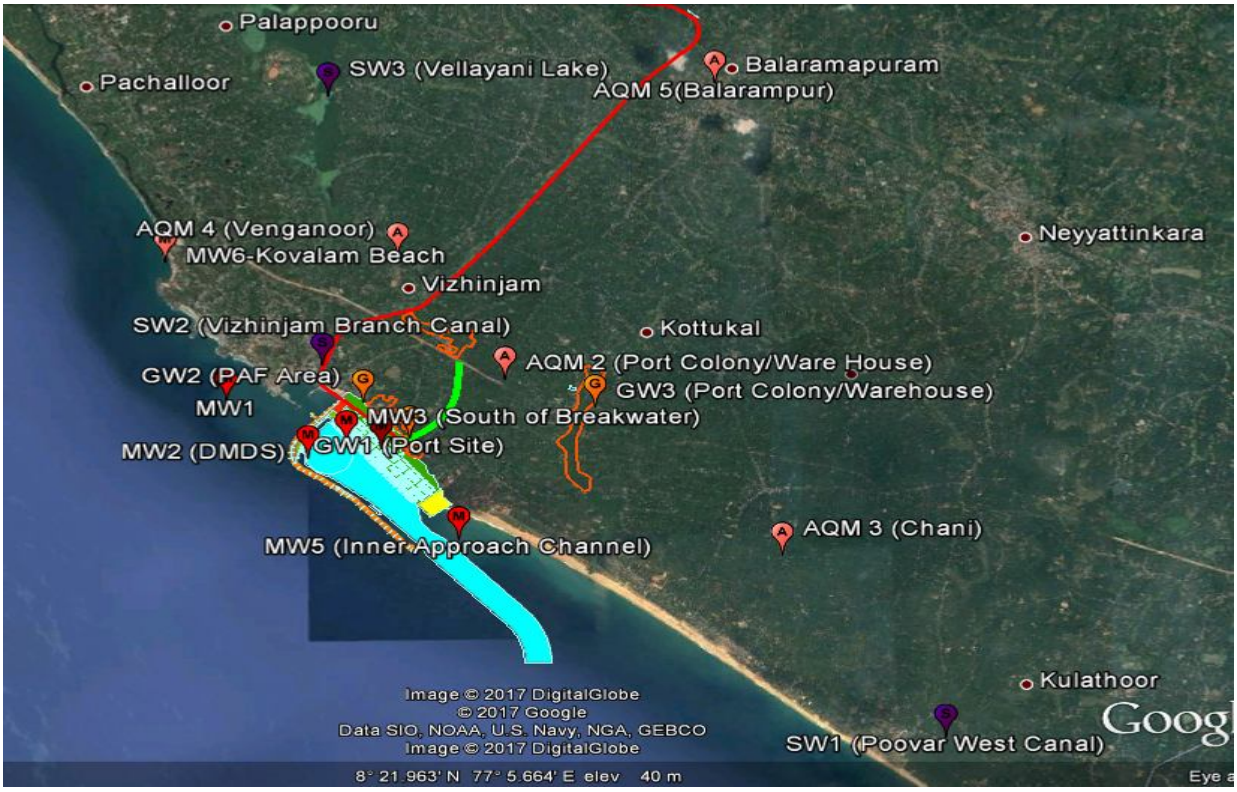
Environmental Monitoring Report



Adani Vizhinjam Port Pvt. Ltd.

Vizhinjam, Kerala

October – 2018

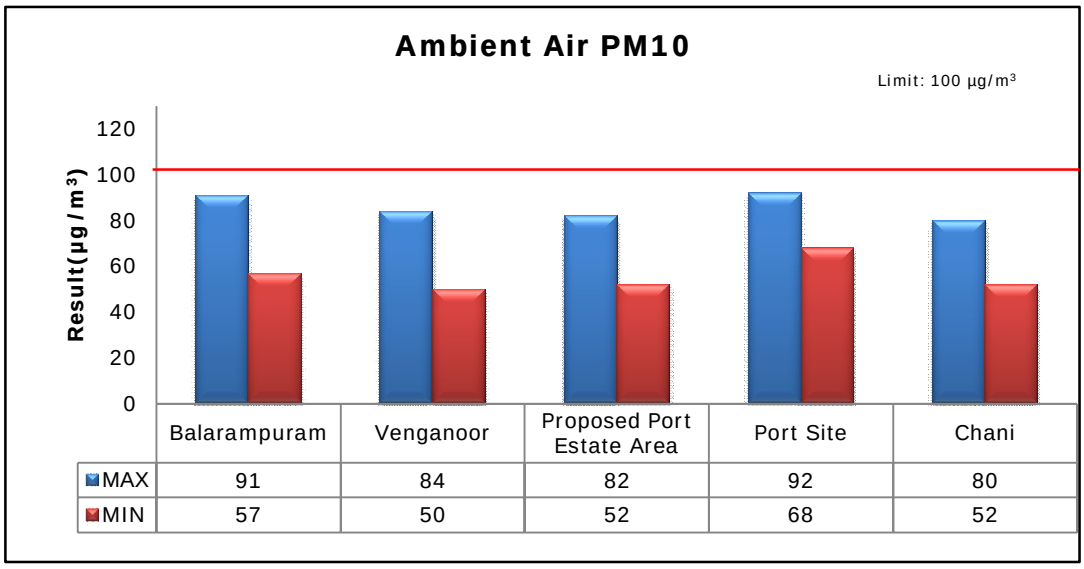
Environment Monitoring Locations:

Sl. No.	Environmental Attribute	Location
1.	Ambient Air Quality Monitoring	Port Site (AQM1)
		Proposed Port Estate Area (AQM2)
		Chani (AQM3)
		Venganoor (AQM4)
		Balarampuram (AQM5)
2.	Ambient Noise	Port Site
		Proposed Port Estate Area
		Chani
		Venganoor
		Balarampuram
3.	Marine Water	Near Kovalam Beach (MW1)
		Proposed Dredge Material Disposal Site (MW2)
		South of Break Water (MW3)
		Port Basin (MW4)
		Inner Approach Channel (MW5)
		Kovalam Beach (MW 6)
4.	Groundwater	Port Site (GW 1)
		PAF Area (GW 2)
		Proposed Port Estate Area (GW 3)
5.	Surface Water	Poovar West Canal (SW 1)
		Vizhinjam Branch Canal (SW 2)
		Vellayani Lake (SW 3)

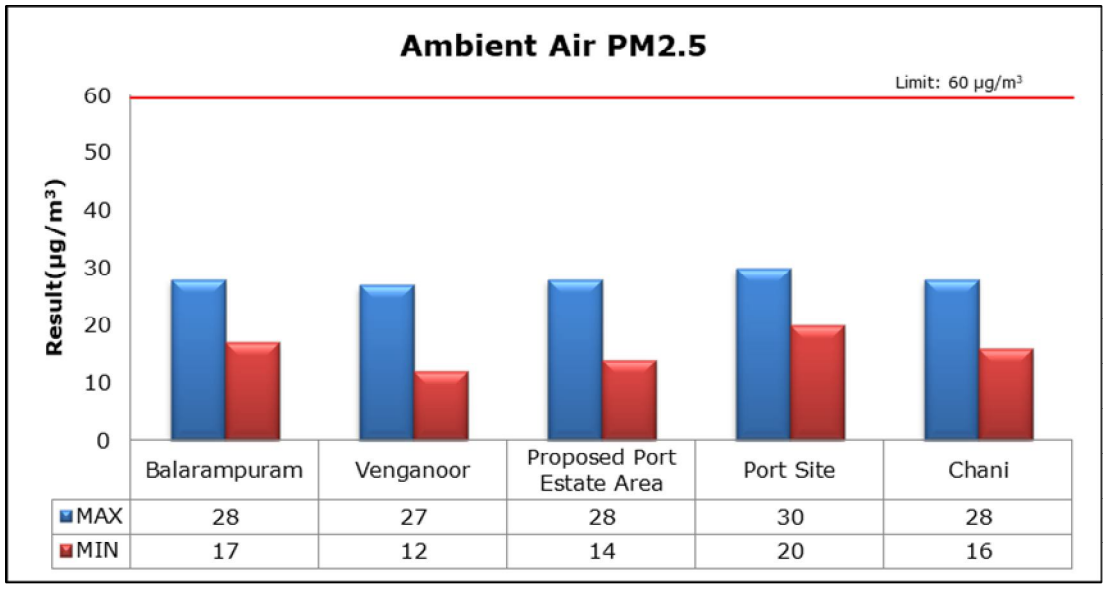
1. Summary

- 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 during the month of October.
- All the parameters of groundwater were recorded within the acceptable limits at all the locations except turbidity which was recorded to be slightly higher than the acceptable limit at one location (PAF); this may be due to rains during the monitoring period.
- Surface water sample and marine water results were observed to be comparable with the baseline.

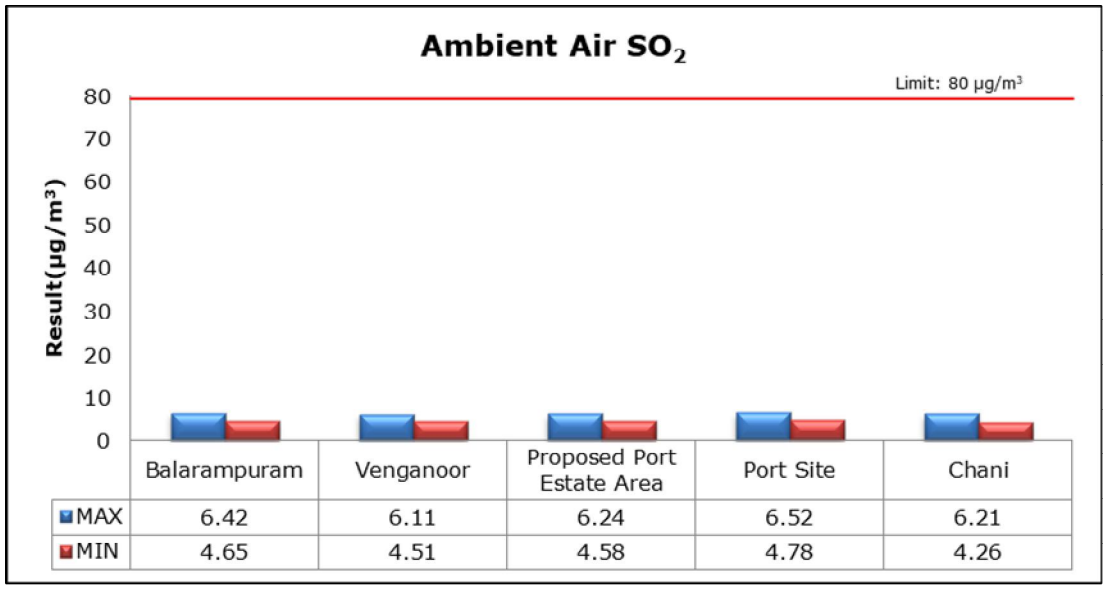
2. Ambient Air Quality



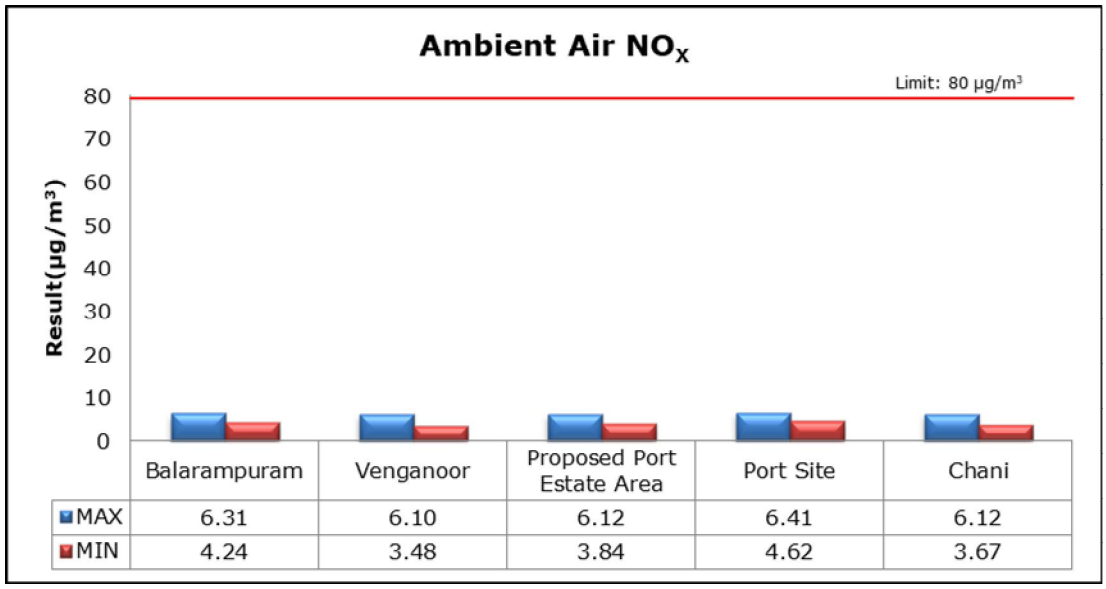
	Balarampuram	Venganoor	Proposed Port Estate Area	Port Site	Chani
MAX	91	84	82	92	80
MIN	57	50	52	68	52



	Balarampuram	Venganoor	Proposed Port Estate Area	Port Site	Chani
MAX	28	27	28	30	28
MIN	17	12	14	20	16

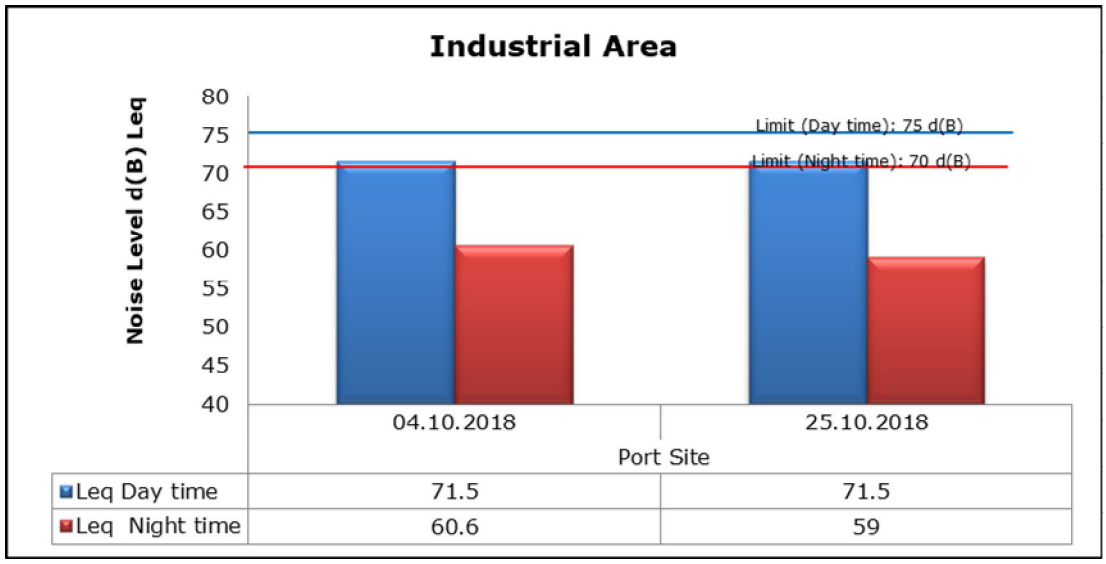


	Balarampuram	Venganoor	Proposed Port Estate Area	Port Site	Chani
MAX	6.42	6.11	6.24	6.52	6.21
MIN	4.65	4.51	4.58	4.78	4.26

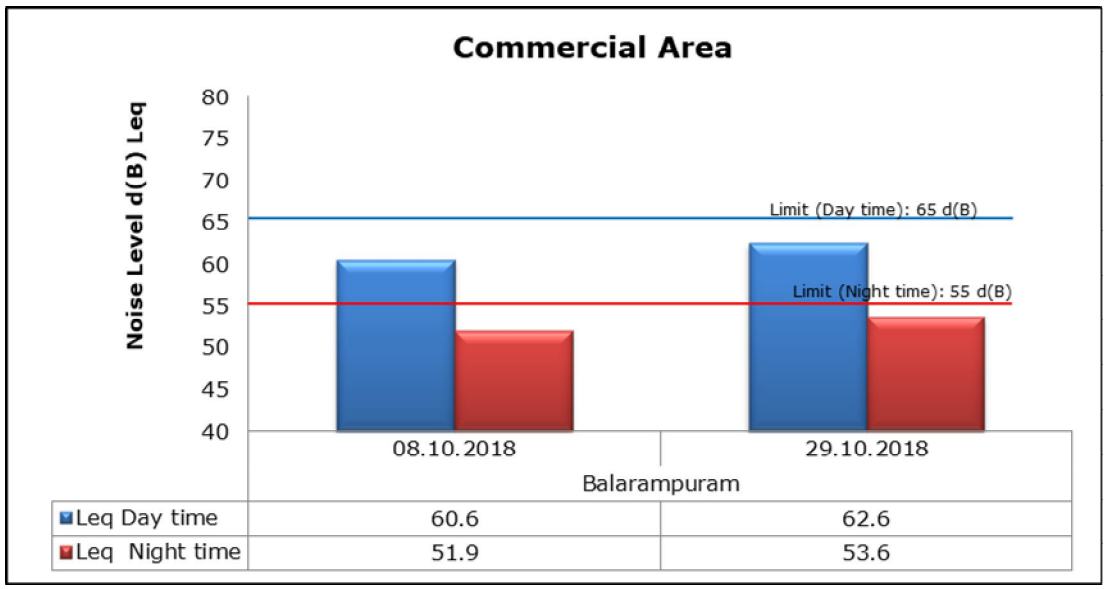


	Balarampuram	Venganoor	Proposed Port Estate Area	Port Site	Chani
MAX	6.31	6.10	6.12	6.41	6.12
MIN	4.24	3.48	3.84	4.62	3.67

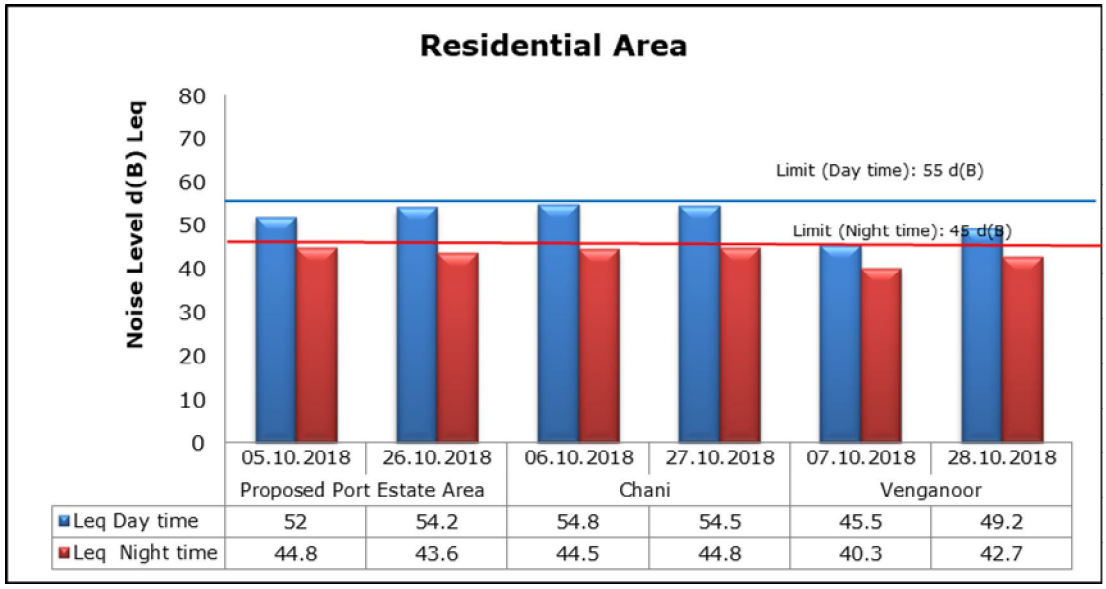
3. Ambient Noise



	04.10.2018	25.10.2018
Leq Day time	71.5	71.5
Leq Night time	60.6	59



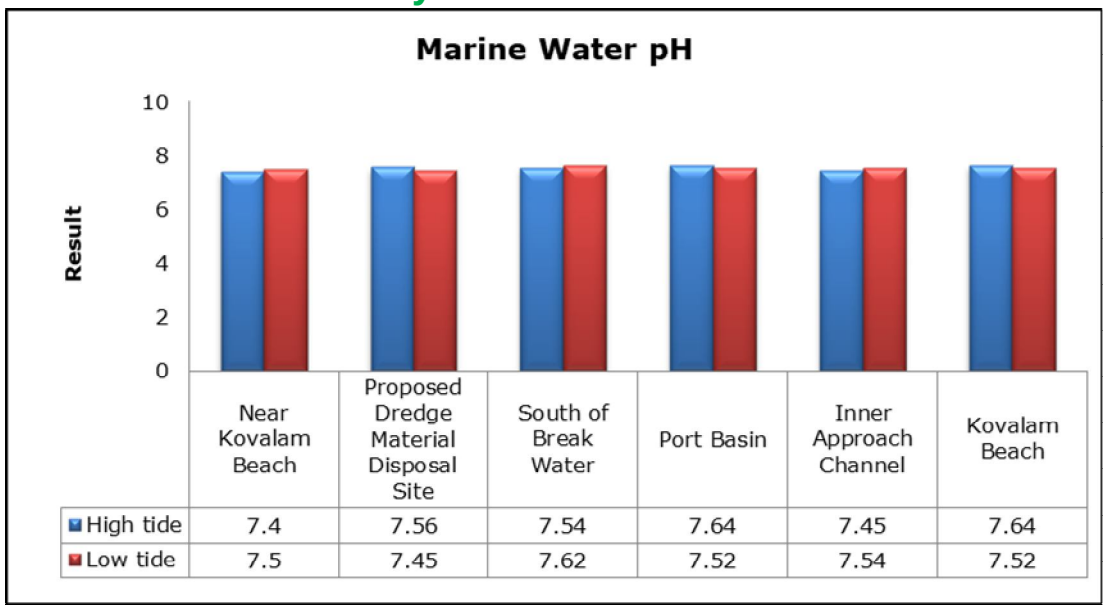
	08.10.2018	29.10.2018
Leq Day time	60.6	62.6
Leq Night time	51.9	53.6



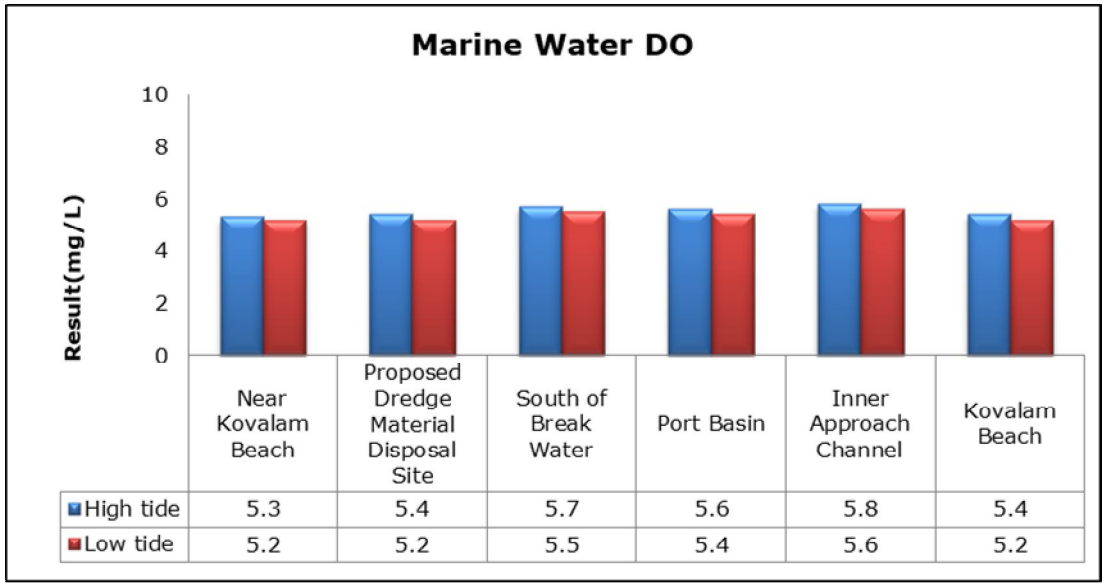
	05.10.2018	26.10.2018	06.10.2018	27.10.2018	07.10.2018	28.10.2018
	Proposed Port Estate Area		Chani		Venganoor	
Leq Day time	52	54.2	54.8	54.5	45.5	49.2
Leq Night time	44.8	43.6	44.5	44.8	40.3	42.7

4. Marine Survey

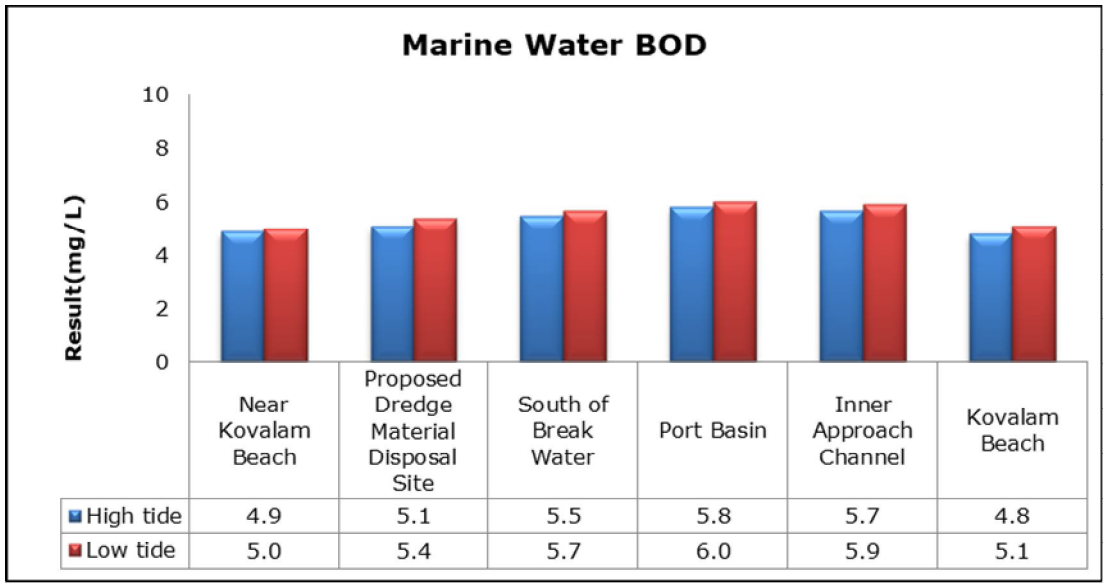
4 a. Marine Water Analysis



	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
High tide	7.4	7.56	7.54	7.64	7.45	7.64
Low tide	7.5	7.45	7.62	7.52	7.54	7.52

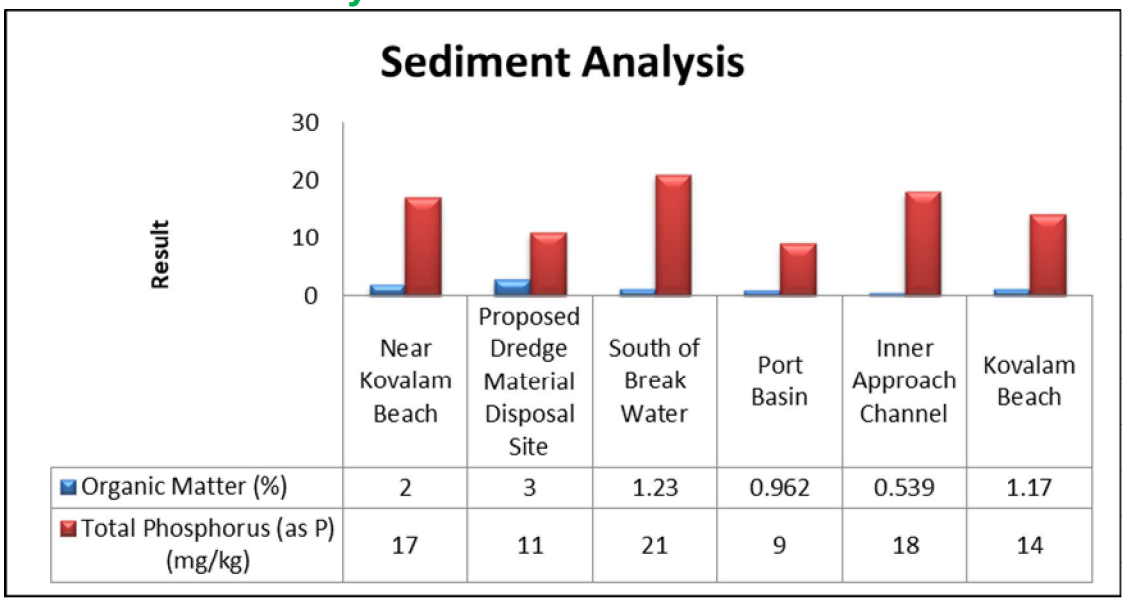


	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
High tide	5.3	5.4	5.7	5.6	5.8	5.4
Low tide	5.2	5.2	5.5	5.4	5.6	5.2

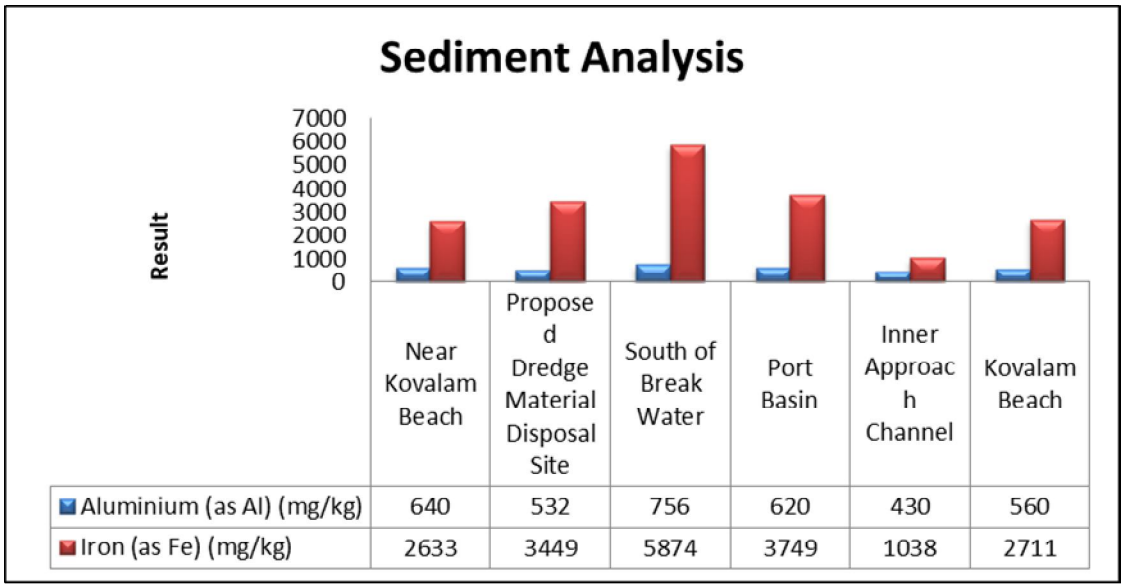


	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
High tide	4.9	5.1	5.5	5.8	5.7	4.8
Low tide	5.0	5.4	5.7	6.0	5.9	5.1

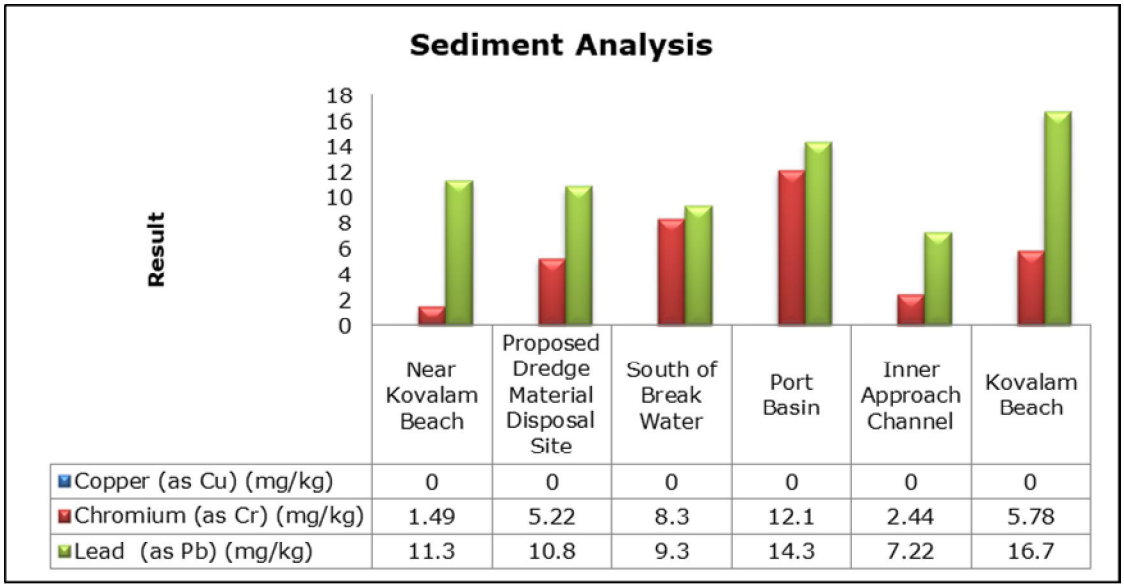
4 b. Sediment Analysis



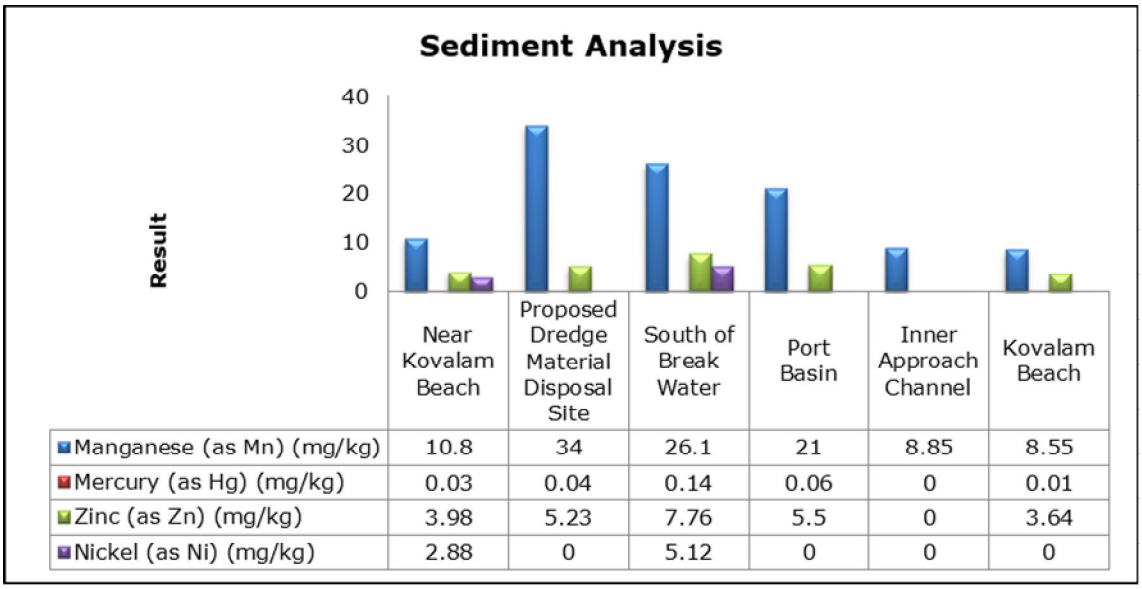
	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
Organic Matter (%)	2	3	1.23	0.962	0.539	1.17
Total Phosphorus (as P) (mg/kg)	17	11	21	9	18	14



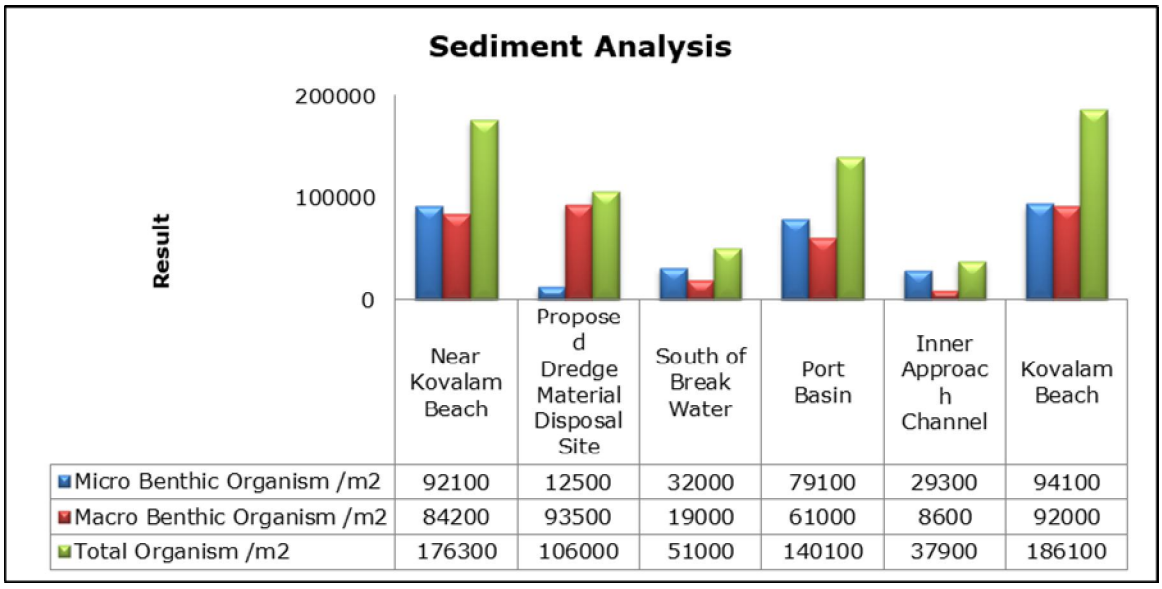
	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
Aluminium (as Al) (mg/kg)	640	532	756	620	430	560
Iron (as Fe) (mg/kg)	2633	3449	5874	3749	1038	2711



	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
Copper (as Cu) (mg/kg)	0	0	0	0	0	0
Chromium (as Cr) (mg/kg)	1.49	5.22	8.3	12.1	2.44	5.78
Lead (as Pb) (mg/kg)	11.3	10.8	9.3	14.3	7.22	16.7

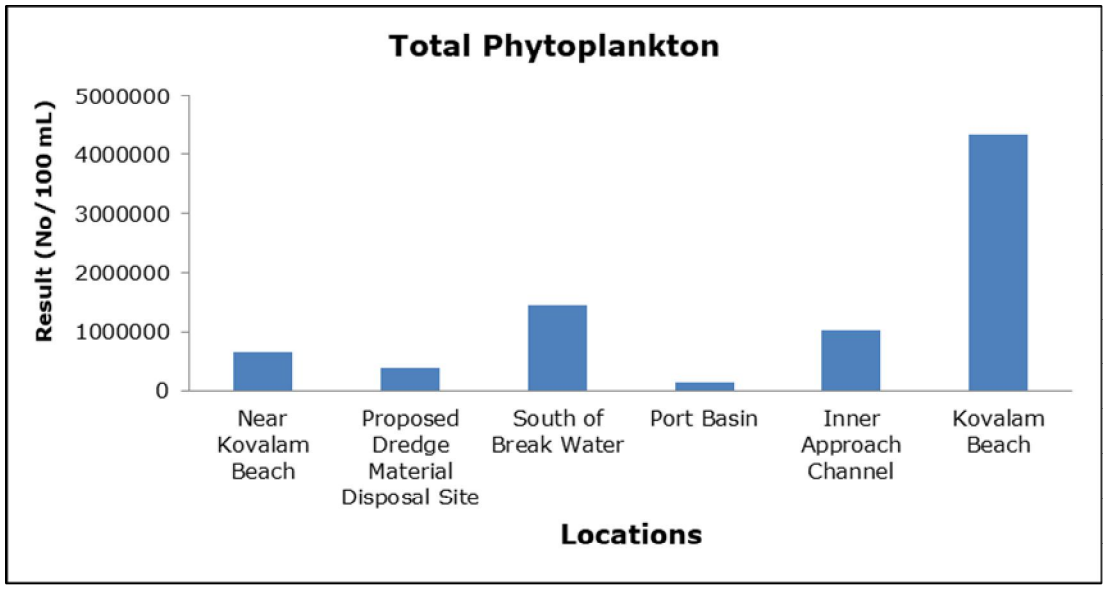


	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
Manganese (as Mn) (mg/kg)	10.8	34	26.1	21	8.85	8.55
Mercury (as Hg) (mg/kg)	0.03	0.04	0.14	0.06	0	0.01
Zinc (as Zn) (mg/kg)	3.98	5.23	7.76	5.5	0	3.64
Nickel (as Ni) (mg/kg)	2.88	0	5.12	0	0	0

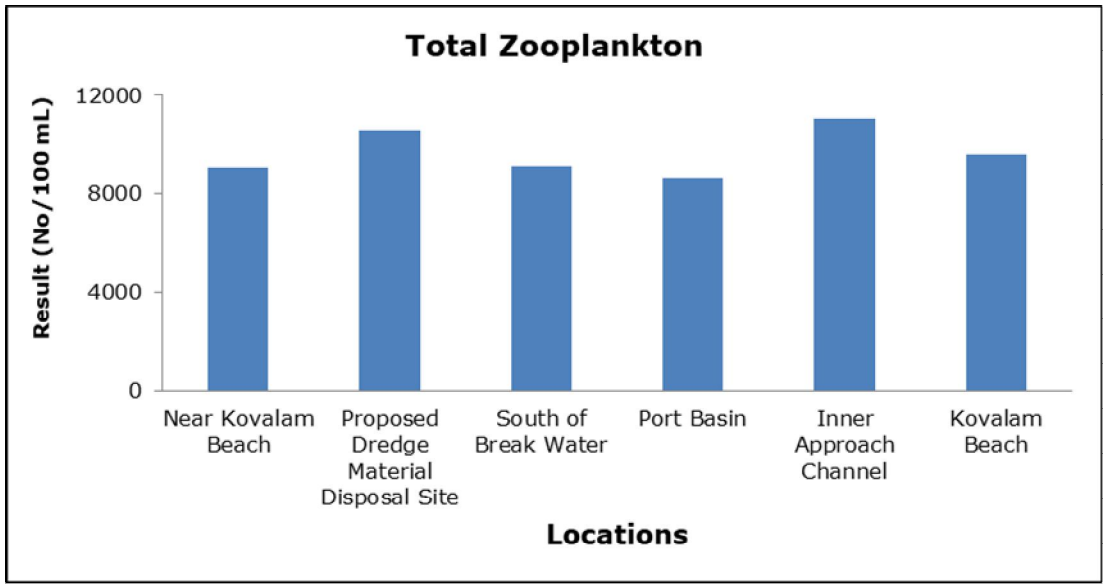


	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
Micro Benthic Organism /m2	92100	12500	32000	79100	29300	94100
Macro Benthic Organism /m2	84200	93500	19000	61000	8600	92000
Total Organism /m2	176300	106000	51000	140100	37900	186100

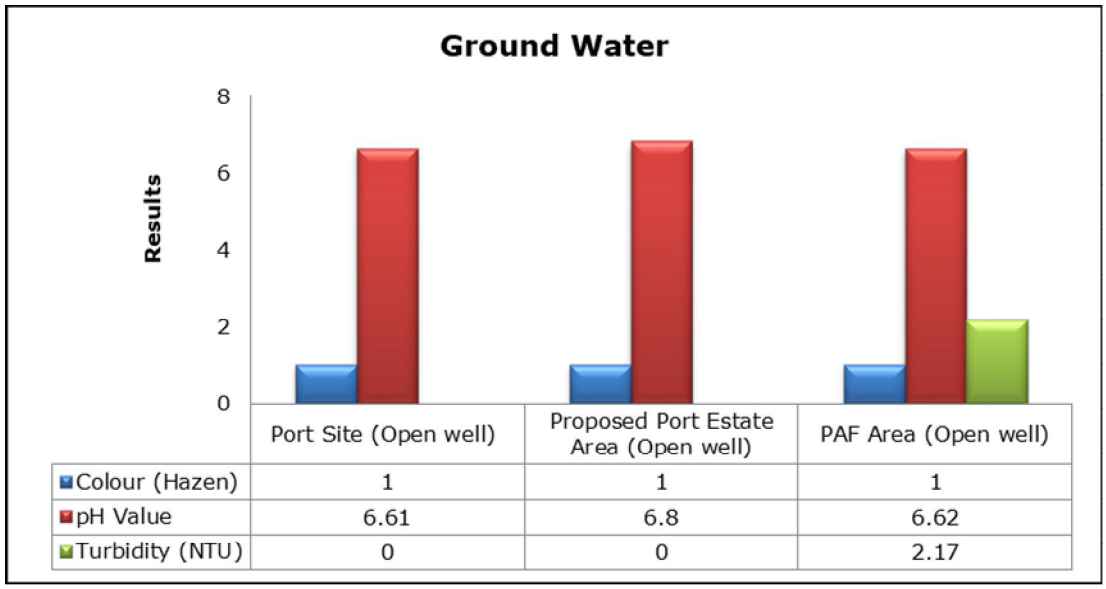
4 c. Phytoplankton Analysis from Marine Samples



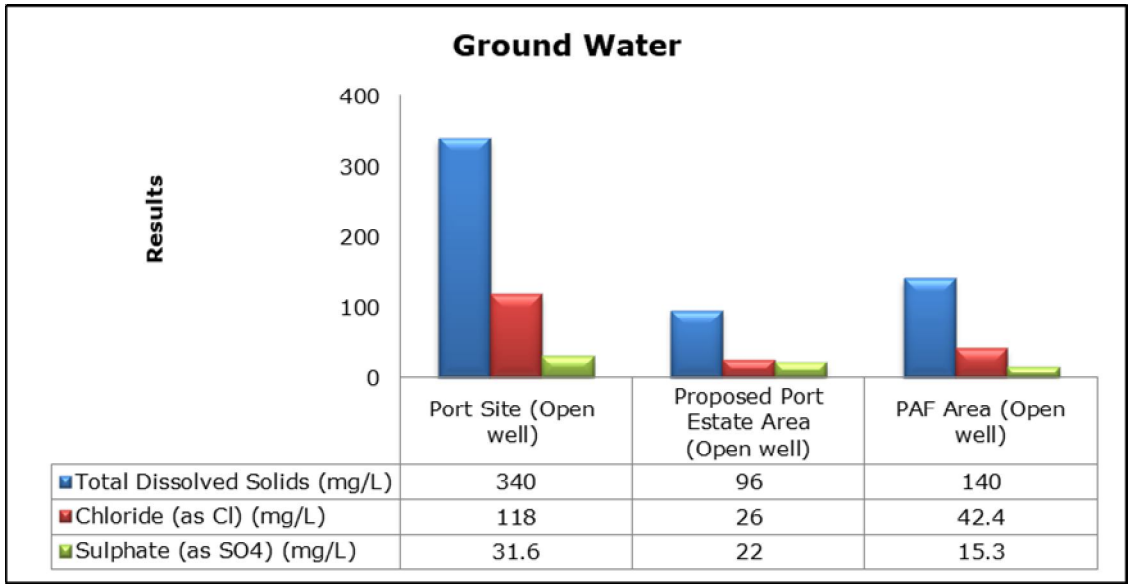
4 d. Zooplankton Analysis from Marine Sample



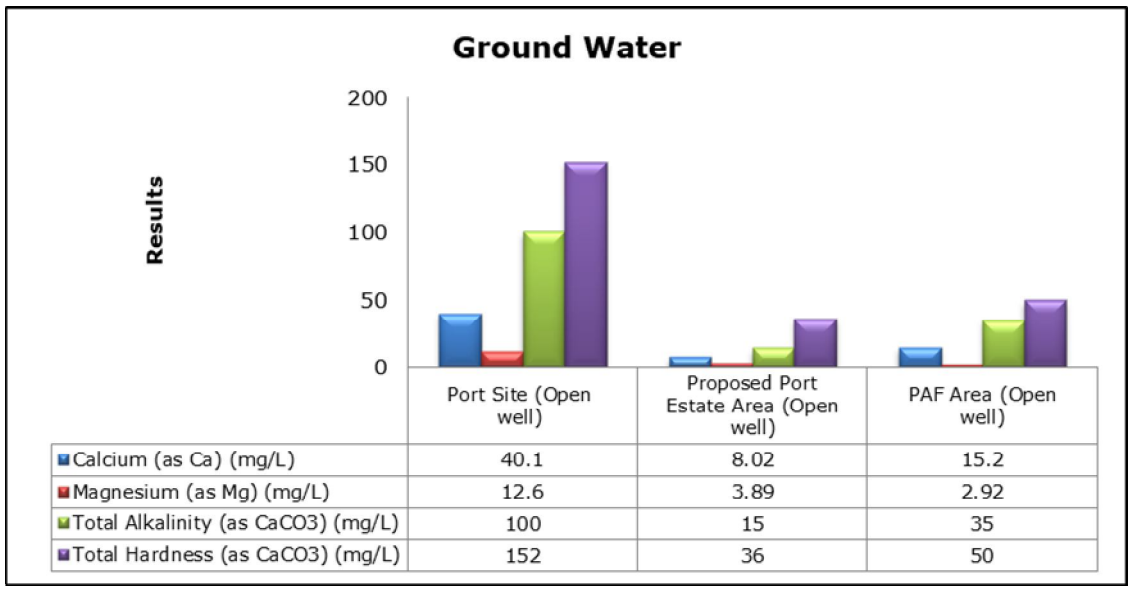
5. Groundwater Analysis



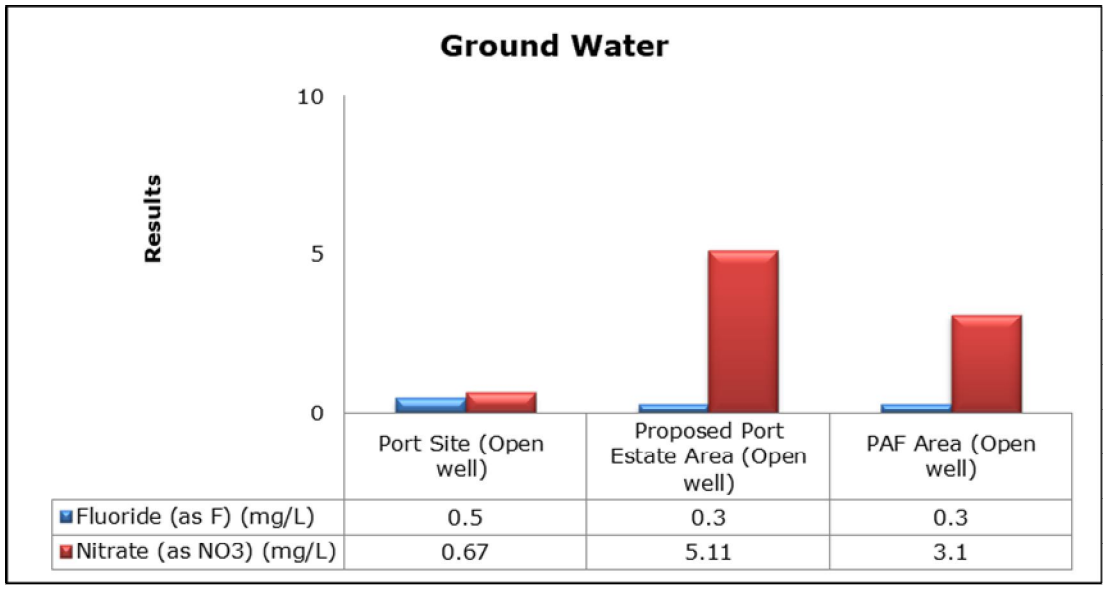
	Port Site (Open well)	Proposed Port Estate Area (Open well)	PAF Area (Open well)
Colour (Hazen)	1	1	1
pH Value	6.61	6.8	6.62
Turbidity (NTU)	0	0	2.17



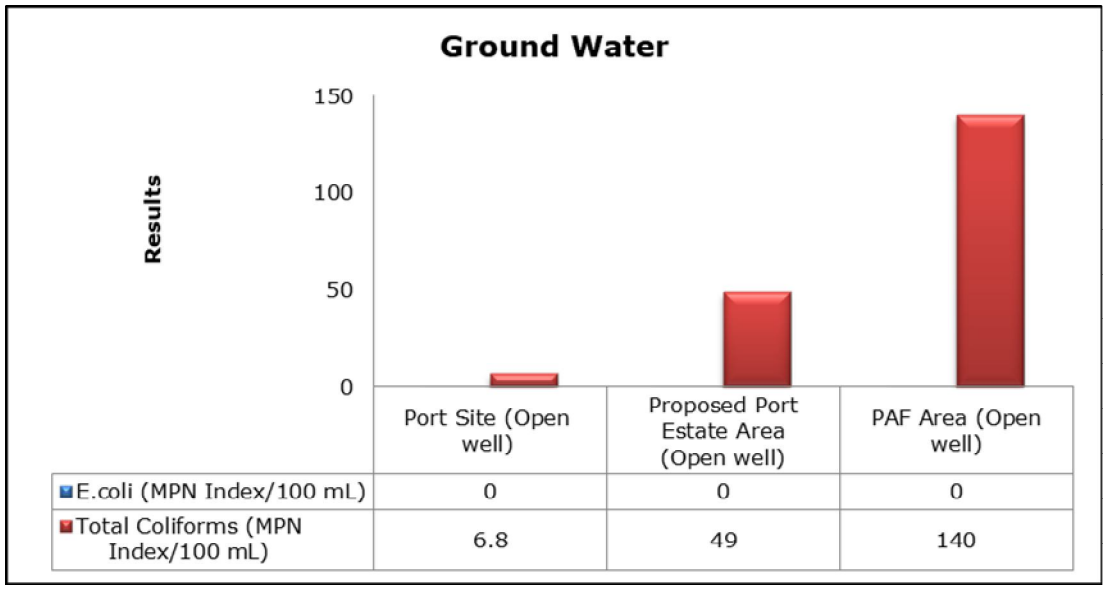
	Port Site (Open well)	Proposed Port Estate Area (Open well)	PAF Area (Open well)
Total Dissolved Solids (mg/L)	340	96	140
Chloride (as Cl) (mg/L)	118	26	42.4
Sulphate (as SO4) (mg/L)	31.6	22	15.3



	Port Site (Open well)	Proposed Port Estate Area (Open well)	PAF Area (Open well)
Calcium (as Ca) (mg/L)	40.1	8.02	15.2
Magnesium (as Mg) (mg/L)	12.6	3.89	2.92
Total Alkalinity (as CaCO3) (mg/L)	100	15	35
Total Hardness (as CaCO3) (mg/L)	152	36	50

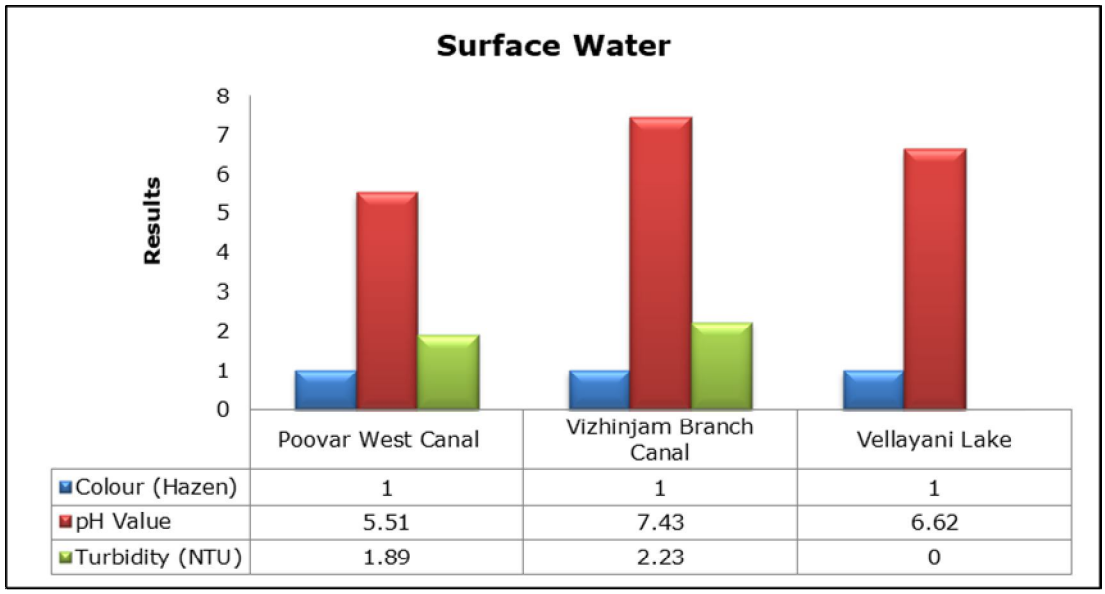


	Port Site (Open well)	Proposed Port Estate Area (Open well)	PAF Area (Open well)
Fluoride (as F) (mg/L)	0.5	0.3	0.3
Nitrate (as NO3) (mg/L)	0.67	5.11	3.1

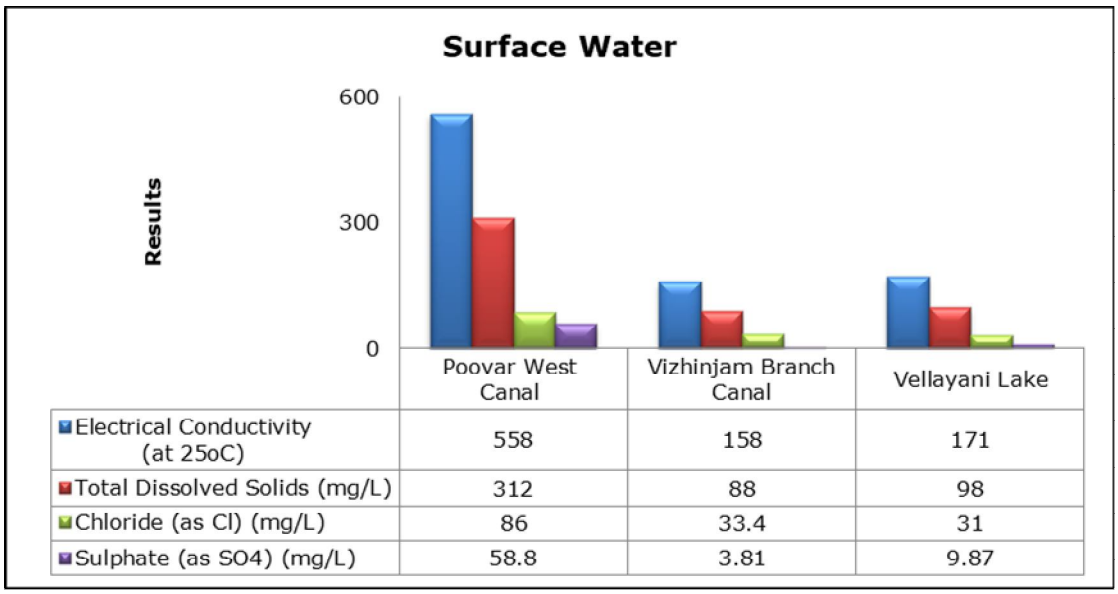


	Port Site (Open well)	Proposed Port Estate Area (Open well)	PAF Area (Open well)
E.coli (MPN Index/100 mL)	0	0	0
Total Coliforms (MPN Index/100 mL)	6.8	49	140

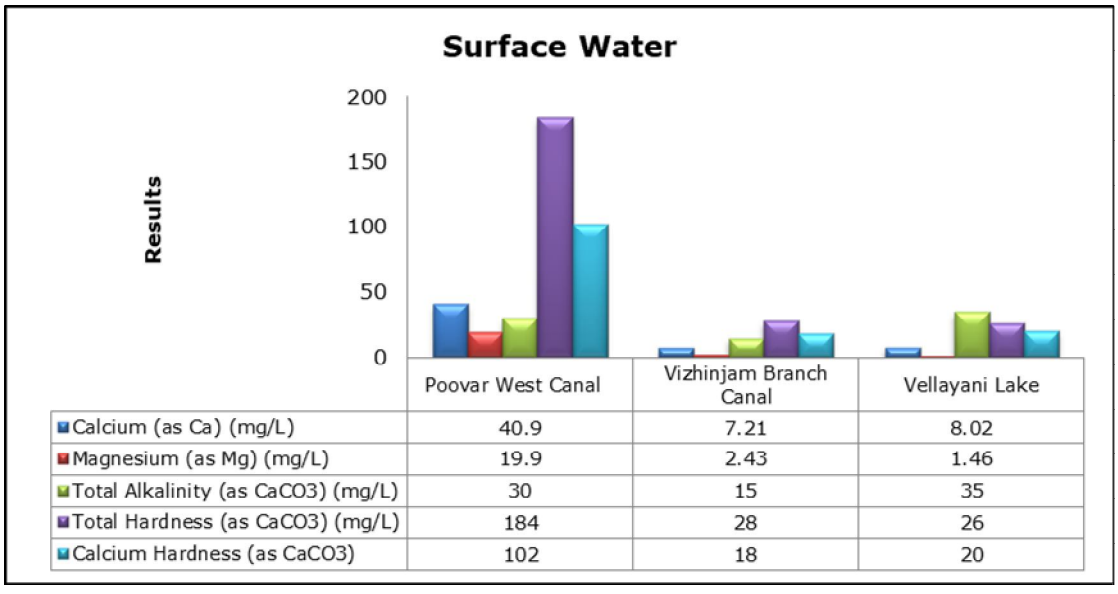
6. Surface Water Analysis



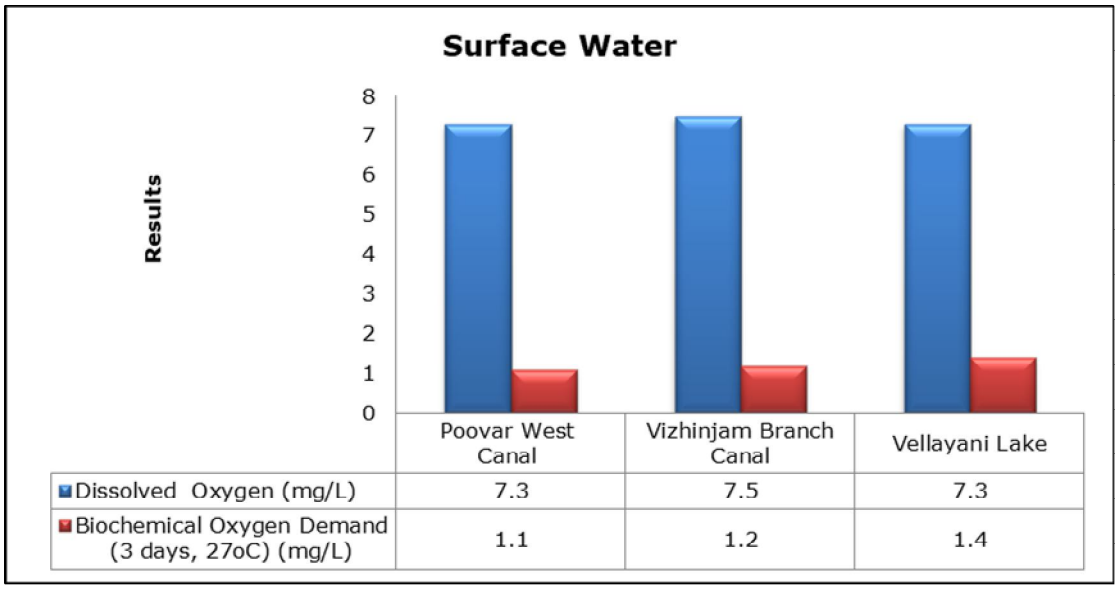
	Poovar West Canal	Vizhinjam Branch Canal	Vellayani Lake
Colour (Hazen)	1	1	1
pH Value	5.51	7.43	6.62
Turbidity (NTU)	1.89	2.23	0



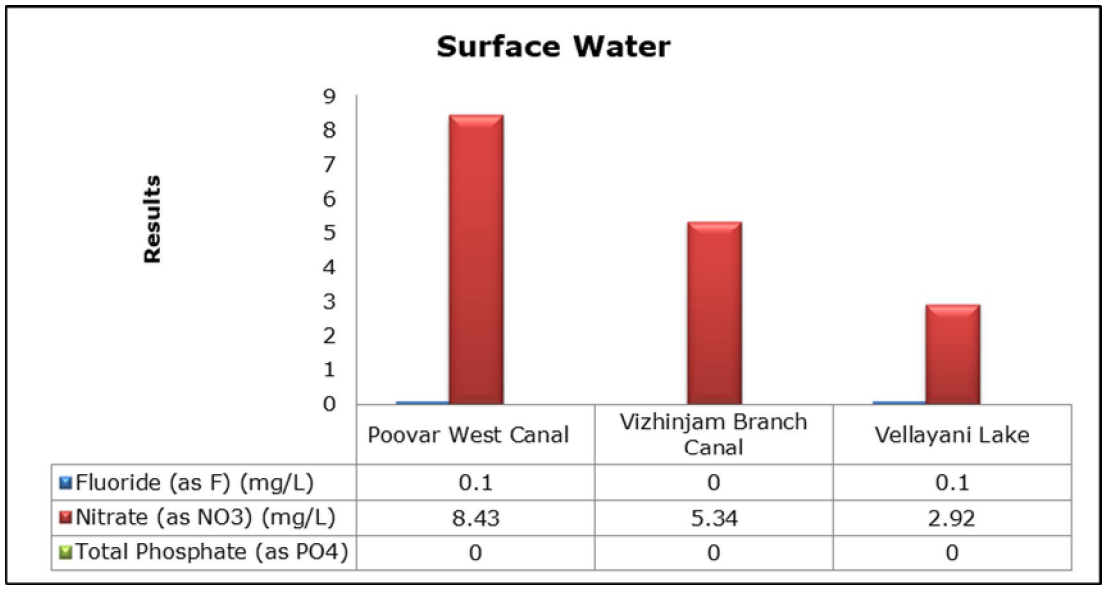
	Poovar West Canal	Vizhinjam Branch Canal	Vellayani Lake
Electrical Conductivity (at 25oC)	558	158	171
Total Dissolved Solids (mg/L)	312	88	98
Chloride (as Cl) (mg/L)	86	33.4	31
Sulphate (as SO4) (mg/L)	58.8	3.81	9.87



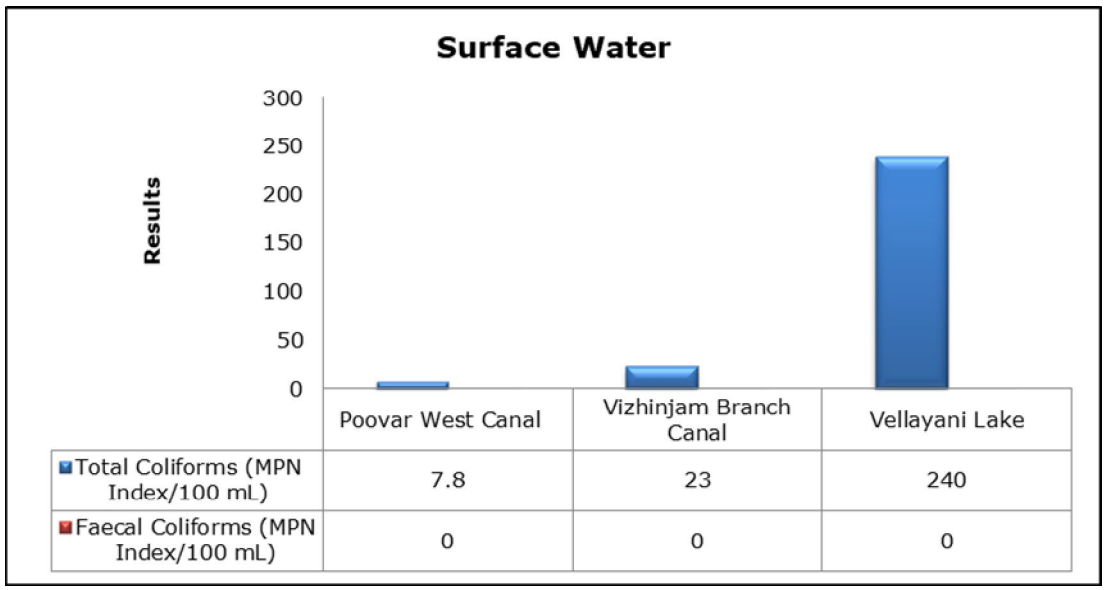
	Poovar West Canal	Vizhinjam Branch Canal	Vellayani Lake
Calcium (as Ca) (mg/L)	40.9	7.21	8.02
Magnesium (as Mg) (mg/L)	19.9	2.43	1.46
Total Alkalinity (as CaCO3) (mg/L)	30	15	35
Total Hardness (as CaCO3) (mg/L)	184	28	26
Calcium Hardness (as CaCO3)	102	18	20



	Poovar West Canal	Vizhinjam Branch Canal	Vellayani Lake
Dissolved Oxygen (mg/L)	7.3	7.5	7.3
Biochemical Oxygen Demand (3 days, 27oC) (mg/L)	1.1	1.2	1.4



	Poovar West Canal	Vizhinjam Branch Canal	Vellayani Lake
Fluoride (as F) (mg/L)	0.1	0	0.1
Nitrate (as NO3) (mg/L)	8.43	5.34	2.92
Total Phosphate (as PO4)	0	0	0



	Poovar West Canal	Vizhinjam Branch Canal	Vellayani Lake
Total Coliforms (MPN Index/100 mL)	7.8	23	240
Faecal Coliforms (MPN Index/100 mL)	0	0	0