“LEAN”ing COORDINATION

Virginia Sutton, P.E., LEED AP BD+C

Virtual Design and Construction Manager

Brian King, AIA, LEED AP BD+C

Integrated Construction Manager


INTRODUCTIONS
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About the speaker

Virginia Sutton, P.E., LEED AP BD+C

Virginia Sutton is the VDC Manager for Rodgers, a Charlotte-based construction company that is ranked among the top 100 construction management firms in the United States.

Experience

Virginia joined Rodgers in 2013 and has 14 years of AEC industry experience. As a VDC Manager, she works with a variety of teams in developing Building Information Models and managing data for design, preconstruction and construction/coordination. Her focus for the past five years has been in the integration of BIM projects from design to construction, which includes: Design-Assist coordination, constructability analysis, site layout, laser scanning, and general project coordination using BIM. Her past experience includes civil engineering and construction management.

Education and Certifications

Virginia received her Bachelor of Science in Civil Engineering from Cornell University. Virginia is a LEED Accredited Professional and Professional Engineer.

Leadership

Virginia leads Rodgers' Summer Internship program and serves on the committee for Rodgers ONE, an onboarding program for first year employees.

About the speaker

Brian King, AIA, LEED AP BD+C

Brian King is the Integrated Construction Manager for Rodgers, a Charlotte-based construction company that is ranked among the top 100 construction management firms in the United States.

Experience

Brian joined Rodgers in 2010 and has 14 years of AEC industry experience. He leads the Virtual Design and Construction department and his responsibilities include managing all aspects of VDC processes from preconstruction through project completion. His past experience includes architecture.

Education and Certifications

Brian received his Bachelor of Environmental Design in Architecture and his Masters of Architecture from North Carolina State University. Brian is a LEED Accredited Professional, Revit Architecture Certified Professional, Revit Mechanical Certified Professional and licensed with the North Carolina Board of Architecture.

Leadership

Brian serves on the board for the Charlotte AIA Technology in Architectural Practice Knowledge Community (TAP) and the Charlotte ACE Mentor Program. He is also involved with Lean Construction Institute.

LEARNING OBJECTIVES

- HOW CAN LEAN PRINCIPLES AND PRACTICES BE APPLIED TO THE CLASH DETECTION PROCESS?
- CAN TRADITIONAL CLASH DETECTION SOFTWARE BE UTILIZED IN A LEAN THOUGHT PROCESS?
- HOW CAN LAST PLANNER METHODOLOGY BE APPLIED TO THE COORDINATION SCHEDULE?
- CAN A LEAN CLASH DETECTION PROCESS BE UTILIZED IN THE DESIGN WORKFLOW?

LEAN INITIATIVES

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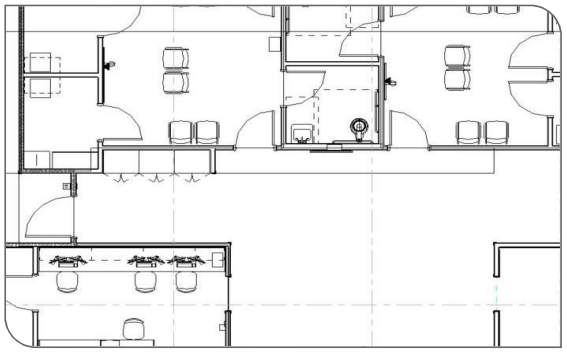
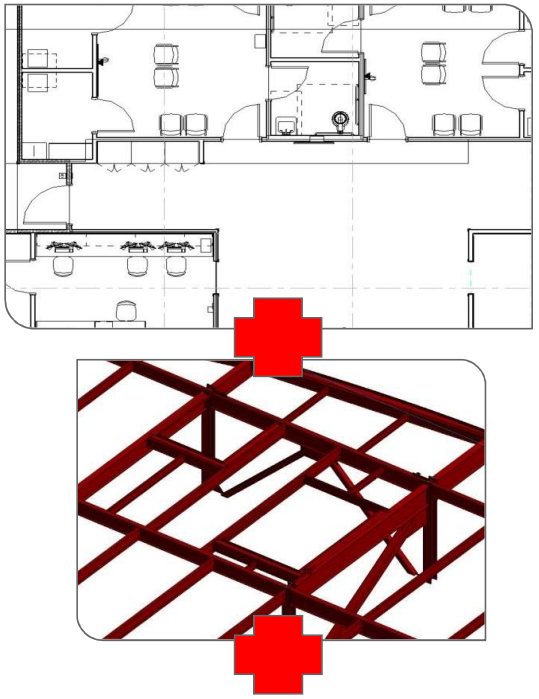
SD



STRUCTURE –NARRATIVE
MEP - ???

= 0 CLASHES

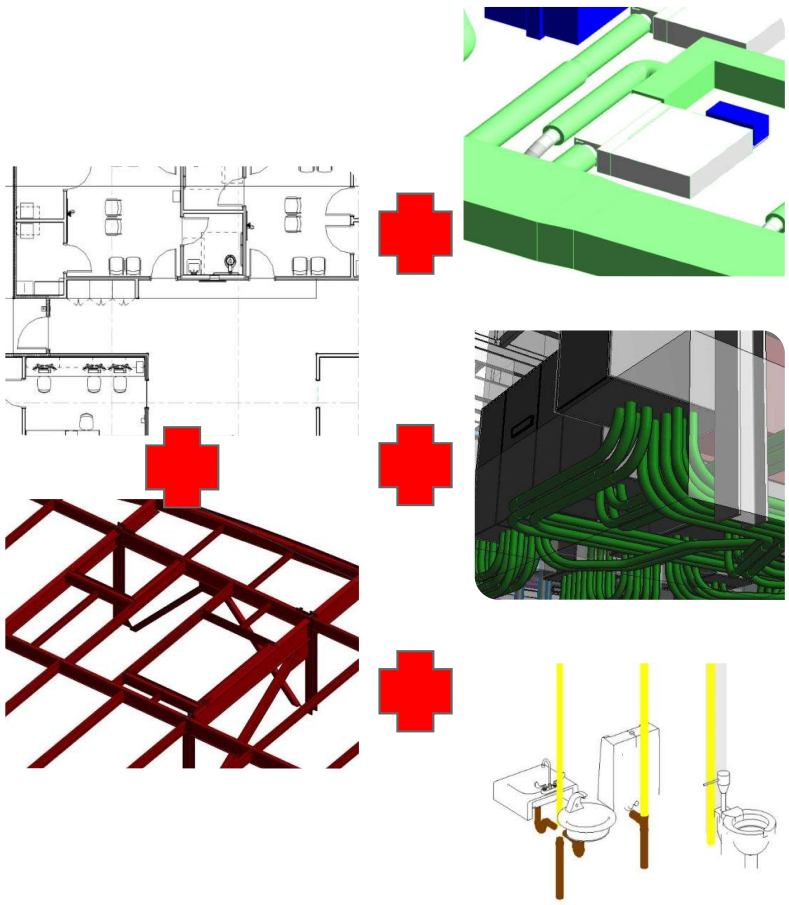
DD



MEP – NARRATIVE

= 100 CLASHES

CD



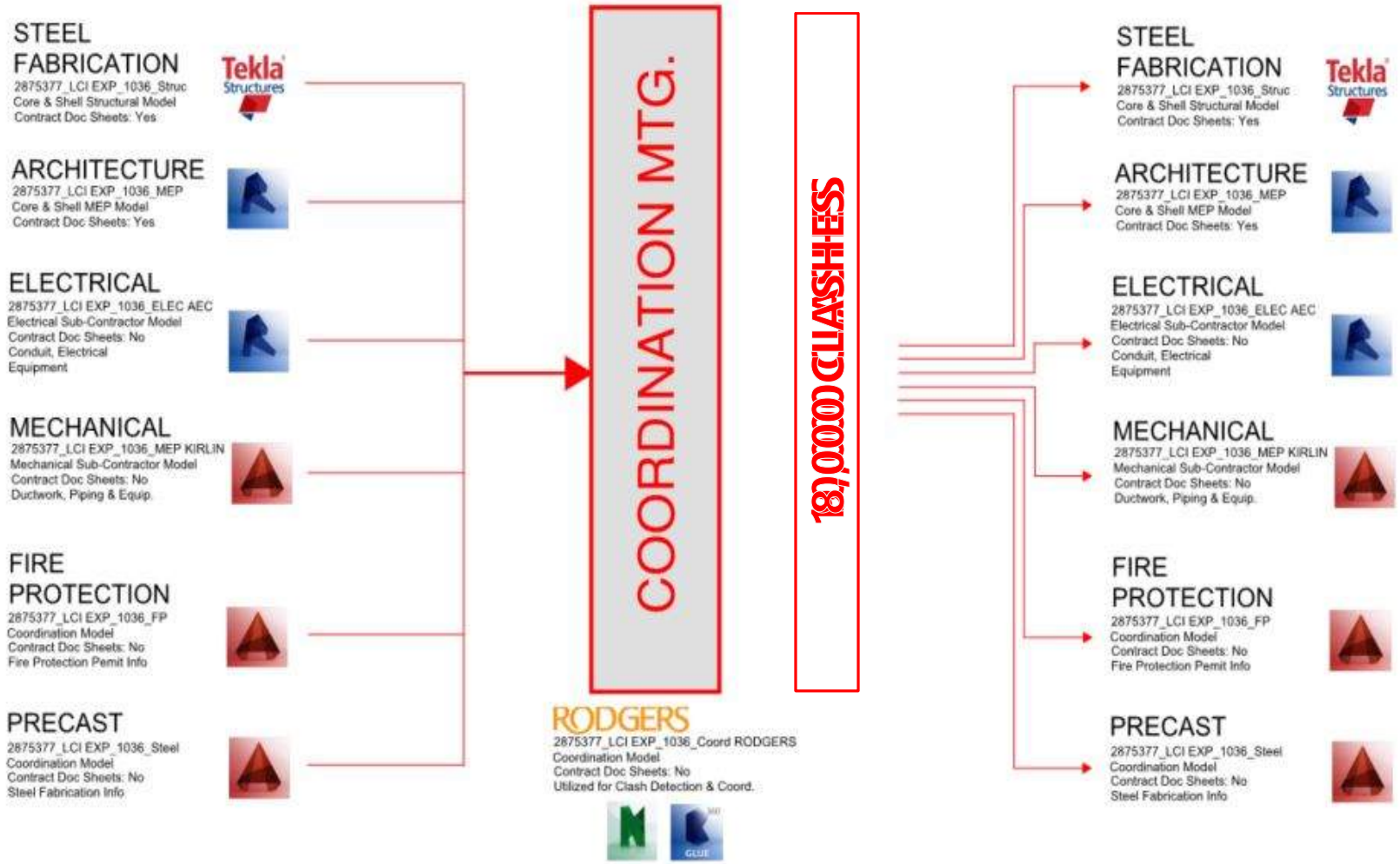
= 1000 CLASHES

= 10,000 CLASHES

= 100,000 CLASHES !!!

WHY?

- TIME CONSTRAINTS
- BUDGET CONSTRAINTS
- LACK OF INSTALLATION/ FABRICATION KNOWLEDGE
- WORK SPACE ISOLATION
- DOCUMENTS = FINAL PRODUCT


STEEL FABRICATION
2875377_LCI EXP_1036_Struc
Core & Shell Structural Model
Contract Doc Sheets: Yes
Tekla Structures
ARCHITECTURE
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Core & Shell MEP Model
Contract Doc Sheets: Yes
ELECTRICAL
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Electrical Sub-Contractor Model
Contract Doc Sheets: No
Conduit, Electrical
Equipment
MECHANICAL
2875377_LCI EXP_1036_MEP KIRLIN
Mechanical Sub-Contractor Model
Contract Doc Sheets: No
Ductwork, Piping & Equip.
FIRE PROTECTION
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Coordination Model
Contract Doc Sheets: No
Fire Protection Permit Info
PRECAST
2875377_LCI EXP_1036_Steel
Coordination Model
Contract Doc Sheets: No
Steel Fabrication Info
COORDINATION MTG.
RODGERS
2875377_LCI EXP_1036_Coord RODGERS
Coordination Model
Contract Doc Sheets: No
Utilized for Clash Detection & Coord.
GLUE
18,000 CLASHES
STEEL FABRICATION
2875377_LCI EXP_1036_Struc
Core & Shell Structural Model
Contract Doc Sheets: Yes
Tekla Structures
ARCHITECTURE
2875377_LCI EXP_1036_MEP
Core & Shell MEP Model
Contract Doc Sheets: Yes
ELECTRICAL
2875377_LCI EXP_1036_ELEC AEC
Electrical Sub-Contractor Model
Contract Doc Sheets: No
Conduit, Electrical
Equipment
MECHANICAL
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Mechanical Sub-Contractor Model
Contract Doc Sheets: No
Ductwork, Piping & Equip.
FIRE PROTECTION
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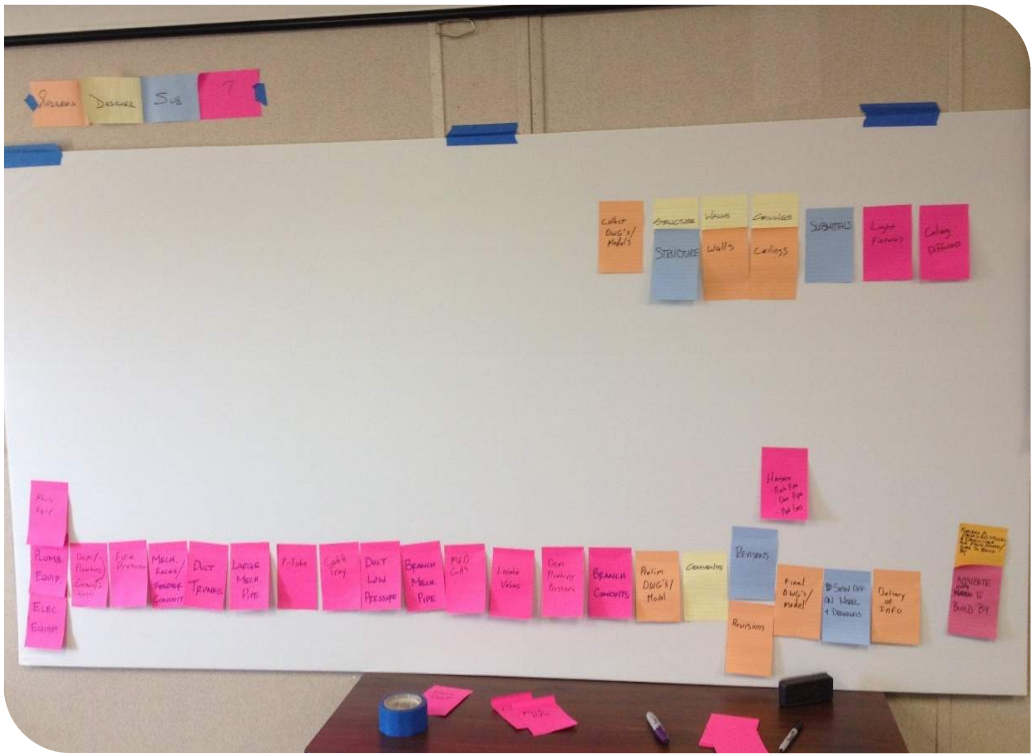
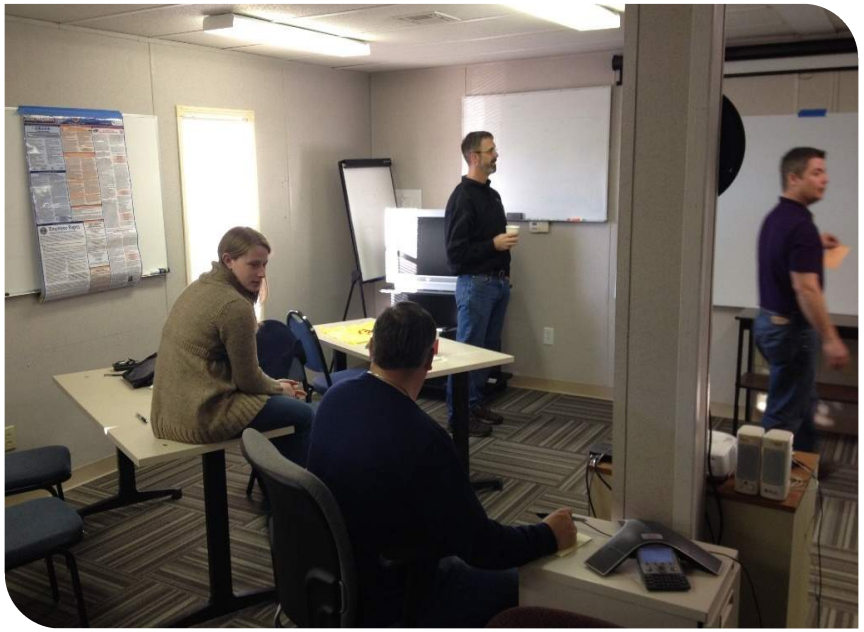
Coordination Model
Contract Doc Sheets: No
Fire Protection Permit Info
PRECAST
2875377_LCI EXP_1036_Steel
Coordination Model
Contract Doc Sheets: No
Steel Fabrication Info

WASTE AREAS

- INEFFECTIVE CLASH REPORTS
- WORKING IN SILOS
- WHO MOVES WHAT AND WHEN?
- INFORMATION AT WRONG TIMES
- TIME CONSTRAINTS
- ACCURACY OF INFORMATION

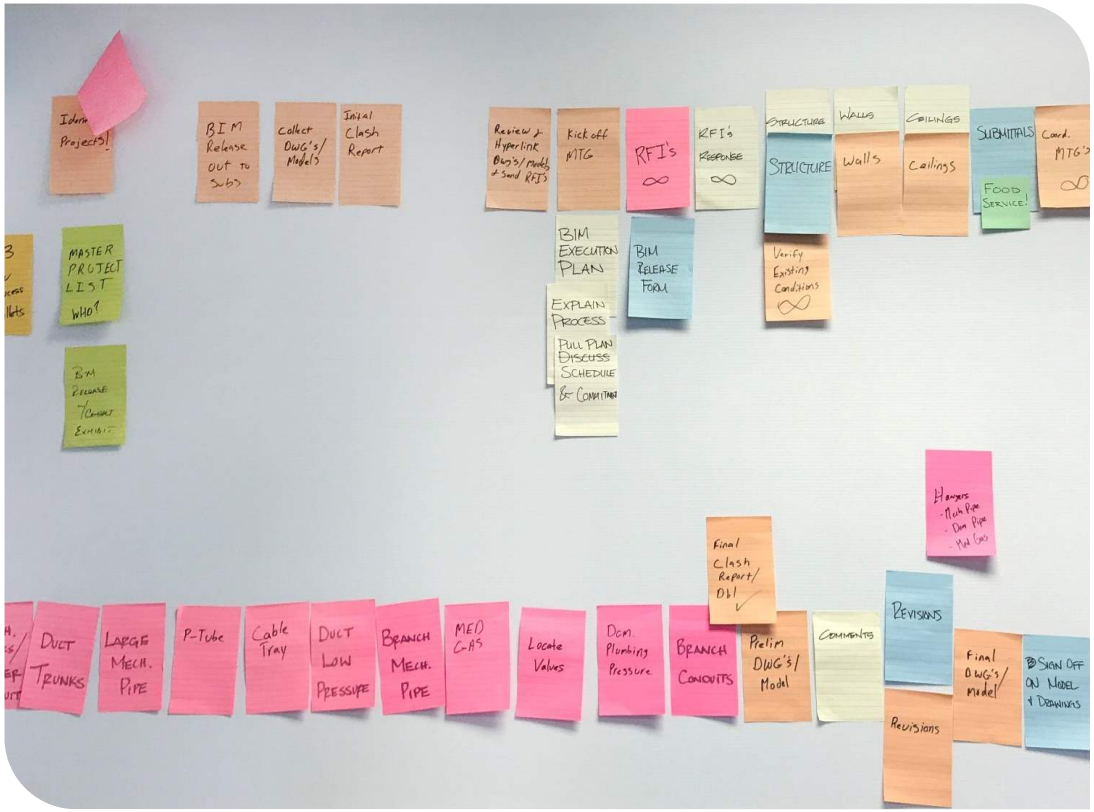


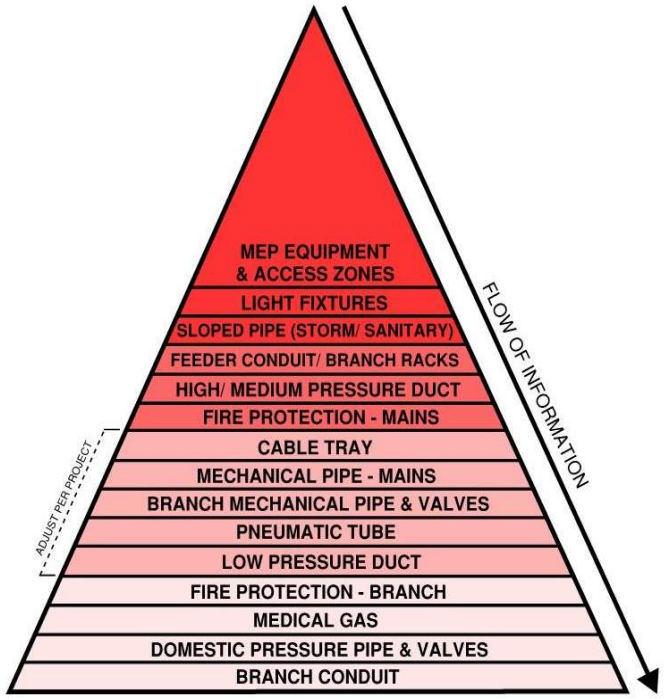
Initial Collaboration/ Pull Plan Meeting



FINAL RESULTS

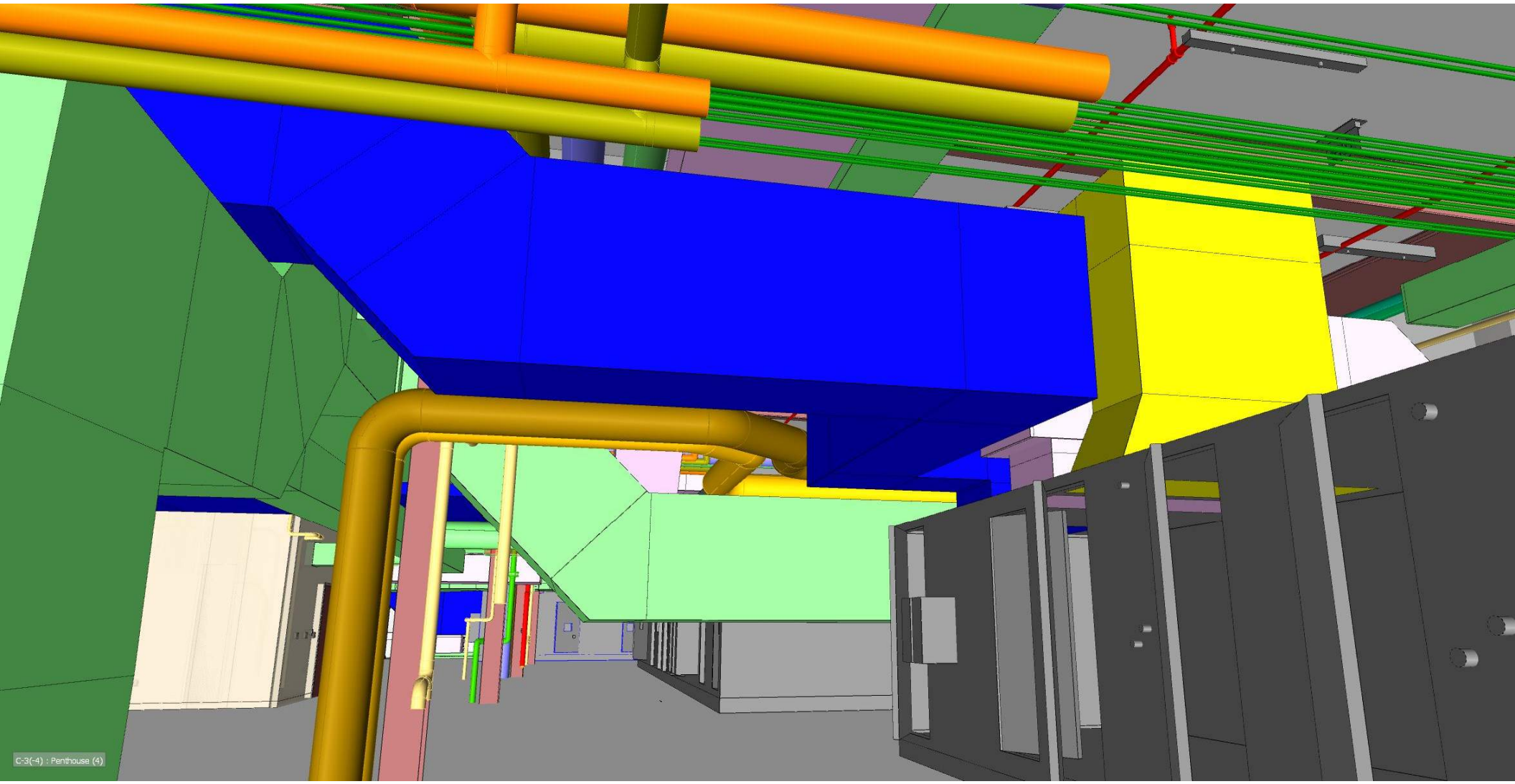
RODGERS' COORDINATION PYRAMID





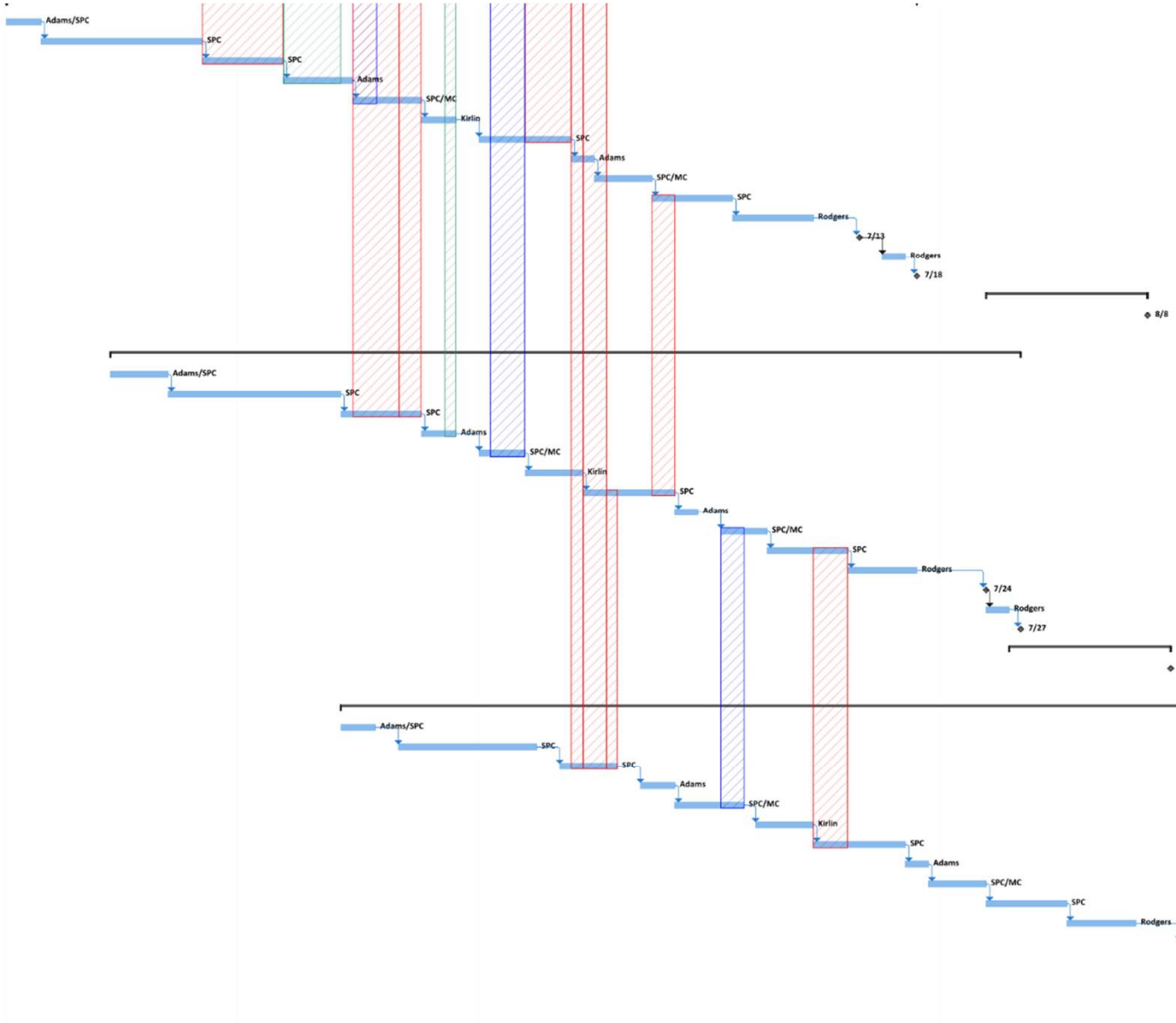
RODGERS
Our Passion is Building®

Revised: 08/01/16


C-3(-4) : Penthouse (4)

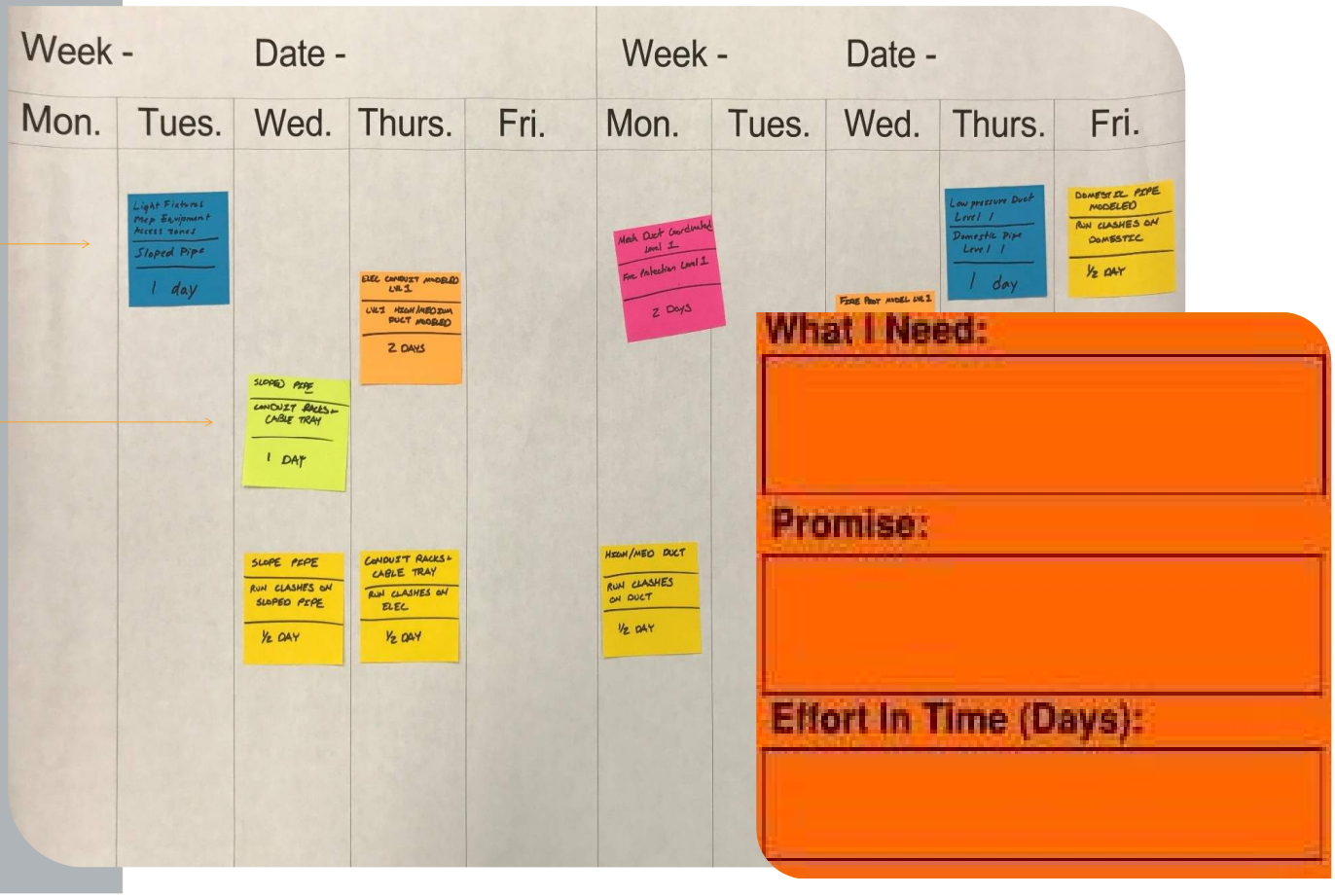
SCHEDULING

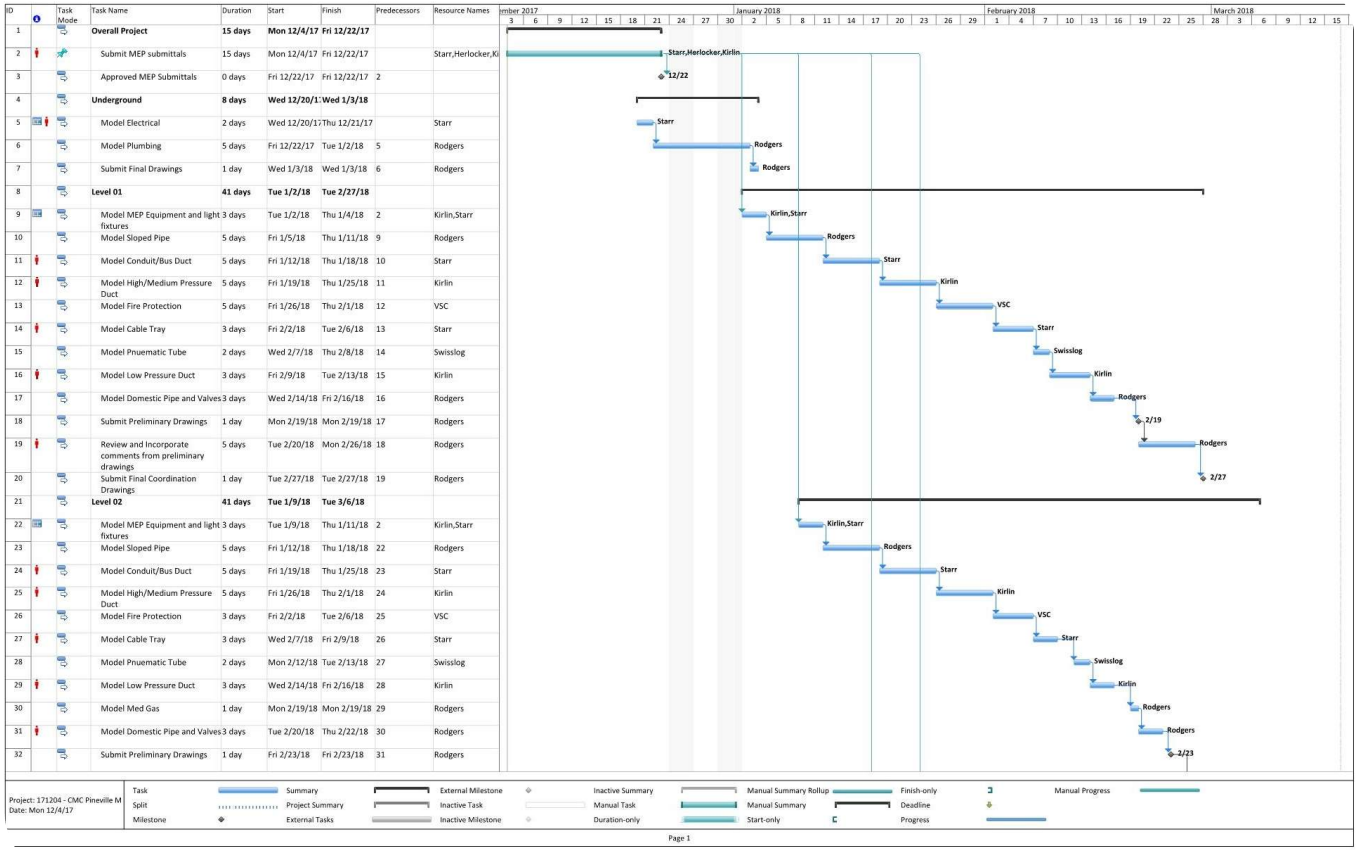
Tue 5/1/18	Thu 5/3/18		Adams/SPC
Fri 5/4/18	Thu 5/17/18	42	SPC
Fri 5/18/18	Thu 5/24/18	43	SPC
Fri 5/25/18	Wed 5/30/18	44	Adams
Thu 5/31/18	Tue 6/5/18	45	SPC/MC
Wed 6/6/18	Fri 6/8/18	46	Kirlin
Mon 6/11/18	Mon 6/18/18	47	SPC
Tue 6/19/18	Wed 6/20/18	48	Adams
Thu 6/21/18	Mon 6/25/18	49	SPC/MC
Tue 6/26/18	Mon 7/2/18	50	SPC
Tue 7/3/18	Mon 7/9/18	51	Rodgers
Tue 7/10/18	Fri 7/13/18	52	Adams/SPC/Kirlin
Mon 7/16/18	Tue 7/17/18	53	Rodgers
Wed 7/18/18	Wed 7/18/18	54	Adams/SPC/Kirlin
Wed 7/25/18	**Tue 8/7/18**		
Wed 8/8/18	Wed 8/8/18		
Thu 5/10/18	**Fri 7/27/18**		
Thu 5/10/18	Mon 5/14/18		Adams/SPC
Tue 5/15/18	Tue 5/29/18	60	SPC
Wed 5/30/18	Tue 6/5/18	61	SPC
Wed 6/6/18	Fri 6/8/18	62	Adams
Mon 6/11/18	Thu 6/14/18	63	SPC/MC
Fri 6/15/18	Tue 6/19/18	64	Kirlin
Wed 6/20/18	Wed 6/27/18	65	SPC
Thu 6/28/18	Fri 6/29/18	66	Adams
Mon 7/2/18	Thu 7/5/18	67	SPC/MC
Fri 7/6/18	Thu 7/12/18	68	SPC
Fri 7/13/18	Wed 7/18/18	69	Rodgers
Thu 7/19/18	Tue 7/24/18	70	Adams/SPC/Kirlin
Wed 7/25/18	Thu 7/26/18	71	Rodgers
Fri 7/27/18	Fri 7/27/18	72	Adams/SPC/Kirlin
Fri 7/27/18	**Thu 8/9/18**		
Fri 8/10/18	Fri 8/10/18		
Wed 5/30/18	**Wed 8/15/18**		
Wed 5/30/18	Fri 6/1/18		Adams/SPC
Mon 6/4/18	Fri 6/15/18	78	SPC
Mon 6/18/18	Fri 6/22/18	79	SPC
Mon 6/25/18	Wed 6/27/18	80	Adams
Thu 6/28/18	Tue 7/3/18	81	SPC/MC
Thu 7/5/18	Mon 7/9/18	82	Kirlin
Tue 7/10/18	Tue 7/17/18	83	SPC
Wed 7/18/18	Thu 7/19/18	84	Adams
Fri 7/20/18	Tue 7/24/18	85	SPC/MC
Wed 7/25/18	Tue 7/	86	SP
Wed 8/1/18	Mon 8/	87	Rodgers
Tue 8/7/18	Fri 8/10/18	88	Adams/SPC/Kirlin
Mon 8/13/18	Tue 8/14/18	89	Rodgers
Wed 8/15/18	Wed 8/15/18	90	Adams/SPC/Kirlin
Wed 8/15/18	**Tue 8/28/18**		



PULL PLANNING COORDINATION SCHEDULES USING COLORS FOR DIFFERENT TRADES

Subject	Comment	Label
Structural	Pull Planning	
Carolina Fire	Pull Planning	
Rodgers	Pull Planning	
Herlocker	Pull Planning	
Norwell	Pull Planning	
WB Moore	Pull Planning	
Company 1	Pull Planning	
Company 2	Pull Planning	
Company 3	Pull Planning	
Company 4	Pull Planning	
Company 5	Pull Planning	
Company 6	Pull Planning	
Company 7	Pull Planning	
MILESTONE	Pull Planning	

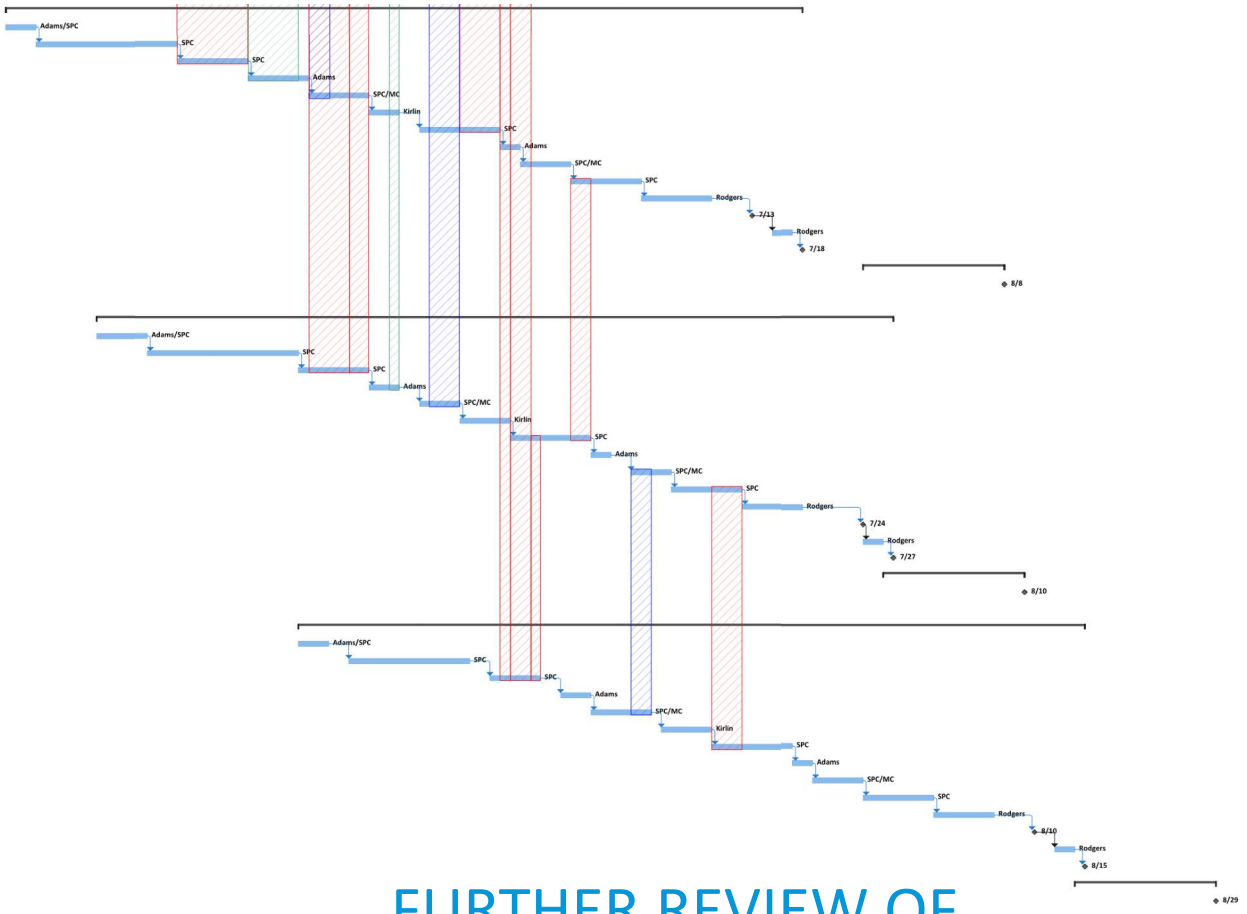




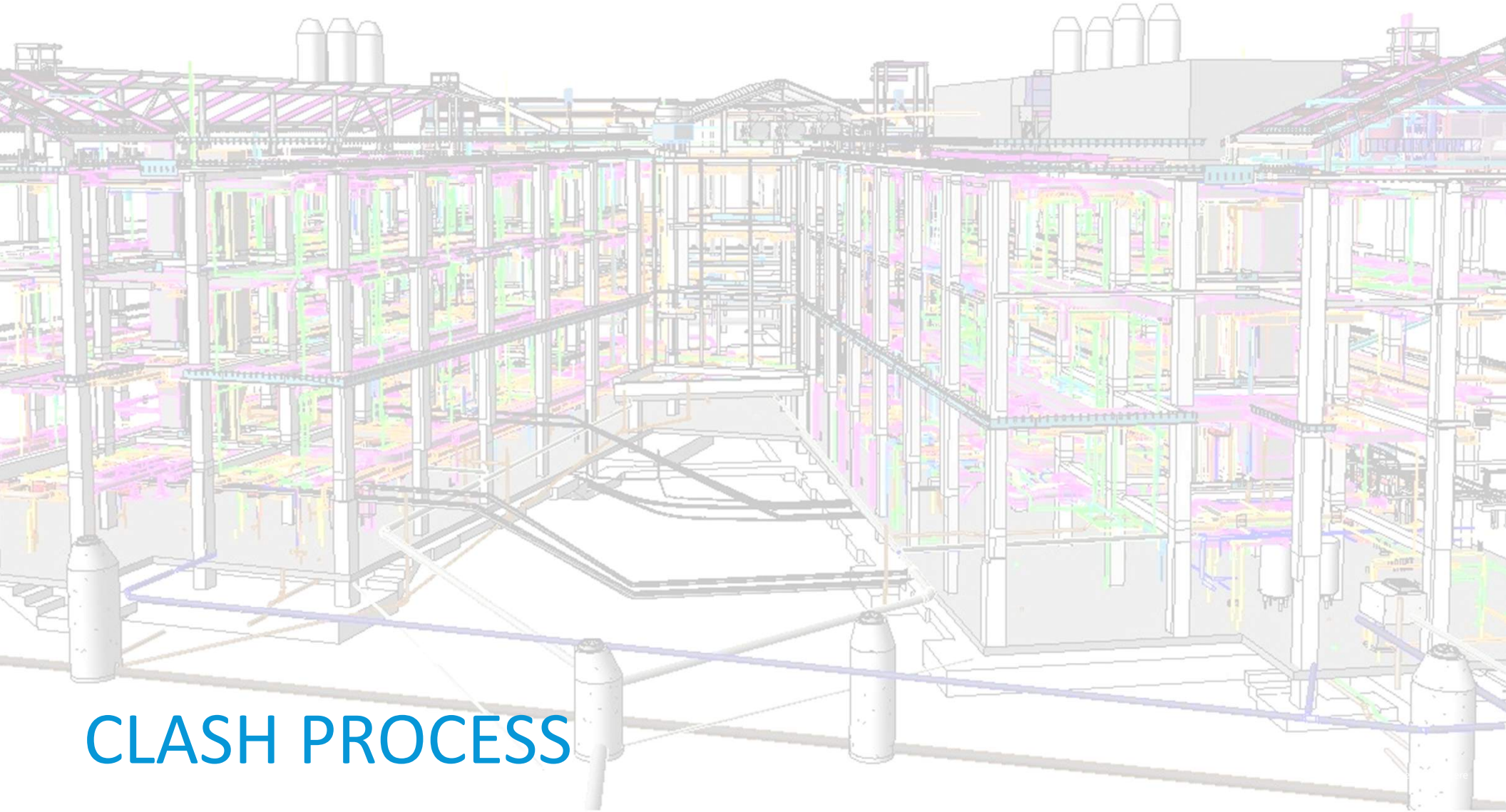
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1		**Overall Project**	**15 days**	**Mon 12/4/17**	**Fri 12/22/17**		
2		Submit MEP submittals	15 days	Mon 12/4/17	Fri 12/22/17		Starr,Herlocker,Ki
3		Approved MEP Submittals	0 days	Fri 12/22/17	Fri 12/22/17	2	
4		**Underground**	**8 days**	**Wed 12/20/1**	**Wed 1/3/18**		
5		Model Electrical	2 days	Wed 12/20/17	Thu 12/21/17		Starr
6		Model Plumbing	5 days	Fri 12/22/17	Tue 1/2/18	5	Rodgers
7		Submit Final Drawings	1 day	Wed 1/3/18	Wed 1/3/18	6	Rodgers
8		**Level 01**	**41 days**	**Tue 1/2/18**	**Tue 2/27/18**		
9		Model MEP Equipment and light fixtures	3 days	Tue 1/2/18	Thu 1/4/18	2	Kirlin,Starr
10		Model Sloped Pipe	5 days	Fri 1/5/18	Thu 1/11/18	9	Rodgers
11		Model Conduit/Bus Duct	5 days	Fri 1/12/18	Thu 1/18/18	10	Starr
12		Model High/Medium Pressure Duct	5 days	Fri 1/19/18	Thu 1/25/18	11	Kirlin
13		Model Fire Protection	5 days	Fri 1/26/18	Thu 2/1/18	12	VSC
14		Model Cable Tray	3 days	Fri 2/2/18	Tue 2/6/18	13	Starr
15		Model Pnuematic Tube	2 days	Wed 2/7/18	Thu 2/8/18	14	Swisslog
16		Model Low Pressure Duct	3 days	Fri 2/9/18	Tue 2/13/18	15	Kirlin
17		Model Domestic Pipe and Valves	3 days	Wed 2/14/18	Fri 2/16/18	16	Rodgers
18		Submit Preliminary Drawings	1 day	Mon 2/19/18	Mon 2/19/18	17	Rodgers
19		Review and Incorporate comments from preliminary drawings	5 days	Tue 2/20/18	Mon 2/26/18	18	Rodgers
20		Submit Final Coordination Drawings	1 day	Tue 2/27/18	Tue 2/27/18	19	Rodgers
21		**Level 02**	**41 days**	**Tue 1/9/18**	**Tue 3/6/18**		
22		Model MEP Equipment and light fixtures	3 days	Tue 1/9/18	Thu 1/11/18	2	Kirlin,Starr
23		Model Sloped Pipe	5 days	Fri 1/12/18	Thu 1/18/18	22	Rodgers
24		Model Conduit/Bus Duct	5 days	Fri 1/19/18	Thu 1/25/18	23	Starr
25		Model High/Medium Pressure Duct	5 days	Fri 1/26/18	Thu 2/1/18	24	Kirlin
26		Model Fire Protection	3 days	Fri 2/2/18	Tue 2/6/18	25	VSC
27		Model Cable Tray	3 days	Wed 2/7/18	Fri 2/9/18	26	Starr
28		Model Pnuematic Tube	2 days	Mon 2/12/18	Tue 2/13/18	27	Swisslog
29		Model Low Pressure Duct	3 days	Wed 2/14/18	Fri 2/16/18	28	Kirlin
30		Model Med Gas	1 day	Mon 2/19/18	Mon 2/19/18	29	Rodgers
31		Model Domestic Pipe and Valves	3 days	Tue 2/20/18	Thu 2/22/18	30	Rodgers
32		Submit Preliminary Drawings	1 day	Fri 2/23/18	Fri 2/23/18	31	Rodgers

SCHEDULE CREATED FROM PULL PLANNING SESSION

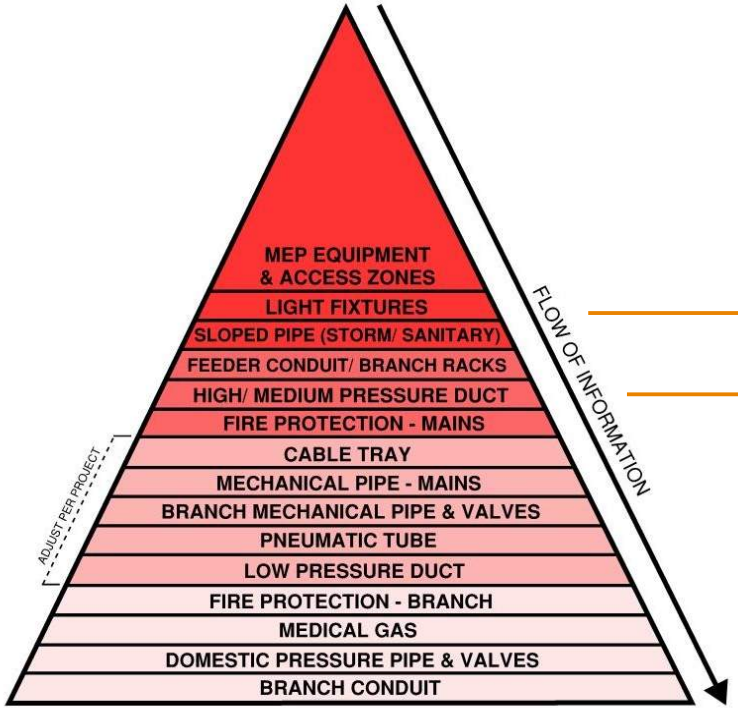
L3	**Level 03 Above Ceiling Coordination**	**55 days**	**Tue 5/1/18**	**Wed 7/18/18**			
All	MEP Equipment/Diffusers/Grilles	3 days	Tue 5/1/18	Thu 5/3/18			Adams/SPC
L3	Duct/ Mech Pipe/ Plumbing - Submit	10 days	Fri 5/4/18	Thu 5/17/18	42		SPC
L3	Sloped Piping	5 days	Fri 5/18/18	Thu 5/24/18	43		SPC
L3	Feeder Conduit/Branch - Coordinatic	3 days	Fri 5/25/18	Wed 5/30/18	44		Adams
L3	High/Med Pressure Duct	4 days	Thu 5/31/18	Tue 6/5/18	45		SPC/MC
L3	Fire Protection - Coordination	3 days	Wed 6/6/18	Fri 6/8/18	46		Kirlin
L3	Mechanical & Gas Piping & Valves	6 days	Mon 6/11/18	Mon 6/18/18	47		SPC
L3	Cable Tray	2 days	Tue 6/19/18	Wed 6/20/18	48		Adams
L3	Low Pressure Duct	3 days	Thu 6/21/18	Mon 6/25/18	49		SPC/MC
L3	Domestic Piping	5 days	Tue 6/26/18	Mon 7/2/18	50		SPC
L3	Final Clash Detection	4 days	Tue 7/3/18	Mon 7/9/18	51		Rodgers
L3	Preliminary Drawings	4 days	Tue 7/10/18	Fri 7/13/18	52		Adams/SPC/Kirlin
L3	Preliminary Review	2 days	Mon 7/16/18	Tue 7/17/18	53		Rodgers
L3	Final Drawings	1 day	Wed 7/18/18	Wed 7/18/18	54		Adams/SPC/Kirlin
L3	**Level 03 Fabrication**	**10 days**	**Wed 7/25/18**	**Tue 8/7/18**			
L3	Level 03 MEP Rough In	0 days	Wed 8/8/18	Wed 8/8/18			
L4	**Level 04 Above Ceiling Coordination**	**55 days**	**Thu 5/10/18**	**Fri 7/27/18**			
All	MEP Equipment/Diffusers/Grilles	3 days	Thu 5/10/18	Mon 5/14/18			Adams/SPC
L4	Duct/ Mech Pipe/ Plumbing - Submit	10 days	Tue 5/15/18	Tue 5/29/18	60		SPC
L4	Sloped Piping	5 days	Wed 5/30/18	Tue 6/5/18	61		SPC
L4	Feeder Conduit/Branch - Coordinatic	3 days	Wed 6/6/18	Fri 6/8/18	62		Adams
L4	High/Med Pressure Duct	4 days	Mon 6/11/18	Thu 6/14/18	63		SPC/MC
L4	Fire Protection - Coordination	3 days	Fri 6/15/18	Tue 6/19/18	64		Kirlin
L4	Mechanical & Gas Piping & Valves	6 days	Wed 6/20/18	Wed 6/27/18	65		SPC
L4	Cable Tray	2 days	Thu 6/28/18	Fri 6/29/18	66		Adams
L4	Low Pressure Duct	3 days	Mon 7/2/18	Thu 7/5/18	67		SPC/MC
L4	Domestic Piping	5 days	Fri 7/6/18	Thu 7/12/18	68		SPC
L4	Final Clash Detection	4 days	Fri 7/13/18	Wed 7/18/18	69		Rodgers
L4	Preliminary Drawings	4 days	Thu 7/19/18	Tue 7/24/18	70		Adams/SPC/Kirlin
L4	Preliminary Review	2 days	Wed 7/25/18	Thu 7/26/18	71		Rodgers
L4	Final Drawings	1 day	Fri 7/27/18	Fri 7/27/18	72		Adams/SPC/Kirlin
L4	**Level 04 Fabrication**	**10 days**	**Fri 7/27/18**	**Thu 8/9/18**			
L4	Level 04 MEP Rough In	0 days	Fri 8/10/18	Fri 8/10/18			
L5	**Level 05 Above Ceiling Coordination**	**55 days**	**Wed 5/30/18**	**Wed 8/15/18**			
All	MEP Equipment/Diffusers/Grilles	3 days	Wed 5/30/18	Fri 6/1/18			Adams/SPC
L5	Duct/ Mech Pipe/ Plumbing - Submit	10 days	Mon 6/4/18	Fri 6/15/18	78		SPC
L5	Sloped Piping	5 days	Mon 6/18/18	Fri 6/22/18	79		SPC
L5	Feeder Conduit/Branch - Coordinatic	3 days	Mon 6/25/18	Wed 6/27/18	80		Adams
L5	High/Med Pressure Duct	4 days	Thu 6/28/18	Tue 7/3/18	81		SPC/MC
L5	Fire Protection - Coordination	3 days	Thu 7/5/18	Mon 7/9/18	82		Kirlin
L5	Mechanical & Gas Piping & Valves	6 days	Tue 7/10/18	Tue 7/17/18	83		SPC
L5	Cable Tray	2 days	Wed 7/18/18	Thu 7/19/18	84		Adams
L5	Low Pressure Duct	3 days	Fri 7/20/18	Tue 7/24/18	85		SPC/MC
L5	Domestic Piping	5 days	Wed 7/25/18	Tue 7/31/18	86		SPC
L5	Final Clash Detection	4 days	Wed 8/1/18	Mon 8/6/18	87		Rodgers
L5	Preliminary Drawings	4 days	Tue 8/7/18	Fri 8/10/18	88		Adams/SPC/Kirlin
L5	Preliminary Review	2 days	Mon 8/13/18	Tue 8/14/18	89		Rodgers
L5	Final Drawings	1 day	Wed 8/15/18	Wed 8/15/18	90		Adams/SPC/Kirlin
L5	**Level 05 Fabrication**	**10 days**	**Wed 8/15/18**	**Tue 8/28/18**			
L5	Level 05 MEP Rough In	0 days	Wed 8/29/18	Wed 8/29/18			

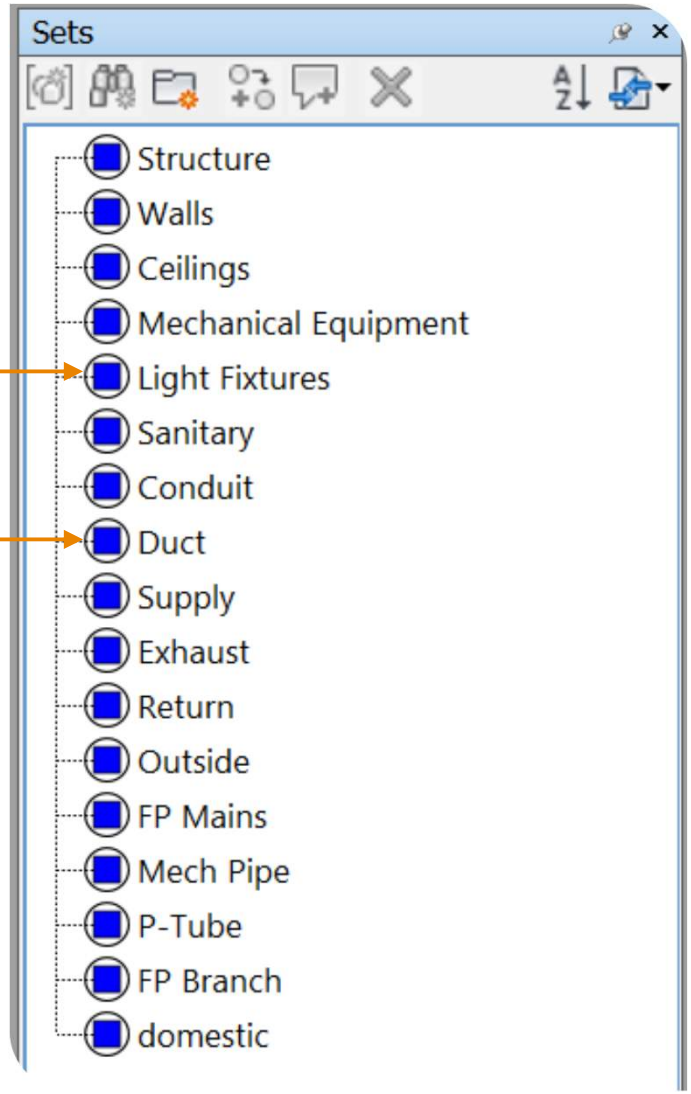


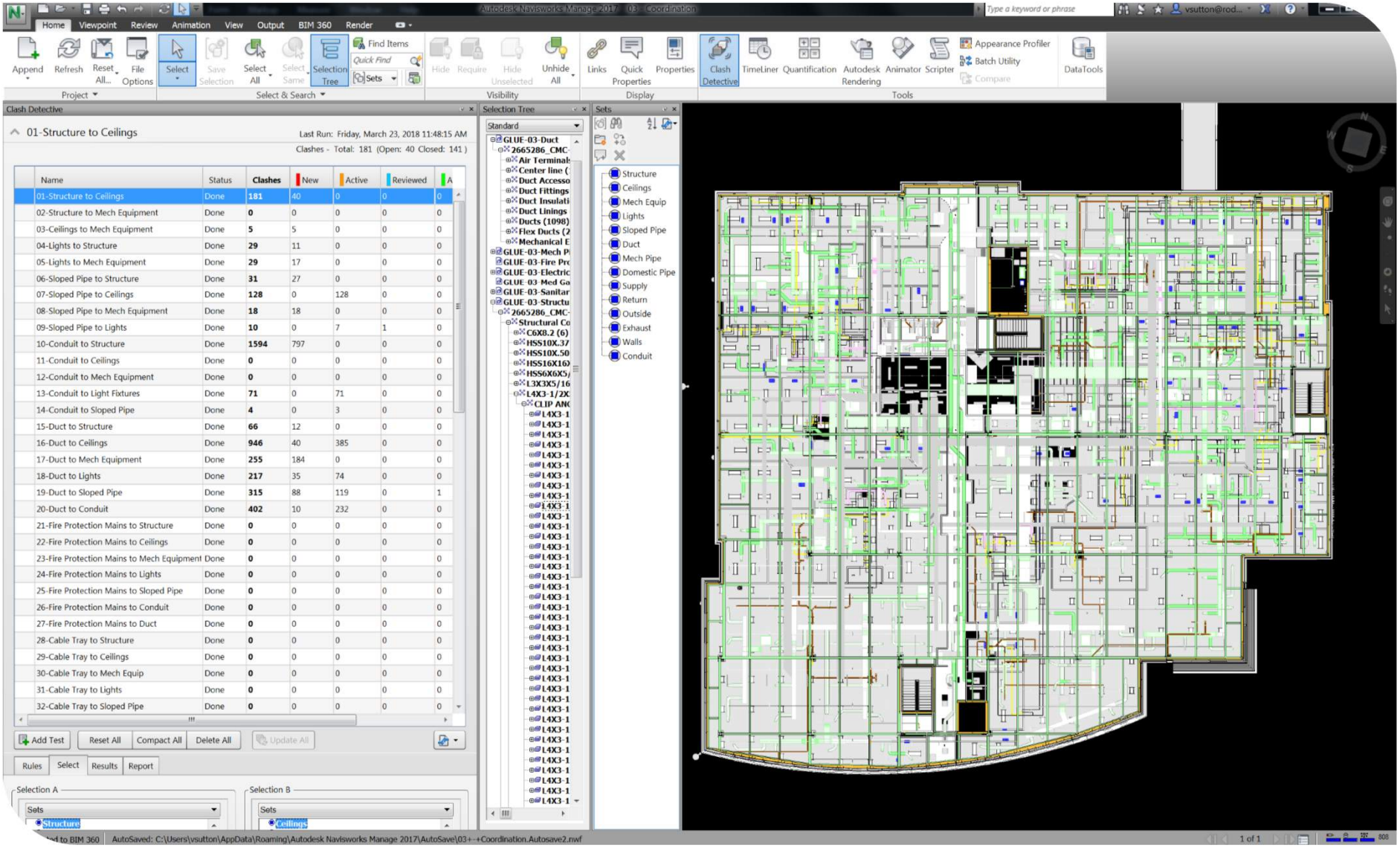
FURTHER REVIEW OF COORDINATION DONE FOR RESOURCE ALLOCATION

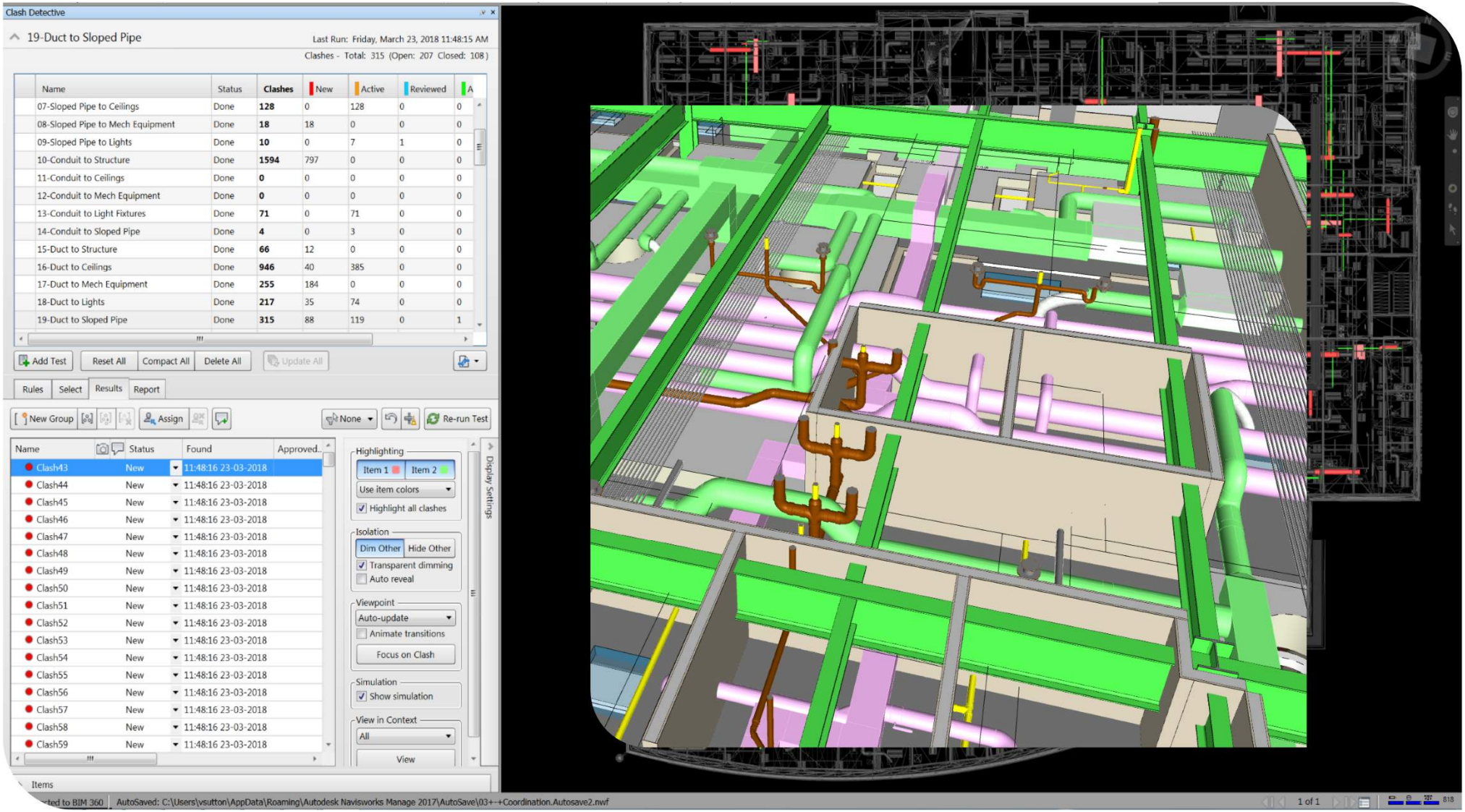


CLASH PROCESS


MEP EQUIPMENT
& ACCESS ZONES
LIGHT FIXTURES
SLOPED PIPE (STORM/ SANITARY)
FEEDER CONDUIT/ BRANCH RACKS
HIGH/ MEDIUM PRESSURE DUCT
FIRE PROTECTION - MAINS
CABLE TRAY
MECHANICAL PIPE - MAINS
BRANCH MECHANICAL PIPE & VALVES
PNEUMATIC TUBE
LOW PRESSURE DUCT
FIRE PROTECTION - BRANCH
MEDICAL GAS
DOMESTIC PRESSURE PIPE & VALVES
BRANCH CONDUIT
ADJUST PER PROJECT
FLOW OF INFORMATION


Sets
Structure
Walls
Ceilings
Mechanical Equipment
Light Fixtures
Sanitary
Conduit
Duct
Supply
Exhaust
Return
Outside
FP Mains
Mech Pipe
P-Tube
FP Branch
domestic


Autodesk Navisworks Manage 2017 03 Coordination
Type a keyword or phrase
vsutton@rod...
Home
Viewpoint
Review
Animation
View
Output
BIM 360
Render
Append
Refresh
Reset All...
File Options
Select
Save Selection
Select All
Select Same
Selection Tree
Find Items
Quick Find
Sets
Hide
Require
Hide Unselected
Unhide All
Links
Quick Properties
Properties
Clash Detective
TimeLiner
Quantification
Autodesk Rendering
Animator
Scripter
Appearance Profiler
Batch Utility
Compare
DataTools
Project
Select & Search
Visibility
Display
Tools
Clash Detective
01-Structure to Ceilings
Last Run: Friday, March 23, 2018 11:48:15 AM
Clashes - Total: 181 (Open: 40 Closed: 141)
Name
Status
Clashes
New
Active
Reviewed
A
01-Structure to Ceilings Done 181 40 0 0 0
02-Structure to Mech Equipment Done 0 0 0 0 0
03-Ceilings to Mech Equipment Done 5 5 0 0 0
04-Lights to Structure Done 29 11 0 0 0
05-Lights to Mech Equipment Done 29 17 0 0 0
06-Sloped Pipe to Structure Done 31 27 0 0 0
07-Sloped Pipe to Ceilings Done 128 0 128 0 0
08-Sloped Pipe to Mech Equipment Done 18 18 0 0 0
09-Sloped Pipe to Lights Done 10 0 7 1 0
10-Conduit to Structure Done 1594 797 0 0 0
11-Conduit to Ceilings Done 0 0 0 0 0
12-Conduit to Mech Equipment Done 0 0 0 0 0
13-Conduit to Light Fixtures Done 71 0 71 0 0
14-Conduit to Sloped Pipe Done 4 0 3 0 0
15-Duct to Structure Done 66 12 0 0 0
16-Duct to Ceilings Done 946 40 385 0 0
17-Duct to Mech Equipment Done 255 184 0 0 0
18-Duct to Lights Done 217 35 74 0 0
19-Duct to Sloped Pipe Done 315 88 119 0 1
20-Duct to Conduit Done 402 10 232 0 0
21-Fire Protection Mains to Structure Done 0 0 0 0 0
22-Fire Protection Mains to Ceilings Done 0 0 0 0 0
23-Fire Protection Mains to Mech Equipment Done 0 0 0 0 0
24-Fire Protection Mains to Lights Done 0 0 0 0 0
25-Fire Protection Mains to Sloped Pipe Done 0 0 0 0 0
26-Fire Protection Mains to Conduit Done 0 0 0 0 0
27-Fire Protection Mains to Duct Done 0 0 0 0 0
28-Cable Tray to Structure Done 0 0 0 0 0
29-Cable Tray to Ceilings Done 0 0 0 0 0
30-Cable Tray to Mech Equip Done 0 0 0 0 0
31-Cable Tray to Lights Done 0 0 0 0 0
32-Cable Tray to Sloped Pipe Done 0 0 0 0 0
Add Test
Reset All
Compact All
Delete All
Update All
Rules
Select
Results
Report
Selection A
Sets
Structure
Selection B
Sets
Ceilings
Selection Tree
Standard
GLUE-03-Duct
2665286_CMC-
Air Terminals
Center line (
Duct Accesso
Duct Fittings
Duct Insulati
Duct Linings
Ducts (1098)
Flex Ducts (2
Mechanical E
GLUE-03-Mech P
GLUE-03-Fire Pr
GLUE-03-Electric
GLUE-03-Med Ga
GLUE-03-Sanitar
GLUE-03-Structu
2665286_CMC-
Structural Co
C6X8.2 (6)
HSS10X.37
HSS10X.50
HSS16X16
HSS6X6X5
L3X3X5/16
L4X3-1/2
CLIP ANG
L4X3-1
Sets
Structure
Ceilings
Mech Equip
Lights
Sloped Pipe
Duct
Mech Pipe
Domestic Pipe
Supply
Return
Outside
Exhaust
Walls
Conduit
AutoSaved: C:\Users\vsutton\AppData\Roaming\Autodesk Navisworks Manage 2017\AutoSave\03+-+Coordination.Autosave2.nwf
1 of 1


Clash Detective
19-Duct to Sloped Pipe
Last Run: Friday, March 23, 2018 11:48:15 AM
Clashes - Total: 315 (Open: 207 Closed: 108)
Name | Status | Clashes | New | Active | Reviewed | A
07-Sloped Pipe to Ceilings | Done | 128 | 0 | 128 | 0 | 0
08-Sloped Pipe to Mech Equipment | Done | 18 | 18 | 0 | 0 | 0
09-Sloped Pipe to Lights | Done | 10 | 0 | 7 | 1 | 0
10-Conduit to Structure | Done | 1594 | 797 | 0 | 0 | 0
11-Conduit to Ceilings | Done | 0 | 0 | 0 | 0 | 0
12-Conduit to Mech Equipment | Done | 0 | 0 | 0 | 0 | 0
13-Conduit to Light Fixtures | Done | 71 | 0 | 71 | 0 | 0
14-Conduit to Sloped Pipe | Done | 4 | 0 | 3 | 0 | 0
15-Duct to Structure | Done | 66 | 12 | 0 | 0 | 0
16-Duct to Ceilings | Done | 946 | 40 | 385 | 0 | 0
17-Duct to Mech Equipment | Done | 255 | 184 | 0 | 0 | 0
18-Duct to Lights | Done | 217 | 35 | 74 | 0 | 0
19-Duct to Sloped Pipe | Done | 315 | 88 | 119 | 0 | 1
Add Test
Reset All
Compact All
Delete All
Update All
Rules
Select
Results
Report
New Group
Assign
None
Re-run Test
Name | Status | Found | Approved
Clash43 | New | 11:48:16 23-03-2018
Clash44 | New | 11:48:16 23-03-2018
Clash45 | New | 11:48:16 23-03-2018
Clash46 | New | 11:48:16 23-03-2018
Clash47 | New | 11:48:16 23-03-2018
Clash48 | New | 11:48:16 23-03-2018
Clash49 | New | 11:48:16 23-03-2018
Clash50 | New | 11:48:16 23-03-2018
Clash51 | New | 11:48:16 23-03-2018
Clash52 | New | 11:48:16 23-03-2018
Clash53 | New | 11:48:16 23-03-2018
Clash54 | New | 11:48:16 23-03-2018
Clash55 | New | 11:48:16 23-03-2018
Clash56 | New | 11:48:16 23-03-2018
Clash57 | New | 11:48:16 23-03-2018
Clash58 | New | 11:48:16 23-03-2018
Clash59 | New | 11:48:16 23-03-2018
Highlighting
Item 1
Item 2
Use item colors
Highlight all clashes
Isolation
Dim Other
Hide Other
Transparent dimming
Auto reveal
Viewpoint
Auto-update
Animate transitions
Focus on Clash
Simulation
Show simulation
View in Context
All
View
Display Settings
Items
AutoSaved: C:\Users\vsutton\AppData\Roaming\Autodesk Navisworks Manage 2017\AutoSave\03+-+Coordination.Autosave2.nwf
1 of 1

Clash Detective

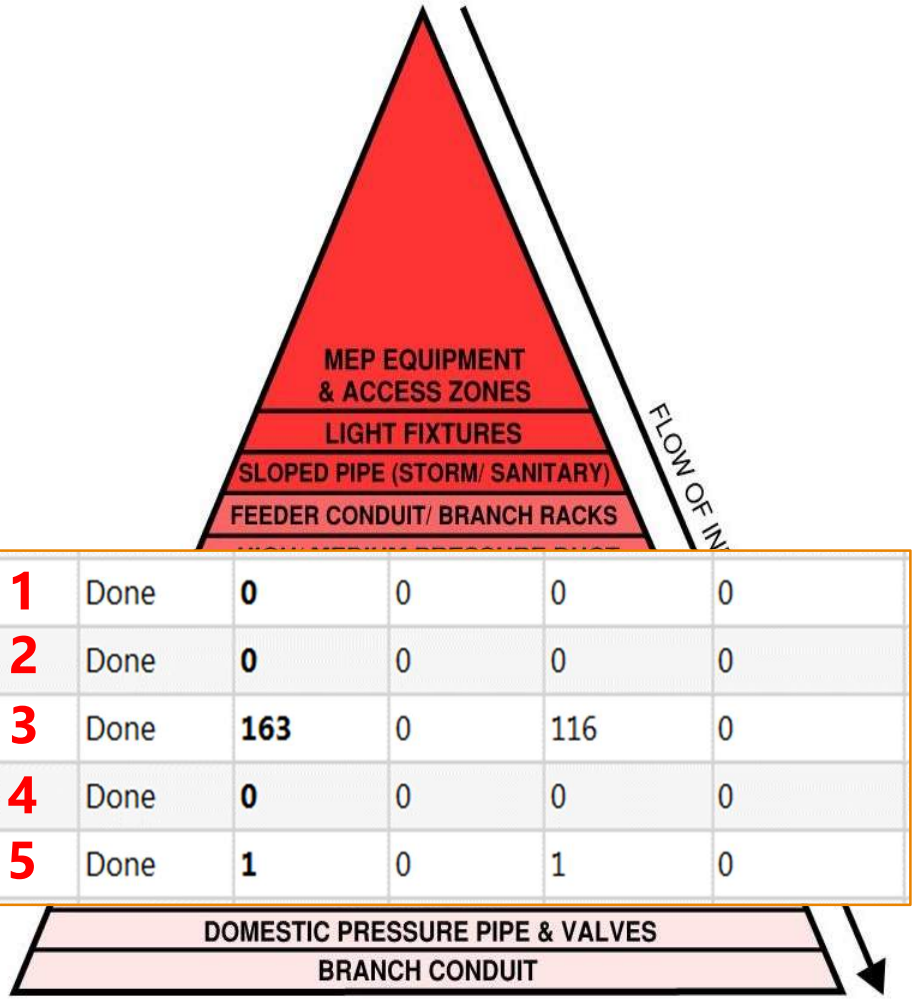
01-Structure to Ceilings

Last Run: Friday, March 23, 2018 11:48:15 AM

Clashes - Total: 181 (Open: 40 Closed: 141)

Name	Status	Clashes	New	Active	Reviewed	A
01-Structure to Ceilings	Done	**181**	40	0	0	0
02-Structure to Mech Equipment	Done	**0**	0	0	0	0
03-Ceilings to Mech Equipment	Done	**5**	5	0	0	0
04-Lights to Structure	Done	**29**	11	0	0	0
05-Lights to Mech Equipment	Done	**29**	17	0	0	0
06-Sloped Pipe to Structure	Done	**31**	27	0	0	0
07-Sloped Pipe to Ceilings	Done	**128**	0	128	0	0
08-Sloped Pipe to Mech Equipment	Done	**18**	18	0	0	0
09-Sloped Pipe to Lights	Done	**10**	0	7	1	0
10-Conduit to Structure	Done	**1594**	797	0	0	0
11-Conduit to Ceilings	Done					
12-Conduit to Mech Equipment	Done					
13-Conduit to Light Fixtures	Done					
14-Conduit to Sloped Pipe	Done					
15-Duct to Structure	Done					
16-Duct to Ceilings	Done					
17-Duct to Mech Equipment	Done					
18-Duct to Lights	Done					
19-Duct to Sloped Pipe	Done					
20-Duct to Conduit	Done	**402**	10	232	0	0
21-Fire Protection Mains to Structure	Done	**0**	0	0	0	0
22-Fire Protection Mains to Ceilings	Done	**0**	0	0	0	0

10-Conduit to Structure	1	Done	**0**	0	0	0
11-Conduit to Ceilings	2	Done	**0**	0	0	0
12-Conduit to Mech Equipment	3	Done	**163**	0	116	0
13-Conduit to Light Fixtures	4	Done	**0**	0	0	0
14-Conduit to Sloped Pipe	5	Done	**1**	0	1	0



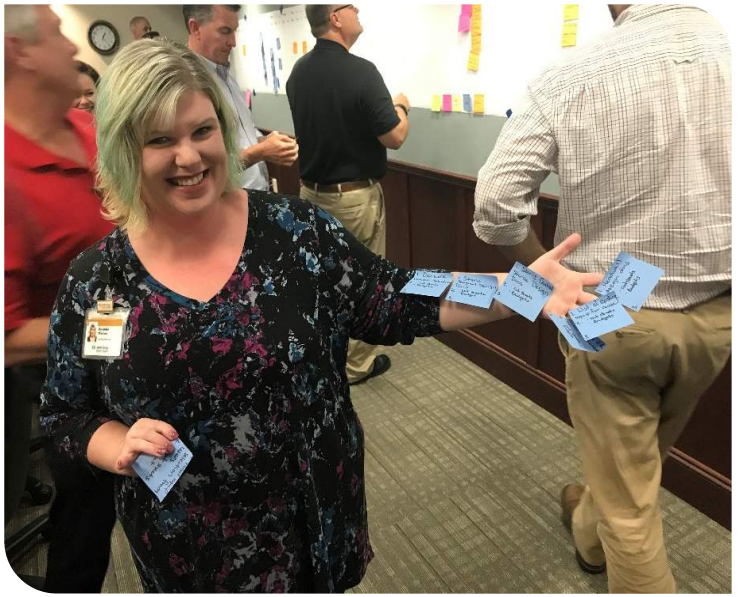
BENEFITS

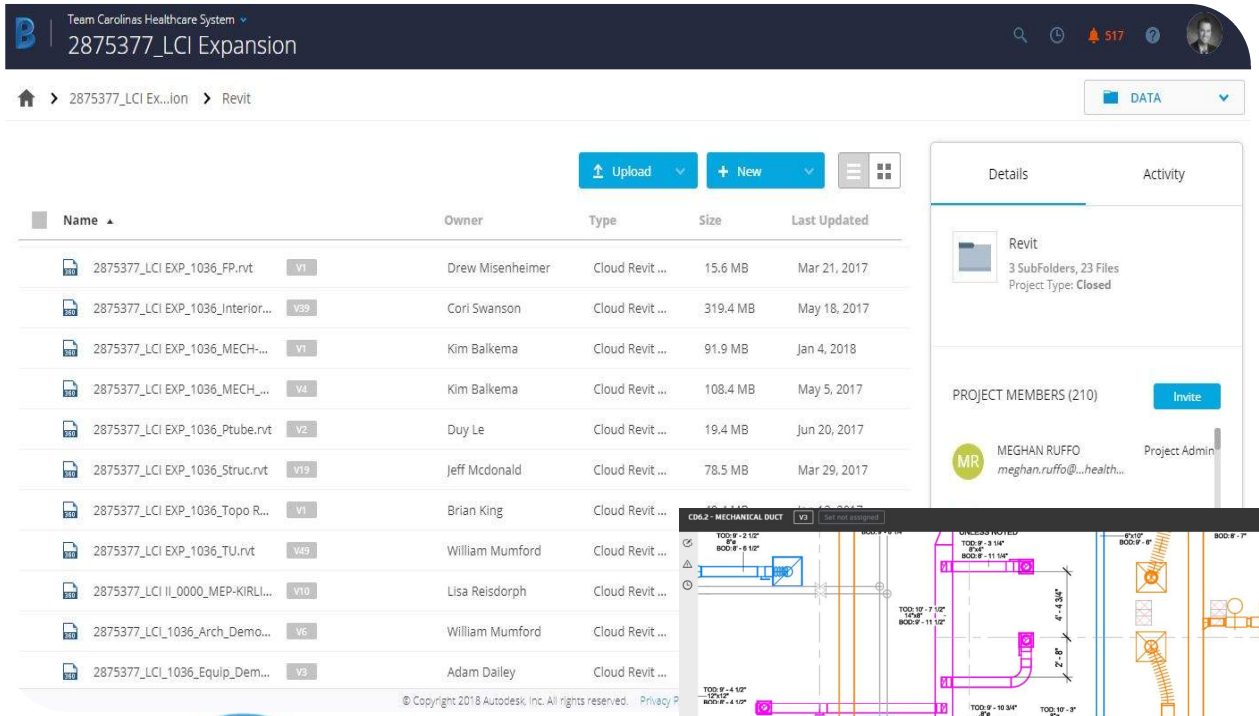
- PRIORITIZED TRADE SCOPES
- DEFINED ORDER FOR MODEL POPULATION
- AVOID REWORK IN BIM
- SCHEDULE OWNERSHIP FROM TRADES
- DETAILED COORDINATION SCHEDULE
- INCREASED EFFICIENCY – TIME/COST

DESIGN PROCESS

Photo credit goes here

INTEGRATING THE DESIGN PROCESS




Team Carolinas Healthcare System
2875377_LCI Expansion
517
2875377_LCI Ex...ion
Revit
DATA
Upload
New
Details
Activity
Name
Owner
Type
Size
Last Updated
2875377_LCI EXP_1036_FP.rvt V1 Drew Misenheimer Cloud Revit ... 15.6 MB Mar 21, 2017
2875377_LCI EXP_1036_Interior... V39 Cori Swanson Cloud Revit ... 319.4 MB May 18, 2017
2875377_LCI EXP_1036_MECH-... V1 Kim Balkema Cloud Revit ... 91.9 MB Jan 4, 2018
2875377_LCI EXP_1036_MECH_... V4 Kim Balkema Cloud Revit ... 108.4 MB May 5, 2017
2875377_LCI EXP_1036_Ptube.rvt V2 Duy Le Cloud Revit ... 19.4 MB Jun 20, 2017
2875377_LCI EXP_1036_Struc.rvt V19 Jeff Mcdonald Cloud Revit ... 78.5 MB Mar 29, 2017
2875377_LCI EXP_1036_Topo R... V1 Brian King Cloud Revit ...
2875377_LCI EXP_1036_TU.rvt V49 William Mumford Cloud Revit ...
2875377_LCI II_0000_MEP-KIRLI... V10 Lisa Reisdorph Cloud Revit ...
2875377_LCI_1036_Arch_Demo... V6 William Mumford Cloud Revit ...
2875377_LCI_1036_Equip_Dem... V3 Adam Dailey Cloud Revit ...
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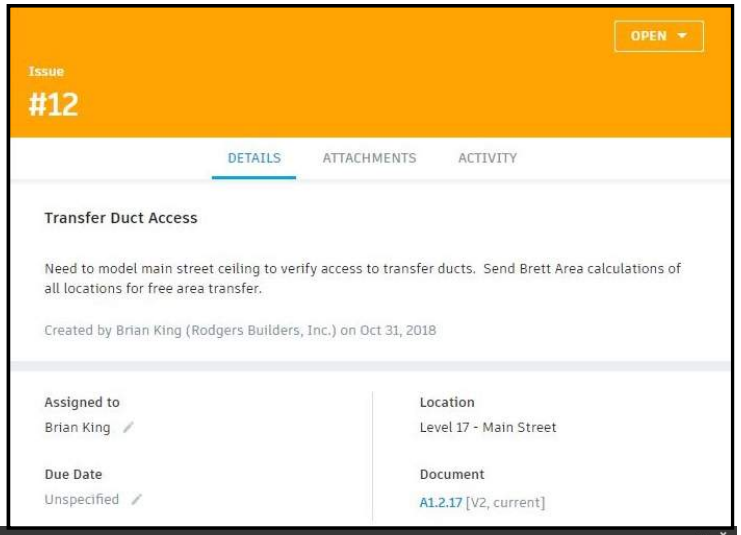
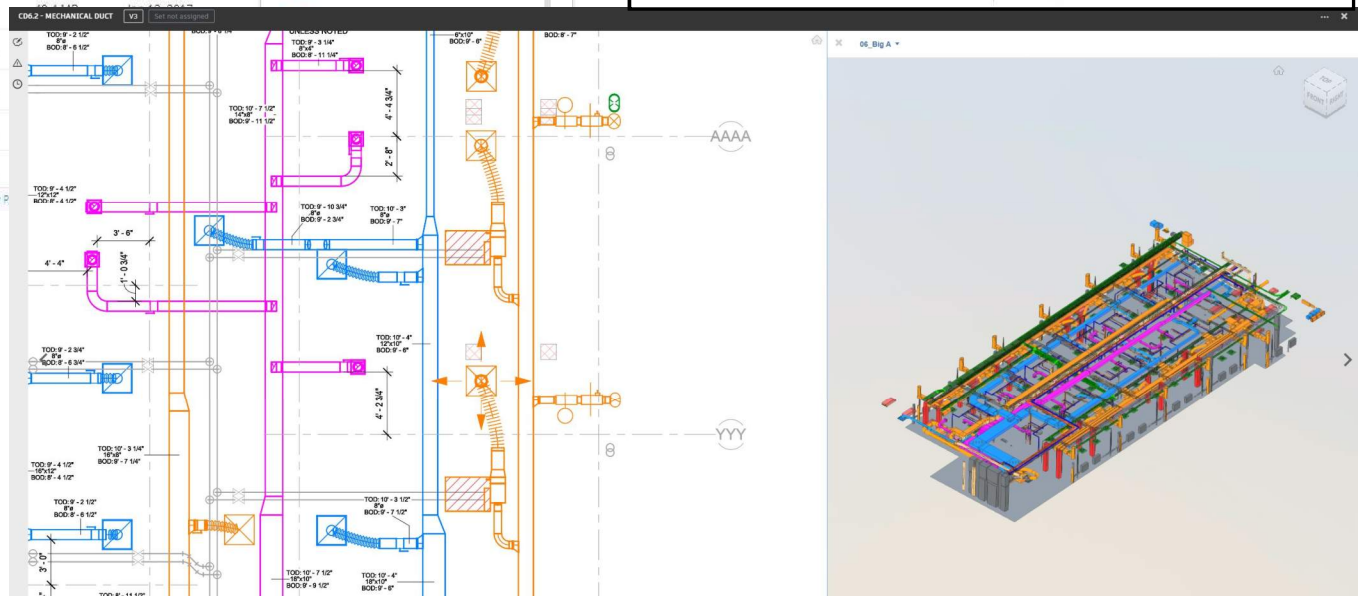
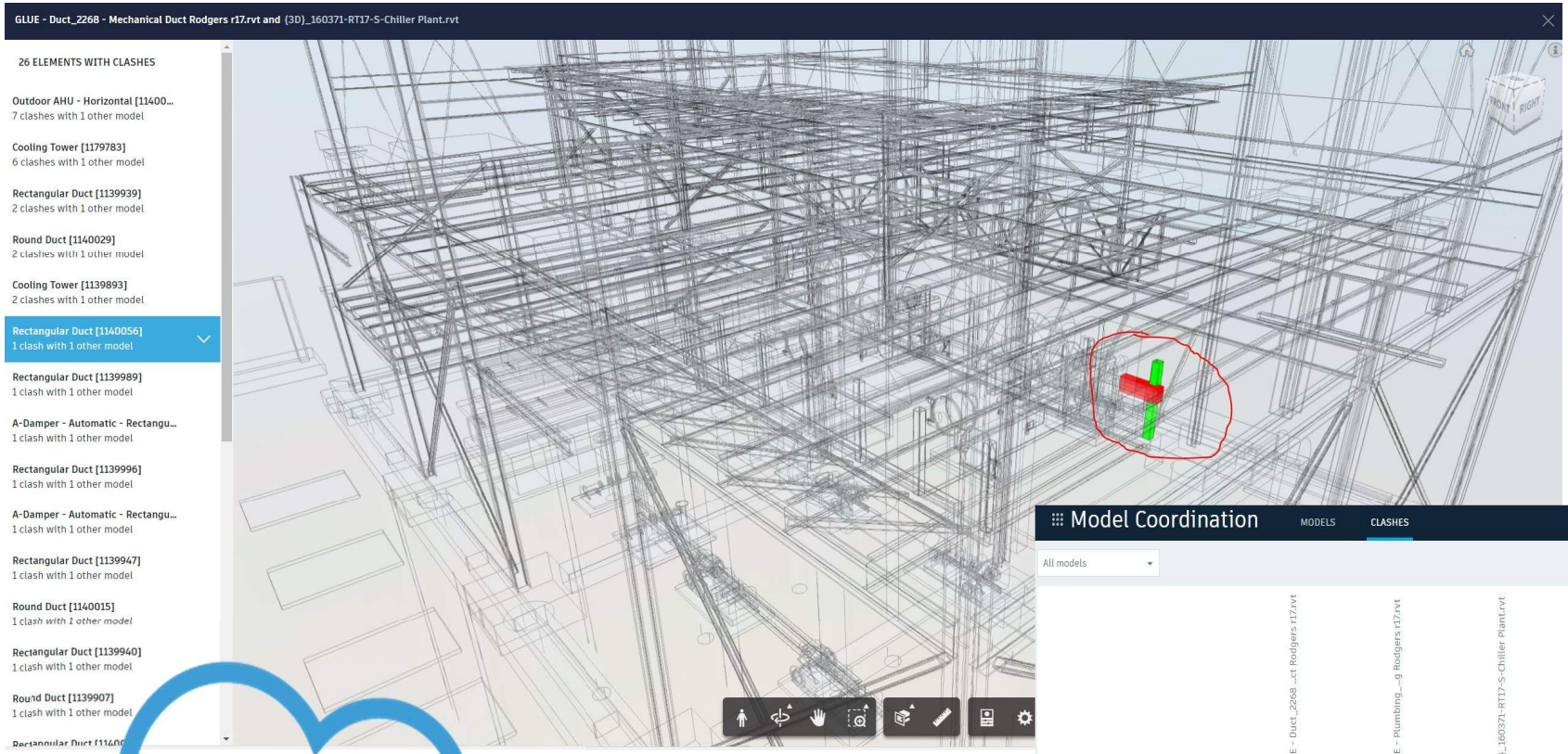
Revit
3 SubFolders, 23 Files
Project Type: Closed
PROJECT MEMBERS (210)
Invite
MEGHAN RUFFO
meghan.ruffo@...health...
Project Admin


OPEN
Issue
#12
DETAILS
ATTACHMENTS
ACTIVITY
Transfer Duct Access
Need to model main street ceiling to verify access to transfer ducts. Send Brett Area calculations of all locations for free area transfer.
Created by Brian King (Rodgers Builders, Inc.) on Oct 31, 2018
Assigned to
Brian King
Location
Level 17 - Main Street
Due Date
Unspecified
Document
A1.2.17 [V2, current]


CD6.2 - MECHANICAL DUCT
V3
AAAA
YYY

BIM 360



Model Coordination

MODELS | CLASHES

All models

	GLUE - Duct_2268 ...ct Rodgers r17.rvt	GLUE - Plumbing_...g Rodgers r17.rvt	{3D}_160371-RT17-S-Chiller Plant.rvt	{3D}_2268 - Fire ...ion Rodgers r17.rvt	{3D}_2268 - Mech...pe Rodgers r17.rvt	{3D}_2268 - Plumbing Rodgers r17.rvt
GLUE - Duct_2268 - Me...l Duct Rodgers r17.rvt 52 clash groups		8	26	9	16	8
GLUE - Plumbing_226...mbing Rodgers r17.rvt 241 clash groups	10		118	2	5	130
{3D}_160371-RT17-S-Chiller Plant.rvt 102 clash groups	37	27		4	45	27
{3D}_2268 - Fire Protection Rodgers r17.rvt 12 clash groups	2	2	5		3	2
{3D}_2268 - Mechanical Pipe Rodgers r17.rvt `9 clash groups	17	5	21	2		5

AUTODESK® BIM 360™ FIELD 2212-CHS LCI Expansion 〉 Equipment

Search Reset Close Add Edit Delete Print More Actions

Filter
VAVs

Name

Type
all

Description

Location
all

Include sub-locations?

Status
all

Custom Properties
01 - Delivery Date
From
To

02 - Installed Date
From
To

03 - Connected Date
From
To

04 - Start-Up Date
From
To

Name	Barcode	CHS Asset Tag Number	Manufacturer	Type	Model	Location Path	Description
VAV-7B27	159057	0	Trane	Variable Air Volume Box's	VCWF05	LCI EXP>Level 7>70342 OFFICE, SHARED	VAV BOX
VAV-7A04	159064	0	Trane	Variable Air Volume Box's	VCWF05	LCI EXP>Level 7>70022 CORRIDOR	VAV BOX
VAV-3A27	158810	0	Trane	Variable Air Volume Box's	VCWF05	LCI EXP>Level 3>30416 BLOOD DRAW PF	VAV BOX
VAV-6B01	158961	0	JCI	Variable Air Volume Box's	SDR-06-WC	LCI EXP>Level 6>60227 OFFICE, TRANSP	VAV BOX
VAV-5B11	158927	0	Trane	Variable Air Volume Box's	VCWF05	LCI EXP>Level 5>50333 EXAM, BARI	VAV BOX
VAV-6A07	159021	0	Trane				
VAV-3B10	158888	0	Trane				
EAV-2A13		0	CRITICAL ROOM CONTROL				
VAV-6B32	158951	0	Trane				
VAV-4A28	159203	0	Trane				
VAV-5A11	159297	0	Trane				
VAV-4A29	A159202	0	Trane				
VAV-4A30	159201	0	Trane				
VAV-5B29	158916	0	Trane				
VAV-7A58	159036	0	Trane				
VAV-5A48	159272	0	Trane				
VAV-5A40	158282	0	Trane				
VAV-2A23	158885	0	Trane				
VAV-3A35	158815	0	Trane				
VAV-3A17	S159176	0	Trane				
VAV-5B22	158930	0	Trane				
VAV-4B06	159222	0	Trane				
VAV-6A35	158995	0	Trane				
VAV-4B17	159229	0	Trane				
VAV-4A22	159246	0	Trane				
VAV-7A42	159019	0	Trane				
VAV-2A21	158777	0	Trane				
VAV-5B08	159307	0	Trane				
VAV-7A51	159103	0	Trane				
VAV-3A09	W158168	0	Trane				
VAV-5A14	159314	0	Trane				
VAV-2A13	158763	0	Trane				
VAV-7A49	159054	0	Trane				
VAV-3A03	159164	0	Trane				
VAV-7A21	159070	0	Trane				
VAV-4B26	159218	0	Trane				
VAV-7B10	159099	0	Trane				
VAV-1A06	158877	0	Trane				

AT&T 11:42 AM 39%

Equipment FS1A-51 Show in Model

Details Checklists Issues Attachments Activity Tasks

Profile
06 - Design Team Acceptance

07 - Commissioning Complete

CHS Asset Tag Number
0

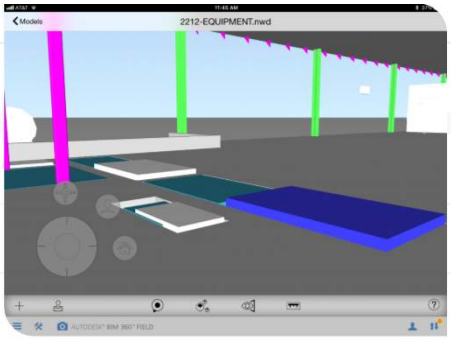
Manufacturer

Model

Identifiers
Barcode

Serial number

Tag number



AUTODESK® BIM 360™ FIELD

CHALLENGES

BENEFITS

- SOFTWARE COMPATIBILITY
- BIM CONTENT AUTHORS
- INTERNET SPEED

- REAL-TIME ACCESS TO INFORMATION
- ALLOWS ACCESS TO NON-TRADITIONAL ROLES
- SPEED OF DELIVERY

LEVEL OF TRUST

LEARNING OBJECTIVES

- HOW CAN LEAN PRINCIPLES AND PRACTICES BE APPLIED TO THE CLASH DETECTION PROCESS?
  - THROUGH SCHEDULING AND SOFTWARE APPLICATIONS
- CAN TRADITIONAL CLASH DETECTION SOFTWARE BE UTILIZED IN A LEAN THOUGHT PROCESS?
  - SET UP IN A SYSTEMATIC APPROACH USING CLASH PRIORITIES AND GROUPS
- HOW CAN LAST PLANNER METHODOLOGY BE APPLIED TO THE COORDINATION SCHEDULE?
  - TEAM COLLABORATION VIA PULL-PLANNING CREATES DETAILED AND WELL ORGANIZED SCHEDULE
- CAN A LEAN CLASH DETECTION PROCESS BE UTILIZED IN THE DESIGN WORKFLOW?
  - WITH PROPER IMPLEMENTION AND TRAINING

QUESTIONS?

Photo credit goes here

Section Break