

BIM 360 Docs: One Collaboration App to Rule Them All

Roy Malcolm

Business Unit VDC Manager





About the speaker

Roy Malcolm, VDC Manager

- Leads development, implementation and support of all VDC process across DPR's Northeast Region.
- 2012 Virginia Tech Building Construction graduate
- Enjoys sampling local craft beer and wine, hiking with his wife, and working on his family's cattle and sheep farm in the mountains of Virginia.



Class Summary

BIM 360 Docs: One Collaboration App to Rule Them All

The talk will include insight into the benefits of using BIM 360 Docs on a large project with many stakeholders, including how the team utilized the software for file sharing, model collaboration, design reviews, and drawing management.

Key Learning Objectives

AT THE END OF THIS INDUSTRY TALK YOU WILL BE ABLE TO:

- Discover the value of BIM 360 Docs for collaboration, file sharing, drawing management, and model hosting
- Evaluate the features of BIM 360 Docs compared to other commercially available solutions
- Learn how to set up a folder structure and process for drawing management within BIM 360 Docs
- Learn how to implement lean tips and tricks while using BIM 360 Docs

Why BIM 360 Docs?

Project Overview

- New In-Patient Children's Hospital Tower
- Built around existing outpatient children's hospital
- Project Information
 - 70,000 SF Demolition
 - Below Grade – 4 Stories / 85,000 SF Garage
 - Above Grade – 16 Stories
 - BGSF 500,000SF
 - Fitout 300,000S
 - 20,000 SF Renovation of Existing outpatient children's hospital



Breaking Down Silos



ELECTRICIAN

Structural engineer

Architect

Precast contractor

Mechanical Engineer

General Contractor

Civil Engineer



Collaborative Approach

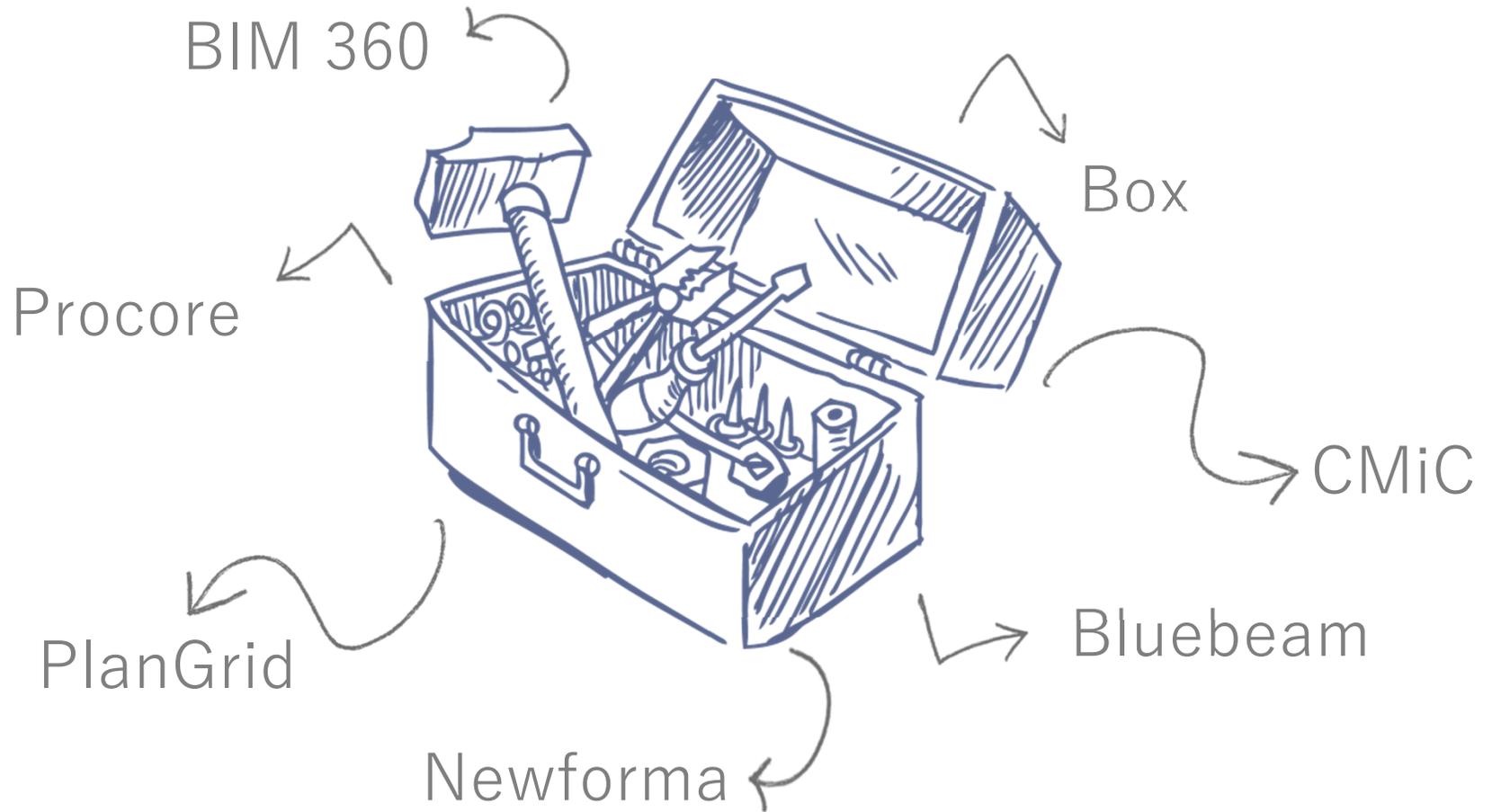
Designing & building together to solve human problems

Model-Based Approach

Integrated Process



Limit the Number of Apps



The Value of BIM 360 Docs



Project Use Cases

1

Collaboration

2

File
Sharing

3

Drawing
Management

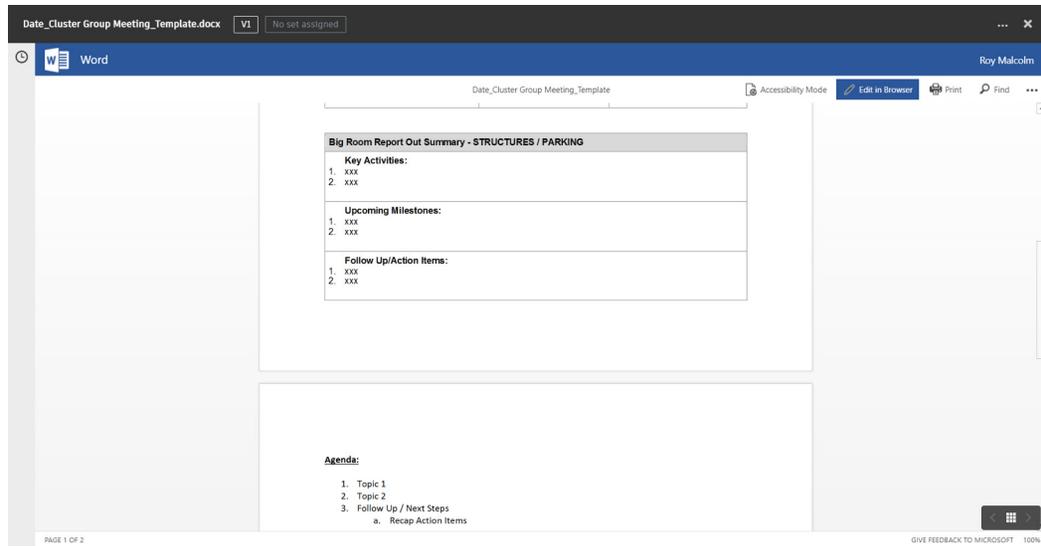
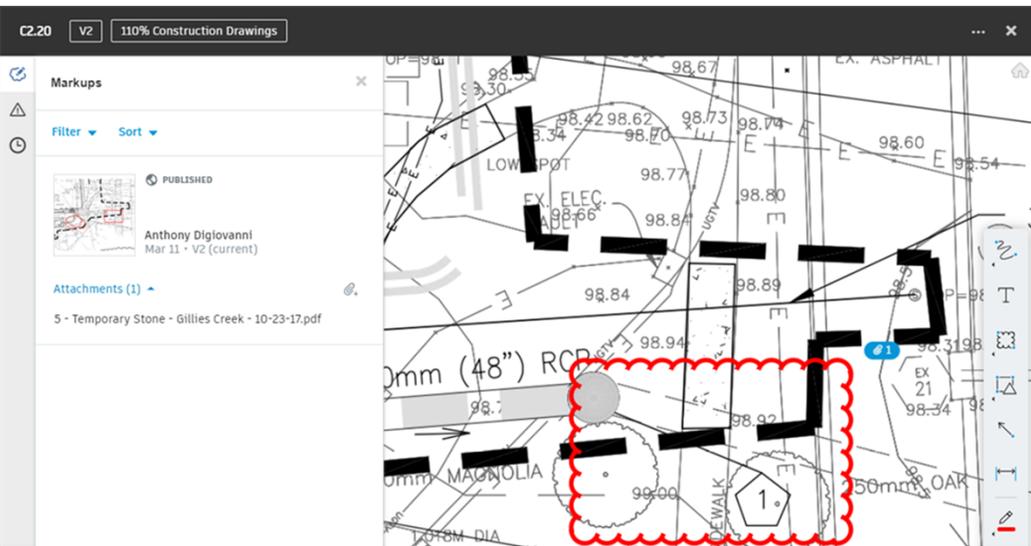
4

Model
Hosting



Collaboration

Keeping all documentation centralized created better transparency into the various project processes and helped to break down traditional work silos



Document Markups

Allowed team members to share comments on design progress drawings without needing to leave Docs, thus eliminating latency for downloading/uploading/converting to other applications. This workflow also lent itself well to other workflows, such as contract language review, pay application approval, and meeting minute corrections.

Microsoft Integration

Not having the ability to open or edit Microsoft documents was a major disadvantage to BIM 360 Docs, and almost caused the project team to seek other solutions. Once the functionality was released, it allowed the team to collaboratively create and edit live documents and spreadsheets

Issues & Field Management

- Utilized Field Management Module for field issuing tracking
- During the shoring installation and excavation phase unsuitable/contaminated soils reports were tracked
 - By linking issues to Assemble, the team was able to provide visuals to better communicate areas where the unsuitable soils were encountered
- Structural engineer site inspections were also tracked using issues
 - Project attributes, such as location and type, were tagged on the issues allowing the team to correct issues faster and keep better metrics

The screenshot shows a web interface for an issue management system. At the top, a blue header bar contains the text 'Issue #5' and a dropdown menu set to 'ANSWERED'. Below the header are three tabs: 'DETAILS' (selected), 'ATTACHMENTS', and 'ACTIVITY'. The main content area is titled 'Unsuitable Soils' and includes a note: 'Created by User has been removed from project on Jul 23, 2019'. A red callout box points to the 'ATTACHMENTS' tab with the text 'Screenshots from Assemble Added as Attachments'. The interface is divided into two columns for project attributes. The left column includes: 'Assigned to' (Unspecified), 'Due Date' (Unspecified), 'Location' (New Tower > Underground), 'Location Details' (Unspecified), and 'Linked document' (Unspecified). The right column includes: 'Type' (Design > Existing Condition), 'Owner' (Unspecified), and 'Root Cause' (Unspecified). A second red callout box points to the 'Location' field with the text 'Project Attributes'. At the bottom, the 'Description' field contains the text: 'Unsuitable soils were encountered on 7/22/19 at SB27 at approximately -30ft.'. The 'Response' field is currently 'Unspecified'.



Pins identifying the piles where unsuitable soils were found

Unsuitable Soil Tracking

Visuals attached to issues identifying locations where the soils were encountered

Issue Activity

- Activity log specific to each issue
- Provides detailed history of an issue, including status changes, dates, linked documents, and comments
- Organizes the process and keeps all content related to an issue centralized for easy reference

Issue #5

ANSWERED

DETAILS ATTACHMENTS **ACTIVITY**

Activity log specific to each

Former user Jul 23, 1:07 PM
Assemble link: <https://dpr-northeast.tryassemble.com/projects/5#views/32/snapshot/4/issue/5>

Former user Jul 23, 1:09 PM
Sub-Type Existing Condition

Former user Jul 24, 8:47 AM
Status **OPEN** → VOID

Roy Malcolm Oct 28, 7:57 PM
Status VOID → **ANSWERED**

Children's Hospital

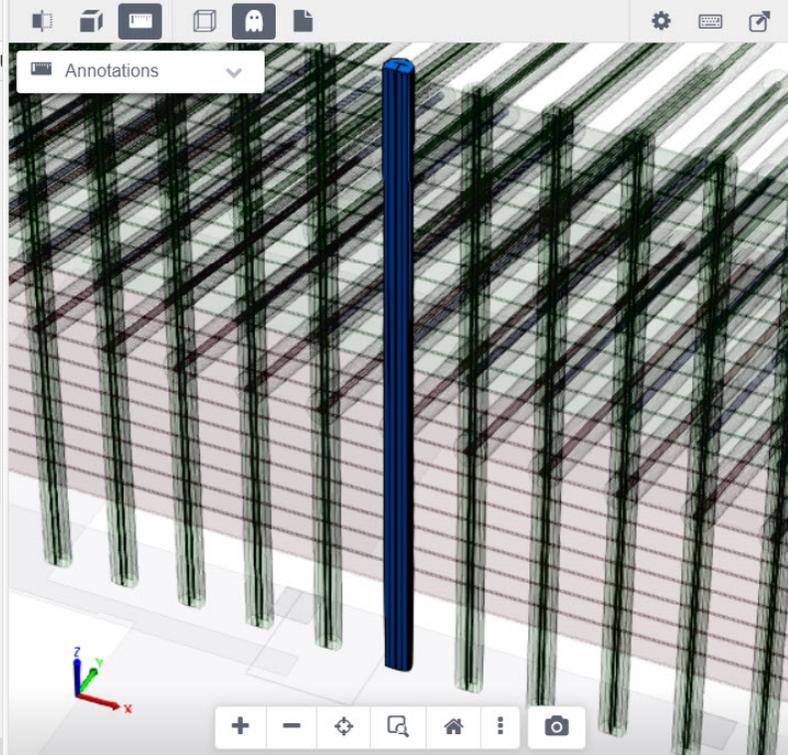
1 Selected 1 EA Inspect Change Visibility

SOE_Status Tracking Show Changes

Grid 3D View Document

Group by: Category Columns Estimate Import/Export

Name	Quantity
3369712	
Structural Columns : HP-Bearing Pile-Column : SB34(HP...	
Structural Columns : HP-Bearing Pile-Column : SB35(HP...	
Structural Columns : HP-Bearing Pile-Column : SB36(HP...	
Structural Columns : HP-Bearing Pile-Column : SB37(HP...	
Structural Columns : HP-Bearing Pile-Column : SB38(HP...	
Structural Columns : HP-Bearing Pile-Column : SB39(HP...	
Structural Columns : HP-Bearing Pile-Column : SB4 (HP1...	
Structural Columns : HP-Bearing Pile-Column : SB40(HP...	
Structural Columns : HP-Bearing Pile-Column : SB41(HP...	
Structural Columns : HP-Bearing Pile-Column : SB42(HP...	
Structural Columns : HP-Bearing Pile-Column : SB43(HP...	
Structural Columns : HP-Bearing Pile-Column : SB44(HP...	
Structural Columns : HP-Bearing Pile-Column : SB45(HP...	
Structural Columns : HP-Bearing Pile-Column : SB46(HP...	
Structural Columns : HP-Bearing Pile-Column : SB47(HP...	



Documents

SB-33_PILE INSTALLATION LOG_05-552

Download Latest

Created Sam Heiberger on 08/08/2019

Last modified Sam Heiberger on 08/08/2019

File Path 04 Sub File Transfer/Schnabel Foun

Linked Instances (1) Select All

Source Id	Type

Assemble Integration

Files from BIM 360 linked to specific elements in Assemble



File Sharing

Promoting lean behavior and eliminating redundancy

File Sharing w/ Docs

USER MANAGEMENT

INTUITIVE & ADAPTABLE

Docs allows for access to be controlled in multiple ways, including by role or company. Control can also be set at the folder level

FILE TYPES

MANY TYPES OF FILES

The team needed to share all kinds of file types, and Docs was one of the few solutions that not only allowed for multiple file types to be shared, but viewed as well

SINGLE SOURCE OF TRUTH

ONE STOP SHOP

Docs allowed a team member to upload a file once, then allowed all proceeding processes to take place within docs without needing to download or save the file elsewhere

DOCUMENT REVIEW

SUBMITTAL PROCESS

Bluebeam Integration with BIM 360 allowed team members to utilize a process they were familiar with, while still maintaining Docs as the main collaboration platform

User Management

330

PROJECT MEMBERS

And we are just getting started!

72

COMPANIES

Does not include most of the trade partners yet to be onboarded

19

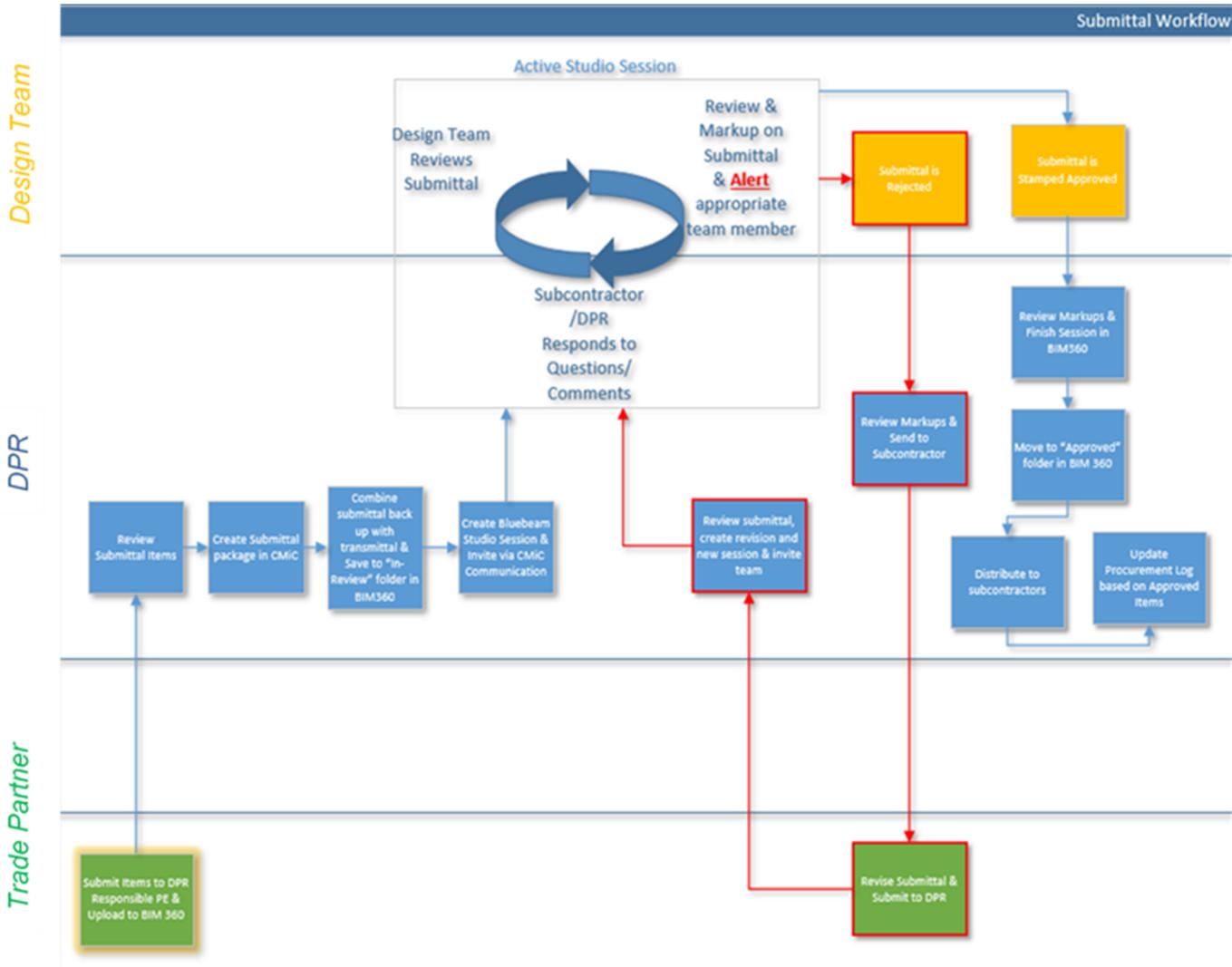
ADMINS

Each of the major stakeholders have "BIM 360 Champions"

2

CLASSIC APPS

BIM 360 Plan & Glue



Submittal Process w/ Bluebeam Integration

- Submittals uploaded to Docs by trade partner
- DPR reviews and moves to another folder called "in review" and creates a Bluebeam Studio Session
- Once approved, the Studio Session is closed and DPR saves the approved version with all markups to the "Approved Submittals" folder on Docs for team consumption
- While Docs contains a Review function that allows for cascading reviews, the team needed a solution that allowed for simultaneous review by multiple parties, and many team members had custom Bluebeam tools used for submittal review and markup

Folder Structure

1. Current Set

- This folder hosts all current contract drawings broken down by discipline.

2. Project Manager, Architect, Contractor files

- This folder is for the sharing of files between these stakeholders

3. Shared Files

- Hosts all project related documents including specifications, approved submittals, answered RFI's, safety plans, etc

4. VDC

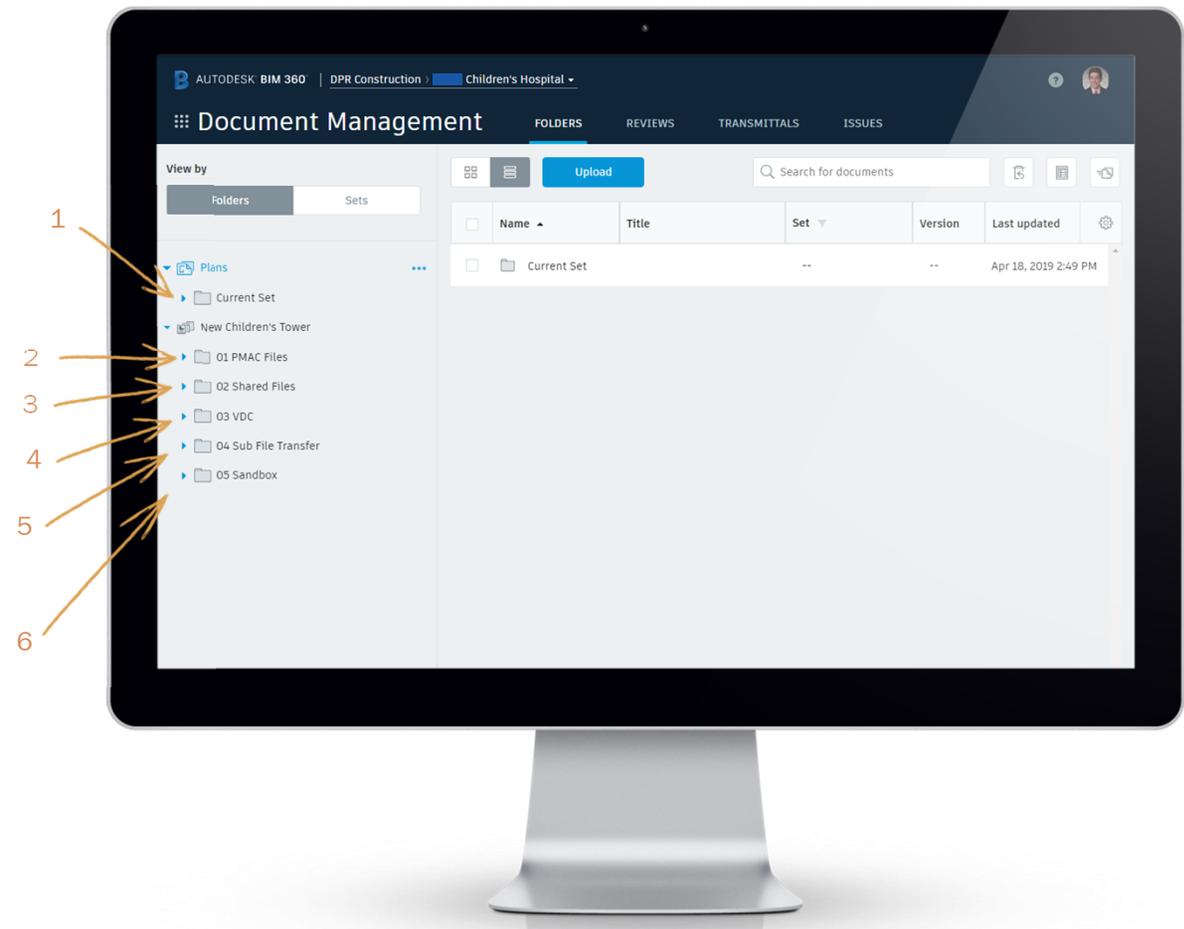
- Houses live models from each team member as well as all documentation related to BIM/VDC

5. Sub File Transfer

- This folder is for subcontractors to upload project specific documents for review

6. Sandbox

- Personal storage for each team and project member to use as needed



Drawing Management

An integrated component of the collaboration software solution



Drawing Categories



Design Snap Shots

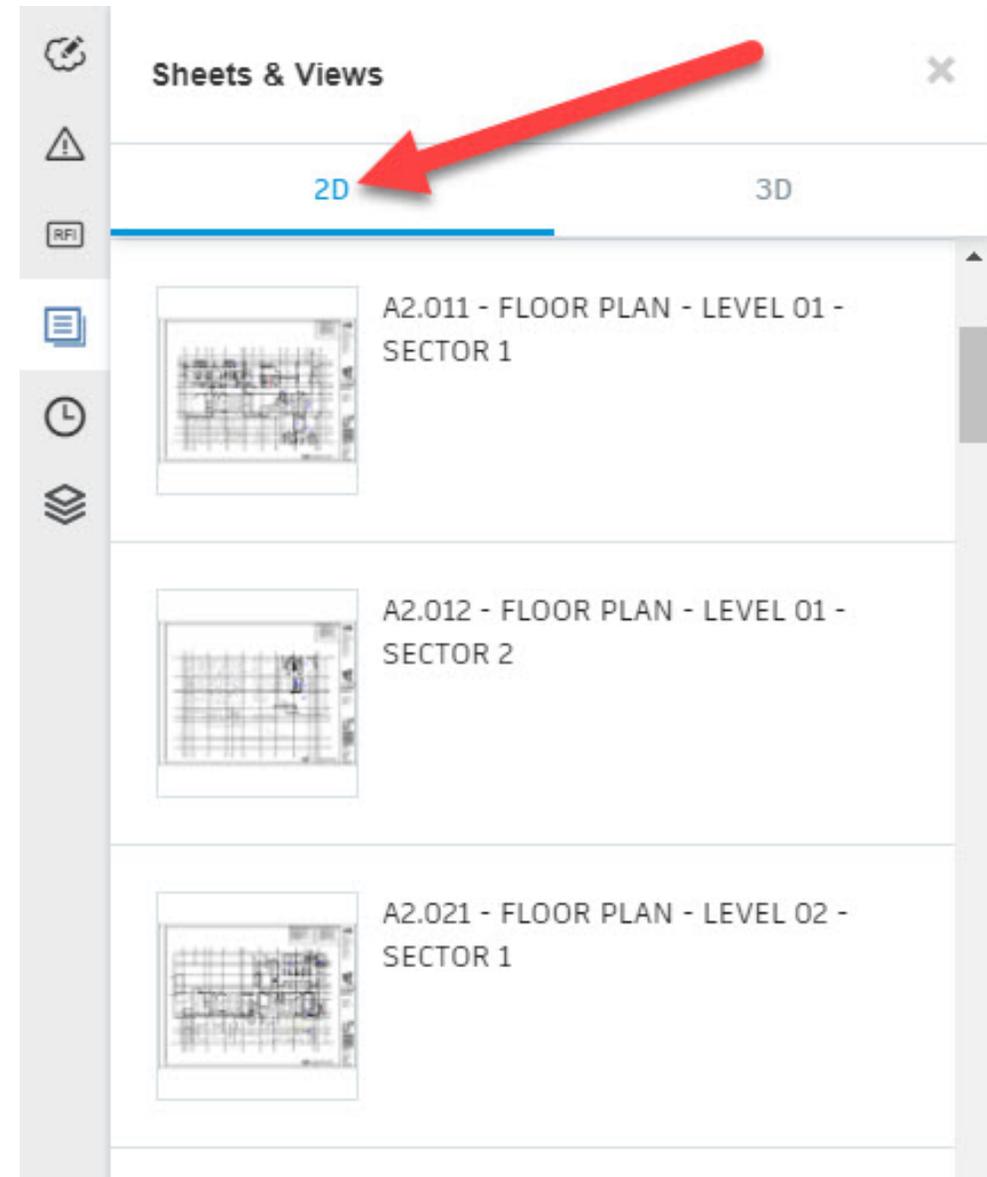
Progress
Prints

Issued for
Construction

Design Snap Shots

Live view of progress design drawings

- The team originally planned to print design update sets from Revit on a weekly basis, which was a huge source of waste given the time it takes to prepare and print sets from Revit
- Sheet views shared when Revit models are published to Docs
- Automatic publish times were set for all Revit models to ensure progress updates were shared weekly at a minimum
- This process encourages users to view the models more since the model viewer must be opened in order to find the sheets
- The compare tool in BIM 360 is used to review and track changes week to week



Folders

Sets

- ▼ Plans
 - ▶ Current Set
- ▼ New Children's Tower
 - ▼ 01 PMAC Files
 - 01 Weekly Reports
 - ▶ 02 Progress Photos
 - ▶ 03 Closeout Documents
 - ▶ 04 Design Estimates
 - ▼ 05 Progress Prints
 - 00 Document Log (Not up to date)
 - ▶ 01 Planning
 - ▶ 02 Exterior Design
 - ▶ 03 Engineering

Progress Prints

PDF set of drawings printed from Revit at progress milestones

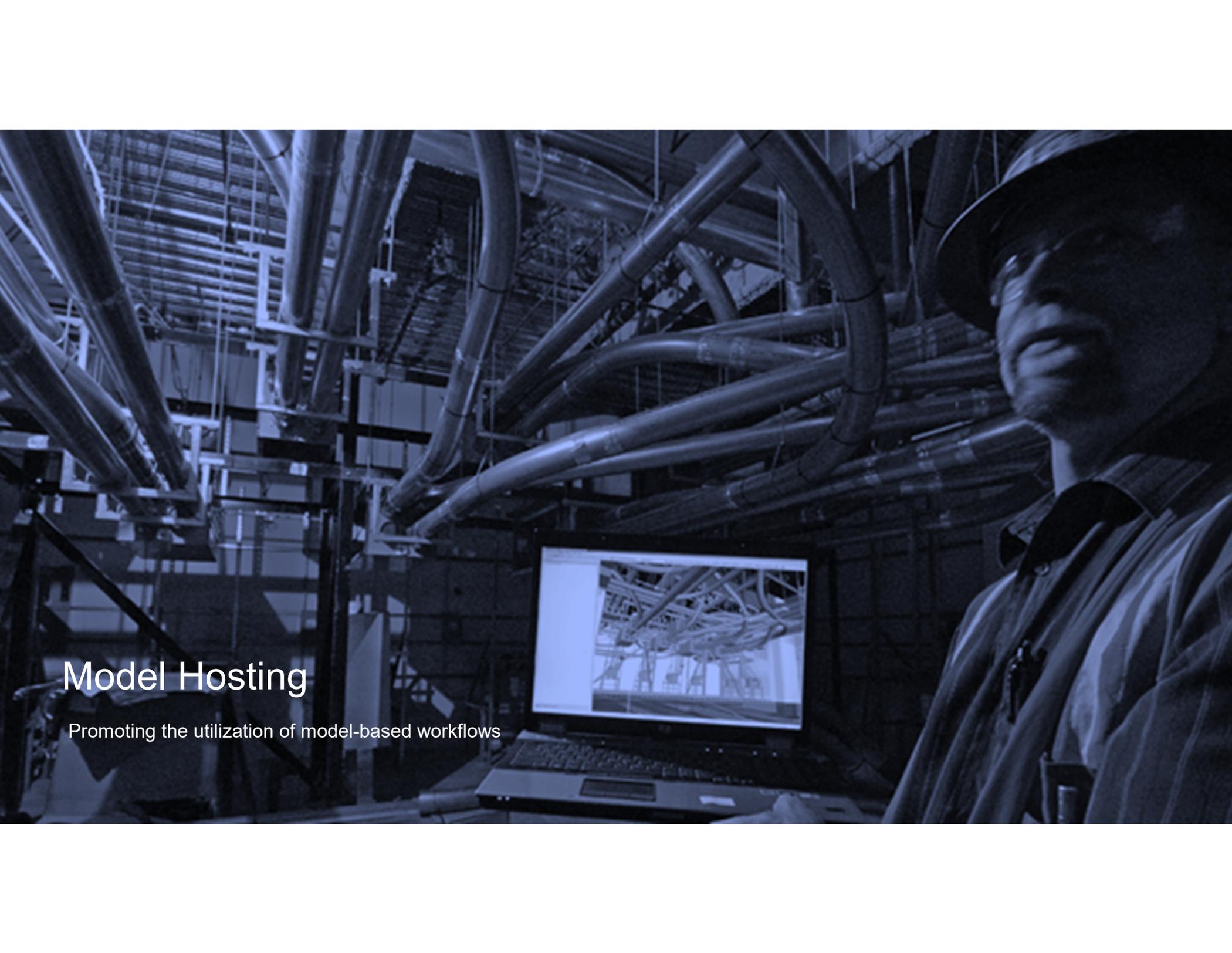
- The drawings were used to document the status of the design at important progress milestones
- Progress prints were saved in a folder with access restricted to DPR and the design team
- Bluebeam Studio Sessions were used to capture comments for a set period

Document Management								FOLDERS	REVIEWS	TRANSMITTALS	ISSUES
View by		<input type="button" value="Folders"/> <input checked="" type="button" value="Sets"/>									
Set		<input type="text" value="Current set"/> <input type="button" value="Manage sets"/>									
<input type="checkbox"/>	Name ^	Title	Set	Version	Last updated	Updated by	Path	Description			
<input type="checkbox"/>	A0.00	ARCHITECTURAL TITLE SHE...	CR19.2 Foundation...	V5	Sep 25, 2019 5:36 AM	Atuldeep Joon	Plans/Current Set/0...	A0-00 - COVER SHEET, PROJECT INFO AND INDEX_FOUNDATI...			
<input type="checkbox"/>	A0.01	SHEET INDEX & PROJECT I...	CR024.1	V2	Sep 25, 2019 5:30 AM	Atuldeep Joon	Plans/Current Set/0...	Architectural.pdf			
<input type="checkbox"/>	A1.10	GRID DIMENSIONAL CONTR...	Foundation Packa...	V1	Jun 26, 2019 10:28 AM	Collin Fish	Plans/Current Set/0...	Architectural Struct Package.pdf			
<input type="checkbox"/>	A2.00	ARCHITECTURAL FOUNDATI...	CR019.1_Foundati...	V2	Sep 25, 2019 3:59 AM	Atuldeep Joon	Plans/Current Set/0...	Architecture.pdf			
<input type="checkbox"/>	A2.0G1C	FLOOR PLAN - GROUND LEV...	CR024.1	V2	Sep 25, 2019 5:30 AM	Atuldeep Joon	Plans/Current Set/0...	Architectural.pdf			
<input type="checkbox"/>	A2.011C	FLOOR PLAN - LEVEL 01 - S...	Concrete Set CD	V1	Sep 3, 2019 3:57 AM	Atuldeep Joon	Plans/Current Set/0...	2019-08-30_Arch Concrete CD.pdf			
<input type="checkbox"/>	A2.B21C	FLOOR PLAN - LEVEL B2 - S...	CR024.1	V2	Sep 25, 2019 5:30 AM	Atuldeep Joon	Plans/Current Set/0...	Architectural.pdf			
<input type="checkbox"/>	A2.B31C	FLOOR PLAN - LEVEL B3 - S...	CR024.1	V2	Sep 25, 2019 5:30 AM	Atuldeep Joon	Plans/Current Set/0...	Architectural.pdf			
<input type="checkbox"/>	A2.B41C	FLOOR PLAN - LEVEL B4 - S...	CR024.1	V2	Sep 25, 2019 5:30 AM	Atuldeep Joon	Plans/Current Set/0...	Architectural.pdf			

Issued for Construction

Drawings issued to the field for construction

- Due to the fast-tracked schedule, the construction documents were delivered in packages
- To keep design progress drawings separate from IFC drawings, the team utilized the Plans folder to only store IFC documents
- Plans functions in a similar way to PlanGrid, which other DPR projects use heavily

A construction worker wearing a hard hat and safety glasses is looking at a laptop. The laptop screen displays a 3D model of a complex pipe system, which is also visible in the background of the image. The scene is dimly lit, with the primary light source being the laptop screen. The worker is wearing a light-colored shirt and a dark jacket. The background shows a dense network of pipes and structural elements, typical of an industrial or construction site.

Model Hosting

Promoting the utilization of model-based workflows

History

SOE_VCUH_SCHNABEL_VC_R19.rvt

V7 **CURRENT**

Uploaded by Pravin Gaikwad. Aug 27th, 04:54 am

V6

Uploaded by Pravin Gaikwad. Jul 19th, 11:00 am

V5

Uploaded by Pravin Gaikwad. Jul 16th, 03:41 am

V4

Uploaded by Pravin Gaikwad. Jul 12th, 08:43 am

V3

Uploaded by Pravin Gaikwad. Jul 12th, 02:45 am

V2

Uploaded by Pravin Gaikwad. Jul 12th, 02:05 am

V1

Uploaded by Pravin Gaikwad. Jul 12th, 02:04 am

HP-Bearing Pile-Column [3369656]

Name HP-Bearing Pile-Column [3369656]

Constraints

Column Location Mark $P(3' - 7 \frac{3}{4}'') - 2.9(-6' - 2 \frac{3}{4}'')$

Base Level Reference Datum

Base Offset 100'

Top Level Reference Datum

Top Offset 168'

Column Style Vertical

Moves With Grids No

Materials and Finishes

Model Viewer



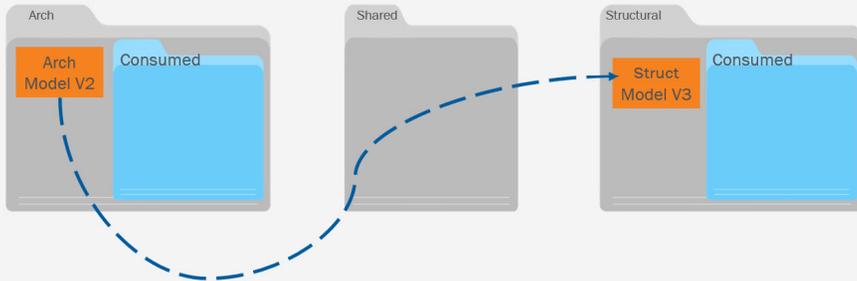


Model Comparison

Visual change analysis

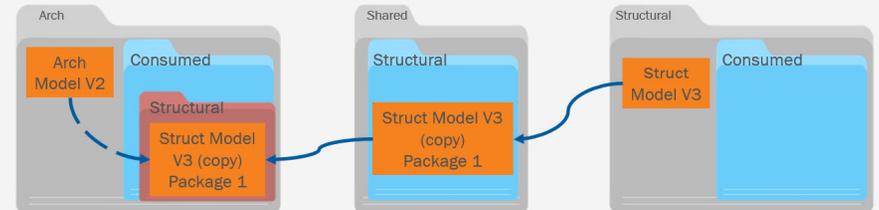
Live Linking

- Traditional process from classic C4R
- Creates a live link to latest version of model, so there is no control over what is shared
- Team providing live access to their model must give the other team “View” permission to access its team folder, which lets this team view and link to the model but not edit it



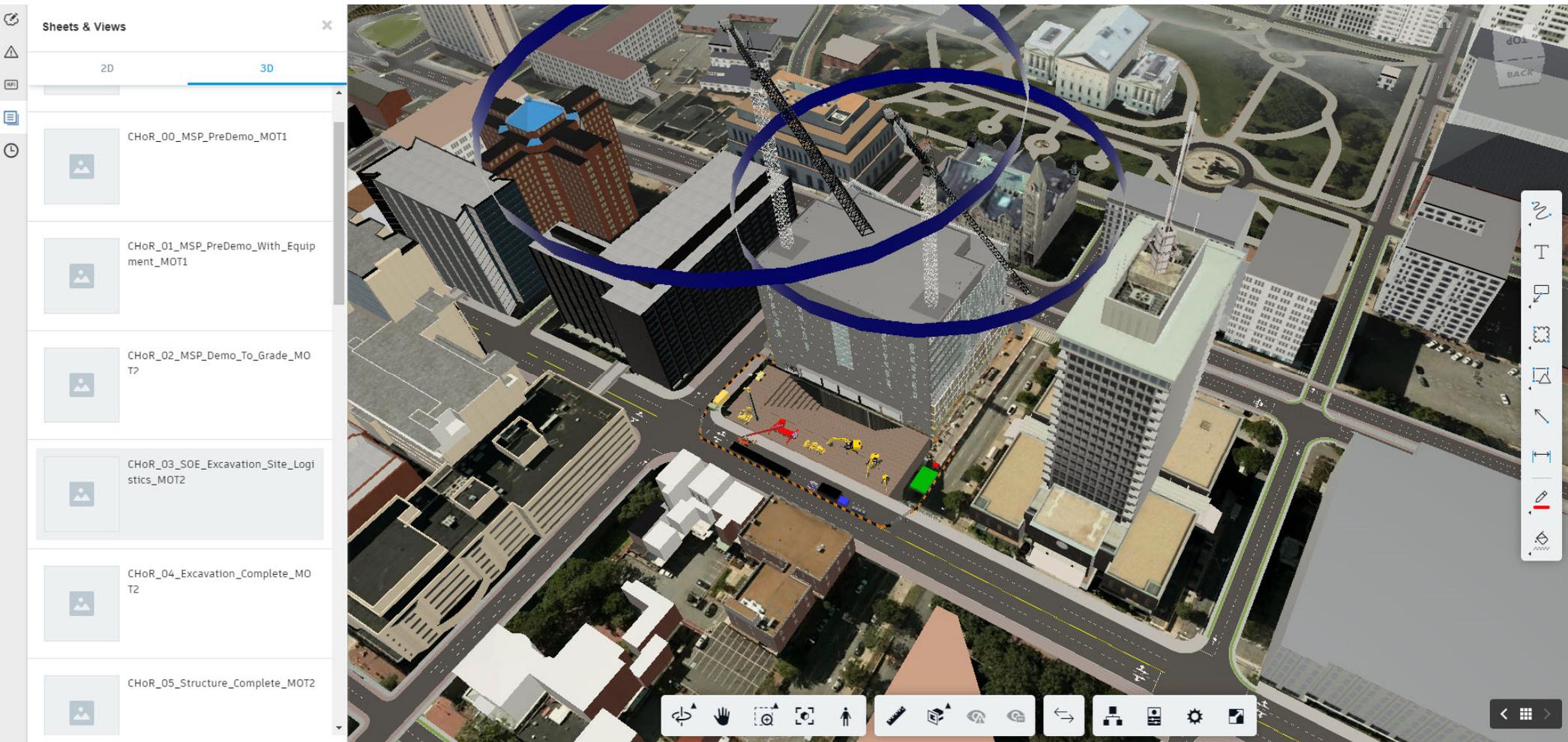
Controlled Sharing

- Full control over what version of model and plans are shared
- Each team controls what is shared with other teams and what is consumed from other teams
- Teams can only view models/sheets in their team folder or the shared folder



Live Linking vs Controlled Sharing

- During design it was critical for each stakeholder to have a live view of each other’s models in order to expedite coordination
- The Design Collaboration module was not used for controlled sharing during design, but teams were setup under Design Collaboration so that the folder structure was ready for future processes
- The team plans on using Controlled Sharing once design is complete to manage how design changes during construction are distributed and tracked



Infraworks

3D interactive site logistics plans and phasing



Infraworks

Street level logistics planning

Evaluation of BIM 360 Document Management



Solution	Model Hosting	Model Viewing	Issue Management	User Management	Collaboration	Mobile Access
BIM 360 Docs	++	++	++	++	++	+
PlanGrid	-	-	++	++	+	++
Box	+	-	-	+	-	+
Bluebeam	+	+	+	+	++	+
Newforma	+	-	+	++	+	+

Legend:

- Poor functionality or not included
- + Function Available
- ++ Best in class

BIM 360 Comparison Chart

The use of BIM 360 Docs was largely successful, although not without setbacks and growing pains

Drawbacks & Challenges

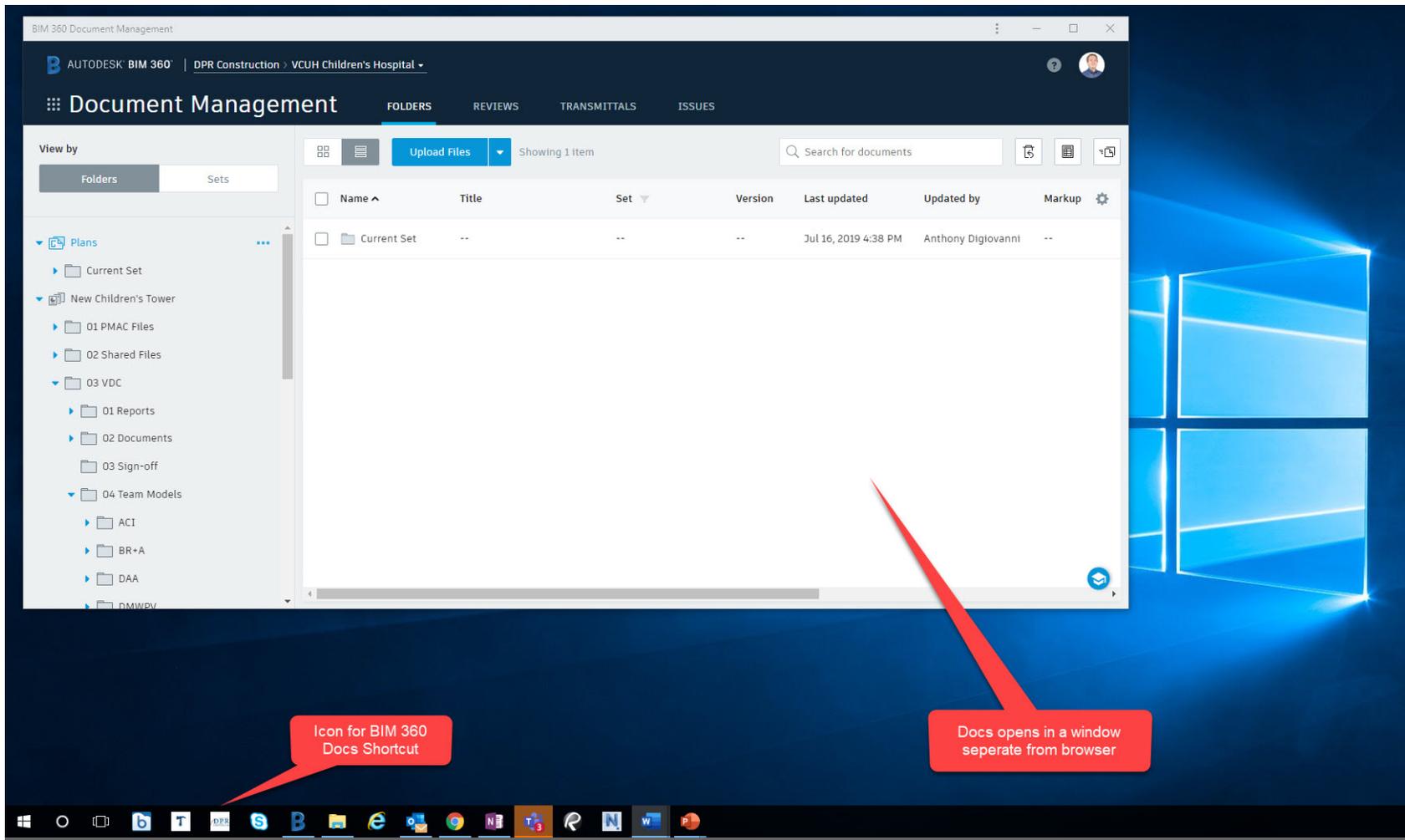
DRAWBACKS ENCOUNTERED BY THE PROJECT TEAM INCLUDED:

- A greater learning curve with Docs
- Links can only be shared at the folder level
- Insight and Project Home lacked key features
- The BIM 360 Coordinate module lacked key features for model coordination
- The mobile application for BIM 360 was not as user friendly at the time as other popular applications

Lean Tips & Tricks

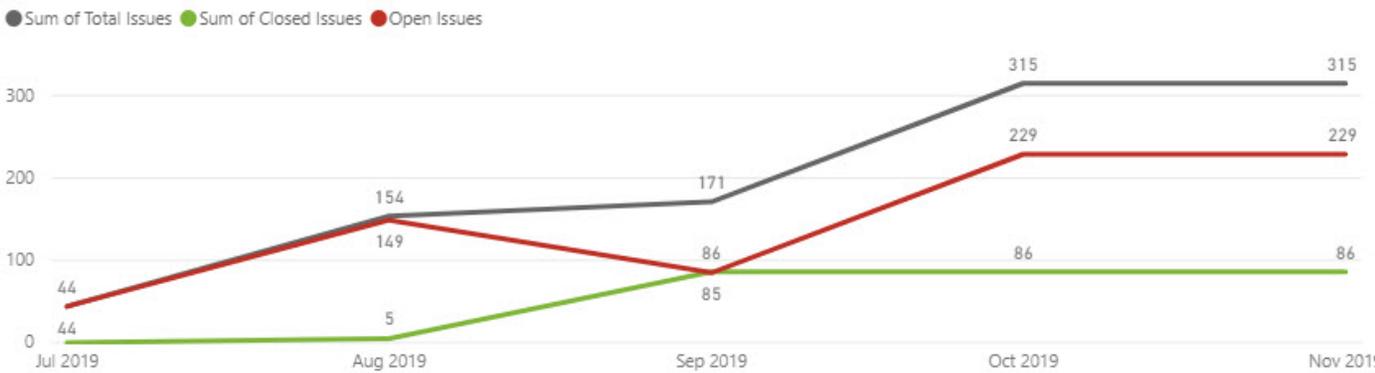


Use Google Chrome for
BIM 360

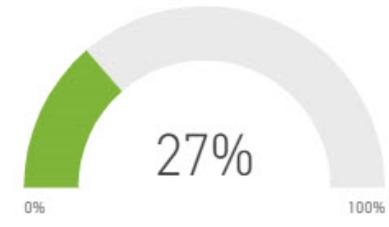


Create a desktop shortcut “application” for Docs

Number of Issues by Month



Current Percentage of Closed Issues



50.65
Average Age of Open Issues

27.65
Average Days to Resolve Issues

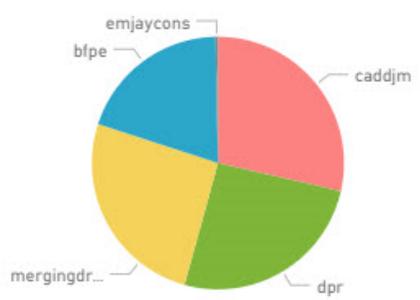
Issue Status

- 01 Open
- 04 Closed
- 05 On Hold
- 06 Roadblock

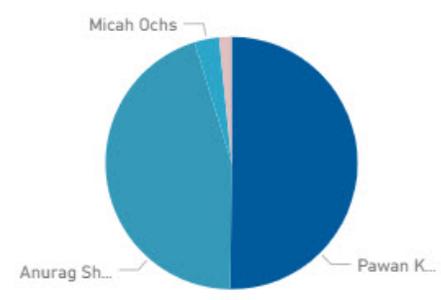
Issue Zone

- A

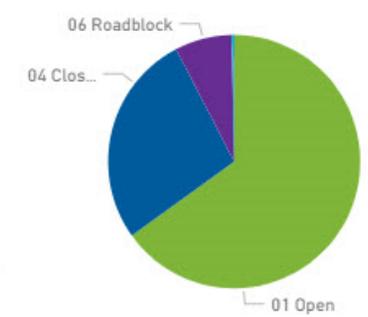
Count of Issues by Company



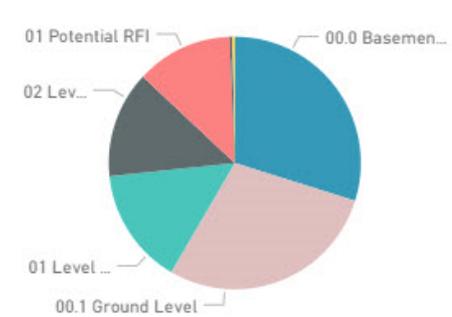
Count of Issues by Author



Count of Issues by Status



Count of Issue Ids by Issue Tier



Assigned to Company

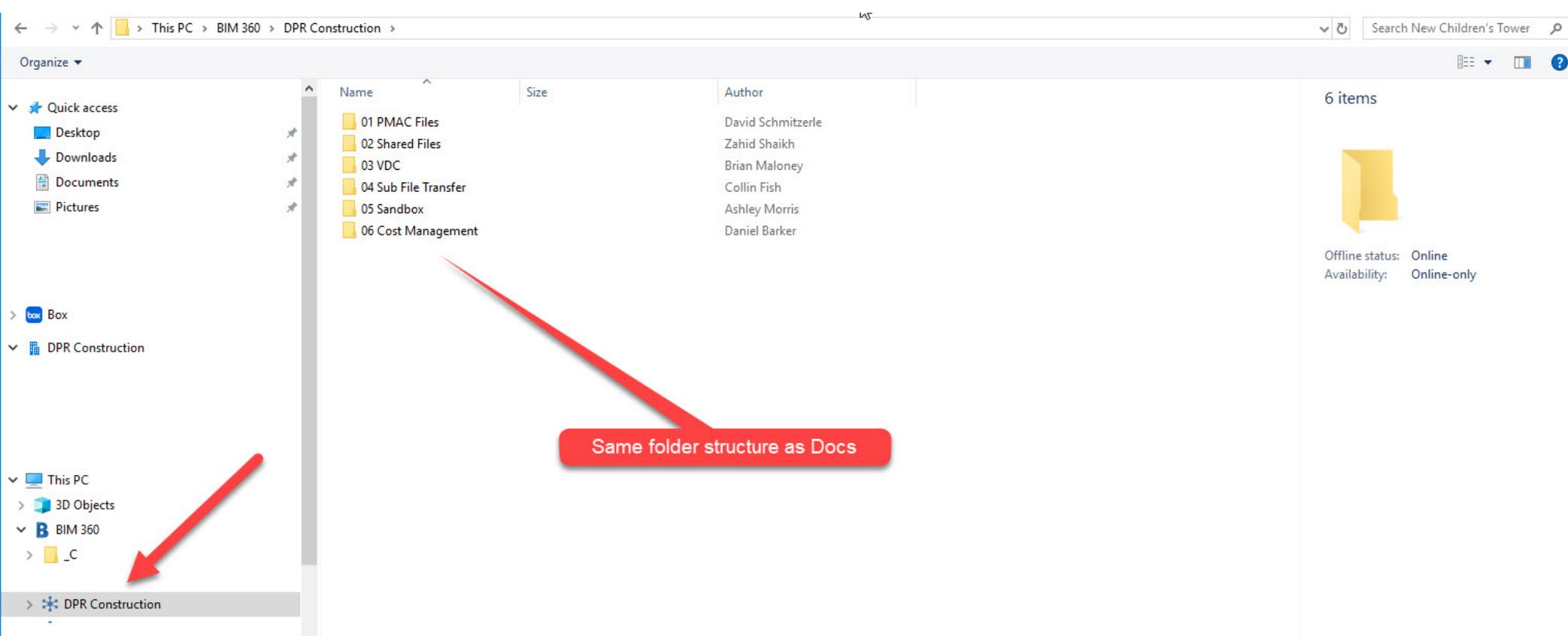
- bfpe
- caddjm
- dpr
- emjaycons
- mergingdraftingsolutions

Issue Type

- 00 Modeling Error
- 03 Constructability
- 04 Operations/Maintenan...
- 06 Trade Coordination
- 07 Field Coordinated

Link Dashboards in Power BI to Project Home

Cards can be created for many third-party integrations

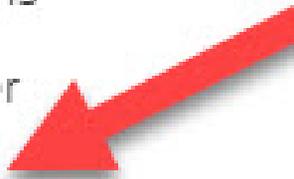


Take Advantage of the Desktop Connector

Ensure that the project team understands the limitations compared to standard Windows File Explorer

Subscribe to Folders

- By subscribing to a folder, an email notification will be sent whenever a file is added or changed
- This is critical for workflows related to design progress updates, submittals, and RFI's
- The blue checkmark indicates that the folder is subscribed to

- + Add Subfolder
 - Rename
 - Upload ▶
 - Share
 - Add Attributes
 - Sort by ▶
 - Delete
-
- Permissions
 - PDF Viewer
 - ✓ Subscribe 
 - Submit for review
 - Create transmittal



Use Mobile Devices Capable of Handling BIM 360

Older devices tended to crash. It is also important to make sure team members update the app regularly

Create Permissions by Both Company & Role

- Allows for flexibility when granting permission to certain folders
- For example, “BIM Manager” has a higher level of access to the VDC folder than companies

Permissions - 02 Shared Files

Users: 24 Companies: 32 Roles: 1

Add

Search for name or email

Name	Permission Level	Type	
Langdon Lynch	Folder Control	User	Project Ad...
Collin Fish	Folder Control	User	Project Ad...
▶ Subcontractor	View/Download+Upload	Role	Remove
▶ DPR - SPW	View/Download+Upload	Company	Remove

AUTODESK BIM 360 | DPR Construction

Account Admin PROJECTS MEMBERS COMPANIES ANALYTICS **SETTINGS** APPS

Profile Business Units Custom Integrations Admin Activities

DPR CONSTRUCTION

DPR Construction

View Account ID

Services Settings

Allow Field Project Admins to add partner companies



Disable "Allow Field Project Admins to add partner companies"
in your host admin settings

Avoid Duplicate Companies

This will create problems with access rights

BIM 360 Release Notes

Search ...

NEXT GEN BIM 360

BIM 360 Docs Update – August 2019

Joan Allen September 10, 2019

Share | (5) | Save | 0 | 0

During the month of August, the BIM 360 team delivered a number of features and enhancements to improve document collaboration, visibility, and control:

- Document Control
 - File-level Activity Log
 - Document Log – now with custom attributes
 - Set deletion
- Review and Markup
 - Review workflow report (individual review)
 - New callout markup tools (text with arrow and cloud)
- Updated Issues feature (ability to re-open and other usability improvements)
- Other improvements
 - Search results in thumbnail view (in addition to list view)

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