





Spring Presentation

# RIVER TEAM 2014

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INTRODUCTION | A | SE | CM | MEP | LCFM | PROJECT EVOLUTION

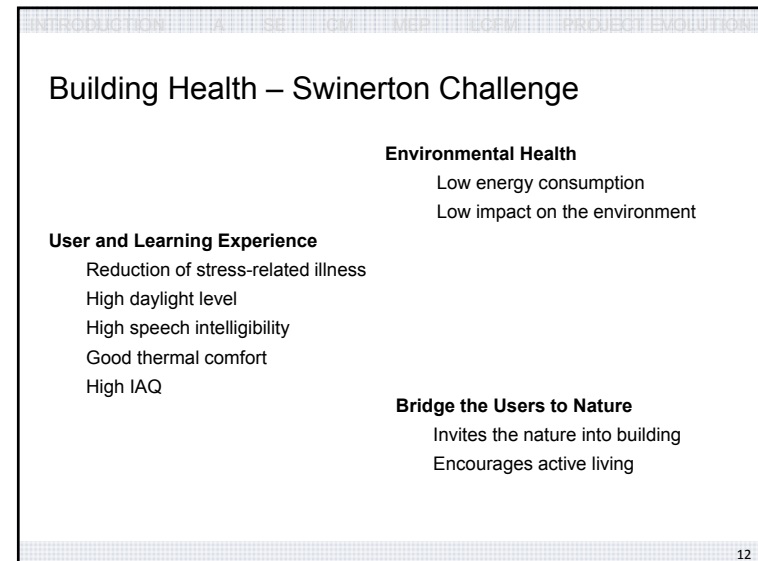
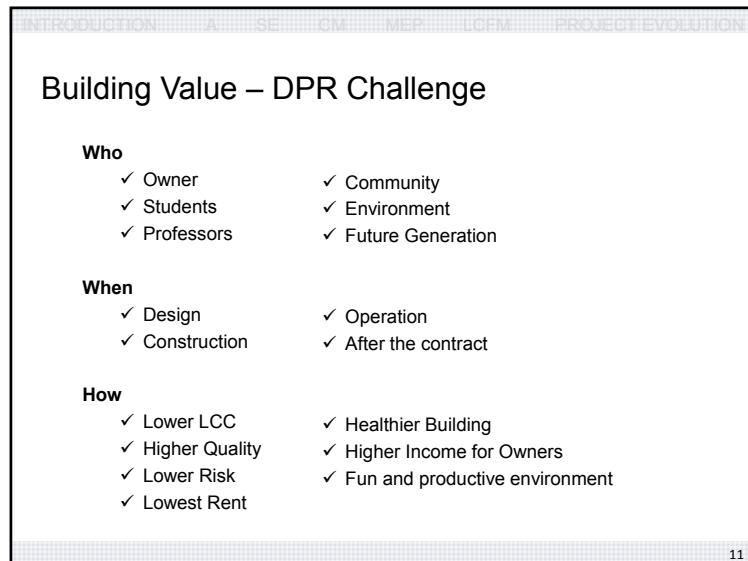
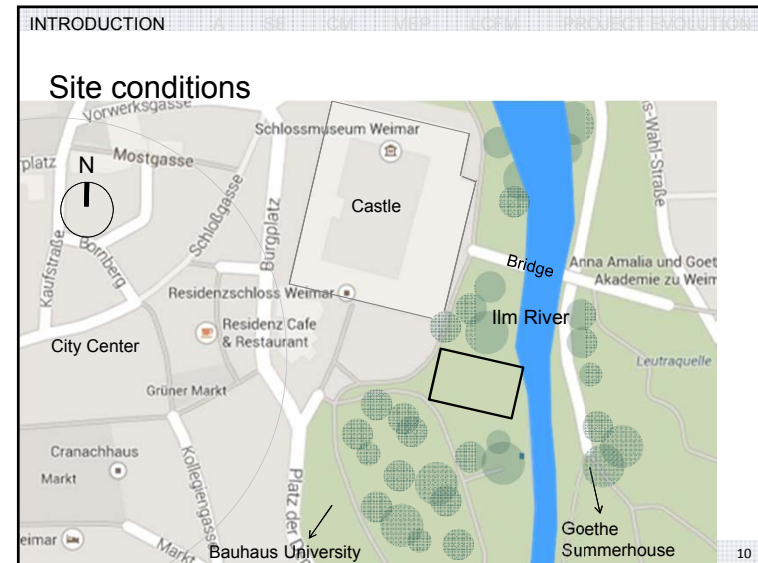
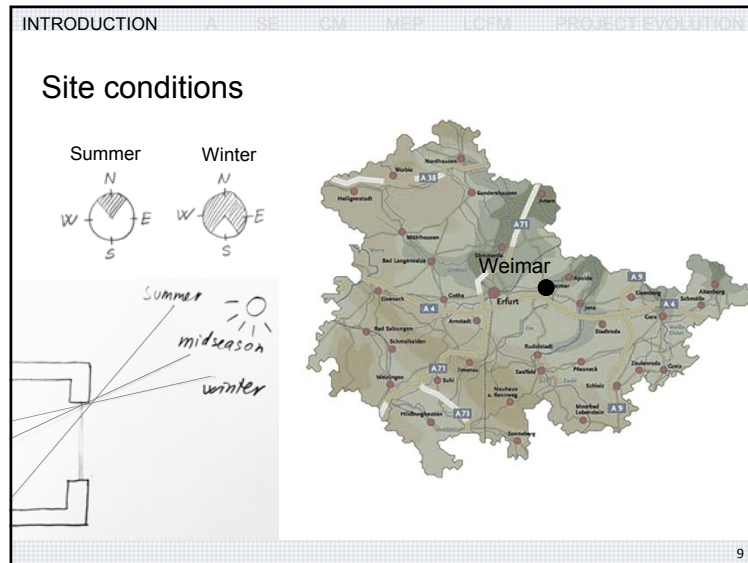
Randi Schieber (CM)  
 Gitte Sørensen (owner)  
 Pawel Wolejsza (A)  
 Anna Heebøll (MEP)  
 Felix Bollwahn (owner)  
 Norayr Badasyan (LCFM)  
 Milos Todorovic (owner)  
 René Gallegos (SE)  
 Qi Wu (SE)  
 Ben Laboy (MEP apprentice)

INTRODUCTION | A | SE | CM | MEP | LCFM | PROJECT EVOLUTION

## Site conditions


	Dec 21	Mar 21	June 21	Sept 21
Daytime (Hours)	7.5	12	15	12
Highest Altitude Angle	15°	40°	63°	40°
Average Solar Radiation (W/m <sup>2</sup> /day)	734	2590	5440	3060
Average High Temp (°C)	3	8	21	19
Average Low Temp (°C)	-2	-1	11	9
Average Precipitation (mm)	30	28	67	46
Heating Degree-days	572	378	44	164

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## Weimar – to connect the city with the park




The open floorplan:

- Architecture which refers to the surrounding (arches) + Bauhaus (open floorplan)
- Creating the public space for events
- Activities on the ground
- Against flood

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## Surrounding architecture

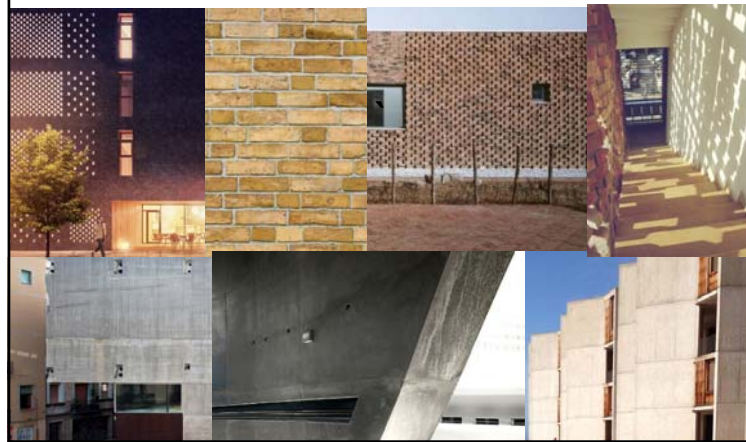


Weimar

Bauhaus

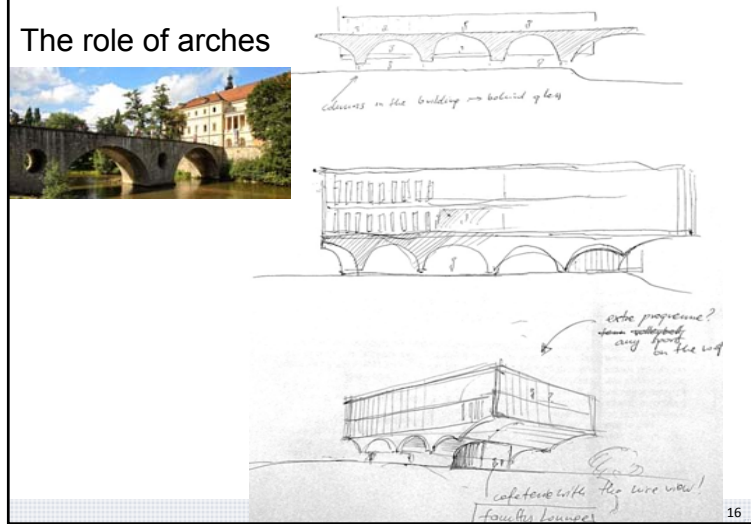
INTRODUCTION A SE CM MEP LCFM PROJECT EVOLUTION

## Brickwork & Concrete



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## The role of arches

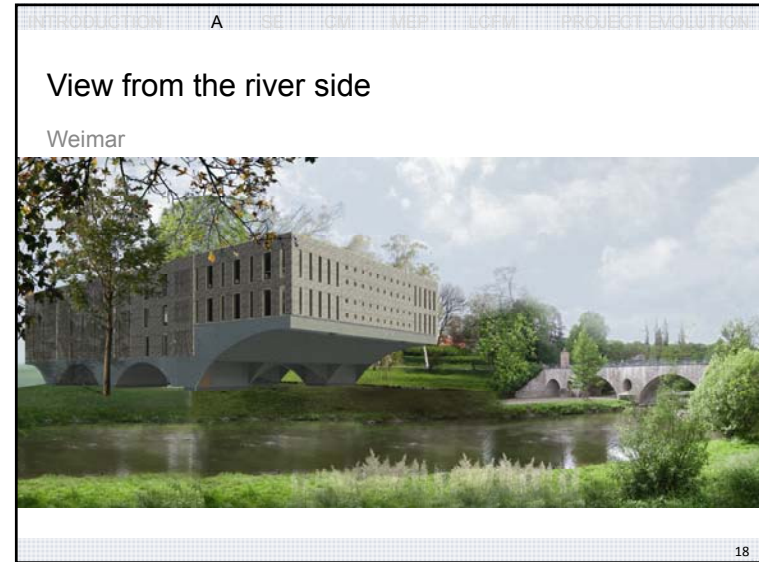
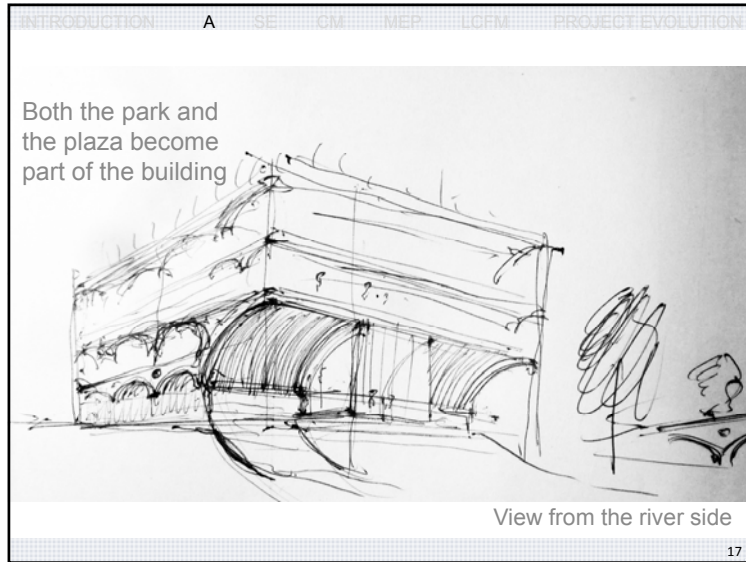


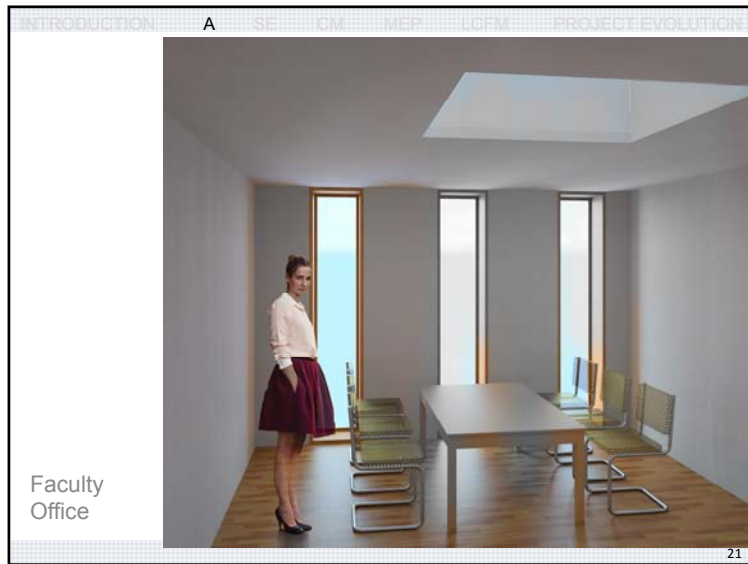
columns in the building on behind glass

extra programme? from workshop and in the way

cafeteria with the wire now!  
franchise lounge

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### Daylight trouble-shooting

**Faculty Offices**  
Level 3

*Solution*

- Skylights & glazing in upper part of partition wall

Before: 0.3% daylight factor

After: 6.5% daylight factor

Daylight Factor

- 8.00
- 7.00
- 6.00
- 5.00
- 4.00
- 3.00
- 2.00
- 1.00

faculty office 0.7% average

faculty office 0.3% average

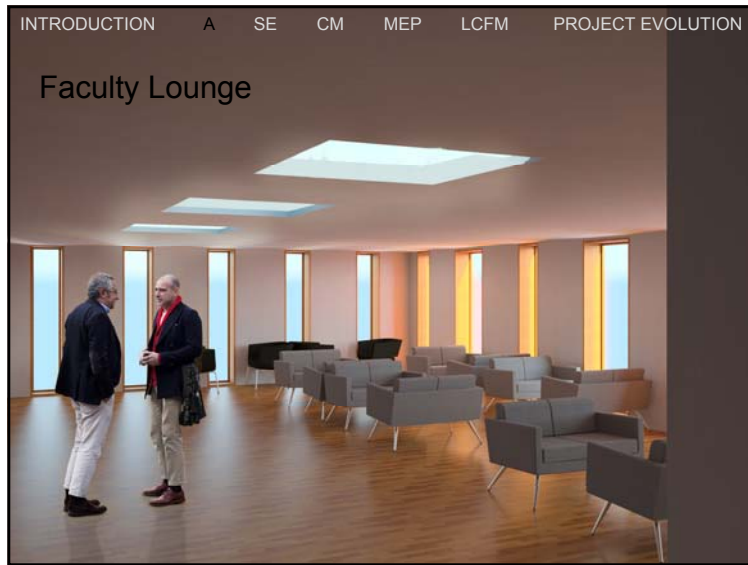
faculty office 2.1% average

faculty office 7.3% average

faculty office 6.5% average

faculty office 2.8% average

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### Daylight trouble-shooting

**Faculty Offices**  
Level 3

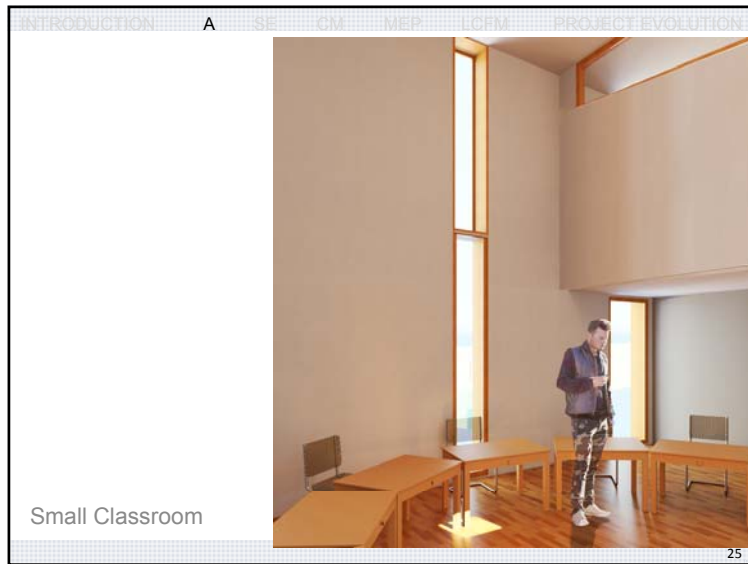
*Solution*

- Skylights & glazing in upper part of partition wall

Before

After

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### Daylight trouble-shooting

**Small Classrooms**  
Level 1

Before: 5.7% daylight factor

*Solution*

- No change necessary

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### Daylight trouble-shooting

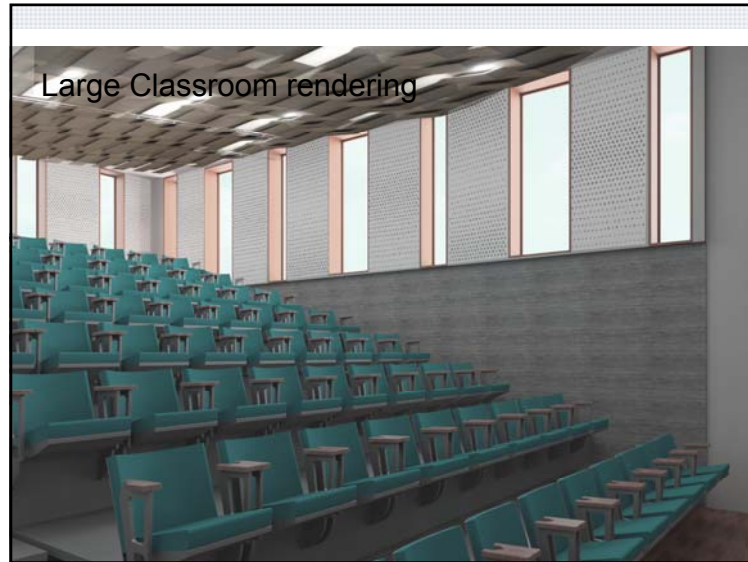
**Small Classrooms**  
Level 1

Before: 5.7% daylight factor

*Solution*

- No change necessary

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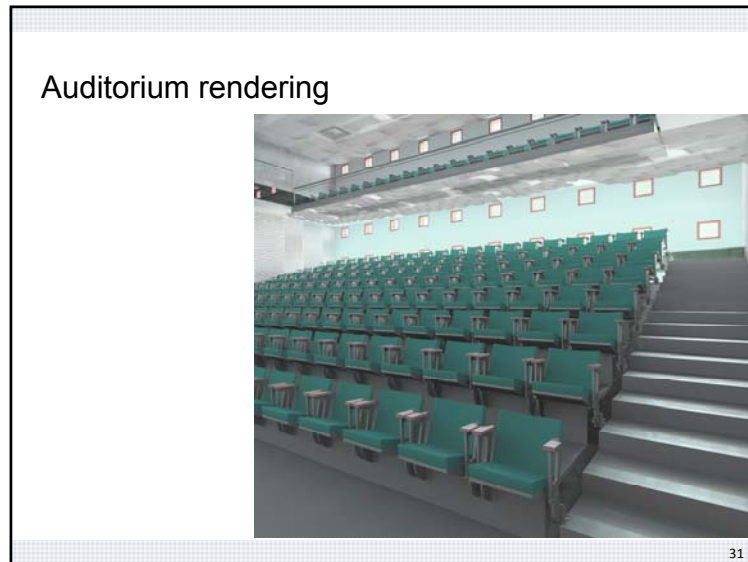


Acoustic treatment of classrooms

- Acoustic panels in ceiling and rear wall to help reduce the reverberation time
- Reflective surface above lecturer to support the lecturer's voice

Side View

Top View



Acoustic treatment of auditorium

- Acoustic panels on the side walls and rear wall help increase the speech intelligibility
- Reflectors in the ceiling ensures evenly distributed sound pressure level



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### Success Criterion of Comfort Level and Energy

European Standard of Class II indoor climate requires

- CO2 level below 900 ppm
- Indoor temperatures between 20-26°C
- Preferably relative humidity between 25-60%

German Regulations of 2018 requires

- A primary energy consumption of 120 kWh/m<sup>2</sup>/year
- Consumption for space heating of 15 kWh/m<sup>2</sup>/year

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### Success criterion accomplished?

- ✓ Thermal comfort
- ✓ Indoor air quality
- ✓ Relative humidity

- ✓ Primary energy consumption
- ✓ Space heating consumption

Energy factors on Germany (2020): Heating = 1, Electricity = 2.2

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### Ground Level- flood risk

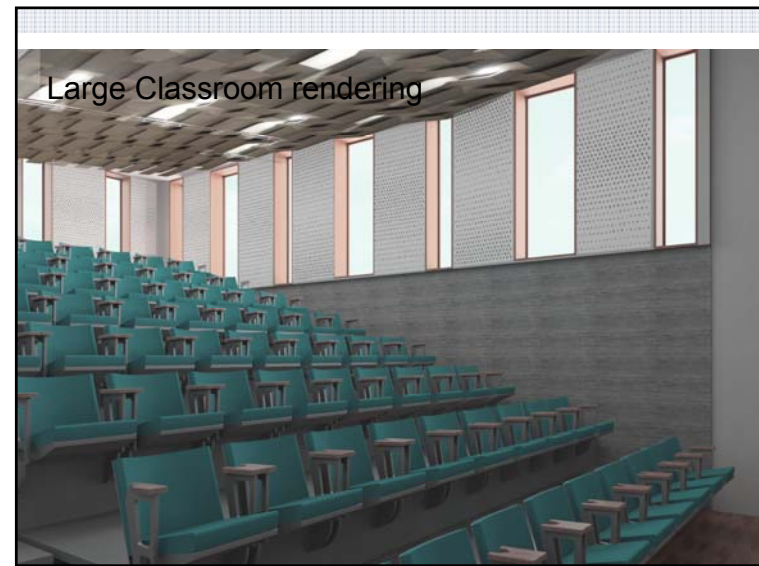
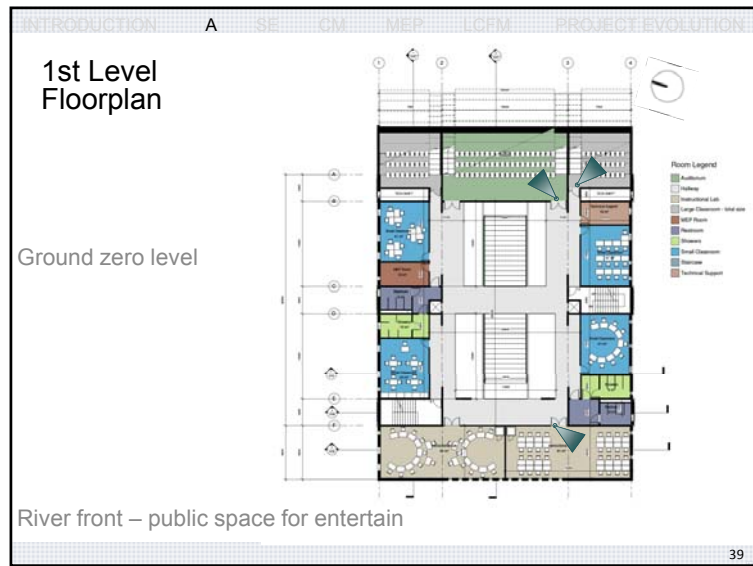
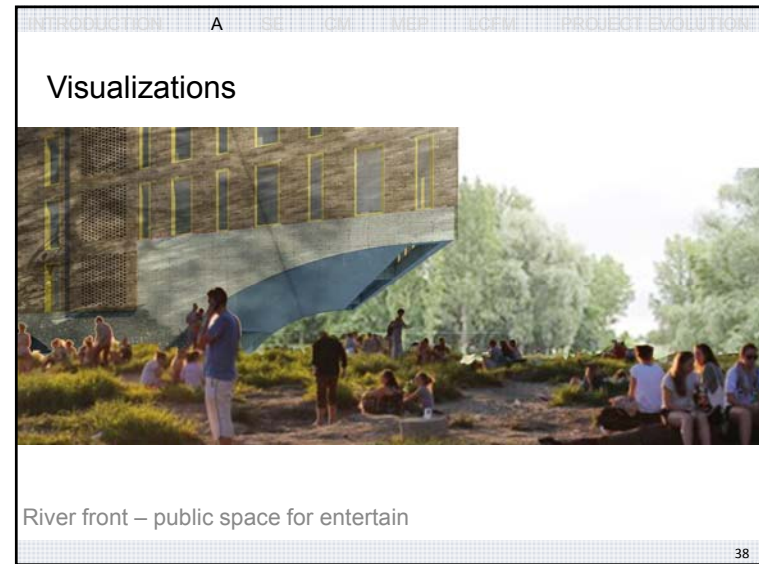
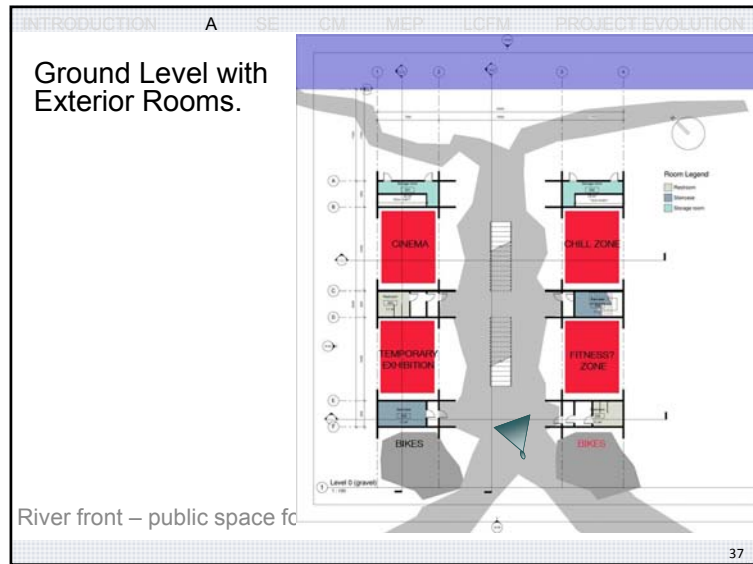
Parallel layout minimizes flood damage.

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The main entrance to the building is highlighted by atrium light

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Auditorium rendering



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Instructional Labs



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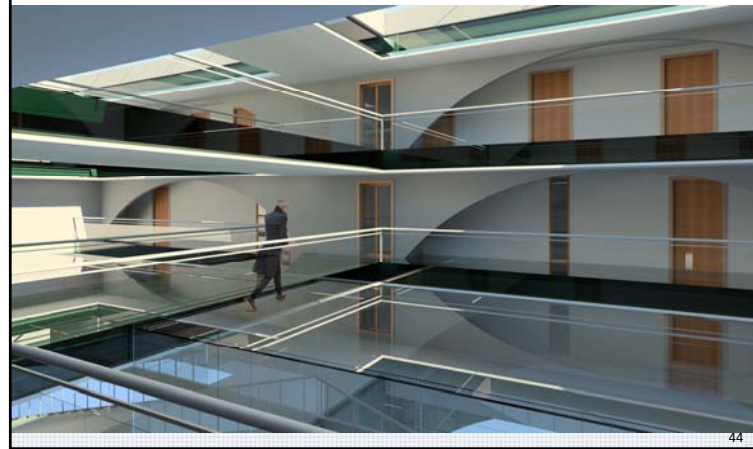
2nd Level Floorplan



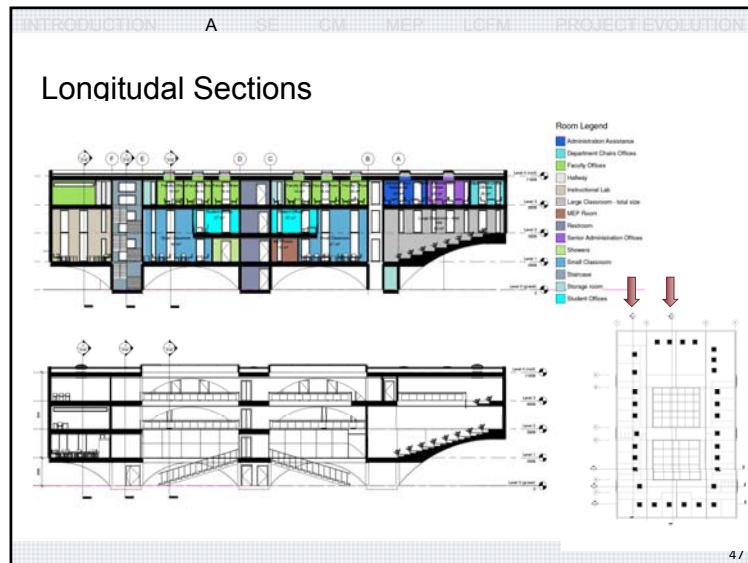
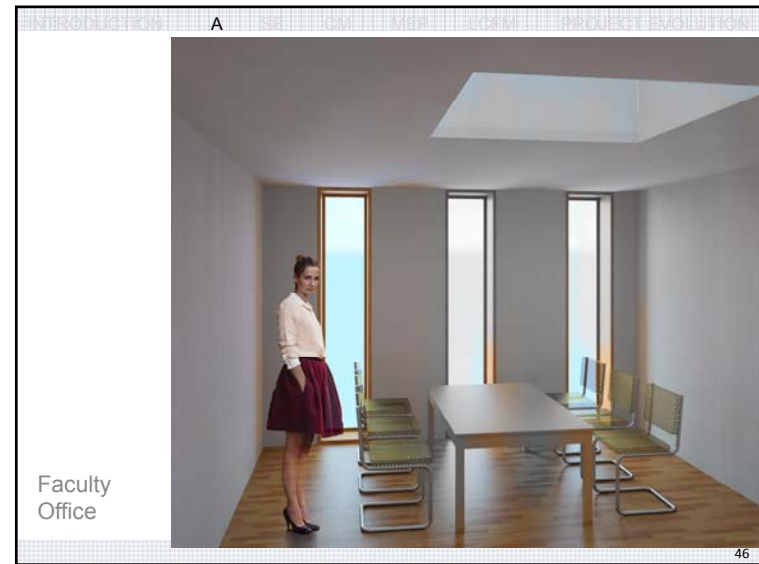
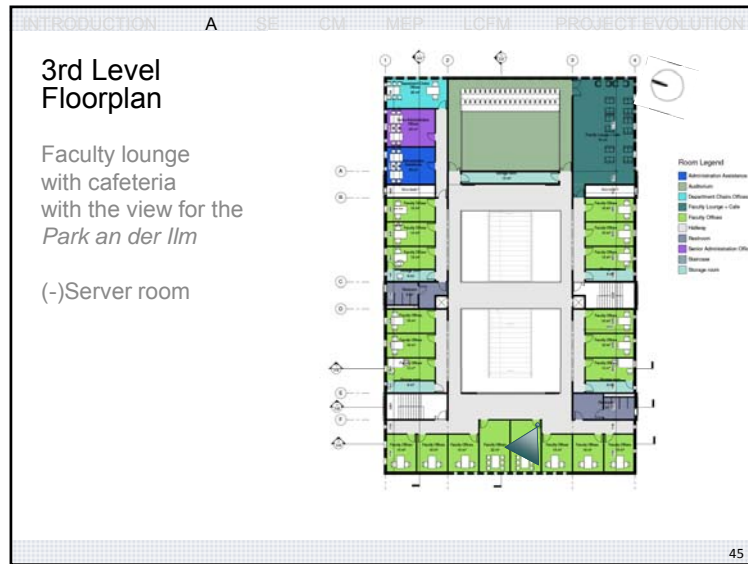
River front – public space for entertain

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The bridge between an atriums



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### Cross Sections

The height of the space depends on its size.

1 Cross Section 2 Athum  
2 Cross Section 3 Transitional LMB  
3 Cross Section Staircase

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### Elevation Views

North elevation  
East elevation  
West elevation (main entrance)

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### Load

	Dead Load [kN/m <sup>2</sup> ]	Live Load [kN/m <sup>2</sup> ]	Snow Load [kN/m <sup>2</sup> ]	Wind Load [kN]
4 <sup>th</sup> Floor (Roof)	6.7	0.96	0.96	56
3 <sup>rd</sup> Floor	6.7	2.39		105
2 <sup>nd</sup> Floor	6.7	2.39		71
1 <sup>st</sup> Floor	6.7	4.79		62
Ground Floor	6.7	4.79		0

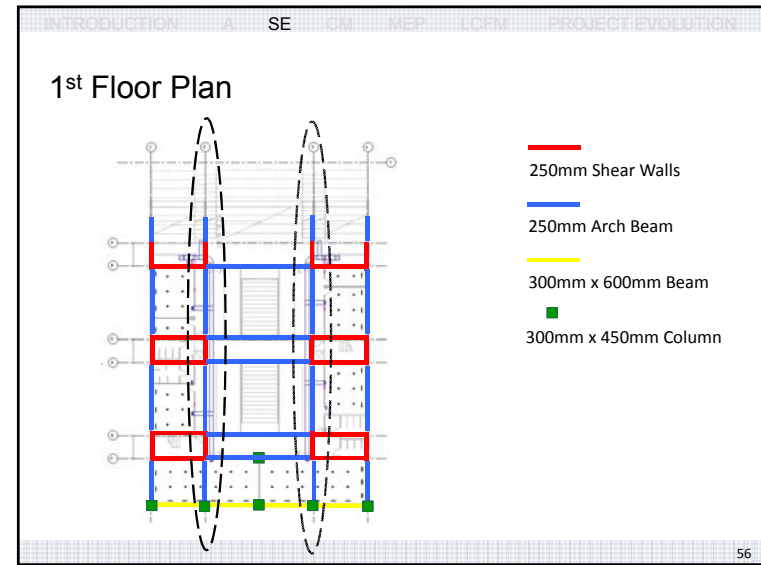
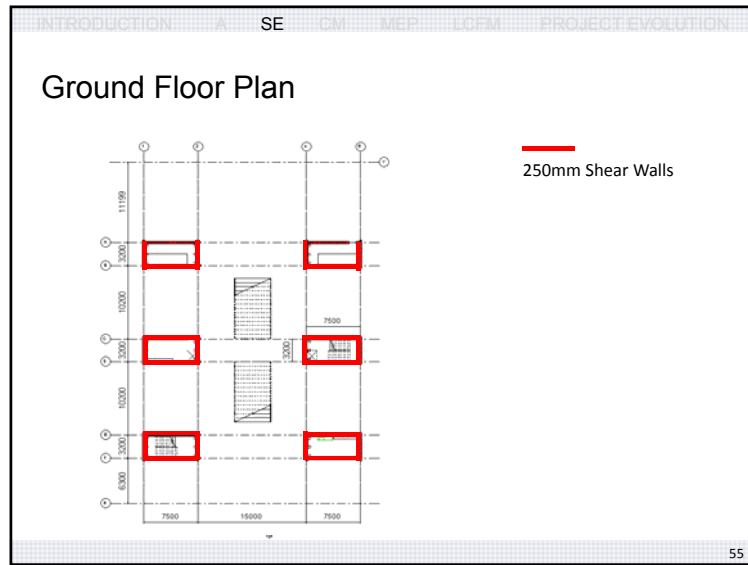
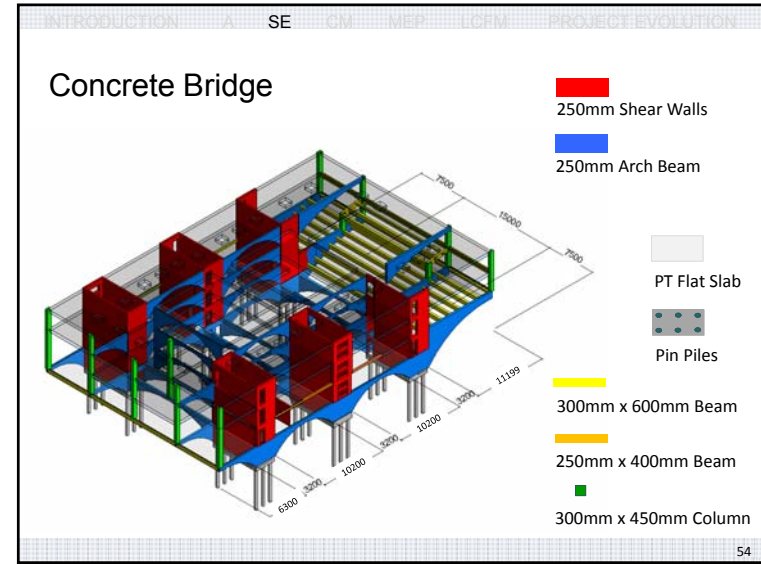
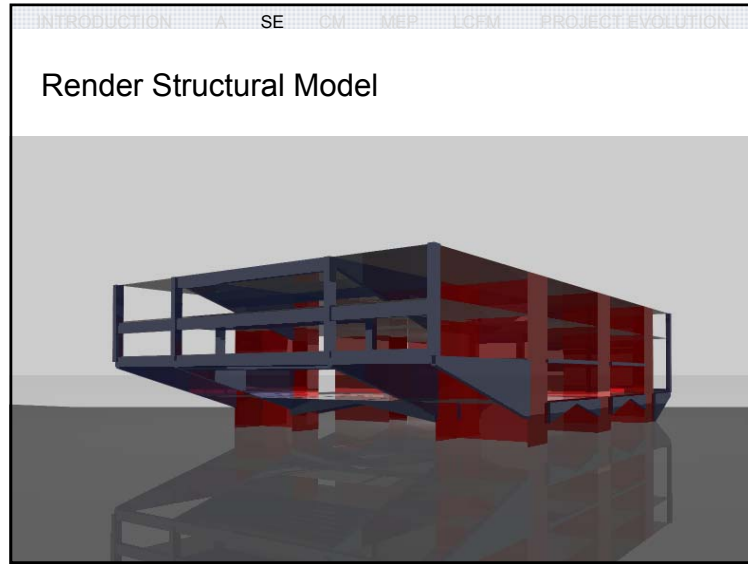
Load Combinations:  
 1.2D+1.6L  
 1.2D+1.6Lr+0.8W  
 1.2D+1.6W+L  
 0.9D+1.6W

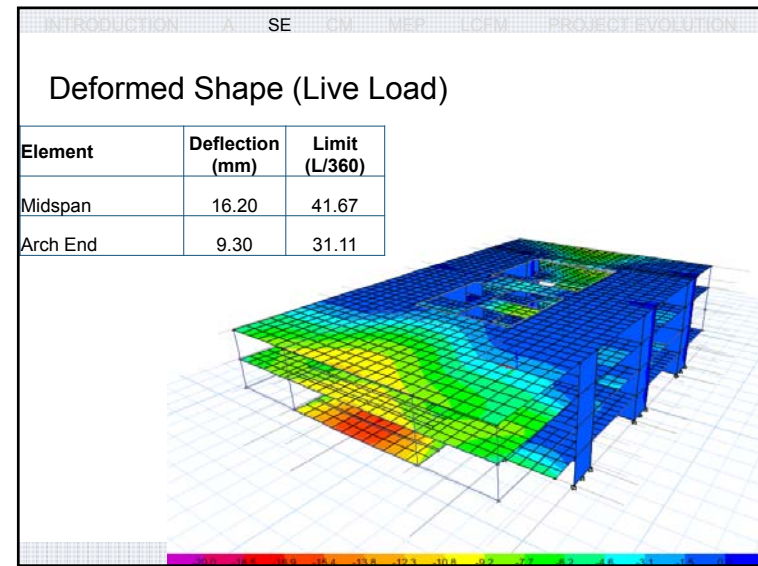
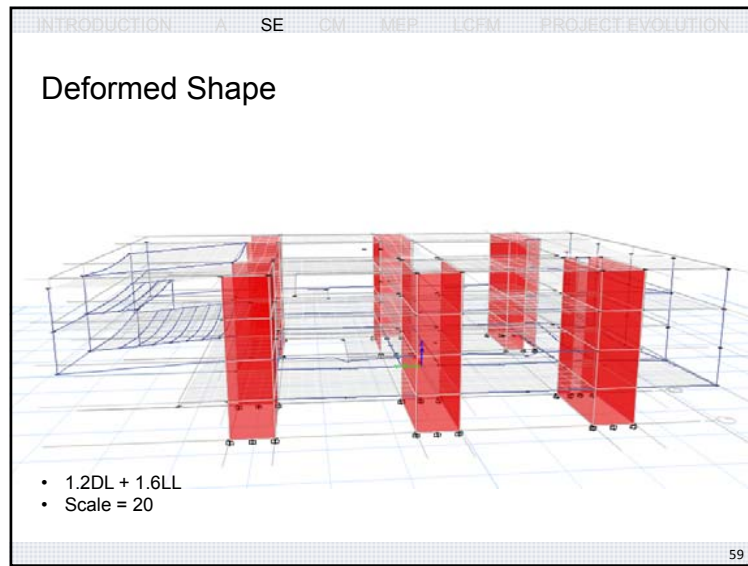
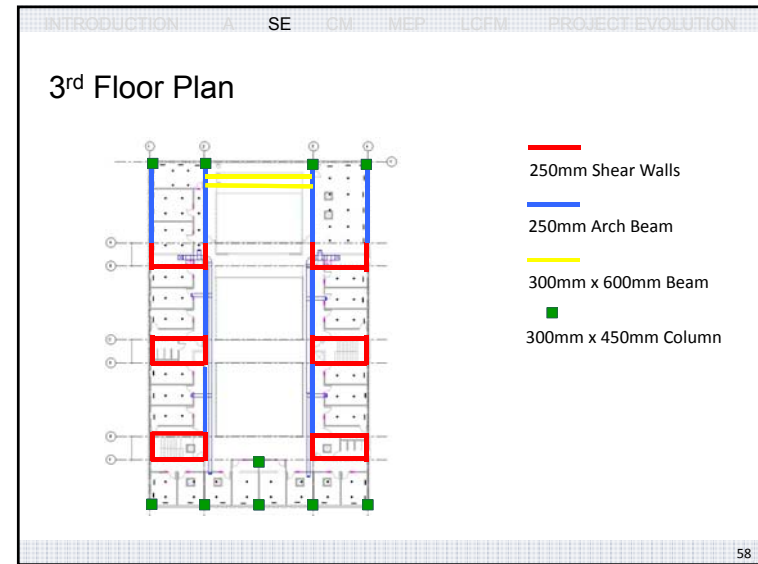
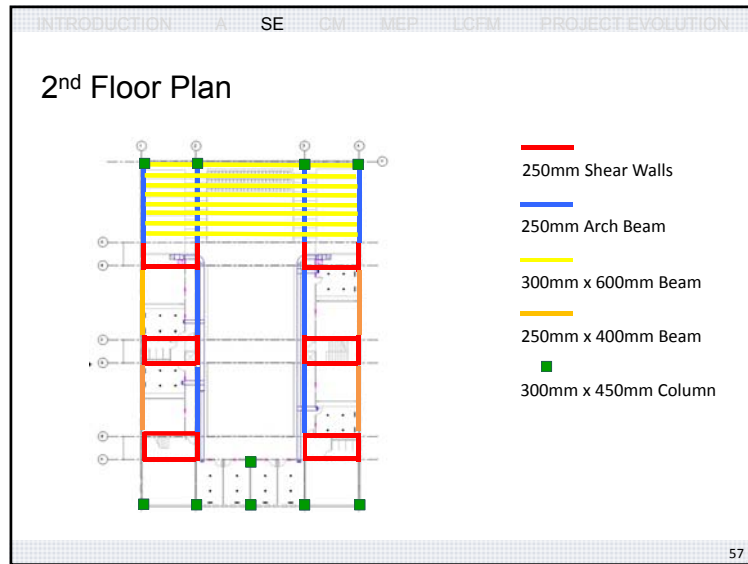
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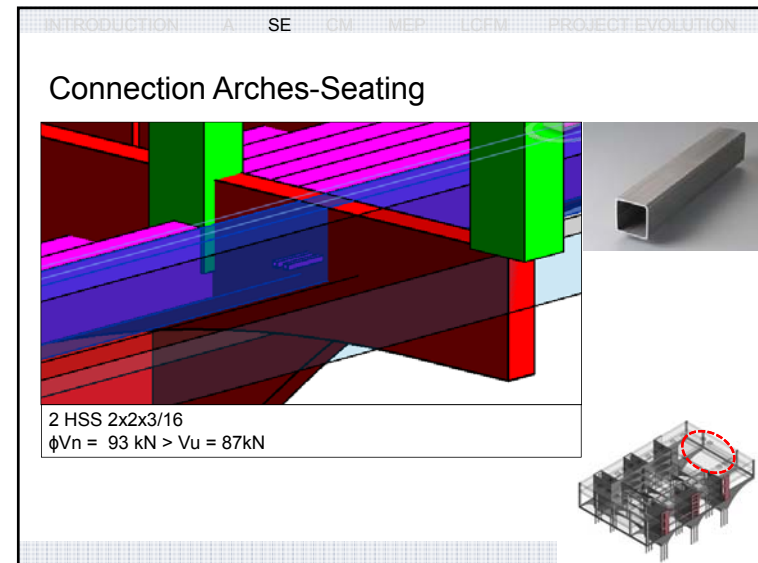
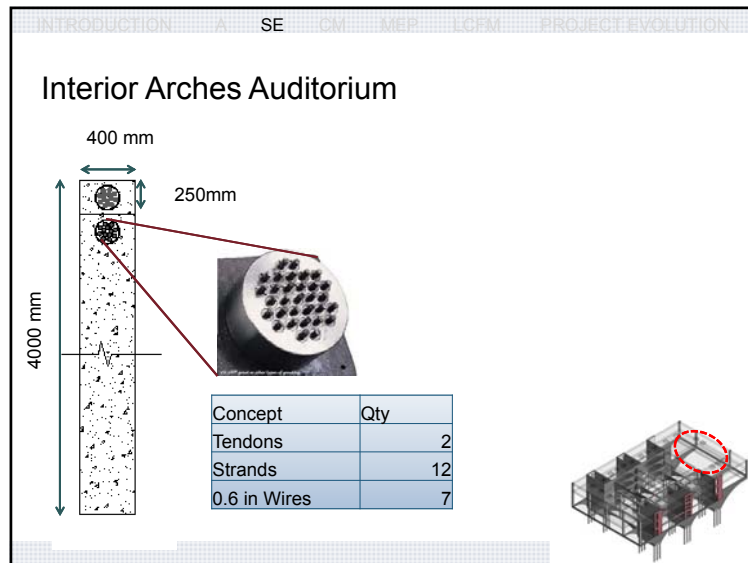
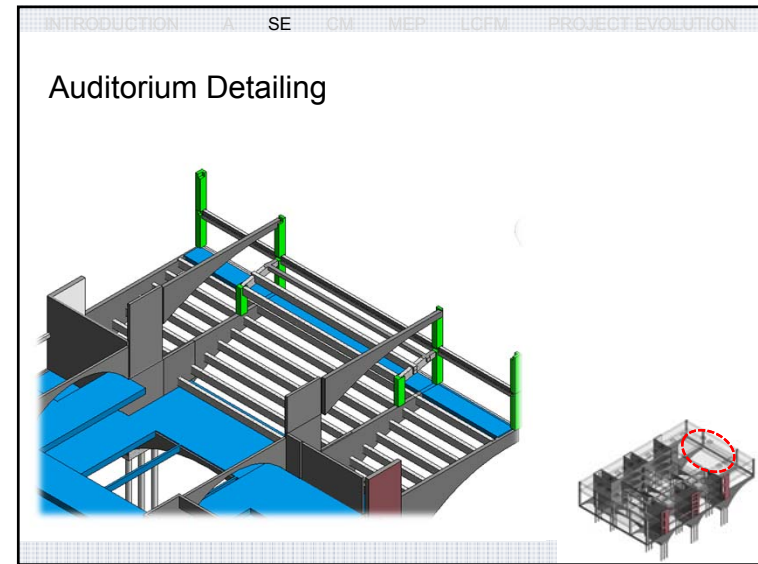
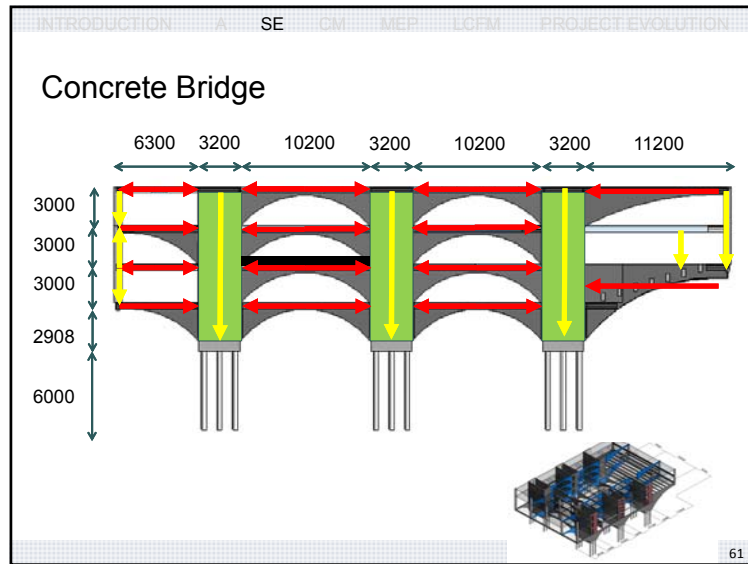
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### Etabs Model

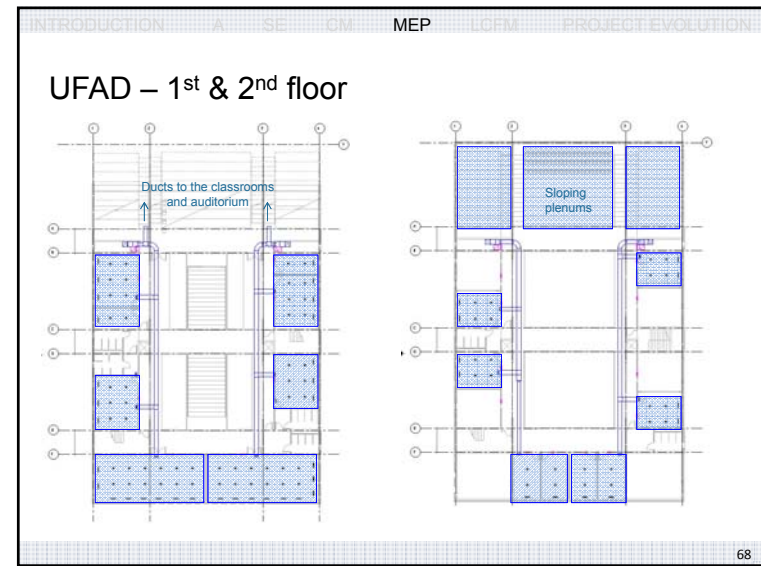
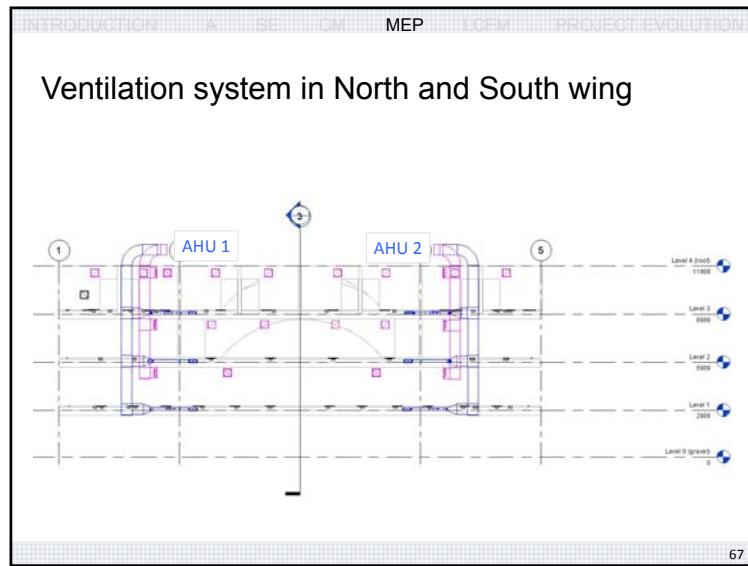
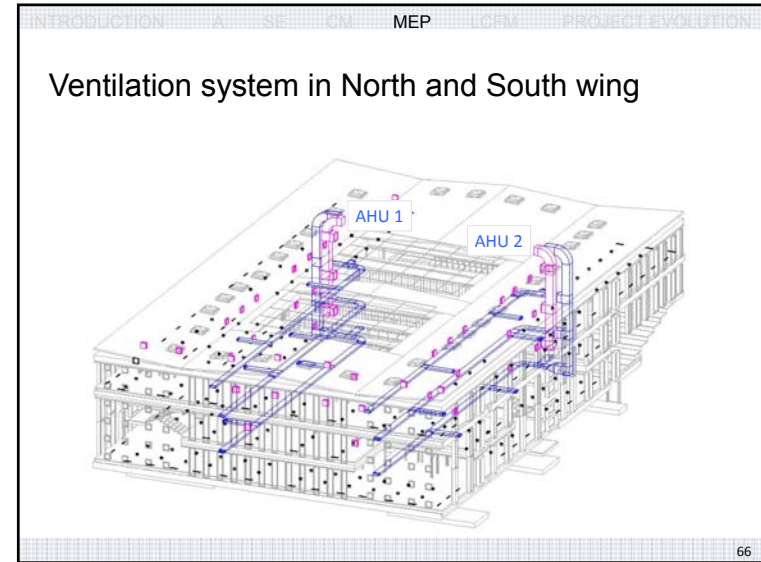
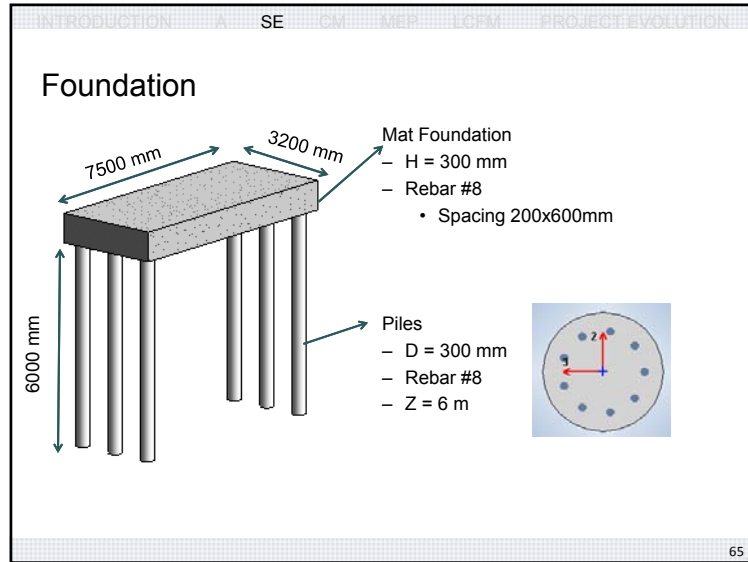
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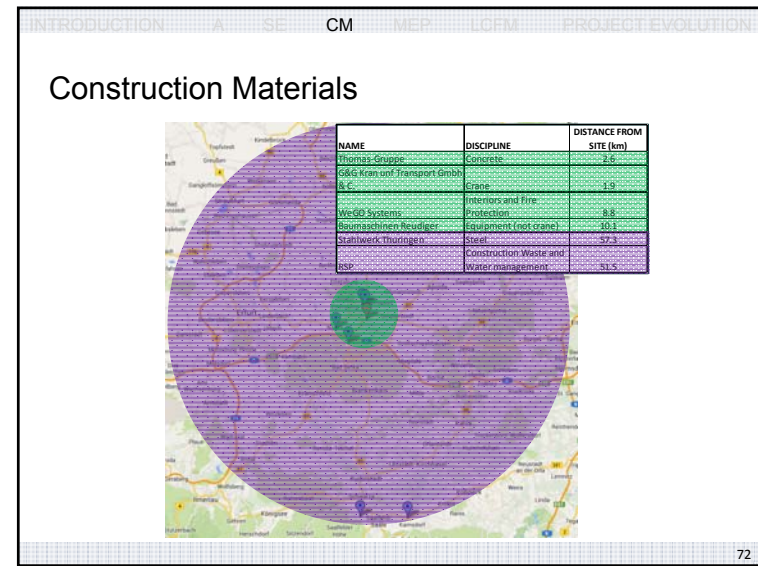
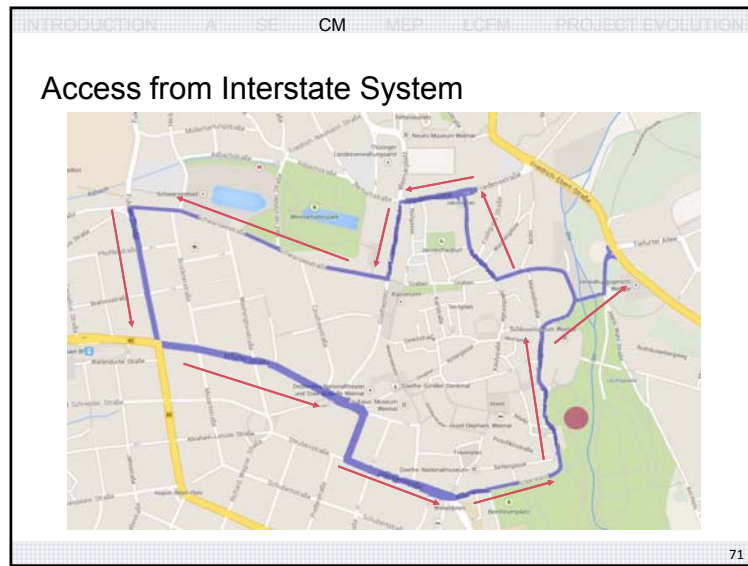
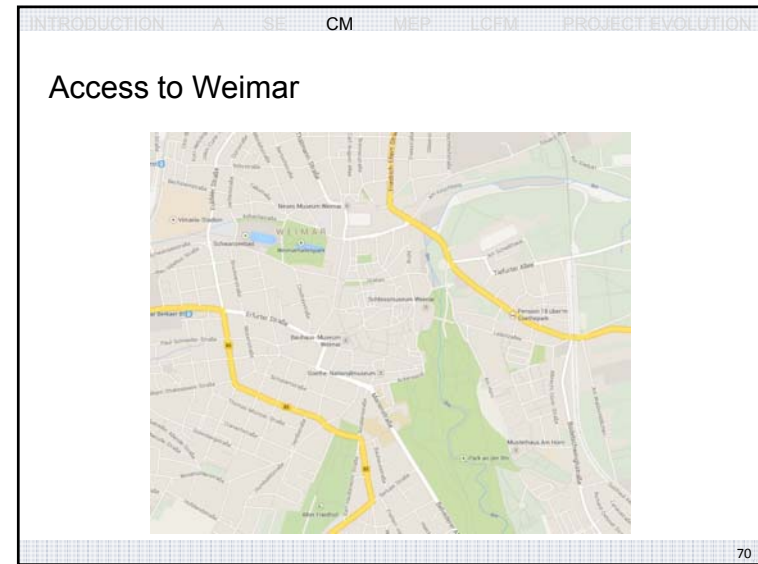
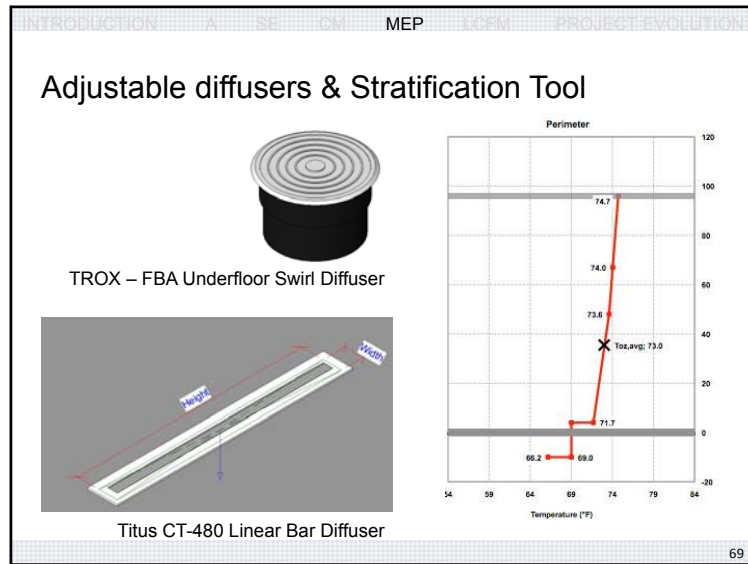












### Construction Site Layout



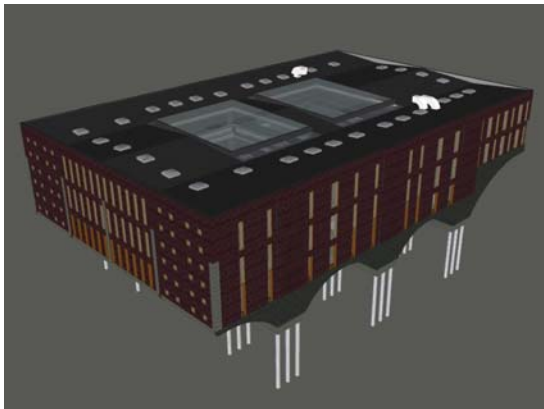
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### Construction Site Layout



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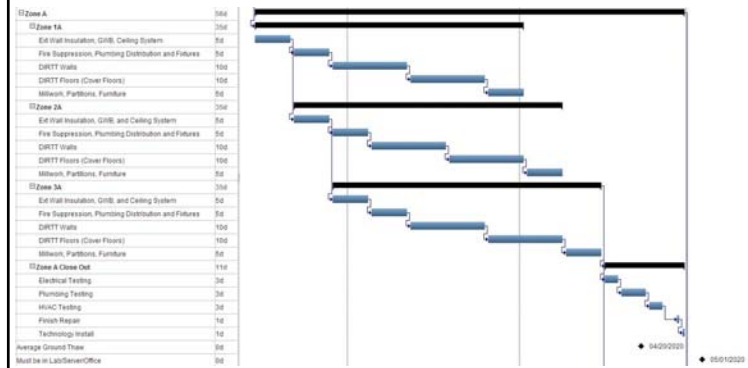
### Traditional Construction Methods



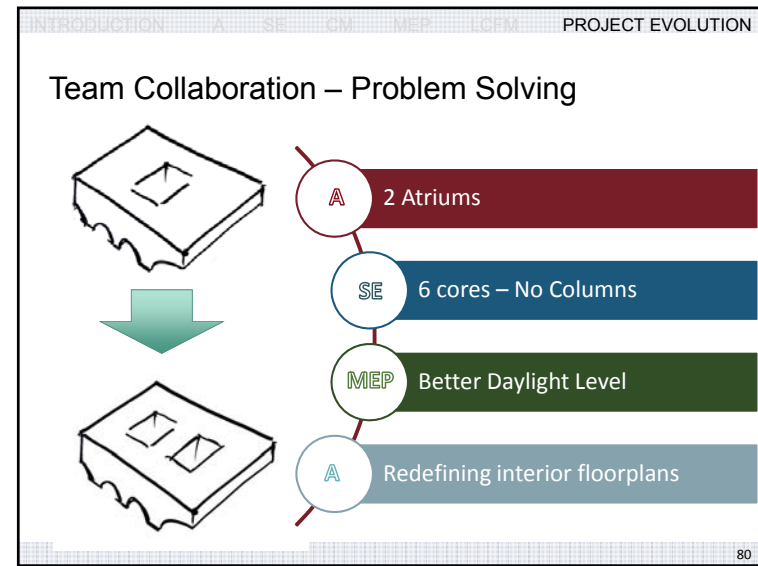
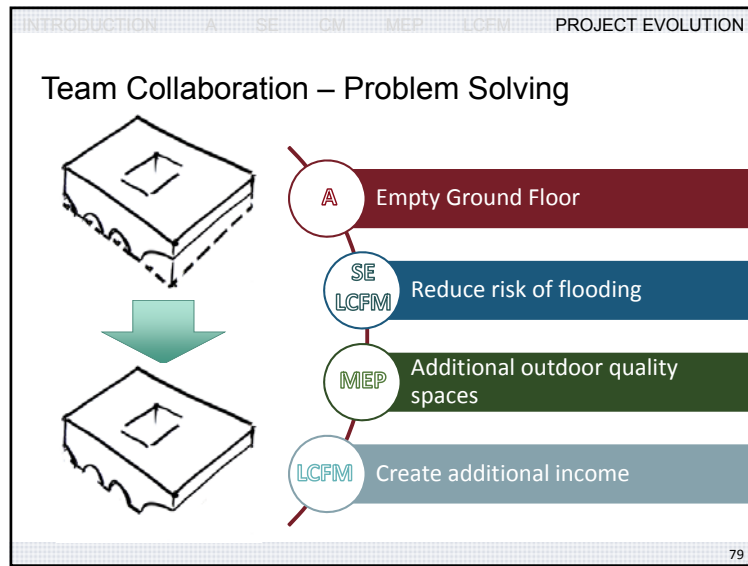
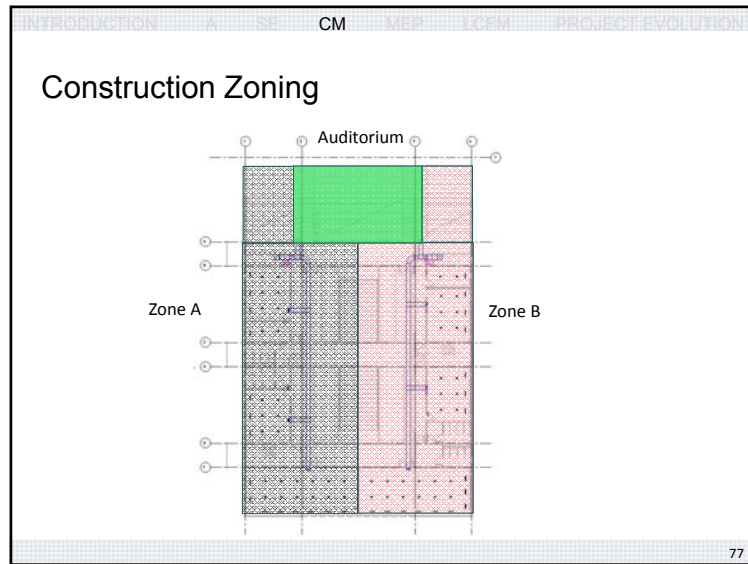
[http://youtu.be/GmAVAg\\_vIKw](http://youtu.be/GmAVAg_vIKw)

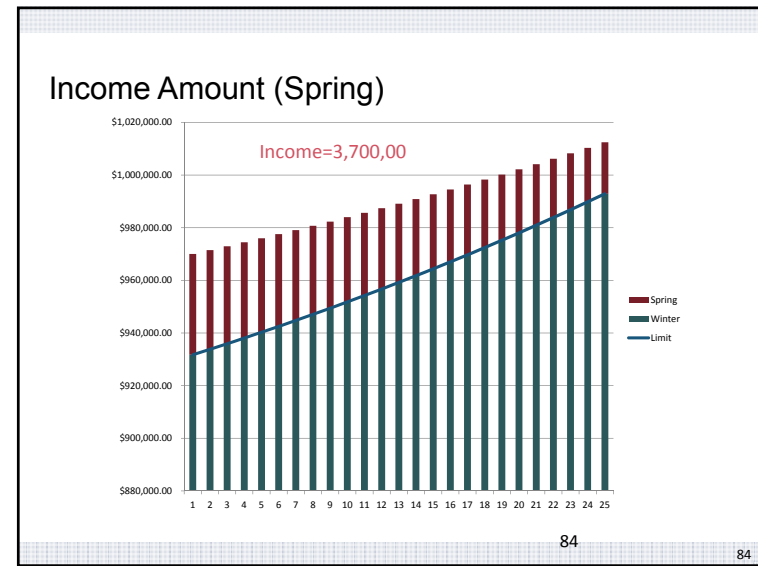
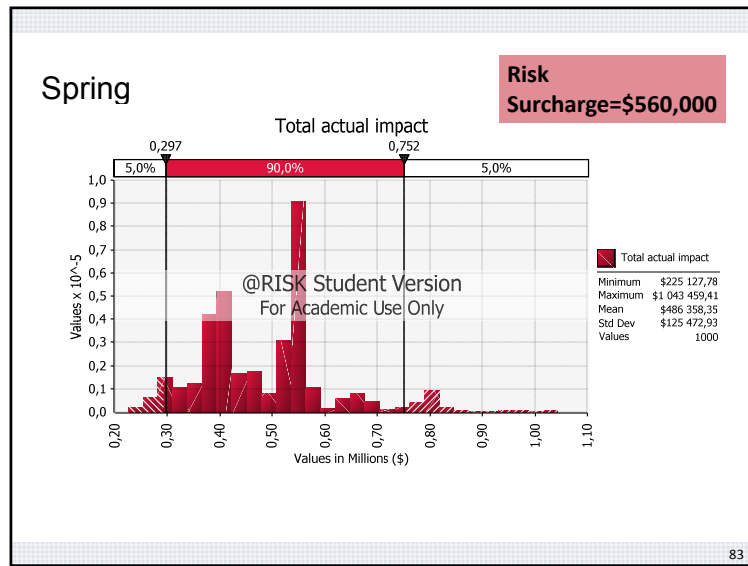
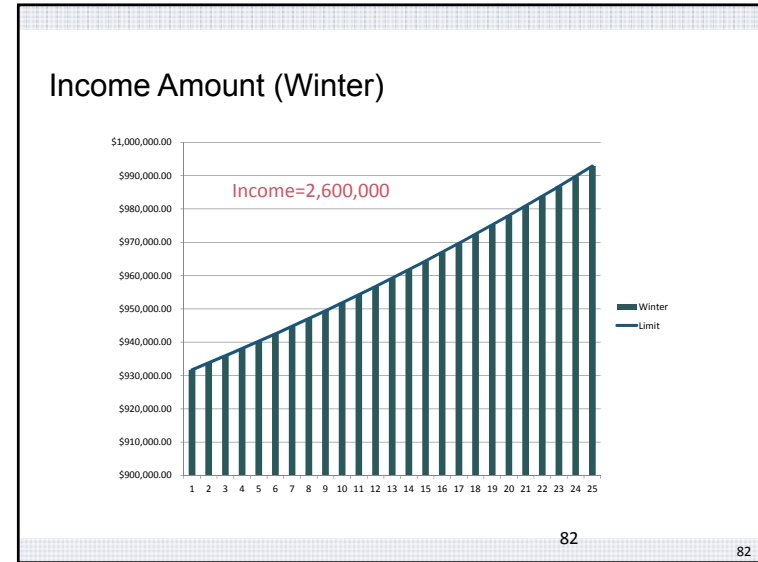
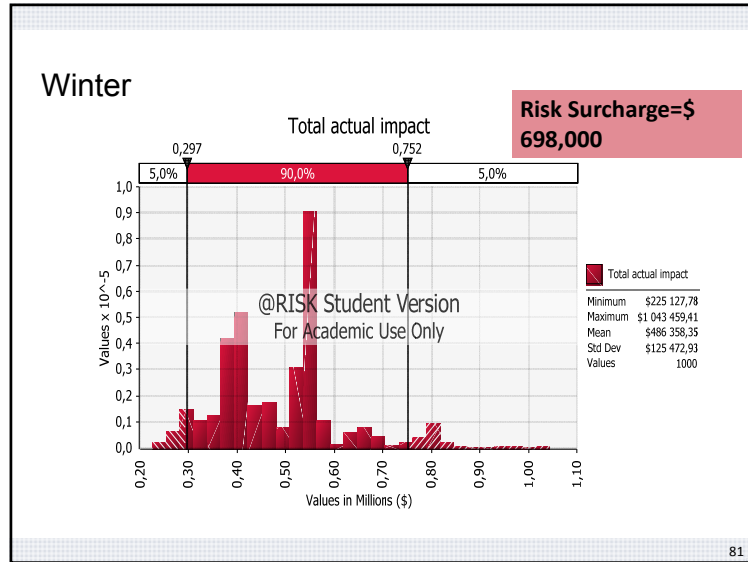
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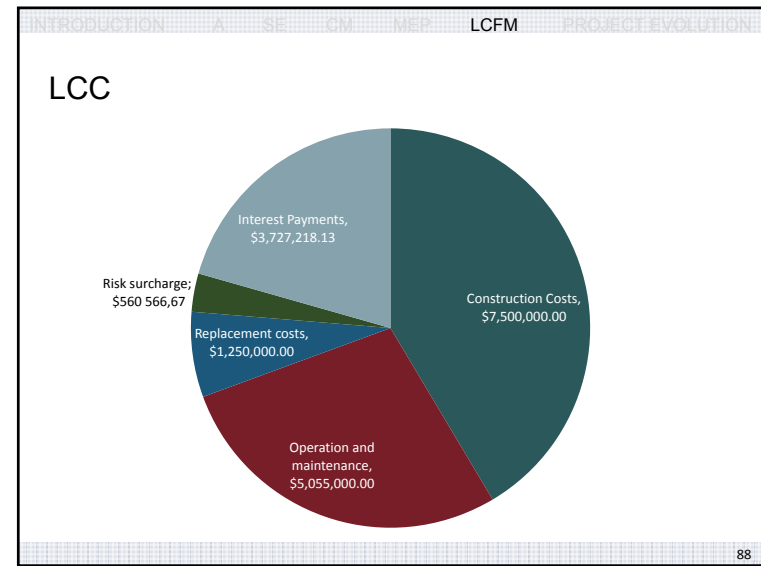
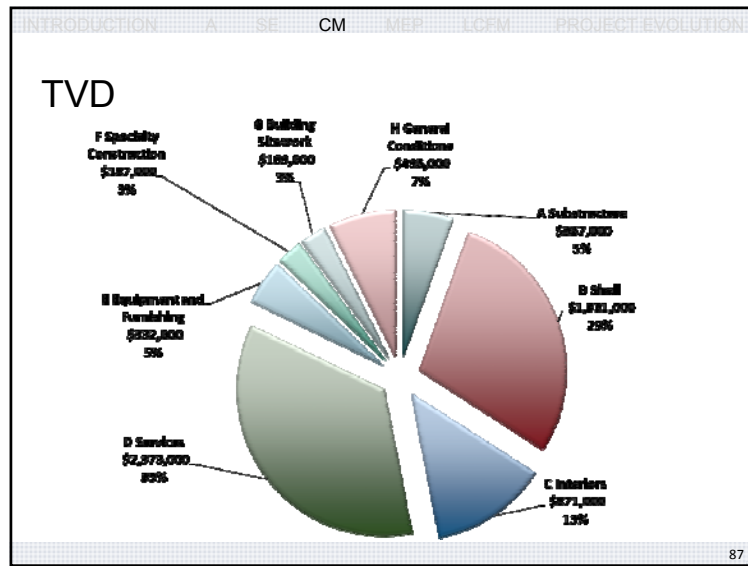
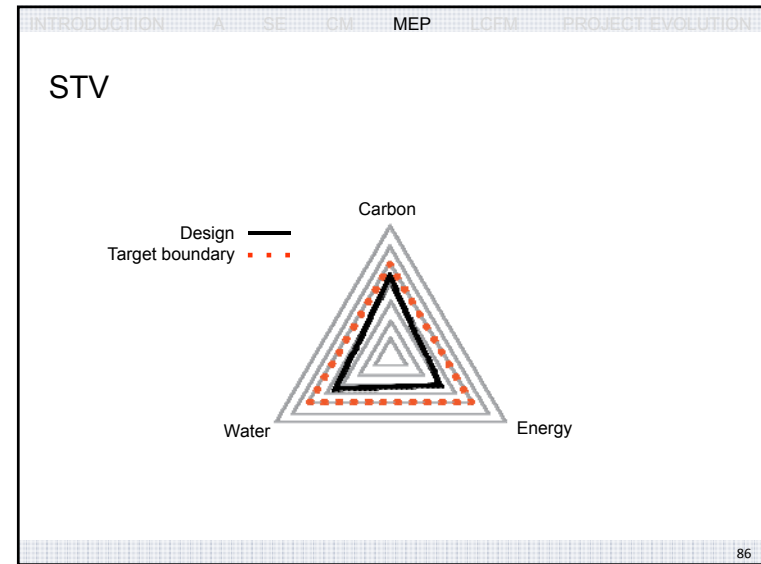
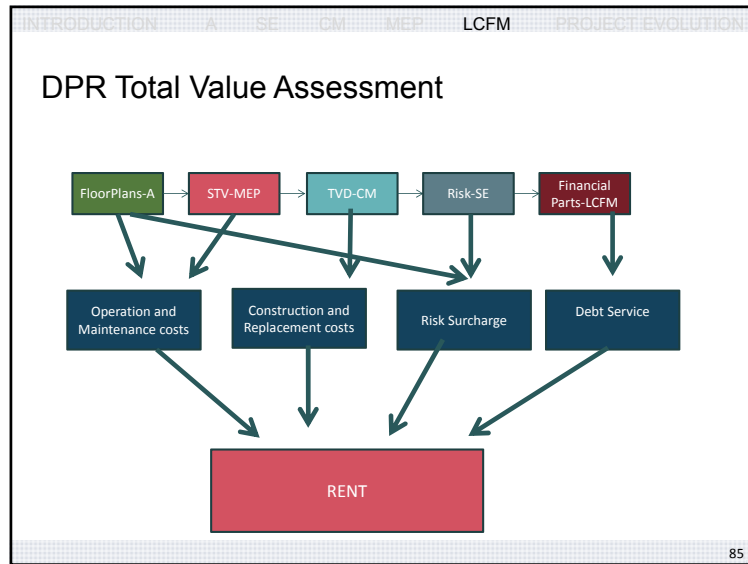
### Innovative Pull and Batch Scheduling

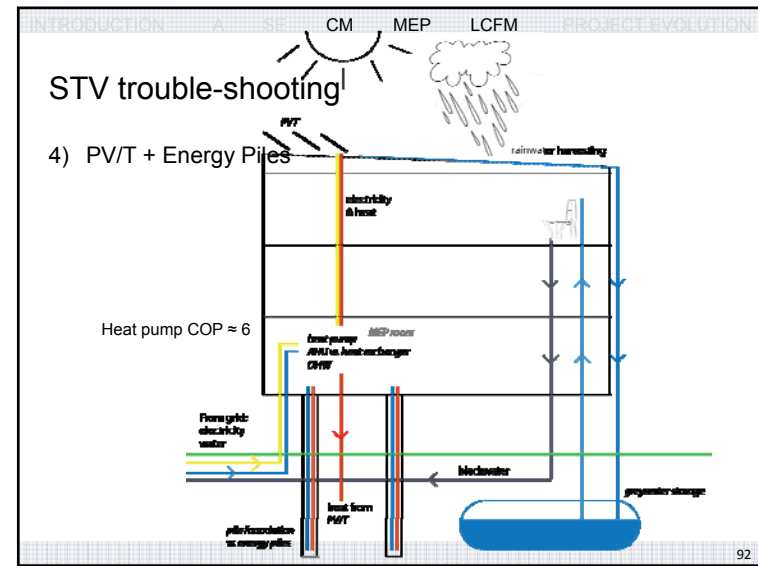
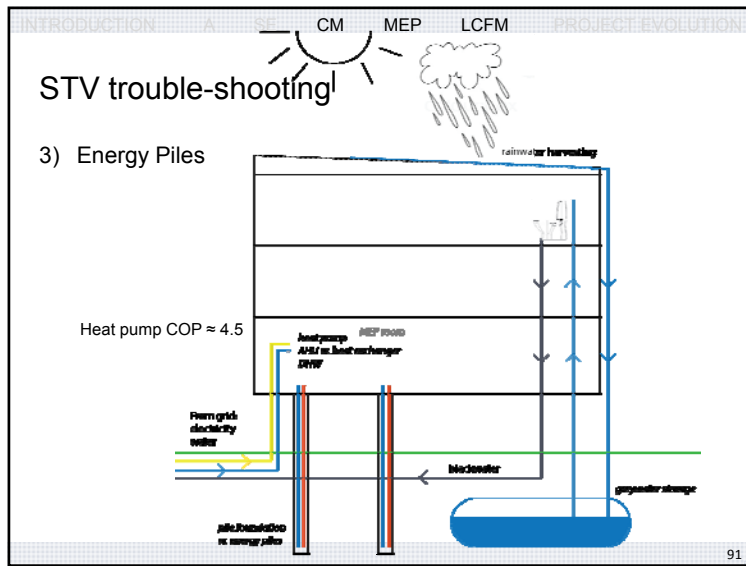
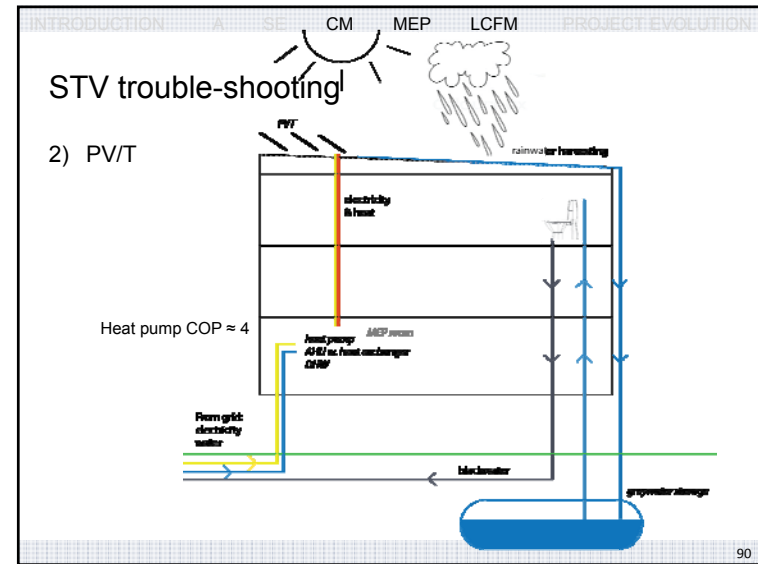
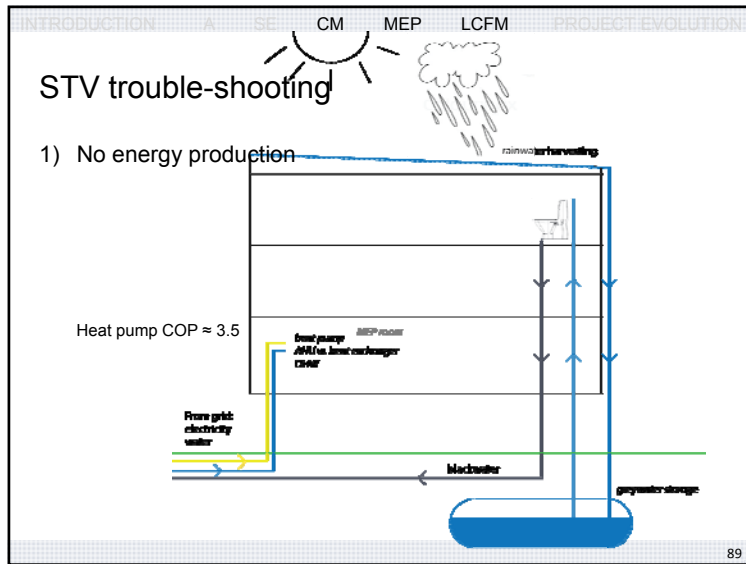


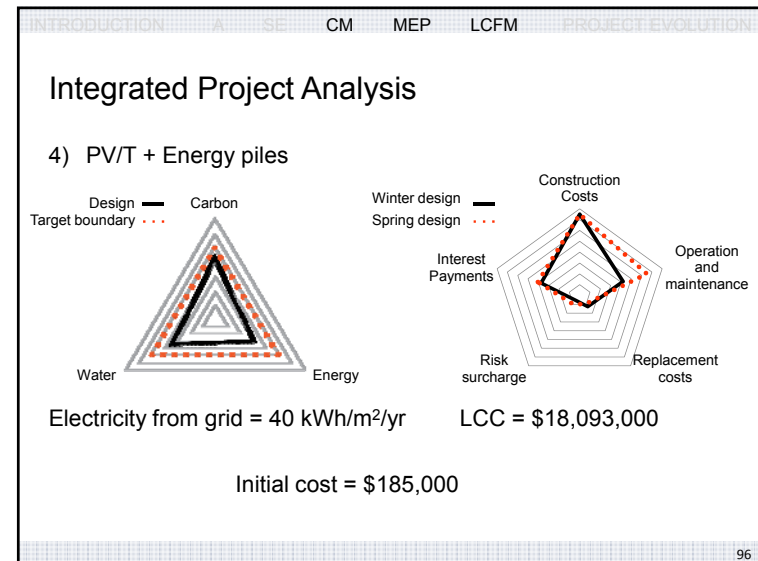
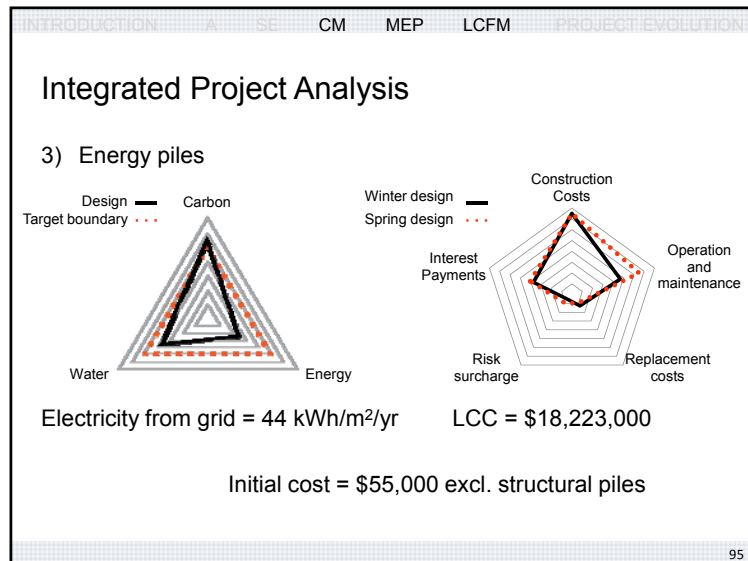
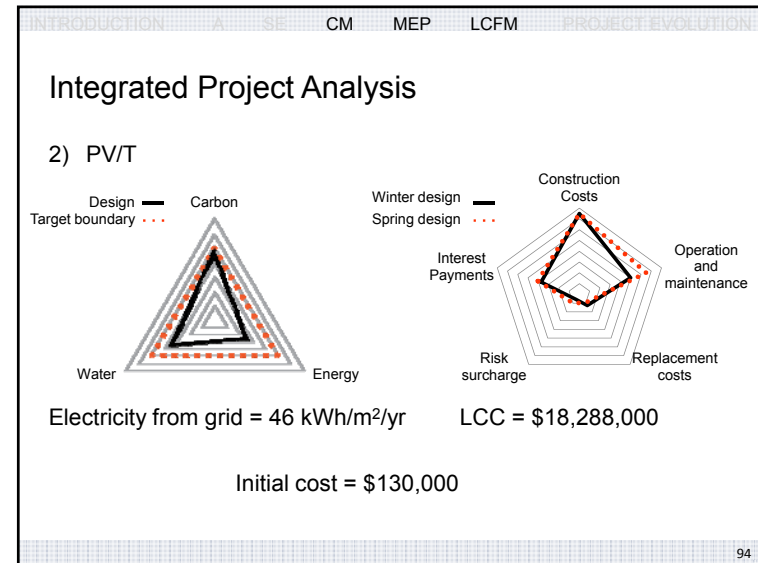
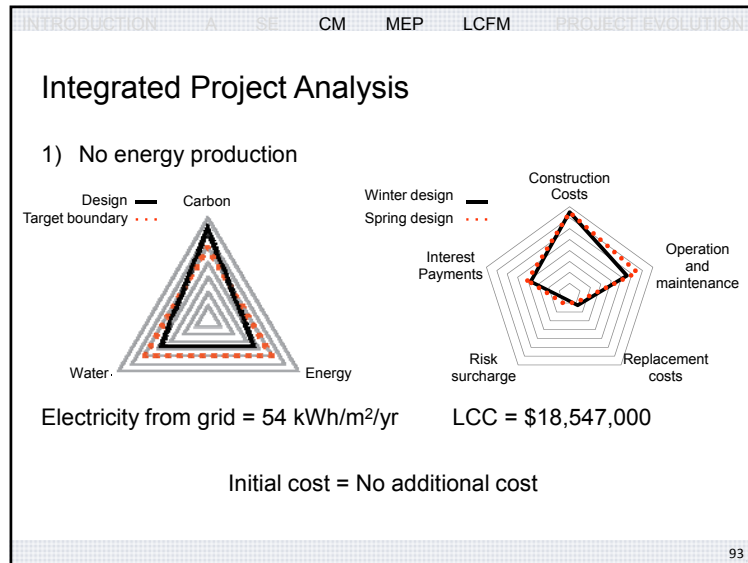
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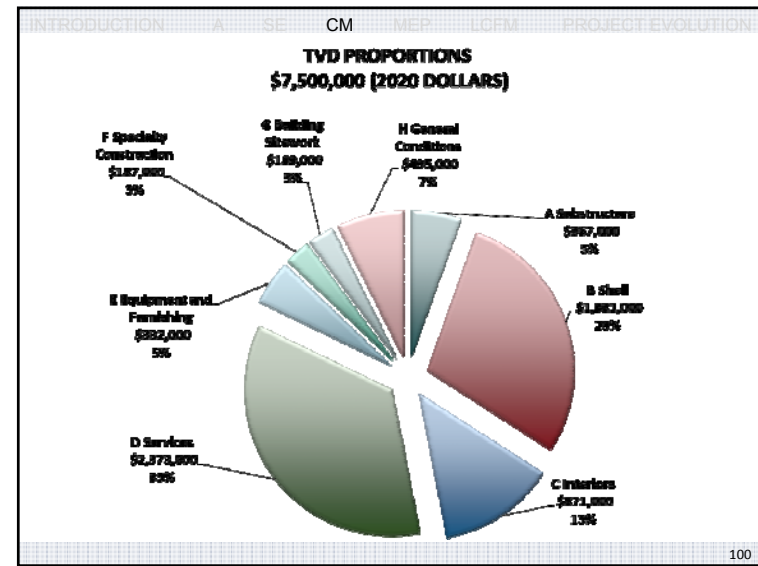
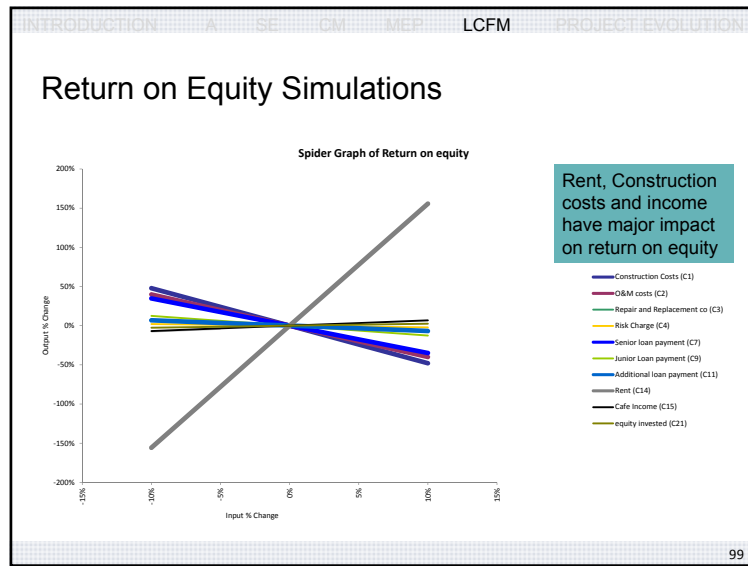
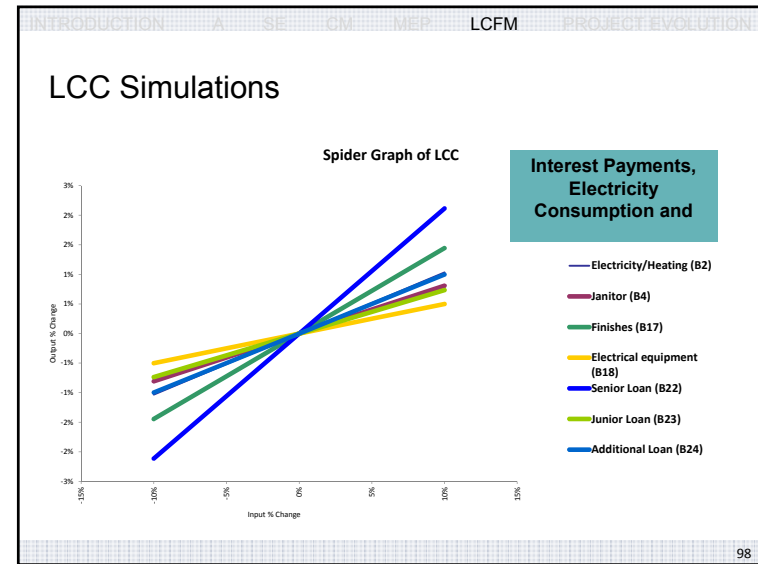
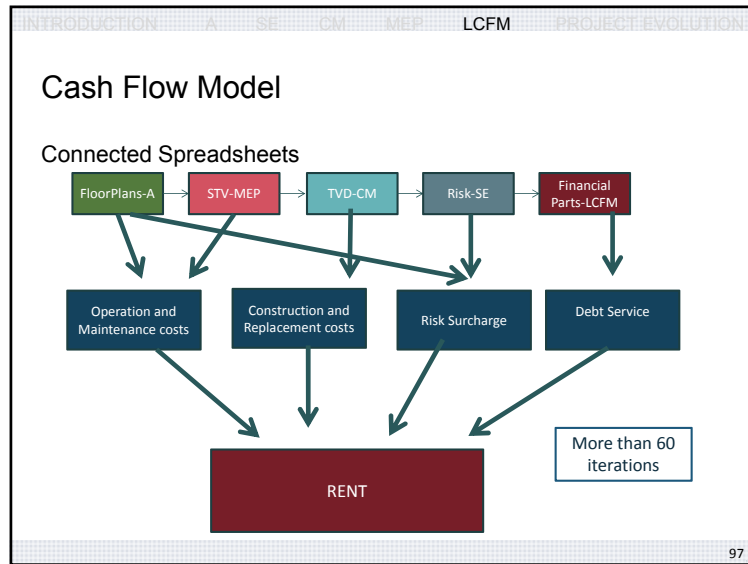










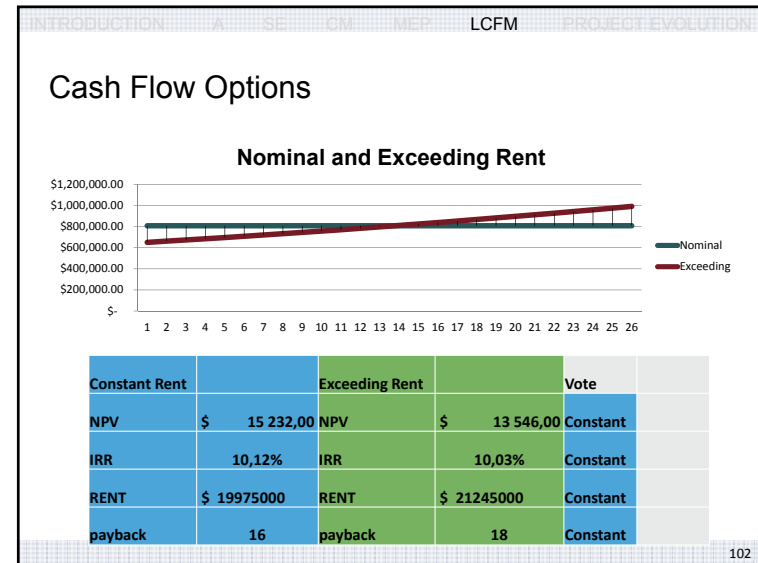


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## TVD TOTALS

ESTIMATE AND TARGET VALUE - SUMMARY			
	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
<b>TOTAL</b>	\$ 6,745,000	\$ 6,800,000	\$ 55,000
A Substructure	\$ 367,000	\$ 340,000	\$ (27,000)
B Shell	\$ 1,931,000	\$ 2,040,000	\$ 109,000
C Interiors	\$ 871,000	\$ 884,000	\$ 13,000
D Services	\$ 2,373,000	\$ 2,380,000	\$ 7,000
E Equipment and Furnishing	\$ 332,000	\$ 68,000	\$ (264,000)
F Specialty Construction	\$ 187,000	\$ 204,000	\$ 17,000
G Building Sitework	\$ 189,000	\$ 272,000	\$ 83,000
H General Conditions	\$ 495,000	\$ 612,000	\$ 117,000

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### Expert Crowd Sourcing Linkedin Discussion Thread “Nominal or Exceeding Rent?”

**Coskun Akdeniz**  
International Business Development Consultant

Coskun  
Thank you Norayr for starting such and interesting yet as critical discussion. I am working to conceptualize a financial model for a PPP project on a BRT (Public Rapid Transit). This is a sensitive sector as it is a public transport. It is a ticket price sensitive issue and the costs and traffic assumptions and mobilization factor of the community making use of it must support assumptions. I would favor a fixed nominal return as well. Can have your and other participants comment on my thinking as well please. Thanks

Like • Reply privately • Flag as inappropriate • 7 days ago

**Valentijn Thijssen**  
independent advisor, freelancer at Independent consultant

Valentijn  
with calculated versus actual return AND return for equity providers, return for debt providers, AND ticket prices in the future AND cost to the government (I assume they will provide some sort of investment or funding support), the factors to be taken into account and to be modelled are already quite complex. Much more so than the question of modelling a yield for equity investors, nominal or inflation linked.

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### Expert Crowd Sourcing Linkedin Discussion Thread “Nominal or Exceeding Rent?”

**Alphons Ranner**  
Voorzitter Waterkring NVRR

Alphons  
Though I fully agree with the remarks made by Valentijn, I would like to draw your attention to the inflation indexation risk. Many PPP projects involve providing services of a public nature and usually have a longer time span. So over the life cycle periods of high and low inflation are likely. In the situation of an inflationary economy price indexation could be very unpopular with the public and unions protesting the price hikes. The government could then press the PPP company to be lenient. In order to ward off reputation risks setting a ceiling to the price increase could be required. Recuperating the resulting loss of revenue and a later moment in time is highly unlikely. Nominal and stable price increases are the easiest way forward.

Like • Reply privately • Flag as inappropriate • 7 days ago


**Yuri Biondi**  
Tenured Research Fellow at CNRS

Yuri  
You can read my own methodology developed in 'Cost of Capital, Discounting, and Relational Contracting: Endogenous Optimal Return and Duration for Joint Investment Projects'. Applied Economics, Volume 43, Issue 30, December 2011, pages 4847-4864. Available at SSRN. <http://ssrn.com/abstract=1330587>. Feel free to contact me privately on its application

Like • Reply privately • Flag as inappropriate • 7 days ago

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### Expert Crowd Sourcing Linkedin Discussion Thread “Nominal or Exceeding Rent?”



**Paul Booth**  
CEO - Brightstar

I agree, presentation in nominal terms as the actual indexing is on speculative at this stage. The more challenging related question is which indices do you use to inflate the different parts of your tariff and how these decisions are justified.

Like • Reply privately • Flag as inappropriate • 8 days ago

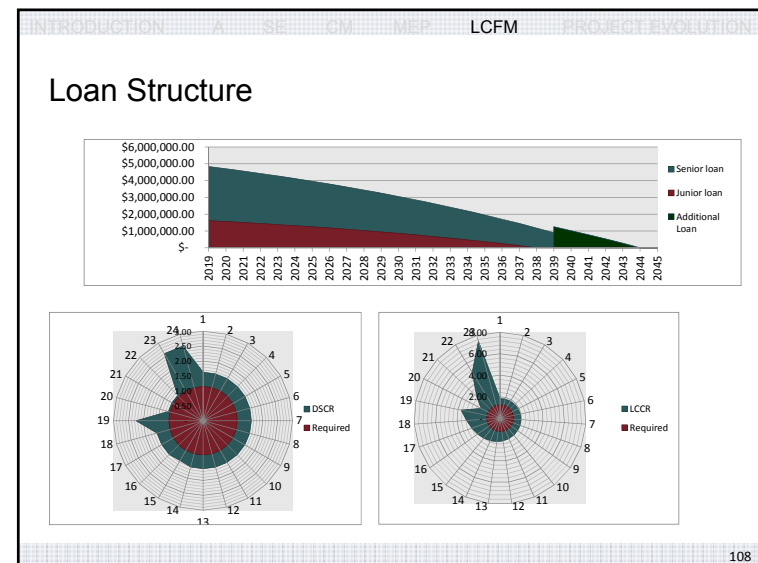
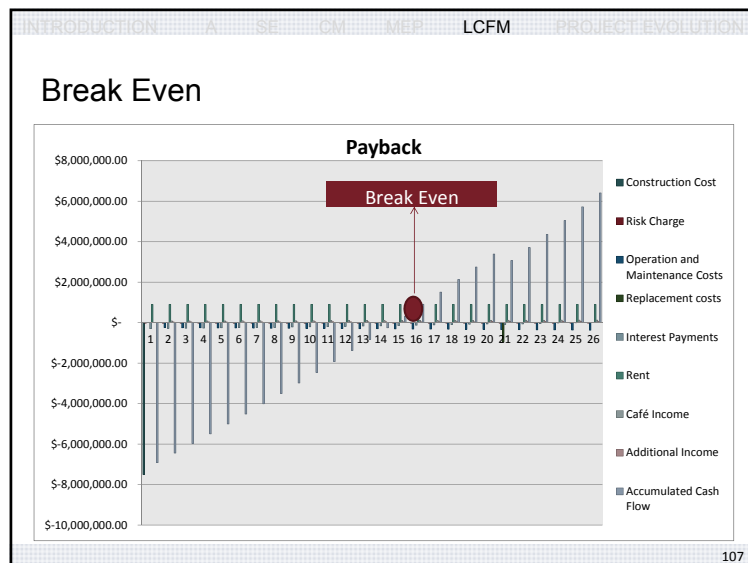
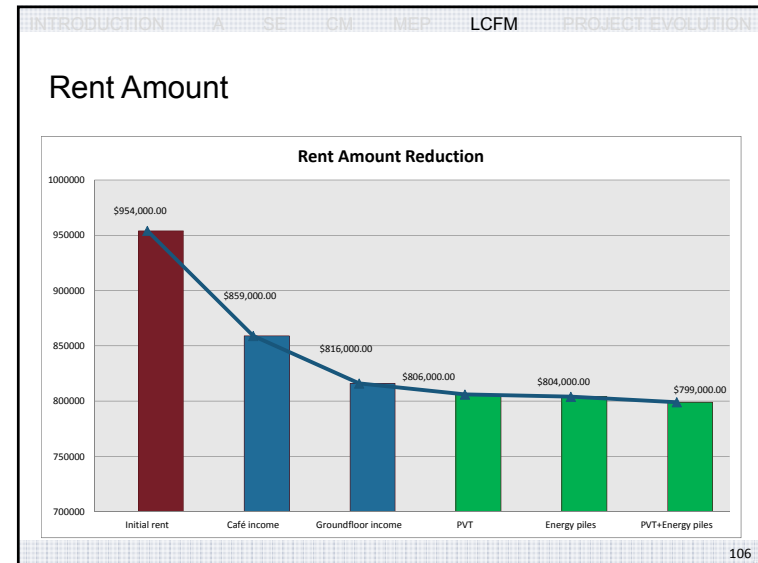


**Norayr Badasyan**  
Doctoral Research Scholar at Bauhaus University Weimar

thanks for the comment. Yes, this was another issue with indices, as it is pretty difficult to justify their rise in future...now it seems that nominal is better with putting all the data in cash flow...npv, irr is also much more attractive...thanks again

Delete • 8 days ago

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## Building Value – DPR Challenge

**Who**

- ✓ Owner
- ✓ Students
- ✓ Professors
- ✓ Community
- ✓ Environment
- ✓ Future Generation

**When**

- ✓ Design
- ✓ Construction
- ✓ Operation
- ✓ After the contract

**How**

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## Building Health – Swinerton Challenge

A building design which.... **Is environmentally healthy**

- ✓ Low energy consumption
- ✓ Low impact on the environment

**Provides comfortable and healthy interior spaces**

- ✓ Reduction of stress-related illness
- ✓ Increased user and learning experience
  - High daylight level
  - High speech intelligibility
  - Good thermal comfort
  - High IAQ

**Is aesthetically pleasing**

- ✓ Invites the nature into building
- ✓ Encourages an active living
  - Parking area for bikes
  - Possibility to bike to work/school because of shower facilities
  - Flow in building, stairs ...?

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## Difference between LEED & DGNB certification



**LEED**  
U.S. GREEN BUILDING COUNCIL  
LEED CERTIFIED  
USGBC



**DGNB**  
Deutsche Gesellschaft für Nachhaltiges Bauen e.V.  
German Sustainable Building Council

<p>Location &amp; Transportation 10/15</p> <p>Sustainable Sites 7/10</p> <p>Water Efficiency 5/12</p> <p>Energy &amp; Atmosphere 26/38</p> <p>Material &amp; Resources 8/8</p> <p>Indoor Environmental Quality 15/17</p> <p>Innovation 4/6</p> <p>Regional Priority 2/4</p> <p><b>Total 77/110</b></p> <p><b>GOLD</b></p>	<p>Environmental Quality 35/60</p> <p>Economic Quality 12/20</p> <p>Sociocultural and Functional Quality 109/150</p> <p>Technical Quality 45/90</p> <p>Process Quality 33/100</p> <p>Site Quality 27/60</p> <p><b>Total 55%/100%</b></p> <p><b>BRONZE</b></p>
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## Clash of the Cultural Titans

- 6 National Identities and Cultures



- 5 Professional Backgrounds
- 5 Organizational Contexts



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## Intentional Communication

- Informal Polling and Discussions



- Focused Facebook Chats and Events



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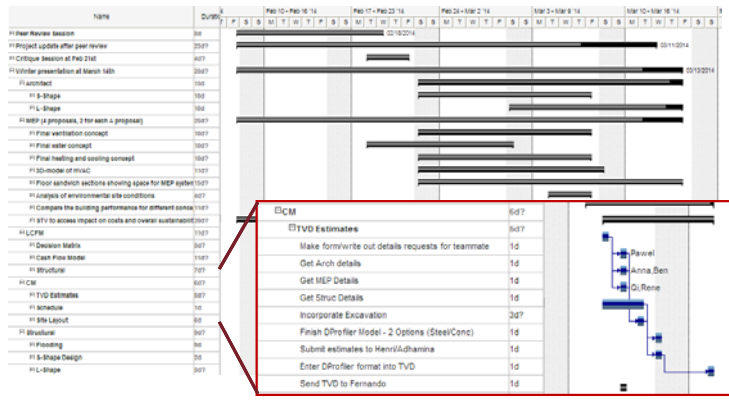
## Overcoming Miscommunication



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## Staying in the Know

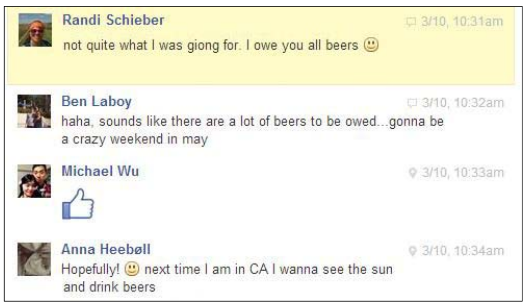


Task	Start	End
Peer Review Session	Feb 10 - Feb 16 '14	Feb 10 - Feb 16 '14
Project update after peer review	Feb 17 - Feb 23 '14	Feb 17 - Feb 23 '14
Critique Session at Feb 21st	Feb 21 - Feb 21 '14	Feb 21 - Feb 21 '14
Vendor presentation at March 14th	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Architect	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
H-Shape	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
H-Shape	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
MEP (4 programs, 2 for each a program)	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Final ventilation concept	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Final water concept	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Final heating and cooling concept	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
3D-model of mvc	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Floor section sections showing space for MEP system	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Analysis of environmental site conditions	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Compare the building performance for different options	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
SV to assess impact on costs and overall sustainability	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
LCFM	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Decision Matrix	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Cost Price Model	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Structure	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
CM	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
TVD Estimates	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Structure	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Site Layout	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Structure	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
Finishing	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
H-Shape Design	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14
H-Shape	Mar 14 - Mar 14 '14	Mar 14 - Mar 14 '14

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## Becoming a Team



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The main thing we learned...

 <i>"Transparency and trust = Key factors of integrated design" ~ Anna</i>	 <i>"Bridging professions, solving the problems" ~ Pawel</i>
 <i>"It is as important to listen as to participate" ~ Rene</i>	 <i>"7 minds are better than 1. Be sure to use them all" ~ Norayr</i>
 <i>"It's all about people" ~ Qi</i>	 <i>"Persistent patience is key to IPD." ~ Randi</i>
 <i>"Always press 'save'" ~ Ben</i>	

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**THANK YOU OWNERS**

Gitte Sørensen, Milos Todorovic & Felix Bollwahn

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**THANK YOU MENTORS**

Willem Kymmell, David Bendet, Kyle Adams, John Nelson, Ronnie Haagenen, Toke R. Nielsen, Forest Peterson, Charles Bovet, Björn Wündsich, Matthias Ehrlich, Axel Seifert, Greg Luth, Nick Arenson, Justin Schwaiger, Eduardo Miranda & Adhemina Rodriguez

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**THANK YOU SUPERMENTOR**

Renate Fruchter

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