

UCSF Cardiovascular Research Building Integrated Project Delivery and Lean Process



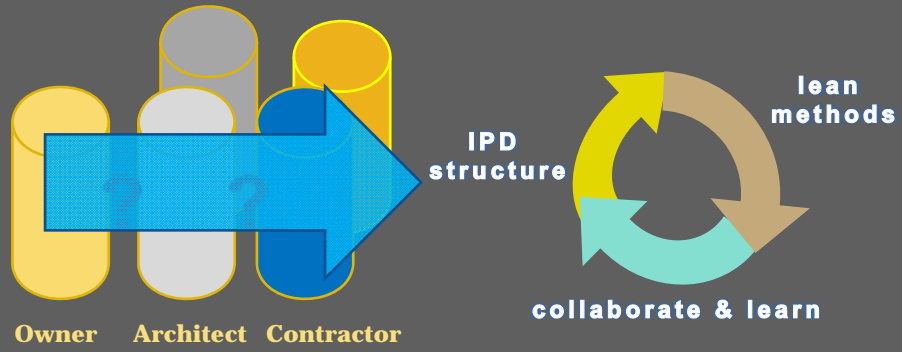
Case Study: Intro to CVRB

- LEED Gold Certified
- 27 month schedule
- Five Stories
- 236,000 GSF
- Construction \$190M
- Project \$254M

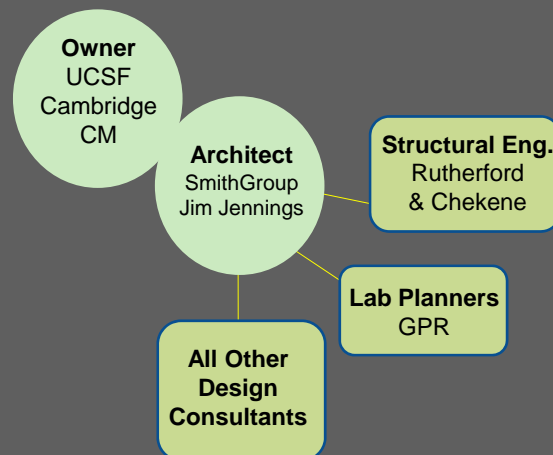


Open wet labs, lab support, offices, vivarium, and an outpatient clinic (OSH PD 3).

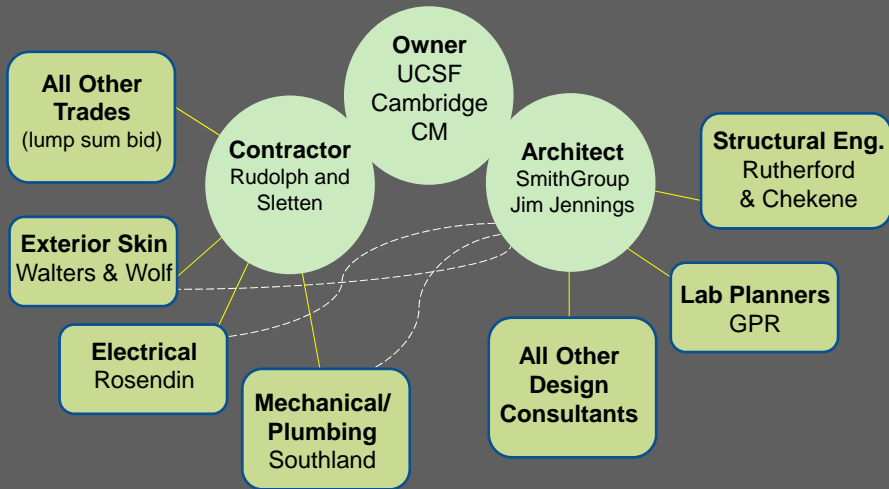
IPD Evolution



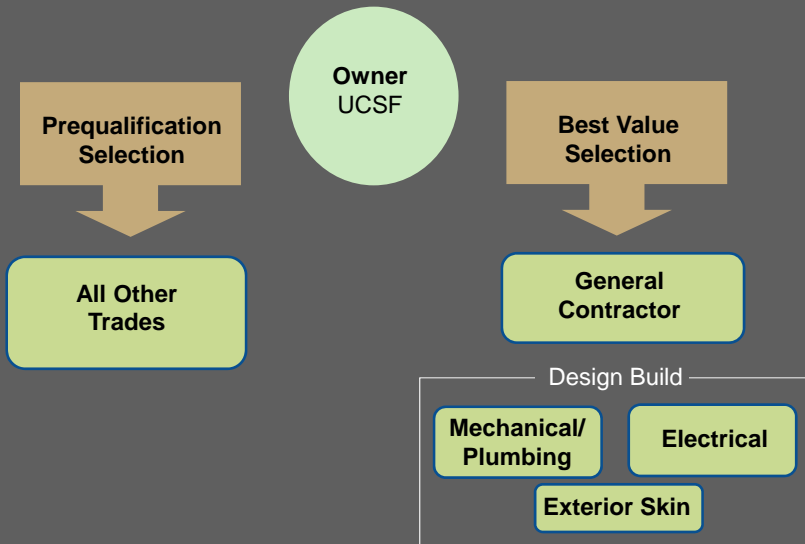
Team Organization



Team Organization



Team Selection



Choosing the Team

Select Team Members Based on Experience

- Building Information Modeling (BIM)
- Integrated Project Delivery
- Design-Build for Key Trades
- Lean Construction Techniques

Personalities of Individuals on Team Matter



Prequalification Team Selection

- Prequalification prior to low bid process
- Prequalification Based on:
 - Management Experience with Similar Projects
 - Management of DB Subs
 - Lean Construction
 - Integrated Team

Fast Track Buyout – Early Packages



Best Value Selection

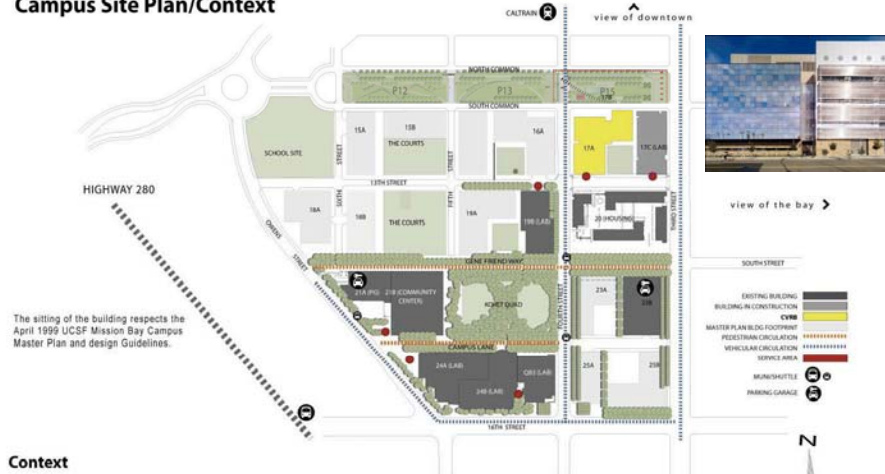
- Evaluate Contractors for:
- Categories:
 - Management Capability
 - Safety
 - Financial Strength
 - Labor Compliance
 - Relevant Experience
- Evaluations are by Points Earned in Each Category



Divide Points into Bid to Determine Lowest Cost Per Point

Design Presentation

Campus Site Plan/Context

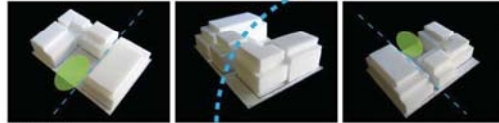


Context

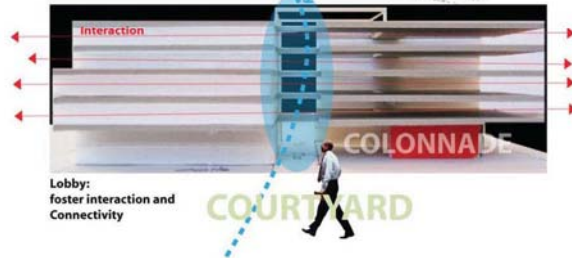


Design Presentation

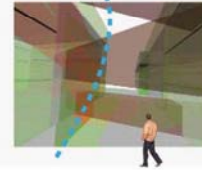
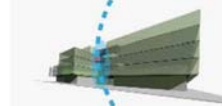
Conceptual Massing and Orientation



Courtyard:
foster interaction and
Connectivity

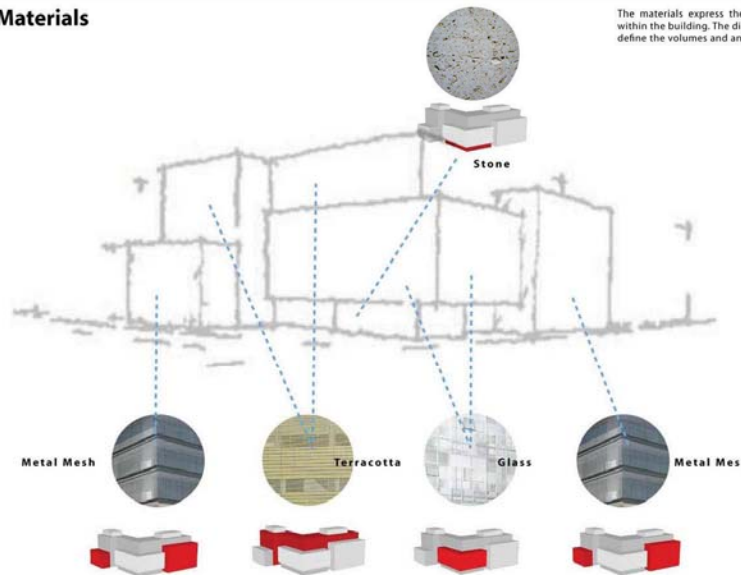


Lobby:
foster interaction and
Connectivity



Design Presentation

Materials



The materials express the different functions within the building. The different materials also define the volumes and animate the facade.

Design Presentation

Planning Concepts – Scientific Collaboration and Translational Research



Design Presentation

Planning Concept - Efficiency and Flexibility



No Rated Corridors
Lab Floor Efficiency Ratio 0.76



Maximizing Energy Efficiency

Conceptual Segregation of Occupancies

Horizontal

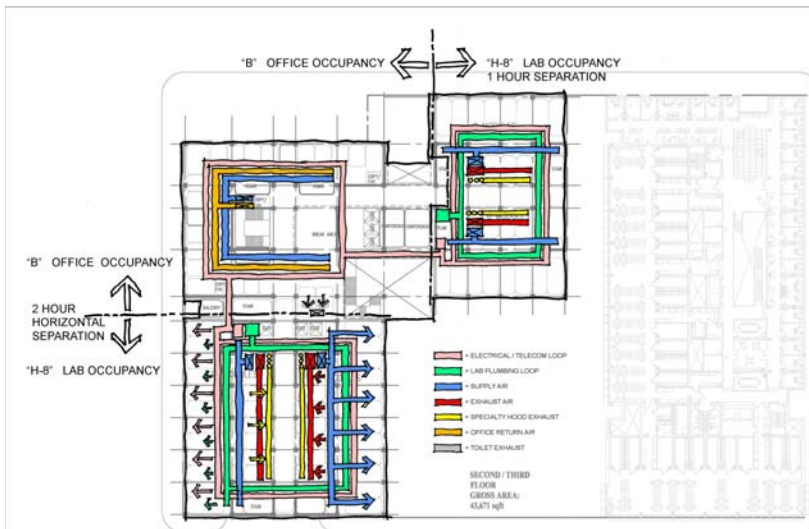


Vertical



Maximizing Energy Efficiency

Conceptual Systems Integration with Planning



Maximizing Energy Efficiency

Architectural Features

Operable Windows at Offices

Window Shading at Labs

Minimal Openings at Vivarium



Maximizing Energy Efficiency

Mechanical Design

- Variable Speed Fans
- Low Velocity Air Systems
- Water Saving Plumbing Fixtures
- Building Systems Control

Electrical Design

- Lighting Control Throughout
- Energy Efficient Lighting



Four Key Concepts

1. Integrating Technology
2. Communication
3. Dispute Resolution
4. Incentives



1. Integrating Technology

- Whole Team in BIM
- BIM Coordination = More Exchange of Ideas, Increased Commitment
- Facilities Group on BIM
- Define Team Member Roles in Coordination
- Foster Trust to Enable Good Performance & Collaborative Approach



**BIM is a tool
which makes IPD
possible**

2. Communication

Creating the tone

- Goal Setting
- Big Room
- Schedules
 - Pull Sessions
 - Last Planner



Goal Setting

Agenda
Goal Setting Meeting
December 7, 2007
SmithGroup

- 1) Review Goals and discuss status
- 2) Construction Document Phase
- 3) Budget Review Process
 - a) Estimates
 - b) Value Engineering
- 4) Construction Documents Phase
 - a) Planning for subs coming onboard
 - b) Plan for weeks prior to Big Room startup
 - c) How will coordination take place, where, how often
- 5) Change Order process
 - a) Streamlining paperwork
- 5) Processes for getting the work done
 - a) Contracts, design coordination, submittals, etc.

+ BIM Quantities - 4D - need mfg.

+ LAST PLANNER - SOFTWARE SPS
- we should use our own system.

+ COLLABORATE -
say what I say being said. get rid of
what we want.

Create & Maintain a Collaborative Environment

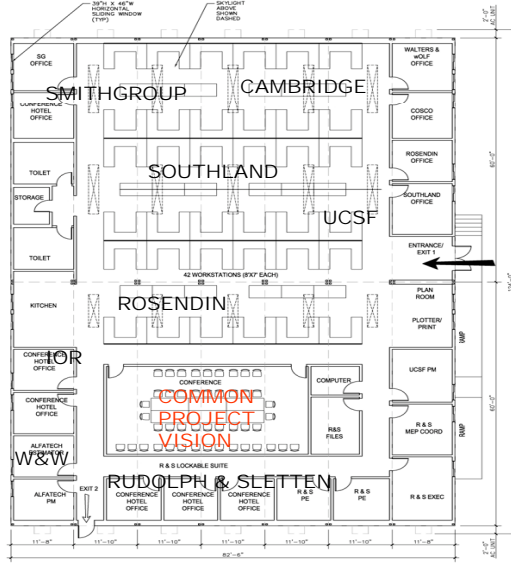
Previous Action Items:

- This "CVRB Goals" group will meet regularly.
- Define project processes that are collaborative & efficient.
- Bringing the design build contractors into the team in a collaborative manor.
- Construction trailers will be large and if possible key personnel will be in the same trailer.
- **METRIC** - at end of construction we all want to do another project together.

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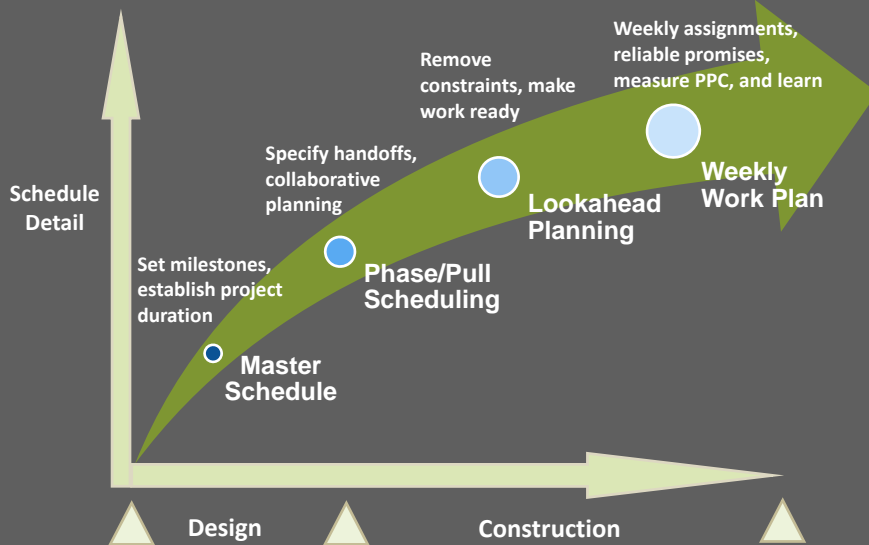
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Big Room – Creating the Tone



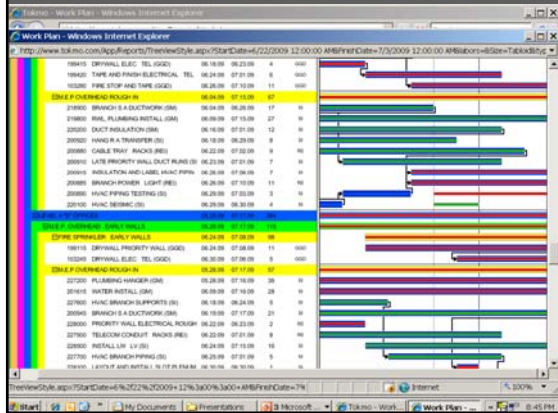
- All Key Members in one trailer
- Team Approach Encouraged by owner
- Blurring the lines working as a team

Schedule Process

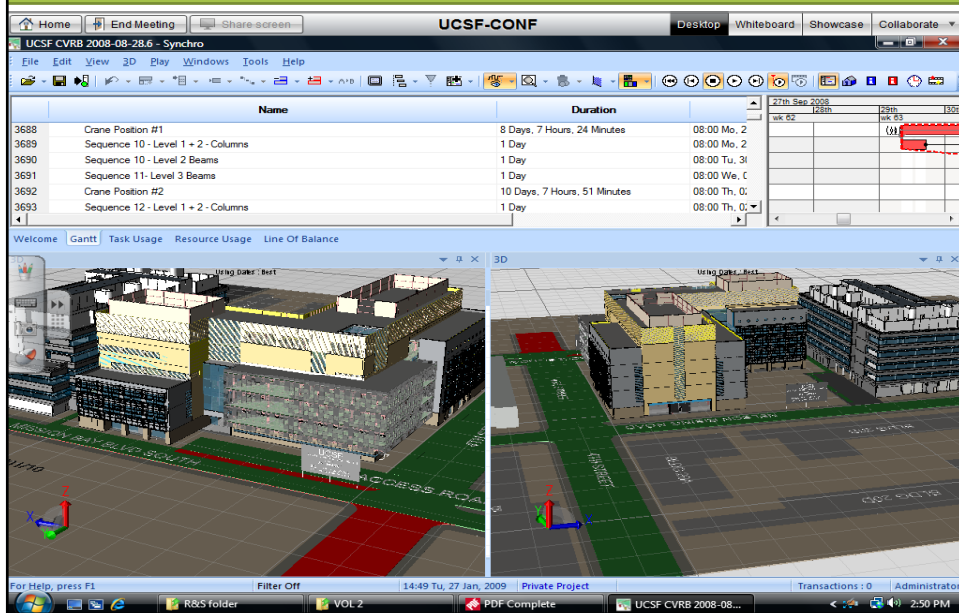


Schedule Process

Pull Schedule Last Planner



Integrating Technology - 4D



3. Dispute Resolution

- Clear, Fair, Process Everyone Can Agree to
- Set Clear Time Frames
- Emphasize a Collaborative Approach
- Review Key Project Process & Modify if Necessary



4. Incentive – Construction

- Performance Based Incentives
- Sharing Risk and Reward
- Set Up a Way to Share the Reward
- Everyone Fails Together or Succeeds Together

Percent Planned Complete & Schedule Milestone Based Incentive Program



Incentive – Construction

Planned Percent Complete (PPC)

- Number of tasks completed vs number of tasks planned
- 10 tasks planned for this week
- 8 tasks completed this week
- PPC = 80%

Percent Planned Complete & Schedule Milestone Based Incentive Program



Incentive – Construction

SCHEDULE INCENTIVE MILESTONES:

- Sept. 26, 2008: Structural Steel Mobilization
- Jan. 27, 2009: Steel & Decking Complete
- March 11, 2009: SOG & Deck Pours
- May 27, 2009: Clinic Sheetrock & Taping Starts

Percent Planned Complete & Schedule Milestone Based Incentive Program



Incentive –Pre Construction

For MEP Trades

- One Bidder Minimum Per Package
- For Every Bidder over Minimum Contractor Receives \$6K Incentive

For All Other Trades

- One Bidder Minimum Per Package
- For Every Bidder over Minimum Contractor Receives \$2K Incentive

Bidder Participation Incentive



Incentive –Pre Construction

**Total
Construction
Cost at Bid**

Must be Between

**Anticipated
Contract Value
(\$175M)**

+ 2% or -5%

Target Cost & Complete Buyout Incentive



Incentive –Pre Construction

... And If

Total Cost at Bid



At end of Construction

Scope Gap COs
less than .5%
+
Constructability
Omission COs
less than .5%

Then

Complete
Buyout Incentive
Achieved

Target Cost &
Complete Buyout
Incentive



Benefits

- Accurate Buy-out at Target Cost
- Improved Schedule Performance
- Greatly Reduced Risk of Claims
- Improved Design Process
- Improved Risk Management Process During Construction
- Improved Communications With Stakeholders
- Decrease in RFI's and Submittal Turn Around
- Faster Decision Making

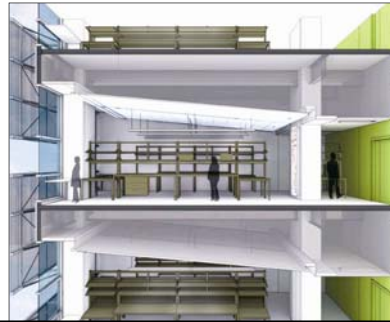
Greatest benefit is
a successful project
for the entire team



Benefits

- Cost Control from Beginning via Integrated Team
- Everybody's ideas contribute
- Early Integration of Installation Criteria Lowered Risk for Owner
- Constructability Resolved Early During Design Stages
- Predictability of Planning Fewer Surprises

Greatest benefit is a successful project for the entire team



Improvements

- Bring on CM/GC During development of BOD
- Design build subs at the beginning of Schematic design
- Further develop Incentive Plan to include smaller subs and expand into design phase
- Use Lean during Design phase
- Content of Building Information Model

What To Do Differently Next Time



Keys to Success

- Everybody Part of the Solution & Outcome
- Culture of “How Can We...”
- Consensus Building
- Owner Driven IPD Process



UCSF Cardiovascular Research Building

