Project Deliverable G: **Prototype II and Customer Feedback** GNG 1103 – Engineering Design

Faculty of Engineering - University of Ottawa

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For the course :

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GNG 1103

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Introduction

During the last deliverable, we created the first prototype which we used as the base prototype to check the feasibility and the volume occupied of it. We were thus able to make a virtual conception of our second prototype from the base of the first. For this deliverable, we had to devise a test plan and develop our second prototype; then get customer feedback for that prototype. This document will be used to assess our second prototype and establish its objectives.

Prototype Image

Figure 1 : Backside

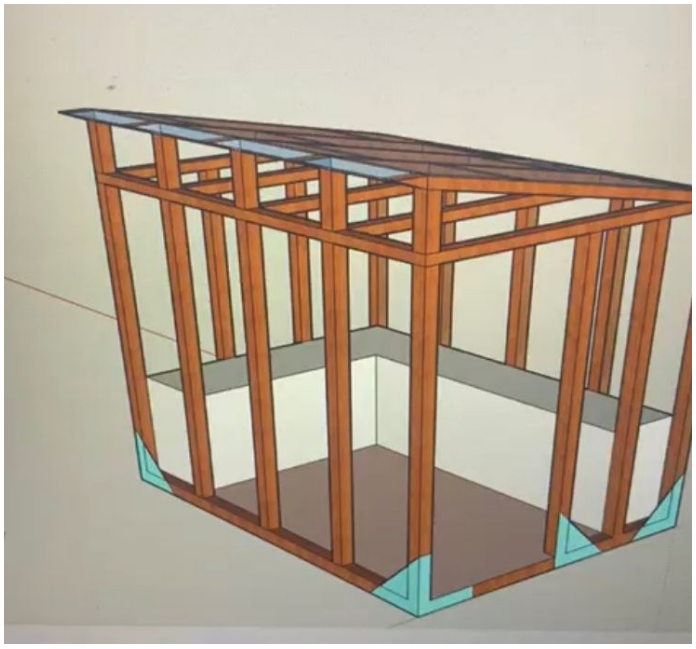


Figure 2 : Doorway

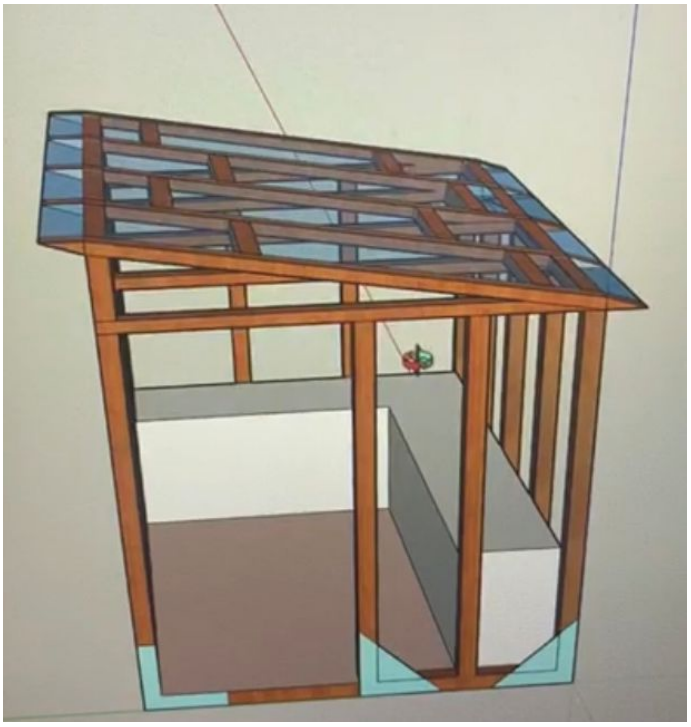


Figure 3 : Another angle of Doorway

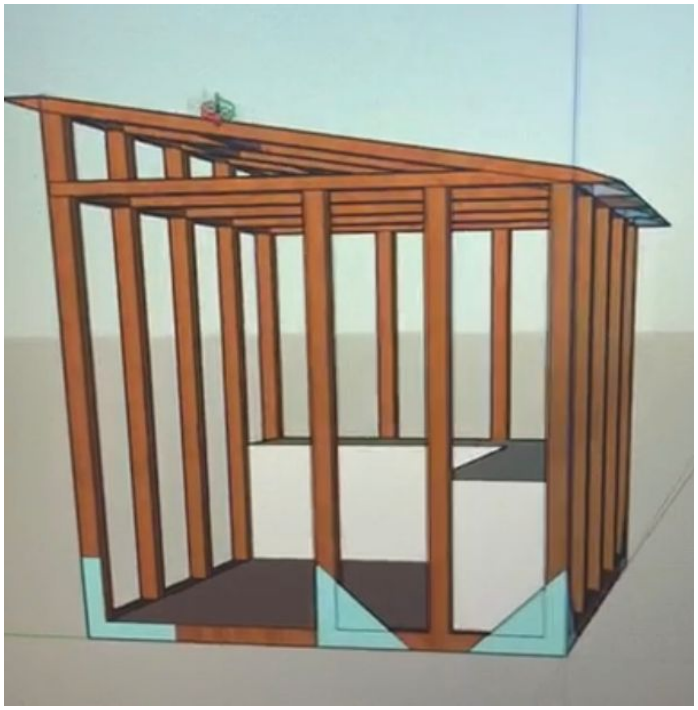


Figure 4 : Frontside

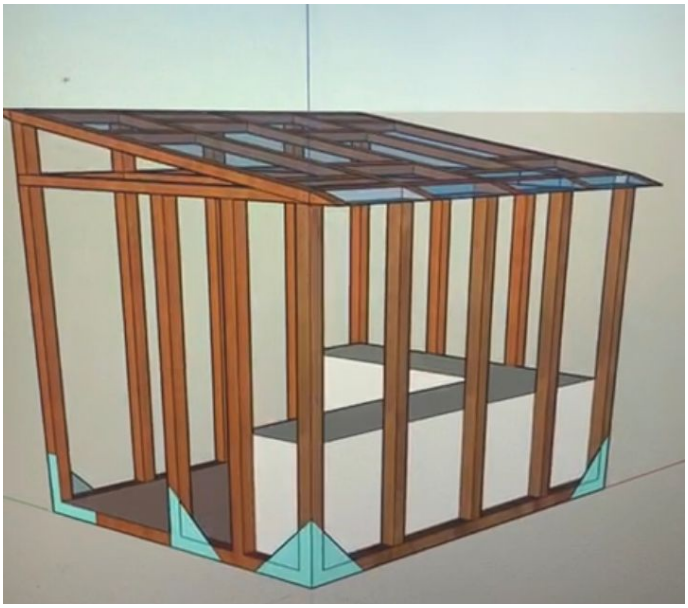


Figure 5 : Another angle of Frontside and roof

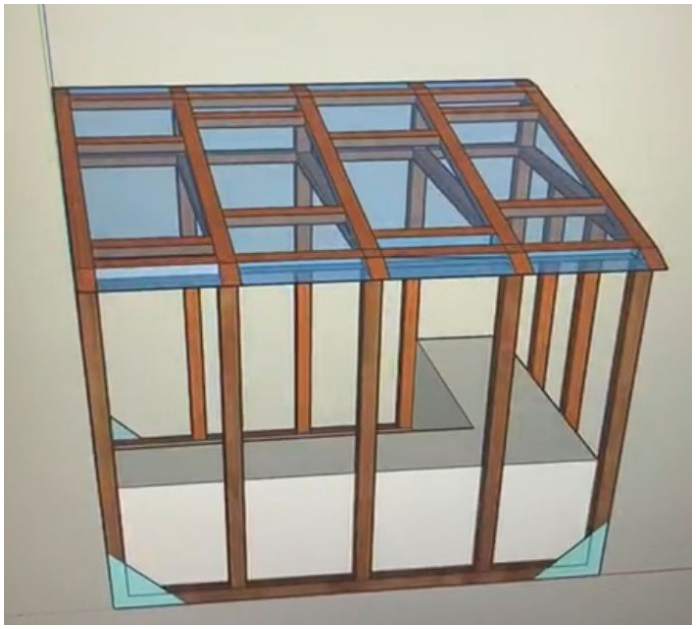


Figure 6 : Another angle of Frontside

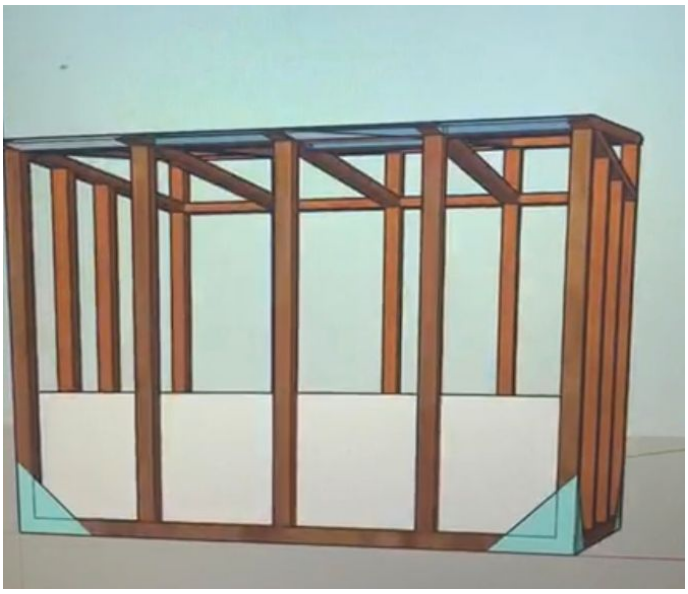
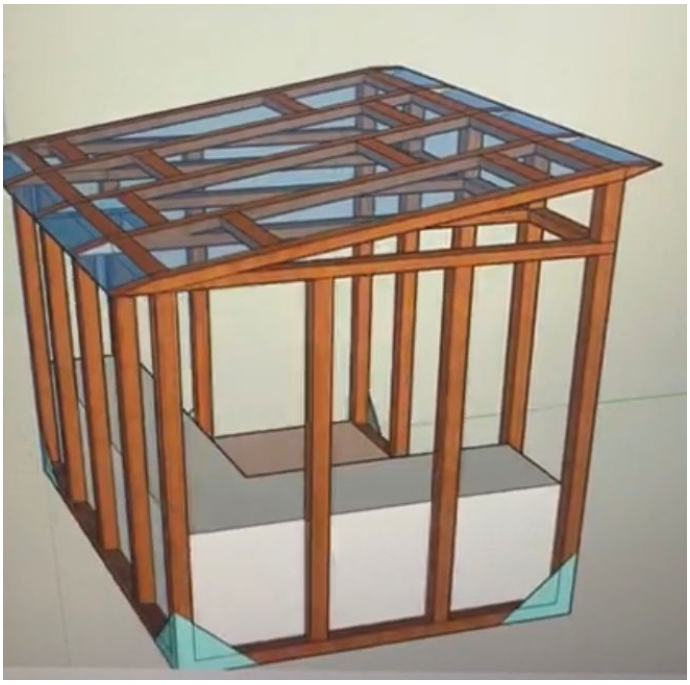


Figure 7 : Leftside



Prototype Test

Why?

This Prototype is virtual but also comprehensive. We decided to do a virtual prototype to evaluate the feasibility of adding a bench storage in the greenhouse, this allows us to depict the dimensions and overall shape that our bench will take to fit the needs of the greenhouse better. This also allows the hydroponic team to give us their input and what would suit them better for their part of the project. This second model shows perfectly the dimensions of the bench and the space it occupied in the greenhouse. This allows the client and the hydroponic team to have an idea of what the interior of the greenhouse will look like. This model also allows us to visualize how the final concept will look like.

In order to ensure that we have picked the correct materials for this greenhouse, and to re-ensure the client of our decisions, analysis on the design and materials will help the client understand why we designed the greenhouse the way we did.

What?

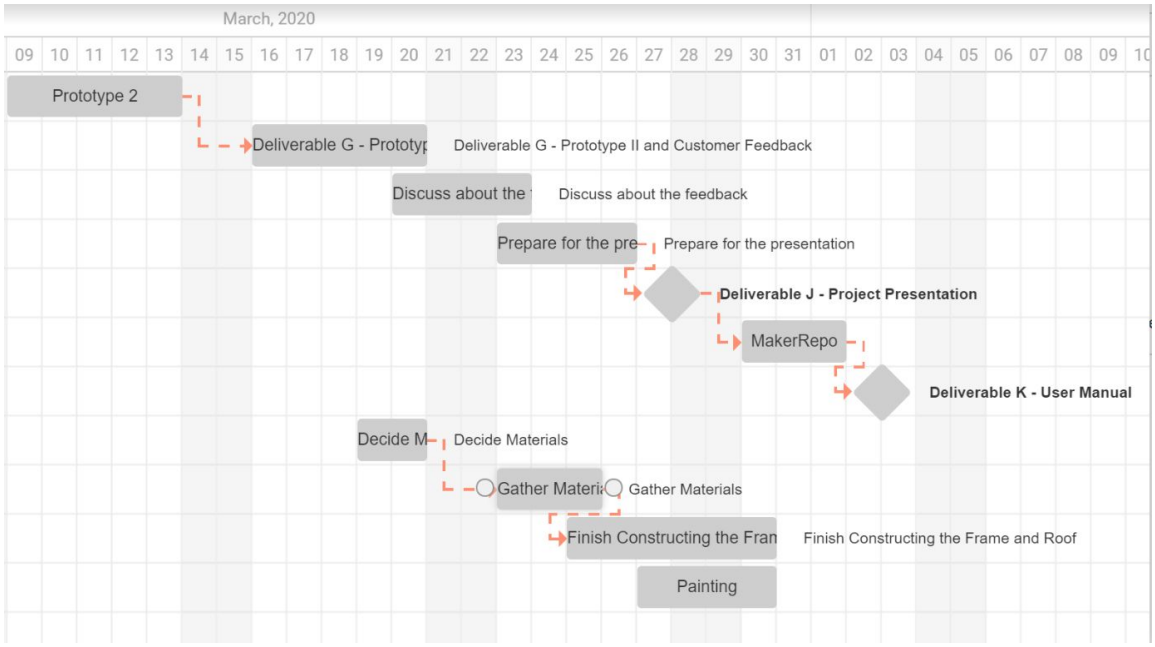
Based on our CAD design that was created using a program called Sketchup we were able to visualize and understand the placement of the bench that we have discussed in our designs and in our client meetings. The bench is completely feasible within our design and budget. Upon further analysis we can determine what materials would work best for this bench idea, which would require tests of its own to support the weight of the hydroponics system as well as the plants themselves.

Other tests can be done via analysis of the materials that have been selected for this greenhouse using sources found online.

When?

Regarding the time period for this test, our goal would be to set it from this second prototype to the end of the final client meeting. The Prototype was complete on Thursday March 12th, and we presented it to the prof and the class on Friday March 13th since the client was absent at the meeting. As mentioned in the last deliverable, the prototype fits within the project schedule really well. The Figure below describes our schedule and how we progress so far in this project.

Figure 8: Gantt Chart Deliverable G



Client Feedback

Due to the fact that the client was not present for our last meeting we cannot write their direct feedback on our last prototype. We can however look at our notes from the first meeting where we were able to identify the needs from the client and compare it to what we were able to provide.

Feed 4-5 people per greenhouse: Our greenhouse has a large interior area for multiple people if not multiple families to share this greenhouse. The way that we have planned the greenhouse out as well will help distribute and organize the quantity of food in the greenhouse.

Self-sufficient: As far as the greenhouse being self-sufficient, we constructed it to provide the optimal amount of sunlight to enter the greenhouse, and allow any snow to slide off of the structure to the best of our abilities, although further testing could be required to prove this further. The other *Hydroponics* group will provide further information on the self-sufficiency of their system. If a gutter system is requested by the hydroponic system,we may look at a way to collect and store water for their system to use.

Animal safe/ proof: At the moment the greenhouse design has minimal design to it, our plan was to further add siding to the bottom and top to provide more security against any critters, or rodents from entering our plant paradise.

Child safe: in the same way as discussed in the animal proofing above, with the additional

siding on the greenhouse, it will provide less access for the children to find themselves in an unexpected situation. Our bench storage will have a locking system on it in a way that makes it difficult for children to access, in case any chemicals or mechanisms are hidden in this area.

Running through 3-4 seasons: Based on our analysis of the design, the structure should be able to withstand the colder and snowier months (fall and spring) in this location, given more time, and supplies we might have been able to build this structure to run even during the winter. Our greenhouse at the moment, is not suitable for these months as of yet.

Easy to maintain, and use: since our greenhouse is larger than others, it makes it more accessible, and easier to use and maintain, since it is comfortable to be inside of. This is opposed to a smaller and more crammed greenhouse. Since it is larger and can feed more people this also means that there will be more people to help maintain the plants.

Conclusion

The design of this prototype allowed us to understand and visualize our final concept. Through this virtual design several ideas emerged to estimate the dimensions of the bench. We finally chose the dimensions to optimize the space where the hydroponic system should design their shelves. Once more tests are done and both teams are satisfied with the results we will be able to guarantee its feasibility and give us a very good idea of what the next prototype will look like. We will approach the next step with the necessary tools and everything should be done well and kept up to the standards our team has set for itself. For the next deliverable, many things will be improved including the aesthetic side of the system and the interior look including the bench and shelves.