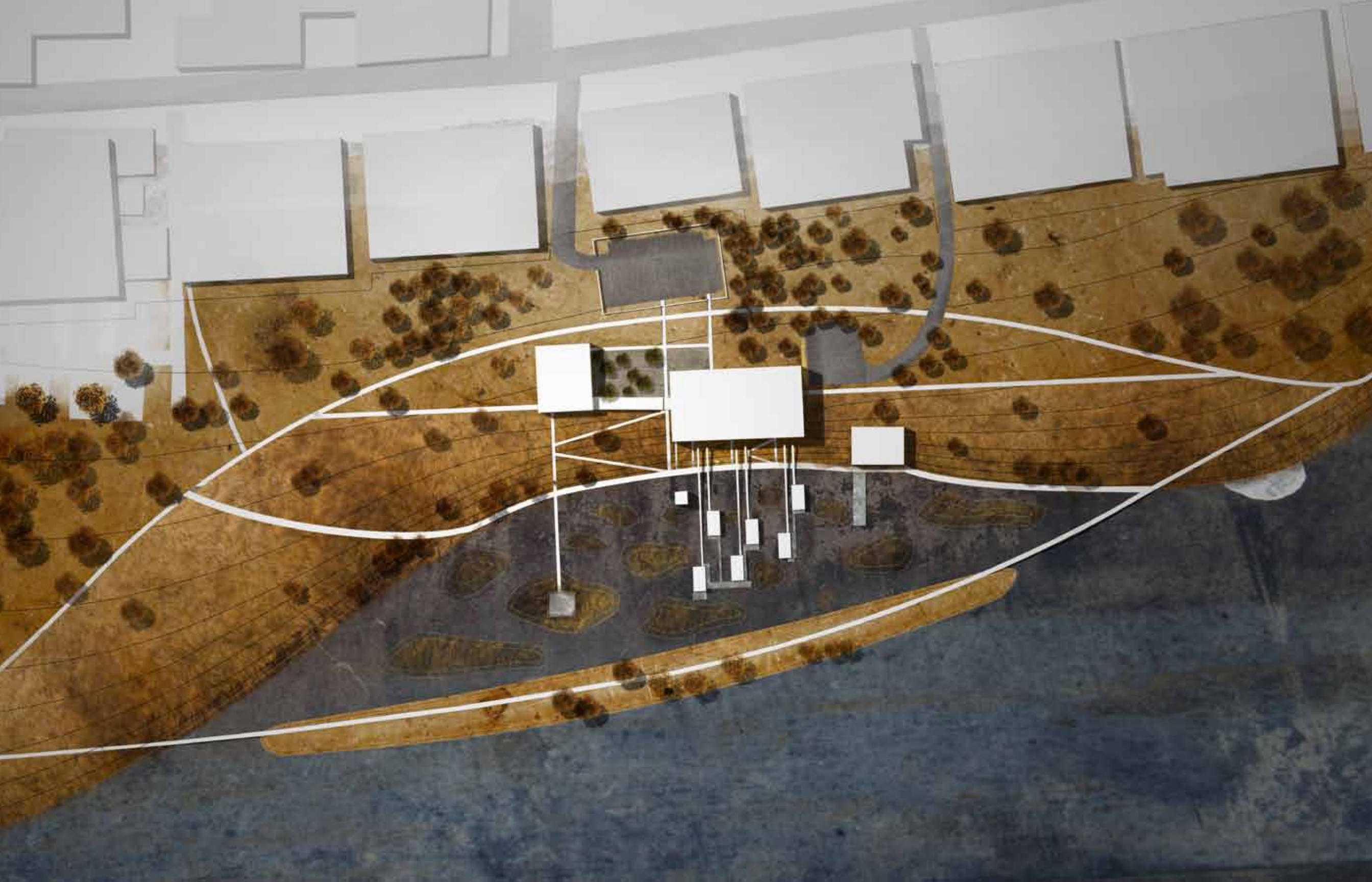
David Carl Johansson

Design Portfolio

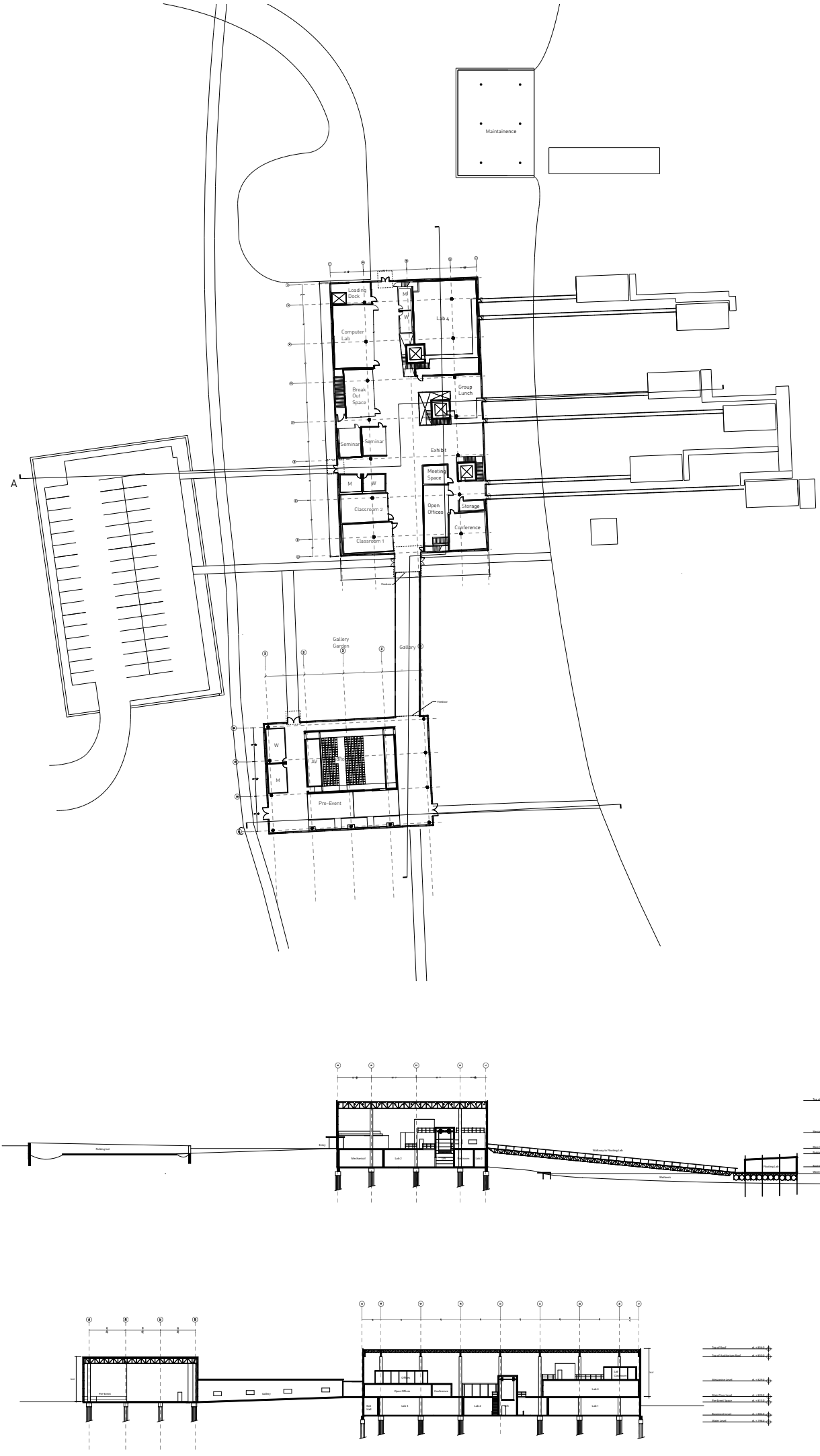
School of Architecture Fellowship Application

University of Minnesota | Masters of Architecture Program | Graduate II



Design Studio, Fall 2011. Instructor: Jeffrey ManDyck

Riparian Wetland Research & Learning Center



From Top to Bottom: Plan view, main level. Section through building and floating labs. Section through main building, gallery, auditorium. Opposite: Site plan of RWRLC proposal

The Riparian Wetland Research & Learning Center project dealt with the design of a research facility that would embrace and bolster both the local community and surrounding natural habitat. The site and program of the project tied into KVA's competition winning, RiverFirst proposal for the redevelopment of the Mississippi River in Minneapolis. Located just north of the Lowry Bridge in Minneapolis Minnesota, the site was located in a current industrial district which would be restored back to its historic existence as wetland. Rather than becoming a restricted area for natural habitat, the new wetlands would host a Wetlands Research and Learning center while tying into a greater network of river rehabilitation projects designed to bring the local community of people and natural habitat back to the river.

Position

The Riparian Wetland Research and Learning Center will establish a place that addresses the cities' tenuous relationship with nature. Sited in a present day industrial zone, the center will strive to be neither another industrial building nor a protected natural habitat but instead, a new, 21st century place where research, nature, and community are equally celebrated and successful. Architecturally, the RWRLC will explore the relationship between our need for stability in structure (shelter) and the ever-shifting nature of the wetlands. As a building, the RWRLC will deal with moving out into and successfully co-existing with natural habitat. As a site, It will bring a sensibility of wetland by providing a community of spaces and program that are part of the larger whole while recalling it's industrial past through materials and structure. By bringing its users into close proximity with the wetlands, the RWRLC will seek to engage our curious natures, creating an environment which reminds us that the desire to understand something is the initial spark of all research and that it is that same curiosity which drives the emergence of new ideas and new ways of thinking.

From Top to Bottom: Bridgeway to floating lab. Wetlands public pathway through research center. Exterior RWRLC in winter. Opposite: Dockway around floating labs.

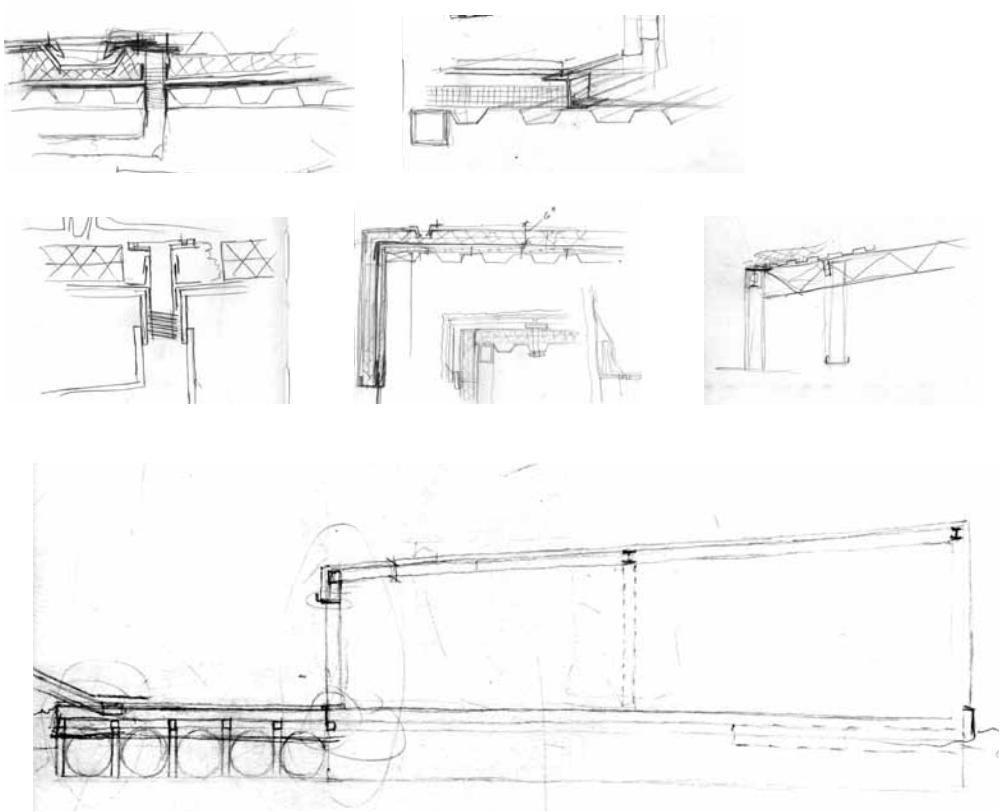
From Top to Bottom: Riparian Wetland Research & Learning Center model, 1/16" = 1'. Section model of main building at vertical circulation and bridge to floating labs, 1/4" = 1'.

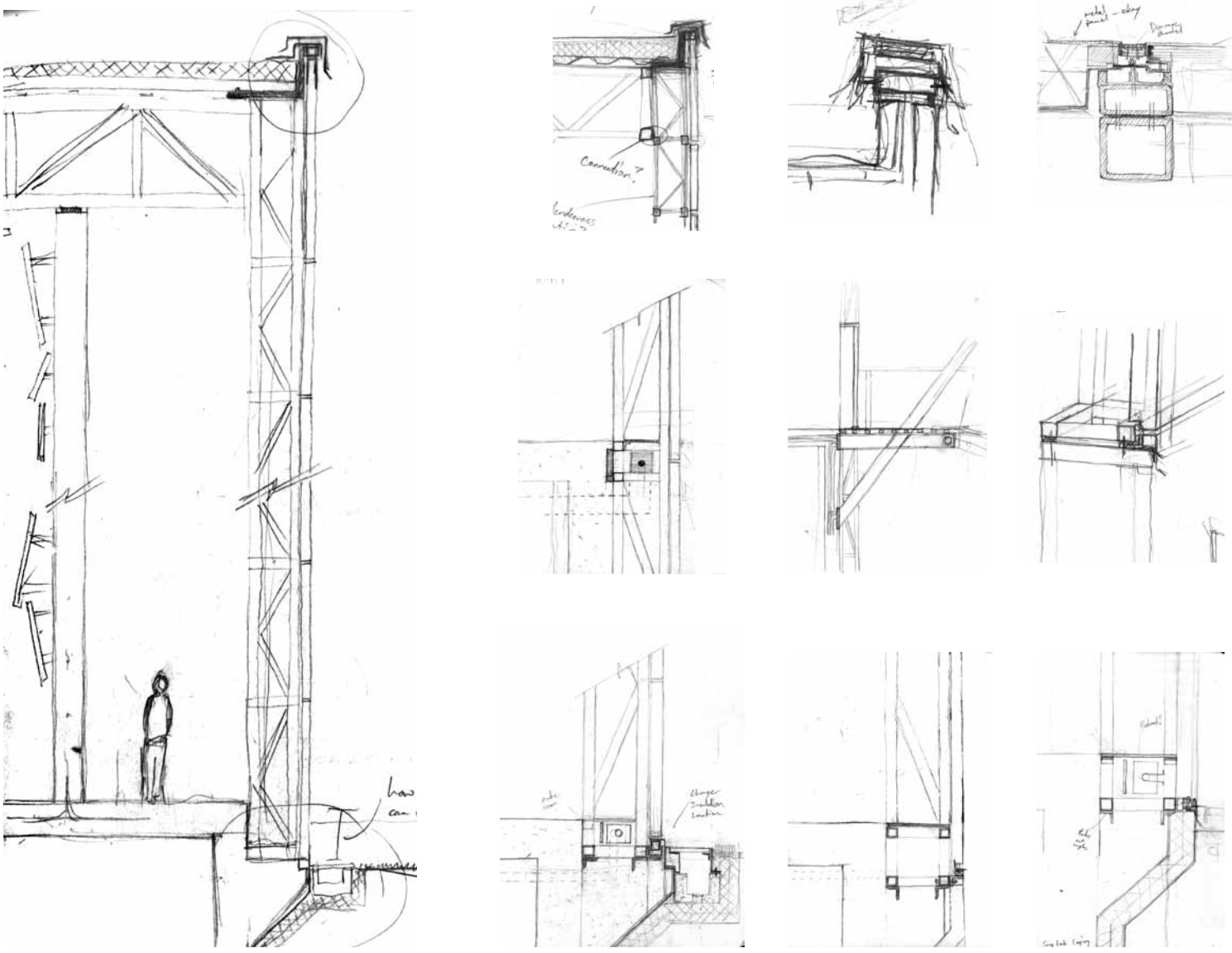
Comprehensive Studio, Spring 2012

Riparian Wetland Research & Learning Center

The Comprehensive Studio dealt with the detailing and design of a building's systems with a focus on making the project more environmentally sustainable. Under the instruction of James Lutz, students took the design projects they had developed to a schematic design level during the 2011 Fall Design Studio and began to address the project from a design development standpoint. Extensive consideration of project sustainability in the Fall Studio for the Riparian Wetland Research & Learning Center provided a solid foundation for a project that was sustainably developed from its beginning.

The images shown represent selections from a highly iterative process using hand drawing to develop details which attempt to address issues of aesthetics, materiality, constructabiity, cost, performance and longevity. The ability to effectively represent details by hand allowed many more iterations and ultimately resulted in a much more extensive understanding and clarity of the design.





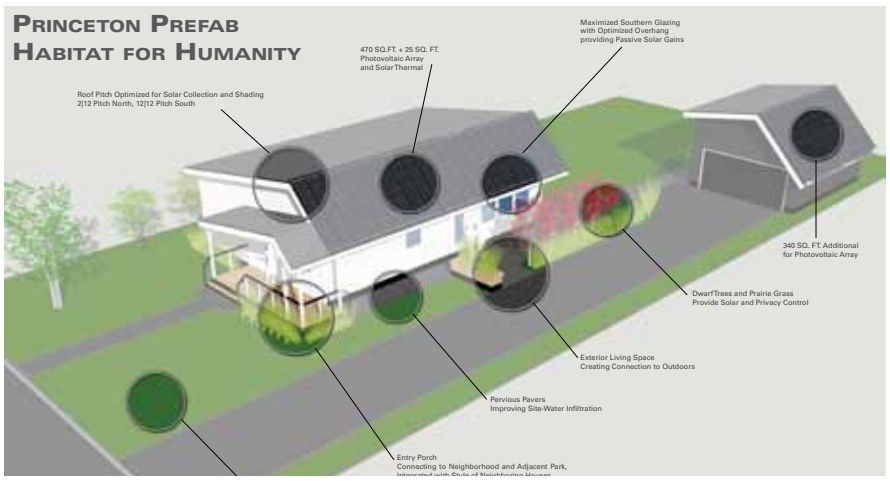
From Top to Bottom: Process drawings of details at section through floating lab. Process drawings of details at section through the main building.

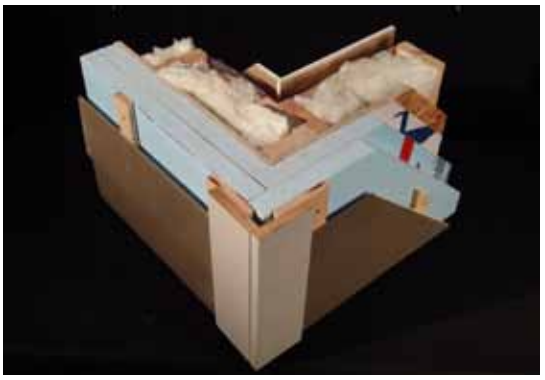
Module, Spring 2011

Habitat for Humanity
Net Zero Energy Design

The focus of the Net Zero Energy Design module was to design an affordable, Net Zero Energy house for the organization, Habitat for Humanity that would continue to reduce the cost of living for the owner throughout the lifetime of the house. Fourteen graduate students worked collaboratively on the design of two houses that could be built for around $100,000, constructed by volunteer labor, and would use little to zero energy. Following the instruction of Lucas Alm and Daniel Handeen, students used energy modeling software, full scale mock-up models and a collaborative design process to create two robust, sixty page construction document sets in seven weeks. The Princeton Prefab house design had a pre-selected client while the Core House design was developed to be used for future HFH clients on a variety of sites. Over the summer, students participated in the construction of the Princeton Prefab house and saw its owners move into the house in the fall of 2011.
Having real clients, a low budget, strict energy performance goals, and time deadlines, resulted in a rapid gain of knowledge and collaborative skills in a short period of time.

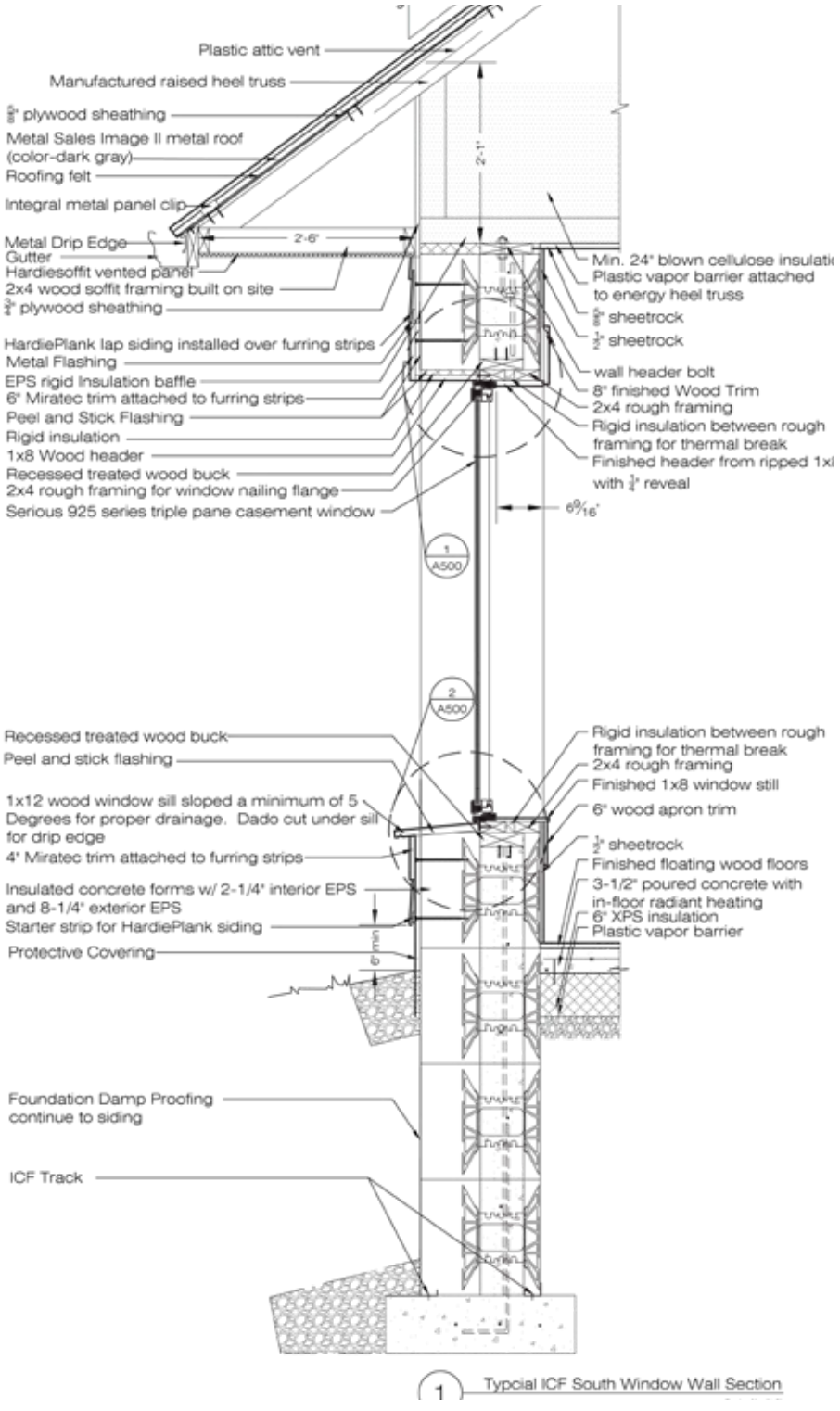
Princeton Prefab



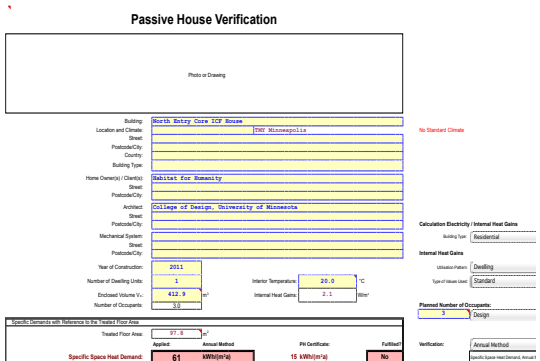


From Left to Right: Progression from conceptual design to built house. Progression from full scale mock-up models to students building the house to the house being moved to the site

Core House



1 Typcial ICF South Window Wall Section



Main Floor Plan
Gross Area: 1,370
Net Area: 1,070

Additional Orientation Options

South Entry

West Entry

East Entry

From Top to Bottom: Images of Core House. Wall section detail drawing. PHPP (Passive House Planning Package) energy modeling. Plan of Core House and orientations for different sites

Catalyst, 2012

Arduino Automatic Window Garden

The goal of the Catalyst was simple: use the Arduino board to make something that works in four days. Under the instruction of Lucy Dunne, students learned basic circuitry, wiring, soldering, and computer programming.

The idea for the Arduino Automatic Window Garden was based on a very simple problem. I love growing plants but am terrible at keeping them alive. Starting with an existing herb garden where the herbs were struggling to grow, the window garden was conceived to be an elegant, product like solution that could be paired with existing herb garden kits to create a successful growing solution.

In collaboration with Alec Sands, a single product was developed that was automated to sense moisture levels and initiate watering, sense light levels and turn on illumination, sense temperature and warn if the temperature next to the window was too cold, and periodically create a breeze over the plants. A water holding container was created by vacuum forming acrylic over a wood block. A solenoid valve is controlled by the Arduino board and releases water through a copper where it drips down onto the plants. The structure of the Auto Garden is made of finished pine wood. The system is run off a 9V battery and was successfully demonstrated to the school on the final day of Catalyst.

From Top to Bottom: View of Arduino Garden as it would sit in a window. Inside wiring and mechanics of Arduino Garden

Independent Work, Summer 2011

King's Guard Fly Boxes

Designed as groomsmen gifts, the King's Guard Fly Boxes were an exploration in design, fine wood working, and hand craft. The goal of the project was to make a unique set of gifts to be given as token's of appreciation for the groomsmen's and fathers' help and participation in my wedding. The gifts needed to be lasting, useful, and carry a memory of the event they were created in conjunction with. All recipients of the gifts happened to be fly fisherman resulting in the birth of a hand-made, wood fly box project. Six individual boxes were made, three in Alder wood for non-blood related family members and three in Walnut wood for blood related family member. Each box is its own unique size, etched with the name of the recipient on its lid. The wood was taken from rough cut lumber, jointed, planed and cut to size. A hand held router was used to create a cavity in the wood for the insides of each box. The halves of each box were attached with brass hidden-barrel hinges and held closed with a pair of inset magnets acting as a clasp. Foam inserts, cut to size, provide a surface for holding flies.
The use of a CNC machine to create the boxes was considered but ultimately discarded as its use would not have been in the spirit of the project. Instead, precision, when needed, was achieved through practice, concentration, and steadiness of hand. Minor imperfections were celebrated as part of the process of learning a craft and helped imbue each box with its own character. Ultimately, the fly boxes have been used successfully during the process of fishing for trout.

From Top to Bottom: Engraved wooden fly boxes at river site. Close up of finish work. Fully opened fly boxes showing hidden barrel hinge joints and magnetic clasps.

Summer, 2011

The Wood & The Ivory Wedding

The Wood & the Ivory Wedding may have taught me more about design than anything yet to date. My wife and I did not start out with an intent to design a wedding. Rather, we slowly, but surely, made a wedding that was us. Located on her grandparents farm in Faribault and titled for our love of music, the event was a "self-made" wedding. With the help of family and friends, we reclaimed land over run for 20 years. Shipping crates were collected, their wood de-stapled, and used to build all the benches and tables for the ceremony and reception, a bathroom enclosure, a bar, and a dance floor. Placecards were cut from wood and laser etched. Staples from the crates were used to hold home grown flowers for table decorations. All the beer and wine was brewed by my wife and I. A concrete table was cast for the bathroom. We collected 10 pianos being thrown out by their owners and used them for performance and decoration on the site. We sang a duet as the intro to our ceremony. Finally, we were married and celebrated in an event in which I have never felt such love and joy.

The making of my wedding for one summer taught me about commitment, vision, collaboration, determination, fun, and how to design with people and event in mind. It showed me how people will rally around a passionate idea, no matter how bold. People are still talking about the wedding almost a year later. I love that. I love remembering that something I helped make was so full of good.

Wedding Photos by Katie Umenthum.