Lot 30: Rerouting Suburbia

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Research & Analysis
Life Style vs. Living Environment

This whole project brings when engaging in a conversation with a couple who own a home in the most suburban neighborhood of Omaha, NE. It was in that conversation I noticed a great contradiction in the lifestyle this family was living and house chosen by the family to build on their new suburban lot.

The reality is that most Americans chose to live a life revolving around cutting edge technologies, such as the laptop, ipod and even the hybrid car. However, the performance of the homes that are being built in our sprawling cities operate at the level of a typewriter.
Lifestyle

Sleek design
compact
efficient
practical

Living Environment

Image rooted in the past
Labour intensive
Energy Consumer
Ecologically combative
Attitudes Toward Land Ownership

The American attitude toward private land ownership has not changed in this country for the last two hundred years. This country in fact use to give land away to citizens and immigrants. The American dream of owning a piece of land that is yours and having the rights to shape it however you chose still rings in the ears of our current generations and has contributed to the formation of our cities. The reason I believe this is important to any domestic project is because a designer should understand how people interact with their property, with their neighbors and the reasons the owner felt this property was right for them. One thing I think is lost in the suburban development is the reality of want you bought. Sure you purchased land within some governed lines, but you also purchased NATURAL RESOURCES, elements inherent within the land.
Resource Consumption

As land developers buy up land to stay ahead of the sprawling residential city, they strip the landscape clean. It is cost effective for developers to remove all natural ecosystems embedded in the landscape. This also eliminates opportunities for great architectural solutions. (Not to say that designers can’t design on a flat site). This also creates a great expense for owners to relandscape, however it is this RE-Landscaping that presents more issues. Not only does it take mass resources to produce new landscaping (i.e. water and fertilizer), it is all to offer produced in an image that is NOT native to its environment.
Suburban sprawl neighbourhood in west Omaha, Nebraska. One can see how developers have wiped all recognizable landscape from the area and reshaped it to prepare for residential housing that is equally irresponsible.

In this development in the state of Washington one can see the extreme consumption of the trees. In most cases the trees consumed for the developments like these are discarded instead of recycled into the construction of the project.
Suburban Orientation

This diagram represents a neighborhood in suburban Omaha, but could be transplanted into any city in this country. What we are looking at is not only how the development is laid out at the planning scale but also the effects the layout have on each and every home in the development. The large arrows are the major roads of the grid city. North is up on this diagram, so we can see in the smaller arrows how many properties have poor orientation in the sense of taking advantage of natural ecological resources. Only 20% of the properties in this development have ideal orientation for passive solar design.
Sentimental Image of “House”

As the general public continues to pick homes to build out of a catologe the progressive nature of humans and technology moves past the demestic place of living at lighting speed. So attached to the sentimental image of a house we begin to forget we are no longer living in a time when these forms were created. The act of form making is the only way to explain the current situation in suburban housing design and desire.

"...HOUSING IS NOT A SERIES OF ICONS BUT RATHER A COMPLEX AND COHESIVE INTERPLAY OF FORM, SPACE AND SOCIAL DYNAMICS."  
SALLY LEWIS - FRONT TO BACK
Cheap Masking of materials

Catalog of Options

Past Applied Ornament
Mechanical Dependency

"We've been blinded by all things mechanically feasible for a long time. It is necessary to rediscover the house as an organic system - and with it the possibilities afforded by natural processes."

Transsolar Climate Engineering
As I approached this project I realize it would be hard to think of a design thesis as a single object that could change the world. In the research phase it became apparent that one must also think about how the development of that single object could influence growth or impact change in the suburban growth pattern. If the single bacillus was multiplied, how would the develop have to respond. As a precedent towards influence I have researched Eddie Jones design of the Jones Residence (his personal home). In his design he paid close attention to the site and how it could work in the homes benefit. In his presentation to the University of Nebraska - Architecture College he spoke about education. His home has became just that for his neighborhood. In a sense he has planted a seed of change in his area and could potentially sprout better design in the future.
Site Analysis
Omaha's suburban expansion has already consumed Ashland, and is creeping ever so closely to Gretna. The Big Sandy Lake development is located only a few miles west of Gretna and in the foreseeable path of urban sprawl.

An opportunity can be seen here as a way to plant a seed for change in how we impact our cities growth. By the time the city reaches this development, a dialogue will have been set in place for how form, space and social dynamics interact with one another, influencing how the cities is shaped.

The diagram to the right shows the suburban sprawl of Lincoln, NE and Omaha, NE. It is important to understand the consumption of smaller cities as a product of suburbia.
Zooming in on the site we see a collection of lakes along the Platte River running north and south splitting Lincoln and Omaha. Sand and gravel quarries in this area have been a big business through the years. Now that some of these areas are no longer producing a quantity of resources desired, people have begun to flock to these man made lakes. Due to their location, close to the expansion of residential Omaha, these developments are positioned in a place that could influence future development in this direction. By planning a seed of quality architecture there, you could in a sense head off poorly designed housing.
The Big Sandy Lake Development is located is the northern most man made lake in the area. The developers have planned for 85 lots and have currently sold everyone.

Chris and Robin MacNight, the owners of Lot 30, introduced me to Big Sandy. It was only after meeting this family and analysing their site that I felt this development had real potential. Lot 30 is located at the southern edge of the development along with eight other lots. Using the MacNight’s as test subjects I decided to design my project around that southern edge of the lake.
Looking back at my research I became very interested in the idea of personal ownership and the attitudes that accompany it. Shown below is an image of Lot 30. One can see that it’s pretty baron and is made up of mostly sand. My interest in this site is to address the reuse of the landscape. Accepting that this site has been stripped of resources. We most ask ourselves, How can we recycle this landscape.
Lots of Interest
When thinking about the role of an architect, one must understand the effects a design could have at a great scale. Asking ourselves how can my project educate or inform change in the built environment. The diagrams shown below are a effort to show the Big Sandy development with a radically different approach to residential master planning. In the first image I show Big Sandy in its current state. 85 lots positioned in the simple fashion along the shore line. The main concern is to get water access to each lot, regardless of the orientation. In the second image, an addition is shown. This addition is proposed due to the success of the original 85. The addition would allow for 40 more properties at Big Sandy.

The last image is a radical reformation of the development to illustrate how Big Sandy could have been planned to allow each lot water access as well as the opportunity for passive solar orientation. In this master plan I have also proved the more lots could be positioned on the development in order to create more revenue for the developer.
Conceptual Design Process
In the beginning stages of the design I became interested in a fallen tree that was left on the site. The way it turned itself over and began to dissolve into the landscape brought to mind the weaving to materials. How interaction of materials on the site could drive design.

The design probe in the bottom right is the first step taken to understand the site as well as materials embedded within this project.
When looking back at the research in this project, it became apparent to me that the attitudes towards land and personal ownership drove an idea of a personal “SLICE OF HEAVEN.” When thinking about your land, you can visualize walls going straight up at lot lines. This mentality is something architects encounter everyday. This idea is obvious in suburbia, one only needs to like at the construction of privacy fences between homes.
It is this idea of a "SLICE OF HEAVEN," that brought me back to my interest in the embedded materials on the site. Now it was not so much about using those materials for construction means but how one can interact with the natural resources found on the site. How can the design create space that responds to the embedded poetry of the site and hold on to the mentality that follows from the slice of heaven?
Imagine being in this place, it’s your place, you own this place. Now walk to the edge of the grass toward the water. Feel the grass brush your leg as you pass. You reach a great spot, prefect for your lawn chair. You sit in your chair and put your toes in the sand. You bask in the sun and let the slight breeze cool you as the environment engulfs this place. One could think, “this is a slice of heaven.”
The models and diagrams shown were an exploration into what this conceptual slice of heaven could be. By constructing walls on a lot from the south bank, I began to experiment with spacial qualities within the lot. Looking for a language that would encompass the idea as well as ideal spacial arrangements. This exercise was not to block out or turn your back to your neighbor, but to understand the site.
As I began to understand the site, the slices became a means of spacial arrangement. Arrangement for program, where divided into slices.
When the slices became the method for spacial arrangement, I realized this project can not be about form making and really needed to be about the spacial quality of these slices.

What are the materials? What are the views? How does the embedded resources found on the site penetrate the space?
"The aim of my work is to move from a position of architectural chaos to one which the architecture dissolves into its surroundings."
Kengo Kuma

Conceptually - the idea of "the slice of heaven" comes from the attitudes in personal ownership and the dream of owning private land. This in turn provokes two meanings for approaching a design solution. First, slices of spacial arrangement and orientation and secondly how two embrace the embedded elements and filter them into the architecture. This filtering of natural landscape became a huge tool in the design process.
Precedent Study:
The Kew House
By: Sean Godsell
Melbourne, Australia

Godsell’s use of material to filter view and light in the space, create a profound experience from the interior of the home.
The structural system of this project started to take on properties needed to achieve a good filter. By looking at vernacular building techniques one can see how light timber frame construction naturally filters light and view into the space. This is, of course, before the exterior cladding is applied.

In the diagram below I show how the structure should be used as a filtering device. Almost like a strainer be pulled from the earth. The structure interacts with the land, but does not strip the site character.
As important as it is for the structure to interact with the topography and landscape, it is of equal importance that the play with sun and shadow be just as delicate.
Schematic Design Process
The poetry in the site was addressed at all levels of the design process. In the site plan shown to the right, I wanted to show through a drawing how important the filter of the natural environment was. The structure at this point wanted to be a light timber frame construction that was interlocked together, allowing for rhythm and equality in the filter. By rasterizing the image of the site 3d model and overlaying a possible structural layout, I was able to represent the site at scale and conceptually.
As the conceptual slices began to define spacial arrangements the structural system created a tubular structure. Each tube or slice through the site defined a change in program. One slice being public and the other private.

This particular design presented at the semesters end, was the first attempted to plug-in programmatic elements. Even though the design was simple, it was lacking its simple beauty. It was chaotic in structure and missing a rhythmic quality. I might also say that it did not fit the site well.
Potential Postfissol Envelope Strategies
Although I spent a good amount of my time on the single family structure I needed to see if something could come out on the research and conceptual backing laid done in this semester's work toward the next evolution. This study was an attempt to look at the idea of planting a seed. How could the work done thus far influence evolution toward more eco-friendly or human-friendly design. My ruling on this study was that it was premature. I needed to spend more time developing a strong single family structure in order to influence better built environment.
Broads and models presented at semester review
Second Semester Design Process
It was important now after the semester review to step back and really get a grip of the structural system I was proposing. I needed to know how it was constructed because it was directly impacting the spacial quality and the filtering...
Structure system and how it filters the landscape.
Progression of slices how it sits on the site
Exploring the flexibility of the structure. How could it adapt to a different program?
The floor plan at this point proved to make the most sense. All typical programic needs are filled and spacial arrangement is clean and crisp.
Final Design Solution
The final solution for the structural system shown in a corner detail to the right. The system made up of 2”x12” members are interlocked at the corner and bolted together. It was apparent that this project could become a modular design and be fabricated off site.
As the modular design gained strength the approach began to form to that system. Shown below are two modular units that would be assembled off site in a controlled environment and truck to the site and placed in position. This process would be repeated to form the slice that is being constructed. The system is flexible in order to adjust for differing programmatic needs.
This structural system is only made up of four timber members of varying lengths and three different panel sizes of a specified glazing system.
The modular components laid out ready for assembly.
2 inch by 12 inch timber members spaced every 2 inch interlocking the vertical members with the horizontal members. The heated treated wood protects against weather conditions. The wood also acts as a thermal collector. The heat gain in the spaces between wood members can be used to heat the home.
OKALUX Triple Glazed

The OKALUX glazing system is a triple glazed system that has a installation quality a 4 inch rock wool wall. It has a low-E coating fixed inside the construction of the panel and is filled with argon gas to help with heat and cold transmission.
Also using the OKALUX system, the roof is then covered with the panels which are filled with different insulating materials. In the image above the white panels are filled with a nanogel filling that has a high R value and also has a translucent quality to the material. This panel will allow natural light to filter into the home while keeping the temperature inside at a desired level.
As you can see in the design of the roof certain areas are pushed up to allow direct sunlight into the home at certain times of the year. On top of those roof areas is the third OKALUX panel system. These panels have a thin-film photovoltaic positioned inside the panel construction. The thin-film photovoltaic will collect solar energy and also allow natural light to filter down into the home.
The timber members locked together as well as the detail of wall glazing panel meeting roof glazing.

The connection at the floor is revealed at regular intervals, allowing for a visual connection to the ground plain outside as well as creating a venting system to move hot air up to meet with cross ventilation.

Venting system detail. Operable door to engage vent when needed to move cool air throughout the house.
The venting system incorporated into the floor will allow natural cool air to enter the home from the floor and push up into the natural ventilation system along the ceiling. As air moves up through the floor and spaces in the structure, any heat gain not desired in the wood members can be exhausted.
A concrete floor is poured in the house after the construction of the modular units. In that floor is a radiant heating and cooling system. This system is powered by the solar energy produced on the roof.
The passive solar technology used in the design able to pick up some of the heat gain needed in the winter months. In the hot month of the year the home is shaded from all direct sunlight. This home may not stand alone as a passive solar house, however any more energy needed to operate the home is produced on site. This makes the home ideal totally self-sufficient.
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Natural Ventilation Application
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