

# **Deliverable E**

**GNG 1103F-  
Winter 2024  
University of Ottawa**

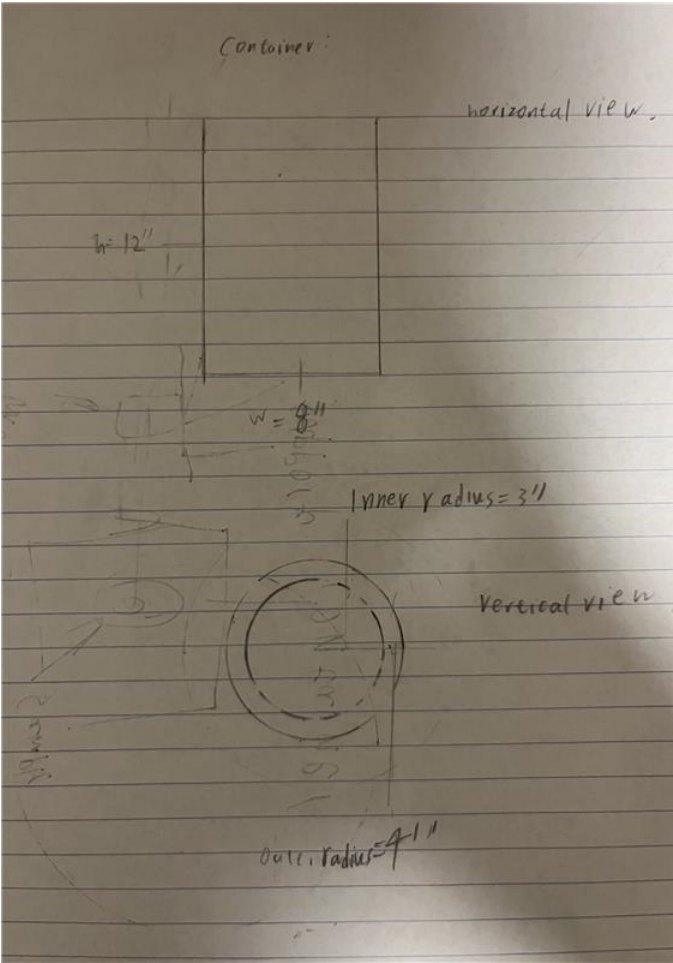
**Breaking Good  
Ibrahim Usman, John, Lightning, James, Ahsan**

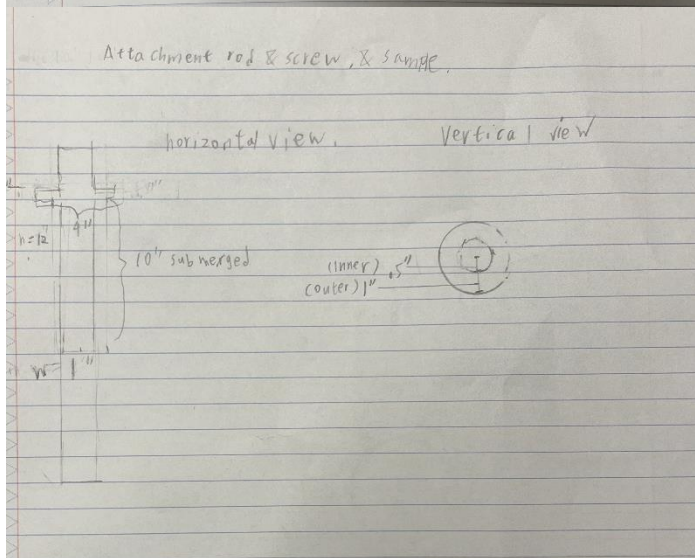
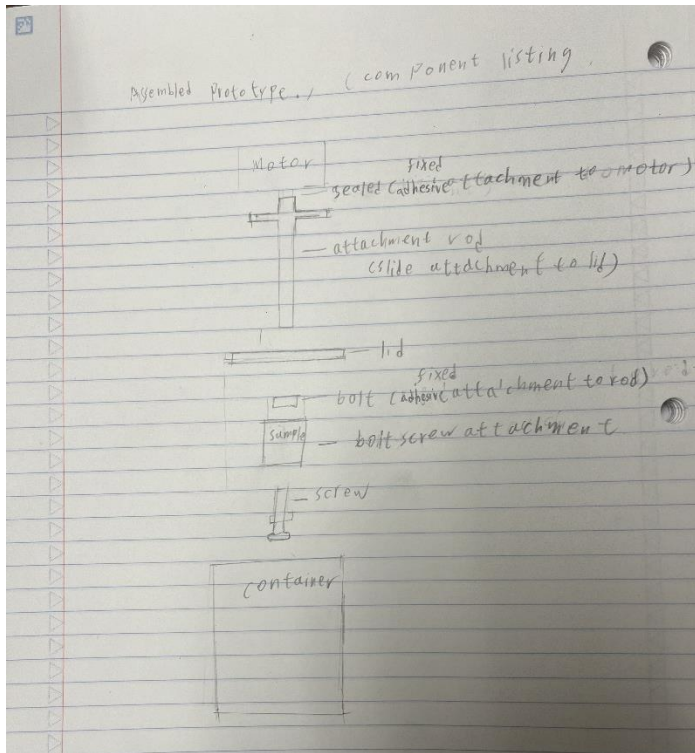
**February 25<sup>th</sup>, 2024**

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Design drawing





Outline plan and eventual prototype testing Link.

Deliverable E plan.xlsx

(too big to copy paste)

## Bill of Materials (BOM)

stuff	Cost (min) (\$)	Cost (max) (\$)
Stepper motor	24.15	63.85
container	4.70	32.10
Lid (if it does not come with the container)(will 3D print this)	1 (if done in maker space at school)	7.10 (if we buy our own material)
screw	5	10.21
sample	3.64	70.78
Bolt	4.99	4.99
Nut	0.68	0.83
arduino	(lightening has one)	(lightening has one)
wires	12.37	14.99
resisters	0.14	0.17
LEDs	7.89	13.34
battery	--- (if plug in)	2
Abrasives	--- (if just water)	7.63

Min 64.36\$

Max 227.99\$

### Sources

stuff	Cost (min) (\$) findings	Cost (max) (\$) findings
Stepper motor	<a href="#">Stepper Motor Nema 17 Bipolar 40mm 64oz.in(45Ncm) 2A 4 Lead 3D Printer Hobby CNC : Amazon.ca: Industrial &amp; Scientific</a>	<a href="#">WO-3518X-08 Lin Engineering   Motors, Actuators, Solenoids and Drivers   DigiKey</a>
container	<a href="#">Plastic Pail with Plastic Handle - 1 Gallon, White S-17943W - Uline</a>	<a href="#">Steel Pail with Lid - 5 Gallon S-7344 - Uline</a>
lid	---	<a href="#">1.75mm PLA SILK Copper Filament 1kg/2.2Lbs for 3D Printer 3D Printer Filament (toolots.com)</a>
screw	<a href="#">Reliable Fasteners Flat Head Wood Screws - #8 x 4-in - Zinc-</a>	<a href="#">Paulin #6 x 1-1/4 -inch Flat Head Phillips Drive Drywall Screws</a>

	<a href="#">Plated - 4 Per Pack - Square Drive FKWZ84MR   RONA</a>	<a href="#">Self-Drilling Fine,100pcs   The Home Depot Canada</a>
sample	<a href="#">Buy 4 Inch Diameter Economy Uncoated Foam Ball Online   Marchants.com</a>	<a href="#">Emsco Group Landscape Rock – Natural Sandstone Appearance – Small – Lightweight – Easy to Install : Amazon.ca: Patio, Lawn &amp; Garden</a>
Bolt	<a href="#">Reliable Hex Head Bolt - Stainless Steel - Zinc Plated - 1/2-in x 1 1/2-in L - 1 per Box HBS12112MR   RONA</a>	<a href="#">Reliable Hex Head Bolt - Stainless Steel - Zinc Plated - 1/2-in x 1 1/2-in L - 1 per Box HBS12112MR   RONA</a>
Nut	<a href="#">0633B C&amp;K   Switches   DigiKey</a>	<a href="#">125-NUT-78 ATTEND Technology   Connectors, Interconnects   DigiKey</a>
arduino	(lightening has one)	(lightening has one)
wires	<a href="#">240Pcs Dupont Jumper Wires, 40 Pin 10CM and 20CM Male to Female, Male to Male, Female to Female Solderless Breadboard Jumper Wires for Arduino : Amazon.ca: Tools &amp; Home Improvement</a>	<a href="#">20cm 240pcs Breadboard Jumper Dupont Wires Cable Kit Male to Female, Male to Male, Female to Female Compatible with Arduino Projects and Raspberry Pi : Amazon.ca: Electronics</a>
resisters	<a href="#">RNMF14FTC56R0 Stackpole Electronics Inc   Resistors   DigiKey</a>	<a href="#">CF12JT120R Stackpole Electronics Inc   Resistors   DigiKey</a>
LEDs	<a href="#">Gikfun 5mm LED Light Assorted Kit DIY LEDs for Arduino (Pack of 100pcs) EK8437 : Amazon.ca: Electronics</a>	<a href="#">Haitronic 300pcs 3mm, 5mm led Assorted 5 Color LED DIY KIT for Prototyping Arduino/breadboard, Teaching Students Electric Circuitry, Christmas Tree Decoration red Yellow Blue Green White : Amazon.ca: Industrial &amp; Scientific</a>
battery	---	<a href="#">Alibaba.com</a>
Abrasives	---	<a href="#">Sea Sand Sand for Crafting Coarse Sand Craft Supply - Etsy Canada</a>

## List of equipment

- Drill
- Screw driver
- Sauder
- 3D printer (maybe)

- Hammer
- Lazer cutter (maybe)
- Breadboard

## Prototyping test plan

Test ID	Test Objective	Description of Prototype used and of Basic Test Method	Description of results to be Recorded and how these results will be used	Estimated Test duration and planned start date
1	See if dimensions of prototype 1 is ideal with sample and slurry	Prototype made out of scraps. The container will be filled with water	Observations will be written down and used to modify dimensions if needed	2 hours , start date: march 2nd
2	see if motor functions properly in the system for prototype 2	run motor on prototype 2 for intervals of 10 and 20 minutes	observe motor health and consistency, if not satisfactory, replace motor or tweak software	2 hours of 10 minute and 20 minute interval testing. Start date : 8th march
3	Test if thereis any leaking with the lid on	prototype 2 will have the motor and the lid assembled with the container, the system running for 20 min or until leakage shows	Oberservation of leakage will be recrded to improve sealing if specific area	3 hours, start date 8th march
4	See if SRS system works with holding method for prototype 2	Prototype 2 will have the SRS in motion with the sample, see if the sample will hold	Observe if the sample will hold or if the screws go loose, if so utilize different method of holding	2 hours . Start date 8th march
5	test slurry see.how it works with the system for prototype 2	prototype 2, will essentially have the entire system active to see how slurry behaves, no sample	looking for smooth operation with slurry incorporated. If not, ratio of slurry or amount of slurry will be adjusted.	2 hours. Start date 9th march
6	test functionality of entire system. Prototype 3	have entire system active with a sample this time	monitor the entire machine and see if erosion results are as expected	4 hours. Start date 17th march

