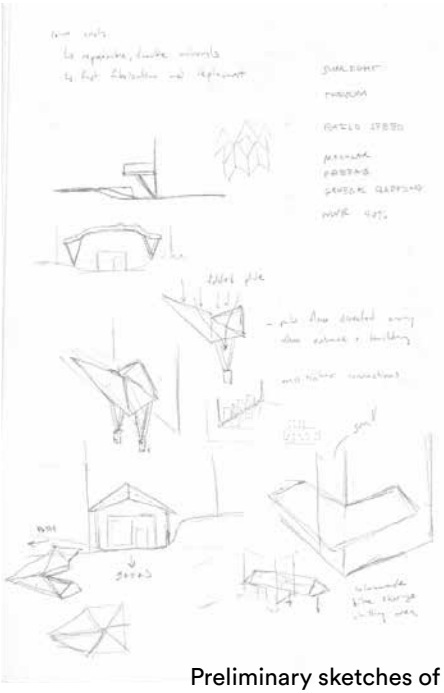
Richard He
Selected Design Work
2018 - 2022

Architectural Design
Technical Drafting
Rendering and Artistic Drawings

Renders created using Enscape.



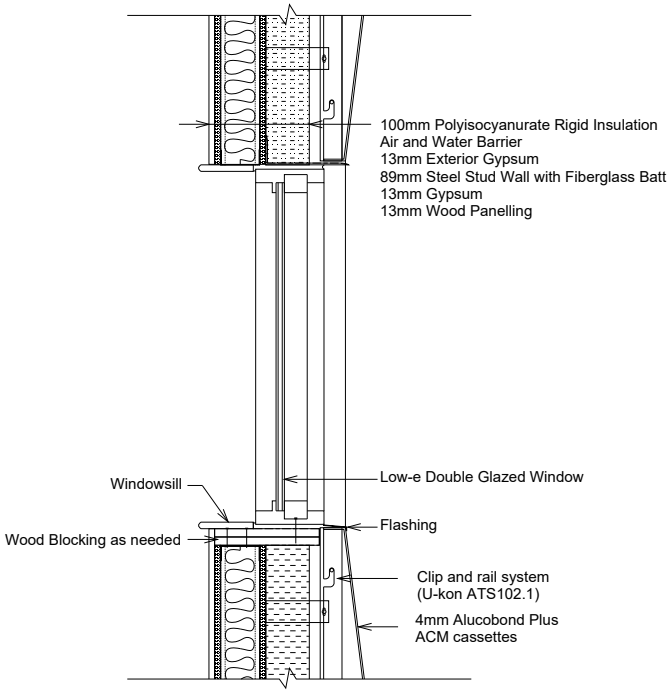
Preliminary sketches of the canopy.

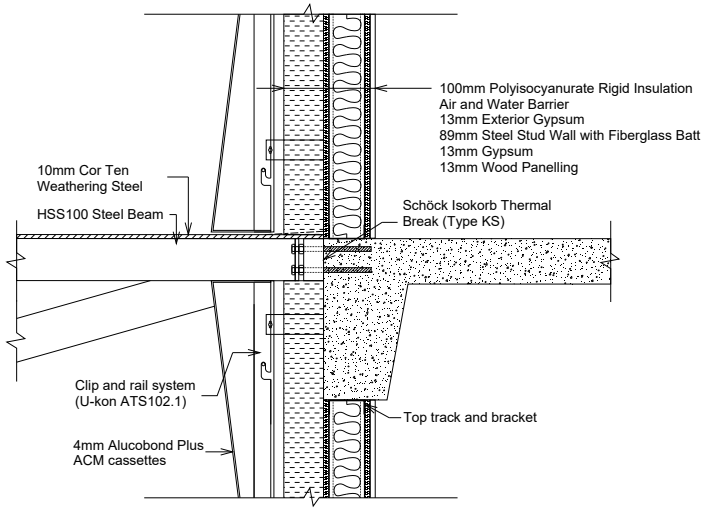
REV Re-clad and Canopy Design
AE200 Building Envelope Studio
University of Waterloo, Winter 2022

At the University of Waterloo, the heating demands of old buildings is a major source of energy waste. Ron Eydt Village (REV) is one such building, built in the 1970s with shortsighted insulation and heat retaining capabilities. Investing in improving the thermal performance of REV can help improve the efficiency of the building without having to demolish it entirely.

After a building envelope performance analysis was conducted, significant areas for thermal improvement were identified, especially in the insulation quality and control layer continuity. Additionally, concerns were raised by faculty and students about the accessibility and quality of the entrances of the building. This renovation project of the REV building is in direct response to these concerns, and consists of a complete re-clad of the building envelope and newly designed entrances, focusing firstly on the East Quad building, with the possibility of future application to other quads.

Designed with:
David Guo, Carol Hu,
and Ambrose Chin

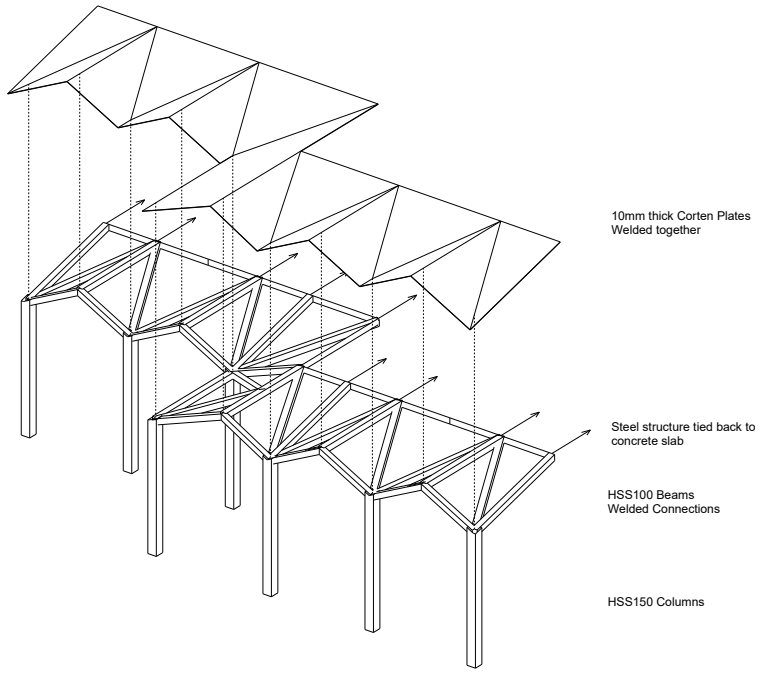




Top left: Re-clad wall window detail.
Top right: Canopy to re-clad wall detail.

Bottom right: Exploded diagram of canopy structure.

Bottom left: Canopy structural sketch model made using paper and foam core.



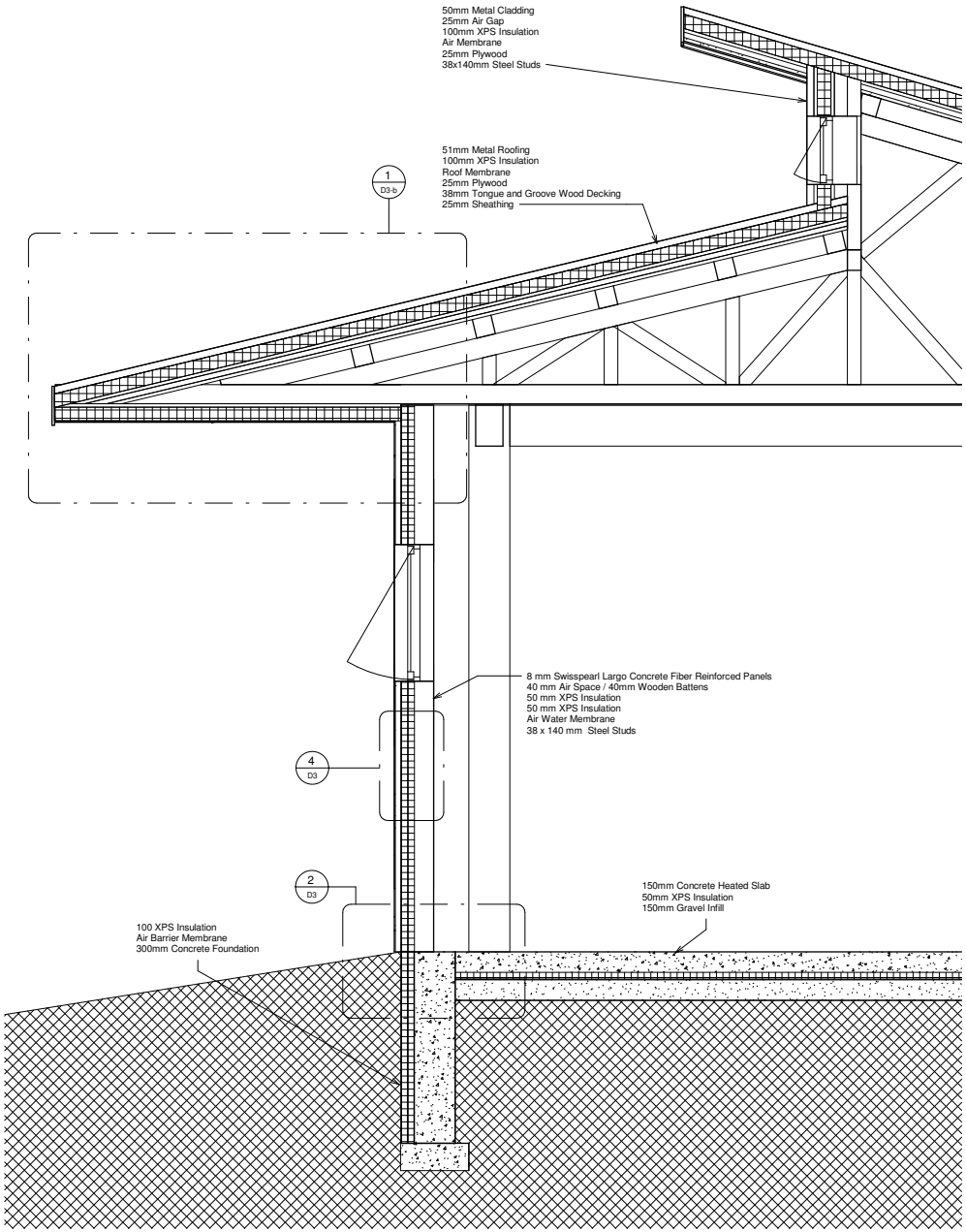
Super Shed
AE200 Building Envelope Studio
University of Waterloo, Winter 2022

This theoretical work shed was designed as a workshop for Architectural Engineering students to build and test projects in. Designed with passive efficiency in mind, the walls are designed to be high-performance and are heavily insulated while balancing sufficient glazing for lighting purposes.

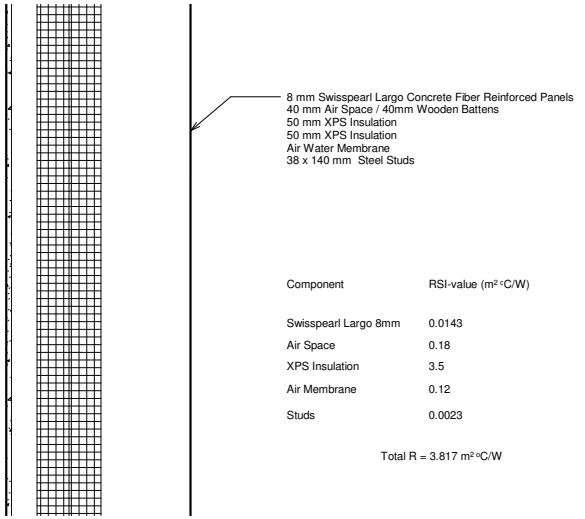
The entire structure is built of heavy timber for its sustainability and insulating qualifies, with a truss system designed to provide a clerestory with operable windows that allows for indirect lighting and better ventilation. Two overhead door bays, directly facing each other, allow the shed to be completely opened in the warmer months, and allow for ample space for any project that might come up.

While designed without a site in mind, this shed was intended to serve as a simple, yet robust outline for future similar “test sheds” that could be built in environments and climates similar to Waterloo, Canada.

Designed with:
David Guo, Carol Hu,
and Ambrose Chin



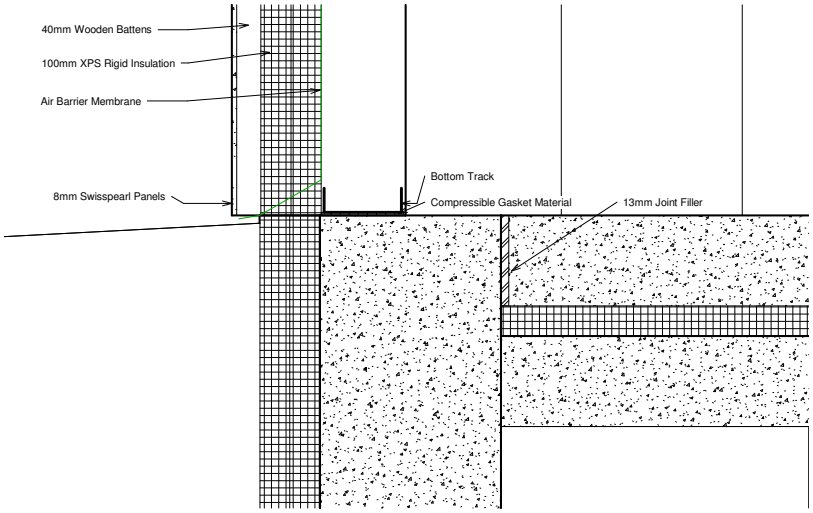
South wall section, originally taken at 1:20.



Component	RSI-value (m^2 °C/W)
Swisspearl Largo 8mm	0.0143
Air Space	0.18
XPS Insulation	3.5
Air Membrane	0.12
Studs	0.0023

Total R = 3.817 m^2°C/W

R-Value Calculations for a south wall sample.



South wall to foundation connection.

The Bluebell Gem
AE125 Structural Design Studio
University of Waterloo, Spring 2021

The current renovation plan for Waterloo Park features plenty of green spaces and environmental amenities, but it's plan for the arboretum lacks built gathering spaces built for flexible group and personal use.

Focusing on the space between the two paths that join the horticultural gardens of the arboretum, our design aimed to be able to serve as a gathering space for many of the diverse needs of the community. Parts of the pavilion closest to the wooded area between the labyrinth and the meadow are bounded by walls, creating a quieter, more enclosed space for studying or meditation. Simultaneously, the front and sides of the pavilion are more open, and can serve as an extension of the path, providing a welcoming space for all.

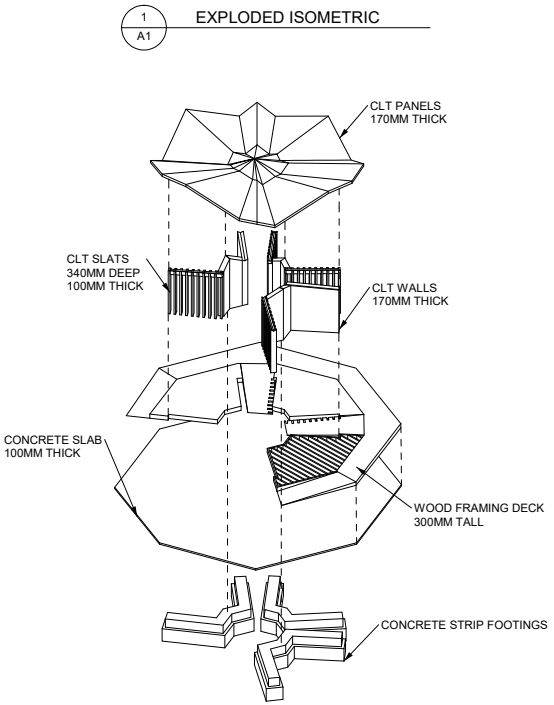
Ultimately, our goal with the Bluebell Gem was to develop an open, accessible structure capable of supporting and mediating between a variety of programs.

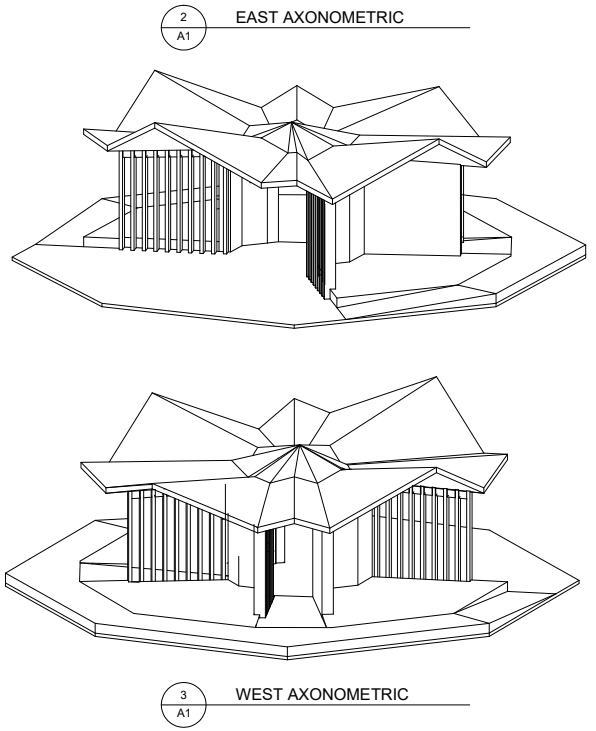
Designed with:
Dagmawit Worku, Pouya Pourrezaei, and Alexandra Keber

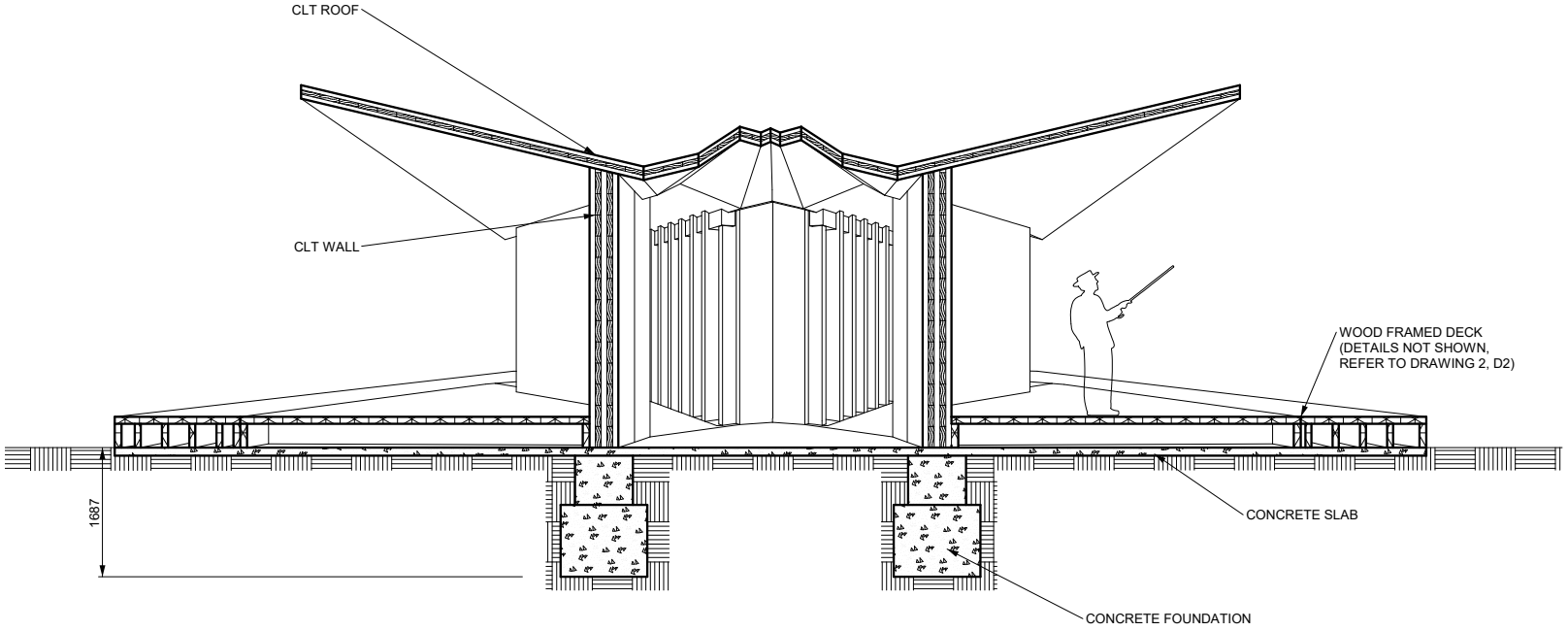
Left: Renders created using Enscape.

Right: Axonometric views showing the overall form of the design, as well as the general construction hierarchy through an exploded view.

Bottom: Section perspective, showing foundations, decking, and structural system. The CLT roof panel connections are designed to utilize a cutting-edge butt-joint connection system known as TS3, currently in the early stages of commercial usage throughout Canada and Switzerland.







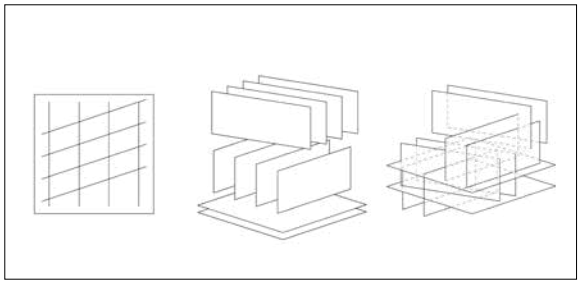
The Stacks

ARC201 How to Design Almost Nothing
University of Toronto, Fall 2019

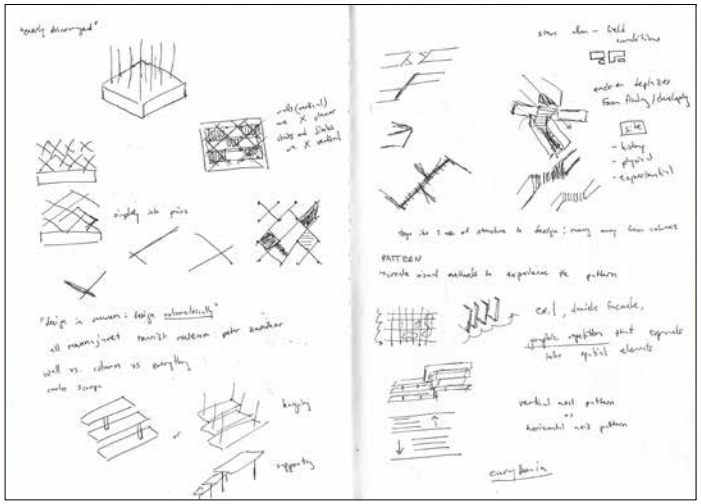
This semester long project explored various responses to the traditional 4×4 column grid question, culminating with a proposal for a study space on a given site within the University of Toronto St. George Campus.

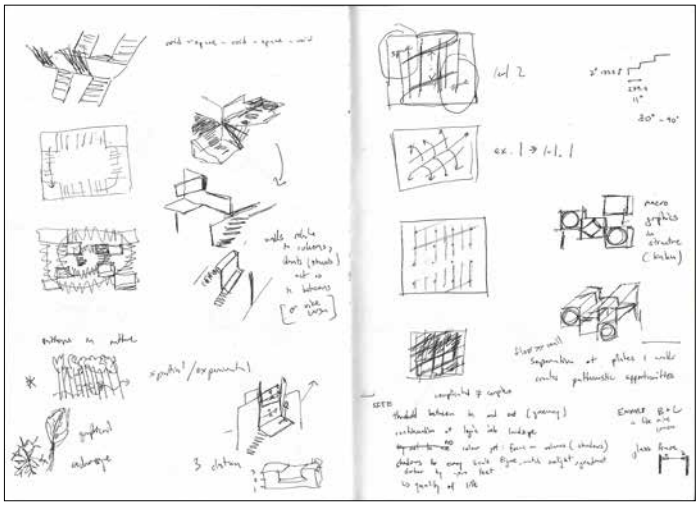
This approach in particular examines the way forms are revealed through the interference of two unique pattern systems. This pattern was then layered, creating a uniquely stacked conditions of space and passageways.

Draft renders of final design completed using Rhino and Lumion.

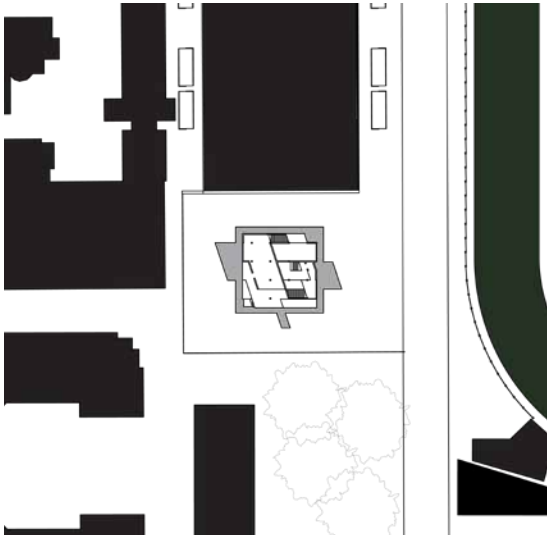


Parti sketches exploring the layering of patterns to create passageways and spaces.

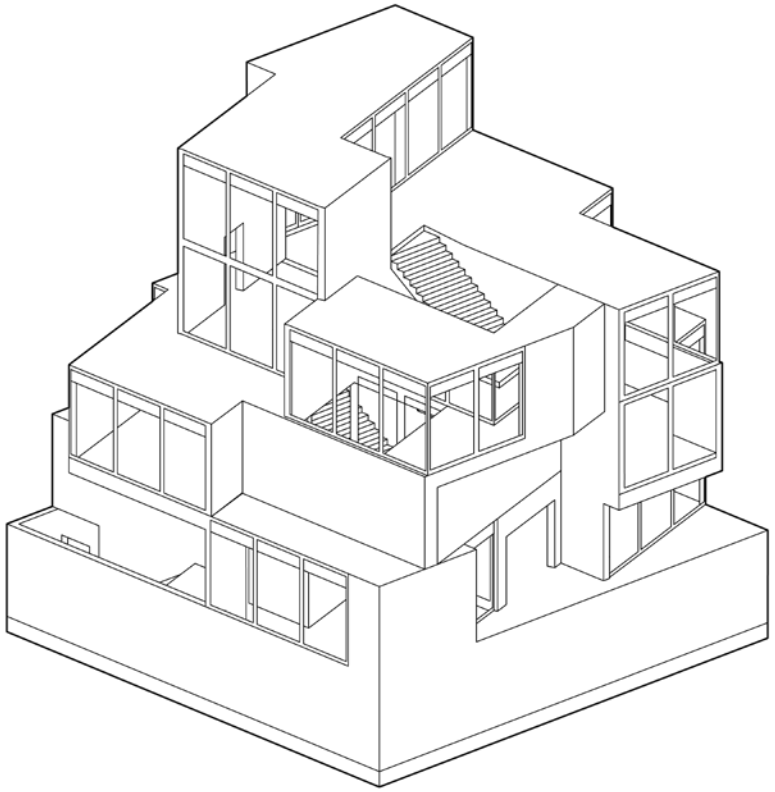




Early design iterations and concept sketches



Left: Site Plan.
Bottom: Isometric drawing.



Top: Perspective Section.
Right: Interior Render.

Left: Hybrid perspective render, situated on-site.

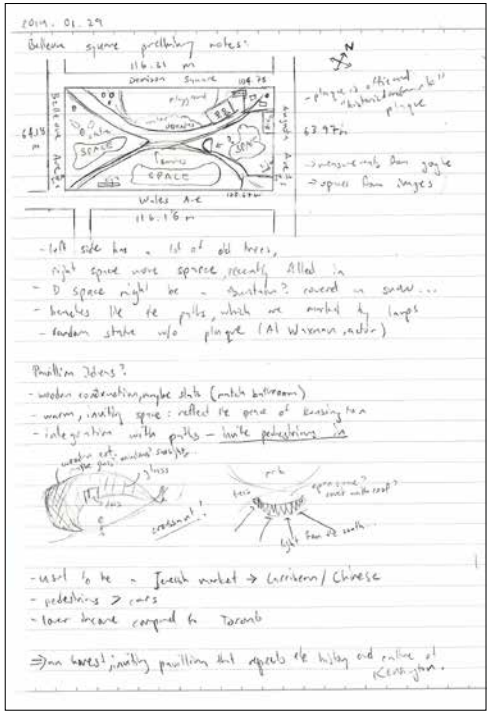
Bellevue Square Pavilion

JAV101 How to Design Almost Anything
University of Toronto, Winter 2019

Designed as a theoretical art exhibit in Bellevue Square Park, Toronto, this project focused on the traversal nature of museums, incorporating it into the walkable nature of the surrounding community of Kensington Market.

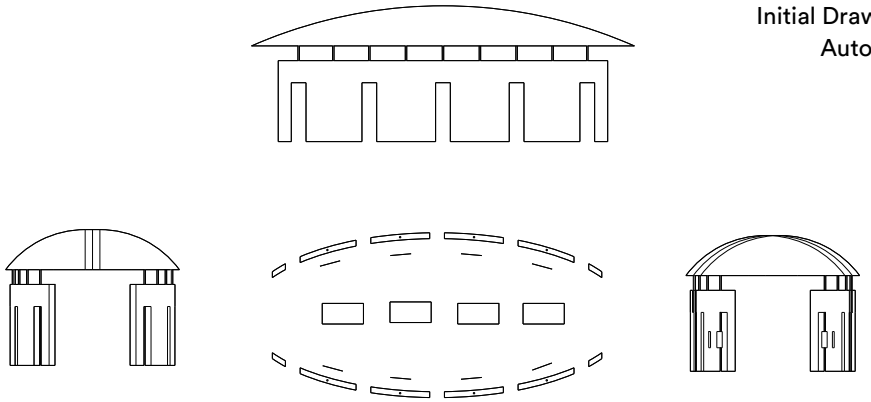
In particular, this pavilion was designed to house the work of Wang Fu Chun, a Chinese photographer who has been documenting the lives of train passengers for decades, telling the stories of people in the midst of transit through both time and space.

Left: Rhino Render. The entire model was parametrically modelled, using Grasshopper.



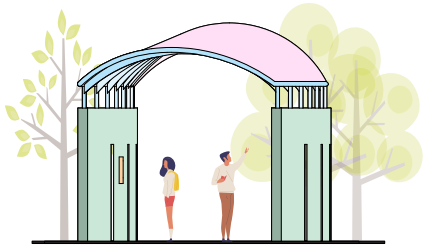
Right: Site measurements, notes, and brainstorming.

Site Plan
CAD, Illustrator

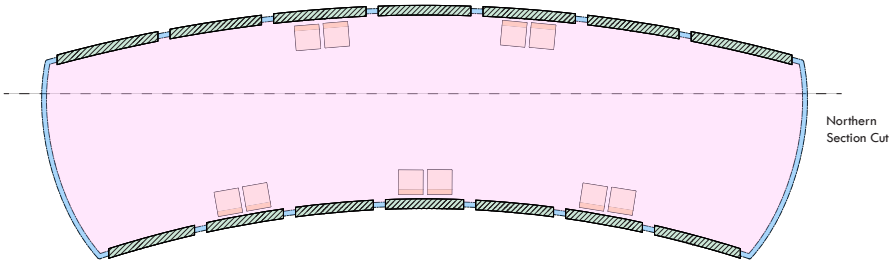


Initial Drawings
AutoCAD

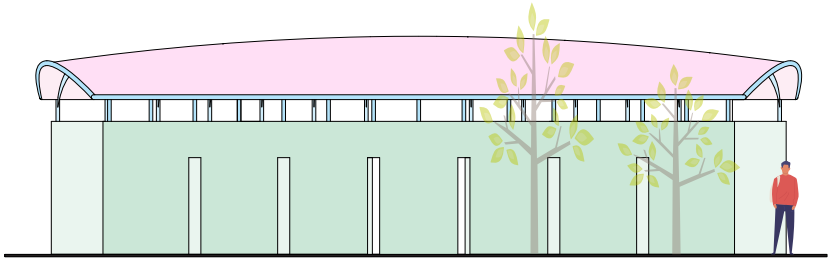
Final Drawings, completed using AutoCAD and Illustrator



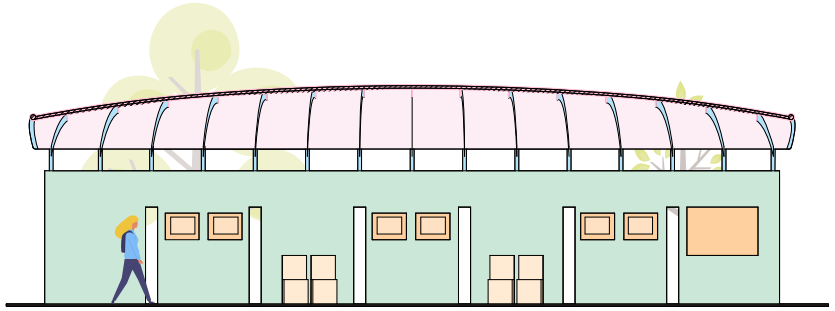
Western Elevation 1:50



Section Plan 1:50



Northern Elevation 1:50



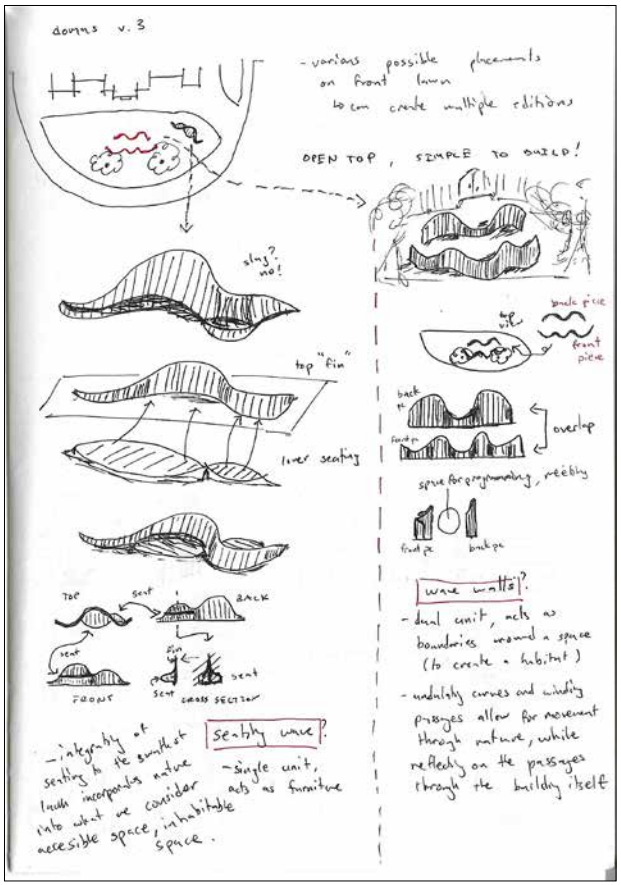
Northern Section 1:50

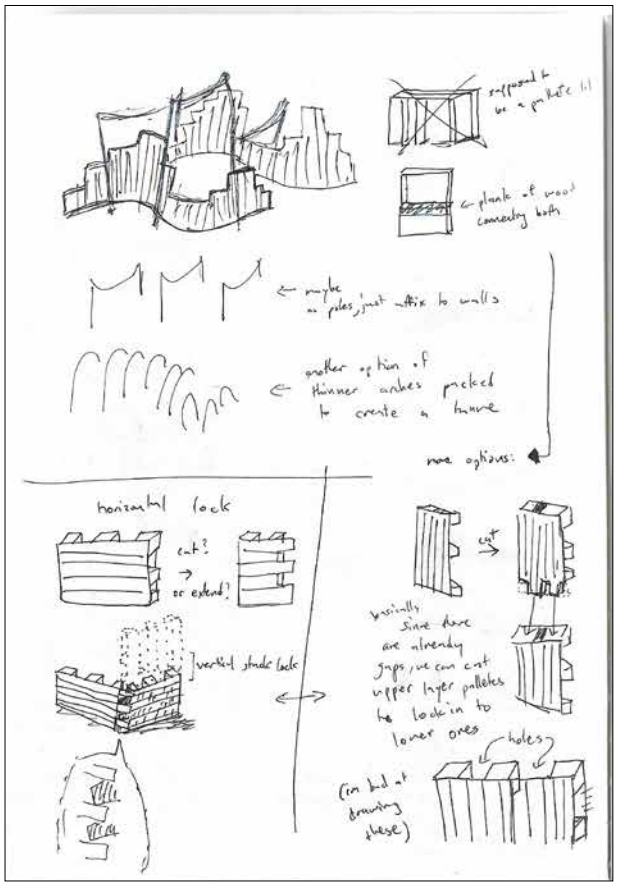
DOMUS
Daniels Art Directive
Summer 2019

The DOMUS project was the inaugural summer installation proposal for the Daniels Building designed by Daniels Art Directive, an undergraduate design and fabrication art installation group.

Working with many other student designers, I worked on early design iterations and wrote copy for the proposal, as well as helping fabricate the project after it was accepted by the faculty.

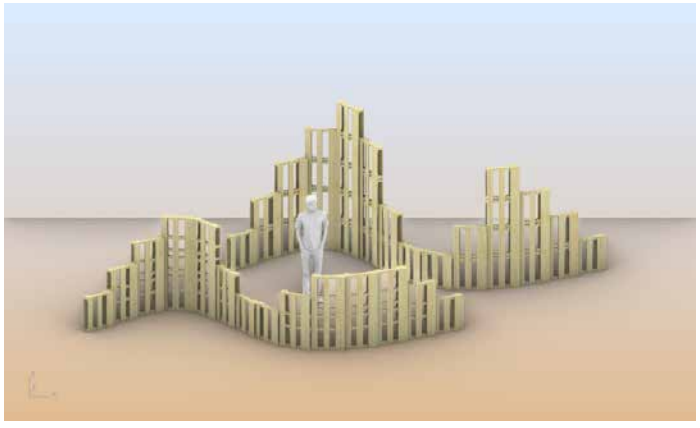
Designed with:
Daniels Art Directive



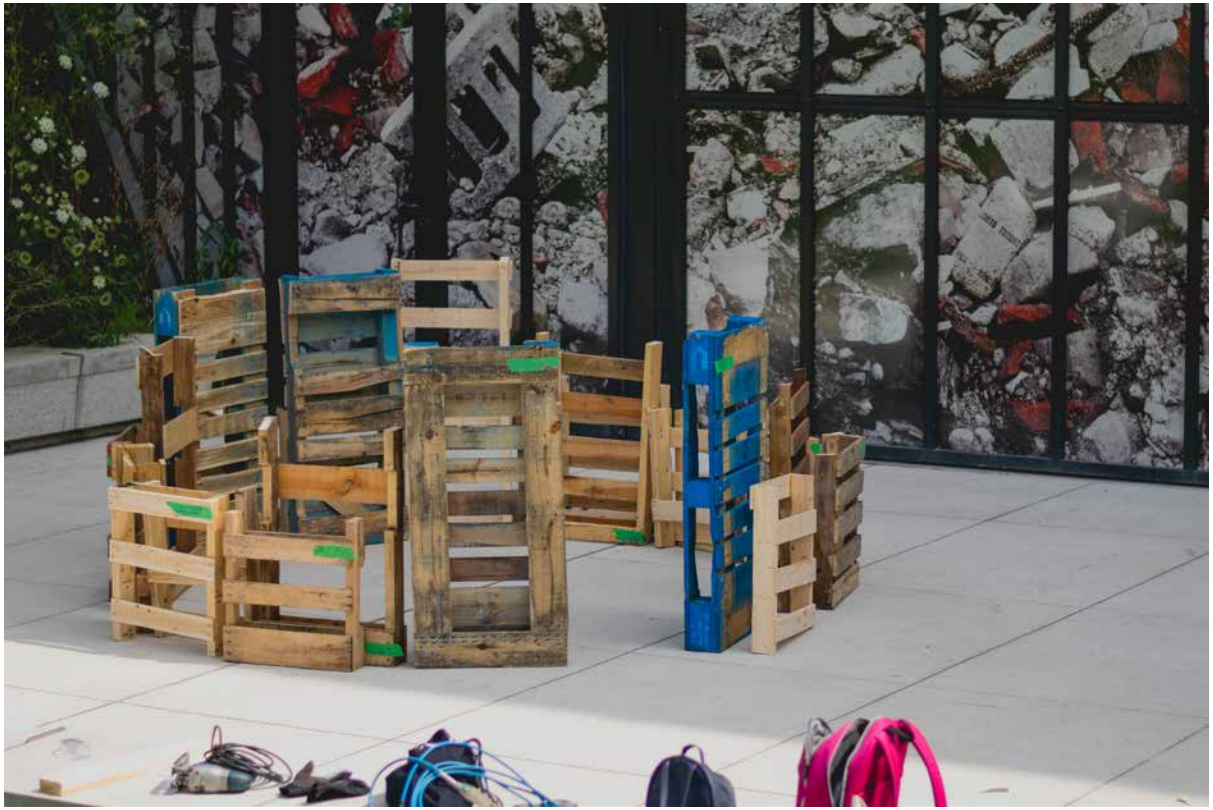


Early Sketches

Quick Rhino Renders, using a model generated in Grasshopper

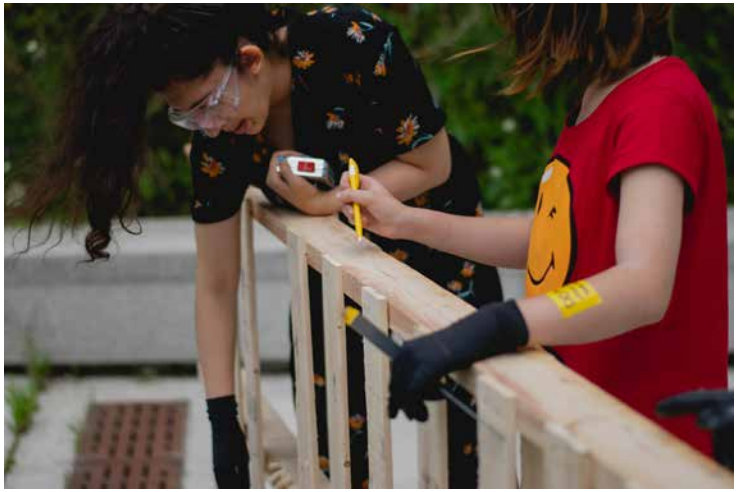


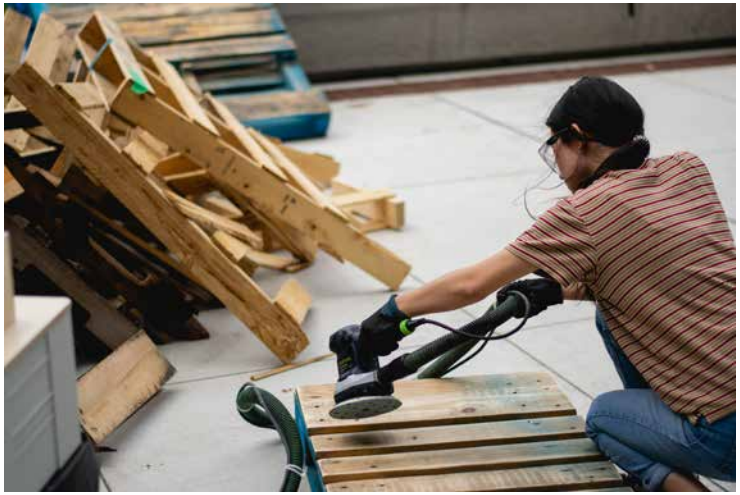
DOMUS, close to completion



Ultimately, the DOMUS project was an exercise in sustainable design, revitalizing used wooden pallets into the basis of the small structure. In addition to fabrication, I also played a role in documenting the process with DSLR photography.

Greenery detail of the final installation





Fabrication process

Graphic Design
Technical Layout and Communication

16 | Solar Car Livery Design, Blue Sky Solar Racing (Ongoing)

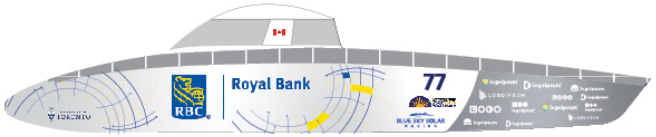
17 | Toy Story, ARC100 Drawing and Representation, Fall 2018

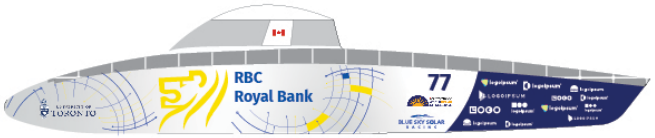
Conceptual Livery Design

Blue Sky Solar Racing
Summer 2020 - present

As the main graphic designer for Blue Sky Solar Racing, I also conceptualized and designed potential liveries for key sponsorship proposals, using Illustrator and Rhino 6 to prepare mockups and renderings that were well-received by potential sponsors.

2D Mockups
2020/07/06





Logo Iterations

Royal Bank

Royal Bank

RBC
Royal Bank

RBC
Royal Bank

RBC Royal Bank

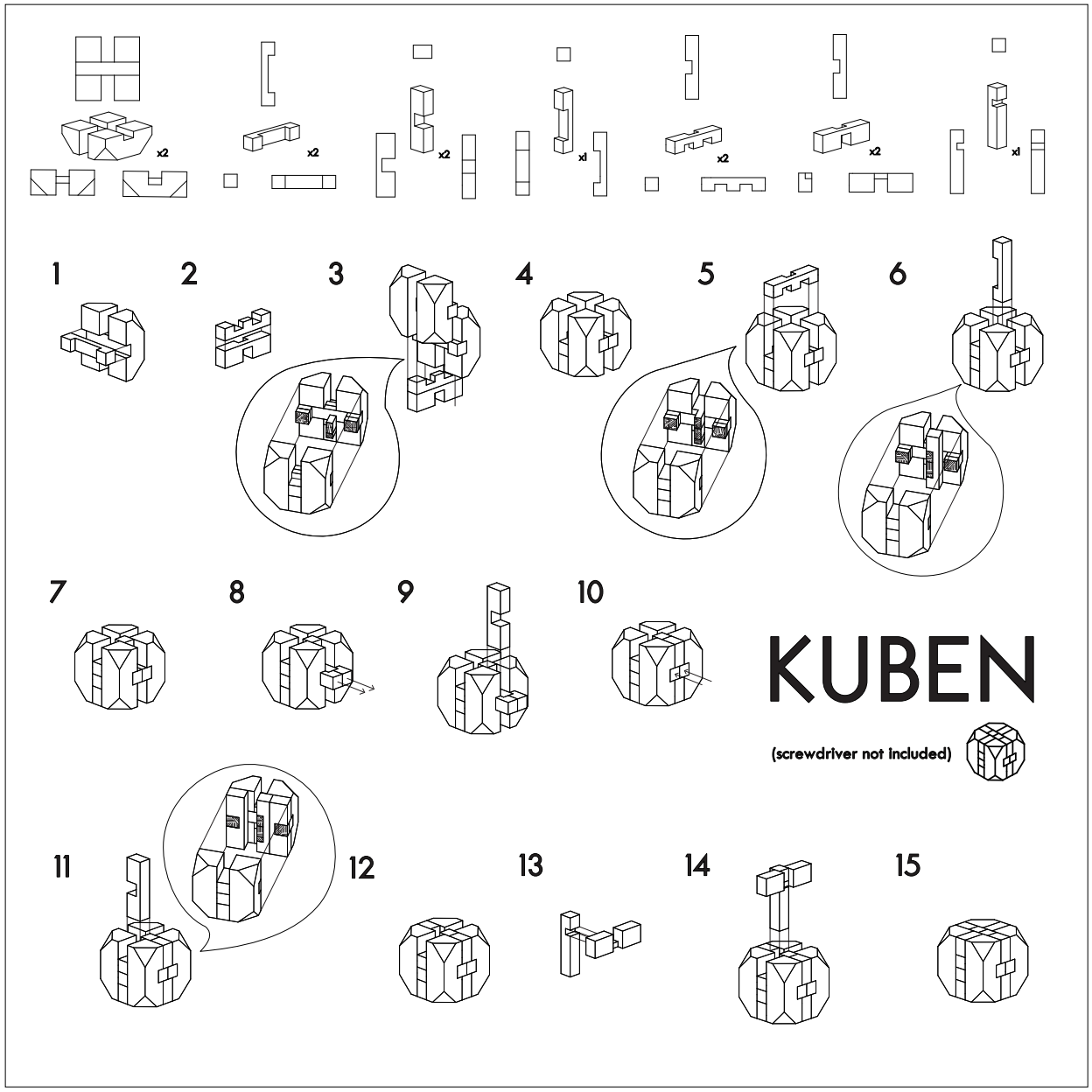
Royal Bank

Hybrid rendering of a design for MNP

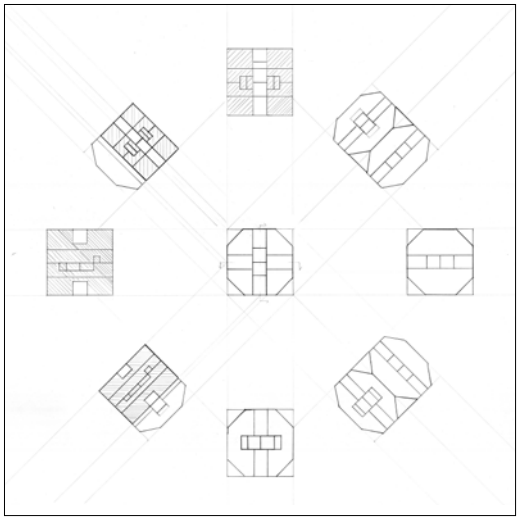
Various design mockups created using Illustrator, for various potential title sponsors

Toy Story
ARC100 Drawing and Representation I
University of Toronto, Fall 2018

This project was a series of assignments that challenged students to depict a wooden puzzle, using both traditional hand drafting and software like Rhinoceros 6 and AutoCAD. Measurements where taken manually from the puzzle, and converted in CAD drawings. The culmination of the project was an exercise in technical documentation, using our drawings to convey a complex series of moves without any supplemental text.



Final graphics set, created using AutoCAD and Illustrator



Hand drafted graphics set

Thank you!

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