Learned

* Sump tank should be twice the size of a grow bed
* Grow bed should fill up fast enough to not get stuck in the dead band of filling up not completely emptying
* Bell siphon should have larger diameter to drain the bed faster.
* Bell siphon top needs to be close to the height of the drain spigot. Siphon needs to float before the auto drain will happen. Account for a couple inches height required in the grow bed
* Fish tank should have an empty valve at the bottom of the tank.
* Biofilter must be in the bottom of the sump tank, preferably at the lowest point
* Bio filter must have holes on the top to let the air escape.
* 100W heater is too small for the 30 gal tank on cold days. At least 200W – 300W
* Sump tank should easily pull out form the bottom of the grow bed, or the grow bed should drain to an easily accessible tank.
* Put a reusable coffee filter, food strainer, or some other filter before the sump tank to allow easy change out and replacing.
* Fish will find a way to get stuck in the piping!
* Use a ziplock bag to germinate seed.
* Have a double sump tank to easily swap out and clean; also doubles as another storage container.
* All drainage to show flow through a filter tank before going to the sump to keep the sump clean of particulate
* Multiple growbeds can be piped together to release in the in filter tank.
* A GLAD container with holes in it makes a descent replaceable filter.
* Fish tank supply needs to be high enough (6+ inches, preferably 12) to allow for aeration, or a simple air stone
* All piping in/out of tanks need to have a ball valve to control flow and isolation
* Checks valves should be place on run that flow to higher tanks that can backfill if power is lost.
* A flow sensor can be added to growbed return to verify cycling and gather statistics on flowrate and cycle time.
* Sump tank needs an overflow that safely drains completely out of the system (in a green house, that would mean to the grass outside)
* Sump tank needs a minimum water level float valve that will fill the tank in the event of water leaking out the system.
* Automatic fish feeder
* There needs to be a filter from the fish tank supply (swirl filter) and the supply to the sump tank (overflow sand filter, etc)
* Fish tank needs to supply a swirl filter (or other filtration) and then supply the growbeds
* Fish tank needs a maximum height overflow that goes to the filter tank.
* Bed siphon guard needs mesh around the outside along with the holes in the PVC.
* All tanks a piping need to not be clear! We want to minimize algae growth
* Bell siphon PVC guard needs to have a flare at the bottom to stop it from slowly lifting up and the tanks cycle water and plants are added/removed from the system
* Need something to keep the cats/and future animals out of the growbed and the fish tank (chicken wire)
* A porch with a door to keep the animals off the growbeds
* Plants need SUN
* Seeds to grow to a sufficient size before adding to the growbeds, the grow media will crush the roots
* Seeds can be planted into small cups with grow media that won’t move within. Also allows for easy replacing by pulling the cup up, harvesting/changing the plant, and the replacing the cup in the system
* Get PVC bushings to create a properly connection going through tank interfaces.
* Use Teflon taping on threaded fittings and properly seal the bushing interfaces.
* Bury the sump tank in the ground. Need to have a proper base that isn’t dirty since if expands and contracts and can damage (crush or create leaks) in the sump tank. Dig a hole, put sand in bottom, place bricks on the side, and then put the tank in the hole. The tank is also semi-removable if problems occur
* Pickle barrels are large, opaque and sturdy
* Danielle approves of the wooden grow boxes in a regular garden
* Local landscaping retailer can ship PH neutral grow media and rocks
* Usiphon appears to have less maintenance than a bell siphon and doesn’t have any moving parts. (Could have problems will clogging because the water has to travel back up the piping to exit)
* Water entering the growbed needs to be opposite the drain
* Need to have a larger drain pipe than supply pipe
* You can use cinderblocks as a support and put a wooden vanity plate on the outside
* Bell siphon needs a snorkel, and possible a cup on the snorkel to allow air to flow into it and not water (this happens right at the end, if the water supply matches the water return)
* PVC bushing or bulk head fitting for pond liner or any tank hole
* Use a union as a quick disconnect for sump tank pump removal and have a check valve up stream of the sump pump supply to prevent back filling the sump tank
* Plastic tubes cannot be buried directly into the ground (I doubt, but the internets told me this). The weight of the soil can potentially rupture the piping, so have a trench lined with brick to lay the piping in and placed boards over the top.
* Construction technique to put a J-bolt in concrete to create a good mounting point. Have a template board over the bolt and secured so the exposed bolt can be the correct height and plume
* Have a house cleaning brush (for kitchen, bathrooms, etc) to clean the fish tanks. Don’t want to use one that has been exposed to chemicals.
* Must have a swirl filter
* Sump tank must have a prefilter (ie: filter tank) and the sump should be easily cleanable