BES466634

Clash Modeling w/o Social Distancing: Using BIM 360 MC & Navisworks Together

Alan Flak, PE
Tetra Tech

Uchenna Okoye, PE
Autodesk

Learning Objectives

- Identify the benefits of using both Navisworks and Model Coordiantion on a design project.
- Collaborate clash modeling between Model Coordiantion and Navisworks.
- Identify the strengths of Model Coordiantion and Navisworks in the clash detection process.
- Improve clash modeling procedures to minimize clashes at design milestones.
- Create a project in Model Coordination in less than 10 minutes.

Description

Many may think that Navisworks and BIM 360 Model Coordination should be separated on a project by choosing one or the for clash modeling. This could not be further from the truth. In this class we will use various case studies of projects that Tetra Tech has recently worked on that has resulted in dropping the average time for disciplines resolving clashes at the end of projects by more than half by using Bim 360 Model Coordination and Navisworks. Attendees will learn how to easily start working within BIM 360 Model Coordination which will enable an earlier start to clash coordination earlier in the project's design cycle before running a more comprehensive clash analysis using Navisworks. After taking this class attendees with be able to minimize clashes at the end of the project resulting in a higher quality deliverable and reduced engineering time during construction. This class will also provide tips, tricks, and innovative processes for working on projects in BIM 360 to easily set up the Model Coordination service as well as the new features added in 2021 for bringing in these results into Navisworks.

Speakers

Alan Flak is the Building Information Modeling (BIM) leader for Tetra Tech, a worldwide company of over 20,000 employees. Within Alan's business unit within Tetra Tech, he directly oversees nearly 300 users to make sure they are working efficiently within various softwares. He has over 20 years of experience in the architecture, engineering and construction world. He is responsible finding ways to improving BIM processes on projects from all phases of a project from studies through final design. He has years of experience with Revit, Navisworks, and BIM 360 Docs. He has worked on a variety of projects running clash detection reviews on water/waste water treatment facilities, commercial buildings, and military facilities.

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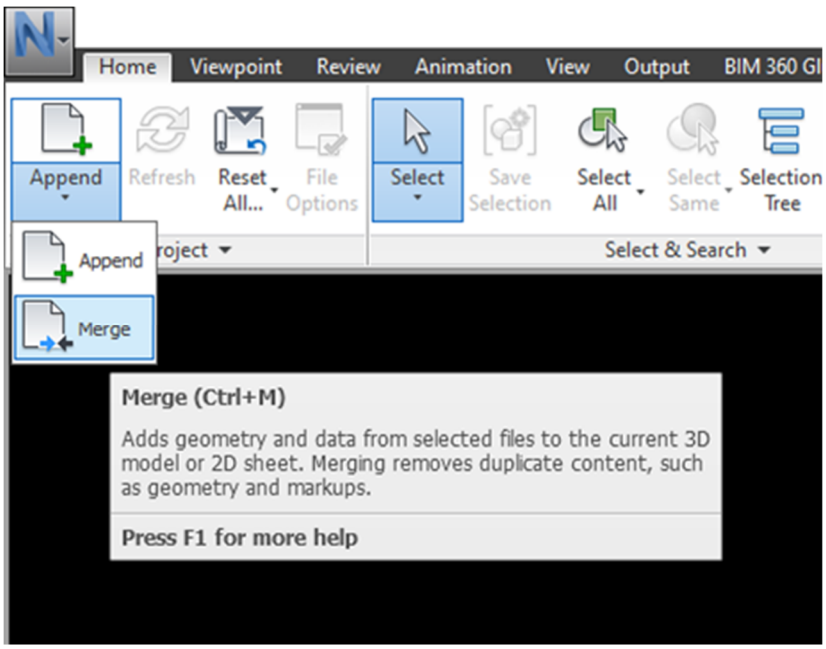

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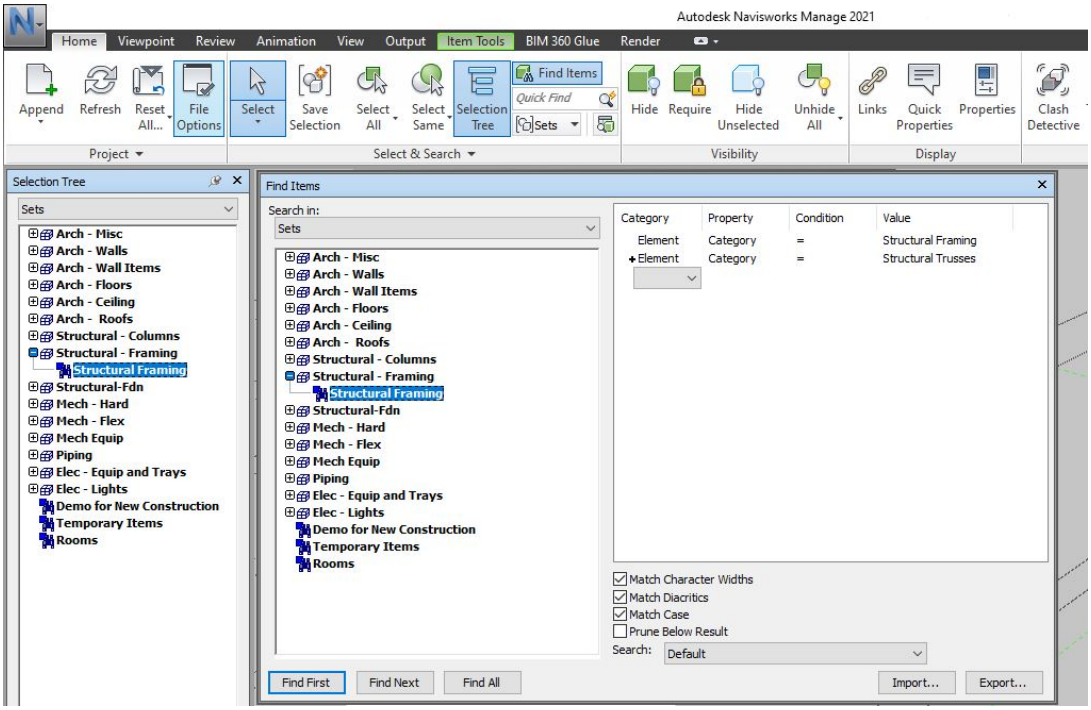
    - Create predefined search sets. This can be done using the Find Items tool using parameters from the Revit families.



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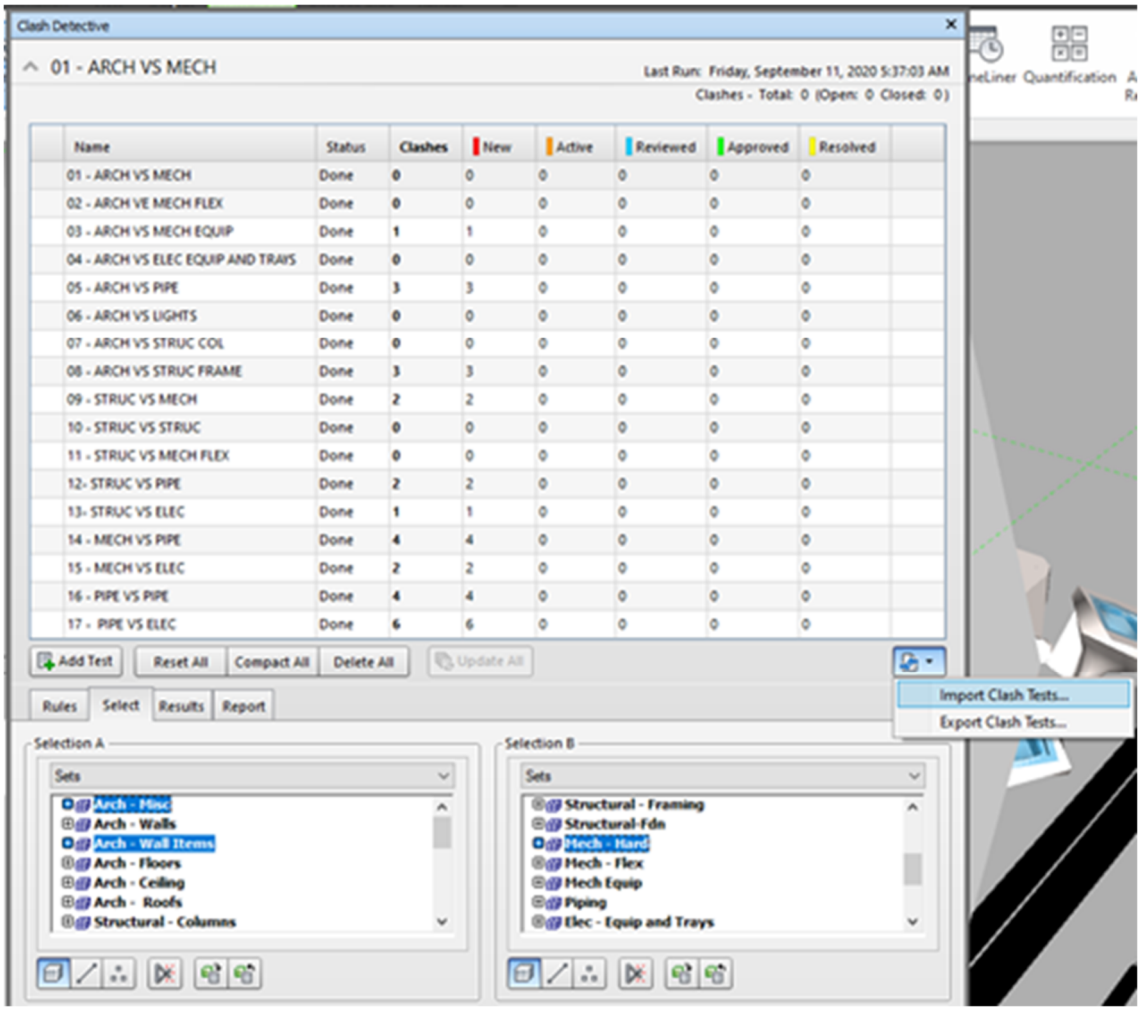

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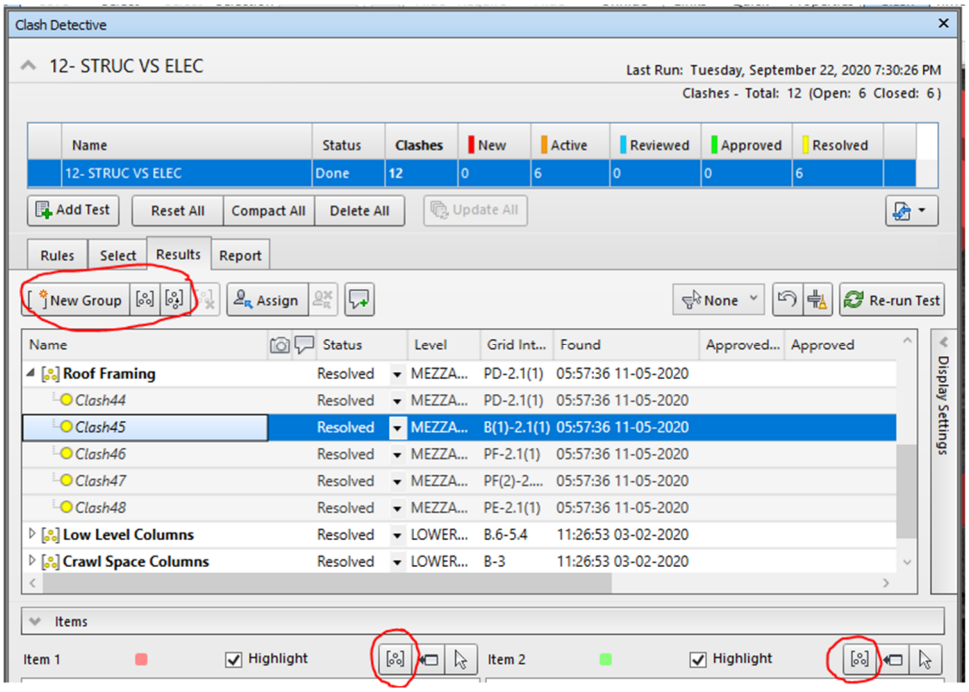
- Hide all elements in the search sets to isolate the elements that will be ignored. (Remember to unhide these elements for running the clash tests).

3. Organize the results by grouping like clashes together.



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Model Coordination

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Workflow Lessons Learned

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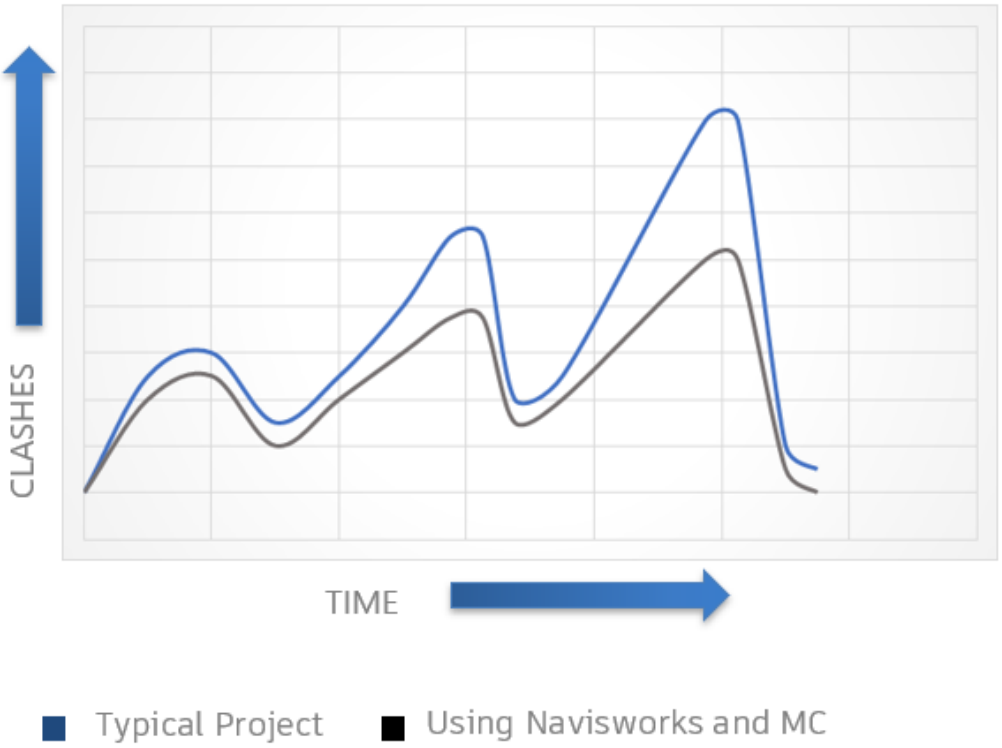

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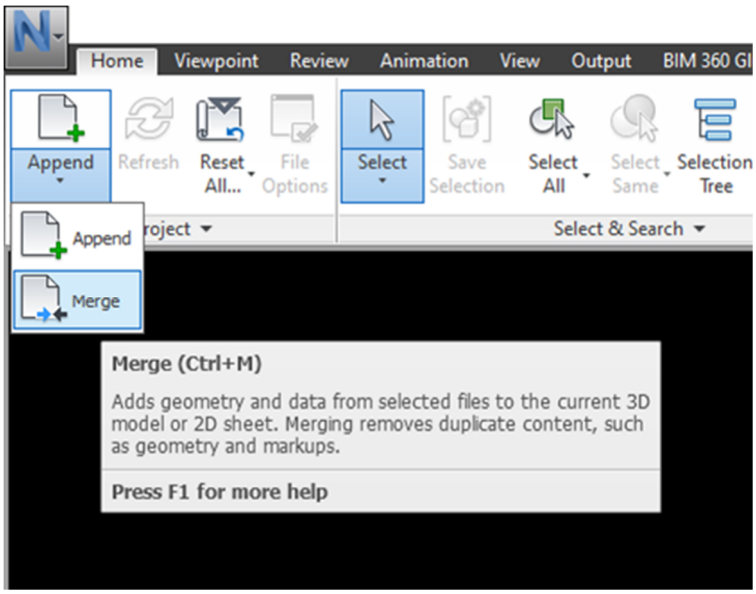

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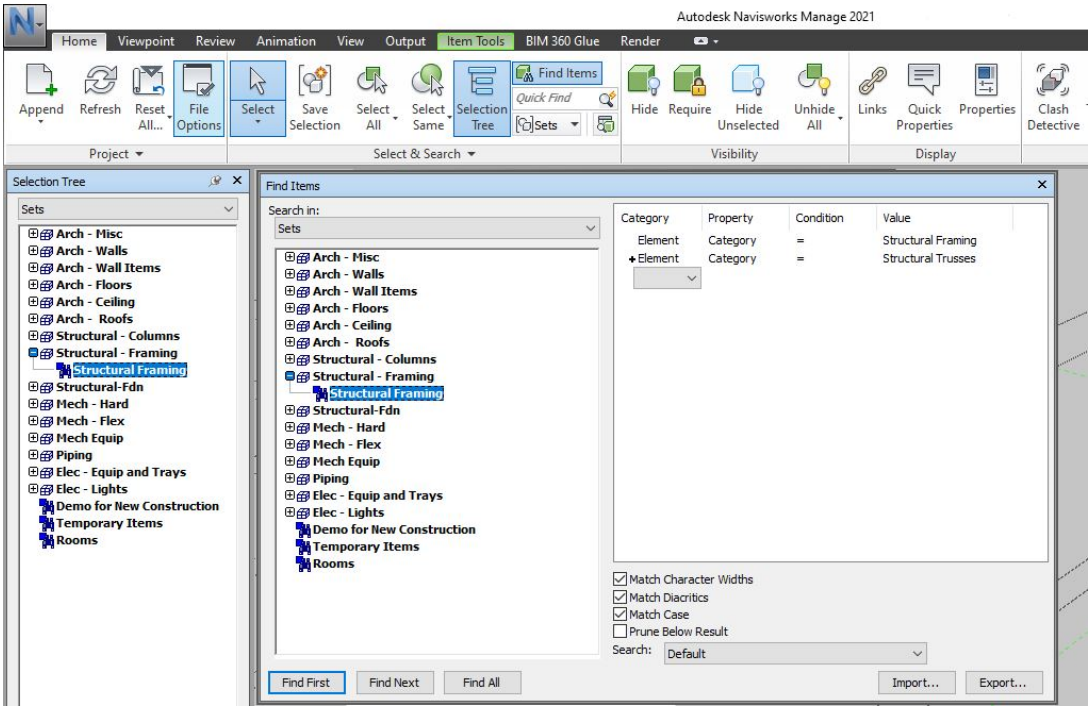

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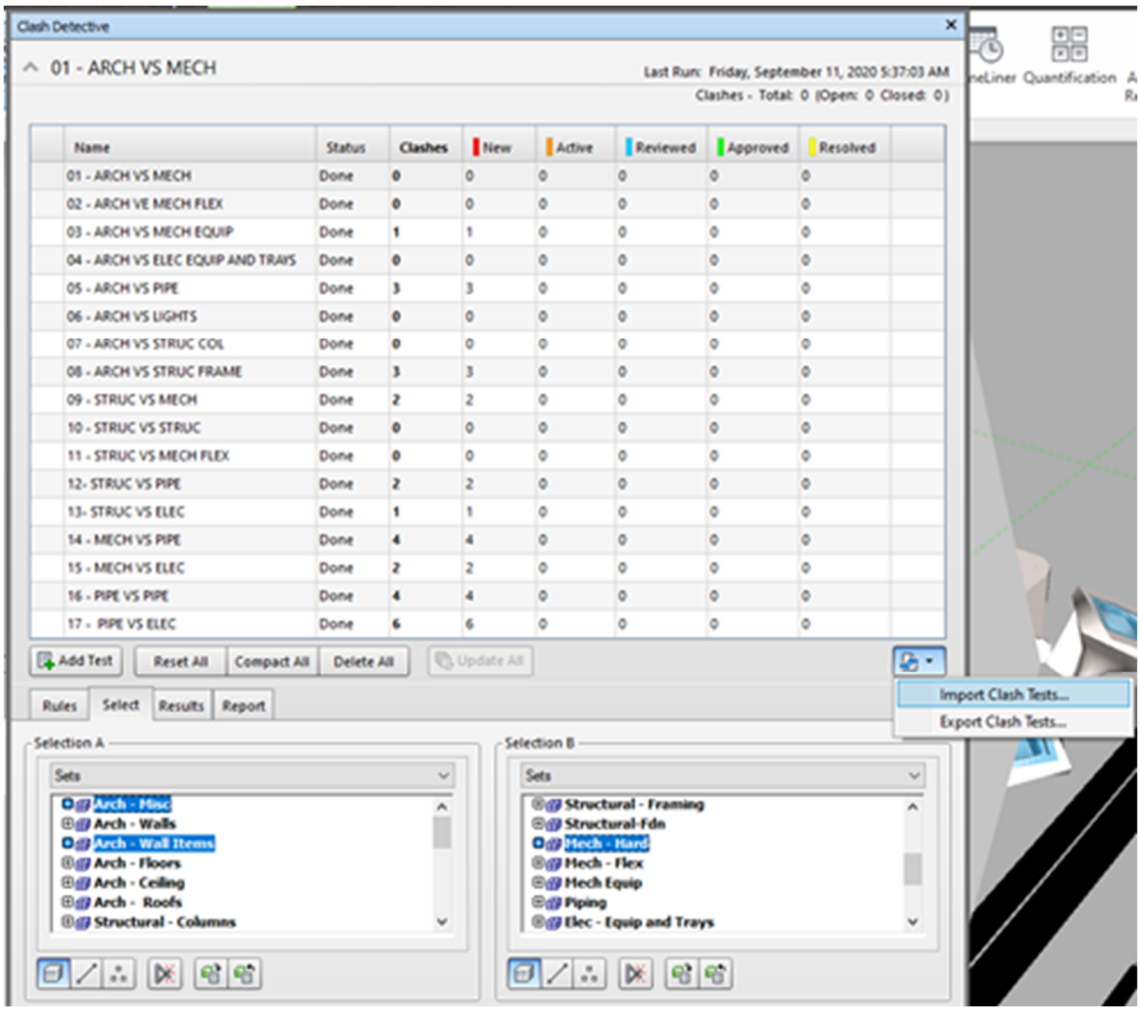

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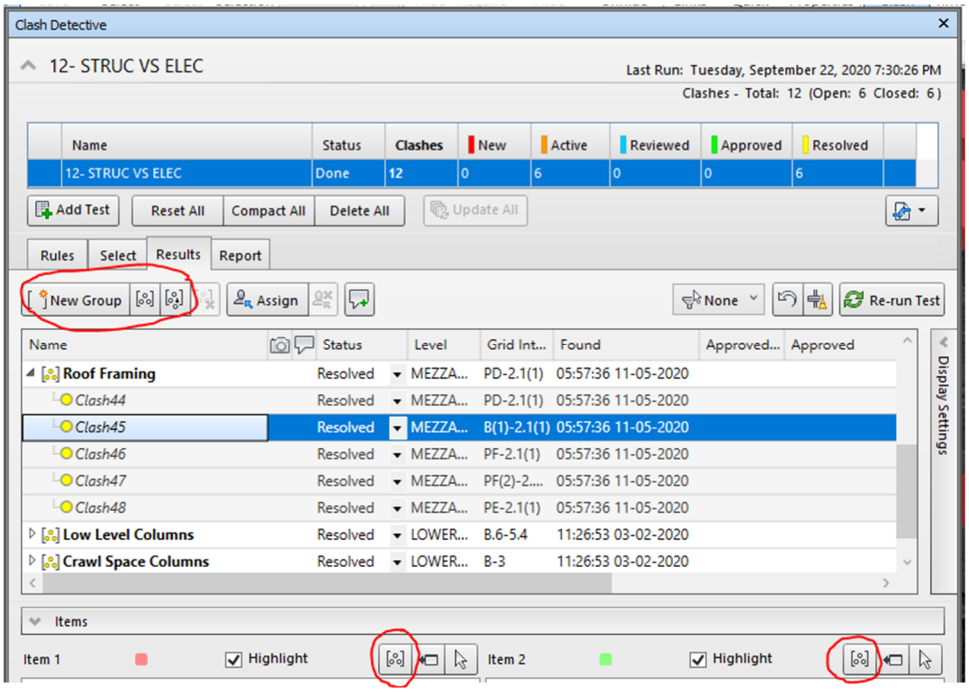

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Model Coordination

Model Coordination is a feature within the BIM 360 platform that can perform clash detection. This feature is a newer version of what used to be called Glue. It allows users to clash many different file formats and it is easy to set up and use. It is also assessable to all users through the web and does not require a license for a BIM authoring tool.

Typical Workflow Using Model Coordination

There are multiple types of workflows that can be ultized to work in Model Coordination. For this session we are going to discuss a workflow that uses a container file that has all of the Work-in-Progress models linked into it. The advantage of this workflow is that this container file can be placed in a folder away from the typical working files so that the typical worker would not accidentally modify the view to affect the clash detection process. Here are the steps to set up this workflow:

A. Setup Coordination Space in BIM 360:

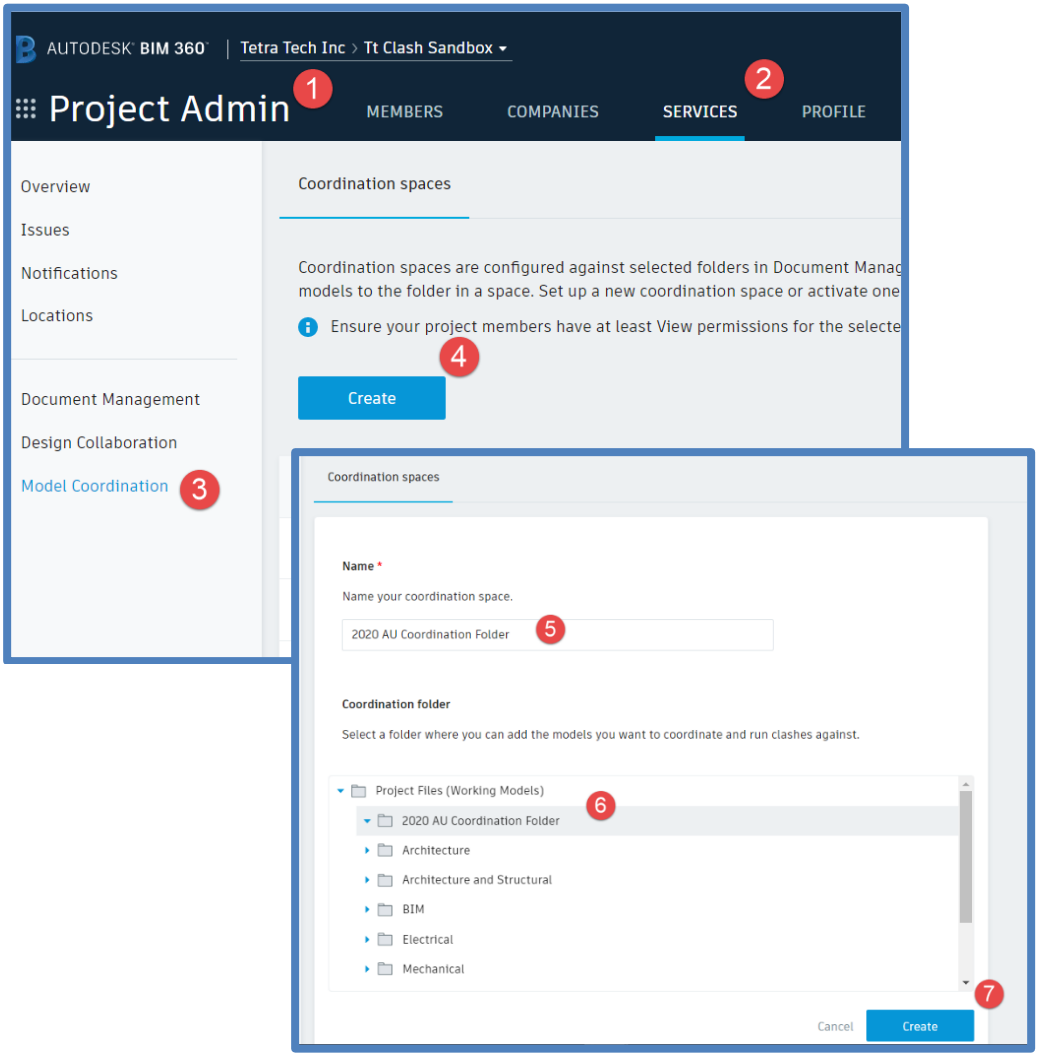

Figure 5: Setting up Coordination Space in BIM360

1. Navigate to BIM 360 Project Admin module
2. Select “Services”
3. Select “Model Coordination”
4. Select “Create”
5. Name Coordination Space
6. Assign BIM 360 Docs coordination space file location
7. Select “Create”

Helpful Hints:
Make sure that the BIM/Coordination manager has View+Download+Upload+Edit access for the project to be able to set up this.

B. Setup Revit Container File:

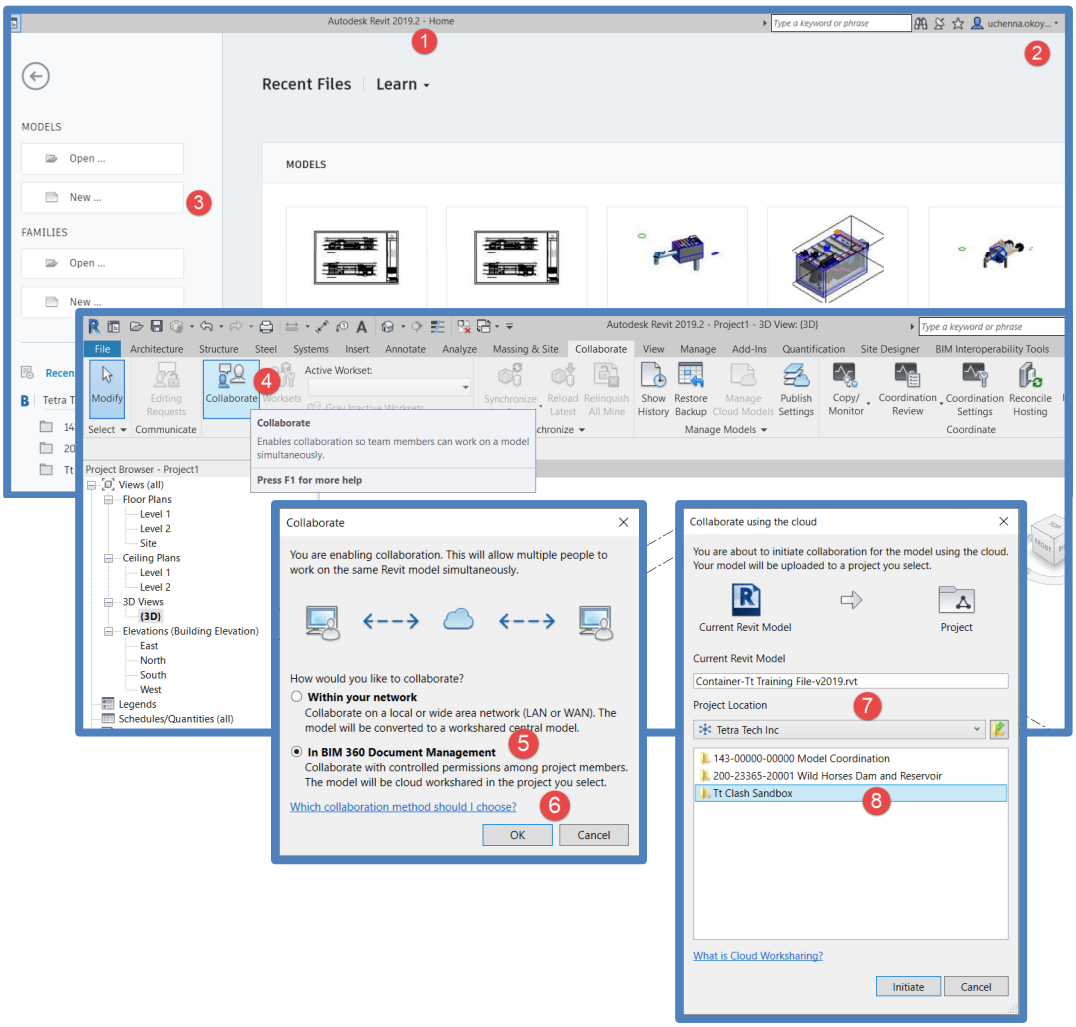

Figure 6: Setting up Revit Container File 1

1. Create a Revit 2019 or later file (other discipline Revit files must match Revit version)
2. Sign into BIM 360
3. Create new file, name, and save locally to your computer
4. Select “Collaborate” ribbon and “Collaborate” button
5. Dave in “BIM 360 Document Management”
6. Select “OK”
7. Navigate to BIM 360 Account
8. Navigate to BIM 360 Project and to Coordination Space Folder
9. Select “Initiate”

Helpful Hints:
Make sure you have the appropriate “Revit Cloud Model” and “Revit Cloud Workshare entitlements to your BIM 360 account.

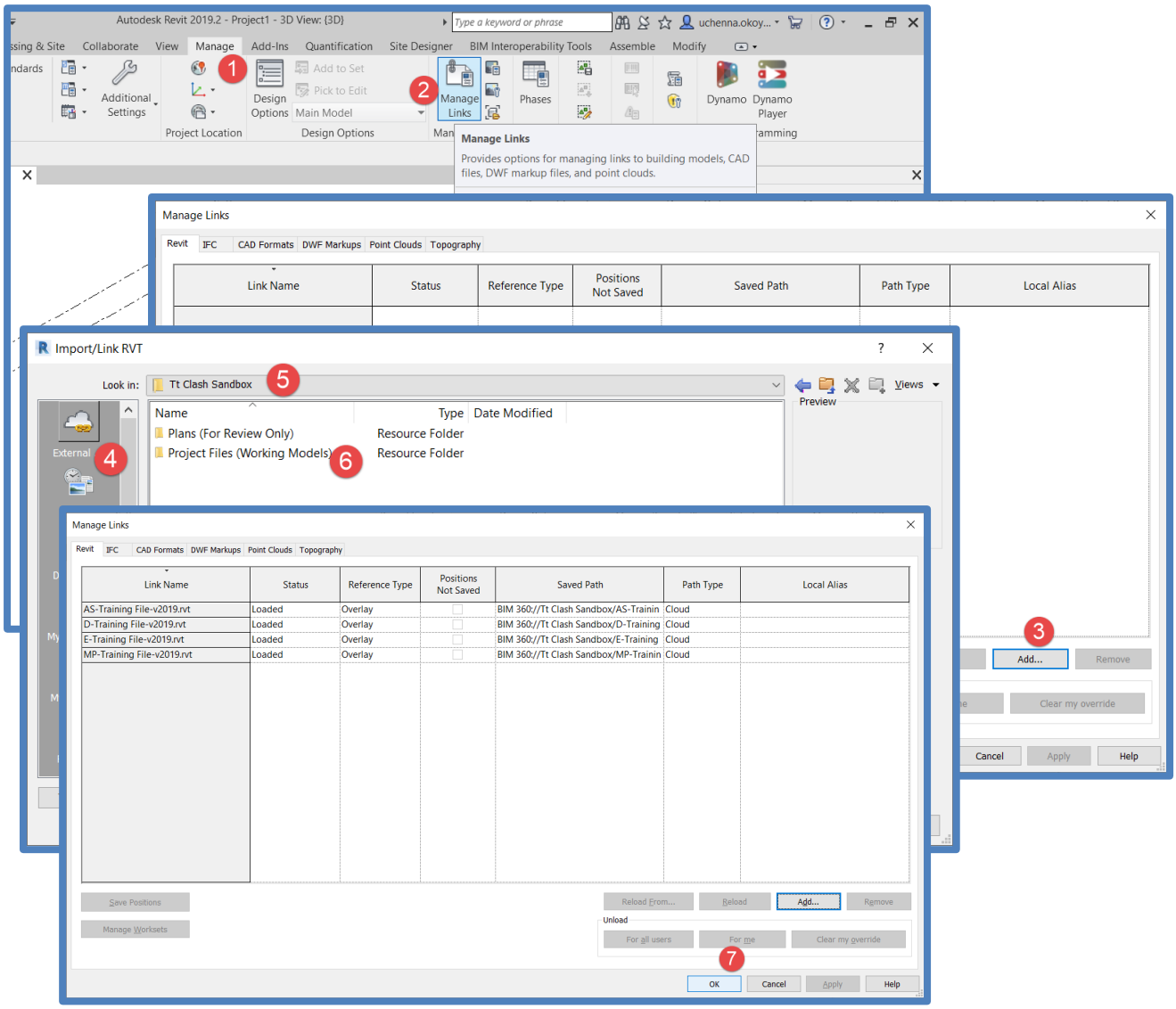

Figure 7: Linking Files

1. Select “Manage” Ribbon
2. Select “Manage Links”
3. Select 3D File Type in Upper Tab and Select “Add”
4. Use “External…” navigation button
5. Navigate to BIM 360 Account and Project
6. Navigate to folder where discipline WIP 3D BIM file is located
7. After all discipline files are loaded select “OK”

Helpful Hints:
When disciplines make updates to work in place models, you must come to the container file and “Reload Latest” linked Revit files and publish to update the clashes.

C. Setup Clashing Views:

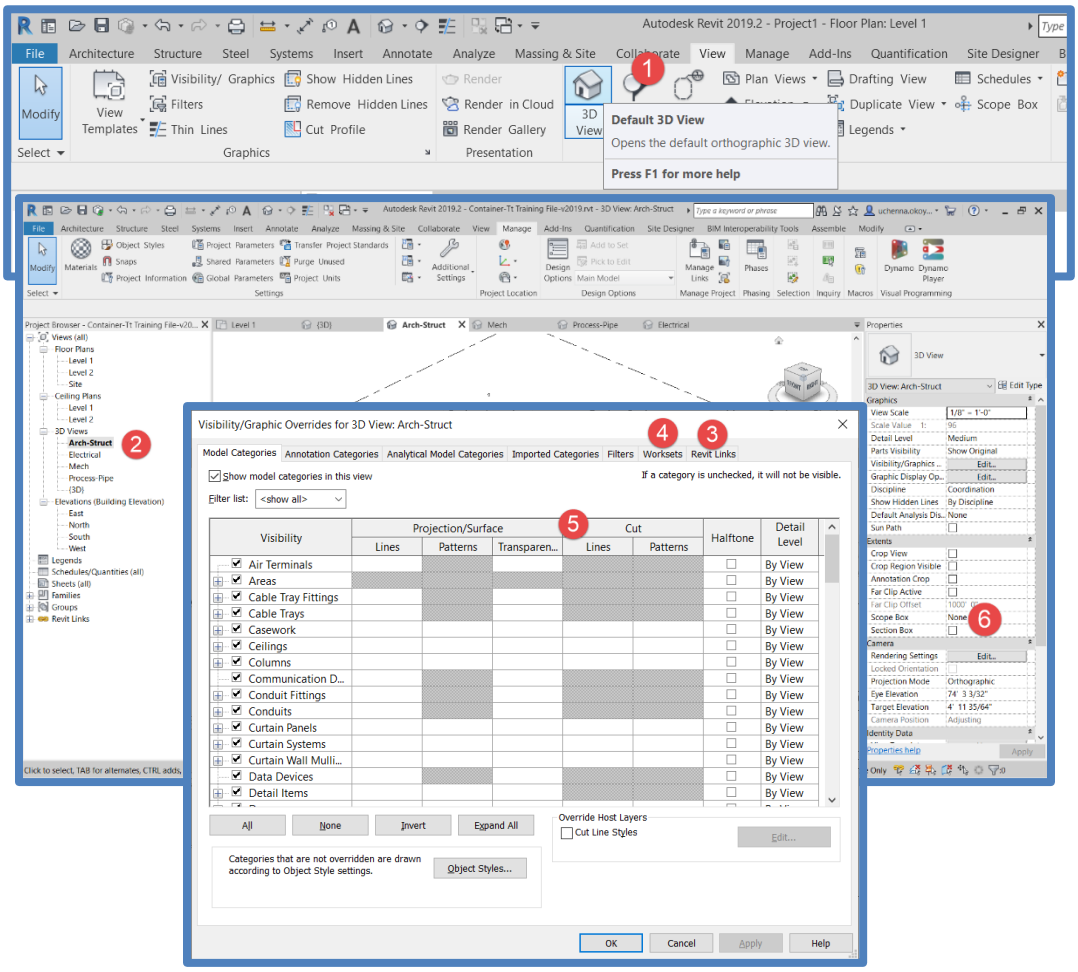

Figure 8: File Visibility

1. Select “View” Ribbon and Select “3D View”
2. Create a 3D view for each discipline coordination model
3. Set Visibility Graphics to show only that discipline Revit file on a 3D view
4. Set Worksets to show which you want to view and clash
5. Set other visibility settings
6. Set Scope box or section box settings as well
7. Publish 3D views to BIM 360 using “Collaborate” Ribbon and “Publish Settings” and “Mange Cloud Models”

Helpful Hints:
Only elements explicitly shown in each view will be clashed in the BIM 360 Model Coordination engine.

D. Review and resolve clashes:

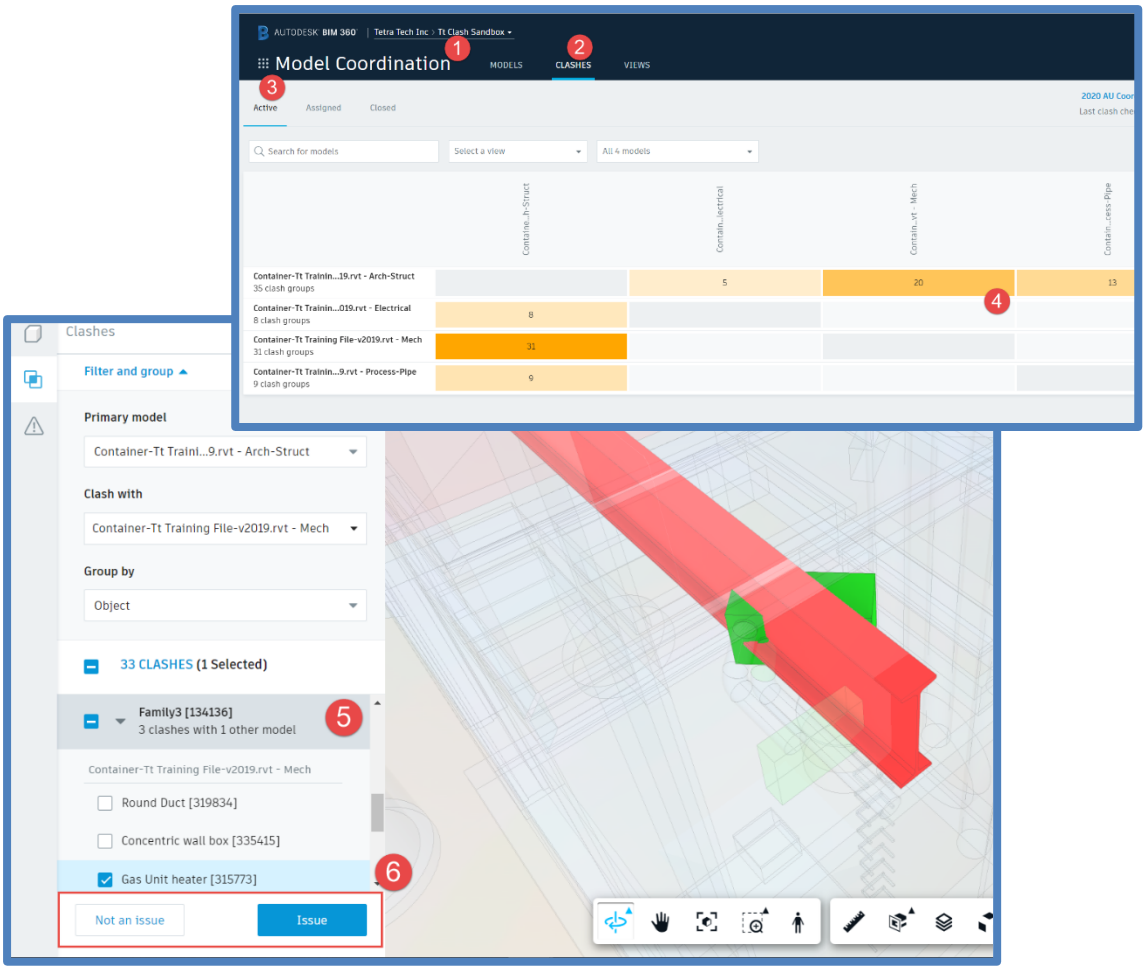

Figure 9: Reviewing Clashes

1. Navigate to the BIM 360 “Model Coordination” module
2. Select “Clashes”
3. Select “Active”
4. Select box/number to view active clashes. Main model is row. Clashing model is column
5. Review each clash in clashing model views
6. Mark active clashes as either “Issue” or “Not an Issue”

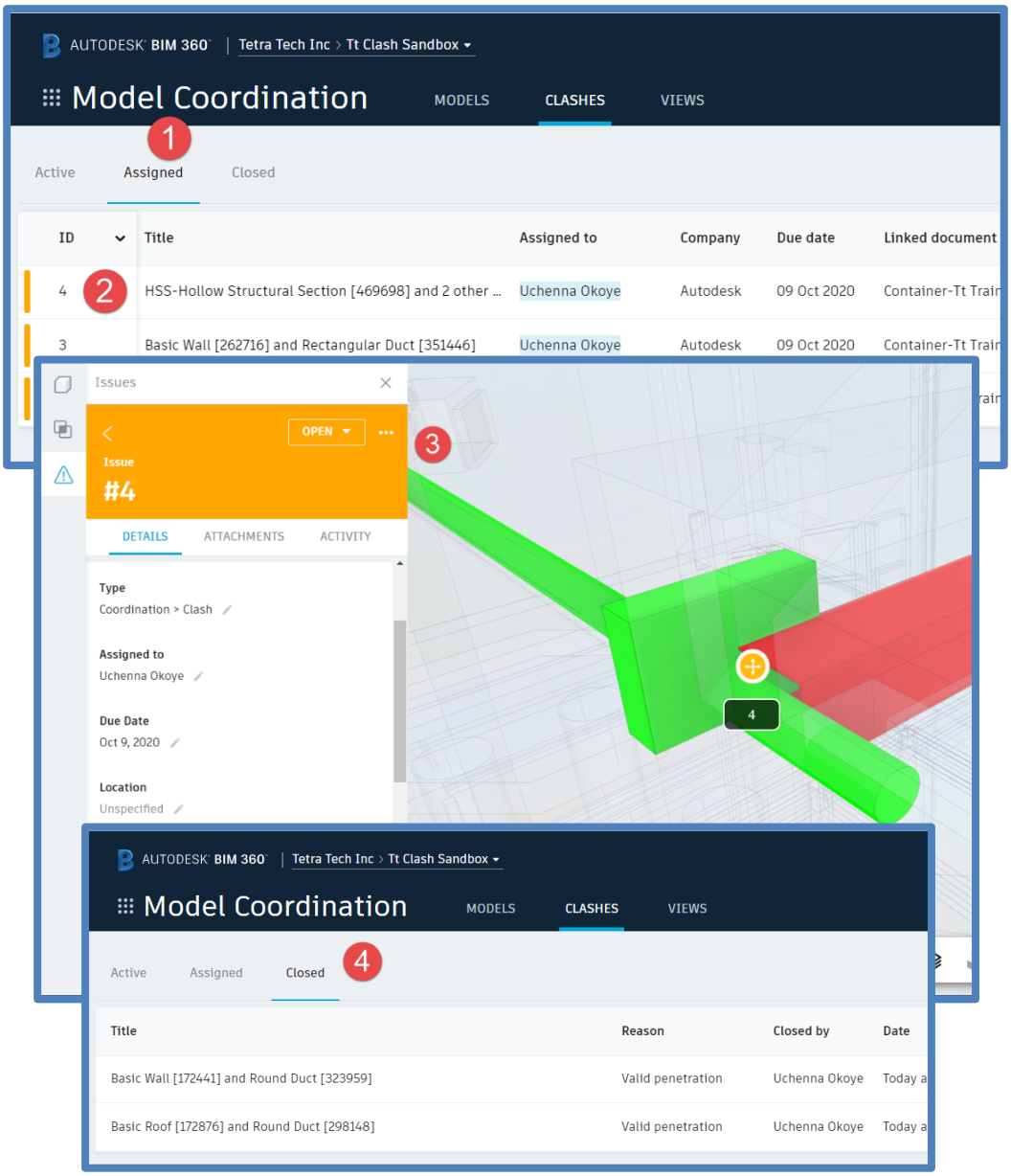

Figure 10: Resolving Clashes

1. Select “Assigned” in Model Coordination Clashes screen
2. Select clashes that were marked “Issues”
3. Review and resolve Issues using the typical BIM 360 Issues process
4. Select “Closed” in Model Coordination Clashes screen to review items that were marked “Not an Issue”
5. Repeat this process after every model update and BIM 360 model publishing

Coordination & Navisworks

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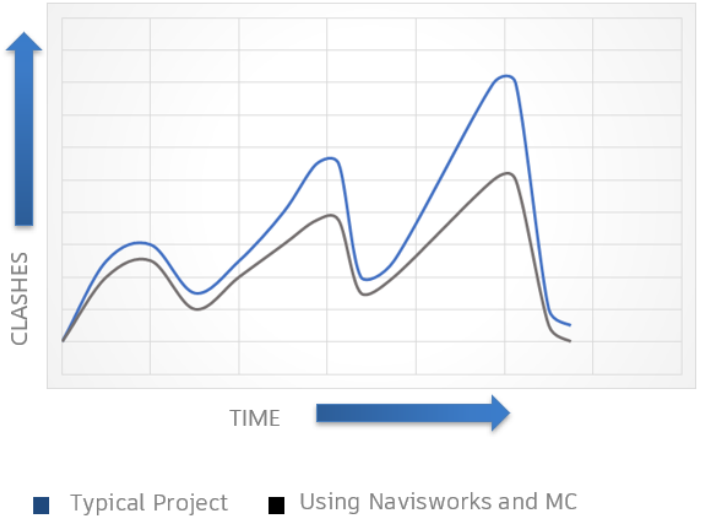

Figure 11: Clashes Over Time for Workflows

Navisworks Model Coordination Plug-In

For even more interaction between Navisworks and Model Coordination, there is a plug in available for Navisworks 2021 that allows for some syncing across these platforms. Here is the basic workflow for doing this:

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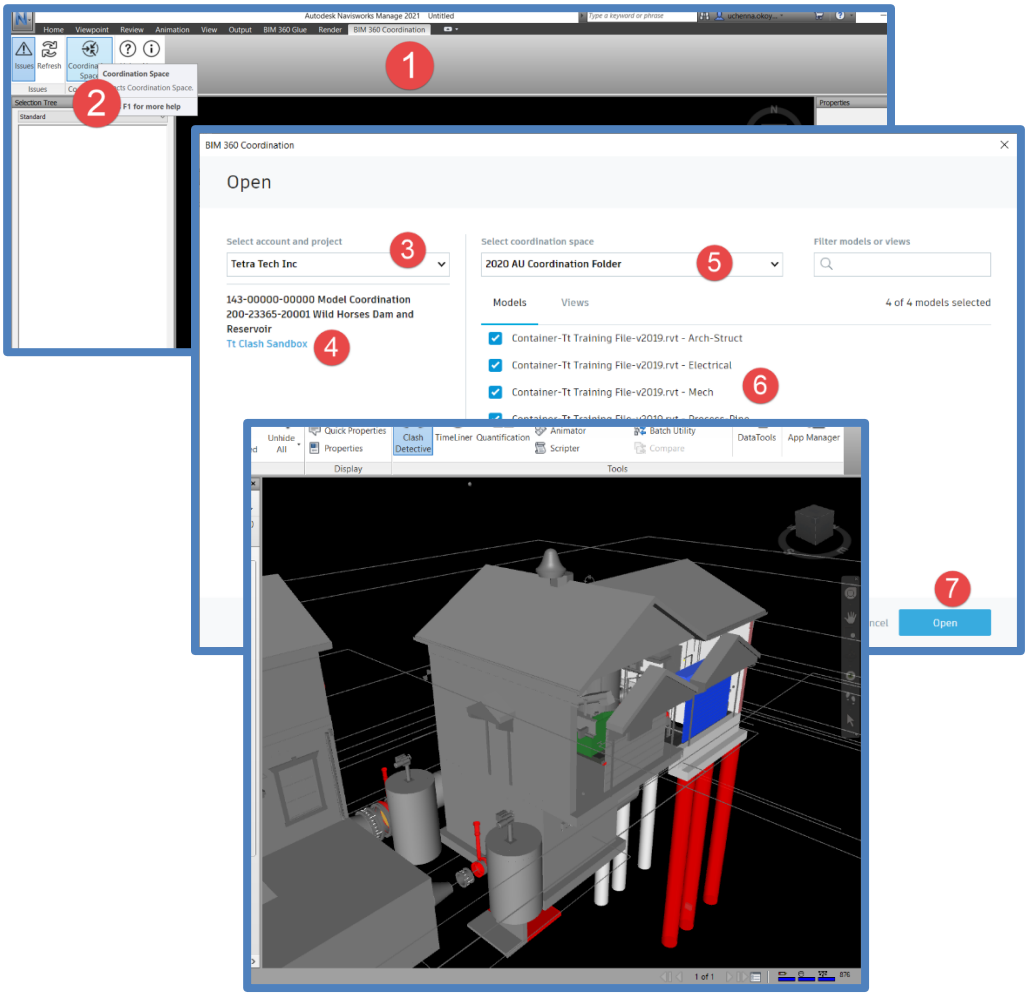

Figure 12: Coordination Space

1. Select BIM 360 Coordination ribbon
2. Select “Coordination Space”
3. Select BIM 360 Account
4. Select BIM 360 Project
5. Select Model Coordination Space
6. Select Models to append to Navisworks for clash detection

B. Run Navisworks Clash Detection

C. Review and Resolve Clashes:

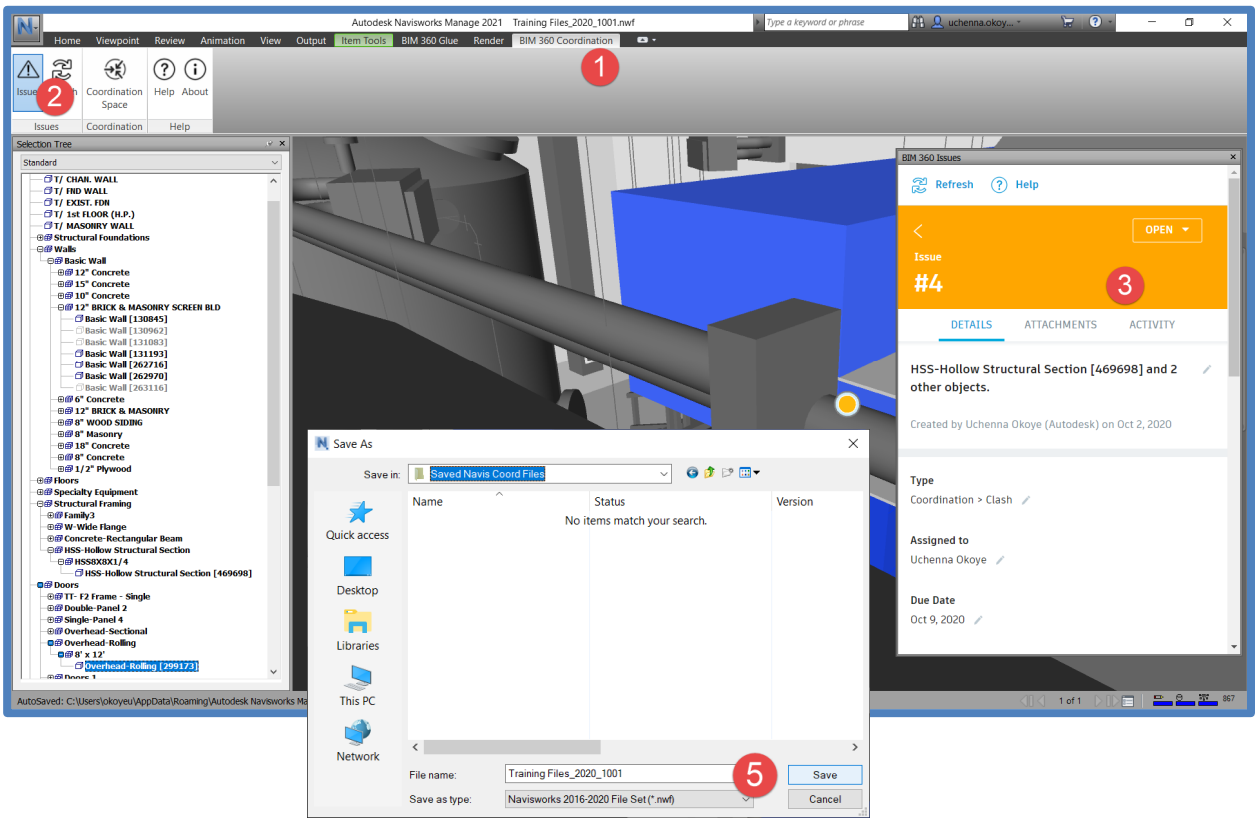

Figure 13: Resolving Clashes

1. Selecting BIM 360 Coordination Ribbon
2. Selecting Issues
3. Resolving BIM 360 Issues from the Navisworks window
4. Then review and resolve Navisworks clashes via the typical saved viewpoint workflow
5. Save as a NWF file back to BIM 360 using the Autodesk Desktop Connector to clash and resolve future coordination file updates in Navisworks

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Make sure the views exported from Revit have all items to be used in the interference check turned on. Check for worksets that are turned off.

Use Merge instead of import to bring the files into Navisworks.

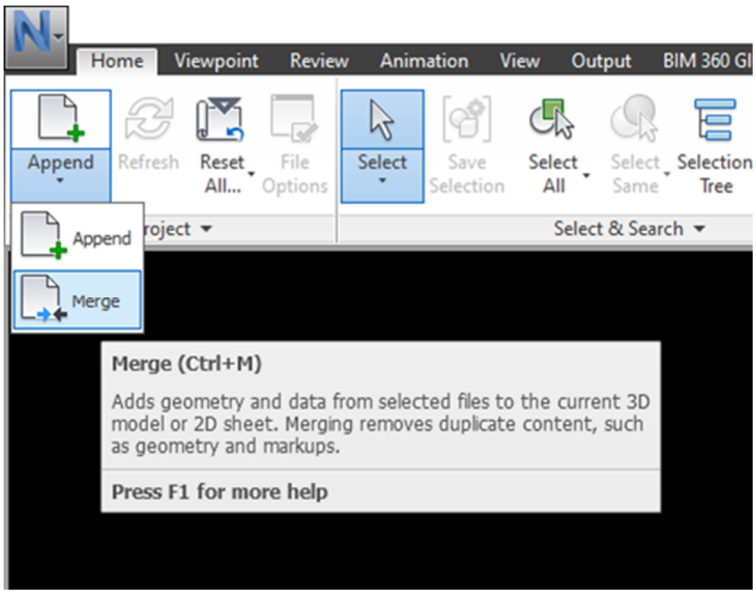

Figure 1: Navisworks Merge Tool

2. Set up and run clash tests.

Helpful Hints:
Create predefined search sets. This can be done using the Find Items tool using parameters from the Revit families.

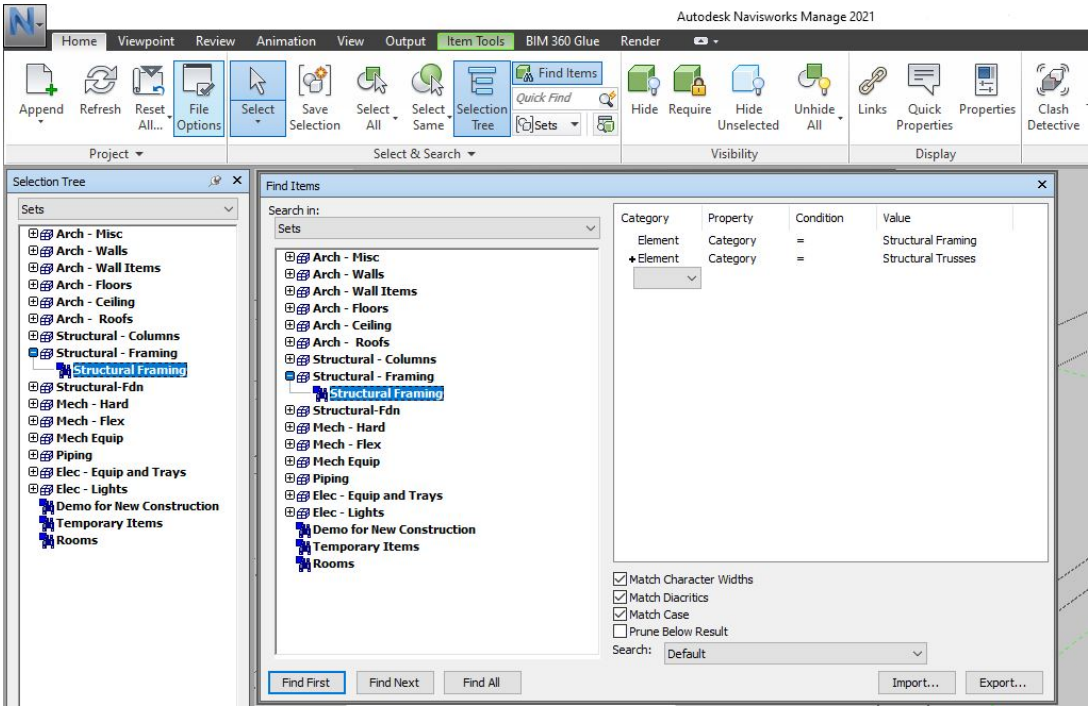

Figure 2: Navisworks Search Sets

Create predefined clash tests from the search sets. Recommend using folders for the search sets so that you can modify what search sets are in the folder but does not change the predefined clash test. Note that when you import clash tests all of the predefined search sets will come into the model as well.

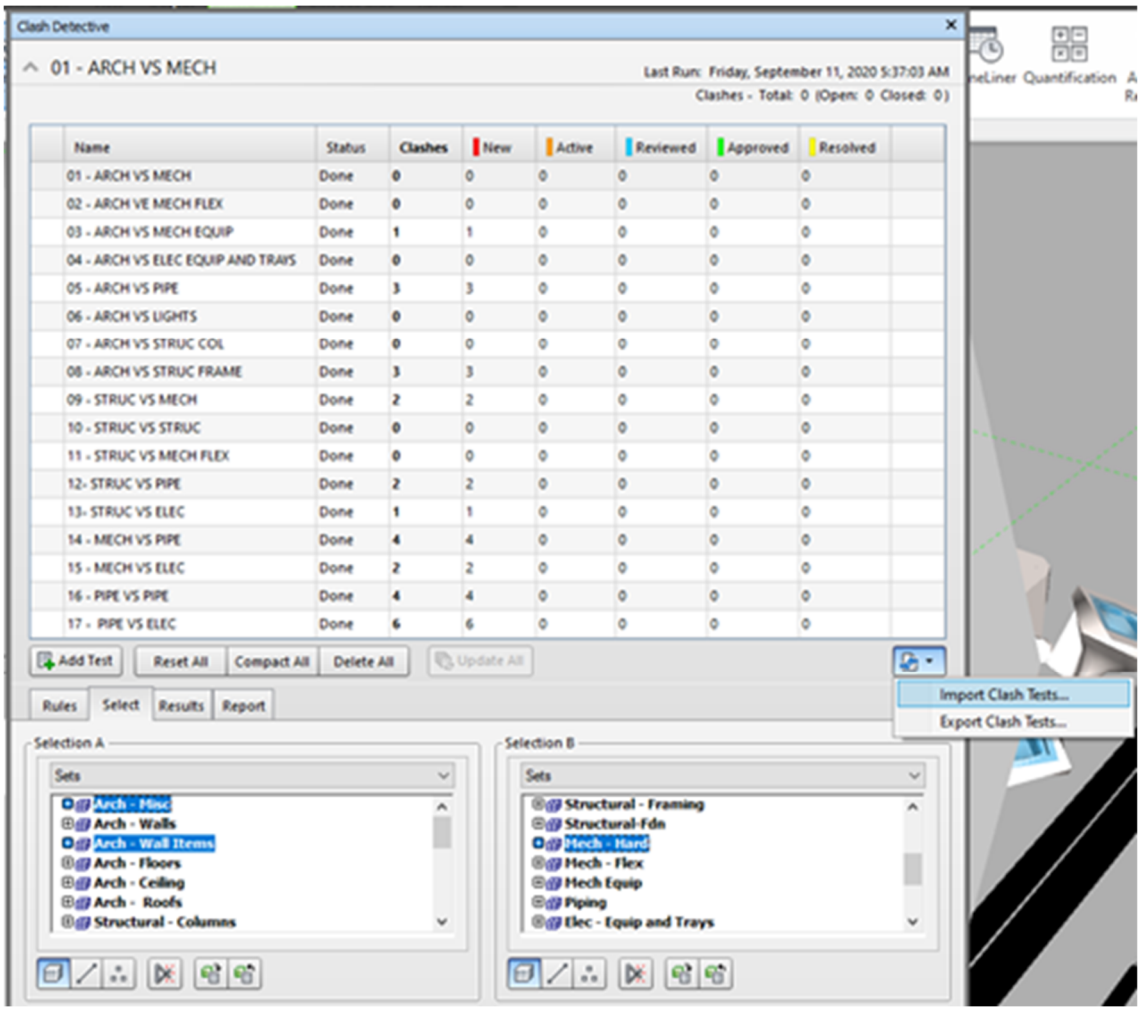

Figure 3: Navisworks Clash Tests

Hide all elements in the search sets to isolate the elements that will be ignored. (Remember to unhide these elements for running the clash tests).

3. Organize the results by grouping like clashes together.

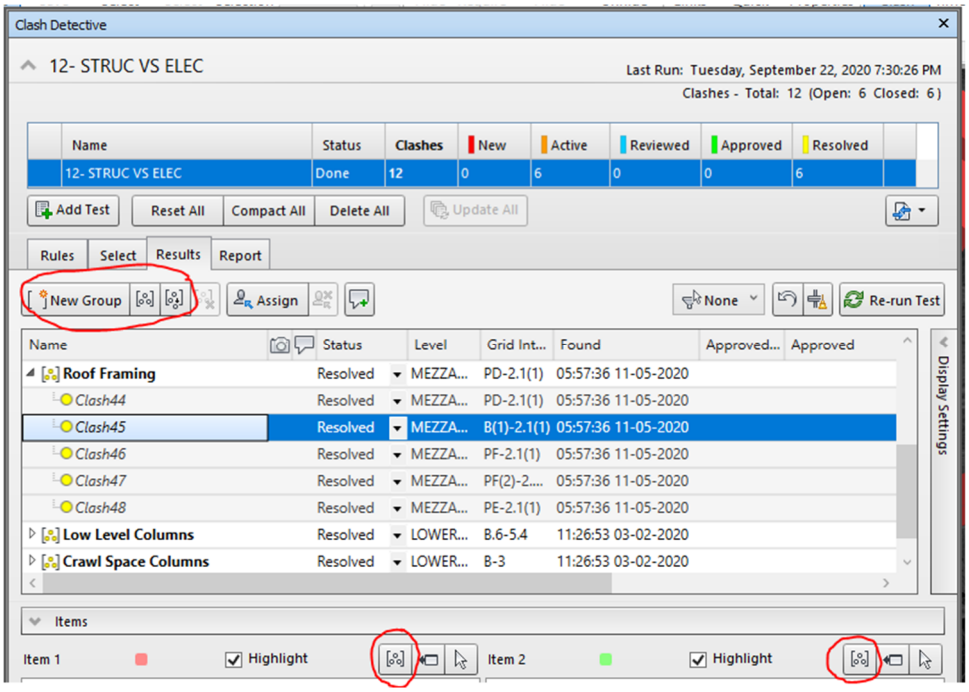

Figure 4: Clash grouping tools

4. Distribute the results to the design team to begin clash resolution.

Helpful Hints:
Have a team meeting to go over the major clash items.
Review with the team how to find the elements in Revit from the reports.

Model Coordination

Model Coordination is a feature within the BIM 360 platform that can perform clash detection. This feature is a newer version of what used to be called Glue. It allows users to clash many different file formats and it is easy to set up and use. It is also assessable to all users through the web and does not require a license for a BIM authoring tool.

Typical Workflow Using Model Coordination

There are multiple types of workflows that can be ultized to work in Model Coordination. For this session we are going to discuss a workflow that uses a container file that has all of the Work-in-Progress models linked into it. The advantage of this workflow is that this container file can be placed in a folder away from the typical working files so that the typical worker would not accidentally modify the view to affect the clash detection process. Here are the steps to set up this workflow:

A. Setup Coordination Space in BIM 360:

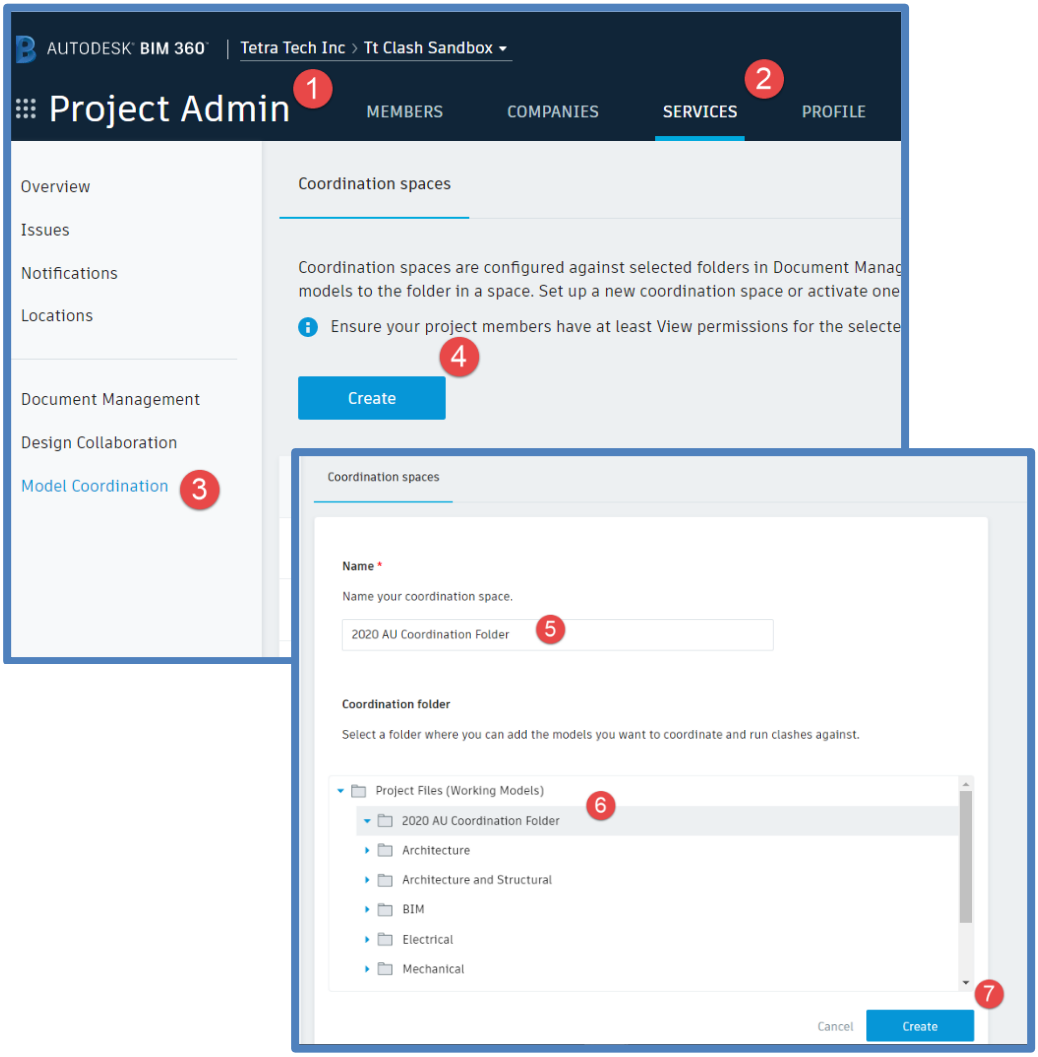

Figure 5: Setting up Coordination Space in BIM360

1. Navigate to BIM 360 Project Admin module
2. Select “Services”
3. Select “Model Coordination”
4. Select “Create”
5. Name Coordination Space
6. Assign BIM 360 Docs coordination space file location
7. Select “Create”

Helpful Hints:
Make sure that the BIM/Coordination manager has View+Download+Upload+Edit access for the project to be able to set up this.

B. Setup Revit Container File:

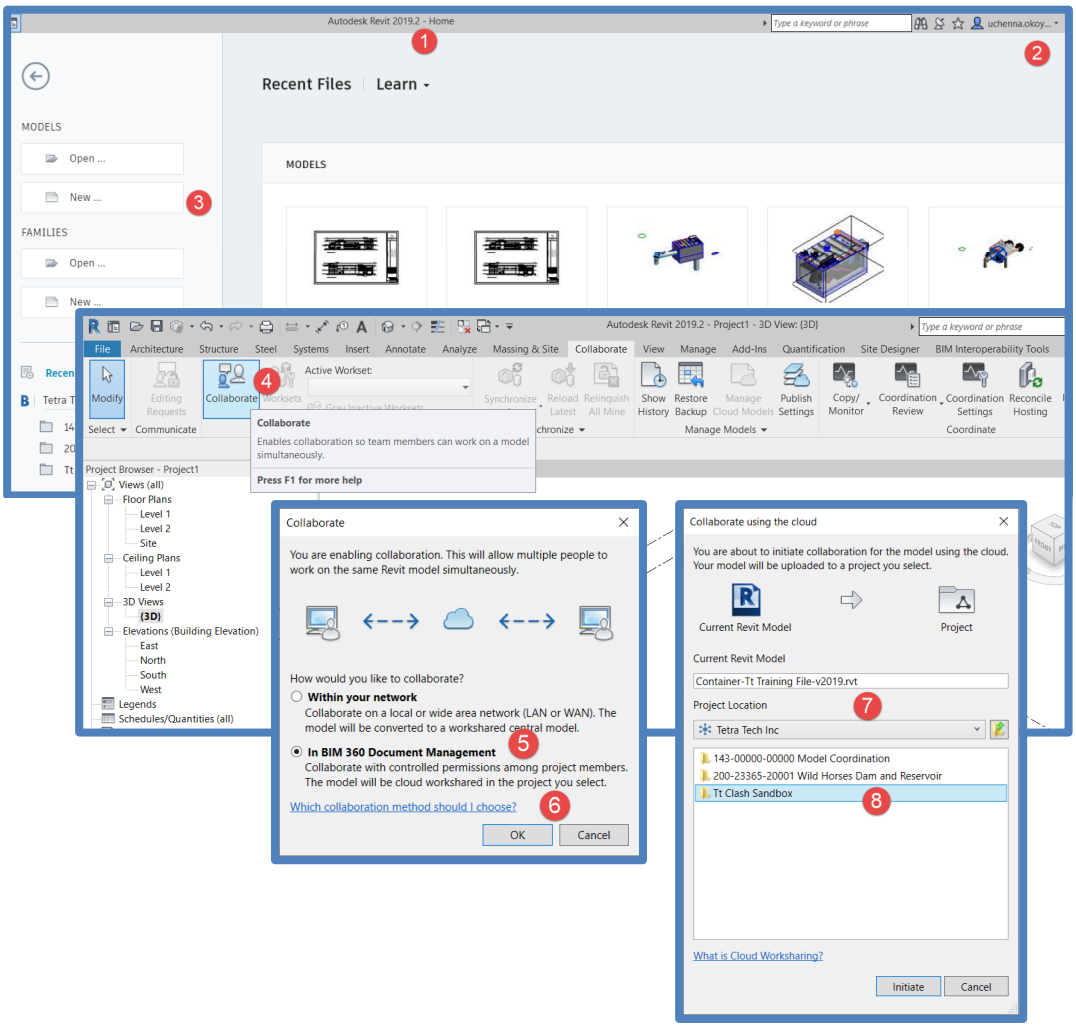

Figure 6: Setting up Revit Container File 1

1. Create a Revit 2019 or later file (other discipline Revit files must match Revit version)
2. Sign into BIM 360
3. Create new file, name, and save locally to your computer
4. Select “Collaborate” ribbon and “Collaborate” button
5. Dave in “BIM 360 Document Management”
6. Select “OK”
7. Navigate to BIM 360 Account
8. Navigate to BIM 360 Project and to Coordination Space Folder
9. Select “Initiate”

Helpful Hints:
Make sure you have the appropriate “Revit Cloud Model” and “Revit Cloud Workshare entitlements to your BIM 360 account.

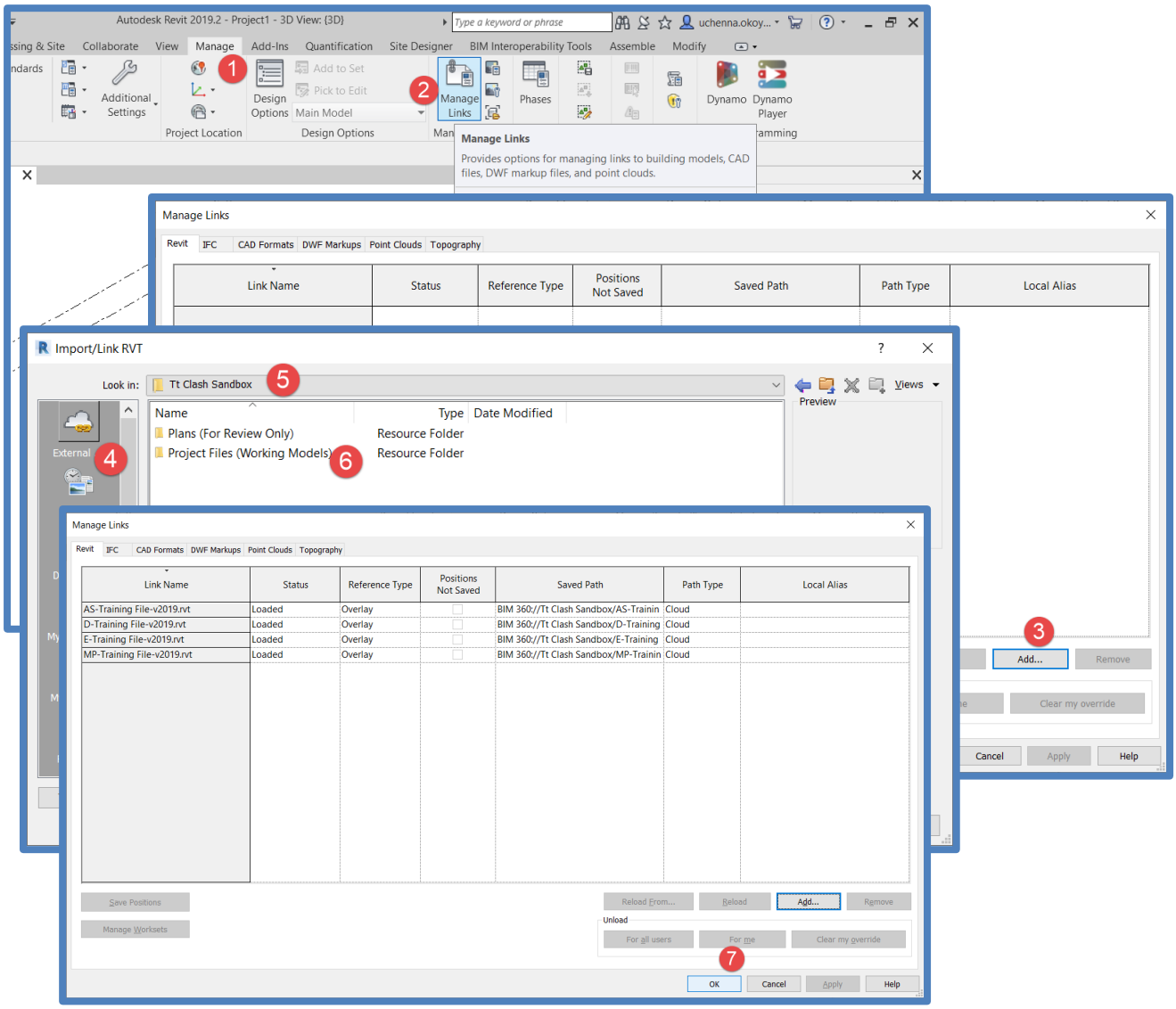

Figure 7: Linking Files

1. Select “Manage” Ribbon
2. Select “Manage Links”
3. Select 3D File Type in Upper Tab and Select “Add”
4. Use “External…” navigation button
5. Navigate to BIM 360 Account and Project
6. Navigate to folder where discipline WIP 3D BIM file is located
7. After all discipline files are loaded select “OK”

Helpful Hints:
When disciplines make updates to work in place models, you must come to the container file and “Reload Latest” linked Revit files and publish to update the clashes.

C. Setup Clashing Views:

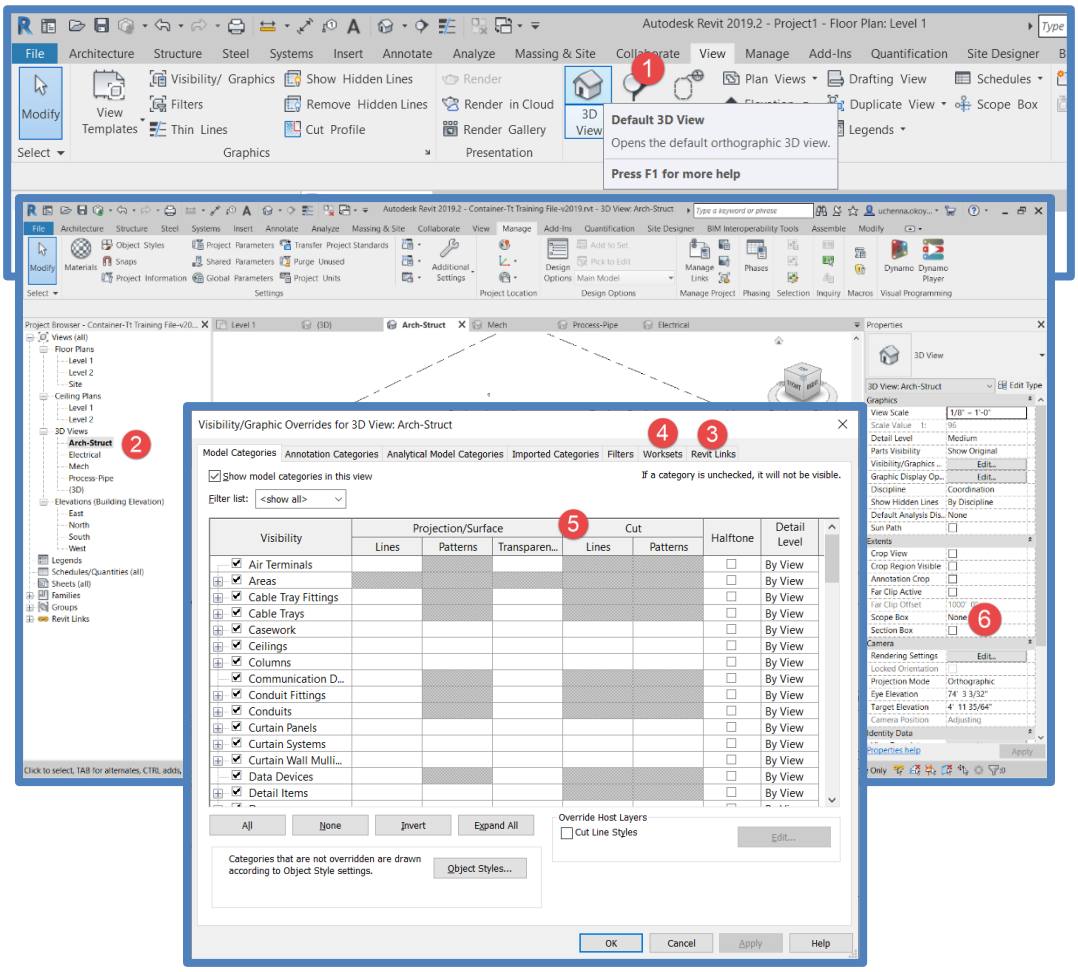

Figure 8: File Visibility

1. Select “View” Ribbon and Select “3D View”
2. Create a 3D view for each discipline coordination model
3. Set Visibility Graphics to show only that discipline Revit file on a 3D view
4. Set Worksets to show which you want to view and clash
5. Set other visibility settings
6. Set Scope box or section box settings as well
7. Publish 3D views to BIM 360 using “Collaborate” Ribbon and “Publish Settings” and “Mange Cloud Models”

Helpful Hints:
Only elements explicitly shown in each view will be clashed in the BIM 360 Model Coordination engine.

D. Review and resolve clashes:

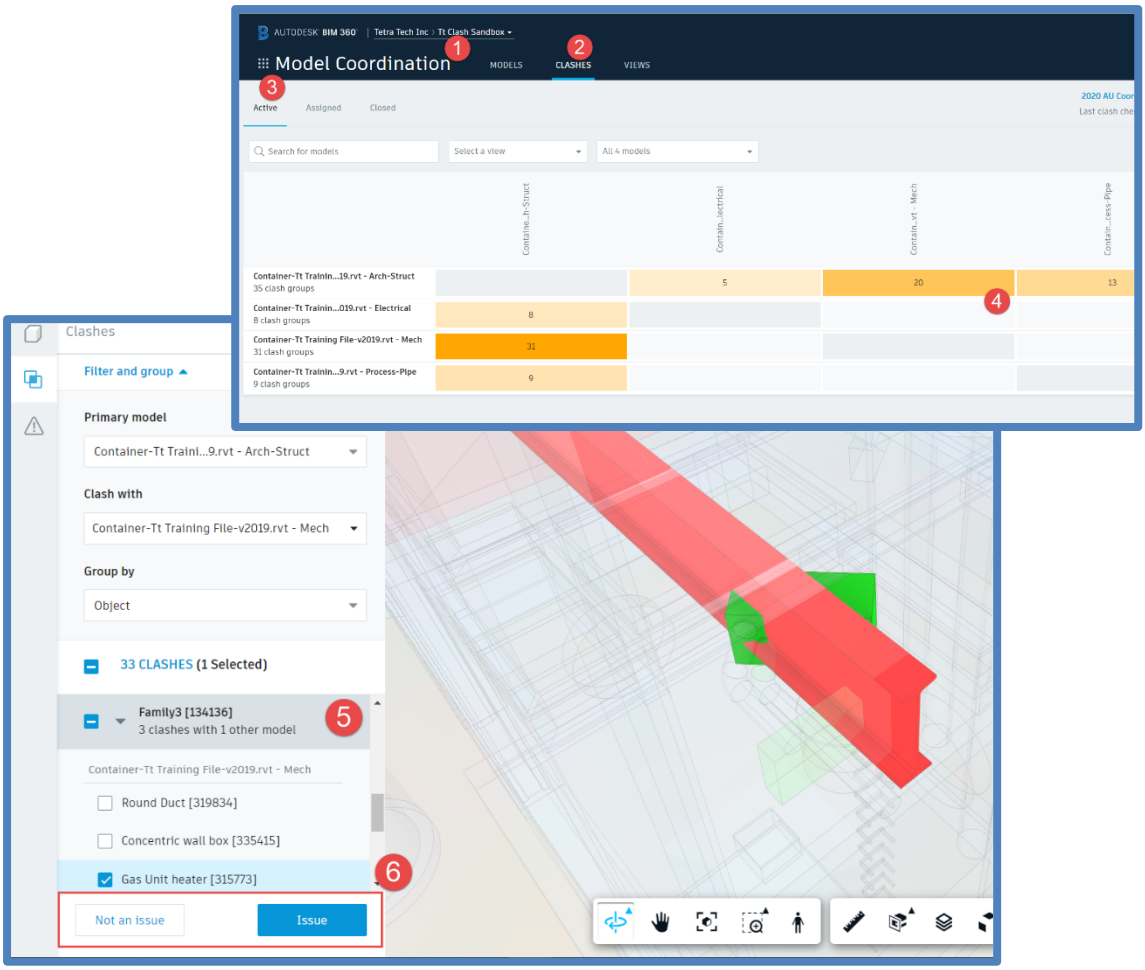

Figure 9: Reviewing Clashes

1. Navigate to the BIM 360 “Model Coordination” module
2. Select “Clashes”
3. Select “Active”
4. Select box/number to view active clashes. Main model is row. Clashing model is column
5. Review each clash in clashing model views
6. Mark active clashes as either “Issue” or “Not an Issue”

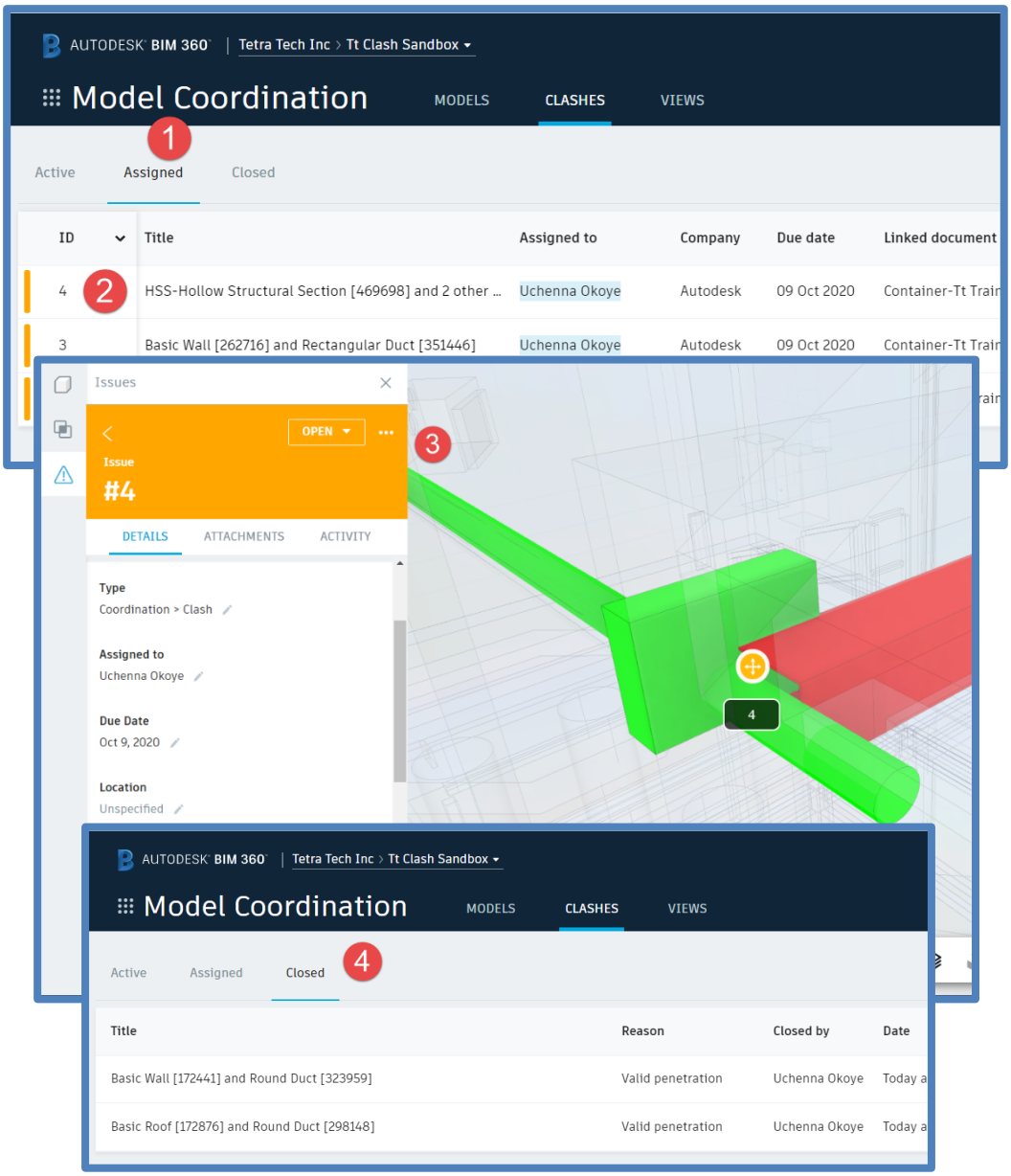

Figure 10: Resolving Clashes

1. Select “Assigned” in Model Coordination Clashes screen
2. Select clashes that were marked “Issues”
3. Review and resolve Issues using the typical BIM 360 Issues process
4. Select “Closed” in Model Coordination Clashes screen to review items that were marked “Not an Issue”
5. Repeat this process after every model update and BIM 360 model publishing

Coordination & Navisworks

Now that we have explored how each program can be used for clash detection, it starts to become apparent that what one program lacks the other one excels. This makes the concept of using both together the perfect remedy to cure a project of those major clashes that occur the week before the final submittal. We will now explore the workflow that we have used to combine the strengths of these programs together.

Workflow Using Model Coordination & Navisworks

This workflow is intended to be a continuous workflow through the design life of a project.

1. At the beginning of a project, once all models are started on BIM 360, set up the Model Coordination space so that it is ready for use.
2. Once the project is far enough along to start running clash detection, complete the first run of Model Coordination and show the project team how to find and use the results.
3. Continuously update the Model Coordination at regular intervals.
4. Prior to milestone submittals create a Navisworks model to create a formal clash detection report to submit to the project team.
5. Have a meeting to discuss the major findings from the clash detection.
6. Repeat steps 3 thru 5 until the project is complete.

Workflow Benefits

Using this workflow that combines the benefits of both software will result in fewer major conflicts at the end of the project because the process will have become democratized. It allows people to realize the clashes with plenty of time to resolve the issues instead of just the week before the submittal. With less clashes that arise at submittal time, the project will run smoother and result in a well-coordinated design package.

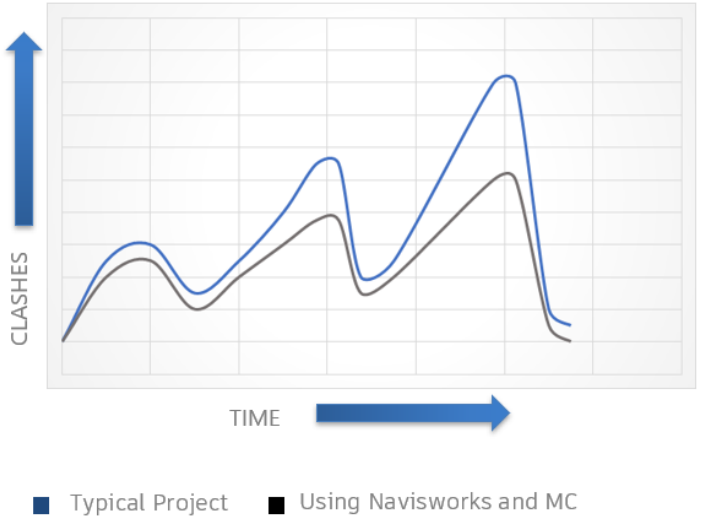

Figure 11: Clashes Over Time for Workflows

Navisworks Model Coordination Plug-In

For even more interaction between Navisworks and Model Coordination, there is a plug in available for Navisworks 2021 that allows for some syncing across these platforms. Here is the basic workflow for doing this:

A. Open Coordation Space:

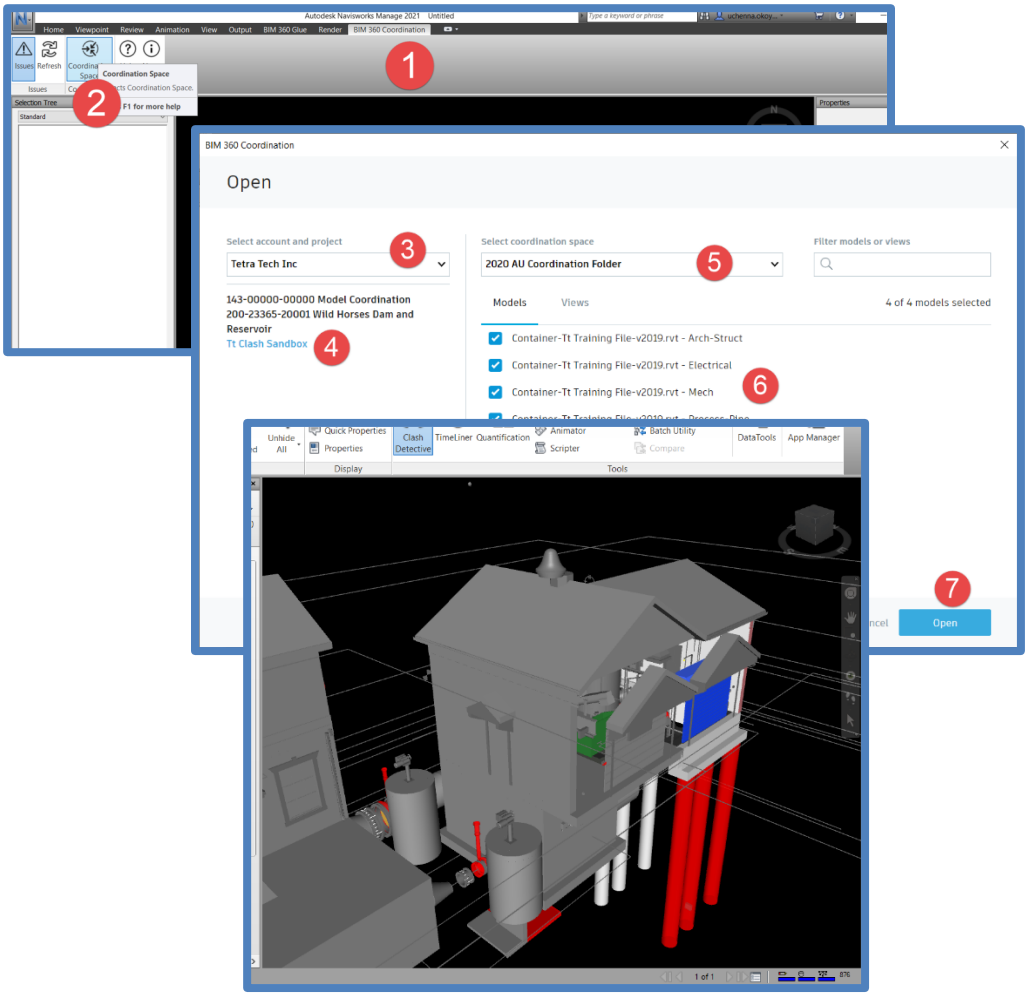

Figure 12: Coordination Space

1. Select BIM 360 Coordination ribbon
2. Select “Coordination Space”
3. Select BIM 360 Account
4. Select BIM 360 Project
5. Select Model Coordination Space
6. Select Models to append to Navisworks for clash detection

B. Run Navisworks Clash Detection

C. Review and Resolve Clashes:

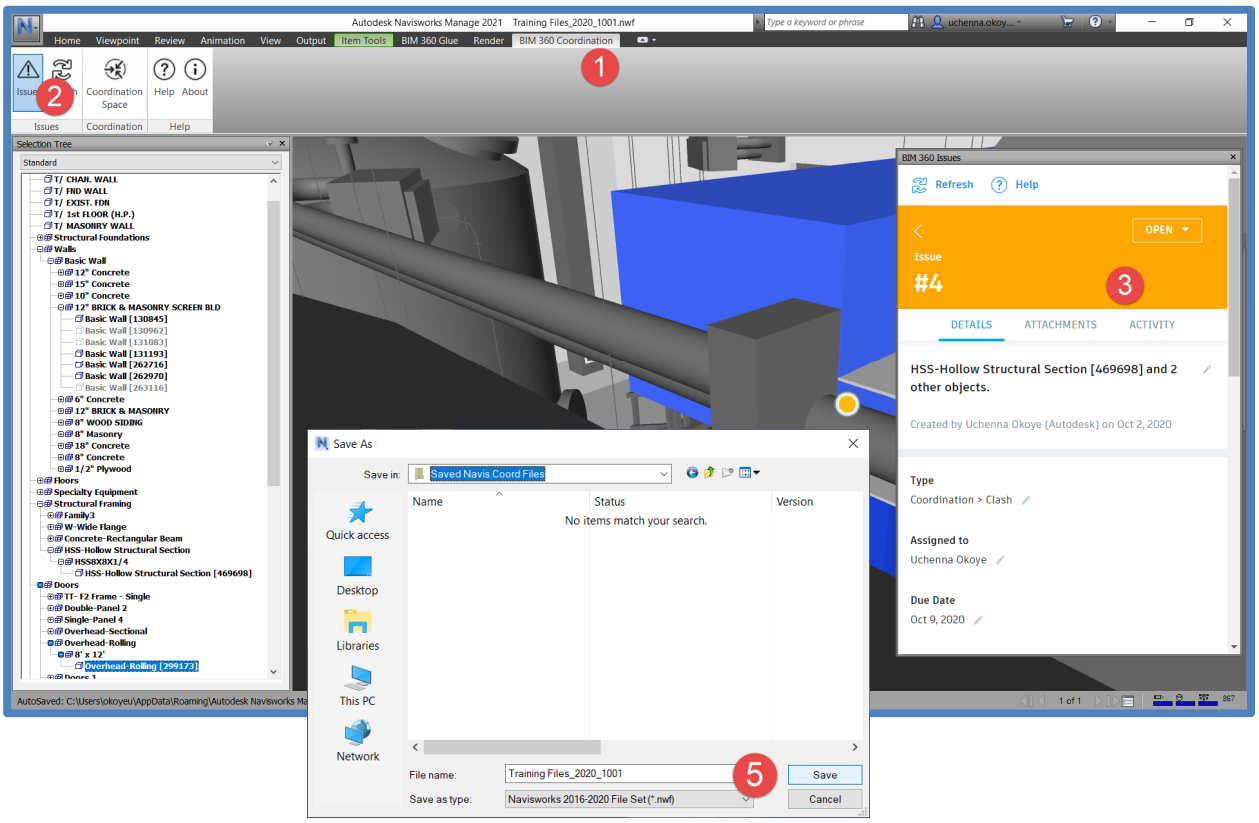

Figure 13: Resolving Clashes

1. Selecting BIM 360 Coordination Ribbon
2. Selecting Issues
3. Resolving BIM 360 Issues from the Navisworks window
4. Then review and resolve Navisworks clashes via the typical saved viewpoint workflow
5. Save as a NWF file back to BIM 360 using the Autodesk Desktop Connector to clash and resolve future coordination file updates in Navisworks

Resources

The following are a set of online resources that may prove to be useful when using BIM 360 Model Coordination, Navisworks Manage:

Autodesk BIM 360 Support Forum:
https://forums.autodesk.com/t5/bim-360-support/bd-p/183

Autodesk Naviswork Support Forum:
https://forums.autodesk.com/t5/navisworks-forum/bd-p/372

Information on Navisworks | BIM 360 Model Coodination Integration:
https://constructionblog.autodesk.com/integrate-navisworks-bim-360/

Autodesk BIM 360 Product Updates:
https://bim360resources.autodesk.com/hot-bim-360-product-updates

Autodesk Virtual Assistant:
https://ava.autodesk.com/

Autodesk All Product Health Dashboard:
https://health.autodesk.com/#