redefining the design spectrum - a reinterpretation of the suburban home
[providing variability through standardization]
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[providing variability through standardization]
This past year has confirmed for me that education has to be an ongoing process. The more I felt I understood, the more obstacles I found myself facing. Many people supported me during this time and I would like to thank them.

my family: for being such loving and supportive parents. I never would have left a career to go back to school without feeling your support. Thank you so much for believing in me and taking an interest in my education. Ally and Emma, thank you for making me laugh when I needed it most. Jennifer, thank you for encouraging me to go back to school. Michael and Jennifer, thanks for your support.

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dr. stephen kendall: for making it clear to me that there is always a better way. Our conversations have fueled an interest that will last a lifetime.

jeff culp: for showing some enthusiasm towards my project ideas when others did not...it kept me motivated to complete the project.
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During the summers of my first college career, I worked in the construction field. Typically, as summer help, my days were spent delivering material throughout the work site to the more experienced laborers. After the footing and foundation had been poured and allowed to cure, pieces of lumber were distributed for the sill plate. Then other pieces of lumber of various dimensions were carried around to several locations for wall construction. After the walls were constructed, pieces of sheathing and decking were distributed. An enormous amount of time was spent on just moving material from one location to another. Because the residences were built in the traditional “stick-built” method, there were an enormous number of pieces. I also found it interesting that a construction crew would spend so much time putting together an enormous number of pieces (that could have been any design in the world) and the home would end up being one of four models. I began to think that there had to be a better way. These past two semesters have been spent considering and exploring the U.S. housing industry and searching for that better way.
Throughout the past two semesters, I have spent a lot of time writing down questions and goals that needed to be addressed in order to find this better way. The following were my thoughts and concerns as I began this exploration.

How can I reduce cost, increase efficiency, enable variety, reduce the number of components, simplify construction, increase thermal efficiency, decrease material "fall off" waste, limit site impact, heighten design, be sensitive to marketable styles and incorporate mechanical, electrical and plumbing (MEP)? How can technology assist in attaining these goals? What construction techniques provide answers to these goals? What prevents existing technologies that do these things from being mainstream? What does a new home designed by an architect and a client (not a builder) look like? What do people dislike in their typical suburban homes? Can a suburban home respond to site / environmental concerns? How? What spaces / qualities of spaces do they desire / dislike? What components of "high end" designed homes do they desire but not have because of cost. Are they componentable pieces? What is the "style" they desire? Are they given the style now or do they choose? Do they "choose" these designs because the builder can provide them quickly and inexpensively? If a well constructed home looked "different," cost less, and was more efficient, would it sell? How many like it would have to surround it and be purchased for it to be accepted? Would the "rich" have to set the standard?

Stick-built construction is inefficient. Not only does it create an enormous amount of fall-off waste, the homes are thermally inefficient. In order to counter the inefficiencies of stick-built construction, builders limit the number of models that are made available. To make matters worse, they also limit the number and types of changes that can be made. Where are the answers to these questions? Can the existing U.S. housing market provide some of these answers?
The typical suburban home is a “decorated box.” It is a prosaic rectangular mass “enhanced” by projected forms. The boxes within a typical suburban residential neighborhood line up along the streetfronts like soldiers standing shoulder to shoulder. These boxes remain in this configuration despite the many unique family types that make up these faceless communities.

It is only when these families are economically capable that they are able to take an interest in the way they are housed. This interest is typically manifested in the hiring of an architect to design a home that suits their individual family dynamics. It is often the architect that provides the homeowner with knowledge regarding sensibilities such as daylighting, capturing breezes and framing views. The architect empowers the homeowner by providing them with choice. As an experienced designer, the architect is able to provide the homeowner with a system or dialogue to direct the evolution of the design. It is the architect that asks the many questions that drive such things as square footages, materials, siting and adjacencies.

This project explores the potential of a system that would bring a high level of design choices to the typical homeowner. This system was derived by reinterpreting the zones within the decorated boxes, both private and public. Reinterpreted as independent pavilions rather than an assortment of individual rooms arranged within a rigid box, an enhanced level of variability can be achieved. The “pavilion village” arrangement offers many opportunities to incorporate the design sensibilities that typical suburban homes are lacking. Most importantly, the homeowner is able to make choices regarding these sensibilities throughout the process. This project tests this system with the design of two homes for two unique family types. The resulting designs of these two homes stemmed from the homeowner’s decisions within this system.
A DESIGN SPECTRUM EXISTS WITHIN THE UNITED STATES HOUSING MARKET

On one end of the design spectrum are the MANUFACTURED HOMES that come standard for every client. They can be transported to a site and fastened to a foundation. These homes offer limited plan configurations and the spatial variability is limited by the rectangular form. These homes are comparatively inexpensive due to standardized components, the economic efficiencies of mass production, utilization of off-the-shelf materials, and limited variability.

Next are the PRODUCTION or BUILDER HOMES. These homes are typical of the suburban neighborhood. In his book, The Distinctive Home, Jeremiah Eck describes them: "Each home, inside and out is one in a series of variations on a theme: the two story colonial, the raised ranch, the Tudor, or the contemporary. These are anonymous production houses, probably built from stock plans designed to appeal to the average consumer. Most of the more than one million homes built in America each year fit into this category." The variations that do occur in these homes typically consist of a change in paint color for the door and shutters, and mirror reflections of the plan. The experiential qualities of the interior are subject to the direction of the street that the homes line up along. The streetfronts are dominated by protruding garages. No consideration is given to views or the natural environment. Prices are kept relatively low through repetitive use of stick-built components (8 ft. walls, 35 ft. wide trusses) and extremely limited variability.
CUSTOM HOMES are still typically selected from a series of stock plans but the amount of variation in those plans is far greater and some consideration can be given to exterior conditions such as compass directions (for daylighting and breezes) and views. Because these plans are stock, they do not result from personal consultation with the clients although some variations may be made. The opportunity for one-off details is greater and the materials (especially for the interior) are only limited by the owner's budget. Despite the opportunity for greater variation, these homes are still often arranged parallel to streetfronts of suburban residential neighborhoods.

ARCHITECT DESIGNED HOMES offer the client the greatest level of personal customization. The architect utilizes his/her resources and experience to deliver a home that fits the specific client and the dynamics of their family. The material palette is only limited by the client's budget. The arrangement of the interior spaces is given special consideration to enhance the client's lifestyle and promote livability. The siting of the home is carefully considered to maximize its relationship with the natural environment. Interior functions are often separated into individual masses thereby enhancing the spatial qualities of the rooms. The costs of these homes is often higher not only due to the quality of the materials used but also because for the builder, every new ARCHITECT DESIGNED HOME has its own unique challenges and details.
This exploration of the design spectrum established the desirable qualities in each of the spectrum's types.

[MANUFACTURED HOMES offer economic efficiency]
[PRODUCTION HOMES offer marketable program]
[ARCHITECT DESIGNED HOMES offer quality-of-life sensibilities]

How can architecture provide the various suburban family types the opportunity to break out of the box that defines suburban life? A reinterpreted suburban home should offer the opportunity for views of the suburban landscape (both borrowed and immediate), better daylighting, and a connection with the outdoors. Having choices regarding these sensibilities is expected to enhance the quality-of-life for the suburban homeowner.

A common strategy utilized by architects to provide many quality of life sensibilities is the "pavilion village," (see exploration at right). This arrangement zones interior functions into independent masses. These masses then can be arranged to take advantage of daylighting, breezes, and views. By grouping these forms together, private porches and courtyards can be created that extend interior rooms outdoors. The pavilion village offers many opportunities for quality of life sensibilities to be enhanced.

These plan configurations are avoided by builders because of the high cost of "stick-building" irregular plans. Therefore, it is assumed that an alternative construction method will be needed; one that enables variability.
If a "pavilion village" arrangement offers the best opportunity for enhancing the quality of life, how can prefabricated / mass produced and off-the-shelf (OTS) materials be utilized to offset the costs associated with an irregular plan?

The examination of manufactured housing provided many answers to this question. First, a component that can be purchased "improved" typically saves steps in assembly and therefore reduces expensive labor costs. If designed at a manageable size, existing construction crews would be easily adapted to these construction processes. The "pavilion village" should take advantage of a strategy utilized in manufactured housing - repeatable standardized components. Any time a component can be repeated without requiring any customization, the cost goes down. This also helps in assembly, as the process remains standardized. If the individual pavilions in this reinterpreted suburban home had standard dimensions, then all of the components comprising an individual pavilion could be standardized as well. This standardization could then provide the framework for a system within which the typical suburban homeowner could make quality-of-life decisions regarding their home.

What are the standard sizes of rooms that are marketable in typical suburban housing?

How do these sizes influence the pavilion that will be used as a repeatable volume? What is the standard size of these pavilions?

What are the manageable (from a typical construction crew standpoint) components that will make up these pavilions?

How does one make these components part of a system that enables variability for the homeowner?
An examination of the housing types within the design spectrum has provided the base information for this reinterpretation of the typical suburban home. It has been determined that homeowner’s who are capable of hiring an architect seek to improve their quality of life by having a home that responds to their unique family type. Therefore, typical production homes have been analyzed in terms of the existing spaces that families utilize and the manner in which these spaces are used. Such information as square footages and dimensions were useful in determining the scale and dimensions of the pavilion (see study on following pages).

**Architect Designed Homes** offered the opportunity for understanding how the homeowner’s quality of life can be enhanced. Homes that have been designed to take advantage of views, breezes and daylighting have been researched and the information that was gathered has been used to develop pavilion configurations that maximize these sensibilities. This exploration also has provided answers as to how elevations should be designed to take maximum advantage of environmental conditions. In examining **Architect Designed Homes**, it became clear that these homes would require three window sizes. A full window would provide the opportunity to frame views and allow a maximum amount of light and air to penetrate the home. Secondly, an intermediate size window would allow for clearance over countertops. Finally, a clerestory window would allow light and air to circulate but would block unwanted views (as in towards a neighbors garage). The explorations of **Architect Designed Homes** also suggested that the elevations be split into two zones. These zones would allow for a systematized choice regarding material differentiation, secondary clerestory windows, and window zones for homes with upper levels. This separation will also play a crucial role in constructability and systems zoning.
The information and principles gained from these explorations has then been applied to efficient construction methods (including off-the-shelf materials, prefabrication, mass production, etc.) in an effort to establish an efficient system of choices that the homeowner can make. It is also assumed that these construction processes will help to offset the costs associated with irregular plans by reducing construction time (and therefore labor costs).

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<td>poor</td>
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<td>high</td>
<td>slow</td>
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<tr>
<td>Build a Stud Wall on Exterior of frame</td>
<td>good</td>
<td>moderate</td>
<td>high</td>
<td>slow</td>
</tr>
<tr>
<td>Shop the frame and Build up wall w/ layers</td>
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<td>high</td>
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DETERMINING STANDARD PAVILION DIMENSIONS

Fifteen typical suburban house plans were analyzed to determine minimum marketable dimensions for the rooms in their programs. These room dimensions were then utilized to determine a standard pavilion size. In determining the pavilion dimensions, consideration was given to closet space, circulation, and mechanical spaces. For instance, the standard bedroom sizes (for bedrooms 2-4) was approximately 10'x12'. When this is considered in conjunction with a minimum hallway width of 3.5', a dimension of 16' can be specified for the width of the pavilion. This was then cross-checked with the minimum for a great room, 15'x16', and the 16' dimension was determined to be suitable. Combining rooms of a particular type, public and private, and using the same process (of adding up necessary spaces), provided the overall dimensions of 16'x32' for an individual pavilion. This suited both expected scenarios of kitchen (plus mechanical, laundry, etc.) / great room and master bedroom (plus master bath, laundry, mechanical, etc.) / bedroom (or office). Once standardized in this way, spaces could be interchanged to incorporate any scenario (ex. great room / master bedroom).

As this study progressed, pavilion plans were configured. While designing these plans many potential scenarios needed to be considered. Some of them were:

Will the homeowner's want to divide the kitchen and the great room into two distinct rooms?

Bathrooms and mechanical closets obstruct views out of wall locations adjacent to them. Should plans be developed that place them on any side so as to allow views out in any desired direction?

Circulation could be necessary across pavilions as well as along their edges.

Which rooms should have direct access to bathrooms (both half and full)?

How much closet space does each room require?
EXPLORING A PANEL SYSTEM'S DESIGN CAPABILITIES

These two models were constructed using a standardized panel system. Panels of 4'x2', 4'x4', and 4'x8' (and their window twins) were used. An attempt was made to show the versatility of this system. For this exploration, one pavilion was designed to maximize views utilizing a wall of windows. The other pavilion was designed in an effort to conform to more traditional standards. Windows were placed regularly along the sides allowing some light to enter but they did not frame views. With both of these models, materials were used to differentiate zones and enhance the elevations. Without a standardized structural system, different heights and plan dimensions were achieved. While this capability may enhance the level of variability, it hinders the ability to standardize most of the other components that would comprise an individual pavilion. This exercise made it clear that everything from stair configurations to joist lengths would be affected if the pavilions were not a standard dimension.

Therefore, this exploration made clear the need for a standardized structural “shell”. While not a “shell” in a true sense, this structural system would provide the framework for decision making regarding window locations and pavilion configurations. Without this “shell” there is no constraint for decisions to be made within; therefore homeowner’s could be overwhelmed with the range of decisions that would need to be made. This “shell” also limits the dimensions of the pavilion providing the standards by which all other components, internal or otherwise can be based.
Early design explorations involved using the window and panel system without any structural system or mechanical zoning. These explorations involved material choices and differentiation. Window types and sizes were explored as well. These explorations reinforced the need for a primary structural system. Without the structural system, there were many questions that had to be answered. These included: How does one make the system rigid? How does one frame the window into place, especially at corners? What counters the thrust of the roof loads? If a window makes up a full panel, how are they stacked? All of these questions led to the determination that a primary system would be needed not only to provide a constraint for decision making, but for structural considerations as well.

These explorations also determined that unique and well designed elevations could be achieved using a standardized panel system. Consideration was given in many of the explorations to daylighting. In one of the explorations (top right) bedrooms were provided with isolated views but light was allowed to flood the interior through the designated clerestory window locations. Also, these explorations showed the capability of the system to frame private courtyard spaces, as seen with the entry space (top right).

The design explorations at the right were developed from material explorations (ex. see below).
The design explorations on the previous page were expanded upon and developed with standardized floor plans. The designs (at left) were created with two standard bedroom pavilions and one standard kitchen/great room pavilion. These explorations sought to determine if unique and varied homes could be developed with this simple palette of materials, window types, colors, plans, and panels. They were designed in several pavilion configurations, two being shown in plans at the bottom of this page.

Consideration was given to how a potential homeowner may want to frame views and how the spaces would be used. In configuration “A” both the master bedroom and the great room have visual and physical access to the shared garden courtyard. In configuration “B” three of the four bedrooms have access to the backyard. These types of considerations led to the determination that many different types of floor plans would be necessary to achieve the level of variability that homeowner’s would desire. What if the homeowner would like for the kitchen and the great room to both have direct access to the backyard patio space but would like to enter into the “private” spaces of the house from the great room? This would require a mirror image of the “public” pavilion represented here. Also, this exploration determined that further examination of the MEP systems would need to be considered.

How would the location of these mechanical closets and chases affect the livibility of these spaces?

If there are to be many interior plan configurations, how are these systems zoned so that all of the differing plans can occur unobstructed?

What spaces (mechanical, laundry) will need to be considered in every plan, to provide vertical chases for the systems? Where are these spaces in every plan?
Prior to developing a primary structural system, consideration needed to be given to the mechanical, plumbing and electrical systems. In his book, *The Timber-Frame Home*, Todd Benson, owner of Benson Woodworking, outlines many strategies for incorporating systems into a timber framed home that utilizes foam-core panels and varied interiors. The website, www.bensonwood.com, also provides many strategies regarding systems. Dr. Stephen Kendall discusses the importance of these strategies in his paper, “The Entangled American House,” where he states, “Today, walls and floors of sticks of wood or substitute materials—the main elements of the beloved and ordinary 2x4 system which first came into use in the 1830’s in Chicago—are filled to overflowing. Many of the wooden or steel structural elements are fastened in place and then pipes, wires, and ducts knitted haphazardly into them. This is especially destructive now in traditional wood-frame construction, where holes are bored on-site as needed and, often at random by each trade, frequently with no coordination.” One aspect that Dr. Kendall is speaking to is control. In his paper, he is discussing the need for many households to have a direct say in “major interior layout, fixtures, and equipment decisions, no longer content with moving into dwellings someone else has decided have ‘good layouts and feel.’” While his discussion is regarding renovations and new tenants, the principle is still applicable to this project. Many potential interior configurations are possible within a single, dimensionally static pavilion, therefore, the installation of the systems needs to be systematized and universal. These detangling principles provide strategies for systems access for any interior configuration.

**HEATING AND COOLING**

Benson’s construction strategy involves simply providing a “zone” for ductwork and utilizes open-web joists for easy delivery in either direction. All of the supplies and returns are facilitated within these zones. The space for the vertical ducts is determined during the design phase; in the case of this project, spaces will need to be set aside in the standardized plan configurations.
ELECTRICAL

Benson also provides many strategies for dealing with electrical wiring. He states that the “most widely used system is the extended-baseboard wire chase, but there are other options.” Benson states that the key to electrical wiring, like all systems, is planning. These strategies provide a basis for dealing with scenarios that would be faced in this project. These examples do not provide a complete strategy for dealing with all of the issues that would need to be dealt with regarding wiring and lighting. In some cases, the open-web joists could provide routing. It was important to determine that strategies exist for dealing with variable interior layouts and unique wiring designs for each layout could be avoided. Benson’s strategies provide general methods for dealing with each of the interior configurations.

PLUMBING

The open web joists provide a zone for plumbing distribution. Utilizing new technologies, the mechanical closet can provide the vertical chase for water distribution. One new technology that could provide an efficient method of installation and water distribution directly to the floor locations of fixtures is described at www.toolbase.org. The website states, “A new method for residential water distribution is gaining acceptance in the home building industry. Manifold plumbing systems are control centers for hot and cold water that feed flexible supply lines to individual fixtures. Plastic manifolds, together with flexible plastic piping, offer installation-related cost advantages over conventional plumbing systems.” This system can be routed independent of the walls making it suitable for the varied interior configurations of this project. This system is diagrammed (opposite page, center image) in green and blue.
PRIMARY STRUCTURAL SYSTEM

Having determined, through the previous explorations, that a primary structural system was necessary, one was developed. This system not only carries the roof loads, but it will also serve as the system within which most of the design decisions can be made. Laid out on a regular grid, standard in both directions, multiple “shells” can be joined into many configurations. These configurations enable the homeowner to react to site conditions such as compass point directions, view framing, and establish private outdoor spaces. The standard framing dimensions not only allow for multiple configurations, they also provide a basis for other components to be developed. Knowing the standard dimensions provided the opportunity (for the purposes of this project) for several porch arrangements to be developed.

In developing this system, several factors were taken into account. They included:

SYSTEMS: The “middle beam” (highlighted in red in the image to the right) establishes the open-web joist zone where many of the systems circulate. This beam not only provides the support for the open-web joists, it also exceeds the joist’s depth (including decking, ceiling, and systems), sheathing those components from exterior view.

ZONING: The structural system also provides the basis for material and window zoning. By creating two zones, the structural system enhances the variability of the exterior elevations. The upper zone can be utilized for clerestory lighting and upper level window placement.

PANELS: Panel sizes were developed in conjunction with this structural system. The dimension between the columns was determined by considering manageable panel sizes. Several panels were then developed allowing for the three window sizes (described earlier), door openings, and solid panels.

SUITABLE PROGRAMMATIC SQUARE FOOTAGE
SINGLE PAVILION DESIGN EXPLORATION

With all of the components designed, a single pavilion was used to explore the design process for three clients. These designs were developed for three existing sites so that the resulting designs could be evaluated against traditional methods. The sites that were selected for this exercise had unique characteristics.

SITE A: The south of the house runs parallel with the street. The south facing wall looks out onto an attractive woods.

SITE B: This corner lot has street frontages on both the south and west sides of the lot. The “front” of the house is currently on the west side.

SITE C: The northeast side of this home faces an attractive woods. The south side of the house faces an unappealing side of a neighbor’s house.

The clients will be referred to as A, B, and C; the sites they were assigned.

CLIENT A: These clients are a retired married couple. Mr. A still does some consulting work from his home. They enjoy the outdoors and wanted a living space flooded with light. They also entertain in their home so they wanted the kitchen and the living space to have an “open” quality.

CLIENT B: This client was a single mother of two elementary school aged boys. It was important for the kitchen to be separate from the living space, so that if one boy was watching television, the other could have some private space for studying.

CLIENT C: This client was a young, single man who liked to entertain. This would require that the plan be open. He also stated that he wanted the living space to be isolated from neighbor’s views.
SITE A: An office was provided for the consulting business Mr. A operates from his home. The southern wall was filled with windows to flood the interior with natural light and to maximize the views of the woods.

SITE B: Porches were added to the south and west elevations in an effort to address both street fronts. The mechanical spaces, stairs, and a bathroom separate the kitchen and living space, providing the opportunity for different and private activities in each.

SITE C: The kitchen and the living space were pushed to opposite ends of the pavilion. Only an open stair divides the space. Clerestory windows were utilized on the southern elevation to allow light but shield views. Views to the northeast were isolated.
The primary objective of this project was to test a system of providing choices to homeowners so that they can live in homes that respond to lifestyles, family types, environmental conditions, and site conditions. It is expected that these homes will enhance their quality of life.

CLIENTS:

Karen and Steve Weifen - They are a married couple with grown children and grandchildren. They had very specific ideas about the spaces they wanted in their home and the manner in which the spaces would be used. It was important to them to create a home that utilized outdoor and transitional (indoor / outdoor - porches, patios) into the design as they like to spend most of their time outdoors. They enjoy entertaining family and friends at their home and frequently have overnight guests; typically grandchildren. They wanted a house flooded with natural light. It was also important to them to have a spacious and open plan, while maintaining some separation of private and public spaces.

Jennifer Weifen - A young single woman, Jennifer wanted a home that suited entertaining. She often enjoys having friends over for dinner parties. It was important to her to have an outdoor space for entertaining adjacent to the living space to serve as an extension of the indoors. Jennifer also stated that she would like to shield the inside from direct views of the neighbors and the front of the house. She stated that she would prefer that the house look out onto nature rather than other homes.

PROCESS

1. Clients are given the opportunity to view the available lots using the neighborhood master plan. A site was selected.

2. Pavilion configurations were considered in 2D. These simply showed the way in which the homes would occupy the specific sites. Some advantages to each configuration was discussed.

3. Several of the pavilion configurations were mocked up using the physical models of the components that would make up the home.

4. A configuration was decided upon. During this stage of the process, many of the plans were considered and some potential plans were discussed regarding the pavilion configuration that was decided upon.

5. Once the models were utilized to mock up the basic form of the house, seventeen individual plans, along with their mirrors were reviewed. Discussions regarding the number of bathrooms, views, laundry rooms, and open vs. closed plans took place.

6. “Cut-outs” of plans were arranged and rearranged. Plans were selected.

7. With a model of the home and corresponding plans, window locations were determined using cut-outs that could be adhered directly to the model. The three different window sizes were available for consideration. The clients discussed window locations in regards to where they would like to frame views and where they would like to shield views. These discussions also involved clerestory lighting when views were not desired but daylighting was. With the cut-outs in place, a representation of the home was created.

8. Porch attachments were placed in their locations. These locations were determined through the client’s discussions on how the spaces would be used.

9. Exterior materials were selected using a layered Photoshop file. This Photoshop file allowed the clients to see the “look” of the several materials made available. (see CD attached to back cover)

10. Window styles were selected using the Photoshop images.

11. Porch styles were selected using the Photoshop images.

Many times this process was circular in nature. Often the clients would make a decision that would alter an earlier decision or they would simply change their minds. Ultimately, the tools supplied made the process very easy for the clients to understand. It became clear that this process would be enhanced by providing some specific design directives. These design directives were verbally communicated by the thesis student for the purposes of this project. Some examples of the design directives that were discussed are: place many windows on the southside of the home to maximize daylighting; opportunities to utilize clerestory windows to maximize daylighting while shielding views; wrapping or extending porches; advantages of some configurations in regards to exterior spaces that could be used as rooms. While these topics were raised by the thesis student, the process of the developing the home was left primarily up to the clients.
This project was developed for the city of Pendleton, Indiana. Pendleton is a town 30 miles northeast of Indianapolis. Listed on the National Register of Historic Places, the town is rich in tradition and proud of its historic buildings and setting. Downtown is a thriving retail and shopping district offering antique stores, restaurants, a grocery store, and a hardware store.

Just outside of town is Falls Park. This park offers baseball diamonds, playgrounds, picnicking, walking trails, a footbridge over Fall Creek waterfalls, and facilities for weddings, reunions and other activities. The park also hosts several community festivals and events.

A diverse cross section of people reside in Pendleton. Retirees have been moving back into town from outlying neighborhoods. Many different family types utilize the park daily and relatively inexpensive property values enable people from varying income levels to enjoy owning homes in Pendleton. Recently, there has been an effort to clean up and restore many of the historical homes in town. This effort is motivated by the resident’s appreciation for the town’s history and also their value of well constructed homes, unique character, and small town architectural languages and sensibilities.

Between the park and downtown is a vacant field that will serve as the site for this project. This site is bordered by houses on the west and south, a woods to the east, and the park to the north. The site was divided into lots by extending the city grid. The sites were based on traditional suburban lot dimensions of 133’ x 75’ and 150’ x 65’. The lots on east-west streets were given the 75’ frontage dimension so the southern sides of the homes could be longer, facilitating maximum southern exposure. Sidewalks were provided and the streets were lined with trees in order to reinforce an attempt at merging this neighborhood with the existing streetscapes.
Strategies were provided for maximizing southern light. This typically meant orienting the long edge of the pavilions perpendicular to the north/south axis.

Modeled components (floor plans, pavilions, porches and "bump outs") were utilized to "mock-up" potential configurations.
Porch styles with varying column designs

Lower level living

Mixed: bedroom/kitchen and bedroom/living

Window styles

Architectural  casement  double-hung

Design palette: tools, materials, components

Brick / horizontal siding  Vertical siding

Brick  Vertical / horizontal

Horizontal  Horizontal / vertical
The clients selected their site for its corner location. The clients stated that they liked the idea of viewing two streetfronts from within the house. They also liked the idea of potentially having porches on both streets. Selecting a pavilion configuration, the clients stated that it would be important for them to have a semi-private screened-in porch. After reviewing the different configurations that had been supplied, they made their selection based on the potential of having the views from the porch isolated by two pavilions. They felt that this would give them the opportunity to concentrate their landscaping to the area immediately to the west of the porch, providing a “beautiful view.” This configuration would also provide a view of sunsets; something they enjoy in their current west facing screened-in porch. They also liked the idea of having a “private” pavilion and a “public” pavilion adjacent to the screened-in porch. The “private” pavilion was selected for the location of the full laundry room, walk-in closet, and bedroom/office. The “public” plan was selected based on the client’s desire to have a private guest bedroom, an open plan, and the kitchen looking out to the streetfronts and the living space. Views were isolated out of the living and master bedroom spaces towards the interior of the site and away from the neighbors. Porches were located outside the breakfast nook for morning newspaper reading as well as outside of the den. The clients liked the idea of using the den as a secondary living space with a different view.
Once the decisions regarding window locations and plan configuration has been mocked up using the physical model, the corresponding panel types can be assigned to their locations. Panels are left out (shown with the "X") in order to join the pavilions. These types of drawings are representative of a type of construction document for these houses.
The client selected this site because of the dense woods that bordered the property. She stated that she would like to be able to have her parties on a patio that looked out onto the woods. This patio would need to be adjacent to the living space so that it could serve as an extension of the living room. The client stated that she would like a plan that treats the kitchen and the living room as one room with a breakfast bar providing some separation. She also stated that she would like to enter into an entry space rather than directly into the living room. It was important to the client to have a “buffer” between the living / entertaining space and the neighbors. These factors led to this pavilion selection. The “private” pavilion acts as a “buffer” for the outdoor space and the mechanical closet and bathroom serve as a buffer for the living space and kitchen. A full bath was desired for shared use by both bedrooms and the laundry was to be located in the private pavilion. After the pavilion configuration and plans had been selected, the client stated that she would like to have views directed out of the living space towards the woods. She also stated that while she would like southern light, she did not want to look out onto the street. Therefore, clerestory windows were utilized on the south elevation. Clerestory windows were also utilized on the west elevation to allow light to penetrate but shield views to the neighbors house. The client stated that she would like a front porch but that it would not get much use. A small one was selected.
The main objective of this thesis was to determine if a system could be devised that put a greater level of design control in the hands of the homeowner. The objective was achieved. The test “clients” were able to have conversations regarding the manner in which the spaces would be used, the views they would like to have framed, the indoor/outdoor spaces they would like to utilize, the style of windows, the materials, and the manner in which the home occupies the site. Each of these conversations led to design decisions that enabled the client to customize their own home. This level of customization is typically reserved for homeowners that are capable of hiring an architect. Because the components that comprise this system have been standardized, the economic efficiencies of manufacturing practices can be expected to drive costs lower if the system were mass-produced. This could provide homeowners with the opportunity to spend more money on details such as fireplaces, unique doors, trims, moldings, built-ins, and appliances.

Jeremiah Eck states in his book, *The Distinctive Home*, that there are four features of every house that can have a lasting impact:

1. How it occupies its site.
2. How the floor plan maximizes efficiency and comfort for today’s living.
3. How the exterior is balanced and blends naturally with site (or neighborhood).
4. How selected exterior and interior details (such as trim, stairs, stair railings, mantels, built-ins) transmit an enduring sense of quality, care, and thought.

This system enhances each of these qualities for the typical suburban homeowner.

Because this system has taken into account desirable qualities from across the design spectrum, it not only provides labor efficient construction processes and livable programmatic room dimensions, it also provides a high level of customization. Many prefabricated houses available today offer efficient construction processes and impeccable designs but they do not offer customization. The homes can be oriented on a site in any direction, but if there is not a window, or door, where one would like, there is no system for providing that opening. Many times, the homeowner will have to decide between several quality of life sensibilities: does one want to capture the breezes from the west or frame the view to the east? Does one want to enter from streetside, or block views of the alley? With the system provided by this thesis, the homeowner is capable of orienting the pavilions in any direction, group them in several configurations AND provide windows and doors in their optimal locations to maximize daylighting, capture breezes, and frame views. Because of this system’s ability to do these things, it is highly successful at enhancing the quality-of-life for the homeowners.

“The Glidehouse” is one prefabricated house that is designed to take advantage of some quality-of-life sensibilities. The large wall of sliding (gliding) glass allows the interior spaces to be flooded with light and allows for passive cooling as it captures breezes. If one wants to capture breezes specific to a site, then the home must be oriented to do so. How then does one frame views that exist in the opposite direction? Because the “Glidehouse” has standard floorplans, how does one “move” the master bedroom in order to place it nearest to the beautiful views?
The history of prefabricated / mass produced housing is long and complex. This endeavor has been explored by many of the finest architectural minds. Their attempts are filled with great successes and many failures. One attempt at the “Factory Made House” was conducted by two of these great minds, Walter Gropius and Konrad Wachsmann. The failure of their attempt was not a result of lacking public interest but rather many factors: “high production costs, difficulties with organized labor, problems generated by the diversity of local building codes and a lack of sympathetic understanding in their application, the necessity of devising an adequate and properly financed distribution system, the unsuitability of bank mortgaging procedures when applied to an ‘instant’ product, insuperable difficulties in raising sufficient capital, and ultimately, the lack of a guaranteed and continuous market of adequate volume inherent in a free-enterprising system.” Their attempt tried to centralize the many levels of construction, so that their ideologies could be imposed. This led to soaring costs as they tried to develop processes for mass-producing THEIR architecture. While this thesis does not suggest that these issues have been solved through the design of this system, it did consider the following.

1. Utilization of existing products produced by manufacturers will reduce costs. This system is simply a re-packaging of existing technologies.
2. Any architecture can be applied to this system. The product developed for this thesis, based on programmatic needs and quality-of-life sensibilities is expected to appeal to a broad, national clientele. Architectural ideologies can be applied at the local or personal level.
3. Labor is dealt with by the manufacturers and the builders. The “production” of this product is simply the orchestration of several existing technologies and its delivery.

4. The manner in which individual trades are involved in the housing industry has not changed. It is expected that with this system, individual trades will still come to the jobsite and install their systems. This process simply provides strategies and zoning for the mechanical, electrical, and plumbing systems.
5. Builders and individuals would be able to utilize this system. The reduced labor time and costs would appeal to builders because of the broadened margins. Individuals will like the easy and efficient construction as well as the ability to “design” their own home. Architects can design within the system to provide parts or all of a home for clients.

This system is just another way of constructing a home. Builders will still be responsible for raising a structural system, enclosing walls, installing windows, and applying materials. Trades people will still be responsible for bringing mechanical, electrical, and plumbing systems into the home. This method of building a home simply takes advantage of existing technologies that can be assembled in an efficient, standardized manner. This standardization provides the homeowner with the ability to make quality-of-life decisions about the homes they will live in.

Further study needs to be done in two key areas: the architectural design potential of the system and the technical aspects of delivery and assembly.

With the limited timeframe of two semesters, the architectural design capabilities of this project could not be explored to the extent that was desired. Only a few configurations were explored for two lot sizes. It would be beneficial to explore the potential of this system on a much larger site that would provide different sensibility issues than the neighborhood lots. Also, the development and use of other components compatible with this system would provide better insights into the implications of this process. As a standardized system, it could be expected that products could be developed for use in this system. Some of these may include: dormer windows, new porch designs / configurations, standardized interior partitions, new panel types / materials, and roof types / pitches.

A better understanding of the economic efficiencies associated with mass-production would benefit this project. Working more closely with suppliers of the products may yield answers to questions such as: How many of product (x) would need to be purchased to begin to see a significant reduction in price? What is the most efficient way to package this system? Should the products be shipped directly from the manufacturers to the site? If there are questions regarding an assembly, who provides the answer?

Ultimately, this project was about choice and the ability of the homeowner to have it. The goal was to show that we all should have the ability to make choices regarding the homes we live in, rather than be housed.
thesis RESEARCH bibliography


