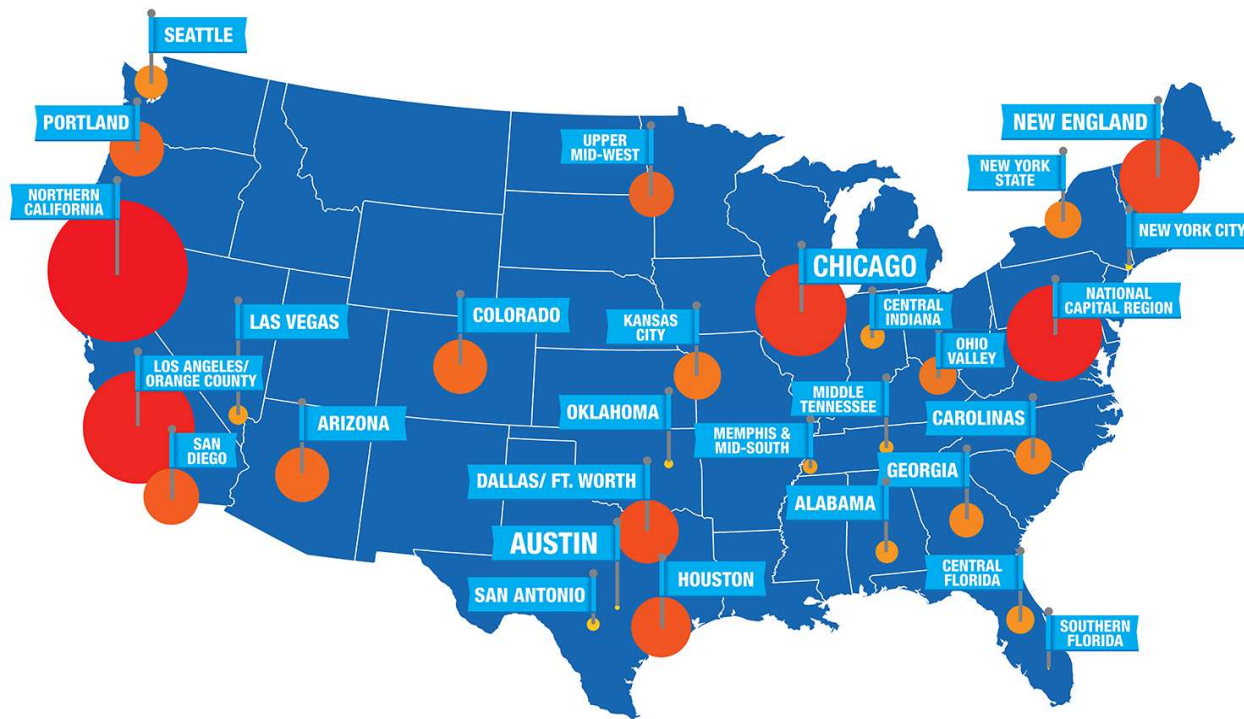


LCI Cascade Seattle COP



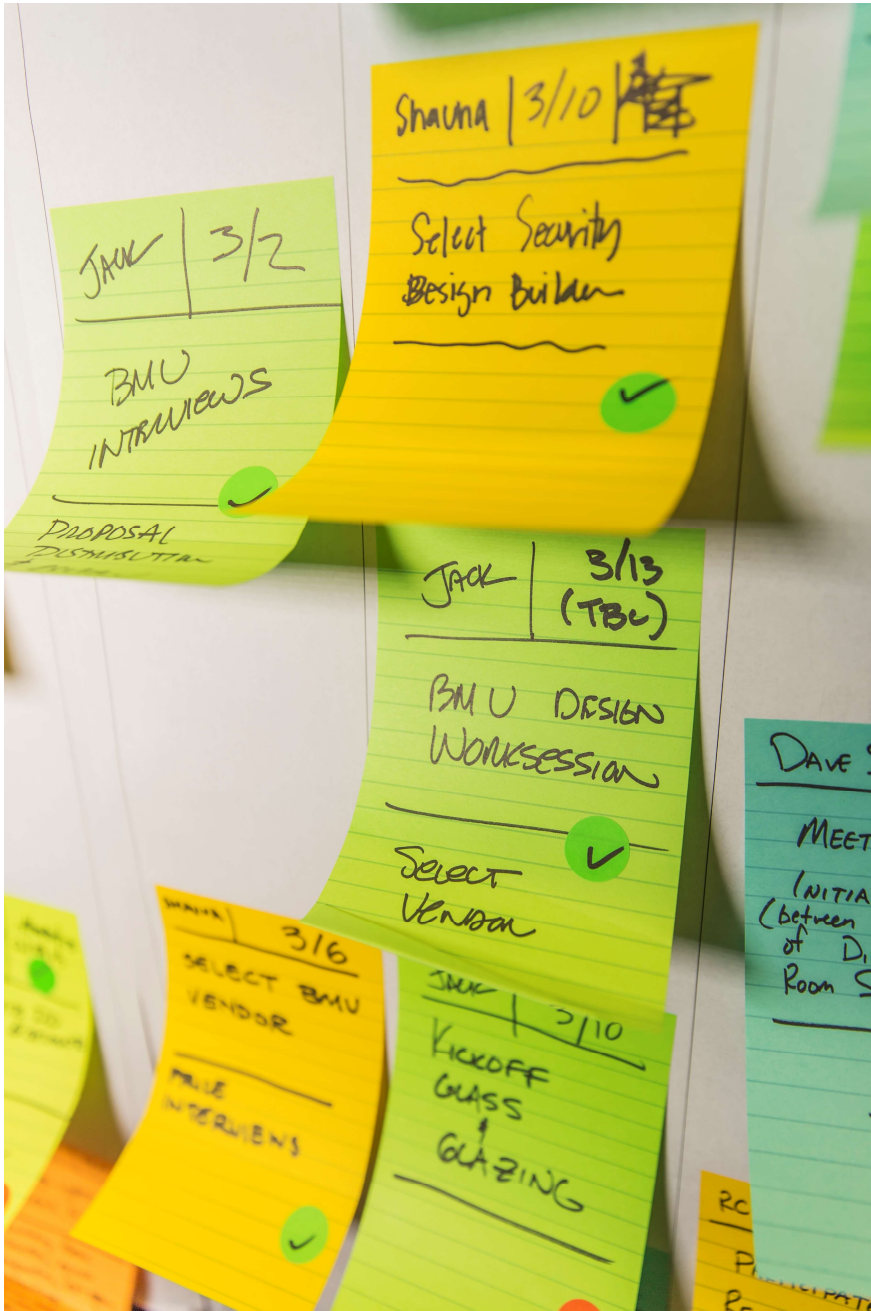
- Lean Coffees
- LCI Education Sessions
- Monthly Meetings and Presentations
- Networking

- LCI Communities of Practice
 - 29 in existence/forming





Sellen's Lean Journey



Sellen's Lean Journey

- Alignment
- Team Collaboration
- Pull Planning
- Mock-up and Demonstration Projects
- Leveraging the Industry
- Integrated Design Process
- Prefabrication / Modular Construction
- Production Planning

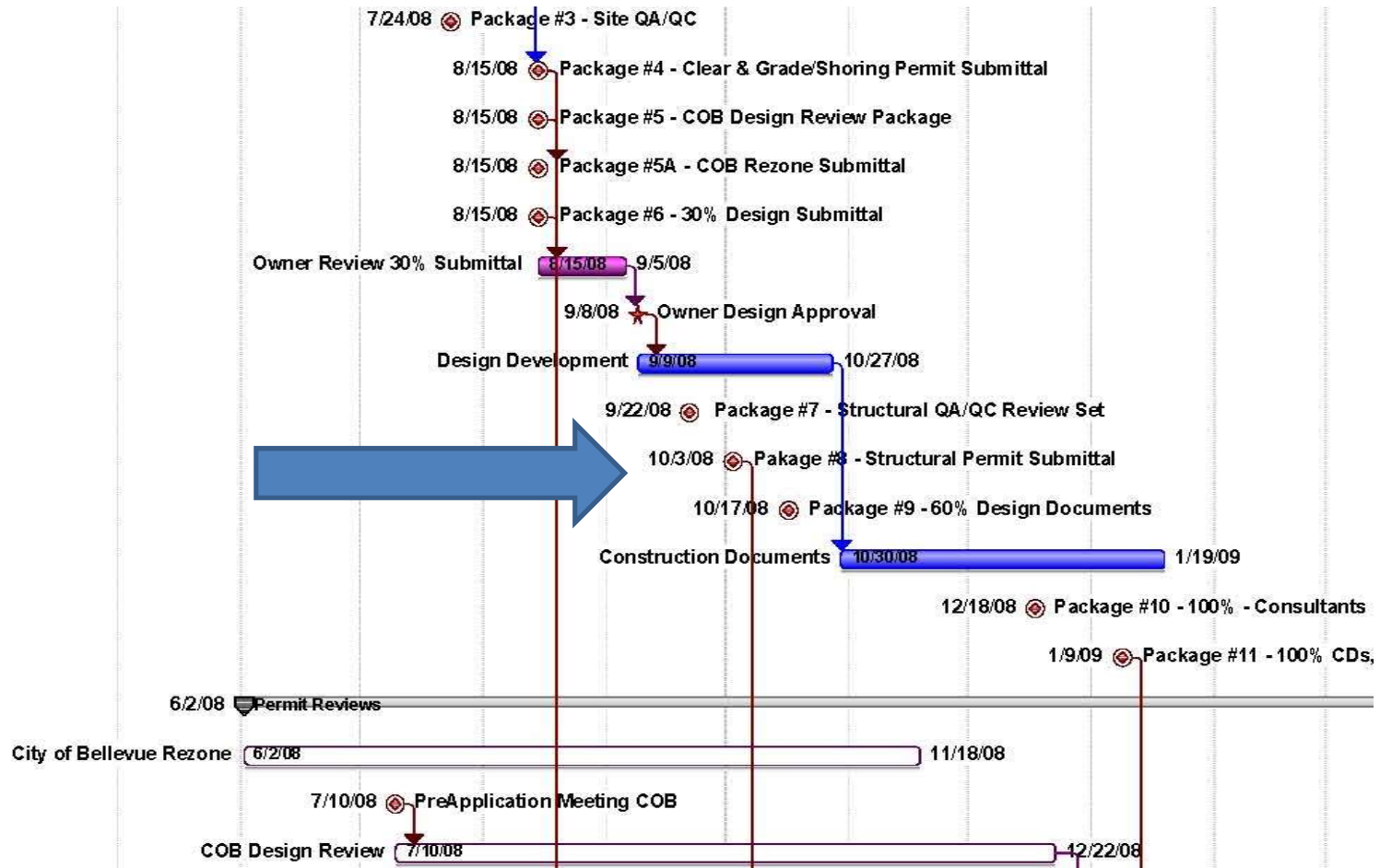
IPD – Seattle Children’s Bellevue Clinic

- Program Results:
 - Initial Strategic Planning Program – 110,000 SF
- Final Design = 79,000 SF
- 28% Reduction in SF
- Savings 30,000 SF at approx \$1000/SF = \$30M in savings



Right Information, Right Time – Design Packages

Seattle Children’s Bellevue Clinic



Right Information, Right Time – Design Packages

Seattle Children’s Bellevue Clinic

Lean Production Plan

PROJECT: **Children's ASC - Bellevue**

ITEM: **Package #4 - Clear & Grade & Shoring Permit Submittals**

Date Reqd: **8/11/2008**



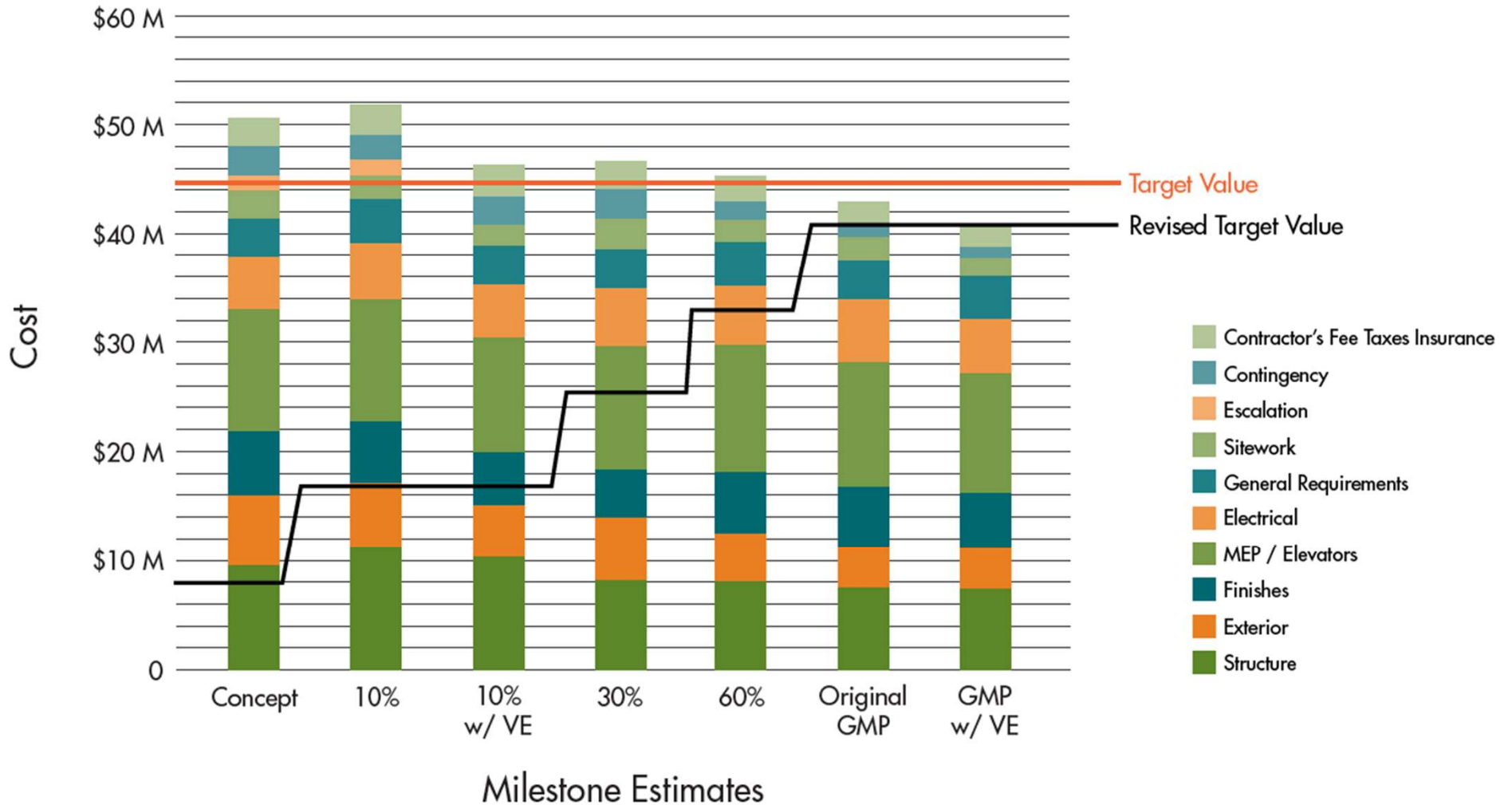
REVDATE: **5-Aug-08**

No.	Required Work to be Complete	Due Date	Company	Resp. Ind.	Status	Done Y/N
4.01	Complete sections on all four sides to show intended construction	Complete	NBBJ/PCS	Rick		Yes
4.02	Review Easements and indentify requirement	Complete	Seneca	Jeff	No longer and issue using temporary tiebacks in south w all and installing a cantilever retraining w all	Yes
4.03	Identify temporary construction loading adjacent to shoring system	In progress	Sellen	Jack	Sellen talking to HC today about staging area along 116st at MSE w all.	
4.04	Finalize building configuration and scope of shoring system	Complete	NBBJ/PCS	Rick	Building relocated 6 feet to south. Update complete	Yes
4.05	Develop final w all section showing proposed construction	Complete	NBBJ/PCS	Rick		Yes
4.06	Preliminary foundation design identifying depth and location of footings	Complete	PCS	Rick		Yes

Package Requirement	
Shoring Drawings & Calculations	Hart Crowser
Excavation Plans	ABKJ
Erosion Control Measures	ABKJ
Survey with easements	BRH
Soils Report	Hart Crowser
Easements - If Required	Seneca
Street Bond - If required	Seneca
Demolition Plan	ABKJ
Site Plan including proposed grading	NBBJ/Siteworks

Package Uses	
Entitlements	Shoring and Excavation Permit Submittal
Procurement	None planned
Estimating	Update shoring & excavation budget
Detailing	None planned

Target Value Design – Budget History Seattle Children’s Bellevue Clinic



Redefining Handoffs – Mechanical Delivery Seattle Children’s Bellevue Clinic

- AEI allowed UMC to produce CD’s drawings
- Contingencies minimized / SCH’s construction budget maximized
- Reduced RFI’s & CA
- More time to plan the work



Seattle Children's Bellevue Clinic

Metrics Matter

Metric Description	Seattle Children's Bellevue Clinic	Comparison Project	% Improvement
Gross Square Feet (Includes garages)	220,587	152,362	
Clinic and ASC	78,770	78,065	
Parking Garage	141,817	74,297	
Project Duration	14.5 months	18 months	19%
Total CO Amount (% of total)	4.2%	8.3%	50%
Quantity of OCR's	18	102	82%
Quantity of RFI's	78	608	87%

Lean Lessons Applied - Pull Planning Swedish Issaquah Hospital



Work Activity Planning – Swedish Issaquah Hospital

- Enhances communication between trades
- Defines handoffs/commitments/promises
- Engages all the players
- Safety risks addressed
- Constraints identified



Daily Huddle & Task Planner – Swedish Issaquah Hospital

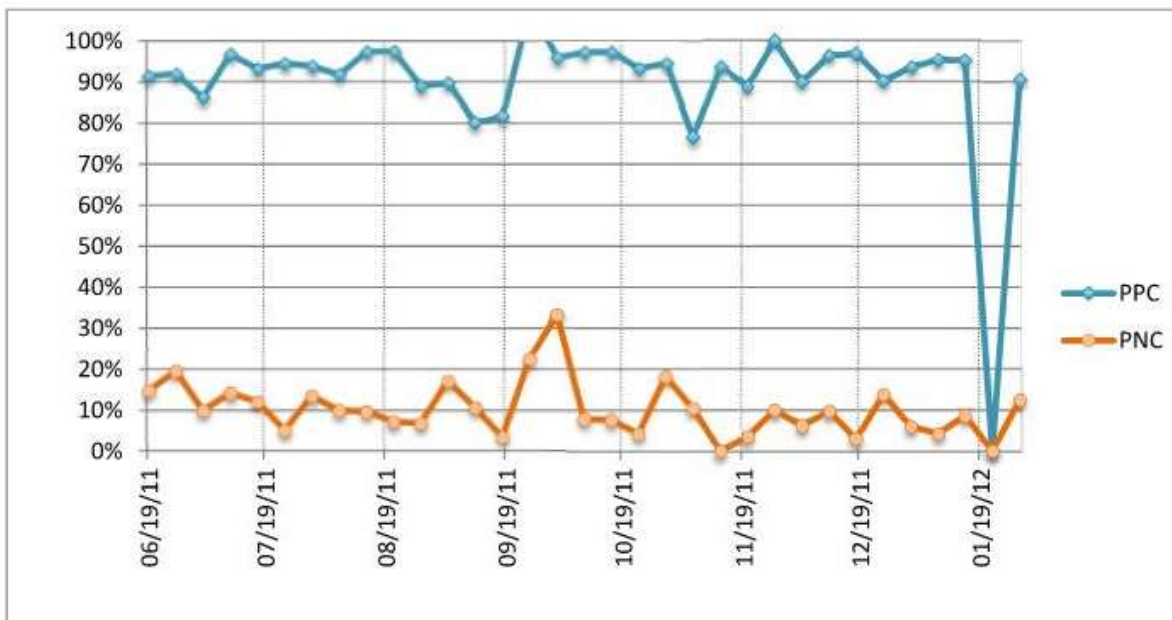


- 15 min On-Site meeting every day
- All Sellen & Sub Field Supervisors
- Discuss obstacles to completing the work
- Safety concerns

Weekly Planner Tracking – Swedish Issaquah Hospital

Weekly Planner Tracking
UW Business School Phase II (Job #6096)

PPC & PPNC TRACKING DATA



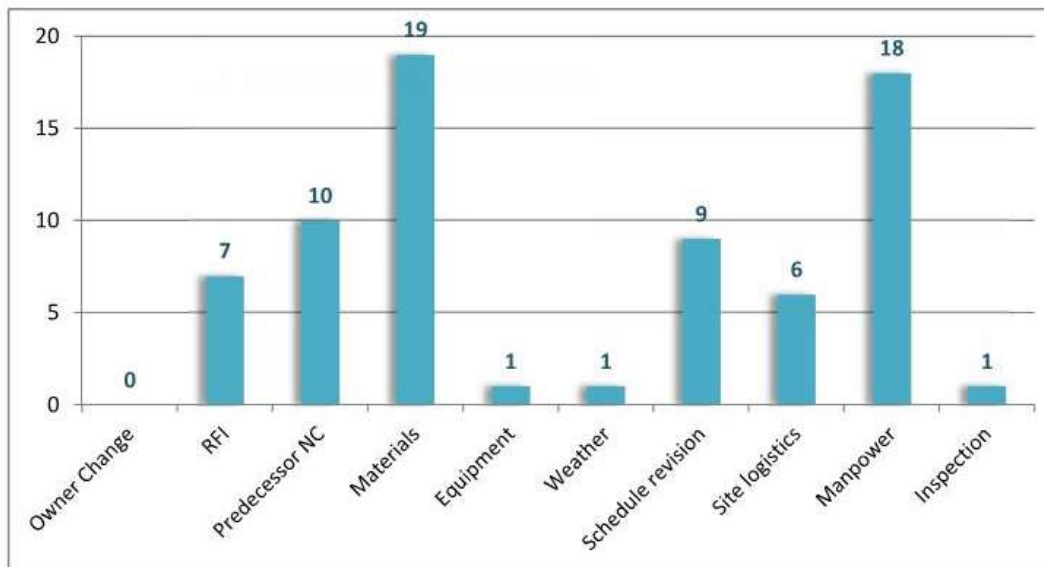
4-Week Trailing Average: 94%
Overall Average: 93%

- Plan Reliability:
The team tracks their weekly commitments by recording how much of the plan was committed and then completed

Weekly Planner Tracking – Swedish Issaquah Hospital

Weekly Planner Tracking UW Business Phase 2

PPC REASONS LOG (Percent Plan Completed)



- Reasons Log
 - Continuous Learning process
 - Identify problems mid-stream and adjust for the NOW
 - Learn from our mistakes

Week Of	Standard Reason	Subcontractor	Count	Notes
6/19/2011	Materials	PCS & Bayley	1	Item 160 Not complete due to verticle sun shade support material not here and installed
6/19/2011	Schedule revision	PCS	1	Item 27 and 28 cant happen concurrently causing Item 27 to take longer

Early Involvement = More Pre-assembly Swedish Issaquah Hospital



Prefabrication & Pre-assembly – Swedish Issaquah Hospital



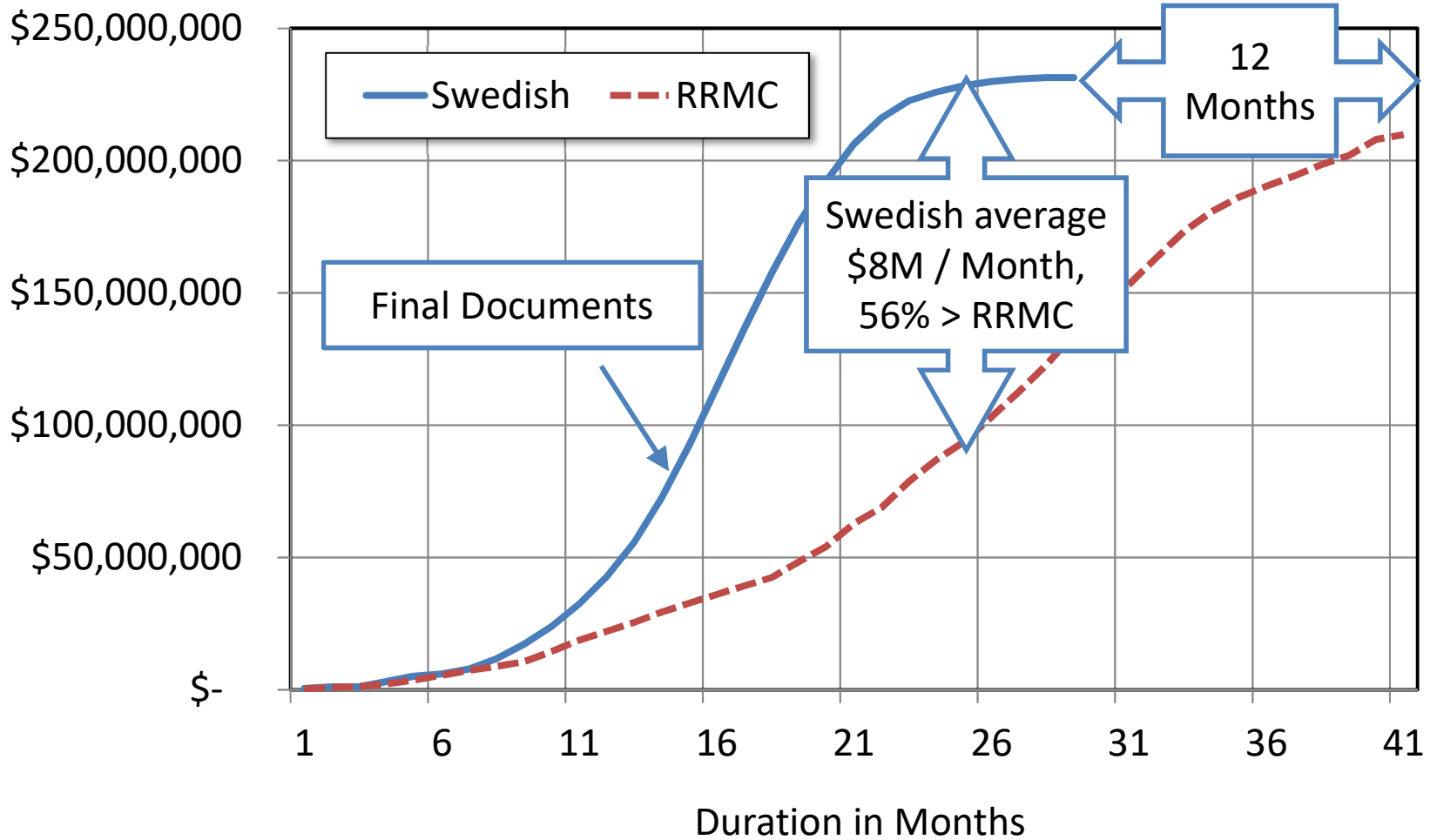
Swedish Issaquah Hospital Metrics

	Prefab Hours	Field Hours	% Prefab
Plumbing	9,600	65,200	14%
Piping	9,700	39,900	24%
Sheet Metal*	7,600	65,000	12%
Electrical	4,600	195,400	2%
TOTAL	31,300	365,500	9%

Reduced MEP field hours by at least 9%

- Improved safety
- Better quality

Swedish Issaquah Hospital Schedule Comparison



Integrated Team w/Aligned Goal Federal Center South Building



Integrated Team w/Aligned Goal Federal Center South Building 10 Weeks to develop a winning design



Leveraging Vendor Expertise – Fed Center South

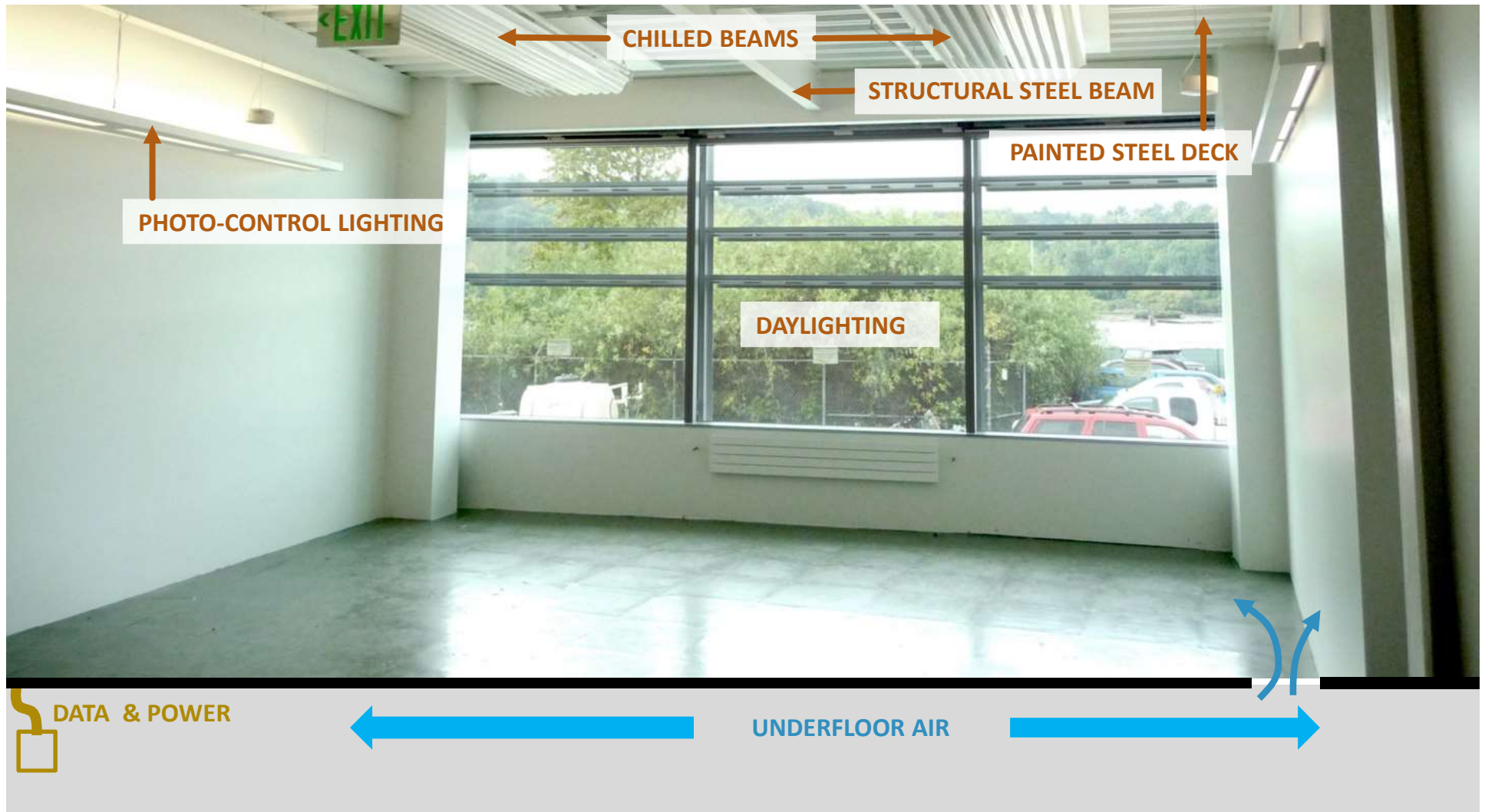


Leveraging Vendor Expertise – Fed Center South Innovation

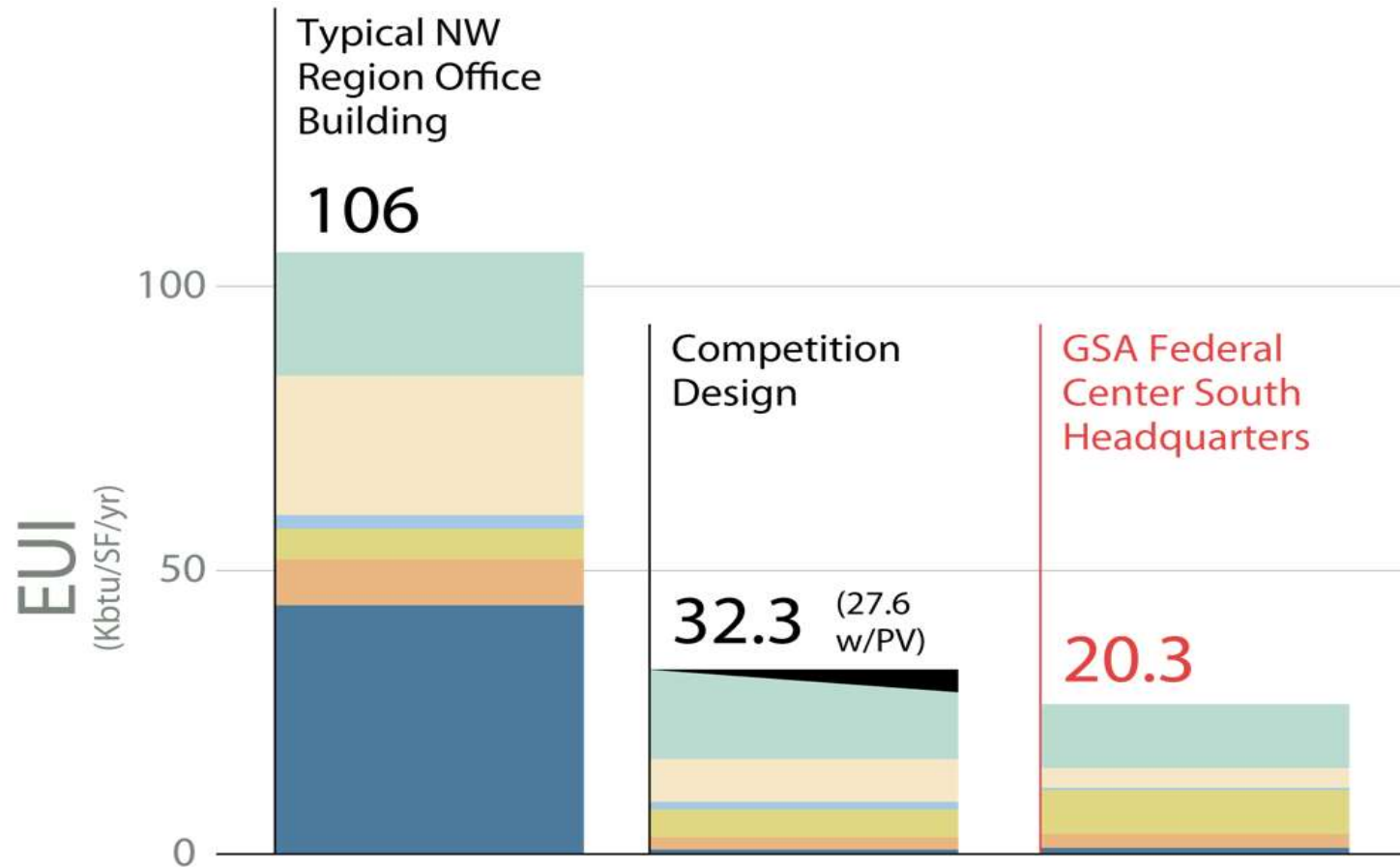
Chilled Sail Development



Full Scale Mock-up – Fed Center South Learning Lab – Test Designs



Achieved Aggressive Energy Goals Federal Center South

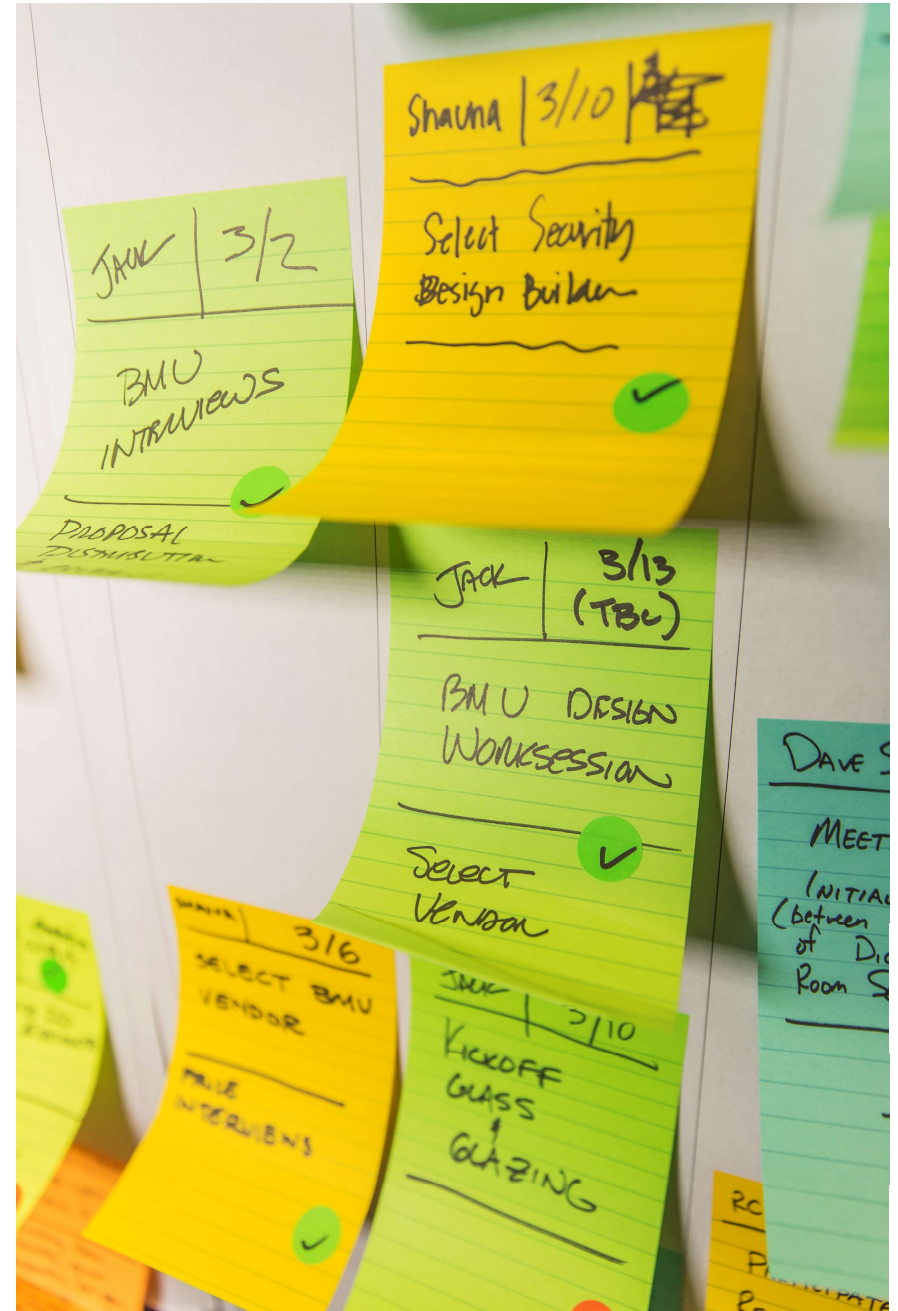


Integrated Project Team Pull Planning Design Phase – 8th and Howell Hotel



Design Pull Planning – 8th and Howell Hotel

- Increased inter team communication
- Prioritized Decisions
- Work Activity tracking
- Big Room Sessions
- Prioritized Systems Development
- Right Information/Right Time



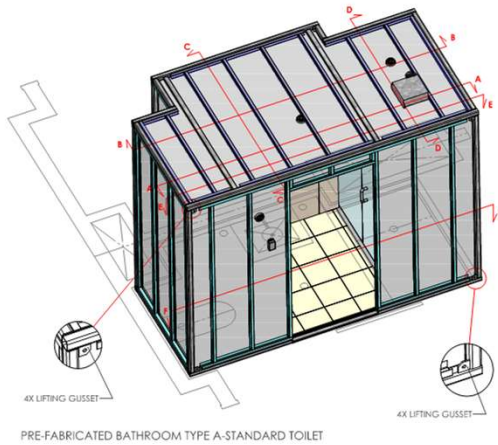
Weekly Work Activity Tracking

8th and Howell Hotel

Project Name: EIGHTH & HOWELL MIXED USE				Date:	10/15/14			
				Check-In Period:	12			
Reason for Variance: 1) Over-committed 2) Miscommunication 3) Previous work not complete 4) Change in work plan 5)Outside Constraint 6) Resource not available 7) Materials/Equipment not available 8) Safety concern 9) Work not authorized by contract/submittal/etc. 10)Other								
Check-In Period	Milestones	Promise from Stickle	Request	Performer	Company	Date	Done?	Reason for Variance
WEEK 10: Sept 29 - Oct 3								
10		Deliver envelope weight to MKA for struct peer review	Need weights/ loading conditions from selected bidder, Precast Award	Steve	LMN	30-Sep		
10		Revit posting includes stair updates to be presented: High rise mtg	input from Arup life safety	Steve	LMN	3-Oct		
WEEK 11: Oct 6 - Oct 10								
11		Have first pass coordination of all shaft section based on stair sizing		Steve	LMN	week of Oct 6		75% complete - week of 10/6
11		Confirm FF+E Matrix Assumpt. w/ Hedreen	Comments from LMN/Team	Dave Scalzo	Sellen	10-Oct		WIP
WEEK 12: Oct 13 - Oct 17								
12	Mtg w/ SDOT			Bill Ames/Leo		TBC		
12		Mtg w/ SDOT to discuss: Planning and Hardscape	Mtg w/ Sellen re impacts of drilling	Todd	Berger	TBC		
12	Energy DPD Meeting			David Okada	Arup	TBC		
12		Hold initial incentives meeting w/ SCL & PSE	Occupancy/ use/schedules by 9/5. Meeting scheduled by 9/3	David Okada	Arup	TBC		meet with DPD - date tbc
12		Meeting w/ Sellen , Arup, electrical sub to discuss electrical spec. TOC & LOD	Select elec. Sub by 9/3. Initiate discussion of specs by 9/8	Jay	Arup	16-Oct		on track
12		Background out for mid DD		Kjell	LMN	17-Oct		
12		Mtg with civil/LMN Grading for DD		Todd	Berger	TBC		
12		Shafts comprehensively coordinated	Coord w/ LMN. Restaurant equipment. Laundry equipment. AV/IT/Security SD. Owner restaurant/ lounge criteria. Stairs updated in Revit.	David Okada	Arup	17-Oct		90% by 10/17
12		Commissioning Agent RFP	RFP/Comments from M-M & Arup	Shauna	RCH	17-Oct		
12		BMS Consultant RFP	RFP/Comments from M-M & Arup	Shauna	RCH	TBC		
WEEK 13: Oct 20 - Oct 24								
13	Updated estimate w/ V.E. inclusions				Sellen	20-Oct		work in progress
13		Cost reconciliation meeting/evaluate/decide VE options		Dave Schneider	LMN	20-Oct		work in progress
13		Determine Level of Detail & TOC for SPEC	contractor clarification	Dave S	LMN	Week of Oct 20		tbc
13		Dryer exhaust heat recovery memo	Laundry SD	David Mech	Arup	Week of Oct 20		two weeks following Laundry SD
13	Security Mtg w/ Hedreen					Week of Oct 20		
13		Confirm power requirements for HVAC equipments (load calc update/update airside equip selections/ update chiller selection)	Kitchen, laundry, AV, IT, security equip, space. Envelope update. Conf. all design occupancies. Elec RM heat loads. City response on life safety.	David Okada	Arup	TBC		3 weeks following kitchen/laundry information on 9/26
13		Discussion of pros/cons for procurement options for cellular DAS	Hedreen- decisions to include/exclude cellular DAS in project by Sept 12 (meeting 9/5)	Jay	Arup	Week of Oct 20		timing tbc
13		Confirm Landscape DD Design Concepts (Geometry, materials, planning)	Mtg w/ Owner	Todd	Berger	20-Oct		

Prioritized Design & Early Vendor Involvement Modular Bathroom Study 8th and Howell Hotel

DESIGN REVIEW AND VALUE ENGINEERING

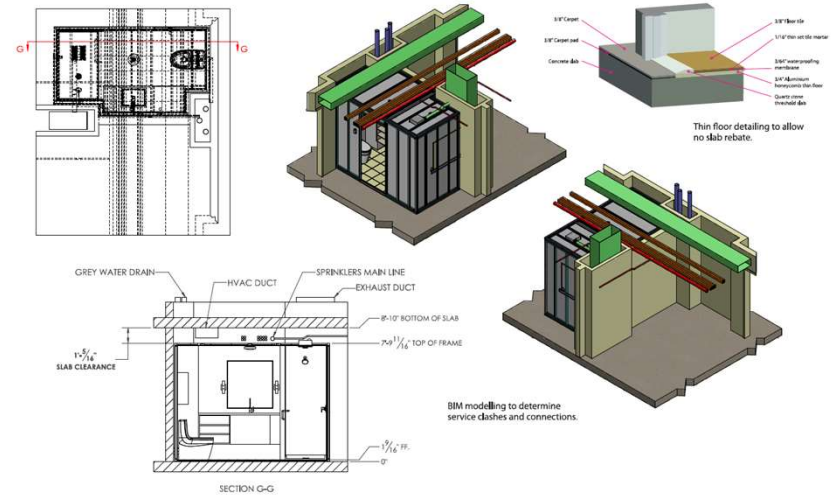


OneBuild has developed and detailed a comprehensive 3D BIM model of the bathroom pod in conjunction with input from Sellen and the sub-contractors. This model has been the basis of determining cost and time advantages of using prefabricated pods on the project.

RC Hedreen Bathroom Pod Proposal 030215



DESIGN REVIEW AND VALUE ENGINEERING (continued)



RC Hedreen Bathroom Pod Proposal 030215



Where Are We Going



9th and Lenora

- Advanced Pull Planning Tools
 - Smartsheet
- Production Planning
 - Crew Leveling
 - Workable Backlog
 - Leveraging Lessons Learned
- Modular Construction

Work Activity Planning – In the Cloud

Level	Area	Description of Tasks	Company	Responsible Individual	MON	TUE	WED	THURS	FRI	SAT	S...	Workable Backlog
22-23	Core	Complete Cell 3 DBS, expand Cell 3, set doc	Sellen	NelsL							13	<input type="checkbox"/>
5-8	Ballroom Struc	Cable rail modification	Sellen	Scott J			1	1	1			<input type="checkbox"/>
9-18	Area A	Clean up	Sellen	Pete S		2	2	2	2			<input type="checkbox"/>
9-18	Area A	Weather protection	Sellen	Pete S		1	1	1	1			<input type="checkbox"/>
9-18	Area A	Drinking water & food trash	Sellen	Pete S		1	1	1	1			<input type="checkbox"/>
all	all	temp power and lights	Holmes	Dave		2	2	2	2			<input type="checkbox"/>
All	Area A	Kone Protection, weather protection	Sellen	Tony G.		2	2	2	2			<input type="checkbox"/>
All	Area A	Drinking water	Sellen	Jeff G		1	1	1	1	1		<input type="checkbox"/>
L 22-2	Area A	Pour Core	Sellen	Jeff G			2					<input type="checkbox"/>
L-1	Area B	Installing glass north & caulking	ANG	Mark W		6	6	6	6			<input type="checkbox"/>
L-1	Area B	Installing CW east	ANG	Mark W		6	6	6	6			<input type="checkbox"/>
L-1	Area B	Installing horizontals east	ANG	Mark W		6	6	6	6			<input type="checkbox"/>
L-1	Area A	Waste water Market Cafe	MacMiller	Tom		2	2	2	2			<input type="checkbox"/>
L-1	Area B	Ramp	MacMiller	Tom		2	2	2				<input type="checkbox"/>
L-12	Area A	Jump Speed fan	Sellen	Tony G.		3	3	3	3			<input type="checkbox"/>
L-14	Area A	Waste and water	MacMiller	Tom		4	4	4	4			<input type="checkbox"/>
L-18	Area A	Pour watch North	MacMiller	Tom		1						<input type="checkbox"/>
L-19	Area A	Deck sleeving	MacMiller	J.Russell		2				2		<input type="checkbox"/>
L-19	Area A	Lay out Sleeve South	MacMiller	Tom		3						<input type="checkbox"/>
L-19	Area A	PEX South	MacMiller	Tom				3				<input type="checkbox"/>
L-3	Area C	Gas water walls	MacMiller	Tom		2	2	2	2			<input type="checkbox"/>
L-5	Area A	Waste Water walls	MacMiller	Tom		2	2	2	2			<input type="checkbox"/>
L-5	Area B	Waste water Overhead	MacMiller	Tom		2	2	2	2			<input type="checkbox"/>

Crew Leveling and Planning

Area	Task	Responsible Individual	Priority (5=High)	TOTAL Crew Size	Monday	Mon Crew	Tues...	Tues Crew	Wednes...	Wed Crew	Thurs...	Thurs Crew	Friday	Fri Crew	Saturday
Go to Week of 3/13/2017															
[-] Carpenters				16	16		16		16		16		15		0
+ SHANE K		Shane K.			0		0		0		0		0		0
[-] JHON A		Jhon A			5		5		5		5		4		0
Level G	Strip curbs	Jhon A	1		2	Daniel,Roberto									
Lvl 2,4,27	Put up tent for waterproof on curbs	Jhon A	4		3	Cody,Octavio ,f	3	Cody,o	2	Cody,Octav	2	Cody,O			
lvl 1 North	build bulkhead for MERLINO and cut down precast	Jhon A	5						2	Daniel,robe					
P7-lvl 15	Wall rails -QC high rise doors	Jhon A	1								2	Daniel ,	2	Daniel ,Rc	
level 25	Build working deck for saw cutter	Jhon A	4						X						
Lvl 15-5	clean up and organize floors	Jhon A	5						1	Pedro	1	pedro		X	
level G west	build curtain walls curbs/ take down riggers shack	Jhon A	3				2	Daniel,					2	Pedro ,Oc	
Lvl G south	clean up level G south	Jhon A					X								
[-] VIRGIL M		Virgil M.		3	3		3		3		3	0	3		0
L6	Build elevator door font templates	Virgil M.	3	3	3		3		3		3		3		
P7-L37	Otis protection adjustments and maintenance as ne	Virgil M.	2	3	x		x		x		x		x		
L12-37	Pick up all of the Velocity fence plywood and screen	Virgil M.	5	3	x	Kenny, Andy ar									
L24 - 29 & 1-	QC elevator fronts	Virgil M.	5	3									x	Andy, Ken	
L1 & 2 mid rise	Put up protection on the elevator doors	Virgil M.	3	3			x	Andy &							
L 20 mid rise	build a wall and door for Otis access to Elevator lobl	Virgil M.	4	3					x	Andy, Kenn					
L30 high rise	Build a wall and a door for Otis to access Elevator lc	Virgil M.	4	3							x	Andy, K			
		Virgil M													

Metrics and Variance Tracking

Level	Area	Description of Tasks	Company	Responsible Individual	MON
		Percent Planned Complete (PPC)	Week of 8.21.17		
		PPC	95%		
		Total Activities	120		
		Activities Completed	114		
		Reasons for Variance			
		1 Safety Concern	Relative/Absolute Form		
		2 Outstanding RFI	CTRL + L		
		3 Owner Change / Decision			
		4 Weather	Update Formula		
		5 Prerequisite Work NC	> 160 Rows		
		6 Labor			
		7 Materials			
		8 Incorrect Duration			
		9 Submittal/Approval			
		10 Eqpt / Hoisting			
		11 Unforeseen Conditions			
		12 Inspection/Permit			

Where Are We Going



9th and Lenora

- Advanced Pull Planning Tools
 - Smartsheet
- Production Planning
 - Crew Leveling
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- Modular Construction