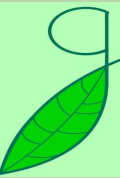


ENGINEERING SOLUTIONS

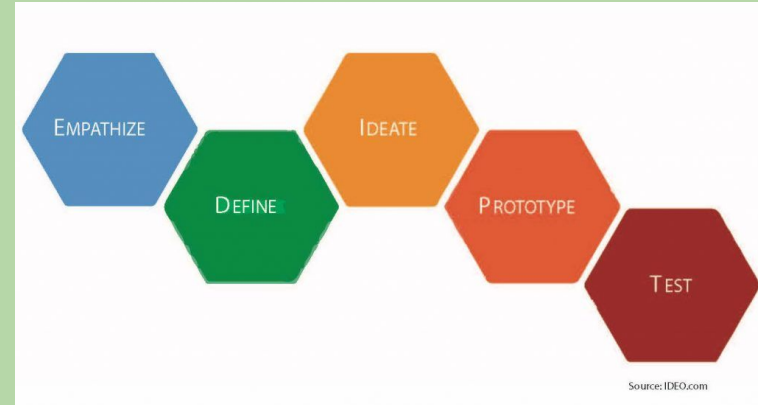
'Preserving the Present, Impacting the Future'

Final Class Presentation - Group 12

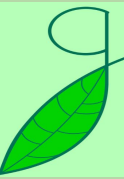
Summary



- **Empathise, Define**
 - During our first group meeting we empathize with our client to define our problem statement.
- **Ideate**
 - During our ideate phase we each made initial designs and subsystems.
- **Prototype, Test**
 - We designed and tested three different prototypes and requested the help of 4 professionals for feedback, alongside client feedback.



Problem Statement



A need exists for the Guardian Program for an environmental research building that provides sustainability and long-term viability, while reflecting the values of the AOPFN. The client expressed a need for an innovative design with the potential to be a pillar of the community that entices government funding.

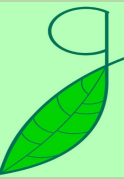


**Algonquins of Pikwakanagan
First Nation**

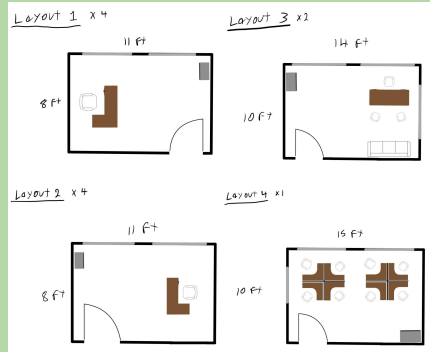
X



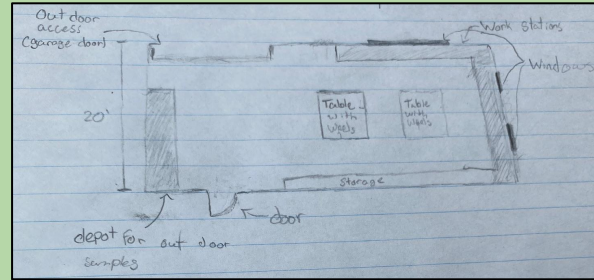
Subsystems - Initial designs



Offices



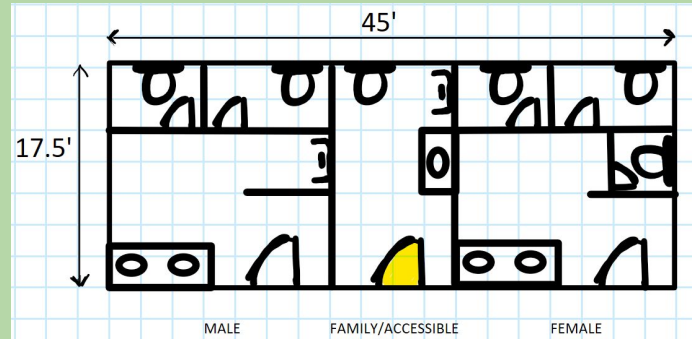
Laboratory

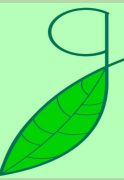


Kitchenette



Bathrooms

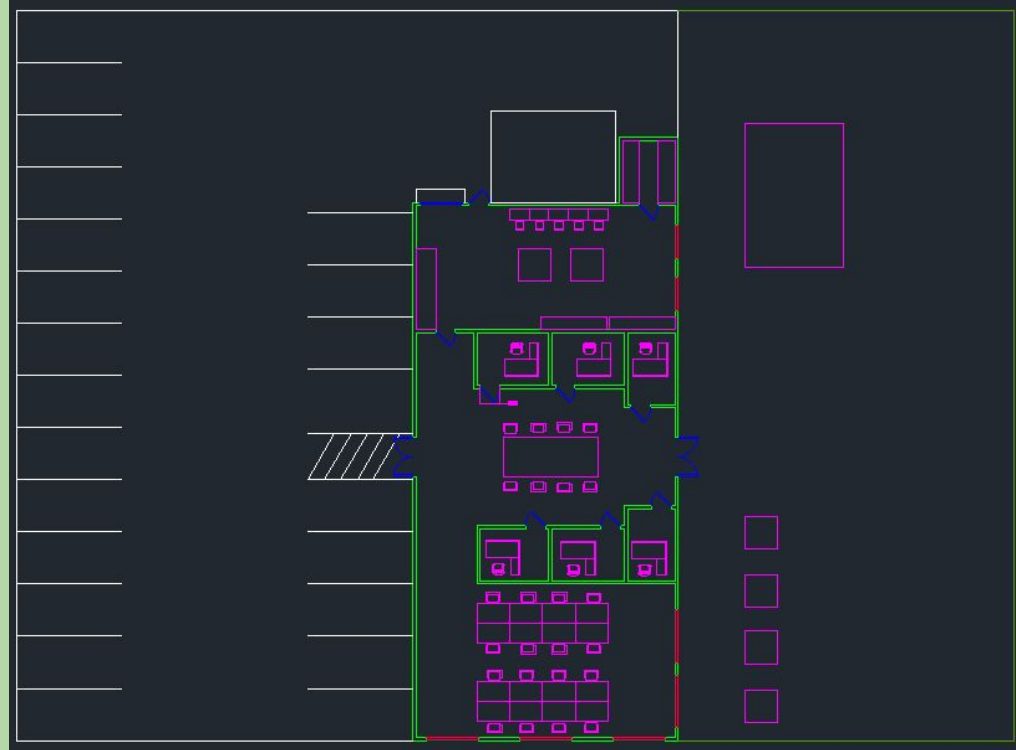
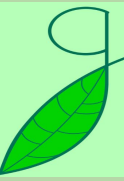




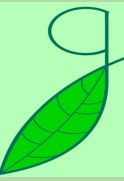
Feedback From the Client

- Client would prefer more, smaller offices than a few big ones
- One larger boardroom is preferred for meetings instead of larger offices
- No cubicles, instead the client wants an open, general work area with many tables/desks
- The client wants the Lean To and loading dock right beside the lab with double access doors
- The client would like more storage space in the lab

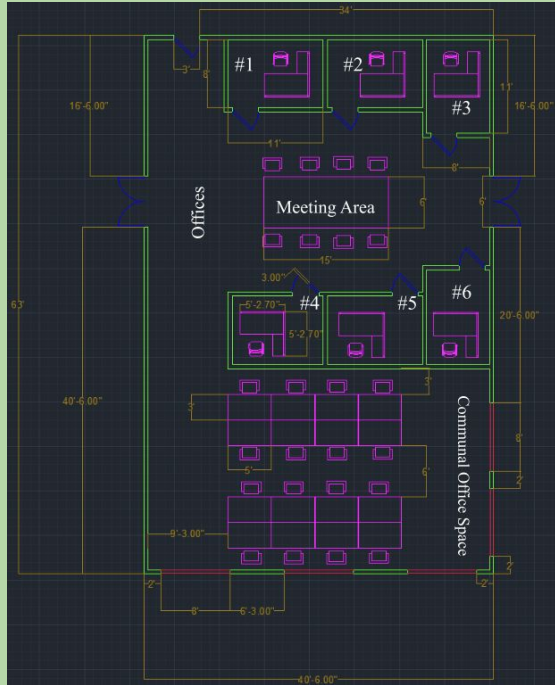
Detailed Design Drawing



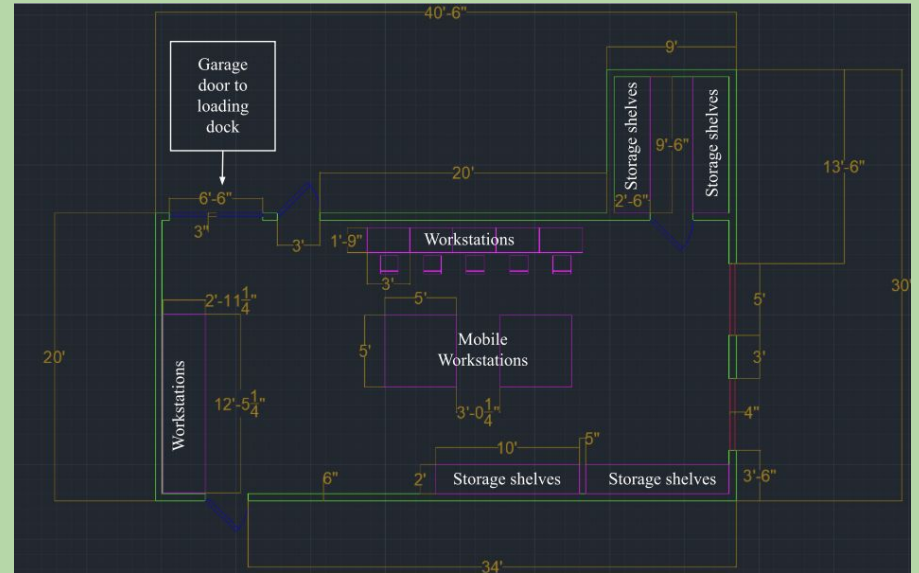
Detailed Design Drawing



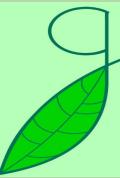
Offices, Meeting Area, Shared Office Space



Lab Space



Feedback that led to prototype 1



Client 1 - Mechanical & Mfg. Engineer

- Provided insight towards improving occupant mood, efficiency, safety, cost, longevity, purpose
- Provided ideas to improve the aesthetic of the building
- Mentioned incorporating a canoe into the architecture of the building

Client 2 - Mechanical Engineer

Practical Design Features:

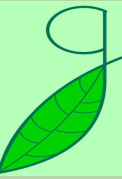
- Dedicated handicap parking (x2)
- Interior doors should open inwards
- Exterior doors should open outwards

Survey Results

- Asked participants their opinions on the layout

Group Discussion

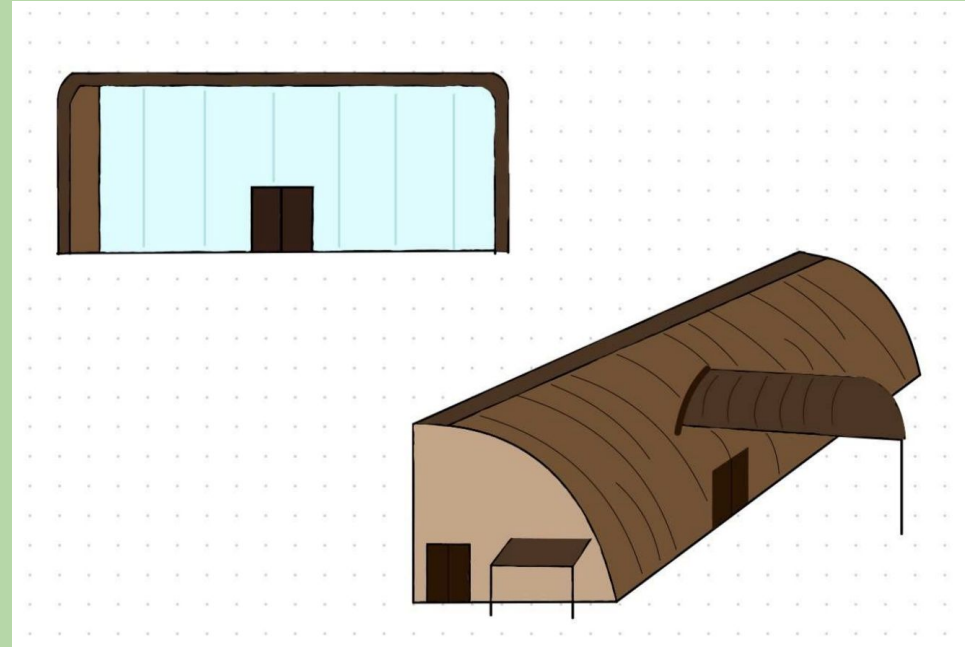
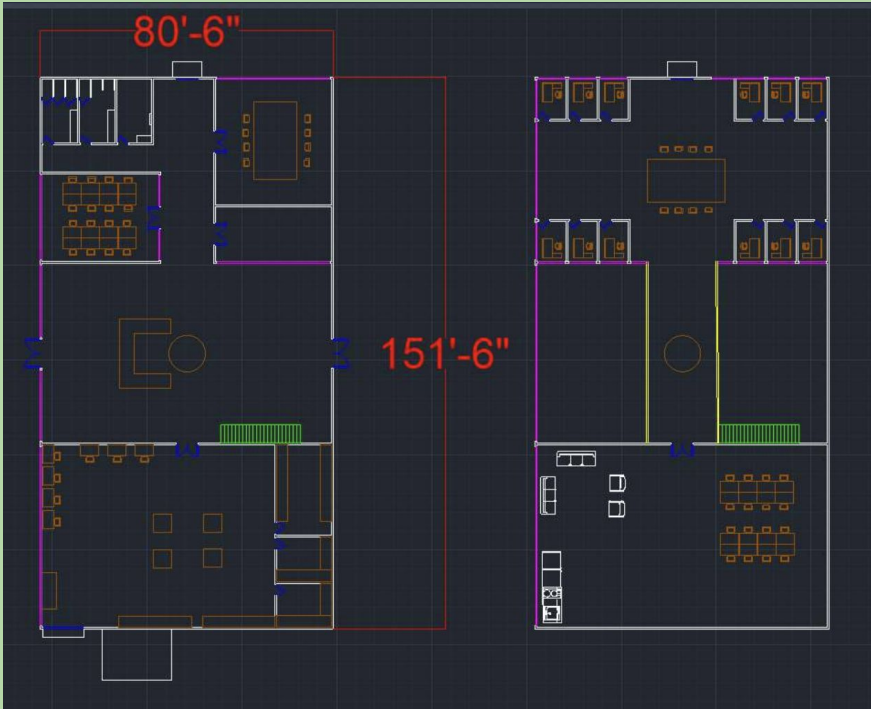
Prototype I



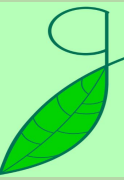
First Floor

Second Floor

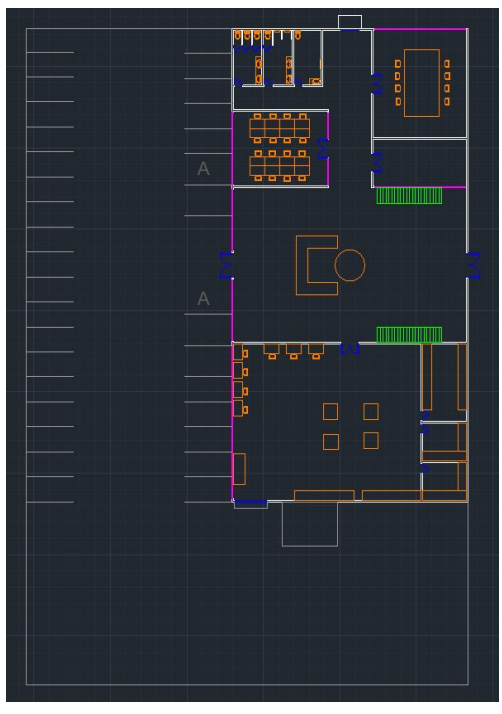
3D Drawing - Exterior



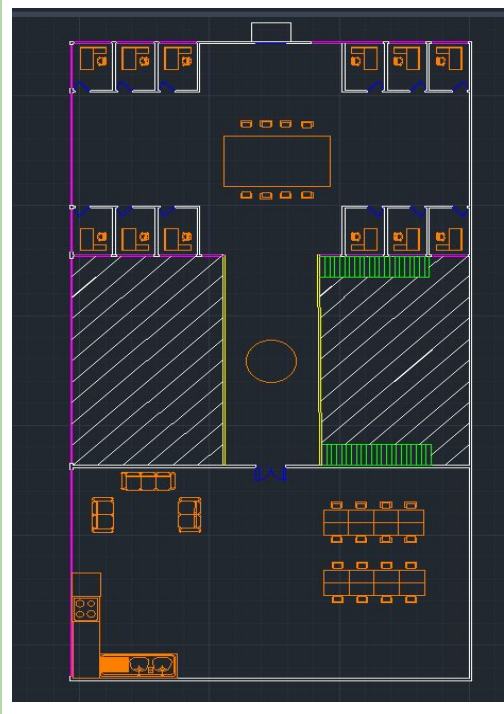
Prototype II



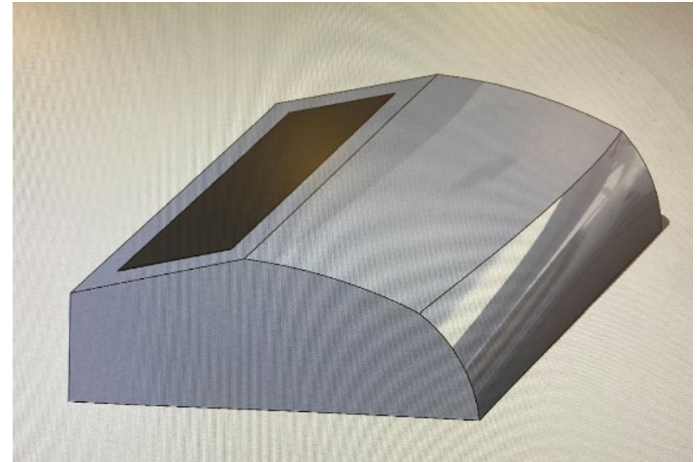
First Floor



Second Floor

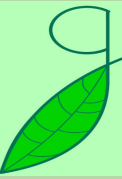


3D Model - Exterior



Final Floor Plan

- *Second Floor*

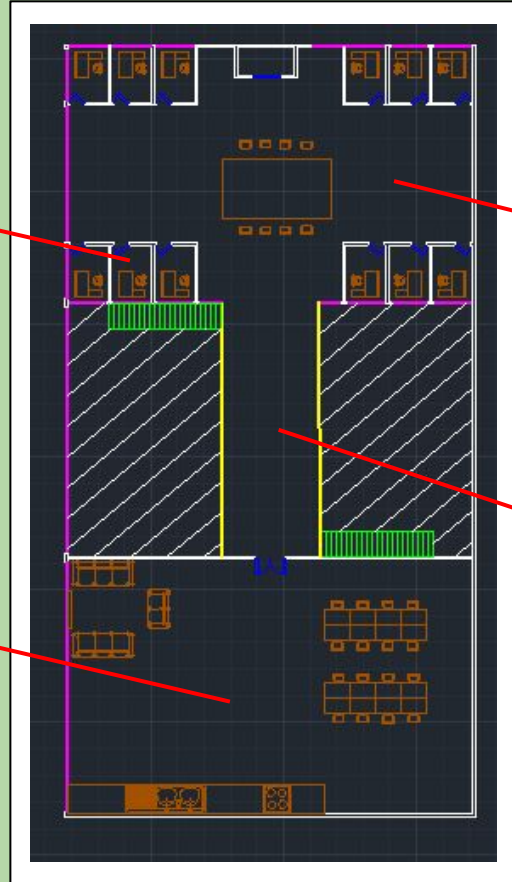


Permanent
Office Spaces

Communal
Boardroom

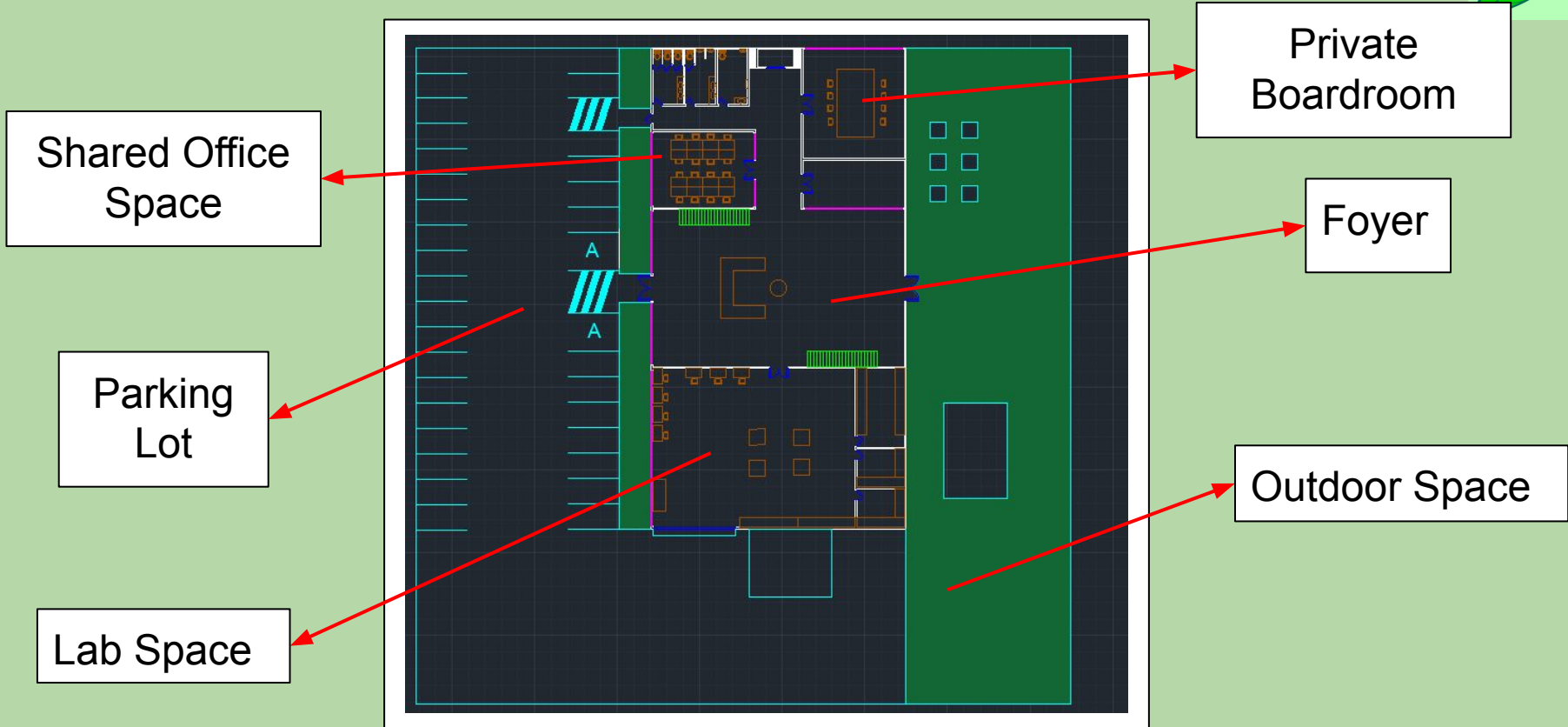
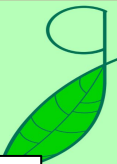
Kitchenette/
Breakroom

Connecting
Bridge



Final Floor Plan

- *First Floor*



Shared Office Space

Private Boardroom

Foyer

Outdoor Space

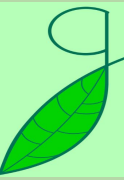
Parking Lot

Lab Space

Final Prototype Exterior

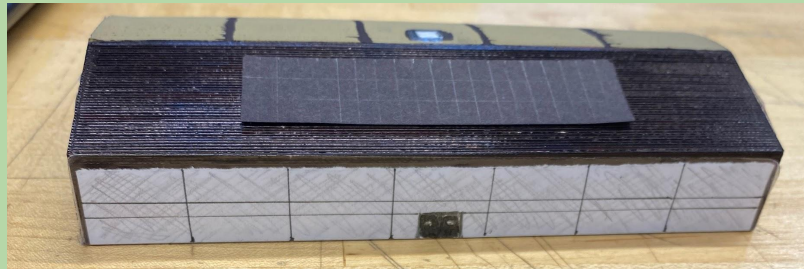
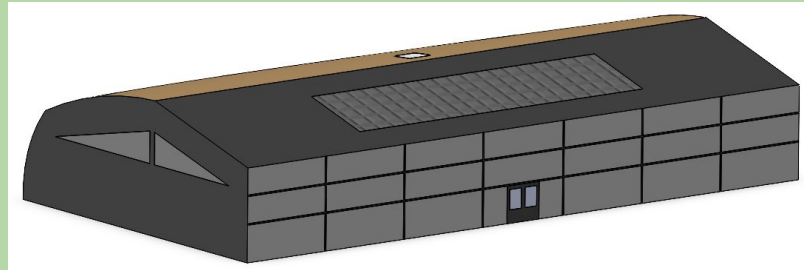
Pikwakanagan is the origin of the world's largest birch bark canoe

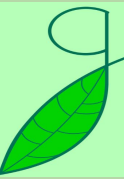
-AOPFN Website



The exterior design of the building consists of 2 main design solutions:

1. Modern Front and Sides
2. Algonquin Canoe Inspired semi-section Rear

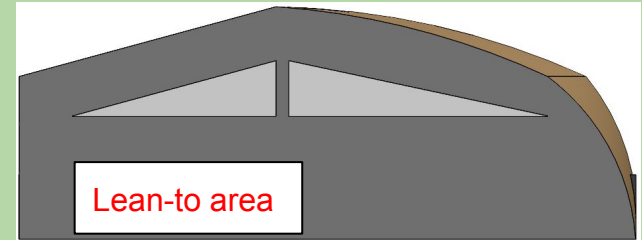
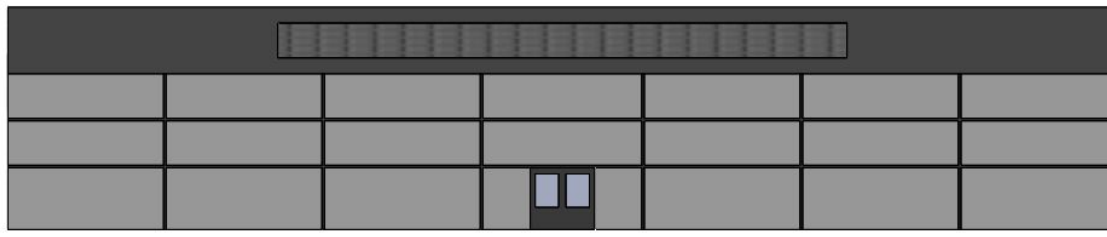


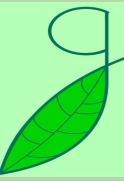


Building Exterior - Front & Sides

Features of front and sides include:

- Lean to on right side of building
- Low-Emissivity Windows (Pane or Film) to reduce Solar Heat Gain Coefficient
- Up to 1400 square feet of dedicated solar panel space on roof
- Potential for rainwater collection system

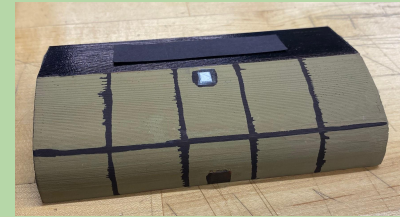
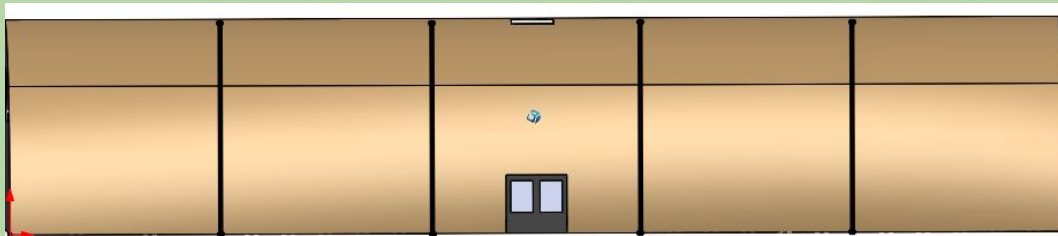
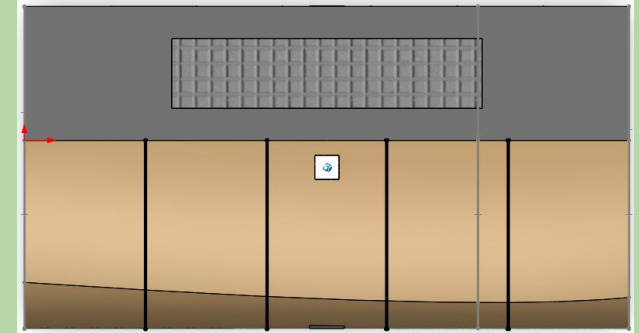
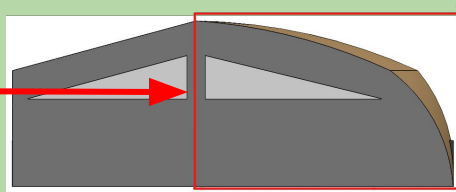
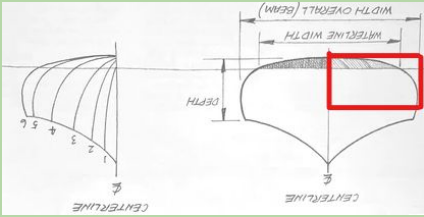




Building Exterior - Rear

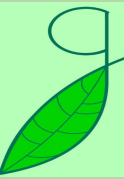
Features of rear include:

- Upside down Canoe-shaped birch colour design to pay homage to the AOPFN
- 6 x 6 ft skylight
- (TOP) Crowned/slanted roof with hydrophobic coating to prevent snow and rainwater buildup

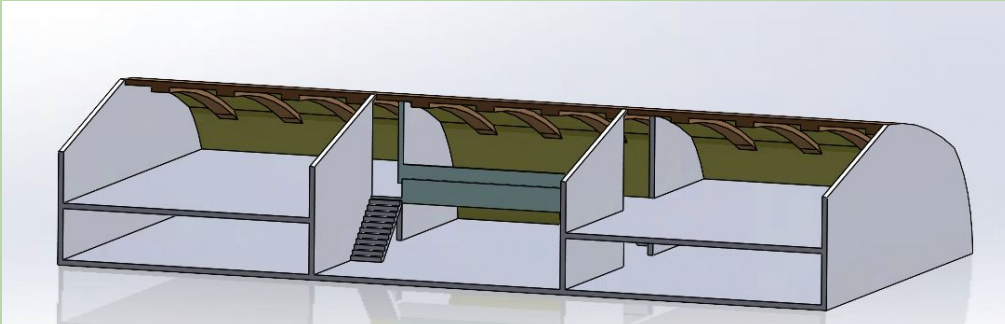


Overall Cost of the Building

- 1.8 million dollars



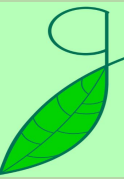
RSMeans
FROM THE GORDIAN GROUP®



Factors considered:

- Choice of materials
- Square footage
- Unique shape
- Solar panels

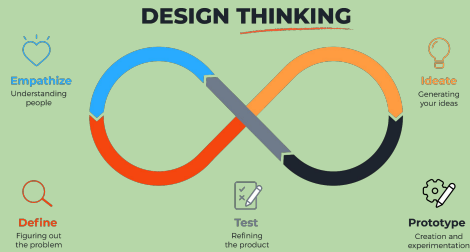
Lessons learned!



Technical Skills



Design thinking



Soft skills



Thank You - Meegwetch!
Questions?

