

Kennesaw State University

DigitalCommons@Kennesaw State University

Bachelor of Architecture Theses - 5th Year

Department of Architecture

Spring 5-9-2023

MANUFACTURED EXURBIA

Elijah Swift

Follow this and additional works at: https://digitalcommons.kennesaw.edu/barch_etd



Part of the [Environmental Design Commons](#), [Landscape Architecture Commons](#), and the [Urban, Community and Regional Planning Commons](#)

Recommended Citation

Swift, Elijah, "MANUFACTURED EXURBIA" (2023). *Bachelor of Architecture Theses - 5th Year*. 286.
https://digitalcommons.kennesaw.edu/barch_etd/286

This Thesis is brought to you for free and open access by the Department of Architecture at DigitalCommons@Kennesaw State University. It has been accepted for inclusion in Bachelor of Architecture Theses - 5th Year by an authorized administrator of DigitalCommons@Kennesaw State University. For more information, please contact digitalcommons@kennesaw.edu.

MANUFACTURED

X
U
R
B
A
N



MANUFACTURED EXURBIA

Thesis proposal is presented to the
Faculty of the Department of Architecture
College of Architecture and Construction Management

Sang Pil Lee

&

The Faculty of the Department of Architecture
College of Architecture and Construction Management

By

ELIJAH SWIFT

In partial fulfillment of the requirements for the Degree:

BACHELOR OF ARCHITECTURE

Kennesaw State University
Marietta, Georgia

May 9, 2023

CONTENT

I.

PREFACE

- iv-v TABLE OF CONTENTS
- viii-ix ACKNOWLEDGEMENTS & DEDICATIONS

01

DESIGN THEOREM

- 1.1 THESIS STATEMENT
- 1.2 PROPOSITION ESSAY
- 1.3 LITERATURE REVIEW
- 1.4 METHODOLOGY
- 1.5 OBJECTIVES

02

DESIGN ANALYSIS

- 2.0 PRECEDENT ANALYSIS
- 2.1 ONTROVERSAY MAPPING
- 2.2 SITE SELECTION

03

DESIGN PROCESS

- 3.0 SITE MANIPULATION
- 3.1 CONCEPTUALIZING TYPOLOGY
- 3.2 FUTURE IMPLICATIONS

04

DESIGN SYNTHESIS

- 4.0 IMAGE INDEX
- 4.1 BIBLIOGRAPHY

ACKNOWLEDGEMENTS

The entirety of this thesis would not have been possible without the guidance of my thesis advisors & others:

Professor Sang Pil Lee

Interim Chair Christopher Welty

Professor Peter Pittman

This thesis simply would not have been possible without the knowledge and experience that you provided throughout the past academic year. I have learned so much from you during the process of constructing this thesis and your years of experience made it easy to trust your critique.

Thank you for your candid advise and for always being open to give legitimate critique. Your mentorship has been highly valued over the past few years

Thank you for your insightful critique of the human behavior in relation to the spaces we live. Our discussions have allowed me to think about how we interact with architecture rather than just become inactive inhabitants.

DEDICATED TO

Cheryl Willson Swift

Easter B. Wilson

Duy (Khan) Lee

I dedicate this thesis to my dear mother who raised me from birth and has been a persistent help in all of my endeavors personal, academic, professional, and religious. The loving example your life has been throughout my life will forever remain with me.

I dedicate this thesis to my grandmother who has also raised me since my years as a pre-teen. Her guidance as an example of unwavering Faith in our Lord Jesus Christ and Goodheartness will endure with me forever.

Lastly, I dedicate this thesis to Duy Lee's my first ever friend in the Architecture program at Kennesaw State University, who sadly passed away in the summer of 2019. The friendship he and I shared was a great source of comfort and comradery.



01

LITERATURE REVIEW:

The literature review is a process of exploration, understanding, and synthesis of information concerning this thesis, involving research questions, or phenomenon and the documentation of the process to answer what a topic is about, what scholars have discussed the topic, what examples are there concerning this thesis, and whether or not there are gaps in the knowledge before a project moves into the design phase.

METHODOLOGY & OBJECTIVE:

The design methodology highlights the focus of the practical problem solving aspect of the project, what goals are to be executed or what elements of the project will be highlighted in the design and fabrication portion of the thesis studio

DESIGN THEOREM



THESIS STATEMENT

This project redefines the identity of the manufactured housing typology by conceiving of more adaptable structural configurations which provide a framework for breaking the conformity of mass production and mass consumption to give the residents true economic prosperity through control of the **3-D manufacturing** process of their homes. Manufactured housing, formerly known as mobile or trailer homes, is one of the most vulnerable housing types in the United States during a severe weather event. This is due to the mass industrial production of a structural composition that is rather suited for permanently fixed construction, leading to fragility in their assemblage and poor construction specifications. The focus of design exploration throughout this thesis is towards the structural stability of manufactured housing in **preparation for a severe natural hazard** predicated upon refabricating three fundamental elements of its construction: **Flexible Frame, Universal bracing, & Ease of the structural manipulation process.**

While the revitalization of manufactured housing in this thesis rests upon the success of establishing the three afore mentioned elements, the socio-political implication of the project rests upon the 3-D fabrication of the manufactured homes. An on-site fabrication center gives residents ownership of the means of production of their homes and affords freedom from established society, which is the identity from which the housing type emerged in the mid-1950s. Introducing a site dedicated worker-space is a radical change in the sustaining logic of consumerism because the fab-center breaks the traditional buyer seller market system by giving the residents the ability to make constructive decisions on how to improve their standard of living.

Given that the chassis of manufactured homes has long served as the defining element of its dual identity as a hybrid house-vehicle typology, the process of equipping manufactured homes will involve designing temporarily held structural assemblies with a flexible frame system that can adapt and respond to regional weather conditions via expansion and reduction of the trailer frame. Therefore, proper bracing of mobile homes involves designing a system that is integrated into the framework of the structure which adapts to various module configurations.



THESIS POSTER & QUOTATION

“When a family sites their typically singlewide home in a rural trailer park, their lives become an ongoing struggle to realize their dreamed-for benefits of homeownership because of the costs and burdens imposed by this type of housing.”

- Sonya Salamon [Singlewide: chasing the American dream in a rural trailer park]

THESIS PROPOSITION

This thesis proposes the solution to the affordable housing crisis in America by calling for its economic and social revitalization via a redesign and redevelopment of the infrastructure of manufactured housing. To address the issue of structural instability in the manufactured housing typology a restructuring of the current conventional type of construction is necessary because modern manufactured homes are built using the same building materials as site-built homes, as underlines by the MHI. But why should a mobile home be built using the same materials as a conventional site-built home which has a cornerstone foundation?

According to the Manufactured Housing Institute (MHI) federal standards regulate manufactured housing design and construction, strength and durability, transportability, fire resistance, energy efficiency and quality by way of the HUD code of 1976. They also state that proper installation and anchoring of the home is a key element in how a manufactured home will perform in severe weather situations. This thesis will engage in a study of the morphology of mobile homes in order to understand how to improve the design of existing structures by creating prototype iterations to examine the benefits of various design decisions that have been made and to propose different design solutions that are more practical and ergonomic.

In June of 2010, the Department of Housing and Urban Development published three major rules in the federal register regarding On-site completion of construction of manufactured homes. The proposed rule would simplify the process by establishing uniform procedures by which manufacturers could complete construction of their homes at the installation site without obtaining advance approval in accordance with section 3282.14 of HUD's Manufactured Home Procedural and Enforcement Regulations. This rule implementation effectively allows my thesis to propose bringing the factory to the site enabling residents to build and make improvements on their homes in a dedicated community oriented workerspace station.

Generally speaking, manufactured homeowners invest money into their homes in the same manner that conventional home owners do sometimes even for generations. Manufactured homeowners are required to pay a space rent for leasing the land their homes reside on and are often faced with the difficulty of dealing with increased rental rates and taxation. When the residents aren't able to meet these desires they are faced with eviction or moving their homes which often can cost them thousands of dollars for removal. As this housing type attracts more attention as a solution for affordable housing there is a pressing need for a solution to homeowners improving and transporting their homes. This development approach will answer the need of economically self-sustaining communities by effectively providing a place-based economic development plan relative to the site conditions of the parks and demographic of the residents.

LITERATURE REVIEW

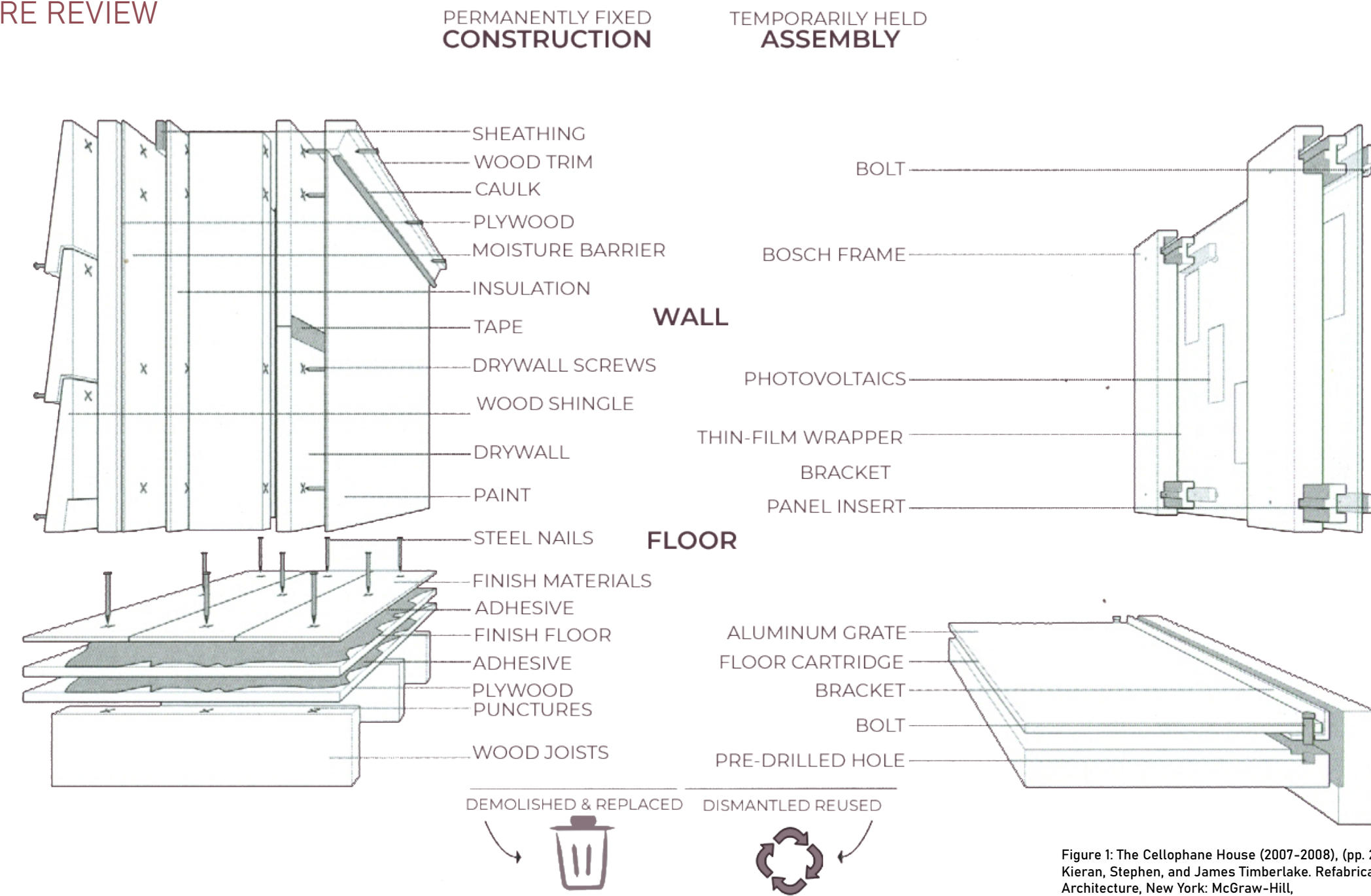


Figure 1: The Cellophane House (2007-2008), (pp. 226) Kieran, Stephen, and James Timberlake. *Refabricating Architecture*, New York: McGraw-Hill,

Pre-fabricate: "To manufacture (a building or section of a building, for example) in advance, especially in standard sections that can be easily shipped and assembled." [2]

Pre- word-forming element meaning "before," from Old French pre- and Medieval Latin pre-, both from Latin prae (adverb and preposition) "before in time or place," (1)

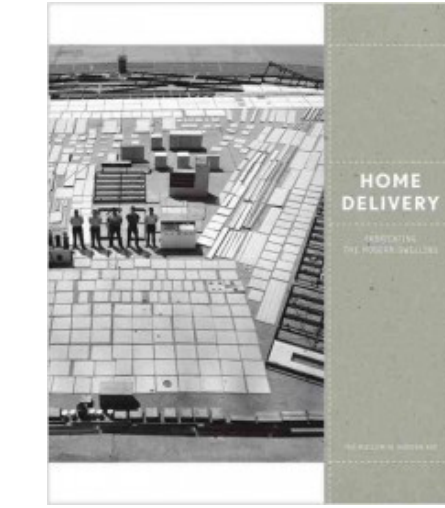
Fabricate (v.) mid-15c., "to fashion, make, build," from Latin fabricatus, past participle of fabricare "to make, construct, fashion, build," from fabrica (see fabric). In bad sense of "tell a lie (etc.)," it is recorded by 1779. Related: Fabricated; fabricating. [1]W

Prefabricate (v.) "Manufacture in a factory prior to assembly on site," 1919 (implied in prefabricated), from pre- + fabricate. [1] Prefab (adj.) "Manufactured in a factory prior to assembly on site," 1937, short for prefabricated "made by assembling large components made elsewhere," originally of housing (see prefabricate). As a noun, "prefabricated housing," from 1942. [1]

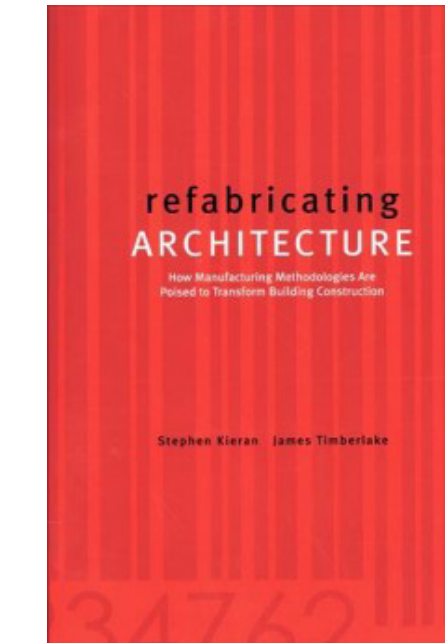
PREFABRICATE

Usage In Architecture: From the onset of modernism in architecture during the twentieth century, prefabrication methods became fundamental to the efficient design and construction of buildings. The building techniques made for architects to design and construct quickly, on a large scale, and in uncompromising site conditions while also reducing the cost of construction. Although prefabrication has reached nearly all facets of modern production, the prominence of prefabrication in the industry is perhaps best exemplified by few projects. Most importantly, Le Corbusier's *Maison Dom-ino* served as a precedent for later high-rise buildings, addressing issues in government subsidized housing which continues to plague western society necessitating the need for prefabrication.

It is necessary to note Le Corbusier's five points of modern architecture based on the ideas of living in the industrial world as they will be the guiding design principles for the on-site fabrication lab. Pilotis: Free standing pillars create a green zone beneath the first floor, where the fabrication will take place. A Free ground plan allowed by a frame construction allows for a free layout for easily moving the manufactured homes through the center. A Free façade makes transport of the manufactured homes efficient and easy. Horizontal Windows is allowed by the frame construction and absence of load bearing walls to allow natural lighting throughout the fabrication center. Finally, a Roof Garden enables the residents to produce local produce and generate a micro-economy for the trailer park residents.



In the book, *Home Delivery: Fabricating the Modern Dwelling* authors Barry Bergdoll and Peter Christensen critique the work of Stephen Kieran and James Timberlake stating that "Their influential book "Refabricating Architecture," (2003) is an unequivocal critique of architecture as a top-down system where architects design a building and then devise a system to make it work." pp. 224 (1). Prefabrication is described in the book "Refabricating Architecture," as a byproduct of Mass production and an emerging ideal at the time known as Mass customization. "Mass customization is a hybrid. It proposes new processes to build using automated production, but with the ability to differentiate each artifact from those that are fabricated before and after." They're critique of this new era of fabrication is that "Architecture has over the past century finally become a machine...the result is a more sustainable architecture." pp. xii-xiii (2)



Personal Criticism and Thesis Usage: The intended general usage of "prefabrication" or any iterations of the word including prefab, prefabricate, prefabrication, etc. in this thesis aims to address the socio-economic implications of implementing mass-customization in the place of mass-consumerism. The pre-fabrication of the manufactured homes will allow for inhabitants to efficiently make design modifications and installations of their individual dwelling units. The structural frame will feature a universal design which is prefabricated in the onsite fabrication center at each mobile home park. The concept that is most often expressed by its usage is the notion of simplistic logical design serving as a catalyst for ease of fabrication and construction prior to on site installation of the built habitats. In this thesis the pre-fabrication will take place in the onsite fabrication center and the modified or newly designed manufactured homes will then be transported to the specific plot of the inhabitant to which it belongs.



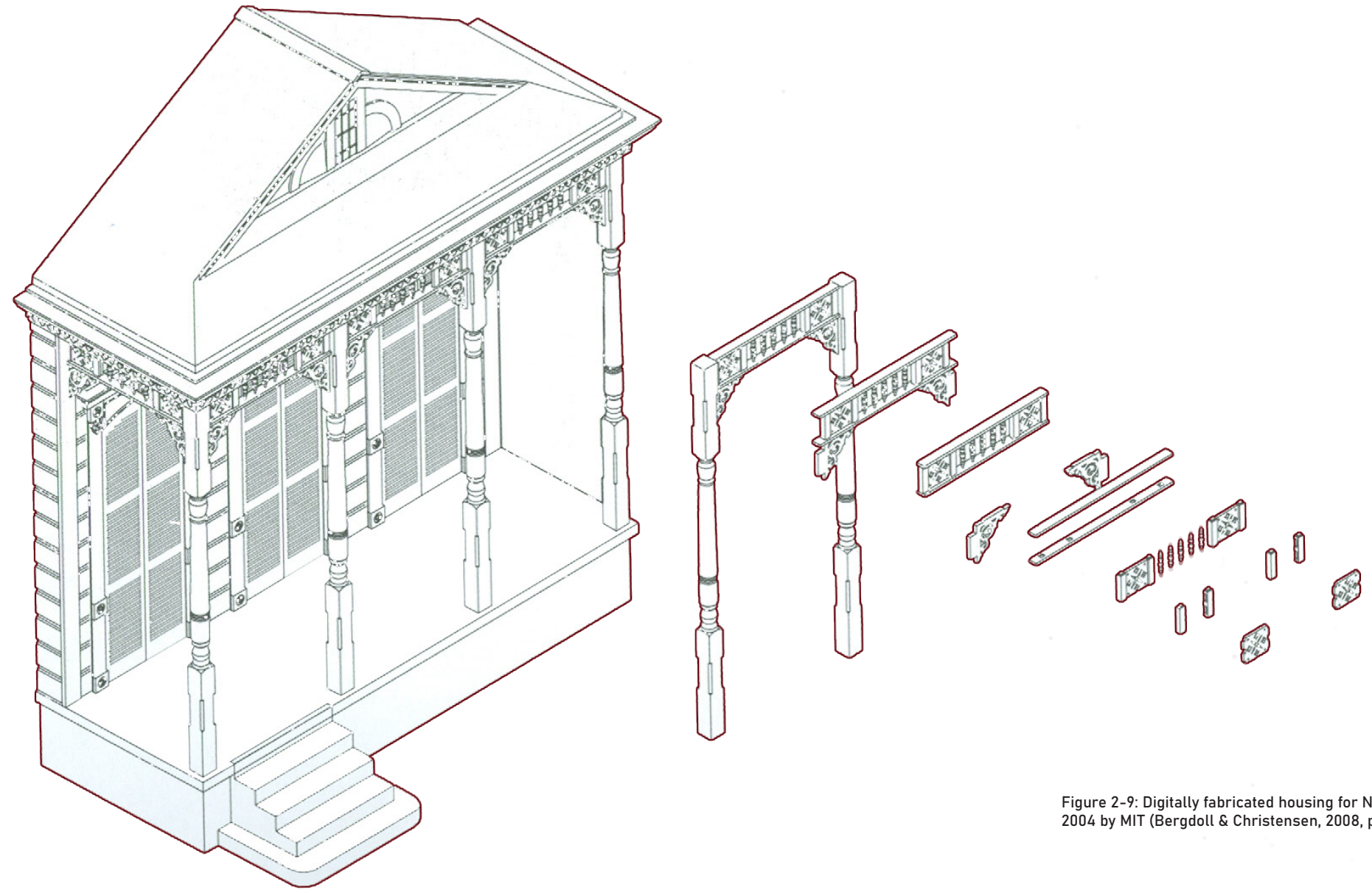


Figure 2-9: Digitally fabricated housing for New Orleans, 2004 by MIT (Bergdoll & Christensen, 2008, p. 198, 202)

Proto-type: "An original type, form, or instance serving as a basis or standard." 2. "An original, full-scale, and usually working model of a new product or new version of an existing product." [2]

Proto- before vowels prot-, word-forming element in compounds of Greek origin meaning "first, source, parent, preceding, earliest form, original, basic," from Greek *prōto-*, from *prōtos* "first" (from PIE **pre-*, from root **per-* (1) "forward," hence "before, first"). It is also used in forming words in the sciences and to form compounds having historical reference (such as Proto-Indo-European). [1]

type (n.) late 15c., "symbol, emblem," from Latin *typus* "figure, image, form, kind," from Greek *typos* "a blow, dent, impression, mark, effect of a blow; figure in relief, image, statue; anything wrought of metal or stone; general form, character; outline, sketch," from root of *typtein* "to strike, beat," from PIE **tup-*, variant of root **(s)teu-* (1) "to push, stick, knock, beat" (see *steep* (adj.)). [1]

Prototype (n.) "a primitive form, original, or model after which anything is formed," c. 1600, from French *prototype* (16c.) and directly from Medieval Latin *prototypus* "original, primitive," from Greek *prōtotypon* "a first or primitive form," noun use of neuter singular of *prōtotypos* "original, primitive," from *prōtos* "first" (see *proto-*) + *typos* "impression, mold, pattern" (see *type* (n.)). In English from 1590s as *prototypon*. [1]

PROTOTYPE

Usage In Architecture: In the field of Architecture prototypes are often used to test how something is working. "...the prototype represents a valuable opportunity to test some aspect of the interaction between built architecture and the environment." pp. 180 (1) 3D printing is quickly becoming the most widely used technology for creating prototypes. "While 3D printing was first used for rapid prototyping in the early 1980s, albeit in a very primitive form, it was not until the late 1990s that architects were able to access such radical new technology...The advantages of 3D printing include the ability to produce highly detailed objects (regardless of scale) accurately and at great speed." pp.46 (1) In the book, "Prototyping for Architects" (2016) authors Mark and Jane Burry makes the important distinction between a prototype and model, with the latter serving merely as a derivative while the prototype is a working artifact or functional archetype. "Prototype: The first or primary type of anything: the original (thing or person) of which another is a copy, imitation, representation, or derivative, or to which it conforms or is required to conform; a pattern, model, standard, exemplar, archetype." "Model: A representation in three dimensions of some projected or existing structure, or of some material object artificial or natural, showing the proportions and arrangement of its component parts." pp. 14 (1)

Personal Criticism and Usage: **In order for the thesis to be truly successful the inhabitants must have the opportunity to create and adapt their own environment.** Prototype is a pivotal key term that describes the purpose for which the thesis exploration is to serve as a structurally innovative prototype from which various iterations of housing adaptations are to follow using the same or similar systems of organization once it is established. Prototyping also describes the process of design discovery to determine the most suitable design, material, and method of fabrication for real-world application through an extensive iterative process.



Radical Technologies

Adam Greenfield

In, "Experimental Architecture," Peter Cook indirectly makes mention of the importance of the universal framing system I intend to iterate various prototypes of by stating "...notions of 'minimal structure supporting maximal space' which is the foundational idea behind the importance of creating prototypes of prefabricated parts in the process of forming the 'ultimate constructional gesture' for the project. [3] Precedents such as the 'package house system,' by Walter Gropius and prototyping of the 'rational jointing theory' by Konrad Wachsmann have aided in seeing how the process of, "system building," has led to a flexible engagement with consumer needs. The reading provides support for the iterative process of experimentation that will be conducted by suggesting that, "...architecture, though an artefact, should arise from a series of basic physical consistencies." [3] Pp.3 Jean Prouve brought to mind the need to explore the protection of the joints from exposure to the elements while also taking into consideration how ubiquitous the structural frame should be.

3-D printing has allowed for a fully democratized production capability that will allow the inhabitants of the mobile home park to create community inspired improvement based upon the flexible framework that will be established. This idea stems from the "Replicating Rapid Prototyper, or RepRap," originally thought up by Adrian Bowyer, who was inspired by Von Neumann's, "Theory of Self-Reproducing Automata." The only major hurdle to overcome is described best in Adam Greenfield's book, "Radical Technologies: The Design of Everyday Life," which states, "As with so many other things, it simply turns out to be cheaper to buy conventionally manufactured RepRap parts from China and have them shipped to you from across the world than it does to print them at home, especially once the value of your own time is factored into the equation." pp. 87 (2)



Figure 10: "9 Unique Vintage Mobile Homes that were Ahead of their Time." <https://mobilehomeliving.org/>. October 5, 2019.

Manufacture: To make or process (a raw material) into a finished product, especially by means of a large-scale industrial operation. b. To make or process (a product), especially with the use of industrial machines.² To create, produce, or turn out in a mechanical manner: "His books seem to have been manufactured rather than composed" (Dwight Macdonald).³ To concoct or invent; fabricate: manufacture an excuse. [2]

Manufacture (n.)¹1560s, "something made by hand," from French manufacture (16c.), from Medieval Latin *manufactura "a making by hand" (source of Italian manifattura, Spanish manufactura), from Latin manu, ablative of manus "hand" (from PIE root *man- (2) "hand") +factura "a working," from past-participle stem of facere "to perform" (from PIE root *dhe- "to set, put"). [1]

"Sense of "process of making goods or wares of any kind, the production of articles of use from raw or prepared materials by hand-labor or machinery" is recorded by 1620s. Related: Manufactures." [1]

"Manufacture (v.)-1680s, "convert material to a form suitable for use," from manufacture (n.).

Meaning "to make or fabricate," especially in considerable quantities or numbers, as by the aid of many hands or machinery" is by 1755. Figurative sense of "produce artificially, invent fictitiously, get up by contrivance or effort" is from 1762. Related: Manufactured; manufacturing; manufacturable." [1]

MANUFACTURE

Usage In Architecture: The usage of the term Manufacture in the field of architecture is most closely associated with the housing type known as Manufactured housing, mobile homes, travel trailers. etc. " Increasing industrialization and advancing technology in the United States throughout the twentieth century, and especially following World War II, led to many attempts to produce and market a factory-built house. The mobile home/ manufactured housing industry has contributed to the growth and expansion of industrialized housing, producing a complete unsubsidized house characterized by economy, ease of finance, and innovative techniques and materials." [1]

Personal Criticism and Usage: The term Manufacture or Manufactured will be used in the context of this thesis primarily in reference the project typology and recording the historical relevance of the mobile home or manufactured housing industry, as well as a method of assessing the chronology of construction technics from their inception. "Manufactured housing must rightfully be regarded as a genuine housing innovation in twentieth-century America.¹ The way it is built, sold, and transported is unique among house types. However, it has provoked contention for sixty years." [1] Nearly half of mobile home parks in America are actually made up of the manufactured housing type. 'Manufactured' homes is synonymous with Mobile homes and thus will be used throughout the explanation of the aim of this thesis which is to explain and address the social stigma that is closely associated with the Mobile home community. "The paradoxical status of the mobile home in American housing—both useful and outcast—reflects conflicts within fundamental beliefs about home and community: place-bound community and the mobility of freedom; factory-built and site-built; the conformity of mass production—and mass consumption—versus individuality. These contradictions become acute when subject to processes of categorization. Is the mobile home more like a car or more like a house?" [1]



Academic Journals



Burns, Carol J. "A Manufactured Housing Studio: Home/on the Highway"



Burkhart, Ann M. "Taxing Manufactured Homes."



Shaw, Isabella "Prefabrication, Patrilineality, and Intergenerational Reuse:"



Manufacture is also used to describe the overall site as a project or single entity of its own similar to a megaform. This is done with the intention to strengthen the community identity by thinking of the project as a megaform of various structures. The distinction that is made by Kenneth Frampton between megaform and megastructure in the 'Megaform as urban landscape' introduced the notion 'place-creating' or 'place-making' potential. When I think of megaform I think in terms of scale, but the idea that the 'programmatic complexity of the form' contributes to the character of a place as a megaform opened the door to the term applying to, "an organic residential continuity." [5] Difference in Megaform and megastructure is described as, "For me, the main difference between the two resides in the emphasis placed on the overall form and its intrinsic spatial order, as opposed to the expressivity of the structure, so that while the megaform may display certain megastructural characteristics, the large-scale manifestation and expression of the megaform's intrinsic structure is not its primary significance." [5]

The prosperity of the megaform is dependent on the prosperity of integrating the fabrication lab into the community as a local stimulus of economic income. How this will be done was best stated by Peter Cooke in Archigram, "We can take advantage of techniques like market research, high- stress technology, consumer-assembly but make sure that the context for them breaks out of the limited barriers of taste, town planning and various mystiques invented by so-called 'experts'." [4]

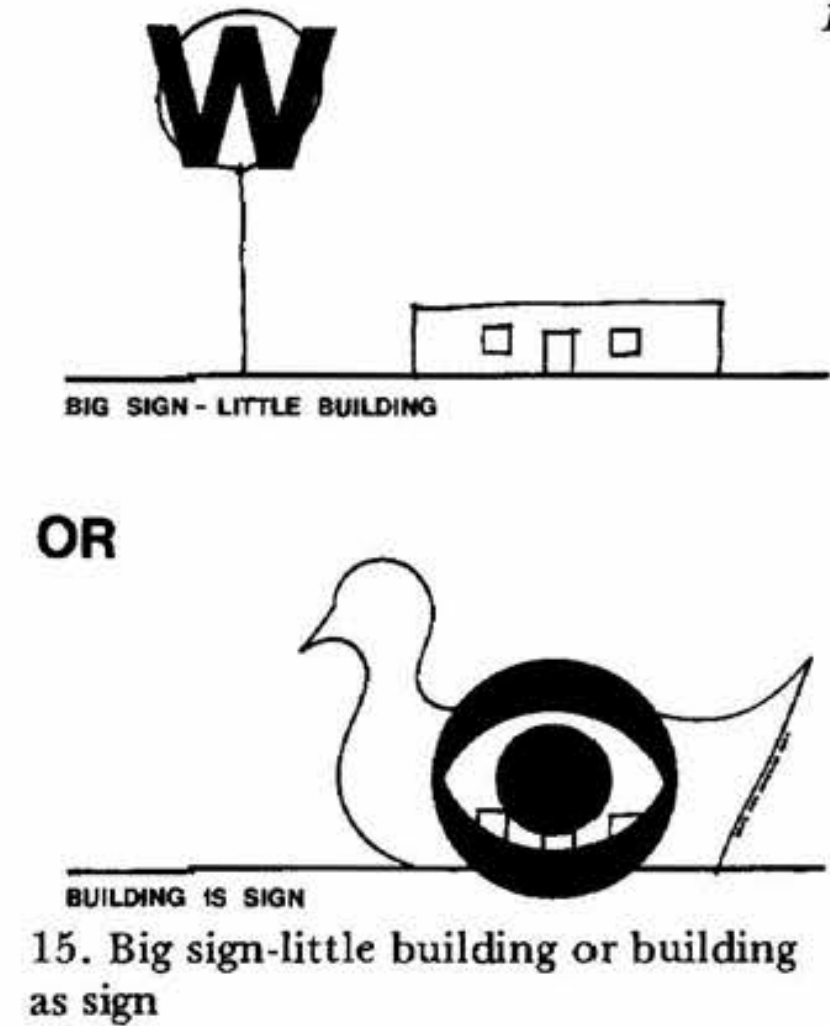


Figure 11-12: [ibid] Fremont Street: Learning from Las Vegas .

Definition: "Vernacular: 1. (of language) spoken as one's mother tongue; not learned or imposed as a second language. 2.(of architecture) **concerned with domestic and functional rather than public or monumental buildings.**" [2] b. A set of such customs and usages viewed as a coherent body of precedents influencing the present: followed family tradition in dress and manners." [2]

Building: n.
 1. **Something that is built, as for human habitation; a structure.**
 2. The act, process, art, or occupation of constructing.

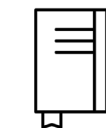
Vernacular (adj.) "c. 1600, "native to a country," from Latin vernaculus "domestic, native, indigenous; pertaining to home-born slaves," from verna "home-born slave, native," a word of Etruscan origin. Used in English in the sense of Latin vernacula vocabula, in reference to language. As a noun, "native speech or language of a place," from 1706." [1]

Building (n.) "c. 1300, "a structure;" late 14c., "act or process of constructing;" verbal noun from build (v.). Building-block is 1846 as "one of a set of children's play blocks;" 1849 as "temporary support on which a ship's keel rests while the ship is being constructed;" 1856 as "cinder-block, concrete block, artificial stone block used in building construction." Figurative sense "basic unit from which something is constructed" is by 1955." [1]

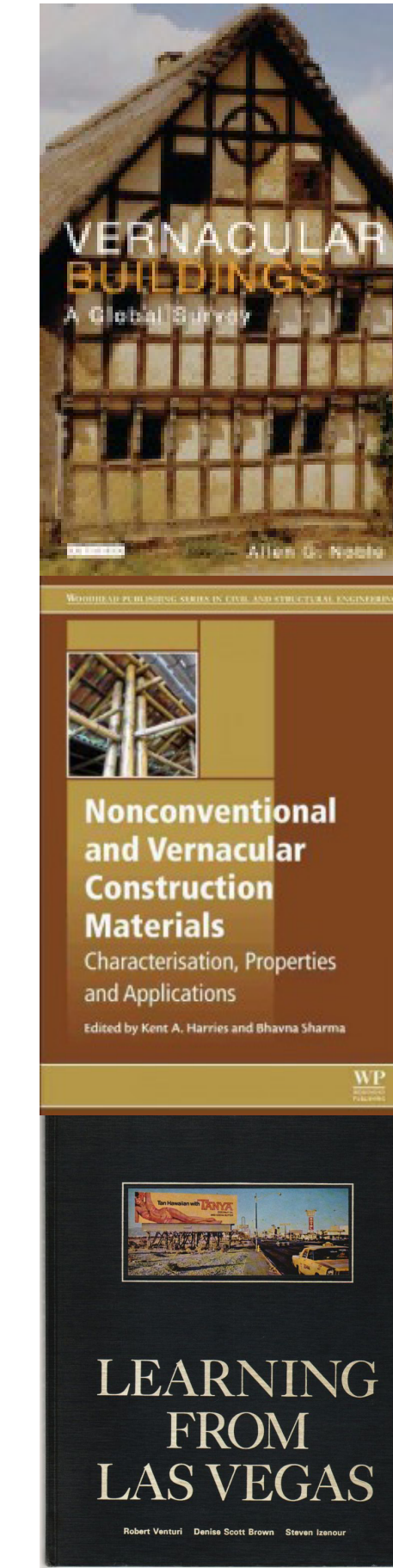
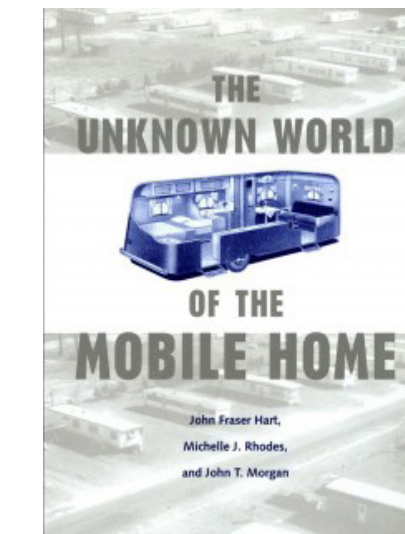
VERNACULAR BUILDING

Usage In Architecture: The usage of the term vernacular or traditional in the field of architecture is typically most closely associated with the method of construction, material quality, and the style or composition of building details communicating the time, place, and people that designed and constructed the building. "The word traditional as used here, refers both to procedures and material objects which have become accepted over a long time as a social norm in a society, and whose elements are passed on from generation to generation, usually orally, or more rarely by documents that have codified orally transmitted knowledge, instructions, and procedures." [1] Vernacular architecture very much has to do with the perception of a building or space rather than conceptualized space, an identity that is captured and perceived is the focus of vernacular architecture rather than the creation of a concept. The collected illustrated representation of a people or place known as iconography or vernacular is the focus of Learning from Las Vegas by Venturi and Scott Brown. In "Learning from Las Vegas" the concern however was just as much with the perception and representation of a changed urban form as with the problem of communication. By focusing their attention on the cityscape and on how urban space is perceived by a " - normally - automobile viewer", Venturi and Scott Brown took a phenomenological stance. [2]

Academic Journal



Abel, Richard M. "Can we read a building as we read a book? Architecture as cultural artifact."



Personal Criticism and Usage: The term vernacular or traditional building will be used in the context of this thesis to describe concept of architecture being a system of communication capturing the identity of a community through a pattern of design methodologies that define the community through craftsmanship quality construction. There is a need for this expression for the mobile home housing type in particular due to the rapid disappearance of the trailer home which represents the identity of a significant portion of the American population both presently and historically. Understanding the mode of thought or behavior of the people in a particular region that live or have lived in mobile home parks from generation to generation is necessary to interpret the effect of their surrounding environment on what their perception, and what they anticipate the representation of their community to be.

The regression of the mobile home vernacular is detailed by John Hart and others as having stated as camper trailers during the automobile boom in the early twentieth century. Later these camper trailers became homemade travel trailers so that laymen could travel where work was needed, or families would tow them behind their car as a mobile vacation home. Eventually small towns and businesses developed trailer parks that would accommodate these trailers which led to the establishment of trailer parks that provided public facilities for washing. "During the Depression years low-income people of limited skills and limited education began to live in trailer parks permanently because they could afford no better housing. They gave trailer parks their unsavory reputation, which the media have gleefully perpetuated, as unhealthy dens of sex and violence. Many towns and cities now deem trailers and trailer parks so undesirable that they have used zoning ordinances and building codes to banish them to concealed sites on the urban fringe and beyond, where they will not offend aesthetic sensibilities." [5]

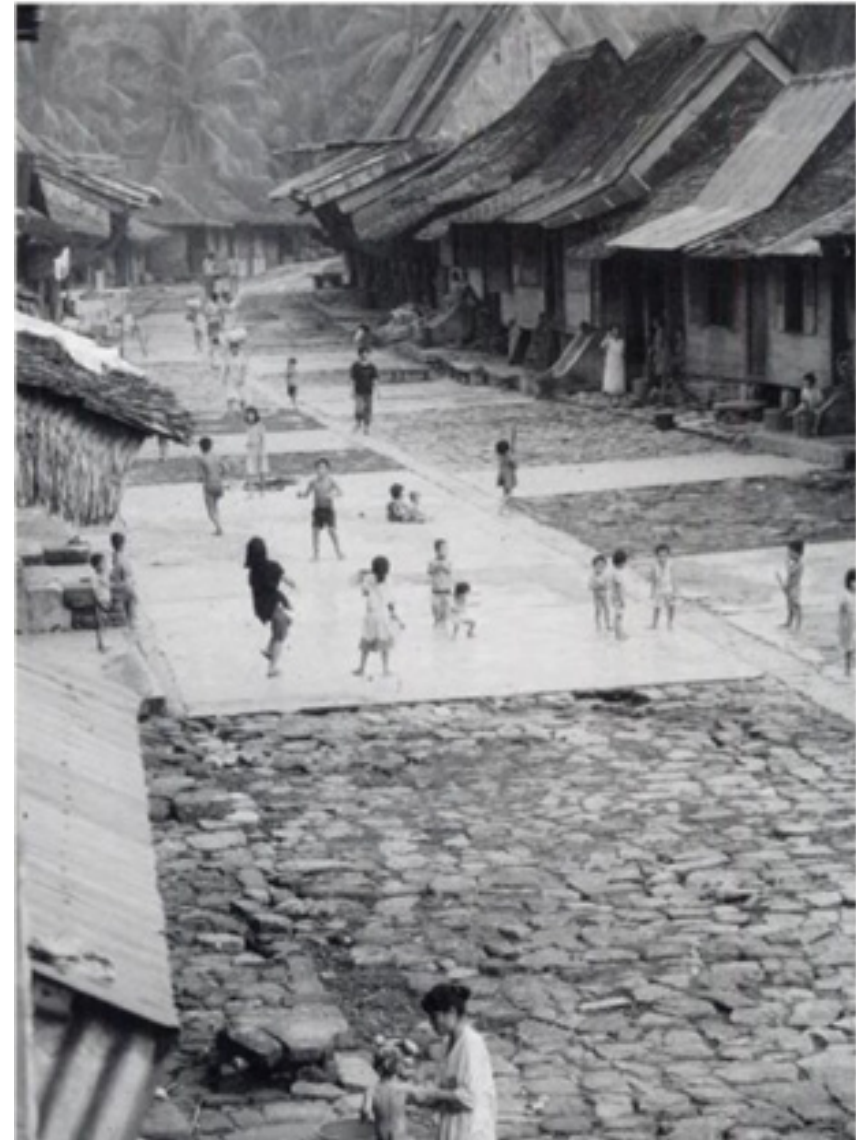


Figure 13-14: [ibid] Hilinawalo- Maenermolo, Image. Herman Hertzburger. Space and the Architect. Lessons in Architecture 2.
 Figure 15: Hilinawalo- Maenermolo, Street Section. Herman Hertzburger. Space and the Architect. Lessons in Architecture 2.

Definition: "A social space is physical or virtual space such as a social center, online social media, or other gathering place where people gather and interact. Some social spaces such as town squares or parks are public places; others such as pubs, websites, or shopping malls are privately owned and regulated." (2)

Socio- word-forming element meaning "social, of society; social and," also "having to do with sociology," from combining form of Latin socius "companion, ally, associate, fellow, sharer," from PIE *sokw-yo-, suffixed form of root *sekw- (1) "to follow." Common in compounds since c. 1880.

Spatial (adj.) 1840 (spacial is from 1838), "occupying space," from Latin spatium + adjectival suffix -al (1); formed in English as an adjective to space (n.), to go with temporal. Meaning "of or relating to space" is from 1857. Related: Spatially.

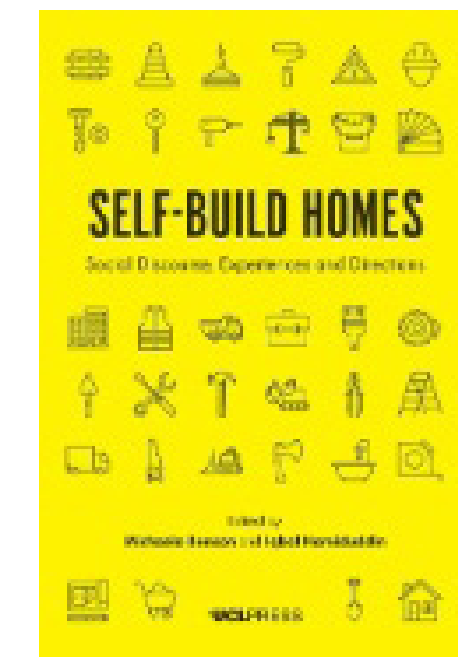
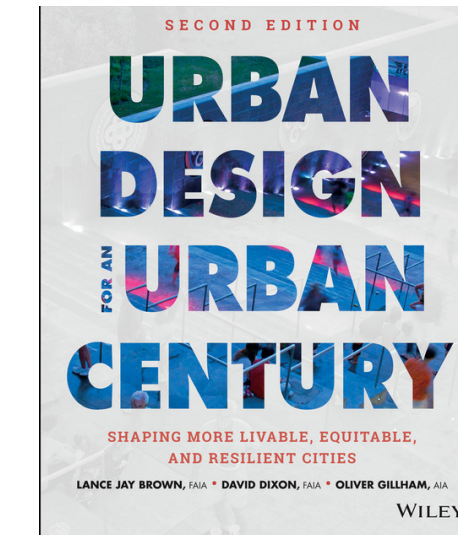
Space (n.)- c. 1300, "extent or area; room" (to do something), a shortening of Old French espace "period of time, distance, interval" (12c.), from Latin spatium "room, area, distance, stretch of time," a word of unknown origin (also source of Spanish espacio, Italian spazio). (1)

Social (adj.)- c. 1400, "devoted to or relating to home life;" 1560s as "living with others," from French social (14c.) and directly from Latin socialis "of companionship, of allies; united, living with others; of marriage, conjugal," from socius "companion, ally," probably originally "follower," from PIE *sokw-yo-, suffixed form of root *sekw- (1) "to follow." Compare Old English secg, Old Norse seggr "companion," which seem to have been formed on the same notion). (1)

Sense of "characterized by friendliness or geniality" is from 1660s. Meaning "living or liking to live with others; companionable, disposed to friendly intercourse" is from 1720s. Meaning "of or pertaining to society as a natural condition of human life" first attested 1695, in Locke. Sense of "pertaining to fashionable society" is from 1873. (1)

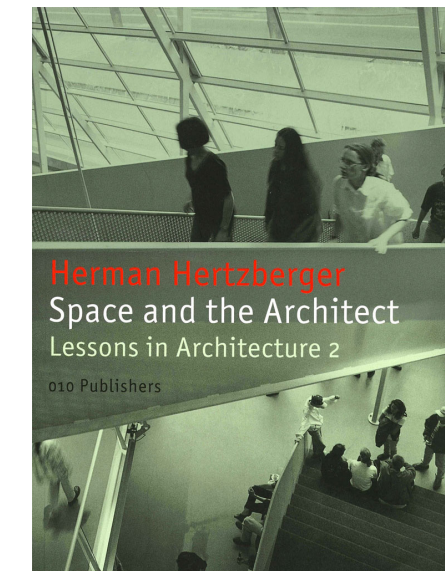
SOCIAL SPACE

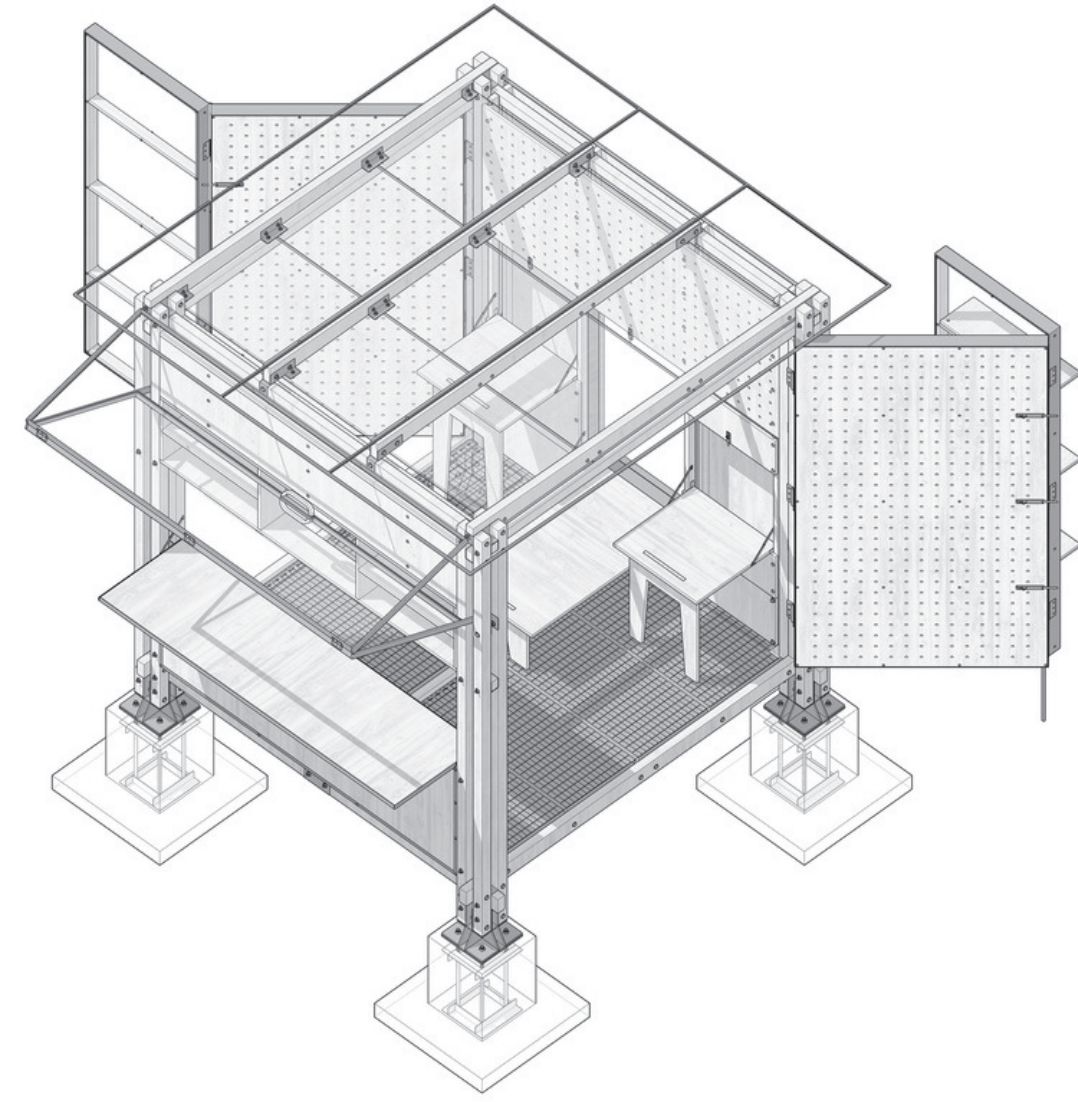
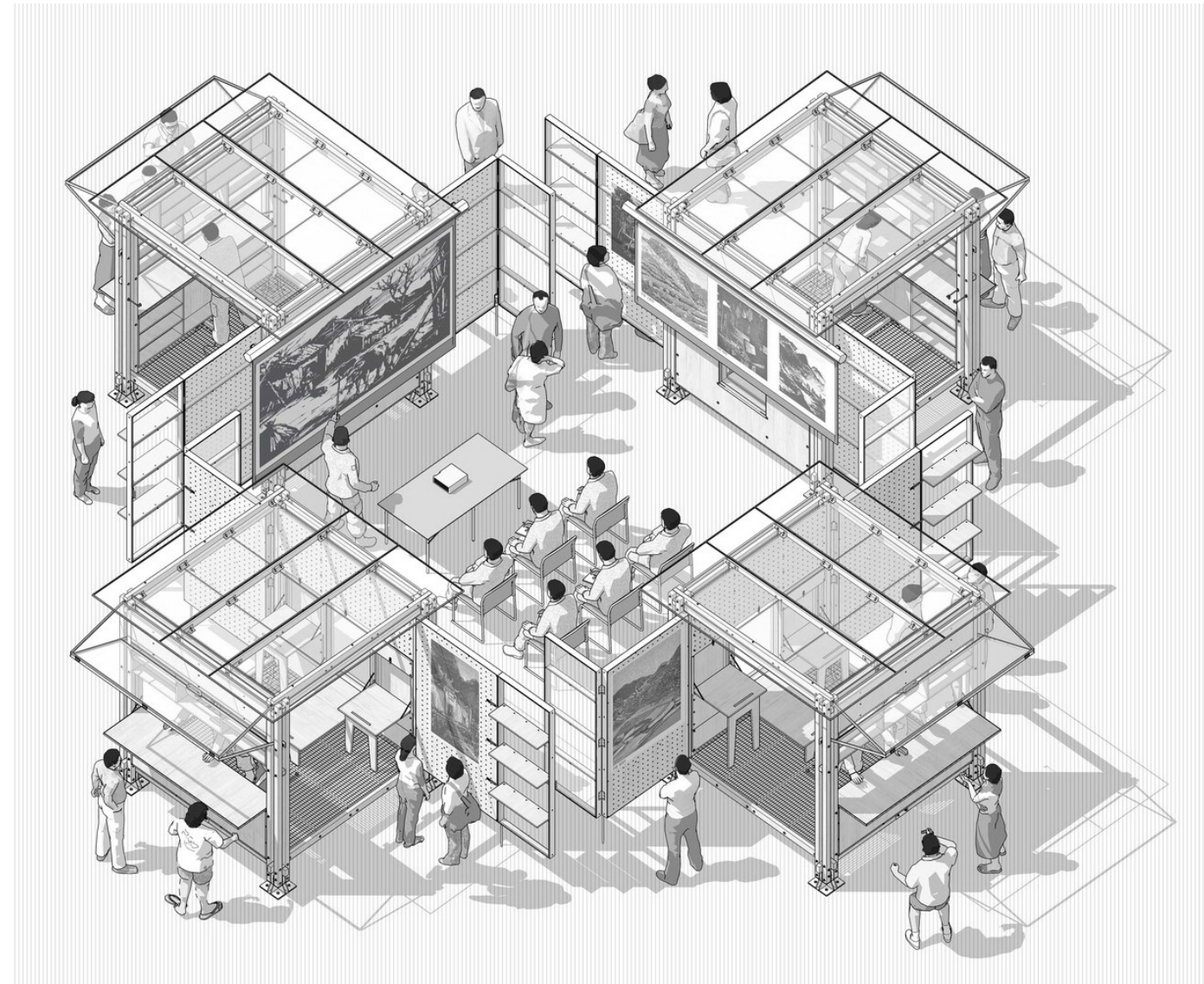
Usage In Architecture: "In 1974, Henri Lefebvre in his famous, "The Production of Space," noted that space is not an empty container. Space is a social formation, shaped by social relations, expressing them, and respectively structuring. Social relations and space are produced and reproduced one through the other. One can reflect on a social space on the level of states or on the level of cities, narrow the notion to a particular building, public space, or apartment interior. Space materializes social relations; it is created according to visions, characteristic of historical periods, power hierarchies and images of a good society." [1] "One can understand such a complex relationship between the users and space applying the three-part dialectics of space (trialectics of space), introduced by Henri Lefebvre: space conceived or representations of space, space perceived or spatial practices and space lived or spaces of representations (space as it might be)." [1]



Personal Criticism and Usage: Social Space in the context on this thesis is centered around the Fabrication center which gives the inhabitants control over the manufacturing process of their homes and thus establishes true individualism from society. The Fabrication center/ Severe Weather Evacuation Center functions not only as a worker space, but also as a space where the community comes together to strengthen their social bonds and learn from and with one another. The concept of social space is used to explain the macro-scale objective of this thesis which is to reflect and give clarity to the social identity of a community by fostering collaboration and promoting social mobility. While social space in practice focuses on human scale development, the concept of social space in theory is synonymous with the concept of establishing a New Urbanism based on expressing, "this pursuit of community most directly through its focus on both human needs and the health of the public realm." [2] The Fabrication center will function as a kind of social axis from which social prosperity and practical community restructuring stem as a multi-use function.

"Through the introduction and exploration of the social values and lived experience of self-building, it provides insights into how individuals and communities are variously shaped by their housing experience." [5]





Figures 16-17: Photographs by: Photographs :Ziye Huang, Yuchen Xing, SCHOOL OF ARCHITECTURE AND URBAN PLANNING, NANJING UNIVERSITY 2021

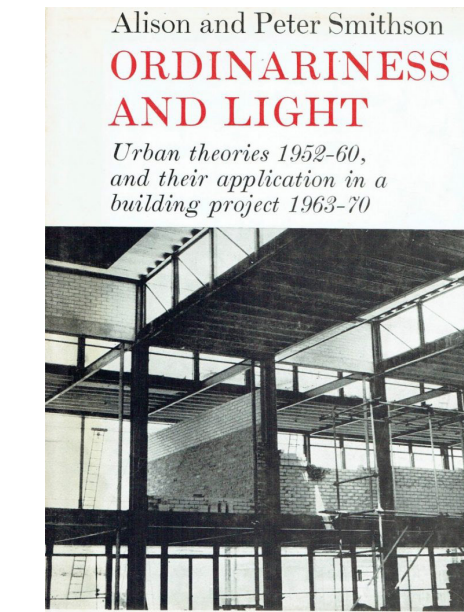
Definition: tran-si-ent: (adj.). " 1. Passing with time; transitory Transient. 2. Remaining in a place only a brief time

Transient: c. 1600, "transitory, not durable," from Latin transientem (nominative transiens) "passing over or away," present participle of transire "cross over, go over, pass over, hasten over, pass away," from trans "across, beyond" (see trans-) + ire "to go" (from PIE root *ei- "to go"). Meaning "passing through a place without staying" is from 1680s. The noun is first attested 1650s; specific sense of "transient guest or boarder" attested from 1857. Related: Transiently.

trans- word-forming element meaning "across, beyond, through, on the other side of, to go beyond," from Latin trans (prep.) "across, over, beyond," perhaps originally present participle of a verb *trare-, meaning "to cross," from PIE *tra-, variant of root *tere- (2) "cross over, pass through, overcome."

TRANSIENT

associated with the road system or express way that allows to move from rural to suburban to urban city centers. In actuality these are described by Alison and Peter Smithson is their book, "Ordinariness and Light," as "existing architectural fixes." In order to adequately understand transient in the context of architecture we need to identify the fixed architectural elements in society. [1] " Historical buildings are often regarded as fixed in perpetuity; others, like law courts and municipal buildings, have almost unchanging functions, or like power stations and heavy industrial plant, represent investments too massive to be altered frequently. These are the traditional architectural fixes. The architectural transients are the small buildings, particularly shops and houses, that are added to, altered, or completely rebuilt on a short-term cycle of change." [1] From this distinction transient are those elements that are not heavily invested in permanence, which an inherent tie to community, as the people grow the community changes with it around the 'architectural fixes.



Personal Criticism and Usage: Transient architecture in the scope of this thesis is to be understood as referring to the spatial dynamism of inhabitants articulating the structure of their homes on a microscale as well as orientating their homes throughout the site on a macro-scale. "The one thing we are likely to get to which transient activity can be related is a special sort of road system, designed to act as a structure for the whole community." [1] To establish a genuine communal identity that is new and distinct from its conventional definition, functionality should be found in the individual dwells as well as the network of transiency throughout the site. Establishing a network upon which the homes can navigate throughout the site which also situates them in a fixed position to create a sense of permanency is the urban design challenge. This can only be done structurally by focusing on the joint connection of the modules. Therefore, joinery or joint is a term akin to transient as the former is the purveyor or the latter. " Buildings should show the part they play in these cycles of change. 'Fixes' should look fixed and 'transients' transient, even if their actual life as buildings (so-called permanent constructions) is the same." [1] Describing the expansion, contraction, and re-orientation of the manufactured homes is the intended primary usage of the key term transient in this thesis exploration.

DESIGN METHODOLOGY

Flexible Frame:

A typological analysis of the current conventional methods of construction will be done to understand how to create module assemblies which work to serve a similar purpose as the compilation of parts found in a typical construction. Various scaled models will be created and explored in different materials that exceed the required insulation standards, structural stability, and locking connection points for the frame and chassis.

Universal Anchoring:

Workable prototypes of current and proposed anchoring systems will be produced through an iterative parametric design process which examines the most effective practical anchoring technique that will respond and adapt to weather and soil conditions throughout the contiguous United States.

Ease of Manufacturing:

A How-To manual and Kit of parts for the 3-D mobile home fabrication process will begin to be developed which will include diagrams that differentiate conventional construction from the 3-D module prototypes residents can create.

The design and construction of the on-site fabrication centers will coincide with the process of creating the flexible frame so that the various scales of the flexible frames created for the manufactured homes will be directly proportional to the size of the fab-centers and size of the mobile home parks.

DESIGN OBJECTIVES

Problem: Fragility of Mobile Homes

Solution: Adaptable framing, Stronger Anchoring, Modernized Construction Specifications

Social issue addressed: mass customization and community control of manufacturing process as a response to dependence on mass production and mass consumerism by establishing an on-site fabrication center redefining the identity of the housing typology as one which is free from the demands of society.

Research Questions & Objectives:

Should the design process cater more towards developing a preparatory design or response plan of action for the manufactured housing typology?

How does the spatial manipulation of the 3-D Manufactured homes in preparation for a severe weather event affect the design methodology process and response time allotted for safe evacuation in each region?

How does the design and manufacture process take into consideration the ability for inhabitants to mass customize progressive alterations to improve their life safety conditions overtime?

How can the design of the universal frame system make renovating the exterior of the manufactured homes just as efficient as the renovation of the interior of the home ?

02

DESIGN ANALYSIS

PRECEDENT ANALYSIS:

CELLOPHONE HOUSE
Home Delivery-Exhibit Structure
Mobile Podium
Archigram- Plug-in City

CONTROVERSY MAPPING:

Mapping Controversies is a research method used to determine points where divisions cross, this thesis focused on the spread of natural hazards in conjunction with the intensity of each hazard across the United States of America. According to the Federal Emergency Management Association (FEMA), "Natural hazards are defined as environmental phenomena that have the potential to impact societies and the human environment."

SITE SELECTION:

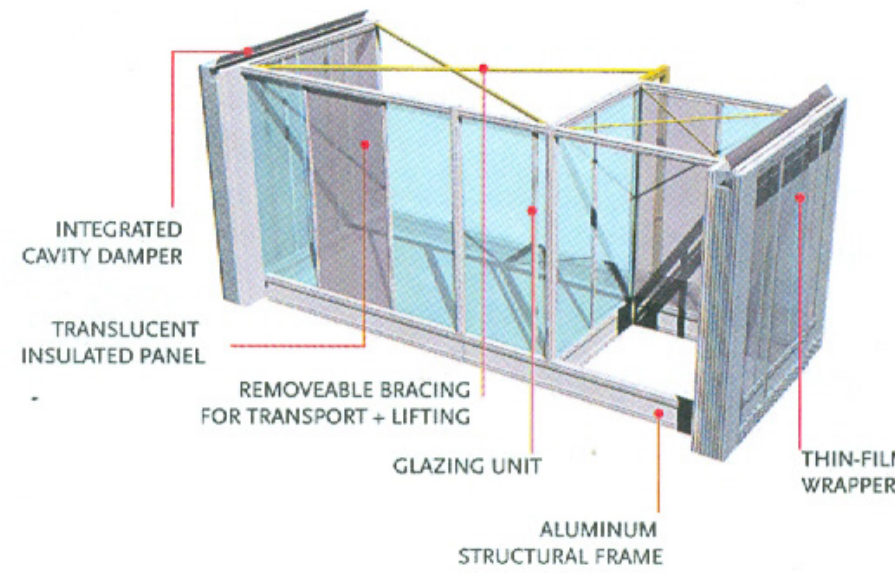
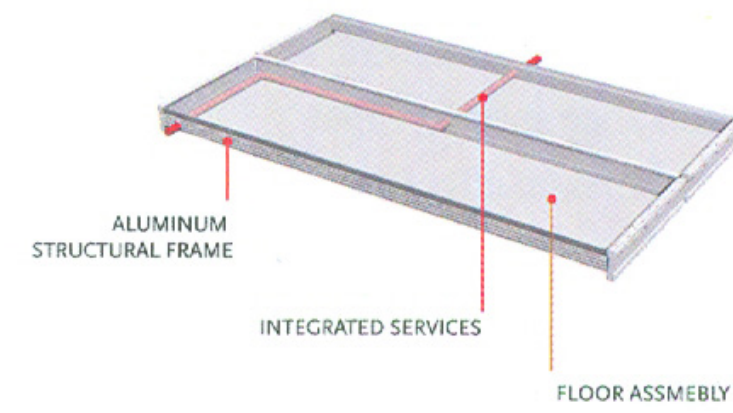
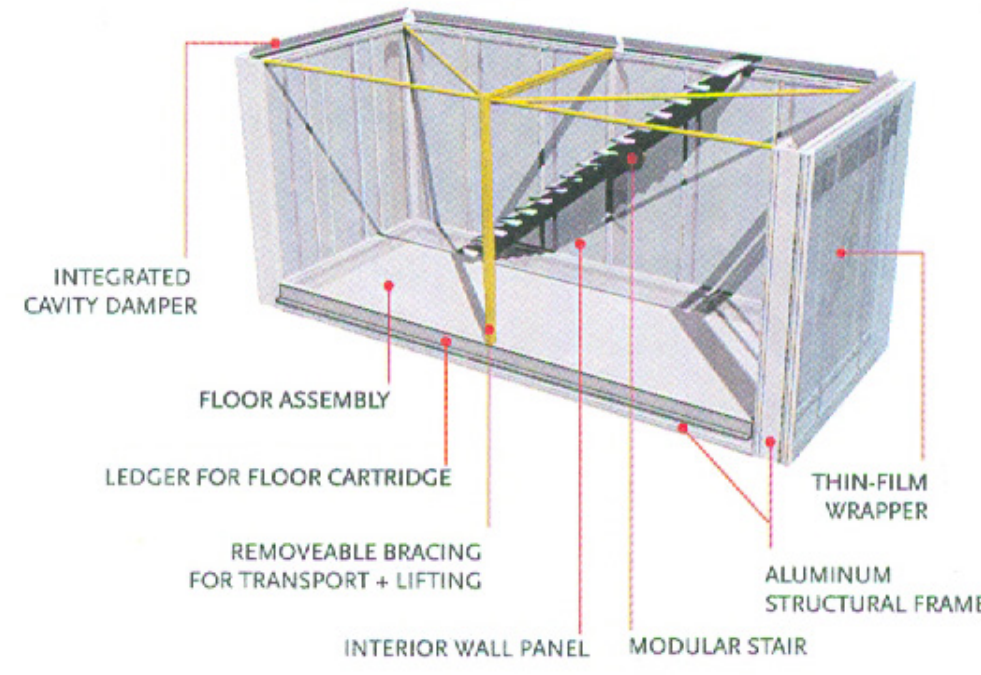
The selection process involved choosing mobile home communities that have experienced a natural disaster in the contiguous United States, more specifically a strong wind or tornado event.

SITE CONTEXT & ANALYSIS:

The site context and analysis takes into account various factors that will affect the outcome of the projects practical implementation and plan of execution including places of shelter present on or near the site.

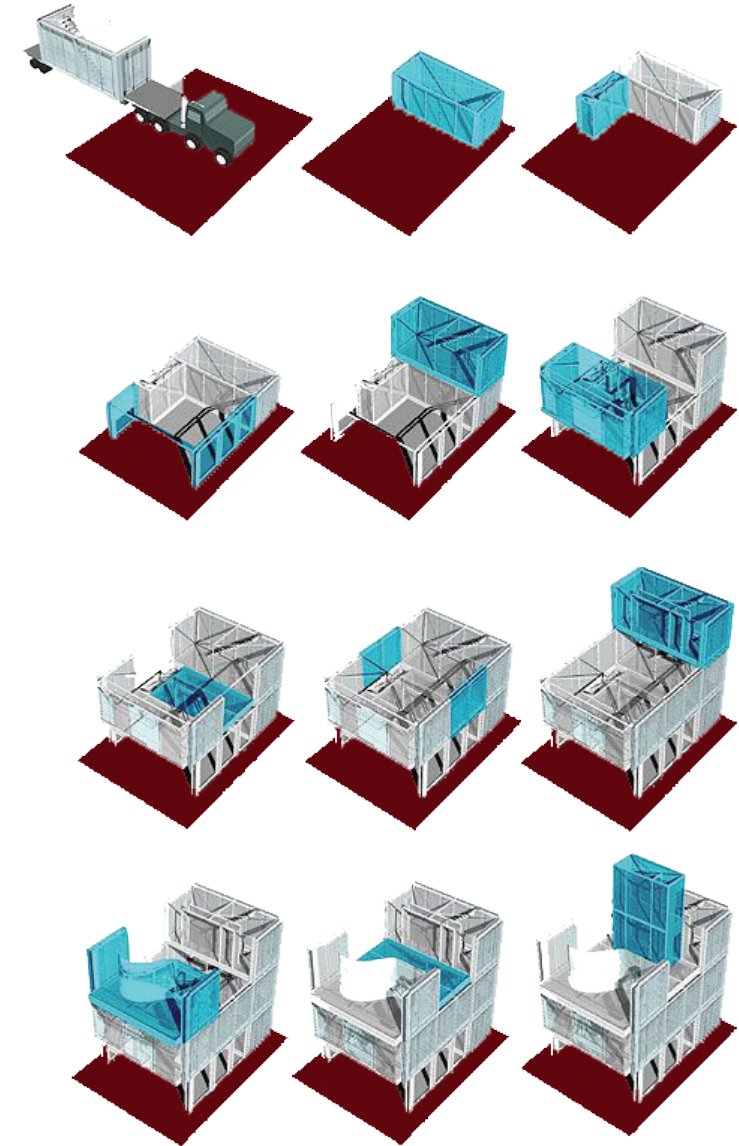


ANALYSIS OF CELLOPHANE HOUSE STRUCTURAL FRAME SYSTEM
- Kieran Timberlake

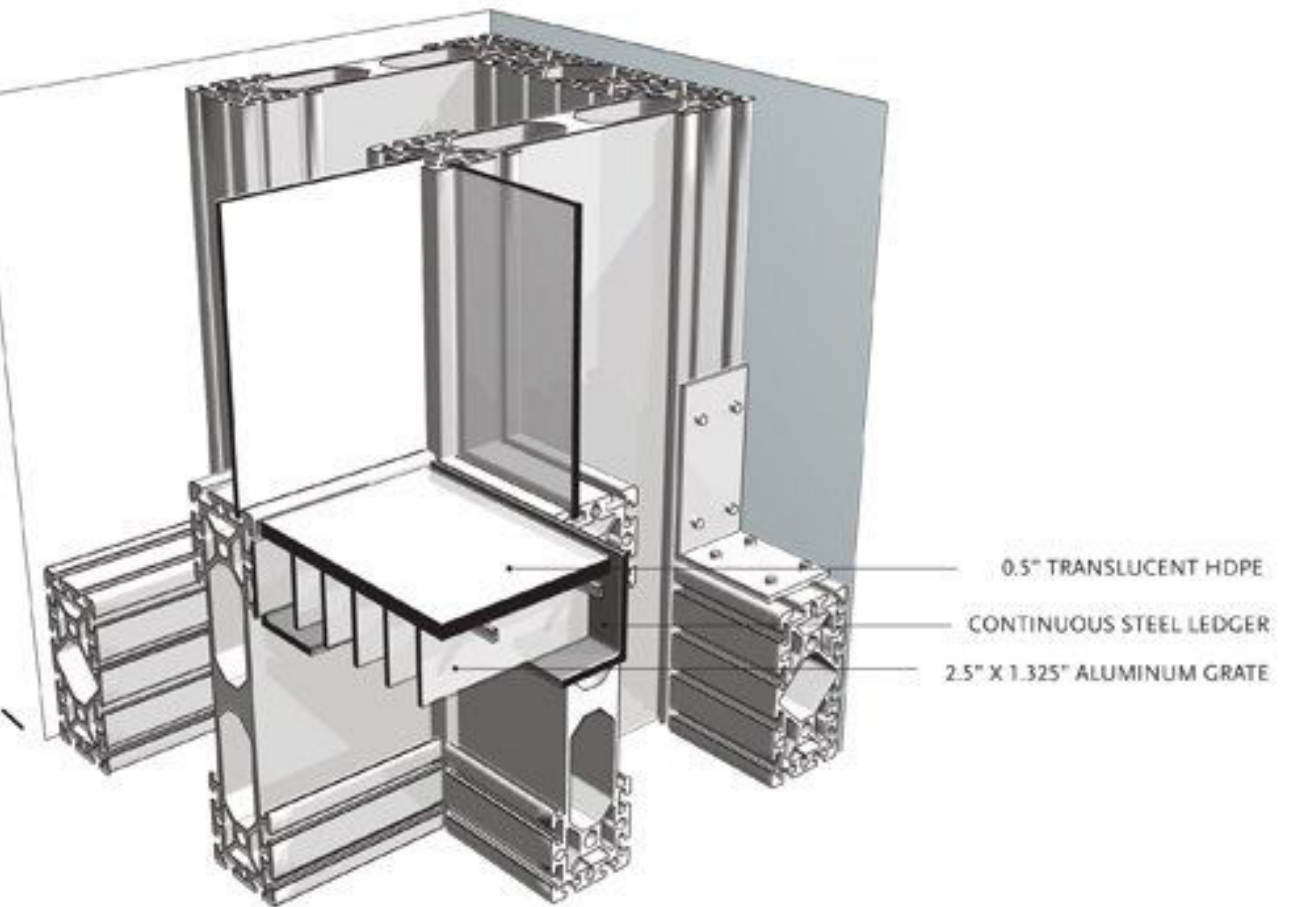
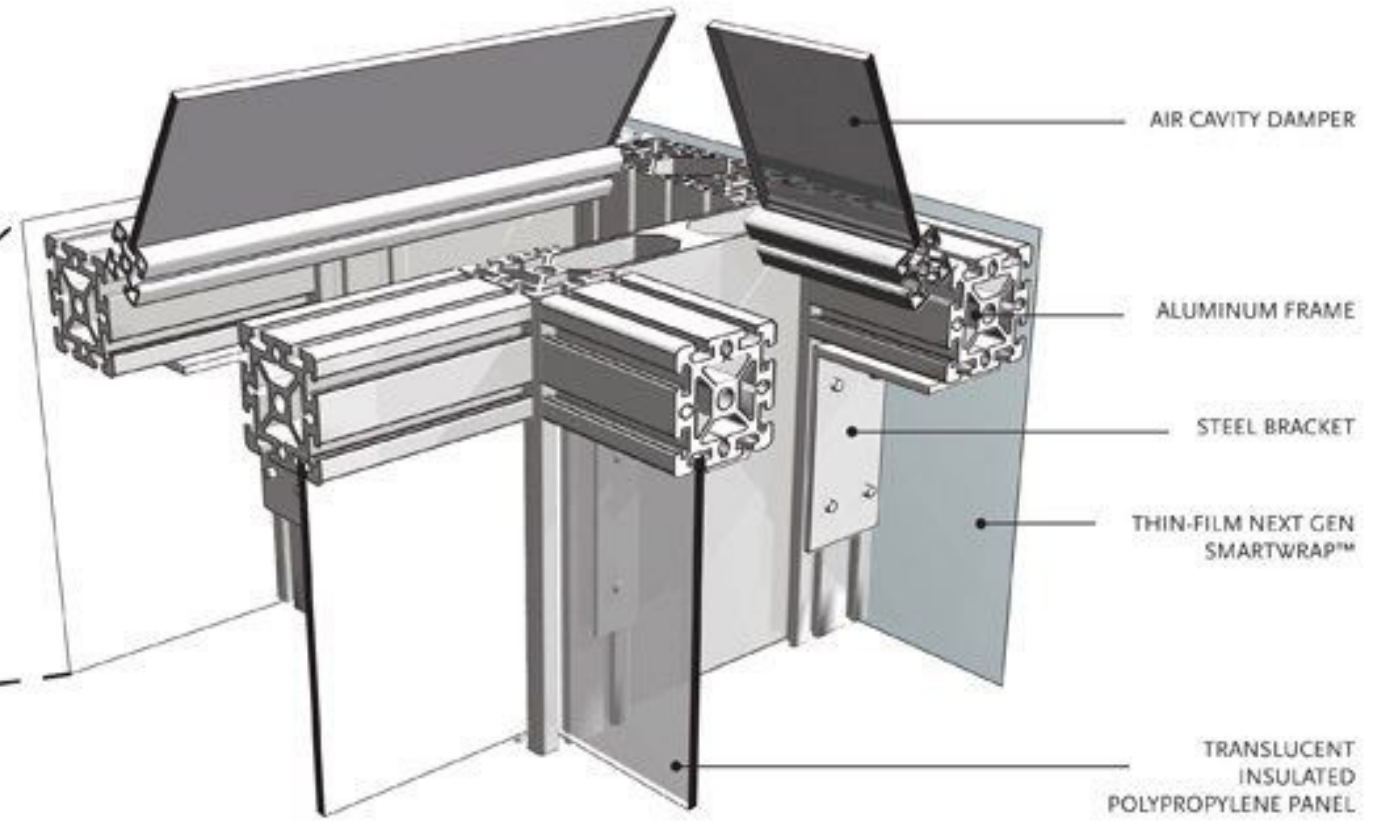


Design Concept: The design language for the Cellophane house is described as an "integrated assemblies," system or called, "chunks," that were fabricated offsite which is the primary method of transporting manufactured housing to the site.

Methodology of Construction: "Here, we began with the **frame-plus-components system as a basis, allowing architecture to grow out of its opportunities and constraints.** Unlike prefabricated housing in which originality and site-specificity may be lost in the manufacturing process, Cellophane House™ is a **flexible system of building** that enables multiple outcomes."



Analysis: Materials were selected to be lightweight, minimizing embodied energy, and reusable within existing recycling streams. The same aluminum frame used for Loblolly House was scaled up from two stories to five, enabled by a strengthening system of custom-designed steel connectors. The SmartWrap skin was attached to that frame, with interior floors, ceilings, and partitions made of structural plastic. The skin was envisioned as a filter, selectively letting in daylight and seasonal heat, and keeping out UV light and hot or cold air, depending on the season.



Figures 18-21: The Cellophane House (2007-2008), (pp. 227) Kieran, Stephen, and James Timberlake. Refabricating Architecture, New York: McGraw-Hill

ANALYSIS OF PROGRAM AND TYPOLOGY
Home Delivery-Exhibit Structure
- M.I.T Professor Larry Sass

Professor Larry Sass began an architectural project that he called the "Instant House," in which he attempted to examine Robert Venturi and Denise Scott Brown's concept of the "decorated shed" in their seminal Learning from Las Vegas (1972.)

Design languages: "They identified there two universal building types: "ducks" and "decorated sheds," the former being structures which explicitly articulate their programmatic content in sculptural form, the latter being mundane structures dressed up in decoration that articulates their programmatic content." Sass sought to deploy the Instant House as a replicable design, or a structure that can change its form to suit the surrounding context. Part of this research effort involved documenting the vernacular architecture of the New Orleans shotgun style house. "

Throughout the research they modeled their selections using two methods: digital fabrication and 3-D printing, the former dealing with architecture as a planar system, the latter as a volumetric one.

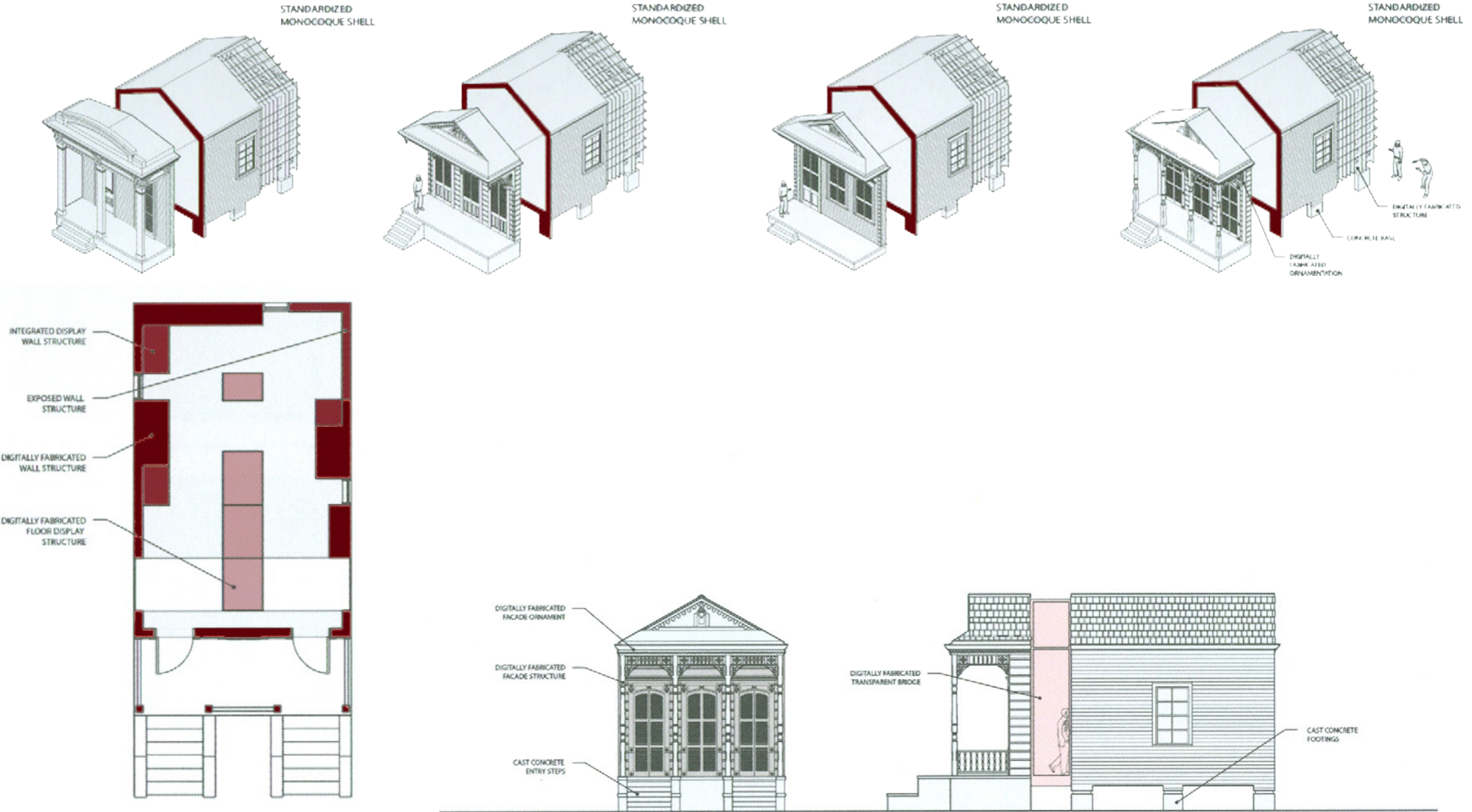
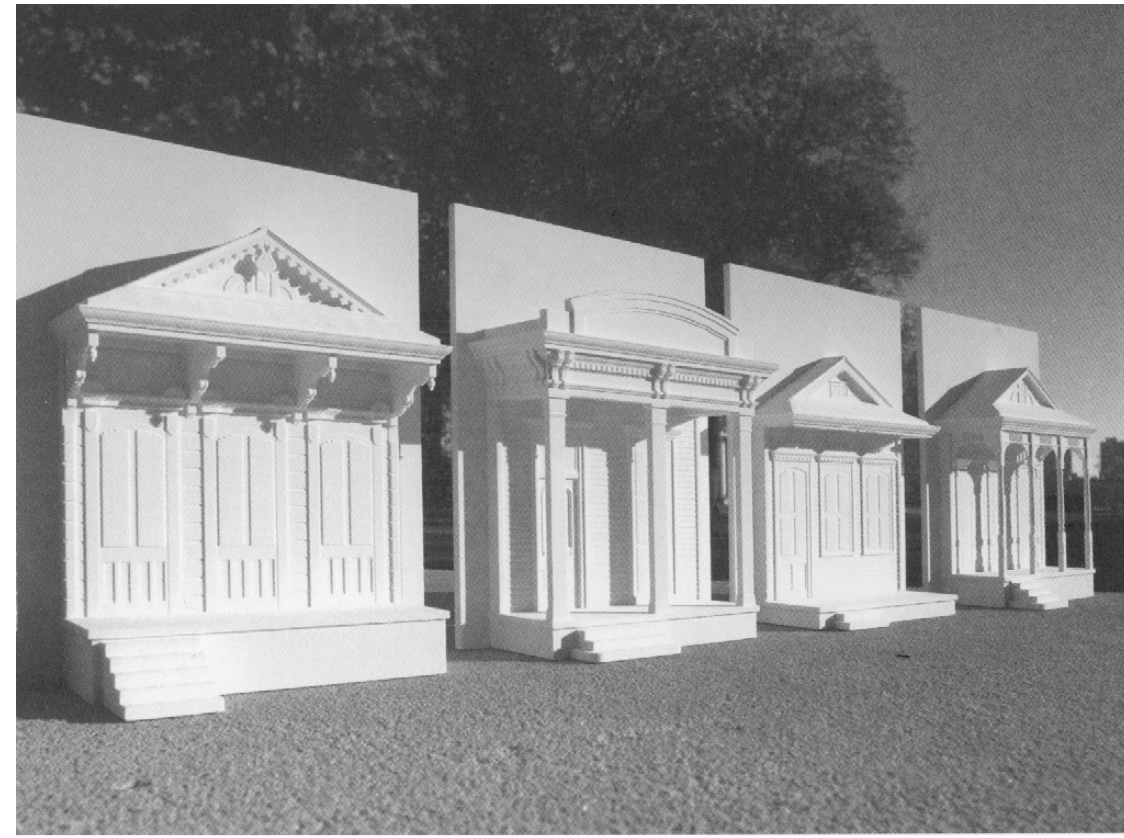
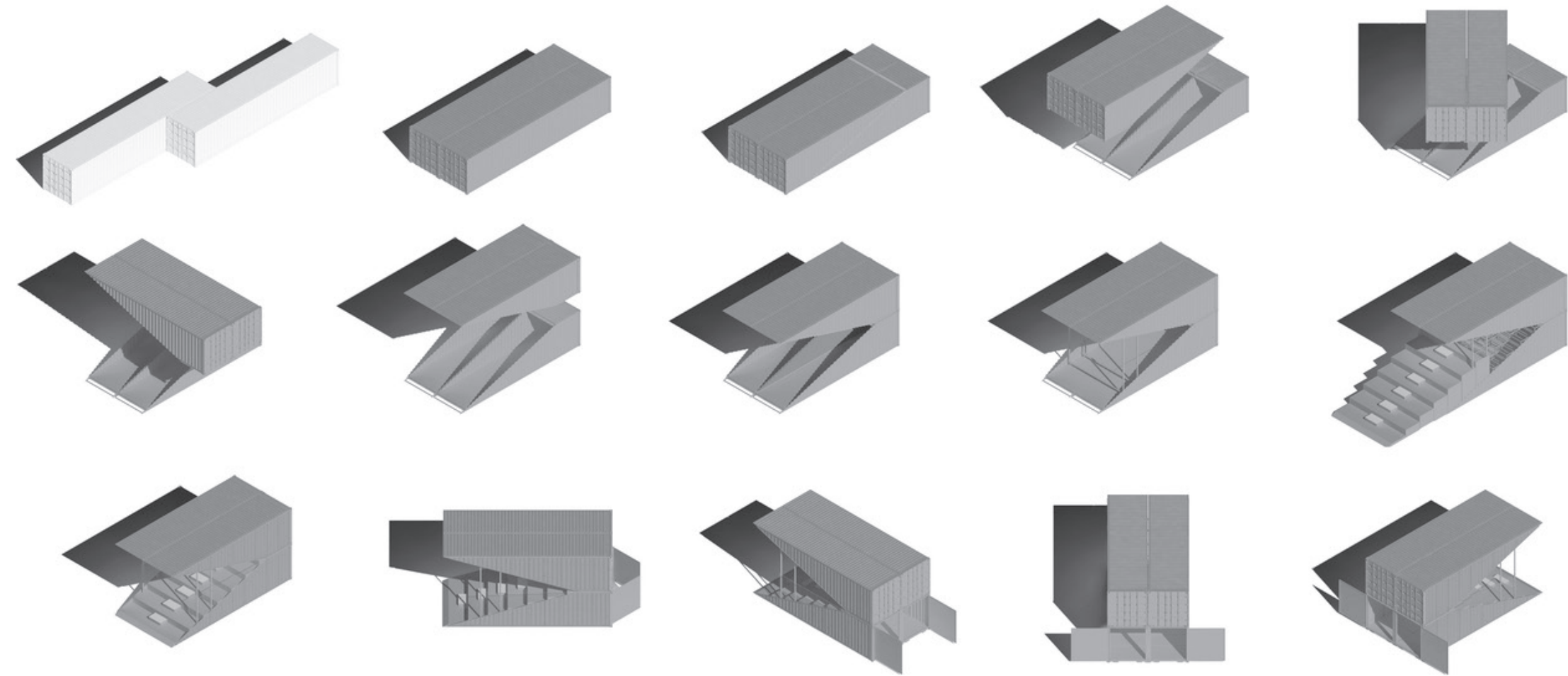


Figure 22-29: Digitally fabricated housing for New Orleans, 2004 by MIT (Bergdoll & Christensen, 2008, p. 198, 2021)

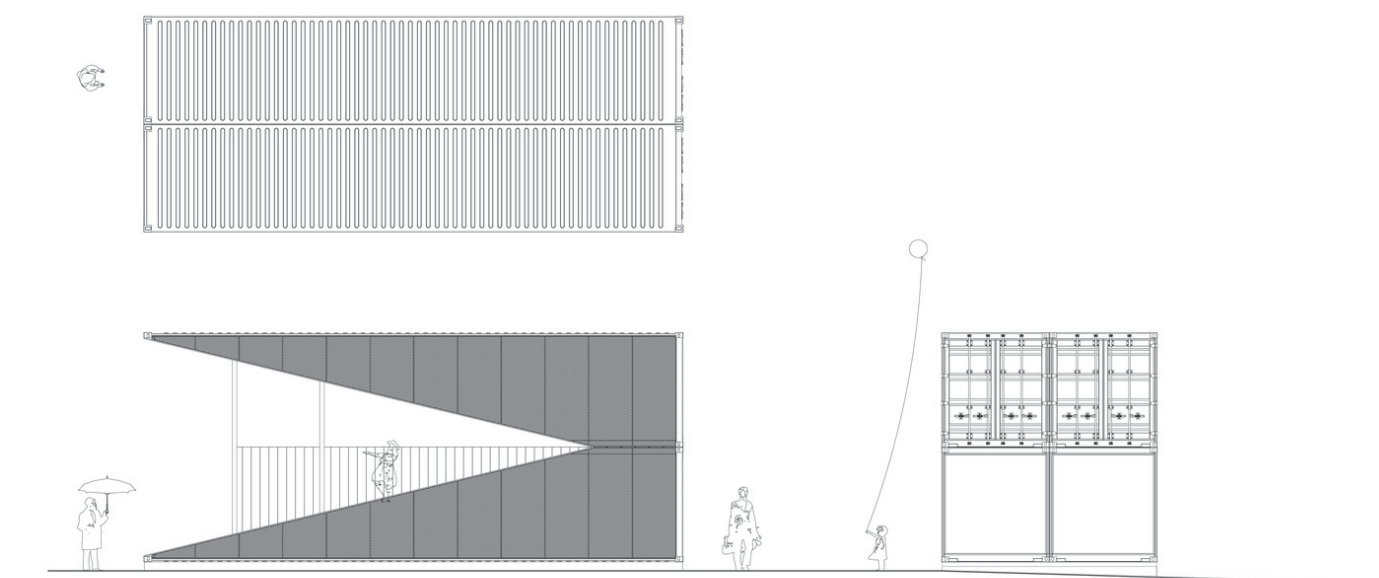
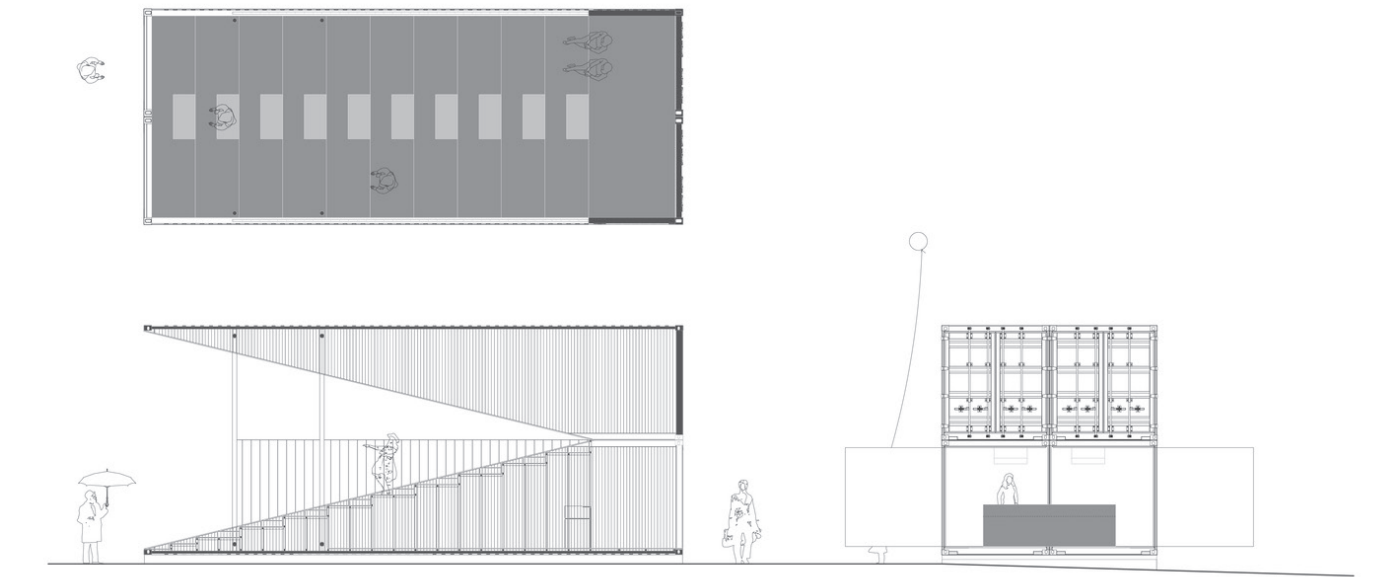
ANALYSIS OF FORM
MANIPULATION
Mobile Podium—
en-route-architecture Kat-
erina Kourkoula, Hannes
Livers Gutberlet



A makeshift format by design, the Mobile Podium provides necessary close quartered interior space that acted as an information center to meet its programmatic needs as an **objective platform that facilitates the exchange of information.** "A platform for gatherings, debates, lectures, and the exchange of ideas."

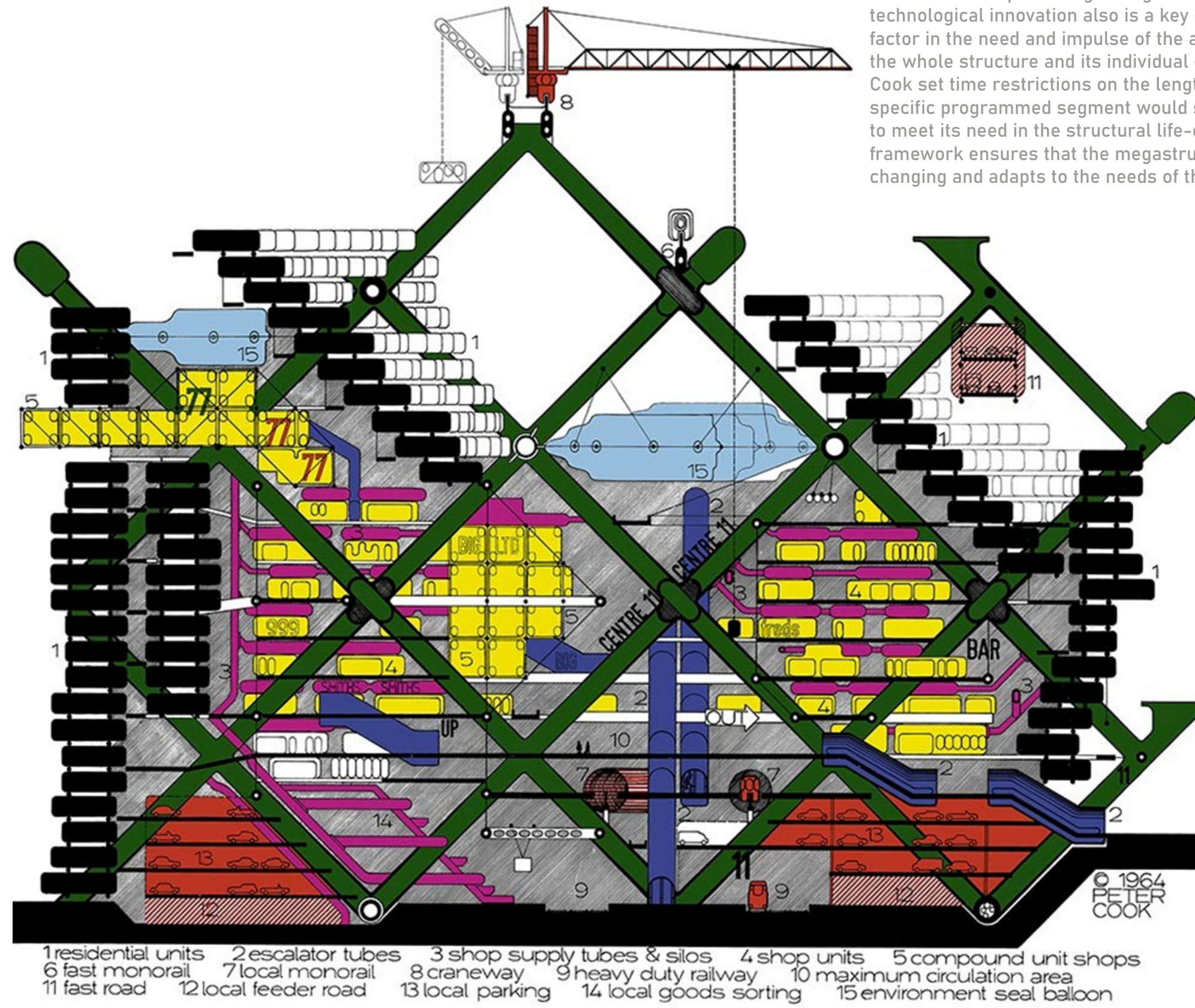
The **ascending functional space** at the rear of the structure, resembling monumental steps, enlivens the public space eventually becoming an **open-air social space.** Design Language: "It formally distinguished itself from the surroundings by becoming an oddly shaped landmark with very functional origins. A beacon of remarkable attraction that serves its purpose as a meeting point."

"Collective Space is neither public nor private but much more and at the same time much less that public space. Large spaces, whether inside or outside, where large numbers or people congregate, may not only impose but also give a sense of like-mindedness or even of fellowship through their role of 'overarching' common interests."



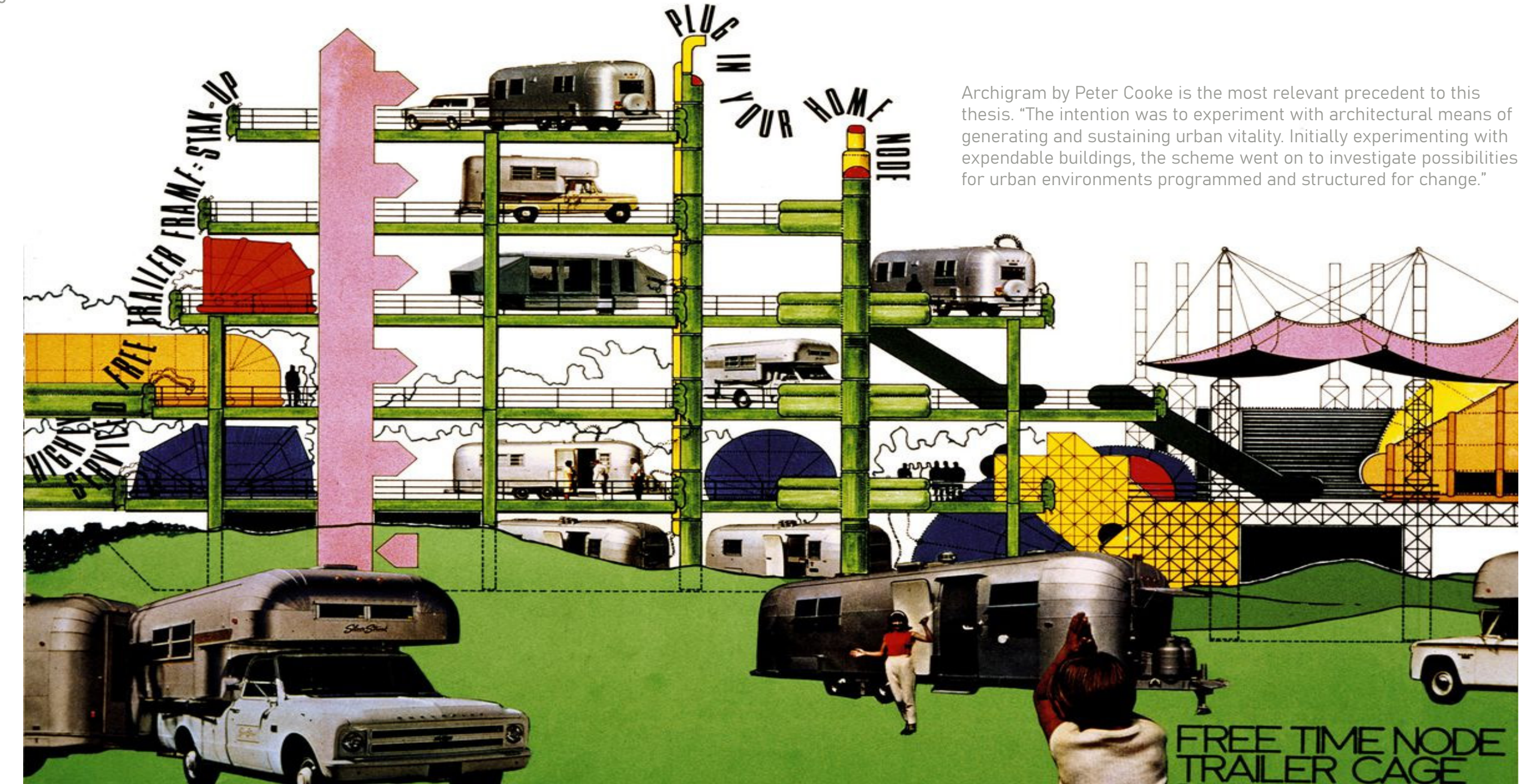
Figures 30-32: Curated by Pintos. Paula "Mobile Podium / en-route-architecture" 01 Jul 2022. ArchDaily. Accessed 26 Sep 2022. <<https://www.archdaily.com/984338/mobile-podium-en-route-architecture>> ISSN 0719-8884

ANALYSIS OF CONCEPT
Archigram by Peter Cooke



The programming of the **PLUG-IN CITY** project structure to adapt to the growing advancement of technological innovation also is a key contributing factor in the need and impulse of the adaptability of the whole structure and its individual components. Cook set time restrictions on the length at which a specific programmed segment would stay in place to meet its need in the structural life-cycle. This framework ensures that the megastructure is ever changing and adapts to the needs of the occupants.

"The project evolved through a critical dialogue with two relatively fewer formative themes of modernism namely, the 'megastructure' and the 'building-in-becoming'. "The intention was to experiment with architectural means of generating and sustaining urban vitality. Initially experimenting with expendable buildings, the scheme went on to investigate possibilities for urban environments programmed and structured for change."



Archigram by Peter Cooke is the most relevant precedent to this thesis. "The intention was to experiment with architectural means of generating and sustaining urban vitality. Initially experimenting with expendable buildings, the scheme went on to investigate possibilities for urban environments programmed and structured for change."

Figures 33-34: Peter Cook, Archigram, "Plug-in City (1964). Source: <http://archigram.westminster.ac.uk/>



LESS

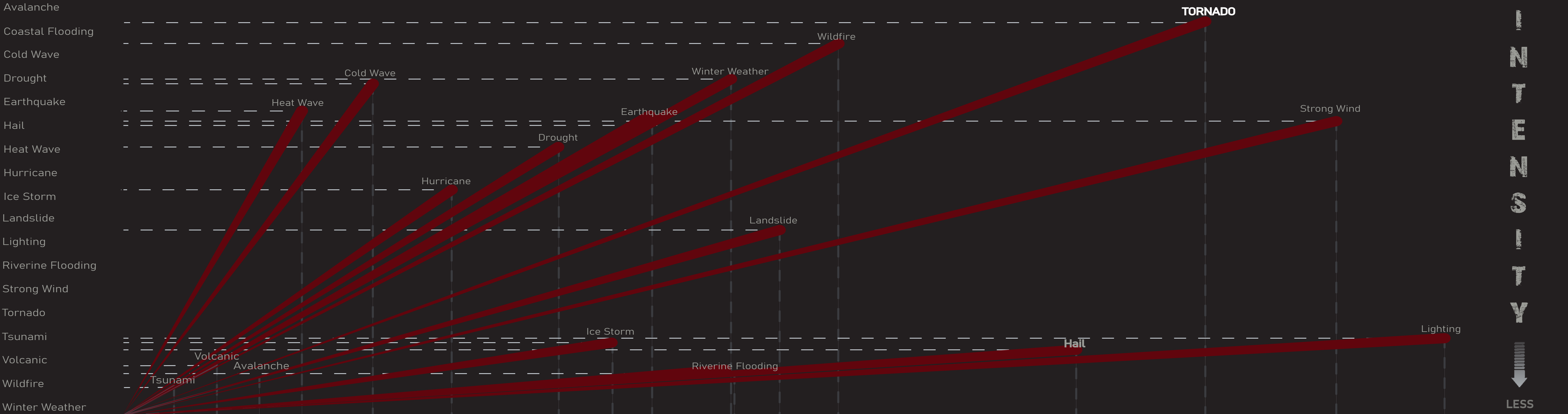
SPREAD OF NATURAL HAZARD

MORE



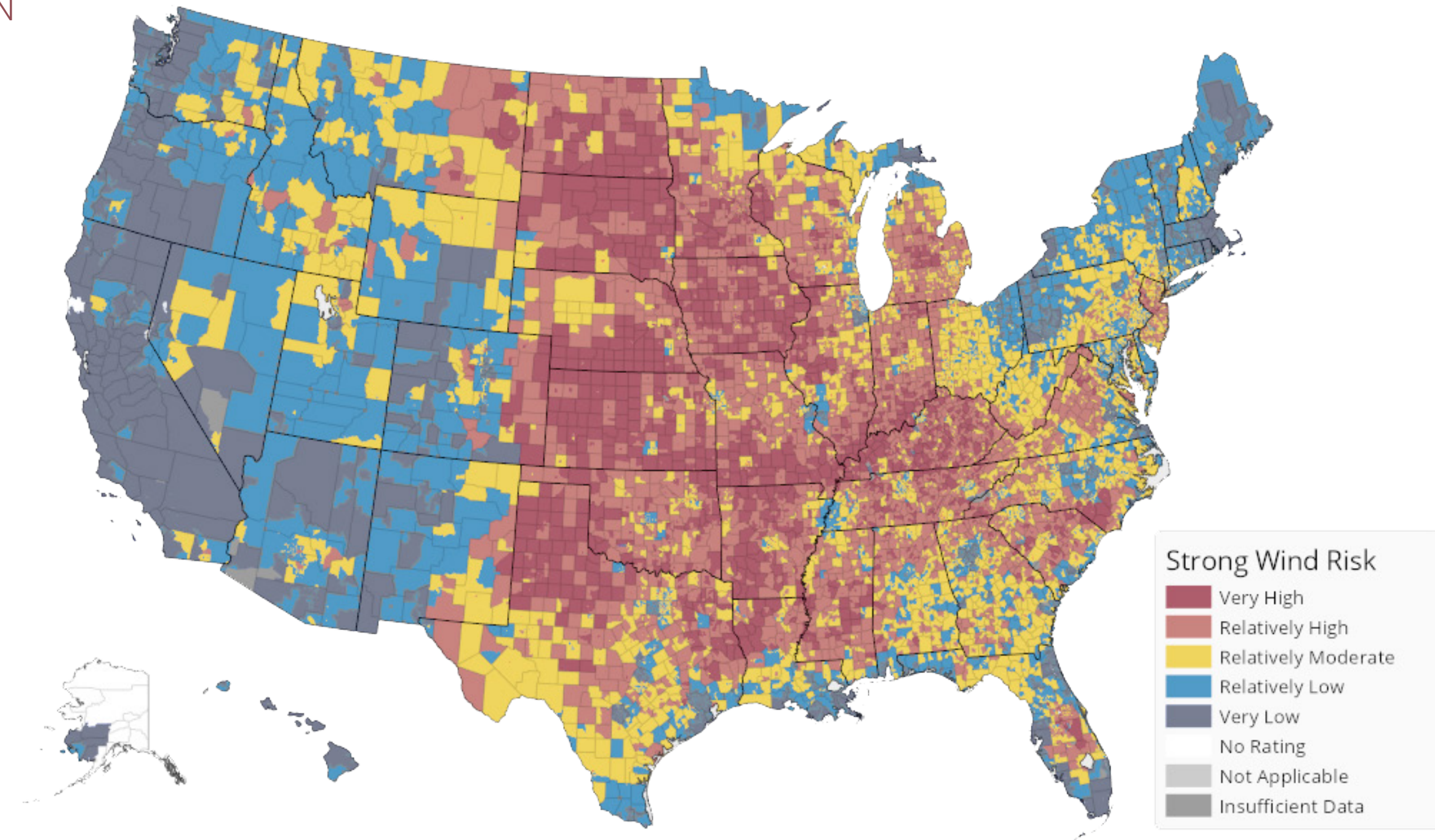
MORE

OCCURENCES ACROSS CONTIGUOUS UNITED STATES



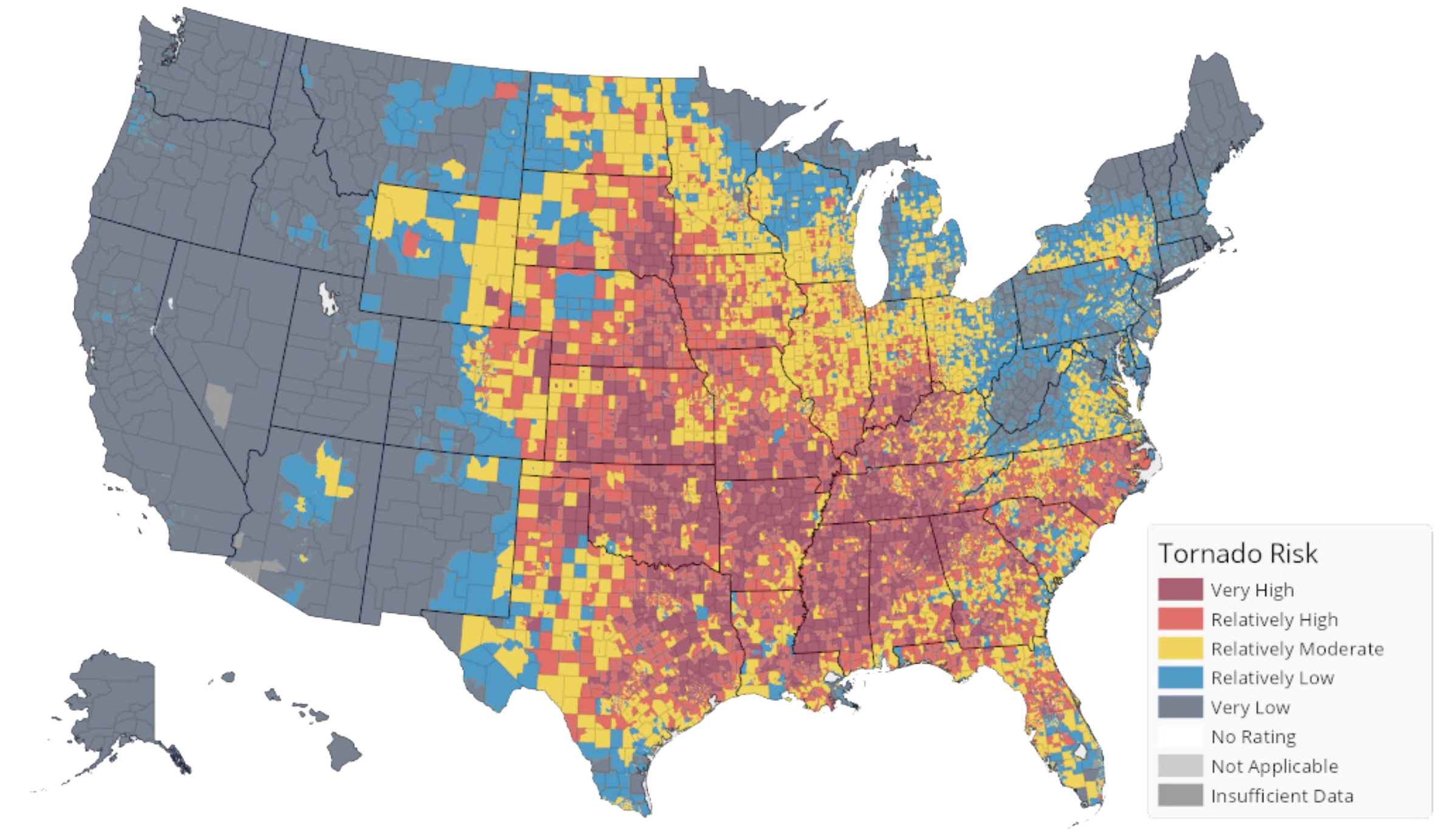
I
N
T
E
N
S
I
T
Y

LESS



According to the Federal Emergency Management Association (FEMA), "Strong Wind consists of damaging winds, often originating from thunderstorms, that are classified as exceeding 58 mph."

In the National Risk Index, a Strong Wind Risk Index score and rating represent a community's relative risk for Strong Wind when compared to the rest of the United States. A Strong Wind Expected Annual Loss score and rating represent a community's relative level of expected building, population, and agriculture loss each year due to Strong Wind when compared to the rest of the United States."



According to the Federal Emergency Management Association (FEMA), "A Tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground and is visible only if it forms a condensation funnel made up of water droplets, dust, and debris."

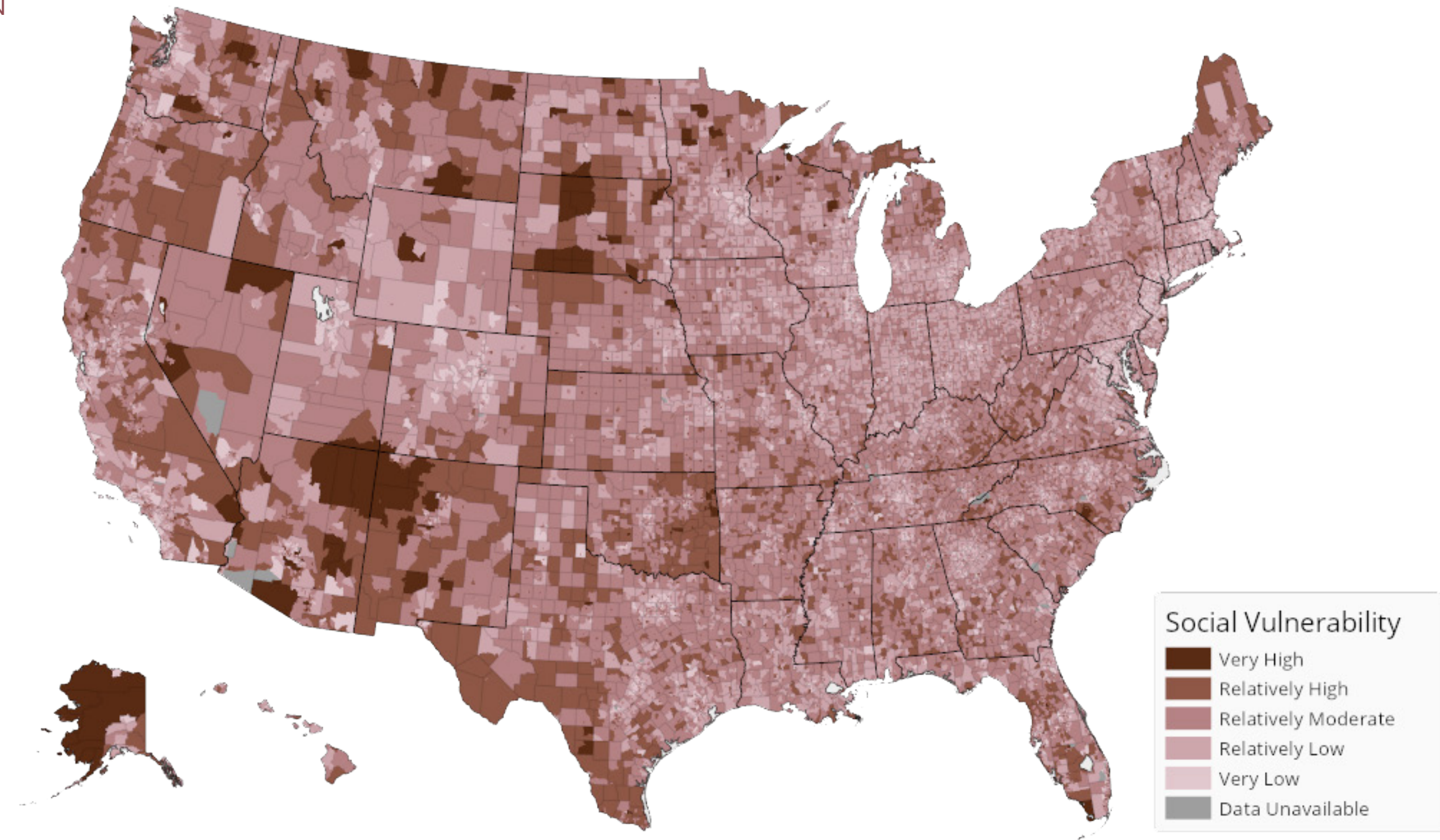
In the National Risk Index, a Tornado Risk Index score and rating represent a community's relative risk for Tornadoes when compared to the rest of the United States. A Tornado Expected Annual Loss score and rating represent a community's relative level of expected building and population loss each year due to Tornadoes when compared to the rest of the United States."

Figures 35: FEMA.org. "FEMA National Risk Index.", accessed October 8, 2022, <https://hazards.fema.gov/nri/strong-wind>.
 Figures 36: FEMA.org. "FEMA National Risk Index.", accessed October 8, 2022, <https://hazards.fema.gov/nri/tornado>

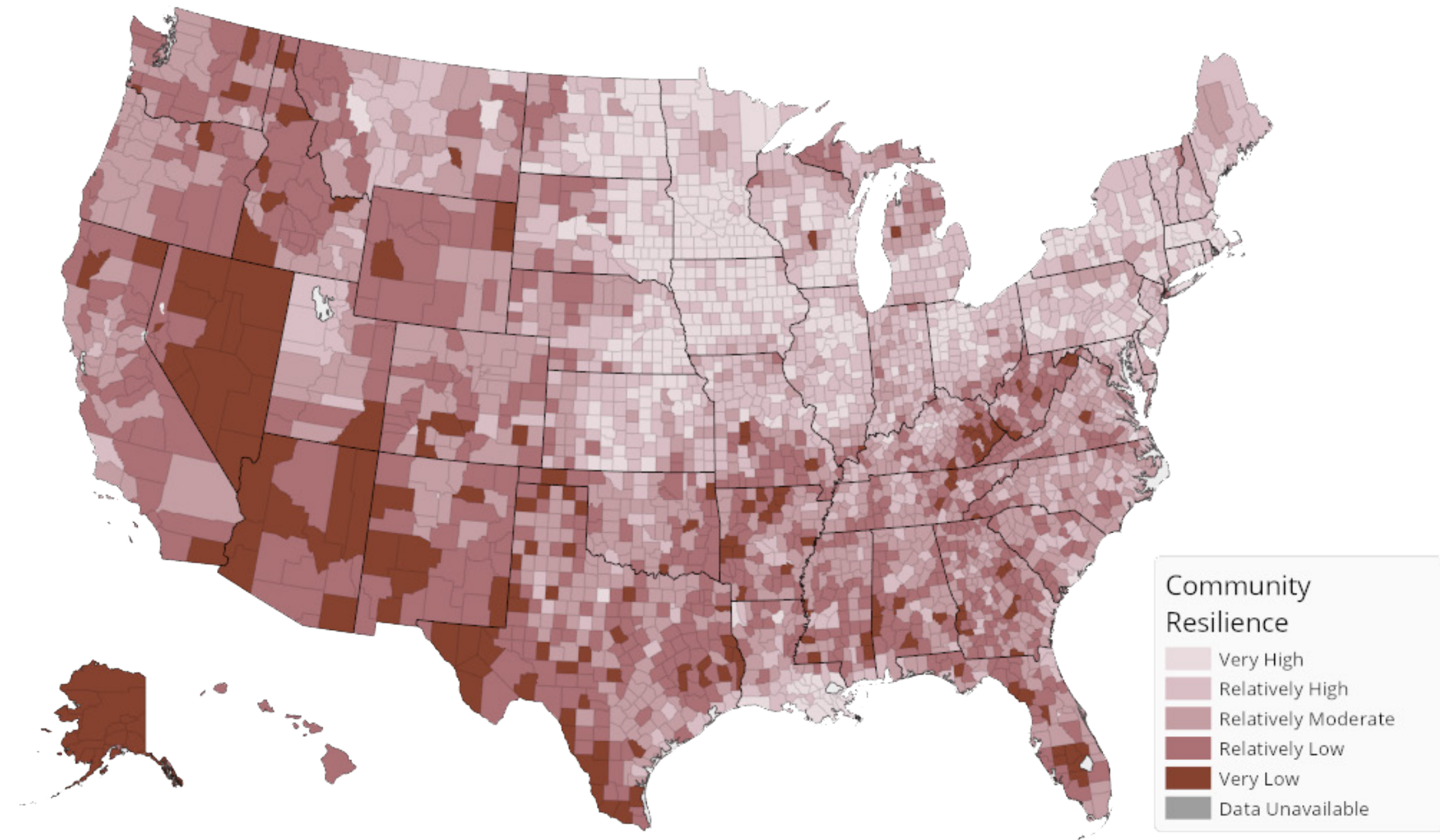
"This product uses the Federal Emergency Management Agency's API, but is not endorsed by FEMA."

"This product uses the Federal Emergency Management Agency's API, but is not endorsed by FEMA."

SITE SELECTION



22 MILLION AMERICANS LIVE IN MANUFACTURED HOMES



According to the Federal Emergency Management Association (FEMA), "Social vulnerability is the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood."

As a consequence enhancing risk component of the National Risk Index, a Social Vulnerability score and rating represent the relative level of a community's social vulnerability compared to all other communities at the same level. A community's Social Vulnerability score is proportional to a community's risk. A higher Social Vulnerability score results in a higher Risk Index score."

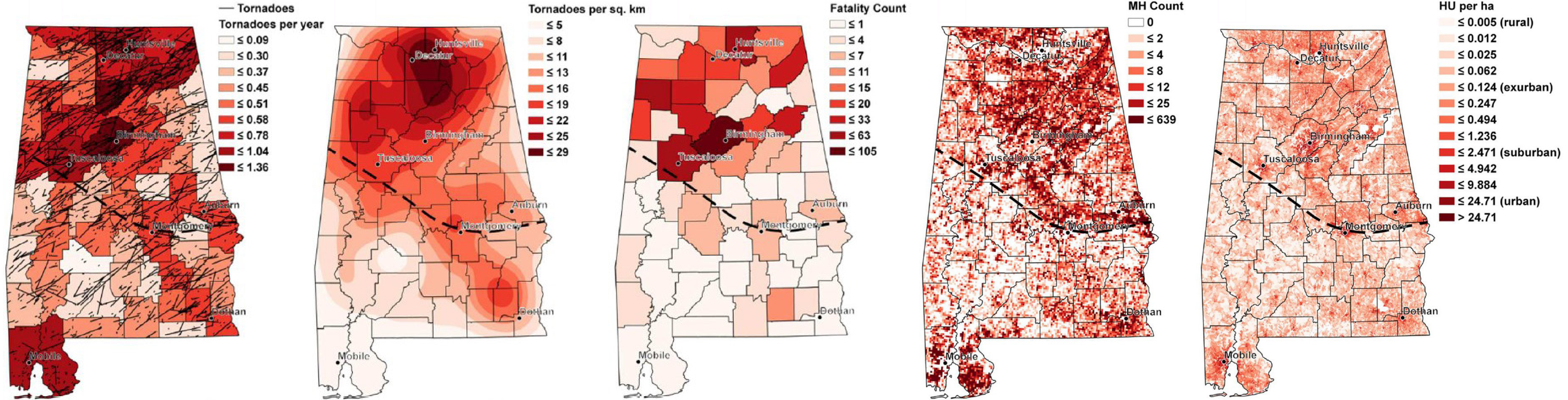
"This product uses the Federal Emergency Management Agency's API, but is not endorsed by FEMA."

Figures 37-38: FEMA.org. "FEMA National Risk Index.", accessed October 8, 2022, <https://hazards.fema.gov/nri/map>

According to the Federal Emergency Management Association (FEMA), "Community resilience is the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions."

As a consequence reduction risk component of the National Risk Index, a Community Resilience score and rating represent the relative level of a community's resilience compared to all other communities at the same level. A Community Resilience score is inversely proportional to a community's risk. A higher Community Resilience score results in a lower Risk Index score."

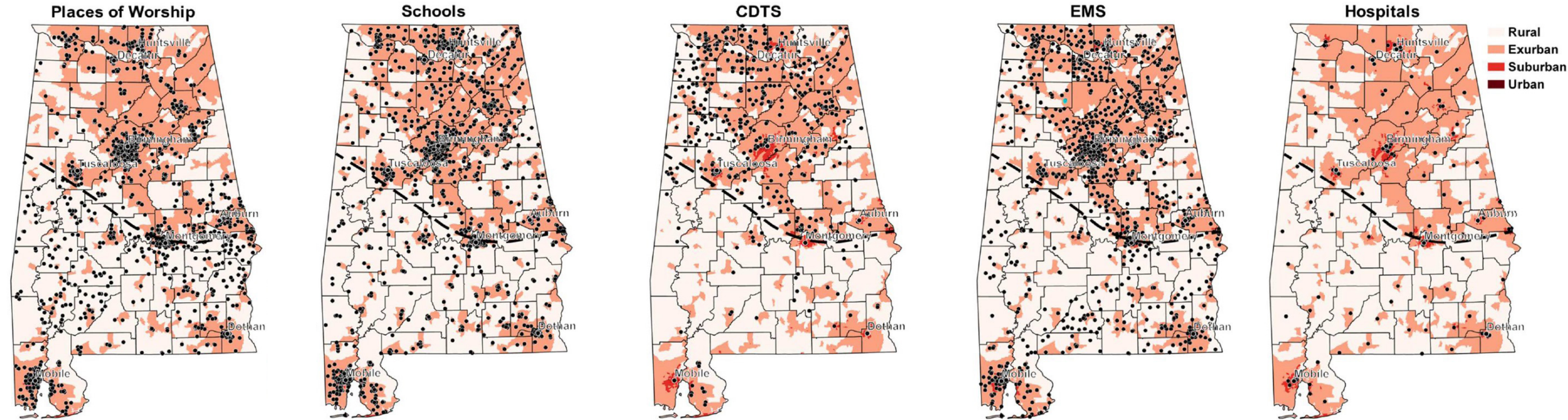
"This product uses the Federal Emergency Management Agency's API, but is not endorsed by FEMA."



Alabama was chosen as the state in which the site selection will occur, due to its social notoriety of being home to lower class citizens, as well as its proximity to the Gulf Coast, which frequently experienced strong winds, along with the understanding that Alabama experiences a high frequency of tornadoes. The diagrams above display Alabama tornado risk illustrated between 1950-2017 to understand what areas of Alabama experience tornadoes most frequently.

During the course of this thesis research it was discovered that a joint thesis was done by the Department of Geography and Environment at Villanova University and the Department of Geography at the University of Florida entitled, "Mobile Home Resident Evacuation Vulnerability and Emergency Medical Service Access during Tornado Events in the Southeast United States."

Figures 39-43: Stephen M. Strader, Kevin Ash, Eric Wagner, Chayla Sherrod, Mobile home resident evacuation vulnerability and emergency medical service access during tornado events in the Southeast United States, International Journal of Disaster Risk Reduction, Volume 38, 2019, 101210, ISSN 2212-4209, <https://doi.org/10.1016/j.ijdrr.2019.101210>.



Data was collected surveying Alabama's places of worship, schools, Community Designated Tornado Shelters (CDTS), Emergency Medical Services (EMS), and hospital locations overlaid on urban, suburban, exurban, and rural land use density from 2012-2016 American Community Survey (ACS) block groups. The typical separation from northern and southern Alabama is shown by the dashed lines it is the socially accepted distinction.

Figures 39-43: Stephen M. Strader, Kevin Ash, Eric Wagner, Chayla Sherrod, Mobile home resident evacuation vulnerability and emergency medical service access during tornado events in the Southeast United States, International Journal of Disaster Risk Reduction, Volume 38, 2019, 101210, ISSN 2212-4209, <https://doi.org/10.1016/j.ijdrr.2019.101210>.

DESIGN PROCESS

CONCEPTUAL TYPOLOGY:

Manufactured housing, formerly known as mobile or trailer homes, is one of the most vulnerable housing types during a severe weather event. This is due to the industrialized production of a structural composition that is rather suited for permanently fixed construction. This misappropriation of materials and improper design scheme has led to fragility in their assemblage and feeble construction specifications. The focus of design exploration throughout this thesis is towards the structural stability of manufactured housing in response to natural disasters by implementing mass customization which will be predicated upon refabricating three fundamental elements of construction: a Flexible Frame, Universal Anchoring, and Ease of the manufacturing process.

FUTURE IMPLICATIONS:

The next step for this thesis is a micro-scale exploration of the systems and envelope that can be mass customized and developing a step-by-step outline of the manufacturing process.



SITE MANIPULATION

Project Site: Big Oak Mobile Home Park 7400 Jack Springs Rd, Atmore, AL 36502

Selection Criteria:

- Site must have experienced a Natural Disaster
- Natural Disaster must have occurred within the past year (2022).
- Site must be large enough to accommodate for rearticulation of manufactured homes and 3-D fabrication center(s).
- Site must be able to serve as good topological precedent for transportation of homes from fab-center to individual plots.

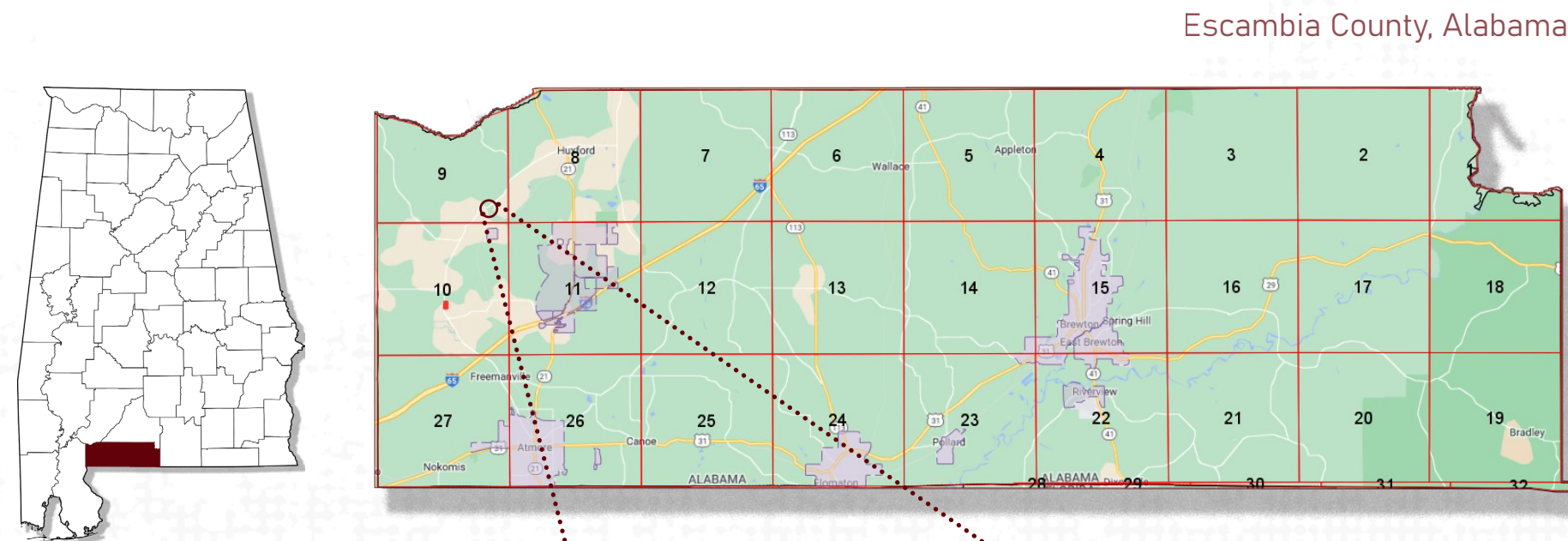
Report of Natural Disaster following Natural Hazard Event:

On Friday, March 18th, 2022 a powerful storm of straight line winds descended on the Big Oak Mobile Home Park in Escambia County, Alabama injuring six people and destroying several homes.

According to the Atmore Advanced Newspaper, "Escambia County Sheriff Heath Jackson said this morning, at approximately 9 a.m., the department started receiving calls of a possible tornado touching down in the 7400 block of Jack Springs Road. Jackson said when the ECSO arrived, there were numerous mobile homes overturned. He said one trailer was completely flipped over. "Approximately, nine were totaled," Jackson said about the trailers. "There were two injuries that were transported by ambulance. One was a walk in and numerous people had bumps and bruises....Jackson said there are approximately 25-30 mobile homes in the facility. He said it looked like a tornado hit the place. "It's devastating," he said. "Those people have nothing left. That's the hardest part. We're thankful no one was killed."

Figures 49: Digital Alabama Digital Alabama. "Escambia County Alabama Map .", <https://digitalalabama.com/wp-content/uploads/2017/04/escambia-county-map.png>. Accessed: Sept. 17, 2022

Figures 50: Map showing location of Big Oak Mobile Home Park 7400 Jack Springs Rd, Atmore, AL. Google Earth, earth.google.com/web/. Accessed: Sept. 17, 2022



Figures 51-60: Smith, Tandra and Specker, Lawrence. "Atmore's Poarch Community Hit by Possible Tornado: 3 Injured as Mobile Homes Damaged." Advance Local Media LLC., last modified Mar. 18, , 1:28 p.m., accessed October 17., 2023, <https://www.al.com/news/2022/03/atmores-poarch-community-hit-by-possible-tornado-mobile-homes-other-buildings-reportedly-struck.html>.

KEY ELEMENTS OF URBAN DESIGN

- KEEP EXISTING ENTRY/EXITS
- GREEN SPACES
- FAB CENTER ON MAIN ROAD
- PEDESTRIAN WALKING PATH



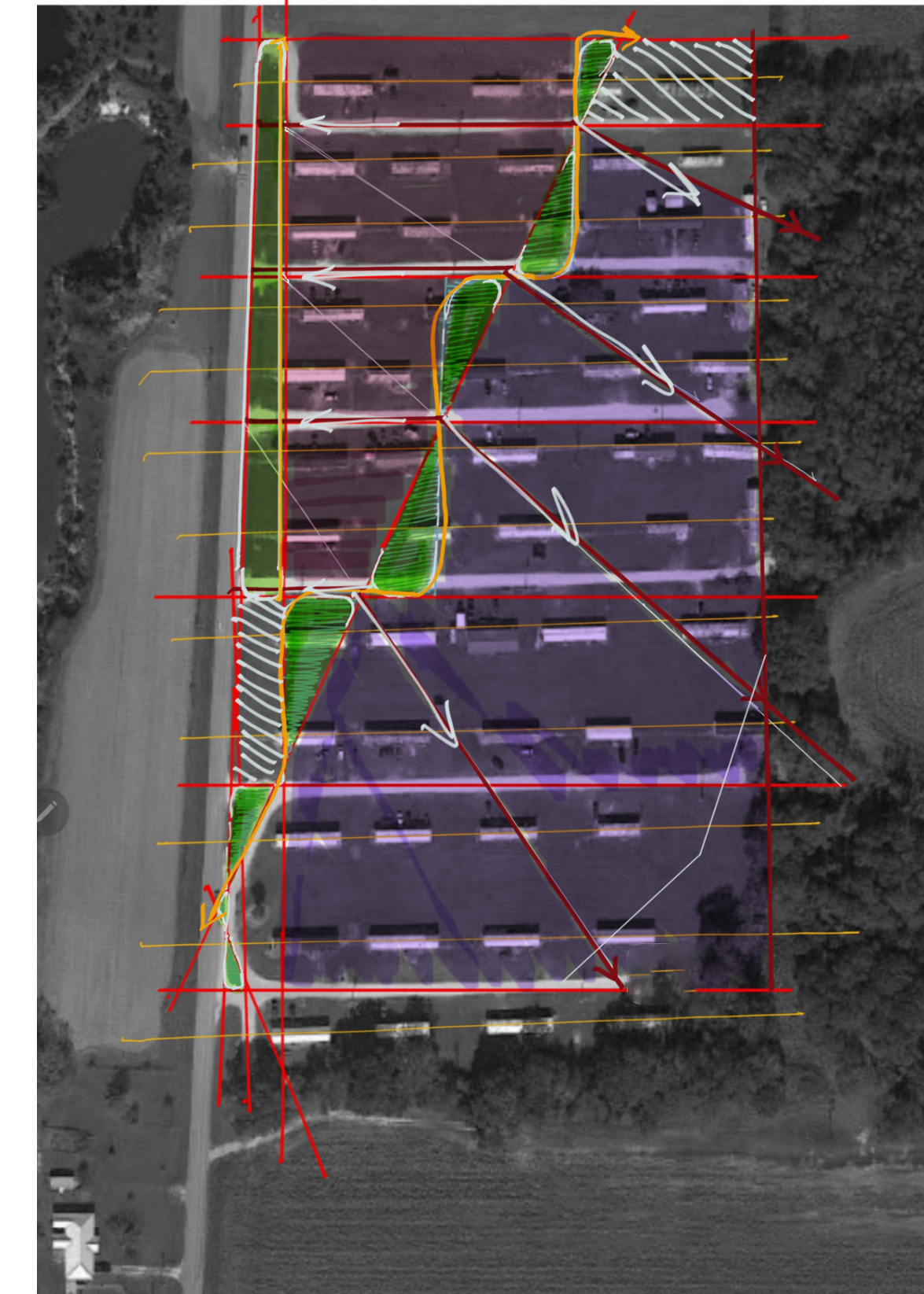
The 2nd iteration of the urban plan took into consideration the ease of transport for the 3-D printed homes therefore a more orthogonal scheme was adhered to for the vehicular circulation



Following an analysis of the diagram denoting the typical amount of tornadoes per year, it was discovered that the wind strong winds from the south-west typically move north-east from the Gulf of Mexico and it was determined that the axial alignment below represented the most likely path of travel for the strong wind event that occurred March of 2022 in Atmore, Alabama.

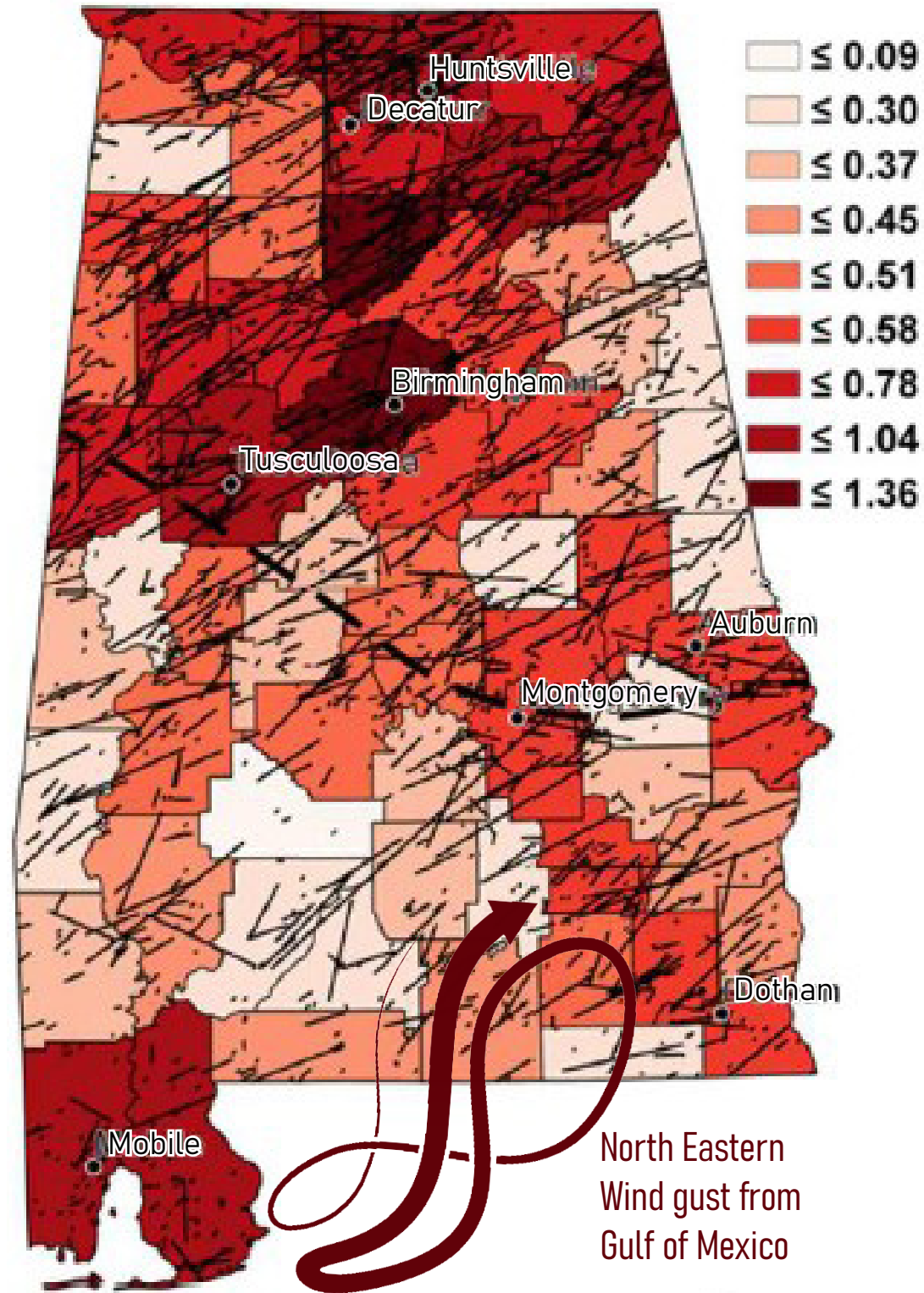


The final iteration features the primary axial diagonal as the spine of the urban plan which is to serve as a pedestrian concourse, while the vehicular travel is denoted by the arrows. The community green spaces function as a buffer between the pedestrian circulation, private plots, and vehicular circulation. The white hatching denotes the most likely places for the fabrication centers to reside.



— Tornadoes

Tornadoes Per Year



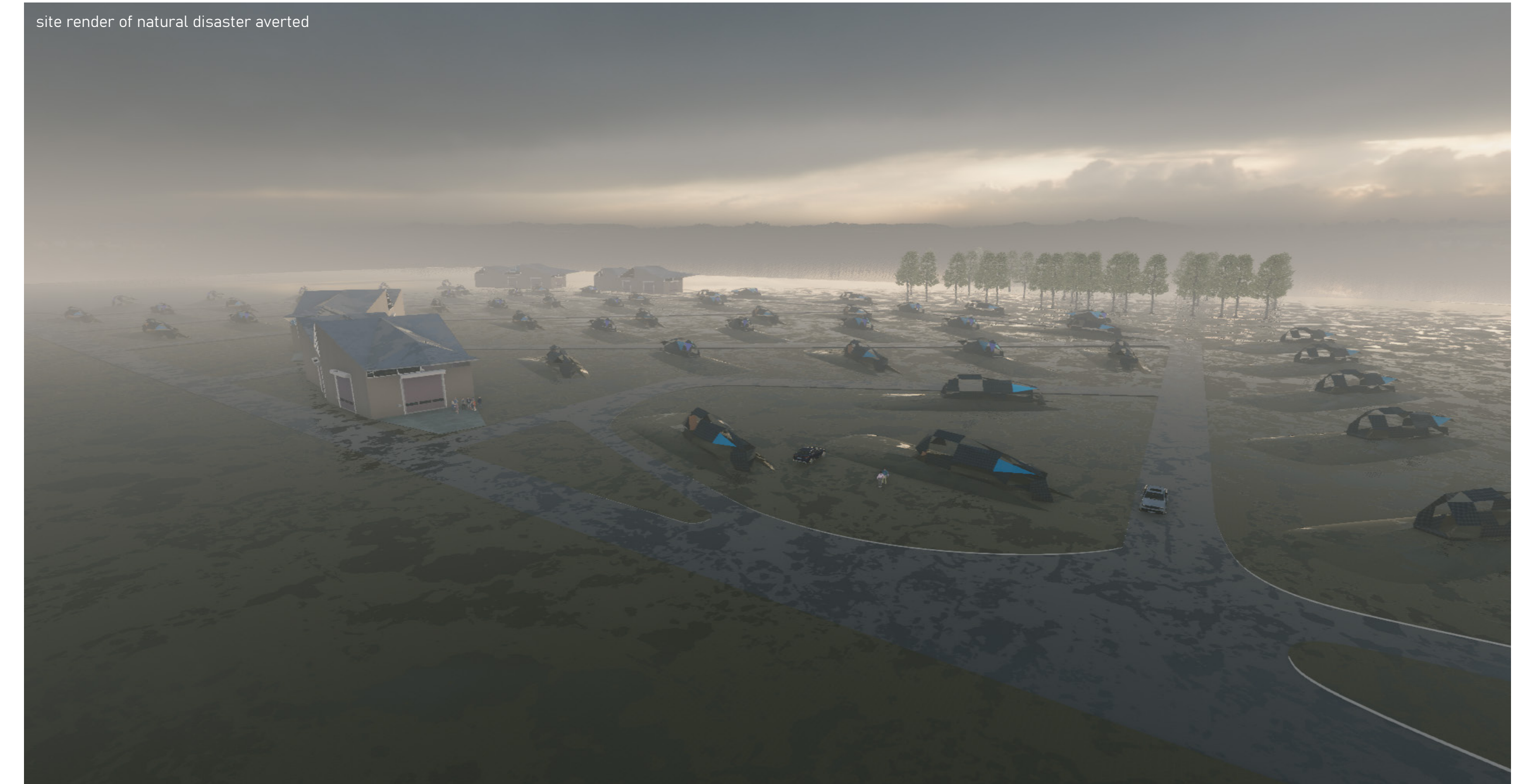
Conceptual Response:

The redesign of the Big Oak Mobile Home Park features four fabrication centers / storm shelters, two dedicated green spaces and main concourse which acts as the primary spine of pedestrian transportation throughout the park. **Mounds were added to protect the homes from lifting off the ground** during a severe weather event, while the plan also avoided adding foliage near the homes to medigate the chances that they would become flying projectiles during a storm.



Conceptual Response:

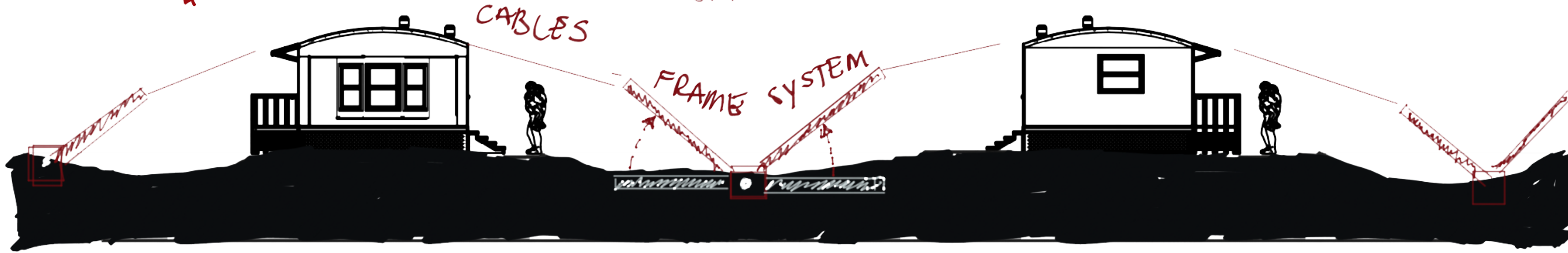
Back fill was utilized from a neighboring site to create **inclined mounds** that provide greater structural stability for the homes during a severe weather event. This design was conceived with the intent to mimic the groundedness of site built construction. Each mound is a **max height of 4'**.



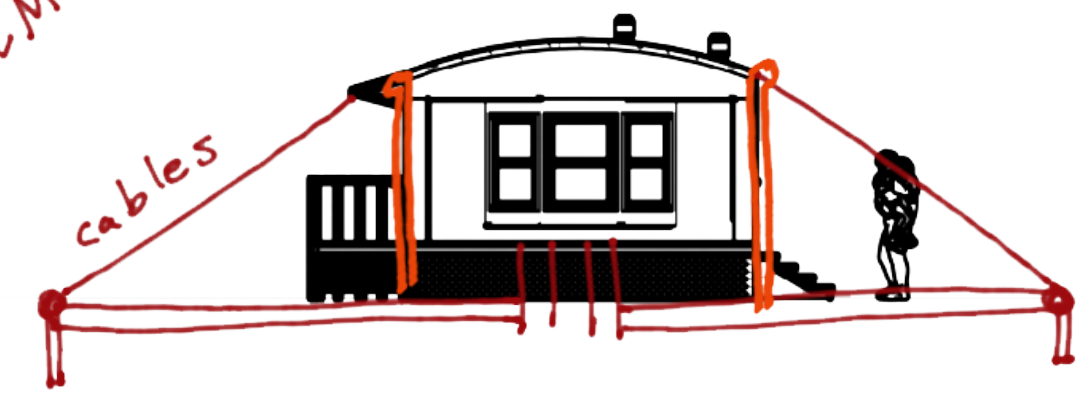
Figures 61: Stephen M. Strader, Kevin Ash, Eric Wagner, Chayla Sherrod, Mobile home resident evacuation vulnerability and emergency medical service access during tornado events in the Southeast United States, International Journal of Disaster Risk Reduction, Volume 38, 2019, 101210, ISSN 2212-4209, <https://doi.org/10.1016/j.ijdr.2019.101210>.

create slight mounds + swells.

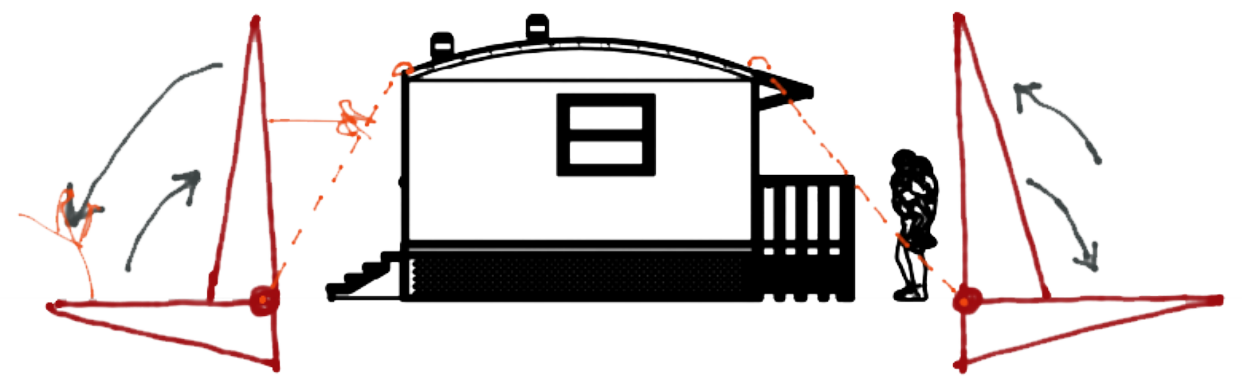
MEGA-STRUCTURE STRONGER THAN INDIVIDUAL UNIT



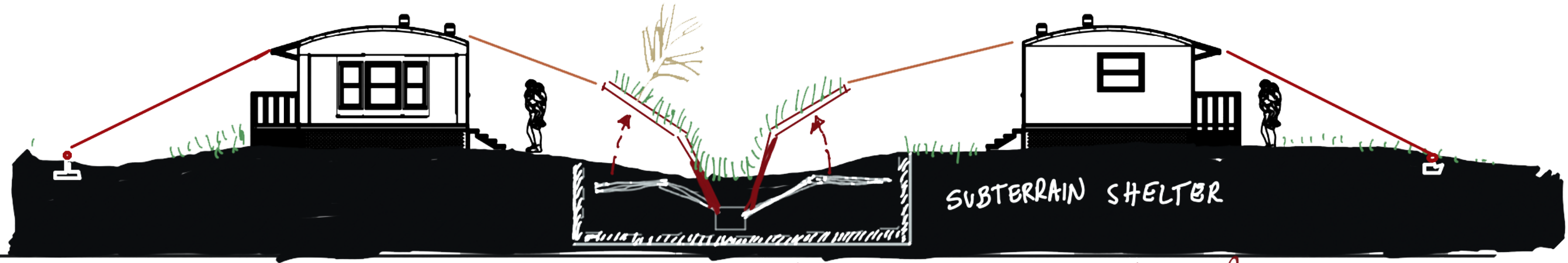
HINGE SYSTEM lateral stability



shielded protection



EASE OF INTEGRATION ACCESS



inhabitants design shape & structure of the universal frame component for their homes

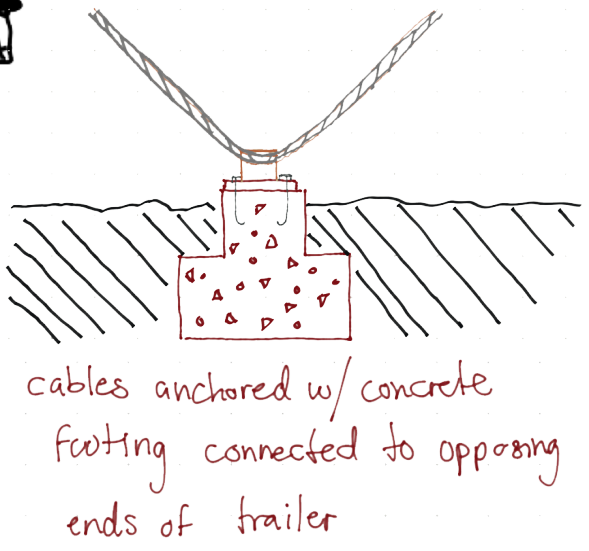
UNIVERSAL FRAME IS NETWORK THAT TIES THE HOMES TOGETHER



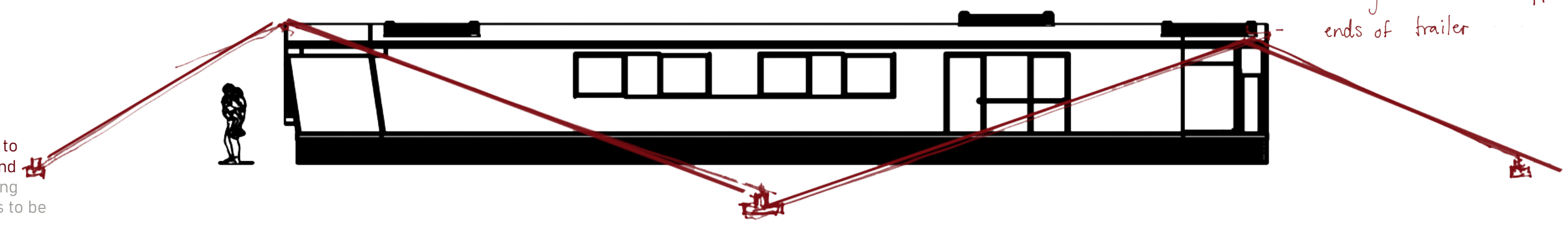
SHIELD IS FABRICATED

Initially a cabling system was integrated into the existing typology of a Manufactured home to understand if stability could be addressed using an additive approach. This idea was ultimately rejected in the design process simply because, in practice implementing a cabling system would pose a serious danger to the inhabitants in the event of a tornado or strong winds due to the high potential for the cables to become unhinged from the anchoring device, creating a serious hazard to the life safety of the residents.

4 Anchoring points for each Home

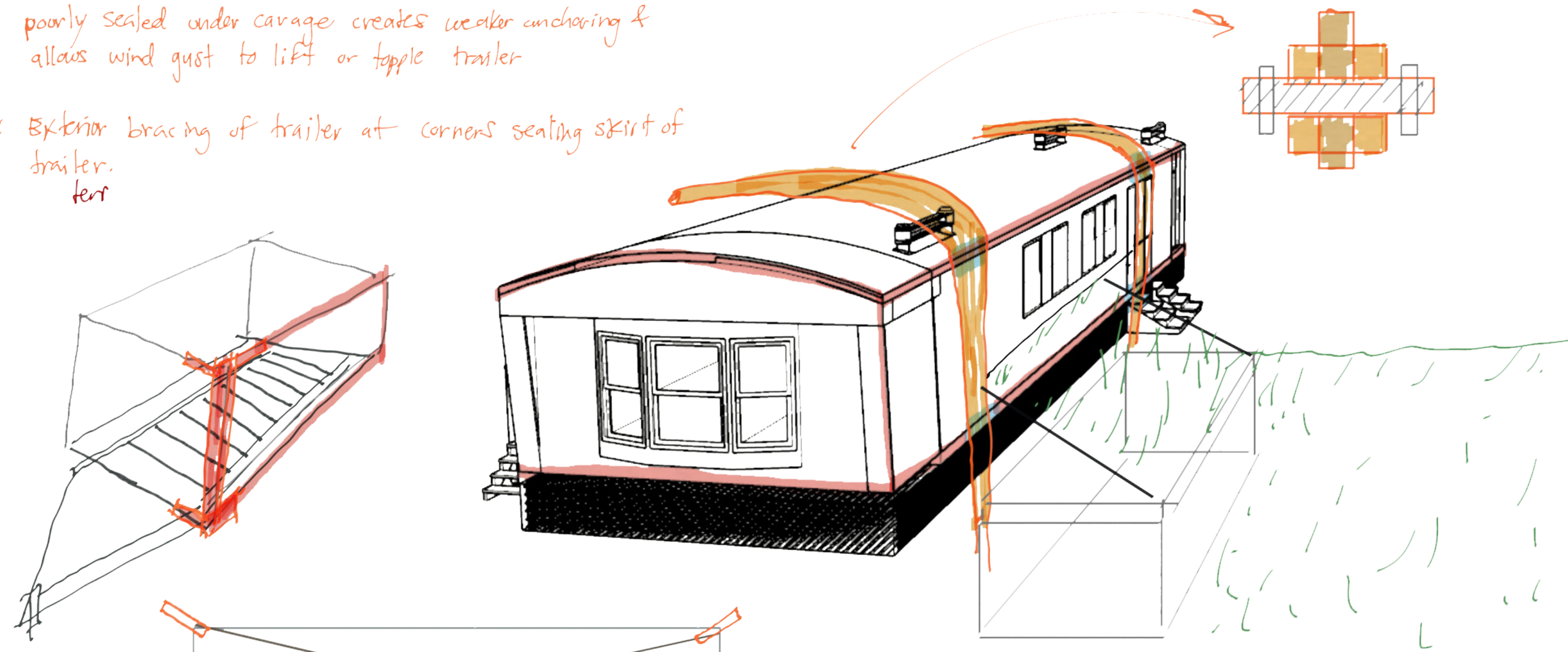


Following the site manipulation, the focus of the project turned to incorporating the notion of a megastructure in which the site and trailer are integrated as an open source plug-in system mimicing the attempt made by Peter Cooke's Archigram to allow changes to be dictated by growth and obsolescence.



2 Wind blows under trailer, knocked off foundation
 problem: poorly sealed under carriage creates weaker anchoring & allows wind gust to lift or topple trailer

solution: Exterior bracing of trailer at corners sealing skirt of trailer.
 tent



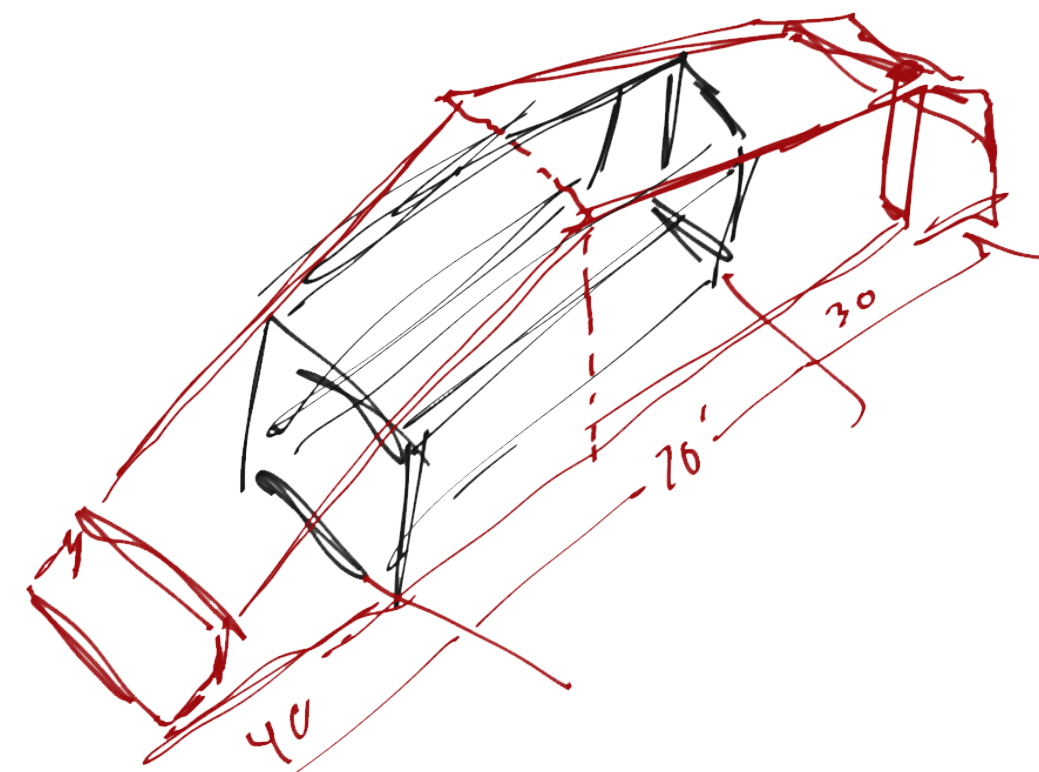
NO HATCH

cable hold down on roof

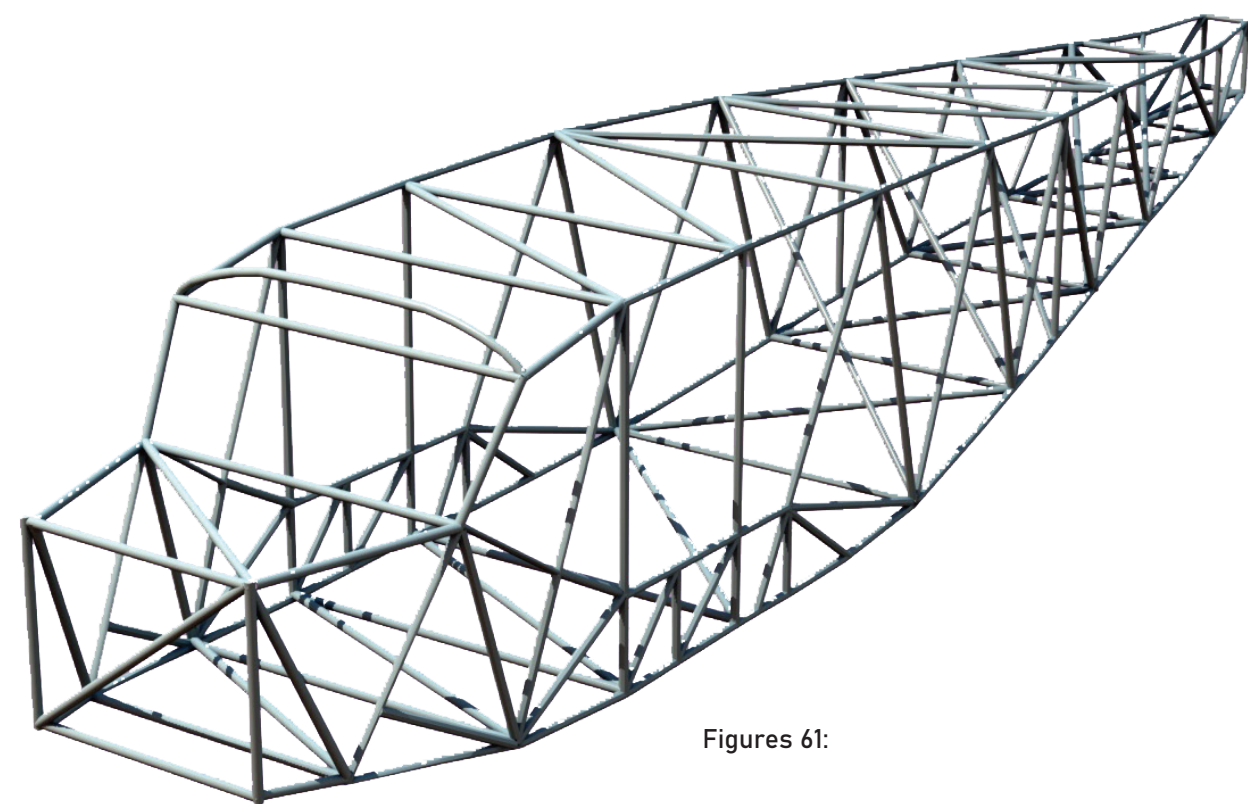
Conceptual Response:

The aim of the initial design approach was to create a megastructure based on various parts in response to a natural disaster occurring. This function over form approach proved difficult because of the high plausibility for the attached appendages to become flying projectiles during the course of the severe weather event. Therefore the approach to design was taken from a form over function approach with the aim to prepare rather than response to a severe weather hazard. The additive approach to the conventional trailer form later became a subtractive formal approach.

The aerodynamic capacity of airplanes to withstand well over 100mph winds was the leading factor in the design implications for the homes. Because a trailer home is both a home and an automobile I began to conceive of a form that could be habitable and transportable. The precedent form that emerged was a commercial airliner, specifically the first class cabin and cockpit. Since the social identity of trailer park inhabitants is closely associated with the stigma of second class citizens, I believe it was appropriate to use the first class portion of a standard airliner as the structural and spatial model for the tectonics of the homes.

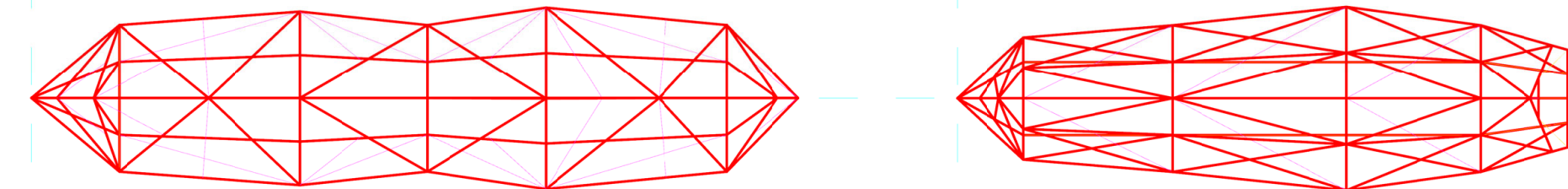


AIR PLANE STRUCTURE

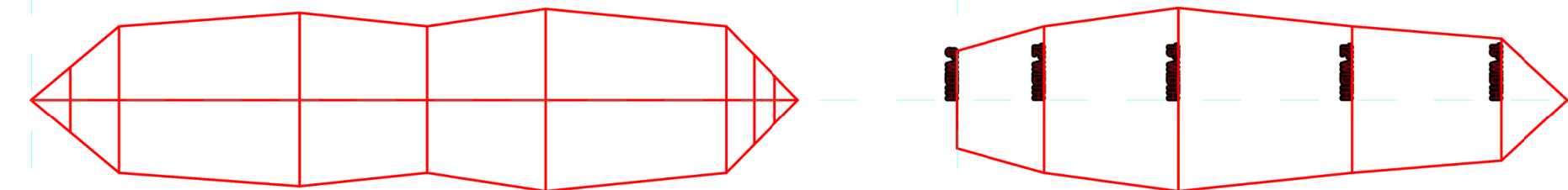


Figures 61:

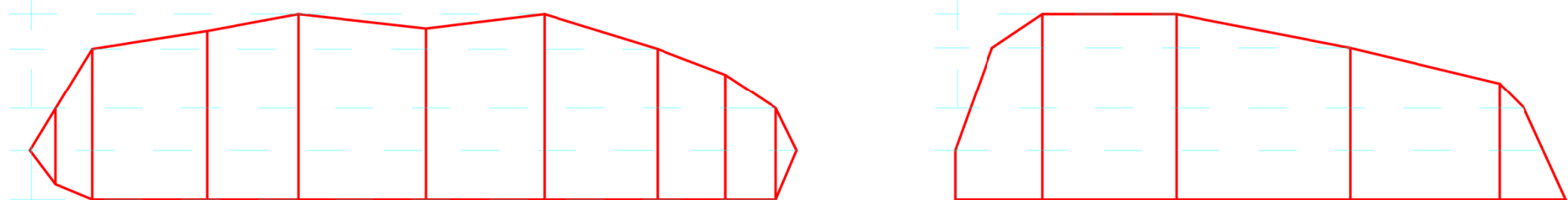
UNIVERSAL FRAME SCHEMATICS



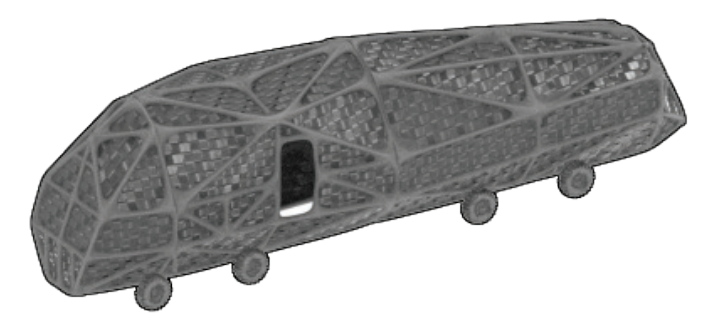
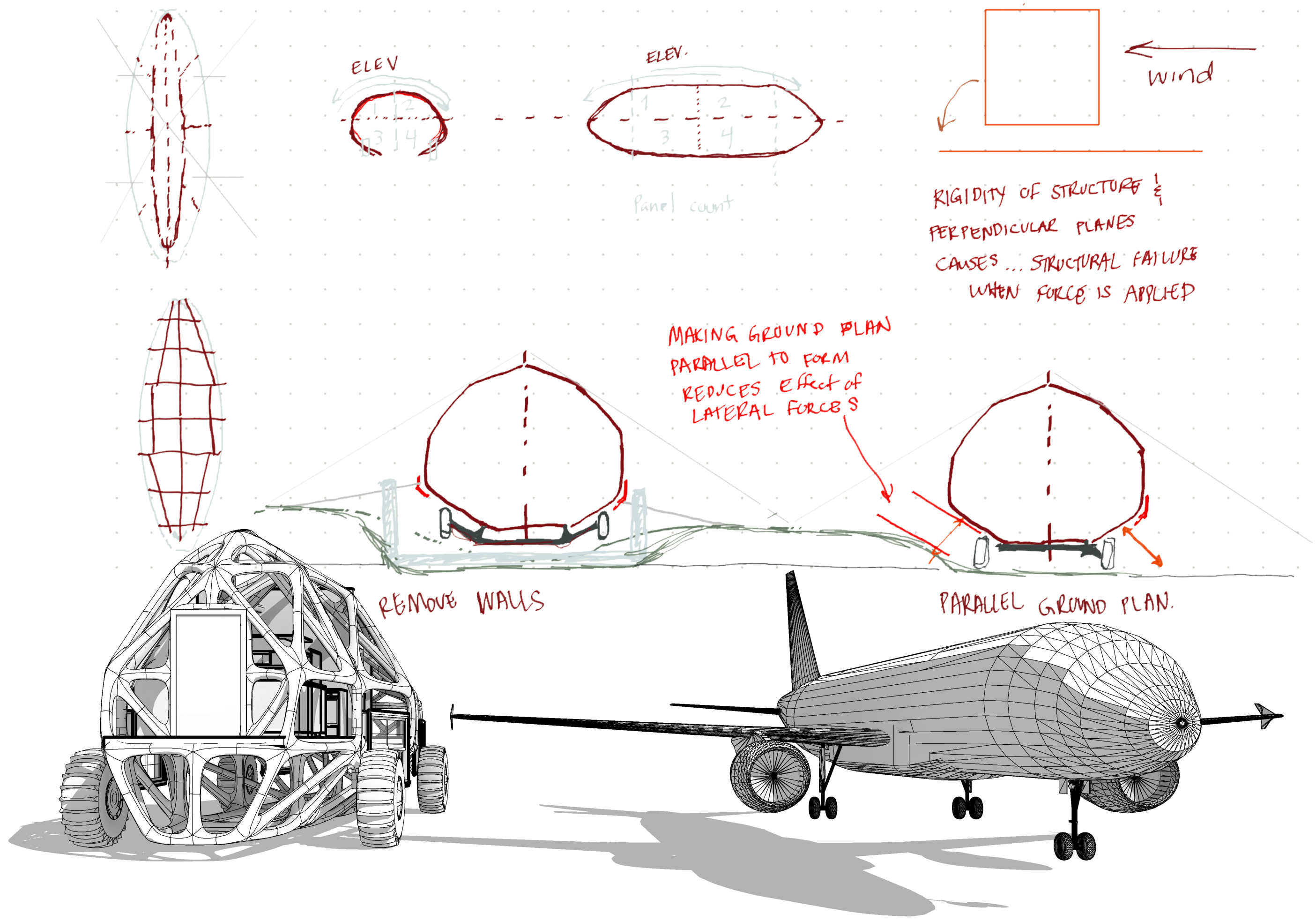
3 Structural Network



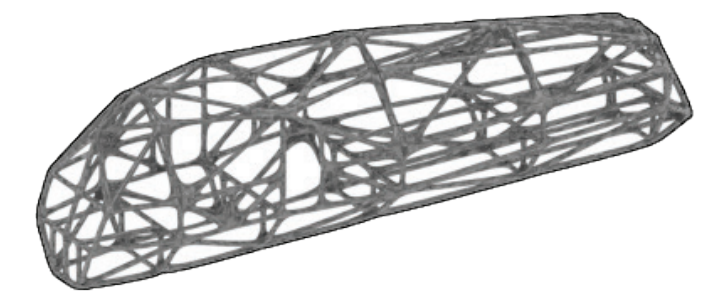
2 Plan Profile



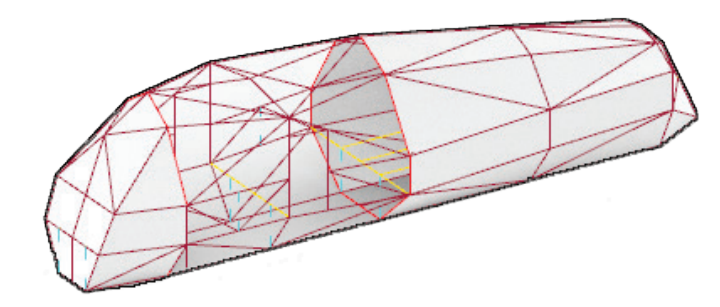
1 Elevation Profile



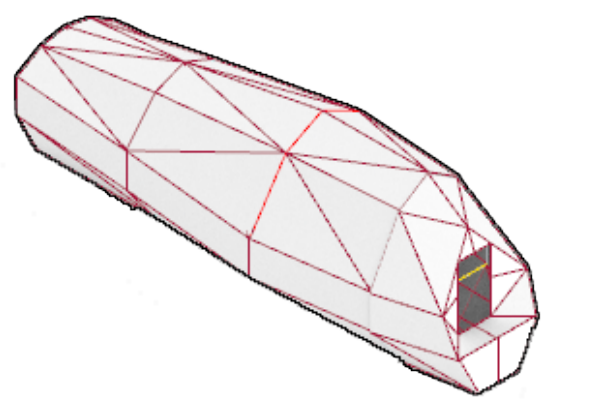
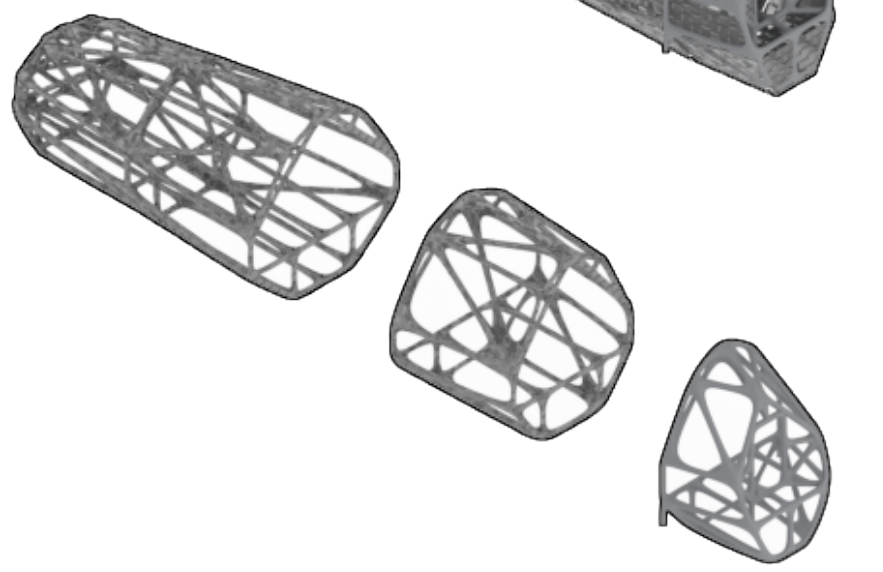
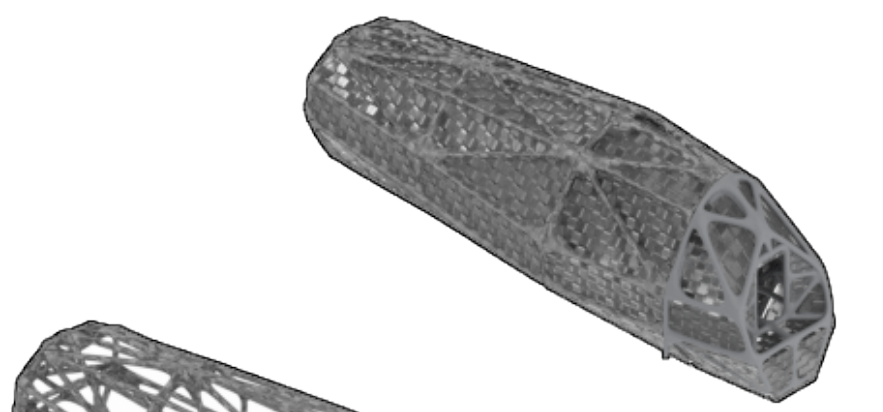
3 Skin and Bones



2 3-D printed structure



1 Aerodynamic Form



How can the design of the universal frame system make renovating the exterior of the manufactured homes just as efficient as the renovation of the interior of the home ?

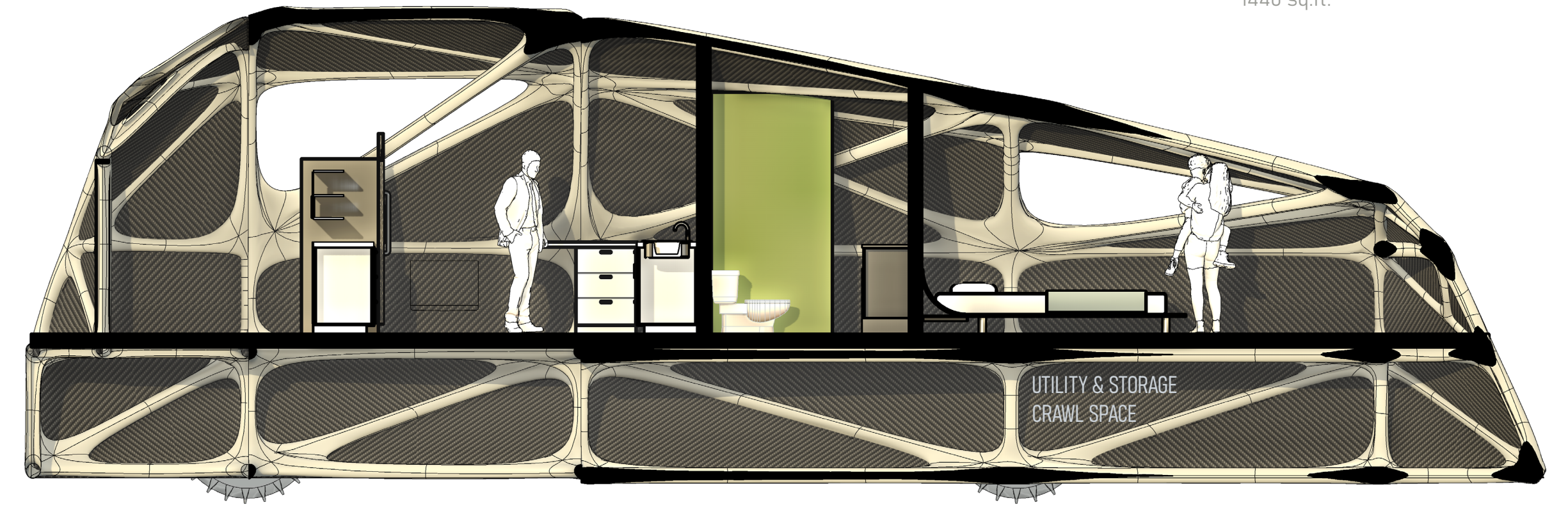
The profile of a commercial airliner was mimiced and implemented as the structural frame for the homes with each varying in with and height. This modular approach to design allows for the structure to become mass customizable, enabling residents the freedom for expansion which is often desired, but an impossibility for most mobile home owners



SCALE 3/16" : 1'-0"

498 SQ.FT. FLOOR PLATE

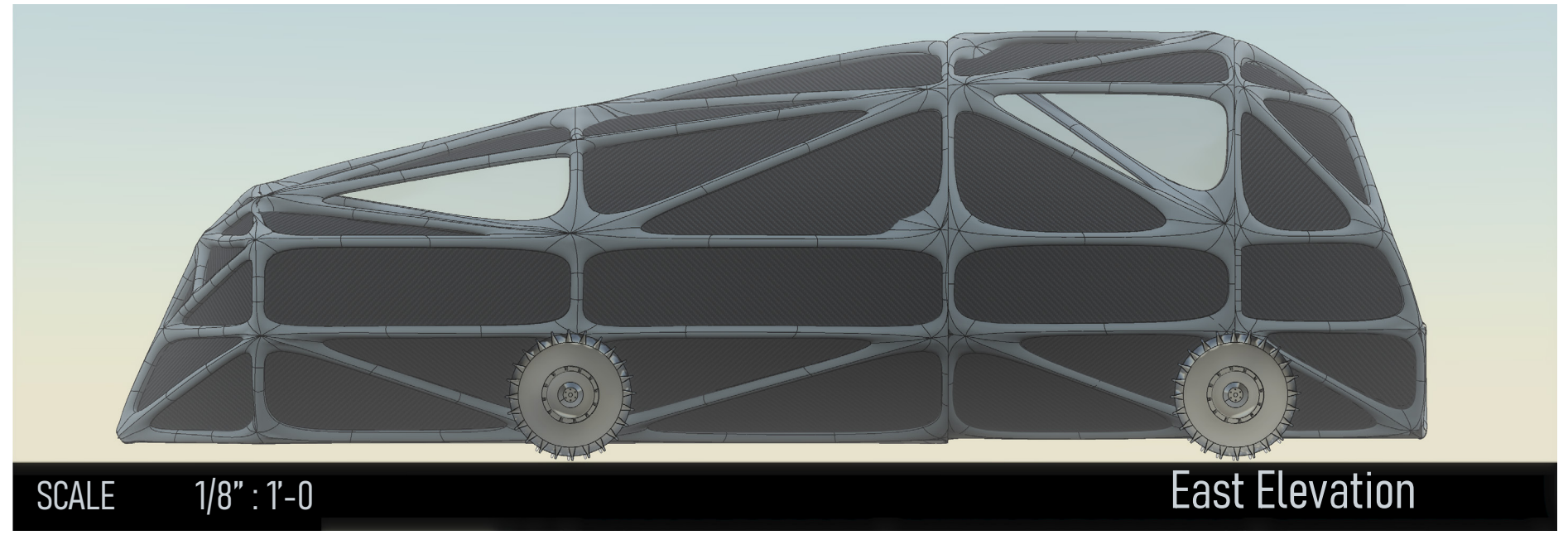
Typical Plan



SCALE 3/16" : 1'-0"

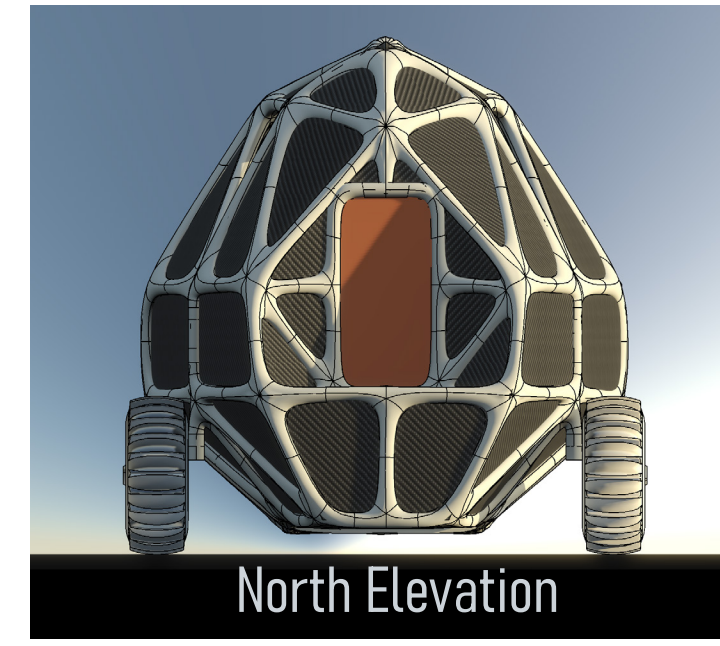
Longitudinal Section

According to Manufactured Home Village, the largest selection of new and pre-owned manufactured homes, "typical" single-wide manufactured home, the dimensions are between 12'-18' wide, 40'- 80' long, & 480 - 1440 sq.ft.

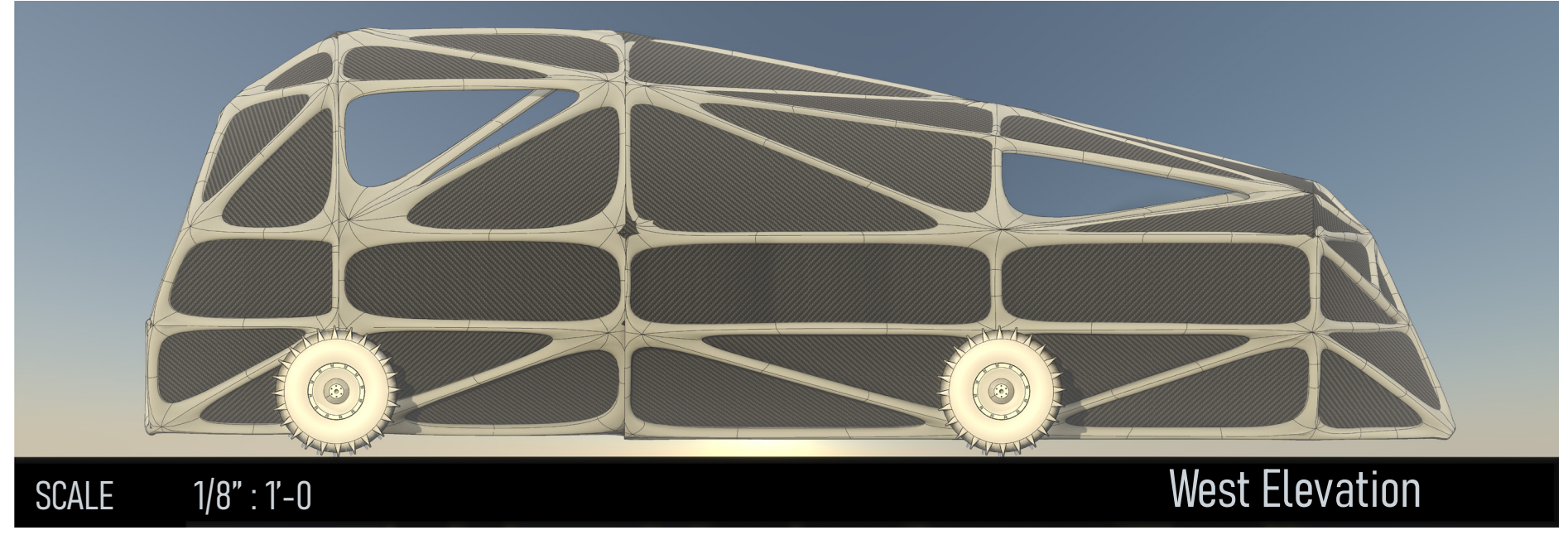


SCALE 1/8" : 1'-0"

East Elevation

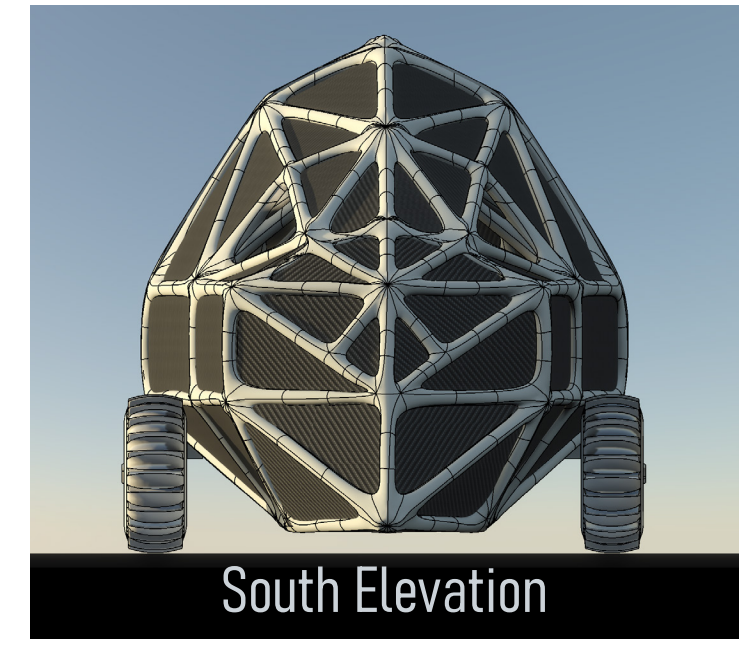


North Elevation



SCALE 1/8" : 1'-0"

West Elevation



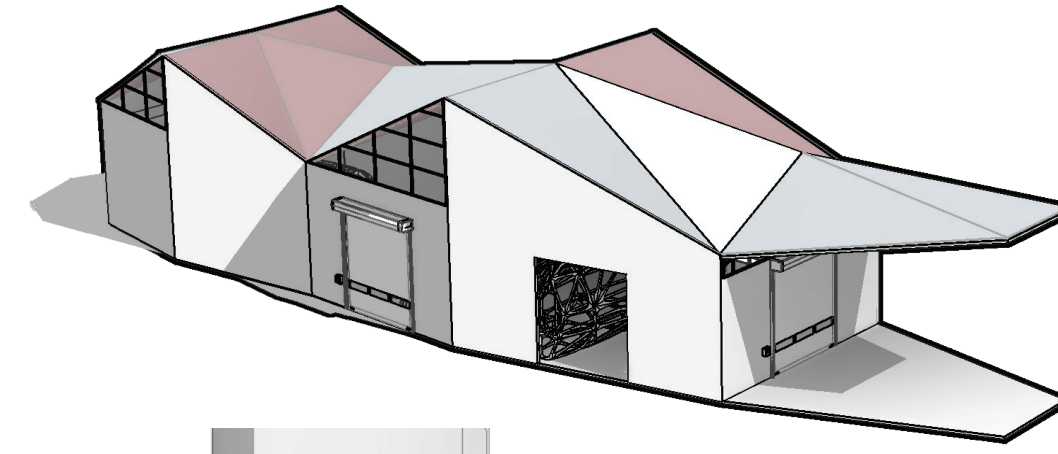
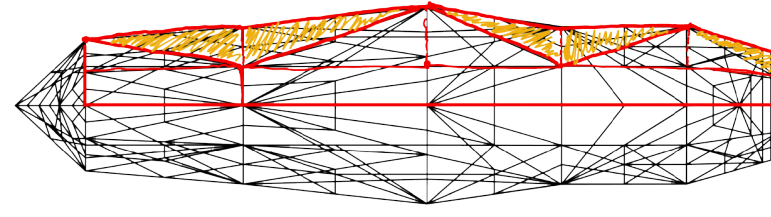
South Elevation

FAB-CENTER FORM SKETCHES

The socio-political implication of the project is founded upon the digital fabrication of the manufactured homes. An on-site fabrication center gives residents ownership of the means of production of their homes and affords them true freedom from established society.

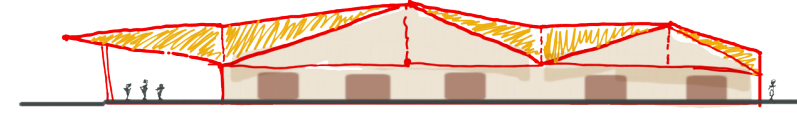
Preliminary Fab-Center Plan

To begin the design of the on-site fabrication center, an elevation profile of the center derived through a process of abstraction, where in the structural plan of the largest trailer was used as a base for the form to be created focusing primarily on the roof structure as the defining figure.



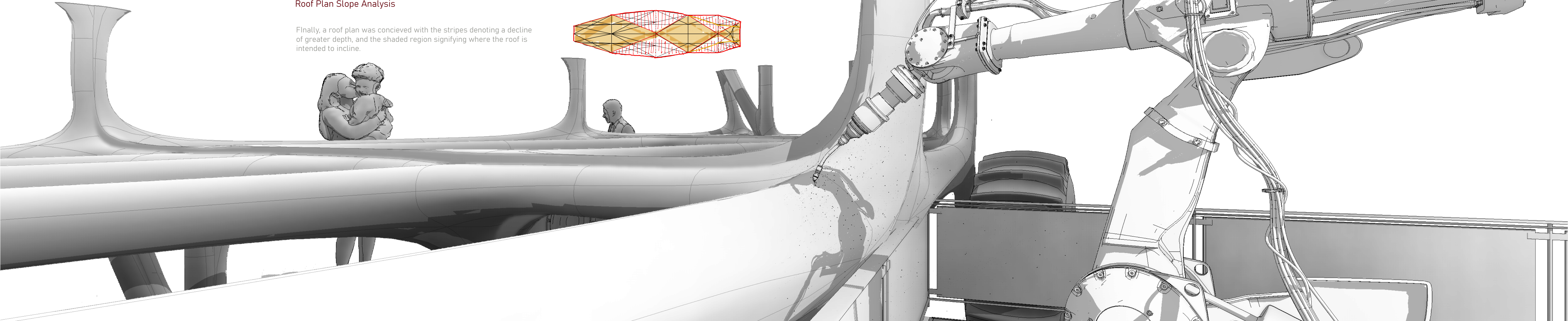
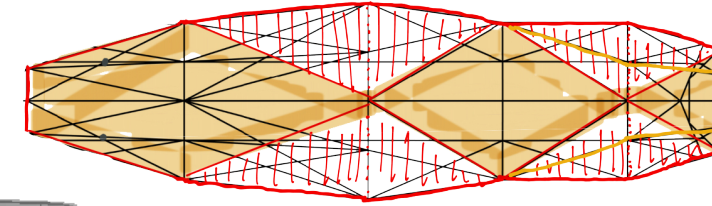
Elevation Form Subtraction

The elevation went through a process of displacing windows on the facade and creating a canopy feature where the inhabitants can view the manufacturing of their homes from the exterior of the fabrication space.

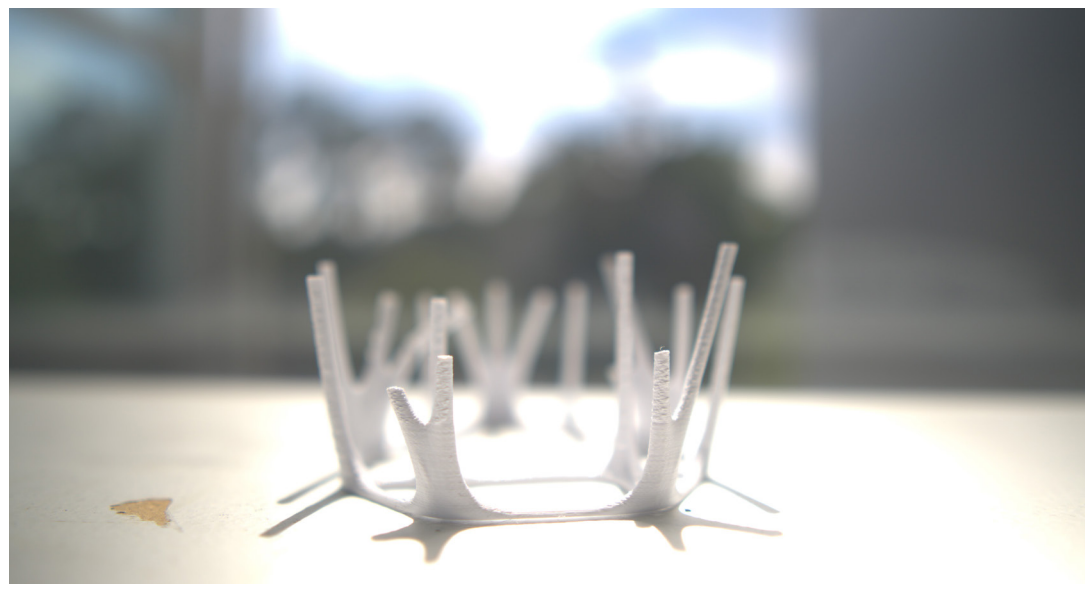
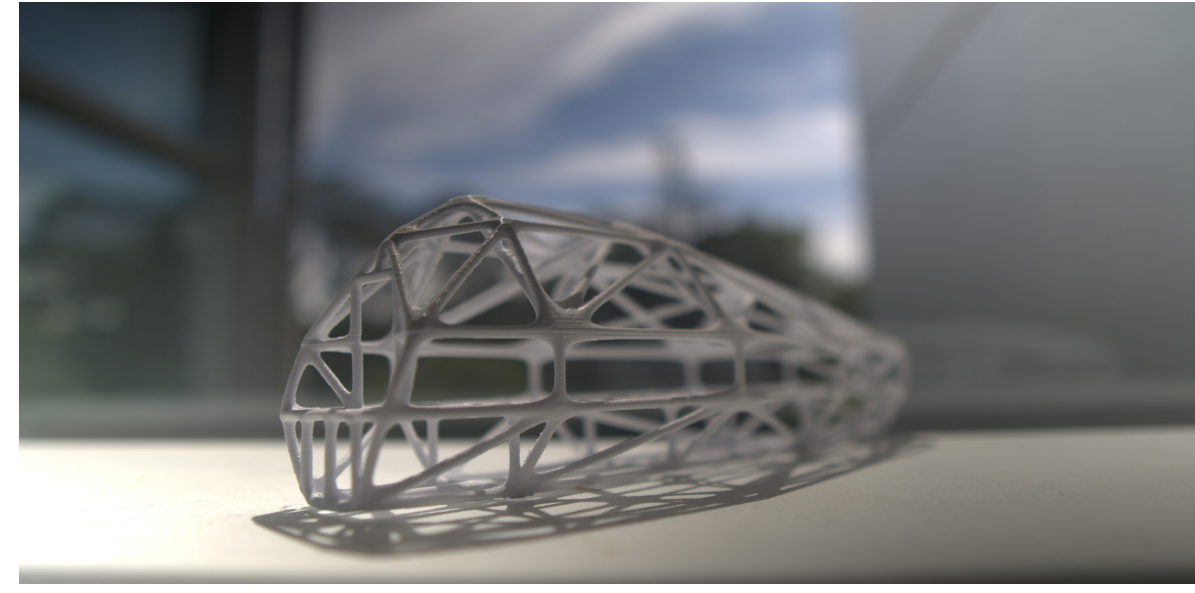
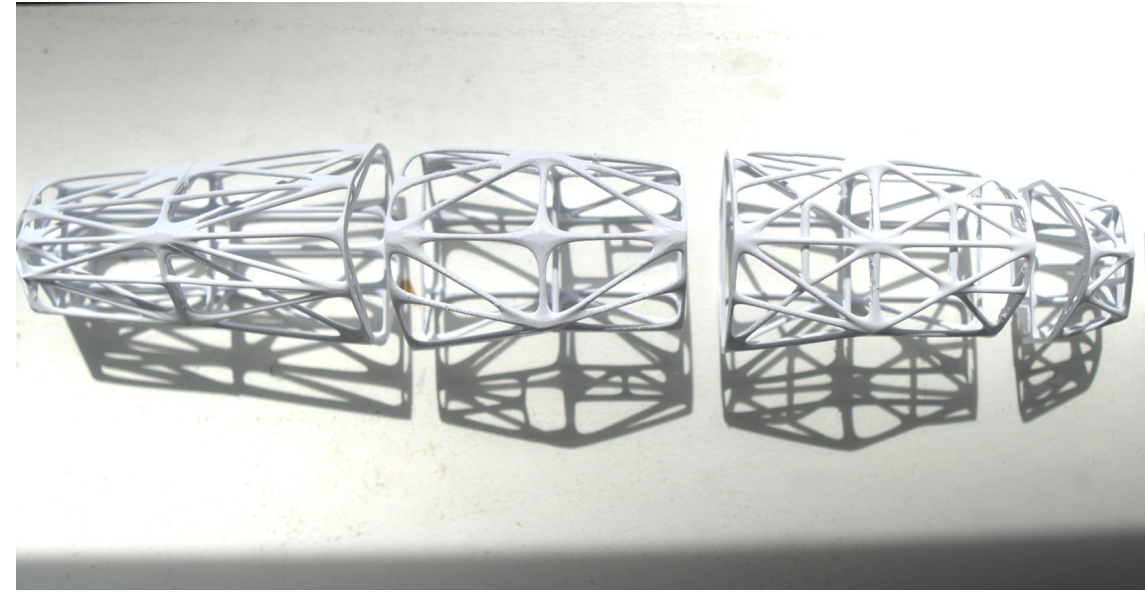
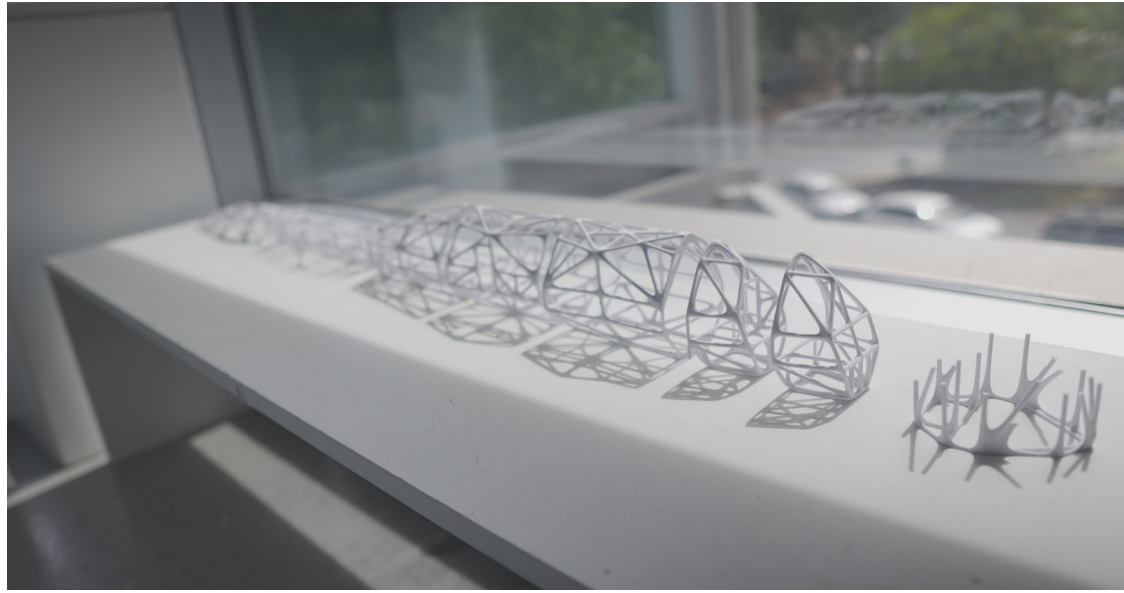
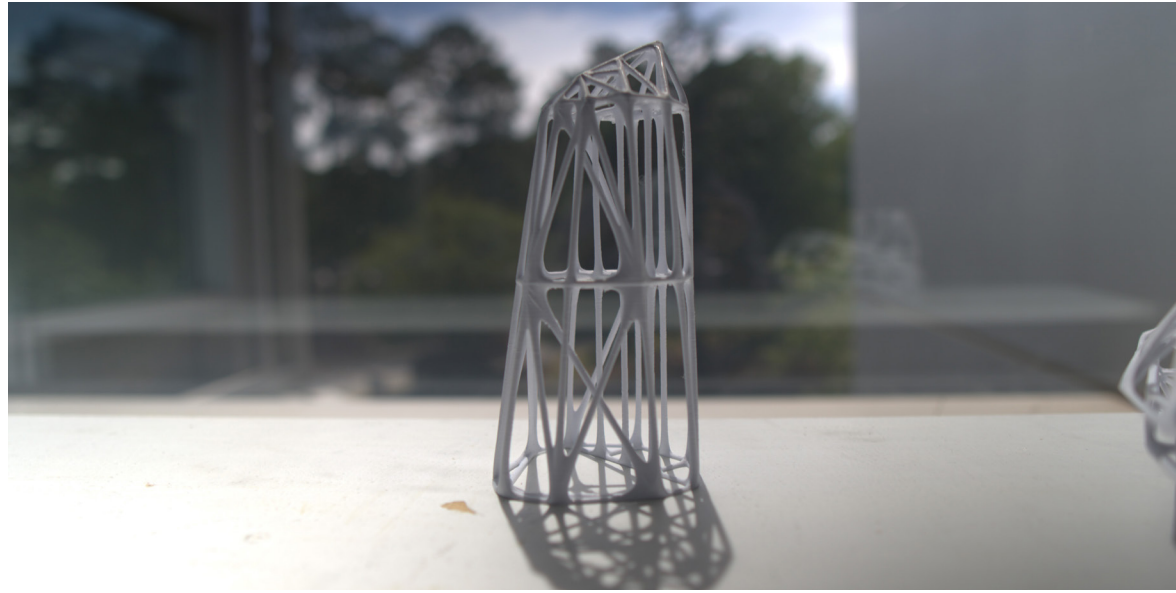
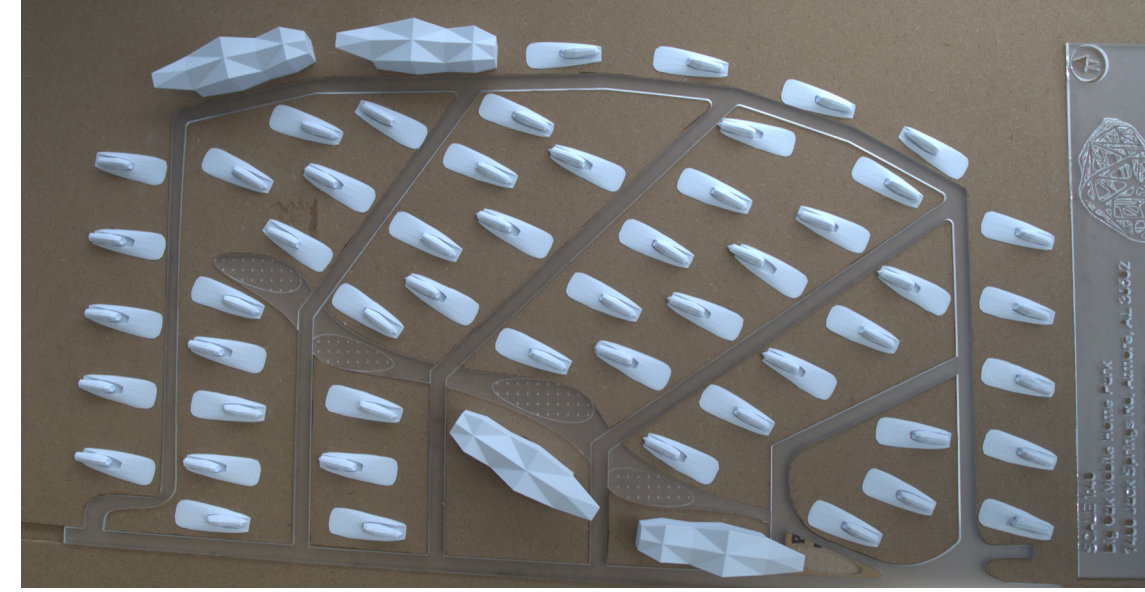
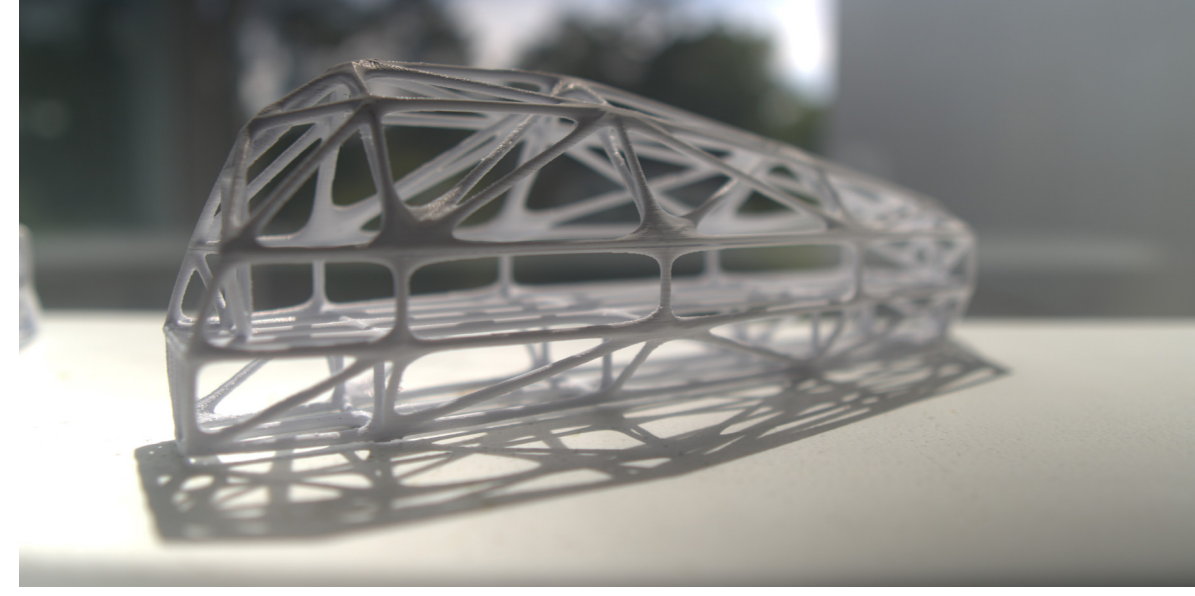
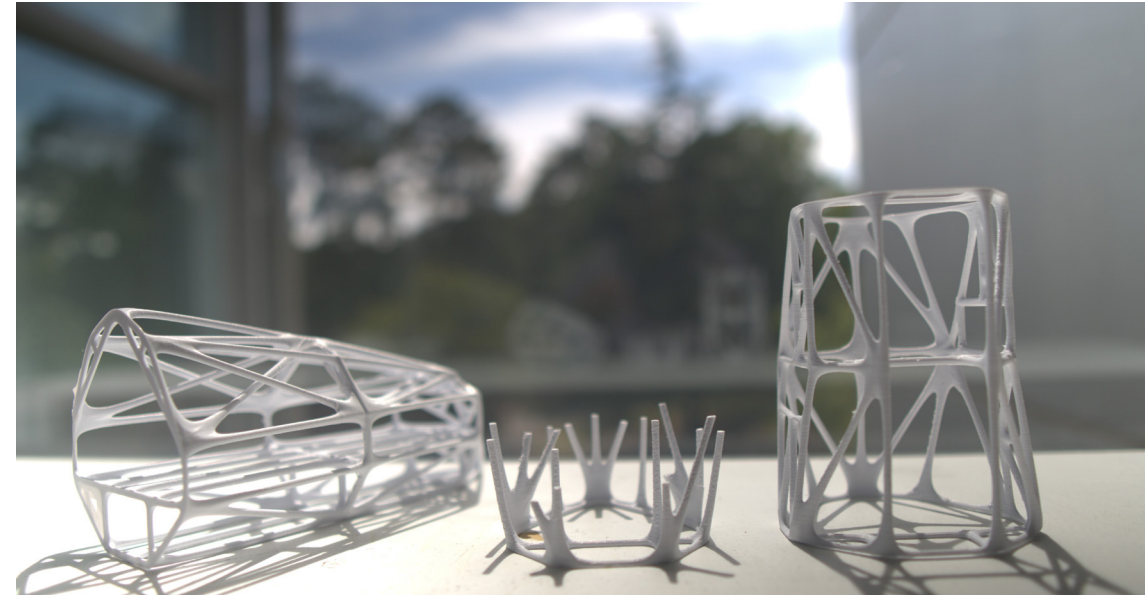
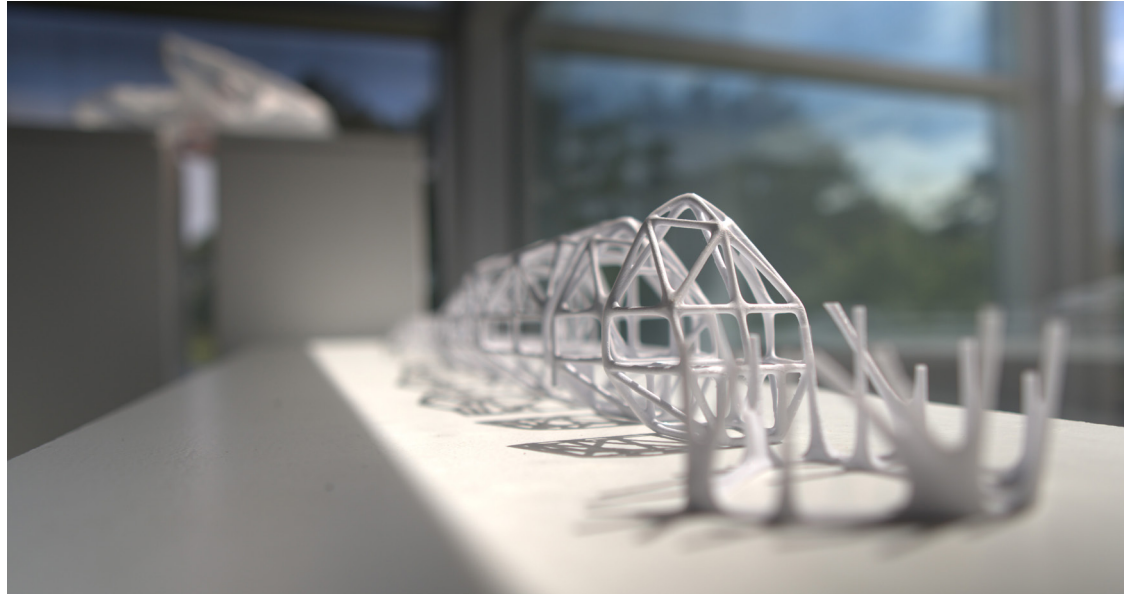
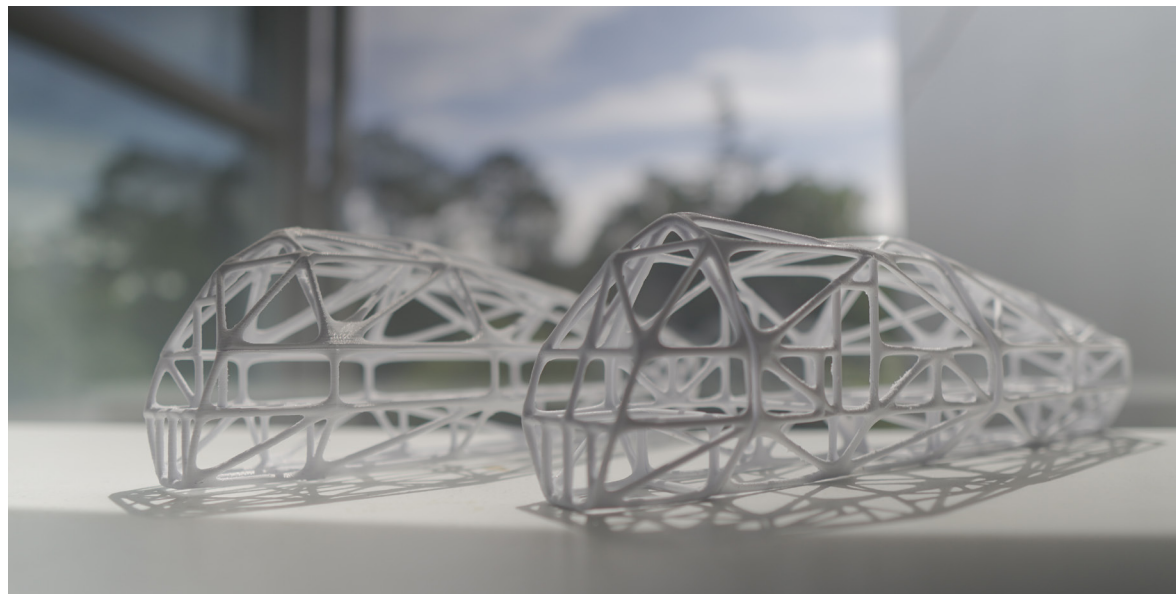


Roof Plan Slope Analysis

Finally, a roof plan was conceived with the stripes denoting a decline of greater depth, and the shaded region signifying where the roof is intended to incline.



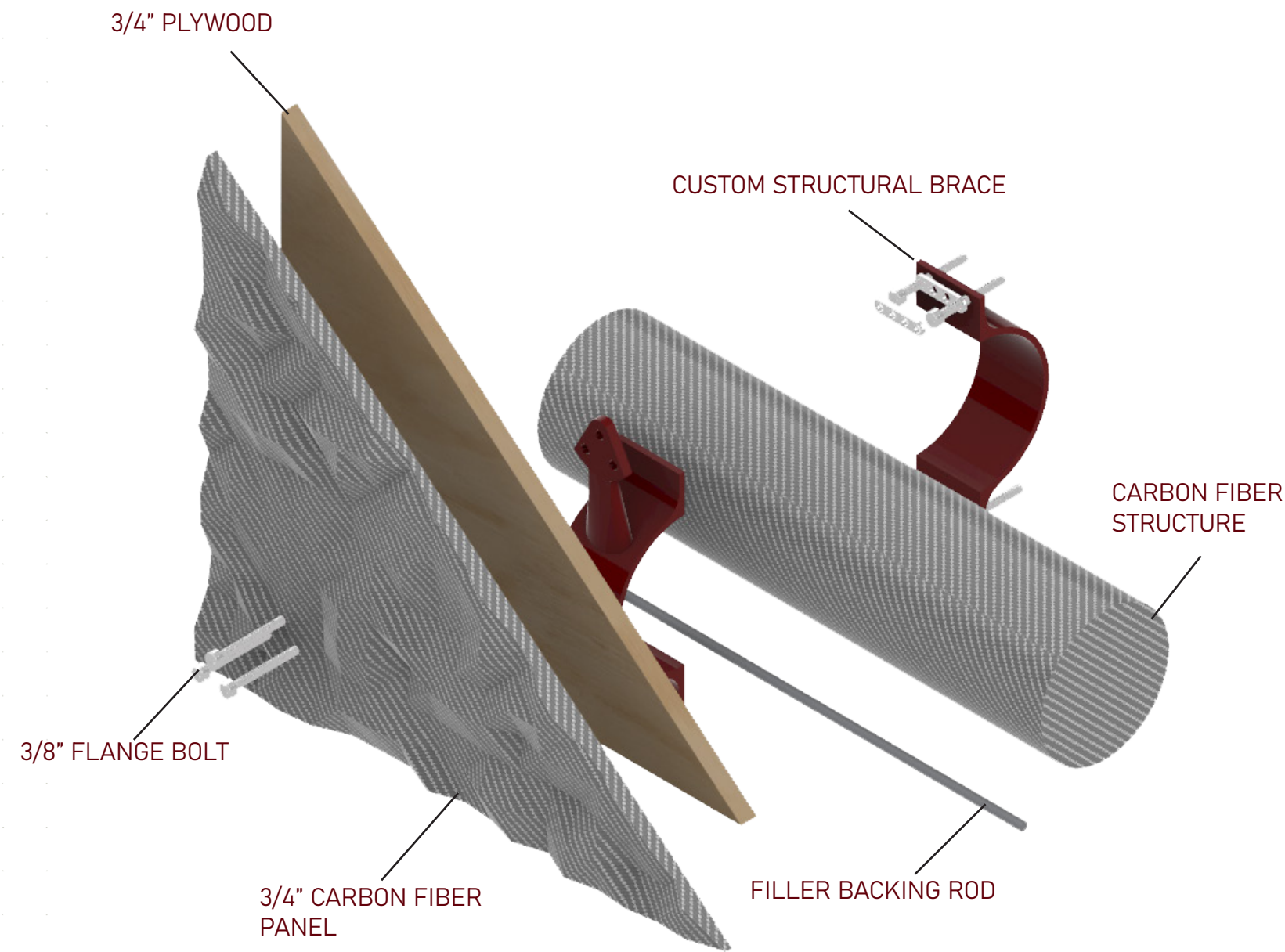
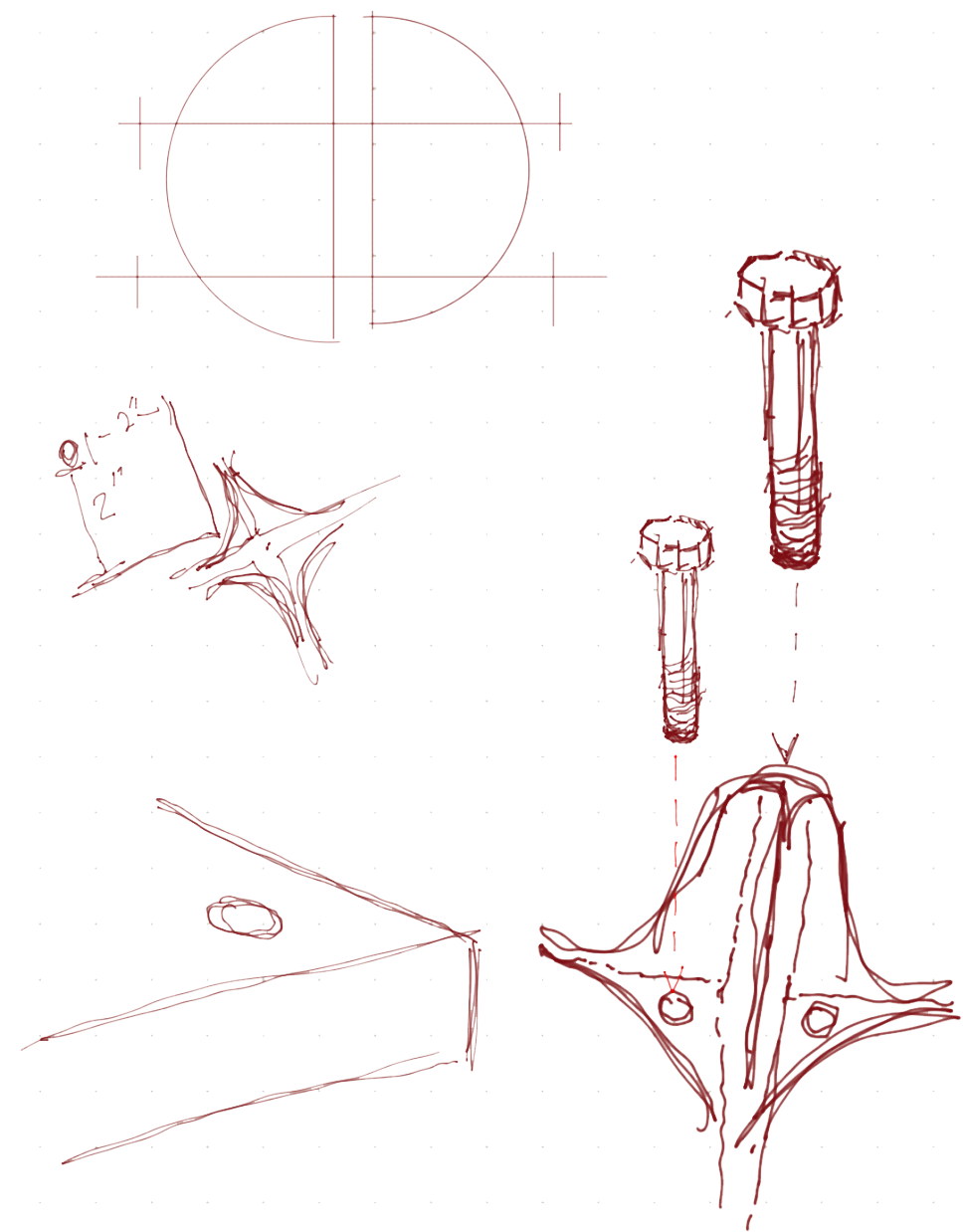
To ensure the perpetual modernization of the manufacturing process, it is necessary to facilitate each trailer park with a dedicated fabrication center where three-dimensional fabrication of site-specific manufactured homes can occur. The on-site fabrication center will serve as a place for the repair and restructuring of existing mobile homes and the design and construction of new manufactured homes. If residents feel the need to seek greater safety, the fabrication center will serve a dual purpose as an on-site design fabrication lab and a severe weather evacuation shelter.



FUTURE IMPLICATIONS

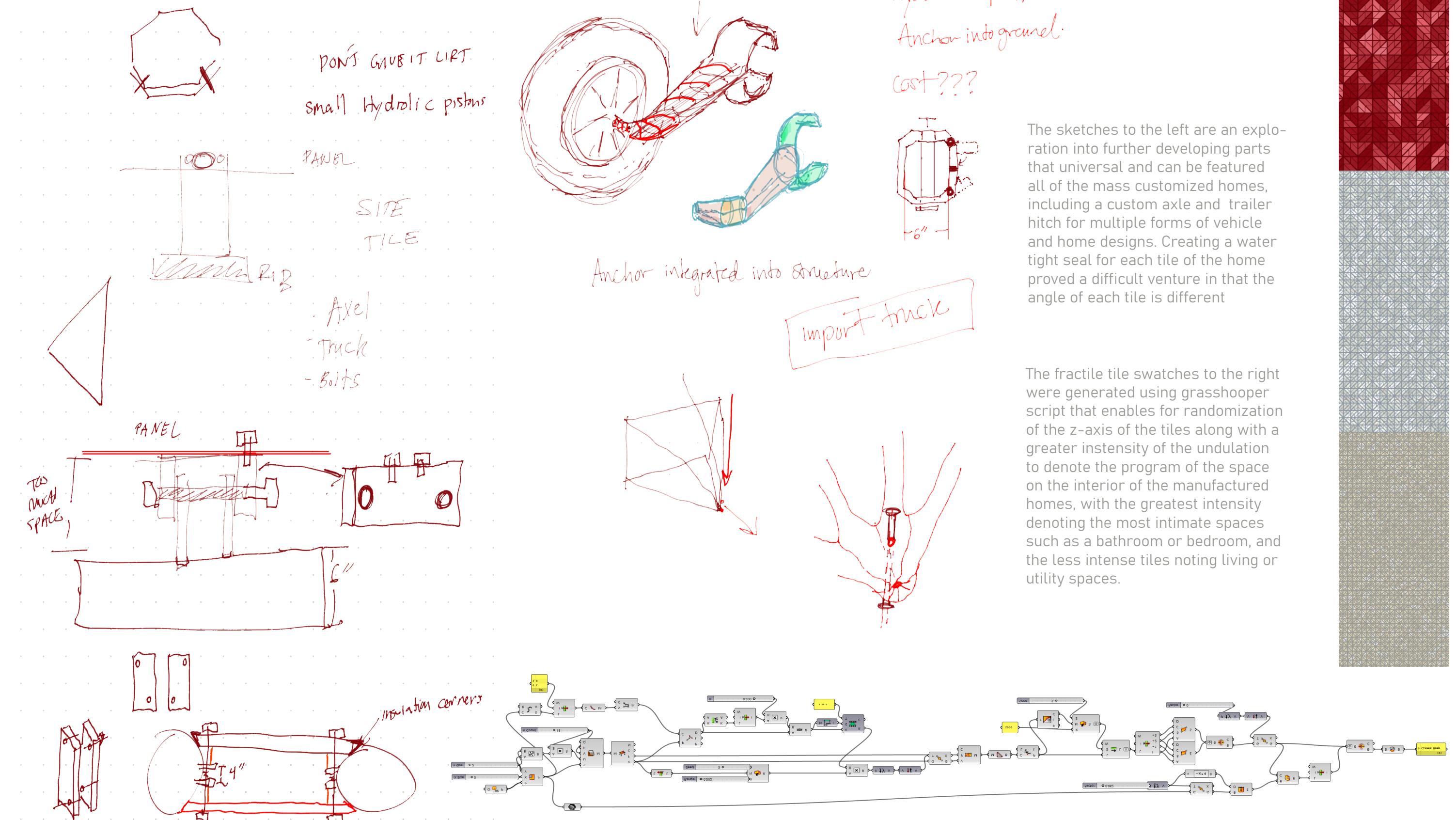
The microscale details of the envelope composition as well as the material choice for the structure of the homes are matters that can be further expanded as new materials and methods of prototype fabrication are emerging at a rapid pace. A need to develop stability for the homes and ease of manipulation led a prototype clamp being designed to fasten and join the segments of the home together. Segmenting the home allows for easy progressive alterations to be made by the inhabitants to improve their life safety conditions overtime because the envelope is strong segmented than if it were of large planes, much like the industrialized box form that most manufactured homes take the shape of today.

CONNECT OF MODULES



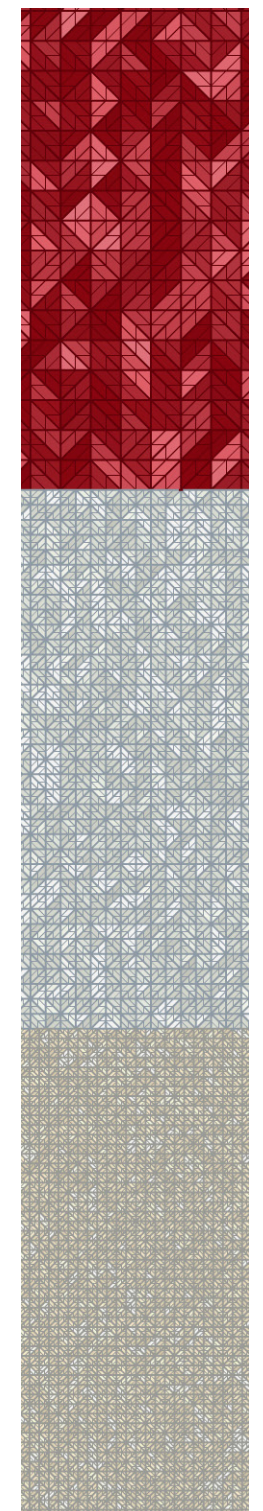
There will be two iterations of the fabrication center with portions of the building being compartmentalized and adaptable to the site as they will likely vary depending on several factors such as location, weather conditions, frequent natural hazards, circulation, etc.

PROTOTYPE FABRICATION



The sketches to the left are an exploration into further developing parts that universal and can be featured all of the mass customized homes, including a custom axle and trailer hitch for multiple forms of vehicle and home designs. Creating a water tight seal for each tile of the home proved a difficult venture in that the angle of each tile is different

The fractile tile swatches to the right were generated using grasshopper script that enables for randomization of the z-axis of the tiles along with a greater intensity of the undulation to denote the program of the space on the interior of the manufactured homes, with the greatest intensity denoting the most intimate spaces such as a bathroom or bedroom, and the less intense tiles noting living or utility spaces.



Bibliography: Literature Review

Prefabricated:

1. [Written Literature] Bergdoll, Barry and Christensen, Peter. Home Delivery: Fabricating the Modern Dwelling. Published in conjunction with the exhibition at The Museum of Modern Art, New York. July 20-October 20, 2008.

2. [Written Literature] Kieran, Stephen and Timberlake, James. Refabricating Architecture. New York: McGraw-Hill, 2004.

3. [Written Literature] Herbert, Gilbert. The dream of the factory-made house. © 1984 by The Massachusetts Institute of Technology.

4. [Written Literature] International Architectural Exhibition et al. Fundamentals : 14th International Architecture Exhibition. First ed. Marsilio 2014.

Prototype:

1. [Written Literature] Burry, M. & Burry, J. (2016). Prototyping for Architects: with more than 700 illustrations. London: Thames & Hudson Ltd. pp. 15, 201-203

2. [Written Literature] Greenfield, Adam. Radical Technologies: The Design of Everyday Life. : Verso, 2017. Print.

3. [Written Literature] Banham, Reyner. 1970. "Experimental Architecture Peter Cook." Official Architecture and Planning 33 (11):999. Web<<https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=edsjsr&AN=edsjsr.43964099&site=eds-live&scope=site&custid=ken1>>.

Manufactured:

1. [Online Journal] Burns, Carol J. "A Manufactured Housing Studio: Home/on the Highway." Journal of Architectural Education 55.1 (2001): 51-57. Web<<https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=a9h&AN=5328828&site=ehost-live&scope=site&custid=ken1>>.

2. [Online Journal] Burkhart, Ann M. "Taxing Manufactured Homes." Tax Lawyer 67.4 (2014): 909-978. Web<<https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=edshol&AN=edshol.hein.journals.txlr67.34&site=eds-live&scope=site&custid=ken1>>.

3. [Online Journal] Shaw, Isabella, et al. "Prefabrication, Patrilineality, and Intergenerational Reuse: The Ruined Third Church of Aniwa, Southern Vanuatu, and its Integration into Domestic Architecture." International Journal of Historical Archaeology 26.3 (2022): 573-598. Web<<https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=30h&AN=158782316&site=eds-live&scope=site&custid=ken1>>.

4. [Written Literature] Peter Cook [and others], 1973. Archigram. [pp. 83] Published in the United States of America by Praeger Publishers, Inc., 111 Fourth Avenue, New York, N.Y. 10003

5. [Written Literature] Darley, Gillian. 2012. "Landform Building: Architecture's New Terrain [Ed. by] Stan Allen [and] Marc McQuade." Architects' Journal 235 (10): 60-62. <https://search.ebscohost.com/login.aspx?direct=true&AuthType=shib&db=bvh&AN=674429&site=eds-live&scope=site>.

Social Space:

1. [Written Literature] Dyer, Hadley, and Ngui, Marc. Watch this Space: Designing, Defending, and Sharing Public Space Pages 12, 23, 24, 34, and 78. Kids Can Press (2010)

2. [Written Literature] Čiupailaitė, Dalia. "Architecture as a Social Space, or a Sociologist Reflects on Architecture." Archmuziejus, 4 Mar. 2016, <http://archmuziejus.lt/en/lietuviu-architektura-kaip-socialine-erdve-arba-sociologe-zvelgia-i-architektura/>.

3. [Written Literature] Brown, Lance Jay. Dixon, David. Gillham, Oliver. Urban design for an urban century: shaping more livable, equitable, and resilient cities. Published by John Wiley & Sons, Inc. Hoboken, New Jersey. 2013

4. [Written Literature] Hertzburger, Herman. Space and the Architect. Lessons in Architecture 2. 010 Publishers, Rotterdam. November 2000

5. [Written Literature] Benson, Michaela, and Iqbal Hamiduddin. Self-Build Homes: Social Discourse, Experiences and Directions. London: UCL Press, 2017. Print.

Transient Architecture:

1. [Written Literature] Smithson, Alison and Peter Smithson. Ordinariness and Light; Urban Teories 1952-1960 and their Application in a Building Project 1963-1970. : MIT Press, 1970. Print.

Supplementary Sources:

1. [Written Literature] Salamon, Sonya and Katherine MacTavish. Singlewide : Chasing the American Dream in a Rural Trailer Park. Ithaca: Cornell University Press, 2017. Print.

2. [Written Literature] Sullivan, Esther. Manufactured Insecurity : Mobile Home Parks and Americans' Tenuous Right to Place. Oakland, California: University of California Press, 2018a. Print.

Vernacular Building:

1. [Written Literature] Noble, Allen. Vernacular Buildings: A Global Survey. London: I.B. Tauris, 2014. Print.

2. [Written Literature] "Ikonografie Der Roadtown. 'Learning from Las Vegas', Ed Ruscha Und Das Stadtbild in Der Amerikanischen Pop- Und Conceptual Art." (2012). OAlster; OCLC. Web

3. [Written Literature] Nonconventional and Vernacular Construction Materials : Characterisation, Properties and Applications, edited by Kent A. Harries, and Bhavna Sharma, Elsevier Science & Technology, 2016. ProQuest Ebook Central. <http://ebookcentral.proquest.com/lib/kennesaw/detail.action?docID=4386618>. Created from Kennesaw on 2022-11-07 01:06:59.

4. [Online Journal] WAbel, Richard M. "Can we read a building as we read a book? Architecture as cultural artifact." The Mississippi Quarterly 45, no. 1 (1991): 83+. Gale Literature Resource Center (accessed December 6, 2022). https://link.gale.com/apps/doc/A295170656/LitRC?u=kennesaw_main&sid=ebsco&xid=2527ddb3.

5. [Written Literature] Hart, John Fraser, et al. The Unknown World of the Mobile Home, Johns Hopkins University Press, 2002. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/kennesaw/detail.action?docID=3318195>. Created from Kennesaw on 2022-11-07 01:49:02.

3. [Written Literature] Gaummitz, Jack E. "Mobile Home and Conventional Home Ownership: An Economic Perspective." Nebraska Journal of Economics & Business 13.4 (1974): 130. Web <<https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=bth&AN=7024041&site=eds-live&scope=site&custid=ken1>>.

