

HEALTH + EFFICIENCY HOUSE

A TAKE ON THE 50x50 GLASS HOUSE

JUNE 2021

ARCHITECTURAL ENGINEERING SENIOR PROJECT

ADVISED BY PROFESSOR EDMOND SALIKLIS

HEALTH + EFFICIENCY HOUSE

Atelier STRIPES

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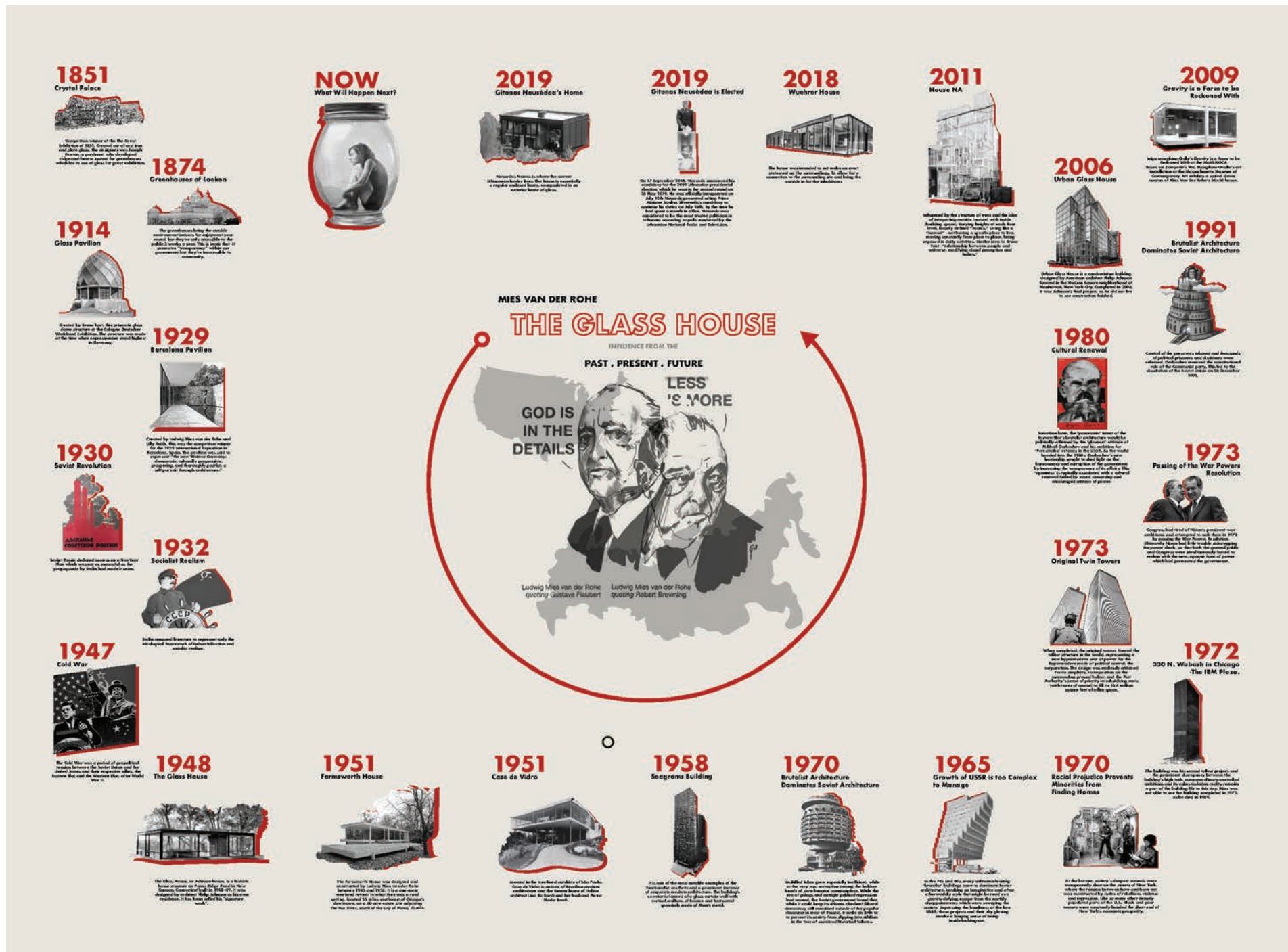
Elle Gallmann
ARCHITECT*

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ARCHITECT*

*STUDENT ARCHITECTS & ENGINEERS DESIGNING IN A CONTROLLED COURSE. DO NOT ATTEMPT TO CONSTRUCT

TIMELINE : origins

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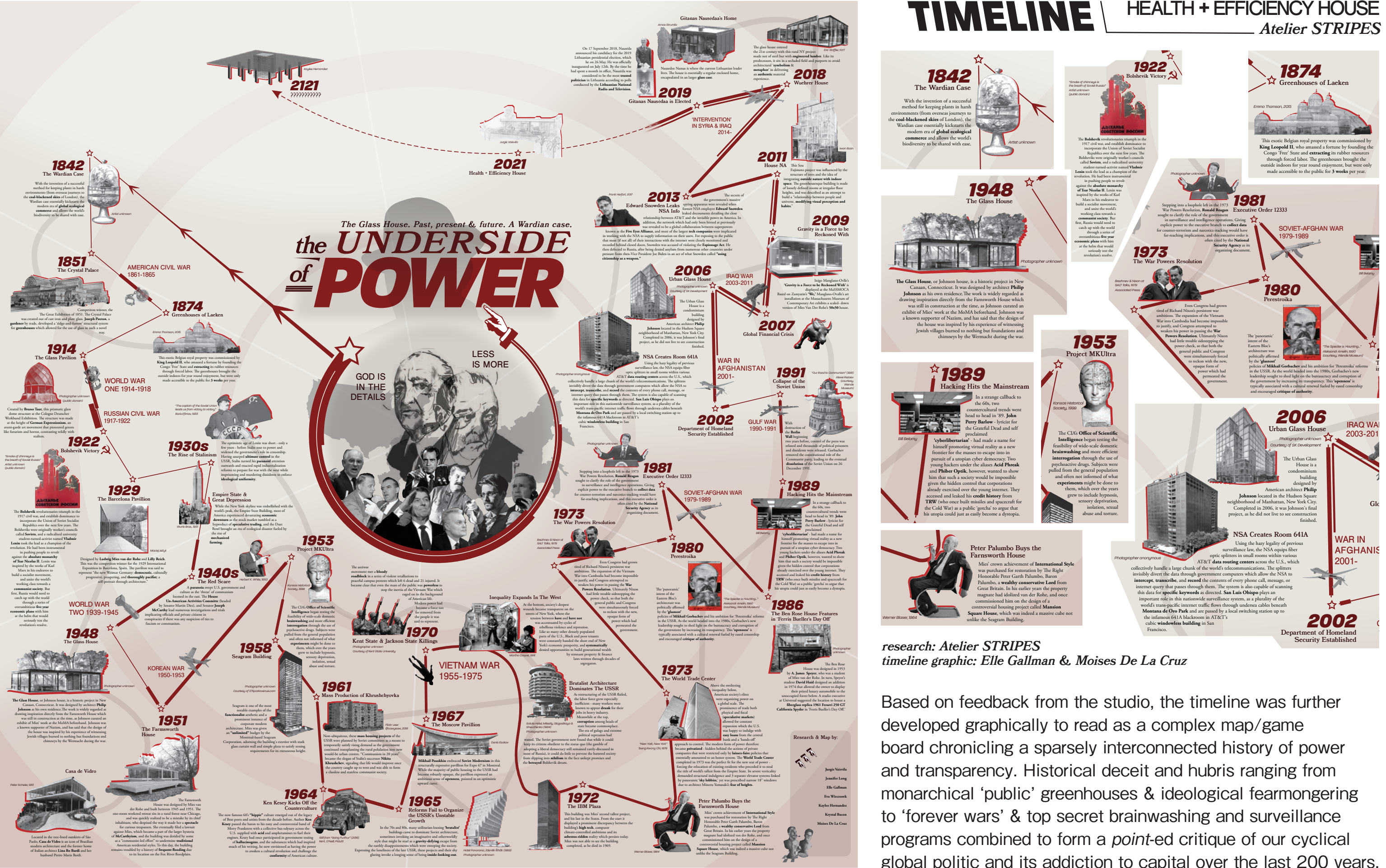


It all began with this timeline. Elle provided this influential first draft as the team was still getting acquainted with each other as well as the history of Mies' 50x50 'Core House.' Already, Mies' ominous caricature took center place, suggesting some form of ideological 'overseer.' The radial configuration of the timeline elements would also go on to influence our design process throughout the quarter.

research: Atelier STRIPES
timeline graphic: Elle Gallman

the UNDERSIDE of POWER

The Glass House. Past, present & future. A Wardian case.



research: Atelier STRIPES
timeline graphic: Elle Gallman & Moises De La Cruz

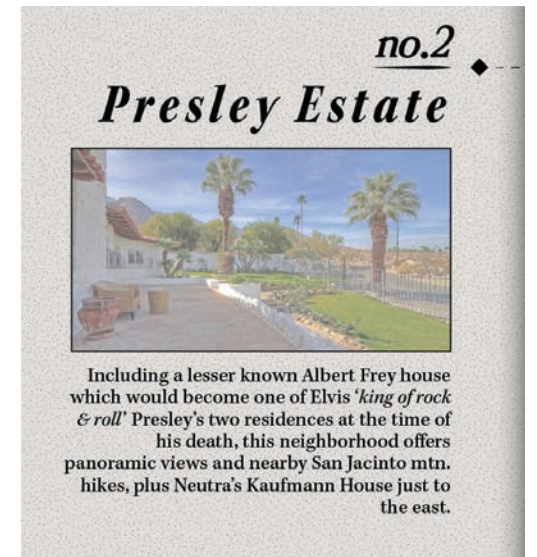
Based on feedback from the studio, the timeline was further developed graphically to read as a complex map/game board chronicling a sparsely interconnected history of power and transparency. Historical deceit and hubris ranging from monarchical 'public' greenhouses & ideological farmingongering to 'forever wars' & top secret brainwashing and surveillance programs combined to form a point-ed critique of our cyclical global politic and its addiction to capital over the last 200 years.

NEIGHBORHOOD CONTEXT

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Elvis Presley Estates
RENOVATION OF 1115 WEST CIELO DRIVE, PALM SPRINGS, CA



Palm Springs, of course, is a uniquely fitting location for a proposal that seeks to reiterate the tenets of mid-century modernism. Affordable housing that resells with million dollar price tags, private residences for public rock stars...our team realized that a glass-walled residence in this city of iconoclasts was less of a contradiction and more of a challenge to turn the 'capital A' Architecture dials up to 11. For this reason, we connected with two clients who were looking to re-develop an existing lot in the neighborhood of the Elvis Presley Estate, on West Cielo Drive.

neighborhood map: Elle Gallman
presley estates graphic: Moises De La Cruz

In determining who the client for our fictitious project would be, it seemed fitting to design their lifestyle and personalities in a similarly fictitious manner. Krystal took the lead on devising a backstory for our young couple, originally based on the archetype of the ‘cool aunt,’ with both spouses having a history of association with hippie counterculture and now working successful careers in big tech. As the design continued to change however, the narrative had to be modified for continuity, and the family’s child was cut from the plot. With the former family involved in a tragic auto accident, the new couple of Corey & Miguel took the helm of the continued project design – the show must go on!

“Our group learned to never discredit the value of the designer’s input and how collaboration with the client’s vision adds to the overall product. Client’s can be set in their ideas and goals for a project, especially when it comes to where people reside. The job of the designer is to push and pull where necessary to, of course, bring dreams into reality but also keep fantastical dreams in the fantastical realm. Working with a specific client throughout the project has given our team the confidence to know when and how to bring the Client’s ideas to a realistic perspective.”

- Krystal Bacon

client backstory + interviews: Krystal Bacon

April 7, 2021 at 12:10:18 PM UTC-8

.....
Cammila - Client
Railee - Architect
Norma - Engineer
Phil - Contractor
Angelina - Client Wife
Nacole - Client Ex-Wife
Sam - Child

Cammila Hello, how are you, nice to see you again.

Railee Hey good morning, I guess afternoon now. Nice to see you too. Hello, I’m Railee it’s nice to finally meet you.

Norma Hi afternoon, I’m Norma nice to meet you.

Cammila This is Angelina, my wife and this is Nacole.

Nacole Hi nice to meet you, Nacole. I’m actually here to get Sam, come on baby let’s go. Hey Angie, Cammila just let me know when you all are wrapping up. Love you bye. Come on Sam.

Railee OK, shall we get started here, we have much to discuss. First, Norma thank you for meeting, I’ll assume you’ve read over the ideation and seen some sketches, in addition to conversing with Cammila about her overall vision.

Cammila Right so first things first, I want to make sure we are all on the same page in terms of aesthetics and materials. Angelina and I agreed on a primarily glass facade with art-deco style perimeter walls by the property. We want the roof to come overhang and provide shade all around the house.

Angelina Square in shape of course and the skylight.

Cammila Right square and an interesting skylight in the center.

Railee Yes! The skylight is what I wanted to discuss I’m glad Norma can be here with us. So I provided all of you with sketches this morning of an idea, its just an idea. But what this is showing here at the top is a glass prism ornamented at the center directly above the skylight. At almost all points in the house you will be able to actually see all sides of the house....

Norma what were you thinking in terms of materials?

Norma Honestly, for a ceiling height of about 10’, having some flexibility with the roof shape, also considering the heat I was hoping concrete for this house.

Angelina Oh I enjoy the cool grey concrete look and I read about using concrete for temperature control in hotter climates.

CLIENT NEEDS

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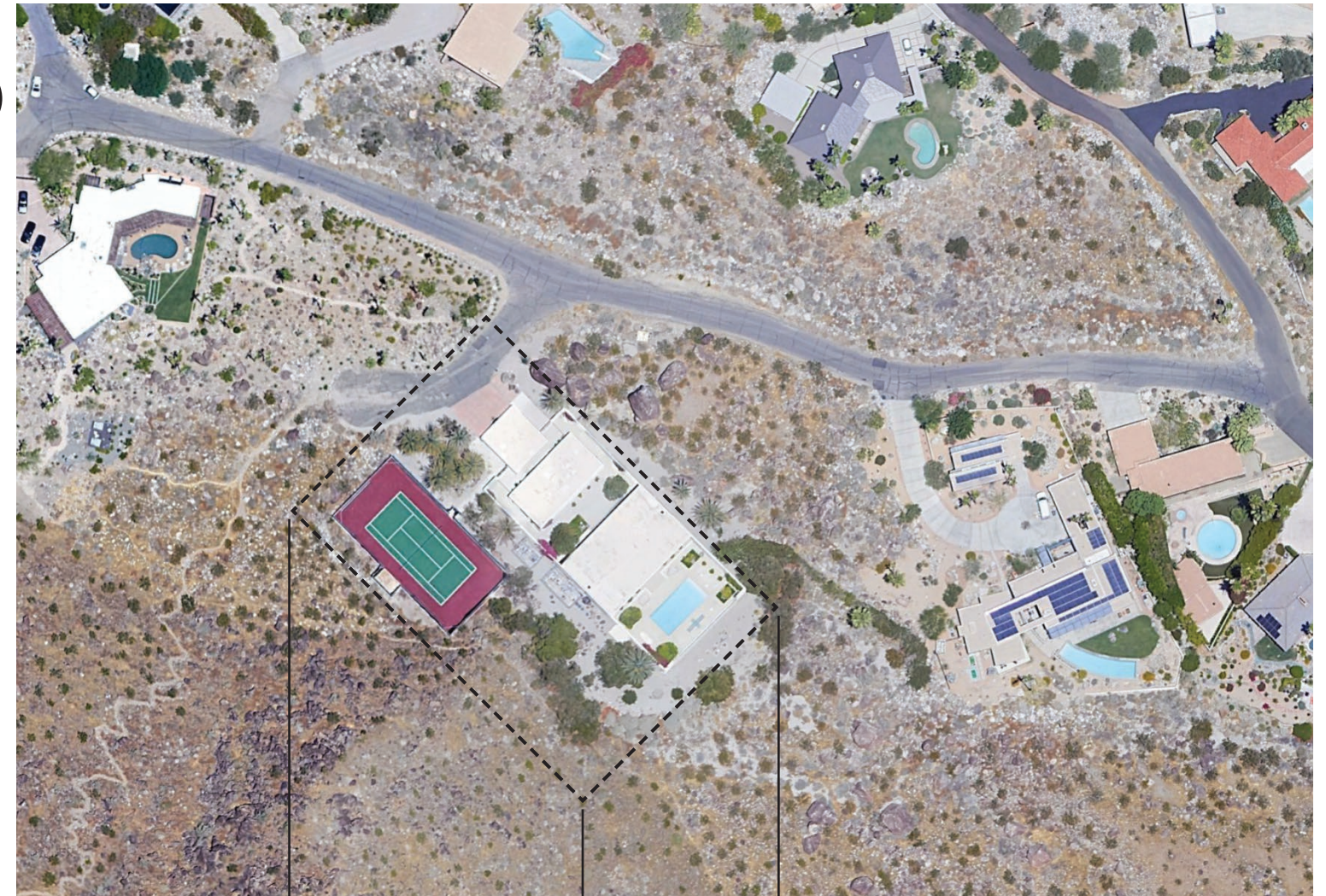


MIGUEL + COREY

Our clients intimately recognize the crucial role of efficiency and self-management in the modern lifestyle. Truly a couple of life-hackers at heart, Miguel & Corey have been married long enough to understand each other's creative neuroses without stepping on each other's toes. Both come from backgrounds in silicon valley and represent the marriage of work and life that Health + Efficiency specializes in – their criteria for a new Palm Springs abode were that it astound them with its solution to the desert's tricky climatic restraints, and that it allow them to fully exhibit their eclectic and enthusiastic personalities knowing that their property's high-visibility siting will make them a fixture of the neighborhood.




*sims™ visualization: Jennifer Long
game © Electronic Arts*



The clients' property in this wealthy hillside neighborhood of Palm Springs motivated an intense site response guided by grandeur, sophisticated indulgence, and aesthetic voyeurism. Replacing an existing structure here requires a continuation of modernist placemaking principles, while maintaining a subtle Californian atmosphere.

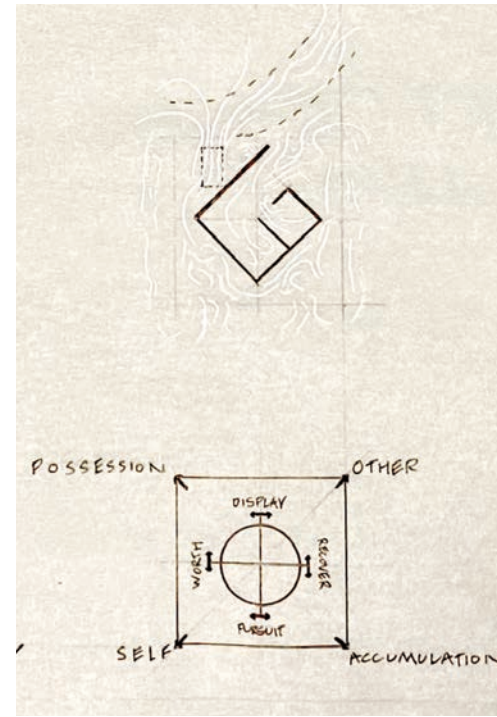
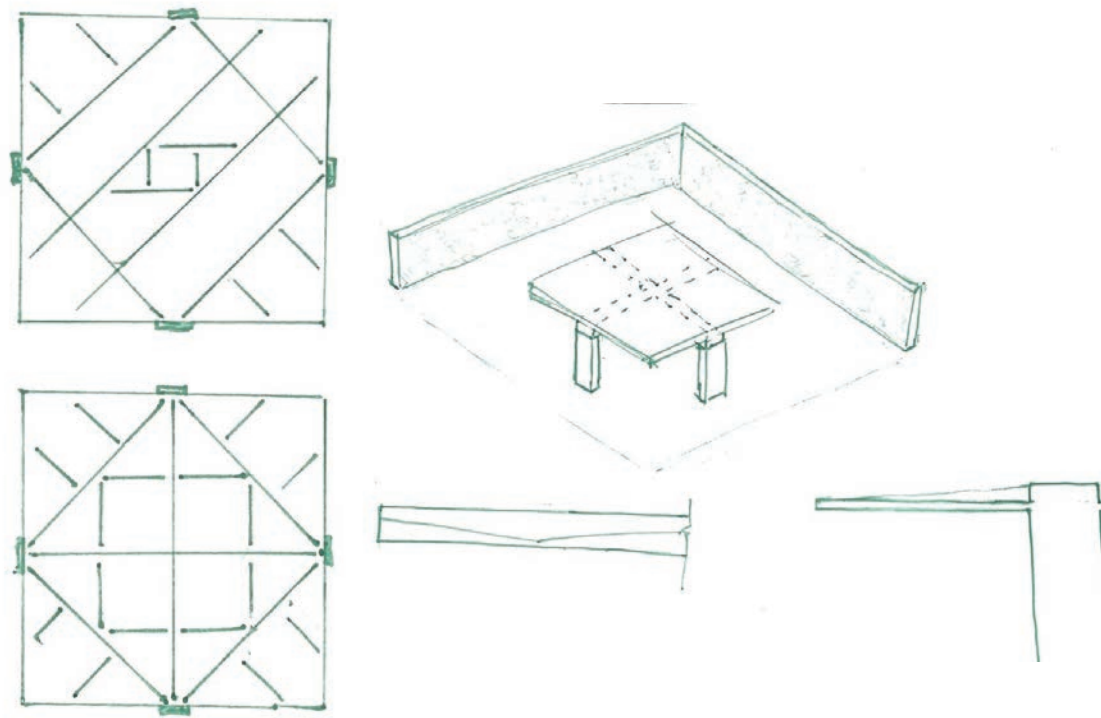
no.2 ♦

Presley Estate



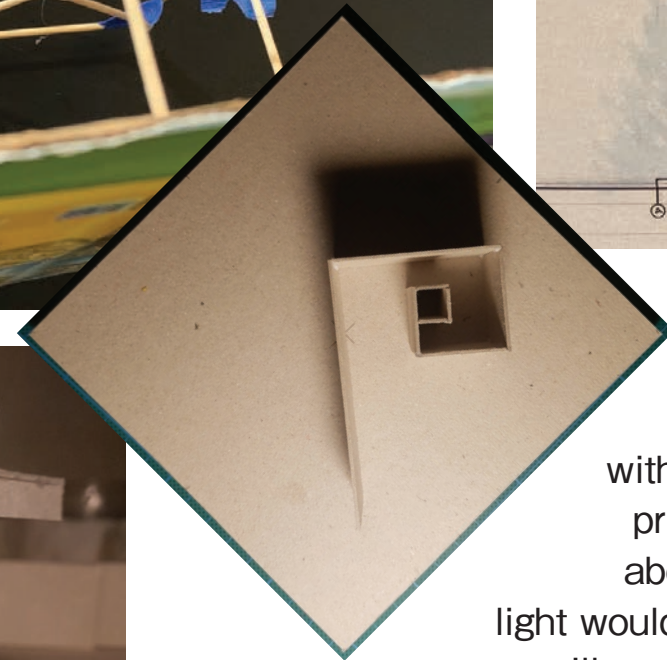
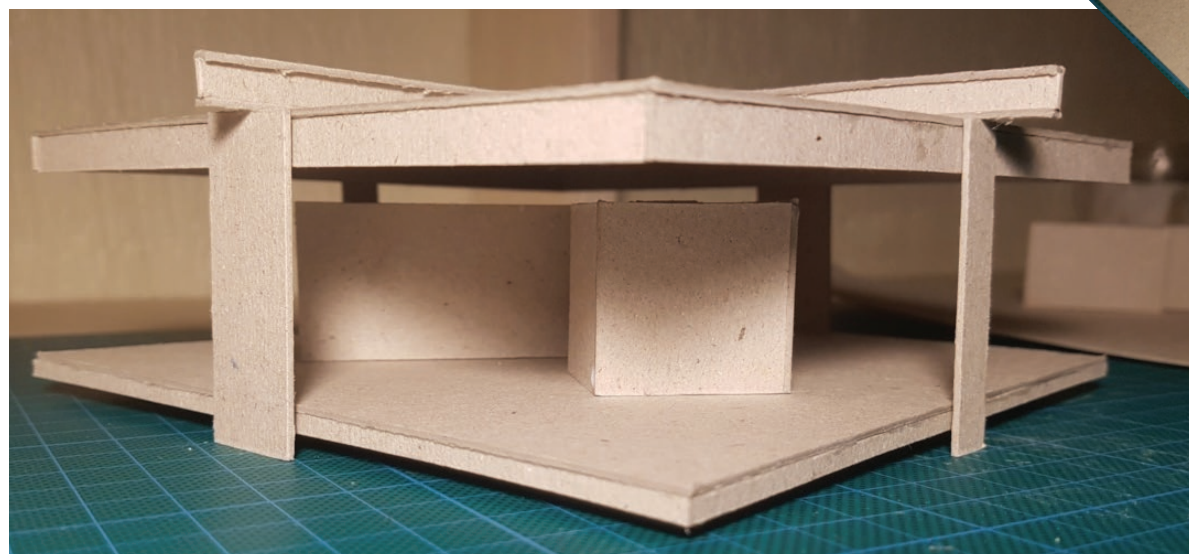
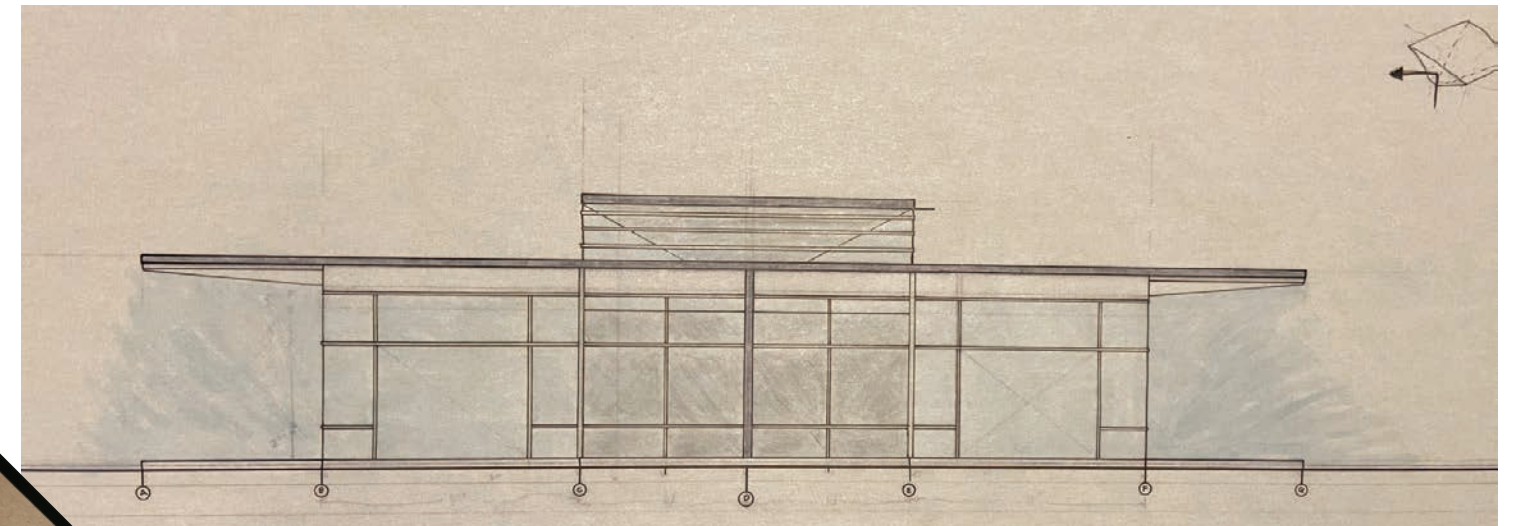
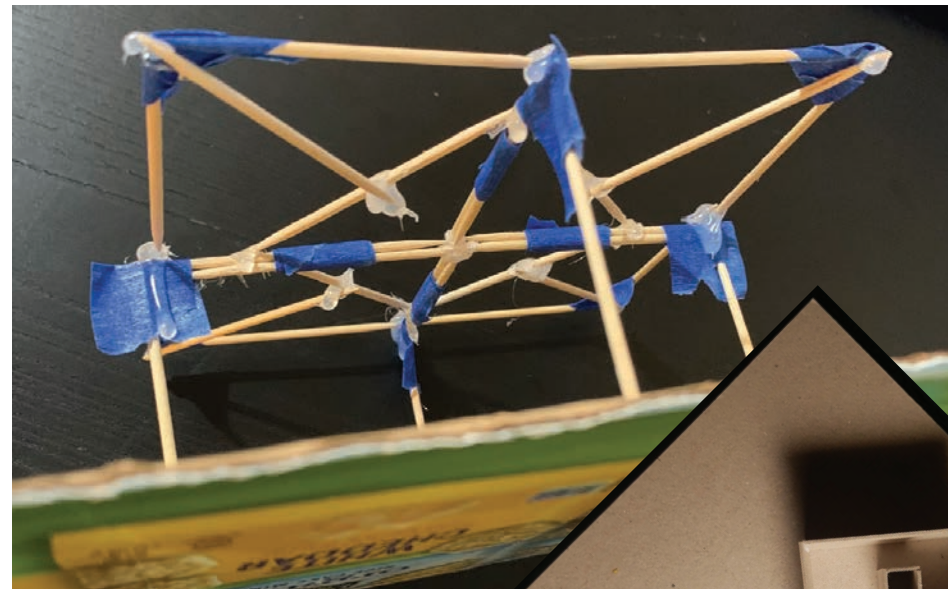
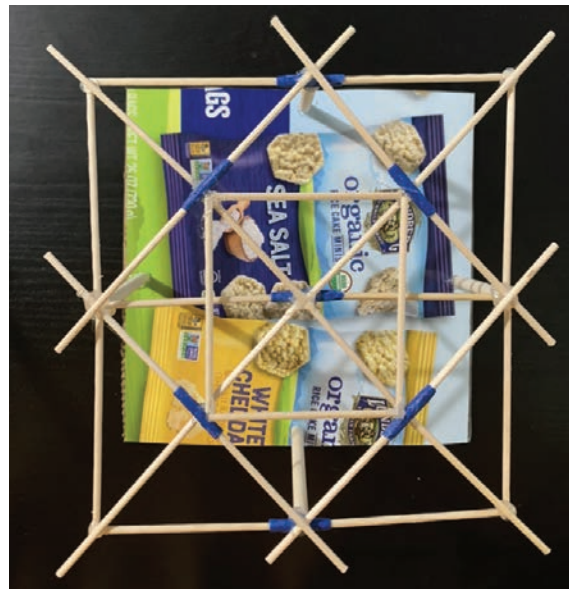
Including a lesser known Albert Frey house which would become one of Elvis 'king of rock & roll' Presley's two residences at the time of his death, this neighborhood offers panoramic views and nearby San Jacinto mtn. hikes, plus Neutra's Kaufmann House just to the east.

EARLY IDEATION | HEALTH + EFFICIENCY HOUSE Atelier STRIPES



Early in the design process, two ideas dominated: first was a notion of ‘squaring the square’: embedding a diamond within the larger square plan of the Core House in order to break some of the rigidity implied by a pure square grid. Early framing designs by Eva and Jen incorporated this idea into the framing plan as we anticipated a central skylight which would direct light in some way towards the center of the large floor area.

Jurgis was the first to synthesize this strategy with the second big idea, with his compelling ‘spiral’ room idea inspired by the earlier timeline’s visual flow. His model of the whole house gave the team inspiration for daylighting and the implications of such a figure and its position within the floor plan.



At the time, the group also toyed with the idea of breaking Mies’ sacred horizontal roof plane with a central skylight, chiefly inspired by the suggestion of an eventual ‘final fantasy’ that would tie the timeline together with science fiction and dystopian fantasy. The top skylight was to be an immense prism, inspired by a camera pentaprism, which would reject sunlight from directly above in favor of clearly mirrored panoramic views from the surrounding site. This light would transmit the diffuse desert albedo while provoking conversation fodder around surveillance – would the clients be watching the neighborhood from their secluded central core, or would it be vice versa?

[top left, green]

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[center row]

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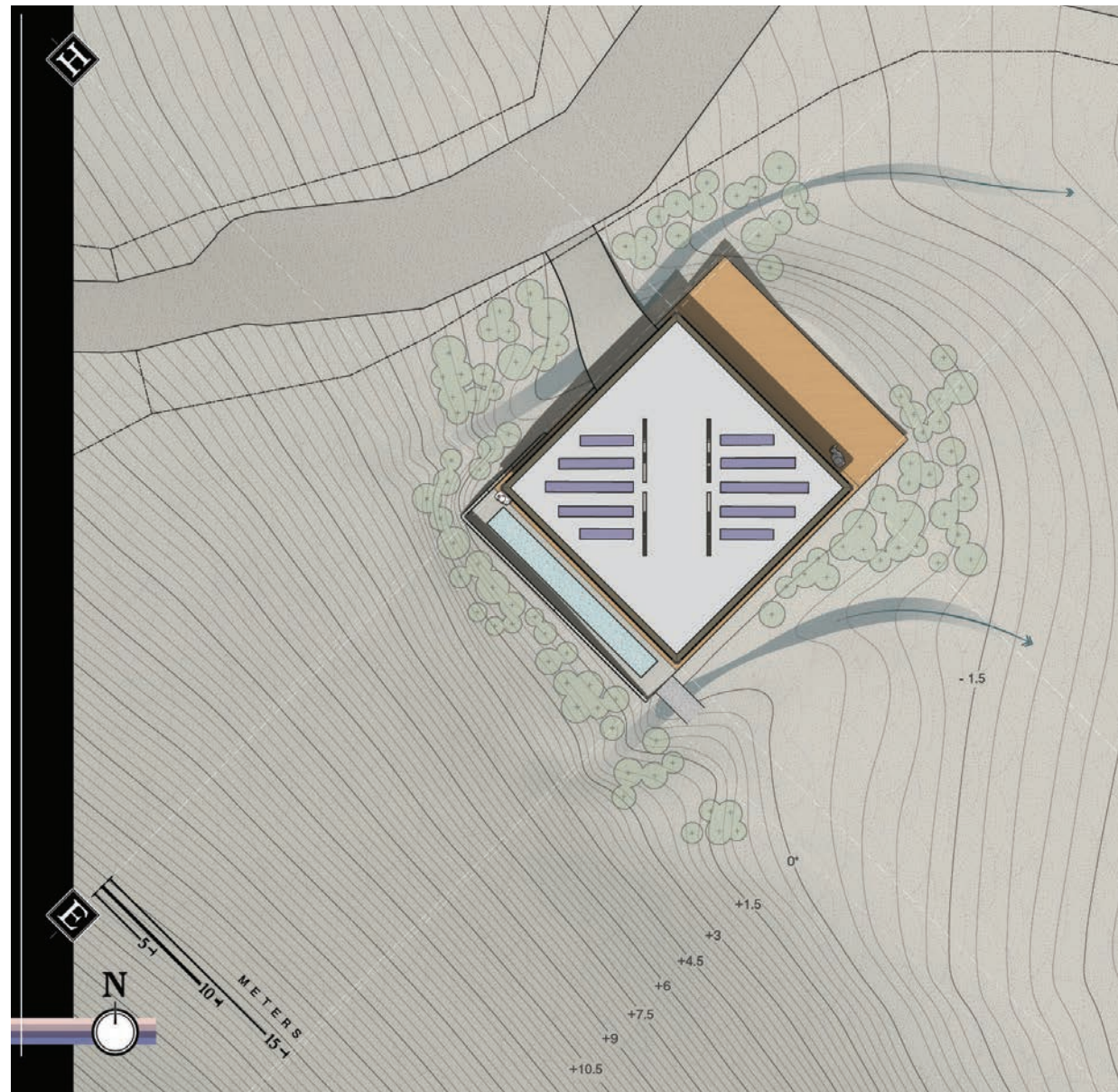
early sketches: *Eva Wieczorek*

early parti diagrams; elevation: *Moises De La Cruz*

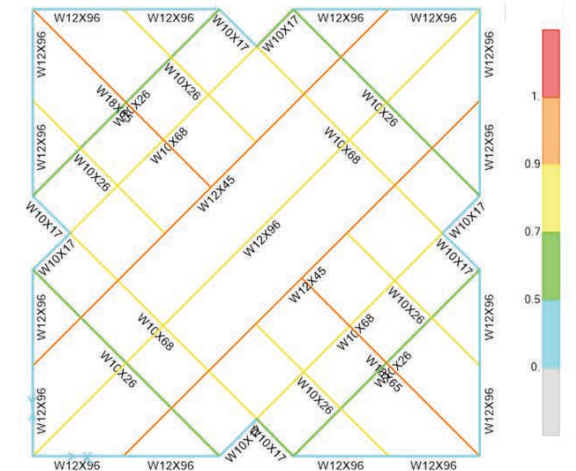
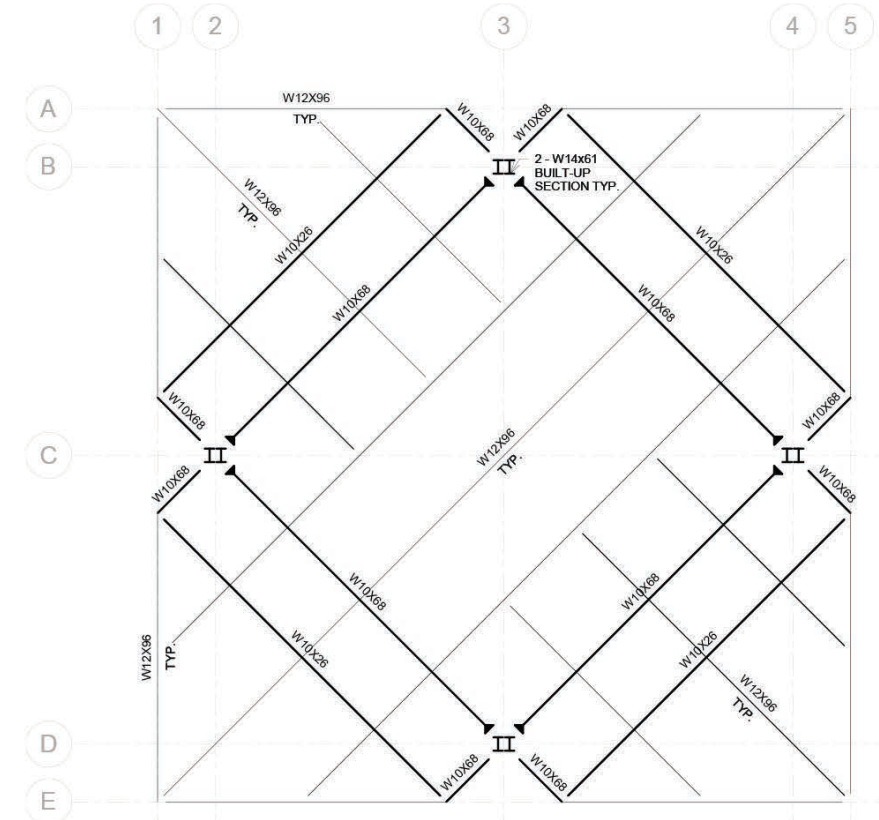
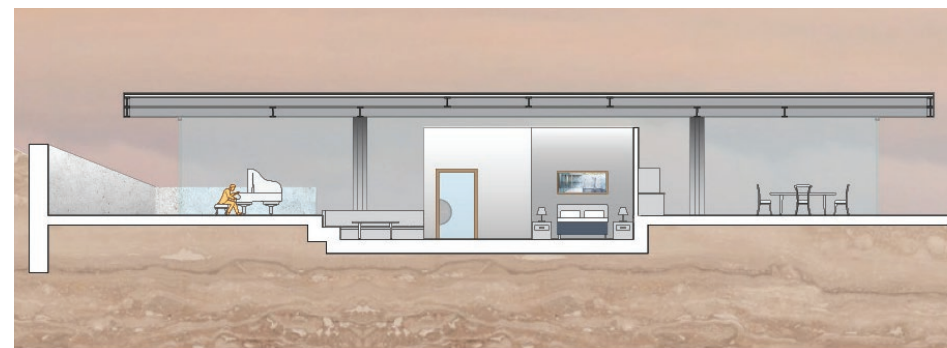
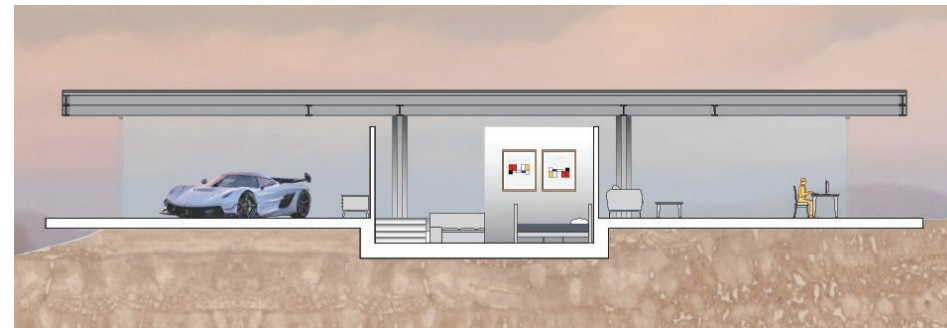
physical framing model: *Jennifer Long*

house & spiral model: *Jurgis Vaisvila*

Ultimately, this idea was deemed too disruptive for the minimalist ambitions of the project.



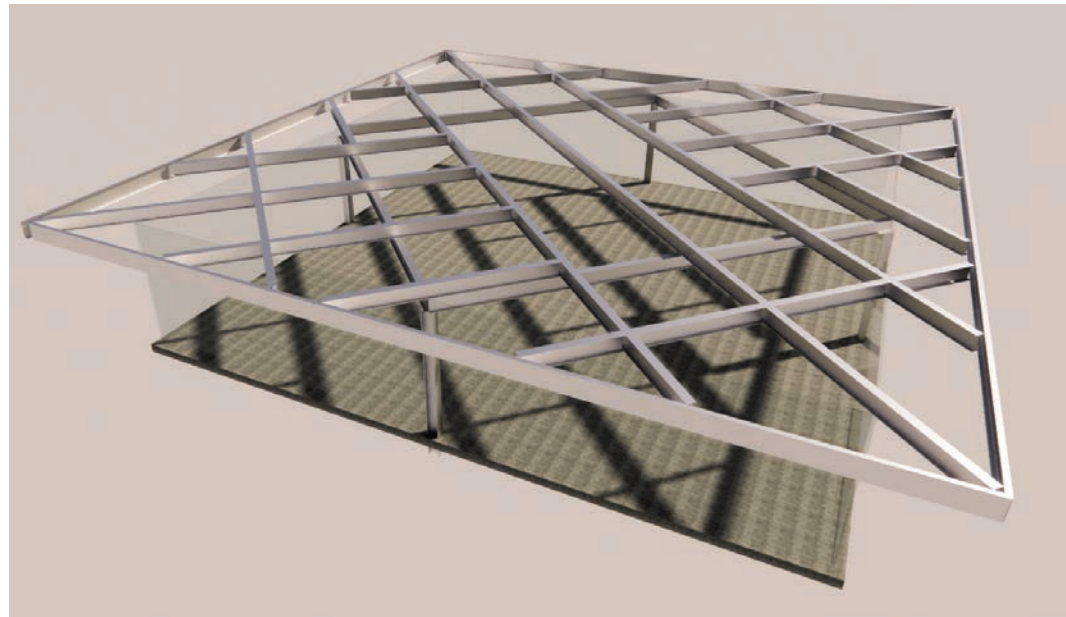
site plan: *Moises De La Cruz*
sections: *Elle Gallman*
framing configuration: *Eva Wieczorek*
framing plan + analysis: *Krystal Bacon*



Around the halfway-point of the quarter, Atelier STRIPES presented their progress on the House to a panel of jurors from Cal Poly and beyond. At that time, the site was only developed to a point of suggesting entry conditions and relationships between landscape & home, but a clear parti was being established. Key ideas to express to the reviewers were the spiral circulation about the floor plan and the highly regular program geometries arranged by quadrant. The group's sections allowed for meaningful conversation about how the project might be experienced from within, especially with the recessed lower floor which seemed to be the House's most successful move thus far. Some elements which would ultimately be modified or removed were the woefully-narrow pool and walkways, and the planned photovoltaic panels which ultimately spoiled the horizontality of the roof, when modeled in 3D some weeks later. Instead, the position of the House within the site would be solidified, while a multitude of elements – the dry creek beneath the entryway to the gardens surrounding – would be clarified and modeled in Rhino with greater resolution.

MID-REVIEW : post-mortem

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*structural modeling + render: Jurgis Vaisvila
renders: Moises De La Cruz*

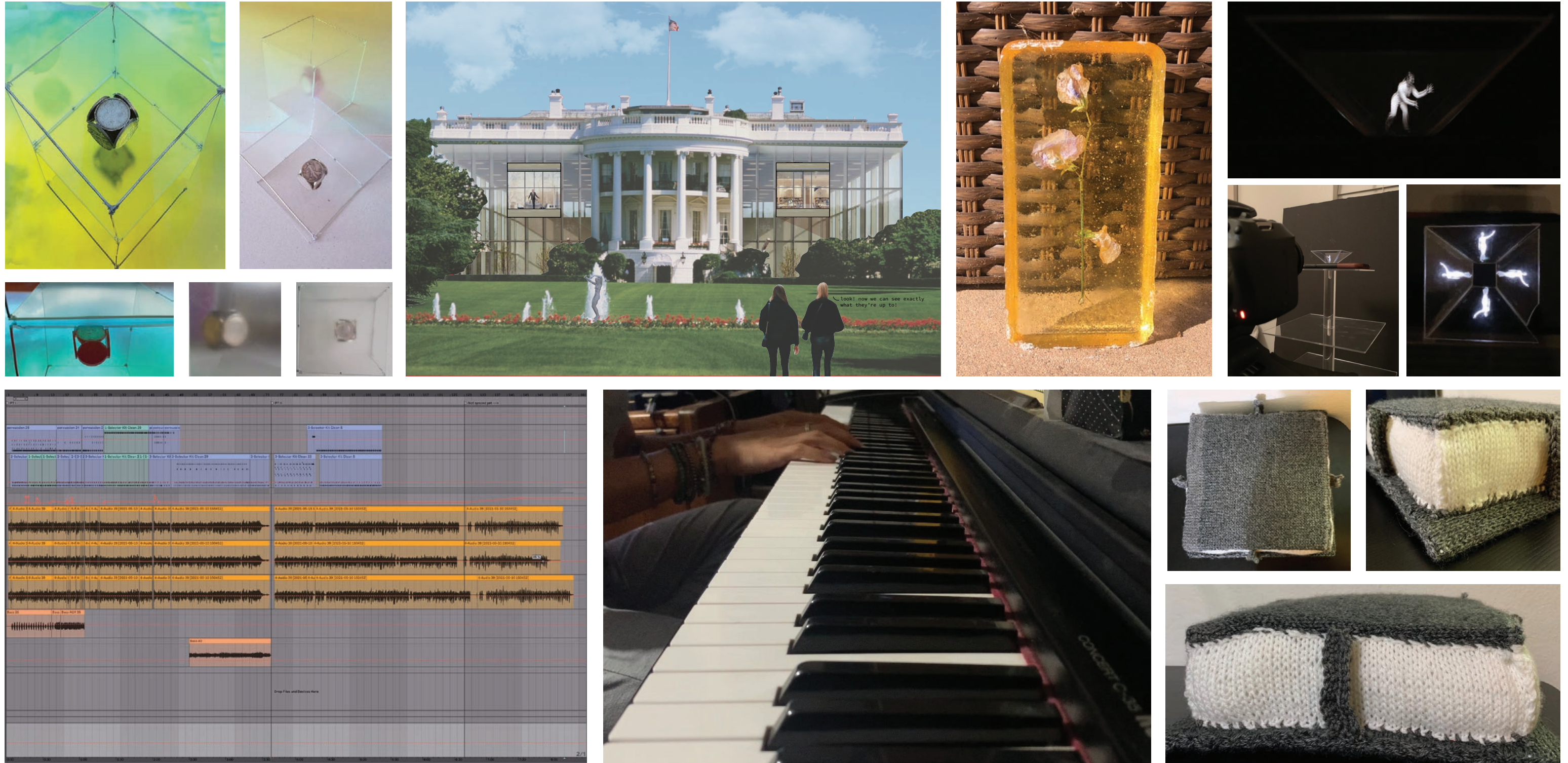


At mid-review, the team was given insightful critique which ultimately pushed us to refine the building even more acutely. Reviewers pointed out that the current framing layout likely would not function as ideally as the team hoped, and the interior condition also needed greater development. While the team felt slightly deflated after the mid-review push, the next few weeks would see us attack the project with renewed enthusiasm, fueled by inspiring preliminary renders, creative artifacts based on our studies, and – still to come – a brand new framing layout to carry the tertiary development home.

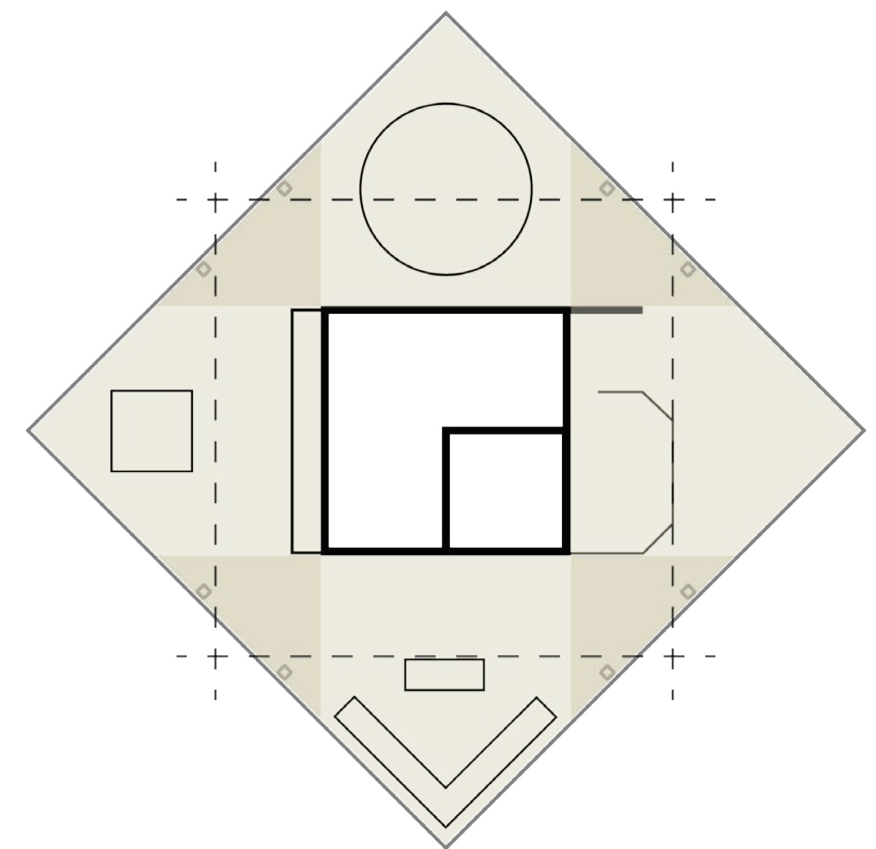
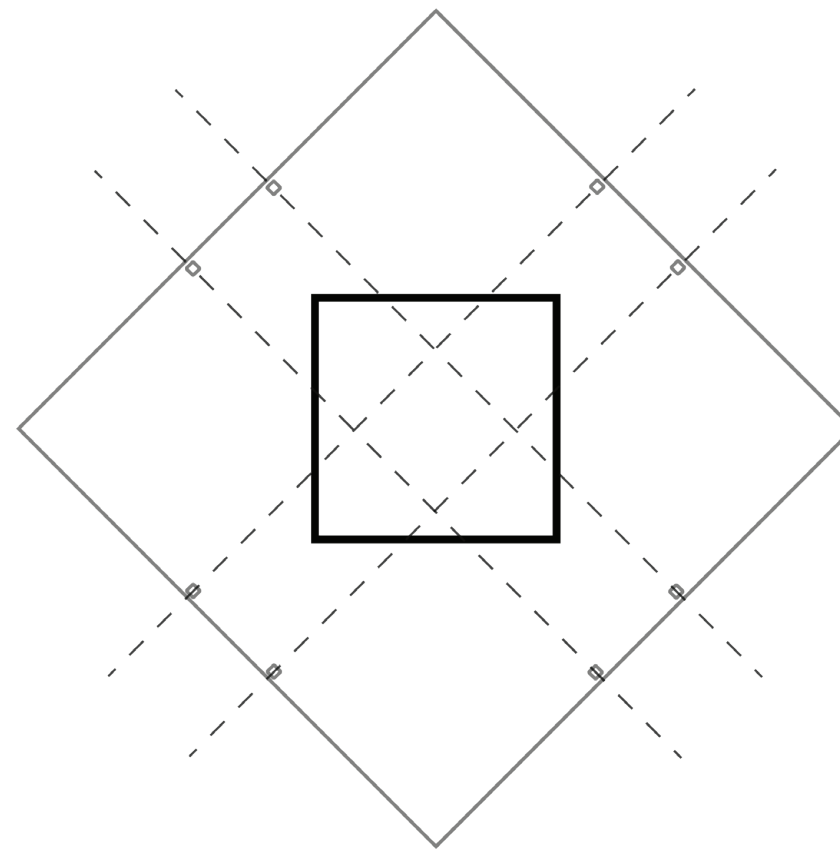
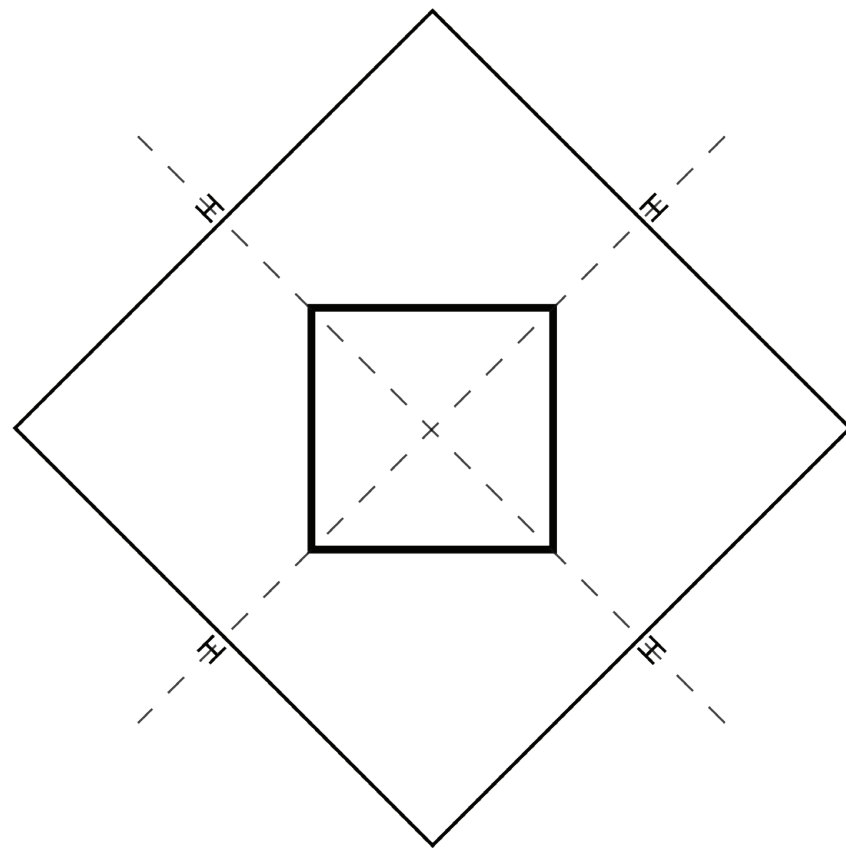
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suspended U.S. & Lithuanian currency: Jurgis Vaisvila
 political speculative rendering: Elle Gallman
 sugar glass composition: Kaylee Hernandez
 holographic phone projector: Eva Wieczorek
 guitar composition in ableton live: Moises De La Cruz
 piano composition: Krystal Bacon
 glasshaus plush: Jennifer Long

ARTIFACTS | HEALTH + EFFICIENCY HOUSE Atelier STRIPES



Following mid-review, Atelier STRIPES took a short retreat from tertiary design to develop individual artifacts inspired by the project. Several members played with the notion of 'encasement,' embedding objects within bodies of glass to mine the artifact for (literal) reflective inspiration. Others gravitated towards expressing the paradoxical features of glass explored earlier in the quarter, juxtaposing softness with hardness and transparency with power. Two members even made musical compositions which drew upon similar ideas.

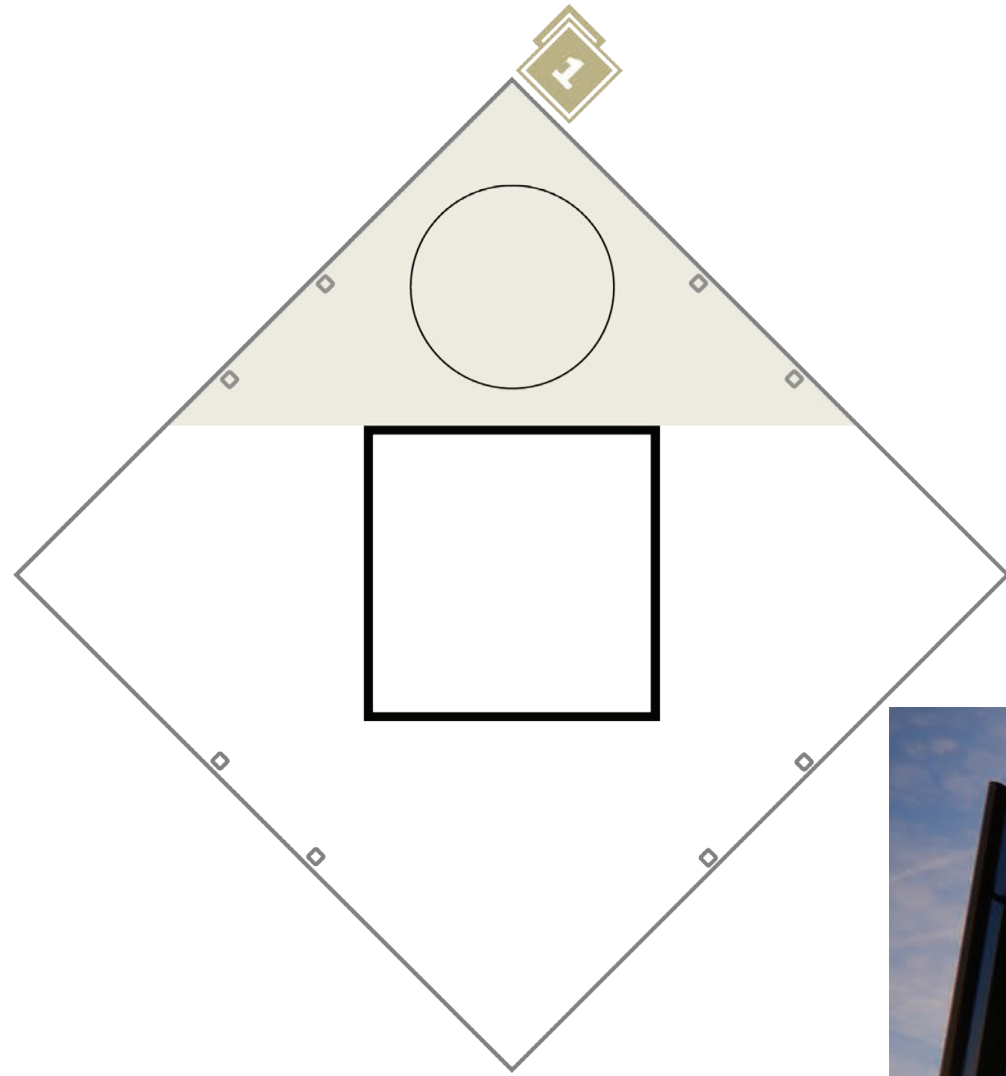


parti diagrams: Moises De La Cruz

The finalized Health & Efficiency parti revolved around a gesture of embedding one square within another – using a 45 degree offset between the two to disrupt their simplicity and create four triangular quadrants with symbolic meaning to the clients’ daily routine. The structure starts with Mies’ mid-wall columns, but splits this gravity system into two members on each face. This serves to create ‘soft’ corridors to partition space, and portal frames for each corner of the interior core to gesture through as an expression of openness that reaches past the edge of the building.

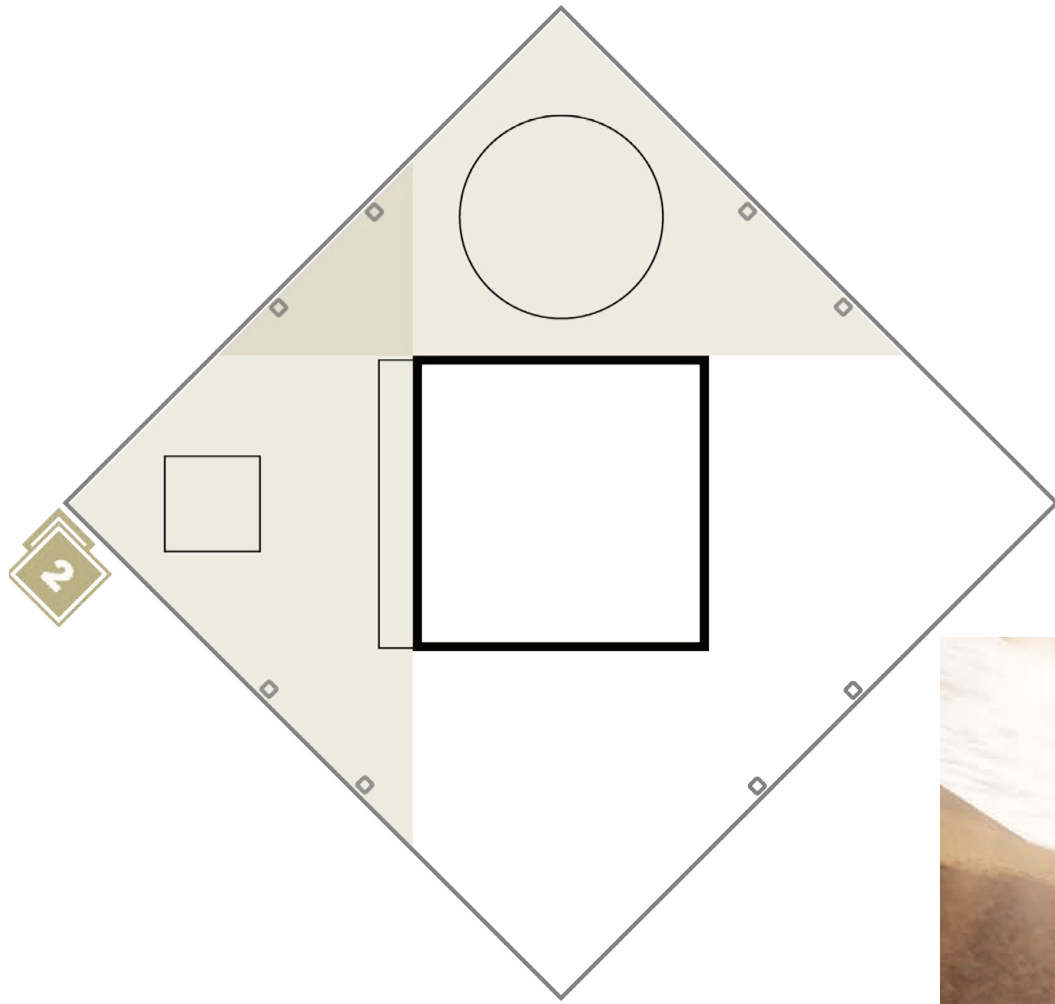
GARAGE : possession

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For our hard-working clients, the fruits of their labor ultimately motivate the need for a custom home in the first place. That's why the garage is freed from a servile role to become an integral part of the interior experience. The centerpiece of this quadrant is a turntable which allows Corey and Miguel to showcase their prized Aston Martin DB4 GT Zagato for friends, the neighborhood, or just themselves...as well as to pull in and out of the home with ease. The garage forms the crucial start and end points of two mirrored journeys that our clients will take each day to depart for work and return to their beloved abode, following a spiral path inspired by the flow of our earlier timeline.



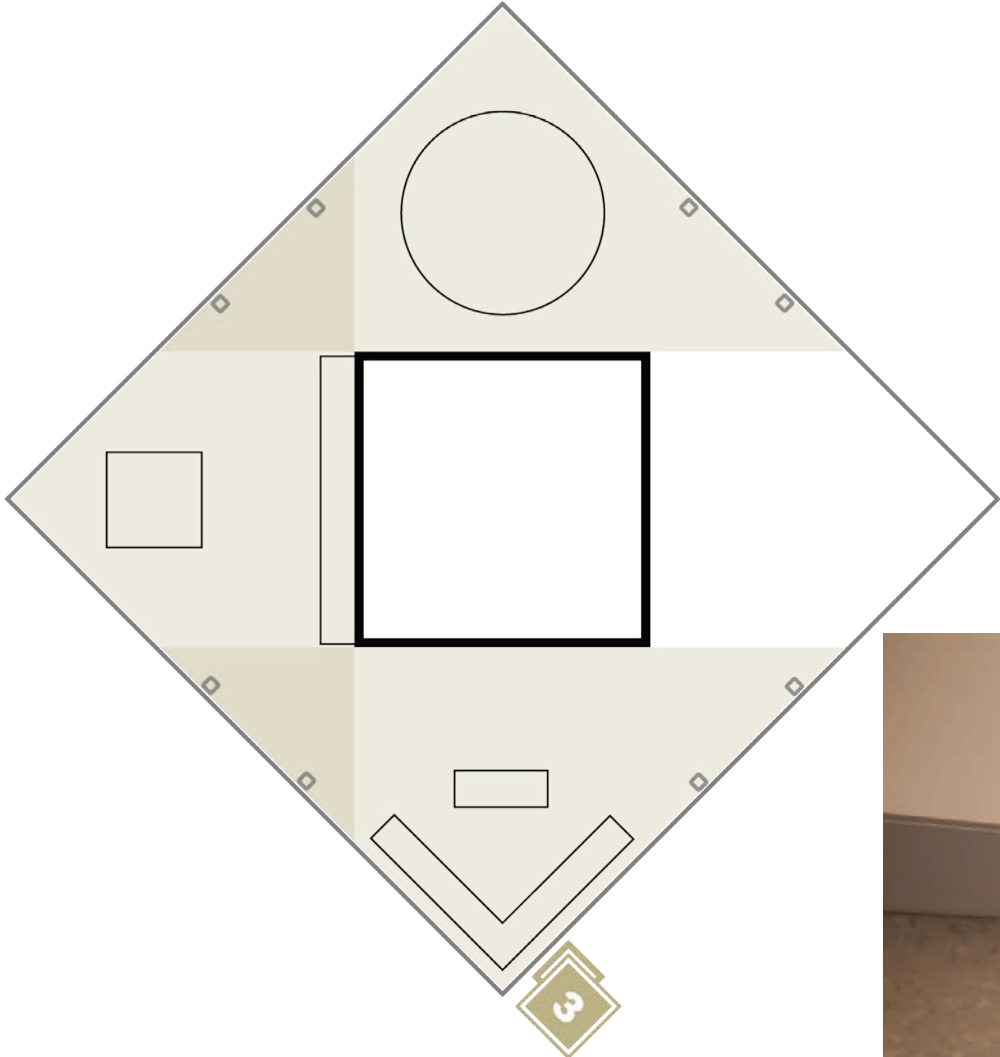


The kitchen is the next step in that path, representing the immediacy of self-maintenance which is crucial to the 'health' in "Health + Efficiency." The kitchen offers an intimate connection to the rear pool and a custom dining table with an industrial aesthetic to match that of the house.



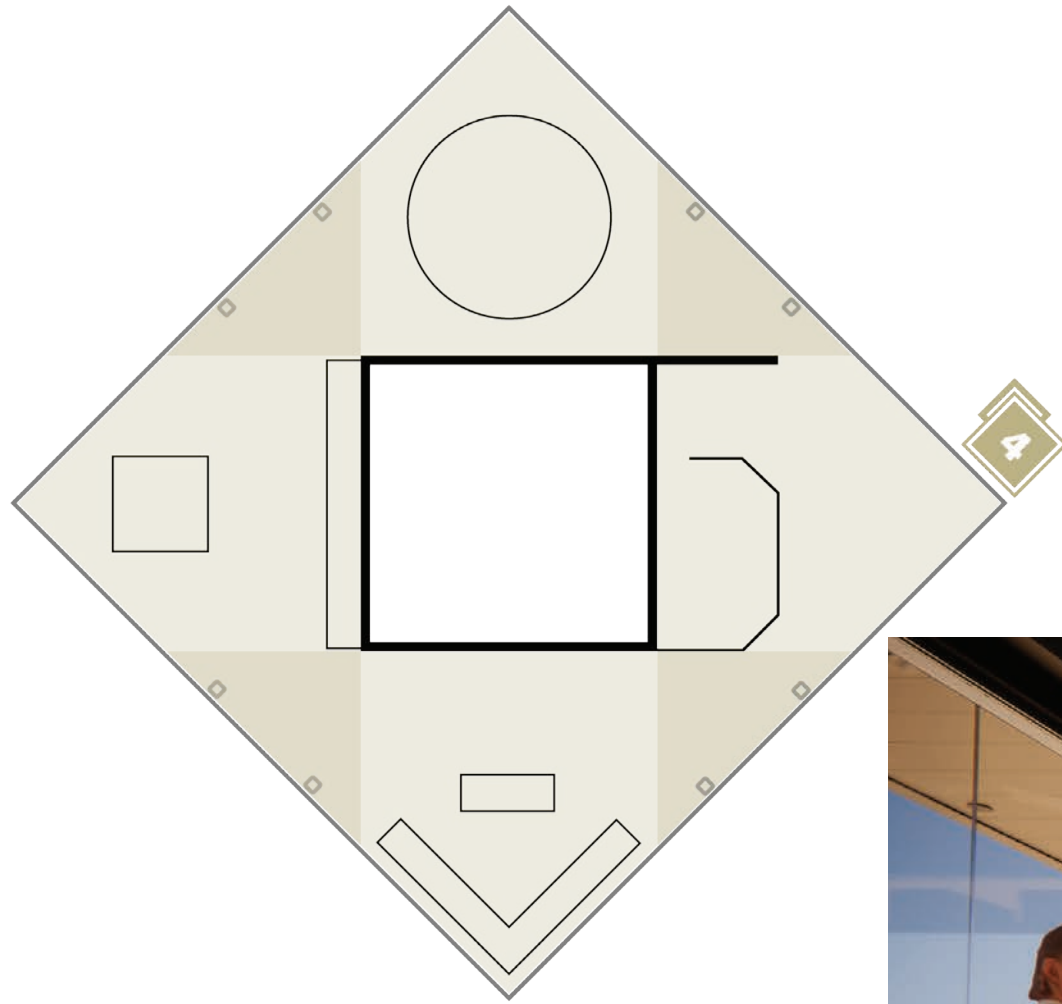
OFFICE : accumulation

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The home office also plays an essential role in 'efficiency,' offering an inspiring waypoint for answering emails and hosting business meetings alike. This space is connected to the pool as well as the sweeping remainder of the property, and symbolizes the accumulation of wealth as a complement to the showcase of that wealth in the opposing garage quadrant.





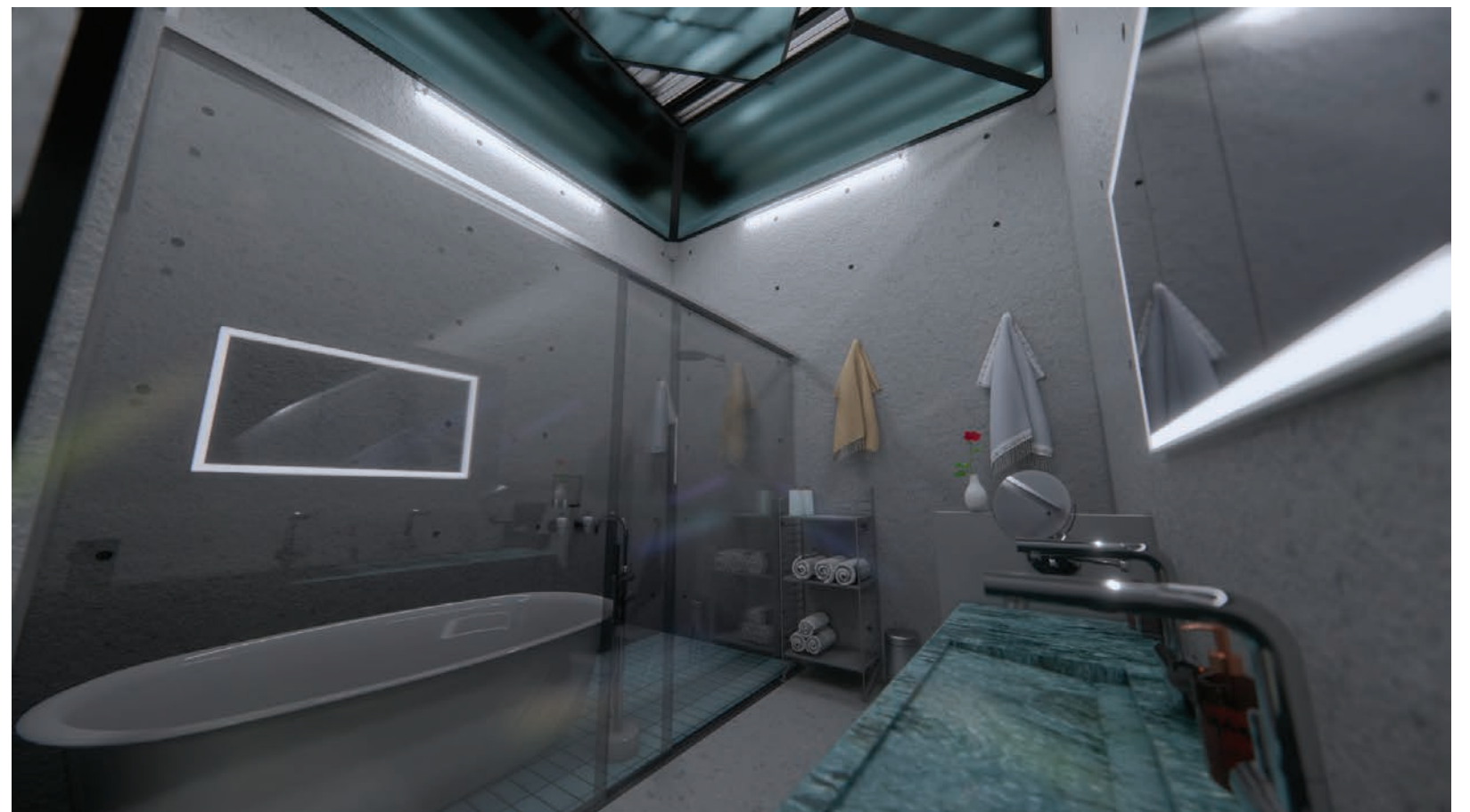
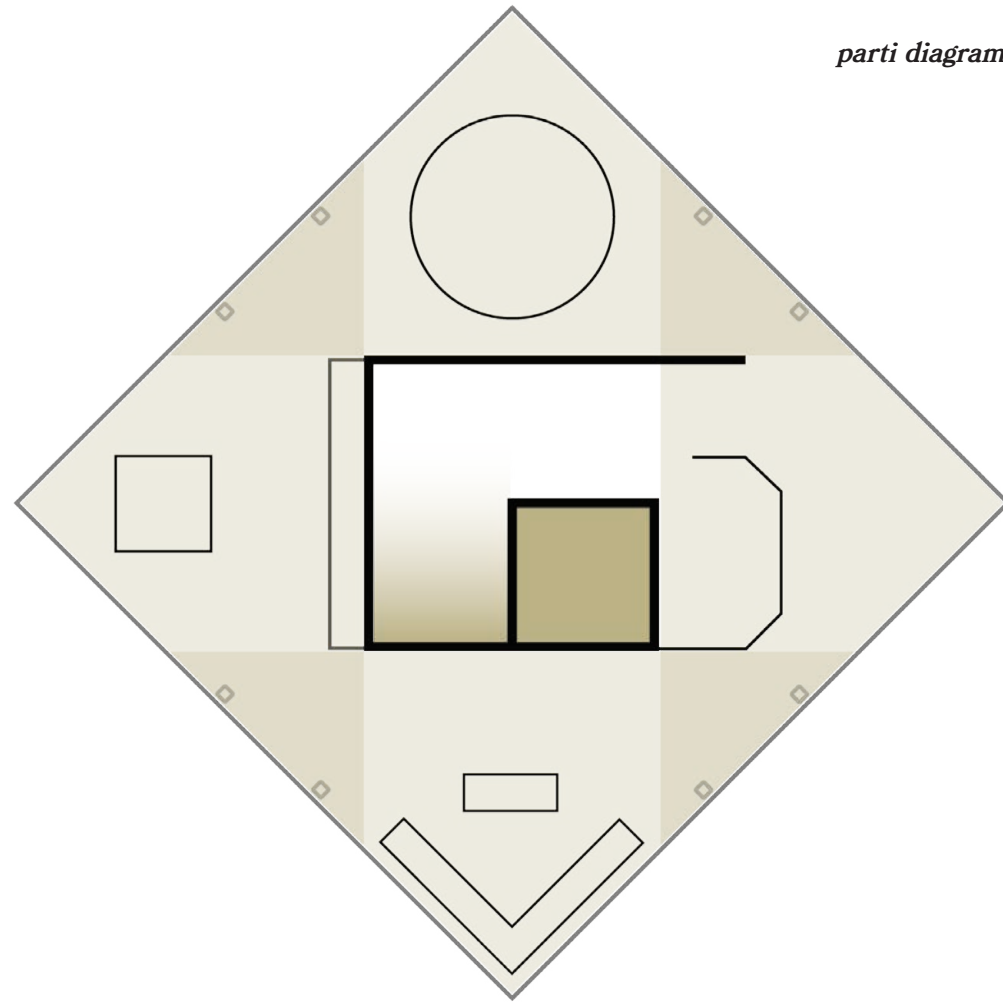
The fourth and final quadrant pairs with the kitchen on the opposite side. Whereas the kitchen is tucked closer to the back of the site as an expression of private self care, the den features a recessed conversation pit and sweeping views of the neighborhood as if to reach out and include others in Corey and Miguel's optimized lifestyle.



CORE : private

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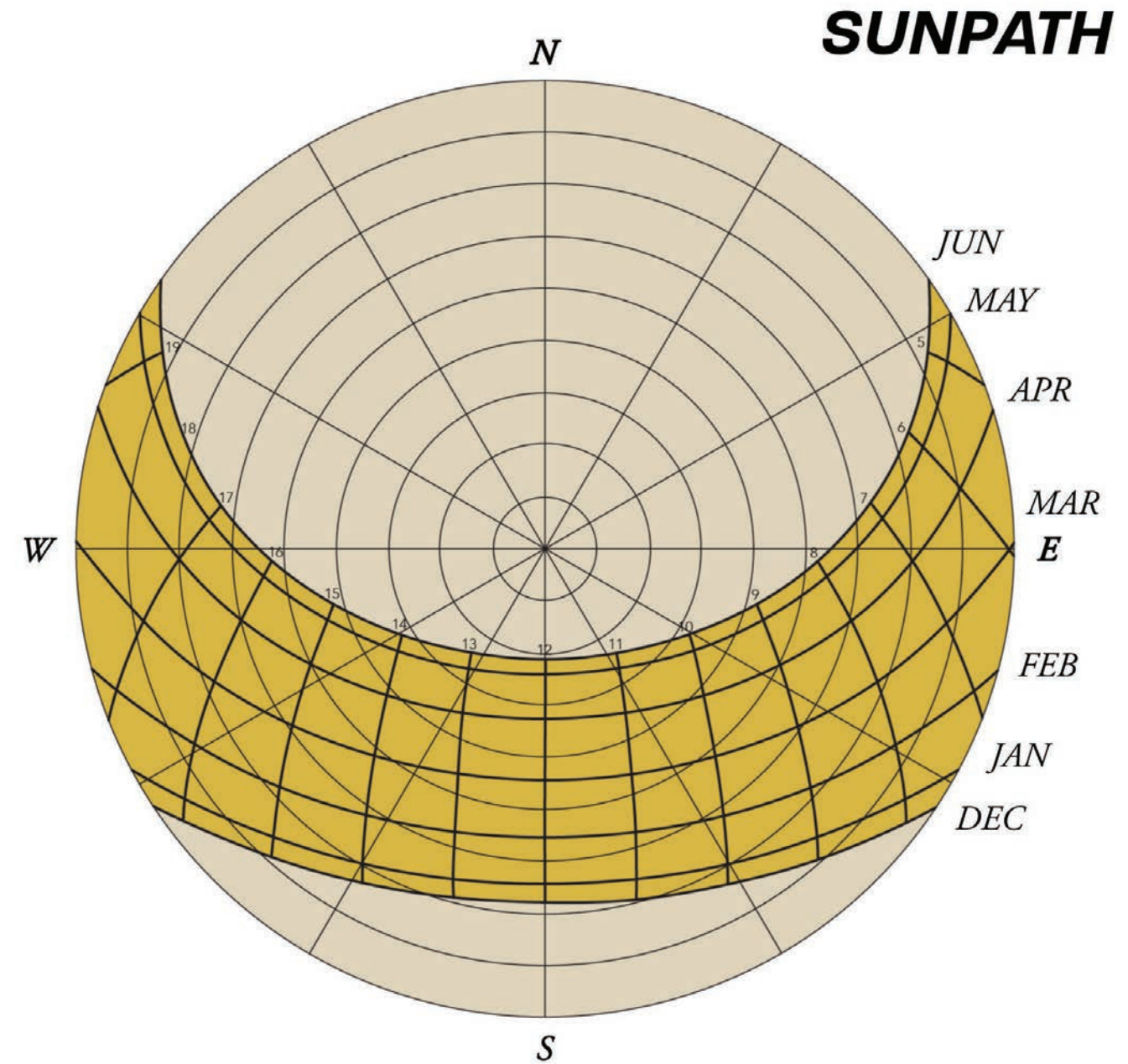
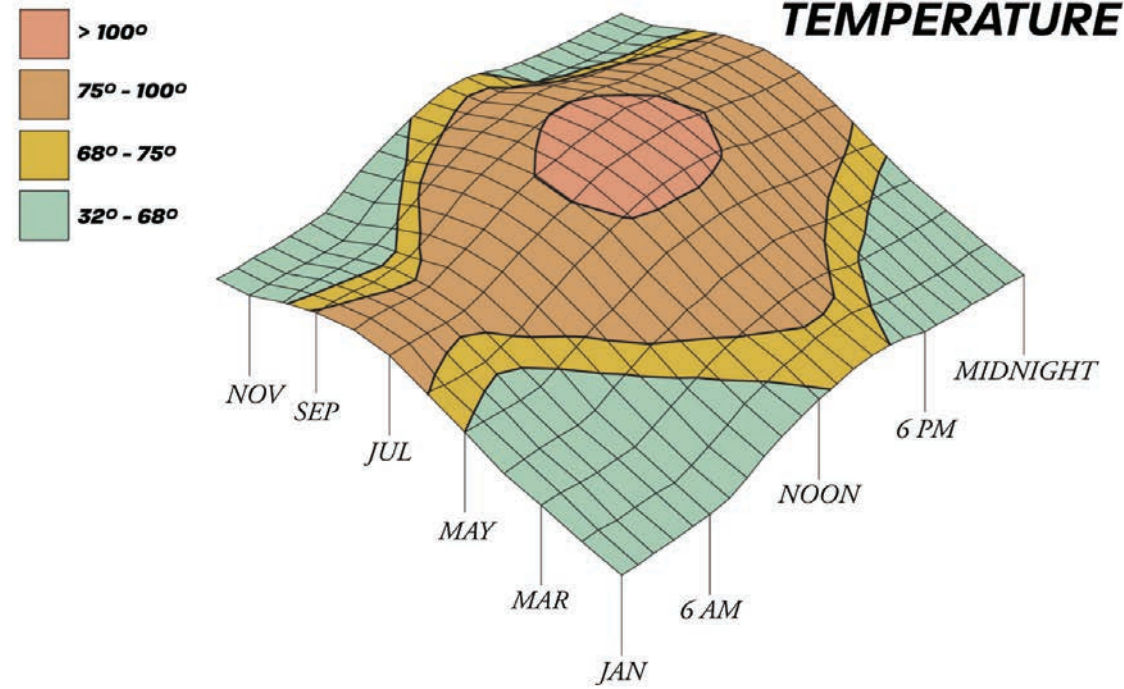
parti diagram + renders: Moises De La Cruz



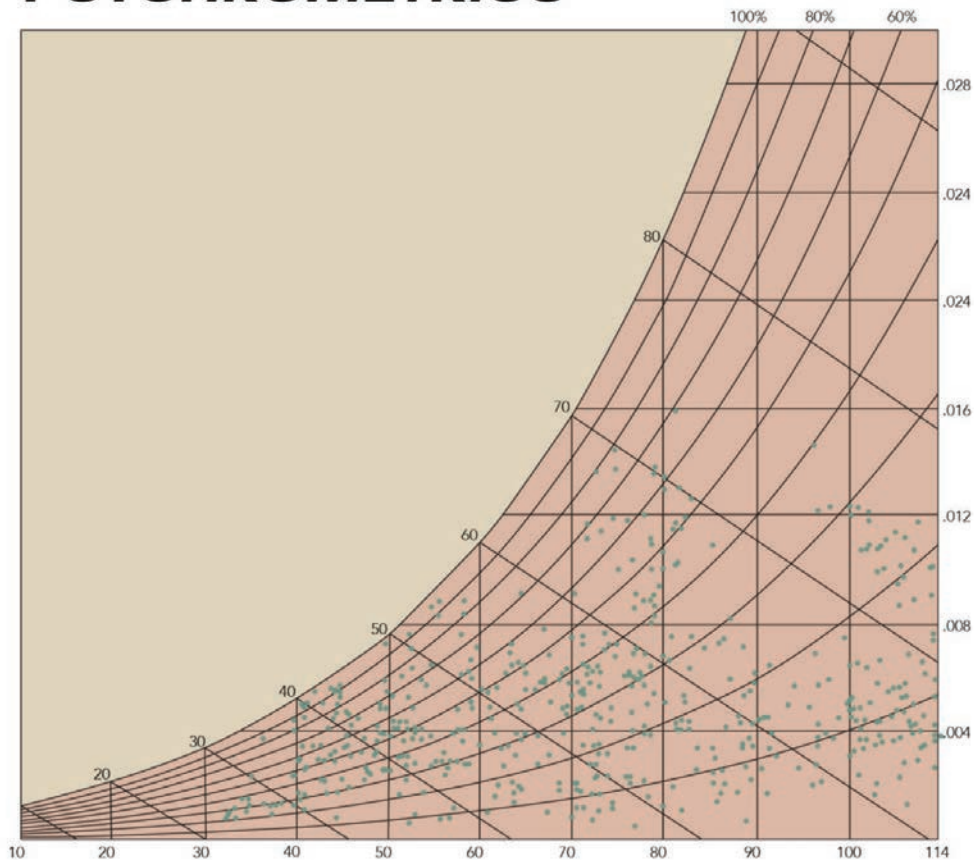
The central core of the House features the bedroom and bathroom, both recessed to match the elevation of the adjacent conversation pit. In this way the project is meant to feel more vertically expansive as one winds into its most secluded spaces in order to play with our expectations regarding privacy.

ENVIRONMENTAL FACTORS

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PSYCHROMETRICS



It is important to recognize the many anticipated issues with the climate in Palm Springs. While maintaining client comfort in an arid desert through detailed shading devices and carefully-tuned HVAC was ultimately beyond the scope of this studio, Atelier STRIPES believes in making the best of a less-than-ideal situation.

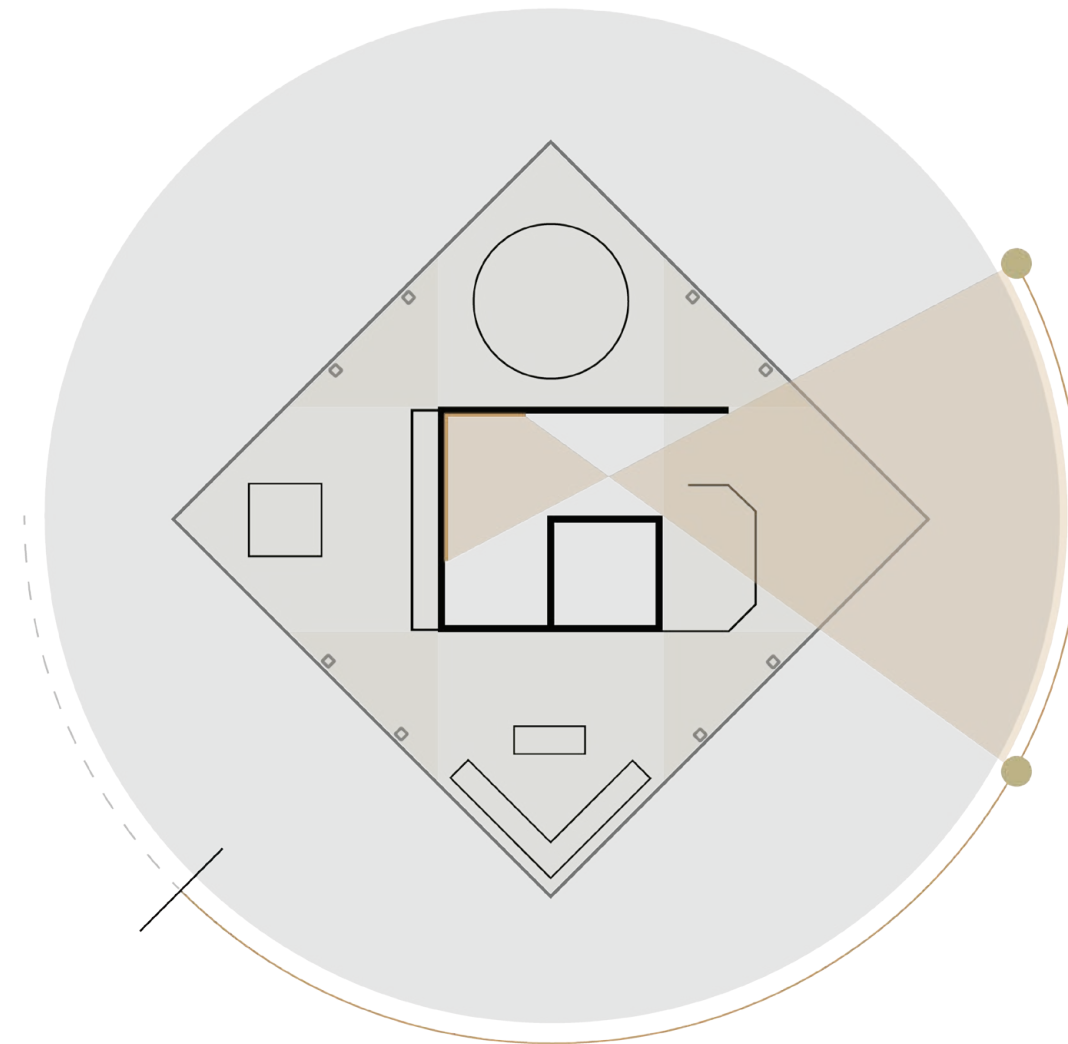


parti diagram + render: Moises De La Cruz

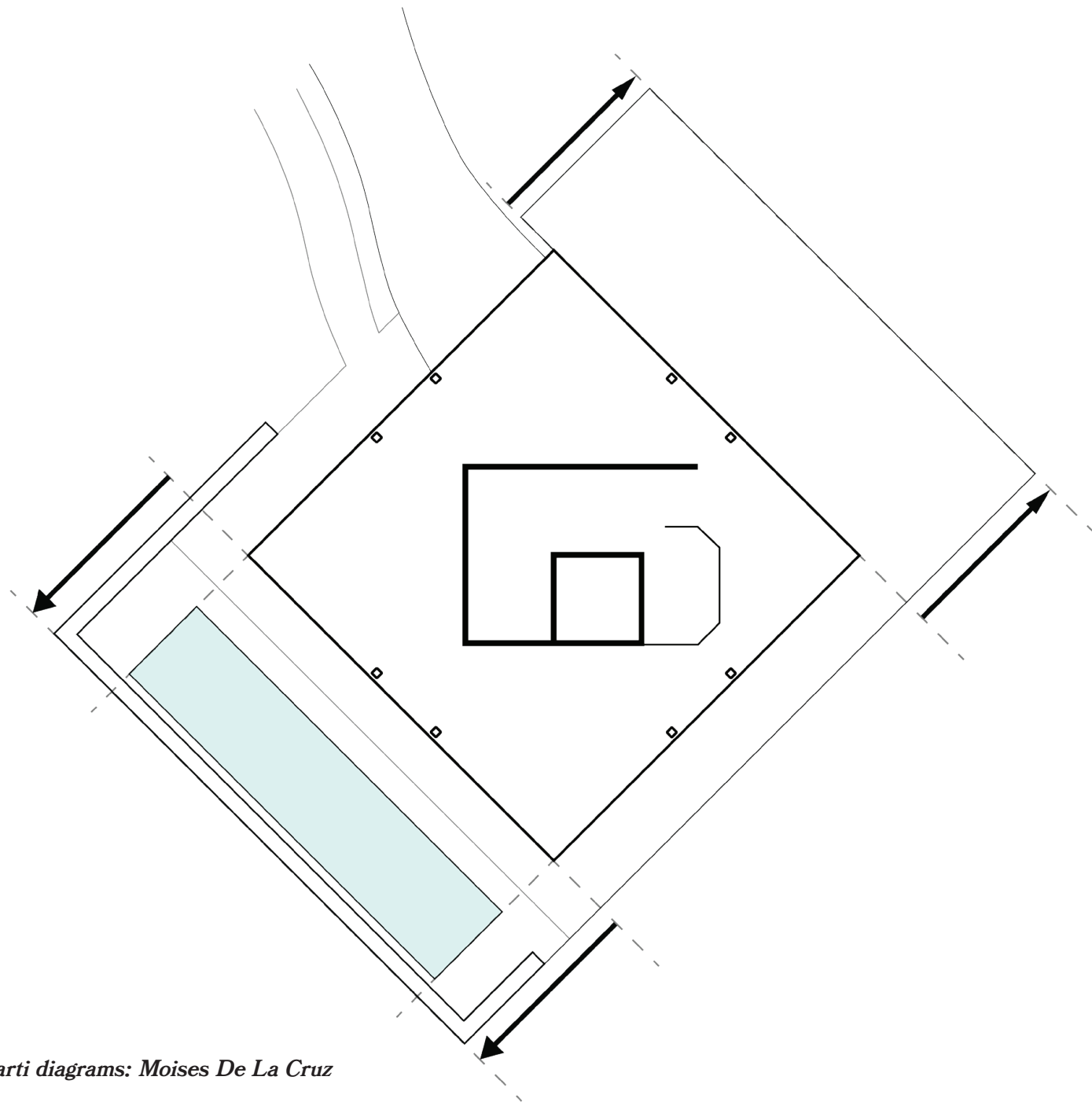
SOLAR PARTI

HEALTH + EFFICIENCY HOUSE

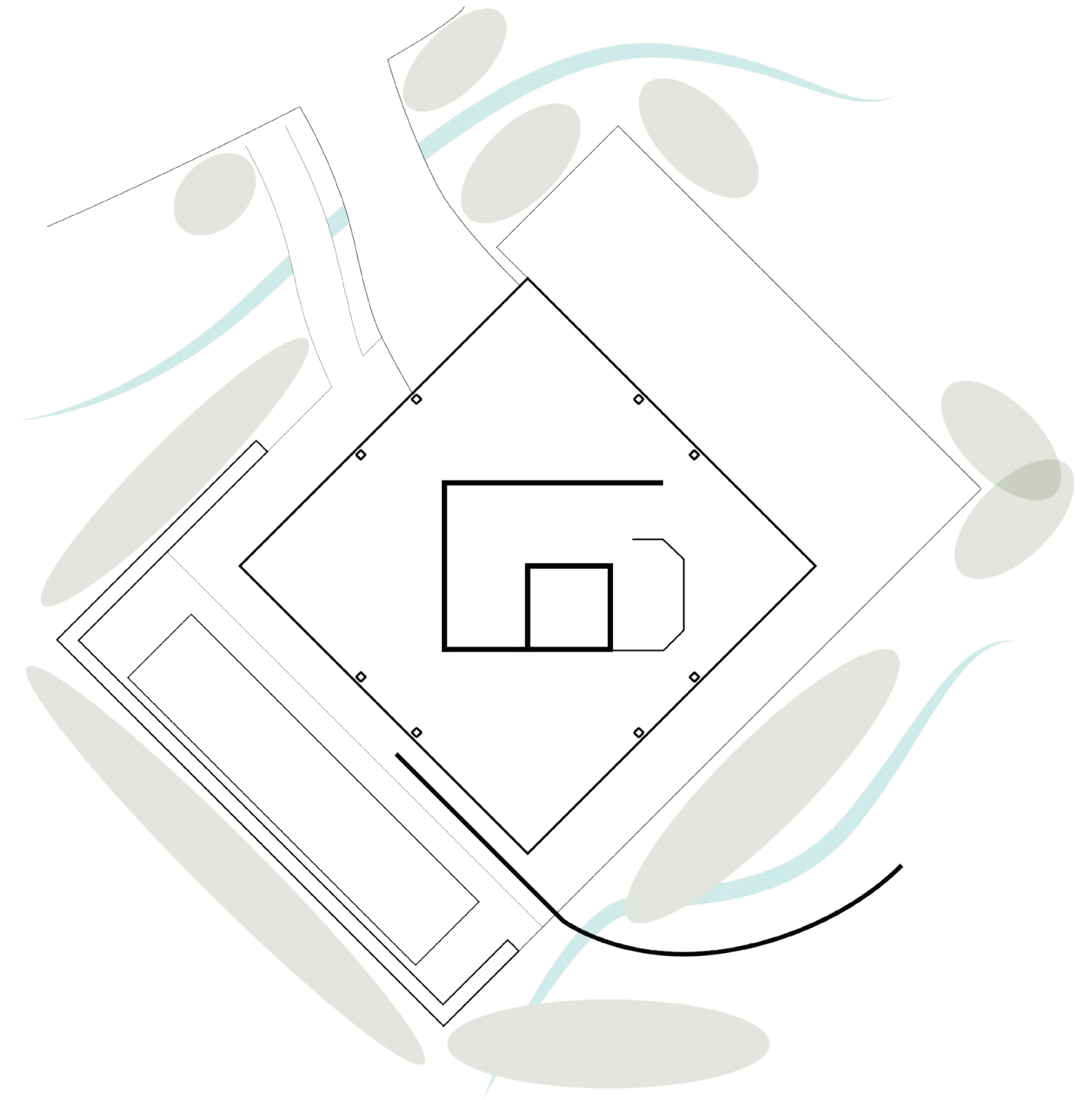
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For the reason discussed on the previous page, the central core was specifically opened on its east face to allow morning sun to bathe the inner wall of the bedroom all year round, offering a potent and natural wake-up prompt for our clients who love the morning for the productivity it promises each day. The ambition was for the project to be relatively shielded from hot afternoon sun by the neighboring mountains, so that the morning glow and noon light would become the full focus of the home's solar response.



parti diagrams: Moises De La Cruz

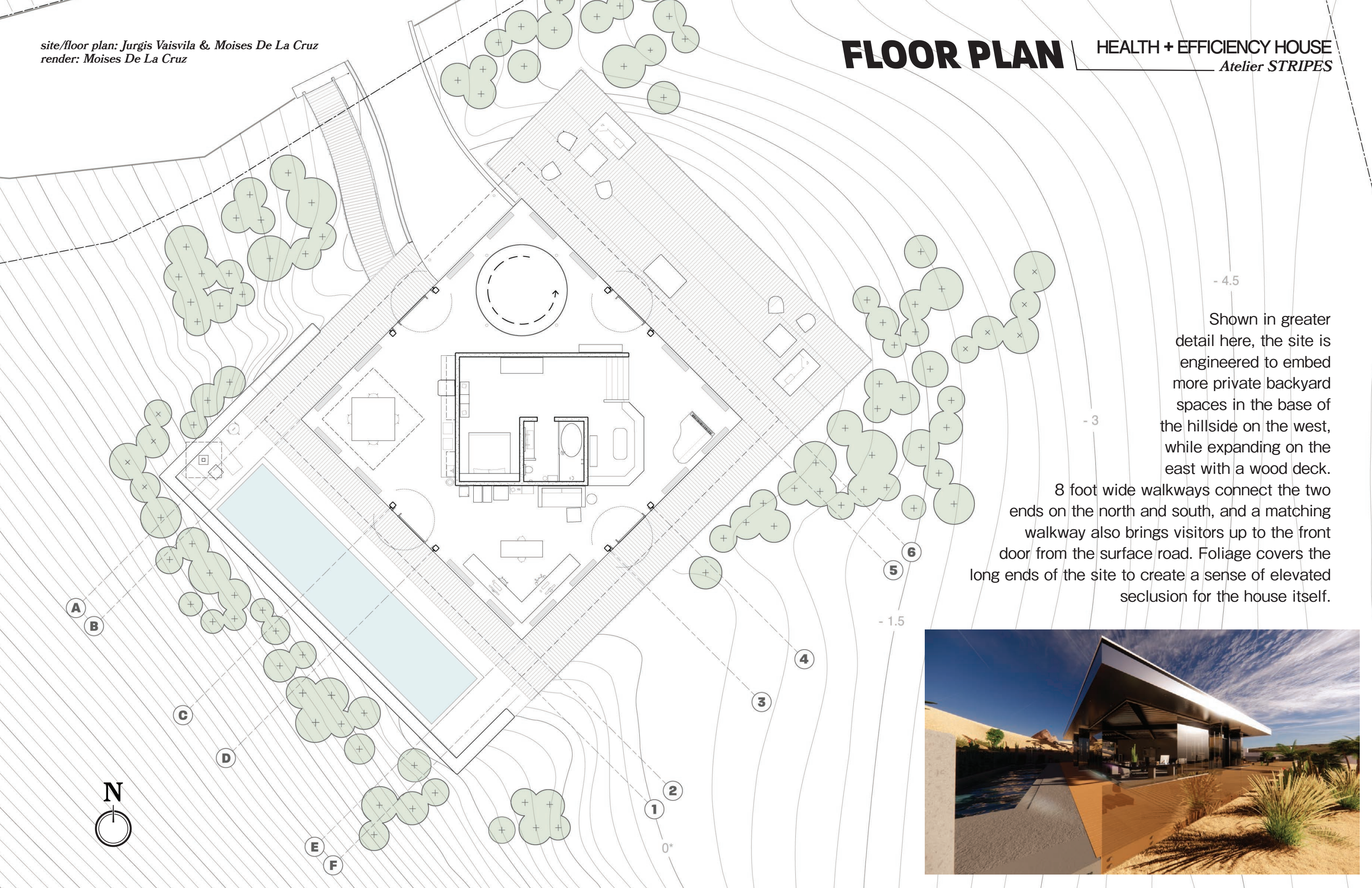


Our team's approach to the site was to use the steep topography and foliage as a means of enveloping the house. The plan is very much about an 'expansion' outward from the hillside towards the horizon and the rest of Palm Springs below, so that the house is both a place for great views and a picturesque landscape itself.

site/floor plan: Jurgis Vaisvila & Moises De La Cruz
render: Moises De La Cruz

FLOOR PLAN

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- 4.5

Shown in greater detail here, the site is engineered to embed more private backyard spaces in the base of the hillside on the west, while expanding on the east with a wood deck.

- 3

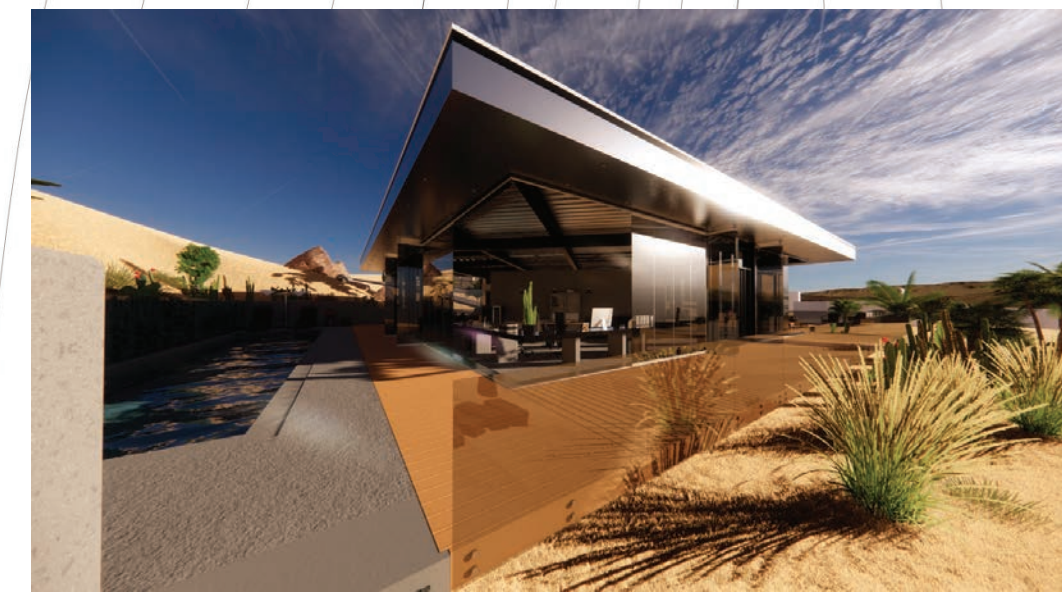
8 foot wide walkways connect the two ends on the north and south, and a matching walkway also brings visitors up to the front door from the surface road. Foliage covers the long ends of the site to create a sense of elevated seclusion for the house itself.

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ENTRY SEQUENCE

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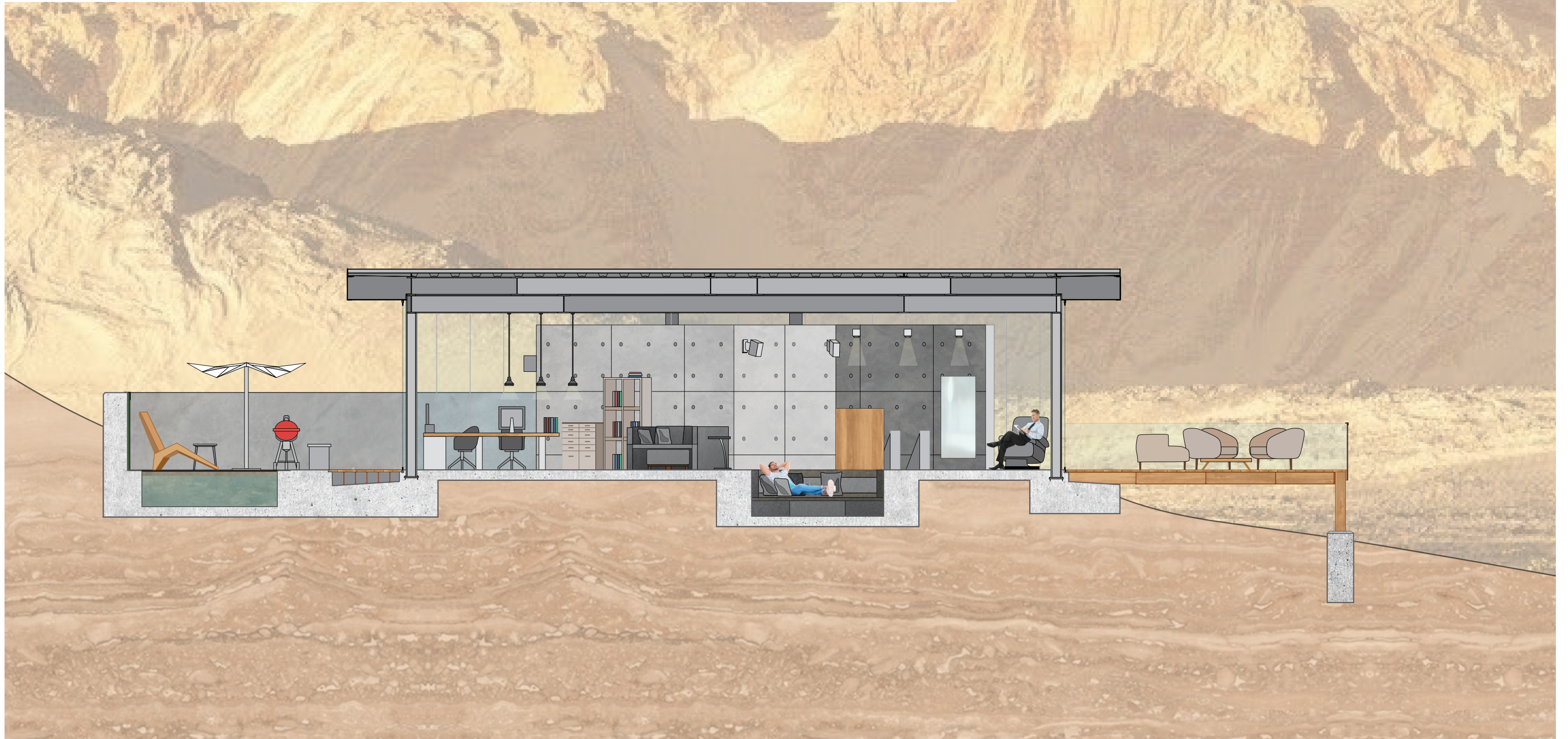


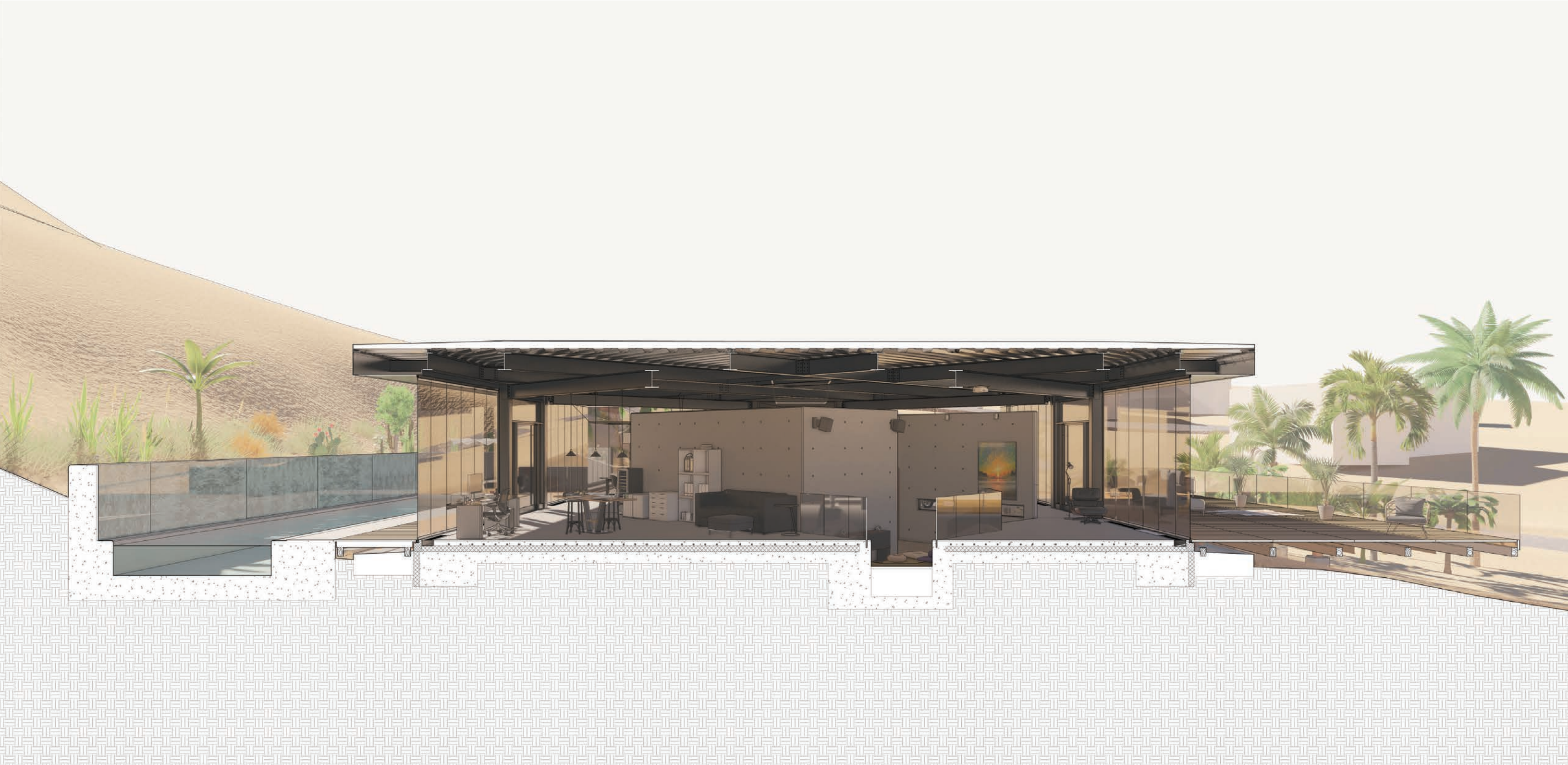
This entry section shows the experience of entering the building in greater detail. Both the driveway and footpath rise above a dry creek doubling as drainage for the infrequent drizzle, directing water and prying eyes away from the embedded backyard and towards the main entrance that seems to expand towards the distant horizon framed by the home.

entry section: Elle Gallman & Moises De La Cruz

The project's sectional strategy of embedment and expansion is most obvious in the east-west section, where the topography is held by a low retaining wall in the back and allowed to drop off swiftly on the opposite side.

section: Elle Gallman & Jurgis Vaisvila



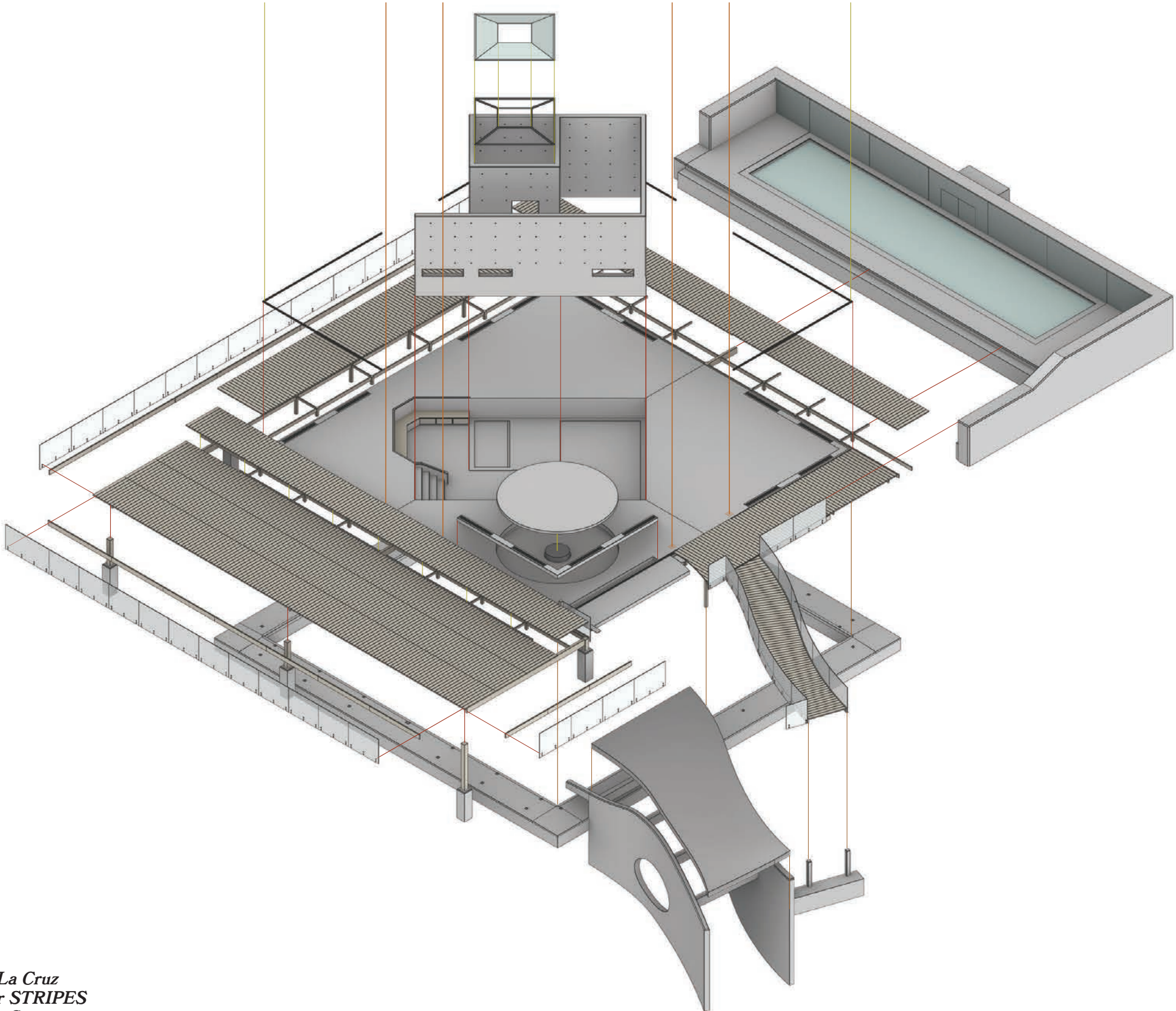
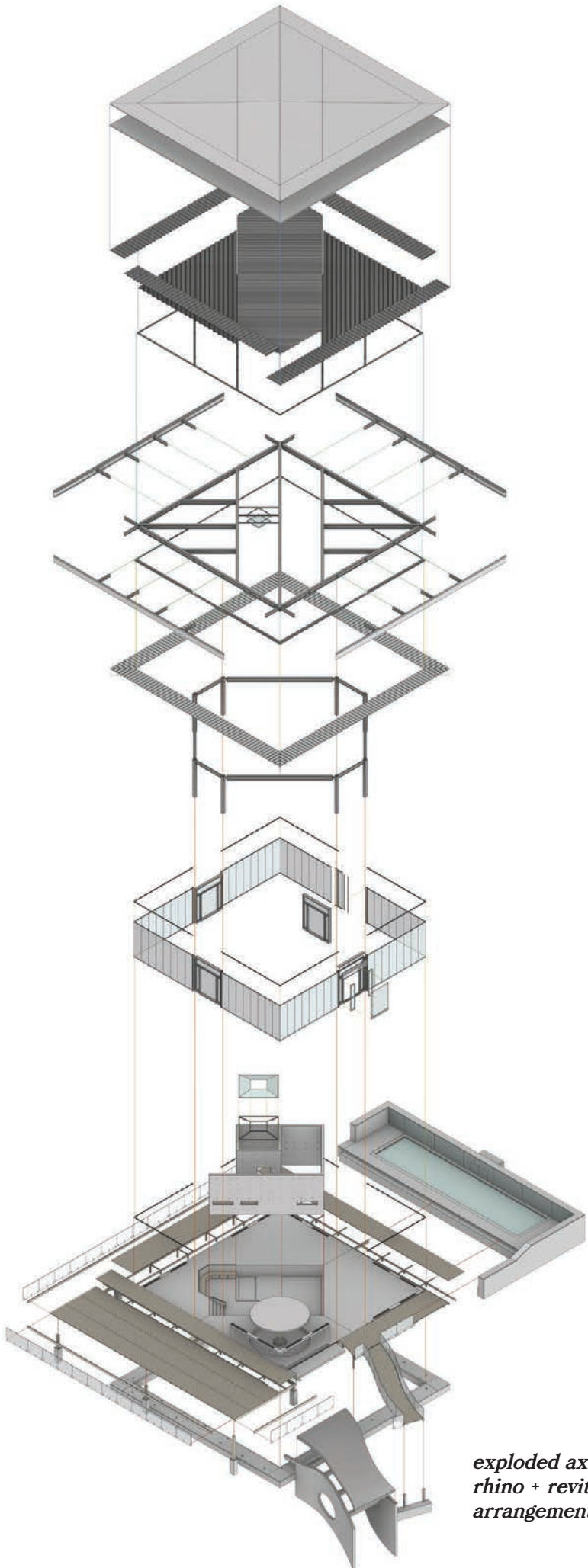


section: Moises De La Cruz & Jurgis Vaisvila

With the context of the mountain behind, we hope that this arrangement truly gives a sense that Health + Efficiency has become one with its environment, despite its expressive and highly industrious steel construction. The next section will feature the Atelier STRIPES engineering department, for their in-depth explanation of how the parti became structural.

STRUCTURAL OVERVIEW

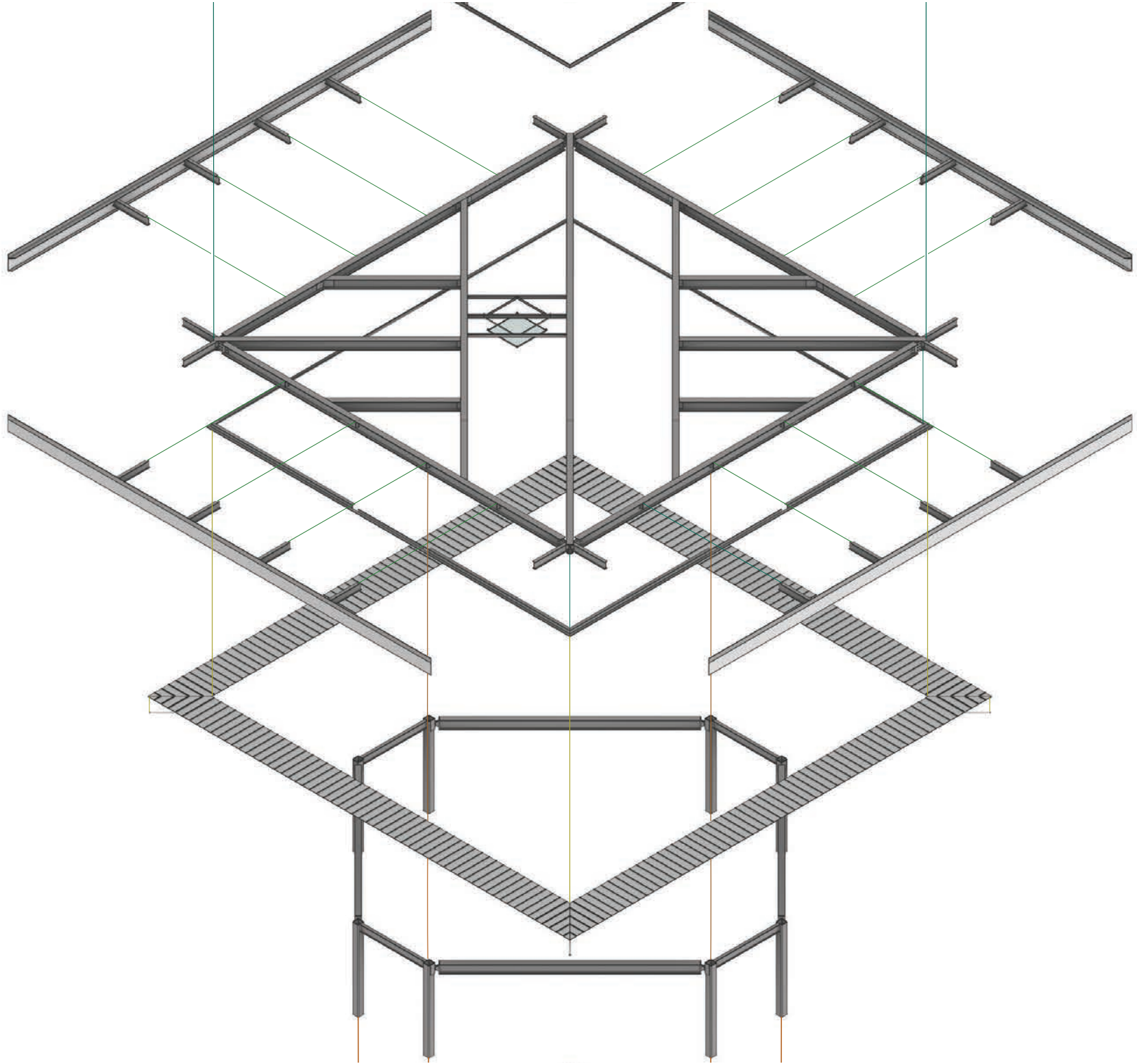
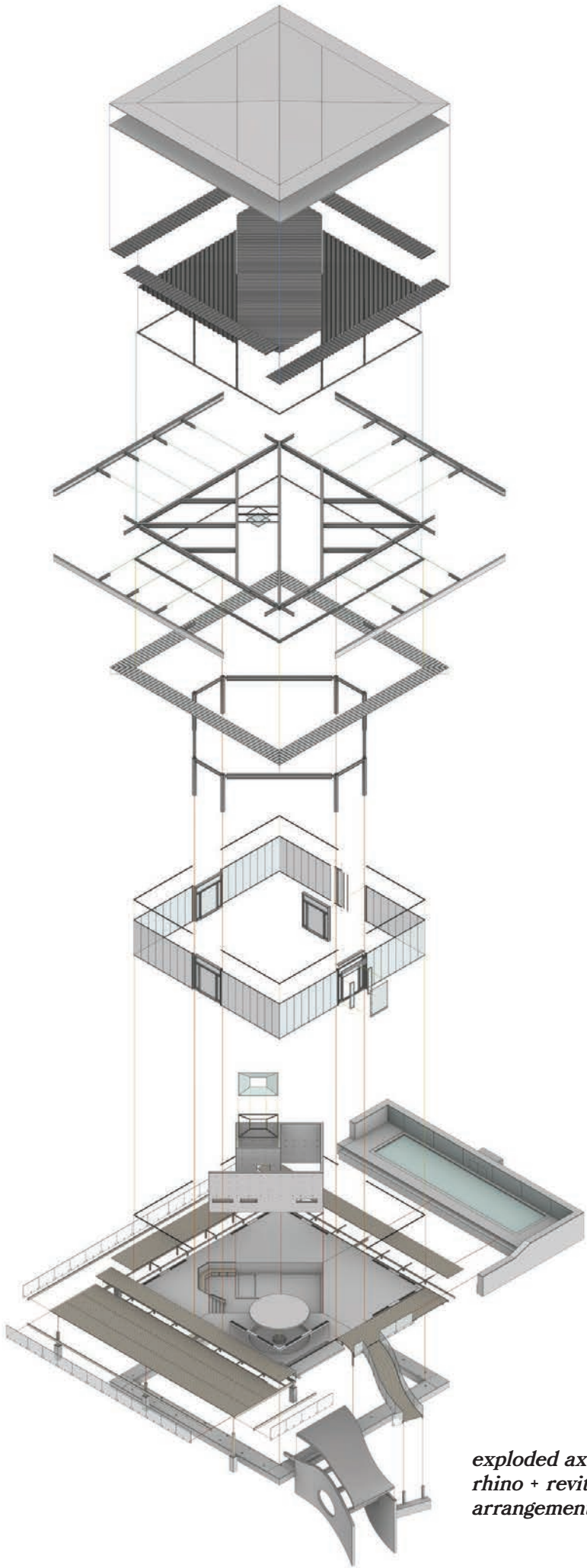
HEALTH + EFFICIENCY HOUSE
Atelier STRIPES



*exploded axon: Moises De La Cruz
rhino + revit models: Atelier STRIPES
arrangement: Moises De La Cruz*

STRUCTURAL OVERVIEW

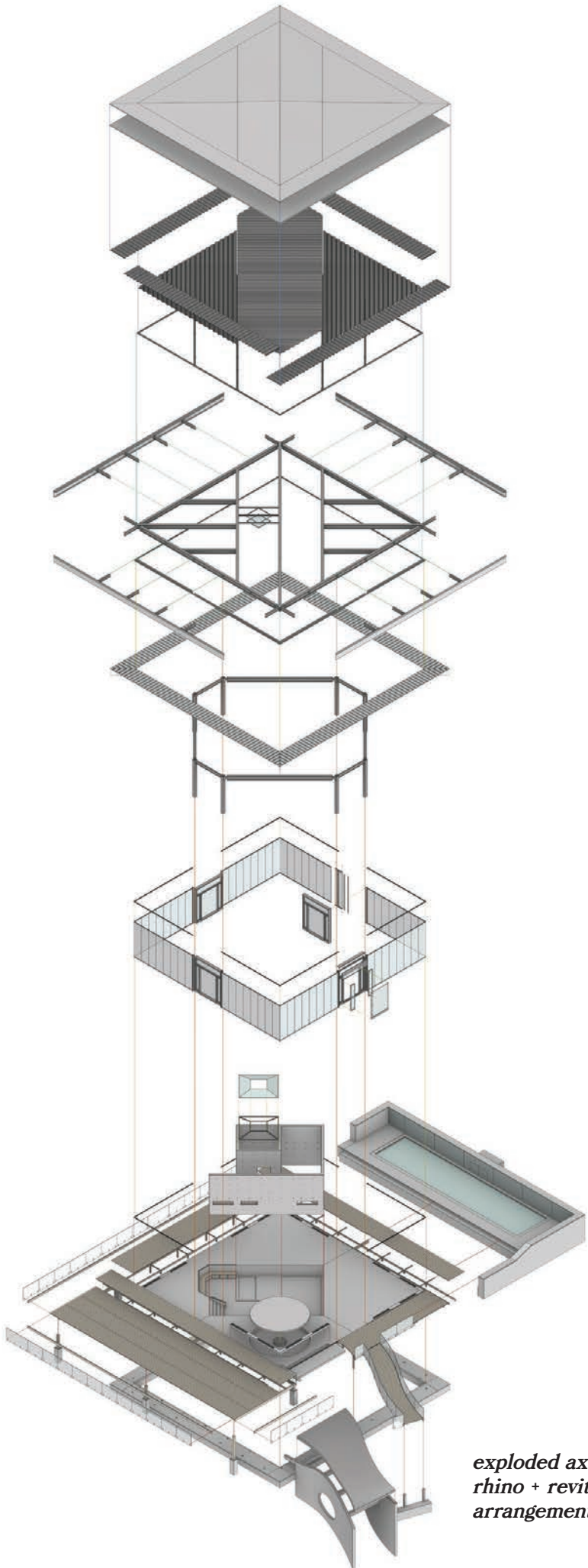
HEALTH + EFFICIENCY HOUSE
Atelier STRIPES



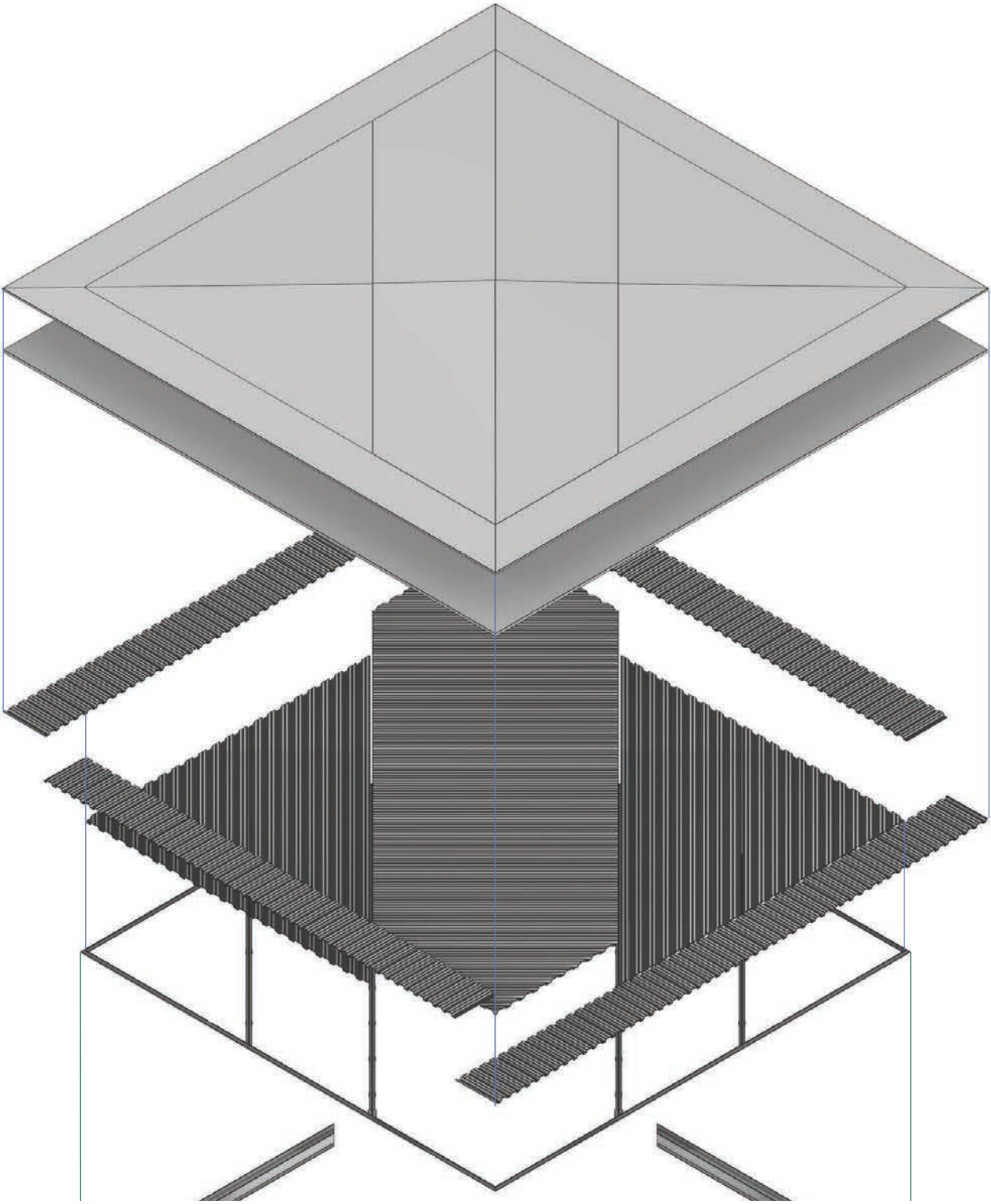
*exploded axon: Moises De La Cruz
rhino + revit models: Atelier STRIPES
arrangement: Moises De La Cruz*

STRUCTURAL OVERVIEW

HEALTH + EFFICIENCY HOUSE
Atelier STRIPES

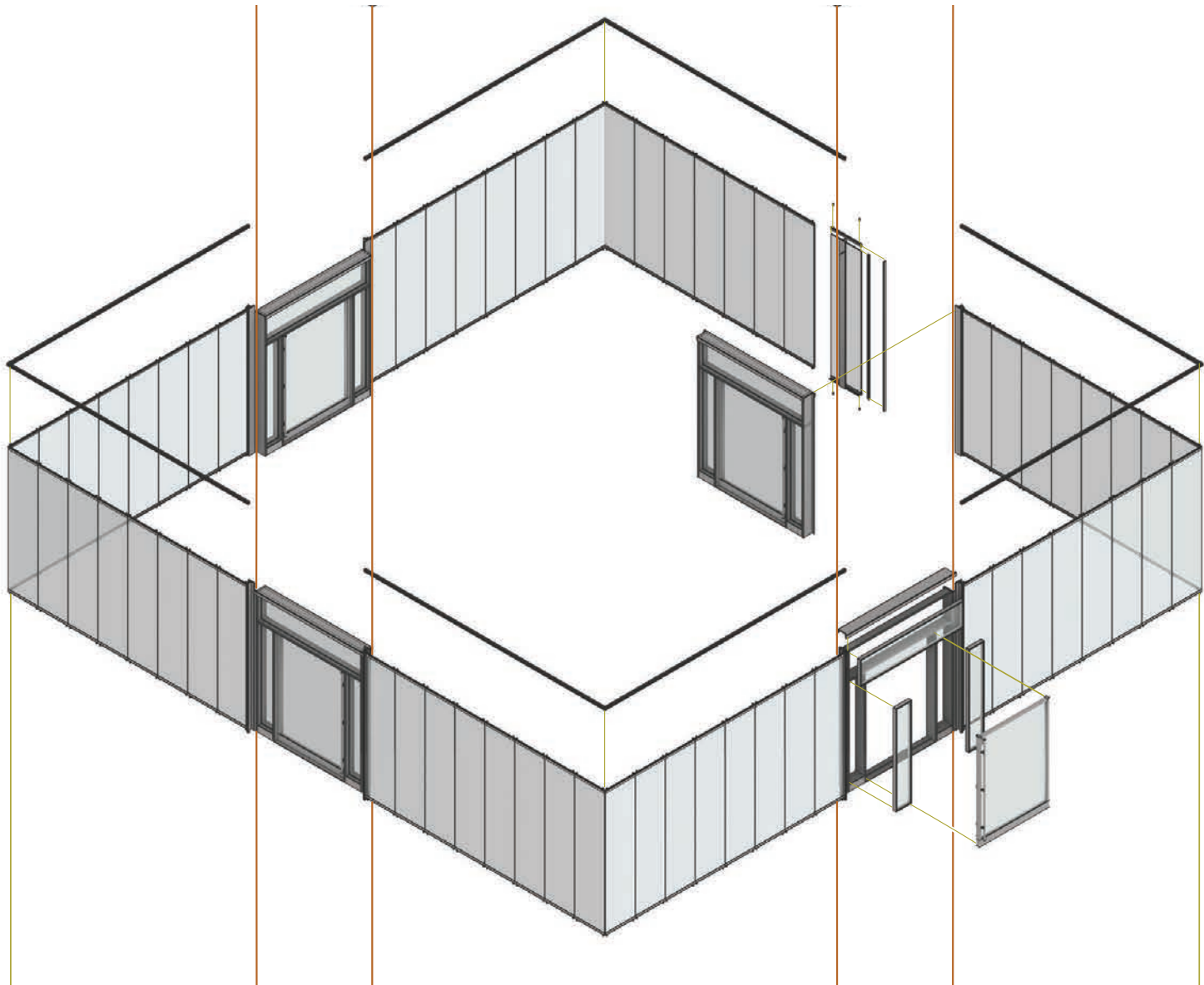
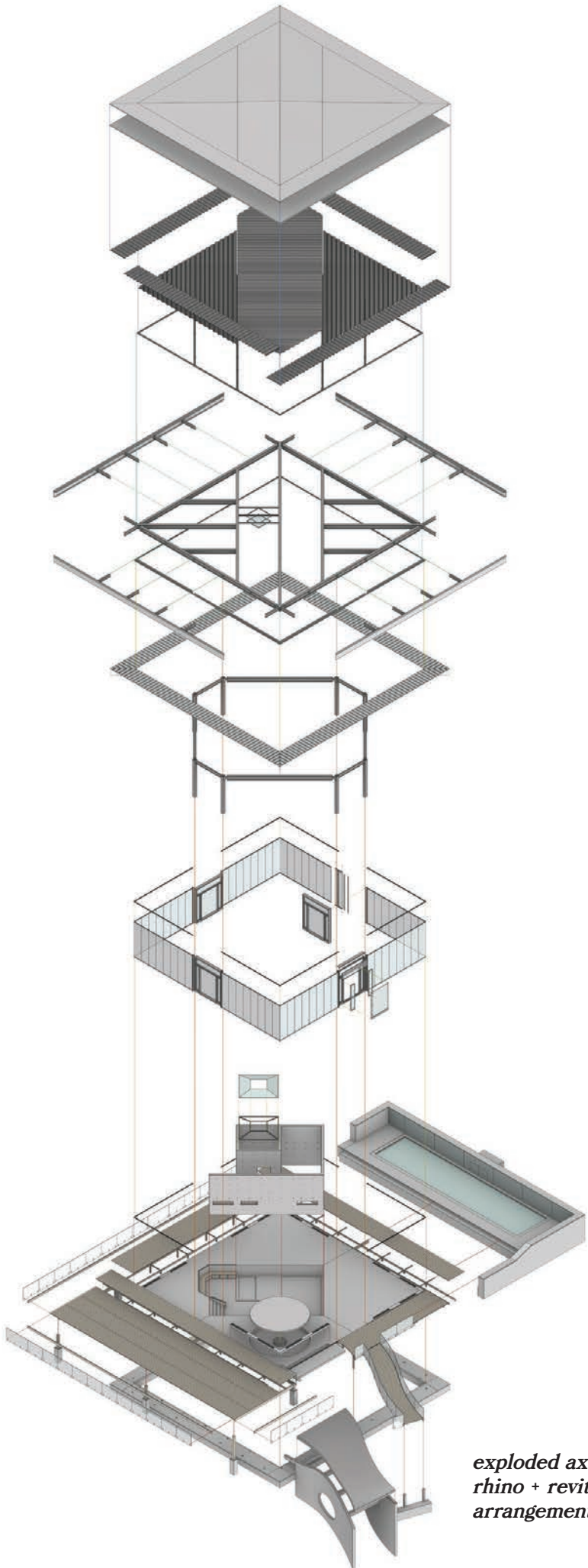


*exploded axon: Moises De La Cruz
rhino + revit models: Atelier STRIPES
arrangement: Moises De La Cruz*



STRUCTURAL OVERVIEW

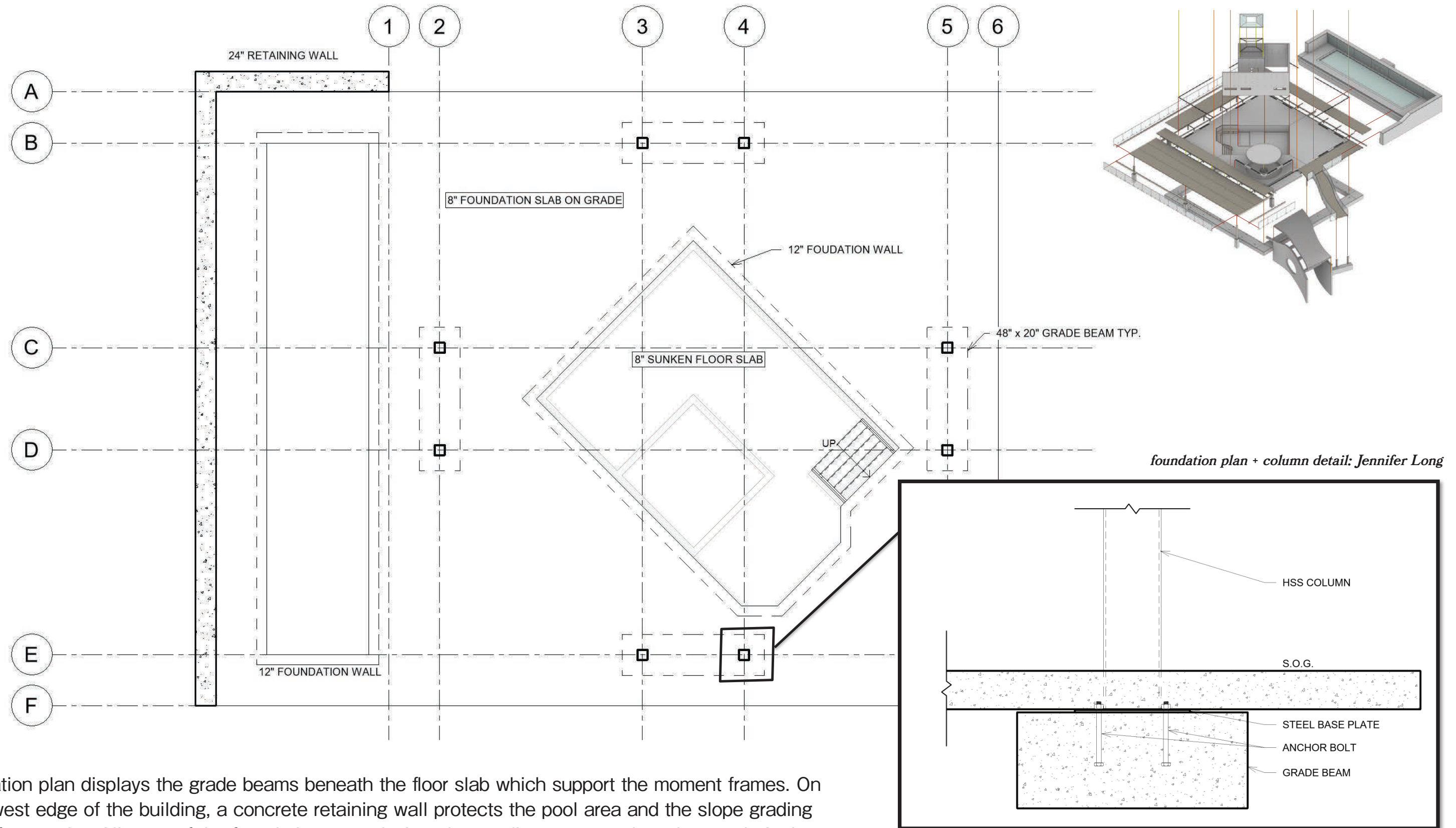
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*exploded axon: Moises De La Cruz
rhino + revit models: Atelier STRIPES
arrangement: Moises De La Cruz*

FOUNDATION PLAN

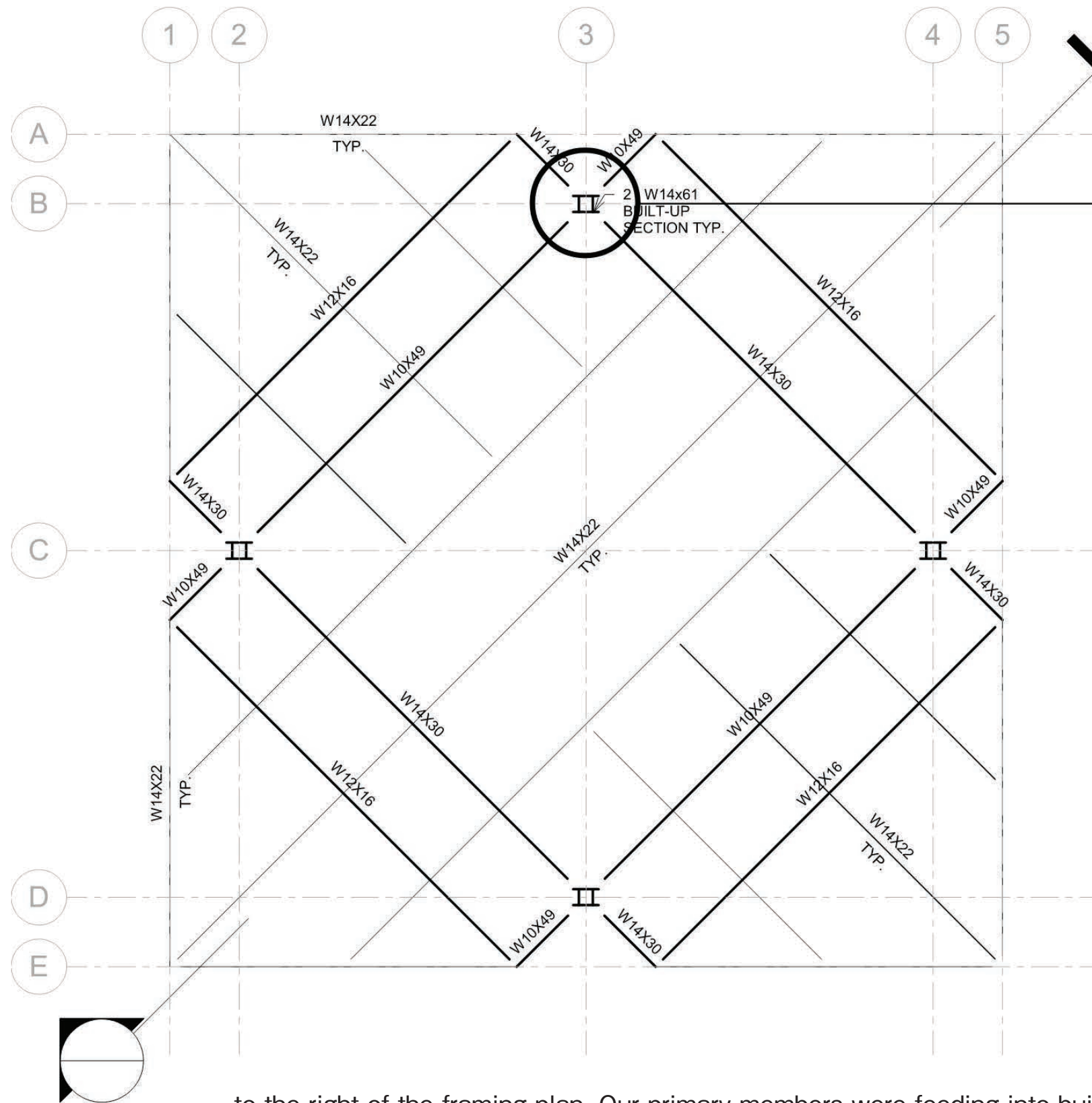
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Atelier STRIPES



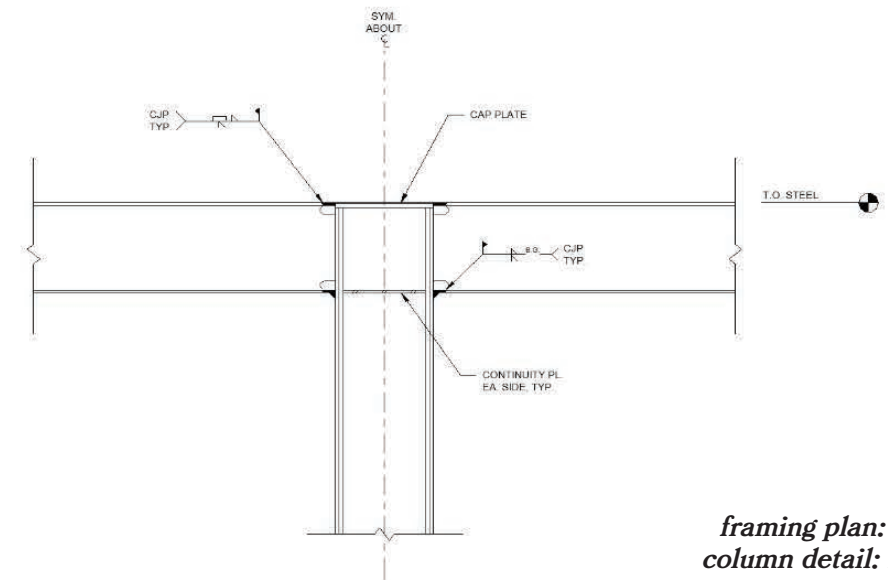
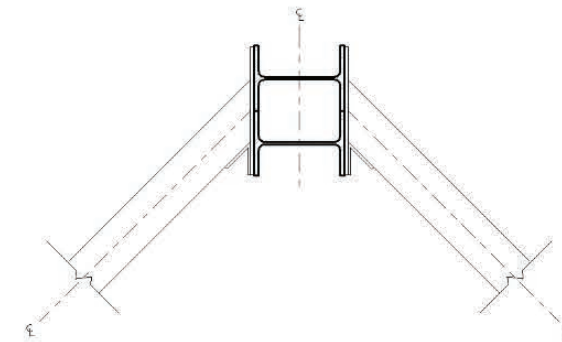
The foundation plan displays the grade beams beneath the floor slab which support the moment frames. On the south west edge of the building, a concrete retaining wall protects the pool area and the slope grading necessary for our site. All parts of the foundation were designed according to research and geotechnical reports from a previous project in the area. You can also see the concrete slab element of the foundation which allows us to have the deep recessed living room, bedroom, and bathroom space. The detail shows how the columns are connected to the foundation to carry loads to the ground. The built-in couch in the living space and the architectural walls rise out of the monolithic slab in contrast with the lightness of the glass curtain wall and the steel frame roof from which it hangs.

INITIAL FRAMING PLAN

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◆ MOMENT FRAME INTO COLUMN

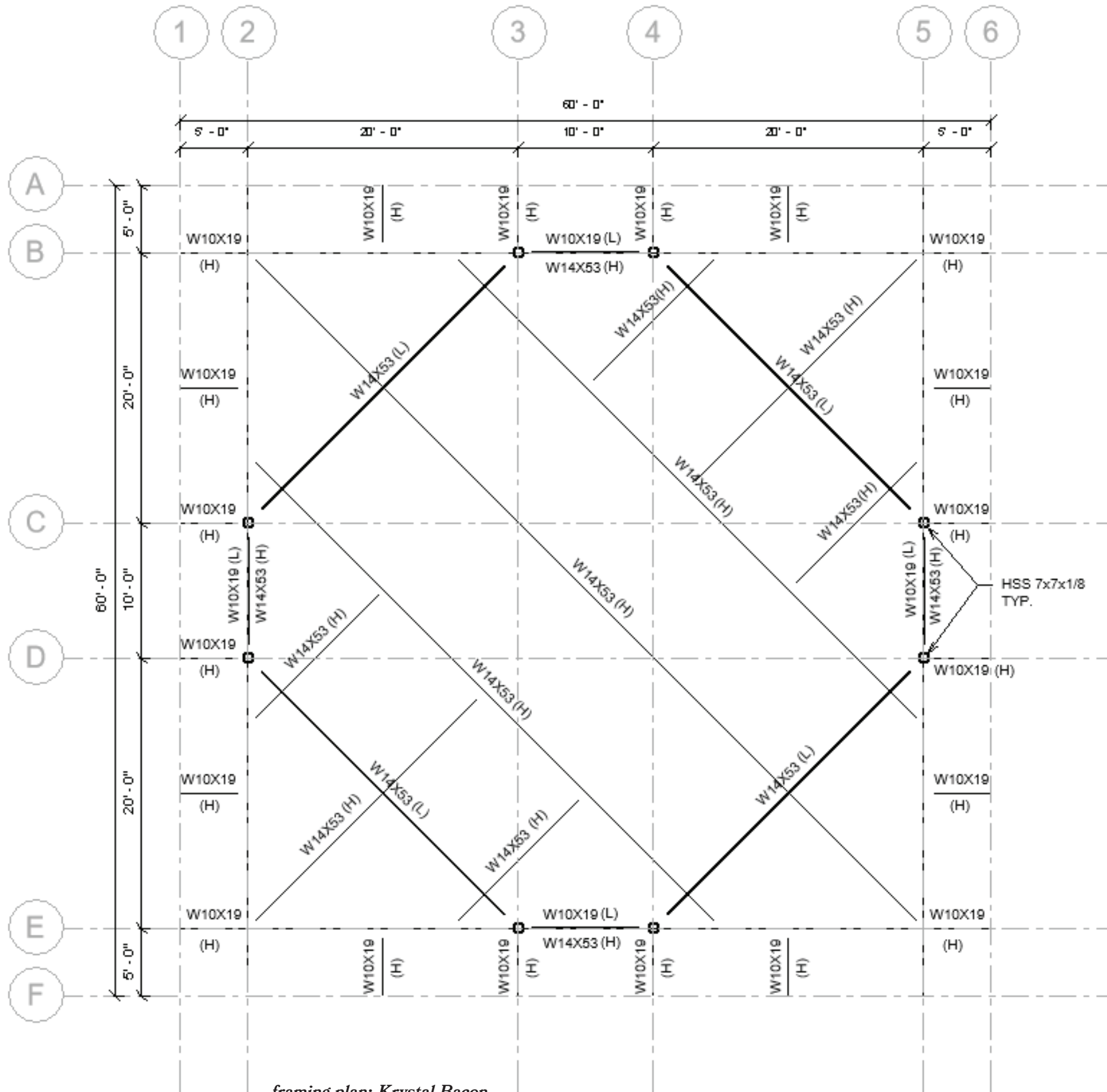


framing plan: Krystal Bacon
column detail: Eva Wieczorek

Our initial structural framing layout - proposed during mid review - introduced a number of issues in regards to connections and lateral load path. A central square formation of wide flange members made up the moment frames to resist lateral loads. We ran into trouble with the moment carrying connection, seen to the right of the framing plan. Our primary members were feeding into built-up columns at a 45 degree angle to allow column orientation, and thus strength, to be the same in each direction. Issues arose when realizing there was no way to also connect the cantilevered extensions of the primary members into the column. Likewise, the load transfer from the diaphragm into the moment frames was neglected, as we failed to realize that the beams of the moment frame were not connected to the diaphragm at any point in the framing layout.

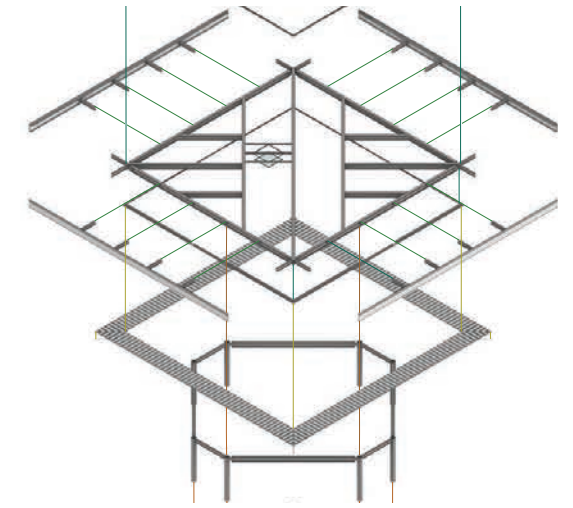
FINAL FRAMING PLAN

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framing plan: Krystal Bacon

(H) HIGH
(L) LOW



“The engineer’s in training on the team had faced many challenges given a Meisian aesthetic was asked for the project. Lacking a typical configuration of columns being located at the corners of the building, our framing layout became much more interesting. The initial framing plan lacked thorough consideration for load flow and constructability issues. The final framing configuration identified these issues and solved most, but as with every step of the design process, more issues arose. Given the time constraint of the studio, our team was not able to continue with revisions but instead reflect on some of those issues.”

- Krystal Bacon

Here we see the updated framing layout. Previous choices led to confusion and inefficiency, which is the main reason why we made significant changes.

STRUCTURAL COMPOSITION

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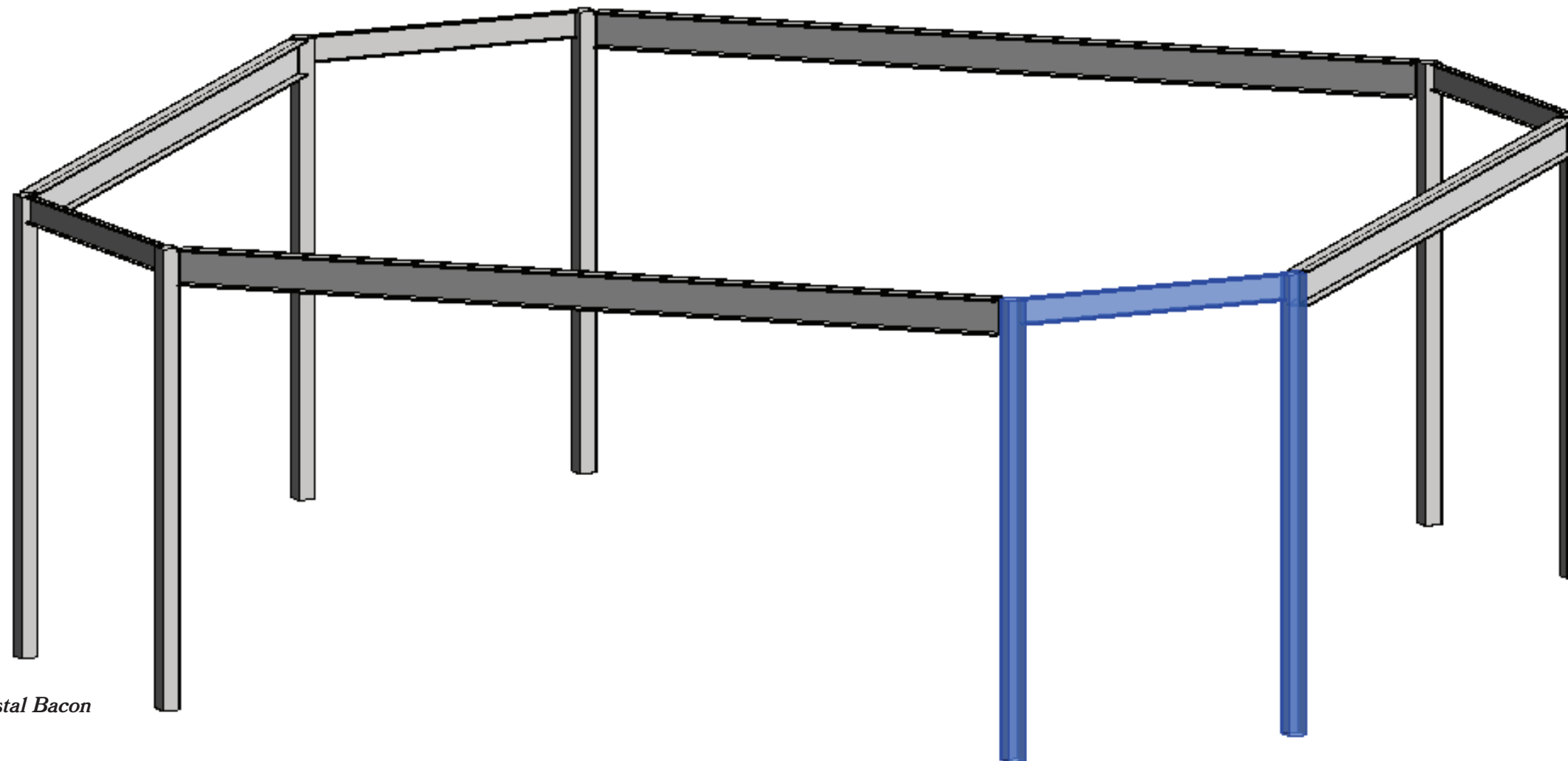
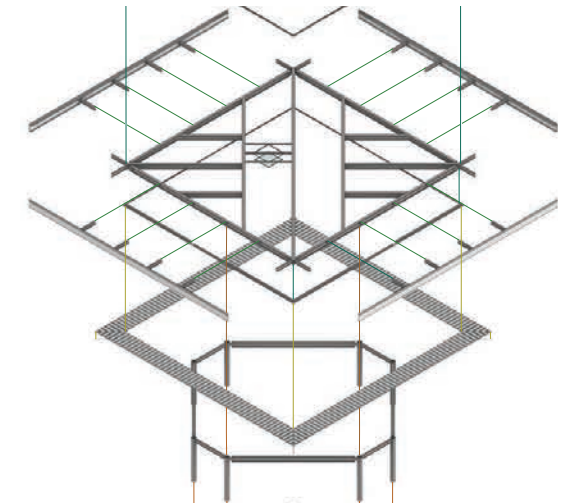
GRAVITY SYSTEM

2 HSS 7X7X1/8" COLUMNS

PRIMARY FRAMING

ANGLED BEAMS FRAMING INTO EACH COLUMN ON ONE SIDE

1 MOMENT FRAME ON EACH WALL FACE



framing visualization: Krystal Bacon

When we revised our framing plan and gravity system, we endeavored towards a more efficient design. Our strive towards efficiency began with many iterations of different column sections and configurations. Our gravity system now consists of two HSS columns on each face, which has on one side a wide flange beam connecting at an angle to the axis of the column and on the other side the column a wide flange creates a moment frame on each face of the walls to make 4 total moment frames, 2 in each principal direction for our lateral system.

STRUCTURAL COMPOSITION

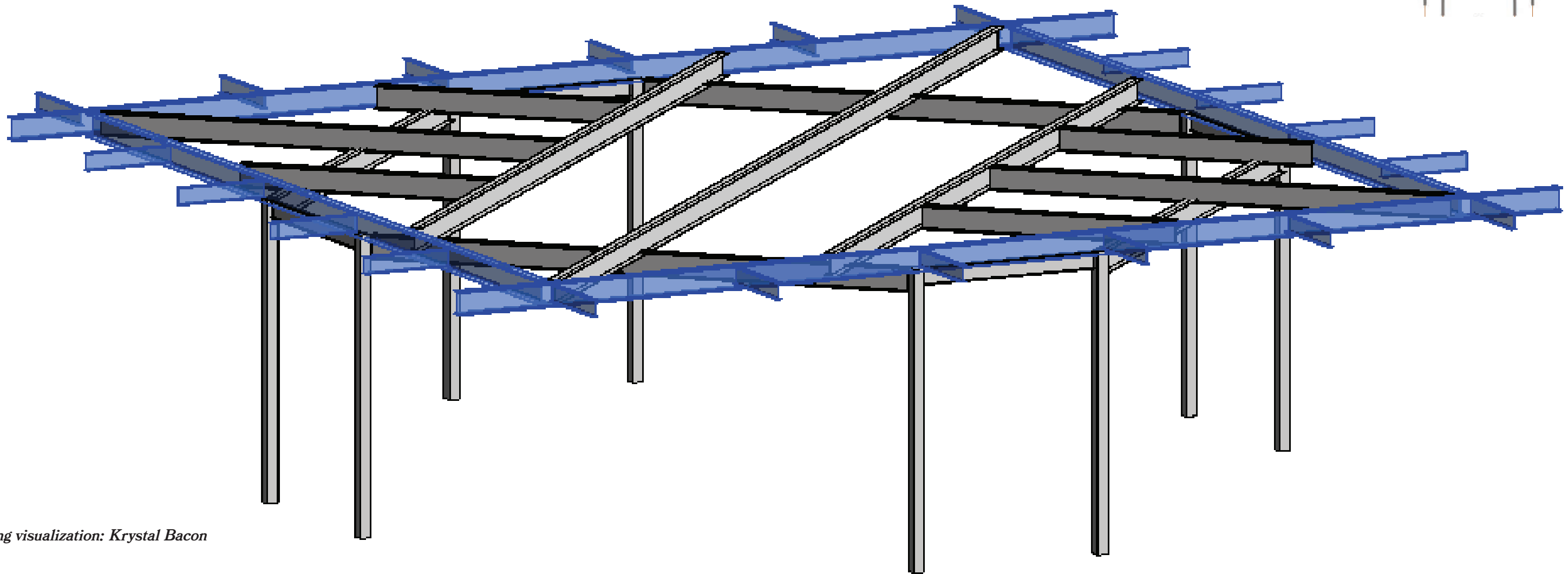
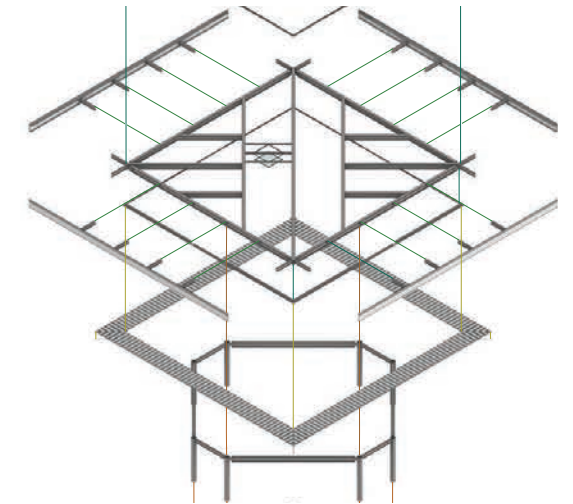
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SECONDARY FRAMING

STACKED FRAMING OVER PRIMARY

3 BEAM INTERSECTION

CANTILEVERED OVERHANG FOR SHADING

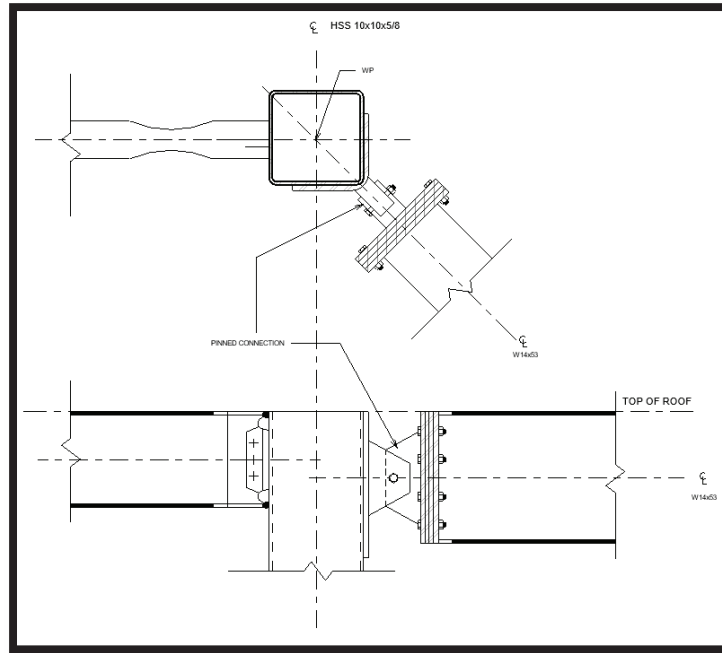


framing visualization: Krystal Bacon

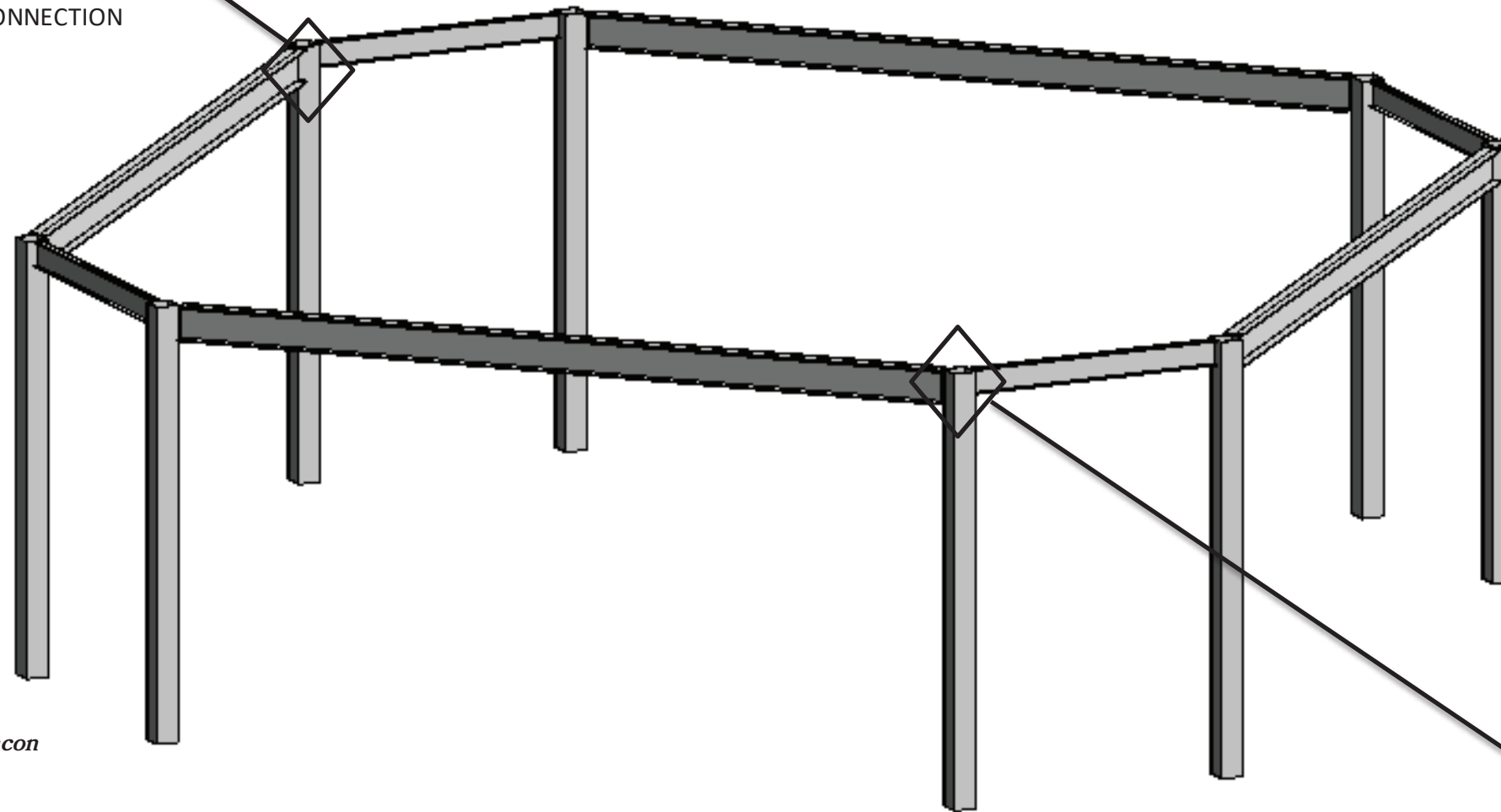
Our final framing plan utilizes stacked framing where our secondary members sit on top of our primary members. The secondary framing led to interesting connection cases such as a 3 beam intersection in each corner. Our top framing layer also utilizes a 5' cantilever around the perimeter for shading.

STRUCTURAL CONNECTIONS

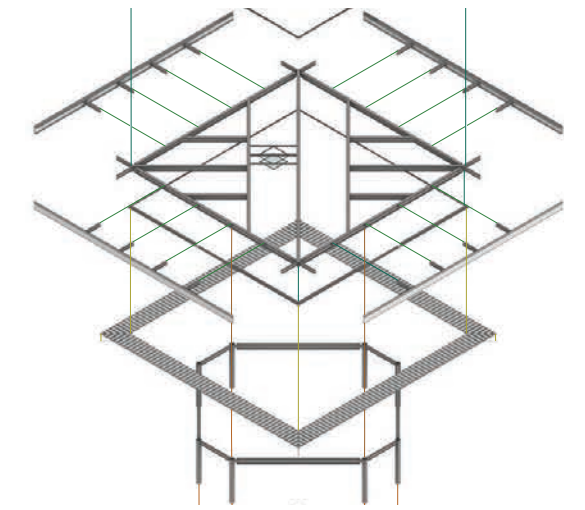
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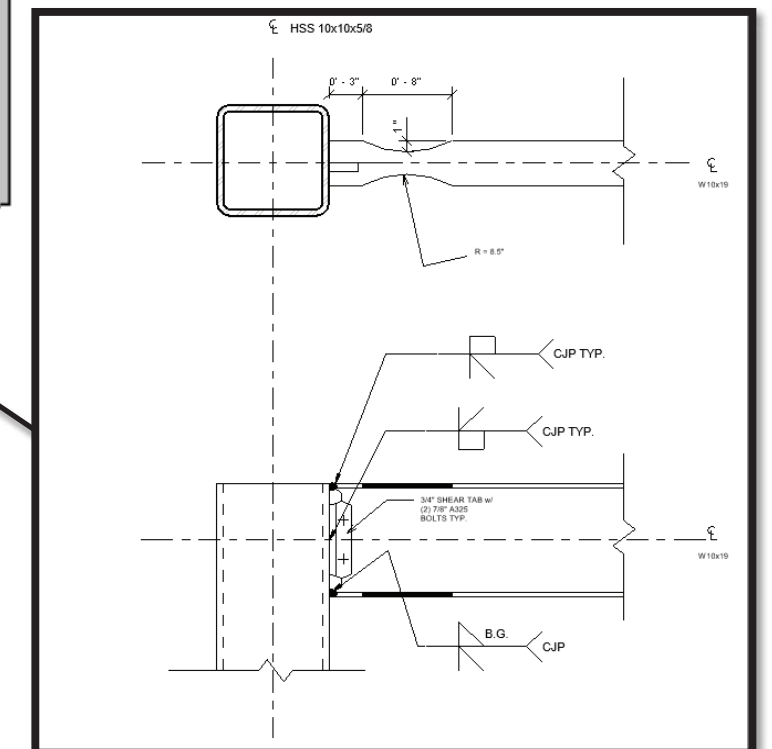
1 ANGLED BEAM TO COL. - PINNED CONNECTION



framing visualization + details: Krystal Bacon



2 SMF CONNECTION TYP.

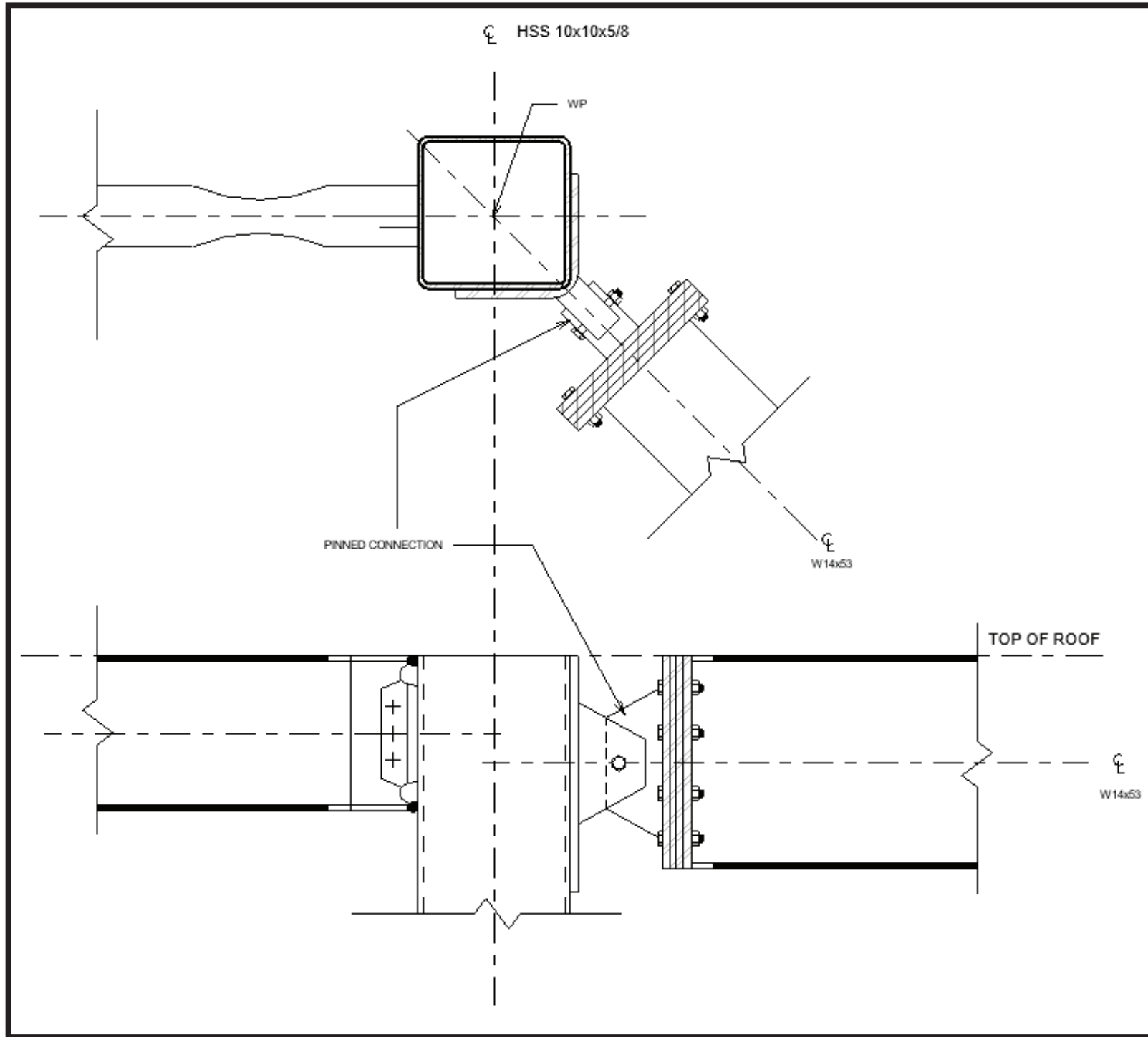


The primary framing system consists of two main connections one on either side of the column. The first, as stated earlier, is on one side of the column connecting to the angled beam. The cross section of the beam is strengthened with plates creating a pinned connection to the HSS. On the other side of each column the beam connects to form the four moment frames, one on each wall face.

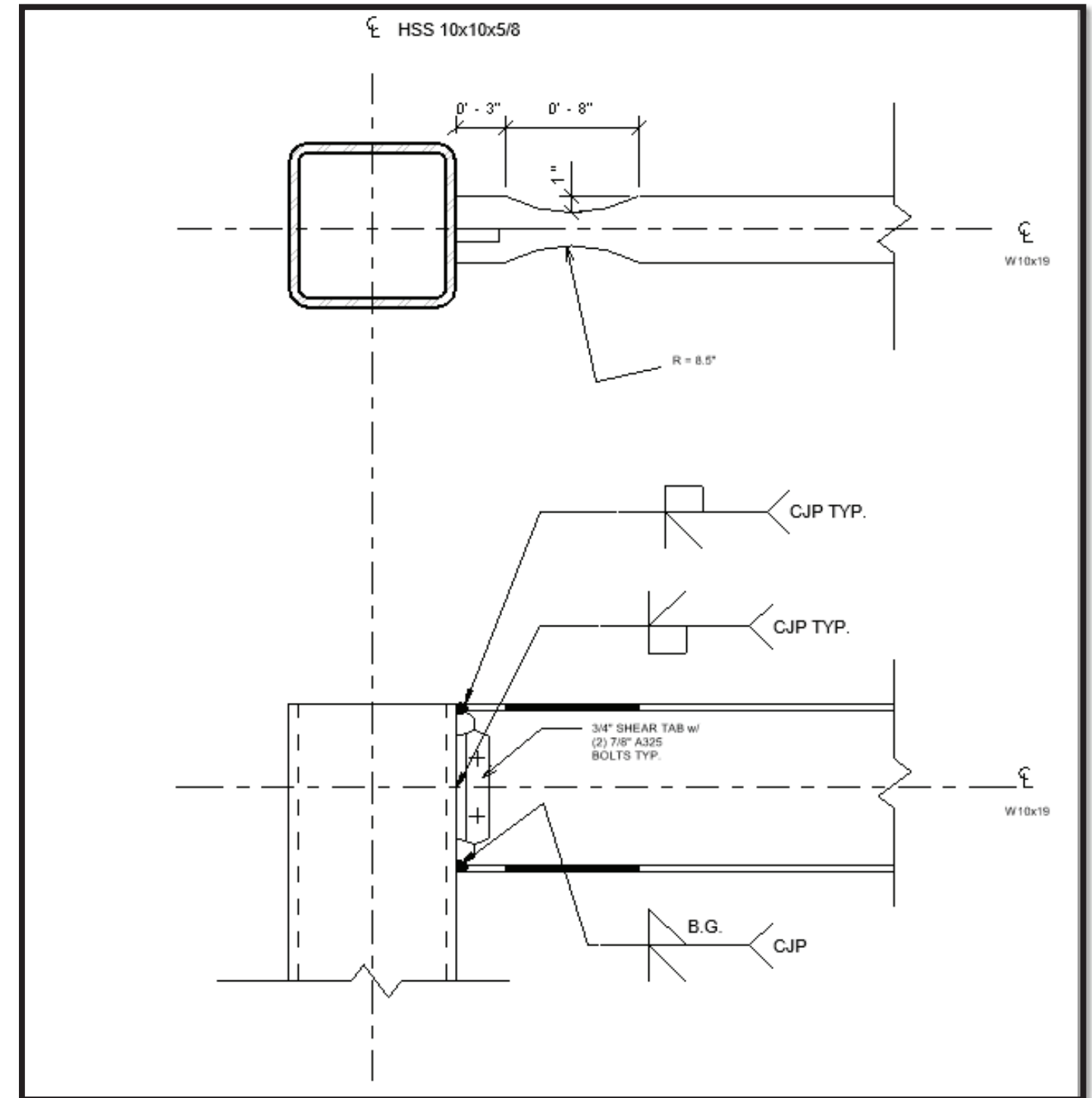
STRUCTURAL CONNECTIONS

HEALTH + EFFICIENCY HOUSE
Atelier STRIPES

details: Krystal Bacon



1 ANGLED BEAM TO COL. - PINNED CONNECTION

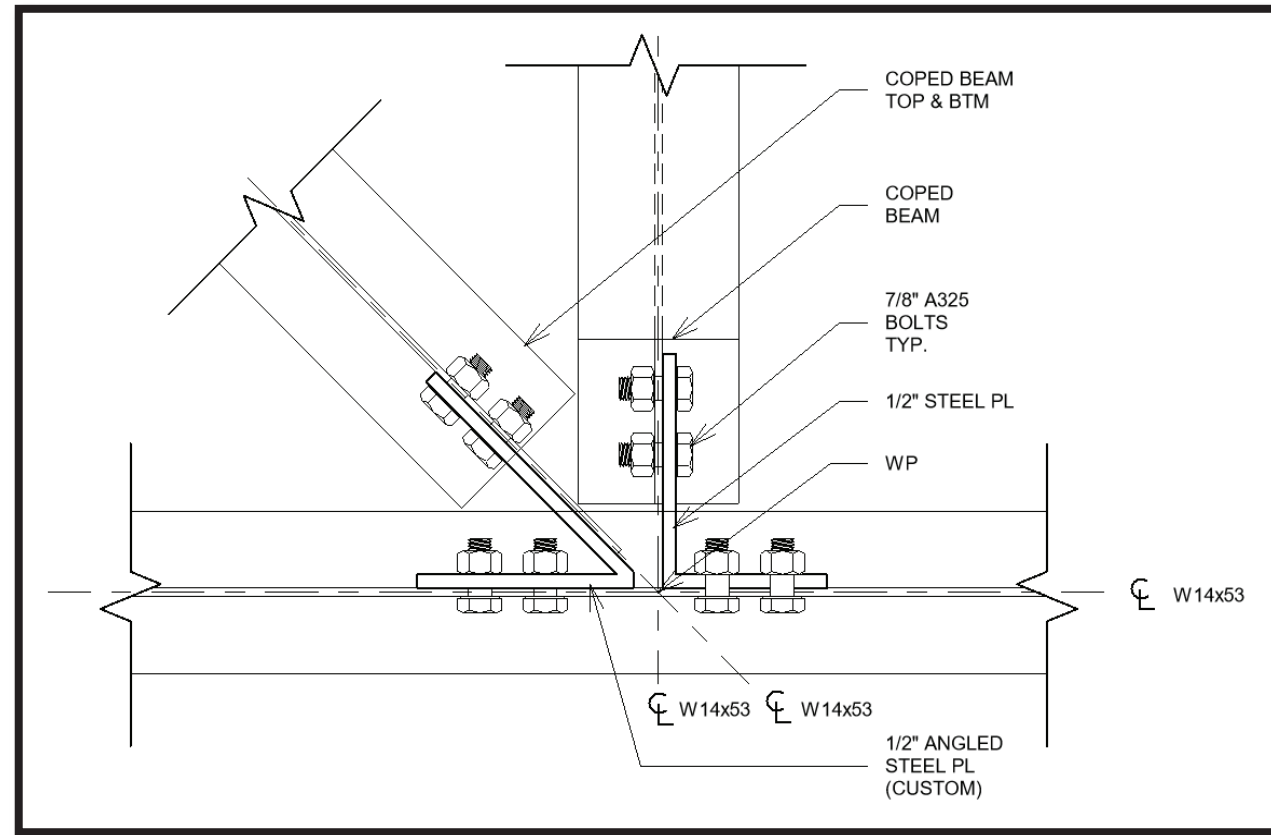
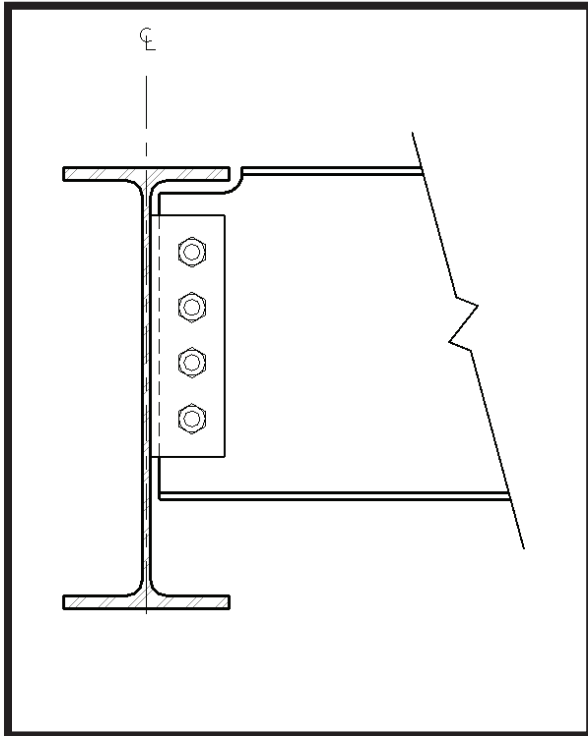


2 SMF CONNECTION TYP.

STRUCTURAL CONNECTIONS

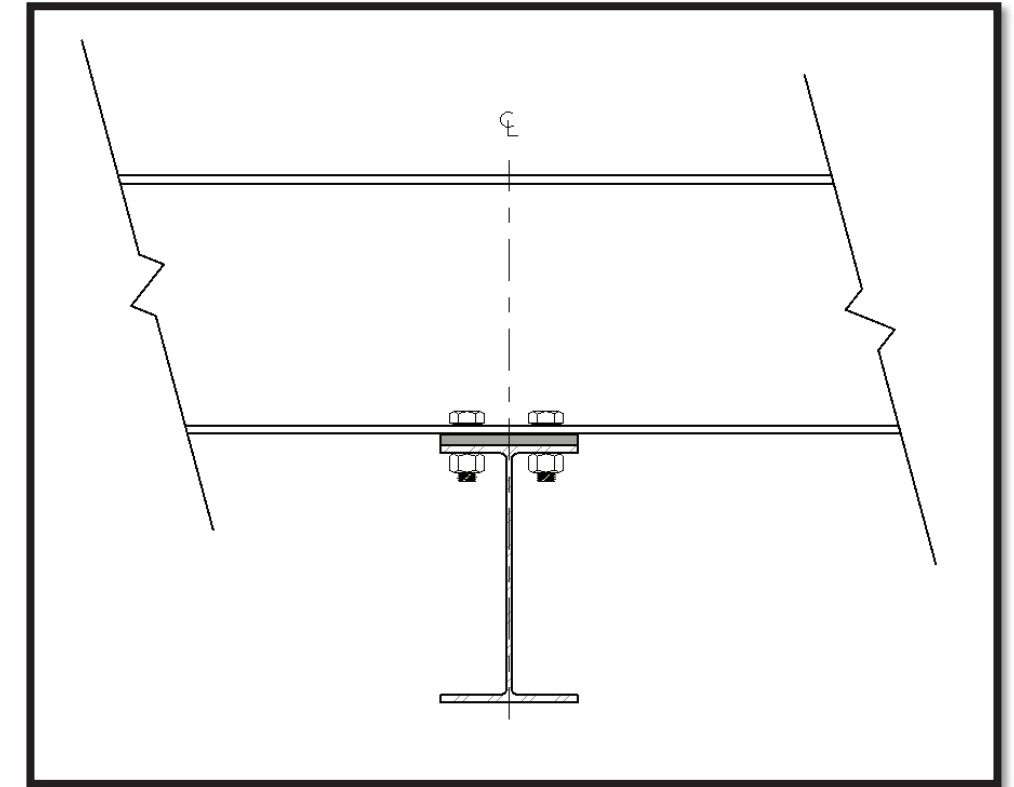
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3 BEAM TO BEAM TYP.



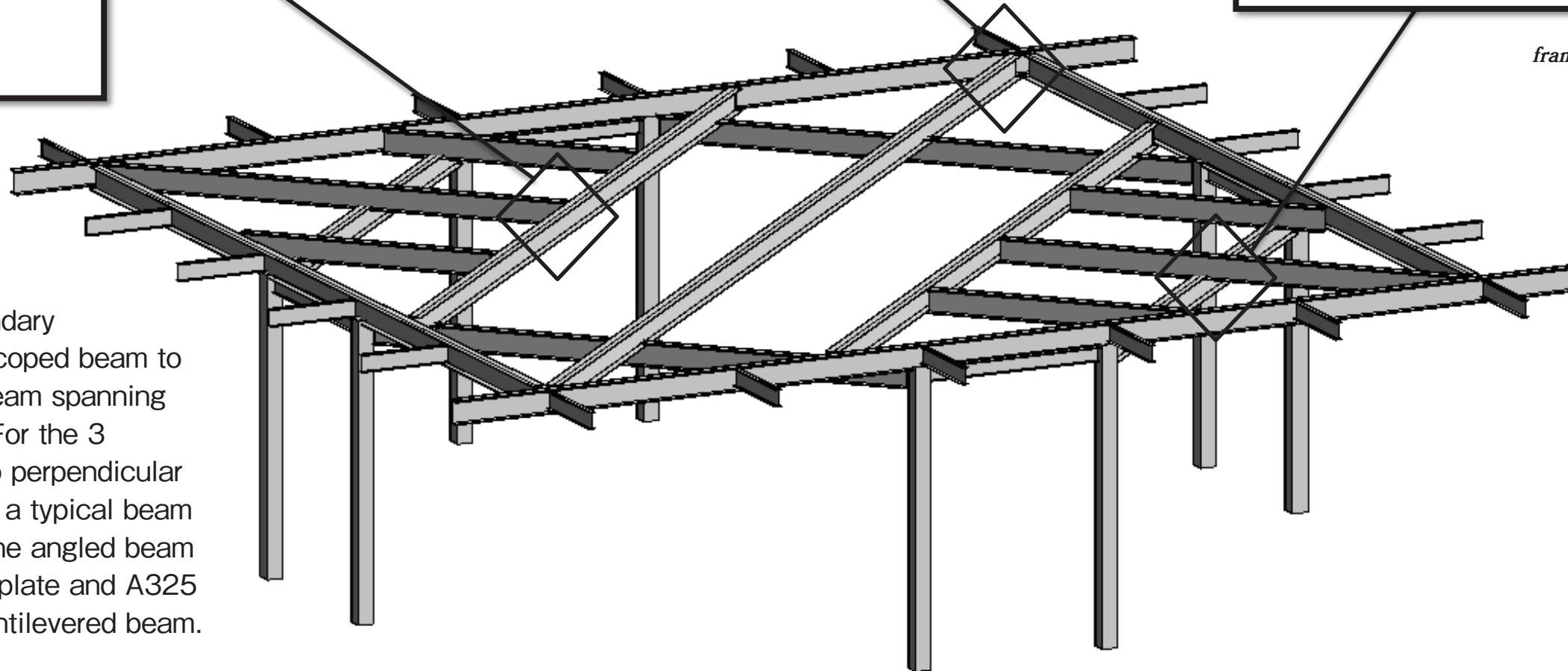
4 THREE BEAM INTERSECTION

5 BEAM OVER BEAM TYP.



framing visualization + details: Krystal Bacon

Other typical connections occurring within the secondary framing system include a coped beam to beam connection and a beam spanning over a beam connection. For the 3 beam intersection, the two perpendicular members will be joined by a typical beam to beam connection and the angled beam will utilize a custom steel plate and A325 bolts to connect to the cantilevered beam.



SEISMIC LOADS

Mapped Spectral Accelerations at Site Class D (%g)		Site Coefficients (%g)		
		Design Site Class	Fa	Fv
Ss =	1.819	D	1.2	1.7
S1 =	0.755			

Importance Factor

Occupancy Category:	II
Importance Factor, I:	1.0

Design Coefficients and Factors for Seismic Force-Resisting System

Response Modification Coefficient, R	8
System Overstrength Factor, Ω_0	3
Deflection Amplification Factor, C _d	5.5
System Limitations (ft)	NL

Acceleration Parameters

SMS = Fa*Ss =	2.183
SM1 = Fv*S1 =	1.284
SDS = 2/3*SMS	1.455
SD1 = 2/3*SM1 :	0.856

Period Determination

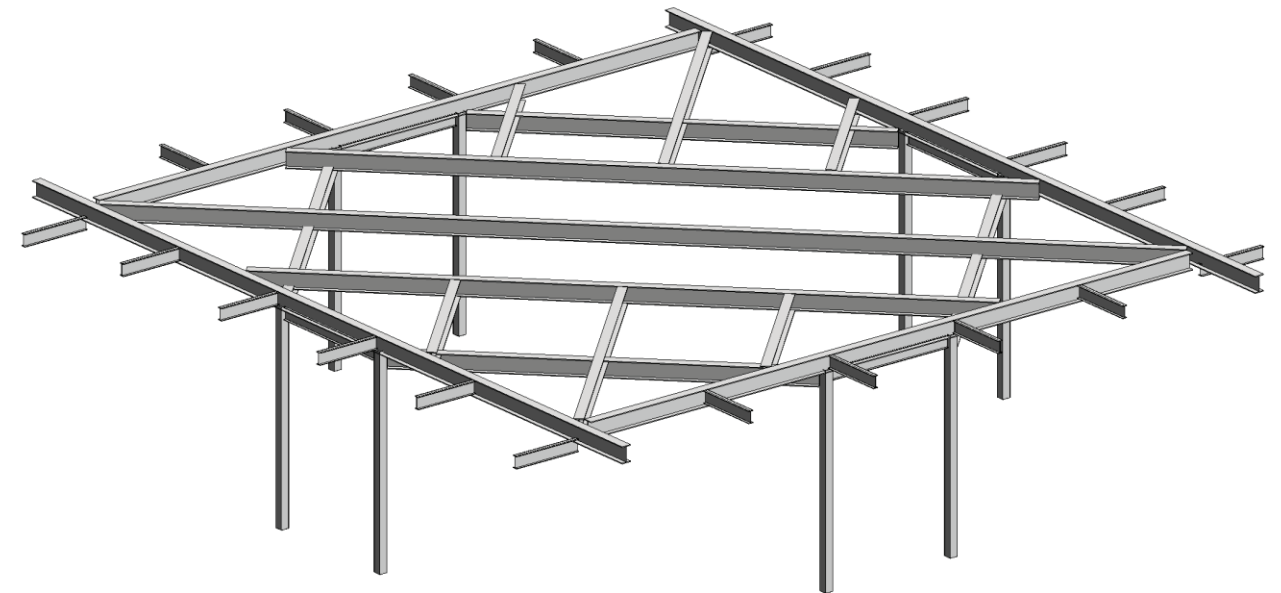
Ct =	0.028
x =	0.8
h _n =	12
T=Ta=Ct*(h _n) ^x :	0.204
TL =	8

Seismic Response Coefficient

$\rho =$	1
Cs = SDS/(R/I) =	0.182
For T<=TL: Cs, max = SD1/(T*R/I) =	0.523
Cs,min = 0.044*SDS*I >= 0.01	0.064
For S1>=0.6g: Cs min = 0.5*S1/(R/I) =	0.047
W (k) =	72
V (k) = ρ *Cs*W =	13.10

WIND LOADS

Risk Category	II
Wind Speed	97 mph
Exposure Category	C
Height	12 ft
K _{zt}	1.0
L/B	1.0
Velocity Correction Factor	0.778
Pressure @ z = 12'	19.60 psf
Pressure @ z = 0'	19.60 psf
Loading	235 plf
Base Shear	1.4 kips - seismic governs

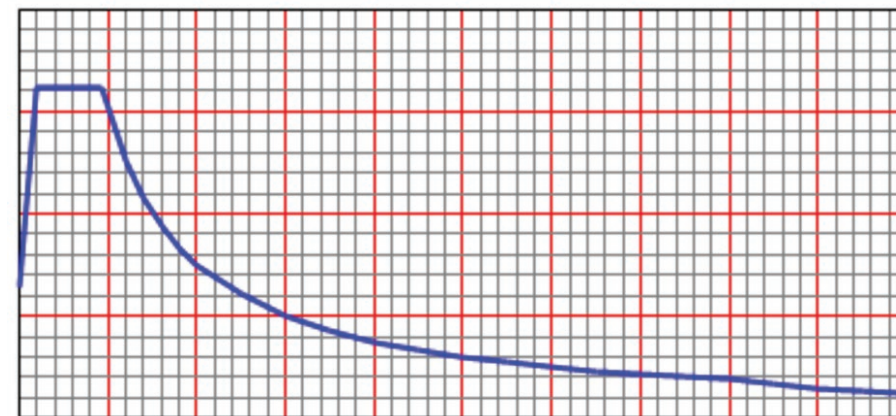


analysis + visualization: Eva Wieczorek

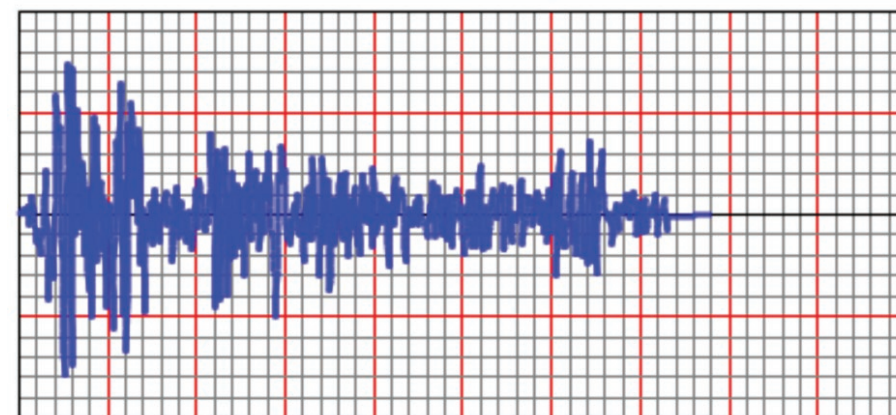
For our lateral analysis, we started by calculating our lateral loads by hand. We used ASCE 7-16's equivalent lateral force procedure to calculate the seismic loads and the directional procedure for the wind loads. It was clear seismic governed with a base shear of approximately 13 kips so we moved forward with seismic loading in our sap analysis.

ASCE 7-16 Equivalent Lateral Force Procedure

$\rho =$	1
$C_s = SDS/(R/I) =$	0.182
For $T \leq T_L$: $C_{s, \max} = SD1/(T \cdot R/I) =$	0.523
$C_{s, \min} = 0.044 \cdot SDS \cdot I \geq 0.01$	0.064
For $S1 \geq 0.6g$: $C_s \min = 0.5 \cdot S1/(R/I) =$	0.047
$W =$	72 kips
$V = \rho \cdot C_s \cdot W =$	13.10 kips



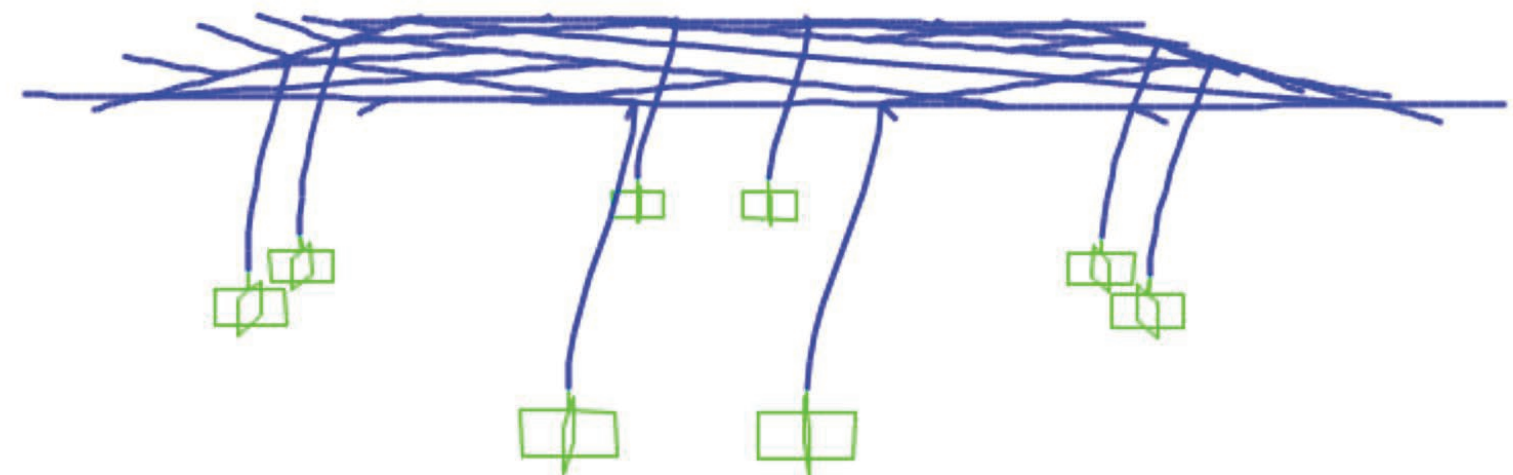
Response Spectrum Palm Springs



El Centro Time History

	Drift	
ELF Procedure	0.43"	0.3%
Response Spectrum	0.14"	0.1%
EL Centro	5.4"	3.8%

2% Allowable Drift = 2.88"



analysis + visualization: Kaylee Hernandez

Since our structure is very close to an active fault, we decided to run three seismic loadings in our sap model. The first analyzed our hand calculated load, our second loading used the response spectrum from our site in Palm Springs, and our third loading used the recorded accelerations from the El Centro earthquake. The drift from the El Centro accelerations were the largest and went over the allowable 2% drift limit. We decided to go forward with our hand calculated seismic load since the two areas do not fall under the same fault zone.

MOMENT FRAME DESIGN

Allowable Drift					
h (ft)	$\Delta_{max} = 0.025h$ (in)	Cd/l	$\Delta_{elastic}$ (in)	Δ_{beam} (in)	Δ_{col} (in)
12	3.6	5.5	0.655	0.491	0.164

If beam contributes 75% of $\Delta_{elastic}$...
 $\Delta_{elastic} = \Delta_{max} / (Cd/l) = 0.055"$

$\Delta_{beam} = 0.041"$
 $\Delta_{col} = 0.014"$

Beam Properties					
F (k)	E (ksi)	L (ft)	I_b (in ⁴)	b/t	h/t
7.33	29000	10	107	7.35	59.0

Required Beam Properties:

$$I_b = (F \cdot h^2 \cdot L) / (12E \cdot \Delta_{beam}) = 107 \text{ in}^4$$

$$b/t < 0.32 \cdot \sqrt{E/R_y F_y} = 7.35$$

$$h/t < 2.57 \cdot \sqrt{E/R_y F_y} = 59.0$$

TRY W10x26, A992 STEEL

$$I_b = 144 \text{ in}^4 > 107 \text{ in}^4$$

$$b/t = 6.56 < 7.35$$

$$h/t = 34.0 < 59.0$$

TRUE

TRUE

TRUE

$$\Delta_{beam} \text{ (in)} = (F \cdot h^2 \cdot L) / (12E \cdot I_b) = 0.364$$

USE W10x26

Column Properties					
F (k)	E (ksi)	Δ_{col} (in)	I_c (in ⁴)	b/t	h/t
7.33	29000	0.290	217	14.9	14.9

Required Beam Properties:

$$I_c = (F \cdot h^3) / (12E \cdot \Delta_{col}) = 217 \text{ in}^4$$

$$b/t < 0.65 \cdot \sqrt{E/R_y F_y} = 14.9$$

$$h/t < 0.65 \cdot \sqrt{E/R_y F_y} = 14.10$$

TRY HSS10x10x5/8, A992 STEEL

$$I_c = 304 \text{ in}^4 > 217 \text{ in}^4$$

$$b/t = 14.2 < 14.9$$

$$h/t = 14.2 < 14.9$$

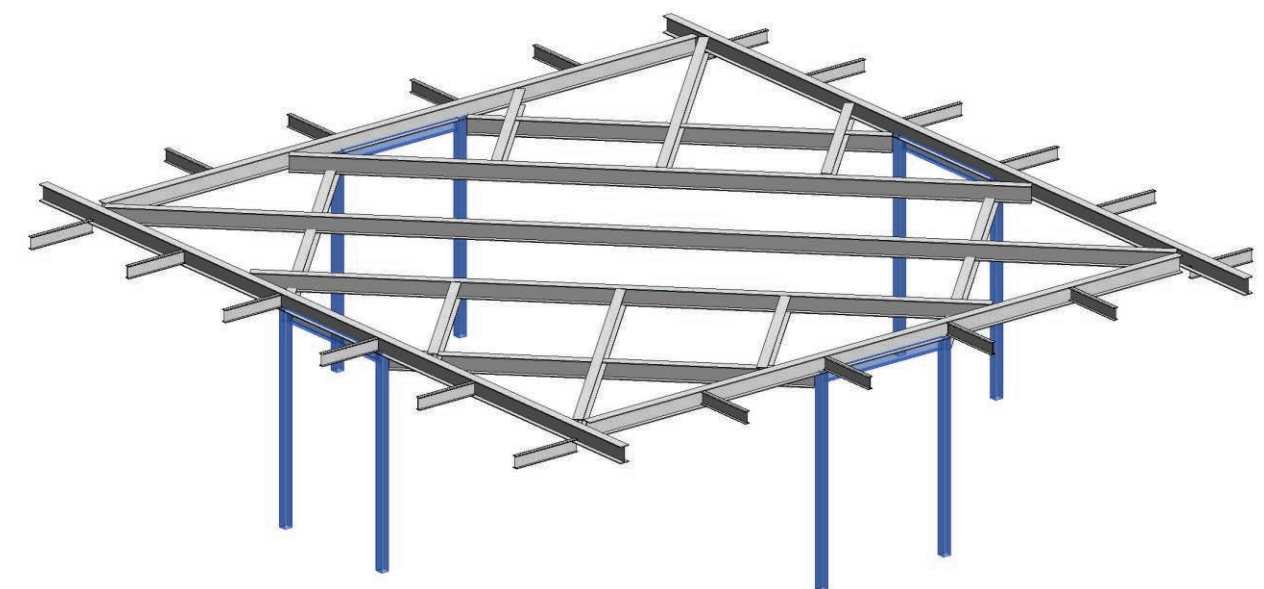
TRUE

TRUE

TRUE

$$\Delta_{col} \text{ (in)} = (F \cdot h^3) / (12E \cdot I_c) = 0.207$$

USE HSS10x10x5/8



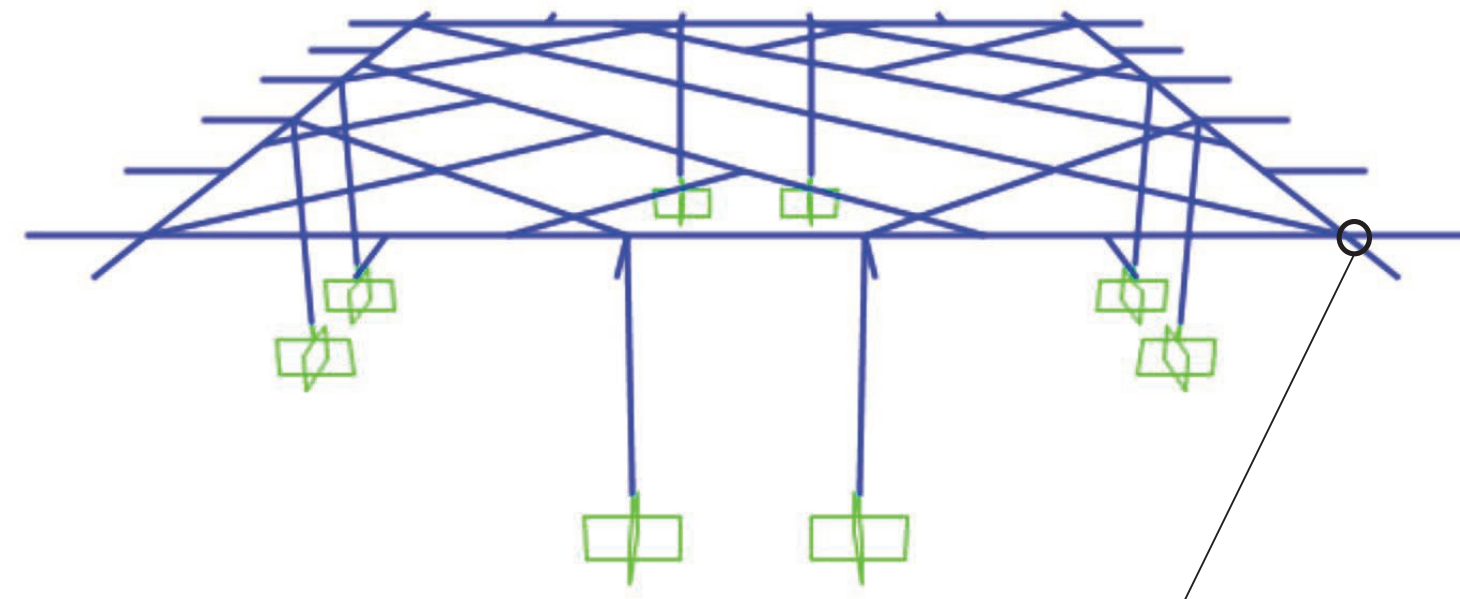
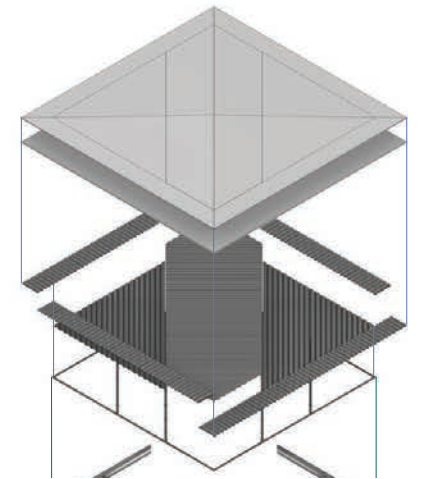
analysis: Eva Wieczorek
 visualization: Kaylee Hernandez

To design the moment frame, we performed ASCE 7-16 allowable drift calculations. Using the calculated force to each frame, required beam properties were found using AISC 341 limitations. The sufficient member sizes for our moment frame remained consistent with rough sizes from SAP results, yielding W10x26 beams and HSS10x10x5/8 columns.

Roof Dead Load Take-off	
Item	Load (psf)
3-ply + Gravel	6
2" Insulation	3
Metal Deck	3
MEP	3
Lighting	3
Joists	3
Misc.	1
Total =	22

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

analysis + visualization: Kaylee Hernandez
additional roof calculations: Eva Wiczorek

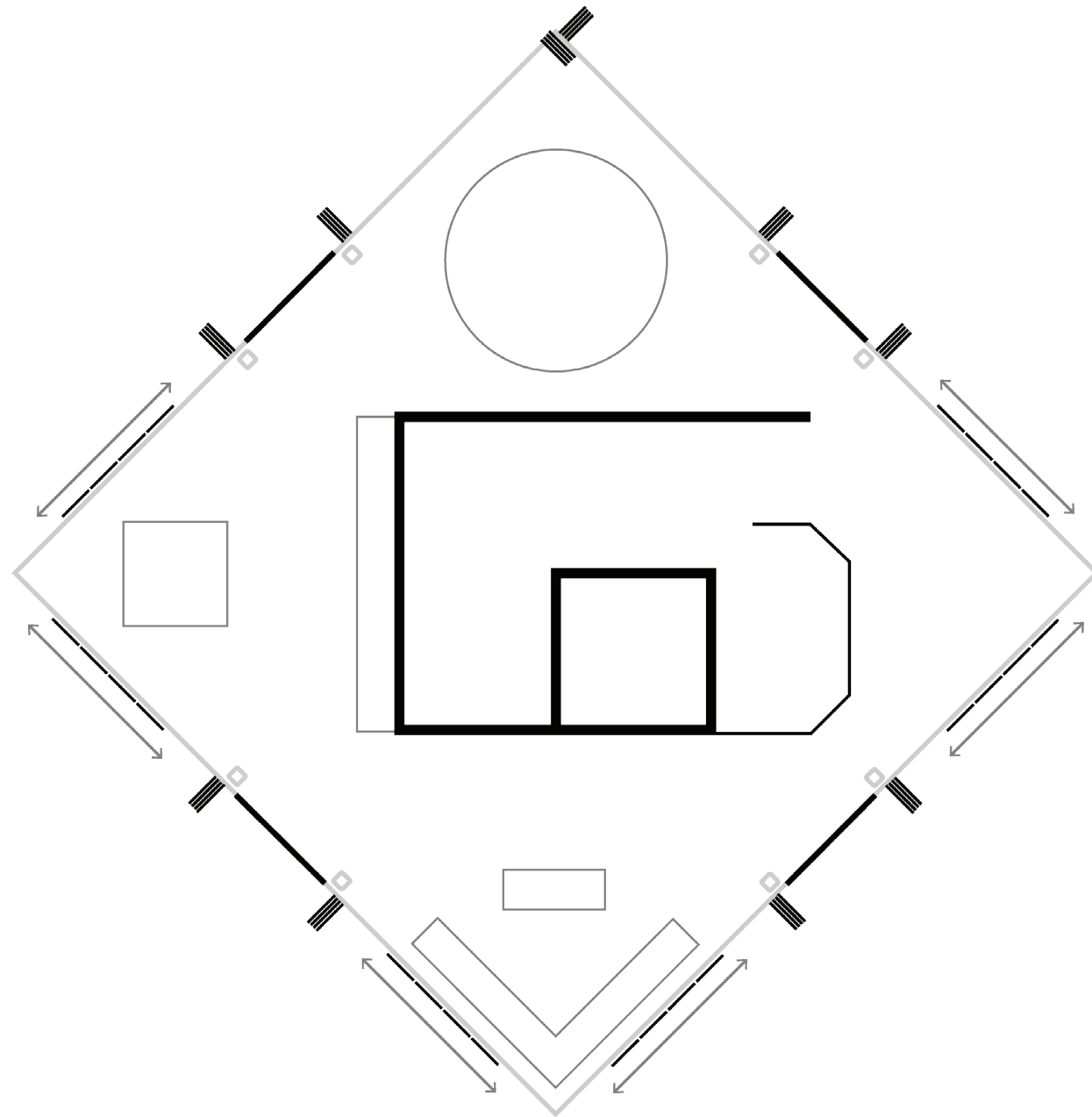
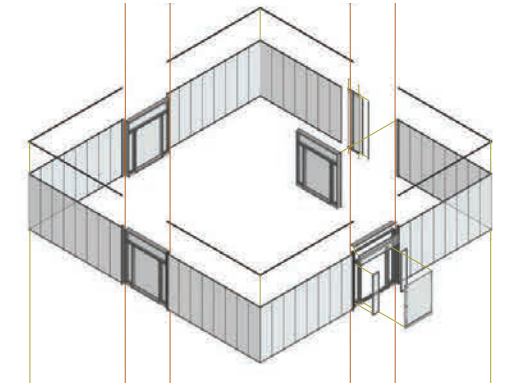


Maximum Deflections:
Symmetrical Loading = 1.7"
Asymmetrical Loading = 2.0"

Along with the seismic loading, we input gravity loads into our model to design our roof framing members. With a dead load of 22 psf and a live load of 20 psf, we loaded our joists, then used SAP's design feature to generate required member sizes. Since our project is governed by deflection like most projects usually are, we set a design target deflection of 2 inches at the cantilevering corners. Once we finalized our member sizes, we reanalyzed our framing plan under asymmetrical loading where we put live load on one of the corners and got a maximum deflection of 2 inches under the governing load combination.

GLAZING PARTI : frameless panels

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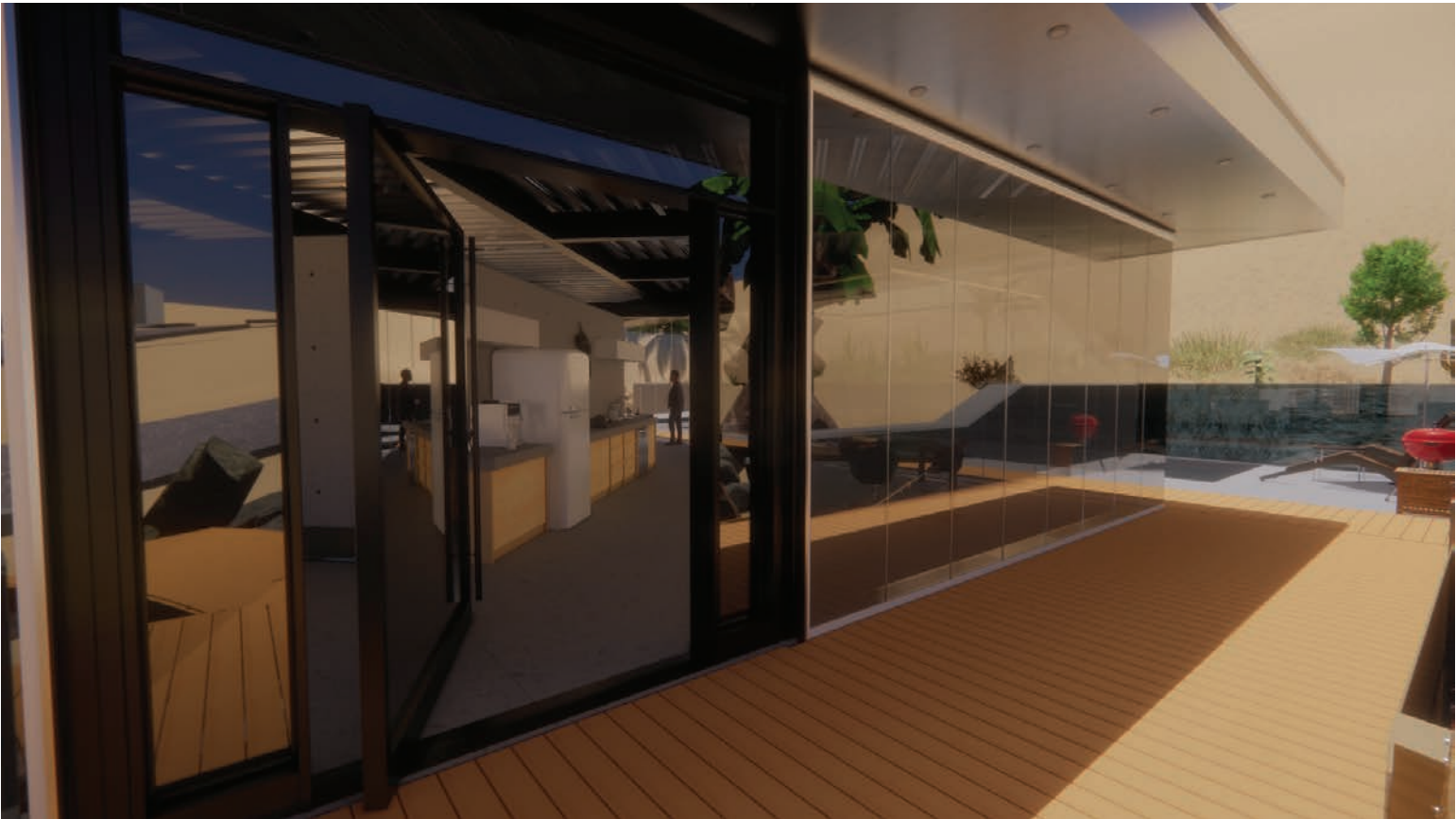
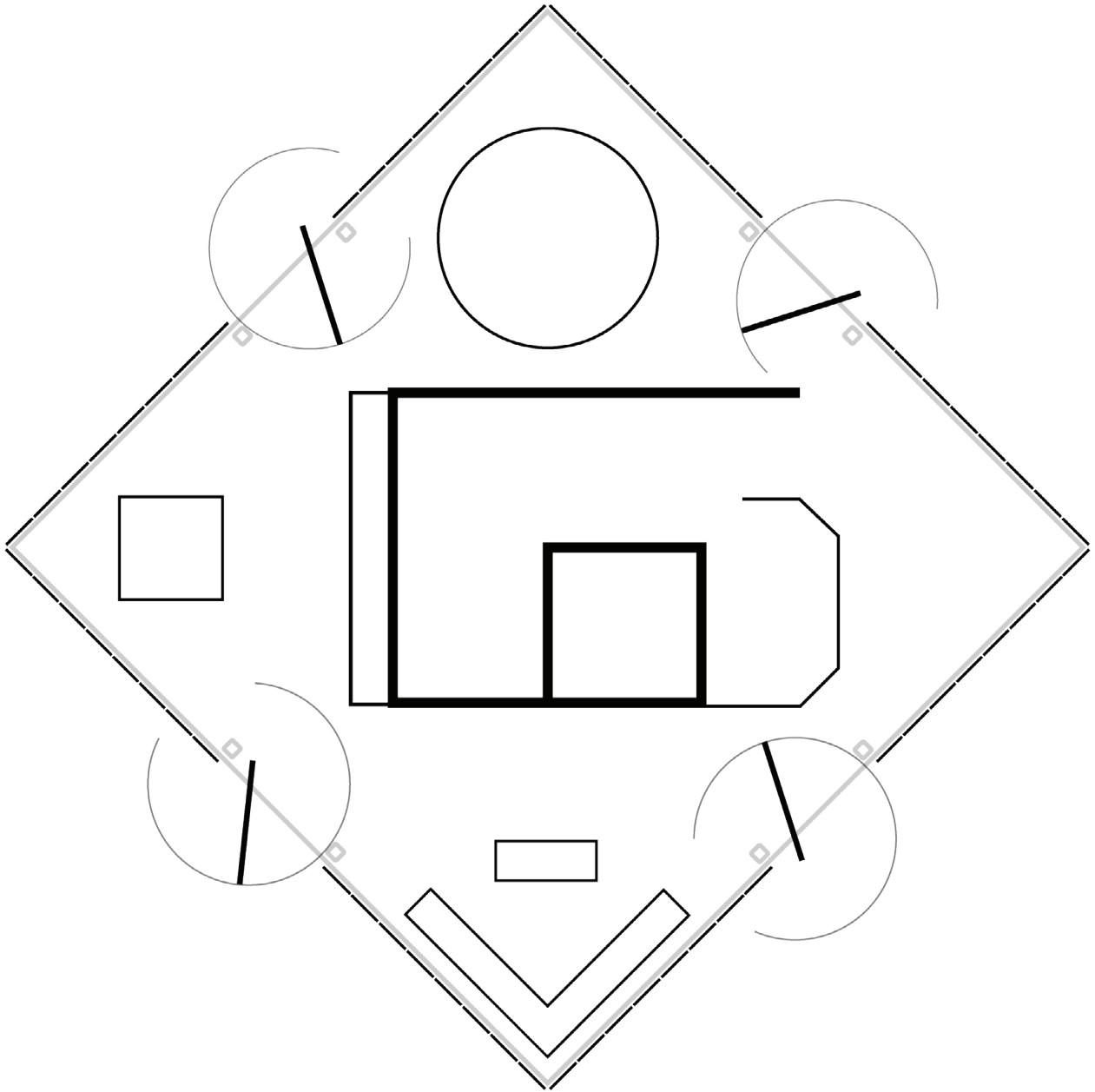
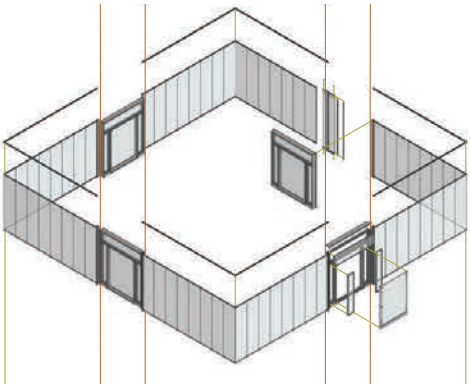
parti diagram + render: Moises De La Cruz
product logo © Cover Glass USA



Last, but certainly not least, the glazing strategy. Nearly every glass surface on the building envelope is designed to be operable, and this is made possible by two exciting systems we spec'd from west coast suppliers. The first is a system of 'frameless' panels provided by CoverGlass down in Costa Mesa. Each wall on either side of the gravity system is equipped with eight panels. With the exception of the motorized garage system, each wall allows up to 4 panels to be folded together magnetically next to the columns, so that the remaining panels can be arranged however the client desires. This includes the coveted open corner, which CoverGlass is able to accomplish thanks to discreet translucent interlocking channels on each pane which even weatherproof the assembly when closed.

GLAZING PARTI : pivot doors

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parti diagram + render: Moises De La Cruz
product logo © Red Horse Fenestration, Inc.

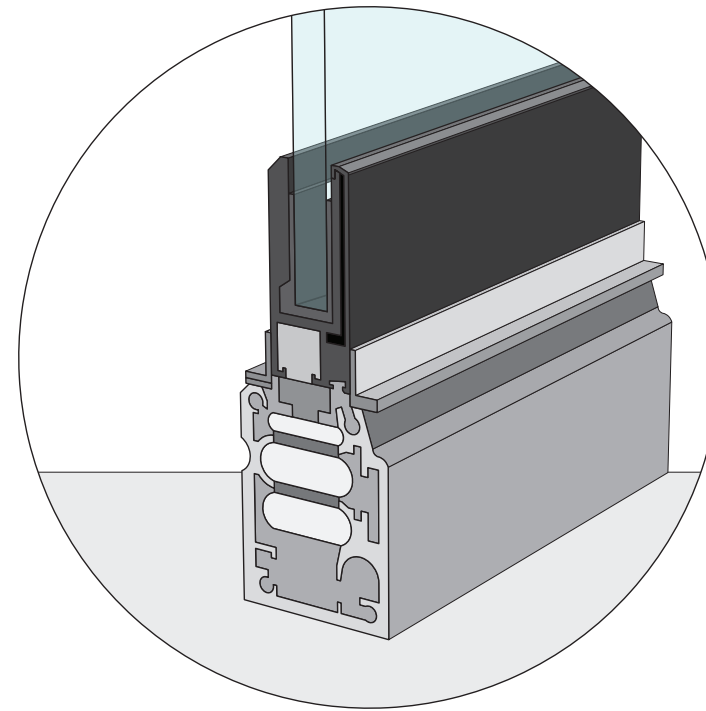


Between the two columns on each wall, we've designed a custom pivot door to be fabricated by Red Horse, who are based out of Reno. These monolithic glass doors rotate around an offset pivot that allows users to feel as if they're effortlessly slipping through another wall of the house rather than a traditional door. The sturdy tube steel frames favored by Red Horse were also a perfect visual fit for the rest of the house structure.

section: *Elle Gallman & Jurgis Vaisvila*
detail: *Elle Gallman*
render: *Moises De La Cruz*

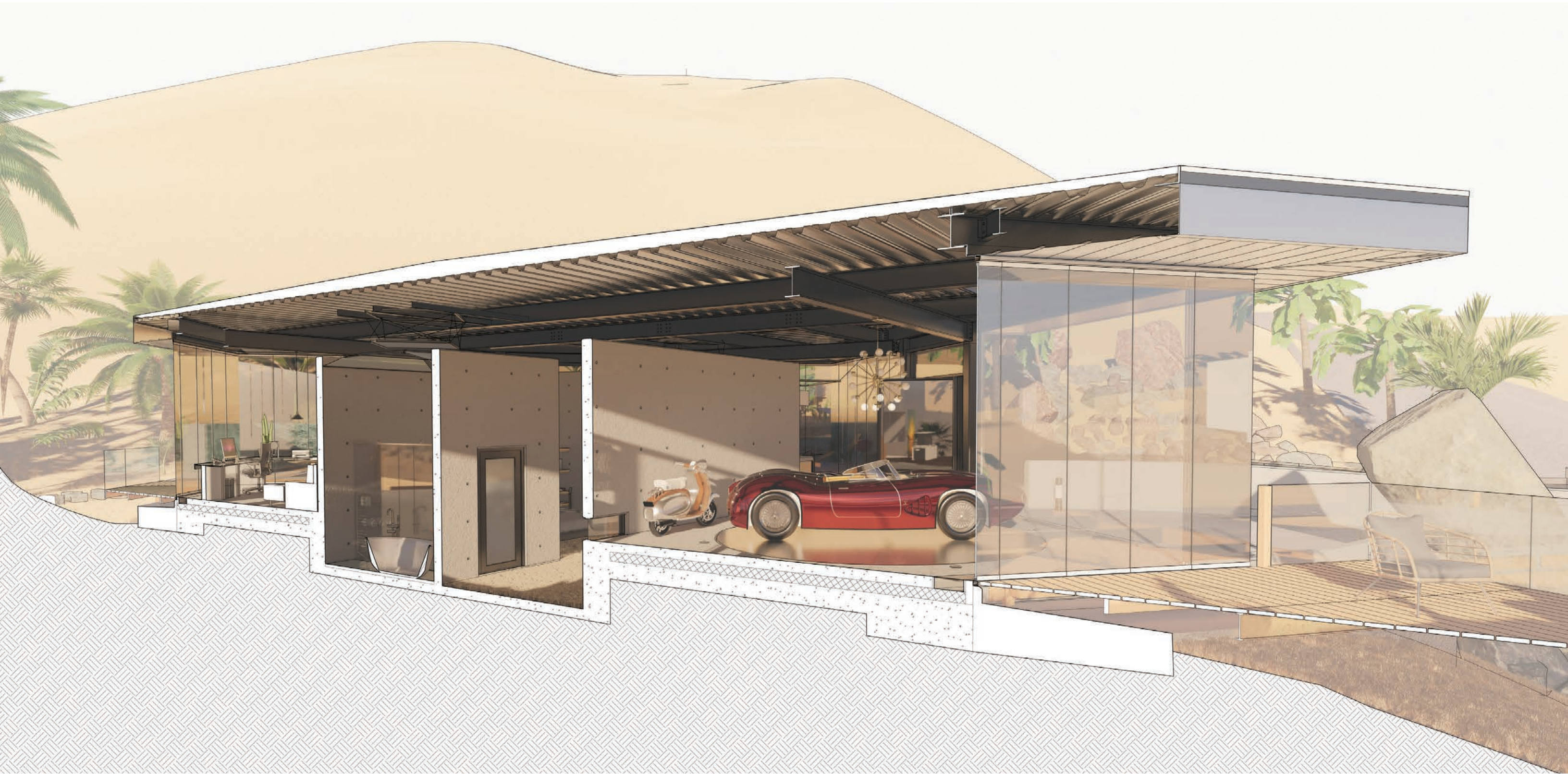
GLAZING ASSEMBLY

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As shown in this section, the bottom stainless steel tracks for the CoverGlass sit on a lip of the concrete floor slab, for ease of drainage and a flush fit that maintains the feeling of a seamless threshold all around the home. At the top, the track is connected to a series of angle steel sections that hang from the perimeter wide flanges of the primary structure, creating a concealed space for seismic tolerance as the exterior soffit panels of the roof overhang span between this system and the perimeter C-channel.





In section, these systems all work together to accentuate the power of clean and orthogonal flat surfaces within the modernist way of life. This section also showcases the floor-height windows which allow our clients to see directly from the lower floor into their garage at any time, so that their prized possessions are never too far from theirs or their visitors' admiring gaze.



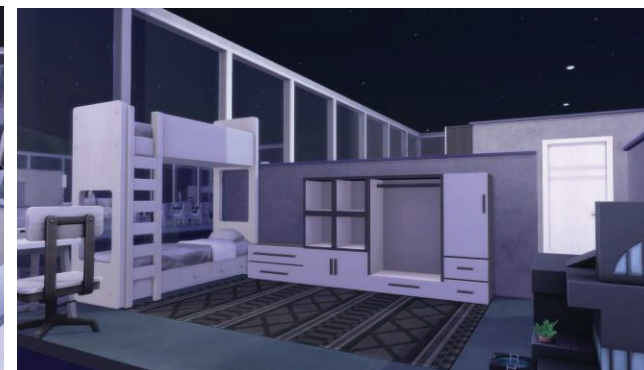
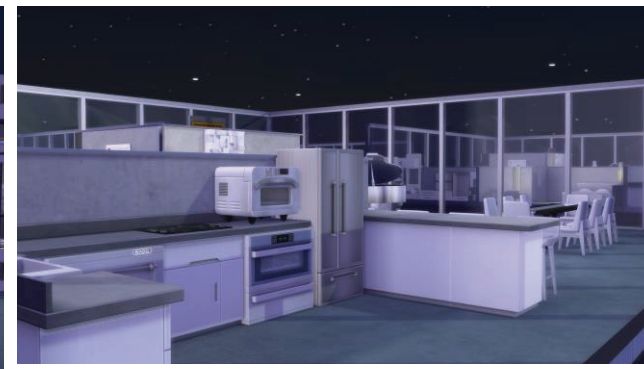
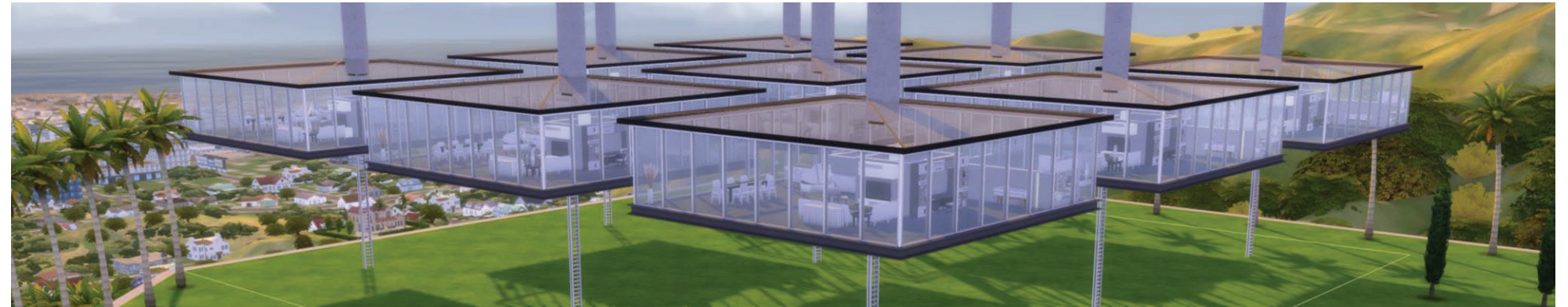
Living with Health + Efficiency, we hope that our clients (and any building occupants that follow) will grow even more attuned to the kind of optimized, clockwork commitment to self-care and productivity that has come to define our generation's lifestyle pursuits. We hope that you were also able to envision yourself inhabiting the home, filling it with your own aspirations and accumulations as Corey and Miguel dreamt of.



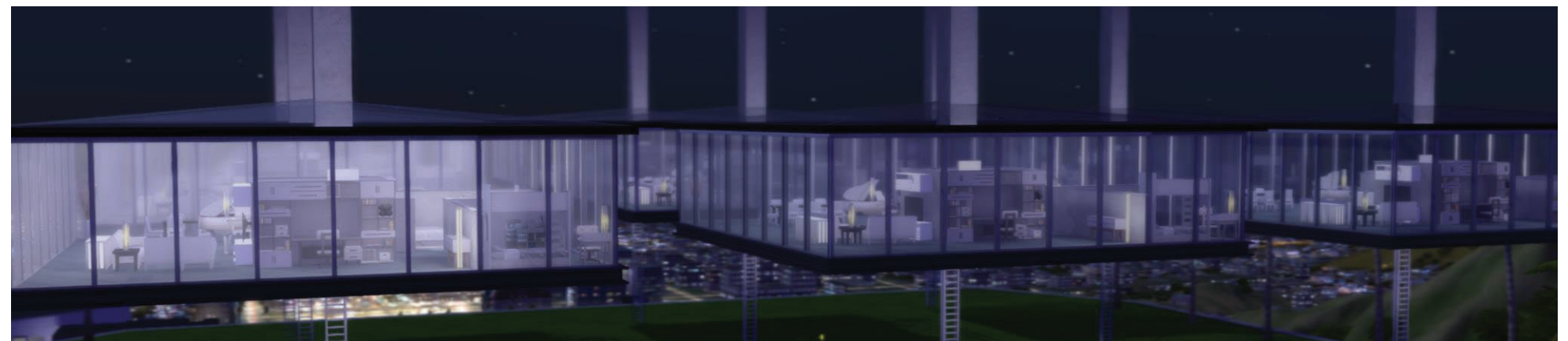
This final orthographic section, highlighting the central sunken core of the home, concludes the formal extents of our project, although the Atelier STRIPES think tank did not stop at the boundaries of our site... The final element was the Final Fantasy, with a focus on dystopian speculative fiction that expands the narrative of the glass house to an extreme degree.

FINAL FANTASY : as advertised | HEALTH + EFFICIENCY HOUSE Atelier STRIPES

The government of the Year 2121 Palm Springs central planning committee introduces the brand new *population protection plan*. The sun has become incompatible with human life, and we have come up with a way to protect you! Come live under the *mile-wide canopy* of Palm Springs in one of these custom glass houses, where your safety is our priority. Enjoy a new life under the sheltering sky and the watchful eye of the Palm Springs collective. These images give you a look at the idyllic life we have designed for you and your family in the new, safe, protected Palm Springs.



These images are part of an advertisement to the public we imagined as being written by the developers of this final fantasy project. The imagery is meant to give the “unwashed masses” an optimistic view of what is ultimately a dystopian society set 100 years in the future.

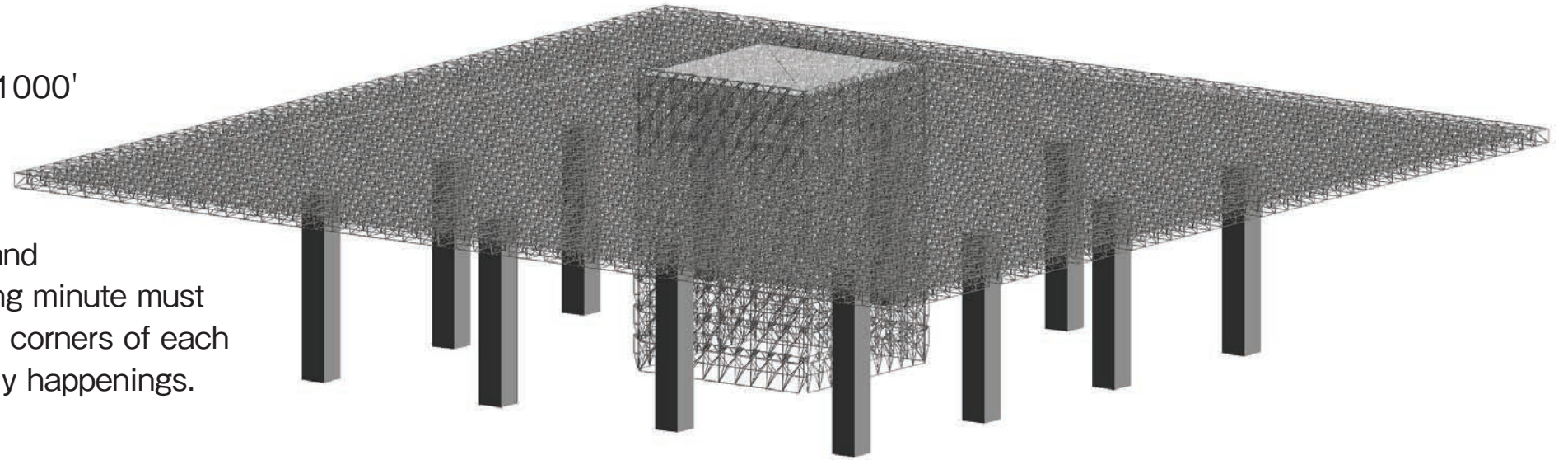


Our Final Fantasy imagines a future society in the year 2121, in which warfare and ecological disaster have given rise to decentralized pockets of human survival guided by strict regimes of control.

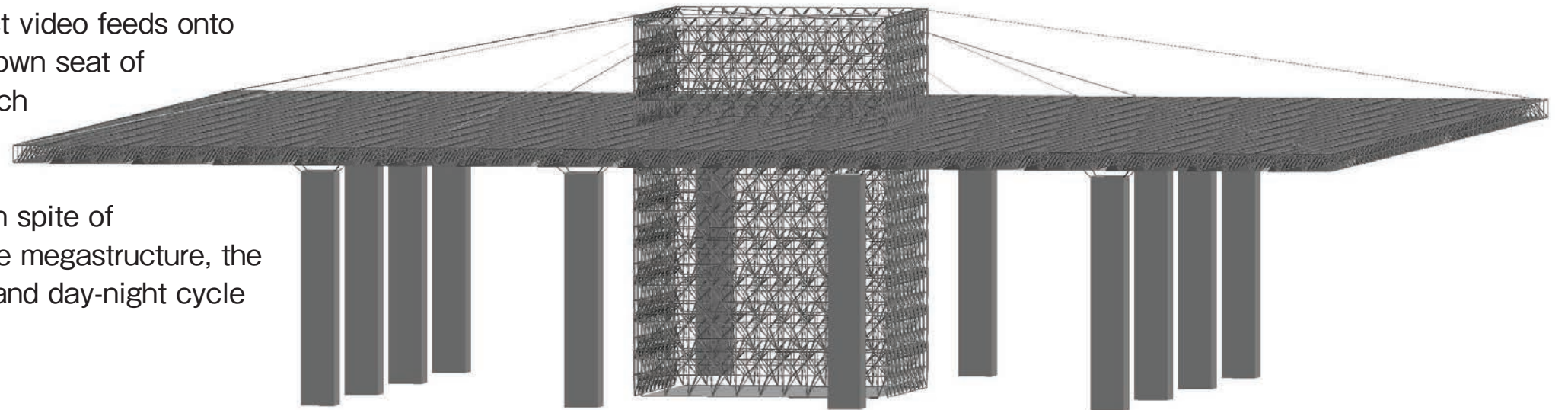
FINAL FANTASY : as built

HEALTH + EFFICIENCY HOUSE
Atelier STRIPES

Within one of these city-states, Overseers have constructed towering 1000' concrete obelisks which surround the desert valley formerly known as Palm Springs, and used them to extend a massive opaque square mile canopy over the entire region. From this plinth, a multitude of glass boxes are suspended above the unmanaged ecosystem below, and linked by transparent bridges. The overseers mandate that every waking minute must be livestreamed and archived, and have installed cameras at the eight corners of each cubic glass cage to produce public live feeds of every individual's daily happenings.



To reinforce their hold on the city-state, the Overseers project video feeds onto every opaque surface, including the walls that conceal their own seat of power, near the tops of each tower. The impossibly-thin hi-tech concrete canopy above also becomes a source of media, as all manner of announcements and simulated celestial events are projected above the people's heads at all times. In spite of evidence to the contrary at any of the glazed four sides of the megastructure, the overseers may announce changes to their artificial calendar and day-night cycle at-will.



The denizens of the city-state are biometrically forbidden from taking the elevator lifts in the towers up to the roof of the plinth, on which they would discover a secret garden and Palm Springs' true seat of power: a lush, integrated community for the descendants of today's ultra-rich – remnants of an extinct hierarchical society long-since destroyed. To the unsuspecting residents of the city-state, however, the upward social mobility which was believed to have existed 100 years prior seems to remain. The intricate web of glass homes is suspended in a pyramidal array, which gradually winds up to the center of the plinth where a square skylight bathes the most fortunate citizens in their own private sun.

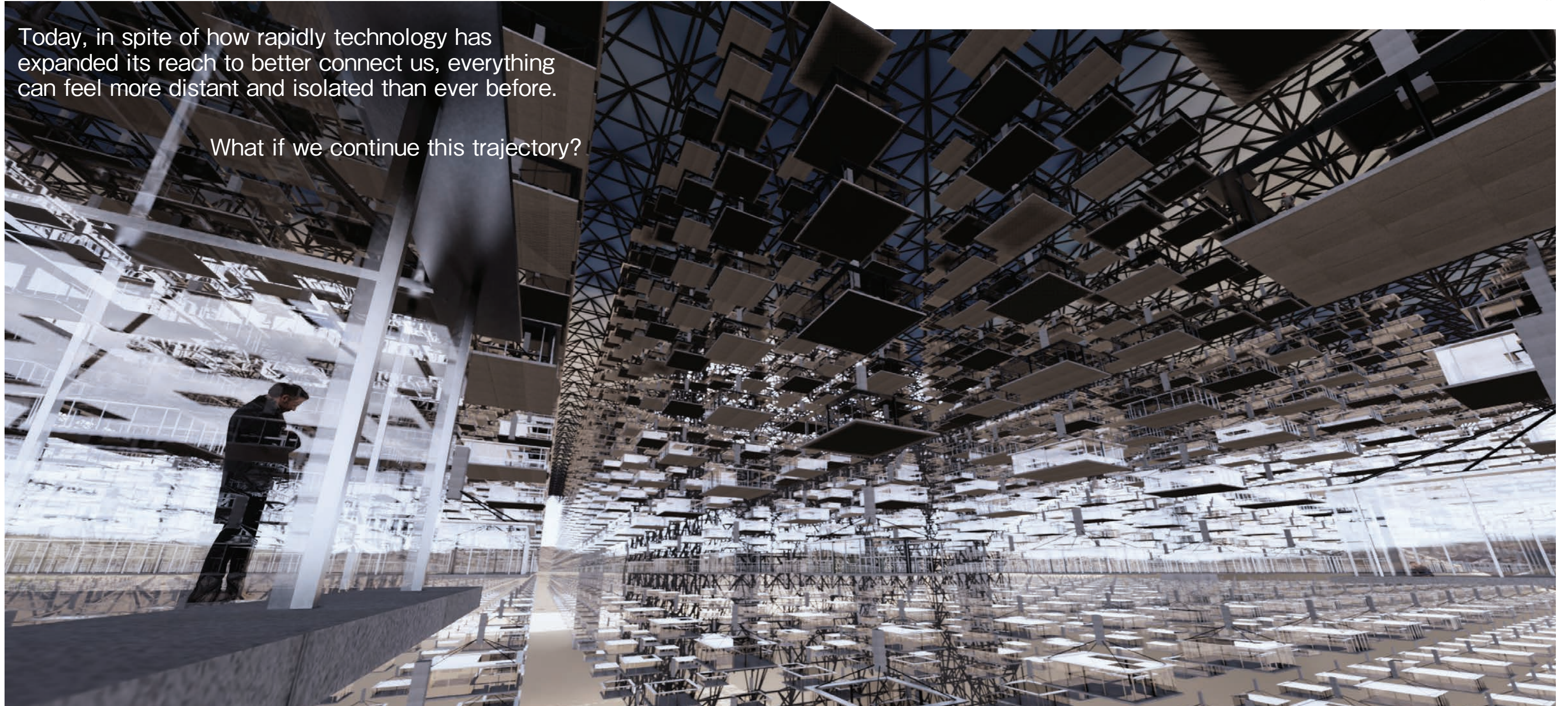
render: *Moises De La Cruz*
narrative: *Atelier STRIPES*

FINAL FANTASY

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Today, in spite of how rapidly technology has expanded its reach to better connect us, everything can feel more distant and isolated than ever before.

What if we continue this trajectory?



According to the Overseers, the embrace of sunlight is a most dangerous privilege, which must only be shared by the chosen few. After the purported deterioration of the Earth's ozone barrier, the overseers argue, raw sunlight has become incompatible with human life, and only society's most resilient individuals are given the glorious opportunity to sacrifice their health to the city-state so that they might conduct 'research' on the long-term effects of this new sunlight. As with many aspects of the new society however, only time will tell whether any of this is truth, or merely a deceit to encase the masses in perpetual deference.

Atelier STRIPES humbly thanks you for reading.

Atsisveikinimas.

lyrics from This Heat - "Health and Efficiency" (1980)
Piano/Rough Trade

Here's a song about the sunshine
Dedicated to the sunshine...

enthusiasm will energize / mind over matter, love over gold / momentum over stasis / rhythm, shape / international / potential / imagination / analogy / commitment