Descriptive Data Sheet

Project Name: Patient Care Pavilion

Facility type: Acute Care Hospital

Project Type: Patient Tower Replacement

Project Location: Oakland, California

Project Stats: 13 Stories

35,000 SF Site Area

253,481 SF Building Area

238 Beds

Construction Cost Estimate: $260M (Building Cost)

$90M (Site Development)

Construction Type: Type 1A

Contract type: 12-Party Contract (IPD with Integrated Form of Agreement)

Estimated Date of Completion: January 2014

Master Plan Description:

The New 13-story Patient Care Pavilion will be a state-of-the-art facility in the center of the Alta Bates Summit medical campus. Designed to be an icon, the tower will become the focal point and new main entrance to the medical complex. The prominent new 238-bed Patient Care Pavilion will also include a new emergency department and additional critical support functions.

The Patient Care Pavilion is the first phase of the campus master plan that focuses on seismic upgrades, with a strategy to enhance the overall campus aesthetics by incorporating new green and landscaped zones. The addition of a new 1,100-car garage was centrally located to improve campus vehicular circulation. The campus master plan also included a new 175,000 SF medical office building that improves physician integration.

The aesthetic of the new bed tower is representative of the health care within; modern, transparent, and technologically advanced. The new Patient Care Pavilion will stand as one of the most visually appealing and technologically advanced healthcare buildings in all of the Bay area.

Alta Bates Summit Medical Center

2012 AIA BIM / TAP Awards

Category B: Delivery Process Innovation

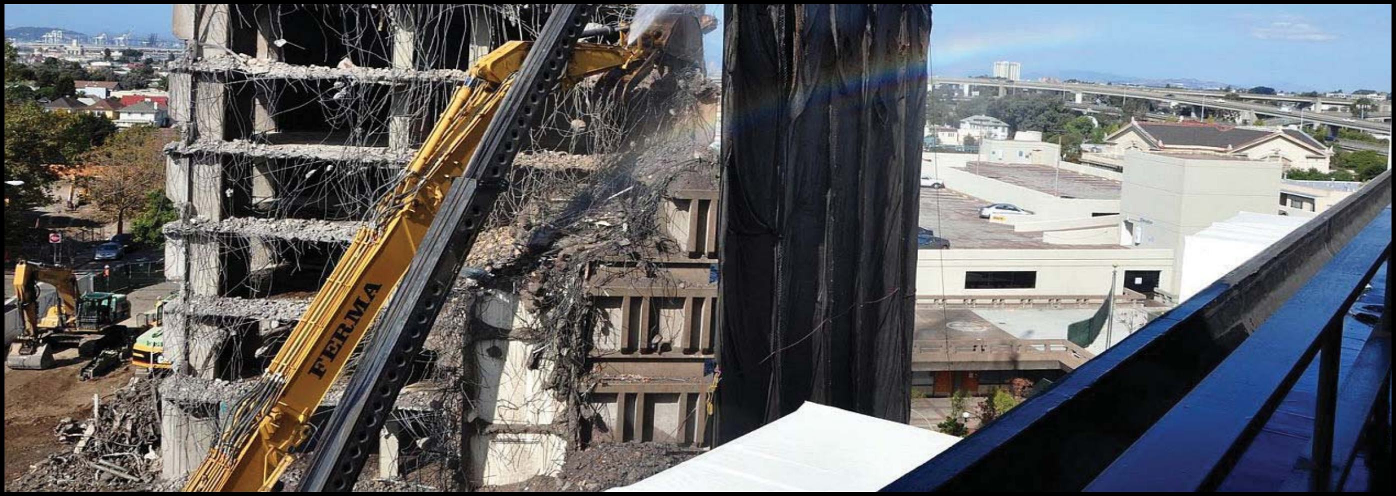
Project Description

The new patient care pavilion will be the center of the improved Alta Bates Summit medical campus in Oakland, California. Designed to be an icon, the tower will become the focal point and main entrance to the medical complex. Its 13-stories will make it the tallest structure on campus, visible from many surrounding areas, ultimately symbolizing the future of healthcare at Alta Bates Summit Medical Center.

Designed to satisfy the SB 1953 Hospital Facilities Seismic Safety Act, the tower will serve the community for decades to come. Along with the tower, the project also includes a public plaza large enough for small community gatherings, student classes, or simply a place to relax in the city. The project has targeted LEED Silver certification, thus requiring an aggressive modeling effort by the mechanical engineering team and building envelope team due to the substantial system requirements of today's modern healthcare facility.

The project is sited within the urban fabric of today's campus. Required to seamlessly interact with existing departments, the tower has a series of bridges that tie into the present facility. Careful attention was needed to align floor-to-floor heights and accommodate seismic action due to its close proximity to the Hayward Fault; the largest joint allowing for 48" of movement. At its closest point, foundation walls for the new tower are being installed 3" from the existing building which is required to remain operational as an acute care facility for the 3-year construction duration. The team was challenged by a highly accelerated schedule, aggressive cost target, and a lengthy and complex permitting process.

"With BIM on the ABSMC project we have solved numerous problems that are currently only a design concept, and may be years away from being completed."
- General Contractor



Project Delivery

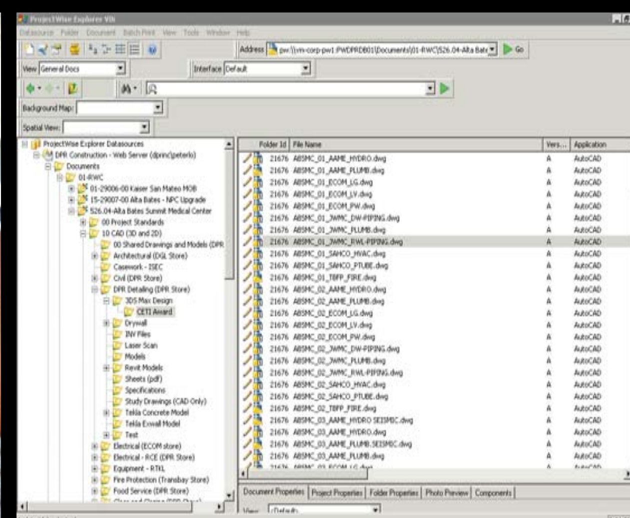
Alta Bates is a unique project utilizing a heavily incentivized, true 12-party contract (Integrated Form of Agreement) to encourage teamwork and deep collaboration. The 12-member core IPD team is comprised of a representative from the Owner, Architect, General Contractor, Mechanical Engineer, Structural Engineer, Electrical Engineer, Steel Fabricator, and Mechanical, Plumbing, Electrical, Fire Protection, and Medical Gas Trade partners. The team identified target principles to which the design is based:

- Integrated Technology
- Just-in-Time Delivery
- Point of Care Testing
- Future Adaptability
- Economic Viability
- Efficient Building Systems
- Structural Adaptability
- Lean Construction

The team was presented with an extremely tight project site and asked to tie into each level of an existing 7-story building at key locations while maintaining an operational acute care facility.

The philosophies of scenario based planning have been adapted by the design and construction team to guide the process from conception through construction.

In order to meet the demands of this complex project with an accelerated schedule, the project team is co-located on site in a “Big Room” since the early stages of design. In addition to having the team co-located, value stream mapping was utilized to drive the process and schedule. Milestones with deadlines were displayed to visually identify the critical path of work necessary. The objective was to produce a much higher level of predictability around the budget, schedule, and quality targets.



Tools

> “One of the most important advantages that we have gained with BIM is the ability to design a highly complex building to very tight installation tolerances.” - Mechanical Trade Partner

BUILDING INFORMATION MODELING (BIM)

The team utilized the latest BIM tools to continually coordinate the multitude of disciplines. By having the trade contractors participate in modeling during design, fabrication drawings were able to be included in the permit set of documents. This eliminated the need for the lengthy detailed shop drawing review thereby releasing contractors to purchase material at an earlier date and reducing the volatility of escalating material and construction costs. This process greatly increased the accuracy of the construction documents relative to the actual installation. All team members were able to access the live model through the use of multiple off-site servers. The entire team met early in the process to identify the key elements to be included in the model relative to the projected value from coordinating that information. Team members were able to collaborate, in person or virtually, in real-time while identifying conflicts and design priorities. By keeping the model live and eliminating the need for design consultants and trades to wait for updated drawings, changes were streamlined reducing the design schedule even further.

COST MODELING

Due to the aggressive schedule the team required cost feedback at more frequent intervals than traditional projects perform at milestone intervals. The team utilized automated cost estimating allowing the contractor to generate costs more frequently and in less time (weekly compared to once a month or more). To automate the estimating process, mapping was required between the model objects and the cost assemblies. Utilizing software like “Sage Timberline” allowed the team to add object parameters to the cost assemblies. Once this mapping was established between objects and cost assemblies is established it became possible for both the estimator and the BIM engineer to estimate the cost associated with the model elements and share the quantity and cost variation with the project team on a weekly basis. This promotes rapid decision making based on real time data.

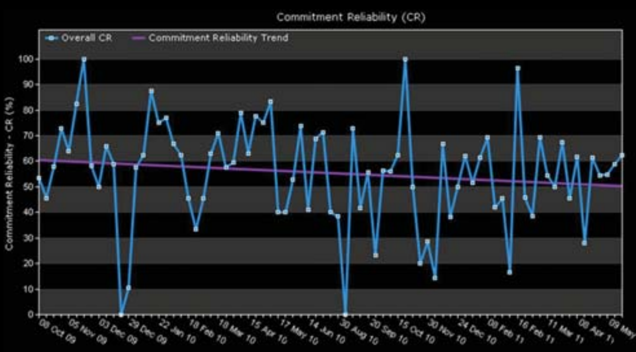
Tools

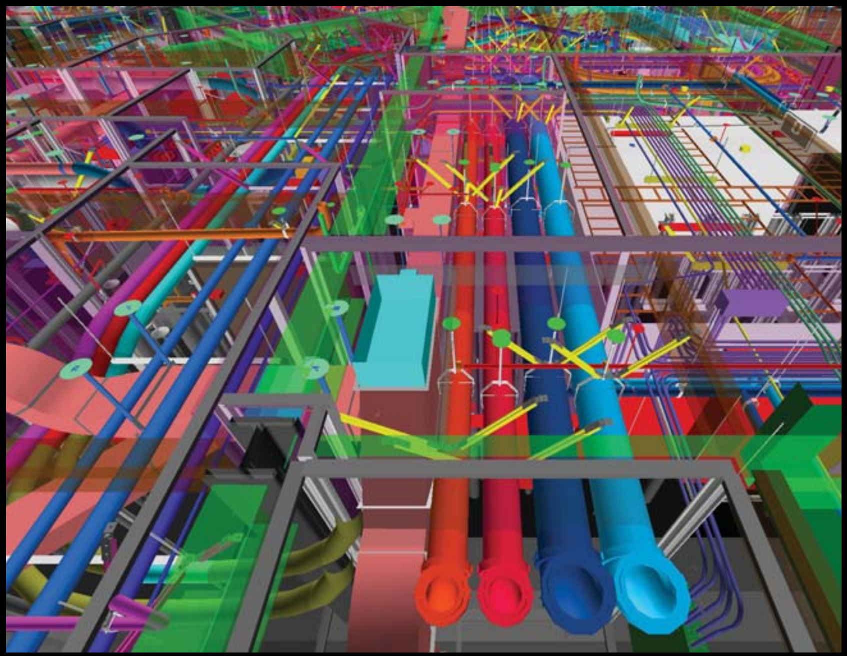
CLASH DETECTION and CONSTRUCTABILITY REVIEWS

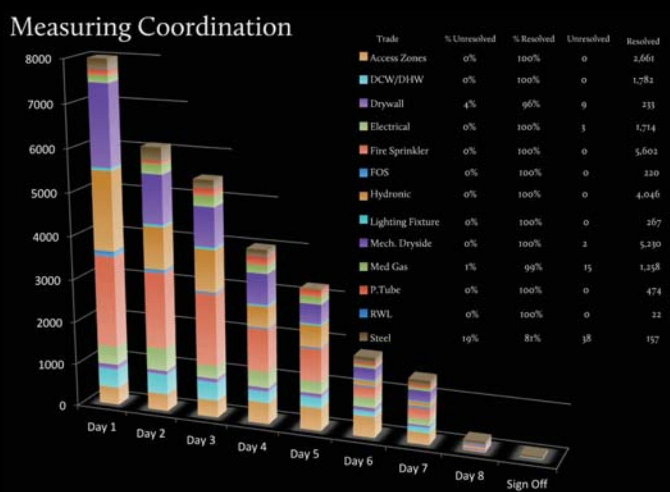
Throughout the design process the team conducted multi-discipline design reviews using the 3D model.These design review meetings occurred once a week and included the design team, as well as the contractor trades. During the model review multi-discipline design issues or clashes are identified, discussed, resolved, or added to the plan depending on the type and complexity of the issues. The goal of the team during these reviews was to design for fabrication workflow. This allowed the team to identify and solve hundreds of potential design coordination issues very early in the process, thus increasing the certainty of the design and reducing risk of downstream changes and schedule delays.

VALUE STREAM MAPPING

Value stream mapping, as touched on above, is a tool for documenting the steps in the workflow that add value to the final deliverable. As the team creates the map, tasks are outlined and connectivity to other tasks in the workflow is discussed, while negotiating the deliverable and the level of detail required to release downstream work with more certainty. In addition, constraints are identified in order to guarantee that all team members have the necessary information before they start on their specific tasks. The plan is reviewed on a regular basis and as more information becomes available the plan evolves. New tasks are constantly added, existing tasks are made more specific, and completed tasks, or tasks that no longer add value, are removed. The team spent time initially defining high level milestones for the project, but then focused on the backward workflow to get to completion. The milestone dates were fixed, and each preceding task was assigned a duration. Through the combination of this logic, each task was given a start date and a completion date. When a start date was missed, the team would re-plan the work to get back on track.







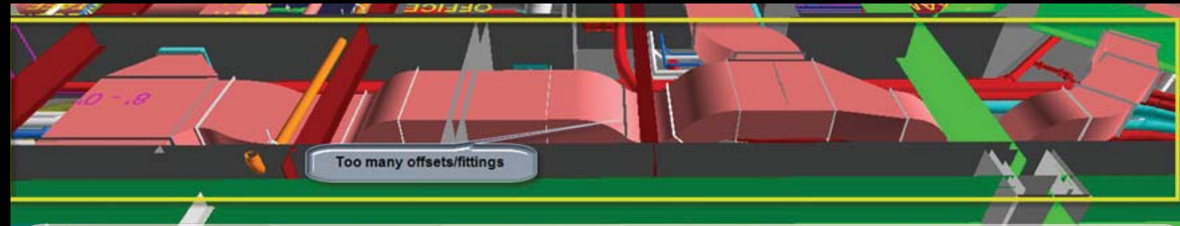
Early Results

Although the bulk of the results (both budget and schedule) are yet to be realized, the team has performed several exercises in attempt to quantify savings using this process. One such study was an evaluation of a "clash session" simplified into 5 batches:

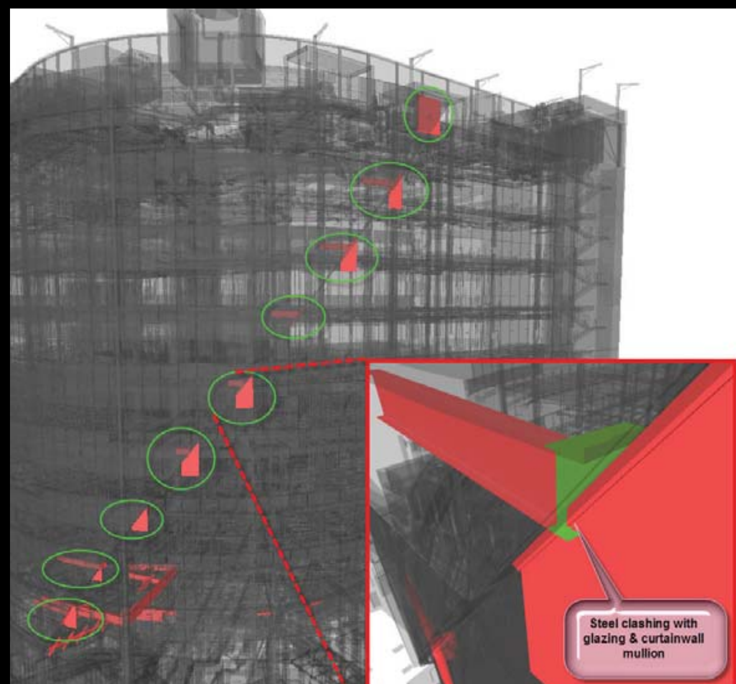
Curtainwall Anchors vs. Structural Steel, Mechanical, Electrical, Plumbing, and Fire Suppression
Exterior Wall vs. Structural Steel
Curtainwall and Storefront vs. Structural Steel
Exterior Wall vs. Structural Steel, Mechanical, Electrical, Plumbing, and Fire Suppression
Edge of Slab vs. Curtainwall and Storefront

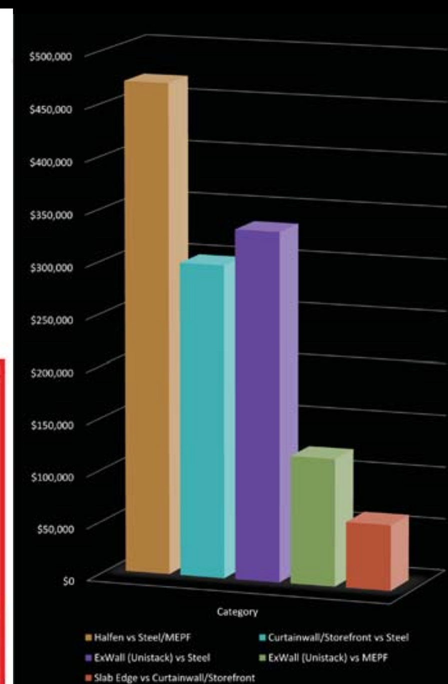
Of hundreds of clashes, the team conducted a cost study based on 16 clashes within these categories that were identified as issues that would have been undetected in a traditional design process, and consequently, unresolved prior to onsite installation and construction. These 16 clashes resulted in an estimated cost savings of close to $1.3 Million in problems the team was able to resolve prior to the initiation of construction.

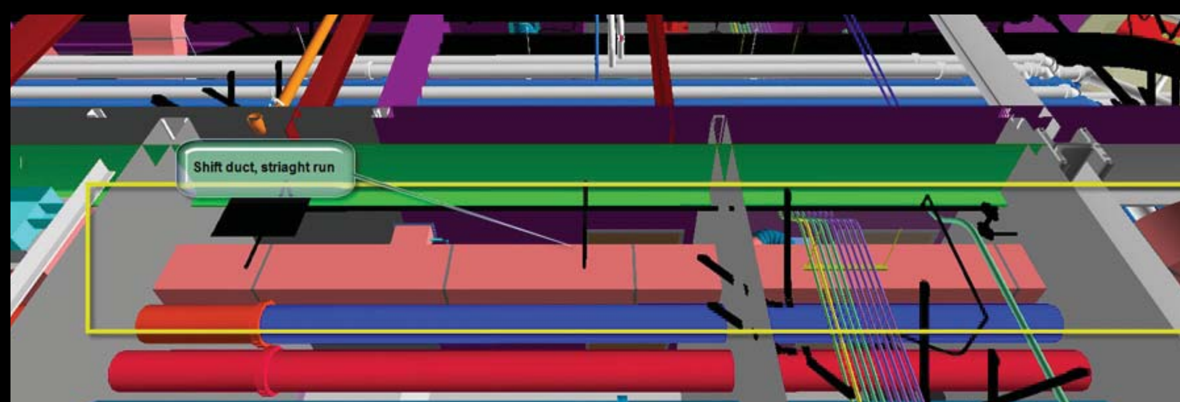
Category	Item	Cost	Quantity	ROI
Halfen vs Steel/MEPF	Halfen vs Steel issue	$1,500	310	$465,000
Halfen vs Steel/MEPF	Halfen vs MEPF	$1,100	5	$5,500
Total				**$470,500**
Curtainwall/Storefront vs Steel	006-DGL/DEG/CDC - Steel penetrating curtainwall at cut, roof level.	$25,000	1	$25,000
Curatinwall/Storefront vs Steel	001-DGL/DEG global issue - steel clash with curtainwall at cut.	$25,000	6	$150,000
Curatinwall/Storefront vs Steel	002-DGL/CDC/DEG - Slope wall clash btw steel and mullons	$50,000	1	$50,000
Curatinwall/Storefront vs Steel	005- DGL/CDC provide detail for cantilevered steel and curtainwall penetration at canopy, typical.	$15,000	1	$15,000
Curatinwall/Storefront vs Steel	007-Steel Clash with storefront	$20,000	1	$20,000
Curatinwall/Storefront vs Steel	008-Steel Clash with storefront	$20,000	1	$20,000
Curatinwall/Storefront vs Steel	009-Steel Clash with storefront	$10,000	1	$10,000
Curatinwall/Storefront vs Steel	010-Steel Clash with storefront	$10,000	1	$10,000
Total				**$300,000**
ExWall (Unistack) vs Steel	001-Centria panel not needed in interior of snorkel. Make the interior of snorkel shaftwall. Carmel to provide credit for reduction of Unistack scope.	$25,000	1	$25,000
ExWall (Unistack) vs Steel	003-A1/DEG/CAS/DGL - how does this unistack attach to the steel? Detail 1/ AY-107CE shows embeds, there is no slab in this area. Need attachment detail.	$40,000	1	$40,000
ExWall (Unistack) vs Steel	005-Why is there steel in the unistack wall? Does this wall need to shift out? How it supported?	$250,000	1	$250,000
ExWall (Unistack) vs Steel	007-How is this centria panel supported? How are all centria panels below L2 supported. There are no AY drawings for below level 2.	$20,000	1	$20,000
Total				**$335,000**
ExWall (Unistack) vs MEPF	Penetrations	$350	350	$122,500
Total				**$122,500**
Slab Edge vs Curtainwall/Storefront	001- Mullion clash with slab edge	$63,000	1	$63,000
Total				**$63,000**
			Total	**$1,291,000**



"Given the complexity of our particular hospital, it is impossible to fathom coordinating all trades without the use of BIM tools."
- Project Engineer





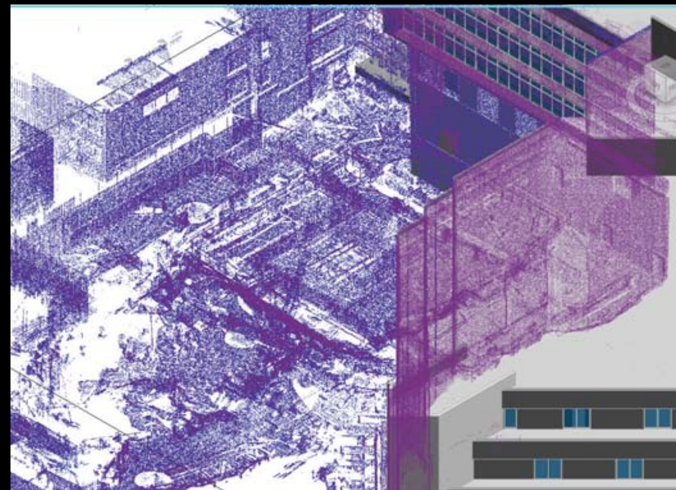


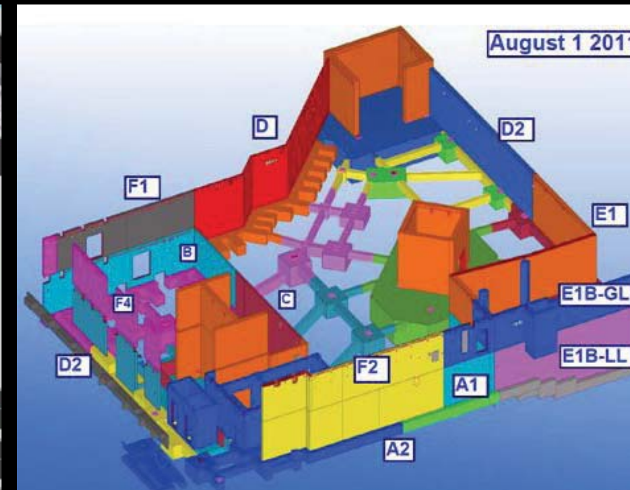
Early Results

The site was laser scanned during excavation resulting in the discovery of an 8" dimensional difference from the original survey. Due to the phased review process, the team was able to adjust the construction drawings during the permitting process saving an estimated $500,000 in change orders.

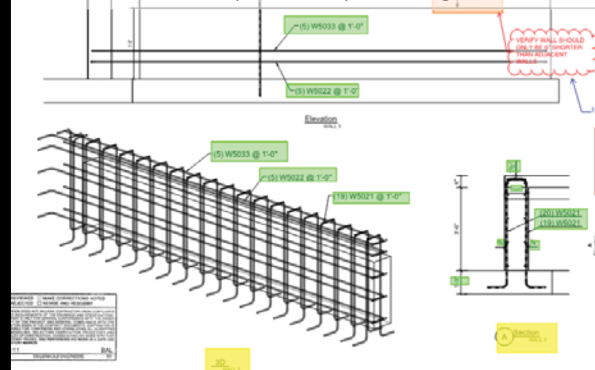
The shop drawings / fabrication drawings for all of the stairs, exterior skin, dry-side mechanical, and elevators were included in the design drawings that went through the permit process. This has allowed the team to fabricate these items off-site with an unprecedented amount of certainty, that when delivered, these items can be installed without obstruction or conflict. Inspections have become simplified, as submittals do not have to be compared to the design drawings, as they are one-and-the-same.

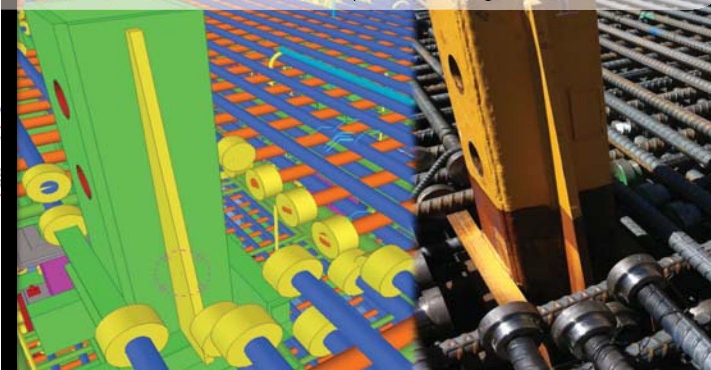
The team continues to meet on a weekly basis to review both the design and construction budgets. While actual estimates are being taken directly from the digital model, potential risks and opportunities are tracked in a separate log. Through these weekly meetings, the team has been able to have a high degree of predictability that the current design is meeting the initial budget.

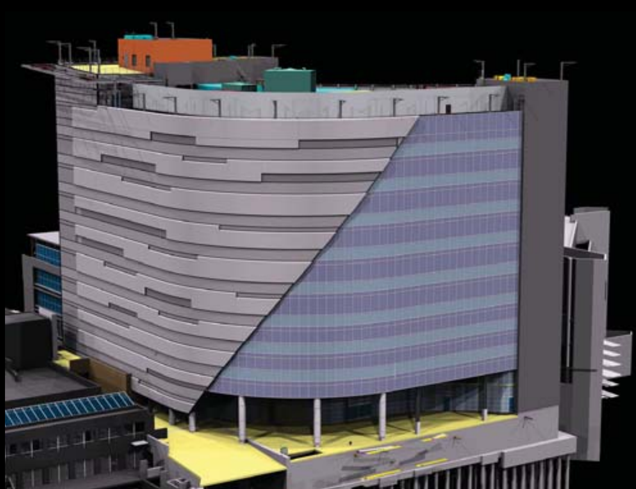


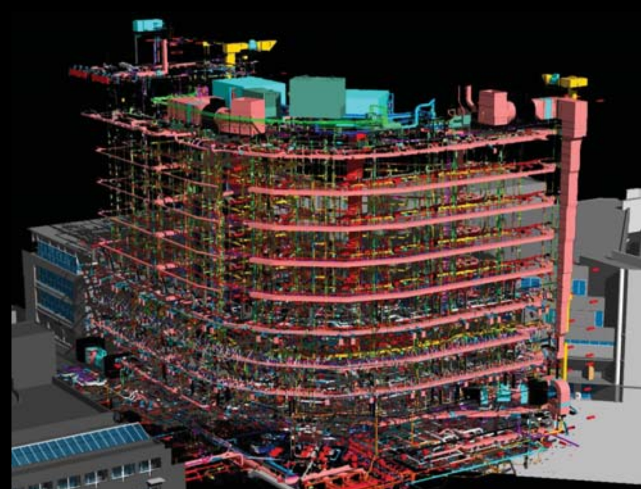


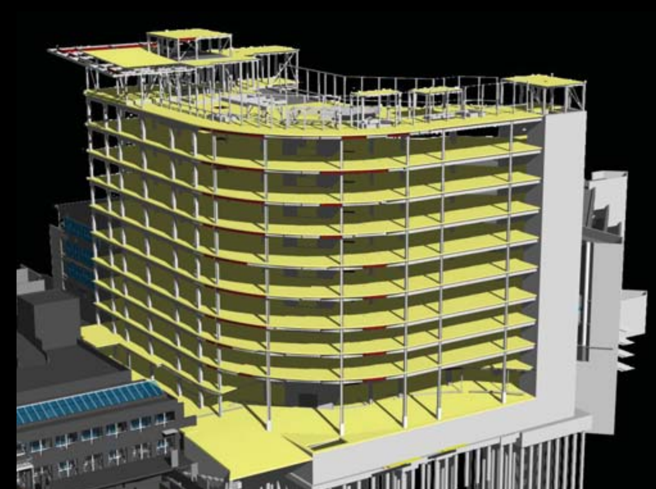
"The advantage of the "future look" at the building allows for prefabrication of practically everything that will be installed." - Project Engineer











"I feel sorry for the person who can't get genuinely excited about his work. Not only will he never be satisfied, but he will never achieve anything worthwhile."

– Walter Chrysler

AIA 2012 TAP/BIM Submission 3d File access instructions

Project Name: Alta Bates Summit Medical Center – Patient Care Pavilion

3d Model file name: 2012 AIA TAP BIM - Patient Care Pavilion.nwd

Software: Autodesk Navisworks Manage 2012

Dropbox File Access Information:

File hyperlink: *http://dl.dropbox.com/u/57717036/2012%20AIA%20TAP%20BIM%20-%20Patient%20Care%20Pavilion.nwd*