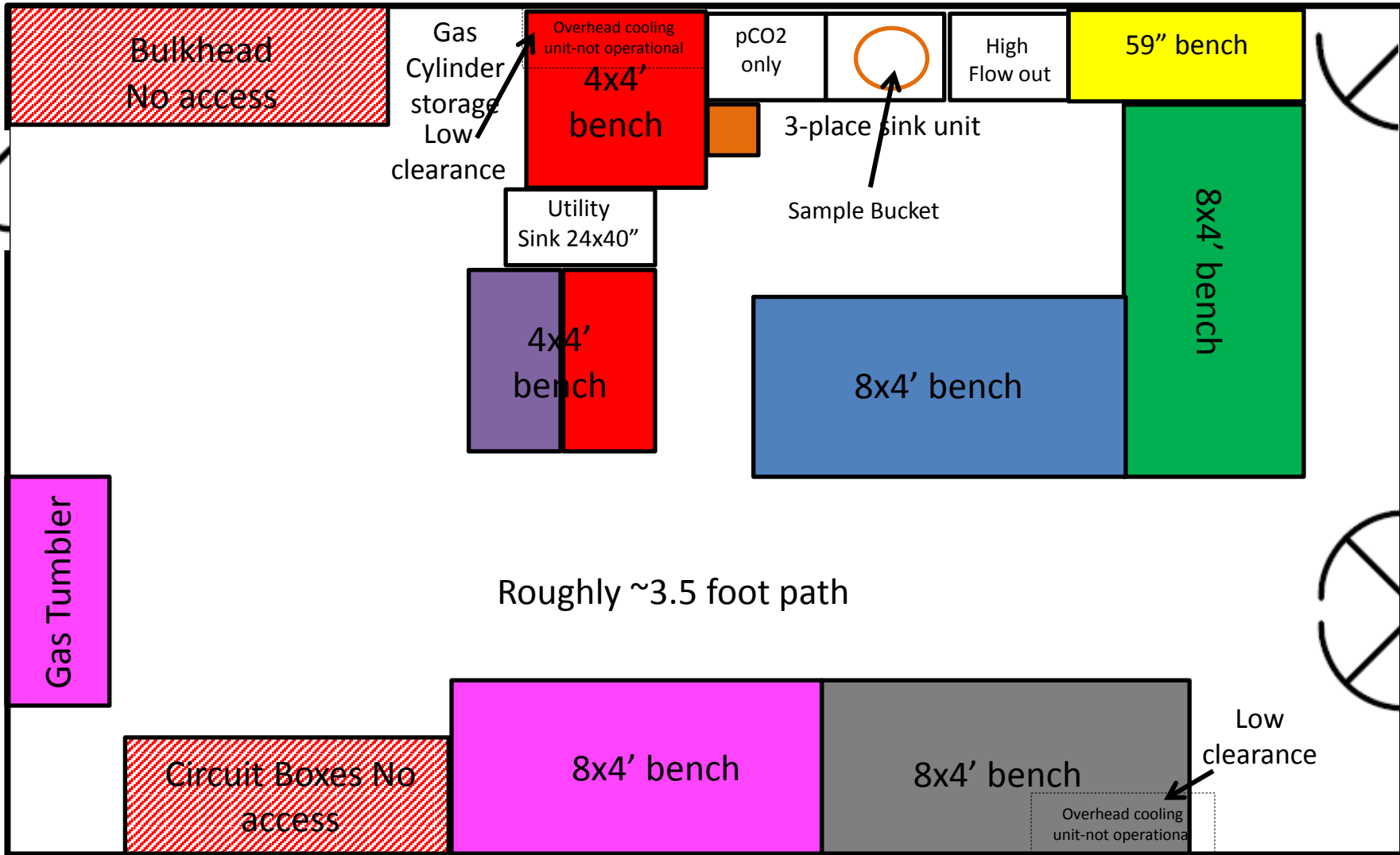


30', each tick = 1'

18', each tick = 1'

Roll up door



Wet Lab

- Seaflow
- AFUs
- High flow optics suite (LISST, acs, ECO-triplet, valve and filter)
- EIMS
- Autoanalyzer
- OSU Space
- Zehr Space
- Imaging Flow Cytobot

# Electronics in the Wet Lab- Currently 2 circuits, both at 110V/20A

## Instrumentation:

- Seaflow- 300W, 3A draw
- IFCB- 18-36 VDC, 1A draw
- Autoanalyzers- 12VDC, 1A draw
- Optics- LISST (nominal power 10-24VDC, 1A draw), acs (12V nominal/0.83A draw), ECO (12V nominal/0.8A draw)
- Two AFUs- each 12 VDC, 1A draw
- EIMS- assuming similar to Seaflow, 300W, 3A draw
- Gas tumbler- 12 VDC, at full load it will draw around 7A. Due to the poor power factor of about 0.55 or so, the VA rating is going to be approximately 1200-1300VA

## Pumps:

- 2 vacuum pumps- each at 115VAC/4.2A
- 4 peristaltic pumps- each 115VAC/2.2A

# Wet Lab Water Manifold- 25gpm

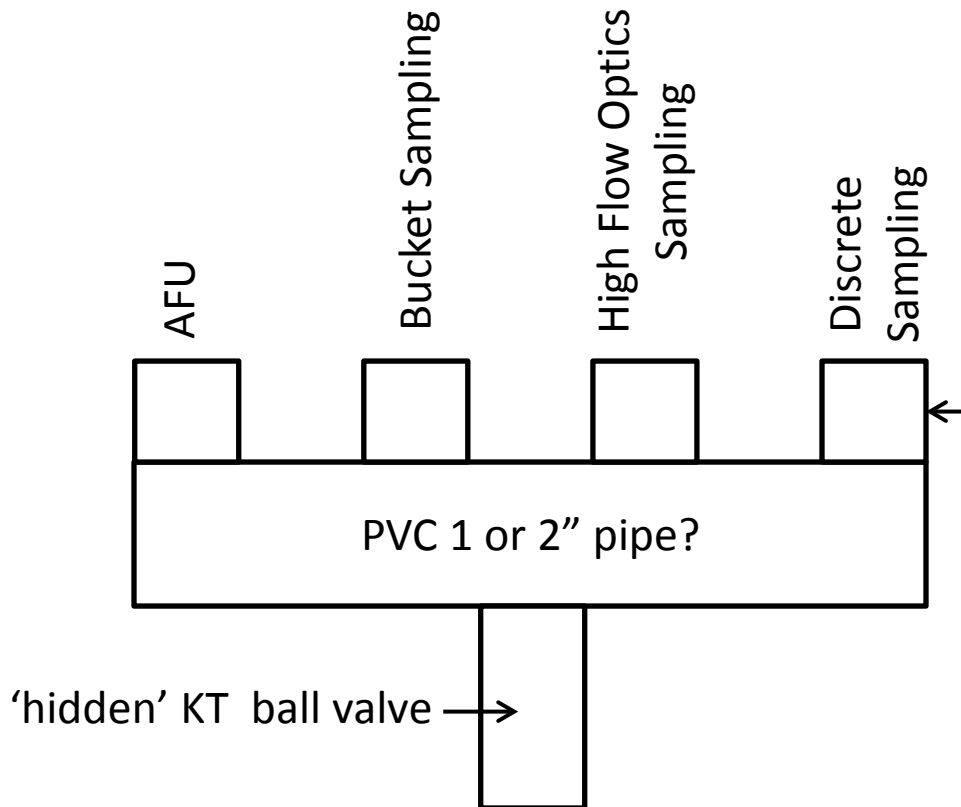
*AFU output*- 1gpm requirement, significant backpressure required, tubing size  $\frac{1}{4}$ " , if all output fittings are  $\frac{1}{2}$ " can get reducer bushing to go to  $\frac{1}{4}$ "

*Bucket sampling*- 2gpm requirement, tubing size  $\frac{1}{2}$ "

*High Flow Optics sampling*- 12L/min or  $\sim 3.2$ gpm, tubing size  $\frac{1}{2}$ "

*Discrete sampling*-  $\sim 5-8$  gpm, tubing size  $\frac{1}{2}$ "

Note: These estimates do not include needs of pCO<sub>2</sub> and TSG system (up to 5 gallons per minute). If we are not getting necessary flow, pCO<sub>2</sub> will be shut down



These quick connect fittings are great for manifolds/pressurized systems and can be in line after the needle valves:

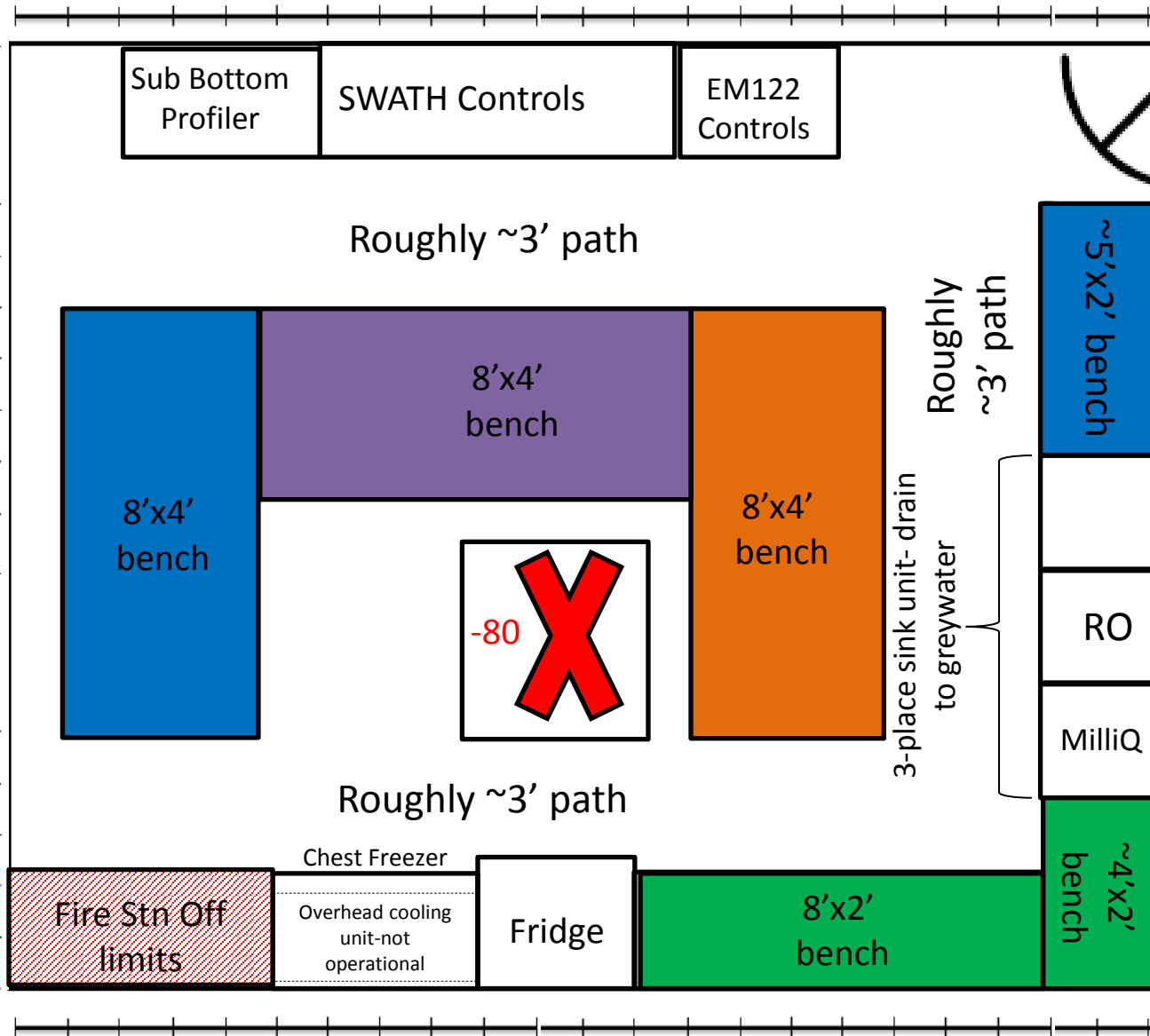
<https://www.mcmaster.com/#catalog/123/224/=17kgnb8>

Each output is fit with a needle valve to regulate flow

<https://www.mcmaster.com/#flow-control-needle-valves/=17kgkqp>

These are SS and will not rust out, just a suggestion, we can use plastic

22', each tick = 1'



18', each tick = 1'

-80 will now be housed in the Freezer Van located next to the Bosun locker.

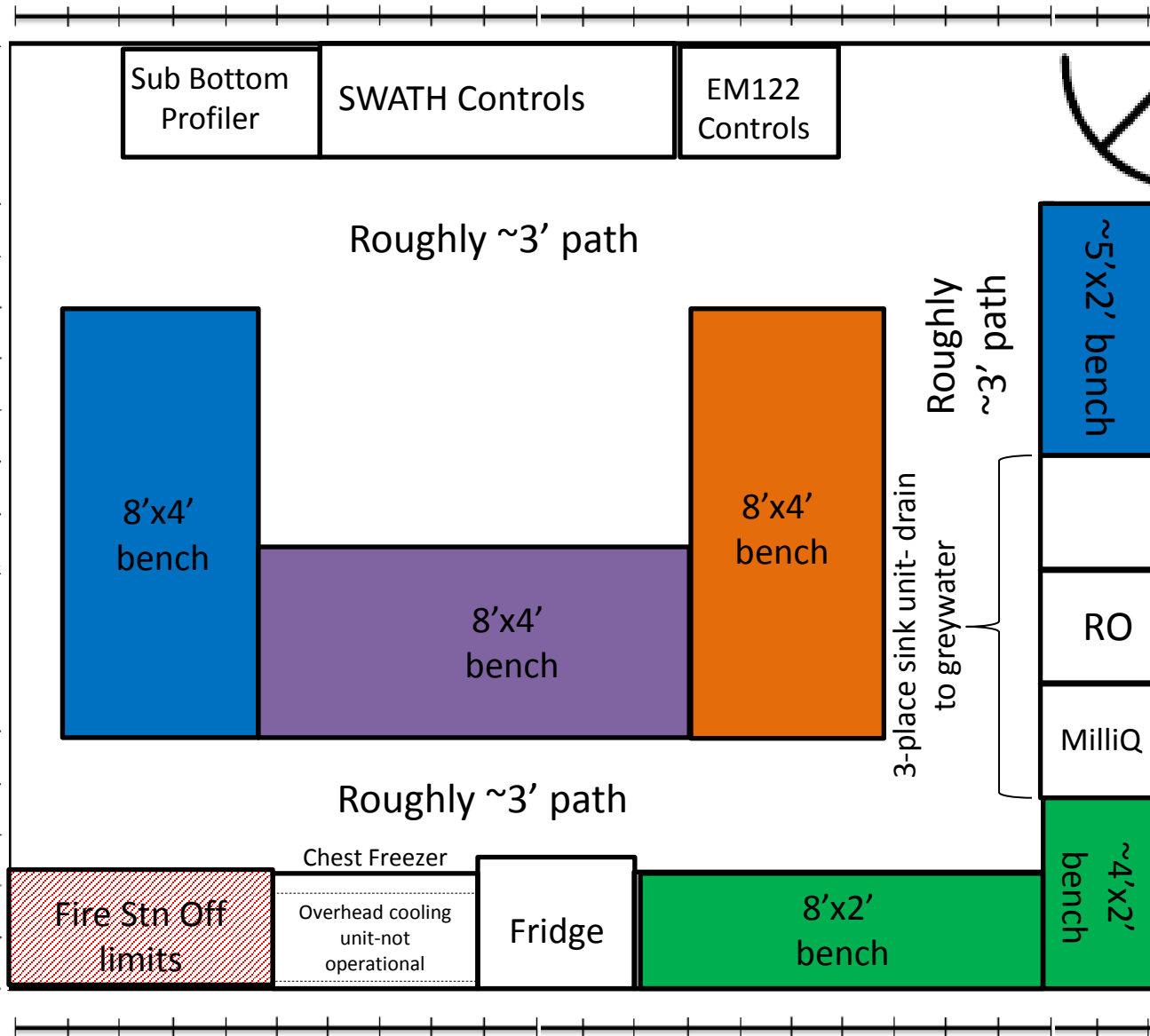
# Layout Diagram #1- Original

Dry Lab

Ferron/Winkler Space   
Lindell Space

Armbrust Space   
Ingalls Space

22', each tick = 1'



18', each tick = 1'

# Layout Diagram #2

Dry Lab

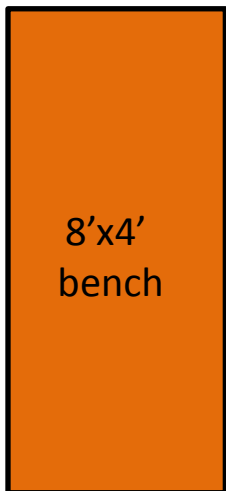
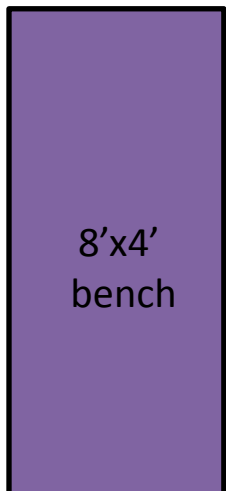
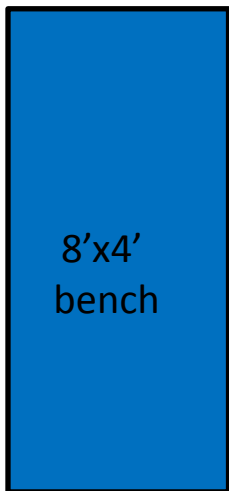
Ferron/Winkler Space ■  
Lindell Space ■

Armbrust Space ■  
Ingalls Space ■

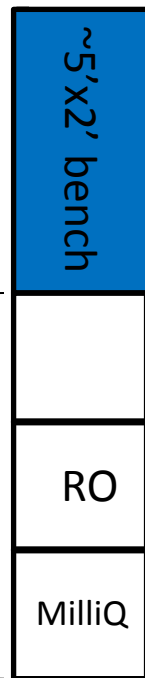
22', each tick = 1'

Sub Bottom Profiler  
SWATH Controls  
EM122 Controls

Roughly ~3' path

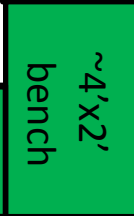
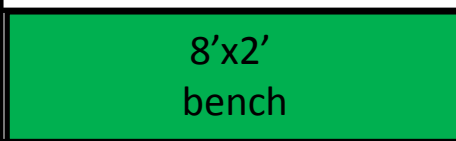
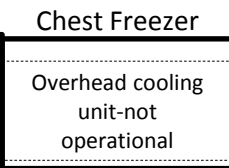
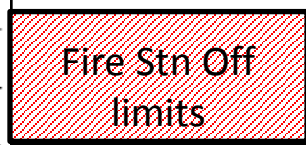


3-place sink unit- drain  
to greywater  
Roughly ~3' path



18', each tick = 1'

Roughly ~3' path



# Layout Diagram #3

*\*Only if 8'x4' Blue bench can be pushed that close to the bulkhead without blocking door/fire station access while also providing roughly 3' between benches*

Dry Lab

Ferron/Winkler Space Lindell Space

Armbrust Space Ingalls Space

# Electronics in the Dry Lab- # of Circuits V/A?

## Instrumentation:

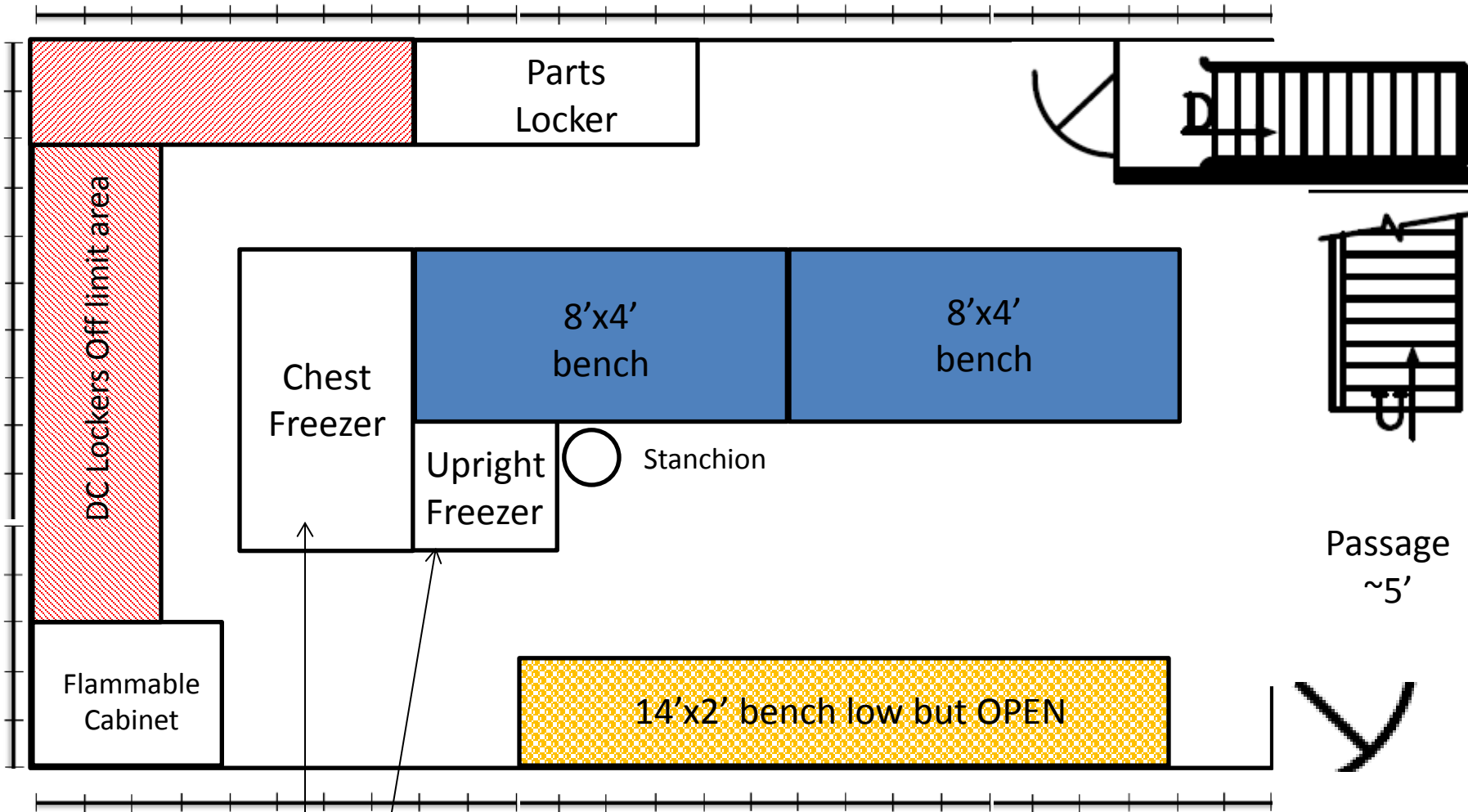
- MIMS- assuming similar to Seaflo, 300W, 3A draw
- Winkler- 12VDC, 1A draw

## Pumps:

- Armbrust 1 vacuum pump- 115VAC/4.2A
- Armbrust 2 peristaltic pumps- each 115VAC/2.2A
- Lindell 1 vacuum pump- 115VAC/4.2A
- Lindell 1 peristaltic pump- each 115VAC/2.2A
- Ingalls 2-3 peristaltic pumps- each 115VAC/2.2A


~26', each tick = 1'

~15', each tick = 1'



Port Lab

These locations may be switched, won't know until they arrive on Friday, chest freezer may appear on right side of stanchion, leaving access to benches on bulkhead

Finkel Lab Space 

OPEN 



# Electronics in the Port Lab- # of Circuits V/A?

## Pumps:

- 2 vacuum pumps- 115VAC/4.2A
- 1 peristaltic pump- each 115VAC/2.2A

# Bird Lab- Open if interested

This whole  
bench top is  
clear and  
OPEN if  
interested



# *Outdoor area for Filtering*

One 8'x4' bench will be secured on the starboard side of the streamer deck. Each side of the bench will be accessible, power is readily available 110V/20A. The bench will be shared between the Armbrust and Zehr Labs



# Main Lab- Huge space (for computers)



- At least 6 displays will be made available to us on the main visualization platform and likely more, if necessary, there are also 2 on port bulkhead and 4 on aft bulkhead.
- CTD Deck Unit and lab ops will be set up here
- There is one long bench where to set up the Armbrust Scope, this is the most stable place on the ship to do microscopy

# OTS Operations Deck

- Streamer and other equipment hanging low, wear a hard hat at all times on deck or you may get scalped...
- FCM and TE van will go aft of the a-frame
- Stairs on this vessel are narrow, steep and there are a lot of them, steel toed boots are **HIGHLY** recommended
- Net tow ops will go over the side, can add a block if necessary, and will provide a salt water wash down hose for rinsing net
- When full of fuel, deck sits **LOW**, we will get wet on deck, however when positioned on station, due to the massive windblock from port side weather will be 'milder'



# *Incubator Summary*

## **Saltwater Fed using OTS Pump:**

- 3 x Big Blue at 35"x35"x22.5" on a 58"x58" plastic pallet, 120 gallon capacity, total estimated weight full = 1242#, total weight of all 3= 3726#
- 1 x Baby Blue at 36"x24"x23" on a 54"x54" plastic pallet, 90 gallon capacity, total estimated weight full = 984#
- 1x Dark Cooler at 38"x15.5"x14" on a small plastic pallet (53"x29"), 37 gallon capacity, total estimated weight full = 380#

\* Note: Each incubator has an inflow and outflow, all inflow are standard  $\frac{3}{4}$ " garden hose female-female, outflows are either garden hose or pool hose variety, need to get a long corrugated downspout to run outflow overboard. All hoses are accounted for with the exception of the hose from the pump to the manifold.

## **Frosty recirculating incubators (using freshwater sourced from near Zodiac once at beginning of the cruise and possibly periodically during the cruise to top off):**

- UH Frosty 3 incubator system with each unit at 24"x24"x24" on a 72"x40" plastic pallet and built in storage table for pump/electronics/chiller (total unit dimensions 100"x52"x54"), each unit has a 60 gallon capacity, total estimated weight full of one unit = 660#, total estimated weight of all units full with storage table = 1980#
- UW Frosty 4 separate incubator systems at 23"x42"x23" each on a 48"x45"x34" plastic pallet, each with a 105 gallon capacity, each unit total estimated weight full = 1036#

\*Note to all DO NOT turn on all systems at once, do them one at a time. In order to ensure the pumps and system is not working too hard it has been requested that ice is added prior to filling up the system the first time. One unit does have a heater, these are common aquarium tank units if you would like to purchase for the other two (you will also need to provide a multi-outlet extension cord with circuit breaker, similar to the one here: <https://www.mcmaster.com/#catalog/123/830/=17kpy3s> . Light levels need to be tested.

# Frosty Electronics Summary:

## **UH Frosty 3 incubator system currently located at the Marine Center:**

- Standard 120V 3 prong plug, all pumps and chillers are powered by this one plug. Each unit has a  $\frac{1}{4}$  HP compressor and a 3A draw, with a total draw of 9A.

## **UW Frosty 4 incubators:**

- Langseth prefers a 110V/30A 3 prong plug for each unit
- Each unit will run continuously at 10amps (chiller requires 8.8A, pump at 1A), each compressor is  $\frac{1}{2}$  HP
- The power source will be on the OBS deck and in close proximity to the Frosty Incubator systems

**This will require at least 5 receptacles for powering units, on different circuits, if necessary.**

# Manifold Design for Seawater Sourced Incubators:

Manifold made out of standard 1 or 2" PVC with  $\frac{3}{4}$ " male out port to each incubator inflow, a total of 5 available ports

All incubator inflows are standard garden hose  $\frac{3}{4}$ " female to female fittings

All incubator outflows are 1" pool hose, the dark incubator is  $\frac{3}{4}$ " garden hose, all will need one large downspout for overboard drainage

All hoses will be provided with the exception of the hose from the pump to the manifold

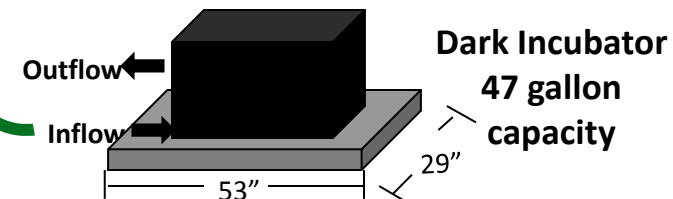
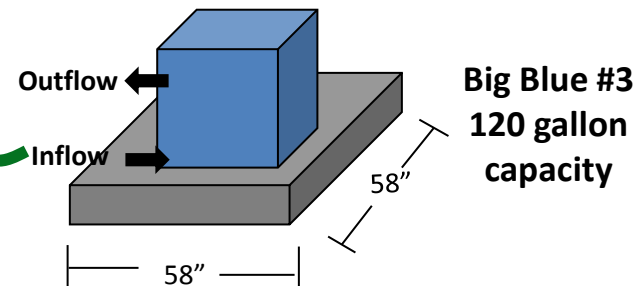
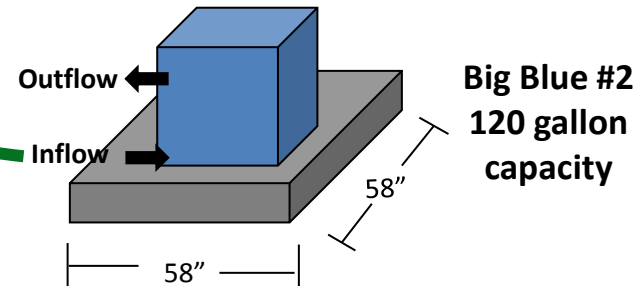
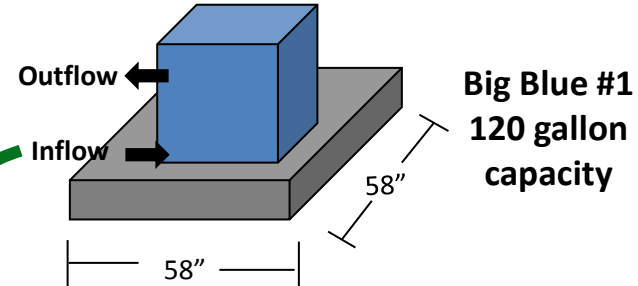
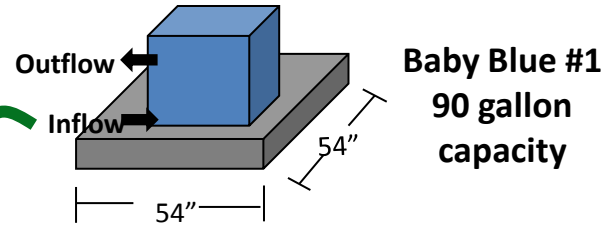
This is an extremely powerful pump, the engineer has no worries with getting the necessary water to the incubator systems and each valve will have a regulator as the flow will likely need to be down regulated

Over the Side Pump  
**20-25gpm**  
>100gpm if needed

Include check valve here?

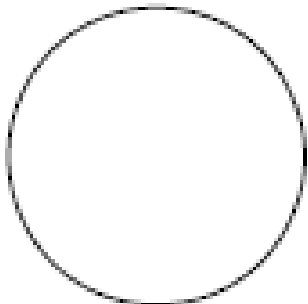
Manifold

Flow regulator here to adjust input pressure

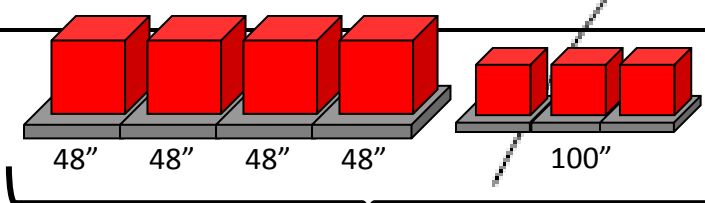




# OBS Deck Layout



R.F.



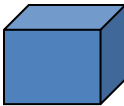
48" 48" 48" 48" 100"

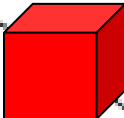
~ 28'

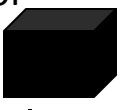
Determine power source location in close proximity

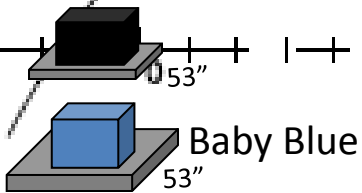
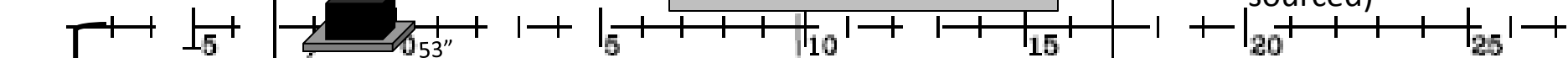
Space reserved as rad van backup location

## Legend:

Seawater sourced Incubators 

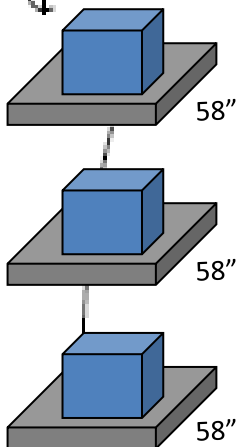
Recirculating Frosty Incubators 

Dark Incubator (seawater sourced) 



Baby Blue

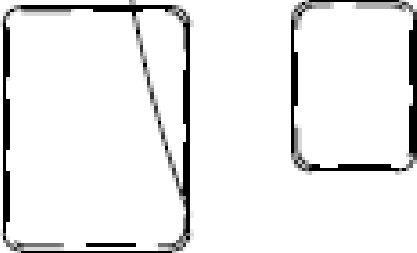
May be able to fit all seawater sourced incubators inline with each other, will depend on bolt pattern for securing pallets to deck, baby blue and dark incubator can go where depicted here or far portside if necessary



58"

58"

58"



**Reposition if incubators will be shaded by anything on deck, such as dumpsters lining the starboard side**

~ 24'

**\*\*Note: Not to scale**

## Incubator or OBS deck reality....there is a ton of room

- No big issues with shading!
- It will be pitch black at night- BRING A HEADLAMP!!!
- This deck is a 3 deck climb from the main deck and stair locations are not straight forward, bring a bag to transport small volume samples
- A basket will be made available and crew will assist in the craning of 20L carboys from the main deck to OBS deck
- The crew will load and secure all available units on board prior to our arrival



# Other:

- Only ONE sink goes overboard and is dedicated to optics/UW sampling. Carboys will have to be dumped on back deck...Dry lab sink goes to grey water
- RO/MilliQ- current issues with RO system, will be fixed by cruise. MilliQ is small, plan accordingly! Access to Beach lab for MilliQ fill pre-cruise?
- PAR sensor- UW one on it's way back from cal, if doesn't arrive in time, UH will loan one out of cal and perform post cruise cal
- UPS- There are 3 small UPC units available for use, if you have a instrument that needs clean power bring your own. Francois- NEWEGG will ship by air good UPS (900W with battery)