STARS | ŽVAIGŽDĖS

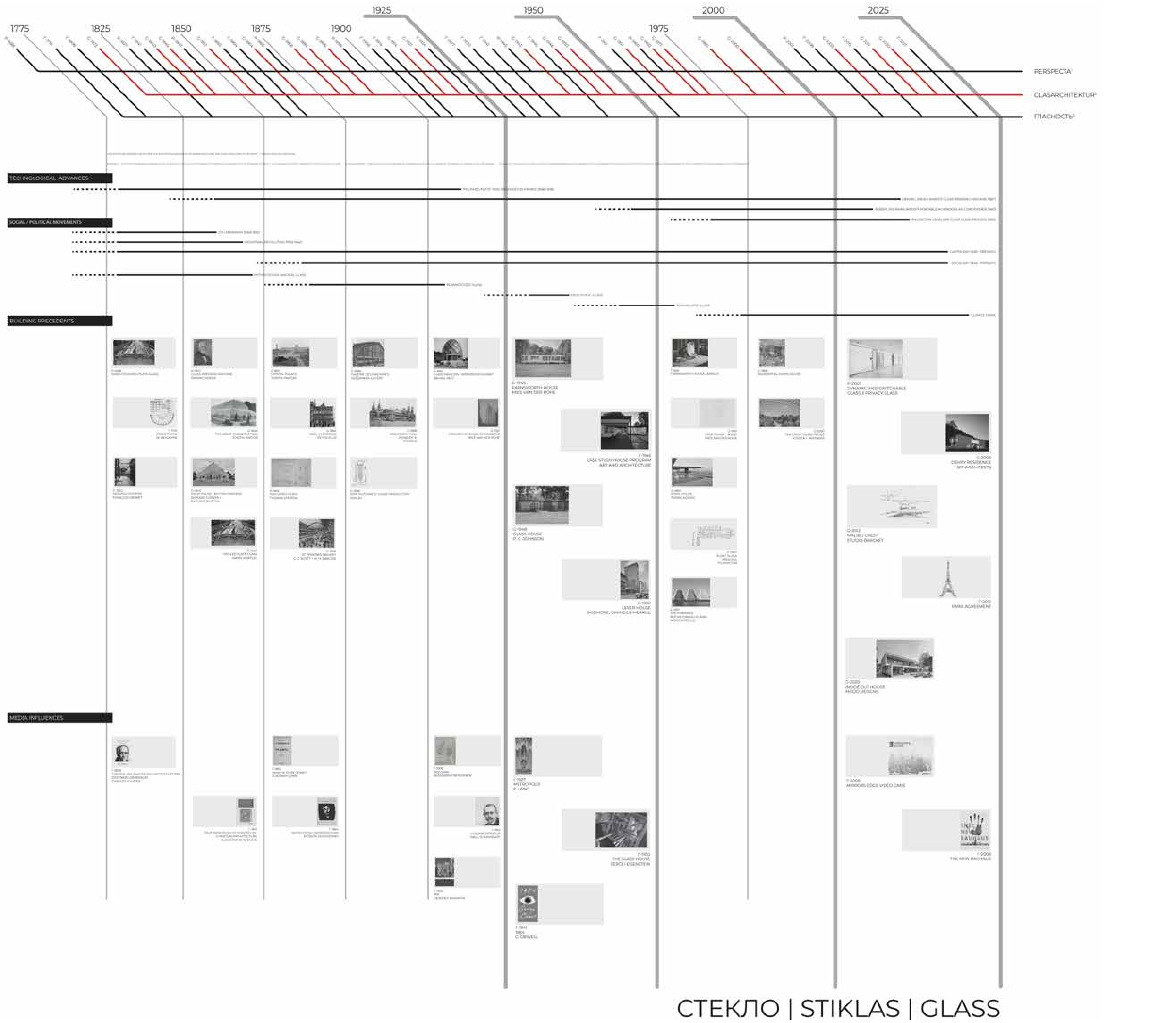
GRAPHIC DRAWING
BY AUGUSTAS LAPINSKAS, 2021

49 X 49

7 X 7 X 7 X 7

X Y Z T

GRACE LAUER | DAISY PENALOZA | AUGUSTAS LAPINSKAS | BLAKE DURHAM | EMMANUEL CORONA NAVARRO | CHENGBIN KUANG

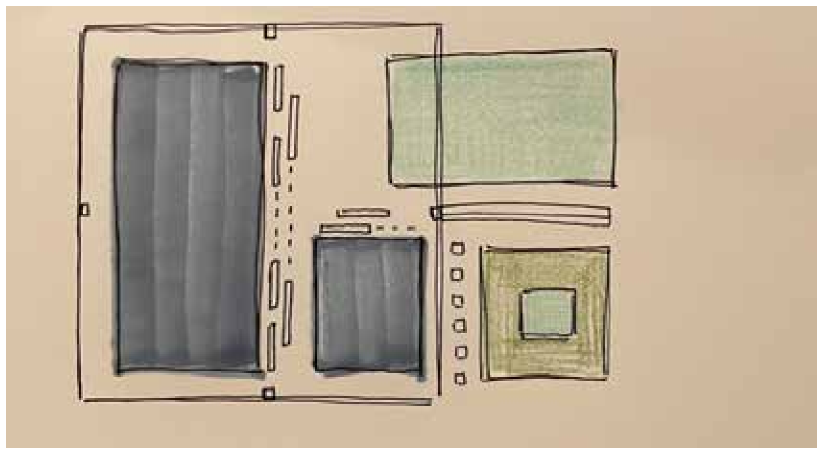


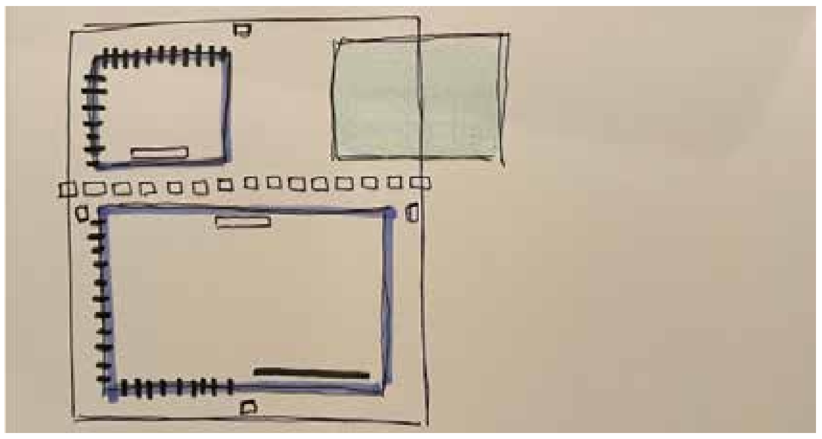
This project started with an analysis of the Core House or 50x50 House by Mies van der Rohe and Myron Goldsmith. Through many iterations and obstacles, we arrived at the 49x49 house. To start the project, we looked back on the sociological and political influences of glass in society. The Industrial Revolution led to technological advances and new applications of glass construction that expanded possibilities for architectural design.

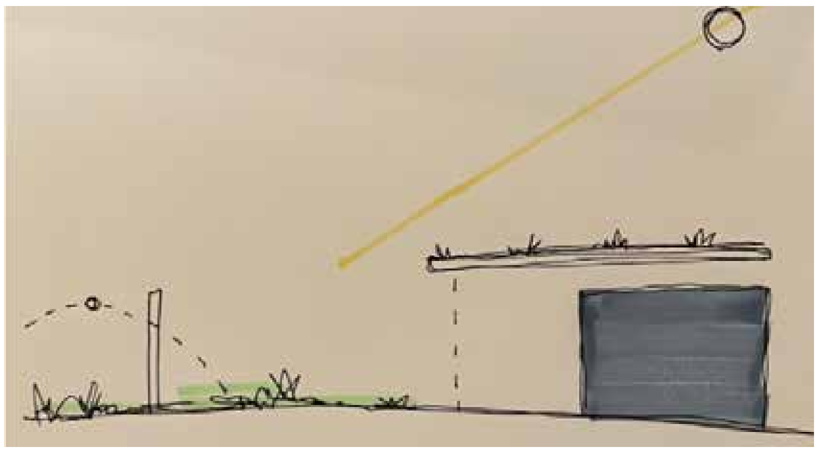
We looked into some literary influences that affected the social interpretations of glass, the most notable one being Zamyatin's "We". These factors influenced our main design process as we asked ourselves, what can we do with glass? When we were imagining our initial ideas for what would become of our house in the future, we took inspiration from another master's work, New Babylon by Constant Nieuwenhuys, which correlated to our nomadic clients and nomadic structure. And for the final fantasy part of the project, the lawless, off-the-grid Slab City was a large influence that led to our Sands of Time project seen in the year 2121. Augustas will now explain more about our nomadic ideology.

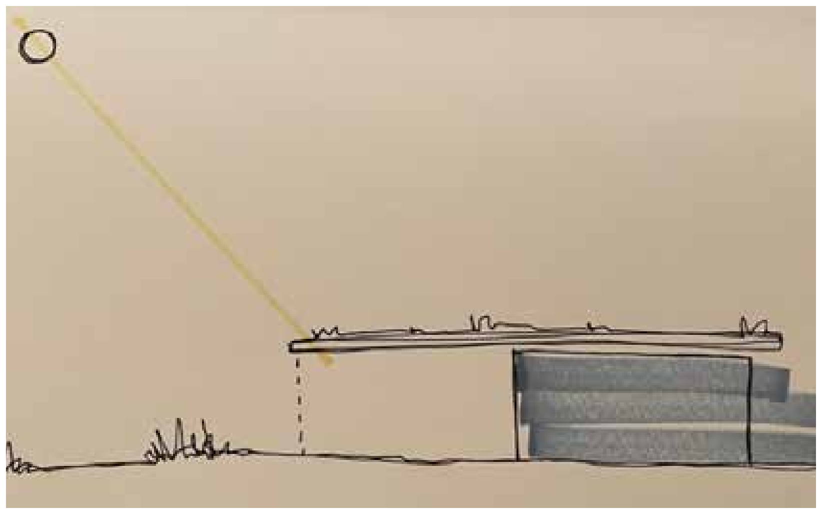
M2_P1 _INTIAL IDEATIONS

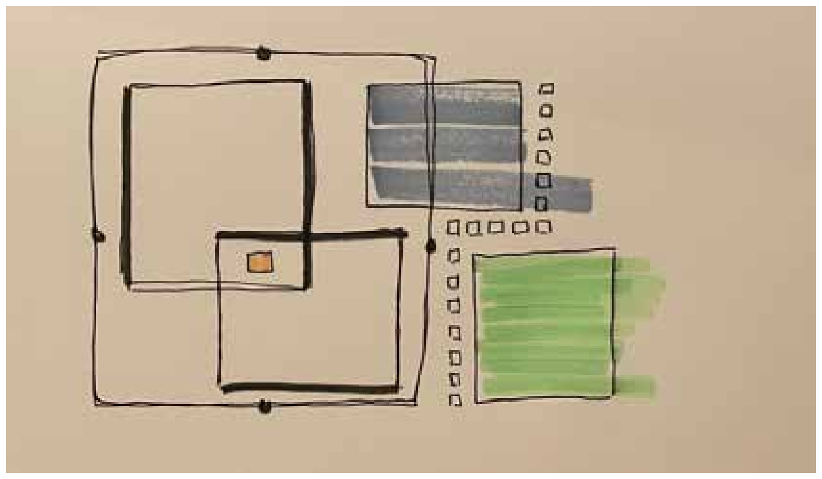
GRACE



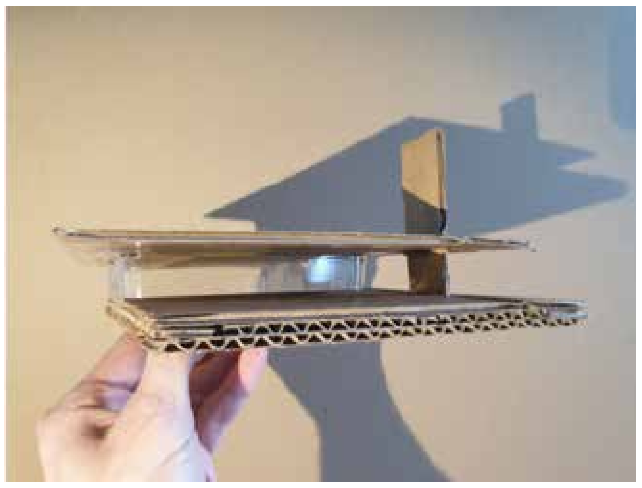


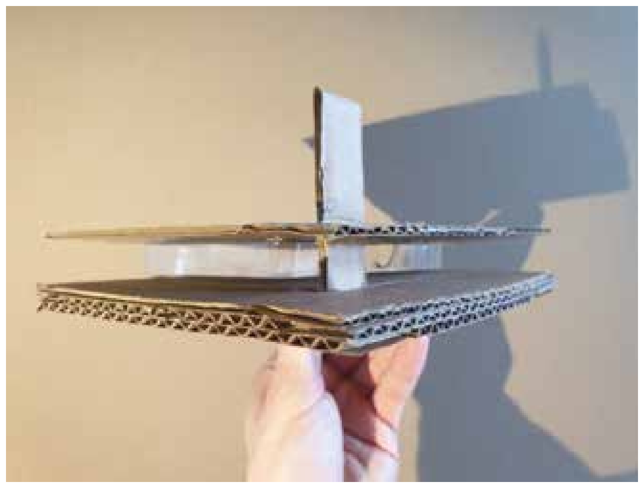


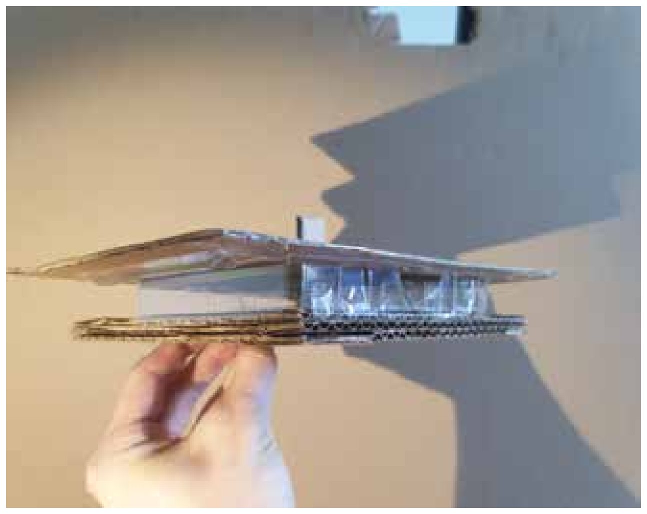


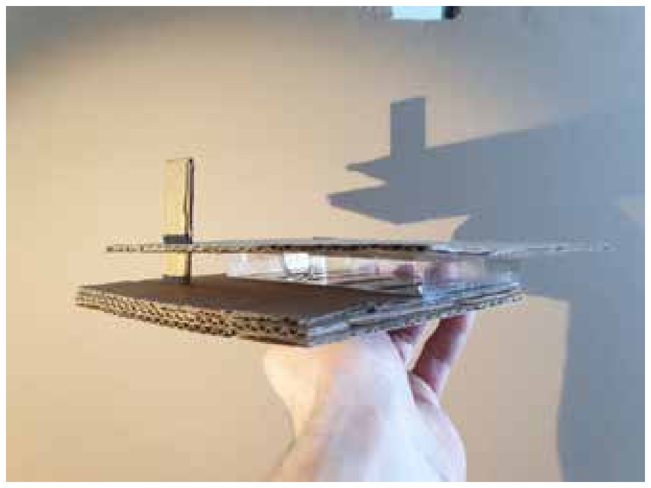


AUGUSTAS

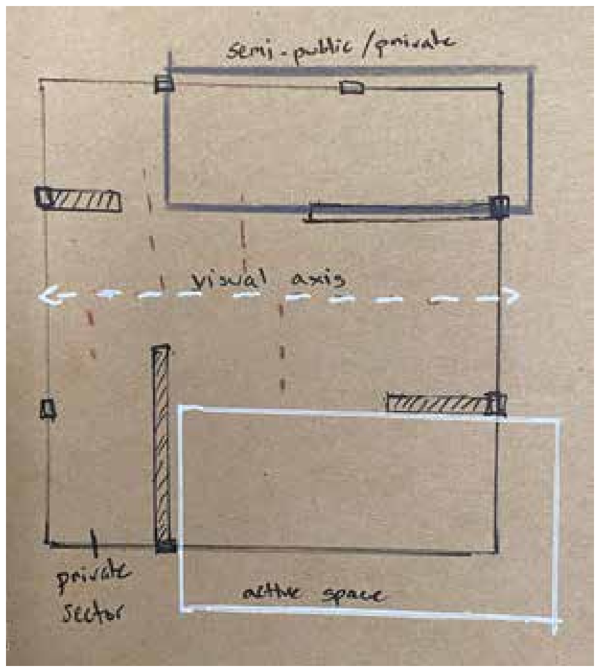


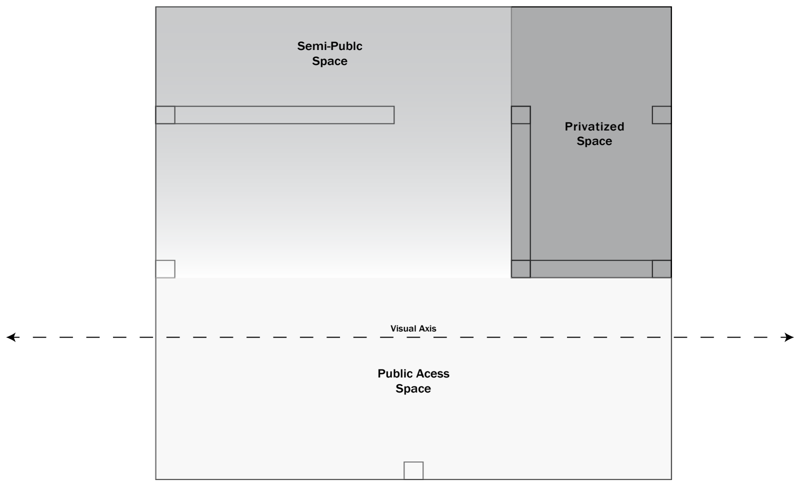


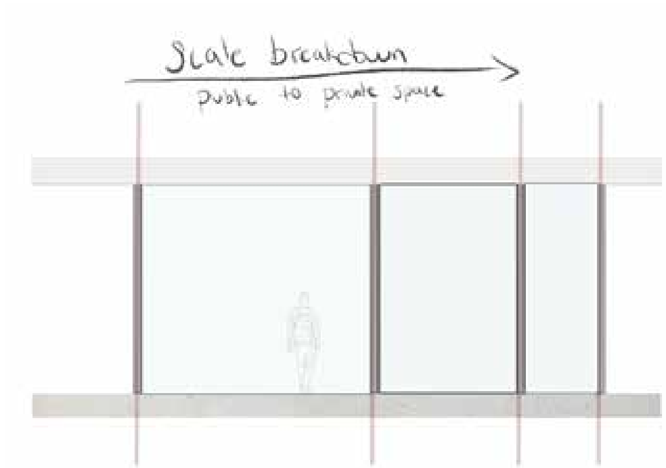


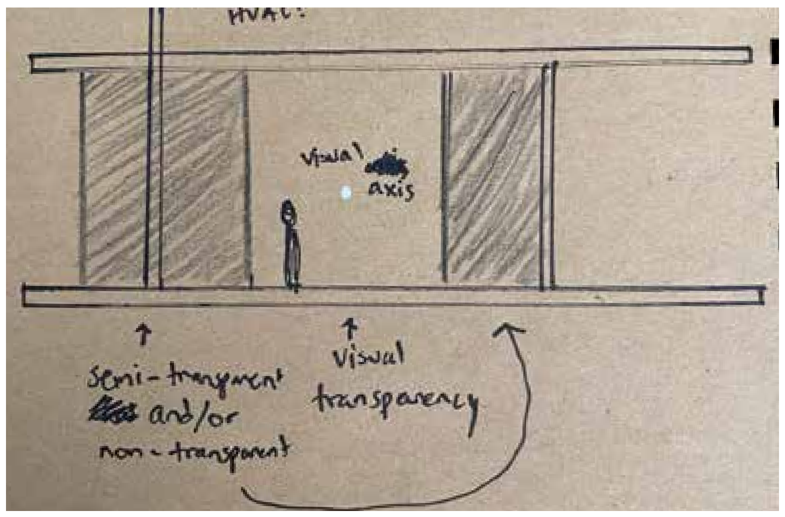


DAISY







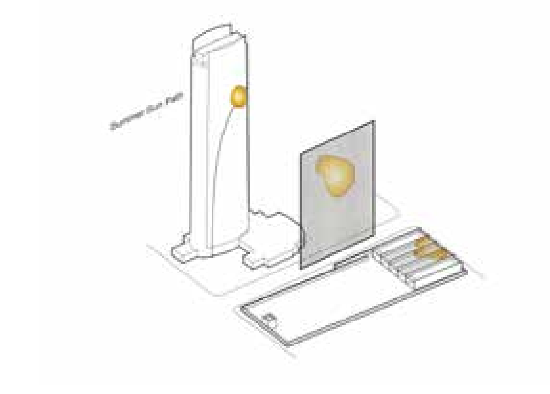


NASHER SCULPTURE CENTER | RENZO PIANO

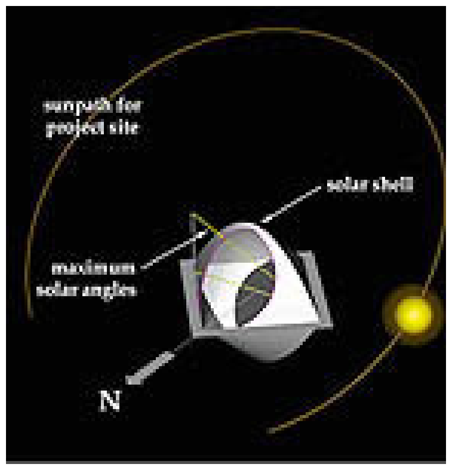
1999 - 2003, DALLAS, U.S.A

SHADING DETAILS

Half a million shell forms make up the Nasher roof designed by Arup.
Photographer: Michel Denancé
http://www.architectureweek.com/2004/0310/building_1-2.html



The intervention's extents were determined by mapping the reflections from museum tower onto a vertical plane along the road separating the two buildings - image © REX architecture
https://www.designboom.com/architecture/rex-and-front-shade-nasher-sculpture-center-with-surya-11-13-2013/



Arup's computer program simulated the sun's movement and subtracted any material from the shell form that did not provide shade.
Image: Arup
http://www.architectureweek.com/2004/0310/building_1-2.html

The shading design was programmed on a computer, starting with a horizontal square with corners pointing north, south, east, and west. The engineers established an initial form based on a sine curve, determined by the building's latitude and longitude, passing through the east and west corners.

This form would block direct sunlight coming from south of the east-west axis. However in the summer, early or late in the day, when the sun is to the north of that axis, direct sunlight would not be blocked by that simple shade.

Below the matrix of shells is a thin skin of curved glass panels with a low-iron composition for maximum transparency. The effect of this roof construction is that direct solar radiation never penetrates to the building's interior, while maximum exposure to the sky provides ample north light, eliminating hard shadows on the sculptures in the galleries.

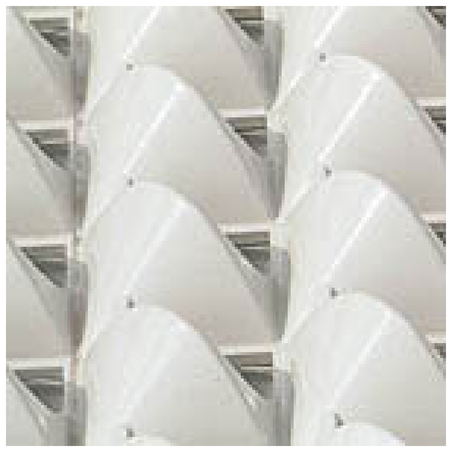
http://www.architectureweek.com/2004/0310/building_1-2.html

Sun screen detail.
Photographer: Michel Denancé
http://www.architectureweek.com/2004/0310/building_1-2.html

The site is situated in downtown Dallas, in what is known as the Art District: the district that houses the city's major cultural and artistic institutions. It was originally a parking lot surrounded by four rectilinear roadways, which was and nestled between a skyscraper and an underground freeway.

According to the customer's requests, the museum had to be a quiet place – an oasis amid the tall skyscrapers. The project's aim was therefore to create a museum-garden that would astound the city from a sociological and anthropological standpoint (as if an archaeological find were to have suddenly been uncovered in the heart of a modern metropolis).

http://www.rpbw.com/project/nasher-sculpture-center

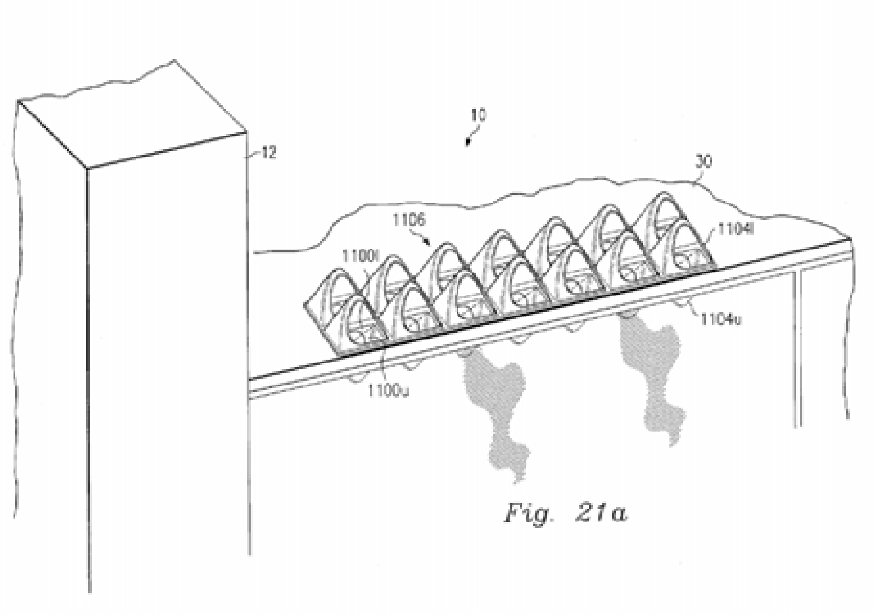


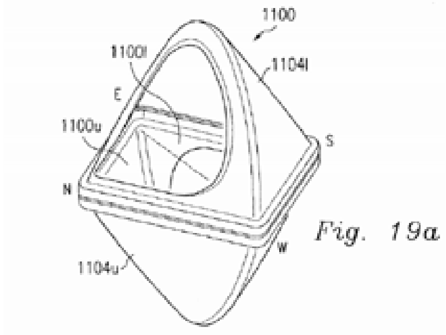
Back of sun screen.
Photographer: Michel Denancé
http://www.architectureweek.com/2004/0310/building_1-2.html

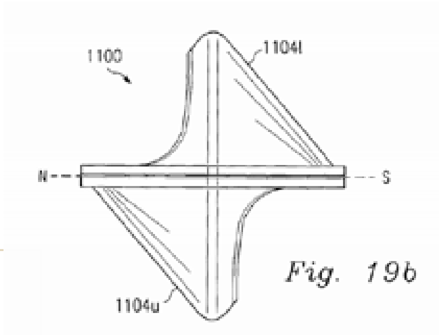
The roof is comprised of five glass vaults nestled between seven others in travertine, which are suspended above the pavilions and rest upon thin steel beams supported by stainless steel tie rods. A shielding system, made up of aluminium panels, is positioned above the glass ceiling. These three-dimensional elements, whose design has been patented, are repeated 223,020 times and only allow for the passage of direct light from the north. The diffused illumination that's achieved by simply pairing of the die-cast shielding elements with the glass roofing provides for lighting levels of up to 2,000 lux, which is only acceptable because the collection is mainly made up of sculptures. The interior space thus acts as an extension of the sculpture garden, and vice versa.

http://www.rpbw.com/project/nasher-sculpture-center

SHADING APPLICATION



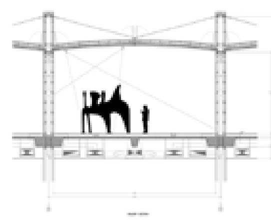




United States Patent. Piano et al. Image Renzo Piano Building Workshop Architects
https://app.conceptboard.com/__/exit?url=https%3A%2F%2Fpatentimages.storage.googleapis.com%2Fa5%2F3b%2F5b%2Fe1221ed243c176%2FUS7222461.pdf&signature=EhHYVHz8qzhmC69oXsF_TBP7kungMlU8taIdQiLndFg%3D

Gallery Section. Image: Renzo Piano Building Workshop
https://www.archdaily.com/773066/search-ends-for-solution-to-museum-towers-glare-problems-at-nasher-sculpture-center

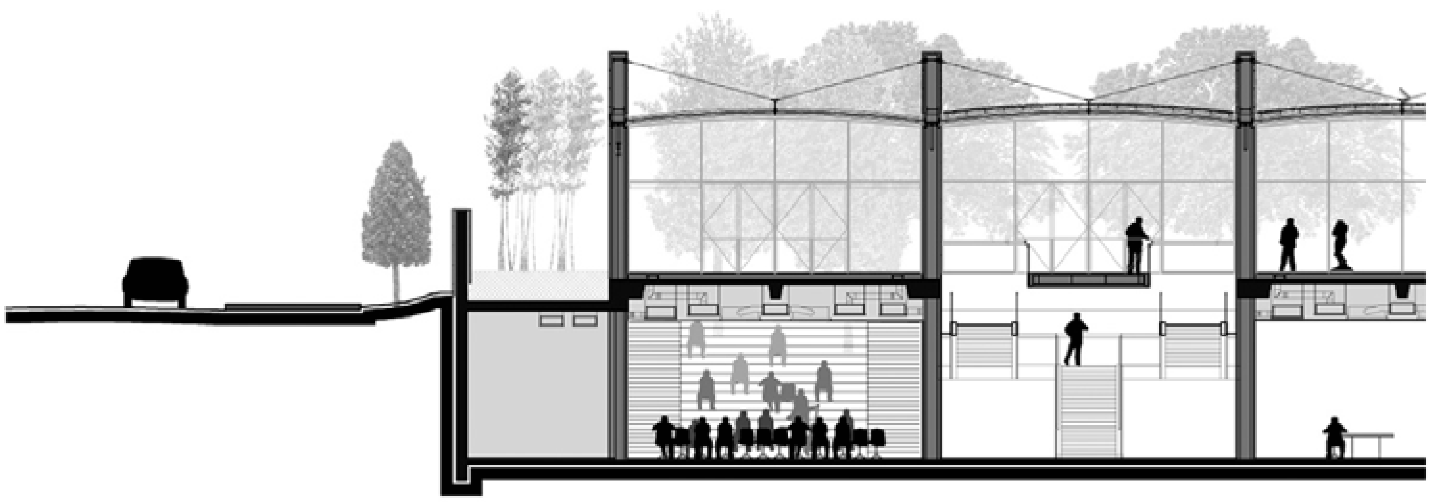
Light reflected off Museum Tower through the building's filters casts shadow patterns inside the gallery building. Photograph courtesy the Nasher Sculpture Center.
https://www.huffpost.com/entry/museum-tower-is-an-attack_b_2189048



Gallery Section. Image: Renzo Piano Building Workshop
http://studioterpeluk.com/project/nasher-sculpture-center/

Schematic view of the roof of the museum.
Image courtesy of Studio Terpeluk.
https://www.inexhibit.com/mymuseum/nasher-sculpture-center-dallas-texas/

Close-up view of the north-west facade of the Nasher Sculpture Center. Image courtesy of Charles Sparks + Company.
https://www.inexhibit.com/mymuseum/nasher-sculpture-center-dallas-texas/



Cross Section Drawing. Image: Renzo Piano Building Workshop
http://studioterpeluk.com/project/nasher-sculpture-center/

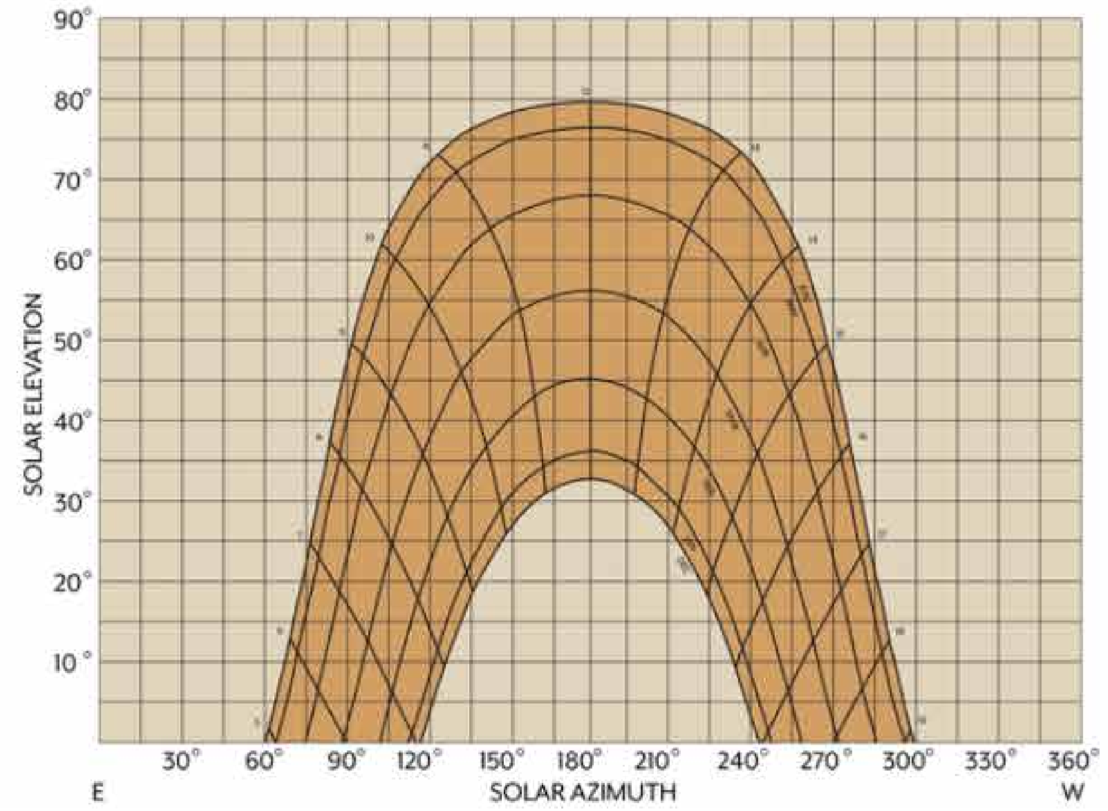
California Climate Zone 15 - Palm Springs

Characterized by extremely hot and dry summers and moderately cold winters.
Considered the low desert and has large diurnal temperature ranges (hot days - cold nights).
Shallow ground water is an average of 72 degrees Fahrenheit.
Best climactic design practices are:

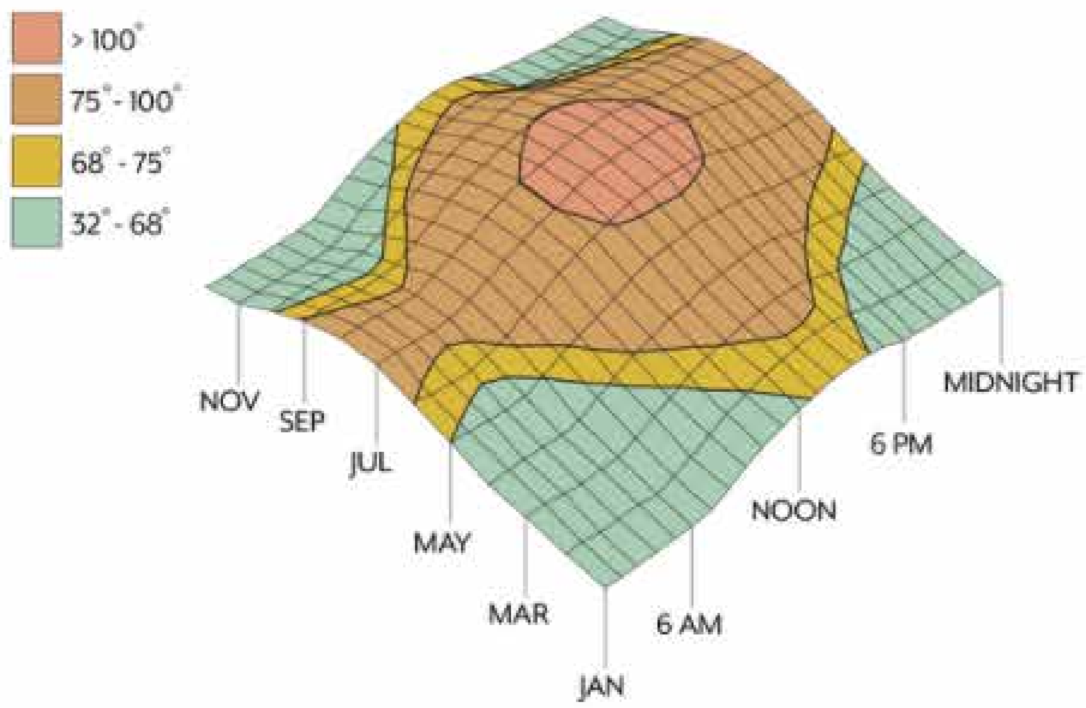
Summer:
- Shading
- Evaporative Cooling
- High Thermal Mass
- Night Ventilation

Winter:
- Insulation
- Infiltration Reduction
- Passive Solar Heating

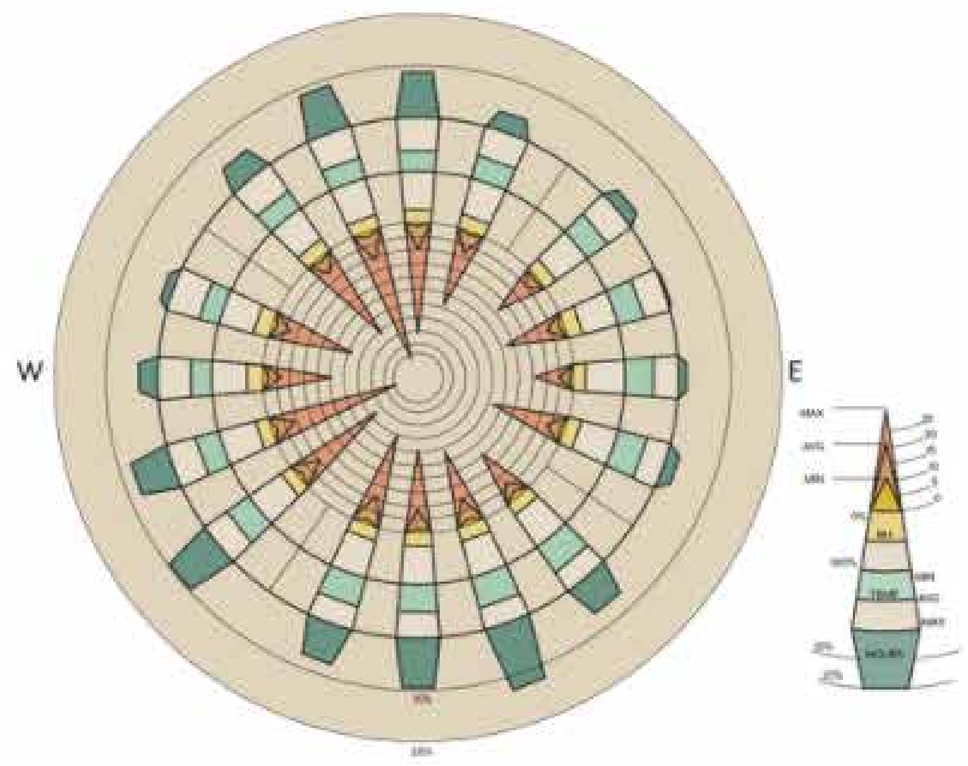
Climate Zone 15 has the highest temperatures in all of California and very low cloud cover and precipitation. Annually, it is sunny 85% and the highest precipitation occurs in August (1 inch of rain typically).



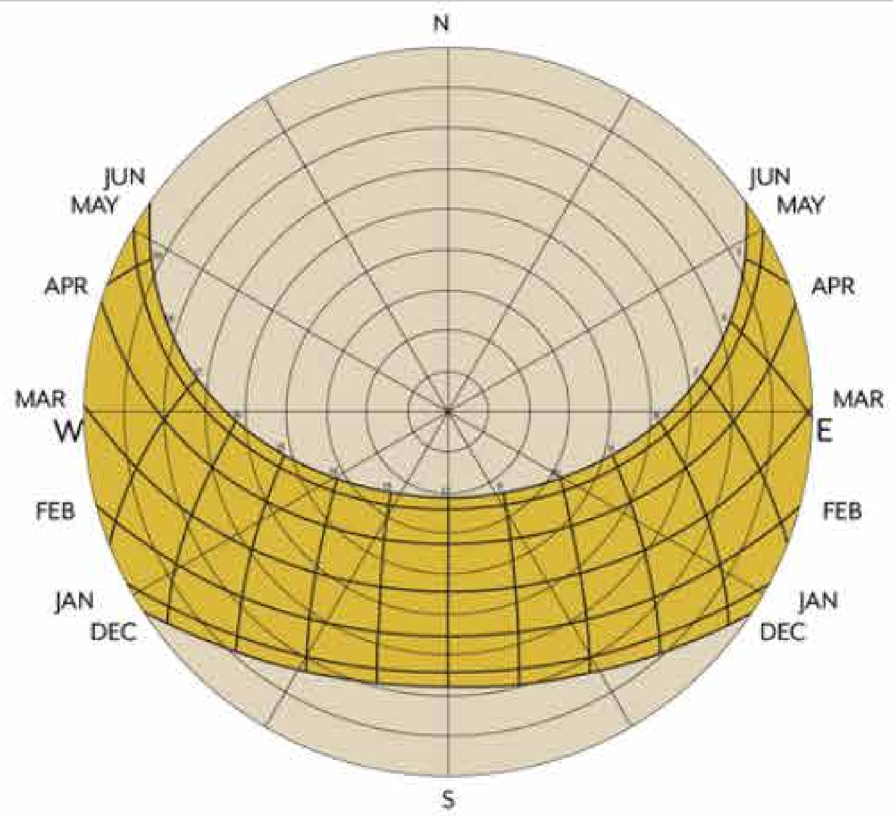
Sun Path Chart



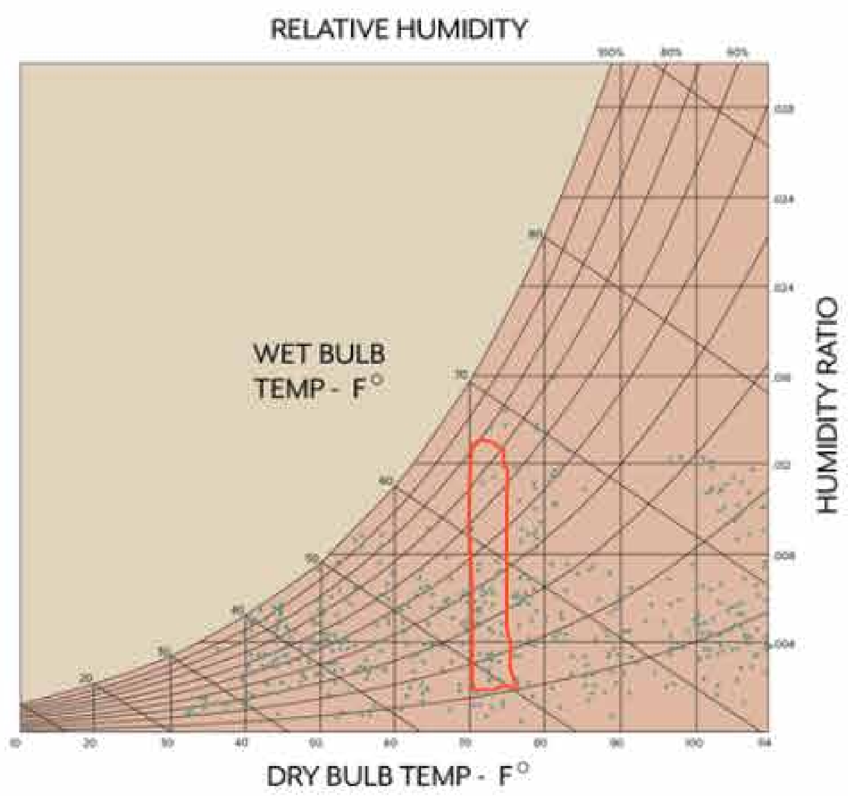
Temperature



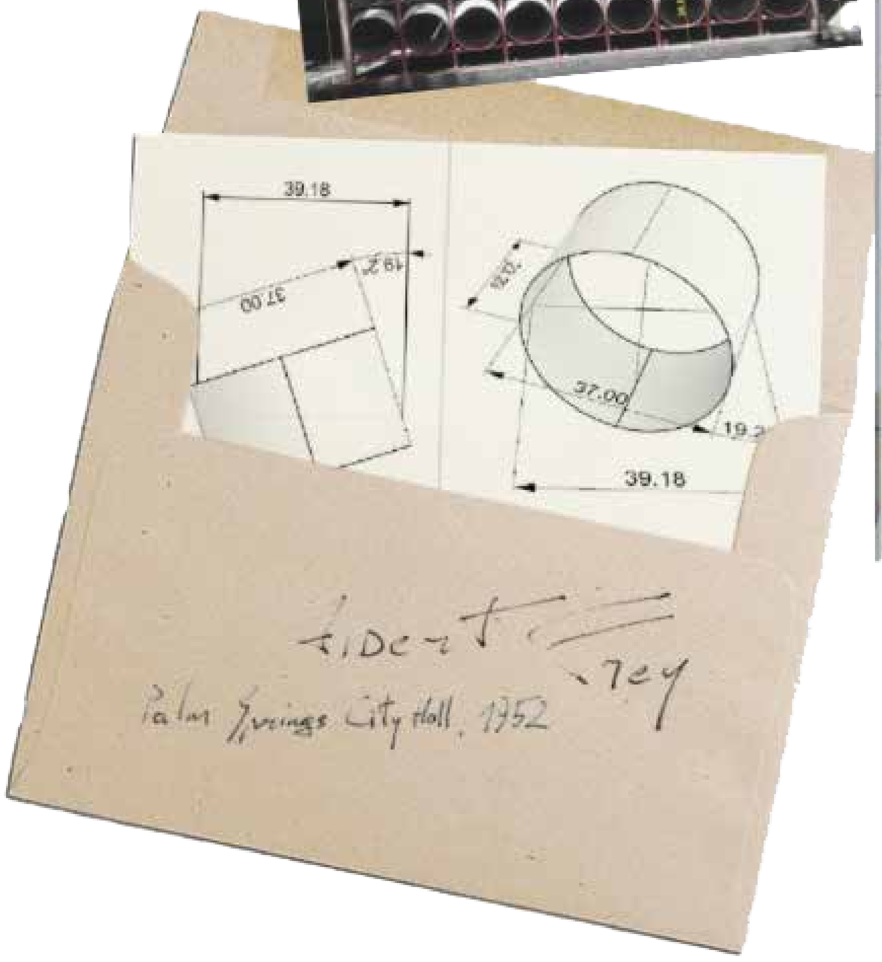
Wind Rose



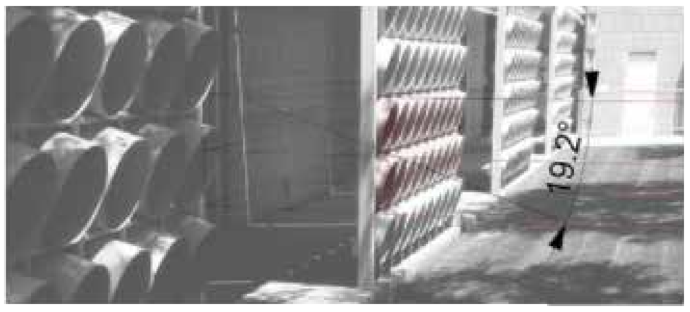
Polar Sun Path

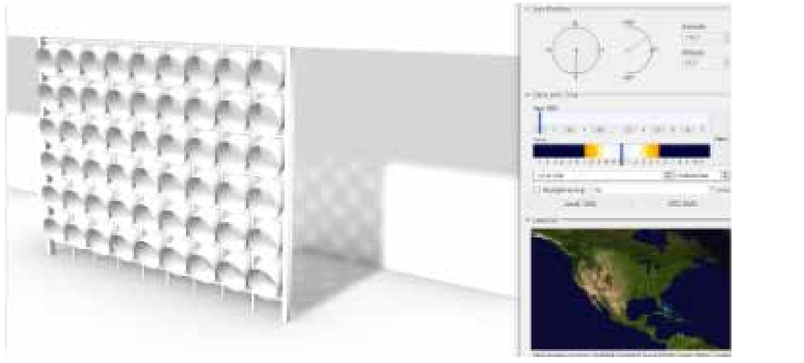


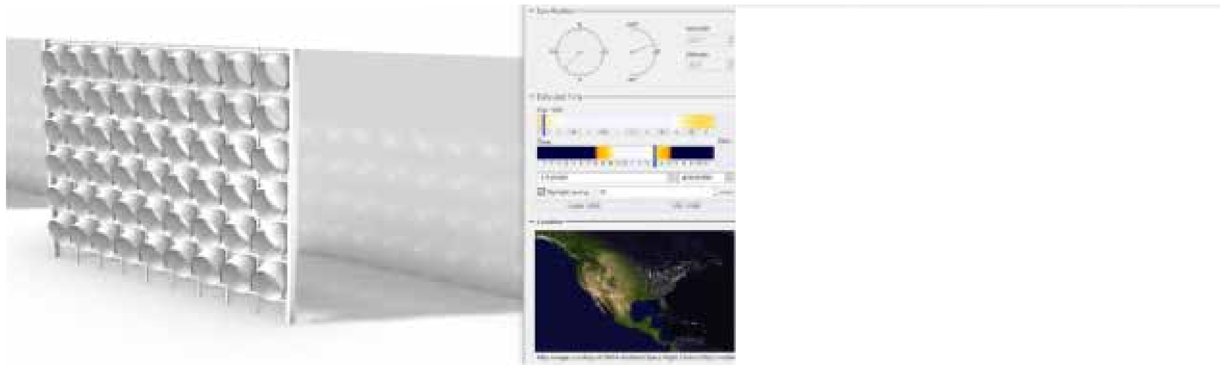
Psychrometric Chart

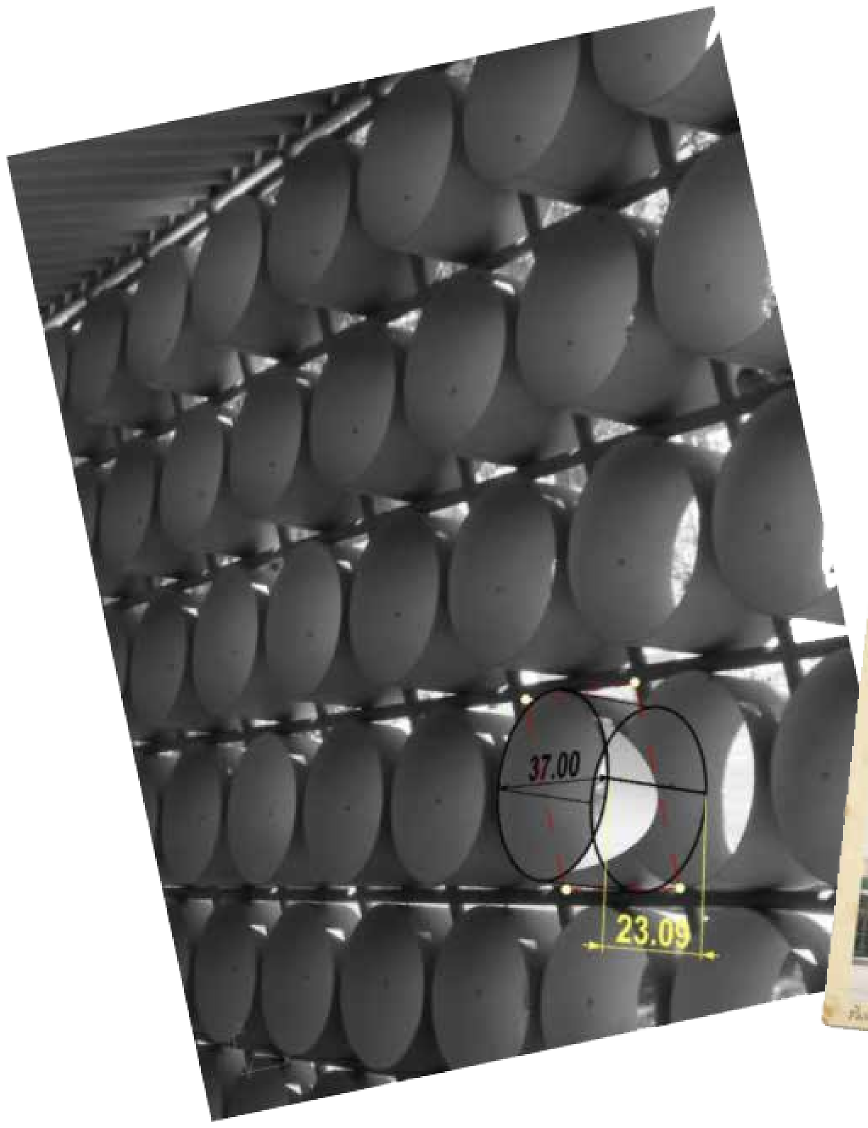

39.18
37.00
19.2
37.00
19.2
39.18
Palm Springs City Hall, 1952

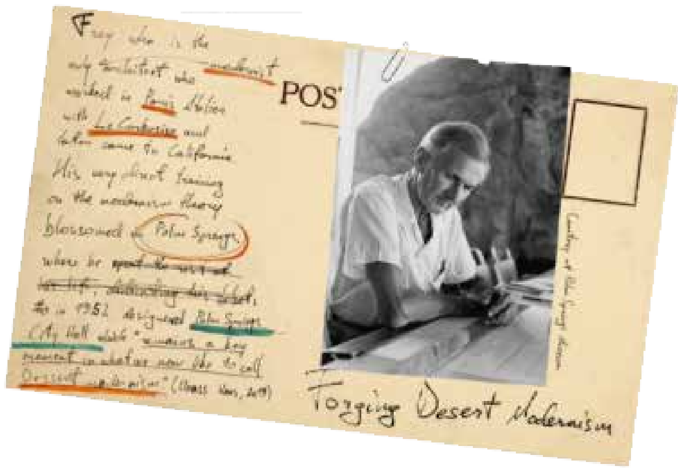

ceiling height =
160.5 / 350 x (350+254) =
276.9771428571


19.2°



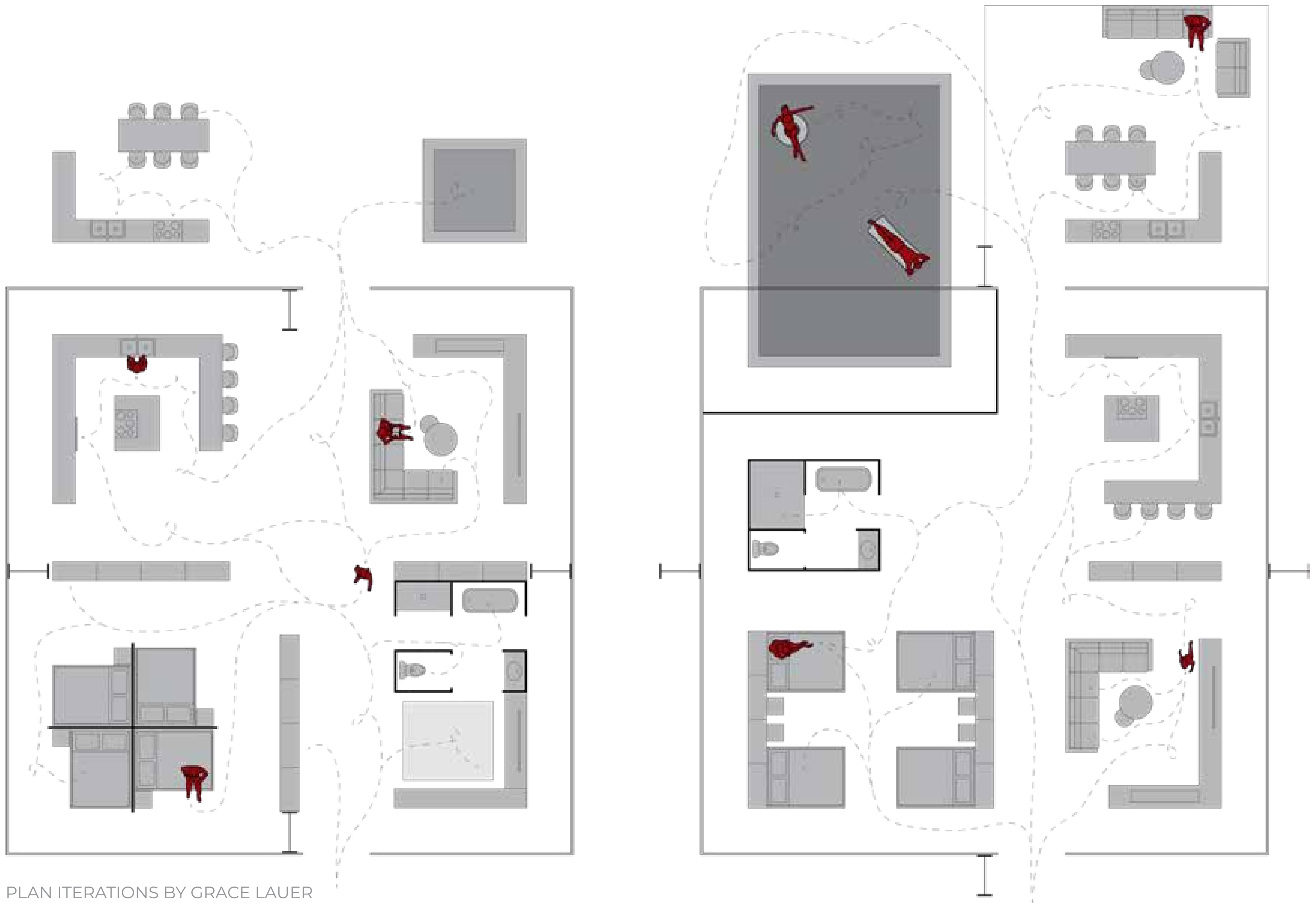



37.00
23.09

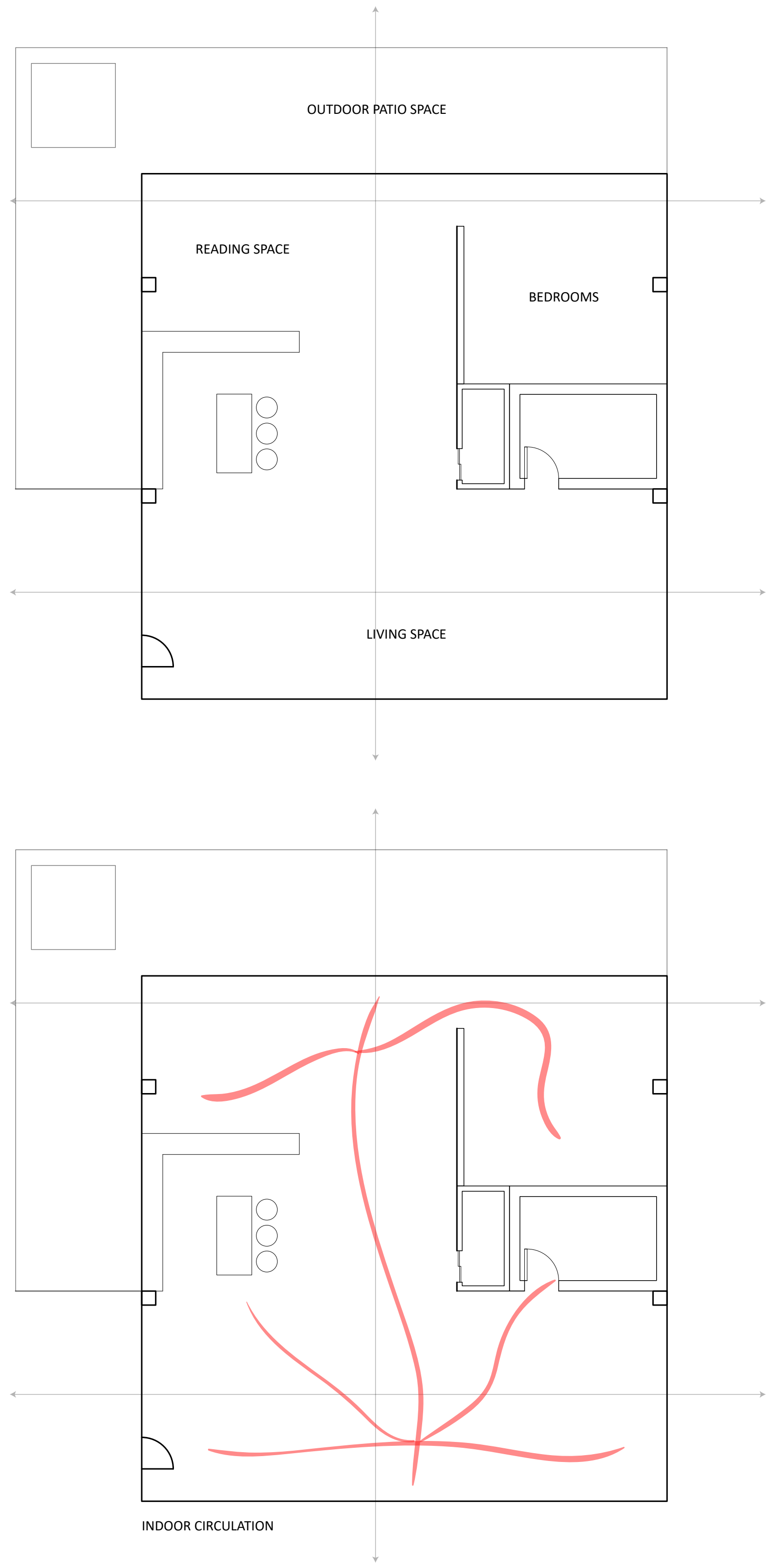

POS
Forging Desert Modernism


Mad Max Gone Right


POST CARD
God is in the details
FOR CORRESPONDENCE
– Mies



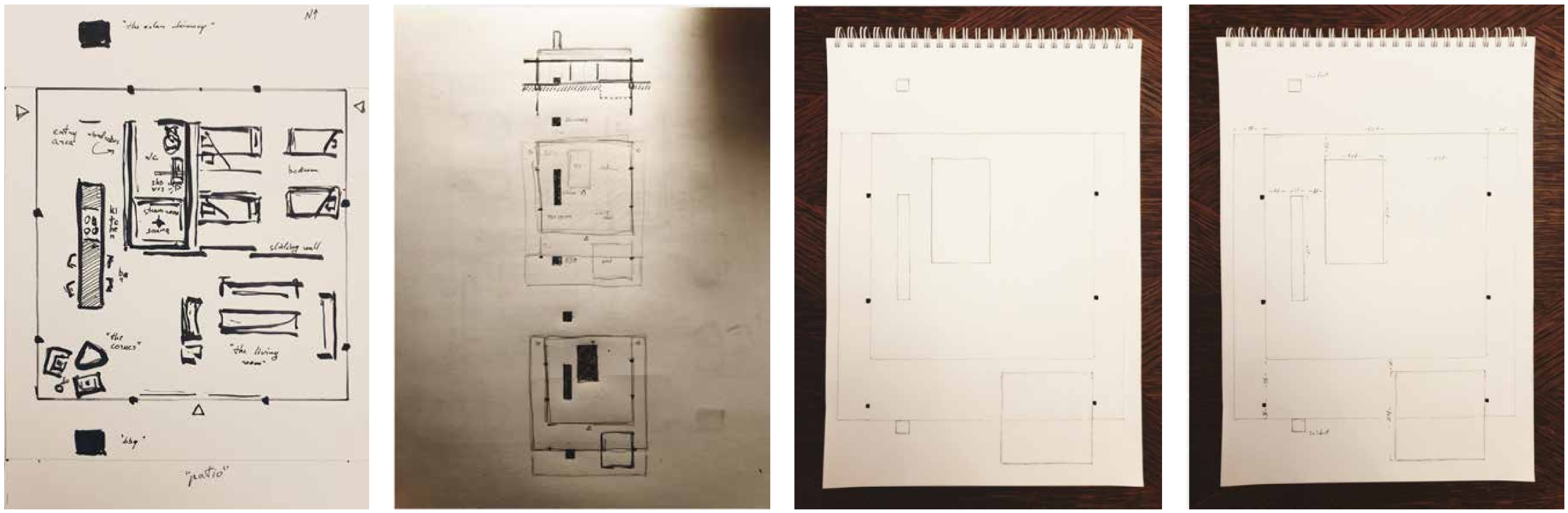
PLAN ITERATIONS BY GRACE LAUER



PLAN ITERATIONS BY DAISY PENALOZA

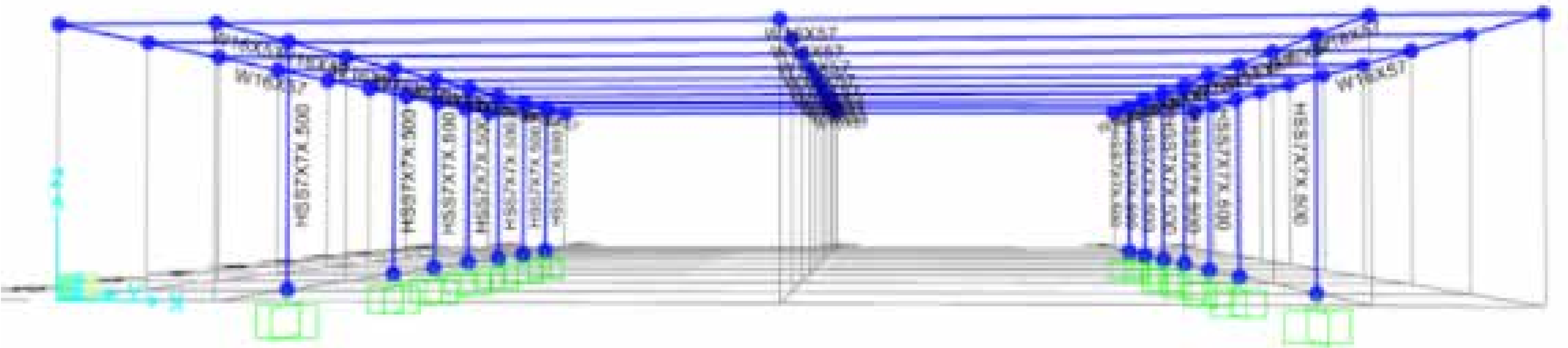
For the second iteration, the architects strived for more detailed program design to accommodate for anticipated need and desires of the future client. The objective was to find the balance between these programs and mies / myrons' free plan scheme.

Some of these ideologies included a square plan, no diagonal structure, and preservation of geometires and proportions. We kept these restrictions in the forefront of our minds as we designed our first initial architectural schemes.

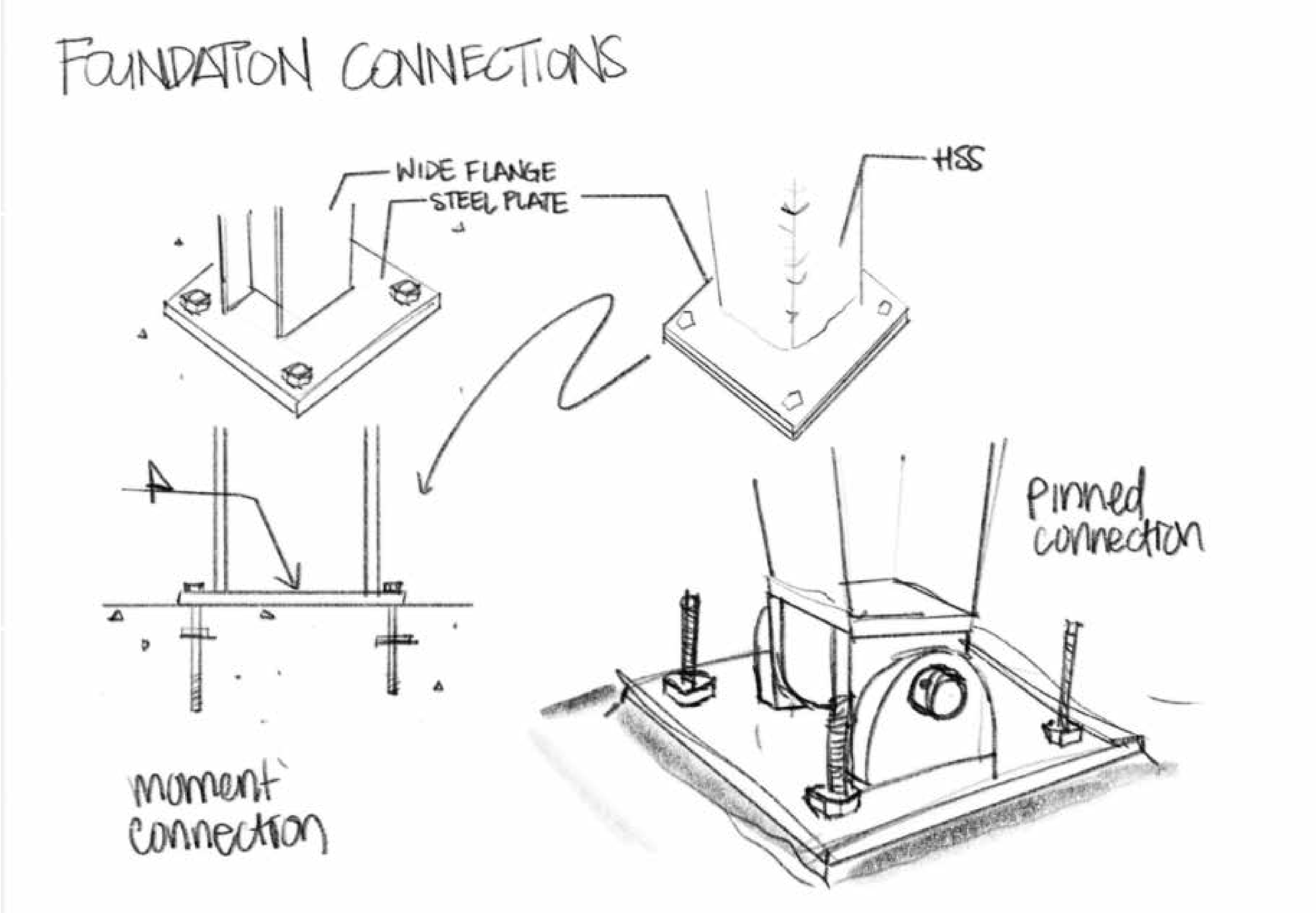


PLAN SKETCHES BY AUGUSTAS LAPINSKAS

ROOF FRAMING IDEATION

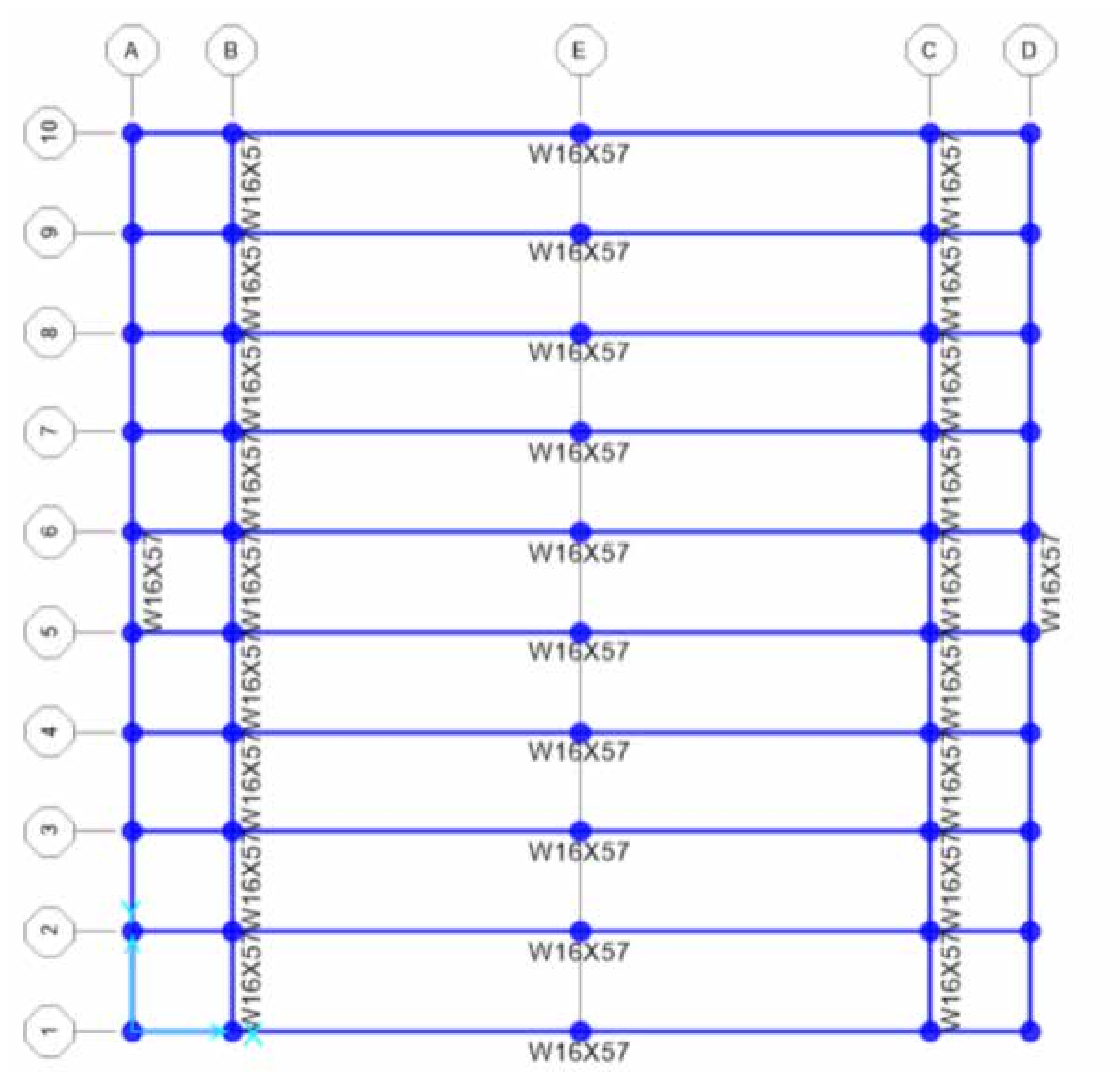


ROOF FRAMING SAP MODEL BY BLAKE DURHAM



FOUNDATION CONNECTION SKETCHES BY EMMANUEL CORONA NAVARRO

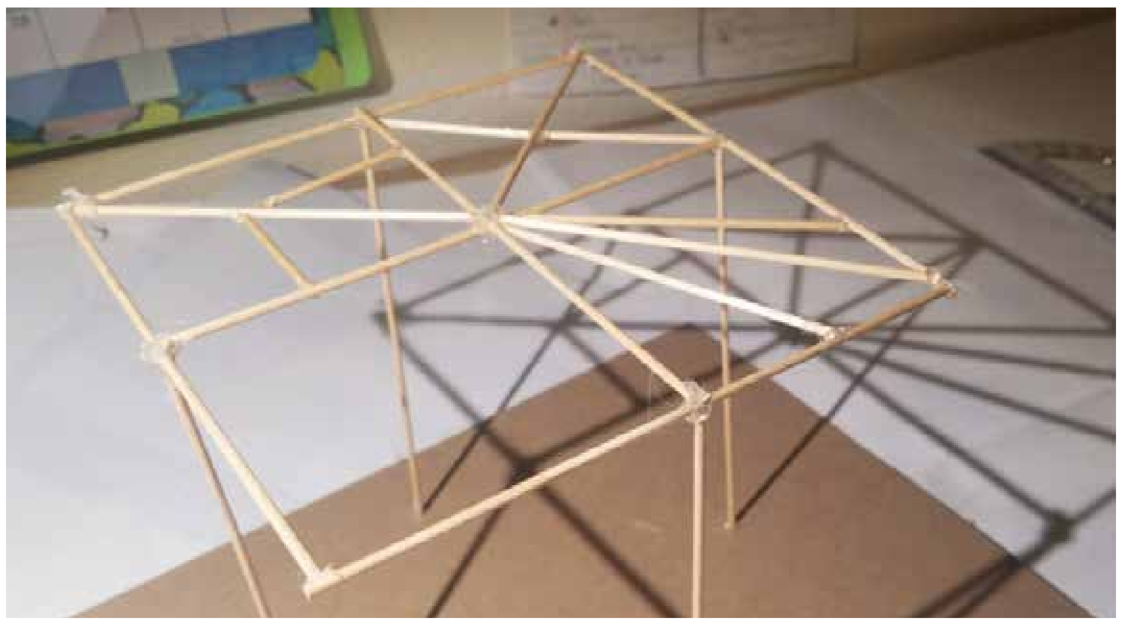
ROOF FRAMING PLAN



ROOF FRAMING PLAN BY BLAKE DURHAM

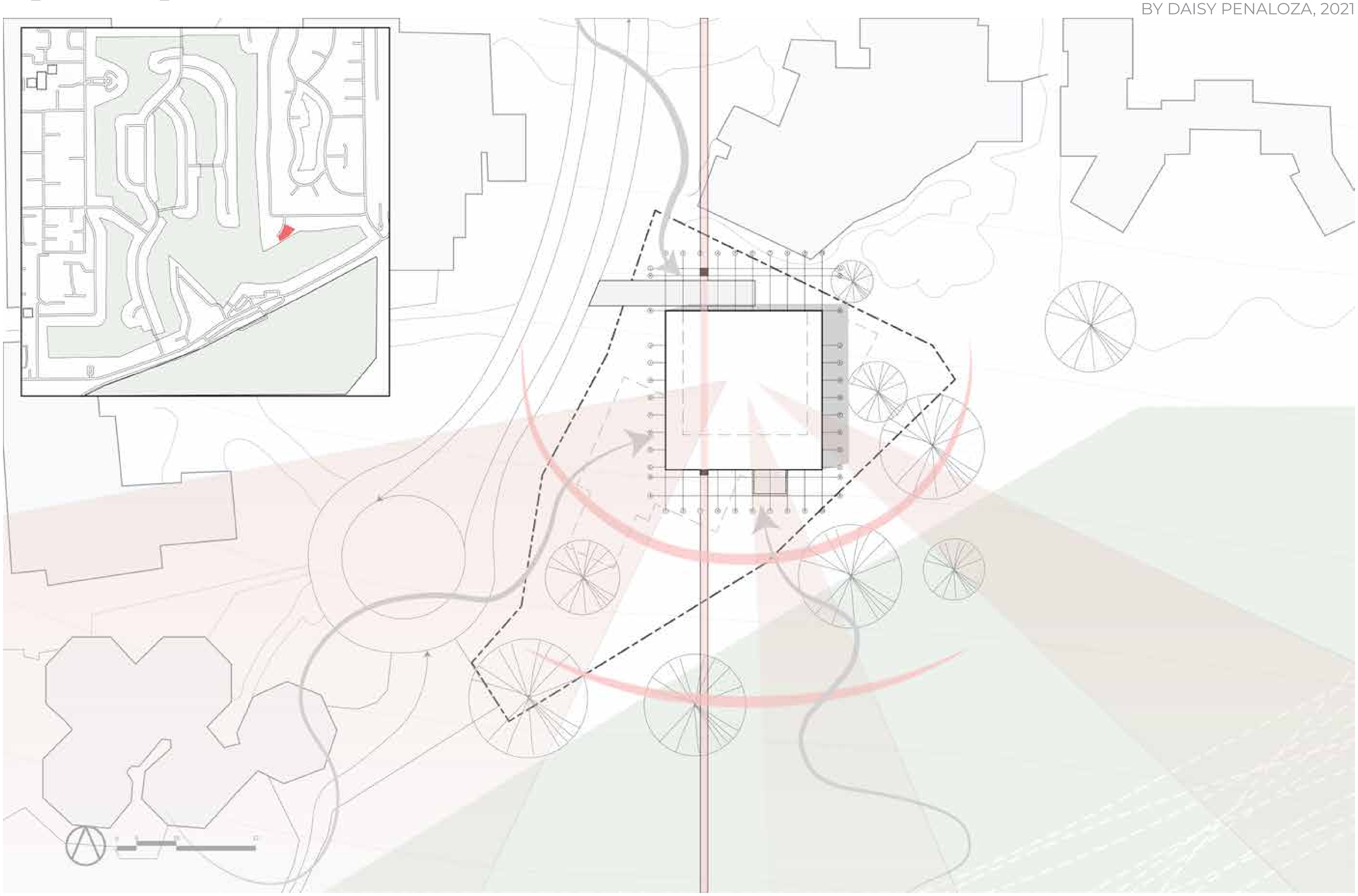
For the initial framing plan, we had a beam framing directly into an HSS column. This calculation overdesigns slightly, providing two (2) shear plates welded into the column and bolted to the web of the beam. To Ensure the most effective connection, the flanges of the beam are groove welded to the column. These connections work to effectively provide a moment connection.

TEXT BY EMMANUEL CORONA NAVARRO



ROOF FRAMING MODEL BY CHENGBIN KUANG

SECONDARY DESIGN



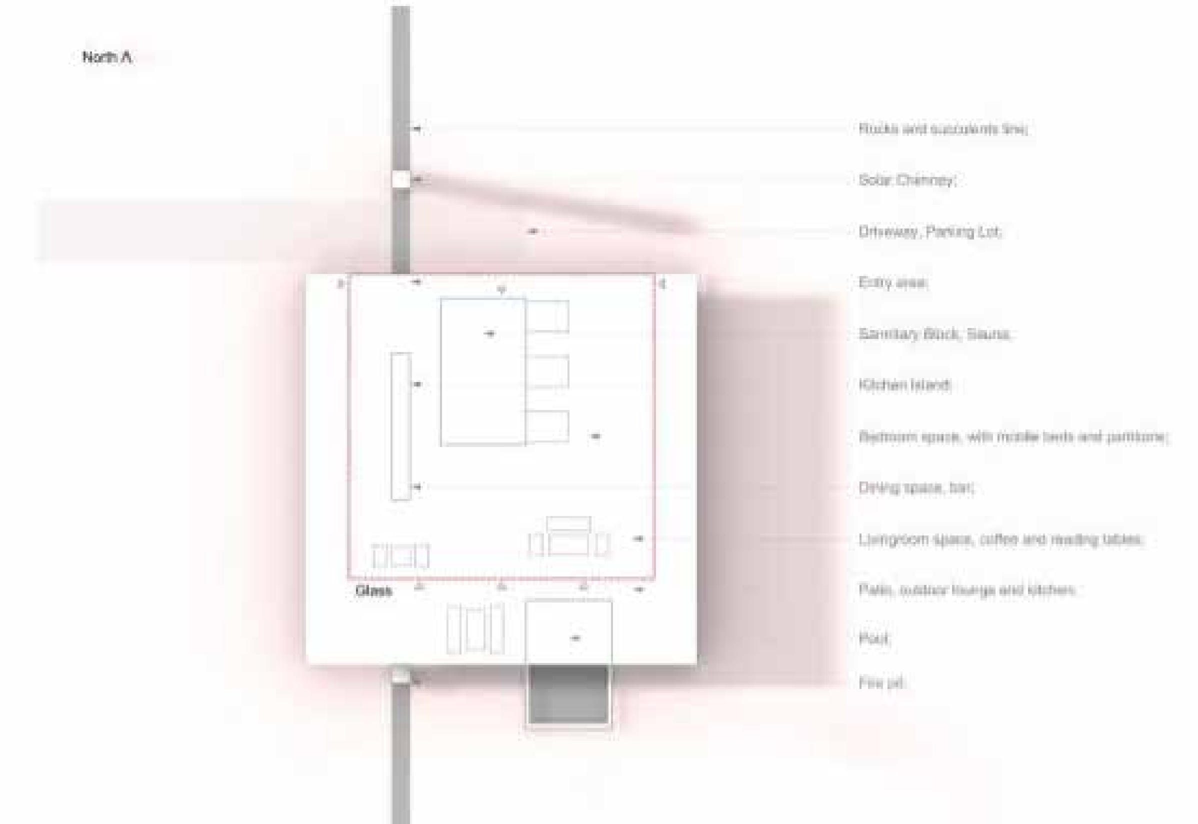
The 49x49 House neighbors the Indian Canyons Golf Resort in Palm Springs, CA which is highlighted in green to the SE of site. The house develops a distinctive form from surrounding neighbors, creating an orthogonal orientation that defines an order on the site, while providing access to sun and views in the southern social spaces of the home. It is positioned to the north of the site allowing the existing tree line to create a private, enclosed condition for the bedroom to the northeast.

BARRY (54)
Occupation: Is a tech executive in Seattle
Hobbies: Running and driving nice cars
Barry is retiring early and traveling around for the next year to rotate through golfing spots with his buddies. He likes to entertain, show off his nice cars to neighbors and go on the occasional run. He is really close to Grant and Norman so sharing space is not a big issue. He has a very large ego and is a loud personality. Barry has a lucky putter that he would like on display and stored in the house. Barry is also very into Japanese design and wants modern furniture that can be easily moved, put away or won't disrupt the views into the landscape.

GRANT (47)
Occupation: Is an orthodontist
Hobbies: Cooking, watching movies
Grant is taking a much needed year sabbatical off from work to get back into golf. When he isn't golfing, he enjoys cooking and watching movies (so a large kitchen and a TV are his main desires). He has a bad knee so he wants either a pool or a sauna to ease his sore muscles after a long day of golfing. Grant also has looked into sustainable features for homes in desert climates and he wants a solar chimney on the property to passively heat and cool the house.

NORMAN (49)
Occupation: Is a pilot
Hobbies: Reading and painting
Norman is the quietest of the trio - while he enjoys being around people, having a nice area to sit and read and enjoy nature is what he is hoping this house offers. Since Grant enjoys cooking and watching movies, having some sort of sound intervention could be nice so he could have some quiet space to read. He needs to work on his putting so Norman also desires a putting green somewhere on the property so his buddies can stop bugging him about missing easy shots. In his free time, he also enjoys watching HGTV and loves the look of epoxied concrete floors

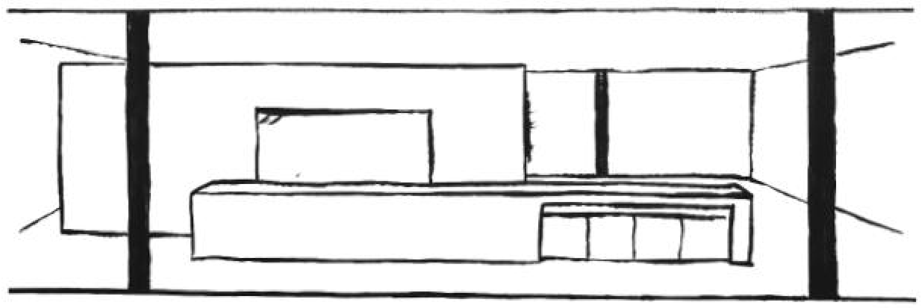
SITE PLAN BY DAISY PENALOZA



FLOOR PLAN BY GRACE LAUER AND AUGUSTAS LAPINSKAS

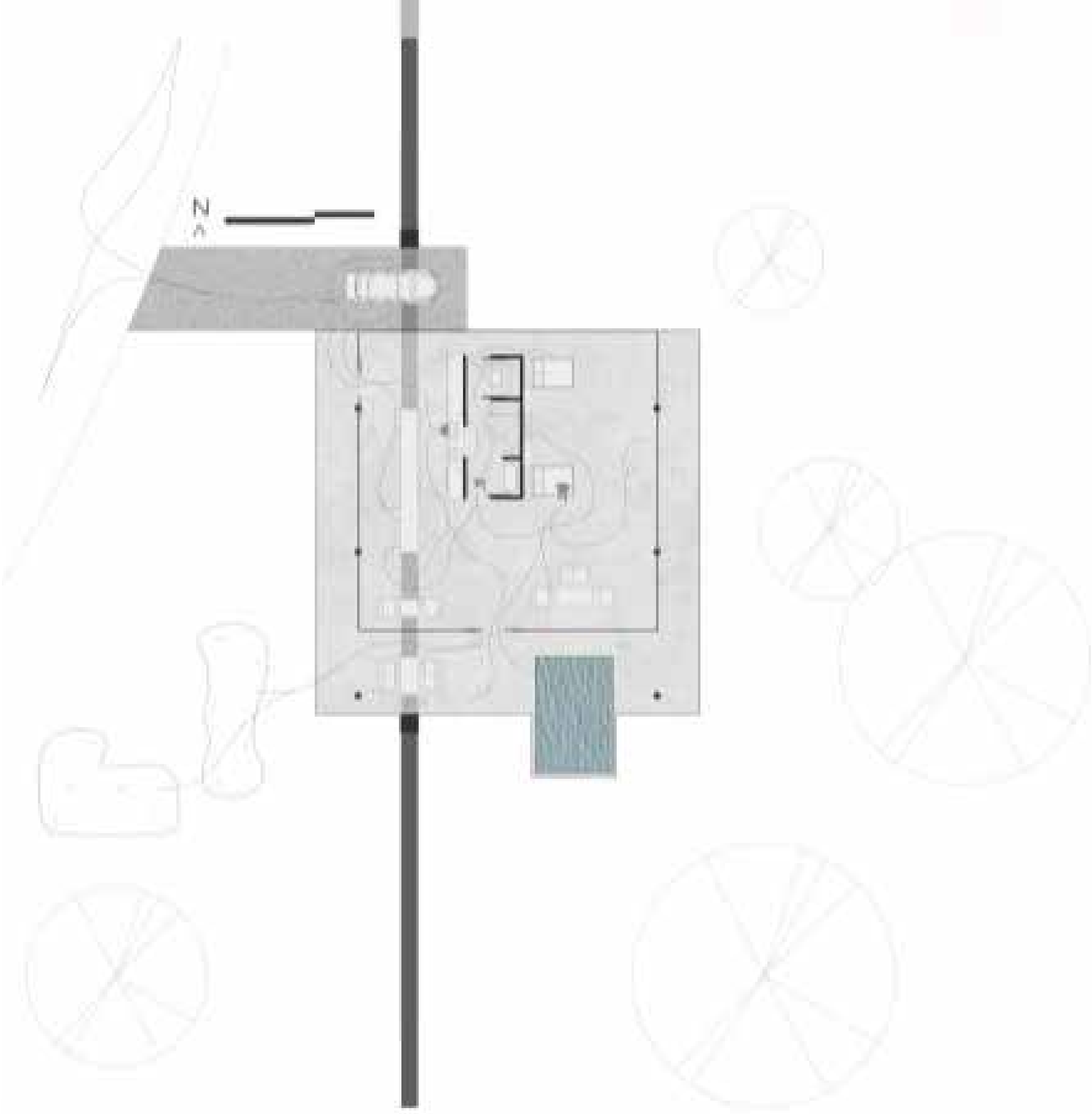
The indoor space is laid out in purely systematic grid-like logic giving the space an easily distinguishable sense of order and aesthetical unity of repetitive proportions. At the same time, the functional layout is designed in a way that satisfies the needs and wishes of the client, providing the space with a huge variety of furniture layouts.

TEXT BY AUGUSTAS LAPINSKAS



ELEVATION SKETCH BY GRACE LAUER

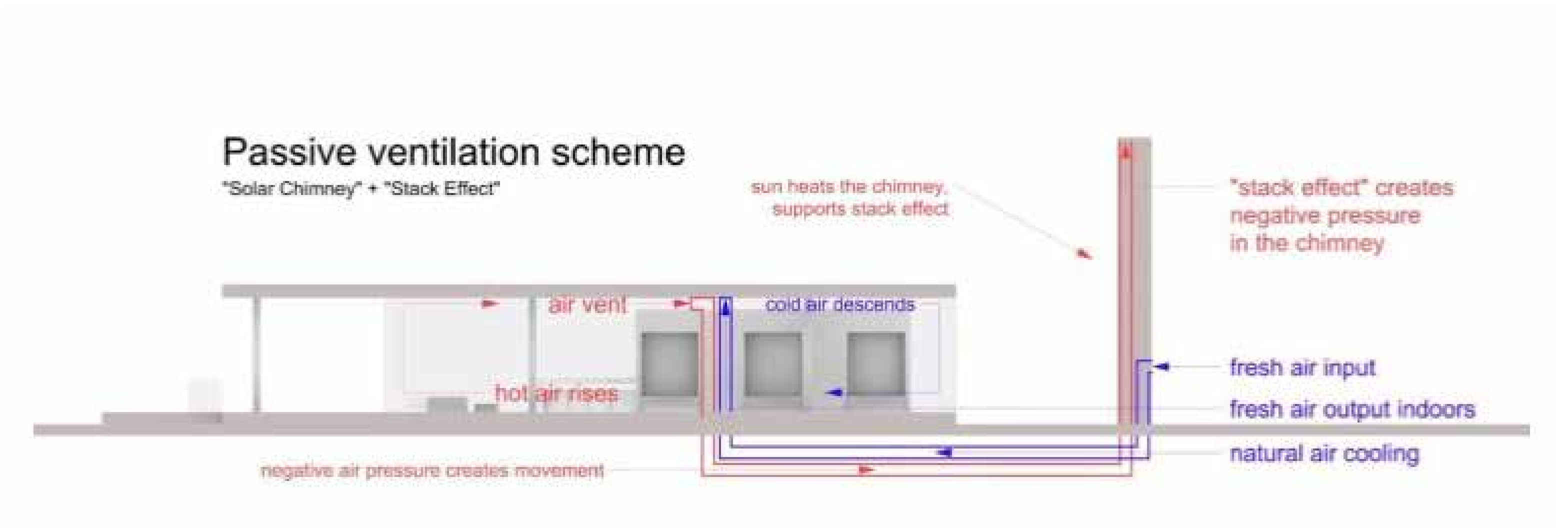
ELEVATION COLLAGE BY GRACE LAUER



FLOOR PLAN BY GRACE LAUER

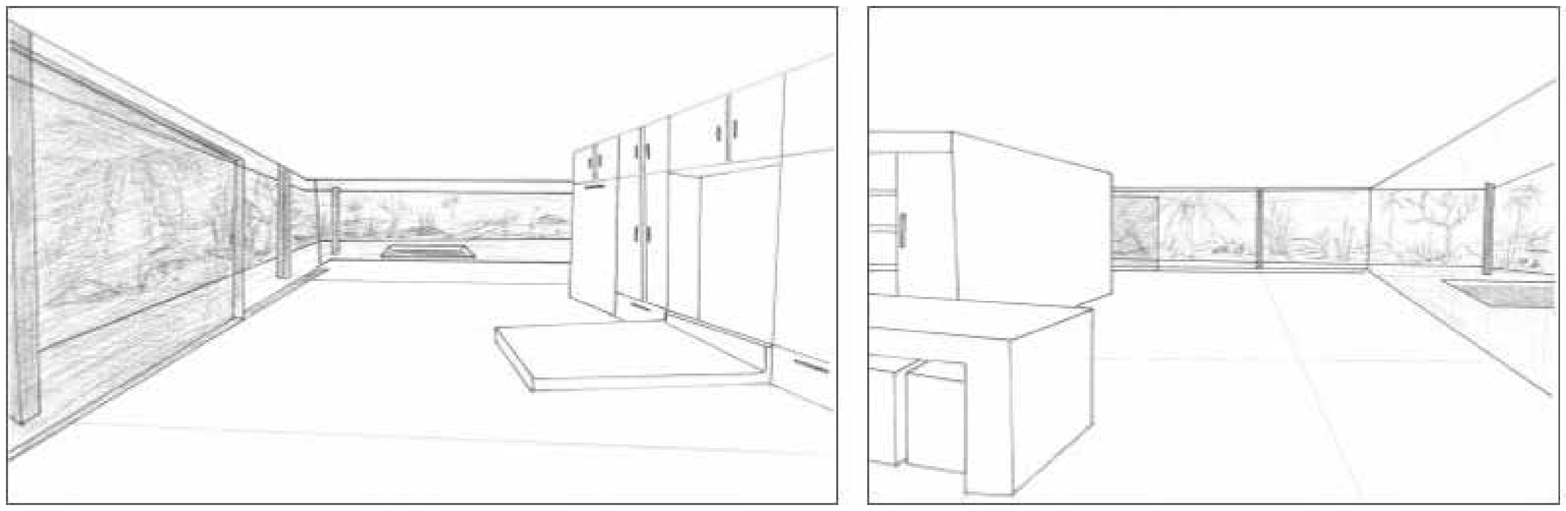
In understanding the floor plan, the main focus is along the axis of the solar chimney, kitchen island and outdoor fireplace. The furniture as you can see is flexible and low to the ground so no views are disrupted and the most prominent feature is the space itself - not what furniture occupies it. Based on japanese styles, the fixtures in New Babylon are minimalistic and serve only the purposes needed to encourage freedom and possibility.

TEXT BY GRACE LAUER



VENTILATION SCHEME BY AUGUSTAS LAPINSKAS

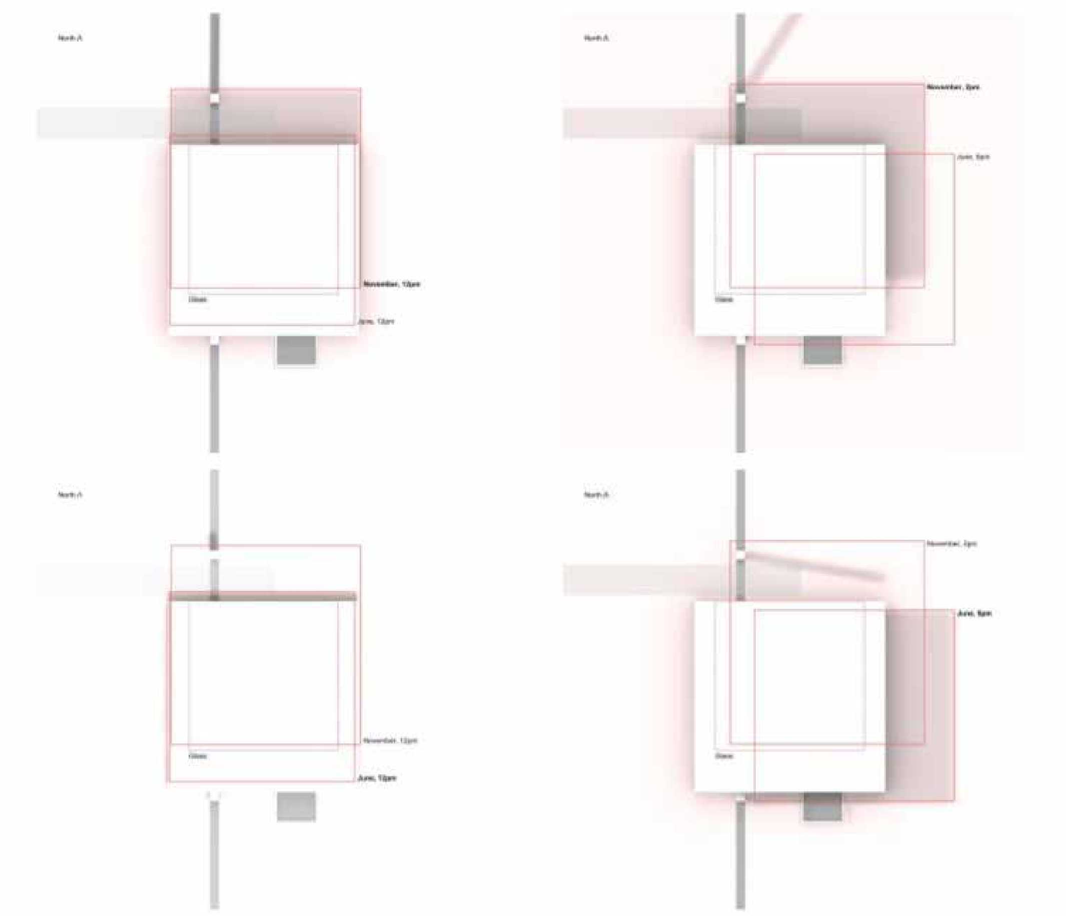
There you can the function scheme of the aforementioned solar chimney is not only a technological device that brings the passive ventilation into the house, but it becomes a major element in the site design, giving the house and the site a unified feeling of a place, making it an easily recognisable and purely minimalistic architectural design.



INTERIOR SKETCHES BY GRACE LAUER

As a preliminary study, the human experience in the space is focused outward into the landscape - materiality has yet to be defined, but potential is endless.

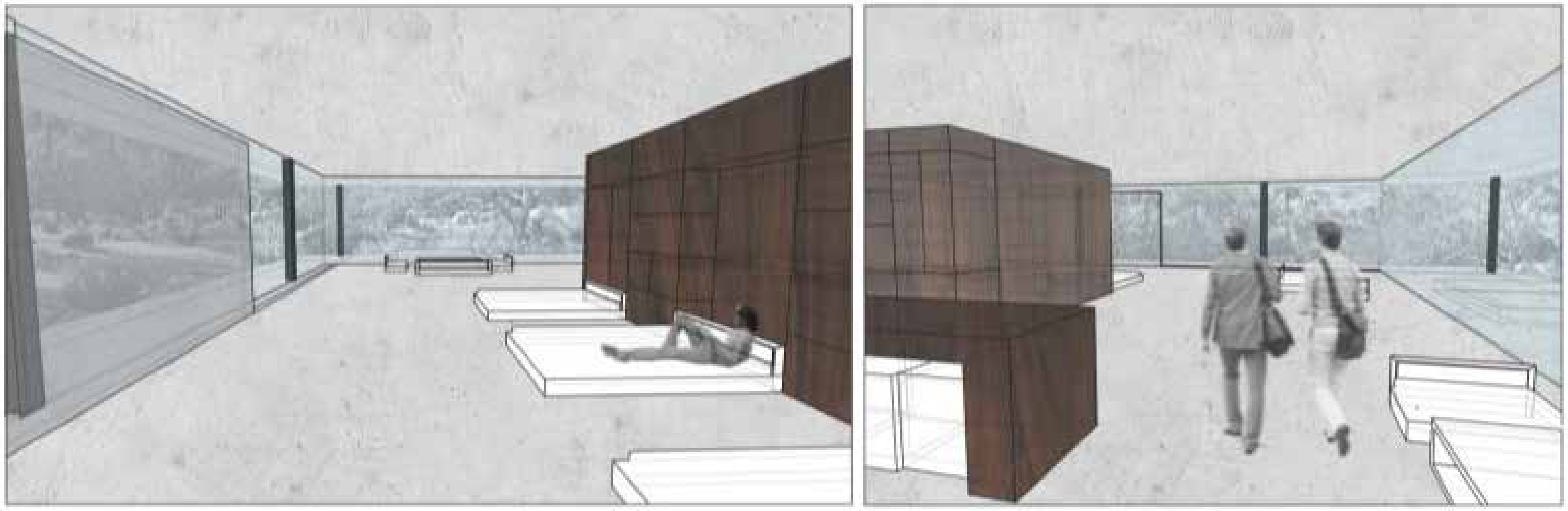
TEXT BY GRACE LAUER



SUN SHADING DIAGRAMS BY AUGUSTAS LAPINSKAS

Although the Core House by Mies and Myron had no overhangs, they are necessary for the 49x49 house in Palm Springs. A 7 foot overhang keeps out intense direct sunlight, but still allows the "golden hour" light to bring a precious glow into the space. Overhangs are not necessary on the northern side of the house so we have decided to maintain the original Core house style there. At the top of the axis is a 24 feet high solar chimney, an obelisk, a monolith, that also functions as a sundial, another aspect of time.

TEXT BY AUGUSTAS LAPINSKAS

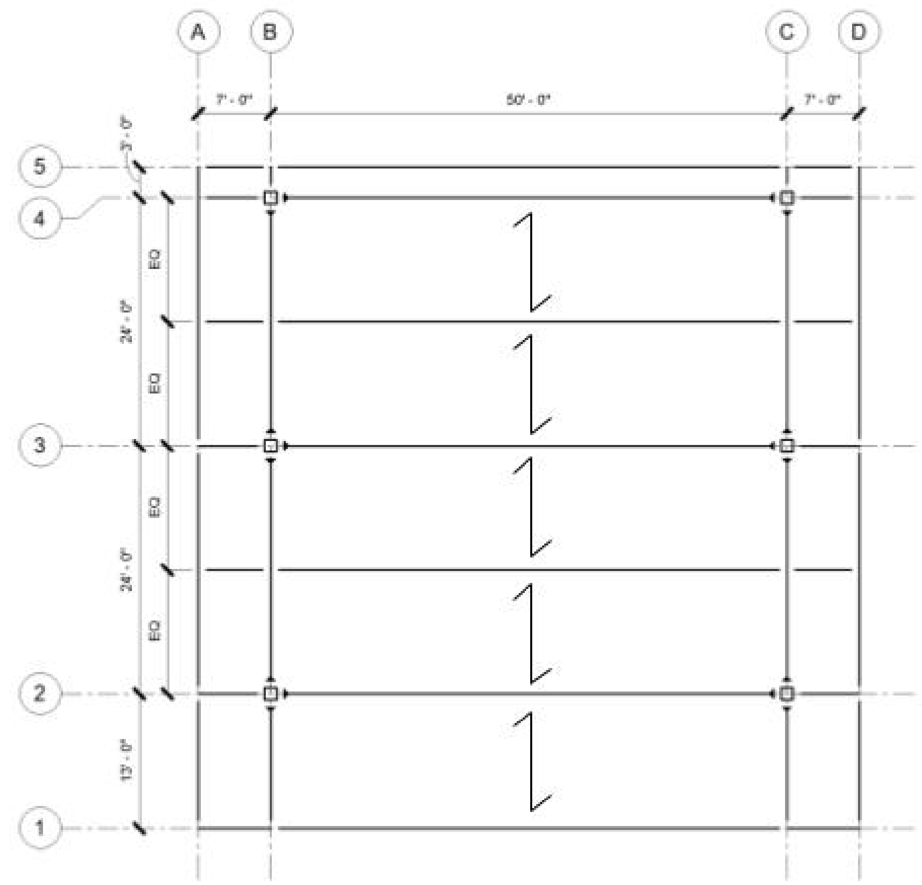


INTERIOR COLLAGE RENDERS BY GRACE LAUER

While defining the space, we've tried ourselves on Mies van der Rohe-like drawings in order to understand the ways he constructs the spatial experience, which - as an artistic method - proved extremely rewarding in the minimalistic space design process. As materiality transforms the space, it doesn't overpower the ideologies of possibility and freedom. Partitions are shifted, furniture is moved and a space becomes a place.

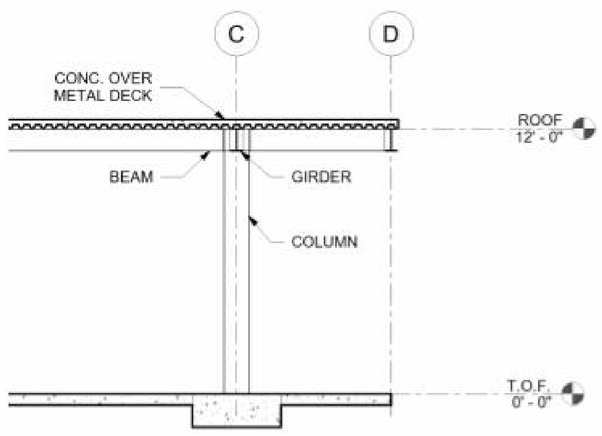
TEXT BY AUGUSTAS LAPINSKAS

ROOF FRAMING PLAN



ROOF FRAMING PLAN BY BLAKE DURHAM

LOAD TAKE OFF



Dead Load @ Roof				
Item	Deck	Beam	Girder	Column
	Load (psf)			
Conc. over Metal Deck	50.0	50.0	50.0	50.0
Beams		4.0	4.0	4.0
Girder			3.0	3.0
Column				2.0
Solar Panels	5.0	5.0	5.0	5.0
Ceiling/Electrical	3.0	3.0	3.0	3.0
Misc.	3.4	3.4	3.4	3.4
Total =	61	65	68	70

Live Load @ Roof	
Item	Load (psf)
Roof	20.0
Total =	20

LOAD TAKE OFF BY BLAKE DURHAM AND CHENGBIN KUANG

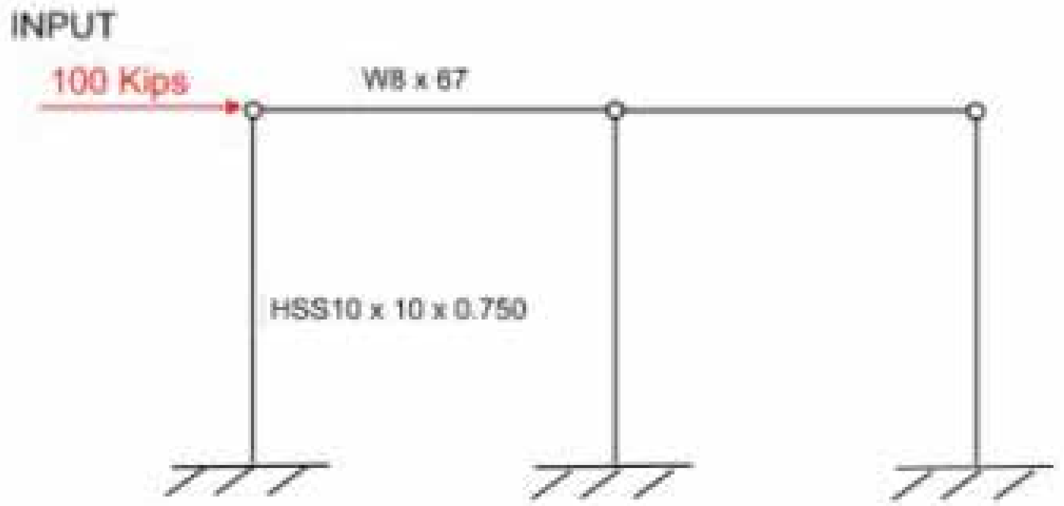
We will have joists spanning 50' with 7' overhangs and metal deck spanning the N-S direction. Our preliminary locations for the moment frames resisting the lateral load will be along gridlines B and C for the N-S direction and gridlines 2, 3, and 4 for the E-W direction.

N
^

As for the loading on the roof, there will be concrete over metal deck, beams, girders, and solar panels on the roof. This will be a relatively lightly loaded roof as seen in the section to the left.

TEXT BY BLAKE DURHAM

MOMENT FRAME STUDY



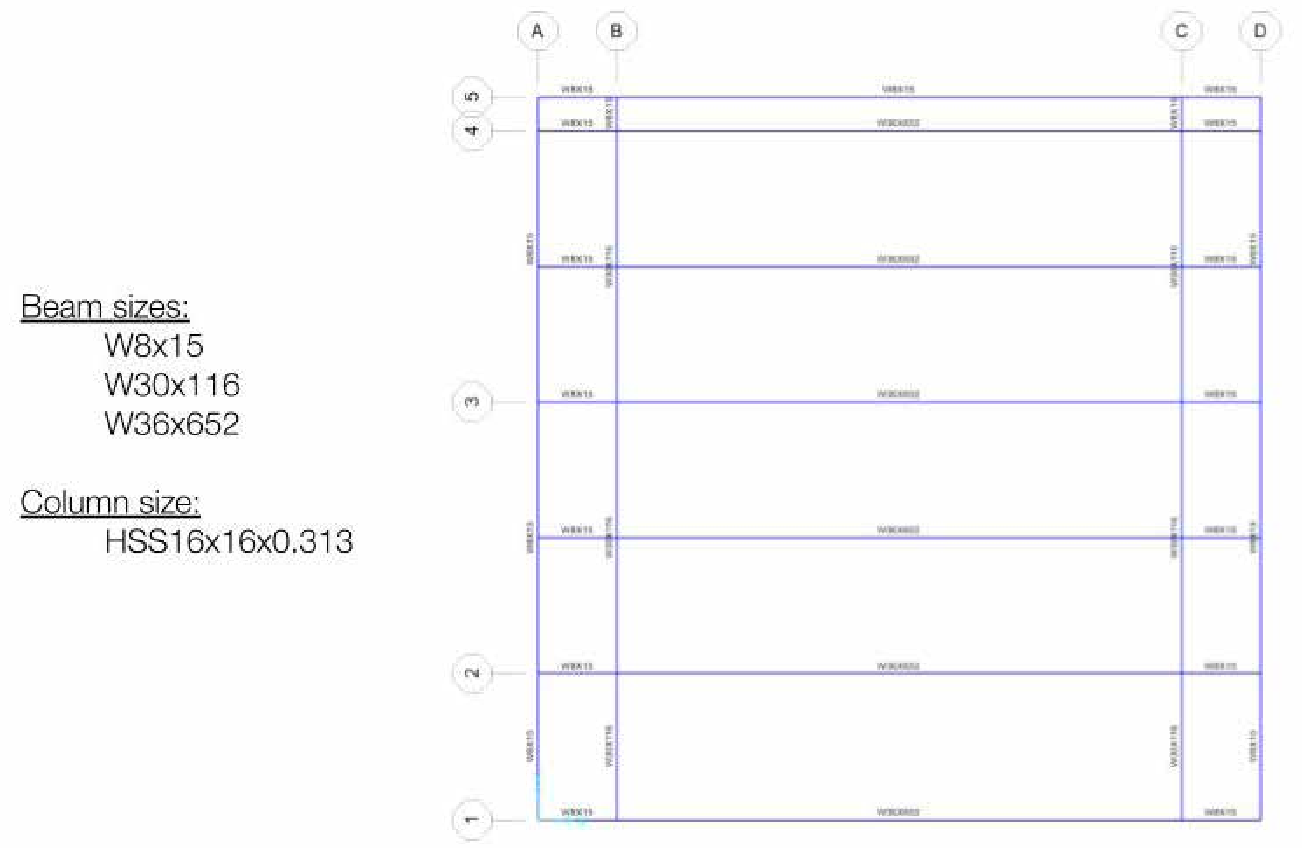
This is a moment frame study. By testing with bay sizes, pin vs fix connection, column height. We conclude that Fix @ Base, Low Column Height, and multiple bays are best.
And we constructed our SAP model based on these conclusions.

TEXT BY CHENGBIN KUANG

SAP INPUT								
Load	100 Kip	Lateral Load						
Column	HSS10 x 10 x 0.750							
Beam	W8 x 67							
DATAS								
Situation	max Deformation (inch)	Location	Max Shear (Kips)	Location	Max Axial (Kips)	Location	Max Moment (Kip Inches)	Location
1 Bay (Fix-Fix)	2.8	Top of Column	50	Similar Both Col	50	Beam First Bay	4557	Similar All Column Base
10' Tall (Fix-Fix)	0.91	Top of Column	40	Middle Column	70	Beam First Bay	2856	Base of Mid Column
Fix Both	1.9	Top of Column	40	Middle Column	70.1	Beam First Bay	3360	Base of Mid Column
Fix only @ Roof	8.7	Top of Column	45	Middle Column	72.8	Beam First Bay	6537	Top of Mid Column
Fix only @ Base	4.13	Top of Column	33.6	First Column	66.4	Beam First Bay	4833	Similar All Column
Summary								
Best Choice		No No Choice						
Fix Both	Fix @ Base	Fix @ Roof						
Lower Heigh		High Heigh						
More Bays		One Bay						

MOMENT FRAME STUDY BY CHENGBIN KUANG

MEMBER SIZES



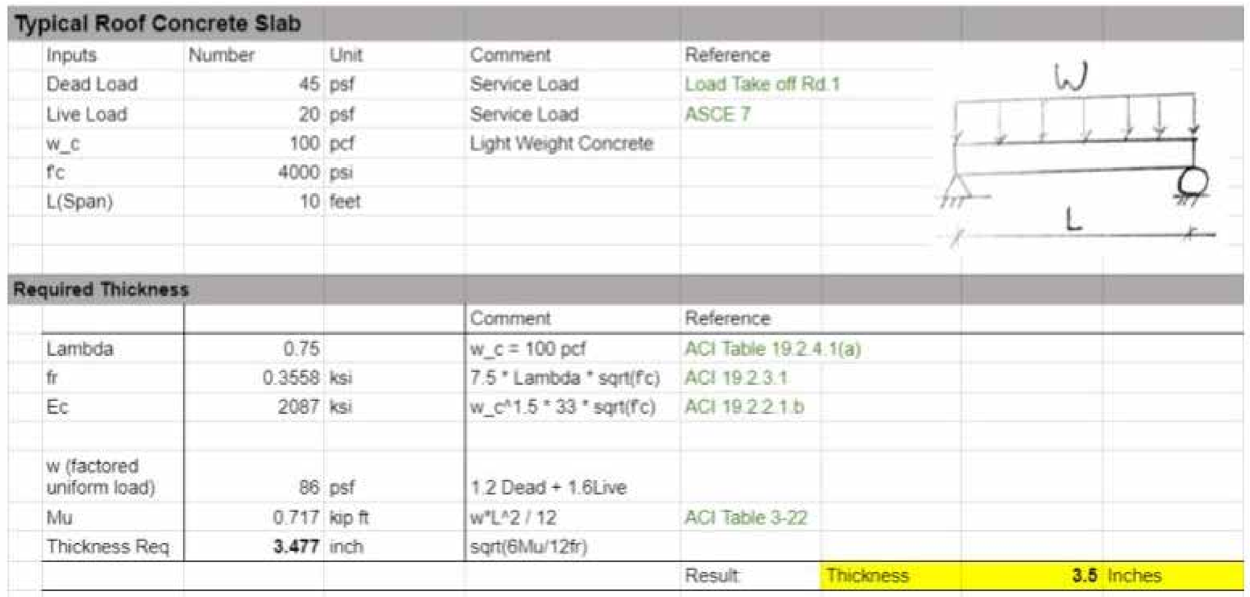
MEMBER SIZING BY EMMANUEL CORONA NAVARRO AND BLAKE DURHAM

This is a simple roof slab design in Excel. There is a 100 psf Factored load base on ASCE 7 load combo. And the slab is designed according to ACI. The result shows a slab thickness of at least 3.5 inches.

After creating a model in SAP, adding the loading from the load take-off and the earthquake requirements and specifications for our site, we got the required member sizes. To minimize deflections in the 50' span, I set the maximum displacement at the midspan to be 3". This gave me W36x for the 50' span. The deflection of the overhangs were quite small, so those could be W8x, and the columns are HSS16x16 to resist the lateral and gravity loads.

MEMBER SIZING BY CHENGBIN KUANG AND BLAKE DURHAM

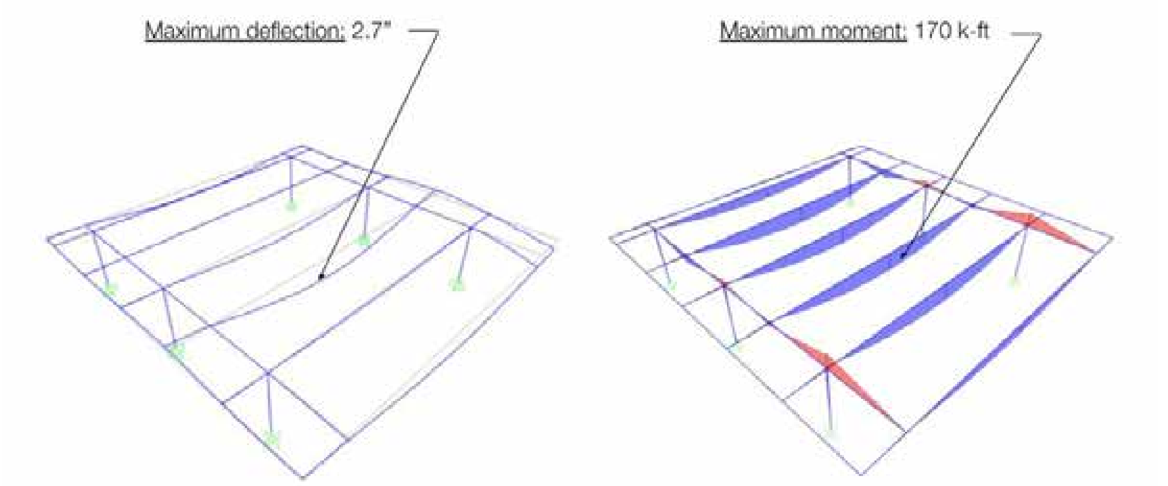
SLAB CALCULATIONS



Typical Roof Concrete Slab							
Inputs	Number	Unit	Comment	Reference			
Dead Load	45	psf	Service Load	Load Take off Rd.1			
Live Load	20	psf	Service Load	ASCE 7			
w_c	100	pcf	Light Weight Concrete				
f'c	4000	psi					
L(Span)	10	feet					
Required Thickness							
			Comment	Reference			
Lambda	0.75		w_c = 100 pcf	ACI Table 19.2.4.1(a)			
fr	0.3558	ksi	7.5 * Lambda * sqrt(f'c)	ACI 19.2.3.1			
Ec	2087	ksi	w_c^1.5 * 33 * sqrt(f'c)	ACI 19.2.2.1.b			
w (factored uniform load)	86	psf	1.2 Dead + 1.6Live				
Mu	0.717	kip ft	w*L^2 / 12	ACI Table 3-22			
Thickness Req	**3.477**	inch	sqrt(6Mu/12fr)				
				Result	Thickness	**3.5**	Inches

SLAB CALCULATIONS BY CHENGBIN KUANG

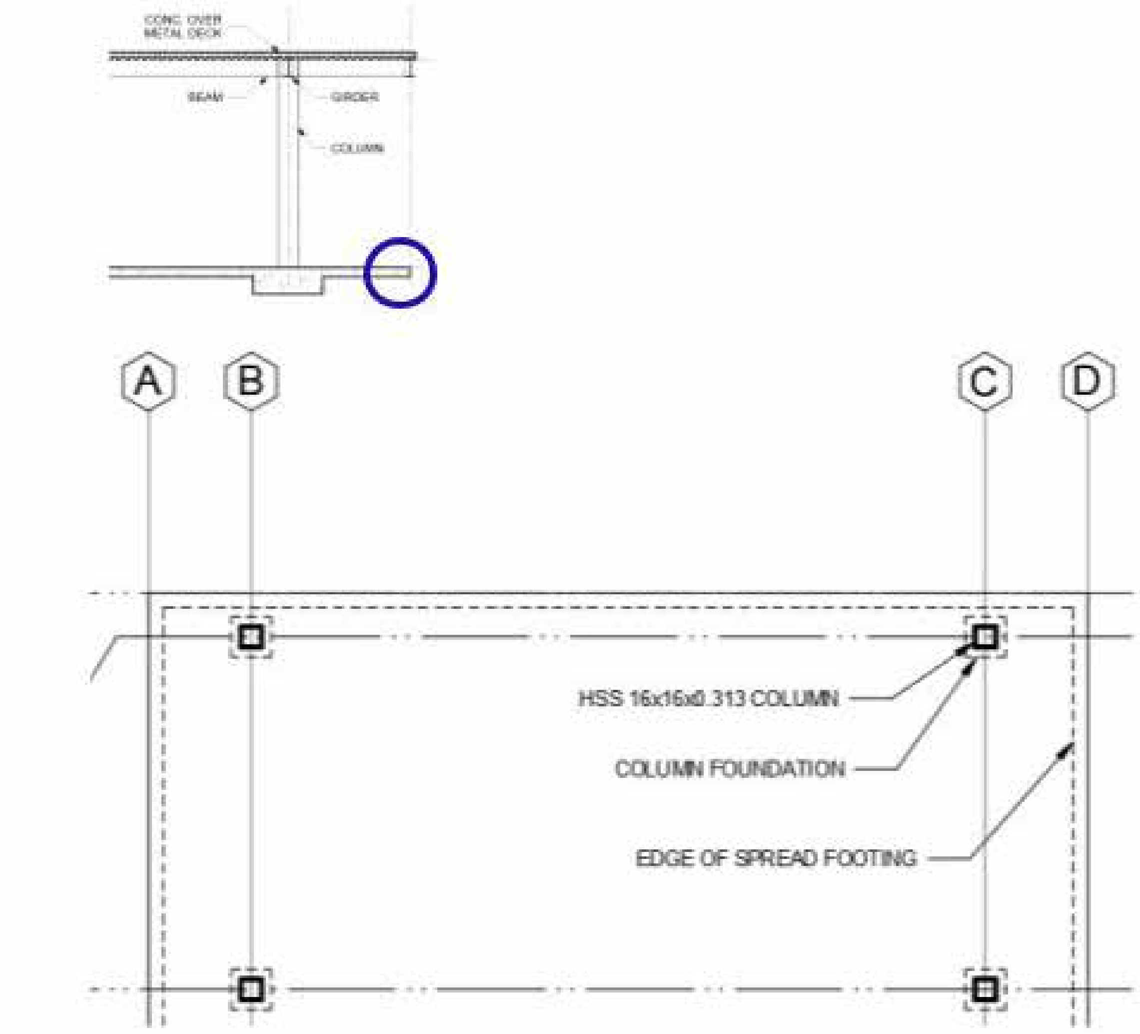
SAP RESULTS



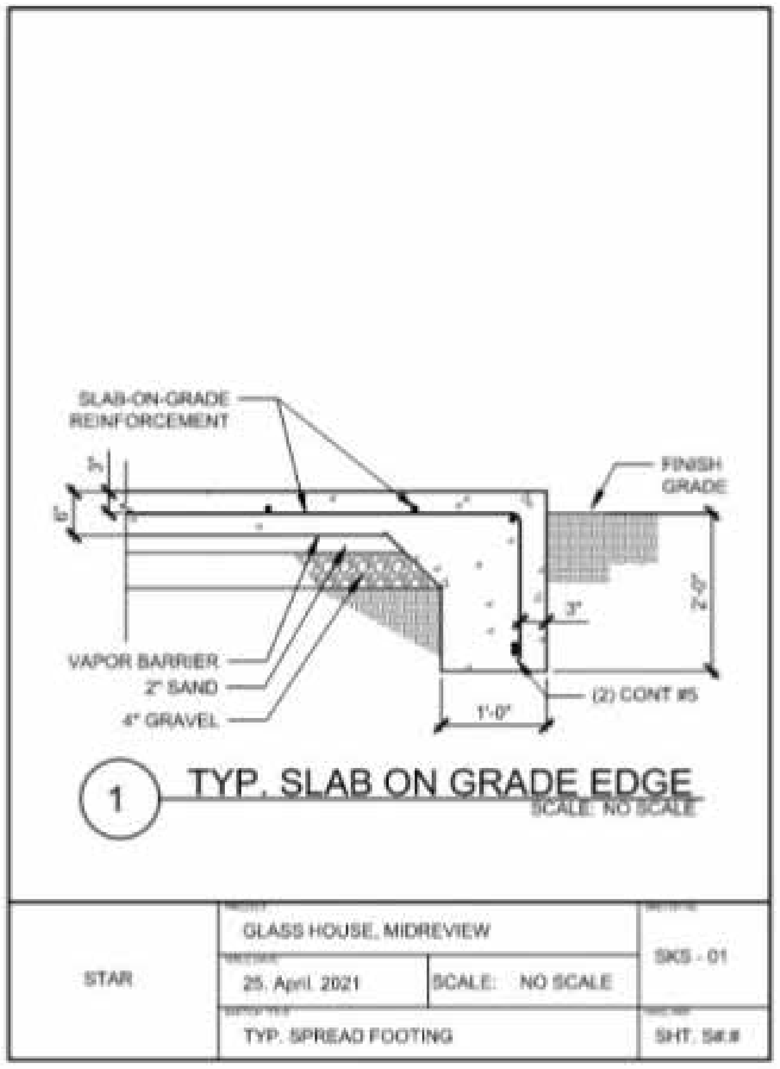
With these member sizes, the maximum deflection is 2.7" as seen in the deflected shape on the left. Next we will be going into some of the connection details for the structure.

SAP RESULTS AND TEXT BY EMMANUEL CORONA NAVARRO AND BLAKE DURHAM

SLAB ON GRADE



SLAB ON GRADE BY ARCE TEAM (ALL)

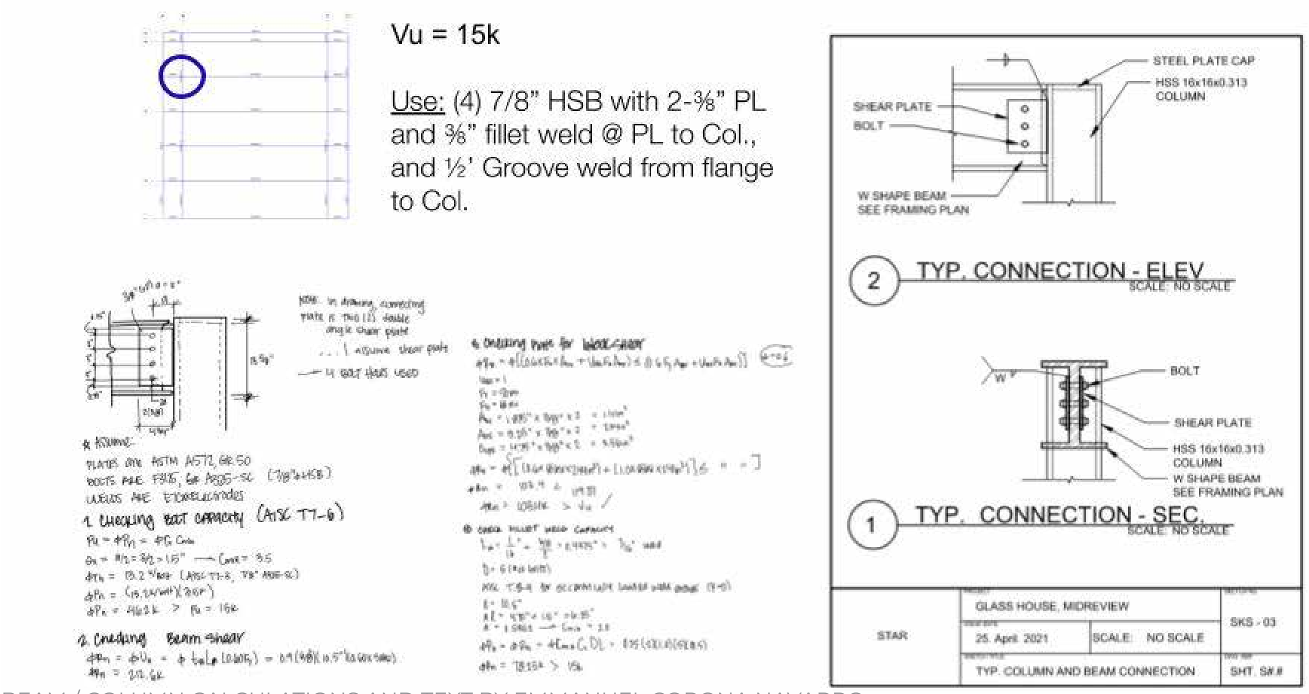


On the left is a portion of our foundation plan. Mostly slab on grade, and to make sure the columns are stable, we add deeper concrete footing under all the columns.

On the right hand side is a typical slab on grade detail.

TEXT BY CHENGBIN KUANG

BEAM AND COLUMN CONNECTION



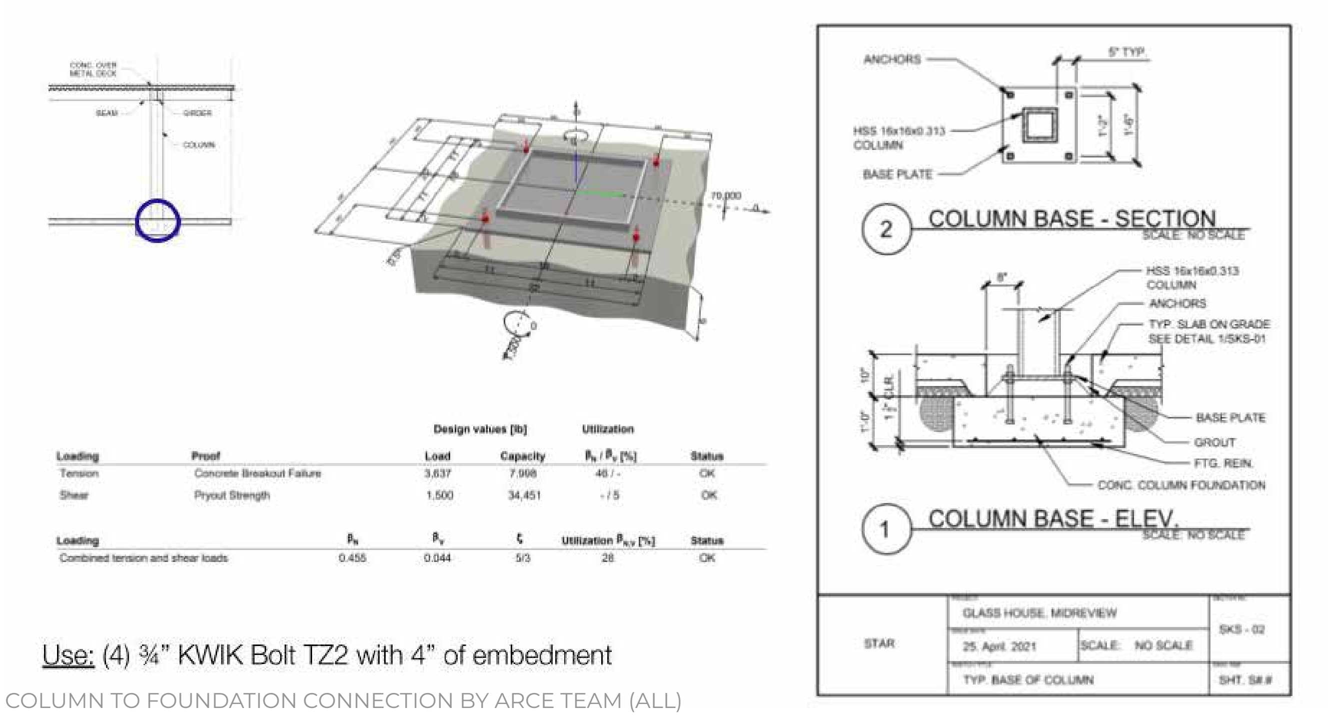
BEAM / COLUMN CALCULATIONS AND TEXT BY EMMANUEL CORONA NAVARRO

Looking at the framing of the building, we take a look at a moment-carrying connection at one of the columns. Here, we have a wide flange framing into an HSS by way of two shear plates connected to the web by high-strength bolts and welded to the HSS column.

Calculations were performed to ensure adequate nominal resistance from the bolts and weld, in accordance with AISC standards.

TEXT BY EMMANUEL CORONA NAVARRO

COLUMN TO FOUNDATION CONNECTION

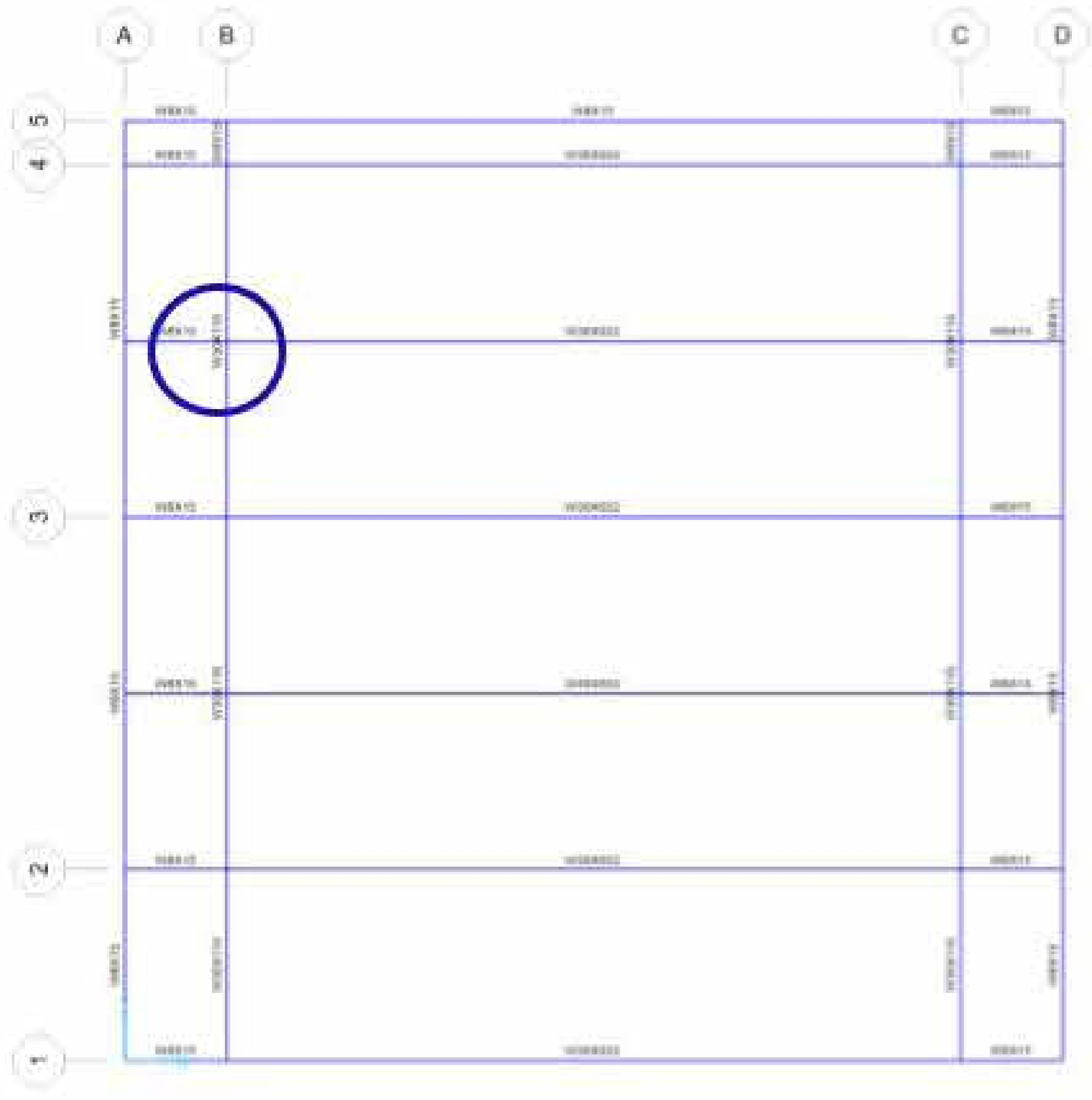


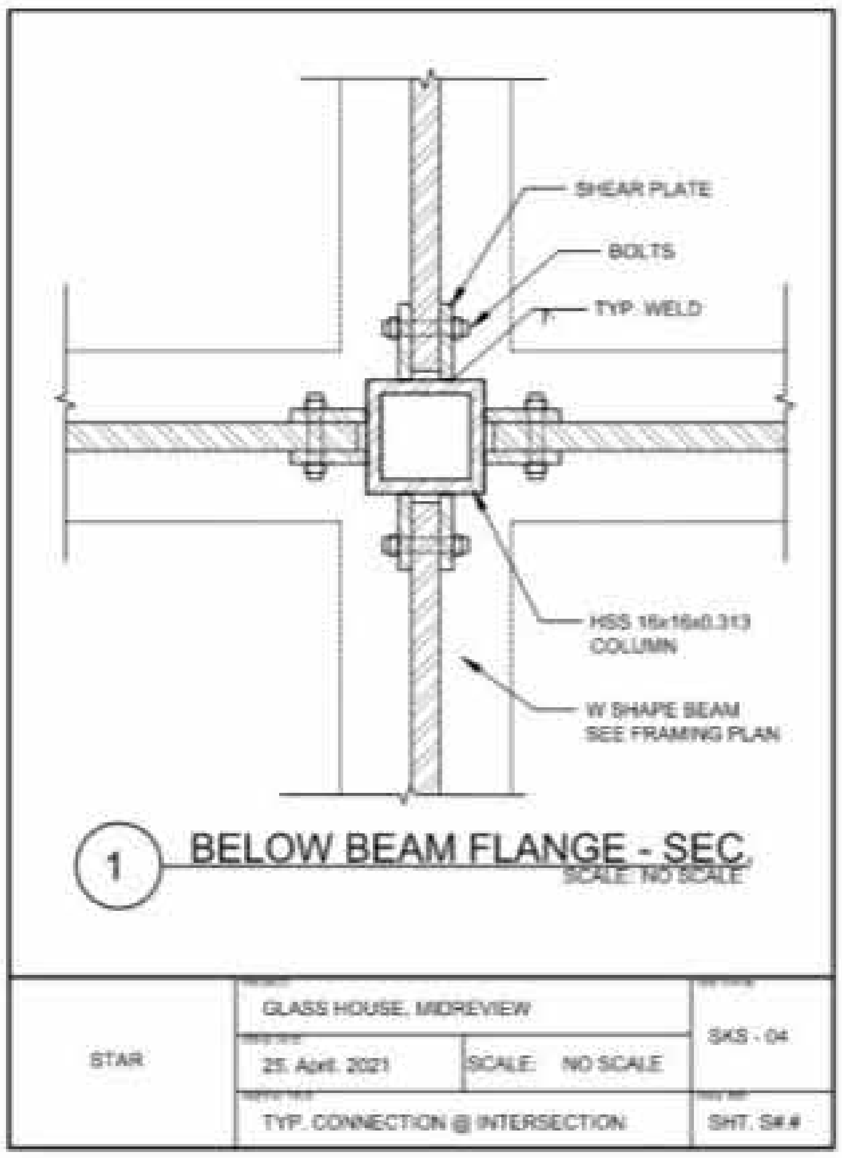
COLUMN TO FOUNDATION CONNECTION BY ARCE TEAM (ALL)

Using the HILTI Profis engineering software, I calculated that we would need to use 4 kwik bolts with 4" of embedment into the floor slab to resist the moment and shear at the base of the column.

TEXT BY BLAKE DURHAM

BEAM INTERACTION CONNECTION

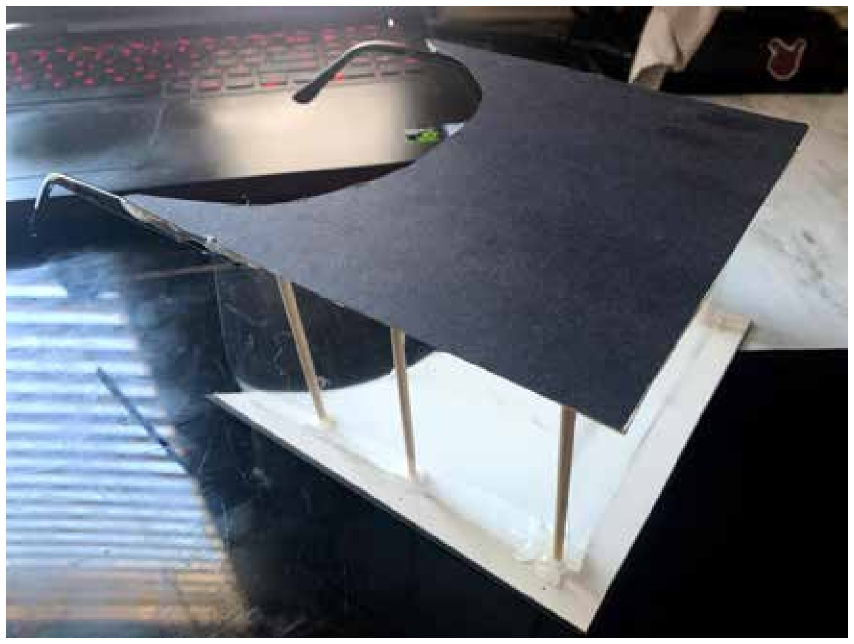


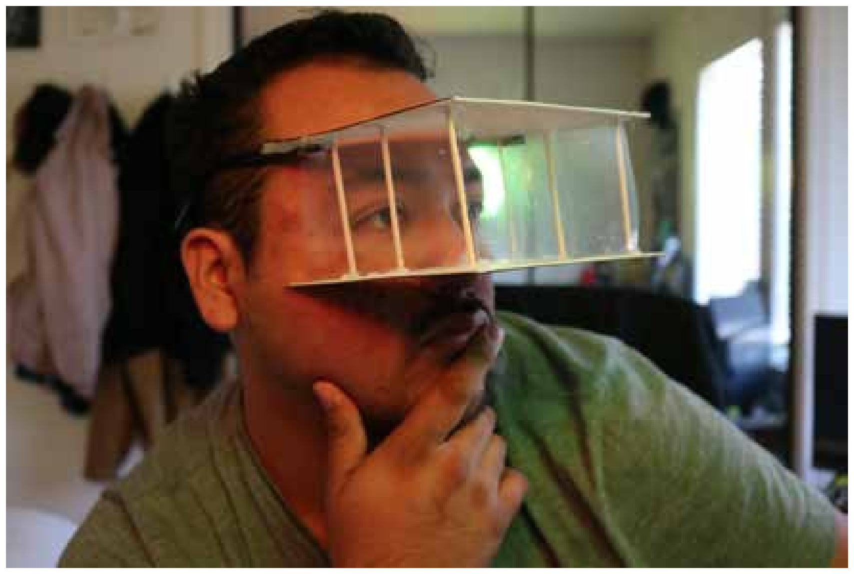


BEAM INTERACTION CONNECTION BY ARCE TEAM (ALL)

The last detail is a connection at the intersection of 4 beams frame into a column. It is a pin connection similar to the columns and beams.

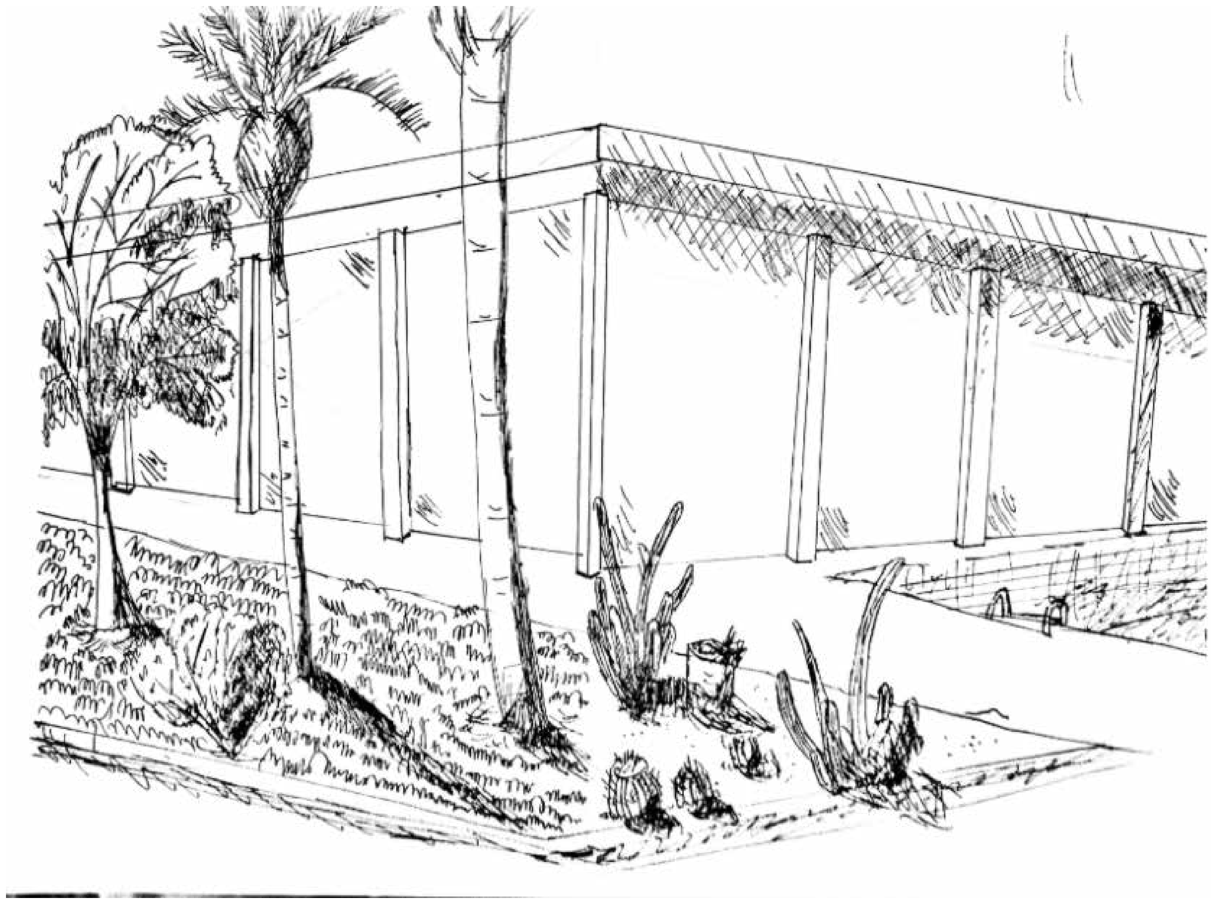
TEXT BY CHENGBIN KUANG





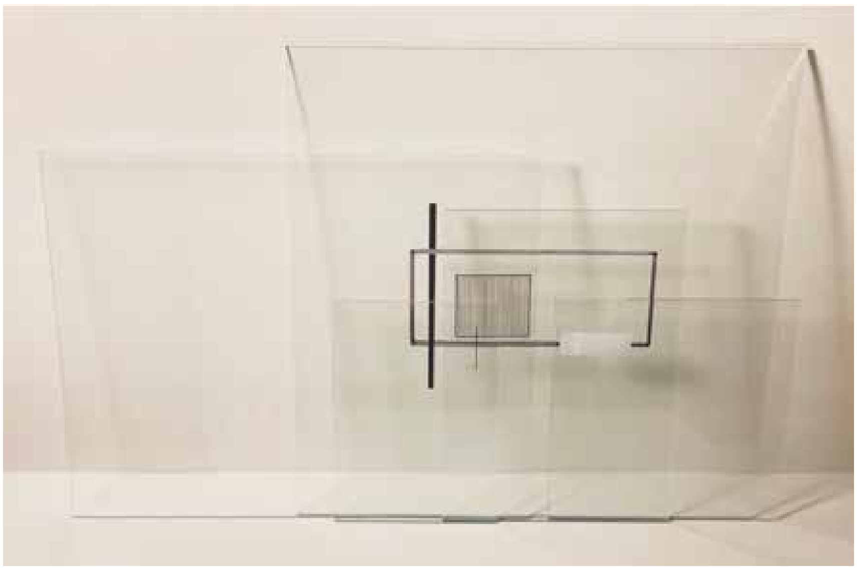
***GLASS**ES* *- EMMANUEL CORONA NAVARRO*

"PERFORMANCE" *- DAISY PENALOZA*



PERSPECTIVE SKETCH *- CHENGBIN KUANG*

SUGAR GLASS *- BLAKE DURHAM*

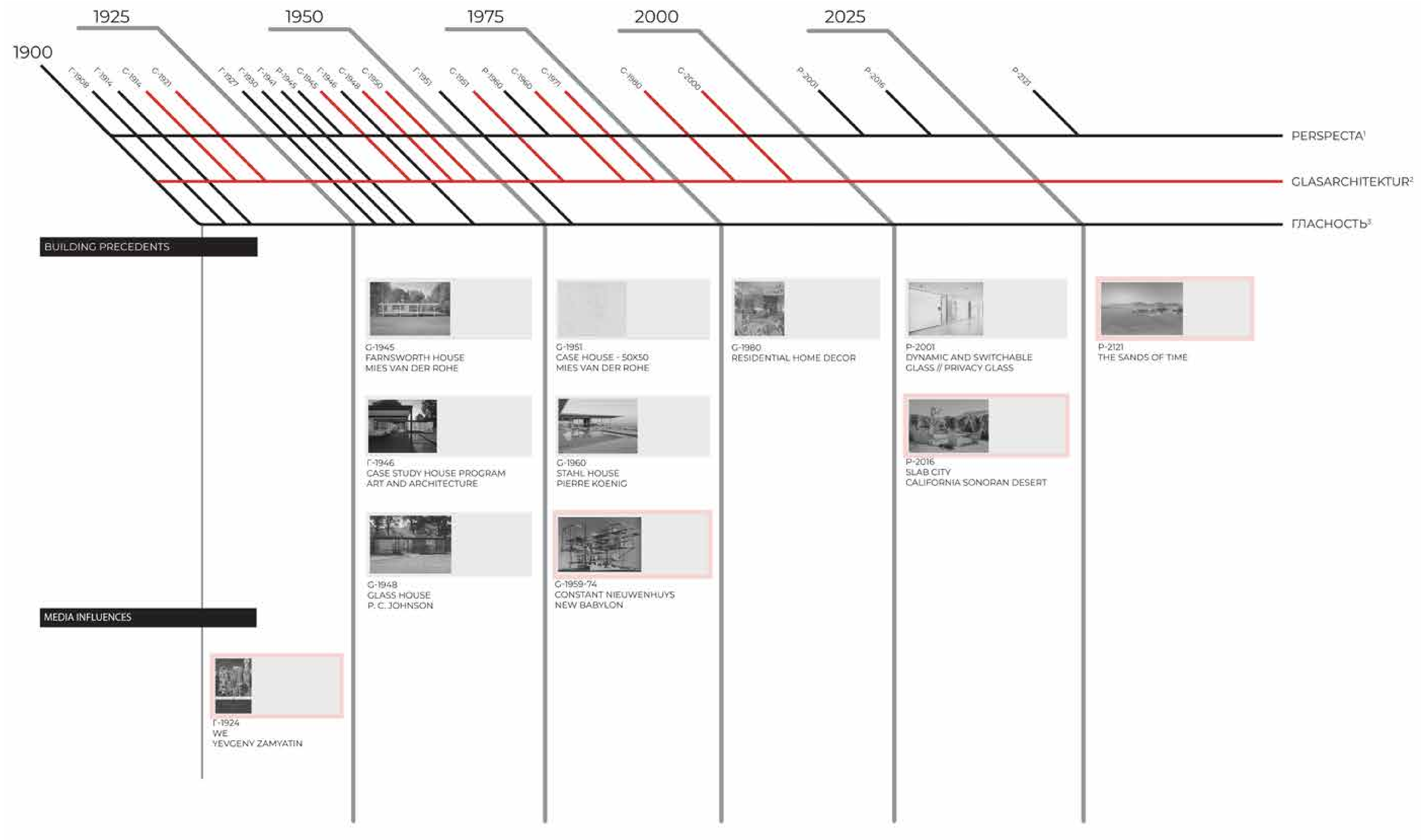


SUGAR GLASS *- GRACE LAUER*

"Go_A Hako otoko" *- AUGUSTAS LAPINSKAS*

https://www.youtube.com/watch?v=eEjIMvJ63bE

TERTIARY DESIGN



СТЕКЛО | STIKLAS | GLASS

We looked into some literary influences that affected the social interpretations of glass, the most notable one being Zamyatin's "We". These factors influenced our main design process as we asked ourselves, what can we do with glass? When we were imagining our initial ideas for what would become of our house in the future, we took inspiration from another master's work, New Babylon by Constant Nieuwenhuys, which correlated to our nomadic clients and nomadic structure. And for the final fantasy part of the project, the lawless, off-the-grid Slab City was a large influence that led to our Sands of Time project seen in the year 2121.

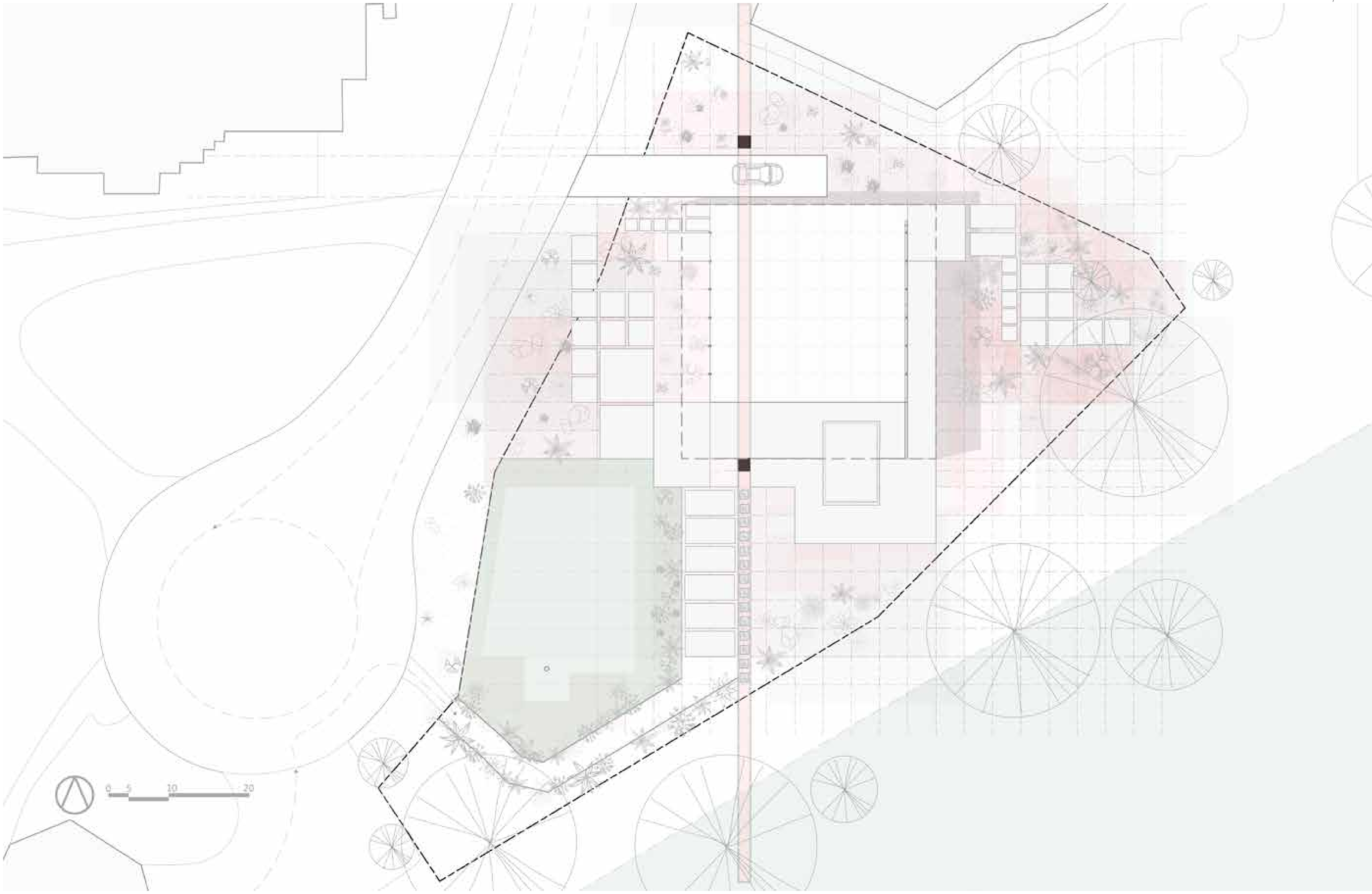
TEXT BY DAISY PENALOZA AND BLAKE DURHAM

This is a comparison between our original clients for the 49' x 49' house and a prediction of who would be occupying this space once Palm Springs runs out of water.

The original clients can travel freely because of their current economic status - they rotate to destination golf courses as a break from their corporate jobs. The future occupants cater more to the nomadic lifestyle in the traditional sense - the 49' x 49' house is a "pitstop oasis" between large cities where like minded people can escape the overwhelming lifestyle of the metropolis.

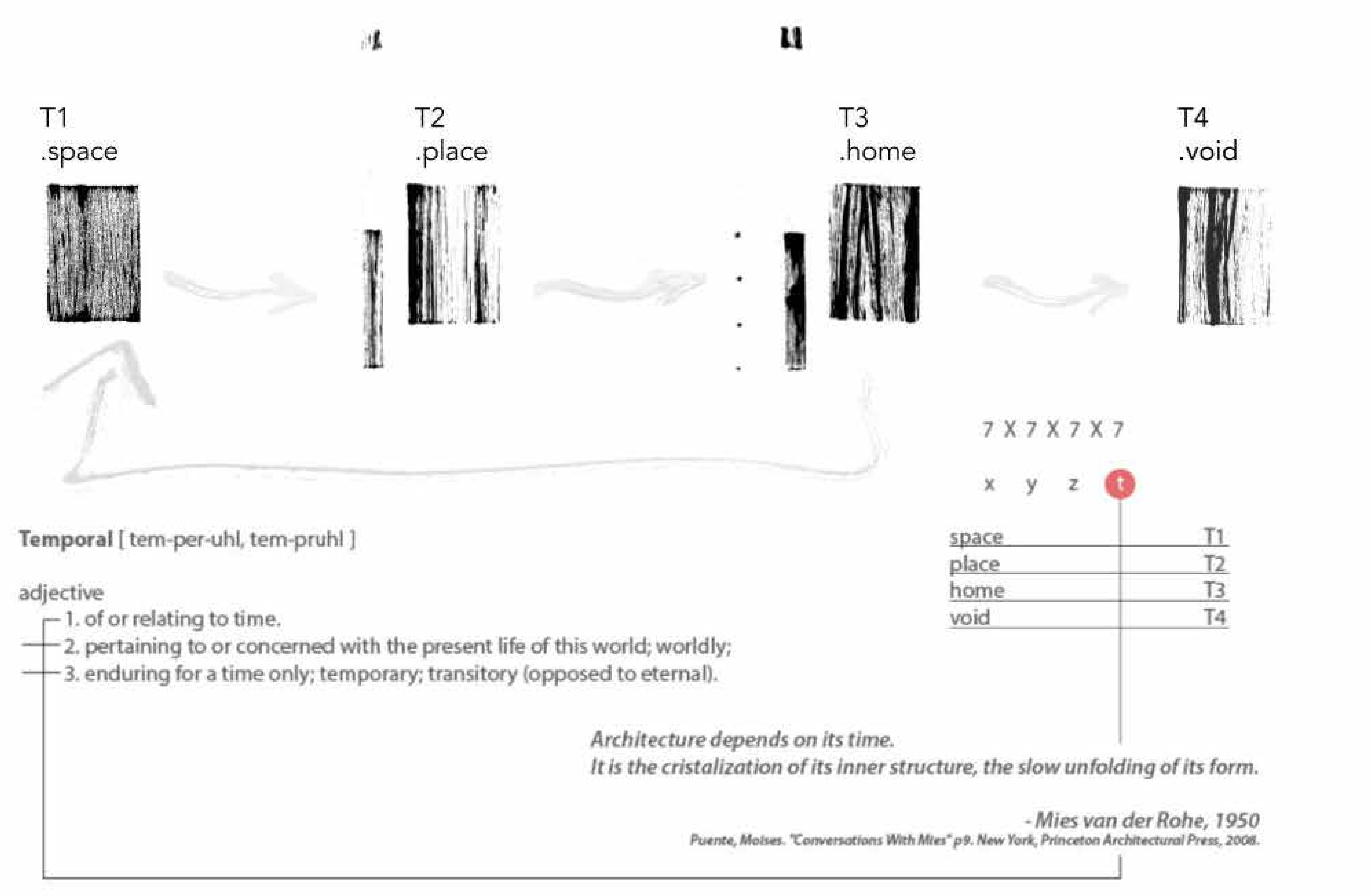
These clients very obviously juxtapose and contradict each other; showing how the life of a building goes far beyond the initial clientele.

SITE PLAN DESIGN AND TEXT
BY DAISY PENALOZA, 2021



The site design follows the established 7x7 grid lines of the house to divide the zones of the landscape. Most notably, the separation created by the solar chimney, kitchen island, and firepit that serves as the main hierarchical axis of the site. The site establishes three major environments of leisure. First, a putting green to the south west of the site for group entertainment and recreation. Just underneath an alleviating tree path on the existing pedestrian access from the golf course to lead back to the axis of the home. On the east side, a secluded oasis in the desert providing a peaceful exterior environment for the clients to enjoy.

The Northwest entrance places the inhabitants within the main organizational axis and directs their attention through the house. The design allows for an unobstructed view axis of the site from within the house and vice versa.

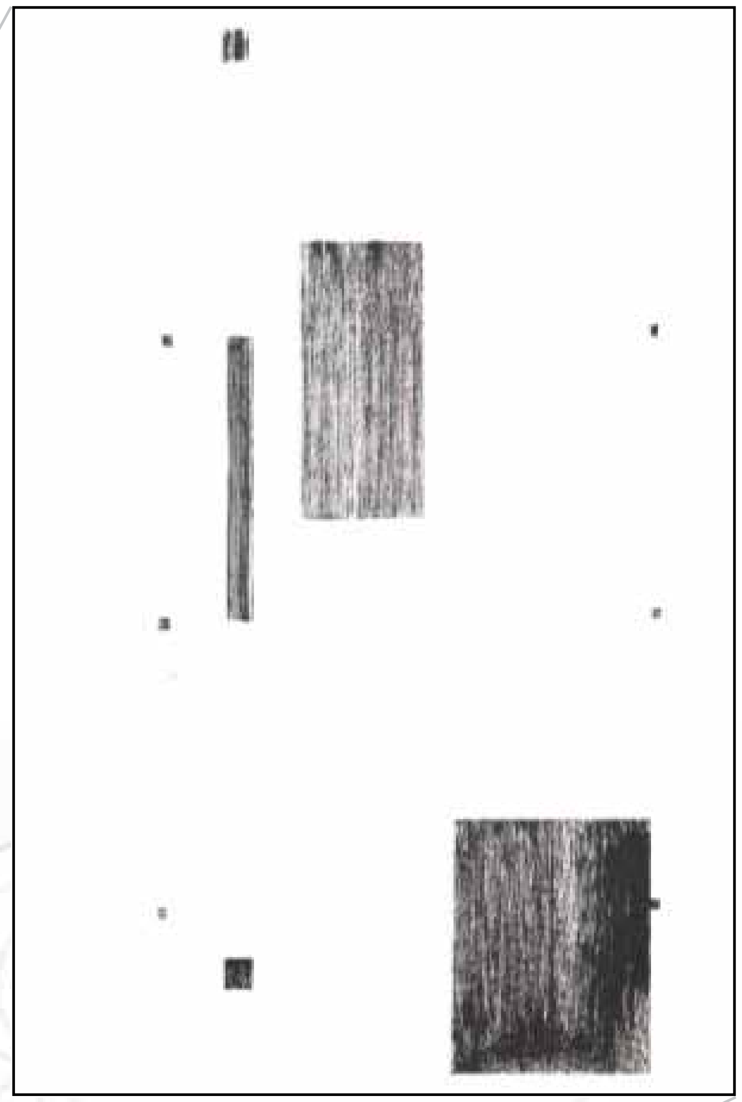


As we moved to the design phase we were hit by the question: who could voluntarily and knowingly choose to inhabit the dynamic and unsettling place that the glass house is and, even more so, embrace its spatial character and qualities?

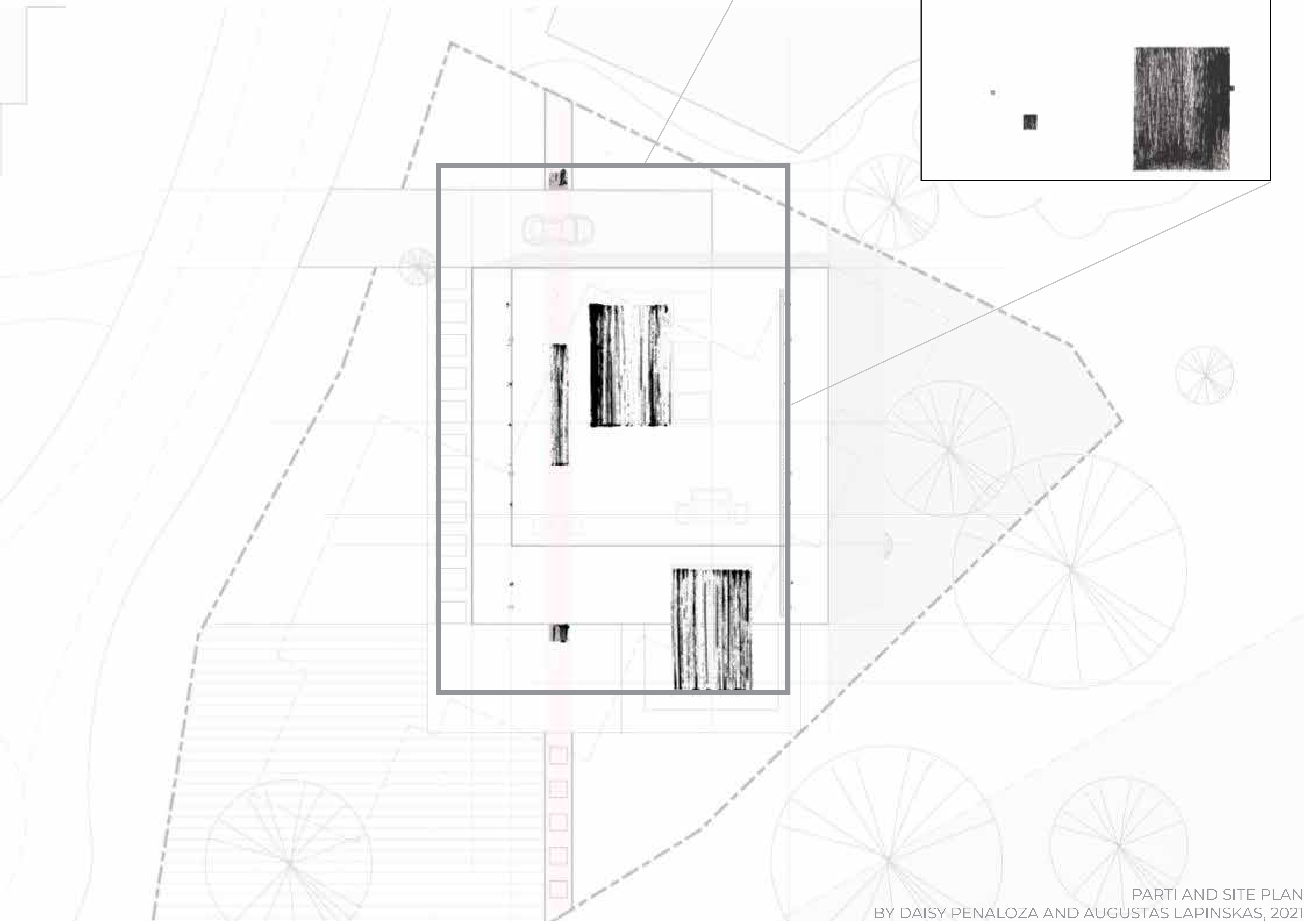
With a bit of research, we stumbled upon the concept of a modern nomadic space, formulated by Constant Nieuwenhuys, a Dutch painter, who was deeply concerned with the nomadic way of living, dreaming of a world as a global system of temporary dwellings. One of his famous quotes being:
The environment is created by the activities of life, not the other way around.

Following this ideology, the transparent living space of a glass house, in contact with the user of space, becomes a place for those who choose to live in transit, embracing the activities and rituals of a nomadic lifestyle. That was the point, when we came to a conclusion who could be the perfect client for a Mies'ian glass house.

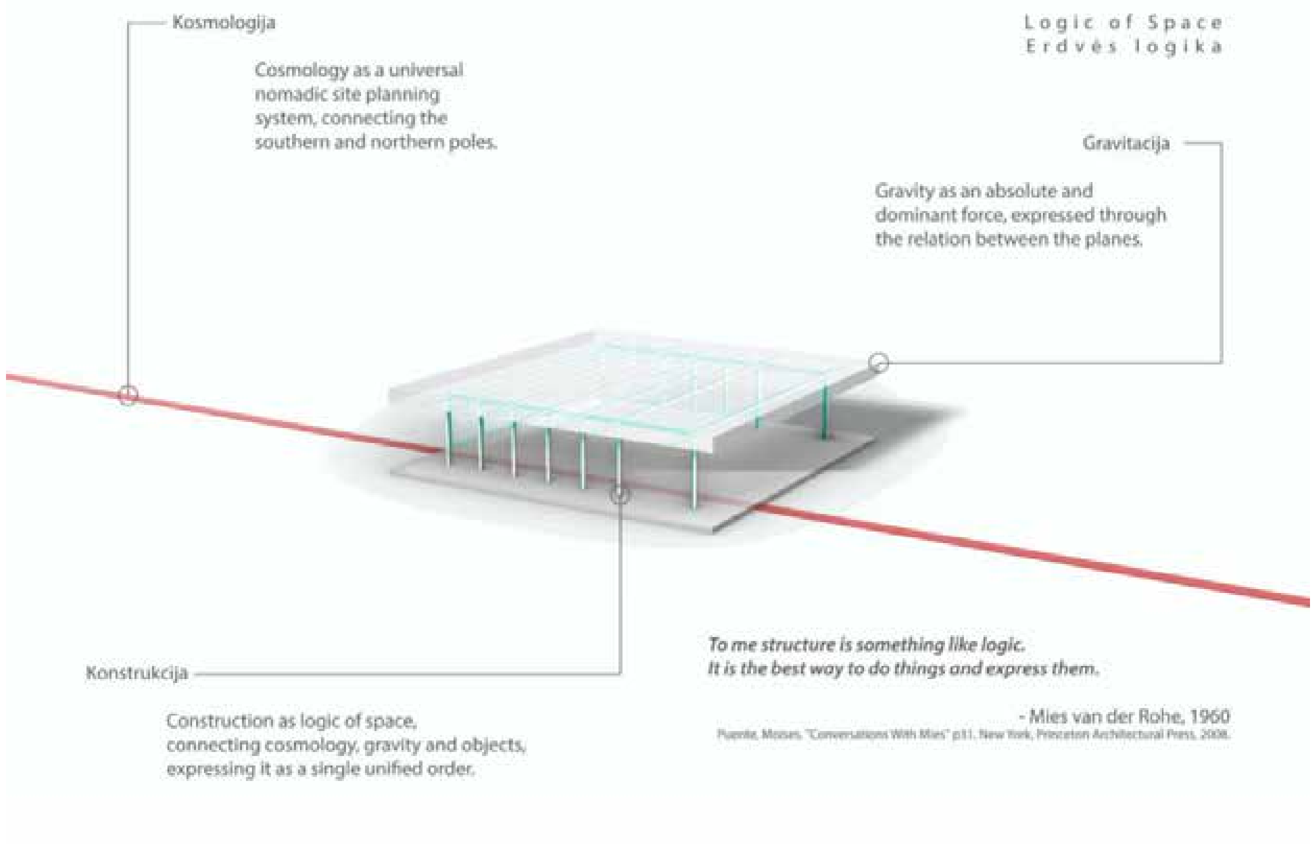
INK PRINT PARTI DIAGRAM, INITIAL SPATIAL ORGANIZATION AND TEXT
BY AUGUSTAS LAPINSKAS, 2021

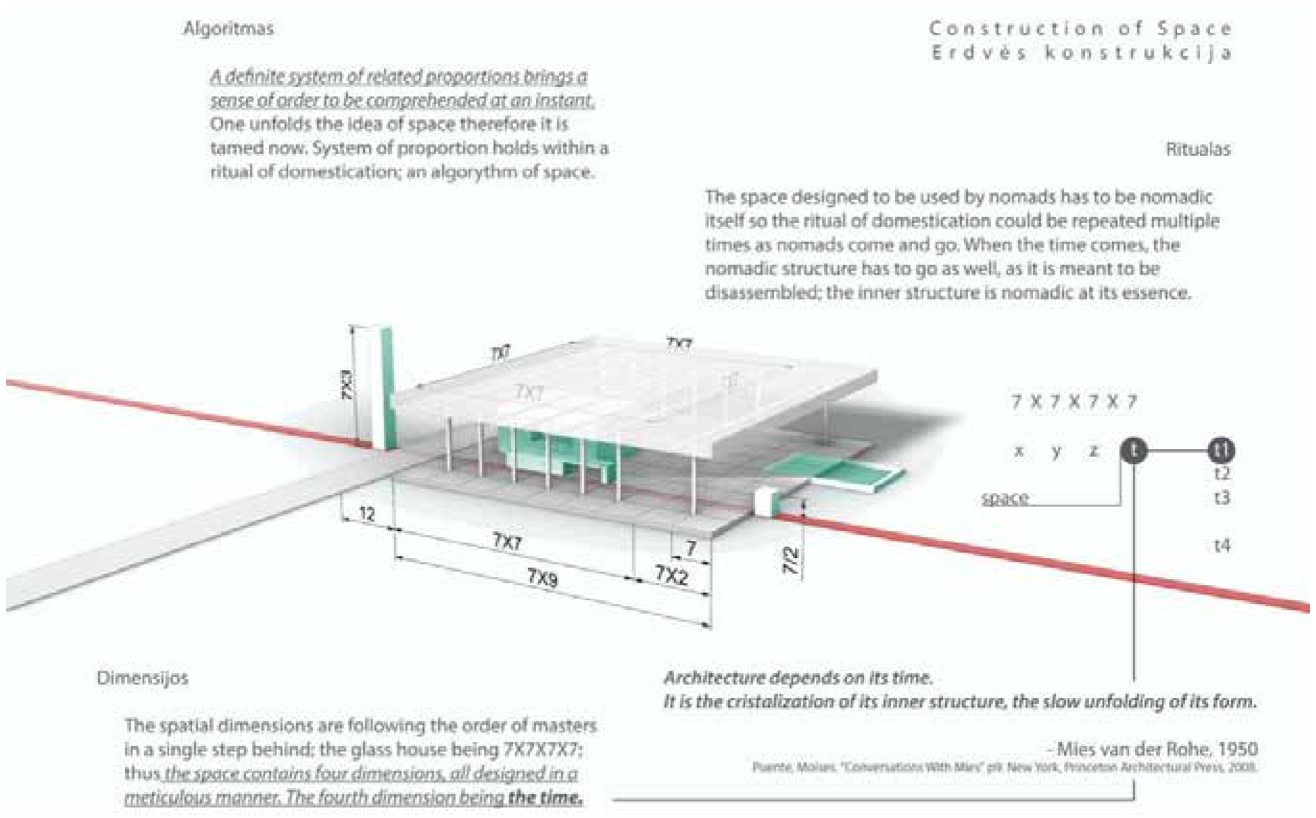


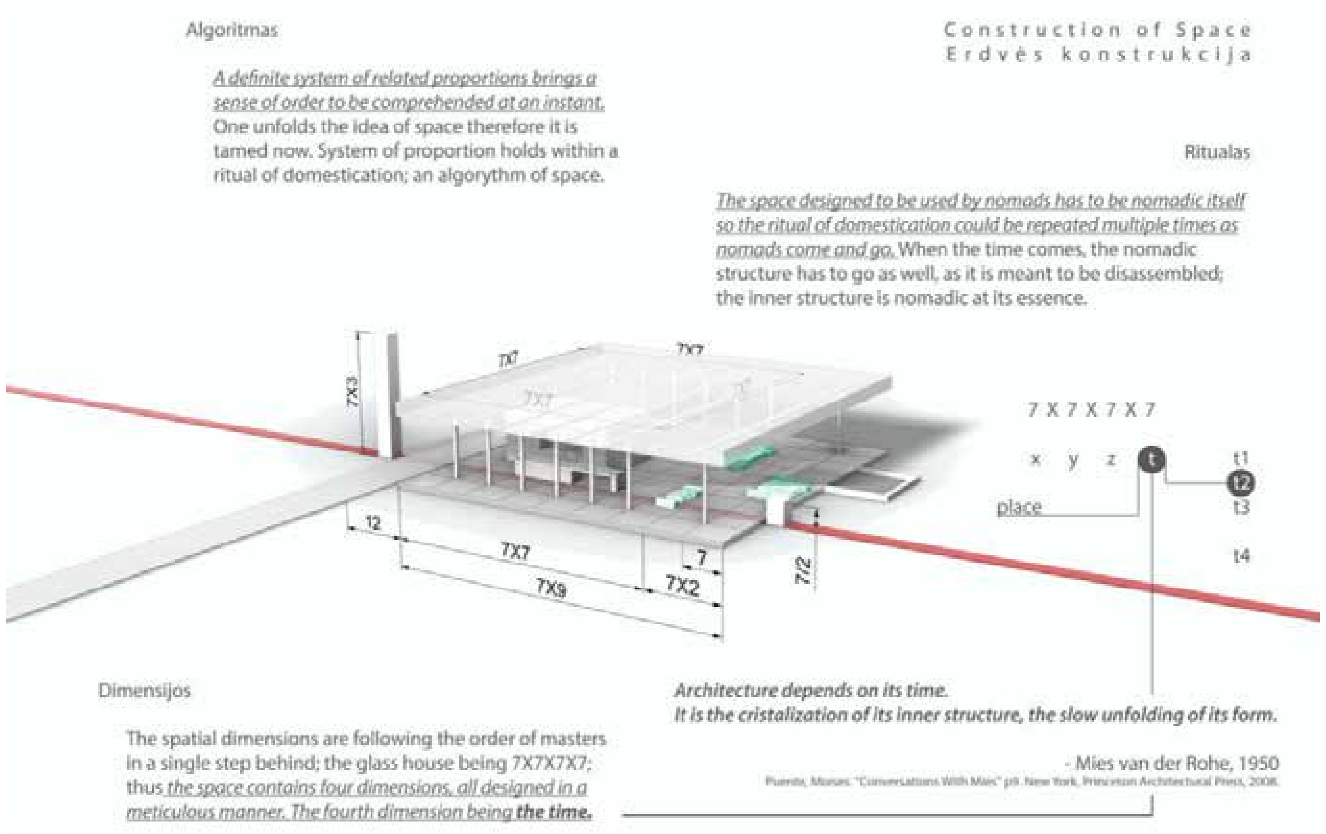
After analyzing many examples of the way Mies van der Rohe organises space, we came up with an absolutely minimalistic yet rational configuration of a plan. There you see an abstract drawing of the composition of space which got slightly modified over the time as we went deeper into the details, but remained the spatial key of the project till the very end, bringing all to an overall unity that aims to create a subconscious sense of belonging, inflicted at an instant, as the person effortlessly comprehends the algorithm of space.



PARTI AND SITE PLAN
BY DAISY PENALOZA AND AUGUSTAS LAPINSKAS, 2021


Kosmologija
Cosmology as a universal nomadic site planning system, connecting the southern and northern poles.
Logic of Space
Erdvės logika
Gravitacija
Gravity as an absolute and dominant force, expressed through the relation between the planes.
Konstrukcija
Construction as logic of space, connecting cosmology, gravity and objects, expressing it as a single unified order.
To me structure is something like logic.
It is the best way to do things and express them.
- Mies van der Rohe, 1960
Puente, Moises. "Conversations With Mies" p31. New York, Princeton Architectural Press, 2008.


Algoritmas
A definite system of related proportions brings a sense of order to be comprehended at an instant. One unfolds the idea of space therefore it is tamed now. System of proportion holds within a ritual of domestication; an algorythm of space.
Construction of Space
Erdvės konstrukcija
Ritualas
The space designed to be used by nomads has to be nomadic itself so the ritual of domestication could be repeated multiple times as nomads come and go. When the time comes, the nomadic structure has to go as well, as it is meant to be disassembled; the inner structure is nomadic at its essence.
7X7X7X7
x y z t
t1
t2
t3
t4
space
7X3
7X7
12
7X9
7X2
7
7/2
Dimensijos
The spatial dimensions are following the order of masters in a single step behind; the glass house being 7X7X7X7; thus the space contains four dimensions, all designed in a meticulous manner. The fourth dimension being the time.
Architecture depends on its time.
It is the cristalization of its inner structure, the slow unfolding of its form.
- Mies van der Rohe, 1950
Puente, Moises. "Conversations With Mies" p9. New York, Princeton Architectural Press, 2008.


Algoritmas
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Construction of Space
Erdvės konstrukcija
Ritualas
The space designed to be used by nomads has to be nomadic itself so the ritual of domestication could be repeated multiple times as nomads come and go. When the time comes, the nomadic structure has to go as well, as it is meant to be disassembled; the inner structure is nomadic at its essence.
7X7X7X7
x y z t
t1
t2
t3
t4
place
7X3
7X7
12
7X9
7X2
7
7/2
Dimensijos
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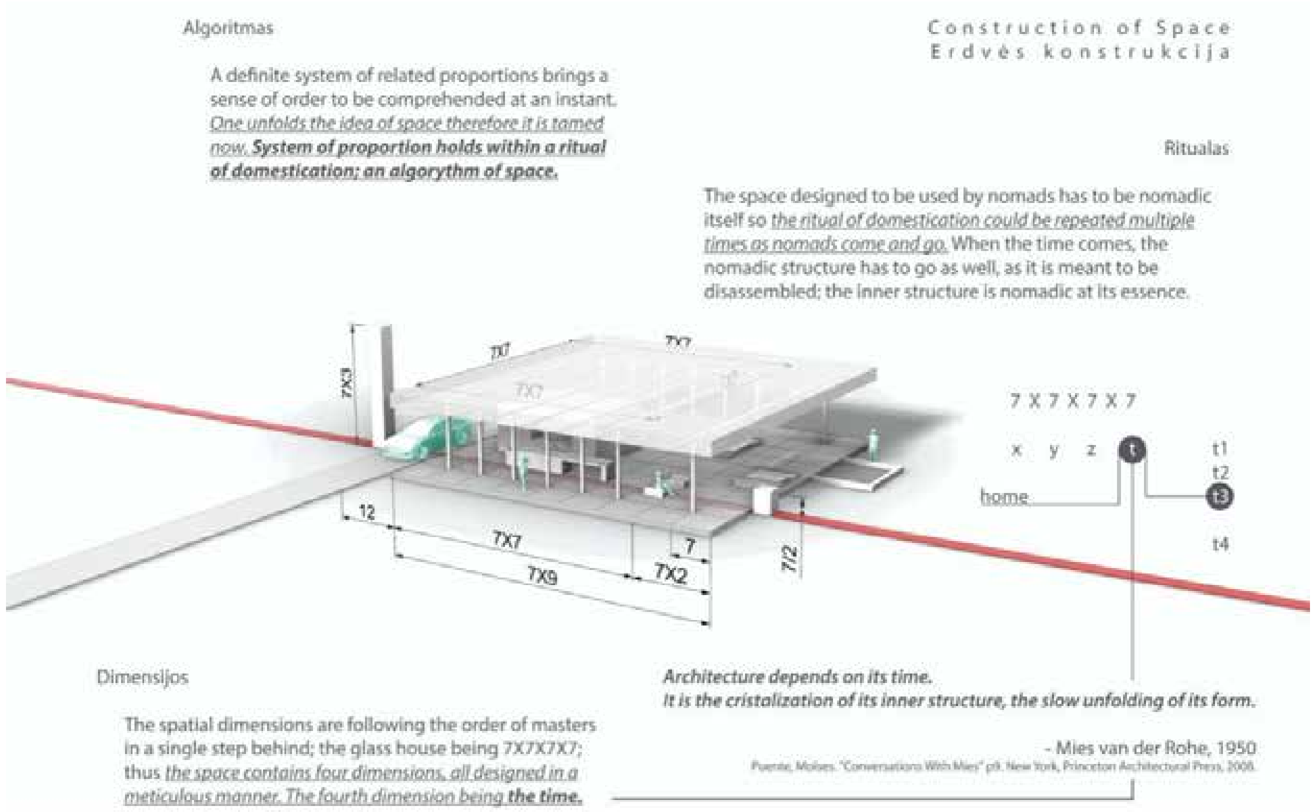
Algoritmas
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Construction of Space
Erdvės konstrukcija
Ritualas
The space designed to be used by nomads has to be nomadic itself so the ritual of domestication could be repeated multiple times as nomads come and go. When the time comes, the nomadic structure has to go as well, as it is meant to be disassembled; the inner structure is nomadic at its essence.
7X7X7X7
x y z t
t1
t2
t3
t4
home
7X3
7X7
12
7X9
7X2
7
7/2
Dimensijos
The spatial dimensions are following the order of masters in a single step behind; the glass house being 7X7X7X7; thus the space contains four dimensions, all designed in a meticulous manner. The fourth dimension being the time.
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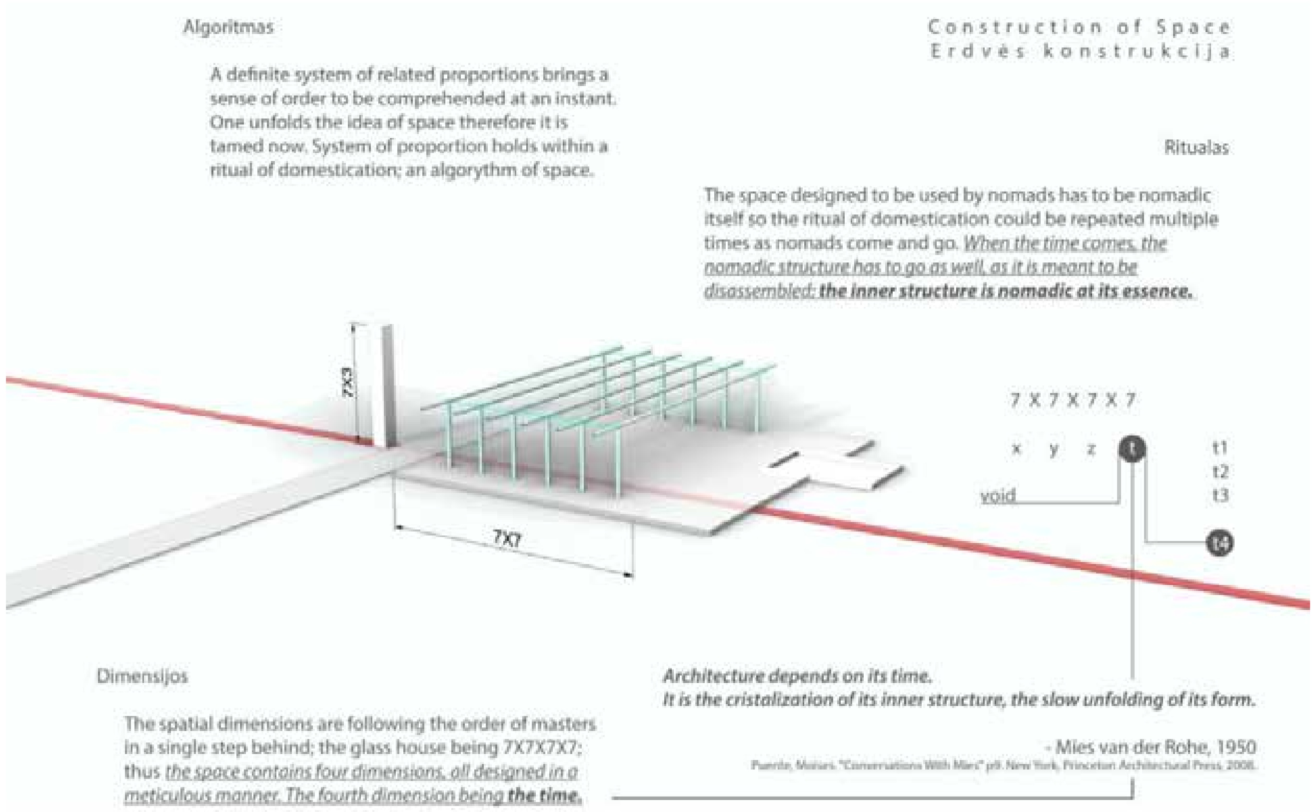
Algoritmas
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7X7X7X7
x y z t
t1
t2
t3
t4
void
7X3
7X7
Dimensijos
The spatial dimensions are following the order of masters in a single step behind; the glass house being 7X7X7X7; thus the space contains four dimensions, all designed in a meticulous manner. The fourth dimension being the time.
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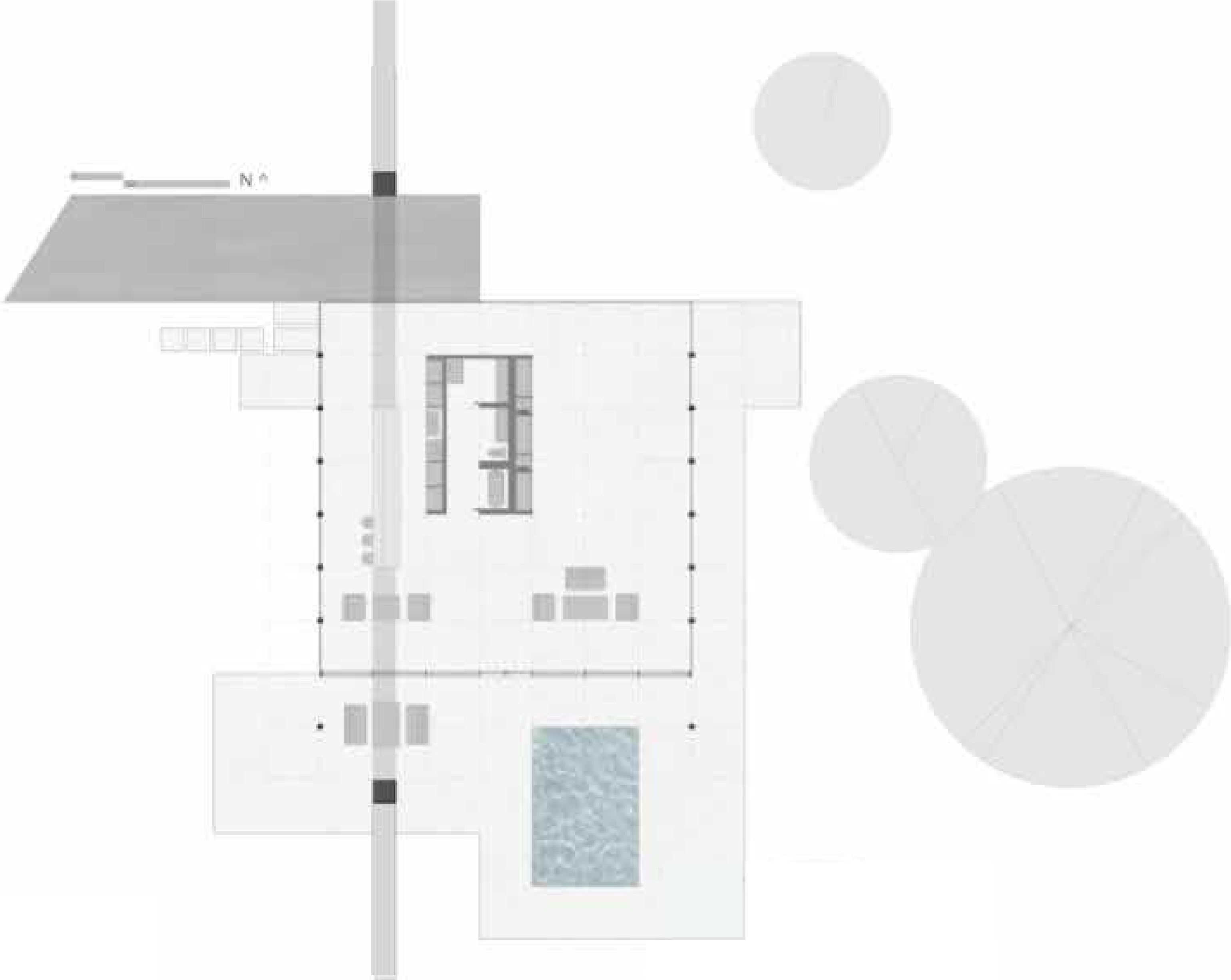
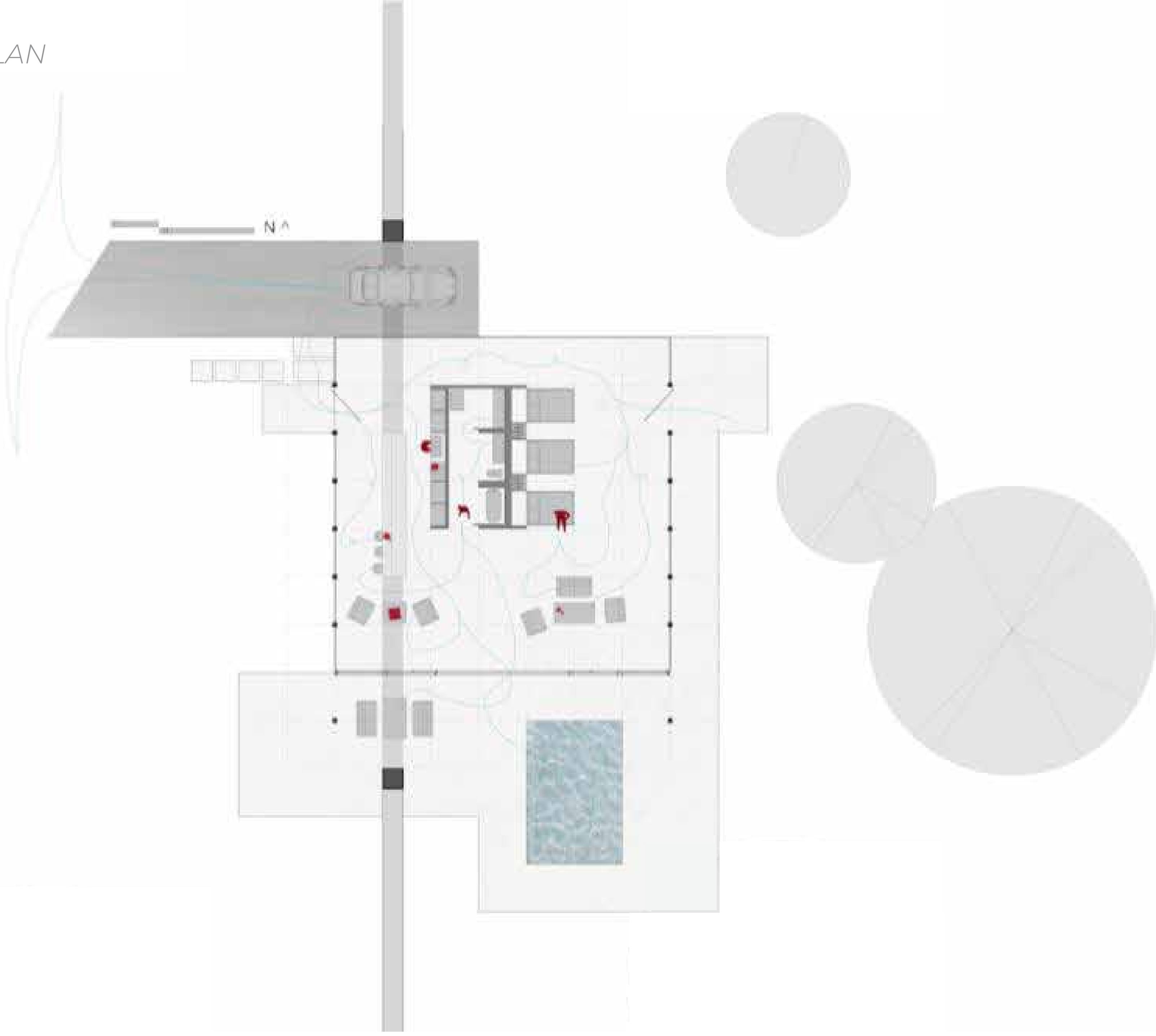
SPACE FLOOR PLAN

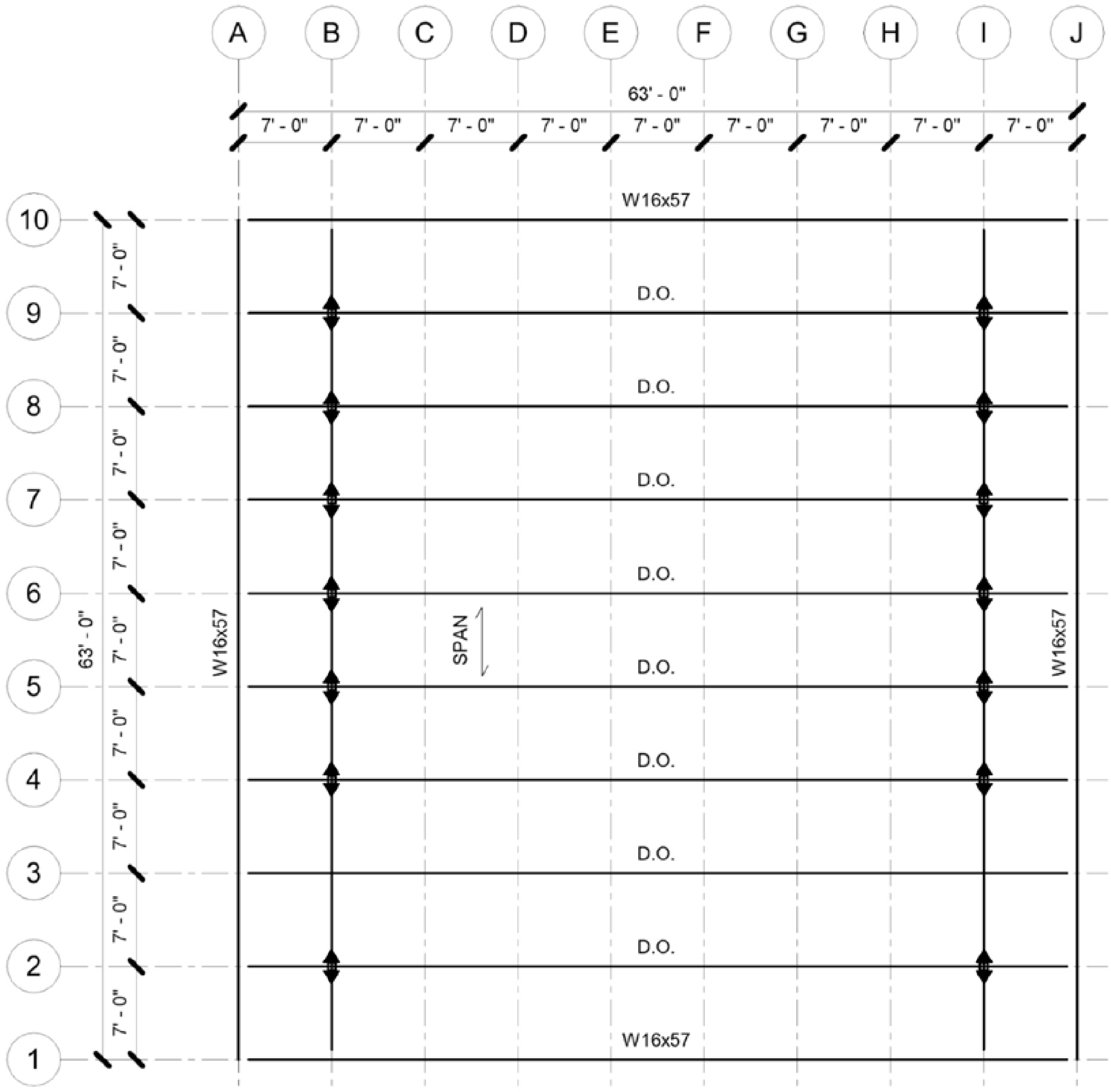


The primary grid of the 49' x 49' house is emphasized by the main axis point of the solar chimney monolith and the kitchen island. This 49' x 49' grid is broken down into 7 by 7 entities along the x and y and another 7 in the z. The final 7 is time
The PLACE sequence depicts how guests enter the building - blank, sterile, and full of possibilities

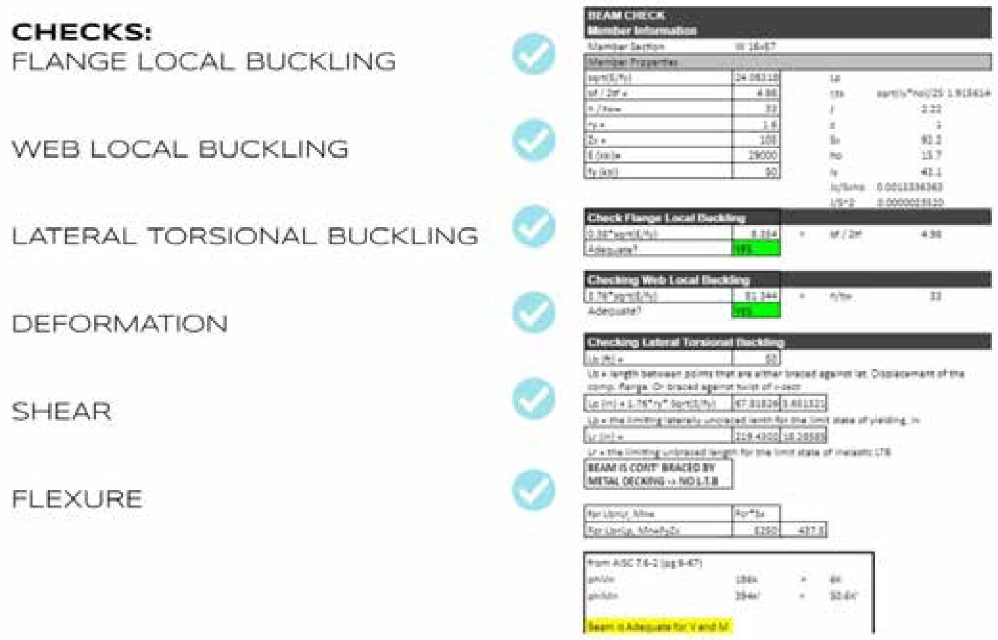
PLACE FLOOR PLAN



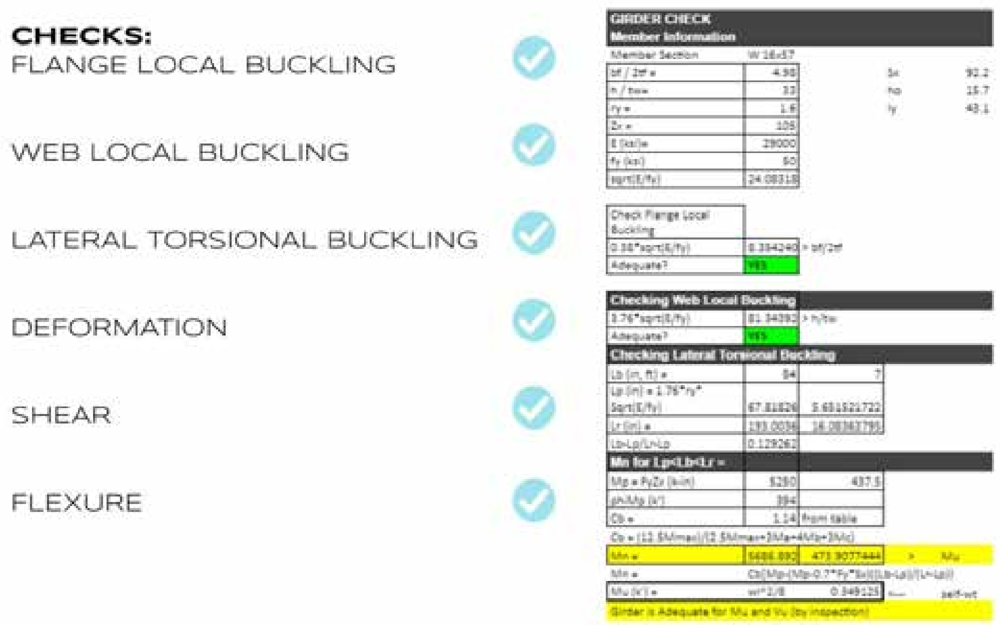
The HOME sequence shows the space once occupied and lived-in - full of life.
The column grid entertains that the 49' x 49' house is at its core, unwhole and moldable - needing the imposition of humans and nature to attempt to fill the void.



ROOF FRAMING PLAN BY BLAKE DURHAM



MEMBER CHECKS | BEAMS BY EMMANUEL CORONA NAVARRO



MEMBER GIRDERS | BEAMS BY EMMANUEL CORONA NAVARRO

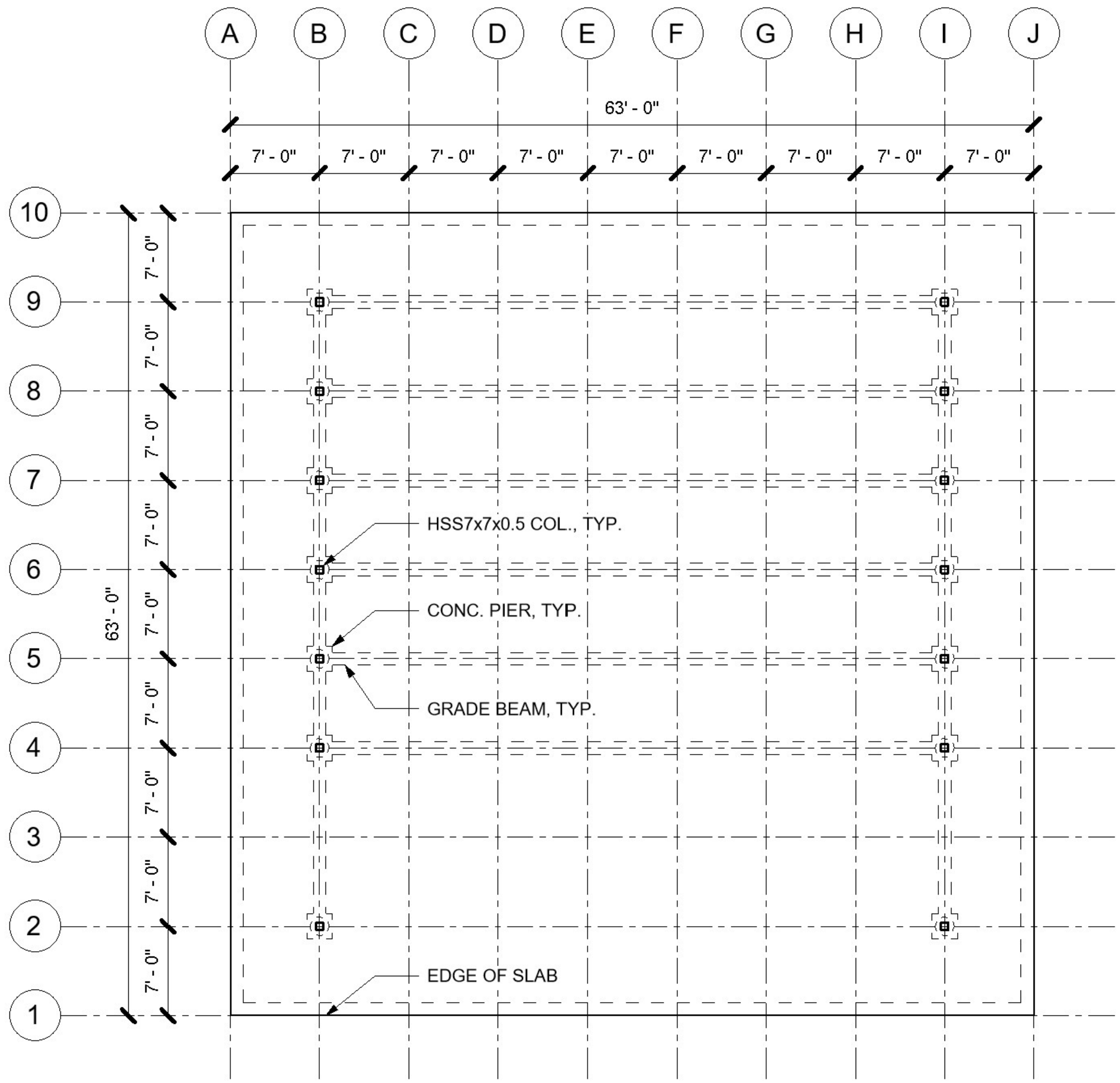
MEMBER COLUMNS | BEAMS BY EMMANUEL CORONA NAVARRO

Some of the critiques we received in the mid review mentioned that our member sizes were quite large, so for this next phase, we changed the concrete over metal deck to a pvc membrane over metal deck as seen in the detail to the right, which cut more than half the weight off of the roof. We also made the beams continuous over the columns spanning 49' with 7' overhangs on each side to help with the deflection and shading. With the addition of many supports and less weight overall, all of the member sizes became much more reasonable with W16x57 being the size for all of the roof members. To account for lateral loads there are moment frames in both directions. To test this, several different earthquake scenarios were run using SAP 2000 including El Centro. The columns are HSS7x7x1/2" to resist the lateral and gravity loads.

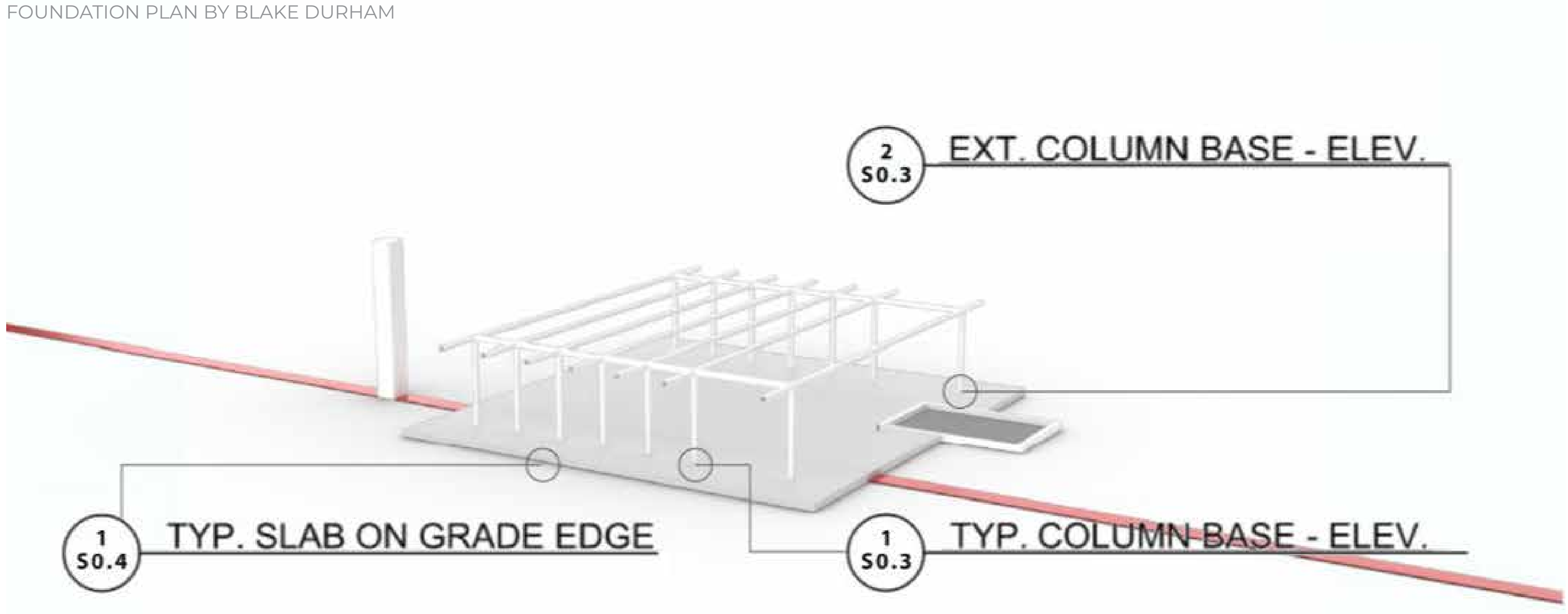
The beam and column members must be checked for compact or non-compact sections per AISC standards, as well as checked for buckling laterally or within the flanges. No issues were found.

The column was also checked for compact/non compact sections as well as for slenderness ratios to see if this typical member would buckle. Again, no issue was found for this member.

TEXT BY BLAKE DURHAM AND EMMANUEL CORONA NAVARRO



FOUNDATION PLAN BY BLAKE DURHAM



FOUNDATION CONNECTION MODEL VIEW BY AUGUSTAS LAPINSKAS

Our foundation consists of 4 different components :

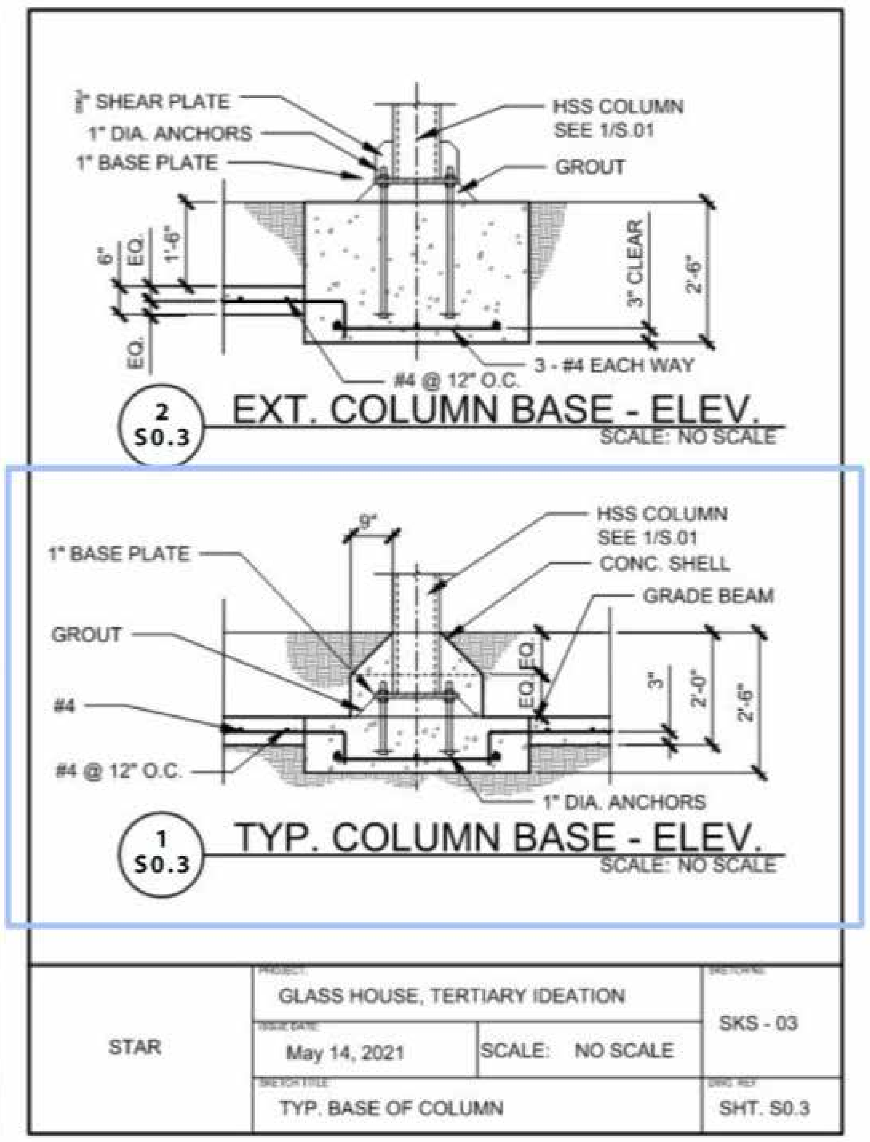
First, are Grade Beams, that spans between columns footings, to transport lateral load.

Next, are the two different types of column footings. As we analysed the details drawn by Myron Goldsmith for the Farnsworth house, we've noticed that the steel column base connections are encased in concrete.

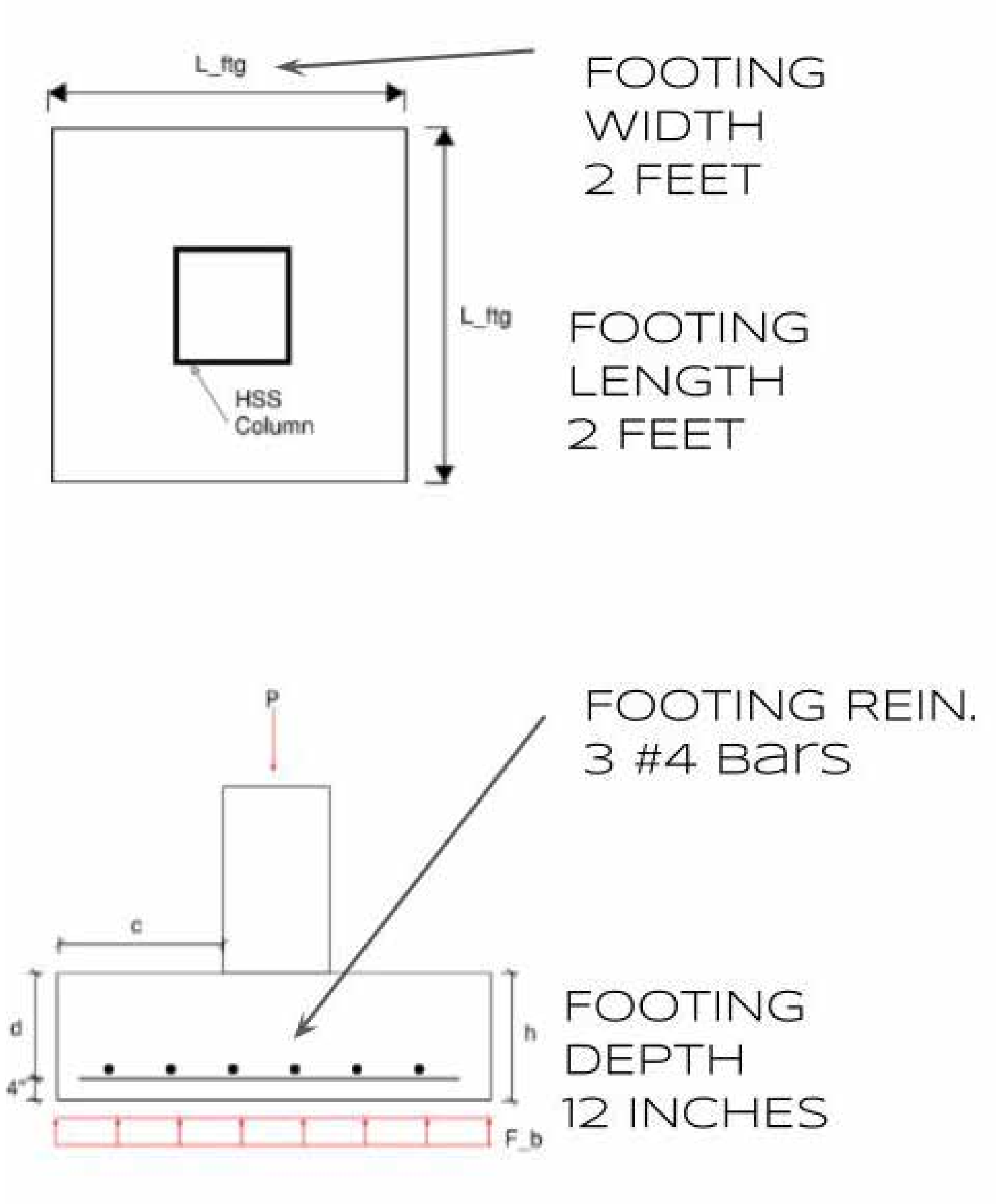
As we have learned, this was a common practice at the time - hiding the column base connection would protect the connection from corrosion and increase its stability.
The hidden column connection would also make the mullion-assembly & disassembly process easier as an uninterrupted rectangle shape will be formed between the columns and the planes of the roof & the floor.

However, in regard to Mies and Myrons respect for details and connections, we have decided to leave the 7th column, on the outdoor patio to have a revealed column base connection. This decision works nicely with the 4th temporal dimension of the house, which is based on the grid of sevens. Since the 7th column base is exposed, the 7th column could be taken away after the house is disassembled.

TEXT BY CHENGBIN KUANG



FOUNDATION CONNECTIONS BY CHENGBIN KUANG

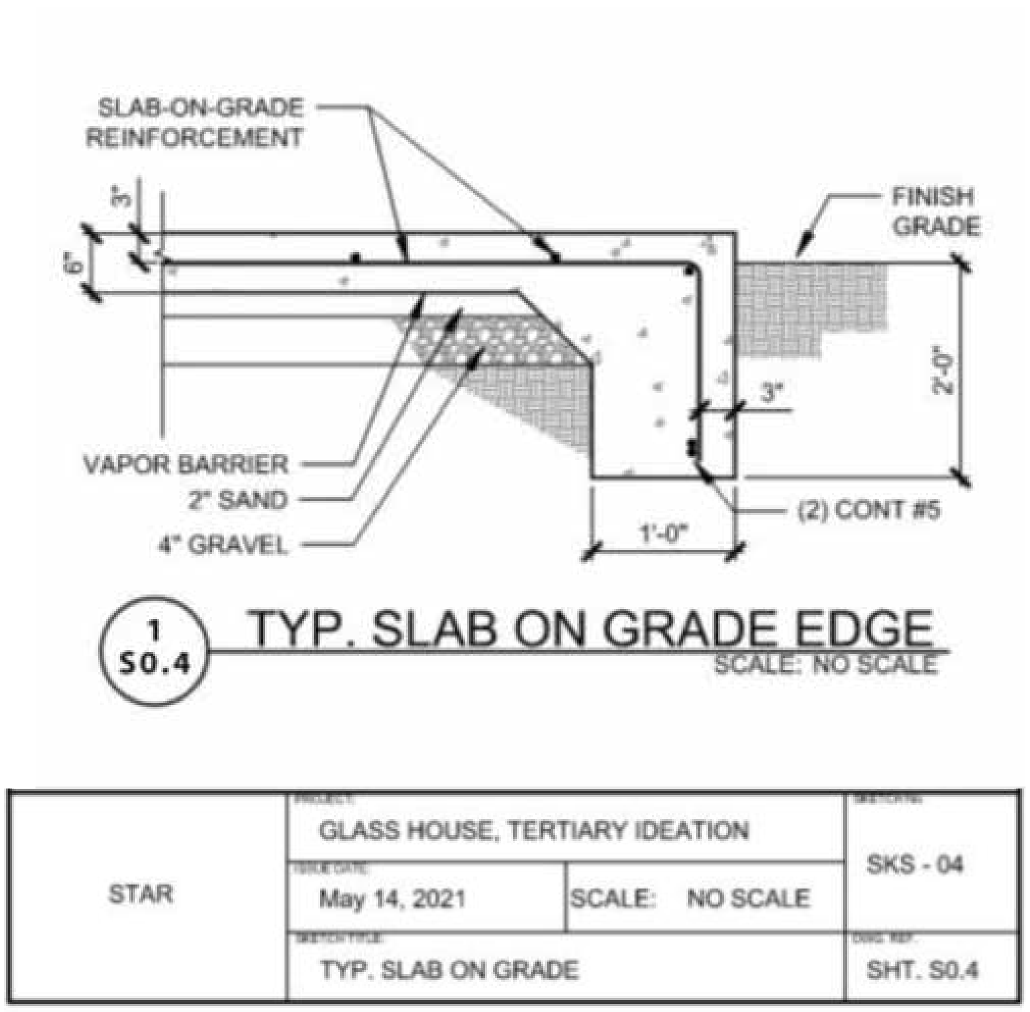


Foundation Size				
INPUT	Unit	#	Comment	Calc
P_D+L	Kips	15		
Fb	psf	4000	Bearing Pressure	
Design				
A_req	ft^2	3.75	Req Bearing Are	P_D+L / Fb
A	ft^2	4	Bearing Area	
L_ftg	ft	2	Footing Length	sqrt(A)
Foundation Depth				
INPUT	Unit	#	Comment	Calc
Col_Width	in	7	HSS 7x7x0.5	
c	ft	0.7083	Distance from Column face to edge of Footing	(L_ftg - Col_Width) /2
d	in	3.018	reinforcement depth	2.2* sqrt(P*c^2/A)
Design				
h_req	in	7	Depth Require	d+4
h_design	in	12		
Foundation Reinforcement				
INPUT	Unit	#	Comment	
b	in	24		
h	in	10		
Design				
Ag	in^2	0.432	0.0018 *b*h	
Try		3 - #4 Bars		

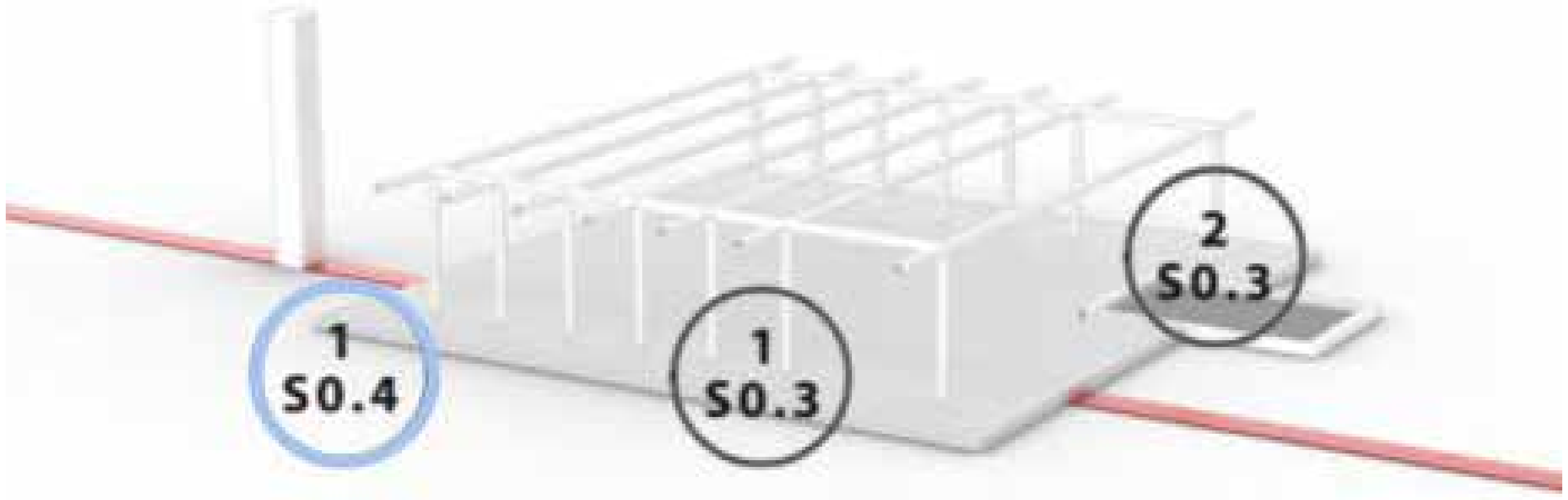
FOOTING CALCULATIONS BY CHENGBIN KUANG

This spreadsheet calculates necessary dimension & steel reinforcement of the footing. The last component of our footing is the slab on grade.

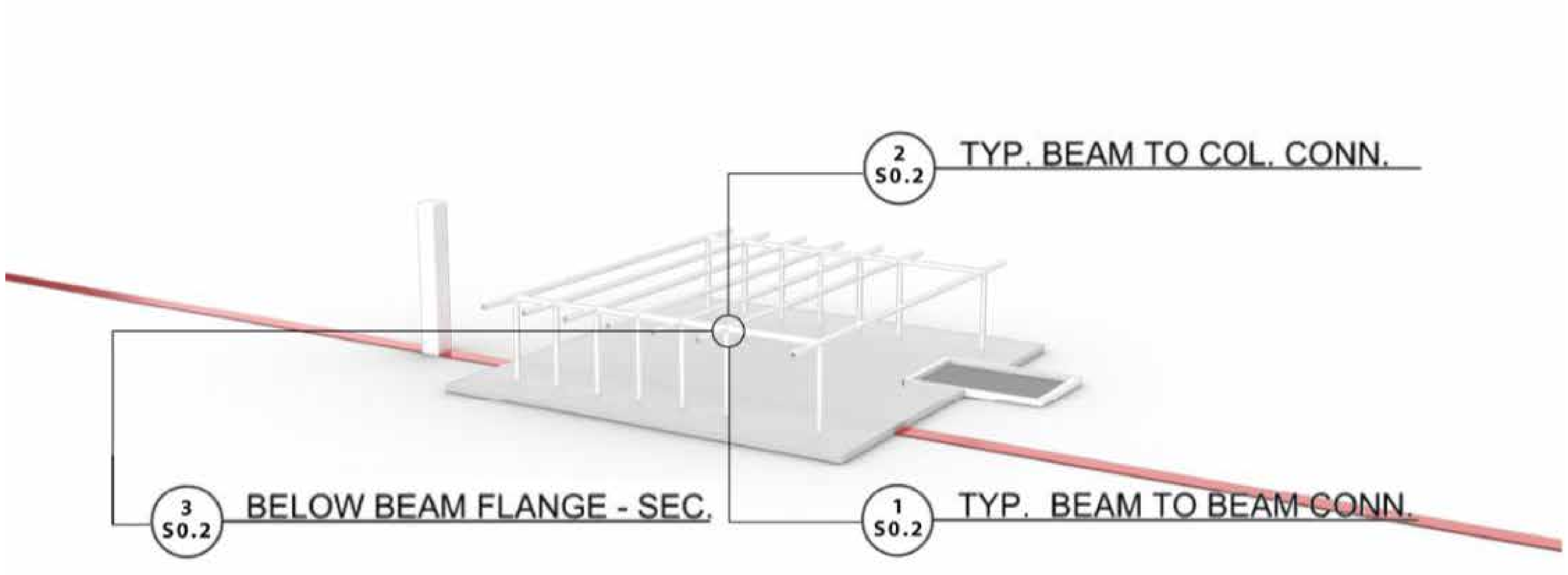
TEXT BY CHENGBIN KUANG



SLAB DETAILS BY CHENGBIN KUANG



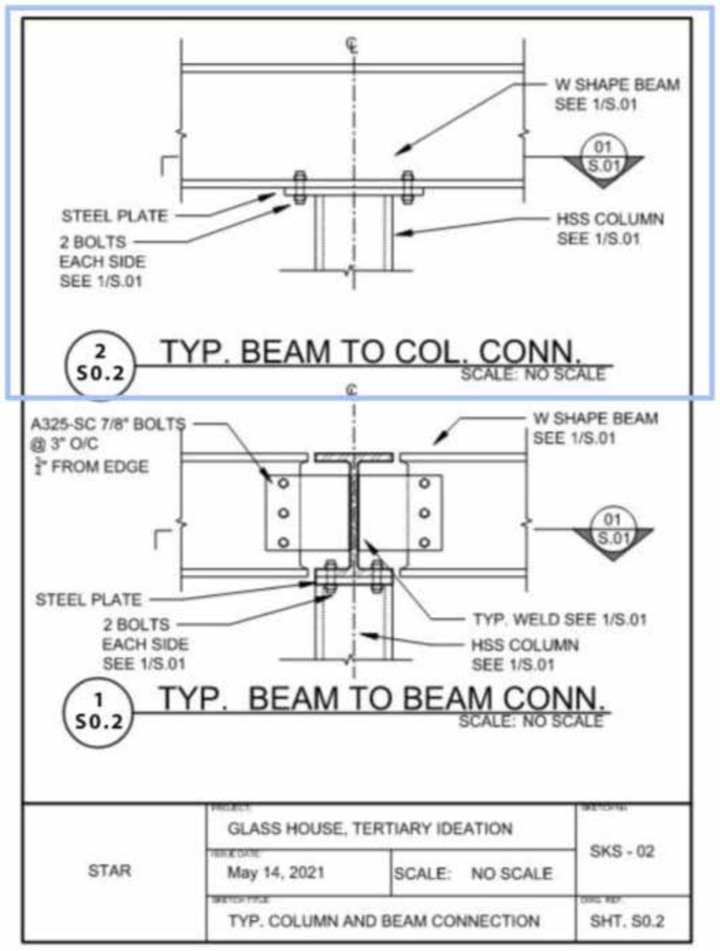
MODEL VIEW BY AUGUSTAS LAPINSKAS



MODEL VIEW BY AUGUSTAS LAPINSKAS

These calls out are where our where we will be doing most of our typical calculations. The highlighted section illustrates our beam which cantilevers the HSS column. This detail demonstrates the girder and how it frames into the web of our beam.

TEXT BY EMMANUEL CORONA NAVARRO



BEAM TO COLUMN CONNECTIONS BY CHENGBIN KUANG

CHECKS:

- BOLT CAPACITY
- BEAM SHEAR
- BLOCK SHEAR ON PLATE
- FIELD WELD CAPACITY
- MIN. BOLT DIAMETER

BEAM CONNECTION DESIGN

Assumptions			
ASTM A572, GR50 V-Plates	3/8 PL		
F3125, GR A325-SC 7/8" High-Strength Bolts			
E7XX Electrodes for Welds			

Values	
Fu (ksi) =	65
Fy (ksi)=	50
Ubs =	1
A,nt =	0.703125
A,nv=	1.21875
A,gv=	1.78125
Plate Thickness (in) =	0.375
phi =	0.8

Bolt Capacity				
Pu = phi_Pn = phi_rn*Cmin				
e,x = a/2 =	1.50	--->	Cmin =	3.5
phi_rn =	13.2		...(AISC T.7-3) for 7/8" HSB	
phi_Pn (k) =	46.2	>	0.1995	Vu for Girder

Beam Shear			
phi_Rn (k) = phi_Vn = phi_t,pl*L*(0.6Fy)	106.3125	>	0.1995

Checking Plate for Block Shear			
phi_Rn =	57.65625	>	0.1995

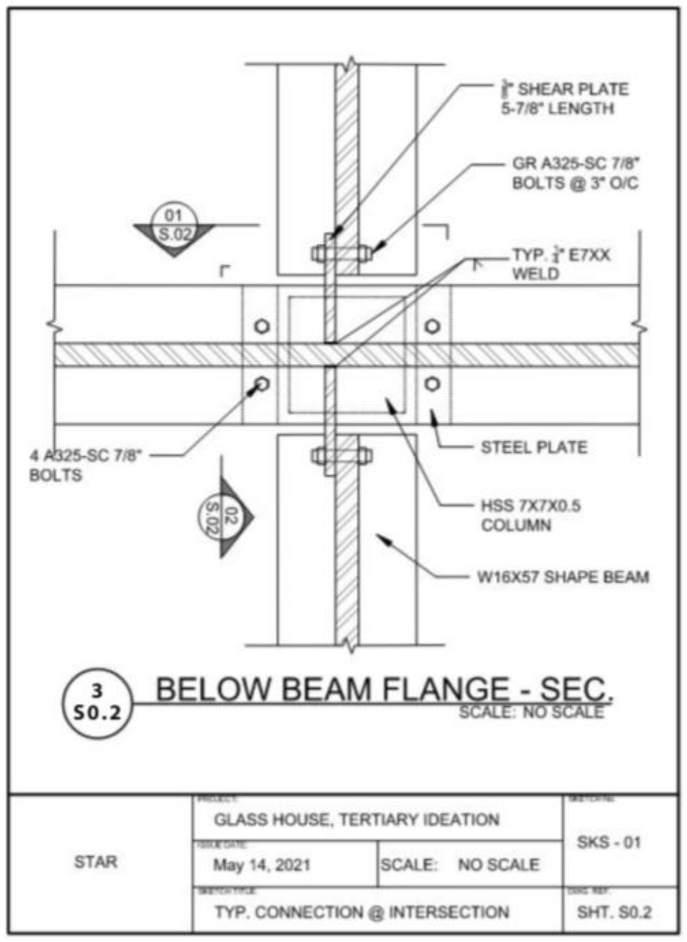
phi_Rn = 0.6*[(Fu*A,nv)+(Ubs*Fu*A,nt) < (Fy*A,gv + Ubs*Fu*A,nt)]
57.65625
80.859375

Check Fillet Weld Capacity				
t,w =	0.25	1/4" weld		
D (# of bolts) =	5		...(AISC T.8-4 for eccentrically loaded weld groups, k=0)	
l (length of weld, in) ==	10.5			
a*l =	6.25			
a =	0.5952	--->	Cmin =	2
phi_Pn = phi_Rn = phi_Cmin*C1*D*l	78.75	>	0.1995	

Use 3/8 Shear Plate with 5-7/8" HSBs and 1/4" weld between shear plate and connecting beam

[bolts are 3" o/c except at ends where cover = 0.75"]

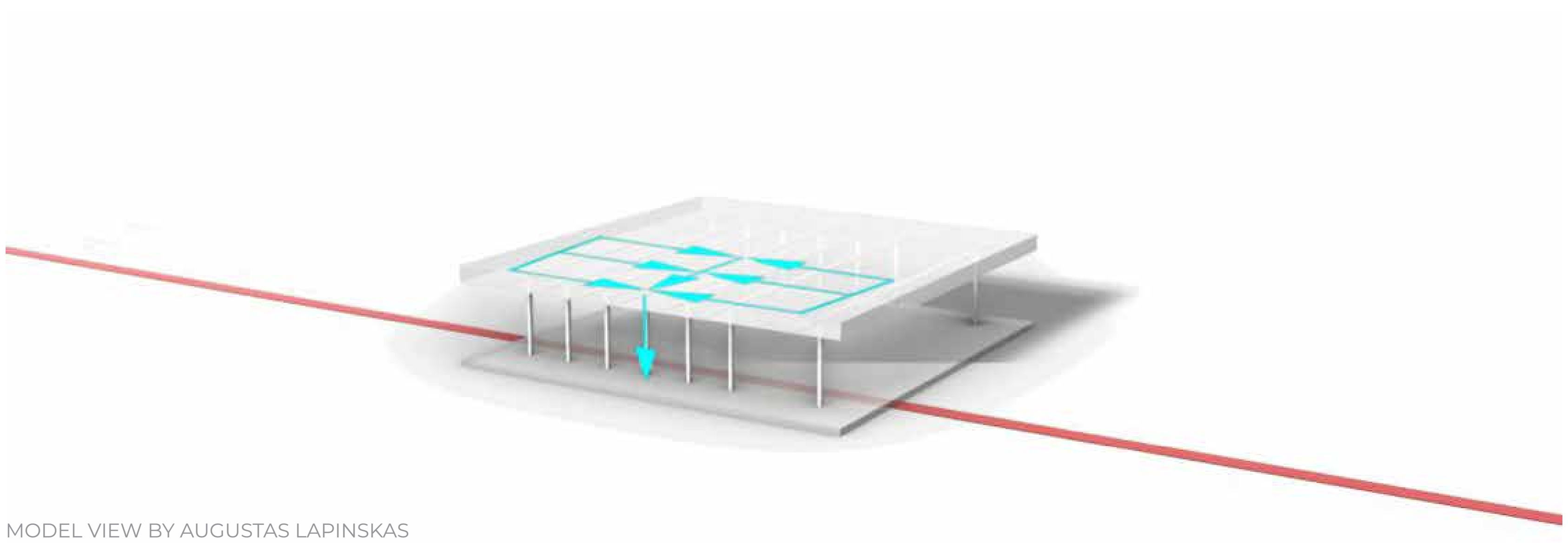
BEAM TO COLUMN CALCULATIONS BY CHENGBIN KUANG



BEAM TO COLUMN INTERSECTION BY CHENGBIN KUANG

Here we see a summary of how all the elements, the beam, girder, and column, all frame into each other from the perspective of looking up. For the beam to column connection, a typical calculation was done, wherein a single shear plate would connect the girder to the web of beam that spans over a column.A ⅜" plate with 5 high strength bolts along with a weld between the plates was found to be sufficient in these typical cases.

TEXT BY EMMANUEL CORONA NAVARRO



MODEL VIEW BY AUGUSTAS LAPINSKAS

These arrows show the gravity load path from the deck through the beams down the columns to the ground.

We first had concrete over metal deck, but to reduce the weight of the roof we changed it to a composite steel deck with insulation and a PVC membrane on top as seen in an earlier slide.

These are the calculations we performed to get the distributed load on the beams and columns.

TEXT BY BLAKE DURHAM

SUMMARY:

RECOMMENDED DESIGN DEAD LOAD OF
DL = 25 PSF
(CODE REFERENCE: ASCE 7-16 TABLE C3.1-1a)

RECOMMENDED DESIGN LIVE LOAD OF
LL = 20 PSF (UNREDUCED)

APPLICABLE ASCE LOAD COMBO
1.4DL
1.2DL + 1.6LL < GOVERN

(CODE REFERENCE: ASCE 7-16 CH2)

(Ref: ASCE7 Table C3.1-1a)

Dead Load @ Roof		
Item		Dead Load (psf)
Roof Members		
	Single-ply sheet,	0.7
	Urethane Foam Insulation (3" thick)	1.5
	Vapor Sealing	0.2
	Ceiling - Gypsum Board	1
	Modular Lighting	2
	Solar Panels	4
	VERCO HSN3 DECK (3" Thick)	4
Structural Members		
	W16 x 57 Beam	10
Other		
	Miscellaneous	1.6
	Total Dead =	25

Live Load @ Roof	
Item	Load (psf)
Roof	20.0
Total Live =	20

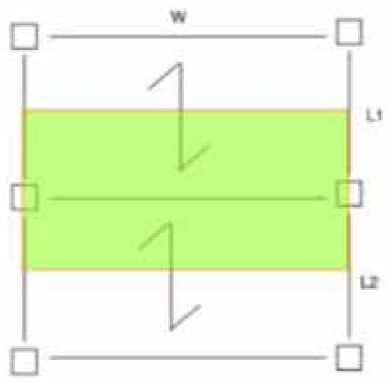
GRAVITY LOAD TAKE-OFFS BY CHENGBIN KUANG AND BLAKE DURHAM

SUMMARY:
LOADS ON BEAM:
ASD/SERVICE OF
W = 350 PLF
LRFD/STRENGTH OF
W = 476 PLF

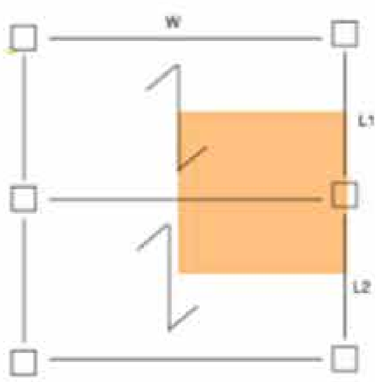
LOADS ON COLUMN:
ASD/SERVICE OF
AXIAL = 11 KIPS
LRFD/STRENGTH OF
AXIAL = 15 KIPS

GOVERN LOAD CASE:
1.2DL + 1.6LL

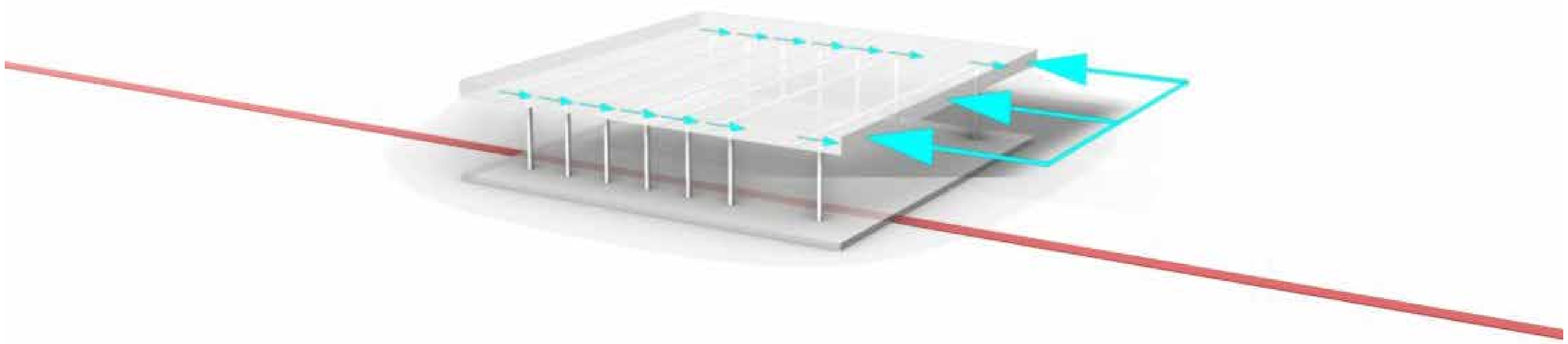
Dead / Live from	Load Take Off		
Load @ Roof Joist			
Input	Unit	Amount	
W	Feet	63	
L1	Feet	7	
L2	Feet	7	
Dead	Psf	30	
Live	Psf	20	
Result	Unit	Amount	Calc
W_D	Plf	210	(L1+L2)*Dead
W_L	Plf	140	(L1+L2)*Live
V_D	Kips	6.62	W_D*W/2
V_L	Kips	4.41	W_L*W/2
M_D	K Ft	104.2	W_D*L^2/8
M_L	K Ft	69.5	W_L*L^2/8
Load Combo			
ASD/Service	plf	350	D+L
LRFD/Strength	plf	476	1.2D+1.6L



Load @ Column			
Input	Unit	Amount	
W	Feet	63	
L1	Feet	7	
L2	Feet	7	
Dead	Psf	30	
Live	Psf	20	
Result	Unit	Amount	Calc
R_D	Kips	6.615	(L1/2+L2/2)*W/2*Dead
R_L	Kips	4.41	(L1/2+L2/2)*W/2*Live
Load Combo			
ASD/Service	Kips	11.03	D+L
LRFD/Strength	Kips	14.99	1.2D+1.6L



GRAVITY LOAD TAKE-OFFS BY CHENGBIN KUANG



MODEL VIEW BY AUGUSTAS LAPINSKAS

SUMMARY:
SEISMIC RESPONSE COEFFICIENT
C_S = 0.15

BASE SHEAR
V_E = 11.25 KIPS
BASE ON C_S AND BUILDING WEIGHT OF 75 KIPS

BUILDING WEIGHT	Type	lb/ft	Length (ft)	Weight (lbs)	Trib Area (ft^2)	Weight (psf)
				lb/ft * Length		Weight(lbs)*Trib Area
Beam	W16x57	57	63	3591	441	8.143
Column	HSS7x7x0.500	42	14	588	220	2.673
Deck	Composite	-	-	-	-	13.4
Total						24.2

Building Area	Weight (psf)	Weight (Kips)
3087	24.2	75

ESIGN SPECTRAL ACCELERATION FACTORS			
ASIC INFORMATION			
Risk Category II		Site Data:	USGS
Seismic Design Category 'D'			
Site Class D			
Type	**Value**	**Description**	**Reference**
S_1	0.6	From Design Map	
F_v	1.7	For S_1 >= 0.6	From ASCE 7, Table 11.4-2
S_M1	1.02	S_1 * F_v	From ASCE 7, (11.4-2)
S_DS	1.2	0.5 <= S_DS	From ASCE 7, Table 11.6-1
S_D1	0.68	2/3*S_M1	From ASCE 7, (11.4-4)
	OK	0.2 <= S_D1	From ASCE 7, Table 11.6-2
nportance Factor			
I_E	1.0	Risk Category 'II'	
esponse Modification Factor			
R_SCBF	8	Steel Speical Moment Frame	
stimated Building Period			
T_n	0.231	C_t * h_n^x	From ASCE 7, (12.8-7)
C_t	0.028	Steel M.F.	From ASCE 7, Table 12.8-2
h_n	14	Stroy Height (ft)	
x	0.80	Steel M.F.	From ASCE 7, Table 12.8-2
T_s	0.57	S_D1 / S_DS	
T_L	8	From Design Map	
eismic Response Coefficient			
C_s	0.15	for T_n <= T_L	From ASCE 7, (12.8-4)
		Cs = S_D1 / (R/I_e)	

EISMIC BASE SHEAR			
Type	**Value**	**Description**	**Reference**
V_E (Kips)	11.25	Cs * W	
Weight	75		
		Seismic Base Shear	**11.25 Kips**

LOADING BY CHENGBIN KUANG

These arrows show the lateral load path from the roof through the moment frames to the ground.

These are some hand calculations we performed to get the lateral loads, earthquake and wind loads, for our site.

As you can see, the seismic loads controlled. These loads influenced the columns and foundation.

TEXT BY BLAKE DURHAM

SUMMARY:
WIND BASE SHEAR
V_W = 10 KIPS
BASE ON 110 MPH OF WIND

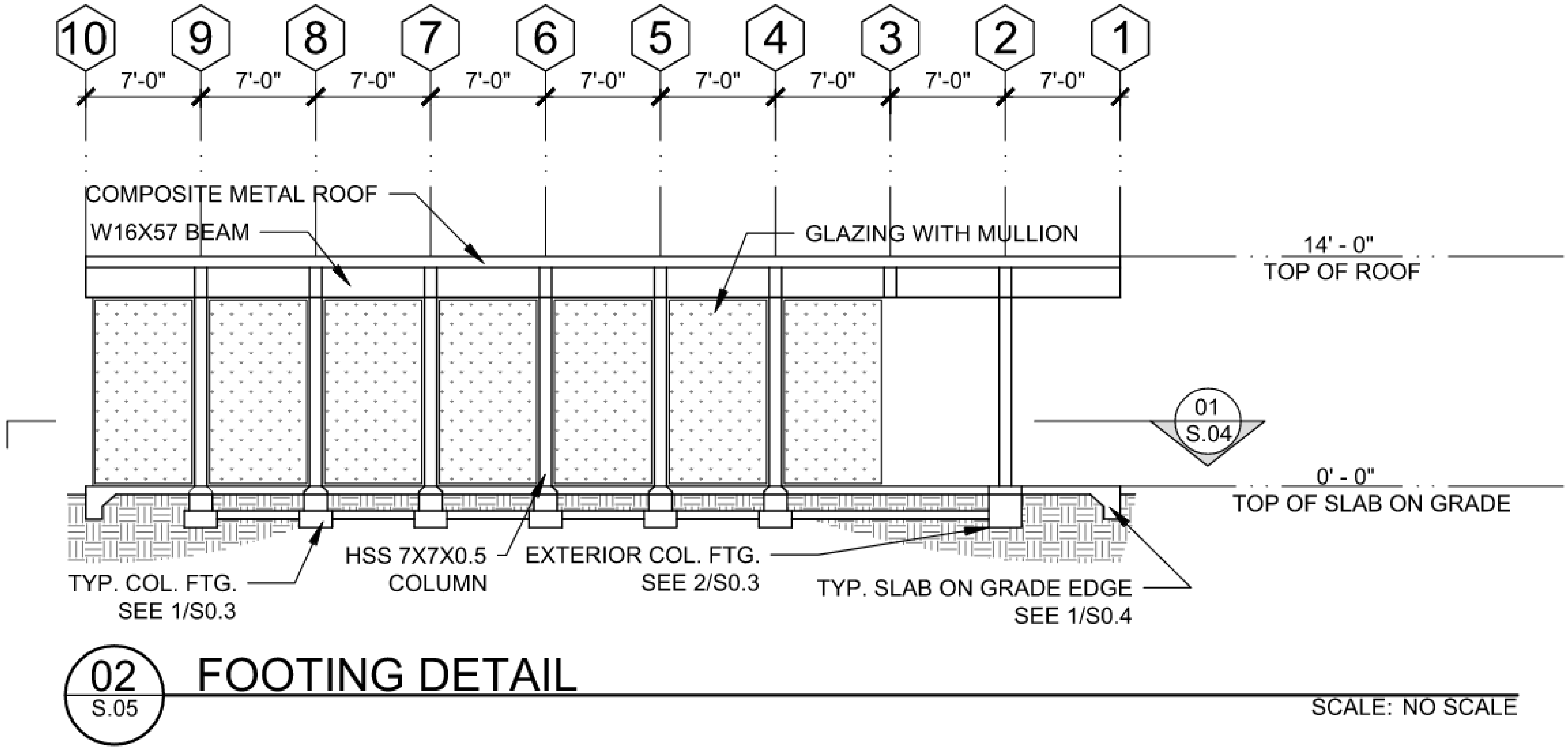
10 KIPS < 11.25 KIPS
SO **SEISMIC BASE SHEAR GOVERN**

WIND LOAD					
BASIC INFORMATION					
SITE	PALM SPRINGS, CA		REFERENCE		
OCCUPANT	RESIDENCE				
RISK CATEGORY	II		ASCE 7	Table 1.5-1	
EXPOSURE CATEGORY	SUBURBAN	B	ASCE 7	Section 26.7	
BASIC WIND SPEED	100 mph	use 110 mph	ASCE 7	Fig 26.5 - 1c	
Elevation	Roof	12 ft			
	Floor	0 ft			

APPROXIMATE F_REQ				
L/B = 50' x 50'	1		REFERENCE	
Heigh	12'			
	Ph	16.7 psf	ASCE 7	Table 27.5-1
	PD	16.7 psf		

WIND LOAD TABLE	W_wind (plf)	L(ft)	Base Shear (lbs)	Story Force (kip)
@12' Roof	100	50	5000	5
@00' Ground	100	50	5000	5
			W_wind * L	V_wind / 1000
			Wind Base Shear	**10 Kips**

LOADING BY CHENGBIN KUANG



This Elevation shows members both above and underground.

Under the ground there are 6 submerged column to footing connections, to allow a better cohesion between glazing and columns.

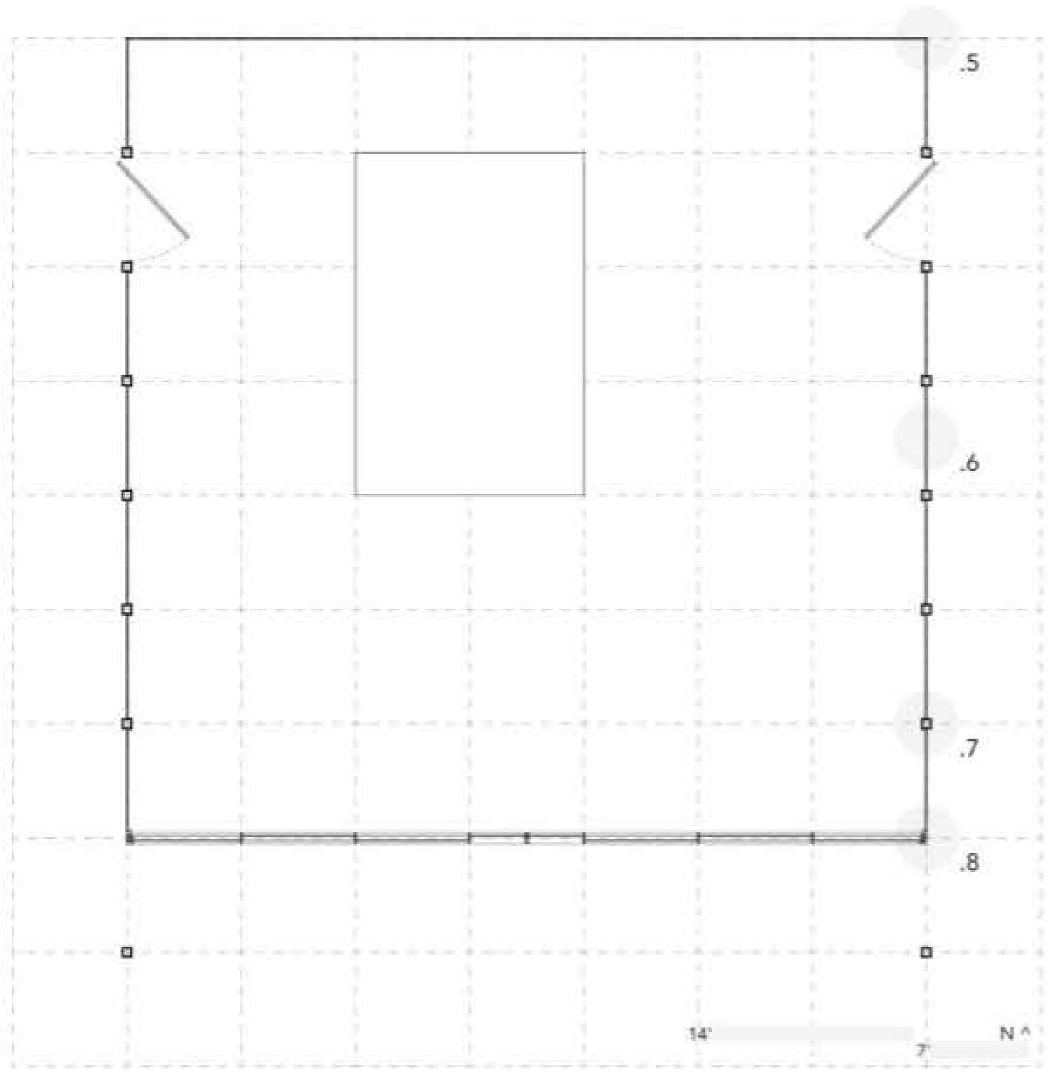
When there is no glazing, the column to footing connection is exposed to celebrate the structural elements.

This elevation also shows a Typ. Slab on Grade Edge & Grade-beams.

ELEVATION AND TEXT
BY GRACE LAUER, 2021

This Miesian collage shows the western elevation of the 49' x 49' house.

Composition in space, plane and void, materiality and pattern all pay homage to Mies and Constant, but also to the potential this spatial entity has.

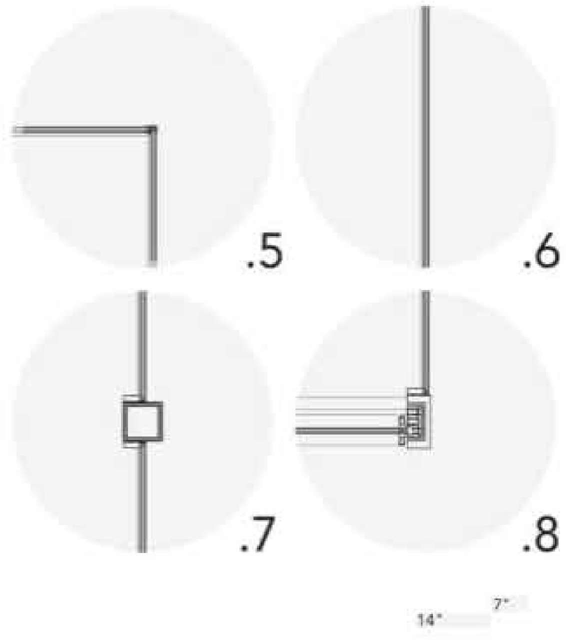


GLAZING STRATEGIES

Double-glazed
.28 - .37 solar-gain coefficient
.30 U-value
Low conductive foam-filled fiberglass and vinyl frame

6. Double glazed argon insulated glass

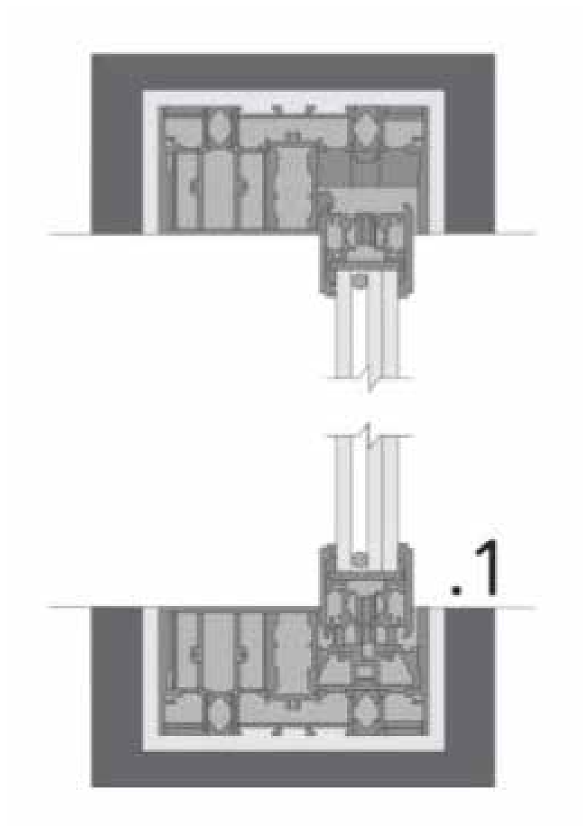
DETAILS

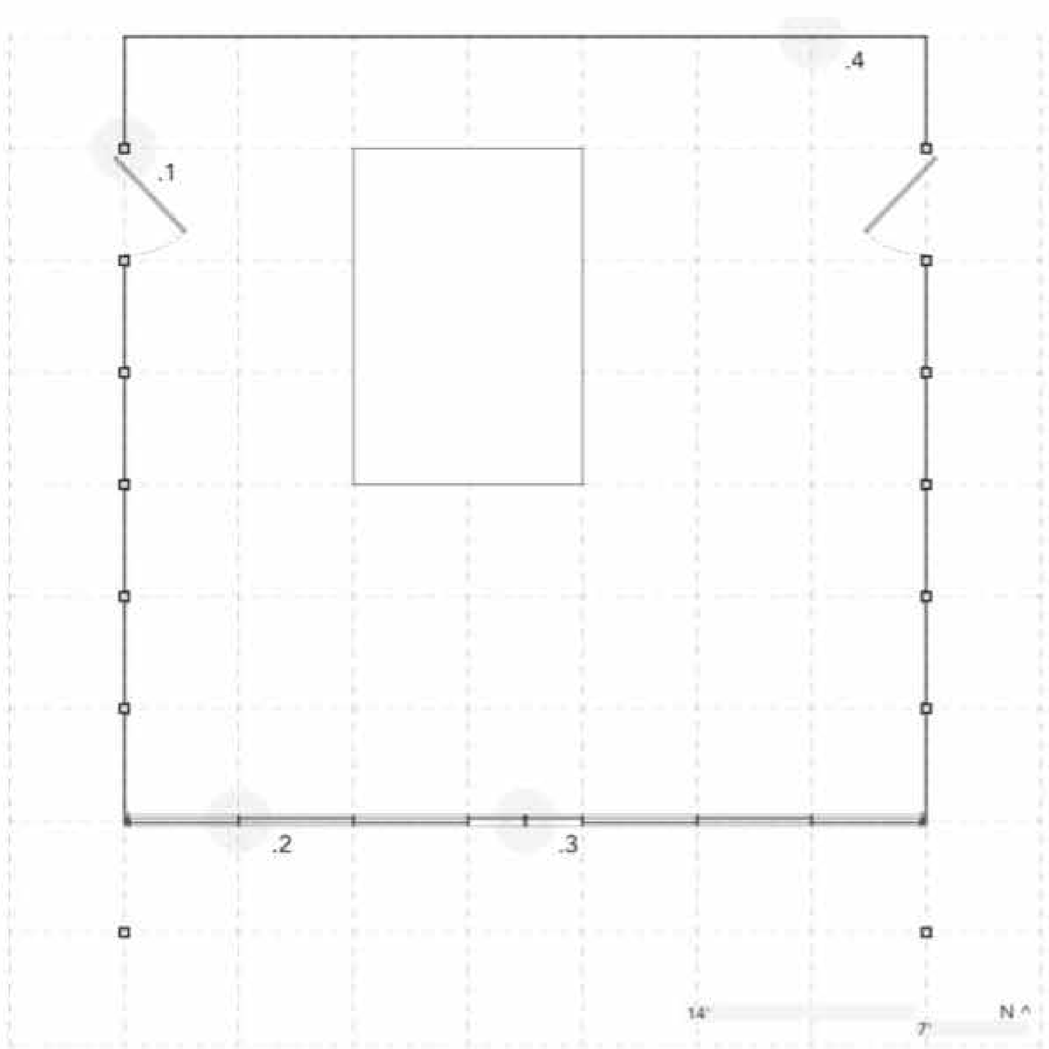


GLAZING STRATEGIES - SECTIONS

Double-glazed
.28 - .37 solar-gain coefficient
.30 U-value
Low conductive foam-filled fiberglass and vinyl frame

1. NanaWall CERO II sliding glass wall | Southern Face
2. Disassemblable mullion glass combo | Western and Eastern Faces
3. Mullionless curtain wall with silicone sealing | Northern Face



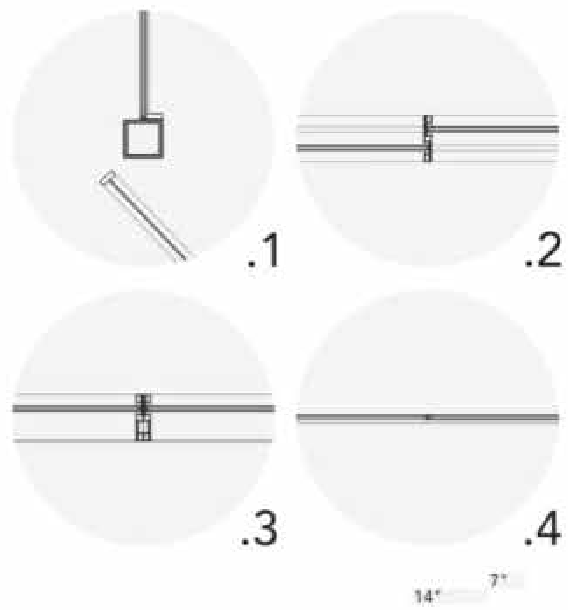


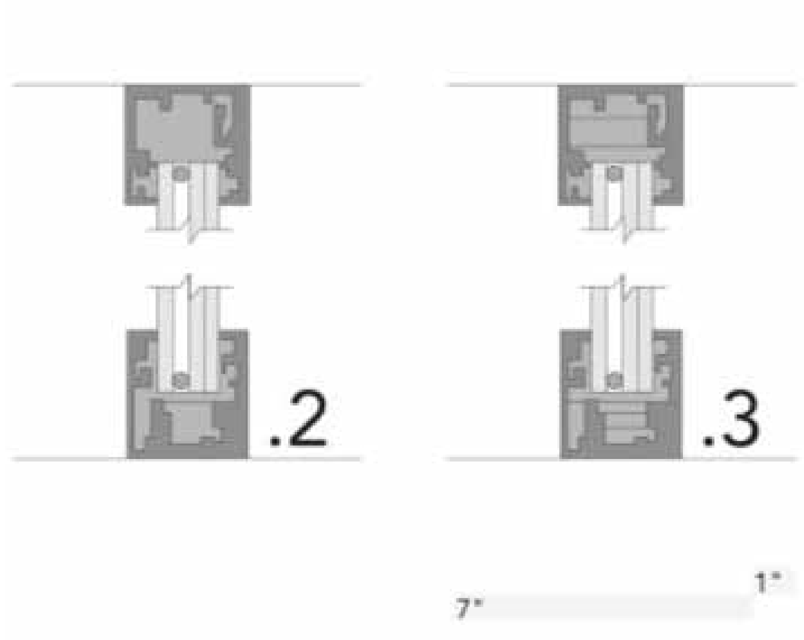
GLAZING STRATEGIES

Double-glazed
.28 - .37 solar-gain coefficient
.30 U-value
Low conductive foam-filled fiberglass and vinyl frame

1. VITROCSA pivot door
2. NanaWall CERO II sliding glass wall
3. NanaWall CERO II OXXXx-xXXXO configuration

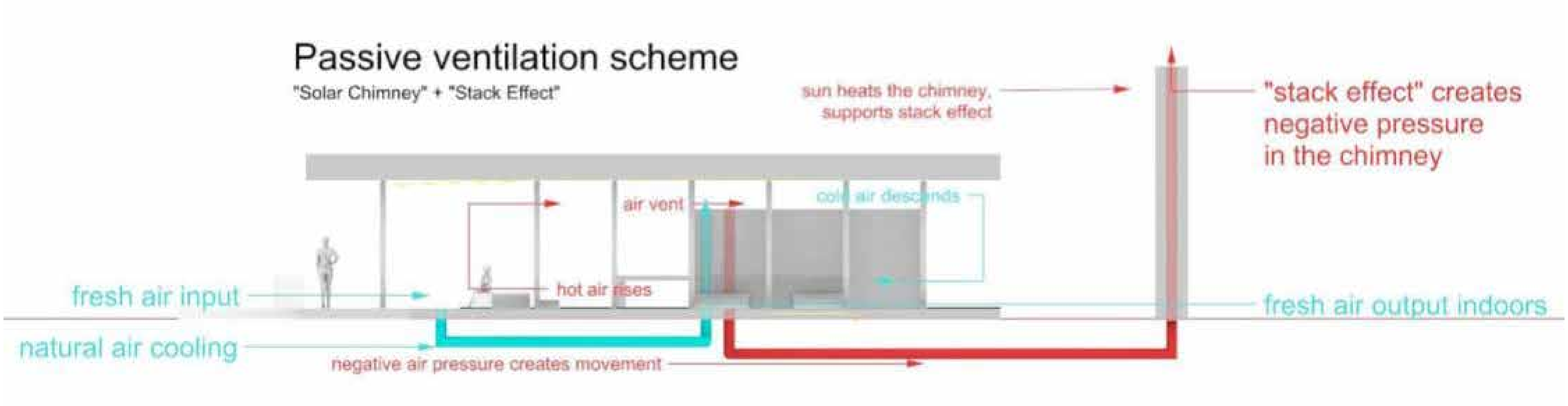
DETAILS





Glass in detail focuses mainly on thermal bridging and water barriers. But there is also beauty that aligns with practicality. Multiples of 7 echo even in mullion detailing. The 49' x 49' glazing strategy is split in three - the southern wall is a flexible moving wall, the northern face is a mullionless glass wall with silicone joints, and finally the eastern and western faces are disassemblable mullion combinations that allow for the glass to live on in other spaces in the future. The eastern and western sides also include offset pivot doors that align with the 7 x 7 beam and mullion grid and also provide cross ventilation capabilities.

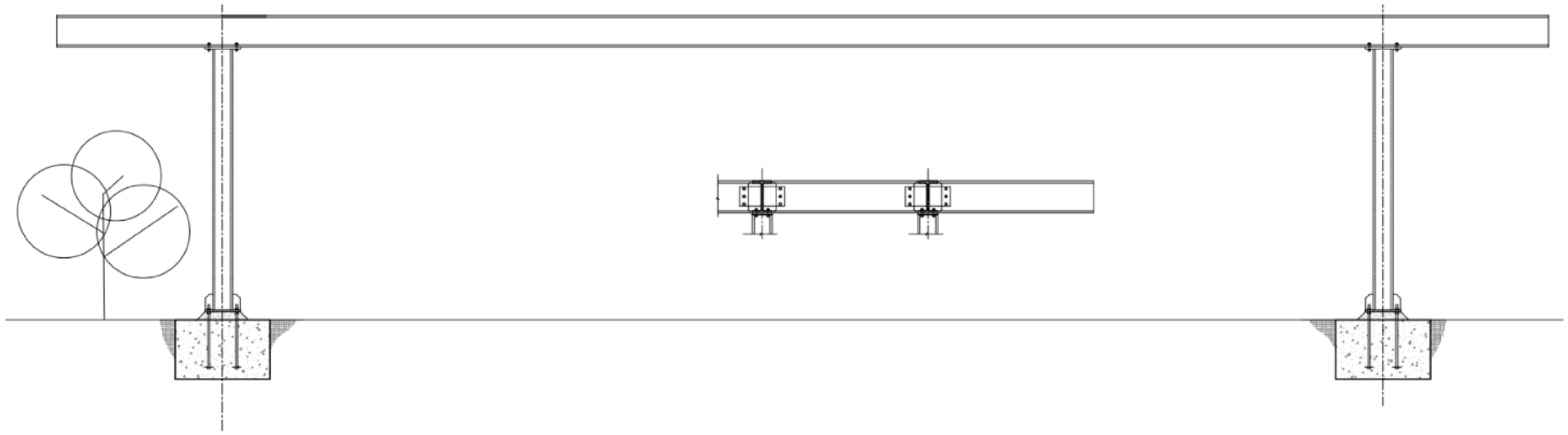
Finally, these section details of the mullions show the ability of disassembly within each of the faces, while still providing moisture and thermal barriers when installed in the house.



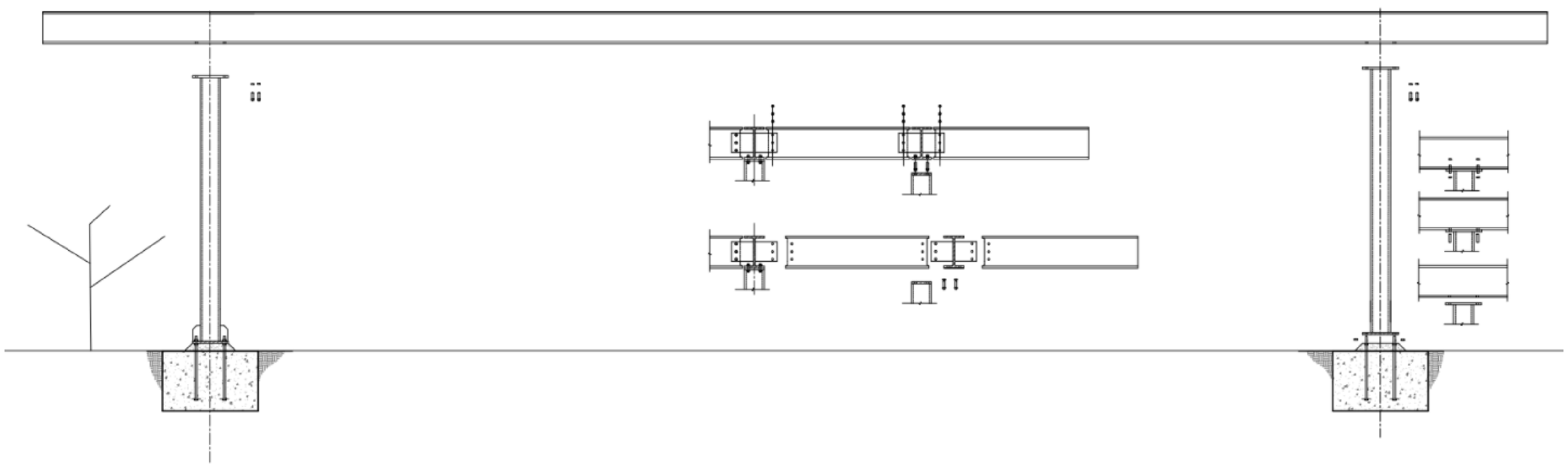
This is a function scheme of the previously mentioned solar chimney.
It is an easily recognisable and purely minimalistic architectural design, establishing “the house and the site” - a unified feeling of place.

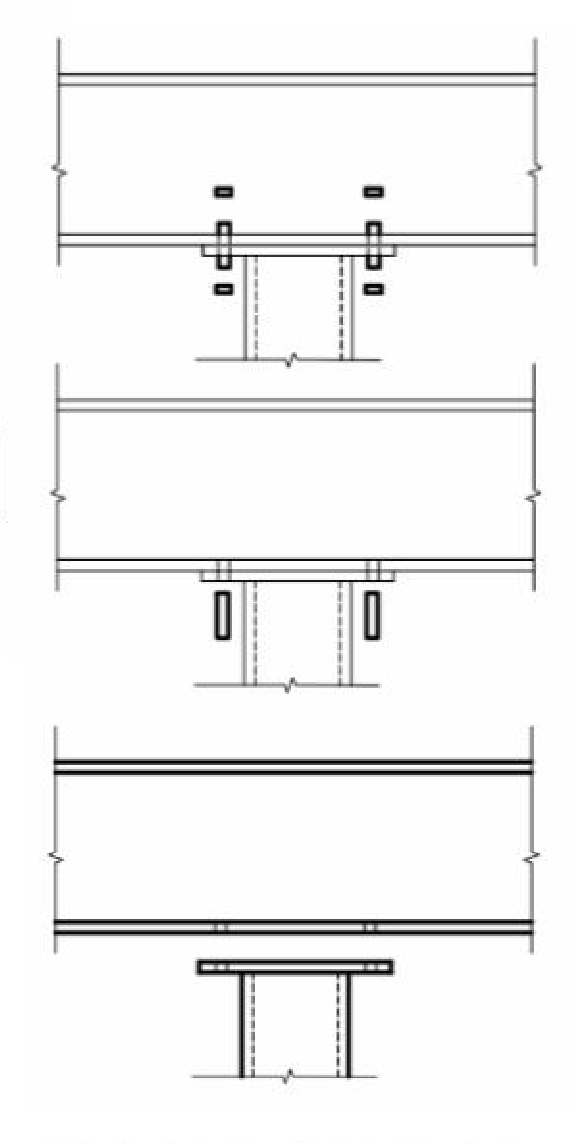
The conditions of the site design represent the passage through time. The undefined Northern end of the site represents the past conditions of the Palm Springs, untouched by human intervention. Moving further south, the site transitions to the present conditions of the 49x49 House with landscape that compliments the programming of the house. The tree walk circulation at the southern end of the site to imply a new age after the glass house in which the natural conditions of Palm Springs retake the site.

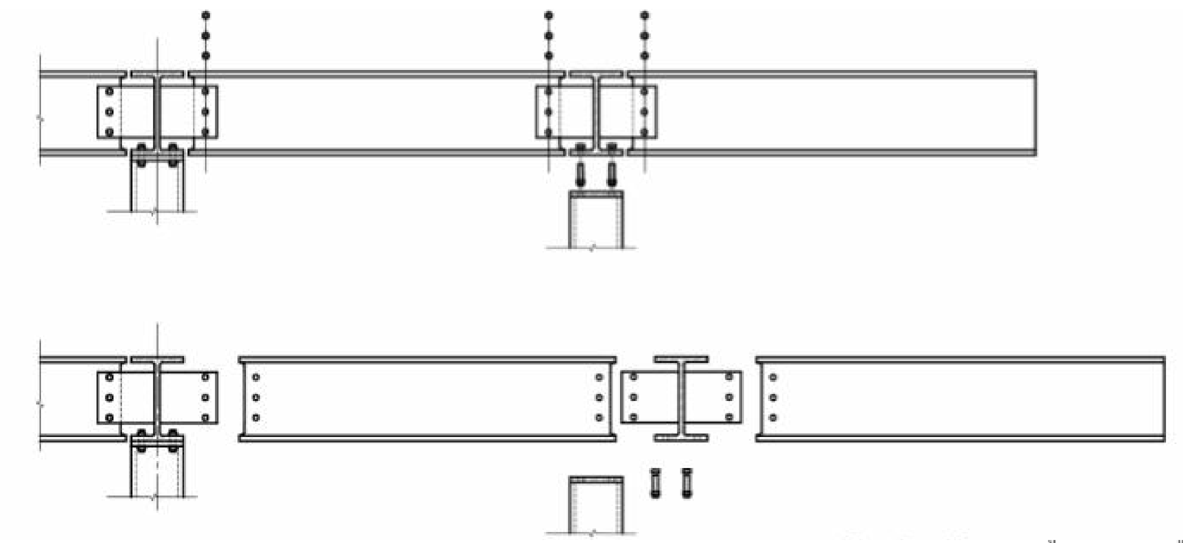
ORIGINAL



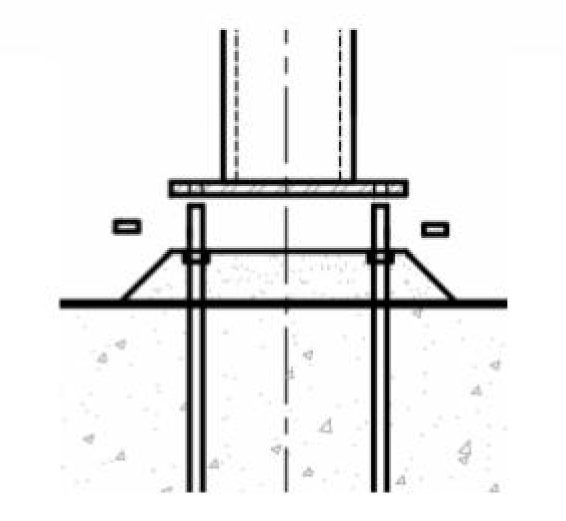
DISASSEMBLED

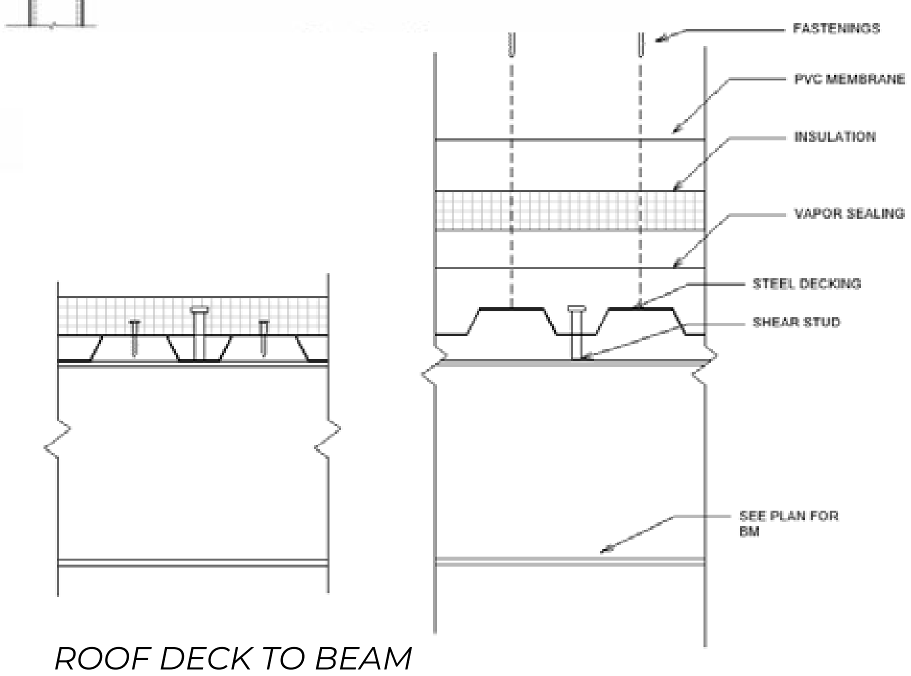






BEAM TO BEAM





BEAM TO COLUMN

BASE OF COLUMN

ROOF DECK TO BEAM

We limited the amount of welding by using bolts whenever possible so all connectiWons can be removed easily.

The detail illustrates the decking materials at the roof, where PVC membrane was attached to the roof insulation, vapor sealing, and steel decking via fastening. The decking itself was secured to the steel via shear stud at 12" o/c.

TEXT BY CHENGBIN KUANG AND EMMANUEL CORONA NAVARRO

FINAL FANTASY
BY DAISY PENALOZA AND GRACE LAUER, 2021

Our vision for the final fantasy portrays the future of Palm Springs in which the rich, golfing inhabitants have abandoned the desert city, allowing the natural conditions of the site to resurface. Palm Springs becomes a home to our new clients, the nomads. The disassembled 49x49 house serves as the foundation and organization for a new makeshift city in the desert, creating a new age in the sands of time.

TEXT BY DAISY PENALOZA

FINAL FANTASY ESSAY QUOTES

"The dystopian future of Palm Springs turned out to bring the ultimate fulfilment of the initial idea of the 49X49 house, making it a pilgrimage destination for the nomads of the world, attracting those who want to live outside mainstream society."

"Through cycles of innovation, materiality and time, the structure has been reclaimed by the nature it was placed on and by those who never originally benefited from the lavish lifestyle of the old Palm Springs. The modular parts removed, the furniture sold and the water evaporated - it is nomadic at its essence and the change goes on."

"The new nomads move in, reviving the nomadic spirit of the space. The hourglass flips once more as the space is turned to place to become a home; to be left empty as the nomads go, keeping the sands of time ever so running."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