

## Report of Prototype 1 and Future Plans

GNG 1103-A01

Nov.9, 2023

Dr. Majeed

## Table of Contents

<b><i>Introduction</i></b> .....	<b>3</b>
<b><i>Prototype 1</i></b> .....	<b>3</b>
Critical components.....	3
Design updates.....	3
Creation of the prototype.....	3
<b><i>Visuals of Prototype 1</i></b> .....	<b>4</b>
<b><i>Testing Prototype 1</i></b> .....	<b>7</b>
<b><i>Plan for Prototype 2</i></b> .....	<b>7</b>
Modifications to the design .....	8
Test plan for prototype 2 .....	8

## Introduction

This document outlines the groups creation of prototype one, the associated tests and design changes, as well as the plans for prototype two. The goal of prototype one was to create a conceptual prototype for the group to follow, and to give a clearer picture to the client of what the finished project will look like. The client feedback received from the previous client meeting, as well as additional research by the group, was used to modify the design to better fit the design specifications.

## Prototype 1

### Critical components

This prototype was created based on the detailed design, and as a basis for future prototypes. As such, this prototype contains the most critical elements of the overall design. The following components were included in prototype 1:

- Building shape
- Building dimension
- Building floor plan
- Overall exterior design

These components were deemed as being the most important for prototype one as they give the group a clear goal (finished product) for future prototypes and provide the necessary information for future components to be added. Additionally, having these components for the client meet will allow the group to receive detailed feedback about the overall aesthetic and give the client an idea of what the finished building will look like.

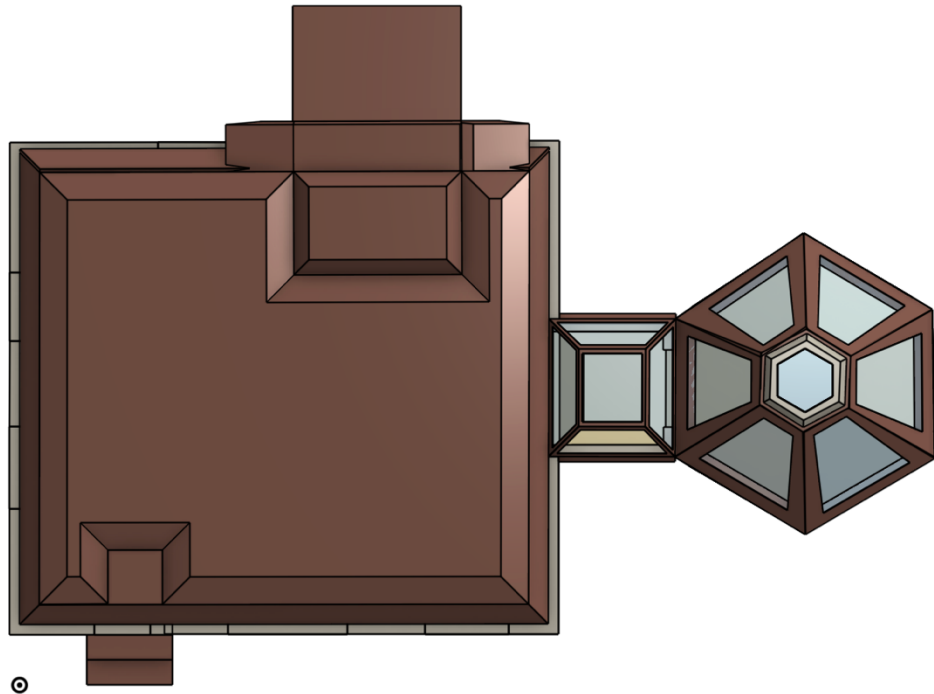
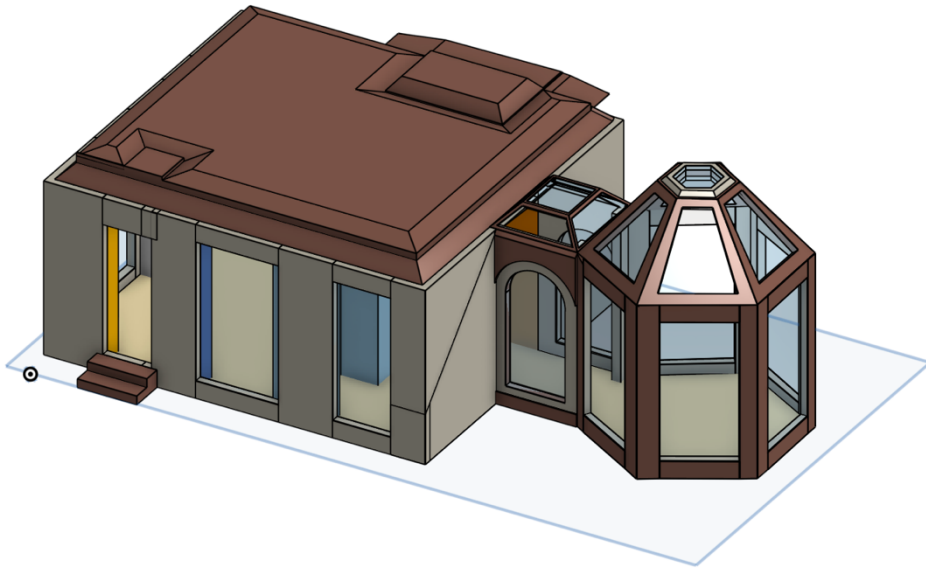
### Design updates

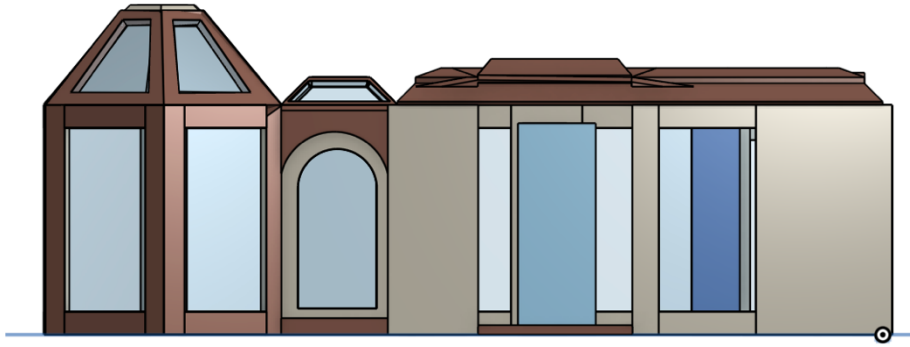
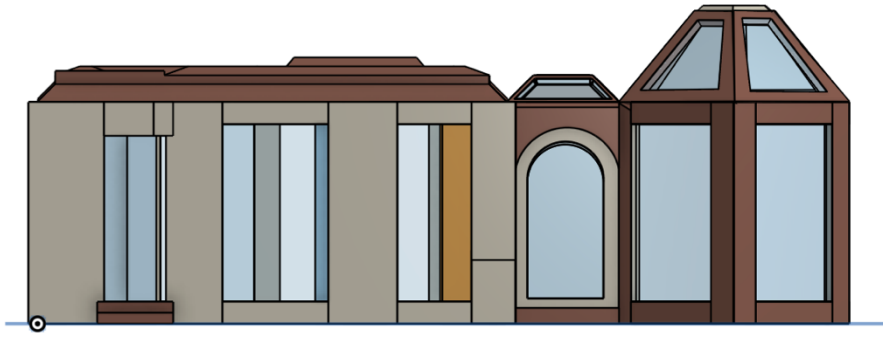
From the previous client meeting, changes were made to the detailed design to better fulfill client needs and design specifications. Due to the nature of this prototype, only a few of the changes made were demonstrated in the prototype. For example, changes to interior components of the building were not strongly demonstrated as the focus of the prototype was on the finished exterior design of the building, and the general floor plan.

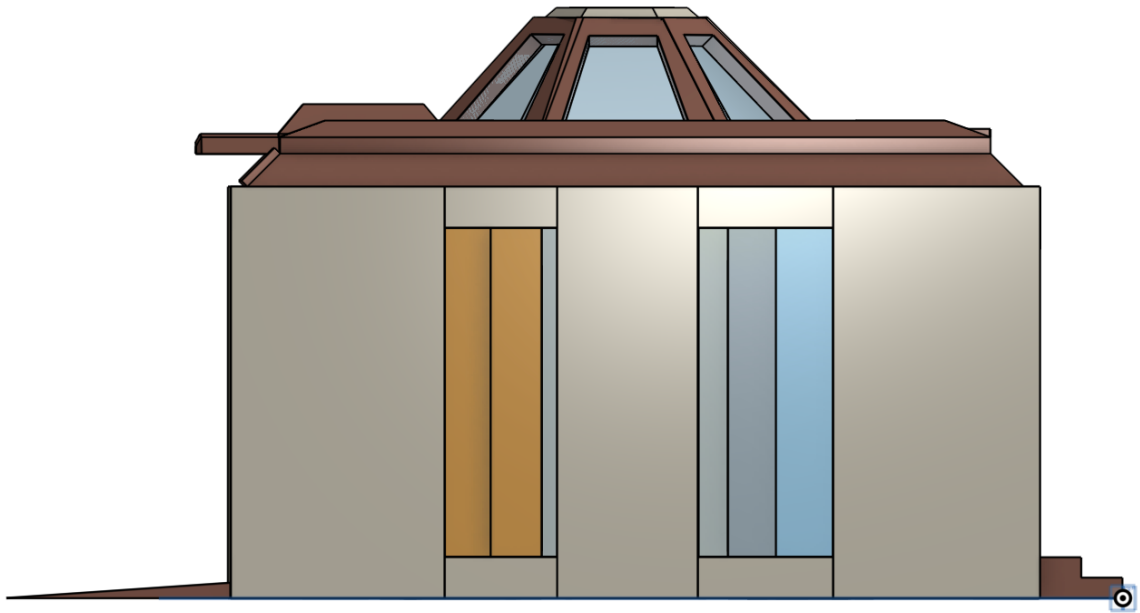
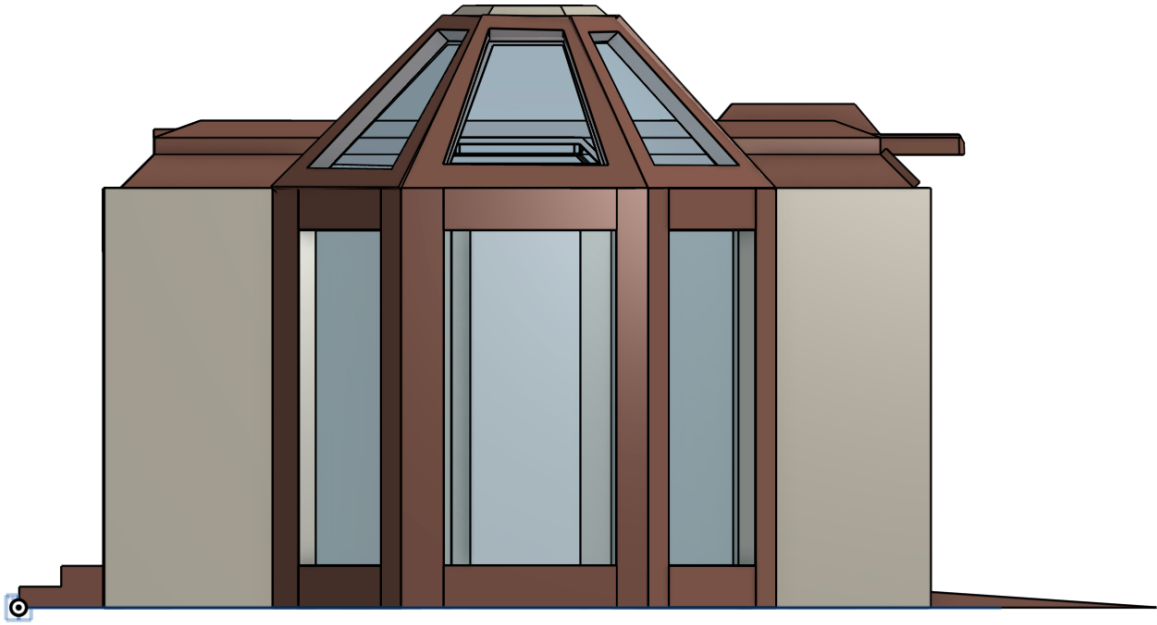
### Creation of the prototype

Prototype one was created online using modeling design software. Onshape was used to demonstrate the exterior components and the finished exterior design, and Autocad was used to create a more concrete floor pan with dimensions.

# Visuals of Prototype 1







## Testing Prototype 1

ID	Design Specification	Value	Verification method
1	Room capacity	Fit $\geq 10$ people	numerical
2	Storage capacity	Accommodate large tires at most	numerical
3	Natural light exposure	As much as possible	Social (ask 50 people, 20 must say it fulfils specification)
4	Building aesthetics	Must look pleasing	Social (ask 50 people, 20 must say it fulfils specification)

### Testing #1

Assuming each person requires  $5m^2$  of usable space,

$$\begin{aligned} \# \text{ of people} &= \frac{\text{area of building } [m^2]}{5 [m^2]} \\ &= \frac{62.4 m^2}{5 m^2} \\ &= 12.48 = 12 \text{ people} \end{aligned}$$

Result: the building can accommodate 12 people at a time and fits the design specification

### Testing #2

If the standard truck tire takes up  $1.6m^3$  of space,

$$\begin{aligned} \text{Largest storage size} &= \# \text{ of truck tires} \cdot 1.6 m^3 \\ &= 5 \text{ tires} \cdot 1.6 m^3 \\ &= 8 m^3 \end{aligned}$$

Result: the largest storage space required is  $8m^3$ .

### Testing #3

We showed our design to approximately 50 people, of which 30 stated that they thought there were enough windows in the design to allow good sunlight exposure. This fulfils the specification

### Testing #4

We showed our design to approximately 50 people, of which 20 stated that it 'looked nice'. This fulfils the specification; however, the group is considering a modification to the design to make it more aesthetically pleasing and to better fit First Nations traditional designs.

### Additional details

The prototype was presented to the client. The group has not yet received feedback

## Plan for Prototype 2

### Modifications to the design

The following modifications will be made to the design based on prototype 1, the feedback received, and the prototype test:

- Exterior will have exposed lumbar
- Dimensions of building will be changed
  - The size of the building was increased to accommodate additional space for use

### Test plan for prototype 2

ID	Design Specification	Value	Verification method
1	Tables must be mobile and sanitary		Materials test, mobility test
2	Table must be strong enough to carry large load	$\geq 1782N$	Materials test, numerical test
3	Table must be large enough to accommodate a deer	$\geq 1.9m^2$	Numerical test
4	Freezer must be able to accommodate a deer	$\geq 1.9m^2$	Numerical test
5	Floor and countertops must be sanitary		Materials test
6	Materials must be able to withstand temperature change	(-30 to 30)	Materials test Numerical test
	Building insulation	Maintain 20 degree Celsius	

Scale: 4cm =1m