

PROBLEM STATEMENT

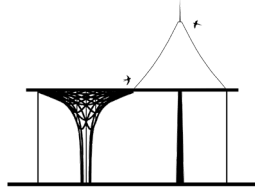
The studio dealt with problems, programs and contexts that were unique to institutional architecture within the city and challenged students to create forward-thinking strategies for renewed civic and cultural development. In addition, because this course is the only required integrative design studio for the Master of Architecture degree program, all students must show the ability to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental systems, structural systems and building envelope systems and assemblies.

In the last 50 years, North American bird populations have decreased by nearly 30%. The reasons for this alarming trend are many, but human effects on the environment is the principal cause. Environmental scientists agree that these trends are reversible, but it will require changes to both environmental policy and regulation of manufacturing/farming practices that directly affect food sources, rearing environments and fertility for birds. As with so many aspects of the natural environment, we are at a pivotal juncture, and what we do in the coming years will profoundly affect the quality and viability of life for all species on Earth, including humans.

Education of the voting public is critical now as it will take a mandate from the people to push lawmakers to take these issues seriously before it is just too late to effectively reverse these trends. To this end, we are proposing a new facility devoted to bird conservation and educating the public on birds, bird habitats and the importance of conservation efforts to ensuring a more vital future for birds of all species. A program for the facility will be researched and documented by studio members. Using precedents, we will try to discern typical organizational types and the most typical programmatic features for large aviaries. Because air quality will likely play an important role in any proposal that is taking the pandemic seriously, we will also place special emphasis on understanding ventilation strategies for such spaces, both passive and active.

The only programmatic mandate for the facility is that there must be at least 80,000 sf under roof (total building program) including unconditioned habitats contained under netting. In addition to the exhibitions, the building will also contain a conservation facility that includes labs devoted to environmental research in the great lake's region and cages/medical facilities devoted to rehabilitation of injured birds. We will also research the history and characteristics of the LPZ as our primary context. Like other zoos in large cities, LPZ has been traditionally considered a primary recreational spot for both tourists and locals. This remains true, but due to the proliferation of environmental crises, twenty-first century zoos have also come to see themselves as centers of education and outreach, portraying the plights of many species in the face of environmental change, as well as showcasing their behaviors and characteristics.

This new facility is seen as an expansion of the mission of both the McCormick Bird House and the Regenstein Birds of Prey exhibit, but those existing sites are not large enough to adequately house the new programs. For this reason, the new facility will be built to the south of the zoo and will constitute an annex to the existing LPZ footprint, expanding their current boundary to the south.



DESIGN CONCEPT

The project was named “Aranya” which in Sanskrit means “grove of trees” or “Forest”. The key concept of the project was to represent the density of the forest in the space and represent the whole building as a part of a natural habitat of birds. Keeping the clarity of the such habitats in mind, the building typology decided was a pavilion with open planning, where the exhibits and other programs would be like a piece of furniture floating in the plan. Structural columns were abstracted so that they resemble trees.

Thus, some of these initial strategies were fragmented out to adhere to the problems like geometry, scale and orientation of the space. A module had to be decided that would repeat itself for the columns and the spaces around it. The focal point for a spatial module was the column at its center. Different types of iterations such as a Square, Triangle, Circle and Hexagon were tested. After careful scrutiny, it was decided that Hexagon fits the best for the geometry and structural stability of the building. This geometry even allowed for an unrestrained flowing of the form to the columns as it progressed up in the vertical direction.

A sense of diaphanousness was introduced while designing the columns which had frames branching out as it touched the ceiling representing a typical structure of a tree. The connections between the supporting frames were shaped in form of a hexagon and were kept hollow to represent simplicity in the design.

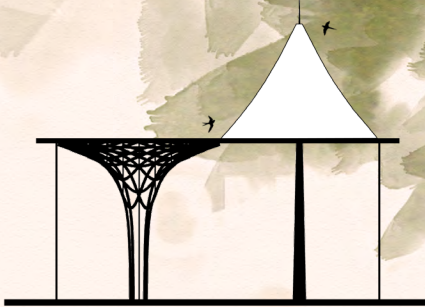
As the geometry reached its final stage, the spatial dilemma occurred in terms of repetition and orientation of the modules. Hexagon having six sides created a meandering space which solved the problem of the space of the building in the plan giving us an undulating façade. After repeating the module, the decided programs were placed to fit the required area statement. The exhibits, which formed the primary program were placed on the main level of the building whereas the secondary programs like the offices, research labs, auditorium and services were placed in the basement.

The exhibits spaces were further divided into 8 subtropical zones, 3 temperate zones, 17 tropical zones, an exterior free flight zone, an interior free flight zone and raptor cages. The raptor cages were secluded from the main building since they had different service requirements. The main building and the raptor cages were then brought together using an entrance plaza with a semi open roof which acted as a conjuncture for the two spaces. To introduce a sense of direction to the visitors, a play in levels was designed as a user experience. At the entrance there is a plaza which has the tree shaped frame columns with creepers growing on them creating a semi open space. As you enter the exhibits lined on either side of the corridor directs the visitor towards the sub-tropical exhibits. At the end of the corridor a rest stop is introduced which includes lounge areas and cafes. The visitor then continues through the exterior free flight zone in the center of the building and then to the temperate zone exhibits. Then, one would follow the meandering pathways dropping 3 feet with each exhibit for the tropical zone. The continuous drop created by ramps and stairs brings the visitor down to the interior free flight zone. After experiencing the different bird habitats in a controlled environment, the visitor is led towards the basement through a series of gift kiosks. An elevator and a staircase await there to take the user back to the main level near the entrance which brings the tour to an end.

A Triple layered mullion-based glass system was introduced to control the heat gain in the structure. The columns were thought off in a such a way that, the main bark was made up of hollow steel tube which had a dual function, it not only supported the super structure above but also acted as a duct to cater the mechanical and electrical. For heating and cooling a radial slab system was introduced. As for materials a structural glulam was considered and

a stone flooring of the building wrapped up the vision of a natural Forest. For the roof a flat slab with ETFE Pillows was designed for the controlled environment spaces whereas a tent like structure made of net was designed for the exterior free flight zone. Planning and designing the site around the building in the geometry of triangles to form a promenade full of activities completed the user experience for the aviary.

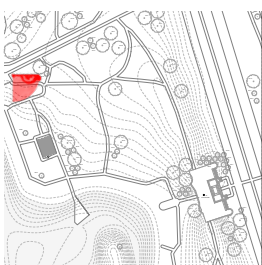
ARANYA

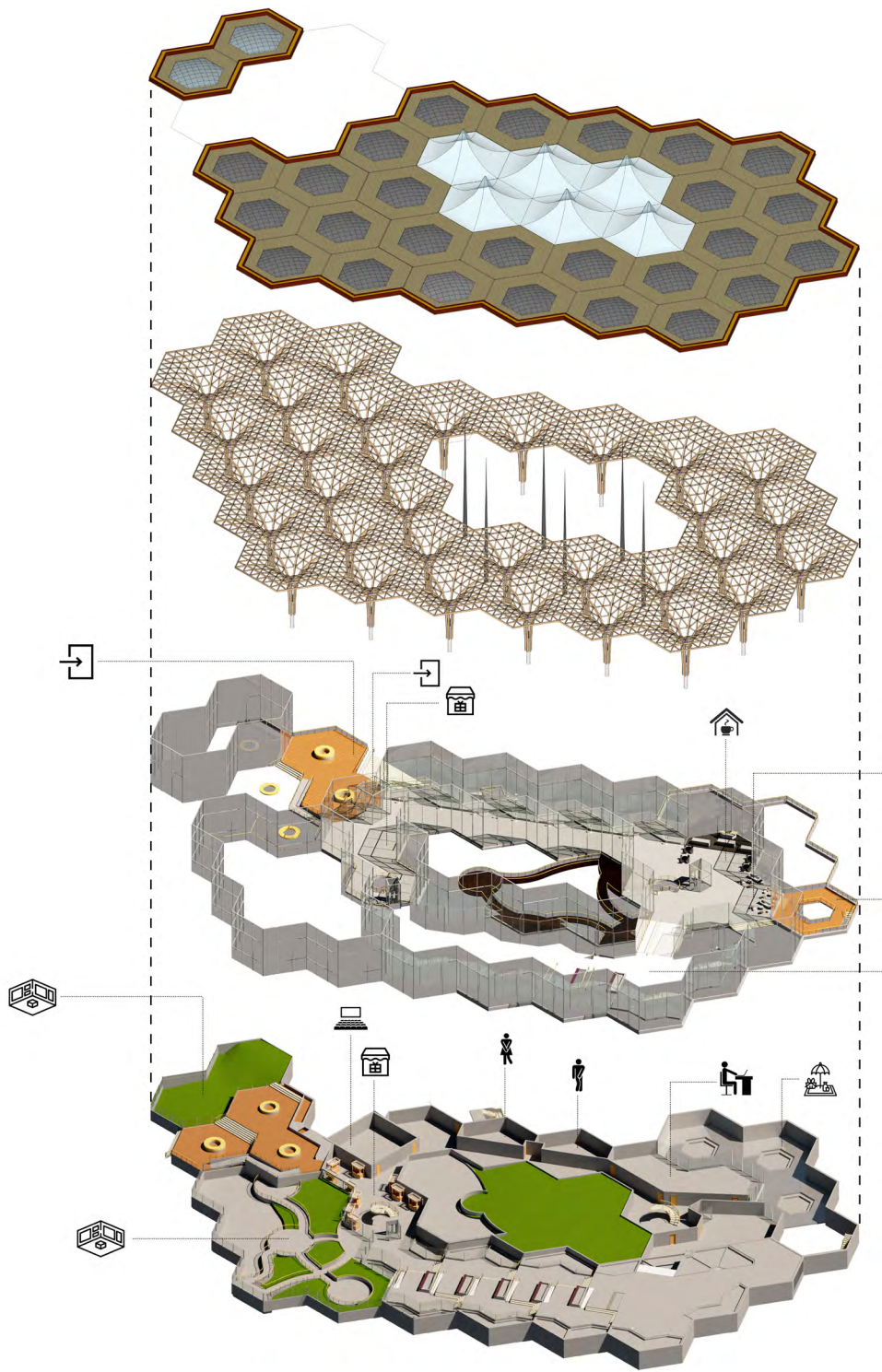










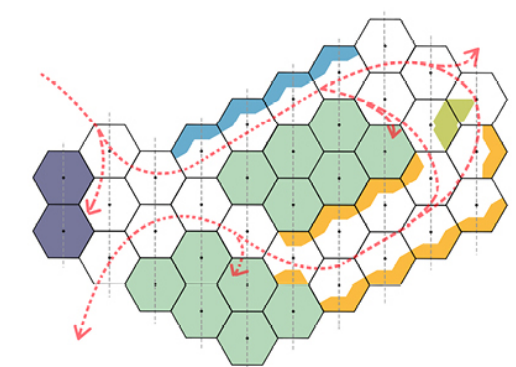
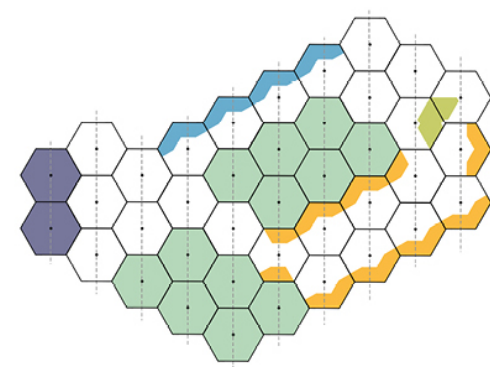
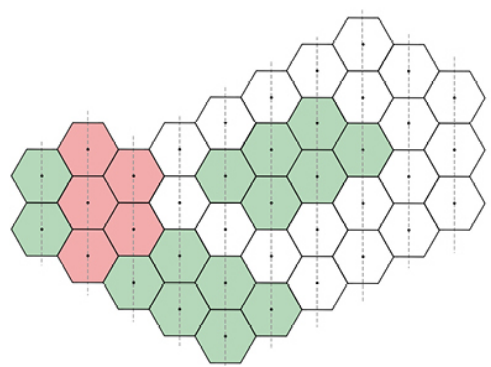
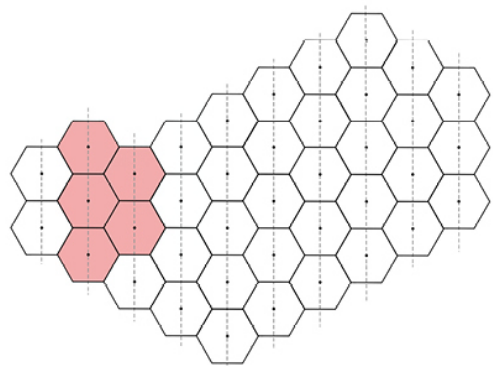
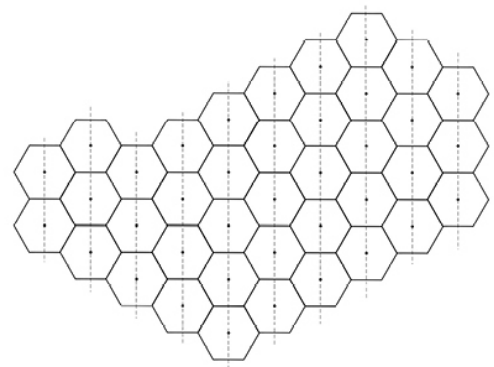
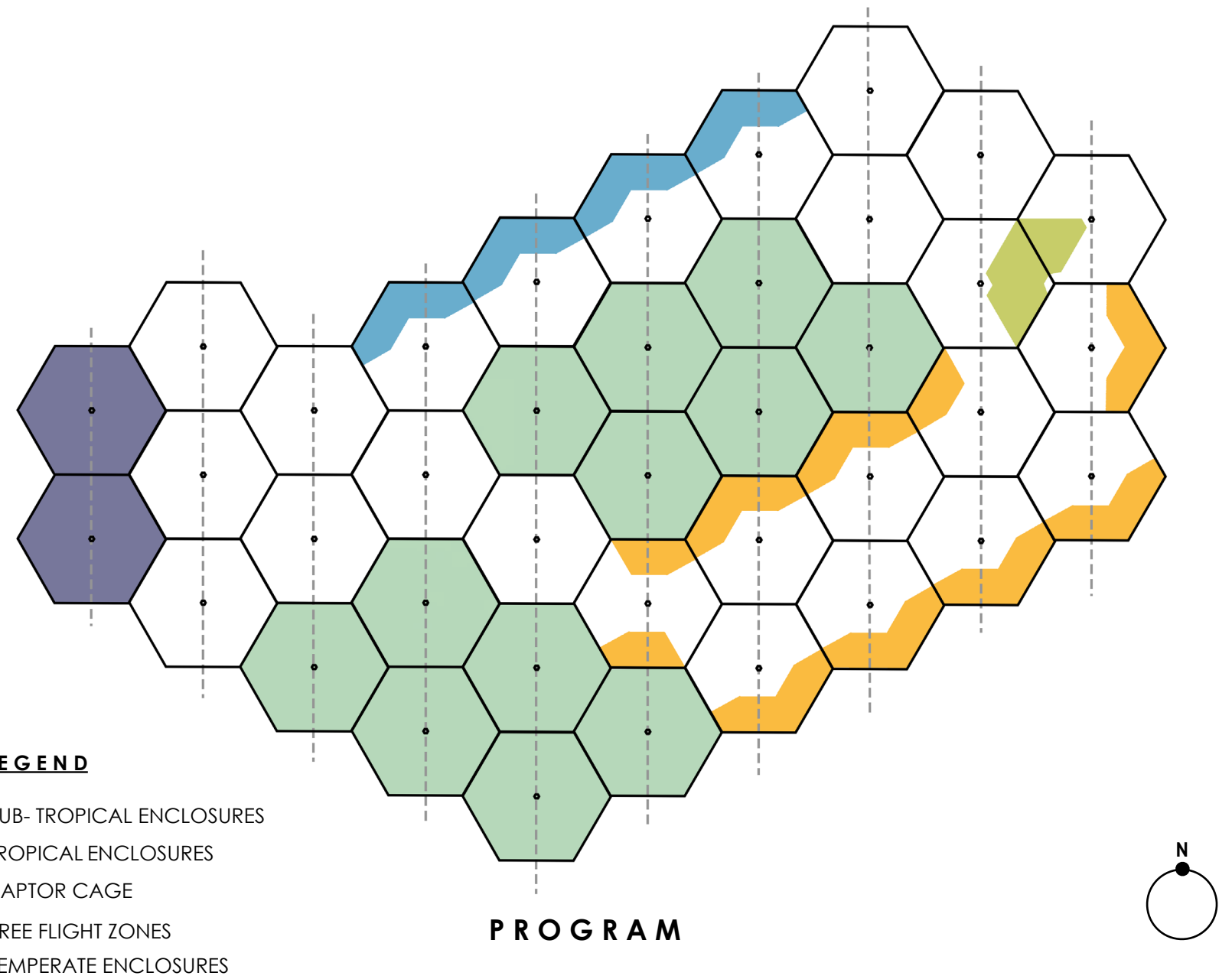
LEGEND

- 1. SOUTH POND BRIDGE
- 2. ZEBRA HOUSE
- 3. ULYSSES S. GRANT MONUMENT
- 4. SOUTH POND
- 5. FARM IN THE ZOO





-  ENTRANCE
-  GIFT SHOP
-  CAFE
-  LOUNGE
-  EMERGENCY EXIT
-  EXHIBITS
-  REST AREA
-  OFFICES
-  TOILET (WOMEN)
-  TOILET (MEN)
-  AUDITORIUM



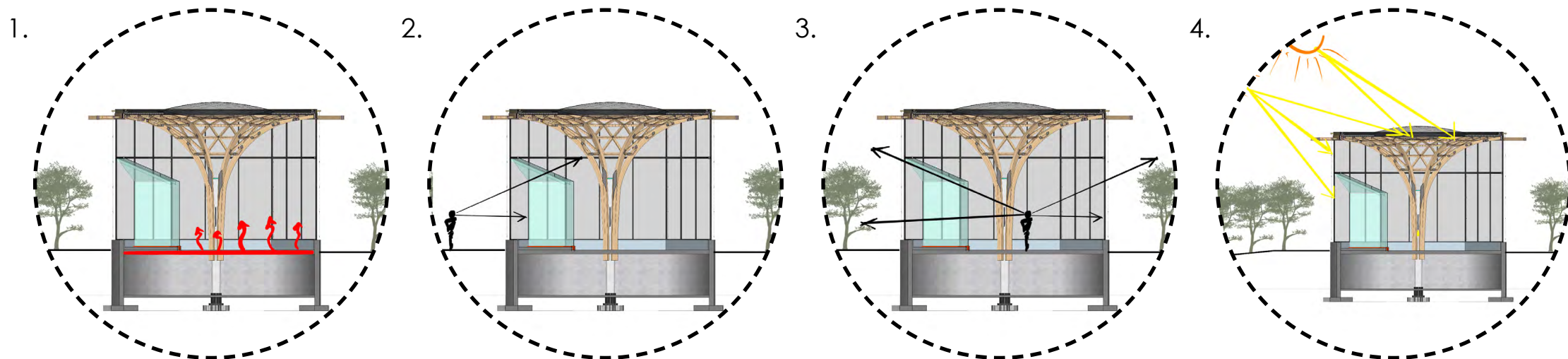
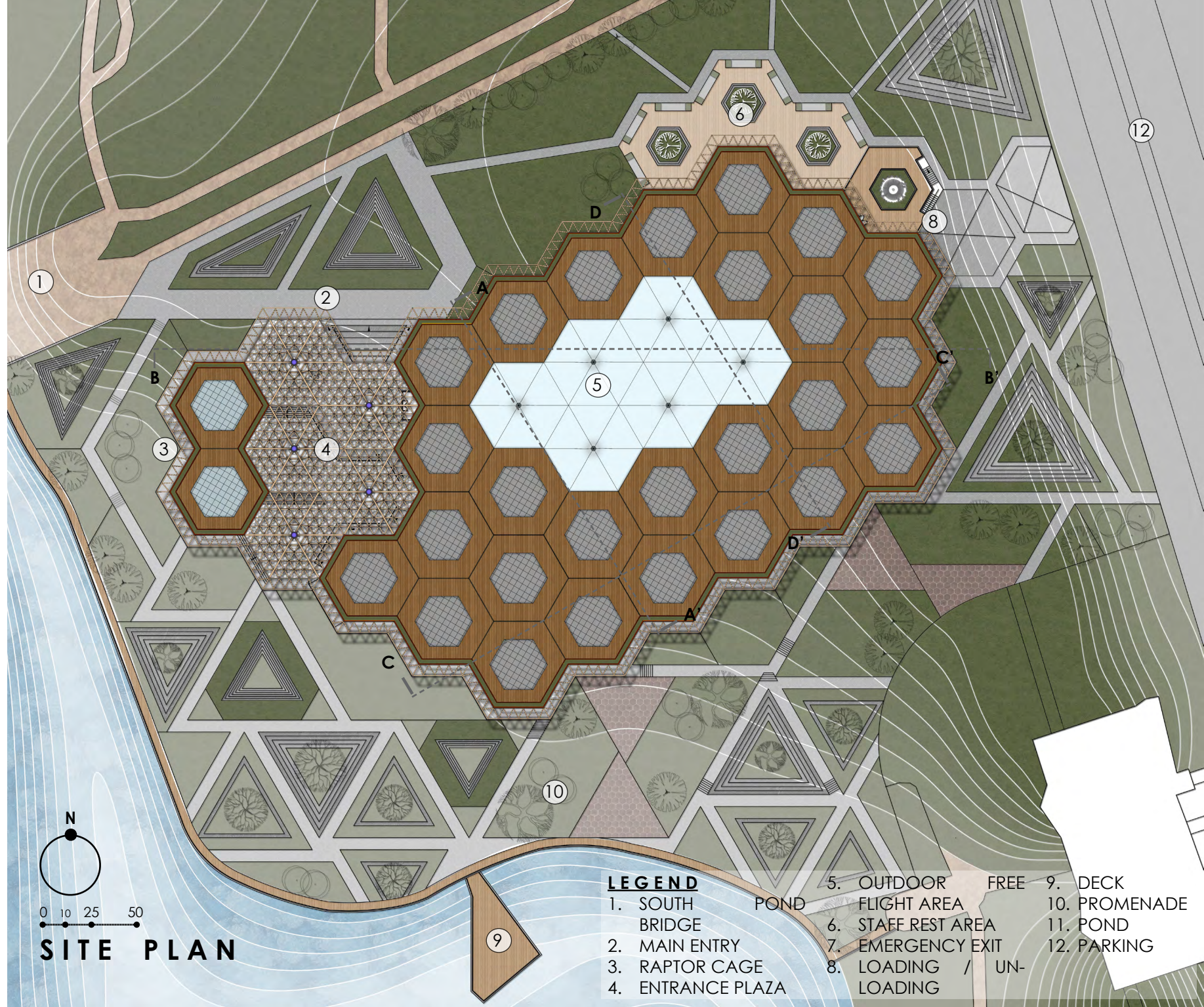
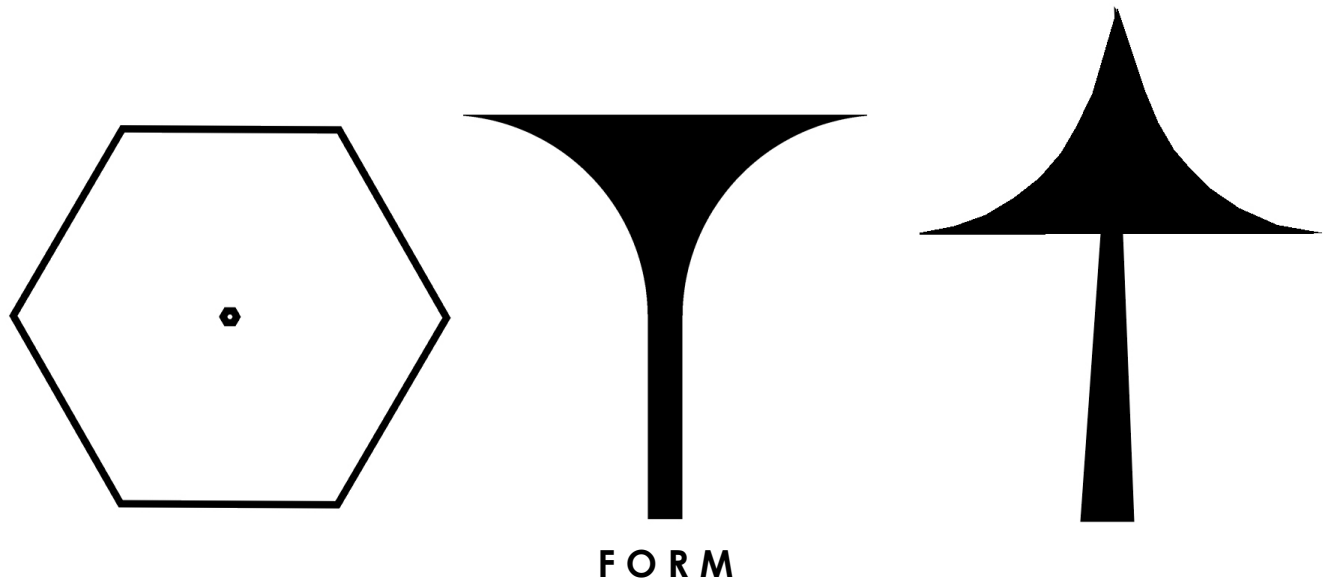
CONNECTION

SEPARATION

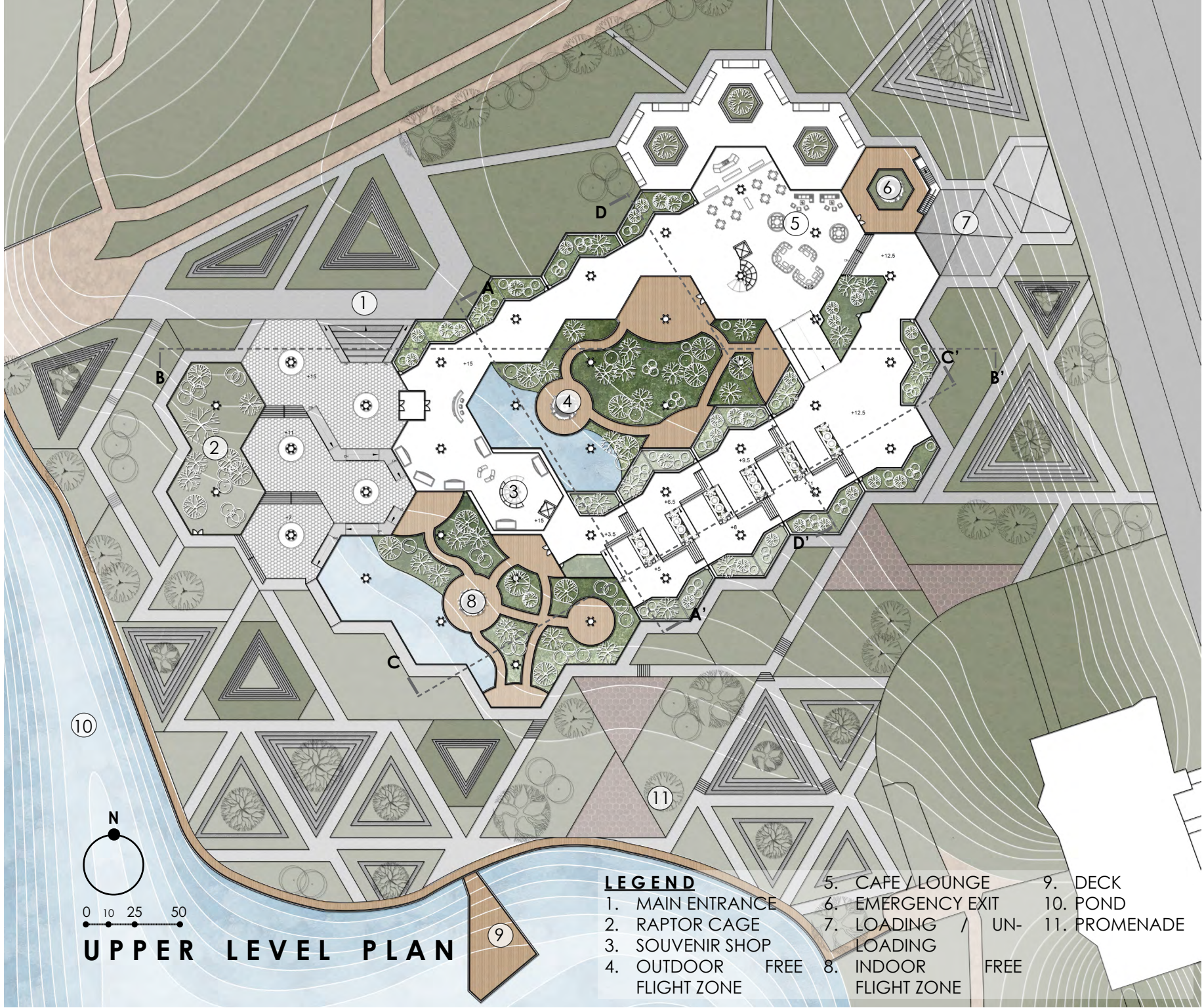
EXTRUSION

CONCLUSION

CIRCULATION



- LEGEND**
- 1. RADIANT FLOOR HEATING
 - 2. UNOBSTRUCTED VIEWS
 - 3. LANDSCAPE VIEWS
 - 4. SUN-SHADING



LEGEND

- 1. GLASS (R-5)
- 2. GLASS (R7-9)
- 3. ARGON GAS
- 4. VACUUM

5. SCUPPER PLATE

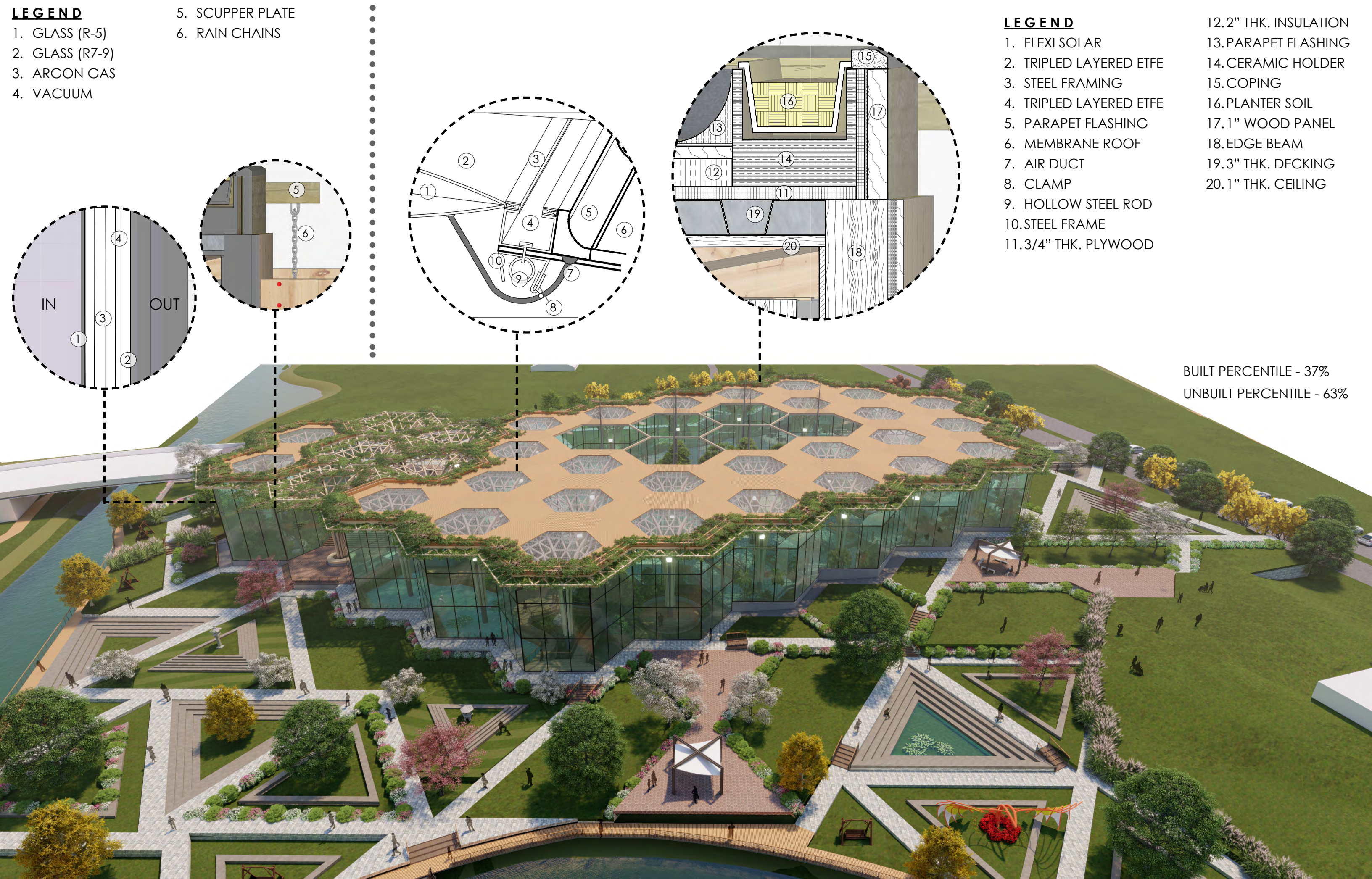
- 6. RAIN CHAINS

LEGEND

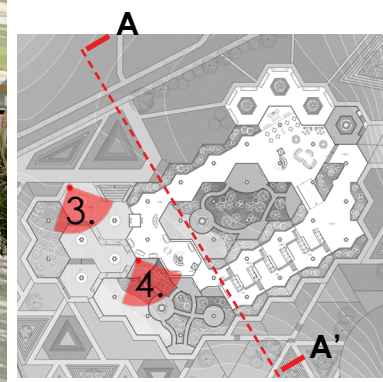
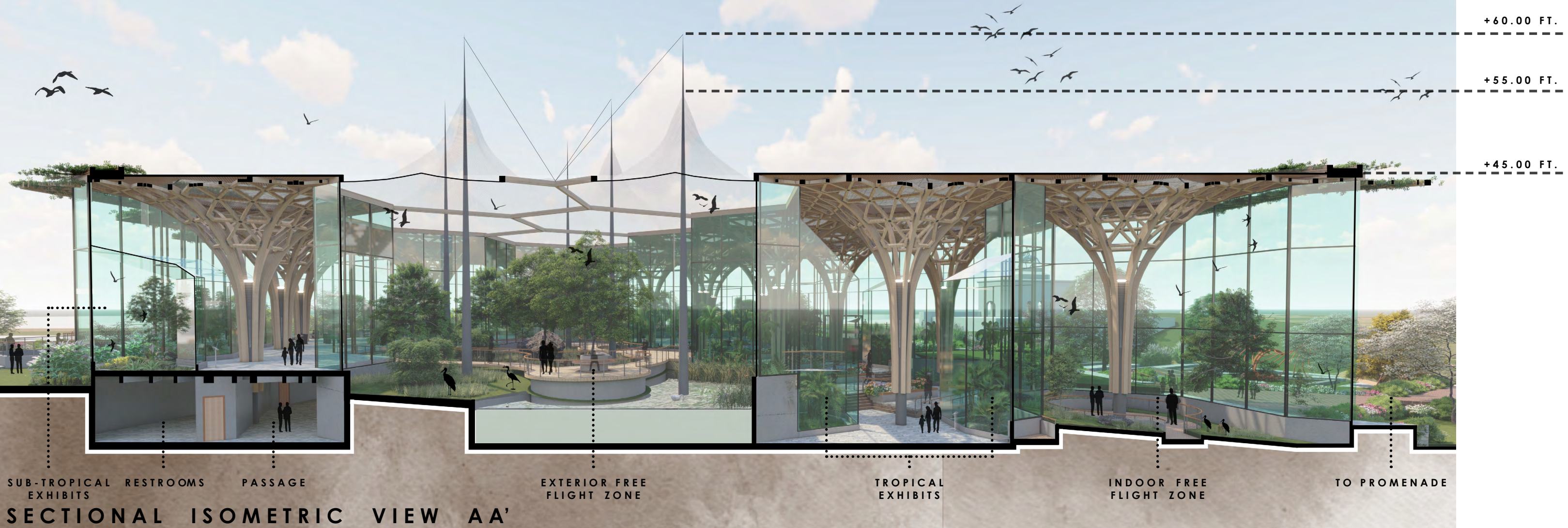
- 1. FLEXI SOLAR
- 2. TRIPLED LAYERED ETFE
- 3. STEEL FRAMING
- 4. TRIPLED LAYERED ETFE
- 5. PARAPET FLASHING
- 6. MEMBRANE ROOF
- 7. AIR DUCT
- 8. CLAMP
- 9. HOLLOW STEEL ROD
- 10. STEEL FRAME
- 11. 3/4" THK. PLYWOOD

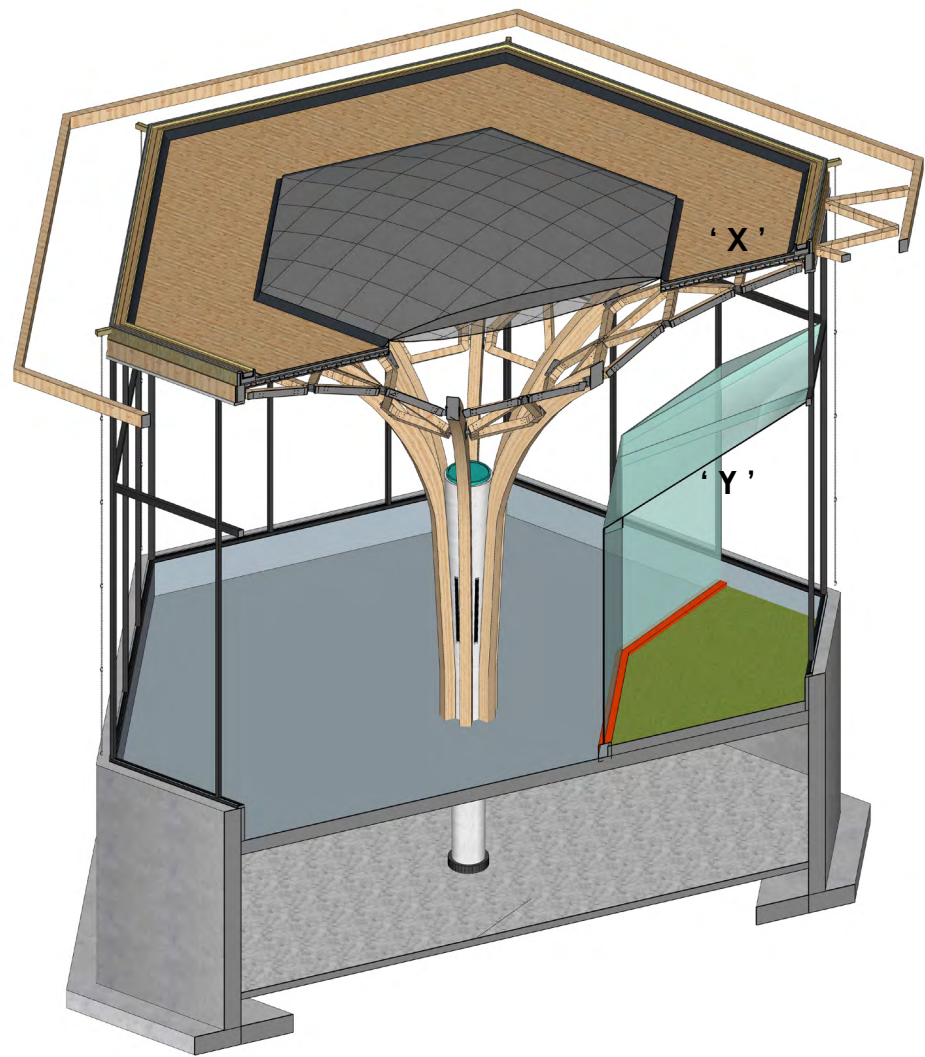
12.2" THK. INSULATION

- 13. PARAPET FLASHING
- 14. CERAMIC HOLDER
- 15. COPING
- 16. PLANTER SOIL
- 17. 1" WOOD PANEL
- 18. EDGE BEAM
- 19. 3" THK. DECKING
- 20. 1" THK. CEILING

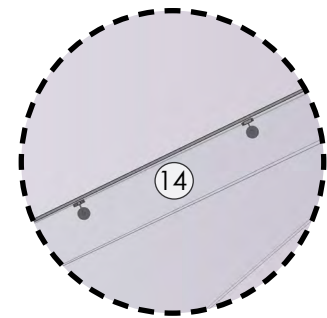


BUILT PERCENTILE - 37%
 UNBUILT PERCENTILE - 63%

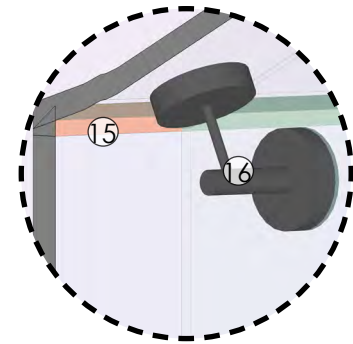




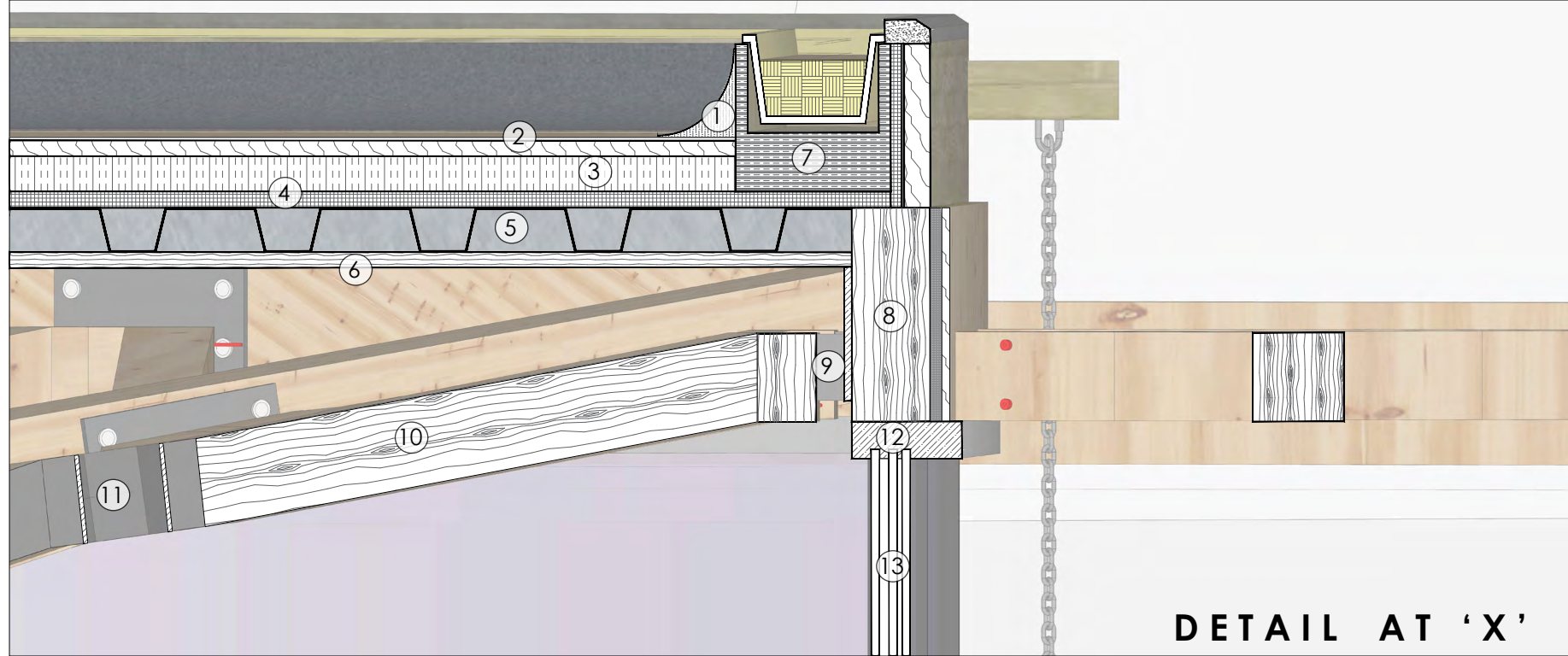
DETAIL OF A SINGLE MODULE



DETAIL AT 'Y'



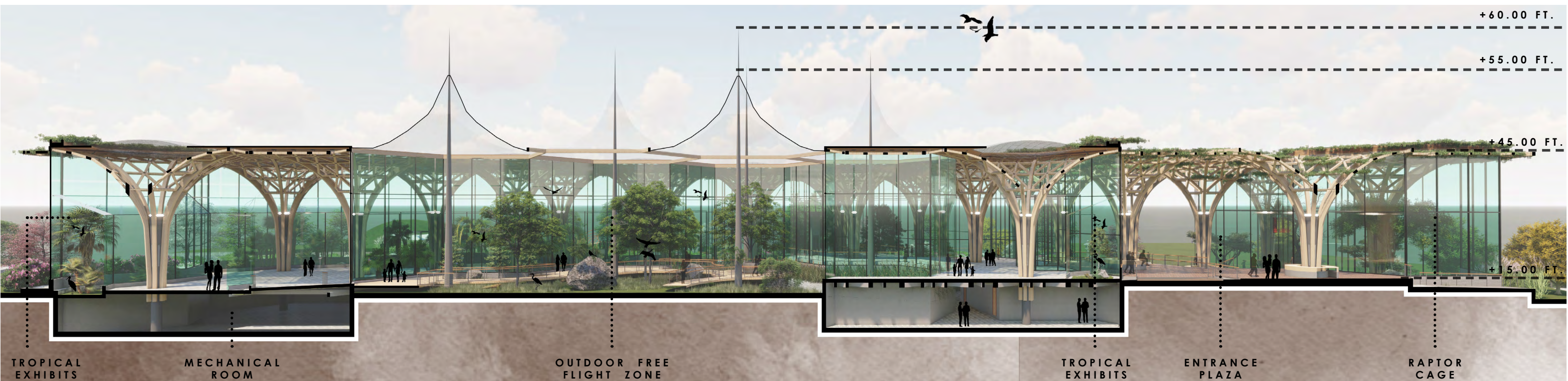
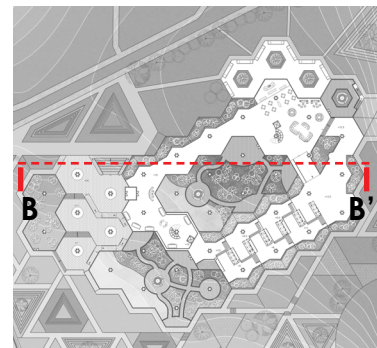
DETAIL AT 'X'



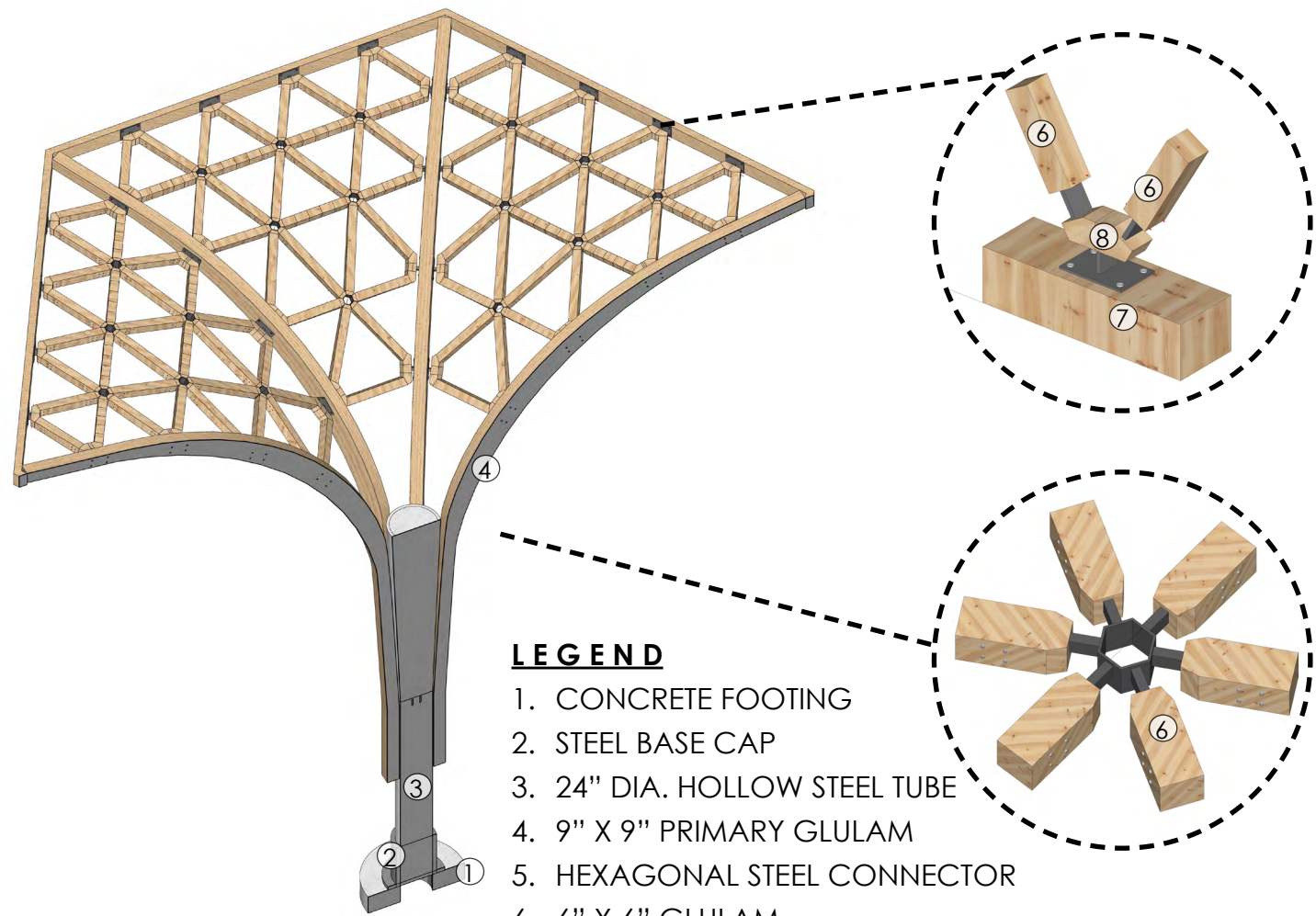
DETAIL AT 'X'

LEGEND

- 1. PARAPET FLASHING
- 2. MEMBRANE ROOF
- 3. 2" THK. INSULATION
- 4. 3/4" THK. PLYWOOD
- 5. 3" THK. DECKING
- 6. 1" THK. CEILING
- 7. CERAMIC HOLDER
- 8. 6" X 15" EDGE BEAM
- 9. EDGE CONNECTION STEEL PLATE
- 10. 6" X 6" THK. GLULAM
- 11. CENTER CONNECTION STEEL PLATE
- 12. THERMALLY BROKEN AL MULLION
- 13. MULLION BASED TRIPLED GLASS SYSTEM
- 14. 9" THK. VERTICAL GLASS FIN
- 15. SILICON SEALANT
- 16. SPIDER CONNECTOR



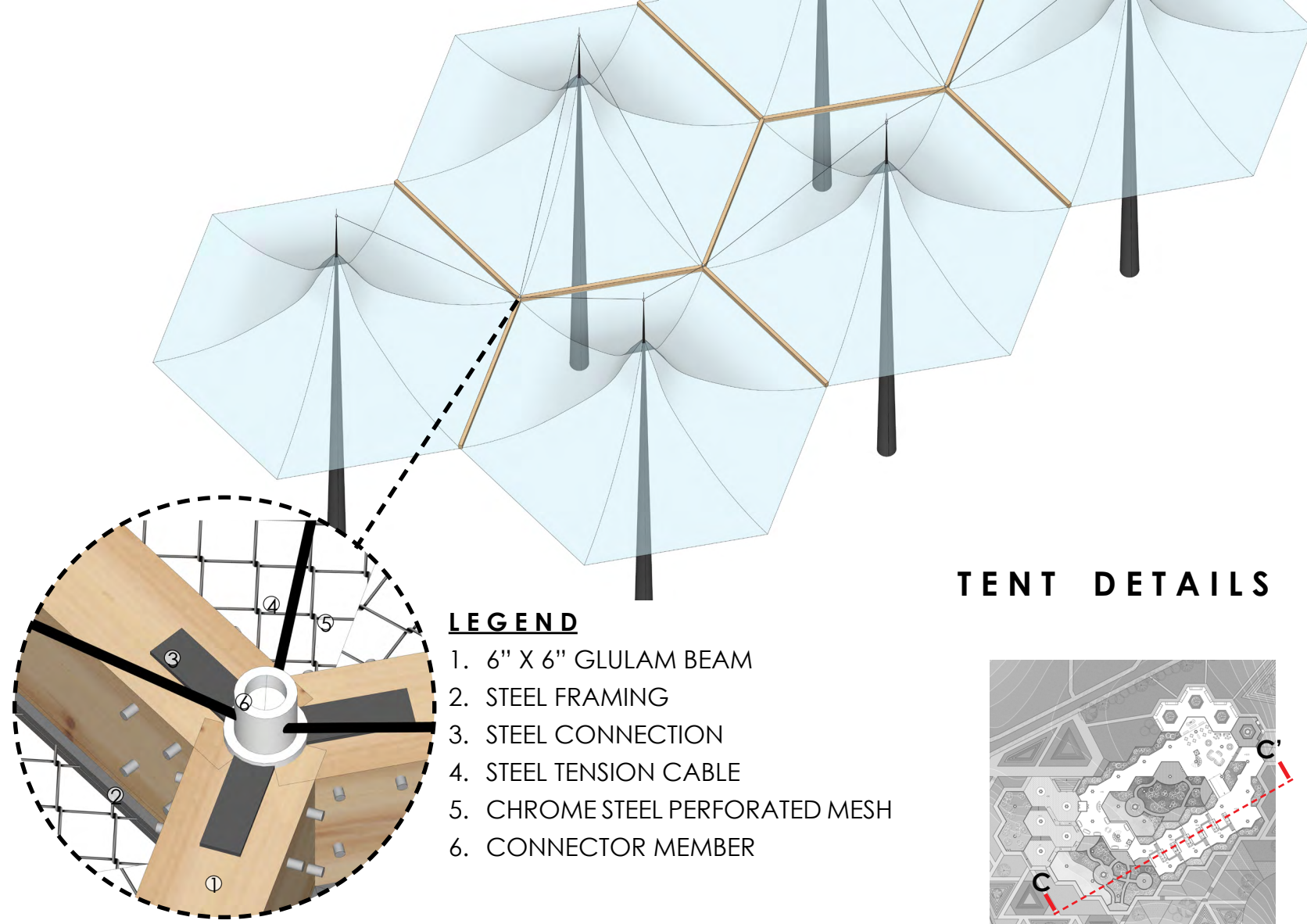
SECTIONAL ISOMETRIC VIEW BB'



LEGEND

- 1. CONCRETE FOOTING
- 2. STEEL BASE CAP
- 3. 24" DIA. HOLLOW STEEL TUBE
- 4. 9" X 9" PRIMARY GLULAM
- 5. HEXAGONAL STEEL CONNECTOR
- 6. 6" X 6" GLULAM
- 7. 6" X 16" GLULAM EDGE BEAM
- 8. EDGE STEEL CONNECTION PIECE

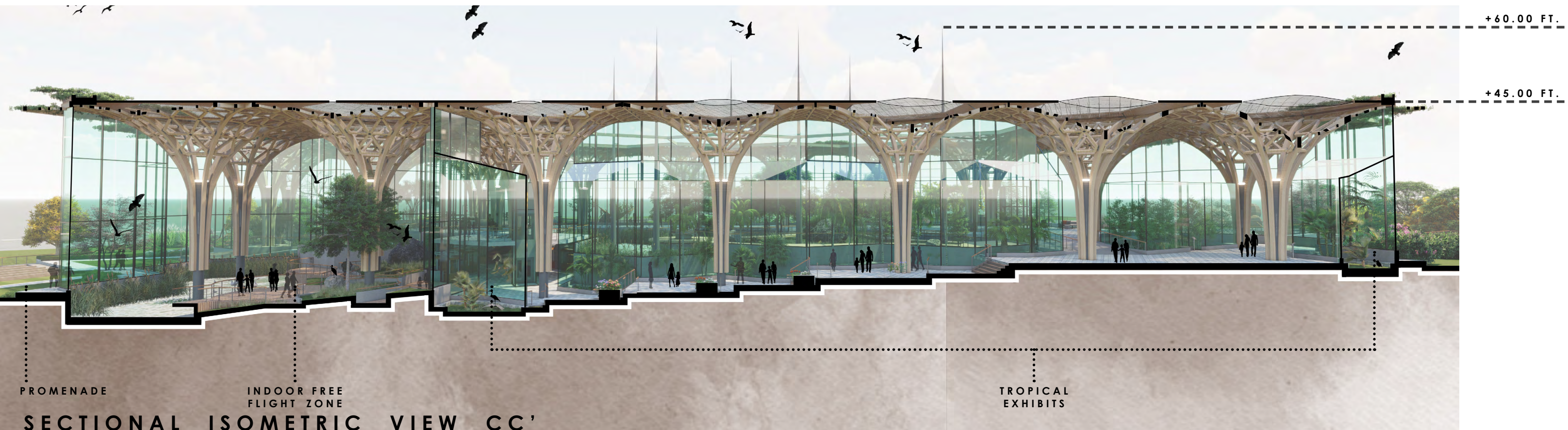
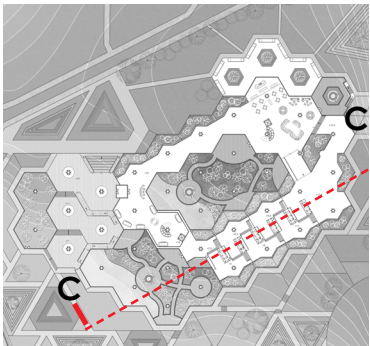
COLUMN DETAIL



LEGEND

- 1. 6" X 6" GLULAM BEAM
- 2. STEEL FRAMING
- 3. STEEL CONNECTION
- 4. STEEL TENSION CABLE
- 5. CHROME STEEL PERFORATED MESH
- 6. CONNECTOR MEMBER

TENT DETAILS



PROMENADE

INDOOR FREE FLIGHT ZONE

TROPICAL EXHIBITS

SECTIONAL ISOMETRIC VIEW CC'

