Michael Bade Associate Vice Chancellor and Campus Architect, UCSF
UCSF Use of Available UC Delivery Methods

1. Private (P3) – MB Neurosciences
2. **Best Value** DBB – many small projects
3. **Best Value Lean** CM@Risk (w/ DB Prime Subs)
4. **Best Value Lean** Design / Build (Performance-Based)
5. Modified Design / Build (not used)
6. Design Consultants & Joint Ventures (not used, open to appropriate use)
7. Multiple Prime (not used)
8. IPD (incorporated into **Lean** approach)
9. **Best Value Lean** JOC – (developing for small projects)
UC System-wide Project Delivery Trends

TRENDS: Delivery Methods for 2012/13 UC Projects

- Design Bid Build
- CM @ Risk
- Design Build
- Multiple Prime
Where We Started (2006-2009)

- Connected with P2SL at UCB, Glenn Ballard
- Joined Lean Construction Institute (Greg Howell and Glenn Ballard)
- Saw results of early Lean projects for Sutter Health, others
- Developed CM@Risk w/ D-B subs and incentives contract for $254 million Cardiovascular Research Building
- Developed D-B contract for $123 million Regeneration Medicine Building with lean elements
- Expanded upon these for $1.5B Mission Bay Med CTR
Smith Cardiovascular Research Building
DOLBY REGENERATION MEDICINE BUILDING
Initial Outcomes

• BOTH BUILDINGS COMPLETED 2010
• SMITH BUILDING FINISHED 3 MONTHS AHEAD OF SCHEDULE, >$5M UNDER BUDGET, EXCELLENT QUALITY
• REGENERATION MEDICINE BUILDING FINISHED ON TIME (2 YEAR DESIGN & CONSTRUCTION) AND ON BUDGET, EXCELLENT QUALITY
• NO CLAIMS ON EITHER PROJECT
• REPEAT BUSINESS WITH GCs AND SUBs
• AND THE WORLD CONTINUES TO TURN...
Current Program

• **CM@RISK w/DB SUBS FOR PARNASSUS SEISMIC PROGRAM (COMPLETION IN 2019)**
  - Renewal and seismic retrofit of 2 80 – 100 year old buildings (110 KGSF, 147 KGSF)
  - 4 x 12 KGSF lab remodels
  - ~60 other much smaller projects being delivered traditionally for the most part

• **PERFORMANCE DESIGN/BUILD (COMPLETION IN 2014)**
  - 265 KGSF Mission Hall office building at Mission Bay
  - Possible Future 175 KGSF at San Fran General
  - Possible Future ~300 KGSF office building at Mission Bay
Mission Hall – Project Drivers

UCSF is investing $1.5B in a new Women’s, Children’s, and Cancer Hospital at Mission Bay. Where will the researchers and clinicians have their academic workplace?

- *Hospital site too valuable for future hospital expansion to commit to academic workplace*
- *Fixed amount to invest*
- *Must be completed in time for move into new hospital*

San Francisco’s economy is hot, driven by the Internet software industry. Rents are rising, and UCSF dry research and educational programs long housed in rental space are being priced out of the market for leased space.

- Opportunities for synergy with existing programs at Mission Bay research campus, new hospital
Parameters of Institutional Building

- Will own for a long time – “in perpetuity”
- Want low long-term holistic cost of ownership
- Want outstanding building systems performance to support low cost of ownership
- Want high level of design well-suited to nurturing a workplace community that can become larger than the sum of its’ parts
- This community has not yet fully formed due to programs and workplaces being scattered across San Francisco in rental space
Work Evolution

TRADITIONAL WORK MODE
- Majority of workday is spent at desk
- Some trips away from desk for meetings and interaction with others
- Little variation or flexibility throughout the day

EVOLVING WORK MODE
- Work hours are distributed between desk, meeting spaces, and informal collaboration spaces.
- Experience activity “highs and lows” throughout the day
- Numerous choices in how to engage in productive work
Project Initiation Process

- Survey of all proposed building occupants
- Met with representatives of most clinical and all leased space departments
- Formed working group to pull program together and generate program options
- Tour of progressive workspaces
- Developed options for Departmental input and Building Committee decisions
Work Styles

Mobile technology allows us to take our work with us wherever we go:
• Notebook computers, tablets, storage on the Cloud
• Applications in the Cloud, accessed from wireless network
• Workplace is increasingly a base for roaming, a place to gather thoughts and get organized for the next expedition

UCSF is developing the tools and infrastructure to support this mobile workforce, which is driven by demand from the workforce itself:
• Wireless data network extension
• DAS system
• Cloud computing
• Data center strategy
Qualitative Objectives

• Enhance the campus community.
• Support collegiality & communal spaces in the workplace. The workforce values community and collaboration.
• Opportunity to create a health/education idea incubator by co-locating departments to increase collaboration and generate new ideas.
• Treat everyone the same and create a manageable workplace with no structural inequalities between departments and employees.
• Provide a contemporary, interesting, cool workspace. No Laurel Heights.
• Many are receptive to a progressive workplace strategy (Peds, Anesthesia as examples).
• Support the need for a private space to decompress.
• Provide the right tools and spaces to support education.
Risk Management

• UCSF wanted high degree of certainty that the building would be:
  • Completed on time
  • Support the emerging research, teaching, and patient care community
  • Have a long-term value horizon
• UCSF was willing to trade control of the process for certainty of outcomes
• UCSF decided to emphasize performance objectives that deliver long-term value
• A performance-based Design/Build delivery model was selected to engender innovation in design and construction
Program in Flux: “The Best-Laid Plans...”

- **After project scope was finalized and cost target set, building population grew from 1,200 to 1,500**
- **Costs could not rise due to financial commitment to the new hospital**
- **Available building volume, entitlement, floor area, environmental footprint could not expand**
- **What gave?**
How to Design & Deliver?

- **DESIGN/BUILD COMPETITION**
- **THREE-LEVEL PERFORMANCE SPECIFICATION:**
  - Base (mandatory minimum) level of performance
  - Tier 2
  - Tier 3
- **FIXED COST OF $93.8 M (INCLUDING FURNITURE AND IT)**
- **FIXED PROGRAM**
- **BEST VALUE AWARD**
Procurement Phases

- **DEVELOP PROGRAM & PERFORMANCE SPECIFICATION (4 MONTHS)**
- **PREQUALIFICATION (4 MONTHS IN PARALLEL WITH PROGRAM AND PERFORMANCE SPEC DEVELOPMENT, 14 TEAMS STARTED, 3 SELECTED)**
- **DESIGN & PERFORMANCE PROPOSAL DEVELOPMENT & SUBMITTAL (3 MONTHS)**
- **EVALUATION & SELECTION (1 MONTH)**
- **PROJECT STARTUP (1 MONTH)**
Mission Hall Contract

• **Dependable Programming Information used as basis for Design-Build competition**

• **Whole-Building Performance Specification**

• **Contractual obligation is to build building that exhibits agreed-upon performance characteristics**

• **Emphasis on QA/QC, which has deep roots in Lean**

• **QA/QC Process Reqts based on Shingo Model**
Mission Bay Block 25A
Planning & Design Criteria
and Technical Criteria

328 pages!
Measuring Value

PROJECT GOALS

- Integrate the site into the Mission Bay Research Campus and its urban context, and connect to the Mission Bay Clinical Campus, across 16th Street, reinforcing the specific identity of the site as both a physical and a metaphorical gateway.
- Respectfully re-interpret the UCSF Mission Bay Campus Master Plan and Design Guidelines, employ the UCSF Physical Design Framework, and respond to the evolving urban context of the site campus and the city.
- Give form to outdoor spaces that promote social interaction and healthfulness while providing refuge and rejuvenation.
- Create an imaginative, elegant, and cost-effective urban landscape that reinforces meaningful spatial interactions between indoors and out.
- Create a high-functioning, aesthetic landscape by integrating infrastructure functions with strong design.
- Achieve the highest standards of sustainability through use of durable and innovative materials, furnishings, lighting, construction techniques and low maintenance landscape strategies.
- Provide clear circulation and wayfinding across the entire site, and between the site and the adjacent off-site green spaces and Campus features, while maintaining safe pedestrian passage at all times.
Measuring Value

PROJECT GOALS

A Quality Work & Learning Environment
A Model of Architectural & Urban Design
A High Performing Building
Environmentally Sustainable
Durable & Long-lasting
Efficiently Serviced & Maintained

BUILDING EXTERIOR

- Design the identity and urban presence of the building to reinforce UCSF’s mission of caring, healing, teaching and discovering.
- Develop passionate, innovative, contemporary yet timeless architecture through the composition of architectural elements and arrangement of materials.
- Imaginatively reinterpret the context of the UCSF campus and city through architectural design.
- Employ high performance design and innovative sustainability strategies to enhance the experience and productivity of the building users.
- Create meaningful spatial interactions between indoors and outdoors to enrich the experience of the building occupants, members of UCSF, and the public.

BUILDING INTERIOR

- Support UCSF’s mission of excellence in academics, health care research and clinical care by developing a gathering place that facilitates a rich professional and community life.
- Foster an interactive, collegial, and collaborative environment that fuses the clinical programs with dry, basic and translational research.
- Set a model for the future of UCSF workplace through an Activity-Based Workplace tailored to the function, activities, and tools of UCSF faculty, staff and students.
- Achieve optimal efficiencies in the use and organization of space, circulation and core functions.
- Integrate building functions, technology and systems for high performance, maximizing function, serviceability and durability.
- Connect the exterior, interior, office and learning program elements to create a rich and full experience for the building users.
- Design the building interior to be imaginative, contemporary yet timelessly elegant, cohesive and meaningfully transparent.
Measuring Value

PROJECT GOALS

A Quality Work & Learning Environment
A Model of Architectural & Urban Design
A High Performing Building
Environmentally Sustainable
Durable & Long-lasting
Efficiently Serviced & Maintained

01 Energy & Resource Efficiency
Design a project that integrates all systems to provide a high-performing building that is appropriately controlled and monitored to minimize energy and resource consumption.

02 Structurally Sound
Develop a code-compliant, safe building that can withstand major seismic events. Provide an efficient structural system that is integrated with the proposed spatial and building systems and that can efficiently adapt to changing office use requirements and infrastructure improvements, while fulfilling or exceeding required performance standards.

03 Climate Responsive
Provide a building that is weather-tight while making maximum use of day-lighting and natural ventilation. Design site utilities, plantings, and site drainage to respond to the specific climactic and soil conditions of the Mission Bay environs.
## Measuring Value

### PROJECT GOALS

<table>
<thead>
<tr>
<th>Goal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>Create an environment that promotes a sense of well-being for the occupant. Such an environment will provide quality thermal and ventilation conditions, safe materials, the necessary acoustic and vibration separation between various functions, and ergonomic furnishings that are tailored to uses and the users.</td>
</tr>
<tr>
<td>05</td>
<td>Strive for excellence through the use of high-performing, adaptive, and innovative technology for telecommunications infrastructure, ubiquitous wireless access, audio visual infrastructure, and security infrastructure that integrates with all specified UCSF campus systems.</td>
</tr>
<tr>
<td>06</td>
<td>Design and build a project that uses materials that are not harmful to the environment, maximizes the use of certified or renewable materials, prioritizes cradle to cradle materials for building construction and interior finishes, and manages waste during the construction process.</td>
</tr>
<tr>
<td>07</td>
<td>Design a building whose building systems are organized and detailed to promote cost effective, easily accessed localized repair and service. Design for durability, maintainability, flexibility, adaptability, and longevity of systems, materials, and details. Design for a minimum 50 year life span of the building.</td>
</tr>
</tbody>
</table>
Measuring Value

Structurally Sound | 02

BUILDING UTILITIES

REQUIRED
Flexible connections to be provided for all utilities connecting to the site.

Underslab piping to be supported per 02|A4.8 “Slabs at Grade, Supplementary Components.” CR Tech 07|D1.1

VERIFICATION

1. PROPOSAL: Narrative for the system design. Preliminary calculations and schematic drawings.
2. DOCUMENTATION (CD): Final design calculations and drawings. Cut sheets of the equipment selected.

ROTATION (D40)

FIRE SUPPRESSION (D4010)

REQUIRED
The building shall be protected by hydraulically calculated automatic wet sprinkler system.
Each building floor shall be an individual zone.
Appropriate drainage of the system shall be provided.

TIER 2
Consultants evaluated all technical criteria, verified if proposed performance met or not.

Users and consultants evaluated qualitative aspects of design proposals.

Performance under technical criteria and of qualitative aspects of designs ranked.

Ranking (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>) determined points awarded (1<sup>st</sup> = 100% of possible points in category, 2<sup>nd</sup> = 66%, 3<sup>rd</sup> = 33%) – out of 6,000 total points possible in all categories.

Total score divided into target cost to obtain cost/quality point for each proposal.

Award to lowest cost/quality point.
Mission Bay Block 25A

BRIDGING TEAM EVALUATIONS
### Ranked Scoring

<table>
<thead>
<tr>
<th>Project Goals</th>
<th>Required</th>
<th>Tier 2</th>
<th>Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Quality Work &amp; Learning Environment</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
<tr>
<td>A Model of Architectural &amp; Urban Design</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
<tr>
<td>A High Performing Building</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
<tr>
<td>Environmentally Sustainable</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
<tr>
<td>Durable &amp; Long-lasting</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
<tr>
<td>Efficiently Serviced &amp; Maintained</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
<tr>
<td>Quality &amp; Clarity of Project Plan</td>
<td>Yes</td>
<td>No</td>
<td>Unclear Submission</td>
</tr>
</tbody>
</table>

Cost pressure reduced performance of proposals submitted  
Technical criteria evaluated by consultant team  
Program & Design criteria evaluated by technical team and users  
How to integrate lots of data?
Ranked Scoring

- Ranked scoring:
  - Top rank gets 100% of points in broad category
  - 2nd rank gets 66% of points in broad category
  - 3rd rank gets 33% of points in broad category
- Cumulative Total Points used to develop Cost Per Quality Point statistic
## Award Calculation

<table>
<thead>
<tr>
<th>Team</th>
<th>Points</th>
<th>Target Cost</th>
<th>Cost/Quality Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEBCOR/Studios</td>
<td>4,200</td>
<td>$93,800,000</td>
<td>$22,333</td>
</tr>
<tr>
<td>Pankow/KSH</td>
<td>2,400</td>
<td>$93,800,000</td>
<td>$39,083</td>
</tr>
<tr>
<td>R&amp;S/WRNS</td>
<td>5,800</td>
<td>$93,800,000</td>
<td>$16,172</td>
</tr>
</tbody>
</table>

- Target Cost is invariant
- Method selects which proposal has best overall performance and best performance relative to other submittals
- Evaluation procedure equally weighted between Design Quality and Building Systems Performance
Procurement Process Benefits

- **Dependable Program, Design Intent Information Allows Design, Engineering, Construction Process Efficiency**

- **Performance Specification vs Traditional Specification** — Performance Spec Allows Focus on Outcomes, Supports Innovation

- **Design-Build Enables Integrated Team Process**

- **Owner Focus on Outcomes, Not Details**
Delivery Model Improvement

• **PROGRAM INFORMATION — DATA-DRIVEN DESIGN PROCESS**
• **PERFORMANCE SPECIFICATION**
• **PROPOSAL PROCESS**
  • Better targeting of proposal features for selection process
  • Increased compensation to teams
  • Phased proposal process
  • Design
  • Production
Delivery Model Improvement

• **PROPOSAL PROCESS**
  
  • Better targeting of proposal features for selection process
  • Increased compensation to teams
  • Phased proposal process
    ➢ Design phase
    ➢ Production planning phase
    ➢ Selection Process
UCSF Capital Programs Lean Process Improvement

- Unhappy Customers — Projects “Too expensive, too time-consuming”
- Stressed-out Staff — “Too much to do, surly customers, too much red tape”
- Rising Workload
- Complex Projects — Even small projects are complex
- Environment of Change in the institution
- Decided to eat our own cooking
First Steps

- Engaged Lean Management Consultants (Hayley & Aldrich)
- Began formal process improvement effort
- Installing new Business System — vehicle for process improvement of basic business processes (will include e-commerce relationships with contractors, subs, consultants, and suppliers)
- Reached out to customers
- Reached out to staff
- Have seen positive results
### CUSTOMERS: CURRENT STATE

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Lots of Pain</th>
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</thead>
<tbody>
<tr>
<td>Capital Project Approval</td>
<td>Project Initiation</td>
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<tr>
<td>Payment Management</td>
<td>Workload Allocation</td>
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<tr>
<td>Professional Services Department</td>
<td>Project Forecasts</td>
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<tr>
<td>Budget Worksheet Development</td>
<td>Budget Development</td>
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<tr>
<td>Additional Funding Request</td>
<td>Funding Request</td>
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<tr>
<td>Design Review &amp; Permitting</td>
<td>Project Launch</td>
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<tr>
<td>Construction Oversight</td>
<td>Need to stay in communication on design changes at each phase of design development</td>
</tr>
<tr>
<td>Construction Oversight</td>
<td>Need smoother turnover, warranty mgmt. punch list completion</td>
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<tr>
<td>Technology Handoffs</td>
<td>Project Closeout</td>
</tr>
<tr>
<td>Archives</td>
<td>Request for Notice of Completion &amp; Final Closeout</td>
</tr>
<tr>
<td>Financial Closeout</td>
<td>Need to review change orders &amp; submittals</td>
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<tr>
<td>Support for remaining issues</td>
<td>Need to stay in communication on design changes at each phase of design development</td>
</tr>
</tbody>
</table>

### 1. Project Initiation
- Workload Allocation
- Project Delivery Strategy
- Project Initiation
- Project Forecasting
- Budget Development
- Funding Request

### 2. Design
- Professional Services Department
- Budget Worksheet Development
- Additional Funding Request
- Design Review & Permitting

### 3. Construction
- Contractor Selection
- Invitation to Bid
- Prequal. 1st & 2nd Stages
- Change Management
- Construction Oversight

### 4. Occupancy Mgmt..

### 5. Project Closeout
- Request for Notice of Completion & Final Closeout
- Archives
- Financial Closeout
- Support for remaining issues

### 6. Capital Planning Process
- Support for remaining issues
- Request for Notice of Completion & Final Closeout
- Archives
- Financial Closeout
STAFF “PAIN” RESULTED FROM PROCESS, PERSONALITY, STRUCTURE

- Workload Allocation
- "Project Initiation"
- Professional Services Procurement
- Design Review & Permitting
- Capital Project Approval
- Contractor Selection
- Change Management
- Reporting
- Occupancy Management
- Archiving
THINGS WORKING WELL

Customers

• Excellent architects & designers. Several strong PMs and analysts.
• Many great projects provide the desired outcomes
• Timely, transparent communications
• Construction is well managed

Staff & Directors

• Strong knowledge on team, always someone who can help
• Able to conceptualize and complete complex projects.
• Everyone chips in – staff get along well
• Highly skilled analysts provide good PM support
THINGS WE NEED TO IMPROVE

Customers

• Inconsistent quality by PMs
• Close out 2+ yrs & hold funds
• Too much waiting
• Too costly, unrealistic budgets
• CP is understaffed

Staff & Directors

• Lack consistency in PM methodologies
• Many processes “get in the way” e.g. closeout
• Approval bottlenecks
• Complex processes used for both small & large projects adds cost
• Staff absorb hours to get job done
CUSTOMER “PAIN” & STAFF PERSONALITY DRIVES MATCHED!

Communication & Consultation

Achieving Cost-Effective Results

Clear Structure & Standard Procedures

Speed & Decisiveness

Mutual Trust

Big Picture Thinking/Strategy

Strengths
## SUMMARY OF KEY ACTIONS

**Process, Capabilities, Structure Will Improve Together**

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<tr>
<td><strong>WORK &amp; MANAGEMENT PROCESSES</strong></td>
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<tr>
<td>Prioritize &amp; develop A3 plan</td>
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<tr>
<td>Process improvement, metrics &amp; business system</td>
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<td><strong>STRUCTURE &amp; CAPACITY</strong></td>
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<tr>
<td>Revisit structure &amp; fill open roles</td>
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<td>Re-define AD Role – customer/project facing</td>
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<tr>
<td>Work with other departments to delineate roles</td>
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<tr>
<td><strong>PEOPLE &amp; SKILLS</strong></td>
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<tr>
<td>PM Skill Improvement</td>
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<td>Continual Improvement Skills</td>
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Understanding Current State: CP Project Initiation

26 Steps
Developing Desired Future State Value Stream Map
Identifying Major Problems & Possible Countermeasures
Assessing Countermeasure Ideas

Start here with the High Impact and Low Difficulty Ideas!
Finalizing a Future State

7 Steps
Creating metrics and Checks

<table>
<thead>
<tr>
<th>Target #</th>
<th>Metric</th>
<th>Type</th>
<th>Start</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Customer Satisfaction</td>
<td>#</td>
<td>3.7</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Unassigned WOs</td>
<td>#</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>3</td>
<td>Staff Utilization (Recharge)</td>
<td>Hours</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
| 4        | Response Time in WLA:  
1. Acknowledge WO  
2. Assessment complete  
3. Assign PM  
4. PM contacts client for scoping | Days | TBD   | TBD    |
| 5        | Iterations (rework) of a budget for AD approval                       | #    | TBD   | TBD    |
| 6        | # Days from when WO is assigned to PM to when PM submits datasheet in Project Initiation Process | Days |       |        |
| 7        | Steps in Project Initiation Process                                   | #    | 26    | 7      |
| 8        | Days to complete Project Initiation                                   | Days | TBD   | TBD    |
Small Projects Initiative

• Small projects are weighted down with costs and the same process steps in letting contracts as large projects

• On the other hand, customers want speedy implementation, low cost, and low disruption of their operations

• Small projects use small contractors who cannot invest in process improvements like larger contractors can

• Most projects are small – UCSF typically has ~200 projects ongoing, of which all but a handful are small

• Dollar volume of small projects can reach $100M annually
Strategies

• Use Best Value contractor selection to identify high-capability, high-quality contractors

• Redesign small projects implementation process – use Job Order Contracting (JOC) to batch small projects into larger batches

• Use Best Value to select contractors for medium-sized projects using Design-Bid-Build delivery

• Create standardized work processes internally to allow process benchmarking

• Focus improvement program on customer value
Small Projects Process Improvements

• Batching small projects gives scale which allows use of Lean construction tools such as Last Planner, Pull Scheduling

• Design of small projects system can allow pairing of design and construction firms into a virtual design-build team

• Duration of JOC contract allows contractor to work with UCSF to improve project logistics and support services (from Facilities Management and other units)

• More to come!
LEAN APPROACH GAVE US A PLAN:
Improve Each Element For Higher Performance

1. **Strategy**: continual PDCA of customer needs, transparency, new business system, define department roles

2. **Work & Management Processes**: systematically streamline, improve delivery models, support with business system

3. **People**: Hire to fill the gaps in capabilities & drives, improve capacity with process change

4. **Structure**: Reshape reporting relationships
A Few Lessons Learned

Start with a shared understanding of the goals, current situation and problems; if you don’t focus on what is most important you might improve the wrong things.

Get the right people involved — include policy and decision makers, staff, customers, suppliers - challenge all of them and help them improve. Select an implementation leader.

Trust people doing the work to understand WAH (What Actually Happens) and to develop solutions; look for waste and for positive deviants.

Match structure to processes to resources to customer needs to strategy.

Engage people to understand the big picture; they will develop ownership for long term success.
Initial Results

- Response to customer work order went from 4 weeks to 1 week
- PMs taking over project assignments with guidance from Dept. leadership
- Effectively cut steps from key processes such as project startup
Questions?