HETERO INFRASTRUCTURE SEZ PVT LTD.
Ch. Lakshmipuram (Vill)
N. Narasapuram (Village), Rajayyapeta (Vill),
Nakkapalli (Mandal),
Anakapalli (Dist) - 531 081, A.P., INDIA.
Tel : +91 891 2877900

16th May 2026

Letter NO: HIS/EHS/MoEF&CC/2026-27/02

The Director
Integrated Regional Office (IRO)
Ministry of Environment, Forest & Climate Change
Green House complex, Gopala Reddy Road
Vijayawada - 520010,
Andhra Pradesh.

Dear Sir,

Sub : Laying of new marine disposal pipeline in place of existing two lines and increase of marine discharge quantity at N. Narasapuram (V), CH. Lakshmipuram (V), Rajayyapeta (V), Peda Teenarla (V) of Nakkapalli (M), Visakhapatnam District, Andhra Pradesh by M/s Hetero Infrastructure SEZ Ltd – Submission of six-monthly compliance Report – Regarding

Ref : CRZ Clearance issued vide F.No:11-45/2022-IA-III dated 11/01/2023

With reference to the above, please find enclosed herewith six-monthly compliance report of CRZ clearance issued to M/s Hetero Infrastructure SEZ Ltd for the period 1st October 2025 to 31st March 2026 with all necessary enclosures for your kind information and perusal.

You are requested to kindly acknowledge the receipt.

Thanking you,

Yours faithfully,
For Hetero Infrastructure SEZ Ltd

S. Kullayi Reddy
Associate Vice President -EHS

Enclosures : As above

COMPLIANCE TO THE CONDITIONS OF CRZ CLEARANCE ISSUED TO M/S HETERO INFRASTRUCTURE SEZ LTD VIDE F.NO: 11-45/2022-IA-III DATED 11/01/2023 COMPLIANCE PERIOD: 1ST OCTOBER 2025 TO 31ST MARCH 2026

S.NO	Specific conditions	Compliance
1	All Constructions shall be strictly in accordance with the provision of the CRZ Notification,2011, as Amended from time to time.	**Complied.** There are no major constructions involved in the project. The clearance is only for laying of new marine disposal pipeline in place of existing pipeline. *The excavation, casting of concrete blocks and minimum required constructions have been carried as per CRZ notification, 2011*
2	M/s Hetero Infrastructure SEZ Ltd. Should strictly ensure disposal of treated effluent discharge into sea or marine outfalls to the prescribe standard of CPCB/SPCB.	**Complying.** The industry is disposing the treated effluents into the Sea through marine outfall after meeting the standards prescribed by CPCB/SPCB from Guard ponds in the presence of APPCB Officials only after meeting the standards prescribed in the CTO Order. Online Continuous Effluent Monitoring system (OCEMS) has been installed in the marine disposal pipeline and connected to both APPCB & CPCB websites for continuous monitoring. Copy of analysis report of Treated effluent is enclosed as ***Annexure-I***.
3	The existing pipeline is to be removed after commissioning of the new pipeline	**Complied.** The industry has put old pipeline out of usage after putting the new pipeline into operation by disconnecting all the pipelines and pumps connected to it w.e.f. 6th June 2024.
4	No brine discharge is permitted currently in the new pipeline. A detailed study to be undertaken on the effluent characteristics due to mixing of brine and treated wastewater and its impact and mitigation. PP will apply separately for allowing discharging of brine and along with effluent among completion of such studies.	**Complying.** Two separate pipelines are being used for disposal of treated effluent & Brine (desalination rejects). The industry is not mixing the brine & treated effluent before discharging into Sea.
5	Any temporary physical Infrastructure setup and excavated material during laying of pipeline shall not be dumped into water bodies are adjacent areas and the site shall be restored to its original condition after completion of construction of work.	**Complied.** No temporary physical infrastructure was created in the project area and the excavated material has been backfilled in the area where it was excavated after laying the pipeline. There is no disposal of construction/ Excavated material during the project.

6	Intake and outfall with 3km radius to be monitored for water quality and marine ecosystem through a nationally reputed institute having expertise in the subject and reported and same should be submitted to IRO.	**Complying.** The industry is carrying the monitoring of water quality & marine ecosystem through National Institute of Oceanography/ MoEFCC approved agency in 5 Km radius of intake & outfall. Reports are being submitted to IRO, MoEF&CC along with six monthly compliance reports. Copy of monitoring report is enclosed as **Annexure-II**.
7	No storage reservoir for sea water shall be permitted and only pipeline conveyance systems shall be installed.	**Complied.** The industry has not created reservoir for storage of sea water in the project area. installed the pipelines for sea water intake and disposal of treated effluent directly into sea from the guard ponds.
8	No ground water shall be extracted within the CRZ area to meet the water requirement during the construction and /or operation phase of the project.	**Complied.** No ground water is being extracted (within or outside CRZ area) for the project and the industry is using desalination water for meeting the water required for the project and for regular operation of the project.
9	Permanent labour camp, machinery and material storage shall not be set up in the CRZ area.	**Complied.** No Labour camps and storage sheds are constructed in the CRZ area for the project.
10	All the conditions stipulated by the Andhra Pradesh Coastal Zone Management Authority for CRZ clearance 2019 vide its letter No. CRZ 382/CRZ/IND/2022-575 dated 09/11/2022 and commitments made by the PP before the APCZMA and EAC shall be followed in letter and spirit.	**Complying.** The industry is complying with the conditions stipulated by the APCZMA in its letter No. CRZ/382/CRZ/IND/2022-575 dated 09/11/2022. Copy of the Compliance report is enclosed as **Annexure-III.**
11	All necessary clearance from the concerned authority, as may be applicable should be obtained prior to commencement of project or activity.	**Complied.** The industry has obtained all permissions required for the projects and completed the installation of pipeline. The details of the permissions obtained for laying of new are shown below:

Name of the Clearance	Issuing Authority	Clearance No & Date
Consent to Establish (CTE)	APPCB	219/APPCB/CTE/RO-VSP/HO/2026 Date: 26/02/2026
Consent to Operate (CTO)	APPCB	APPCB/VSP/VSP/219/HO/CTO/2025 Date:13/06/2025
Permission from the Port	AP Maritime Board	PPP/Extended Limits/2022 Date: 04/02/2023

GENERAL CONDITIONS		
1	Management of solid waste in accordance with the Solid Waste Management Rules, 2016 shall be strictly implemented.	**Complying.** The industry is complying with the Solid Waste Management Rules, 2016 by disposing the waste in accordance with the rules and as specified in the CTO issued by APPCB.
2	Consent to establishment and/or Consent to operate shall be obtained	**Complying.**

	from State Pollution Control Board under the provisions of air (Prevention and Control of pollution) Act, 1981 and/ or the water (Prevention and control of pollution) Act 1974, as may be applicable.	➢ The industry has obtained Consent to Establishment (CTE) for laying of pipeline from APPCB vide order NO: **Order No.219/APPCB/CFE/RO-VSP/HO/2010 dated 15/02/2023**. ➢ The industry has obtained Consent to Operate (CTO)from APPCB vide order No: **APPCB/VSP/VSP/219/HO/CTO/2024- Dated 21/03/2024 valid up to 31/12/2027.** Copies of CTE and CTO are enclosed as **Annexure- IV**.
3	Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval Competent authority.	**Complied.** The project is only laying of new pipeline in place of existing pipeline and hence there is no muck generation during the project execution. The industry has not created any disturbance to the neighbouring community during the construction/laying of pipeline.
4	All the liquid waste arising from the proposed development will be disposed of as per the norms prescribe by Central/ State Pollution Control Board. There shall not be any disposal of untreated effluent into the sea / coastal water bodies. it shall be ensured that the wastewater generated is treated in the STP as committed by the project proponent. The treated wastewater shall be reused for landscaping, flushing and/ or HVAC cooling purpose etc. within the development. The project proponent should also make alternate arrangement for situation arising due to malfunctioning of STP. There shall be regular monitoring of standard parameters of the effluent discharge from STP under intimation to the SPCB.	**Complied.** ***The proposed development is only for laying of new pipeline in place of existing pipeline and hence there is no liquid waste generated from the new project***. This is to inform that, the industry is treating & disposing the liquid waste (trade effluent) only after meeting the standards prescribed by the CPCB/APPCB in the presence of APPCB Officials. The domestic waste is being treated in the STP and reused for gardening and greenbelt development. All parameters are being monitored by third party (Approved by MoEF&CC) for the parameters mentioned in CTO issued by APPCB.
5	Any hazardous waste generated during construction phase, shall be disposed off as per applicable rules and norms with necessary approvals of the State Pollution Control Board.	**Complied.** There is no hazardous waste generation during construction phase as the project involves only laying of pipeline**.** Obtained CTE & CTO for laying of new pipeline from APPCB.
6	A Copy of the clearance letter shall be uploaded on the website of the concerned State Coastal Zone Management Authority/State Pollution Control Board. The Clearance letter shall also be displayed at the regional office, District Industries Centre, and	**Complied.** The industry has submitted Clerance letters to APPCB, Collector Office and Tahsildar Office for necessary action at their end**.** ***Displaying of clearance letter in APCZMA & APPCB website is not in the scope of Industry.***

	Collector's Office/Tehsildars' office for 30 days.	
7	A six-monthly monitoring reports shall need to be submitted by the project proponent to the concerned Regional Office of this Ministry regarding the implementation of the stipulated conditions.	**Complied.** The industry is submitting six monthly compliance reports regarding the implementation of the stipulated conditions to IRO, Vijayawada by 1st June and 1st December of every year.
8	The Ministry of Environment, Forest & Climate Change or any other competent Authority may stipulate any additional conditions or modify the existing ones, if necessary, in the interest of environment and the same shall be complied with.	**Noted and agreed upon.**
9	Full Co-operation shall be extended to the officials from the Regional Office of MoEF & CC, during monitoring of implementation of environmental safeguards stipulated. It shall be ensured that documents/data sought pertinent is made available to the monitoring team. A complete set of all documents submitted to MoEF&CC shall be forwarded to the concerned Regional Office of MoEF&CC.	**Complying.** The industry is extending its full co-operation to the officials from the Regional Office of MoEF & CC, during monitoring of implementation of environmental safeguards stipulated. The industry is providing all documents/data sought by the monitoring Team. The industry has forwarded all documents submitted to MoEF&CC to the IRO, Vijayawada through e-mail dated 27/04/2024 and submitted hard copies of complete set of documents at IRO, Vijayawada on 10th June 2024. Copy of e-mail sent to IRO & Copy of hard copy acknowledgement are enclosed as ***Annexure- V.***
10	In the case of any change (s) in the scope of the project, the project would require a fresh appraisal by this Ministry.	**Noted and will be followed.**
11	The Ministry reserve the right to add additional safeguard measures subsequently, if considered necessary, and to take action to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner, including revoking of the environment clearance under the provisions of the Environmental (Protection) Act ,1986, for Non-Compliance.	**Noted and agreed upon.**
12	All other statutory clearance such as the approval for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act,1980 and wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project	**Being Complied.** The industry obtained following clearances for the project: ➢ Fire NOC from APSDRFS Department ➢ Permission from the Ports

	proponent from the respective competent authority	There is no diesel storage in the area and hence permission from Chief Controller of Explosives is not applicable.
13	The Project proponent should advertise in at least two local newspaper widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded CRZ Clearance and copies of clearance letters are available with the State Pollution Control Board (SPCB) And may also be seen on the website of the Ministry of Environment, Forest and Climate Change at https://parivesh.nic.in The advertisement should be made within Sven days from the date of receipt of the clearance letter and a copy of the same should be forwarded to the concerned Regional Office of this Ministry.	**Complied.** The industry has informed the public by advertising in two newspapers on 29th January 2023 (The Hindu and Sakshi Newspapers) about CRZ clearance. Copies of News paper Advertisement is enclosed as **Annexure-VI.**
14	A copy of the clearance letter shall be sent by the proponent to be concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.	**Complied.** The industry has submitted copy of clearance letter to all Panchayats and to the District Collector, Anakapalli. Copy of the acknowledgement is enclosed as **Annexure-VII.**
15	The proponent shall upload the status of compliance of the stipulated conditions including results of monitored data on their websites and shall updates the same periodically.it shall simultaneously be sent to the regional office of MoEF&CC, the respective Zonal office of CPCB and the SPCB.	**Complied.** The industry has uploaded the six-monthly compliance report in the Company website www.hetero.com.
16	The environmental statement for each financial year ending 31st march in FORM-V as is mandated to be submitted by the project proponent to the concerned State pollution Control Board as prescribed under the Environment (Protection) Rules, 1986,as amended subsequently, shall also be put on the website of the project proponent along with the status of compliance of clearance conditions and shall also be sent to the respective Regional Office of the Ministry by e-mail.	**Complied.** The industry is regularly submitting the Form-V of M/s Hetero Infrastructure SEZ Ltd along with six monthly compliance reports to IRO, Vijayawada and is being placed in Company website www.hetero.com. The current clearance is only for laying of new pipeline in place of existing pipeline and it is part of M/s Hetero Infrastructure SEZ Ltd.
6	This Clearance is subject to final order of the Hon'ble Supreme court of India in the matter of Goa Foundation Vs	**Noted and agreed upon.**

	Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.	
7	This Ministry reserve the right to stipulate additional conditions, if found necessary at subsequent stages and the project proponent shall implement all the said conditions in a time bound manner. The Ministry may revoke or suspend the CRZ Clearance, if implementation of any of the above conditions is not found satisfactory.	**Noted and agreed upon.**
8	Concealing factual data or submission of false/ fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act,1986.	**Noted and agreed upon.**
9	Any appeal against this CRZ Clearance shall lie with the National Green Tribunal, if Preferred, within a period of 30 days as prescribe under section 16 of the National green Tribunal Act,2010.	--
10	The above conditions shall be enforced, inter-alia under the provisions of the Water (prevention & Control of pollution)Act,1974, the Air (prevention Control of pollution) Act,1981, the Environment (protection) Act,1986, Hazardous and Other Waste (Management and Transboundary movement) Rules,2016 and the Public Liability Insurance Act,1991 along with their amendment and Rules and any other ordered passed by the Hon'ble supreme Court of India / High Court and any other Court of law relating to the subject matter.	**Noted and agreed upon.**

Hetero Infrastructure SEZ Ltd

25/03/2026

S. Kullayi Reddy
Associate Vice President

ANNEXURE-I

SV ENVIRO LABS & RESEARCH PRIVATE LIMITED

formerly known as SV ENVIRO LABS & CONSULTANTS
Researching for better Environmental Solutions

Ref: SV/HISEZL/26-04/01 Date: 23-04-2026

NAME AND ADDRESS : **M/s. HETERO INFRASTUCTURE SEZ LIMITED,**
N.Narasapuram Village,
Nakkapally Mandal,
Visakhapatnam District.

SAMPLE PARTICULARS : **EFFLUENT ANALYSIS**

SOURCE OF COLLECTION : ETP OUTLET

DATE & TIME OF COLLECTION : 14-04-2026

DATE OF RECEIPT : 14-04-2026

TEST REPORT

S NO	PARAMETER	UNIT	RESULT	STANDARD	METHOD (APHA 24th Ed, 2023)
1.	pH	-	6.98	6.0-9.0	APHA,4500-H+B
2.	Chemical Oxygen Demand – COD	mg/l	90.0	250	APHA,5220-B
3.	Bio-Chemical Oxygen Demand– BOD (3 days incubation at 27^0C)	mg/l	26.0	100	IS 3025 Part 44
4.	Total Suspended Solids (TSS)	mg/l	53.0	100	APHA,2540-D
5.	Temperature	^{o}C	21.6	Shall not exceed more than 5^0C above ambient water	APHA,2550-B
6.	Oil & Grease	mg/l	<1.0	10.0	APHA,5520-D
7.	Ammonical Nitrogen	mg/l	14.3	50.0	APHA,4500-NH_3
8.	Total Kjeldahl Nitrogen (TNK)	mg/l	32.4	50.0	APHA,4500-Norg B.
9.	Nitrate –Nitrogen	mg/l	4.68	50.0	APHA,4500 NO3-C
10.	Phosphates as P	mg/l	3.92	5.0	APHA,4500-P E
11.	Fluoride as F	mg/l	1.33	15.0	APHA,4500-S^2
12.	Sulphide as S	mg/l	<0.1	2.0	APHA,4500S^2 D
13.	Phenolic compounds (C_6H_5OH)	mg/l	<0.001	5.0	APHA,5530-C
14.	Total Residual Chlorine	mg/l	<0.1	1.0	APHA,4500-CL
15.	Zinc as Zn	mg/l	0.18	15.0	APHA,3120-B
16.	Iron	mg/l	<0.02	3.0	APHA,3500-FE
17.	Copper as Cu	mg/l	<0.02	3.0	APHA,3120-B
18.	Trivalent Chromium	mg/l	<0.02	2.0	APHA,3120-B
19.	Manganese as Mn	mg/l	<0.02	2.0	APHA,3120-B
20.	Nickel as Ni	mg/l	<0.02	3.0	APHA,3120-B
21.	Arsenic as As	mg/l	<0.02	0.2	APHA,3120-B
22.	Vanadium	mg/l	<0.02	0.2	APHA,3120-B
23.	Lead as Pb	mg/l	<0.02	0.1	APHA,3120-B

Recognized by GOI - MoEFCC, Accredited by NABL & NABET

Corporate Office and Laboratory: Enviro House, B-1, Block-B, IDA, Autonagar, Visakhapatnam - 530012
Hyderabad Office: #402, SaiKrishna Villa, Behind CMR Shopping Mall, AS Raju Nagar, Kukatpally, Hyderabad - 500072
Website: www.svenvirolabs.com
E-Mails : info@svenvirolabs.com, svenviro_labs@yahoo.co.in
Contacts 0891-2755528, +91 7207664444
PAN: ABQCS0643F
CIN: U74909AP2025PTC119098

24.	Hexavalent chromium as Cr^{+6}	mg/l	<0.1	0.1	APHA,3500-Cr B
25.	Selenium as Se	mg/l	<0.02	0.05	APHA,3120-B
26.	Cadmium as Cd	mg/l	<0.02	0.05	APHA,3120-B
27.	Mercury as Hg	mg/l	<0.02	0.01	APHA,3120-B

CHECKED BY

SV Enviro Labs & Research Pvt. Ltd. VSP-12

AUTHORIZED SIGNATORY

Post Project Monitoring study around the marine outfall points of Hetero Infrastructure SEZ Ltd in the coastal waters off Rajayyapeta

Sponsored by

HETERO INFRASTRUCTURE SEZ LIMITED

Spectra Envirotech Private Limited

December 2025

CONTENTS

P R E F A C E

M/s. Hetero Infrastructure SEZ limited, Rajayyapeta village, Nakkapalli Mandal, Anakapalle district issued work order (No. 7599000715 dated 21.05.2025) to M/s Spectra Envirotech Private Limited to carry out the post project monitoring of marine environment at its marine outfall point (MOP) to know the impacts on the ecology, seawater quality and sediment characteristics due to the discharge of treated effluent from Hetero chemical complex. M/s Spectra Envirotech Private Limited has conducted a field campaign on 23rd May 2025 in the marine outfall region of M/s Hetero Chemical Complex for sample collection for the comprehensive study on water quality, biological and sediment characteristics of the region.

The following studies were carried out:

- The main objective of this study is to conduct monitoring of physico-chemical, biological and sedimentological parameters in the coastal waters off Rajayyapeta to assess the present status of marine ecology.

- Toxicological studies to know the survival rate of the test species with the treated effluent from the guard pond of M/s Hetero Infrastructure SEZ Limited.

Results of this study is described in this report and provides recommendations to M/s Hetero Infrastructure SEZ limited to maintain the sea water quality and health of the ecosystem in the coastal waters off Rajayyapeta.

Acknowledgements

M/s Spectra Envirotech Private Limited, Visakhapatnam acknowledges **Shri S. Kullayi Reddy,** Associate Vice President, EHS**,** Hetero Infrastructure SEZ Limited for his keen interest, involvement, support and continuous interaction throughout the project tenure.

Executive Summary

M/s Spectra Envirotech Private Limited received a work order from M/s Hetero Infrastructure SEZ Limited to conduct post project monitoring study of the marine environment around its marine outfall point in the coastal waters of Rajayyapeta. M/s Spectra Envirotech Private Limited has carried out a field sample collection in the coastal waters off Rajayyapeta on 23rd May 2025. The salient features of our study are given below.

- ✓ The range of values observed for temperatures and salinities of the study region is normal and consistent with coastal waters of east coast of India.
- ✓ The range of concentrations observed for chemical parameters such as dissolved inorganic nutrients is normal and is concurrent with the coastal waters along the east coast of India.
- ✓ The range of values observed for pH and total suspended matter in the study region are normal and are well within the values reported for coastal waters of east coast of India.
- ✓ Mean dissolved oxygen (DO) concentrations in the surface (6.6±0.2 mg/L) and bottom (6.4±0.2 mg/L) waters of the study region are well above the threshold limit of DO concentrations for good quality of seawater (5.0 mg/L), indicating that coastal waters of this region are healthy with respect to DO concentrations.
- ✓ Mean values of biochemical oxygen demand for three days (BOD_3) in the surface and bottom waters of this study (2.1±0.6 mg/L and 2.3±0.5 mg/L, respectively) are well within the reported BOD_3 values for east Indian coastal waters. The BOD_3 values found in this study

indicate that there is no significant pollution of organic matter load from external sources during the study period.

✓ Phytoplankton biomass, in terms of Chlorophyll-a (chl-a), varied from 0.6 to 1.3 mg/m^3 (mean: 1.0 mg/m^3) and it is comparable with previous reports from this region.

✓ Phytoplankton abundance varied from 6942 No/L to 13201 No/L in surface waters and from 6127 No/L to 12764 No/L in bottom waters. Mean phytoplankton abundance in the study region is more or less similar in surface (10297±1797 No/L) and bottom (10723±1790 No/L) waters of the study region. The phytoplankton abundance found in this study is relatively higher than those reported in previous study conducted in this region (4952 No/L and 8262 No/L, respectively).

✓ Number of phytoplankton genera identified in the study region is limited to 28 in surface waters and 27 in the bottom waters. Most of the phytoplankton belongs to diatom group. Diatoms contribution to the total phytoplankton is ~68% in the surface waters and ~71% in the bottom waters. Dinoflagellate contribution to the total phytoplankton abundance was 20% in the surface waters and 21% in the bottom waters. Contribution from other phytoplankton groups to the total phytoplankton abundance is 12% and 8% in the surface and bottom waters, respectively

✓ Meso-zooplankton abundance in surface waters of the study region varied from 419 No/m^3 to 810 No/m^3 in the study region, with a mean abundance of 564±113 No/m^3. These abundances are comparable with meso-zooplankton abundance reported in the previous monitoring studies conducted in this region (502 No/m^3) and coastal waters of east coast of India.

✓ A total of 18 meso-zooplankton groups were identified in the study region. Among various groups, Copepods dominantly contributed to the total meso-zooplankton abundance of the study region, consistent with previous reports. Its mean contribution to the total meso-

zooplankton abundance is ~91%. Chaetognatha are the second largest contributor to the total meso-zooplankton, with mean contribution of 2.8%.

- ✓ Appendicularia is the third major contributor to the total meso-zooplankton abundance in the study region and its contribution was 1.4%. Other meso-zooplankton groups found in this study are Siphonophore (mean contribution 1.0%), Decopod larve (1.0%), Fish eggs (0.6%), Gastropods (0.5%), Thaliacea (0.5%), Pteropods (0.5%), Polychaete larve (0.4%) and Cladocerans (0.3%).

- ✓ Abundance of macro-benthic organisms broadly varied from as low as 2196 No/m^2 to as high as 3391 No/m^2 in surface sediments of the study region. Mean abundance of macro benthos in the study region is 2749±431 No/m^2. It is comparable with the reported values macro-benthic abundance from this region in previous monitoring study conducted in 2019 (900 – 4600 No/m^2).

- ✓ The total number of fauna found in surface sediments of the study region is limited to 25 and their individual contributions ranged from 5% to 32%. Polychaete is the dominant group that was contributed largely (~32%) to the total macrofaunal density. The second largest contributing group is foraminifera and their contribution to the total macrofaunal density is 21%. Contribution from Mollusca is 18% to the total macrofaunal density. Minor phylum contributes 13% while Arthropoda contribution is limited to 11%.

- ✓ Abundance of meio-faunal benthic organisms varied from 462 No/10cm^2 to 715 No/m^2 in surface sediments of the study region. Mean abundance of meio benthos in the study region is 583±98 No/10cm^2. It is comparable with the reported values macro-benthic abundance from this region in previous monitoring study conducted in 2017(416-1006 No/10cm^2).

✓ The total number of meio-fauna found in surface sediments of the study region is limited to 13 and their individual contributions ranged from 3% to 33%. Nematoda is the dominant group that was contributed largely (~33%) to the total meiofaunal density. The second largest contributing group is Foraminifera and their contribution to the total meiofaunal density is 21%. Polychaeta is the third major group that contributed to the total meiofaunal abundance and its mean contribution is 10%. Contribution from Harpacticoida, Ostracoda, Bivalves, Gastropoda, Turbellari and Nauplii to the total meio-faunal abundance is 9%, 8%, 4%, 4%, 3% and 3%, respectively.

✓ Total *coliform* counts varied from NG to 1.5×10^3 CFU/mL in the surface waters with mean of $0.9\pm0.3\times10^3$ CFU/mL. In the bottom waters, counts of total *coliform* varied from NG to 1.8×10^3 CFU/mL, with mean counts of $1.0\pm0.4\times10^3$ CFU/mL. *Escherichia coli* like organism (ECLO) counts varied from NG to 2.4×10^3 CFU/mL in surface water and NG to 2.1×10^3 CFU/mL in bottom water. The range of ECLO found in this study is comparable with those found in the previous monitoring study conducted in this region.

✓ The *Vibrio* like organism (VLO) counts ranged from NG to 0.6×10 CFU/ml in surface water and NG to 0.60 ×10 CFU/ml in bottom waters. *Vibrio cholerae* like organisms (VCLO) counts ranged from NG to 0.3×10 CFU/ml in surface water and NG to 0.2×10 CFU/ml in bottom waters. Bacterial counts found in surface and bottom waters of the study region are well below the counts reported in the previous studies conducted in this region.

✓ Counts of TC, ECLO, VLO and VCLO at effluent release point and RO reject discharge points are similar to those obtained in the vicinity of the study region, and are comparable with those reported in the east Indian coastal waters. These results indicate that

release of treated effluent and RO reject in to the sea from M/s Hetero Drugs Limited do not pose any threat to the increase of these microorganisms in the coastal waters of study region

- ✓ Mean concentrations of Iron (Fe; 218 µg/g), Manganese (Mn; 23.8 µg/g), Zinc (Zn; 2.8 µg/g), Copper (Cu; 5.8 µg/g), Cadmium (Cd; 0.59 µg/g), Chromium (Cr; 3.9 µg/g), Lead (Pb; 1.3 µg/g) and Arsenic (As; 1.8 µg/g) in surface sediments are well below the concentrations of trace elements reported from the polluted regions in the coastal waters. Mercury concentrations are below detection limits (BDL) at all stations. Concentrations of trace elements found in surface sediments of the study region do not indicate trace metal pollution in the coastal waters of Rajayyapeta.
- ✓ Treated effluent collected from the guard pond of M/s Hetero Infrastructure Limited compliance with the CPCB standard for bio-assay test with a survival rate of 92% of test organisms in the 100% effluent after 96 hours.
- ✓ Based on the results obtained in the coastal waters of Rajayyapeta, it is recommended to carry out yearly monitoring study in the coastal waters of Rajayyapeta to maintain the seawater quality and health of the ecosystem.

Chapter 1
Introduction

1.1 Background information

M/s Hetero Group of Companies has set up an Industrial Estate in the name of Hetero Infrastructure SEZ Ltd for Bulk Drug Manufacturing with four units situated at N. Narasapuram, Nakkapalli – Mandal, Visakhapatnam –Dist. of Andhra Pradesh.

The industrial estate is situated in Sy. Nos: 215, 286/1, 286/2, 283/1 in Ch. Lamxipuram village, 312/1 to 312/5, 312/10 to 312/12, 313/1 to 313/7 of Rajayyapeta village, 19(part) in PedaTeenarla village, 117/1 to 117/3, 119/1, 119/2, 120/1, 120/2, 125, 126, 129/1 to 129/9, 138, 142, 150, 215, N. Narsapuram village, Nakkapalli Mandal, Visakhapatnam District spread in an area of 350 Acres approximately (Fig. 1.1). The various units which are working at present are as below:

- Hetero Drugs Limited, Unit-IX (SEZ)
- Hetero Labs Limited, Unit-IX (SEZ)
- Honour Lab Ltd, Unit-III (SEZ)
- Hetero Infrastructure SEZ Ltd (Service provider)
- Hetero Labs Ltd, Unit-III (Non-SEZ)

The complex is surrounded by open Lands & Salt Lake in the South direction, Open lands in the East direction, open Lands in north direction and road connecting Upamaka village with Rajayappeta village in the West direction, The NH 16 is in the North direction at a distance of 4 km, the nearest Railway station is located at Narsipatnam at a distance of 9 km in the North direction.

M/s Hetero Infrastructure SEZ Ltd is a service provider to all the manufacturing units mentioned above and has the following common facilities in M/s Hetero Infrastructure SEZ Ltd to operate the industrial estate:

- Boilers & Coal Sheds
- Seawater Desalination Plants
- Effluent Treatment Plant
- Sewage Treatment Plant

- Hazardous waste storage shed
- Scrap & Detoxification Yard
- Vermi Compost/Bio manure plant
- Guard Ponds & Marine Disposal Facility etc.

Fig. 1.1.: Hetero Complex Nakkapalli

M/s Hetero Infrastructure SEZ Limited is discharging the treated effluents into the sea through a dedicated marine disposal pipeline. The disposal points in the sea are at distances of 3 km from the coast. These disposal points are recommended by the National Institute of Oceanography in their Rapid Marine Environmental Impact Assessment report of 2008 (MOP 1) and in 2010 (MOP 2) for safe disposal and for quick dispersion. As per the conditions of Environmental Clearance (EC) issued by MoEF&CC, Govt. of India and consent for operation issued by APPCB, M/s. Hetero Infrastructure SEZ Limited has been carrying out post-project monitoring studies in the marine environment on regular time intervals. M/s Hetero Infrastructure SEZ Limited issued work order to M/s Spectra

Envirotech Private Limited to study the effects of treated effluent release on the ecology, seawater quality and sediment characteristics in the coastal waters off Rajayyapeta. Previous post project monitoring studies in this region were conducted by the National Institute of Oceanography in 2017, 2019, 2023 and 2024. During 2018-2019, post project monitoring studies in the coastal waters off Rajayyapeta were conducted by Andhra Pradesh Pollution Control Board (APPCB).

1.2.: Objectives and scope of the Study

In this study, M/s Spectra Envirotech Private Limited planned to collect data on physico-chemical, biological and sediment parameters to examine the Sea water quality at and around the marine outfall points (MOP-1 & MOP-2) during calm season.

The main objective of the study is to understand the cumulative impact, if any, on the ecosystem in the coastal waters off Rajayyapeta due to the release of treated effluent from M/s Hetero Infrastructure SEZ Limited. Hence, the scope of the present study includes the generation of reliable data, at least one time, in respect of physico-chemical, biological, micro biological and sedimentological parameters to understand the water quality and sediment quality at and around the marine out fall point (MOP; discharge point) covering 12 stations. Since the toxicological studies are important to assess the survival rate of test species in the treated effluent, the scope of the work also includes to carry out the bioassay test for four days (96 hours) on the treated effluent collected from the guard pond of M/s Hetero Infrastructure SEZ Limited using pink zebra fish as test species. The results of the monitoring study conducted in the coastal waters off Rajayyapeta on 7th May 2022 and the toxicological studies conducted on the treated effluent are given in this report.

Chapter 2
Company Profile

2.1.: Background

M/s Hetero Infrastructure SEZ Limited (Fig. 2.1) is a Bulk Drug Manufacturing Complex with four units situated at N. Narasapuram, Nakkapalli Mandal, Visakhapatnam district of Andhra Pradesh (Fig 2.2). Out of four units, one unit is in the non-Special Economic Zone (SEZ) and the other three units are in the SEZ. M/s Hetero Infrastructure SEZ Ltd is providing utilities & common facilities like Water, Steam, Effluent Treatment, Sewage Treatment, Scrap Yard, Hazardous waste handling etc. to all the manufacturing units located in this area.

The industrial estate is situated in Sy. Nos: 215, 286/1, 286/2, 283/1 in Ch. Laxmipuram village, 312/1 to 312/5, 312/10 to 312/12, 313/1 to 313/7 of Rajayyapeta village, 19(part) in Peda Teenarla village, 117/1 to 117/3, 119/1, 119/2, 120/1, 120/2, 125, 126, 129/1 to 129/9, 138, 142, 150, 215, N. Narasapuram village, Nakkapalli Mandal, Visakhapatnam District spread over an area of 139.856 ha. The various units which are working at present are as below:

- Hetero Labs Limited, Unit-III (Non SEZ)
- Hetero Drugs Limited, Unit-IX (SEZ)
- Hetero Labs Limited, Unit-IX (SEZ)
- Honour Lab Ltd, Unit-III
- Hetero Infrastructure SEZ Ltd (common facilities)

The Hetero complex is surrounded by open lands & salt-lake in the south direction, open lands in the east direction, open lands in north direction and road connecting Upamaka village with Rajayyapeta village in the West direction, The NH 16 is in the north direction at a distance of 4 km, the nearest railway station is located at Narsipatnam at a distance of 9 km in the north direction (Fig. 2.3). The

nearest airport is located at a distance of 70 km in the northeast direction at Visakhapatnam. The Bay of Bengal is in the southeastern direction of the site at a distance of 1.2km. The area is drained by the Varaha River in the northern direction up to a distance of 13km, and the Tandava River in the southwest direction at a distance of 14km.

Fig. 2.1 Synoptic view of Hetero infrastructure SEZ Limited

The capital cost of the project is Rs.2000 Crores. The SEZ is designed on the basis of required infrastructure for pharmaceutical manufacturing facilities like, road, storm water network, common utilities, storage facilities for raw materials, solvents, parking areas, pollution control facilities etc. The water requirement of the project is being met with the sea water desalination plants (Fig. 2.3) installed in the premises of Hetero Infrastructure SEZ Ltd. Vermi Compost and sewage treatment plants (Fig.2.4 & Fig.2.5) are provided to treat the wastewater and effluent treatment plant, containing different stages of treatment for industrial wastewater.

Water conservation measures were incorporated in the plumbing designs. Water recycling / reuse were adopted by way of using treated sewage for green belt development. The storm water from the

site is collected in a storage tank and the same is reused for various purposes (as and when required), while the over flow is let out into the natural drain adjacent to the site. The required power is drawn from the AP TRANSCO and adopted energy efficient design for lighting and utility systems to optimize the energy requirement. Construction material was drawn from local sources. The industry installed a 6.1 MW Captive power plant for the generation of power and uses power from Hetero Wind Power.

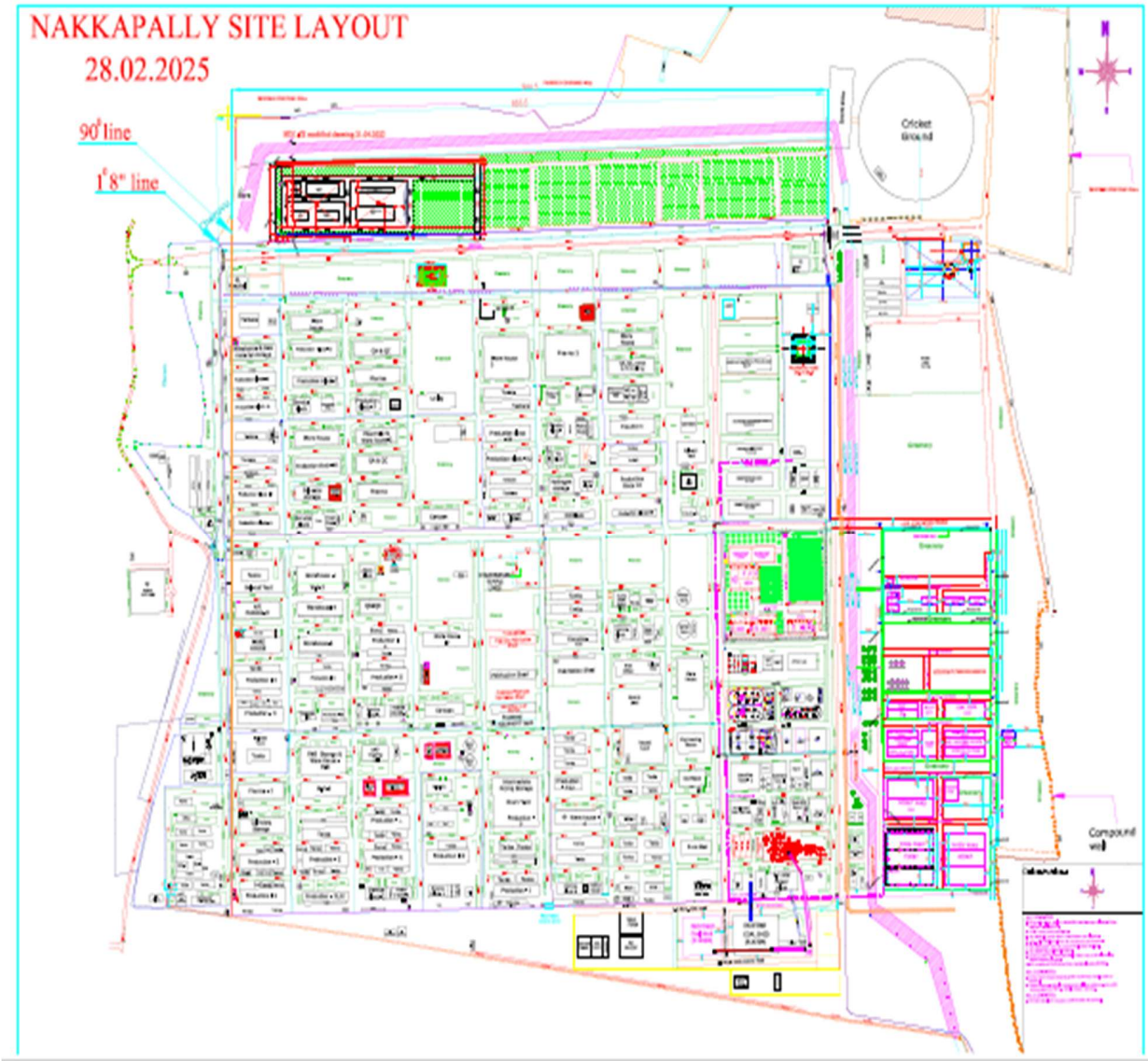

Fig 2.2 Layout of Hetero infrastructure SEZ Limited

Location of the project:

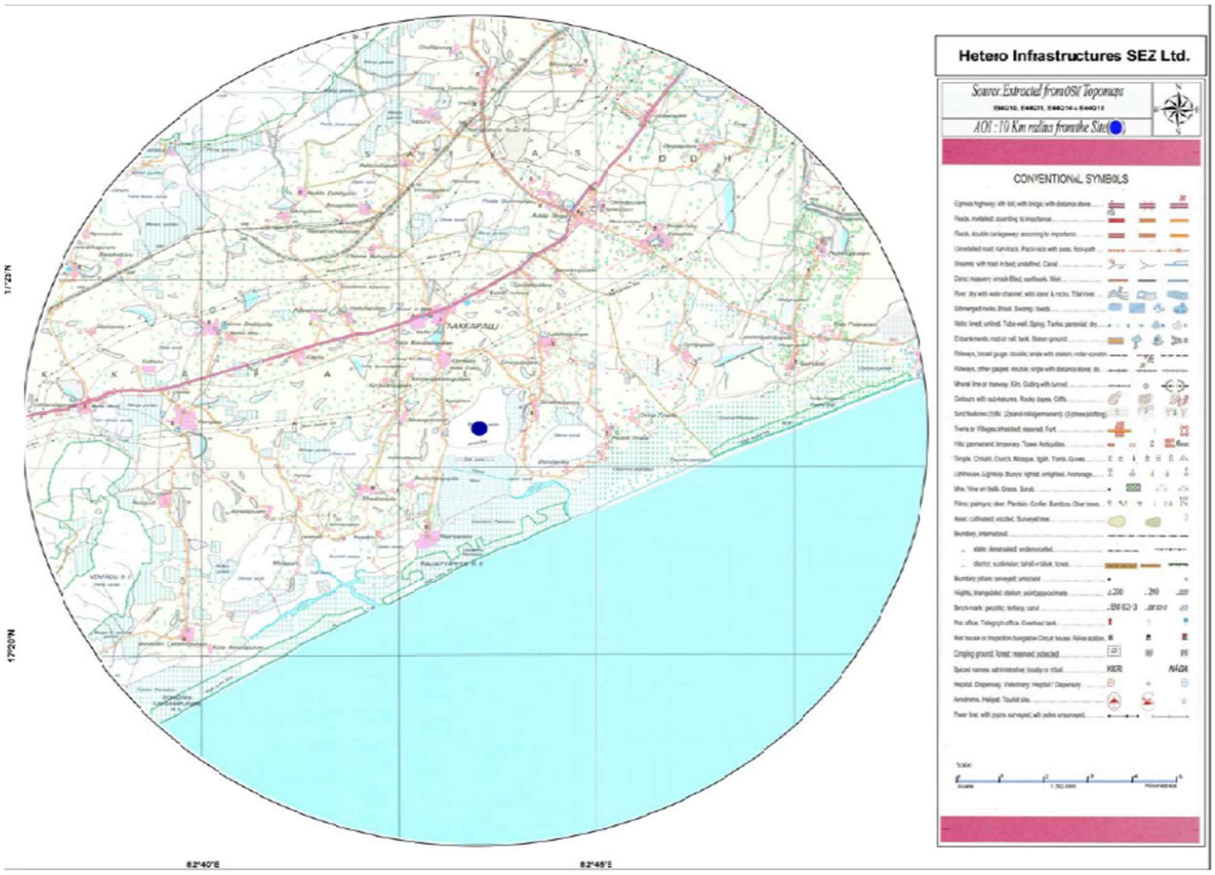

Fig 2.3: Location of Hetero infrastructure SEZ Limited

2.2 Amenities and utilities:

A number of amenities and utilities were implemented during the operation phase (Fig. 2.4 to 2.13) to provide common infrastructure and pollution control facilities.

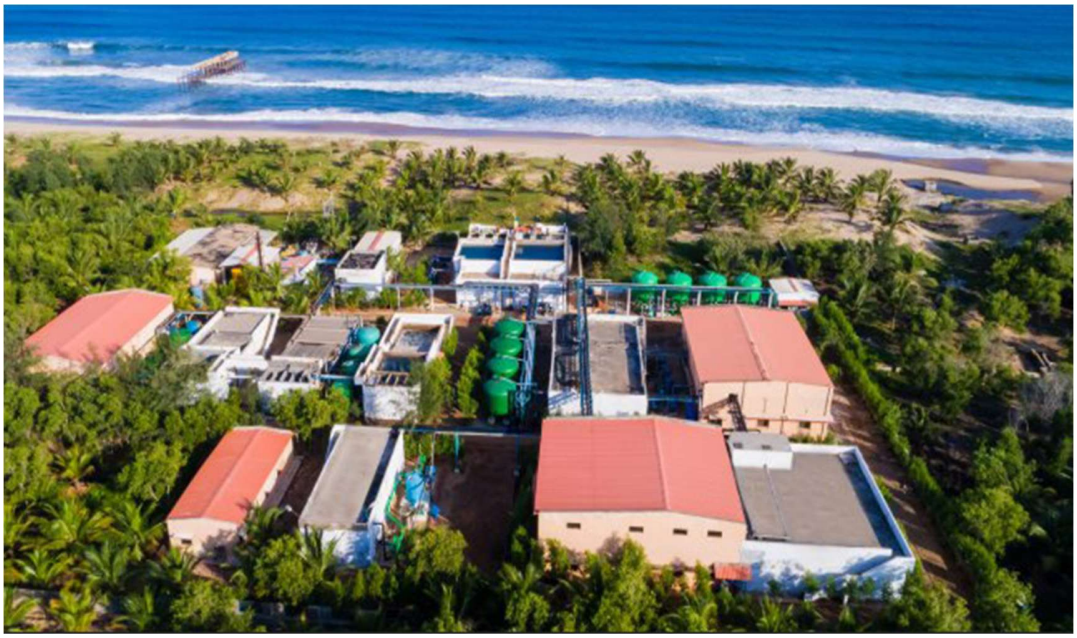

Fig. 2.4 Desalination plant in the Hetero Premises

Fig.2.5: Vermi Compost

Fig.2.6: Sewage Treatment Plant (STP)

Fig.2.7: Stripper and MEE

Fig.2.8: HTDS Tanks covered with Hoods and connected to Scrubbers

Fig.2.9: Biological system for LTDS & Condensate of MEE & ATFD

Fig.2.10: Guard ponds for storage of treated Effluent

Fig.2.11: Aeration tanks

Fig. 2.12: Online Effluent Monitoring System

Fig. 2.13: Environment Laboratory

Baseline environment:

The baseline environment of the project impact areas (PIA) spread over 25km radius from the site was studied for air, water, soil, noise, ecological and social economic status. The baseline status is found to be within the prescribed limits in all respects except the noise levels which are found to be above the prescribed limits during day time in the PIA.

2.3 Major Products:

Table: 2.1
Products List of M/s Hetero Labs Limited, UNIT – III

S.NO	Name of the Product	PRODUCTION CAPACITY Kg/Day
GROUP-A: REGULAR PRODUCTS		
1	Abacavir Sulphate	333.33
2	Abiraterone acetate	66.67
3	Amlodipine Besylate	100
4	Atorvastatin Calcium	333.33
5	Capecitabine	333.33
6	Citalopram Hydrobromide	66.67
7	Citicoline sodium	333.33
8	Darunavir	333.33
9	Dolutegravir Sodium	500
10	Domperidone IP	333.33
11	Etoricoxib	66.67
12	Folic acid	66.67
13	Fluconazole	333.33
14	Gabapentin	6666.67
15	Gliclazide	333.33
16	Hydralazine Hydrochloride	333.33
17	Irbesartan	166.67
18	Levetiracetam	3333.33
19	Losartan Potassium	866.67
20	Osaltamivir phosphate	66.66
21	Pantoprazole Sodium	500
22	Pthalazinone	333.33
23	Phenyl Ephrine HCl	166.67
24	Pioglitazone Hydrochloride	166.67
25	Quetiapine fumerate	500

26	Relugovir	100
27	Ritonavir	100
28	Rosuvastatin calcium	100
29	Simvastatin	66.67
30	Telmisartan	333.33
31	Tenofovir Disoproxil fumerate	666.67
32	Terbinafine HCL	166.67
33	Tranexamic acid	100
34	Valsartan	333.33
35	Voriconazole	66.67
36	Zidovudine	333.33
37	Zonisamide	66.67
38	(1S,4R)-4-AMINO-2-(cyclopentene-1-methanol hydrochloride (Balaji) (Intermediate of Abacavir Sulphate)	500
39	n-(2-amino-4,6-dichloro-pyrimidin-5yl)formamide(BALU)	333.33
40	(4- bromo methyl- 2-cyano-1,1 biphenyl) (Common intermediate for Setrans)	833.33
41	(5-hydroxy-1,3-oxathiolane-2-carboxylicacid (1r,2s,5r)- menthyl ester) (Intermediate of Lamivudine)	6666.67
42	4-Chloro butyryl chloride	6666.67
43	Dimethyl3-isobutylpentanedioate (DID) (Intermediate of Pregablin)	3333.33
GROUP-B: CAMPAIGN PRODUCTS		
1	Alectinib	0.33
2	Anastrozole	1.66
3	Aripipazole	33.33
4	Atazanavir Sulphate	33.33
5	Atomoxetine HCL	33.33
6	Axitinib	0.33
7	Azacytidine	0.66
8	Benazepril HCL	16.67
9	Benfotiamine	33.33
10	Bicalutamide	33.33
11	Bortezomib	16.67
12	Bosutanib	0.33
13	Butenafine Hydrochloride	0.67
14	Candersatan cilexetile	3.33
15	Carlflzomib	0.33
16	Cilazapril Monohydrate	0.66

17	Cilostazol	33.33
18	Critozanib	1
19	Cyclophosphoide amine HCL	5
20	Daclatasvir	1.66
21	Desloratadine	3.33
22	Deflazacort	1.66
23	Docetaxel	0.33
24	Doralutamide	0.66
25	Duloxetine HCL	33.33
26	Effavirenz	33.33
27	Eletripton	0.33
28	Emtricitabine	33.33
29	Enzalutamide	3.33
30	Eplerenone	3.33
31	Eprosartan Mesylate	16.67
32	Erlotinib Hydrochloride	16.67
33	Escitalopram Oxalate	33.33
34	Ezetimibe	16.67
35	Febuxostat	16.67
36	Gemcitabine HCL	33.33
37	Giftinib(GTB)	16.67
38	Giftinib(CFA)	16.67
39	Giftinib(MMQ)	16.67
40	Glimpiride	26.67
41	Ibrutanib	3.33
42	Imatinib mesylate	33.33
43	Itraconazole	25
44	Lacosamide	0.33
45	Lapatanib	3.33
46	Ledipasvir Premix IH	0.33
47	Levetiracetam	3.33
48	Levofloxacin	25
49	Levo Milnacipran	3.33
50	Letrozole Intermediate	3.33
51	Lopinavir	33.33
52	Loratadine	6.67
53	Maraviroc	16.67
54	Melphalan	0.33
55	Methyl Cobalamin	0.66
56	Milnacipran HCL	3.33
57	Nevirapine	16.66

58	Nadifloxacin	3.33
59	Nintenib	3.33
60	Nilotanib	6.66
61	Niraparib	3.33
62	Pazopanib(IBM)	6.66
63	Pazopanib(MBS)	6.66
64	Ramipril	33.33
65	Rupatadine Fumarate	33.33
66	Ruxolatinib Phosphate	1.66
67	Sunitinib Malate	3.33
68	Sofosbuvir	50
69	Sorafanib	6.66
70	Stavudine	16.67
71	Temozolamide	1.66
72	Tioconazole	6.66
73	Torsemide	33.33
74	Velpatasvir	16.67
75	Voglibose	1.66

The total Production Capacity Per Month is 891.78 TPM

Table. 2.2
Products List of M/s Hetero Labs Limited, UNIT – IX

S.No	Name of the product	Production per Day (Kg)
GROUP -A: REGULAR PRODUCTS		
1	Abacavir Suphate	333.34
2	Acyclovir	333.34
3	Atorvastatin Calcium Trihydride	1000
4	Darunavir Amorphous	166.67
5	Darunavir Ethanolate	166.67
6	Dextromethorphan	166.67
7	Diltiazem Hydrochloride	1666.6
8	Dolutegravir sodium	666.67
9	Efavirenz	666.67
10	Emtricitabine	400
11	Gabapentin	3333.34
12	Lamivudine	3333.34
13	Levetiracetam	3333.34
14	Lopinavir	166.7
15	Naproxen Sodium	166.67
16	Pregabalin	833.34

17		833.34
18	Quetiapine Fumarate	1000
19	Tenofovir Disoproxil Fumarate	3333.34
20	Valacyclovir	166.67
21	Zidovudine	333.34
GROUP-B: CAMPAIGN PRODUCTS		
1	Aripiprazole	16.67
2	Atazanavir Sulphate	33.34
3	Atomoxetine Hydrochloride	66.67
4	Avacapon	0.33
5	BDH	100
6	Doravirine	16.67
7	Escitalopram Oxalate	166.67
8	Etoricoxib	100
9	Etravine Premix	8.33
10	Ezitamibe	33.34
11	Hydralazine Hydrochloride	166.67
12	Levodopa	100
13	Lenacapavir Sodium (Premix)	1.67
14	Lidocaine Hydrochloride Monohydrate	166.67
15	Meriviroc	33.34
16	Milnacipran	16.67
17	Nevirapine	16.67
18	Oseltamivir Phosphate	166.67
19	Ritonavir	66.67
20	Rimegepant	1.67
21	Simvastatin	33.34
22	Tenofovir Alafenamide Hemi fumarate	33.34
23	Tolvaptan povidone premix	16.67
24	Valganaclovir	66.67
25	Vericiguat Hydrochloride	0.67
26	Voriconazole	16.66
27	Vortioxetine Hydrobromide	66.67
28	Sample of Validation	100

The total Production Capacity Per Month is 587 TPM

Table. 2.3
Products List of Hetero Drugs Limited, Unit – IX

S.No	Product Name	Production per Day (Kg)
A) REGULAR PRODUCTS		
1	Acyclovir	333.33
2	Bupropion	500
3	Celecoxib	333.33
4	Citaloparm hydro bromide	133.33
5	Diclofenac Diethyl Amine	333.33
6	Diclofenac Potassium	333.33
7	Diclofenac Sodium	800
8	Diolat-12	150
9	Divalproex Sodium	333.33
10	Esomeprazole Magnesium Di Hydrate	133.33
11	Esomeprazole Magnesium Tri Hydrate	233.33
12	Fenofibrate	333.33
13	Fexofenadine	300
14	Gabapentine	400
15	Metaxalone	166.67
16	Nabimitone	100
17	Pregabalin	200
18	Ritanovir Premix	666.67
19	Savelomir Carbonate	100
20	Sertraline HCl Form-I &II	600
21	Topiramate	200
GROUP-B: CAMPAIGN PRODUCTS		
1	Carbidopa	20
2	Cinacalcet	16.66
3	Dabigetran Exilate Mesylate	33.33
4	Eletripan Hydrobromide	16.67
5	Febuxostat	33.33
6	Fesoterodine	6.67
7	Ivacaftor (Premix)	10
8	Lacosamide	50
9	Levodopa	33.33
10	Lopinavir	66.67
11	Lurasidone	40
12	Mamantine HCL	33.33
13	Mexiletine Hydrochloride	80
14	Mirabegron Alpha	20
15	Mirabegron Beta	33.33

16	Pitavastatin	16.67
17	Prasugrel Hydrochloride	17
18	Relaxifene Hydro chloride	33.33
19	Residronate Sodium	16.67
20	Rilpivirine Hydrochloride	16.67
21	Rivastigimine Base	50
22	Rizatriptan	16.67
23	Rosuvastin	50
24	Rufinamide Premix	30
25	Rufinamide	33.33
26	Silodosin	6.67
27	Sodium Zirconium Cyclosilicate	50
28	Valgaciclovir	33.33
29	Zafirlukast (Amorphous)	10
30	Zolmitriptan	10
31	2-Acetoxy ethyl acetoxy methyl ether	2000
32	Validation batches for samples	100

The total Production Capacity Per Month is 101.5 TPM

Table. 2.4
Products List of Honour Lab Limited, Unit – III

S.No	Product Name	Production per Day (Kg)
1	APH	300
2	Aripiprazole Lauroxil	10
3	Atomoxetine Hydrochloride	50
4	Avanafil	50
5	Azilsartan	50
6	Azilsartan Kamedoxomil	50
7	Betrixaban Maleate	50
8	Brivaracetam	50
9	Clorthalidone	50
10	Crisaborole	20
11	Dapagliflozin propanediol monohydrate	20
12	Deferasirox	50
13	Diatrizoate Meglumine	50
14	Diatrizoate Sodium	20
15	Dimethyl Fumarate	50
16	Dolutegravir	300
17	Edoxaban Tosylate monohydrate	50
18	Eluxadoline	10
19	Empagliflazin	20

20	Empagliflozin (Amorphous)	25
21	Hydralazine Hydrochloride	100
22	Lifitegrast	20
23	Lopinavir	180
24	Monomethyl fumarate	166.6
25	Nebivalol HCl	166.6
26	Nirmatrelvir	150
27	Ospemifene	166.6
28	Pirfenidone	333.33
29	Posaconazole	100
30	Quetiapine Fumarate	16.6
31	Ramipril	20
32	Sacubitril and Valsartan Sodium Hydrate	200
33	Sacubitril and Valsartan Sodium(Amorphous)	100
34	Sacubitril valsartan sodium On Colloidal silicon dioxide	200
35	Sapropterin Dihydrochloride	20
36	Sitagliptin Hydrochloride	333.33
37	Sitagliptin phosphate Anhydrous	200
38	Sitagliptin Phosphate Monohydrate	333.33
39	Sugammadex sodium	50
40	Teneligliptin Hydrobromide Hydrate	50
41	Tenofovir Alafenamide Hemifumarate	50
42	Terbinafine Hydrochloride	50
43	Torsemide	50
CAMPAIGN PRODUCTS		
1	Algolipton Benzoate	4
2	Apixaban	4
3	Aripiprazole	20
4	Atzanavir Sulphate	33.3
5	Bosantan	4
6	Brexpiprazole	4
7	Cholchicine	66.6
8	Clobazam	26.6
9	Clorazepate Dipotassium	10
10	Cobisistat silicon dioxate	4
11	Dapaglifozin	50
12	Darunavir Amorphous	20
13	Dicyclomine hydrochloride	10
14	Diroximel Fumarate	16.6

15	Doxylamine Succinate (DAS)	20
16	Edaravone (EDR)	5
17	Elvitegravir	2
18	Ertugliflozin L-Pyroglutamic Acid	10
19	Favipiravir	50
20	Fingolimode	4
21	Fosfomycin tromethamine	30
22	HRF-099	20
23	Isavucoazole	10
24	Isavuconazonium Sulfate	10
25	Linagliptin	5
26	Linagliptin premix	66.6
27	Liveteracetam	50
28	Macitentan	4
29	Maravirac (Form-B)	20
30	Maraviroc Amorphous	2
31	Molnupiravir	50
32	Pyridoxine Hydrochloride	20
33	Riociguat	10
34	Rivastigmine	66.6
35	Saxagliptin Monohydrate	20
36	Selenious Acid	10
37	Selexipag(Amorphous)	5
38	Sofosbovir	33.3
39	Tadalafil	20
40	Tavaborole	10
41	Terriflunomide	66.6
42	Tfamidis Meglumine	2
43	Ticagrelor	4
44	Tofacitinib Citrate	30
45	Vildagliptin	60
46	Vonoprazam fumarate	10
47	Validation Batches for trial	50

The total Production Capacity Per Month is 61.3 TPM.

Table 2.5: Effluent generation per day

S.No.	Unit	HTDS & HCOD (KLD)	LTDS & LCOD (KLD)	RO Rejects (KLD)	Domestic (KLD)	Total Effluent Generation (KLD)
1	HDL - IX	62.167	2.50		25.00	**89.667**
2	HLL - IX	223.64	45.00		40.00	**308.64**
3	HLL - III	616.21	120.00		120.00	**856.21**
4	Honour	30.60	5.35		10.00	**45.95**
5	Hetero Infra	--	35.5	30.00	8.00	**73.5**

Table 2.6: Water Consumption as per Consents

S.No.	Unit	Purpose				Total Water consumption (KLPD)
		Process & washing	Cooling	Domestic	Additional water to RO	
1	**HDL - IX**	62.79	50	25	0	137.79
2	**HLL - IX**	210.23	220	50	0	480.23
3	**HLL - III**	603.05	600	120	0	1323.05
4	**Honour**	32.23	80	10	0	122.23
5	**Hetero Infra**	--	--	10	107	117

Table 2.7.: Details of boilers

S.No	Boiler	Air Pollution Control Devices
1	1 X4 5 TPH	Electro Static Precipitator (ESP)
2	1 X 20 TPH	Dust Collector followed by Bag filter
3	1 X 12 TPH	Dismantled and not in existence
4	1 X 10 TPH	

2.4.: Green Belt Development

Green belt is recommended as one of the major components of the Environmental Management Plan. The existing industry has green belt and the management emphasizes the development of further greening of the site to enhance environmental quality through mitigation of fugitive emissions, attenuation of noise levels, balancing eco-environment, consumption of treated effluent, prevention of soil erosion, and creation of the aesthetic environment. The greenbelt is in an area of 124.5 acres. The enhancement of the green belt involved the plantation of small species. Proper attention and management are being taken up by the firm to maintain the survival rate of the planted species. For plantation of the small plants digging pits are very important for preparing the soil environment near the roots of the plants. The size of the pit will be optimum enough to supply required nutrients to the roots of the plant. The usual method is to dig a pit of required size three to four months before planting of the species, which is generally done at the break of the monsoon. The pits of 45 cm x 45 cm x 45 cm size in the case of hardier spices like Eucalyptus, Shisham, Acacia etc., but larger pit size is preferred for fruit yielding trees like mango, Jamun etc. 1m x 1m x 1m pits may be used for plantation of other trees. The soils of the plant side will be mixed with 1/3 farmyard manure before refilling about a week prior to planting.

M/s. Hetero units are having good environment management plan and made this as part of their corporate policies. The firm has considered Safety, Health and Environmental protection as an integral part of their business. As a part of the environmental management plan the firm established and developed a thick green belt in and around the plant.


STOP
STOP

Green Belt inside the company

Chapter 3
Study Region

With reference to the work order No. 7599000715 dated 21st May 2025 for post project monitoring study in the vicinity of marine outfall points of treated effluent and RO reject from desalination plant, M/s Spectra Envirotech Private Limited has conducted field campaign on 23rd May 2025 in the coastal waters of Rajayyapeta for sample collection. Sampling locations were fixed in all four directions from discharge point of treated effluent (MOP2) with distances of 0.5 km, 1.0 km, 2.0 km and 5.0 km from MOP2. Water samples were collected at a total of 14 stations in the vicinity of marine outfall points including discharge point of RO reject (MOP1) and discharge point of treated effluent (MOP2). Water samples were collected at both surface and bottom of the water column in each station using Niskin water sampler. Samples were collected for chemical parameters such as pH, dissolved oxygen (DO), biochemical oxygen demand (BOD_3), dissolved inorganic nutrients, ammonium, nitrite, nitrate, phosphate, silicate, total nitrogen, total phosphorous, petroleum hydrocarbons, total suspended matter etc. and preserved them in bottles for further analysis in the laboratory. Phytoplankton samples were collected at both surface and bottom in all 14 stations and preserved with Lugol's solution for further analysis in the laboratory. Latitude and longitude details of all sampling stations were given in Table 3.1 and are shown in Figure 3.1. Meso-zooplankton samples were collected by towing a bongo net in the surface waters and the sample collected in the bucket that was fixed at the end of the net, was transferred into 500ml wide mouth PVC jar and preserved the sample in formalin for further analysis in the laboratory. Surface sediments were collected using Van Veen Grab samplers for macro faunal and meio faunal studies. Sediments were also collected for texture (grain size) and trace metal analysis.

Table 3.1: Details of sampling location in the coastal waters off Rajayyapeta

S. No.	Sampling points	Distance from MOP	Direction from MOP1	Longitude	Latitude
1	H1	0.5 Km	South	82°44'24.42"E	17°20'45.10"N
2	H2	1.0 Km	South	82°44'6.53"E	17°20'38.36"N
3	H3	2.0 Km	South	82°43'35.25"E	17°20'24.84"N
4	H4	5.0 Km	South	82°41'58.13"E	17°19'35.70"N
5	H5	0.5 Km	North	82°44'56.21"E	17°21'0.72"N
6	H6	1.0 Km	North	82°45'14.33"E	17°21'7.78"N
7	H7	2.0 Km	North	82°45'46.95"E	17°21'20.69"N
8	H8	5.0 Km	North	82°47'21.87"E	17°22'2.33"N
9	H9	0.5 Km	East	82°44'47.83"E	17°20'35.08"N
10	H10	1.0 Km	East	82°44'59.03"E	17°20'18.56"N
11	H11	2.0 Km	East	82°45'17.54"E	17°19'49.27"N
12	H12	5.0 Km	East	82°46'18.17"E	17°18'25.51"N
13	MOP1	---	---	82°44'31.00"E	17°21'7.00"N
14	MOP2	---	---	82°44'39.18"E	17°20'52.56"N

Fig. 3.1: Map showing the sampling locations in the coastal waters off Rajayyapeta around marine outfall points (MOP). Discharge point of RO reject from desalination plant (MOP1) and discharge point of treated effluent from ETP (MOP2) are shown by cyan colour pins. Hetero Chemical Complex on the land is shown by yellow coloured line.

Chapter 4
Methods

The methods used in this study were given below

pH (IS 3025 part 11, 2022)

Portable pH meter or pH meter with glass calomel electrode, pH 0.1 accuracy. Rinse the electrode with MQ water and calibrate at pH 4.0 and 7.0/9.0. Introduce the electrode in desired water sample and allow the reading to stabilize for 1 min and read the pH. Rinse the electrode by DW after each use.

Dissolved Oxygen (DO) (IS 3025 part 38, 1989)

Winkler's method was adopted for the determination of DO concentrations. A measured volume of water sample was fixed immediately after collection with the reagents Winkler's A (manganous chloride) and Winkler's B (alkaline potassium iodide). Standard titration with sodium thiosulphate (standardized with potassium Iodate, KIO_3) was adopted for the analysis purpose. Concentration of DO was expressed in mg/l. The precision of analysis, expressed as standard deviation with this method was ±0.07%. Dissolved oxygen in water reacts with manganese hydroxide in strongly alkaline medium forming manganese (trivalent) hydroxide. When acidified to a pH less than 2.5, the manganese hydroxide dissolves to liberate manganese, which is a strong oxidizing agent in acidic media. Trivalent manganese reacts with Iodine, which was previously added, liberating equivalent amount of free Iodine, which is titrated against a standard Thiosulphate solution using starch as indicator.

Biochemical Oxygen Demand (BOD) (IS 3025 part 44, 2023)

BOD is the amount of oxygen required by microorganisms to oxidize the degradable organic substances in water. Samples for the determination of biochemical oxygen demand were collected in triplicate. The dissolved oxygen concentration was immediately determined using one of the triplicate samples according to Winkler's method, as detailed above. Keep the sampled bottles in the BOD incubator at 27^0 C for 3 or 5 days. Determine DO of sample collected separately using the Winkler method as described in 2.5. Record the value obtained as "Initial DO (mg/l)". After three or five days remove the BOD samples from the incubator and analyze DO as per procedure given 3.5(3). Record the values as "Final DO (mg/l)".

Ammonium - Nitrogen (NH_4^+ - N) (IS 3025 part 34, 1988)

This procedure describes the determination of ammonia nitrogen (NH_3-N) concentration in water and wastewater samples using the titrimetric method. Collect samples in clean, airtight bottles. Ensure samples are representative of the overall water body. Sample Preparation: Pipette an appropriate volume (typically 50 mL) of the sample into a clean Erlenmeyer flask. Add 10 mL of boric acid solution to the sample Add 25 mL of sodium hydroxide solution to adjust the pH to make the sample alkaline. Distill the sample in a distillation apparatus. Collect the distillate in a receiving flask containing a known amount of boric acid. Add 3-5 drops of methyl orange indicator to the distillate. Titrate with the standard H2SO4solution until the endpoint is reached, indicated by a colour change from Green to Blue

Nitrite - Nitrogen (NO_2^- - N) (IS 3025 part 34, 1988)

Nitrite in water is either due to oxidation of ammonium compounds or due to reduction of nitrate. As an intermediate stage in the nitrogen cycle it is unstable. A usual concentration in natural water is in the range of some tenths of mg/L. Higher concentrations are present in industrial wastes. Sewage and in biologically purified effluents and in polluted streams. In chlorinated supplies, levels of nitrite are often less than the limit of detection, i.e. 0.005mg/L $NO2^-$ N but high levels may occur in unchlorinated water. Very high nitrite levels are usually associated with water of unsatisfactory microbiological activity.

If the sample is turbid, filter through a 0.45 µm membrane filter. To 50.0 mL of clear sample neutralized to pH 7 or to a portion diluted to 50mL add 1 mL of sulphanilamide solution. Let the reagent react for 2 to 8 minutes. Add 1.0 mL of NED dihydrochloride solution and mix immediately. Let stand for at least 10 minutes but not more than 2 hours. Measure absorbance at 543 nm.

Nitrate - Nitrogen (NO_3^- - N) (IS 3025 part 34, 1988)

The nitrate and nitrite is reduced to ammonia under hot alkaline conditions in the Presence of the reducing agent (Devarda's alloy). The ammonia formed distils and is trapped in a Receiving flask containing boric acid. The ammonia can be determined either by direct nesslerization Or acidimetrically. This method is recommended for nitrate nitrogen and nitrite nitrogen.

If ammonia has not been determined by a method involving preliminary distillation, dilute a portion of the sample to 500 ml with ammonia free water. Add 25 ml of borate buffer and adjust to pH 9.5 with 6 N sodium hydroxide using a pH meter or short range pH paper. Distil250 to 300 ml into a dry receiving flask and discard. Make sure that the last part of the distillations conducted with condenser tip out of the liquid in receiving flask. To the residue after removing ammonia, add 1 g

of Devarda's alloy and sufficient ammonia-free distilled water to bring total volume to 350 ml. Place in a receiving flask 50 ml boric acid absorbent for each milligram of nitrate nitrogen in sample. Immerse the end of condenser in the absorbent. Heat distillation flask until boiling or vigorous bubbling occurs. Reduce heat and distil at the rate of 5 to 10 ml/min until at least 150 distillate have been collected. Lower receiver so liquid is below the end of the condenser and distillation for 1 to 2 minutes to cleanse condenser.

Phosphate - Phosphorus (PO_4^{3-} -P) (IS 3025 part 31-1, 2022)

The molybdo-phosphoric acid is formed and reduced by stannous chloride and intensely coloured molybdenum blue is obtained. To 100 ml sample that does not contains more than 200 µg phosphorous (P) and is free from colour and turbidity, add phenolphthalein indicator 0.05 ml (1 drop). If sample turns pink, add strong acid solution drop by drop so as to discharge the colour. If more than 0.25 ml (5 drops) of acid is required, take a small amount of sample and dilute to 100 ml with distilled water after first discharging the pink colour with acid. After thorough mixing after every addition, further add 4.0 ml molybdate reagent I and 0.5 ml (10 drops) stannous chloride reagent. After 10 min measure colour photometrically at 690 nm and compare with a calibration curve, using a distilled water blank.

Silicate - Silicon (SiO_4^{2-} - Si) (IS 3025 part 35, 2003)

Ammonium molybdate at pH about 1.2 reacts with silica and any phosphate present to produce heteropoly acids. Oxalic acid is added to destroy molybdophosphoric acid. Even if phosphates known to be absent, the addition of oxalic acid is must in this method. The intensity of yellow colour produced IS proportional to concentration of molybdate reactive silica. To 50 ml of sample, add in quick succession 1.0 ml of 1:1 hydrochloric Acid and 2.0 ml ammonium molybdate reagent. Mix

by inverting at least six times and let stand for 5 To 10 minutes. Add 2.0 ml of oxalic acid solution and mix well. Read colour alter 2 minutes but Before 15 minutes, measuring time from addition of oxalic acid. Measure colour in a spectrophotometer at 410nm.

Total Phosphorus (TP) (IS 3025 part 31-1, 2022)

Into a series of 100mL Nessler tubes pipette appropriate amounts of phosphate working solution to cover the range of 5-30mg/L or 0.3-2mg/L P when $SnCl_2$/Ascorbic acid reagent is used as a reducing agent.Add 4mL ammonium molybdate followed by 0.5mL stannous chloride or 8mL combined reagent and dilute to 100mL with distilled water and mix well. Allow to stand for 10 minutes. Prepare blank using distilled water in the same way. Measure the intensity of blur coloured complex at 690nm or 880nm between 10 and 12 minutes after the development of the colour.Plot absorbance vs. phosphate concentration to give a straight line passing through the origin. The total phosphorus is expressed in µmol/l. The precision of analysis, expressed as standard deviation, is ±0.02 µmol/l

Total suspended matter (TSM)

One litre of seawater sample was filtered through a pre-weighed Polycarbonate filter (0.22 µm; Millipore) and after filtration the filter was dried for about 2 days at 60°C. The dried filter was weighed and noted down the reading. The filter was dried again and took the weight measurement. This procedure was continued until the weight loss of the filter due to drying is zero. The weight of the material retained on the filter was considered as TSM concentration and was expressed as mg/L.

Petroleum Hydrocarbons (PHC)

Collect about 1L sample and mark sample level in bottle for later determination of sample volume. Acidify to pH 2 or lower; generally, 5mL HCl (1+1) is sufficient. Transfer to a separatory funnel. Carefully rinse sample bottle with 30mL n-hexane and add the solvent washings to separatory funnel. Preferably shake vigorously for 2 min. However, if it is suspected for a stable emulsion, shake gently for 5 to 10 min. Let the layers separate. Drain solvent layer through a funnel containing solvent-moistened filter paper and 10g Na_2SO_4 into a clean, tared distilling flask. If a clear solvent layer cannot be obtained and emulsion exists, centrifuge the solvent and emulsion. Transfer centrifuged material to a separating funnel and drain solvent layer through a funnel with a prerinsed filter paper and 10 g Na_2SO_4. Extract twice more with 30mL solvent each but first rinse sample container with each solvent portion. Combine extracts in tared distilling flask and wash filter paper with an additional 10 to 20mL solvent. Distill solvent from distilling flask in a water bath at 70°C for solvent recovery. Place flask on a water bath at 70°C for 15 min and draw air through it with applied vacuum for the final 1min after the solvent has evaporated. If the residue contains visible water, add 2mL acetone, evaporate on a water-bath and repeat the addition and evaporation until all visible water has been removed. Cool in a desiccator for 30 min and weigh.

Phytoplankton

1-2 litre of the water samples were collected with the help of a Niskin sampler from the surface and bottom. The collected samples were preserved with lugols iodine (10%) and few drops of 2.5 % buffered formalin. In the laboratory, phytoplankton samples were allowed to settle for 24-48 hrs. in one litre measuring jars. After the gravity settlement, the samples were concentrated into

10ml from which 1ml samples were taken and phytoplankton cells were enumerated using a Sedgwick Rafter counting chamber following a standard protocol (UNESCO, 1978). Phytoplankton cells were identified into the genus/species levels using the Olympus inverted microscope (model: IX 71) with the aid of standard taxonomic literatures of Diatoms, Dinoflagellates and Blue-green algae (Subrahmanyam, 1946).

Zooplankton

Zooplankton samples were collected through horizontal hauls of HT net (49.5 cm diameter and 200 µm mesh) attached with the calibrated digital flow meter to measure the amount of water filtered through the net. At each station, the net was operated for 5 minutes as shown in Plate 2.4 and the sample remained in the bucket (Plate 2.5) after filtering the seawater through the 200 µm mesh was collected in a pre-cleaned PVC bottle. The excess waters were removed using bolting paper. Zooplankton biomass was measured through the displacement method (Postel et al., 2000). After the biomass measurements, zooplankton samples were preserved in 4-5% buffered formaldehyde for further analysis. In the laboratory, 25-50% of subsamples were taken using Folsom's plankton splitter the subsamples were analyzed in detailed for quantitative analysis. Zooplankton samples were sorted into group levels using the standard literatures of the Conway et al., 2000 and their abundances were represented in m^3.

Benthos

Samples for benthos i.e., bottom living organisms, were collected using a Van Veen grab (Plate 2.6), covering an area of 0.04m^2 and a penetration depth of 10 cm. Biota (organisms) contained in the sediment were separated by wet sieving (Plate 2.7).

(a) Meio-fauna

Sub-samples for meiofauna were collected from the Van Veen grab using a hand core (3 cm diameter) and preserved in formalin-Rose Bengal solution. Samples were passed through a set of two sieves; 0.5 mm and 0.045 mm mesh sieve. The material retained on the finer mesh was used for the analysis of meiofauna. All organisms were sorted and counted under binocular stereoscope microscope in the laboratory. An average of three replicates was taken for the population count and expressed as number per 10 cm^2.

(b) Macro fauna

The sediment samples for macro fauna was washed through a 0.5 mm mesh size sieve and the retained samples were preserved in 10% seawater formalin containing Rose-Bengal stain. In the laboratory, the macro faunal samples were again washed through 0.5 mm mesh sieve in running water to clear adhering sediments. All stained animals were picked and preserved in 5% formaldehyde. Later organisms were sorted and counted group wise under a stereoscope zoom binocular microscope. Wet weight of major macro faunal taxa was recorded on a single pan balance. Fauna was identified as far as possible.

Microbiological parameters

About 100 ml of the sample was sub-sampled into a pre-sterilized bottle for bacterial analysis. All samples were collected with precautions required for microbiological analysis.

Sample serially diluted to 3 times of 10^{-1} to 10^{-3} with sterile salt water. Heterotrophic bacterial counts were determined using R2A agar. Around 100 µl of each serially diluted water samples is plated on R2A agar plates and spread with sterile glass rod and incubated at 37 ^oC for 48-72 hours. The colonies formed on the plates are counted using the colony counter and represented as a number of colony forming units (CFU) per ml of water sample after considering

dilution factor. Total coliform counts were obtained by plating water samples on MacConkey agar. The colonies formed on the plates are counted using the colony counter and represented as number of colony forming units per ml of water sample after considering the dilution factor. The colonies of pink-red colour and with bile precipitate are counted as ECLO on MacConkey agar plates. The colonies of colourless to pale pink are counted as EFLO on MacConkey agar plates. PALO counts were obtained by plating water samples on Cetrimide agar. The colonies exhibiting fluorescence at 250nm and a blue green pigmentation are considered PALO. VLO counts were obtained by plating water samples on TCBS agar. The colonies formed on the TCBS agar plates are counted as VLO. The colonies of yellow colour are counted as VCLO on TCBS agar plates. The colonies of bluish-green colour are counted as VPLO on TCBS agar plates.

Bio-assay Test:

Bio-assay test on treated effluent was conducted following CPCB guidelines (IS:6582-1971) using pink zebrafish test organisms. Different concentrations of treated effluent like 20%, 40%, 60% and 80% were prepared by dilution. 100% effluent was taken without any dilution. Dilution water was used as control for the experiment. Test was conducted for 4 days (96 hours.)

Chapter 5

Physico-Chemical Parameters

Sea surface temperature ranged from 27.8 ºC to 28.2ºC and the mean surface temperature in the study region was 28.0± 0.1ºC (Fig. 5.1; Table 5.1). In the bottom waters, temperature varied between 27.1ºC and 28.1ºC, with a mean bottom water temperature in the study region of 27.8±0.3ºC (Fig. 5.1; Table 5.1). Salinity varied from 32.7 to 33.4 in the surface waters and from 32.8 to 34.0 in the bottom waters (Fig. 5.1; Table 5.1). Mean salinity values in the surface and bottom waters of the study region are 33.0±0.2 and 33.1±0.3, respectively. Turbidity values ranged from 0.5 NTU to 1.3 NTU in the surface and from 0.6 NTU to 1.6 NTU in the bottom waters (Fig. 5.1; Table 5.1). Mean turbidity values were 1.0±02 NTU and 1.1±0.3 NTU in the surface and bottom waters of the study region.

Dissolved oxygen (DO) concentrations in the surface water of the study region varied from 6.3 mg/L to 6.8 mg/L and the mean DO concentrations are 6.6±0.2 mg/L (Fig. 5.2; Table 5.2). In the bottom waters, DO concentrations ranged from 5.9 mg/L to 6.6 mg/L (Fig. 5.2; Table 5.2), with a mean DO concentration of 6.4±0.2 mg/L in the study region during our sampling period. Biochemical oxygen demand for three days (BOD_3) varied from 1.1 mg/L to 3.0 mg/L (Fig. 5.2; Table 5.2) in the surface waters with a mean BOD_3 concentration of 2.1±0.6 mg/L in the study region. BOD_3 ranged from 1.6 mg/L to 3.3 mg/L in the bottom waters (Fig. 5.2; Table 5.2) and the mean BOD_3 concentration of the study region in the bottom waters are 2.3±0.5 mg/L. Both DO and BOD_3 concentrations in the surface and bottom waters of the study region indicate no external input of organic matter to the study region.

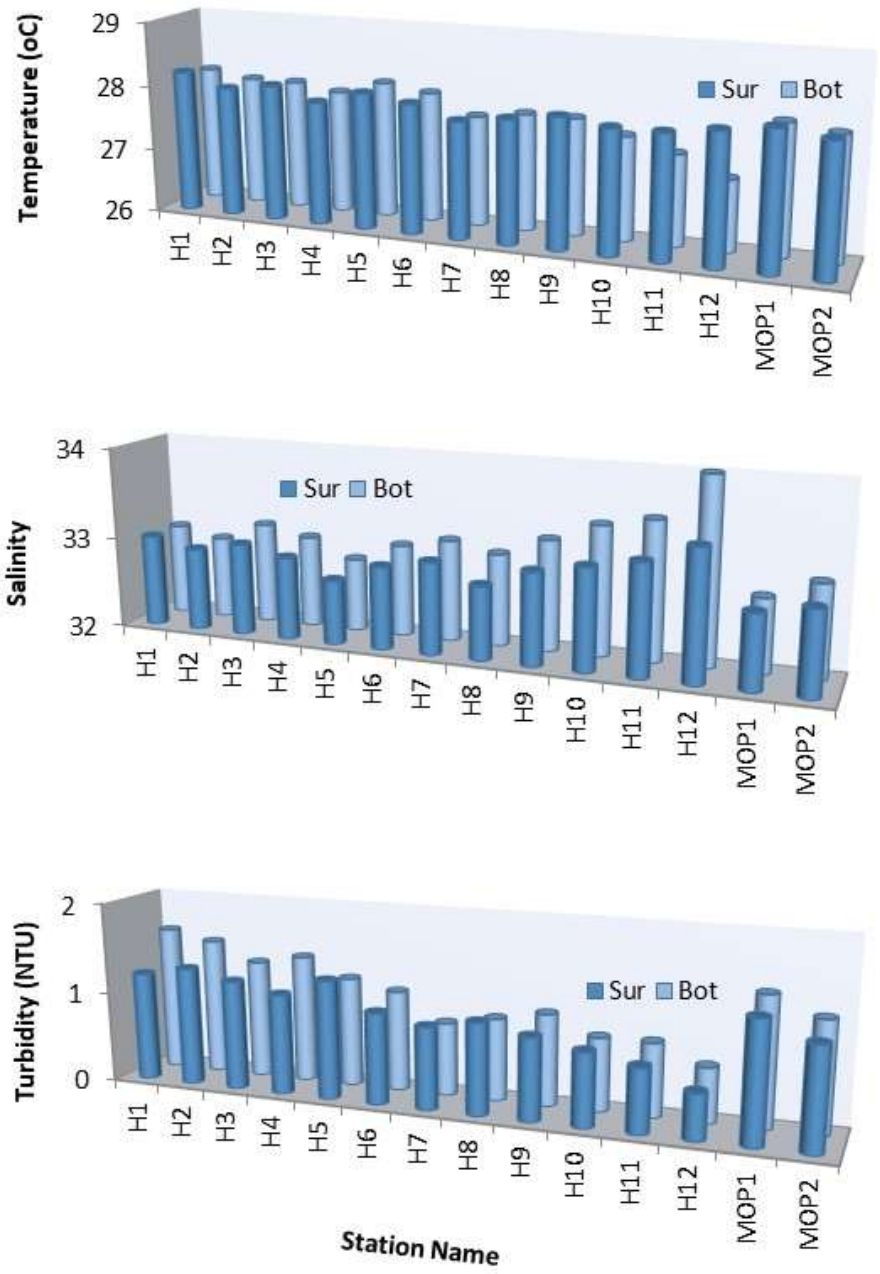

Fig. 5.1: Spatial variability of temperature, salinity and turbidity in the surface and bottom waters of the study region during sampling period.

pH varied from 7.8 to 8.2 in the surface waters (Fig. 5.2; Table 5.2) with a mean pH value of 8.0±0.1 in the study region. pH ranged between 7.7 to 8.0 in the bottom waters (Fig. 5.2; Table 5.2). Mean pH in the bottom waters of the study region was 7.9±0.1 during our sampling period.

Station Name	Temperature (°C)		Salinity (PPT)		Turbidity (NTU)	
	Sur	Bot	Sur	Bot	Sur	Bot
H1	28.2	28.1	33	33	1.2	1.6
H2	28	28	32.9	32.9	1.3	1.5
H3	28.1	28	33	33.1	1.2	1.3
H4	27.9	27.9	32.9	33	1.1	1.4
H5	28.1	28.1	32.7	32.8	1.3	1.2
H6	28	28	32.9	33	1	1.1
H7	27.8	27.7	33	33.1	0.9	0.8
H8	27.9	27.8	32.8	33	1	0.9
H9	28	27.8	33	33.2	0.9	1
H10	27.9	27.6	33.1	33.4	0.8	0.8
H11	27.9	27.4	33.2	33.5	0.7	0.8
H12	28	27.1	33.4	34	0.5	0.6
MOP-1	28.1	28	32.8	32.8	1.3	1.4
MOP-2	28	27.9	32.9	33	1.1	1.2

Table 5.1: Temperature, salinity and turbidity in the surface (Sur) and bottom (Bot) waters of the study region during sampling period

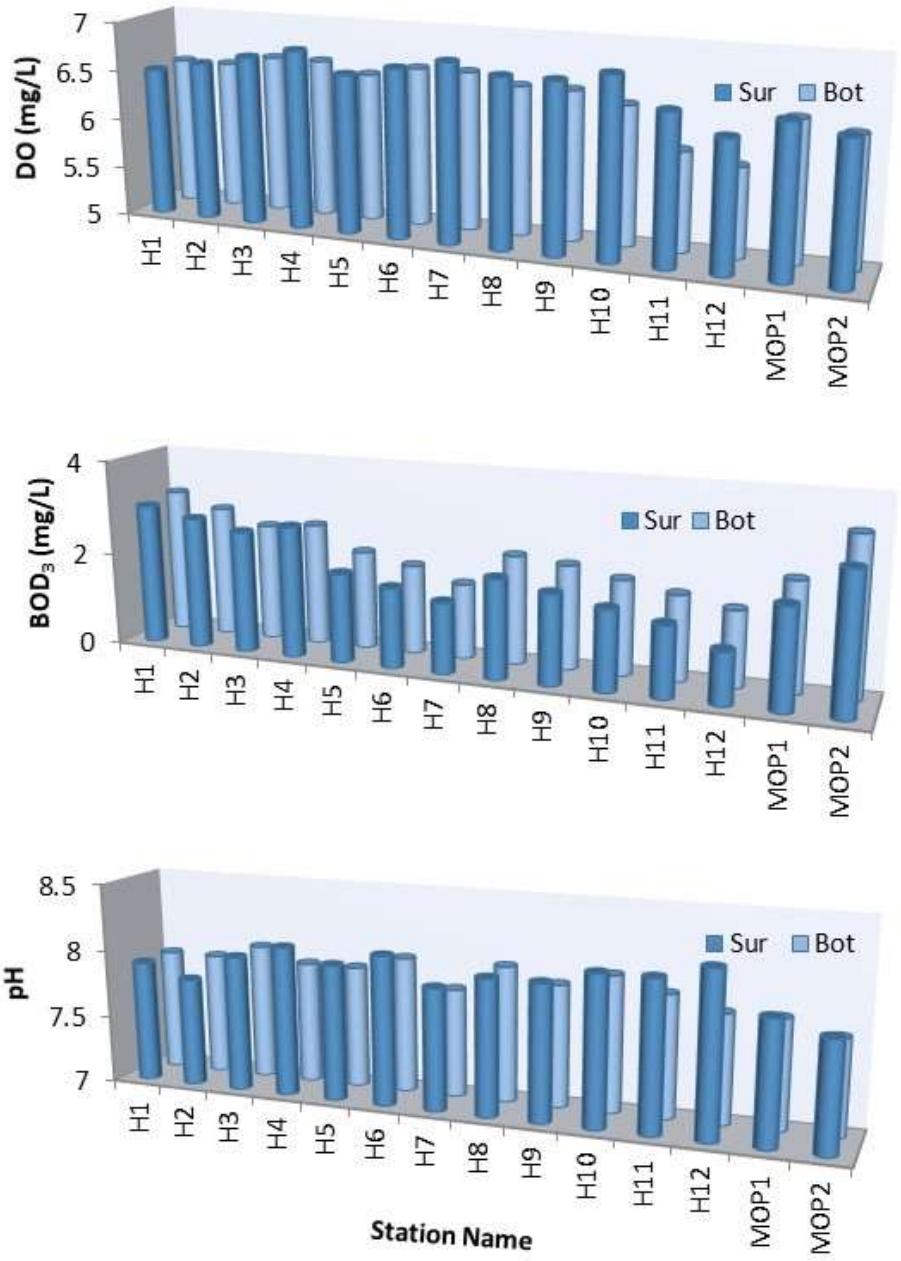

Fig. 5.2: Spatial variability of dissolved oxygen (DO), Biochemical oxygen demand for three days (BOD_3) and pH in the surface and bottom waters of the study region during sampling period.

Station Name	DO (mg/L)		BOD_3 (mg/L)		pH	
	Sur	Bot	Sur	Bot	Sur	Bot
H1	6.5	6.5	3	3.1	7.9	7.9
H2	6.6	6.5	2.8	2.8	7.8	7.9
H3	6.7	6.6	2.6	2.5	8	8
H4	6.8	6.6	2.8	2.6	8.1	7.9
H5	6.6	6.5	1.9	2.1	8	7.9
H6	6.7	6.6	1.7	1.9	8.1	8
H7	6.8	6.6	1.5	1.6	7.9	7.8
H8	6.7	6.5	2.1	2.3	8	8
H9	6.7	6.5	1.9	2.2	8	7.9
H10	6.8	6.4	1.7	2	8.1	8
H11	6.5	6	1.5	1.8	8.1	7.9
H12	6.3	5.9	1.1	1.6	8.2	7.8
MOP-1	6.5	6.4	2.1	2.3	7.9	7.8
MOP-2	6.4	6.3	2.9	3.3	7.8	7.7

Table 5.2: Dissolved oxygen (DO), biochemical oxygen demand for three days (BOD_3) and pH in the surface (Sur) and bottom (Bot) waters of the study region during sampling period

Dissolved ammonium concentrations varied from 0.3 µM to 1.5 µM in the surface waters and from 0.2 µM to 1.6µM in the bottom waters (Fig. 5.3; Table 5.3). Mean ammonium concentration are 0.9±0.3µM in the surface and 0.9±0.4µM in the bottom waters of the study region during our sampling period.

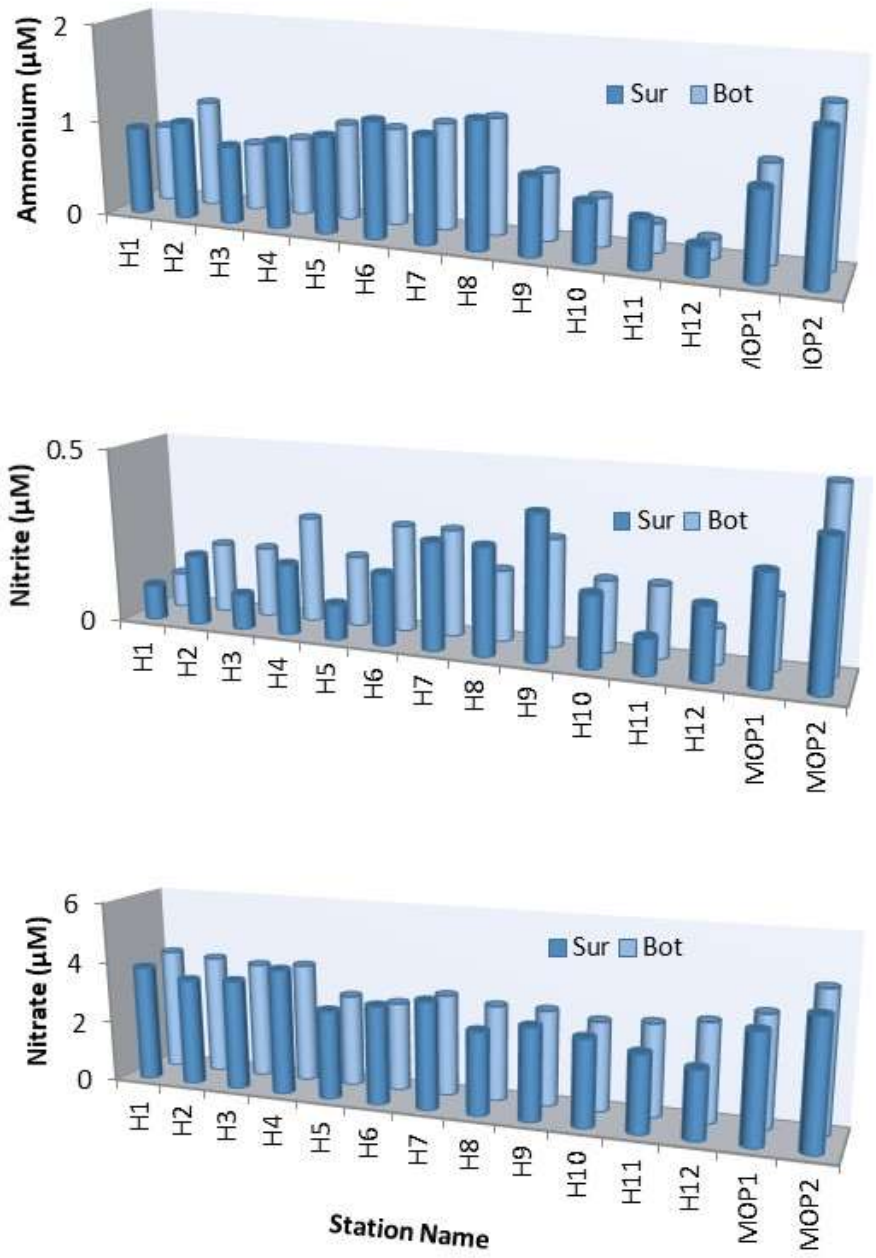

Fig. 5.3: Spatial variability of ammonium (µM), nitrite (µM) and nitrate (µM) in the surface and bottom waters of the study region during sampling period.

Dissolved nitrite concentrations varied from 0.1 µM to 0.4 µM in the surface and from 0.1 µM to 0.5 µM in the bottom waters of the study region with a mean nitrite concentration of 0.2±0.1 µM in both surface and bottom waters (Fig. 5.3; Table 5.3).

Station Name	Ammonium (µM)		Nitrite (µM)		Nitrate (µM)	
	Sur	Bot	Sur	Bot	Sur	Bot
H1	0.9	0.8	0.1	0.1	3.8	4
H2	1	1.1	0.2	0.2	3.5	3.9
H3	0.8	0.7	0.1	0.2	3.6	3.8
H4	0.9	0.8	0.2	0.3	4.1	3.9
H5	1	1	0.1	0.2	2.9	3
H6	1.2	1	0.2	0.3	3.2	2.9
H7	1.1	1.1	0.3	0.3	3.5	3.3
H8	1.3	1.2	0.3	0.2	2.7	3.1
H9	0.8	0.7	0.4	0.3	3	3.1
H10	0.6	0.5	0.2	0.2	2.8	2.9
H11	0.5	0.3	0.1	0.2	2.5	3
H12	0.3	0.2	0.2	0.1	2.2	3.2
MOP-1	0.9	1	0.3	0.2	3.5	3.6
MOP-2	1.5	1.6	0.4	0.5	4.1	4.5

Table 5.3: Dissolved inorganic nitrogenous nutrients, i.e., ammonium (µM), nitrite (µM) and nitrate (µM) in the surface and bottom waters of the study region during sampling period

Nitrate concentrations ranged between 2.2 µM and 4.1 µM in the surface and between 2.9 µM and 4.5 µM in the bottom waters (Fig. 5.3; Table 5.3). Mean nitrate concentrations in the study region are 3.8±0.6µM and 3.4±0.5 µM in the surface and bottom waters, respectively.

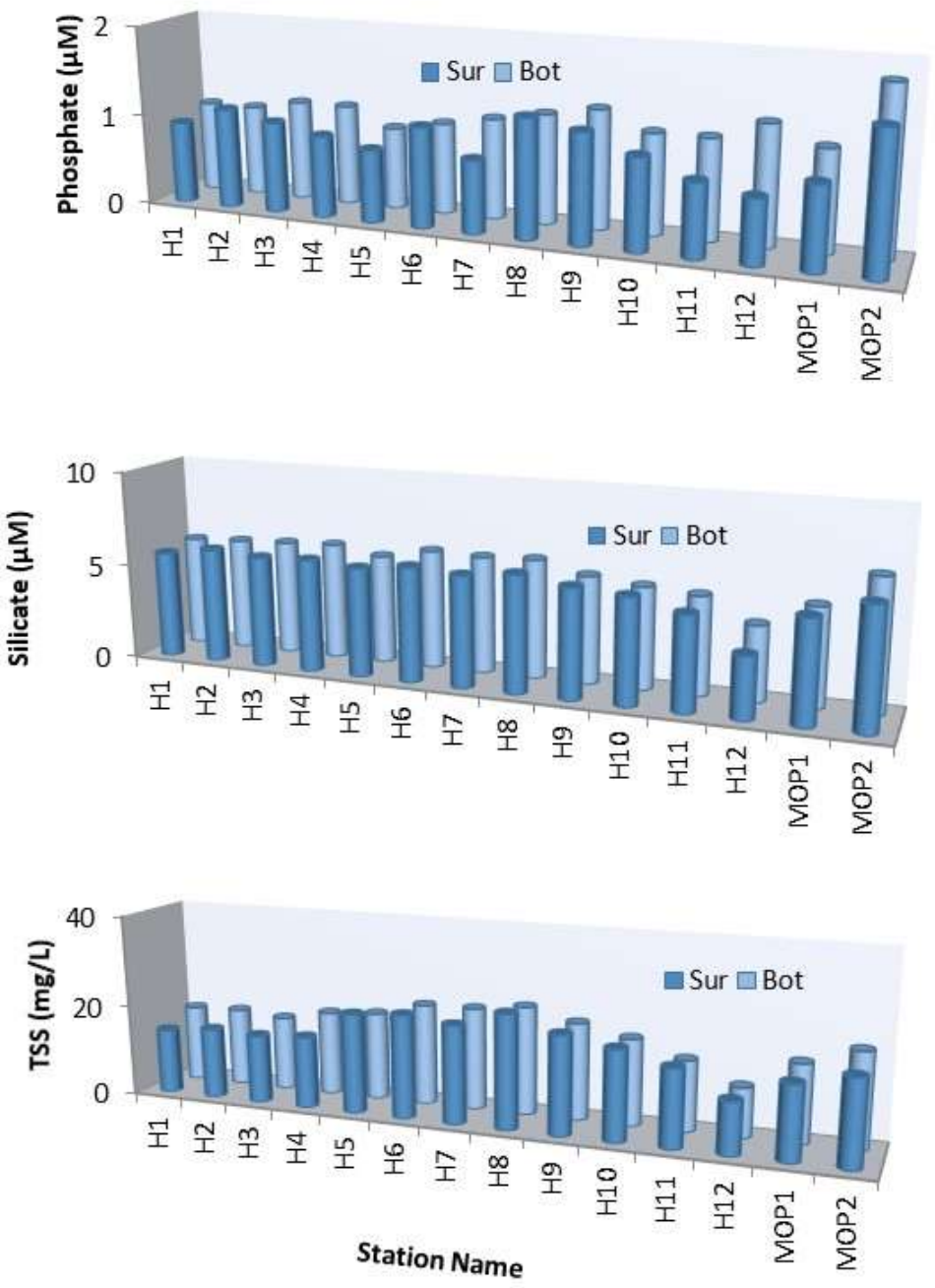

Fig. 5.4: Spatial variability of phosphate (µM) and silicate (µM) and total suspended solids (TSS; mg/L) in the surface and bottom waters of the study region during sampling period.

Station Name	Phosphate (µM)		Silicate (µM)		TSP (µM)	
	Sur	Bot	Sur	Bot	Sur	Bot
H1	0.9	1	5.6	5.8	14.2	16.8
H2	1.1	1	6	5.9	15.3	17.1
H3	1	1.1	5.8	6	14.9	16.2
H4	0.9	1.1	5.9	6.1	15.6	18.3
H5	0.8	0.9	5.7	5.7	21.6	19.1
H6	1.1	1	6	6.2	22.4	21.9
H7	0.8	1.1	5.8	6.1	21.2	22.1
H8	1.3	1.2	6.1	6.2	24.6	23.4
H9	1.2	1.3	5.7	5.6	21.3	20.9
H10	1	1.1	5.5	5.3	19.4	18.6
H11	0.8	1.1	4.9	5.1	16.7	15.2
H12	0.7	1.3	3.2	3.9	11.2	10.7
MOP-1	0.9	1.1	5.3	5.1	15.9	16.8
MOP-2	1.5	1.8	6.2	6.8	18.4	20.4

Table 5.4: Dissolved inorganic nutrients, i.e., phosphate (µM) and silicate (µM) and total suspended solids (TSS; mg/L) in the surface and bottom waters of the study region during sampling period

Dissolved inorganic phosphate concentrations ranged from 0.7 µM to 1.5 µM in the surface waters (Fig. 5.4; Table 5.4) with a mean phosphate concentration of 1.0±0.2µM. In the bottom waters, it varied from 0.9 µM to 1.8 µM (Fig. 5.4; Table 5.4), with a mean concentration of 1.2±0.2 µM in the study region during our sampling period. Silicate concentrations varied from 3.2 µM to 6.2 µM in the surface waters and from 3.9 µM to 6.8 µM in the bottom waters (Fig. 5.4;

Table 5.4). Mean silicate concentrations in the surface and bottom waters of the study region are 5.6±0.8 µM and 5.7±0.7 µM, respectively. Concentrations of total suspended solids (TSS) ranged between 11.2 mg/L to 24.6 mg/L in the surface waters (Fig. 5.4; Table 5.4), with mean TSS of 18.1±3.8 mg/L in the study region. In the bottom waters, TSS concentrations ranged from 10.7 mg/L to 23.4 mg/L (Fig. 5.4; Table 5.4) and the mean TSS in bottom waters of the study region is 18.4±3.3 mg/L.

Total nitrogen (TN) concentrations varied from 7.1 µM to 14.6 µM in the surface waters (Fig. 5.5; Table 5.5) and from 7.0 µM to 15.3 µM in the bottom waters (Fig. 5.5; Table 5.5). Mean TN concentrations in the study region are 9.7±1.7 µM and 9.9±1.9 µM in the surface and bottom waters, respectively. Total phosphorus (TP) concentration ranged from 2.4 µM to 3.1 µM in the surface waters (Fig. 5.5; Table 5.5), with a mean TP concentration of 2.7±0.2 µM in the study region. Similar range of TP concentrations were observed in the bottom waters (2.4 µM – 3.3 µM; Fig. 5.5, Table 5.5), with a mean TP concentration of 2.9±0.2µM. Total petroleum hydrocarbon (TPHC) concentrations in the study region varied from 6.4 µg/L to 12.4 µg/L in the surface waters (Fig. 5.5; Table 5.5) and from 5.3 µg/L to 11.6 µg/L in the bottom waters (Fig. 5.5; Table 5.5) during our sampling period. Mean TPHC concentrations in the study region are 10.3±1.6 µg/L and 9.6±1.6 µg/L in the surface and bottom waters, respectively. Concentrations of TP, TP and TPHC observed in this study are concurrent with those reported from this region in previous years.

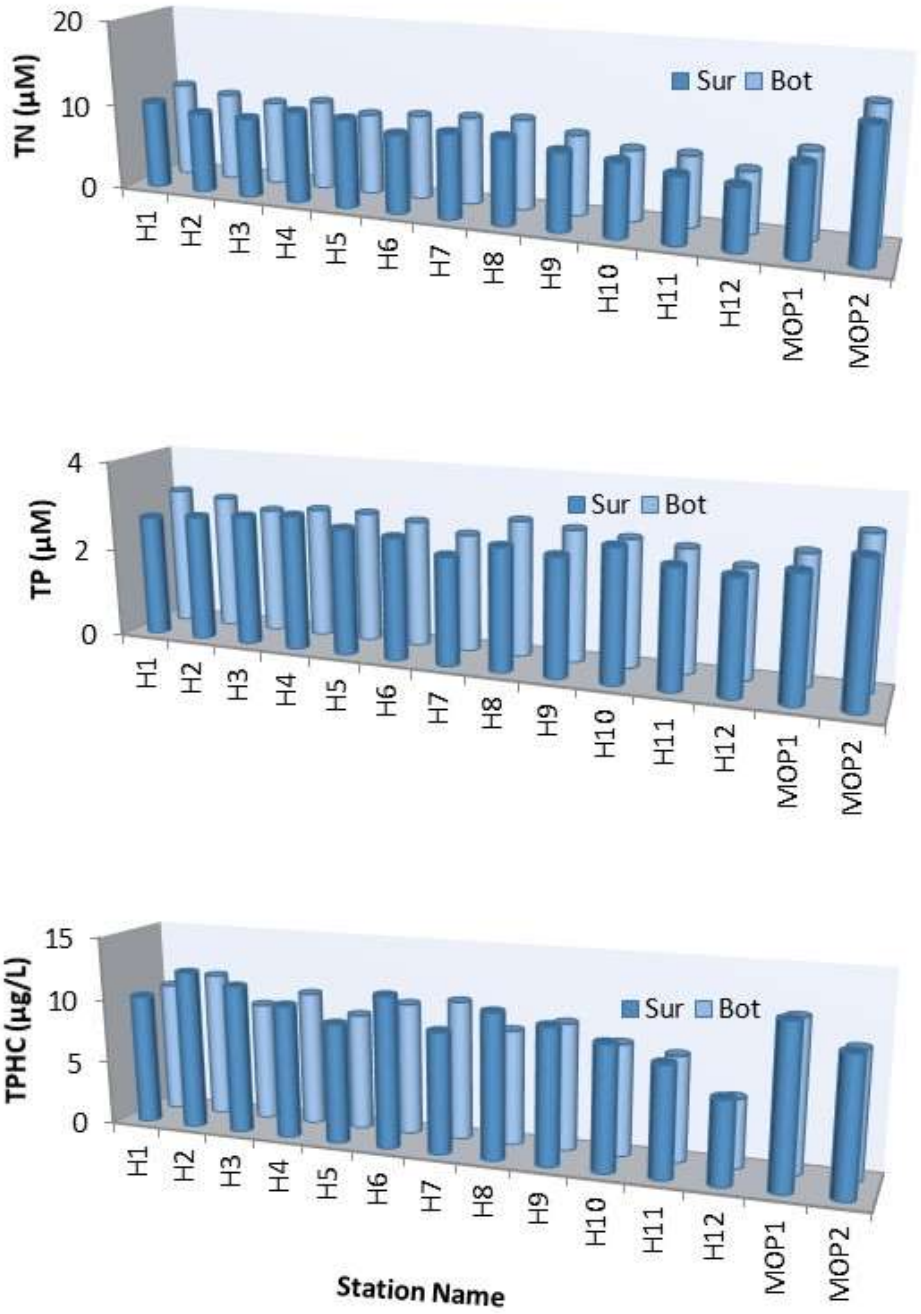

Fig. 5.5: Spatial variability of Total nitrogen (TN; µM), total phosphorus (TP; µM) and total petroleum hydrocarbon (TPHC; µg/L) in the surface and bottom waters of the study region during sampling period.

Station Name	TN (µM)		TP (µM)		TPHC (µg/L)	
	Sur	Bot	Sur	Bot	Sur	Bot
H1	10.2	11	2.7	3.1	10.2	10.3
H2	9.4	10.3	2.8	3	12.4	11.4
H3	9.3	9.8	2.9	2.8	11.6	9.3
H4	10.6	10.4	3	2.9	10.4	10.5
H5	10.3	9.4	2.8	2.9	9.3	9.1
H6	9.1	9.8	2.7	2.8	11.8	10.3
H7	9.8	10.1	2.4	2.6	9.4	10.8
H8	9.9	10.4	2.7	3	11.2	8.9
H9	8.9	9.2	2.6	2.9	10.5	9.8
H10	8.4	8.1	2.9	2.8	9.6	8.6
H11	7.6	8.1	2.6	2.7	8.5	8.1
H12	7.1	7	2.5	2.4	6.4	5.3
MOP-1	10.1	9.8	2.7	2.8	12.3	11.6
MOP-2	14.6	15.3	3.1	3.3	10.4	9.7

Table 5.5: Total nitrogen (TN; µM), total phosphorus (TP; µM) and total petroleum hydrocarbon (TPHC; µg/L) concentrations in the surface and bottom waters of the study region

Chapter 6

Biological Parameters

Phytoplankton biomass (Chl-a) ranged from 0.6 to 1.3 µg/L, with mean Chl-a concentration of 1.0±0.2 µg/L in surface waters of the study region (Fig. 6.1). In bottom waters, it varied from 0.5 to 1.2 µg/L, with mean concentration of 1.1±0.2µg/L (Fig. 6.1). Chl-a concentrations found in this study are relatively higher than those found in previous monitoring studies of this region. Chl-a concentrations at sea discharge points are comparable to the mean Chl-a concentrations observed in the region (Table 6.1). Phytoplankton abundance varied from 6942 No/L to 13201 No/L in surface waters and from 6127 No/L to 12764 No/L in bottom waters (Fig. 6.1; Table 6.1). Mean phytoplankton abundance in the study region is more or less similar in surface (10297±1797 No/L) and bottom (10723±1790 No/L) waters of the study region. The phytoplankton abundance found in this study is relatively higher than those reported in previous study conducted in this region (4952 No/L and 8262 No/L, respectively). Number of phytoplankton genera identified in the study region is limited to 28 in surface waters and 27 in the bottom waters. Most of the phytoplankton belongs to diatom group. Diatoms contribution to the total phytoplankton is ~68% in the surface waters and ~71% in the bottom wates (Fig. 6.2). Dinoflagellate contribution to the total phytoplankton abundance was 20% in the surface waters and 21% in the bottom waters (Fig. 6.2). Contribution from other phytoplankton groups to the total phytoplankton abundance is 12% and 8% in the surface and bottom waters, respectively (Fig. 6.2). The phytoplankton composition found in this study is similar to the composition of phytoplankton reported from this region in previous monitoring studies and in the coastal waters along east coast of India. These results show that there is no significant impact of treated effluent release on phytoplankton's biomass (Chl-a) and abundance.

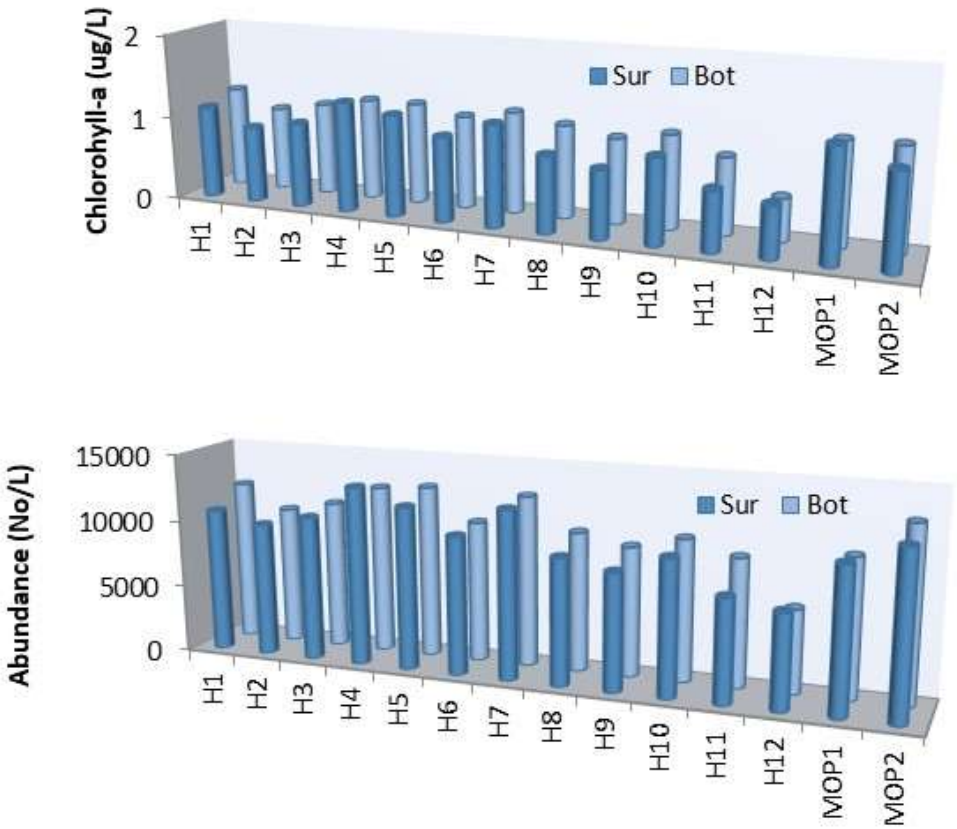

Fig. 6.1: Spatial variability of chlorophyll-a (µg/L) and total abundance of phytoplankton (No/L) in the surface and bottom waters of the study region during sampling period.

Meso-zooplankton abundance in surface waters of the study region varied from 419 No/m^3 to 810 No/m^3 in the study region (Fig. 6.3; Table 6.1), with a mean abundance of 564±113 No/m^3. These abundances are comparable with meso-zooplankton abundance reported in the previous monitoring studies conducted in this region (502 No/m^3) and coastal waters of east coast of India. A total of 18 meso-zooplnankton groups were identified in the study region. Among various groups, Copepods dominantly contributed to the total meso-zooplankton abundance of the study region, consistent with previous reports. Its mean contribution to the total meso-zooplankton abundance is ~91% (Fig. 6.4). Chaetognatha are the second largest contributor to the total meso-zooplankton, with mean contribution of 2.8% (Fig. 6.4).

Station	Chlorophyll-a (ug/L)		Phytoplankton (No/L)		Zooplankton (No/m3)
	Sur	Bot	Sur	Bot	
H1	1.1	1.2	10648	11973	467
H2	0.9	1	9861	10268	529
H3	1	1.1	10692	10986	483
H4	1.3	1.2	13201	12458	611
H5	1.2	1.2	12036	12754	570
H6	1	1.1	10211	10398	761
H7	1.2	1.2	12436	12603	810
H8	0.9	1.1	9326	10264	614
H9	0.8	1	8631	9534	593
H10	1	1.1	9978	10429	512
H11	0.7	0.9	7596	9413	432
H12	0.6	0.5	6942	6127	419
MOP-1	1.3	1.2	10561	10146	583
MOP-2	1.1	1.2	12036	12764	508
Mean	1.0	1.1	10297	10723	563.7
Std.	0.2	0.2	1797	1790	113.3

Table 6.1: Chlorophyll-a (µg/L) and total phytoplankton abundance (No/L) in the surface and bottom waters of the study region. Meso zooplankton abundance in surface waters of the study region is also given.

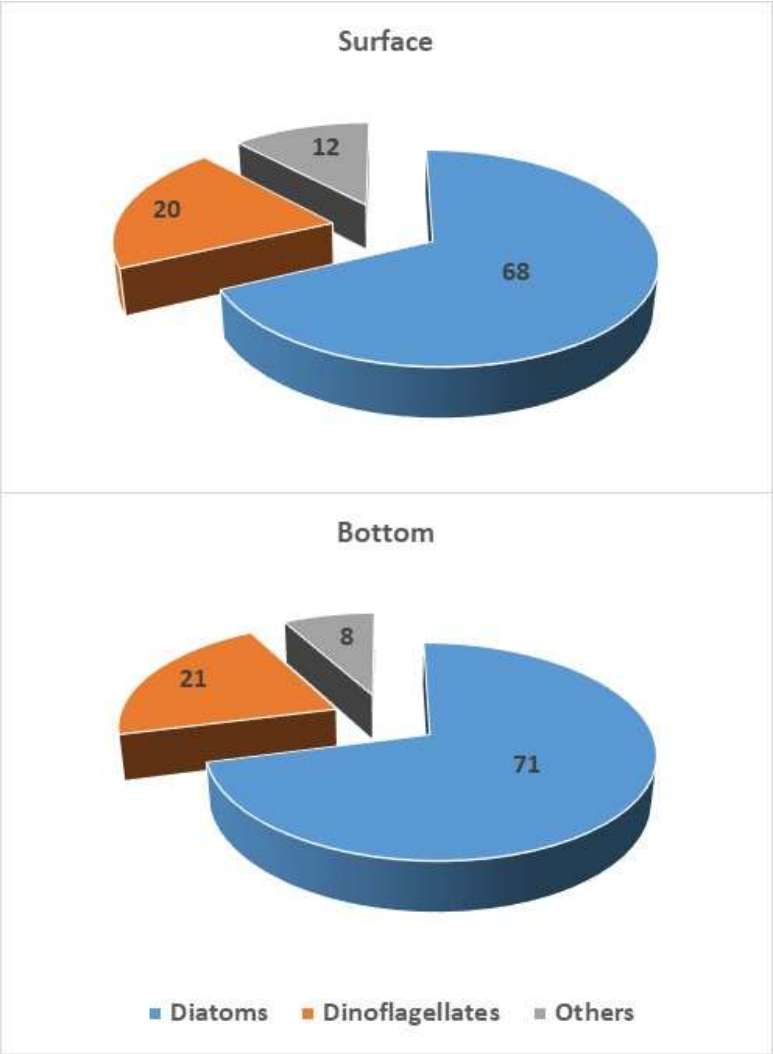

Fig. 6.2: Percent contribution of various phytoplankton groups to the total abundance of phytoplankton in the surface and bottom waters of the study region during sampling period.

Appendicularian is the third major contributor to the total meso-zooplankton abundance in the study region and its contribution was 1.4% (Fig. 6.4). Other meso-zooplankton groups found in this study are Siphonophore (mean contribution 1.0%), Decopod larve (1.0%), Fish eggs (0.6%), Gastropods (0.5%), Thaliacea (0.5%), Pteropods (0.5%), Polychaete larve (0.4%) and Cladocerans (0.3%) as shown in figure 6.4.

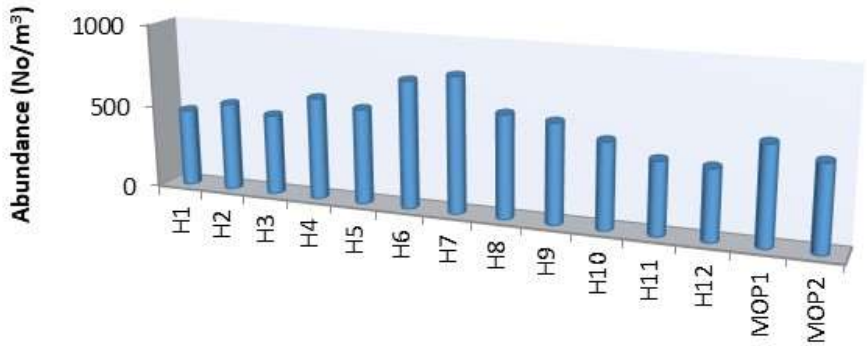

Fig. 6.3: Abundance of meso-zooplankton in the surface waters of the study region during sampling period.

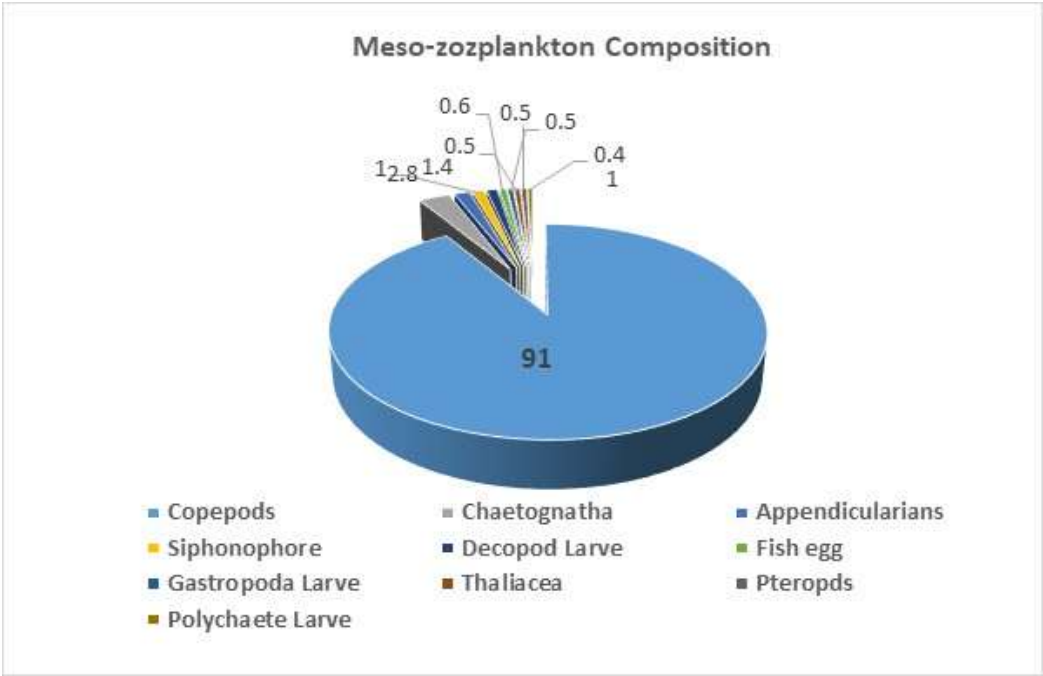

Fig. 6.4: Percent contribution of various meso-zooplankton groups to the total abundance of meso-zooplankton abundance in the surface waters of the study region during sampling period.

Abundance of macro-benthic organisms broadly varied from as low as 2196 No/m^2 to as high as 3391 No/m^2 (Fig. 6.5) in surface sediments of the study region. Mean abundance of macro benthos in the study region is 2749±431 No/m^2. It is comparable with the reported values macro-benthic abundance from this region in previous monitoring study conducted in 2022 (1950 – 3500 No/m^2). The total number of fauna found in surface sediments of the study region is limited to 25 and their individual contributions ranged from 5% to 32%. Polychaete is the dominant group that was contributed largely (~32%) to the total macrofaunal density (Fig. 6.6). The second largest contributing group is foraminifera and their contribution to the total macrofaunal density is 21% (Fig. 6.6). Contribution from Mollusca is 18% to the total macrofaunal density. Minor phylum contributes 13% while Arthropoda contribution is limited to 11% (Fig. 6.6).

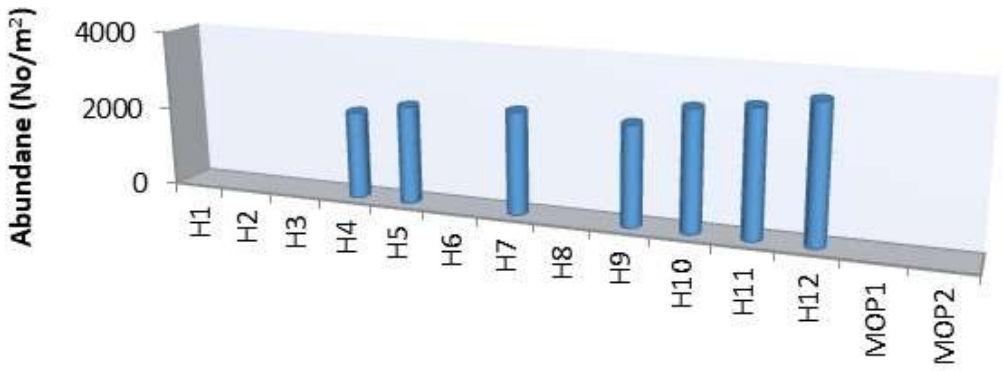

Fig. 6.5: Abundance of macro-fauna in surface sediments of the study region during sampling period.

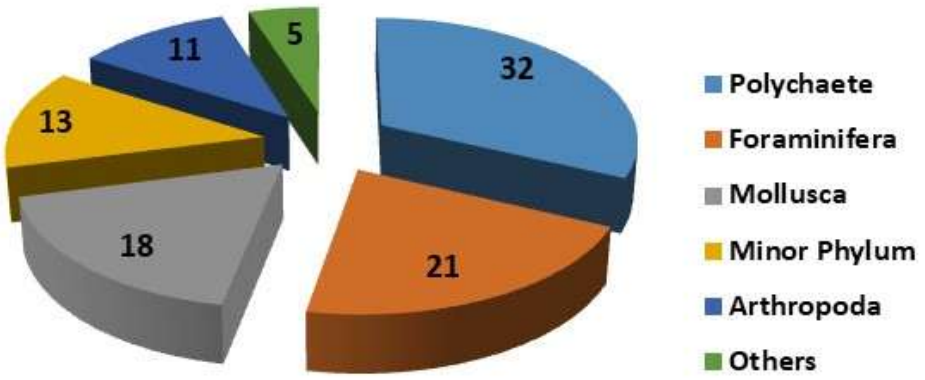

Fig. 6.6: Percent contribution of various groups to the total macro-faunal density in the surface sediments of the study region during sampling period.

Abundance of meio-faunal benthic organisms varied from 462 No/10cm^2 to 715 No/m^2 (Fig. 6.7) in surface sediments of the study region. Mean abundance of meio benthos in the study region is 583±98 No/10cm^2. It is comparable with the reported values macro-benthic abundance from this region in previous monitoring study conducted in 2017(416-1006 No/10cm^2). The total number of meio-fauna found in surface sediments of the study region is limited to 13 and their individual contributions ranged from 3% to 33%. Nematoda is the dominant group that was contributed largely (~33%) to the total meiofaunal density (Fig. 6.8). The second largest contributing group is Foraminifera and their contribution to the total meiofaunal density is 21% (Fig. 6.8). Polychaeta is the third major group that contributed to the total meiofaunal abundance and its mean contribution is 10% (Fig. 6.8). Contribution from Harpacticoida, Ostracoda, Bivalves, Gastropoda, Turbellari and Nauplii to the total meio-faunal abundance is 9%, 8%, 4%, 4%, 3% and 3%, respectively (Fig. 6.8). Contribution from others to the total meio-faunal abundance limited to 5% only (Fig. 6.8).

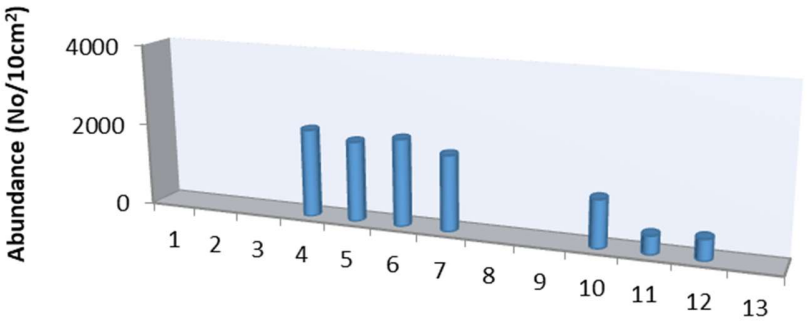

Fig. 6.7: Abundance of meio-fauna in surface sediments of the study region during sampling period.

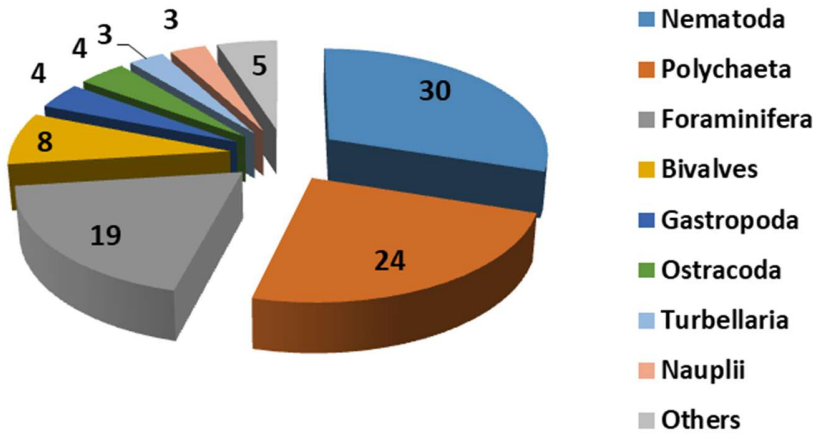

Fig. 6.8: Percent contribution of various groups to the total meio-faunal density in the surface sediments of the study region during sampling period.

Total *coliform* counts varied from NG to 1.5×10^3 CFU/mL in the surface waters with mean of $0.9\pm0.3\times10^3$ CFU/mL (Fig. 6.9; Table 6.2). In the bottom waters, counts of total *coliform* varied

from NG to 1.8×10^3 CFU/mL, with mean counts of $1.0\pm0.4\times10^3$ CFU/mL (Fig. 6.9; Table 6.2). *Escherichia coli* like organism (ECLO) counts varied from NG to 2.4×10^3 CFU/mL in surface water and NG to 2.1×10^3 CFU/mL in bottom water. Mean ECLO counts are $1.3\pm0.5\times10^3$ CFU/mL and $1.3\pm0.4\times10^3$ CFU/mL in the surface and bottom waters, respectively (Table 6.2). The range of ECLO found in this study is comparable with those found in the previous monitoring study conducted in this region.

The *Vibrio* like organism (VLO) counts ranged from NG to 0.6×10 CFU/ml in surface water and NG to 0.60 ×10 CFU/ml in bottom waters (Fig. 6.9; Table 6.2). *Vibrio cholerae* like organisms (VCLO) counts ranged from NG to 0.3×10 CFU/ml in surface water and NG to 0.2×10 CFU/ml in bottom waters (Fig. 6.9; Table 6.2). Bacterial counts found in surface and bottom waters of the study region are well below the counts reported in the previous studies conducted in this region. Counts of TC, ECLO, VLO and VCLO at effluent release point and RO reject discharge points are similar to those obtained in the vicinity of the study region, and are comparable with those reported in the east Indian coastal waters. These results indicate that release of treated effluent and RO reject in to the sea from M/s Hetero Drugs Limited do not pose any threat to the increase of these microorganisms in the coastal waters of study region

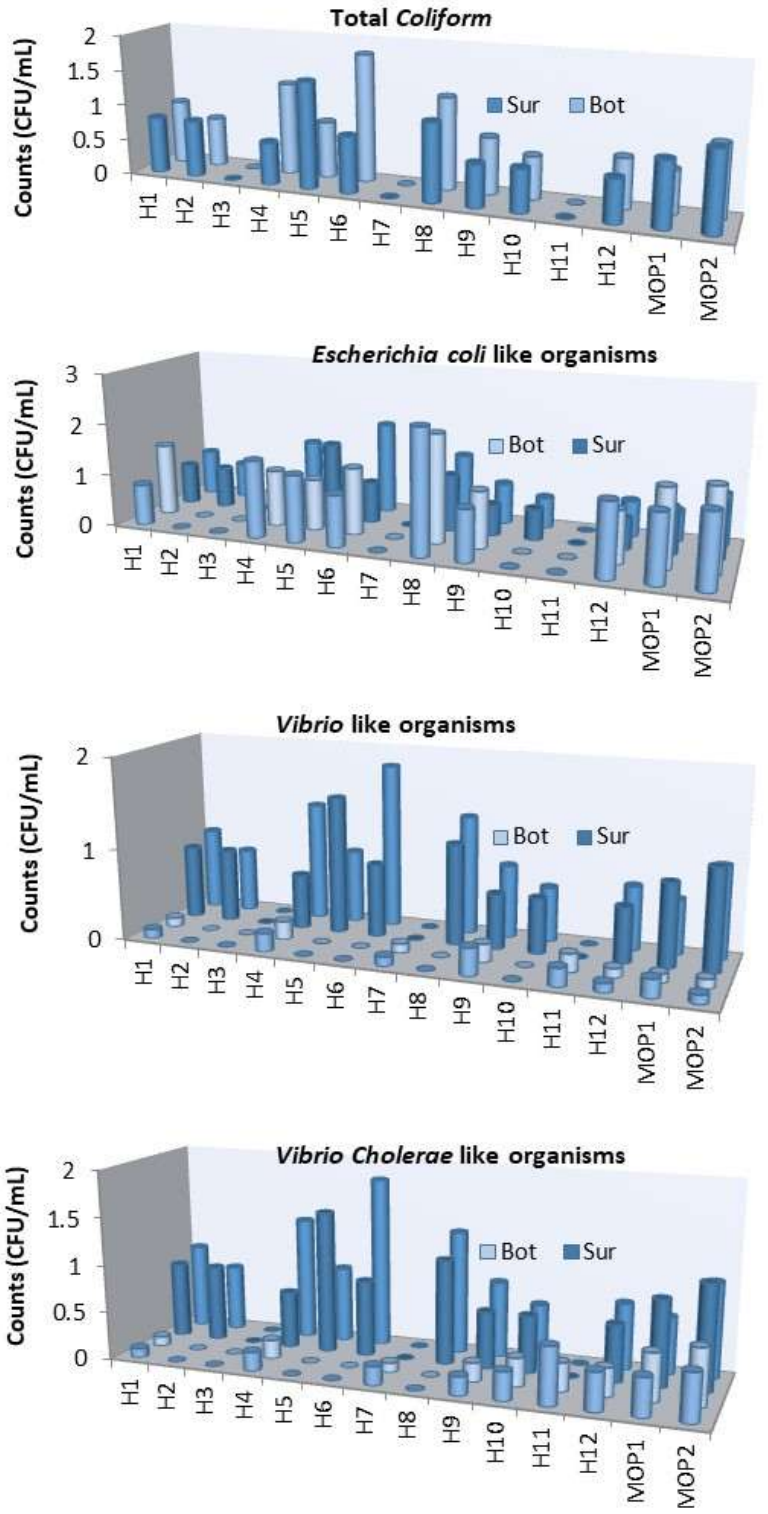

Fig. 6.7: Counts of various bacterial organisms in the surface and bottom waters of the study region during sampling period

Station	TC		ECLO		VLO		VCLO	
	Sur	Bot	Sur	Bot	Sur	Bot	Sur	Bot
H1	0.8	0.9	0.8	1.4	0.1	0.1	0.1	0.1
H2	0.8	0.7	NG	NG	NG	NG	NG	NG
H3	NG	NG	NG	NG	NG	NG	NG	NG
H4	0.6	1.3	1.5	1.1	0.2	0.2	0.2	0.2
H5	1.5	0.8	1.3	1	NG	NG	NG	NG
H6	0.8	1.8	1	1.3	NG	NG	NG	NG
H7	NG	NG	NG	NG	0.2	0.1	0.1	0.1
H8	1.1	1.3	2.4	2.1	NG	NG	NG	NG
H9	0.6	0.8	1	1.1	0.2	0.2	0.3	0.2
H10	0.6	0.6	NG	NG	0.3	0.3	NG	NG
H11	NG	NG	NG	NG	0.6	0.3	0.2	0.2
H12	0.6	0.7	1.4	1	0.4	0.3	0.1	0.1
MOP-1	0.9	0.6	1.3	1.5	0.4	0.5	0.2	0.1
MOP-2	1.1	1	1.4	1.6	0.5	0.6	0.1	0.1
Mean	0.9	1.0	1.3	1.3	0.3	0.3	0.2	0.1
Std.	0.3	0.4	0.5	0.4	0.2	0.2	0.1	0.1

Table 6.2: Abundance (CFU/mL) of Total *Coliform*, *Escherichia coli* like organism (ECLO), *Vibrio* like organism (VLO) and *Vibrio cholerae* like organisms (VCLO)in the surface and bottom waters of the study region. NG represents No Growth.

During the bio-assay test period of 96 hours, survival rate of zebrafish was noted down at various time intervals in different concentrations of treated effluent and the same was given in Table 6.3.

No mortality of zebra fish was recorded in the control, 20% and 40% tanks. In the 60% tank, 4% mortality was found in the last 96 hours. In 80% effluent, 4% mortality was recorded after 72 hours and 8% mortality was recorded after 96 hours. In the 100% effluent, 4% mortality was recorded after 48 hours and continued the same until 72 hours. Mortality increased to 8% after 96 hours.

Table 6.3: Survival rate (%) of zebra fish at different time periods exposed to different concentrations of effluent

Time	0%	20%	40%	60%	80%	100%
24 hr	100	100	100	100	100	100
48 hr	100	100	100	100	100	96
72 hr	100	100	100	100	96	96
96 hr	100	100	100	96	92	92

Results of this bio-assay test revealed that treated effluent collected from the guard pond of M/s Hetero Infrastructure SEZ Limited is compliance with the CPCB standards for bio-assay test with the survival rate of 92% after 96 hours in the 100% treated effluent.

Chapter 7

Sediment Characteristics

Sand, silt and clay composition of surface sediments collected from the study region was provided in Table 7.1 and Fig. 7.1. Sand content varied from 2% to 94% while silt and clay contents ranged from 5% to 34% and from 1% to 89%, respectively.

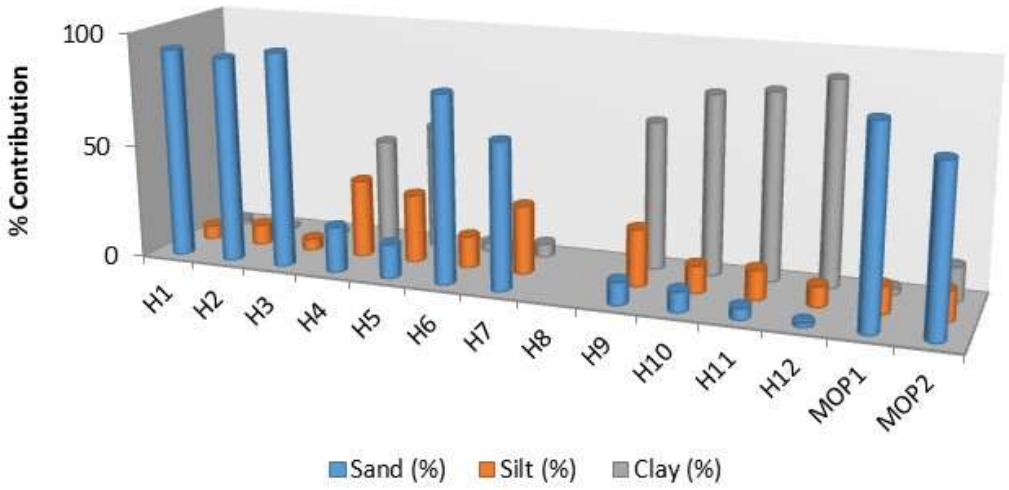

Fig. 7.1: Sand, silt and clay composition of surface sediments collected from the study region

Station	Sand (%)	Silt (%)	Clay (%)
H1	92	6	2
H2	90	9	1
H3	94	5	1
H4	20	34	46
H5	15	30	55
H6	82	14	4
H7	64	30	6
H9	10	25	65
H10	9	12	79
H11	5	13	82
H12	2	9	89
MOP1	85	12	3
MOP2	72	13	15

Table 7.1: Sand, Silt and Clay composition of surface sediments of the study region

Concentration trace elements in surface sediments of the study region were given in Table 7.2 and figure 7.2. Iron (Fe) concentrations varied from 117 µg/g to 273 µg/g (Table 7.2), with a mean concentration of 218 µg/g. Manganese (Mn) concentrations ranged from 10.8 µg/g to 41.5 µg/g (mean: 23.8 µg/g) in the study region. Zinc (Zn) and Copper (Cu) concentrations in surface sediment varied from 1.3 µg/g to 4.8 µg/g and from 3.1 µg/g to 9.3 µg/g (Table 7.2), with mean

concentrations of 2.8 µg/g and 5.8 µg/g, respectively. Cadmium concentration ranged between 0.17 µg/g and 0.89 µg/g (Table 7.2), with mean concentrations of 0.59 µg/g in the study region. Chromium (Cr), Lead (Pb) and Arsenic (As) concentration varied from 2.4 µg/g to 7.1 µg/g, 0.6 µg/g to 2.1 µg/g and from 0.9 µg/g to 3.5 µg/g, with mean concentrations of 3.9 µg/g, 1.3 µg/g and 1.8 µg/g, respectively (Table 7.2). Mercury concentrations are below detection limits (BDL) at all stations. The concentrations are well below the concentrations of trace elements reported from the polluted regions in the coastal waters. Concentrations of trace elements found in surface sediments of the study region do not indicate trace metal pollution in the coastal waters of Rajayyapeta.

Station	Fe (µg/g)	Mn (µg/g)	Zn (µg/g)	Cu (µg/g)	Cd (µg/g)	Cr (µg/g)	Pb (µg/g)	As (µg/g)	Hg (µg/g)
H4	197	18.6	1.7	4.1	0.49	3.1	1.2	1.9	BDL
H5	210	16.7	1.3	3.2	0.55	2.4	0.9	1	BDL
H9	225	24.7	2	5.1	0.58	3.4	0.6	0.9	BDL
H10	248	21.9	3.5	7.6	0.67	3.2	1.3	1.3	BDL
H11	260	32.7	4.3	8.4	0.81	5.6	1.8	2.1	BDL
H12	273	41.5	4.8	9.3	0.89	7.1	2.1	3.5	BDL
MOP2	117	10.8	2.1	3.1	0.17	2.6	1.3	1.7	BDL

Table 7.2: Trace element (Fe, Mn, Zn, Cu, Cd, Cr, Pb, As and Hg) concentrations (µg/g) in surface sediments of the study region

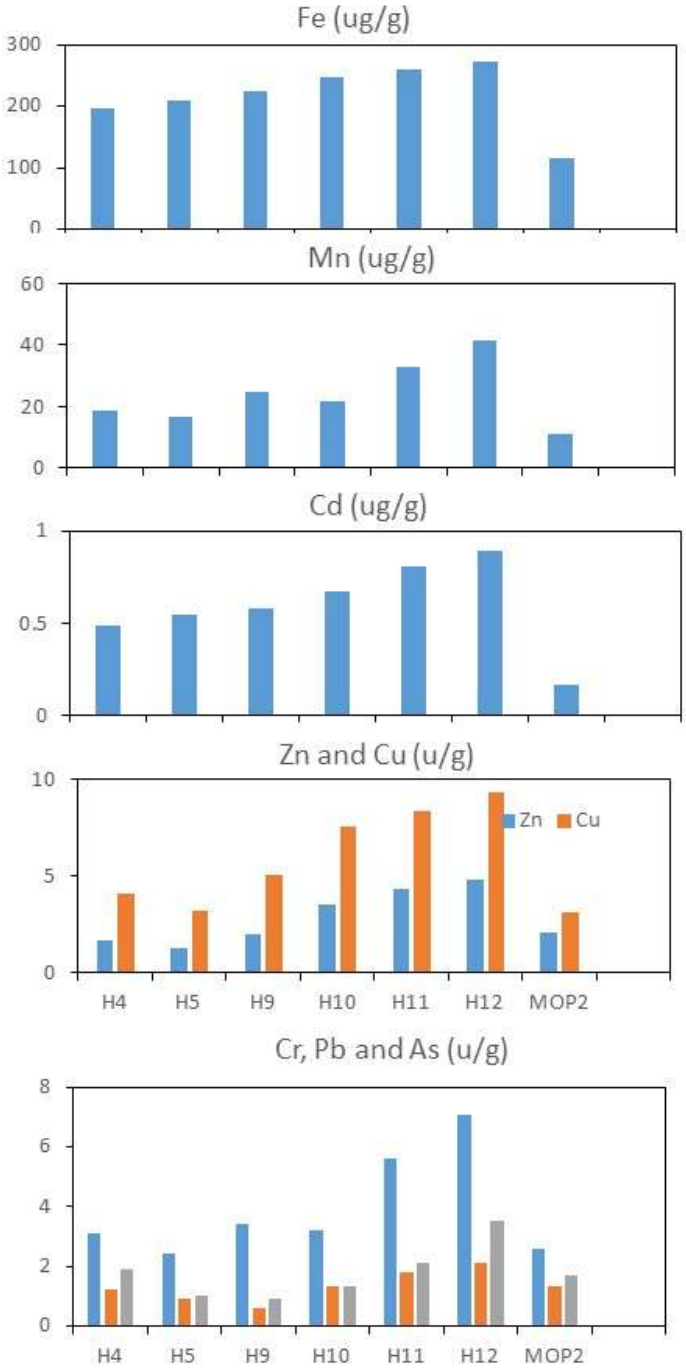

Fig. 7.2: Spatial variability of trace element (Fe, Mn, Zn, Cu, Cd, Cr, Pb, As and Hg) concentrations (μg/g) in surface sediments of the study region

Chapter 8
Summary

Field campaign was conducted on 23rd May 2025 in the coastal waters of Rajayyapeta for collection of samples. Samples were collected in all four directions from discharge point of treated effluent (MOP2) with distances of 0.5 km, 1.0 km, 2.0 km and 5.0 km from MOP2. Both surface and bottom waters were collected at all locations. Salient features of results obtained in this study are given below

- Temperature, salinity, pH, suspended solids of coastal waters of Rajayyapeta are normal and are comparable with previous reports
- Concentrations of dissolved inorganic nutrients, like nitrate, nitrite, ammonium, phosphate and silicate are within the limits of reported values from this region
- Dissolved oxygen concentrations are well above the threshold limit of 5 mg/L in the coastal waters off Rajayyapeta
- Biochemical oxygen demand for three days (BOD_3) values in both surface (2.1±0.6 mg/L) and bottom (2.3±0.5 mg/L) are low and do not indicate any contamination of organic matter from local sources
- Concentrations of total petroleum hydrocarbon (TPHC) in the study region are comparable with previous reports from this region
- Phytoplankton biomass in terms of Chlorophyll-a in the surface (1.0±0.2 µg/L) and bottom (1.1±0.2 µg/L) waters of the study region is normal and comparable with chlorophyll-a concentration reported from this region in previous monitoring studies.

- Phytoplankton abundance in the surface (10297 No/L) and bottom (10723 No/L) waters of the study region are comparable with the previous studies from this region. Number of phytoplankton genera identified in the study region is limited to 28 in surface waters and 27 in the bottom waters.
- Diatoms contribution to the total phytoplankton is ~68% in the surface waters and ~71% in the bottom waters. Dinoflagellate contribution to the total phytoplankton abundance was 20% in the surface waters and 21% in the bottom waters. Contribution from other phytoplankton groups to the total phytoplankton abundance is 12% and 8% in the surface and bottom waters, respectively
- Abundance of meso-zooplankton from surface waters of the study region (563 No/m^3) are comparable to previous monitoring studies conducted in this region. A total of 18 meso-zooplnankton groups were identified in the study region. Among various groups, Copepods dominantly contributed to the total meso-zooplankton abundance (~91%). Chaetognatha are the second largest contributor to the total meso-zooplankton, with mean contribution of 2.8%.
- These results indicate no adverse effect of treated effluent release on both phytoplankton and zooplankton in the water column.
- Density of macro and meio fauna in surface sediments of the study region (2749 No/m^2) were comparable with the reported values in surface sediments of east coast of India
- The total number of fauna found in surface sediments of the study region was limited to 25 and their individual contributions ranged from 5% to 32%.
- Polychaete is the dominant group, with mean contribution of ~32% to the total macrofaunal density. The second largest contributing group is foraminifera and their contribution to the

total macrofaunal density is 21%. Mollusca and Arthropoda are contributing 18% and 13%, respectively, to the total macrofaunal density.

- Abundance of meio-faunal benthic organisms found in surface sediments of the study region (462 No/10cm^2 to 715 No/m^2) is comparable with previous reports from this region. Mean abundance of meio benthos in this study is 583±98 No/10cm^2.

- The total number of meio-fauna found in surface sediments of the study region is limited to 13 and their individual contributions ranged from 3% to 33%.

- Nematoda is the dominant group that was contributed largely (~33%) to the total meiofaunal density. The second largest contributing group is Foraminifera and their contribution to the total meiofaunal density is 21%. Polychaete is the third major group that contributed to the total meiofaunal abundance and its mean contribution is 10%.

- Treated effluent collected from the guard ponds of M/s Hetero Infrastructure SEZ Limited is compliance with CPCB standards for bio-assay test with the survival rate of 92% after 96 hours in the 100% treated effluent.

- Counts of Total *coliform, Escherichia coli* like organism (ECLO), *Vibrio* like organism (VLO), *Vibrio cholerae* like organisms (VCLO) in the study region are normal and do not indicate contamination

- Concentration trace elements in surface sediments of the study region such as Iron (Fe), Manganese (Mn), Zinc (Zn), Copper (Cu), Cadmium (Cd), Chromium (Cr), Lead (Pb) and Arsenic (As) are within the limits. Concentrations of mercury (Hg) in surface sediment were below detection limits.

Chapter 9

Recommendations

All the results of this study shown that there is no significant change in the seawater quality and marine ecosystem in the study region compared to the coastal waters of east coast of India, confirming that the impact of treated effluent release from M/s Hetero Infrastructure SEZ Limited on the marine ecosystem is not significant. However, to maintain the seawater quality and health of the ecosystem in the coastal waters off Rajayyapeta, the following are recommended.

- Continuous yearly monitoring studies on physic-chemical, biological and sedimentological characteristics in the vicinity of marine outfall location may be conducted.
- Compare the results with baseline data and take precautionary measures if there are any significant changes in the data from baseline data

COMPLIANCE TO THE APCZMA RECOMMENDATIONS OF NO OBJECTION UNDER THE PROVISIONS OF CRZ NOTIFICATION 2011 VIDE LETTER NO: 382/CRZ/IND/2022-575 DATED 09/11/2022.

S.NO	Conditions	Compliance Status
PART-A: Specific Conditions		
(i)	The proposed constructions shall conform to the norms prescribed in CRZ- Notification issued by the Ministry of Environment and Forests, Government of India S.O.No.19(E), dated 06/01/2011 and shall not affect the coastal ecology of the area.	**Complied.** All constructions have been carried as per the norms prescribed in CRZ- Notification issued by the Ministry of Environment and Forests, Government of India S.O.No.19(E), dated 06/01/2011 and it has been ensured no damage to the coastal ecology of the area.
(ii)	No Activity on ground shall be undertaken without obtaining Environmental Clearance from the Ministry of Environment and Forests, Government of India S.O.No.19(E), dated 06/01/2011	**Complied.** Activities related to new pipeline have been carried only after obtaining Environmental Clearance from the Ministry of Environment and Forests, Government of India S.O.No.19(E), dated 06/01/2011
(iii)	The treated effluent existing pipeline is to be removed, after commissioning of the new pipeline.	**Complied.** The newly laid pipeline has been put into usage w.e.f 6th June 2024 and on old pipeline has been put out of usage after disconnecting all pipelines & pumps connected to it.
(iv)	Due to accidental breakage of pipeline, the necessary mitigation measures like immediately attending the repair of pipeline has to be taken up. Necessary spares of pipeline segments with bends/tees and divers with experience in salvation operation irrespective of Sea condition have to be kept ready always within the industrial unit.	**Being complied.** All required spares for the pipeline are being maintained in stock for taking care of repairs of accidental breakage of pipeline.
(v)	The industry should install flow meters to record the quantities of treated effluents discharge. Regular annual monitoring of coastal waters is to be carried-out by the reputed institutions, for water quality near the proposed outfall locations.	**Complied.** The industry installed flow meters to record the quantities of treated effluents discharged into Sea. Regular annual monitoring of coastal waters is being carried out by NIO for water quality near the outfall locations. Reports are being submitted to IRO, Vijayawada & APPCB along with six monthly compliance reports.
(vi)	A continuous monitoring system should be put in place by the applicant to find out the impact on marine life/flora/fauna, due to discharge	**Complied.** Continuous monitoring is being carried through CSIR-NIO on yearly basis to find out the impact on marine life/flora/fauna, due to discharge of treated effluent.

(vii)	The project proponent shall conduct the bioassay test for the treated effluent discharges from the marine outfalls as per the MoEF&CC Guidelines. Bio-assay analysis shall be conducted every six months to establish the toxicity levels and report to be submitted to APPCB.	**Being Complied.** The industry is carrying Bioassay test for the treated effluent discharges from the marine outfalls as per the MoEF&CC Guidelines through National Institute of Oceanography (NIO) once a year and the reports are being submitted to APPCB. However, the industry is carrying Bioassay test through in house facilities and records are being maintained.
(viii)	The project proponent shall treat the effluents before discharging into sea duly complying with the APPCB and MoEF&CC Norms.	**Being Complied.** The effluents are being treated to comply with the APPCB and MoEF&CC Norms. Disposal of treated effluent is being carried in presence of APPCB officials after meeting the standards.
(ix)	The activity is continuous and every day the industry discharges for about 8-10 hours. Over a long period, the industry should ensure all the precautions mentioned and also see that this activity should not create any bacterial and virus vectors.	**Being complied.** Continuous monitoring is being done on a yearly basis through reputed agencies and complying with all the precautions/recommendations mentioned and ensuring that this activity is not creating any bacterial and virus vectors.
(x)	No solid waste shall be disposed in the Coastal Regulatory Zone area. The solid waste shall be properly collected. Segregated and disposed as per the provisions of solid waste (Management and Handling) Rules 2000 and amended thereof.	**Being Complied.** Solid waste is being disposed of as per the conditions mentioned in Hazardous waste authorization issued by APPCB and as per solid waste (Management and Handling) Rules 2016 and amended thereof. No solid waste is being disposed in the CRZ area.
(xi)	The green belt shall be maintained to improve aesthetic value of the area.	**Complied.** Thick green belt is being maintained in and around the factory premises. More than 40% of project area is covered with green belt.
(xii)	The proponent shall allocate enough budget for regular maintenance in all aspects i.e, drainage, garbage, effluent discharge and other activities.	**Complied.** The industry has allocated enough budget for regular maintenance of drainage, garbage, effluent discharge and other activities
(xiii)	The proponent shall implement all the mitigation measures as mentioned in EIA Report.	**Complied.** All the mitigation measures as mentioned in EIA Report have been implemented. Status of implementation of mitigation measures is enclosed as **Annexure-A**.
(xiv)	Ground water shall not be tapped in the CRZ area.	**Complying.** No ground water is being used for the project. The total water requirement of the project is being met through Desalination Plants.
(xv)	The project proponent shall submit the half yearly compliance reports of CRZ	**Being Complied.**

	clearance duly audited by the accredited consultants on the degree of compliance by the project proponent during and after construction of the project.	The industry regularly submitting the six-monthly compliance reports of CRZ clearance to IRO, Vijayawada and APPCB.
PART-B: General Conditions		
(i)	A copy of the clearance letter shall also be displayed on the website of the AP Pollution Control Board. The clearance letter shall also be displayed at the AP Pollution Control Board, Regional Office, District Industries Center and District Collector Office / Mandal Revenue Office for 30 days	**Complied.** The industry has submitted clearance letters to APPCB and District Collector for necessary display in their websites/Offices. Displaying in the websites of APPCB is not in the scope of industry.
(ii)	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year – wise expenditure shall be reported to the Andhra Pradesh Coastal Zone Management Authority (APCZMA) and A.P. Pollution Control Board Regional Office	**Being Complied.** The funds earmarked for environmental protection measures are not being diverted for other purposes. Year wise expenditure will be reported to the Andhra Pradesh Coastal Zone Management Authority (APCZMA) and A.P. Pollution Control Board Regional Office
(iii)	Concealing factual data by the project proponent, any officer on behalf the project proponent and consultants hired by the project proponent or submission of false / fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986	**Noted and agreed upon.**
(iv)	Consent for Establishment (CFE) and Consent for Operation (CFO), as may be applicable, shall be obtained from Station Pollution Control Board under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974. All waste (liquid and solid) arising from the proposed development shall be disposed of as per the norms prescribed by Station Pollution Control Board. There shall not be any disposal of untreated effluent into the Sea / costal waster bodies.	**Complying.** ➢ The industry has obtained Consent to Establishment (CTE) from APPCB vide order NO: 19/APPCB/CFE/RO-VSP/HO/2010 dated 15/02/2023. ➢ The industry has obtained Consent to Operate (CTO)from APPCB vide order No: APPCB/VSP/VSP/219/HO/CTO/2024 Dated 21/03/2024. All waste (liquid and solid) arising from the proposed development are being disposed of as per the norms prescribed by State Pollution Control Board. The industry ensuring no disposal of untreated effluent into the Sea / costal waster bodies

(v)	Full co-operation shall be extended to the officials from the APCZMA, APPCB and Regional Office of MoEF&CC, during monitoring of implementation of environmental safeguards stipulated. It shall be ensured that documents / data sought pertinent is made available to the monitoring team. A complete set of all the documents submitted to APCZMA shall be forwarded to the A.P. Pollution Board Regional Office.	**Being Complied.** The industry is extending its full co-operation to the officials from the APCZMA, APPCB and Regional Office of MoEF&CC, during monitoring of implementation of environmental safeguards stipulated. Providing all data/documents as desired by the monitoring team.
(vi)	In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by the APCZMA.	**Noted and will be followed.**
(vii)	The APCZMA reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the CRZ clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound any satisfactory manner	**Noted and agreed upon.**
(viii)	All other statutory clearance shall be obtained, as applicable by project proponents from the respective competent authorities.	**Being Complied.** The industry has obtained all statutory clearances as applicable from the respective competent authorities and are being updated/ renewed from time to time as per prevailing Rules & regulations.
(ix)	The project proponent should advertise in at least two local newspapers widely circulated in the regional, one of which shall be in the vernacular language informing that the project has been accorded CRZ clearance and copies of clearance letters are available with the AP Pollution Control Board and may also be seen on the website of APCZMA. The advertisement should be made within Seven days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the A.P Pollution Control Board Regional Office.	**Complied.** The industry has informed the public by advertising in two newspapers on 29th January 2023 (The Hindu and Sakshi Newspapers) about CRZ clearance. Copies of Newspaper Advertisement is enclosed as **Annexure-B.**
(x)	This Clearance is subject to any order passed by any Hon'ble Courts, as may be applicable to this project.	**Noted and agreed upon.**
(xi)	A copy of the clearance letter shall be sent by the proponent to concerned	**Complied.**

	Panchayat, Zilla Parishad / Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions / representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	The industry has submitted copy of CRZ clearance letter to all Panchayats and to the District Collector, Anakapalli. Copy of the acknowledgement is enclosed as **Annexure-C.**
(xii)	The proponent shall upload the status of compliance of the stipulated conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the AP Pollution Control Board, Regional Office and the APPCB Head Office.	**Complied.** The industry is submitting six monthly compliance reports to IRO, MoEF&CC, Vijayawada and APPCB regularly. The same is being uploaded in the company website www.hetero.com.
(xiii)	The project proponent shall ensure that there are no destructions of mangroves, if any, during the construction as well as the operation phase of the project	**Not Applicable.** There are no mangroves in the project area.
(xiv)	There shall be no dressing or alteration of the sand dunes and natural features, including landscape changes for beautification, recreation, and other such purpose.	**Complied.** Only pipeline laying is involved in the project and hence there is no dressing or alteration of the sand dunes and natural features, including landscape changes for beautification, recreation, and other such purpose.
(xv)	No permanent labour camp, machinery and material storage shall be allowed in CRZ area	**Complied.** Only pipeline laying is involved in the project and hence there is no permanent labour camp, machinery, and material storage in CRZ area.
(xvi)	There shall no ground water drawl within CRZ without prior approval of the State Ground Water Authority	**Being Complied.** Total water requirement of the project is being met through the Desalination plants and not drawing any ground water.
(xvii)	Disposal of muck during construction phase should not create any adverse effect on the neighboring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority	**Complied.** The project is only laying of new pipeline in place of existing pipeline and hence there is no muck generation during the construction. The industry has not created any disturbance to the neighboring community during the construction/laying of pipeline

Hetero Infrastructure Sez Ltd

09/05/2026

S. Kullayi Reddy
Associate Vice President – EHS

ANNEXURE-IV

ANDHRA PRADESH POLLUTION CONTROL BOARD

D. No. 33-26-14 D/2, Near Sunrise Hospital, Pushpa Hotel Centre,

Chalamalavari Street, Kasturibaipet, Vijayawada - 520 010

Website: www.pcb.ap.gov.in

CONSENT TO ESTABLISH ORDER

Order No.219/APPCB/CFE/RO-VSP/HO/2010 **15/02/2023**

Sub: APPCB – CTE – **M/s. Hetero Infrastructure SEZ Ltd., at N.Narsapuram (V), Ch.Lakshmipuram(V), Rajaiahpet (V), Pedda Teernala(V) of Nakkapalli (M), Visakhapatnam District -** Consent to Establish of the Board (**CTE) for laying of new Marine disposal Pipeline in place of existing treated effluent disposal pipe line and increase of marine discharge quantity** under Sec.25 of Water (P & C of P) Act, 1974 and Under Sec.21 of Air (P & C of P) Act, 1981 - Issued - Reg.

Ref:
1. APPCB NOC Order dt.14.12.2021.
2. CRZ clearance dt.11.01.2023 issued by MoEF & CC, GoI, New Delhi.
3. Industry's CTE application received through single desk portal on 20.01.2023.
4. R.O's inspection report dt.28.01.2023.
5. Industry's mail dt.31.01.2023.
6. CTE Committee meeting held on 31.01.2023.

1. **M/s. Hetero Infrastructure SEZ Ltd.,** vide reference 3rd cited, submitted an application to the Board seeking CTE for **laying of new Marine Disposal Pipeline in place of existing treated effluent disposal pipe line and increase of marine discharge quantity**. The details of the marine outfall are as following:

Description of Intake / Marine outfall	Existing (as per CRZ clearance dt.11.01.2023)	Proposed (as per CRZ clearance) (in place of existing pipelines)
Sea water intake	Depth - 6m Distance from LFP – 682m Volume - 15 MLD	---
Effluent outfall	Depth - 12m Outer Distance – 330mm Distance from LFP – 993.4m Volume - 10 MLD	2.366 MLD.
Brine reject outfall	Outer Distance – 200mm Distance from LFP – 1155 m Volume - 1.040 MLD	10 MLD Salinity of Brine reject – 58PPT. Ambient Salinity – 35 PPT.

2. As per the application, the details of the project are as following:
    - The alignment of the pipeline starts from the existing premises and passes through N.Narsapuram (V), Ch.Lakshmipuram (V), Rajaiahpet (V), Pedda Teernala(V) of Nakkapalli (M), Visakhapatnam District
    - The details of the land in which pipeline is passing is as below:
        - Sy.No.146,147,150 of N. Narasapuram Village
        - Sy.No. 284 of Ch. Laxmipuram Village
        - Sy.No. 19(P) & 20 of Peda Teenarla Village.
    - Total length of the treated effluent marine disposal pipeline will be 4,522.44 meters (Onshore: 2,000 m and off-shore: 2,522.44 m).
    - The diameter of the pipeline proposed is 500 mm and the pipeline will be buried at a safe depth i.e 1.5 meters (wherever applicable) in the public places on the land side from the CETP of Hetero Infrastructure SEZ Ltd to LFP point.
    - It crosses the creek connected to Upputeru (Rajayyapeta Village) & Sea and road connected to Rajayyapeta & Dondavaka.
    - The Latitudes & Longitudes of **proposed new marine pipeline discharge points:**

      Land Fall point: 17° 21' 33".3 N & 82° 44' 11".5 E
      Marine Out Fall Point: 17° 21' 01".1 N & 82° 45' 10".3 E
    - The proposed pipeline to be laid from HTL / LFP to discharge point in the sea as follows:

i. 2km pipeline from HTL to discharge point.

ii. Duck-bill valves in place of diffusers to be proposed at a depth of 14.8 m in the sea

3. The alignment of the marine outfall inspected by the Environmental Engineer & Asst. Environmental Engineer, Regional office: Visakhapatnam, A.P Pollution Control Board on 27.01.2023 and informed that this is a linear project.

4. The representative of the project proponent attended the meeting through video conference and informed as following:

- A**mendment to EC order dt.11.01.2023 will be obtained to correct the existing capacity of pipelines / marine outfall.**
- **The capacity of marine outfall to discharge the treated effluent is 2366 KLD.**
- Duck-bill valves would be provided in place of diffusers at a depth of 14.8m in the sea for effective disposal of effluents.

5. The Board, after careful scrutiny of the application, verification report of Regional Officer: Visakhapatnam, request of the industry in the CTE Committee meeting and recommendation of the CTE Committee hereby issues **CONSENT TO ESTABLISH for laying of new Marine disposal Pipeline only in place of existing treated effluent disposal pipe line and increase of marine discharge quantity** under Section 25 of Water (Prevention & Control of Pollution) Act 1974 and Section 21 of Air (Prevention &

Control of Pollution) Act, 1981 and the rules made there under. **This order is issued to the activity as mentioned below:**

Description of Marine outfall	**(Proposed as per CRZ clearance) (in place of existing pipelines)**
Treated effluent outfall	2.366 MLD.

6. This order is subject to the conditions mentioned in the annexure.

7. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.

8. **This order is valid for a period of 7 years from the date of issue.**

Encl: Annexure

PRAVIN KUMAR IAS, MS(PK), O/o MEMBER SECRETARY-APPCB

To

M/s. Hetero Infrastructure SEZ Ltd., at
N.Narsapuram (V), Ch.Lakshmipuram(V),
Rajaiahpet (V), Pedda Teernala(V)
Nakkapalli (M), Visakhapatnam District.
Email: kullayireddy.s@heterodrugs.com

Copy to: 1. The JCEE, Z.O: Visakhapatnam for information and necessary action.

2. The E.E., R.O: Visakhapatnam for information and necessary action.

Annexure

1. The project is laying of treated wastewater pipeline and marine outfall system (2.66 MLD). Water requirement during the execution of the project will be 0.5 KLD (Pipeline testing and domestic purpose) and on completion of the project there will be no water consumption.

2. The proponent shall provide ETP of adequate capacity to treat the effluents. The effluents shall be treated to the marine discharge standards, as stipulated under Schedule VI of Environment (Protection) Rules, 1986, notified by Ministry of Environment and Forests, Government of India vide G.S.R.422 (E), dt.19.05.1993 and its amendments thereof.

3. The proponent shall construct guard ponds to store the treated effluent generated with lock and key arrangement to the outlet. The treated effluent from the guard pond shall be discharged into the sea under the supervision of APPCB officials.

4. The proponent shall provide magnetic flow meter with the digital totalizer with recording facility for the purpose of quantification of treated effluent discharged through marine outfall.

5. Effluents shall not be discharged on land or into any water bodies or aquifers under any circumstances.

6. The proponent shall regularly monitor the flora and fauna of the marine aquatic life. The trend analysis of the monitoring reports shall be compared with the base line data. If it is found any negative impacts, immediate restorative measures shall be implemented duly submitting a report to Board.

7. The proponent shall provide 2 no.s of online continuous effluent monitoring system (OCEMS) along with Real Time Flow Meters i.e one inside the premises after the lock and key and the other before the pipeline enters the Sea to be connected online to APPCB and CPCB website through IoT for regular monitoring and cross checking of flow and prescribed parameters at the outlet of the industry.

8. **The industry shall comply with the conditions stipulated in the CRZ clearance dt. 11.01.2023 issued by MoEF & CC, GoI, New Delhi.**

9. **The industry shall comply with the SoPs issued by the Board w.r.t. marine outfalls.**

10. **The industry shall comply with the following conditions as committed during the CTE Committee meeting held on 31.01.2023:**

    - **The industry shall comply with the conditions stipulated in CRZ clearance.**

    - **The industry shall comply with the final orders of Hon'ble NGT/ any Court of law.**

- **SCADA system shall be installed by the industry for the proposed new marine outfall.**

- **The industry shall not discharge any desalination rejects (brine effluent) into this pipeline.**

11. **The proponent shall comply with the following conditions as committed vide lr.dt.31-01-2023:**

    - **The industry shall replace the existing marine pumps on completion of the new pipeline as the existing pumps are of very small capacity and adequate velocity of flow cannot be maintained in the pipeline.**
    - **The industry shall maintain the effluent quantities well within the EC quantities. The industry shall submit complete layout and flow diagrams of existing and proposed ETPs along with detailed Feasibility report to the Board by the end Feb, 2023.**
12. The proponent shall comply with all the directions issued by the Board from time to time.

13. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attracts action under the provisions of relevant pollution control Acts.

14. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec.27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions by the Board.

15. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules,1982, to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of Water (Prevention and Control of Pollution)Act,1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

PRAVIN KUMAR IAS, MS(PK), O/o MEMBER SECRETARY-APPCB

To

M/s. Hetero Infrastructure SEZ Ltd., at
N.Narsapuram (V), Ch.Lakshmipuram (V),
Rajaiahpet (V), Pedda Teernala (V)
Nakkapalli (M), Visakhapatnam District.

ANDHRA PRADESH POLLUTION CONTROL BOARD
Dr. YSR Paryavaran Bhavan, APIIC Colony Road,
Gurunanak Colony, Autonagar, Vijayawada- 520007
Phone. No.0866-2463200, Website : https://pcb.ap.gov.in/

RED CATEGORY
CONSENT TO OPERATE

Consent Order No : APPCB/VSP/VSP/219/HO/CTO/2024- **Dt. 21/03/2024**

CONSENT is hereby granted to Operate under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof and Authorisation under Rule 6 of the Hazardous & Other Wastes (Management and Transboundary, Movement) Rules, 2016 and the rules and orders made there under (hereinafter referred to as 'the Acts', `the Rules') to:

M/s. Hetero Infrastructure SEZ Ltd.,
at N. Narsapuram (V), Ch. Lakshmi Puram(V),
Rajaiahpet (V), Pedda Teernala(V) of Nakkapalli (M),
Anakapalli District
E-mail: kullayireddy.s@heterodrugs.com

(Hereinafter referred to as 'the Applicant') authorizing to operate the industrial plant to discharge the effluents from the outlets and the quantity of emissions per hour from the chimneys as detailed below:

i) Out lets for discharge of effluents:

Sl.No.	Activity	Quantity	Point of disposal
1.	Treated effluent marine outfall	0.535 MLD	The treated wastewater shall conform to marine discharge standards, before discharging into the marine outfall.

The Board has issued CTOs to 4 units located in Hetero Complex for discharge of total treated effluents of 535 KLD (0.535 MLD) into sea through marine outfall pipeline.

ii) Emissions from chimneys: NIL

iii) HAZARDOUS WASTE AUTHORISATION (FORM – II) [See Rule 6 (2)] : Nil

This consent order is valid for laying of new marine disposal pipeline in place of existing two marine disposal pipelines and increase of marine discharge quantity with capacities mentioned above.

This order is subject to the provisions of `the Acts' and the Rules' and orders made thereunder and further subject to the terms and conditions incorporated in the schedule A, B & C enclosed to this order.

This combined order of consent to operate & Hazardous Waste Authorisation shall be valid for a period ending with the **31st day of December, 2027.**

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To
M/s. Hetero Infrastructure SEZ Ltd.,
at N. Narsapuram (V), Ch. Lakshmi Puram(V),
Rajaiahpet (V), Pedda Teernala(V) of Nakkapalli (M),
Anakapalli District

Copy to:

1. The JCEE, Zonal Office, **Visakhapatnam** for information and necessary action.
2. The EE, Regional Office, **Visakhapatnam** for information and necessary action.

SCHEDULE – A

1. Any up-set condition in any industrial plant / activity of The industry, which result in, increased effluent / emission discharge and/ or violation of standards stipulated in this order shall be informed to this Board, under intimation to the Collector and District Magistrate and take immediate action to bring down the discharge / emission below the limits.
2. The industry should carryout analysis of waste water discharges or emissions through chimneys for the parameters mentioned in this order on quarterly basis and submit to the Board.
3. Notwithstanding anything contained in this consent order, the Board hereby reserves the right and powers to review / revoke any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.
4. The industry shall ensure that there shall not be any change in the process technology, source & composition of raw materials and scope of working without prior approval from the Board.
5. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E(P) Rules, 1986 & amendments thereof.
6. The applicant should make applications through Online for renewal of Consent (under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts and detailed compliance of CFO conditions for obtaining Consent & HW Authorization of the Board.
7. The industry should immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions. Any change in the management shall be informed to the Board. The person authorized should not let out the premises / lend / sell / transfer their industrial premises without obtaining prior permission of the State Pollution Control Board.
8. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to Appellate authority constituted under Section 28 of the Water(Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air(Prevention and Control of Pollution) Act, 1981.
9. The industry shall be liable to pay Environmental Compensation / Other Environmental Taxes, if any environmental damage caused to the surroundings, as fixed by the Collector & District Magistrate or any other competent authority as per the Rules in vogue.

10. The industry may explore the possibility of tapping the solar energy for their energy requirements.
11. The industry should educate the workers and nearby public of possible accidents and remedial measures.

SCHEDULE - B

The issue of CTO&HWA order to operate new marine disposal Pipeline in place of existing marine disposal pipeline to the industry was placed in the Consent Management Committee meeting held on 06.03.2024. The industry shall comply with the following conditions:

1. The industry shall remove the existing marine pipeline after laying new pipeline in presence of APPCB officials.
2. The industry shall provide 2 no.s of online continuous effluent monitoring system (OCEMS) along with Real Time Flow Meters i.e. one inside the premises after the lock and key and the other before the pipeline enters the Sea to be connected online to APPCB and CPCB website through IoT for regular monitoring and crosschecking of flow and prescribed parameters.
3. The industry shall explore the possibility to install SCADA system, for the pipeline system.
4. The industry shall strictly comply with the directions of the Hon`ble NGT issued from time to time.

WATER POLLUTION:

1. The treated effluent discharged at marine outfall shall not contain constituents in excess of the tolerance limits mentioned below:

Outlet No.	Parameter	Concentration not to exceed limits in mg/l (except pH)
1	pH	6.0 – 9.0
	BOD (5 days at 27^{o} C)	100.0
	COD	250.0
	Total Suspended Solids (TSS)	100.0
	Temperature at the point of discharge	Shall not exceed more than 5^{0}C above ambient water temperature
	Oil and Grease	10.0
	Ammonical Nitrogen	50.0
	Total Kjeldahl Nitrogen (TKN)	50.0
	Nitrate- Nitrogen	50.0
	Phosphates, as P	5.0
	Fluoride (as F)	15.0
	Sulphide (as S)	2.0
	Phenolic Compounds (as C_6H_5OH)	5.0
	Total residual Chlorine	1.0
	Zinc (as Zn)	15.0
	Iron	3.0
	Copper (as Cu)	3.0
	Trivalent Chromium	2.0

	Manganese	2.0
	Nickel (as Ni)	3.0
	Arsenic (as As)	0.2
	Cyanide (as CN^-)	0.2
	Vanedium	0.2
	Lead (as Pb)	0.1
	Hexavalent Chromium	0.1
	Selenium (as Se)	0.05
	Cadimum (as Cd)	0.05
	Mercury (as Hg)	0.01
	Bio-assay test	90% survival of fish after 96 hours in 100% effluents.
*	All Efforts shall be made to remove colour and unpleasant odour as far as possible. The TDS of the treated effluents discharged from CETP at marine outfall shall not be more than the TDS of sea.	

The parameters of low TDS effluents shall meet the standards mentioned below:

Parameter	Concentration in mg/l
$_pH$	6.50 – 8.50
Temperature ^oC	$<45^oc$
TDS	15,000 mg/l
TSS	600 mg/l
BOD	3,000 mg/l
COD	15,000 mg/l
Oil and Grease	20 mg/l
Chromium Hexavalent (as Cr+6)	2 mg/l
Chromium (total) (as Cr)	2 mg/l
Ammonical Nitrogen (as N)	30 mg/l
Cynide (as CN)	0.20 mg/l
Lead (as Pb)	1 mg/l
Nickel (as Ni)	3 mg/l
Zinc (as Zn)	15 mg/l
Arsenic (as As)	0.20 mg/l
Mercury (as Hg)	0.01 mg/l

(The industry shall segregate the HTDS & LTDS effluent streams and the effluents which are not meeting the above standards shall be treated as HTDS effluents and shall be sent to MEE of M/s. Hetero Infrastructure SEZ Ltd., for evaporation)

5. The industry shall maintain online continuous effluent monitoring systems at the outlet of CETP before discharging to Sea and connect effluent monitoring system to APPCB/CPCB websites as per CPCB directions dated 05.02.2014.
6. The industry shall maintain online TOC online analyzer and flow meters in the marine pipeline to verify the quality and quantity of effluents discharged through pipeline.

7. **The industry shall comply with the SOPs issued by the APPCB to the Marine Discharge Industries.**

GENERAL:

8. The industry shall not treat effluents more than the permitted quantity and not exceed the consented capacity without CTE/CTO of the Board.
9. The industry shall maintain the elevated concrete platform with dyke wall with leachate collection system for storing of hazardous waste to prevent ground water contamination.
10. The industry shall install and maintain hood on the top of the effluent storage tanks and vent connected to scrubber with online pH meter to avoid odour nuisance.
11. The industry shall maintain log books on the following:

i. Characteristics of effluents
ii. Quantity of effluents generated.
iii. Hazardous waste generated and disposed.
iv. Hydraulic loads of effluent generation

12. The industry shall submit Half yearly compliance reports to all the stipulated conditions in Environmental Clearance (EC), Consent to Establishment (CTE) and Consent to Operation (CTO) through website i.e., https://pcb.ap.gov.in by 1st of January and 1st July of every year. The first half yearly compliance reports shall be furnished by The industry and second half yearly compliance reports shall be the audited through MoEF&CC recognized and National Accreditation Board for Laboratory Testing (NABL) accredited third party.
13. The industry shall comply with conditions stipulated in EC, CFE orders and Taskforce directions issued by the Board from time to time.
14. Any other directions / circulars / notices issued by CPCB, MoEF&CC and APPCB shall be followed from time to time.
15. The conditions stipulated are without prejudice to the rights and contentions of this Board in any Hon'ble Court of Law.

B SREEDHAR IAS, MS(BS), O/o MEMBER SECRETARY-APPCB

To
M/s. Hetero Infrastructure SEZ Ltd.,
at N. Narsapuram (V), Ch. Lakshmi Puram(V),
Rajaiahpet (V), Pedda Teernala(V) of Nakkapalli (M),
Anakapalli District .

ANNEXURE-V

Kullayi Reddy Sane

From: Kullayi Reddy Sane
Sent: 27 April 2024 10:31
To: IROVijayawada
Cc: Suresh Babu Pasupuleti
Subject: Laying of new marine disposal pipeline in place of existing two lines and increase of marine discharge quantity at N. Narasapuram (V), Ch. Lakshmipuram (V), Rajaihpeta (V), Peda Teemala (V) of Nakkapalli (M), Visakhapatnam District, Andhra Pradesh by
Attachments: Documents of Hetero Infra CRZ Clearance.pdf

Dear Sir,

In continuation to the trailing mail (Reply) to your letter, please find attached documents which were submitted to MoEF&CC for getting "CRZ clearance in the name of M/s Hetero Infrastructure SEZ Ltd for laying of new marine disposal pipeline in place of existing pipelines and increase in the marine discharge quantity" for your information and records.

You are requested to kindly acknowledge the receipt of same.

Thanks and Regards,

SANE KULLAYI REDDY
Associate Vice President- EHS
HETERO INFRASTRUCTURE SEZ LTD
Mobile- 9490793284

Inspiring human belief
in a healthier world.

www.hetero.com

N.Naraspuram (Village), Nakkapalli Mandal, Anakapalli (Dist) -531081
Phone: 0891-2877941

From: Kullayi Reddy Sane
Sent: Saturday, April 27, 2024 9:23 AM
To: IROVijayawada <iro.vijayawada-mefcc@gov.in>; shruti rai bhardwaj <moefcc-monitoring@gov.in>; Dr. Harendra Kharkwal <h.kharkwal@nic.in>
Cc: Suresh Babu Pasupuleti <suresh.pasupuleti@gov.in>
Subject: RE: Laying of new marine disposal pipeline in place of existing two lines and increase of marine discharge quantity at N. Narasapuram (V), Ch. Lakshmipuram (V), Rajaihpeta (V), Peda Teemala (V) of Nakkapalli (M), Visakhapatnam District, Andhra Pradesh by

Dear Sirs,

With reference to the letter Received through trailing mail, please find attached status of compliance to the points mentioned in the letter w.r.t CRZ clearance for laying of new marine disposal pipeline for you information and perusal.

Further this is to bring to your kind notice that, the industry is always complying with the conditions/Terms stipulated by MoEF&CC and Other regulatory bodies in a time bound manner. Not violating any Rules & Regulations of MoEF&CC for protection of Environment.

Submitted for your information and needful please.

Thanks and Regards,

SANE KULLAYI REDDY
Associate Vice President- EHS
HETERO INFRASTRUCTURE SEZ LTD
Mobile- 9490793284

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in a healthier world.

www.hetero.com

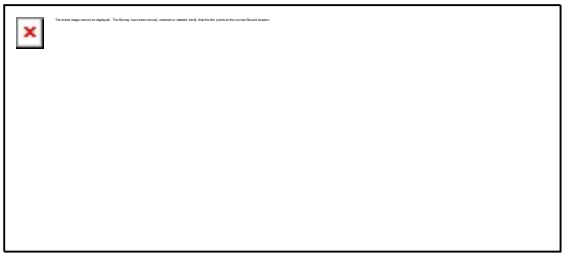
N.Naraspuram (Village), Nakkapalli Mandal, Anakapalli (Dist) -531081
Phone: 0891-2877941

From: IROVijayawada <iro.vijayawada-mefcc@gov.in>
Sent: Thursday, April 25, 2024 12:49 PM
To: Kullayi Reddy Sane <KullayiReddy.S@hetero.com>; shruti rai bhardwaj <moefcc-monitoring@gov.in>; Dr. Harendra Kharkwal <h.kharkwal@nic.in>
Cc: Suresh Babu Pasupuleti <suresh.pasupuleti@gov.in>
Subject: Laying of new marine disposal pipeline in place of existing two lines and increase of marine discharge quantity at N. Narasapuram (V), Ch. Lakshmipuram (V), Rajaihpeta (V), Peda Teemala (V) of Nakkapalli (M), Visakhapatnam District, Andhra Pradesh by M...

Sir,

Please find the enclosed attachment for kind information and further necessary action.

भवदीय / Yours faithfully,
डॉ। सुरेश बाबु पसुपुलेटी
Dr. Suresh Babu Pasupuleti
Joint Director (S)
Sub Office at Vijayawada,
Ministry of Environment, Forest & Climate Change,
Green House complex, Gopala Reddy Road,
Vijayawada - 520010, Andhra Pradesh.
Ph: +91 8008143846



HETERO INFRASTRUCTURE SEZ LTD.
Ch. Lakshmipuram (Vill)
N.Narasapuram (Village), Rajayyapeta (Vill),
Nakkapalli (Mandal),
Anakapalli (Dist) - 531 081., A.P., INDIA.
Tel : +91 8931 227307, Fax: +91 8931 227200

27th April 2024

Letter NO: HIS/EHS/MoEF&CC/2024-25/03

Dr. Suresh Babu Pasupuleti
Joint Director (S)
Integrated Regional Office (IRO),
Ministry of Environment, Forest & Climate Change,
Green House complex, Gopala Reddy Road,
Vijayawada - 520010,
Andhra Pradesh.

Dear Sir,

Sub : Laying of new marine disposal pipeline in place of existing two lines and increase of marine discharge quantity at N. Narasapuram (V), Ch. Lakshmipuram (V), Rajayyapeta (V), Peda Teenarla (V) of Nakkapalli (M), Visakhapatnam District, Andhra Pradesh by M/s Hetero Infrastructure SEZ Ltd – Letter issued – Submission of compliance status – Regarding

Ref :

1. **Letter Issued by the Integrated Regional Office, MoEF&CC, Vijayawada vide File No: SO/VIJ/EPA/EC-A/101/10-130/2024 dated 24/04/2024.**
2. **CRZ Clearance vide F.No: 11-45/2022-IA.III dated 11th January 2023**

With reference to the above and to comply with the condition of CRZ Clearance " *A complete set of all documents submitted to MoEF&CC shall be forwarded to the concerned Regional Office of MoEF&CC*", we are herewith submitting the following documents for your information and perusal.

1. Check list for CRZ Clearance (Annexure -I)
2. EIA Report prepared by M/s Indomer Coastal Hydraulics, Chennai (Annexure -II)
3. CRZ Report prepared Institute of Remote Sensing (IRS) (Annexure -III)
4. CRZ Map (Scale 1:4000) (Annexure-IV)
5. CRZ Map 7 Km Radius (Scale 1:25000) (Annexure-V)
6. NOC Issued by APPCB (Annexure-VI)
7. Recommendations of APCZMA (Annexure-VII)
8. Hetero PPT presented to the Committee (Annexure-VIII)
9. Additional Information sought by the Committee (Annexure-IX)

Submitted for your kind information and requested to kindly acknowledge the receipt of same at the earliest.

Thanking you,

Yours faithfully,
For Hetero Infrastructure SEZ Ltd

S. Kullayi Reddy
Associate Vice President -EHS

Enclosures : As above

GOVT. OF INDIA
MoEF & CC, Sub Office
VIJAYAWADA-520 010.
Teja. 10 JUN 2024
RECEIVED

Corporate
7-2-A2, Industrial Estates, Sanath Nagar, Hyderabad-500 018. Telangana, India
T: +91 40 23704923 / 24 / 25, Fax : +91 40 23704926, 23714119
www.hetero.com

ANNEXURE-VI

Ratha Saptami celebrated with fervour in city

A devotee performing puja to Sun God on the occasion of Ratha Saptami near RK Beach in Visakhapatnam on Saturday.V. RAJU

The Hindu Bureau
VISAKHAPATNAM

People celebrated Lord Sri Suryanarayana Swamy's annual Ratha Saptami or Surya Jayanti with religious fervour here on Saturday. Devotees visited the temples and worshipped the lord. Most people bathed with Jilledu leaves (Calotropis leaves) in the early morning before sunrise.

East Coast Railway Women's Welfare Organisation (ECoRWWO) president Parijata Satpathy said that a 15-day yogasana camp started on Makara Sankranti at Rail Club concluded here on Saturday.

Waltair Divisional Railway Manager Anup Satpathy, who was the chief guest, said that Surya Namaskar is a form through which one can get the power of Sun.

The Ratha Saptami celebrations were held at Yoga Village of Andhra University. Suryaharati and Aditya Hrudayam were recited by the participants with prayers to Lord Surya.

Yoga Village Director O.S.R.U. Bhanu Kumar explained the relationship between Sun and humans. The Yoga centre caters to everyone by conducting yoga courses, he added. Yoga master Vishnu Prasad said that Vitamin D required by the human body can only be obtained from Lord Surya.

B. Yamini, a student of the department, performed Omkara Asana, Purna Salabhasana, Padmabakasana, Gandaberundasana and Trivikramasana.

In another event, a mass 108 Surya Namaskar programme was held under the guidance of Yoga Master Chilaka Ramesh of Om Yoga Centre at Gadiraju Palace in Appugarh here.

Thousands of devotees from across State visit Arasavilli sun temple

Devotees start reaching the temple from Friday night itself to take part in Ksheerabhishekham that began around 12.15 a.m.; organisations distribute water and prasadam packets to pilgrims

The Hindu Bureau
SRIKAKULAM

Thousands of pilgrims from across the State converged on Arasavilli in Srikakulam district to offer prayers at the Sri Suryanarayana Swamy temple on the occasion of Ratha Saptami on Saturday.

The devotees reached the temple from Friday night itself to take part in Ksheerabhishekham ritual that began around 12.15 a.m. on Saturday.

Sarada Peetham's Uttaradhikari Swatmanandendra, Andhra Pradesh Legislative Assembly Speaker Thammineni Seetharam, Minister for Revenue Dharmana Prasada Rao and others also participated in the rituals in the early hours of Saturday. Minister for Endowments Kottu Satyanarayana offered 'silk vastrams' to the deity on behalf of the State government.

The Sun temple at Arasavilli in Srikakulam district decorated tastefully for the Ratha Saptami festival on Saturday. SPECIAL ARRANGEMENT.

Separate queue lines for ₹500 ticket and ₹100 ticket holders, and for those having free darshan, were arranged. Srikakulam Collector Shrikesh B.Lathkar and Superintendent of Police G.Rss. Radhika and other officials coordinated the arrangements at the temple.

Volunteers of multiple service organisations distributed water and prasadam packets to the pilgrims. Srikakulam Arya Vysya Sangham leaders arranged prasadam counters at Indira Vignan Bhavan and other places.

GVMC should seek funds from State govt. for G-20 meet works: corporator

The Hindu Bureau
VISAKHAPATNAM

Corporator of Ward 22 and Jana Sena Party (JSP) leader P.L.V.N. Murthy has demanded that the Greater Visakhapatnam Municipal Corporation (GVMC) seek funds from the State Government and take up development works in the city ahead of G-20 working group committee meeting scheduled on March 28 and 29, instead of spending its money as part of beautification.

Addressing a press conference here on Friday, Mr. Murthy said that the GVMC has proposed to take up development works worth around ₹150 crore under the civic body limits for the two-day global event and has questioned the need for the civic body to bear the burden by spending its own money, when it is already facing financial burden.

Pending dues

"The State Government has failed to give ₹20 lakh to each sachivalayam as part of Gadapa Gadapa ki Mana Prabhutvam. As part of SC-ST sub plan works, about ₹45 crore government was to be given by the government, but it didnt. GVMC had to bear ₹14 crore, which was supposed to be given by the government as part of special development funds. So far, the State Government has also not given any funds for the CITIIS project. Why should we believe that the government would release the ₹150 crore?" the corporator questioned.

'VVS should be made an international school'

The Hindu Bureau
VISAKHAPATNAM

District Collector and Visakha Valley School (VVS) Chairman A. Mallikarjuna said that VVS should be made an international school. He added that efforts are also being made to complete the iconic building on VVS premises.

Addressing the students and parents at the school's annual day celebration titled `Abhivyakti - Expression of Life' at Gurajada Kalakshetram here on Saturday, Mr. Mallikarjuna said that parents and teachers should teach children on 'What is happiness, stress, success and failure' by giving proper explanation to the students to avoid extreme actions when they face unusual problems.

U.S. universities continue to charm students aspiring to study abroad

The Hindu Bureau
VIJAYAWADA

The United States of America continues to be the preferred destination for students looking for universities abroad to pursue higher education.

A good number of parents, eager to explore the possibility of sending their wards to overseas universities and colleges for higher education, formed the crowd at *The Hindu* EducationPlus's International Education Fair, held in Vijayawada on Saturday.

Students, many of them with their parents in tow, lapped up information at the stalls put up by representatives of educational consultants and allied services.

A large number of them made enquiries about American universities that specialise in courses such as computer science, data science, cybersecurity and other related areas, despite their high fee structure.

"My son, who is currently pursuing a computer science engineering course, has scored over 85% in his 7th semester. He plans to go to the U.S. and pursue an MS in cybersecurity or data science. I want him to choose a university where he can develop his talent," said Ashok Kumar S., a resident of Machilipatnam, where he owns a hotel.

When asked why the U.S. in specific, he points to the fact that the country has top universities and that his son could make good money there.

P. Annapurna is eager to see her daughter migrate to the U.S. to pursue MD in data science, as she sees the country with high employment rate.

"But the high fees is a dampner," she says.

FCI offers wheat, rice in open market

The Hindu Bureau
GUNTUR

The A.P. region of the Food Corporation of India (FCI) offered 1,380 MT and 1,100 MT wheat through e-auction from Visakhapatnam and Port Blair respectively on Saturday. Further, on the request of roller flour mills, eight wheat rakes have been planned for Visakhapatnam, Rajahmundry, Samalkot and Hanuman Junction depots.

The FCI officials said in a statement that the Government of India had decided to release 30 Lakh Metric Tons of wheat and rice in the open market.

SCR official holds freight customers' meet

The Hindu Bureau
VIJAYAWADA

The South Central Railway Principal Chief Commercial Manager G. John Prasad conducted freight customers' meet at Kakinada on Saturday.

He inspected the Kakinada goods shed complex and interacted with the officials of the Kakinada Sea Port Limited, Coromandel Fertilizers, Nagarjuna Fertilizers and other companies.

ఆదిత్యాయనమః

- రాజుపాలెం సూర్యదేవాలయానికి పోటెత్తిన భక్తులు
- ఘనంగా రథసప్తమి వేడుకలు
- స్వామివారి సేవలో మంత్రి అమర్‌నాథ్, ప్రభుత్వ విప్ కరణం ధర్మశ్రీ, న్యాయమూర్తి గంగరాజు


స్వామివారి దర్శనానికి వెళ్తున్న అనకాపల్లి కోర్టు న్యాయమూర్తి గంగరాజు


ఆలయం వద్ద కోలాటం ఆడుతున్న మహిళలు


స్వామివారి ఉత్సవ రథాన్ని ప్రారంభిస్తున్న మంత్రి గుడివాడ అమర్‌నాథ్


స్వామివారి దర్శించుకున్న ప్రభుత్వ విప్ కరణం ధర్మశ్రీ

అనకాపల్లి టౌన్: వెలుగుల రేడును దర్శించి భక్తులు పులకించి పోయారు. ఆదిదేవ నమస్తుభ్యం ప్రసీద మమభాస్కర.. దివాకర నమస్తుభ్యం ప్రభాకర నమోస్తుతే అంటూ పూజించారు. రథసప్తమి సందర్భంగా శనివారం తెల్లవారుజాము నుంచే జీవీఎంసీ విలీన గ్రామమైన రాజుపాలెం బ్రహ్మాద్రిపై వెలిసిన సూర్యనారాయణస్వామి దేవాలయానికి పొటెత్తారు. విశాఖ ఉమ్మడి జిల్లాలోని పలు ప్రాంతాల నుంచి తరలివచ్చి స్వామివారిని దర్శించుకునేందుకు క్యూలైన్లలో నిలిచారు. స్వామివారిని పరిశ్రమలు, ఐటీ శాఖ మంత్రి గుడివాడ అమర్‌నాథ్, ప్రభుత్వ విప్, వైఎస్సార్‌సీపీ జిల్లా అధ్యక్షుడు కరణం ధర్మశ్రీ, అనకాపల్లి కోర్టు న్యాయమూర్తి గంగరాజు, ఎస్పీ గౌతమిసాలి, మాజీ ఎమ్మెల్సీ పప్పల చలపతిరావు, మాజీ ఎమ్మెల్యే పీలా గోవింద సత్యనారాయణ దర్శించుకుని ప్రత్యేక పూజలు చేశారు. ఆలయ చైర్మన్ కొణతాల బాబూరావు ఆధ్వర్యంలో వారిని సత్కరించి, స్వామివారి విగ్రహాలను బహూకరించారు. కొత్తూరు నర్సింగరావుపేట నుంచి రాజుపాలెం వరకు వెళ్లే ప్రధాన రహదారి, తాడి నుంచి ఎరుకువానిపాలెం మీదుగా రాజుపాలెం వచ్చే రహదారితోపాటు మునగపాక మండలం నుంచి రామారాయుడుపేట వచ్చే రహదారి మీదుగా భక్తులు భారీగా తరలివచ్చారు. ఆలయ పరిసరాల్లో ఉచిత ప్రసాదం పంచిపెట్టారు. దేవాలయం ఆధ్వర్యంలో సేవాదళ్ సభ్యులు భక్తులకు ఎక్కడికక్కడ సహకరించారు. ఇరుకైన రహదారి కావడంతో వాహనాలు అడ్డుగా ఉండడంతో ట్రాఫిక్ నిలిచిపోయింది. రూరల్ సీఐ రవికుమార్, ఎస్‌ఐలు సీహెచ్ నర్సింగరావు, డి.ఈశ్వరరావు నేతృత్వంలో పోలీస్ బందోబస్తు ఏర్పాటు చేశారు.

రథాన్ని ప్రారంభించిన మంత్రి గుడివాడ అమర్‌నాథ్...

రాజుపాలెం సూర్యనారాయణమూర్తి ఉత్సవ విగ్రహ రథాన్ని పరిశ్రమలు, ఐటీ, వాణిజ్యశాఖ మంత్రి గుడివాడ అమర్‌నాథ్ శనివారం ప్రారంభించారు. ఎంపీపీ గొర్లి సూరిబాబు, వైఎస్సార్‌సీపీ పట్టణాధ్యక్షుడు మందపాటి జానకీరామరాజు, పార్టీ జిల్లా అధికార ప్రతినిధి మళ్ల బుల్లిబాబు, కశింకోట మండలాధ్యక్షుడు శ్రీనివాసరావు, పార్టీ పట్టణ యువజన విభాగం అధ్యక్షుడు జాజుల రమేష్, ఆలయ కమిటీ సభ్యులు పాల్గొన్నారు.

ఆకట్టుకున్న సాంస్కృతిక కార్యక్రమాలు...

రథసప్తమి వేడుకల్లో భాగంగా ఆలయం వద్ద పలు సాంస్కృతిక కార్యక్రమాలు ఏర్పాటు చేశారు. జబర్దస్త్–2023 డైనమిక్ డ్యాన్స్, నమో వెంకటేశాయ నృత్య ప్రదర్శన, బుర్రకథ, భక్తి రంజని, శివ నృత్యం(అఘోరాల డ్యాన్స్), భక్తి రససంకీర్తన కోలాటం, కూచిపూడి క్లాసికల్ డ్యాన్స్ వంటి కార్యక్రమాలు జరిగాయి. తిమ్మరాజుపేటకు చెందిన సరిసా శ్రీనివాసరావు, రమాదేవి దంపతుల ఆధ్వర్యంలో ప్రసాద వితరణ చేశారు.

గవరపాలెం కోలాహలం

- అంగరంగ వైభవంగా గౌరమ్మ జాతర
- అమ్మవారిని దర్శించుకున్న మంత్రి గుడివాడ అమర్‌నాథ్


గవరపాలెంలో ఏర్పాటు చేసిన బెంగాల్ లైటింగ్


గౌరీపరమేశ్వరుల ఉత్సవ రథాన్ని ప్రారంభిస్తున్న వైఎస్సార్‌సీపీ రాష్ట్ర ప్రధాన కార్యదర్శి వీరభద్రరావు


పులివేషాలు

అనకాపల్లి టౌన్: ఉత్తరాంధ్రలో ప్రఖ్యాతిగాంచిన అనకాపల్లి గవరపాలెం గౌరీపరమేశ్వరుల జాతర శనివారం అంగరంగ వైభవంగా ప్రారంభమైంది. తెల్లవారు జాము నుంచి అమ్మవారి కోవెలలో ప్రత్యేక పూజలు నిర్వహించారు. ఈ సందర్భంగా గౌరమ్మ దర్శనానికి పెద్ద ఎత్తున భక్తులు తరలి రావడంతో ఆలయ పరిసరాలు కిటకిటలాడాయి. పట్టణంలోని ఏ వీధి చూసినా జనంతో కిక్కిరిసిపోయింది. ఉత్తరాంధ్ర జిల్లాల నుంచే కాకుండా ఉభయ గోదావరి జిల్లాల నుంచి జనం పెద్ద ఎత్తున తరలివచ్చారు. గవరపాలెంలో ప్రతి వీధిలో ఒక వేదికను నెలకొల్పి వివిధ సాంస్కృతిక కార్యక్రమాలు ఏర్పాటు చేశారు. గవరపాలెం ప్రతి వీధిలోనూ స్టేజ్ ప్రోగ్రామ్‌లతోపాటు, బెంగాల్ లైటింగ్ భక్తులను ఎంతగానో ఆకట్టుకున్నాయి. తొలుత మంత్రి గుడివాడ అమర్‌నాథ్ అమ్మవారి దర్శించుకుని ప్రత్యేక పూజలు చేశారు. అనంతరం ఆలయ ఉత్సవ కమిటీ చైర్మన్ కొణతాల సంతోష్ అప్పారావునాయుడు మంత్రిని సత్కరించి అమ్మవారి చిత్రపటాన్ని బహూకరించారు. వైఎస్సార్‌సీపీ రాష్ట్ర ప్రధాన కార్యదర్శి దాడి వీరభద్రరావు అమ్మవారి రథ ఉత్సవాన్ని ప్రారంభించారు. ఉత్సవంలో ఎటువంటి అవాంఛనీయ సంఘటనలు జరగకుండా పట్టణ పోలీసులు ప్రత్యేక బందోబస్తు ఏర్పాటు చేశారు.

నూకాంబిక ఆలయం నుంచి పట్టువస్త్రాల సమర్పణ...

గౌరీపరమేశ్వరుల మహోత్సవంలో భాగంగా గవరపాలెం నూకాంబిక అమ్మవారి ఆలయ ఈవో చంద్రశేఖర్, వైఎస్సార్‌సీపీ సీనియర్ నాయకుడు దాడి జయవీర్ సారె, పట్టువస్త్రాలు ఆలయ కమిటీ సభ్యులకు అందజేశారు. నూకాంబిక అమ్మవారి ఆలయ ఉద్యోగులు తదితరులు పాల్గొన్నారు.

అలరించిన నేలవేషాలు..

కరీంనగర్, విజయనగరం, శ్రీకాకుళం, కేరళ, తమిళనాడు, హైదరాబాద్ కళాకారులతో పుణేబ్యాండ్, గారడీ, కేరళ వాయిద్యం, దాండియా, కాంతారా, గరగలు, తీన్‌మార్ డప్పులు, పులివేషాలు, బుట్టబొమ్మలు, కోలాట నృత్యాలు భక్తులను ఎంతగానో ఆకట్టుకున్నాయి. గవరపాలెంలోని 20 ప్రధానమైన కేంద్రాల్లో వివిధ సంఘాల నేతలు భక్తులకు అమ్మవారి ప్రసాదాలు పంచిపెట్టారు.

అమ్మవారిని దర్శించుకున్న నేతలు...

గౌరమ్మను మాజీ మంత్రి కొణతాల రామకృష్ణ, మాజీ ఎమ్మెల్యే పీలా గోవింద సత్యనారాయణ, వైఎస్సార్‌సీపీ పట్టణాధ్యక్షుడు మందపాటి జానకీరామరాజు, ఎన్టీఆర్ ఆస్పత్రి అభివృద్ధి కమిటీ డైరెక్టర్ డాక్టర్ శ్రీరామ్మూర్తి, వైఎస్సార్‌సీపీ జిల్లా అధికార ప్రతినిధి మళ్ల బుల్లిబాబు, వివిధ ప్రభుత్వ శాఖల అధికారులు దర్శించుకున్నారు.

30న తల్లి, నవజాత శిశువు సంరక్షణ విభాగం ప్రారంభం

అనకాపల్లి టౌన్: స్థానిక ఎన్టీఆర్ జిల్లా ఆస్పత్రిలో ఈ నెల 30వ తేదీన ఏపీ వైద్య ఆరోగ్యశాఖ ఆధ్వర్యంలో కొత్తగా నిర్మించిన ఎనిమిది పడకల అధిక–ఆధారిత ఎం.ఎస్.సి.యు యూనిట్ (తల్లి, నవజాత శిశువు సంరక్షణ విభాగం) ప్రారంభిస్తున్నట్లు డీసీహెచ్‌ఎస్ కె.శ్రావణ్‌కుమార్ శనివారం పేర్కొన్నారు. నూతన భవనాన్ని రూ. 92 లక్షలతో నిర్మించామన్నారు. కార్యక్రమానికి ముఖ్య అతిథులుగా డిప్యూటీ సీఎంలు పీడిక రాజన్నదొర, బూడి ముత్యాలనాయుడు, పరిశ్రమలు, ఐటీ, వాణిజ్య శాఖ మంత్రి గుడవాడ అమర్‌నాథ్, ఎంపీ బీశెట్టి వెంకట సత్యవతి హాజరు కానున్నట్లు పేర్కొన్నారు.

వేద ఘోషతో మార్మోగిన శారదాపీఠం

సింహాచలం : పెందుర్తి మండలం చినముషిడివాడలో వేద ఘోషతో విశాఖ శారదా పీఠం మార్మోగింది. పీఠం వార్షికోత్సవాల్లో భాగంగా పీఠాధిపతులు స్వరూపానందేంద్ర సరస్వతి, స్వాత్మానందేంద్ర సరస్వతి ఆధ్వర్యంలో రెండో రోజు శనివారం యజ్ఞయాగాదులు దిగ్విజయంగా జరిగాయి. సాయంత్రం శారదా స్వరూప రాజశ్యామల సమేత చంద్రమౌళీశ్వరుల పీఠార్చనను ఘనంగా నిర్వహించారు. రాజశ్యామల అమ్మవారికి పంజాబ్ గవర్నర్ భన్వర్‌లాల్ పురోహిత్, రాష్ట్ర డిప్యూటీ సీఎం బూడి ముత్యాలునాయుడు, పర్యాటకశాఖ మంత్రి ఆర్.కె.రోజా , ఎమ్మెల్యే వరుదు కల్యాణి, పెందుర్తి ఎమ్మెల్యే అన్నంరెడ్డి అదీప్‌రాజ్, తమిళనాడు గవర్నర్ రవీంద్ర నారాయణ రవి సందర్శించారు.


స్వామీజీ ఆశీస్సులు తీసుకుంటున్న బూడి ముత్యాల నాయుడు


మంత్రి రోజాకి జ్ఞాపికను అందజేస్తున్న స్వరూపానందేంద్ర సరస్వతి

ఇళ్ల నిర్మాణాల పురోగతిపై కలెక్టర్ అసంతృప్తి

- ప్రత్యేక దృష్టి సారించి పూర్తి చేయాలని ఆదేశం
- చినదొడ్డిగల్లులో జగనన్న లేఅవుట్ పరిశీలన


చినదొడ్డిగల్లులో లేఅవుట్ వద్ద అధికారులతో మాట్లాడుతున్న కలెక్టర్ రవి పట్టాన్‌శెట్టి

నక్కపల్లి: మండలంలో ఇళ్ల నిర్మాణాల పురోగతి బాగాలేదని కలెక్టర్ రవి పట్టాన్‌శెట్టి అసంతృప్తి వ్యక్తం చేశారు. దీనిపై ప్రత్యేక దృష్టి సారించి త్వరగా పూర్తి చేయాలని ఆదేశించారు. మండలంలోని చినదొడ్డిగల్లు జగనన్న లేఅవుట్‌ను శనివారం ఆయన పరిశీలించారు. మండలంలోని పలు గ్రామాల్లో ఇళ్ల నిర్మాణాలు ప్రారంభం కాలేదన్న నివేదికలు వస్తున్నాయని అధికారులను ప్రశ్నించారు. చినదొడ్డిగల్లు లేఅవుట్ శ్మశానవాటికకు ఆనుకుని ఉండటం వల్ల ఇళ్లు నిర్మించుకోవడానికి ఆసక్తి చూపడం లేదని వైస్ ఎంపీపీ వెలగా ఈశ్వరరావు, ఎంపీడీవో సీతారామరాజు, గృహ నిర్మాణశాఖ అధికారులు వివరించారు. కొత్తగా ఎక్కడైనా స్థలాన్ని లేఅవుట్‌గా ఏర్పాటు చేసి ఇవ్వాలని కోరారు. డొంకాడలో ఇదే పరిస్థితి ఉందని, లేఅవుట్‌కు రోడ్డు సదుపాయం లేదని, 15 సెంట్లు స్థలం కొనుగోలు చేసి రోడ్డు నిర్మిస్తే లబ్ధిదారులు ఇళ్లు నిర్మించడానికి ముందుకొస్తారని మరో వైస్ ఎంపీపీ వీసం నానాజీ కలెక్టర్ దృష్టికి తీసుకొచ్చారు. ఎక్కడైనా లేఅవుట్లలో సమస్యలు ఉంటే ప్రత్యామ్నాయంగా ప్రభుత్వ స్థలాలుంటే, సేకరించి ఇస్తామన్నారు. కొత్తగా స్థలాలు కొనుగోలు చేసి లేఅవుట్లు వేసే పరిస్థితి లేదని స్పష్టం చేశారు. గతంలో లేఅవుట్ కోసం భూసేకరణ సమయంలోనే ఇటువంటి సమస్యలను గుర్తించి ఉండాల్సిందన్నారు. ప్రస్తుతం పంపిణీ చేసిన స్థలాల్లో ప్రత్యామ్నాయ ఏర్పాట్లు చేసుకుని ఇళ్లు నిర్మించుకోవాలని సూచించారు. గ్రామంలో డ్రైనేజీ సమస్య పరిశీలించి పరిష్కరించాలని ఎంపీటీసీలు ఈశ్వరరావు, తోట సత్తిబాబు కోరారు. దీనిపై తహసీల్దార్, ఎంపీడీవోలను పంపించి పరిష్కరిస్తానని, అప్పటికీ కాకపోతే డీపీవోను పంపిస్తానని హామీ ఇచ్చారు. కలెక్టర్ వెంట తహసీల్దార్ సుబ్రహ్మణ్యశాస్త్రి, ఈవోపీఆర్డీ వెంకటనారాయణ, డిప్యూటీ తహసీల్దార్ నీరజ, ఆర్ఐ ప్రసాద్, ఎంఈవో డీవీడీ ప్రసాద్, వివిధ శాఖల అధికారులు, వైఎస్సార్‌సీపీ నాయకులు పాల్గొన్నారు.

ధ్వజస్తంభం పునఃప్రతిష్టకు రూ. 6 లక్షల విరాళం


రూ. 6 లక్షలు విరాళమిస్తున్న జెడ్పీటీసీ మారిశెట్టి విజయశ్రీకాంత్

చోడవరం: ప్రాచీన దేవాలయాల్లో ఒకటైన చోడవరం స్వయంభూ గౌరీశ్వరస్వామి ఆలయంలో ధ్వజస్తంభం పునః ప్రతిష్టకు జెడ్పీటీసీ మారిశెట్టి విజయశ్రీకాంత్ రూ. 6లక్షలు విరాళం అందజేశారు. ఈ మొత్తాన్ని ఆలయ ప్రధాన అర్చకుడు కొడమంచిలి చలపతిరావు, ఆలయ ట్రస్టు బోర్డు చైర్మన్ గూనూరు సత్తిబాబులకు విజయశ్రీకాంత్ దంపతులు శనివారం అందజేశారు. ఈ నెల 31న ఆలయ ధ్వజస్తంభం పునః ప్రతిష్ట కార్యక్రమం నిర్వహించనున్నారు.

ANNEXURE-VII

HETERO INFRASTRUCTURE SEZ LTD.

Ch. Lakshmipuram (Vill.), N. Narasapuram (Vill.), Rajayyapeta (Vill.), Nakkapally (Mandal)
VISAKHAPATNAM (Dist.) - 531 081. A.P., India. Tel : 08931- 227307, Fax : 08931- 227200
E-mail : contact@heterodrugs.com. URL : http//www.heterodrugs.com.

28th January 2022

Letter NO:HIS/EHS/Gram Panchayat/2022-23/03

To,
The Sarpach
Gram Panchayat
N.Narasapuram Village
Nakkapalli Mandal
Anakapalli Dist

Dear Sir,

Sub : CRZ Clearance for laying of new marine disposal pipeline in place of existing pipelines – Submission of CRZ Clearance Letter – Regarding

This is to bring to your kind notice that M/s Hetero Infrastructure SEZ Ltd has been obtained **CRZ clearance** for laying of new marine disposal pipeline in place of existing two pipelines from the Ministry of Environment Forest and Climate Change, Government of India vide F.NO: 11-45/2022-IA.III dated 11/01/2022.

We are herewith submitting the copy of same CRZ clearance for your information and records please.

Kindly acknowledge the receipt of the same.

Thanking you,

Yours faithfully,
For Hetero Infrastructure SEZ Ltd

28/01/2022

S. Kullayi Reddy
Associate Vice President – EHS

Enclosures : As above

Received copy.

P. [illegible]
Sarpanch
Gramapanchayat
N. NARSAPURAM
Nakkapalli (Md), Visakha Dt.

HETERO INFRASTRUCTURE SEZ LTD.

Ch. Lakshmipuram (Vill.), N. Narasapuram (Vill.), Rajayyapeta (Vill.), Nakkapally (Mandal)
VISAKHAPATNAM (Dist.) - 531 081. A.P., India. Tel : 08931- 227307, Fax : 08931- 227200
E-mail : contact@heterodrugs.com. URL : http//www.heterodrugs.com.

28th January 2022

Letter NO:HIS/EHS/Gram Panchayat/2022-23/02

To,
The Sarpach
Gram Panchayat
Peda Teenarla Village
Nakkapalli Mandal
Anakapalli Dist

Dear Sir,

Sub : CRZ Clearance for laying of new marine disposal pipeline in place of existing pipelines – Submission of CRZ Clearance Letter – Regarding

This is to bring to your kind notice that M/s Hetero Infrastructure SEZ Ltd has been obtained **CRZ clearance** for laying of new marine disposal pipeline in place of existing two pipelines from the Ministry of Environment Forest and Climate Change, Government of India vide F.NO: 11-45/2022-IA.III dated 11/01/2022.

We are herewith submitting the copy of same CRZ clearance for your information and records please.

Kindly acknowledge the receipt of the same.

Thanking you,

Yours faithfully,
For Hetero Infrastructure SEZ Ltd

28/01/22

S. Kullayi Reddy
Associate Vice President – EHS

Received copy from

President 28/1/2023
PEDATEENRLA
Nakkapalli Mandal
Anakapalli Dist.

Enclosures : As above

HETERO INFRASTRUCTURE SEZ LTD.

Ch. Lakshmipuram (Vill.), N. Narasapuram (Vill.), Rajayyapeta (Vill.), Nakkapally (Mandal)
VISAKHAPATNAM (Dist.) - 531 081. A.P., India. Tel : 08931- 227307, Fax : 08931- 227200
E-mail : contact@heterodrugs.com. URL : http//www.heterodrugs.com.

28th January 2022

Letter NO:HIS/EHS/Gram Panchayat/2022-23/01

To,
The Sarpach
Gram Panchayat
Rajayyapeta Village
Nakkapalli Mandal
Anakapalli Dist

Dear Sir,

Sub : CRZ Clearance for laying of new marine disposal pipeline in place of existing pipelines – Submission of CRZ Clearance Letter – Regarding

This is to bring to your kind notice that M/s Hetero Infrastructure SEZ Ltd has been obtained **CRZ clearance** for laying of new marine disposal pipeline in place of existing two pipelines from the Ministry of Environment Forest and Climate Change, Government of India vide F.NO: 11-45/2022-IA.III dated 11/01/2022.

We are herewith submitting the copy of same CRZ clearance for your information and records please.

Kindly acknowledge the receipt of the same.

Thanking you,

Yours faithfully,
For Hetero Infrastructure SEZ Ltd

S. Kullayi Reddy
Associate Vice President – EHS

Enclosures : As above

Received copy

Sarpanch
Grama Panchayat
Rajayyapeta
Nakkapalli Mandal