The El Sol Science and Arts Academy: A Case Study

The Benefits of Rapid-Response Facility Solutions for K-12 District Planners

Orange County Schools Facility Planners: May 11th, 2016

Introductions

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President
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Superintendent,
Santa Ana Unified

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Vice President
Project Frog

Former Director of
Strategies at
MKThink

Agenda

1. El Sol Context

2. District / Charter Partnership

3. Campus Development Model
   - Funding
   - Design
   - Delivery

4. Measuring Outcomes

5. Lessons Learned

El Sol
Santa Ana Science and Arts Academy

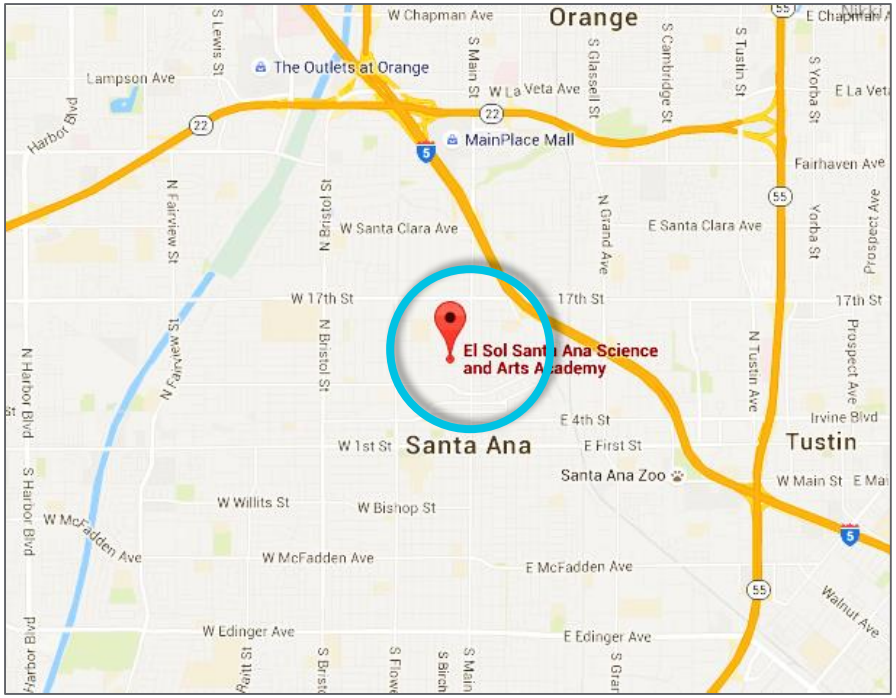
An Excellent Public School

Founded in 2001

Grades: K-8

Number of Students: 850

District: Santa Ana Unified School District



Features:
- 2.1 acre site
- 81% Free and Reduced Lunch
- 61% ESL
- Dual-Immersion Curriculum
- Onsite Preschool and Wellness Center
- Extended Day & Preschool Program

Awards and Accolades:
- Title I Academic Achievement Awards
- California Association of Bilingual Educators Award
- 2014 Hart Vision Award: Charter School of the Year

El Sol Science & Arts Academy | 2012: 800 Kids in 100% Portables
Santa Ana Unified School District, Santa Ana, CA

The El Sol Development Team

Monique Daviss
Exec. Director
El Sol

Marshall Kaplan
Director,
Mirage
Foundation /
Fundraiser

John Sun
CEO
Pacific Charter
School Development

+

Joe Dixon
Former Asst.
Superintendent,
Santa Ana Unified

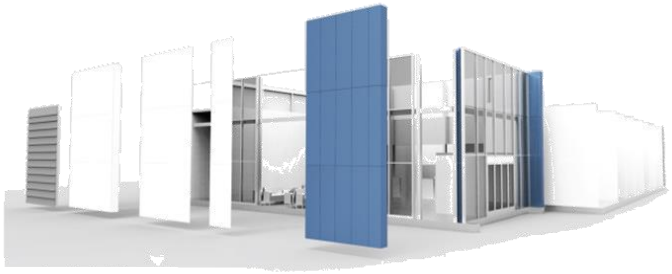
MODULAR

100% of construction occurs off-site

Standard Module

COMPONENT

50-90% of construction occurs off-site



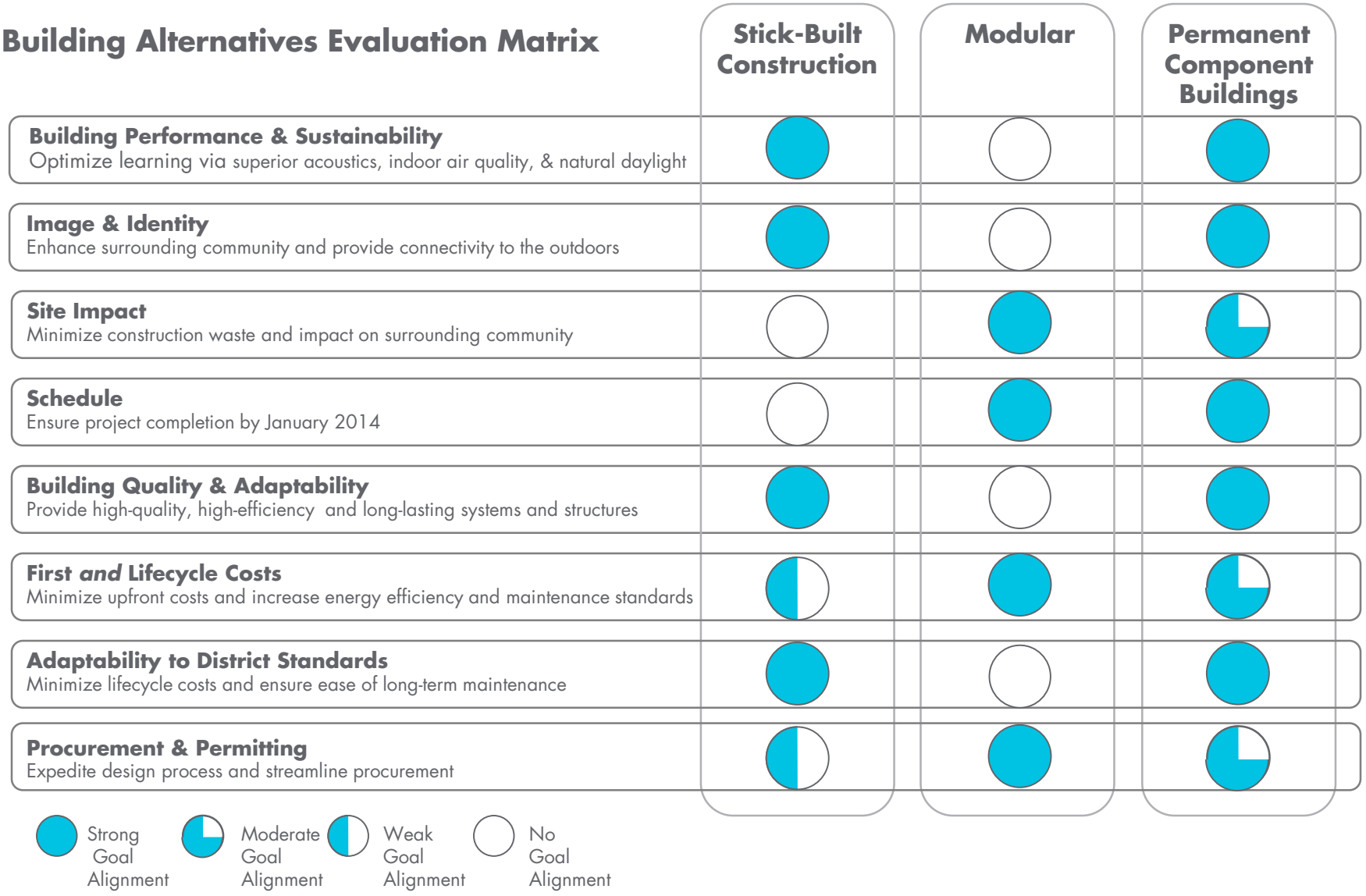
Kit of Parts

TRADITIONAL

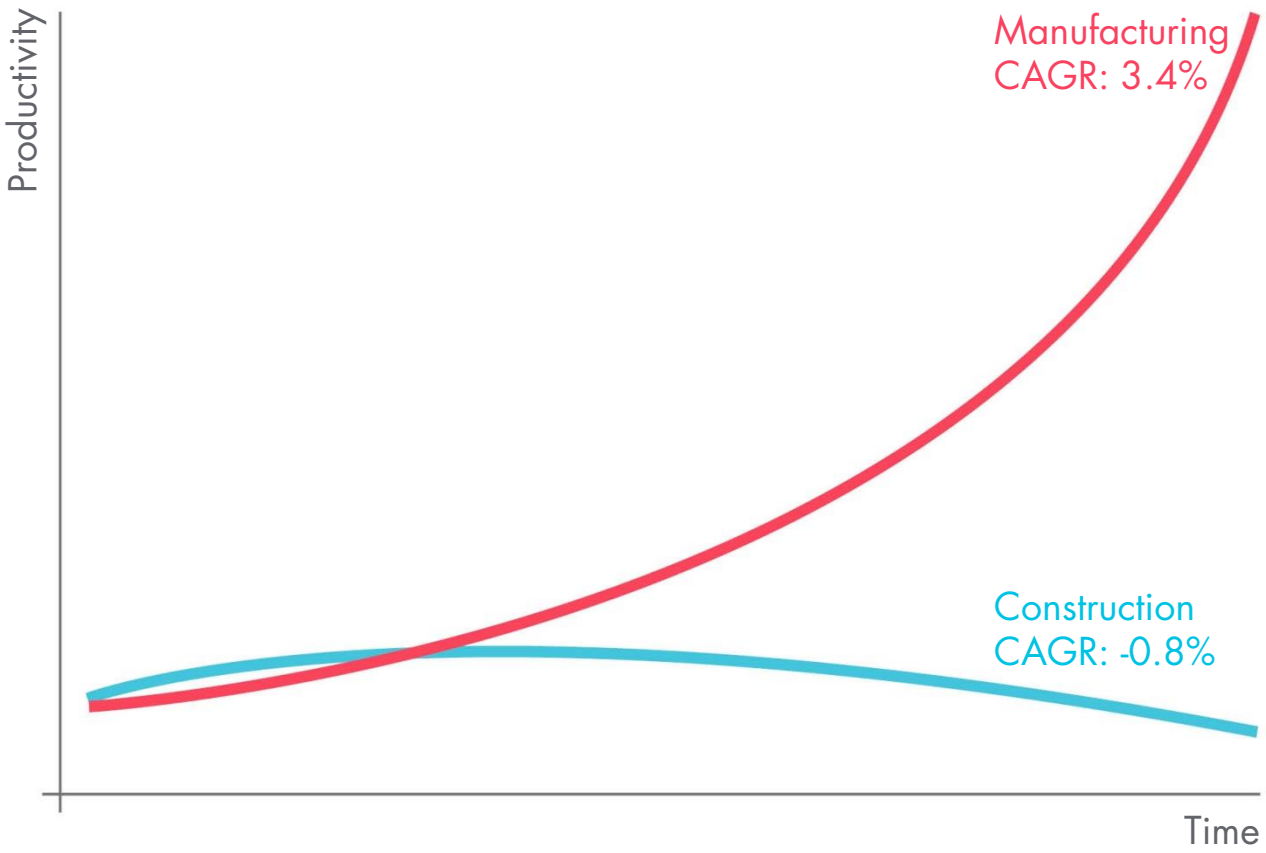
100% of construction occurs on-site

Stick-built

Building Alternatives Evaluation Matrix



Productivity



Source: Bureau of Labor Statistics, Bureau of Economic Analysis, Stanford University Dept. of Civil and Environmental Engineering
Note: Productivity measured as real sector GDP divided by total labor hours

BOEING
Efficiency through Prefabrication

TOYOTA
Standard Components Across Models

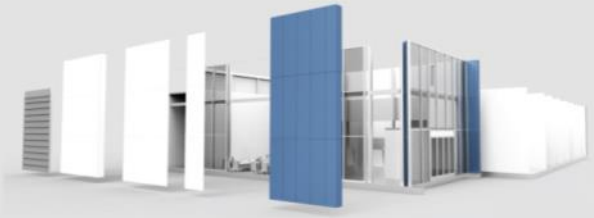
IKEA
Flat packed Shipping & Assembly

DESIGNED FOR MANUFACTURING

ZERO DEFECTS

DESIGNED FOR DELIVERY

FLAT PACK SHIPPING



DESIGNED FOR ASSEMBLY

SPEED TO MARKET

Reverse Designed for Manufacturing, Delivery and Assembly



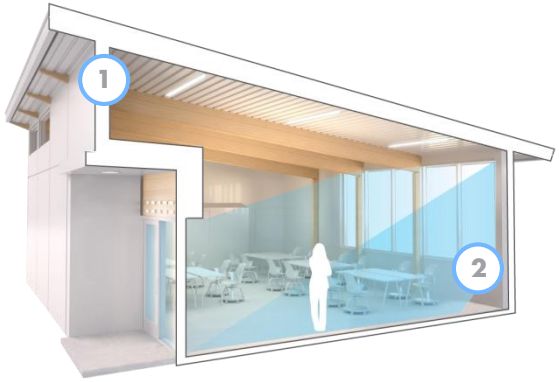







Don't be afraid
Fronts

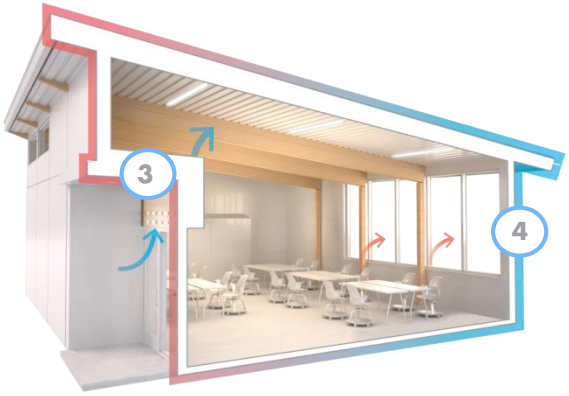
light



1 **Abundant natural daylighting is correlated with reduced absenteeism.**
Large operable view windows, high clerestories, LED lighting and high-performance low-e glazing facilitate an even distribution of light and views to the outdoors.

2 **Daylit classrooms yield up to 26% faster learning rates and 14% improved test scores.**
Frog classrooms are designed to be 75% daylight autonomous.

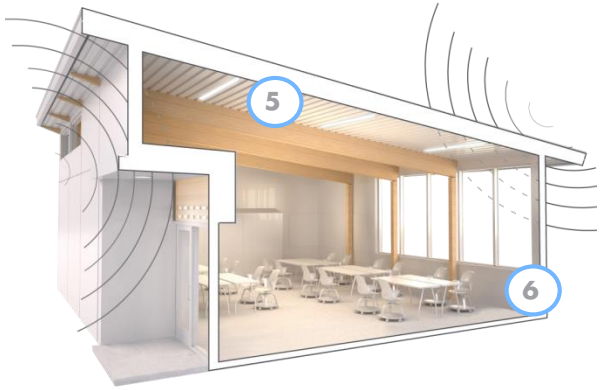
air



3 **Superior indoor air quality reduces rates of respiratory illnesses such as asthma, the #1 cause of absenteeism.**
Voluminous spaces and operable windows encourage continuous air flow.

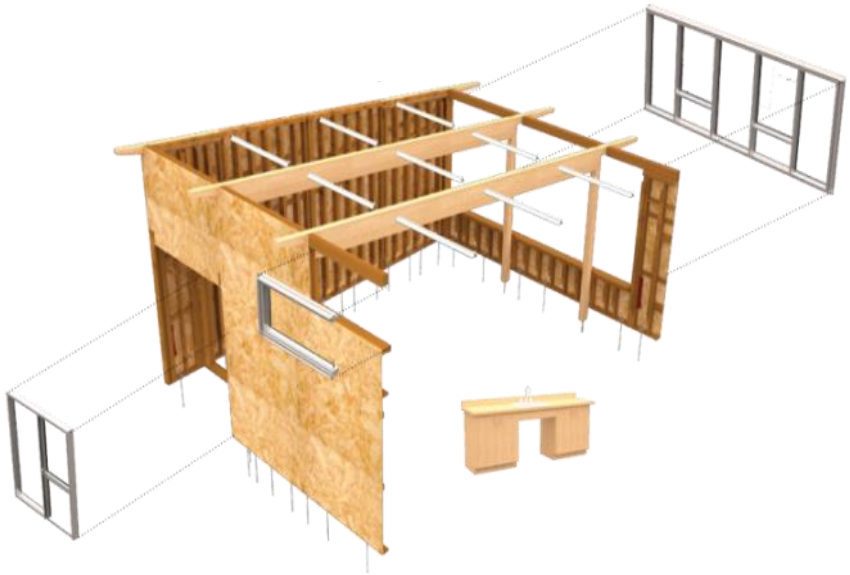
4 **High-performance building envelops deliver significant energy & cost savings.**
A life cycle analysis comparing Frog vs. traditional portables showed Frog buildings will generate $690K in life time savings.

sound



5 **Good acoustics are linked to increased student performance and enhanced comprehension.**
Insulated roof and wall panels mitigate sound and reduce reverberation.

6 **Good acoustics are correlated with increased teacher retention.**
Frog classrooms are designed to a max 45 dBA and 0.6 reverbation time.



50%

The Frog Kit: Core and Shell
Fast deployment, standardization where it matters

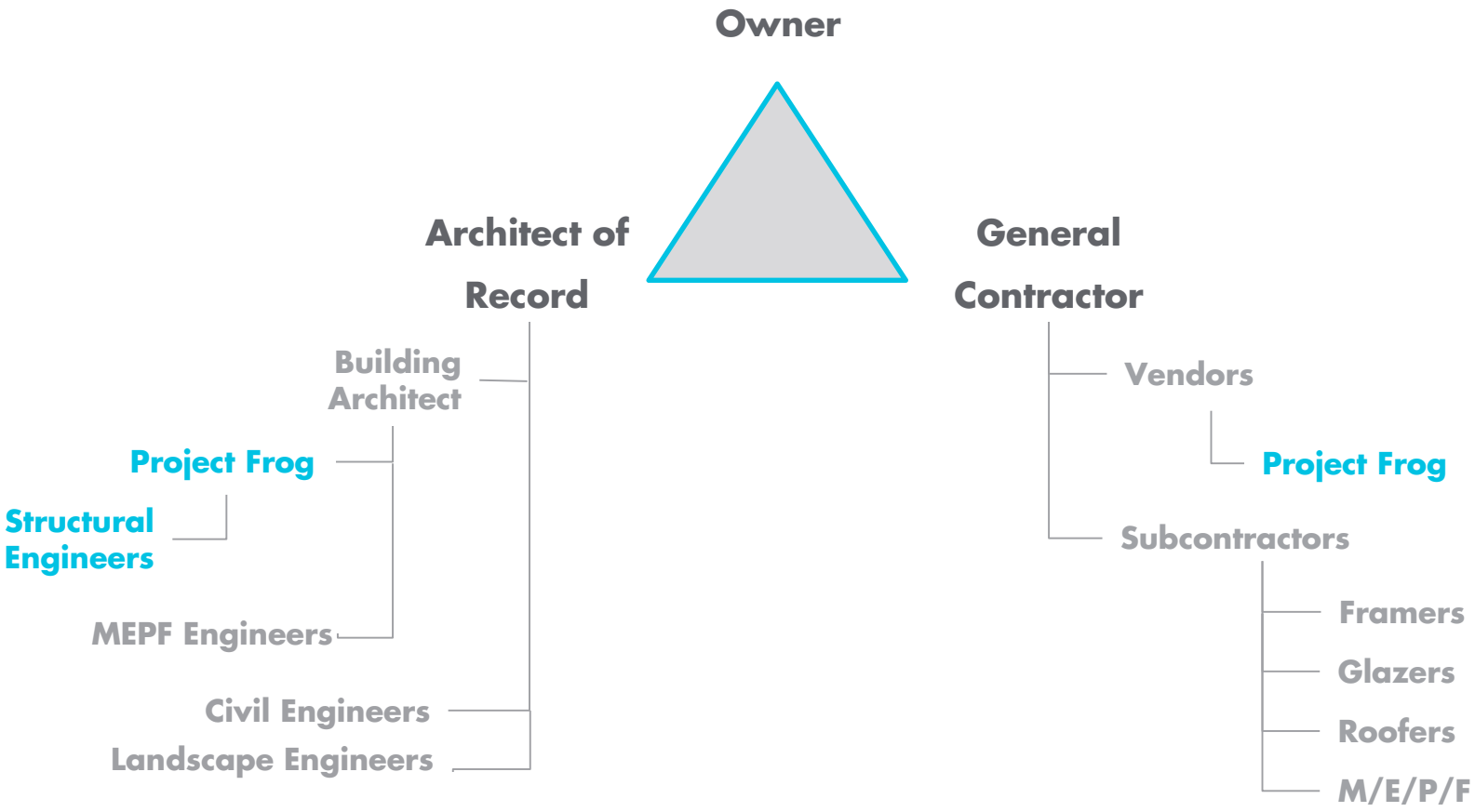
50%

General Contractor & Architect: Fit-Out & Finish
Flexibility in program, MEP systems, and finishes

One size doesn't fit all.

Solving the Critical Path for Speed of Delivery |
& Adapting District Standards for Design, Maintenance and Operations

projectfrog



PFI Roles and Responsibilities

El Sol Science & Arts Academy 2014
Santa Ana Unified School District, Santa Ana, CA

El Sol Science & Arts Academy – Present (2016)
Santa Ana Unified School District, Santa Ana, CA

Towards a better way

El Sol Science & Arts Academy – Present (2016)
Santa Ana Unified School District, Santa Ana, CA

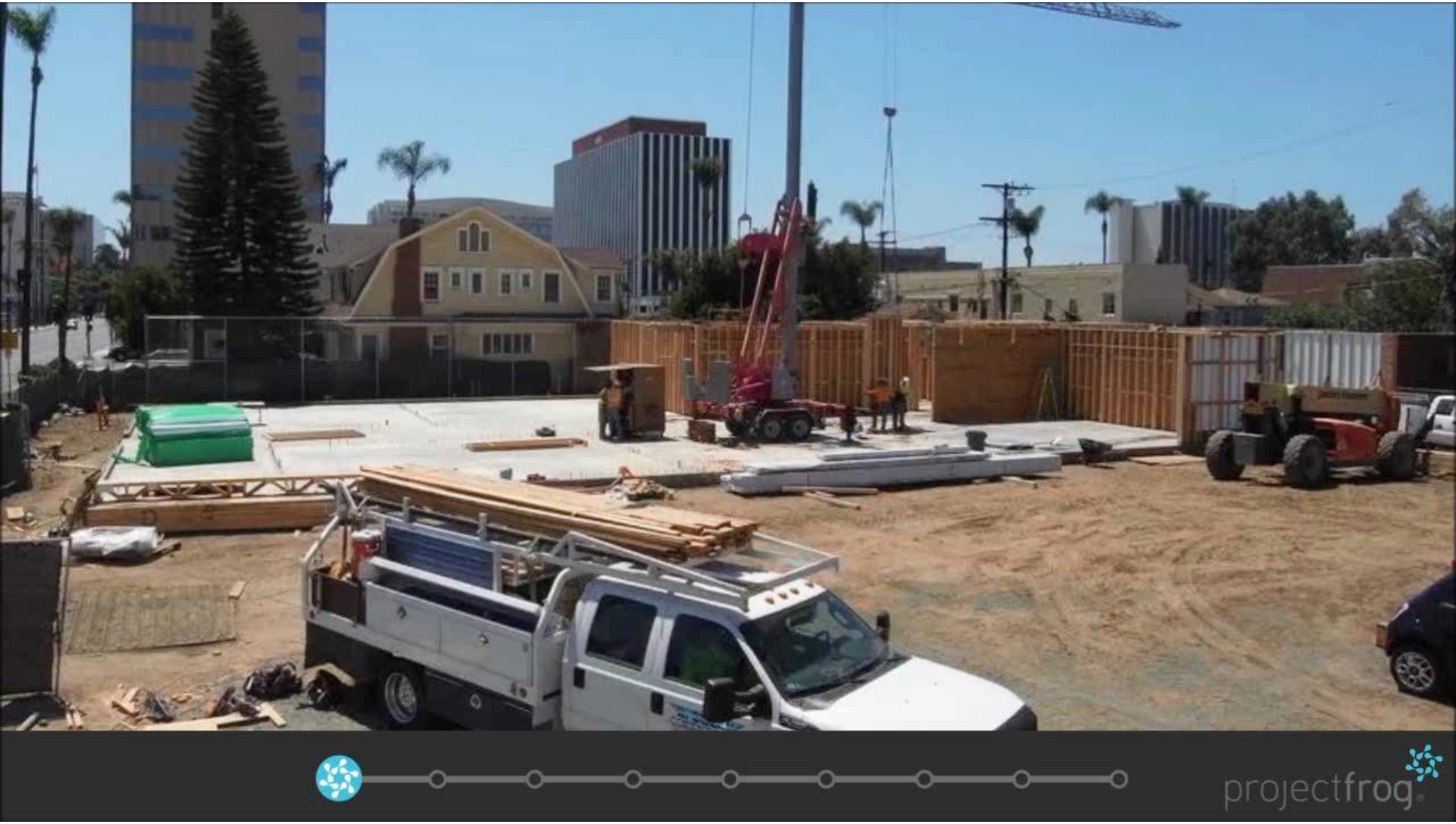






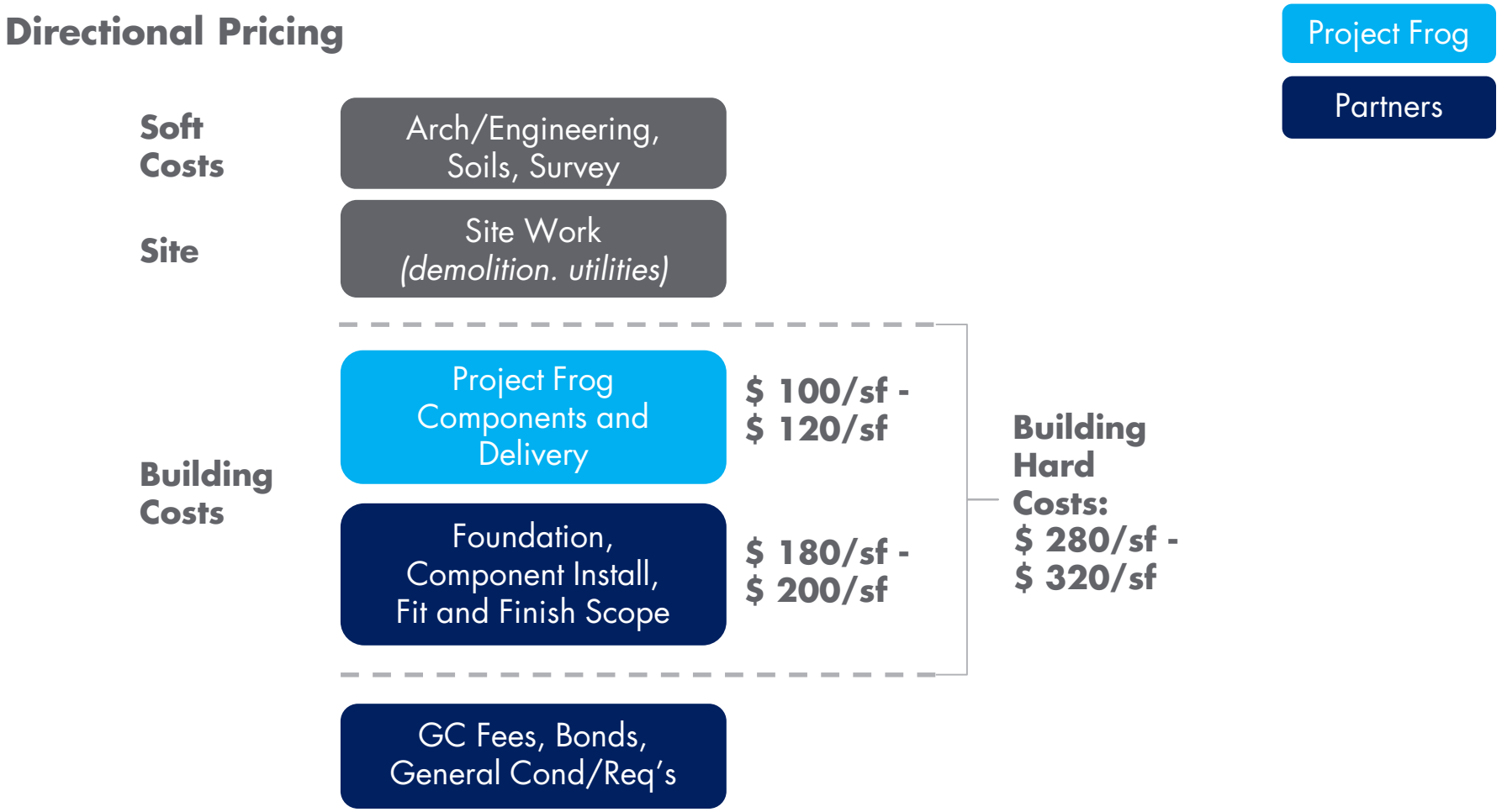






El Sol Science + Arts Academy, 19,000 sf
9-week construction sequence

Directional Pricing



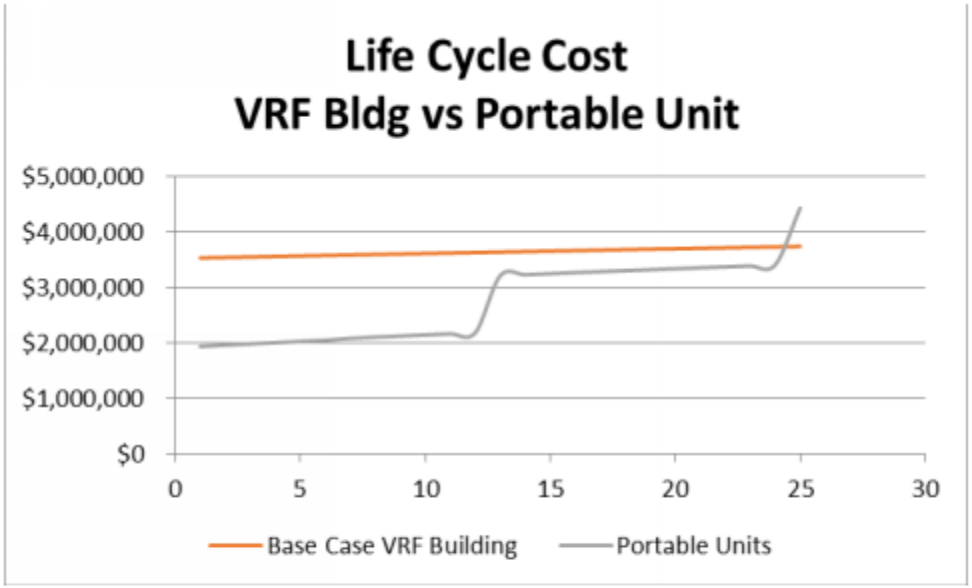
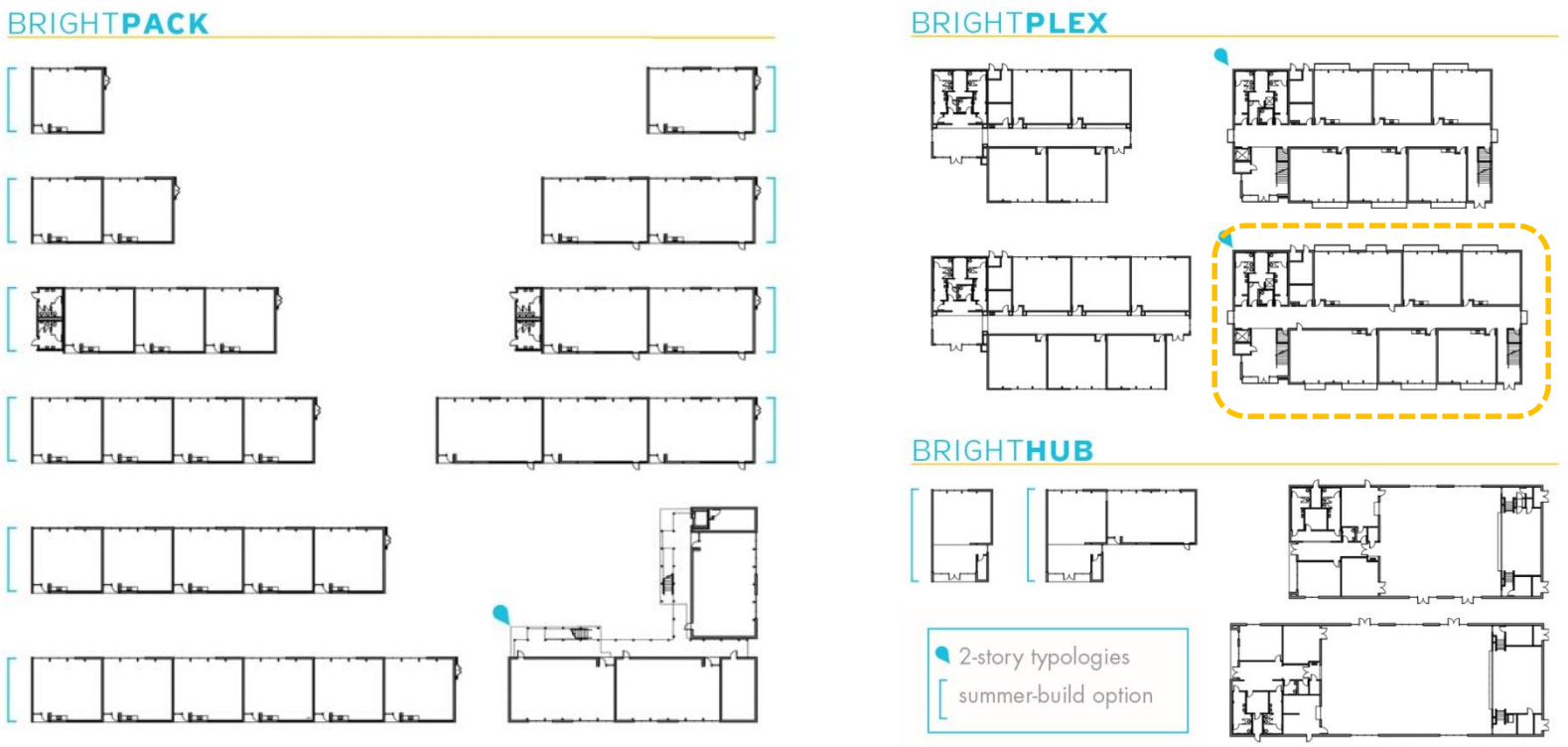


Chart 1: Life Cycle Cost Comparison

As the chart above depicts, the life cycle cost of the VRF building is $3,737,254 at the end of 25 years, whereas the Portable unit had a life cycle cost of $4,426,183. The permanent state of the art building has a life cycle cost savings of $688,929.

DSA Off-the-Shelf Typologies



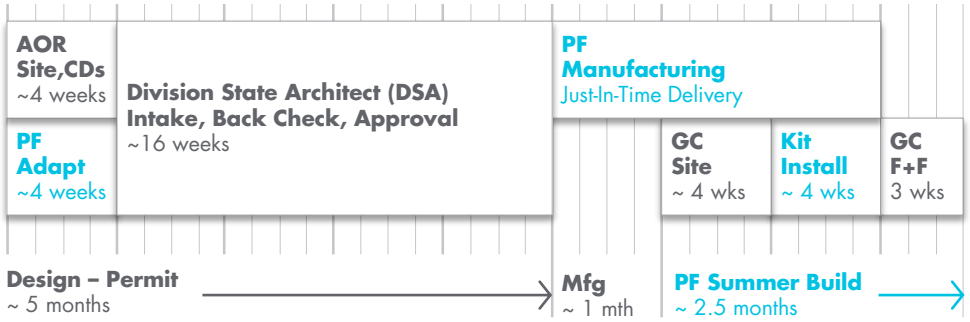
Summer Build 2015
97 Classrooms

Davis: Cesar Chavez Elementary School
Davis: Holmes Junior High School
Fremont: Mattos Elementary School
Fremont: Azevada Elementary School
OUSD Greenleaf Elementary School
SSFUSD: South San Francisco HS
SSFUSD: Parkway MS
SSFUSD: Buri Buri ES
SSFUSD: Junipero Sera ES


W. HALESWORTH STREET
N. BROADWAY


EL SOL
SCIENCE
&
ARTS
ACADEMY

Project Frog Summer Build | One-Story Typologies Up to 8,000 sf

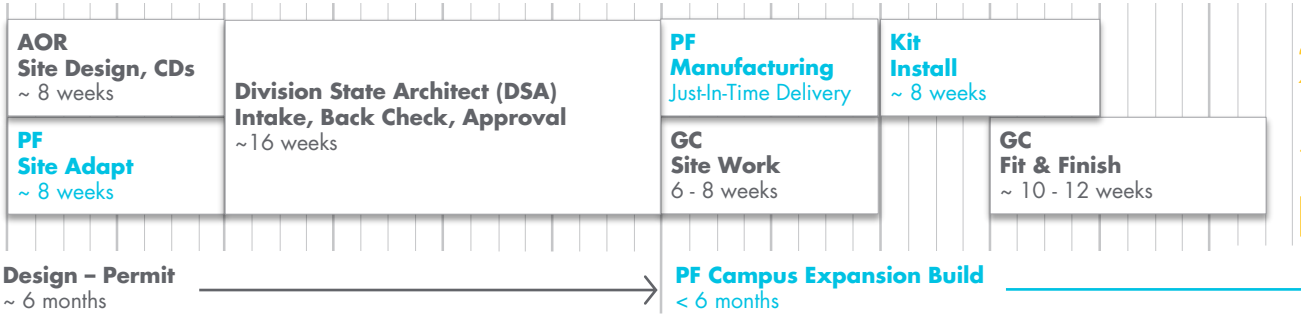


1-story

~8 ½ months

Design - Completion

Project Frog Campus Expansion | Two-Story and Multi-Purpose Typologies

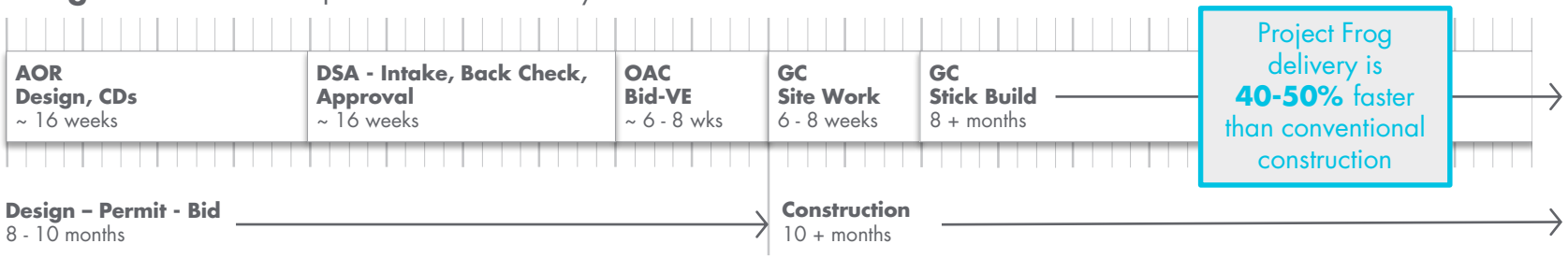


2-story

~12 months

Design- Completion

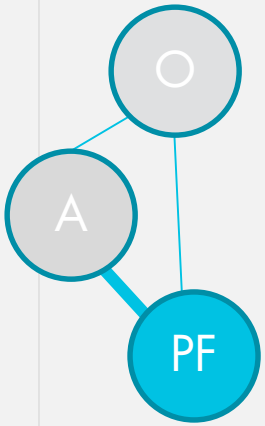
Design – Bid – Build | Conventional Delivery



Project Frog delivery is **40-50%** faster than conventional construction

Lease Lease Back
(public/private)

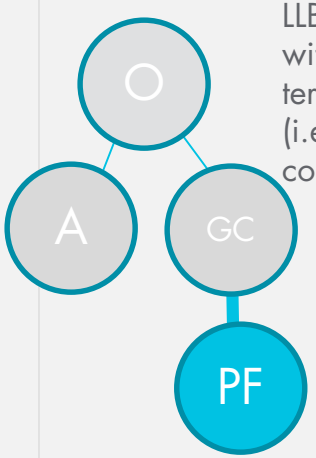
Design



Contract early with Architect as basis of design to circumvent restrictive procurement

Ex: Evergreen: Cedar Grove

Kit

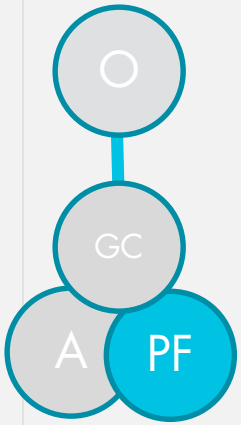


LLB contract with GC for term of lease (i.e., construction)

Ex: Evergreen: Cedar Grove

Design / Build

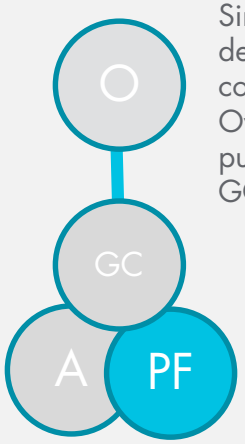
Design



Single design/build contract with Owner/ Contracting entity includes A/E and GC.

Ex: Fremont

Kit

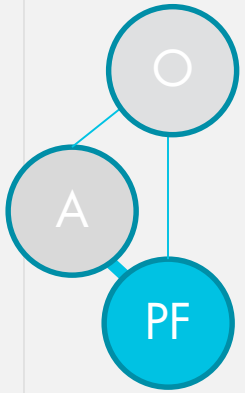


Single design/build contract with Owner. Frog kit purchased by GC.

Ex: Fremont

Design Bid Build
Using 'Piggy Back'

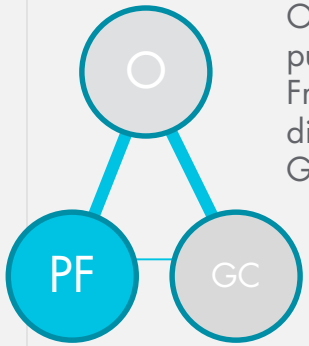
Design



Owner approves Frog piggy back and contracts with Architect using Frog as basis of design

Ex: El Sol 2

Kit



Owner purchases Frog kit directly. GC installs.

Ex: El Sol 2

Contracting I Each procurement method demands different sales & pre-con strategies

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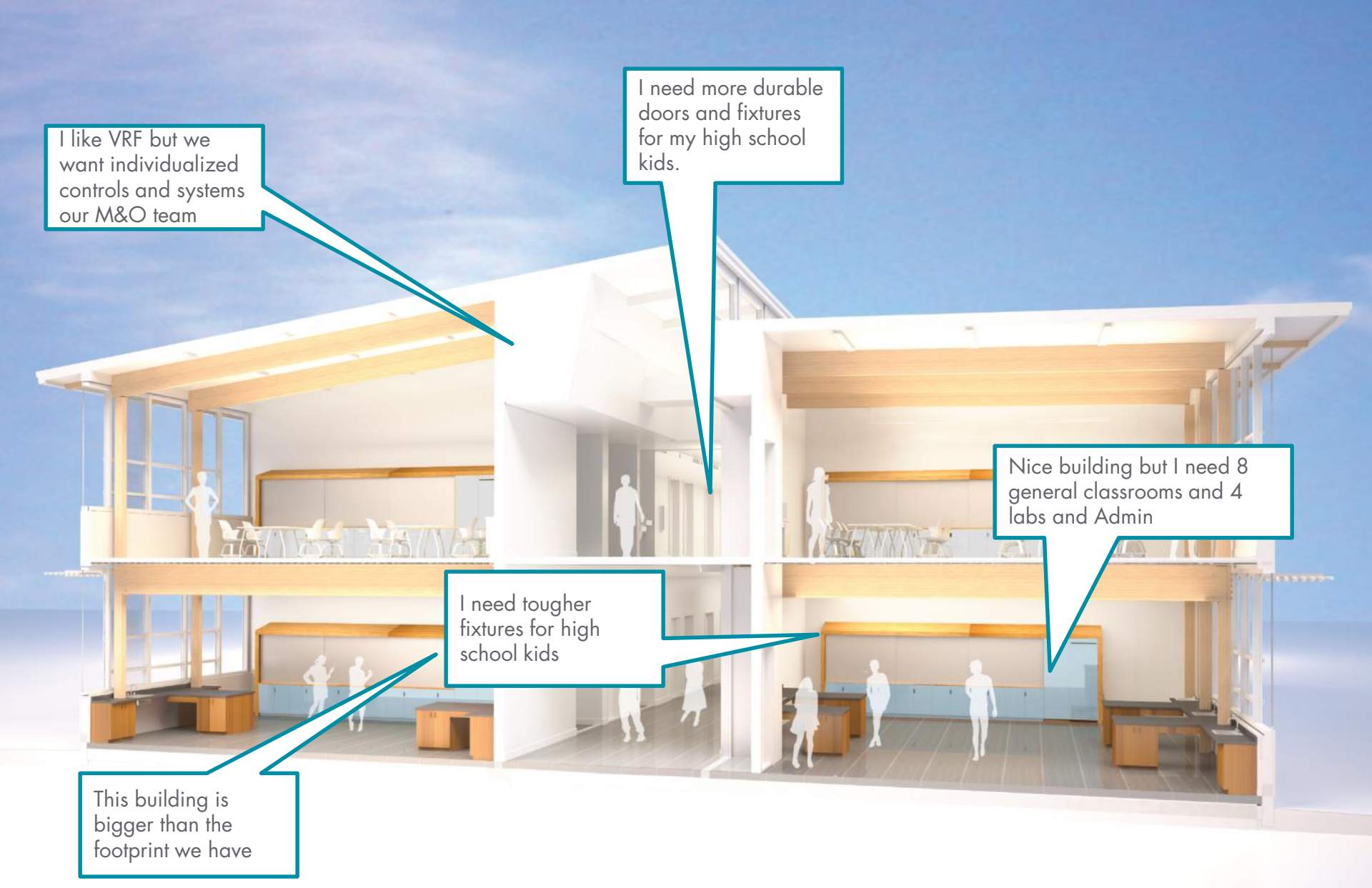
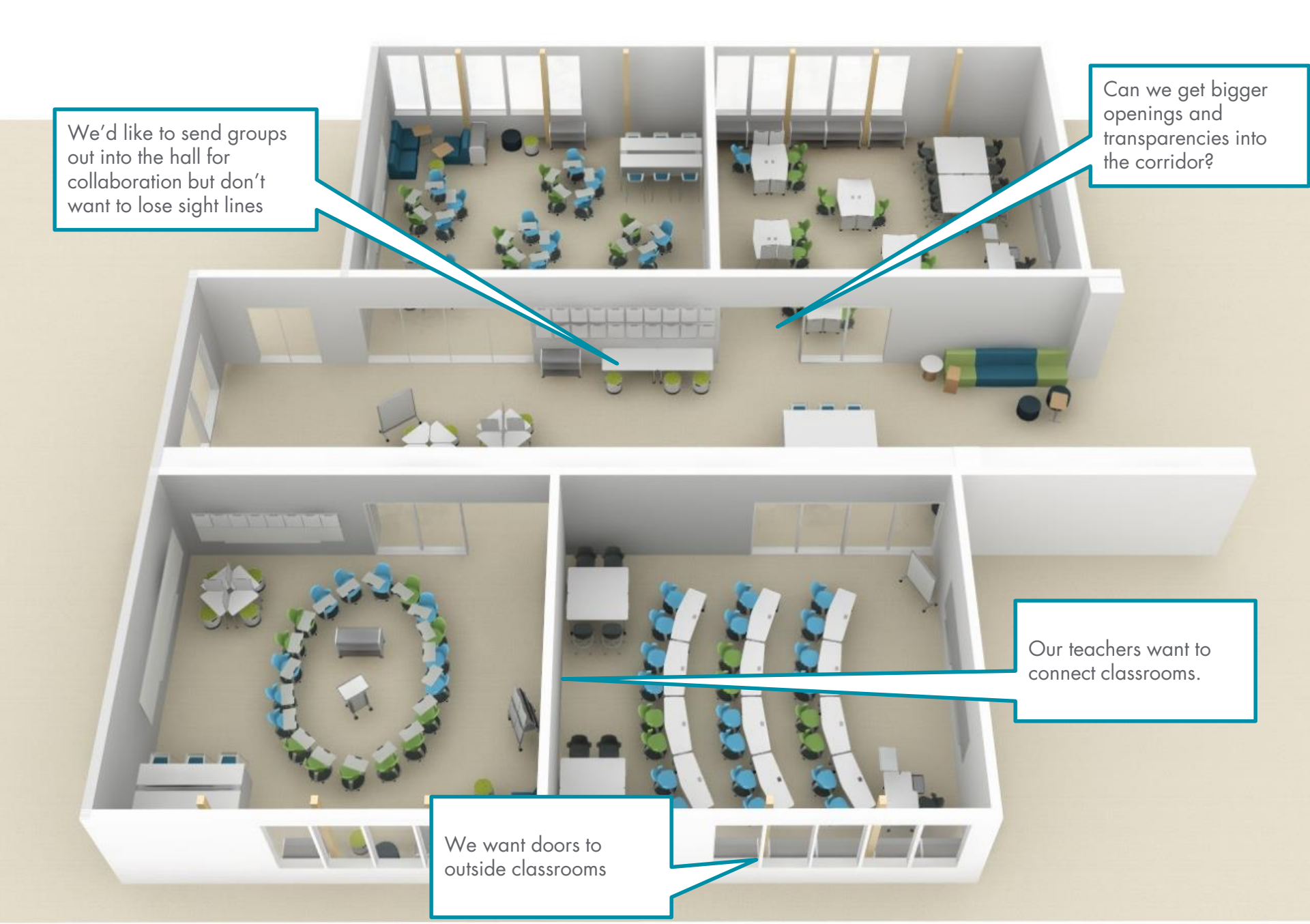


Lessons Learned...in the spirit of continuous improvement

projectfrog


We'd like to send groups out into the hall for collaboration but don't want to lose sight lines
Can we get bigger openings and transparencies into the corridor?
Our teachers want to connect classrooms.
We want doors to outside classrooms

Product Evolution I Increased flexibilities and transparencies

MPR Rendering
South San Francisco USD

Lessons Learned

Component construction was critical to success of the project

- **Speed was a necessity** not a nice to have given state of the campus
- High quality finishes signaled value to school & surrounding community
- **Limited laydown area demanded 'Just In Time' materials delivery**
- School integrated construction process into STEM related curriculum

Plan for Continuous Improvement

- PC can stymie product evolution– especially in 2-story

Design/Build delivery allowed true design/delivery partnership

- HMC, Bernards and Frog collaborated from project conception – transparency of project costs passed to client

Project Frog kit of parts slips easily into GC managed Project Schedule & sequencing

- 'Product only' scope gives GC flexibility for trade coordination
- Quickly delivered weather tight shell facilitates early utility rough-in and allows interior finishes earlier that stick built construction.
- Interior bathroom pods, while innovative and easy to install, caused potential issues for inclement weather

VRF system, while highly efficient, needs consistent maintenance and commissioning