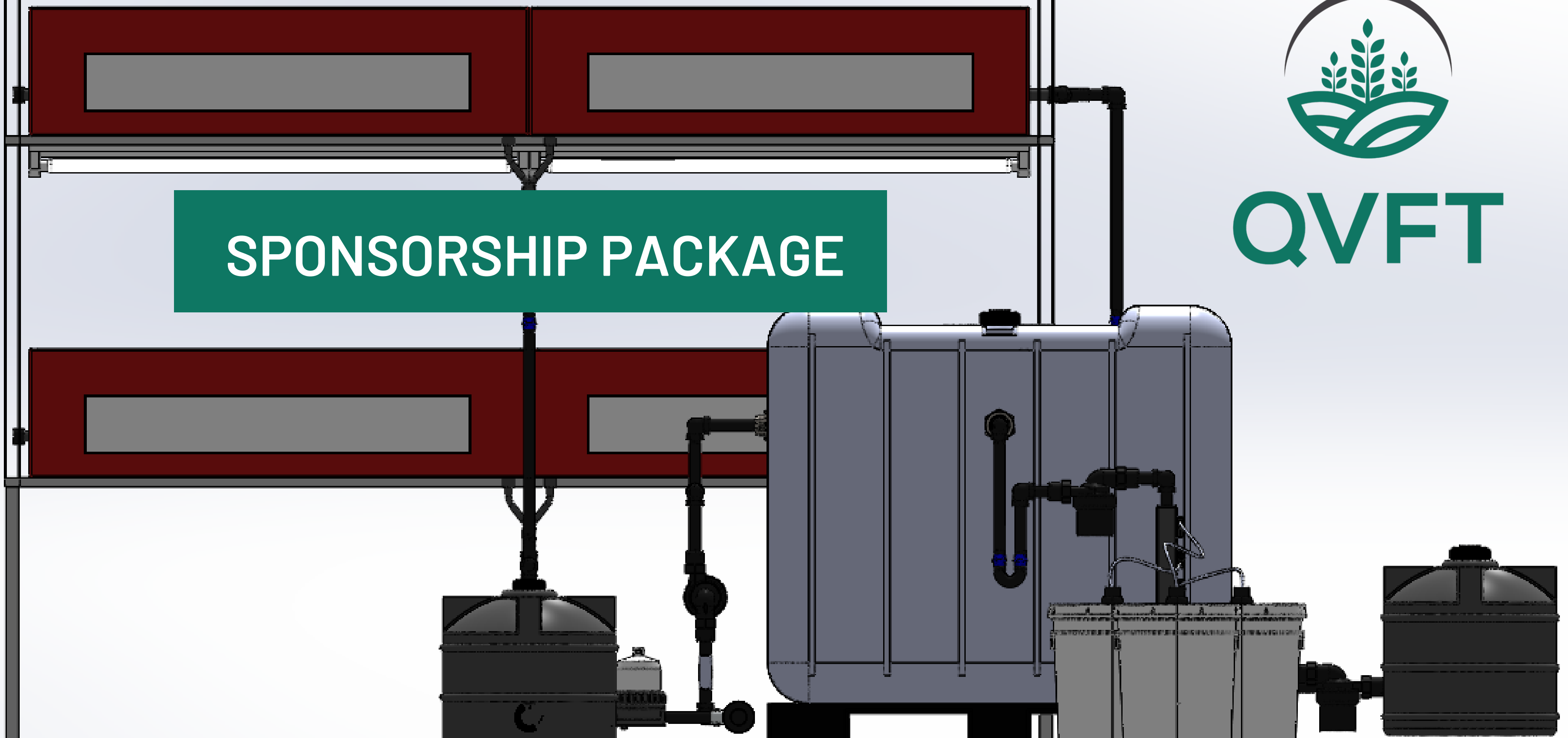




# QVFT

## SPONSORSHIP PACKAGE



# ABOUT US

## OUR MISSION

- Founded in Sep. 2019, QVFT is Canada's first student-led undergraduate vertical farming design team
- We are designing and building a functional, software-automated aeroponic vertical farm on Queen's University campus
- The majority of existing research in this field is conducted by private companies and is thus inaccessible to the public; through its open-source approach, QVFT aims to democratize vertical farming knowledge and research
- Our fundraising goal for 2022-23 is \$5,500, which will be used to manufacture our first physical prototype
- The prototyping and manufacturing will be all student based using necessary tools and machines on campus to complete the design.



# WHY VERTICAL FARMING?

## THE PROBLEM

- A global trend of increasing concern is the diminishing supply of arable land per capita
- Due to trends such as climate change, freshwater depletion, and soil degradation, arable land per capita will fall to one-third of the amount available in 1970 by 2050
- The unsustainable practices of conventional agriculture exacerbate the problem
- The world population is also expected to increase from 7.7 billion (2019) to 9.7 billion (2050)
- The intersection of these climate and population challenges means that global food security depends on our ability to adapt to increased demand and develop better farming techniques







## THE SOLUTION

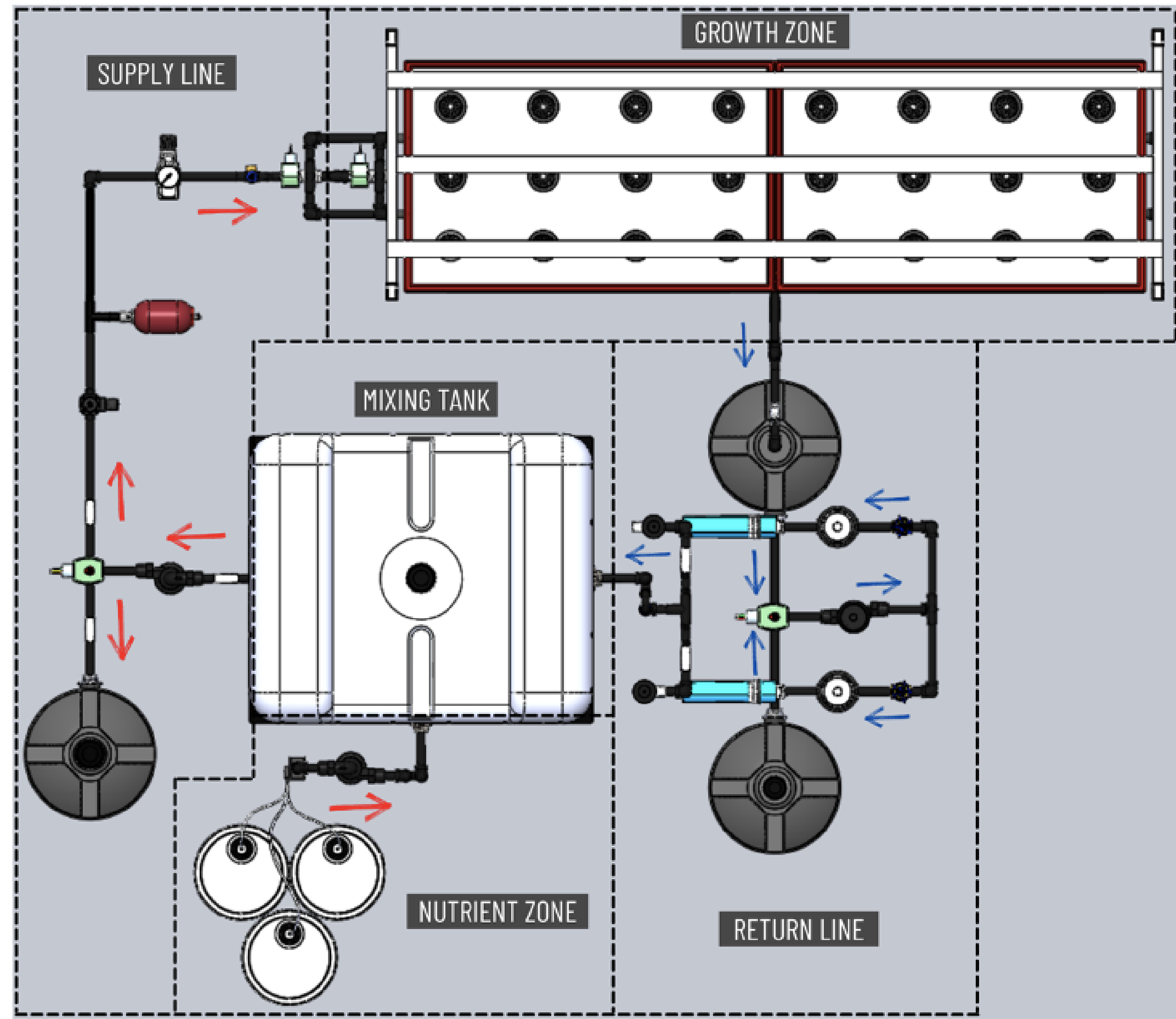
- Vertical farming is a cultivation practice in which crops are grown in an indoor, climate-controlled facility
- This approach is associated with dramatically reduced water consumption (~95%), minimal transportation costs, and massive improvements in per-acre land productivity
- Vertical farming can grow nutritious, organic produce in any location, at any time of year
- Given these advantages, this technology is projected to become a major contributor to global food production in the coming decades
- The vertical farming industry's global market value is projected to grow from \$2.23 billion in 2018 to \$12.77 billion by 2026, representing a compounded annual growth rate of 24.6%

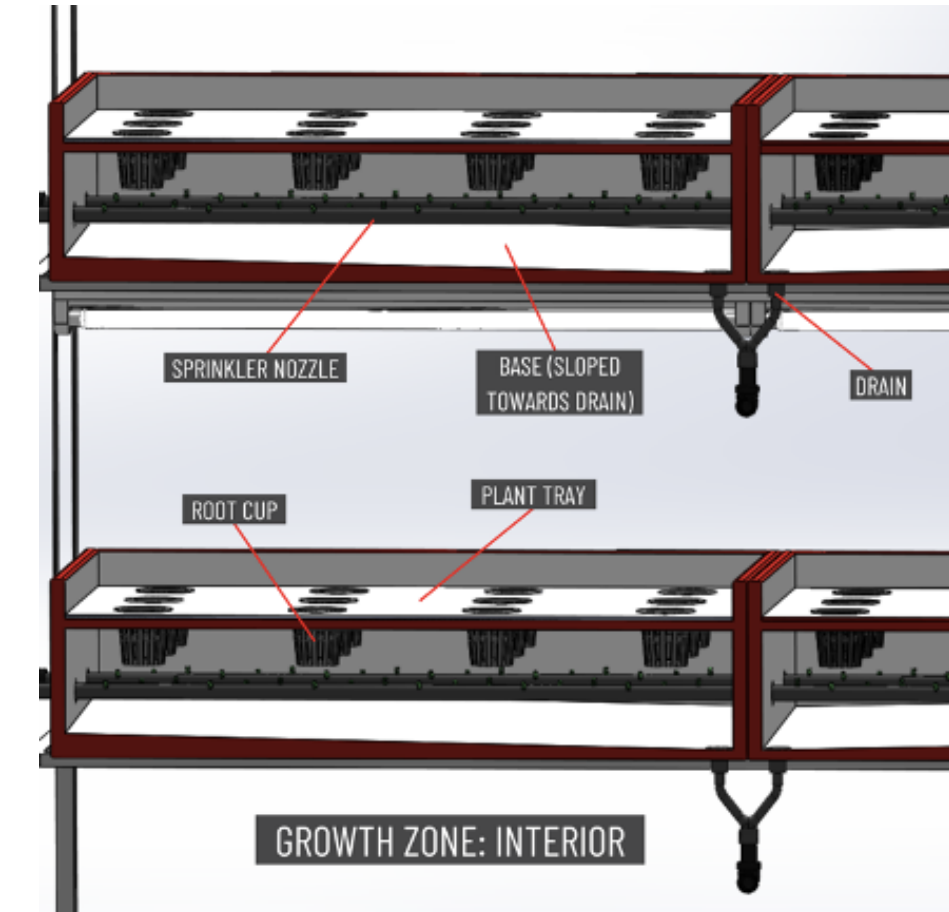
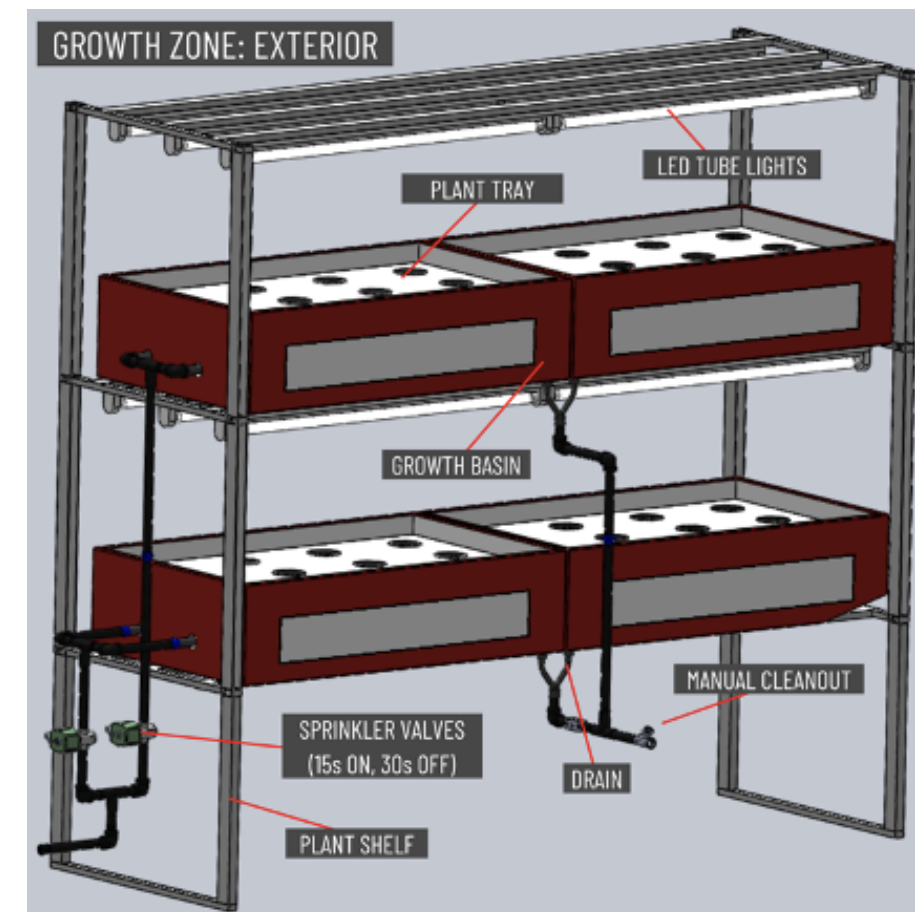
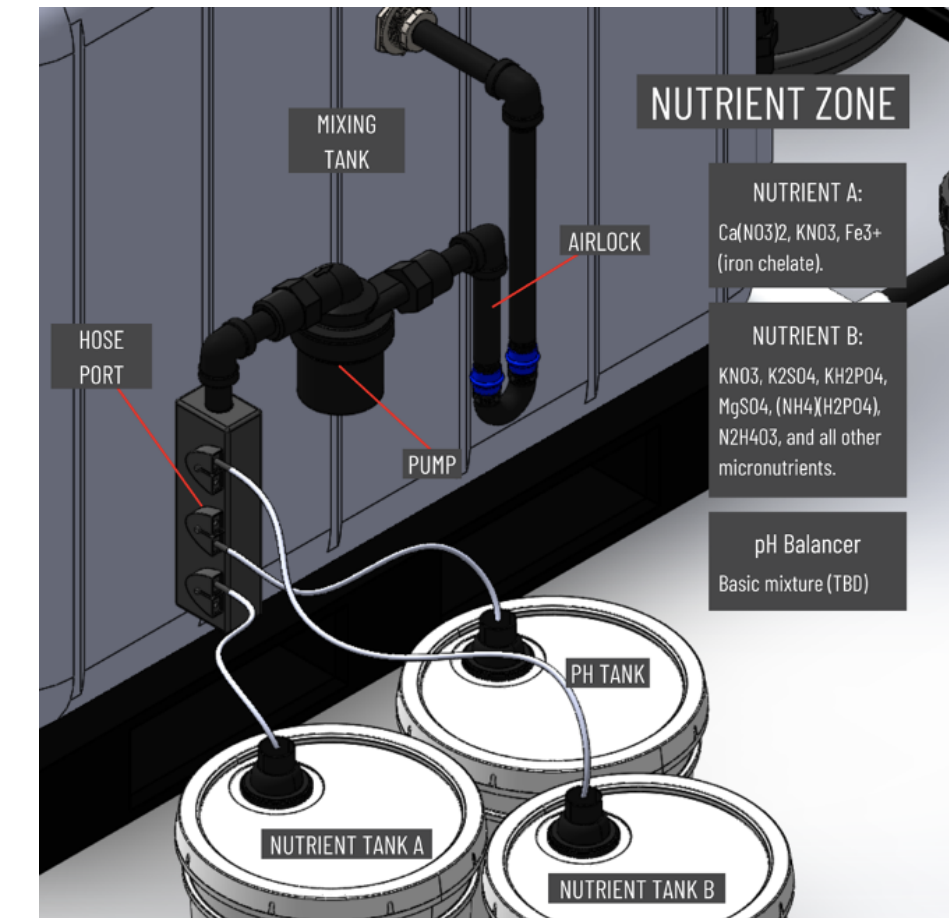
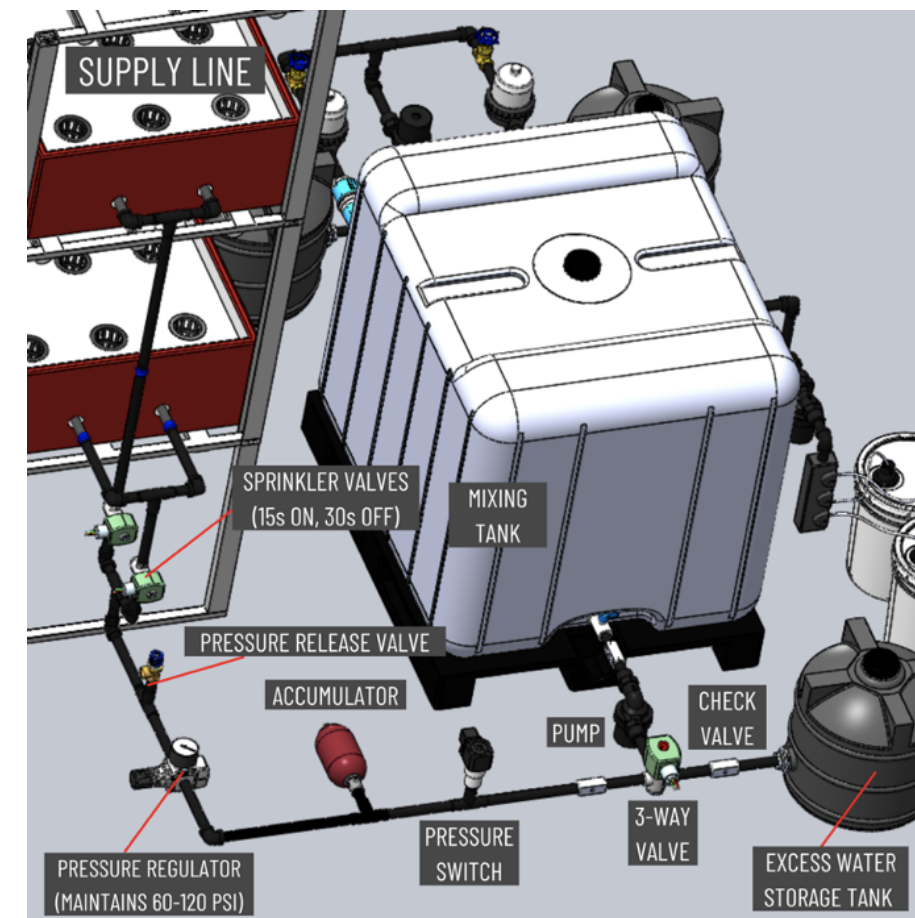
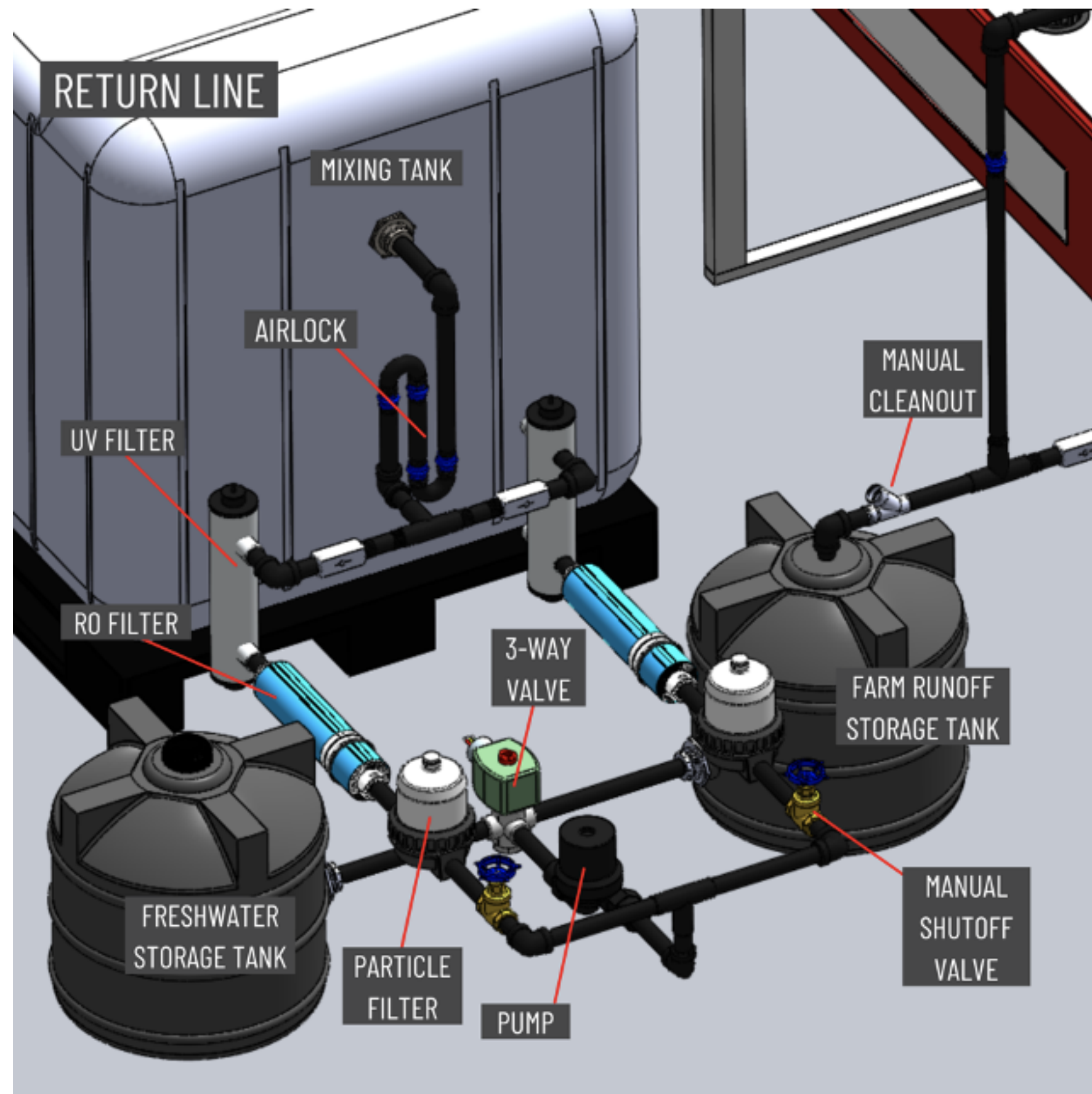


# WHAT WE DO

## AEROPONIC SYSTEM

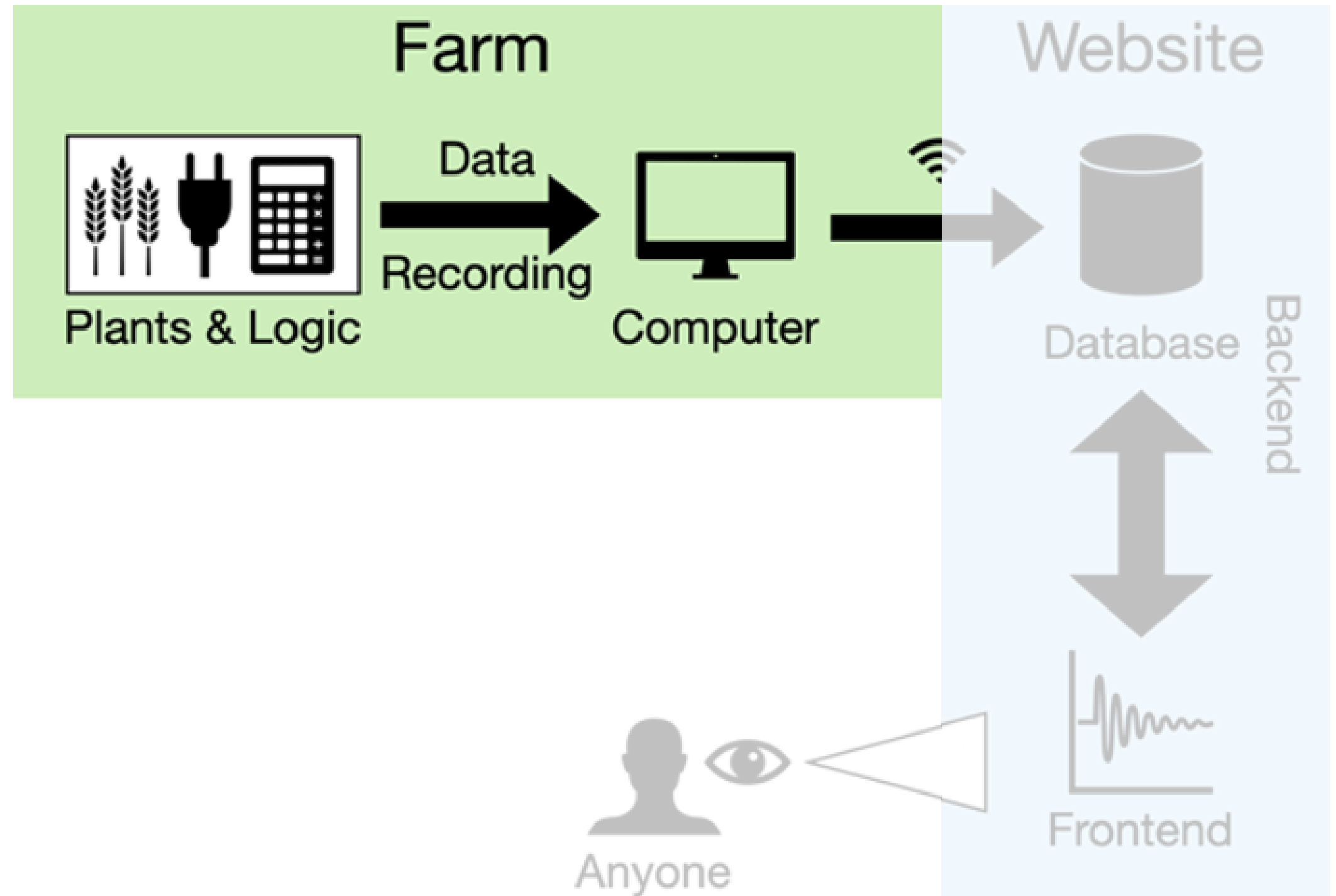
- QVFT employs an aeroponic cultivation method, in which plants grow without soil and are fed by a nutrient-enriched mist
- Crops rest in thin, slotted plastic root cups, through which their roots hang into a basin below
- Aeroponics lend well to automation and can allow for near-complete control over the plant growth environment
- The system is broadly divided into five zones: mixing tank, nutrient zone, supply line, growth zone, and return line





## AUTOMATION SUBSYSTEM ("FARM")

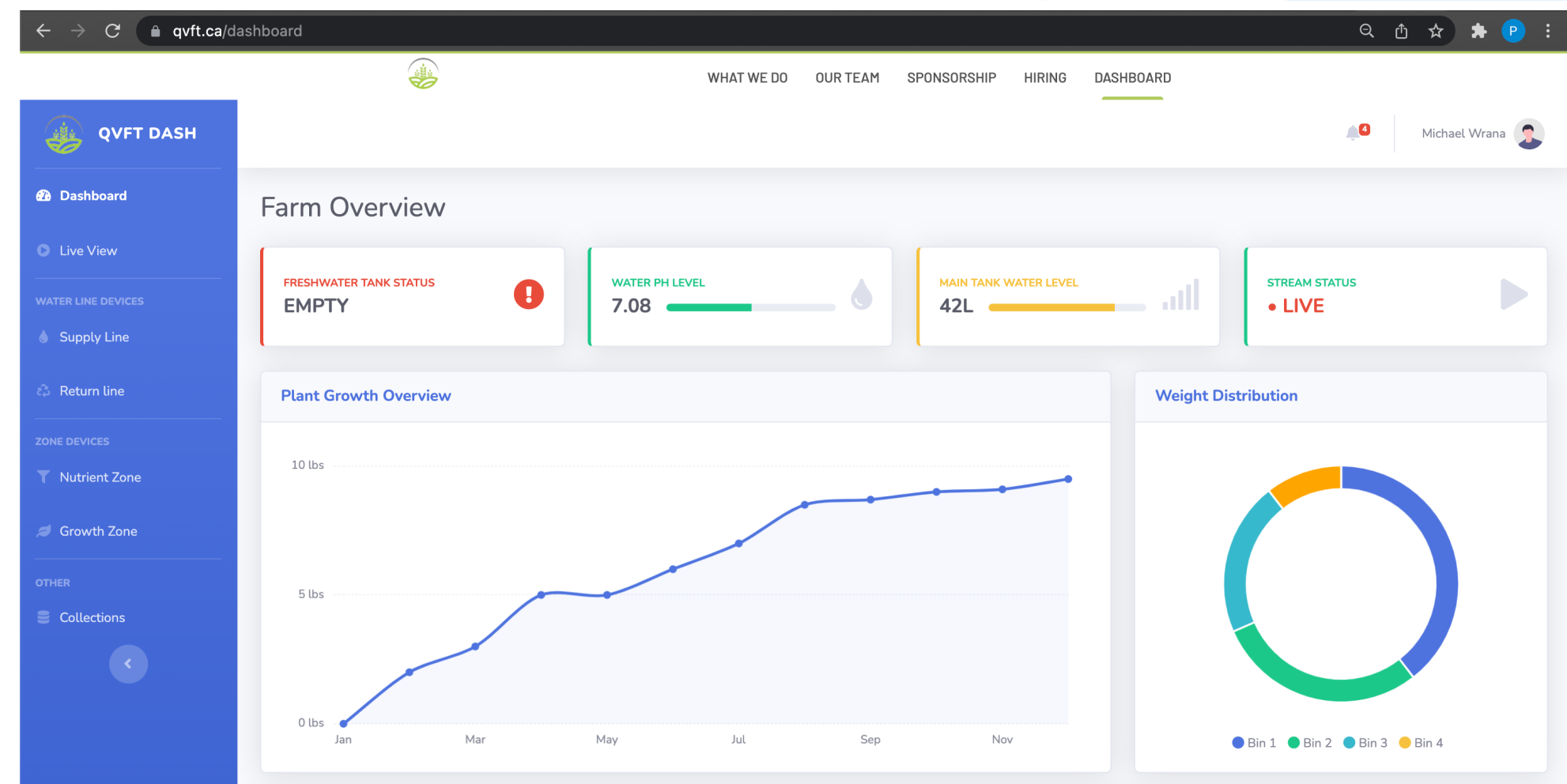
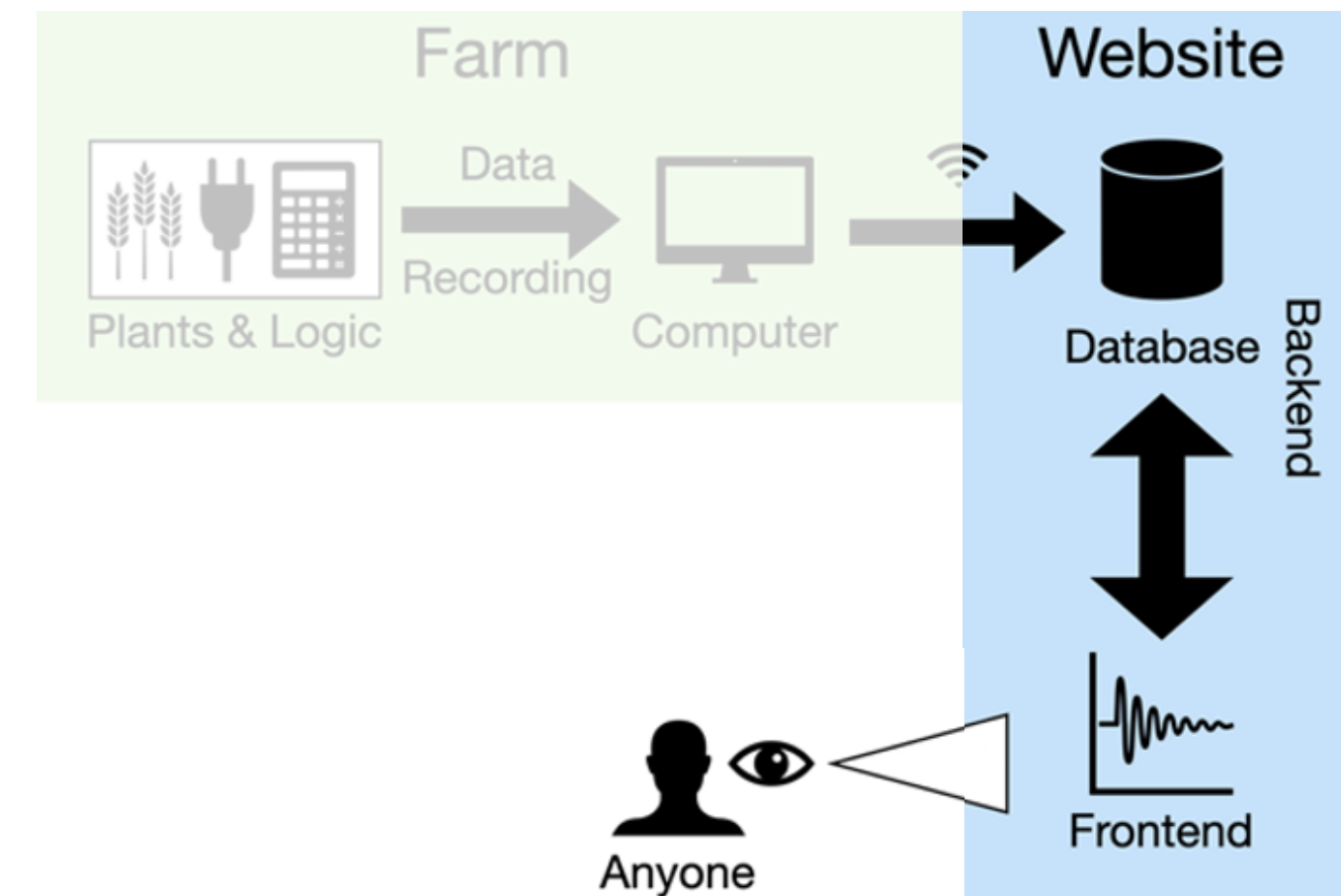
- An electromechanical feedback control system that automatically maintains optimal growth conditions using interconnected sensors and actuators, which interact through a logical framework programmed into their Arduino micro-controllers
- Sensor readings are simultaneously logged by a computer and then uploaded to the website via Ethernet





## SOFTWARE STACK ("WEBSITE")

- Entails the database, back-end, and front-end and ultimately aims to provide a publicly accessible repository of real-time vertical farming data
- This repository achieves three objectives:
  - Allows technicians to remotely monitor farm equipment, which improves operations and resource allocation efficiency
  - Provides a record for future tuning and improvement of the farm by comparing data to commercial vertical farms and conventional producers
  - Creates a public knowledge base to assist other groups with vertical farming research







# SPONSORSHIP TIERS

## Bronze

\$100+

- Display logo on website
- Print logo on team apparel
- Place logo on promotional materials
- [Non-financial mentorship partnerships are considered bronze]

## Silver

\$500+

- Display logo on website
- Print logo on team apparel
- Place logo on promotional materials
- Provide social media coverage throughout the year

## Gold

\$1,000+

- Display logo on website
- Print logo on team apparel
- Place logo on promotional materials
- Provide social media coverage throughout the year
- Imprint logo on completed system

# CURRENT PARTNERS

Bronze

ZIPGROW™



THE ENGINEERING SOCIETY  
OF QUEEN'S UNIVERSITY

AEROK

iGrow

Silver

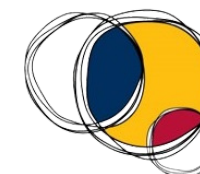


SIMBL

Queen's  
UNIVERSITY

FACULTY OF  
ARTS AND SCIENCE

Gold



Dunin-Deshpande  
Queen's INNOVATION CENTRE

boma  
HYDROPONICS



# PROMOTIONAL OPPORTUNITIES

*Conferences:* Prior to COVID-19, we attended the Queen's Water Environment Conference (QWEC), the Commerce and Engineering Environmental Conference (CEEC), and the Queen's Healthcare and Business Conference (QHBC) where we distributed materials, recruited students and informed attendees to the benefits of vertical farming.

*Online Presence:* QVFT has a website and several hundred followers on LinkedIn and Facebook.





# BUDGET

## HISTORICAL (2019-22)

LINE #	ITEM	Specifics	Unit Price	Qty	Sub-total	Budget
Revenue						
Sponsorship, Donations, and Grants						
00001	SIMBL Business Enablement	External donation	\$ 500.00	1	\$ 500.00	\$ 500.00
00002	Faculty of Arts and Science Student Initiatives Fu	University grant	\$ 900.00	1	\$ 900.00	\$ 900.00
00003	DDQIC	Fall sponsorship [Funds not yet accepted]	\$ 1,000.00	1	\$ 1,000.00	\$ 1,000.00
Total Sponsorship, Donations, and Grants					\$	1,400.00
Internal Reimbursements from Members						
00004	Team Sweaters	Member reimbursement for Standard Sweater	\$ 35.00	7	\$ 245.00	\$ 245.00
00005	Team Sweaters	Member reimbursement for Embroidered Sweater	\$ 41.00	5	\$ 205.00	\$ 205.00
00006	Loan	Loan from Patrick to help pay for sweaters (repaid when Artsco grant funds arrived)	\$ 40.00	1	\$ 40.00	\$ 40.00
00007	RBC	Reversed service fee	\$ 5.00	1	\$ 5.00	\$ 5.00
00008	RBC	Reversed service fee	\$ 4.50	1	\$ 4.50	\$ 4.50
Total Internal Reimbursements from Members					\$	499.50
TOTAL REVENUE					\$	1,899.50
Expenses						
Business Operations						
00009	Shoppers Drug Mart	Postage stamps for mailing sponsorship package to potential sponsors	\$ 3.38	1	\$ 3.38	\$ 3.38
00010	RBC	Paper statement with images fee	\$ 4.50	3	\$ 13.50	\$ 13.50
00011	RBC	Monthly banking fee	\$ 5.00	3	\$ 15.00	\$ 15.00
00012	AMS Publishing	3 nametags for use at CEEC trade show, printed at P&CC	\$ 8.76	1	\$ 8.76	\$ 8.76
00013	AMS Publishing	Colour prints of QVFT proposal from P&CC	\$ 14.47	1	\$ 14.47	\$ 14.47
00014	Namecheap.com	Cost of QVFT's domain name (11.98/year, with rates increasing after year 1). Netlify server is linked to this.	\$ 16.35	1	\$ 16.35	\$ 16.35
00015	AMS Publishing	Colour prints of QVFT proposal from P&CC	\$ 17.94	1	\$ 17.94	\$ 17.94
00016	Michelle Ye	Headshots	\$ 10.00	9	\$ 90.00	\$ 90.00
00017	AMS Publishing	Posters and other promotional material for CEEC trade show, printed at P&CC	\$ 21.75	1	\$ 21.75	\$ 21.75
00018	AMS Publishing	Colour prints of sponsorship package booklets from P&CC	\$ 29.50	1	\$ 29.50	\$ 29.50
00019	Michelle Ye	Headshots (discounted rate, 30/four people)	\$ 7.50	4	\$ 30.00	\$ 30.00
00020	Team Sweaters	Sweater money sent back to Spencer	\$ 35.00	1	\$ 35.00	\$ 35.00
00021	Milan Paymar @ Upwork	QVFT logo made through Upwork.com	\$ 50.10	1	\$ 50.10	\$ 50.10
00022	Refreshments for Team Social	24 bottles of 5minioffice	\$ 56.00	1	\$ 56.00	\$ 56.00
00023	Service Ontario 185A	Registration of Varsity Greens as a business	\$ 60.00	1	\$ 60.00	\$ 60.00
00024	Refreshments for Team Social	24 tall cans of Hey Yall	\$ 68.40	1	\$ 68.40	\$ 68.40
00025	Campus Equipment Outfitters	Embroidered sweaters	\$ 41.00	5	\$ 205.00	\$ 205.00
00026	Campus Equipment Outfitters	Unembroidered sweaters	\$ 35.00	8	\$ 280.00	\$ 280.00
Total Business Operations					\$	1,015.15
Aeroponic System						
00027	Root cups		FREE	~24		
Total Aeroponic System					\$	-
Automation System & Software Stack						
00028	Qkits	Tax	\$0.62	1	\$ 0.62	\$ 0.62
00029	10 cm MF jumper cable	Qkits - 40 Pin Male to Female Jumper Cable 10 CM	\$2.26	1	\$ 2.26	\$ 2.26
00030	20 cm MM jumper cable	Qkits - 40 Pin Male to Male Jumper Cable 20 CM	\$2.52	1	\$ 2.52	\$ 2.52
00031	20 cm MF jumper cable	Qkits - 40 Pin Male to Female Jumper Cable 20 CM	\$2.52	1	\$ 2.52	\$ 2.52
00032	10 cm MM jumper cable	Qkits - 40 Pin Male to Male Jumper Cable 10 CM	\$1.94	2	\$ 3.88	\$ 3.88
00033	General parts and supplies	Qkits	\$4.50	1	\$ 4.50	\$ 4.50
00034	Toggle switch	Qkits - DPDT ON-OFF-ON 15A/125V AC	\$5.48	1	\$ 5.48	\$ 5.48
00035	Mini LED board	Qkits - Traffic Light LED Display	\$2.95	2	\$ 5.90	\$ 5.90
00036	Breadboard	RobotShop - Full-Size Bare Breadboard (830 Tie Point)	\$7.93	1	\$ 7.93	\$ 7.93
00037	Load cell	RobotShop- 5 kg Micro Load Cell	\$9.35	1	\$ 9.35	\$ 9.35
00038	Temp/humidity sensor	Qkits - DHT22	\$10.26	1	\$ 10.26	\$ 10.26
00039	Load cell amplifier	RobotShop - HX711	\$13.31	1	\$ 13.31	\$ 13.31
00040	Assorted resistors (100 ohms to 100K ohms)	Qkits - Set of 610 Resistors (E-12 Series)	\$15.42	1	\$ 15.42	\$ 15.42
00041	RobotShop	HST	\$15.68	1	\$ 15.68	\$ 15.68
00042	QKits	Tax	\$16.28	1	\$ 16.28	\$ 16.28
00043	Analog TDS (EC/nutrient) sensor	RobotShop - Gravity Analog TDS Sensor/Meter for Arduino	\$18.20	1	\$ 18.20	\$ 18.20
00044	Breadboard	Qkits - 1260 Point Bread Board	\$23.16	1	\$ 23.16	\$ 23.16
00045	Arduino Nano	RobotShop - Arduino Nano 33 IoT Microcontroller with Headers	\$32.43	1	\$ 32.43	\$ 32.43
00046	pH meter	RobotShop - Gravity Analog pH Meter Kit	\$39.33	1	\$ 39.33	\$ 39.33
00047	Multimeter	Qkits - 3 1/2 Digit Multi Meter 20A	\$54.12	1	\$ 54.12	\$ 54.12
Total Automation System & Software Stack					\$	283.15
Plant Science Research						
00048	Custom Hydro Nutrients	Magnesium sulfate 1lb	\$ 4.62	1	\$ 4.62	\$ 4.62
00049	Custom Hydro Nutrients	Calcium nitrate 1lb	\$ 6.60	1	\$ 6.60	\$ 6.60
00050	Custom Hydro Nutrients	Soluble trace element mix 8oz	\$ 7.52	1	\$ 7.52	\$ 7.52
00051	Custom Hydro Nutrients	Potassium chloride 1lb	\$ 10.23	1	\$ 10.23	\$ 10.23
00052	Custom Hydro Nutrients	ICL Peak MKP 1lb	\$ 11.88	1	\$ 11.88	\$ 11.88
00053	Custom Hydro Nutrients	Shipping	\$ 45.13	1	\$ 45.13	\$ 45.13
Total Plant Science					\$	85.98
TOTAL EXPENSES					\$	1,384.28
SUMMARY						
Total Revenue					\$	1,899.50
Total Expenses					\$	1,384.28
Net Surplus					\$	515.22

## FUTURE (2022-23)\*

\*Estimated; excludes tax

LINE #	ITEM	Specifics	Unit Price	Qty	Sub-total	Budget
Revenue						
Sponsorship, Donations, and Grants						
Total Sponsorship, Donations, and Grants					\$	-
TOTAL REVENUE					\$	-
Expenses						
Business Operations						
Total Business & Administration					\$	-
Aeroponic System						
00001	1/2" clear tubing	USA Sealing Tubing, Clear, 1/2 in Inside Dia.	\$ 3.28	3	\$ 9.84	\$ 9.84
00002	1/8" ID rubber tubing	length	\$ 14.60	1	\$ 14.60	\$ 14.60
00003	2-way solenoid valve + actuators	Alcon 05EZ009A2-1/JIA Solenoid Valve	\$ 48.12	2	\$ 96.24	\$ 96.24
00004	2" pipe coupling (rough estimate of qty.)	Eastman 2 in. x 2 in. PVC DWV Flexible Coupling	\$ 4.67	10	\$ 46.70	\$ 46.70
00005	2" PVC elbow joint	Home Depot Charlotte Pipe 2 in. PVC Schedule. 40 90-Degree S x S Elbow Fitting	\$ 3.53	22	\$ 77.66	\$ 77.66
00006	2" PVC Piping (385" altogether in CAD model)	Xirtec white PVC SCH40 plain.end pipe, 2 in. x 10 ft	\$ 25.99	4	\$ 103.96	\$ 103.96
00007	2" PVC U-bend	Waterwau PVC U-Bend - 2" Slip x 2" Slip	\$ 14.19	2	\$ 28.38	\$ 28.38
00008	3-way solenoid valve	Tameson TP-DA 1/4" 3/2 Way NC Brass FKM 0-2bar 12V DC	\$ 55.10	2	\$ 110.20	\$ 110.20
00009	3/4" PVC Piping (384" of sprinkler line in CAD model)	Xirtec white PVC SCH40 plain.end pipe, 3/4 in. x 10 ft.	\$ 13.99	4	\$ 55.96	\$ 55.96
00010	30 gallon plastic drum	Very rough estimate	\$ 88.00	3	\$ 264.00	\$ 264.00
00011	Accumulator tank	SEAFLO Pre-Pressurized Accumulator Tank SFAT-075-125-01	\$ 65.01	1	\$ 65.01	\$ 65.01
00012	Analog pressure gauge	Baker 421AVND-300 Pressure Gauge, 0-300 PSI	\$ 37.40	1	\$ 37.40	\$ 37.40
00013	Check valves	American Valve P32S 2" PVC in-Line Check Socket Schedule 40, 2-inch	\$ 23.61	5	\$ 118.05	\$ 118.05
00014	Custom-made growth basin built from CAD model	Very rough estimate	\$ 60.00	4	\$ 240.00	\$ 240.00
00015	Digital pressure sensor	Robotshop Water Pressure Sensor G1/4 1.2MPa	\$ 16.54	1	\$ 16.54	\$ 16.54
00016	Full-spectrum LED tubes (price is special deal arranged with manufacturer)	Jointech LED T8 Tube Plant Light - 32W Full Spectra		8	\$ 400.00	\$ 400.00
00017	General hardware	Very rough estimate	\$100.00	1	\$ 100.00	\$ 100.00
00018	IBC Tank (For mixing tank)	330 Gallon Reconditioned IBC Tote (IBC Tanks)	\$ 222.99	1	\$ 222.99	\$ 222.99
00019	Manual cleanout w/ plug	Mueller Industries Clean Out Tee, W/ Plug, 2 in, PVC, WH	\$ 11.36	1	\$ 11.36	\$ 11.36
00020	Manual shutoff valve (2-way_	Boshart Canada 2 inch PVC FPT x FPT Molded-in-Place Compact Ball Valve (2-Pack)	\$ 31.20	2	\$ 62.40	\$ 62.40
00021	Misting nozzle kit	Kalolary 50-pack	\$ 42.74	1	\$ 42.74	\$ 42.74
00022	Particle filter	HydroLogic Small Boy Sediment Carbon Filter 1 GPM	\$164.99	2	\$ 329.98	\$ 329.98
00023	Peristaltic pump	ZipGrow Peristaltic Pump – Single (300mL/min)	\$ 174.95	2	\$ 349.90	\$ 349.90
00024	Plastic pail lid	Standard Lid	\$ 2.45	3	\$ 7.35	\$ 7.35
00025	Pumps	Seaflo 12V 100PSI Self-Priming Diaphragm Pump, 1.3 GPM	\$ 44.99	3	\$ 134.97	\$ 134.97
00026	Reverse osmosis filter	Stealth-RO™ Reverse Osmosis Filter	\$239.99	2	\$ 479.98	\$ 479.98
00027	Rona All-Purpose Round Pail		\$ 3.97	3	\$ 11.91	\$ 11.91
00028	Sprinkler nozzles	Antelco 0.36 mm micro spray jet (100 pack)	\$ 57.70	1	\$ 57.70	\$ 57.70
00029	Tee joint	Rona 2-in PVC Tee	\$ 6.89	6	\$ 41.34	\$ 41.34
00030	Tools	Very rough estimate	\$100.00	1	\$ 100.00	\$ 100.00
00031	UV filter	GrowoniX UV Sterilization for EX100-GX400	\$ 216.44	2	\$ 432.88	\$ 432.88
Total Mechanical					\$3,526.50	
Automation System & Software Stack						
00032	Arduino 21V power supplies	Very rough estimate	\$ 15.00	4	\$ 60.00	\$ 60.00
00033	Continuous fluid level sensor	PN-12110215TC-X	\$59.95	7	\$ 419.65	\$ 419.65
Total Systems Automation					\$	479.65
Plant Science Research						
Total Plant Science					\$	-
TOTAL EXPENSES					\$4,006.15	
SUMMARY						
Total Revenue					\$	-
Total Expenses					\$4,006.15	
Net Surplus					-\$4,006.15	



# CONTACT US

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