

Scrub, Tina, Scrub! Oregon State Hospital Case Study in Keeping a Clean Autodesk® Revit® Model

Thomas Whisker, AIA, LEED AP
BIM Coordinator - HOK

Scrub!!



Oregon State Hospital Junction City

Oregon State Health Authority
Junction City, Oregon

Architect

HOK - San Francisco, CA

Associate Architect

SRG – Portland, OR

Landscape Architect

Walker Macy – Portland, OR

General Contractor

Hoffman - Portland, OR

Civil Engineer

Westlake – Portland, OR

Structural Engineer

KPFF – Portland, OR

MEP Engineers

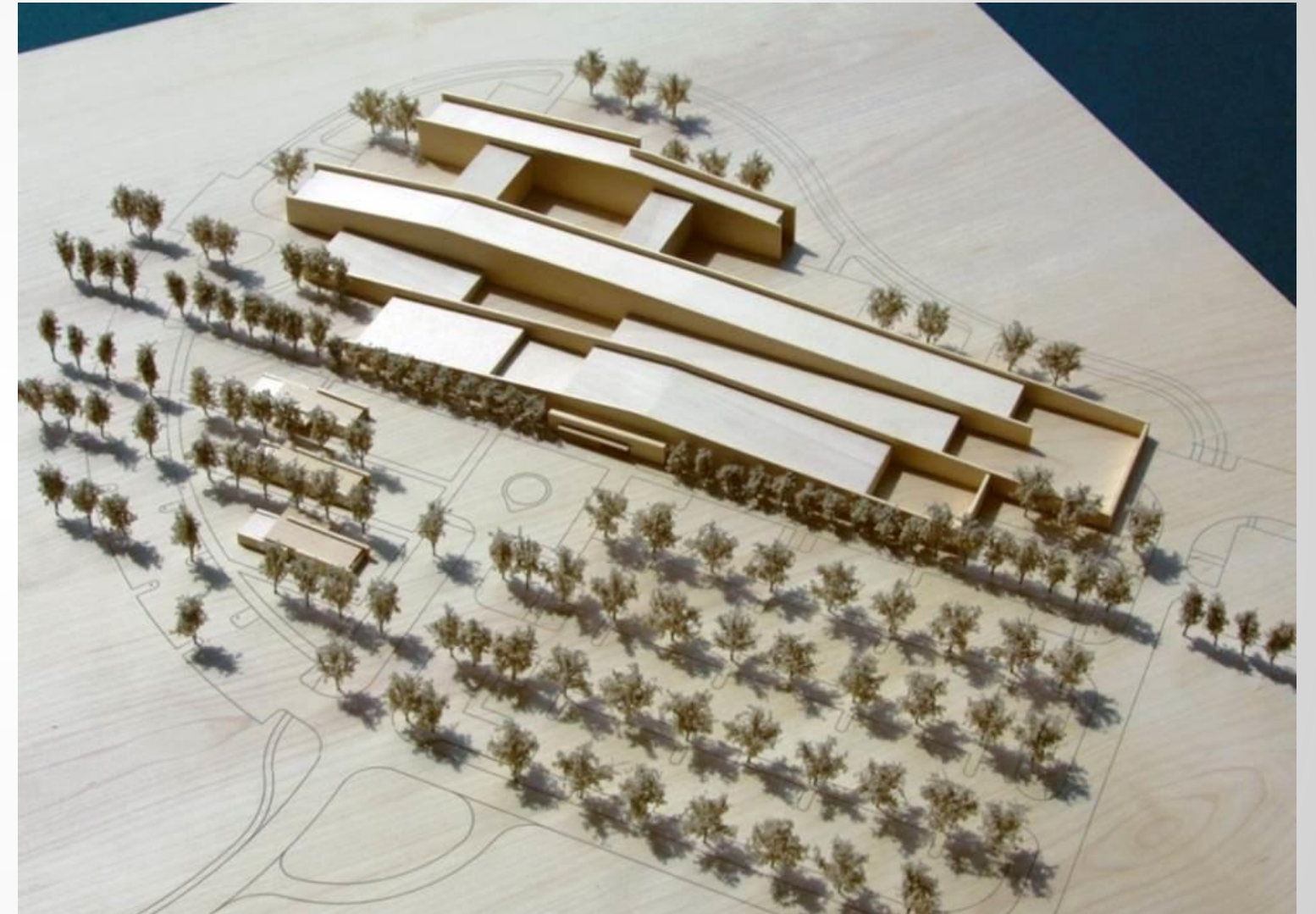
AEI - San Francisco, CA

Construction Manager

CH2MHill - Portland, OR

Junction City Campus

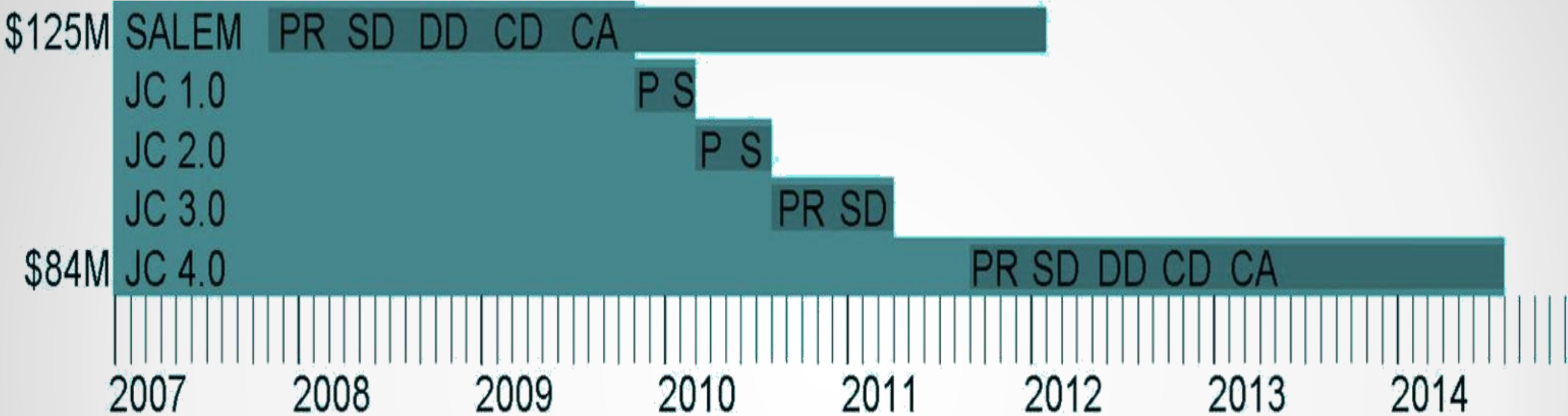
- Oregon State Mental Health Facility
- Multi-Campus Project
- New Construction on Greenfield Site
- 220,000 SF Hospital
- 3 story facility with (3) one story resident bungalows
- Programming through CA



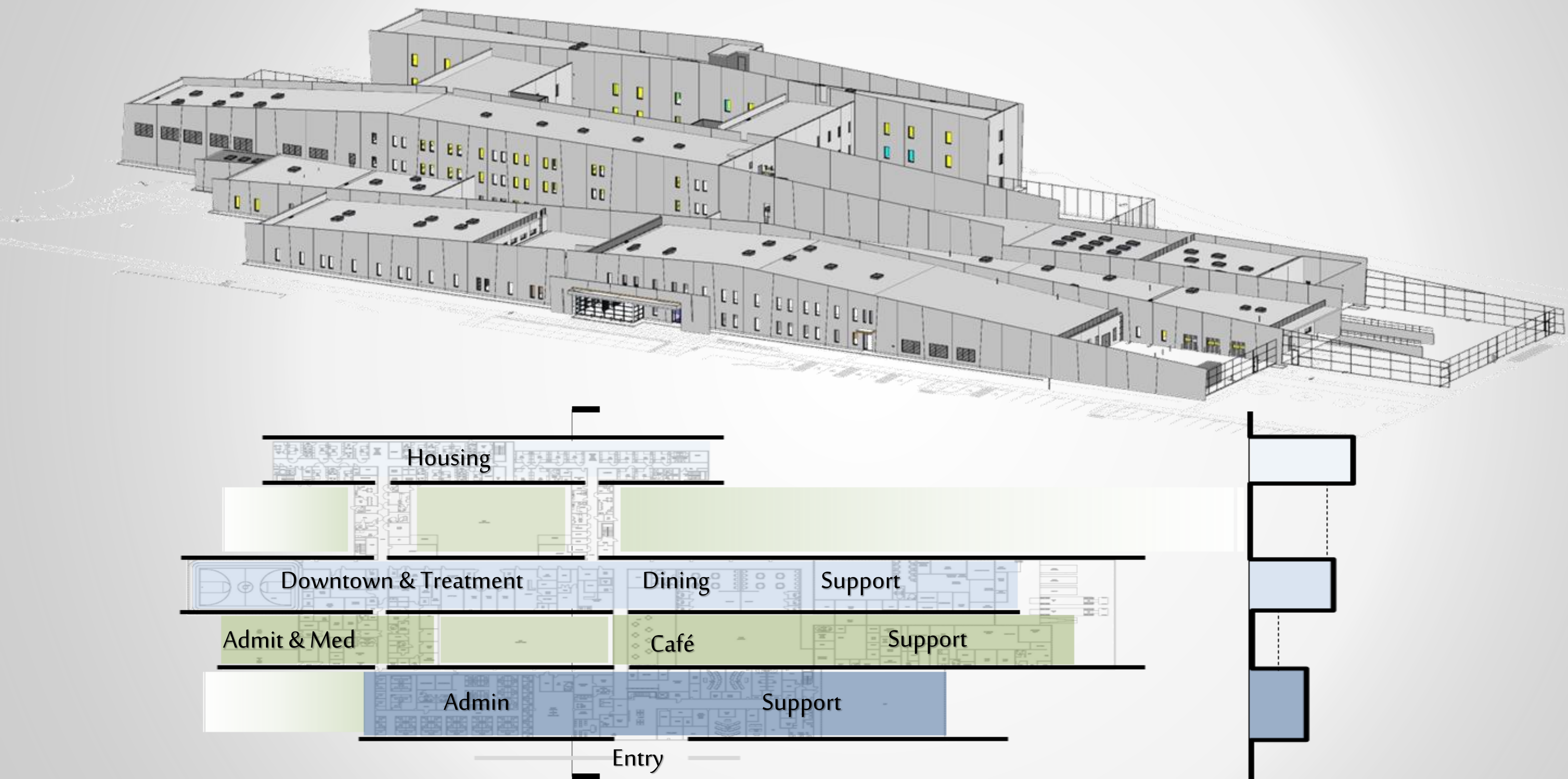
Salem Campus



The Budget



The Design



The Design Team



PHASE

SCHEMATIC DESIGN
DESIGN DEVELOPMENT
CONSTRUCTION DOCUMENTS
CONSTRUCTION ADMINISTRATION

HOK	SRG
75%	25%
75%	25%
50%	50%
00%	100%



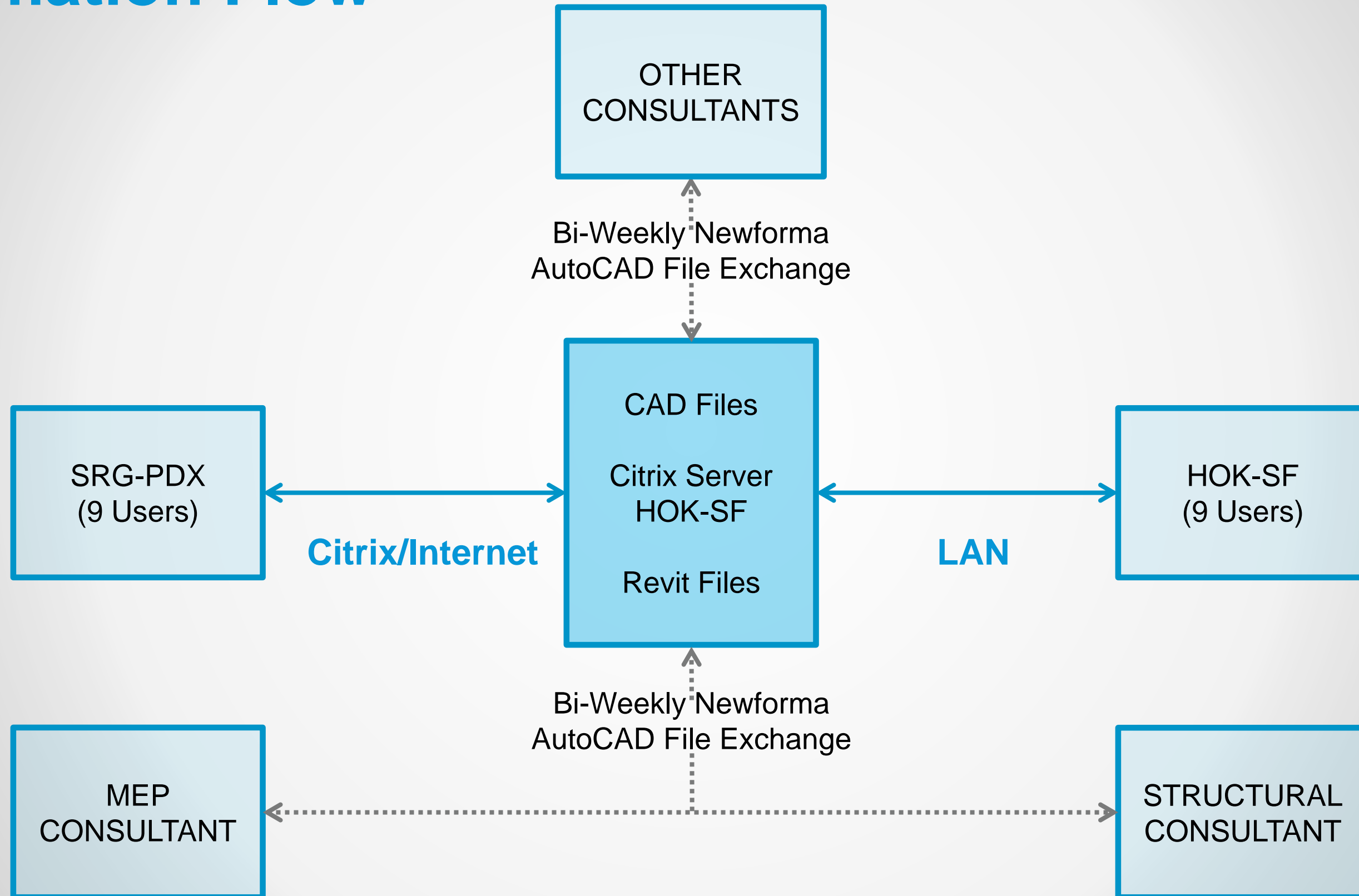
Construction Documentation
Scope Split

The Challenges

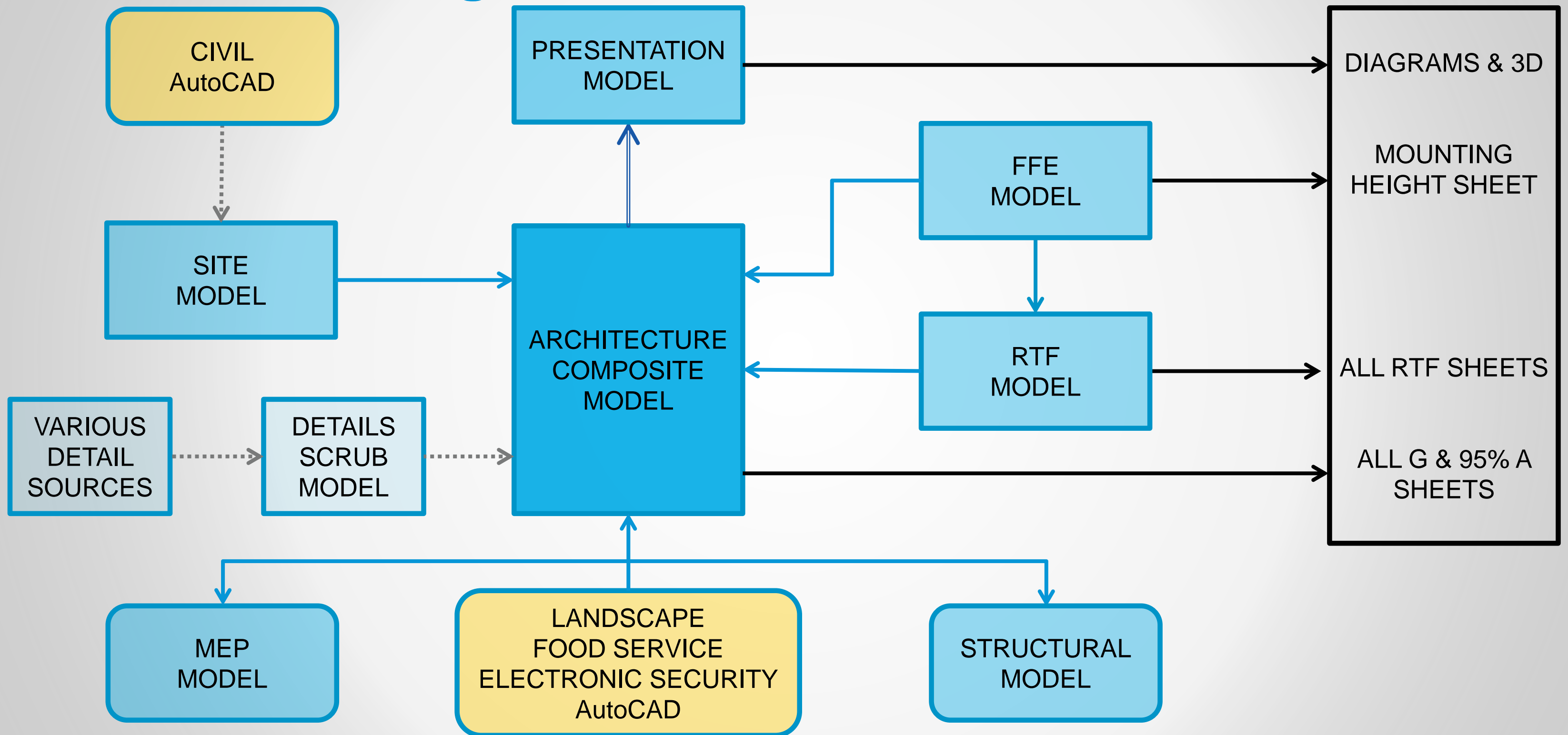
- Working & Sharing Models with Partner Firm
- Multiple Revit Versions – 2007, 2008, 2009, & 2012
- Inheriting Old Processes & Families
- Citrix ON Gen-1 Server With 18 Users
- First Time & Non-Revit Users
- Restarting Project With New Team Members
- BIM Coordinator New to HOK



Information Flow



Information Organization



Best Practices

Project Metrics

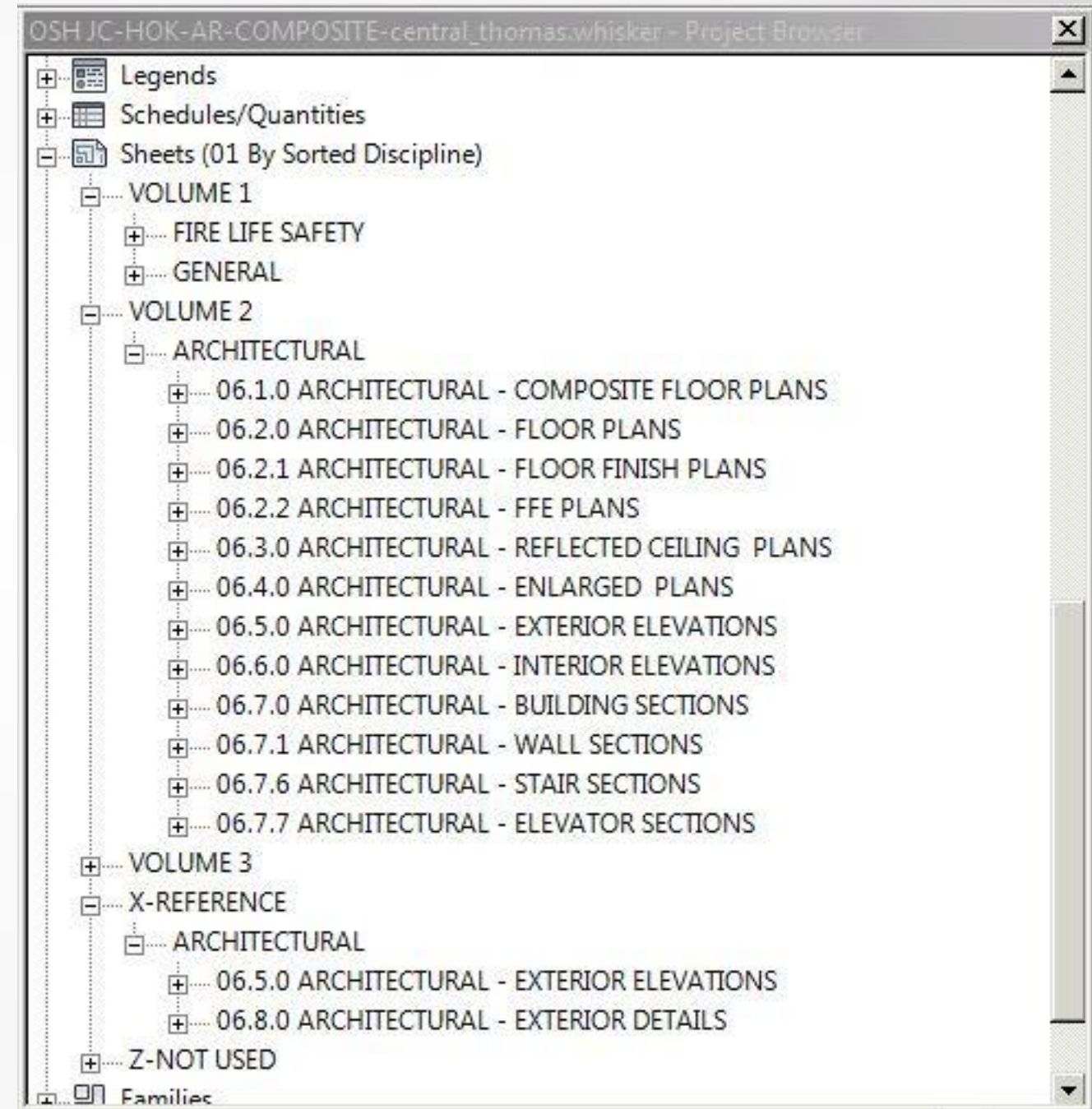
■ File Size	326MB	■ System Family Types	
■ Building Stories	3	Walls	±307
■ Area	± 220,000 SF	Ceilings	±15
		Floors	±11
■ Number of Project Views	±1742	Roofs	±22
Floor Plans	±255	Stairs / Railings	±15
Ceiling Plans	±47	■ Family Components	±457
3D Views	±33	■ Groups	
Elevations	±529	Detail	±50
Sections	±108	Model	0
Drafting	±804	■ Room separation lines	±49
■ Views NOT on Sheet	±62	■ DWG imports	3
■ Schedules	±60	■ Revit links	5
■ Reports	0		
		■ Warnings	18
■ User Created Worksets	±20	Room Sep Lines & Walls Overlap	11
		Duplicate Type Marks	7

Worksets

▪ _Link-AutoCAD	NON-Revit Consultant CAD Plans
▪ _Link-FFE	Furniture, Specialty Equipment
▪ _Link-MEP	Mechanical, Electrical, Plumbing, & Lighting
▪ _Link-RTF	Core/Shell & Interiors for RTF Buildings
▪ _Link-Site	Site Context & Topography
▪ _Link-Structure	Steel Framing & Foundations
▪ _Room Separator Lines	Room Separation Lines
▪ _Reference	Scope Boxes & Reference Planes
▪ _Shared Levels and Grids	Levels & Grids
▪ _Workset1	Miscellaneous
▪ CORE & SHELL	Exterior Doors & Windows, Tilt-Up/Shaft Walls
▪ INTERIORS – HOK LEVEL 1	Casework, Ceilings, Interior Doors & Windows, Plumbing Fixtures, Rooms, & Interior Partitions by Level & Firm Scope
▪ INTERIORS – HOK LEVEL 2	
▪ INTERIORS – HOK LEVEL 3	
▪ INTERIORS – SRG LEVEL 1	
▪ INTERIORS – SRG LEVEL 2	
▪ INTERIORS – SRG LEVEL 3	
▪ SITE	Exterior Building Components (Fencing, Bollards, Etc..)
▪ STRUCTURE	Slabs & Temporary Steel Framing
▪ VERTICAL CIRCULATION	Stairs, Ramps, Railings, & Shafts

Organization

- Grouping Views & Sheets



Organization

- Grouping Views & Sheets
- Hide Views on Sheets

Browser Organization Properties

Filtering Grouping and Sorting

Browser Organization: 08 NOT on sheet BY view group
Specify the filtering rules for this browser organization.

Filter by:

Sheet Number

Equal to <None>

And:

<None>

Equal to <None>

And:

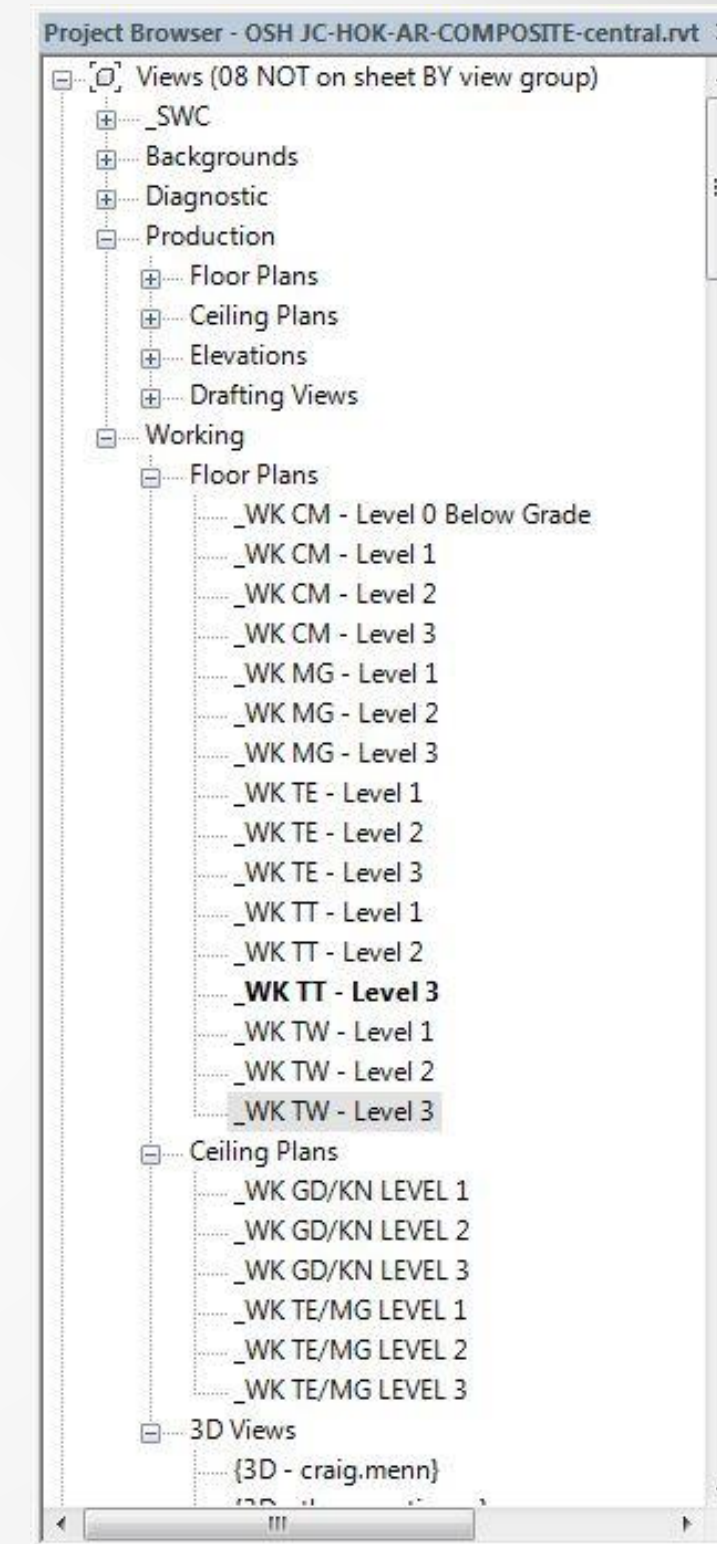
<None>

Equal to <None>

OK Cancel Help

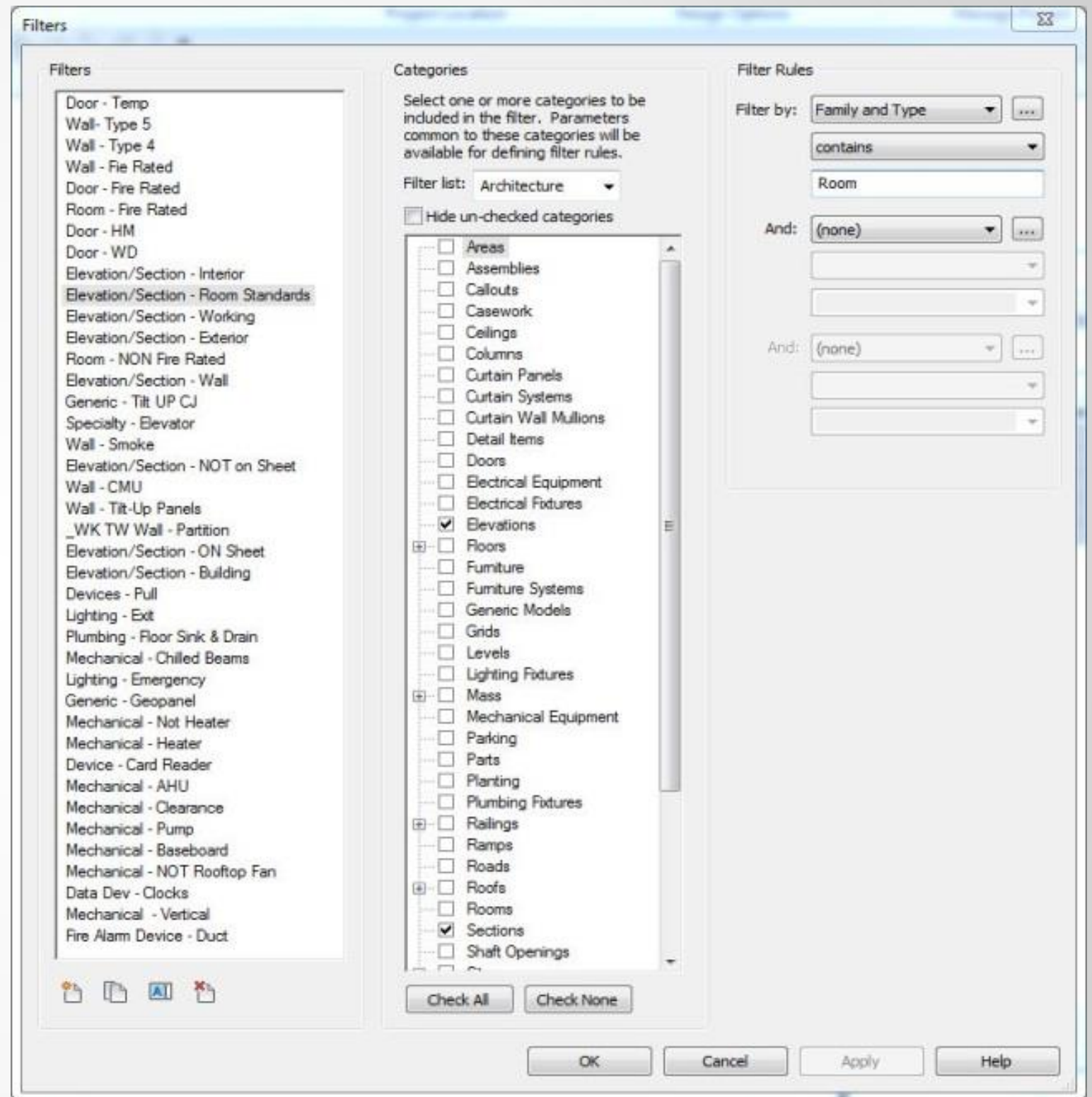
Organization

- Grouping Views & Sheets
- Hide Views on Sheets
- Working Views



Organization

- Grouping Views & Sheets
- Hide Views on Sheets
- Working Views
- Naming Conventions



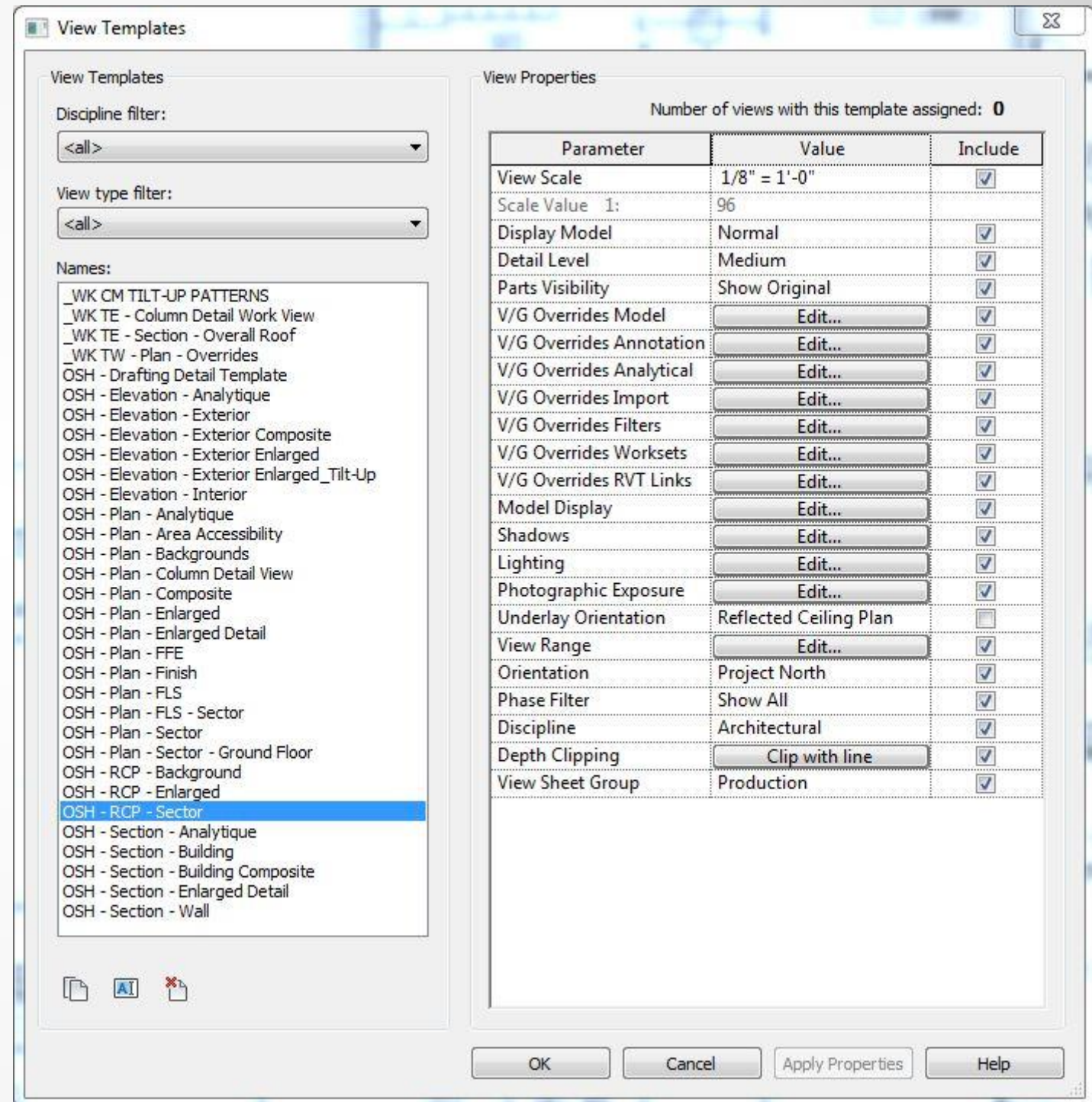
Information Management

■ Schedules

<*Working- LF - Room Occupancy - LEVEL 3 - CODE A>										
A	B	C	D	E	F	G	H	I	J	K
OSH Building Num	Number	Name	Area	Occupancy	OLF	Load	Calculated Load	Load Check	Level	Code Area Group
5	M3501	ACTIVITY	827.93 SF	ASSEMBLY UNC	15	56	56	YES	LEVEL 3	A
6	F3602	ACTIVITY	634.56 SF	ASSEMBLY UNC	15	43	43	YES	LEVEL 3	A
6	F3605	CHART	283.38 SF	OFFICE	100	3	3	YES	LEVEL 3	A
3	T3320	CHART	401.50 SF	OFFICE	100	5	5	YES	LEVEL 3	A
5	M3516	CHART	393.61 SF	OFFICE	100	4	4	YES	LEVEL 3	A
5	M3535	COMMON AREA	365.14 SF	ASSEMBLY UNC	15	25	25	YES	LEVEL 3	A
6	F3631	COMMON AREA	166.57 SF	ASSEMBLY UNC	15	12	12	YES	LEVEL 3	A
5	M3509	CONS	179.13 SF	ASSEMBLY UNC	15	12	12	YES	LEVEL 3	A
3	T3311	FITNESS	620.76 SF	EXERCISE	50	13	13	YES	LEVEL 3	A
3	T3305	GROUP LG	809.59 SF	ASSEMBLY UNC	15	55	54	NO	LEVEL 3	A
3	T3339	GROUP LG	734.45 SF	ASSEMBLY UNC	15	49	49	YES	LEVEL 3	A
3	T3307	GROUP SM	427.88 SF	ASSEMBLY UNC	15	29	29	YES	LEVEL 3	A
3	T3309	GROUP SM	425.24 SF	ASSEMBLY UNC	15	29	29	YES	LEVEL 3	A
3	T3331	GROUP SM	388.63 SF	ASSEMBLY UNC	15	26	26	YES	LEVEL 3	A
5	M3505	KIT	170.99 SF	VOCATIONAL	50	4	4	YES	LEVEL 3	A
6	F3606	KIT	143.38 SF	VOCATIONAL	50	3	3	YES	LEVEL 3	A
5	M3538	LNDRY	162.61 SF	VOCATIONAL	50	4	4	YES	LEVEL 3	A
6	F3622	LNDRY	152.96 SF	VOCATIONAL	50	4	4	YES	LEVEL 3	A
5	M3531	LNDRY	165.83 SF	VOCATIONAL	50	4	4	YES	LEVEL 3	A
5	M3520	MEDS	133.84 SF	OFFICE	100	2	2	YES	LEVEL 3	A
6	F3632	MEDS	121.40 SF	OFFICE	100	2	2	YES	LEVEL 3	A
3	T3325	MEDS	130.40 SF	OFFICE	100	2	2	YES	LEVEL 3	A
3	T3335	NIGHT PHARM	102.68 SF	OFFICE	100	2	2	YES	LEVEL 3	A
6	F3614	PAT PRVT ADA	182.86 SF	INSTIT-SLEEPING	120	2	2	YES	LEVEL 3	A
5	M3513	PAT PRVT ADA	221.86 SF	INSTIT-SLEEPING	120	2	2	YES	LEVEL 3	A

Information Management

- Schedules
- View Templates



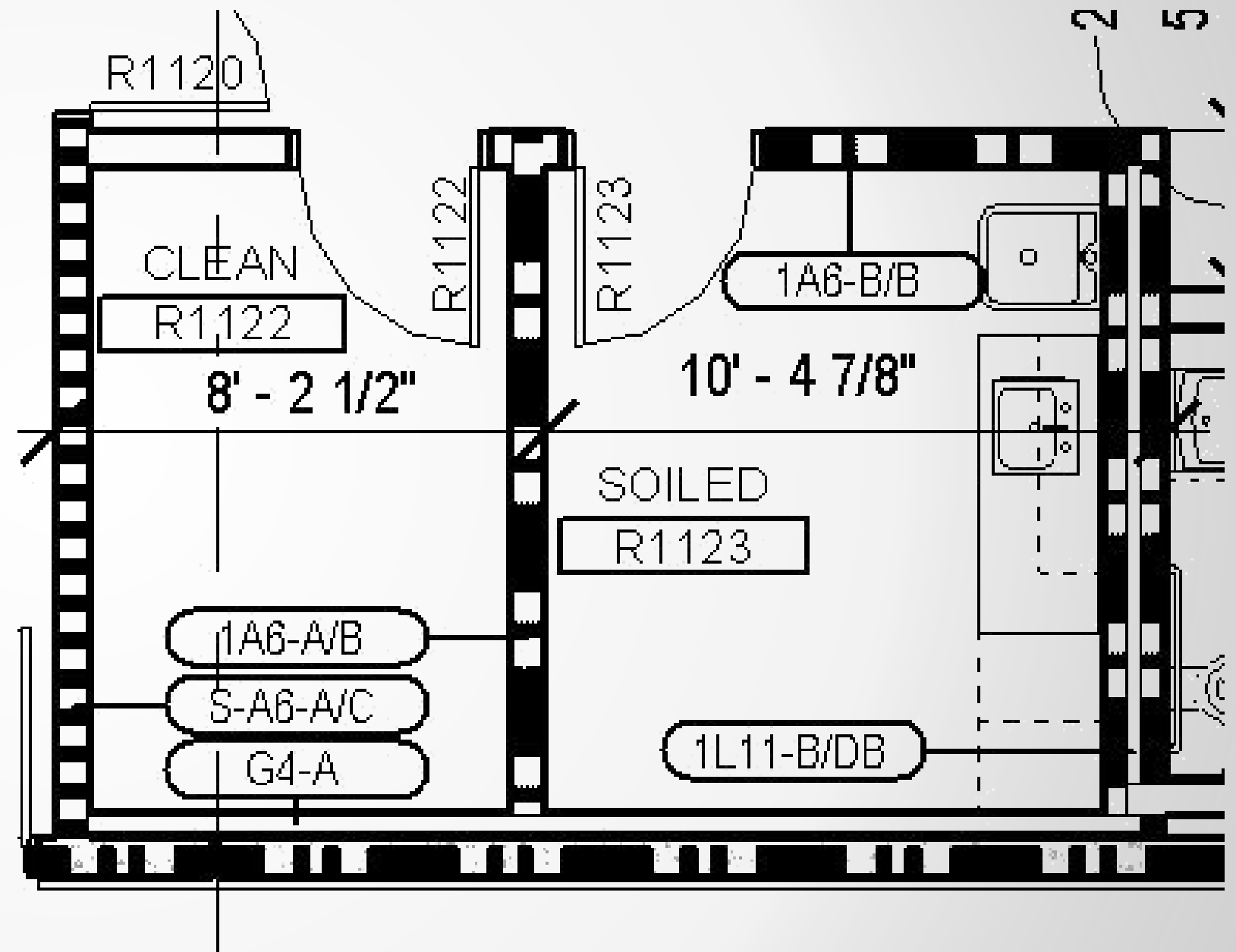
Information Management

- Schedules
- View Templates
- Linked Information

VOLUME 1	05.3.7 STRUCTURAL - TILT UP ELEVATIONS	S3.88	CONCRETE TILT PANEL ELEVATION	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.3.7 STRUCTURAL - TILT UP ELEVATIONS	S3.89	CONCRETE TILT PANEL ELEVATION	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.3.7 STRUCTURAL - TILT UP ELEVATIONS	S3.90	CONCRETE TILT PANEL ELEVATIONS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S5.01	CONCRETE DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S5.02	CONCRETE DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S5.03	CONCRETE DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S5.04	CONCRETE DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S6.01	STEEL DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S6.02	STEEL DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S6.03	STEEL DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S6.04	STEEL DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S6.05	STEEL DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S6.06	STEEL DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S7.01	WOOD DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S7.02	WOOD DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S8.01	MASONRY DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 1	05.5.0 STRUCTURAL - DETAILS	S8.02	MASONRY DETAILS	OSH JC-KPFF-STR-COMPOSITE-linked.rvt
VOLUME 2	06.1.0 ARCHITECTURAL - COMPOSITE FLOOR PLANS	A1.01	FLOOR PLAN- LEVEL 1 - COMPOSITE	
VOLUME 2	06.1.0 ARCHITECTURAL - COMPOSITE FLOOR PLANS	A1.02	FLOOR AND ROOF PLAN - LEVEL 2 - COMPOSITE	
VOLUME 2	06.1.0 ARCHITECTURAL - COMPOSITE FLOOR PLANS	A1.03	FLOOR AND ROOF PLAN - LEVEL 3 - COMPOSITE	
VOLUME 2	06.1.0 ARCHITECTURAL - COMPOSITE FLOOR PLANS	A1.04	ROOF PLAN-PENTHOUSE AND ROOF LEVEL - COMPOSITE	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-A	FLOOR PLAN-LEVEL 1 - SECTOR A	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-B	FLOOR PLAN-LEVEL 1 - SECTOR B	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-C	FLOOR PLAN-LEVEL 1 - SECTOR C	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-D	FLOOR PLAN-LEVEL 1 - SECTOR D	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-E	FLOOR PLAN-LEVEL 1 - SECTOR E	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-F	FLOOR PLAN-LEVEL 1 - SECTOR F	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-G	FLOOR PLAN-LEVEL 1 - SECTOR G	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-H	FLOOR PLAN-LEVEL 1 - SECTOR H	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-J	FLOOR PLAN-LEVEL 1 - SECTOR J	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.01-K	FLOOR PLAN-LEVEL 1 - SECTOR K	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-A	FLOOR PLAN - LEVEL 2 - SECTOR A	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-B	FLOOR PLAN - LEVEL 2 - SECTOR B	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-C	FLOOR AND ROOF PLAN - LEVEL 2 - SECTOR C	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-D	FLOOR AND ROOF PLAN - LEVEL 2 - SECTOR D	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-E	ROOF PLAN - LEVEL 2 - SECTOR E	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-F	FLOOR AND ROOF PLAN - LEVEL 2 - SECTOR F	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-G	ROOF PLAN - LEVEL 2 - SECTOR G	
VOLUME 2	06.2.0 ARCHITECTURAL - FLOOR PLANS	A2.02-H	FLOOR AND ROOF PLAN - LEVEL 2 - SECTOR H	

Information Management

- Schedules
- View Templates
- Linked Information
- Embedded Information



Maintenance

■ Worksets

Worksets

Active workset: ☒ Gray Inactive Workset Graphics

Name	Editable	Owner	Borrowers	Opened	Visible in all views
_Link-AutoCAD	No			No	<input checked="" type="checkbox"/>
_Link-Revit FFE	No			No	<input checked="" type="checkbox"/>
_Link-Revit MEP	No			No	<input type="checkbox"/>
_Link-Revit RTF	No			No	<input checked="" type="checkbox"/>
_Link-Revit Site	No			No	<input checked="" type="checkbox"/>
_Link-Revit Structure	No			No	<input type="checkbox"/>
_Room Separator Lines	No			Yes	<input type="checkbox"/>
_Scope Boxes	No			Yes	<input type="checkbox"/>
_Shared Levels and Grids	Yes	thomas.whis		Yes	<input checked="" type="checkbox"/>
_Workset1	No			No	<input checked="" type="checkbox"/>
CORE & SHELL	No			Yes	<input checked="" type="checkbox"/>
INTERIORS - HOK LEVEL 1	No			Yes	<input checked="" type="checkbox"/>
INTERIORS - HOK LEVEL 2	No			No	<input checked="" type="checkbox"/>
INTERIORS - HOK LEVEL 3	No			No	<input checked="" type="checkbox"/>
INTERIORS - SRG LEVEL 1	No			No	<input checked="" type="checkbox"/>
INTERIORS - SRG LEVEL 2	No			No	<input checked="" type="checkbox"/>
INTERIORS - SRG LEVEL 3	No			No	<input checked="" type="checkbox"/>
SITE	No			No	<input checked="" type="checkbox"/>
STRUCTURE	No			Yes	<input checked="" type="checkbox"/>
VERTICAL CIRCULATION	No			Yes	<input checked="" type="checkbox"/>

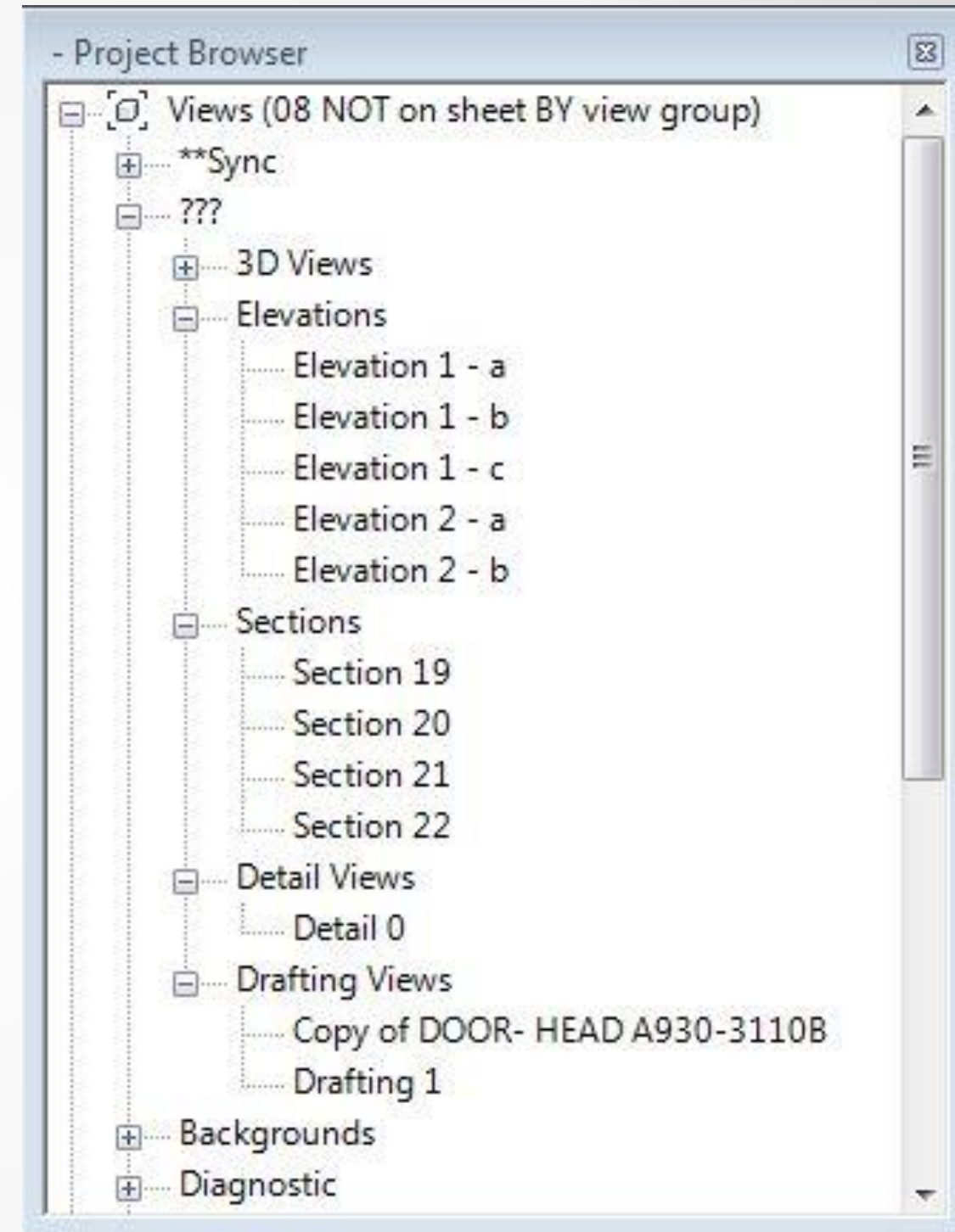
Show:
☒ User-Created ☐ Project Standards
☐ Families ☐ Views

New
Delete
Rename
Open
Close
Editable
Non Editable

OK Cancel Help

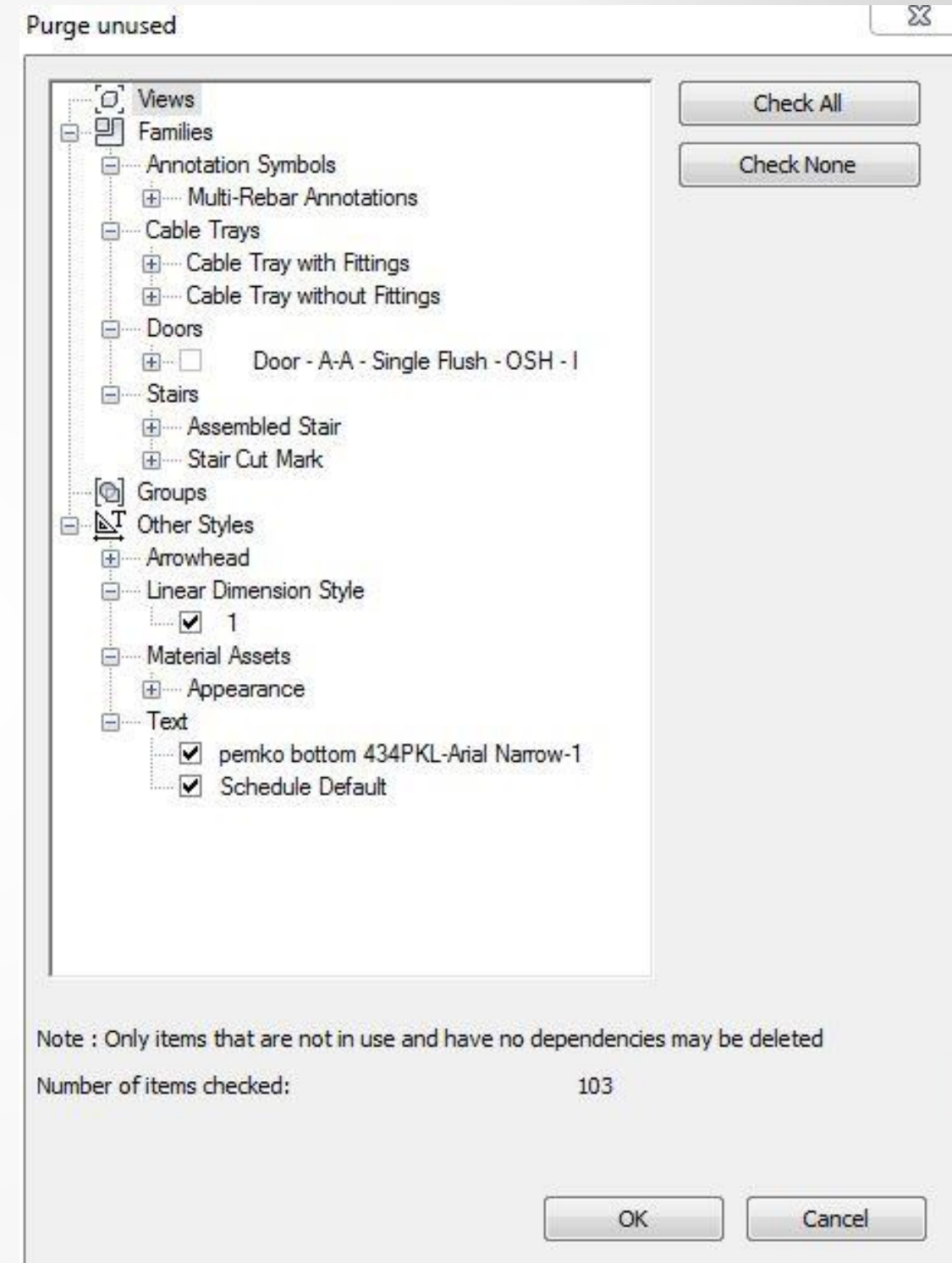
Maintenance

- Worksets
- Take Out the Trash



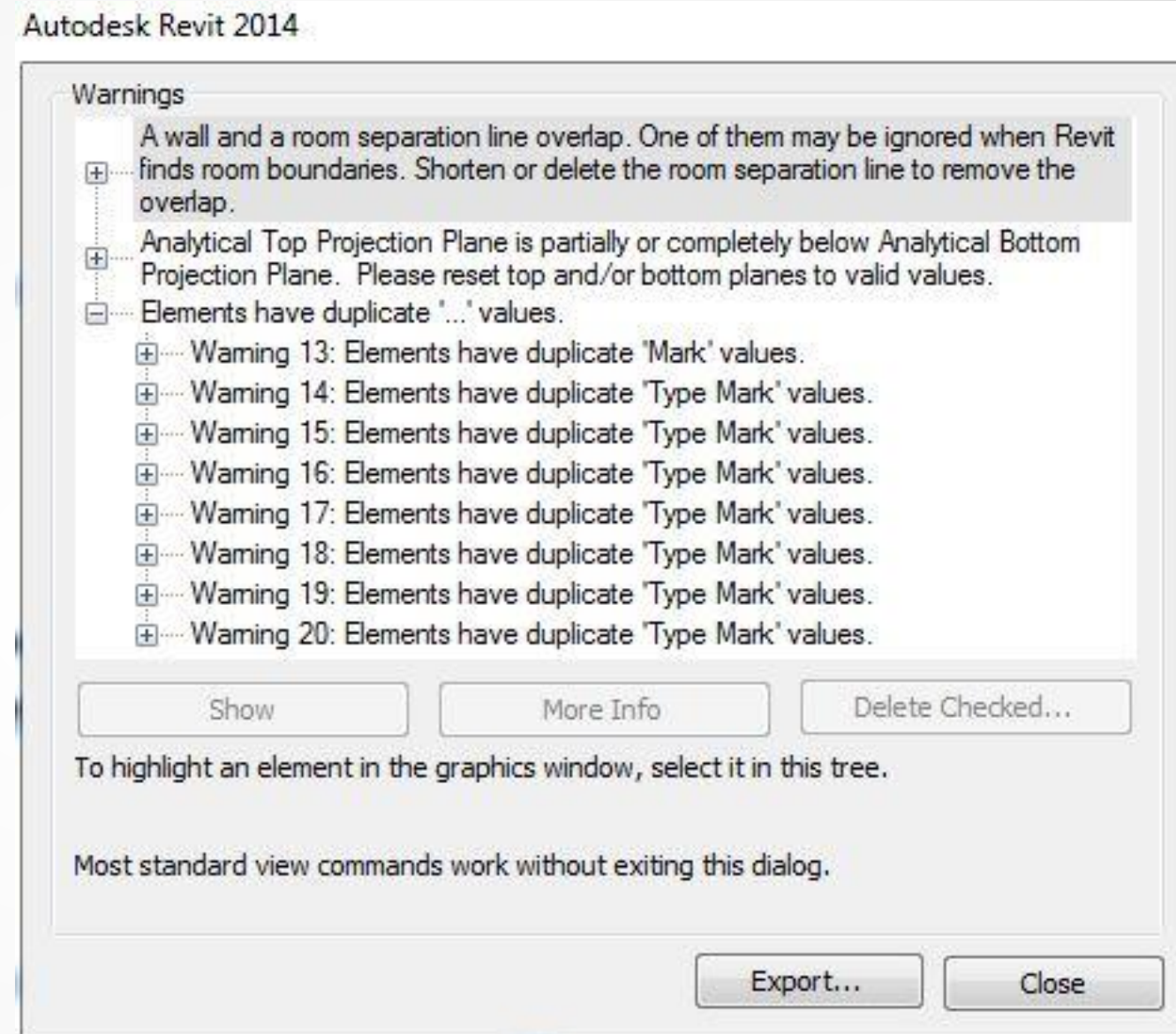
Maintenance

- Worksets
- Take Out the Trash
- Purge



Maintenance

- Worksets
- Take Out the Trash
- Purge
- Warnings



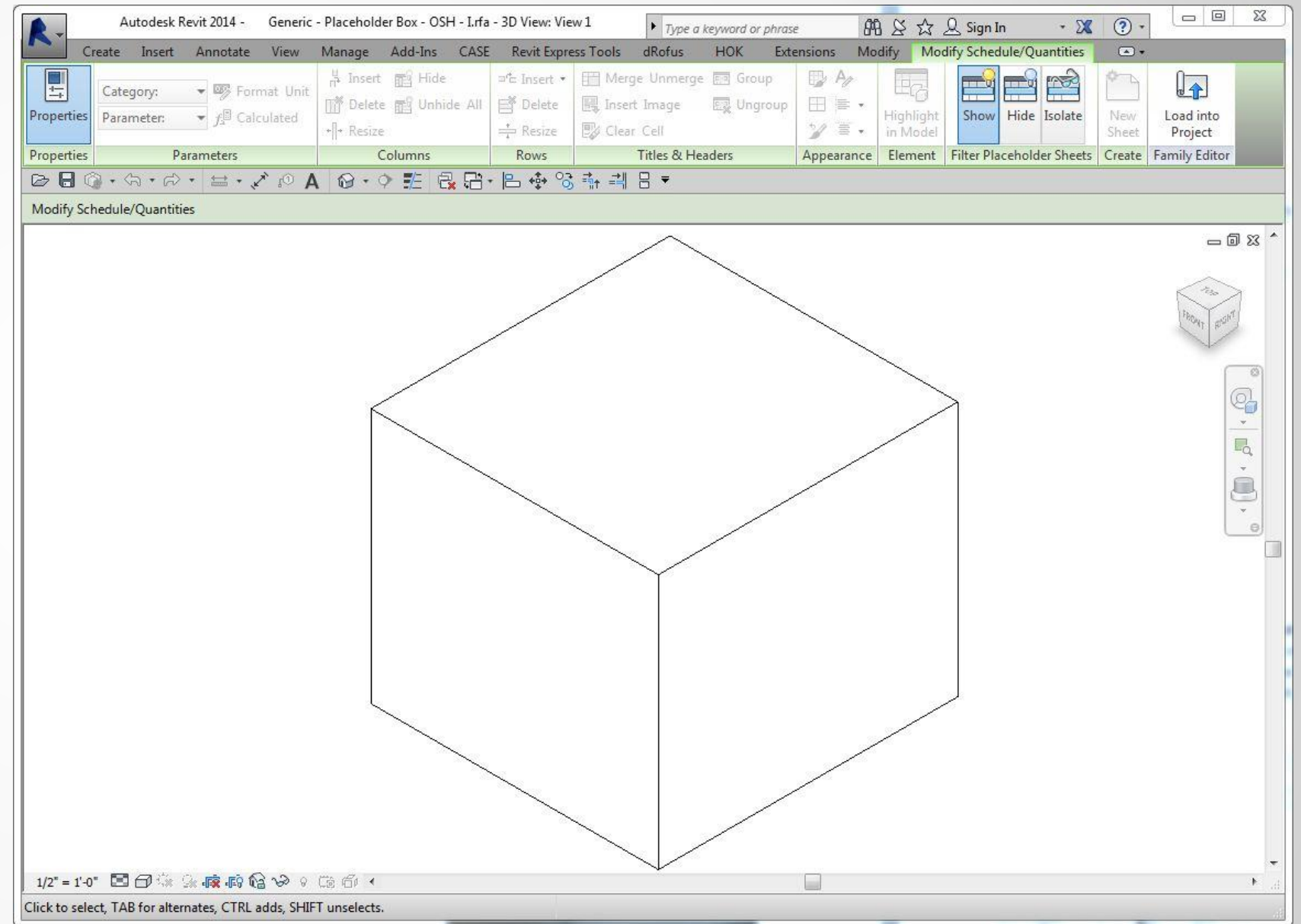
Workflow

- One At a Time



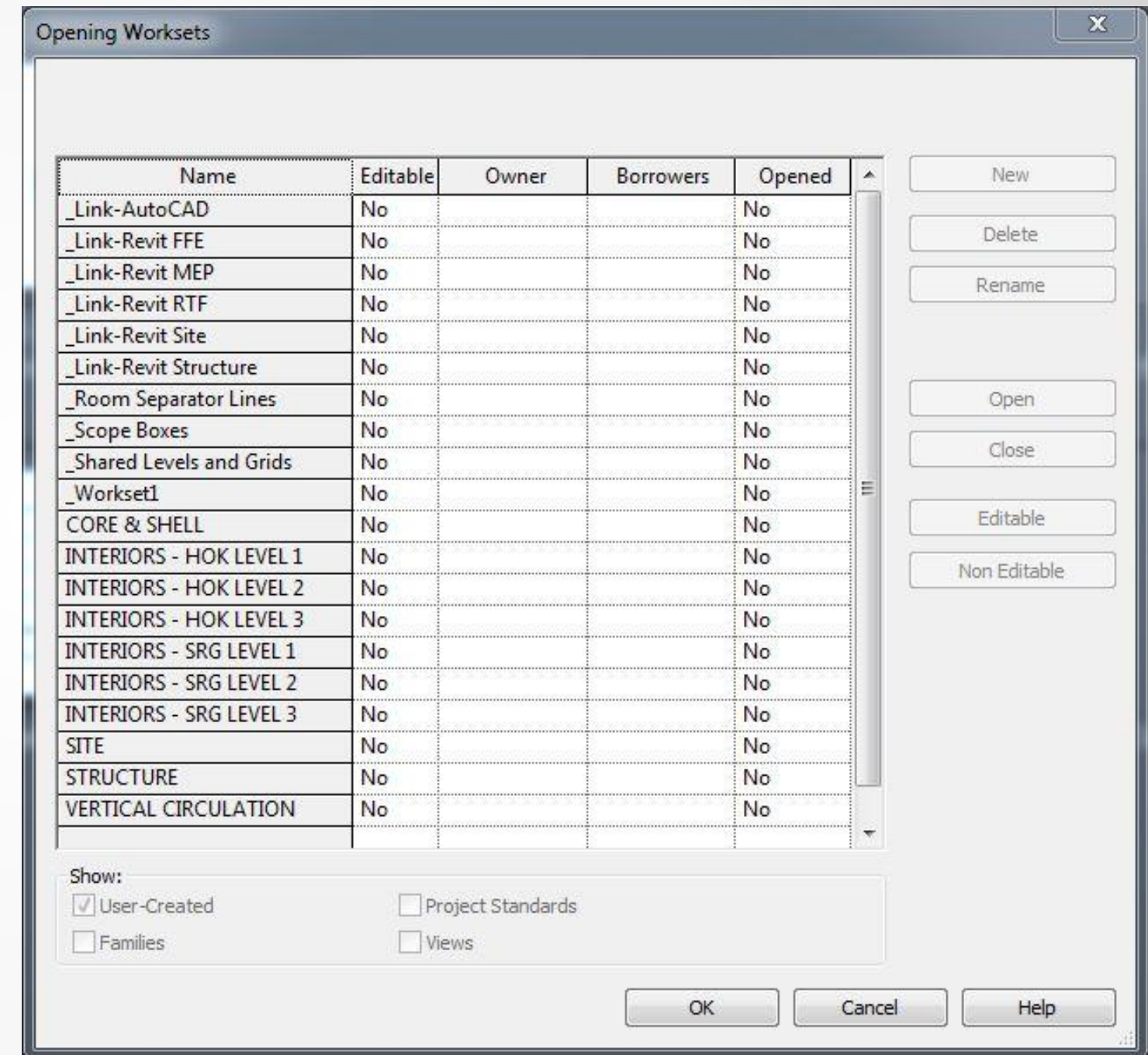
Workflow

- One At a Time
- Placeholders



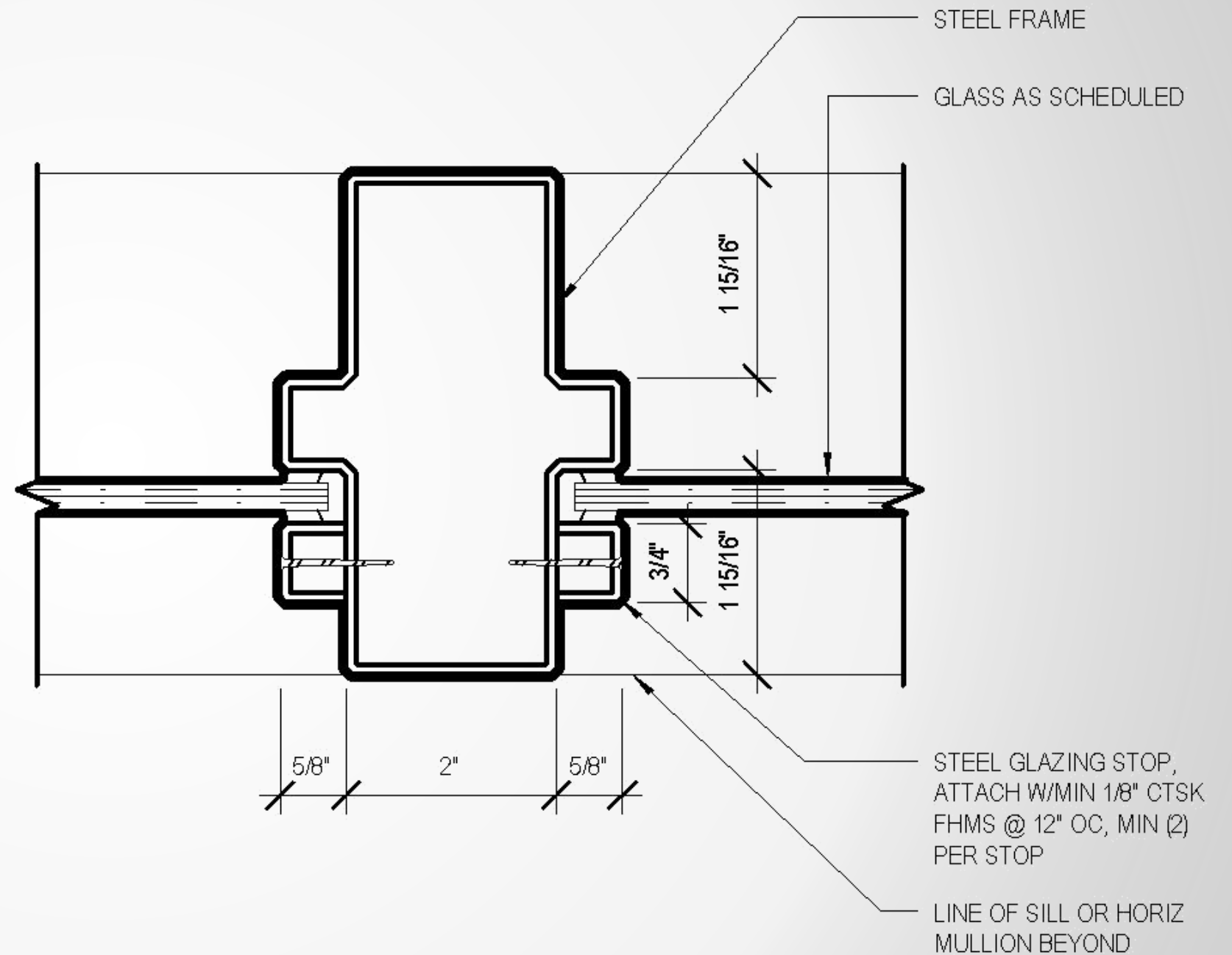
Workflow

- One At a Time
- Placeholders
- Selective Worksets



Workflow


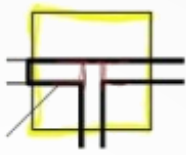
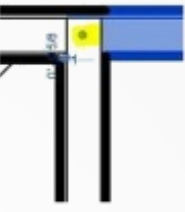
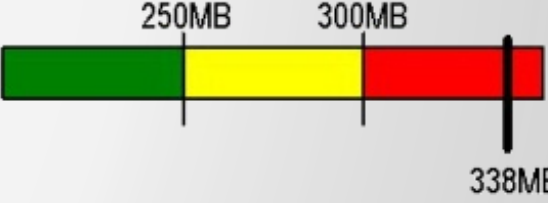
- One At a Time
- Placeholders
- Selective Worksets
- Drafting Details Scrub



Communication

- SWC Opening View

OSH - Junction City

October 25, 2012	TIP OF THE WEEK	ANNOUNCEMENTS
  Wall join	 Disallow join <p>Use the wall join tool to cycle through the various ways 2 or more walls come together. Right click on the end of wall grip and select Disallow Join to manually bring walls together.</p>	<p>Warnings are cleaned up - please review and take care of them as they occur.</p> <p>Presentation model created for all coordination & presentation output.</p>
MAINTENANCE		MODEL SIZE
<p>Friday 10/26 - Bid Package 2</p> <p>Friday afternoon model cleansing. All ??? views, unused families, and unnamed views, families, & ref planes will be purged.</p>		 <p>250MB 300MB 338MB</p>

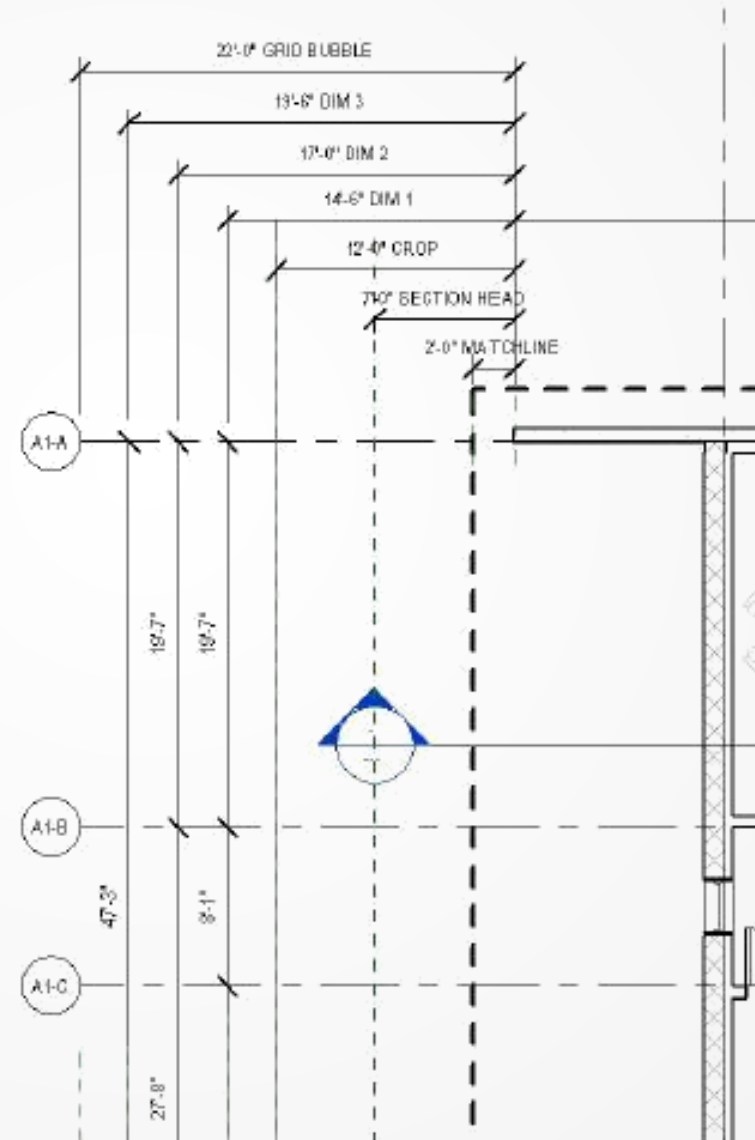
Communication

- SWC Opening View
- PxP & Best Practices Guide

Dimensions

The typical dimensions string used is Typical 3/32" Arial Narrow.

Placement



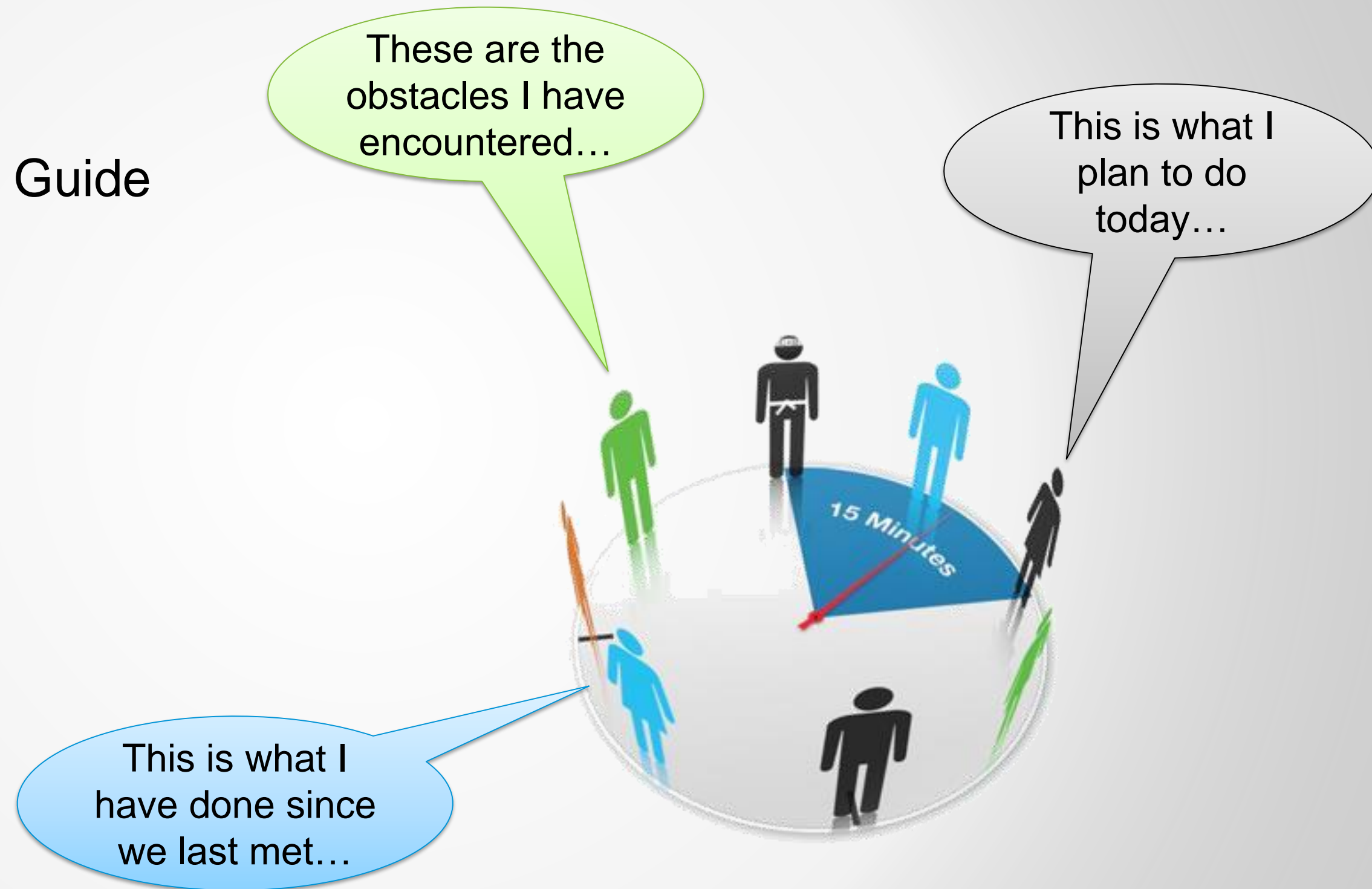
All annotations are placed in a view – never on a sheet. In order to keep model views consistent, we have come up with a system for annotation placement along the outside edge of the drawing.

All annotation should be on the top and left hand side whenever possible. Please use the follow baseline distances for annotation placement working away from the building edge as follows:

- Match line:– 2'
- Center Line of Section Head: 7'
- Crop Boundary: 12'
- Dimension String 1– Segments: 14.5'
- Dimension String 2– Segments: 17'
- Dimension String 3– Full: 19.5'
- Grid Bubble: 22'

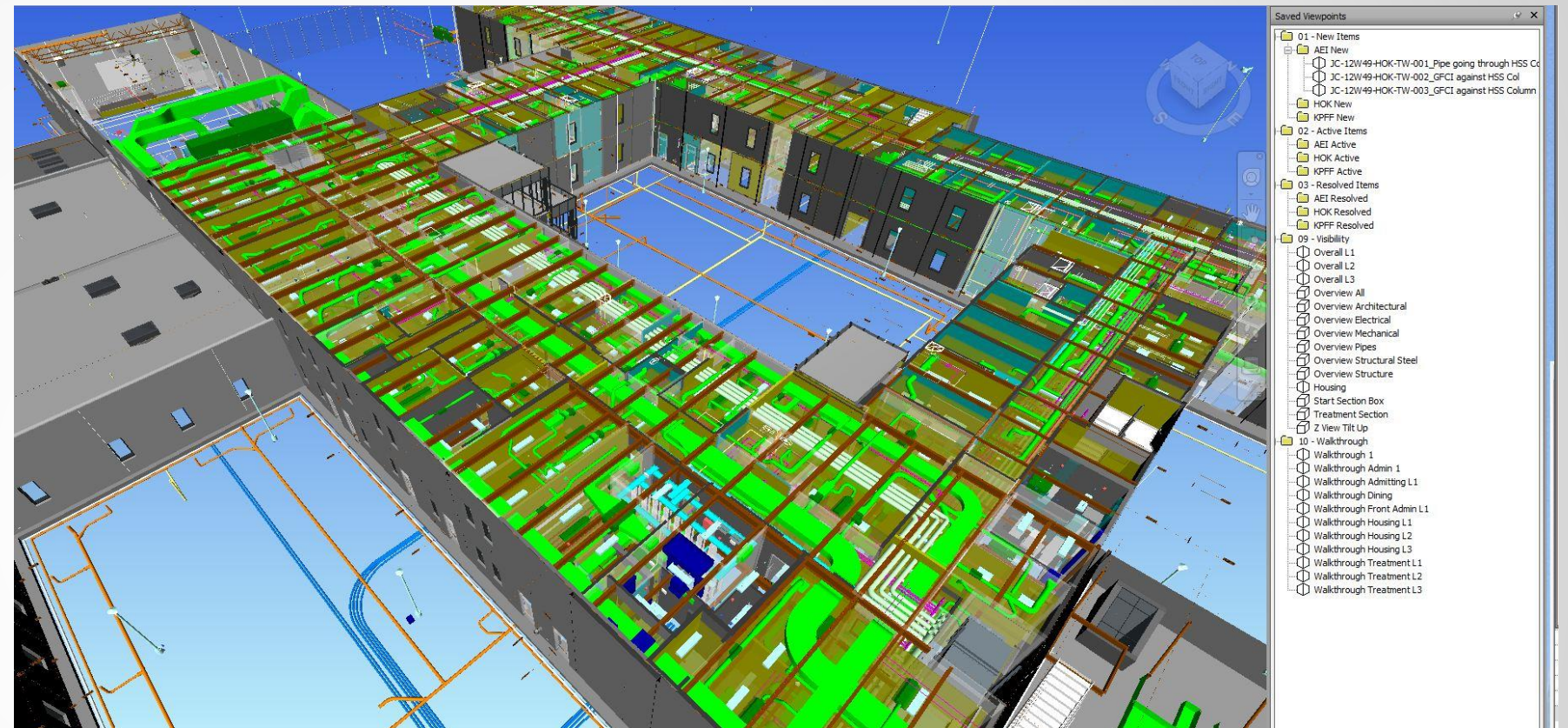
Communication

- SWC Opening View
- PxP & Best Practices Guide
- Stand Up Meeting



Communication

- SWC Opening View
- PxP & Best Practices Guide
- Stand Up Meeting
- External



Constant Improvement

- Weekly standup style meeting with both firms together.
- All team members within the same office should be located together.
- Revit capable team members should be greater than 75%.
- Users to model ratio should be no more than 10-12.
- Maximize RAM & user capacity on Citrix server.
- BIM Coordinator to review all families before they go into model.
- Start clash detection earlier than CD.
- MEP should be modeling much sooner than late DD.
- Always model every system to the correct size, shape, position, & material.
- For improved accuracy – SLOW DOWN – this is not an AutoCAD speed test.
- Use models in more than just the BIM coordination meeting.
- More time needs to be budgeted for production and post-production.
- Always ask – “How can I improve my workflow?”



Final Thoughts

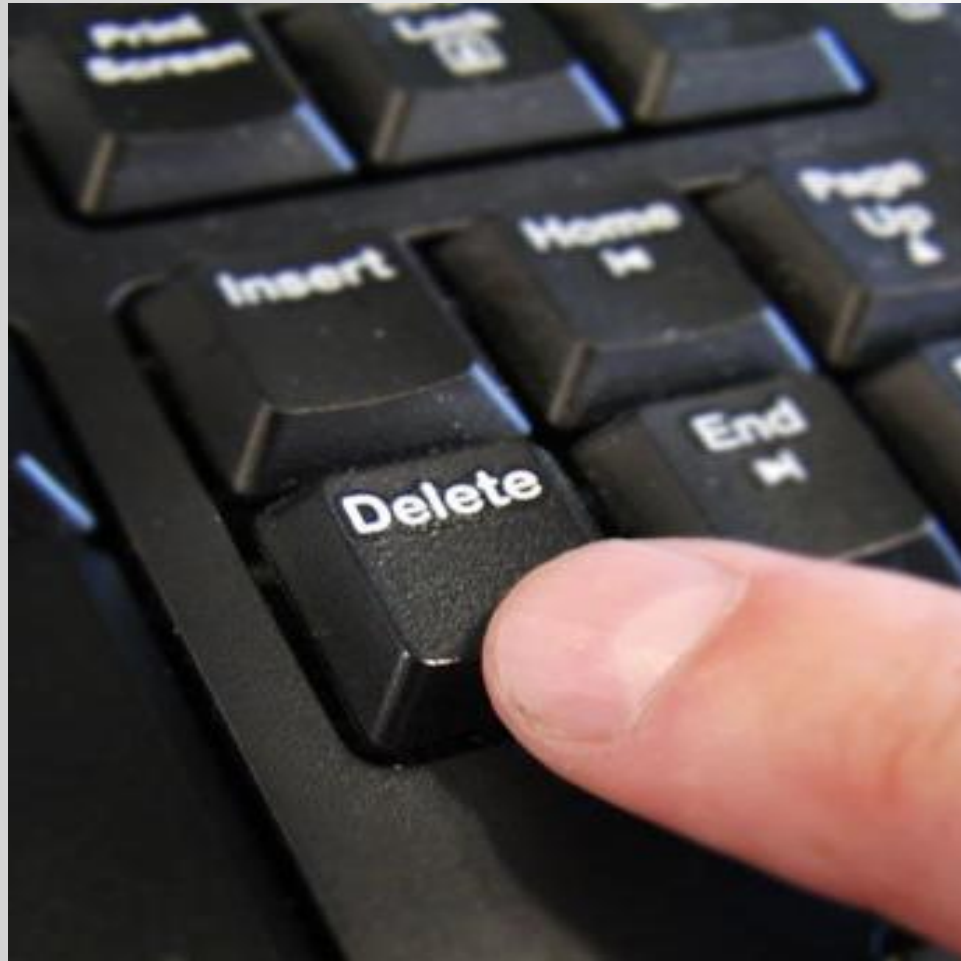


Keys to Success

- Consistency
- Communication
- Documentation



BIM Manager Tool Kit



Q & A



Thomas Whisker, AIA LEED AP
thomas.whisker@hok.com

