



LEARNING FROM THE VERNACULAR

THE EVOLUTION AND APPLICATIONS OF NATIVE AMERICAN ARCHITECTURE



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ABSTRACT

Vernacular architecture best exemplifies a relationship between form and function; the simplest form of providing shelter while adapting to function, climate, culture, and resources. Native American architecture is the true vernacular style of America, but centuries of colonization and segregation have eroded these traditions, preventing them from entering mainstream design. This thesis tackles the extent to which an American vernacular still exists, and how it has evolved over time. Other considerations include the benefits and cultural heritage of the vernacular, and how it can be used to improve modern design.

Utilizing case study analysis, historical timelines and precedents, categorization of building systems and materials, and studying environmental impacts, this investigation aims to create a framework of design which can utilize the vernacular to inform the future and preserve the past. This thesis has revealed that an interest and ability to create vernacular design still exists within Native American communities, but financial constraints, lack of control, and inferior subsidized alternatives often prevent these styles from being used. Native American interests have become a very timely topic due to recent controversies and renewed government interest; there is real possibility that vernacular research could result in improvements to housing infrastructure and design as well as a new understanding and respect for Native American people and their culture.

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INTRODUCTION

THESIS STATEMENT
DEFINITIONS

1

THESIS STATEMENT

Vernacular architecture best exemplifies a relationship between form and function, as perhaps the simplest form of providing shelter while adapting to function, climate, culture, and resources. Other architectural styles may borrow inspiration and materials from many places, but vernacular architecture is a true reflection of a region. It can also be an enduring tradition, with many regions constructing buildings in the same way for thousands of years. In North America, the true vernacular styles are those of Native Americans, who were the first to cultivate this land, and derive architectural typologies through a synthesis of native materials, culture, and climate.

The first framing concept is that of Critical Regionalism, popularized by Kenneth Frampton in his 1983 essay, "Towards a Critical Regionalism, Six Point of an Architecture of Resistance". Critical regionalism can be described as an architectural style that seeks to define a sense of place, while incorporating tradition and culture, and rejecting more individualistic styles. Essentially, it is a solution to the problems of both International and Postmodern style architecture.

International architecture is another framing concept, especially *The International Style* book by Henry-Russell Hitchcock, first published in 1932, which documented the then new style as it was emerging at a 1932 Museum of Modern Art show. International style is known for its modern sensibilities, use of volumes, lightweight mass-produced materials, simple forms, and rejection of ornamentation. Due to its popularity around the world, this style is criticized for a lack of relation to place, or expression of culture, the opposite of vernacular architecture.

Vernacular architecture theory is the last framing concept, defined as the architecture of ordinary places by Dell Upton in his 1986 essay, "Ordinary Buildings: A Bibliographical Essay on American Vernacular Architecture." This definition of vernacular draws on the characteristics that can be found in local architecture, and how buildings and landscapes change and adapt over time.

The questions investigated in this thesis are to what extent do Native American vernaculars still exist, and how have they evolved over time? It is also an investigation on the effects of American colonization

and how it impacted architecture. Another area to explore is how vernacular practices could be implemented today, their sustainability implications, and the future of preserving vernacular cultures and practices. Finding a synthesis of vernacular and modern is the ultimate goal, particularly in light of new developments in Native American communities, such as compensation for residential schools in Canada. Consequently, this thesis aims to explore vernacular styles and their evolution over time, as a representation of American vernacular architecture and connection to place.

This thesis is an exploration of vernacular architecture, and how architectural styles develop and evolve to suit the changing needs and priorities of society. The position of this thesis on this topic is exploring the importance of vernacular architecture, and introducing ways that it can be preserved. While preserving vernacular architecture, another objective is to learn from it, and introduce a vernacular approach in mainstream architecture.

The methodology of this thesis involves case study analysis, historical timelines and precedents, cataloging building systems and materials, and studying environmental implications. The aim is to use three main case studies of modern Native American architecture cross referenced with materials, systems, and historical Native American Architecture to determine vernacular methods that have been upheld, and those that have been lost. The emerging position is an approach to how these findings can be incorporated into formal architecture and design.

The biggest critique relevant to this subject matter is the disparity between modern life and the lifestyles that early vernacular structures supported. For example, how can modern comforts like heating and cooling systems, energy, and electricity be sourced locally and used sustainably? Likewise, the lifestyle of the average Native American person is very different than it once was, and colonization and European influence have led to degradation of cultural traditions and craft. The question is, is there still a place for these methods in modern architecture, and can they be successfully adapted and preserved?

In response to these critiques, concessions must

be made that a fully authentic use of vernacular architecture is not supportable anymore. In many cases these structures do not have the size or features that would be considered essential in modern buildings, and would not be functional for daily life. The understanding of this approach is that a vernacular design framework as defined by the thesis is something that can be applied to different typologies and contexts, rather than specific structures built in specific ways.

The value of this study is in the preservation and understanding of American vernacular architecture, and its use in the future of sustainable design. Native American interests have become a very timely topic due to recent controversies and renewed government interest, and there is real possibility that this time-period could result in a new understanding and respect for Native American people and their culture. Combined with the relevance and intersection of vernacular architecture and sustainability, this thesis and its findings could be very topical and desirable.

DEFINITIONS

VERNACULAR ARCHITECTURE: Regional building typologies shaped by site specific factors.

FOLK ARCHITECTURE: Informal architecture designed or built outside of formal education.

FORMAL ARCHITECTURE: Architecture designed and built under formal design education and regulations.

CRITICAL REGIONALISM: Modern architecture adapted to specific climate, culture, and resources, as opposed to placeless globalized architecture.

COLONIZATION: The process of invading an area and taking control over the indigenous people.

SELF-DETERMINATION: The power to act without external control or influence.

BACKGROUND AND THEORY

CRITICAL REGIONALISM

INTERNATIONAL ARCHITECTURE

ARCHITECTURAL THEORY

DEFINING THE VERNACULAR SCOPE

2

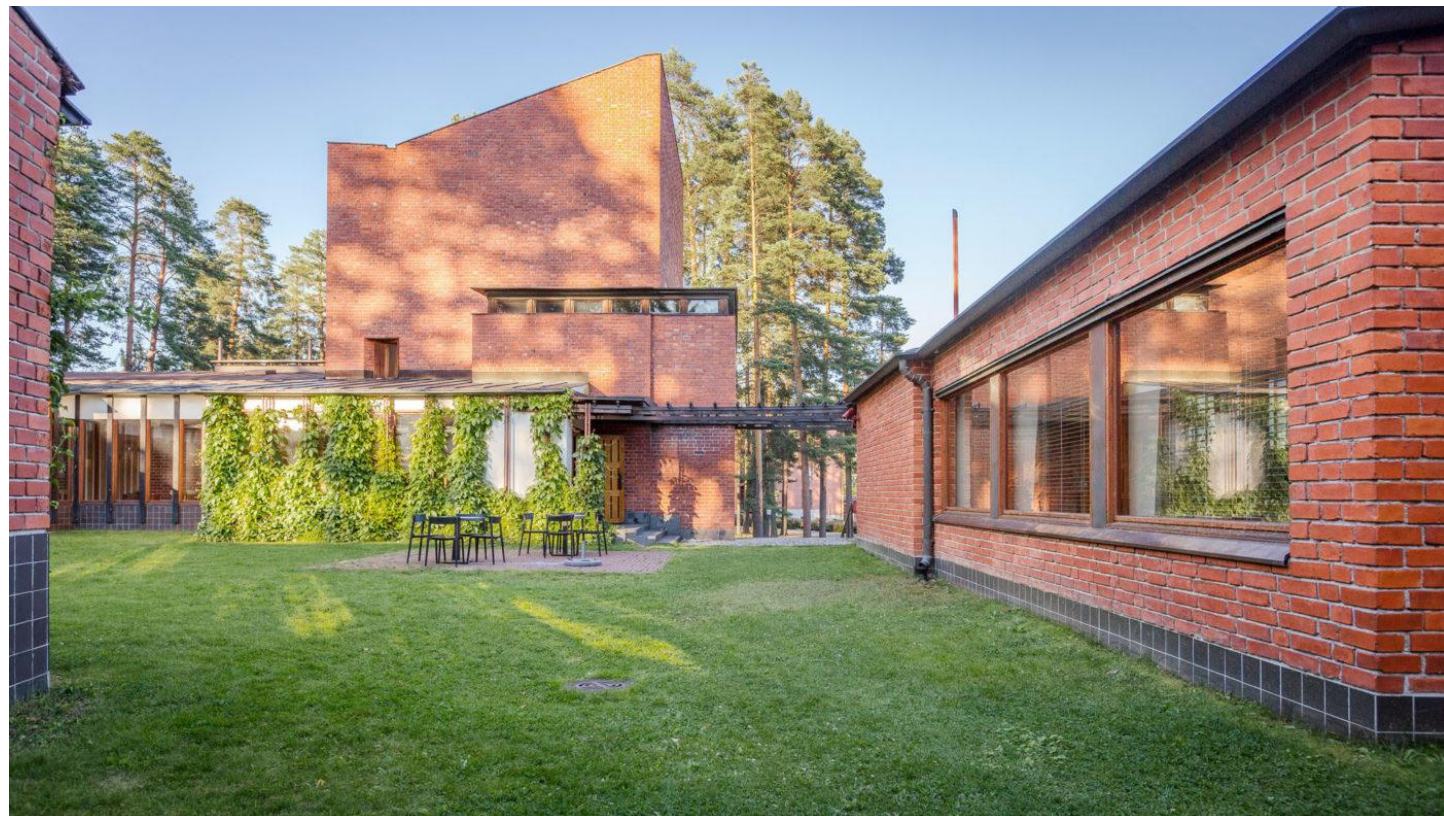


Fig. 2.01 Säynätsalo Town Hall (1951) by Alvar Aalto, example of Critical Regionalism given by Kenneth Frampton

CRITICAL REGIONALISM

Critical regionalism is an architectural approach that adapts modern architecture to the context of a specific geographic location, and is considered a critique and an alternative to both postmodern and international style architecture. It is seen as a solution to addressing both the global and local context of the built environment. The application of a critical lens helps to distinguish it from the theory of Historicism, which involves recreating architectural styles of the past. Instead of looking to tradition, critical regionalism seeks to adapt to the context in a modern way. The term was first proposed by Alexander Tzonis and Liane Lefaivre in 1981, in the essay “The Grid and the Pathway”, however it is more commonly associated with British architect Kenneth Frampton and his 1983 essay, “Towards a Critical Regionalism: Six Points for an Architecture of Resistance”. In this essay, Frampton outlines his six points, which are:

1. Culture and Civilization
2. The Rise and Fall of Avant-Garde
3. Critical Regionalism and World Culture
4. The Resistance of the Place-Form
5. Culture vs. Nature: Topography, Context, Climate, Light, and Tectonic Form
6. The Visual vs. The Tactile

Culture and Civilization

Over time, civilization, automation, and modern technology has allowed buildings to manipulate the context and conditions of site and create a standard urban condition, decreasing the ability to create cultural diversity. This divides architecture into two primary modes; the technological interventions acting on the product, and the façade which attempts to conceal the uniformity of these interventions.

The Rise and Fall of Avant-Garde

Avant-garde architecture has emerged in tandem with the modernization of architecture. However, it also presents a critique of industrialized architecture and Neoclassical form, and represents the reaction of tradition to modernization in architecture. The mid-19th century emerging styles of the Gothic Revival and Art and Crafts movement embody nostalgic “art for arts sake” and reject the premise of standardized technological advancement.

Critical Regionalism and World Culture

To succeed, critical regionalism must distance itself from both the sweeping solution of progressing technology, and the Historicism based, unrealistic pre-industrial designs. Instead, architecture should adopt a critical implementation of aspects like tectonics, topography, texture, light, and climate.



Fig. 2.02 Bagsværd Church (1976) by Jørn Utzon, example of Critical Regionalism given by Kenneth Frampton

The Resistance of the Place-Form

The application of the place-form is such that architecture is not just the physical building, but also the site and surrounding context. Spaces are enclosed by walls, but also include the characteristics of the place and creation of a public realm. Interior spaces are designed in relation to exterior spaces, which are a response to the larger context.

Culture vs. Nature: Topography, Context, Climate, Light, and Tectonic Form

Rather than an abstraction of form and concept, critical regionalism creates a more direct connection to nature. Buildings are not isolated objects, they must be activated by the environment and surrounding context. Creating a synthesis between the natural environment and cultural legacy allows a “place-form” to emerge.

The Visual vs. The Tactile

In addition to creating and involving visual engagement, architecture should be designed to engage the other senses as well. This lends to richer and more appealing architecture, and a better experience in the space. In particular, a sense of tactility should be engaged, through materiality and form.

In relation to the vernacular, Frampton’s definition

of critical regionalism applies similar principles, with the exception of the treatment of tradition. Critical regionalism rejects traditional or historical design precedents, and aims to create entirely original, site-specific design with connection to place, nature, and sensorial experience. Vernacular architecture also creates a connection to place, but includes traditional building forms or methods, or region-specific typologies.



Fig. 2.03 The Glass House (1948-1949) by Philip Johnson

INTERNATIONAL ARCHITECTURE

International architecture is another architectural theory, which is defined by its modern sensibilities, use of volumes, lightweight mass-produced materials, simple forms, and rejection of ornamentation. Due to its popularity around the world, this style is criticized for a lack of relation to place, or expression of culture, the opposite of vernacular architecture. From the late 19th century on, there were three main factors that led to the development of the international style. The first is the mixing of elements from different time periods within the same designs, which was seen by many architects as superfluous and unrelated to the context or function. The second was the rise of industrialization, and the economic possibilities of standardizing and simplifying designs such as offices and commercial spaces. The third was emerging building technologies allowing steel, iron, reinforced concrete, and glass to be applied in innovative ways, which led to the prominence of these materials in international architecture. As a result, a utilitarian, economical, and widely applicable style was desired, as a synthesis between simplistic expression, form, and technology.

Early uses of the style were based in France and Germany, and originators include Walter Gropius,

Ludwig Mies van der Rohe, Le Corbusier, and Philip Johnson. Famous buildings include the Bauhaus (1925–26) by Walter Gropius, the Seagram Building (1958) by Mies van der Rohe, and the Glass House (1948-1949) by Philip Johnson. In 1932, American architectural historian Henry-Russell Hitchcock and American architect Philip Johnson were hired to create a catalogue book called *The International Style*, first published in 1932, which was designed to promote the 1932 international style show at the Museum of Modern Art, which was the first show at the museum. This event and book were very influential in bringing the style to America, and in the 1930s-40s it continued to gain popularity in the rest of North America, South America, Japan, Britain, and Scandinavia, becoming truly international. From there, international style influenced the sleek modern skyscraper beginning in the 1950s-60s, and representing the ideal of power and progress in the urban environment. Skyscrapers can be found in most big cities, which adds to the factor of placelessness and uniformity.

International architecture can be seen as the antithesis of vernacular architecture, which helps to further understanding of the vernacular through the contrast. International architecture utilizes modern technologies and manufactured building materials, while the vernacular looks to the past of local materials

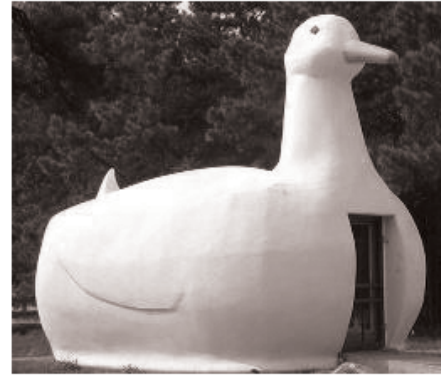
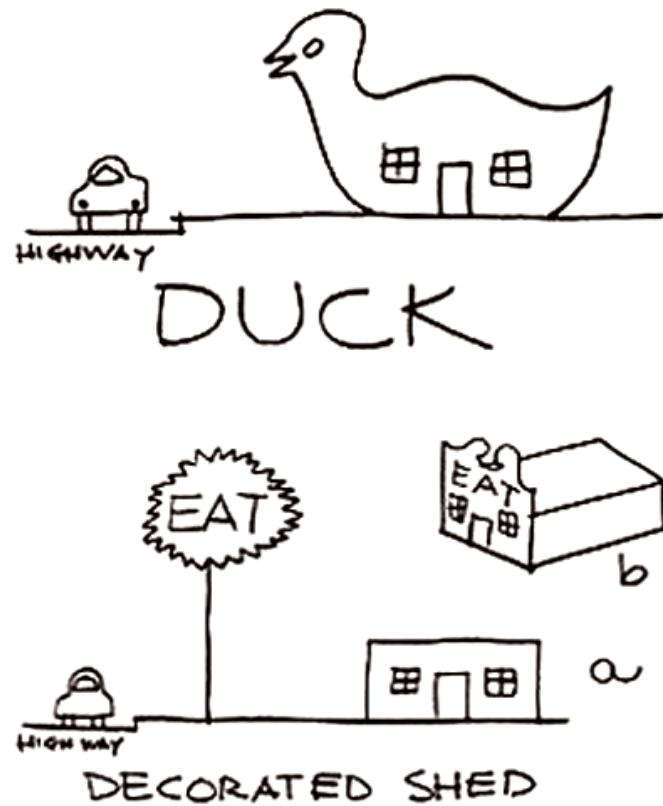


Fig. 2.04 The Bauhaus (1925-1926) by Walter Gropius

and passive systems. International architecture uses building technology to gain control over the climate, while vernacular works with the climate. International architecture includes elements of standardization and mass production, while the vernacular focuses on a personalized and community connected design. Lastly, international architecture is used universally, while the vernacular is site specific with connection to place.



Fig. 2.05 (right)
The Seagram Building (1958) by Mies van der Rohe



VS



Fig. 2.06 The Duck and the Decorated Shed, Learning from Las Vegas

VERNACULAR THEORY

There are many different existing theories of vernacular architecture. In some, vernacular architecture comes with a certain degree of tradition and historical integrity, and poses a contrast to modern construction methods. This type of building exists outside of formal architectural education and practice, and represents an intuitive approach to design and construction. However, vernacular can also refer to more modern site-specific typologies, which originate due to certain cultural and climatic factors and histories. Across definitions, a common element is the site-specific nature of vernacular architecture, and its connection to place. Vernacular architecture is applicable only in the context it originated in, and cannot be used everywhere.

Vernacular architecture is defined as the architecture of ordinary places by Dell Upton in his 1986 essay, "Ordinary Buildings: A Bibliographical Essay on American Vernacular Architecture." This definition of vernacular draws on the characteristics that can be found in local architecture, and how buildings and landscapes change and adapt over time. Upton finds that while in the past vernacular architecture was considered to be only folk buildings and historical precedents, the definition has expanded to include

everyday buildings. Upton's definition applies to buildings that have a unique connection to place and specificity within the context, making many ordinary buildings built within local building standards and tastes part of this scope.

Documentation of American vernaculars became a topic of interest in the 18th to early 19th century, with styles such as Gothic Revival, Queen Anne, Arts and Crafts, and Colonial Revival attracting attention and imitation beyond the United States. Most of the American homes referenced by Upton are European in style, and not influenced by indigenous architecture. Another significant contributor to this documentation was American landscape designer Andrew Jackson Downing, particularly with his book *The Architecture of Country Houses* (1850), a comprehensive catalogue of American housing types and interiors. Downing's detailed and evocative drawings were revolutionary in their ability to capture the character of different typologies and relate them to the public, and the book was widely referenced by both design professionals and homeowners. Upton notes that many other early documentations of American vernaculars regard it as a pioneering phase, not deserving of longevity or intensive study, and a temporary stage in American architecture. This leads to difficulty in achieving a comprehensive overview of American vernaculars.

One important topic to consider in the discussion of American vernaculars is the process of acculturation. During the colonization of America, Anglo-American settlers found ways to adapt their own European typologies to the climate and resources they were presented with. Anglo-Americans eventually became the dominant culture, with some integration of other European groups. For example, German typologies such as the continental log house in the Midwest were particularly distinct for holding out against English influence. Although today many of these cultures have amalgamated into uniquely American vernaculars, there are still existing typologies that can be traced to the architecture of evident cultural groups. A significant cultural group outside of Western tradition would be African-Americans. African Americans differ from other groups in that they did not come to the United States by choice, and were held in slavery for almost three centuries, limiting their power and influence over the American architectural landscape. There was also an erasure of culture that occurred during this time, as African-Americans were not able to make their own independent decisions and express their styles and values. Nonetheless, there are traces of Afro-American influence that can be found, such as the shotgun house.



Fig. 5



Fig. 2.07 Cottage Drawing, *The Architecture of Country Houses*

While scholars agree that early American typologies are considered vernacular, can the same be said for popular modern designs? There are different schools of thought on this topic, and while some argue that a vernacular must be antiquated and traditional, there has also been significant research on these new vernaculars. One such study is the 1972 book *Learning from Las Vegas* by Robert Venturi, Denise Scott Brown, and Steven Izenour. This study resulted from the graduate studio that husband and wife team Venturi and Scott Brown taught at the Yale School of Art and Architecture, and the research that the class conducted in Las Vegas. At this time Las Vegas was hardly considered a real city, and certainly not an area of interest for the unusual building styles that had originated there. With the help of student Steven Izenour, Venturi and Scott Brown documented and analyzed typologies such as casinos, hotels, bars, and the unique signage found in Las Vegas. One of the most notable findings of this study was the categorization of the duck and the decorated shed. The duck in this analogy is a building that is able to express its purpose through form, while the decorated shed relies on signage for identification. A place like Las Vegas has many decorated sheds, with the copious neon signs and billboards, while something like Modernist architecture avoids ornamentation and attempts to use mass, colour, and form for expression. Other modern day, commercial American vernaculars include examples such as strip malls, fast food restaurants, and gas stations, as uniquely American typologies emerging from factors such as the automotive emphasis in the United States, city size, convenience, food and culture, and consumer interests.

It is evident that there are many forms of vernacular architecture in the United States, as Upton described the evolution from colonial times, and the role of emerging vernaculars. However, this essay does not consider the original vernacular architecture of the United States, Native American architecture. Within the context of time from colonization, acculturation, and cultural decimation, to what extent do these traditions still exist?

DEFINING THE VERNACULAR SCOPE

From my literature and theory analysis, I have devised this diagram, which defines the characteristics of vernacular architecture through in the lens of this thesis. Vernacular architecture is an intersection of climate, relation to place, and social and cultural elements, and how the building adapts to these elements, with intersections of building systems, craft, and local materials. This creates a framework to appraise the efficacy and authenticity of a vernacular design.

The climatic aspect is important to address the conditions of the site, and the interplay between the building and natural forces. As noted in the theories of critical regionalism and international architecture, architecture that is reliant on technology to control the climate creates a placelessness and removal from the context. Additionally, relying solely on modern building technologies as climatic adaption is expensive and unsustainable. In the era of climate change, it is increasingly important that passive and active strategies can be utilized to interact with individual climate, and create lasting solutions to preserve and accommodate individual climatic conditions. Building systems create an overlap between climate and relation to place, as a means to treat to existing climate, informed by additional factors that shape the systems that can be used and implemented in construction in the area.

Relation to place comes into play as a means of grounding the design in its context, and combatting the universal application of international styles. Factors of relation to place might include materials, local traditions, historic models, utilizing resources, and working with local industries and economies. It is a means of ensuring that the construction will have longevity and appeal in relation to its location and the surrounding community. Climatic conditions may present similarly in various locations, but a relation to place takes into account other unique features of the location in its design approach. The overlap between social and cultural elements and relation to place is craft, as the traditions of construction or design practiced by a subset of the population, informing on both the community and their treatment of place and building practices.

The aspect of cultural and social elements accounts

for the occupants of the building and surrounding area, their needs and reflection of self through construction. Form follows function, and therefore the specific use of the building and its program must inform the design. Occupants of different backgrounds can have different needs in the built environment, including the function of space and reflection of values and culture. This prevents the design from being well adapted to place but generic in terms of use and character. Additionally, the overlap between social and cultural elements and climate is local materials, which can be shaped by the conditions of the local population's historical use, local industries, quantity of resources, and sustainability in line with climatic solutions.

The matrix of climate, relation to place, and social and cultural elements forms the overview for design methodology, as well as critical vernacular evaluation within this thesis. Further precedent research and design applications will be informed and evaluated using this process.

The goal of this thesis is to research Native American housing typologies and histories, and evaluate the efficacy and role of the vernacular features. Using this information, end goals of vernacular design and design principles can be created to inform the future of Native American architecture and vernacular design. To form a consistent baseline, all analysis will be held to this model of the vernacular.

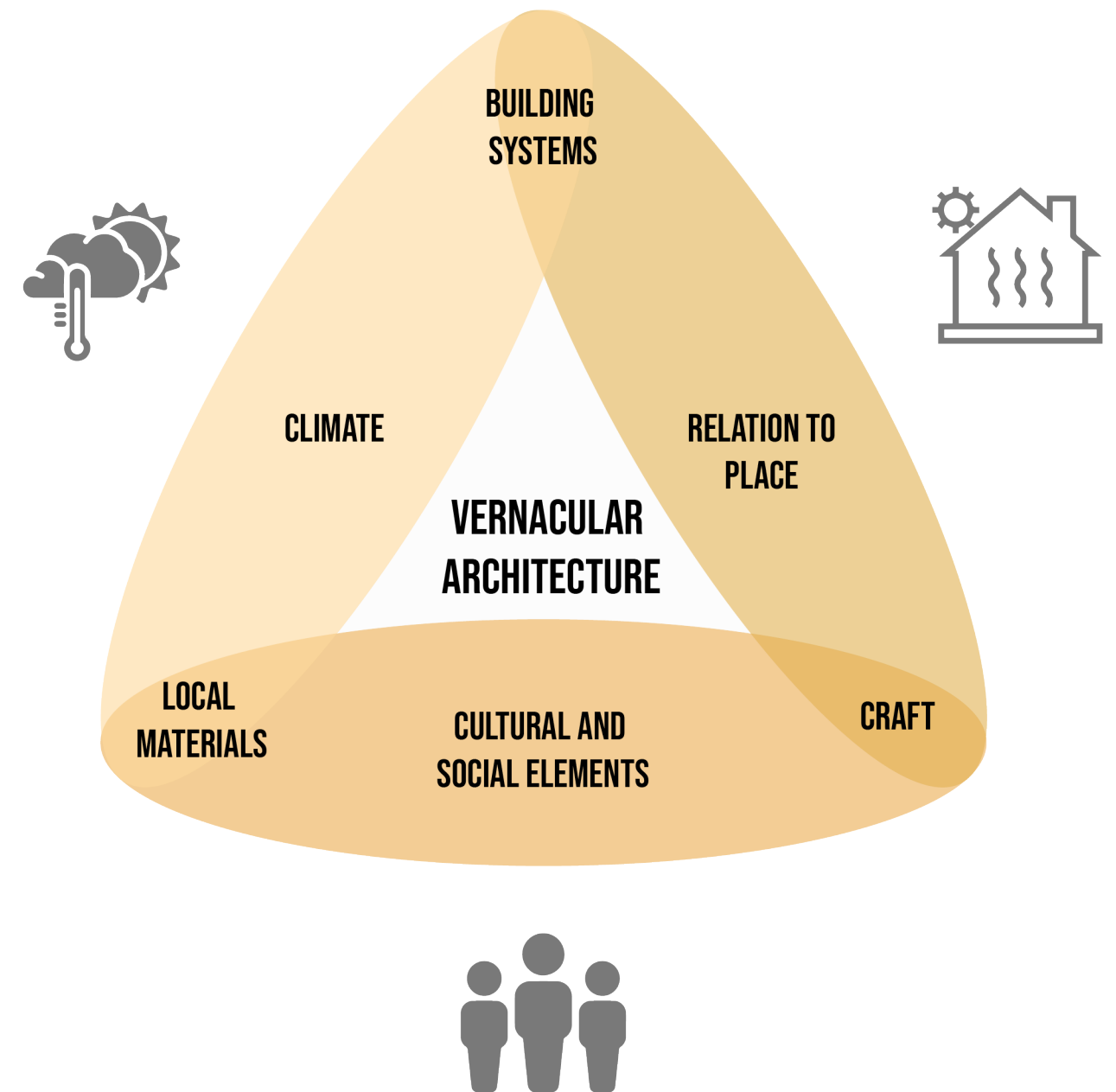


Fig. 2.08 (right)
Vernacular diagram

HISTORICAL RESEARCH

HISTORY OF COLONIZATION
MATERIALS AND METHODS
MAPPING TYPOLOGIES

3

HISTORY OF COLONIZATION

Native Americans are thought to have lived in America for at least 12,000 years, after crossing the Bering land bridge from Siberia, and estimates of a pre-Columbian population total more than 60 million people. There were many diverse tribal groups at this time, with rich cultural traditions and thriving societies. While originally native groups followed a hunter-gatherer model and moved around frequently, after the domestication of corn in 5,000 BCE the people were able to create more permanent shelters and establish crops and towns. This fostered a greater connection to place, and a sense of land authority and stewardship. Other crops included squash, corn, and beans, also known as the three sisters, potatoes, pumpkins, and yams; with plants originally cultivated by Native Americans making up over half of modern American produce types. Cultivated plants were also used to create medicines, and dyes. It is difficult to determine the number of ethnic groups that existed at this time, due to the complex conditions of borders, differentiation between farming and hunter-gatherer groups, religious and social hierarchies, and multi-level polities involving clans, villages, and confederations. However, the diversity of the people can be reflected through the 50 language families that were in use at this time, divided into 300-500 spoken languages. In contrast, in Europe at the same time there were only two language families in use, and 40-70 spoken languages. Native American politics at this time mainly followed a democratic model, with decisions reached through consensus of the collective. However, Southwest Indians and Northwest Coast Indians instead adopted a hierarchical structure with a chief in command.

Meanwhile in Europe, a combination of factors set the stage for exploration and colonization. Following the epidemic of the bubonic plague from 1347- 1400, approximately 25 million people, or one-third of the European population, had been eliminated. Due to labour shortages peasants were able to start earning a wage for their work and buying land, disrupting the system of serfdom that had long been in place. This contributed to shifting the status quo and economic upheaval. At the same time, many different wars were waging, including the Hundred Years' War, from 1337-1453 between France and England; the Wars of the Roses, from 1455-85 between two branches of English royalty; and the Reconquista, from c. 718-



Fig. 3.01 Columbus meeting Ferdinand II and Isabella I

1492 as an effort by the Roman Catholics to eliminate Muslims from the Iberian Peninsula. This created a general acceptance of wartime pillaging, rape, and murder, and also depleted the treasuries of European monarchs.

The Ottoman Empire controlled the land route between Europe and South Asia, therefore controlling the lucrative spice trade. Expeditions sponsored by Portuguese prince Henry the Navigator explored the Atlantic coast of Africa, and later tried to reach the Indian Ocean to no avail. Italian explorer Christopher Columbus had been on several of these journeys, and attempted to gain approval for an alternate transatlantic voyage to the East Indies in 1484, which was refused by John II, the king of Portugal. Meanwhile in Iberia, Ferdinand II and Isabella I had just faced a civil war as the result of uniting their kingdoms of Aragon and Castille. As Roman Catholics, they also waged the Reconquista against Muslim groups, while also expelling any Jewish citizens who would not convert to Catholicism. This led to an extremely depleted treasury, as well as the economic damage of expelling so many professional and learned citizens. As a bid to regain their wealth, they agreed to sponsor Columbus's proposal in 1486, despite the implausibility of the voyage.

After Columbus reached America in 1492, he went

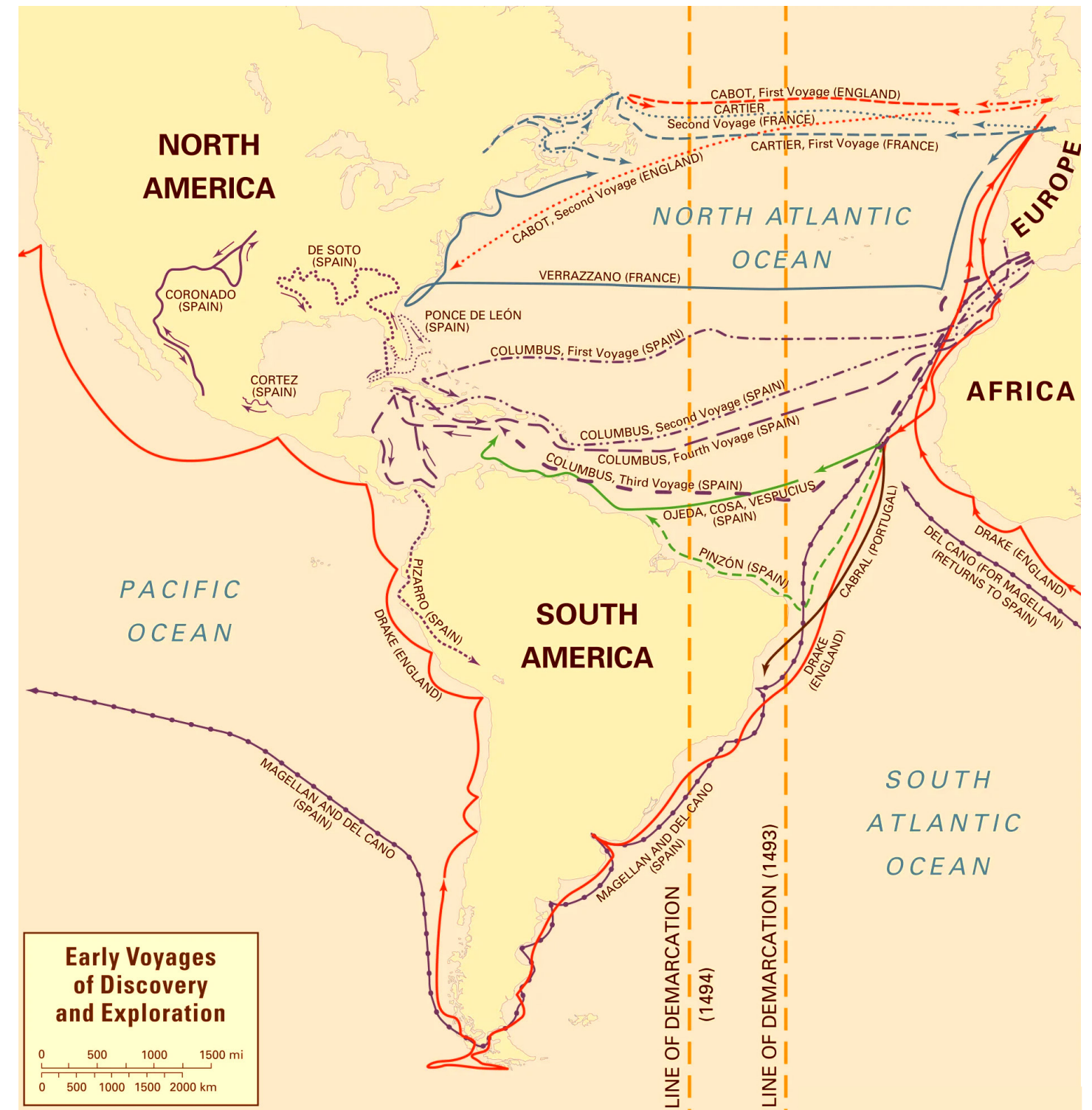


Fig. 3.02 Map of American voyages

on to make three more voyages to the “new world” in 1493, 1498, and 1502. Columbus is often credited for discovering America, but of course the land was already inhabited by a thriving population. Columbus was not even the first European to discover North America, as Vikings had visited Canada some 500 years before his first voyage. However, he can be credited for introducing America to Europe as a whole, and spurring the influx of exploration and colonization that would eventually lead to the formation of the United States, Canada, and Mexico. After Columbus, Spain sent conquistadors to the Americas to attain wealth, resulting in the fall of the wealthy Aztec and Inca empires, in 1521 and 1532 respectively. France sent Jacques Cartier to the Americas in 1534, and claimed the area of the Gulf of St. Lawrence as New France. England sent John Cabot in 1497, primarily as a means of territorial expansion.

To the Native American population, the motives of these invaders were not immediately clear. In some early cases, colonizing groups made efforts to trade and communicate with the tribes, while in others they raped and murdered the Native people. The Spanish in particular were eager to continue the war practices they had utilized during the Reconquista, and acted as a brutal occupying force. Even their missionaries were hostile, and were known to beat and execute Native Americans who refused to forego their own religion. Most Southeast Indians first encountered colonizers via conquistador Hernando de Soto, and as many were settled with crops, they acted as hosts and even offered gifts to the Spanish. However, de Soto was not receptive, and forced many Natives into slavery. After this the Southeast Indians turned on the Spanish, and many battles were waged to hinder their invasion. The Northeast Indians had more peaceful early interactions with the French and English, who were initially more interested in exploration than conquering the people. The mid-Atlantic Algonquian groups were accustomed to sharing land boundaries, and were willing to let the English build and farm on nearby land, however they soon discovered that the English did not honour their agreements, leading to conflict. Native-European relations continued to escalate due to the actions of the Europeans, and by 1609 all peaceful interactions had ceased.

Over the course of the next hundred years, an estimated 55 million indigenous people in North, Central, and South America were killed by European



Fig. 3.03 Hernando de Soto in America

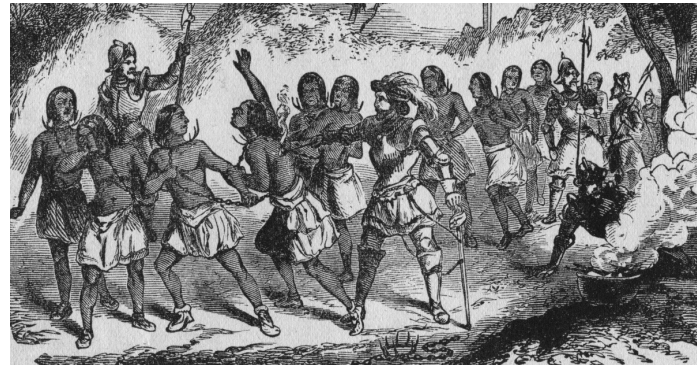


Fig. 3.04 Christopher Columbus in America

settlers. This made up nearly 90% of the Native population, and caused expansive damage to Native culture and societies. In addition to war and famine, the presence of the Europeans spread unfamiliar diseases such as smallpox to the Native people. In 2019 it was discovered that death on this scale actually caused a small-scale Ice Age, resulting in a period of global cooling from the 16th and mid-19th century. Colonization forever changed the future of Native American people, resulting in death, land loss, displacement, cultural deterioration, and lack of rights and power.

From the beginning, laws and policy in the United States persecuted Native Americans, denying them rights and freedoms, and refusing to cede rightfully owned land. The timeline on the next few pages visualizes Native American policy in the US, aligned with photos of these events and maps of Native American lands. As the timeline progresses, the native lands dramatically disappear. Looking at these policies demonstrates that there were many events that shaped the living situations of Native Americans, from where they could live to the uses of their homes. For example, tribal social and cultural activities were heavily limited, such as the banning of important ceremonies, and the restriction of Native status. This changed the layout of native neighborhoods and homes. Financial limitations were also a big contributor, as federal laws

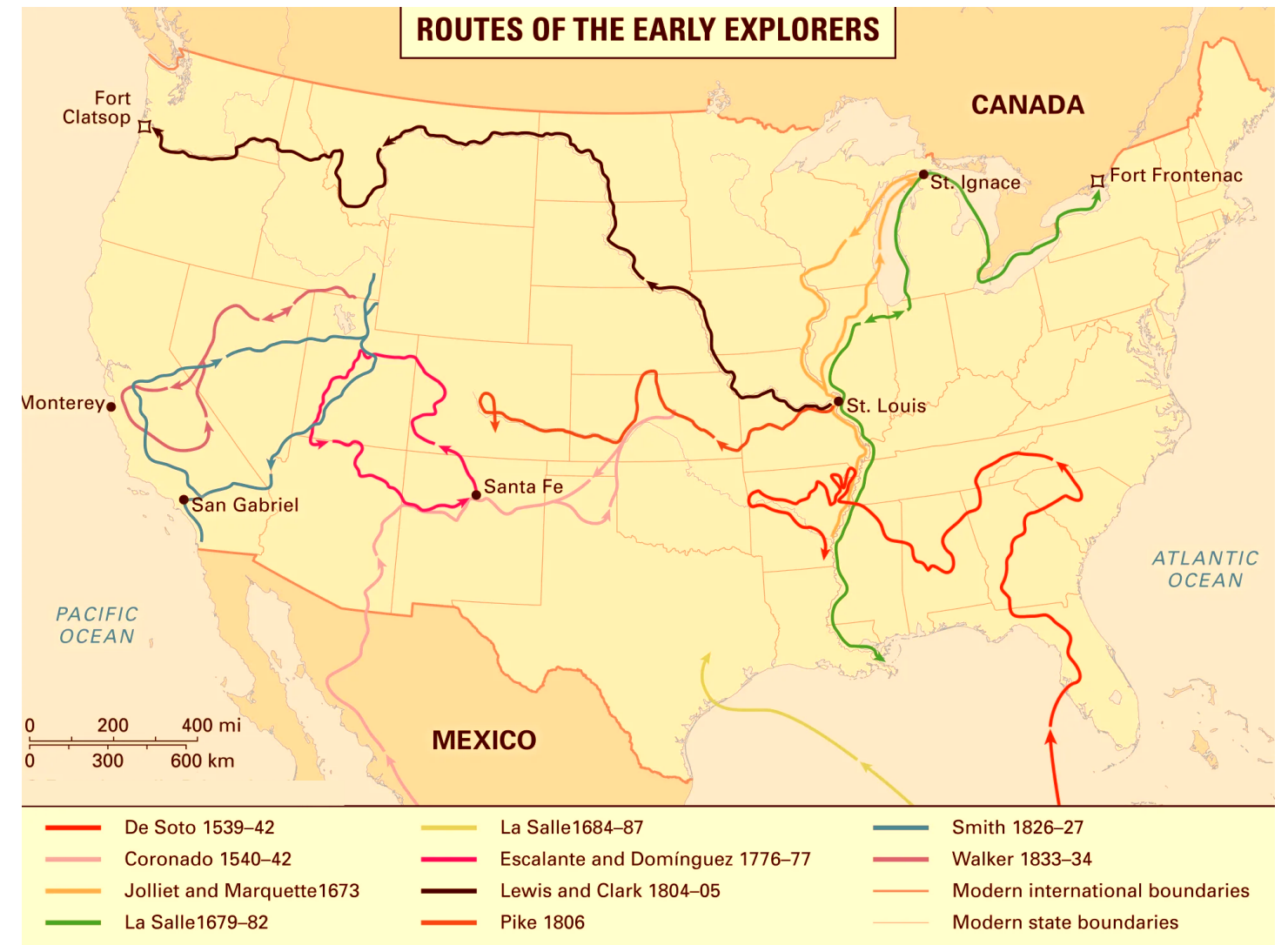
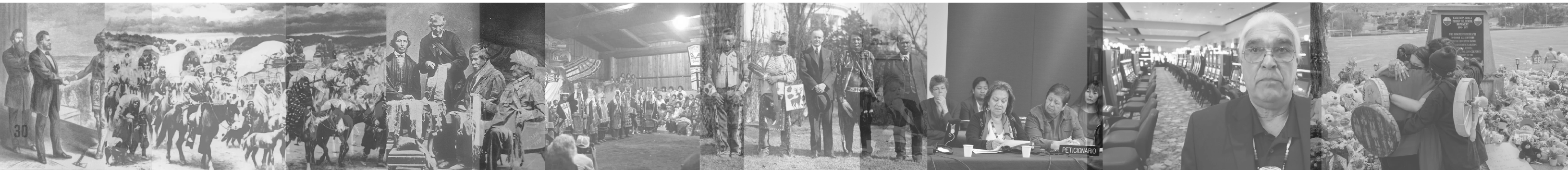
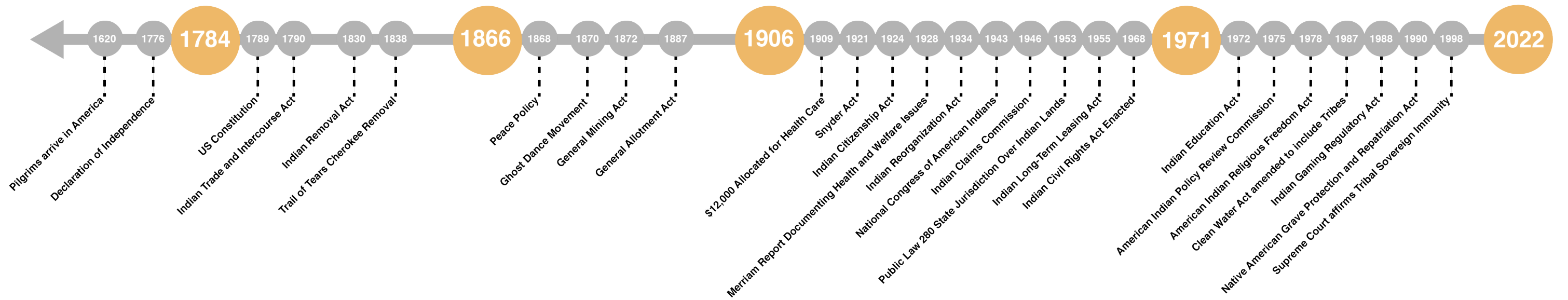
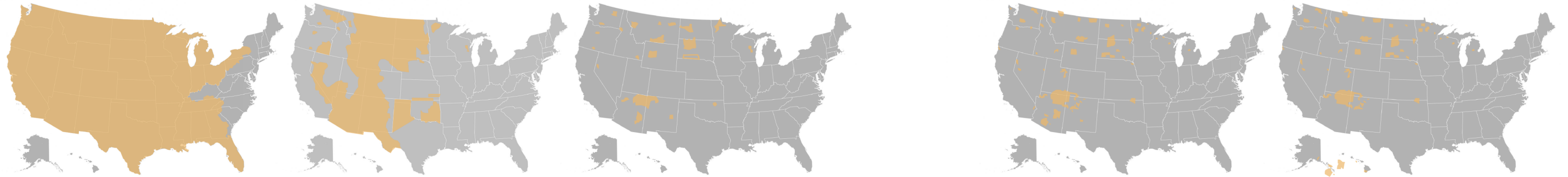


Fig. 3.05 Map of early explorations

prevented Native people from working many jobs, and trapped them in cycles of poverty. Material access was also limited, and the Industrial Revolution led to widespread use of prefabricated materials. Finally, tribes were often relocated to reservations far from their original homelands, disrupting their connection to nature and skillful climatic adaptations. Relevant to this timeline is the recent tragedy of unmarked graves found at residential schools in Canada, which has led to mass outrage and a new attention to Native rights and status. In 2021, the Canadian government arranged a two-billion dollar reparation agreement towards the Native tribes, including areas for improvement in housing, which offers a real opportunity to address and correct shoddy reservation housing, and instead look to the vernacular. While in Canada, this demonstrates a new priority and effort to improve Native housing.

Fig. 3.06 (both pages)
Timeline of Native lands and policies

NATIVE AMERICAN LANDS



Raw Materials		
EARTH	ORGANIC	HYBRID
adobe mud stone	timber sablings bark reed grass brush hide sinew, bone snow, ice	adobe/timber sod wattle and daub

Structural Types		
BENT FRAME	POST AND BEAM	COMPRESSION
Wigwam Wikiup Grass house	Lean-to shed Pit house Earthlodge Longhouse Chickee Plank house Summer house	Igloo Tipi Hogan Pueblo Town house

Building Forms		
DOMICAL	CONICAL	RECTILINEAR
Igloo Wigwam Wikiup Grass house Ki Log hogan Barabara	Tipi Forked-pole hogan Earthlodge Pit house	Chickee Longhouse Plank house Pueblo Summer house Winter house King Island house

Fig. 3.07 Historical Native American materials and construction methods

MATERIALS AND METHODS

In pre-Columbian times, Native American tribes had a close connection the vernacular, and were very effective at utilizing it through materials and building methods. For example, some groups would practice harvesting straight-grained types of wood from living trees while leaving the existing tree, which was a very sustainable practice. Other materials might be considered a waste product of the environment, such as reeds and bones. This section includes a collection of different vernacular building methods and materials, categorized by raw materials, structural forms, and building types, with early photos and diagrams. These materials are all local to the areas that these housing types occurred in, and were able to be sustainably harvested. They could be divided into the categories of earth materials, organic materials, or a hybrid in one construction. Native Americans also utilized unique structural types, which could be divided by bent frame, post and beam, or compression. Many of these types were defined by the permanency of the dwelling, and the type of weather conditions experienced. Last are the building forms, which are divided as domical, conical, and rectilinear. Influences such as circulation and need for fire ventilation helped inform these shapes. Application of material and building method was highly individualized to the tribe and utilization of

environment.

The Industrial Revolution began in England in 1760, and led to a worldwide transition in materiality and fabrication methods. Materials such as glass, steel, and iron were now available, and becoming popular due to their structural properties, malleability, and impact on the building envelope. From this point onward utilization of natural and local materials began to decrease, and more and more factories were built to keep up with the demands for manufactured materials. One of the biggest issues with using primarily manufactured materials is the amount of energy and transportation needed to create and supply it. In 2020, transportation was the largest contributor to US greenhouse gas emissions, making up 27% of total greenhouse gas emissions. In contrast, a vernacular approach utilizes local materials that do not need to travel long distances, and require much less processing and energy consumption than manufactured materials.

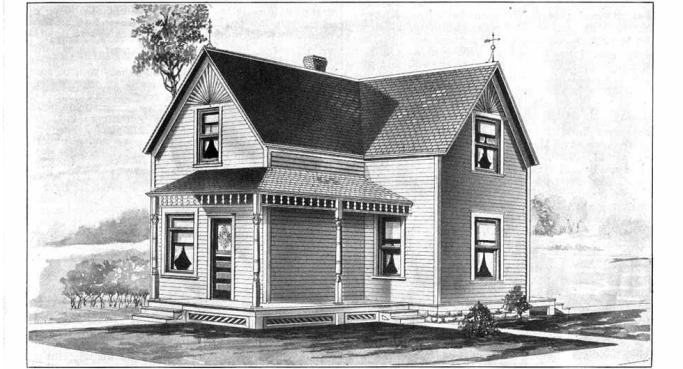
In addition to housing, the Industrial Revolution had a huge impact on landscape and transportation. After the manufacturing of iron became possible, iron rails were invented by Richard Reynolds in 1767, followed by the invention of the steam locomotive by Richard Trevithick in 1801. By 1821 the Stockton and Darlington Railway (S&DR) was created as the first

steam powered passenger railway, followed in 1827 by the Baltimore and Ohio Railroad, the first steam passenger and freight line. This was the origin of the American railway boom. In 1862, Congress passed the Pacific Railway Act, allowing the construction of a transcontinental railroad, and by 1871, 45,000 miles of track had been laid for one. By 1900, four other transcontinental railway lines crossed the United States. In addition to the environmental impact, the railway had other consequences for Native groups. The Lakota practiced moving through the land following after the buffalo, but after the railroad was built, hunters came to the area, killing off buffalo and altering the ecosystems. The rails also bisect the landscape, altering the conditions of the land and boxing in free moving tribes. For the Cheyenne, this broke up the long-standing practice of inter-tribal trade, and made them reliant on annuities paid by the government instead of a traditional and sustainable stream of revenue. Some tribes, such as the Pawnee, found employment working on the railway, but this also had the consequence of displacing the workers from their lands as they followed the rail. Overall, the Industrial Revolution introduced many innovations and new concepts to America, most of which were contrary and harmful to existing Native American customs and practices.

Another concept introduced in a post-Industrial world is that of prefabrication, and more specifically prefabricated homes. Prefabricated homes are homes that are assembled on site utilizing pieces that have been manufactured for easy assembly. The lauded advantages of these homes are that they are more affordable, more sustainable, and faster and easier to build. Many subsidized housing options for Native tribes utilize a form of prefabrication as a result. Prefabricated homes might involve options such as trailers, which are completely constructed off site and later moved into position. However, they also could be modular homes, which are constructed using a kit of parts provided by the manufacturer. One of the most well-known examples of this is Sears Modern Homes, a line of catalogue kit houses made by Sears, Roebuck, and Co., from 1908 to 1940. Sears started to make them to utilize an abundance of unused building material inventory, and had an advantage over other kit houses made at the time with the use of a mail order catalogue. With an increasing number of middle-class citizens and WWI veterans pursuing home ownership at this time, it was the perfect

\$725⁰⁰ and Our **FREE BUILDING PLANS**
WILL BUILD, PAINT AND COMPLETE, READY FOR OCCUPANCY,
THIS INVITING \$1,100.00 SIX-ROOM COTTAGE.

We tell you on page 2 how we furnish, free, the plans for this house, or any of the many houses shown in this book.



MODERN HOME No. 115
With Wood Foundation, Not Excavated.

On the opposite page we illustrate a few of the materials we specify on this, our \$725.00 house.

The arrangement of this house is as follows:

FIRST FLOOR.	
Parlor	12 feet by 10 feet 6 inches
Bedroom	8 feet 6 inches by 11 feet 9 inches
Kitchen	14 feet by 11 feet 9 inches
Pantry	8 feet 2 inches by 3 feet 6 inches

SECOND FLOOR.	
Front Bedroom	8 feet 3 inches by 10 feet 6 inches
Rear Bedroom	8 feet 6 inches by 11 feet 9 inches
Large Attic	14 feet by 11 feet 9 inches

All bedrooms have roomy closets.
Size: Width, 24 feet; length, 28 feet, exclusive of porch

GOOD MATERIALS MAKE GOOD HOUSES

When planning our houses it is a question of how good, not how cheap. This statement is easily proven by referring to some of the materials we illustrate and describe on opposite page. In using our plans, you take no risk of getting poor materials, such as might occur if the work were done by some unscrupulous contractor. The mill work specified is the best in each grade. You take no risk when building from our plans, as we positively guarantee every piece of material we furnish, and if each piece is not entirely satisfactory, it may be returned and your money will be refunded, together with all transportation charges.

BOOK OF MODERN HOMES —9— Sears, Roebuck & Co., Chicago, Ill.

Fig. 3.08 Sears Modern Houses catalogue entry

opportunity to start offering low-cost housing that you could build yourself. The drawbacks of this housing model were the heavy use of train transportation to move the kits across the country, as well as the lack of individuality and connection to site. You could buy the same house no matter where in the US you lived, so there was no attention to vernacular concepts or relation to place.



1
WIGWAM
Northeast and Great Lakes area

Conical or rounded in form, wigwams were built using a bent sapling form, and covered with birch bark or reed woven mats, with a small opening. Wigwams could also come in lengthened sizes to house more people or serve as communal buildings.



3
MOUND
Southeast

Mounds were man-made flat-topped hills, capped with rectangular homes framed with canes and thick adobe walls. The mounds were constructed in layers, with higher mounds indicating higher social position.



5
CHICKEE
Southeast

Chickees were platformed houses, elevated three feet off the ground, to provide ventilation and protect from pests. Palmetto logs and thatching covered the structure, including deep eaves to provide shade and shelter from heat and rain.



7
GRASSHOUSE
Great Plains

Pointed-dome grasshouses were constructed using branch framing, covered in thick grass, allowing smoke to aerate through the walls as well as the smokehole. Grasshouses feature heavily in tradition and myth, and constructing them was done jointly as a village.



9
PIT HOUSE
Plateau

Pit houses were dug using sharpened sticks, creating a three foot deep hole for the house. Log posts and beams were sunk in the ground around it, creating the structure. After a layer of pine needles, earth was packed over the house, leaving a smoke hole and entrance by ladder.



11
WINTER HOUSE
Arctic

Winter houses were built with whatever materials were on hand, including sod, rocks, driftwood, and whalebone. They were recessed several feet deep into the ground, and the entrance would be an angled passageway. Soapstone lamps with moss wicks burning whale blubber helped monitor air quality; if they burned yellow more ventilation was needed.



2
LONG HOUSE
Northeast and Great Lakes area

Longhouses were culturally and spiritually significant buildings, passed down through the female lineage. They were made using sapling structures, bark, and animal hides, and could be up to 330 feet long, and house 150-200 people.



4
TOWN
Southeast

Towns were highly ordered settlements complete with gathering areas, ball fields, and a sense of community. Houses were built with a wooden frame, plastered with clay, and shingled with bark. 'Red' and 'white' towns had different industries.



6
EARTHLUDGE
Great Plains

Earthlodges were constructed using rings of cottonwood posts and crossbeams around the central fire, with a wall of planks around the side to support the heavy earth walls. These dwellings might house a family in the warm months, while in the winter the men would travel in tipis to hunt.



8
TIPI
Great Plains

Tipis were a form of nomadic housing, utilizing a ring of leaning branches covered in tanned animal hide to keep traveling hunters dry. They typically had a smoke flap and highly decorative coverings. They were transported using a travois, a sled pulled by dogs, with larger branches dragged by horses.



10
EXTENDED TIPI
Plateau

Extended tipis were used as summer houses by plateau dwellers in the warmer temperatures. They were extended in length using a main ridgepole spanning between two tripod rings, and covered with mats. Mats could be made of woven plants or buffalo hide, and were of great significance.



12
IGLOO
Arctic

Igloos were hemispheric domes made of densely packed snow blocks, with an optimized height to diameter ratio to prevent collapse. Most Inuit groups used them as temporary shelter against the cold while hunting, and a basic dome could be constructed in a few hours using a bone knife. However, central Inuit built more complex systems with connecting passageways.



13
TENT
Arctic

Tents were inter-seasonal housing to adapt to warming weather conditions. The walls of a melting igloo might be used, with animal skins and interior branch supports. Like a winter house, the interior was divided between sleeping and storage space, with the exception that the cooking fire was typically outdoors.



15
CALIFORNIA HOUSES
California

Houses in California presented great diversity in style and materials, to reflect the diversity of California and its climate and tribal groups. Northern groups built dugout plank houses, central groups built pit houses, brush and bark houses, and earthlodges, and southern groups built domed grass or brush houses.



17
KI
Southwest

A Ki was a wood framed house, using four posts and cross beams in a rectangular structure. Some versions might be dug into the ground and reinforced around the base with earth, and the structure was then covered with brush and mud.



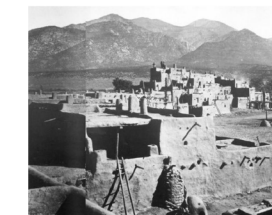
14
PLANK HOUSE
Northwest Coast

Plank houses were constructed using wooden planks, most commonly cedar. Cedar was straight-grained enough to allow harvesting of planks from living trees, which was very sustainable, and also made a great insulator. A totem pole might be positioned at the front of the house, carved with culturally significant figures and animals.



16
HOGAN
Southwest

Hogans were made of interlocking wood poles and covered with brush, with later iterations using an adobe covering. Framing variations included the forked pole version with four leaning posts, the four-sided leaning log version, and the six-sided corbeled log roof version.



18
PUEBLO
Southwest

Pueblo buildings were wood-framed, four storey structures, covered with adobe. They would have a central courtyard, and the first two floors would have external corridors, with ladders to reach the upper floors. The upper floors were typically living spaces, while the lower floors were for making and storing food.

Fig. 3.09 (both pages)
Map of selected historical typologies

MODERN CONTEXT

DEMOGRAPHICS
SUBSIDIZED HOUSING

4

To understand the real living conditions of Native American people, it is necessary to look to demographics. Firstly, this map illustrates the concentration of Native American people in the US. The map closely resembles previous mapping iterations to illustrate Native lands. There are 6.8 million Native Americans in the US and 574 federally recognized tribes, with 78% of Native Americans living outside of tribal areas, and only 22% living on reservations or other tribal lands. This demonstrates that Native American integration in mainstream society is much more prevalent than might be assumed, and the majority live in typical urban areas and typical housing.

However, 40% of Native American housing has been found to be inadequate, 30% is overcrowded, and less than 50% is connected to a sewer. This demonstrates a systemic issue with tribal housing, and the infrastructure that supports it. This can be partially attributed to by financial inequality, with 26.8% of Native Americans living below the poverty line, as opposed to 14.6% for all of America. Additionally, the median household income for Native Americans is \$49,906, as opposed to \$71,664 for white Americans. Financial inequality is a huge influence in Native American housing conditions.



American Indian and Alaska Natives median household income is \$49,906



Non-Hispanic white households median household income is \$71,664

26.8% of Native Americans live in poverty



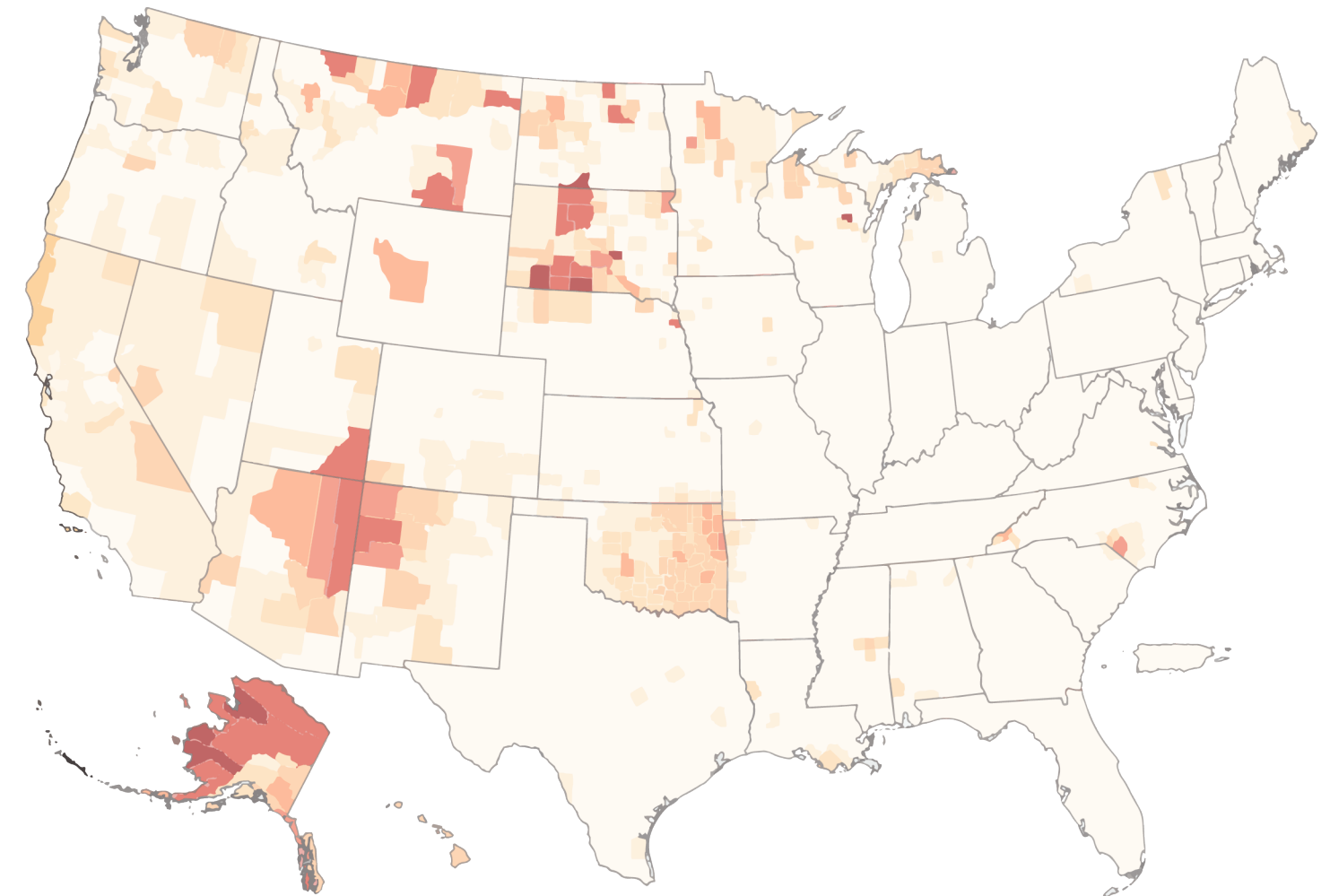
Compared to 14.6% for the nation

40% of on-reservation housing is inadequate

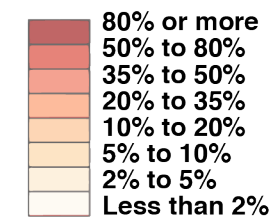


30% of Native housing is over crowded, less than 50% is connected to a sewer

Fig. 4.01-4.04 Demographic diagrams



*Meaning American Indian, Alaska Native, Native Hawaiian, and other Pacific Islanders
% of Indigenous Alone Population



In 2020, there were 4,447,431* Americans with only Indigenous ancestry

Total: 1.3%*

Fig. 4.05 Population density map

Native Americans Living in Metropolitan areas

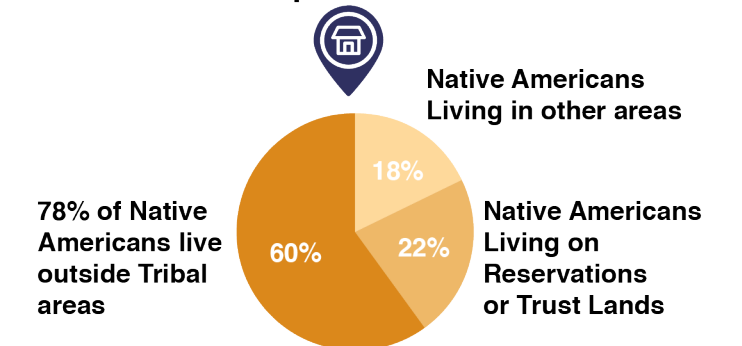


Fig. 4.06 Living conditions diagram

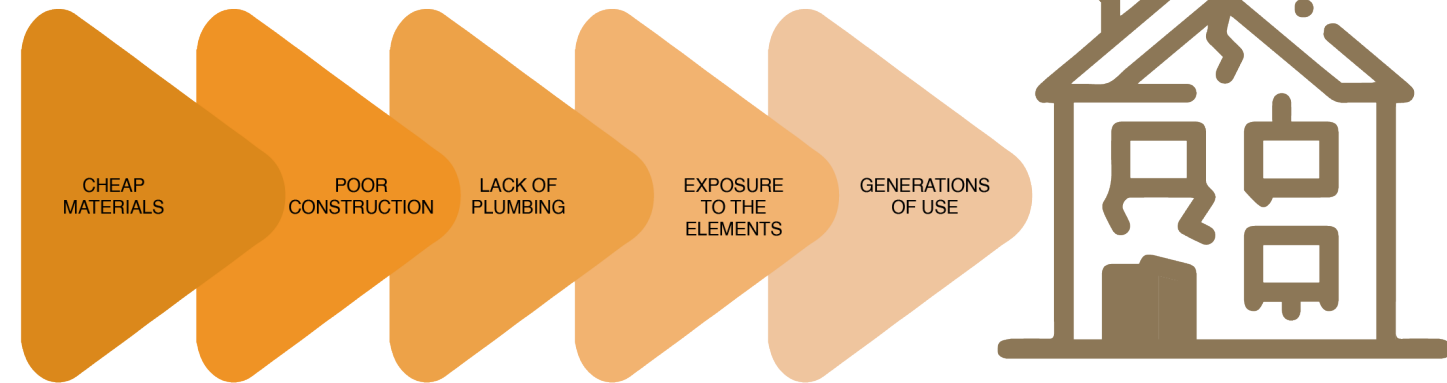


Fig. 4.07 Reservation housing deterioration diagram

SUBSIDIZED HOUSING

A huge factor in the condition of Native American vernaculars today is the level of tribal involvement in housing design. Many Native Americans are low-income, and need support to achieve home ownership. In order to receive housing support from the US Department of Housing and Urban Development, applicants must go through the process of determining housing allocations, requesting housing, design, and finally construction. In this process there is not much room for consumer input, aside from the request stage, let alone tribal input. The measures of consulting with Indian Housing Authority elders at the request stage, working with Indian Housing Authority architects and engineers at the design stage, and working with approved construction partners at the final stage could be added to ensure that tribal values are considered and incorporated into the design. With these measures, Native Americans seeking housing through HUD could feel as though their interests are valued and they are ending up with a house that suits their needs. This would help give power back to the tribes, and redevelop inadequate housing.

Inadequate housing is a systemic issue within reservations, which has been contributed to by the careless subsidized housing options developed by the

government. Around the 1960s, the US government became concerned with the state of reservations, and started to provide low-cost housing options. Quite a few were developed for South Dakota, which has one of the highest populations of Native Americans, and therefore one of the biggest Native housing challenges. However, these designs were very Eurocentric, boxy, closed off, generic, and standardized. There was no incorporation of location, or cultural values. An evaluation tool for analyzing vernacular models will be used further on in this thesis, but it has not been applied here due to the poor quality and total lack of criteria. These houses were very cheap, and had numerous problems including leaning walls, leaks, snow in the attics, collapse, poor plumbing, and poor insulation. They were well received only because there were no better options at the time for reservations, but as time went on their quality rapidly deteriorated. Many of these houses are still around, and have been in use for generations. Overall, a lack of power over these options is very harmful to Native populations. To achieve self-determination in design, Native people need a combination of power, involvement, and resources. In this way, they would have greater control over their homes and their vernacular qualities.

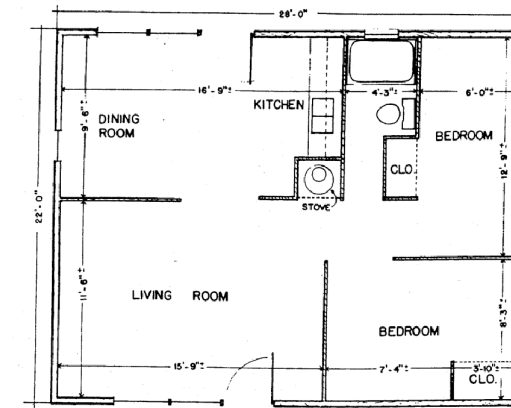


Fig. 4.08
Transitional House (1960s)
Rosebud Sioux
South Dakota

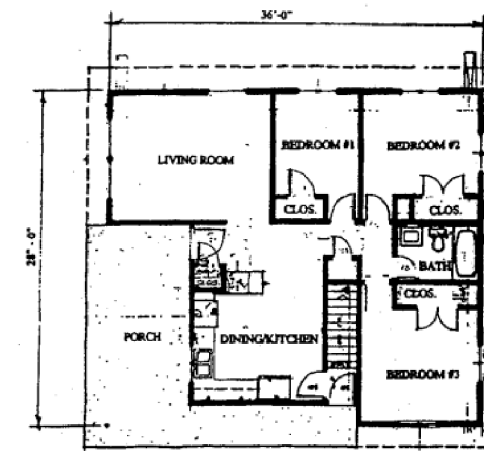
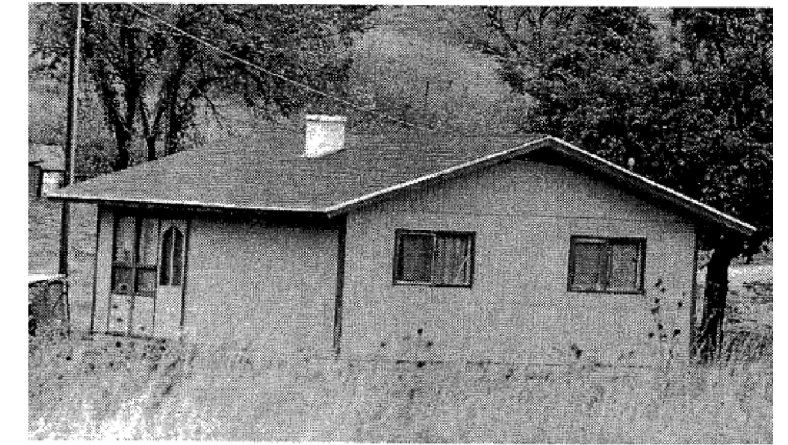


Fig. 4.09
Three Bedroom Housing (1960s)
Yankton Sioux
South Dakota

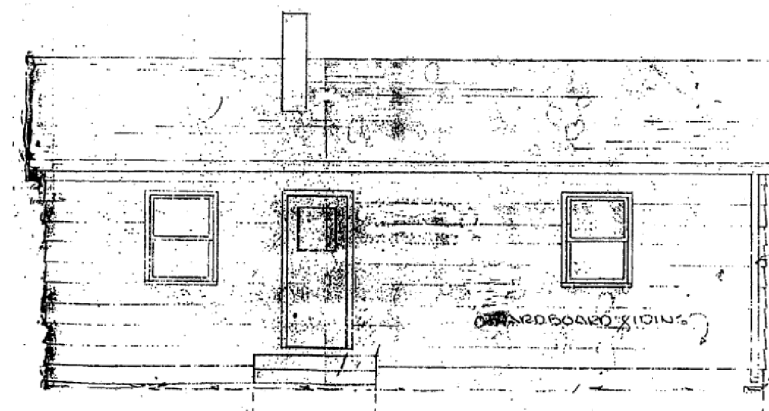
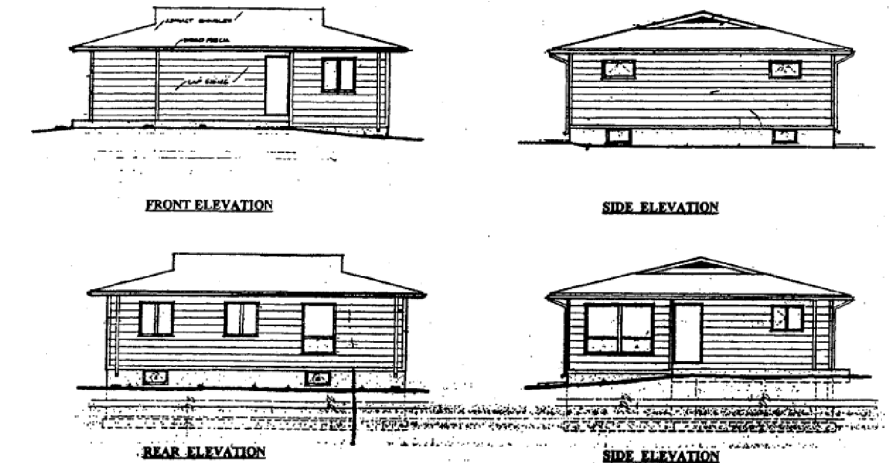
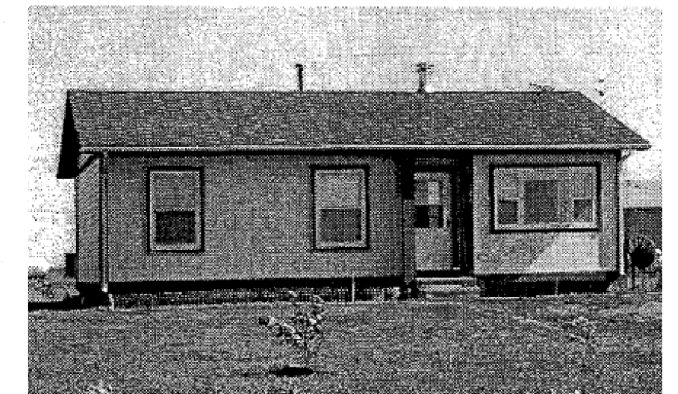


Fig. 4.10
SD-2 House (1970s)
Standing Rock Sioux
South Dakota



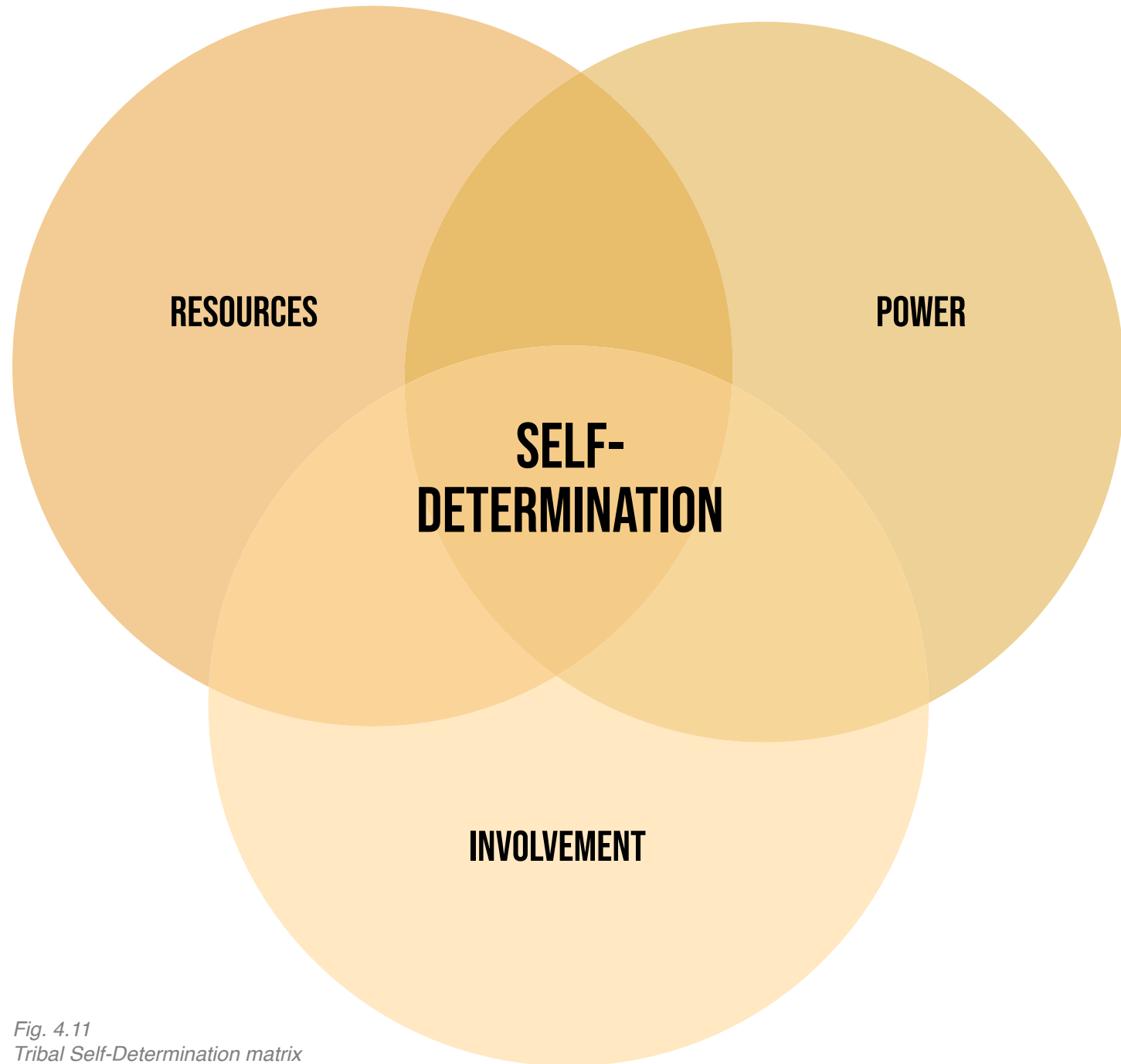


Fig. 4.11
Tribal Self-Determination matrix

**UNITED STATES DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT:
HOUSING DEVELOPMENT PROCEDURES**

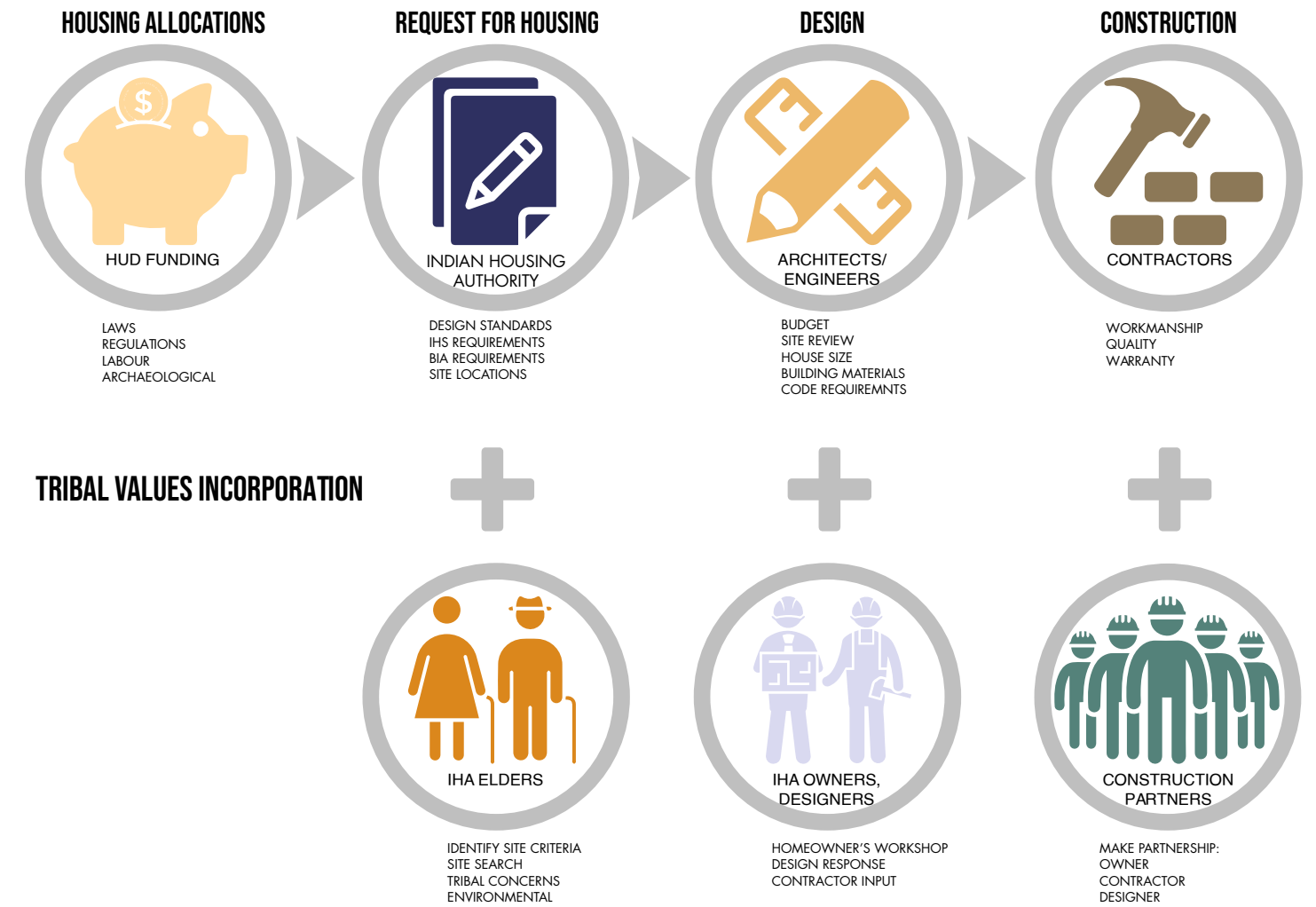


Fig. 4.12
HUD process recommendations diagram

5

DATA AND IMPLICATIONS

To analyze the sustainability impacts of vernacular architecture, a comparison to more standard construction can be used as a control. In this study, test subject buildings around the world were chosen in three categories, Building Energy Optimization Tool ideal cases, which are designed to be efficient and reduce costs, International Energy Conservation Code standard cases, which are designed to be energy efficient in response to climatic area, and vernacular test subjects. In different climatic zones around the world, these three building types were then compared in the areas of heating, cooling, and heating and cooling combined. In almost every combination and scenario, the vernacular test came out as the most efficient example.

In another study, buildings with heavyweight vs. light weight wall mass were tested in the different climatic zones. The results demonstrated that one type of wall mass is not better in every situation, and that these considerations should be adapted to the specific site and context to maximize efficiency. In another study, the prevalence of different roof materials was recorded in the different climatic zones. Again, this study revealed that different roof materials are more suitable and prevalent in certain climates, as they are better adapted for efficiency, and that there is no standard that will perform optimally in every scenario. These studies demonstrate the financial and environmental benefits to adapting vernacular designs and making the building a reflection of the site context. The materials tested here are consistent with the Native American materials that I studied, and reliably perform well, especially in the right environment.

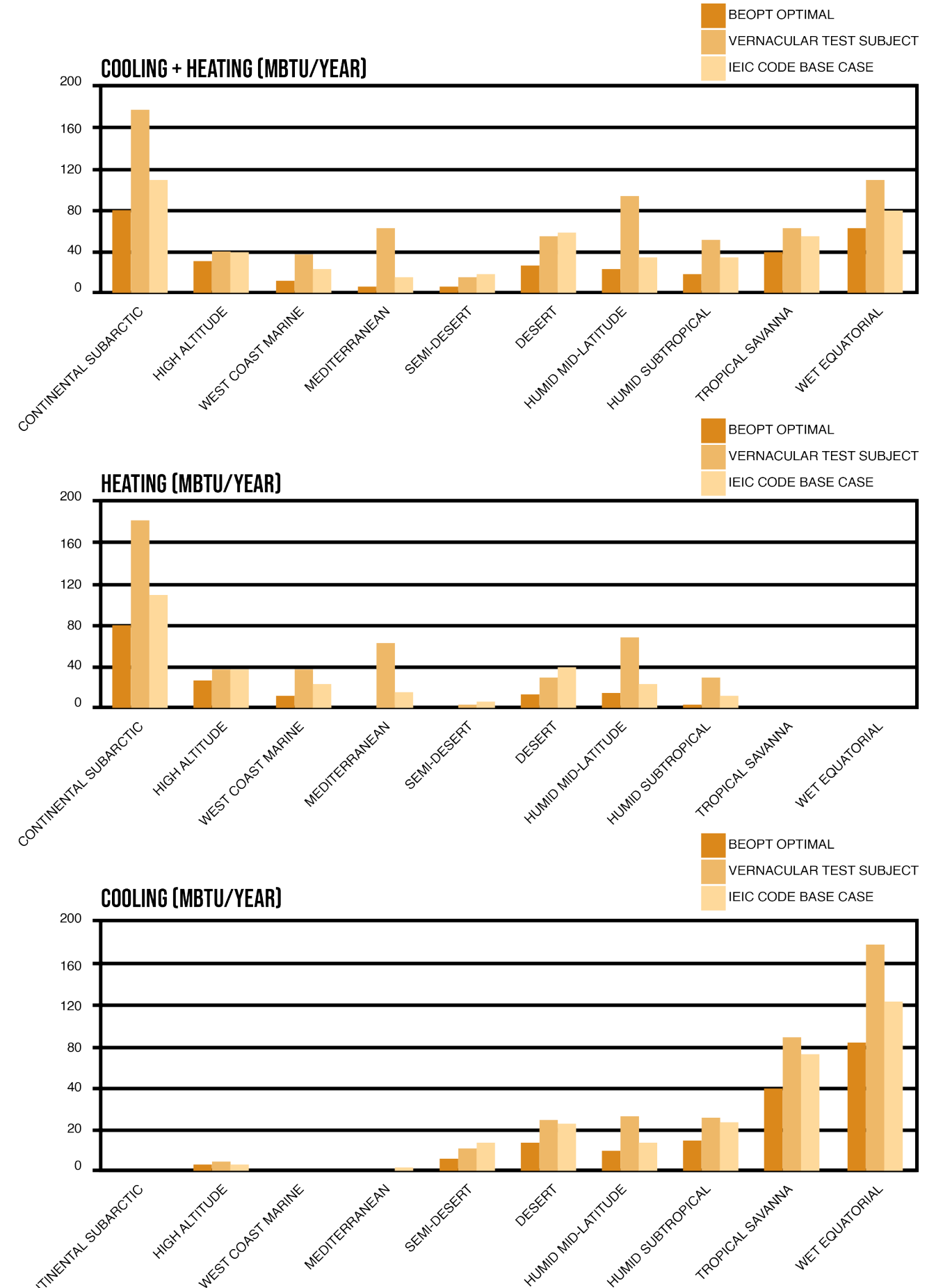
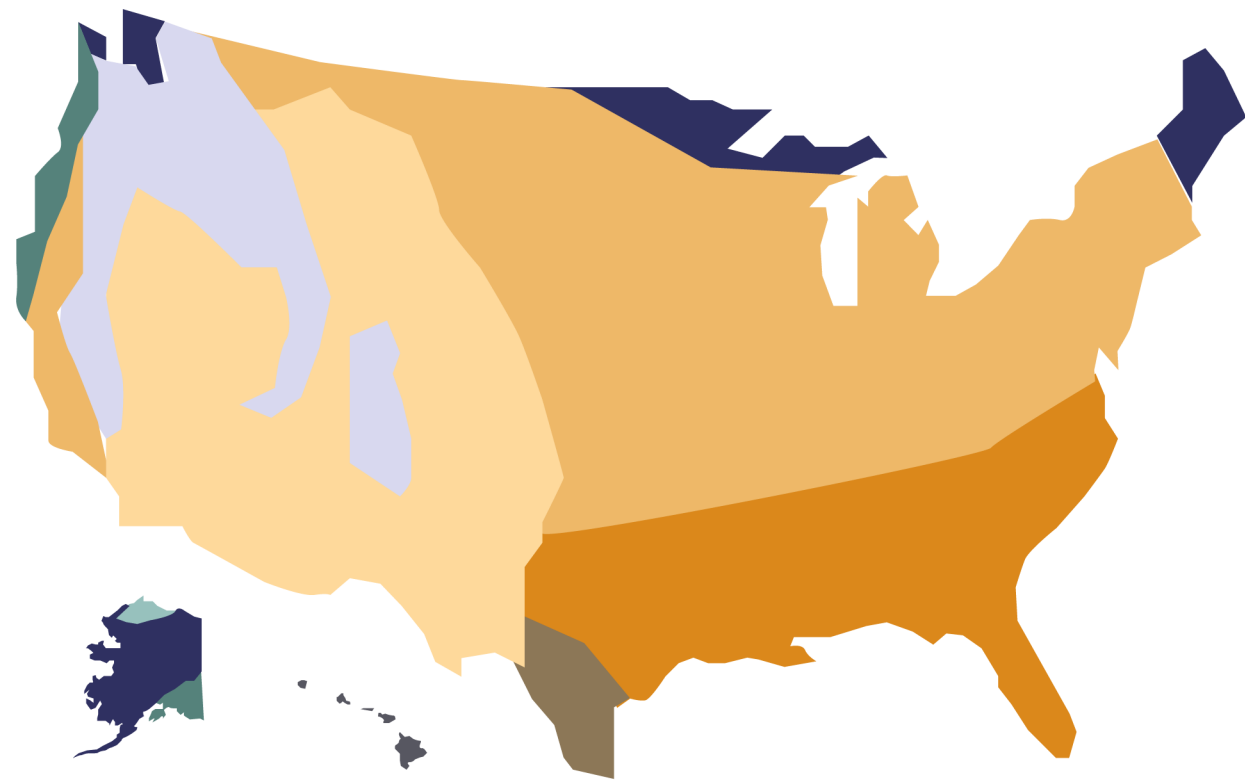


Fig. 5.01-5.03 Heating and cooling data results



- DESERT
- SEMI-DESERT
- WEST COAST MARINE
- HUMID MID-LATITUDE
- CONTINENTAL SUBARCTIC
- TUNDRA/ICE CAP
- HUMID SUBTROPICAL
- WET EQUATORIAL
- HIGH ALTITUDE

Fig. 5.04
Climatic zone map

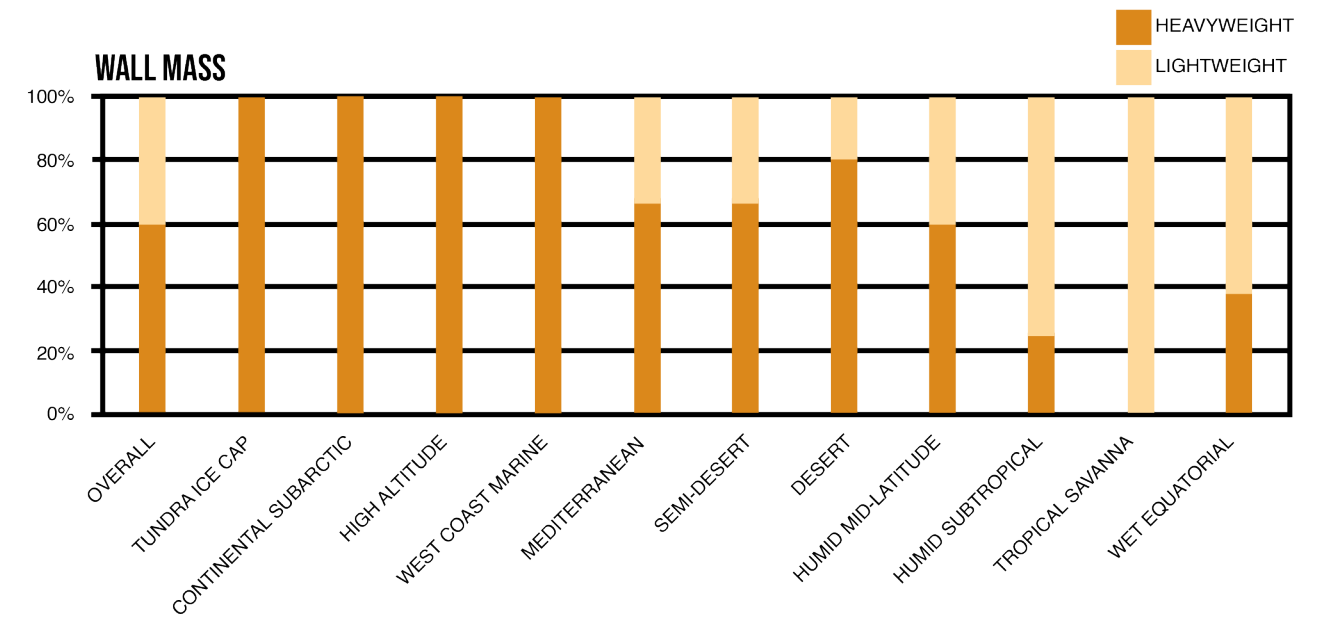
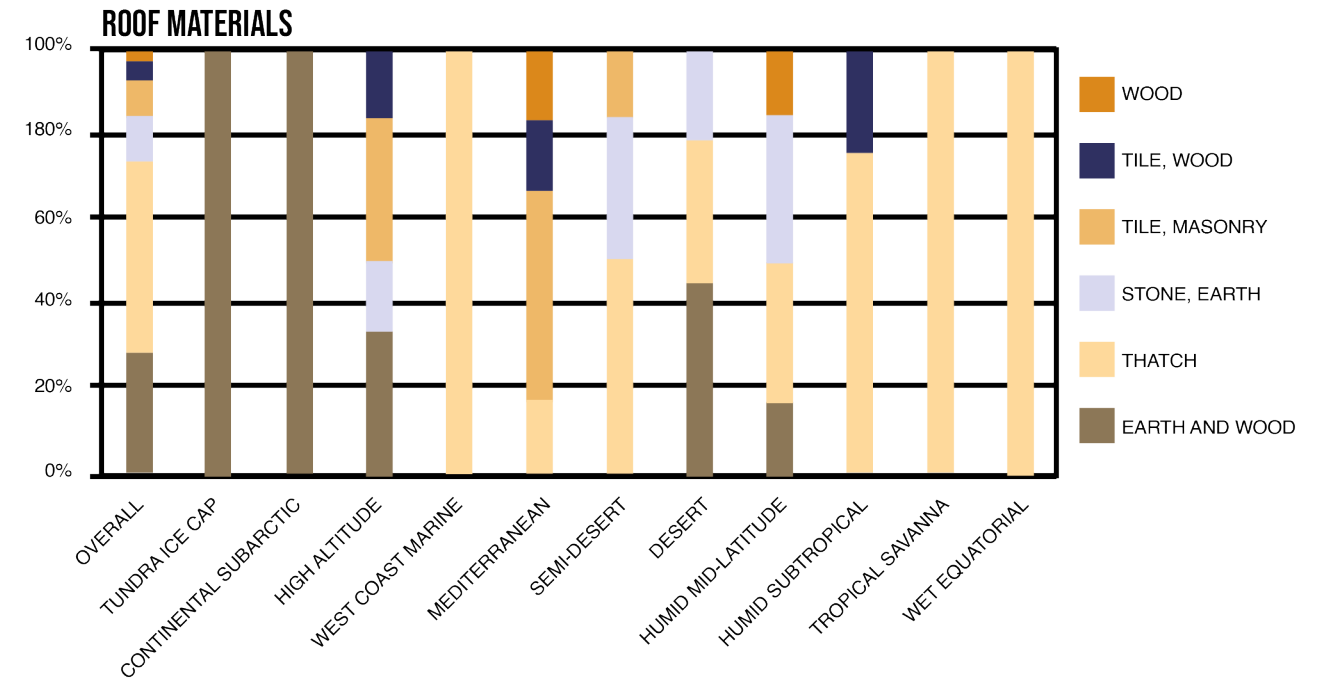


Fig. 5.05
Material data results

6

DESIGN FRAMEWORK

To inform the process of vernacular design, a design framework can be used direct the right priorities. This is the analysis formed by this study of how vernacular design should be performed, summarized in a means of application. This framework is adapted for the climatic zones of the United States, but it could be revised to be used in other areas with an understanding of the relevant climatic solutions. The framework is comprised of two different frameworks, which are to be applied in tandem.

The first framework is the cultural and social framework, a combination of craft, forms, uses, and history. Craft can be considered a way of engaging local building knowledge, and ensuring that applicable building traditions are preserved. Forms relate to the appearance and spatial quality of a building, which is often one of the most striking features of a building, and can help evoke culture through collective memory. Uses refer to how the occupants will function in the space, including the privacy level and connectivity created. History refers to features of the building that create traditions and patterns of behaviour, such the need for a connection to nature. When applying this framework, not all of these elements need to be engaged on one design, as they are merely different options for creating a connection to the culture and community.

The second framework is the climatic framework, which maps out the nine different climatic zones in the United States, and how designing for each climate should be approached. For each model, a combination of passive systems, active systems, and materials are utilized. These should be all the elements necessary to address climate; passive systems to work with the existing climatic conditions, active systems to mitigate extremes in the environment and use technology as a tool, and materials to utilize natural properties such as insulation and solar heat gain to an advantage. Once again, the exact examples for each category do not all have to be in place for an effective design, but they are good suggestions for the use of each climate. However, an effective modern vernacular design should utilize at least one successful element of each for passive systems, active systems, and materials.

By combining the cultural and social framework with the climatic framework, the result should be a vernacular categorized as a combination of climate, relation to place, and social and cultural elements, which is consistent with the definition of vernacular throughout this thesis. This is an effort to modernize vernacular architecture, and adapt it to technologies, uses, and culture while being specific to place.

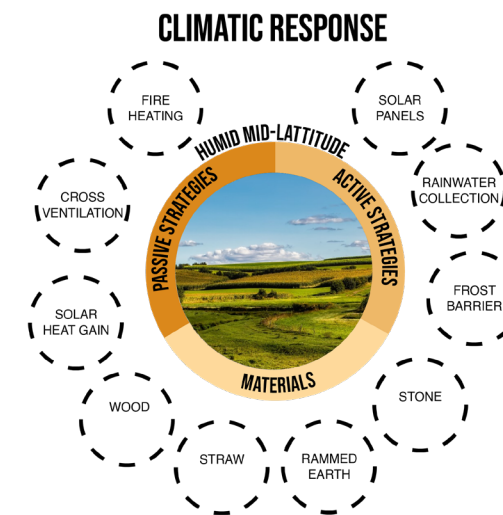
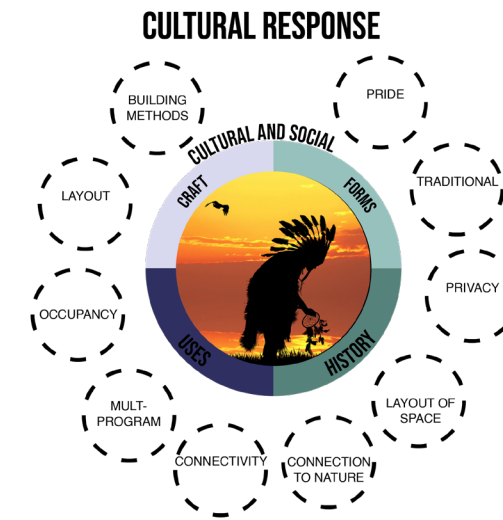


Fig. 6.01 (right)
Cultural and climatic framework diagrams

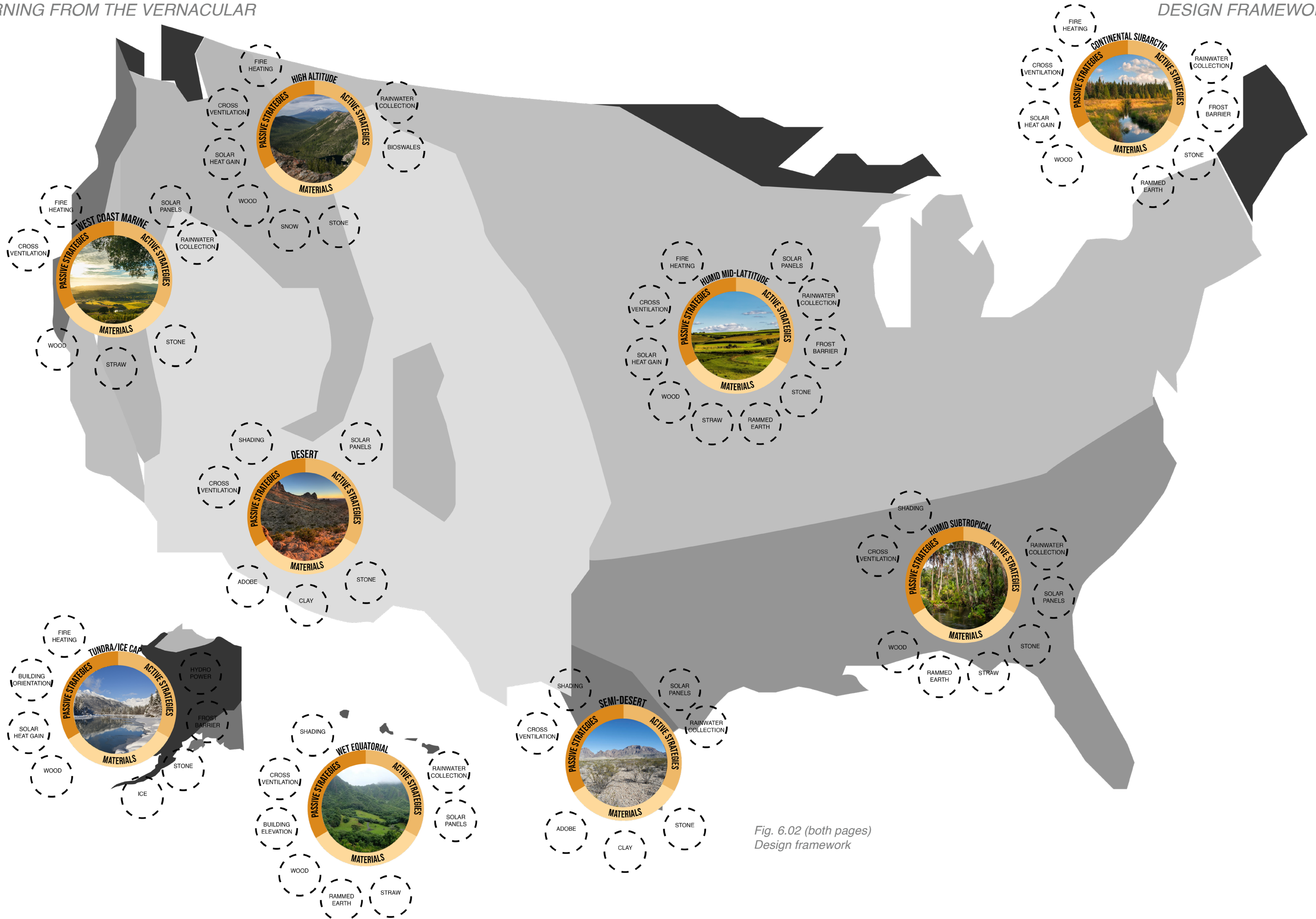


Fig. 6.02 (both pages) Design framework

PRECEDENT ANALYSIS

PINOLEVILLE POMO NATION

NORTHERN CHEYANNE TRIBE

POKEGON BAND OF POTAWATOMI INDIANS

7



Fig. 7.01 Historic Pomo winter shelter

PINOLEVILLE POMO NATION

History

The Pinoleville Pomo Nation is a tribe that originated in Potter Valley, California. In the period of time before colonization, there were three primary villages, called Pomo, Sedam, (or Tse tum) and Canel (or Shanel, Sanel), as well as several smaller camps and developments. The name of the tribe comes from Pomo poma the primary village, and means something valued (po) magnesite bead (mo) and people (poma), in Northern Pomo language. Historically, villages might have five to a hundred homes, in the form of hemispheric winter shelters called tca. The floors were sunken to keep warm, and the walls were woven with willow and grass. A single house might contain one to five families, and larger roundhouses might also be used as gathering and ceremonial space. The people were hunters and gatherers, and in the warmer months would move around to find resources. A brush shelter might be used as seasonal housing while hunting. Foods such as fish, small game, clover and greens, seeds, Indian potatoes, berries, and most importantly acorns made up the staple diet of the Pomo people. During the winter, hand craftsmanship was a prominent activity, such as basket-weaving, bead making, string, arrows, and obsidian spears, all of which could be traded with other tribes. The

Pomo highly value ceremonial spaces, and holding community gatherings to dance and celebrate.

After several occurrences of disruptions and displacement from Potter Valley, the Pomo people ended up in Mendocino County, joining members from other tribelets on the land. In 1905, the land was deemed to be overcrowded, so through the Homeless, Landless Indian Act, an adjacent Rancheria was purchased, now known as Pinoleville Rancheria. Agriculture became a primary industry of the tribe, with some farming their own land, and others working on land in the Ukiah Valley. In the 1950s the government utilized the Rancheria Act of 1958, an act designed to integrate those on rancherias with the general population, and decided to improve the infrastructure of the Pinoleville Rancheria. This led to the Rancheria and tribe being disbanded in 1966, with the land held in trust by the Superior Court. In 1983, in the class action lawsuit *Tillie Hardwick v. the United States*, the wrongful termination of the tribe was overturned, and the original lands were restored to the Pomo.

Fig. 7.03-7.04 (next page)
Straw bale construction photos



Fig. 7.02 Pomo housing typology exterior

Housing Typology

In 2012, the Pinoleville Pomo Nation celebrated the grand opening of three new homes, iterations of a typology designed in collaboration with UC Berkeley engineering students. The collaboration was initiated by a chapter of the American Indian Science and Engineering Society reaching out to a UC Berkeley professor, in a desire to create more sustainable and culturally appropriate housing, in contrast to the box-like HUD housing they had received in the past. Considering their history reclaiming their land, these houses can also be seen as a celebration of Pomo culture and history, as well as an attempt to expand their housing infrastructure and correct housing shortages.

This typology is a single-family house that is highly sustainable and utilizes local materials, such as the walls which are made of rice straw, which is a bi-product of the local rice industry. The walls are covered in earthen plaster and cob, are R-50 insulated, and constructed by the Pomo nation during community events. The building is south orientated and utilizes thermal mass, uses solar panels for electricity and water heating, and has a composting toilet, rainwater collection, and greywater tanks. It also has ground-based heat pumps, and natural ventilation. This demonstrates sustainability, adaptation to the





Fig. 7.05 Pomo typology elevation

adaptation to the California climate, and relation to place. Sustainability is very important to the tribe, and they are eager to incorporate as many green strategies as possible into their housing. The round shape of the house also references the vernacular round winter houses built by the tribe in the past, including a sunken floor which frames the gathering space. Thanks to its green systems, these houses have earned support from federal programs, including the U.S. Environmental Protection Agency's Tribal Green Building Initiative, which offers technical assistance to tribes, and the Department of Housing and Urban Development's Sustainable Construction in Indian Country Small Grant Program, which offers both guidance and funding opportunities.

This precedent demonstrates the financial feasibility of following a vernacular model, and how utilizing sustainability can enable Native tribes to take ownership over their housing designs. The tribe has been very involved in this design, even helping with construction, and they are looking to build more.

Fig. 7.06-7.07 (right)
Interior and exterior finish photos



Fig. 7.08 Pomo typology construction process

Critique

Is the Pinoleville Pomo Nation housing typology a successful use of vernacular architecture? In order to answer this question, the vernacular definition of this thesis as well as the design framework will be applied. In regards to the aspect of cultural and social elements, the design referenced the culture through its resemblance to the historic housing typology, including the sunken floor. For the climate aspect, the design integrates solar panels, natural ventilation, and solar mass. Lastly, for the relation to place, the design utilizes local straw bale material, solar panels, and a ground-based heat pump. Based on adherence to the definition, this typology can be considered a vernacular.

The second lens is the use of the design framework. For the cultural and social framework, the design should have aspects of craft, forms, history, and uses. The design references history through the historic typology, as well as the form, which includes the sunken floor aspect. One aspect that is missing from the design is the incorporation of community connectivity, which is very important to the Pomo. For the climatic framework, the design falls into the West Coast Marine region. This should include features like fire heating, cross ventilation, solar panels, and rainwater collection and active and

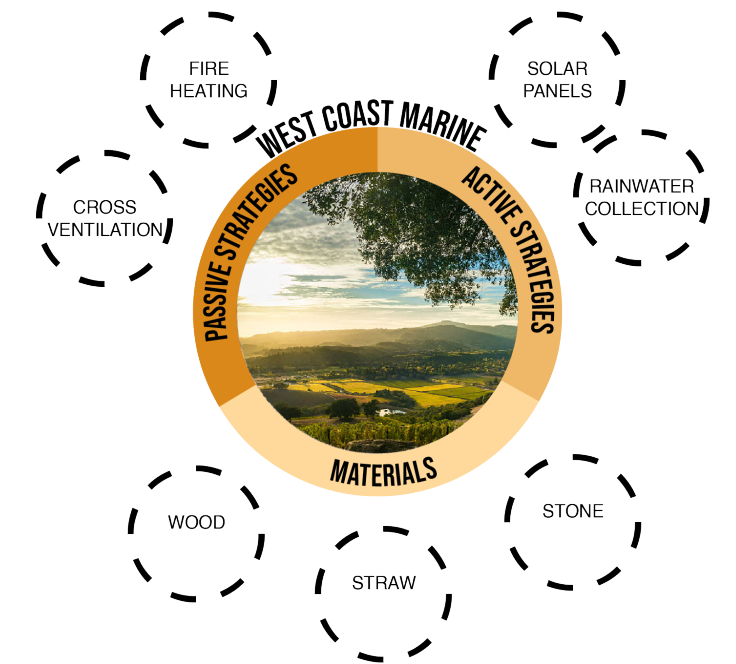


Fig. 7.09 West coast marine framework

and passive strategies, and materials such as wood, straw, and stone. The housing typology fits this framework nicely, with some additional strategies such as solar heat gain. Overall, this is a successful vernacular, but areas for improvement include site integration and community connection.



Fig. 7.10 Cheyenne typology exterior

NORTHERN CHEYANNE TRIBE

History

The Northern Cheyenne tribe originated in Minnesota, and were once part of the greater Cheyenne tribe. They were a nomadic hunter-gatherer tribe, and utilized animal skins to make clothing, and gathered plants to eat and make medicines. In 1825, the tribe divided into Northern and Southern Cheyenne, with the Northern Cheyenne leaving for Wyoming. From this point onward, the Northern Cheyenne were continuously fighting with the United States army, leading to confrontations such as the Sand Creek massacre, where hundreds of Native people were killed. Another notable conflict was the Battle of Little Big Horn in 1876, where the Northern Cheyenne helped to defeat General Custer. Eventually, the tribe was made to relocate to the south, but they struggled to find land and resources there. However, when they tried to return to the north, they would be captured and confined in the cold in Nebraska. Eventually, in 1884 they were able to find land in southeastern Montana on the Tongue River Reservation, which was later renamed to the Northern Cheyenne Indian Reservation.

Housing Typology

Red Feather Development, founded in 1994, is a non-profit development group based in Bozeman, Montana, which builds two homes a year for Native American communities around Montana, North Dakota, and South Dakota. This is made possible through working with the American Indian Sustainable Housing Initiative, founded in 1999, which creates housing opportunities in the realm of Native American vernaculars. And since 1999, Red Feather has utilized a straw bale typology, which can be constructed as quickly as 28 days with the help of volunteers and tribal engagement. This technique saves an estimated 60% in labour costs, and gets the community active in building their own homes. This typology is used for the Northern Cheyenne Housing by the Northern Cheyenne Tribe in Busby, Montana, and Red Feather has been building them houses since 2001. This typology was designed as more of a means of affordable quality housing than vernacular integration, however it does have some vernacular features as a means to reduce costs. The home utilizes straw bale walls, solar heat gain, solar panels, radiant floor heating, shallow foundations to minimize evacuation, frost protected foundations, the use of recycled newspaper as insulation, and the use of fly-ash, a by-product of the local coal industry. To engage with the culture, the design has east-facing doors, which the Northern Cheyenne enjoy for the ability to face the sunrise. Another feature is open kitchens and living rooms, which provides space for gatherings.



Fig. 7.11 Cheyenne typology construction

Critique

Is the Northern Cheyenne housing typology a successful use of vernacular architecture? In order to answer this question, the vernacular definition of this thesis as well as the design framework will be applied. In regard to the aspect of cultural and social elements, the design appeals to culture in terms of the east orientation and the open floor plan, engaging the uses aspect of the framework. For the climate aspect, the design integrates solar heat gain, solar panels, and radiant floor heating. Lastly, for the relation to place, the design utilizes local straw bale material, shallow frost protected foundations, and local fly-ash. Based on adherence to the definition, this typology can be considered a vernacular.

The second lens is the use of the design framework. For the cultural and social framework, the design should have aspects of craft, forms, history, and uses. The design references the uses aspect through the programming of space, as well as orientating to the sun.

For the climatic framework, the design falls into the High-Altitude region. This should include features like fire heating, solar heat gain, rainwater collection, and cross ventilation as active and passive strategies, and materials such as wood, snow, and stone. The housing typology fits this framework somewhat, with some additional strategies such as the straw material.

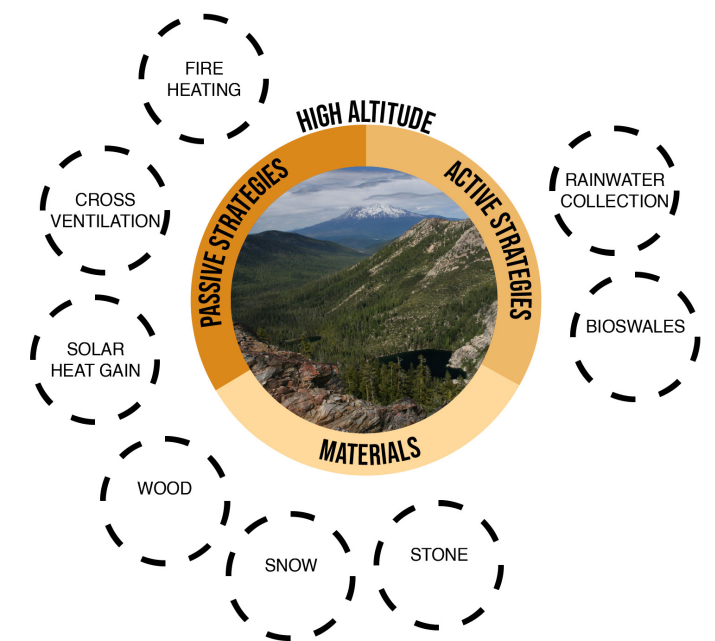


Fig. 7.12 High-altitude framework

Overall, this is a somewhat successful vernacular, but areas for improvement include site integration, and linking the houses through proximity and community, and creating a more engaging form.

This design also disrupts minimal aspects of the natural landscape, and the affordability and easy construction allows the community to participate and achieve home ownership more easily. As a critique, the design has a lack of relationship to the local landscape, and the homes do not have much proximity or connection as a community.



Fig. 7.13 Pokegon typology exterior

POKEGON BAND OF POTAWATOMI INDIANS

History

The Potawatomi originated by the Eastern seaboard, and formed the Three Fires Confederacy along with the Ojibwe and Odawa tribes. In the confederacy, each served a role, with the Ojibwe acting as the Keepers of Tradition, the Odawa acting as the Keepers of the Trade, and the Potawatomi acting as the Keepers of the Fire. At some point, the Potawatomi relocated to an area of Wisconsin, southern Michigan, northern Indiana, and northern Illinois, but with the passing of the Indian Removal Act in 1830 and the Treaty of Chicago in 1833, they were forced to move west. The journey was disastrous, killing one out of every ten people, which led those who still remained to hide in Northern Michigan and Canada. Those who were found by the US Government were killed, which is why this event is referred to as the Potawatomi Trail of Tears. A small number of tribe members were later permitted to stay, including Leopold Pokegon, ancestor of the Pokegon Band of the Potawatomi. The band moved around Michigan for many years, battered by changing treaties and attitudes of Americans, before finally receiving a judgment from the Michigan Supreme Court to stay in Silver Creek

Township, near Dowagiac. The band did not achieve federal status until 1994 despite many applications, as it was once decided that only one tribe in the lower peninsula of Michigan could be designated.

Housing Typology

To learn more about this typology, I interviewed Patrick Judd, who was a landscape architect on this design. The Pokégnek Édawat Village may look like a typical American suburb, but vernacular features are present in the design. For example, the homes utilize solar panels, local materials in the interior, bioswales, and fire heating, which demonstrates relation to place and climate.

The village is shaped around the natural contour of the site, and strategically orientated to avoid knocking down trees. A connection to nature and the culturally significant black ash trees are very important to the Potawatomi, so much more care was taken in the treatment of site than a typical housing development. The Potawatomi carefully maintain the adjacent woods and paths, eradicating invasive species and practicing controlled burning. This demonstrates a connection to culture and site.



Fig. 7.14 Pokegon Edawat site

Critique

Is the Pokegon Band housing typology a successful use of vernacular architecture? In order to answer this question, the vernacular definition of this thesis as well as the design framework will be applied. In regards to the aspect of cultural and social elements, the design referenced the culture through its use of fire in the home and site, as the Potawatomi were previously called the Keepers of Fire. For the climate aspect, the design integrates fire heating and insulative local materials. Lastly, for the relation to place, the design utilizes bioswales, solar panels, and woods maintenance. Based on adherence to the definition, this typology could loosely be considered a vernacular.

The second lens is the use of the design framework. For the cultural and social framework, the design should have aspects of craft, forms, history, and uses. The design references history through the use of fire, however this is not a very strong cultural link.

For the climatic framework, the design falls into the Humid Mid-Latitude region. This should include features like fire heating, cross ventilation, solar gain, and rainwater collection and active and passive strategies, and materials such as wood, straw, and stone. The housing typology does fit this

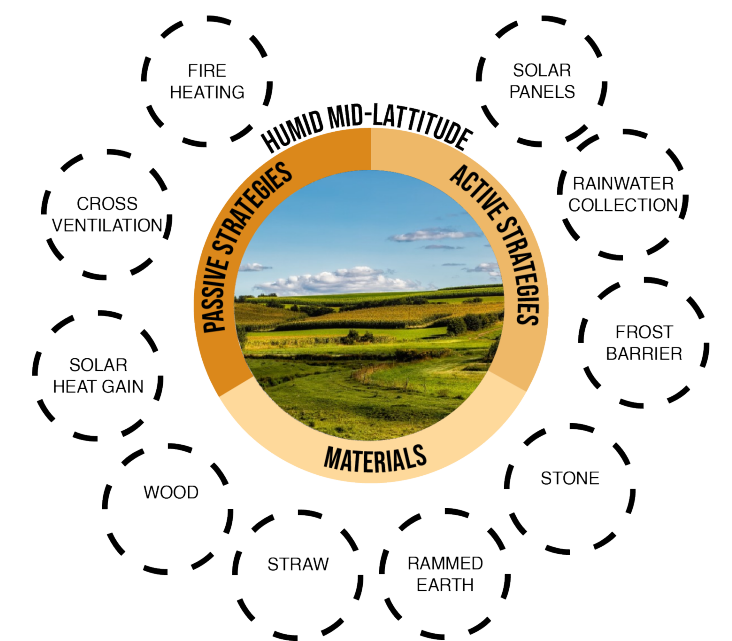


Fig. 7.15 Humid mid-latitude framework

framework fairly well, and there are some valuable climatic adaptations in this design. However, it could be improved with additional strategies such as connection to culture, and use of less standard forms and materials. Overall, this is a successful vernacular landscape, but areas for improvement include the housing design and cultural integration.

INTERVIEW WITH PATRICK JUDD

In the course of this study, an interview with Patrick Judd, Senior Manager of ECT, a Landscape Architecture and Green Infrastructure Studio in Ann Arbor, was conducted about the Pokagon Band of the Potawatomi, and their ongoing residential and commercial developments in Michigan. Judd is a Landscape Architect who has experience working on various projects with the Pokagon, including this one, so he was able to provide some insight into the modern living conditions of local indigenous people and their relationship to vernacular.

This interview focused mainly on the tribal village Hartford, as well as the band headquarters in Dowagiac. According to Judd, the process of designing with a tribe is very similar to designing with any other client, in that the designer must be receptive and adaptive to the client's needs. As a Caucasian man, Judd talks about the importance of being a conduit to the process, and not trying to take over with assumptions of the client's needs. He discusses hammy design approaches such as making a building shaped like a canoe, and how this design would be based on assumptions of what the client wants, and not what they actually want. In terms of his own role, Judd says, "I just consider myself a sous chef."

Judd talks about the priorities of the Pokagon, and how they value community and communal living, and the relationship to casino, as both a livelihood and a cultural facet. There are different values and opinions held among tribe members, which can be looked at in the categories of those who love the casino and embrace modernity, those who are more traditional and are somewhat opposed to it, and those with Catholic beliefs. These three may have very different opinions on priorities and solutions, so it can be a challenge to find strategies that please everyone.

In terms of the building conditions, Judd says that the Pokagon highly value natural materials and authenticity, such as stone and wood, and don't want to see any imitation materials in their projects. Black ash wood is particularly important, as both a local material historically used for making baskets, and as a connection to culture. Other priorities include the houses facing cardinal directions, and views out onto the natural systems. Judd included rain gardens in his landscape design, and he says that while some enjoy

the feature, others do not care for it or upkeep it.

In many respects, the houses are very "Westernized", with typical American yards and forms. The houses look fairly generic, but an expression of culture is shown through the design of buildings such as community centers and other gathering places. However, Judd states that the Pokagon have great appreciation for high performance buildings, and efficient energy use. They also appreciate fire, as both a natural heating method, an outdoor gathering space, and an environmental tool for controlled burns in the area.

While very different from early Native American architecture, Pokagon housing does exhibit properties of vernacular architecture. There is a focus on real, local materials, as well as high performance buildings and the use of fire as a heating method, which applies to the climate portion of vernacular design, as well as the local materials and building systems. Relation to place is maintained through attention to cardinal directions, and scheduled burns to care for the landscape, which also engages aspects of craft and building systems. Lastly, cultural and social elements are inherent to the design, in elements such as the communal tribal living structure and the connection to ancestral lands. While not as "purely" vernacular as early Native American housing, this development demonstrates methods of connecting to place while still utilizing modern comforts.

Fig. 7.16 (right top)
Pokagon site ground breaking
Fig. 7.17 (right bottom)
Pokagon typology exterior



DESIGN APPLICATION

POKEGON BAND OF POTAWATOMI
INDIANS TYPOLOGY DESIGN

8

DESIGN APPLICATION

In order to test the use and efficacy of the design framework, it has been used in study to try and improve the design typology of the Pokegon Edawat village. There are things that the design achieved successfully, particularly the site conditions, so this design focuses primarily on the housing element. Going further into history, The Pokegon Band of Potawatomi is a federally recognized tribe located in Michigan and Indiana, with the tribal headquarters located in Dowagiac, Michigan. As of 2014, the tribe had 4,990 members. They originated on the eastern coast at the base of the St. Lawrence River, but came to the Great Lakes area 500-800 years ago during the Great Migration. They are the only Potawatomi tribe still living in the area, after the Indian Removal Act displaced all the other bands after the 1830s. Today, they have a land base of 4,700 acres, and frequently utilize the architect Seven Generation Architecture + Engineering on projects.

The Pokegon Band falls into the Humid Mid-Latitude zone of the climatic framework, which means that the design must be equipped for temperate seasons and ample precipitation. Adaptations of solar energy collection, fire heating, local wood, and cross ventilation will be most effective.

Looking back to historical typologies, the Pokegon primarily lived in wigwams. These can be built with many materials, such as animal hide, brush, and reeds, but the Pokegon used birch bark. Trees are very culturally important to the Pokegon, particularly the sacred black ash tree, and they are used for both basket weaving and construction. The Pokegon engage in many efforts to preserve these trees, such as an initiative where they release wasps, acquired from the USDA, into the area to eat the emerald ash borers and protect the trees. They also hold tree planting events. Using birch bark as a material in this design brings a cultural connection as well as a cost and sustainability factor, as bark is a waste product, and each year landfills in the US collect around 12 million tons of wood waste, which could be put to use. Additionally, these wigwams would be dome shaped and utilize fire heating, which this design will also apply. Historically, the village structure would involve clustered wigwams around a communal space, typically with a larger outdoor fire. This created a community space among the individual homes.

This design utilizes a domed timber structure for increased energy efficiency, increased air flow, resistance to natural forces, and use of solar heat gain; bark shingles for utilization of a waste product material, lack of chemicals, powerful insulation, longevity of 75+ years, and no staining requirement; and ash tree inclusion and planting for cultural significance, increased soil quality, and providing a natural habitat for wildlife. To improve the site plan from the original, this design includes a circular park, representative of the outdoor community space utilized in historical Pokegon villages, surrounded by a car park ring. The individual houses surround the car park at a distance, allowing more personal forest space and making the design much less automotive orientated than the original. However, they cannot be too far away, as this community includes many elderly members.

Other features of the design include solar panels, two fireplaces with a large joint chimney to provide radiant heat, window placement for cross-ventilation, better air circulation from the timber dome form, and the insulative bark material.

As a critique, this design was not as informed by tribal involvement as it would ideally be, and the landscape features are not very significant. This could be improved by integrating features of the existing design, such as bioswales, rain gardens, controlled burns, and forest stewardship.



Fig. 8.01 Humid mid-latitude framework



EXISTING SITE



NEW SITE

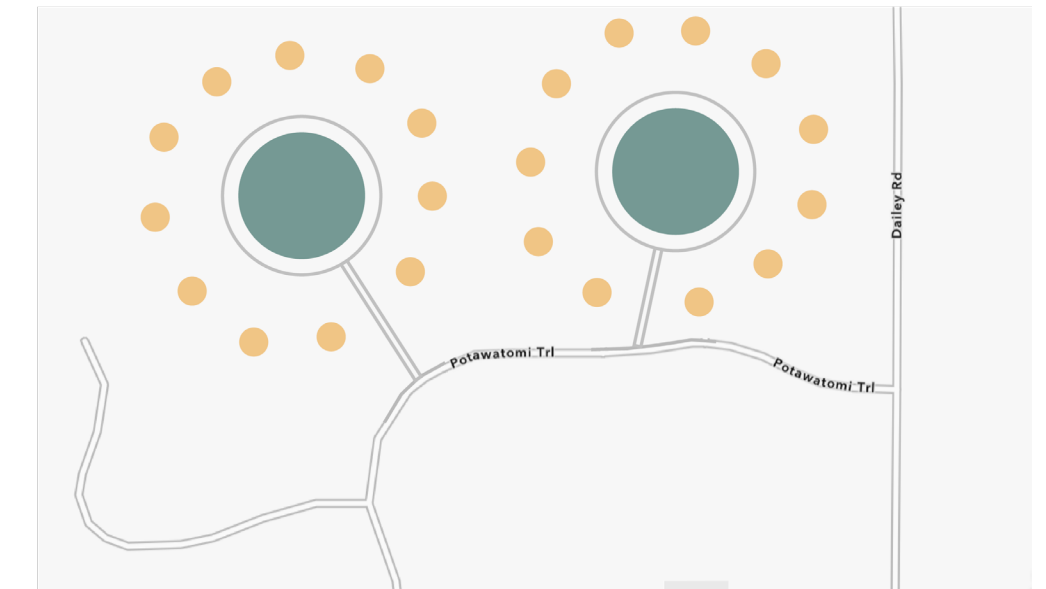
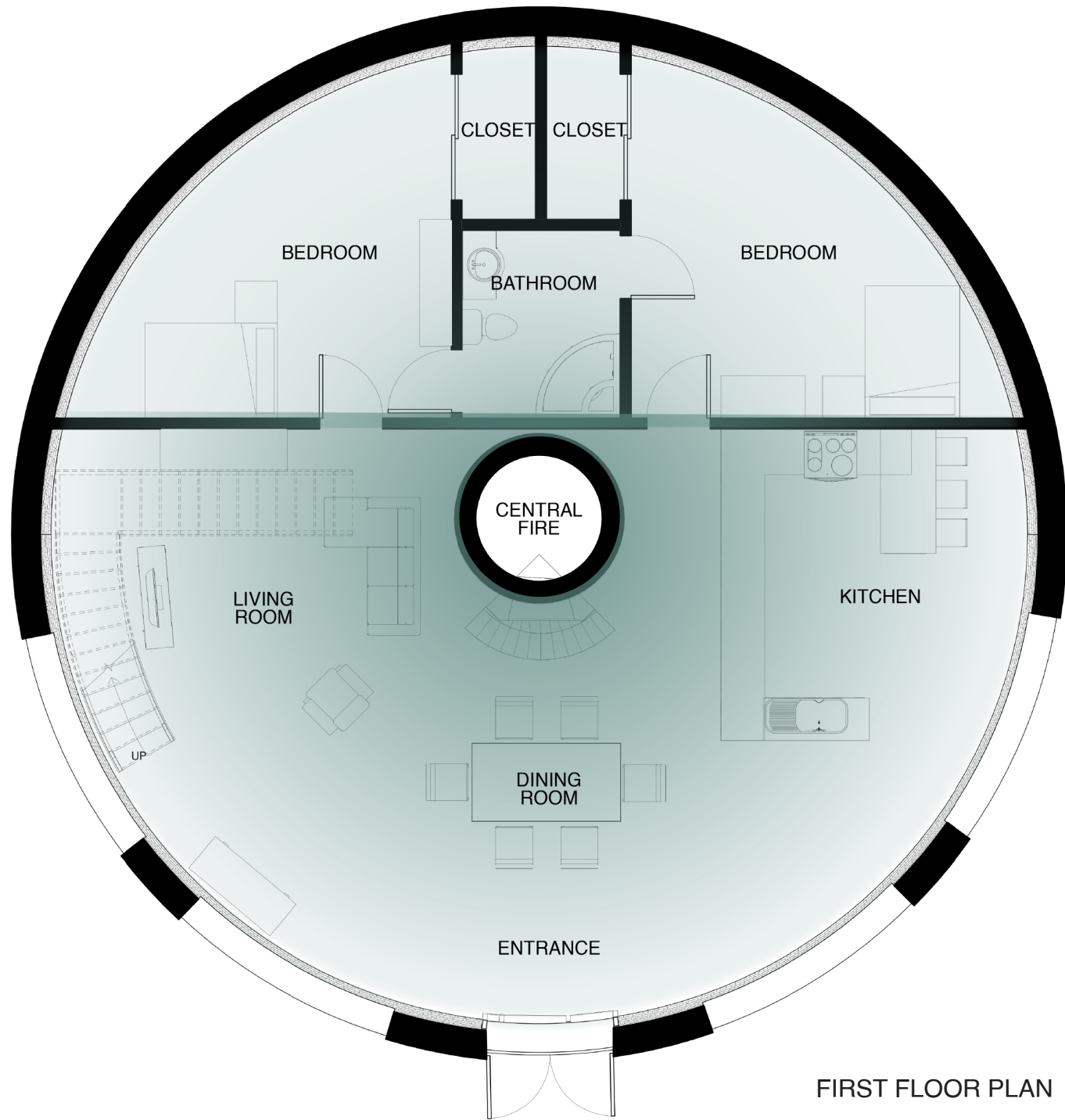


Fig. 8.02-8.07 (left, top to bottom) Historic photos

Fig. 8.08-8.09 (top to bottom) Site plans

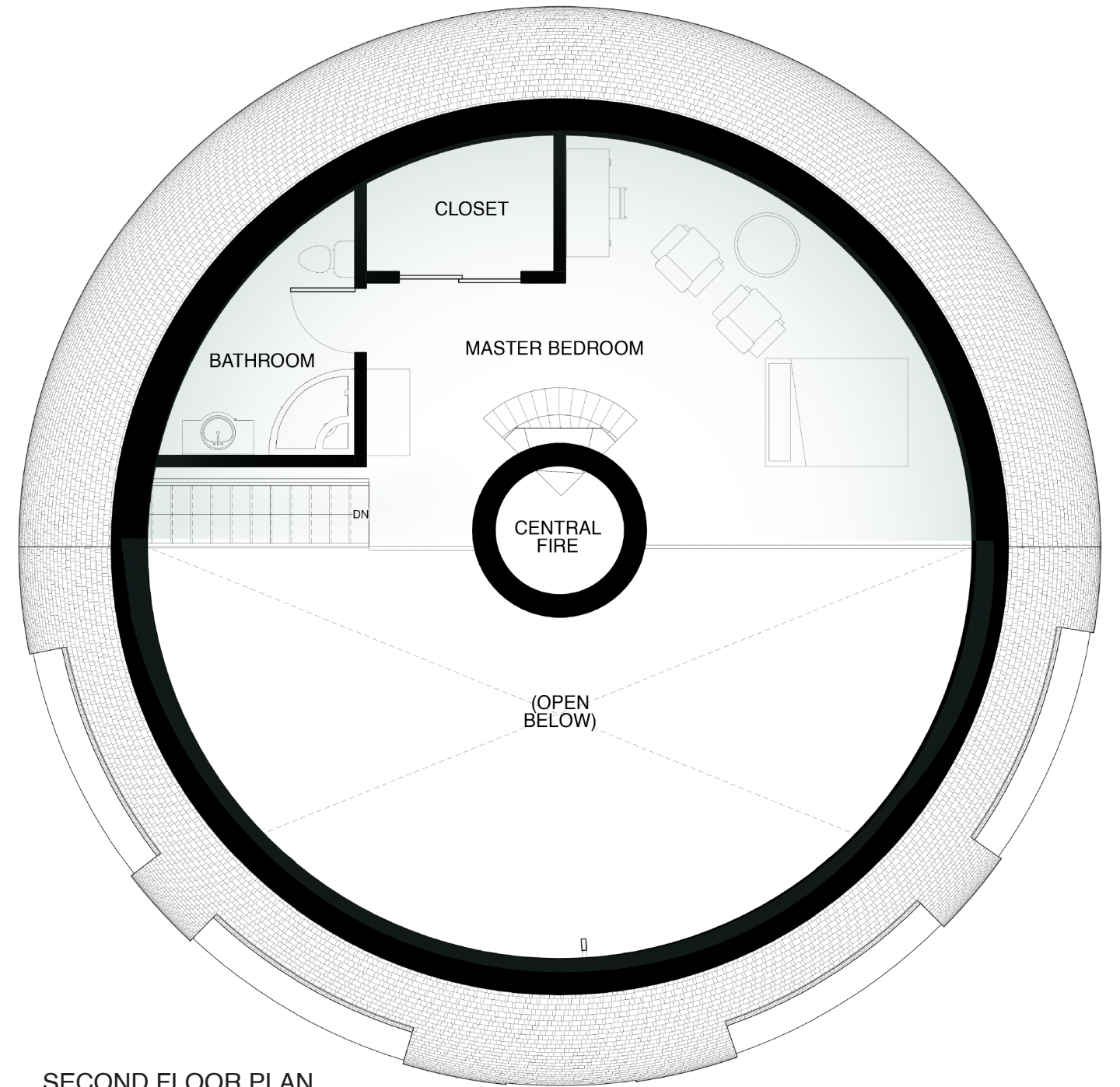
PRIVATE

SHARED



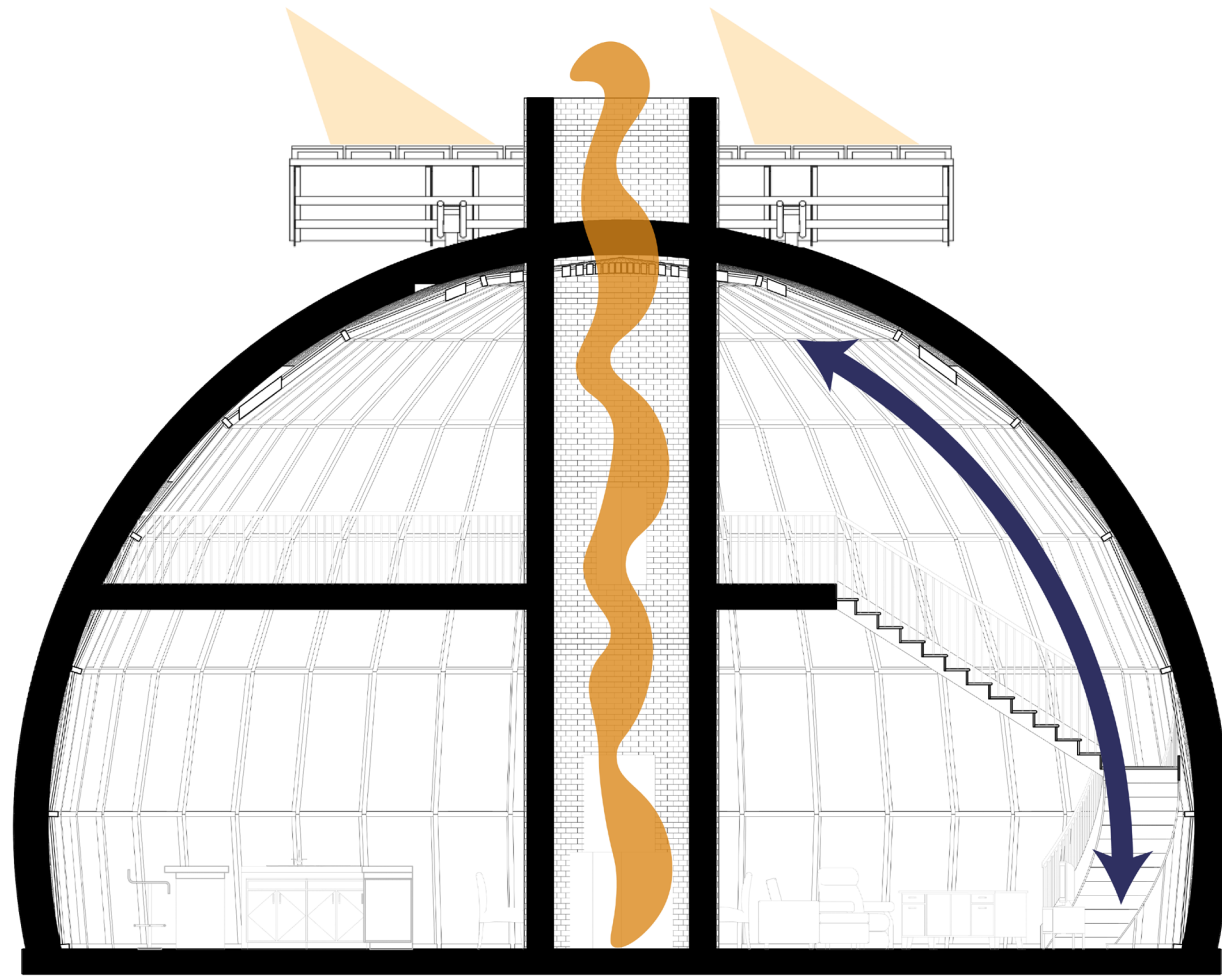
FIRST FLOOR PLAN

Fig. 8.10 First floor plan

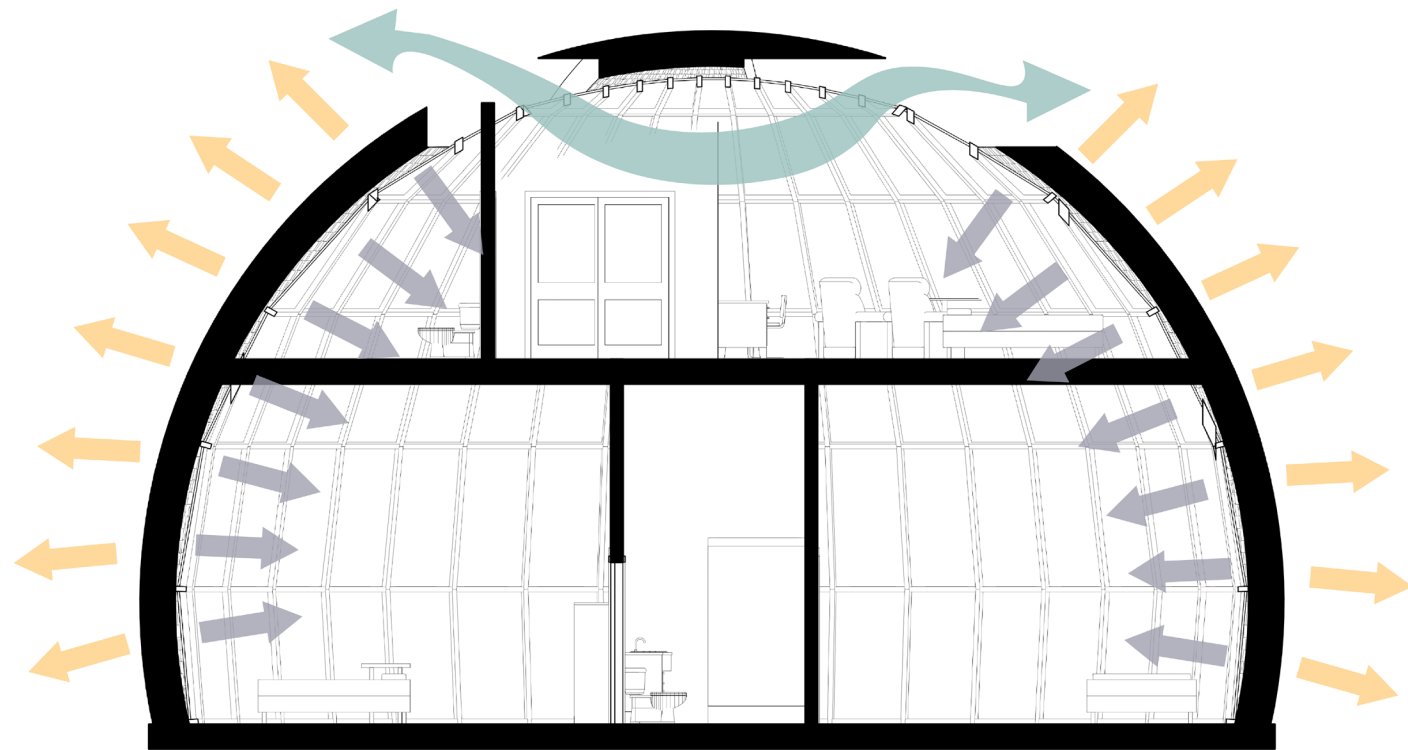


SECOND FLOOR PLAN

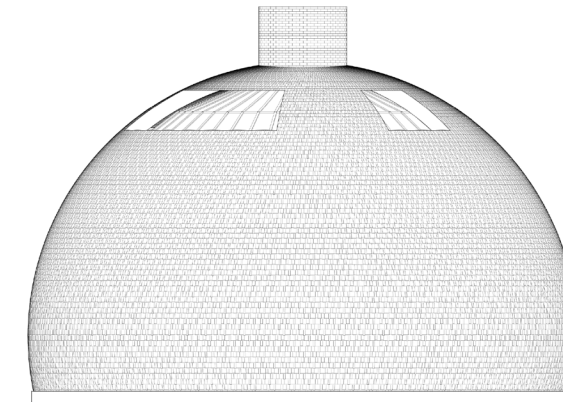
Fig. 8.11 Second floor plan



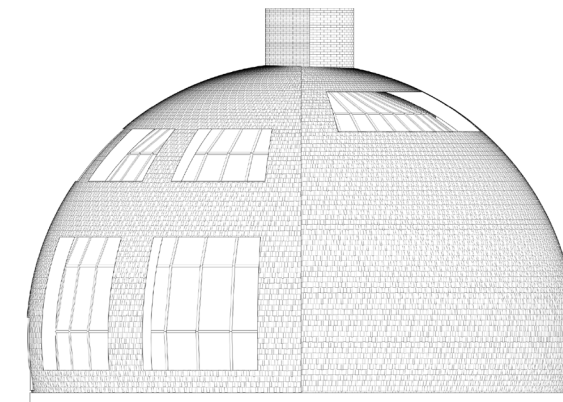
N-S SECTION NTS Fig. 8.12 N-S section



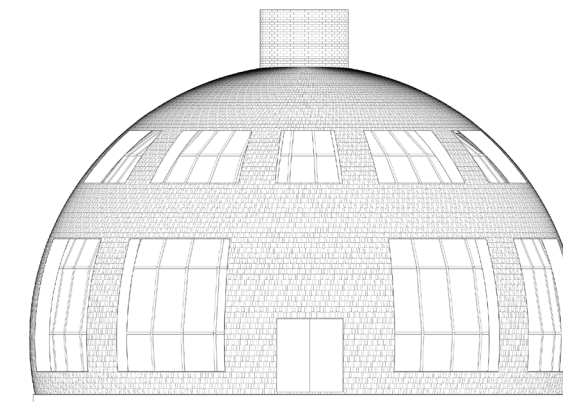
S-N SECTION NTS Fig. 8.13 S-N section



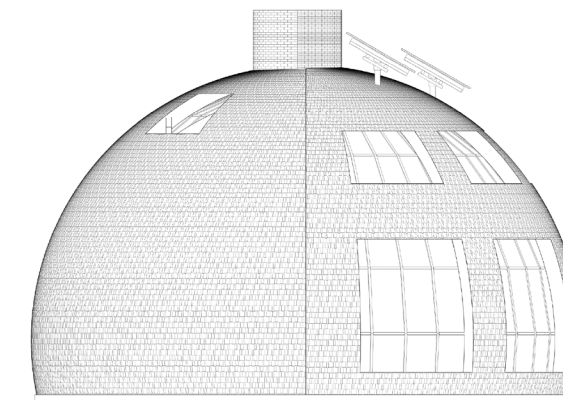
NORTH ELEVATION NTS



EAST ELEVATION NTS

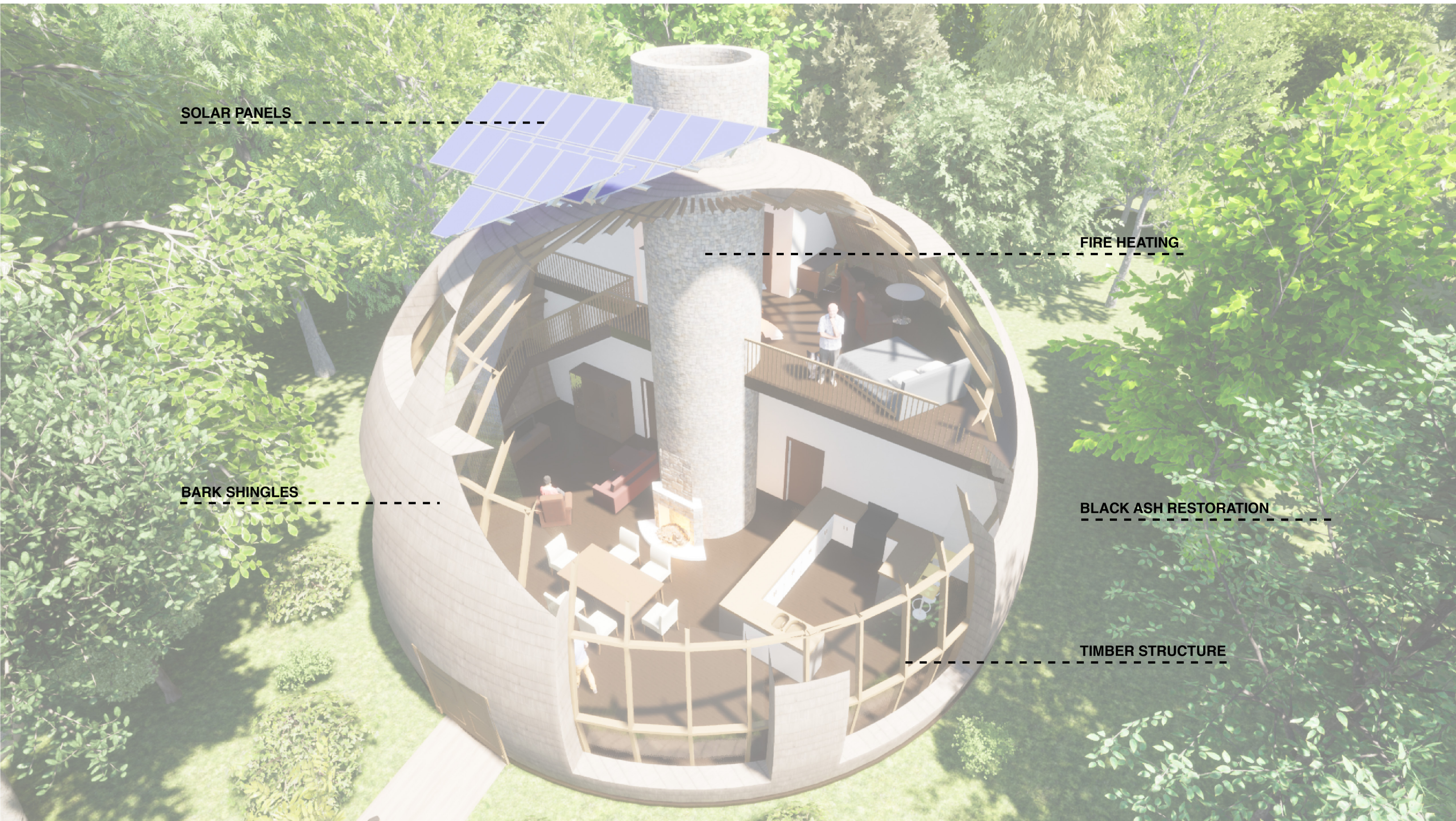


SOUTH ELEVATION NTS



WEST ELEVATION NTS

Fig. 8.14 (right) Elevations



SOLAR PANELS

FIRE HEATING

BARK SHINGLES

BLACK ASH RESTORATION

TIMBER STRUCTURE

Fig. 8.15 Rendered section

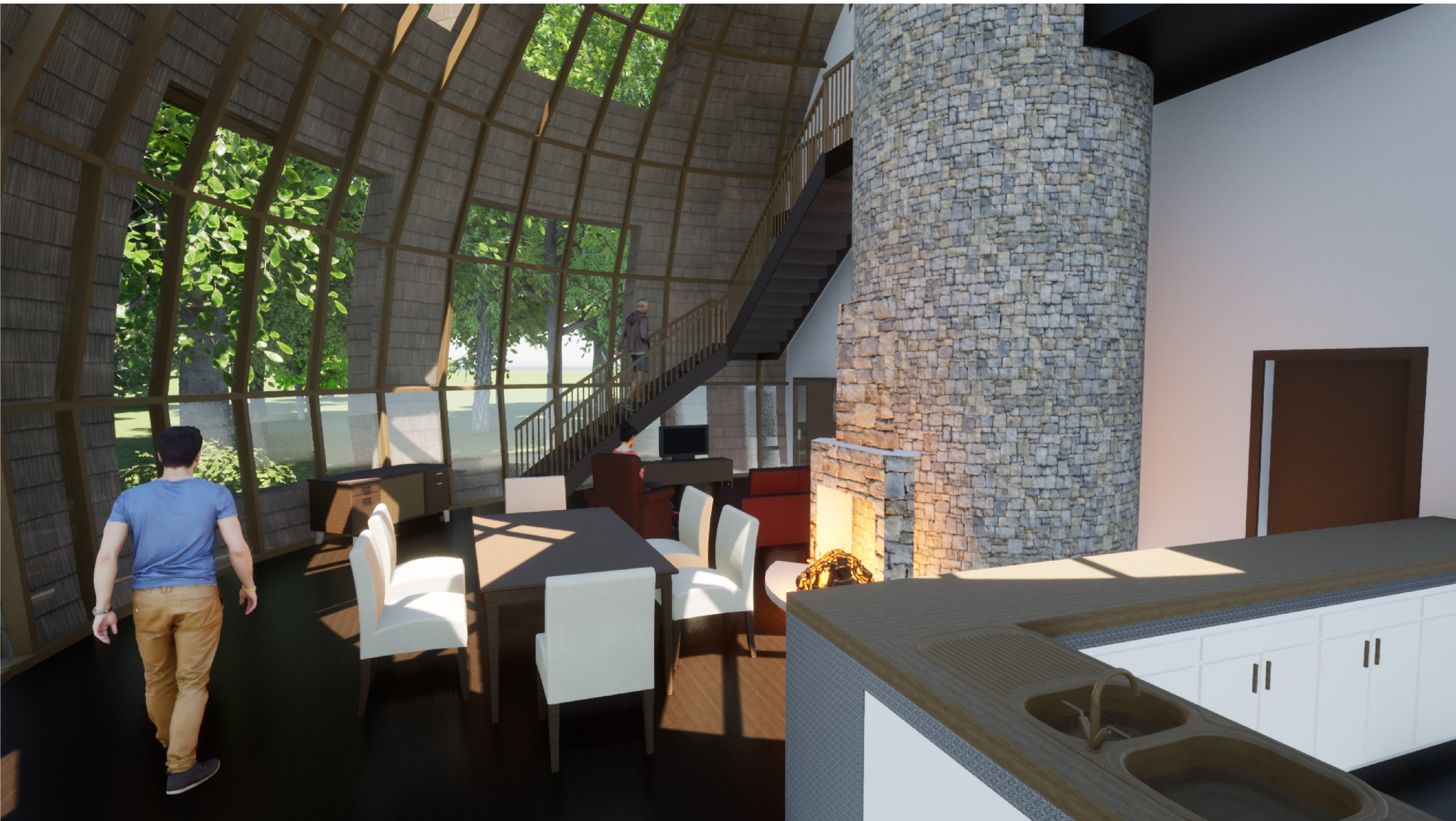


Fig. 8.16 Interior render



Fig. 8.17 Interior render



Fig. 8.18 Exterior render

CONCLUSIONS

This thesis argues that while the use of vernacular housing is still an interest and priority to Native American populations, there are many obstacles to its execution. Factors such as lost knowledge and craft, displacement, lack of funding and power, societal norms, and allotment of inferior housing options have been explored in this study as the detriment to Native American vernaculars. If architecture is a reflection of culture and identity, then the forced assimilation, cultural erosion, and widespread hostility faced by Native populations in the last few centuries can be seen to have a huge impact on architectural expression. This investigation has revealed that although many tribes have the vision and desire for vernacular housing, this may not always be the case, and it should not be assumed that all Native Americans will have the same sense of identity or desire to express it through architecture. Some simply wish to have better housing conditions, and improve on the quality which many subsidized options provide.

This is why the concept of self-determination is so important to this thesis. It is valuable to learn from the history and modern-day use of Native American vernaculars, but ultimately it is not the role of an academic study to tell Native people what they should want, or what their future in architecture will look like. This thesis has unveiled ways that tribes can be more engaged with their built environment, such as working with sustainability grants, integration into the HUD housing process, and community driven projects. These are all ways in which the individuals can take back the power in their relationship to place, and utilize whatever design approach they see fit. This demonstrates that the real beauty of the Native American vernacular is the having the power to engage with the context, and bring your own identity to the place where you live. Are Native American vernaculars gone forever? Absolutely not, but this relationship may never be reflected the way it once was. The real priority is that Native American people have the ability to once again control their own narrative and expression.

The design framework achieved in this thesis can help direct a relationship to place in design, as informed by Native American vernaculars. This approach has huge potential in the lens of sustainability, and for the future of eliminating placeless, globalized architecture.

While the applications in this study have focused on tribal projects, this framework can be translated to a multitude of contexts and cultural backgrounds. The important thing is to take into account the location, and how to work with it rather than against it. Sustainability is a very relevant topic in architecture right now, and adding an aspect of personalization and engagement with the occupants and site is a valuable way to enrich environment focused design. Some may consider theories of vernacular architecture to be stuck in the past, but critical analysis and design application have revealed valuable possibilities in the future of architecture.

10

Fig. 2.01 Säynätsalo Town Hall (1951) by Alvar Aalto, example of Critical Regionalism given by Kenneth Frampton (from <https://visit.alvaraalto.fi/app/uploads/2018/05/aalto-sacc88ynacc88tsalon-kunnantalo-visit-jyvacc88skylacc88-tero-takalo-eskola-1-1400x806.jpg>)

Fig. 2.02 Bagsværd Church (1976) by Jørn Utzon, example of Critical Regionalism given by Kenneth Frampton (from <https://i0.wp.com/archeyes.com/wp-content/uploads/2016/04/church-Bagsvaerd-jorn-utzon-6.jpg?fit=1250%2C680&ssl=1>)

Fig. 2.03 The Glass House (1948-1949) by Philip Johnson (from <https://cdn.britannica.com/42/7942-050-7C9EFEC2/Interrelation-space-Harmony-landscape-exterior-interior-design-1949.jpg?w=690&h=388&c=crop>)

Fig. 2.04 The Bauhaus (1925-1926) by Walter Gropius (from https://static.dezeen.com/uploads/2018/10/bauhaus_weimar_school_walter_gropius_dezeen_2364_col_6.jpg)

Fig. 2.05 The Seagram Building (1958) by Mies van der Rohe (from https://static.wikia.nocookie.net/skyscraper-shighrise-buildings/images/a/a0/Seagram_Building.jpeg/revision/latest?cb=20201106024308)

Fig. 2.06 The Duck and the Decorated Shed, Learning from Las Vegas (from Learning from Las Vegas Venturi, Robert, et al. Learning from Las Vegas. The MIT Press, 2017.)

Fig. 2.07 Cottage Drawing, The Architecture of Country Houses (from The Architecture of Country Homes Downing, Andrew Jackson. The Architecture of Country Houses. Da Capo Press, 1968.)

Fig. 2.08 Vernacular diagram
Authored by Sabine Ducharme

Fig. 3.01 Columbus meeting Ferdinand II and Isabella I (from https://cdn11.bigcommerce.com/s-yzgoj/images/stencil/1280x1280/products/1637953/4092238/apibnnhzi__82860.1626750286.jpg?c=2)

Fig. 3.02 Map of American voyages
Altered by Sabine Ducharme (from <https://cdn.britannica.com/79/64879-050-96829EE4/Knowledge-region-Mississippi-River-explorers-west-nations.jpg>)

Fig. 3.03 Hernando de Soto in America (from <https://cdn.britannica.com/21/70221-050-D7F3A98C/Hernando-de-Soto-atrocities-engraving-Indians-Florida-1591.jpg?w=690&h=388&c=crop>)

Fig. 3.04 Christopher Columbus in America (from https://www.history.com/.image/t_share/MTYxNjcxOTYzOTkzOTc0MDYy/colonization-getty-586122346.jpg)

Fig. 3.05 Map of early explorations
Altered by Sabine Ducharme, from <https://cdn.britannica.com/61/103661-050-2CDC5259/Map-exploration-European-New-World-voyages-others.jpg>)

Fig. 3.06 (both pages)
Timeline of Native lands and policies
Authored by Sabine Ducharme

Fig. 3.07 Historical Native American materials and construction methods
Authored by Sabine Ducharme, photos from Native American Architecture Nabokov, Peter, and Robert Olney Easton. Native American Architecture. Oxford University Press, 1990.)

Fig. 3.08 Sears Modern Houses catalogue entry (from <http://www.searsarchives.com/homes/1908-1914.htm>)

Fig. 3.09 (both pages)
Map of selected historical typologies
Authored by Sabine Ducharme, photos from Native American Architecture Nabokov, Peter, and Robert Olney Easton. Native American Architecture. Oxford University Press, 1990.)

Fig. 4.01-4.04 Demographic diagrams
Authored by Sabine Ducharme

Fig. 4.05 Population density map
Authored by Sabine Ducharme

Fig. 4.06 Living conditions diagram
Authored by Sabine Ducharme

Fig. 4.07 Reservation housing deterioration diagram
Authored by Sabine Ducharme

Fig. 4.08
Transitional House (1960s) Rosebud Sioux South Dakota (from <https://history.sd.gov/preservation/docs/SDIndianHousing.pdf>)

Fig. 4.09
Three Bedroom Housing (1960s) Yankton Sioux South Dakota (from <https://history.sd.gov/preservation/docs/SDIndianHousing.pdf>)

Fig. 4.10 SD-2 House (1970s) Standing Rock Sioux South Dakota (from <https://history.sd.gov/preservation/docs/SDIndianHousing.pdf>)

Fig. 4.11
Tribal Self-Determination matrix
Authored by Sabine Ducharme

Fig. 4.12
HUD process recommendations diagram
Authored by Sabine Ducharme

Fig. 5.01-5.03
Heating and cooling data results
Authored by Sabine Ducharme, using data from Nguyen, Anh Tuan, et al. "Studies on Sustainable Features of Vernacular Architecture in Different Regions across the World: A Comprehensive Synthesis and Evaluation." *Frontiers of Architectural Research*, Elsevier, 20 Sept. 2019, <https://www.sciencedirect.com/science/article/pii/S2095263519300603>.

Fig. 5.04
Climatic zone map
Authored by Sabine Ducharme, using data from Nguyen, Anh Tuan, et al. "Studies on Sustainable Features of Vernacular Architecture in Different Regions across the World: A Comprehensive Synthesis and Evaluation." *Frontiers of Architectural Research*, Elsevier, 20 Sept. 2019, <https://www.sciencedirect.com/science/article/pii/S2095263519300603>.

Fig. 5.05
Material data results
Authored by Sabine Ducharme, using data from Nguyen, Anh Tuan, et al. "Studies on Sustainable Features of Vernacular Architecture in Different Regions across the World: A Comprehensive Synthesis and Evaluation." *Frontiers of Architectural Research*, Elsevier, 20 Sept. 2019, <https://www.sciencedirect.com/science/article/pii/S2095263519300603>.

Fig. 6.01 (right)
Cultural and climatic framework diagrams
Authored by Sabine Ducharme

Fig. 6.02 Design framework
Authored by Sabine Ducharme

Fig. 7.01 Historic Pomo winter shelter (from <https://www.mendorailhistory.org/images/redwoods/pomo/pomo-Camp.jpg>)

Fig. 7.02 Pomo housing typology exterior (from <https://i0.wp.com/www.dailycal.org/assets/uploads/2012/09/09.25.design.ryanshelby.jpg?ssl=1&w=900>)

Fig. 7.03-7.04 Straw bale construction photos (from https://www.mdpi.com/sustainability/sustainability-04-00794/article_deploy/html/images/sustainability-04-00794-g017-1024.png)

Fig. 7.05 Pomo typology elevation (from <https://lacoassociates.us/wp-content/uploads/2019/06/Pinoleville-Elevation-for-House-A-Residential-Designsm.jpg>)

Fig. 7.06-7.07 Interior and exterior finish photos (from https://indiancountrytoday.com/.image/t_share/MTU4NDEyMzgzMzkxMzkzNzI3/pinoleville_homes.jpg)

Fig. 7.08 Pomo typology construction process (from https://www.mdpi.com/sustainability/sustainability-04-00794/article_deploy/html/images/sustainability-04-00794-g016-1024.png)

Fig. 7.09 West coast marine framework
Authored by Sabine Ducharme

Fig. 7.10 Cheyanne typology exterior (from <https://jamessobczak.info/home/?/Volunteer/straw-bale-house/>)

Fig. 7.11 Cheyanne typology construction (from <https://jamessobczak.info/home/?/Volunteer/straw-bale-house/>)

Fig. 7.12 High-altitude framework
Authored by Sabine Ducharme

Fig. 7.13 Pokegon typology exterior (from <https://www.slideshare.net/MarkParrish2/edawat-hud-casestudypokagon>)

Fig. 7.14 Pokegon Edawat site (from <https://www.slideshare.net/MarkParrish2/edawat-hud-casestudypokagon>)

Fig. 7.15 Humid mid-latitude framework
Authored by Sabine Ducharme

Fig. 7.16 (right top)
Pokegon site ground breaking
Fig. 7.17 (right bottom)
Pokegon typology exterior (from <https://www.slideshare.net/MarkParrish2/edawat-hud-casestudypokagon>)

Fig. 8.01 Humid mid-latitude framework
Authored by Sabine Ducharme

Fig. 8.02-8.07 Historic photos (from Native American Architecture Nabokov, Peter, and Robert Olney Easton. Native American Architecture. Oxford University Press, 1990.)

Fig. 8.08-8.09 Site plans
Authored by Sabine Ducharme

Fig. 8.10 First floor plan
Authored by Sabine Ducharme

Fig. 8.11 Second floor plan
Authored by Sabine Ducharme

Fig. 8.12 N-S section
Authored by Sabine Ducharme

Fig. 8.13 S-N section
Authored by Sabine Ducharme

Fig. 8.14 Elevations
Authored by Sabine Ducharme

Fig. 8.15 Rendered section
Authored by Sabine Ducharme

Fig. 8.16 Interior render
Authored by Sabine Ducharme

Fig. 8.17 Interior render
Authored by Sabine Ducharme

Fig. 8.18 Exterior render
Authored by Sabine Ducharme

“Andrew Jackson Downing.” Andrew Jackson Downing - History of Early American Landscape Design, https://heald.nga.gov/mediawiki/index.php/Andrew_Jackson_Downing.

Barber, Megan. “Want a Prefab House? Here’s Everything You Need to Know.” Curbed, Curbed, 2 Mar. 2020, <https://archive.curbed.com/2020/3/2/21142898/modular-prefab-homes-house-build-cost>.

“Bringing Shelter to the Reservation.” Los Angeles Times, Los Angeles Times, 19 Sept. 2004, <https://www.latimes.com/archives/la-xpm-2004-sep-19-adna-redfeather19-story.html>.

Cutieru, Andreea. “Re-Evaluating Critical Regionalism: An Architecture of the Place.” ArchDaily, ArchDaily, 9 Aug. 2021, <https://www.archdaily.com/966401/re-evaluating-critical-regionalism-an-architecture-of-the-place>.
DeepDove. “Add IMG.” Critical Regionalism, <https://www.criticalregionalism.com/>.

Downing, Andrew Jackson. *The Architecture of Country Houses*. Da Capo Press, 1968.

Enochs, Kevin. “The Real Story: Who Discovered America.” VOA, *The Real Story: Who Discovered America*, 10 Oct. 2016, <https://www.voanews.com/a/who-discovered-america/3541542.html#:~:text=Christopher%20Columbus%20is%20credited%20with%20discovering%20the%20Americas%20in%201492>.

Hesson, Robert. “Andrew Jackson Downing and the Sociologically Conceived Plan - Architectural Theory.” Northern Architecture, 25 Feb. 2022, <https://www.northernarchitecture.us/architectural-theory/andrew-jackson-downing-and-the-sociologically-conceived-plan.html>.
“History and Heritage: The Northern Cheyenne - Soaring Eagle Charity.” Soaring Eagle, <https://soaringeagle.org/history-and-heritage/#:~:text=The%20Northern%20Cheyenne%20were%20once,and%20appreciation%20for%20the%20land>.

Hornstein, Shelley. *Losing Site: Architecture, Memory and Place*. Ashgate, 2013.

Hosagrahar, Jyoti. *Indigenous Modernities: Negotiating Architecture and Urbanism*. Routledge, 2009.

“International Style.” *Architecture & Design Dictionary* | Chicago Architecture Center, <https://www.architecture.org/learn/resources/architecture-dictionary/entry/international-style/>.

“International Style.” Encyclopædia Britannica, Encyclopædia Britannica, Inc., <https://www.britannica.com/art/International-Style-architecture>.
“The Iroquoians of Huronia.” Encyclopædia Britannica, Encyclopædia Britannica, Inc., <https://www.britannica.com/topic/Native-American/The-Iroquoians-of-Huronia>.

Kiddle, Rebecca, et al. *Our Voices: Indigeneity and Architecture*. ORO Editions, 2018.

Kohlstedt, Kurt. “Lessons from Sin City: The Architecture of ‘Ducks’ versus ‘Decorated Sheds.’” 99% Invisible, 1 Jan. 1970, <https://99percentinvisible.org/article/lessons-sin-city-architecture-ducks-versus-decorated-sheds/>.

Krinsky, Carol Herselle. *Contemporary Native American Architecture: Cultural Regeneration and Creativity*. Oxford University Press Inc, USA, 1997.
Kronenberg, Arthur. *Portable Architecture*. Wiley, 1998.

Malnar, Joy Monice, and Frank Vodvarka. *New Architecture on Indigenous Lands*. University of Minnesota Press, 2013.

May, John, and Anthony Reid. *Buildings without Architects: A Global Guide to Everyday Architecture*. Ivy Press, 2013.

Mumford, Lewis. *Sticks and Stones: A Study of American Architecture*. Dover, 1955.

Nabokov, Peter, and Robert Olney Easton. *Native American Architecture*. Oxford University Press, 1990.

“Native American Societies before Contact (Video).” Khan Academy, Khan Academy, <https://www.khanacademy.org/humanities/us-history/precontact-and-early-colonial-era/before-contact/v/native-american-societies-before-contact>.

Nguyen, Anh Tuan, et al. “Studies on Sustainable Features of Vernacular Architecture in Different Regions across the World: A Comprehensive Synthesis and Evaluation.” *Frontiers of Architectural Research*, Elsevier, 20 Sept. 2019, <https://www.sciencedirect.com/science/article/pii/S2095263519300603>.

Olgiati, Valerio, and Markus Breitschmid. *Non-Referential Architecture Ideated by Valerio Olgiati – Written by Markus Breitschmid*. Park Books, 2019.
“Our History.” Pinoleville Pomo Nation, <https://pinoleville-nsn.gov/heritage/our-history/>.

“Pinoleville Straw Bale Housing.” LACO Associates, <https://lacoassociates.us/projects/pinoleville-straw-bale-housing/>.

“Railroads in the Late 19th Century : Rise of Industrial America, 1876-1900 : U.S. History Primary Source Timeline : Classroom Materials at the Library of Congress : Library of Congress.” The Library of Congress, <https://www.loc.gov/classroom-materials/united-states-history-primary-source-timeline/rise-of-industrial-america-1876-1900/railroads-in-late-19th-century/>.

Rifkin. *A Field Guide to American Architecture*. Bonanza, 1984.

Sam Vong, June 3. “The Impact of the Transcontinental Railroad on Native Americans.” National Museum of American History, 4 Jan. 2022, <https://americanhistory.si.edu/blog/TRR>.

Scott Sidler Founder & Editor-in-Chief I love old houses. “The History of Sears Kit Homes.” *The Craftsman Blog*, 9 Aug. 2021, <https://thecraftsmanblog.com/the-history-of-sears-kit-homes/>.

Seltenrich, Nate. “Indian Country Leading Green-Building Revolution.” *Indian Country Today*, Indian Country Today, 14 May 2013, <https://indiancountrytoday.com/archive/indian-country-leading-green-building-revolution>.

Shelby, Ryan, et al. “Partnering with the Pinoleville Pomo Nation: Co-Design Methodology Case Study for Creating Sustainable, Culturally Inspired Renewable Energy Systems and Infrastructure.” *MDPI, Molecular Diversity Preservation International*, 25 Apr. 2012, <https://www.mdpi.com/2071-1050/4/5/794/htm>.

Staff, Ally Rondoni I, and Ally Rondoni. “Collaboration between Students, California Indian Nation Culminates in Development of New Houses.” *The Daily Californian*, 25 Sept. 2012, <https://www.dailycal.org/2012/09/24/collaboration-between-students-native-american-nation-culminates-in-development-of-new-houses/>.

Szacka, Léa-Catherine. “Critical Regionalism for Our Time.” *Architectural Review*, 30 Mar. 2021, <https://www.architectural-review.com/essays/critical-regionalism-for-our-time>.

Szacka, Léa-Catherine. “Critical Regionalism for Our Time.” *Architectural Review*, 30 Mar. 2021, <https://www.architectural-review.com/essays/critical-regionalism-for-our-time>.

Tomasulo, Katy. “Project Spotlight: Straw-Bale Homes Provide Shelter for Native American Families in Need.” *Architect*, 18 Aug. 2009, https://www.architectmagazine.com/technology/project-spotlight-straw-bale-homes-provide-shelter-for-native-american-families-in-need_o.

Venturi, Robert, et al. *Learning from Las Vegas*. The MIT Press, 2017.

Watson, Julia, and Wade Davis. *Lo-Tek: Design by Radical Indigenism*. Taschen, 2020.

Wilde, Robert. “How the Railways Burst into Life during the Industrial Revolution.” *ThoughtCo*, ThoughtCo, 28 May 2019, <https://www.thoughtco.com/railways-in-the-industrial-revolution-1221650>.

Woodward, Aylin. “European Colonizers Killed so Many Indigenous Americans That the Planet Cooled down, a Group of Researchers Concluded.” *Business Insider*, Business Insider, 9 Feb. 2019, <https://www.businessinsider.com/climate-changed-after-europeans-killed-indigenous-americans-2019-2>.

APPENDIX A

INTERVIEW WITH PATRICK JUDD, ECT

12

Sabine Ducharme

There we go. Okay. So to give you a little bit more context about what I'm going for, my thesis is on vernacular architecture. So I'm looking into sort of architecture that has ties with the place and its climate and its culture. And I'm focusing specifically on American vernaculars, so I've been looking a lot at Native American architecture. That's kind of why I'm interested in this project.

Patrick Judd

Great.

Sabine Ducharme

Yeah. So I guess I just wanted to ask you kind of like about the design process and sort of how that worked with the client and what they were specifically going for.

Patrick Judd

Yeah. I'd have to... because we had probably about a half dozen or so projects with both the Pokagon, but also we worked with the Saginaw Chippewa on putting together a design for their Tribal College. Geeze, this was on a living building challenge, but I'll get into that later. But for the most part, you know the process isn't too much different from typical design process. But in this instance, it's almost listening to what they have to say and kind of understanding some of the things that they may want or desire. Priorities may be different from the wants or desires of us as conventional European white people that came here.

Sabine Ducharme

Right.

Patrick Judd

And it's one of those things where they may not know design or what design is, but they know what's comfortable for them. And what they would like to see, and what is really important is kind of the family unit, and that is very important to them.

Sabine Ducharme

Right. More like a communal living service situation.

Patrick Judd

Yes, yeah. But not always, because the elderly housing, the Edawat villages that we designed for, the elderly want to be able to have their own homes as well and kind of be away from their children or

grandchildren.

Sabine Ducharme

Kind of like a generational thing.

Patrick Judd

Yeah. And it's almost as if at times, but they do want those shared spaces when it makes sense, whether it's at a community center or whether it's at, I'm trying to think, of the Powwow grounds. There are certain events that they come and participate in, but there's also that very important connection to understanding, passing down the stories and passing down the education and understanding as to who they are, where they came from, and what needs to take place.

Sabine Ducharme

Right. Yeah. I was looking at the Seven Gen architects their catalogue, and there was like a historical or like a cultural centre sort of thing.

Patrick Judd

Yeah. And what's interesting, though, with our experience, and this is probably somewhat true for many of the tribes here in Michigan, and maybe so throughout the US, that they do have casinos.

Sabine Ducharme

Yeah. You were talking about that, like it's sort of an important source of income.

Patrick Judd

Yeah. It's a source of income, but it's not a means to the end. What they want to be able to do is have enough money so that they can begin to invest in other ventures, into sustaining an economic base or market for the tribe, rather than dependence on the casino and the casino money. Yes, it brings in great money. It brings in a lot of money. And at the same time, it just has to be careful because they are regulated, how much money can be sent out to the citizens who are part of the tribe.

It's not like they make a ton of money one year and they disperse it all out equally amongst everybody, money has to be set aside for these other economic ventures. And so it's taken time, but it's slowly happening. But then there is the folks that are totally into casino, and that being part of the economic development. And there's those that are very much the traditionalist that wants to keep kind of the

the traditional aspects of the tribe alive. And then there's kind of the religious factions that are much more, you know, like I mentioned following more or less Catholic. And there's always some tension between all three. And so it's one of those things that just being aware of, because the architectural or the design process for one group might be different for another group.

So it's trying to merge all three of those together to come up with what is ultimately the design of the building or the grounds.

Sabine Ducharme

Right. Yeah. And you were talking about, there was a lot of sort of integration with the landscape. And I remember you had, like that sort of gathering area with the landscaping.

Patrick Judd

Yeah. Even how that is laid out is very important to them, because it's all based on the cardinal directions as well as the seasonal and also as to the type of plant material that is selected. So that certain types of plants are whether they're harvested in the spring or in the summer or even in the fall or even the winter, even for whether it's the fruit, the leaves, the sap from Maple trees or many other things. So it's really intertwined, and it really is all connected. So when you tug on one aspect of, let's say, a spider web, it does have an effect on other things. So you just have to be conscious of that, but they will tell you, you know.

Sabine Ducharme

Right, so there's a lot of integration. So when you are working with them, did they have like specific plants that they selected, that they wanted?

Patrick Judd

I have to think back... they have kind of a program list of what they wanted. So there really wasn't a design per se. The things you do want to avoid thinking about it, is we had worked with the Pokagon on a Cultural Centre.

Sabine Ducharme

Right.

Patrick Judd

And they had brought in an architect that they had worked with before, or had worked with other tribes

from Arizona. And so when they came on board and kind of listened to them, they really didn't listen to them, because what they came up with was kind of this building that was designed like a canoe that was upside down.

Sabine Ducharme

It was kind of like their interpretation of what they thought they would want.

Patrick Judd

Right. And it was something like, why a canoe? It's not like the symbology of something. It's kind of taken something for granted, just like people who have designed buildings that look like teepees.

Sabine Ducharme

It's just saying, like that's kind of all, you know about it and just going off that right.

Patrick Judd

Right, right, and so the design isn't necessarily something that is representing a structure or a feature, whether it's a wigwam or a long house, it has to be much more than that. But the elements and the structures that support it very much have some commonality to them. And so it's a matter of working with that as part of that design. And you may go through, I think we went through two or three iterations of some of the planning and the design we did, which is somewhat common in the design process anyway.

So it's like I'm working with the Charles Wright Museum, and it's probably very similar to working with the bands, is that I just consider myself a sous chef. They bring all the ingredients to the table. We assemble whatever the dish is going to be, or the course of the dinners are going to be, and they are the client, and they are the chefs, I would say.

Sabine Ducharme

Great, yeah. Something I wanted to ask was about, was maybe like certain materials or I don't know, any sort of ideas that they had about the house in particular, if you would happen to know that.

Patrick Judd

Yeah they kind of want authenticity. Don't try to replicate wood by stamping concrete, use wood, same with stone or rock. Don't use fake rock or fake materials. Use the material that it's intended for. And

it's from the materials, the colors, detectors, all of that are found within their tribal land. So what you see in southwest Michigan might be different from northern Michigan.

Sabine Ducharme

That's what I'm looking at, like the things that are specific to place.

Patrick Judd

Yup. That's very important to them. Like the Pokagon, what was big to them were black ash trees. Only because that is part of their basket making, and whether it was for artistic purposes to promote and sell as an enterprise, or it's just for functional, everyday carrying baskets around. But it shows that they're connected to the traditions that the black oak has provided them for millennium. And that also just part of that carrying down of the stories to the younger generation, that's why black oak.

Sabine Ducharme

Interesting. And what about maybe, like the orientation of the housing or like the amount of personal space for each house? Do they have any thoughts on that?

Patrick Judd

Yeah. They definitely want enough distance between each house, because they just didn't want to be viewed at or viewed out to see somebody else. And that's one of the reasons a lot of the views in the back windows were out to the natural systems. Same with the rain gardens, too. But at the same time, they're very Westernized, so to say, you know, they still mow their lawns. They still do regular maintenance on their homes. And it's nothing really too much different. You know, the one big thing, specifically with the Potawatomi and some of the tribes here in the I would say, the southeast, southwest portion of Michigan, all the way down into Indiana, Chicago, is the fire was very important to them. That was the other thing, too, is that wherever they had a gathering firewood had to be a component of that.

Sabine Ducharme

Are we talking like fireplaces in the home?

Patrick Judd

Fireplaces in the home, fireplaces outside at gathering areas, or even part of the landscape, the backyards where we did recreated the Prairie grasslands. Those

got managed by fire on an annual basis.

Sabine Ducharme

Interesting. Yeah. What about anything else particular about the building systems other than using firewood, in part as heating, just kind of more Western approach, sort of?

Patrick Judd

Well, they do understand what a high-performance building is. They understand that insulation is important to them, renewable energies are important to them. One of the tribal members at the Pokagon actually invested in a solar company to start to provide solar to a lot of the homes and facilities throughout not only the Pokagon, but other tribes in the area.

Sabine Ducharme

Is that like a solar field or more of, like a personal on the roof solar?

Patrick Judd

A little bit of both.

Sabine Ducharme

Little bit of both. Cool.

Patrick Judd

So it's kind of like, I don't know if you've been on down I-94 toward Battle Creek, where the Four Winds casino is right off the highway, there's like, maybe a half dozen or so solar arrays that actually rotate toward the sun. It's right there on the south side.

Sabine Ducharme

Great. I guess another question I would have is maybe about the relationship to the rain garden, like how that integrates, with the housing.

Patrick Judd

Some of the rain gardens were very well accepted and understood, that they needed care. They loved them, provided beauty, and it provided a benefit. As far as collecting the storm water, other tribal members could care less. Yeah, they got installed, but then they became weedy and they just removed them.

Sabine Ducharme

So kind of depends if they're interested. And for this particular project, they're currently adding onto it, right? Like they have the housing area and they're

adding more commercial areas.

Patrick Judd

Yeah. They continue to add the elderly housing. They also now have housing for the low income and affordable housing in the same neighborhood. They're in their own building and they're in the same neighborhood. But they're away from the elders. So there is some separation, not by much, but it's still enough separation.

Sabine Ducharme

Okay. So they're kind of expanding the housing first before doing any sort of commercial. And in the area that it is, is there, like, any commercial near it, or is it kind of far from everything?

Patrick Judd

The Pokagon are just outside of Dowagiac, which is their ancestral tribal ground. And so, yeah, they're still away from it all. But where their casinos are, they have actually purchased and built gas stations and mini marts at those gas stations, because they know that people coming and going from the casinos may need to fill up.

Sabine Ducharme

Right. It's probably kind of practical for them as well up there.

Patrick Judd

Right. It's one of those first interventions, as people are coming in to and from the casinos, because most of them are right off major highways. And so right where those major highways are service stations. Well, why not invest in a service station?

Sabine Ducharme

Another question I had is maybe, like, the approximate size, I wasn't too sure about? Like how many homes, how many people?

Patrick Judd

Oh that first phase, I think was 18 to 20 homes. And then it expanded to maybe 136 units, both single family and towns homes. And then there was four buildings outward quads. Yeah. It's becoming more dense.

Sabine Ducharme

Did they ever look at maybe, like, duplexes or apartment buildings? Are they interested in that sort

of thing.

Patrick Judd

Yeah. The townhomes that I mentioned, are the two are the duplexes.

Sabine Ducharme

Oh, oh they're duplexes.

Patrick Judd

And then the apartments or the quads are two-storey with upper and lower housing units connected by a central stairwell.

Sabine Ducharme

Great. Yeah. And one of those apartment buildings kind of look like they have, like, the kind of standard balcony?

Patrick Judd

Pretty standard.

Sabine Ducharme

Pretty standard. Okay. All right.

Patrick Judd

For most of the housing, it is high performance. You couldn't tell at times if it were a tribal home or not. But when you get into the casinos or the cultural centers and the administrative centers, just looking on Pokagon's website, you'll see a big difference.

Sabine Ducharme

Right, there's more like integration of the history and culture in those communal areas, but there's still the emphasis on the high performance and the more natural material. I guess another question I would have is for the landscape. Are there, like personal yards and do people kind of garden and do their own thing, or is it fairly standardized with the landscape?

Patrick Judd

Yeah. There's personal landscapes around their house. And there's no, I would say, communal vegetable gardens at the time, it could have changed by now. I know that on the one site in Dowagiac it was adjacent to an existing agricultural field, and so we recommended that they start that as enterprise of mixed crops, not just corn or soybean, but something much more specific to small grains or some of the traditional crops that they would have grown, but also

start thinking about using that as a pilot project that could feed into some of their other tribal lands that were large agricultural fields, in which case, looking at sustainable farming that then would feed into the casinos for the meals there that are being served at casinos.

Sabine Ducharme

Right. Sort of like integrated with the other things that they have going on. I did have a question about sort of like the way finding and that paths throughout the community, are there kind of like walking areas or how are things sort of connected in that way?

Patrick Judd

Yeah. There was very much an emphasis on safety and both walking and, I'm trying to picture, yeah, there were walking trails, both to connect to the housing development to the community center over in Dowagiac. Yeah. Just personal connections. I would say there's a lot of walkways and trails and also through I'm trying to think, the Paw Paw site did have a lot of trail systems through the natural areas. And then there was some of those trail systems that they really didn't want even the band to know about, told me from a medicinal standpoint or spiritual standpoint, there are some grounds or some areas that were kind of off limits unless you ask for permission to go to those places.

Sabine Ducharme

Really interesting. Okay. I think that's all my questions. Unless, is there anything else of interest that I should know?

Patrick Judd

Yeah, I think Seven Gen is one of those firms that is an enterprise that was developed over at Pokagon. I don't know, Steve Winchester, but I know that it was either one of his relatives or his siblings that we worked with, one of the Winchesters. But if you were to drop the name Conservation Design Forum, if you want to reach out to him, he may recognize Conservation Design Forum, it was one of the early firms that helped him out, and he would kind of know who they were, but he would definitely get a great resource, much more in depth.

Sabine Ducharme

Yes. This has been pretty good, but yeah, if I expand it, I'll see if they're willing to talk to me.

