Conceptual Design Analysis: Plant Processing Station

GNG 1103-A01

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While creating conceptual designs, the team focused on creating an efficient and functional plant processing station. Five designs were created, two of them being primary concepts. The designs developed meet the assumed demands of the client for plant processing and storage, and have been modified to better suit the clients needs based on the second client meeting. This document will evaluate the created conceptual designs based on the accessibility, productivity, sustainability and efficiency of the design, both before and after the client meeting. After each client meeting in which the design will be presented and discussed, the chosen design will be modified and improved based on client feedback to create the best global concept.

The team had two main conceptual designs for the plant processing station. The first design (shown in the figure 1) featured two floors, with the main workspace on the first floor. This design was created with the idea of a ‘wet’ and ‘dry’ room to separate the primary workstation from the computer and storage space. This allowed easy cleaning of the primary workstation without damaging the computers and plant samples being stored. The second floor of this design has a greenhouse and outdoor lounge area. There were no significant drawbacks to this design, aside from the increased cost for building two floors. The client has not defined a clear budget, however the team is assuming that the building should cost as little as possible. Assuming this, the cost of building a two-story building is a potential drawback.

A greenhouse and garage access were included in both designs. A greenhouse was included as the team thought that would be an advantage to allow year-round plant storage. A greenhouse also allows the control of temperature and humidity to fit the specific needs of the plants being stored. Garage access was included to make transportation of larger objects easier. Drawbacks to including a greenhouse and garage access are the cost and water regulation. Having an attached greenhouse will increase the cost of the overall design since it will need specific materials for construction as well as temperature regulation. The garage access will allow large water exposure during the winter and rainy weather, which may not be ideal if computers are inside the building.

The second design (shown in the figure 2) featured a single floor and optimized storage space over other components. Similar to design 1 the second design incorporated an attached greenhouse and garage access, and simplified the two-story building into a single floor. There were no significant drawbacks to this design, aside from the garage access which could introduce lots of water to the building. This could be a potential problem if items which need to be kept dry are stored in the building and are in an area exposed to the grace access. This design is very user-friendly, as the single-floor design allows access to everyone. This design was a great baseline, and will be improved to satisfy all of the needs of the customers.

Of the presented designs, the second was the most liked by the client. The components of design two which stood out most to the client were the single floor, attached greenhouse and garage access, variation of storage spaces, and simplicity. The client emphasized the need for a large amount of storage spaces which vary in size to fit both small and large sizes. The client also wanted to incorporate more windows, a larger freezer, fridge, and sink, larger work tables, and more sitting areas. The team has considered this, and will modify the design to accommodate these needs.

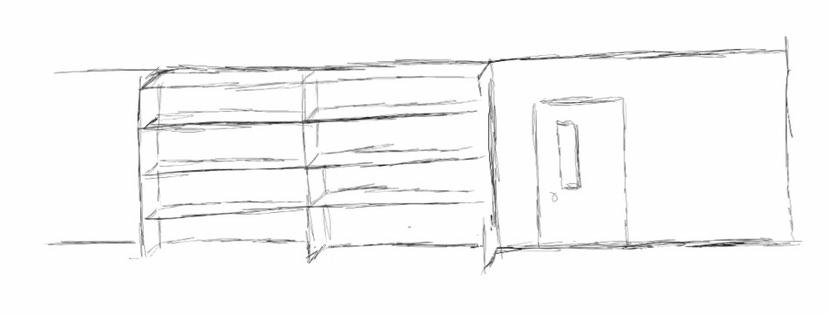
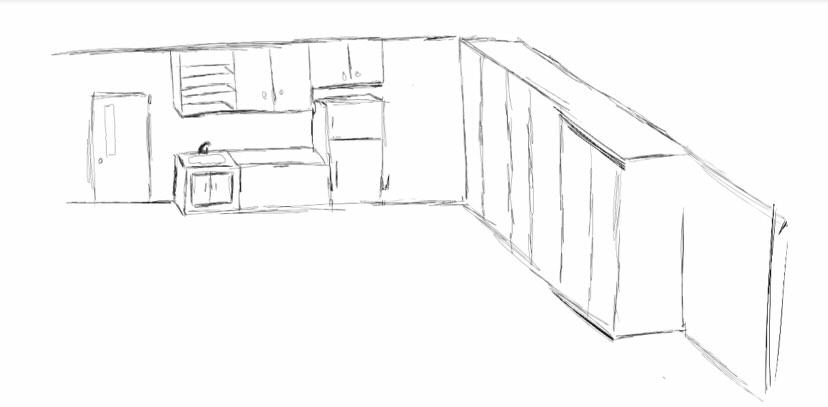
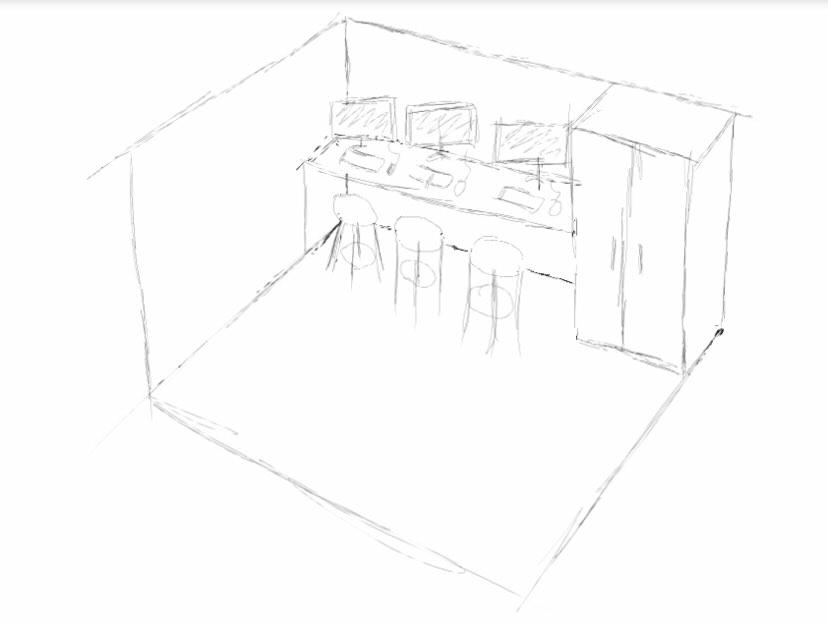
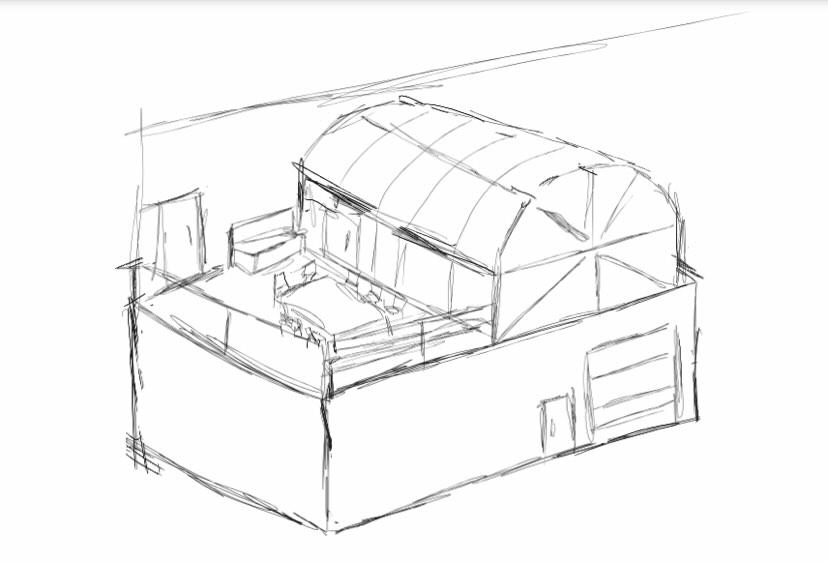
In addition to the two main designs, three other alternative designs were created (figure 3). Although the remaining designs were not preferred by the client, they have provided the team with different perspectives and possible design improvements based on certain components. For the third design, it’s not ideal to divide a laboratory into multiple floors, however, it provided the idea that each space can be divided according to function, which can be incorporated into the chosen design. This will not only improve the work efficiency of laboratory users but also provide convenience for workers. For designs four and five, the design is more monotonous which did not attract the client‘s attention, however the large floor space and multiple windows will be included in the improved chosen design. By combining the components of the discarded designs, and using the client feedback provided to us, the following adjustments will be made:

* extra storage areas will be added, including a variety of shelving and cabinets of different sizes, to maximize room capacity and accommodate as much storage as feasible.
* the building will be made for 3-4 computer spaces.
* work tables will be made large enough to accommodate huge things such as deer.
* an industrial freezer, conventional refrigerator, and sink will be added.
* windows will be added to allow more natural light, as requested by the client
* potential installation of a drain for easy cleaning of the room
* potential temperature and humidity regulation
* regular safety standards be met
* simple, non-special lighting, with an emphasis on natural light.
* outside space for activities such as potting, cultivating, or developing a garden

These improvements are a combination of the client feedback, and incorporation of elements of each conceptual design created. It is also acknowledged that these adjustments may need to be changed or modified in the future, and should remain flexible.

After the creation of multiple conceptual designs and individual analysis of each design, it is clear to the group which elements are paramount to the structural design; thus yielding the most value to the client and utmost priority for its inclusion during the prototype stage. Additionally, the client meeting provided the team with invaluable insight about the design components that fall short or work in tandem, and made the purpose of the design more coherent. However, at this stage, all information stated will be used as reference in the future to improve and modify the chosen design as needed, with analysis and evaluation of the design happening at every step.

Figure 1: conceptual design #1



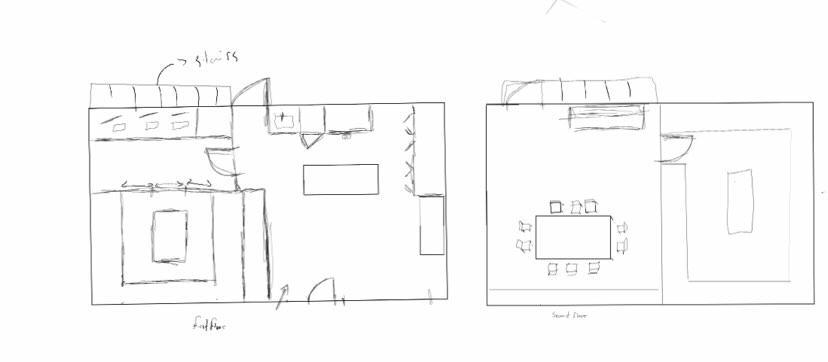


Figure 2: conceptual design #2

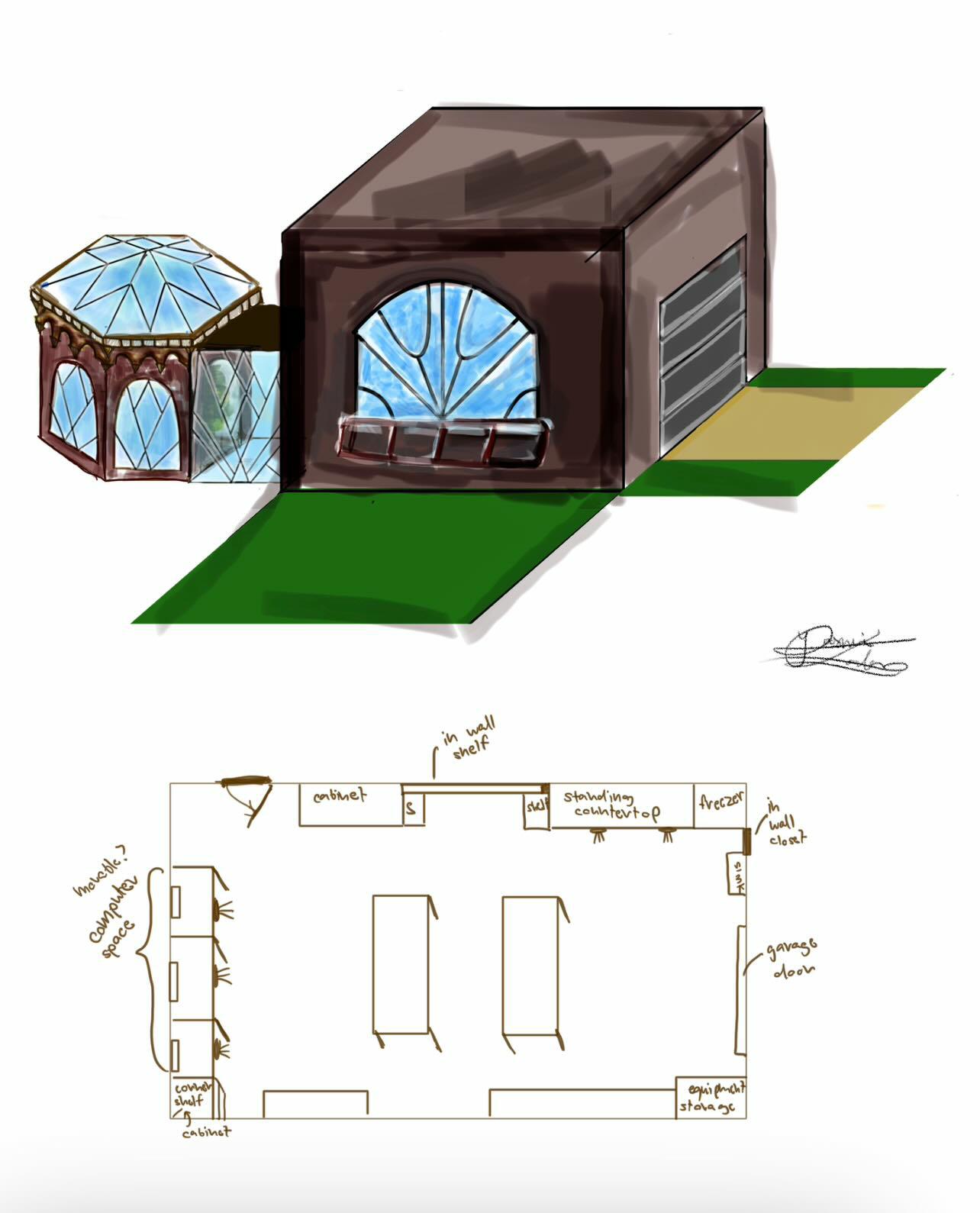
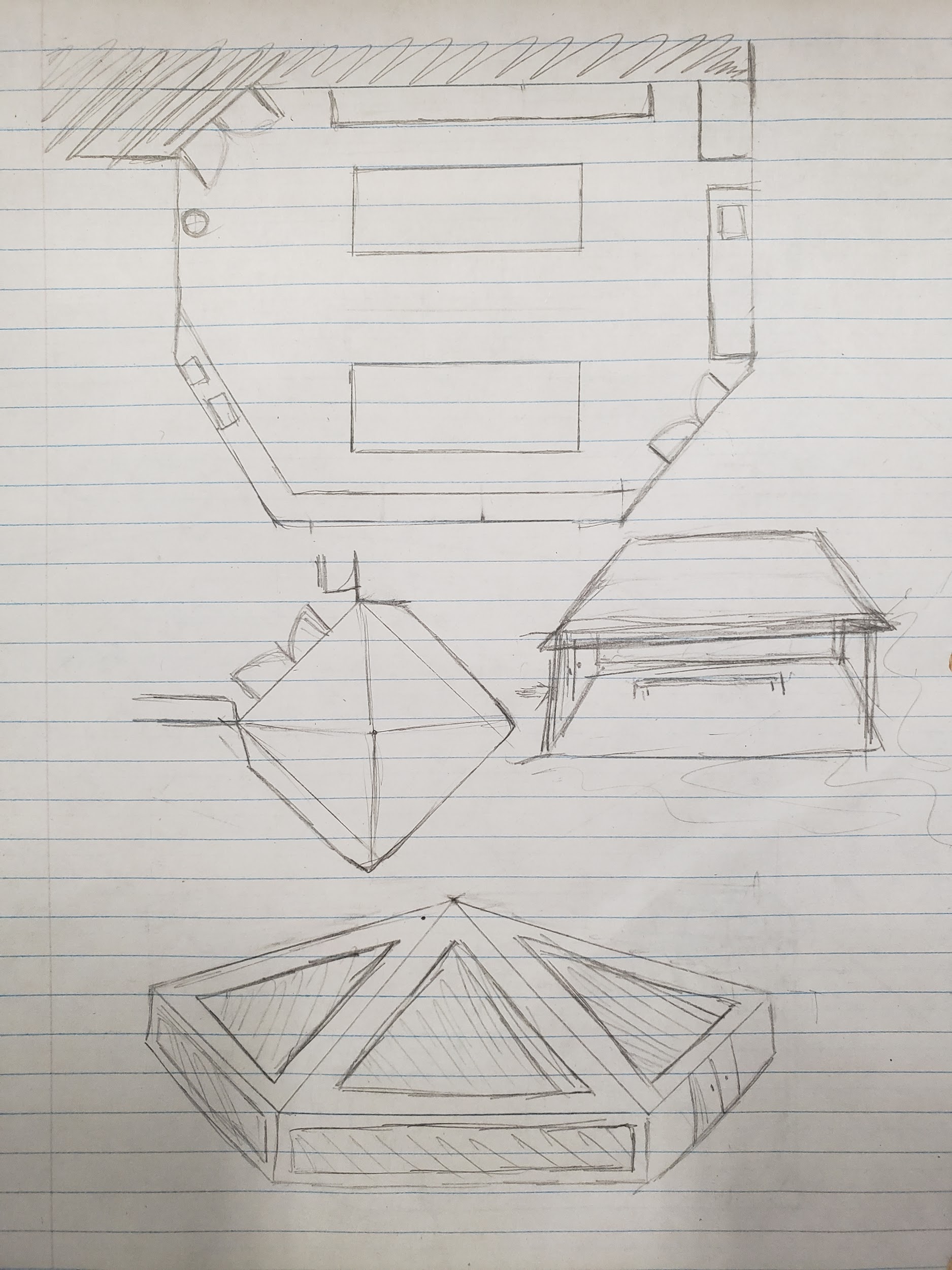
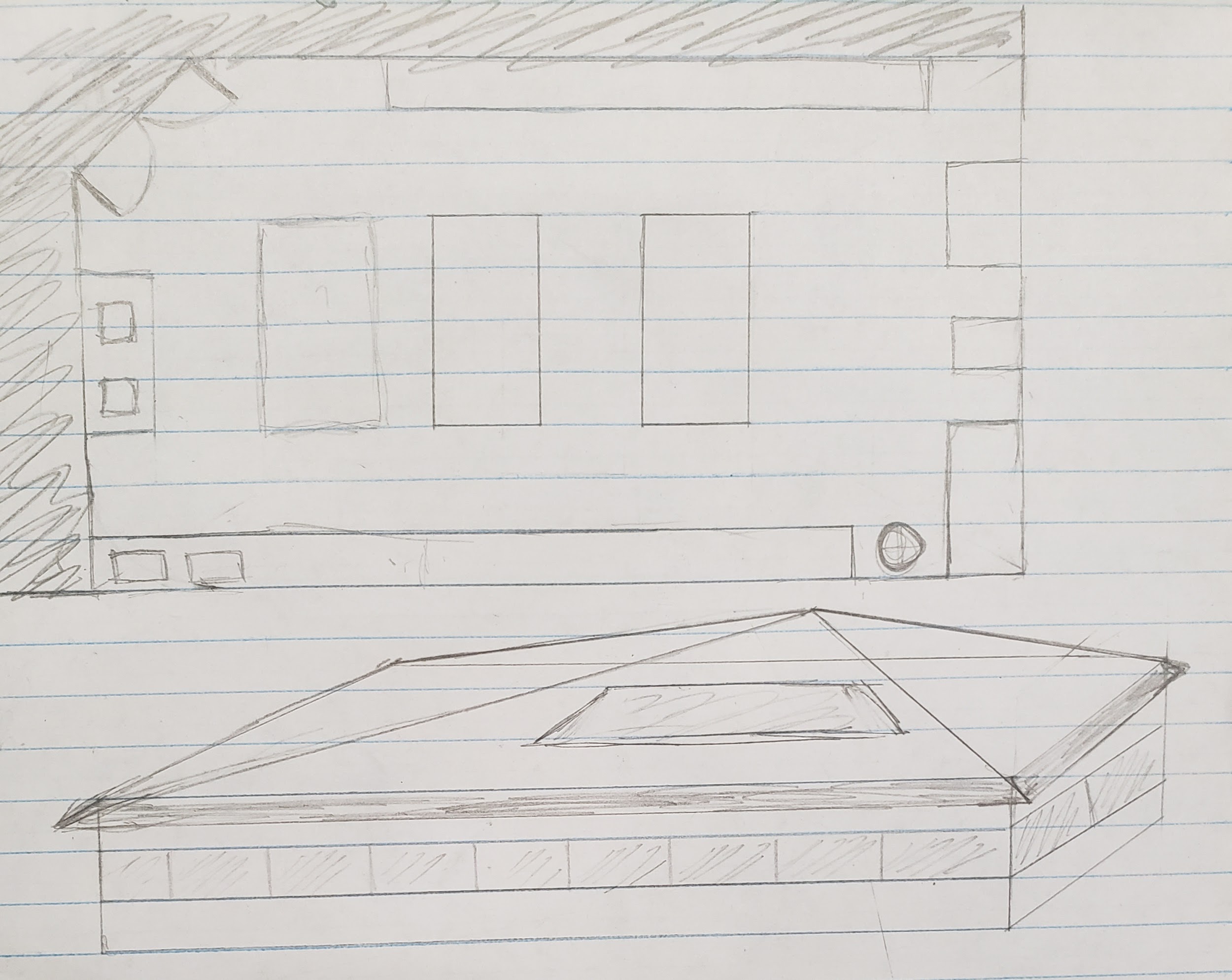
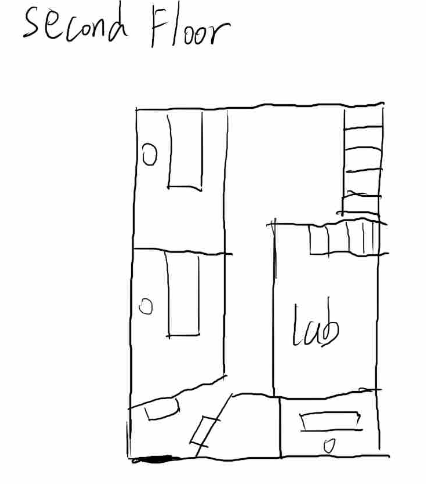
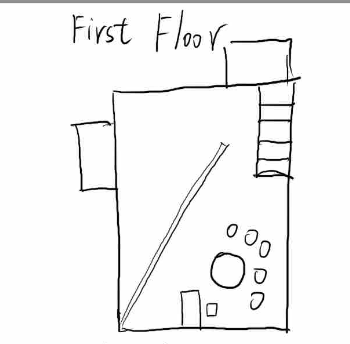
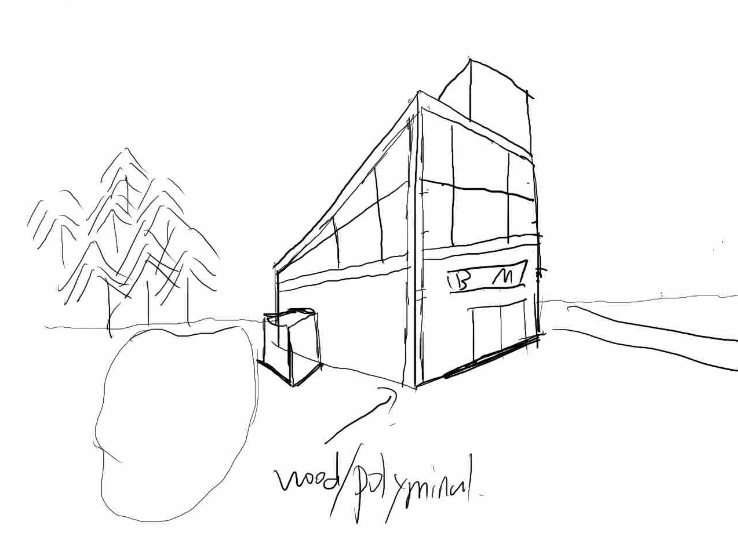


Figure 3: additional conceptual designs



Additional comments regarding the contents of this document:

The team was originally designing the main building, and had to switch to the plant processing station on short notice. Due to this, Deliverables A-C do not apply to the plant processing station discussed in this document. Furthermore, due to the small size of the plant processing station, the team was not able to design three subsystems for this deliverable, and instead designed an overall system. The attached greenhouse of the chosen design was a possible subsystem, however the team was unsure if the client required (or wanted) a greenhouse, so it was not fully elaborated on to use our time more efficiently (rather than spending it on something we were unsure about).