

Furnishing the Future
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This book is dedicated to my grandmother, a constant source of love, support, and inspiration. Rest in peace.

Thank you to all of my family, friends, professors, mentors, jurors, etc. who helped make this possible, enriched the process, and kept pushing me forward.

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Preface

“Do what you love” and “Follow your passion” are the directions and advice given when the daunting task of an architectural thesis is barreling toward you. These are nice sentiments and, in retrospect, words of wisdom. But what should one do if one’s interests are multiple, varied, and arguably outlying one’s course of study? Such was my predicament when I was floundering to formulate a path for the focus of my Master’s year in academia.

Topics that rivet my attention and possibilities I considered exploring included the notion of contrast, anthropometrics and ergonomics, flexibility and adaptability, simplicity and sustainability, and affordable high design. As a detail-oriented person, I am continually drawn to design on a smaller scale and preserve the fields of furniture, object, lighting, fashion, and graphic design as well within the parameters of my future career path, supported by my architectural education. Selecting from these areas and avenues, frequently meandering between them as I often became caught up in research (only a fraction of which is presented hereafter), I arrived at the thesis exploration through which this book will give you a guided tour. Enjoy!

Abstract

To design is to plan and fashion the form and structure of something artfully and skillfully. Design thus encompasses many fields and mediums, tapping architecture, furniture, objects, lighting, fashion, graphics, and more. Often times the lines between these design sectors blur and designers work on projects outlying their normal range of work (if they even have one), bringing their specific expertise along with them, energizing the new realm of design with a fresh perspective.

Moving beyond and implementing design takes a project into fabrication. Whereas it was once common for a single person to design and construct a building or other project, nowadays this is quite rare and almost exclusively occurs with small ventures. There exists a level of divorce, margin of error, and misunderstanding between ideation and creation. Most manufacturing is done on a large scale for the sake of the inherent economies of mass production. Machines are more or less the real workers, as technology advances and molds us into a species of button-pushers. Such progress has led us to systems far flung from the wise processes

devised by Mother Nature wherein waste is an unfamiliar concept. Consequently, the environment is suffering for the sake of human endeavors, leading to a situation that cannot be sustained.

The public in general is largely aloof from the problem of global warming, although the green movement has certainly picked up steam in recent times. The average consumer is clueless as to the impact of various common decisions. The consequences, largely out of sight and out of mind, if made more readily apparent, could help deter environmentally costly behaviors.

This thesis examines the intersection of architectural and furniture design, the consolidation of design and production, and sustainability in industrial practice and public education. These topics are explored in a project intent upon the adaptive reuse of a former furniture factory in Grand Rapids, Michigan for the establishment of a facility that uses postconsumer goods in the design, manufacture, and sale of furniture by a company whose transparent business practices serve to help other industrial enterprises and society at large convert to more sustainable behaviors.

Thesis Paper

Today's society exhibits a culture of disposal. Or so it seems. The money and materials spent on packaging that is often thrown away minutes after purchase is staggering. The Environmental Protection Agency says that one third of the waste in a typical manufacturing and distribution operation is in packaging¹. People tend to single-use solutions—families are switching to paper plates and groan with disappointment as they discover their ancestors have deeded them the formal dinnerware capable of serving a party of twelve noblemen. The general public has accepted, nay, embraced such a lifestyle filled with fleeting companionships. Yet there is surprise and disbelief in response to the discoveries of a hole in the ozone layer, a massive swirling cesspool of debris in the ocean, and other disturbances of the natural order and balances due to human negligence.

Wastefulness appears in many mediums, physical and otherwise. People waste words, time, and effort. People waste gasoline, electricity, water, and heat. Goods spanning the width and breadth of

size and price scales are wasted too, ranging from a piece of fruit left to rot on the counter to a sofa left at the side of the road to be taken to the dump because its springs have permanently deformed. Waste also emerges in the realm of architecture as evidenced by the abundance of abandoned buildings and demolished monuments. To simplify matters in business terms, to waste anything is to waste money. So, in essence, to waste is wasteful. Then why do it? How has waste become a mainstay in a culture wherein money makes the world go round? Bad decisions. A series of bad decisions made again and again. To decide is to design. As such, this is how each person is rightfully referred to as the designer of his or her own fate. Professional designers, then, must be at the forefront making the best decisions in order to lead by example the rest of the populace, or the amateur designers, in good decision-making. In fact, without the guidance of professional designers, the average person might not even realize the bounty of options available. One can hardly expect to make the so-called right choice if one does not even know it is an available option for selection in the first place.

As some would say, with great power comes great responsibility. Many designers and theorists have realized this and invariably preach to this effect. One infamous evangelist of social accountability is William McDonough, American architect and coauthor of the staple text of the sustainability movement, *Cradle to Cradle: Remaking the Way We Make Things*. In his tome, McDonough explains the concept of intergenerational responsibility, giving a name to the duty he sees every person possessing, indebtedness to future generations of all species to fulfill the needs of today without compromising the abilities of successors to meet the needs of tomorrow². More or less, he urges the recollection of times gone by when people, entrenched in the lines of small interdependent tribesmen, could not help but consider the consequences of every action, not just in terms of personal repercussions, but the effect upon group dynamics and the natural environment. Despite the prevalence of social networking and connective technologies, people often forget the complex interrelations sometimes hidden, but nevertheless vital to the world's functioning.

McDonough directs his readers to follow the green permeably paved brick road leading to the impressive emerald city of the future. The journey requires the utilization and implementation of numerous tactics aimed at augmenting sustainability. One such tactic is to nurture biodiversity. With a range of species in an environment's plant and animal life, it is less likely that damage to or removal of a single thread will cause the interwoven web of life to unravel detrimentally. Similarly, decentralization of operations prevents the destruction of an entire system due to the downfall of a single node. Furthermore, decentralization allows for great local specificity. When a problem is well-defined it can be solved more efficiently and economically, typically, with nearby resources, thereby minimizing negative environmental impact by avoiding the risky introduction of foreign goods and services via energy-consuming and pollutive long-distance transportation. McDonough also recommends looking to nature for answers, as years of trial-and-error have led to the evolution of unparalleled solutions to countless types of problems. And, in

nature, he explains, waste is a foreign concept. The output of one system or process always becomes the input for another. Nature operates cyclically. Hence, nature's problem-solving yields not only highly effective, but also sustainable responses, ripe for emulation.

Although setting environmental standards seems admirable, McDonough argues that regulation indicates shortcomings and the ultimate goal for any design project should be eco-effectiveness. By this he means that people should strive not only to be less bad for the environment, but to actually improve the existing circumstances with their actions³. This usually requires limitations on the number and types of materials used, respectful business practices, restoration efforts, and sometimes the complete abandonment of past systems to allow for radically innovative methods to take reign⁴. Specific to products, McDonough and business partner Michael Braungart have established a certification system recognizing those items composed of high amounts of recycled materials and which are highly recyclable themselves at end of life.

Another flag bearer for social responsibility is Dr. Donald Norman, computer science professor, cognitive science expert, human-centered design pioneer, and author of *The Design of Future Things*. Reminiscent of McDonough's charge, Norman declares the existence of a common social duty to consider other people, in the past, present, and future, when trying to fulfill one's individual needs. Design itself, he states, is the deliberate shaping of the environment to satisfy individual and societal needs⁵. To achieve such, Norman believes designers need the rigor of business, an understanding of social interactions, and the aesthetics of art⁶. In fact, he states that designers need to be generalists in order to keep a watchful eye on the big picture and should call on specialists as needed⁷. And although designers have much power in terms of the presentation of options and ability to sway decisions, this power can only be fully tapped when designers share information and work in conjunction with end-users because collaboration fosters trust. Designers must, of course, not abuse this trust, and remember their fiduciary responsibilities, aiming for outcomes that benefit all involved. Norman also, despite being a strong supporter of new technologies like smart

homes, warns that overautomation can lead to inattentive human operators, resulting in undue danger⁸. Machines are advancing, but they cannot do everything.

Considering the power of decisions and design, this thesis confronts the notion of waste in the architecture and furniture industries. Hopefully, by design, the right decision will become easier to make. Through the reuse of an old factory and of goods diverted from landfills, a company is proposed to present consumers with a variety of furniture options, each piece a respectable exemplar of the opportunities embedded in what many people might consider junk. Creative minds can take advantage of the possibilities inherent to materials and items, or even generate new potential. The proposed business will consequently employ many more designers than typical furniture companies. Decidedly, however, the existing state of the furniture industry will be studied (see Case Studies) to inform the constitution of this new business model. Particular issues of importance relate to manufacturing and design philosophy, besides business operation, programmatic distribution, physical structure, adaptive reuse, public education, and branding.

Simplification is the name of the game when it comes to manufacturability. Lean manufacturing processes are described in the video *Design for Manufacture & Assembly* produced by *Manufacturing Engineering* magazine. To achieve quicker, easier, and cheaper fabrication, the number of parts and materials in a product need to be distilled to as few as possible. Limitations as to the number of moving parts, the number of fasteners, and the ways in which the parts can fit together can also streamline the process of assembly⁹. In addition, prototyping is an incredibly effective method for understanding and working out details in configuration.

Even the great furniture, exhibition, toy, graphic, video, and architectural designers Charles and Ray Eames utilized prototyping in their design processes. The legendary couple rose to fame through their ingenuity with materials and ability to design for mass production, integrating quality into quantity while avoiding driving up price. The constant undertone to their work was a devotion to functionalism once expressed by Ray with, "It matters less if it looks good, as long as it works."¹⁰ However, the Eameses also believed that



Charles & Ray Eames

delight was an often overlooked purpose, so at times marketed their pieces as “functioning decoration.”¹¹

The Eameses for many years worked with the furniture company Herman Miller, whose ideals and philosophies paralleled their own. The company has always seen design as problem-solving and aims for solutions which are clean, simple, functional, and honest, without subscription to fads, as they see good design is able to produce its own market. Herman Miller also believes that inspiration can often come from unexpected sources and that great design capacity cannot be confined to a single outlet, encouraging their collaborators to broaden their scopes, as well as attracting talent from varied backgrounds.

Such amalgamation of creative minds was seen historically in the German Werkbund movement. It was a general association of businessmen, artists, architects, teachers, publishers, and other professionals united solely by their devotion to quality, however they chose to define the term. The association had a functionalist tilt, which is not surprising since a main requirement for entitlement as high quality is fulfilling a purpose well. The

Werkbund struggled with industrialization, seeing the advantages of mass production, but simultaneously the Marxist concern regarding the alienation of the laborer from the product due to the assembly line process in which each worker is typically responsible for one task or part, while the employing company dealt with the final products.¹² The Werkbund also took issue with industrialization for what would now be termed ecological and health concerns such as air pollution. The separation and faulty communication between designers and makers was a hot topic, too. Often times the intent of a decision can be lost as details are worked out by people uninvolved in the development of a concept. Consolidation, or at least compression, of worker functions in the company proposed in this thesis addresses these issues, positing new interdisciplinary roles. If a person is not necessarily a designer, manufacturer, and seller all at once in the proposed arrangement, he or she can at least fulfill these roles at different times of the day, work week, or year, for simple exposure's sake. Walking a mile in the shoes of one's coworkers naturally engenders understanding, cohesiveness, and cooperation in the workplace. A survey of job

types of this sort might also be beneficial in identifying talent and fit for a person's primary usage.

As for the debate over the basic merit of mass production, a return to handcraftsmanship typically cannot be economically competitive. However, when dealing with a varied flow of material input like the donation circumstance proposed for the business in this thesis, machines capable of handling the modifications to such material into final products would need to be highly adaptable, equating to higher expense. To maintain the range of inputs and outputs envisioned, basic tools and machinery coupled with primarily human power seems the best fit.

Some might also be concerned about the available market. Who would want to buy old furniture or things made out of "junk"? The designs and forms of reuse in the company would need to be cleverly ingenious and unexpected to shock customers into realizing the value of the reincarnation of once landfill-bound materials. Much like Herman Miller, the attitude would necessarily be that good design creates its own market, although the recent development is that green is becoming the new

black—sustainability is fashionable, luxurious even. The model of clever repurpose is not entirely new anyway. Image is everything, as pop culture icon Madonna has proven with her countless reinventions that keep her in the public eye. Take also the niche market of vintage clothing and its continual reappearance as itself fashionable or influential to current designs. In terms of architectural and interior design, examples abound as well. In *Good House Cheap House*, Kira Obolensky presents illustrations of the phenomenon with hammers hung upside down as a coat rack, corrugated metal pipes from drainage ditches serving as entry columns, and high school chemistry work surfaces becoming durable kitchen countertops. Architectural salvage and careful deconstruction are continually more viable options. This is not to say that technology should stagnate, but current utilization and original purposes are fast becoming outdated by the resourcefulness jumpstarted by a recession in the economy. Society must take the time to relearn how to use its existing resources concurrently with the development and discovery of new sustainable supply chains.

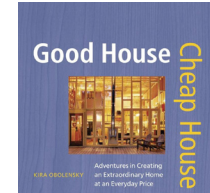
1. *Beyond Recycling*.
2. McDonough, *Cradle to Cradle* 181.
3. McDonough, *Cradle to Cradle* 165.
4. McDonough, *Cradle to Cradle* 181.
5. Norman, *Future Things* Ch 7.
6. Norman, *Future Things* Ch 7.
7. Norman, *Future Things* Ch 7.
8. Norman, *Future Things* Ch 4.
9. *Design for Manufacture*.
10. Berry, *Herman Miller* 107.
11. Kirkham, *Charles and Ray* 166.
12. Burckhardt, *The Werkbund* 8.

Research

Research for this thesis heavily utilized books, but also videos, websites, and other methods. Topics of research included design philosophies and methodologies, advancing technology, sustainability, and innovations in materiality. The following are short summaries of some of the more influential resources tapped.

<i>Good House Cheap House</i> -----	14
<i>The Design of Future Things</i> -----	15
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<i>Cradle to Cradle</i> -----	18
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Good House Cheap House
Kira Obolensky



old found hammers used in an eye-catching coat rack

Obolensky touts the innovative ways in which various architects and designers have substituted materials, carried out methods, and cut corners to save money on projects without losing quality in the design. For example, sliding glass doors can be utilized as large operable windows. She also promotes the use of salvaged and recycled materials to not only save money but also to increase a project's sustainability. In terms of design philosophy, Obolensky maintains that well-designed architecture has dynamic form, nice proportions, practical interior spaces, lasting quality, and pleasing details. Details can be even more special when the number of them is limited, she says.



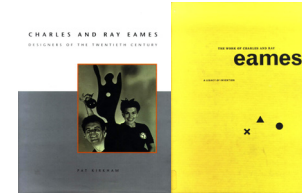
The Design of Future Things

Donald A. Norman

Much of Norman's teachings were previously discussed in the thesis paper, but besides his definition of and requirements for design, he provided valuable insight on the value of good design and inspiration one can find in nature. As he recounted the strengths and weaknesses of automated intelligent machines, he focused on the ease of use for humans. When one can perceive the opportunities for use, one can readily and intuitively understand something's operation. Truly good design thus need not be explained. Despite his belief in technology, Norman cannot deny the genius of natural solutions. He illustrates by speculating on the incorporation of swarm mentality into smart vehicles, permitting the elimination of lanes, signals, and other expensive infrastructure while still avoiding crashes and increasing efficiency.



Donald A. Norman



...Designers of the Twentieth Century

Pat Kirkham

...A Legacy of Invention

Donald Albrecht, et. al



print ad for an Eames molded plywood chair design

As previously mentioned in the thesis paper, the Eameses were problem-solving designers rather than stylists. After defining a clear problem, they would devise an innovative solution, typically with a minimum of materials and complexity, thereby instilling within their designs ease of manufacturability at a low price. The pair were innovators, testing the limits of materials using new methodologies and viewing the world with as few preconceived notions as possible. They surprised not only with unique designs, but decontextualization in their print ads. Unexpected backgrounds would surprise and delight, causing the public to view things in new ways. Much of the graphic design work was done by Ray, while Charles specialized more in engineering and construction techniques.



Herman Miller: The Purpose of Design

John R. Berry

The Herman Miller Collection 1952

Herman Miller, Inc.

The continuing success of Herman Miller is a testament to one of their strongly held beliefs--that there is always a market for good design. Of course, what constitutes good design is debatable, but the company has traditionally held the necessary attributes to include functionality, material efficiency, ease of manufacturing, and visual appeal. However, there is a tendency in aesthetics toward modern designs with clean simple lines, honest construction, and mobility. Such results usually stem from a logical design process, they claim, but one that is open to unexpected inspiration. Herman Miller believes that seemingly disconnected ideas, fields, and experiments can invaluablely inform design decisions, so they encourage well-rounded educations and diversified interests.



Herman Miller's infamous Aeron chair

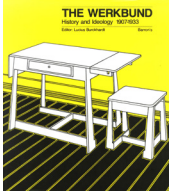


Cradle to Cradle: Remaking the Way We Make Things
William McDonough & Michael Braungart



*Herman Miller's Green House Factory & Offices
LEED Pioneer design by William McDonough*

McDonough & Braungart are the most sought-after sustainability consultants. They have helped many big name businesses clean up their acts, including Nike, Ford, and Herman Miller. The process is driven by the effort to restore everything from the nutrients in the soil and cleanliness of the air to natural day lighting and employee morale. Although change is difficult, the pair advocate the abandonment of existing systems to allow for dramatic innovation. Naturally, the compositions of products and building materials need to be considered carefully, weeding out known environmentally harmful culprits like many heavy metals and PVC, and exchanging these for positive alternatives which do not off gas, pollute the water and soil, and/or are easily biodegradable, reusable, or recyclable.



The Werkbund: History & Ideology 1907-1933
ed. Lucius Burckhardt

As said before, the Werkbund was held together by a striving for quality. Constructive criticism, not surprisingly, was thus highly encouraged and valued for the improvement of processes and products. Designs emerging from this group were simple, without ornamentation, capable of being mass-produced, and consequently reasonably affordable, which is why the target market was the middle class, but even aristocrats were attracted to the resultant aesthetics. Peter Behrens is included among the Werkbund's members and is considered by many to be the first industrial designer. Many people involved were obsessed with manufacturability, helping to give rise to the International Style. It is so named because it is believed that its outputs can fulfill the needs of anyone, no matter the context.



van de Velde silver vessel



Cut Loose: A Documentary Film on Studio Furnituremakers
dir. Doug Weihnacht



*Gary Bennett & David Paris with their acclaimed
The River Flows Through desk*

Interviews with four furniture designers, as well as seeing some of their pieces, provided insight into an array of design philosophies, material sources, and inspirations. Gail Fredell is inspired by serenity in the natural landscape. Jeff Benedetto is inspired by the hidden potential in junk. Gary Bennett enjoys combining disparate materials and including hidden details. Meanwhile, Philip Agee reinterprets existing furniture prototypes. All agree that objects not only serve purposes, but can bring joy to everyday life. One of the most profound statements, a cry for simplicity, was uttered by Fredell:

Knowing where to end is easy--that's when I've managed to pare the designs down to an absolute minimum, where there's nothing I can take away and nothing that I can add to the design that wouldn't compromise its integrity or its sense of resolution.



Transmaterial

ed. Blaine Brownell

Material ConneXion

George M. Beylerian & Andrew Dent

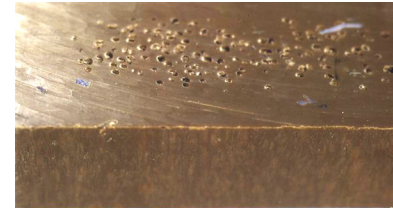
Material World 2

materiO

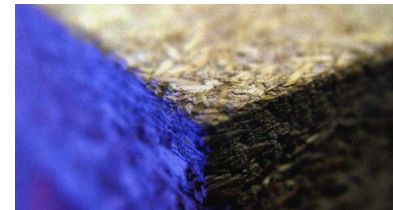
The tremendous range in materials available is mind boggling and new ones are constantly being developed. The majority of materials can be recycled. The true question is if the composition deteriorates from this process (and if so, how much) and whether or not it is cost effective. Research for this thesis began investigating recycling, but the complexity became quickly apparent and many pointed out that such matters are not often handled by designers. Furthermore, the equipment requirements would be hard to discern unless a narrow range of inputs were to be accepted by the proposed business. Focus then turned to reuse, which is actually more sustainable because there is much less processing and thus less energy spent, not to mention a faster turn-around time.



Wellies Sheets by Smile Plastics are composed of melted rubber children's rain boots; uses include floor and wall coverings, tabletops, etc.



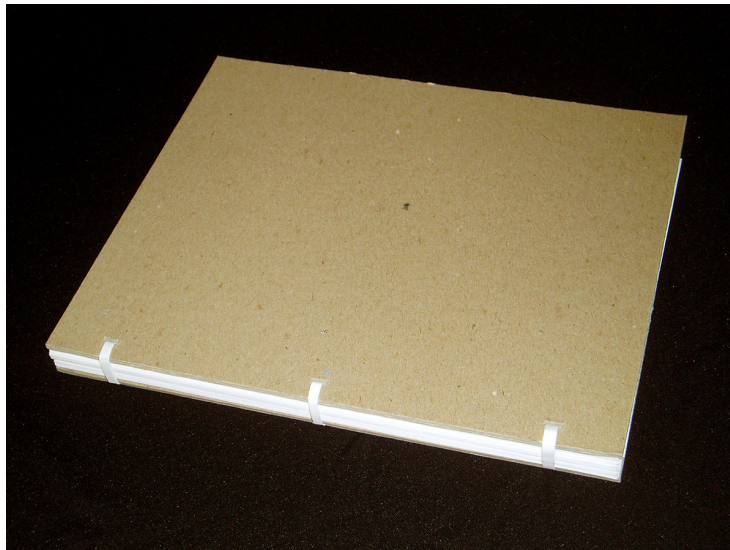
postconsumer plastics can be recombined into a material than can be used and worked just like wood; saltwater, chemical, and pest resistant



PanLin is an alternative to wood particle board composed of flame retardant, fully recyclable linen industrial scraps which also insulate acoustically



materials eliminated, some used for experimentation



slimmer, simpler result

Sketch Problem One: Materials Library Binder

Given: a typical materials library binder

Mission: create something embodying the thesis

Rather than crafting some abstract representation, the binder was submitted to a simplification process much like the designers at the proposed furniture company would utilize in their work. A series of tests were executed in a fashion similar to the prototyping process utilized by the Eameses and many other designers. Through the innovative use of paper to bind itself, the metal three-ring binding mechanism and attached plastic cover were able to be eliminated. The weaving of paper strips and resultant friction still allowed for the attachment of a stiff protective cover to the booklet, the chipboard found within the plastic encasing. Furthermore, since the binder happened to be for a furniture line, the collection was pared down, eradicating the overly complicated and ornate wasteful designs. In the end, the information was compiled with only two materials, simplifying things once the time to recycle arrives and the thinner volume would take up much less space on a shelf.

Case Studies

To be thorough and inform design decisions, research included the touring and analysis of several existing companies. Those studied were selected for their integration of green features in their manufacturing facilities and to get an understanding of the sustainability of the mainstream furniture industry.

Ford Rouge-----	24
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HAWORTH®

 Herman Miller





Ford Rouge: Overview

Henry Ford envisioned and realized, with the help of architect Albert Kahn, one of the largest and most efficient manufacturing facilities in the world, which has now been in operation in Dearborn, Michigan, since 1919. Time catches up with even genius developments, though, so Ford found itself with 600 acres of outdated brownfield industrial site approaching the turn of the century. Rather than abandoning the area, Ford invested \$2 billion to bring the plant into the new millennium. Welcome to the age of lean and flexible manufacturing!

Ford brought in none other than William McDonough to help with the updates. The Rouge is now home to one of the largest living roof systems in the world with over 450,000 square feet of sedum. This green roof helps lower indoor temperatures, reduce heat reflection, mitigate storm water runoff, and restores natural habitat taken by the building footprint. Rainwater is collected and stored beneath the porous pavement of the parking lots and treated in natural bioswales and wetlands. Phytoremediation is also in the process of purifying contaminated soil in the area. Meanwhile, large monitors break up the expansive roof and provide factory workers with floods of natural day light.



HAWORTH

Haworth: Overview



Haworth's long light-filled atrium

Haworth is a global company specializing in office furniture and systems headquartered in the suburbs of Holland, Michigan, adjacent to a major highway, convenient for shipping by truck. No longer utilized, a rail line also passes its location. Among the major furniture companies, it has the most recent substantial architectural advancement. A circulation atrium, café, adaptable office infrastructure, green roof, and material exhibits are all part of the addition and reconstruction, which recycled 98% of the materials from the existing building. One unique method was to grind up the old glass windows to create new terrazzo flooring. The abundant natural light, open floor plans, and mixing of programs makes for a pleasant environment rife with social interaction and educational opportunity, although tours are mostly conducted for clients and are not well publicized for general audiences. Haworth is striving for more sustainability through careful material selection, emissions reductions, and a goal of zero waste. The headquarters building is one piece of a complex housing four different manufacturing facilities, a shipping center, and a so-called recycling center which is simply an area for sorting production and employee household wastes eventually sent elsewhere for processing.

HAWORTH

Rail Lines
Major Highway
One Haworth Center, et al

Industrial

Rural



nearest recycling center: 4.4 mi N
nearest international airport: 35.4 mi ENE
nearest landfill: 10.9 mi S

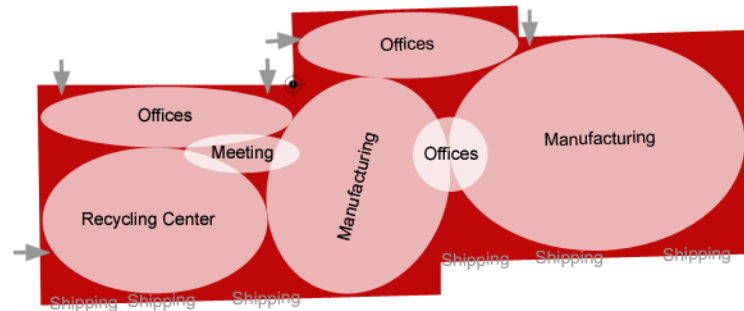
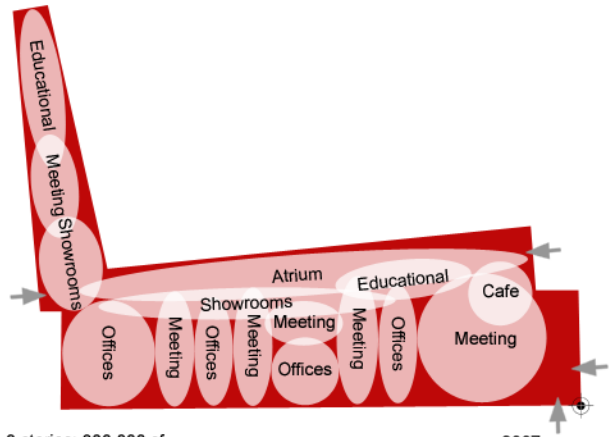
Agricultural

HAWORTH

Haworth: Spatial Organization

Culture: Collaborative/Intermixed

The recent renovation and expansion of the Haworth headquarters was based on research of work styles, so the whole building serves as a lab. Three floors of interspersed offices, meeting spaces, and showrooms overlook a long atrium that terminates in a perpendicular wing focused on education. Permanent walls are outnumbered by movable ones to allow for reconfiguration as necessary. Individual work spaces are rather small, but group discussion areas abound. The panel plant connected in the rear has office/break areas at intervals along the production line and wide aisles to help accommodate the automated guided vehicles.



1-3 stories; 300,000 sf

2007



One Haworth Center



inside: lounge/showroom

1-2 stories; 348,000 sf

1979



Panel Plant & Recycling Center

Haworth: Zody Chair



designed by ITO Design



- disassembles in fifteen minutes
- up to 98% recyclable (take-back program)
- parts labeled with ISO recycling & material info
- up to 51% recycled content

Materiality

- includes aluminum, steel
- 100% recycled & MBDC optimized fabric selections available
- no PVC, CFCs, PBDEs, or chrome

Durability & Use

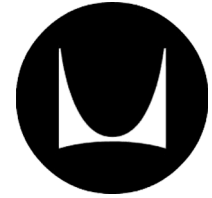
- limited lifetime warranty

Production & Transport

- assembled in Allegan, Michigan & Bruce, Mississippi
- produced with wind energy or offset by purchase of renewable energy certificates

Certifications & Awards

- MBDC Cradle to Cradle Gold Certification (first chair!)
- GreenGuard certified for low or non-emitting
- contributes to LEED certification for recycled content, regional materials, &/or low emitting materials
- GOOD DESIGN Award 2005
- Australian Environmental Choice Award 2006
- Gold IDEX/NeoCon Canada Product Award, Seating: Desk/Workstation Chairs 2005
- Silver Best of NeoCon Award, Seating: Ergonomics Desk/Task 2005
- Silver Industrial Design Excellence Award 2006
- I.D. magazine Annual Design Review 2006 Honorable Mention in Furniture
- American Physical Therapy Association Endorsement 2005
- 16 patents pending

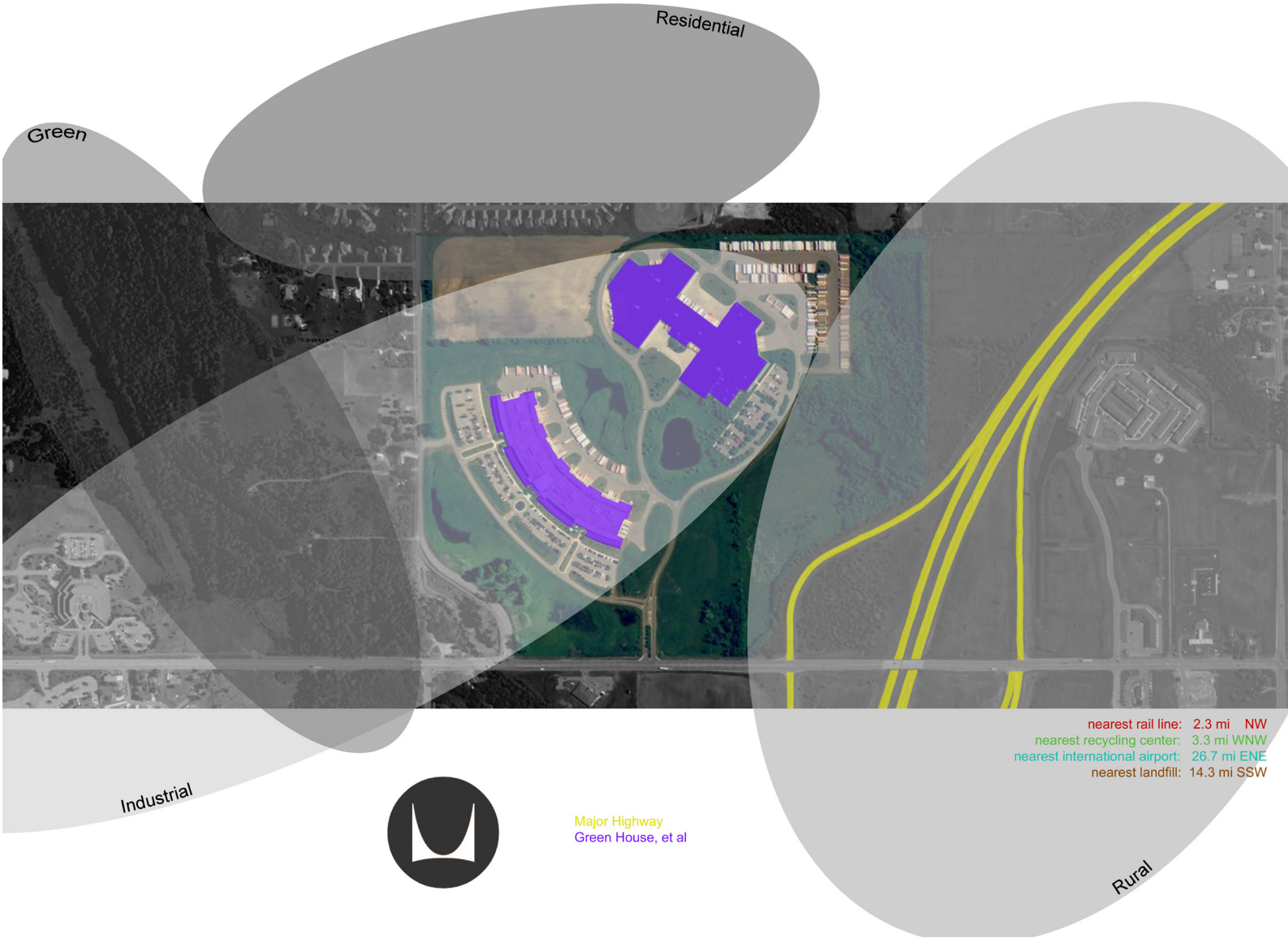


Herman Miller: Overview



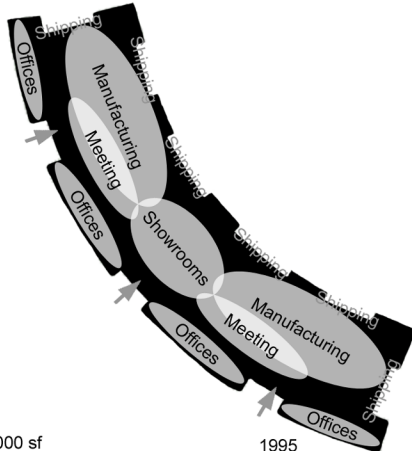
"The Street" of Herman Miller's Green House

Herman Miller is a top producer of furniture for office, healthcare, learning, and residential applications. The company is headquartered in Zeeland, Michigan, near a major highway and has branches around with world. The culture is hierarchical only in titles, with no special parking, and frequent intermingling of departments thanks to permeable spatial divisions and many common plaza like circulation areas. The company is firmly committed to sustainability, as demonstrated in its participation in the upstart of the U.S. Green Building Council and collaboration with William McDonough to make its headquarters a LEED Pioneer building. In fact, Herman Miller is among the top five companies with the most LEED Gold buildings. They have a zero waste goal established and their Design for the Environment department continues to collaborate with McDonough and Braungart to shift their product materials to more sustainable options. This parallels their long history of partnerships with big name designers, including the Eameses.





Herman Miller: Spatial Organization



1-2 stories; 295,000 sf

1995



Greenhouse Factory & Offices

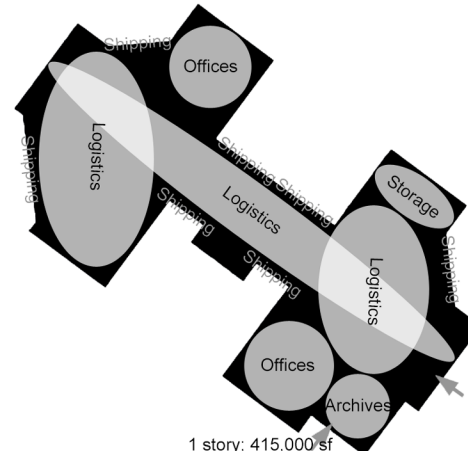
LEED Pioneer



inside: showrooms

Culture: Shared Spaces/Layers

Greenhouse departments are connected by a communal hallway known as "The Street." It houses the necessities of restrooms and dining spaces, as well as provides entertainment with table games and folk art pieces. Programmatic areas are long strips having both blurred and distinct boundaries, allowing for interaction without undue distraction. As long as they meet their deadlines, office workers can set their own hours and work where they please. If so inclined, they can play some basketball on the court upstairs! The distribution center provides large spaces for unloading, organizing, and packing orders.



1 story; 415,000 sf

1989



Midwest Distribution Center

Herman Miller: Celle Chair



designed by Jerome Caruso



- disassembles in five minutes
- 99% recyclable
- parts labeled with ASTM recycling codes
- 33% recycled content (28% post-consumer)

Materiality

- includes steel, molded polymer plastic, & textile

Durability & Use

- 12 year 24/7 warranty
- easy part replacement
- adjusts to fit 95% of people

Production & Transport

- assembled using renewable energy
- domestic orders ship blanket-wrapped
- other orders ship with recyclable polyethylene bags & cardboard boxes

Certifications & Awards

- GreenGuard certified for low emitting
- BIFMA Level 2 certified
- contributes to LEED certification for returnable/reusable packaging, durability, recycled content, &/or regional materials
- GOOD DESIGN Award 2005
- Best of NeoCon Innovation Award 2005
- People's Choice Award at National Ergonomics Conference & Exposition 2005

Steelcase: Overview



Steelcase University showroom & meeting spaces

Founded as The Metal Office Furniture Company in 1912, Steelcase continues to be an international leader in interior work environment elements. It is still headquartered in Grand Rapids, Michigan, but has facilities around the globe (and scattered all over Grand Rapids). With such a vast network of buildings, transportation is key. Steelcase relies mainly on truck transport, so shipping would be much more efficient if their locations were nearer to highways. The work force is segmented among the many buildings, mostly divided by function. This allows for little interaction with people outside one's department. The architecture itself in each of these facilities is outdated as well and was designed for a different generation of worker. Remodeling projects are a frequent occurrence and help to update the company and draw new talent, but the transformation is slow. The environments are gradually becoming more relaxed, open, and lounge like. Updates also incorporate sustainable elements like bioswales and porous concrete. Steelcase, like the other major furniture companies, also has a zero waste goal set.

Industrial

Steelcase

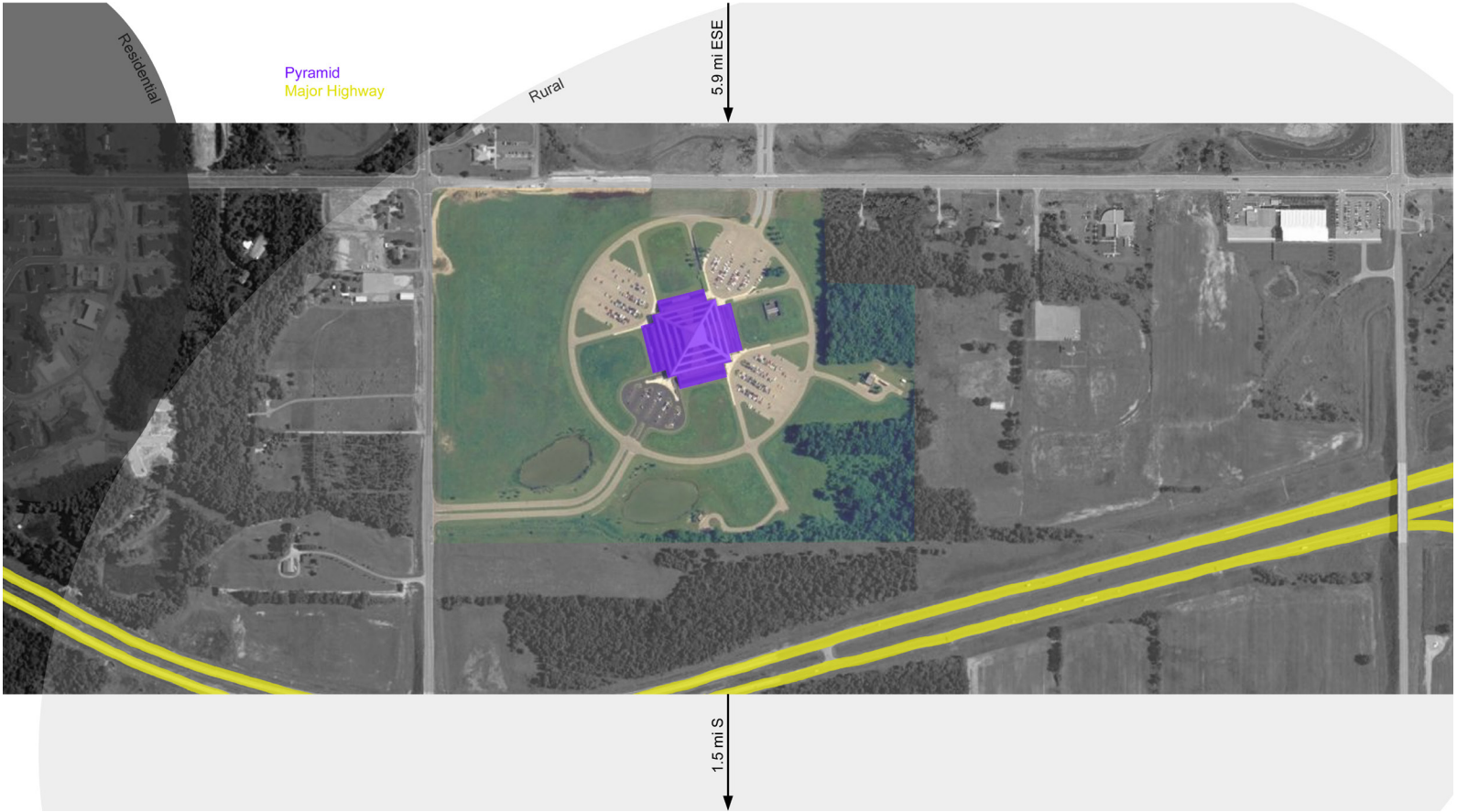
Headquarters, University, et al

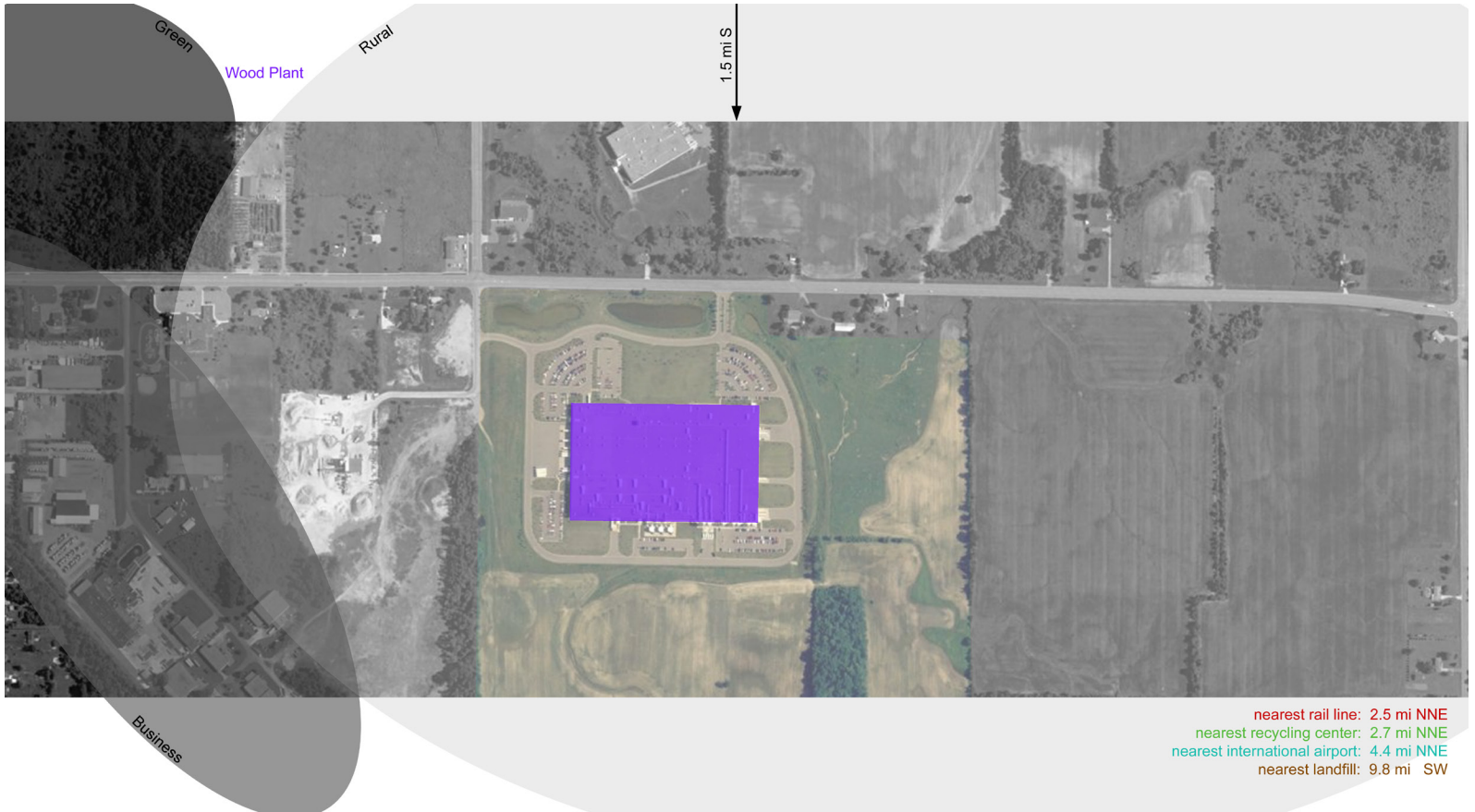
Residential



5.9 mi ESE

Business



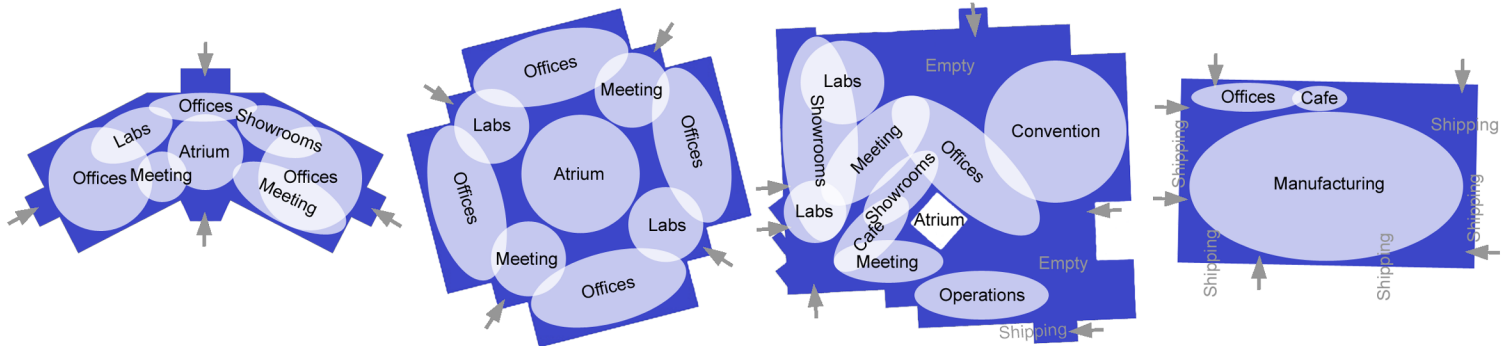




Steelcase: Spatial Organization

Culture: Separatist/Satellite

In Headquarters and the Pyramid, central atriums dominate the plan, movement between spaces is guided by labyrinthine branching hallways, and elevators are vital. Areas of the developing University building flow together more, visually if not physically. The more open spaces, cutting edge technologies, and contemporary aesthetics are attracting employees from the scattered other buildings, who are accommodated by numerous unassigned first-come-first-served work stations. Manufacturing facilities like the Wood Plant are the prototypical big empty box factories with suggested circulation paths painted onto the floor.



4-5 stories; 395,000 sf

1983

1-6 stories; 575,000 sf

1989

1-2 stories; 745,000 sf

2000

1 story; 600,000 sf

2001



Global Headquarters



Corporate Development Center



University Learning Center



Wood Products Plant

LEED Silver

Steelcase: Think Chair



designed by Glen Oliver Löw



Materiality

- disassembles in five minutes
- up to 99% recyclable by weight
- parts weighing more than 50g are labeled for easier recycling
- up to 44% recycled content

Durability & Use

- includes acetal, aluminum, nylon, polyethylene terephthalate, polyurethane, polypropylene, steel, & zinc
- no VOCs, CFCs, HCFCs, heavy metals, or other hazardous materials
- McDonough Braungart Design Chemistry consulted for material selection

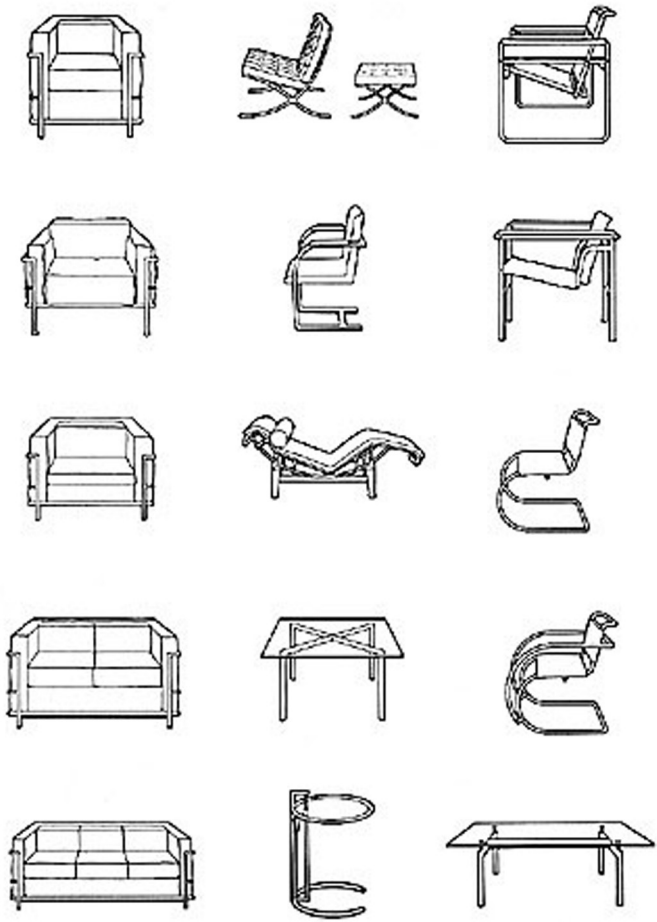
- lifetime warranty
- tested for up to 300 lbs
- Life Cycle Assessment by Denmark's Institute for Product

Production & Transport

- manufactured in Grand Rapids, Michigan; Sarrebourg, France; & Kuala Lumpur, Malaysia
- ships in pieces, ready to assemble

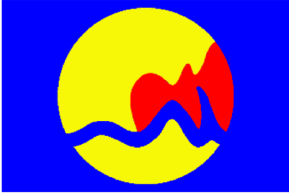
Certifications & Awards

- BIFMA e3 Level 3 certified (first product!)
- SCS Indoor Advantage Gold Certification
- NF Environnement Label in France
- contributes to LEED certification for recycled content, low emitting materials, employee health, &/or innovation
- GOOD DESIGN Award
- iF Design Award in Germany
- Enterprise & Environment Award for Best French Eco-Product
- Red Dot Award for Product Design
- NeoCon Editor's Choice Award
- Gold Industrial Design Excellence Award for Design, Functionality, & Innovation
- Gold IIDEX Sustainable Design Award
- Gold IIDEX Innovative Product Award
- Silver IIDEX Workstation Seating Award



Site Selection & Analysis

Every project, even a hypothetical one, needs to have a context. Considering a project related to furniture, Grand Rapids, Michigan, naturally comes to mind. Its history with furniture is common knowledge. It is also a growing city well on its way to becoming the next major metropolis of Michigan, an excellent place to start a business. In-person research included traversing the city on foot, taking in the Art Prize festival, and visiting museums.



Grand Rapids, MI

Established 1850
Second Largest City in Michigan

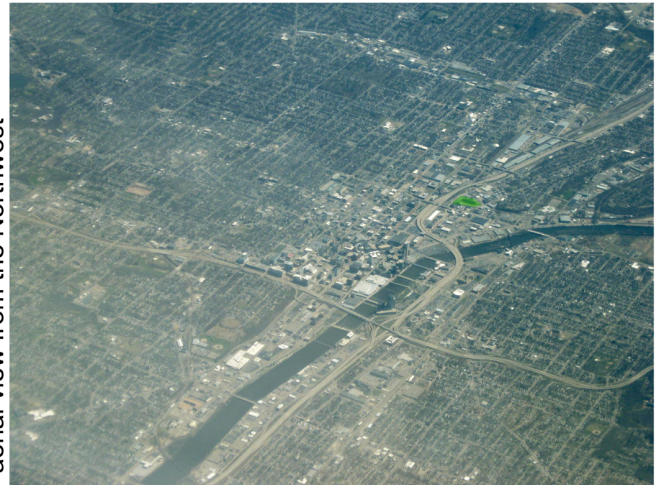


- Furniture Capital of the World, formerly
- Office Furniture Capital of the World, currently
- Kendall College of Grand Rapids educates 90+% of the American Society of Furniture Designers
- Aquinas College of Grand Rapids offers the rare Sustainable Business degree
- 13th in the World Knowledge Competitive Index
- 1st in the U.S. for # of green buildings per capita
- one of the top metro areas to start and grow a business (*Entrepreneur* and the *National Policy Research Council*)
- Grand Rapids private companies have the highest median revenue of any U.S. metro area (*Inc.* magazine)

Population (city proper):	193,167 people and growing
Population (combined statistical area):	1,333,240 people and growing
Working Population:	634,101 people
Time to Workplace:	Less than 15 minutes 33.65%
	15-29 minutes 41.22%
	30-44 minutes 16.05%
	45-59 minutes 5.10%
Education:	High school graduates 32.30%
	Some college or associates degree 30.63%
	Bachelor's degree 14.76%
	Graduate or professional degree 6.38%
Manufacturing Employment Sector:	21.3%
Top Employers:	Steelcase (5th)
	Herman Miller (8th)
	Haworth (16th)



airial view from the Northwest





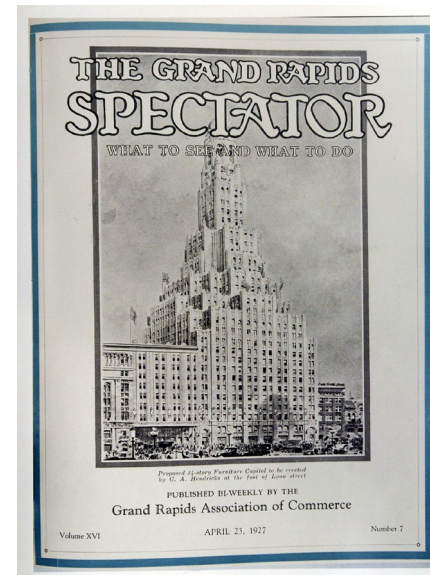
The Furniture City

The furniture industry took form in Grand Rapids due to its abundant surrounding forests, easy river transport of logs, and a hard-working immigrant work force with skills in cabinetry and wood carving. Most businesses started small and local, expanding with branches into larger markets and transitioning from physical samples shown by traveling salesmen to graphic catalogs sent by mail. The arrival of trains to the city in 1858, along with steam engines and other mechanization, decreased the industry's dependence on the Grand River.

The city became recognized as a leader in fine furniture production beginning with the 1876 international exhibition in Philadelphia and continuing through the 1960s. A semi-annual furniture market was held for three weeks each January and July from 1878 through 1964, bringing together local and distant buyers and sellers. At the peak, furniture factory wages accounted for almost half of those in the entire city. The largest factory complex was 1.5 million square feet and the tallest rose seven stories, making it the second tallest building in Michigan at the time. Most factories were brick for fire safety reasons and long to house the linear manufacturing process. Companies typically held no inventory, simply filling orders as they were submitted.



As furniture companies gained notoriety, they had to protect their designs with special labels and seals. The majority of companies transitioned from wood into metals and plastics in the first ten years of the 20th century. The Furniture Capitol Building was proposed in 1925 to provide one million square feet in 34 stories for showrooms, restaurants, a museum, and train station, but the stock market crash precluded implementation of the plan. Nearly all of the remaining companies specialize in office furniture or comparable niche markets.



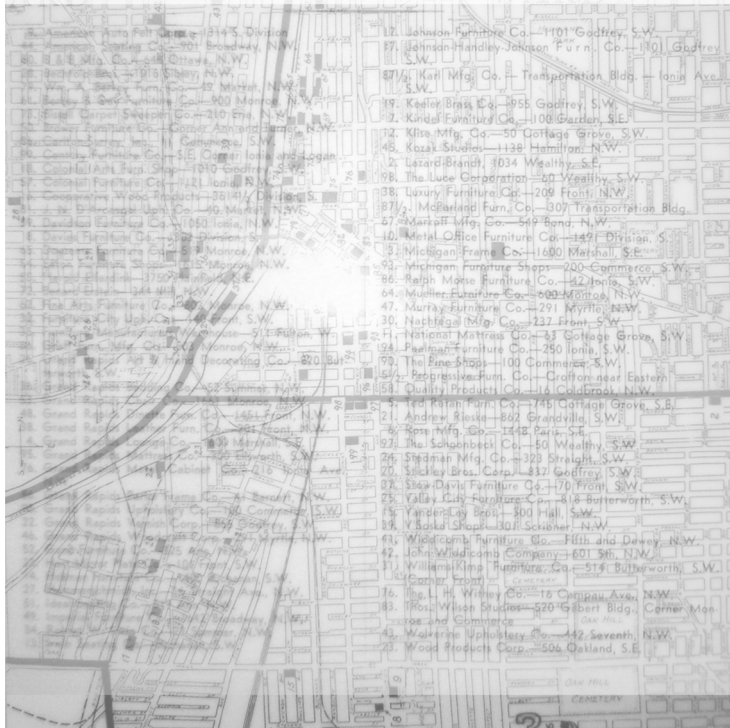
GRAND RAPIDS FURNITURE EXPOSITION ASSOCIATION

FURNITURE MAP OF GRAND RAPIDS

Showing Location of Railroad and Bus Stations, Hotels, Furniture Exhibition Buildings and Furniture Factories

Common Reasons for the Failure of Grand Rapids Furniture Businesses:

- Bad Partnerships/Mergers
- Directors Dying/Stuck in Ways
- Inability to Judge Public Taste
- Prison Labor Drove Prices Down
- Mismanagement
- Failure to Mechanize
- Succumbing to Competition
- Depressions, Wars, Strikes, etc.

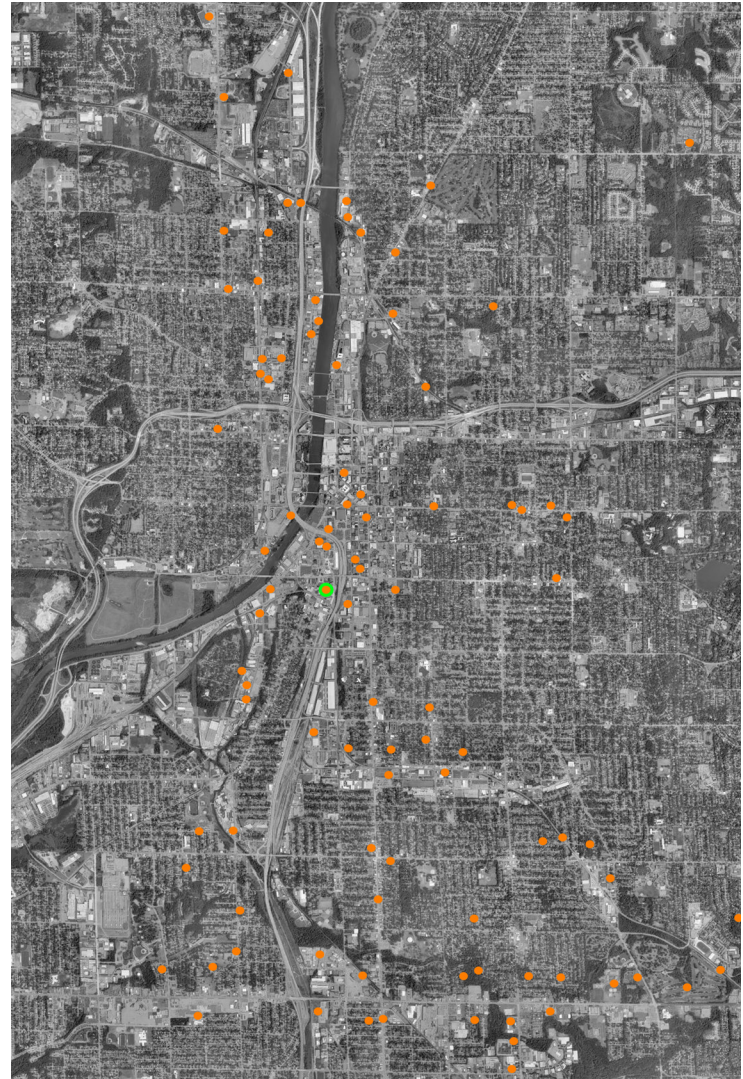


Census Year:	1860	1870	1880	1890	1900	1905	1910	1915	1920	1923	1927	1929	1940	1947
Number of Firms:	9	8	15	31	34	38	54	67	71	72	70	72	47	88
Number of Employees:	53	281	2,279	4,347	6,236	6,654	7,220	6,991	9,372	11,055	12,692	12,096	2,942	5,026
Total Wages:	14,802	121,590	720,000	2,000,000	2,562,000	2,460,000	3,960,000	4,313,000	10,594,000	15,829,000	17,517,000	17,350,000	3,063,000	14,704,000
Capital:	31,200	329,500	1,636,000	5,500,000	8,362,000	8,005,000	13,322,000	17,314,000	27,453,000					
Cost of Material:	6,978	117,650	908,000	2,225,000	3,300,000	3,582,000	4,937,000	5,558,000	13,363,000	21,000,000	20,695,000	21,034,000		
Value of Product:	32,255	348,900	2,016,000	5,639,000	7,435,000	9,409,000	12,630,000	14,940,000	34,962,000	53,000,000	55,810,000	57,851,000	10,375,000	
Value Added by Manufacturer:				4,150,000	5,826,000	7,693,000	9,221,000	21,079,000				36,211,000	6,285,000	19,400,000

In the 1870s, three to five furniture businesses closed each year. They were quickly replaced by others. More stability came with the turn of the century. With all the competition, companies must be run well to avoid failure. Innovation can help an enterprise stay afloat.

While competition can drive one out of business if one is not careful, it also forces a company to stay on its toes and try new things. Competition drives innovation.

The Furniture Resources on the map range from cabinet makers and upholsterers to Steelcase and Art Van.



● Furniture Resources
● Site



- Recycling Resources
- Site

Despite the benefits of competition, cooperation can yield impressive positive results as well. Businesses that work together can help sustain one another during recessions. Plus, an allied business can help voice concerns and opinions when a stand must be taken in regulatory politics. Whatever the proposed business in this thesis ends up not being able to reuse or recycle itself needs to be turned over to a facility that can deal with it appropriately, preferably the closest one available. Louis Padnos, a recycling facility used by Haworth, Herman Miller, and Steelcase, has a location in downtown Grand Rapids right by the Grand River.

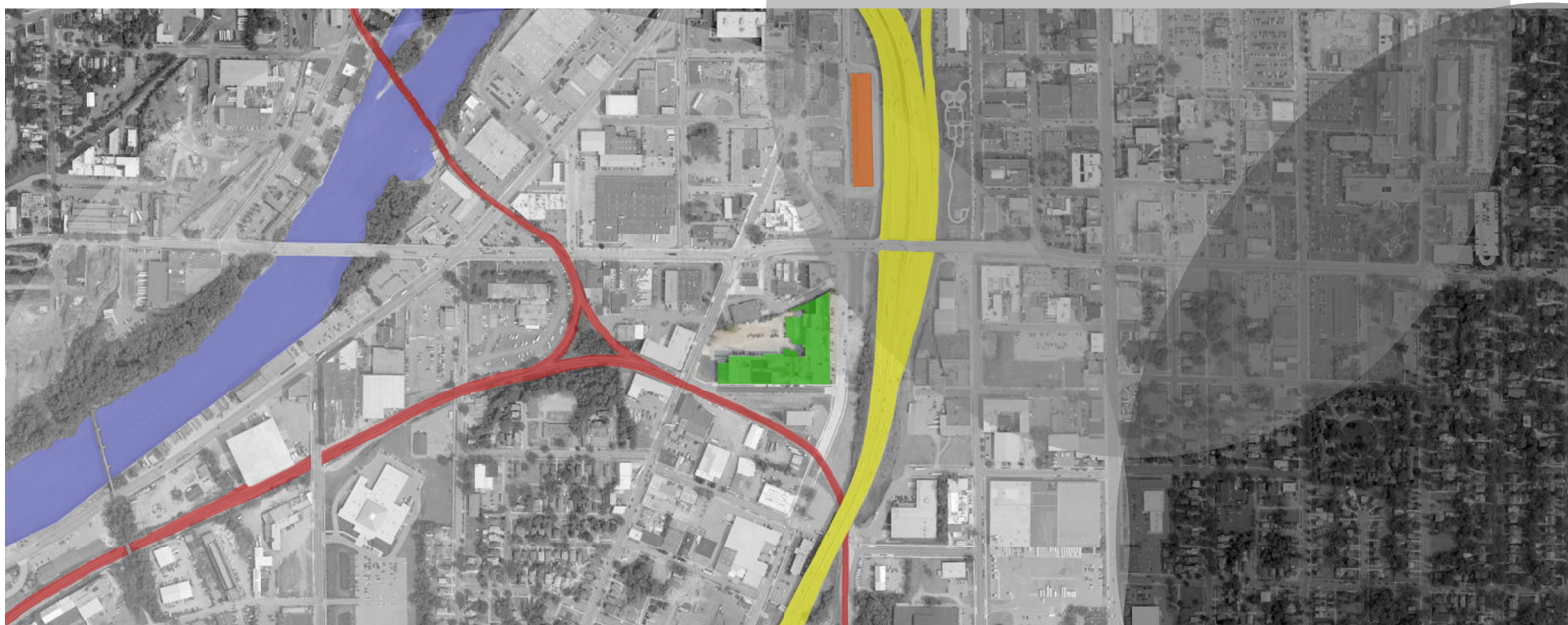
Site Selection Criteria:

- a. near downtown Grand Rapids
- b. easy access to transportation options
- c. highway visibility would be a plus
- d. sizable business would not feel out of place
- e. preferably a reusable facility not currently in use
- f. room for expansion

Possible Sites

- 1. Former Sligh Furniture Company
 - a, b, c, d, 1/2 e, f
- 2. Former Banta Furniture & Adjacent Parking
 - a, b, c, e, f
- 3. Abandoned School, Grounds, & Adjacent Lot
 - a, 1/2 b, e, 1/2 f
- 4. Empty Half Block & Adjacent Parking
 - a, 1/2 b, 1/2 f





Business

Industrial

Residential

nearest international airport: 12 mi ESE



detail shots of the selected Sligh building





Renaissance Zone-5 Acres
 1-7 Stories
 Original Construction: 1880
 Last Construction: 1940
 665,000 sf total (200,000 sf leased)
 16'x16' bays; 10'-12' ceilings
 Heavy Wood Timber Posts & Beams
 Brick Exterior Walls
 5 Elevators
 12 Loading Docks; 7 Oversize Garage Doors
 Natural Gas; No A/C

- first company to offer complete sets of bedroom furniture
- was largest manufacturer of bedroom furniture in the world topping out at 1,500 employees in 1927
- management was very involved in the community through governmental politics, industrial organizations, and economic boards



446 Grandville



215 Logan

203 Logan



449 Century

447A Century



447B Century

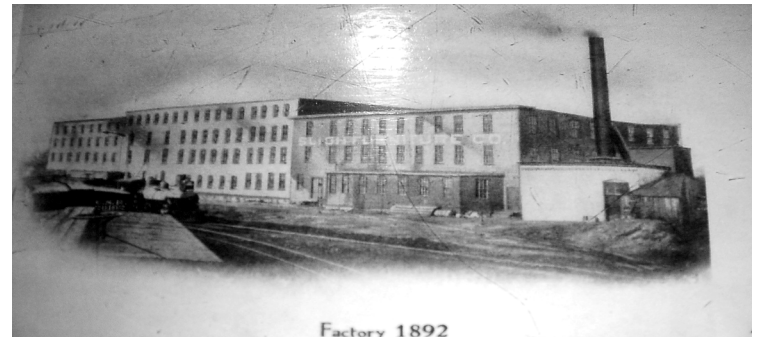
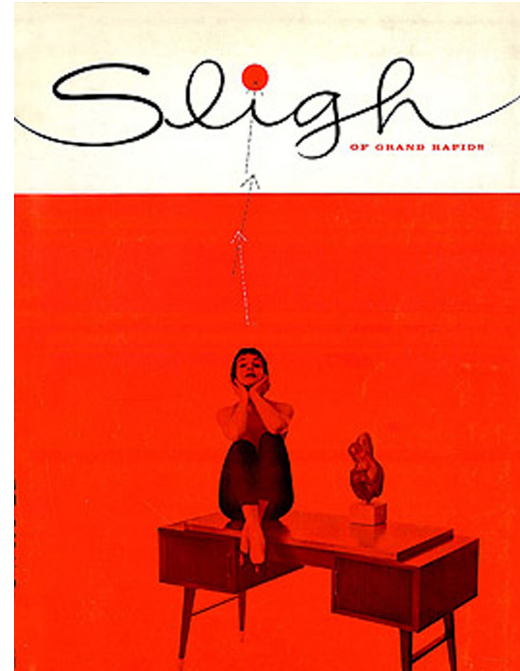
445A Century



445B Century

Sligh

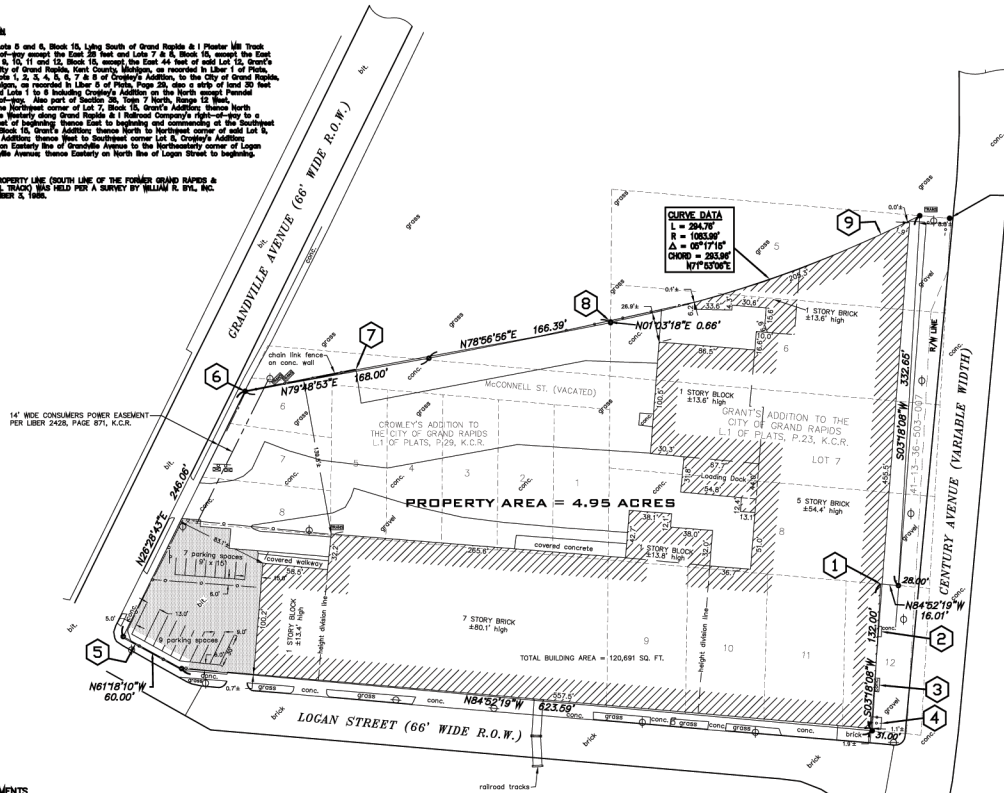
Sligh Furniture Company was founded in 1880 in Grand Rapids, Michigan. It made a name for itself among the myriad of other furniture companies and survived much competition thanks to the founder's innovative idea to offer matching bedroom sets all from one facility. Most companies were highly specialized and consumers had to assemble furniture from various locations, hoping it all looked okay together. A building with a rich history of its own and originally occupied by a truly avant-garde business deserves to shine once again and house a new daring business, as this thesis proposes. Through the years, it was converted for war time manufacturing and automobile parts, but now houses many small businesses. Sligh ventured into clocks and now deals in home entertainment systems from new facilities in Holland, MI and down in South Carolina.



LEGAL DESCRIPTION

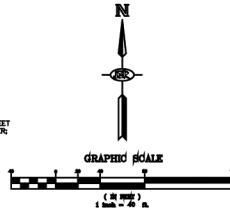
All that part of Lots 8 and 9, Block 10, Lying South of Grand Rapids & 1/2 Center Mt. Trunk (as noted) right-of-way running East 20 feet and Lots 7 & 8, Block 10, except the East 20 feet and Lots 9, 10, 11 and 12, Block 10, except the East 44 feet of said Lot 10, Grant's Addition to the City of Grand Rapids East County, Michigan, as recorded in Liber 1 of Plats, Page 233, and Lots 1, 2, 3, 4, 5, 6, 7 & 8 of Crowley's Addition, to the City of Grand Rapids, East County, Michigan, as recorded in Liber 8 of Plats, Page 201, also a strip of land 20 feet wide adjoining said Lot 10 & bounded completely thereon to the North except a portion commonly held by the above named parties, together with the North 1/2 of the Parcel commonly held by the above named parties, all of Lot 7, Block 10, Crowley's Addition, thence North 45° 15' 00" East bearing along Grand Street 1/2 Section Corner of said Lot 7, Block 10, a point 100 feet West of beginning thence East to beginning and commencing at the Southeast corner of Lot 8, Block 10, Crowley's Addition, thence North to Northwest corner of said Lot 8, Block 10, Grant's Addition, thence West to Southeast corner Lot 8, Crowley's Addition, thence Southerly on Center line of Grandville Avenue to the Northwest corner of Logan Street and Grandville Avenue, thence Easterly on North line of Logan Street to beginning.

NOTE:
THE NORTH PROPERTY LINE (SOUTH LINE OF THE FENCED GRAND RAPIDS & 1/2 CENTER MOUNTAIN TRUNK) WAS HELD FOR A SURVEY BY WILLIAM R. DILL, JR., DATED SEPTEMBER 3, 1960.



CURVE DATA

L = 294.70'
R = 1083.90'
Δ = 0°17'18"
CHORD = 293.96'
N77°30'00\"/>



SURVEYOR'S CERTIFICATE

The undersigned, being a registered surveyor of the State of Michigan, certifies to (1) MORGAN GUARANTY TRUST COMPANY of NEW YORK, its successors and assigns (2) MORGAN MORTGAGE CAPITAL, INC., (3) TransUnion Title Insurance Company, and (4) GE. Properties, LLC on file as follows:

1. The survey was made on the ground on September 22, 2000 by me or under my supervision and correctly shows the legal description and the land area of the subject property, the location and type of all visible above-ground buildings, structures and other improvements (including sidewalks, curbs, parking areas and spaces and fences) situated on the subject property, and any other matters situated on the subject property.
2. Except as shown on the survey, there are no visible easements or rights of way or other encumbrances on the subject property.
3. Except as shown on the survey, there are no party walls and no encroachments, above-ground encroachments (1) by the improvements on the subject property upon adjoining properties, streets, easements, or rights of way, or (2) by the improvements or any adjoining property, street, or other matter on the subject property.
4. The location of each easement, right of way, or other matter (above or below ground) affecting the subject property is shown on the survey in accordance with the 2000-2002 dated September 28, 2002 issued by TransUnion Title Insurance Company with respect to the subject property, has been shown on the survey together with appropriate recorded references, and the subject property is in compliance with the Property shown on the survey is the Property described in that file commitment. The location of all improvements on the subject property is in accord with minimum setback, site yard and rear yard lines, provisions and restrictions of record for the subject property referenced in each file commitment.
5. The subject property has direct access to and from a duly dedicated and accepted public street or highway.
6. Except as shown on the survey, the subject property does not serve any adjoining property for drainage, utilities, structural support or support and egress.
7. The recorded description of the subject property forms a mathematically closed figure.
8. Except as shown on the survey, no portion of the Property shown on the survey lies within a Special Hazard Area, as described on the Flood Insurance Rate Map for the community in which the subject property is located.

The parties listed above and their successors and assigns are entitled to rely on the survey and this certification as being true and accurate.

Joseph C. Kaganovich, P.E.
Professional Surveyor #0008

ENCROACHMENTS

1. BUILDING CORNER ENCROACHES OVER PROPERTY LINE 4.21' EAST.
2. CONCRETE STEPS /# LANDING ENCROACH OVER PROPERTY LINE 32.70' EAST.
3. CONCRETE STEPS /# LANDING ENCROACH OVER PROPERTY LINE 32.70' EAST.
4. CONCRETE AND FENCE ENCROACH OVER PROPERTY LINE 32.70' EAST.
5. FENCE ENCROACHES OVER PROPERTY LINE 34.07' SOUTH.
6. CONCRETE WALL /# CHAIN LINK FENCE ENCROACHES OVER PROPERTY LINE 34.07' NORTH.
7. CONCRETE WALL /# CHAIN LINK FENCE AND OLD BUILDING FOUNDATION ENCROACH OVER PROPERTY LINE 34.07' NORTH.
8. OLD BUILDING FOUNDATION AND CHAIN LINK FENCE ENCROACH OVER PROPERTY LINE 42.27' NORTH.
9. BUILDING ENCROACHES OVER PROPERTY LINE 40.17' NORTH.

LEGEND

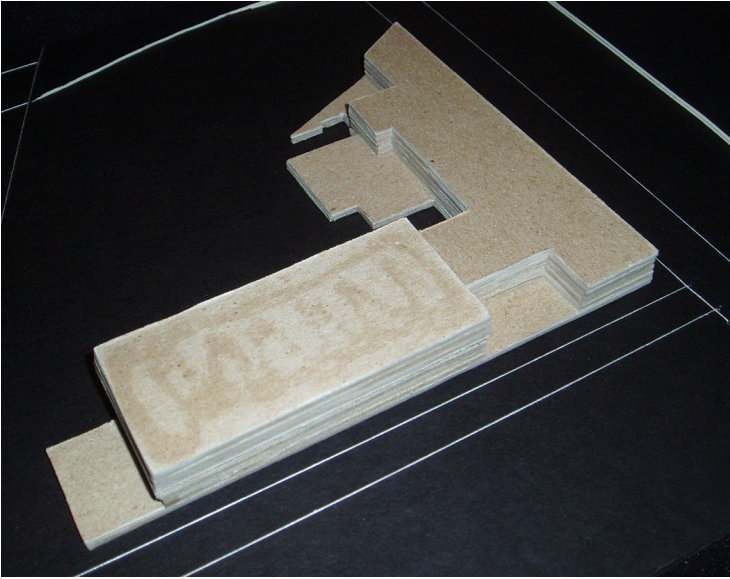
⊕	UTILITY POLE
⊕	TRANSFORMER
---	SEW
---	SEW
⊕	MAIL BOX
⊕	FLAG POLE
⊕	FENCE
⊕	FOUND IRON
⊕	SET IRON
⊕	ENCROACHMENT

JCK & ASSOCIATES, INC.
 ENGINEER/ARCHITECT/SURVEYOR
 4401 W. GRANDVILLE AVENUE, SUITE 200
 GRANDVILLE, MI 49431 (616) 964-3770

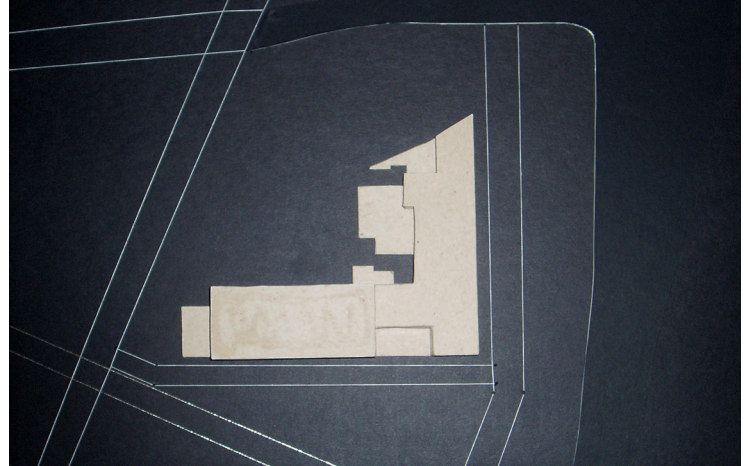
JCK
 BOUNDARY/MORTGAGE SURVEY
 OR TERMINAL WAREHOUSE
 446 GRANDVILLE AVE.

DATE	10/27/00
BY	JCK
CHKD BY	JCK
Scale	1"=40'
Date	10-27-00
Job No.	P-4955-15
Sheet No.	1

© 1999 JCK & ASSOCIATES, INC.

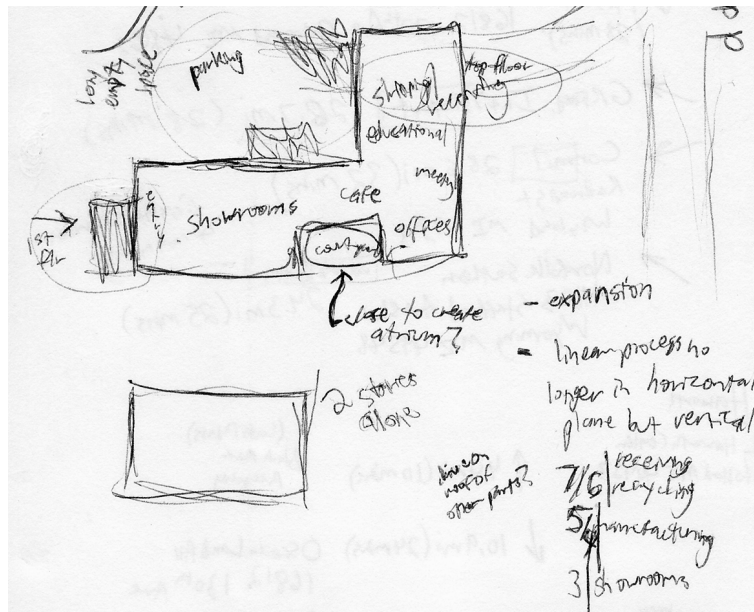


existing massing model, perspective



existing massing & simple site plan model, top view

Schematic Design



Delving into design required getting to know the building and its current use a little better. More information was also needed about the client and since the client is a proposed business, it needed to be more well-defined, replete with business plan, promotional materials, and company culture. Ideas thrown around would hopefully be more feasible with all of this information in mind. Some headway was made in space planning, although it was accounting for a diversion of the highway for access at a level other than the ground, an idea that was not pursued. One decision from this stage that survived to the end of the project was that of an atrium to infill the apparent missing chunk on the South side of the building. An expanse of glazing would add a contrasting contemporary element and allow for light-filled offices, showrooms, and/or a cafe.

Parts of the Problem

-first and second floors largely leased out, so design is limited to mostly floors three through seven

-shipping and receiving typically requires ground floor loading docks

-manufacturing is usually easiest and most efficient in a single story building

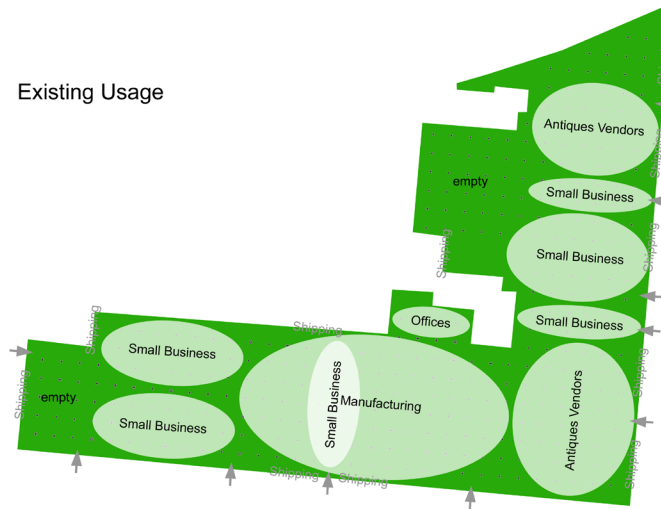
-small bay size translates into many columns taking up space and serving as obstacles to both operation and machinery installation

-old wooden floors cannot support the use of hi-los

-thick brick walls with punch windows do not permit much visibility from the exterior, which is desired to coincide with the transparent practices of the company

-although just outside downtown, industrial district and highway seem to limit pedestrian traffic, so the building itself must be made an attractive destination

Existing Usage



Musings on Solution(s)

-although manufacturing is usually a linear process in the horizontal dimension, perhaps it can take place in the vertical dimension, each floor being a progressive step in processing and production

-since ground floor space is limited, could new access be added on another level through connection to the nearby elevated highway or access ramp?

-new structure replacing old

-reinforcement of the existing structure

-new structure coexisting with old

-expansion upward and/or outward

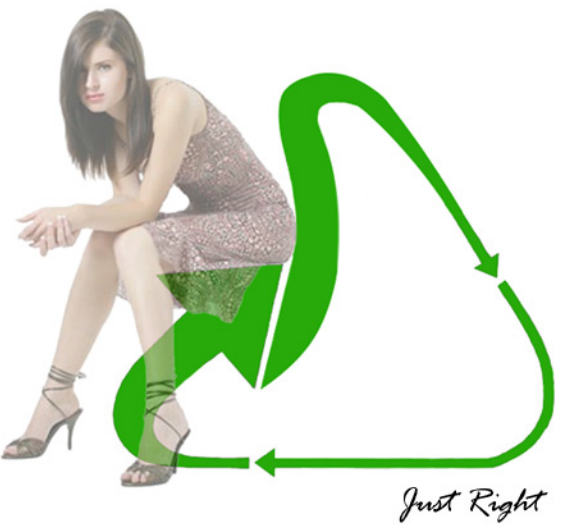
-integration of more glazing in facade

-could turn the roof of the large one story current manufacturing area into a courtyard or atrium space

-public education can extend out and off of the building to reach people in their vehicles



Visibility from the Highway



Just Right

postcard front



Hi!

We just moved to the neighborhood and would love to meet you. Our business takes things that people usually throw away and makes furniture out of it. Pretty cool, huh? Anyway, if you want to see how we do it or the stylish finished products, come visit us just Southwest of Van Andel Arena and the Square of 131. See you soon,

100% Recycled

 Please Recycle

Presorted Std
 US Postage
 PAID
 Grand Rapids, MI
 Permit 564

From

re:Usit

To

Sophia Harrison

392 Oak Street

Grand Rapids, MI 49508

 For more information, call 1-888-Y-REUSIT
 or visit www.reusit.com

re:Usit
 480 Grandville Ave SW
 Grand Rapids, MI 49503



postcard back



Mission

Our mission is to provide our customers with sustainable, attractive, and ergonomic furnishings composed of materials derived from postconsumer goods. We expect our material reuptake services, donation discount program, transparent manufacturing processes, and public education initiatives will help foster ecological conscientiousness, transform the general views of waste, and inspire industry reform.

Vision

We transform waste into beautiful well-designed furniture

Values

- Product Quality & Value Creation
- Need Satisfaction & Customer Delight
- Resourcefulness & Alternative Thinking
- Fine Tuning & Progressive Reform
- Team Growth & Daily Challenges
- Public Education & Increased Awareness
- Community Activism & Volunteer Efforts
- Corporate Integrity & Transparent Practices

Company Culture

- 2 (or 3 or 4...) Heads Are Better Than 1**
Teamwork and collaboration usually lead to better solutions
- The Possibilities Are Endless**
Not all ideas are feasible, but reality should not limit imagination
- The Only Constant Is Change**
Our facilities and our team must be ready for anything—routine is stagnation!
- If The Shoe Fits**
Flexibility in schedules and environments optimizes performance
- Our Business Is Everyone's Business**
We don't hide anything—being open can garner fresh perspectives
- What's Mine Is Yours**
Sharing saves money & often results in beneficial chance encounters
- Mother Nature Knows Best**
Solutions can usually be found in or inspired by the natural world
- Mix Business With Pleasure**
When you find your passion, work is less like work and more like play
- Variety Is The Spice of Life**
Exposure to difference shatters preconceived notions—try it, you might like it!



re:Usit

480 Grandville Ave SW
Grand Rapids, MI 49503
1-888-Y-REUSIT
(1-888-973-8748)
www.reusit.com

informative poster

Programming

The focus and scale of the proposed business changed as the project progressed. One important shift was from recycling to reuse. This would allow a greater variety of material inputs, necessitating more storage and sorting space, but reducing the quantity and size of necessary machinery. Considering the relaxation of the work world and to increase sustainability, living spaces were also added to allow some employees a short, eco-friendly commute. These quarters could also serve as hotel spaces for visiting designers or as dorms for students at nearby Grand Valley State University or the Kendall College of Design.

Necessary programmatic elements:

- Shipping & Receiving
- Materials Sorting
- Materials Storage
- Tool Workshops
- Product Line Assembly
- Product Staging
- Showroom/Education
- Design Studios
- Meeting Rooms
- Offices
- Residential Units
- Café
- Mechanical/Utilities
- Restrooms
- Circulation

FREITAG®

Program Precedent: Freitag



Truck tarpaulins

Car Seat Belts

Airbag

Bicycle inner tube



Freitag store display

The Freitag brothers started their company in 1993 after deciding to turn their quirky custom reused bags into a business. They are headquartered in Zurich, Switzerland, with 80 employees in 2800 square meters of factory in an old industrial shed warehouse, but have five flagship stores and sell through 300 other shops worldwide. Each bag in the product line of 40+ is made from old truck tarps and parts from cars and bicycles, making the bags quite durable. Buyers can choose their own custom designs by using the interactive pattern template on the website. The company deals mainly with the procurement of materials and initial processing, while the end construction is contracted to local sewing workshops.



Program Precedent: Scrap Lab

Incorporated into the curriculum at Kasetsart University's Building Technology Division in Bangkok, Thailand, is the Scrap Lab design studio devoted to the creation of furniture out of industrial scraps. Students tour manufacturing facilities to learn about production and collect resulting waste materials. Items in the inventory are then categorized according to properties, shape, composition, color, and condition. The intent is to teach students about sustainability, transforming views of waste. With creativity, each piece gains value and none would dare to call it garbage.



denim pillows sling chair



Black Nest Chair of rubber strips

old drawers



Upcycled Drawers by Rupert Blanchard

heavy machinery components & tools



chair by Stig

suitcases



Sit Bag chair and ottoman by Maybe Design

Program Precedents: Reuse for Furniture

plastic shopping bags



chair by Ryan Frank

bath tub



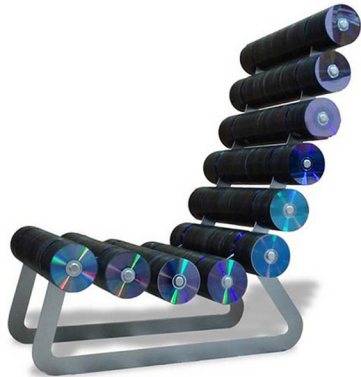
Max chaise by Reestore

vintage couch



reconfigured sofa by Hans Grebin

CDs



PANDA chair by Belen Hermosa

shopping cart



Annie chair by Reestore

old drawers



chest of drawers by Tejo Remy for droog

Program Precedents: Reuse for Furniture

silverware



Precious Famine table by Toni Grilo for Christofle

bicycle wheels



side table by Andrew Gregg

washing machine



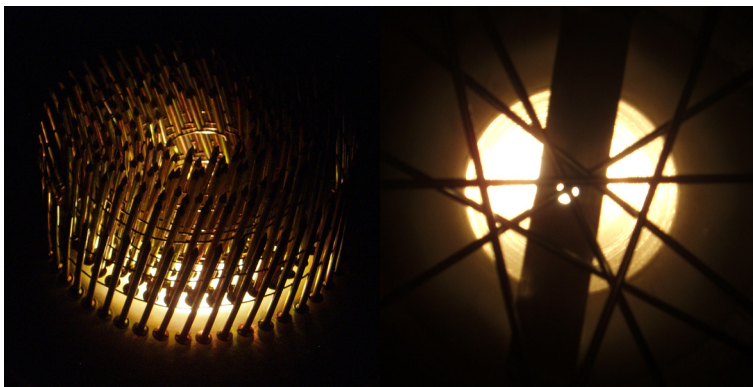
Silvana table/lamp by Reestore



Sketch Problem Two: Pedestal Side Table

Materials: two roof vents, roofing nails, metal scraps
Mission: create my own junk furniture piece

Upon browsing the architectural salvage at Habitat for Humanity's REstore, items in the roofing department proved most interesting and promised the most potential. Combining two roof vents allowed the creation of a spindle shape, or the form of a pedestal table. With a roll of nails and other metal scraps, lighting and decorative elements were explored, a swirling wrap up the "column" of the table becoming the final touch. Being construction waste, these materials are not reused, but recovered. Regardless, they are diverted from landfills and a sustainable supply source.





Building Precedent: RT London

RT London is a Grand Rapids furniture company specializing in education furniture, selling to institutions nationwide. It recently relocated to a 500,000 square foot industrial building built in 1936 located in a Renaissance Zone NW of the city. The complex is larger than needed, so some portions are leased out to other companies. Through past expansions, a few exterior walls are now interior walls and there is a narrow moat of a light well courtyard around the section housing offices. The old wood floors have been refinished, but still cannot support hi-los. Metal plates must be added just to accommodate pallet hand carts. Large windows were punctured through the thick masonry walls to help illuminate the showroom area. Sales mostly occur on-site or through the catalog and shipped samples. Dropped ceilings were added in some rooms to preclude the troublesome discovery of asbestos.



one end of RT London's main building



white finishes & large windows brighten the showroom



metal fire doors are still required, but are no longer red

The aorta of the facility is its single 10'x12' freight elevator. If it gives out, production more or less comes to a standstill. In the main building, the basement, second, and third floors are storage. Manufacturing and shipping are on the first floor, while finishing occurs on the fourth. Finishing would move to the first, but it faces heavy regulation and survives as it is thanks to being grandfathered into the place. Break rooms, design studios, and restrooms are scattered throughout. Stairwells are at the edges of the building. Upholstery takes place on the second floor of the showroom building. The offices, as previously mentioned, are housed in their own building along with meeting rooms, lecture spaces, and the like. All the buildings are interconnected through their adjacency or an enclosed or open-air bridge.

One of the most interesting refurbishments carried out by RT London was the treatment of the heavy timber structure. The beams and columns were stripped of countless coats of paint and dirt by a blast of crushed walnut shells! It is less abrasive than using sand, so the wood is cleaned with the surface receives little damage. Such an update would work wonders at the Sligh building and help celebrate its structure, materiality, and history, while adding a contemporary look.

The like-new wood is highly visible as the structure is unobscured by finished ceilings. Instead, pipes are exposed and a hanging ceiling grid accommodates partitions, lighting, electrical, and other systems and utilities.



walnut blasted



sand blasted



before & after walnut blasting

Building Precedent: Solomon R. Guggenheim Museum

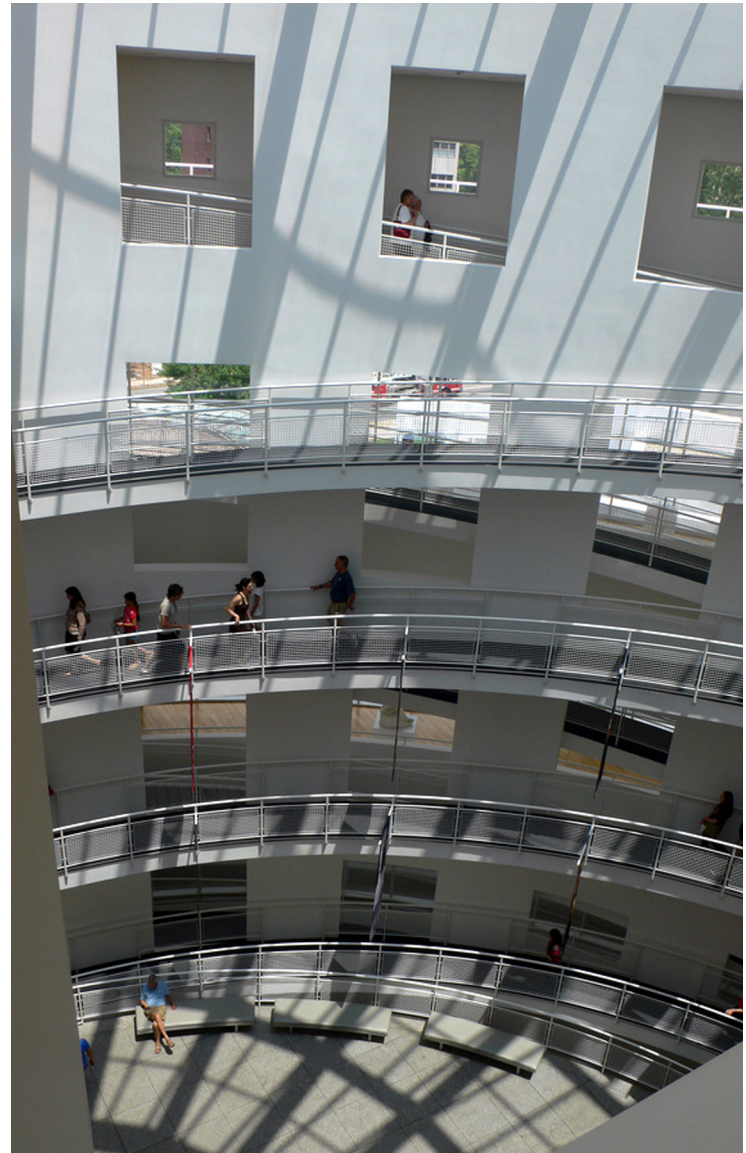


Frank Lloyd Wright took 15 years and six sets of drawings to design New York City's infamous Guggenheim. As intended, its rounded organic form contrasts sharply with the surrounding typically orthogonal architecture in the neighborhood adjacent to Central Park. Spiraling around the central rotunda, a helical ramp serves as circulation and gallery space. Some high-heeled women complain the endless incline hurts their feet. Artists, on the other hand, complain about having to try to mount canvases on a concave wall. They also accuse the architecture of overshadowing their work. Opinions aside, the architecture does overshadow itself. Artificial lighting is relied upon heavily despite the large central skylight and expansion of the ramp's radius as it moves upward. The atrium design in this thesis should avoid this issue by having glazing not only above, but on the South-facing facade. And the curved walls will not be problematic, as educational text can be in decal form and the main exhibits are free-standing furniture. Those pieces highly sensitive to a canted ground plane will be exhibited on the floor of the atrium.

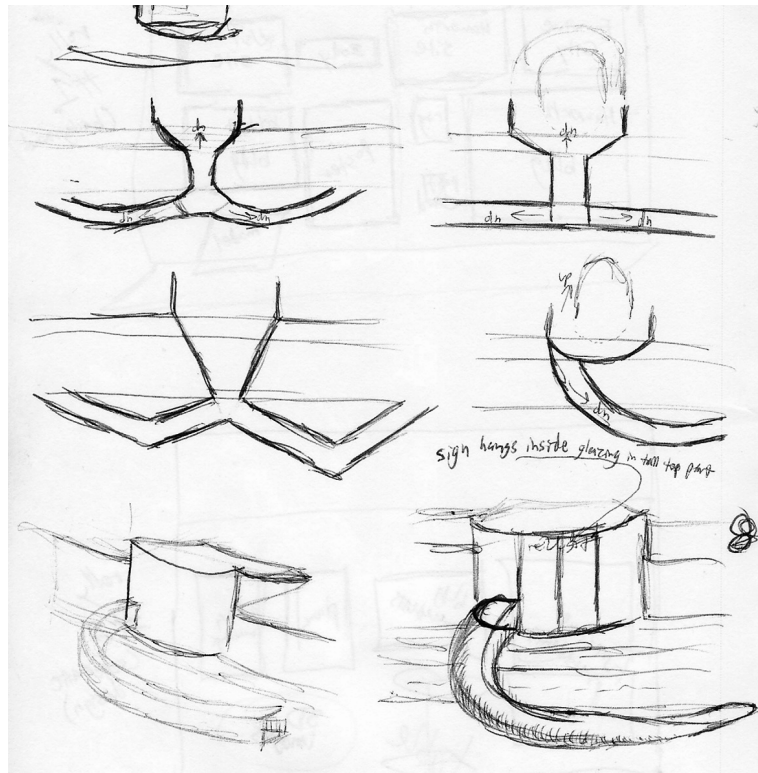


Building Precedent: High Museum

Atlanta, Georgia, welcomed Richard Meier's High Museum in 1983. It is a concrete frame structure with his characteristic white steel enamel cladding. The 130,000 square foot museum exhibits its share of furniture, most of which is displayed on short ledges in stark white environs. Its quarter of a circle atrium helps orient visitors and is edged by a helical circulation ramp that pays homage to Frank Lloyd Wright's Guggenheim. Unlike the Guggenheim, the ramp is narrow and purely for circulation, having nothing on the adjacent walls. Its small width and wire panel railing allow deeper light penetration into the spaces. The building's exterior entrance ramp visually elongates the short front lawn. Renzo Piano designed the museum's recent addition.

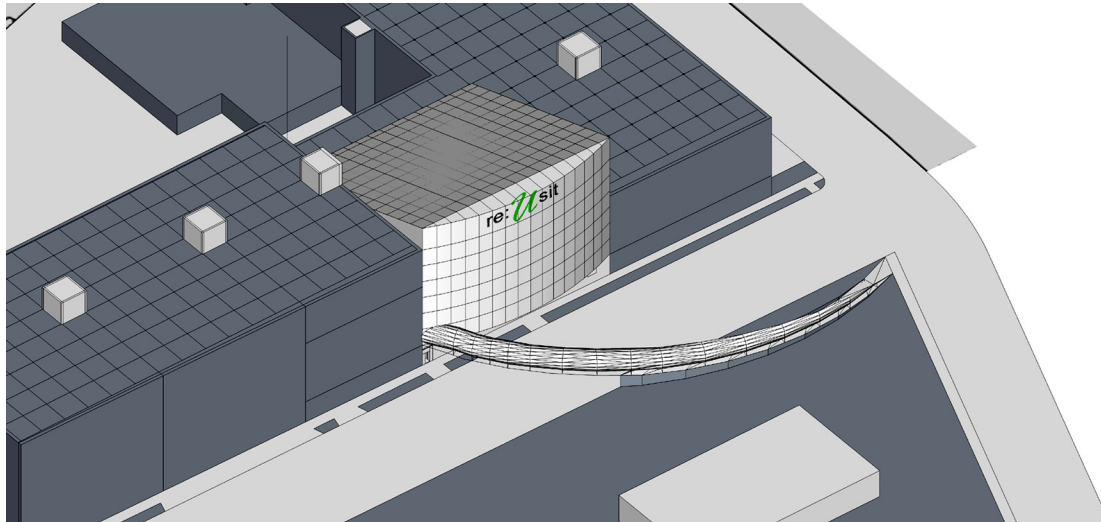


Design Development

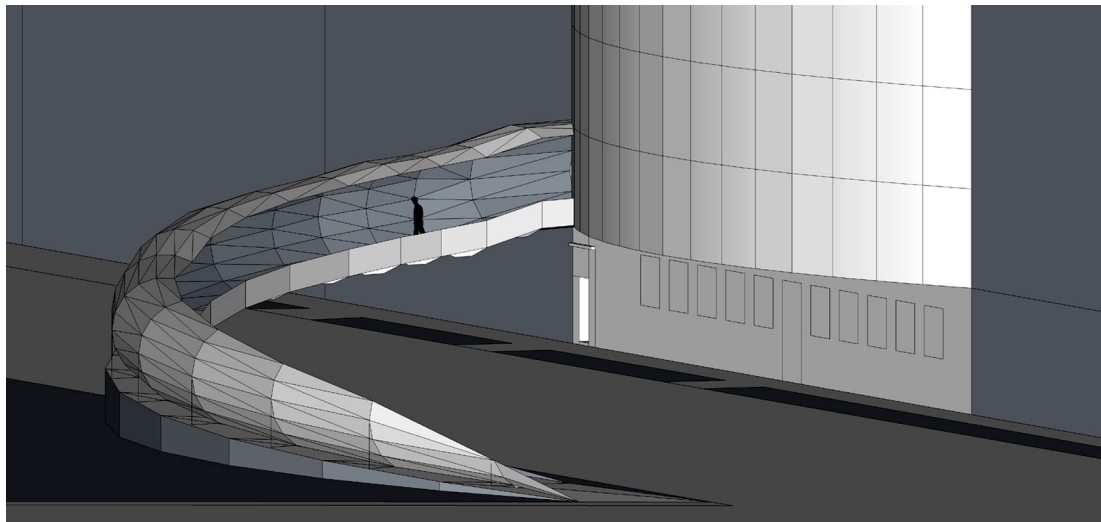


entrance ramp iterations

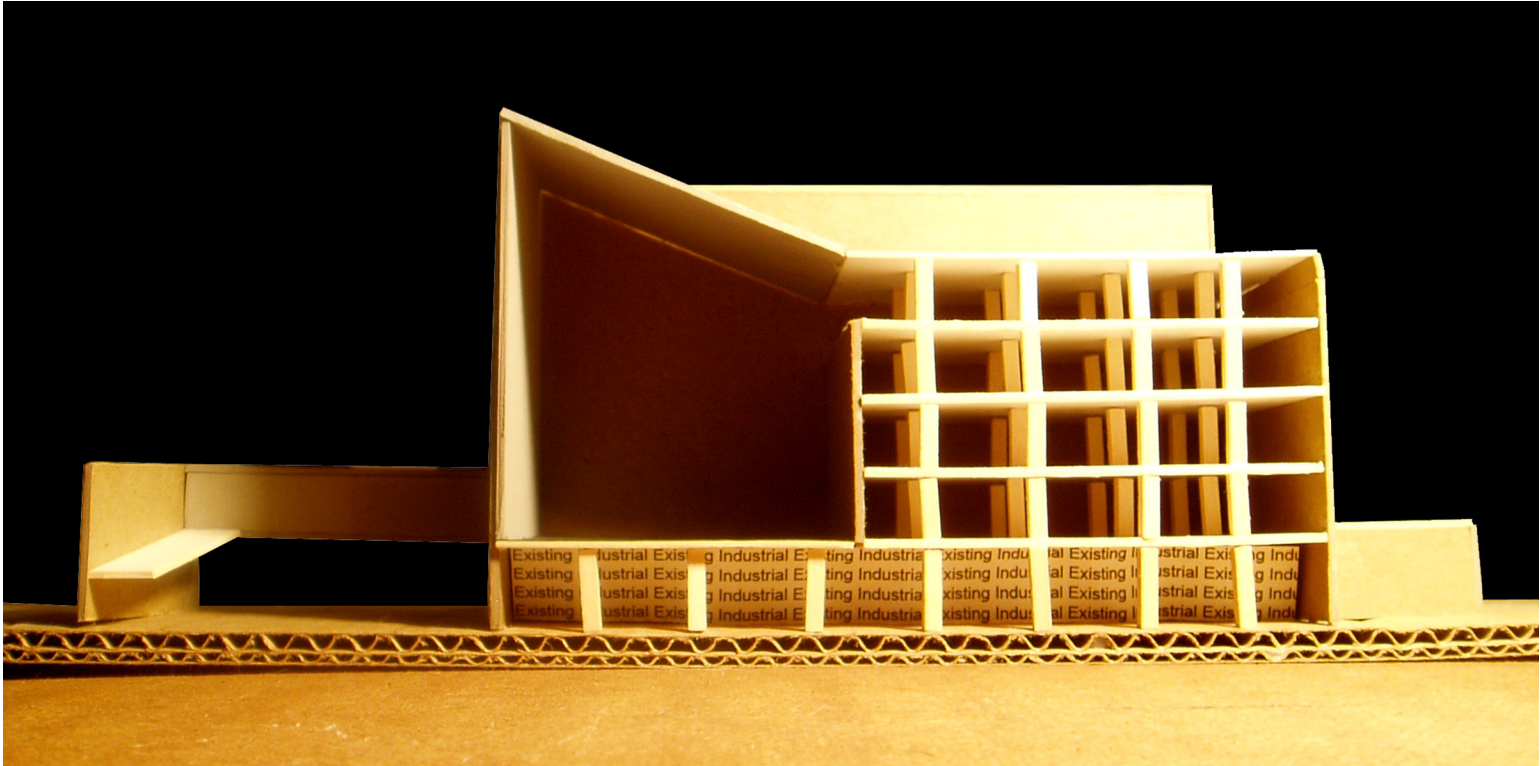
Advancing the project, a preservationist attitude was taken toward the building and its present occupants. Not wanting to disturb the current tenants, the main challenge of the design was to figure out how people and materials would enter the business with limited or no ground level access. Ramps seemed to be the logical solution. One for materials connecting to the nearby Exit 84 off-ramp from US 131. Another crossing Logan Street to the South and connecting with the sidewalk, making pedestrians enter the business on the second floor. The entrance ramp could then connect to the spiraling walkway inside the atrium for a seamless experience as visitors would begin learning about sustainability at the street level and continue up through the educational atrium/showroom. Also, the height of the atrium was increased to allow for greater visibility from the highway. As space planning advanced, the notion of expressing the floor plans in a physical manner utilizing reused materials was carried to fruition. This resulted in a series of weavings of scraps into wire mesh, the squares representing the structural bays and the weaving indicating the rather hands-off reinhabitation of the building.



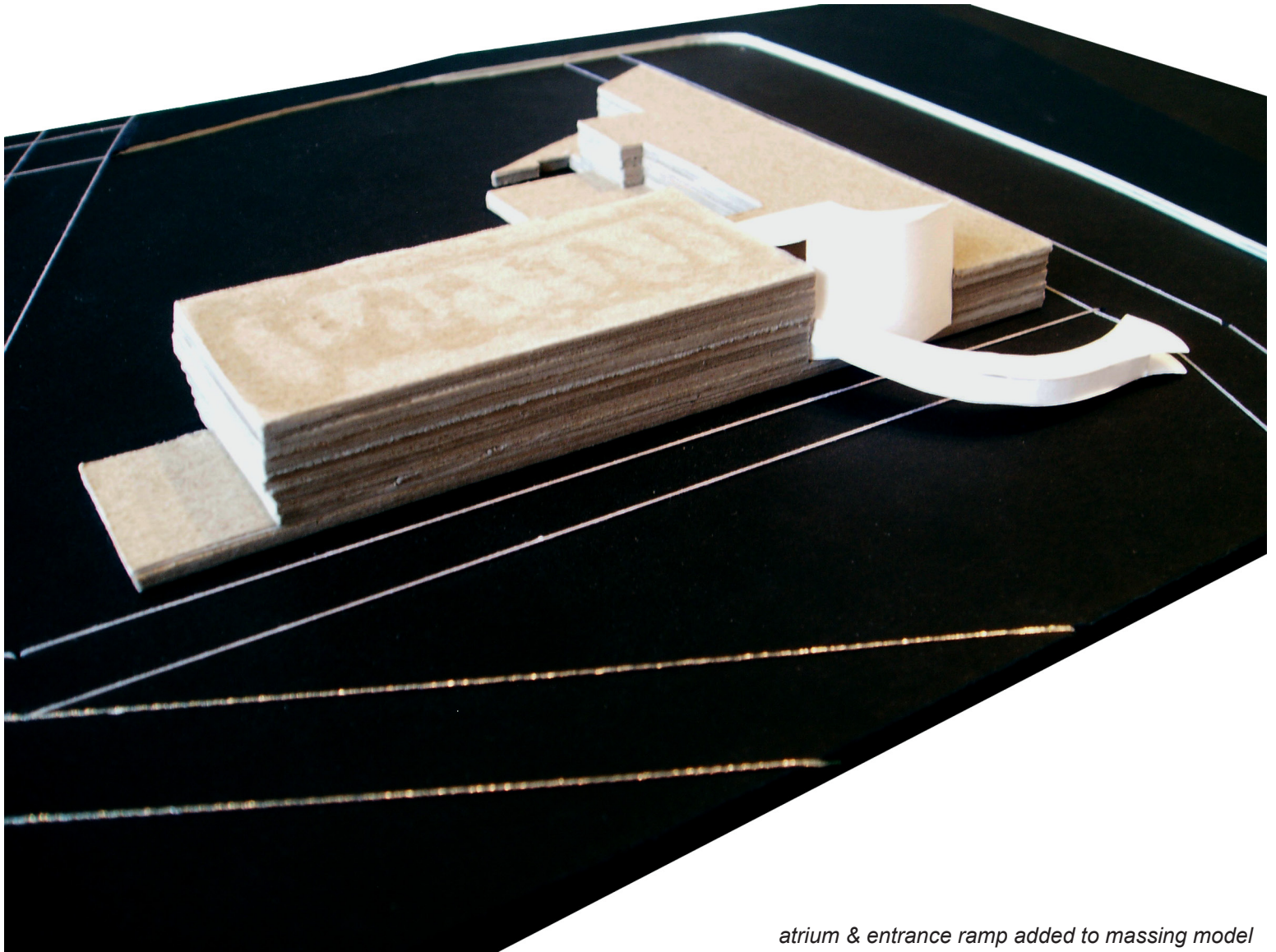
preliminary exterior view of atrium with entrance ramp over the road



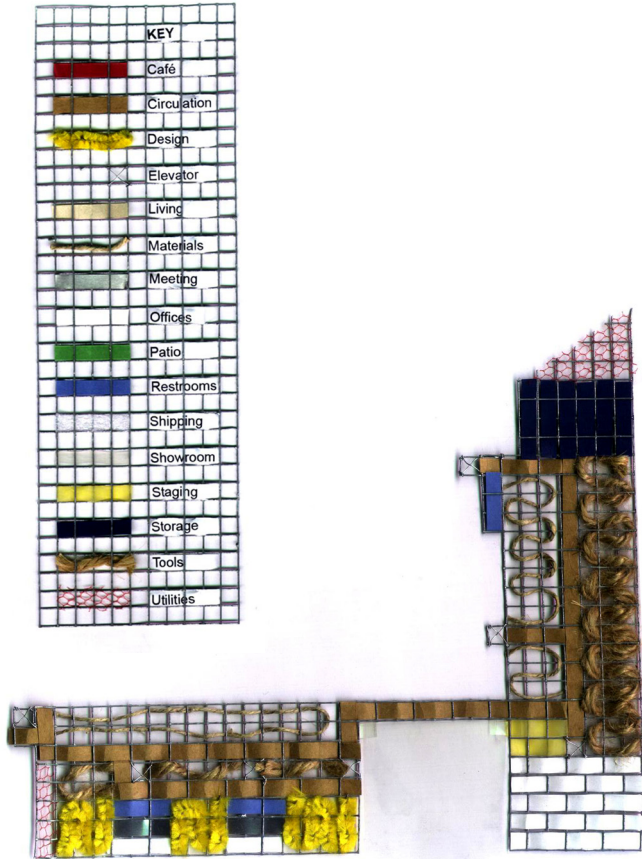
entrance ramp close-up



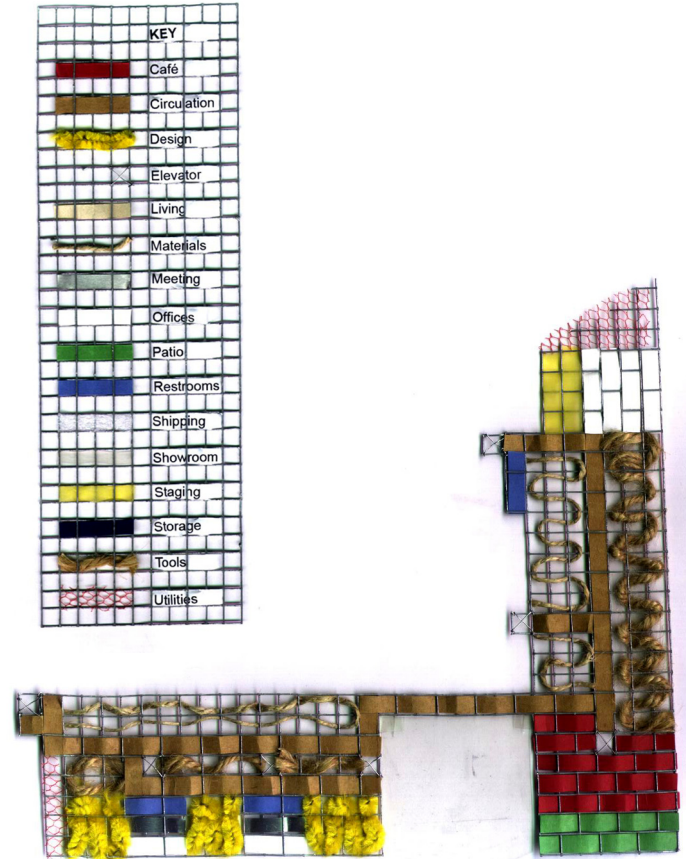
sectional model cut through atrium facing West showing entrance ramp on outside & column grid on inside



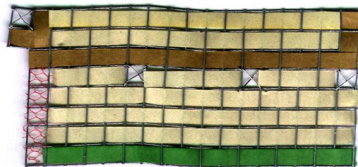
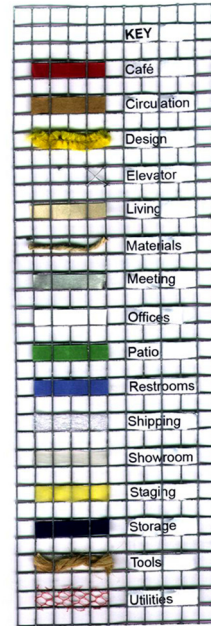
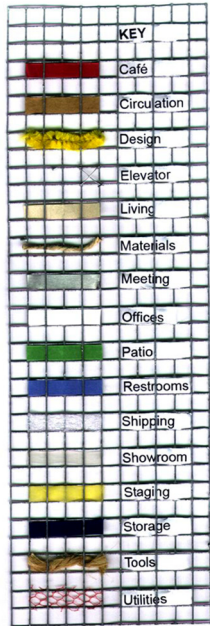
atrium & entrance ramp added to massing model



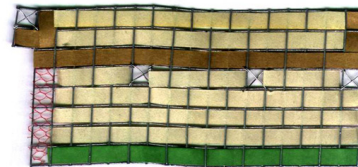
plan weaving, fourth floor



plan weaving, fifth floor



plan weaving, sixth floor



plan weaving, seventh floor

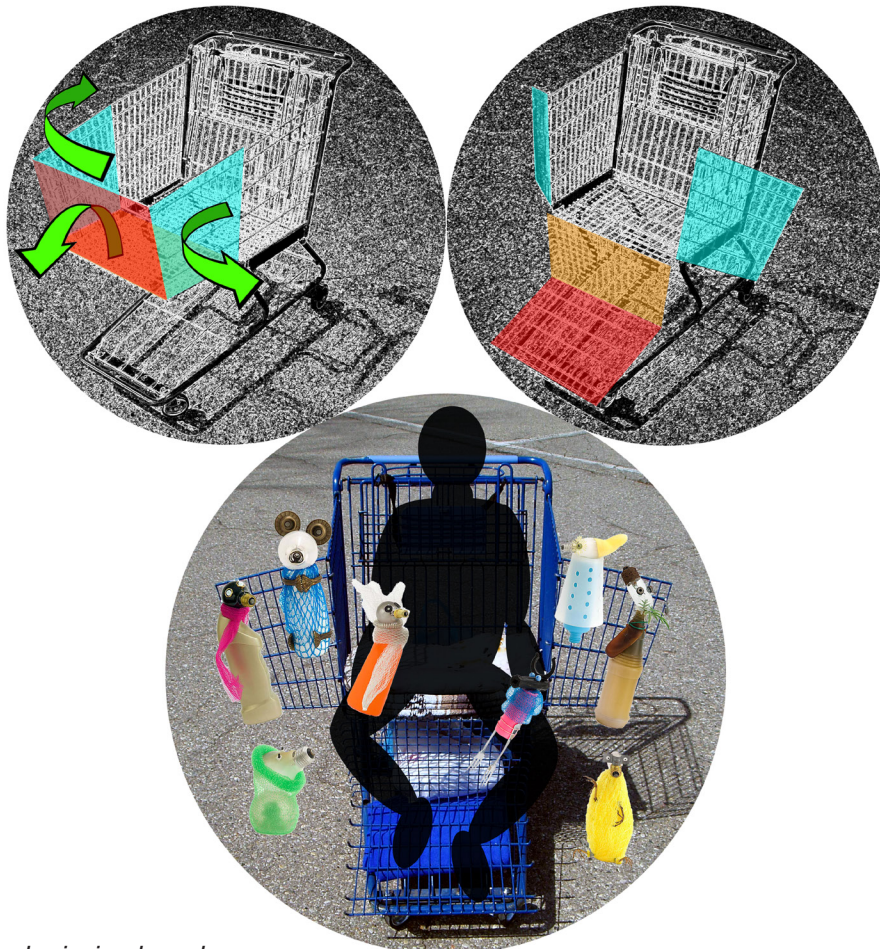
Sketch Problem Three: Shopping Cart Chair

Materials: found shopping cart

Mission: create the future of seating

Cranbrook Academy of Art's annual chair show charged its entrants to speculate on the future of seating. Befitting this thesis, the argument can be made that the future of seating is in reuse. Hence the design of this shopping cart chair. The front end of the shopping cart is cut off and reattached in three hinged pieces that pivot downward and to either side of the basket but which may be fixed in their original positions by the addition of a carabiner clip at each front corner. The design thusly preserves the storage capabilities inherent to a shopping cart, while allowing alternate functionality as a place to sit. The sides can either fold all the way back and flush or be perpendicular to the sitter, serving as display boards, thus revealing the third function of small scale mobile retail unit. Brakes added to two wheels allow the design to be fixed in one location, making entry into and exit from the seat easier and safer. "Upholstery" for added comfort is simply blankets and/or bagged clothing such as is typical in reclaimed shopping carts. The design won the Kroloff Krowning Achievement Award.





submission board

re:scu

relaxation & exchange: shopping cart undertones

Kyle Hibbard
School of Architecture
University of Detroit Mercy

[Description]

With the economic recession, the future of seating is in reuse and many people are down on their luck. The homeless population has grown, many more joining its ranks as the result of job losses. For a lot of homeless individuals, shopping carts become the luggage of choice, their storage ability and portability lending them to such use. Considering that homeless life often depends so heavily on shopping carts, wouldn't it be nice if they could do more? This design opens up the shopping cart (literally) to new uses while preserving the old. It can serve as a chair, providing a place to sit in any location—no more need to find a bench or stoop. It can also serve as a retail outlet—the sale of junk art, handicrafts, produce from an urban garden, etc. could help turn life around. The entrepreneurial spirit, no matter its scale of operation, might be the key to enduring and returning from hard times.

[Materials]

found shopping cart, two carabiners



[Methods]

Using the existing materiality and construction language of the shopping cart, the front end of the basket could be cut into three pieces able to pivot to become a leg/foot rest and panels for the display of wares. These pieces could resume their original positions by using a carabiner to clip them together at the front two corners of the basket. Brakes added to two wheels would make entering and exiting the chair safer. "Upholstery" for increased comfort might be in the form of the bagged clothes and blankets typically carried in a shopping cart or a cushion formed from and stuffed with plastic shopping bags.



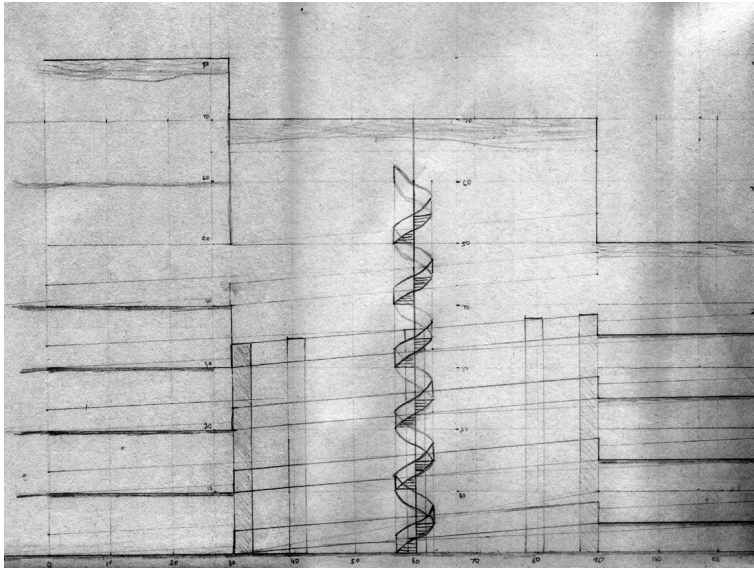
Final Design

Finalizing the design necessitated tweaking of the space planning for the last time. Two elevators and sets of enclosed fire stairs were added for easier circulation, safety purposes, and to provide residents in the living units a private access. The cafe was relocated to the abandoned garage space on the ground floor, putting it near the residential entrance and allowing easier public patronage.

In response to criticism that the design was too tentative, less care was taken in preserving the existing condition and a ground floor small business was theoretically relocated to allow street level access to the proposed business of this thesis, eliminating the need for the soaring entrance ramp. For deliveries and shipments, existing loading docks and a freight elevator in the rear service area were to be exploited.

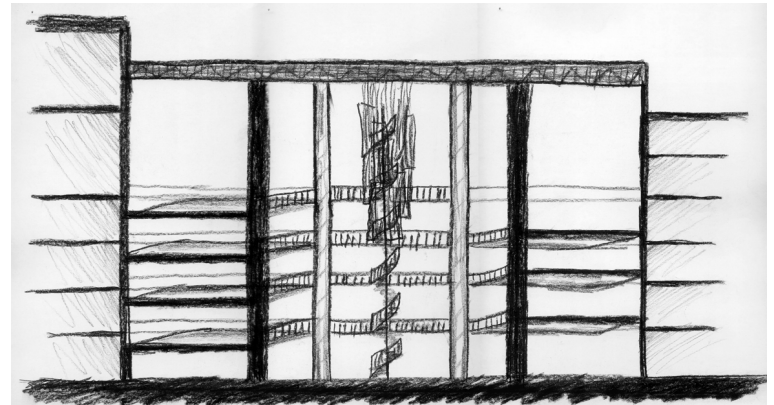
The existing bearing walls on either side of the new atrium space, in combination with six concrete columns cast within and covered by reused round metal air ducts, support the helical ramp.

Site design and the atrium are presented subsequently in an exterior perspective collage rendering along with before-and-after vignettes illustrating changes and activations of spaces.

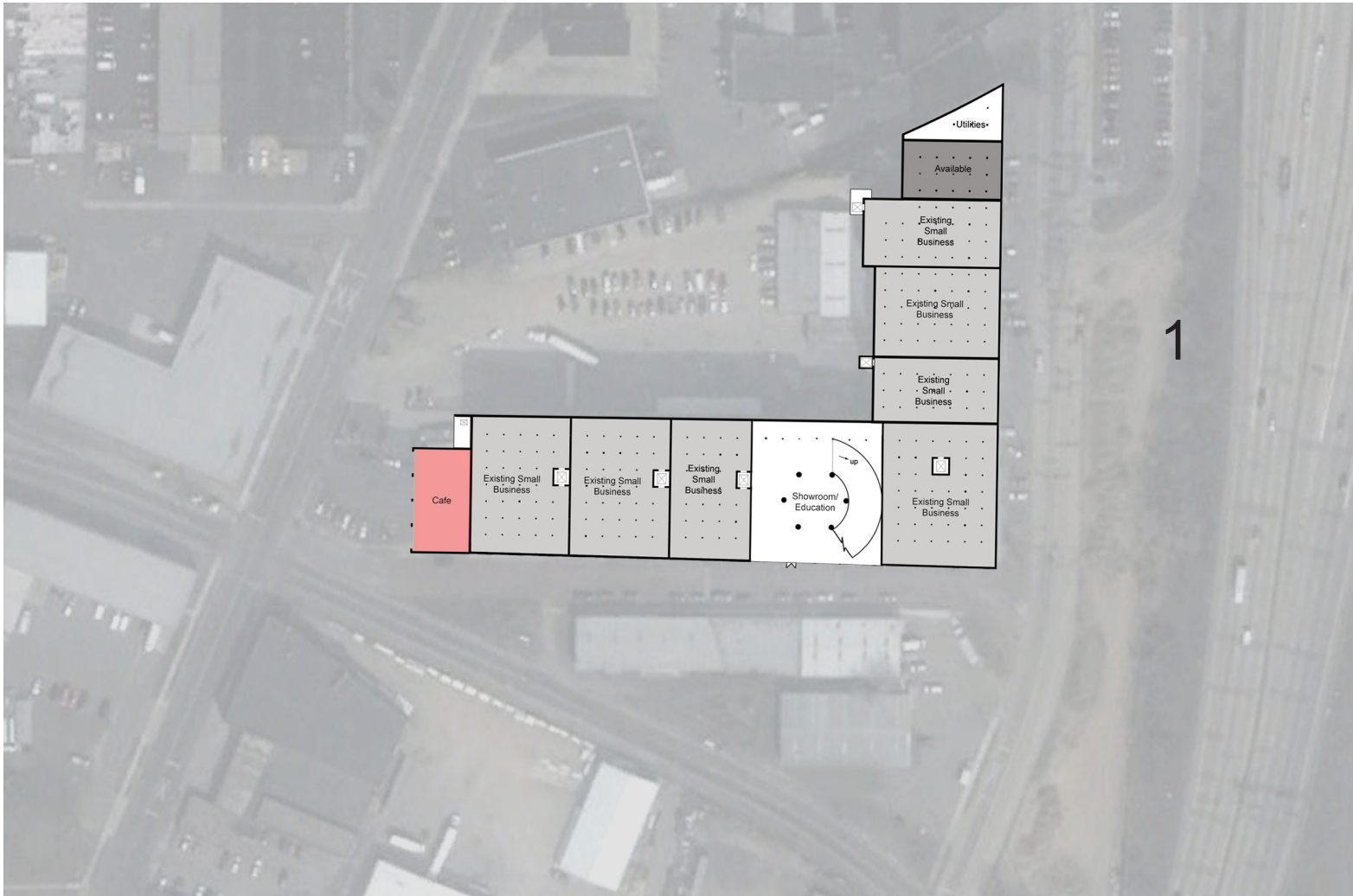


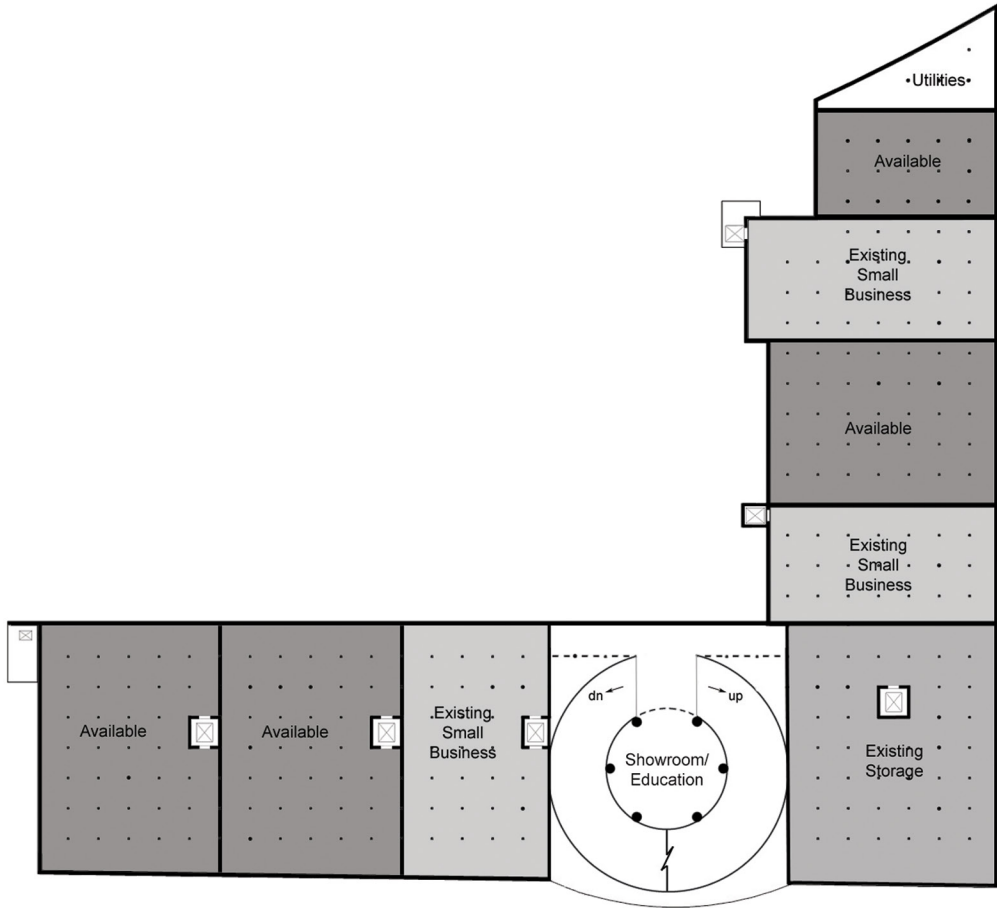
section drawing through atrium featuring a relocated fire stair

Nearing the end of design, the project pushed into the domain of industrial design. The concept of reuse was reoriented to the building itself, so the architecture would echo the program of the business within it. Materials for new construction and occupation of the existing spaces were to be drawn from dismantled portions of the building tacked onto the original Sligh construction and no longer used or necessary. From these deconstructions and the disassembling of other nearby buildings, common construction components like concrete masonry units, corrugated metal decking, and plumbing became the material palette. But to reuse these in clever unexpected ways, most turned into nonstructural elements like cladding, sculpture, light fixtures, and spatial partitions. With this strategy and array of tools, the interior of the building was further developed.

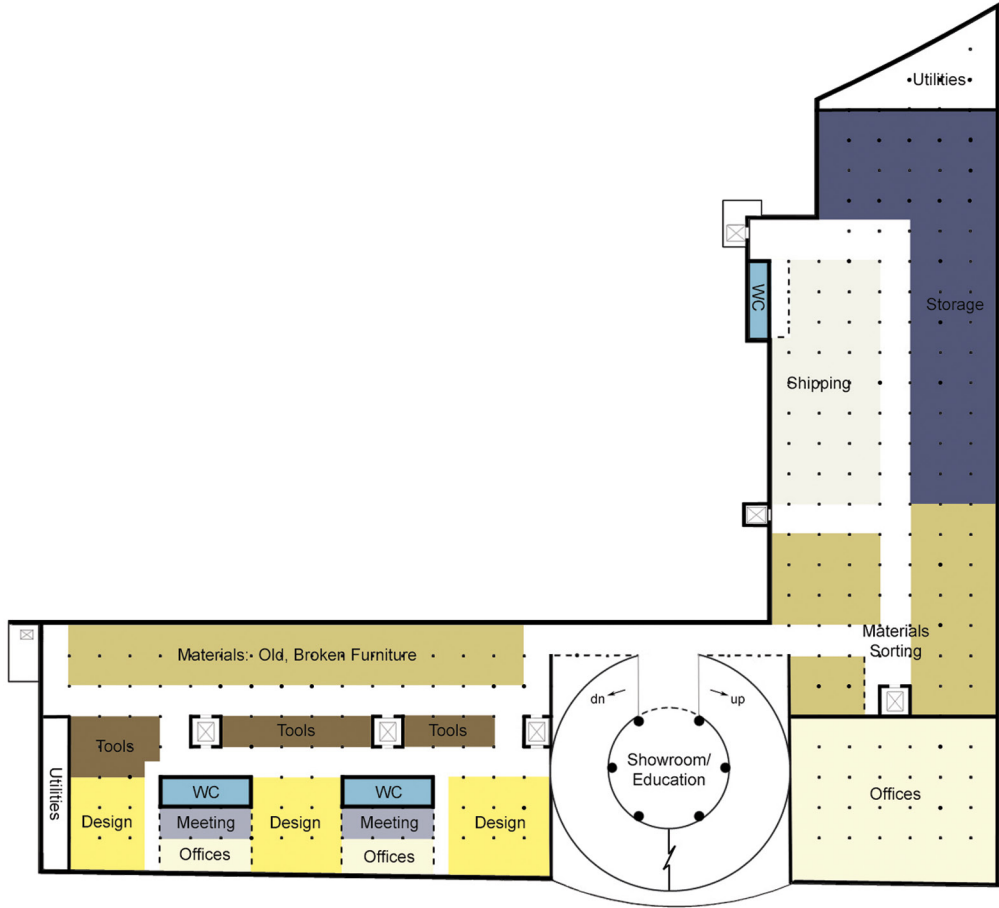


charcoal section drawing cut through atrium facing North showing updated ramp configuration, new structural columns, safety railings, & the penetration of the central sculptural fire stair into a large hanging chandelier of corrugated metal panels

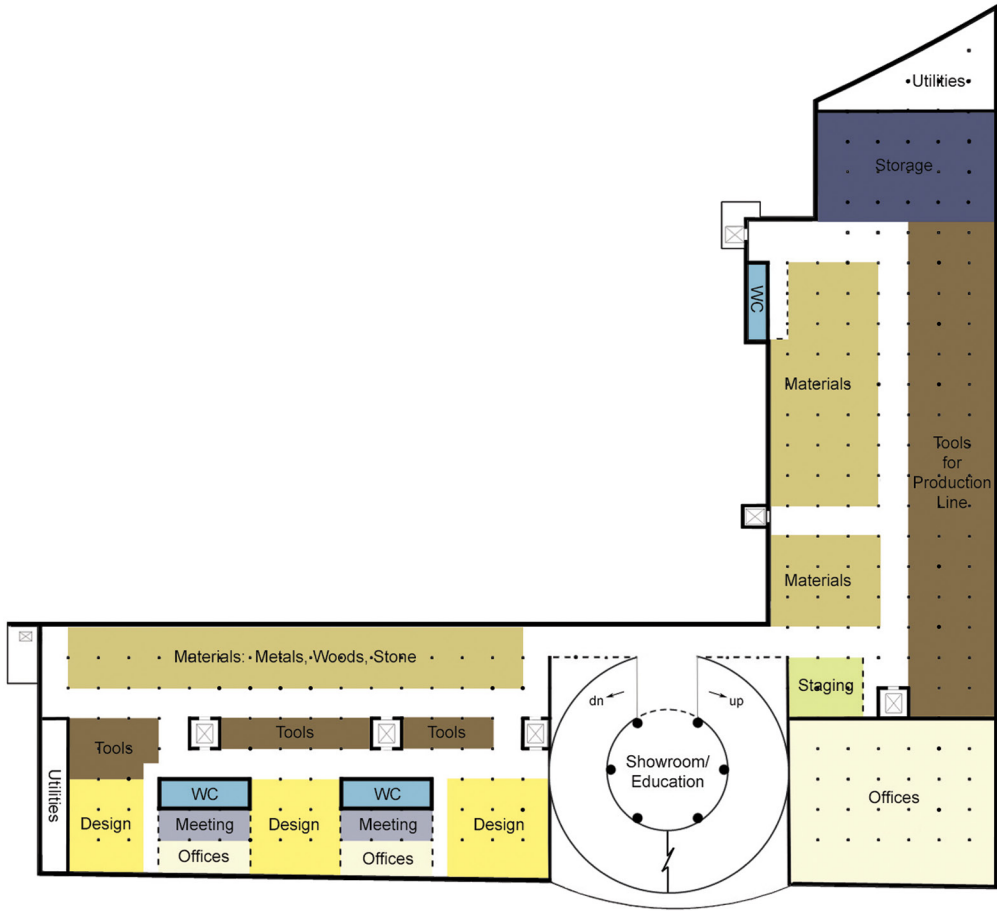




2



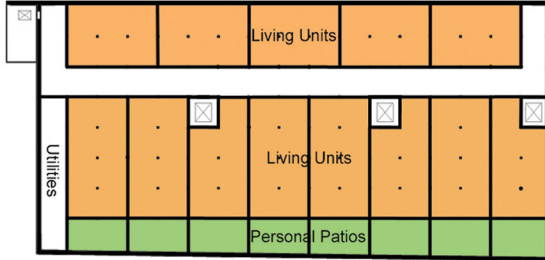
3



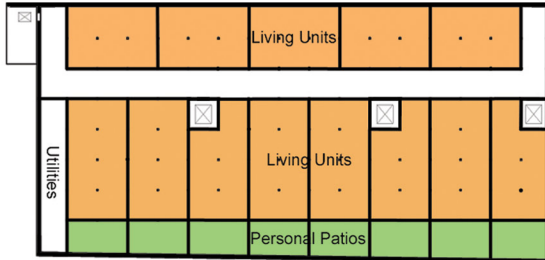
4



5



6



7



exterior perspective collage rendering showing how the new atrium fits into the existing facade; the entrance is covered by the outbulging of the atrium on the above floors; the lowest shading fin extends down the facade to the East corner to turn the sidewalk into a covered walkway & helps guide pedestrians to the entrance; site development adds a visitor's parking lot across the street in an empty triangular lot adjacent to the railroad tracks & a small business



BEFORE: missing chunk & only antiques advertised



AFTER: new atrium announces presence of new business

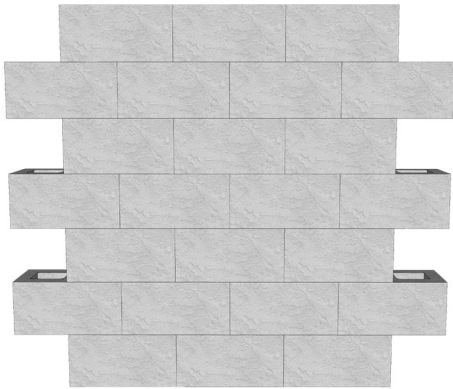


BEFORE: vacant oversized garage & parking lot

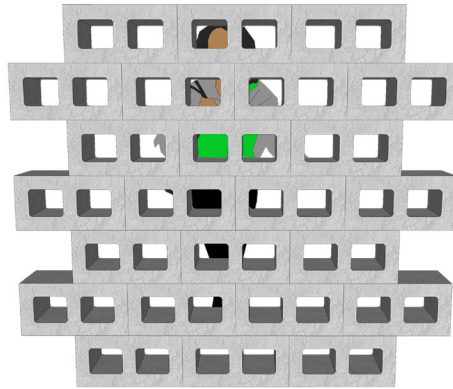


AFTER: relaxing indoor/outdoor cafe & green space

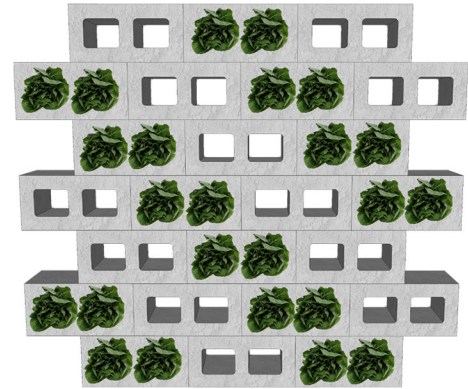
re: turn
CMU



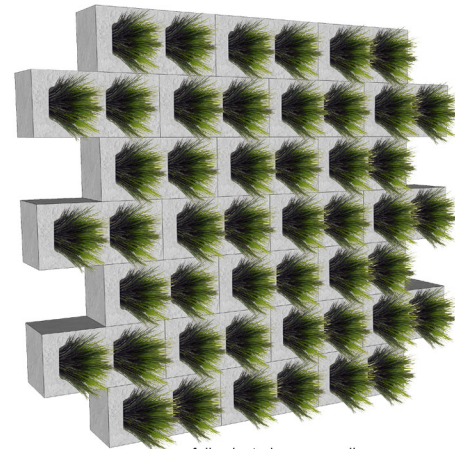
traditional use: opaque structural wall



alternative reuse: visually permeable partition

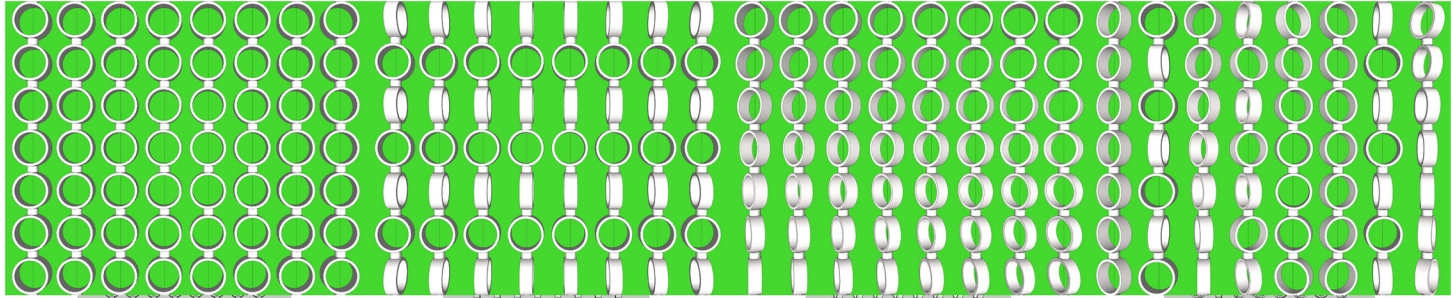


partially planted: visual screen & green wall

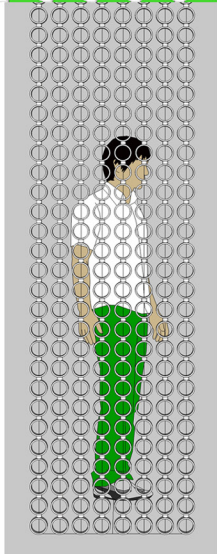


fully planted: green wall

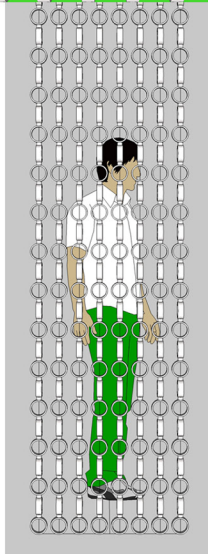
re: hash
PVC pipe



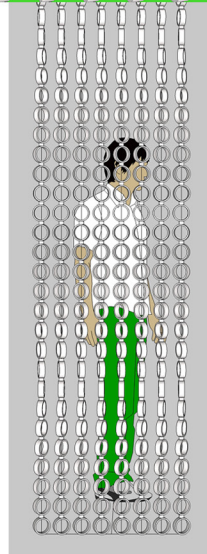
segments on wire strands = curtains/visual screen spatial partitions



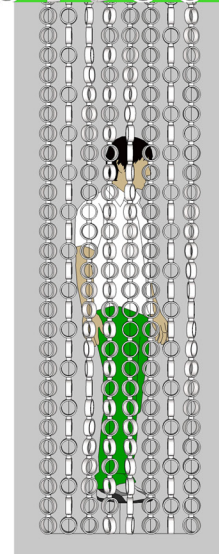
straight



90°



swirl



random

re: light
lightbulbs



reused fluorescent tube light
by Castor Canadensis

original use: lamp/light source
adaptive reuse: fixture/light diffuser

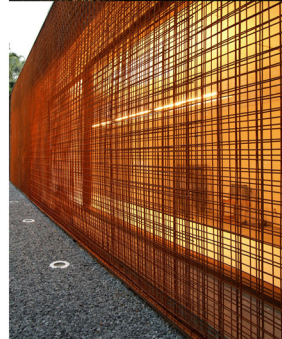


light bulb fixture
by Bulbs Unlimited

re: capture
rebar cages



Vitra in Sao Paulo by Marcio Kogan



original use: concrete reinforcement
alternative reuse: facade treatment



cage lamp shade

re: conduct
metal plumbing pipes



furniture



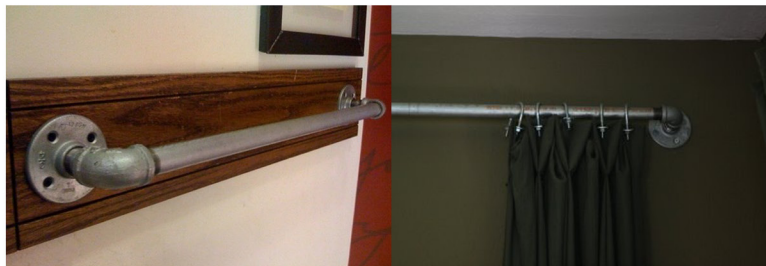
sculpture

Singing Ringing Tree
by Tonkin Liu Architects



light fixtures

hardware



hand rail or towel bar

curtain rod



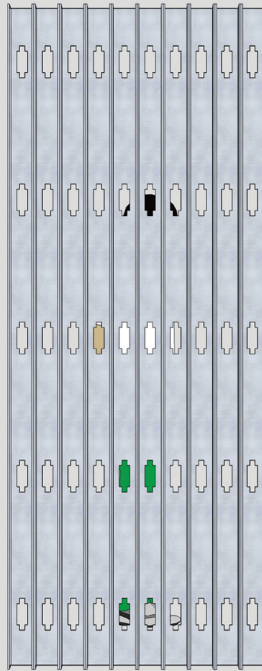
Kozo2 desk lamp
by Design 2009

re: align
light gauge steel framing

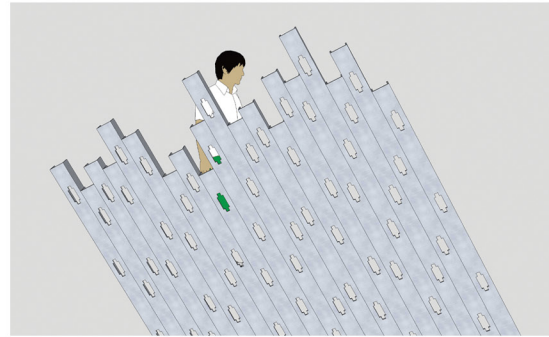
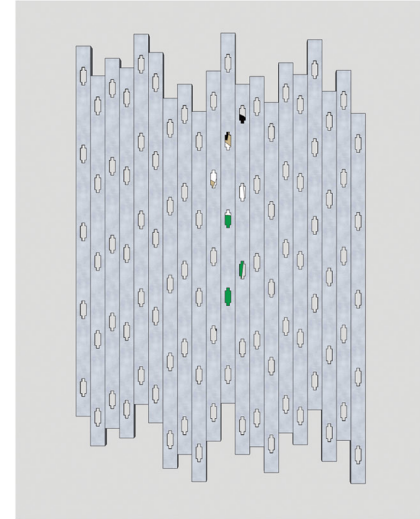
partition wall (front?)



partition wall (back?)

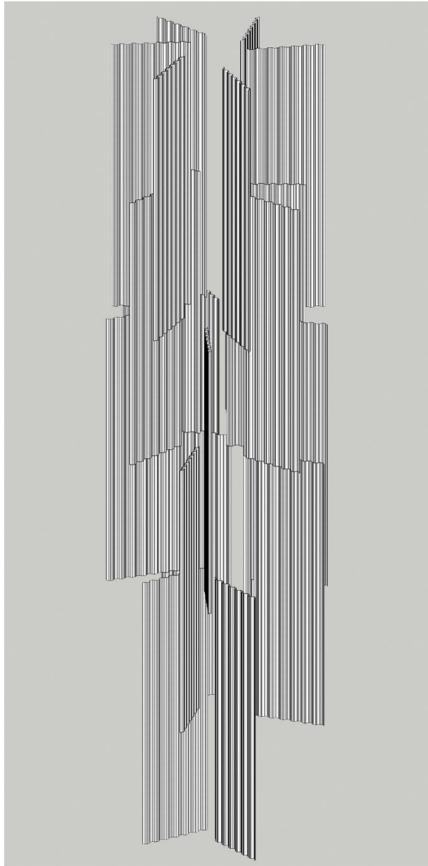


building shading device/
visual screen



decorative privacy fence / parking lot enclosure

re: purpose
corrugated metal decking

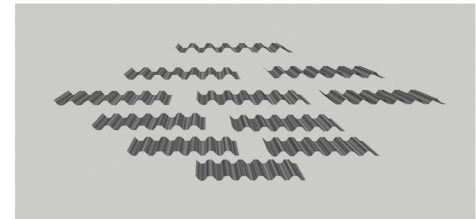


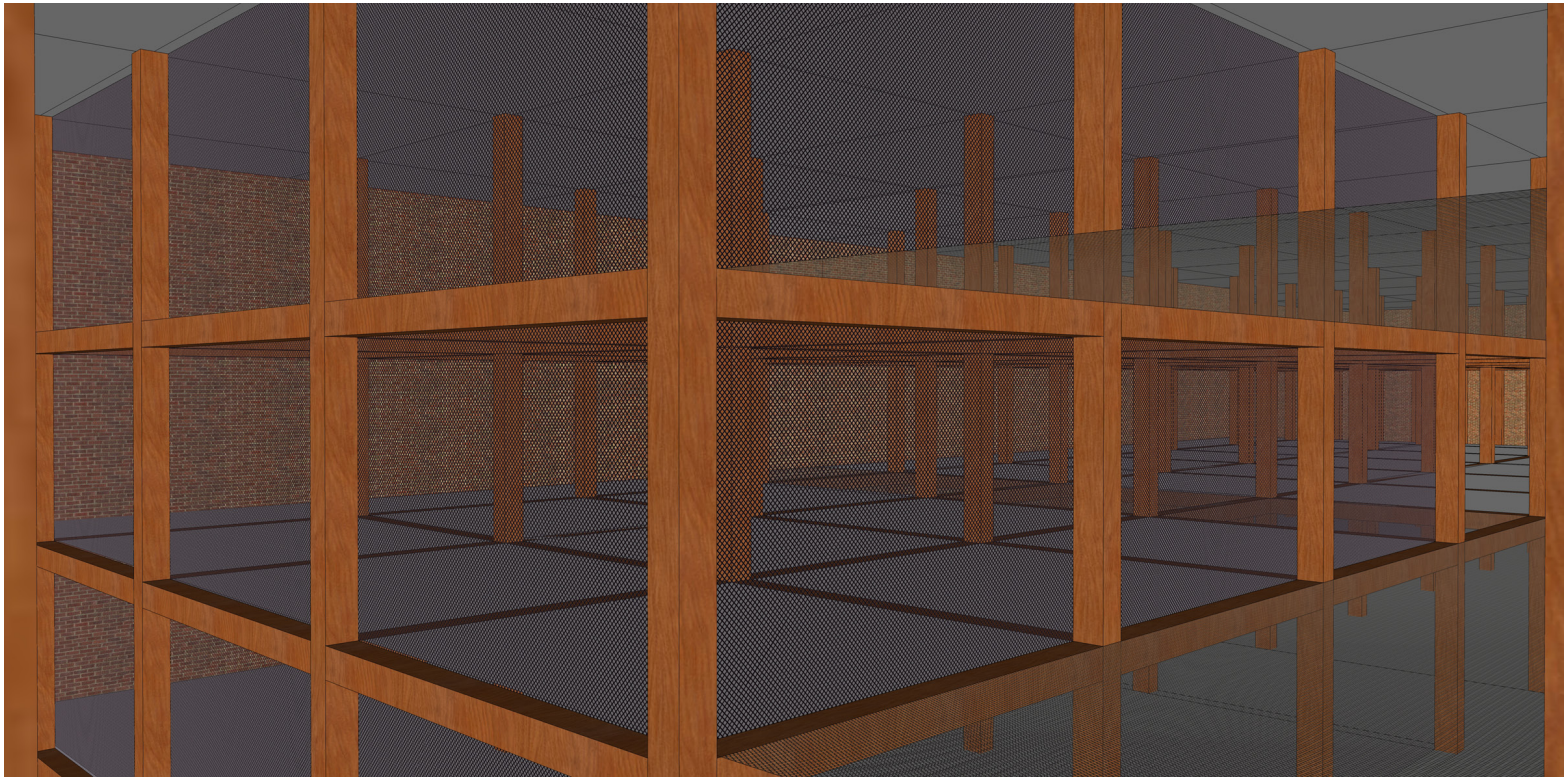
hanging sculpture / light fixture
(below, as seen from beneath)



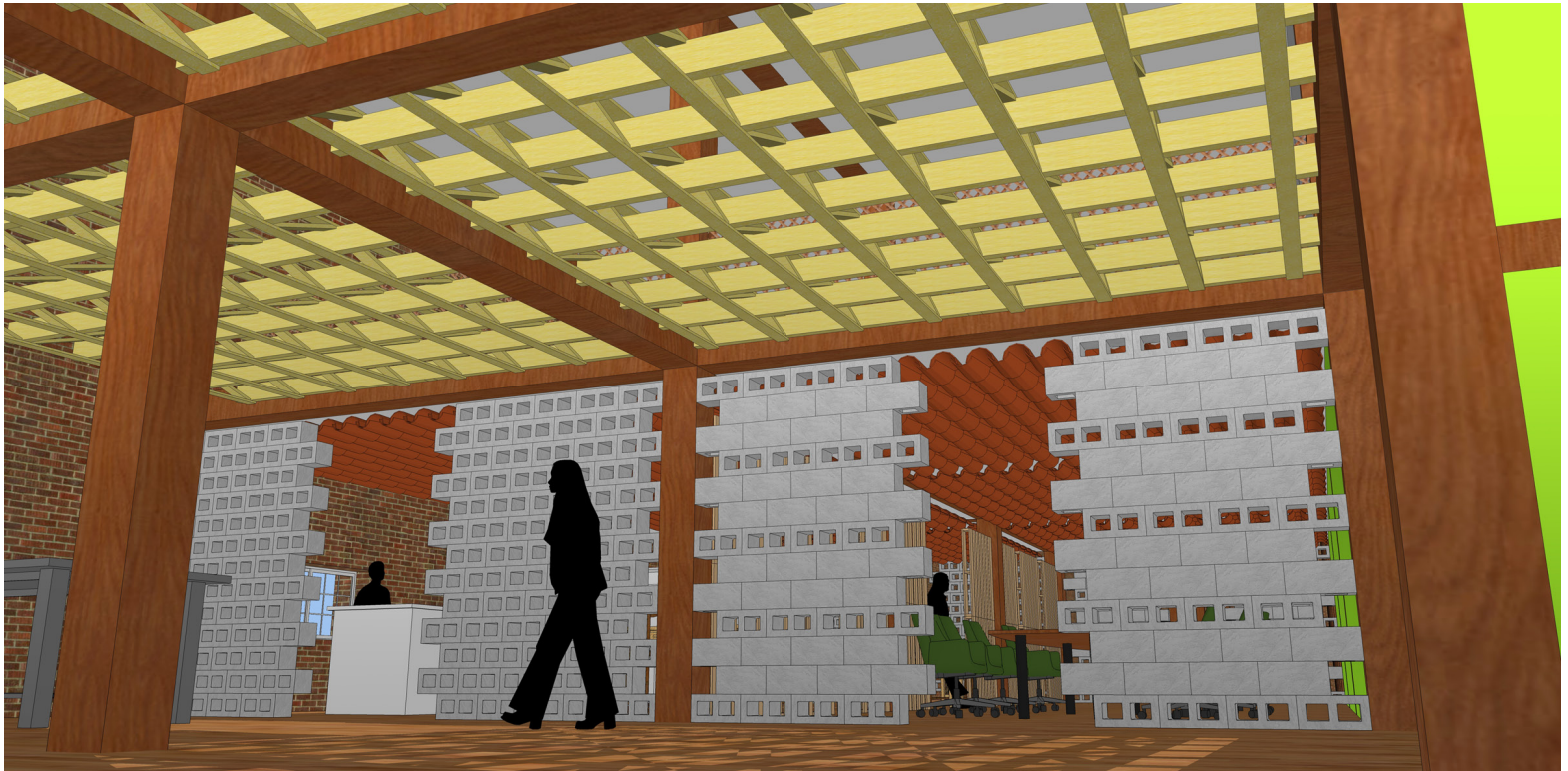
shading device / weather protection

shelving





interior section perspective taken at the fourth floor showing the concept of architecture-within-architecture through the enclosure of multistory volumes with hurricane fencing; notice also the openness of the floors & the resultant column forest, each member's surface refinished by walnut blasting; circulation at this part of the building is on metal mesh walkways, allowing occupants to see the layering of the floor slabs



interior perspective taken within a design space looking toward office spaces on the left & meeting spaces on the right, defined as separate spaces by visual screen concrete masonry partition walls; the offices are sectioned off from the meeting space using another screen, but composed of wooden pallets; ceilings in the single story spaces are adorned with suspende clay roof tiles, adding texture & dispersing sound; the design space is double height with exposed formerly subfloor crossbracing serving as a light-filtering trellis & reclaimed wooden latticework forming a safety railing for the adjoining space above

Conclusion



'round & 'round it goes, where it stops nobody knows

Brainstormed and presented are a few of endless methodologies by which the Sligh building could be adaptively reused for the proposed innovative re: U sit business. A less transformative approach, as initially taken, would be more economical and consequently more well-received in a real world setting. RT London served as a demonstration as to the feasibility and functionality of small changes to an existing facility. Considering the older roots of the Sligh building, any major changes would likely draw attention from regulatory authorities and some legal protection for its historical significance could quite possibly be introduced. If re: U sit were to become a reality, it would doubtless be heartily accepted in Grand Rapids and serve as another tourist attraction for the city. Considering the company ideals, the building's renovations and restorations would doubtless be levered to garner LEED certification to add to the city's unmatched bounty of green buildings. The company's inherent sustainability would also help expedite the ecological revisions to West Michigan's other furniture companies. Time to LEED the way!

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hermanmiller.com
inhabitat.com
junktion.co.il
mbdc.com (McDonough Braungart Design Chemistry)
oregonmetro.gov
padnos.com
reestore.com
rtlondon.com
scraplab.org
sligh.com
steelcase.com
thefreedictionary.com
thehendryford.org/rouge
treehugger.com
turninghousefurniture.com
visitgrandrapids.org

“I guess I’m a cop-out. Designing a whole building is just too demanding of attention to keep the basic concept from disintegrating. Builders, prices, materials--so many things work toward lousing it up. I’ve chosen to do things which one can attack and better control as an individual.

Furniture design or a film, for example, is a small piece of architecture one man can handle.”

—Charles Eames

