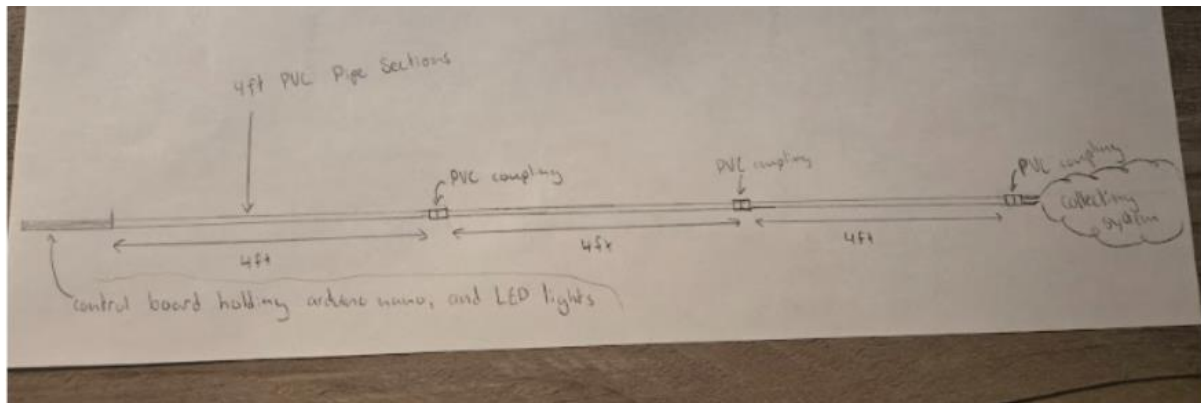


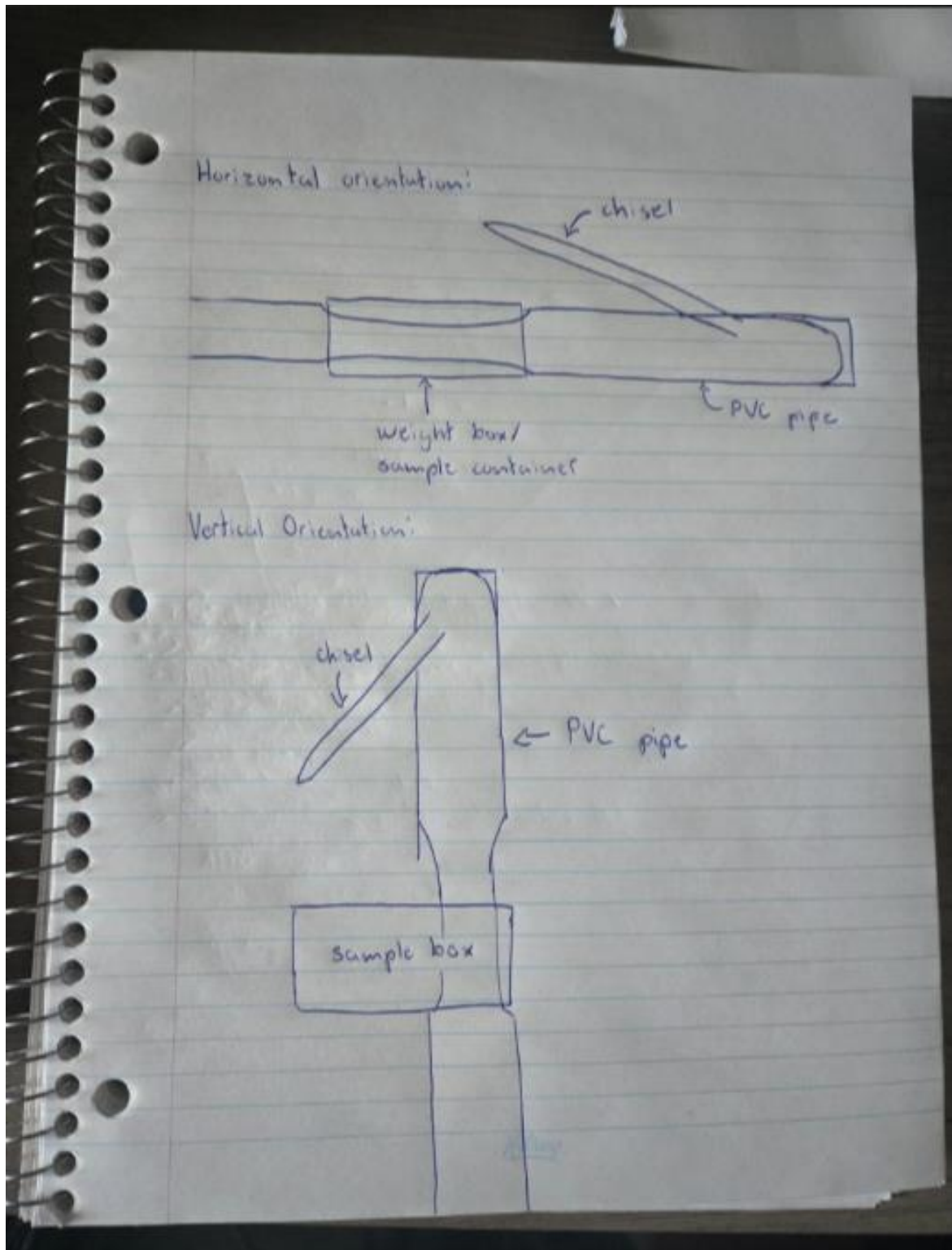
Final Design Concept 1:

The picture below has the main body of the tool. It would be made of 4ft sections of 1in diameter PVC pipe. To connect the sections of PVC pipes there will be PVC couplings glued to the end for modularity. At the end there will be a section of PVC with the sample container. The sample container would contain a load cell connected by a 15ft wire to the operators control board which would simply have a green light that goes on when the sample is within the 0.03g-0.08g range.



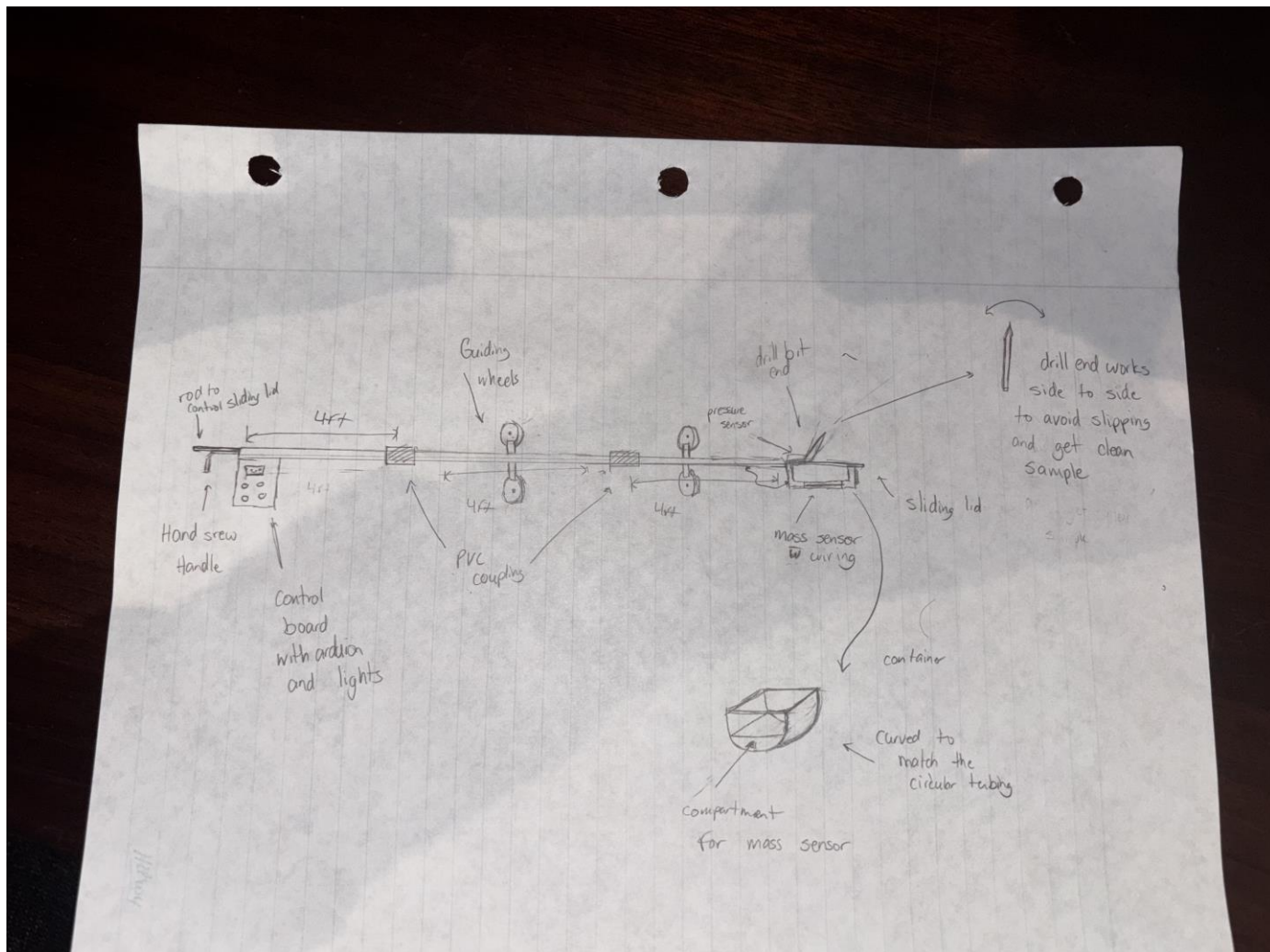
In the image, the clouded area labelled "collecting system" would be where the chisel and sample container would be located.

"Collecting System" for the Final Design Concept 1:



The sample box would slide into and clip to a modified section of the PVC pipe for two orientations. There would be a wire that plugs into the box to connect the load cell within to an Arduino board 15ft away for weight information. To close the lid of the sample box remotely a string would be used that runs through the PVC pipe like the wire.

Final Design Concept 2:



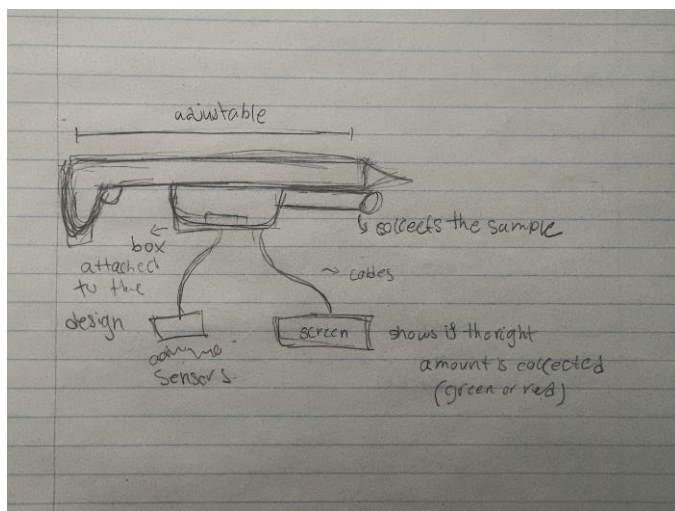
This design uses the drill bit scraper we brought up earlier but in a way that it uses a milling technique rather than a drilling technique. The drill moves the end piece side to side scraping off small shavings at a time that can be easily collected and will not spew everywhere. It is controlled by a hand crank on the other end. It uses small wheels to guide the shaft smoothly into the tube while keeping it straight. The piping is modular and can be broken down into 3 smaller pieces. The container is semi-circular to match the tubing, so it fits flush to ensure there are no shavings left behind. There is a sliding lid that is controlled by and rod on the other end of the design which can be disconnected when the container needs to be removed.

Final Design Concept 3:

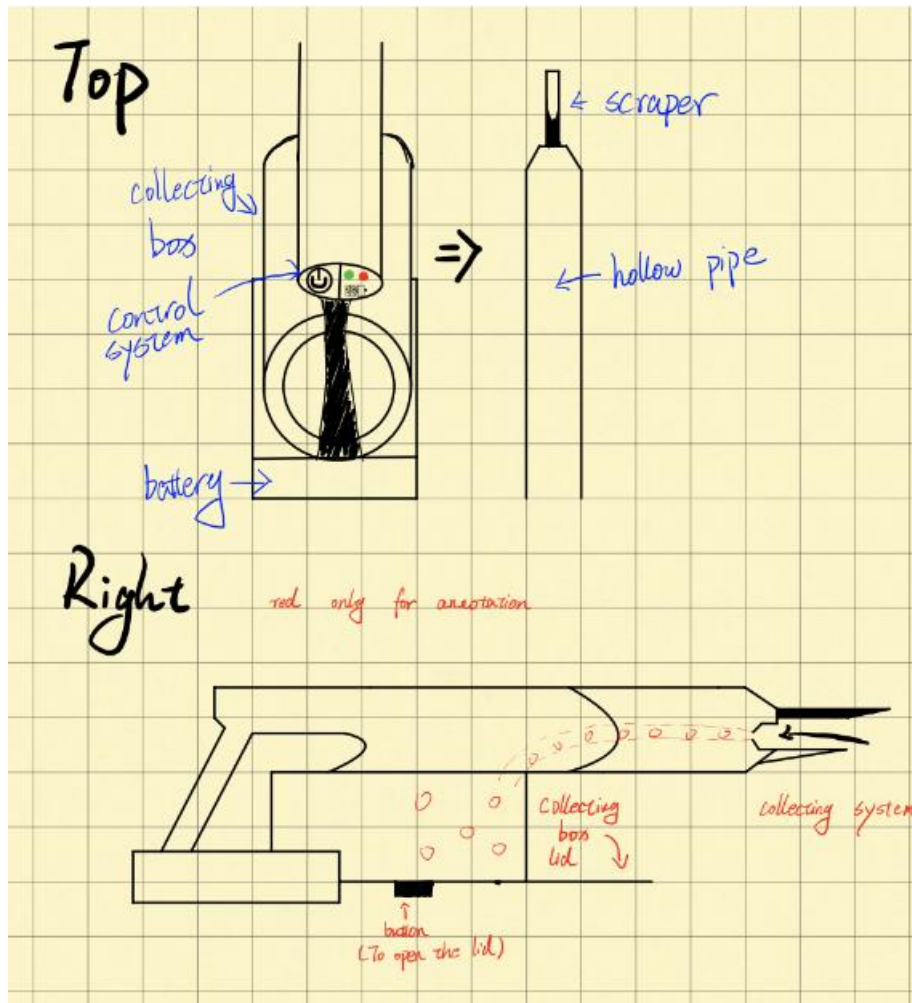
This concept design has **three main components**:

1. **Weighing Scale Box** – A small box that acts as a weighing scale, connected to sensors (Arduino) attached to the main body of the design.
2. **Pipe** – A pipe with specific measurements and dimensions requested by the client.
3. **Scraper with Vacuum System** – A scraper used to collect samples. A vacuum is also attached to collect the sample and transfer it to the weighing scale box.

The system ensures accurate measurement of collected material, with the Arduino providing real-time feedback.



Final Design Concept 4:



This design includes that main body of the tool with a control system, collection container and vacuum components. The collection container is attached to a vacuum tube with a scraper on the end. The bits if sample will be collected by the vacuum pipe with a green light that goes on when the weight in the sample container is 0.03-0.08g.