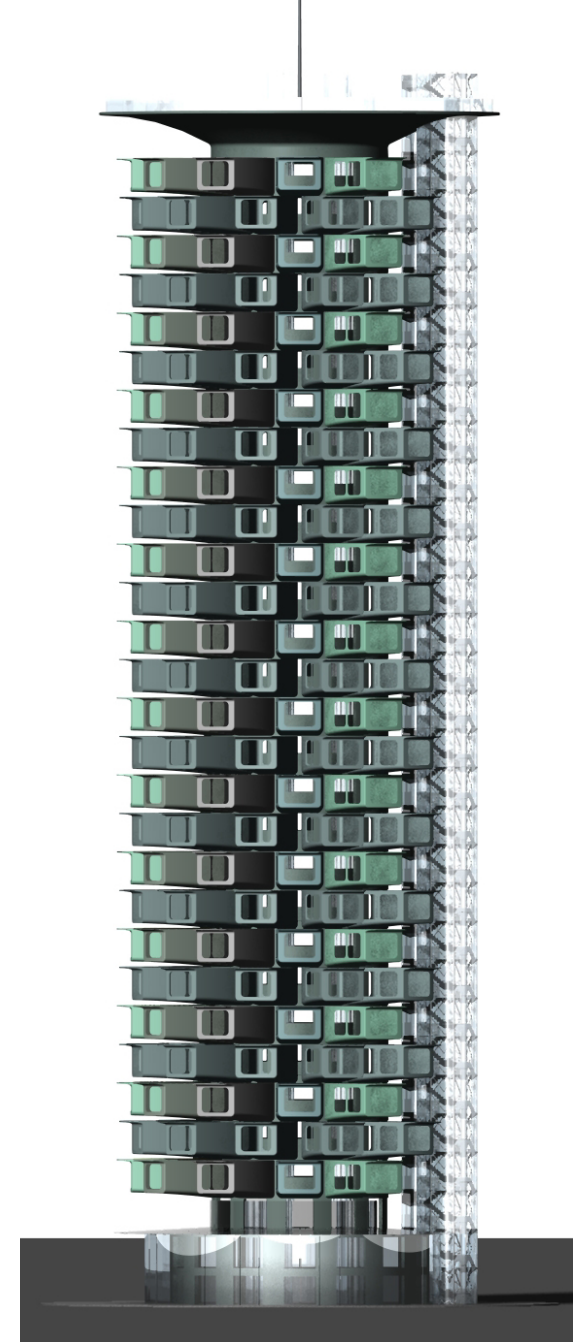


University of Hawai'i at Mānoa School of
Architecture

Explorations in Affordable Housing Design

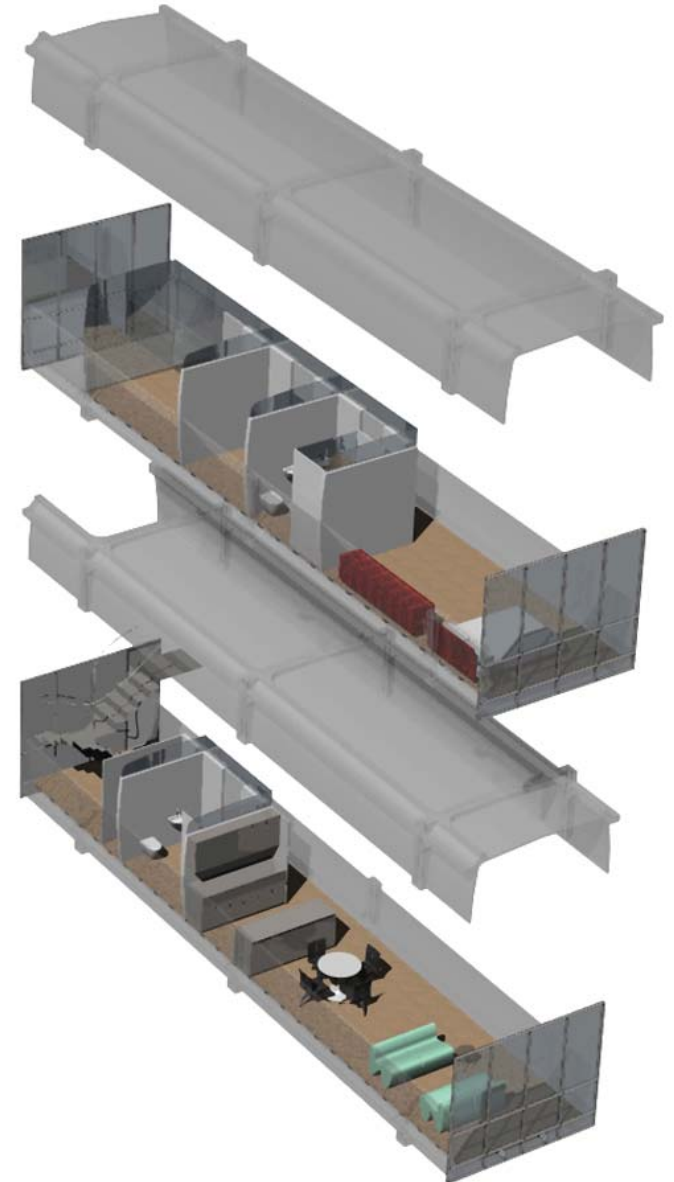
by Students and the Construction
Process Innovations Lab

Presented by David Rockwood, Associate Professor



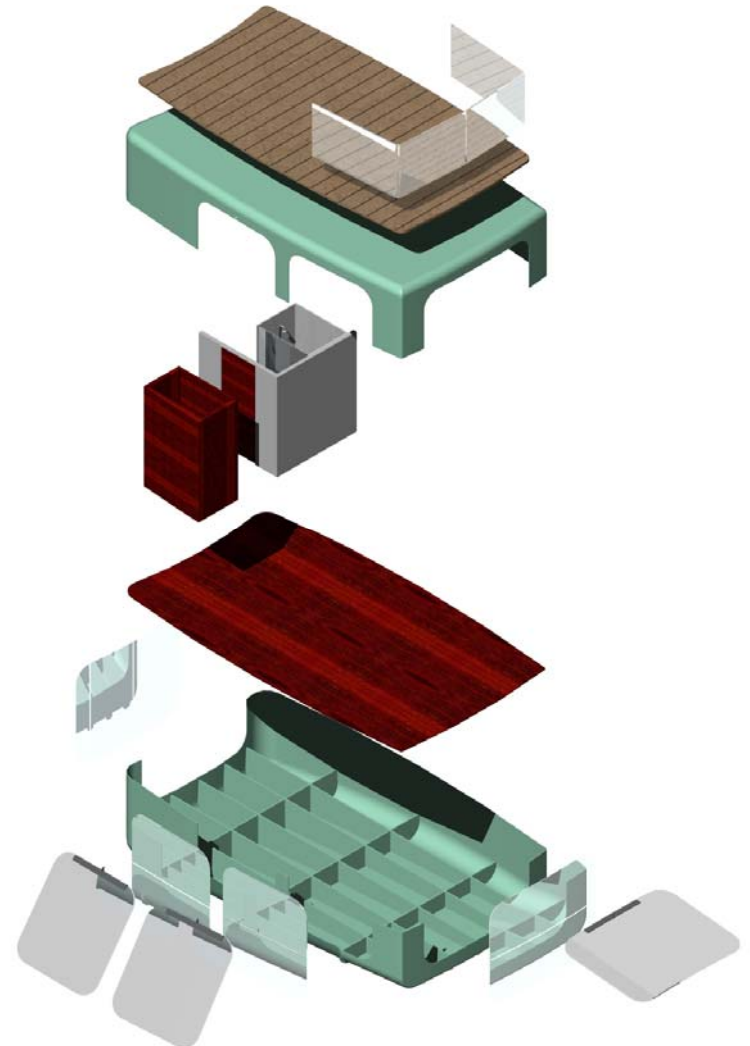
Strategies to Provide Affordable Housing

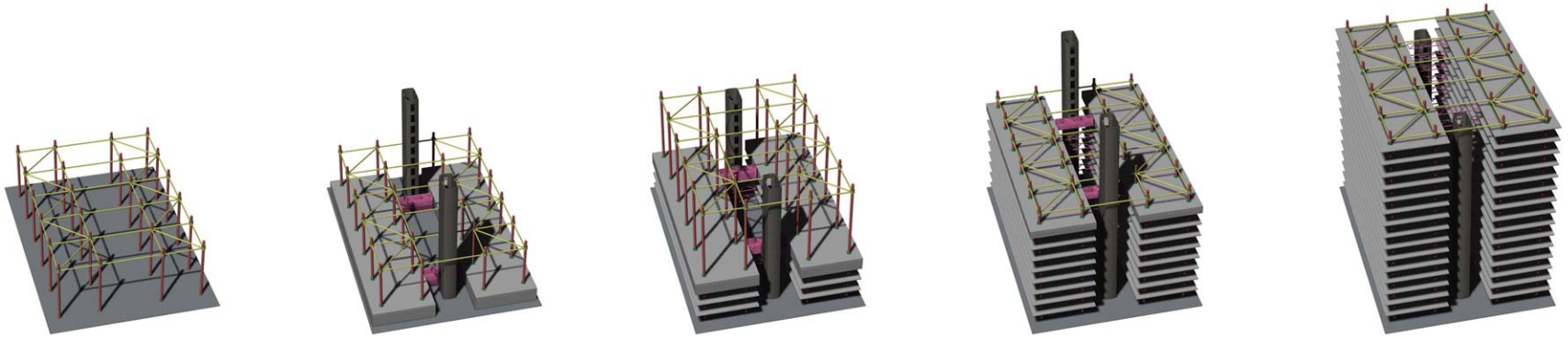
- **Financing Cost:**
 - Shorten Construction Period
- **Design Cost:**
 - BIM/Parametric Design Software
 - Modular and Repeatable Designs
- **Land Cost per Unit:**
 - Density/Multi-Storey
- **Construction Labor Cost:**
 - Simplicity
 - Repetitive Operations
 - Pre-fabrication
 - CAD/CAM
- **Total Cost of Ownership:**
 - Sustainable Design
 - Durable/Low Maintenance Materials
- **Reduce Material Cost:**
 - Local Materials (reduce shipping costs)
 - Reduce Amount Material Used



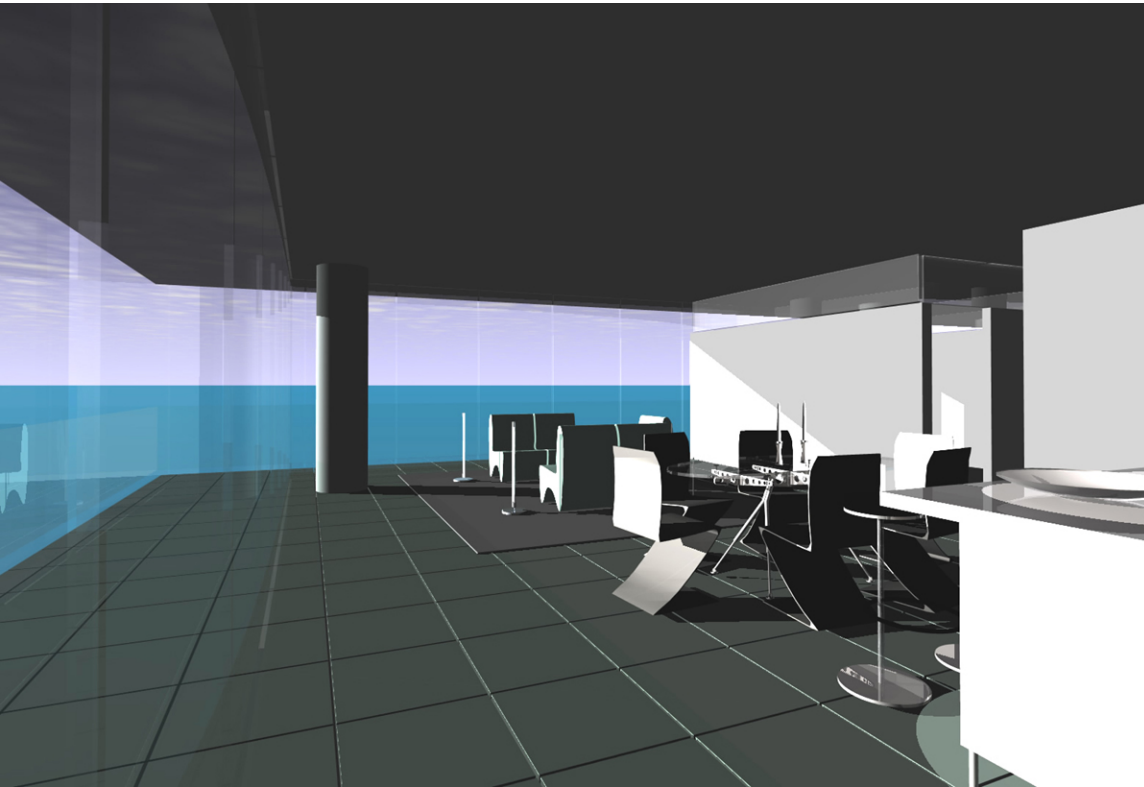
Construction Process Innovations (CPI) Lab

- Create and disseminate new knowledge
 - Materials
 - Methods
 - Structures
- Increase value, safety, time savings, aesthetic/functional quality
- Provide more valuable solutions to work through inventive synthesis of materials
 - Materials: FRC Concrete, FRP Composites
 - Form: Shells, Tension Nets, Space Frames
 - Processes: Pre-Fab, CAD/CAM, Fabrication





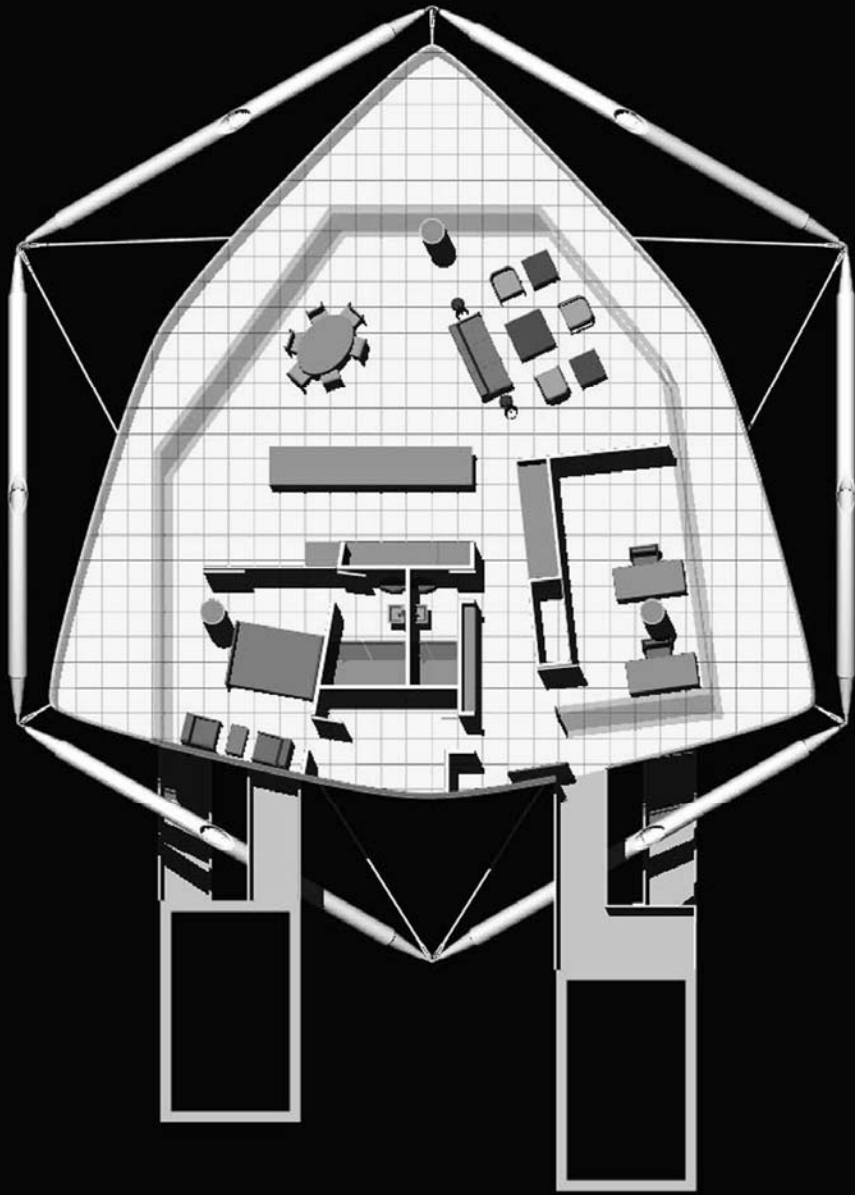
Construction Process



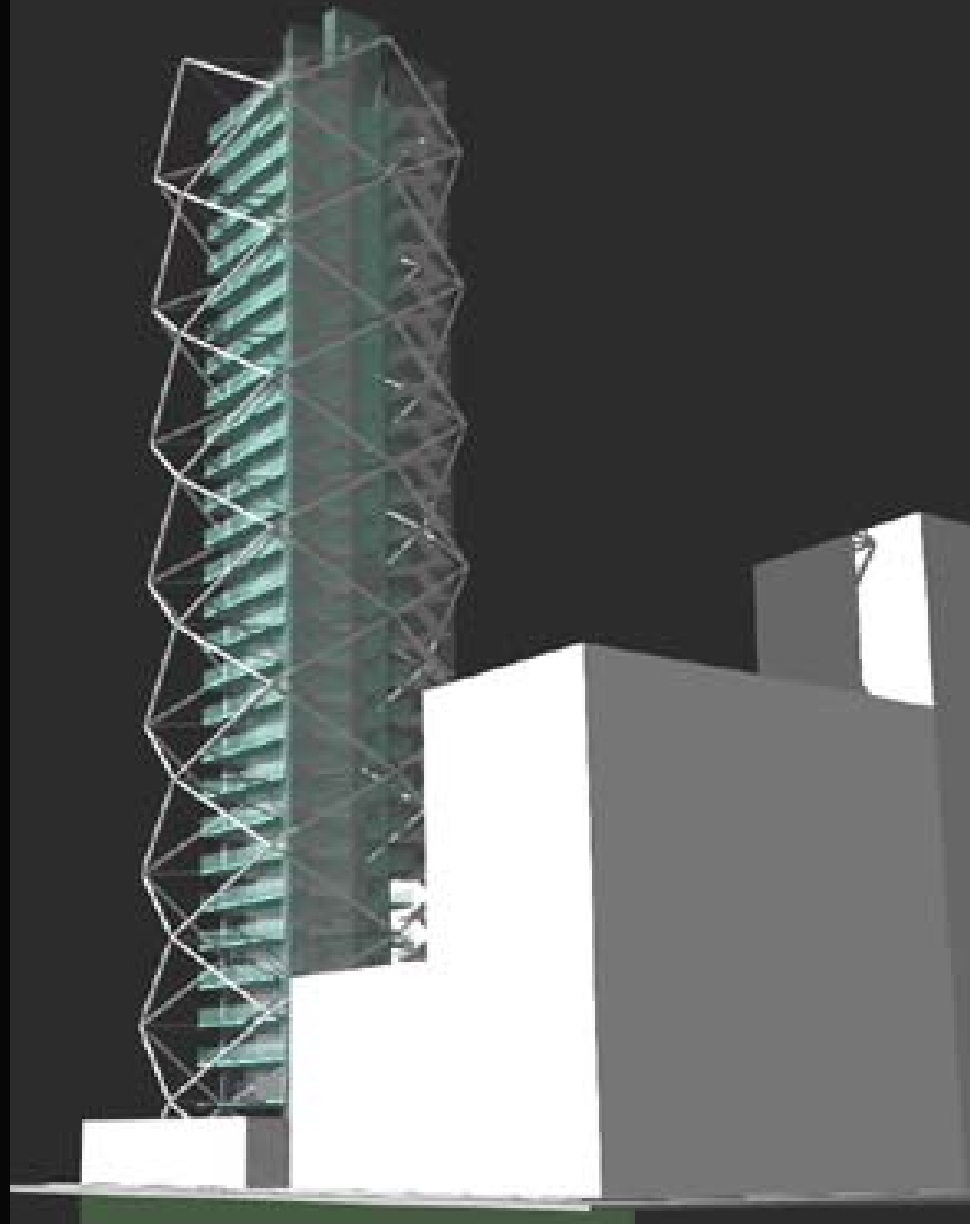
Interior View



Exterior View



Plan View



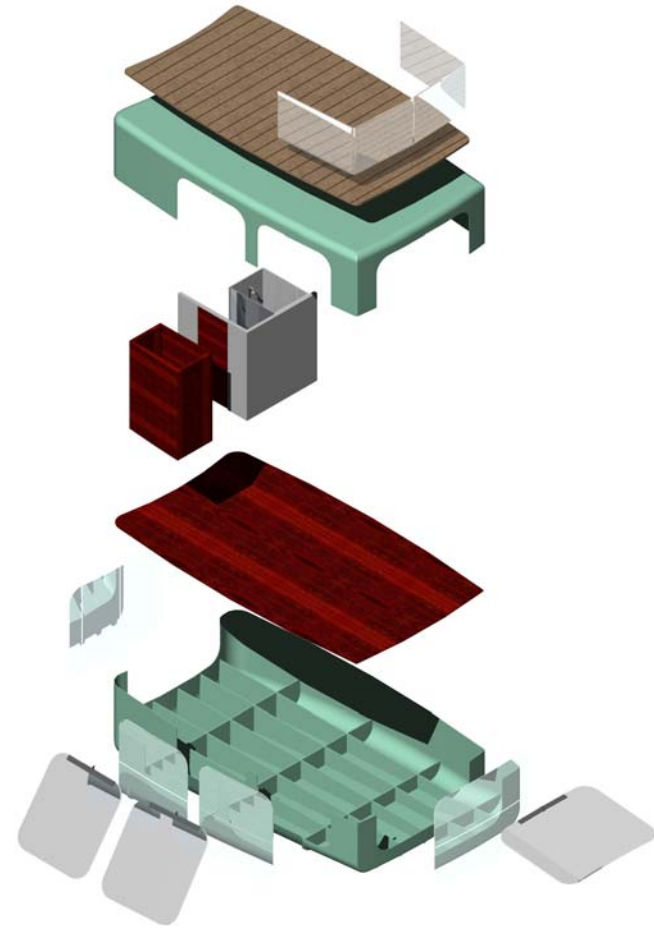
Exterior View



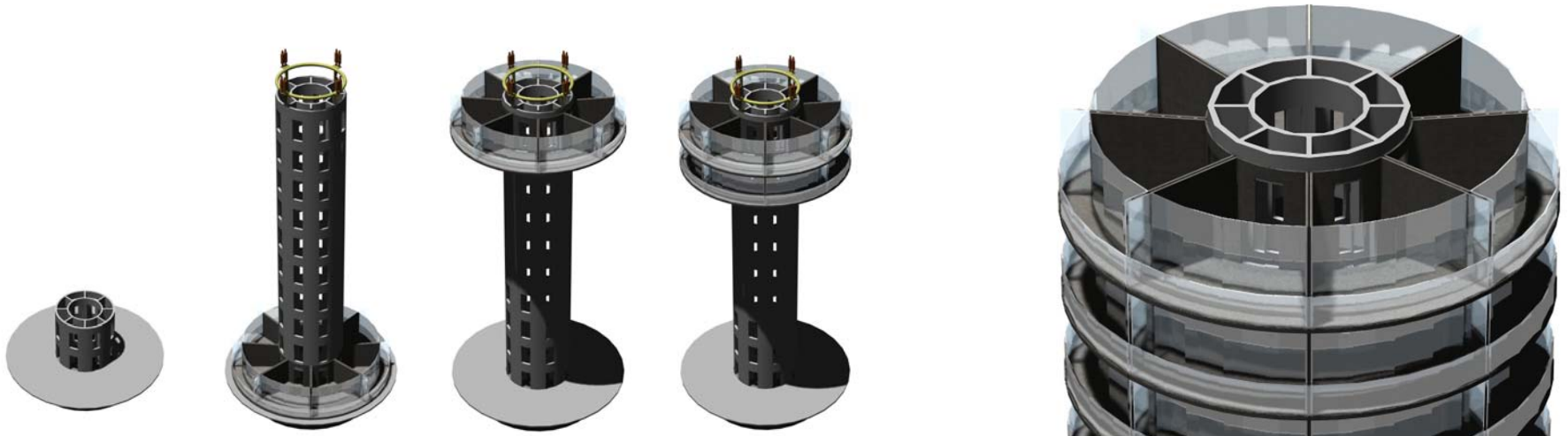
Exterior View



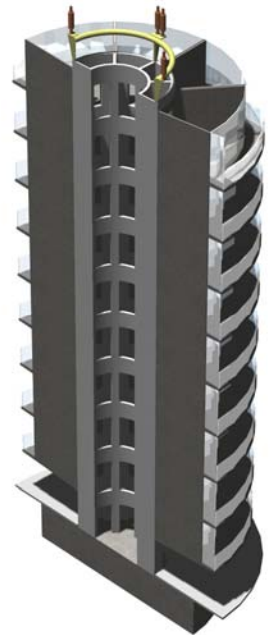
Exterior Detail View



Room Module Construction



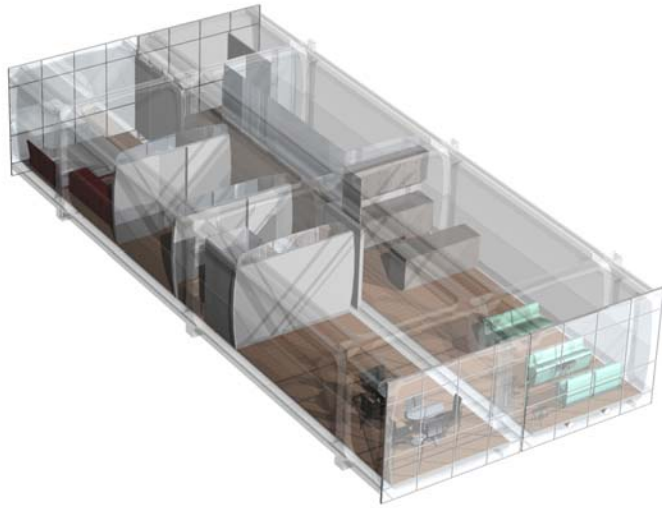
Construction Sequence



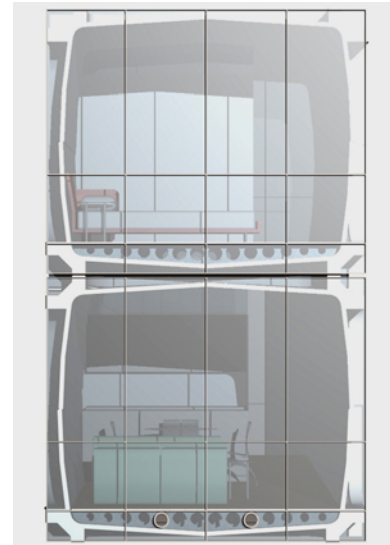
Section View



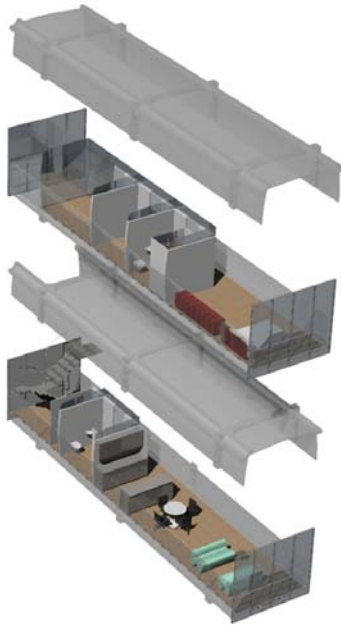
Exterior View



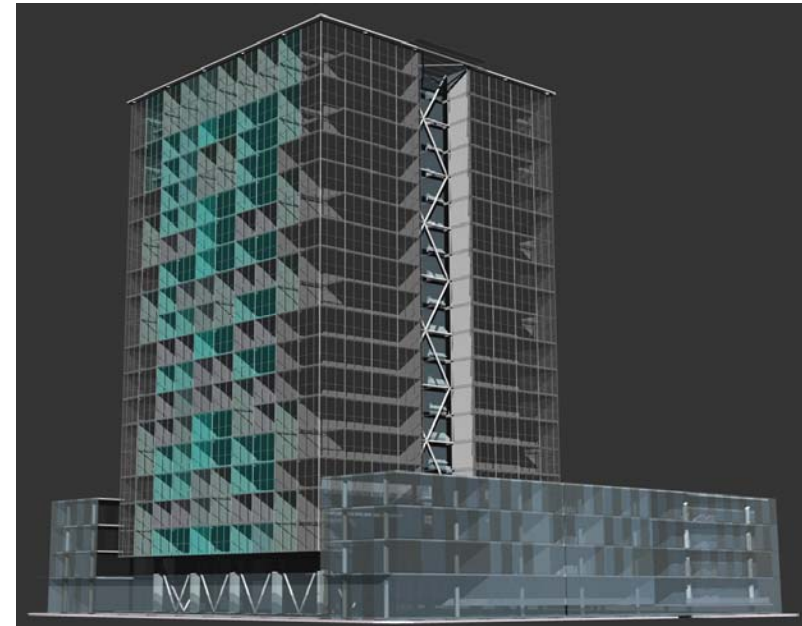
View – Double Wide Unit



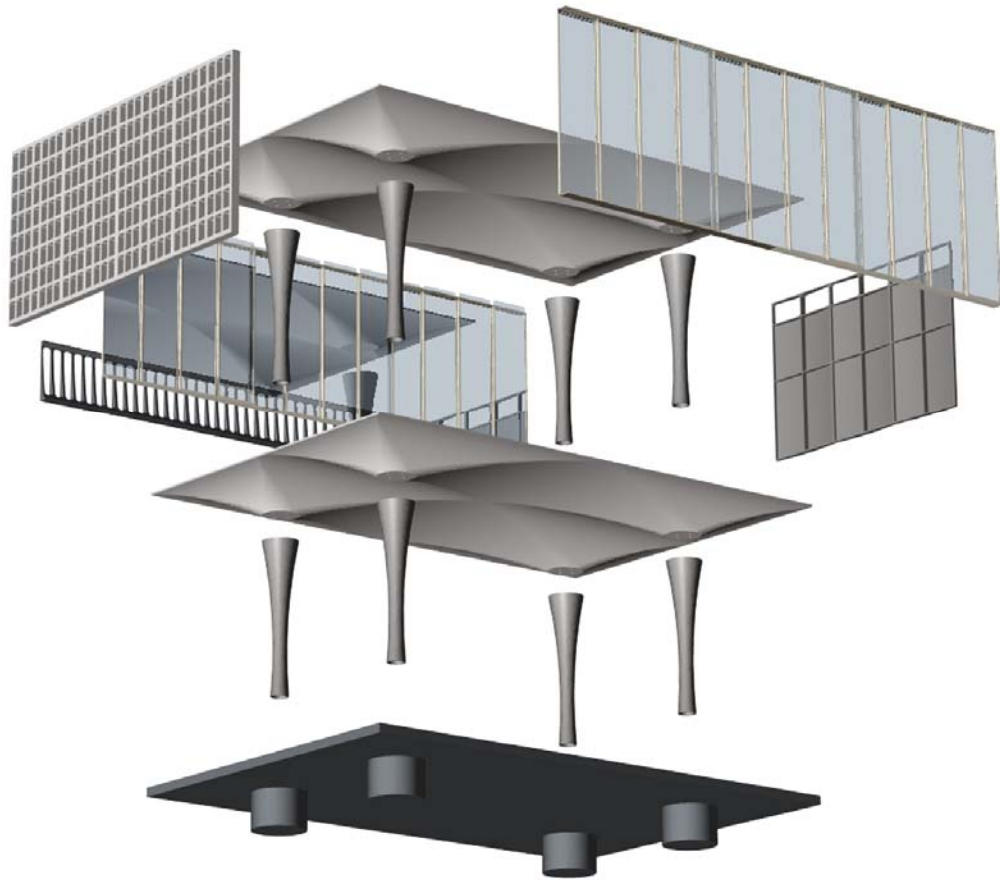
Exterior Detail View



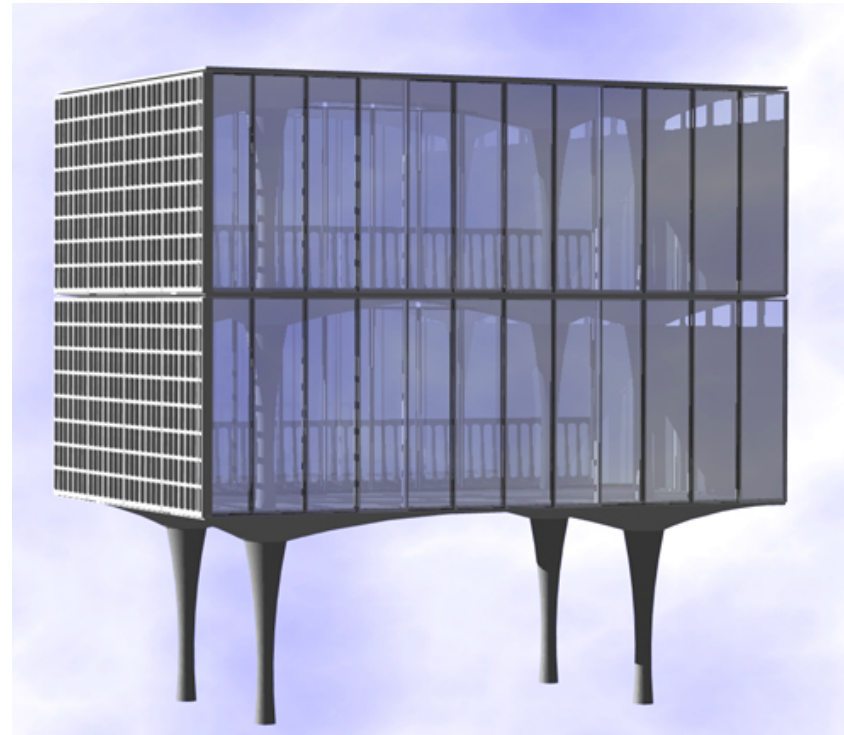
Exploded View – Double Height Unit



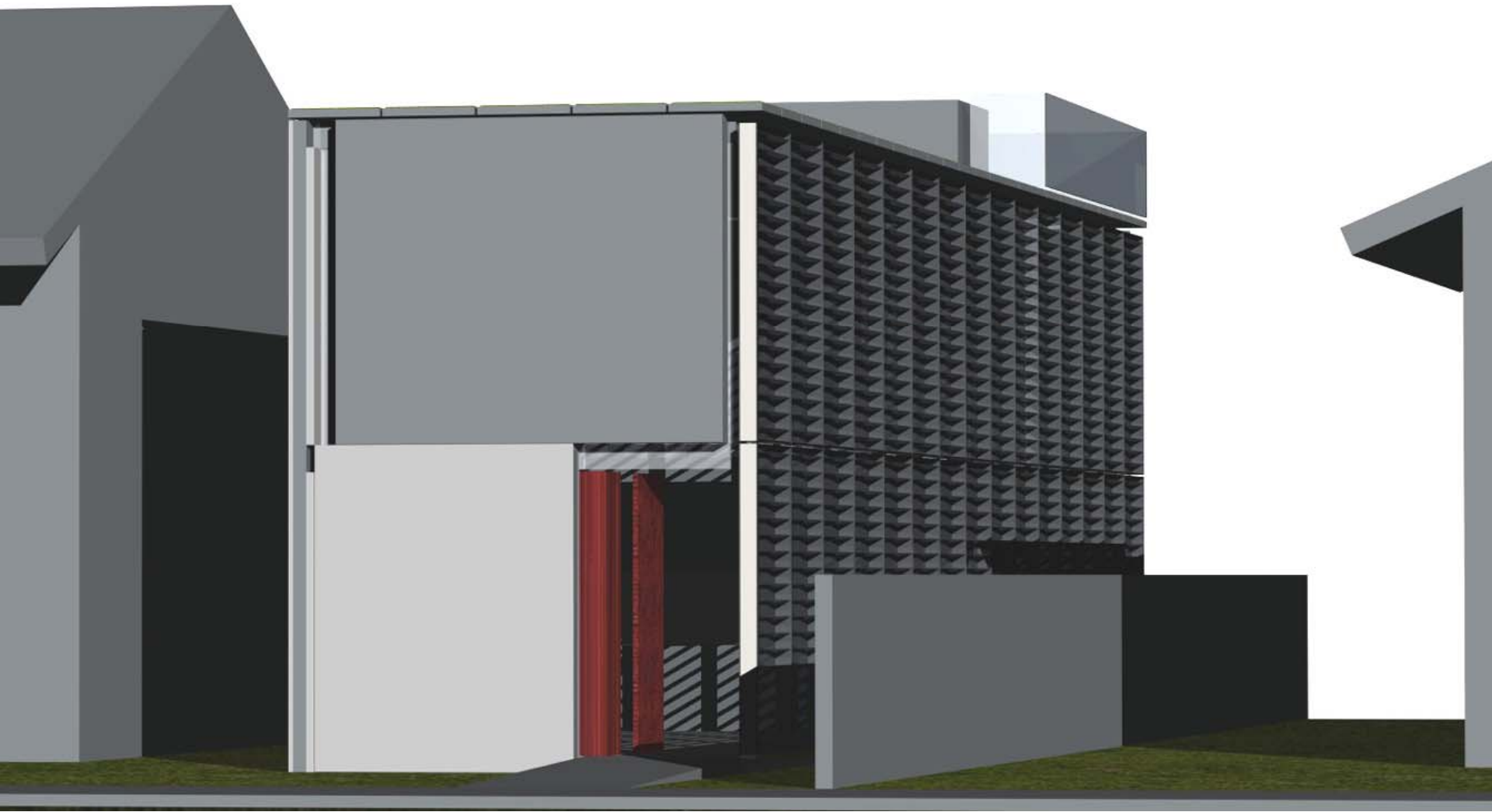
Exterior View



Exploded View



Exterior View

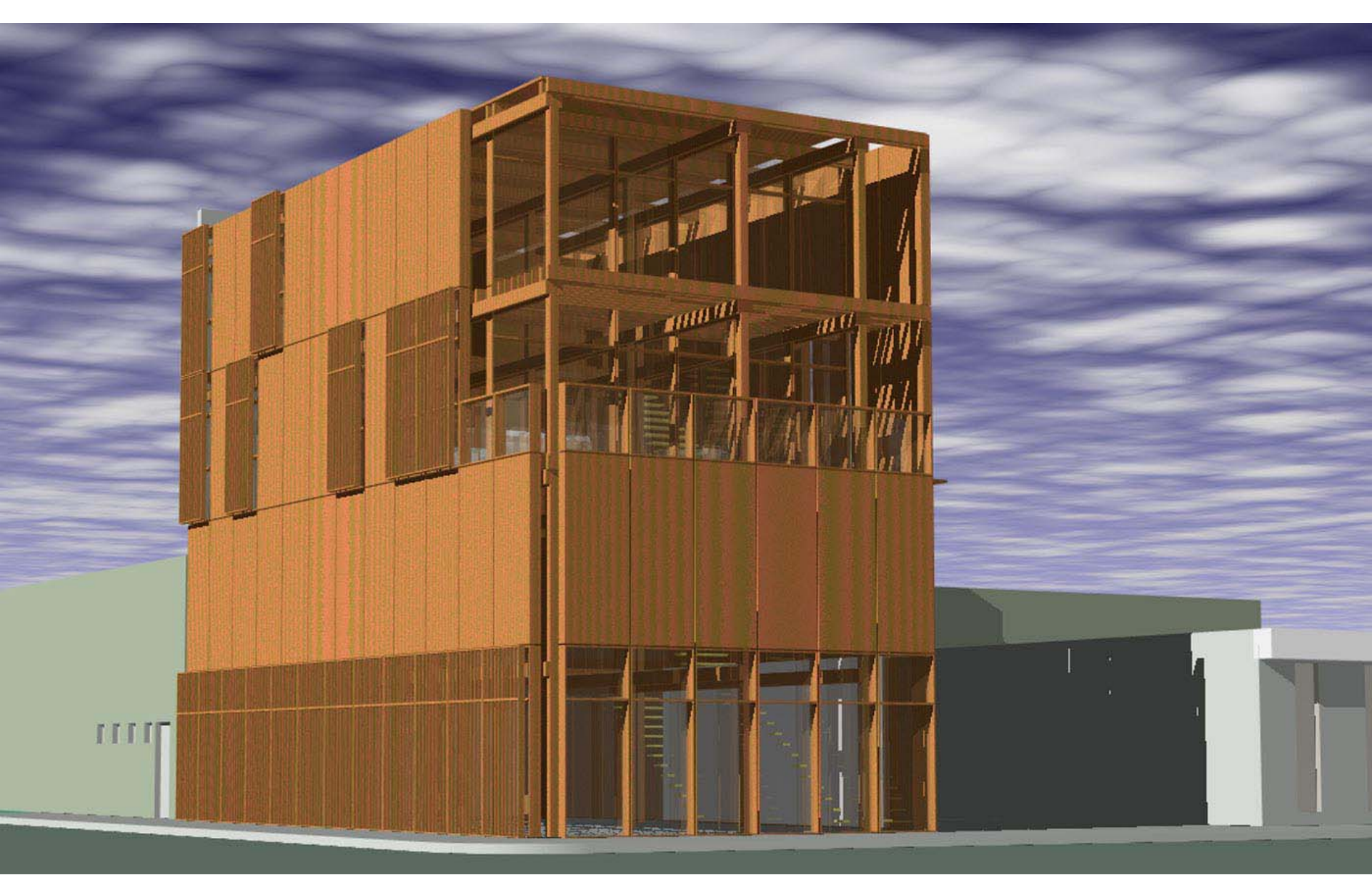


Exterior View



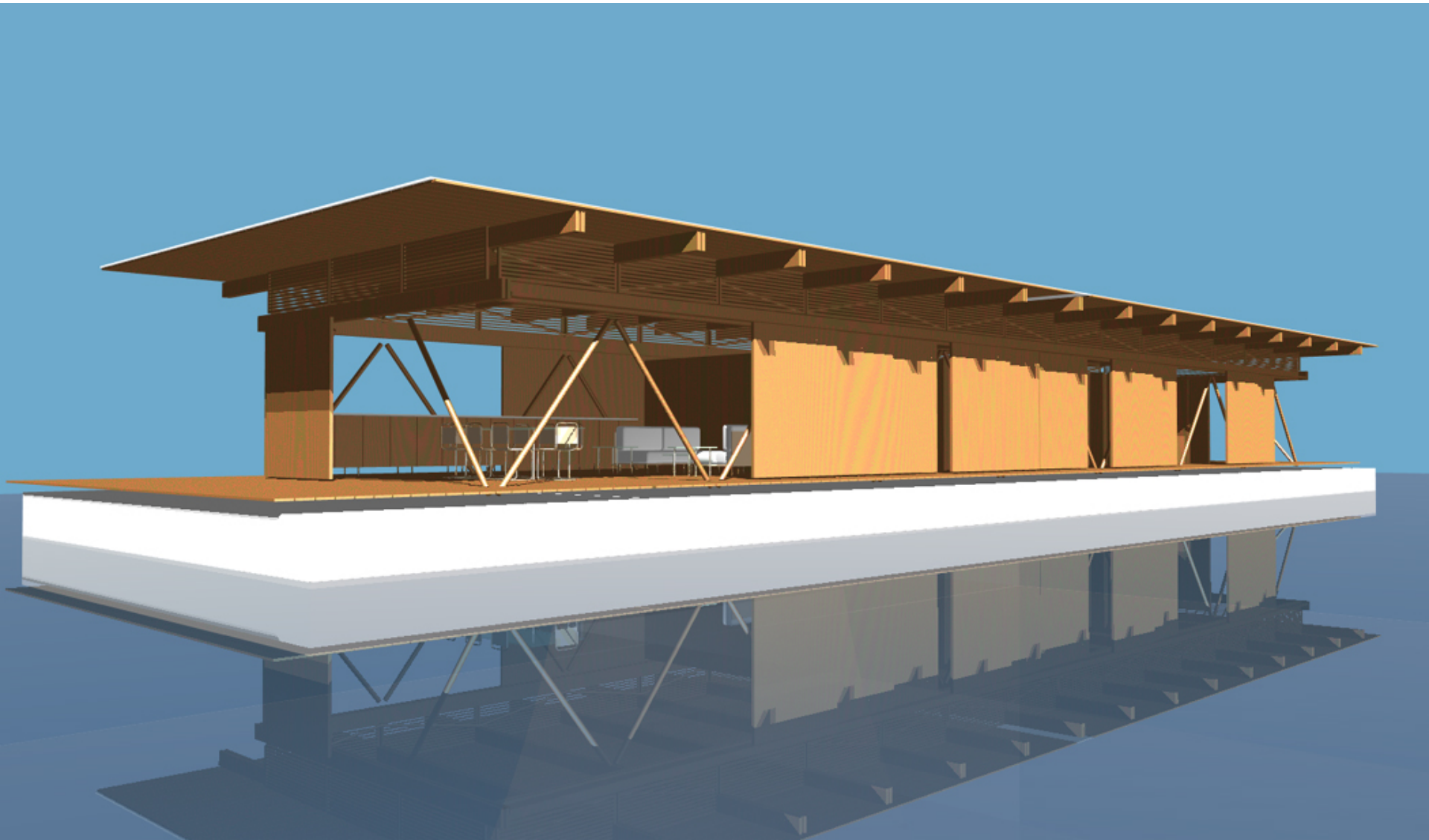
Exterior View

CPI Lab, "Prefabricated Concrete Sandwich Panel Construction for Infill Mixed-Use"



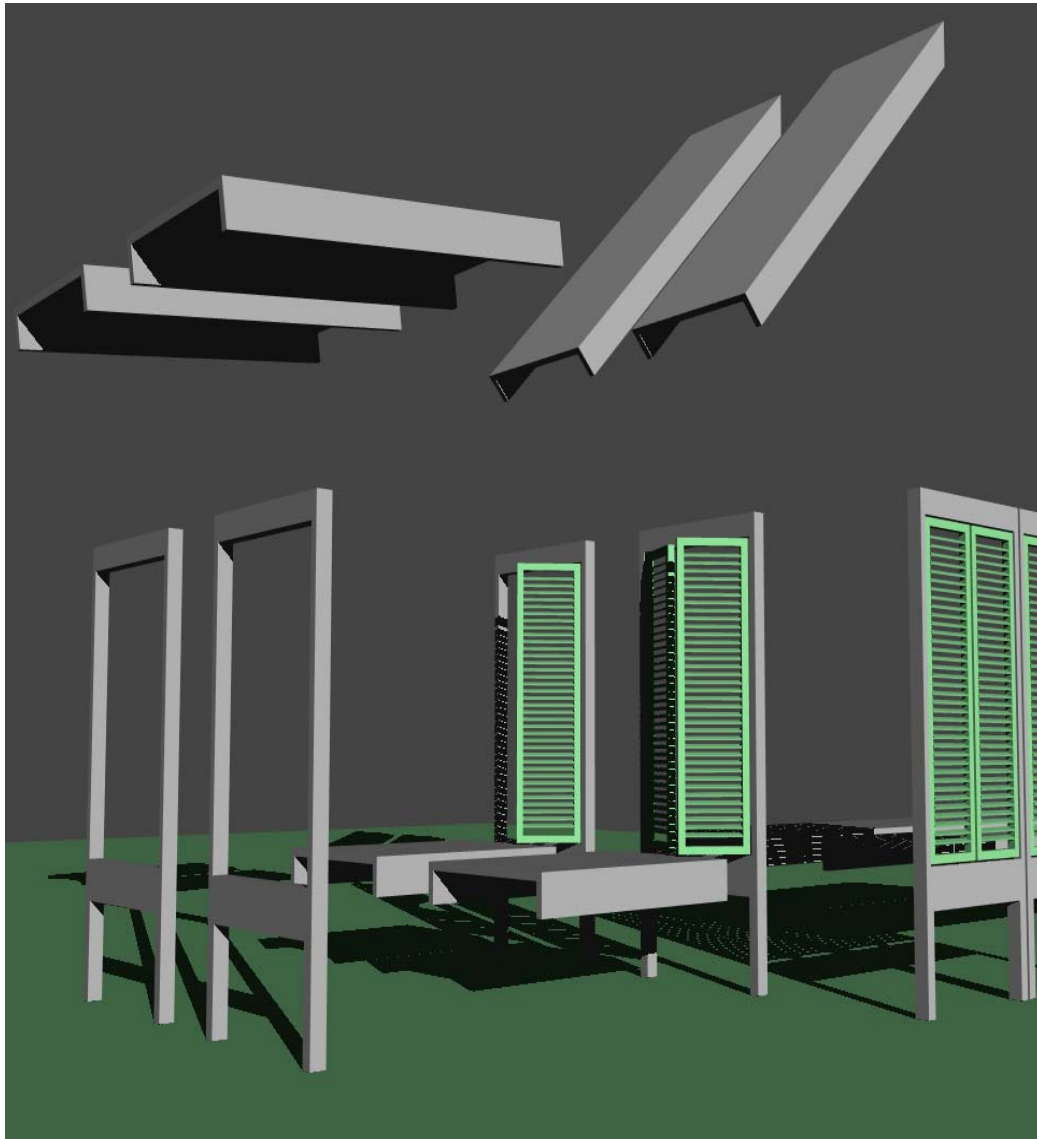
Exterior View

CPI Lab, "Prefabricated Tropical Hardwood Sandwich Panel Construction for Infill Mixed-Use"



Exterior View

CPI Lab, "Prefabricated Wood Panel Floating House"



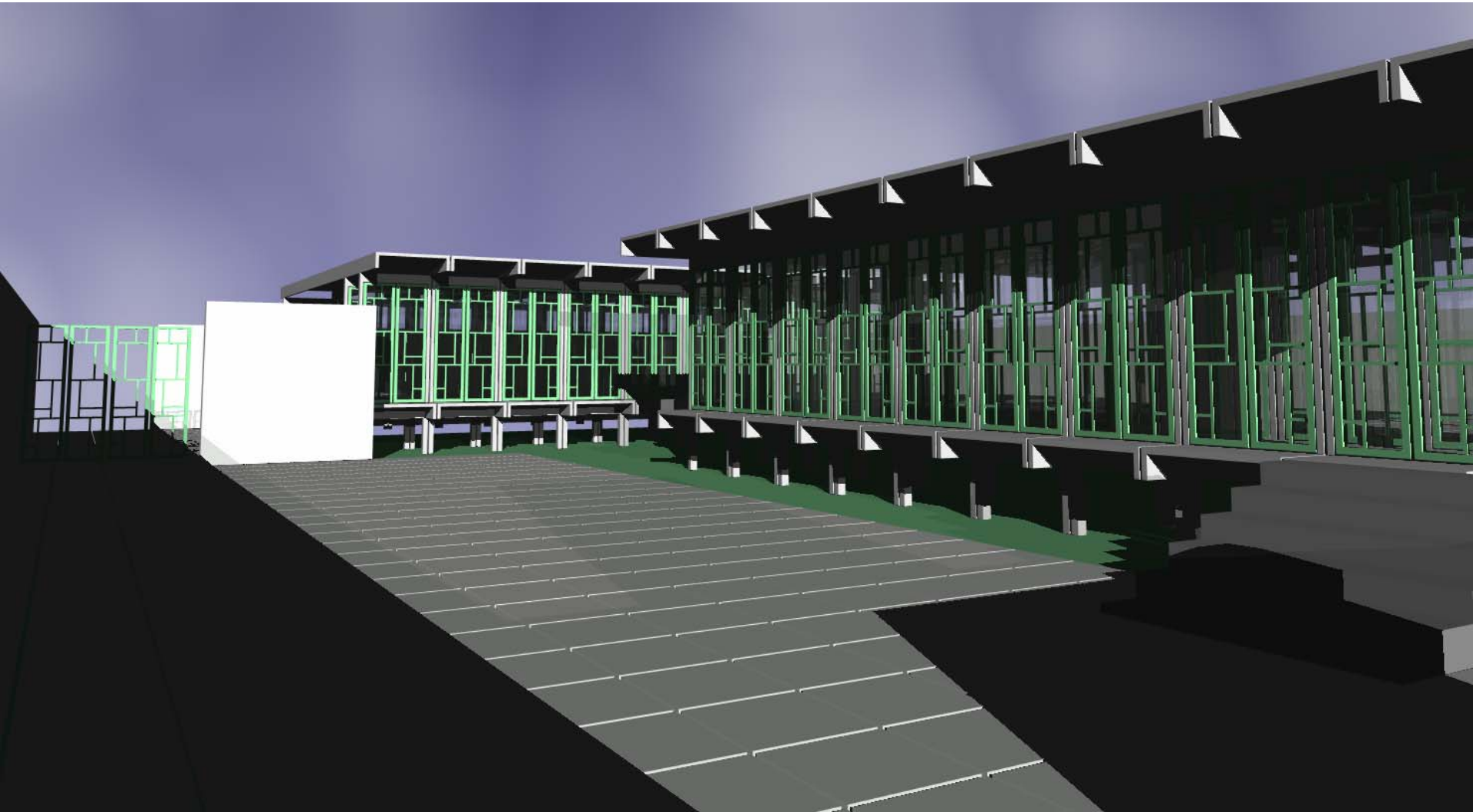
Exploded View – Construction Elements



Exterior View – Two Storey House



Exterior View – One Storey House



Courtyard View

Student Projects

- Fred Hong, Doctorate Project, “Utilizing Prefab Technologies to Develop High Quality Urban I

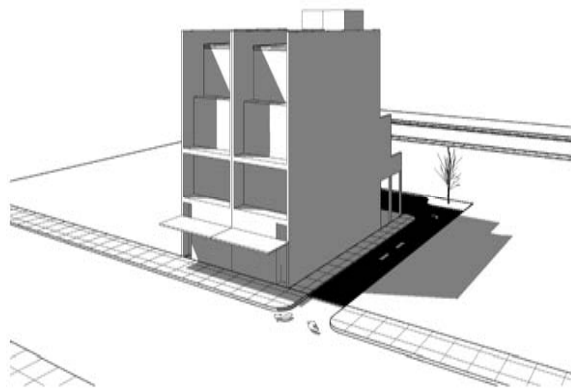


- Austin Poe, “Solar Decathlon: Utilizing Shipping Solar Power for Sustainable Affordable Housing

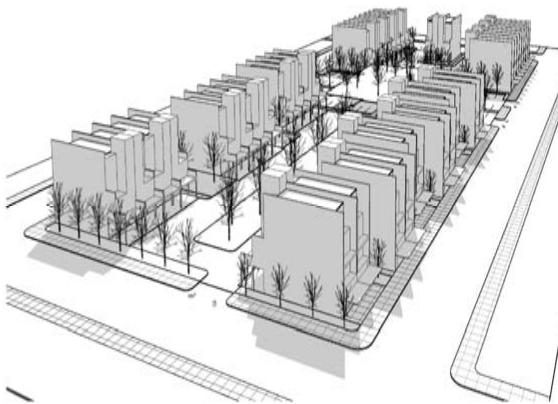


- Kanoa Chung, Design Studio Project, “Hawaii Development, East Kapolei, Oahu, Hawaii”

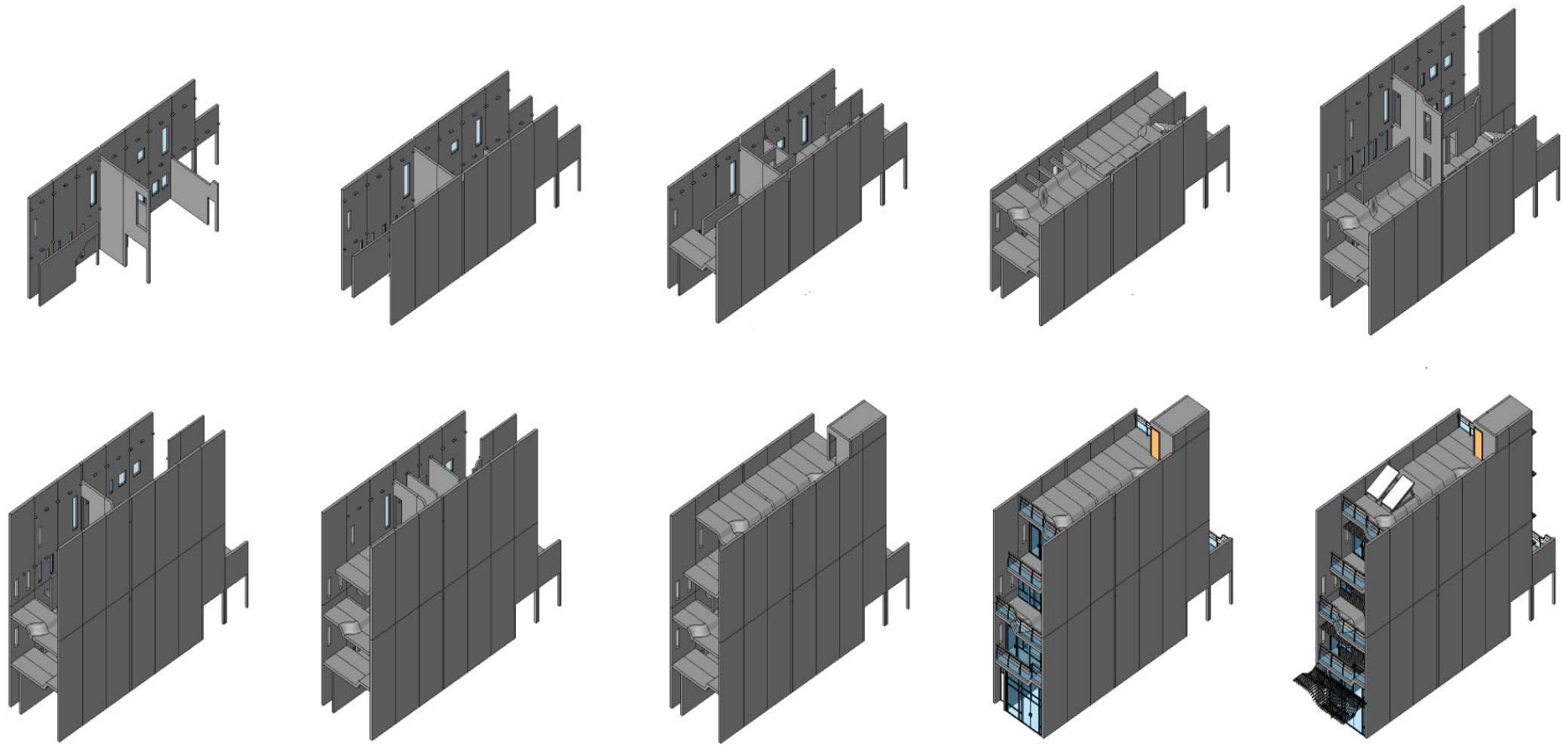




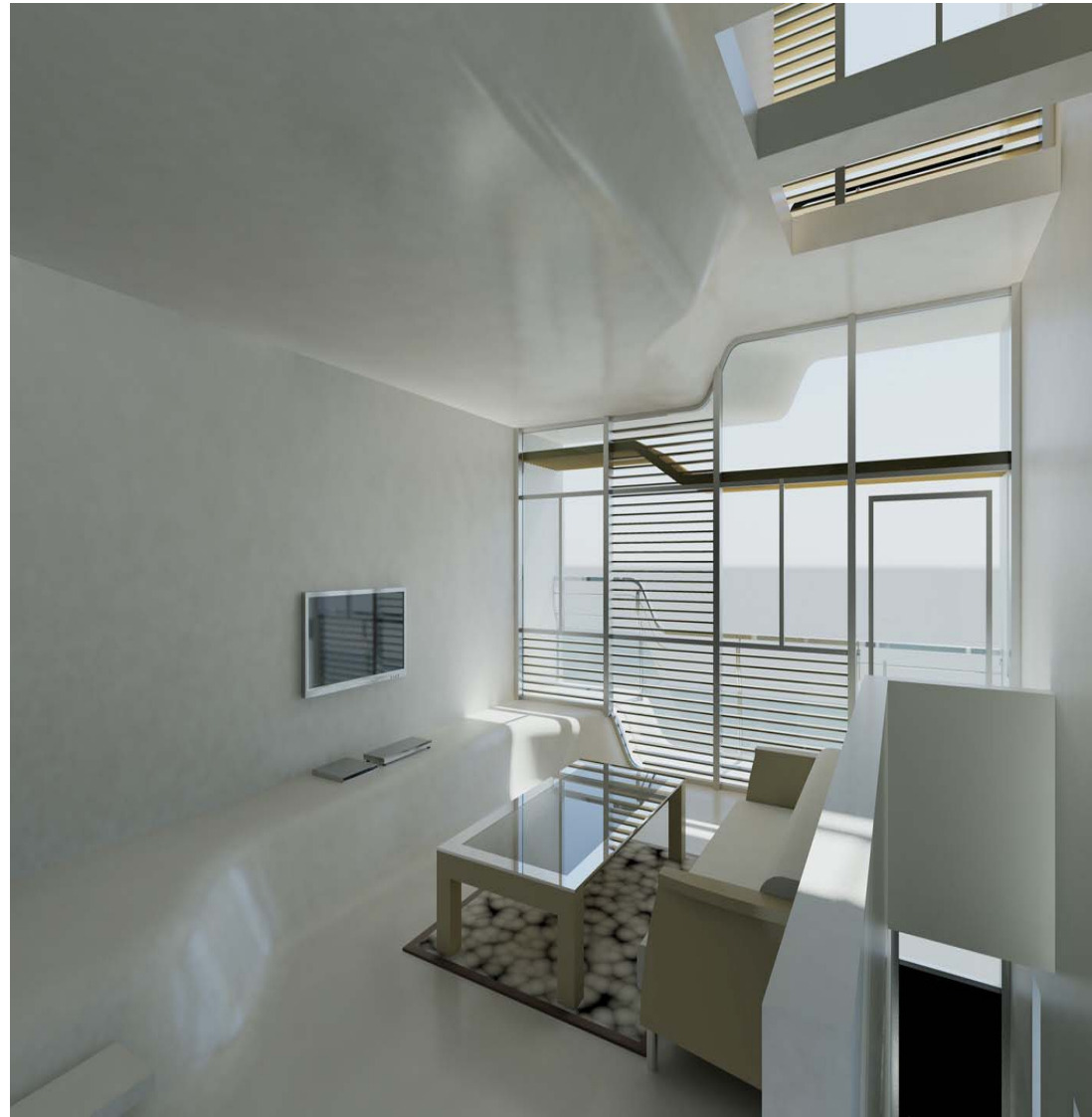
Site Configuration: 5,000 SF BMX-3 Duplex Lot



Site Configuration: 150,000 SF Development Lot



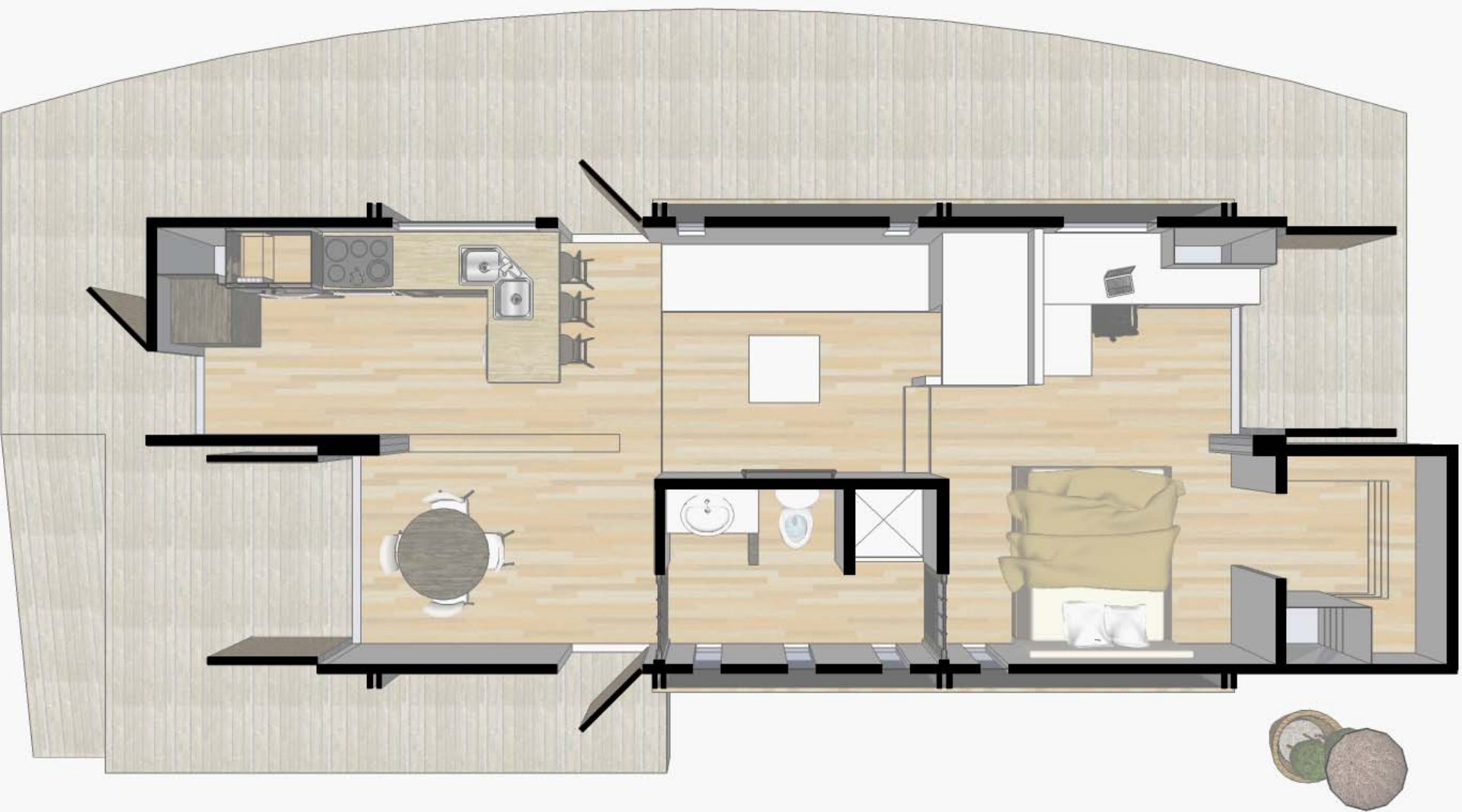
On-Site Assembly Process



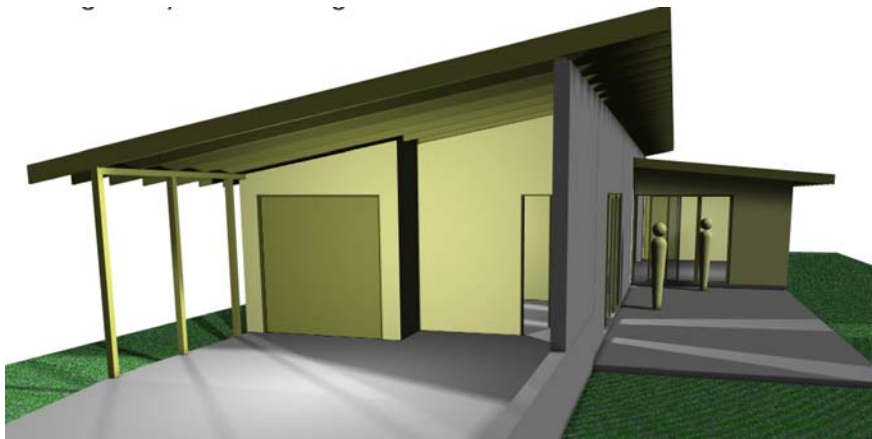
Interior Views



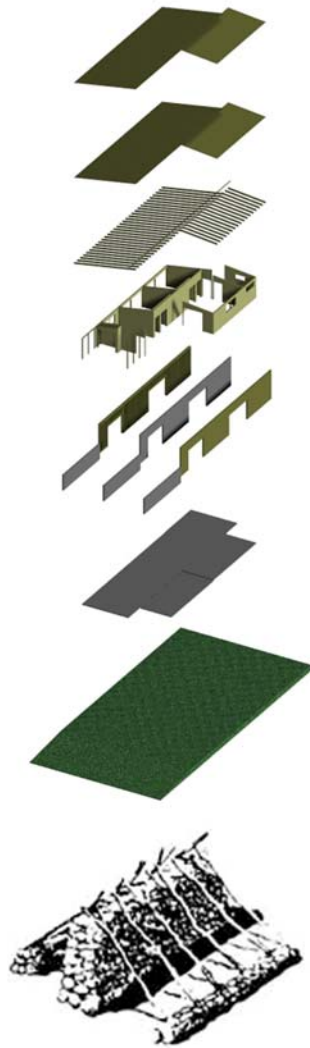
Exterior View



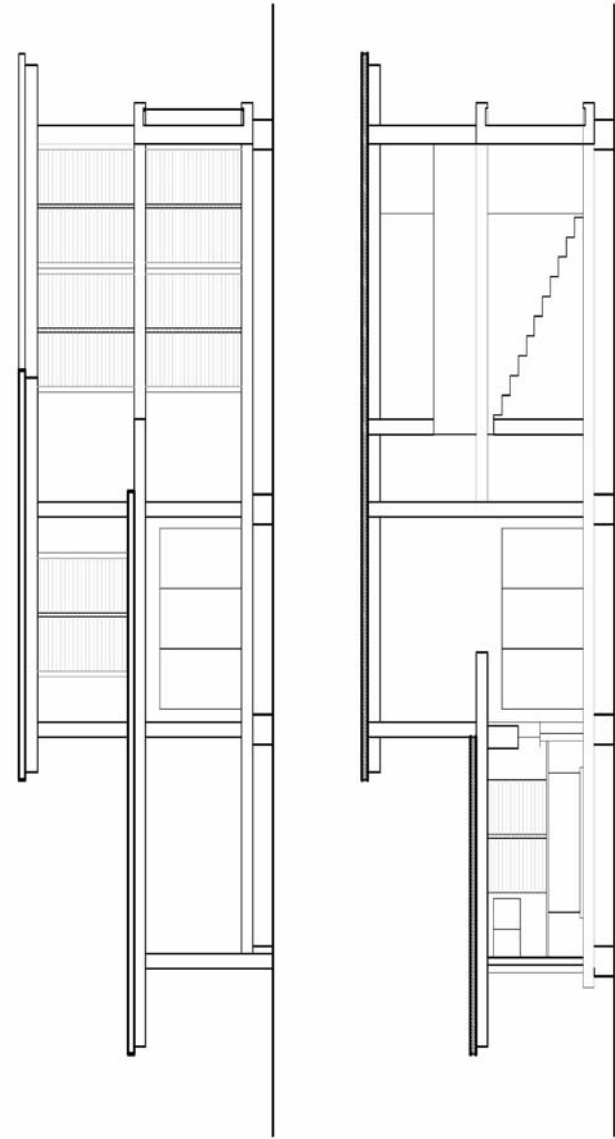
Plan View



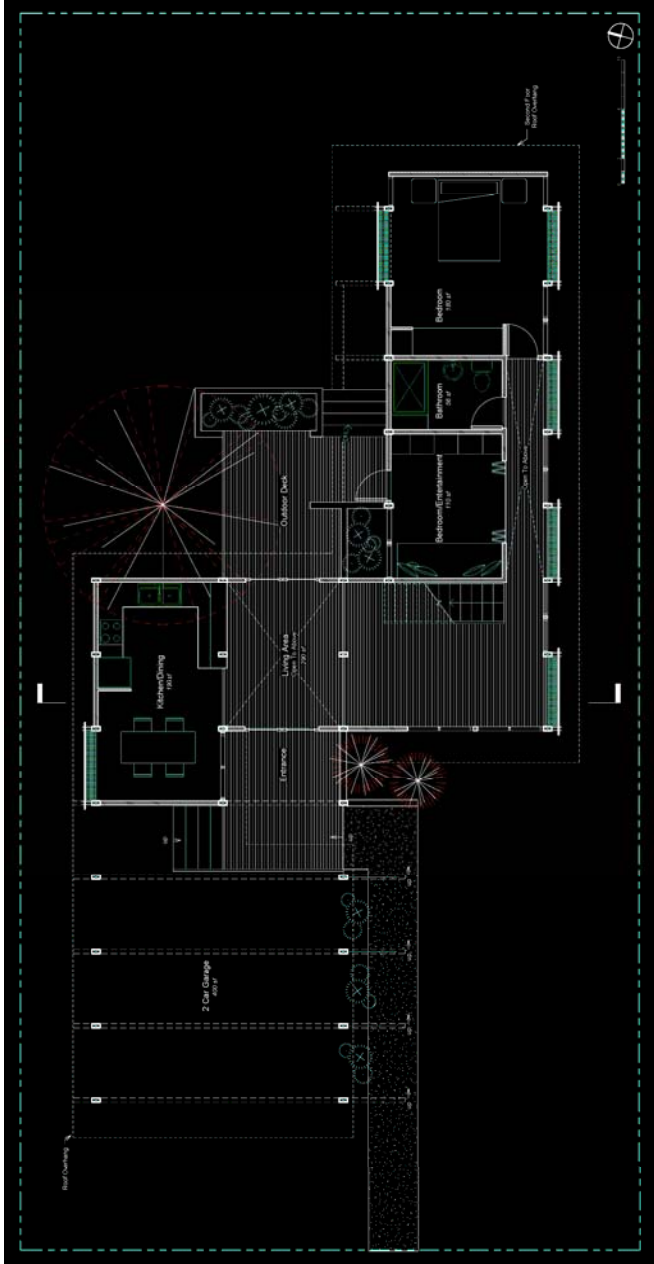
Exterior View



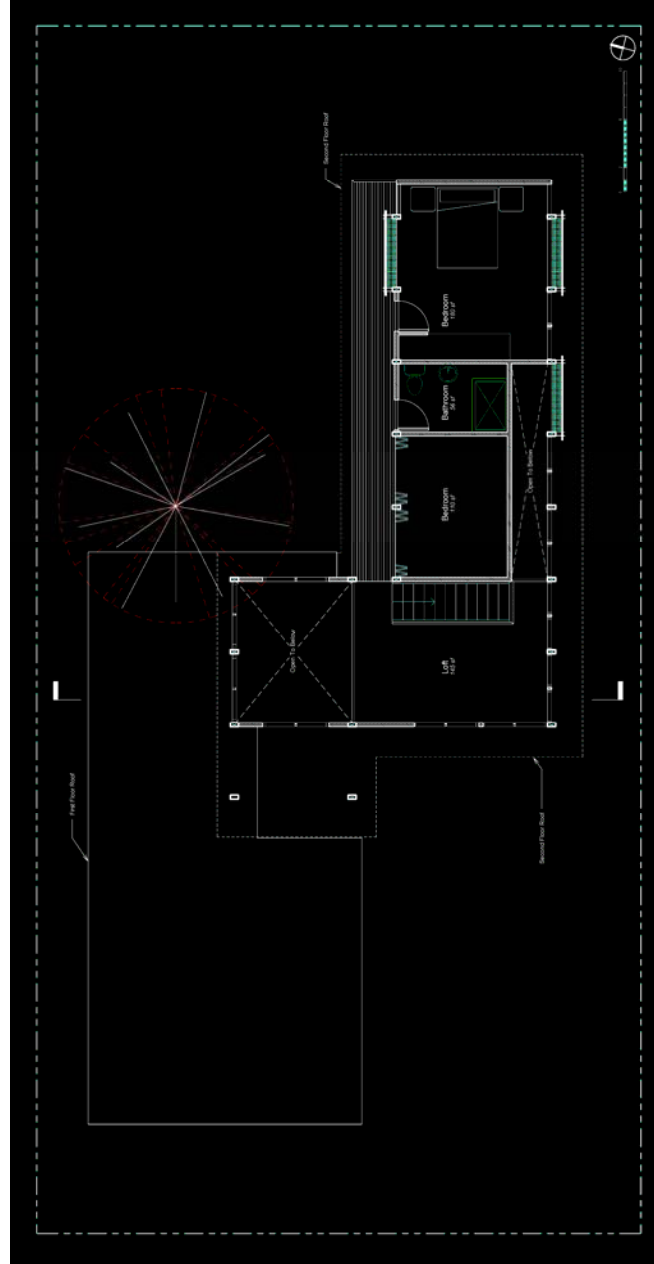
Exploded View



Plan View



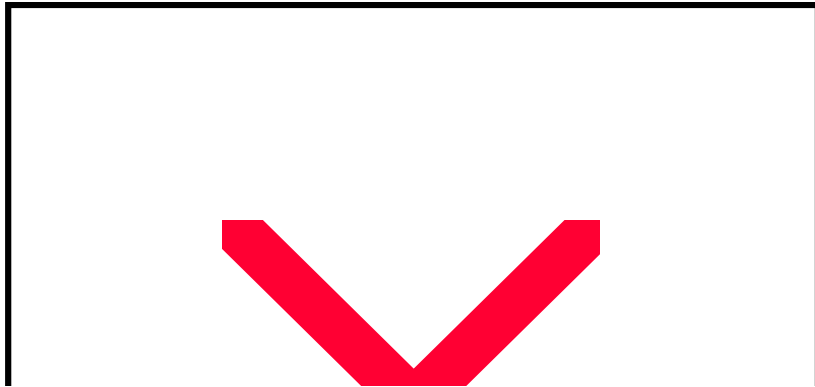
First Floor Plan



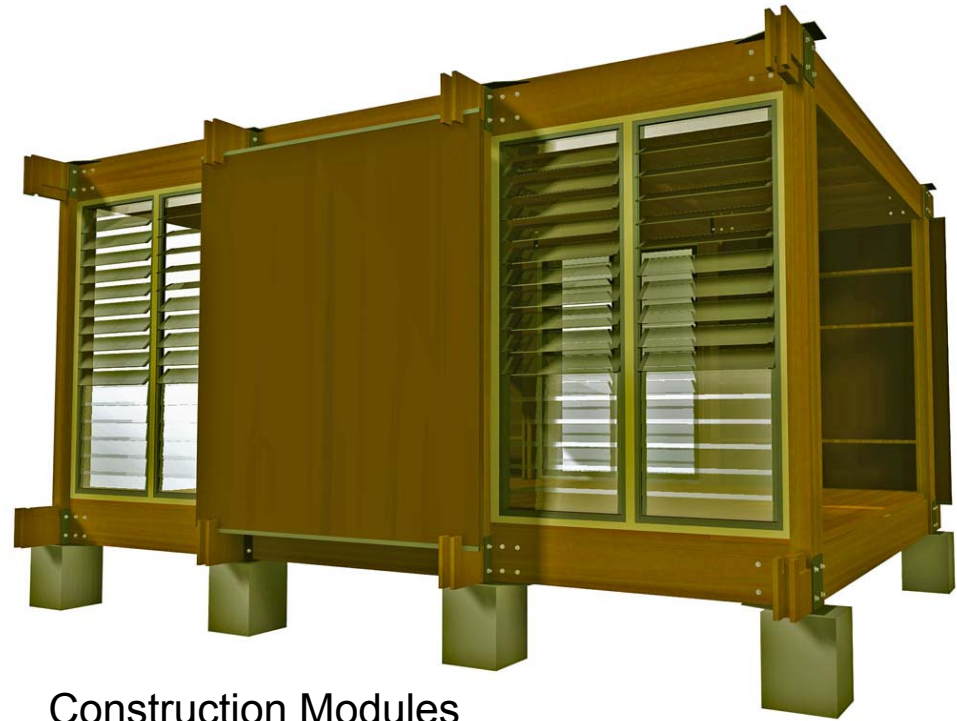
Second Floor Plan



Section View



Elevation View



Construction Modules