MICHELLE YANG ARCH 3630 Advanced Detailing Studio Assignment #3

Assignment research on **Czech Republic** and **University of Southern California**

Project climate conditions: average temperature characteristics of **New York City** and **Irvine California**.

Project climate conditions:

New York City: (central park)

Mean Temperature:

Aveg.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annu.
High	37.6	40.3	50	61.2	71.7	80.1	85.2	83.7	76.2	65.3	54	42.5	62.3
Low	25.3	26.9	34.8	43.8	53.7	63	68.4	67.3	60.1	49.7	41.1	30.7	47.1
Mean	31.5	33.6	42.4	52.5	62.7	71.6	76.8	75.5	68.2	57.5	47.6	36.6	54.7

Heating Degree Days:

New York Central Park Heating and Cooling	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Heating Degree Days	1039	879	701	375	125	0.0	0.0	0.0	34.0	250	522	880	4805
Cooling Degree Days	0.0	0.0	0.0	0.0	54.0	203	366	326	130	17.0	0.0	0.0	1096

Practical seasons: Four seasons

Humidity:

Avg. Relative Humidity	66.0	64.0	62.5	60.5	61.0	63.5	65.5	66.5	68.0	66.5	64.0	64.0	66.0

Precipitation:

Avg. Relative Humidity	66.0	64.0	62.5	60.5	61.0	63.5	65.5	66.5	68.0	66.5	64.0	64.0	66.0
Precipitation (inches)	3.4	3.3	4.1	4.2	4.4	3.7	4.3	4.0	3.9	3.6	4.5	3.9	47.2
Days with Precipitation 0.01 inch or More	11.0	10.0	11.0	11.0	11.0	10.0	11.0	10.0	8.0	8.0	9.0	10.0	121
Monthly Snowfall (inches)	7.5	8.6	5.1	0.9	< 0.05	0.0	< 0.05	0.0	0.0	0.0	0.9	5.4	28.4

Temperature extremes records:

Aveg.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annu.
High	37.6	40.3	50	61.2	71.7	80.1	85.2	83.7	76.2	65.3	54	42.5	62.3
Low	25.3	26.9	34.8	43.8	53.7	63	68.4	67.3	60.1	49.7	41.1	30.7	47.1

New York City

Record	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
High	70	72	80	87	97	100	102	100	99	85	81	70
Low	-4	-3	5	18	34	44	49	47	38	27	14	19

Source: http://www.climate-zone.com/climate/united-states/new-york/new-york-central-park/

OEESC climate Zone: 4A

Irvine California

Mean Temperature:

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
Avg.	55.9	57.3	58.5	61.7	64.8	68.5	73.1	74.4	72.4	68.1	61.3	56	

Heating Degree Days:

Long Beach Heating and Cooling	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Heating Degree Days	285	221	214	134	69.0	39.0	0.0	0.0	15.0	24.0	145	284	1430
Cooling Degree Days	0.0	5.0	13.0	35.0	63.0	144	255	295	237	120	34.0	0.0	1201

Practical seasons: Four seasons

Humidity:

Avg. Relative Humidity	51.5	65.5	66.5	66.5	65.5	68.0	68.5	67.5	67.5	67.0	66.0	64.0	65.5

Precipitation:

Long Beach Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation (inches)	2.5	2.5	2.0	0.7	0.2	0.0	0.0	0.1	0.3	0.3	1.6	1.7	11.8
Days with Precipitation 0.01 inch or More	6.0	5.0	5.0	3.0	1.0	< 0.5	< 0.5	< 0.5	1.0	2.0	3.0	5.0	32.0
Monthly Snowfall (inches)	< 0.05	< 0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Temperature extremes records:

Long Beach Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Temperature	55.9	57.3	58.5	61.7	64.8	68.5	73.1	74.4	72.4	68.1	61.3	56.0	64.3
Avg. Max Temperature	66.8	67.7	68.0	71.5	73.3	77.0	82.7	84.0	82.1	78.4	72.1	67.0	74.2
Avg. Min Temperature	44.9	46.9	49.0	51.8	56.3	59.8	63.4	64.8	62.7	57.8	50.4	45.0	54.4

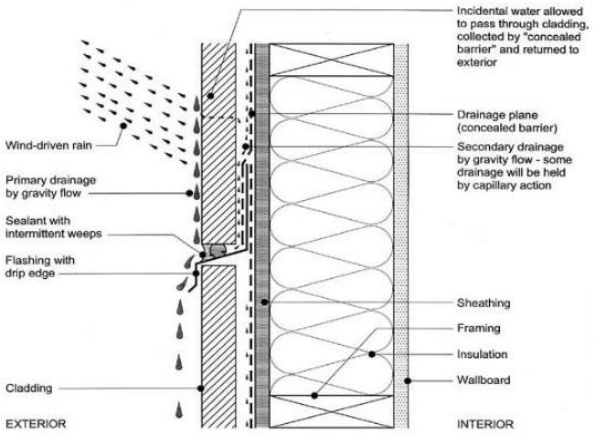
OEESC climate Zone: 3B

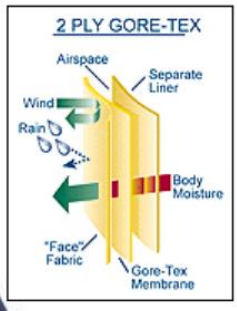
Source: http://www.climate-zone.com/climate/united-states/california/long-beach/

Wall strategy:

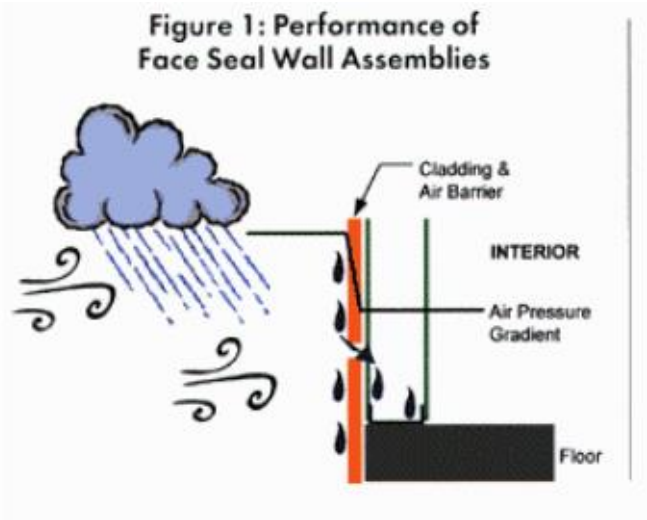
Concealed barrier: An approach to enclosure rain control that employs a single waterproof barrier to rain penetration. The barrier is not on the exposed face of the assembly but concealed behind the cladding and other material layers, which reduces the amount of rainwater reaching the barrier. (source: http://www.buildingscience.com/glossary/concealedbarrier)

Concealed barrier: *relies on multiple layers*





Face seal: In a face seal wall assembly (Figure 1), the air barrier is the exterior surface of the cladding, and thus is the surface at which the pressure drop occurs. This surface is frequently wetted and any imperfections in the face seal surface at wall interfaces will lead to air movement through the holes, and with the wind as the driving force will bring in the water that is readily available on the face of the cladding. (source:http://www.rdhbe.com/database/files/Leaky_Condos___Why_the_Technology_Didnt_Work%2824%29.pdf



Mass wall:

Rainscreen: relies on 2 layers with air space and drainage.

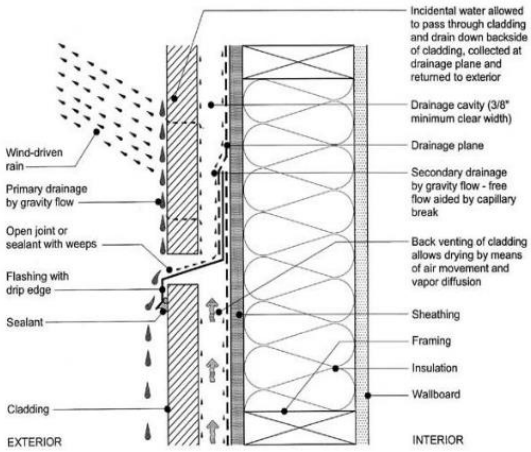
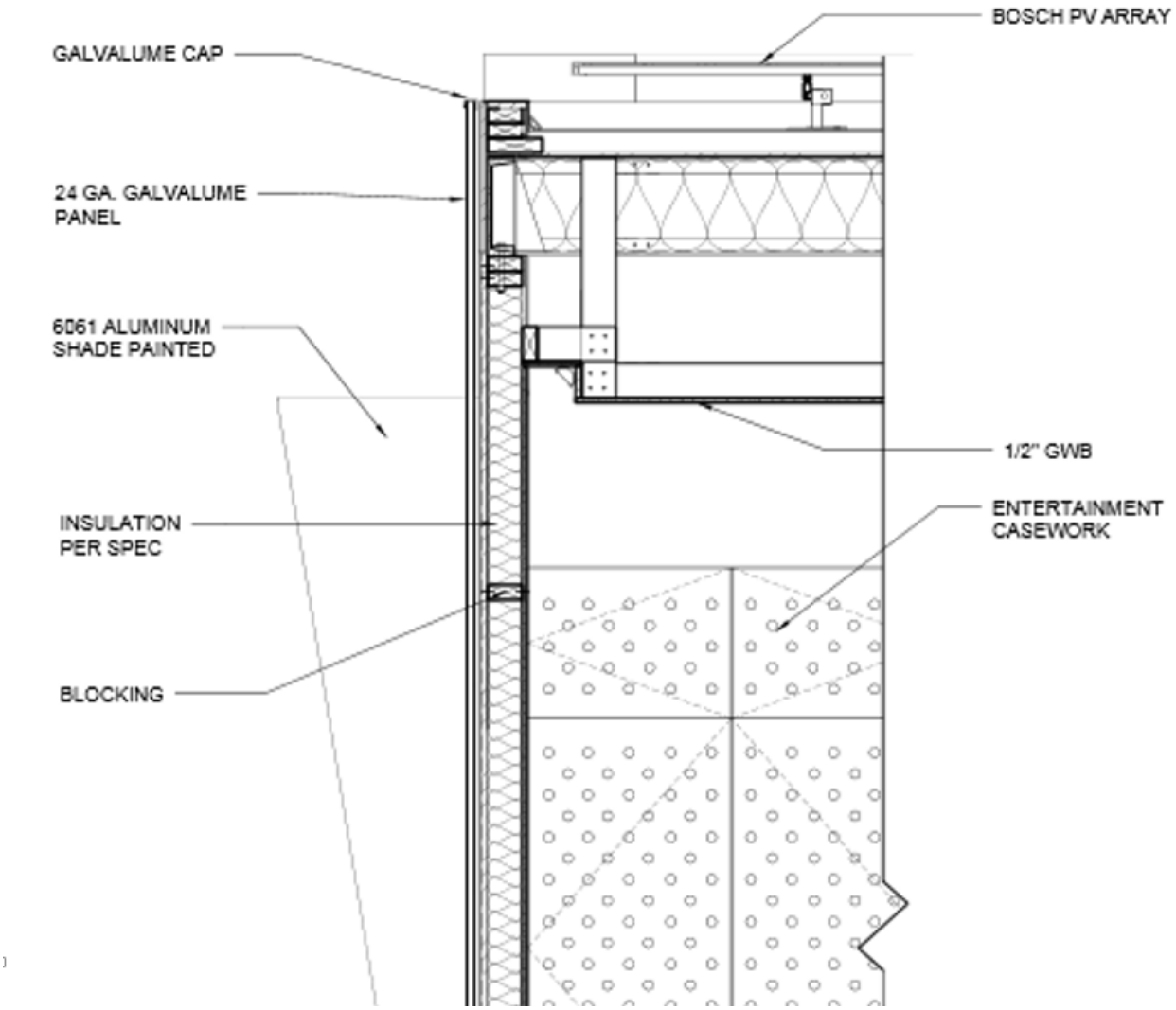
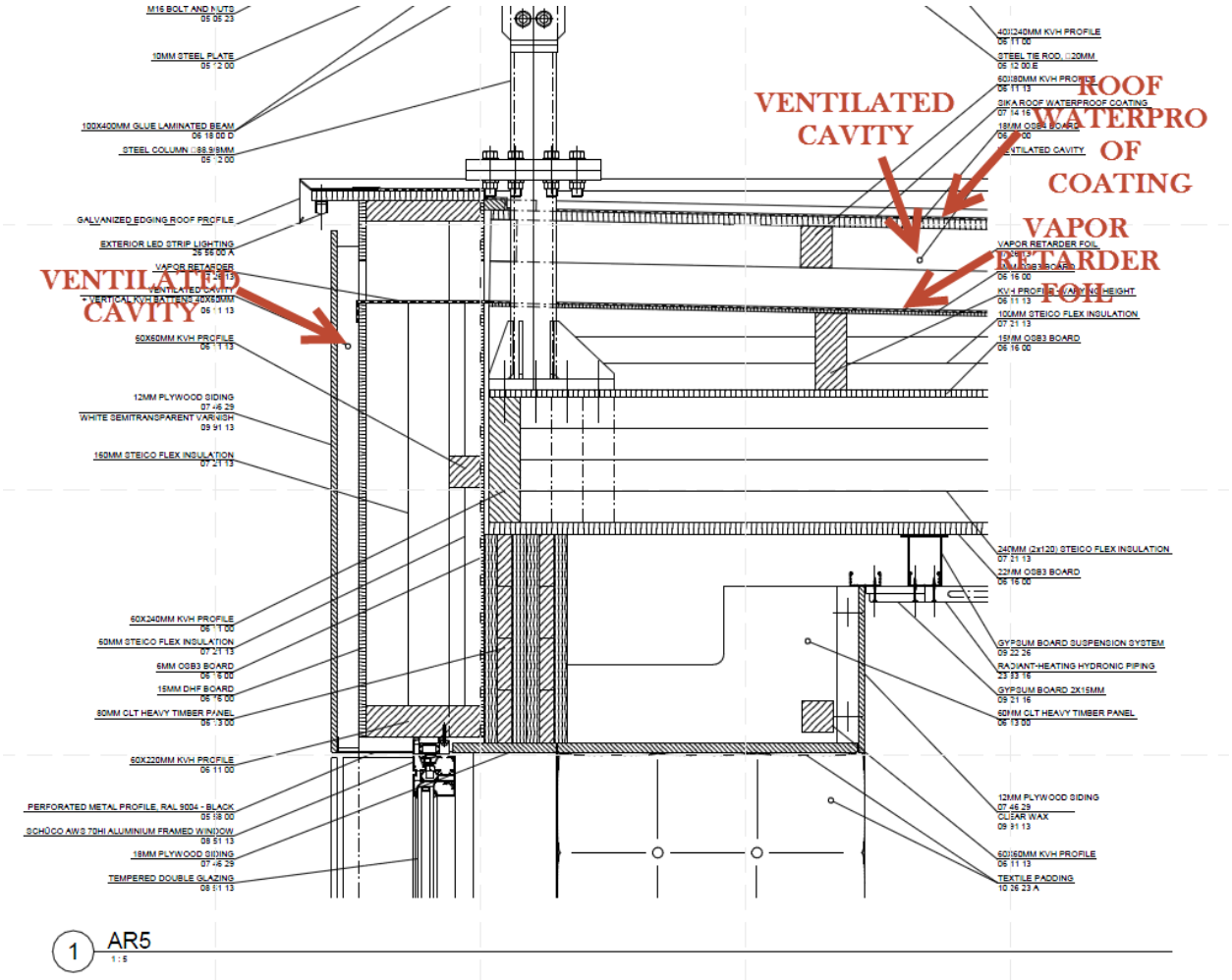


Figure 3 Rainscreen Wall Assembly

How does your wall address: (**UNIVERSITY OF SOUTH CALIFORNIA**)
Durability:
Dewpoint temperature
Water vapor diffusion
Air leakage
Diffuse Flow
Heat Flow within the wall

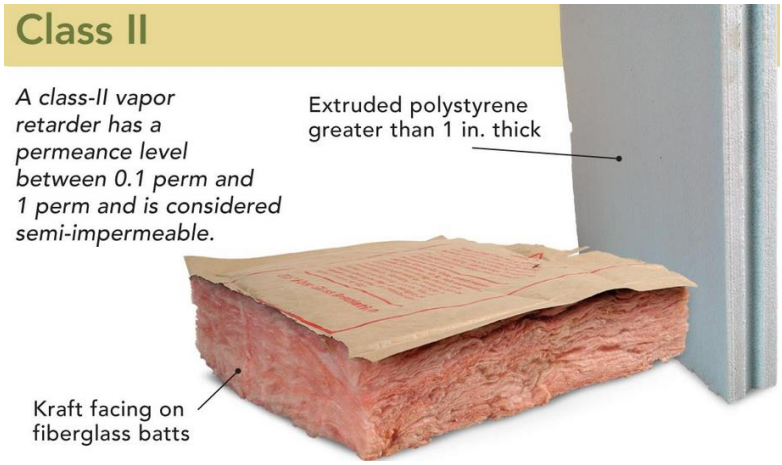


How does your wall address: (**CZECH TECHNICAL UNIVERSITY**)
Durability:
Dewpoint temperature
Water vapor diffusion
Air leakage
Diffuse Flow
Heat Flow within the wall



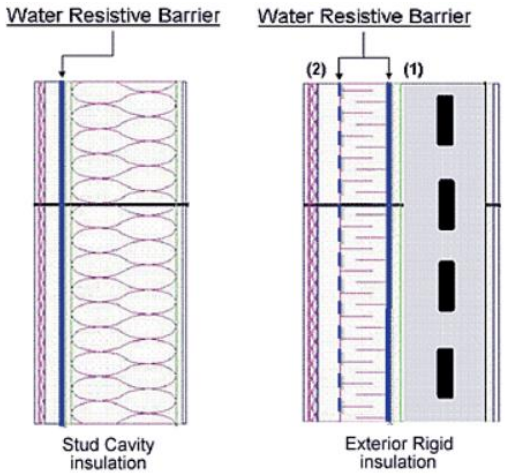
Are these strategies utilized in your project?

Vapor retarder:



Air Barrier: Air barriers control air leakage into and out of the building envelope.

Water Resistive Barrier: are materials specifically designed to protect against rain penetration and prevent water leakage into the building interior.



Source: http://continuingeducation.construction.com/article.php?L=51&C=201&P=2

Thermal Barrier (insulations) and what type(s): Thermal barrier coatings typically consist of four layers: the metal substrate, metallic bond coat, thermally grown oxide, and ceramic topcoat.