**SOP for Weekly RAS Water Testing**

1. Water samples will be collected once every week.
2. To be collected from eg row 91 & 92, 1 cup.
3. Once collected, gown PPE - Gloves and goggles.
4. Perform necessary Tests - In-situ. Salinity, TDS, pH, Temperature, DO.
5. Followed by Ex-situ. GH, KH, NH4+NH3, NO3, NO2.
6. Once completed, record down on the weekly water quality record form which will be documented.
7. If results are in the range from 5-5-6.7 based on our husbandry, it is good.
8. However if they are not, corrective action will be we will monitor and change water in % accordingly like increasing water content to dilute or add sodium bicarbonate.
9. Perform housekeeping.

**Theory on Weekly RAS Water Testing**

RAS stands for Recirculating Aquaculture System. The purpose of water testing and collection is to ensure optimal water conditions. Our husbandry is to be at peak condition so whenever there is a complaint, there may be no worries on our side as we had to check thoroughly. This system is almost similar to the function of a hydroponics system however they go through a semi-permeable membrane that can filter out and chemically react in the pump chamber, allowing it to produce new fresh water. The RAS system is connected in two rows with 1 RAS membrane. All water will be recycled. The feces produced by fishes that reside on the bottom of the partitioned glass side will naturally flow down and back to the ras system to be filtered and cleaned through a semipermeable membrane and then recycled back to all the tanks.

Some setback of using RAS is that once one tank is contaminated, the potential of introducing the same type of danger to other tanks is highly likely. Hence, species like the lily are not able to use the RAS system due to the high frequent water change and unstable salt concentration that they need as well as they carry high amounts of viruses. Water change frequency depends on ammonia products hence lily’s only twice a week as not high protein = less ammonia. For  Koi fish, 3  times as they produce more protein. 

1. We will perform the test to see if it may affect the new shipment drastically. Reason being is that RAS is a connected system hence if water is not good, it will affect the new arrival of fishes.
2. Proper PPE is a must as it is part of the safety protocol.
3. Test is to perform as part of an indication to note our performance in husbandry. We are to prevent any unwanted incidents that can cause fatality to the fishes.
4. In-situ and Ex-situ is only a term used to identify whether it is a test via chemical reaction or water parameters.
5. Record keeping
6. NIL
7. This is a protocol we must follow and monitor closely to prevent any death of fishes. Medicine may be used to raise effectiveness. Active ingredients would be Malachite Green and Formaldehyde.
8. NIL