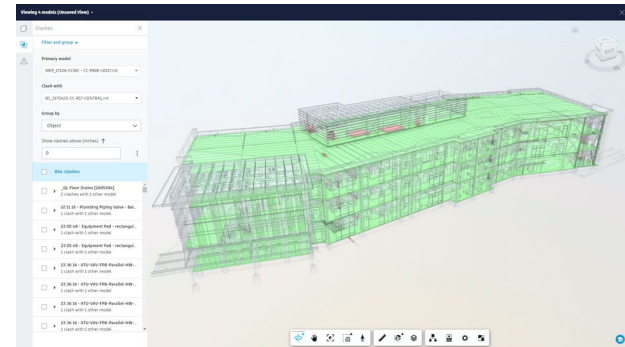
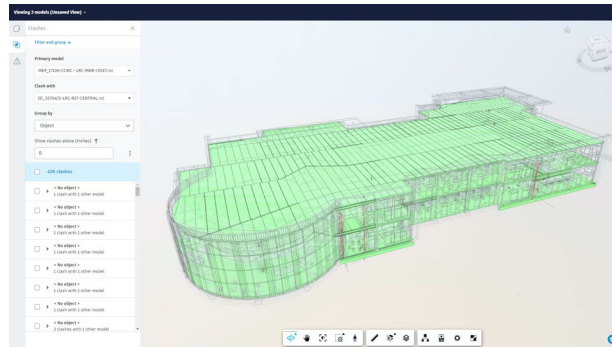
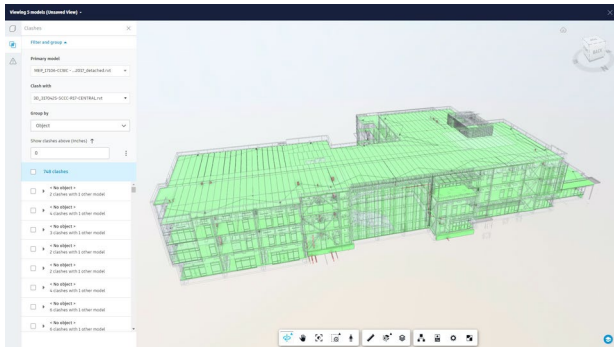
Date

Choose date

Clear all

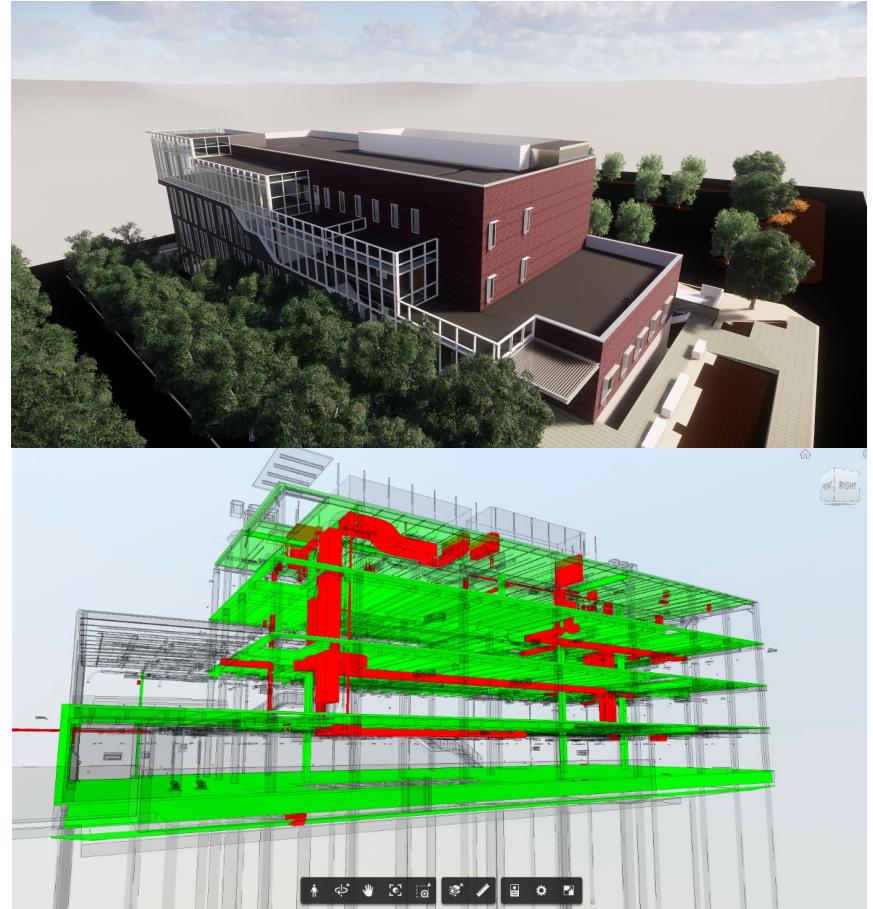
Beta - Collin College Wylie Campus

We used Glue and Navisworks for coordination but pulled the building files into model coordination.



Beta – Alamo Culinary Arts

- We started using Model Coordination in 2018 for design coordination. It was still pretty Beta at that point.
- We wanted a quick way to share and review Design models during preconstruction.
- The clash detection tool worked great; grouped clashes even
- Issues didn't exist so we documented in word
 - Clash screen captures
 - Element IDs



SKANSKA

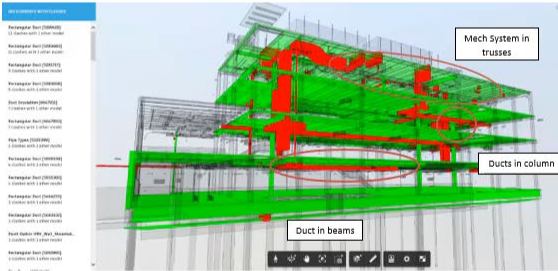
ACC'D ST. Phillip's Campus THCA Center of Excellence
Skanska USA Building Inc.
Weekly BIM Coordination Meeting
June 19th, 2018

Mech

Clash Matrix

<https://model.b360.autodesk.com/projects/ad8dcf3b-7814-4d61-9b44-3274a176b0f0/clashes>

Mech VS Struc

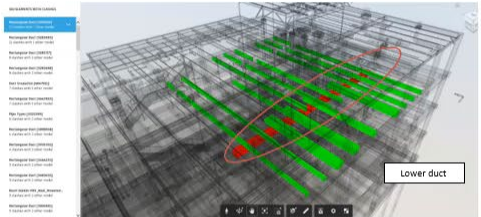


1

SKANSKA

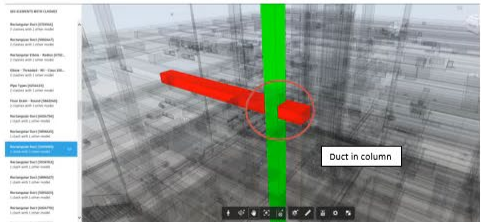
Mechanical duct in beams

Rectangular Duct [5199419] – 06/19/2018



Mechanical duct in column

Rectangular Duct [5197200] – 06/19/2018



2

TCC Campus

Building Demos, Renovations and New Construction

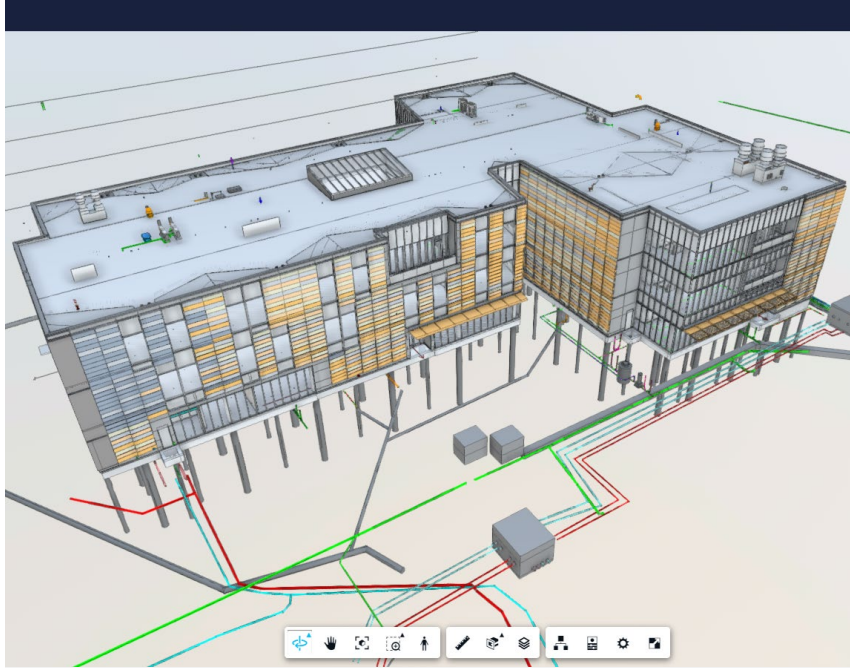


TCC Campus

Demo WADM

Construction Coordination Projects

First two buildings in Texas



Model Coordination Campus Setup

No need to setup a separate project for each building

- Setup a main folder for Design and Construction with building subfolders.
- Revit and CAD files go into each subfolder.
- Separate coordination spaces are setup for each subfolder.

The screenshot shows the Autodesk Construction Cloud Project Admin interface. The top navigation bar includes 'Project Admin', 'TCCD - NW CAMPUS', and a user profile icon. The left sidebar has tabs for 'Members', 'Companies', 'Services', and 'Profile'. The 'Services' tab is active, showing a sidebar with 'Overview', 'Issues', 'Notifications', 'Locations', 'Document Management', and 'Model Coordination'. The 'Model Coordination' section is expanded, displaying 'Coordination spaces'. A message states: 'Coordination spaces are configured against selected folders in Document Management, which contain the models you want to review and coordinate. Clash models to the folder in a space. Set up a new coordination space or activate one of the spaces below. If required, you can create multiple spaces to represent different models. Ensure your project members have at least View permissions for the selected folder in Document Management. [Learn more >](#)'. A 'Create' button is visible. Below is a table of existing coordination spaces.

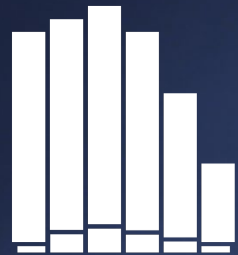
Name	Folder path	Date created	Added by
DALLAS SANDBOX 2	Project files/Model Coordination/DALLAS SA...	21 Jun 2022 08:06	James Dallas Sewell III
SUB-NW04	Project files/Sub Coordination/SUB-NW04	26 Apr 2022 06:54	James Dallas Sewell III

Design Coordination

The screenshot shows a folder hierarchy for Design Coordination. The root folder is 'Model Coordination', which contains several subfolders: 'DALLAS SANDBOX', 'DALLAS SANDBOX 2', 'HUB (SKANSKA ONLY)', 'TCCD-NW01', 'TCCD-NW02', 'TCCD-NW03', 'TCCD-NW04', 'TCCD-SITE', 'TCCD-WACB', 'TCCD-WADM', 'TCCD-WBSA', 'TCCD-WCTS', 'TCCD-WFAB', 'TCCD-WHPE', 'TCCD-WSTU', and 'TCCD-WTLO'.

Construction Coordination

The screenshot shows a folder hierarchy for Construction Coordination. The root folder is 'Sub Coordination', which contains several subfolders: 'SUB-NW01', 'SUB-NW02', 'SUB-NW03', 'SUB-NW04', 'SUB-WADM', and 'SUB-WBSA'.



1550

ON THE GREEN

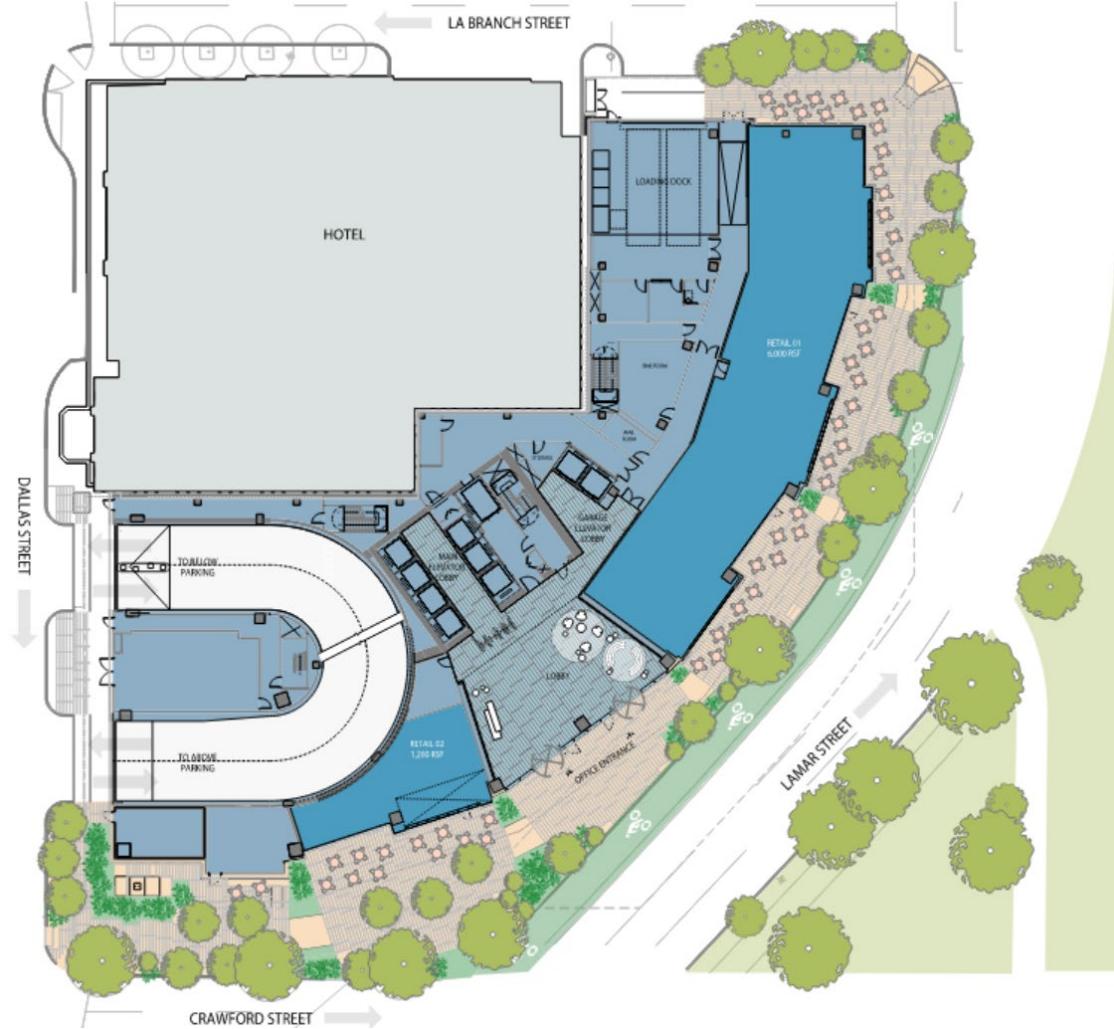
Project Overview



A SITE LIKE NO OTHER

DISCOVERY WEST

- Unique building footprint
- Existing hotel on site
- Easy access to Discovery Green Park



Building Details

- Designed by Bjarke Ingles Group (BIG)
- 28-story 375,000 RSF Class A Office Building
- 8-level on-site parking garage with 1.5/1000 spaces
- Directly adjacent to Discovery Green Park





Design Coordination

Pre 100% CD model coordination

- Owner (Skanska CD), Design Architects, Architects of Record, Engineers, and General Contractor (Skanska USB)
- 10 Revit files, 12 model views by discipline (MEP is split into 3)
- Zero CAD
- Level selection tool used
- 12 Total model views clashed

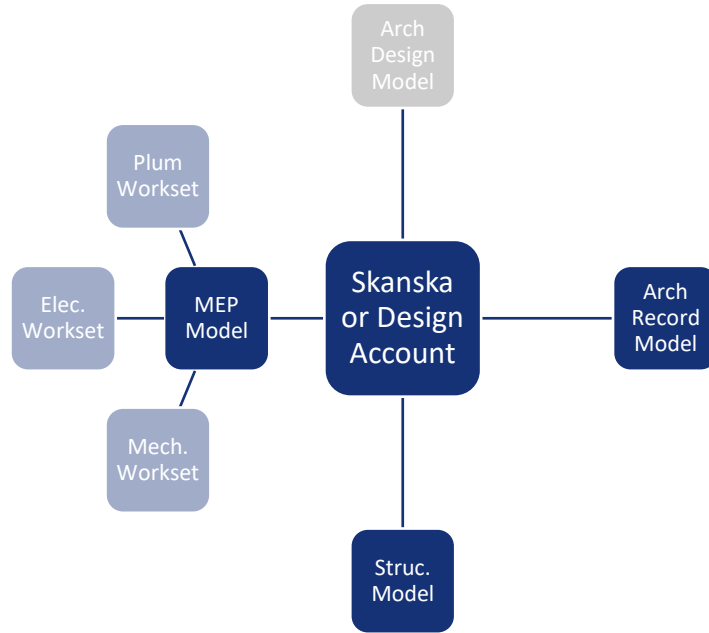
Construction Coordination

Post 100% CD model coordination

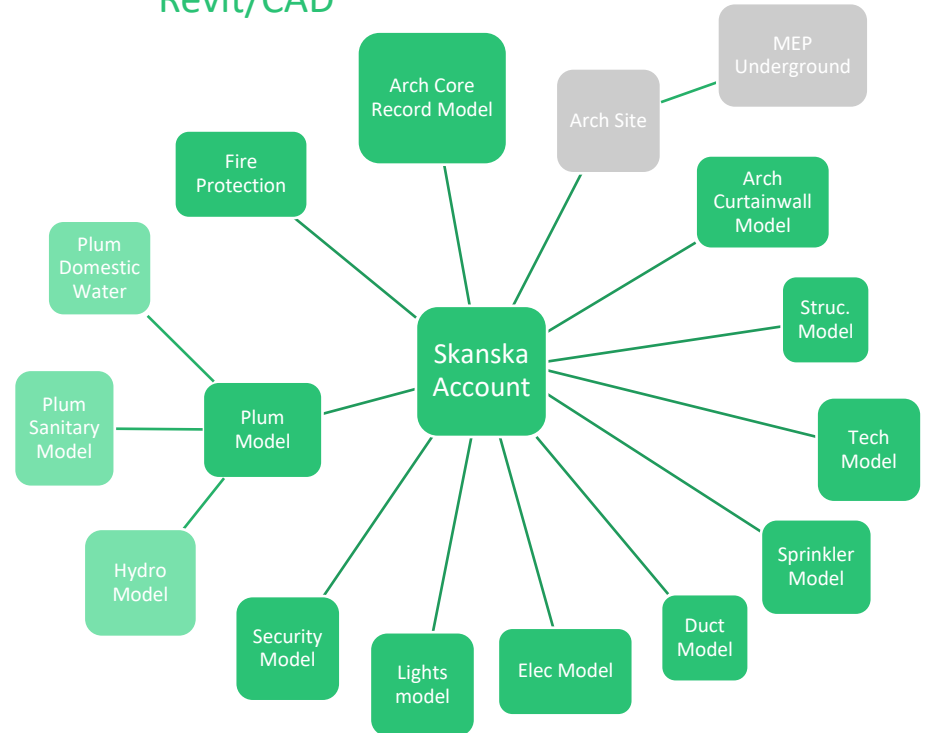
- General Contractor (Skanska USB), Sub Contractors, Owner (Skanska CD), Design Architect, Architects of Record, Engineers
- Average 6 Revit disciplines with views per level
- Average 4 CAD files per level
- Average 10 total models per level
- 300+ Total model views clashed

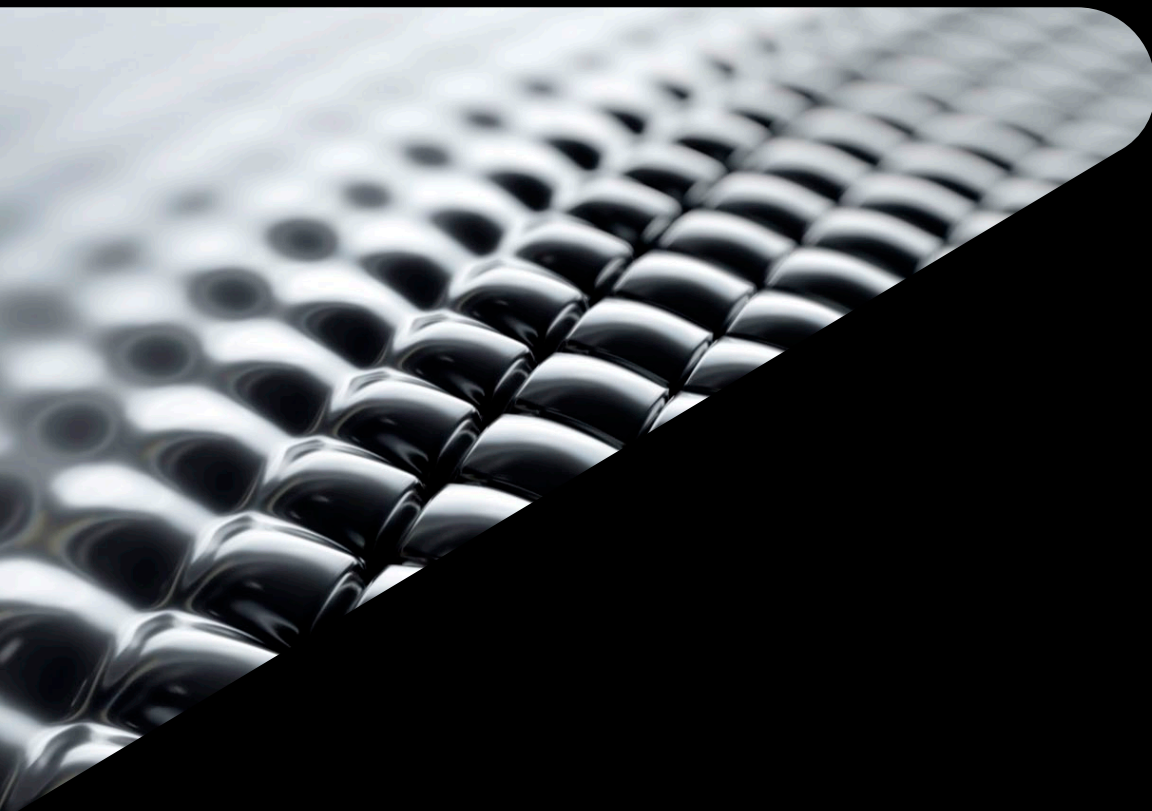
Design and Construction Coordination Setup

Design Coordination Revit



Construction Coordination Revit/CAD





Design Coordination

Video Overview



Construction Coordination

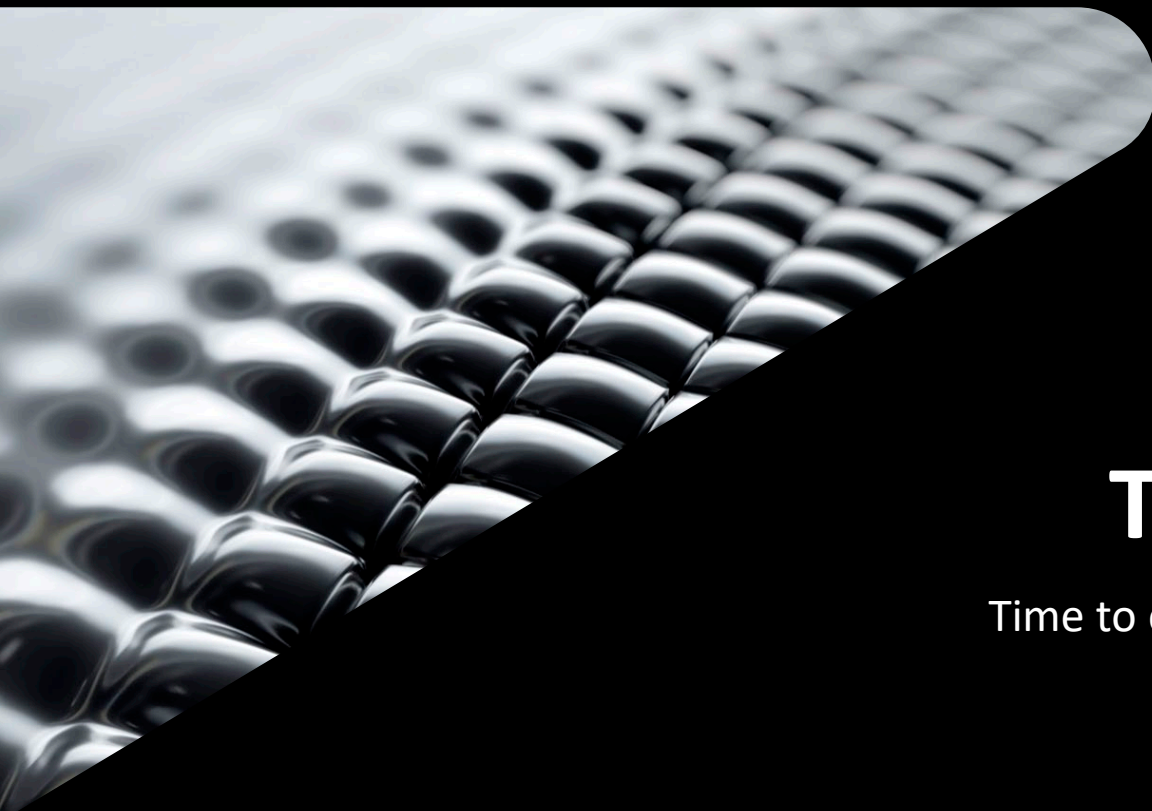
Video Overview

Coordination spaces

Coordination spaces are configured against selected folders in Document Management, which contain the models you want to review and coordinate. Clashes are detected automatically when you add models to the folder in a space. Set up a new coordination space or activate one of the spaces below. If required, you can create multiple spaces to represent separate areas of a project or separate teams.

 Ensure your project members have at least View permissions for the selected folder in Document Management. [Learn more »](#)

Name	Folder path	Date created	Added by	Change status
Sub Coordination	Project files/Sub Coordination	31 Aug 2021 10:19	Edwin Bailey	Deactivate
Model Coordination	Project files/Model Coordination	24 Aug 2020 09:58	Edwin Bailey	Deactivate



Technical Details

Time to check your phones if you don't care
about the techy stuff.



Clash groups

Less is more

- In clash mode there is a primary model
- Clashes are grouped based on the primary model's perspective.
- When clashing two models, the number of clash groups changes base on which is currently set as primary.



We've got Issues!

Goodbye Navisworks for Construction Coordination

- We first started assigning issues during design model coordination.
- We quickly realized that issues would allow us to use this tool for construction coordination.
- Only the assigned user or company can see their clashes.
- Admins can see and filter all clashes for everyone.

Viewing 5 models (Unsaved View) ▾

Issues

Filter ▾ Sort ▾

CLOSED

Unspecified

#88 - Remove Walls 3 [4057276]

Assigned to: Fernando Torrealva (Walter P Moore)

Location: Unspecified

CLOSED

Apr 22, 2021

#87 - Pipe in panel

Assigned to: Former user

Location: Unspecified

CLOSED

Apr 22, 2021

#86 - Pipe outside curtainwall

Assigned to: Former user

Location: Unspecified

CLOSED

Apr 22, 2021

#85 - conduits vs ducts

Assigned to: Former user

Location: Unspecified

CLOSED

Apr 22, 2021

#84 - Conduits vs pipes

Assigned to: Former user

Location: Unspecified

Create Issue



Locations	
<div><div>Add</div><div>Delete</div><div>▲▼</div><div>Export</div></div>	
[-]	Name
<input checked="" type="checkbox"/>	▼ Project
<input type="checkbox"/>	▼ NW01
<input type="checkbox"/>	NW01-UG
<input type="checkbox"/>	NW01-L1
<input type="checkbox"/>	NW01-L2
<input type="checkbox"/>	NW01-L3
<input type="checkbox"/>	NW01-RF
<input type="checkbox"/>	▼ NW02
<input type="checkbox"/>	NW02-UG
<input type="checkbox"/>	NW02-L1
<input type="checkbox"/>	NW02-L2
<input type="checkbox"/>	NW02-L3
<input type="checkbox"/>	NW02-RF

Locations

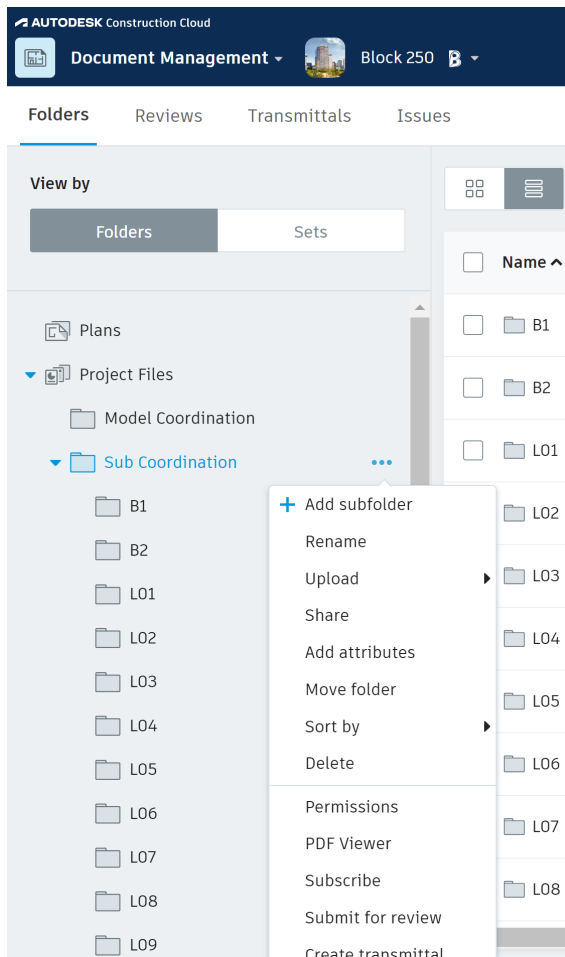
Where and why to use them

- Setup in Project Admin
- Allows you to group assigned clashes in reports by locations
- Building, level, area, etc.

Project Members

Folder permissions

- Setup companies and users
- Assign folder access by company
- This also controls access to model coordination spaces based on folder permissions



Permissions - Sub Coordin

Users: 13 Companies: 13 Roles: 0

Add	
Name	Permission Level
▶ BIG ARCHITECTURE DPC	View + Download
▶ Ferguson	View + Download + Uplo...
▶ Grant Sheet Metal	View + Download + Uplo...
▶ Kendall Heaton Associat...	View + Download
▶ LETSOS	View + Download + Uplo...
▶ Merit	View + Download + Uplo...
▶ MLN	View + Download + Uplo...
▶ Skanska CD	View + Download + Uplo...
▶ Skanska USA	View + Download + Uplo...
▶ Skanska USA Building	View + Download + Uplo...

Reports

Why two?

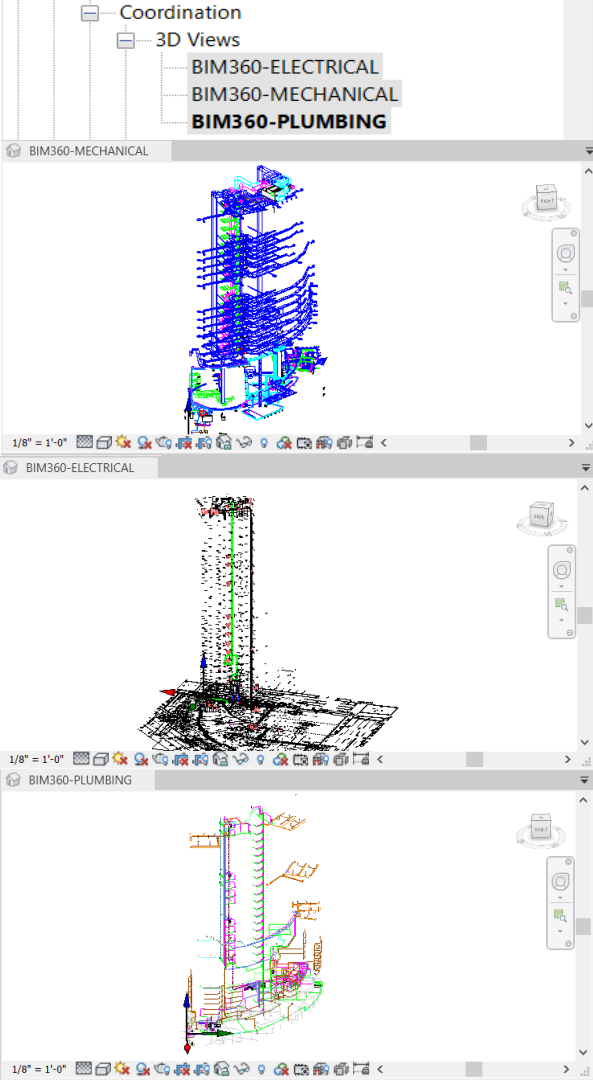
- Reports can be scheduled to go out to a distribution list.
- Users can see outstanding issues by company, user, etc.
- We tend to use two reports.
 1. One shows clash details with thumbnails and number sequentially.
 2. Grouped by company but without thumbnails

Issue detail

B250 Issue Detail



Created on	Aug 18, 2022, 9:04 AM CDT
Created by	Edwin Bailey
Total items	13
Sorted by	ID (Descending)
Filtered by	Status (Open, Not approved, In dispute) Created on (Apr 30, 2022 - Aug 31, 2022)



Revit Views and Model Geometry

WYSIWYG

- {3D} is the default view extracted.
- In workshared files it is either neglected or deleted.
- Visibility settings, worksets, phases, options, section boxes, etc. all have an effect on what geometry is extracted.
- MEP from a single file should have separate views setup for each discipline.
- You can also split a discipline model by level or area if you choose. (Optional)

Revit Publish Settings

Did someone say user error?

- Revit publish settings are how you specify which views should be extracted from each file for ACC/BIM360
- A separate publish set for ACC should be created and left checked.
- Don't check the boxes for all your other publish sets.
- Don't add unnecessary 2D or 3D views to your ACC set.

Publish Settings

Select Sets

Include	Name
<input type="checkbox"/>	ADDENDUM 1 - FIRE PROTECTION
<input checked="" type="checkbox"/>	BIM 360
<input type="checkbox"/>	DD
<input type="checkbox"/>	Elec 50%DD

Edit Set

Show in list: All views and sheets in the Set

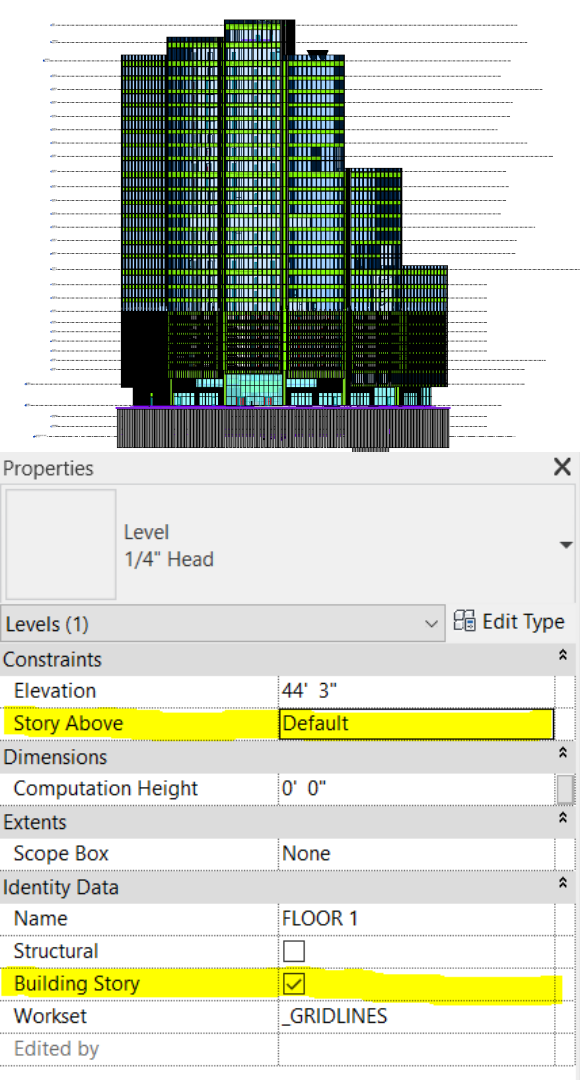
Search:

Select All Select None

Include	Type	Name
<input checked="" type="checkbox"/>	3D View	BIM360-ELECTRICAL
<input checked="" type="checkbox"/>	3D View	BIM360-MECHANICAL
<input checked="" type="checkbox"/>	3D View	BIM360-PLUMBING

[How to select views/sheets to publish to the cloud](#)

<< Preview Save & Close Cancel



On the Level

Revit levels and building stories

- Revit levels and building story settings affect how Model Coordination auto sections the models by level.
- Use the same level names between Revit discipline files.
- Turn off building story settings for any extra modeling levels or avoid them all together.
- Building settings can be used to adjust the level above if necessary.



Search for models

☐ Models☐ B250-Merit-21-ELEC-L14-LTS.dwg +☐ B250-MLN-20-FP-L02.DWG +☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-B1☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-B2☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L01☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L02☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L03☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L04☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L05☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L06☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L07☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L08☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L09☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L10☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L11☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L12☐ B250-MLN-PDW-R20.rvt - BIM360-PDW-L14

Showing 253 of 253 models.

Naming Conventions

I'm a big fan of STANDARDS, that's why I have a set of my own!

- Revit File = **Bld-Company-R23.rvt**
- Revit View = **ACC-Trade-L01**
- Model Coordination =
 - **Bld-Company-R23.rvt - ACC-Trade-L01**
- CAD File = **Bld-Company-23-Trade-L01.dwg**

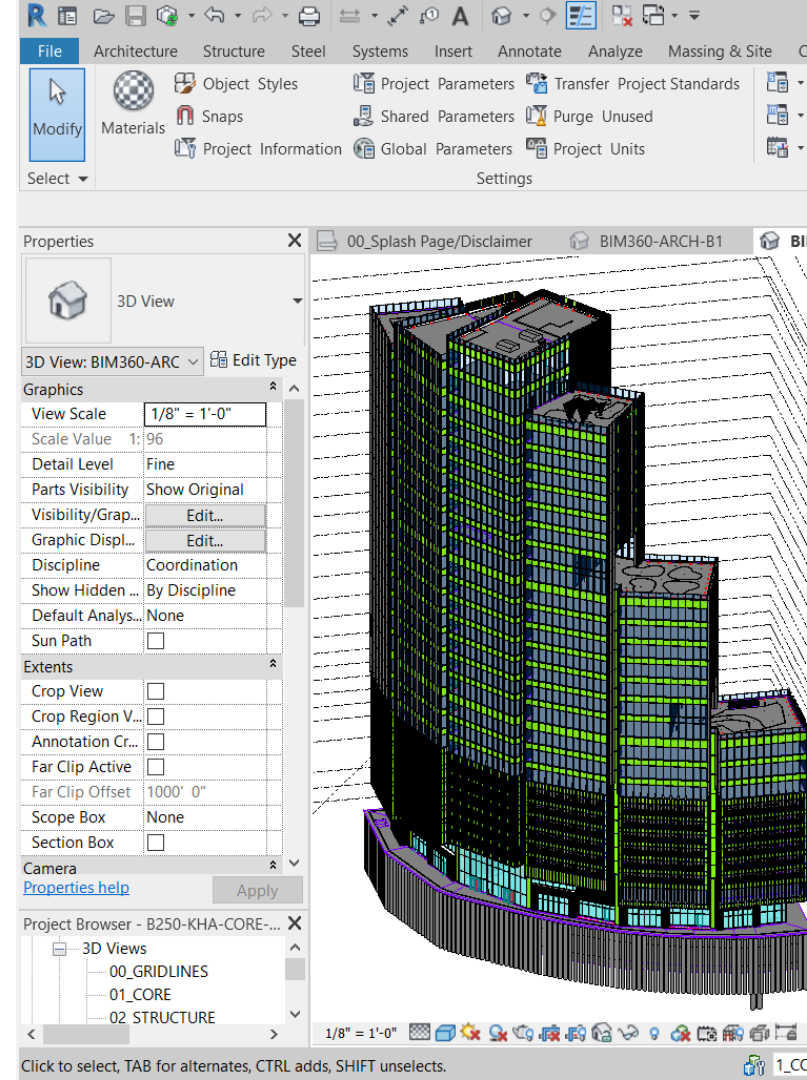
Revitup!

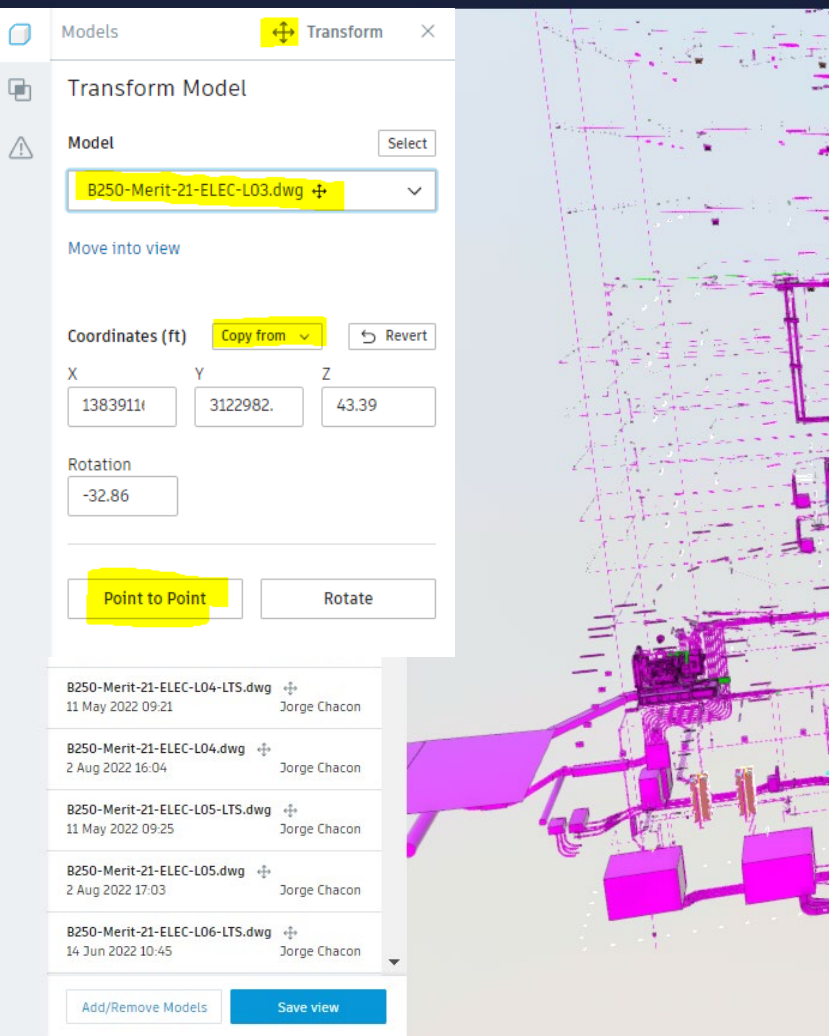
Best practices for Revit based files

- Use internal origin or project base point to link building files together
 - All Revit files should use the same shared coordinates to align in Model Coordination.



- Manage Views for export – WYSIWYG
- Use same level names between disciplines
- Manage building stories, if required
- Manage Publish Settings





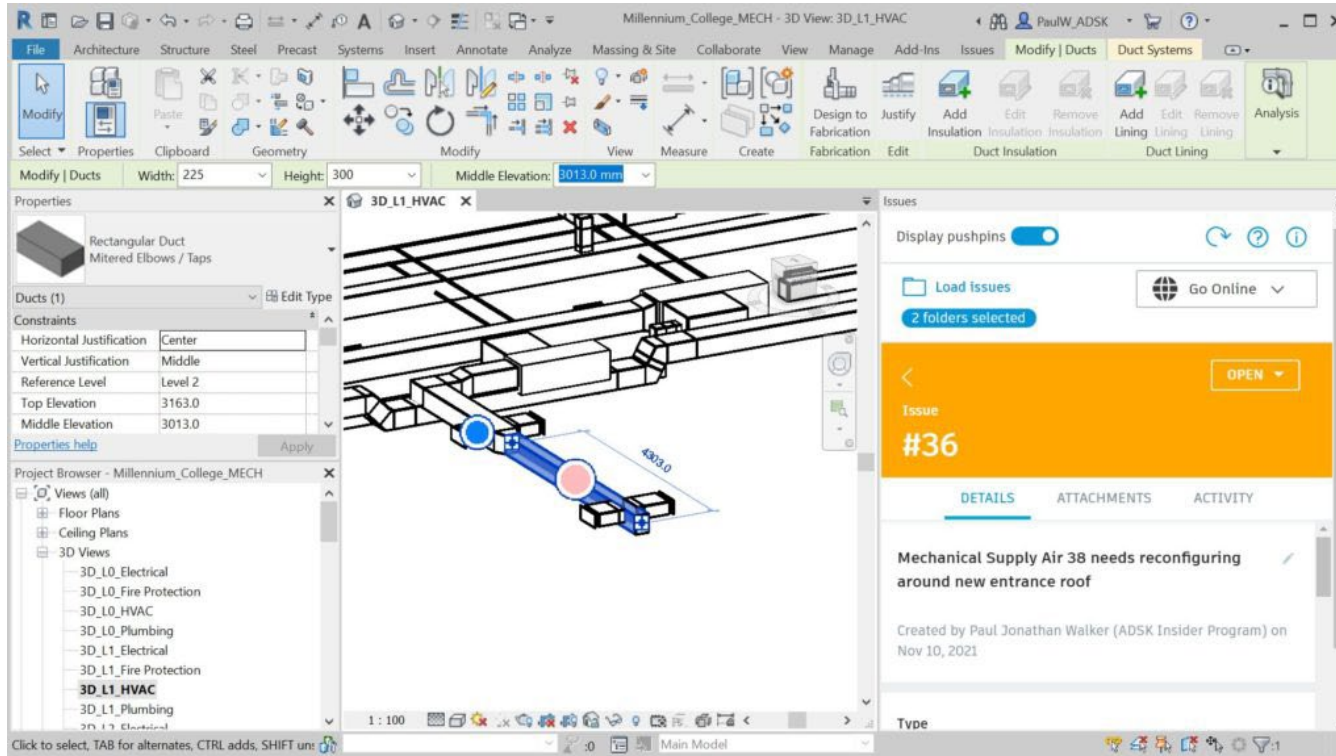
CADastrophe?

Best practices for CAD based files in Model Coordination

- Link CAD to Revit based on internal origin or project base point.
- Modeling CAD to align with a share coordinate system is more difficult and not required.
- In Model Coordination
 - All CAD can be transformed (relocated) in XYZ and R
 - Settings are easy to copy from one file to the next once you have one file aligned.
 - New uploads of the same files stay aligned.

Revit Issues Add-in

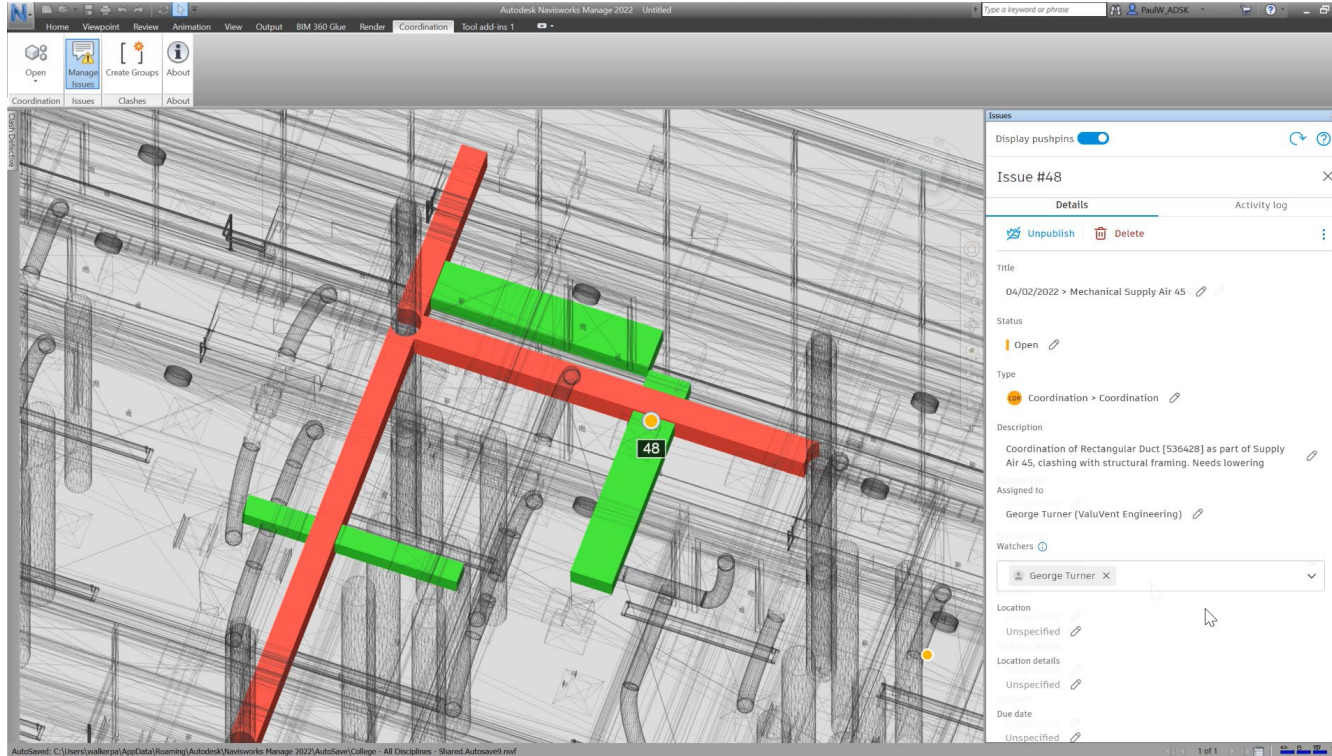
<https://manage.autodesk.com/products/updates>



Download

Navisworks Issues Add-In

apps.autodesk.com/NAVIS/en/Detail/Index?id=5155805354033590972



Download



Enter the Matrix?

Clash Matrix

"You take the **red pill** - you stay in Wonderland and I show you how deep the rabbit-hole goes"

AUTODESK Construction Cloud

Model Coordination - TCCD - NW CAMPUS B - Edwin Bailey -

Models Clashes Views

Active Assigned Closed

Search for models Select a view All 51 models Settings

SUB-NW01
Last clash check 6 Jul 2022 17:37

	NW01-ARC-PCELL-L1	NW01-ARC-PCELL-L2	NW01-ARC-PCELL-L3	NW01-AR-O-ARCH-L1	NW01-AR-O-ARCH-L2	NW01-AR-O-ARCH-L3	NW01-AR-O-ARCH-RF	NW01-AR-O-ARCH-UG	NW01-AS-CXING-L1	NW01-AS-CXING-L2	NW01-AS-CXING-L3	NW01-AS-CTURE-L1	NW01-CES-ELEC-L1	NW01-CES-ELEC-L2	NW01-CES-ELEC-L3	NW01-CES-ELEC-UG	NW01-END-EPLUM-L1	NW01-END-EPLUM-L2	NW01-END-EPLUM-L3	NW01-END-LUM-ROOF	NW01-END-EPLUM-UG	NW01-ORI.rvt - {3D}
NW01-AS-SKANSKA-ISC STRUCTURE-L1 58 clash groups	6			51	7			4									1					
NW01-CESG-R21.rvt - BIM360-ELEC-L1 1101 clash groups	96			953	158			43					2			166	11					
NW01-CESG-R21.rvt - BIM360-ELEC-L2 1491 clash groups		112	2	13	1321	103		6		3			3		5	2		61	2			
NW01-CESG-R21.rvt - BIM360-ELEC-L3 1127 clash groups			57		10	1024	30							9		1			75			
NW01-CESG-R21.rvt - BIM360-ELEC-UG 941 clash groups				721	6	3		828					319	2	1		5				6	
NW01-ENDUR-R21.rvt - BIM360-EPLUM-L1 1947 clash groups	73			1577	158			52	1			1	12			11		264			49	
NW01-ENDUR-R21.rvt - BIM360-EPLUM-L2 2173 clash groups		53		288	1298	117								93			272		118			
NW01-ENDUR-R21.rvt - BIM360-EPLUM-L3 1650 clash groups			10		172	973	23							2	120			119				
NW01-ENDUR-R21.rvt - BIM360-EPLUM-ROOF 52 clash groups						44	21															
NW01-ENDUR-R21.rvt - BIM360-EPLUM-UG 74 clash groups				25				41								13	43					
NW01-ORIGIN.rvt - {3D} 0 clash groups																						
NW01-SKANSKA-R21...M360-ELEC/TELE-L1 44 clash groups				44	4								5									
NW01-SKANSKA-R21...360-ELEC/TELE-L2 90 clash groups					4	65				2				27				5				
NW01-SKANSKA-R21...360-ELEC/TELE-L3 28 clash groups						28					3								2			

Questions?





Autodesk and the Autodesk logo are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document.

© 2022 Autodesk. All rights reserved.