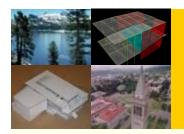
Ridge Team 2003 Spring Quarter Presentation



TEAM MEMBERS







Jack Kim Architect



Andy Essary

Engineers



Ines Lam



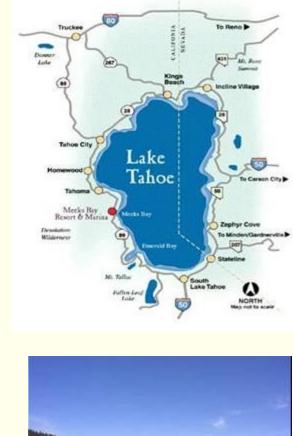
Construction Manager

A/E/C Spring Quarter Presentation

Ridge 2003



Revisit Global Context: Tahoe City



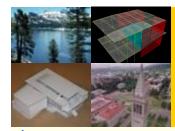
Climate:

- Average Temperature: 43 F
- •Range: 30.5 F to 53 F
- Avg. Annual Precipitation: 32 in

Activities:

- Skiing/Snowboarding
- Hiking/Camping
- Water Activities

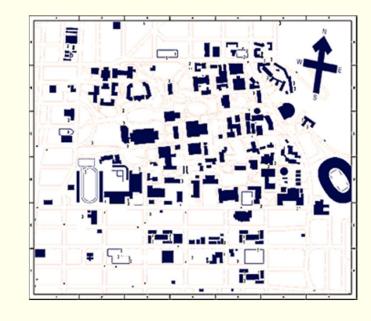
A/E/C Spring Quarter Presentation



Revisit Local Context: UC Berkeley



An eclectic "mishmash" of architectural styles



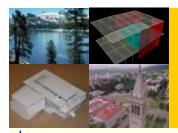








A/E/C Spring Quarter Presentation



Site Constraints and Project Considerations LOADS

Dead Loads:

Steel Structure:

- Steel Deck: 55 psf
- Framing: 15 psf

Concrete Structure:

- Deck: 60 psf
- Framing: 45 psf

Superimposed:

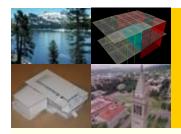
- MEP/Part. Etc: 35 psf
- Façade: 20 psf

Live Loads: (From ASCE-7)

- Office/Classroom: 50 psf
- Auditorium: 80 psf
- Computing/Labs: 100 psf
- Corridors: 100 psf
- MEP Rooms: 200 psf
- Roof Snow: 200 psf

Seismic Loads: (UBC 1997)

• Seismic Zone: 3

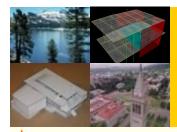


Site Constraints and Project Considerations SOIL PROFILE

- Frost line at 4' below grade (1500 psf Bearing)
- Bearing Capacity of 5000 psf at 5' below grade and 8000 psf at 7' below grade

Depth of Excavation (inches)			Soil Type	Thickness
	0		Stony Sandy Loam	
			and	
			Heav y Loam	
	20			19"
			Sandy Clay Loam	
	_			10"
			Clay	
	40		and	
			Clay Loam	
		Water Table at 48" Below Grade		
	60			27*
			Very Gravelly Sandy	
			Loam	
			and	
	80		Very Gravelly Loam	
	84			28"
			Volcanic Rock	Unknown

6



Site Constraints and Project Considerations

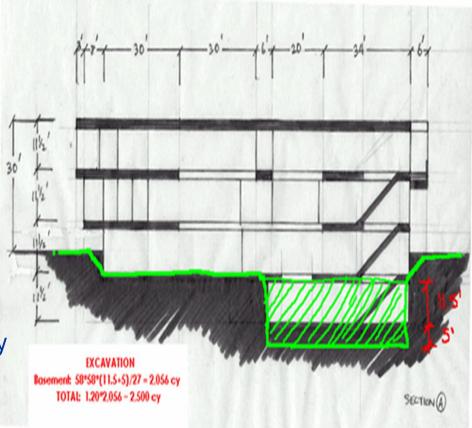
Mountain and Water Excavation

Account for Existing Basement Reduced excavation: **2,800 cy**

The Challenge

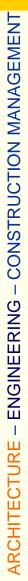
Closed shell before Christmas
Provide the computer lab in May 2016

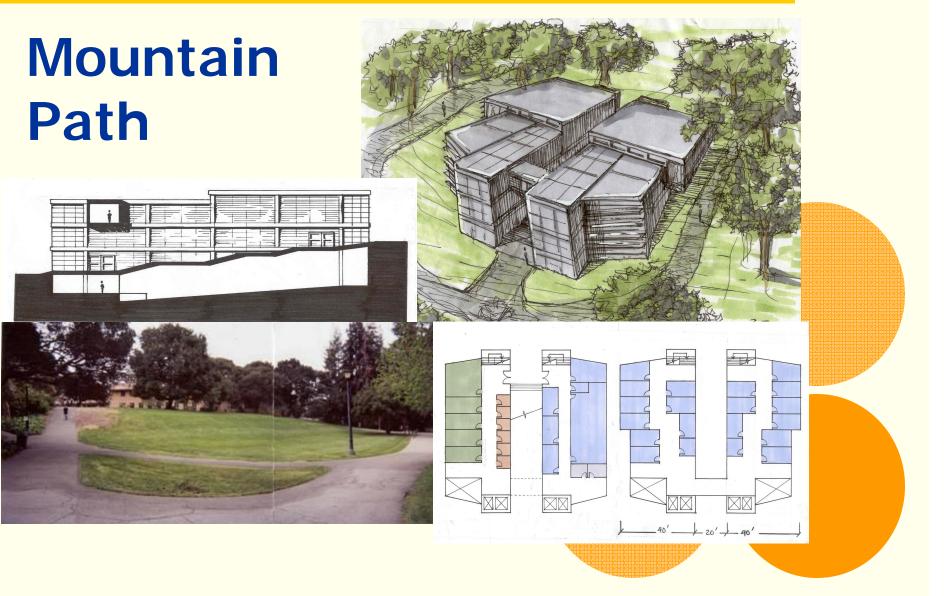
• Fast delivery of the building



7

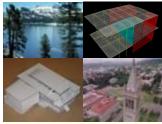
Winter Design Alternatives





Winter Design Alternatives

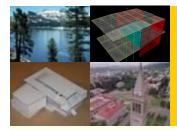




Winter Design Alternatives – Pro/Cons

Mountain& Water Mountain Path

PROs	CONs
 Building as icon Ductile structure Cost efficient solution Interaction of Structure and Architecture 	 Unremarkable interior spaces Large auditorium span Large transfer and walkway loads
	 Large amount of excavation
 Spatially exciting Little structural interference Faster construction Owner's Preference 	 Less than optimal zoning Intensive detailing MEP challenges Interrupted sightlines
C Spring Quarter Presentation	Ridge 2003 10

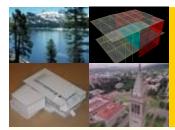


Decision Matrix

Ridge 2003 Schematic Decision Matrix

	Mountain Path Steel	Mountain Path Concrete	Mountain & Water Steel	Mountain & Water Concrete
Cost	1	2	3	4
Delivery Time	1	3	2	4
Computer Lab Delivery Time	2	4	1	3
Building Enclosure	1	3	1	3
Architectural Statement	3	4	2	1
LEED Implementation	3	4	2	1

	Mountain Path Steel	Mountain Path Concrete	Mountain & Water Steel	Mountain & Water Concrete
Site Impact	4	2	2	1
Constructability During Winter	1	3	2	4
Owner's Preference	3	4	2	1
Team's Preference	2	4	3	1
Total	21	33	20	23

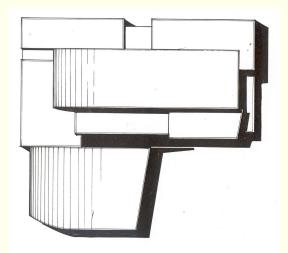


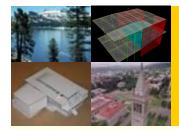
Considerations for Design Development

WINNER -> MOUNTAIN AND WATER - STEEL DESIGN

- Provide bay spacing that works with architecture and structure
- Create balance between façade and exposed structure by using metallic panels
- Create greater balance of footprint within site context

- Use excavated soil as part of the site design
- Use trees to reduce the air condition requirements





Mountain and Water: Site band Circulation





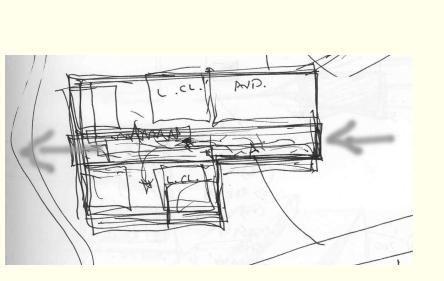


- •Heavy vegetation; limited sight lines
- •4-6 feet change in elevation
- Stream to N

A/E/C Spring Quarter Presentation

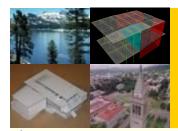
Mountain and Water: Concept





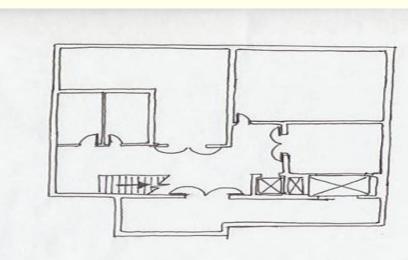


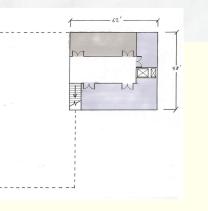
- •The dual nature of mountain and water
- the solid and the void
- mass and air



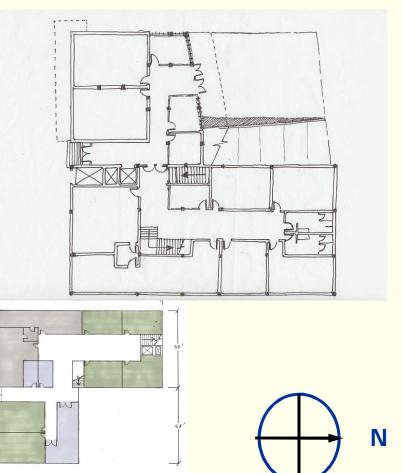
Mountain and Water: Plans

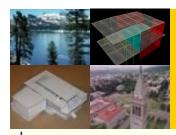
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT Basement





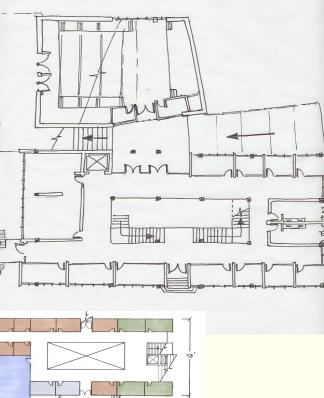
Ground Floor

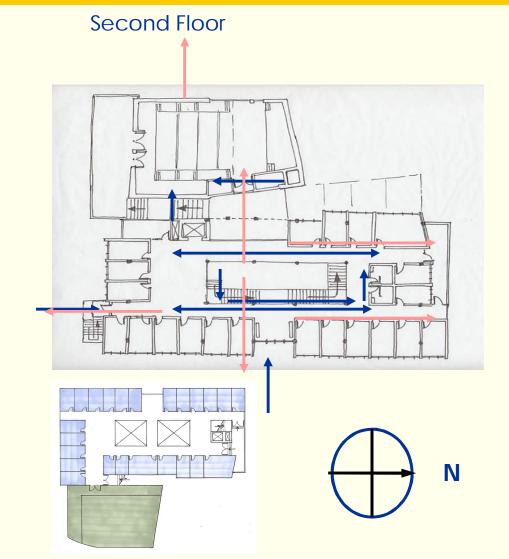


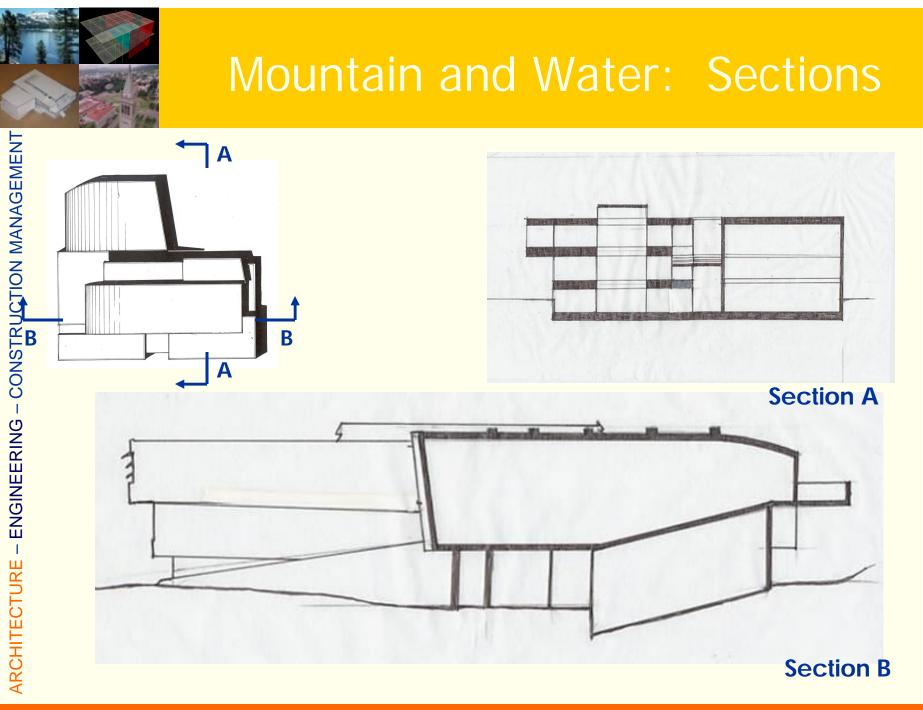


Mountain and Water: Plans

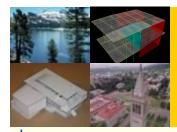
First Floor





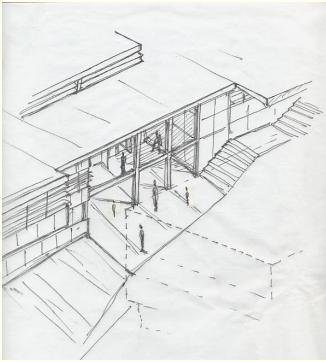


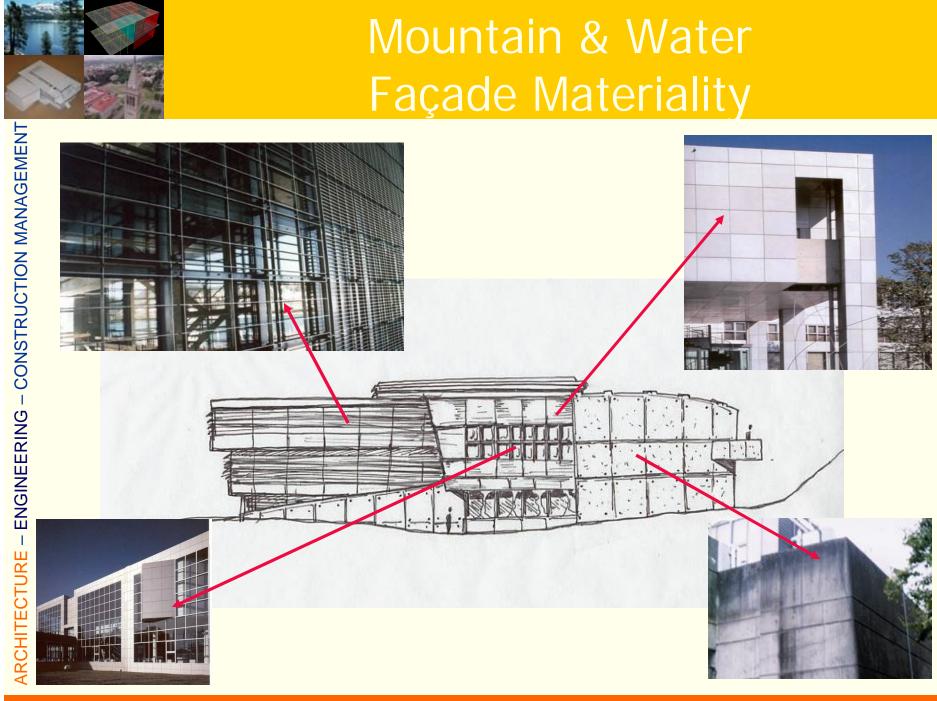
A/E/C Spring Quarter Presentation



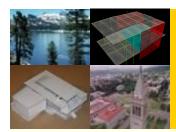
Mountain and Water: Exterior Views







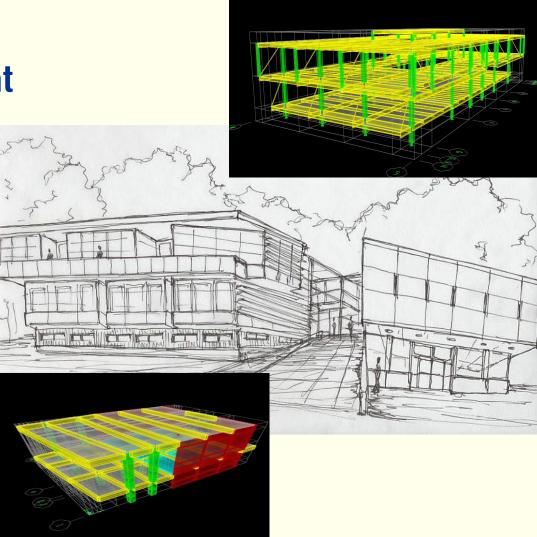
A/E/C Spring Quarter Presentation

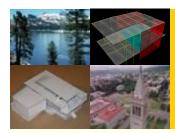


Mountain & Water Structural

Design Broken into Two Independent Structures

- Education Wing—
 Steel Structure
- Auditorium Wing—
 Concrete Structure
- Linked by Seismically Isolated Ramp
- Shared Foundation and Basement





Mountain & Water Structural

Education Wing

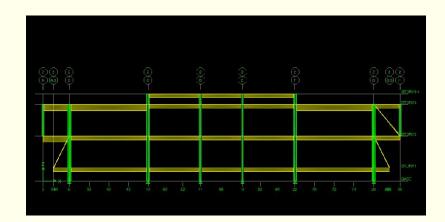
• Spread Footing with Bearing/Retaining Wall at perimeter

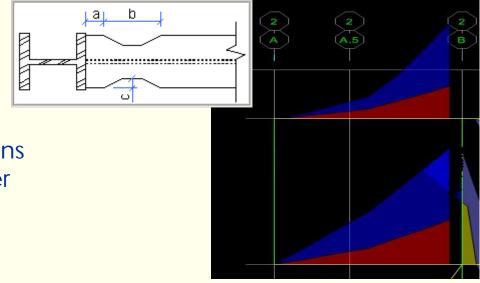
•Standard Beam/Girder Gravity System

• SMRF Lateral System with Reduced Beam Sections

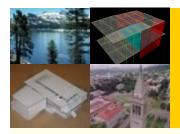
Design Challenges

• Reduce Moment connections due to cantilevered areas per owners request

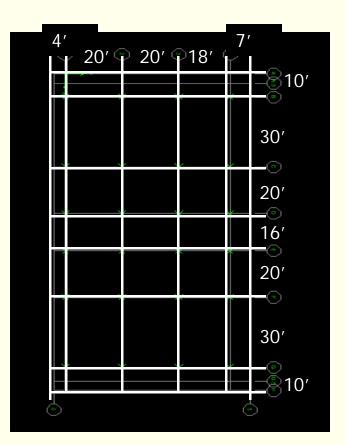




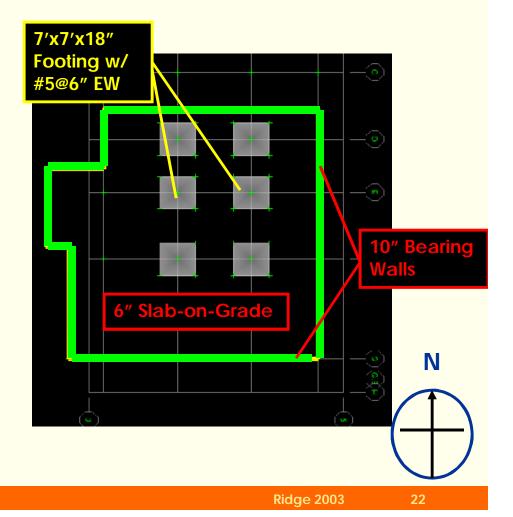
21

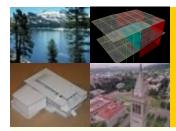


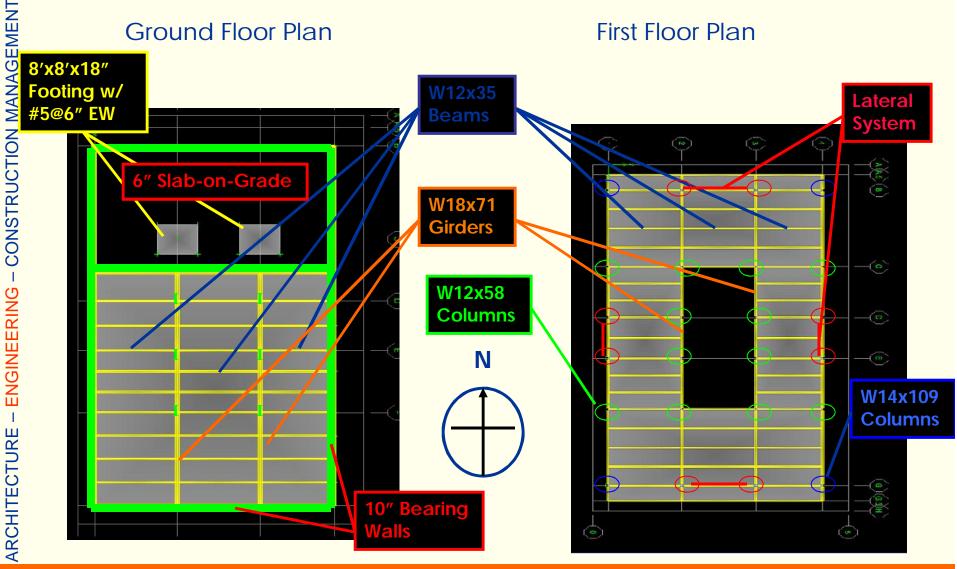
Structural Grid



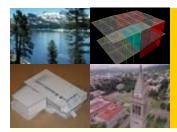
Foundation Plan

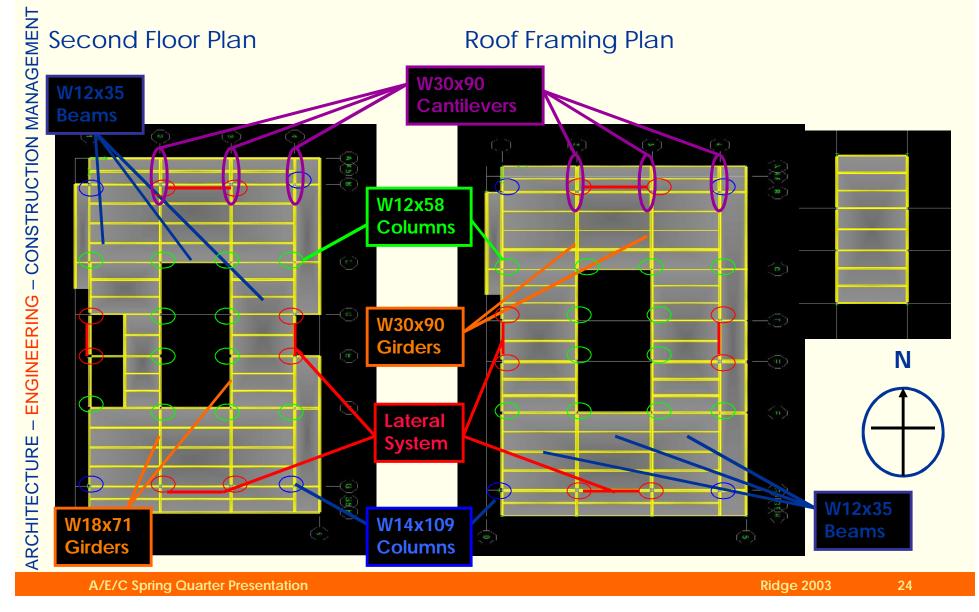


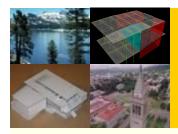


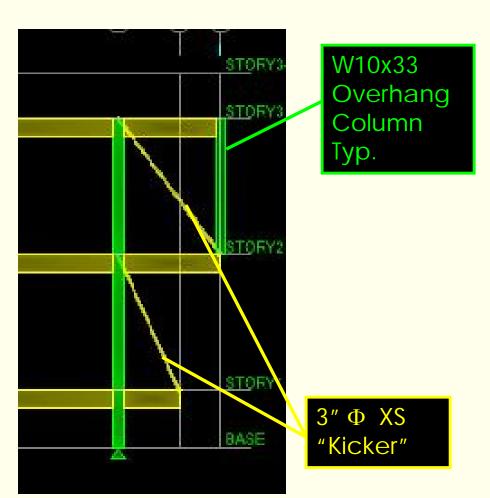


A/E/C Spring Quarter Presentation



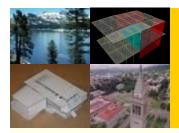






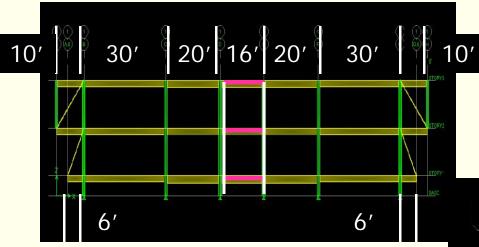
Cantilever Solution

- In Response to Architecture Layout and Owner Request
- Address Overhang Areas of 4'-10' throughout Building
- Use 3" Φ Extra Strong Pipe in Tension to Suspend Cantilever
- Able to hide "Kickers" within partition walls
- Able to reduce moment connections from 30 to 6



Mountain & Water Structural Lateral System

North-South Lateral System

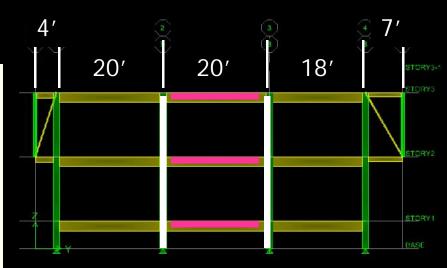


SMRF Characteristics

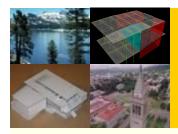
- Greater N-S System Stiffness
- Minimize Bays in Lateral System
- Design iterations led to no RBS members

Special Moment Resisting Frame

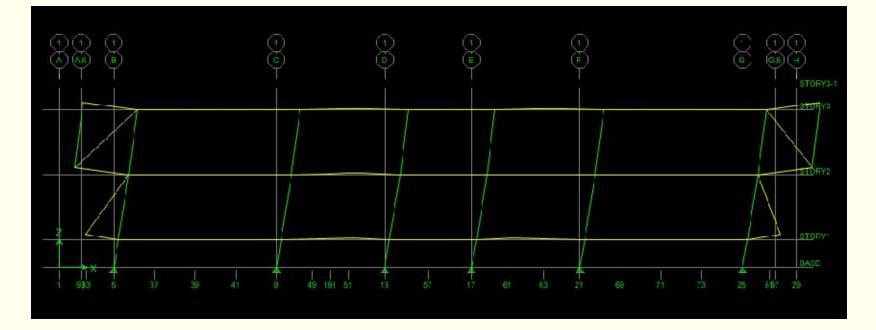
- Each Direction uses identical structural components
- Lateral Columns: W14x132
- •Lateral Beams: W21x73



East-West Lateral System



Lateral Deflections

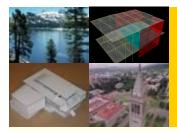


Maximum Deflection $\Delta_{NS} = 0.52$ in $\Delta_{EW} = 1.52$ in

Period = 1.18s

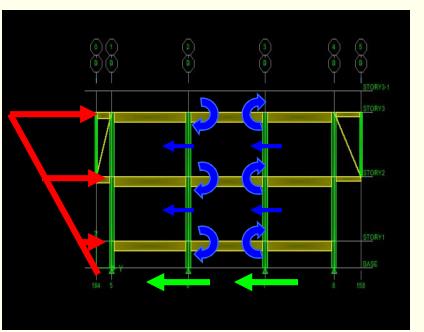
Maximum Drift

 $\delta_{NS} = 0.52\%$ $\delta_{EW} = 1.52\%$ Base Shear = 146 kips



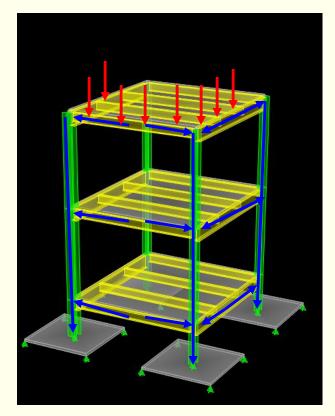
Load Paths

Lateral Loads



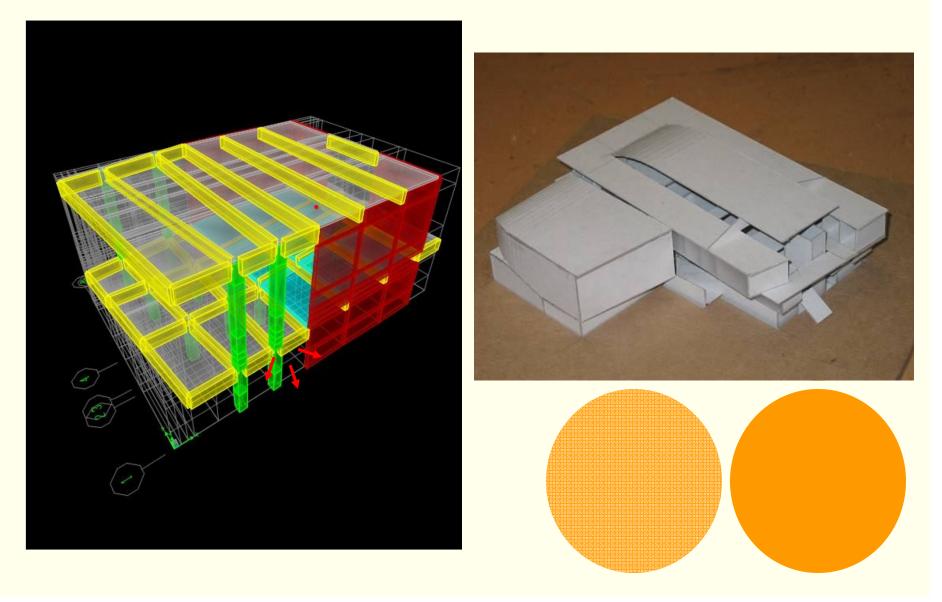
ETABS Response Spectra Applied with SRSS Modal Combination used for Analysis

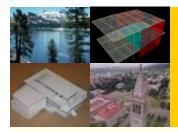
Gravity Loads



28

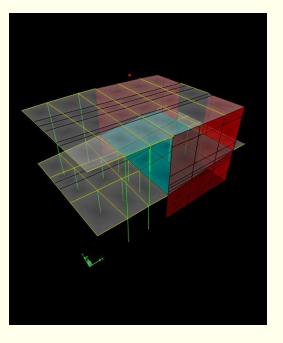
Mountain & Water Structural Auditorium Wing

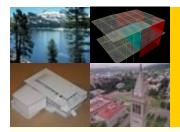




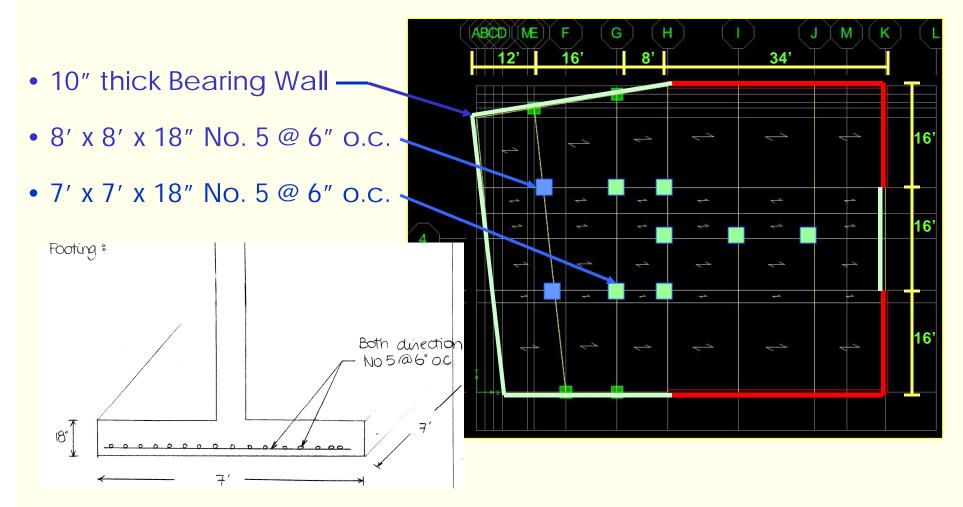
Mountain & Water Structural Auditorium System Overview

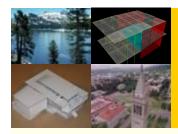
- Cast-in-place concrete building
 - -F'c = 4000 psi
 - -Fy = 60 ksi
- Gravity System
 - Slab, Beams and Columns
- Lateral Resisting System
 - Shear Wall





Mountain & Water Structural Auditorium Foundation



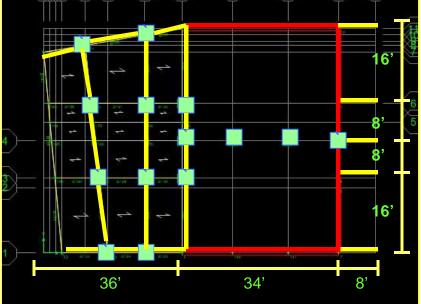


ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

Mountain & Water Structural Auditorium Second Floor

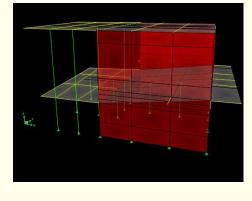


Balcony Level

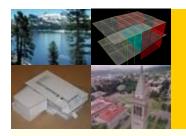




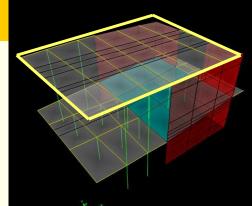
- 6" concrete slab
- BEAMS: 12" x 18" with 3 No. 10 and 2 No. 8
 - # 3 stirrups 8" o.c.
- COLUMNS: 12" x 12" with 8 No. 7



A/E/C Spring Quarter Presentation

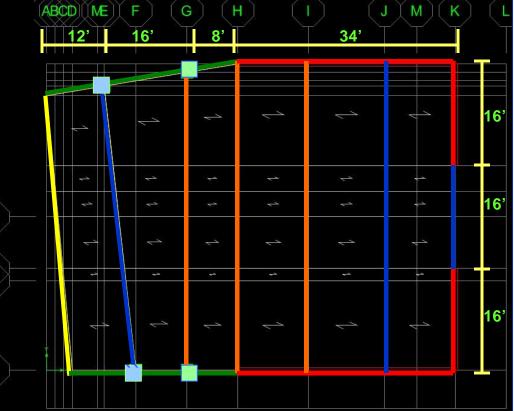


Mountain & Water Structural Auditorium Roof



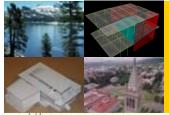
32

- Cambered 6" thick concrete slab
- BEAM: 12" x 36" with
 - 3 #11 and 3 #9
 - •6 #9
 - •2#9 and 2#8
 - #3 stirrups at 8" o.c.
- COLUMN: 18" x 18" with 12 #10
 - #4 hoops confinement

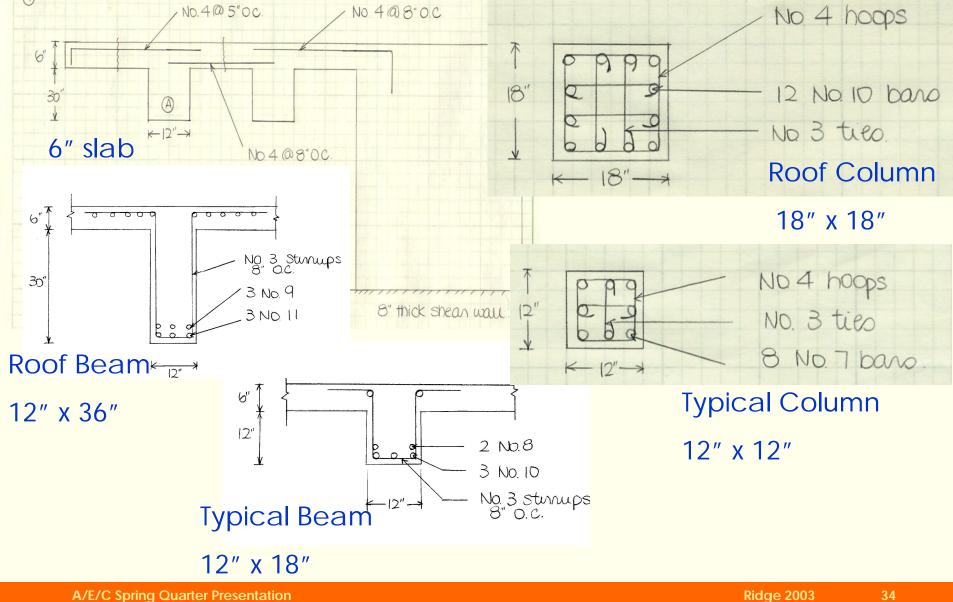


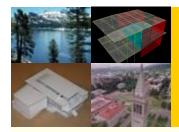
Roof Plan

33

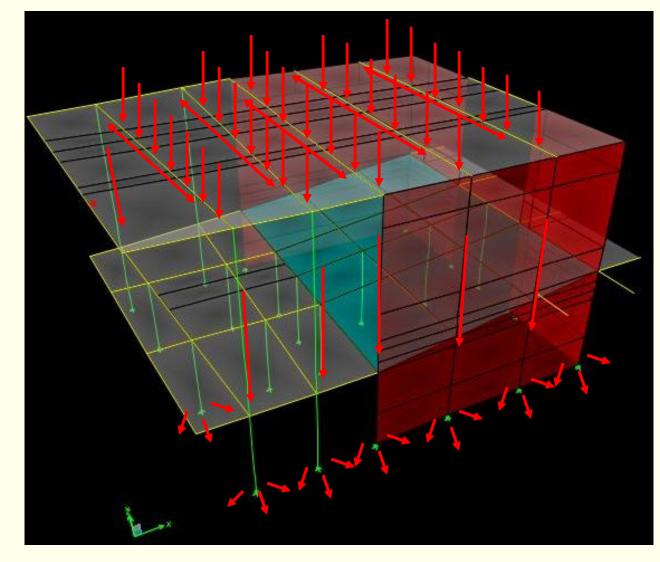


Mountain & Water Structural Typical Auditorium Sections

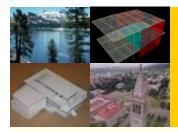




Mountain & Water Structural Auditorium Load Path



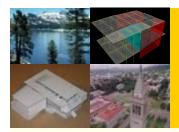
35



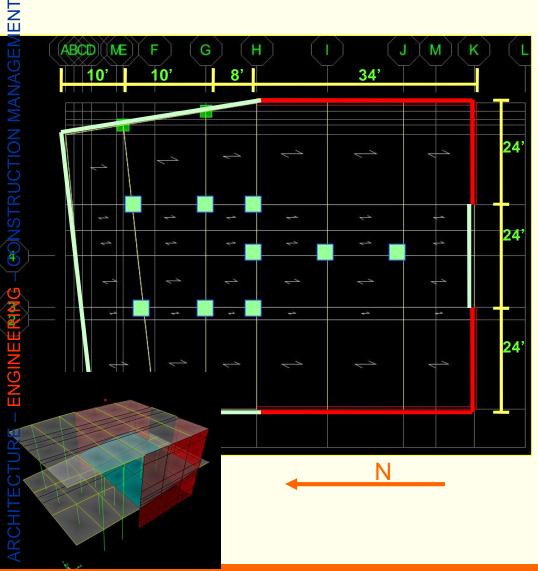
Mountain & Water Structural Auditorium Dynamic Analysis

- ETABS Modeling
- UBC 97 Response Spectrum
- SRSS method for combining modal responses
 - Fundamental Period = 0.176 sec
 - Story Base Shear = 500 kip
- Rigid Diaphragm

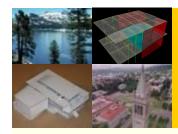
36



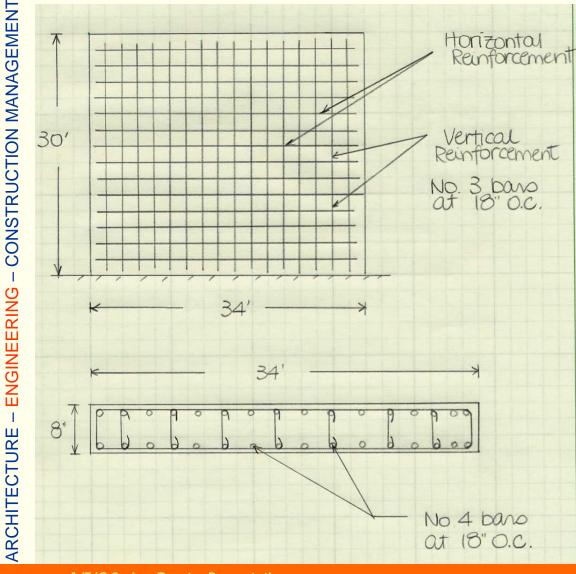
Mountain & Water Structural Lateral Resisting System

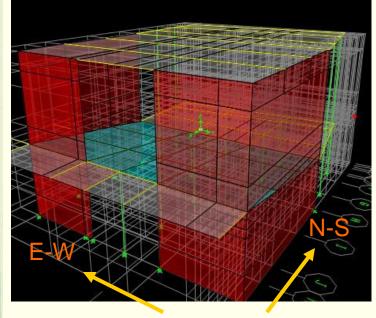


- 8" thick shear wall in NS and EW
 - Horizontal No. 4 bars at 18" o.c.
 - Vertical No. 3 bars at 18" o.c.

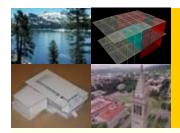


Mountain & Water Structural Auditorium Shear Wall Reinforcement



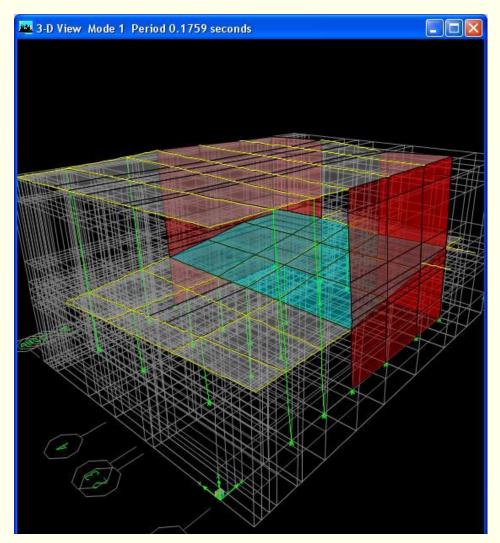


N-S direction: 2 - 8" x 34' E-W direction: 2 - 8" x 16'

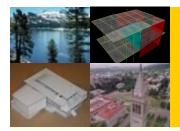


Mountain & Water Structural Auditorium Behavior

- Max. Story Drift:
 - N-S Direction = 0.35 %
 - E-W Direction = 0.82%
- Max. Displacement:
 - N-S Direction = 0.2 inch
 - E-W Direction = 0.65 inch

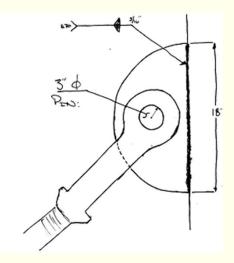


39



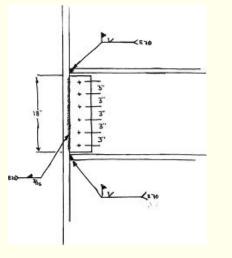
Mountain & Water Structural Connections

Steel Connections



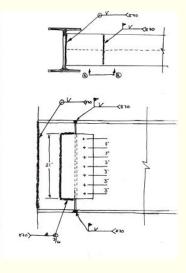
- •18" Φ ¾" Thick Plate
- •3/16" E70 2-Sided Fillet Weld
- #7 Clevis

Pinned Kicker Connection



- •18" x 6" x ¼" Shear Plate w/ 3/16" E70 Fillet Weld
- •Total Penetration Weld for Flanges

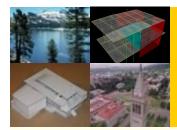
Typical Moment Connection



- •7/8" Φ A325 Bolts
- •21" x 9" x ¼" Shear Plate w/ 3/16" E70 Fillet Weld
- •Total Penetration Weld to Col.

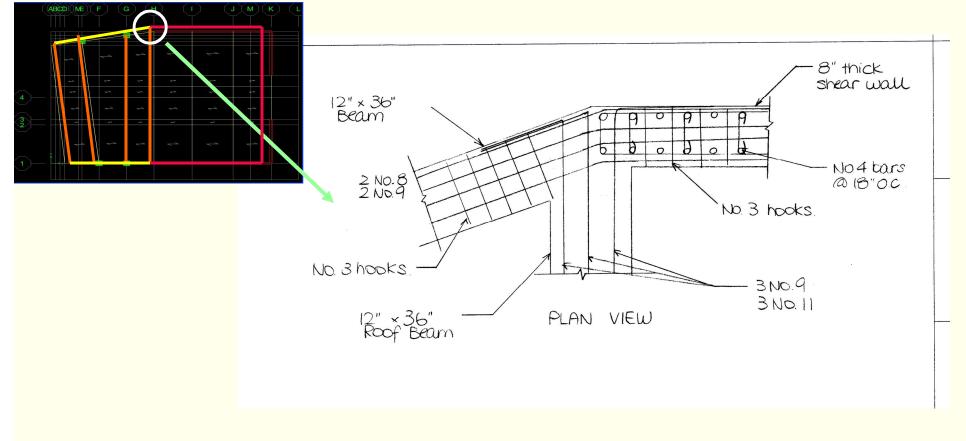
Cantilever Moment Connection

A/E/C Spring Quarter Presentation

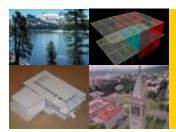


Mountain & Water Structural Connections

Concrete Connection



Beam-Shear Wall Connection

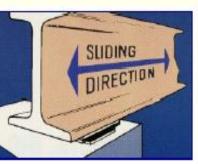


Mountain & Water Structural Building Interactions

Seismic Interaction

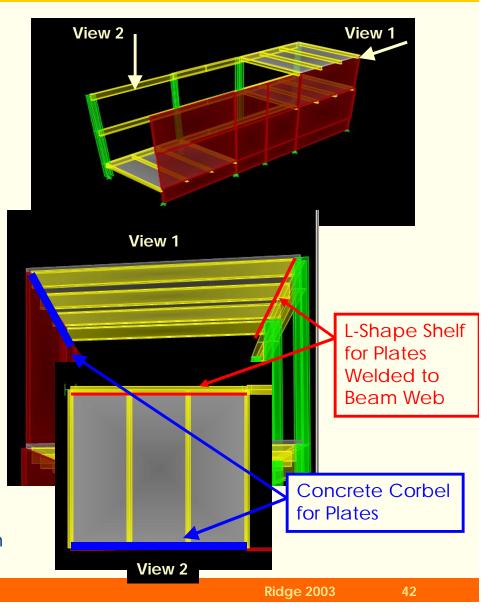
- Guard against Pounding
- Provide Bearing Support with Lateral Freedom

Sliding Bearing Plates

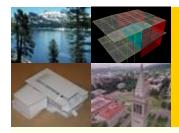


• Low Friction Coefficient (Teflon) • Cost Effective

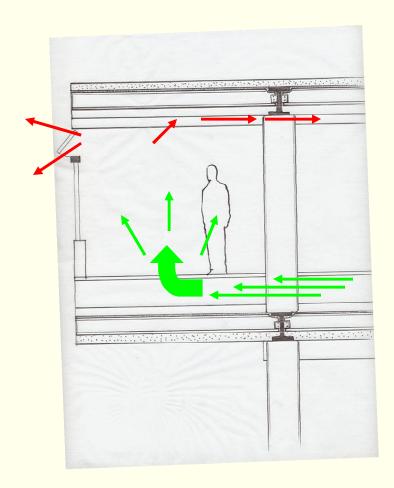
Reference: Piping Technology & Products www.pipingtech.com/products/slideplates.htm

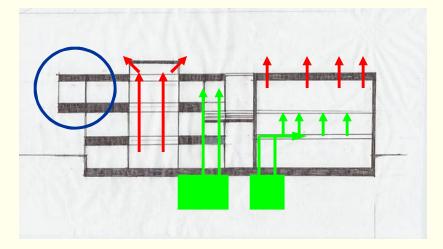


ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT



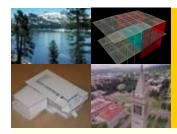
Mountain & Water HVAC Concept





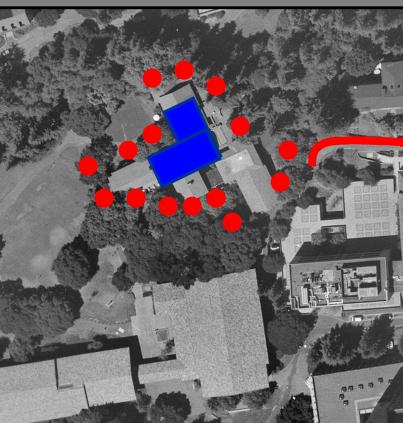
Under Floor HVAC

- Create Pressurized Air Highway
- •Exhaust through overhead ductwork
- •No Additional to Inter-story height

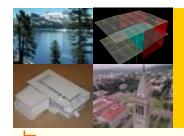


Site Layout and Access 2003

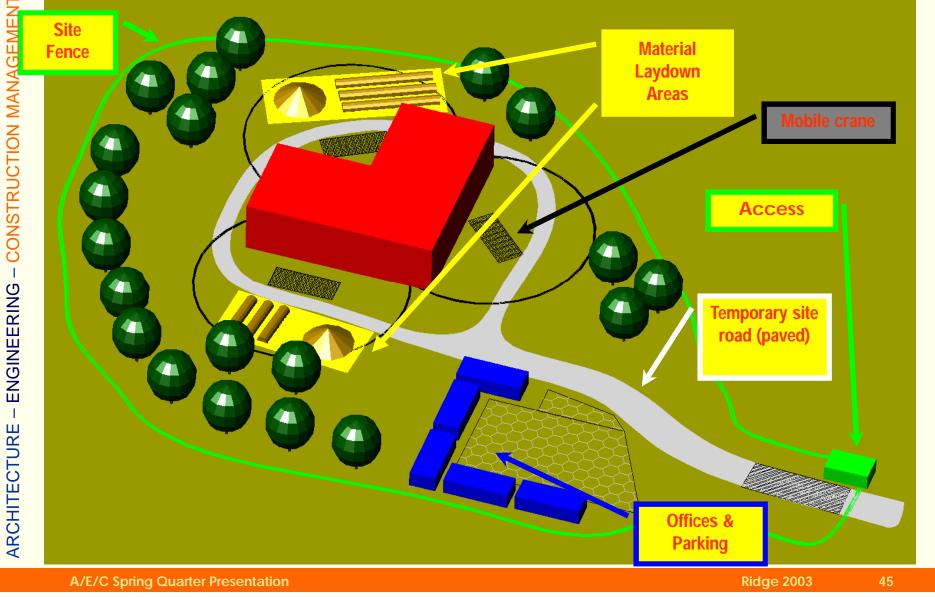
Demolition of existing buildings is not part of in the project but tree removal and protection Access to the site over a paved 12 feet wide road linked to a main road

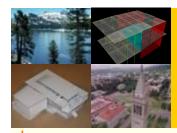


A/E/C Spring Quarter Presentation



Site Layout 2015 – under Construction





Heavy Construction Equipment

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT













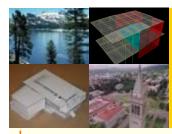
EARTH WORK



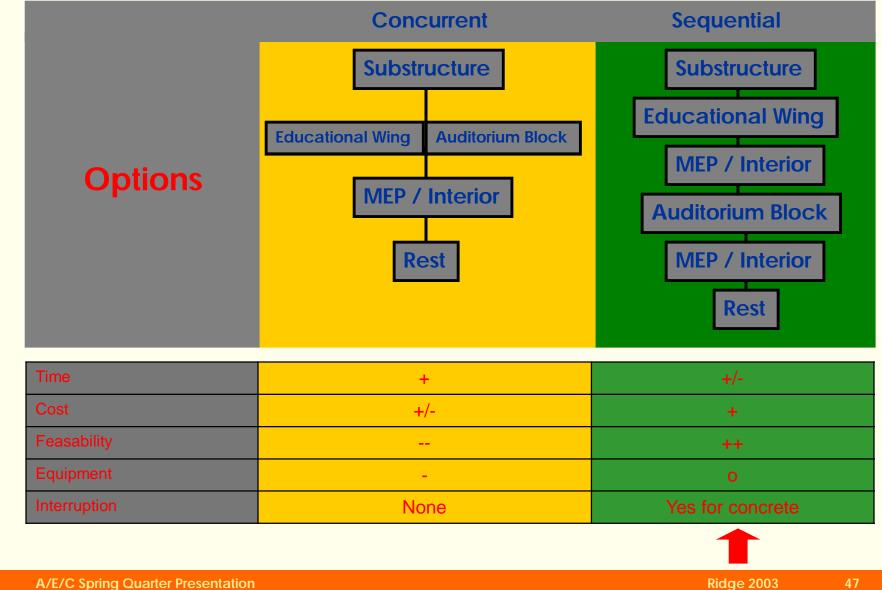




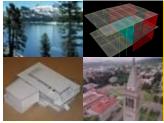
A/E/C Spring Quarter Presentation



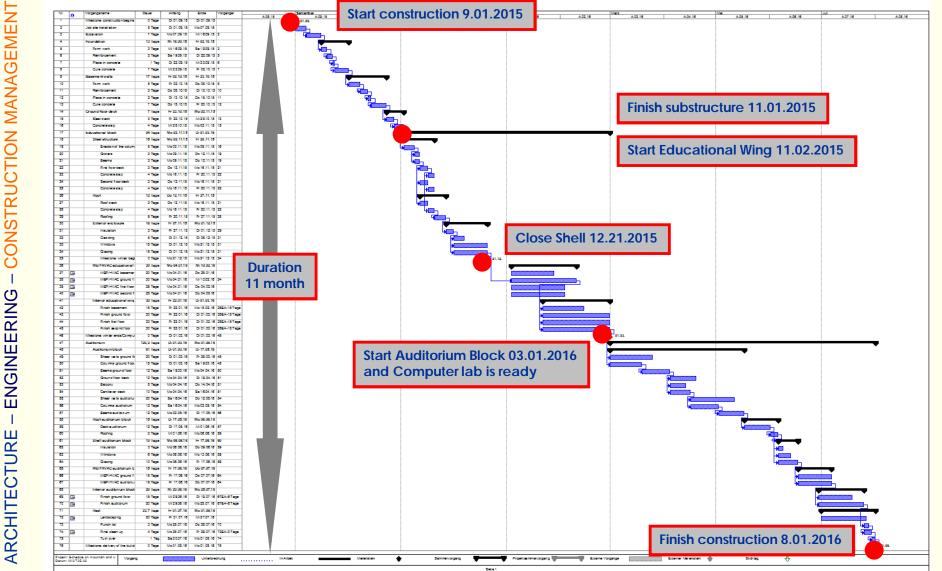
Choice of Construction Method



A/E/C Spring Quarter Presentation



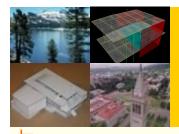




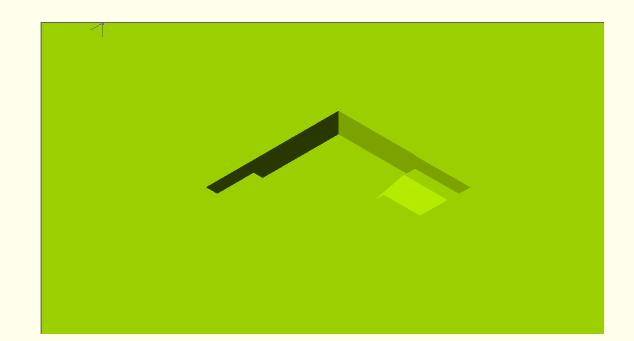
A/E/C Spring Quarter Presentation

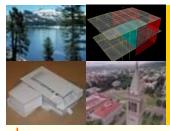
Ridge 2003

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Excavation



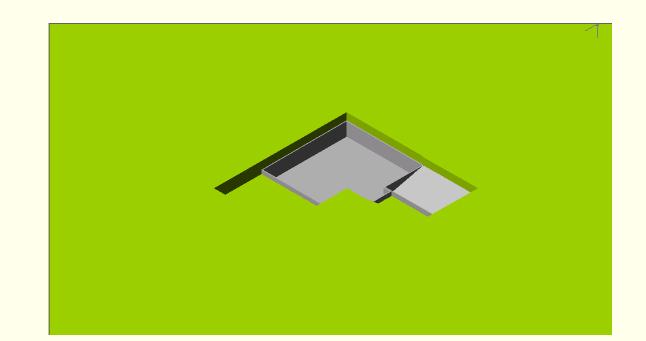


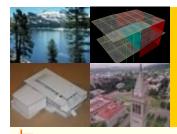
Foundation Basement





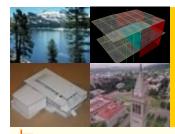
Bearing Walls Basement



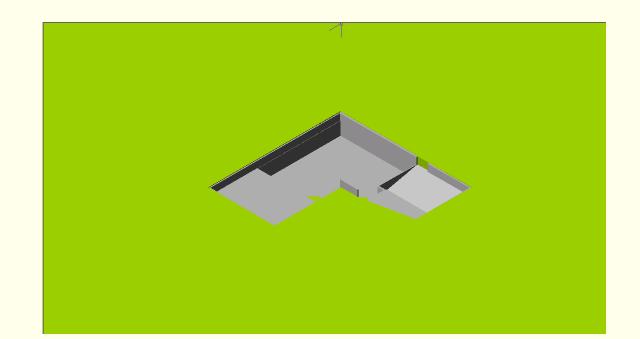


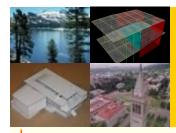
Foundation Educational Wing and Auditorium



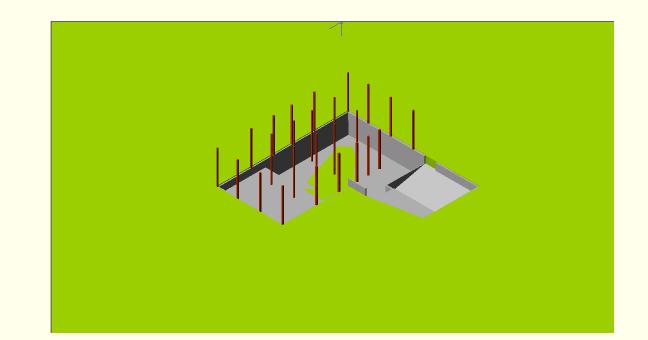


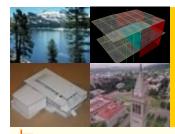
Retaining Walls



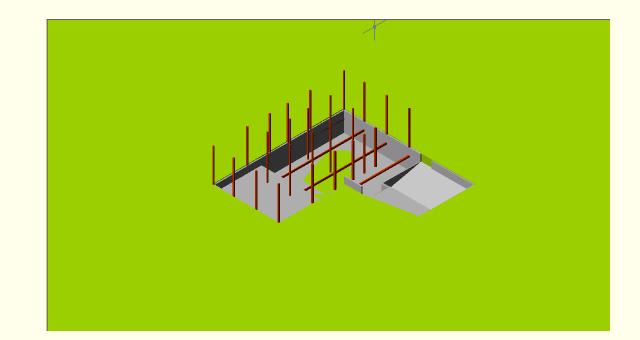


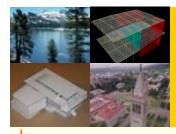
Erection Columns Educational Wings





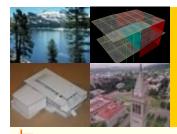
Griders for Ground Floor



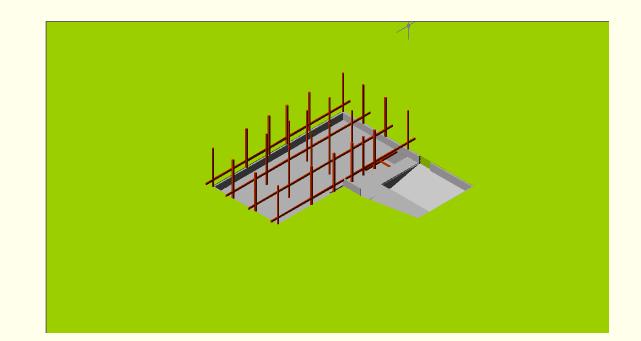


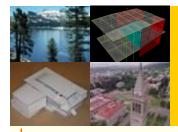
Beams for Groundfloor





Concrete Slab Groundfloor and Griders

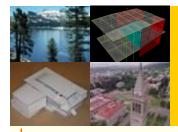




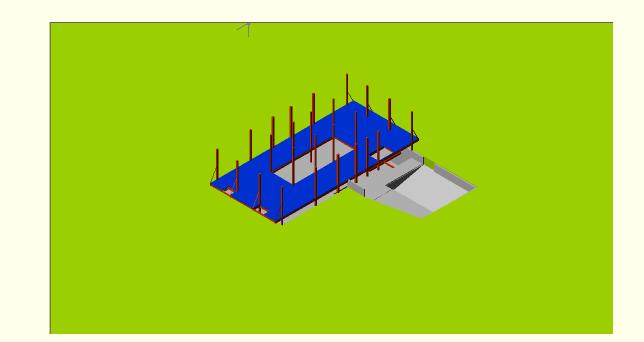
First Floor Beams and Steel Deck

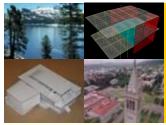
A/E/C Spring Quarter Presentation



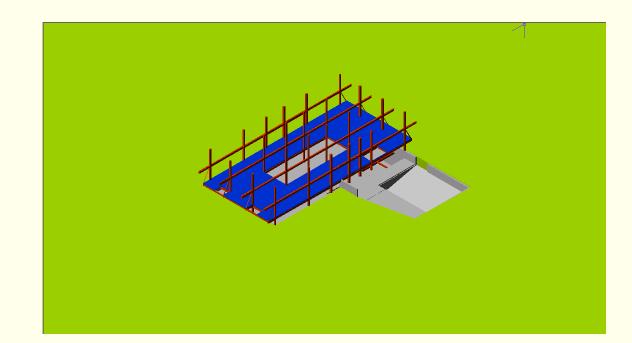


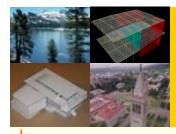
First Floor Concrete Slab



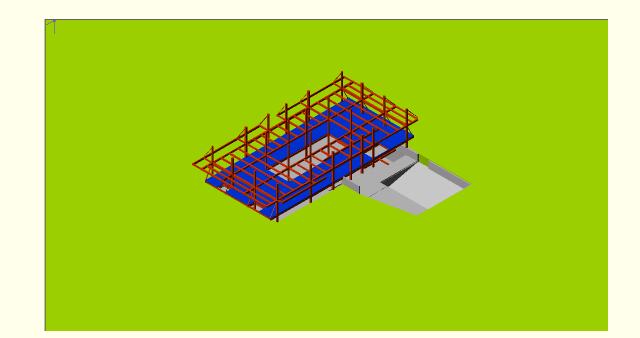


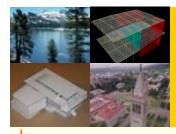
Girders



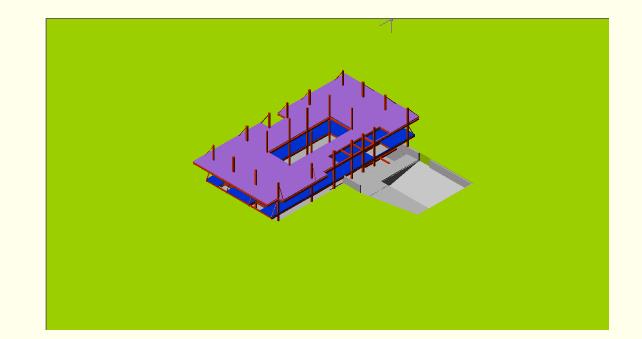


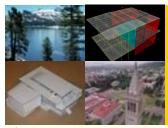
Second Floor Beams and Steel Deck



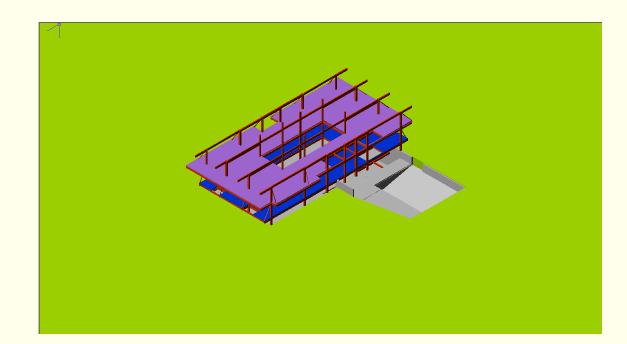


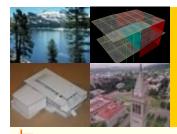
Second Floor Concrete Slab



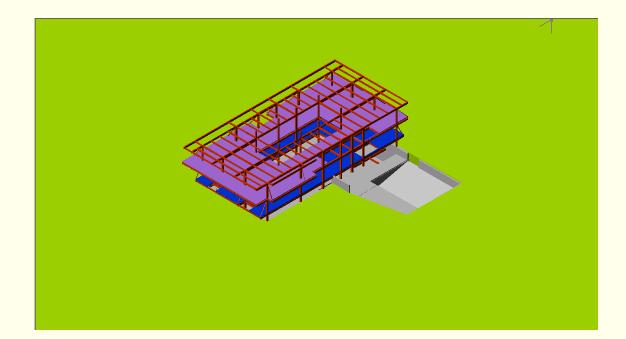


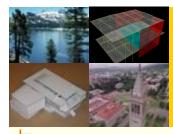
Griders



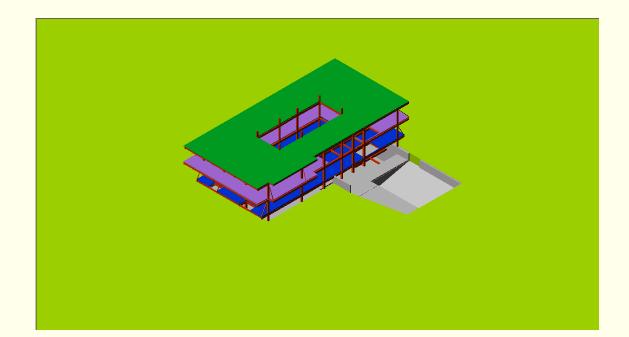


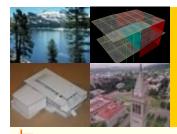
Roof Deck



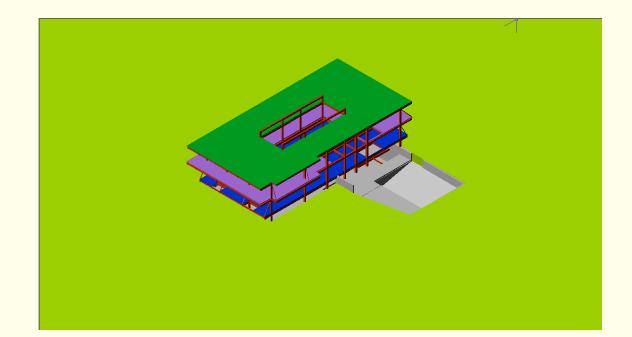


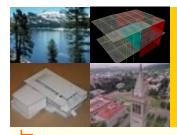
Roof Concrete Slab





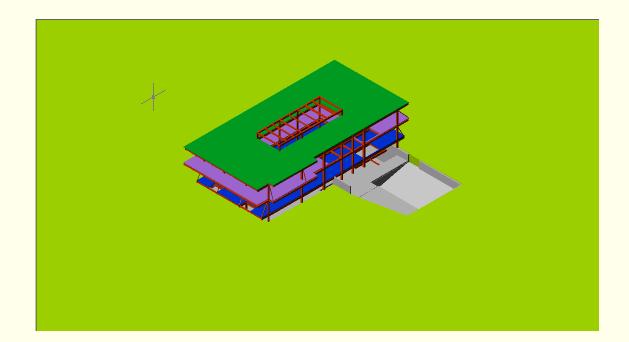
Griders Atrium



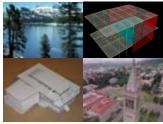


Beams Atrium

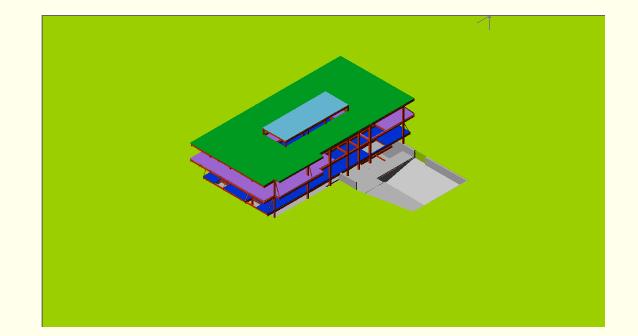
A/E/C Spring Quarter Presentation



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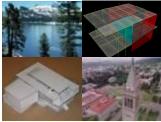
Concrete Slab Atrium



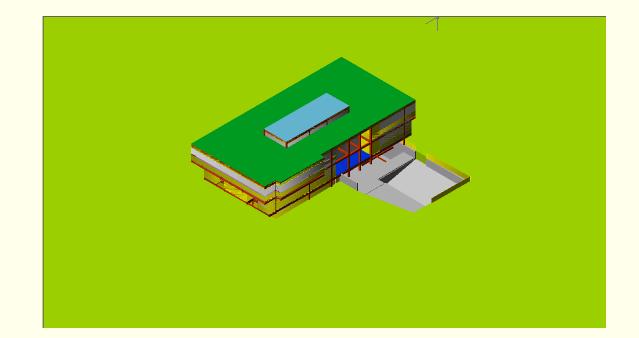


Enclosure Educational Wing

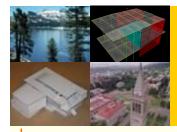




Windows and Glazing



70

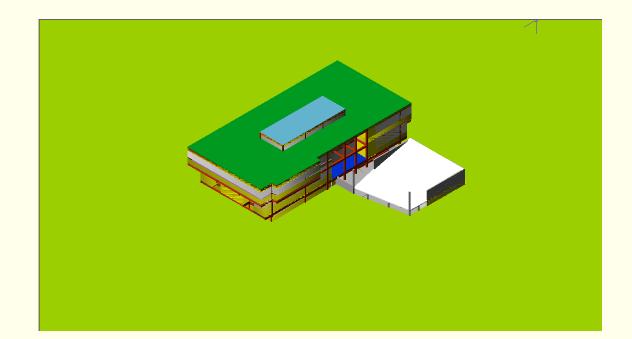


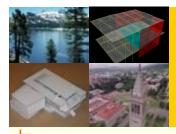
Shear Walls/Columns of Auditorium



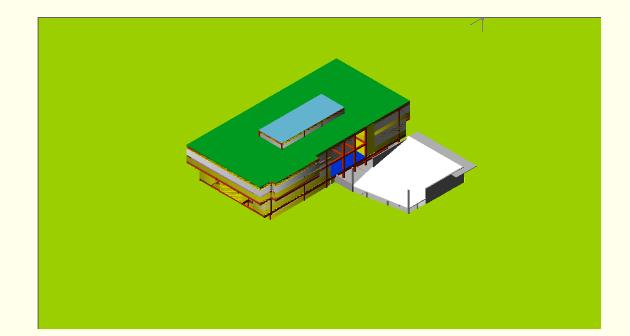


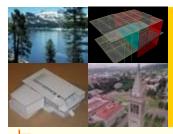
Auditorium Deck



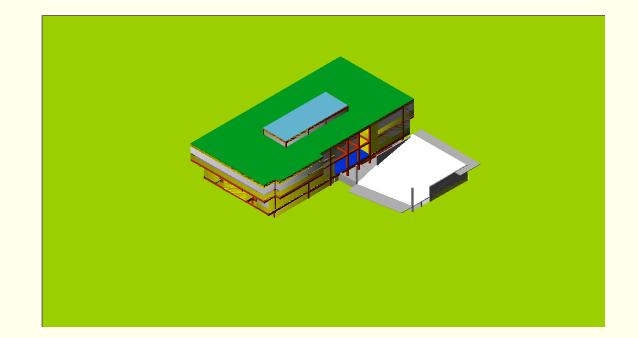


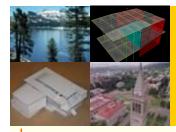
Auditorium Balcony





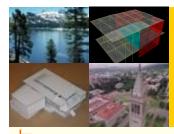
Auditorium Cantilever



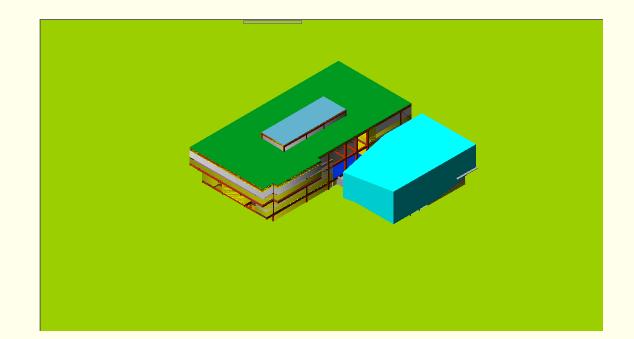


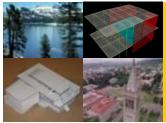
Shear Walls Auditorium Block



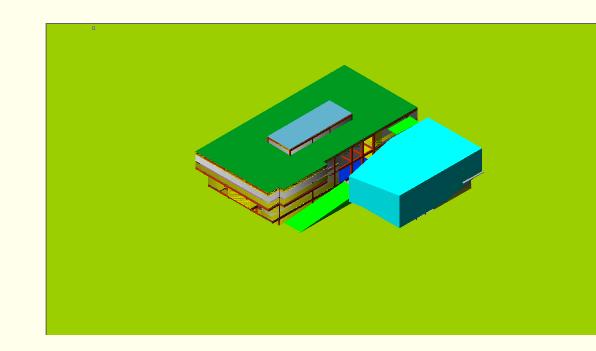


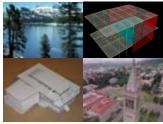
Enclosure Auditorium





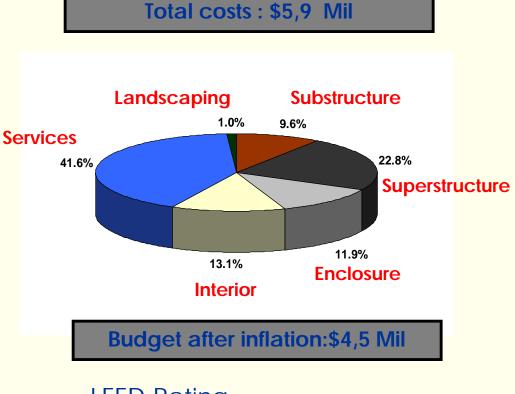
Ramp



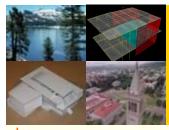


Unit Pricing and Breakdown

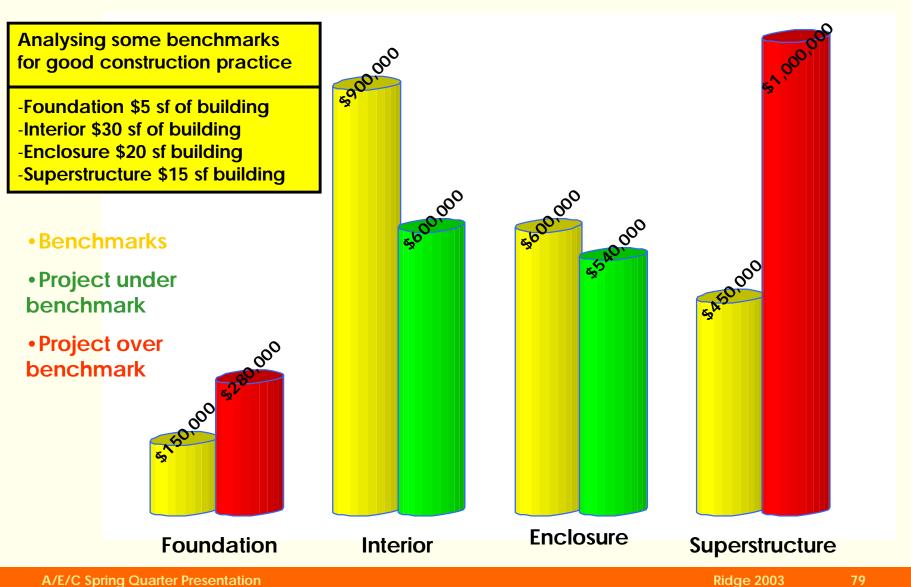
Quantity take off - "Mountain and water" (Ridge Team 2003)								
Division ob site installation	Units	Material	Quantity	Unit Price	Total [\$]	City cost index 111	% of Total	Remarks
OB SITE INSTALLATION					\$0.00	\$0.00	0.0%	
and excavation	cy	Standard	960	\$15.00	\$14,400.00	\$15,984.00	0.078	Including haul off
ock excavation	cy	Standard	2640	\$75.00	\$198,000.00	\$219,780.00		Including haul off
XCAVATION					\$212,400.00	\$235,764.00	5.3%	
pread footing lab on grade 6" thick (cast in place)	cy cy	Cast in place concrete Cast in place concrete	50	\$350.00 \$300.00	\$17,500.00 \$56,400.00	\$19,425.00		38 units 10120 sf
OUNDATION	Cy	cast in pace conciete	100	\$500.00	\$73,900.00	\$82,029.00	1.8%	101205
earing wall basement	cy	Cast in place concrete	109	\$500.00	\$54,500.00	\$60,495.00		Including every work
etaining wall	cy		108	\$500.00	\$54,000.00	\$59,940.00		•
ackfil ASEMENT	cy	Gravel	360	\$4.00	\$1,440.00	\$1,598.40	2.7%	Not everywhere
UBSTRUCTURE					\$396,240.00	\$439,826.40	9.8%	
loor construction/roof	tn	Steel (incl. 10% for connections)	227.7	\$2,500.00	\$569,250.00	\$631,867.50		Includes the welding of moment connection
teel deck	st	Standard	24000	\$2.50	\$60,000.00	\$66,600.00		Only deck
lab on steel deck hear studs	cy	Lightweight concrete Steel	319 1482	\$300.00 \$1.50	\$95,700.00 \$2,223.00	\$106,227.00 \$2,467.53		
hear studs hearwalls/decks/roof/cantilever/balcony/ramp	ea cy	Cast in place concrete	1482	\$1.50	\$2,223.00 \$125,500.00	\$139,305.00		- Auditorium Block
ore for elevator	tn	Sted		\$500.00	\$0.00	\$0.00		Included in steel for foor construction
UPERSTRUCTURE and ROOF					\$852,673.00	\$946,467.03	21.1%	
xposed concrete	cy	Cast in place concrete	0	\$0.00	\$0.00	\$0.00		Included in superstructure
luminium panels Indows	st	Aucobond system Auminum frame	4500	\$35.00	\$157,500.00	\$174,825.00		Including insulation, frame Low U-Value
Indows lazing	st	Aluminum frame Aluminum frame	1000	\$40.00	\$40,000.00	\$44,400.00		
acrig of covering	st	Built-Up	10500	\$6.50	\$68,250.00	\$75,757.50		Including all fashing
pors - double flush	ea	Standard	7	\$750.00	\$5,250.00	\$5,827.50		Including hardware
pors - single flush	ea	Standard	4	\$375.00	\$1,500.00	\$1,665.00		Including hardware
un shads NCLOSURE	st	Outside system in aluminum	1000	\$15.00	\$15,000.00	\$16,650.00 \$541,125.00	12.1%	1
NGE030RE								
HELL					\$1,340,173.00	\$1,487,592.03	33.2%	
artition walls	r	Metal stud frame	2250	\$60.00	\$135,000.00	\$149,850.00		Hight 9 feet
sulation board	st	Insulation and plaster board	7200	\$3.30	\$23,760.00	\$26,373.60	3.9%	Inside of parts with exposed concrete
ood Door/ Metal Frame, single door	ea		58	\$268.00	\$158,760.00 \$15,544.00	\$176,223.60	3.9%	
ood Door/ Metal Frame, double door	68		2	\$536.00	\$1.072.00	\$1,189.92		
terior Doors					\$16,616.00	\$18,443.76	0.4%	
ilet Partitions	unit		7	\$683.00	\$4,781.00	\$5,306.91		-
andicap Addition rinal Screens	unit		2	\$300.00 \$374.00	\$600.00	\$666.00 \$2,075.70		
ittings	unz		5	\$374.00	\$7,251.00	\$2,075.70	0.2%	•
tairs	step		84	\$220.00	\$18,480.00	\$20,512.80		Including railing
terior railings	r		210	\$50.00	\$10,500.00	\$11,655.00		For atrium
tairs					\$28,980.00	\$32,167.80	0.7%	
ainting Iall Finishes	st	Standard	52000	\$0.60	\$31,200.00	\$34,632.00 \$34,632.00	0.8%	
arret	st	Standard	3000	\$3.50	\$31,200.00	\$34,632.00	0.8%	
eramic tile	st	Standard	27000	\$7.00	\$189.000.00	\$209.790.00		
loor Finishes					\$199,500.00	\$221,445.00	4.9%	
coustical Celling	st	Mineral fiber	29000	\$3.15	\$91,350.00	\$101,398.50		-
ieling finish					\$91,350.00	\$101,398.50	2.3%	
NTERIORS					\$533,657.00	\$592,359.27	13.2%	
evator	unit	Hydraulic, 1500 lbs. 3 Floors	1	\$51,535.00	\$51,535.00	\$57,203.85		•
argo lit	unit	Standard, 3 tn, 1 Floor	1	\$18,000.00	\$18,000.00	\$19,980.00		To MEP-Rooms in basement
onveying Systems	st	Standard	29000	\$6.00	\$69,535.00 \$174.000.00	\$77,183.85 \$193.140.00	1.7%	
lumbing VAC	st	Standard Standard	29000	\$6.00 \$15.00	\$174,000.00 \$435.000.00	\$193,140.00 \$482,850.00		
reprotection	st	Standard	29000	\$15.00	\$435,000.00	\$96,570.00		
lectrical	st	Standard	29000	\$20.00	\$580,000.00	\$643,800.00		Including communication and safety
nderflooring	st	Standard	24000	\$15.00	\$360,000.00	\$399,600.00	40.5%	For MEP/HVAC
EP/HVAC					\$1,636,000.00	\$1,815,960.00	40.5%	
ERVICES					\$1,705,535.00	\$1,893,143.85	42.3%	
Owner								Not in contract
QUIPMENT & FURNISHING					\$0.00	\$0.00	0.0%	
AUDITION A FURNISHING	sf		2300	\$1.44	\$0.00 \$3,312.00	\$0.00 \$3,676.32	0.0%	
indscaping irregations indscaping planting	st		2300 2300	\$1.44 \$1.62	\$3,312.00	\$3,676.32 \$4,135.86		
ees	63	Cak Tree	12	\$510.00	\$6,120.00	\$6,793.20		Due to tree removal at site
indscape concrete	st		1200	\$7.80	\$9,360.00	\$10,389.60		For access ramp
ndscape ligting	st		3700	\$0.48	\$1,776.00	\$1,971.36		
oofing of the ramp sating for the Ramp	st	Steel-System Gaia snow melting system	350	\$7.00 \$12.00	\$2,450.00	\$2,719.50 \$15.984.00		Avoide accidents
	51	and anoth mentily system	1200	\$12.00				and the second s
ANDSCAPING					\$41,144.00	\$45,669.84	1.0%	
					\$4,034,749.00	\$4,478,571.39	100.0%	Base for Breakdown
	%	Constant					100.0%	
		Standard Standard	1	8.0	\$322,779.92 \$100,868.73	\$358,285.71 \$111,964.28		Based on total net Based on total net
eneral requirements	96.			4.0	\$161,389.96	\$179,142.86		Based on total net
eneral requirements uilding Permit	%	Standard			\$121 042 47	\$134,357.14		Based on total net
eneral requirements uliding Permit rolit onds and insurance	% % %	Standard	1	3.0				
eneral requirements uliding Permit tofit ands and insurance ees (AEC)	% % h		1	3.0 \$100.00	\$55,000.00	\$61,050.00		Hours of Team
eneral requirements iliding Permit ofit nods and insurance ees (AEC)	% % %	Standard	1			\$61,050.00 \$111,000.00		Hours of Team Reserve
uliding Permit rott onds and insurance ees (AEC) ntilingeny	% % h	Standard	1		\$55,000.00 \$100,000.00	\$111,000.00		
eneral requirements iliding Permit ofit nods and insurance ees (AEC)	% % h ls	Standard	1		\$55,000.00			
aneral requirements aliding Permit ott ands and insurance ass (AEC) stringeny VERHAED ED-Rating	% % h ls	Standard Ines, Andy and Oliver -	1	\$100.00	\$55,000.00 \$100,000.00	\$111,000.00 \$955,799.99 \$407,577.85		
neral requirements liding Permit of: mds and insurance es (AEC) chingeny VERHAED	% % h ls	Standard Ines, Andy and Oliver -	1	\$100.00	\$55,000.00 \$100,000.00	\$111,000.00 \$955,799.99		

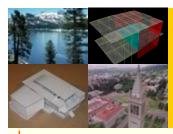


- -LEED-Rating
- -MEP/HVAC underflooring
- -Superstructure
- -Owner allocates additional funds

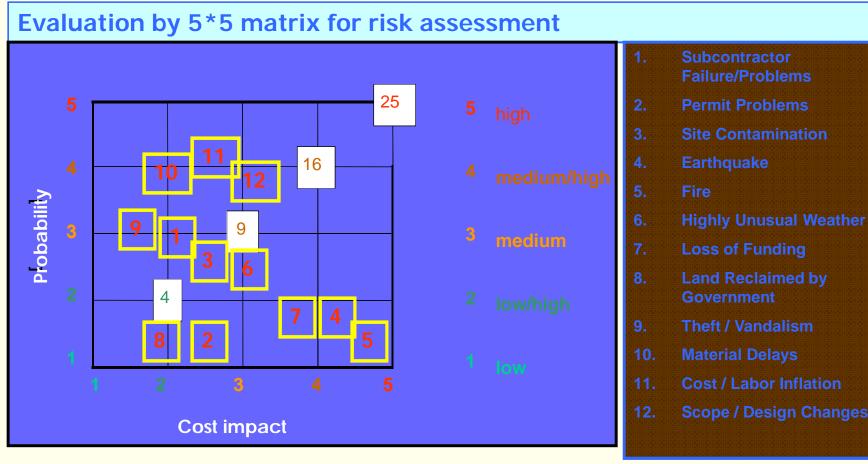


Benchmark Comparison





Risk Analysis and Management

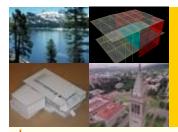


-Risk transfer to contractors (Design and build)

-Controlling

-Insurance

A/E/C Spring Quarter Presentation



LEED Certification

Green Building Features of MW:

EED^M Scorecard

 Solar powered snow removal system

•Use of Trees to reduce energy requirements

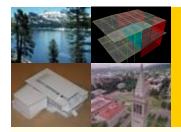
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

•Use of window shades to reduce heat gain on building

• Under floor HVAC system for energy efficiency

•Low-emitting finishing materials

13	15	Tota	Project Score					Possible Points	6
			ed 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points	Platinum			more poi		- 01
		Sustai	nable Sites Possible Points 14	5	4		Materi	als & Resources Possible Points	1
1	N	a	2 (2) (2) (2) (2) (2) (2)	Y	1	N			
111			Erosion & Sedimentation Control	Ŷ				Storage & Collection of Recyclables	152
1	1	Credit 1	Site Selection 1		2012/261	1		Building Reuse, Maintain 75% of Existing Shell	1
		Credit 2	Urban Redevelopment 1			1		Building Reuse, Maintain 100% of Existing Shell	
	1	- CEECONES	Brownfield Redevelopment 1			1		Building Reuse, Maintain 100% Shell & 50% Non-Shell	
_			Alternative Transportation, Public Transportation Access 1	1		_	Credit 2.1	Construction Waste Management, Divert 50%	
			Alternative Transportation, Bicycle Storage & Changing Rooms 1		1			Construction Waste Management, Divert 75%	
	1		Alternative Transportation, Alternative Fuel Refueling Stations 1		1			Resource Reuse. Specify 5%	
			Alternative Transportation, Parking Capacity 1		1			Resource Reuse, Specify 10%	
	1		Reduced Site Disturbance, Protect or Restore Open Space 1	1				Recycled Content, Specify 25%	
	1		Reduced Site Disturbance, Development Footprint 1	1				Recycled Content, Specify 50%	
1			Stormwater Management, Flate and Quantity 1	1				Local/Regional Materials, 20% Manufactured Locally	
			Stormwater Management, Treatment 1			1		Local/Regional Materials, of 20% Above, 50% Harvested Locally	
		Credit 7.1			1		Credit 6	Rapidly Renewable Materials	
		Credit 7.2		1			Credit 7	Certified Wood	
		Credit 8	Light Pollution Reduction 1	-					
				13			Indoo	Environmental Quality Possible Points	- 6
2		Water	Efficiency Possible Points 5	-Y	1	N			
?	N			Y			Preroc	Minimum IAQ Performance	
		Credit 1.1	Water Efficient Landscaping, Reduce by 50%	Y	1111		Prered	Environmental Tobacco Smoke (ETS) Control	
		Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation 1	1			Credit 1	Carbon Dioxide (CO ₂) Monitoring	
		Credit 2	Innovative Wastewater Technologies 1	1			Credit 2	Increase Ventilation Effectiveness	
1		Credit 3.1	Water Use Reduction 20% Reduction 1	1			Crodit 3.1	Construction IAQ Management Plan, During Construction	
1		Credit 3.2	Water Use Reduction, 30% Reduction 1			1	Credit 3.2	Construction IAQ Management Plan, Before Occupancy	
				1			Crodit 4.1	Low-Emitting Materials, Adhesives & Sealants	
5	4	Energy	y & Atmosphere Possible Points 17	1				Low-Emitting Materials, Paints	
2	N			1			Credit 4.3	Low-Emitting Materials, Carpet	
		Prereq 1	Fundamental Building Systems Commissioning	1			Credit 4.4	Low-Emitting Materials, Composite Wood	
		Preria 2	Minimum Energy Performance	1			Credit 5	Indoor Chemical & Pollutant Source Control	
		Prereg 3	CFC Reduction in HVAC&R Equipment	1			Gredit 6.1	Controllability of Systems, Perimeter	
		Credit 1.1	Optimize Energy Performance, 20% New 710% Existing 2			1	Credit 6.2		
		Credit 1.2	Optimize Energy Performance, 30% New / 20% Existing 2	1			Credit 7.1	Thermal Comfort, Comply with ASHRAE 55-1992	
2		Credit 1.3	Optimize Energy Performance, 40% New 730% Existing 2	1			Credit 7.2	Thermal Comfort, Permanent Monitoring System	
2		Credit 1.4	Optimize Energy Performance, 50% New / 40% Existing 2	1			Credit 8.1	Daylight & Views, Daylight 75% of Spaces	
	2	Credit 1.5	Optimize Energy Performance, 60% New / 50% Existing 2	1			Credit 8.2		
1	-	Credit 2.1							
-	1		Renewable Energy, 10% 1	2	1		Innova	ation & Design Process Possible Points	
	1		Renewable Energy, 20% 1	Y	?	N			-
	-	Credit 3	Additional Commissioning 1	1			Credit 11	Innovation in Design: Building to be Interactive Educational tool	
		Credit 4	Ozone Depletion 1		1			Innovation in Design: Use possible rain and snow run off to create p	
		Credit 5	Measurement & Verification 1					Innovation in Design: Ose possible rain and show run on to create p	
	-	Gredit 6	Green Power 1			-	Gredit 1.4	· 이상 · · · · · · · · · · · · · · · · · ·	
		oregito		1				LEED TM Accredited Professional	



LEED Certification

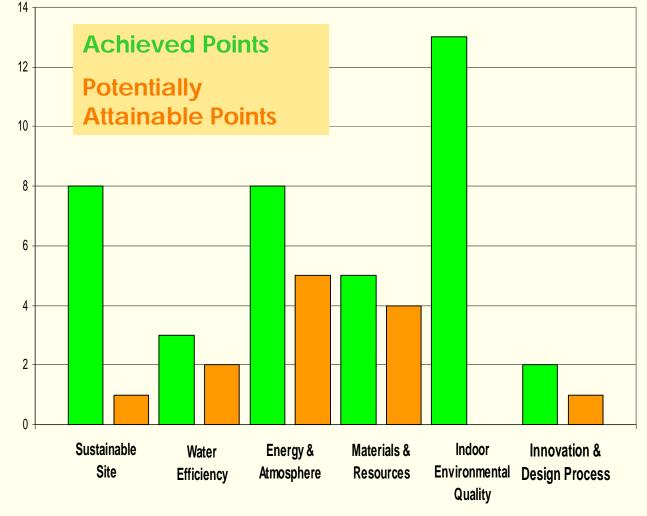
Owner Request:

- Silver Rating
- Minimum of 33 points necessary

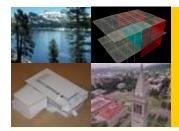
Focus on:

- Indoor Environmental Quality
- •Energy and Atmosphere
- Sustainable Site

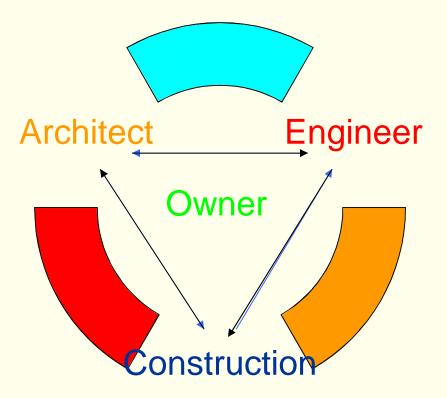
Total Points: 39 Gold Rating

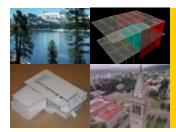


LEED Catagories



Design Process & Iterations





Mountain & Water Iterations

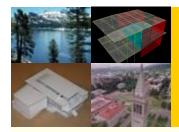
Choice to Blend Construction Materials.

- -Initial all-steel construction
- -Architect's desire for steel and concrete construction to articulate and "juxtapose" the techtonics of education block, auditorium block and the unifying ramp
- -Integration of steel and concrete alternatives from winter quarter

Cantilever Solution

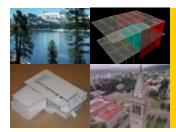
In reaction to proposal made by Owner to reduce moment connections
Original engineering solution to use exposed compression members
A/E Interaction to develop "hidden" system within partitions





Discipline Roles as Defined by Ridge Team

	Architect	Engineer	Construction		
Primary Roles:	 Formulation of Thesis Spatial transition of Thesis Arrangement of spaces to fulfill program 	Design Structural and Lateral System to meet program and applicable codes	 Budget design alternatives Schedule design alternative 		
Secondary Roles:	•Create feasible space (structure and construction)	 Structure to compliment architecture Structure that is modular and constructible 	 Advise Architect and Engineer on constructability of design 		

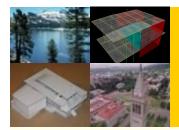


Winter Areas of Improvement:

- More Real Time Communication (ICQ, NetMeeting)
- Involvement of All Disciplines in LEED Design

Achievement of Goals:

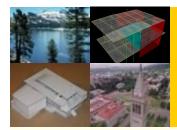
- Heavy use of ICQ in last weeks of design
- More efficient use of NetMeeting for file sharing
- All Disciplines offered ideas for ways to cut energy consumption and showed flexibility within discipline to attain LEED Credits



Ridge Team Interactions

Team Interactions:

- Disciplines began to anticipate the needs of other team members and act accordingly
- Team members began to act across disciplines in order to expedite the design process

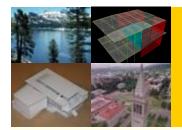


Interaction Experiences & Lessons Learned

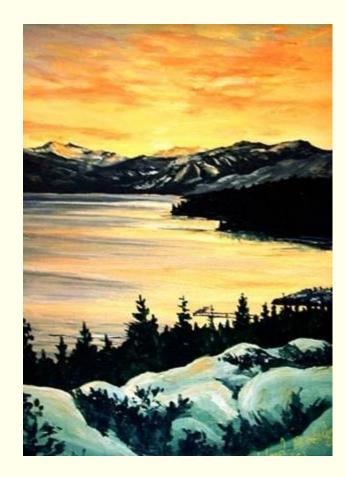
Gained both knowledge and understanding of other disciplines

Learned the importance of collaboration and coordination between team members

Gained international and intercultural point of view towards the A/E/C industry



Thanks to All the Mentors



With Special Thanks to:

Dr. Renate Fruchter of Stanford Joel Villamil of Tipping + Mars Prof. Helmut Krawinkler of Stanford Prof. Eduardo Miranda of Stanford Humberto Cavallin of UCB Susan Ubbelohde of UCB Mike Martin of UCB Daniel Gonzalez of Design Village Robert Alvarado of Charles Salter & **Associates** Greg Luth of KL&A, Inc. Henry Tooryani of Swinerton Adhamina Rodriguez of Swinerton