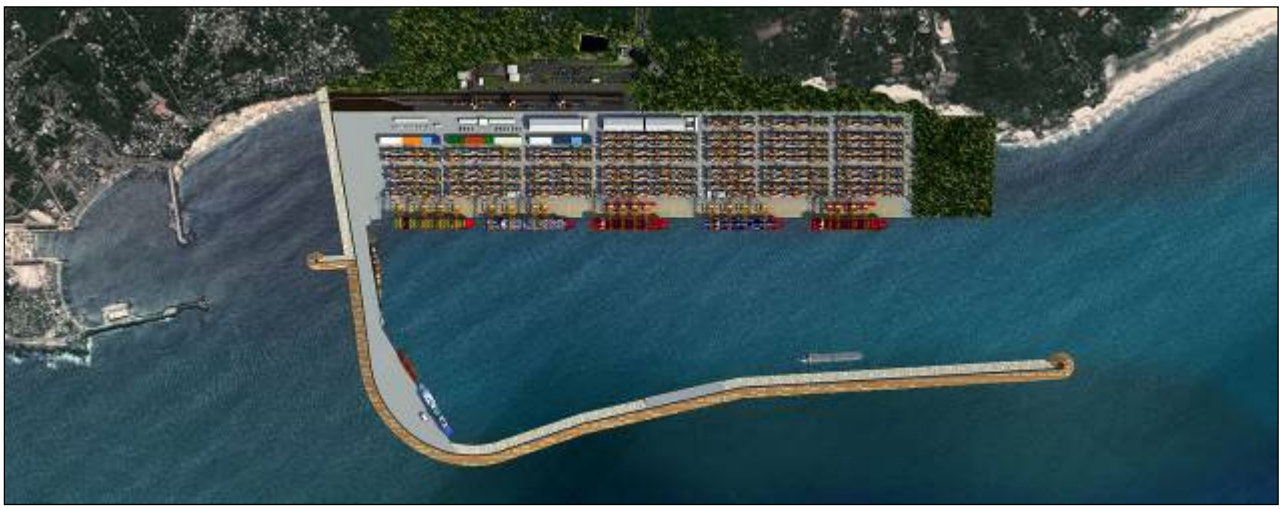
Environment Monitoring Report



Adani Vizhinjam Port Pvt. Ltd.

Vizhinjam, Kerala

May 2024

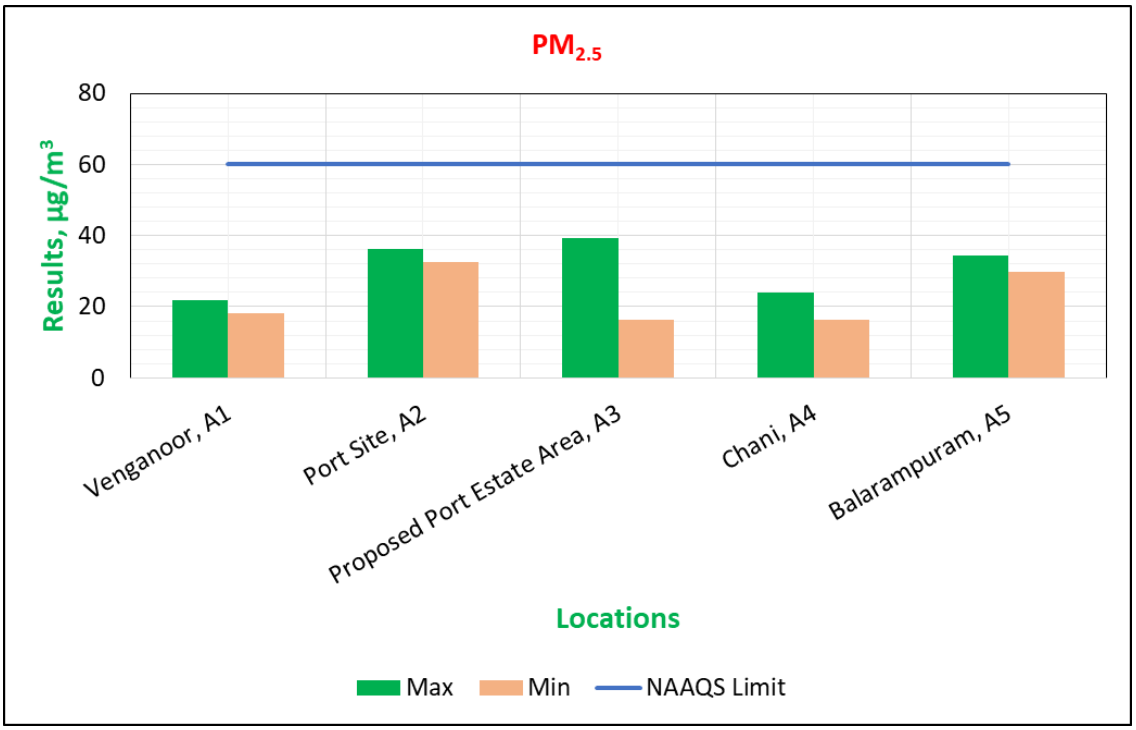
Environment Monitoring Locations:

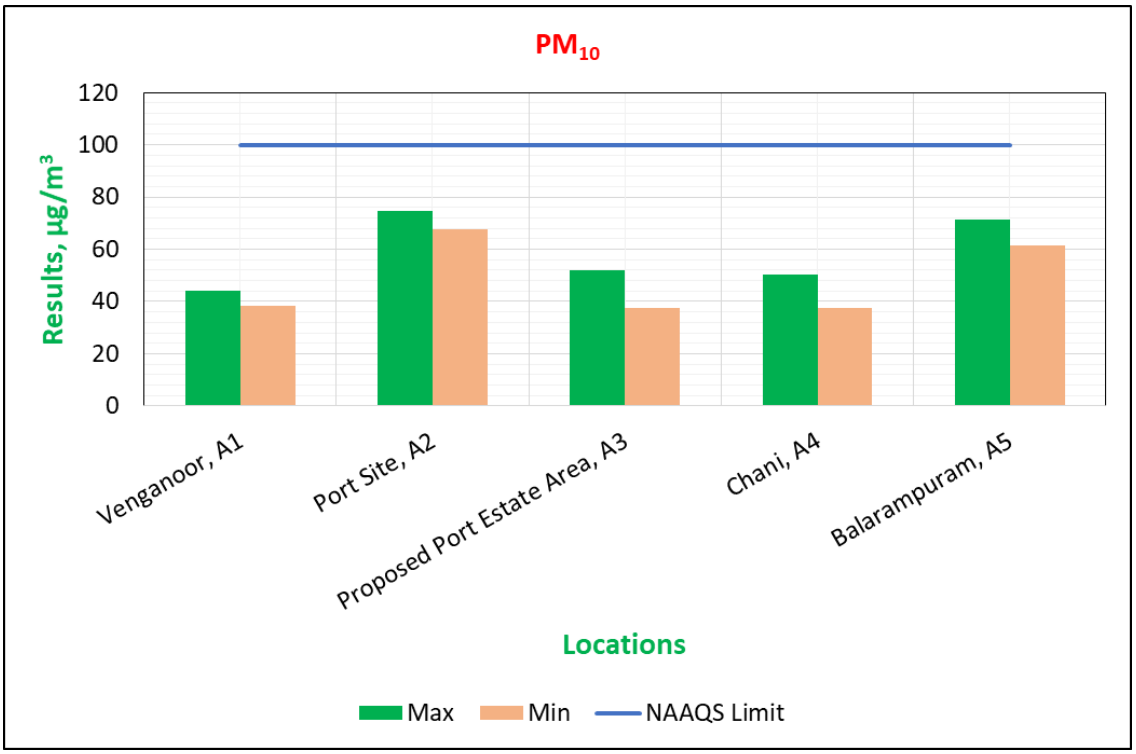
S. No.	Environmental Attribute	Location
1.	Ambient Air Quality Monitoring	Venganoor (A1)
		Port Site (A2)
		Proposed Port Estate Area (A3)
		Chani (A4)
		Balarampuram (A5)
2.	Ambient Noise	Venganoor (Residential) (N1)
		Port Site (Industrial) (N2)
		Proposed Port Estate Area (Residential) (N3)
		Chani (Residential) (N4)
		Balarampuram (Commercial) (N5)
3.	Marine Water/Sediment	Near Kovalam Beach (M1)
		Proposed Dredging Site (M2)
		Port Basin (M3)
		South of Breakwater (M4)
		Inner Approach Channel (M5)
		Kovalam Beach (M6)
4.	Groundwater	Port Site (G1)
		Proposed Port Estate Area (G2)
		PAF Area (G3)
5.	Surface Water	Poovar West Canal (S1)
		Vizhinjam Branch Canal (S2)
		Vellayani Lake (S3)
		Poovar Estuary (S4)

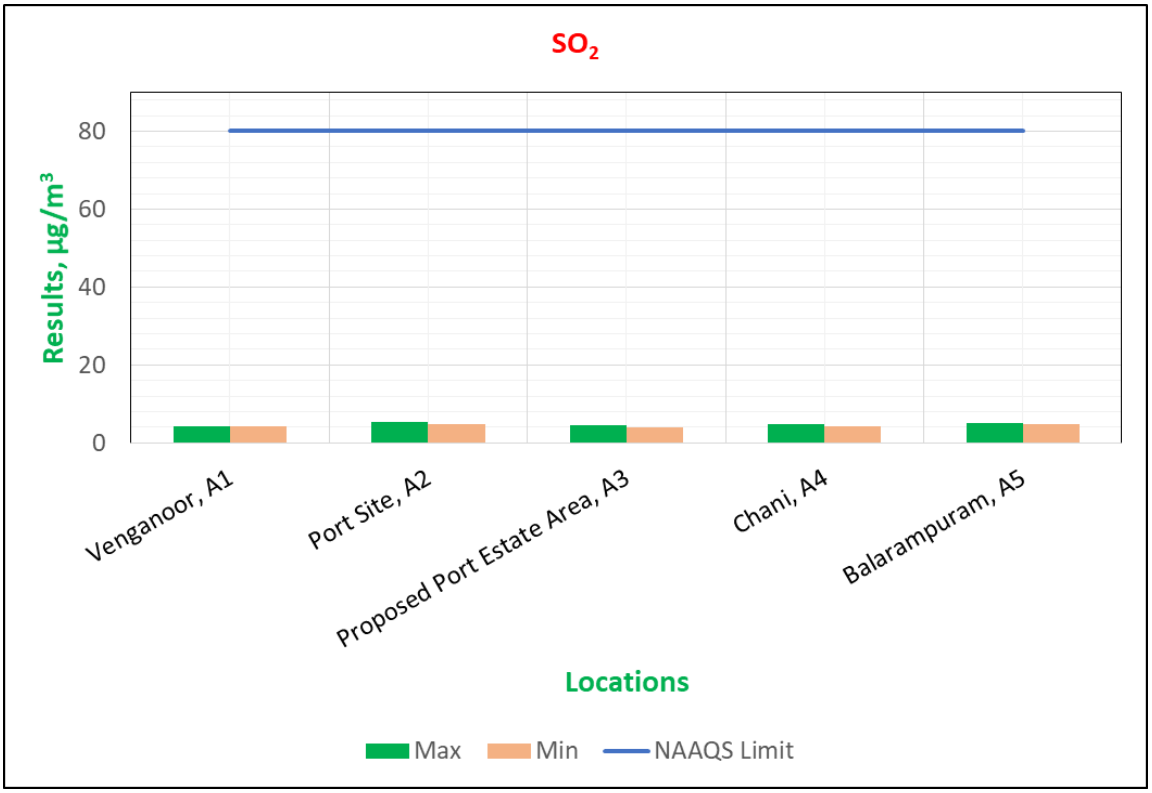
1. Summary of Environmental Monitoring Results for the Month of May 2024:

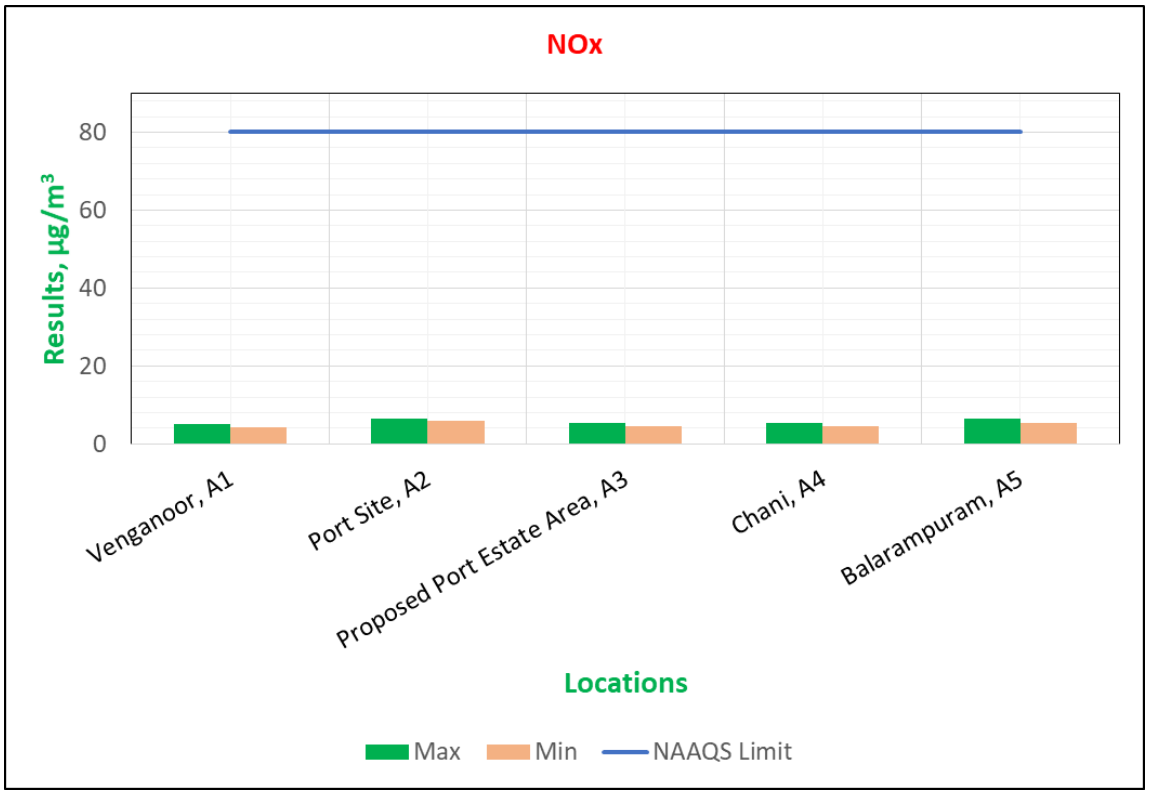
- The ambient air quality monitoring results were observed to be within National Ambient Air Quality Standards (NAAQS), 2009 at all the five locations.
- Noise readings were within limits at all the monitoring locations except at Proposed port estate area, Chani and Balarampuram due to usage of loudspeakers at nearby temples as part of temple festival and heavy rainfall with thunder. There is no construction work taking place at the Proposed port estate area and locations Chani and Balarampuram are not near the port and therefore the exceedance values are not due to port construction.
- Marine water and sediment samples results were observed to be comparable with the baseline.
- Ground water samples were collected from 3 locations (open wells). All the parameters at all locations were within the acceptable limits as per IS 10500:2012. The water from these locations is not used for drinking purposes.
- Surface water sample results were observed to be comparable with the baseline.

2. Ambient Air Quality

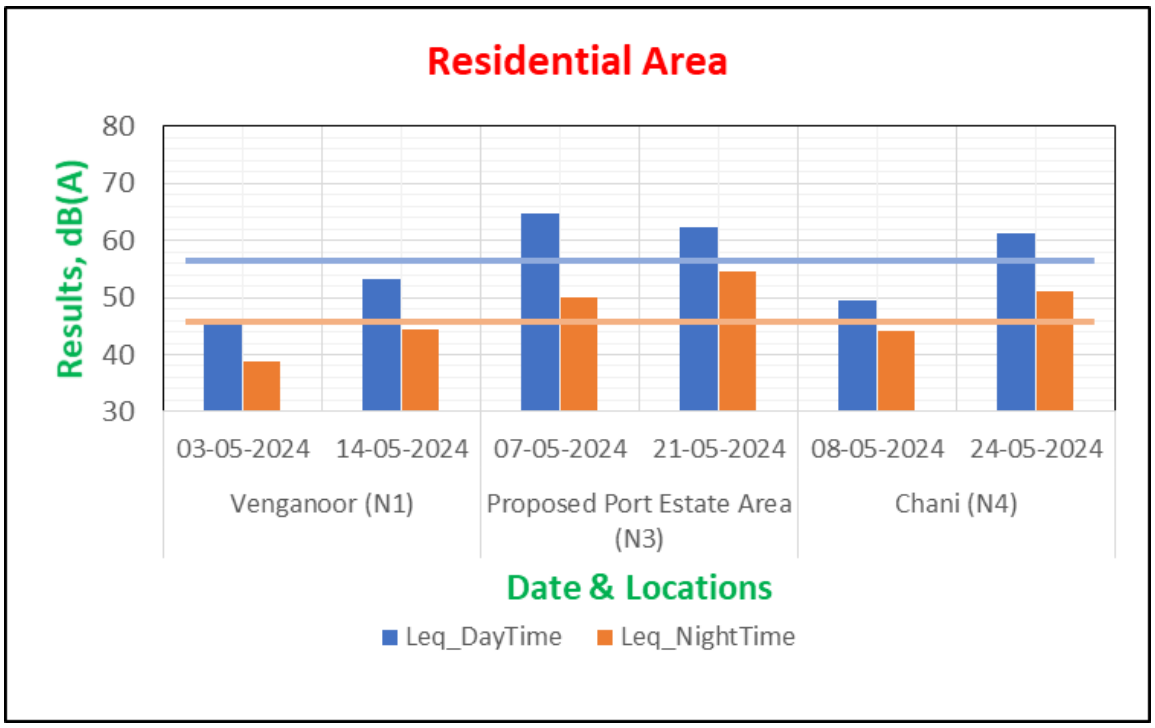


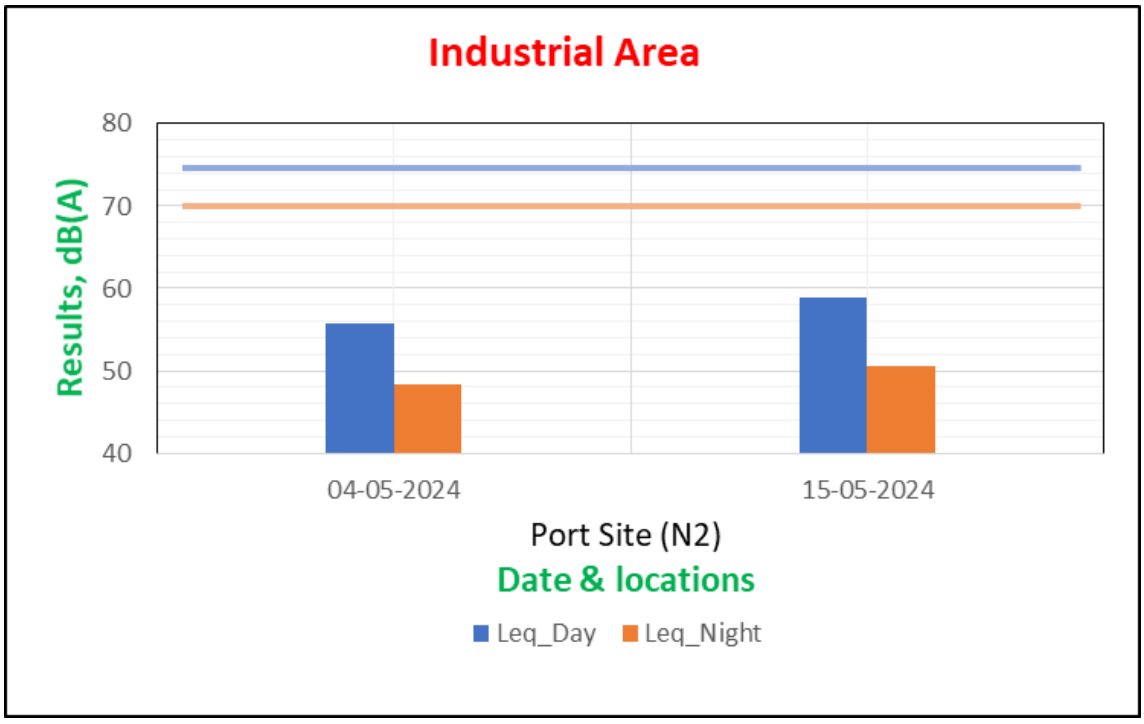


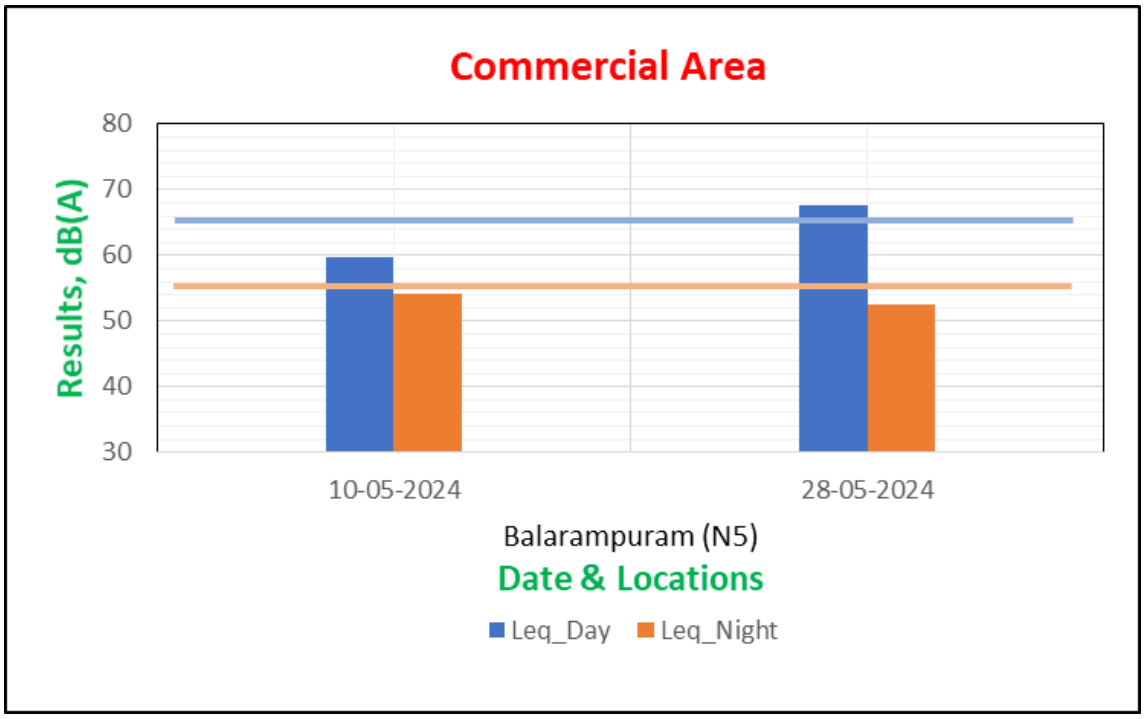

SO_2
Results, µg/m³
80
60
40
20
0
Venganoor, A1
Port Site, A2
Proposed Port Estate Area, A3
Chani, A4
Balarampuram, A5
Locations
Max
Min
NAAQS Limit


NOx
Results, µg/m³
80
60
40
20
0
Venganoor, A1
Port Site, A2
Proposed Port Estate Area, A3
Chani, A4
Balarampuram, A5
Locations
Max
Min
NAAQS Limit

3. Ambient Noise

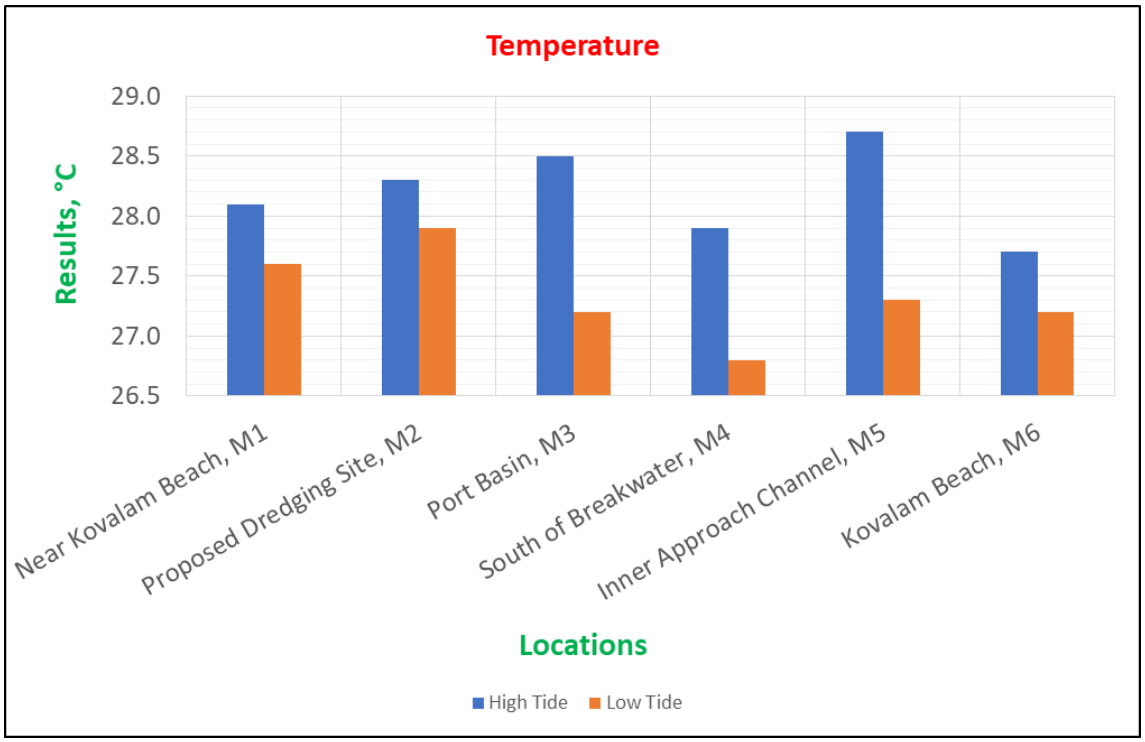


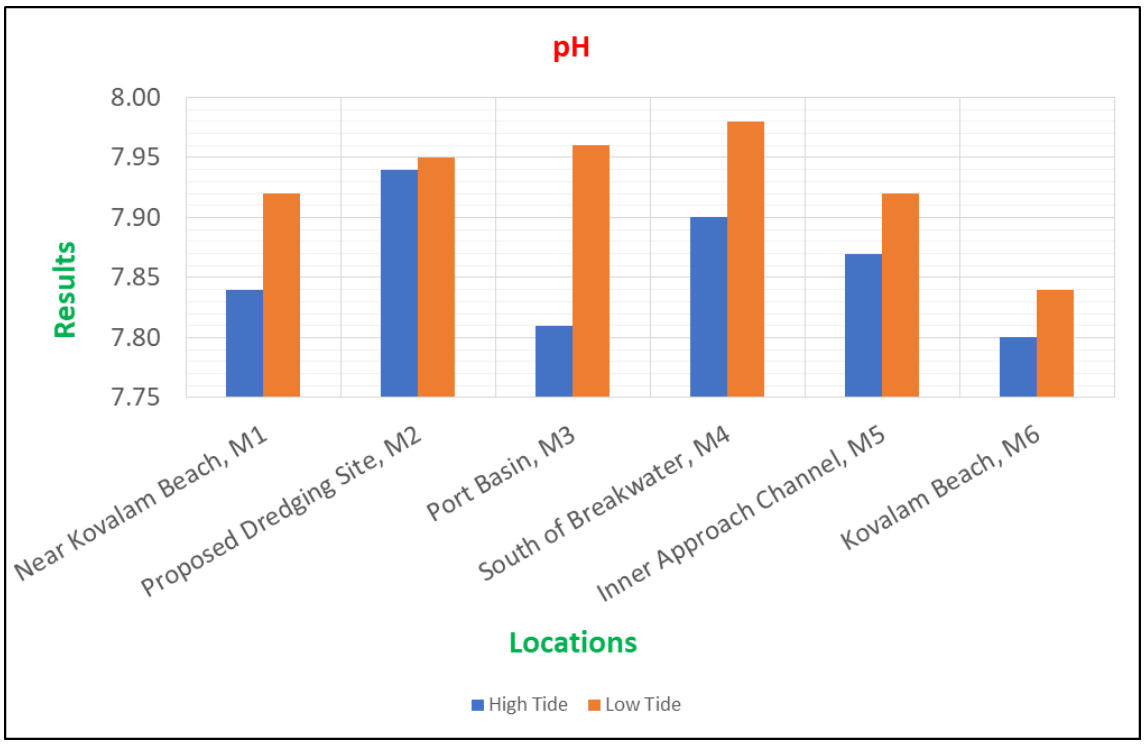


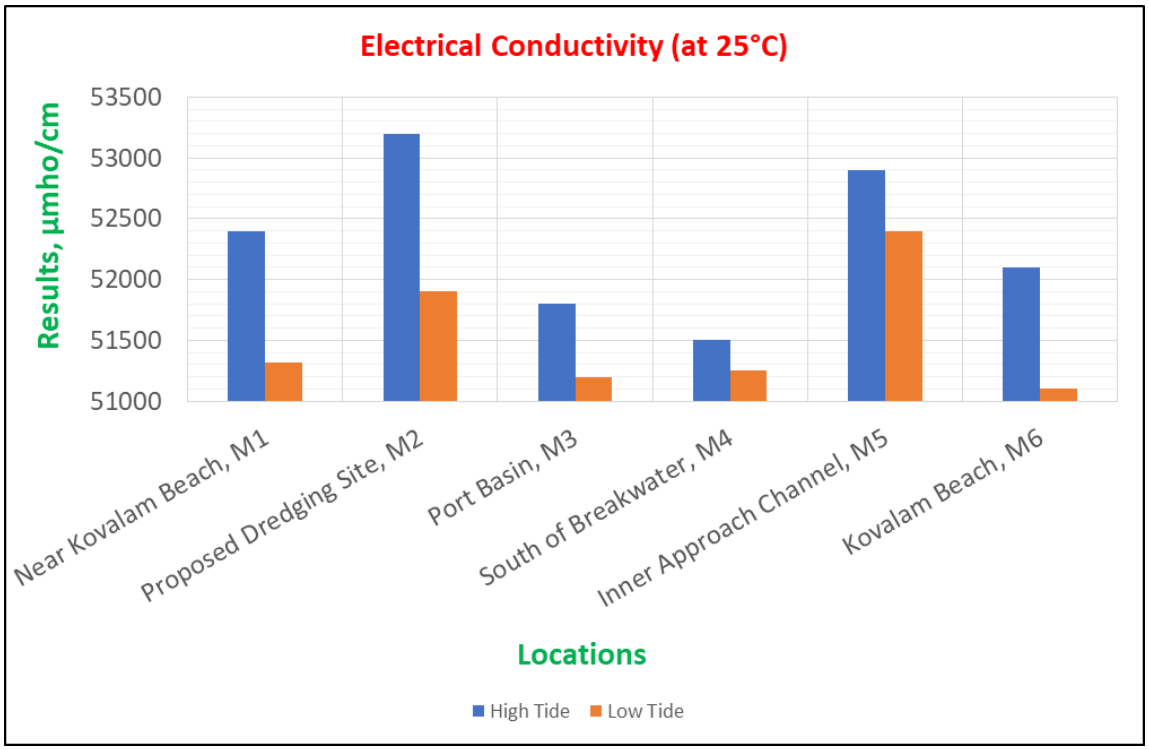

Commercial Area
80
70
60
50
40
30
Results, dB(A)
10-05-2024
28-05-2024
Balarampuram (N5)
Date & Locations
Leq_Day
Leq_Night

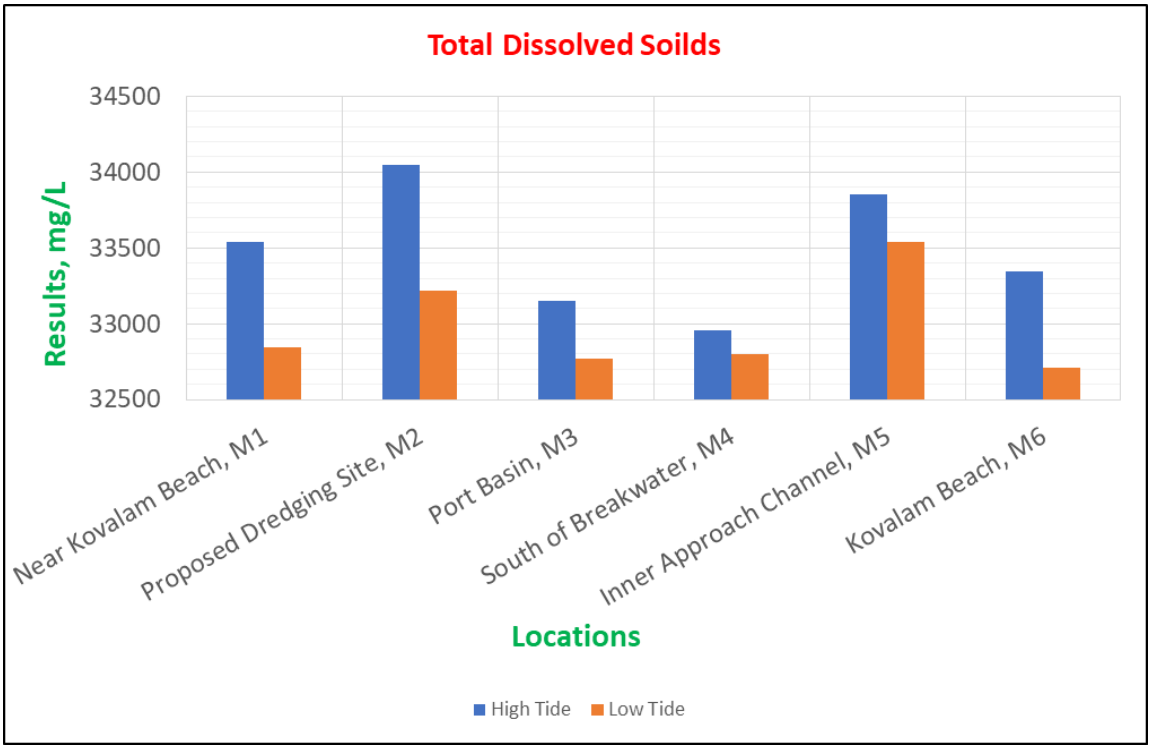
4. Marine Survey

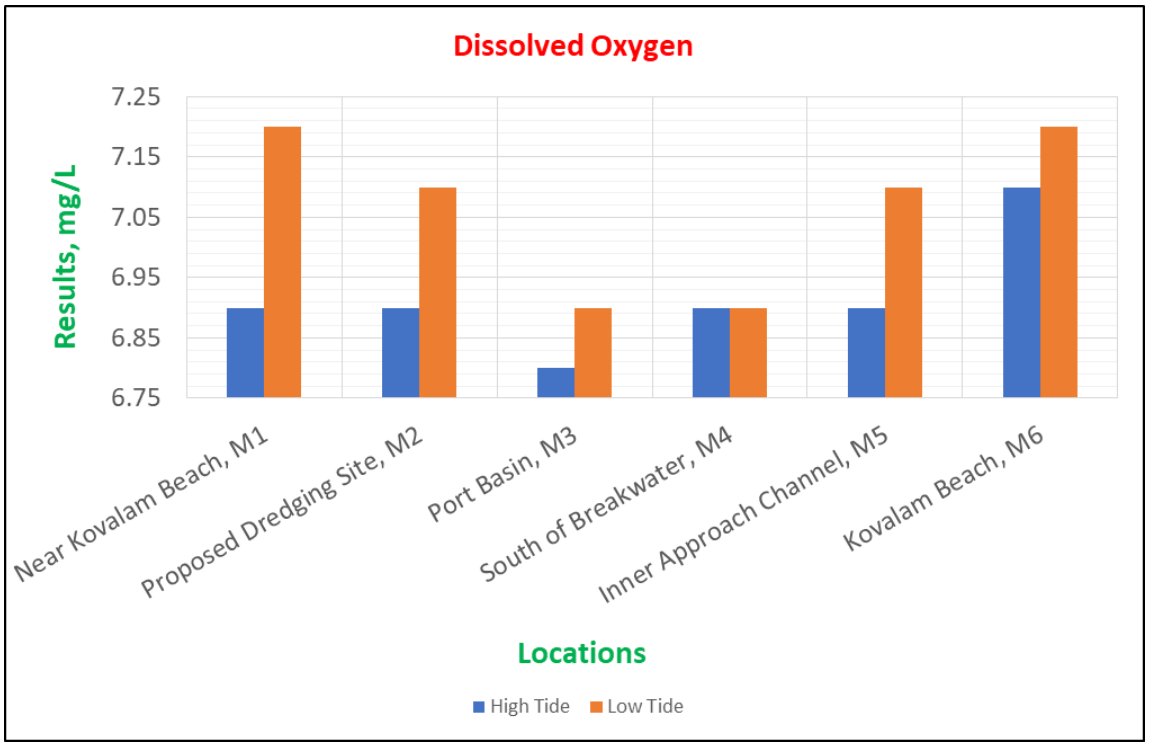
4 a. Marine Water Analysis

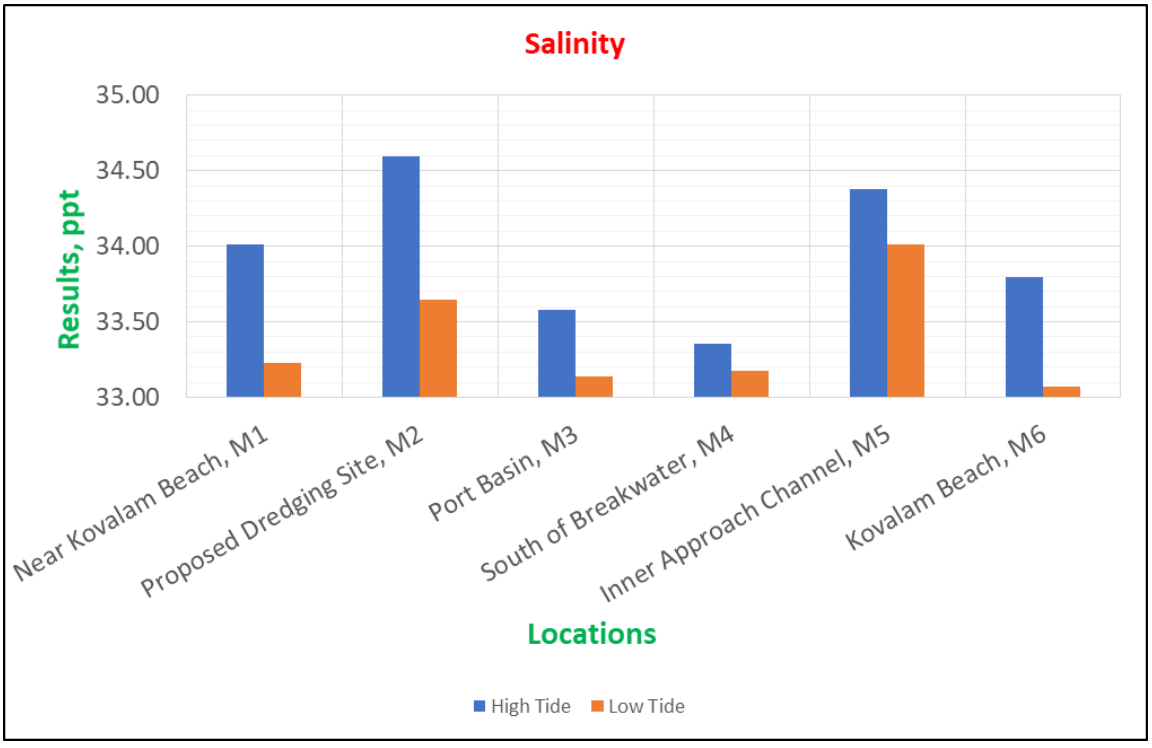


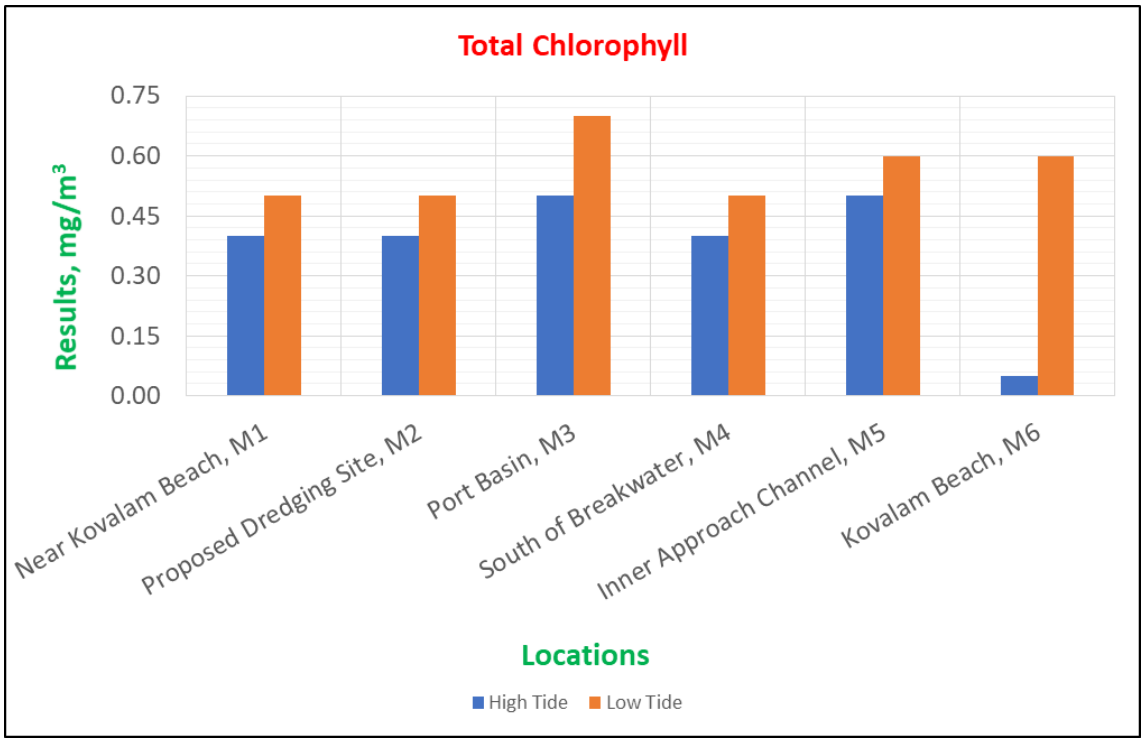


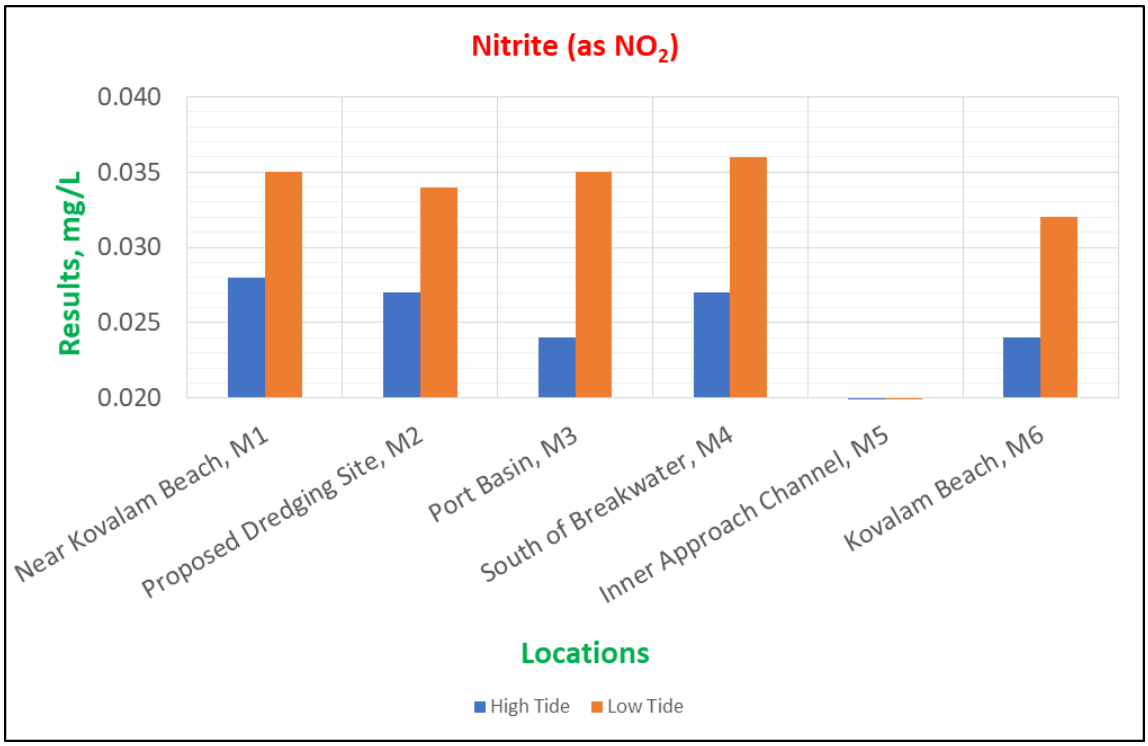

Electrical Conductivity (at 25°C)
Results, µmho/cm
53500
53000
52500
52000
51500
51000
Near Kovalam Beach, M1
Proposed Dredging Site, M2
Port Basin, M3
South of Breakwater, M4
Inner Approach Channel, M5
Kovalam Beach, M6
Locations
High Tide
Low Tide


Total Dissolved Soilds
Results, mg/L
34500
34000
33500
33000
32500
Near Kovalam Beach, M1
Proposed Dredging Site, M2
Port Basin, M3
South of Breakwater, M4
Inner Approach Channel, M5
Kovalam Beach, M6
Locations
High Tide
Low Tide

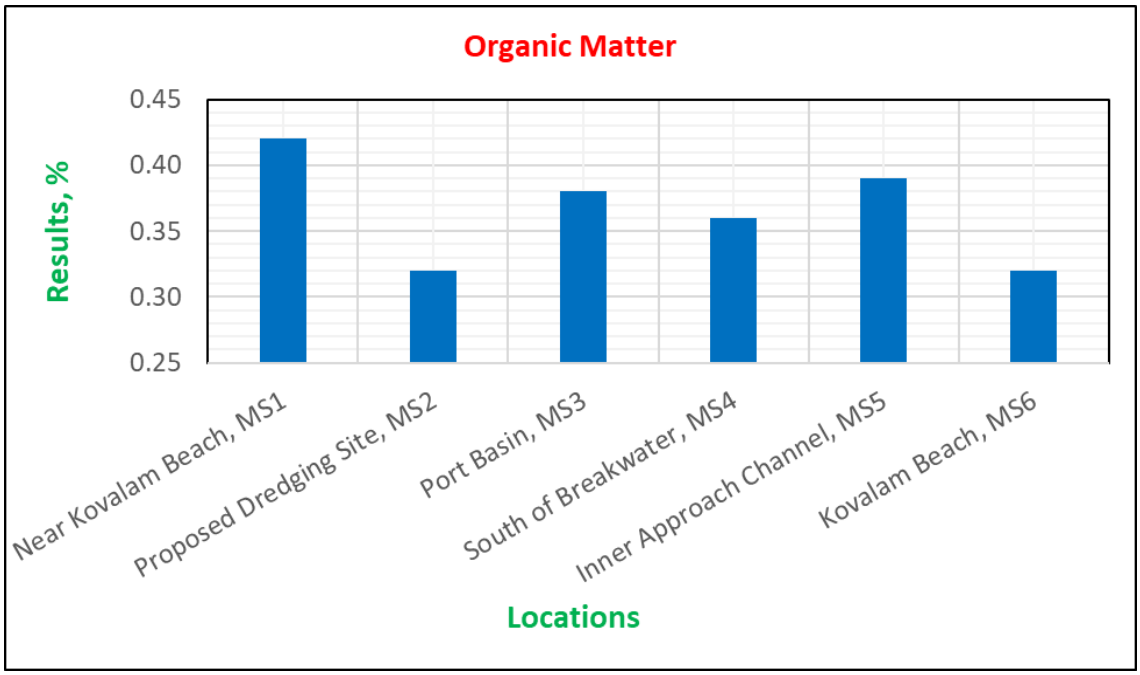

Dissolved Oxygen
Results, mg/L
7.25
7.15
7.05
6.95
6.85
6.75
Near Kovalam Beach, M1
Proposed Dredging Site, M2
Port Basin, M3
South of Breakwater, M4
Inner Approach Channel, M5
Kovalam Beach, M6
Locations
High Tide
Low Tide

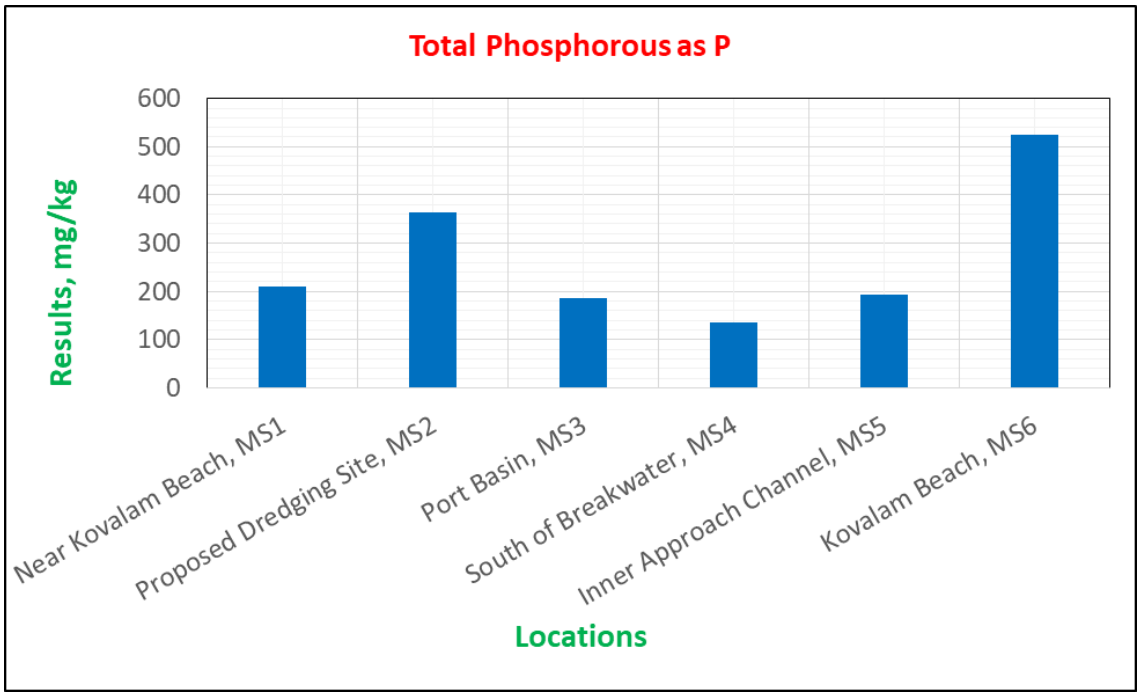

Salinity
Results, ppt
35.00
34.50
34.00
33.50
33.00
Near Kovalam Beach, M1
Proposed Dredging Site, M2
Port Basin, M3
South of Breakwater, M4
Inner Approach Channel, M5
Kovalam Beach, M6
Locations
High Tide
Low Tide

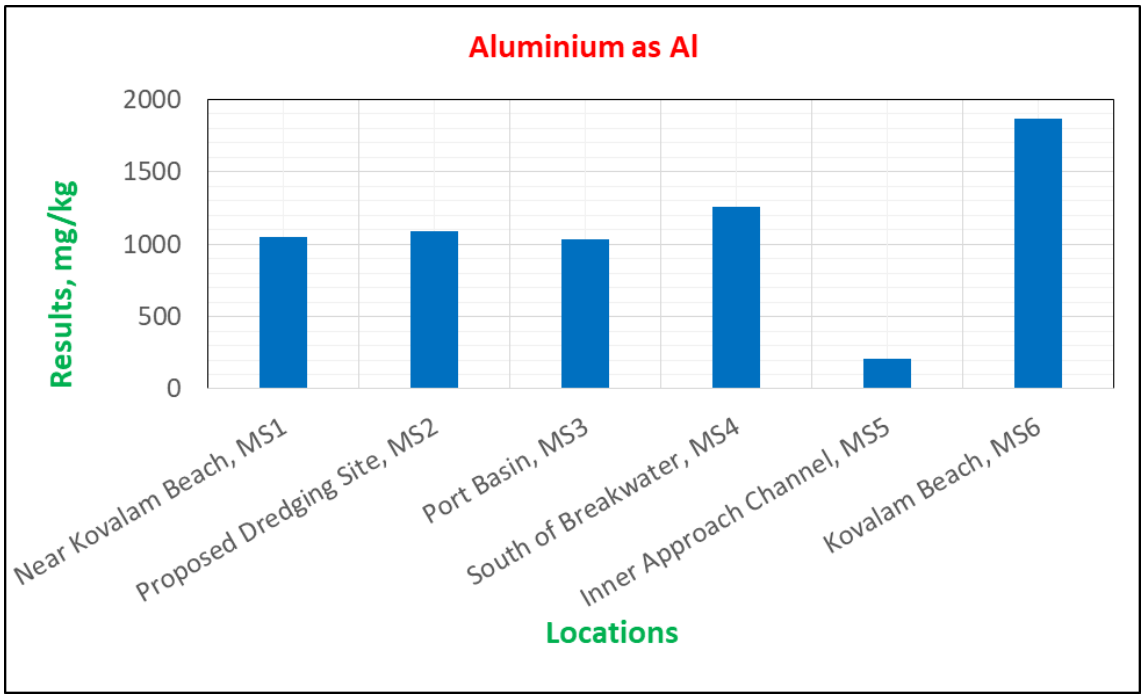

Total Chlorophyll
Results, mg/m³
0.75
0.60
0.45
0.30
0.15
0.00
Near Kovalam Beach, M1
Proposed Dredging Site, M2
Port Basin, M3
South of Breakwater, M4
Inner Approach Channel, M5
Kovalam Beach, M6
Locations
High Tide
Low Tide

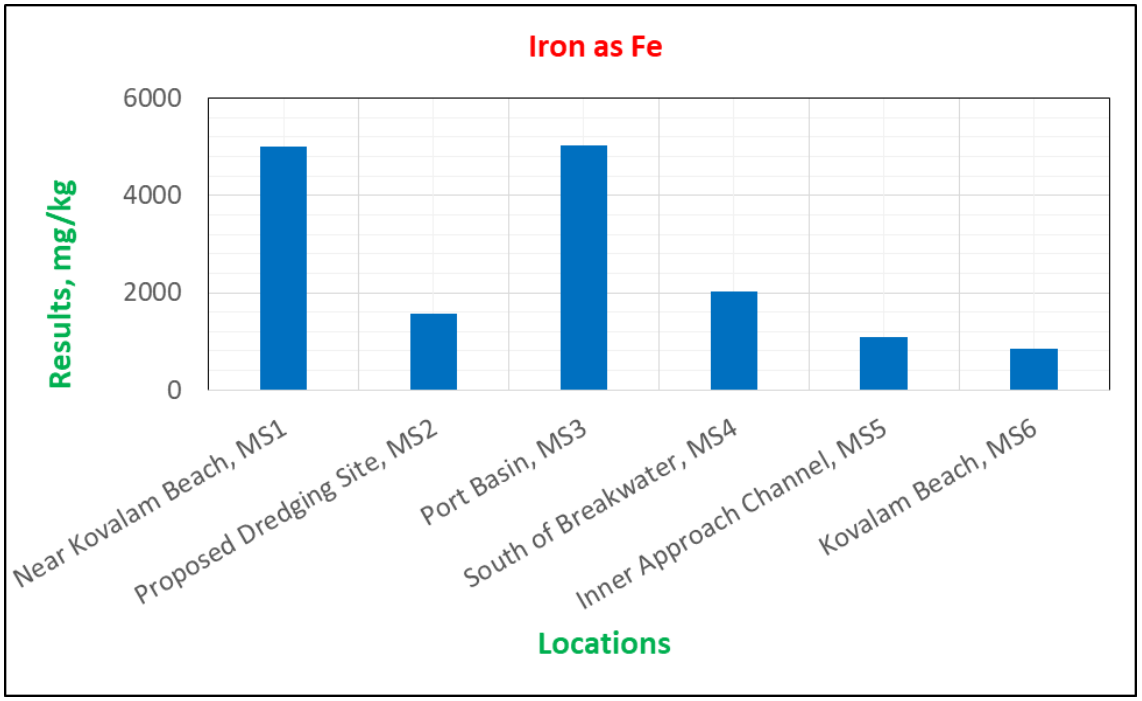

Nitrite (as NO2)
Results, mg/L
0.040
0.035
0.030
0.025
0.020
Near Kovalam Beach, M1
Proposed Dredging Site, M2
Port Basin, M3
South of Breakwater, M4
Inner Approach Channel, M5
Kovalam Beach, M6
Locations
High Tide
Low Tide

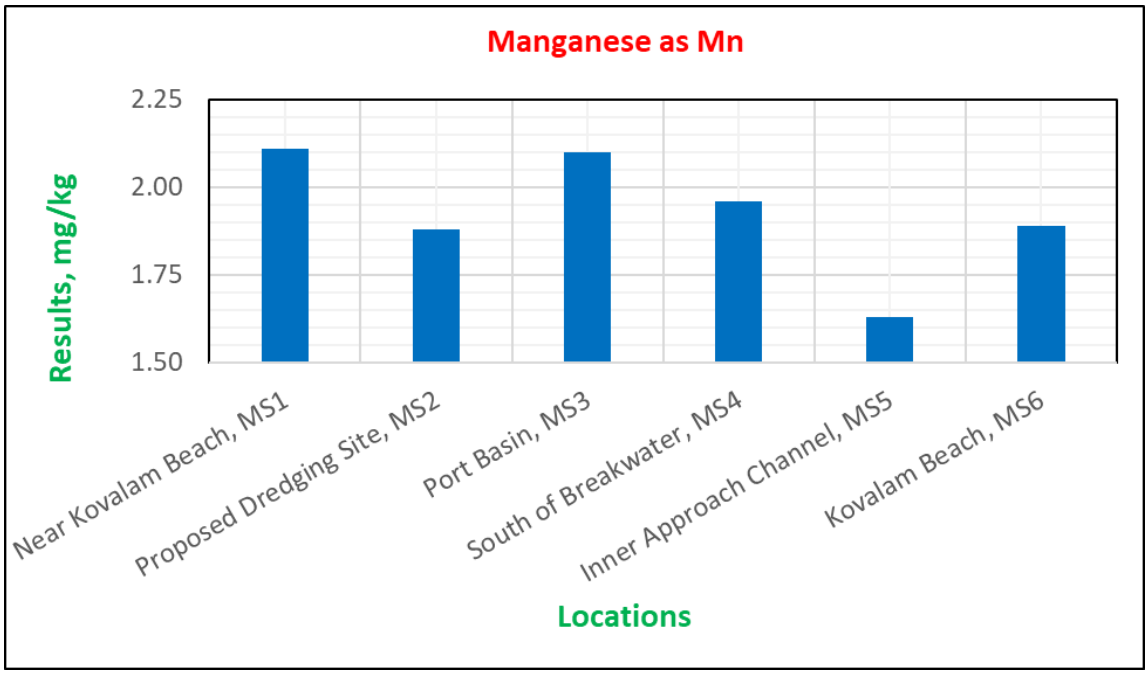
4 b. Sediment Analysis

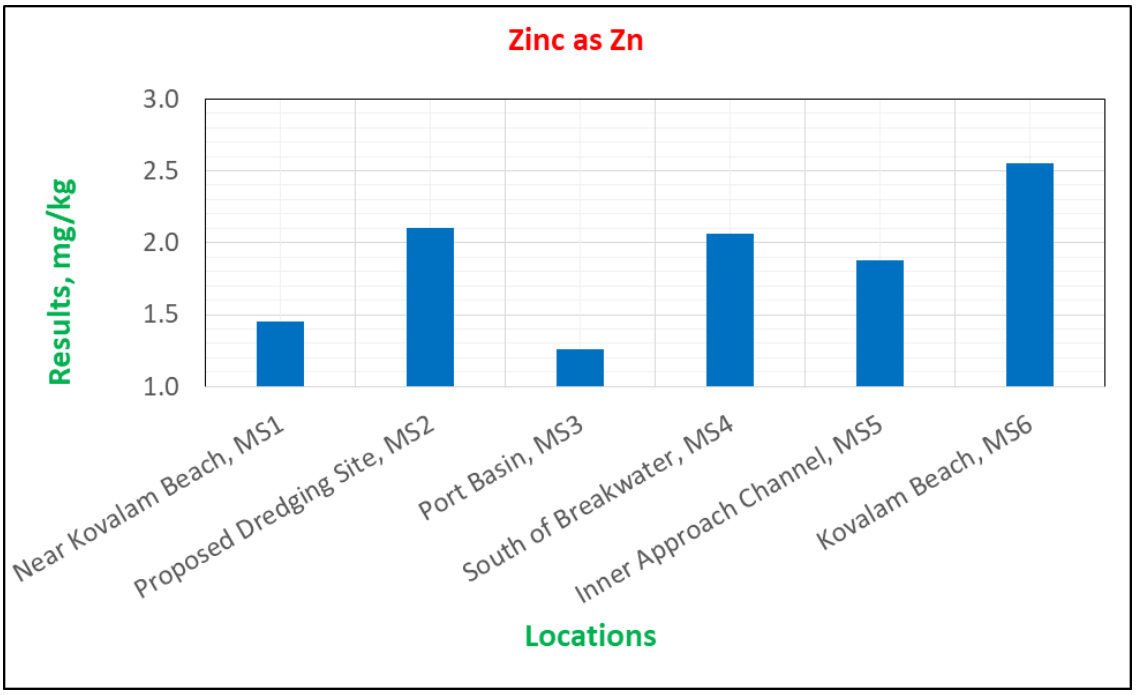


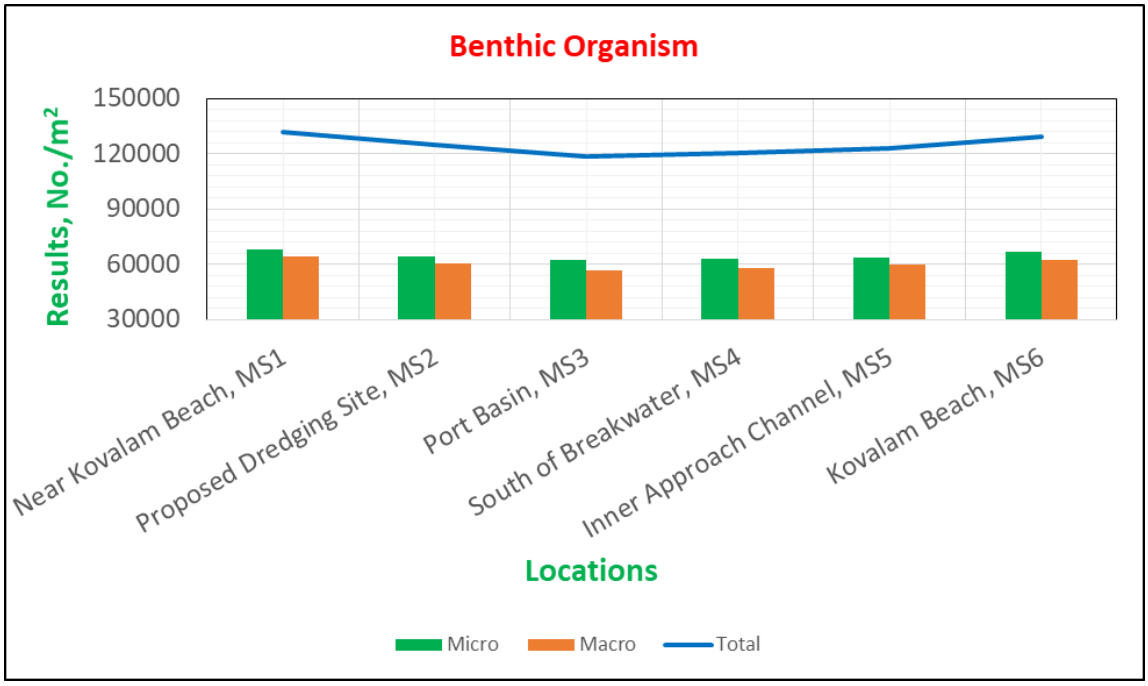



Aluminium as Al
Results, mg/kg
2000
1500
1000
500
0
Near Kovalam Beach, MS1
Proposed Dredging Site, MS2
Port Basin, MS3
South of Breakwater, MS4
Inner Approach Channel, MS5
Kovalam Beach, MS6
Locations

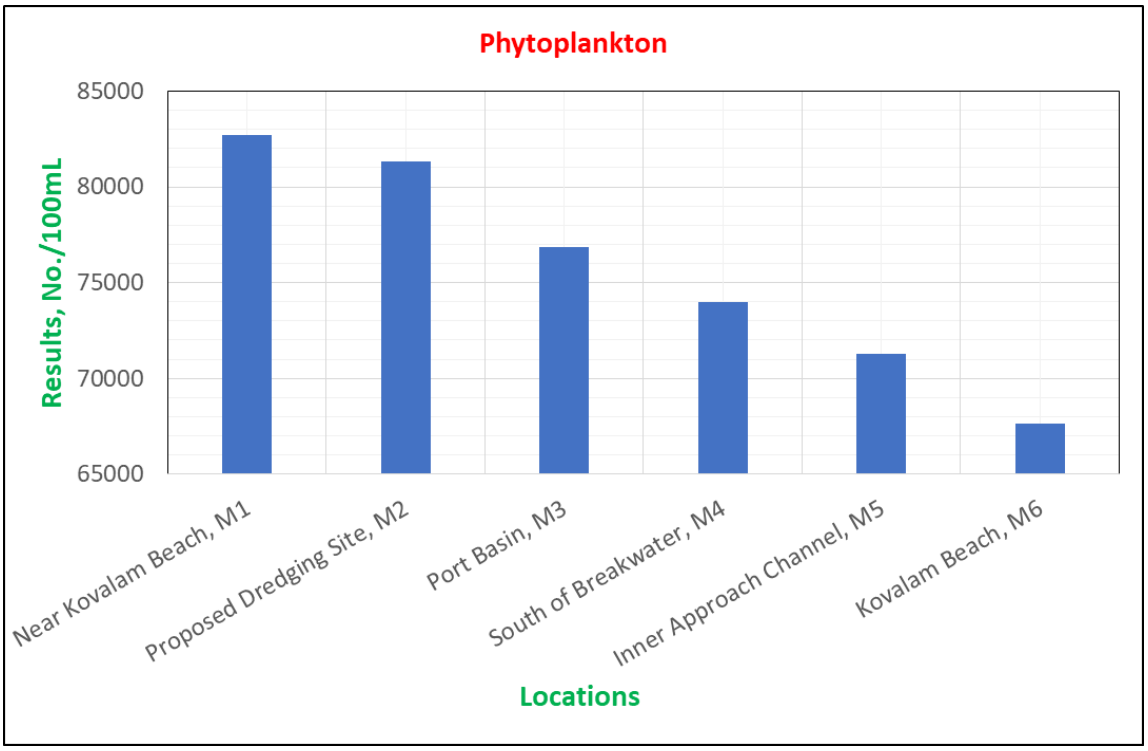

Iron as Fe
Results, mg/kg
6000
4000
2000
0
Near Kovalam Beach, MS1
Proposed Dredging Site, MS2
Port Basin, MS3
South of Breakwater, MS4
Inner Approach Channel, MS5
Kovalam Beach, MS6
Locations


Manganese as Mn
Results, mg/kg
2.25
2.00
1.75
1.50
Near Kovalam Beach, MS1
Proposed Dredging Site, MS2
Port Basin, MS3
South of Breakwater, MS4
Inner Approach Channel, MS5
Kovalam Beach, MS6
Locations

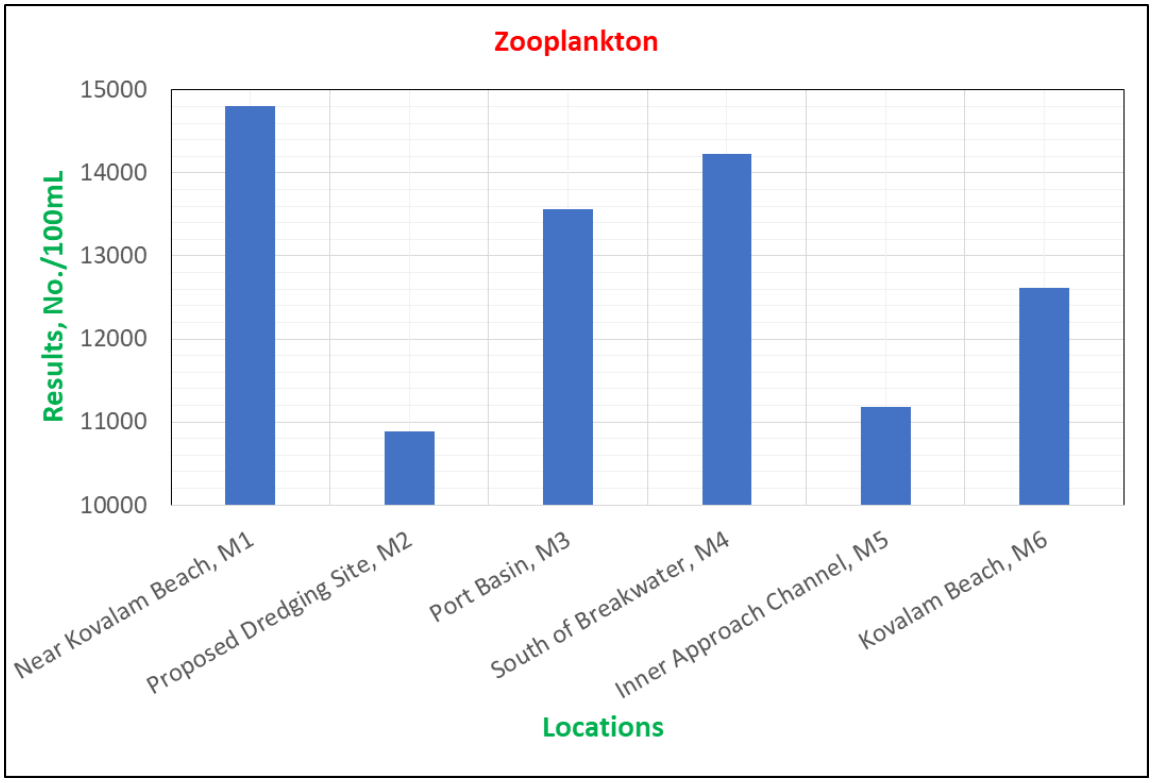

Zinc as Zn
Results, mg/kg
3.0
2.5
2.0
1.5
1.0
Near Kovalam Beach, MS1
Proposed Dredging Site, MS2
Port Basin, MS3
South of Breakwater, MS4
Inner Approach Channel, MS5
Kovalam Beach, MS6
Locations



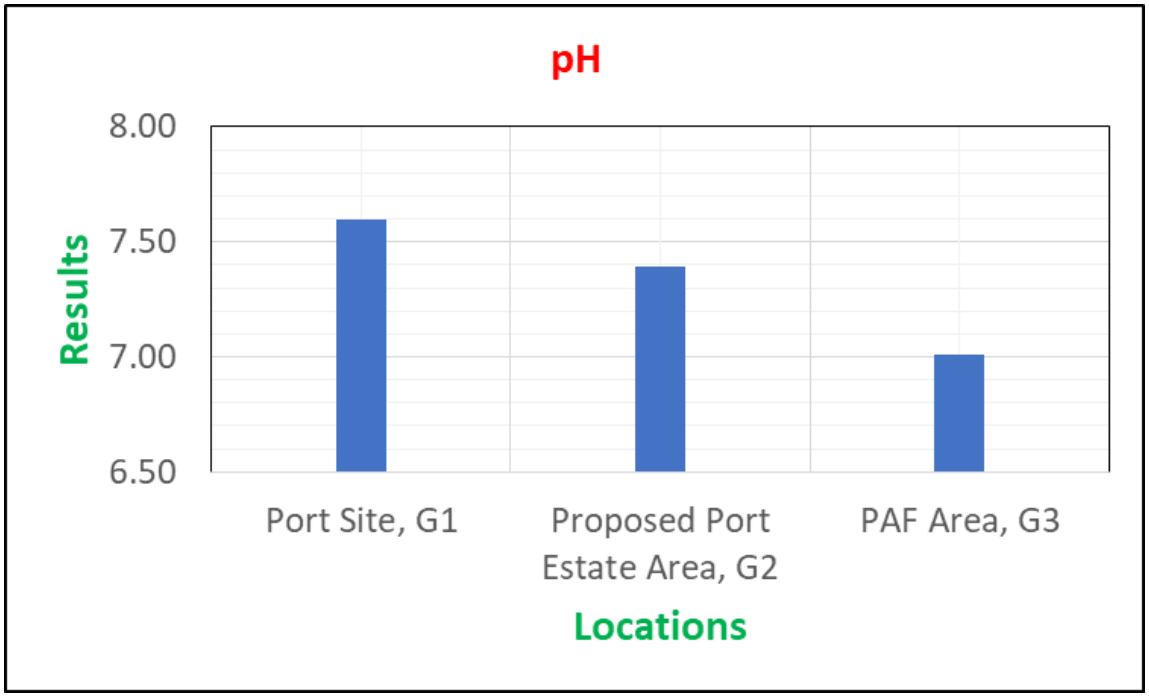
4 c. Phytoplankton Analysis from Marine Samples

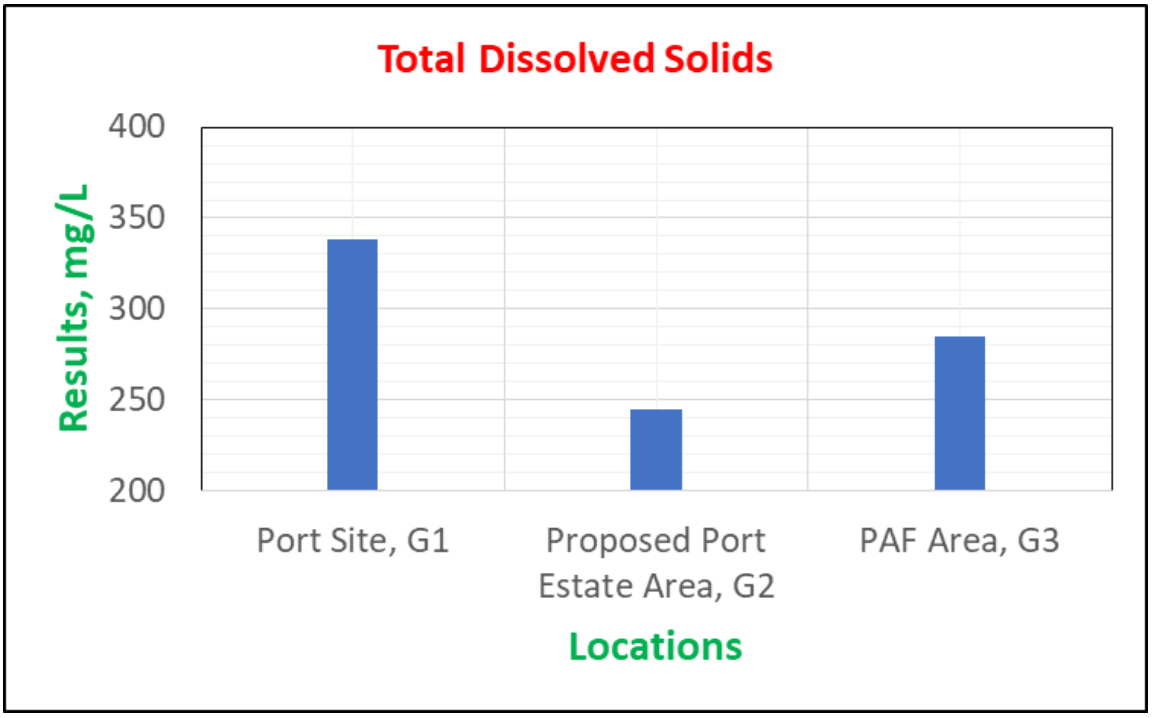


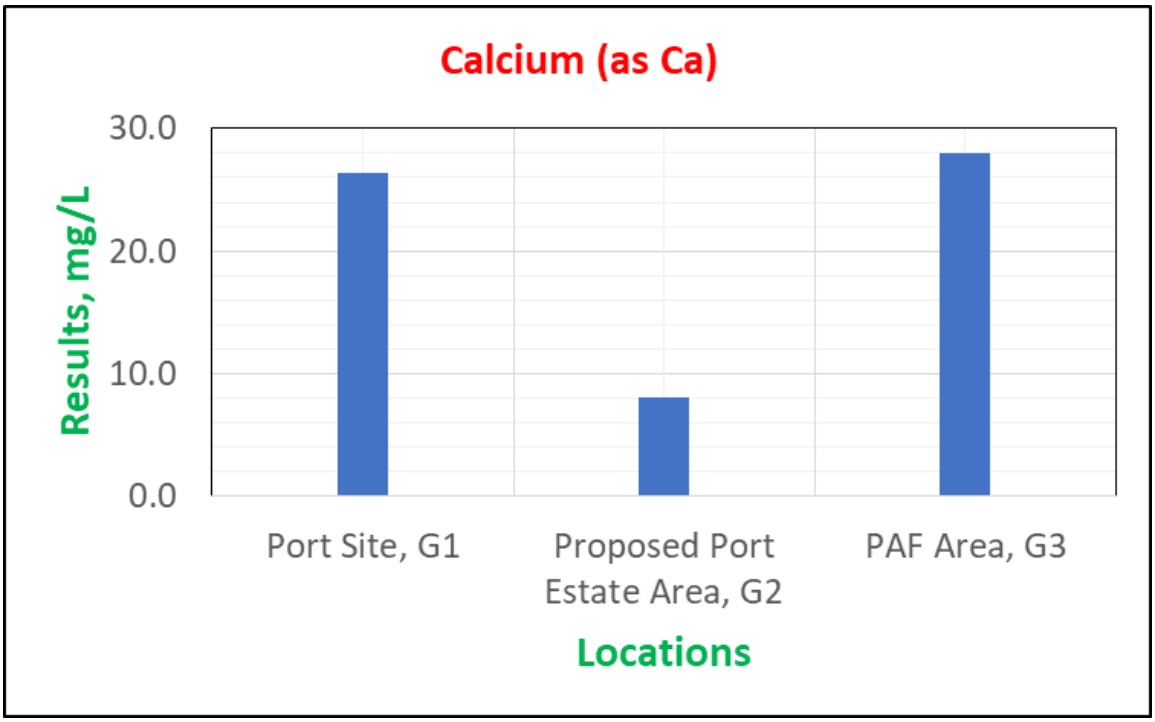
4 d. Zooplankton Analysis from Marine Samples

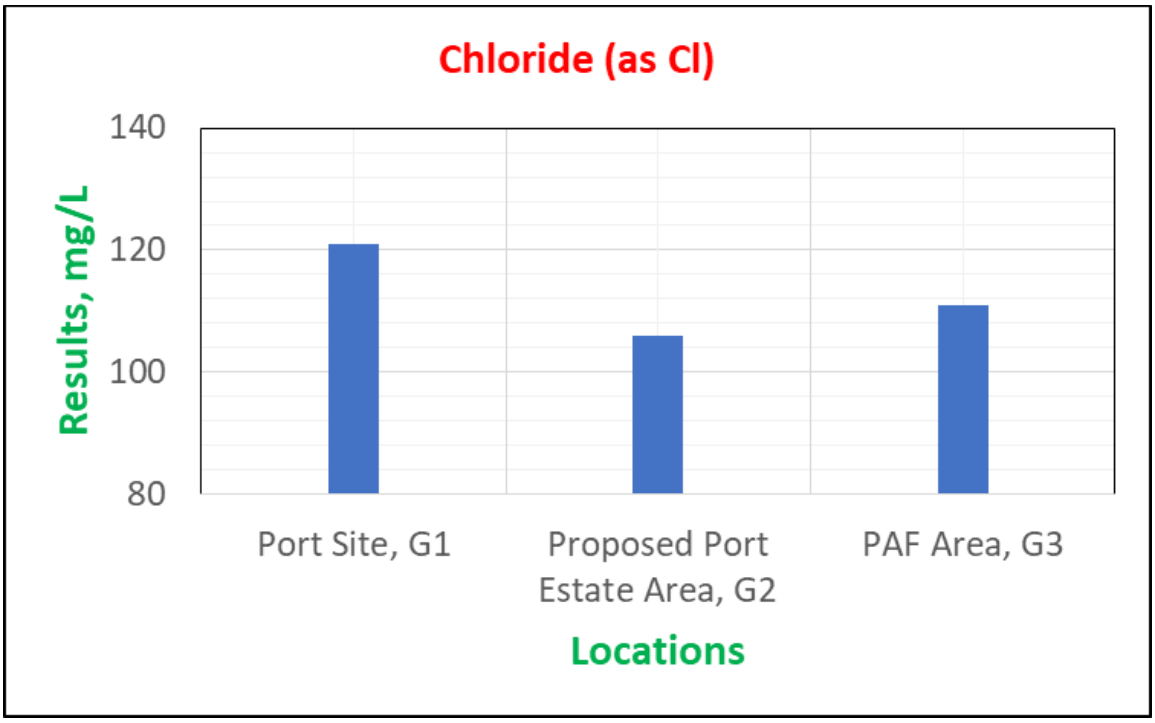


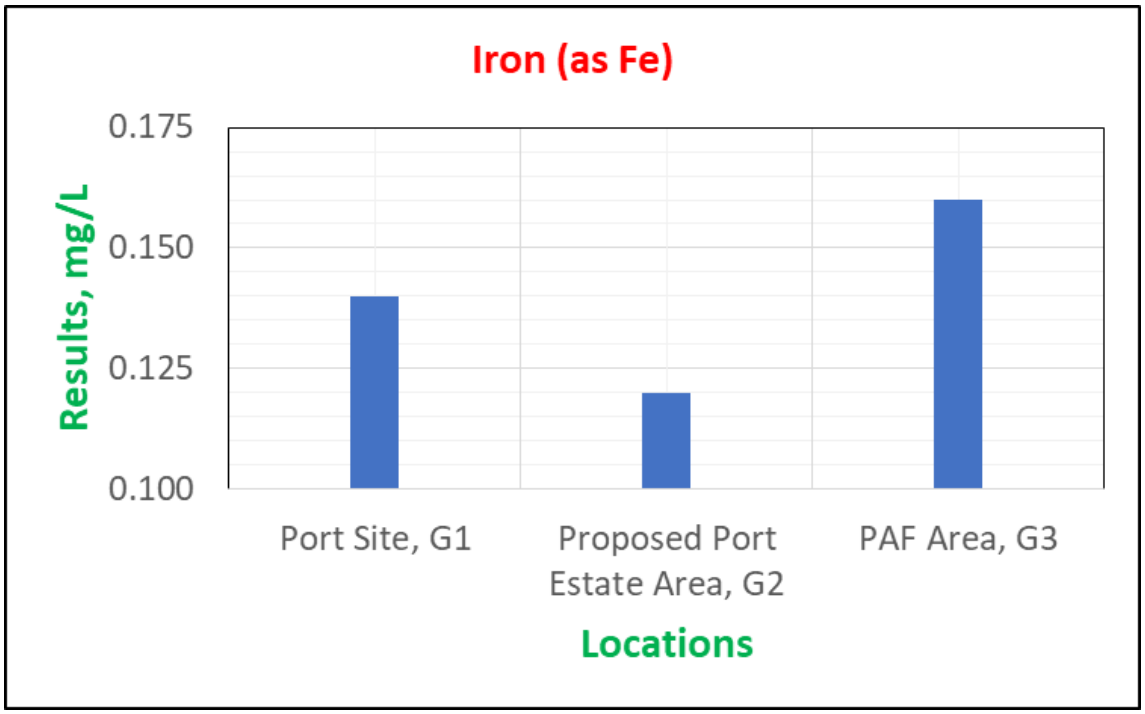
5. Groundwater Analysis

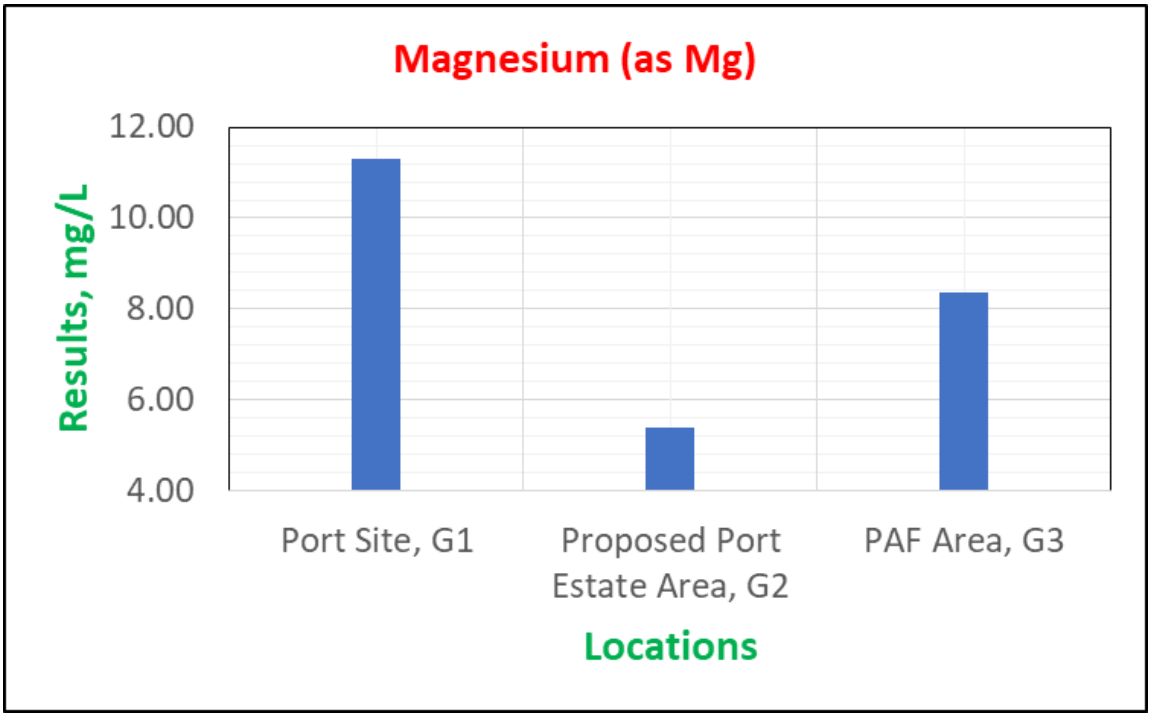


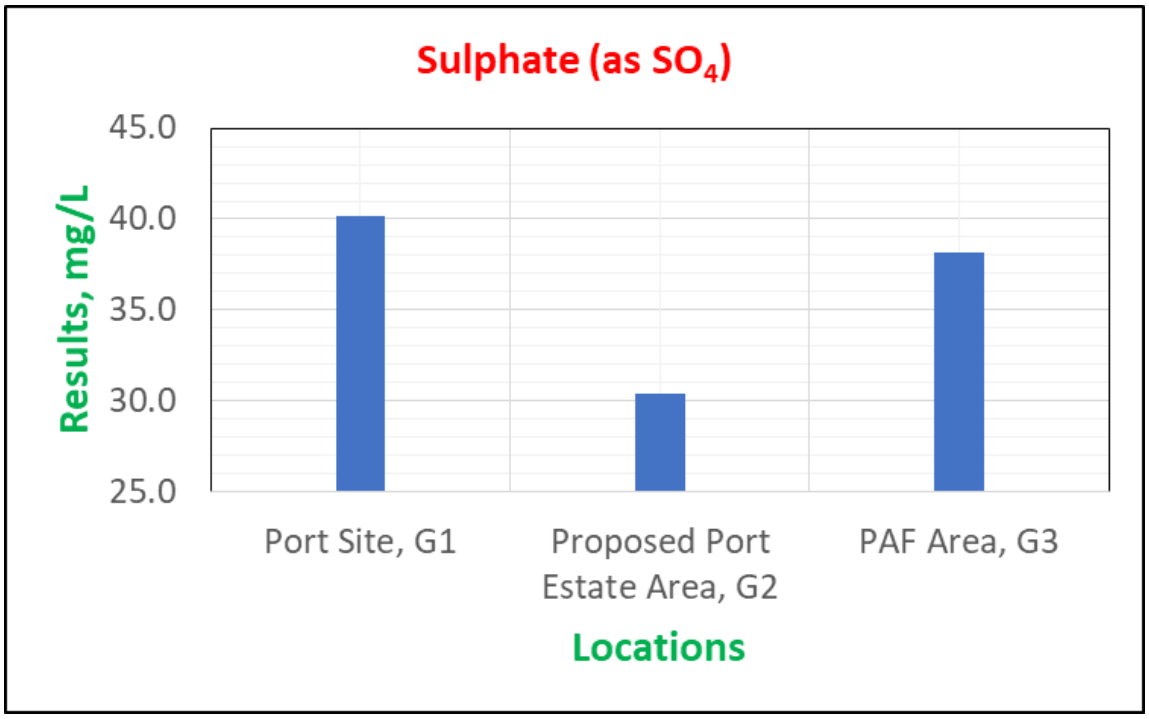


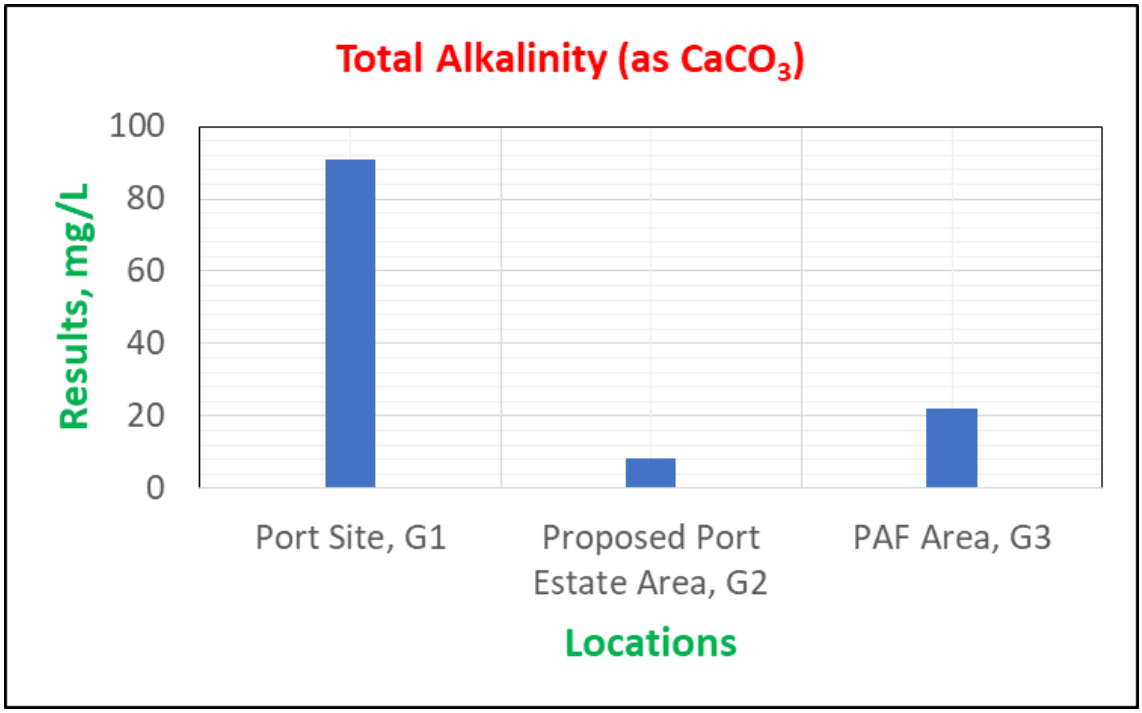

Calcium (as Ca)
Results, mg/L
30.0
20.0
10.0
0.0
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations

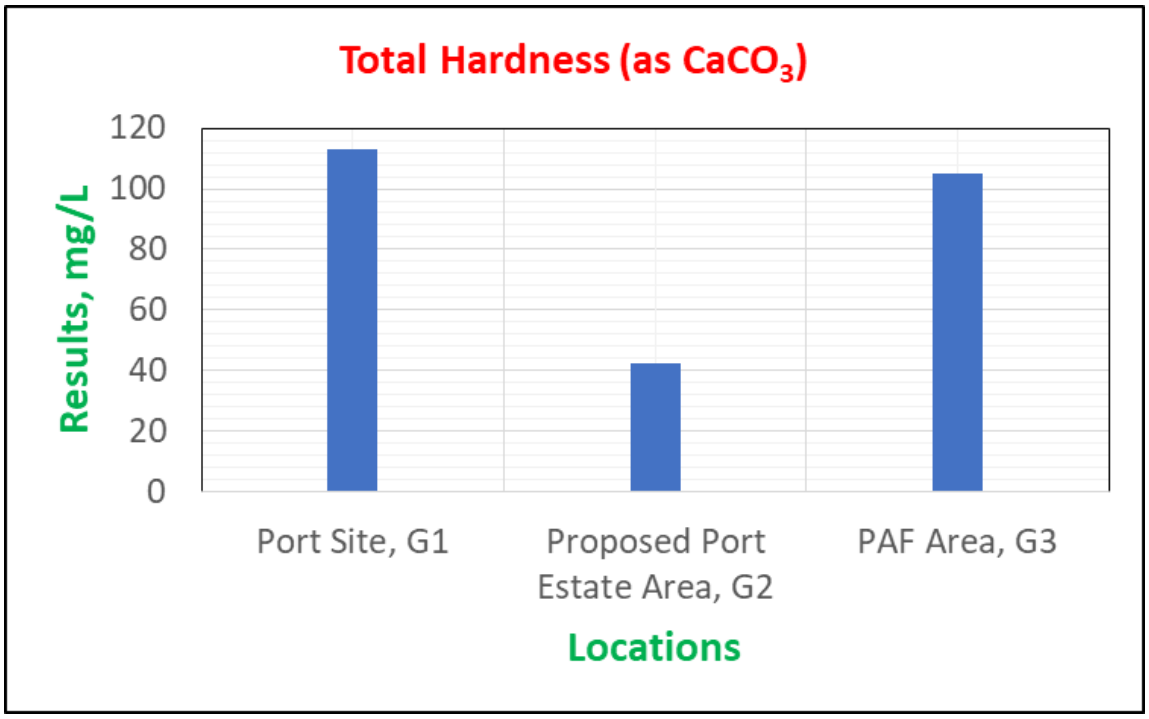

Chloride (as Cl)
Results, mg/L
140
120
100
80
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations


Iron (as Fe)
Results, mg/L
0.175
0.150
0.125
0.100
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations

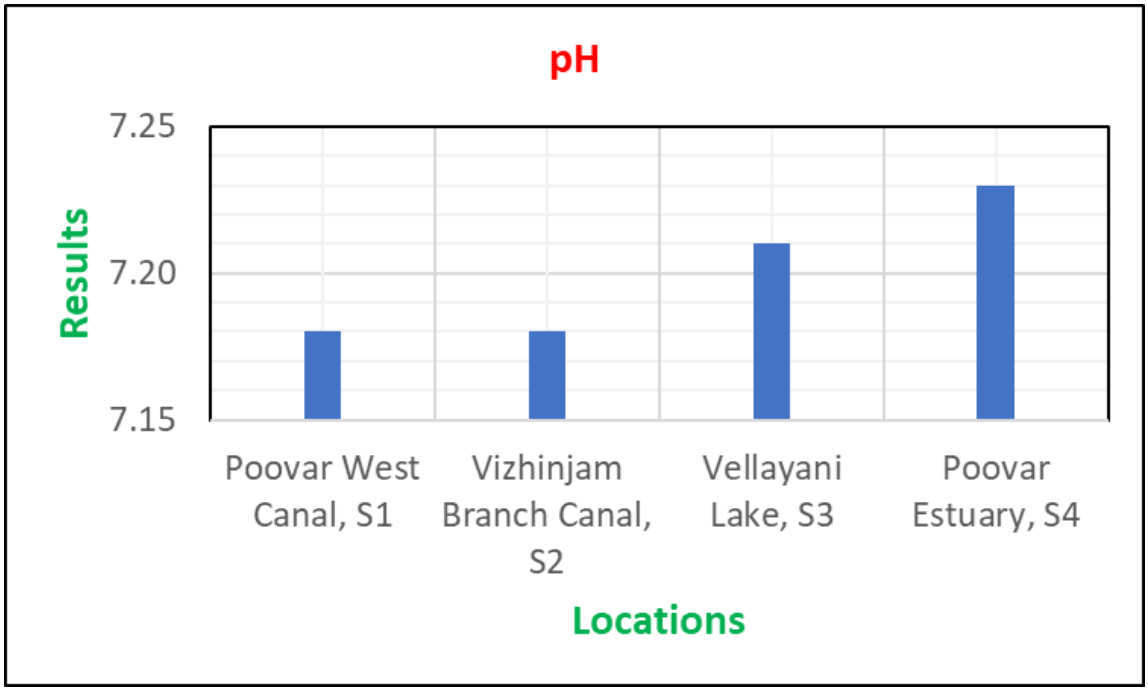

Magnesium (as Mg)
Results, mg/L
12.00
10.00
8.00
6.00
4.00
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations

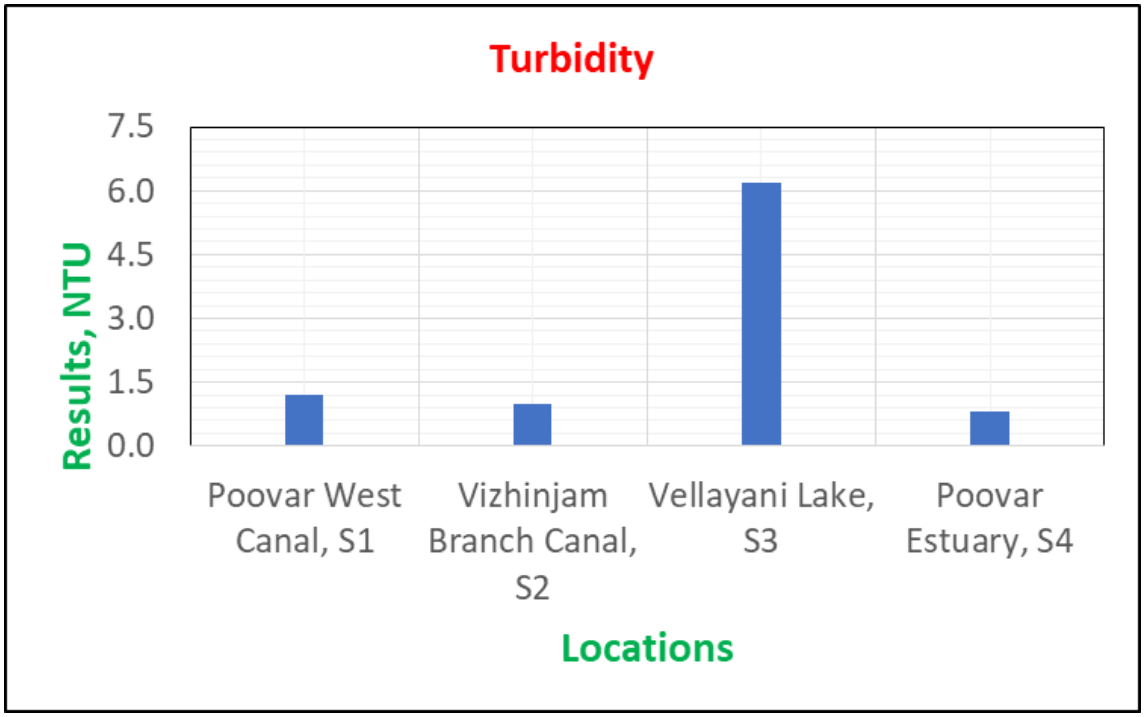

Sulphate (as SO_4)
Results, mg/L
45.0
40.0
35.0
30.0
25.0
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations

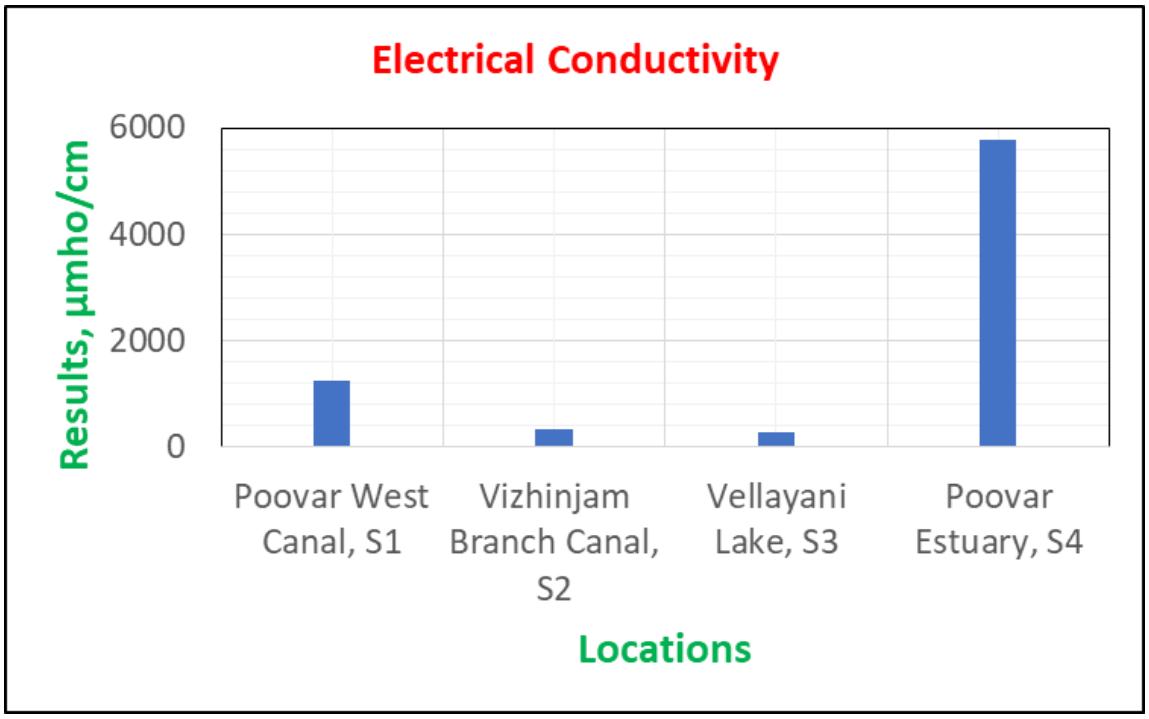

Total Alkalinity (as $CaCO_3$)
Results, mg/L
100
80
60
40
20
0
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations

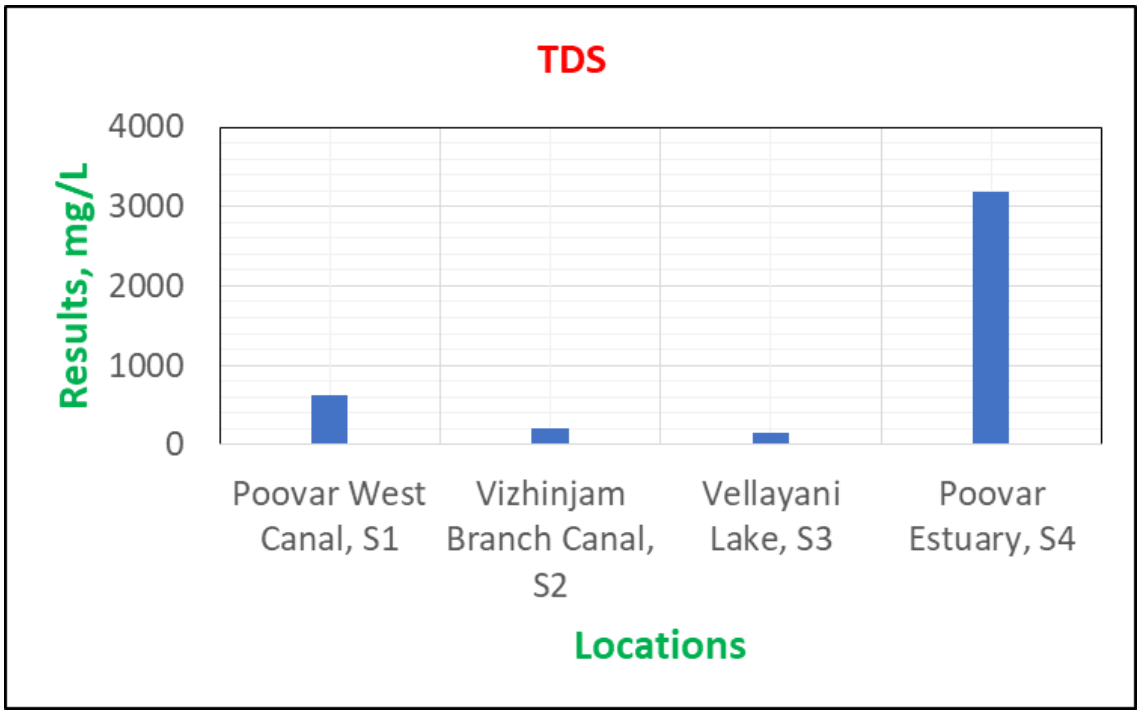

Total Hardness (as $CaCO_3$)
Results, mg/L
120
100
80
60
40
20
0
Port Site, G1
Proposed Port Estate Area, G2
PAF Area, G3
Locations

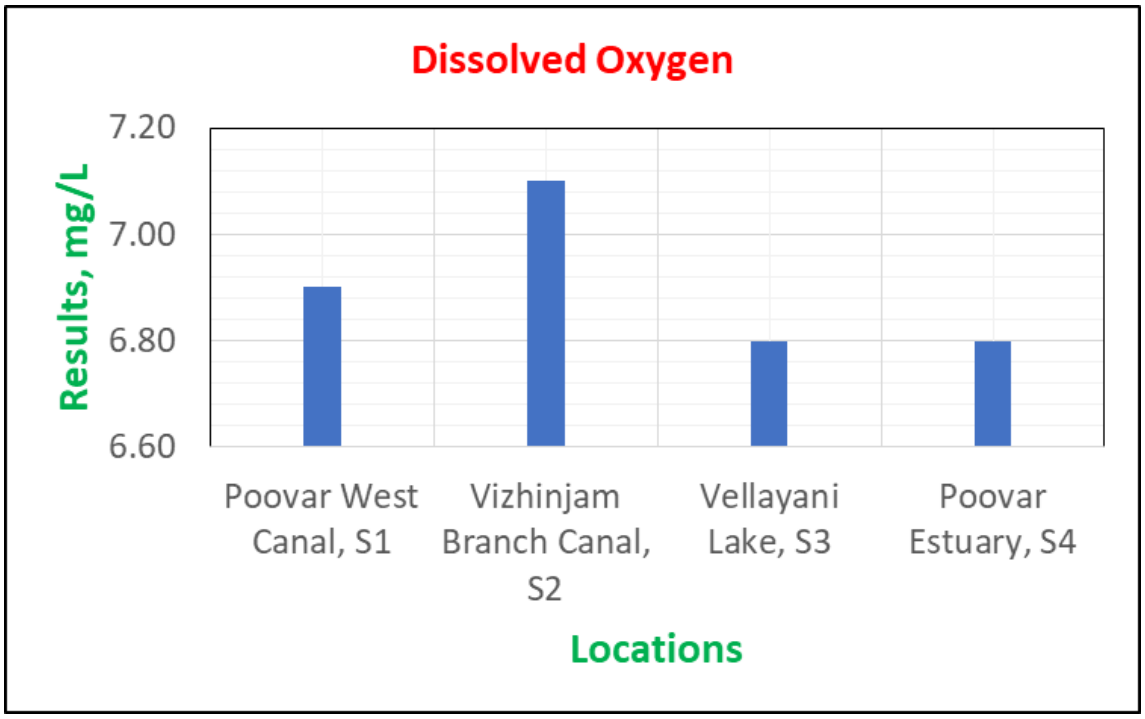
6. Surface Water Analysis

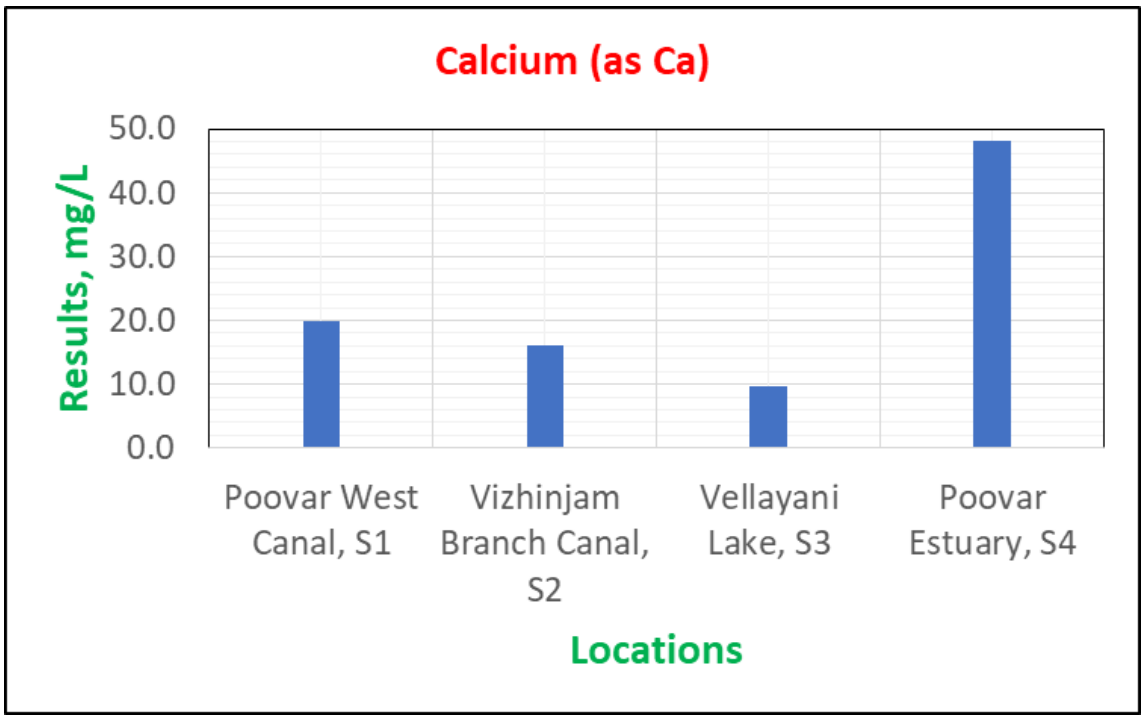


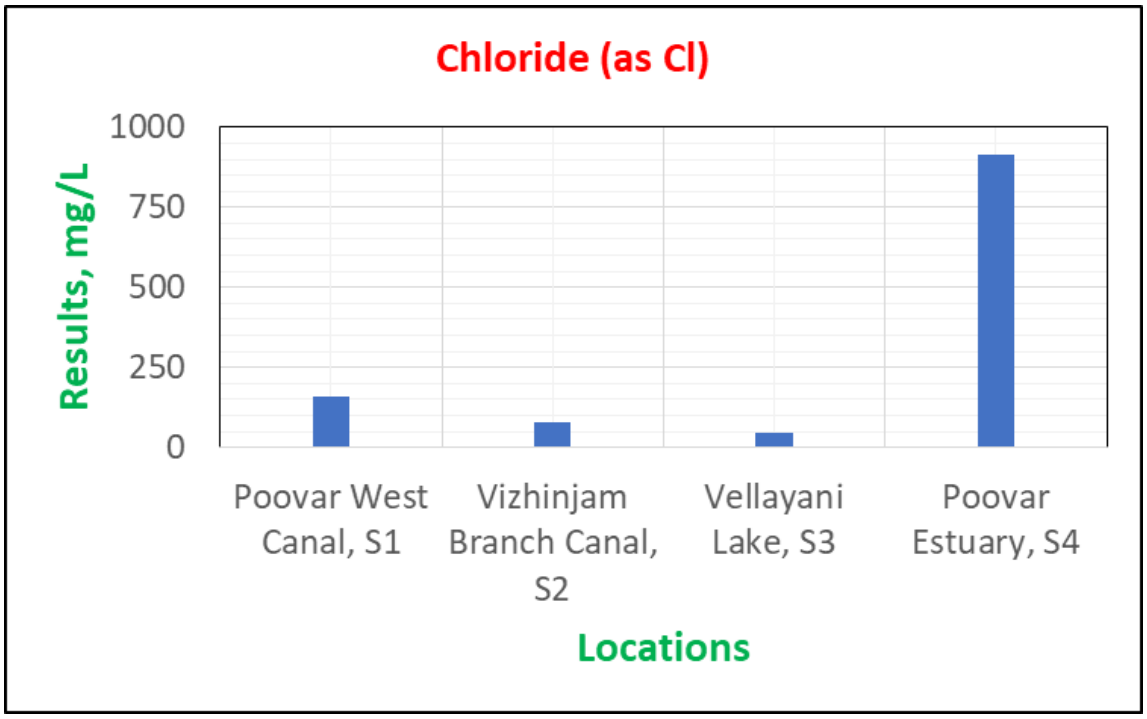


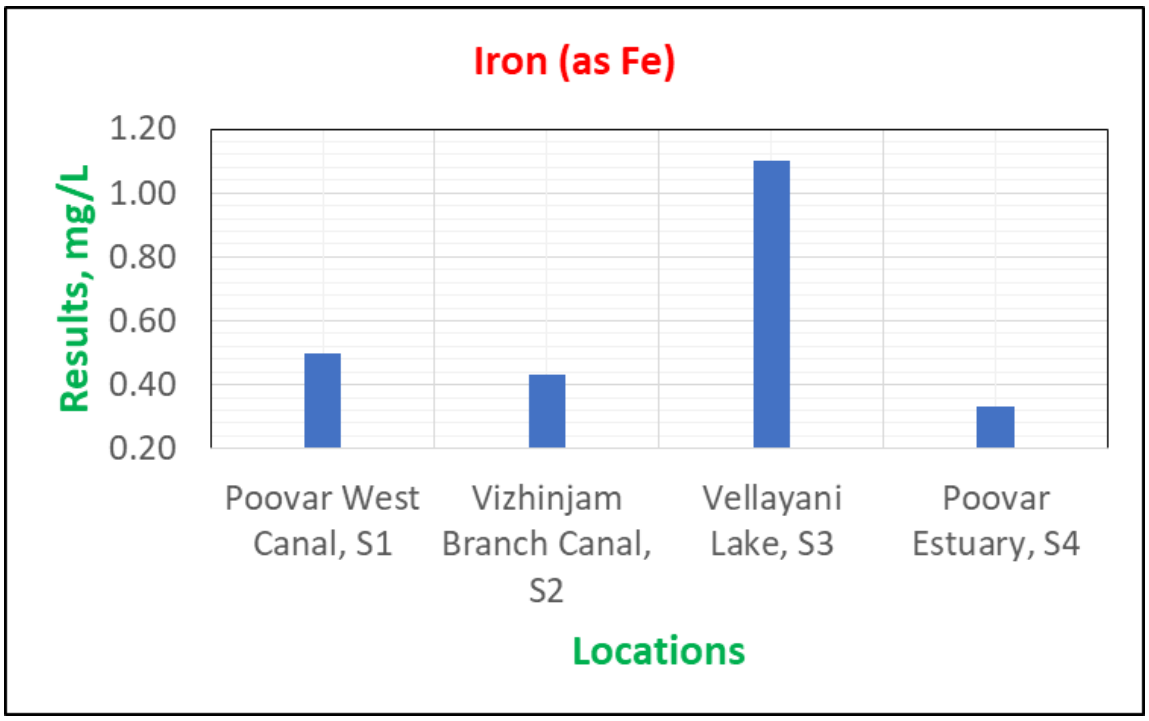

Electrical Conductivity
Results, µmho/cm
6000
4000
2000
0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

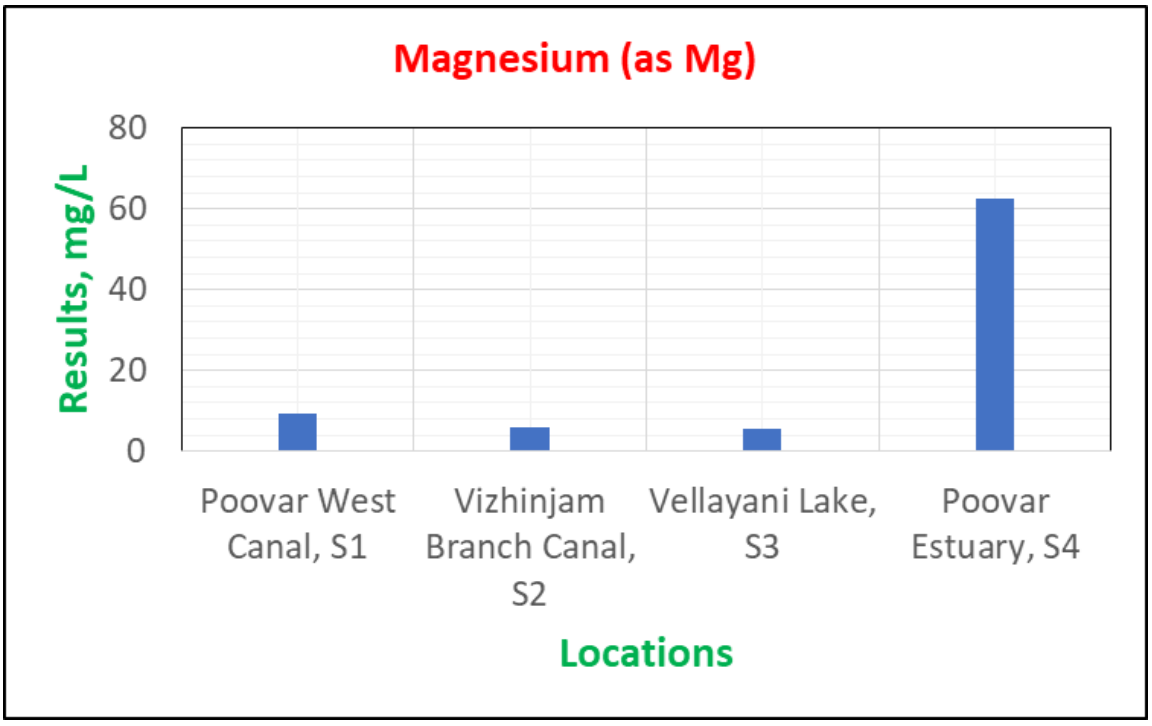

TDS
Results, mg/L
4000
3000
2000
1000
0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

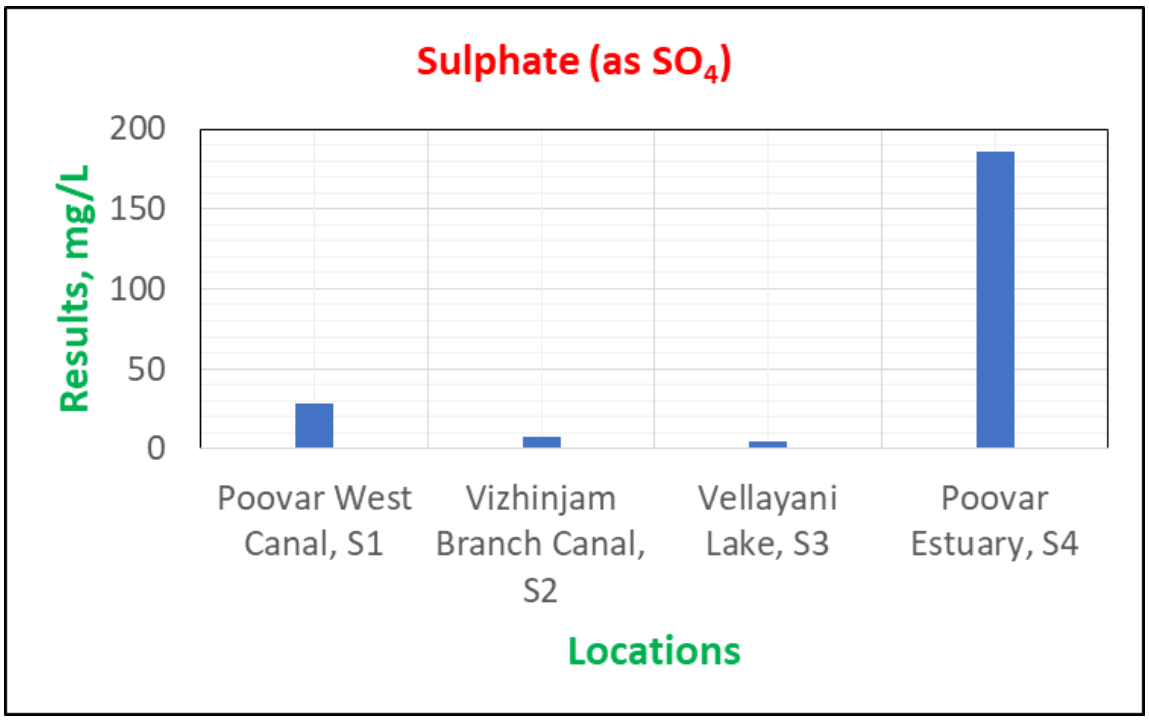

Dissolved Oxygen
Results, mg/L
7.20
7.00
6.80
6.60
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

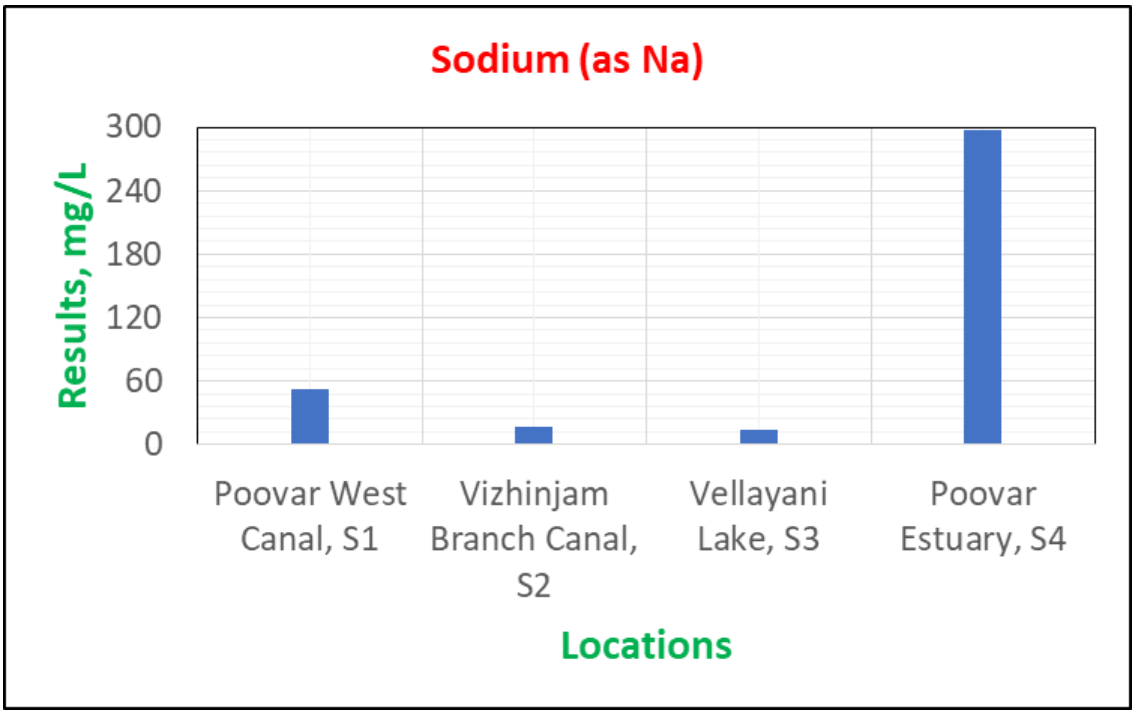

Calcium (as Ca)
Results, mg/L
50.0
40.0
30.0
20.0
10.0
0.0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

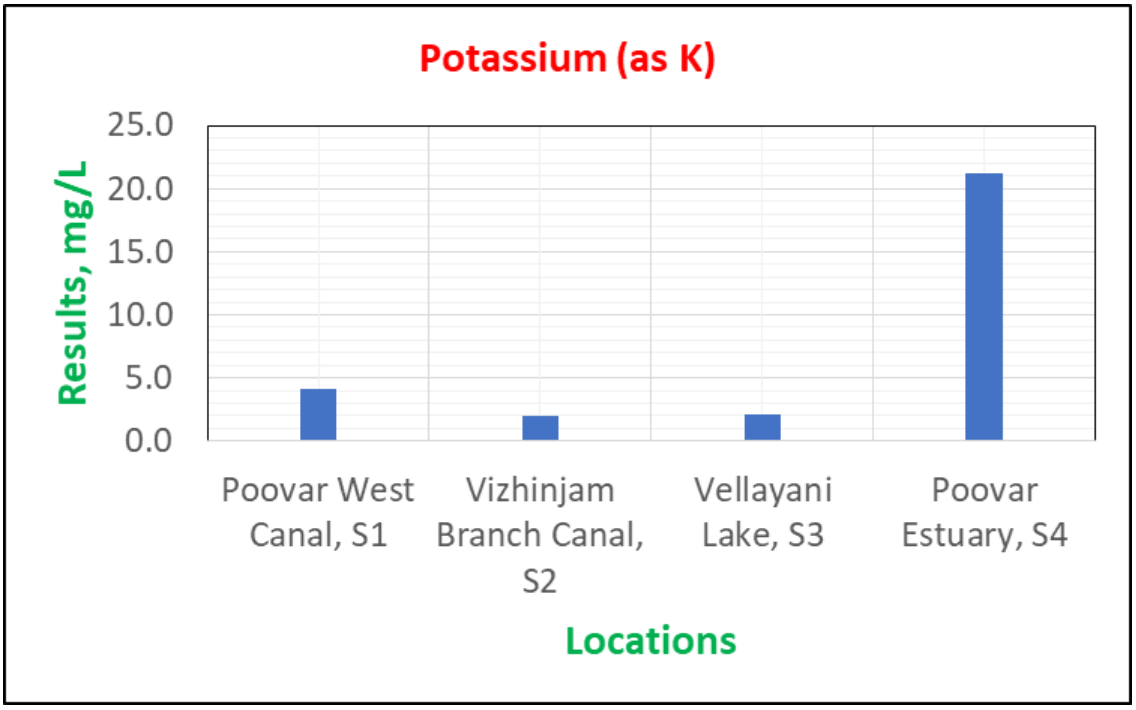

Chloride (as Cl)
Results, mg/L
1000
750
500
250
0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

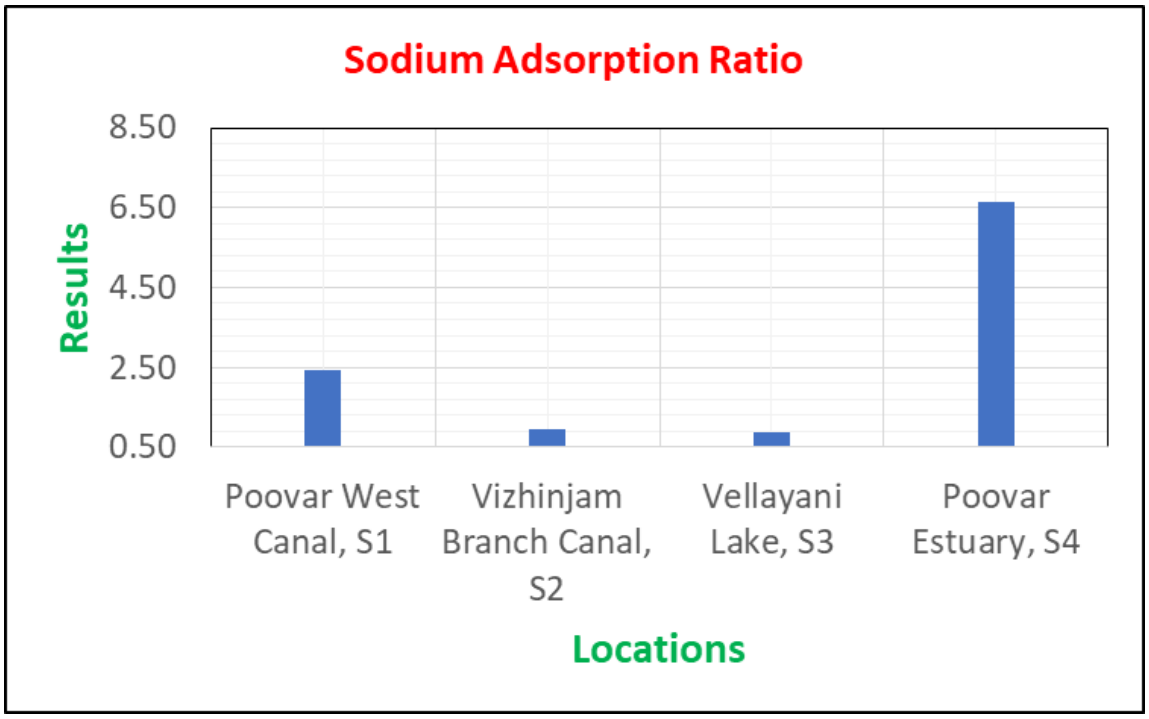

Iron (as Fe)
Results, mg/L
1.20
1.00
0.80
0.60
0.40
0.20
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

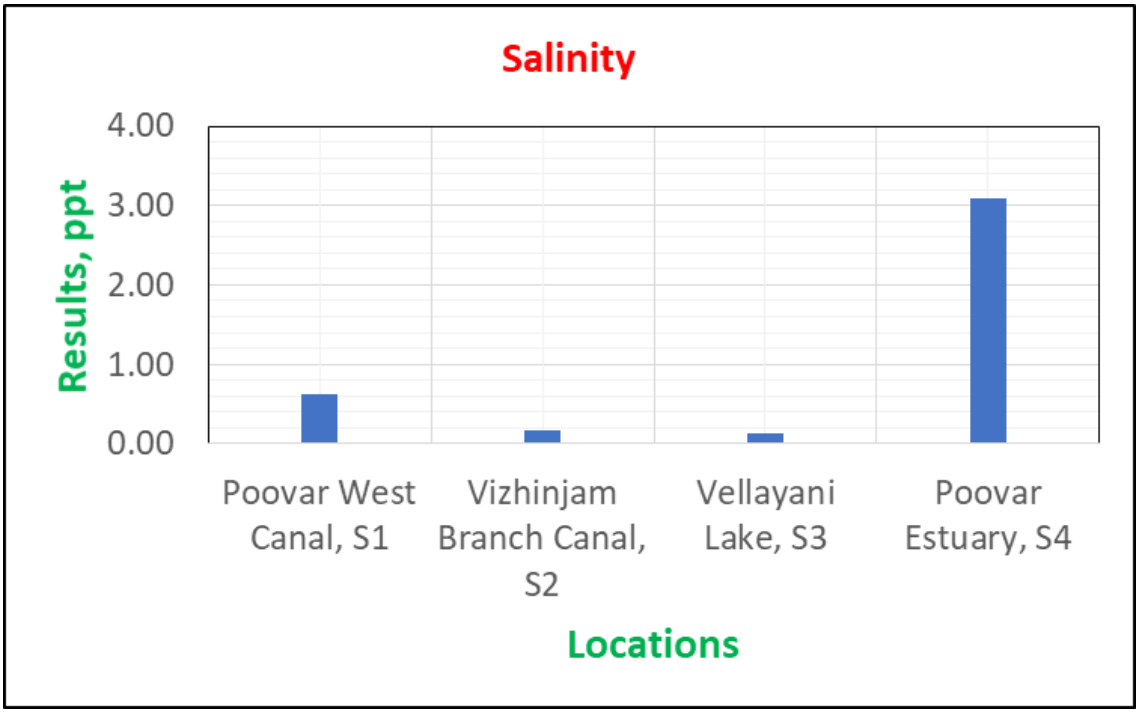

Magnesium (as Mg)
Results, mg/L
80
60
40
20
0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations

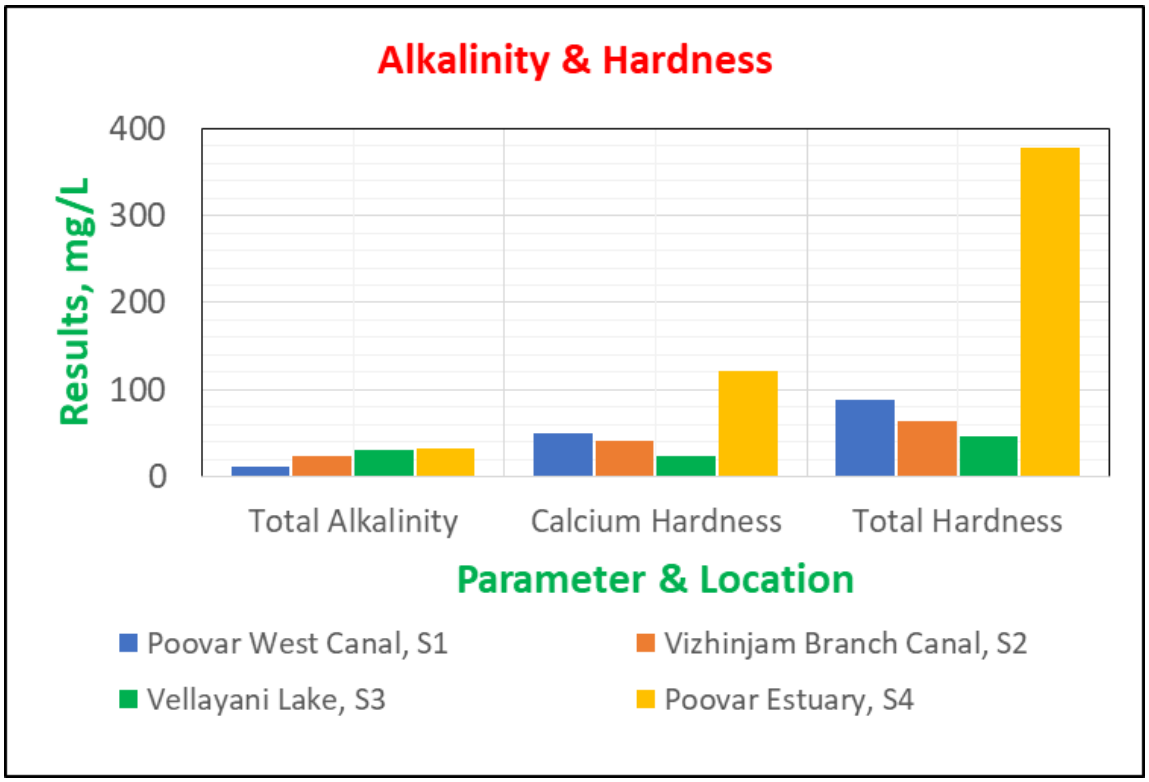

Sulphate (as SO_4)
Results, mg/L
200
150
100
50
0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations


Sodium (as Na)
Results, mg/L
300
240
180
120
60
0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations


Potassium (as K)
Results, mg/L
25.0
20.0
15.0
10.0
5.0
0.0
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations


Sodium Adsorption Ratio
8.50
6.50
4.50
2.50
0.50
Results
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations


Salinity
4.00
3.00
2.00
1.00
0.00
Results, ppt
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4
Locations


Alkalinity & Hardness
Results, mg/L
400
300
200
100
0
Total Alkalinity
Calcium Hardness
Total Hardness
Parameter & Location
Poovar West Canal, S1
Vizhinjam Branch Canal, S2
Vellayani Lake, S3
Poovar Estuary, S4