

Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Wednesday, May 29, 2024 5:59 PM
To: ecompliance-guj@gov.in; iro.gandhingr-mefcc@gov.in
Cc: ec-rdw.cpcb@gov.in; ro-gpcb-kute@gujarat.gov.in; ms-gpcb@gujarat.gov.in; mefcc.ia3@gmail.com; monitoring-ec@nic.in; direnv@gujarat.gov.in; Anil Trivedi; Sujalkumar Shah
Subject: Half Yearly EC Compliance Report WFDP Submission for Period of Oct.2023 to March 2024
Attachments: EC and CRZ Compliance Report-WFDP_2009_Oct'23 to Mar'24-part-1.pdf



APSEZL/EnvCell/2024-25/010

Date: 29.05.2024

To
The Inspector General of Forest / Scientist C,
Integrated Regional Office (IRO),
Ministry of Environment, Forest and Climate Change,
Aranya Bhawan, A Wing, Room No. 409,
Near CH 3 Circle, Sector – 10A,
Gandhinagar – 382007.
E-mail: ecompliance-guj@gov.in, iro.gandhingr-mefcc@gov.in

Sub : Half yearly Compliance report for Environment and CRZ Clearance for "Water Front Development Project at Mundra, Dist. Kutch, Gujarat.

Ref : i) Environment and CRZ clearance granted to M/s Adani Ports & SEZ Limited vide letter dated 12th January, 2009 and 19th January, 2009 bearing MoEF letter No. 10-47/2008- IA.III.
ii) Environment and CRZ clearance Extension order granted to Water Front Development Project at Mundra in Kutchh District (Gujarat) vide letter dated 7th October, 2015 bearing MoEF letter No. 10-47/2008- IA.III.
iii) MoEF&CC's Order dated 18.09.2015

Dear Sir,

Please refer to the above cited reference for the said subject matter. In connection to the same, it is to state that copy of the compliance report for the Environmental and CRZ Clearance for the period of October 2023 to March 2024 is being submitted through soft copy (e-mail communication).

Kindly consider above submission and acknowledge.

Thank you,
Yours Faithfully,
For, **M/s Adani Ports and Special Economic Zone Limited**

A handwritten signature in blue ink, appearing to read "Bhagwat Swaroop Sharma".

Bhagwat Swaroop Sharma
Head – Environment
Mundra & Tuna Port

Encl: As above
Copy to:

- 1) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003.
- 2) The Zonal Officer, Regional Office, CPCB – Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara – 390023.
- 3) The Member Secretary, GPCB – Head Office, Paryavaran Bhavan, Sector 10 A, Gandhi Nagar – 382010.
- 4) The Director, Forests & Environment Department, Block – 14, 8th floor, Sachivalaya, Gandhi Nagar – 382010.
- 5) The Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham – 370201.

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Environmental Clearance Compliance Report



Waterfront Development Project,
Mundra, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited
Mundra, Kutch

For the period of
October-2023 to March-2024

Index

Sr. No.	Particulars	Page Nos.	
1	Environment and CRZ Compliance Report	1-47	
2	Annexures		
	Annexure - A	Compliance of CRZ Recommendation	48-53
	Annexure - B	Compliance of MoEF&CC Order dated 18th Sep, 2015	54-90
	Annexure - 1	The algal removal report	92
	Annexure - 2	Adani Foundation – CSR Report for the FY 2023-24	94-185
	Annexure - 3	Details of status of legal cases	187-188
	Annexure - 4	Details on Mangroves afforestation & Green belt development	190-191
	Annexure - 5	Half Yearly Environment Monitoring Summary Report	193-308
	Annexure - 6	Budget spent for environmental protection expenditure	310
	Annexure - 7	Copy of submitted action taken report w.r.t. , IRO- MoEF&CC Gandhinagar site visit on 18th to 20th December, 2023 for compliance verification	312-391
	Annexure - 8	The copy of updated/renewed PLI policy of APSEZ – Liquid Terminal & Mundra LPG Terminal Pvt. Ltd	393-402
	Annexure - 9	Compliance report of environmental management plan and mitigation measures proposed as part of the EIA report	404-406
	Annexure - 10	Details of Regional Level Pollution Response exercise and Oil Spill mock drill report	408-420
Annexure - 11	Fishermen livelihood expenditure	422	
Annexure - 12	Compliance report of IGFRI site visit report recommendation	424-432	
Annexure - 13	Compliance Report of CIA EMP	434-529	

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'23 To : Mar'24
Status of the conditions stipulated in Environment and CRZ Clearance		

fThe name of the company was changed from "Mundra Port and Special Economic Zone Limited" to "Adani Ports and Special Economic Zone Limited" on 6th January, 2012.

Activities/facilities approved, major components completed and proposed future activities as per Environment and CRZ Clearance are as below:

Description (Type of Facility or Berth)	Approved Berths or Length as per Environmental & CRZ Clearance	So far Developed and In Operation
	Nos. of Berths or Length	Nos. of Berths
Multipurpose	4 (550 m + 2 Berths)	4
Container	16 (2680 m + 2000 m)	7 (2110 m)
Ro-Ro	2	-
Coal	6	4
Dry-Bulk Cargo	5	-
Liquid/POL	9*	-
LNG	2	Developed and operated by GSPC LNG Limited as per separate permissions obtained and NOC given by APSEZ
Light & Heavy Engineering	2	-
Port Craft	1 (330 m)	-
Shipyard	2	-

* Liquefied Petroleum Gas (LPG) Terminal has been developed by M/s. Mundra LPG Terminal Pvt. Ltd. under Waterfront Development Project of Adani Ports and SEZ Limited and LPG is being handled at existing Multipurpose Terminal APSEZ. M/s. Mundra LPG Terminal Pvt. Ltd is 100% subsidiary of APSEZ.

In addition to above berths or facilities, following components were also approved.

1. Dredging Quantity: 210 Mm³. Overall dredging to the tune of 123 Mm³ is completed till date.
2. Back-up area, back-up facilities like railway line, rail sidings, rail truck loading, open paved areas, associated buildings, utilities, amenities, etc. and connectivity to rail and road corridor for each port were approved and majority of them are constructed and in operation. Remaining facilities will be developed based on future requirements.
3. Seawater intake channel and outfall channel for power plants, desalination plants (47 MLD is operational out of 300 MLD) and other industrial requirements approved and is already in operation.

 Ports and Logistics	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'23 To : Mar'24
Status of the conditions stipulated in Environment and CRZ Clearance		

Note:

- APSEZ has applied for EC & CRZ Clearance for expansion of Waterfront Development Project vide dated 7th March, 2019.
- MoEF&CC has issued Terms of Reference (ToR) vide Ref. – F. No. 10-24/2019-IA-III dated 17th May, 2019 and it is further amended on 27th Sep, 2019, 10th April, 2020 & its latest amendment vide dated 26th Feb, 2024.
- The project proposal has been considered in 364th EAC Meeting held on 15th & 16th May, 2024.

Compliance Report of Environmental and CRZ Clearance

Status of the conditions stipulated in Environment and CRZ Clearance

Half yearly Compliance report for Environment and CRZ Clearance for the project "Water Front Development Project (WFDP) at Mundra, Dist. Kachchh, Gujarat of M/s. Adani Ports and SEZ Limited"

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
Specific Conditions		
i	No existing mangroves shall be destroyed during construction / operation of the Project.	<p>Complied.</p> <p><u>Conservation of mangroves:</u></p> <ul style="list-style-type: none"> • In and around APSEZ, approx. 1800 ha. Mangrove area was identified by NIO in an EIA report prepared the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP). • It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. <p>As per MoEF&CC directive dated 18th Sep, 2015, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, mangrove cover in and around APSEZ was over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha.</p> <p>NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around was submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide email dtd 22nd Sept, 2020 with conditions, which was submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024		
		As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.		
		Sr. No.	Recommendations	Compliance
		1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"> • APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island. • As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.94%. • This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ. • According to GUIDE Mangrove monitoring study report November 2023 (was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024																											
			<p>during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <ul style="list-style-type: none"> Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). The cost of the said study was INR 23.60 Lacs incurred by APSEZ. <p>Summary of Mangrove mapping and monitoring (from 2011 to 2021):</p> <table border="1"> <thead> <tr> <th rowspan="2">Mangrove mapping Year</th> <th rowspan="2">Mangrove cover total Area (Ha.)</th> <th colspan="2">Mangrove cover area Increased</th> </tr> <tr> <th>Hac.</th> <th>Hac.</th> </tr> </thead> <tbody> <tr> <td>2011</td> <td>2094</td> <td>-</td> <td>-</td> </tr> <tr> <td>2011 to 2016-17</td> <td>2340</td> <td>246</td> <td>11.75 %</td> </tr> <tr> <td>2017 to 2019 till March</td> <td>2596</td> <td>256</td> <td>10.94 %</td> </tr> <tr> <td>2019 to 2021 till March</td> <td>2723</td> <td>127</td> <td>4.89</td> </tr> <tr> <td>Total</td> <td>2723</td> <td>629</td> <td>--</td> </tr> </tbody> </table> <p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</p>	Mangrove mapping Year	Mangrove cover total Area (Ha.)	Mangrove cover area Increased		Hac.	Hac.	2011	2094	-	-	2011 to 2016-17	2340	246	11.75 %	2017 to 2019 till March	2596	256	10.94 %	2019 to 2021 till March	2723	127	4.89	Total	2723	629	--
Mangrove mapping Year	Mangrove cover total Area (Ha.)	Mangrove cover area Increased																											
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Total	2723	629	--																										
	2.	Tidal observation in creeks in and around APSEZ	<ul style="list-style-type: none"> APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. The cost of the said activity was INR 1.0 Lacs. 																										
	3.	Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. The cost of the said activity was Rs. 80000 during the FY 2023-24. The 																										

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024	
			<p>algal removal report is attached as Annexure - 1.</p> <p>4. Awareness of mangroves importance in surrounding communities</p> <ul style="list-style-type: none"> Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. Adani Foundation provides Good Quality dry and green fodder to 29 Villages. Project is covering total 16000 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green – 2359204 Kg. Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. Grass Land development: 213 acres of gauchar land has been cleaned and allocated for Grass land development with strong Community Contribution and Mobilization. Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on 28th July 2023 to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The report of day celebration was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23. Since PhD scholars and students frequently visit this area for study. we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist. Refer CSR report attached as Annexure - 2.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<p>Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted along with half yearly compliance report for the period of Oct'20 to Mar'21.</p> <p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial issues work order has been canceled. After that again issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work was 23.60 Lacs (Including Taxes), which was paid by APSEZ.</p> <p>GUIDE has completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of the report of Monitoring and Distribution of the Mangroves was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.</p> <p>According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradimata, Navinal, Bocha and Khari creeks and also in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) – 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<p>Hence overall mangrove cover was considered as 2596 Ha in year 2019.</p> <p>According to GUIDE Mangrove monitoring study report November 2023 (was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <p>Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%).</p> <p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</p>
li	There shall be no filling up of the creek and reclamation of the creeks.	<p>Complied.</p> <p><u>Conservation of creeks:</u></p> <ul style="list-style-type: none"> • The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river). • All above creek mouths are open allowing free flow of water in to the creeks and surrounding areas and there is no filling or reclamation of any creek area. • This aspect is also confirmed from the study of NCSCM in 2017-18, which highlights the bathymetry data of the entire coast around APSEZ. • From the bathymetry data it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Three RCC Bridges have also been constructed over Kotdi creek with total length of 230 m and cost of INR 10 Crores. Photographs showing the same were submitted along with half yearly compliance report for the period of Apr'17 to Sep'17. Please refer condition no. i of EC & CRZ compliance report for further details.
iii	The Project proponent shall comply with all the Orders/directions of the Honorable High Court of Gujarat and Supreme Court in the matter.	<p>Complied.</p> <p>1. SLP (Civil) no. 5509 of 2019 The Hon'ble Gujarat High Court dismissed the matter dated 06.02.2023 and also stated that the petitioners are at liberty to approach National Green Tribunal as a part of the alternative remedy available to them. The order copy of Hon'ble Gujarat High Court was submitted during the last compliance period Oct'22 to Mar'23.</p> <p>There are two ongoing matters pending (One pending at High Court and other pending at Supreme Court). Details of status of legal cases is attached as Annexure-3.</p>
iv	Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the High Current in the area.	<p>Complied.</p> <p>The hydrodynamic study for the waterfront area has been carried out by HR Wallingford, a maritime design expert. As per the recommendations in their report, the following safety measures are implemented.</p> <ol style="list-style-type: none"> The alignment of the berth has been kept in line with the current flow in order to reduce the effect of current on vessels moored alongside. The breasting dolphins have been designed in such a configuration so as to provide appropriate lead to the vessels mooring ropes. The berth being in line with the current flow will facilitate Pilotage operation and provide better maneuverability of vessels. The strength of the berth structure has been calculated to absorb the energy transferred to fenders while berthing of tanker vessels at the terminal. Navigational buoys and lead lights marking the channel and clearing distance off the breakwater are installed.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<p>6. The strength of the fenders at the berth and the SWL of the bollards / winches are sufficient to absorb the forces of vessels alongside keeping in mind the monsoon weather conditions.</p> <p>7. Sufficient depths are maintained at all times to ensure 10% UKC at the time of berthing / un-berthing.</p> <p>8. The capstans / winches / bollards are of adequate strength with respect to the vessels being handled.</p> <p>9. The berth has been designed at an appropriate distance from the existing berths at MMPT-1 in order to safely allow berthing / un-berthing of vessels at MMPT-1 with vessels berthed at the South Port tanker terminal.</p> <p>10. Berths have been planned close to the breakwater as there is a reduced strength of current along the coastline.</p>
v	<p>The shore line changes in the area shall be and monitored periodically the report submitted every 6 months to Regional Office Bhopal.</p>	<p>Complied.</p> <p>Shore line change aspect has been studied in detail as part of following two studies;</p> <ul style="list-style-type: none"> • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. <p>As per the outcome of these studies, no erosion is observed on the coast of the project area. As part of the Regional Impact Assessment study, the possible changes in shoreline that may occur due to the proposed developments in 10 km area on either side of the waterfront development project have been predicted. It has been inferred from the modelling study that the shift in the shoreline will be less than 0.5 m/year, which reconfirms that the APSEZ facility would pose insignificant impact on the Mundra shoreline. Accretion is observed at South port and at West port due to approved reclamation activities.</p> <p>Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

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		<p>Shoreline change study was carried out by M/s. Gujarat Institute of Desert Ecology, Bhuj in 2022 as a part of the Environmental Management Plan (EMP) compliance with the CIA study. The cost of said study was INR 17.39 Lacs.</p> <p>In the present study, the rate of shoreline changes statistics on a time series of multiple shoreline positions of a totally 43 km coastline stretches (16 km on the west side and 27 km on the east side of Adani main port) on either side of Adani Ports and Special Economic Zone Ltd (APSEZL) has been taken into account for the calculation by using satellite images.</p> <p>As a part of the NGT direction, the shoreline change analysis has been carried out for the years 2015-2022 to study the immediate changes after the commissioning of the port and initiation of the activities (September 2015) for short-term variation for the year 2015-2022 using EPR method has been carried out.</p> <p>The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarized in below table.</p> <table border="1"> <thead> <tr> <th rowspan="2">Period</th> <th rowspan="2">Name of the block</th> <th rowspan="2">Average Shoreline Change (M/Year)</th> <th colspan="2">Shoreline Change(M)</th> </tr> <tr> <th>Maximum Accretion</th> <th>Maximum Erosion</th> </tr> </thead> <tbody> <tr> <td rowspan="2">2015-2022</td> <td>West Port</td> <td>-11.43</td> <td>39.86</td> <td>-78.68</td> </tr> <tr> <td>Eastern side</td> <td>-26.60</td> <td>191.32</td> <td>-165.19</td> </tr> </tbody> </table> <p>The Shoreline Change Assessment Study report of GUIDE was submitted along with half yearly compliance report for the period of Oct'22 to Mar'23.</p> <p>The Shoreline change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) also as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study are as below.</p> <p>To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar</p>	Period	Name of the block	Average Shoreline Change (M/Year)	Shoreline Change(M)		Maximum Accretion	Maximum Erosion	2015-2022	West Port	-11.43	39.86	-78.68	Eastern side	-26.60	191.32	-165.19
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		<p>tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis.</p> <p>10 km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition.</p> <p>The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively.</p> <p>The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 05 m/yr and 0.82 m/yr respectively.</p> <p>Please refer Annexure – B (Compliance of MoEF&CC Order dated 18th Sep, 2015) for further details regarding the mentioned studies.</p>
vi	<p>The recommendations of the risk assessment shall be implemented; any change in the design of the project shall come before the committee for seeking necessary approval.</p>	<p>Complied.</p> <p>Risk Assessment was carried out at the time of preparation of the EIA report for the Liquid Berths and LNG terminal. However, it may be noted that liquid berths are not yet developed. Hence recommendations of Risk Assessment will be implemented once the liquid berths & pipelines are developed by APSEZ.</p> <p>The LNG terminal is constructed by GSPC LNG Ltd. and a separate Environment and CRZ clearance is obtained by them. Please refer general condition no ix below for details regarding the same.</p> <p>LPG is being handled from the existing multipurpose terminal. A detailed risk assessment study as per MoEF&CC letter no.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'23 To : Mar'24
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<p>F. No. 10-47/2008-IA-III dated 31st May, 2016 was carried out by iFluids Engineering for handling as well as storage activities. Recommendations of the risk assessment have been implemented as part of the construction activity and details of the same were submitted along with half yearly compliance report for the period of Oct'18 to Mar'19. Reports of the same were submitted to MoEF & CC along with half yearly compliance report for the period of Apr'17 to Sep'17. Implantation report of risk assessment study during operation phase was submitted along with half yearly compliance report for the period Oct'19 to Mar'20.</p> <p>There are no other activities which attract requirement of Risk Assessment.</p>
vii	<p>Mangrove plantation of 200 ha to be done in consultation with GEER / GEC of Forest Department, a detailed plan shall be submitted within six months from the date of receipt of this letter.</p>	<p>Complied.</p> <p>APSEZ has consulted Gujarat Institute of Desert Ecology (GUIDE) as they are one of the authorized agencies of Dept. of Forest & Env., Govt. of Gujarat for carrying out mangrove afforestation. GUIDE has completed mangrove plantation in an area of 200 ha at Jakhau, Gujarat during the year 2012-13. Copy of the mangrove plantation completion certificate was submitted along with EC compliance report for the period Apr'18 to Sep'18. Total expenditure for the said work was INR 40 lakh.</p> <p>To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 4140 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 1592.8 lakh.</p> <p>Details on Mangroves afforestation & Green belt development carried out by APSEZ till Mar'24 is annexed as Annexure - 4.</p> <p>Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04</p>

Status of the conditions stipulated in Environment and CRZ Clearance

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		<p>Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE, Gujarat.</p> <p>These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem.</p> <p>Please refer attached Annexure – 2 for CSR activity report carried out by Adani Foundation.</p>				
viii	<p>It shall be ensured that during construction and post construction of the proposed jetty the movement of fishermen vessel of the local communities are not interfered with.</p>	<p>Complied.</p> <p>During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, so far APSEZ has provided seven (7) access roads instead of four (4). Total length of all the approach roads is approx. 23 Kms and expenditure involved is Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats.</p> <p>APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation. Adani Foundation is working in main five persuasions as below.</p> <ul style="list-style-type: none"> ❖ Education ❖ Community Health ❖ Rural Infrastructure ❖ Sustainability Livelihood ❖ Skill Development <p>Brief information about activities in the main five persuasions is mentioned below. Activities carried out for the same are summarized as below.</p> <table border="1"> <thead> <tr> <th>Area</th> <th>Activity</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Area	Activity		
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		Community Health	<ul style="list-style-type: none"> • Mobile Health Care Units and Rural Clinics • 07 Rural Clinics • 05 villages of Mundra & 02 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 23327 (direct & indirect) by Mobile van and rural clinic. • 2 financially challenged patients has been supported with Dialysis treatment at 124 Times which added day in their Life. • Provided 41,546 medical health services and conducted health awareness camps for 763 High school students. • Cataract-Free Mundra: The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below. Lives Impacted: - 1131 <ul style="list-style-type: none"> ➤ Comprehensive Eye Screenings at Village level ➤ Cataract Surgeries to GKGH ,Bhuj ➤ Post-Operative Care and Follow-up ➤ 5 successful Operation <p>Health camp:</p> <ul style="list-style-type: none"> • Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and other are conducted in core villages as well as in labour colonies. • Specialty health (Gynec, ophthalmic, specialty health camp): - 5795 Patients Benefitted. • General health camp: - 1618 Patients benefited. • Blood Donation Camp: 1715 people have donated blood. • Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being. • Women's Health: Provided health services to more than 2610 women benefitted through Menstrual & Mental Health Awareness Drive. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 124 Times which added day in their Life. • Medical Supports: 1 007 beneficiary in 35 village. • • International year of Millets – 2023: To promote millet culture and raise awareness about its benefits in Mundra, we organized a Millet Competition across nine villages. Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this initiative, 300 indigenous millet recipes were showcased, highlighting the

Status of the conditions stipulated in Environment and CRZ Clearance

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			<p>potential for sustainable and nutritious dishes in our daily diets.</p> <ul style="list-style-type: none"> • Ayushman card facilitation: Ayushman card issued to 6865 for 25 village of 686.50 Cr. health insurance. Preventive health Campaign The Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body. • Sample Survey Report 2023-24 <ul style="list-style-type: none"> o 55% Never heard about Menstrual hygiene o 60% Are using cloths on regular basis o 36% Had never used sanitary pads o 68% Had no information about UTI o 30% Never used millets in their diet o 60% Never heard about millets or it's benefits • 2222 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 7 villages and Super specialist camp which benefitted more than 4690 patients of Mundra & Mandvi Taluka. • Cattle Health Camp: Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages with total 18903 cattle benefitted and 18870 cattle vaccinated. Total 982 cattle owners benefited for Preventive Health Care & Fodder Support Program
		Sustainable Livelihood – Fisher folk, Agriculture & Women	<p>Overall Persistent efforts for Fisherman development:</p> <ul style="list-style-type: none"> • 598 Education Kit Support • 273 Fisherman Shelter Support • 1,247 Vehicle transportation support of Mundra and Mandvi taluka • 106 Cycle Support to high school going students • 613 Scholarship Support • 419 Youth Employment • 195 Linkages with Fisheries Scheme • 3,534 Ramatotsav Community Engagement • 56,523 Man days Mangroves Plantation <p>Empowering Fisherfolk Communities through Education:</p> <ul style="list-style-type: none"> • Vehicle Transportation Facilities: 146 Students supported Mundra Taluka and 58 Students supported at Mandvi Taluka during the compliance period • Education Kits Support: Education Kits including notebooks, guides, and bags, to fisherfolk students studying in 9th to 12th standard to enhance their learning experience (57 nos. students benefitted).

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			<ul style="list-style-type: none"> ● Educational Awareness Sessions: Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on advancing girl-child education. (487 Students motivated for high school Education). ● Scholarship Support: Provide scholarship support to 31 deserving students, covering their higher secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates. ● Cycle Support: Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease. ● Assisting During Emergencies: Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery. (336 Fisherfolk house benefited) ● Fostering Youth Employment: At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future. (115+ Fisherfolk youth employed) ● Strengthening Fisherfolk women: Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support. (449 Women benefited) ● Potable Water Distribution: Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity. (5000+ Population benefited). <p>Sustainable Livelihood - Agriculture: During compliance period This year, the Adani Foundation continued its strong commitment to advancing natural farming in Mundra. Through various initiatives and partnerships, we provided crucial support to local farmers, empowering them with knowledge and resources to transition to sustainable practices.</p> <ul style="list-style-type: none"> ● 2200+ Farmers educated in natural farming ● 800+ Farmers embracing natural farming methods ● 200 Farmers got financial assistance of Rs. 10,000

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		<ul style="list-style-type: none"> • 3 District level exposure visit • ₹ 36.7 lakh Business done by our benefited Farmers <p>Promoting Natural Farming:</p> <ul style="list-style-type: none"> • Training: Conducted training for 1250 farmers in 16 villages, enlightening them about the harmful effects of chemical fertilizers. Demonstrated how to produce organic fertilizer using household products, emphasizing its benefits and cost-effectiveness. After adopting it, they witnessed its positive effects on their fields. • Kitchen Garden Kit: We have supported vegetable kitchen garden kits to 500 farmers with the aim to enable them to grow fresh and nutritious, chemical-free vegetables. This will enhance their food security and promote self-reliance. • Empowering Farmers: This year, amidst the aftermath of the cyclone, we stood by our farmers and held dedicated meetings with KVK, KCS, and DRC to restore the fallen date trees. Collaboratively, provided JCB, technical support, organic fertilizer etc. Successfully restored 615 trees. Each Date trees is projected to yield approximately Rs. 25,000, Total Yield in Next Season:- Rs.1.53 Cr. • Financial Assistance: Extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. This fund will help farmers in planting a total of 53,136 fruit-bearing plants. <p>Raj Shakti Prakrutik Kheti Sahkari Mandali:</p> <ul style="list-style-type: none"> • Appreciation by Governor: Governor of Gujarat, Shree Acharya Devvratji, encouraged 25 of our farmers practicing natural farming at the Krushi and Dairy Expo event in Bhuj. • Exposure Visits Certification by GOPCA: Our farmers embarked on three eye-opening exposure visits to Gautech-2023, • Certification by GOPCA: We have successfully certified 28 farmers under the Gujarat Organic Products and Certification Agency (GOPCA). <p>Kutch Kalptaru FPO (KKPC) and Prakrutik Mandli</p> <ul style="list-style-type: none"> • To promote horticulture, the Kutch Kalptaru FPO (KKPC) was established in 2020 by farmers from Mundra Block to address various challenges they faced. With an initial 350 shares held by 280 shareholders, the company is now expanding to include up to 5000 farmers and 537 registered shareholders. (800 Farmers benefited and ₹ 33.67 lacs Turn over)

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		<ul style="list-style-type: none"> • 19 nos. of Market Linkage for supporting to Green carnival at Samudra Township & Shantivan colony Now 302+ farmers are collaborated with Mandli. Total Green Carnivals 37, Total Sell 8,623 kg and Revenue generated ₹ 30184805. by connecting directly with consumers, they've seen a remarkable 35% increase in their income. • Adani Foundation has also provided 14.38 lacs kg Dry Fodder and 45.85 lacs kg Green fodder in 31 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24. • Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 15005 Cattels / 2070 farmers and hence enhancing cattle productivity during FY 2023-24. • Grass Land development: AF converted 18 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara, Siracha, Gundal , Kukadsar village to transform into Fodder Sustain village during FY 2023-24. <p>Women Empowerment:</p> <ul style="list-style-type: none"> • Self Help Groups (SHGs): Established 82 self-help groups in various rural and urban areas to provide financial and social support to women We provided training and capacity building workshops to members of these SHGs to help them develop income generating activities and improve their livelihoods Through this initiative, we have empowered over 850 women to become self-reliant with Savings of more than Rs 35 Lacs. • Making SHG Self Reliant: <ul style="list-style-type: none"> ➤ 16 SHG are on pathways of self-reliance. ➤ Various handicraft, dry and fresh food making, stitching, tie and die etc. ➤ 175+ women - Monthly average income @ 7000 of each member over Month. • Job Sourcing – Govt: <ul style="list-style-type: none"> ➤ 11 Women supported for application and process of Gram Rakshak Dal, Bank Sakhi, Bima Sakhi and Professional Resouce Person. ➤ Average income 4200 Per Month. • Job Sourcing – Private: <ul style="list-style-type: none"> ➤ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company. ➤ 398 Women supported till date for job sourcing of more than 18 villages. ➤ Average income 10200 Per Month. • Social Empowerment:

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			<ul style="list-style-type: none"> ➤ 2 Livelihood Enhancement Training through RSETI. ➤ Financial support for business set up. ➤ Legal rights and domestic violence workshops. ➤ Family counselling for Job sourcing. • During FY2023-24 Approx. INR 122.32 lakh were spent for Fisherfolk Amenities work in different core areas. • Till FY 2023-24 Adani Foundation has done total expenditure of INR 1460.50 lakh for Fisherfolk Amenities work in different core areas. • Skill Development and Income Generation –Adani Foundation is working with 82 Self-help group and supporting to develop entrepreneur skills to become self-reliant, sourcing more than 850 women to absorb in various job. <p>Previous development activities:</p> <ul style="list-style-type: none"> • Cement Roof Sheet Support: fisherfolk Home were significantly damaged by the Bipor Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery." • Potable water Distribution: Providing access of potable Drinking water Facilities to Nine fisherfolk vasahat on Daily bases, either By Water tanker or Linkage with Nearest Gram panchayat. • More than 5000 Fisherfolk Population are getting benefit which impact on their health and efficiency. • Water distribution to Luni & Bavadi Bandar Fisherfolk Vasahat: 35000 KL water for 936 people. • Sagar Mitra Card: Introduced the 'Sagar Mitra Card' to simplify access for Fisherfolk to specific fishing routes within APSEZ. This digital card is connected to a digital punching machine located at designated entry points. Initially, we have implemented this system for Navinal Fisherfolk, and so far, we have issued a total of 57 Sagar Mitra Cards." • Government scheme Awareness session was held in association with Fisheries department Bhuj to facilitate pagadiya fishermen by providing fishing kits to seven Fishermen. The coordination was made by Adani Foundation to process application. • Organic Vegetable Shop Inauguration: Adani Foundation is promoting natural farming in Mundra through the "Rajshakti Prakrutik Kheti Sahkari Mandali," a group of 32 farmers. They opened a shop on May 24th to sale their produce in the open market. • 257 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation.

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		Education	<ul style="list-style-type: none"> Supported 1500 farmers for barrel & wormi compost. <p>Initiatives Under Utthan Project:</p> <table border="1"> <thead> <tr> <th>Utthan Initiatives</th> <th>Benefited</th> </tr> </thead> <tbody> <tr> <td>Strengthening government Primary & High schools</td> <td>31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.</td> </tr> <tr> <td>Appointing an Utthan sahayak</td> <td>70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.</td> </tr> <tr> <td>Mainstreamed Progressive learner</td> <td>Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.</td> </tr> <tr> <td>Providing required resources and facilities</td> <td>Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.</td> </tr> <tr> <td>Enabling joyful learning spaces</td> <td>Smart Class with Navneet software+ Bala painting + Activity base learning.</td> </tr> <tr> <td>Adani Students Development Center (ASDC)</td> <td>2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center</td> </tr> <tr> <td>Introducing English as a Third Language</td> <td>Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English</td> </tr> <tr> <td>Enhancing Reading Habits</td> <td>Redding corner , 1000+ Oasis workshop , 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month(ISLM)</td> </tr> <tr> <td>IT on Wheels</td> <td>2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students , 200+ High schools' students</td> </tr> <tr> <td>Promote sports</td> <td>6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh : 2000+</td> </tr> <tr> <td>Teachers' & Sahayak Capacity Building</td> <td>3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.</td> </tr> <tr> <td>Formation of Eco Club</td> <td>Plastic free village workshop : 1250+ Students, Environment Awareness program & Tree plantation in schools.</td> </tr> <tr> <td>Day Celebrations & Collaboration with GoG</td> <td>Summer Camp : 6000+ Students Diwali Mela : 5500+ Students. 1400+ Parents participated.</td> </tr> <tr> <td>Mothers as catalyst in transformation</td> <td>Mothers meet : 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)</td> </tr> <tr> <td>Strengthening Stakeholders</td> <td>Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Utthan Marks 5-Year Milestone: Celebrating the extraordinary five-year journey of Utthan in Mundra, we hosted a remarkable event graced by the presence 	Utthan Initiatives	Benefited	Strengthening government Primary & High schools	31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.	Appointing an Utthan sahayak	70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.	Mainstreamed Progressive learner	Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.	Providing required resources and facilities	Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.	Enabling joyful learning spaces	Smart Class with Navneet software+ Bala painting + Activity base learning.	Adani Students Development Center (ASDC)	2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center	Introducing English as a Third Language	Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English	Enhancing Reading Habits	Redding corner , 1000+ Oasis workshop , 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month(ISLM)	IT on Wheels	2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students , 200+ High schools' students	Promote sports	6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh : 2000+	Teachers' & Sahayak Capacity Building	3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.	Formation of Eco Club	Plastic free village workshop : 1250+ Students, Environment Awareness program & Tree plantation in schools.	Day Celebrations & Collaboration with GoG	Summer Camp : 6000+ Students Diwali Mela : 5500+ Students. 1400+ Parents participated.	Mothers as catalyst in transformation	Mothers meet : 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)	Strengthening Stakeholders	Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.
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Providing required resources and facilities	Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.																																		
Enabling joyful learning spaces	Smart Class with Navneet software+ Bala painting + Activity base learning.																																		
Adani Students Development Center (ASDC)	2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center																																		
Introducing English as a Third Language	Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English																																		
Enhancing Reading Habits	Redding corner , 1000+ Oasis workshop , 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month(ISLM)																																		
IT on Wheels	2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students , 200+ High schools' students																																		
Promote sports	6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh : 2000+																																		
Teachers' & Sahayak Capacity Building	3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.																																		
Formation of Eco Club	Plastic free village workshop : 1250+ Students, Environment Awareness program & Tree plantation in schools.																																		
Day Celebrations & Collaboration with GoG	Summer Camp : 6000+ Students Diwali Mela : 5500+ Students. 1400+ Parents participated.																																		
Mothers as catalyst in transformation	Mothers meet : 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)																																		
Strengthening Stakeholders	Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.																																		

Status of the conditions stipulated in Environment and CRZ Clearance

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		<p>of distinguished individuals. The event witnessed the convergence of more than 2000 students, 416 school principals and teachers, and 145 School Management Committee Members</p> <ul style="list-style-type: none"> • Mother's Meet - Promoting Community Bond: Mothers meet is special intervention of Utthan, This year, more than 15000+ Mothers Joined in 700+ Mothers meet. • Utthan other various initiatives & Achievements: <ul style="list-style-type: none"> ➤ Utthan won FOKIA Award under the category "Excellence in collaborative CSR Project. ➤ Utthan created special syllabus of Maths, Science & English to achieve good result in board exam. ➤ The Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office. ➤ Career Counselling in Utthan High Schools same remedial classes during summer break. ➤ Health awareness programs in schools, children of class 6 to 8 were made aware about health. ➤ High school girls' students celebrated Rakshabandhan with Shoulder at Boarder. ➤ 1000+ Students are preparing for competitive exam. Its more than double from last year. <p>Adani Vidya Mandir, Bhadreshwar</p> <ul style="list-style-type: none"> • Empowering Communities through Free and Compulsory Education: We are empowering economically disadvantaged families through free and quality education. In the academic year 2023-24, it proudly serves a student population of 604, with 174 students hailing from fisher-folk communities. 24 dedicated teachers are there in school. • Achievement in sports: <ul style="list-style-type: none"> ➤ In August 2023, students of AVMB engaged in block-level sports competitions, excelling in Athletics, Kho-Kho, and Yoga. Team of AVMB: U14 & U17 boys secured 1st place in Kho-Kho and progressed to the district level. ➤ Notably, Abzal Reliva, a Class X student, clinched 1st position in Shot Put, and Hardev Jadeja from Class IX achieved 1st rank in Long Jump earning the opportunity to represent Mundra block at the district level • Achievement in Arts: <ul style="list-style-type: none"> ➤ An Essay and Quiz Competition arranged by TATA BUILDING INDIA was organized on the theme of "Recycle". 81 students of AVMB participated. ➤ 06 Students of Class VI to VIII appeared in PRARAMBHIK VISHARAD examination conducted by BRIHAD GUJARAT SANGIT SAMITI on 14/12/2023, School is waiting for the result.

Status of the conditions stipulated in Environment and CRZ Clearance

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			<ul style="list-style-type: none"> ➤ 19 Students of Class V to IX wrote inspirational stories in Gujarati language all the stories were submitted to a published in "GULSHAN" magazine in 10th edition on 11/10/2023. ● Training Skill Development: Adani Skill Development Centre (ASDC) is dedicated to enhancing employability and entrepreneurship. This year, ASDC has trained 50,00 individuals across Kutch, resulting in 65% livelihood generation. ASDC's vision is to make everyone skilled and employable, meeting industry demands through trained manpower. 																				
	Rural Infrastructure & Environmental Sustainability	Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area.	<p>WORK COMPLETED Below tabulated Water Conservation Projects completed during Compliance period:</p> <p>Water Conservation Projects: Swajal Project:</p> <ul style="list-style-type: none"> ➤ Aim: The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district. ➤ Water Security Plan: Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared forl the Seven villages. <table border="1"> <thead> <tr> <th>Block Name</th> <th>Water conservation structure</th> <th>Total no. of Structure</th> <th>Total Capacity Created (CUM)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Mundra</td> <td>Check Dam</td> <td>23</td> <td>6,07,332.80</td> </tr> <tr> <td>Pond Deepening</td> <td>66</td> <td>1,89,121.08</td> </tr> <tr> <td>RRWHS</td> <td>275</td> <td>2750</td> </tr> <tr> <td>Bore & Well</td> <td>209</td> <td>-</td> </tr> <tr> <td>Percolation Well</td> <td>24</td> <td>-</td> </tr> </tbody> </table> <p>Soil Conservation:</p> <ul style="list-style-type: none"> ● 1250 Farmers Awareness Sessions at Village Level: Spreading awareness on natural farming benefits and address their concerns. ● 7 exposure of Hands-On Training & Exposures : Arranged Workshop and training to emphasizing on real-world techniques. ● 857 Farmers link with Government Scheme: facilitation of govt. Cow Nurturing scheme to promote eco- friendly farming practices. 	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)	Mundra	Check Dam	23	6,07,332.80	Pond Deepening	66	1,89,121.08	RRWHS	275	2750	Bore & Well	209	-	Percolation Well	24	-
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			<ul style="list-style-type: none"> • 258 Gobardhan Bio-gas Support: Link with Gov Gobardhan Dhan Biogas Unit Nutrient-rich slurry serves as an essential organic fertilizer for natural farming. • 35 Farmers Natural Farming Certification Process to obtain natural farming certification through the GOPCA for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali. • Rs.9.88 Lacs RG Marketing Assistance: Provide platforms and resources ensuring fair prices and broader consumer reach. <p>Earlier Completed Activities/Projects:</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Project</th> <th>Unit</th> <th>Outcome</th> <th>Impact</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Check dam Restrengthening- Nana Kapaya</td> <td>1</td> <td>Water Storage Capacity increased by 48000 Cum</td> <td>60 + farmer's 120+Acre Area of Agri land can be Irrigated</td> </tr> <tr> <td>2</td> <td>Recharge Borewell</td> <td>21</td> <td>Reduce Salinity ingress, and preventing water run</td> <td>150+ farmer's 260+ Acre Area of Agri land for Irrigated</td> </tr> <tr> <td>3</td> <td>Pipe Culvert at Checkdam at Bhujpur</td> <td>1</td> <td>prevent water runoff into seaside.</td> <td>35 farmers' 120+Acre Area of Agri land can be Irrigated</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth 	Sr. No.	Project	Unit	Outcome	Impact	1	Check dam Restrengthening- Nana Kapaya	1	Water Storage Capacity increased by 48000 Cum	60 + farmer's 120+Acre Area of Agri land can be Irrigated	2	Recharge Borewell	21	Reduce Salinity ingress, and preventing water run	150+ farmer's 260+ Acre Area of Agri land for Irrigated	3	Pipe Culvert at Checkdam at Bhujpur	1	prevent water runoff into seaside.	35 farmers' 120+Acre Area of Agri land can be Irrigated
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		<p>decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.</p> <ul style="list-style-type: none"> • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • 377 - AC Roof sheet support to Fisherfolk Vasaha 1700+ Benefited. • 2 Development of Common Gathering flooring work – 4000+ Benefited. • 195 Stall – Vegetable market– 900+ Benefited. • Solar Panel System at Mundra – 600+ Benefited. • Maintenance, Fencing & Material Support - 30+ Benefited. • Renovation of Shed at Shekranpir Bhopavandh - 2000+ Benefited. <ul style="list-style-type: none"> • 40 RRWHS structure have been completed. • Total 229 nos. Bore-well recharging activity is completed Percolation well Recharging work at Bhadiya & Mota Kandgra village. • Sluice gate Construction to Control Flood during Flooding at Khoydivadi Vistar Bhujpur. • Pond Beatification and Bund Strengthening at Bhujpur village. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • commissioning of Community Training Centre at Shekhadiya. • Two Pond Deepening at Zarpara under Amrut Sarovar Yojna. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • JCB & Hitachi Machine Support for Pre-Moonson activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • 3 Re-strengthening of Approach Road. • Renovate Blood storage Lab CHC Mundra Renovation Blood storage Lab CHC Mundra. • Constructed 2 nos. of CC Road of 700 mtr. • Constructed Community Training center Shekadiya. • Constructed 2 nos. Disable Widow Toilet Block

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		<ul style="list-style-type: none"> • Installed R.O. Plant at Mokha with capacity 1000ltr /HR. • Constructed 4 nos. Common gathering Open Shed • Constructed 03 nos. of Water Tank at Luni Bandar. • Developed of Cricket Ground at Hatdi Village <p>ENVIRONMENT SUSTAINABILITY PROJECTS till Compliance period:</p> <ul style="list-style-type: none"> • Dates Tree -Restoration: Biparjoy cyclone has damaged huge number plants of Dates, Mango, Sapota. In coordination with Kutch Crop Services and Krishi Vigyan Kendra – more than 615 plants are restored till date and continue. • Miyawaki Forest Development, Nana Kapaya - Native species planation in the 2 acre area at Nana Kapaya village creating a flourishing mini-forest with 5,508 trees. • "Adani Van": Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 23,000 trees were planted. Second example Momai Mata temple, Desalpar 10,000 trees were planted. Third Example Matiyadada at Bhujpur 8000 trees were planted. Fourth example Rasha pir, Dhruh 2-acre 5000 tree planted. Thus, in PPP Model 4 Adani Van were developed where 46,000 trees were planted. • Prakruti Rath: This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 46,750 sapling distribution to individuals, we have empowered communities to take ownership of their surroundings, leading to a heightened consciousness about the environment's significance. • Till the date Total 1.49 Lac tree plantation have been done that has enriched the local ecosystem and significantly contributed to carbon sequestration • Smruti Van – Plantation more than 47,000 sapling with more than 115 species through Miyawaki methodology. • Ecosystem Restoration, Guneri – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years. The site visit and soil samplings conducted by GES team. Regular bi monthly meeting conducted to assess the annual phase wise growth of ongoing activities. • Multi-Species Mangrove Park - Adani Foundation at Mundra's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha

Status of the conditions stipulated in Environment and CRZ Clearance

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			<p>area coastal stretches have been planted with species. During current FY 2022-23, 04 Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE,</p> <ul style="list-style-type: none"> • Mangroves Biodiversity Park within one year • Home biogas - Under Gram Uthhan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Total 583 farmers are supported with Biogas as sustainable environment protection
		Skill Development	<p>Over the previous few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training in those areas in partnership with various colleges and institutes.</p> <p>ASDC Mundra Center Activities & Achievements:</p> <ul style="list-style-type: none"> • Women Empowerment through Skill Training: Provided Mud work training to 180 women in Mundra taluka villages supported by MPL. • RTG Crane Operator Training: Collaborated with APSEZ HR Team to train 79 students. • Dori Work and Hand Embroidery Training: Benefited 90 women in various Mundra villages supported by MPL. • Health Awareness and Career Sessions: 108 Ambulance Department enlightened GDA trainees at Adani Institute of Medical Sciences. Guest session on career advancement led by Mr. Kapil Goswami. • Exposure Visit for Women: Women trained in Mud Work, Dori Work, and Hand Embroidery showcased their skills during a visit by foreign delegates to the Solar Plant. • Women's Related Training Seminar: Held at Matr Vandana College, Bidada, Mandvi. <p>ASDC Bhuj Center Activities & Achievements:</p> <ul style="list-style-type: none"> • Commendation from Shree Jeet Adani: Received appreciation for supporting the Divyang job fair. • Employee Development Initiatives: Conducted Advanced Excel training for 18 Sumitomo India Ltd employees • Entrepreneurship Development Program: Organized a comprehensive 12- day program with 60 diverse candidates. • New Trainee Orientation: Conducted sessions about SAKSHAM center and LMS registration at the Bhuj Centre. • Civil Defense Training (5 days): Covered essential topics including Disaster Management, First Aid, 181 Mahila Helpline, 108 Emergency Services, and Fire Safety.

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			<ul style="list-style-type: none"> • F&B & Housekeeping Batch Inauguration: 92 students trained to enhance employability. • Indo-Euro Project Seminar: Arranged at various Nursing Colleges in Kutch District. Focused on German Language training and job placements. • Crucial Meeting with ISAR & UNICEF: Discussed future skill development challenges and transgender equality on 9th December 2023. <p>Total 734 nos. in ASDC Mundra Center and 405 nos. in ASDC Bhuj Center male & female trained in various skill development programme.</p> <p>Please refer Annexure – 2 for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2023-24 is to the tune of INR 953.50 lakh. Out of which, Approx. INR 940.52 lakh is spent during the FY 2023-24.</p>																																																														
ix	Relocation of the fishermen community if any shall be done strictly in accordance with the norms prescribed by the State Government.	Not Applicable	The project was conceptualized in such a way that there are no fishermen settlements in the project proposal. Hence there is no relocation of fishermen communities required.																																																														
x	Marine ecology monitoring shall be done regularly during construction of breakwater and dredging /disposal operation.	Complied.	<p>Constructions as well as maintenance dredging operations are ongoing activities. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'23 to Mar'24 is mentioned below.</p> <p>Total Sampling Locations & frequency: 09 Nos. (Frequency: Once a month)</p> <table border="1"> <thead> <tr> <th rowspan="2">Parameter</th> <th rowspan="2">Unit</th> <th colspan="3">Surface</th> <th colspan="3">Bottom</th> </tr> <tr> <th>Min</th> <th>Max</th> <th>Avg.</th> <th>Min</th> <th>Max</th> <th>Avg.</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>--</td> <td>7.99</td> <td>8.24</td> <td>8.17</td> <td>7.86</td> <td>8.12</td> <td>8.01</td> </tr> <tr> <td>BOD (3 Days @ 27 °C)</td> <td>mg/L</td> <td>98</td> <td>152</td> <td>126.91</td> <td>78</td> <td>128</td> <td>106.11</td> </tr> <tr> <td>TSS</td> <td>mg/L</td> <td>2.2</td> <td>3.5</td> <td>3.02</td> <td>BDL(M DL:1.0)</td> <td>BDL(M DL:1.0)</td> <td>BDL(M DL:1.0)</td> </tr> <tr> <td>DO</td> <td>mg/L</td> <td>5.88</td> <td>6.35</td> <td>6.09</td> <td>5.68</td> <td>6.25</td> <td>5.91</td> </tr> <tr> <td>Salinity</td> <td>ppt</td> <td>35.24</td> <td>38.88</td> <td>36.39</td> <td>36.15</td> <td>37.38</td> <td>37.06</td> </tr> <tr> <td>TDS</td> <td>mg/L</td> <td>35864</td> <td>36610</td> <td>36225</td> <td>34500</td> <td>37540</td> <td>37077</td> </tr> </tbody> </table>	Parameter	Unit	Surface			Bottom			Min	Max	Avg.	Min	Max	Avg.	pH	--	7.99	8.24	8.17	7.86	8.12	8.01	BOD (3 Days @ 27 °C)	mg/L	98	152	126.91	78	128	106.11	TSS	mg/L	2.2	3.5	3.02	BDL(M DL:1.0)	BDL(M DL:1.0)	BDL(M DL:1.0)	DO	mg/L	5.88	6.35	6.09	5.68	6.25	5.91	Salinity	ppt	35.24	38.88	36.39	36.15	37.38	37.06	TDS	mg/L	35864	36610	36225	34500	37540	37077
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		<p style="text-align: right;">*BDL – Below Detection Limit *MDL – Minimum Detection Limit</p> <p>Please refer Annexure – 5 for detailed analysis reports. Approx. INR 13.37 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ, Mundra.</p> <p>Marine monitoring for west port area is being carried out by M/s. Adani Power (Mundra) Limited (Pre-monsoon & Post-monsoon) through NABL accredited and MoEF&CC authorized agency namely M/s. UniStar Environment & Research Labs Pvt. Ltd. Monitoring reports are also enclosed as Annexure – 5.</p> <p>Summary of ecological parameters of M/s. Adani Power (Mundra) Limited is given below:</p> <p>PHYTOPLANKTON DIVERSITY: Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. During the sampling period (December 2023) the phytoplankton population in the coastal waters of APL-Mundra was diverse and represented with a total of 33 phytoplankton genera (Table 6) belonging to diatoms (28 genera) and dinoflagellates (5 genera). Diatoms Species belonged to Asterionella sp., Chaetoceros sp., Corethron sp., Coscinodiscus sp., Cyclotella sp., Cymbella sp., Ditylum sp., Guinardia sp., Odontella sp., Rhizosolenia sp., Thalassiosira sp., Amphora sp., Amphiphora sp., Bacillaria sp., Cylindrotheca sp., Diploneis sp., Gyrosigma sp., Lauderia sp., Leptocylindrus sp., Licmophora sp., Lithodesmium sp., Navicula spp., Nitzschia spp., Pinnularia sp., Pleurosigma spp, Pseudonitzschia sp., Synedra sp. and Thalassionema sp. The phytoplankton abundance in the study region was ranged from 134 to 262 cells x 10² L-1. The highest phytoplankton abundance was observed at Station 5 in the surface (262 cells x 10² L-1) and then at Station 2 in Surface water (134 cells x 10² L-1). The lowest phytoplankton abundance (134 cells x 10² L-1) was observed at Station 3 in bottom water. The study shows that the marine water around was enriched with the diverse phytoplankton population.</p>

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		<p>BENTHIC DIVERSITY: During the present study, more macrobenthos abundance and biomass were reported at subtidal stations than at intertidal stations at APL-Mundra. The macrobenthos density ranged from 780 no./m² to 1280 nos./m² at sampling stations (Table 10; Figure 7). The biomass of the macrobenthic community in the study region was ranged from 1.47 g/ m² to 2.1 g/ m² in the study region. The maximum abundance of benthic microorganisms was reported at Station 4 (1280 nos./m²). The highest biomass of macrobenthic species was observed at Station 4 (2.1 g/m²). In species composition, Polychaete species (Phylum Annelida) belonging to the family Glyceridae, Paraonidae, Pilargidae, Capitillidae, Cossuridae, Ciratullidae, Nephthyidae, Nereidae, Lumbriconeridae, Spionidae were abundant contributing ~82% to microbenthic population. Overall, the presence of Polychaete, Amphipods, and Nemerteans suggest the availability of food organisms for benthic predators in the area.</p>																																																						
xi	Regular Monitoring of air quality shall be done in the settlement areas around the Project site and appropriate safeguard measures shall be taken.	<p>Complied.</p> <p>Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'23 to Mar'24 is mentioned below:</p> <p>Air sampling locations & frequency: 13 nos. (twice a week including surrounding villages)</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Min</th> <th>Max</th> <th>Average</th> <th>Perm. Limit\$</th> </tr> </thead> <tbody> <tr> <td colspan="6" style="text-align: center;">AAQM</td> </tr> <tr> <td>PM10</td> <td>µg/m³</td> <td>40.8</td> <td>87.32</td> <td>74.67</td> <td>100</td> </tr> <tr> <td>PM2.5</td> <td>µg/m³</td> <td>18.84</td> <td>43.22</td> <td>32.39</td> <td>60</td> </tr> <tr> <td>SO2</td> <td>µg/m³</td> <td>10.5</td> <td>38.91</td> <td>24.46</td> <td>80</td> </tr> <tr> <td>NO2</td> <td>µg/m³</td> <td>14.83</td> <td>44.25</td> <td>29.08</td> <td>80</td> </tr> </tbody> </table> <p>Noise sampling locations & frequency: 10 nos. (once in a month)</p> <table border="1"> <thead> <tr> <th>Noise</th> <th>Unit</th> <th>Leq Min</th> <th>Leq Max</th> <th>Leq Ave.</th> <th>Leq Perm. Limit*</th> </tr> </thead> <tbody> <tr> <td>Day Time</td> <td>dB(A)</td> <td>57.4</td> <td>69.9</td> <td>64.9</td> <td>75</td> </tr> <tr> <td>Night Time</td> <td>dB(A)</td> <td>53.8</td> <td>64.8</td> <td>60.7</td> <td>70</td> </tr> </tbody> </table> <p style="text-align: right;">\$ as per NAAQ standards, 2009 * as per CC&A granted by GPCB</p>	Parameter	Unit	Min	Max	Average	Perm. Limit\$	AAQM						PM10	µg/m ³	40.8	87.32	74.67	100	PM2.5	µg/m ³	18.84	43.22	32.39	60	SO2	µg/m ³	10.5	38.91	24.46	80	NO2	µg/m ³	14.83	44.25	29.08	80	Noise	Unit	Leq Min	Leq Max	Leq Ave.	Leq Perm. Limit*	Day Time	dB(A)	57.4	69.9	64.9	75	Night Time	dB(A)	53.8	64.8	60.7	70
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024												
		<p>Values recorded confirms to the stipulated standards.</p> <p>Please refer Annexure - 5 for detailed analysis reports. Approx. INR 13.37 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ, Mundra.</p> <p>Ambient air quality monitoring in surrounding villages is being carried out by M/s. Adani Power (Mundra) Limited, Mundra through NABL accredited and MoEF&CC authorized agency namely M/s. UniStar Environment & Research Labs Pvt. Ltd. and monitoring reports of the same are also enclosed in Annexure - 5.</p> <p>Following safeguard measures are taken for abatement of dust / fugitive emissions.</p> <ul style="list-style-type: none"> • Regular water sprinkling on road and other open area • Regular cleaning of roads through mechanized equipment • Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts • Use of water mist canon • Closed type conveyor belts • Regular sprinkling on coal heaps with mechanized system • Covering other types of dry bulk cargo heaps • Installation of wind breaking wall • Development of greenbelt along the periphery of the storage yards/back up area • Mechanized handling system for coal and other dry bulk cargo • Wagon loading and truck loading through closed silo 												
xii	Sewage arising in the Port area shall be disposed off after adequate treatment to conform to the standards stipulated by Gujarat State Pollution Control Board and shall be utilized / recycled for Gardening, Plantation and Irrigation.	<p>Complied.</p> <p>Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.</p> <table border="1"> <thead> <tr> <th>Location</th> <th>Capacity</th> <th>Quantity of Treated Water (Avg. from Oct'23 to Mar'24)</th> <th>Type of ETP / STP</th> </tr> </thead> <tbody> <tr> <td>LT</td> <td>265 KLD</td> <td>93.62 KLD</td> <td>Activated Sludge</td> </tr> <tr> <td>West Port</td> <td>55 KLD</td> <td>16.94 KLD</td> <td>FAB</td> </tr> </tbody> </table>	Location	Capacity	Quantity of Treated Water (Avg. from Oct'23 to Mar'24)	Type of ETP / STP	LT	265 KLD	93.62 KLD	Activated Sludge	West Port	55 KLD	16.94 KLD	FAB
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		<p>Third party analysis of the treated water is being carried out once in a month at ETP & twice in a month at West Port by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'23 to Mar'24 is mentioned below.</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Min</th> <th>Max</th> <th>Average</th> <th>Perm. Limit[§]</th> </tr> </thead> <tbody> <tr> <td colspan="6">Industrial Effluent / Sewage (For ETP)</td> </tr> <tr> <td>pH</td> <td>--</td> <td>6.55</td> <td>7.42</td> <td>7.11</td> <td>6.5 – 8.5</td> </tr> <tr> <td>TSS</td> <td>mg/L</td> <td>26</td> <td>48</td> <td>35</td> <td>100</td> </tr> <tr> <td>TDS</td> <td>mg/L</td> <td>970</td> <td>1184</td> <td>1096</td> <td>2100</td> </tr> <tr> <td>COD</td> <td>mg/L</td> <td>82</td> <td>89</td> <td>87.37</td> <td>100</td> </tr> <tr> <td>BOD (3 Days @ 27°C)</td> <td>mg/L</td> <td>24</td> <td>26</td> <td>25</td> <td>30</td> </tr> <tr> <td>Ammonical Nitrogen as NH₃-N</td> <td>mg/L</td> <td>23.8</td> <td>28.4</td> <td>25.8</td> <td>50</td> </tr> <tr> <td colspan="6">Domestic Sewage (For STP)</td> </tr> <tr> <td>pH</td> <td>--</td> <td>7.18</td> <td>7.46</td> <td>7.35</td> <td>6.5 – 8.5</td> </tr> <tr> <td>TSS</td> <td>mg/L</td> <td>23</td> <td>26</td> <td>24.58</td> <td>100</td> </tr> <tr> <td>BOD (3 Days @ 27 °C)</td> <td>mg/L</td> <td>15.5</td> <td>18</td> <td>16.54</td> <td>30</td> </tr> <tr> <td>Residual Chlorine</td> <td>ppm</td> <td>0.69</td> <td>0.86</td> <td>0.79</td> <td>Min. 0.5</td> </tr> <tr> <td>Fecal Coliform</td> <td>MPN/ 100 ml</td> <td>60</td> <td>80</td> <td>74.17</td> <td><1000</td> </tr> </tbody> </table> <p>[§] as per CC&A granted by GPCB Values recorded confirms to the stipulated standards.</p> <p>Monitoring and analysis of ETP and STP treated waste is also carried out regularly through in-house laboratory for the parameters such as pH, TDS, TSS, COD, Chlorides, and residual chlorine.</p> <p>Please refer Annexure - 5 for detailed analysis reports. Approx. INR 13.37 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ Mundra.</p> <p>It is also noted that GPCB is doing regular site inspection along with wastewater sampling and analysis. The last GPCB sample analysis reports were submitted during half yearly EC</p>	Parameter	Unit	Min	Max	Average	Perm. Limit [§]	Industrial Effluent / Sewage (For ETP)						pH	--	6.55	7.42	7.11	6.5 – 8.5	TSS	mg/L	26	48	35	100	TDS	mg/L	970	1184	1096	2100	COD	mg/L	82	89	87.37	100	BOD (3 Days @ 27°C)	mg/L	24	26	25	30	Ammonical Nitrogen as NH ₃ -N	mg/L	23.8	28.4	25.8	50	Domestic Sewage (For STP)						pH	--	7.18	7.46	7.35	6.5 – 8.5	TSS	mg/L	23	26	24.58	100	BOD (3 Days @ 27 °C)	mg/L	15.5	18	16.54	30	Residual Chlorine	ppm	0.69	0.86	0.79	Min. 0.5	Fecal Coliform	MPN/ 100 ml	60	80	74.17	<1000
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		Compliance report for the period of Apr'21 to Sep'21 which shows all the parameters are well within the permissible limit.
xiii	Adequate Plantation shall be carried out along the roads of the Port premises and a green belt shall be developed.	<p>Complied.</p> <p>APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation.</p> <p>The species such as <i>Ficus Infectoria</i>, <i>Ficus religiosa</i>, <i>Terminalia arjuna</i>, <i>Cocos nucifera</i>, <i>Washingtonia fillifera</i>, <i>Casurina spp.</i>, <i>Azadirachta Indica</i>, <i>Eucalyptus spp.</i>, <i>Jatropha curacus</i>, <i>Ficus bengalensis</i>, <i>Subabool spp.</i>, <i>Casia fistula</i>, <i>Date Palm</i> and <i>Delonix regia</i> are grown within APSEZ area.</p> <p>Within the port areas approx. 189.41 hectare of greenbelt having 461349 trees with the density of 2435 trees per hectare is developed till date within port premises. So, far APSEZ has developed 457.99 ha. area as greenbelt with plantation of more than 9.06 Lacs saplings within the APSEZ area.</p> <p>Please refer Annexure - 4 for further details regarding greenbelt development, mangrove afforestation and updated green belt development plan. The spent budget of Horticulture Department for the period of financial year 2023-24 is INR 904 lacs and allocated budget has spent during the FY 2023-24.</p>
xiv	There shall be no withdrawal of Ground Water in CRZ area for this Project.	<p>Complied.</p> <p>APSEZ does not draw any ground water for the water requirement. Present source of water for various project activities is desalination plant of APSEZ and/or water through Gujarat Water Infrastructure Limited (GWIL). Average water consumption for entire APSEZ area is 5.14 MLD during compliance period i.e. Oct'23 to Mar'24.</p>
xv	Specific arrangements for rain water harvesting shall be made in the Project design and the rain water so harvested shall be optimally utilized. Details in	<p>Complied.</p> <p>Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rainwater within project area is managed through storm water drainage.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
	<p>this regard shall be furnished to this Ministry's Regional Office at Bhopal within 3 months.</p>	<p>We have installed Rainwater recharge bore well (4 Nos.) within our township to recharge ground water. Details of the same were submitted along with half yearly EC compliance report for the period of Apr'19 to Sep'19. During FY 2023-24 till Sep'23 monsoon Approx. 4.58 ML of rainwater had been recharged to increase the ground water table.</p> <p>We have also connected roof top rainwater duct of operational building (Tug berth building within MPT) with u/g water tank for utilization of collected rain water for gardening / horticulture purpose. Details of the same were submitted along with EC Compliance report for the period of Oct'18 to Mar'19.</p> <p>However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals.</p> <p>Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up.</p> <p>To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan.</p> <p>Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures.</p> <p>Our water conservation work is as below. Below tabulated Water Conservation Projects completed during Compliance period:</p> <p>Swajal Project:</p> <ul style="list-style-type: none"> ➤ Aim: The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024																																								
		<p>of groundwater levels and reduction in water sources in various parts of Kutch district.</p> <p>➤ Water Security Plan: Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared for the Seven villages.</p> <table border="1"> <thead> <tr> <th>Block Name</th> <th>Water conservation structure</th> <th>Total no. of Structure</th> <th>Total Capacity Created (CUM)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Mundra</td> <td>Check Dam</td> <td>23</td> <td>6,07,332.80</td> </tr> <tr> <td>Pond Deepening</td> <td>66</td> <td>1,89,121.08</td> </tr> <tr> <td>RRWHS</td> <td>275</td> <td>2750</td> </tr> <tr> <td>Recharge Borewell</td> <td>209</td> <td>-</td> </tr> <tr> <td>Percolation Well</td> <td>24</td> <td>-</td> </tr> </tbody> </table> <p>Below tabulated Water Conservation Projects completed during last Compliance period:</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Project</th> <th>Unit</th> <th>Outcome</th> <th>Impact</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Check dam Restrengthening-Nana Kapaya</td> <td>1</td> <td>Water Storage Capacity increased by 48000 Cum</td> <td>60 + farmer's 120+Acre Area of Agri land can be Irrigated</td> </tr> <tr> <td>2</td> <td>Recharge Borewell</td> <td>21</td> <td>Reduce Salinity ingress, and preventing water run</td> <td>150+ farmer's 260+ Acre Area of Agri land for Irrigated</td> </tr> <tr> <td>3</td> <td>Pipe Culvert at Checkdamat Bhujpur</td> <td>1</td> <td>prevent water runoff into seaside.</td> <td>35 farmers' 120+Acre Area of Agri land can be Irrigated</td> </tr> </tbody> </table> <p>Earlier Completed Activities/Projects:</p> <ul style="list-style-type: none"> Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. 	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)	Mundra	Check Dam	23	6,07,332.80	Pond Deepening	66	1,89,121.08	RRWHS	275	2750	Recharge Borewell	209	-	Percolation Well	24	-	Sr. No.	Project	Unit	Outcome	Impact	1	Check dam Restrengthening-Nana Kapaya	1	Water Storage Capacity increased by 48000 Cum	60 + farmer's 120+Acre Area of Agri land can be Irrigated	2	Recharge Borewell	21	Reduce Salinity ingress, and preventing water run	150+ farmer's 260+ Acre Area of Agri land for Irrigated	3	Pipe Culvert at Checkdamat Bhujpur	1	prevent water runoff into seaside.	35 farmers' 120+Acre Area of Agri land can be Irrigated
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. <p>With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Please refer Annexure – 2 for full details of CSR activities carried out by Adani Foundation in the Kutch region.</p>
xvi	Land Reclamation shall be carried out only to the extent that it is essential for this Project.	<p>Complied.</p> <p>Out of approved reclamation area of 1138 ha for west port, 695 ha area is reclaimed and out of approved reclamation area of 700 ha for south port, 665 ha area is reclaimed. Details of the same were submitted along with half yearly</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		compliance report for the period of Apr'17 to Sep'17 and there is no further change.
xvii	No Product other than those permissible in the Coastal Regulation Zone Notification, 1991 shall be stored in the Coastal Regulation Zone area.	Complied. No products other than those permissible in the CRZ Notification 1991 are stored in the CRZ area.

General Conditions

i	Construction of Proposed structures, if any in the Coastal Regulation Zone area shall be undertaken meticulously confirming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification 1991 and its amendments. All the construction designs/drawings relating to the proposed construction activities must have approvals of the concerned State Government Departments/ Agencies.	<p>Complied.</p> <p>All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification.</p> <p>Further, the requisite permissions from Gujarat Maritime Board (GMB), for carrying out construction activities are taken from time to time. Details of the same are mentioned below:</p> <ul style="list-style-type: none"> • Permission for starting construction work for South port vide letter no GMB/N/PVT/711/870 dated 26.02.2009 • Permission for starting construction work for West port vide letter no GMB/N/PVT/711/871 dated 26.02.2009 <p>The copies of these letters were submitted along with half yearly compliance report for the period of Apr'16 to Sep'16.</p> <p>The project has been developed as per Consent to Establish (CtE) and Consent to Operate (CtO) granted by SPCB. The present in-force CtE & CtO are mentioned below.</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Permission</th> <th>Project</th> <th>Ref. No. / Order No.</th> <th>Valid till</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CtE – Amendment</td> <td>LPG Terminal</td> <td>PC/CCA-KUTCH-1437/PCB ID-53331/473995</td> <td>03.10.25</td> </tr> <tr> <td>2</td> <td>CtE – Amendment</td> <td>WFDP</td> <td>17739 / 15618</td> <td>18.05.27</td> </tr> <tr> <td>3</td> <td>CtO - Fresh</td> <td>LPG Terminal</td> <td>AWH-103906</td> <td>27.06.24</td> </tr> <tr> <td>4</td> <td>CtE – Amendment</td> <td>LPG Terminal</td> <td>PC/CCA-KUTCH-1437/GPCB ID-53331/587015</td> <td>01.03.26</td> </tr> <tr> <td>5</td> <td>CC&A - Amendment</td> <td>LPG Terminal</td> <td>PC/CCA-KUTCH-1437/GPCB ID-53331/595228</td> <td>27.06.24</td> </tr> <tr> <td>6</td> <td>CC&A - Renewal</td> <td>West Port –</td> <td>AWH-113458</td> <td>01.02.27</td> </tr> </tbody> </table>	S. No.	Permission	Project	Ref. No. / Order No.	Valid till	1	CtE – Amendment	LPG Terminal	PC/CCA-KUTCH-1437/PCB ID-53331/473995	03.10.25	2	CtE – Amendment	WFDP	17739 / 15618	18.05.27	3	CtO - Fresh	LPG Terminal	AWH-103906	27.06.24	4	CtE – Amendment	LPG Terminal	PC/CCA-KUTCH-1437/GPCB ID-53331/587015	01.03.26	5	CC&A - Amendment	LPG Terminal	PC/CCA-KUTCH-1437/GPCB ID-53331/595228	27.06.24	6	CC&A - Renewal	West Port –	AWH-113458	01.02.27
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4	CtE – Amendment	LPG Terminal	PC/CCA-KUTCH-1437/GPCB ID-53331/587015	01.03.26																																	
5	CC&A - Amendment	LPG Terminal	PC/CCA-KUTCH-1437/GPCB ID-53331/595228	27.06.24																																	
6	CC&A - Renewal	West Port –	AWH-113458	01.02.27																																	

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024				
				WFDP		
		7	CC&A – Renewal	Mundra Port Terminal	AWH-117045	20.11.26
		8	CC&A - Correction	Mundra Port Terminal	PC/CCA-KUTCH-39(8)/GPCB ID 17739/592900	20.11.26
		<p>The permissions mentioned above (Sr. 1 to 6) were submitted along with earlier compliance report submission. The permission copies (Sr. No. 7) were submitted along with half yearly compliance report for the period of Oct'21 to Mar'22. The permission copy (Sr. No. 8) of CC&A – Correction letter was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.</p>				
ii	Adequate provision for infrastructure facilities such as water supply, fuel, sanitation etc. shall be ensured for construction workers during the construction phase of the project so as to avoid felling of trees/mangroves and pollution of water and the surroundings.	<p>Not applicable</p> <p>Most of the construction labours reside in the nearby villages where all basic facilities are easily available. There are no housing requirements for labours inside the project area.</p>				
iii	The project authorities must make necessary arrangements for disposal of solid wastes and for the treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid waste, and noise level etc. must conform to the standards laid down by the competent authorities including the Central/ State Pollution Control Board and the Union Ministry of Environment	<p>Complied.</p> <p>Monitoring of environmental attributes viz. Air, Water, Noise, Soil, etc. is being carried out on regular basis by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi and Approx. INR 13.37 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ, Mundra.</p> <p>Please refer Specific Conditions no. x, xi & xii for further details regarding environmental monitoring.</p> <p>Liquid Effluent & Sewage – It is being treated at decentralized treatment plants and treated water confirming the stipulated norms is being utilized for horticulture purposes within APSEZ. Please refer specific condition no xii above for details regarding the same.</p>				

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
	<p>and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.</p>	<p><u>Waste Management</u> – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste.</p> <p><u>Non-Hazardous Solid Waste:</u> A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, and Glasses, etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plant (M/s. Ambuja Cement Ltd., Kodinar) for Co-processing as RDF (Refused Derived Fuel).</p> <p>APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUV Rheinland India Pvt. Ltd. (valid up to 31.05.2024). Details of the same were submitted along with half yearly compliance report for the period of Apr'21 to Sep'21.</p> <p><u>Hazardous & Other Waste:</u></p> <ul style="list-style-type: none"> • Bio medical waste generated from OHCs and Adani Hospital is being disposed at Common Bio Medical Waste Treatment Facility namely M/s. Distromed Kutch Services Pvt. Ltd., Bhuj. • E – Waste is being sold to GPCB registered recyclers namely M/s. Galaxy Recycling, Rajkot. • Used Batteries are being sold to GPCB registered recyclers namely M/s. Sabnam Enterprise, Kutch and M/s. S K Metal Industries, Rajkot. • Solid Hazardous Waste is being disposed through co-processing / incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau, Safe Enviro Private Limited, Bharuch and/or cement industries of Ambuja Cement Ltd., Kodinar. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<p>Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem - Bhavnagar. It is also being reused within organization for lubrication purpose.</p> <ul style="list-style-type: none"> • Discarded drums / barrels are being sold to authorized decontamination facility i.e. M/s. Jawrawala Petroleum, Ahmedabad. It is also being reused within organization for filling hazardous waste. • Solid hazardous waste i.e. Tank bottom sludge was being sold to authorized recycler namely M/s. Mundra Oil Pvt. Ltd., Mundra for recycling. • Expired paint materials was being disposed by incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau. • Downgrade chemicals generated from cleaning of storage tanks / pipelines were being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar • Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s. Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem – Bhavnagar and water is sent to ETP for further treatment. • However during the compliance period, there was no generation and disposal of Sludge & Filters contaminated with oil, Tank Bottom sludge, Asbestos Waste, Glass wool Waste (Thermal Insulation Material), Downgrade Chemicals, Waste Oil and Expired Paint Material. • Horticulture waste is collected from various green belt areas and it is using for making of manure and manure is being utilizing in horticulture purpose within plant premises. <p>Details of permissions / agreements of hazardous waste authorized vendors were submitted along with pervious half yearly EC Compliance Reports. And there is no further change.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024																																														
		<p>The following table summarizes the waste management practice (from Oct'23 to Mar'24) for different types of wastes at APSEZ:</p> <table border="1"> <thead> <tr> <th>Type of Waste</th> <th>Name of Waste</th> <th>Quantity (MT)</th> <th>Disposal Method</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Hazardous Waste</td> <td>Used / Spent / Waste Oil</td> <td>121.93</td> <td>Sell to registered recycler</td> </tr> <tr> <td>Pig Waste</td> <td>8.69</td> <td>Co-processing at cement industries</td> </tr> <tr> <td>Oily Cotton Waste</td> <td>68.67</td> <td>Co-processing at cement industries</td> </tr> <tr> <td>ETP Sludge</td> <td>5.68</td> <td>Co-processing at cement industries</td> </tr> <tr> <td>Discarded Containers / Barrels</td> <td>3.42</td> <td>Sell to registered recycler</td> </tr> <tr> <td rowspan="5">Non-Hazardous Waste</td> <td>Wet Waste (Food waste + Organic waste)</td> <td>500.32</td> <td>Converted to Manure for Horticulture use / Biogas for cooking purpose</td> </tr> <tr> <td>STP Sludge</td> <td>3</td> <td>Converted to Manure for Horticulture use</td> </tr> <tr> <td>Recyclables Dry Waste / Scrap</td> <td>1211.94</td> <td>After recovery sent for recycling / Reuse within premises</td> </tr> <tr> <td>RDF (Non Recyclable Waste)</td> <td>197.74</td> <td>Co-processing at cement industries</td> </tr> <tr> <td>Horticulture Waste</td> <td>318.44</td> <td>Used for making of manure and utilize for horticulture purpose</td> </tr> <tr> <td rowspan="3">Other Waste</td> <td>E-Waste</td> <td>11.6</td> <td>Sell to registered recycler</td> </tr> <tr> <td>Bio Medical Waste</td> <td>3.72</td> <td>To approved CBWTF Site and registered recylcers</td> </tr> <tr> <td>Battery Waste</td> <td>11.94</td> <td>Sell to registered recycler</td> </tr> </tbody> </table>	Type of Waste	Name of Waste	Quantity (MT)	Disposal Method	Hazardous Waste	Used / Spent / Waste Oil	121.93	Sell to registered recycler	Pig Waste	8.69	Co-processing at cement industries	Oily Cotton Waste	68.67	Co-processing at cement industries	ETP Sludge	5.68	Co-processing at cement industries	Discarded Containers / Barrels	3.42	Sell to registered recycler	Non-Hazardous Waste	Wet Waste (Food waste + Organic waste)	500.32	Converted to Manure for Horticulture use / Biogas for cooking purpose	STP Sludge	3	Converted to Manure for Horticulture use	Recyclables Dry Waste / Scrap	1211.94	After recovery sent for recycling / Reuse within premises	RDF (Non Recyclable Waste)	197.74	Co-processing at cement industries	Horticulture Waste	318.44	Used for making of manure and utilize for horticulture purpose	Other Waste	E-Waste	11.6	Sell to registered recycler	Bio Medical Waste	3.72	To approved CBWTF Site and registered recylcers	Battery Waste	11.94	Sell to registered recycler
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iv	The Proponent shall obtain the requisite consents for discharge of effluents and emissions under the Water (Prevention and Control of pollution) Act, 1974 and the Air (Prevention and Control of pollution) Act, 1981 from the Gujarat Pollution Control Board before	<p>Complied.</p> <p>All construction activities were carried out confirming to the existing rules and regulation and as per the CRZ notification.</p> <p>Please refer General condition no. i for permission granted from state pollution control board regarding the same.</p>																																														

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024									
	commissioning of the Project and copy of each of these shall be sent to this Ministry.										
v	The sand dunes, corals, and mangroves, if any, on the site shall not be disturbed in any way.	<p>Complied</p> <p>There are no sand dunes and corals at the project site. 1254 ha area identified as potential mangrove conservation is being conserved and there is no disturbance to the mangroves in this area.</p> <p>Please refer specific condition no i above for details regarding the same.</p>									
vi	A copy of the clearance letter will be marked to the concerned Panchayat / Local NGO, if any from whom any suggestions /representations has been received while processing the proposal.	<p>Complied.</p> <p>Copy of the clearance letter was marked to the concerned panchayats. A typical proof of the same submitted to Mundra village Panchayat on 21.03.2009 was submitted as a part of compliance report submission for the period Apr'16 to Sep'16.</p>									
vii	The funds earmarked for environment protection measures shall be maintained in a separate account and there shall be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bhopal and the State Pollution Control Board.	<p>Complied.</p> <p>Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level and budget allocation is done accordingly. All the expenses are recorded in advanced accounting system of the organization.</p> <p>Budget for environmental management measures (including horticulture) for the FY 2023-24 is to the tune of INR 1536.48 lakh. Out of which, Approx. INR 1366.78 lakh is spent during the year FY 2023-24. Detailed breakup of the expenditures for the past 3 years is attached as Annexure - 6.</p> <p>Details regarding the past six compliance report submissions are mentioned below:</p> <table border="1"> <thead> <tr> <th>Sr. no.</th> <th>Compliance period</th> <th>Date of submission</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Oct'20 to Mar'21</td> <td>25.05.2021</td> </tr> <tr> <td>2.</td> <td>Apr'21 to Sep'21</td> <td>30.11.2021</td> </tr> </tbody> </table>	Sr. no.	Compliance period	Date of submission	1.	Oct'20 to Mar'21	25.05.2021	2.	Apr'21 to Sep'21	30.11.2021
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024			
		3.	Oct'21 to Mar'22	30.05.2022	
		4.	Apr'22 to Sep'22	30.11.2022	
		5.	Oct'22 to Mar'23	30.05.2023	
		6.	Apr'23 to Sep'23	29.11.2023	
viii	Full support shall be extended to the Officers of this Ministry's Regional Office at Bhopal and the Officers of the Central and State Pollution Control Boards by the Project Proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental Protection activities.	<p>Complied</p> <p>APSEZ is always extending full support to the regulatory authorities during their visit to the project site. All necessary documents are submitted as per the request of the visiting authorities.</p> <p>Last visit of Regional Office, GPCB was done on 09.04.2021 for West Port APSEZL has submitted the reply to the site visit report vide letter dated 12.04.2021. Details of the same were submitted along with half yearly compliance report for the period of Apr'21 to Sep'21.</p> <p>As well as last visit of Regional Office, GPCB was done on 23.03.2022 for Main port & APSEZL has submitted the reply vide letter dated 05.04.2022. Details of the same were submitted along with half yearly compliance period of Apr'22 to Sep'22.</p> <p>Inline to the compliance certification process of Environment Clearance condition of Waterfront Development Plan, RO, MoEF&CC Bhopal had visited the site on 27th & 28th January, 2020 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer MoEF&CC). During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed.</p> <p>Inline to the compliance certification process of Consent to Operates of existing facilities developed under Waterfront Development Plan, RO, GPCB, Gandhidham had visited the site on 17th March, 2021 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer GPCB). During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed.</p>			

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
		<p>Inline to the compliance of MoEF&CC Order dated 18th September, 2015, Joint Review Committee (JRC) comprising officials from various competent authorities visited the APSEZ, Mundra from 1st to 3rd September, 2021 to monitor the progress of implementation of the conditions stipulated in the order. APSEZ provided all requisite information and documents required by the JRC. As per the report received by MoEF&CC vide dated 01.12.2021, there was no non-compliance observed.</p> <p>Inline to the compliance certification process for getting Environment Clearance of Waterfront Development Plan, IRO-MoEF&CC Gandhinagar has lastly visited the site on 18th to 20th December, 2023 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer MoEF&CC). During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed. Copy of submitted action taken report w.r.t. certified compliance is attached as Annexure - 7.</p>
ix	<p>In case of deviation or alteration in the Project including the implementing agency, a fresh reference shall be made to this Ministry for modification in the clearance conditions or imposition of new ones for ensuring environmental protection.</p>	<p>Complied.</p> <p>LNG terminal was initially approved under the Waterfront Development Project. However, the same has been developed by GSPC LNG Ltd. for which, separate EC and CRZ clearance has already been obtained from MoEF&CC by them. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17.</p> <p>LPG terminal was initially approved under the Waterfront Development Project of Adani Ports and SEZ Limited and the same has been developed by M/s. Mundra LPG Terminal Pvt. Ltd., which is 100% subsidiary of APSEZ. Details of the same were submitted along with half yearly compliance report for the period of Oct'17 to Mar'18.</p>
x	<p>The Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.</p>	<p>Point noted and agreed.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
xi	<p>This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection which shall be complied with.</p>	<p>Complied</p> <p>As part of the directions given by MoEF&CC vide order dated 18th Sep, 2015, following studies were proposed.</p> <ul style="list-style-type: none"> • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. <p>Please refer Annexure – B for further details regarding the mentioned studies.</p>
xii	<p>The project proponent shall advertise at least in two local newspapers widely circulated in the region around the Project, one of which shall be in the vernacular language of the locality concerned informing that the Project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forest at http://www.envfornc.in. The advertisement shall be made within 7 days from the date of issue of the clearance letter and a copy of the same shall be forwarded to the Regional Office of this Ministry at Bhopal.</p>	<p>Complied.</p> <p>The original copy of the EC and CRZ clearance was obtained on 10.03.2009 and advertisement (containing informing that the EC and CRZ clearance is accorded to the proposed project and a copy of clearance letter is available with the SPCB and may also be seen at the website of MoEF&CC) was given in The Indian Express newspaper dated 18.03.2009. Copy of the same was submitted along with compliance report submission for the period Apr'16 to Sep'16.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
xiii	The Project proponent shall inform the Regional Office at Bhopal as well as the Ministry the date of financial closure and final approval of the Project by the concerned authorities and the date of start of land development work.	Complied. APSEZ had informed the Regional Office of MoEF&CC at Bhopal as well as MoEF&CC, New Delhi regarding the date of financial closure and the date of start of land development work vide letter sent in August, 2009.
xiv	Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within period of 30 days as prescribed under section 11 of the National Environment Appellate Act, 1997.	Point noted and agreed. This EC and CRZ clearance was challenged in National Environment Appellate Authority. In this matter, Order has also been passed in favour of APSEZ. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17.
4.	The above mentioned stipulations will be enforced among others under the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981, the Environment (Protection) Act 1986, the Hazardous chemicals (Manufacture, Storage & Import) Rules 1989, the Coastal Regulation Zone Notification 1991 and its subsequent amendments and the Public Liability Insurance Act 1991 and the rules made there under from time to time. The project proponent shall ensure that the proposal complies with the	Point noted and Agreed APSEZ is being complied all the conditions said rules and regulations mentioned in EC point no. 4. APSEZ has valid insurance policy under PLI act 1991 as below. 1. APSEZ – Liquid Terminal: Valid till 31.03.2025 2. Mundra LPG Terminal Pvt. Ltd.: Valid till 31.03.2025 The copy of updated/renewed PLI policy of APSEZ – Liquid Terminal & Mundra LPG Terminal Pvt. Ltd is attached as Annexure – 8.

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'23 To : Mar'24
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2024
	provisions of the approved Coastal Zone Management Plan of Gujarat state and the supreme court's order dated 18 April, 1996 in the writ petition No. 664 of 1993 to the extent the same are applicable to this proposal.	

 <p>adani Ports and Logistics</p>	<p>Adani Ports and Special Economic Zone Limited, Mundra.</p>	<p>From : Oct'23 To : Mar'24</p>
<p>Status of the conditions stipulated in Environment and CRZ Clearance</p>		

**Compliance Status of CRZ Recommendation given by GCZMA for the Waterfront
Development Project**

**ANNEXURE - A
CRZ Recommendation Compliance
Report of WFDP**

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2024
Specific Conditions		
1	The provisions of the CRZ notification of 1991 and subsequent amendments issued from time to time shall be strictly adhered to by the MPSEZL. No activity in contradiction to the provisions of the CRZ Notification shall be carried out by the MPSEZL.	Complied. All construction and operation activities are being carried out in line with the CRZ recommendation and permissions granted.
2	All necessary permissions from different Government Departments/ agencies shall be obtained by the MPSEZL before commencing any activities.	Complied. Necessary permissions from competent authority have been obtained before commencing any the activities. Please refer condition no. i & iv of General Conditions of the EC & CRZ Clearance above.
3	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	Complied. All major creeks within the APSEZ area are protected. Please refer specific condition no iii of the EC and CRZ clearance for details regarding this point.
4	The project proponent shall conserve the 1254 ha. of area as committed and proposed in their master plan and shall carry out plantation of various mangrove species in the said area.	Complied. Mangrove conservation area of 1254 Ha is conserved as proposed in the master plan. Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.
5	Massive mangroves plantation activity in at least 300 ha. area shall be carried out within a time frame of 5 years as committed by the project proponent. This would be in addition to the earlier commitment	Complied. Mangrove plantation is already completed during the year 2012-13. Please refer specific condition no. vii of the EC and CRZ clearance for further details.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2024
	for 1200 ha. of mangroves plantation.	
6	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	<p>Complied.</p> <p>No effluent or sewage is discharged in to the CRZ area.</p> <p>Please refer specific condition no xii of the EC and CRZ clearance for details regarding this point.</p>
7	All the recommendations and suggestions given by NIO in their Environment Impact Assessment report for conservation / protection and betterment of environment shall be implemented strictly by MPSEZL.	<p>Complied.</p> <p>Compliance report of environmental management plan and mitigation measures proposed as part of the EIA report is attached as Annexure – 9.</p>
8	The construction and operational activities as well as dredging and reclamation activities shall be carried out in such a way that there is no negative impact on mangroves and other coastal /marine habitat except the proposed approx. 63 ha of area for which the compensation (300 ha.) is proposed.	<p>Complied.</p> <p>All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals.</p> <p>1254 ha area identified as mangrove conservation area is being conserved by APSEZ.</p> <p>Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.</p>
9	The construction activities and dredging shall be carried out under the supervision/monitoring of the NIO or any such institute of repute.	<p>Complied.</p> <p>Construction activities are carried out as per EIA study carried out by NIO with all mitigative measures as suggested. Requisite permissions are taken from competent authorities such as GMB and GPCB. Site visits are being carried out by govt. officers from time to time to ensure compliance of the conditions stipulated in respective permissions. No capital dredging activities are carried out during the current compliance period.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2024
		Please refer condition no. i, iv & viii of General Conditions of the EC & CRZ Clearance above.
10	The dredge material generated during capital dredging shall be used only for reclamation and that to be generated during maintenance dredging shall be disposed of at the place identified by NIO/CWPRS/WAPCOS through appropriate modeling and it shall be ensured that it does not create any negative impacts.	Complied. Entire quantity of dredged material is used for reclamation activities only; no disposal is carried out in the sea. No capital dredging activities are carried out during the current compliance period.
11	Necessary measures including the shore protection activities shall be undertaken to ensure that there are no erosion in surrounding area due to the proposed activities.	Complied. All dredging and reclamation activities are carried out as per EC and CRZ Clearance. For further details regarding the shoreline change study for the Mundra region, please refer specific condition no v of the EC and CRZ clearance.
12	The alignment of the jetties/berths and other structures shall be done after conducting the detailed modeling to ensure that there are no erosion and accretion in the region due to proposed activities.	Complied. Detailed hydrodynamic modeling was carried out by NIO during preparation of the EIA report. All construction activities are being carried out as per the outcome/recommendations of the modeling report. However, a detailed shoreline change assessment study was also carried out. Please refer specific condition no v of the EC and CRZ clearance for further details.
13	The MPSEZL shall contribute financially for any common study or project that may be proposed by this department for environment management / conservation / improvement for the Gulf of Kutchh.	Complied. There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.
14	The construction debris and /or any other type of waste shall not be disposed of into the sea, creek or in the CRZ areas. The construction is	Complied. All construction and operation activities as well as dredging and reclamation activities are being carried

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2024
	over and shall be disposed off in low lying areas in consultation with NIO, NEERI or any such institute of repute.	out as per the EIA report prepared by NIO. The construction debris, if any, is being used for area development outside CRZ area. For details about management of other types of wastes, please refer general condition no. iii of the EC and CRZ clearance.
15	The construction camps shall be located outside the CRZ area and the construction labour shall be provided with the necessary amenities, including sanitation, water supply and fuel and it shall be ensured that the environmental conditions are not deteriorated by the construction labors.	Compiled. Please refer general condition no ii of the EC and CRZ clearance for further details.
16	The MPSEZL shall regularly update their Local Oil Spill Contingency and Disaster Management Plan in consonance with the National Oil Spill and Disaster Contingency Plan and shall submit the same to this Department after having it vetted through the Indian Coast Guard.	Compiled. Disaster Management Plan is updated regularly and the updated DMP was submitted as a part of compliance report for the period Apr'16 to Sep'16. On Site Emergency Response Plan and Crisis Management Plan is in place and implemented. The updated (Aug'23) Onsite emergency plan was submitted during the compliance period Apr'23 to Sep'23 . Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan is being updated on regular basis and the same was last updated on 30.07.2022 is in place and implemented. The latest Oil spill contingency response plan was submitted during the compliance period Apr'22 to Sep'22. . For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2024
		<p>operation since 1996. Oil Spill Contingency Response Plan (OSCRP) is prepared in accordance with the NOSDCP.</p> <p>Latest Regional Level Pollution Response exercise "SWACHCHH SAMUDRA-NW 2023" was carried out by Indian Coast Guard on 25th November, 2023 at Vadinar, Gujarat. All participants from various Oil Handling Agencies and Stakeholders (IOCL- Jamnagar, APSEZ- Mundra, Nayara Energy LTD VOTL- Vadinar, Reliance Industries LTD- Sikka Jamnagar, Essar Bulk Terminal- Salaya and Coast Guard) were participated in this exercise. Details of the same is attached Annexure - 10.</p> <p>Mock drills are conducted regularly by APSEZ. Last Oil Spill Mock drill was conducted on 19.01.2024. Oil Spill Mock Drill report is enclosed as Annexure - 10.</p>
17	<p>The MPSEZL shall participate and contribute for the Vessel Traffic Management System to be developed for the Gulf of Kutchh being developed.</p>	<p>Complied.</p> <p>A VTMS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India.</p> <p>APSEZ is practicing well defined traffic control procedure. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77. Arrival and departure information in Gulf of Kutch is provided to VTMS information cell through an agent or directly by sending an e-mail to vtsmanagergulfofkutch@yahoo.com and vtsgok@yahoo.com.</p> <p>Mundra port has subscribed and taking VTMS feed from Kandla from link www.vts.gov.in.</p>
18	<p>The MPSEZL shall bear the cost of external agency that may be appointed by this Department for supervision/monitoring of proposed activities and the environmental impacts of the proposed activities.</p>	<p>Complied.</p> <p>There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'23 To : Mar'24
Status of the conditions stipulated in Environment and CRZ Clearance		

Annexure – B

Compliance Status of MoEF & CC Order dated 18.09.2015

Based on the report submitted by Sunita Narain committee, MoEF&CC issued a Show Cause Notice (SCN) to APSEZ vide their letter dated 30.09.2013. APSEZ replied to the SCN vide letter dated 14.10.2013. Further, an order (containing 10 directions) was issued by MoEF&CC vide their letter dated 18.09.2015. Compliance to these 10 directions is mentioned below.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
i	The proposal of extension of the validity of environmental clearance granted to the North Port vide letter dated 12.01.2009 will be considered separately at later stage.	<p>Point Noted & Complied</p> <p>After receipt of this order, so far APSEZ has not done any application to MoEF&CC for the proposed North port. The expansion of Waterfront Development plan has been proposed excluding North Port area.</p>
ii	Bocha island, ecologically sensitive geomorphological features and areas in the island and creeks around the island will be declared as conservation zone action plan for its conservation must be prepared. M/s. APSEZ should provide necessary financial assistance for this purpose.	<p>Complied</p> <p>This reply covers condition no ii, iv and v.</p> <p>Based on the MoEF&CC directions,</p> <ol style="list-style-type: none"> 1. APSEZ, vide letter dtd. 19th October 2015 had requested GCZMA, for consideration of project for finalization of ToR for NCSCM. 2. Project was considered on 28th GCZMA meeting, scheduled on 22nd April 2016, where ToR was discussed and agreed, upon. 3. APSEZ, vide its letter dtd. 25th April 2016, submitted the proposal to GCZMA along with Scope of work, as submitted by NCSCM. 4. Service Order was issued to NCSCM vide SO dtd. 29th Aug 2016. Cost of the study as per the NCSCM proposal was 315 Lakh and 100% of payment has already paid to NCSCM. 5. NCSCM has carried out number of site surveys during the period, February 2017 – April 2018 as per the defined scope 6. The study report was submitted to GCZMA (with a copy to MoEF&CC vide letter dated 04.06.2018) for their consideration and recommendation if any. 7. A reminder letter was submitted to GCZMA vide letter dated 4th Jan 2019.
iv	A comprehensive and integrated study and protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary, will be put in place. The	<p>Details of above chronology were submitted along with half yearly compliance report for the period of Apr'19 to Sep'19.</p> <p>The site survey carried out by NCSCM includes:</p> <ol style="list-style-type: none"> 1. Bathymetry survey of creeks 2. Topography survey of intertidal areas 3. Mangrove survey (health and area demarcation)

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
	<p>plan will take note of all the conditions of approvals granted to all the project proponents in this area e.g. the reported case of disappearance of mangroves near navinal creek. The preservation of entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of bocha island up to baradimata and others.</p>	<p>4. Sampling of soil and water for analysis of physico-chemical and biological parameters 5. Tide and currents data collection (including residence time of tidal water) 6. Focus Group Discussions with the community in the close vicinity of the project area</p> <p>In addition to the site surveys, NCSCM has procured satellite images for analysis of mangrove cover.</p> <p>The data collected (through site surveys and analysis of satellite maps) was used as input for mathematical modelling. The modelling studies were carried out to understand the impacts of the development activities. Based on the outcome of the modelling studies the necessary conservation plan for protection of creeks and mangrove areas is prepared.</p> <p>Based on the final study report, outcome is summarized in to following points :</p> <ol style="list-style-type: none"> 1. There is no obstruction to any water stream (creeks / branches of creeks / rivers) 2. The mangrove cover in and around APSEZ was over 2596 ha. There was substantial growth in mangrove cover to the tune of 502 ha (comparison between 2011 and 2019) 3. Mundra has undergone substantial development during this tenure. Hence it can be interpreted that the infrastructure development has not left any adverse impacts on ecology.
v	<p>NCSCM will prepare the plan in consultation with NIOT, PP and GCZMA. In recognition of the fact that the existing legal provisions under the E(P) Act 1986 do not provide for any authority to impose ERF by the government, the plan will be financed by the PP. the implementation</p>	<p>NCSCM study same was submitted to the GCZMA on 04.06.2018. Details of the same were submitted along with half yearly EC Compliance report for the period of Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide email dtd 22nd Sept, 2020 with conditions. Details of the same were submitted along with half yearly compliance report for the period of Oct'20 to Mar'21.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024		
	will be carried out by GCZMA. The monitoring of the implementation will be carried by NCSCM.	Sr. No.	Recommendations	Compliance
		1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"> • APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island. • As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.94%. • This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ. • According to GUIDE Mangrove monitoring study report

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024																	
					<p>November 2023 (was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <ul style="list-style-type: none"> Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). The cost of the said study was INR 23.60 Lacs incurred by APSEZ. <p>Summary of Mangrove mapping and monitoring (from 2011 to 2021):</p> <table border="1"> <thead> <tr> <th rowspan="2">Mangrove mapping Year</th> <th rowspan="2">Mangrove cover total Area (Ha.)</th> <th colspan="2">Mangrove cover area Increased</th> </tr> <tr> <th>Hac.</th> <th>Hac.</th> </tr> </thead> <tbody> <tr> <td>2011</td> <td>2094</td> <td>-</td> <td>-</td> </tr> <tr> <td>2011 to 2016-17</td> <td>2340</td> <td>246</td> <td>11.75%</td> </tr> </tbody> </table>	Mangrove mapping Year	Mangrove cover total Area (Ha.)	Mangrove cover area Increased		Hac.	Hac.	2011	2094	-	-	2011 to 2016-17	2340	246	11.75%
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		Hac.	Hac.																
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2011 to 2016-17	2340	246	11.75%																

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024			
				2017 to 2019 till March	2596
		2019 to 2021 till March	2723	127	4.89
		Total	2723	629	--
		To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.			
	2. Tidal observation in creeks in and around APSEZ	<ul style="list-style-type: none"> APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. The cost of the said activity was INR 1.0 Lacs. 			
	3. Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. The cost of the said activity was Rs. 80000 during the FY 2023-24. The algal removal report is attached as Annexure - 1. 			
	4. Awareness of mangroves importance in	<ul style="list-style-type: none"> Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community 			

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024		
			surrounding communities	<p>regarding importance of mangroves. Adani Foundation provides Good Quality dry and green fodder to 29 Villages. Project is covering total 16000 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg.</p> <ul style="list-style-type: none"> • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. • Grass Land development: 213 acres of gauchar land has been cleaned and allocated for Grass land development with strong Community Contribution and Mobilization. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. • APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on 28th July 2023 to raise awareness of the importance of mangrove ecosystems as “a unique, special and vulnerable ecosystem”. The report of day celebration was submitted along with half yearly

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024			
					<p>compliance report for the period of Apr'23 to Sep'23.</p> <ul style="list-style-type: none"> • Since PhD scholars and students frequently visit this area for study, we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist. • Refer CSR report attached as Annexure - 2.
<p>Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted along with half yearly compliance report for the period of Oct'20 to Mar'21.</p> <p>CZMP of Kutch region has been finalized and published on GCZMA website in the Month of Feb-2022. NCSCM has issued final authorized maps for HTL and CRZ Boundary prepared in line with approved CZMP of Gujarat State as per CRZ Notification, 2011. The details of the maps were submitted along with half yearly compliance period of Oct'21 to Mar'22.</p> <p>As per the approved map of CZMP Kutch region APSEZ has been demarcated the HTL boundary line within APSEZ area. Photographs of the demarcated HTL boundary line was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.</p> <p>After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis for a better review of the mangroves, APSEZ has been issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work was 23.60 Lacs (Including Taxes), which was being paid by APSEZ.</p> <p>GUIDE has been completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of</p>					

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<p>the report of Monitoring and Distribution of the Mangroves was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.</p> <p>According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradi Mata, Navinal, Bocha and Khari creeks and also in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. Hence overall mangrove cover was considered as 2596 Ha in year 2019.</p> <p>Then according to GUIDE Mangrove monitoring study report November 2023 (was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi Mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <p>Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%).</p> <p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024																																					
iii	The violations of specific condition of all the ECs and CRZ clearances, if any, will be examined and proceeded with the provisions of EP Act, 1986 independently.	<p>Complied</p> <p>During the said site visits from various regulatory authorities and as per the compliance certification received, there was no non-compliance observed.</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Authority</th> <th>Date of Visit</th> <th>Purpose of Visit</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>RO, MoEF&CC, Bhopal</td> <td>21st – 22nd Dec, 2016</td> <td>EC Compliance Certification of WFDP</td> </tr> <tr> <td>2</td> <td>RO, MoEF&CC, Bhopal</td> <td>3rd May, 2018</td> <td>EC Compliance Certification of WFDP & MSEZ</td> </tr> <tr> <td>3</td> <td>RO, MoEF&CC, Bhopal</td> <td>3rd & 4th Sep, 2019</td> <td>Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug, 2019 w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015.</td> </tr> <tr> <td>4</td> <td>RO, MoEF&CC, Bhopal</td> <td>27th & 28th Jan, 2020</td> <td>EC Compliance Certification of WFDP</td> </tr> <tr> <td>5</td> <td>SPCB, Gandhinagar</td> <td>17th March, 2021</td> <td>CC&A Compliance Certification of existing facilities developed under WFDP</td> </tr> <tr> <td>6</td> <td>Joint Review Committee</td> <td>1st to 3rd Sep, 2021</td> <td>Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug, 2019 w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015.</td> </tr> <tr> <td>7</td> <td>NEERI, Nagpur</td> <td>21st & 22nd Sep 2023.</td> <td>EC Compliance verification site visit of MSEZ. Copy of EC compliance verification certificate was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.</td> </tr> <tr> <td>8</td> <td>IRO, MoEF&CC, Gandhinagar</td> <td>18th – 20th Dec, 2023</td> <td>EC Compliance Certification of WFDP. During the said compliance verification visit and as per the compliance certification received, there</td> </tr> </tbody> </table>		Sr. No.	Authority	Date of Visit	Purpose of Visit	1	RO, MoEF&CC, Bhopal	21 st – 22 nd Dec, 2016	EC Compliance Certification of WFDP	2	RO, MoEF&CC, Bhopal	3 rd May, 2018	EC Compliance Certification of WFDP & MSEZ	3	RO, MoEF&CC, Bhopal	3 rd & 4 th Sep, 2019	Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22 nd Aug, 2019 w.r.t. compliance verification of MoEF&CC order dated 18 th Sep, 2015.	4	RO, MoEF&CC, Bhopal	27 th & 28 th Jan, 2020	EC Compliance Certification of WFDP	5	SPCB, Gandhinagar	17 th March, 2021	CC&A Compliance Certification of existing facilities developed under WFDP	6	Joint Review Committee	1 st to 3 rd Sep, 2021	Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22 nd Aug, 2019 w.r.t. compliance verification of MoEF&CC order dated 18 th Sep, 2015.	7	NEERI, Nagpur	21 st & 22 nd Sep 2023.	EC Compliance verification site visit of MSEZ. Copy of EC compliance verification certificate was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.	8	IRO, MoEF&CC, Gandhinagar	18 th – 20 th Dec, 2023	EC Compliance Certification of WFDP. During the said compliance verification visit and as per the compliance certification received, there
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024			
					<p>was no non-compliance observed. Copy of submitted CCR & action taken report w.r.t. certified compliance is attached as Annexure - 7.</p>
vi	<p>There will be no development in the area restricted by the High court of Gujarat. APSEZ shall abide by the outcome of the PIL 12 of 2011 and other relevant cases.</p>	<p>Complied</p> <p>The order passed by Hon' ble high court in context of PIL 12 of 2011 vide dated 10th Nov 2011. Subject PIL has been disposed off by Hon'ble High Court vide their order dated 17.04.2015 and now there is no restriction on development in the subject area. The order reads as <i>"In view of the aforesaid discussion, we do not find any merit in this writ petition. This writ petition fails and is accordingly dismissed. No order as to cost."</i> Copy of the order was submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18.</p> <p>Considering the above status and in line to submission of compliance of all the directions under this order, this condition is closed.</p>			
vii	<p>APSEZ will submit specific action plan to protect the livelihood of fishermen along with budget.</p>	<p>Complied.</p> <p>Adani Foundation (AF) is the CSR arm of the Adani Group actively working for upliftment of the communities in the surroundings of various project sites of Adani Group. AF has prepared a specific action plan to protect livelihood of fishermen at Mundra.</p>			

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<p>Various initiatives, as stated below are discussed in detail in the report namely "Silent Transformation of Fisher folk at Mundra". Said report also includes the information related to the planned expenses to the tune of approx. 13.5 Cr. INR for various initiatives for the next five years (2016 – 2021) (Budget details provided in Page No. 68 of report). Copy of the same is already submitted to MoEF&CC vide our letter dated 10.09.2016.</p> <p>Till, Mar'24 approx. 14.61 Cr. INR, has already been invested fisherfolk livelihood. Further, details regarding the expenditure incurred against the commitment are attached as Annexure – 11.</p> <p>APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes:</p> <ul style="list-style-type: none"> ❖ Vidya Deep Yojana Developing school preparedness programme and empowering balwadis at fisherfolk settlement Under this scheme, 4 balwadis at different settlement has been constructed. This programme include nutrition food, hygiene, awareness of health, cleanliness, discipline, regularity and development of basic age appropriate conception ❖ Youth employment: Our main objective is to offer sustainable employment opportunities to the local fishing community in APSEZ Mundra. We bridge the gap between industries and Fisherfolk youth by facilitating job placements. ❖ Currently, we have successfully engaged a total of 12 Fisherfolk youth in this endeavor. ❖ Vidya Sahay Yojana – Scholarship Support All basic education supportive facilities have been created to promote education in fisher folk community. We are deeply committed to empowering the future of fisherfolk communities through education. To this end, we provide scholarship support to 30 deserving students, covering their actual school fees. In our unwavering commitment to promoting gender equality and advancing girl child education, we extend 100% fee support to female candidates and 80% to male candidates." ❖ Adani Vidya Mandir Children of the family with the income of salary less than 1.5 lac/annum are admitted.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<p>School focusses on nutrition food, uniform and other services to the children for free.</p> <ul style="list-style-type: none"> ❖ Fisherman Approach in SEZ After due consultative process, APSEZ has provided 7 fishermen access roads for to approach to the sea for fishing activity. ❖ Machhimar Arogya Yojana The Fisher folk communities are disposed to several water and air abided diseased due to exposure to unhygienic working conditions. Frequently Special Health care Camps are organized at Vasahat. Our Mobile health care unit van regularly visit fisher folk settlements. ❖ Machhimar Kaushalya Vardhan Yojana Based on need assessment a number of trades were introduced through the Adani Skill Development Centre in Mundra, where in fisher folk youth could join and get a number of technical and non-technical training ❖ Machhimar Sadhan Sahay Yojana Fishing material support was provided by AF at Mundra as per the requests of Pagadiya fishermen. According to their needs, fishing nets, ropes, buoys, ice boxes, crates, weighing scales, anchors, solar lights etc., were provided. ❖ Machhimar Awas Yojana Shelters, equipped with basic facilities of a toilet. and pure drinking water have been constructed for living while fishing and to provide a healthy and hygienic residence. ❖ Machhimar Shudhh Jal Yojana This scheme of providing potable water has helped in reducing the drudgery of women and contributed largely towards general wellbeing. ❖ Sughad Yojana Toilets for men and women are constructed at all three Vasahats. Infrastructure was accompanied with continuous awareness campaign on hygiene sanitation and use of toilets in particular. ❖ Machhimar Akshay kiran Yojana Solar street lights at each settlement have been installed. For fish landing shed and school extension room have been fitted with solar invertor allowing late evening video shows for awareness and fish sorting work at ease. ❖ Machhimar Suraksha Yojana Distance Alarm Transmission System – DATS' project was introduced in order to promote safety of the fishermen. Forced to

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024				
		<p>be at sea to earn their livelihood puts the lives of many fishermen at risk.</p> <ul style="list-style-type: none"> ❖ Machhimar Ajivika Uparjan Yojana Mangrove plantation in the area as means of alternate income generating activity for the fisher folk community during the non-fishing months. During the non-fishing months, the fishermen under usual circumstances were benefited by other alternate economic activity to sustain them. ❖ Bandar Svachhata Yojana Waste bins have been provided for proper collection and segregation of waste. <p>Further, APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation. Adani Foundation is working in main five persuasions as below.</p> <ul style="list-style-type: none"> ❖ Education ❖ Community Health ❖ Rural Infrastructure ❖ Sustainability Livelihood ❖ Skill Development <p>Brief information about activities in the main five persuasions is mentioned below. Activities carried out for the same are summarized as below.</p> <table border="1"> <thead> <tr> <th>Area</th> <th>Activity</th> </tr> </thead> <tbody> <tr> <td>Community Health</td> <td> <ul style="list-style-type: none"> • Mobile Health Care Units and Rural Clinics • 07 Rural Clinics • 05 villages of Mundra & 02 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 23327 (direct & indirect) by Mobile van and rural clinic. • 2 financially challenged patients has been supported with Dialysis treatment at 124 Times which added day in their Life. • Provided 41,546 medical health services and conducted health awareness camps for 763 High school students. </td> </tr> </tbody> </table>	Area	Activity	Community Health	<ul style="list-style-type: none"> • Mobile Health Care Units and Rural Clinics • 07 Rural Clinics • 05 villages of Mundra & 02 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 23327 (direct & indirect) by Mobile van and rural clinic. • 2 financially challenged patients has been supported with Dialysis treatment at 124 Times which added day in their Life. • Provided 41,546 medical health services and conducted health awareness camps for 763 High school students.
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		<ul style="list-style-type: none"> • Cataract-Free Mundra: The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below. Lives Impacted: - 1131 <ul style="list-style-type: none"> > Comprehensive Eye Screenings at Village level > Cataract Surgeries to GKGH ,Bhuj > Post-Operative Care and Follow-up > 5 successful Operation <p>Health camp:</p> <ul style="list-style-type: none"> • Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and other are conducted in core villages as well as in labour colonies. • Specialty health (Gynec, ophthalmic, specialty health camp): - 5795 Patients Benefited. • General health camp: -1618 Patients benefited. • Blood Donation Camp: 1715 people have donated blood. • Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being. • Women's Health: Provided health services to more than 2610 women benefitted through Menstrual & Mental Health Awareness Drive. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 124 Times which added day in their Life. • Medical Supports: 1 007 beneficiary in 35 village. <ul style="list-style-type: none"> • International year of Millets - 2023: To promote millet culture and raise awareness about its benefits in Mundra, we organized a

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<p>Millet Competition across nine villages. Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this initiative, 300 indigenous millet recipes were showcased, highlighting the potential for sustainable and nutritious dishes in our daily diets.</p> <ul style="list-style-type: none"> • Ayushman card facilitation: Ayushman card issued to 6865 for 25 village of 686.50 Cr. health insurance. Preventive health Campaign The Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body. • Sample Survey Report 2023-24 <ul style="list-style-type: none"> ○ 55% Never heard about Menstrual hygiene ○ 60% Are using cloths on regular basis ○ 36% Had never used sanitary pads ○ 68% Had no information about UTI ○ 30% Never used millets in their diet ○ 60% Never heard about millets or it's benefits • 2222 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 7 villages and Super specialist camp which benefitted more than 4690 patients of Mundra & Mandvi Taluka. • Cattle Health Camp: Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages with total 18903 cattle benefitted and 18870 cattle vaccinated. Total 982 cattle owners benefitted for Preventive Health Care & Fodder Support Program

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024	
	Sustainable Livelihood – Fisher folk, Agriculture & Women		<p>Overall Persistent efforts for Fisherman development:</p> <ul style="list-style-type: none"> • 598 Education Kit Support • 273 Fisherman Shelter Support • 1,247 Vehicle transportation support of Mundra and Mandvi taluka • 106 Cycle Support to high school going students • 613 Scholarship Support • 419 Youth Employment • 195 Linkages with Fisheries Scheme • 3,534 Ramatotsav Community Engagement • 56,523 Man days Mangroves Plantation <p>Empowering Fisherfolk Communities through Education:</p> <ul style="list-style-type: none"> • Vehicle Transportation Facilities: 146 Students supported Mundra Taluka and 58 Students supported at Mandvi Taluka during the compliance period • Education Kits Support: Education Kits including notebooks, guides, and bags, to fisherfolk students studying in 9th to 12th standard to enhance their learning experience (57 nos. students benefitted). • Educational Awareness Sessions: Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on advancing girl-child education. (487 Students motivated for high school Education). • Scholarship Support: Provide scholarship support to 31 deserving students, covering their higher secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates. • Cycle Support: Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease.

Status of the conditions stipulated in Environment and CRZ Clearance

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		<ul style="list-style-type: none"> • Assisting During Emergencies: Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery. (336 Fisherfolk house benefited) • Fostering Youth Employment: At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future. (115+ Fisherfolk youth employed) • Strengthening Fisherfolk women: Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support. (449 Women benefited) • Potable Water Distribution: Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity. (5000+ Population benefited). <p>Sustainable Livelihood - Agriculture: During compliance period This year, the Adani Foundation continued its strong commitment to advancing natural farming in Mundra. Through various initiatives and partnerships, we provided crucial support to local farmers, empowering them with knowledge and resources to transition to sustainable practices.</p> <ul style="list-style-type: none"> • 2200+ Farmers educated in natural farming

Status of the conditions stipulated in Environment and CRZ Clearance

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		<ul style="list-style-type: none"> • 800+ Farmers embracing natural farming methods • 200 Farmers got financial assistance of Rs. 10,000 • 3 District level exposure visit • ₹ 36.7 lakh Business done by our benefited Farmers <p>Promoting Natural Farming:</p> <ul style="list-style-type: none"> • Training: Conducted training for 1250 farmers in 16 villages, enlightening them about the harmful effects of chemical fertilizers. Demonstrated how to produce organic fertilizer using household products, emphasizing its benefits and cost-effectiveness. After adopting it, they witnessed its positive effects on their fields. • Kitchen Garden Kit: We have supported vegetable kitchen garden kits to 500 farmers with the aim to enable them to grow fresh and nutritious, chemical-free vegetables. This will enhance their food security and promote self-reliance. • Empowering Farmers: This year, amidst the aftermath of the cyclone, we stood by our farmers and held dedicated meetings with KVK, KCS, and DRC to restore the fallen date trees. Collaboratively, provided JCB, technical support, organic fertilizer etc. Successfully restored 615 trees. Each Date trees is projected to yield approximately Rs. 25,000, Total Yield in Next Season:- Rs.1.53 Cr. • Financial Assistance: Extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. This fund will help farmers in planting a total of 53,136 fruit-bearing plants. <p>Raj Shakti Prakrutik Kheti Sahkari Mandali:</p>

Status of the conditions stipulated in Environment and CRZ Clearance

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		<ul style="list-style-type: none"> • Appreciation by Governor: Governor of Gujarat, Shree Acharya Devratji, encouraged 25 of our farmers practicing natural farming at the Krushi and Dairy Expo event in Bhuj. • Exposure Visits Certification by GOPCA: Our farmers embarked on three eye-opening exposure visits to Gautech-2023, • Certification by GOPCA: We have successfully certified 28 farmers under the Gujarat Organic Products and Certification Agency (GOPCA). <p><u>Kutch Kalptaru FPO (KKPC) and Prakrutik Mandli</u></p> <ul style="list-style-type: none"> • To promote horticulture, the Kutch Kalptaru FPO (KKPC) was established in 2020 by farmers from Mundra Block to address various challenges they faced. With an initial 350 shares held by 280 shareholders, the company is now expanding to include up to 5000 farmers and 537 registered shareholders. (800 Farmers benefited and ₹ 33.67 lacs Turn over) • 19 nos. of Market Linkage for supporting to Green carnival at Samudra Township & Shantivan colony Now 302+ farmers are collaborated with Mandli. Total Green Carnivals 37, Total Sell 8,623 kg and Revenue generated ₹ 30184805. by connecting directly with consumers, they've seen a remarkable 35% increase in their income. • Adani Foundation has also provided 14.38 lacs kg Dry Fodder and 45.85 lacs kg Green fodder in 31 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24. • Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 15005 Cattels / 2070 farmers and hence enhancing cattle productivity during FY 2023-24.

Status of the conditions stipulated in Environment and CRZ Clearance

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		<ul style="list-style-type: none"> • Grass Land development: AF converted 18 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara, Siracha, Gundal , Kukadsar village to transform into Fodder Sustain village during FY 2023-24. <p>Women Empowerment:</p> <ul style="list-style-type: none"> • Self Help Groups (SHGs): Established 82 self-help groups in various rural and urban areas to provide financial and social support to women We provided training and capacity building workshops to members of these SHGs to help them develop income generating activities and improve their livelihoods Through this initiative, we have empowered over 850 women to become self-reliant with Savings of more than Rs 35 Lacs. • Making SHG Self Reliant: <ul style="list-style-type: none"> ➤ 16 SHG are on pathways of self-reliance. ➤ Various handicraft, dry and fresh food making, stitching, tie and die etc. ➤ 175+ women - Monthly average income @ 7000 of each member over Month. • Job Sourcing – Govt: <ul style="list-style-type: none"> ➤ 11 Women supported for application and process of Gram Rakshak Dal, Bank Sakhi, Bima Sakhi and Professional Resouce Person. ➤ Average income 4200 Per Month. • Job Sourcing – Private: <ul style="list-style-type: none"> ➤ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company. ➤ 398 Women supported till date for job sourcing of more than 18 villages. ➤ Average income 10200 Per Month. • Social Empowerment: <ul style="list-style-type: none"> ➤ 2 Livlihood Enhancement Training through RSETI. ➤ Financial support for business set up.

Status of the conditions stipulated in Environment and CRZ Clearance

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		<ul style="list-style-type: none"> ➤ Legal rights and domestic violence workshops. ➤ Family counselling for Job sourcing. • During FY2023-24 Approx. INR 122.32 lakh were spent for Fisherfolk Amenities work in different core areas. • Till FY 2023-24 Adani Foundation has done total expenditure of INR 1460.50 lakh for Fisherfolk Amenities work in different core areas. • Skill Development and Income Generation – Adani Foundation is working with 82 Self-help group and supporting to develop entrepreneur skills to become self-reliant, sourcing more than 850 women to absorb in various job. <p>Previous development activities:</p> <ul style="list-style-type: none"> • Cement Roof Sheet Support: fisherfolk Home were significantly damaged by the Bipor Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery." • Potable water Distribution: Providing access of potable Drinking water Facilities to Nine sherfolk vasahat on Daily bases, either By Water tanker or Linkage with Nearest Gram panchayat. • More than 5000 Fisherfolk Population are getting benefit which impact on their health and efficiency. • Water distribution to Luni & Bavadi Bandar Fishfolk Vasahat: 35000 KL water for 936 people. • Sagar Mitra Card: Introduced the 'Sagar Mitra Card' to simplify access for Fisherfolk to specific fishing routes within APSEZ. This digital card is connected to a digital punching machine located at designated entry points. Initially, we have implemented this system for

Status of the conditions stipulated in Environment and CRZ Clearance

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			<p>Navinal Fisherfolk, and so far, we have issued a total of 57 Sagar Mitra Cards."</p> <ul style="list-style-type: none"> • Government scheme Awareness session was held in association with Fisheries department Bhuj to facilitate pagadiya fishermen by providing fishing kits to seven Fishermen. The coordination was made by Adani Foundation to process application. • Organic Vegetable Shop Inauguration: Adani Foundation is promoting natural farming in Mundra through the "Rajshakti Prakrutik Kheti Sahkari Mandali," a group of 32 farmers. They opened a shop on May 24th to sale their produce in the open market. • 257 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. • Supported 1500 farmers for barrel & wormi compost. 										
		Education	<p>Initiatives Under Utthan Project:</p> <table border="1"> <thead> <tr> <th>Utthan Initiatives</th> <th>Benefited</th> </tr> </thead> <tbody> <tr> <td>Strengthening government Primary & High schools</td> <td>31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.</td> </tr> <tr> <td>Appointing an Utthan sahayak</td> <td>70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.</td> </tr> <tr> <td>Mainstreamed Progressive learner</td> <td>Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.</td> </tr> <tr> <td>Providing required resources and facilities</td> <td>Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.</td> </tr> </tbody> </table>	Utthan Initiatives	Benefited	Strengthening government Primary & High schools	31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.	Appointing an Utthan sahayak	70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.	Mainstreamed Progressive learner	Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.	Providing required resources and facilities	Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.
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		<p>Adani Vidya Mandir, Bhadreswar</p> <ul style="list-style-type: none"> • Empowering Communities through Free and Compulsory Education: We are empowering economically disadvantaged families through free and quality education. In the academic year 2023-24, it proudly serves a student population of 604, with 174 students hailing from fisher-folk communities. 24 dedicated teachers are there in school. • Achievement in sports: <ul style="list-style-type: none"> ➤ In August 2023, students of AVMB engaged in block-level sports competitions, excelling in Athletics, Kho-Kho, and Yoga. Team of AVMB: U14 & U17 boys secured 1st place in Kho-Kho and progressed to the district level. ➤ Notably, Abzal Reliva, a Class X student, clinched 1st position in Shot Put, and Hardev Jadeja from Class IX achieved 1st rank in Long Jump earning the opportunity to represent Mundra block at the district level • Achievement in Arts: <ul style="list-style-type: none"> ➤ An Essay and Quiz Competition arranged by TATA BUILDING INDIA was organized on the theme of "Recycle". 81 students of AVMB participated. ➤ 06 Students of Class VI to VIII appeared in PRARAMBHIK VISHARAD examination conducted by BRIHAD GUJARAT SANGIT SAMITI on 14/12/2023, School is waiting for the result. ➤ 19 Students of Class V to IX wrote inspirational stories in Gujarati language all the stories were submitted to a published in "GULSHAN" magazine in 10th edition on 11/10/2023. • Training Skill Development: Adani Skill Development Centre (ASDC) is dedicated to enhancing employability and

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			<p>entrepreneurship. This year, ASDC has trained 50,00 individuals across Kutch, resulting in 65% livelihood generation. ASDC's vision is to make everyone skilled and employable, meeting industry demands through trained manpower.</p>																				
	<p>Rural Infrastructure & Environmental Sustainability</p>		<p>Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area.</p> <p><u>WORK COMPLETED</u> Below tabulated Water Conservation Projects completed during Compliance period:</p> <p><u>Water Conservation Projects:</u> <u>Swajal Project:</u></p> <ul style="list-style-type: none"> ➤ Aim: The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district. ➤ Water Security Plan: Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared forl the Seven villages. <table border="1"> <thead> <tr> <th>Block Name</th> <th>Water conservation structure</th> <th>Total no. of Structure</th> <th>Total Capacity Created (CUM)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Mundra</td> <td>Check Dam</td> <td>23</td> <td>6,07,332.80</td> </tr> <tr> <td>Pond Deepening</td> <td>66</td> <td>1,89,121.08</td> </tr> <tr> <td>RRWHS</td> <td>275</td> <td>2750</td> </tr> <tr> <td>Recharge Borewell</td> <td>209</td> <td>-</td> </tr> <tr> <td>Percolation Well</td> <td>24</td> <td>-</td> </tr> </tbody> </table>	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)	Mundra	Check Dam	23	6,07,332.80	Pond Deepening	66	1,89,121.08	RRWHS	275	2750	Recharge Borewell	209	-	Percolation Well	24	-
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024																							
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • 377 - AC Roof sheet support to Fisherfolk Vasaha 1700+ Benefited. • 2 Development of Common Gathering flooring work – 4000+ Benefited. • 195 Stall – Vegetable market– 900+ Benefited. • Solar Panel System at Mundra – 600+ Benefited.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> • Maintenance, Fencing & Material Support - 30+ Benefited. • Renovation of Shed at Shekranpir Bhopavandh - 2000+ Benefited. • 40 RRWHS structure have been completed. • Total 229 nos. Bore-well recharging activity is completed Percolation well Recharging work at Bhadiya & Mota Kandgra village. • Sluice gate Construction to Control Flood during Flooding at Khoydivadi Vistar Bhujpur. • Pond Beatification and Bund Strengthening at Bhujpur village. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • commissioning of Community Training Centre at Shekhadiya. • Two Pond Deepening at Zarpara under Amrut Sarovar Yojna. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • JCB & Hitachi Machine Support for Pre-Moonson activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • 3 Re-strengthening of Approach Road. • Renovate Blood storage Lab CHC Mundra Renovation Blood storage Lab CHC Mundra. • Constructed 2 nos. of CC Road of 700 mtr. • Constructed Community Training center Shekadiya. • Constructed 2 nos. Disable Widow Toilet Block • Installed R.O. Plant at Mokha with capacity 1000ltr /HR. • Constructed 4 nos. Common gathering Open Shed • Constructed 03 nos. of Water Tank at Luni Bandar.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> • Developed of Cricket Ground at Hatdi Village <p><u>Environment sustainability projects till compliance period:</u></p> <ul style="list-style-type: none"> • Dates Tree -Restoration: Biparjoy cyclone has damaged huge number plants of Dates, Mango, Sapota. In coordination with Kutch Crop Services and Krishi Vigyan Kendra – more than 615 plants are restored till date and continue. • Miyawaki Forest Development, Nana Kapaya - Native species planation in the 2 acre area at Nana Kapaya village creating a flourishing mini-forest with 5,508 trees. • “Adani Van”: Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 23,000 trees were planted. Second example Momai Mata temple, Desalpar 10,000 trees were planted. Third Example Matiyadada at Bhujpur 8000 trees were planted. Fourth example Rasha pir, Dhruh 2-acre 5000 tree planted. Thus, in PPP Model 4 Adani Van were developed where 46,000 trees were planted. • Prakruti Rath: This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 46,750 sapling distribution to individuals, we have empowered communities to take ownership of their surroundings, leading to a heightened consciousness about the environment's significance. • Till the date Total 1.49 Lac tree plantation have been done that has enriched the local ecosystem and significantly contributed to carbon sequestration • Smruti Van – Plantation more than 47,000 sapling with more than 115 species through Miyawaki methodology.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024	
			<ul style="list-style-type: none"> • Ecosystem Restoration, Guneri – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years. The site visit and soil samplings conducted by GES team. Regular bi monthly meeting conducted to assess the annual phase wise growth of ongoing activities. • Multi-Species Mangrove Park - Adani Foundation at Mundra's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hecter plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE, • Mangroves Biodiversity Park within one year • Home biogas - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Total 583 farmers are supported with Biogas as sustainable environment protection
		Skill Development	<p>Over the previous few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training in those areas in partnership with various colleges and institutes.</p> <p><u>ASDC Mundra Center Activities & Achievements:</u></p> <ul style="list-style-type: none"> • Women Empowerment through Skill Training: Provided Mud work training to 180 women in Mundra taluka villages supported by MPL. • RTG Crane Operator Training: Collaborated with APSEZ HR Team to train 79 students.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> • Dori Work and Hand Embroidery Training: Benefited 90 women in various Mundra villages supported by MPL. • Health Awareness and Career Sessions: 108 Ambulance Department enlightened GDA trainees at Adani Institute of Medical Sciences. Guest session on career advancement led by Mr. Kapil Goswami. • Exposure Visit for Women: Women trained in Mud Work, Dori Work, and Hand Embroidery showcased their skills during a visit by foreign delegates to the Solar Plant. • Women's Related Training Seminar: Held at Matr Vandana College, Bidada, Mandvi. <p><u>ASDC Bhuj Center Activities & Achievements:</u></p> <ul style="list-style-type: none"> • Commendation from Shree Jeet Adani: Received appreciation for supporting the Divyang job fair. • Employee Development Initiatives: Conducted Advanced Excel training for 18 Sumitomo India Ltd employees • Entrepreneurship Development Program: Organized a comprehensive 12- day program with 60 diverse candidates. • New Trainee Orientation: Conducted sessions about SAKSHAM center and LMS registration at the Bhuj Centre. • Civil Defense Training (5 days): Covered essential topics including Disaster Management, First Aid, 181 Mahila Helpline, 108 Emergency Services, and Fire Safety. • F&B & Housekeeping Batch Inauguration: 92 students trained to enhance employability. • Indo-Euro Project Seminar: Arranged at various Nursing Colleges in Kutch District. Focused on German Language training and job placements. • Crucial Meeting with ISAR & UNICEF: Discussed future skill development challenges and transgender equality on 9th December 2023.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024	
			<p>Total 734 nos. in ASDC Mundra Center and 405 nos. in ASDC Bhuj Center male & female trained in various skill development programme.</p>
viii	<p>APSEZ will voluntarily return the grazing land, if any, in their possession.</p>		<p>Point noted.</p> <p>All lands are acquired through proper procedure prescribed by State Government. However, APSEZ has agreed for voluntarily giving land back to Zarpara village for the purpose of Gauchar. Land has been identified in the presence and confirmation of Gram Panchayat. Necessary procedure has been initiated by APSEZ vide its letter dated 09th Aug 2012 with concerned revenue authority with respect to surrender of gauchar land at village Zarpara. Same has been taken up by revenue department for necessary procedure of transfer and is under process. Details of the same were submitted along with half yearly compliance report for the period of Apr'19 to Sep'19.</p> <p>As per recommendations given in Joint Review Committee visit report dated 1st December 2021, APSEZ has been approached M/s. Indian Grassland and Fodder Research Institute (IGFRI), Jhansi to get the consultancy work for enhancing / upscaling the forage production in Gauchar Land at Zarpara in 400 acres. Proposal has been received from IGFRI was submitted along with half yearly compliance report for the period of Apr'22 to Sep'22.</p> <p>The officials of M/s. Indian Grassland and Fodder Research Institute (IGFRI), Jhansi have visited at proposed Gauchar Land development site at Zarpara village dated 8th to 10th May 2023 for site survey work and according guidance & suggestion of IGFRI, APSEZ will start the work for developing the Gauchar Land. IGFRI has provided site visit report with technical recommendation. Final Report with conclusion / recommendations from IGFRI and updated compliance report of its recommendation is attached as Annexure - 12.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
ix	A regional strategic impact assessment report with a special focus on Mundra region will also be prepared. The cost towards these studies will also be borne by PP.	<p>Complied</p> <p>This reply covers direction no ix and x.</p> <ol style="list-style-type: none"> 1. APSEZ vide its letter dtd. 24th Feb 2014 has submitted draft ToR for preparation of CIA report to GCZMA for their approval. 2. GCZMA vide its letter dtd. 19th Dec 2014, has approved ToR for CIA. 3. Based on the ToR finalized by GCZMA (as per the instructions of MoEF&CC) for carrying out regional impact assessment study, APSEZ awarded the work to NABET accredited consultant M/s. Cholamandalam MS Risk Services Ltd. to carry out the studies, vide SO dtd 10th Feb 2016 as stated in these directions. 4. Primary baseline environmental monitoring data collection during March – June 2016 and published secondary data on various environmental attributes have been considered for the study. 5. The study has been concluded and the final report was submitted to GCZMA and MoEF&CC for their consideration vide our letter dated 30.04.2018. 6. Reminder letter has been submitted to GCZMA for their comments and consideration vide letter dated 4th Jan 2019. <p>Details of above chronology were submitted along with half yearly compliance report for the period of Apr'19 to Sep'19.</p> <p>Total cost of the study is approx. INR 1.3 cr. which is financed by APSEZ.</p> <p>The stated study was carried out in following 3 phases.</p> <ul style="list-style-type: none"> • Baseline data collection and review of the past EIA reports and clearances issued to APSEZ. • Mathematical modelling and other technical studies for identification of potential impacts (for the year 2030) of the approved and existing project activities. • Development of macro level EMP for the phase wise implementation of actionable points. <p>As part of the study, following modelling exercises / technical studies have been carried out to study the impacts on all environmental attributes:</p> <ul style="list-style-type: none"> • Ambient air quality • Marine (Hydrodynamic, Thermal & Salinity dispersion, Sediment transport) • Noise level
x.	In the subject matter of thermal power plant, the proposed regional strategic Impact assessment analysis will take In to account salinity aspect along with its potential environmental Impact to suggest future corrective actions as well as the guiding tool on extension and addition of the capacities.	

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<ul style="list-style-type: none"> • Traffic assessment • Oil spill contingency plan • Water resource and salinity ingress • Land Use / Land Cover • Socioeconomic, Regional infrastructure • Waste management • Ecology, Bio diversity and Fisheries • Shoreline change assessment <p>Preparation of these reports require extensive use of modelling software and study of the available information / research reports to assess the impacts on individual attribute of environment. Based on the modelling outcomes and findings of the technical studies, a macro level environment management plan is prepared.</p> <p>Inline to the present stage of the project, APSEZ is already complying, as per Environment Management Plan and further recommendations, applicable to APSEZ as mentioned in the EMP, wrt Traffic Management Plan, Ground water quality management, Salinity ingress programme, Air and Noise quality Management, Surface and Marine water quality management, Ecology and Biodiversity Management, Solid & Hazardous waste management, Socio-economic Management and Shoreline Management, will be implemented in phase wise manner as per the progress of development within the boundary limits of APSEZ.</p> <p>The final CIA Report was prepared inline to the ToR by Chola MS and the same was submitted to the GCZMA on 30.04.2018. Details of the same were submitted along with half yearly EC Compliance report for the period of Apr'18 to Sep'18. Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and after detailed discussion, authority has decided to constitute committee to discuss the details of the report further.</p> <p>Reminder Letter vide dated 07.09.2020 & 10.03.2021 submitted to the GCZMA, Gandhinagar for further directives to present the findings of the CIA report in detail. Details were submitted along with half yearly compliance report for the period of Oct'20 to Mar'21.</p> <p>Presentation done before GCZMA on 31.10.2021 and 16.02.2021 to discuss proposed EMP of CIA study in detail and way forward.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'23 To : Mar'24
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status as on 31-03-2024
		<p>GCZMA, Gandhinagar issued a letter to co-ordinate with various departments in the matter of CIA with Gujarat Pollution Control Board as Nodal Agency vide dated 12th July, 2022. APSEZ submitted the letter to GPCB for detailed deliberation and suitable action / way forward vide letter dated 20th July, 2022. The copy of acknowledgement was submitted along with half yearly compliance report for the period of Apr'22 to Sep'22.</p> <p>However, APSEZ is already complying with the Environment Management Plan (applicable to APSEZ) suggested in Cumulative Impact Assessment report. The detailed compliance, applicable to APSEZ is attached as Annexure - 13.</p>

Annexure – 1

ALGAL REMOVAL WORK FROM MANGROVE AREAS

Creek area is regularly observed for checking algal encrustations. On the mangrove recruits & where the algal encrustation is found to be substantial, it is removed manually by deployment of required manpower. This operation is performed during the low tide conditions. The main object is to provide better growing condition for the growth of mangroves. Periodically, spread of *Prosopis* sp towards the mangrove areas is also observed as this species will compete with mangrove plants for growth.

Photographs of removal of algal encrustations:



Annexure – 2

CSR Gujarat

Kutch – Hazira – Dahej

adani
Foundation

pond deepening

A N N U A L R E P O R T 2 0 2 3 - 2 4



Our Journey by Mr. Rakshit Shah, Executive Director APSEZ



From Pledge to Progress Further,

I am happy to share that Adani Foundation continued to make significant strides to elevate the sustainability of our CSR operations. This year We prioritize capacity building and awareness on ESG, as evidenced in 8 employees completing training modules that raise awareness about best practices in ESG. We raised the bar through our environmental initiatives, Water Conservation, Terrestrial and Coastal Biodiversity. We are also spreading awareness for reducing paper usage, Reducing emissions through firewood cooking, diesel free village drive at Surat district and increasing the green cover by planting trees. We enhanced the impact of our social initiatives by empowering women through Enhancing skill and Livelihood, increasing gender diversity and improving inclusivity. We are working for socio economic upliftment marginalized community i.e. Primitive Tribes at Bharuch and Surat district and fisherman at Kutchh district.

Our commitment to sustainable CSR operations has earned the trust of our stakeholders and contributed to our success. It has also helped us build a more resilient, sustainable and profitable business. I thank our Adani Foundation Team for their continued support and dedication to our commitment to sustainable CSR practices, as we remain focused on driving long-term value for our stakeholders, and the communities in which we operate.

With best wishes,

Rakshit Shah

Contents

4 CSR Kutch

Demographic Detail	5
Mundra Site	
Environment Sustainability	6
Education	22
Sustainable Livelihood Development	37
Community Health	53
Community Infrastructure Development	60
Community Resource Centre	63
Adani Skill Development Centre	70
AKBPTL Tuna	74
AGEL Khavda	75
AGEL Dayapar & Mandvi	79
Adani Cement Sanghi	83

NDTV	87
Shree Renuka Sugar Ltd.	88
AESL – Mandvi & Rapar	89
CER – APSEZ	90
Biporjoy Cyclone Relief Work	91
Events	94
Awards & recognition	97
VVIP & VIP Visits	99
Case Study	103
Beneficiaries list	108

109 CSR Hazira

Education	110
Community Health	113
Sustainable Livelihood Development	115

Community Infrastructure Development	117
Project Udaan	118
Mega Event – Day Celebration	119
Appreciation Letter	120
Case Study	121

123 CSR Dahej

Education: Utthan	124
Community Health	125
Sustainable Livelihood Development	126
Community Infrastructure Development	130
Case Study	131
Budget utilization	132
Media coverage	133

CSR KUTCH

The Adani group plans to invest over two lakh crore rupees in Kutch over the next five years, creating around 100,000 jobs. The investment is expected to contribute to a Vikshit Gujarat, with the group constructing a world-largest green energy park in Khavda, Kutch, and expanding its green supply chain. Kutch Copper Ltd, a subsidiary of Adani Enterprises Ltd (AEL), the world's largest single-location copper manufacturing plant at Mundra in Gujarat, will start operations of the first phase by March-end and full-scale 1 million tonnes capacity by FY29. Mundra Port, Adani Power Plant, Adani Wilmar and Mundra Solar is reached to remarkable development ! Adani Foundation is instrumental in Mundra from 25 years but for last 3 years, started CSR at Khavda, Nakhtranana, Lakhpat and Abdasa Taluka in Community health care, Women Empowerment and Water conservation core.



Demographic Details

Block	Villages	No. of HHs	Population
Mundra	61 Villages	35192	153179
Anjar	6 Villages	5350	28500
Nakhtrana	22 Villages	14093	36373
Lakhpat	20 Villages	8092	18976
Khavda	22 Villages	8450	35200
Rapar	3 Villages	345	12450
Mandvi	8 Villages	2780	14560
Abdasa	12 Villages	2415	9660

1. Adani Ports and SEZ Limited
2. Adani Power Mundra Limited
3. Adani Wilmar Limited
4. Adani Wilmar – Caster Limited
5. Kutchh Copper Limited
6. Mundra Solar PV Ltd
7. Mundra Petrochem Ltd
8. Adani Kandla Bulk Terminal Private Limited
9. Adani Solar Limited – Bitta, Abdasa
10. Adani Green Energy Limited – Nakhtrana
11. Adani Green Energy Limited - Khavda
12. Adani Energy Solution Limited – Rapar

Environment Sustainability



Water Conservation 

Soil Conservation 

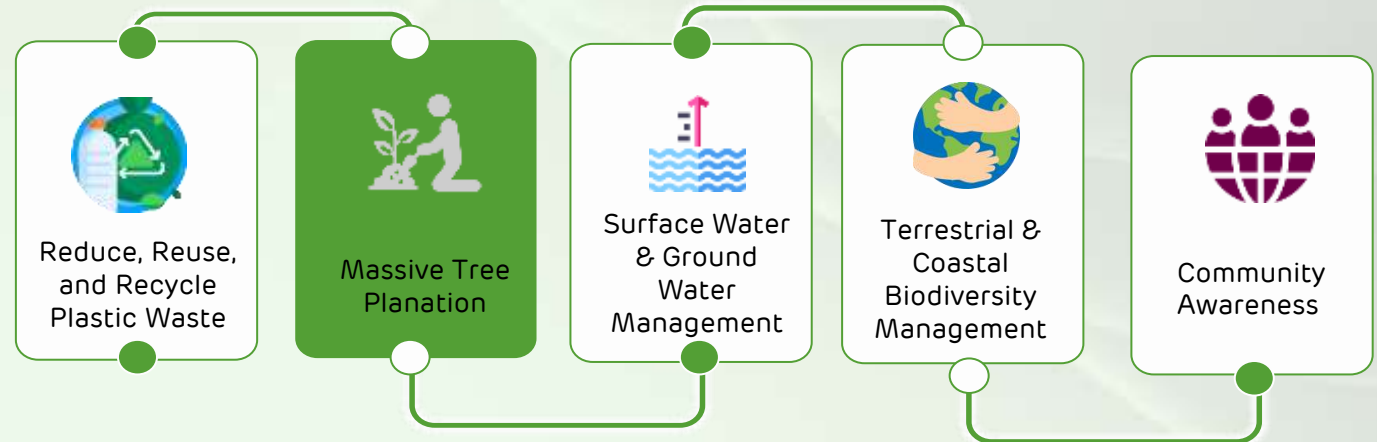
Terrestrial Biodiversity 

Coastal Biodiversity 

Plastic Free Drive 

Environment Sustainability

As per UN Sustainable Development Goal. 13 - The environment and biodiversity serve as the lifeblood of our planet, playing a crucial role in maintaining ecological balance and sustaining life in all its diverse forms. Preserving them is more than a necessity; it is a shared responsibility to secure the health and well-being of both present and future generations. Adani Foundation embodies this commitment through its varied environmental projects. These range from extensive tree plantation and mangrove restoration to innovative biogas provision, drip irrigation, Plastic Free Drive, groundwater recharging, and water conservation.



Action to environment Sustainability



Swajal Project



AIM:

The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district.

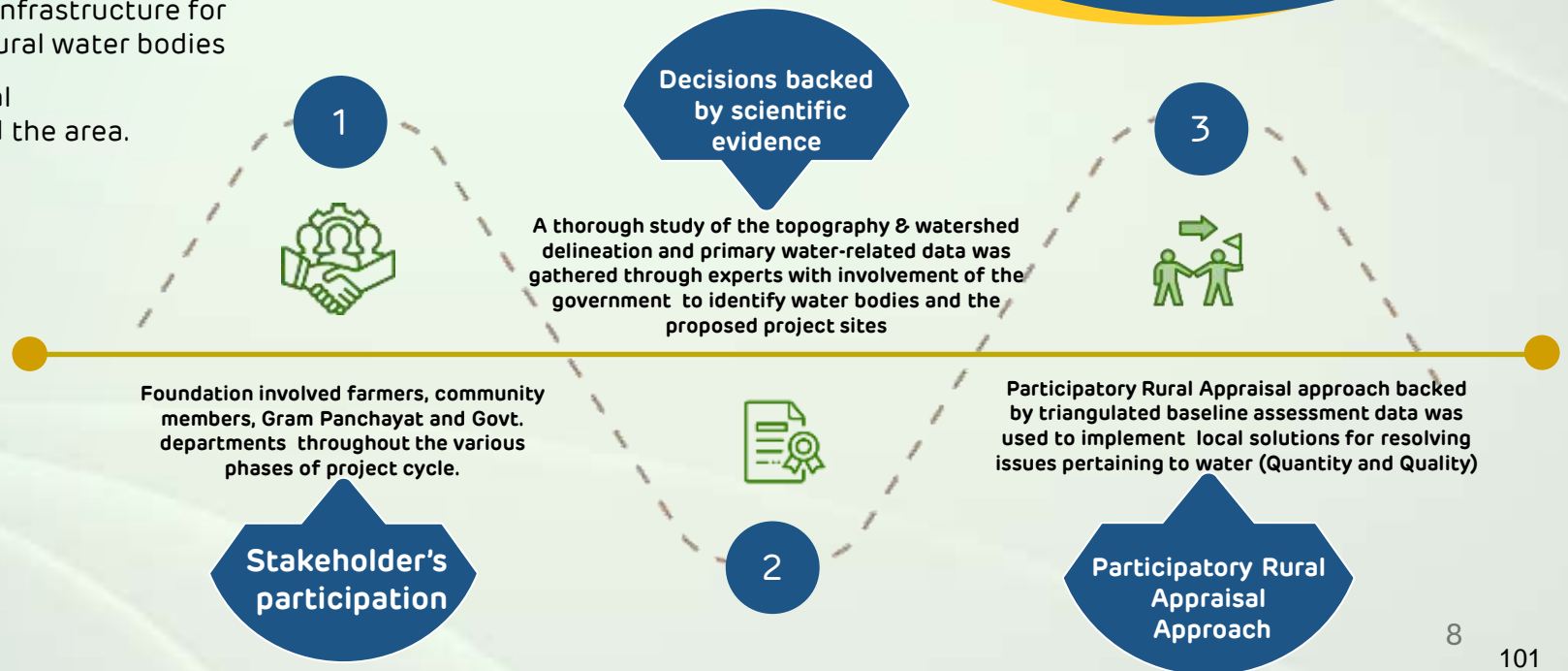


Vision:

Devising eco-friendly and cost-efficient methods of water body rejuvenation, the project works

1. To revive existing water resources,
2. Plan sustainable infrastructure for protection of natural water bodies
3. Improve ecological conditions around the area.

Process:





Water Security Plan

Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared for all the Seven villages.

To prepare water security plan following method has been adopted:

1. Overview of the Project villages through primary field visit and reference of prestudied and reports.
2. Survey of existing surface water resources to assess the potential and further scope of development.
3. Groundwater monitoring in term of storage and quality assessment.
4. Water balance calculation considering water supply and demand estimation.
5. Integrated water resource development and management plan for each village.

Swajal in Kutch – Block wise:

Sr. No.	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)
1	Mundra	Check Dam	23	6,07,332.80
		Pond Deepening	66	1,89,121.08
		RRWHS	275	2750
		Percolation Well	24	-
		Bore & Well Recharge	209	-
2	Dayapar	Pond Deepening	2	9,200
		Check Dam	1	18,000.00
3	Khavda	Pond Deepening	1	2,000
		Check Dam	1	16,000.00
4	Abdasa	Pond Deepening	1	22,000
5	Lakhpat	Check Dam	1	21,237.64

Swajal - Impact:



28,000
farmers Benefited



7.2%
Increase Revenue



17% TDS reduced



Rs. 1150
Reduce in health expenses/month



Total Water capacity increased

8,87,641 Cum
= 31.35 MCFT

Water Conservation Structure:



Soil Conservation

<p>1250 Farmers</p>	<p>07 exposure</p>	<p>857 Farmers</p>	<p>258 Gobardhan</p>	<p>35 Farmers</p>	<p>Rs.9.88 Lacs RG</p>
<p>•Awareness Sessions at Village Level: Spreading awareness on natural farming benefits and address their concerns.</p>	<p>•Hands-On Training & Exposures : Arranged Workshop and training to emphasizing on real-world techniques.</p>	<p>•Link with Government Scheme: facilitation of govt. Cow Nurturing scheme to promote eco-friendly farming practices.</p>	<p>•Bio-gas Support: Link with Gov Gobar Dhan Biogas Unit Nutrient-rich slurry serves as an essential organic fertilizer for natural farming</p>	<p>•Natural Farming Certification Process to obtain natural farming certification through the GOPCA for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali.</p>	<p>•Marketing Assistance: Provide platforms and resources ensuring fair prices and broader consumer reach.</p>

Natural Farming

Natural farming is an urgent need of the hour, We have initiated a comprehensive approach to promote natural farming practices through a variety of activities aiming to minimize pesticides and chemicals uses ,lead to produce , nutritious, chemical-free produce which is benefitting both farmers and consumers by providing healthier and more sustainable food options as well as plays significant role to flourishing environment and balanced ecosystem.



Home Biogas

Phase	unit	Unit Cost In Rs.	AF in Lac	Support Beneficiaries Contribution in Lac	Gov. Convergence in Lac	Total in Lac
Phase -1	125	23200	29	3.75	0	32.75
Phase -2	100	42000	42.0	5.0	0	47
Phase -3	100	42000	0	5.0	37	42
Phase -4	258	42000	6.45	6.45	95.46	108.36
Total	583	149200	77.45	20.2	132.46	230.11



Home biogas systems, adept at converting organic waste into renewable energy, present a sustainable and eco-friendly solution for cooking. We have started this project in 2020, with farmers contributing 10% towards the cost, that persisted till 2022. Since then, we have scaled our initiative by aligning with government home biogas schemes to amplify the reach and adoption of this eco-friendly technology in wider rural regions.

The deployment of home biogas has been particularly transformative for women, offering a healthier, smoke-free cooking environment reducing greenhouse gas emissions.

Current year we process to facilitate 258 Gobardhan unit through Gov.



Natural farming Workshop with Governor of Gujarat

- To promote natural farming, the Adani Foundation and Shri Rajshakti Natural Farming Cooperative Society Ltd. are making numerous efforts in kutch. In our endeavor to motivate and raise awareness among farmers, we recently organized a significant event inviting the Governor of Gujarat, Shri Acharya Devrath, Mr. V.S. Gadhavi, Executive Director of the Adani Foundation, and other distinguished guests. Addressing a gathering of 2000 farmers, Shri Acharya Devvrat aimed to inspire and enlighten them about the benefits and importance of adopting natural farming practices.
- "The foundation of people's well-being and health lies in the health of the land. Natural farming is the only way for this," said Acharya Devvratji, emphasizing that microscopic organisms in the soil nourish crops with essential elements, providing healthy and nutritious food. Devvratji highlighted the harmful effects of chemical fertilizers and pesticides on the land and urged farmers to adopt natural farming practices.

* Funded by -Mundra Petro chem Limited





Revival of Date Palm destroyed by **BIPORJOY** Cyclone



Dates Tree -Restoration

Biparjoy cyclone has damaged huge number plants of Dates, Mango, Sapota. In coordination with Kutch Crop Services and Krishi Vigyan Kendra – more than 615 plants are restored till date and continue. This initiative has created trust and credibility in farmers of Mundra. As for one date tree Average revenue is 25000 INR – this initiative revenue generation will be 1.53 Cr per year which is remarkable.



Go Green – Horticulture Saplings Distribution to Farmers



Objective :

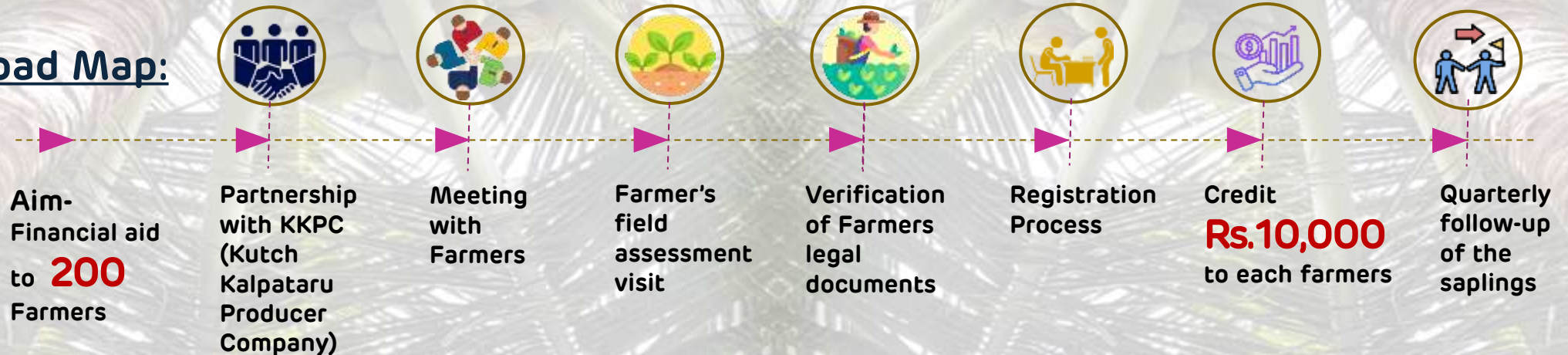
In alignment with a vision for sustainable agriculture and environmental stewardship, MPL aims to empower local farmers and contribute to larger environmental goals. The initiative focuses on providing financial assistance to 200 farmers for cultivating horticultural saplings.



Impacts :

- Environmental sustainability
- Carbon sequestration
- Soil conservation
- Combat climate change
- A healthier ecosystem
- Contributing to a cleaner atmosphere

Road Map:



Go Green – Horticulture Saplings Distribution to Farmers



Carbon sequestration Value :

Supported the plantation of 53,136 fruit bearing trees.

These plants will sequester 1,465.00 MT of CO2 after 5 years as per calculation in Mundra Petrochem villages

Name of Fruit bearing Tree	Co2 Sequ Kg	No of Plants	Total Co2 Seq - Kg
Mango	41.47	33,780	1,400,856.6
Custard Apple	4	1,300	5,200
Dates	12.8	15,856	2,02,956.8
Coconut	26.87	2,200	59,114
Total		53,136	1,465,170.6



Event: Horticulture Sapling Distribution and No Plastic Drive

Noteworthy event unfolded at the serene Sonal Mata Ji Temple in Vakrai - Moti Bhujpur, organized by Adani Foundation and Adani Petrochemicals. The focus of this gathering was giving away horticulture saplings through financial assistance, a symbolic step towards fostering a cleaner and sustainable environment.

Our esteemed guests for this event include R N Parmar, RO GPCB; Javed Sindhi, Mamlatdar Mundra; Vinay Kumar Singh, Head ESG MPL; Bhagwat Swaroop Sharma, Head Environment; Panktiben Shah, Head CSR Gujarat; Vishnu Patidar, ESG expert; and Laxmiben Ninjan, Sarpanch Bhujpur.

Mr. R.N. Parmar addressed the imperative need for cultivating a green and healthy environment for current and future generations. Additionally, he praised the efforts of Adani Petrochemicals and Adani Foundation, emphasizing the importance of sustainable practices.

The primary objective of the event was to extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. Presently, MPL is aiding over 300 farmers in planting a total of 53,136 fruit-bearing plants.

The event further shone a spotlight on past beneficiaries of drip irrigation and tissue dates distribution, who took the stage to share their experiences and express gratitude for the transformative support received. Adding a touch of artistry, small Utthan students staged a captivating environment protection act.

As the event wrapped up, a strong commitment was made to keep supporting and assessing efforts for a greener environment, contributing to carbon sequestration.



Terrestrial Biodiversity

Vruksh Se Vikas – Massive Drive

Since 2014, we have embarked on a transformative journey to execute a wide range of tree plantation drives in collaboration with local communities and forestry departments.

1. Miyawaki Forest Development: Native species plantation in the 2-acre area at Nana Kapaya village creating a flourishing mini-forest with 5,508 trees.

2. "Adani Van": Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 23,000 trees were planted. Second example Momai Mata temple, Desalpar 10,000 trees were planted. Third Example Matiyadada at Bhujpur 8000 trees were planted. Fourth example Rasha pir, Dhruv 2-acre 5000 trees planted. Thus, in PPP Model 4 Adani Van were developed where 46,000 trees were planted.

Prakruti Rath: This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 46,750 sapling distribution to individuals, we have empowered communities to take ownership of their surroundings, leading to a heightened consciousness about the environment's significance.

Till the date Total 1.49 Lac tree plantation have been done that has enriched the local ecosystem and significantly contributed to carbon sequestration

Completed the plantation of 1,49,889 trees. These plants will sequester 3180.00 MT of CO₂ after 5 years as per calculation in Mundra Petrochem villages

1.49
Lac tree
plantation





Coastal Biodiversity

Mangrove Biodiversity



In 2010, we initiated a mangrove plantation project at Luni coastal belt, ultimately leading to 162 hectares of dense mangrove forests. Subsequently, we expanded our efforts by planning and implementing a multi-species mangrove plantation across an additional 20 hectares. These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and

migratory bird species, enriching the local ecosystem.. Since PhD scholars and students frequently visit this area for study, we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist

Mangrove Plantation Work Detail				
Sr. No	Year	Number	Person days	Remarks
1	2011-12	50000	3000	
2	2012-13	125000	6943	
3	2013-14	60000	1480	
4	2014-15	125000	6501	
5	2015-16	65000	3533	
6	2016-17	20000	3125	
7	2017-18	100000	3666	
8	2018-19		7539	Algal Removal work
9	2019-20		6261	Algal Removal work
10	2020-21		4830	Algal Removal work
11	2021-22	97000	5200	
12	2022-23	100000	4445	
Total		742000	56523	

4+

Spices of Mangroves

60+

Coastal Spices as habitat preservation

160+

Hector Avicennia marine plantation

20+

Hector Biodiversity park

Plastic Free Drive

Objective:

The central aim of the Plastic-Free Drive is to empower and enlighten students as key agents of change, enabling them to disseminate awareness and instill the practice of reducing single-use plastics within their community.

1. Educate: Spread awareness about the harmful effects of plastic on the environment, marine life, soil health, and human well-being.

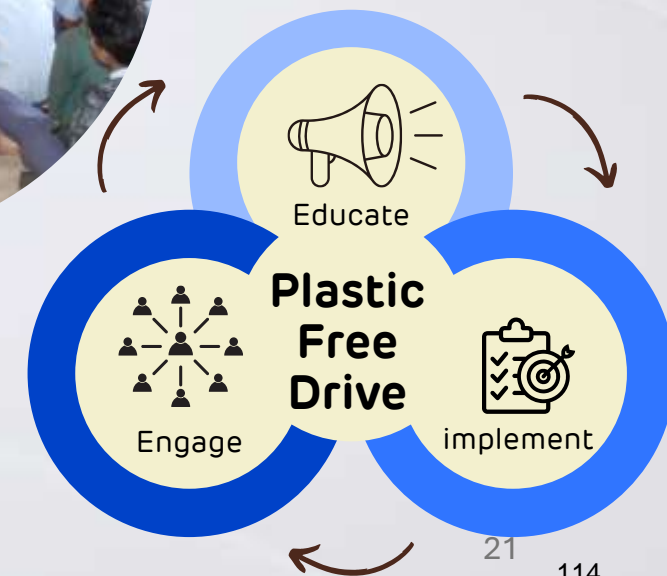
2. Engage: Mobilize community members, especially the youth and family members to actively participate in plastic waste reduction activities.

3. Implement: Introduce sustainable alternatives to ensure proper disposal and recycling. As of now we supply plastic to one NGO to prepare Garden benches. .

Outreach :-

12000 Students of Primary Schools.

990 Students of Secondary Schools of Mundra Block.





5 Years

उत्थाव

2018-2023

adani
Foundation

Celebration

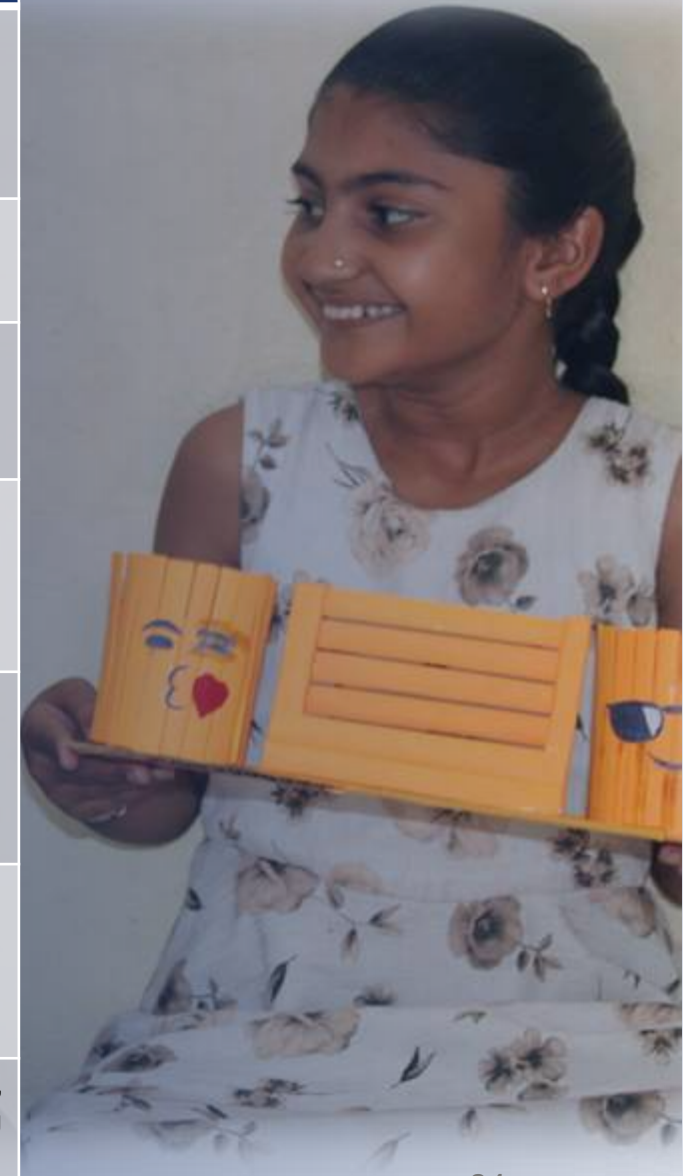


Education: Utthan

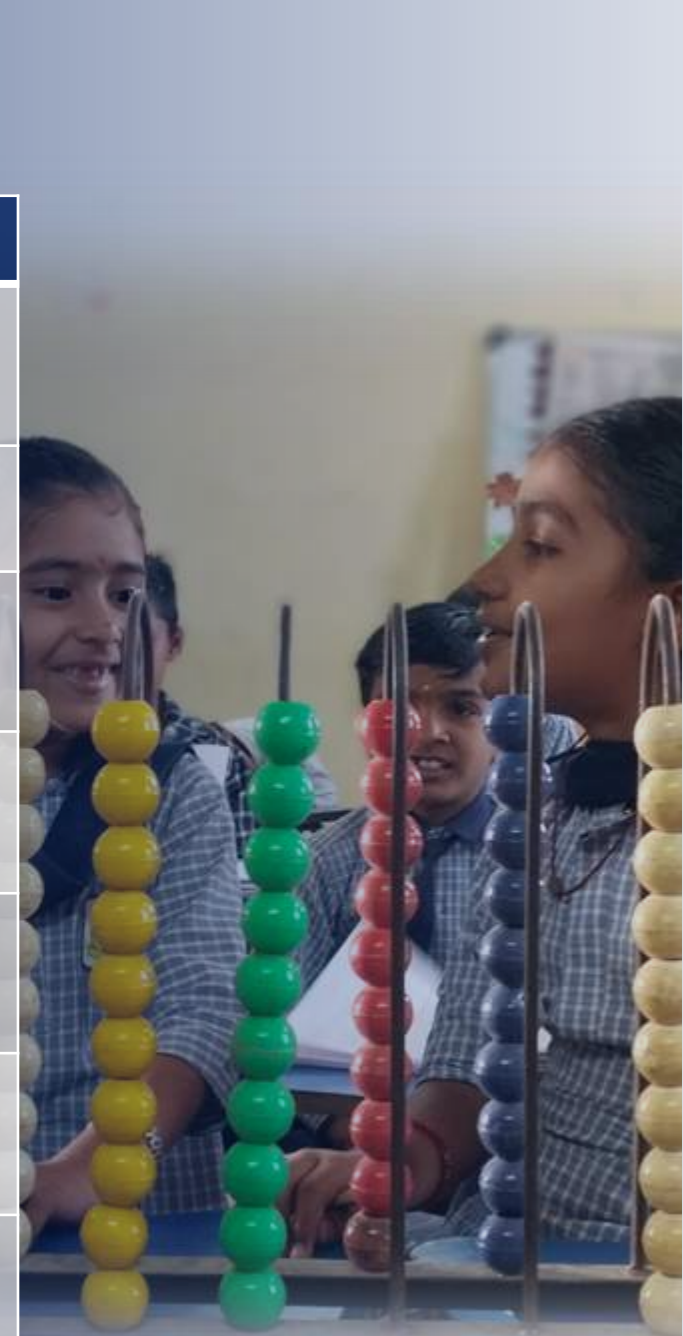
Project Utthan, an innovative initiative by the Adani Foundation by Mou with DEO, which aligns seamlessly with both the National Education Policy 2020 and the Sustainable Development Goal. By adopting government primary schools, Utthan fostering community engagement, it aims to create model schools that empower students and elevate education quality. By providing dedicated teachers and essential facilities, Utthan strive to enhance the Gunotsav results of primary schools and improve the Board results of 10th standard students. Project Utthan takes the lead in initiating various co-curricular activities to ensure the holistic development of students. Through capacity-building programs and collaborative efforts, we envision a future where every child receives holistic and empowering education, paving the way for a brighter tomorrow.



Utthan Initiative	SDG 4	NEP 2020	Benefited
Strengthening government Primary & High schools	Target 4.1.0 suggest to contributes to providing quality education for all.	4.1 and 4.2 - improving primary education.	31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.
Appointing an Utthan sahayak	Target 4.1.1 suggest to support students.	5.2 - focus on capacity building and support systems	70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.
Mainstreamed Progressive learner	Target 4.6.1 suggest fixed level of proficiency in functional	2.1 and 2.2 Mainstream students from progressive learners	Assessment : 6982, Progressive learners : 2541 Mainstreamed : 1278.
Providing required resources and facilities	Target 4.2.1 Suggest the necessary resources for effective learning.	7.4 and 7.5 emphasis on infrastructure development and resource availability.	Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.
Enabling joyful learning spaces	Target 5.1.2 Suggest positive and engaging learning environments	5.9 & vision of NEP suggest experiential learning to encourages creativity.	Smart Class with Navneet software+ Bala painting + Activity base learning.
Adani Students Development Center (ASDC)	Target 6.1.2 Suggest preparing students for future opportunities.	20.1 and 20.2 NEP's It resonates with the NEP's focus on holistic development and skill-building.	2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center
Introducing English as a Third Language	Target 5.1.2 Suggest other language learning.	4.13 emphasizes multilingualism and language learning.	Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English



Utthan Initiative	SDG 4	NEP 2020	Benefited
Enhancing Reading Habits	Target 7.1.2 Promote literacy and a love for reading.	2.8 Supports the NEP's goal of enhancing reading & comprehension skills.	Redding corner , 1000+ Oasis workshop , 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month(ISLM)
IT on Wheels	Target 4.2.3 Promotes Digital literacy.	5.9 focuses on integrating technology in education.	2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students , 200+ High schools' students
Promote sports	Target 6.1.2 Suggest preparing students for future opportunities	4.8 promoting physical fitness and sports.	6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh : 2000+
Teachers' & Sahayak Capacity Building	Target 4 C Suggest to qualified teachers by cooperation	2.6 emphasizing teacher training and professional development.	3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.
Formation of Eco Club	Target 5.1.2 Suggest to increase awareness of Environment.	4.44 Promoting environmental awareness.	Plastic free village workshop : 1250+ Students, Environment Awareness program & Tree plantation in schools.
Day Celebrations & Collaboration with GoG	Target 4.2.1 Suggest to inspire Holistic development of students	7.1 children of all ages should learn about arts, sports and careers.	Summer Camp : 6000+ Students Diwali Mela : 5500+ Students. 1400+ Parents participated.
Mothers as catalyst in transformation	Target 4.1.1 Suggest to inspire parents in growth of students	Aligned with NEP's Principles. Page No.6	Mothers meet : 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)
Strengthening Stakeholders	Target 4.1.0 suggest to work	Aligned with NEP's Preface, Page No. 4	Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.



Utthan Marks 5-Year Milestone

Celebrating the extraordinary five-year journey of Utthan in Mundra, we hosted a remarkable event graced by the presence of distinguished individuals. Among them, the Director of Primary Education, Gujarat, Mr. M. I. Joshi, brought with him not only wisdom but also a sense of grace that elevated the occasion. Standing alongside were the District Development Officer, Mr. Prajapati, and the District Primary Education Officer, Mr. Sanjay Parmar.

Yet, beyond the notable dignitaries, the event witnessed the convergence of more than 2000 students, 416 school principals and teachers, and 145 School Management Committee Members. Their collective presence bore witness to a significant milestone in the enduring journey of Utthan, leaving an indelible mark on our hearts and memories.

In this gracious event, we commend the outstanding contributions of the Principal, Utthan Sahayak, and students who have excelled over the past five years.

During the event, the children showcased their incredible talents. They enthralled the audience with mesmerizing performances, including folk songs, classical dances, and vibrant folk Garba dance. The young talents also graced the stage with captivating dramas and much more.

The event was a true celebration of their skills and abilities, and it was executed with utmost dedication and excellence.





Mother's Meet – Promoting Community Bond

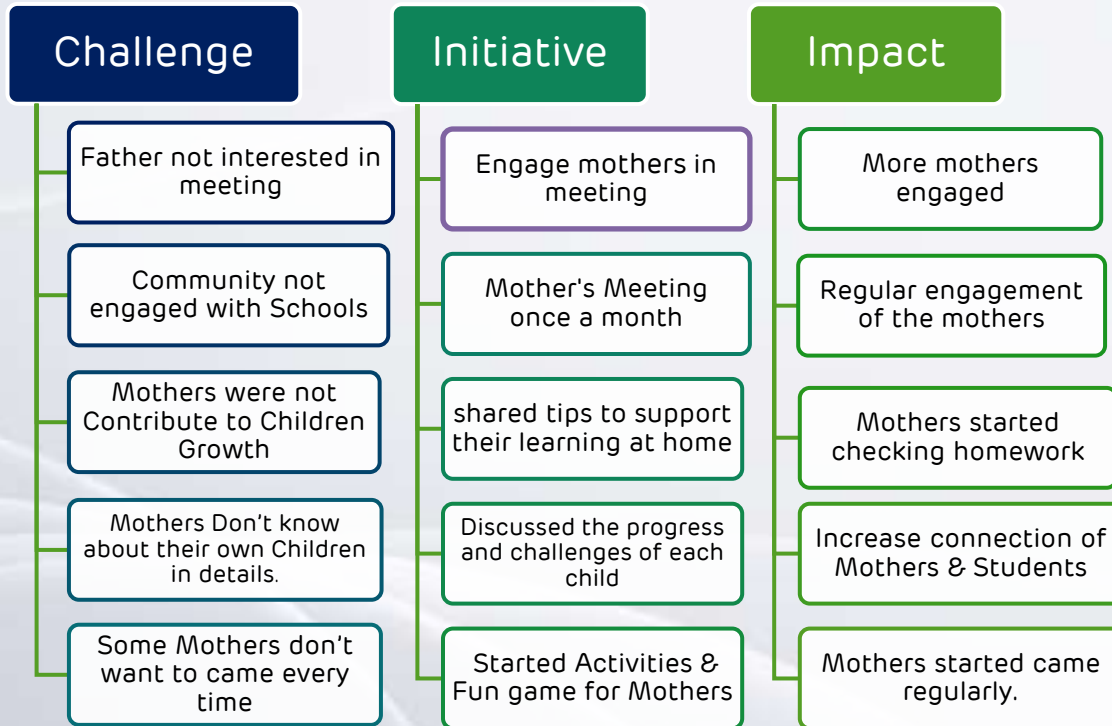
Mothers meet is special intervention of Utthan, This year, more than 15000+ Mothe's Joined in 700+ Mothers meet. Some of the challenges and impact of this initiative through out the year is as bellow:



700+
Mother's meet



15,000+
mother participated

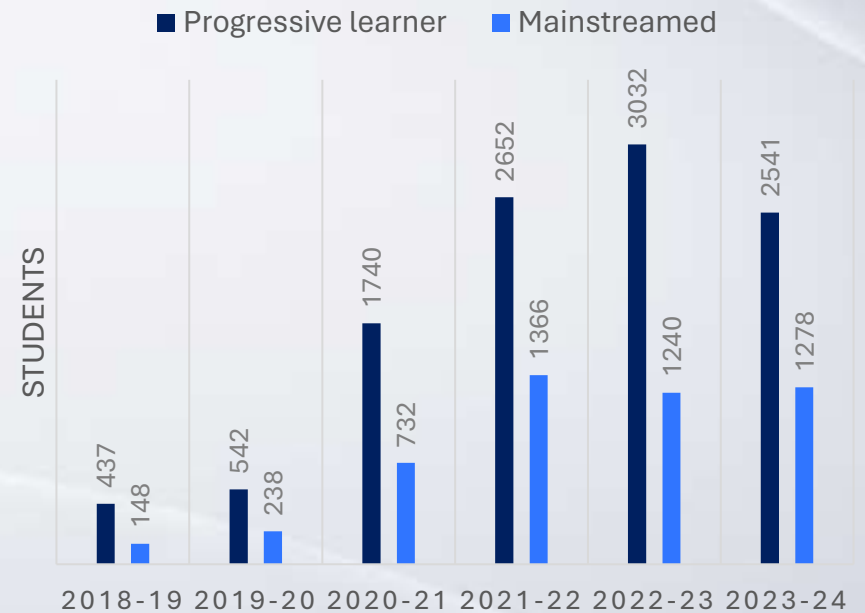


Mainstreaming Progressive learners

Utthan, through its assessment, has identified over 2541 Progressive students out of 6459 from 3rd to 7th standard . Among them, 1278 students have been successfully mainstreamed. The key role played by Utthan Sahayak has been instrumental in achieving this success. Utthan's approach includes a customized syllabus, activity-based learning, and teaching at the right level. Additionally, Utthan actively involves mothers and members of the School Management Committee (SMC) in strengthening progressive learners. Below is the yearly outcome of our hard work:

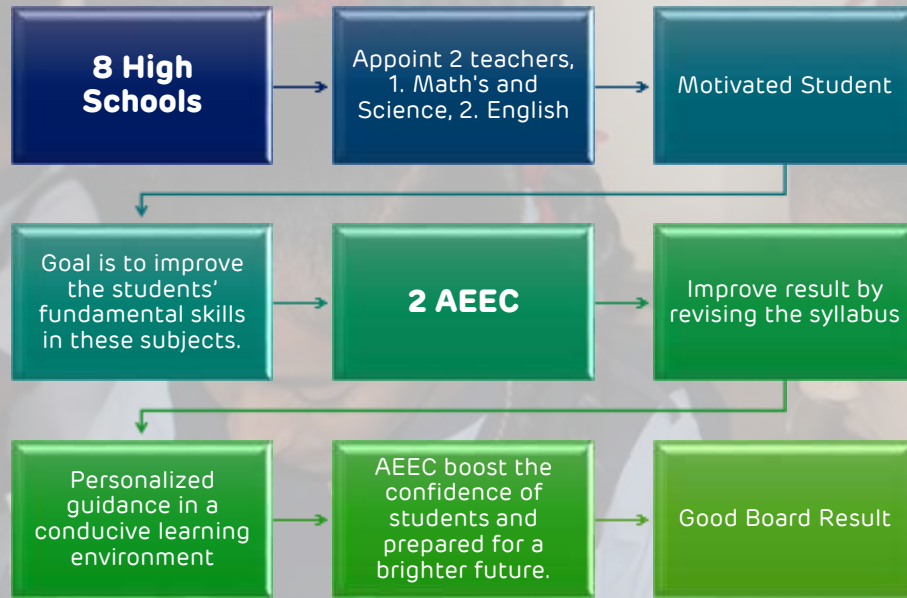


1278 students
mainstreamed

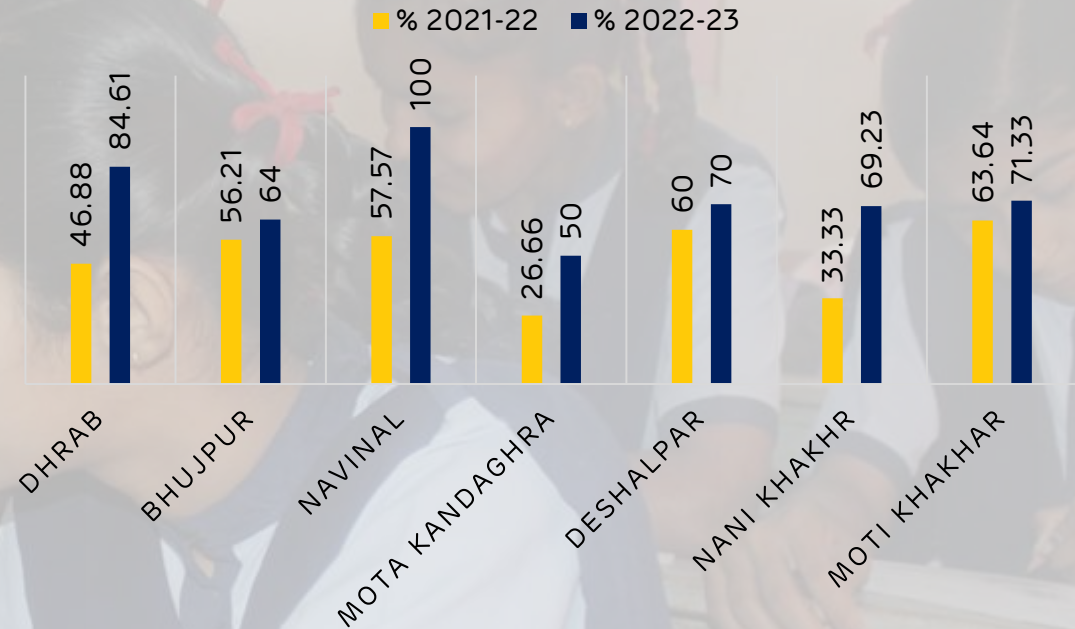




Utthan in High Schools



UTTHAN HIGH SCHOOL RESULT COMPARISON



Utthan other various initiatives & Achievements

- ✓ Utthan won FOKIA Award under the category "Excellence in collaborative CSR Project.
- ✓ Utthan created special syllabus of Maths, Science & English to achieve good result in board exam.
- ✓ The Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office.
- ✓ Career Counselling in Utthan High Schools same remedial classes during summer break.
- ✓ Health awareness programs in schools, children of class 6 to 8 were made aware about health.
- ✓ High school girls' students celebrated Rakshabandhan with Shoulder at Boarder.
- ✓ 1000+ Students are preparing for competitive exam. Its more than double from last year.

Adani Vidya Mandir, Bhadreshwar

Empowering Communities through Free and Compulsory Education

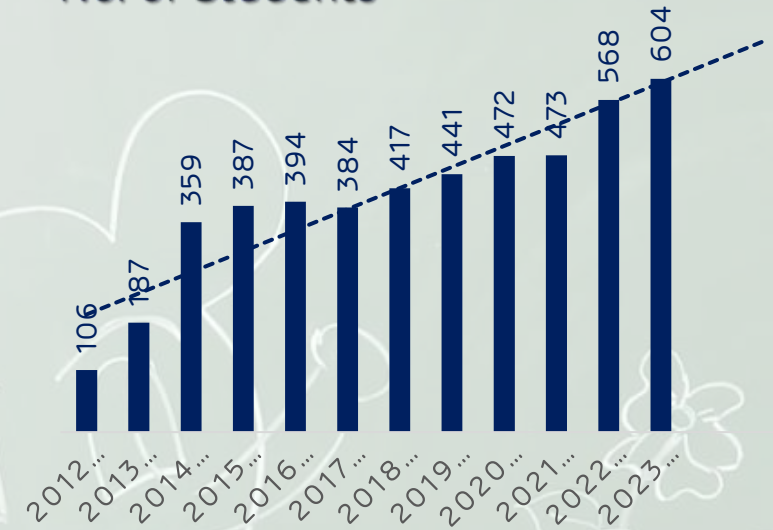
- Established in June 2012, school is a Gujarati Medium, Co-educational institution that adheres to the Gujarat State Board curriculum. It is a school for the students of KG to Class X. Starting its journey in a rented house in Bhadreshwar village, the school commenced operations with 80 students in class-I. Guided by a committed team of six teachers. In the academic year 2023-24, it proudly serves a student population of 604, with 174 students hailing from fisher-folk communities. 24 dedicated teachers are there in school. Committed to providing comprehensive and quality education, the school operates with a unique approach – offering education at no cost. Furthermore, the school extends support by providing complimentary uniforms, books, and stationery. It's noteworthy that all the students belong to the Economically Weaker Sections (EWS), emphasizing dedication to inclusivity and accessible education.
- School stands as a trailblazer, being the first state board school in Gujarat to receive accreditation from NABET under the Quality Council of India.



Adani Vidya Mandir, Bhadreshwar

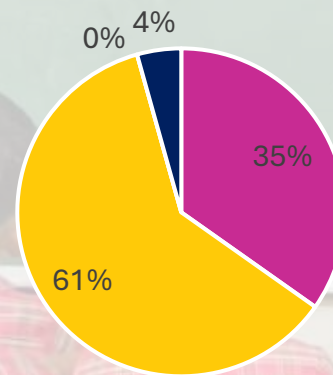


No. of Students



Achievement in sports

- In August 2023, students of AVMB engaged in block-level sports competitions, excelling in Athletics, Kho-Kho, and Yoga. Team of AVMB: U14 & U17 boys secured 1st place in Kho-Kho and progressed to the district level.
- Notably, Abzal Reliva, a Class X student, clinched 1st position in Shot Put, and Hardev Jadeja from Class IX achieved 1st rank in Long Jump earning the opportunity to represent Mundra block at the district level.



■ District ■ First Class
■ Second Class ■ Pass Class

AVMB STD 10 – SSC Board Result (2022-23)		
Sr. No.	Grade	Student
1	Above 80%	8
2	Above 70%	8
3	Above 60%	6
4	Above 50%	0
5	Above 40%	1
Total Students		23



100%

**Success in Gujarat Board
Standard 10th Examination.**

Achievement in Arts:

- An Essay and Quiz Competition arranged by TATA BUILDING INDIA was organized on the theme of "Recycle". 81 students of AVMB participated. Winners were recognized and rewarded by Tata Group, Rajkot. Winner students received medals.
- School orchestrated a special moment. Parents were invited to the school where they had the honor of presenting medals and certificates to the winning students. Notably, Ms. Manjaliya Najirhussain Hasam hails from the fisherman community.
- 06 Students of Class VI to VIII appeared in PRARAMBHIK VISHARAD examination conducted by BRIHAD GUJARAT SANGIT SAMITI on 14/12/2023, School is waiting for the result.
- 19 Students of Class V to IX wrote inspirational stories in Gujarati language all the stories were submitted to a publisher name: Jagdish Jepu, among them 01 story of Maheshwari Raj of Class IX title: Importance of Every individual" published in "GULSHAN" magazine in 10th edition on 11/10/2023.



Annual Function in AVMB

- On 5 March 2024, the school celebrated its 12th annual day with a pledge to plant over 25000+ saplings over 3 years in the school premises and in the surroundings, including mangroves in the coastline. The annual day named Utkarsh was aptly linked with the United Nation's Sustainable Development Goals, especially highlighting environmental consciousness.
- Utkarsh gave these students a platform to celebrate the ethos of environmental conservation with a lot of take aways in terms of showcasing learning through models based on SDGs and working models on environment and water conservation. The students presented various sustainability goals through skits, songs, and poetry narration in an enthralling event in AVMB.
- The highlight of Utkarsh 2024 was a pledge that students have taken to plant 25000+ saplings towards greening the region. The fishermen community also came forward to support the children in achieving this pledge. AVMB is committed towards contributing to a secure world. At the event, all 17 SDGs were presented in two sections – 1) Exhibition – through models, charts, and painting and 2) Drama, dance, and songs. The carefully curated event by the teachers under the guidance of the Adani Foundation sensitized the guests on the seriousness of causes, especially the importance of preserving the coastal biodiversity.
- Mr. Jugeshinder ('Robbie') Singh, CFO of Adani Group, chaired the program. He was impressed by the state-of-the-art facilities of the school and especially by the knowledge showcased by the children on the topics which are generally taken up and discussed in higher academics, policy roundtables and corporate chambers. He said, "I am humbled to be here and seeing fantastic knowledge and models presented by these young children. I am sure each of them will make great progress in their lives, become financially independent and help their families, communities and our great nation."







Natural Farming (Cow based Farming):

Adopting sustainable practices i.e., organic pesticides/bio enzymes, Jivamrut, Vermi compost, and bacterial culture to enhance Agri yield.

- First and Second phase Training given to 2200+ Farmers to motivate for Natural Farming
- 2500+ Farmers supported by 25000+ Fruit bearing Saplings. Natural Farming Training will result in 15-20% increase in income after 3 years.



Udaan GET INSPIRED Inspiring Minds



About Project

Udaan is a special project inspired by the life-changing story of Mr. Gautam Adani. As a child, he had visited the Kandla port in Gujarat, and after looking at the expanse of the port, he dreamt of having his own port one day. The rest is history. Under this project, exposure tours are organized wherein school, college students, faculties, employees from corporates are given a chance to visit the Adani Group facilities. Under this project, services are absolutely-free of cost for government schools.

Vision

To create a pool of inspired young minds for nation building at a global scale.

Mission

To motivate young students to dream big by exposing them to world-class industrial facilities.



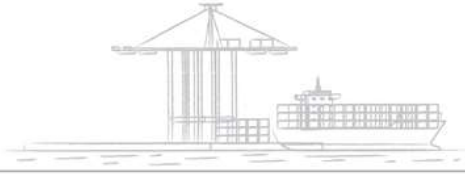
Total no. of visits

7019

Total no. of participants

447541





Project Site
Mundra, Gujarat
 (Site commenced on Dec 2010)

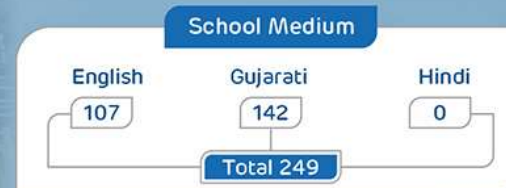
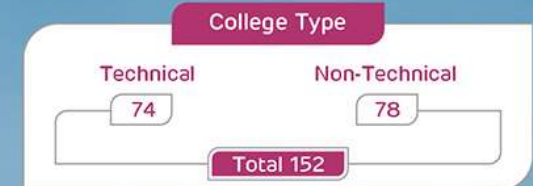
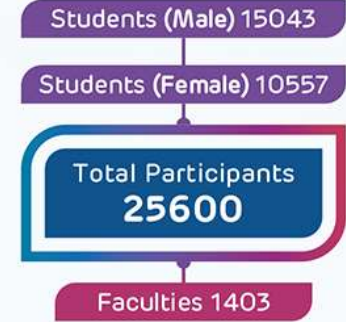
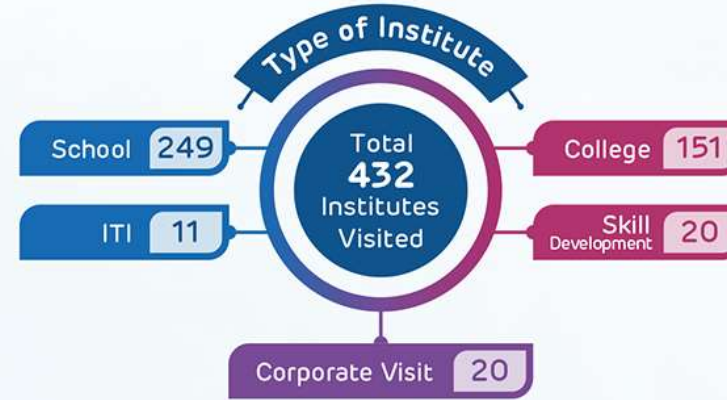
Adani Ports and Special Economic Zone Limited (APSEZ)
 India's largest port operator and SEZ

Adani Power Mundra Limited (APMuL)
 India's largest single location coal based private power plant

Adani Wilmar Limited (AWL)
 Asia's largest single location edible oil refinery

MSPVL - Adani Mundra Solar PhotoVoltaic Limited
 India's first and largest vertically integrated solar company

Mundra Windtech Ltd
 A wind turbine taller than the world's tallest Statue of Unity.





Sustainable Livelihood Projects

Sustainable Livelihood - Animal Husbandry

In the face of dwindling rainfall and increasing salinity in groundwater, agriculture is under threat. Recognizing this challenge, the Adani Foundation has initiated various interventions to foster the holistic development of agriculture and animal husbandry.

Pashudhan initiative:

Two vital pillars of this initiative:

Preventive Health Care & Fodder Support Program

Preventive Health Care: Cattle Health camp

The Adani Foundation, in collaboration with the Animal Husbandry department, organizes cattle health awareness and vaccination programs in 24 villages surrounding our area. These camps bring together government veterinary doctors who conduct check-ups and administer treatments for common ailments. The remaining medicines and vaccines are provided by the Adani Foundation.

These programs are highly effective in maintaining the optimal health of livestock and safeguarding them against deadly diseases like Foot-and-Mouth Disease (FMD) and Clostridial infections. The vaccines used are specifically designed to offer long-lasting immunity against specific diseases, ensuring the continued health of the animals even in harsh environmental conditions.



* Funded by - Kutch Copper Limited

Fodder Support:

Our Fodder Support Program is dedicated to assisting our neighboring villages during the challenging seasons of summer, drought, and crop failures. Through this program, we have provided a significant amount of Green and dry Fodder to ensure the well-being of both the communities.

Adani Foundation provides good quality dry and green fodder to 24 villages in our vicinity, covering 15,005 cattle of 2070 Cattel owners.

Grass Land development:

AF converted 18 acres of denuded village common pastureland (Gauchar) into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village with Community participation and responsibility for maintain and Monitoring.

Among that 18 Acre of Gauchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value. More than 1500 Cattle will sustain with Improving quality and quantity of milk.

1500 cattle get benefitted by green fodder for 30 days – which increase 0.5-liter milk quantity of 50% cattle.

(750 cattle x 0.5-liter milk quantity Increase x 40 INR per liter=Rs.15,000/day).

This Intervention could benefit ₹ 4,50,000.

14,38,163 Kg Dry Fodder Support

45,85,278 Kg Green Fodder Support

24 Beneficiary Villages

15005 Cattle Benefitted

2070 Cattle Owner Benefitted

“It would be highlighted as best Demonstration and replicate in the other villages as sustainable fodder development project”

* Funded by - Kutch Copper Limited



Sustainable Livelihood - Fisherfolk Community

Persistent efforts for Fisherman development:

598 Education Kit Support

273 Fisherman Shelter Support

1,247 Vehicle transportation
support

106 Cycle Support to high school
going students

613 Scholarship Support

419 Youth Employment

195 Linkages with Fisheries Scheme

3,534 Ramatotsav Community
Engagement

56,523 Man days Mangroves
Plantation



Empowering Fisherfolk Communities through Education



Vehicle Transportation Facilities:

Ensure seamless access to education for school-going children from Luni, Randh and Juna Bandar Fisherfolk Students in reaching the nearest School, eliminating barriers to regular attendance.

146 Students supported Mundra Taluka

58 Students supported at Mandvi Taluka



Educational Awareness Sessions:

Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on advancing girl-child education.

487 Students motivated for high school Education



Cycle Support:

Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease.



Scholarship Support:

Provide scholarship support to 31 deserving students, covering their higher secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates.



Education Kits Support:

Equipping fisherfolk students in grades 9 to 12 with essential tools for academic success, including notebooks, guides, and study bags, we empower them to pursue their educational aspirations with confidence.

15 Students supported at Mundra

42 Students supported by Mandvi



Assisting During Emergencies:

Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery.

336 Fisherfolk house benefited



Fostering Youth Employment:

At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future.

115+ Fisherfolk youth employed



Strengthening Fisherfolk women:

Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support.

449 Women benefited



Potable Water Distribution:

Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity.

5000+ Population benefited





Sustainable Livelihood - Agriculture

Sustainable agriculture is a powerful force for good, safeguarding our environment, public health, communities, and the welfare of animals.

Through practices like soil enrichment, diverse crop patterns, eco-friendly cover crops, natural farming methods, orchard development, tissue culture, and water harvesting, sustainable agriculture ensures the well-being of our ecosystem while replacing harmful chemicals with healthier alternatives.

This year, the Adani Foundation continued its strong commitment to advancing natural farming in Mundra. Through various initiatives and partnerships, we provided crucial support to local farmers, empowering them with knowledge and resources to transition to sustainable practices.



2200+

Farmers
educated in
natural
farming

800+

Farmers
embracing
natural farming
methods

200

Farmers got
financial
assistance of
Rs. 10,000

3

District
level
exposure
visit

₹ 36.7 lakh

Business done
by our
benefited
Farmers

*It's more than just a farming practice;
it's a commitment to nurturing our
planet and enhancing lives.*

Promoting Natural Farming

The Adani Foundation is dedicated to advancing natural farming through a cow-based farming initiative. Our interconnected techniques aim to boost farmer yields, with a primary focus on enhancing soil quality. We conduct pre-testing and post-testing to manage soil carbon content effectively. These are our endeavor for promoting natural farming this year:

Training

Conducted training for **1250 farmers in 16 villages**, enlightening them about the harmful effects of chemical fertilizers. Demonstrated how to produce organic fertilizer using household products, emphasizing its benefits and cost-effectiveness. After adopting it, they witnessed its positive effects on their fields.



Kitchen Garden Kit

We have supported vegetable kitchen garden kits to 500 farmers with the aim to enable them to grow fresh and nutritious, chemical-free vegetables. This will enhance their food security and promote self-reliance.



Empowering Farmers

This year, amidst the aftermath of the cyclone, we stood by our farmers and held dedicated meetings with KVK, KCS, and DRC to restore the fallen date trees. Collaboratively, provided JCB, technical support, organic fertilizer etc. Successfully restored **615 trees**. **Each Date trees is projected to yield approximately Rs. 25,000, Total Yield in Next Season:- Rs.1.53 Cr.**

Financial Assistance

Extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. This fund will help farmers in planting a total of **53,136 fruit-bearing plants**.



Raj Shakti Prakrutik Kheti Sahkari Mandali

The Adani Foundation has taken a proactive step by organizing awakening and awareness sessions to promote natural farming practices in Mundra block Villages. These efforts led to the formation of the "Raj Shakti Prakrutik Kheti Sahkari Mandali," comprised of 35 dedicated farmers who are deeply committed to natural farming. These are the activities done assisting the Mandali this year:

Interaction with Governor

Rajshakti Prakrut sahakari Mandali had Opportunity to meeting with honorable Governor of Gujarat Achrya devvrat at Gandhinagar. They got the valuable knowledge by the him on Natural Farming and gave their farm's vegetables to sir.



Appreciation by Governor

Governor of Gujarat, Shree Acharya Devvratji, encouraged 25 of our farmers practicing natural farming at the Krushi and Dairy Expo event in Bhuj. He motivating them to continue their commendable work for our mother earth.



Exposure Visits

Our farmers embarked on three eye-opening exposure visits to Gautech-2023, Bansi Gir Gaushala, and Narayan Dev Dwisatabdi Mahotsav, where they learned about new agricultural tools, various seeds, organic products, and making of Gau Krupa Amrutam organic fertilizer

Certification by GOPCA

We have successfully **certified 28 farmers** under the Gujarat Organic Products and Certification Agency (GOPCA). Now, they have authentic validation as organic farmers, ensuring they receive the best prices for their farm products.



Kutch Kalptaru FPO (KKPC) and Prakrutik Mandli

To promote horticulture, the Kutch Kalptaru FPO (KKPC) was established in 2020 by farmers from Mundra Block to address various challenges they faced. With an initial 350 shares held by 280 shareholders, the company is now expanding to include up to 5000 farmers and 537 registered share holders.

In the current year, KKPC began selling 10kg capacity packaging boxes at a minimal profit margin of Rs. 29 per box, resulting in a turnover of Rs. 10.5 lakh and a profit of Rs. 75 thousand. This initiative has indirectly supported over 800 farmers.

Regular director board meetings and capacity-building training sessions have been arranged to ensure effective management and growth. Total Turn over is Rs. 33.67 Lacs current year which is four times higher than last year which shows remarkable progress of FPO.



800
Farmers
benefited

₹ 33.67 lacs
Turn over

Green Carnival

Today, finding truly natural, chemical-free food has become a challenge. Our fruits and vegetables are often processed with chemicals, stripping them of their nutritional value. But there's hope. For years, the Adani Foundation has been supporting farmers practicing natural farming methods. However, these farmers lacked a platform to sell their produce. That's why AF has launched the Green Carnival. At Shantivan, Samudra colonies in Mundra, and KCL's Mandvi colony, we've provided a marketplace for these farmers to showcase and sell their agricultural bounty. The response has been overwhelming.

Encouraged by the positive feedback, these farmers have even established an organic produce shop in Mundra, setting an example for sustainable agriculture. Today, over **302 farmers** are part of this initiative.

Previously, these farmers sold their harvest in bulk to vendors. Now, by connecting directly with consumers, they've seen a remarkable **35% increase in their income**.

The communities of both colonies are delighted and eagerly anticipate the Green Carnival every Sunday. Together, we're not just changing food habits, but also supporting the livelihoods of those who cultivate our food, and nurturing a healthier, more sustainable future.

Total Green Carnivals = 37

Total Sell = 8,623 kg

Revenue = ₹ 3,01,805





Sustainable Livelihood - Women Empowerment

Women's empowerment holds a significant place within the Adani Foundation. Since its inception, the foundation has been dedicated to strengthening women by providing training, essential materials, and creating platforms for them to sell their products. Additionally, the foundation collaborates with the government to establish Self-Help Group (SHG) initiatives, enabling women to conduct their

businesses more effectively and encouraging savings. Through various training programs, the Adani Foundation empowers women, fostering their growth and self-reliance. Moreover, the foundation is acutely aware of hygiene and health, actively involving women in initiatives related to these crucial aspects. The holistic development of women is at the core of the foundation's approach and strategy.

We dedicated to empowering women both financially and socially. To that end, a comprehensive training program that has reached 850 women across 82+ Self Help Groups with 35+ Lacks saving Corpus, out of which 5 groups have outstanding revenue generation.

About - Project Saheli



Self Help Groups

- ✓ 82 Self Help Groups in coordination with National Rural Livelihood Mission.
- ✓ 850+ Members
- ✓ Over Rs.35 Lacs Saving Amount Corpus



Job Sourcing - Govt

- ✓ 11 Women supported for application and process of Gram Rakshak Dal, Bank Sakhi , Bima Sakhi and Professional Resouce Person.
- ✓ Average income Rs.4200 Per Month



Making SHG Self Reliant

- ✓ 16 SHG are making strides towards self-reliance.
- ✓ Various handicraft, dry and fresh food making, stitching, tie and die etc.
- ✓ 175+ women - Monthly average income @ Rs.7000 of each member/Month



Social Empowerment

- ✓ 2 Livelihood Enhancement Training through RSETI
- ✓ Financial support for business set up
- ✓ Legal rights and domestic violence workshops
- ✓ Family counselling for Job sourcing



Job Sourcing - Private

- ✓ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company
- ✓ 398 Women supported till date for job sourcing.
- ✓ Average income Rs.10200 Per Month

Revenue of each SHG in the FY 2023-24

Name of IG activity of SHG's/JLG/FPC's	Income 2023-24 (INR)	Cumulative income (INR)
Sonal Saheli	480250	3027450
Jay Adhar Saheli	26,500	252,066
Tejasvi Saheli	325000	3,390,150
Umang Saheli	76500	225800
Vishvas Saheli	26300	511400
Jay Momay Saheli	21000	151500
Meghadhanush Saheli	116950	597450
Sanitary Pad Group	71300	746300
Radhe Saheli	31000	870418
Shrddha Saheli	486580	1107580
Chamunda Saheli	21900	1726400
Jay shakti Saheli	2500	605500
Food Sister Sahlei	898250	898250
Jyot Saheli	40800	40800
Pantjanpir gau Saheli	412000	412000
Total	3036830	14563064

Highlights of the Work done by our SHG!



Australia 29th PM visit: Exhibition in Adani Solar

The 29th PM of Australia, Mr. Malcolm Bligh Turnbull and his wife Lucinda Mary Turnbull visited Adani, Mundra. At Adani Solar, they saw our 20+ SHG exhibition stall and interacted with over 180 working women from SHGs. Mr. Turnbull was genuinely thrilled to see women stepping out of their homes, crafting beautiful pieces, and supporting their families. Mr. Malcolm Bligh Turnbull – “It’s empowering to witness women taking charge of their livelihoods and making a difference.”



Sathwara Mela 2023-24

The event unfolded with the captivating theme of 'Powering Art Empowering Women,' setting the stage for an extraordinary celebration. Held at the prestigious Adani Corporate House in Ahmedabad, the inauguration was graced by the esteemed presence of the Honorable Chairperson of AF, Dr. Preeti G Adani, Mrs. Shilin R Adani, and Shri V.S. Gadhvi. We were delighted to welcome over 500 enthusiastic visitors to our stall, contributing to the resounding success of the event. **Notably, SHG Groups earned a remarkable income of over Rs. 75,000.**



Switzerland delegate visits SHG

Switzerland delegates made a memorable visit to Adani Solar to witness the exceptional craftsmanship showcased by our SHG exhibition. Captivated by the intricate artwork, they engaged with the women, gaining a profound understanding of their skills and purchasing a significant quantity of goods. **Overwhelmed by the quality of workmanship, they graciously extended their support by sponsoring \$100 (90,000 INR) towards our SHG.** This monumental gesture marks a historic milestone for our group.



Handicraft Day Celebration

After 3-day training from Shrujan, hosted an exhibition showcasing handmade crafts by women, alongside interactive workshops on handicraft techniques.



Workshop on Women Health

Aware the women connected to our SHG about mental and menstrual health care, benefited over 130 women, especially those neglecting personal well-being during menstruation.



Gauchar Cleaning Abhiyan

At Bujpur, 31 women initiated the 'Gauchar Cleaning Abhiyan,' with support from AF's Loader Machine. This collaboration aims to enhance environmental preservation and community development.



Women's Day celebration

Celebrated Women's Day with entrepreneur training and mental peace awareness sessions, attracting over 100 participants.



Community Health




Ensuring good health is not just a priority; it's the cornerstone of a thriving community. At the heart of Kutch, the Adani Foundation is dedicated to nurturing well-being and facilitating access to expert medical care. Collaborating closely with G.K General Hospital in Bhuj and Adani Hospital in Mundra, we tirelessly strive to enhance community health standards.

For over a decade, our commitment to community care has been unwavering, manifested through our Mobile Health Care Units, Rural Clinics, and Ayushman Cards linkages with the beneficiaries and THO. In recent years, a concerning trend of Viral, kidney and ortho related diseases has emerged due to salinity ingress. In response, we have orchestrated a series of specialized health camps to address these issues, offering essential treatment support while fostering awareness about preventive measures.

We firmly believe that both preventive and curative healthcare are fundamental pillars for sustaining community well-being and fostering economic prosperity. Our aim is to strike a harmonious balance, paving the way for a journey of longevity, vitality, and fulfilment for all those under the care of the Adani Foundation.

Summary of Healthcare Initiatives for the Year

This year, we provided **41,546** medical health services and conducted health awareness camps for **763 High school students**. Our annual medical facilities have made a significant impact in improving healthcare access and awareness. Here are the direct beneficiaries of our endeavor:


 **2,108** Medical Support to needy patients


 **118** Dialysis Support


 **10,477** Mobile Van

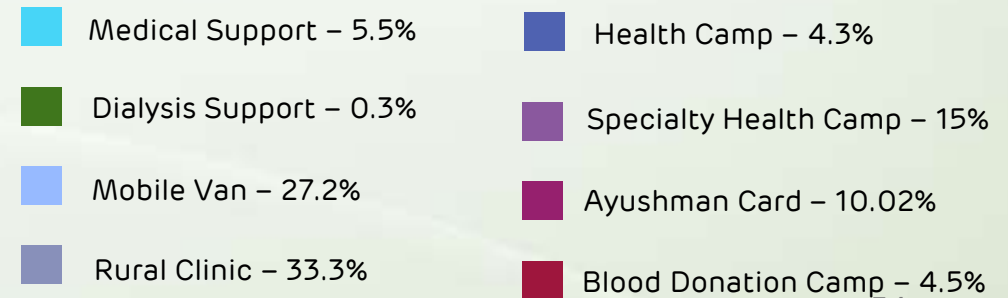
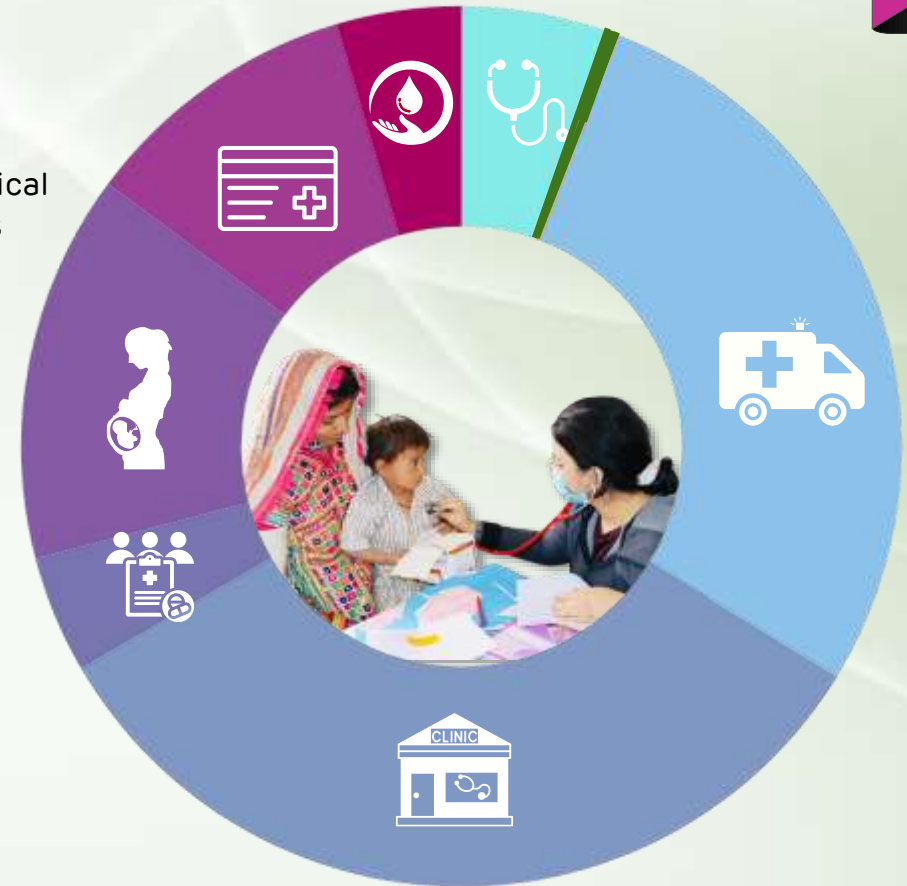
 **12,850** Rural Clinic

 **1,618** Health Camp

 **5,795** Specialty Health Camp

 **6,865** Ayushman Card till date

 **1,715** Blood Donation Camp





Rural Clinic & Mobile Health Care Unit

Health stands as the cornerstone for community development, and to revolutionize rural healthcare, the Adani Foundation has launched the 'Mobile Health Care' and 'Rural Clinic Service'. These initiatives aim to offer primary, preventive, and curative healthcare services accessible in remote and inaccessible areas, a commitment upheld for over a decade.

Rural Clinic



Rural clinics extend their services to 5 villages in Mundra and 2 villages of Mandavi Block. The services of both MHCU and Rural Clinics are accessible to patients at token charges of Rs. 20 per visit.



Mobile Healthcare Unit

MHU is equipped with a range of integrated medical devices enabling staff to conduct preliminary check-ups. With over 90 types of essential lifesaving medicines available, the Mobile Health Care Unit covers 29 villages with 7 fishermen settlements. Services provided include blood pressure checking, sugar testing, and ECG assessments.



Ayushman card facilitation

In a world where medical costs are overwhelming, the Ayushman Card offers hope by providing affordable access to quality healthcare. The Adani Foundation bridges the gap between the government and those in need ensuring that 3865 people received this vital resource. Ayushman Bharat PM-JAY provides Rs. 10 lakhs per card owner for secondary and tertiary care, Adani Foundation is aiming to achieve 100% coverage in Mundra's villages.

25 Village

6,865

Ayushman cards Issued

686.50 Cr

Health insurance

** Funded by - Kutch Copper Limited*



Supporting Individuals



The Adani Foundation extends financial assistance to the most economically challenged patients facing life-threatening diseases such as those related to the heart, liver, kidney, and cancer. This support comes with minimum participation requirements, ensuring access to crucial medical care.

In the current year, a total of 2,108 patients from Mundra, Mandavi, and Anjar Block have received support at Adani Hospital, Mundra. This assistance underscores our commitment to providing essential healthcare services to those in need, regardless of economic status. The medical staff of GKGH stood with us in these endeavors.

Dialysis Support



In the arid region of Kutch, particularly in Mundra where saline drinking water is prevalent, cases of urinary stones and kidney failure are significant. To address this issue, a dialysis support project has been initiated to provide essential dialysis treatment to the most vulnerable patients, enabling them to lead healthier lives.

This year, a total of 2 patients have been supported with regular dialysis sessions, twice a week. Regular dialysis sessions have notably improved the patients' conditions, extended their life expectancy and enhanced their quality of life.

Special Camp

Cataract-Free Mundra



The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below.

Lives Impacted :- 1131

- Comprehensive Eye Screenings at Village level
 - Cataract Surgeries to GKGH ,Bhuj
 - Post-Operative Care and Follow-up
 - 5 successful Operation



This year Adani Foundation organized numerous special health camps, such as blood donation camps where 1715 donors contributed, helping save countless lives.



Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being.



Our camps for pregnant women provided essential prenatal care, ensuring healthier pregnancies and safer deliveries. It benefited 809 pregnant women.



Conducted a pediatric health camp, nurturing the health of 628 children and ensuring their well-being.

GKGH medical staff support in all camps.

Preventive health Campaign

The Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body.

Sample Survey Report 2023-24

- 55%** Never heard about Menstrual hygiene
- 60%** Are using cloths on regular basis
- 36%** Had never used sanitary pads
- 68%** Had no information about UTI
- 30%** Never used millets in their diet
- 60%** Never heard about millets or it's benefits.



Menstrual & Mental Health Awareness Drive:



We organized impactful awareness camps in various villages, empowering women and adolescent girls with knowledge about menstrual hygiene, ensuring both physical and mental fitness.

Impact:

- 36%** Growing usage of sanitary napkins
- 22%** reduction in UTI
- 2610** women & girls benefited

International year of Millets – 2023



To promote millet culture and raise awareness about its benefits in Mundra, we organized a Millet Competition across nine villages. **Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this initiative, 300 indigenous millet recipes were showcased**, highlighting the potential for sustainable and nutritious dishes in our daily diets.

Impact:

- 65%** of women are using millet in their regular diet.
- 17%** Women grappling with obesity and diabetes are experiencing positive transformations in their health, evident in significant weight loss.

Millets Food Festival

In the wake of the "International Year of Millet" in 2023, KCL took decisive steps to promote the nutritional and empower women from remote area of Mundra Taluka.

Across the villages of Mundra Taluka, KCL organized a series of millet awareness camps and a thrilling millet food competition. The response was nothing short of remarkable, with 715 women actively participating and sharing 300 indigenous millet recipes. To commemorate this achievement, we hosted a grand millet festival at Adani House, in which 120 women showcased a diverse array of millet dishes, each one bursting with flavor and nutritional value.

But the significance of the event extended beyond mere culinary delight. Women spoke of how millets had become integral to their lives, aiding them in combating long-term ailments. They are very much grateful for these awareness camps and look forward to such health-promoting events.

At this event, we had the privilege of welcoming esteemed guests, including Mr. Sujal Shah (CEO, APSEZ), Mrs. Rachna Joshi (President, Mundra Nagar Palika), Mr. Pandya (Program officer, ICDS), Mr. Saurabh Shah (Head Corporate Affairs, APSEZ), and Mrs. Nehalben (Nutrition expert). Their presence added immense value to our gathering.



Community Infrastructure Development

Adani Foundation is dedicated to enhancing the quality of life of communities under the Community Infrastructure Development Initiative. It acknowledges the government's role in providing fundamental infrastructure facilities and strives to bridge gaps, ensuring its activities are tailored to meet specific needs and responsive to grassroots requirements.

Some of the initiatives include constructing check dams, deepening ponds to augment water storage capacity, infrastructure support to fisherfolk communities, developing secure education premises and facilitating access to clean drinking water for villagers.



CID endeavor of FY 2023-24



Renovation Check dam and CC road work at Nani Khakhar – 200+ benefited



Renovation of High School at Zaarapa – 2200+ Benefited



Construction of Pipe Culvert – 400+ Benefited



Construction of chain-link fencing at Mangra village – 300 people benefited



Gaushala Shed at Zarapara village – 400 cattle benefited



195 Stall – Vegetable market– 900+ Vegetable vendor benefited



Renovation of approach road, Zarapara – benefiting 400 villagers



Renovation of Civil and Electrical Work at ITI, Mundra - 500 students benefited

CID endeavor of FY 2023-24



Construction of 21 Borewell Recharge in Nagmati River - 150+ farmer benefited



Check dam Desilting and restoration at Nana Bhadiya – 100+ farmers benefited



Renovation of Check dam at Pavadiyara village - 300 people benefited



Renovation of Balwadi at Juna bandar & Luni bandar



185 RRWS construction is ongoing in various villages - will benefit 1300+ residents



Supply & installation of Solar panel (3.25 KV) at CGP, Mundra – benefiting 1200 people



Development of Model Farm in Zarpara, Siracha & Mangra – Benefiting 300 people



Renovation of approach road at various fisherfolk vasahat

Community Resource Centre



Government Scheme Facilitation				
Sr. No	Scheme Detail	Gov. Support Rs/Month.	Total Beneficiaries	Total Amount per Month (INR)
1	Widow Pension	1250	674	28323150
2	Bal seva Ayog	2000	49	3430000
3	Divyang pension	1000	27	586000
5	Niradhar Pension	1000	126	5178000
6	Palak Mata Pita	3000	5	696000
Total			1439	38213150



Community resource Centre is the bridge between Government Schemes and real Beneficiaries. It is situated at Adani Field Office, Baroi with the motive to be Single window point solution (Online Application & Documentation) to Facilitate Government Schemes leveraged to needy and Eligible people.

Till Date 1439 beneficiaries are getting aid of Widow Pension scheme, Senior Citizen and Divyang pension scheme and Palak Mata Pita Scheme 3.81 Crore Monthly by procedure support of AF.

Key Achievements of Community Resource Center

One time

Sr.No	Gove Scheme one Time	Gov. Support	Total Beneficiaries	Total Amount/Year
1	Covid Support One Time	50000	12	600000
2	Vahali Dikri @ 18 Year	110000	113	12430000
3	Divayang Sadhan Sahay one time	5000	176	880000
4	Manrega (NB21)	22000	32	704000
5	Pagadiya Sadhan Sahay Yojana	9000	9	81000
6	Gau Dattak Yojana	10800	857	9255600
7	Gobardhan Yojana	42000	100	4200000
8	Fishermen Shram Yojna		163	
			1487	28150600





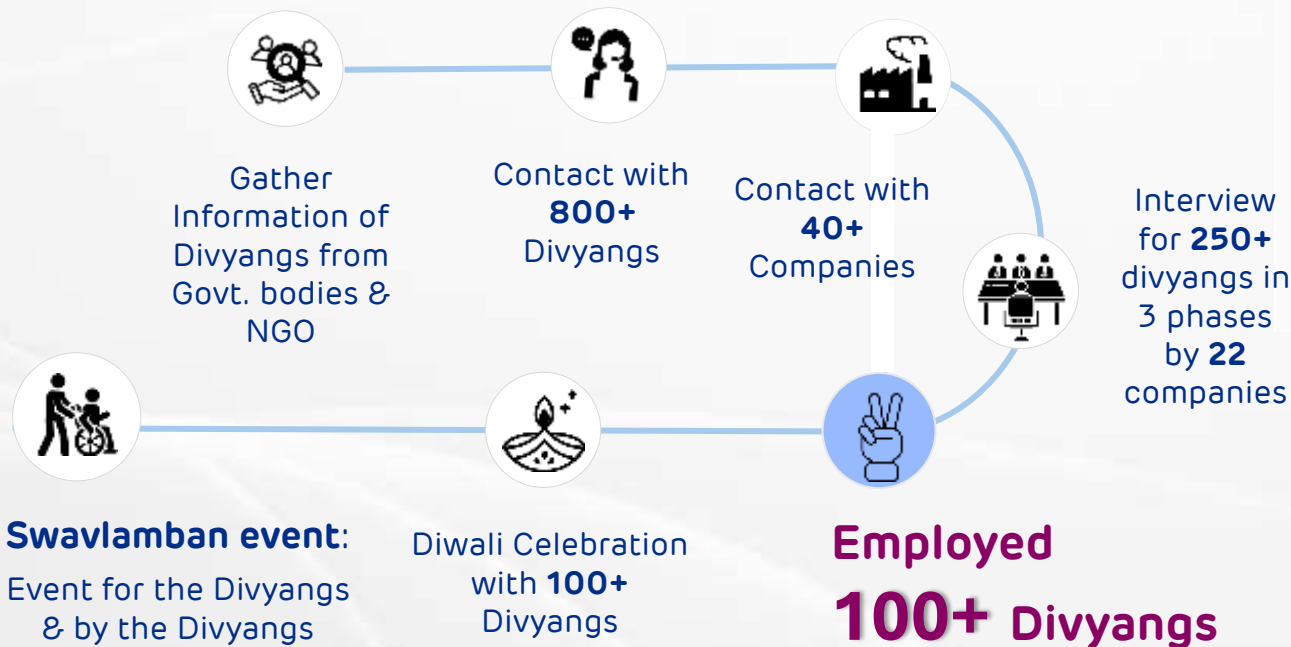
Swavlamban - Project for Divyangs

Adani Foundation's vision extends beyond Aid, focusing on dignity and sustainability through meaningful employment. While equipment support offers mobility, employment bestows the dignity to stand tall in society.

With noble intentions in mind, this year, we organized a mega employment drive. Our goal is to provide job opportunities to over 100 disabled individuals.

We've conducted interviews in three phases, for 250+ divyang candidates engaging 22 companies from Adani Groups and other reputed firms in Mundra.

➤ Roadmap of this incredible vision:



Diwali Celebration

After the successful completion of the 1st phase of the Divyang Employment Fair on November 8th, we gathered to share the joy of Diwali with over 100 remarkable divyangs.

In the spirit of uplifting divyangs, we have also invited advocates dedicated to the well-being of disabled people. Mrs. Anni Rakshit Shah and Mrs. Rupa Kapoor graced us with their presence as chief guests. Our invitation also extended to the HR representatives of Adani Group and SEZL companies.

On this auspicious occasion, we **equipped 32 divyangs with essential tools such as wheelchairs, tricycles, harmoniums, and facilitated 10 divyangs through government schemes.**

To express our gratitude to those who have dedicated their lives to improving the lives of disabled individuals, we honored them with certificates and mementos.

Just as we light up our homes with glowing diyas during Diwali, the smiling faces of these divyang individuals illuminated our Adani House during this event. It was a celebration that went beyond the ordinary, leaving a lasting impression of compassion and unity.



Swavlamban Event

In the spirit of hard work and dedication, the Adani Foundation concluded its Divyang Employment Fair, marking a significant milestone in transforming lives. Through three phases of dedicated effort, the Foundation successfully secured over 100 employments, providing a newfound sense of self-reliance to individuals with disabilities.

Notably, 35 divyangs were equipped with essential employment tools, fostering self-sufficiency. To commemorate this achievement and honour the divyangs, companies, and advocates of inclusivity, the Foundation organized the Swavlamban event on December 5th at GAIMS, Bhuj.

The event garnered the presence of esteemed personalities, including Jeet Adani, Director of Adani Group, V.J. Rajput, Commissioner for Persons with Disabilities, and Nimesh Pandya, Ed. of Kutch collector, among others.

This celebration was a testament to the Foundation's commitment to redefining the narrative around disability and employment.

As the Adani Foundation rejoices in this achievement, it reaffirms its commitment to ongoing efforts that positively impact the lives of differently-abled individuals, embodying a vision of a more inclusive and empowered society.



Our Pride from Divyang Employment Fair !



Bhimaji Maheswari
DEO, Mundra Windtech Ltd



Patani Govind Babu
Document Officer, KCL, Mundra



Arjan Gadhavi
DEO, Adani Solar, Mundra



Govind Maheswari
DEO, Mundra Windtech Ltd



Devangh Gadhavi
DEO, Adani Solar, Mundra



Jadeja Natubha Gangji
KCRC NGO, Bhuj



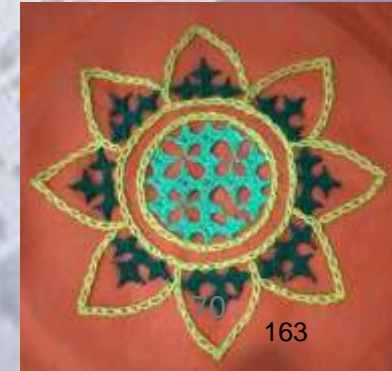
Arti Nilesh Jethva
Trainer, ASDC, Mundra



Bharat Makwana
CMR, Admin, Adani house

Adani Skill Development

Adani Skill Development Centre (ASDC) is dedicated to enhancing employability and entrepreneurship. This year, ASDC has trained 50,00 individuals across Kutch, resulting in 65% livelihood generation. Their innovative courses cover diverse sectors, and they have played a significant role in empowering marginalized communities in places like Mundra and Bhuj, Gujarat. ASDC's vision is to make everyone skilled and employable, meeting industry demands through trained manpower.



ASDC Mundra Center

Course Name	Gender Category		Total
	Female	Male	
Digital Literacy	04	03	07
Mud Work	180	00	180
JOC (RTG Crane Operator)	00	79	79
Hydrography	00	03	03
Advance Excel	00	18	18
Domestic data entry operator	23	30	53
Tally with GST	02	00	02
Hand Embroidery	170	00	170
Dori/ Macramé Work	90	00	90
Food & Beverage	20	12	32
General Housekeeper	60	00	60
Beauty Therapist	40	00	40
Total	589	145	734

ASDC Bhuj Center

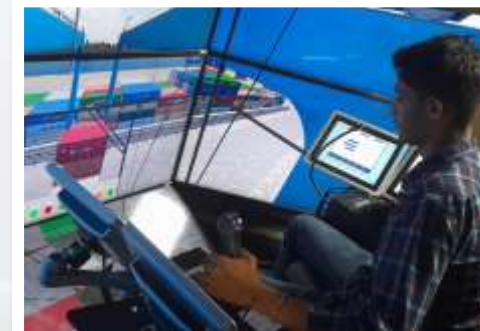
Course Name	Gender Category		Total
	Female	Male	
General duty Assistant	84	20	104
Digital literacy	46	16	62
Hydrography	9	0	09
Industrial Safety	1	0	01
5S	1	0	01
Entrepreneurship Development program	60	0	60
Domestic data entry operator	25	0	25
Financial Literacy	64	0	64
Diet and Nutrition	50	0	50
First aid	18	0	18
Interview skills	11	0	11
Total	369	36	405

ASDC Mundra Center

At Mundra Center ASDC, our mission is to equip young individuals with the skills necessary for success. In the current year, a remarkable 734 youth have undergone comprehensive skill training. Our unwavering commitment extends to ensuring that every aspiring professional receives an opportunity for growth and development. Almost 99% of our fees are tied up with various companies, allowing students to access high-quality training without financial barriers.

Other Activities & Achievements

- i. Women Empowerment through Skill Training: Provided Mud work training to 180 women in Mundra taluka villages supported by MPL.
- ii. RTG Crane Operator Training: Collaborated with APSEZ HR Team to train 79 students.
- iii. Dori Work and Hand Embroidery Training: Benefited 90 women in various Mundra villages supported by MPL.
- iv. Health Awareness and Career Sessions: 108 Ambulance Department enlightened GDA trainees at Adani Institute of Medical Sciences. Guest session on career advancement led by Mr. Kapil Goswami.
- v. Exposure Visit for Women: Women trained in Mud Work, Dori Work, and Hand Embroidery showcased their skills during a visit by foreign delegates to the Solar Plant.
- vi. Women's Related Training Seminar: Held at Matr Vandana College, Bidada, Mandvi.



ASDC Bhuj Center

ASDC Bhuj, established following successful skill development initiatives, is a beacon for aspiring professionals. Driven by youth demand, this center plays a pivotal role in providing crucial training for self-development and enhancing personality traits.

Our mission is clear: to equip young individuals with essential skills that position them for success in the job market. With almost 58% of fees tied up by ASDC through strategic partnerships and 42% of fees contributed by students, we ensure that financial barriers do not hinder skill acquisition.

Other Activities & Achievements

- i. Commendation from Shree Jeet Adani: Received appreciation for supporting the Divyang job fair.
- ii. Employee Development Initiatives: Conducted Advanced Excel training for 18 Sumitomo India Ltd employees
- iii. Entrepreneurship Development Program: Organized a comprehensive 12-day program with 60 diverse candidates.
- iv. New Trainee Orientation: Conducted sessions about SAKSHAM center and LMS registration at the Bhuj Centre.
- v. Civil Defense Training (5 days): Covered essential topics including Disaster Management, First Aid, 181 Mahila Helpline, 108 Emergency Services, and Fire Safety.
- vi. F&B & Housekeeping Batch Inauguration: 92 students trained to enhance employability.
- vii. Indo-Euro Project Seminar: Arranged at various Nursing Colleges in Kutch District. Focused on German Language training and job placements.
- viii. Crucial Meeting with ISAR & UNICEF: Discussed future skill development challenges and transgender equality on 9th December 2023.



AKBPTL - TUNA



CID:

The paver block work at Vandi and Tuna Common Gathering which enhances their usability and convenience for the community. Community hall Room construction at Rampar is completed. It will benefit 1010 fishermen.



Potable Water Distribution:

Potable water (17.5 KL per Day) Distribution to Vandi, Vira and Dhavar varo Bandar on regular base through Water tanker Regularly through **AKBTPL and GWIL**. This initiative **benefited 2230 Fishermen**.



Prakrut Rath -Tree Plantation:

Total 3000 Tree sapling were distributed to individual, And 500 tree have planted at Common place and school with ensure their responsibility for watering and caring.



Fodder Support:

Support of Dry & Green Fodder to Tuna and Rampar Village and Gaushala during Scarcity. That impacted on Cattle health and Milk Productivity.

7410 kg Dry fodder

4,47,473 kg Green fodder

1228 Cattle Benefited



3000 Tree plantation



193 Benefited by Mobile Van



56 Benefited by Medical support

AGEL – Khavda

Adani Green Energy Ltd. Khavda renewable solar plant is a hybrid power project that will use both solar and wind energy to generate electricity. It will be built in the Khavda desert along the Indo-Pak border in Kutch district of Gujarat, having a total capacity of 20,000 megawatts (MW), making it the world's largest hybrid renewable energy park and will be cover an area of 72,600 hectares of waste land. It is expected to play a major role in fulfilling India's vision of generating 450 gigawatts (GW) of renewable power by 2030.

Our Vision for Khavda:



Empowering through Education: Elevate overall academic results, champion girl child education, and ignite a passion for technical streams. We aspire to pave the way for stable employment, fostering a prosperous livelihood for the youth.



Empowering Khavda's Women: Empower 1000+ women socially, economically, and financially through the establishment of a strong federation "Sarhadi Mahila Vikas Sangathan"



Elevating Healthcare: Provide quality healthcare services in 22 villages of Khavda, with a primary focus on enhancing women and child health.



Water Positive Villages: Achieve water positivity in 8 villages of Khavda through our dedicated water conservation structures. We aim to create sustainable solutions for water availability, ensuring a secure and flourishing future for these communities.



Transforming lives in Khavda!

Nestled deep within the remote borderlands of Kutchh, Khavda grapples with the harsh reality of limited access to fundamental necessities: education, healthcare, clean water, and crucial preventive care for women. In response to these pressing challenges, the Adani Foundation has embarked on a transformative journey, launching four visionary projects aimed at illuminating hope and progress across Khavda and its surrounding villages.

Recently, luminaries including Mr. Amit Arora, the Collector of Kutchh, Mr. Verma, Plant Head of AGEL, and Mr. Sanjay Avinash, BSF Head Bt.72, convened with local leaders from 26 villages to honor the Foundation's unwavering commitment.

Amidst accolades and appreciation, Mr. Amit Arora lauded the Foundation's healthcare initiatives and advocated for further support, proposing the launch of an "Arogya Van" to bridge the gap in access.

Echoing this sentiment, Mr. Sanjay Avinash championed the pursuit of higher education, heralding a beacon of hope for the community. As the event culminated with the felicitation of five specialist doctors by the District Collector, it underscored the profound impact of the Adani Foundation's endeavors, igniting a flame of optimism that illuminates the path towards a brighter tomorrow.



Endeavor In Core Areas:



Education – Project Utthan:

Through our Utthan project, we've embraced 8 high schools.

Our mission: Elevate 10th board results, boost attendance, slash dropout rates, promote girls' education, and uplift education quality in Khavda.

At this high schools, we've enlisted 8 dedicated Utthan Sahayaks, equipped with specialized training. They're laser-focused on bolstering core subjects such as Math, Science, and English. Additionally, we've brought on board 2 community mobilizers, tasked with persuading parents to prioritize their children's education, particularly for girls.

Fostering ambition & motivation by facilitating with Industrial visit & notebook distribution



Empowering 364 Students



Health Care:

The community struggles with limited healthcare resources, including just one CHC with a single general doctor, no specialized care for women and children, and insufficient diagnostic equipment. Financial constraints further hinder access to medical services.

To improve healthcare, we're tackling diseases in two ways: through health camps and Adani Arogya Karyakram Khavda CHC for treatment, and dedicated awareness camps for prevention.

Curative Health Camp:

Adani Arogya Karyakram Khavda CHC:

Gynec	Pedia	Physi	Ortho	Optho
555	640	283	206	197

Health Camp:

Gynec	Pedia	Physi	Ortho	Optho
278	455	579	61	139



42 Villages benefited



3433 patients benefited

Preventive Health Camp:

Actively promoting preventive health awareness through family planning education, menstrual hygiene workshops, nutrition advocacy, mental health awareness sessions. Conducted 49 training in 38 villages.



1453 Women Benefited



1300 Pad Distributed

Endeavor In Core Areas:



CID – Water Conservation

In Khavda, water scarcity is critical: supply is weekly, groundwater levels are low, and villagers and animals share a single pond. Students drink unfiltered water at school, and rainwater flows away, unused.

1. Kuran village – Pond deepening & Filter well
2. Tuga village - Check dam maintenance



15 lakh cum



3600+ villagers benefited

Other CID work

1. Roof Shed in khavda High school
2. RO plant in 5 High school

350+ students benefited



Farmer welfare:

In Khavda, agriculture struggles due to limited knowledge and challenges like water scarcity and soil fertility issues, despite 80% of the population being engaged in dairy farming.

To educate farmers we organized an awareness camp for **275 farmers**, encouraging them to join the **ATMA Government Sanstha**. This initiative aims to provide guidance on conventional agriculture techniques and exposure to modern farming methods and tools.



Women Empowerment:

Women empowerment initiatives are underway, emphasizing financial independence and self-reliance.

Conducting awareness camps across 38 villages, we're educating women about the importance of having Saving Accounts, Through awareness camps, established Saving Account Groups, forming 7 SHG with 150 women.



15 SHG formed



150+ Women Economically Empowered

Green Energy



AGEL – Dayapar & Mandvi



Dayapar Adani Wind Energy project is a large-scale wind power project located in the Kutch district of Gujarat, India. It is one of the biggest wind farms in the country, with a total capacity of 575 MW. The project was developed by Adani Group and Inox Wind, its project was commissioned in April 2019 and supplies clean energy to various states in India through power purchase agreements with Maharashtra State Electricity Distribution, NTPC and PTC India.

Our Vision for Dayapar & Mandavi:



Water Positive Villages: Achieve water positivity in 42 villages of Dayapar through our dedicated water conservation structures. We aim to stablish sustainable solutions ensuring reliable water availability.



Improve Animal Husbandry: Focus on the health of cattle by providing vaccinations, medical treatment, and highly nutritious food to cattle. Helping Cattle owners to generate good revenue and sustain their livelihoods.



Enhance Education: Enhance the school's infrastructure and financially support students for educational equipment, providing them with a modern classroom environment equipped with the modern technology.



Health Services: Provide medical services to 3500 people of Dyapar and connect them with government medical schemes.



Endeavor In Core Areas:



CID – Water Conservation

Kutch suffers from a water shortage, particularly in the Dayarpar region, which receives the least amount of rainfall and has high TDS groundwater. To conserve as much water as possible in the AGEL Dayarpar region, the Adani Foundation has initiated various pond deepening and check dam restoration projects.

Sustainable Water Management projects:

1. Pond deepening in 8 Villages
2. Check Dam renovation & deepening in 2 villages
3. Over Head Portable Water Tank in 1 village

10.4 lakh cum
Water capacity

985 acers
Water rich land

1500+
Farmers Benefited

50,000/Ltr
Capacity of Over head water tank



SLD - Kamdhenu:

The Dayapar people rely largely on animal husbandry as their second most important income source, after agriculture. But villagers lack in sufficient knowledge on the dietary needs and vaccinations for cattle.

To educate them we are organizing cattle treatment and vaccination program, workshop on Animal Husbandry, and participating in Krushi Mela providing cattle owners mineral mixers to improve animal health and milk production.



455
cattle owners
provided Mixture
Mineral

1500
cattle Vaccination

Endeavor In Core Areas:



CID - Education:

Committed to improving educational infrastructure to ensure every student in Dayapar has access to safe and quality education environment. Through smart classes and material support, we're easing financial burdens and creating engaging learning environments. For good health of students ensuring portable water facility and tree plantation drive in schools.

Support	School
LED TV for smart class	3
Morden Education tools	2
Education kit support	2
Portable water facility	3
Eco club	1
School renovation	2



Health Care:

In AGEL Dayapar region, the health condition is concerning with major diseases like kidney stones and arthritis are prevalent in the villages. To battle this situation we are conducting health camps and organized Ayushman Bharat card camps. During these events, we distributed medicine free of cost to patients and provided recommendations for optimal treatment to those in need.

AGEL/ Adani foundation have supported 20 different equipment like Cardiac Machine, Semi auto analyzer, and other medical tools at CHC Dayapar which is going to facilitate 56 villages benefiting 62,500+ population.



618 Health camp Beneficiaries

86 Ayushman card Beneficiaries

₹8.6 Cr. Medical Coverage



13
Schools
Benefited



1500+
Students
Empowered

Adani Cement - Sanghi



Adani Cement Plant, prominently located near Moti Ber Village in the Abdasa block of Kutch, Gujarat, stands as a distinguished entity in the cement industry. Our facility is not just a cornerstone of the local economy, but also a pivotal contributor to the community's development. With a robust and integrated manufacturing infrastructure, we boast:

- A 6.6 MMTPA (Million Metric Tones Per Annum) capacity Clinker Plant
- A 6.1 MMTPA capacity Cement Plant
- Power generation facilities with a capacity of 143 MW.

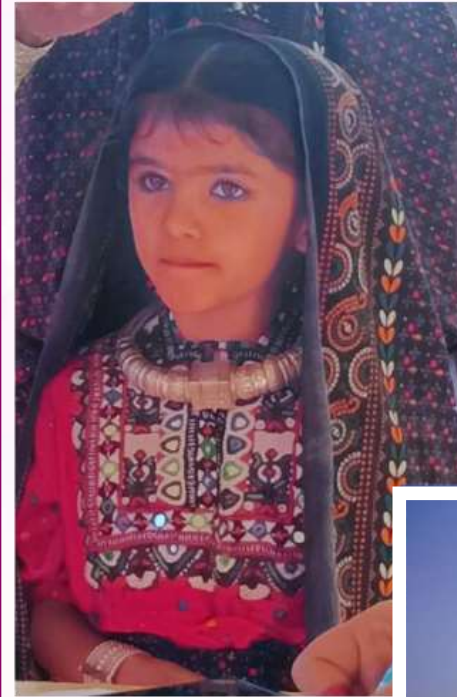
About Abdasa:

Abdasa is a region of Gujarat's Kutch district, defined by its diverse geography and rich cultural tapestry, influenced by different communities, agriculture crops and livestock rearing, particularly cattle and camel husbandry, is integral to the region's livelihoods.

The coastal areas support fishing communities, despite progress in infrastructure and development, Abdasa faces challenges related to water scarcity, education, and healthcare, while its diverse culture and unique landscapes continue to define its identity.

Our vision:

To foster and create a sustainable future for all by providing affordable and accessible facilities at the core of health, education, livelihood, and infrastructure.



Endeavor In Core Areas:



Joyful Beginnings:

Our CSR journey in Sanghi commenced with a joyous Christmas celebration at Adani Cement Abdasa on December 24th. The event, attended by over 500 students and parents, featured cultural performances and dance competitions, spreading festive cheer. Esteemed guests, including Mr. Vivek Misra, Head of Adani Cement Plant, Sanghipuram, Mr. Pushkar Chaudhry, HR Head, and Mrs. Pankti Shah, Gujarat CSR Head, graced the occasion.



Health:



Addressing the pressing healthcare needs of residents near Adani Cement Sanghipuram, a series of specialty health camps were launched. These camps, featuring Pediatric, Gynecological, Ophthalmic, and General medical services, aimed to bridge the gap in access to specialized healthcare. Previously, locals had to travel long distances to Naliya or Bhuj for medical care. By bringing essential health services directly to the communities, these camps have made a significant impact, offering health check-ups, consultations, and treatment for various illnesses and conditions, ensuring better healthcare accessibility for all.



1200 patients benefited



11 Villages benefited

Endeavor In Core Areas:



Road Superheroes:

Introducing the "Road Superheroes" Health Care Program, tailored specifically for the drivers of

Adani Cement Abdasa, dedicated to promoting health awareness and preventive care within our driving community.

This holistic initiative comprises five vital stages:

1. Health Screening
2. Telehealth Services
3. De-addiction Awareness
4. Stress Management & Yoga
5. Regular Health Tracking

150
Drivers Benefited
& Receive Health Card

A two-day health screening camp held at Adani Cement, offered comprehensive health assessments, including vision tests, blood pressure measurements, ECG, diabetes screenings, and BMI evaluations, alongside expert consultations.



Tree Plantation Initiative:

Adani Cement Campus hosted a remarkable tree planting drive as part of our employee volunteer program. More than 50 enthusiastic employees joined forces to plant trees, showcasing our dedication to a greener future. This collective effort exemplifies our commitment to environmental conservation and responsible corporate citizenship.





adani
Cement

NDTV

adani
Foundation

અદાણી ફાઉન્ડેશન દ્વારા

અબડાસા વિસ્તારમાં સામાજિક ઉત્તરદાયિત્વના ભાગરૂપે

શૈક્ષણિક કાર્યનો શુભારંભ

સ્થળ : મોટી બેર, અબડાસા

સમય : ૧૦:૩૦ કલાકે

adani
Foundation

અદાણી ફાઉન્ડેશન

આપનું હાર્દિક સ્વાગત કરે છે.



NDTV, or New Delhi Television Limited, stands as one of India's premier news networks, renowned for its steadfast commitment to journalistic integrity and comprehensive coverage. Founded in 1988 by Radhika Roy and Prannoy Roy, NDTV has emerged as a trusted source of news and analysis, shaping public discourse on critical issues both within India and around the world.

At the heart of NDTV's ethos lies an unwavering dedication to delivering unbiased, credible, and impactful journalism



Empowerment through Education:

In Abdasa Block, the AF, partnering with NDTV, is revolutionizing education through CSR initiatives. Faced with low literacy rates and infrastructure challenges, the Foundation conducted a thorough needs analysis. This led to targeted interventions, including:

- 1. Smart Classes: Implemented in 10 primary schools for interactive learning.**
- 2. School Building & Bala Painting: Creating vibrant learning spaces.**
- 3. Educational Kits Distribution: Providing 1,150 students in 15 schools with essential learning materials.**

A momentous **Handing Over Ceremony** unfolded in Moti Ber Village, Abdasa, marking the debut of Smart Classes and vibrant Bala Painting in 15 primary schools.

A notable announcement by Mr. Vivek Mishra, Plant head, Adani cement, Sanghipuram unveiled plans for a forthcoming hospital within Sangji premises, promising enhanced community healthcare access.

In this overwhelming event **1,150 students facilitated with essential education kits** and teachers were honored with memento.



Shree Renuka Sugar Ltd.

Shree Renuka Sugars Limited stands as a globally recognized agribusiness and bio-energy corporation, covering the entire sugar value chain.

As one of India's largest producers of sugar and green energy, Renuka is at the forefront of sugar manufacturing. With eight cutting-edge sugar mills, many equipped with ethanol and power co-generation capabilities, Renuka leads the industry. Additionally, Renuka operates two of India's largest port-based refineries.



Education:

Committed to improving educational infrastructure to ensure every student has access to safe and quality education environment; we are committed to do following work:

- Renovation of 15 Anganwadi in Kidana, Bharapar, Tuna, Rapar and Wandri village benefiting **600+ students**. Also, supporting primary schools with smart class education equipment.
- Bala Panting and construction of stage in Primary school, Rapar.



Water Conservation Project

To support the community with secure and safe water we are dedicated in implementing water project.

Sustainable Water Management projects:

1. Pond deepening work in Kidana, Bharapar and Tuna Villages. It will benefit 600+ villagers and will have 24,000 CUM water holding capacity.
2. Construction of RO plant room with installation of 1000 ltr./ hr RO System.



AESL



Adani Energy Solutions Ltd, formerly known as Adani Transmission Ltd, is an electric power transmission company.

ATL is the country's largest private transmission company, with a presence across 16 states of India and a cumulative transmission network of 19,800 ckm and 53,000 MVA transformation capacity.

In its distribution business, AESL serves more than 12 million consumers in metropolitan Mumbai and the industrial hub of Mundra SEZ. AESL is ramping up its smart metering business and is on course to become India's leading smart metering integrator.

Course of Action in ATL's Villages:

Upon receiving the CSR responsibility for villages under ATL, the Adani Foundation embarked on a mission to address community challenges. Recognizing the pressing issue of increased salinity affecting water availability for daily needs and agriculture, we initiated work on water conservation structures as a sustainable solution to alleviate the villagers' hardships.

- **Initiated Pond deepening and Check dam restrengthening work in 5 villages of Rapar and Mandvi Taluka.**

- **Additionally, started working for Cattle Health Camp and tree plantation drive.**



27,200 cum
Water Capacity



17,000+ villagers
benefited



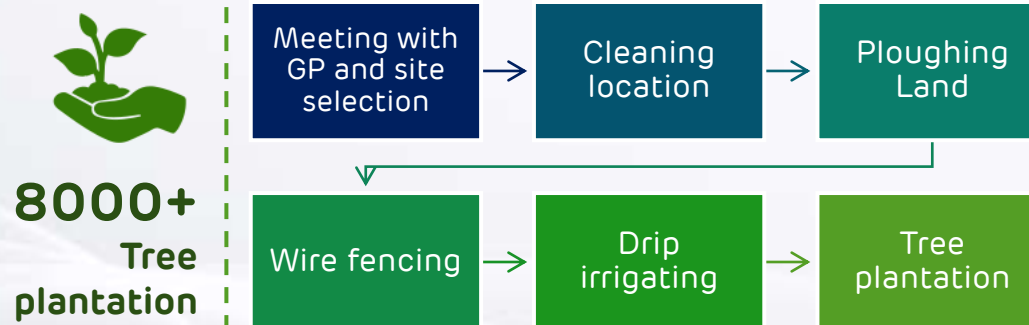
CER – APSEZ



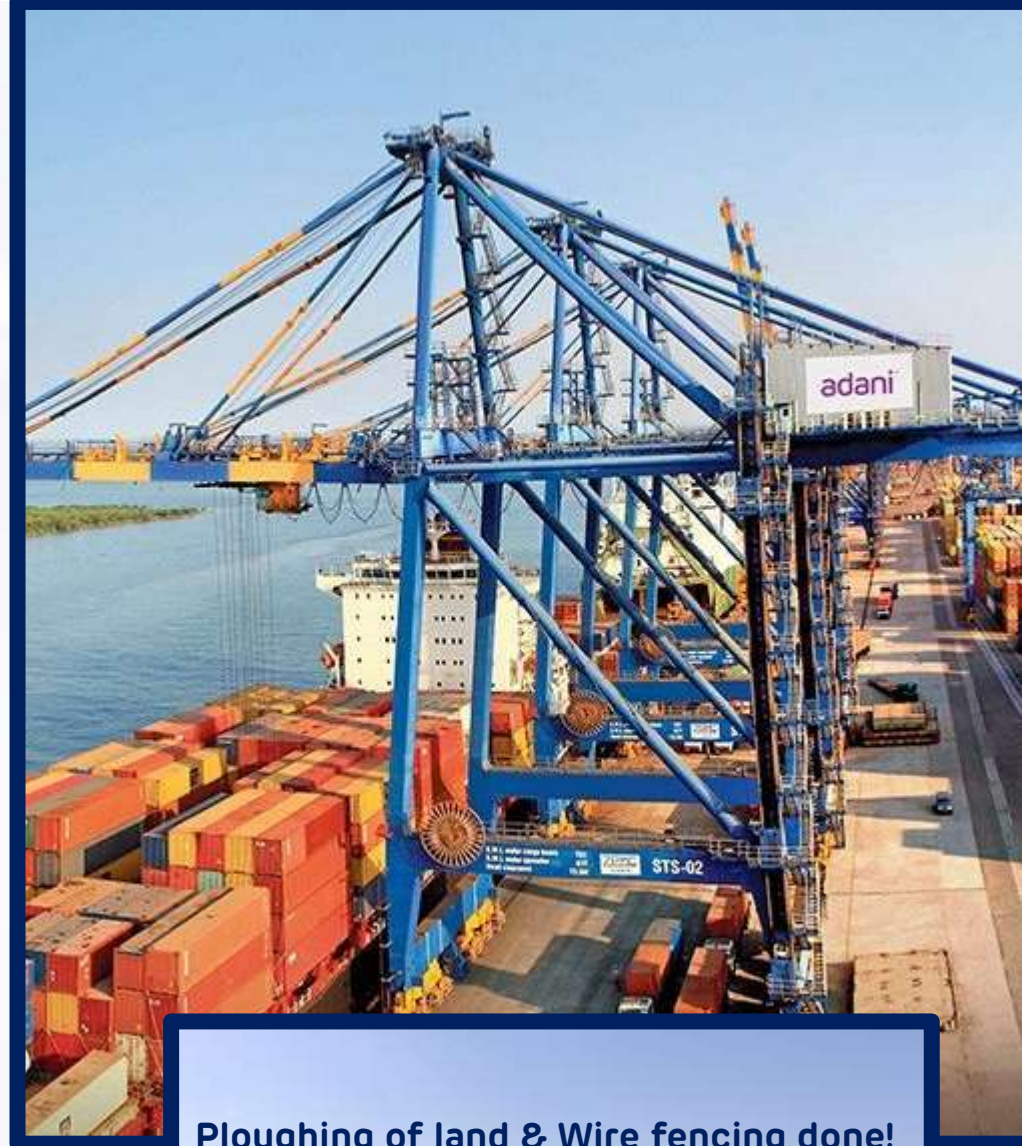
Adani Ports and Special Economic Zone Limited, a subsidiary of Adani Group, is India's largest private port Operator, operating 12 ports and terminals, including India's first deep water Transshipment Port Vizhinjam International Seaport Thiruvananthapuram and India's first port-based SEZ at Mundra.

Course of Action:

Taking on the CER responsibility from APSEZ, the Adani Foundation has undertaken a massive tree plantation drive in Moti Bhujpar. To ensure its success, we have devised a comprehensive six-step plan.



Our initiative represents a sustainable approach to addressing environmental challenges and reducing carbon emissions.



Ploughing of land & Wire fencing done!





Work done during Biparjoy Cyclone

Cyclone Biparjoy caused huge losses in Mundra and nearby villages. Adani Foundation's worked for relief and recovery with Panchayat & Government body. More than 17,000 people benefited from various efforts.

Adani foundation consider this as ethical responsibility and a source of satisfaction. Stakeholders and government bodies also appreciated the efforts.

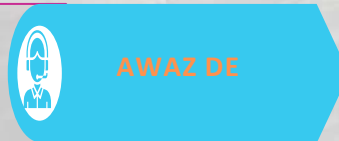
Meetings with Taluka & District government officials to facilitate assistance and coordination with local authorities.



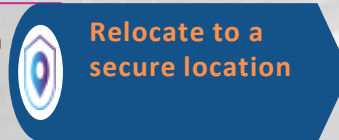
Health teams and ambulances on standby in case of emergency.



Reached to more than 10000 people by Awaz de to aware all, specially for fisherfolk settlement.



4500+ Workforce migration with basic amenities.



100+ Team member distributed for each taluka/Villages as per requirement



Monitoring

Tracking the cyclone's progress by AF team member.



Connect

Team members in directly touch with 10 Temporary housing & 60 Villages.



Government

Co-ordinating with Government organizations from Talati to Collector.



Panchayat

Co-ordinate with Gram panchayat in case they need any emergency support.

Pre-cyclone preparation



- Team distribution
- Workforce migration
- Basic amenities
- Awareness efforts.
- Meetings with government.

During cyclone



- Food and shelter provision
- Fodder support
- Awareness messages
- Vehicle support.
- Coordination with Panchayat

Post-cyclone relief



- Temporary housing
- Food packets
- Excavator support
- Transfer of affected individuals.
- Provision of fodder

Annexure – 3

APSEZ ONGOING LEGAL MATTERS

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on date)	Current Status	Action Taken/Proposed
1.	Kheti Vikas Seva Trust Vs UoI & Others CA 9124 of 2011 in WPPIL 12 of 2011	<ul style="list-style-type: none"> The writ petition has been dismissed by the Gujarat High Court on 17th April 2015. The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court. However, an application was filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state forest and environment department in relation to the writ petition. The said Writ Petition before the Gujarat High Court has been disposed of by common order dated 05.09.2022. Further, a Civil Application No. 1 of 2011 in CA 9124 of 2011 was filed against APSEZ and APL for initiation of contempt proceedings. The court ordered the CA to be listed with another matter (WPPIL 121 of 2021) 	Not Listed since October 2021	Matter pending before Gujarat High Court	<ul style="list-style-type: none"> The committee of Mr. Claude Alvaris, Mr. Subrata Maity and Deputy Conservator of Forest, Kachchh was appointed and the committee submitted its report on 7.6.2016. The committee suggested various measures like replanting of mangroves in 5333 ha area, GCZMA to re-examine the entire proposal of APSEZL in line with CRZ notification, measures to safeguard Bocha Island and annual uploading of satellite images by APSEZL. APSEZL has challenged the recommendations of the committee stating that it has exceeded its terms of reference and APSEZL has already done mangrove reforestation and is in compliance with the Environment Clearance dated 18.9.2015. The Sunita Narain Committee recommendations have already been captured in the EC conditions and the company is in compliance of the same.
2.	SLP 28788 of 2016 Pravinsinh Bhurabhai Chauhan Vs State of Gujarat & Others Petitioner 1. PRAVINSINGH BHURABHA CHAUHAN Respondent 2. State of Gujarat 3. APSEZ 4. MoEF&CC, New Delhi 5. MOC&I, New Delhi 6. Collector, Bhuj	<ul style="list-style-type: none"> Public Interest Litigation was filed before the Hon'ble Gujarat High Court by Mr. Pravinsingh Bhurubha Chauhan alleging, presence of Sand dunes in the APSEZ project area. APSEZ has submitted its representation that no Sand dunes are present in the project area and same was also verified during the site visit carried out by the Committee, constituted by Collector, Kutch on 25.07.2014 and by Regional Office of MoEF&CC, Bhopal on 25.09.2014. Hon'ble High Court of Gujarat had dismissed the PIL filed by the Petitioner, vide their order dtd. 18.02.2015 stating that, "There is no need of constituting a new committee to look into the alleged violations as there is already a committee constituted by the ministry and a report by the same committee has also been submitted" Later on Special Leave Petition was filed in Supreme Court by the Petitioner vide dated 26.10.2015 against the above said order of the Hon'ble High Court of Gujarat In view of above, Hon'ble Supreme Court vide their order dated 23.08.2017, had requested the earlier formed Sunita 	Last hearing was done on 14th Sept 2018	Matter pending Hon'ble at Supreme Court.	<ul style="list-style-type: none"> APSEZ has already submitted as part of their submission to the Committee that there is no presence of "Sand dunes", in APSEZ area, inline to the authenticated maps & report available for this area. The Committee visited Mundra on January 3 & 4, 2018 and the core issues to be examined by the Committee were (i) whether sand dunes are allotted in the forest land and whether APSEZL has destroyed/disturbed them and (ii) whether measurement of land was wrongly done? The Sunita Narain committee filed its report in the Hon'ble Supreme Court of India on 14.9.2018. The Committee heard representations from both the parties and concluded that the term "Dhuva" is not synonymous with shifting sand dune. The Committee concluded that there is no incontrovertible evidence that Mor Dhuva was a sand dune and it cannot be said that M/s. APSEZL violated any conditions of the Environmental Clearance. With regards to the issue of

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on date)	Current Status	Action Taken/Proposed
	7. Principal Secretary, Gujarat	<p>Narayan Committee to relook in to this matter and submit their report.</p> <ul style="list-style-type: none"> • Committee had visited the site on 3/4.01.2018 and has submitted their detailed report to Hon'ble Supreme Court. • Further, based on the findings of the report, the subject land is not classified as Sand dune and therefore allegations are not correct. 			measurement of land, the Committee stated that there was no credible evidence to show that Mor Dhuva was not part of the allotment to APSEZ and all measurements were done appropriately.

Annexure – 4

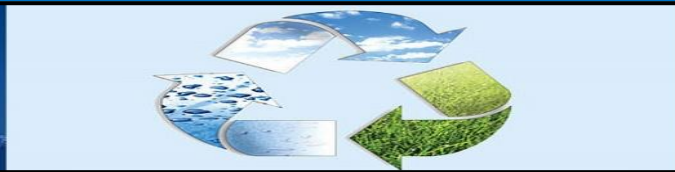
Details of Greenbelt Development at APSEZ, Mundra

	Total Green Zone Detail till Up to March 2024				
LOCATION	Area (In Ha.)	Trees (Nos.)	Palm (Nos.)	Shrubs (SQM)	Lawn (SQM)
SV COLONY	72.29	34920.00	7962.00	69696.00	100646.00
PORT & NON SEZ	81.61	149359.00	19220.00	75061.78	62966.38
SEZ	115.70	226120.00	20489.00	220583.60	28162.03
MITAP	2.47	8113.00	33.00	3340.00	4036.00
WEST PORT	104.29	248074.00	66816.00	24112.00	16369.00
AGRI PARK	8.94	17244.00	1332.00	5400.00	2121.44
SOUTH PORT	14.45	27530.00	3470.00	3882.00	3327.26
Samundra Township	58.26	63722.00	11834.00	23908.89	47520.07
Productive Farming (Vadala Farm)	0.00	0.00	0.00	0.00	0.00
TOTAL (APSEZL)	457.99	775082.00	131156.00	425984.27	265148.18
		906238.00			

Details of Mangrove Afforestation done by APSEZ

Sl. no.	Location	District	Area (Ha)	Duration	Species	Implementation agency
1	Mundra Port	Kutch	24	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
2	Mundra Port	Kutch	25	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
3	Luni/Hamirmora (Mundra)	Kutch	160.8	2007 - 2015	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
4	Kukadsar (Mundra)	Kutch	66.5	2012 - 2014	Avicennia marina	GUIDE, Bhuj
5	Forest Area (Mundra)	Kutch	298	2011 - 2013	Avicennia marina	Forest Dept, Bhuj
6	Jangi Village (Bhachau)	Kutch	50	2012 - 2014	Avicennia marina	GUIDE, Bhuj
7	Jakhau Village (Abdasa)	Kutch	310.6	2007-08 & 2011-13	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
8	Sat Saida Bet	Kutch	255	2014-15 & 2016-17	Avicennia marina & Biodiversity	GUIDE, Bhuj
9	Dandi Village	Navsari	800	2006 - 2011	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GEC, Gandhinagar
10	Talaja Village	Bhavnagar	50	2011-12	Avicennia marina	Forest Dept, Talaja
11	Narmada Village	Bhavnagar	250	2014 - 2015	Avicennia marina	GEC, Gandhinagar
12	Malpur Village	Bharuch	200	2012-14	Avicennia marina	SAVE, Ahmedabad
13	Kantiyajal Village	Bharuch	50	2014-15	Avicennia marina	SAVE, Ahmedabad
14	Devla Village	Bharuch	150	210-16	Avicennia marina	SAVE, Ahmedabad
15	Village Tala Talav (Khambhat)	Anand	100	2015 - 2016	Avicennia marina	SAVE, Ahmedabad
16	Village Tala Talav (Khambhat)	Anand	38	2015 - 2016	Avicennia marina	GEC, Gandhinagar
17	Aliya Bet, Village Katpor (Hansot)	Bharuch	62	2017-18	Avicennia marina & Rhizophora spp.	GEC, Gandhinagar
18	Kukadsar- (Bhadeswar- Mundra)	Kutch	250	2021-22	Avicennia marina	Shreeji Enterprise, Amreli
19	Kukadsar- (Bhadeswar- Mundra)	Kutch	750	2022-23	Avicennia marina	Shreeji Enterprise, Amreli
20	Kukadsar- (Bhadeswar- Mundra)	Kutch	250	2023-24	Avicennia marina	Shreeji Enterprise, Amreli
Total			4140			

Annexure – 5



“Half Yearly Environmental Monitoring Reports “



M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port)

PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.

Monitoring Period: October – 2024 to March - 2024

Submitted By



UniStar Environment & Research Labs Pvt. Ltd.

White House, Near GIDC Office, Char Rasta, Vapi, Gujarat, India – 396195




RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	WFDP WEST PORT STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Oct-23		Nov-23		Dec-23			
			09-10-2023	23-10-2023	07-11-2023	22-11-2023	07-12-2023	26-12-2023		
1.	pH @ 25 ° C	--	7.42	7.46	7.35	7.33	7.18	7.22	6.5 to 9	APHA 23 rd Ed.,2017,4500-H*B
2.	Total Suspended Solids	mg/L	26	24	26	23	24	24	100	APHA 23 rd Ed.,2017,2540 - D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	17	16	15.8	16	15.9	16	30	APHA 23 rd Ed.,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.82	0.86	0.78	0.74	0.77	0.74	0.5 Min.	APHA 23 rd Ed.,2017,4500-Cl-B
5.	Fecal Coliform	MPN Index/100ml	80	80	70	80	80	80	1000	IS 1622: 1981



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Technical Manager

RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	WFDP WEST PORT STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Jan-24		Feb-24		Mar-24			
			12-01-2024	27-01-2024	09-02-2024	26-02-2024	06-03-2024	18-03-2024		
1.	pH @ 25 ° C	--	7.32	7.31	7.36	7.38	7.45	7.39	6.5 to 9	APHA 23 rd Ed.,2017,4500-H ⁺ B
2.	Total Suspended Solids	mg/L	26	24	24	24	24	26	100	APHA 23 rd Ed.,2017,2540 -D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	16	15.5	18	16.8	17.5	18	30	APHA 23 rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.82	0.84	0.74	0.69	0.81	0.84	0.5 Min.	APHA 23 rd Ed.,2017,4500-CI-B
5.	Fecal Coliform	MPN Index/100ml	70	70	60	70	70	80	1000	IS 1622: 1981



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MARINE WATER MONITORING SUMMARY REPORT

RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.11	7.94	8.21	8.06	8.18	8.12	8.17	8.05	8.12	7.98	8.14	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29.8	29.7	29.7	29.6	29.6	29.5	29.5	29.4	29.6	29.5	29.7	26.6	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	132	94	144	116	132	108	124	112	132	112	142	124	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.6	BDL	2.5	BDL	2.3	BDL	2.4	BDL	2.9	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.08	5.78	6.08	5.88	6.22	5.92	6.17	5.97	6.12	5.92	6.25	6.05	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.84	36.15	36.12	36.38	36.34	36.88	36.32	37.14	36.12	37.18	36.19	37.24	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	3.23	3.06	3.39	3.23	3.06	2.9	2.42	2.26	2.24	2	3.23	2.9	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.348	0.326	0.304	0.261	0.348	0.326	0.261	0.217	0.543	0.5	0.522	0.5	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.74	3.59	4.22	4.11	4.16	4.11	4.06	3.95	3.95	3.8	4.11	4.06	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	1.47	1.26	1.37	1.16	1.16	1.05	1.26	1.05	2.32	2.11	1.58	1.47	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.318	6.976	7.914	7.601	7.568	7.336	6.741	6.427	6.733	6.3	7.862	7.46	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	35864	36890	36110	36910	36180	37120	35980	37060	36120	36980	36328	37118	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	32	12	24.29	8.1	28.25	12.11	20.38	4.08	24.1	8	28.03	12.01	APHA 23 rd Ed.,2017, 5220-B

Continue...

RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m ³	3.05	2.65	2.36	2.15	2.41	2.36	3.01	2.44	2.66	2.44	3.05	3.25	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	2.1	0.96	1.4	0.86	1.61	1.25	1.79	2	1.79	1.66	2	1.56	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	125	142	111	98	124	100	106	96	120	84	109	90	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Coscinodiscus</i>	<i>Odontella</i>	<i>Nitzschia</i>	<i>Biddulphia</i>	<i>Nitzschia</i>	<i>Biddulphia</i>	<i>Thalassiothrix</i>	<i>Dinophysis</i>	<i>Thalassiothrix</i>	<i>Dinophysis</i>	<i>Thalassiothrix</i>	<i>Dinophysis</i>	APHA (23rd Ed. 2017)10200 F
			<i>Diploneis</i>	<i>Rhizosolenia</i>	<i>Diploneis</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Rhizosolenia</i>	<i>Surirella</i>	<i>Pinnularia</i>	<i>Surirella</i>	<i>Pinnularia</i>	<i>Biddulphia</i>	<i>Pinnularia</i>	
			<i>Rhizosolenia</i>	<i>Coscinodiscus</i>	<i>Rhizosolenia</i>	<i>Coscinodiscus</i>	<i>Rhizosolenia</i>	<i>Coscinodiscus</i>	<i>Navicula</i>	<i>Thalassiothrix</i>	<i>Navicula</i>	<i>Thalassiothrix</i>	<i>Navicula</i>	<i>Thalassiothrix</i>	
			<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Grammatophora</i>	<i>Nitzschia</i>	<i>Grammatophora</i>	<i>Nitzschia</i>	<i>Grammatophora</i>	
			<i>Thalassionema</i>	<i>Thalassiosira</i>	<i>Biddulphia</i>	<i>Navicula</i>	<i>Biddulphia</i>	<i>Navicula</i>	<i>Skeletonema</i>	<i>Ceratium</i>	<i>Skeletonema</i>	<i>Ceratium</i>	<i>Skeletonema</i>	<i>Ceratium</i>	
B			Zooplankton												
1	Abundance(Population)	noX103/ 100 m ³	52	50	46	50	41	55							APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Crustacean Larvae</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		
			<i>Egg(Fish and Shrimps)</i>		<i>Pinnularia</i>		<i>Pinnularia</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		
			<i>Copepods</i>		<i>Copepods</i>		<i>Copepods</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		
			<i>Crustacean</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		
			<i>Bivalve Larvae</i>		<i>Thalassionema</i>		<i>Thalassionema</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		
3	Total Biomass	ml/100 m ³	15.63	14.25	15.44	15.26	14.78	13.69							

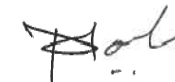
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RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	244		214		230		242		96		102		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	56		44		41		39		10		14		APHA 23 rd Ed.2017,9222-B
3	Ecoli	/100ml	32		30		22		19		8		10		IS :15185:2016
4	Enterococcus	/100ml	19		22		14		12		Absent		Absent		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.53	0.46	0.42	0.48	0.44	0.41	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	494.2	510.3	514.8	532.2	542.2	549.3	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	4.02	3.92	3.96	3.98	4.02	4.06	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	124.9	110.3	115.4	121.2	124.4	130.8	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	627.3	644.8	622.5	618.2	612.4	618.3	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.97	4.06	4.09	4.11	4.15	4.08	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	38.62	42.28	42.44	41.08	42.02	41.88	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	37.19	40.25	40.86	41.12	42.11	42.32	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	132.2	124.3	119.2	116.34	112.5	118.2	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.44	2.49	2.44	2.38	2.32	2.36	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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MoEF&CC (GOI) Recognized Environmental Laboratory under the EPA-1986 (31.03.2023 to 22.09.2024)

QCI-NABET Accredited EIA & GW Consultant Organization

GPCB Recognized Environmental Auditor (Schedule-II)

ISO 9001 : 2015 Certified Company

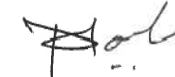
ISO 45001 : 2018 Certified Company

RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	APHA (23rd Ed. 2017)10500 C
			<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	
			<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Amphipods</i>	<i>Gastropods</i>	<i>Gastropods</i>	
			<i>Amphipods</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	
2	MeioBenthos	--	<i>Herpectacoids</i>	<i>Gastropods</i>	Herpectacoids	Turbellarians	<i>Turbellarians</i>	<i>Turbellarians</i>	
			<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	
3	Population	no/m ²	318	303	347	356	289	368	



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RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.17	7.94	8.14	7.89	8.16	7.94	8.21	8.08	8.18	8.06	8.15	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.4	29.3	29.5	29.4	29.6	29.5	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	136	114	122	108	128	114	134	112	142	118	136	120	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	2.8	BDL	2.5	BDL	2.2	BDL	2.6	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.88	5.68	5.98	5.78	6.12	5.82	6.17	5.87	6.12	5.82	6.25	5.95	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.24	36.41	35.62	36.55	35.98	36.84	36.22	37.15	36.25	37.18	36.32	37.24	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	2.9	2.58	3.06	2.74	3.39	3.23	2.74	2.58	2.9	2.58	3.55	3.23	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.413	0.391	0.37	0.348	0.348	0.304	0.326	0.304	0.478	0.435	0.522	0.478	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.59	3.48	3.95	3.8	3.9	3.85	3.85	3.74	3.9	3.74	4.16	4.11	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	1.68	1.58	1.47	1.37	1.37	1.26	1.47	1.37	2.32	2.21	1.9	1.68	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.903	6.451	7.38	6.888	7.638	7.384	6.916	6.624	7.278	6.755	8.232	7.818	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36124	36960	36206	36988	36220	37110	36124	37104	36150	37110	36222	37180	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	36	16	32.38	4.05	32.29	16.14	16.3	4.08	20.1	4.1	24.02	12.01	APHA 23 rd Ed.,2017, 5220-B

RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
Phytoplankton															
1.	Chlorophyll	mg/m ³	3.15	3.56	3.02	2.88	3.12	3.04	3	2.56	3.21	3.11	2.98	2.69	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	2.31	2.47	2.63	1.96	2.41	2.33	2.22	2.09	2.01	2.44	2.09	2.06	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	108	127	142	102	125	127	120	132	100	125	95	147	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Thalassiothrix</i>	<i>Pinnularia</i>	<i>Thalassiothrix</i>	<i>Pinnularia</i>	<i>Dinophysis</i>	<i>Pinnularia</i>	<i>Navicula</i>	<i>Thalassiothrix</i>	<i>Surirella</i>	<i>Thalassiothrix</i>	<i>Surirella</i>	<i>Thalassiothrix</i>	APHA (23rd Ed. 2017)10200 F
			<i>Surirella</i>	<i>Biddulphia</i>	<i>Surirella</i>	<i>Biddulphia</i>	<i>Surirella</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Surirella</i>	<i>Pinnularia</i>	<i>Surirella</i>	<i>Pinnularia</i>	<i>Surirella</i>	
			<i>Navicula</i>	<i>Navicula</i>	<i>Navicula</i>	<i>Navicula</i>	<i>Nitzschia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Melosira</i>	<i>Navicula</i>	
			<i>Thalassiosira</i>	<i>Rhizosolenia</i>	<i>Cyclotella</i>	<i>Rhizosolenia</i>	<i>Cyclotella</i>	<i>Rhizosolenia</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	
			<i>Skeletonema</i>	<i>Skeletonema</i>	<i>Skeletonema</i>	<i>Thalassiosira</i>	<i>Skeletonema</i>	<i>Thalassiosira</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	
Zooplankton															
1	Abundance (Population)	noX10 ³ / 100 m ³	44		57		38		41		52		47		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		
			<i>Copepods</i>		<i>Oikoplura</i>		<i>Nitzschia</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		
			<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods</i>		<i>Copepods</i>		<i>Copepods</i>		
			<i>Crustacean</i>		<i>Crustacean</i>		<i>Pinnularia</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Copepods nauplii</i>		
<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>			
3	Total Biomass	ml/100 m ³	17.36		15.36		13.25		14.13		14.39		15.78		

Continue...

RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	200		188		200		222		144		120		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	42		30		36		40		36		30		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	20		24		21		22		18		12		IS :15185:2016
4	Enterococcus	/100ml	18		10		18		15		Absent		Absent		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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Sr. Chemist




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Technical Manager

RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.46	0.43	0.48	0.46	0.42	0.44	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	582.2	588.4	546.2	538.4	550.2	561.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	4.07	4.16	4.09	4.02	4.11	4.03	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	162.4	156.8	148.2	142.2	134.5	142.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	684.4	702.2	686.5	644.4	652.2	644.5	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.02	4.11	4.08	4.03	4.09	4.02	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	40.39	40.88	41.05	42.12	42.84	42.52	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	40.28	40.62	41.12	42.35	42.66	42.15	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	144.8	148.9	152.24	148.6	150.24	149.62	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.18	2.24	2.18	2.24	2.33	2.28	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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GPCB Recognized Environmental Auditor (Schedule-II)

ISO 9001 : 2015 Certified Company

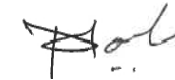
ISO 45001 : 2018 Certified Company

RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	<i>Decapods Larvae</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	APHA (23rd Ed. 2017)10500 C
			<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	
			<i>Amphipods</i>	<i>Amphipods</i>	<i>Gastropods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	
			<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Amphipods</i>	<i>Amphipods</i>	
2	MeioBenthos	--	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Decapods Larvae</i>	<i>Herpectacoids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	
			<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	
3	Population	no/m ²	256	350	321	308	254	307	



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RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.12	8.02	8.18	8.04	8.24	8.11	8.16	7.98	8.12	7.89	8.16	7.99	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	111	84	118	92	126	98	130	104	136	110	144	120	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.2	BDL	3.1	BDL	2.9	BDL	3.1	BDL	3.3	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.18	6.08	5.98	5.88	5.92	5.72	5.97	5.77	5.92	5.72	6.05	5.85	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.78	36.35	36.24	36.68	36.68	37.16	36.74	37.22	36.77	37.28	36.84	37.32	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	3.06	2.74	3.55	3.39	3.23	2.9	3.06	2.9	2.74	2.42	3.06	2.9	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.435	0.391	0.456	0.413	0.391	0.348	0.326	0.304	0.348	0.326	0.391	0.37	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.69	3.48	4.01	3.9	3.74	3.69	3.69	3.59	3.74	3.59	4.06	4.01	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	1.79	1.68	1.58	1.47	1.37	1.26	1.58	1.37	1.47	1.26	1.58	1.37	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.185	6.611	8.016	7.703	7.361	6.938	7.076	6.794	6.828	6.336	7.511	7.28	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	35880	36744	35970	36790	36130	36860	36080	36780	36210	37050	36320	37180	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	32	8	28.34	16.19	28.25	16.14	12.03	4.08	16.1	8	20.02	12.01	APHA 23 rd Ed.,2017, 5220-B

Continue...

RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD		
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
A																	
Phytoplankton																	
1.	Chlorophyll	mg/m ³	3.11	2.83	3.11	3.04	2.98	3.26	2.45	3.08	2.74	2.56	2.47	2.47	APHA (23rd Ed. 2017)10200 H		
2.	Phaeophytin	mg/m ³	1.65	1.52	1.65	2.01	2.01	2.18	2.06	2.41	1.87	1.45	1.66	1.47	APHA (23rd Ed. 2017)10200 H		
3.	Cell Count	No. x 10 ³ /L	147	109	147	110	148	135	132	125	154	88	140	98	APHA (23rd Ed. 2017)10200 F		
4	Name of Group Number and name of group species of each group	--	<i>Pinnularia</i>	<i>Coscinodiscus</i>	<i>Pinnularia</i>	<i>Coscinodiscus</i>	<i>Pinnularia</i>	<i>Coscinodiscus</i>	<i>Melosira</i>	<i>Cyclotella</i>	<i>Melosira</i>	<i>Cyclotella</i>	<i>Melosira</i>	<i>Cyclotella</i>	APHA (23rd Ed. 2017)10200 F		
			<i>Biddulphia</i>	<i>Pinnularia</i>	<i>Biddulphia</i>	<i>Pinnularia</i>	<i>Biddulphia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>		<i>Pinnularia</i>	
			<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Rhizosolenia</i>	<i>Skeletonema</i>	<i>Skeletonema</i>	<i>Rhizosolenia</i>	<i>Skeletonema</i>	<i>Rhizosolenia</i>	<i>Skeletonema</i>		<i>Rhizosolenia</i>	<i>Skeletonema</i>
			<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>	<i>Thalassiosira</i>		<i>Thalassiosira</i>	<i>Thalassiosira</i>
			<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Thalassionema</i>	<i>Thalassionema</i>	<i>Thalassionema</i>	<i>Thalassionema</i>		<i>Thalassionema</i>	<i>Thalassionema</i>
B																	
Zooplankton																	
1	Abundance (Population)	noX10 ³ / 100 m ³	63		55		50		38		30		65		APHA (23rd Ed. 2017)10200 G		
2	Name of Group Number and name of group species of each group		<i>Copepods</i>		<i>Copepods</i>		<i>Rhizosolenia</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>				
			<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Crustacean Larvae</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>				
			<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>		<i>Crustacean Larvae</i>				
			<i>Crustacean</i>		<i>Pinnularia</i>		<i>Oikoplura</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Egg(Fish and Shrimps)</i>				
			<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Thalassionema</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>				
3	Total Biomass	ml/100 m ³	15.69		16.35		14.23		17.12		15.47		15.47				

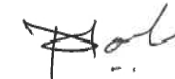
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RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	178		164		188		198		132		128		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	33		28		30		42		24		26		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	23		20		24		20		10		20		IS :15185:2016
4	Enterococcus	/100ml	17		12		20		19		Absent		Absent		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF SEDIMENT ANALYSIS [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.43	0.47	0.46	0.41	0.44	0.45	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	564.2	570.3	580.4	584.6	602.2	612.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	4.08	4.14	4.09	4.13	4.15	4.09	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	124.6	121.2	125.4	132.2	142.2	138.6	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	624.2	633.4	621.2	614.4	618.2	622.5	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.12	4.15	4.08	4.01	4.06	4.12	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	44.28	48.2	46.4	44.8	42.9	42.5	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	38.2	40.3	38.5	38.95	40.12	41.08	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	117.4	120.2	118.4	120.2	124.5	132.1	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.44	2.51	2.46	2.38	2.44	2.38	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

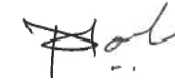
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RESULTS OF SEDIMENT ANALYSIS [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23 SEDIMENT	Nov-23 SEDIMENT	Dec-23 SEDIMENT	Jan-24 SEDIMENT	Feb-24 SEDIMENT	Mar-24 SEDIMENT	TEST METHOD
Benthic Organisms									
1	Macrobenthos	--	Polychates	<i>Polychates</i>	<i>Amphipods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Decapods Larvae</i>	APHA (23rd Ed. 2017)10500 C
			<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	
			<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	
			<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	
2	MeioBenthos	--	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Foraminiferan</i>	
			<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	
3	Population	no/m ²	284	303	247	268	287	296	



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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.19	8.06	8.24	8.09	8.17	8.12	8.22	8.09	8.19	8.04	8.24	8.05	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.7	29.6	29.5	29.4	29.4	29.3	29.5	29.4	29.6	29.5	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	146	118	134	112	128	110	142	118	136	122	152	128	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.4	BDL	3.2	BDL	3.1	BDL	3	BDL	3.4	BDL	3.2	BDL	IS 3025(Part 4)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.18	5.98	5.88	5.68	6.22	6.12	6.27	6.18	6.22	6.12	6.35	6.25	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.27	36.83	36.54	37.02	36.74	37.19	36.66	37.34	36.84	37.32	38.88	37.34	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd.2
8.	Nitrate as NO ₃	µmol/L	2.74	2.42	2.9	2.74	2.74	2.58	3.06	2.9	3.23	3.06	3.06	2.9	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.478	0.435	0.5	0.478	0.478	0.435	0.391	0.37	0.522	0.478	0.478	0.456	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.9	3.74	3.85	3.69	3.8	3.74	4.16	4.11	3.85	3.64	4.01	3.9	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	2.32	2.21	1.79	1.68	1.47	1.37	1.37	1.16	2.53	2.42	2.32	2.11	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.118	6.595	7.25	6.908	7.018	6.755	7.611	7.38	7.602	7.178	7.548	7.256	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36220	37120	36290	37140	36330	37210	36228	37120	36340	37150	36460	37240	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	32	20	12.14	4.05	32.29	20.18	20.38	4.08	24.1	8	28.03	12.01	APHA 23 rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'57" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
Phytoplankton															
1.	Chlorophyll	mg/m ³	3.42	3.55	3.22	2.86	3.08	2.56	2.88	3.04	2.9	3.14	2.36	3.14	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	1.36	1.35	1.58	1.87	2.33	1.88	1.98	1.56	2.03	1.65	2.69	2	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	109	188	110	142	125	139	99	126	108	145	154	88	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Coscinodiscus</i>	<i>Surirella</i>	<i>Surirella</i>	<i>Surirella</i>	<i>Coscinodiscus</i>	<i>Surirella</i>	<i>Thallassiosira</i>	<i>Coscinodiscus</i>	<i>Thallassiosira</i>	<i>Coscinodiscus</i>	<i>Thallassiosira</i>	<i>Coscinodiscus</i>	APHA (23rd Ed. 2017)10200 F
			<i>Diploneis</i>	<i>Biddulphia</i>	<i>Diploneis</i>	<i>Biddulphia</i>	<i>Diploneis</i>	<i>Biddulphia</i>	<i>Melosira</i>	<i>Diploneis</i>	<i>Melosira</i>	<i>Diploneis</i>	<i>Melosira</i>	<i>Diploneis</i>	
			<i>Rhizosolenia</i>	<i>Navicula</i>	<i>Thalassiothrix</i>	<i>Coscinodiscus</i>	<i>Skeletonema</i>	<i>Coscinodiscus</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	
			<i>Dinophysis</i>	<i>Thallassiosira</i>	<i>Navicula</i>	<i>Thallassiosira</i>	<i>Navicula</i>	<i>Thallassiosira</i>	<i>Rhizosolenia</i>	<i>Dinophysis</i>	<i>Rhizosolenia</i>	<i>Dinophysis</i>	<i>Rhizosolenia</i>	<i>Dinophysis</i>	
			<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Thalassionema</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	

Zooplankton																
1	Abundance (Population)	noX10 ³ / 100 m ³	48	63	49	50	36	40								APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Copepods nauplii</i>	<i>Copepods nauplii</i>	<i>Copepods nauplii</i>	<i>Copepods nauplii</i>								
			<i>Copepods nauplii</i>	<i>Rhizosolenia</i>	<i>Rhizosolenia</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Egg(Fish and Shrimps)</i>								
			<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Egg(Fish and Shrimps)</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>								
			<i>Crustacean Bivalve Larvae</i>	<i>Crustacean Bivalve Larvae</i>	<i>Crustacean Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Copepods nauplii</i>								
3	Total Biomass	ml/100 m ³	17.58	16.55	16.25	15.26	14.25	14.23								

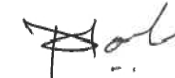
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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	258		248		280		258		90		88		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	44		46		62		56		30		42		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	24		32		35		29		14		18		IS :15185:2016
4	Enterococcus	/100ml	14		21		23		15		Absent		Absent		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.52	0.49	0.44	0.48	0.52	0.49	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	648.1	640.2	610.5	612.2	625.4	611.1	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	4.01	4.08	4.11	4.08	4.12	4.09	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	142.7	146.4	138.5	132.5	135.2	141.3	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	604.5	610.2	594.5	580.5	594.2	602.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.06	4.12	4.15	4.1	4.12	4.05	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	52.37	54.36	55.08	49.38	50.12	49.54	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	42.24	44.28	44.62	42.33	44.25	44.63	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	122.3	126.4	124.2	122.4	136.4	130.1	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.64	2.71	2.64	2.58	2.45	2.36	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

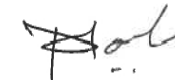
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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23 SEDIMENT	Nov-23 SEDIMENT	Dec-23 SEDIMENT	Jan-24 SEDIMENT	Feb-24 SEDIMENT	Mar-24 SEDIMENT	TEST METHOD
Benthic Organisms									
1	Macrobenthos	--	<i>Foraminiferan</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	APHA (23rd Ed. 2017)10500 C
			<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	
			<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	
			<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Turbellarians</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Foraminiferan</i>	
2	MeioBenthos	--	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Turbellarians</i>	<i>Gastropods</i>	<i>Gastropods</i>	APHA (23rd Ed. 2017)10500 C
			<i>Polychates</i>	<i>Turbellarians</i>	<i>Decapods Larvae</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	
3	Population	no/m ²	322	341	288	304	308	300	



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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.15	8.01	8.12	8.05	8.18	8.08	8.18	8.01	8.24	8.06	8.15	8.01	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	104	82	124	98	142	122	134	108	138	112	126	108	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	3.1	BDL	3.5	BDL	3.4	BDL	3.2	BDL	2.9	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.08	5.88	6.18	5.78	6.22	6.02	6.27	6.07	6.22	6.02	6.35	6.15	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.18	36.71	36.46	37.12	36.65	37.33	36.84	37.28	36.74	37.25	36.79	37.31	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd.2
8.	Nitrate as NO ₃	µmol/L	2.58	2.42	3.23	3.06	3.06	2.74	2.9	2.74	3.39	3.23	3.71	3.55	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.348	0.326	0.37	0.348	0.413	0.37	0.391	0.37	0.348	0.326	0.391	0.37	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.48	3.32	3.9	3.8	4.01	3.95	4.32	4.22	3.74	3.59	4.06	3.85	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	1.9	1.68	1.79	1.58	1.68	1.58	1.79	1.68	1.47	1.26	1.68	1.47	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.408	6.066	7.5	7.208	7.483	7.06	7.611	7.33	7.478	7.146	8.161	7.77	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36233	37080	36274	37112	36320	37140	36120	37060	36140	37100	36186	37260	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	40	28	20.24	8.1	24.22	20.18	20.38	8.15	24.1	12.1	28.03	16.02	APHA 23 rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
Phytoplankton															
1.	Chlorophyll	mg/m ³	3.47	2.96	3.45	2.68	2.36	2.76	3.05	3.14	3.14	3.1	3.14	3.09	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	1.63	1.75	2.14	2.07	1.23	1.66	1.68	2.03	2.11	2.66	2.45	1.22	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	100	109	152	132	110	157	105	106	1422	141	110	109	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Diploneis</i>	<i>Navicula</i>	<i>Diploneis</i>	<i>Navicula</i>	<i>Navicula</i>	<i>Navicula</i>	<i>Navicula</i>	<i>Pinnularia</i>	<i>Navicula</i>	<i>Pinnularia</i>	<i>Navicula</i>	<i>Pinnularia</i>	APHA (23rd Ed. 2017)10200 F
			<i>Rhizosolenia</i>	<i>Skeletonema</i>	<i>Rhizosolenia</i>	<i>Skeletonema</i>	<i>Biddulphia</i>	<i>Skeletonema</i>	<i>Biddulphia</i>	<i>Biddulphia</i>	<i>Biddulphia</i>	<i>Biddulphia</i>	<i>Biddulphia</i>	<i>Rhizosolenia</i>	
			<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Navicula</i>	<i>Nitzschia</i>	<i>Navicula</i>	<i>Odontella</i>	<i>Dinophysis</i>	
			<i>Cyclotella</i>	<i>Dinophysis</i>	<i>Cyclotella</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Biddulphia</i>	<i>Cyclotella</i>	<i>Thalassiosira</i>	<i>Cyclotella</i>	<i>Thalassiosira</i>	<i>Cyclotella</i>	<i>Coscinodiscus</i>	
			<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Skeletonema</i>	

B			Zooplankton												
1	Abundance (Population)	noX10 ³ / 100 m ³	52	44	36	44	48	41							APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Copepods nauplii</i>	<i>Nitzschia</i>	<i>Nitzschia</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>							
			<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Egg(Fish and Shrimps)</i>	<i>Egg(Fish and Shrimps)</i>	<i>Egg(Fish and Shrimps)</i>							
			<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Copepods</i>	<i>Copepods</i>	<i>Copepods nauplii</i>							
			<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Crustacean</i>	<i>Crustacean</i>	<i>Crustacean</i>							
			<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>							
3	Total Biomass	ml/100 m ³	14.6	13.52	14.23	14.52	15.36	14.68							

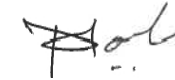
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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	286		256		242		244		140		140		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	50		38		33		42		28		28		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	28		25		26		31		15		16		IS :15185:2016
4	Enterococcus	/100ml	14		14		21		25		4		Absent		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.57	0.53	0.48	0.45	0.48	0.52	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	562.4	570.5	765.2	738.6	744.1	721.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	4.04	4.13	4.11	4.04	4.08	4.11	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	138.2	136.2	130.5	134.6	142.2	136.5	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	627.8	633.2	624.4	621.5	626.4	618.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.09	4.12	4.08	3.98	4.12	3.96	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	46.97	48.23	46.85	46.12	45.98	45.36	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	42.38	44.28	45.21	45.58	45.96	45.82	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	118.2	123.4	119.6	119	124.1	118.2	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.41	2.46	2.35	2.27	2.24	2.11	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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MoEF&CC (GOI) Recognized Environmental Laboratory under the EPA-1986 (31.03.2023 to 22.09.2024)

QCI-NABET Accredited EIA & GW Consultant Organization

GPCB Recognized Environmental Auditor (Schedule-II)

ISO 9001 : 2015 Certified Company

ISO 45001 : 2018 Certified Company

RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23 SEDIMENT	Nov-23 SEDIMENT	Dec-23 SEDIMENT	Jan-24 SEDIMENT	Feb-24 SEDIMENT	Mar-24 SEDIMENT	TEST METHOD
D			Benthic Organisms						
1	Macrobenthos	--	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	APHA (23rd Ed. 2017)10500 C
			<i>Polychates</i>	<i>Sipunculids</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Gastropods</i>	
			<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	
			<i>Gastropods</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	
2	MeioBenthos	--	Decapods Larvae	Decapods Larvae	Foraminiferan	Polychates	Herpectacoids	<i>Herpectacoids</i>	
			<i>Herpectacoids</i>	<i>Gastropods</i>	<i>Herpectacoids</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Polychates</i>	
3	Population	no/m ²	336	247	256	264	298	302	



Mr. Nilesh Patel
Sr. Chemist




Mr. Nitin Tandel
Technical Manager

RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.17	7.99	8.21	7.96	8.24	8.12	8.19	8.02	8.14	7.88	8.09	7.91	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	112	88	128	104	110	94	124	110	130	114	124	98	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.3	BDL	3.5	BDL	3.4	BDL	3.2	BDL	3.1	BDL	3.3	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.98	5.78	6.08	5.78	6.12	5.92	6.07	5.97	6.02	5.92	6.15	6.05	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.29	36.64	36.41	36.98	36.52	37.17	36.44	37.25	36.35	37.18	36.41	37.22	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	2.9	2.74	3.06	2.58	3.55	3.23	3.39	3.06	3.23	2.9	3.39	3.06	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.522	0.478	0.435	0.413	0.456	0.435	0.435	0.413	0.435	0.391	0.478	0.435	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.85	3.64	4.11	3.95	4.06	3.95	3.95	3.85	3.69	3.48	3.95	3.85	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	2.53	2.42	2.11	2	1.9	1.79	1.58	1.47	1.79	1.68	2.11	1.9	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.272	6.858	7.605	6.943	8.066	7.615	7.775	7.323	7.355	6.771	7.818	7.345	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36122	37148	36180	37180	36240	37210	36124	37180	36220	37090	36340	37230	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	28	8	36.43	16.19	36.32	24.22	16.3	4.08	20.1	8	24.02	12.01	APHA 23 rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
Phytoplankton															
1.	Chlorophyll	mg/m ³	2.98	3.35	3.08	3.35	3.25	3.65	3.12	2.88	2.96	3	3.09	2.49	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	1.36	2.47	2	1.78	2.44	2.44	2.14	2.04	2.14	1.25	2.19	1.78	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	106	160	108	158	156	137	128	100	120	96	87	121	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Nitzschia</i>	<i>Thalassiothrix</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Diploneis</i>	<i>Coscinodiscus</i>	<i>Diploneis</i>	<i>Coscinodiscus</i>	<i>Diploneis</i>	<i>Coscinodiscus</i>	APHA (23rd Ed. 2017)10200 F
			<i>Pinnularia</i>	<i>Surirella</i>	<i>Pinnularia</i>	<i>Surirella</i>	<i>Odontella</i>	<i>Surirella</i>	<i>Rhizosolenia</i>	<i>Diploneis</i>	<i>Rhizosolenia</i>	<i>Diploneis</i>	<i>Rhizosolenia</i>	<i>Diploneis</i>	
			<i>Odontella</i>	<i>Navicula</i>	<i>Dinophysis</i>	<i>Navicula</i>	<i>Dinophysis</i>	<i>Navicula</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	<i>Nitzschia</i>	<i>Rhizosolenia</i>	
			<i>Dinophysis</i>	<i>Thalassiosira</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Thalassiothrix</i>	<i>Dinophysis</i>	<i>Thalassiothrix</i>	<i>Dinophysis</i>	<i>Thalassiothrix</i>	<i>Dinophysis</i>	
			<i>Surirella</i>	<i>Skeletonema</i>	<i>Surirella</i>	<i>Skeletonema</i>	<i>Cyclotella</i>	<i>Skeletonema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Thalassionema</i>	<i>Cyclotella</i>	<i>Thalassionema</i>	

Zooplankton															
1	Abundance (Population)	noX10 ³ / 100 m ³	50		48		53		41		25		38		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Nitzschia</i>		<i>Nitzschia</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		<i>Egg(Fish and Shrimps)</i>		
			<i>Pinnularia</i>		<i>Pinnularia</i>		<i>Coscinodiscus</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		<i>Oikoplura</i>		
			<i>Odontella</i>		<i>Odontella</i>		<i>Odontella</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		<i>Copepods nauplii</i>		
			<i>Dinophysis</i>		<i>Dinophysis</i>		<i>Dinophysis</i>		<i>Crustacean</i>		<i>Crustacean</i>		<i>Crustacean</i>		
3	Total Biomass	ml/100 m ³	16.33		16.25		17.35		16.23		13.56		16.58		
			<i>Surirella</i>		<i>Surirella</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		<i>Bivalve Larvae</i>		

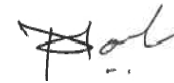
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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	186		200		202		260		86		96		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	33		41		36		46		12		27		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	30		31		24		36		5		14		IS :15185:2016
4	Enterococcus	/100ml	21		19		22		23		Absent		Absent		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.21	8.04	8.18	8.08	8.16	8.06	8.09	7.96	7.99	7.86	8.06	7.88	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.4	29.3	29.5	29.4	29.6	29.5	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	102	78	112	84	98	84	106	88	112	90	122	98	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.4	BDL	3.1	BDL	3.4	BDL	3.1	BDL	3.3	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.98	5.88	5.88	5.68	6.02	5.82	6.07	5.87	6.02	5.82	6.15	5.95	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.02	36.76	36.27	36.88	36.44	37.09	36.38	37.24	36.22	37.14	36.38	37.09	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	3.23	2.9	3.39	3.06	3.71	3.39	3.55	3.23	3.23	3.06	3.55	3.06	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.543	0.5	0.522	0.478	0.478	0.456	0.456	0.435	0.435	0.391	0.543	0.478	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.95	3.8	4.16	4.01	4.11	4.06	3.74	3.64	3.85	3.64	4.06	3.95	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	2.32	2.11	2.21	2	2.11	1.9	2.21	2	2.53	2.32	2.32	2.21	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.723	7.2	8.072	7.548	8.298	7.906	7.746	7.305	7.515	7.091	8.153	7.488	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36268	37350	36302	37410	36380	34500	36410	37320	36540	37410	36610	37540	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	24	12	28.34	8.1	32.29	28.25	20.38	12.23	24.1	16.1	28.03	20.02	APHA 23 rd Ed.,2017, 5220-B

Continue...

RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
Phytoplankton															
1.	Chlorophyll	mg/m ³	2.68	2.47	2.36	2.85	2.3	2.88	2.95	3.04	2.36	3.01	3	3.01	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	0.99	2.03	1.06	1.88	2.03	1.78	2.36	1.55	1.88	1.63	1.88	1.36	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	78	156	86	145	97	148	100	85	123	96	106	106	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Odontella</i>	<i>Cyclotella</i>	<i>Odontella</i>	<i>Cyclotella</i>	<i>Odontella</i>	<i>Cyclotella</i>	<i>Nitzschia</i>	<i>Diploneis</i>	<i>Nitzschia</i>	<i>Diploneis</i>	<i>Nitzschia</i>	<i>Diploneis</i>	APHA (23rd Ed. 2017)10200 F
			<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Grammatophora</i>	<i>Rhizosolenia</i>	<i>Grammatophora</i>	<i>Rhizosolenia</i>	<i>Grammatophora</i>	<i>Rhizosolenia</i>	
			<i>Coscinodiscus</i>	<i>Skeletonema</i>	<i>Coscinodiscus</i>	<i>Skeletonema</i>	<i>Coscinodiscus</i>	<i>Skeletonema</i>	<i>Diploneis</i>	<i>Nitzschia</i>	<i>Diploneis</i>	<i>Nitzschia</i>	<i>Diploneis</i>	<i>Nitzschia</i>	
			<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Thalassiothrix</i>	<i>Cyclotella</i>	<i>Thalassiothrix</i>	<i>Cyclotella</i>	<i>Thalassiothrix</i>	<i>Grammatophora</i>	
			<i>Thalassiosira</i>	<i>Thalassionema</i>	<i>Thalassiosira</i>	<i>Thalassionema</i>	<i>Thalassiosira</i>	<i>Thalassionema</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	

Zooplankton															
1	Abundance (Population)	noX10 ³ / 100 m ³	41	52	60	49	49	49							APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Coscinodiscus</i>	<i>Coscinodiscus</i>	<i>Odontella</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>						
			<i>Diploneis</i>	<i>Egg(Fish and Shrimps)</i>	<i>Egg(Fish and Shrimps)</i>	<i>Copepods nauplii</i>	<i>Copepods nauplii</i>	<i>Egg(Fish and Shrimps)</i>							
			<i>Rhizosolenia</i>	<i>Rhizosolenia</i>	<i>Rhizosolenia</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>							
			<i>Dinophysis</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Crustacean</i>	<i>Crustacean</i>	<i>Crustacean</i>							
3	Total Biomass	ml/100 m ³	<i>Thalassionema</i>	<i>Thalassionema</i>	<i>Thalassionema</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>							
			16.45	15.44	17.68	15.44	15.44	14.78							

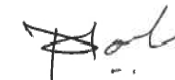
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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	202		274		250		266		98		98		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	30		39		35		32		20		14		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	22		30		26		27		14		10		IS :15185:2016
4	Enterococcus	/100ml	17		18		20		16		10		8		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.43	0.42	0.46	0.41	0.42	0.43	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	580.4	594.2	580.3	582.8	580.5	574.2	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	4.11	4.16	4.11	4.15	4.16	4.12	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	134.1	128.5	122.6	121.2	120.4	116.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	621.2	630.4	624.2	618.4	620.5	624.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.14	4.12	4.08	4.02	4.11	4.02	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	46.92	42.85	42.22	41.23	42.35	41.86	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	47.79	46.57	45.88	45.27	45.39	45.21	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	122.2	114.2	119.4	112.2	114.5	110.6	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.41	2.32	2.18	2.1	2.3	2.41	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

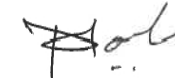
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RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23 SEDIMENT	Nov-23 SEDIMENT	Dec-23 SEDIMENT	Jan-24 SEDIMENT	Feb-24 SEDIMENT	Mar-24 SEDIMENT	TEST METHOD
D			Benthic Organisms						
1	Macrobenthos	--	<i>Polychates</i>	<i>Gastropods</i>	<i>Gastropods</i>	<i>Polychates</i>	<i>Polychates</i>	<i>Polychates</i>	APHA (23rd Ed. 2017)10500 C
			<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	<i>Decapods Larvae</i>	<i>Amphipods</i>	<i>Amphipods</i>	<i>Amphipods</i>	
			<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Isopods</i>	<i>Sipunculids</i>	
			<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Sipunculids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	
2	MeioBenthos	--	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Herpectacoids</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	<i>Foraminiferan</i>	
			<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	<i>Turbellarians</i>	
3	Population	no/m ²	240	307	335	333	300	366	



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Mr. Nitin Tandel
Technical Manager

RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.16	8.02	8.19	8.06	8.22	8.1	8.14	7.99	8.12	7.86	8.18	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.7	29.6	29.6	29.5	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	134	106	126	114	122	110	118	106	124	108	138	112	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.2	BDL	2.9	BDL	2.6	BDL	2.8	BDL	2.9	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.88	5.68	6.18	6.08	6.02	5.92	6.07	5.97	6.02	5.92	6.15	6.05	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.89	37.06	36.21	37.14	36.39	37.31	36.44	37.38	36.33	37.32	36.31	37.18	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	3.39	3.23	3.55	3.23	3.39	3.06	3.55	3.23	2.74	2.42	2.9	2.58	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.435	0.391	0.413	0.391	0.5	0.478	0.522	0.478	0.609	0.543	0.609	0.522	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.85	3.64	4.22	4.06	4.27	4.22	4.43	4.32	3.74	3.53	4.27	4.16	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	2.53	2.32	2.32	2.21	2.21	2.11	2	1.79	2.11	1.9	2.32	2.11	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.675	7.261	8.183	7.681	8.16	7.758	8.502	8.028	7.089	6.493	7.779	7.262	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36210	37132	36340	37150	36400	37210	36104	36940	36220	37124	36310	37220	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	28	8	20.24	8.1	28.25	24.22	16.3	8.15	20.1	12.1	24.02	16.02	APHA 23 rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m ³	3.05	3.07	2.36	2.85	3.68	3.54	3.06	3.11	3.09	2.63	2.98	2.5	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	1.11	1.88	1.06	1.88	2.57	2.67	2.47	2.44	2.55	1.45	1.55	1.87	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	109	134	86	145	187	174	148	64	122	117	122	114	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Dinophysis</i>	<i>Navicula</i>	<i>Odontella</i>	<i>Cyclotella</i>	<i>Cyclotella</i>	<i>Surirella</i>	<i>Odontella</i>	<i>Nitzschia</i>	<i>Odontella</i>	<i>Nitzschia</i>	<i>Odontella</i>	<i>Nitzschia</i>	APHA (23rd Ed. 2017)10200 F
			<i>Pinnularia</i>	<i>Skeletonema</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Pinnularia</i>	<i>Skeletonema</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	<i>Rhizosolenia</i>	<i>Pinnularia</i>	
			<i>Thalassiothrix</i>	<i>Rhizosolenia</i>	<i>Coscinodiscus</i>	<i>Skeletonema</i>	<i>Thalassiothrix</i>	<i>Rhizosolenia</i>	<i>Coscinodiscus</i>	<i>Odontella</i>	<i>Coscinodiscus</i>	<i>Odontella</i>	<i>Coscinodiscus</i>	<i>Odontella</i>	
			<i>Grammatophora</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Thalassiosira</i>	<i>Rhizosolenia</i>	<i>Cyclotella</i>	<i>Grammatophora</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Dinophysis</i>	<i>Pleurosigma</i>	<i>Dinophysis</i>	
			<i>Ceratium</i>	<i>Thalassionema</i>	<i>Thalassiosira</i>	<i>Thalassionema</i>	<i>Ceratium</i>	<i>Thalassionema</i>	<i>Thalassiosira</i>	<i>Surirella</i>	<i>Thalassiosira</i>	<i>Surirella</i>	<i>Thalassiosira</i>	<i>Surirella</i>	

B			Zooplankton												
1	Abundance (Population)	noX10 ³ / 100 m ³	40	60	42	51	51	43							APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Diploneis</i>	<i>Diploneis</i>	<i>Diploneis</i>	<i>Decapoda</i>	<i>Decapoda</i>	<i>Decapoda</i>							
			<i>Rhizosolenia</i>	<i>Rhizosolenia</i>	<i>Rhizosolenia</i>	<i>Copepods</i>	<i>Copepods</i>	<i>Oikoplura</i>							
			<i>Nitzschia</i>	<i>Nitzschia</i>	<i>Nitzschia</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>							
			<i>Thalassiothrix</i>	<i>Coscinodiscus</i>	<i>Coscinodiscus</i>	<i>Crustacean</i>	<i>Crustacean</i>	<i>Bivalve Larvae</i>							
			<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>							
3	Total Biomass	ml/100 m ³	15.47	17.45	15.24	16.02	16.02	15.23							

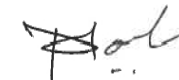
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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	222		221		222		212		212		222		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	40		39		28		33		33		40		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	33		30		26		28		28		30		IS :15185:2016
4	Enterococcus	/100ml	24		16		14		21		21		18		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.16	7.94	8.12	7.88	8.19	7.98	8.24	8.08	8.19	8.04	8.14	7.98	IS 3025 (Part11)1983
2.	Temperature	°C	29.8	29.7	29.7	29.6	29.6	29.5	29.4	29.2	29.5	29.3	29.6	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	118	98	132	110	124	108	116	102	112	108	134	120	APHA 23 rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.7	BDL	3.4	BDL	2.8	BDL	3.1	BDL	3.4	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.18	5.78	6.18	5.98	5.92	5.82	5.97	5.87	5.92	5.82	6.05	5.95	APHA 23 rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.08	36.74	36.22	36.97	36.34	37.11	36.48	37.38	36.44	37.32	36.48	37.35	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO ₃	µmol/L	3.23	2.9	3.39	3.06	3.23	3.06	3.39	3.06	2.9	2.74	3.23	2.9	APHA 23 rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO ₂	µmol/L	0.609	0.543	0.565	0.522	0.522	0.5	0.5	0.456	0.522	0.478	0.565	0.543	APHA 23 rd Ed.,2017,4500NO ₂ B
10.	Ammonical Nitrogen as NH ₃	µmol/L	3.74	3.53	4.27	4.16	4.01	3.95	4.22	4.06	3.85	3.64	4.32	4.22	APHA 23 rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO ₄	µmol/L	2.11	1.9	2	1.79	2.32	2.21	1.68	1.58	2.53	2.42	2.32	2.11	APHA 23 rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.579	6.973	8.225	7.742	7.762	7.51	8.11	7.576	7.272	6.858	8.115	7.663	APHA 23 rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23 rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36138	37122	36210	37140	36270	37180	36120	37090	36324	37210	36410	37390	APHA 23 rd Ed.,2017, 2540- C
15.	COD	mg/L	24	12	36.43	16.19	24.22	20.18	8.15	4.08	12.1	8	16.02	12.01	APHA 23 rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
Phytoplankton															
1.	Chlorophyll	mg/m ³	2.22	3.26	2.35	3	2.58	2.98	2.58	3.07	2.64	3.07	2.58	2.87	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m ³	0.85	1.63	1.05	1.77	1.44	2.06	2	2.63	1.74	2.4	1.09	1.44	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10 ³ /L	90	145	101	123	129	152	162	111	135	102	74	124	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	<i>Ceratium</i>	<i>Melosira</i>	<i>Ceratium</i>	<i>Rhizosolenia</i>	<i>Surirella</i>	<i>Rhizosolenia</i>	<i>Skeletonema</i>	<i>Odontella</i>	<i>Skeletonema</i>	<i>Odontella</i>	<i>Skeletonema</i>	<i>Odontella</i>	APHA (23rd Ed. 2017)10200 F
			<i>Pinnularia</i>	<i>Dinophysis</i>	<i>Pinnularia</i>	<i>Dinophysis</i>	<i>Pinnularia</i>	<i>Dinophysis</i>	<i>Grammatophora</i>	<i>Rhizosolenia</i>	<i>Grammatophora</i>	<i>Rhizosolenia</i>	<i>Grammatophora</i>	<i>Rhizosolenia</i>	
			<i>Odontella</i>	<i>Skeletonema</i>	<i>Odontella</i>	<i>Skeletonema</i>	<i>Grammatophora</i>	<i>Skeletonema</i>	<i>Nitzschia</i>	<i>Coscinodiscus</i>	<i>Nitzschia</i>	<i>Coscinodiscus</i>	<i>Nitzschia</i>	<i>Coscinodiscus</i>	
			<i>Thalassiothrix</i>	<i>Thalassiosira</i>	<i>Thalassiothrix</i>	<i>Thalassiosira</i>	<i>Thalassiothrix</i>	<i>Thalassiosira</i>	<i>Thalassiothrix</i>	<i>Grammatophora</i>	<i>Thalassiothrix</i>	<i>Grammatophora</i>	<i>Coscinodiscus</i>	<i>Pinnularia</i>	
			<i>Thalassiosira</i>	<i>Thalassionema</i>	<i>Thalassiosira</i>	<i>Melosira</i>	<i>Rhizosolenia</i>	<i>Melosira</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	<i>Pleurosigma</i>	<i>Thalassiosira</i>	

Zooplankton															
1	Abundance (Population)	noX10 ³ / 100 m ³	39	41	55	49	49	32							APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		<i>Nitzschia</i>	<i>Nitzschia</i>	<i>Nitzschia</i>	<i>Copepods</i>	<i>Copepods</i>	<i>Copepods</i>							
			<i>Grammatophora</i>	<i>Grammatophora</i>	<i>Grammatophora</i>	<i>Oikoplura</i>	<i>Oikoplura</i>	<i>Oikoplura</i>							
			<i>Diploneis</i>	<i>Diploneis</i>	<i>Egg(Fish and Shrimps)</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>	<i>Crustacean Larvae</i>							
			<i>Thalassiothrix</i>	<i>Thalassiothrix</i>	<i>Thalassiothrix</i>	<i>Crustacean</i>	<i>Crustacean</i>	<i>Crustacean</i>							
			<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Pleurosigma</i>	<i>Bivalve Larvae</i>	<i>Bivalve Larvae</i>	<i>Egg(Fish and Shrimps)</i>							
3	Total Biomass	ml/100 m ³	14.56	15.15	16.23	15.23	15.23	14.56							


Continue...

RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	202		240		256		288		288		248		APHA 23 rd Ed.2017,9215-C
2	Total Coliform	/100ml	50		50		44		43		43		52		APHA 23 rd Ed.2017,9222-B
3	E.coli	/100ml	42		33		32		36		36		41		IS :15185:2016
4	Enterococcus	/100ml	19		21		17		26		26		31		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23 rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976



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Results of Ambient Air Quality Monitoring

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	02-10-2023	79.73	37.88	33.43	37.84	1.10	--	NOT DETECTED
2.	05-10-2023	83.35	35.85	31.52	36.14	1.05	4.59	NOT DETECTED
3.	09-10-2023	80.64	36.31	33.65	39.30	1.12	4.36	NOT DETECTED
4.	12-10-2023	76.31	39.75	37.54	42.61	1.24	4.57	NOT DETECTED
5.	16-10-2023	81.68	37.95	35.37	39.51	1.18	4.85	NOT DETECTED
6.	19-10-2023	79.27	38.27	34.76	39.42	1.17	4.82	NOT DETECTED
7.	23-10-2023	85.72	35.91	32.85	37.63	1.10	4.16	NOT DETECTED
8.	26-10-2023	79.24	40.69	36.35	40.16	1.19	4.37	NOT DETECTED
9.	30-10-2023	83.47	36.42	33.91	38.48	1.12	4.67	NOT DETECTED
10.	02-11-2023	81.26	37.85	34.52	38.33	1.10	4.74	NOT DETECTED
11.	06-11-2023	84.49	39.28	35.06	39.15	1.14	4.86	NOT DETECTED
12.	09-11-2023	83.62	38.96	34.21	38.52	1.18	4.91	NOT DETECTED
13.	13-11-2023	80.42	37.29	32.61	36.84	1.15	4.56	NOT DETECTED
14.	16-11-2023	78.36	35.19	31.57	36.26	1.14	4.42	NOT DETECTED
15.	20-11-2023	75.59	33.84	30.53	35.78	1.05	4.35	NOT DETECTED

Continue...

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
16.	23-11-2023	79.40	35.63	32.26	36.92	1.10	4.46	NOT DETECTED
17.	27-11-2023	81.12	37.46	34.89	38.45	1.10	4.76	NOT DETECTED
18.	30-11-2023	76.52	34.91	31.23	36.76	1.06	4.46	NOT DETECTED
19.	04-12-2023	82.15	39.1	36.21	39.89	1.12	4.91	NOT DETECTED
20.	07-12-2023	80.72	38.59	33.96	37.42	1.10	4.75	NOT DETECTED
21.	11-12-2023	81.46	38.92	34.17	38.92	1.11	4.82	NOT DETECTED
22.	14-12-2023	77.69	36.17	32.59	36.76	1.08	4.63	NOT DETECTED
23.	18-12-2023	75.42	34.65	30.41	34.67	1.04	4.43	NOT DETECTED
24.	21-12-2023	78.36	36.85	30.72	35.3	1.09	4.58	NOT DETECTED
25.	25-12-2023	81.57	38.63	33.10	36.49	1.12	4.69	NOT DETECTED
26.	28-12-2023	77.91	35.17	32.85	35.12	1.10	4.5	NOT DETECTED
27.	01-01-2024	81.26	38.62	31.26	36.13	1.14	--	NOT DETECTED
28.	04-01-2024	84.52	40.21	35.78	38.56	1.19	5.12	NOT DETECTED
29.	08-01-2024	80.97	41.10	32.66	36.15	1.23	5.2	NOT DETECTED
30.	11-01-2024	83.74	39.53	34.56	38.67	1.20	4.79	NOT DETECTED
31.	15-01-2024	80.26	37.88	30.76	34.43	1.15	4.65	NOT DETECTED

Continue...

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
32.	18-01-2024	78.47	35.81	29.89	33.65	1.12	4.51	NOT DETECTED
33.	22-01-2024	82.63	38.71	31.62	36.11	1.16	4.72	NOT DETECTED
34.	25-01-2024	84.55	40.16	34.12	38.24	1.19	4.88	NOT DETECTED
35.	29-01-2024	80.79	37.42	32.50	37.02	1.15	4.70	NOT DETECTED
36.	01-02-2024	84.29	39.97	35.15	39.86	1.20	5.06	NOT DETECTED
37.	05-02-2024	82.11	37.56	34.58	38.47	1.16	4.87	NOT DETECTED
38.	08-02-2024	79.64	34.97	32.61	36.35	1.13	4.43	NOT DETECTED
39.	12-02-2024	81.76	36.52	33.64	37.68	1.16	4.95	NOT DETECTED
40.	15-02-2024	75.82	33.86	30.94	34.69	1.12	4.62	NOT DETECTED
41.	19-02-2024	78.64	35.42	32.71	36.27	1.15	4.35	NOT DETECTED
42.	22-02-2024	82.51	38.03	34.59	38.62	1.21	4.76	NOT DETECTED
43.	26-02-2024	75.89	34.37	29.88	33.52	1.12	4.36	NOT DETECTED
44.	29-02-2024	79.48	36.91	31.64	35.36	1.15	4.82	NOT DETECTED
45.	04-03-2024	77.31	32.78	30.36	35.17	1.10	4.53	NOT DETECTED
46.	07-03-2024	80.57	36.91	33.52	38.64	1.16	4.87	NOT DETECTED
47.	11-03-2024	82.75	37.42	35.83	39.52	1.12	4.46	NOT DETECTED

Continue...

MoEF&CC (GOI) Recognized Environmental Laboratory under the EPA-1986 (31.03.2023 to 22.09.2024)

QCI-NABET Accredited EIA & GW Consultant Organization

GPCB Recognized Environmental Auditor (Schedule-II)

ISO 9001 : 2015 Certified Company

ISO 45001 : 2018 Certified Company

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
48.	14-03-2024	76.49	31.97	32.16	37.91	1.15	4.25	NOT DETECTED
49.	18-03-2024	79.80	33.48	34.24	38.56	1.10	4.62	NOT DETECTED
50.	21-03-2024	75.48	32.85	31.93	35.27	1.16	4.50	NOT DETECTED
51.	25-03-2024	81.42	37.21	35.64	39.42	1.15	4.86	NOT DETECTED
52.	28-03-2024	78.64	33.58	33.85	36.17	1.13	4.59	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part-23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS – 5182, Part – 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	02-10-2023	81.42	37.31	32.53	35.86	0.95	--	NOT DETECTED
2.	05-10-2023	78.69	35.91	30.48	35.96	1.00	3.16	NOT DETECTED
3.	09-10-2023	85.49	38.74	33.56	39.28	1.04	3.68	NOT DETECTED
4.	12-10-2023	82.46	41.83	35.03	39.88	1.13	3.46	NOT DETECTED
5.	16-10-2023	78.52	37.54	31.20	37.89	1.14	3.23	NOT DETECTED
6.	19-10-2023	80.79	40.71	34.16	40.34	1.08	3.47	NOT DETECTED
7.	23-10-2023	84.42	39.49	32.95	37.28	1.05	3.25	NOT DETECTED
8.	26-10-2023	82.54	37.10	29.52	35.19	1.00	3.54	NOT DETECTED
9.	30-10-2023	84.47	35.62	33.79	36.85	0.97	3.77	NOT DETECTED
10.	02-11-2023	82.36	35.19	30.32	35.19	1.10	3.68	NOT DETECTED
11.	06-11-2023	84.50	38.62	31.20	37.71	1.10	3.81	NOT DETECTED
12.	09-11-2023	80.14	36.91	29.61	34.24	1.12	3.67	NOT DETECTED
13.	13-11-2023	82.56	38.1	31.28	37.85	1.14	3.79	NOT DETECTED
14.	16-11-2023	80.13	35.42	28.76	37.46	1.10	3.56	NOT DETECTED
15.	20-11-2023	78.42	33.91	27.86	32.59	1.04	3.38	NOT DETECTED

Continue...

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
16.	23-11-2023	74.85	32.59	26.86	31.58	1.00	3.25	NOT DETECTED
17.	27-11-2023	77.31	34.69	28.96	33.48	1.02	3.40	NOT DETECTED
18.	30-11-2023	79.53	36.22	30.84	35.62	1.00	3.52	NOT DETECTED
19.	04-12-2023	80.56	34.13	29.63	33.27	1.13	3.48	NOT DETECTED
20.	07-12-2023	83.47	36.89	32.43	36.86	1.15	3.65	NOT DETECTED
21.	11-12-2023	84.52	37.89	34.15	38.74	1.17	3.78	NOT DETECTED
22.	14-12-2023	82.42	35.57	32.16	36.82	1.14	3.60	NOT DETECTED
23.	18-12-2023	79.61	34.21	30.75	34.43	1.10	3.41	NOT DETECTED
24.	21-12-2023	75.26	31.84	29.65	32.99	1.05	3.25	NOT DETECTED
25.	25-12-2023	78.40	33.49	31.56	35.44	1.09	3.43	NOT DETECTED
26.	28-12-2023	80.72	36.54	32.70	36.12	1.11	3.62	NOT DETECTED
27.	01-01-2024	83.52	38.43	34.11	38.25	1.14	--	NOT DETECTED
28.	04-01-2024	80.16	36.27	31.73	35.46	1.11	3.46	NOT DETECTED
29.	08-01-2024	77.64	35.48	29.71	33.45	1.08	3.26	NOT DETECTED
30.	11-01-2024	79.49	34.87	31.64	36.27	1.10	3.35	NOT DETECTED
31.	15-01-2024	75.97	33.64	28.89	33.54	1.05	3.17	NOT DETECTED

Continue...

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
32.	18-01-2024	78.53	34.12	30.73	35.61	1.08	3.29	NOT DETECTED
33.	22-01-2024	82.69	37.38	32.72	37.81	1.11	3.51	NOT DETECTED
34.	25-01-2024	77.13	38.88	33.52	38.31	1.13	3.62	NOT DETECTED
35.	29-01-2024	84.75	40.03	35.10	39.65	1.16	3.76	NOT DETECTED
36.	01-02-2024	81.48	40.32	35.67	38.96	1.15	3.68	NOT DETECTED
37.	05-02-2024	84.63	43.22	37.10	40.00	1.18	3.95	NOT DETECTED
38.	08-02-2024	82.46	40.83	35.75	39.42	1.16	3.72	NOT DETECTED
39.	12-02-2024	77.62	37.41	32.57	36.86	1.12	3.39	NOT DETECTED
40.	15-02-2024	80.19	39.52	33.38	37.29	1.15	3.60	NOT DETECTED
41.	19-02-2024	82.69	40.11	34.16	38.35	1.17	3.76	NOT DETECTED
42.	22-02-2024	78.35	37.74	32.2	36.91	1.12	3.45	NOT DETECTED
43.	26-02-2024	84.24	39.43	35.18	39.42	1.15	3.98	NOT DETECTED
44.	29-02-2024	80.73	41.29	33.76	36.55	1.11	3.71	NOT DETECTED
45.	04-03-2024	87.32	43.16	36.72	41.19	1.21	3.71	NOT DETECTED
46.	07-03-2024	84.61	40.63	34.86	39.54	1.17	3.53	NOT DETECTED
47.	11-03-2024	81.49	38.65	31.62	36.56	1.13	3.35	NOT DETECTED

Continue...

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
48.	14-03-2024	86.74	41.22	36.71	40.94	1.11	3.48	NOT DETECTED
49.	18-03-2024	84.27	40.64	34.55	38.26	1.16	3.62	NOT DETECTED
50.	21-03-2024	80.71	37.59	31.39	36.57	1.15	3.44	NOT DETECTED
51.	25-03-2024	78.54	36.91	33.28	38.64	1.18	3.27	NOT DETECTED
52.	28-03-2024	82.38	38.83	31.76	36.28	1.14	3.58	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part-23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	02-10-2023	79.24	38.10	33.79	39.62	1.05	--	NOT DETECTED
2.	05-10-2023	82.56	40.81	36.42	42.64	1.19	4.12	NOT DETECTED
3.	09-10-2023	78.96	38.65	34.28	39.12	1.13	3.98	NOT DETECTED
4.	12-10-2023	81.75	36.82	38.11	42.52	1.22	4.10	NOT DETECTED
5.	16-10-2023	84.18	41.59	35.97	41.78	1.15	4.35	NOT DETECTED
6.	19-10-2023	80.61	35.64	37.18	44.25	1.19	4.21	NOT DETECTED
7.	23-10-2023	83.64	40.52	34.19	40.46	1.10	3.78	NOT DETECTED
8.	26-10-2023	85.42	38.61	32.55	38.11	1.03	4.49	NOT DETECTED
9.	30-10-2023	80.64	36.28	38.91	36.85	1.04	4.22	NOT DETECTED
10.	02-11-2023	81.26	37.5	35.81	38.64	1.10	4.23	NOT DETECTED
11.	06-11-2023	83.68	40.35	36.14	39.63	1.13	4.36	NOT DETECTED
12.	09-11-2023	80.42	37.55	33.69	37.92	1.10	4.28	NOT DETECTED
13.	13-11-2023	82.87	39.17	36.49	39.64	1.16	4.42	NOT DETECTED
14.	16-11-2023	79.09	36.86	32.10	36.34	1.12	4.15	NOT DETECTED
15.	20-11-2023	76.33	35.99	31.67	35.88	1.10	3.87	NOT DETECTED

Continue...

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
16.	23-11-2023	78.41	36.30	33.53	37.62	1.15	3.91	NOT DETECTED
17.	27-11-2023	80.13	39.62	36.74	39.36	1.18	4.14	NOT DETECTED
18.	30-11-2023	77.54	36.12	34.63	38.29	1.11	3.79	NOT DETECTED
19.	04-12-2023	83.15	38.52	36.26	39.10	1.16	4.59	NOT DETECTED
20.	07-12-2023	84.97	40.11	37.58	39.97	1.18	4.75	NOT DETECTED
21.	11-12-2023	82.54	37.43	35.21	38.47	1.14	4.52	NOT DETECTED
22.	14-12-2023	84.42	39.85	37.14	40.00	1.16	4.69	NOT DETECTED
23.	18-12-2023	80.14	37.53	35.46	37.81	1.12	4.24	NOT DETECTED
24.	21-12-2023	77.51	36.19	33.74	36.49	1.10	4.12	NOT DETECTED
25.	25-12-2023	75.35	35.79	32.18	35.51	1.10	4.05	NOT DETECTED
26.	28-12-2023	78.54	36.43	33.68	36.42	1.12	4.29	NOT DETECTED
27.	01-01-2024	81.62	37.16	35.32	38.48	1.11	--	NOT DETECTED
28.	04-01-2024	77.85	35.62	33.84	36.83	1.05	3.95	NOT DETECTED
29.	08-01-2024	80.49	37.74	34.89	38.12	1.10	4.21	NOT DETECTED
30.	11-01-2024	84.63	39.27	36.21	39.43	1.14	4.49	NOT DETECTED
31.	15-01-2024	81.92	41.46	34.98	37.59	1.19	4.60	NOT DETECTED

Continue...

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
32.	18-01-2024	78.79	40.87	36.91	39.33	1.15	4.51	NOT DETECTED
33.	22-01-2024	82.53	38.24	34.2	38.76	1.12	4.25	NOT DETECTED
34.	25-01-2024	84.42	40.11	36.31	39.88	1.16	4.42	NOT DETECTED
35.	29-01-2024	81.97	37.64	32.92	36.49	1.12	4.20	NOT DETECTED
36.	01-02-2024	84.36	39.14	37.86	39.91	1.15	4.49	NOT DETECTED
37.	05-02-2024	81.57	35.89	34.76	37.8	1.12	4.29	NOT DETECTED
38.	08-02-2024	83.16	36.48	36.53	38.16	1.15	4.56	NOT DETECTED
39.	12-02-2024	78.72	35.10	34.74	36.98	1.10	4.13	NOT DETECTED
40.	15-02-2024	75.29	34.73	31.85	35.61	1.10	3.95	NOT DETECTED
41.	19-02-2024	77.17	35.51	33.49	36.72	1.11	4.25	NOT DETECTED
42.	22-02-2024	81.56	38.33	36.80	39.11	1.15	4.46	NOT DETECTED
43.	26-02-2024	75.84	35.16	32.42	36.28	1.12	3.86	NOT DETECTED
44.	29-02-2024	79.63	37.81	34.73	38.24	1.11	4.32	NOT DETECTED
45.	04-03-2024	80.42	36.37	34.71	37.54	1.13	3.97	NOT DETECTED
46.	07-03-2024	84.12	39.51	36.91	41.73	1.17	4.15	NOT DETECTED
47.	11-03-2024	78.89	35.48	33.54	37.47	1.14	4.04	NOT DETECTED

Continue...

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
48.	14-03-2024	81.37	36.40	34.48	39.03	1.15	4.65	NOT DETECTED
49.	18-03-2024	85.63	40.87	38.66	42.52	1.19	4.71	NOT DETECTED
50.	21-03-2024	80.74	38.68	36.52	40.75	1.13	4.49	NOT DETECTED
51.	25-03-2024	77.39	35.32	32.86	36.48	1.10	4.22	NOT DETECTED
52.	28-03-2024	82.36	37.54	35.16	39.63	1.15	4.41	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part-23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	02-10-2023	78.43	36.85	25.69	30.35	1.04	--	NOT DETECTED
2.	05-10-2023	85.29	38.94	27.42	33.10	1.10	5.14	NOT DETECTED
3.	09-10-2023	82.57	36.15	25.73	30.64	1.05	4.85	NOT DETECTED
4.	12-10-2023	85.67	40.75	29.46	34.58	1.17	5.59	NOT DETECTED
5.	16-10-2023	81.87	37.33	26.63	31.26	1.10	5.23	NOT DETECTED
6.	19-10-2023	83.81	39.15	30.19	34.85	1.15	5.49	NOT DETECTED
7.	23-10-2023	78.65	35.69	28.62	33.69	1.10	5.26	NOT DETECTED
8.	26-10-2023	73.35	38.59	26.89	30.84	1.18	5.53	NOT DETECTED
9.	30-10-2023	76.95	38.95	29.36	34.97	1.06	4.76	NOT DETECTED
10.	02-11-2023	75.82	34.90	27.31	32.52	1.08	5.36	NOT DETECTED
11.	06-11-2023	78.69	36.43	28.68	34.02	1.12	5.52	NOT DETECTED
12.	09-11-2023	80.10	38.19	30.76	35.67	1.15	5.79	NOT DETECTED
13.	13-11-2023	83.69	39.51	31.52	36.16	1.20	5.95	NOT DETECTED
14.	16-11-2023	81.46	38.59	29.83	34.79	1.15	5.76	NOT DETECTED
15.	20-11-2023	77.62	35.76	27.40	32.22	1.10	5.41	NOT DETECTED

Continue...

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
16.	23-11-2023	79.17	37.32	28.96	34.61	1.13	5.65	NOT DETECTED
17.	27-11-2023	71.21	32.92	26.54	30.89	1.05	5.25	NOT DETECTED
18.	30-11-2023	74.58	34.66	28.42	32.73	1.08	5.50	NOT DETECTED
19.	04-12-2023	74.19	36.84	29.31	32.68	1.04	5.21	NOT DETECTED
20.	07-12-2023	71.95	33.69	25.85	30.59	1.00	4.95	NOT DETECTED
21.	11-12-2023	76.63	35.92	27.27	32.48	1.07	5.38	NOT DETECTED
22.	14-12-2023	80.86	39.100	30.74	35.97	1.10	5.74	NOT DETECTED
23.	18-12-2023	78.93	38.64	28.39	32.48	1.08	5.62	NOT DETECTED
24.	21-12-2023	80.12	40.05	30.42	34.86	1.12	5.80	NOT DETECTED
25.	25-12-2023	76.42	35.93	27.64	32.47	1.10	5.57	NOT DETECTED
26.	28-12-2023	73.69	33.87	25.97	30.63	1.06	5.45	NOT DETECTED
27.	01-01-2024	75.37	34.56	26.42	29.87	1.06	--	NOT DETECTED
28.	04-01-2024	77.49	36.16	27.89	32.63	1.10	5.36	NOT DETECTED
29.	08-01-2024	80.34	38.13	30.08	34.21	1.14	5.56	NOT DETECTED
30.	11-01-2024	75.17	34.11	26.92	30.43	1.05	5.27	NOT DETECTED
31.	15-01-2024	72.29	32.54	25.74	29.86	1.00	4.95	NOT DETECTED

Continue...

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
32.	18-01-2024	76.42	34.68	27.53	31.27	1.06	5.19	NOT DETECTED
33.	22-01-2024	79.61	37.96	29.88	33.49	1.10	5.46	NOT DETECTED
34.	25-01-2024	75.72	33.46	26.73	30.39	1.05	5.31	NOT DETECTED
35.	29-01-2024	70.83	31.98	25.26	28.99	1.00	4.86	NOT DETECTED
36.	01-02-2024	73.65	35.32	27.62	31.28	1.10	5.48	NOT DETECTED
37.	05-02-2024	80.24	38.51	29.91	33.64	1.16	5.82	NOT DETECTED
38.	08-02-2024	77.36	36.91	28.87	32.49	1.13	5.69	NOT DETECTED
39.	12-02-2024	72.92	35.13	25.84	29.18	1.10	5.43	NOT DETECTED
40.	15-02-2024	75.83	37.46	27.83	32.47	1.12	5.62	NOT DETECTED
41.	19-02-2024	70.46	33.97	25.32	29.63	1.10	5.31	NOT DETECTED
42.	22-02-2024	73.55	35.71	26.79	29.88	1.13	5.50	NOT DETECTED
43.	26-02-2024	71.18	32.96	24.98	28.41	1.11	5.42	NOT DETECTED
44.	29-02-2024	77.84	36.42	28.46	32.61	1.15	5.76	NOT DETECTED
45.	04-03-2024	76.12	33.79	27.96	30.53	1.06	5.38	NOT DETECTED
46.	07-03-2024	79.42	34.11	28.54	32.18	1.10	5.85	NOT DETECTED
47.	11-03-2024	73.75	30.42	26.43	29.76	1.08	5.27	NOT DETECTED

Continue...

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
48.	14-03-2024	70.21	28.75	24.83	27.56	1.13	5.38	NOT DETECTED
49.	18-03-2024	76.83	32.57	25.61	29.11	1.09	5.13	NOT DETECTED
50.	21-03-2024	67.49	31.84	23.92	26.63	1.00	4.97	NOT DETECTED
51.	25-03-2024	65.92	29.18	24.11	28.48	1.05	5.36	NOT DETECTED
52.	28-03-2024	70.64	32.55	26.47	30.58	1.12	5.51	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part-23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
1.	02-10-2023	70.17	24.68	11.59	16.32	NOT DETECTED
2.	05-10-2023	74.26	25.51	13.64	18.02	--
3.	09-10-2023	77.39	26.91	12.64	17.43	--
4.	12-10-2023	82.17	28.63	13.53	18.11	--
5.	16-10-2023	78.98	27.64	12.76	17.84	--
6.	19-10-2023	80.27	28.56	13.57	18.15	--
7.	23-10-2023	74.68	25.82	12.53	16.94	--
8.	26-10-2023	77.53	28.21	11.98	16.38	--
9.	30-10-2023	71.96	25.31	12.60	17.32	--
10.	02-11-2023	73.54	26.36	11.68	15.26	--
11.	06-11-2023	76.32	27.25	12.59	16.92	--
12.	09-11-2023	74.86	24.19	11.48	15.64	--
13.	13-11-2023	78.10	26.84	13.56	17.88	--
14.	16-11-2023	75.46	24.54	11.47	16.29	--
15.	20-11-2023	77.68	26.91	12.55	15.93	--

Continue...

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
16.	23-11-2023	80.15	28.49	13.62	18.10	--
17.	27-11-2023	73.79	23.91	11.76	16.50	--
18.	30-11-2023	78.38	25.32	13.58	17.86	--
19.	04-12-2023	76.13	27.42	12.15	16.48	--
20.	07-12-2023	79.65	28.25	13.48	17.53	--
21.	11-12-2023	75.48	26.83	12.62	15.89	--
22.	14-12-2023	73.58	25.31	11.95	15.13	--
23.	18-12-2023	70.17	23.95	11.47	14.83	--
24.	21-12-2023	75.39	25.42	12.37	16.12	--
25.	25-12-2023	78.53	26.19	13.62	17.11	--
26.	28-12-2023	80.15	28.31	13.68	17.64	--
27.	01-01-2024	83.21	30.56	14.18	18.39	NOT DETECTED
28.	04-01-2024	79.64	27.43	12.91	16.84	--
29.	08-01-2024	75.15	25.61	11.83	15.46	--
30.	11-01-2024	81.37	28.17	13.36	17.21	--
31.	15-01-2024	83.46	30.55	14.28	18.33	--

Continue...

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
32.	18-01-2024	78.76	26.23	12.88	17.10	--
33.	22-01-2024	81.28	29.04	13.59	17.95	--
34.	25-01-2024	77.35	26.20	11.89	15.58	--
35.	29-01-2024	79.62	28.78	12.47	16.56	--
36.	01-02-2024	75.36	27.53	12.84	17.16	--
37.	05-02-2024	72.69	26.84	11.92	15.89	--
38.	08-02-2024	77.16	28.69	12.43	17.85	--
39.	12-02-2024	83.29	30.52	14.12	18.31	--
40.	15-02-2024	80.46	28.88	13.75	17.97	--
41.	19-02-2024	78.91	27.96	13.26	17.48	--
42.	22-02-2024	75.91	25.73	11.85	15.67	--
43.	26-02-2024	79.58	28.39	13.64	16.82	--
44.	29-02-2024	75.46	26.12	12.79	15.81	--
45.	04-03-2024	77.48	30.16	13.65	18.13	--
46.	07-03-2024	81.37	30.84	14.63	18.89	--
47.	11-03-2024	75.94	27.83	12.79	16.38	--

Continue...

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
48.	14-03-2024	78.53	29.18	13.75	16.96	--
49.	18-03-2024	83.61	25.94	14.57	18.20	--
50.	21-03-2024	80.27	28.63	12.85	16.74	--
51.	25-03-2024	75.39	26.17	12.23	17.11	--
52.	28-03-2024	78.42	29.41	13.76	17.93	--
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0
Test Method		IS - 5182, Part- 23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		CT-4 RMU-1						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
1.	02-11-2023	76.42	28.27	23.65	28.37	0.90	4.26	NOT DETECTED
2.	06-11-2023	72.59	26.92	21.37	26.55	0.84	4.05	NOT DETECTED
3.	09-11-2023	67.73	30.76	24.68	29.81	1.00	4.38	NOT DETECTED
4.	13-11-2023	74.25	33.13	26.72	31.64	1.05	4.76	NOT DETECTED
5.	16-11-2023	87.13	28.64	23.13	28.72	0.95	4.52	NOT DETECTED
6.	20-11-2023	84.25	26.49	22.51	26.94	0.88	4.36	NOT DETECTED
7.	23-11-2023	82.64	25.20	21.35	25.46	0.85	4.14	NOT DETECTED
8.	27-11-2023	76.37	23.58	18.96	23.89	0.76	3.96	NOT DETECTED
9.	04-12-2023	82.75	30.41	25.13	29.85	0.94	4.62	NOT DETECTED
10.	07-12-2023	78.38	27.53	22.96	25.27	0.82	4.41	NOT DETECTED
11.	11-12-2023	80.16	29.37	25.12	28.76	0.86	4.73	NOT DETECTED
12.	14-12-2023	84.48	33.81	27.64	32.49	0.98	4.89	NOT DETECTED
13.	18-12-2023	82.31	31.26	24.94	28.51	0.90	4.75	NOT DETECTED
14.	21-12-2023	76.47	27.83	23.46	27.25	0.81	4.52	NOT DETECTED

Continue...

Name of Location		CT-4 RMU-1						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
15.	25-12-2023	73.59	24.57	20.13	24.81	0.74	4.36	NOT DETECTED
16.	28-12-2023	79.11	29.32	22.53	26.76	0.79	4.48	NOT DETECTED
17.	01-01-2024	81.42	31.86	24.28	28.17	0.97	--	NOT DETECTED
18.	04-01-2024	84.26	34.48	26.84	31.46	1.00	4.82	NOT DETECTED
19.	08-01-2024	79.82	28.91	22.86	27.52	0.92	4.53	NOT DETECTED
20.	11-01-2024	82.57	31.49	25.22	29.35	1.00	4.68	NOT DETECTED
21.	15-01-2024	78.84	27.59	22.12	26.89	0.87	4.41	NOT DETECTED
22.	18-01-2024	80.64	29.17	23.79	27.42	0.91	4.65	NOT DETECTED
23.	22-01-2024	83.49	32.72	26.31	30.58	1.05	4.73	NOT DETECTED
24.	25-01-2024	85.27	35.49	29.32	33.24	1.10	4.82	NOT DETECTED
25.	29-01-2024	80.65	30.16	24.05	29.13	0.95	4.70	NOT DETECTED
26.	01-02-2024	78.62	28.96	22.10	26.93	0.82	4.45	NOT DETECTED
27.	05-02-2024	82.36	30.19	24.56	29.31	0.93	4.62	NOT DETECTED
28.	08-02-2024	84.16	32.46	27.84	33.46	0.97	4.87	NOT DETECTED
29.	12-02-2024	80.43	31.46	25.63	29.7	0.89	4.70	NOT DETECTED
30.	15-02-2024	77.29	29.66	22.38	27.62	0.76	4.62	NOT DETECTED

Continue...

Name of Location		CT-4 RMU-1						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³	HC µg/m ³	Benzene µg/m ³
31.	19-02-2024	75.73	27.43	20.96	25.17	0.70	4.39	NOT DETECTED
32.	22-02-2024	79.37	30.11	22.16	26.93	0.78	4.53	NOT DETECTED
33.	26-02-2024	82.64	32.83	25.31	29.62	0.86	4.81	NOT DETECTED
34.	29-02-2024	79.55	29.89	23.72	27.53	0.77	4.68	NOT DETECTED
35.	04-03-2024	85.13	34.25	25.81	28.47	0.79	4.85	NOT DETECTED
36.	07-03-2024	80.74	31.48	22.57	26.35	0.64	4.71	NOT DETECTED
37.	11-03-2024	78.93	28.52	21.76	26.11	0.57	4.52	NOT DETECTED
38.	14-03-2024	75.38	30.86	23.29	27.46	0.52	4.68	NOT DETECTED
39.	18-03-2024	81.52	33.47	24.92	29.53	0.76	4.82	NOT DETECTED
40.	21-03-2024	86.14	37.35	27.11	32.42	0.82	4.97	NOT DETECTED
41.	25-03-2024	83.74	34.68	25.24	30.48	0.73	4.72	NOT DETECTED
42.	28-03-2024	86.85	31.57	26.86	29.62	0.87	4.82	NOT DETECTED
Permissible Value as per NAAQMS		100.0	60.0	80.0	80.0	2.0	---	5.0
Test Method		IS - 5182, Part-23	UERL/AIR/SOP/11	IS - 5182, Part - 2	IS - 5182, Part - 6	IS - 5182, Part - 10	Gas analyzer	IS - 5182, Part - 11

MoEF&CC (GOI) Recognized Environmental
Laboratory under the EPA-1986 (31.03.2023 to 22.09.2024)

QCI-NABET Accredited EIA & GW
Consultant Organization

GPCB Recognized Environmental
Auditor (Schedule-II)

ISO 9001 : 2015
Certified Company

ISO 45001 : 2018
Certified Company



Nikunj D. Patel
(Chemist)



Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		West Port – West Basin Main Gate					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		19-10-2023	20-11-2023	25-12-2023	22-01-2024	22-02-2024	25-03-2024
1	06:00 to 07:00	64.3	63.8	64.8	64.5	65.1	63.6
2	07:00 to 08:00	65.4	65.4	66.5	66.5	65.6	65.6
3	08:00 to 09:00	62.5	67.3	64.7	63.8	66.3	67.4
4	09:00 to 10:00	66.4	64.8	66.7	65.2	64.7	63.5
5	10:00 to 11:00	67.2	68.6	65.5	64.3	63.2	64.5
6	11:00 to 12:00	68.6	63.6	65.9	66.7	65.1	63.8
7	12:00 to 13:00	60.4	68.6	68.1	68.1	67.6	65.8
8	13:00 to 14:00	62.1	66.2	65.7	65.7	64.3	65.1
9	14:00 to 15:00	67.5	67.8	68.2	67.1	66.9	65.8
10	15:00 to 16:00	68.7	65.3	66.8	66.8	67.2	66.4
11	16:00 to 17:00	65.3	67.4	68.4	68.2	65.3	63.8
12	17:00 to 18:00	68.2	68.5	66.5	66.5	65.4	65.7
13	18:00 to 19:00	64.7	66.9	68.1	67.3	66.3	65.3
14	19:00 to 20:00	67.3	62.5	64.8	65.8	64.8	62.6
15	20:00 to 21:00	61.5	63.3	65.4	66.0	65.2	63.4
16	21:00 to 22:00	62.6	59.1	61.8	62.8	61.9	60.9
Day Time		<75 dB (A)					

Continue...

Location Name		West Port – West Basin Main Gate					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		19-10-2023	20-11-2023	25-12-2023	22-01-2024	22-02-2024	25-03-2024
1	22:00 to 23:00	60.4	56.9	57.6	58.3	57.3	58.2
2	23:00 to 24:00	61.3	58.6	60.8	61.2	59.6	58.9
3	24:00 to 01:00	58.6	57.2	59.9	59.9	61.8	62.3
4	01:00 to 02:00	62.5	54.2	62.5	62.5	63.7	61.8
5	02:00 to 03:00	58.3	58.4	64.1	64.5	63.5	62.8
6	03:00 to 04:00	59.1	55.6	61.3	62.7	61.9	63.7
7	04:00 to 05:00	61.5	59.8	60.7	60.7	60.5	61.2
8	05:00 to 06:00	62.1	57.6	58.6	59.2	57.6	59.3
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		West Port – Horti Culture					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		23-10-2023	23-11-02023	28-12-2023	25-01-2024	26-02-2024	28-03-2024
1	06:00 to 07:00	61.9	62.4	63.5	63.9	63.2	61.3
2	07:00 to 08:00	65.8	68.5	65.7	67.1	66.5	63.4
3	08:00 to 09:00	68.2	65.1	68.2	68.2	67.4	65.4
4	09:00 to 10:00	69.8	67.6	65.5	64.5	65.3	65.3
5	10:00 to 11:00	64.2	62.9	63.7	62.9	63.8	63.8
6	11:00 to 12:00	67.4	61.4	63.7	63.7	64.3	63.9
7	12:00 to 13:00	69.9	65.5	66.7	65.4	66.3	65.7
8	13:00 to 14:00	67.5	63.6	64.9	64.9	65.8	64.7
9	14:00 to 15:00	62.7	68.3	66.4	65.3	66.1	62.9
10	15:00 to 16:00	67.5	66.5	68.1	67.2	63.9	64.7
11	16:00 to 17:00	64.8	65.5	63.9	65.8	66.4	65.8
12	17:00 to 18:00	63.5	64.1	65.8	65.8	66.5	66.1
13	18:00 to 19:00	67.5	66.4	67.3	66.3	65.7	65.7
14	19:00 to 20:00	66.1	67.8	68.4	67.4	66.1	64.7
15	20:00 to 21:00	63.4	65.6	66.3	65.2	64.8	63.8
16	21:00 to 22:00	64.7	62.5	63.2	63.5	62.5	64.2
Day Time		<75 dB (A)					

Continue...

Location Name		West Port – Horti Culture					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		23-10-2023	23-11-02023	28-12-2023	25-01-2024	26-02-2024	28-03-2024
1	22:00 to 23:00	59.3	60.7	60.8	61.5	60.2	61.6
2	23:00 to 24:00	62.7	62.5	63.1	63.4	61.9	63.6
3	24:00 to 01:00	63.2	61.9	60.8	61.8	63.4	64.1
4	01:00 to 02:00	61.9	60.8	61.3	61.3	63.8	62.5
5	02:00 to 03:00	61.2	61.3	63.7	63.7	64.3	62.6
6	03:00 to 04:00	59.4	58.5	62.4	64.5	62.7	61.8
7	04:00 to 05:00	62.0	56.7	61.8	61.7	60.3	58.7
8	05:00 to 06:00	57.8	59.3	60.4	60.9	59.1	58.5
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		WEST PORT - PMC OFFICE					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		26-10-2023	27-11-2023	02-12-2023	29-01-2024	29-02-2024	01-03-2024
1	06:00 to 07:00	62.4	63.9	61.8	62.1	62.5	62.7
2	07:00 to 08:00	64.3	65.7	63.7	62.8	64.5	63.8
3	08:00 to 09:00	67.4	63.4	66.1	65.3	64.9	64.7
4	09:00 to 10:00	65.3	64.5	63.9	66.8	66.8	66.8
5	10:00 to 11:00	68.1	64.7	65.2	64.7	65.3	65.3
6	11:00 to 12:00	66.2	67.2	68.5	68.4	67.6	67.3
7	12:00 to 13:00	67.4	63.8	65.3	64.3	65.3	64.5
8	13:00 to 14:00	68.5	65.7	64.6	62.7	63.8	64.8
9	14:00 to 15:00	67.4	64.1	65.7	64.6	65.4	65.4
10	15:00 to 16:00	63.4	67.8	66.8	65.1	64.3	64.3
11	16:00 to 17:00	66.2	63.5	65.3	64.2	63.8	62.9
12	17:00 to 18:00	68.6	66.6	68.4	68.3	68.1	67.9
13	18:00 to 19:00	67.2	61.7	66.3	64.8	65.3	66.3
14	19:00 to 20:00	63.7	63.5	64.8	64.2	62.8	64.3
15	20:00 to 21:00	68.2	60.2	63.2	63.2	65.1	65.1
16	21:00 to 22:00	64.3	58.9	60.5	60.8	62.3	62.7
Day Time		<75 dB (A)					

Continue...

Location Name		WEST PORT - PMC OFFICE					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		26-10-2023	27-11-2023	02-12-2023	29-01-2024	29-02-2024	01-03-2024
1	22:00 to 23:00	61.7	58.8	59.1	59.6	60.8	60.2
2	23:00 to 24:00	63.6	60.8	61.3	62.8	63.2	62.4
3	24:00 to 01:00	61.4	63.1	63.1	64.2	64.7	63.5
4	01:00 to 02:00	57.8	62.3	62.3	63.4	62.6	64.1
5	02:00 to 03:00	60.4	60.3	59.9	60.7	63.7	62.8
6	03:00 to 04:00	63.7	57.2	58.3	59.6	62.6	61.7
7	04:00 to 05:00	58.4	60.8	60.8	61.5	60.4	60.4
8	05:00 to 06:00	59.5	61.8	59.6	59.8	60.2	59.7
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		LPG Terminal Substation					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		16-10-2023	16-11-2023	21-12-2023	18-01-2024	19-02-2024	21-03-2024
1	06:00 to 07:00	65.5	61.7	62.3	63.7	62.5	61.8
2	07:00 to 08:00	68.7	63.8	64.8	65.8	63.9	62.8
3	08:00 to 09:00	67.3	64.7	66.4	66.4	65.3	64.6
4	09:00 to 10:00	64.6	62.1	67.2	67.8	66.8	65.1
5	10:00 to 11:00	68.9	65.3	65.7	66.2	65.1	66.7
6	11:00 to 12:00	65.3	62.4	64.4	64.4	63.6	64.5
7	12:00 to 13:00	62.3	66.5	67.8	67.9	67.4	66.3
8	13:00 to 14:00	66.7	63.8	65.9	66.2	65.3	64.8
9	14:00 to 15:00	64.2	64.3	66.4	64.3	65.9	66.2
10	15:00 to 16:00	67.5	61.9	63.6	65.8	64.2	65.3
11	16:00 to 17:00	64.8	63.5	65.8	64.2	65.3	67.1
12	17:00 to 18:00	67.3	59.7	63.3	63.3	64.5	63.4
13	18:00 to 19:00	64.8	58.5	60.9	60.8	63.6	65.4
14	19:00 to 20:00	68.5	60.1	63.6	64.1	65.2	63.9
15	20:00 to 21:00	64.3	59.5	61.8	62.8	63.9	63.5
16	21:00 to 22:00	61.7	57.4	60.3	61.2	62.5	63.3
Day Time		<75 dB (A)					

Continue...

Location Name		LPG Terminal Substation					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		16-10-2023	16-11-2023	21-12-2023	18-01-2024	19-02-2024	21-03-2024
1	22:00 to 23:00	55.2	58.6	60.2	60.6	63.2	62.7
2	23:00 to 24:00	58.4	60.3	63.1	64.8	64.2	63.8
3	24:00 to 01:00	60.1	60.1	62.5	62.5	62.9	63.1
4	01:00 to 02:00	59.5	57.4	63.8	64.3	63.4	62.4
5	02:00 to 03:00	56.9	61.2	62.7	63.7	64.8	64.3
6	03:00 to 04:00	59.4	57.4	61.8	61.8	63.2	61.9
7	04:00 to 05:00	55.4	56.2	58.4	59.6	60.7	60.4
8	05:00 to 06:00	57.4	60.2	56.9	57.9	59.5	58.7
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		Adani Guest House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		31-10-2023	29-11-2023	30-12-2023	31-01-2024	24-02-2024	27-03-2024
1	06:00 to 07:00	60.1	59.9	58.7	59.1	60.3	59.5
2	07:00 to 08:00	65.7	62.8	62.3	63.5	63.8	61.8
3	08:00 to 09:00	63.2	66.1	64.8	65.7	64.9	63.8
4	09:00 to 10:00	65.8	64.8	66.5	65.8	66.3	65.5
5	10:00 to 11:00	66.1	68.3	63.7	63.7	62.1	64.6
6	11:00 to 12:00	63.4	66.5	67.9	67.7	65.3	66.2
7	12:00 to 13:00	66.8	64.3	64.3	65.3	64.7	65.3
8	13:00 to 14:00	63.5	66.3	66.3	66.3	65.6	65.6
9	14:00 to 15:00	62.4	67.8	65.2	64.7	65.8	63.8
10	15:00 to 16:00	65.3	63.5	63.5	65.2	64.2	65.7
11	16:00 to 17:00	64.1	62.8	64.6	64.6	65.8	64.3
12	17:00 to 18:00	65.9	65.6	66.7	66.7	66.6	65.7
13	18:00 to 19:00	62.1	62.4	64.5	65.3	63.2	64.1
14	19:00 to 20:00	64.5	61.3	66.4	66.4	63.9	63.8
15	20:00 to 21:00	62.3	63.2	61.3	62.8	64.3	63.5
16	21:00 to 22:00	57.8	61.3	60.4	60.8	61.8	60.4
Day Time		<75 dB (A)					

Continue...

Location Name		Adani Guest House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		31-10-2023	29-11-2023	30-12-2023	31-01-2024	24-02-2024	27-03-2024
1	22:00 to 23:00	59.3	58.8	59.5	60.2	59.7	60.5
2	23:00 to 24:00	57.4	55.3	58.6	59.6	60.3	63.6
3	24:00 to 01:00	55.4	54.9	60.5	62.3	61.8	62.5
4	01:00 to 02:00	53.9	56.4	59.4	60.7	61.4	61.4
5	02:00 to 03:00	60.5	58.4	57.2	58.4	60.7	60.7
6	03:00 to 04:00	57.5	60.1	55.8	56.3	58.6	60.5
7	04:00 to 05:00	55.9	58.6	57.6	58.7	56.2	58.3
8	05:00 to 06:00	59.6	57.7	56.3	57.1	57.3	56.9
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		CT-4 RMU-1				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		22-11-2023	18-12-2023	15-01-2024	15-02-2024	18-03-2024
1	06:00 to 07:00	62.2	63.7	62.8	64.2	63.3
2	07:00 to 08:00	65.2	66.4	65.3	64.9	65.2
3	08:00 to 09:00	63.8	68.9	68.9	67.8	66.3
4	09:00 to 10:00	66.8	65.4	64.1	65.3	67.2
5	10:00 to 11:00	64.1	66.3	65.8	63.8	65.4
6	11:00 to 12:00	63.4	65.6	66.7	65.2	66.8
7	12:00 to 13:00	65.3	64.3	65.3	62.3	65.1
8	13:00 to 14:00	68.1	67.2	67.5	66.8	65.4
9	14:00 to 15:00	64.9	65.2	64.2	63.8	64.3
10	15:00 to 16:00	66.3	67.8	66.8	64.9	66.1
11	16:00 to 17:00	64.8	65.1	66.2	66.3	64.8
12	17:00 to 18:00	65.3	64.5	64.5	65.1	63.7
13	18:00 to 19:00	66.2	67.4	67.4	66.7	65.2
14	19:00 to 20:00	64.8	65.3	64.3	65.2	64.8
15	20:00 to 21:00	63.2	64.7	64.7	63.7	61.7
16	21:00 to 22:00	60.6	62.5	62.4	63.1	62.7
Day Time		<75 dB (A)				

Continue...

Location Name		CT-4 RMU-1				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		22-11-2023	18-12-2023	15-01-2024	15-02-2024	18-03-2024
1	22:00 to 23:00	60.4	62.8	63.6	62.9	61.8
2	23:00 to 24:00	63.2	60.5	61.4	63.2	64.3
3	24:00 to 01:00	60.1	64.3	64.3	63.4	62.7
4	01:00 to 02:00	58.4	61.6	62.8	64.3	64.3
5	02:00 to 03:00	60.2	62.4	62.4	63.8	62.4
6	03:00 to 04:00	57.4	64.1	63.8	64.6	64.1
7	04:00 to 05:00	56.2	62.6	63.7	62.4	63.4
8	05:00 to 06:00	57.3	60.1	60.3	58.6	60.2
Day Time		<70 dB (A)				

Test Method	IS: 9989 : 1981
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Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring

Sr. No.	Parameter	Unit	Mar – 2024		GPCB LIMIT	Method of Test
			D.G.Set No. S-1 (1500 KVA)	D.G.Set No. S-2 (1500 KVA)		
			15-03-2024	15-03-2024		
1	Particulate Matter	mg/Nm ³	18.42	18.31	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO ₂	ppm	15.28	14.93	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO _x	ppm	21.76	19.58	50	IS 11255 (Part - 7)



Nikunj D. Patel
(Chemist)




Jaivik S. Tandel
(Manager - Operations)

Sr. No.	Parameter	Unit	Mar-24	GPCB LIMIT	Method of Test
			D.G. Set-1 (2000 KVA)		
			28-03-2024		
1	Particulate Matter	mg/Nm ³	27.23	150	IS 11255 (Part - 1)
2	Sulphur Dioxide	ppm	12.71	100	IS 11255 (Part - 2)
3	Oxide of Nitrogen	ppm	25.10	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm ³	1.87	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	--	UERL/AIR/SOP/27

Minimum Detection Limit

Ambient Air Quality Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Particulate Matter (PM10)	µg/m3	5 µg/m3
2	Particulate Matter (PM10)	µg/m3	5 µg/m3
3	Sulphur Dioxide (SO2)	µg/m3	4 µg/m3
4	Nitrogen Dioxide (NO2)	µg/m3	5 µg/m3
5	Carbon Monoxide (CO)	mg/m3	0.01 mg/m3
6	Ammonia (NH3)	µg/m3	5 µg/m3
7	Ozone (O3)	µg/m3	5 µg/m3
8	Lead (Pb)	µg/m3	0.5 µg/m3
9	Nickle (Ni)	ng/m3	1 ng/m3
10	Arsenic (As)	ng/m3	1 ng/m3
11	Benzene	µg/m3	1µg/m3
12	Benzo(o)Pyrene	ng/m3	0.1 ng/m3
14	Hydro Carbon	µg/m3	1 µg/m3

Stack Emission Monitoring

Sr. No.	Test Parameter	Unit	MDL
1	Suspended particulate matter	mg/Nm3	2 mg/Nm3
2	Sulphur Dioxide SOX	mg/Nm3	4 mg/Nm3
3	Oxides of Nitrogen NOX	mg/Nm3	5 mg/Nm3

STP Outlet

Sr. No.	Test Parameter	Unit	MDL
1	pH @ 25 ° C	--	2
2	Total Suspended Solids	mg/L	4
3	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	1
4	Residual chlorine	mg/L	0.1
5	Fecal Coliform	mg/L	<2

ETP Outlet

Sr. No.	Test Parameter	Unit	MDL
1	Colour	Pt. Co. Scale	5
2	pH @ 27 ° C	--	2
3	Temperature	0c	5
4	Total Suspended Solids	mg/L	4
5	Total Dissolved Solids	mg/L	4
6	COD	mg/L	2
7	BOD (3 days at 27 °C)	mg/L	1
8	Chloride (as Cl) -	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate (as SO ₄)	mg/L	1
11	Ammonical Nitrogen	mg/L	2

12	Phenolic Compound	mg/L	0.1
13	Copper as Cu	mg/L	0.05
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.05
16	Cadmium as Cd	mg/L	0.003
17	Fluoride as F	mg/L	0.2
18	Residual Chlorine	mg/L	0.1
19	Percent Sodium	%	--
20	Sodium Absorption ratio	--	--

MARINE MONITORING REPORT

December 2023



Submitted to
Adani Power Ltd. (APL), Mundra
Village Tunda & Sirach
Taluka Mundra
District Kutch- 370 435
Gujarat

Prepared by
M/s. UniStar Environment and Research Labs. Pvt. Ltd.
White House, Near GIDC Office, Char Rasta, Vapi,
District Valsad - 396 195
Gujarat

PREFACE

M/s. Adani Power Ltd., Mundra (APL-Mundra) is a subsidiary company of Adani Group engaged in imported coal-based thermal power generation located near village Tunda and Siracha, Taluka Mundra District Kutch, Gujarat. APL-Mundra has commissioned the first supercritical 660 MW unit in the country. This is also the World's First supercritical technology project to have received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). Currently, the total power production capacity of the APL-Mundra has increased to 4620 MW.

APL-Mundra has engaged **M/s. UniStar Environment and Research Labs Pvt. Ltd., Vapi** to carry out the seasonal Marine Monitoring Study along with the seawater intake and outfall (discharge) channels of Mundra power plant. This marine monitoring study involved the assessment of Physio-chemical parameters at the earlier prescribed locations. The distribution and diversity of marine flora and fauna were assessed through water sampling from sub-tidal regions. Furthermore, the distribution of the benthic community was evaluated from the sediment samples collected along the sub-tidal and inter-tidal regions. The overall objective of this study is to monitor the status of prevailing ecology along the intake and discharge (outfall) channels, in terms of water and sediment quality through assessment of physico-chemical parameters and marine biota. This marine monitoring report provides a comprehensive analysis of the Data obtained through a monitoring study undertaken during December 2023.

Date: 22/12/2023

M/S. UniStar Environment and Research Labs Pvt. Ltd.

White House, Char Rasta,

Vapi-396 191

Approved by



Mr. Jaivik Tandel
(Authorized By)



TABLE OF CONTENTS

NO.	Contents	Page no.
1.0	Introduction	4
1.1	Overview	4
1.2	Objectives	4
2.0	Study program	5
2.1	Study period	5
2.2	Sampling locations	5
2.3	Sampling strategy	7
2.3.1	Sampling frequency	7
2.3.2	Sampling methodology	7
2.4	Sample analysis method	7
2.4.1	Physicochemical parameter	7
2.4.2	Sediment quality parameter	8
2.4.3	Biological parameter	8
3.0	Water quality monitoring	9
3.1	Result of Physico-chemical water parameter analysis	9-13
4.0	Sediment quality monitoring	14-16
5.0	Biological parameters (Biodiversity study)	17
5.1	Planktonic forms	18
5.1.1	Phytoplankton	18
5.1.2	Zooplankton	18
5.2	Significance of (phyto- and zoo-) planktons	18
5.3	Phytoplankton diversity	19
5.4	Phytoplankton pigment (Chlorophyll <i>a</i> and Pheophytin)	21
5.4.a	Chlorophyll <i>a</i> and Pheophytin concentration	22
5.5	Zooplankton diversity	23
5.6	Microbenthic fauna	25
5.6.1	Significance of macrobenthic organisms	26
5.6.2	Benthic biodiversity (Subtidal and intertidal regions)	26
6.0	Conclusion	30
	Sampling photographs	31

Figure No.	Contents	Page No.
Map / Photos / Images/Graph		
1	Map of the study area illustrating the subtidal and intertidal sampling stations	6
2	Phytoplankton abundance (cells×10 ² L ⁻¹) reported in the surface and bottom waters along the APL-Mundra coast, Mundra	21
3	Microphotographs of phytoplankton reported in the coastal waters of APL-Mundra, Mundra	21
4	Zooplankton population (nos. /100 m ³) reported in the subtidal waters (Station 1 to 5) along the APL-Mundra coast, Mundra	23
5	Dominant groups of Zooplankton reported from APL-Mundra coast, Mundra during December 2023	24
6	Microphotographs of zooplanktons reported in the coastal waters of APL-Mundra, Mundra	25
7	Subtidal macrobenthos abundance (no. m ⁻²) at different sampling stations at APL-Mundra, Mundra	27
8	Inter-tidal macro benthos abundance (nos./m ²) at different sampling stations at APL-Mundra, Mundra during December 2023	29
9	Microphotographs of macrobenthic organisms observed in the sediment samples collected in the vicinity of APL-Mundra, Mundra during December 2023.	29
	Sampling Photographs	31
Table No.	Contents	Page No.
Tables		
1	Geographic coordinates, water, and sediment parameters at the subtidal sampling stations.	5
2	Geographic coordinates, water, and sediment parameters at the Intertidal sampling stations.	6
3	Water quality parameters and their test methods.	11-13
4	Subtidal sediment quality parameters and their test methods.	15
5	Intertidal sediment quality parameters and their test methods.	16
6	Test Method for Phytoplankton, Zooplankton, Benthos, Chlorophyll <i>a</i> and Pheophytin analysis.	19
7	The phytoplankton abundance (cells×10 ⁻² L ⁻¹) at different sampling stations in the coastal waters.	20
8	Chlorophyll-a, Pheophytin concentrations along with their ratios (Chl <i>a</i> : Pheophytin) in the marine waters.	22
9	Population (Nos. m ⁻³) and contribution (% in parentheses) of various zooplankton groups at station 1 to 5.	24
10	Faunal composition, population (no. m ⁻²) and biomass (g. m ⁻²) of the macrobenthos community in the subtidal region.	27
11	Faunal composition, density (nos. m ⁻²) of macrobenthos from the sediments collected at High Tide Levels (HTL) and Low Tide Levels (LTL) in the inter-tidal region.	28
12	Names of the marine monitoring team members.	30

1. INTRODUCTION

1.1 OVERVIEW

Adani Power Limited (APL-Mundra) is an imported coal-based thermal power plant located near village Tunda and Siracha, Taluka Mundra, District Kutch, Gujarat, India. APL-Mundra is the largest single location private coal-based power plant in India. Mundra plant capacity is 4620 MW, comprising of 9 units with 4 units of 330 MW (Phase I and II) and 5 units of 660MW (Phase III and IV). The 330 MW units are based on subcritical technology and the 660 MW units are based on supercritical technology. APL-Mundra has created history by synchronizing the first super-critical technology-based 660 MW generating unit. This is not only the first super-critical generating unit in the country but also the fastest project implementation ever by any power developer in the country. The Phase III of the Mundra project, which is based on supercritical technology, has received the ‘Clean Development Mechanism (CDM) Project’ certification from United Nations Framework Convention on Climate Change (UNFCCC).

M/S. UniStar Environment and Research Labs Pvt. Ltd., Vapi, India have carried out the routine Marine Monitoring Study in the vicinity of the APL-Mundra Mundra plant during 29 and 30 December 2023. The sampling was carried out along the integrated sea intake channel (2 stations) and at vicinity of discharge/outfall channel water mixing region (2 stations). These integrated intake and outfall channels were developed and maintained by Adani Port and SEZ (APSEZ). One station was situated in between these two locations. This assessment involves the collection of Physico-chemical parameters from 5 subtidal locations (Table 1). The distribution and diversity of marine microflora (phytoplankton and pigments) and fauna (zooplankton) were assessed from water samples collected from 5 subtidal stations (Table 1). The assemblage of the macrobenthic community was studied from 5 sub-tidal and 3 inter-tidal stations. The present report presents a detailed account of the results observed during the Marine Monitoring Study at the vicinity of the APL-Mundra during December 2023.

1.2 OBJECTIVES

- a) To analyses the Physico-chemical seawater parameter for understanding the water quality in the study area.
- b) Evaluation of the prevailing status of marine biota through the quantitative and qualitative analysis of marine flora (phytoplankton and pigments) and fauna (zooplankton and macrobenthos).
- c) To recommend adequate marine environmental management measures.

2. STUDY PROGRAM

2.1 STUDY PERIOD

The field investigation was carried out on 22 December 2023. The sampling strategy was planned in such a manner as to get a detailed characteristic of the marine environment of the study area. Sampling and analysis for the marine environment have been carried out by **M/s. UniStar Environment and Research Labs Pvt. Ltd, Vapi, India.**

2.2 SAMPLING LOCATIONS

Sampling was carried out at 5 subtidal stations and 3 intertidal transects along with the sea intake and outfall channels. Out of 5 subtidal stations, 2 were in the sea intake channel, 2 along the discharge mixing (outfall channel) region and remaining 1 in between these two locations. One intertidal station was located along the sea intake channel and 2 were along the discharge region. The detailed geographic coordinates of sampling stations are given in Table 1, 2 and Figure 1.1.

Table 1: Geographic coordinates, water, and sediment parameters at the subtidal sampling stations, APL-Mundra during December 2023.

Subtidal station							
Station	Station code	Locations	Coordinates		Water depth	Tide	Sediment texture
1	St-1	Intake point	22°48' 30.'69"N	69°32'55.18"E	5.4 m	Flood	Silty-sand
2	St-2	Mouth of intake point	22°46'51.62"N	69°32'10.89"E	4.5 m	Flood	Silty-sand
3	St-3	West port area	22°45'15.56"N	69°34'43.26"E	5.0 m	Ebb	Silty-sand
4	St-4	Outfall area	22°44' 27.23"N	69°36'19.02"E	4.0 m	Ebb	Silty clay
5	St-5	Outfall area	22°44'45.17"N	69°36'352.74"E	4.2 m	Ebb	Silty clay

Table 2: Geographic coordinates, water, and sediment parameters at the intertidal sampling stations, APL-Mundra during December 2023.

Intertidal transect						
Station	Station code	Tide Level	Coordinates		Intertidal exposed area	Sediment texture
I	IT-1 (HW)	High Tidewater level	22°44'17.44" N	69°38'26.70" E	5.1 m	Silty-sand
	IT-1 (LW)	Low Tide water level	22°45'36.52"N	69°28'51.42"E		Silty-sand
II	IT-2 (HW)	High Tide water level	22°48'50.63" N	69°33'40.52" E	4.0 m	Silty-Sandy
	IT-2 (LW)	Low Tidewater level	22°41'37.54" N	69°32'45.56" E		Silty-sand
III	IT-3 (HW)	High Tidewater level	22°46'52.35" N	69°46'31.50"E	4.5 m	Sandy
	IT-3 (LW)	Low Tidewater level	22°45'44.33" N	69°40'28.31" E		Sandy



Figure 1: Map of the study area illustrating the subtidal and intertidal sampling stations.

2.3 SAMPLING STRATEGY

2.3.1 Sampling frequency

A sampling at the subtidal stations was carried out during the flood to ebb tides. Surface and bottom water samples were collected in duplicate for assessing water quality and marine biota. Intertidal samples were collected in duplicate during low tide at each transect.

2.3.2 Sampling methodology

For estimation of Physico-chemical parameters and marine flora (phytoplankton and pigments), subsurface samples were collected using the Niskin water sampler (5-litre capacity) with a mechanism for closing at the desired depth. Surface water samples were collected using a clean polyethylene bucket. Phytoplankton samples were collected in clean polyethylene bottles (1 L) fitted with inert cap liners and preserved with 4% Lugol's iodine solution. For pigment analysis, water samples were stored in clean, dark polyethylene cans (5 L). Chemical parameters samples were collected in polyethylene or glass bottles. Samples for phenol were collected in polyethylene or glass bottles and Petroleum Hydrocarbon samples collected in glass bottles. Dissolve oxygen (DO) and Biological Oxygen Demand (BOD) samples were collected in glass BOD bottles. The temperature was measured on the field with a calibrated thermometer. Analysis of other parameters was carried out in the laboratory.

For zooplankton, oblique hauls were made using Heron Tranter net attached with calibrated flow meter. Samples were stored in clean polyethylene bottles (0.5 L) and fixed with 5% formaldehyde.

For the analysis of macrobenthos, subtidal sediment samples were collected using a Van Veen grab covering an area of 0.04 m². Intertidal samples were collected using a metal quadrant. Samples were sieved with a 500 μ metal sieve and preserved with Rose Bengal-formalin solution and stored in plastic zip-lock bags.

2.4 SAMPLE ANALYSIS METHODS

2.4.1 Physico-chemical parameter:

Samples were analysed by using different analytical methods for estimations of Temperature, Turbidity, PH, Suspended Solid (SS), Salinity, DO, BOD, COD, Phosphate, Total nitrogen, Nitrite, Nitrate, Phenols and PHc. The standard methods used for the analysis of each parameter are given in Table 3.

2.4.2 Sediment Quality parameters:

Sediment texture, Petroleum Hydrocarbon (PHc), Phosphorus, Organic Carbon, Aluminium, Iron, Chromium, Nickel, Zinc, Lead, Copper, Cobalt, Cadmium, Mercury, Arsenic. The standard methods used for the analysis of each parameter.

2.4.3 Biological parameters:

2.4.3a Phytoplankton:

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

2.4.3b Phytoplankton pigments:

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

2.4.3c Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

2.4.3d Benthos:

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

3 WATER QUALITY MONITORING

3.1 RESULT OF PHYSICO-CHEMICAL WATER PARAMETER ANALYSIS

The samples collected during the field visit were brought to the laboratory for further analysis of Physico-chemical parameters. The standard methods used for the analysis of water quality parameters are given in Table 3.

3.1.1 Temperature: Marine water temperature was checked on-site during the sampling. Surface and bottom water temperatures observed in the study area were in a range between 24.2^oC to 25.5^oC. The water temperature generally varied in accordance with the prevailing air temperature, tidal activity, and seasonality.

3.1.2 pH: The pH of the water is generally buffering effect, influenced by the freshwater and anthropogenic discharge from land. The observed pH in the study area was in the range of 7.9 to 8.06 at the surface and bottom water.

3.1.3 Turbidity: Seawater turbidity is the cloudiness caused by large numbers of individual particles such as very fine clay and minute marine organisms. This also varies seasonally due to intrusion of land runoff and/or sediment resuspension. Surface and bottom water turbidity observed in the study area was in a 1 NTU.

3.1.4 Total suspended solids (TSS): The suspended solids generally constitute silt and clay eroded from the land or shore erosions and suspension of the benthic layers from the seabed. Anthropogenic discharges also contribute to suspended solids in the form of contaminants such as oil and solid waste in a polluted area. On a seasonal basis, high TSS in seawater could be observed during the active monsoon season. Suspended solid concentration in the study area was a little variable. In surface water, TSS was 76 to 98 mg/L and in the bottom water, it was ranged from 96 to 118 mg/L.

3.1.5 Salinity: Salinity is an indicator of (saline or freshwater) water masses intrusion within the region. The standard average salinity of seawater is 38.2, which may vary with the riverine or inland influx, rains, or evaporation in the region. The salinity variation during the present sampling was 36 to 39 at surface and 37.9 to 40 at the bottom water.

3.1.6 DO and BOD: High DO level is an indication of good oxidizing conditions in an aquatic environment. In unpolluted waters equilibrium is maintained through oxygen production during photosynthesis, dissolution from the atmosphere consumption by the respiration and decay of organic matter in a manner that DO levels are close to or above saturation value.

The DO level of the study area was varied from 5.3 to 6.5 mg/L at the water surface and 4.2 to 5.7 mg/L at the bottom water. The average DO value was 5.4 mg/L, which indicates the oxygenated conditions in the study region.

BOD is generally indicating the effective consumption of oxidizable matter in that water body. The industrial effluents contain high BOD levels. Thus, high BOD is also an indication of the intrusion of industrial polluted effluent into natural waters. BOD levels in the study area were varied from 3.9 to 5.1 mg/L at surface and 4.5 to 5.2 mg/L at bottom water.

3.1.7 Nutrients: Dissolved phosphorus and nitrogen compounds serve as the nutrients for phytoplankton growth. The high nutrient concentrations in the seawater generally could be attributed to the anthropogenic and industrial influx. This could lead to further eutrophication and further deterioration of the pristine ecosystem. In the present study, Phosphate concentration was range from 0.2 to 0.3 $\mu\text{mol/L}$ on the surface and 0.2 to 0.4 $\mu\text{mol/L}$ bottom water. Nitrite concentration was range from 0.2 to 0.6 $\mu\text{mol/L}$ on the surface and 0.4 to 0.6 $\mu\text{mol/L}$ bottom water. Nitrate concentration was range from 1.96 to 2.24 $\mu\text{mol/L}$ on the surface and 2.24 to 2.9 $\mu\text{mol/L}$ bottom water.

3.1.8 PHc and phenol: The Phenol compounds and PHc were not detected in the present investigation.

Table 3: Water quality parameters and their test methods.

Sr. No.	Parameters	Station 1		Station 2		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.05	8	7.99	7.98	IS 3025(Part 11)1983
2.	Temperature (°C)	25.5	24.7	25.2	24.4	IS 3025(Part 9) 1984
3.	Turbidity (NTU)	1	1	0.1	1	IS 3025(Part 10) 1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	94	110	98	116	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37	38	36	37.9	By Calculation
3.	Dissolved Oxygen (mg/l)	5.8	5.1	5.9	5.7	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	4.8	4.6	3.9	5.2	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO ₄ (mg/l)	1840	1908	1926	2080	APHA 23rd Ed.,2017,4500- SO ₄ E
6.	Ammonical Nitrogen (µmol/l)	1.71	1.9	1.6	0.76	APHA 23rd Ed.,2017,4500- NH ₃ B
7.	Total Nitrogen (µmol/l)	5.2	6.4	4.8	6	By Calculation
8.	PO ₄ ³⁻ -P (µmol/l)	0.31	0.26	0.29	0.28	APHA 23rd Ed.,2017,4500 -P,D
9.	(NO ₃ ⁻ -N) (µmol/l)	2.04	2.8	2.14	2.24	APHA 23rd Ed.,2017,4500 NO ₃ -B
10.	(NO ₂ ⁻ -N) Nitrite (µmol/l)	0.24	0.46	0.5	0.6	APHA 23rd Ed.,2017,4500 NO ₂ B
11.	Phenol (mg/l)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	IS 3025(Part 43):2020
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable
 Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 2)

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.04	8.06	7.9	8.1	IS 3025(Part 11)1983
2.	Temperature °C	24.7	24.2	25.2	24.4	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	88	96	76	104	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37	38	39	40	By Calculation
3.	Dissolved Oxygen (mg/l)	6.5	4.6	5.8	4.2	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	5.1	4.5	4.6	5	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO ₄ (mg/l)	1940	2050	1856	2140	APHA 23rd Ed.,2017,4500- SO ₄ E
6.	Ammonical Nitrogen (µmol/l)	0.9	0.75	0.59	1.01	APHA 23rd Ed.,2017,4500- NH ₃ B
7.	Total Nitrogen (µmol/l)	5.8	7.1	4.6	6	By Calculation
8.	PO ₄ ³⁻ -P (µmol/l)	0.2	0.2	0.3	0.4	APHA 23rd Ed.,2017,4500 –P,D
9.	(NO ₃ ⁻ -N) (µmol/l)	2.4	2.9	1.96	2.38	APHA 23rd Ed.,2017,4500 NO ₃ -B
10.	(NO ₂ ⁻ -N) Nitrite (µmol/l)	0.3	0.5	0.6	0.4	APHA 23rd Ed.,2017,4500NO ₂ B
11.	Phenol (mg/l)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	IS 3025(Part 43):2020
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable
 Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 3)

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25°C	8.1	8.2	IS 3025(Part 11)1983
2.	Temperature (°C)	25.4	24.6	IS 3025(Part 9)1984
3.	Turbidity (NTU)	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids (mg/l)	84	118	APHA 23rd Ed.,2017,2540- D
2.	Salinity	38.5	39	By Calculation
3.	Dissolved Oxygen (mg/l)	5.3	5	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	4.9	4.8	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO ₄ (mg/l)	1946	2162	APHA 23rd Ed.,2017,4500- SO ₄ E
6.	Ammonical Nitrogen(μmol/l)	1.2	0.94	APHA 23rd Ed.,2017,4500- NH ₃ B
7.	Total Nitrogen (μmol/l)	6.4	7.9	By Calculation
8.	PO ₄ ³⁻ -P (μmol/l)	0.31	0.41	APHA 23rd Ed.,2017,4500 -P,D
9.	(NO ₃ ⁻ -N) (μmol/l)	2.24	2.8	APHA 23rd Ed.,2017,4500 NO ₃ -B
10.	(NO ₂ ⁻ -N) Nitrite (μmol/l)	0.2	0.6	APHA 23rd Ed.,2017,4500 NO ₂ B
11.	Phenol (mg/l)	BDL(MDL:0.001)	BDL(MDL:0.001)	IS 3025(Part 43):2020
12.	PHc (ppb)	N.D.	N.D.	APHA 23rd ED,2017,5520 F

Note: MDL = Minimum Detection Limit and N.D. = Not detectable
 Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

4 SEDIMENT QUALITY MONITORING

The sediment quality at different sampling stations was measured during this investigation. The results are presented in Tables 4 and 5.

- The sediment in the subtidal region was mainly composed of silty sand to loamy sand. In the intertidal region, sediment texture was sandy.
- The **Aluminium** was not detected.
- The highest **Cobalt** content (9.67 µg/g) was recorded at ST-1 and lowest at ST-4 (6.54 µg/g).
- At ST-3, the highest **Copper** content (13.72 µg/g) was recorded, whereas the lowest was detected at ST-4 (8.6 µg/g). In the intertidal region, highest copper content (11.73 µg/g) was found at IT-3 (LWL) and lowest was detected at IT-1 (HWL) (8.24 µg/g).
- The **Zinc** content (67.46 µg/g) was highest at ST-4 and the lowest zinc content (27.22 µg/g) at ST-3. The zinc content in the intertidal region was within range of 9.84 µg/g to 28.4 µg/g.
- In the subtidal stations, the highest **phosphorus** content (502.4 µg/g) was recorded at ST-3 whereas the lowest was at ST-1 (385.4 µg/g). In the intertidal region highest phosphorus content (502.3 µg/g) was recorded at IT-1 (LWL) and lowest at (364.2 µg/g) IT-2(HWL).
- The highest **Organic carbon** content (0.6 %) was recorded at ST-4 .
- The **Chromium** content of marine sediment was ranged from 7.3 µg/g to 12.25 µg/g. The highest chromium content was recorded at ST-3 and the lowest at ST-4. In the Intertidal region, the chromium content was varied from 9.82 µg/g to 15.21 µg/g.
- The highest **Nickel** content (24.94 µg/g) was recorded at ST-1 and lowest (15.76 µg/g) at ST-4. In the intertidal region higher nickel content (21.05 µg/g) was found at IT-2 (LWL) and lowest (16.05 µg/g) at IT-3 (LWL).
- In the subtidal region, the highest **Manganese** content was recorded at ST-4 (354.8 µg/g).
- The **Iron** content was higher at ST-1 (0.95 %) and lower at ST-4 (0.45%). In the Intertidal region, the highest iron content was recorded at IT-1(HWL) (0.21 %) and lowest at IT-3 (LWL) (1.7 %).
- The **PHc, Arsenic & Mercury** was not detected in the sediments during this study.

Table 4: Subtidal sediment quality parameters and their test methods.

No.	Parameters	SUBTIDAL SEDIMENT QUALITY($\mu\text{g/g}$)					Test Permissible	Method
		Station 1	Station 2	Station 3	Station 4	Station 5		
1	Texture	Silty sand	Silty-sand	Silty-sand	Silty-clay	Silty-clay	--	
2	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	N.D.	Spectrophotometer Method	
3	Cobalt as Co($\mu\text{g/g}$)	9.67	9.29	7.51	6.54	7.39	EPA 3050B :1996/7000B :2007	
4	Copper as Cu($\mu\text{g/g}$)	12.9	10.94	13.72	8.6	12.23	EPA 3050B :1996/7000B :2007	
5	Zinc as Zn	33.19	29.17	27.22	67.46	31.27	EPA 7471A Method	
6	Mercury($\mu\text{g/g}$)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	IS 10158B (Stannous Chloride Method)	
7	Phosphorous (Total)($\mu\text{g/g}$)	385.4	436.5	502.4	476.1	492.1	EPA 3050B :1996/7000B :2007	
8	C (Org.) %	0.2	0.4	0.3	0.6	0.4	IS: 2720 (Part 22):1972	
9	Chromium($\mu\text{g/g}$)	11.89	10.1	12.25	7.3	8.43	EPA 3050B :1996/7000B :2007	
10	Nickel ($\mu\text{g/g}$)	24.94	23.07	22.16	15.76	20.49	EPA 3050B :1996/7000B :2007	
11	Manganese	234.5	188.5	224.3	354.8	174.1	EPA 3050B :1996/7000B :2007	
12	Iron%	0.95	0.93	0.68	0.45	0.62	EPA 3050B :1996/7000B :2007	
13	PHc($\mu\text{g/g}$)	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F	
14	Arsenic($\mu\text{g/g}$)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	EPA 1998, SW-846, Method 7061A 1992	

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5: Intertidal sediment quality parameters and their test methods.

INTER TIDAL SEDIMENT QUALITY ($\mu\text{g/g}$)								
Sr. No	Parameters	Transect 1		Transect 2		Transect 3		Test Method Permissible
		High Tide	Low Tide	High Tide	Low Tide	High Tide	Low Tide	
1.	Texture	Silty-sand	Silty-Sand	Silty-sand	Silty-sand	Sandy	Sandy	Spectrophotometer Method
2.	pH	7.41	8.53	8.61	8.46	8.74	8.84	IS: 2720 (Part 26):1987 (By pH Meter)
3.	Copper as Cu	8.24	10.52	9.06	11.55	11.44	11.73	EPA 3050B :1996/7000B :2007
4.	Mercury as Hg	BDL(MDL :0.1)	BDL(MDL :0.1)	BDL(MDL :0.1)	BDL(MDL: 0.1)	BDL(MDL :0.1)	BDL(MDL :0.1)	EPA 7471A Method
5.	Phosphorous as P	472.6	502.3	364.2	452.1	392.5	402.8	IS 10158B (Stannous Chloride Method)
6.	Chromium as Cr	15.21	13.74	12.82	9.82	14.06	14.62	EPA 3050B :1996/7000B :2007
7.	Zinc as Zn	14.26	20.04	27.55	28.4	18.41	9.84	EPA 3050B :1996/7000B :2007
8.	Nickel as Ni	18.71	19.72	19.31	21.05	16.25	16.05	EPA 3050B :1996/7000B :2007
9.	Arsenic as As	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL :0.05)	BDL(MDL: 0.05)	BDL(MDL :0.05)	BDL(MDL :0.05)	EPA 1998, SW-846, Method 7061A 1992
10.	Cobalt as Co	6.24	7.12	5.26	3.41	5.61	2.43	EPA 3050B :1996/7000B :2007
11.	Iron as Fe	0.44	0.34	0.39	0.29	0.3	0.21	EPA 3050B :1996/7000B :2007
12.	Aluminium as Al	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	Spectrophotometer Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

❖ BIOLOGICAL PARAMETERS:

Phytoplankton:

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

Phytoplankton pigments:

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

Benthos:

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

5 BIOLOGICAL PARAMETERS (BIODIVERSITY STUDY)

Marine ecosystems are subject to a multitude of direct human pressures, such as overexploitation, eutrophication, pollution, and species introductions. These stressors can have synergistic effects on marine ecosystems, altering its functioning. Anthropogenic involvements constantly compromise the health of the marine ecosystem by disturbing the ecological balance. Hence the assessment of the biotic components along with abiotic factors is an integral part of environmental assessment and monitoring study. During the present investigation at APL-Mundra, the abundance and distribution of marine organisms (Plankton and benthos) were studied as part of routine environmental monitoring.

5.1 PLANKTONIC FORMS

The name plankton is derived from the Greek word “planktons”, meaning “wanderer” or “drifter”. While some forms of plankton are capable of independent movement and can swim up to several hundred meters in a single day, their position is primarily determined by currents in the body of water they inhabit. As per definition, organisms classified as "plankton" are unable to resist ocean currents. Plankton is primarily divided into two broad functional groups i.e., Phytoplankton and Zooplankton.

5.1.1 Phytoplankton

Phytoplankton are microscopic, single-celled photosynthetic organisms that live suspended in all water niches, including oceans, freshwater, and marine niche. Like the terrestrial ecosystem where plants are an integral part of the ecosystem, phytoplankton play key role in the biogeochemistry of the oceans. As they are dependent on sunlight for energy, they mostly inhabit the euphotic zone. Therefore, they are responsible for production of half of the atmosphere’s oxygen and more than half of the primary production in the oceans. There are many species of phytoplankton, each of which has a characteristic shape, size, and function. Marine species of phytoplankton grow abundantly in oceans around the world and are the foundation of the marine food chain. Marine phytoplankton are the producing (autotrophic) component in the ocean. There are fourteen classes of phytoplankton. Each class of phytoplankton contains unique attributes in size, cell structure, nutrients, and function.

5.1.2 Zooplankton:

Zooplankton occupies second position in the food web of the marine niche. They are the primary consumer’s organisms and generally feed on phytoplankton or small, microscopic group of organisms for they are nutritional needs. They are incapable of making their own food from sun-light or inorganic compounds, and feed on organisms or the remains of other organisms to get the energy necessary for survival.

5.2 SIGNIFICANCE OF PHYTO- AND ZOOPLANKTONS

Phytoplankton are vital to marine ecosystems. They are producers, or autotrophs, that form the foundation of most marine food webs. As photosynthetic organisms, they can convert solar energy into chemical energy and store it in form of sugars. They are responsible for half of the photosynthetic activity on the planet. The significance of zooplanktons is found in their role of transferring biological production from phytoplankton to large organisms in the marine food web and the seafloor. The microscopic protozoan, tunicates, copepods, and other crustaceans

graze upon many phytoplankton species. These in turn become food for other animals further linking the food web. Therefore, variability in reproduction of copepods would affect the survival of young fish that feeds on them.

Table 6: Test methods for phytoplankton, Zooplankton, Benthos, Chlorophyll a and Pheophytin analysis

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 23, Part 10000, 10200 F
2	Chlorophyll <i>a</i> and Pheophytin	APHA, Edition 23, Part 10000, 10200 H (with some modification)
3	Zooplankton	APHA, Edition 23, Part 10000, 10200 G
4	Macro benthos	APHA, Edition 23, Part 10000,10500 A-10500 D

5.3 PHYTOPLANKTON DIVERSITY:

Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. During the sampling period (December 2023) the phytoplankton population in the coastal waters of APL-Mundra was diverse and represented with a total of 33 phytoplankton genera (Table 6) belonging to diatoms (28 genera) and dinoflagellates (5 genera). Diatoms Species belonged to *Asterionella* sp., *Chaetoceros* sp., *Corethron* sp., *Coscinodiscus* sp., *Cyclotella* sp., *Cymbella* sp., *Ditylum* sp., *Guinardia* sp., *Odontella* sp., *Rhizosolenia* sp., *Thalassiosira* sp., *Amphora* sp., *Amphiphora* sp., *Bacillaria* sp., *Cylindrotheca* sp., *Diploneis* sp., *Gyrosigma* sp., *Lauderia* sp., *Leptocylindrus* sp., *Licmophora* sp., *Lithodesmium* sp., *Navicula* spp., *Nitzschia* spp., *Pinnularia* sp., *Pleurosigma* spp, *Pseudo-nitzschia* sp., *Synedra* sp. and *Thalassionema* sp.

The phytoplankton abundance in the study region was ranged from 134 to 262 cells x 10² L⁻¹. The highest phytoplankton abundance was observed at Station 5 in the surface (262 cells x 10² L⁻¹) and then at Station 2 in Surface water (134 cells x 10² L⁻¹). The lowest phytoplankton abundance (134 cells x 10² L⁻¹) was observed at Station 3 in bottom water. The study shows that the marine water around was enriched with the diverse phytoplankton population.

Table 7: Phytoplankton abundance (cells×10² L⁻¹) at different sampling stations in the coastal waters of APL-Mundra, Mundra during December 2023.

Phytoplankton Genera	Sampling Stations									
	St-1	St-1	St-2	St-2	St-3	St-3	St-4	St-4	St-5	St-5
	S	B	S	B	S	B	S	B	S	B
Diatoms										
<i>Amphora sp.</i>	0	2	2	3	5	1	1	2	7	3
<i>Amphiphora sp.</i>	0	0	1	0	1	2	3	1	0	1
<i>Asterionella sp.</i>	20	15	30	18	21	10	19	5	30	21
<i>Bacillaria sp.</i>	4	1	0	4	11	2	2	0	4	4
<i>Chaetoceros sp.</i>	5	8	2	1	2	4	1	4	3	6
<i>Corethron sp.</i>	0	2	1	0	2	1	0	1	1	1
<i>Coscinodiscus sp.</i>	54	25	35	22	20	13	22	16	35	12
<i>Cyclotella sp.</i>	1	2	6	0	0	4	0	0	5	5
<i>Cylindrotheca sp.</i>	2	0	4	0	3	1	3	4	3	2
<i>Cymbella sp.</i>	0	1	1	1	0	0	0	0	0	2
<i>Diploneis sp.</i>	0	1	0	1	1	0	0	1	0	2
<i>Ditylum sp.</i>	4	4	3	1	0	1	11	8	4	2
<i>Guinardia sp.</i>	20	12	21	20	5	2	3	10	16	0
<i>Gyrosigma sp.</i>	3	1	4	0	2	1	2	0	2	0
<i>Lauderia sp.</i>	0	2	0	1	1	0	2	1	0	0
<i>Leptocylindrus sp.</i>	5	10	8	3	1	2	0	1	1	4
<i>Licmophora sp.</i>	0	3	2	0	1	1	1	2	3	1
<i>Lithodesmium sp.</i>	3	1	0	1	1	4	3	8	4	3
<i>Navicula spp.</i>	26	20	21	18	25	15	12	10	35	20
<i>Nitzschia spp.</i>	4	8	18	11	20	19	10	10	22	20
<i>Odontella sp.</i>	12	11	20	8	15	5	15	12	19	14
<i>Pinnularia sp.</i>	3	0	0	2	0	6	10	0	2	2
<i>Pleurosigma spp</i>	1	7	0	2	4	2	16	12	10	5
<i>Pseudo-nitzschia sp.</i>	2	1	5	1	1	5	4	4	2	0
<i>Rhizosolenia sp.</i>	3	10	14	11	10	13	12	8	3	6
<i>Synedra sp.</i>	2	1	1	0	2	4	3	0	2	1
<i>Thalassionema sp.</i>	21	11	20	10	16	11	16	14	10	14
<i>Thalassiosira sp.</i>	20	1	23	10	2	0	20	13	25	13
Dinoflagellates										
<i>Alexandrium sp.</i>	3	1	1	1	2	0	2	1	3	1
<i>Ceratium sp.</i>	3	1	4	2	4	1	3	1	2	2
<i>Gymnodinium sp.</i>	2	2	1	1	2	1	2	4	4	2
<i>Prorocentrum sp.</i>	2	2	1	1	2	2	0	1	4	5
<i>Protoperidinium sp.</i>	1	1	3	0	1	1	0	0	1	1
Total Phytoplankton (Cells x 10² L⁻¹)	226	167	252	154	183	134	198	154	262	175

Note: S=surface; B=bottom; St=station

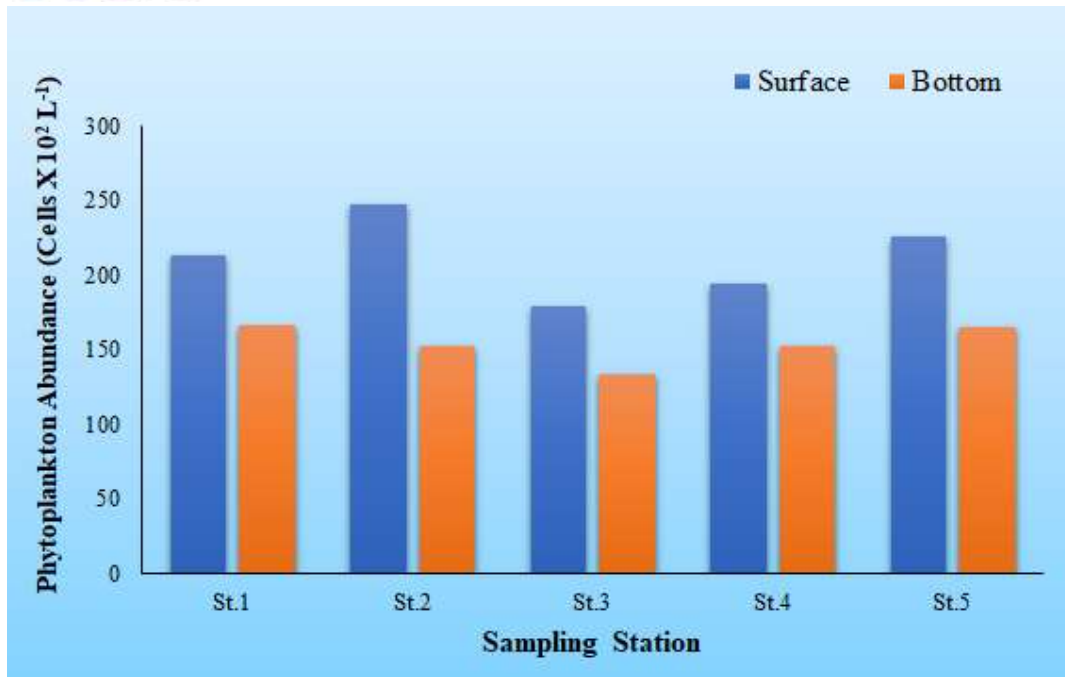


Figure 2: Phytoplankton abundance (cells×10² L⁻¹) reported in the surface and bottom waters along the APL-Mundra coast, Mundra during December 2023. Note: St=Station



Rhizosolenia sp.



Chaetoceros sp.



Ceratium sp.

Figure 3: Microphotographs of phytoplankton reported in the coastal waters of APL-Mundra, Mundra during December 2023.

5.4 PHYTOPLANKTON PIGMENTS (CHLOROPHYLL *a* AND PHEOPHYTIN):

Marine phytoplankton contains essential as well as accessory pigments like that of terrestrial plants. Phytoplankton pigments capture sunlight. The resulting photosynthesis and its products, especially the oxygen and organic compounds, all rely on the light energy captured by the different phytoplankton pigments. Chlorophyll *a* is the major pigment for light harvesting, and plays a significant role in photosynthesis and photoprotection, by extending the light collection

window and protecting the cell from the damage of high irradiance levels or high ultraviolet light exposure.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells. The nature of these degradation products depends on which part of the chlorophyll molecule is affected. As chlorophyll degrades, the initial step is either the loss of the magnesium from the centre of the molecule or the loss of the phytol tail. This results in the formation of the molecule, phaeophytin. Depending on the parent molecule several distinct molecules like phaeophytins, chlorophyllides, and pheophorbides can be produced. Thus, in addition to Chlorophyll *a* filtered seawater contains colour degradation products of phytoplankton pigments.

5.4a CHLOROPHYLL *a* AND PHAEOPHYTIN CONCENTRATIONS

The phytoplankton biomass distribution expressed in terms of Chlorophyll *a* (Chl-*a*) and Pheophytin at selected stations in the coastal region of APL-Mundra, Mundra is presented in Table 7. The Chl-*a* concentrations in the study region were ranged from 1.7 µg/L to 2.7 µg/L. The Pheophytin content was ranged from 0.7 µg/L to 1.1 µg/L. The Chl-*a* and Pheophytin concentrations were more in the surface water as compared to the bottom water. The variations observed between the surface and bottom waters could be due to several natural biological variability. The highest Chl-*a* and Pheophytin concentrations were observed at surface waters of all stations and highest Chl-*a* (3.0 µg/L) was observed at surface waters of station 1.

Table 8: Chlorophyll *a*, Pheophytin concentrations along with their ratios (Chl-*a*: Pheophytin) in the marine waters of APL-Mundra, Mundra during December 2023.

Sampling stations		Chlorophyll <i>a</i> (µg/L)	Phaeophtin (µg/L)	Chl <i>a</i> :Phaeophtin ratio
St-1	Surface	2.7	0.9	3.00
St-1	Bottom	2.3	1.1	2.09
St-2	Surface	2.5	1.0	2.50
St-2	Bottom	2.2	0.8	2.75
St-3	Surface	1.9	0.8	2.38
St-3	Bottom	1.8	0.7	2.57
St-4	Surface	1.9	1.0	1.90
St-4	Bottom	1.7	0.7	2.43
St-5	Surface	2.7	0.92	2.93
St-5	Bottom	1.8	0.8	2.25

Note: ST= Station

The concentration of Pheophytin is a measure of the dead cells and is an indirect indicator of biotic and abiotic stress conditions of the algae leading to a deterioration of Chl-*a*. The ratio from concentrations of Chl-*a* and Pheophytin in an aquatic ecosystem suggests a balance between the growth and mortality of phytoplankton life. In healthy environments, ratios of Chl-*a* to Pheophytin generally exceed 1.1. In the present study, this ratio was ranged from 1.9 to 3.0 (Table 8). The Chl-*a* and Pheophytin ratio showed marginally elevated levels in the surface waters as compared to the bottom waters. Overall, the ratios of Chl-*a* and Pheophytin concentration in the study region were generally high (>1), indicating that the appropriate conditions prevailed for the phytoplankton growth.

5.5 ZOOPLANKTON DIVERSITY:

Zooplankton standing stock in terms of population and biomass revealed substantial spatial variation within all 5 stations (Table 9). The maximum zooplankton population (18.1 nos. $\times 10^3/100 \text{ m}^3$) and biomass (2.39 ml/ 100 m^3) were recorded at station 1. The lowest zooplankton population (11.3 nos $\times 10^3/100 \text{ m}^3$) was observed at station 3 and biomass (1.82 ml/ 100 m^3) (Figure 4). Different groups of identified zooplankton groups are mentioned in Table 9.

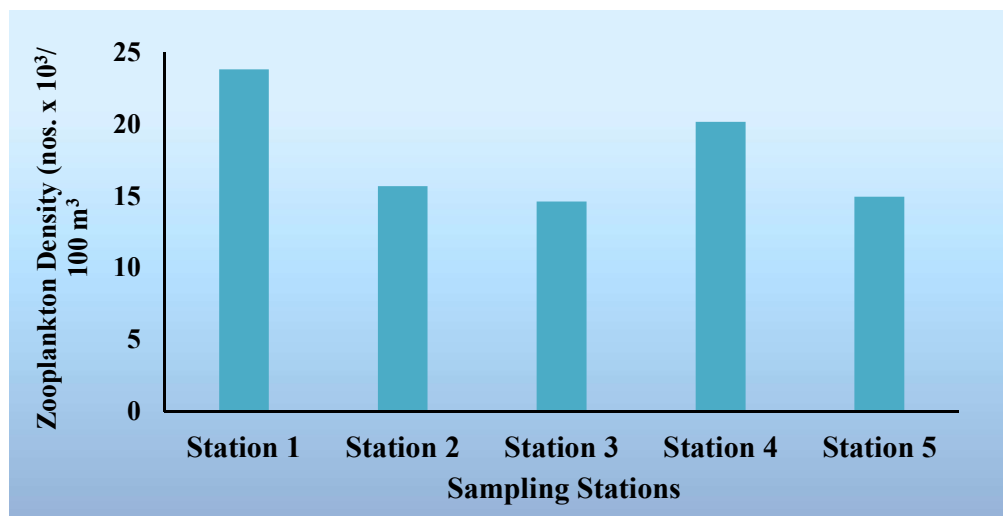


Figure 4: Zooplankton population (nos. $\times 10^3 /100 \text{ m}^3$) reported in the subtidal waters (Station 1 to 5) along the APL-Mundra coast, Mundra during December 2023.

Table 9: Population (nos. $\times 10^3/100 \text{ m}^3$) and biomass (ml/100 m^3) of various zooplankton groups in the coastal waters at the APL-Mundra, Mundra during December 2023.

Zooplankton Groups	St-1	St-2	St-3	St-4	St-5
Copepods	11.4	9.8	7.6	9.3	8.5
Copepod nauplii	2.6	2.5	2.1	3.2	2.9
Brachyuran crab larvae	1.1	0.6	0.4	0.5	0.3
Anomuran crab larvae	1.8	0.5	0.5	0.7	0.6
Decapod (shrimps)	0.1	0.0	0.1	0.1	0.0
Fish and shell fish eggs	0.6	0.2	0.2	0.5	0.4
Fish larvae	0.0	0.0	0.0	0.0	0.0
Gastropod larvae	0.1	0.1	0.0	0.1	0.0
Chaetognaths	0.2	0.1	0.2	0.3	0.2
Polychaete larvae	0.0	0.0	0.0	0.0	0.0
Siphonophora	0.1	0.0	0.0	0.0	0.0
Ostracods	0.0	0.0	0.0	0.0	0.0
Oikopleura	0.1	0.1	0.1	0.0	0.1
Amphipods	0.0	0.0	0.0	0.0	0.0
Population (nos. $\times 10^3/100 \text{ m}^3$)	18.1	14.0	11.3	14.7	13.3
Biomass (ml./100 m^3)	2.39	1.82	1.84	2.16	1.63

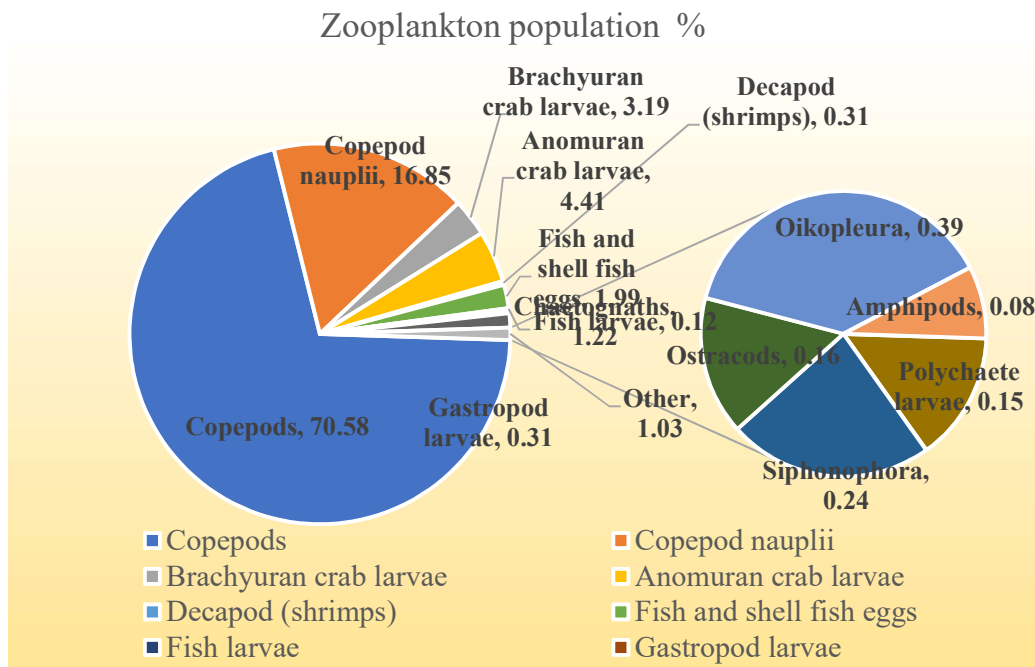


Figure 5: Dominant groups of Zooplankton reported from APL-Mundra coast, Mundra during December 2023.



Gastropod larvae



Crab larvae



Fish egg

Figure 6: Microphotographs of zooplankton reported from APL-Mundra coast, Mundra during December 2023

5.6 Macrobenthic fauna

The benthic zone is the lowest ecological zone of a water body which usually involves the sediments at the seafloor. The benthic environment is divided into distinctive ecological zones based on depth, seafloor topography, and vertical gradients of physical parameters. These are the supralittoral, littoral, sublittoral, bathyal, abyssal, and hadal zones. The number of phyla and species of benthic animals exceeds those of pelagic species, at least partly because of the greater physical variety of benthic habitats. Benthic animals are separated into infaunal and epifaunal species, depending upon whether they live within sediments or on the surface of the seafloor, respectively. Size categories of the zoobenthos consist of the larger macrofauna (>1.0 mm), the small meiofauna which is characteristically found in sand and mud, and the microfauna which is made up mostly of protozoans.

Benthic organisms are morphologically different from those planktonic organisms. Many are adapted to live on the substrate (bottom). In benthic habitats, they can be considered dominant creatures. These organisms adapted to deep-water pressure so cannot survive in the upper parts of the water column. Since light does not penetrate very deep ocean water, the benthic organisms often depend on the organic matter falling from the upper water column as their main energy source. This dead and decaying matter sustains the benthic food chain. The most benthic organisms are scavengers or detritivores. These organisms under being relatively stationary, are constantly exposed to changes undergoing in overlying water, and hence, respond very well to aquatic pollution. The macro benthos population is very sensitive to environmental perturbation and is highly influenced by the physicochemical characteristics of

water, the nature of the substratum, food, predation, and other factors. The density of benthic invertebrates also fluctuates widely with the changes in the season.

5.6.1 Significance of macrobenthic organisms

The biomass of macrobenthic organisms in estuaries and coastal embayment is often high. It declines if communities affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbation) help to mix the sediment and enhance the decomposition of organic matter. Nitrification and denitrification are also enhanced because a range of oxygenated and anoxic micro-habitats are created. For example, the area of oxic-anoxic boundaries and the surface area available for diffusive exchange are increased by tube-building macrobenthos. The loss of benthic suspension-feeders can further enhance turbidity levels because these organisms filter suspended particles including planktonic algae, and they enhance sedimentation rates through bio deposition (i.e., voiding of their wastes and unwanted food). Changes in the macro fauna (and flora) cause changes in nutrient storage pools. Macro fauna is also important constituents of fish diets and thus are an important link for transferring energy and nutrients between trophic levels, also driving pelagic fish and crustacean production. For these reasons, the benthic organisms are extremely important indicators of environmental change.

5.6.2 Benthic Diversity

5.6.2a Subtidal region:

During the present study, more macrobenthos abundance and biomass were reported at subtidal stations than at intertidal stations at APL-Mundra. The macrobenthos density ranged from 780 no./m² to 1280 nos./m² at sampling stations (Table 10; Figure 7). The biomass of the macrobenthic community in the study region was ranged from 1.47 g/ m² to 2.1 g/ m² in the study region. The maximum abundance of benthic microorganisms was reported at Station 4 (1280 nos./m²). The highest biomass of macrobenthic species was observed at Station 4 (2.1 g/m²). In species composition, Polychaete species (Phylum Annelida) belonging to the family Glyceridae, Paraonidae, Pilargidae, Capitillidae, Cossuridae, Ciratullidae, Nephthyidae, Nereidae, Lumbriconeridae, Spionidae were abundant contributing ~82% to macrobenthic population. Overall, the presence of Polychaete, Amphipods, and Nemerteans suggest the availability of food organisms for benthic predators in the area.

Table 10: Faunal composition, density (no/m²) and biomass (g/m²) of the macrobenthos community in the subtidal region at APL-Mundra, during December 2023.

Taxa	Stations				
	St-1	St-2	St-3	St-4	St-5
Phylum Polychaeta					
Paraonidae	310	390	340	480	280
Pilargidae	60	10	30	30	50
Capitillidae	40	110	120	160	40
Cossuridae	50	70	50	20	50
Glyceridae	30	40	30	60	40
Ciratullidae	50	10	10	10	50
Nephtyidae	40	0	10	110	120
Nereidae	30	60	60	50	80
Lumbriconeridae	10	20	0	120	90
Spionidae	50	50	30	60	40
Phylum Mollusca					
Bivalvia	40	90	30	40	30
Gastropoda	40	40	10	50	30
Phylum Arthropoda					
Amphipoda	50	50	30	30	30
Isopoda	20	30	20	30	10
Phylum Nemertea					
Nemertea	20	10	10	30	20
Total abundance (nos./m²)	840	980	780	1280	960
Biomass (g/m²)	1.54	1.68	1.47	2.1	1.89

Note: ST=Station

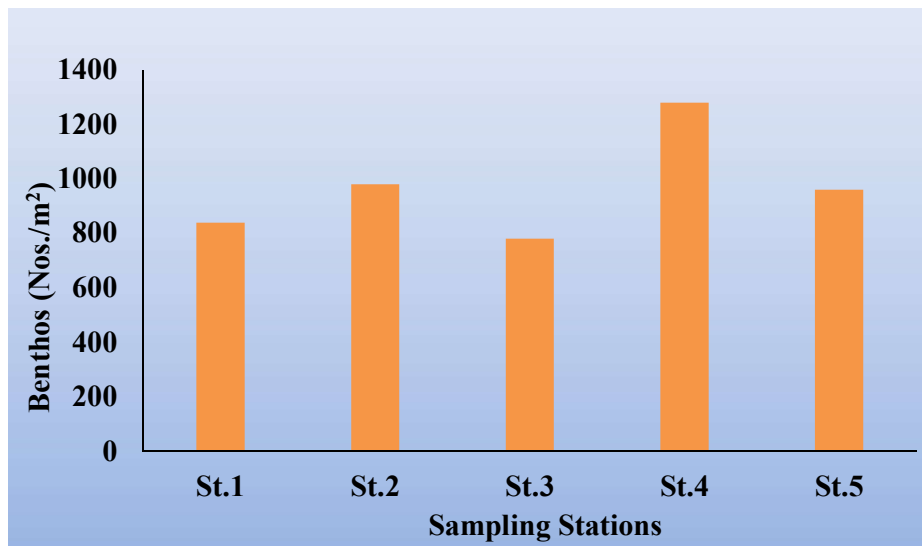


Figure 7: Subtidal macrobenthos abundance (no/m²) at different sampling stations at APL-Mundra, during December 2023

5.6.2b Intertidal region

The sandy substratum with low organic matter affects the occurrence of the macrobenthic community in the intertidal region. Low macrobenthos biomass was measured (0.72 g/m² to 1.12 g/m²) in the intertidal region at the APL-Mundra (Table 11). The lowest density of macrobenthic organisms was reported at station IT-2 (HW) (168 nos. /m²), whereas the highest density was reported at Station IT-1 (LW) (316 nos. /m²). No macrobenthic community was observed at station 3 (HW and LW) may be due to sandy sediment.

Table 11: Faunal composition, density (no/m²) of macrobenthos from the sediments collected at High tide water level (HW) and Low tide water level (LW) in the inter-tidal region at APL-Mundra, during December 2023.

Faunal groups	Intertidal stations					
	IT-1 (HW)	IT-1 (LW)	IT-2 (HW)	IT-2 (LW)	IT-3 (HW)	IT-3 (LW)
Phylum Polychaeta						
Paraonidae	8	44	8	32	-	-
Pilargidae	4	8	4	16	-	-
Capitillidae	8	16	4	12	-	-
Cossuridae	12	12	16	20	-	-
Glyceridae	4	8	12	28	-	-
Ciratullidae	4	44	0	0	-	-
Nephtyidae	8	12	12	24	-	-
Nereidae	4	32	16	20	-	-
Lumbriconeridae	8	16	12	12	-	-
Spionidae	16	24	12	16	-	-
Phylum Mollusca						
Bivalvia	12	16	8	12	-	-
Gastropoda	8	12	4	16	-	-
Phylum Arthropoda						
Amphipoda	44	24	20	28	-	-
Isopoda	32	36	32	16	-	-
Phylum Nemertea						
Nemertea	4	12	8	12	-	-
Total density (no/m²)	176	316	168	264	-	-
Biomass (g/m²)	0.72	1.12	0.72	0.82	-	-

(Note: LW=low water during low tide; HW=high water during high tide; St=Station)

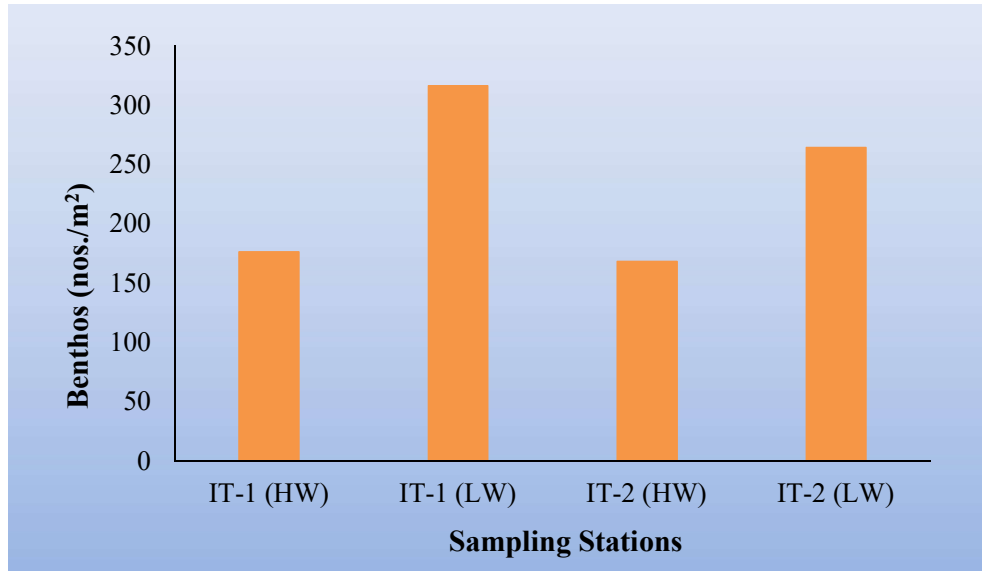


Figure 8: Inter-tidal macro benthos abundance (nos./m²) at different sampling stations at APL-Mundra, during December 2023



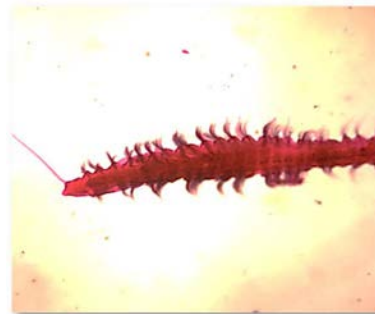
Nereidae



Capitellidae



Amphipoda



Paraonidae

Figure 9: Microphotographs of macrobenthic organisms observed in the sediment samples collected in the vicinity of APL-Mundra, during December 2023.

6 CONCLUSIONS

The marine monitoring study conducted during the December 2023 in vicinity of APL, Mundra reveals no adverse change in physical, chemical water parameters and sedimentary heavy metal concentration. Moreover, no unfavourable impact was observed on the biological parameters such as planktonic and macro-benthic population, except some seasonal variability. The enriched biotic population could support the fish population in the region. No notable adverse influence of Outfall seawater discharge was observed on the biotic and abiotic marine components during the present study. Our contemporary fish bioassay study revealed that the fish species *Mugil cephalus* had a 90% survival rate in absolute outfall water, which also supports the findings of present study. Fish for the bioassay study were collected from Kotadi Creek. 90% survival of the *Mugil cephalus* population (in bioassay study) and the diverse biotic population near outfall channel (present study) indicate that the abiotic parameters, such as temperature of discharge water does not have the adverse biological impact. The well-built 11 km-long outfall channel enables cooling of outfall water before intrusion into the sea.

Table 12: Names of the Marine Monitoring Team Members

Sr. No.	Name of Person
1.	Mr. Vijay Thanki (Env. Chemist)
2.	Mr. Pravin Singh (Env. Chemist)
3.	Ms. Shweta A. Rana (Env. Microbiologist)
4.	Mr. Bhavin Patel (Env. Engineer)
5.	Dr. Sushant Sanaye (Marine Biologist)



PHOTOGRAPHS OF DIFFERENT TYPES OF SAMPLING

Annexure – 6

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2021 - 22	2022 - 23	2023 - 24	2023 - 24
1.	Environmental Study / Audit and Consultancy	6.82	7.32	22.67	27
2.	Legal & Statutory Expenses	10.52	12.32	8.60	13
3.	Environmental Monitoring Services	14.31	15.32	13.37	19.20
4.	Hazardous / Non-Hazardous Waste Management & Disposal	107.09	104.035	130.11	148.68
5.	Environment Days Celebration and Advertisement / Business development	4.04	2.53	3.42	11.50
6.	Treatment and Disposal of Bio-Medical Waste	2.14	2.29	2.28	2.28
7.	Mangrove Plantation, Monitoring & Conservation	53.6	35.0	15	15.0
8.	Other Horticulture Expenses	921	956	904	904
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	252.27	141.33	186.94	212.9
10.	Expenditure of Environment Dept. (Apart from above head)	149.8	90.14	80.39	182.92
Total		1371.79	1366.28	1366.78	1536.48

Annexure – 7

Date: 1st April, 2024

To,

**The Inspector General of Forest / Scientist C,
Integrated Regional Office (IRO),**

Ministry of Environment, Forest & Climate Change (MoEF&CC),

Aranya Bhavan, A-wing, Room Number 409,

Near Ch-3 Circle, Sector 10 A,

Gandhinagar, Gujarat – 382007.

E-mail: iro.gandhingr-mefcc@gov.in

Sub : Submission of Action Taken Report w.r.t. Certified Compliance to Waterfront Development Project of M/s. Adani Ports and Logistics at Mundra, District Kutchh, Gujarat -reg.

Ref. : 1. Environment and CRZ clearance granted to M/s Adani Ports & SEZ Limited vide letter dated 12th January, 2009 and 19th January, 2009 bearing MoEF&CC letter No. 10-47/2008- IA.III.
2. Environment and CRZ clearance validity extension order vide letter dated 7th October, 2015 bearing MoEF&CC letter No. 10-47/2008- IA.III.
3. Certified Compliance Certification Report vide Letter No. J-11/14-2024-IROG NR/ I/66337/2024 dated 27th February, 2024.

Respected Sir,

With respect to the above subject and references, IRO-MOEF&CC, Gandhinagar had carried out the site visit of WFDP area, Mundra Port from 18th to 20th December, 2023 and have submitted certified EC compliance report vide Letter No. J-11/14-2024-IROG NR/ I/66337/2024 dated 27th February, 2024.

Action plan / Action taken report is prepared and being submitted as below, for further consideration -

Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
1.	Specific Condition (i) of EC & CRZ Clearance. No existing mangroves shall be destroyed during construction / operation of the	Complied. It is brought into the light of the EAC committee that the monitoring carried out by GUIDE has used LISS IV data having spatial resolution of 5.8m whereas the report submitted by NCSCM has	Noted and Agreed. GUIDE has carried out mangrove mapping using authentic Indian satellite imagery of the year 2019 & 2021. GUIDE study leveraged the LISS IV (5.8-meter spatial resolution) multi-spectral imageries, which represent the highest resolution available from Indian satellites.

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
	Project.	<p>used 0.6m data for the mapping. The location of sampling for ground truthing mentioned in the GUIDE report was found vague while plotting manually on the map. The interpretation from GUIDE report is quite difficult when compared with the NCSCM report.</p> <p>It has been advised to conduct the survey through NCSCM and submit the report for interpretation. EAC committee may take a call.</p>	<p>Methodology adopted by GUIDE:</p> <p>a) Satellite Imagery: GUIDE meticulously utilized the LISS IV imagery to assess mangrove cover, distribution, and health. These images were obtained from only authorized Indian Government agency National Remote Sensing Centre, Hyderabad.</p> <p>b) Ground Truthing: To enhance the reliability of findings, GUIDE conducted extensive ground truthing. Field surveys were carried out to verify the accuracy of the satellite data.</p> <p>Authenticity and Verifiability: GUIDE dataset stands out for its authenticity and verifiability. By combining satellite imagery with ground truthing GUIDE data is not only accurate but also reflects the ground reality, making it a valuable resource for mangrove conservation and management.</p> <p>Subsequently, APSEZ has corrected the report from GUIDE w.r.t. co-ordinates. The updated survey report is attached as Annexure – 1.</p> <p>However, as per suggestion given by your good office, APSEZ agreed to conduct a mangrove monitoring survey through NCSCM for the year 2023. APSEZ has already initiated to carry out such monitoring with NCSCM to get a techno commercial offer, but still there is no response from their side. (Mail conversation is attached as Annexure – 2).</p> <p>Mangrove monitoring study report carried out through NCSCM (once agreed) will be</p>

Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
			submitted to concerned regulatory authorities for their interpretation and recommendations if any. Undertaking stating the same is attached as Annexure - 3 .
2.	<p>Specific Condition (viii) of EC & CRZ Clearance.</p> <p>It shall be ensured that during construction and post construction of the proposed jetty the movement of fishermen vessel of the local communities are not interfered with.</p>	<p>Complied</p> <p>Being a vast expanse under the head, it is advised to conduct the study through the Mahatma Gandhi Labour Institute.</p>	<p>Noted and Agreed.</p> <p>Below studies have already been conducted by APSEZ.</p> <p>a) CSR Impact Assessment to <i>"assess the Social Impact created by the Mobile Health Care Units (MHCU) operated by the Adani Foundation in the villages of Mundra intends to find out the change/improvement in the health status of the beneficiaries"</i> carried out through M/s. SOULACE CONSULTING PVT LTD. during the period FY 2022-23 (Report's cover page is attached as Annexure - 4).</p> <p>b) Assessment of Water Conservation Programs to <i>"assess changes in the various activities that may be attributed to the Foundation's water harvesting initiatives"</i> carried out in the year 2022 through M/s. THINKTHROUGH CONSULTING (Report's cover page attached as Annexure - 5).</p> <p>The frequency to carry out CSR Impact Assessment is once in two years. As per recommendations, APSEZ will approach the Mahatma Gandhi Labor Institute to conduct the upcoming CSR assessment study in FY 2024-25. The assessment reports will be submitted along with half yearly EC compliance report and recommendations given in study report will be implemented in proper manner.</p>

Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
3.	<p>Specific Condition (6) of CRZ Recommendations.</p> <p>All major creeks shall be protected, and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rainwater during rainy seasons.</p>	<p>Partly Complied.</p> <p>The unit has developed a garland drain all along the coal storage area through which water goes into a common sump. It is advised to clean the garland drains. It is advised to use collected wastewater for dust suppression after filtration. The first wash of the storm drain should be diverted into the sump.</p>	<p>Complied.</p> <p>Cleaning of garland drains is being done on regular basis and water collected in the sump is being used for dust suppression after proper filtration / sedimentation.</p> <p>Photographs showing garland drain & common sump / dump pond are attached as Annexure - 6.</p> <p>The first wash of storm water drain during monsoon will be diverted into common sump for sedimentation and reused for dust suppression.</p>
4.	<p>Specific Condition (16) of CRZ Recommendations.</p> <p>The MPSEZL shall regularly update their Local Oil Spill Contingency and Disaster Management Plan in consonance with the National Oil Spill and Disaster Contingency Plan and shall submit the</p>	<p>Partly Complied.</p> <p>As the port is handling coal, certain specialized infrastructure is required to be installed at the port:</p> <p>a) Installation of hooks at the corner of the berths for fixing of green curtains.</p> <p>b) All the water outlets at the berth should be connected through pipelines from which</p>	<p>Complied / Agreed to comply.</p> <p>All the mitigations measures are being taken for abatement of fugitive dust emission within port premises and complying with the coal handling guidelines issued by GPCB. However, as per recommendations given by your good office to install certain specialized infrastructure, APSEZ has taken the following steps:</p> <p>a) APSEZ has provided hydraulic operated spill plate & side wall to prevent any spill of coal into the sea during vessel operations. Photographs of the same are</p>

Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
	<p>same to this Department after having it vetted through the Indian Coast Guard.</p>	<p>the floor washing will go to collection pit for further treatment.</p> <p>c) Floating booms should be placed along the berths to trap any coal particle which may fall over ocean surface due to high wind velocity.</p>	<p>attached as Annexure – 7.</p> <ul style="list-style-type: none"> • Earlier, cargo was unloaded from grab sampler unit to conveyer system though hopper system with the height. Now, it is adhered to unload the cargo with minimum height to prevent such cargo spill into sea as well as on jetty. • The construction of toe wall on jetty edge as well as fixing of green curtain between the edge of jetty & vessel are being ruled out because of the obstruction from the vessel gang way, tiding of vessel to berth and very limited narrow space between the jetty edge and rail track of GSU. However, the team along with the Marine guys are exploring the possibility of coming up with patch toe walls as well as fixing of green curtains and that will be implemented as and when it is finalized. • APSEZ is exploring the possibilities to connect all the outlets of jetty to dump pond through pipeline in consultation with marine and operation team. The same will be implemented once it is feasible. <p>b) APSEZ does not carry any jetty washing activity through water.</p> <ul style="list-style-type: none"> • APSEZ has a dedicated housekeeping staff with a mechanized system. APSEZ is doing regular housekeeping with mechanized sweeping machine on jetty facility and the cleaning frequency has also been increased especially during vessel operations. • APSEZ is providing green curtain filters on jetty outlet gradually to

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
			<p>After that, APSEZ has already awarded work for refurbishing of damaged part of wind breaking wall. During the site visit it was also verified by IRO officials that refurbishing work was in progress. The same will be completed by the month of June'2024.</p> <p>Photographs showing installed wind breaking wall and ongoing refurbishing work are attached as Annexure – 10.</p>

Requested to kindly consider our submission for further consideration and acknowledge the same.

Thanking you,
Yours Faithfully,

For, Adani Ports and Special Economic Zone Limited



Dr. Anil Kumar Trivedi
(Head – Environment)

Encl. As Above

ANNEXURE – 1

UNDERTAKING FOR MANGROVE MONITORING

UNDERTAKING

I, Dr. Anil Kumar Trivedi son of Late Shri Rajkumar Sharma, age 45-years Head – Environment of Adani Ports and SEZ Limited having its registered office at Adani Corporate House, Shantigram, Near Vaishnodevi Circle, S G Highway, Ahmedabad-382421, Gujarat hereby undertake as mentioned below:

- APSEZ is carrying out mangrove monitoring in and around creek of APSEZ, Mundra at every 2 years in compliance with recommendations of approved mangrove conservation plan.
- APSEZ has carried out last mangrove monitoring through M/s. Gujarat Institute of Desert Ecology (GUIDE), Bhuj for the year 2021 (till March). Report has submitted along with half yearly EC compliance report.
- APSEZ agreed to conduct a mangrove monitoring survey through NCSCM (once agreed) / any other reputed organization for the year 2023.
- Mangrove monitoring study report carried out through reputed organization will be submitted to concerned regulatory authorities for their interpretation and recommendations if any.
- All the above-mentioned information is correct to the best of my knowledge.

For, Adani Ports and SEZ Limited

Dr. Anil Kumar Trivedi
Head – Environment

Date: 1st April, 2024

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ANNEXURE – 2

MANGROVE MONITORING REPORT – GUIDE

Final Report

Monitoring and Distribution of the Mangroves Along the Creeks in and Around APSEZ, Mundra, Kachchh, Gujarat



Submitted to:

Adani Ports and Special Economic Zone Ltd. (APSEZL),
Mundra, Kachchh District, Gujarat

Submitted by: -



Gujarat Institute of Desert Ecology
P.O. Box # 83, Opp. Changleshwar Temple,
Mundra Road, Bhuj,
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November- 2023

Project Personnel

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TABLE OF CONTENTS

1. INTRODUCTION	1
1.1. About Adani Ports and Special Economic Zone Ltd. (APSEZL).....	2
1.2. Origin of the Study	2
1.3. Objectives of the Study.....	5
2. STUDY AREA	6
2.1. Location	6
2.2. Climate.....	8
2.2.1. Tidal Regime.....	8
2.2.2. Currents	8
2.2.3. Salinity.....	9
3. METHODOLOGY AND DATA USED	10
3.1. Methodology.....	10
3.2. Data Used	10
3.2.1. Pre-processing.....	11
3.3. Zonation.....	11
3.4. Mangrove Vegetation.....	12
3.5. Field Work	14
4. RESULTS AND ANALYSIS.....	20
4.1. Overall APSEZ Mangrove Assessment	20
4.2. Creek Wise Assessment.....	23
4.2.1. Kotadi Creek Area	23
4.2.2. Baradi mata Creek area.....	25
4.2.3. Bocha-Navinal Creek Area	28
4.2.4. Khari Creek	31
4.3. Mangrove Vegetation.....	33
4.3.1.: Diversity	33
4.3.2.: Density	34
4.3.3. Regeneration and Recruitment Class of Mangroves.....	37
5. CONCLUSION.....	40
5.1. Shoreline and Mangrove Cover Changes	40
5.2. Recommendations	41

LIST OF FIGURES

Figure 2.1: Location Map of The Study Area.....	7
Figure 3.1: Study Area in Four Different Zone.....	12
Figure 3.2: Mangrove Data Collection During Field Visits	14
Figure 3.3: Ground Truthing Data and Mangrove Data Collection Points	15
Figure 3.4: Surveyed and Collected Ground Truthing Data Various Categories of Mangroves.....	19
Figure 4.1: Comparison of Various Categories of Mangroves in APSEZ Between 2019 and 2021	21
Figure 4.2: Distribution of Various Categories of Mangroves in March 2019	22
Figure 4.3: Distribution of Various Categories of Mangroves in March 2021	22
Figure 4.4: Comparison of Various Categories of Mangroves in Kotadi Creek Zone Between 2019 and 2021	23
Figure 4.5: Distribution of Mangroves in 2019 in Kotdi Creek Zone System.	24
Figure 4.6: Distribution of Mangroves in 2021 in Kotdi Creek Zone System.	24
Figure 4.7: Change Analysis from 2019 to 2021 on Categories of Mangroves in Kotadi Creek System.....	25
Figure 4.8: Comparison of Various Categories of Mangroves in Baradi Mata Creek Zone Between 2019 and 2021.....	26
Figure 4.9: Distribution of Mangroves at Baradi Mata Creek Zone in 2019	27
Figure 4.10: Distribution of Mangroves at Baradi mata Creek Zone in 2021.....	27
Figure 4.11: Change Analysis From 2019 To 2021 On Categories of Mangroves in Baradi Mata Creek System.....	28
Figure 4.12: Comparison of Various Categories of Mangroves in Bocha-Navinal Creek Zone Between 2019 and 2021	29
Figure 4.13: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone System for The Year 2019	29
Figure 4.14: Distribution of Various Categories of Mangroves in Bocha -Navinal Creek Zone System for The Year 2021	30
Figure 4.15: Change Analysis From 2019 To 2021 On Categories of Mangroves in Bocha- Navinal Creek System	30
Figure 4.16 : Comparison of Various Categories of Mangroves in Khari Creek Zone Between 2019 and 2021	31
Figure 4.17 : Distribution of Various Categories of Mangroves in Khari Creek Zone System for The Year 2019.....	32
Figure 4.18: Distribution of Various Categories of Mangroves in Khari Creek Zone System for The Year 2021.....	32
Figure 4.19: Change Analysis From 2019 To 2021 On Categories of Mangroves in Khari Creek System.....	33
Figure 4.20 : Diversity of Mangrove Species in APSEZ Area, Mundra	39

LIST OF TABLES

Table 3.1: Satellite Data for Mangrove mapping procured from NRSC	11
Table 4.1: Distribution of Various Categories of Mangroves in APSEZ During 2019 and 2021	21
Table 4.2: Distribution of Various Categories of Mangroves in Kotadi Creek Zone During 2019 and 2021	23
Table 4.3: Distribution of Various Categories of Mangroves in Baradi Mata Zone Creek During 2019 and 2021	26
Table 4.4: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone During 2019 and 2021	29
Table 4.5: Distribution of Various Categories of Mangroves in Khari Creek Zone During 2019 and 2021	31
Table 4.6: Density of Trees in the Kotadi Creek Area	34
Table 4.7: Density of Trees in the Baradi mata Area	35
Table 4.8: Density of Trees in the Bocha-Navinal Creek Area	36
Table 4.9: Density of Trees in the Khari Creek Area	36
Table 4.10: Density of Younger Classes in the Kotadi Area (Plant/Ha)	37
Table 4.11: Density of Younger Classes in the Baradi mata Area (Plant/Ha)	38
Table 4.12: Density of Younger Classes in the Bocha-Navinal Area (Plant/Ha).....	38
Table 4.13: Density of Younger Class in Khari creek	39

1. INTRODUCTION

The Kachchh district of the Gujarat State is located between latitude 23.13°-24.68°N and longitude 68.10°-71.80°E, encompassing an area of 45,612 km². The coastal stretch of the district constitutes the entire northern coast of Gulf of Kachchh (GoK) which is one of the three major Gulf systems in India and is endowed with high biological diversity along with physical and chemical peculiarities. Kachchh coast constitutes about 25.37% and 5.3% of the coastal stretch of Gujarat and India respectively. In spite of its high aridity (4 in a scale of 1- 4) along with scanty and erratic rainfall with an annual average of 520.9 mm (1988-2017). Kachchh coast has diverse ecological habitats and ecosystems like mangroves, sandy coasts, mudflats, creeks and other tidal incursions which enhance manifold its coastal landscape diversity and its natural resources. Besides, extensive mangrove formations and a vast continental shelf of 1,64,000 km² facilitates a rich fishery resource.

Kachchh coast supports the mangrove extent of 798.74 km², constituting 68% of state's mangroves (1175 km²) which is the largest mangrove entity in India's western coast as per Forest Survey of India 2021 (FSI report 2021). Due to the presence of rich natural resources and favourable natural conditions, Kachchh coast has become a zone of intensive industrial development. Since late 1990's, industrial development is being promoted aggressively in view of its very rich mineral deposits, shortest sea route to Gulf countries and easy availability of land which is at premium in other coastal regions of the state. Announcement of tax holidays during the post-earthquake in 2001 by the state government has provided further impetus for coastal industrial development. Many of these developments are beginning to have implications on ecological, social and economic spheres. Kachchh coast faces threats from climate change, pollution and habitat changes which are also important to understand the impacts on the mangroves.



Adani Port is one of the fastest growing and largest private ports in the country and also encompassing a SEZ (Special Economic Zone) area. The port in year 2013-14 has handled >100 million tons of cargo. The port is equipped with road, rail and air connectivity which has attracted few big and many small industries of this area.

On the other hand, the area also harbours a luxuriant mangrove forest which is very close to the Port and SEZ.

1.1. About Adani Ports and Special Economic Zone Ltd. (APSEZL)

The former Gujarat Adani Port Ltd., now named as Adani Ports and Special Economic Zone Ltd. (APSEZL) started its operations in Mundra during the year 1998 with an all-weather, open-sea jetty and port backup at Navinal Island. The Port has since then undergone four expansions, namely a railway line and container terminal in 2000, Single Point Mooring and Pipeline for crude oil terminal in 2004, a Multipurpose wharf Terminal-II in 2007, and a Waterfront development project in 2009 which includes the development of North Port, South Port, East Port & West Port and its associated infrastructure facilities. In addition to these, port-based special economic zone and two thermal power plants exists which form a major industrial cluster of this coast.

1.2. Origin of the Study

The northern Gulf of Kachchh in the western coast of India has extensive formation of mangrove. Ministry of Environment, Forest and Climate Change have accorded Environment and CRZ Clearance (EC) vide Letter No. F.No.10-138/2008-IA.III dt. 15th July, 2014 & 12th February, 2020 to M/s Adani Ports and Special Economic Zone Ltd (APSEZ), to set up a multi-product SEZ at Mundra, Kachchh, Gujarat. The project involves development of SEZ in a notified SEZ area of 8481.2784 ha. Adani Ports and Special Economic Zone Ltd. (APSEZL) covering a total area of 9625 ha, over and above 10,000 ha including port and its back-up area.

While issuing the Environmental Clearance (EC) to the project, the MoEF & CC have stipulated General and Special conditions in their Environment Clearance. Further,



inline to the MoEF&CC final order, vide F.No.10-47/2008-IA.III dated 18th Sept. 2015 which also contained special conditions, two of which (sr. no *iv* and *v* of the order) are as follows:

(iv) A Comprehensive and integrated conservation plan including detailed bathymetry study and protection of creeks/mangrove area including buffer zone, mapping of coordinates, running length, HTL, CRZ boundary will be put in place. The plan will take note of all the conditions of approvals granted to all the project proponents in this area, e.g., the reported case of disappearance of mangroves near Navinal creek. The preservation of the entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of Bocha Island up to Baradi mata and others.

(v) NCSCM will prepare the plan in consultation with NIOT, PP and GCZMA. In recognition of the fact that the existing legal provisions under the E(P) Act 1986 do not provide for any authority to impose ERF by the Government, the plan will be financed by the PP. The implementation will be carried out by GCZMA. The monitoring of the implementation will be carried by NCSCM.

Accordingly, Adani Ports and Special Economic Zone Limited (APSEZ) had requested the National Centre for Sustainable Coastal Management (NCSCM) for preparation of

Comprehensive and Integrated plan for preservation and conservation of mangroves and associated creeks. The components of plan are analysis of mangrove health by comparing the coverage between 2011 and 2016, bathymetry of creeks, socio-economics of villages adjoining creeks of APSEZ. One of the key recommendations is monitoring of coverage of mangrove in the late 2019 and comparing its extent of distribution with the data reported in 2016-17. As per reported in the Conservation plan there has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. It was recommended that the trend of mangrove cover needs to be studied in Jan/March



2020 using satellite images of late 2019 and if the trend continues, only monitoring is needed. The Conservation plan was submitted to the Gujarat Coastal Zone Management Authority and in its meeting held in October, 2019, then plan was approved as per their email dt 22nd Sept 2020. The major recommendation relating to mangroves that were specified in the conservation plan are as follows:

2.1. There has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. No action is needed at present except at Navinal creek, Bocha island and off Bocha creek. The trend of mangrove cover needs to be studied in Jan/March 2020 using satellite images of late 2019 and if the trend continues, only monitoring needed. The tidal range in the mangroves is also to be observed annually using tide poles to ensure that the flow of tidal water remains same as observed in April 2017 during the field study. If degradation of mangroves to the extent of 10% due to inadequate seawater is observed in Kotdi and Baradimata creeks, initially the mouth areas need to be made free from silt. If tidal flow does not improve after one year and if the extended banks are noticed which might be due to siltation, silt need to be removed on the banks where there are no mangrove roots. If the tidal conditions still do not improve after one year, the interior parts of the creeks need to be dredged in a phased manner from 0.5 m to 1 m. Otherwise, the monitoring of mangrove needs to be carried out once in two years and whenever, degradation is noticed the above strategy needs to be implemented.

2.2. In the Navinal creek, if degradation of mangroves or reduction of mangrove cover by even 10% is noticed in 2020 due to decrease in tide water flow, dredging of Navinal creek from beyond port operation areas up to 4.5 km to increase the depth by 1 m in a phased manner must be taken up to facilitate increased tidal water flow into the mangrove areas of Bocha island. Otherwise, the monitoring of mangrove needs to be carried out once in two years and whenever, degradation is noticed the above strategy needs to be implemented.



In view of the above, Adani Ports and Special Economic Zone Ltd. (APSEZL) has approached M/s. Gujarat Institute of Desert Ecology (GUIDE) to conduct a detailed study of the mangrove coverage using the satellite images of 2021 and also the changes in the mangrove areas of APSEZ between 2019 and 2021. In order to comply with the above recommendations relating to monitoring of mangrove, the plant distribution in the creeks in and around APSEZL, Mundra, Gujarat with the following objectives were formulated.

1.3. Objectives of the Study

1. To map the current extent of mangrove cover and its changes in comparison to 2021 data, through GIS and RS in the APSEZ area.
2. To assess and monitor the changes in the mangrove cover between 2019 and 2021 by using RS and GIS in the APSEZ area.
3. LISS-IV (MSS) ortho rectified imagery data will be used for the mangrove mapping study.
4. Monitoring of mangrove density in the APSEZ area at Mundra through assessment of the vegetation cover in the area.
5. Formulating an appropriate management plan based on the results for the sustained well being and conservation of mangroves in APSEZ area, Mundra.



2. STUDY AREA

2.1. Location

Kachchh coast constitutes the entire northern shore of the Gulf of Kachchh marked by narrow beaches and wide mudflats. The Mangrove cover of the Mundra taluka is about 19.1 km² distributed mostly along the creek systems. The coastal stretch of Mundra is dissected by extensive mudflats and creek systems, many of which harbour good mangrove formations. Major creek systems in the area are Navinal, Bocha, Baradi mata and Kotadi creeks. These creeks again divide into minor creek complexes. Many of these creeks support mangrove stands, especially along the eastern and western side of the waterfront area of APSEZ. Koylavalu creek is luxuriantly lined by mangrove patches, predominantly with the species, *Avicennia marina*. The Adani Port and Special Economic Zone Ltd.-APSEZ is located at about 3 km from Bacha mouth towards eastern extension. The present study was focused towards the mangrove stand at Bocha / Navinal creek, Kotdi creek, Baradi Mata creek and Khari creek adjoining to the waterfront area of APSEZ which falls within the conservation zone of APSEZ (Figure 2.1) that earmarked as conservation zone.

Bocha/Navinal and East of Bocha Mangrove Stand

Bocha Island is a finger like projection surrounded by the Bocha creek on the west and Navinal creek on the eastern part. The Adani/MICT container terminal is located right across the Bocha Island at a distance of 100m. The island supports mature and healthy mangrove stands.

Kotadi and Baradi mata

Kotadi and Baradi mata creek systems on the western part of APSEZL area include luxuriant mangrove patches. These two creeks bifurcate further at their tail end into several minor creeks forming a complex water way with many small Islands. Many of these Islands harbour healthy mangrove stands.



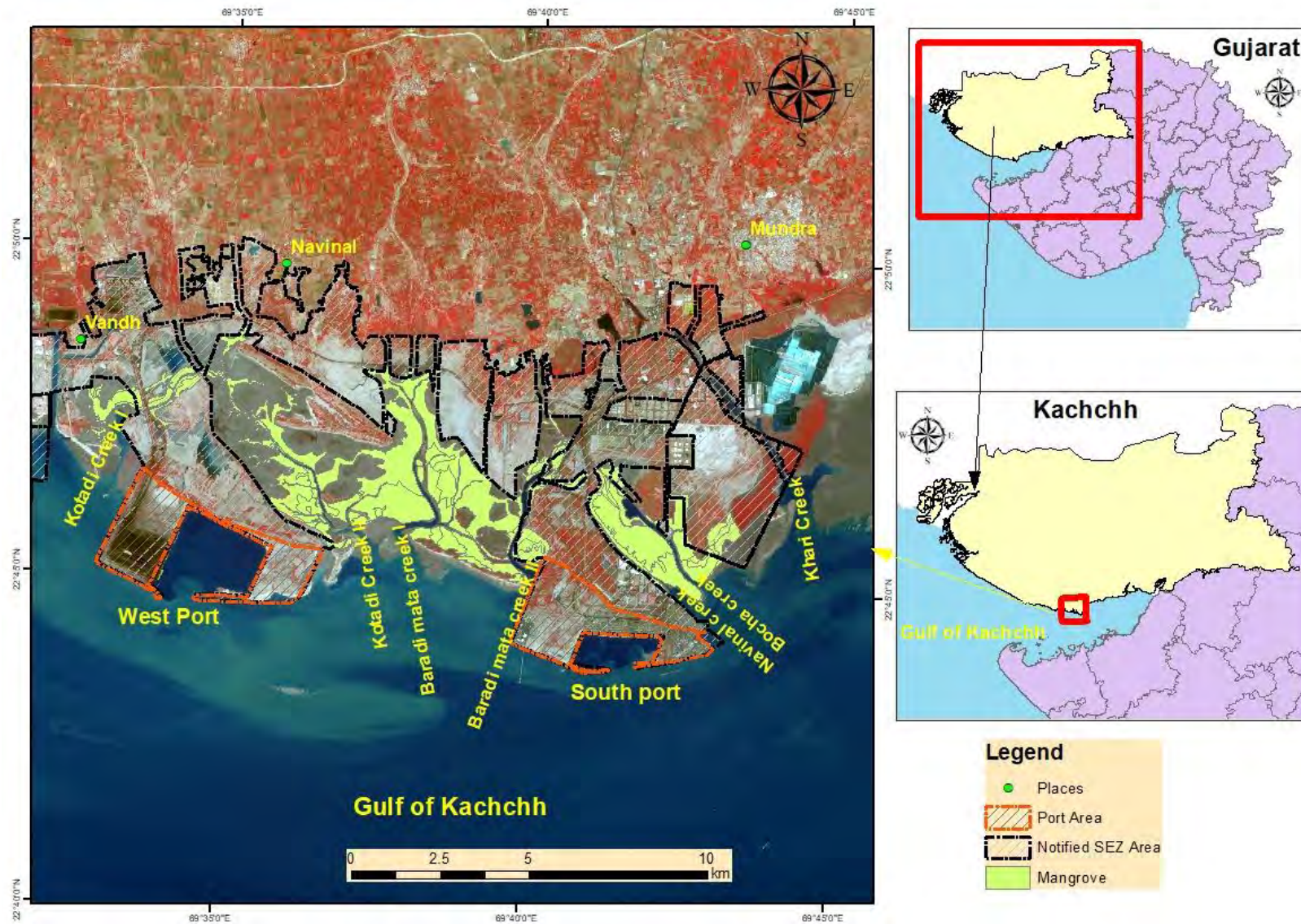


Figure 2.1: Location Map of The Study Area



2.2. Climate

As per the Indian Meteorological Department, Govt. of India, the highest monthly mean of daily maximum temperature of the study area is 36⁰C. The dry bulb temperature goes up to 47.8⁰C, considering max Humidity of 95%. The wind is predominantly from the south-west as well as from the west to some extent. The wind velocity is 65 km/hr.

Due to its arid nature, annual rainfall in Kachchh is generally poor, ranging from 250-350 mm which is often irregular. However, the mean annual rainfall during 1932 to 2021 was higher at Mundra (407 mm) comparing to other coastal talukas of Kachchh district due to good rainfall during the last 3-4 years. Rain during monsoon is confined to only 12-16 days and occurs as an instant downpour. Freshwater input into the near coastal waters is quite meagre and appears to influence the coastal erosion. Annual temperature fluctuation in the district is extreme, ranging from 7- 47 ⁰C with a yearly average humidity of 60% which increases to 80% during the southwest monsoon and decreases to 50% during November-December. The phenomenon of drought is common, with 2 drought years in a cycle of 5 years (Thivakaran *et al.*, 2015).

2.2.1. Tidal Regime

Tides at Mundra are the mixed type, predominantly semi-diurnal type with a Mean High-Water Spring (MHWS) of 6.66 m and Mean High water Neap (MHWN) of 5.17 m. The phase difference is not uniform for successive tides in the Gulf and it varies as per tidal conditions ((ICMAM, 2004).

2.2.2. Currents

The currents in the Gulf and associated creeks are largely tide induced and oscillations are mostly bimodal reversing in direction with the change in the tidal phase. The influence of wind on variations in current is minor. The current reversals are quite sharp occurring within 30 - 60 min. The maximum current



speed varied from 0.5 to 1.2 m/s. The predominant direction of the current is 45° during flood and 220° during ebb.

The circulation is generally elliptical with the major axis in the east-west direction. These trajectories suggest that the excursion lengths are in the range of 10 to 15 km depending on the tidal phase (neap or spring)(NIO, 2009).

2.2.3. Salinity

Salinity is an indicator of freshwater intrusion in nearshore coastal waters as well as the excursion of salinity in inland water bodies such as estuaries, creeks, and bays. Normally seawater salinity is 35.5 ppt but may vary depending on evaporation, precipitation, and freshwater addition. Salinity largely influences several processes such as dissolution, dispersion, dilution, etc. in seawater due to high dissolved salt content and hence high density. In the absence or minimum of freshwater inflow, the salinity varies from 35.9 to 38.0 ppt.

Due to its arid nature, annual rainfall in Kachchh is generally poor, ranging from 250-350 mm which is often irregular. However, mean rainfall (1932 to 2001) was higher at Mundra (407 mm) due to very good rainfall during the last 3-4 years. Except very good rainfall years, freshwater input into the near coastal waters is quite low and appears to influence coastal flora like mangroves explaining poor floral diversity. Annual temperature fluctuation in the district is extreme, ranging from 7- 47°C with a yearly average humidity of 60% which increases to 80% during south-west monsoon and decreases to 50% during November-December. The phenomenon of drought is common, with 2 drought years in a cycle of 5 years.



3. METHODOLOGY AND DATA USED

Basic approach for the present exercise was identification of the threats and pressures on the mangrove ecosystem.

3.1. Methodology

Satellite imageries were procured from National Remote Sensing Centre (NRSC) who are the only authorized distributor of satellite images in India, for availability of high-resolution satellite imagery especially multi-spectral images similar to the images used to study the mangrove distribution. The present report on mangrove distribution is based on LISS IV satellite images of March 2019 and March 2021, as cloud free images. The details of the satellite imagery used for the present study are given below (Table 3.1). The methodology adopted to map the distribution of mangroves is by NDVI method using ERDAS Software by using satellite images which delineate vegetation and non -vegetation data. Further, based on the Ground truthing, colour and tone of satellite data of the mangrove and other vegetation are delineated by using manually digitizing on the computer screen. Further, it has limitations as it is not a direct digital data and the mangroves details are obtained from satellite images by directly digitizing from the computer screen.

The categories of mangrove cover as dense, sparse and scattered area evaluated based on the percentage of mangrove cover in the study area. The percentages used for different classes are dense mangrove (40-70% cover), sparse mangrove (10-40% cover) and scattered mangrove (< 10% cover) (Kathiresan, K. (2022). There could be a possible error of less than 10 % in mangrove categorization (as dense, sparse and scatter) and also extent of total coverage in terms of hectare.

3.2. Data Used

The Multi-date satellite LISS-IV imageries, were procured from NRSC, Hyderabad, was used for the analysis of the present study.



Table 3.1: Satellite Data for Mangrove mapping procured from NRSC

Satellite	Date	Sensor	Resolution (m)
IRS-R2	23 March 2019	LISS -IV	5.8
IRS-R2A	19 March 2021	LISS -IV	5.8

3.2.1. Pre-processing

Pre-processing of satellite data includes correction of geometric, atmospheric, and radiometric aspects and clipping of the area to obtain the exact imagery of the project sites. The rectification operation aims to correct distorted images to create a more correct representation of the original scene. It typically involves the initial processing of raw image data to correct geometric distortions.

Radiometric Correction: The Radiometric correction addresses variations in the pixel intensities (DNs) that have not been caused by the object or scene scanned. These variations include differing sensitivities or malfunctioning of the detectors, topographic effects and atmospheric effects.

Geometric Correction: The Geometric correction addresses errors in the relative positions of pixels. These errors are induced by the sensor viewing the geometry or terrain variations. A geometric correction was done based on Ground Control Points (GCPs) and the image was re-sampled using the nearest neighbourhood interpolation method.

3.3. Zonation

Zoning of the Study Area: Considering the extent of the area, the whole Mundra mangrove formation was divided into smaller zones in order to facilitate better evaluation and understanding of the ecosystem. Moreover, this kind of zoning helps to analyse the root cause of the issues, enabling better understanding of the ecosystem level problems. Accordingly, Mundra coast was divided into four zones as indicated below for the purpose of this study;



- Zone 1: Bocha-Navinal creek Zone (The Island proper and areas in and around Adani house and between Bocha and Navinal creek)
- Zone 2: Baradi mata creek zone (Creek’s west of south port to surrounding to Baradi mata temple)
- Zone 3: Kotadi creek Zone (Creeks surrounding to West Port)
- Zone 4: Khari creek Zone (Area both the side of Khari creek)

Representative study points covering all the zones were studied on ground and documented for status, Figure 3.1 shows the earmarked zones in the study area.

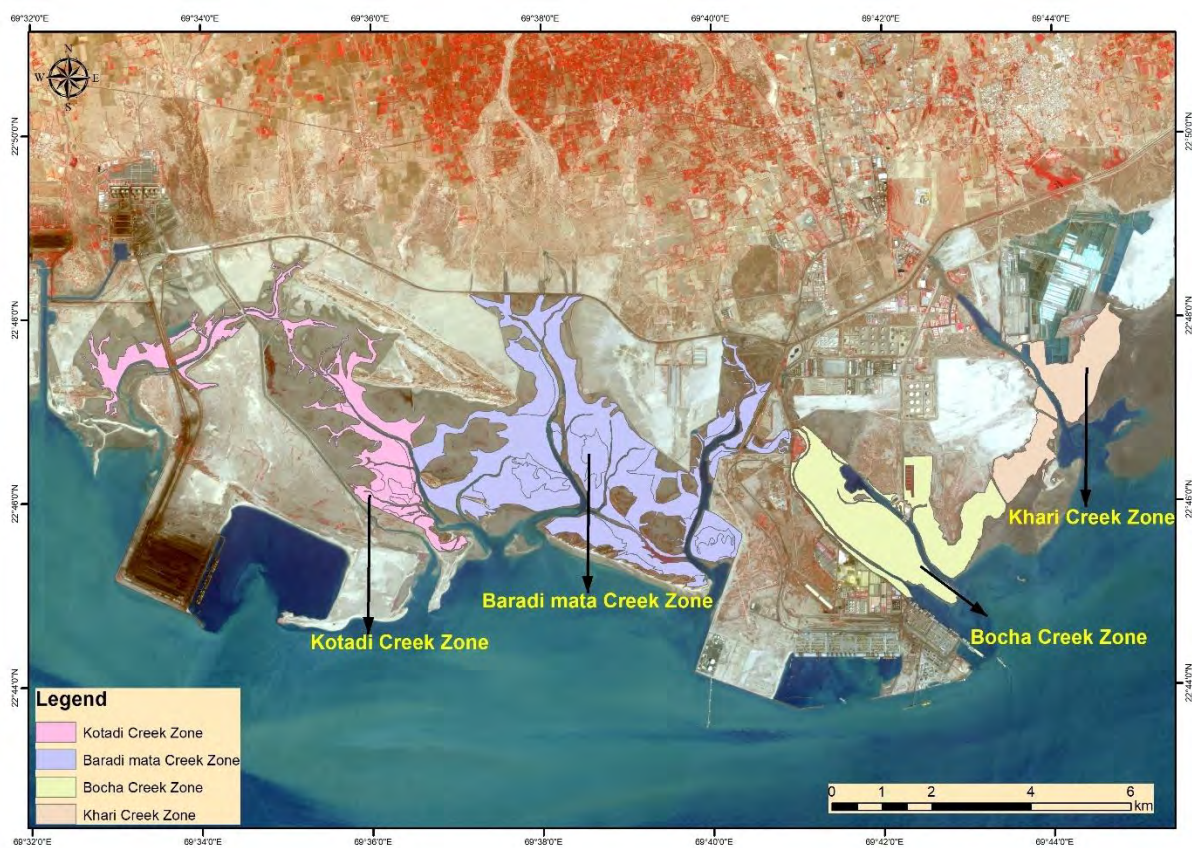


Figure 3.1: Study Area in Four Different Zone

3.4. Mangrove Vegetation

The survey area of APSEZ was divided in the three zones for the survey. During the survey of the mangroves in these three areas, the density and diversity of mangroves in prefixed sites was carried out. The selected sites were located in the intertidal belts and the adjacent estuarine environment of APSEZ area. The major part of assessment was done during low tide of the project sites. The density of the



tree class along with the regeneration and recruitment classes were recorded from the study area. In general, plants or seedlings with a height <50 cm were considered as regeneration class and those are in between 50 cm to 100 cm as recruitment class. For regeneration class, 1 m × 1 m and for recruitment class plants, 2 m x 2 m quadrates were used randomly for the measurement. For mature plants, 10 m x 10 m quadrates were used at the selected sites. The mature plants with height more than 100 cm and girth more than 7 cm were considered as trees. The equipments utilized in this study were user-friendly and easy to carry such as ranging rods, pipes, measuring tape, rope, etc.





Figure 3.2: Mangrove Data Collection During Field Visits

3.5. Field Work

Field investigation is a vital part of the project. Fieldwork helps to check and collect most of the ground information required for mangrove mapping. The reconnaissance field survey had been undertaken to get acquainted with the general patterns of vegetation of the area. The variation and tonal patterns had been observed on existing images. Traverses along all dense mangrove, sparse mangrove, scatter mangrove and major creeks have been noticed and were considered for collecting ground truth data between maps/images and on the ground. The fieldwork was conducted during the period between 03rd to 07th July 2023; 11th to 16th September 2023 and 16th to 20th October 2023 for collecting ground truthing data to cover the entire APSEZ area.



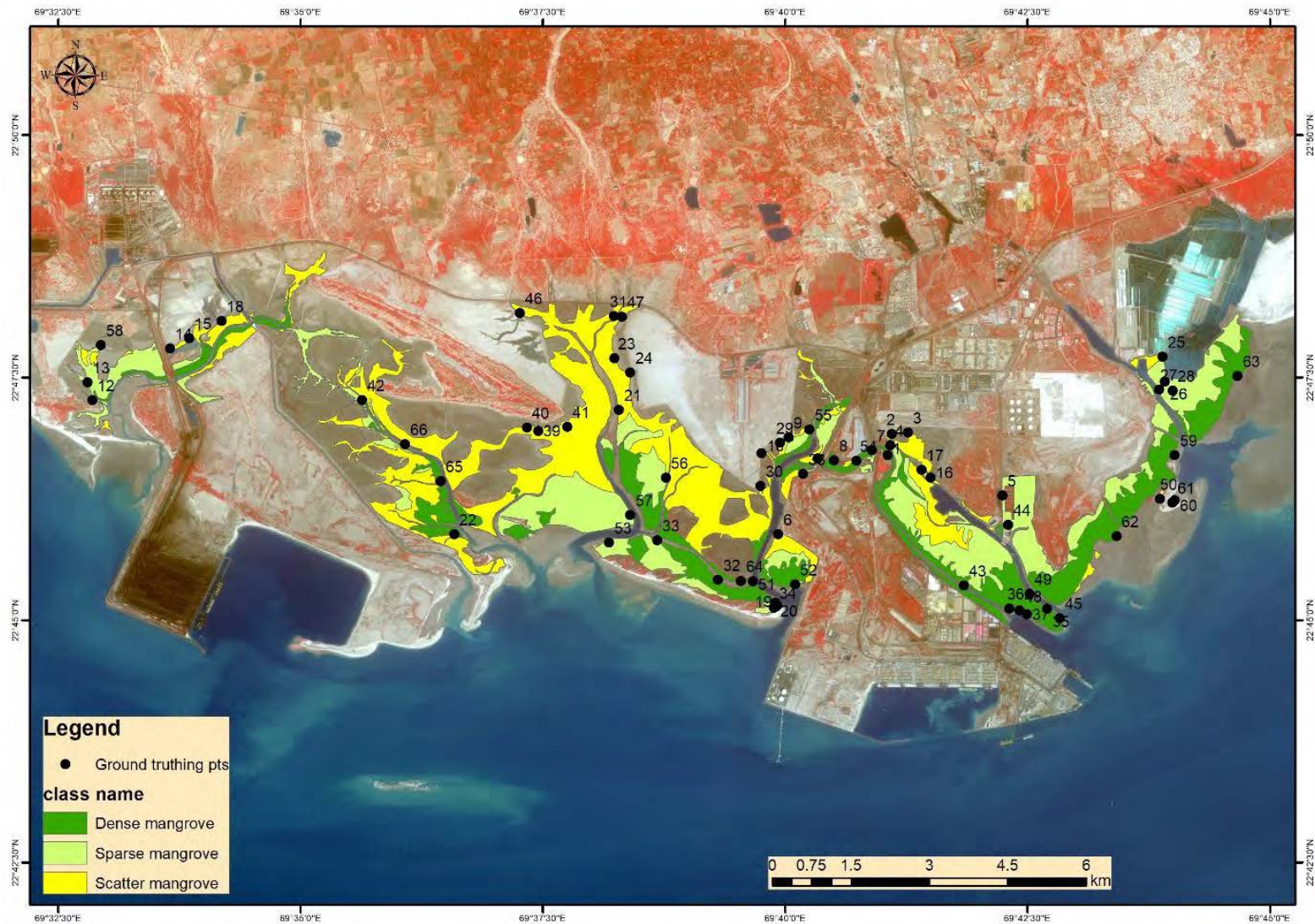


Figure 3.3: Ground Truthing Data and Mangrove Data Collection Points



Kotadi Creek Block

Dense Mangrove

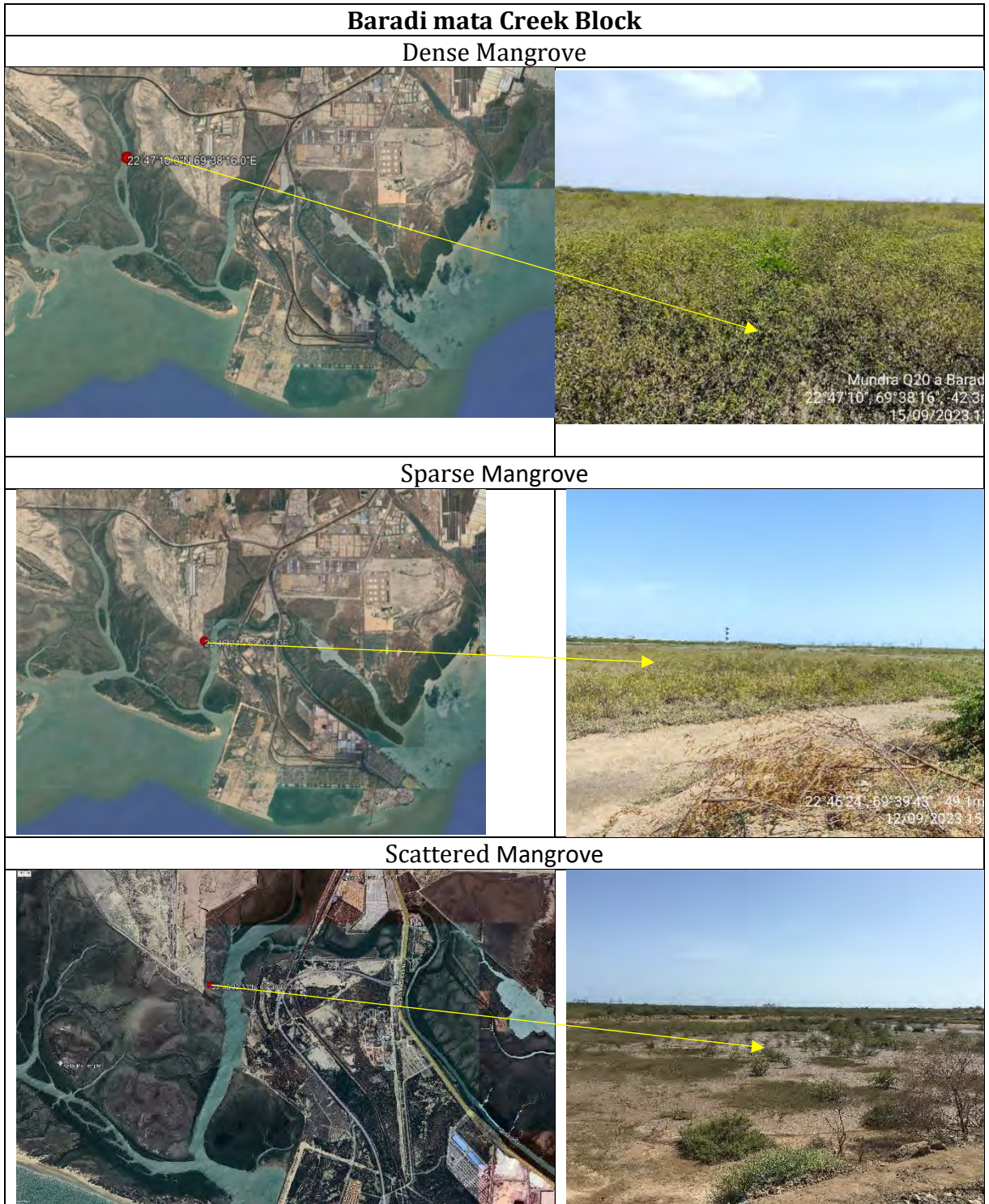


Sparse Mangrove



Scattered Mangrove





Bocha-Navinal Creek Block	
Dense Mangrove	
	 <p style="text-align: right;">Mundra Bocha Isl 22°45'14", 69°42'33", -42.1m, 1 14/09/2023 15:02</p>
Sparse Mangrove	
	
Scattered Mangrove	
	 <p style="text-align: right;">22°46'52", 69°41'1", -42.7m 11/09/2023 13:4</p>



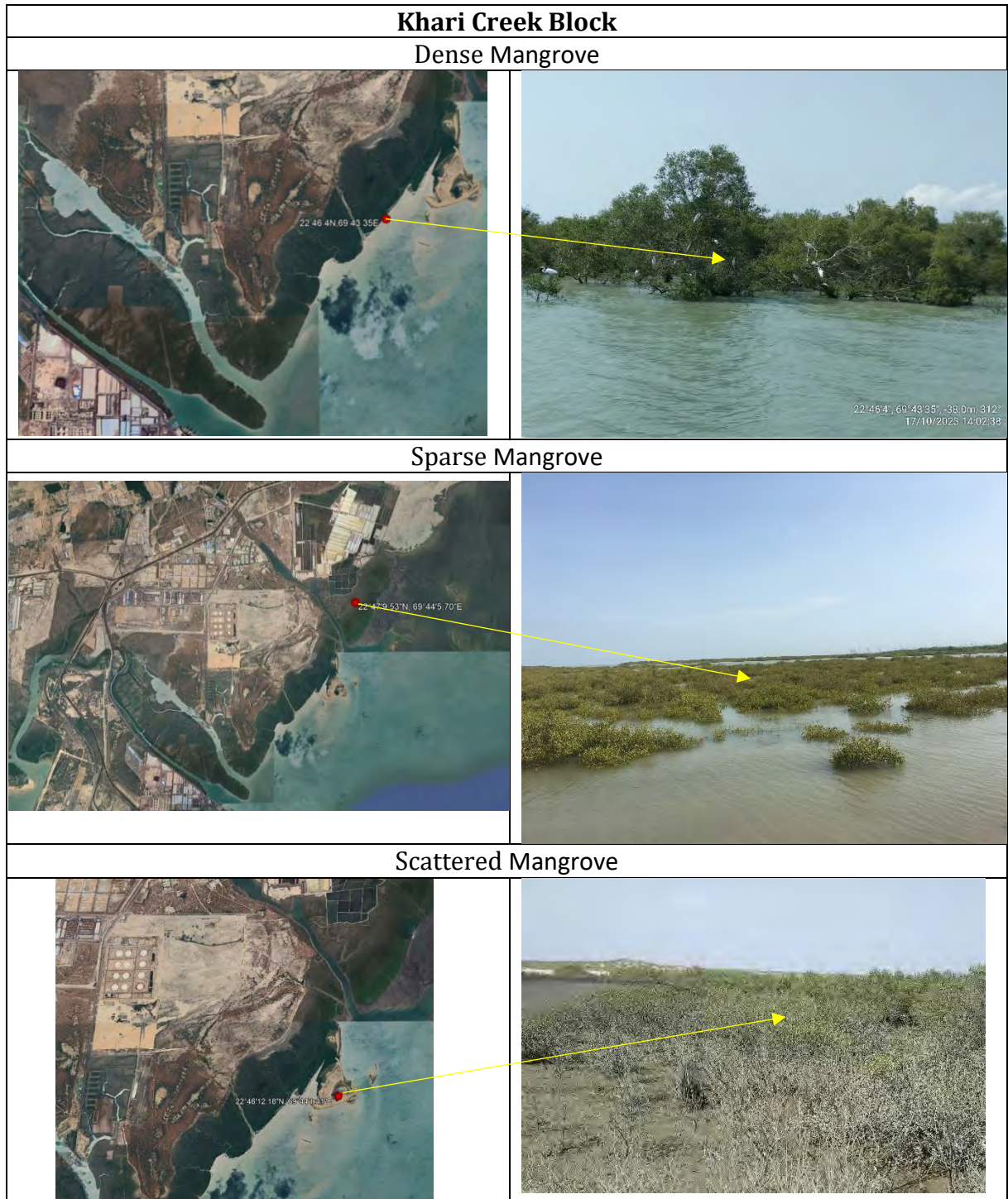


Figure 3.4: Surveyed and Collected Ground Truthing Data Various Categories of Mangroves



4. RESULTS AND ANALYSIS

The Kotadi, Baradi mata, Navinal, Bocha-Navinal and Khari creeks experience high tidal ranges up to 6m and with average tidal range of 2 to 4.5m which varies annually. The creeks have mangrove formation due to muddy substratum and the mangroves are tide fed and tidal flow into the mangroves occurs only during high tide. This makes the mangroves as intertidal one and any change of tidal conditions in the creeks affect the growth and distribution of mangroves. Distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images (2019 March and 2021 March).

4.1. Overall APSEZ Mangrove Assessment

Mangrove areas are known to vary over time and may be mixed with associate vegetation. However, by analysing the colour and tone of multi-spectral high-resolution LISS IV (5.8 m spatial resolution) satellite data and extensive ground truthing survey data in each block of the study area, mangrove coverage could be more accurately estimated. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670.08 ha which has increased to 2722.87 ha during the year 2021 (Table 4.1). This indicates that the mangrove and the tidal system in the creeks were not adversely affected by any anthropogenic or natural disturbances during this period. The analysis of the data revealed that the dense mangrove category has increased by 3.01 ha (0.11%) due to sparse mangrove converted to dense mangrove, while sparse mangrove category has increased by 45.90 ha (1.7%) which is mainly due to the conversion of scattered mangroves into sparse mangroves. The scattered mangrove category has also showed an increase by 3.88 ha (0.14%), which is suggesting the recruitments and regeneration of mangroves in the area. The changes in the mangrove cover are summarized in Table 4.1 and Figure 4.3.



Table 4.1: Distribution of Various Categories of Mangroves in APSEZ During 2019 and 2021

Class	Area (ha)		
	2019	2021	Change
Dense Mangrove	706.02	709.03	3.01
Sparse Mangrove	927.31	973.22	45.90
Scattered Mangrove	1036.74	1040.62	3.88
Total	2670.08	2722.87	52.79

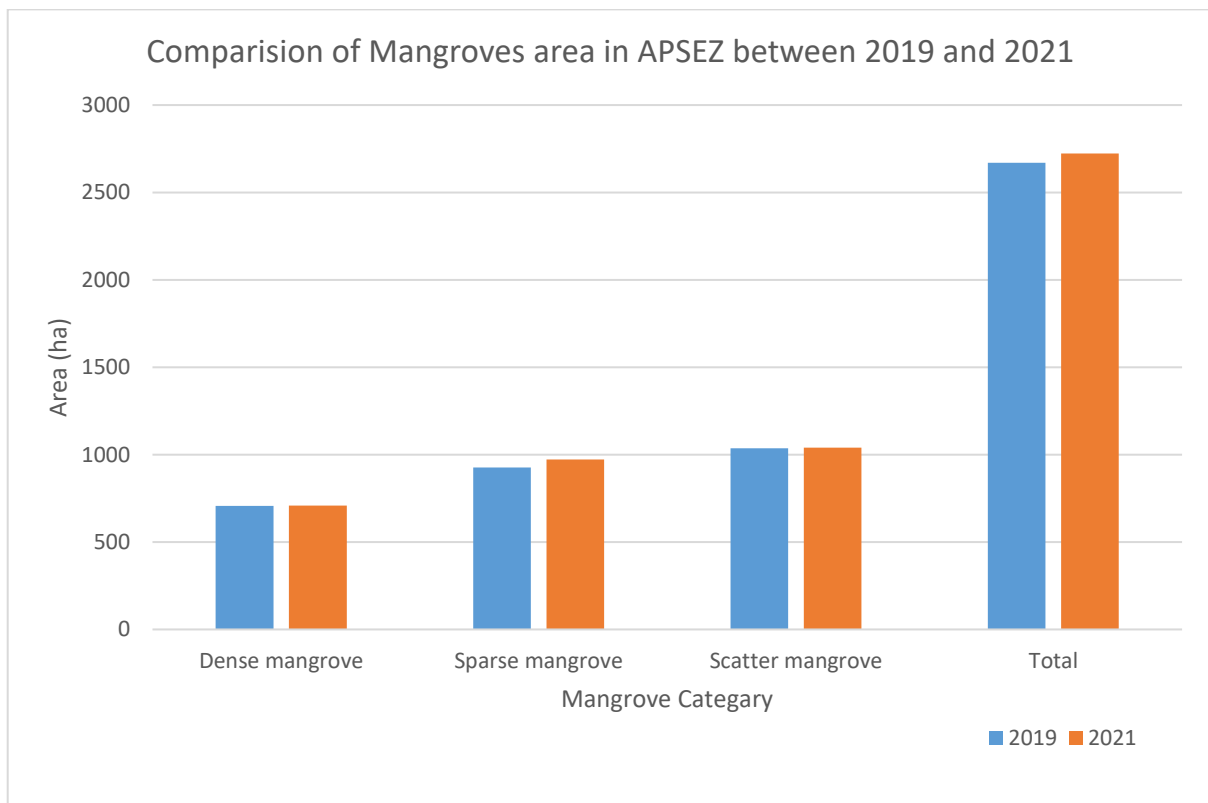


Figure 4.1: Comparison of Various Categories of Mangroves in APSEZ Between 2019 and 2021



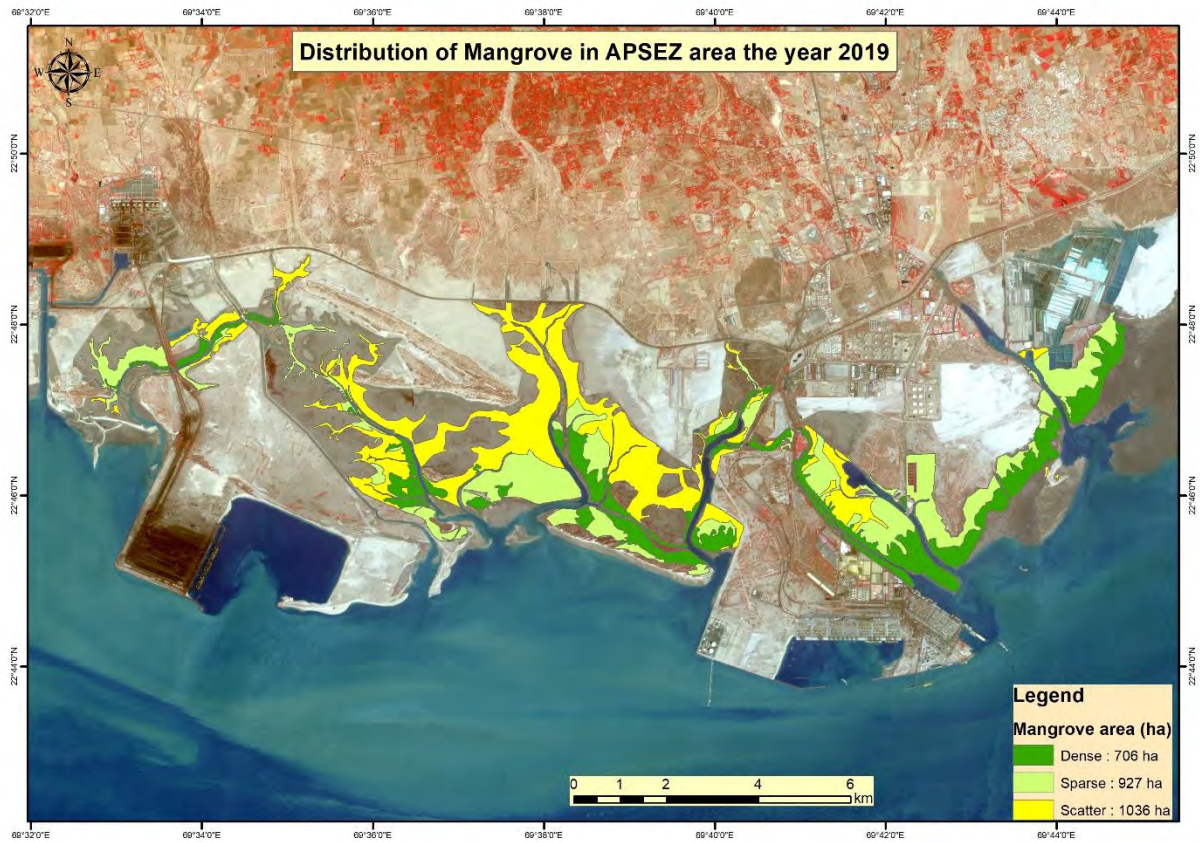


Figure 4.2: Distribution of Various Categories of Mangroves in March 2019

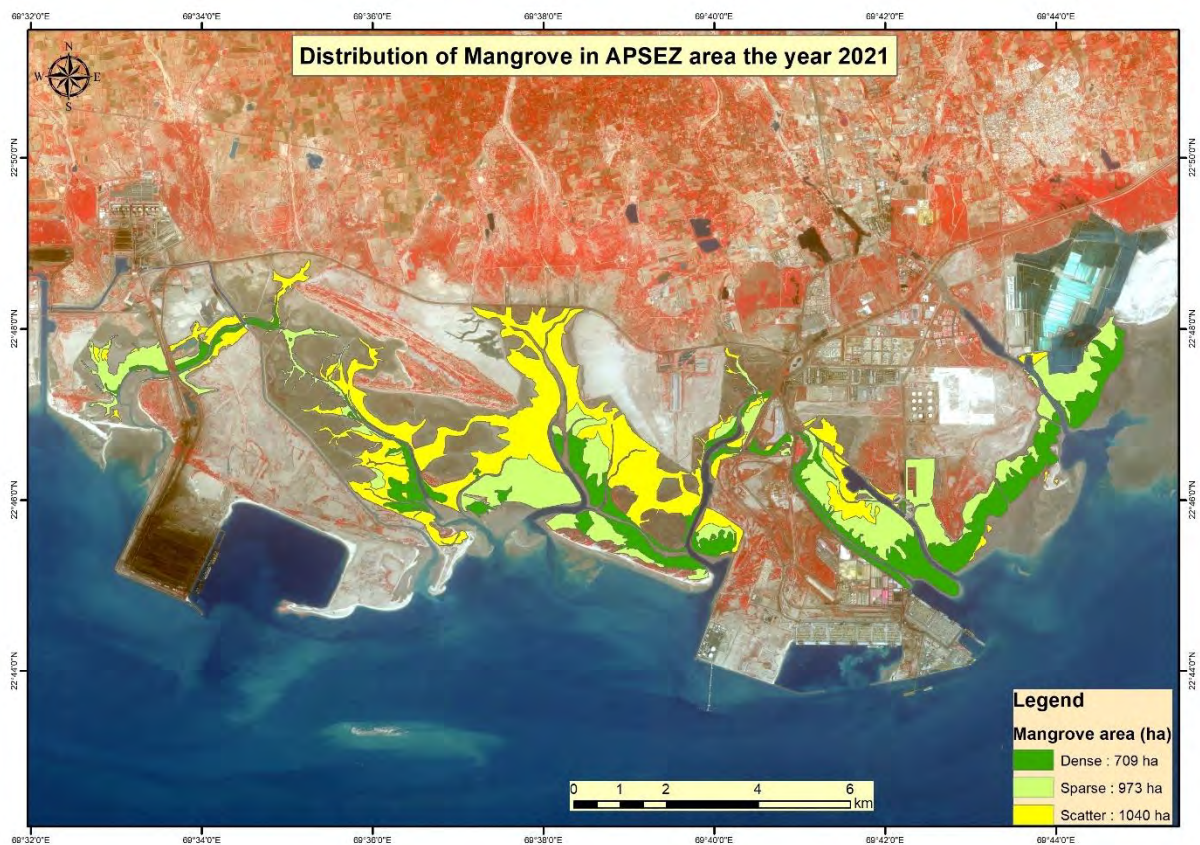


Figure 4.3: Distribution of Various Categories of Mangroves in March 2021



4.2. Creek Wise Assessment

4.2.1. Kotadi Creek Area

The study site Kotadi creek, which has two mouths: Kotadi-I on the western end of west port of Adani and Kotadi-II located east of Kotdi-I. The tidal flow reaches up to 4.5 km in Kotadi-I and up to 7.4 km in Kotadi-II during high tide periods. The mangrove cover at these sites were compared for the period, during March 2019 and March 2021 using satellite images and field surveys. There are three categories: dense, sparse, and scattered mangroves and it was found that the total mangrove area increased by 21.43 ha (4.1%) from 2019 to 2021 (Table 4.2). The dense category increased by 0.3% (1.78 ha), while the sparse category increased by 39.71 ha and the area of scattered category decreased by 20 ha (Figure 4.4 to Figure 4.7) from the 2019 imagery. These results indicate that the mangroves in Kotadi creek are healthy and benefited from the regular tidal flow. The decrease in the area of the of scattered category and increase of sparse are due to natural transitions in mangrove growth stages, from scattered to sparse category.

Table 4.2: Distribution of Various Categories of Mangroves in Kotadi Creek Zone During 2019 and 2021

Class Name	Area(ha)		
	2019	2021	Change
Dense Mangrove	98.12	99.89	1.78
Sparse Mangrove	166.21	205.92	39.71
Scattered Mangrove	255.01	234.96	-20.05
Total	519.34	540.77	21.43

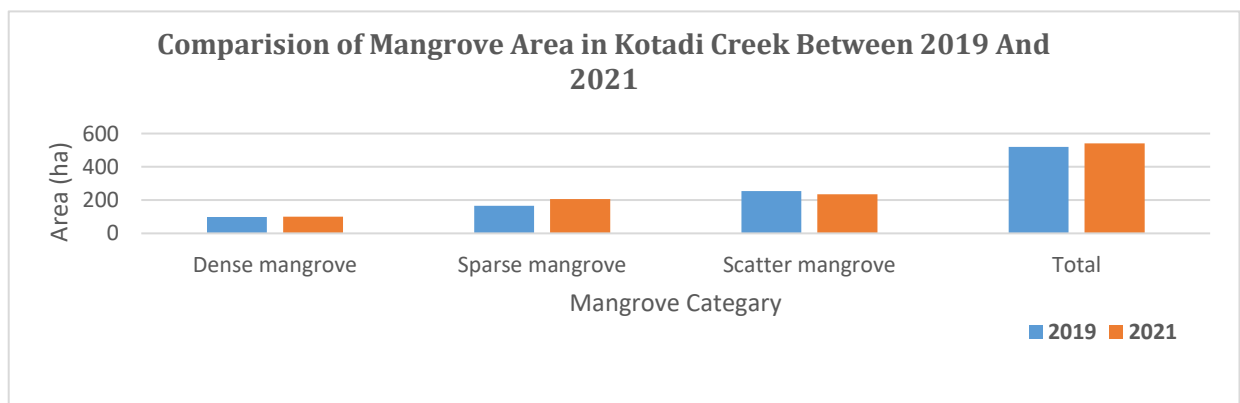


Figure 4.4: Comparison of Various Categories of Mangroves in Kotadi Creek Zone Between 2019 and 2021



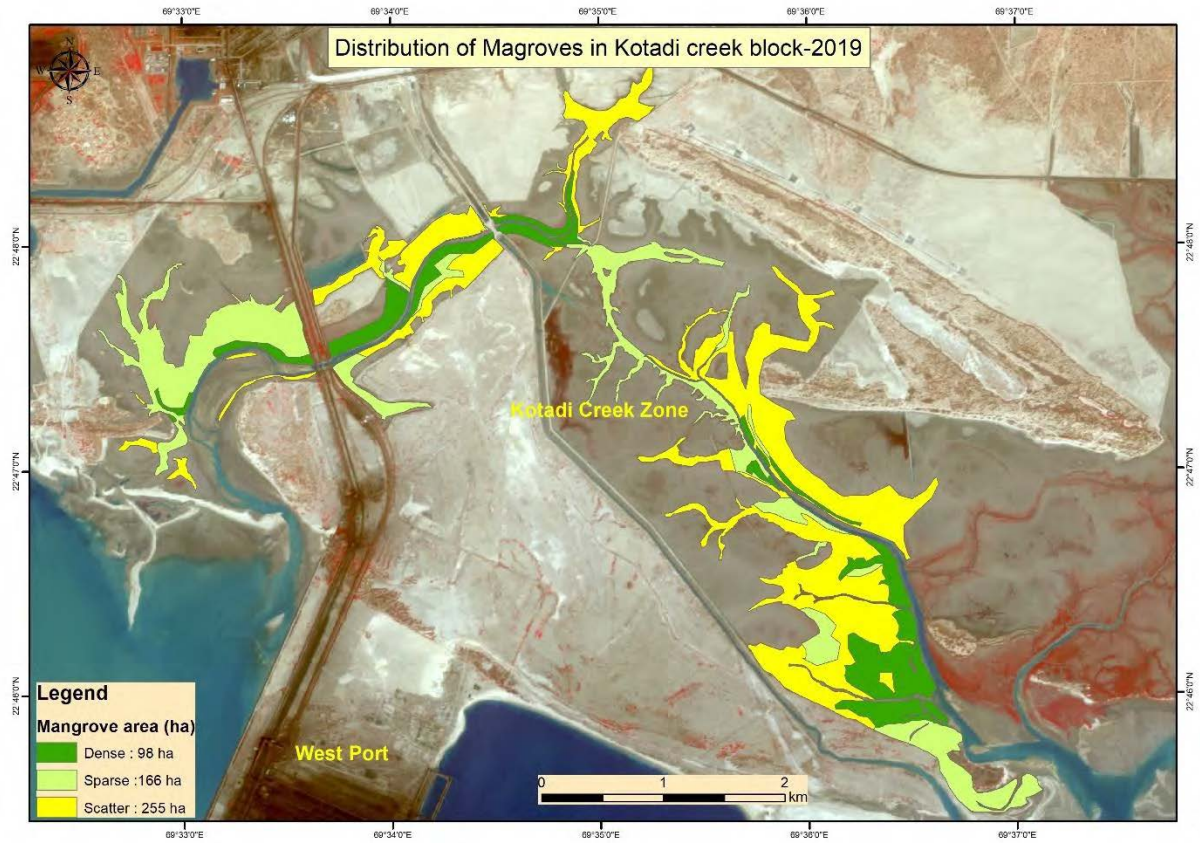


Figure 4.5: Distribution of Mangroves in 2019 in Kotadi Creek Zone System.

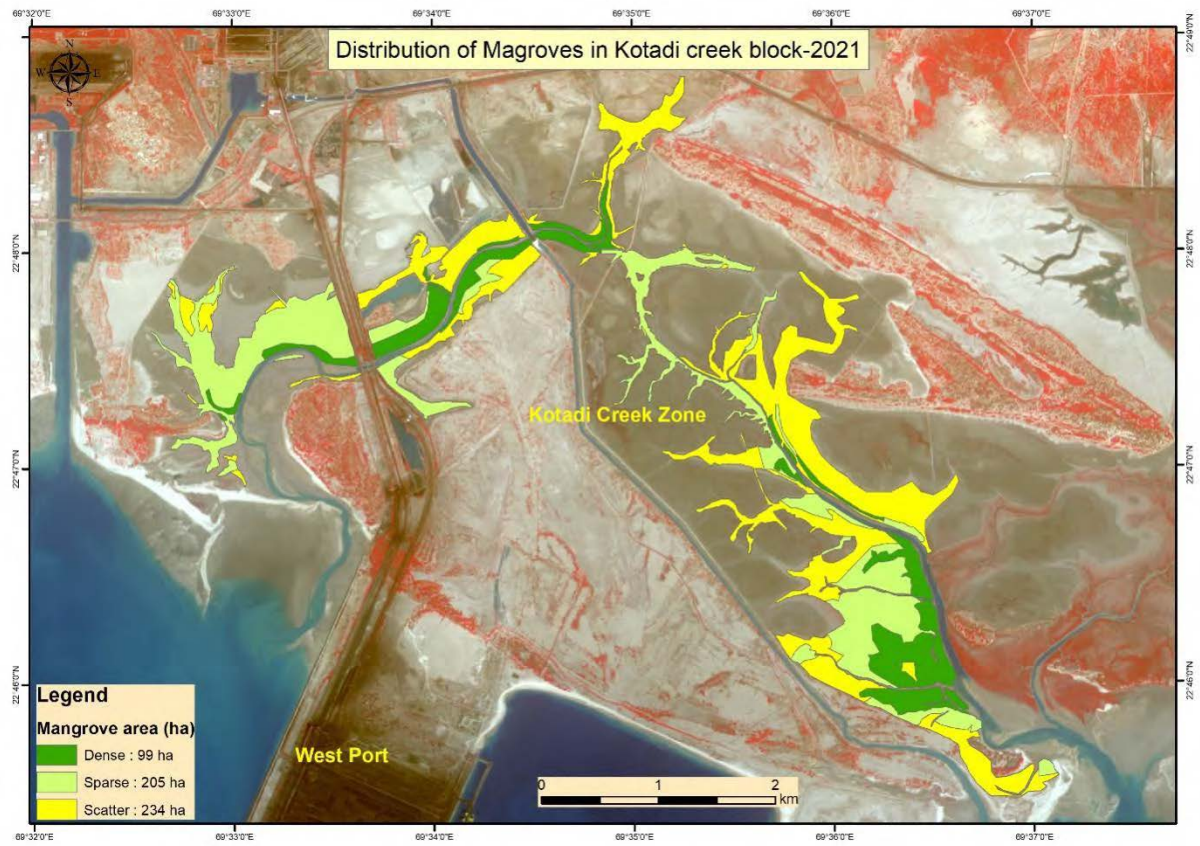


Figure 4.6: Distribution of Mangroves in 2021 in Kotadi Creek Zone System.



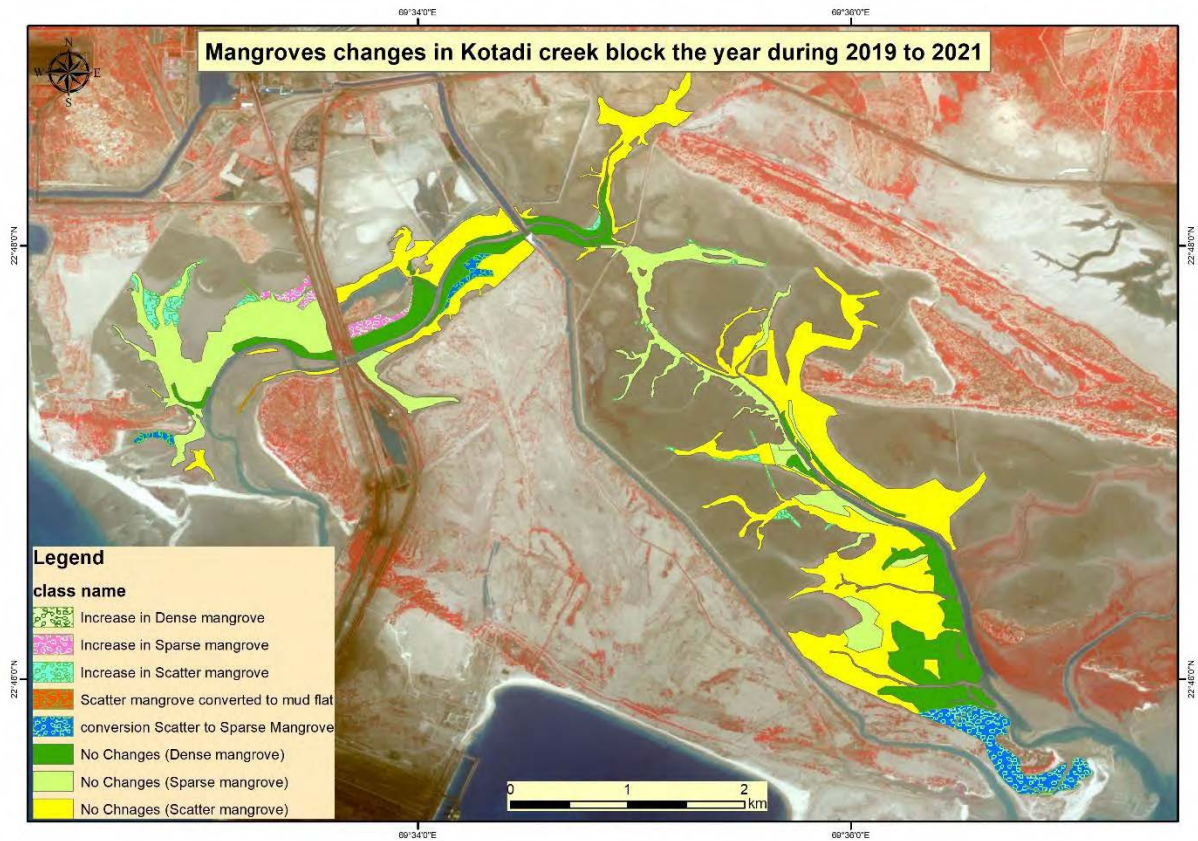


Figure 4.7: Change Analysis from 2019 to 2021 on Categories of Mangroves in Kotadi Creek System

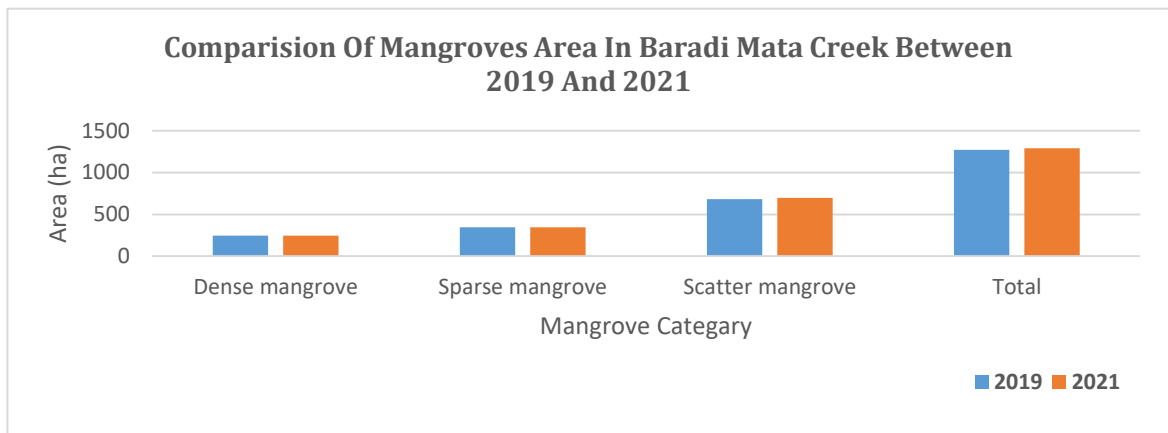
4.2.2. Baradi mata Creek area

This creek remains uninfluenced by human interventions except for navigation by the fishing community from the nearby villages. The status (growth cover) of the mangroves was assessed between 2019 and 2021 and the results are shown in (Table 4.3 and to Figure 4.11). The comparative study of the images revealed the overall improvement in mangrove coverage to the extent of 15.91 ha (1.2% increase) mostly with formation of new mangroves in the form of scattered mangroves with minor inter-conversion in categories of sparse to dense, The data on mangrove distribution has showed an increase from 2019 to 2021 especially improvement to higher categories (i.e., from scattered to sparse and further to dense) and also the formation of new mangroves was also significant. These results lead to infer that the mangroves in the creek are in a healthy condition with normal regular tidal flow.



Table 4.3: Distribution of Various Categories of Mangroves in Baradi Mata Zone Creek During 2019 and 2021

Class Name	Area (Ha)		
	2019	2021	Change
Dense Mangrove	245.22	245.94	0.72
Sparse Mangrove	344.83	345.92	1.09
Scatter Mangrove	683.76	697.86	14.10
Total	1273.81	1289.72	15.91

**Figure 4.8: Comparison of Various Categories of Mangroves in Baradi Mata Creek Zone Between 2019 and 2021**

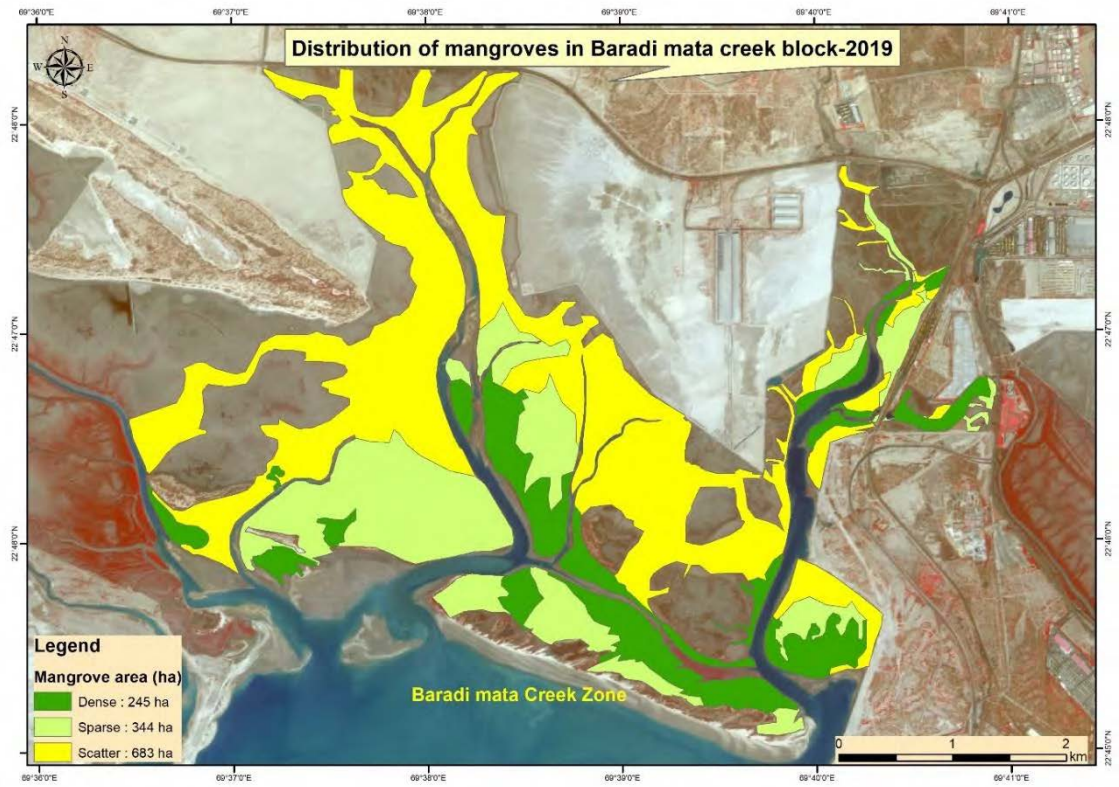


Figure 4.9: Distribution of Mangroves at Baradi Mata Creek Zone in 2019

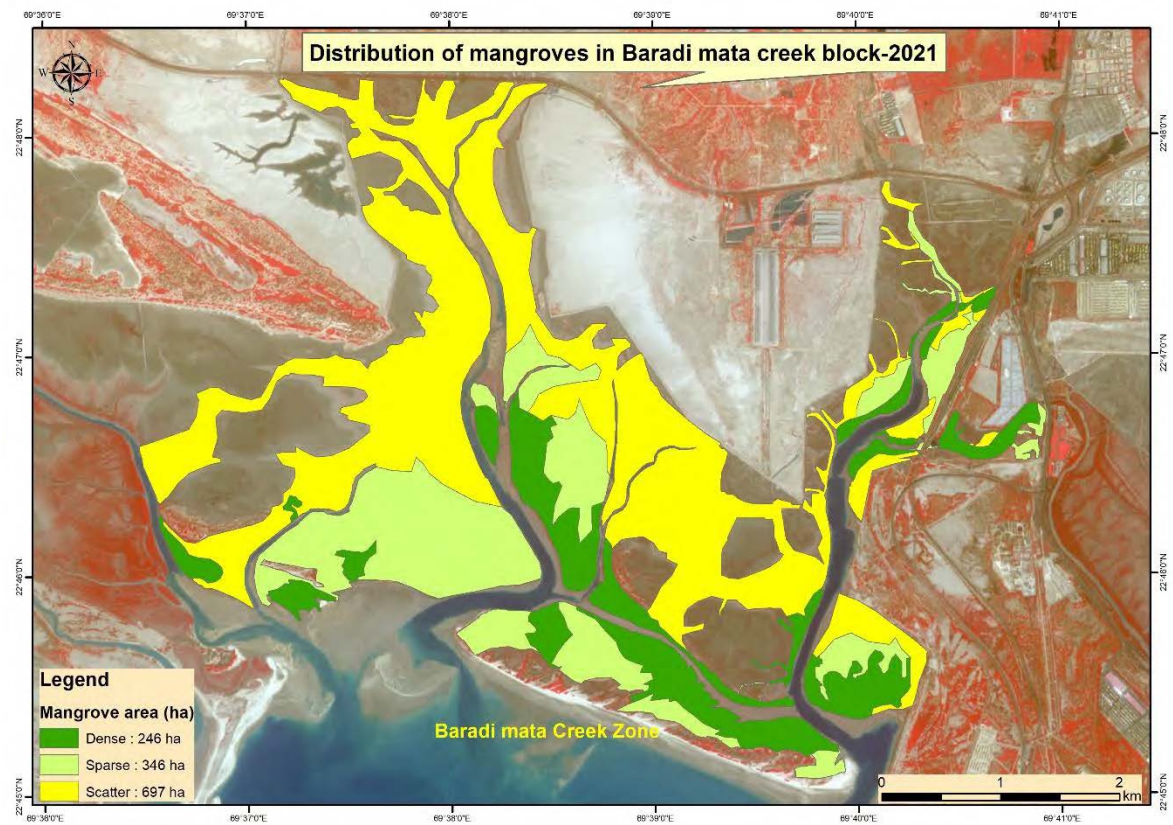


Figure 4.10: Distribution of Mangroves at Baradi mata Creek Zone in 2021



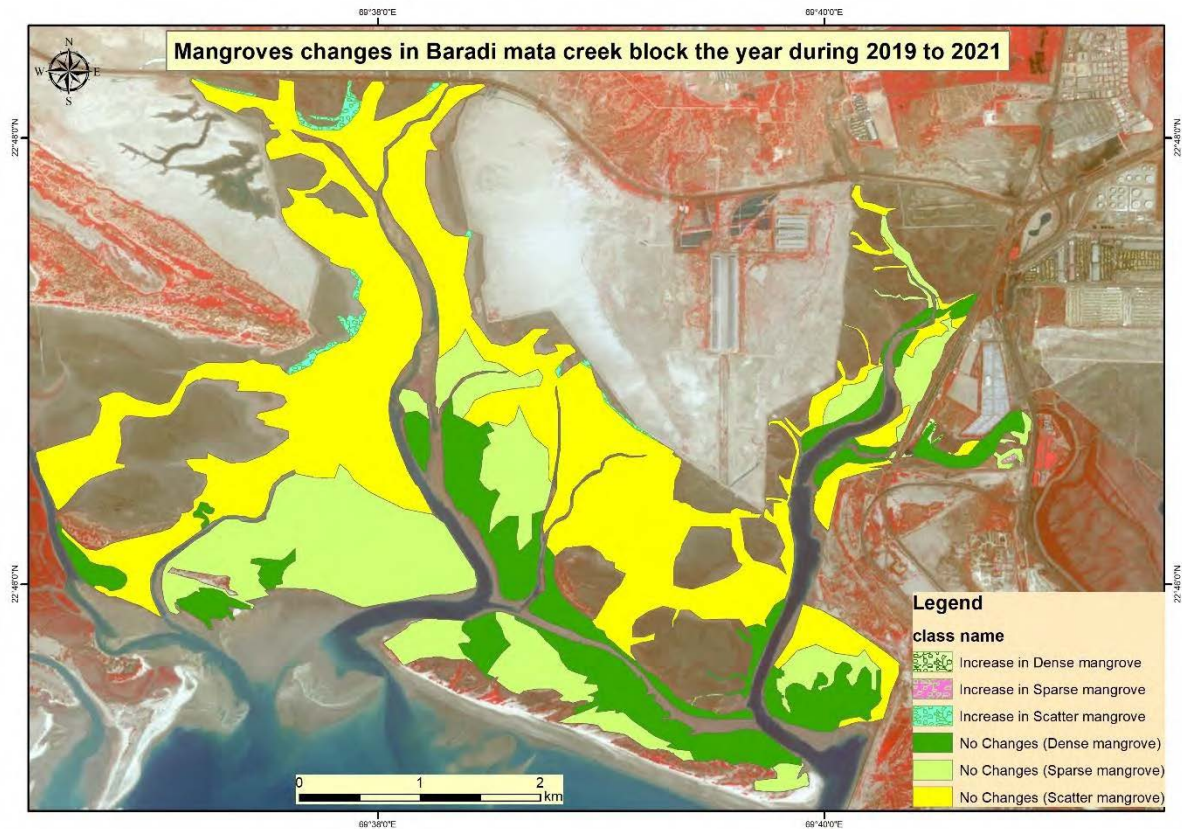


Figure 4.11: Change Analysis From 2019 To 2021 On Categories of Mangroves in Baradi Mata Creek System

4.2.3. Bocha-Navinal Creek Area

The study area comprises two creeks, Navinal creek, Bocha creek, and bocha island, thus form a complex of creek system. The Navinal creek is adjacent to Adani Port and joins the Bocha creek in the north, forming Bocha island that has dense mangroves. The mouth of Navinal creek is also known as the entrance to the Port and receives good tidal inflow. The Navinal creek narrows down as it flows northward and eastward to merge with Bocha creek (Figure 2.1). The banks of all the two creeks have fair to good mangrove growth, with dense mangroves particularly along the border of the Bocha island and the nearby minor creeks (Figure 4.12 to Figure 4.15). For the comparative study, the satellite images and field survey results on the mangrove cover for the period March 2019 and March 2021 were considered. The three classes of the mangrove types: dense, sparse, and scattered were observed. The total mangrove area has increased by 7.74 ha (1.3%) from 2019 to 2021 data (Table 4.4). These results suggest that the mangroves in



Bocha -Navinal, creek and Bocha island system are healthy and influenced by the normal regular tidal flow.

Table 4.4: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone During 2019 and 2021

Class Name	Area (ha)		
	2019	2021	Changes
Dense Mangrove	207.42	206.30	-1.13
Sparse Mangrove	269.44	271.43	1.98
Scatter Mangrove	89.17	96.06	6.89
Total	566.04	573.78	7.74

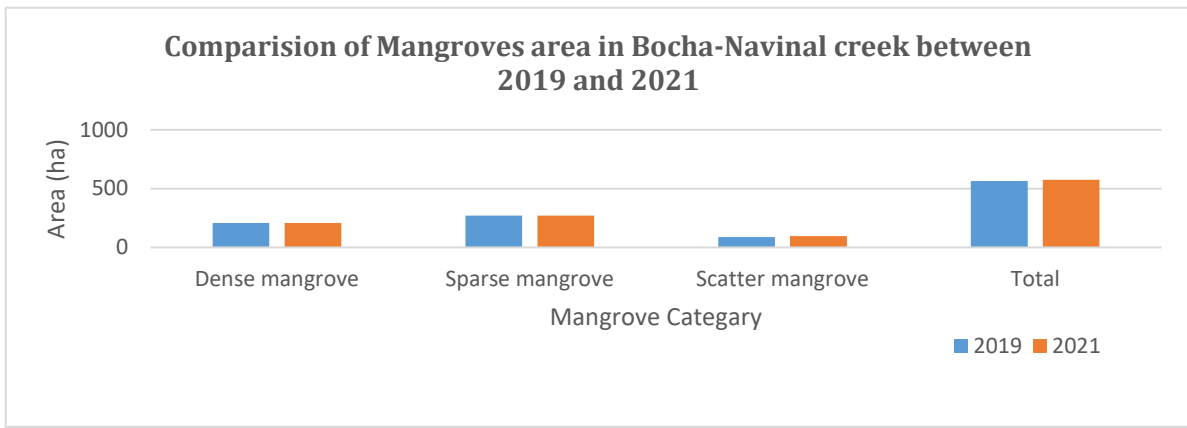


Figure 4.12: Comparison of Various Categories of Mangroves in Bocha-Navinal Creek Zone Between 2019 and 2021

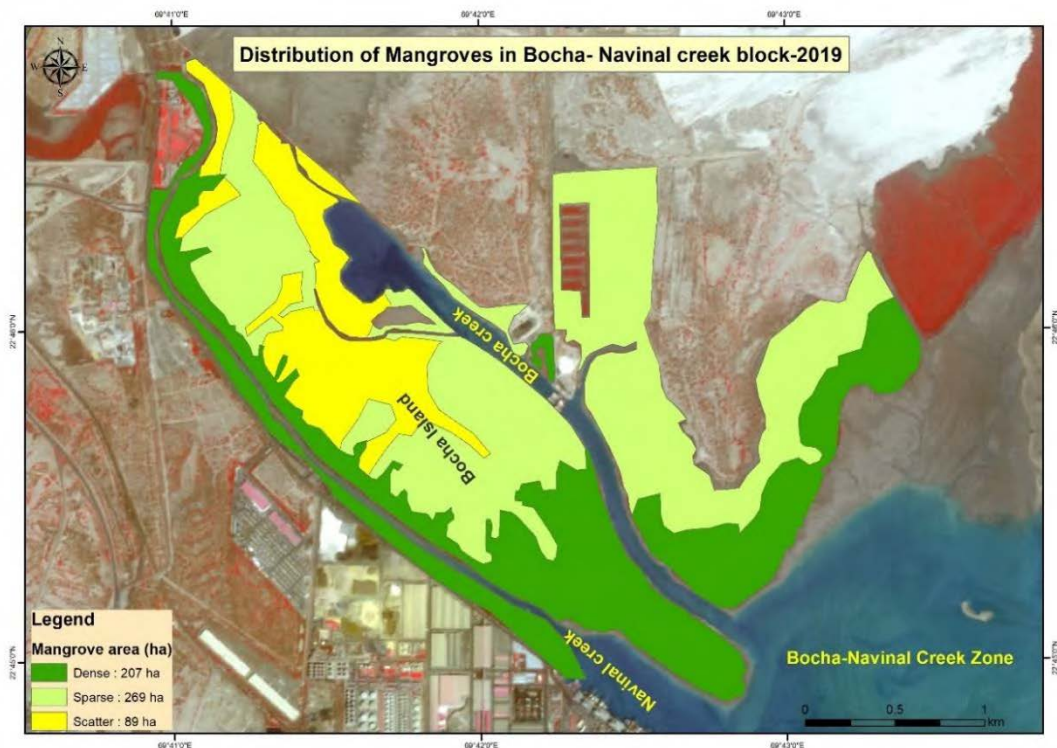


Figure 4.13: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone System for The Year 2019



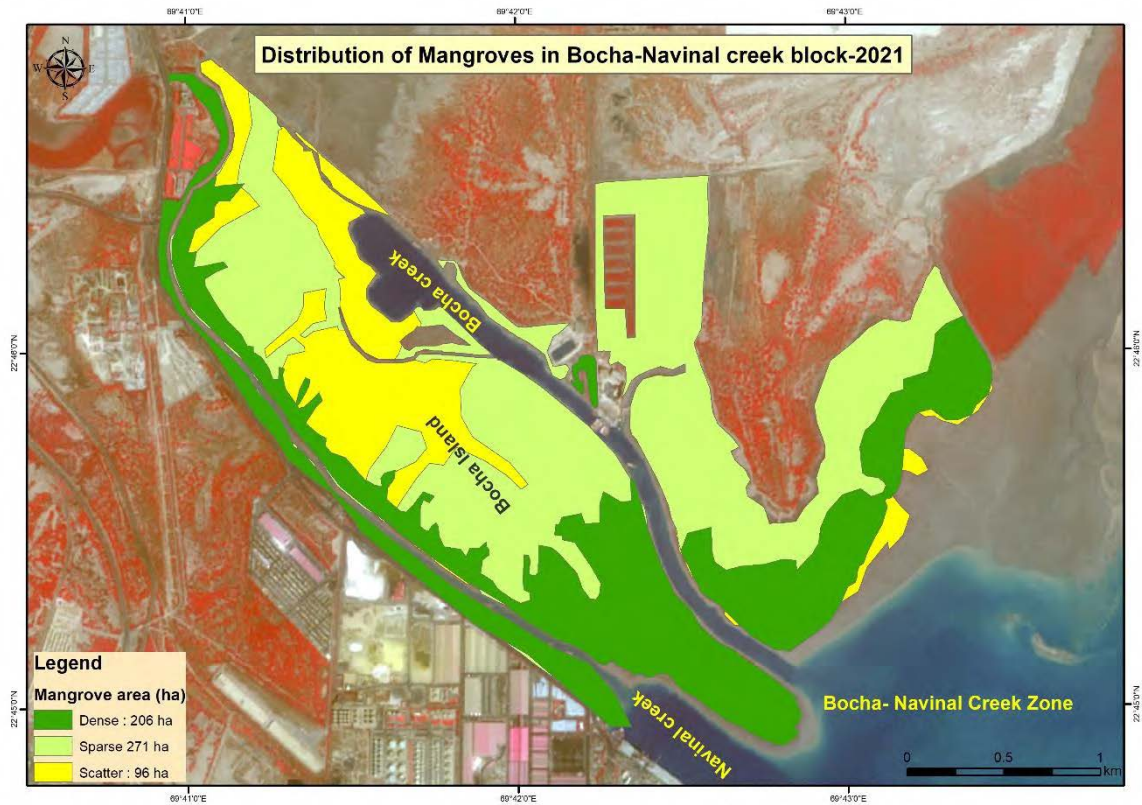


Figure 4.14: Distribution of Various Categories of Mangroves in Bocha - Navinal Creek Zone System for The Year 2021

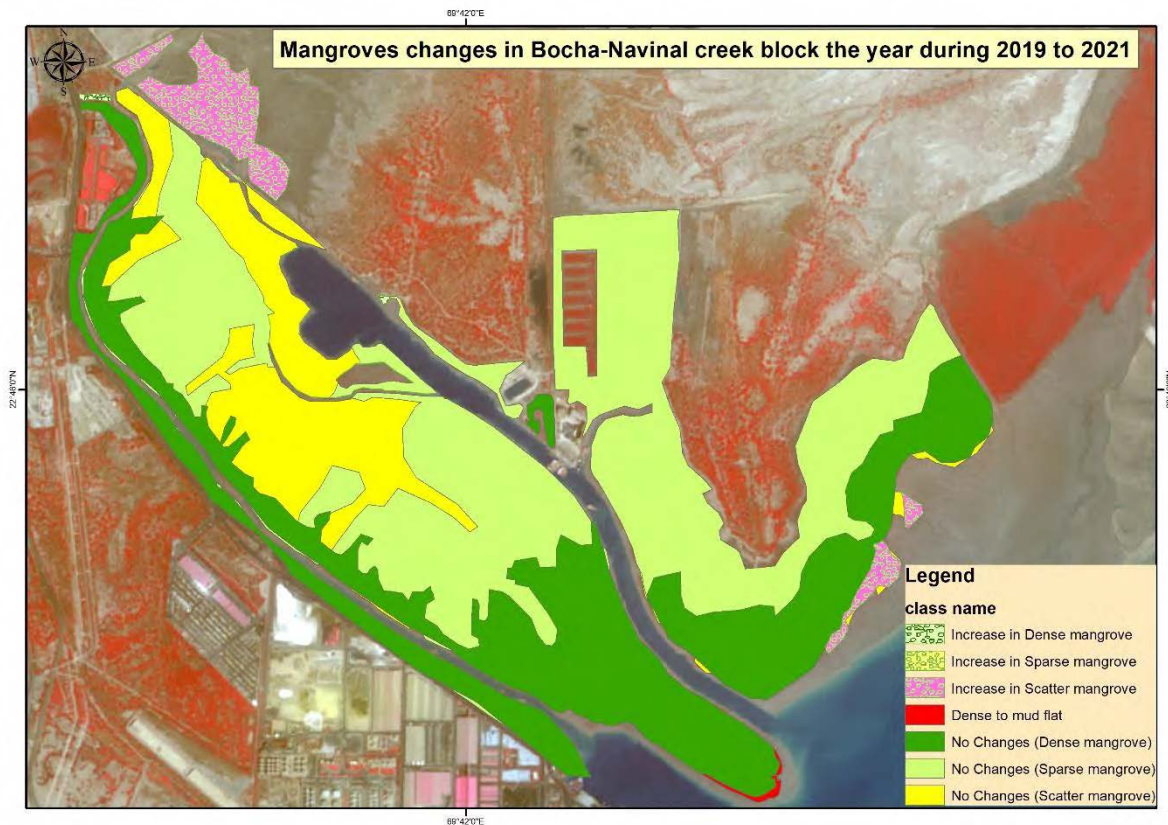


Figure 4.15: Change Analysis From 2019 To 2021 On Categories of Mangroves in Bocha- Navinal Creek System



4.2.4. Khari Creek

The creek experiences normal tidal flow with settlements located in the northern part of the creek (Junabunder village). Study is to assess the changes in mangrove distribution and density in Khari creek (Junabunder) between March 2019 and March 2021, using satellite imagery and field surveys and the data is given in Table 4.5 and Figure 4.16. and categories of mangroves are indicated in Figure 4.17 to Figure 4.19. The data indicates that there is a marginal increase of mangroves to the extent of 7.71 ha which is 2.47% compared to 2019 level. Dense mangrove is marginally increased mostly due to conversion of sparse mangrove to dense mangrove. Sparse mangrove has been increasing due to transformation of scatter to sparse category. The minor increase in scatter category is due to regeneration and recruitment class. Overall, mangrove is healthy in this block due to the favourable tidal regime and the low human pressure in the creek. the mangrove density has increased mainly due to the conversion of sparse and scatter mangroves to dense mangroves, indicating an improvement in mangrove quality.

Table 4.5: Distribution of Various Categories of Mangroves in Khari Creek Zone During 2019 and 2021

Class Name	Area (ha)		
	2019	2021	Changes
Dense Mangrove	155.26	156.90	1.64
Sparse Mangrove	146.84	149.95	3.11
Scatter Mangrove	8.80	11.75	2.95
Total	310.90	318.60	7.71

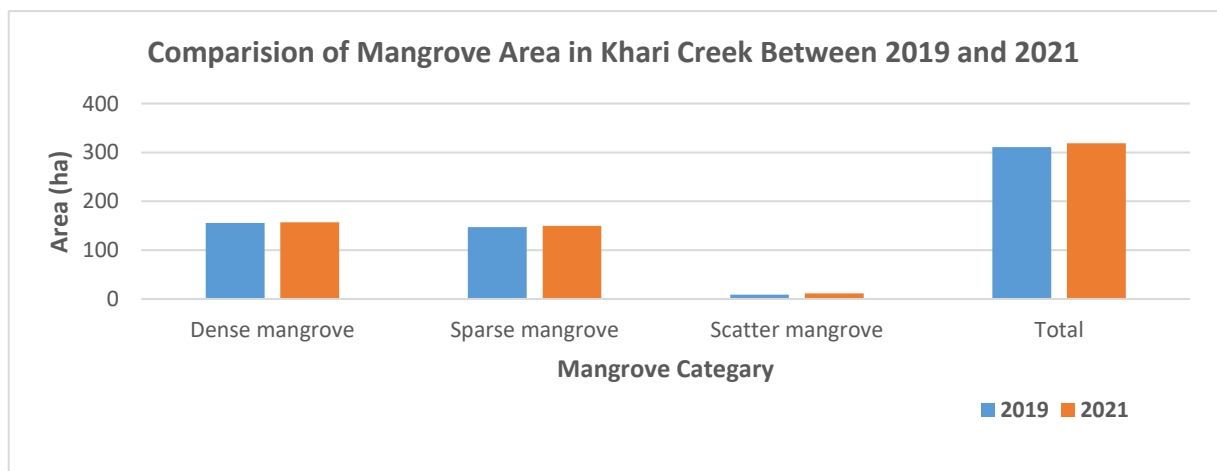


Figure 4.16 : Comparison of Various Categories of Mangroves in Khari Creek Zone Between 2019 and 2021



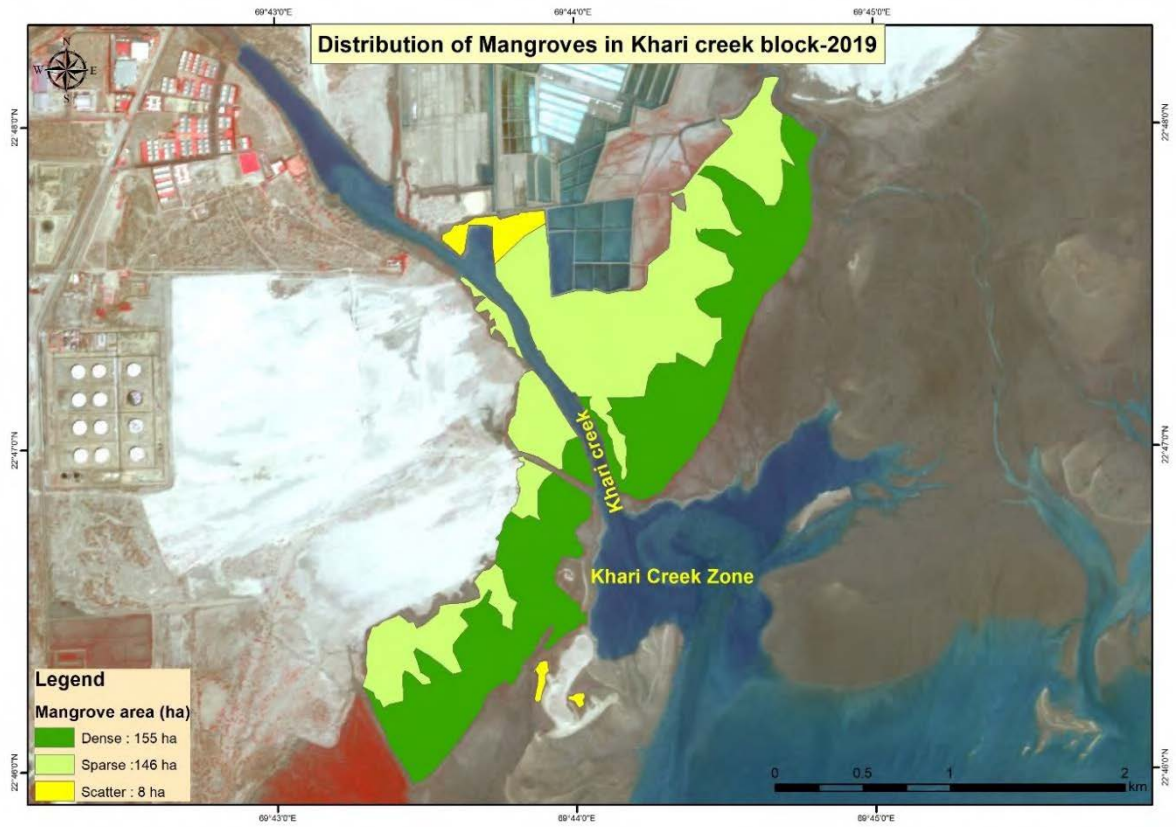


Figure 4.17 : Distribution of Various Categories of Mangroves in Khari Creek Zone System for The Year 2019



Figure 4.18: Distribution of Various Categories of Mangroves in Khari Creek Zone System for The Year 2021



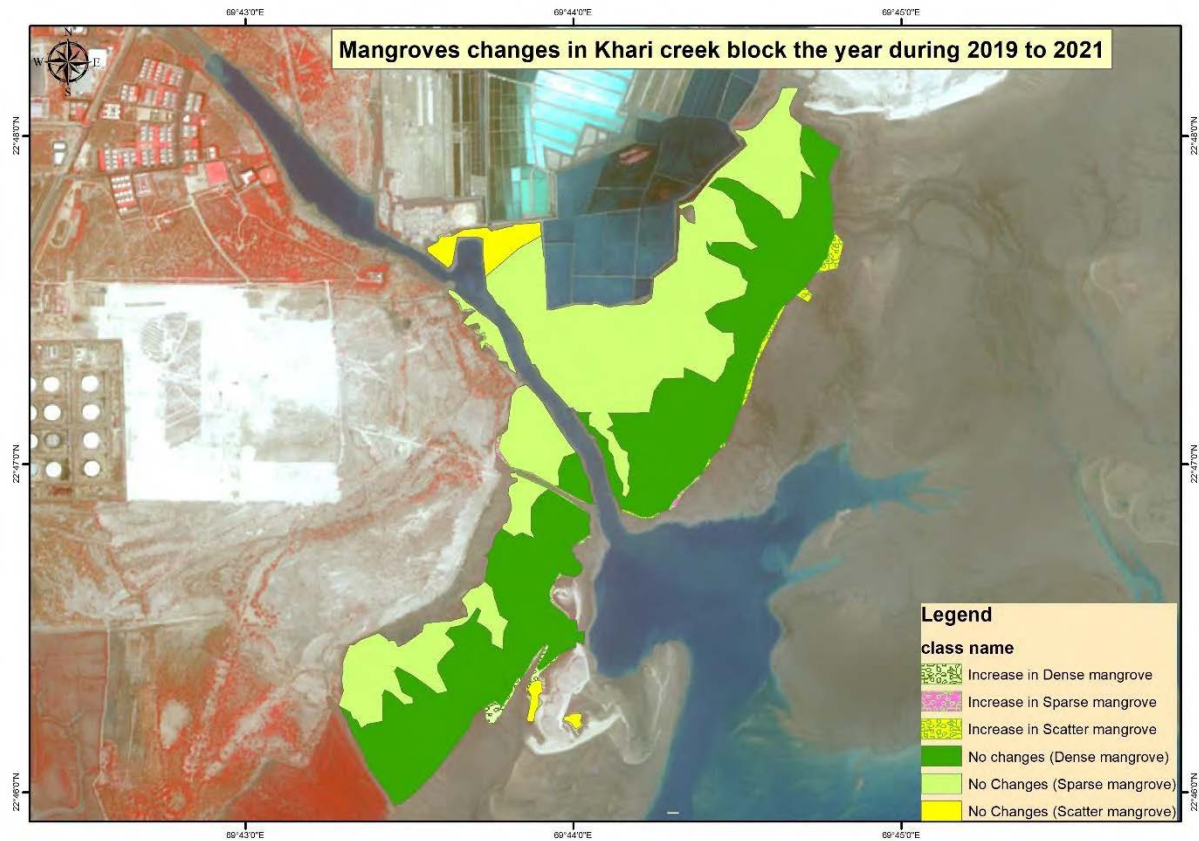


Figure 4.19: Change Analysis From 2019 To 2021 On Categories of Mangroves in Khari Creek System

4.3. Mangrove Vegetation

In India, the state of Gujarat encompasses the longest coastline (1650 km) and largest coastal area (28,000 km²), which supports the second largest mangrove cover of the country, which is almost 23 % of the Indian mangrove cover (Devi and Pathak, 2016). Gujarat mangrove cover is divided in three parts, Kachchh and Gulf of Kachchh (GOK), Saurashtra, and Gulf of Khambhat and South Gujarat.

4.3.1. : Diversity

In Gujarat a total of 15 species of mangrove have been recognized as true mangroves (Ragavan *et al.*, 2016), but this diversity is very less compared to the other Indian states. The diversity of mangroves in Gujarat is concentrated mainly in the Gulf of Khambhat and South Gujarat regions. The availability of freshwater inflow into this area resulted in the highest floristic diversity of mangroves than the other parts of the state. In general, the Gujarat mangrove cover is fully dominated by single mangrove species (Mono-floral) which is *Avicennia marina*



specifically along the coastal belt of the the Gulf of Kachchh. The extreme tolerance to low rainfall, higher salinity, evapo-transpiration and temperature, etc. of this species made it successful in the Gujarat coasts. A few true mangroves species can be found in the Gulf of Kachchh sporadically. The distribution of the other halophytes such as *Suaeda*, *Salvadora*, *Salicornia*, etc. and mangrove associate plants was also recorded. At the survey sites, two more true mangrove species which are *Rhizophora mucronata* and *Cerops tagal* plants were also found however, they are very less in number and present in small patches.

4.3.2. : Density

The overall average mature tree density (>100 cm) recorded was 1471 trees/ha (Ranging from 1120 to 1944 trees/ha) in the entire study area of APSEZ. The area wise density recorded was higher in Khari creek area (1944 trees/ ha) followed by Baradi mata area (1565 trees/ ha) and Bocha/Navinal creeks (1256 trees/ha). Among the study locations, lowest tree density was observed in the Kotadi creek area which was 1120 trees/ha. Further, major part of Bocha Island and surrounding areas supports good population of well matured and grown-up trees of *A. marina*, along with the presence of a few well matured trees of *Rhizophora mucranata* and *Cerops tagal*.

Table 4.6: Density of Trees in the Kotadi Creek Area

Q. Number	Latitude	Longitude	No of Tree Per Ha
12	22° 47' 16"	69° 32' 51"	1100
13	22° 47' 27"	69° 32' 48"	1100
14	22° 47' 48"	69° 33' 39"	500
15	22° 47' 54"	69° 33' 51"	600
18	22° 48' 5"	69° 34' 11"	0
22	22° 45' 53"	69° 36' 35"	2500
42	22° 47' 16"	69° 35' 38"	700
58	22° 47' 50"	69° 32' 56"	400
65	22° 46' 25"	69° 36' 32"	2500
66	22° 46' 49"	69° 36' 5"	1800
Average			1120



Table 4.7: Density of Trees in the Baradi mata Area

Q. Number	Latitude	Longitude	No of Tree per Ha
6	22° 45' 53"	69° 39' 56"	1200
7	22° 46' 45"	69° 40' 54"	1700
8	22° 46' 39"	69° 40' 30"	1200
9	22° 46' 53"	69° 40' 2"	1800
10	22° 46' 43"	69° 39' 45"	1200
11	22° 46' 40"	69° 40' 20"	600
19	22° 45' 9"	69° 39' 55"	2000
20	22° 45' 11"	69° 39' 54"	600
21	22° 47' 10"	69° 38' 17"	400
23	22° 47' 42"	69° 38' 14"	2400
24	22° 47' 33"	69° 38' 24"	3300
29	22° 46' 50"	69° 39' 57"	600
30	22° 46' 23"	69° 39' 45"	800
31	22° 48' 8"	69° 38' 14"	1300
32	22° 45' 25"	69° 39' 18"	1700
33	22° 45' 49"	69° 38' 41"	2300
34	22° 45' 8"	69° 39' 53"	1600
38	22° 46' 30"	69° 40' 11"	1200
39	22° 46' 57"	69° 37' 27"	2100
40	22° 46' 59"	69° 37' 20"	1400
41	22° 46' 60"	69° 37' 45"	1700
46	22° 48' 10"	69° 37' 16"	800
47	22° 48' 8"	69° 38' 19"	300
51	22° 45' 24"	69° 39' 40"	2900
52	22° 45' 22"	69° 40' 6"	2800
53	22° 45' 48"	69° 38' 11"	1900
54	22° 46' 39"	69° 40' 44"	4400
55	22° 46' 58"	69° 40' 15"	700
56	22° 46' 28"	69° 38' 46"	900
57	22° 46' 5"	69° 38' 24"	700
64	22° 45' 24"	69° 39' 33"	2000
Average			1565



Table 4.8: Density of Trees in the Bocha-Navinal Creek Area

Q. Number	Latitude	Longitude	No of Tree per Ha
1	22° 46' 42"	69° 41' 3"	200
2	22° 46' 55"	69° 41' 6"	200
3	22° 46' 56"	69° 41' 16"	1000
4	22° 46' 48"	69° 41' 5"	2100
5	22° 46' 17"	69° 42' 15"	2600
16	22° 46' 28"	69° 41' 30"	1500
17	22° 46' 33"	69° 41' 24"	1200
35	22° 45' 7"	69° 42' 42"	1800
36	22° 45' 7"	69° 42' 19"	1500
37	22° 45' 4"	69° 42' 30"	1500
43	22° 45' 21"	69° 41' 51"	1800
44	22° 45' 59"	69° 42' 18"	1100
45	22° 45' 1"	69° 42' 50"	1200
48	22° 45' 6"	69° 42' 25"	900
49	22° 45' 16"	69° 42' 31"	700
62	22° 45' 52"	69° 43' 25"	800
Average			1256

Table 4.9: Density of Trees in the Khari Creek Area

Q. Number	Latitude	Longitude	No of Tree per Ha
25	22° 47' 43"	69° 43' 54"	1800
26	22° 47' 28"	69° 43' 55"	3500
27	22° 47' 23"	69° 43' 52"	1700
28	22° 47' 22"	69° 43' 60"	1200
50	22° 46' 15"	69° 43' 52"	1800
59	22° 46' 42"	69° 44' 1"	1600
60	22° 46' 14"	69° 44' 1"	2200
61	22° 46' 13"	69° 43' 60"	2500
63	22° 47' 31"	69° 44' 40"	1200
Average			1944



4.3.3. Regeneration and Recruitment Class of Mangroves

The average density of the regeneration class of mangroves in the sampling site (saplings with a height of <50 cm) was recorded at 62,727 plants/ha (Ranging from 22,500 to 96,250 plants/ha) and for recruitment class mangrove, the overall average was recorded as 10,455 plants/ha (Ranging from 8,125 to 14,167 plants/ha) during the study. The highest regeneration class (96,250 plants/ha) was recorded in Bocha/Navinal and is followed by Kotadi creeks (78,889 plants/ha) and this creek system also supports highest density of recruitment class (14,167 plants/ ha) in the entire study area. Although, the density of trees is comparatively less in this area, it is favourable for the dispersal of seeds and germination for younger classes. This can further be representing that ecosystem is favourable for younger class mangrove formation. The lowest regeneration (22,500 plants/ ha) and recruitment (8,125 plants/ha) class was recorded in the Khari creek area; however, the mature tree density was highest in this area (1944 trees/ha. The ratio of recruitments to tree is 1:7 and regeneration to recruitment is 42:7 in the study area. The density of mature trees and younger classes (recruitment and regeneration) in the APSEZ showed that this area supports healthy mangrove ecosystem and that the mangrove area as well as the density will increase significantly in the near future.

Table 4.10: Density of Younger Classes in the Kotadi Area (Plant/Ha)

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
1	12	22° 47' 16"	69° 32' 51"	10000	0
2	13	22° 47' 27"	69° 32' 48"	40000	10000
3	14	22° 47' 48"	69° 33' 39"	350000	10000
4	15	22° 47' 54"	69° 33' 51"	60000	15000
5	18	22° 48' 5"	69° 34' 11"	90000	17500
6	42	22° 47' 16"	69° 35' 38"	100000	32500
7	58	22° 47' 50"	69° 32' 56"	30000	10000
8	65	22° 46' 25"	69° 36' 32"	30000	15000
9	66	22° 46' 49"	69° 36' 5"	0	17500
Average				78,889	14167



Table 4.11: Density of Younger Classes in the Baradi mata Area (Plant/Ha)

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
1	6	22° 45' 53"	69° 39' 56"	170000	7500
2	7	22° 46' 45"	69° 40' 54"	30000	10000
3	8	22° 46' 39"	69° 40' 30"	60000	20000
4	9	22° 46' 53"	69° 40' 2"	140000	10000
5	10	22° 46' 43"	69° 39' 45"	80000	0
6	11	22° 46' 40"	69° 40' 20"	40000	5000
7	19	22° 45' 9"	69° 39' 55"	0	7500
8	21	22° 47' 10"	69° 38' 17"	60000	17500
9	29	22° 46' 50"	69° 39' 57"	30000	2500
10	30	22° 46' 23"	69° 39' 45"	90000	12500
11	31	22° 48' 8"	69° 38' 14"	30000	10000
12	39	22° 46' 57"	69° 37' 27"	30000	5000
13	40	22° 46' 59"	69° 37' 20"	50000	7500
14	41	22° 46' 60"	69° 37' 45"	20000	7500
15	46	22° 48' 10"	69° 37' 16"	30000	20000
16	47	22° 48' 8"	69° 38' 19"	40000	37500
17	52	22° 45' 22"	69° 40' 6"	10000	0
18	53	22° 45' 48"	69° 38' 11"	20000	7500
19	54	22° 46' 39"	69° 40' 44"	10000	0
20	55	22° 46' 58"	69° 40' 15"	40000	5000
21	56	22° 46' 28"	69° 38' 46"	60000	7500
22	57	22° 46' 5"	69° 38' 24"	100000	10000
23	64	22° 45' 24"	69° 39' 33"	50000	7500
Average				49,583	9,063

Table 4.12: Density of Younger Classes in the Bocha-Navinal Area (Plant/Ha)

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
1	1	22° 46' 42"	69° 41' 3"	10000	5000
2	2	22° 46' 55"	69° 41' 6"	20000	7500
3	3	22° 46' 56"	69° 41' 16"	110000	10000
4	4	22° 46' 48"	69° 41' 5"	140000	12500
5	5	22° 46' 17"	69° 42' 15"	260000	5000
6	16	22° 46' 28"	69° 41' 30"	140000	10000
7	17	22° 46' 33"	69° 41' 24"	50000	17500
8	43	22° 45' 21"	69° 41' 51"	40000	15000
				96,250	10,313



Table 4.13: Density of Younger Class in Khari creek

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
9	50	22° 46' 15"	69° 43' 52"	20000	2500
10	59	22° 46' 42"	69° 44' 1"	20000	10000
11	60	22° 46' 14"	69° 44' 1"	20000	0
12	61	22° 46' 13"	69° 43' 60"	30000	20000
Average				22,500	8,125



Figure 4.20 : Diversity of Mangrove Species in APSEZ Area, Mundra



5. CONCLUSION

5.1. Shoreline and Mangrove Cover Changes

The distribution of mangroves in the creeks in and around APSEZ was analysed using satellite images from March 2019 and March 2021. The major findings are:

- ✓ The mangrove cover in the study area has increased by 52.79 ha from 2019 to 2021, indicating that the mangrove ecosystem and the tidal regime were not adversely affected during this period.
- ✓ The tide levels in the creeks were observed to be normal and adequate for the growth of mangroves.
- ✓ The dense mangrove cover has showed an increase in Kotadi creek, Khari Creek and Baradi mata creeks while it was not much changed in Bocha/Navinal creek system.
- ✓ Further Kotadi creek showed highest increase of sparse mangrove area (39.71ha) while Baradi mata creeks (14.10ha) and Bocha/Navinal creek system (6.89ha) showed an increase in scattered mangrove areas.
- ✓ Nevertheless, overall, an increase in all three categories of mangroves in the study area between 2019 and 2021, indicating a healthy status of mangroves.
- ✓ The study measured the density of mature trees, recruitments (young trees), and regeneration (seedlings) in different locations. Mangrove tree density is influenced by many factors like salinity, tidal inundation, fresh water flow, sediment characterises, etc. The ratio between mature tree density and recruitment class among all the stands (1:7) indicating good entrance of recruitment classes into mature tree category. A conducive physical milieu with favourable tidal range and less anthropogenic pressure seems to favour the present mangrove strands in a healthy state.
- ✓ The conservation and management and recommendation plan are indicated below:



5.2. Recommendations

- ❖ The mangrove cover in the APSEZ area was found in healthy condition with dense, sparse and scattered mangroves, which has overall increase of 52.79 ha between 2019 and 2021, indicating that the mangrove ecosystem and the tidal regime were not adversely affected during this period. Therefore, future attempt should be restoration of sparse and scattered mangrove areas and convert it into dense patches. This could be restored to dense formation through physical amendment measures *viz.*, canal digging, removing blockage in natural canal systems, and by other physical means.
- ❖ The Mundra coastal scenario supports *A. marina* which is predominant, due to lack of continuous fresh water source which is atypical in this part. Nevertheless, presence of other mangrove species though sporadically recorded, *viz.*, *R. mucronate* and *C. tagal*, which gives a confidence for plantation in the sparse and scattered mangrove areas following zonation techniques. Plantation of these species is expected to create a seed bank in due course of time which would eventually convert single species stand of *A. marina* into multi species formation which in turn enhance the marine biodiversity of the area.
- ❖ Kotadi creek area has highest recruitment class mangroves while highest regeneration class was recorded from Bocha/Navinal creeks. Promoting natural regeneration where the mangrove stand has got the capacity to self-renewal will ensure sustained well-being on the stand and its succession. Natural regeneration capacity of the stand is based on the extent of entrance of younger classes such as saplings into mature tree category. The observation that natural seedling recruitment is occurring normally will indicate that the system is functioning normally. The present study shows that natural regeneration in the studied mangrove formations is normal as indicated by the entrance of younger classes into adult categories. Continued observation of this natural succession in regular mangrove monitoring studies is necessary to assess and ascertain that the natural procession of succession is maintained.



- ❖ Plantation of suitable saline tolerant plant species (shrubs and trees) also helps in controlling the soil erosion along the coastal area.
- ❖ The establishment of facilities and the expansion of infrastructure over the coming years will bring about notable changes in the landscape and seascape in and around the Adani Ports and Special Economic Zone Ltd (APSEZL). Long-term human-centred/induced activity of this magnitude in any coastal belt will have repercussions on its natural resources and ecosystems. As mangroves, mudflats and tidal creeks are the major ecological entities within the Adani Ports and Special Economic Zone Ltd (APSEZL), their conservation and management warrants priority and calls for a holistic approach. Thus, measures should be taken to conserve and preserve the mudflats and mangroves within the Adani Ports and Special Economic Zone Ltd (APSEZL) to retain their tangible and intangible ecological benefits. The conservation and management plan presented in the proceeding section has the following broad aspects and different activities under each aspect are dealt with.
- ❖ The creation of baseline information to track subsequent changes in natural shoreline formation within the Adani Ports and Special Economic Zone Ltd (APSEZL) observations through GIS and RS tools have to be adopted. The GIS maps may be utilized for the purpose and could serve as a base map. Changes in creek systems, shoreline configuration and other land use categories could be monitored through this exercise once in three years.
- ❖ Periodical monitoring, preferably once in 2 years, and comparison of results with baseline data to underline changes will pave way for the formulation of mitigation and conservation efforts.
- ❖ Mudflats and mangrove conservation and restoration measures could subsequently be undertaken based on the results of the monitoring programs.
- ❖ Research needs to be undertaken to assess the economic and ecological benefits of sustainable development of shoreline configuration.



- ❖ Awareness should be generated among local people about the shoreline configuration changes in the surrounding areas and the consequences, particularly to the fishermen community.



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ANNEXURE – 3

MAIL COMMUNICATION WITH NCSCM

Chiragsing Rajput

From: Chiragsing Rajput
Sent: Thursday, March 28, 2024 4:10 PM
To: edcprojects@ncscm.org; Purvaja Ramachandran
Cc: Ashvin Kumar Patni; Dhanesh Tank; Bhagwat Swaroop Sharma; Piyush Bhanji Sanghani; Robin Rs; Deepak S; Radheshyam Singh; Anil Trivedi
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

From: Chiragsing Rajput <Chiragsing.Rajput@adani.com>
Sent: Thursday, March 21, 2024 9:06 AM
To: edcprojects@ncscm.org; Purvaja Ramachandran <purvaja@ncscm.res.in>
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>; Anshul Sanduja <Anshul.Sanduja@adani.com>
Subject: Re: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

Get [Outlook for Android](#)

From: Chiragsing Rajput <Chiragsing.Rajput@adani.com>
Sent: Friday, March 15, 2024 12:34:08 PM

To: edcprojects@ncscm.org <edcprojects@ncscm.org>; Purvaja Ramachandran <purvaja@ncscm.res.in>
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

-----Original Message-----

From: Chiragsing Rajput

Sent: Monday, March 4, 2024 4:41 PM

To: edcprojects@ncscm.org; Purvaja Ramachandran <purvaja@ncscm.res.in>

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>

Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

Environment Cell | Adani Ports & Special Economic Zone Ltd.

Mob +91 9687678443 | Ext. 59523 | chiragsing.rajput@adani.com | www.adani.com Adani Corporate House, 3rd Floor, North Wing, Shantigram, Ahmedabad - 382421, Gujarat, India.

-----Original Message-----

From: Chiragsing Rajput

Sent: Wednesday, February 28, 2024 10:39 AM

To: edcprojects@ncscm.org

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>

Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Regards
Chiragsing Rajput

-----Original Message-----

From: Chiragsing Rajput

Sent: Tuesday, February 20, 2024 11:00 AM

To: edcprojects@ncscm.org

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Charanjit Singh <Charanjit.Singh@adani.com>

Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Regards
Chiragsing Rajput

-----Original Message-----

From: Chiragsing Rajput

Sent: Monday, February 12, 2024 5:19 PM

To: edcprojects@ncscm.org

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>

Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Regards
Chiragsing Rajput

-----Original Message-----

From: Chiragsing Rajput

Sent: Monday, February 5, 2024 12:26 PM

To: edcprojects@ncscm.org

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>

Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

Please find attached RFQ for conducting Monitoring of Mangrove Distribution in creeks in and around Adani Ports and Special Economic Zone Limited (APSEZ), Mundra site between 2021 to 2023.

So kindly provide us your best Techno-commercial proposal for the same at earliest.

Thanks & Regards,

Chiragsing Rajput

Environment Cell | Adani Ports & Special Economic Zone Ltd.

Mob +91 9687678443 | Ext. 59523 | chiragsing.rajput@adani.com | www.adani.com Adani Corporate House, 3rd Floor, North Wing, Shantigram, Ahmedabad - 382421, Gujarat, India.

-----Original Message-----

From: Radheshyam Singh <Radheshyam.Singh@adani.com>

Sent: Wednesday, December 20, 2023 7:03 PM

To: edcprojects@ncscm.org; purvaja@ncscm.res.in; mahapatra.sac@gmail.com

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Chiragsing Rajput <Chiragsing.Rajput@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>

Subject: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir/Madam,

Please provide us Techno-commercial proposal for conducting Monitoring of Mangrove Distribution in creeks in and around Adani Ports and Special Economic Zone Limited (APSEZ), Mundra site for the duration of Mar-2021 to Mar-2023.

ANNEXURE - 4

CSR HEALTH IMPACT ASSESSMENT

CSR Impact Assessment Report

Prepared For



Adani Ports & SEZ Ltd

Prepared By



SOULACE CONSULTING PVT LTD

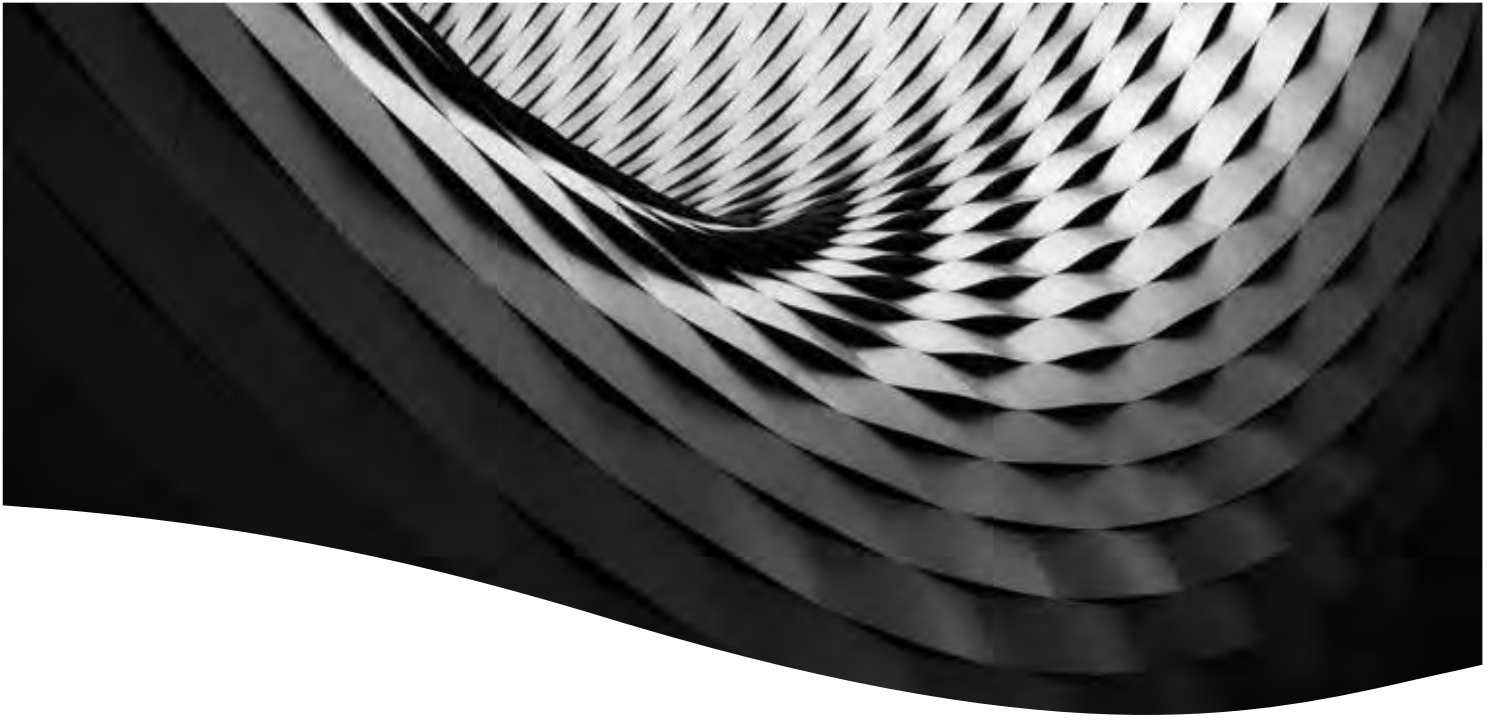
ISO 27001:2013 Certified

DELHI NCR | MUMBAI | KOLKATA

Website: www.soulace.in; Email: enquiry@soulace.in

ANNEXURE - 5

ASSESSMENT OF WATER CONSERVATION PROGRAMS



Outcome Assessment of Water Conservation Programs

Report

2nd November 2022

Adani Ports and Special Economic Zone (APSEZ)



Thinkthrough Consulting

ANNEXURE - 6

PHOTOGRAPHS OF GARLAND DRAIN AND DUMP POND

PHOTOGRAPHS OF CLEANING OF GARLAND DRAINS



PHOTOGRAPHS OF CLEANING OF COMMON SUMP



ANNEXURE - 7

PHOTOGRAPHS OF SPILL PLANT AND SIDE WALL AT GSU

PHOTOGRAPHS OF HYDRAULIC OPERATED SPILL PLATE WITH SIDE WALL
TO PREVENT COAL SPILL



Side Wall



Spill Plate

ANNEXURE - 8

PHOTOGRAPHS OF FILTERS AT JETTY OUTLET

FILTERS AT JETTY OUTLET



Filters at Jetty
Outlet



ANNEXURE - 9

PHOTOGRAPHS OF HOUSEKEEPING AWARENESS

Photographs of Awareness Training Programme for Proper House Keeping



ANNEXURE – 10

PHOTOGRAPHS OF WIND SCREEN AND ONGOING REFURBISHING WORK

Photographs of Installed Wind Screen and Ongoing Refurbishing work



Installed Wind Screen



Ongoing Refurbishing work of Wind Screen

Annexure – 8

CONTRACT OF INSURANCE

INSURED NAME: Mundra LPG Terminal Private Limited



INSURER: IFFCO TOKIO General Insurance Company Limited

Policy Type - Public Liability - Act

Policy Period - (01/04/2024 to 31/03/2025)

Servicing Branch : AHMEDABAD
Policy Issuing Office : IFFCO TOKIO GEN INSU. CO. LTD. Ground Floor, IFFCO Bhavan Bh Maruti Arcade, Shivranjani Cross Rd, Satellite AHMEDABAD , GUJARAT - 380015 , GSTIN - 24AAACI7573H1ZI
Issuing Office GSTIN : 24AAACI7573H1ZI
Corporate Office : IFFCO TOKIO GEN INSU. CO. LTD.4th - 5th Floor, IFFCO TowersPlot No 3, Sector 29, GURGAON (HARYANA) - 122001
Policy No : 41088956
Unique Invoice No : 41088956
Invoice Date : 15/04/2024
SAC : 997139
Intermediary Details : ACE INSURANCE BROKERS PVT LTD

POLICY SCHEDULE CUM TAX INVOICE

Insured	Mundra LPG Terminal Private Limited																												
GSTIN	24ANCA7329N1Z6																												
Address	Adani Corporate House,																												
	Shantigram Nr. Vaishno Devi																												
	Circle, S G																												
	Highway, Ahmedabad,																												
	Gandhinagar (na)																												
	Pin Code	382421																											
Place of Supply	GUJARAT																												
CKYC Number	NA																												
Contact No	*****145																												
Email	AB*@GMAIL.COM																												
Business Description	Port Operations																												
Policy Period	01/04/2024- 31/03/2025																												
Co Insurance Details	NA																												
Limit of Liability	Cover																												
	50,000,000 per occurrence and 150,000,000 in the aggregate																												
Deductible	NA																												
Territorial Limits	INDIA																												
Jurisdiction	INDIA																												
Turnover Details	INR 1,510,000,000																												
Policy Type	Occurrence Based																												
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GST Related Declarations	Whether GST is Payable on Reverse Charge Basis- No																												
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Other Terms and Conditions	All Other terms & conditions as per Policy Wordings attached.																												

Disclaimer:

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Toll Free: 1-800-103-5499; SMS "claim" to 56161
SAC Code: 9971
Regd. Office: IFFCO SADAN, C1 Distt Centre, Saket, New Delhi -110017
Corporate Identification Number (CIN) U74899DL2000PLC107621, IRDA Reg. No. 106
Consolidated Stamp Duty Deposited as per the order of Government of National Capital Territory of Delhi

For IFFCO-Tokio General Insurance Company Limited



Authorised Signatory

Regd. Office : IFFCO Sadan
C-1 Dist, Centre, Saket,
New Delhi-110017
CIN: U74899DL2000PLC107621

POLICY FORM
(PUBLIC LIABILITY INSURANCE – ACT ONLY POLICY)

1. OPERATIVE CLAUSE

Whereas the Insured Owner, named in the Schedule hereto and carrying on business described in the said Schedule, has applied to IFFCO-TOKIO General Insurance Co. Ltd. (hereinafter called the Company) for the indemnity hereinafter contained and has made a written proposal and declaration which shall be the basis of this contract and is deemed to be incorporated herein and has paid the premium and statutory contribution towards the Environment Relief Fund as per the provisions of the Public Liability Insurance Act and the rules framed thereunder.

NOW THIS POLICY WITNESSETH that subject to the terms, exceptions and conditions contained herein or endorsed hereon, the company will indemnify the insured owner against the statutory liability arising out of accidents occurring during the currency of the policy due to handling hazardous substances as provided for in the said act and the rules framed thereunder.

2. DEFINITIONS

- a) "Act" unless otherwise specifically mentioned shall mean the Public Liability Insurance Act, 1991.
- b) "Accident" means an accident involving a fortuitous or sudden or unintentional occurrence while handling any hazardous substance resulting in continuous, intermittent or repeated exposure to death of, or injury to any person or damage to any property but does not include an accident by reason only of war or radio-activity.
- c) "Handling" in relation to any hazardous substance, means the manufacture, processing, treatment, package, storage, transportation by vehicle, use, collection, destruction, conversion, offering for sale, transfer or the like of such hazardous substance.
- d) "Hazardous Substance" means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act, 1986, and exceeding such quantity as may be specified, by notification, by the Central Government.
- e) "Owner" means a person who owns, or has control over handling any hazardous substance at the time of accident and includes:-
 - (i) in the case of a firm, any of its partners;
 - (ii) in the case of an association, any of its members, and
 - (iii) in the case of a company, any of its directors, managers, secretaries or other officers who is directly in-charge of and is responsible to the company for the conduct of the business of the company.
- (f) "Turnover" shall mean –
 - i) Manufacturing units – Annual Gross Sales including all levies and taxes.
 - ii) Godown/warehouse owners – Annual rental receipts.
 - iii) Transport Operators – Annual freight receipts
 - iv) Others – Annual gross receipts

3. EXCLUSIONS

This Policy does not cover liability:

- (1) arising out of willful or intentional non-compliance of any Statutory Provisions.
- (2) in respect of fines, penalties, punitive and/or exemplary damages.
- (3) arising under any other legislation except in so far as is provided for in Section 8 Sub-Section (1) and (2) of the Act.
- (4) arising out of damage to property owned, leased or hired or under hire purchase or on loan to the Insured or otherwise in the Insured's control, care or custody.
- (5) directly or indirectly occasioned by, happening through or in consequence of war, invasion, act of foreign enemy, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection or military or usurped power.
- (6) directly or indirectly caused by or contributed to by
 - a) ionizing radiations or contamination by radio activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel.
 - b) the radioactive, toxic, explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof.

4. CONDITIONS

- (1) The Insured Owner shall give written notice to the Company as soon as reasonably practicable of any claim made against the Insured Owner or any specific event or circumstance that may give rise to a claim. The Insured shall immediately give to the Company copies of notice of application(s) forwarded by the Collector and all such additional information and or assistance that the Company may require.
- (2) No admission, offer, promise or payment shall be made or given by or on behalf of the Insured owner under this policy without the written consent of the Company.
- (3) The Company shall not be liable for any claims for relief made after five years from the date of occurrence of the accident.
- (4) The Insured Owner shall keep record of annual turnover, and at the time of renewal of insurance declare such turnover and all other details as may be required by the Company. The Company shall at all reasonable times have full rights to call for and examine such records.
- (5) If at the time of happening of any accident, resulting in a claim under this policy, there be any other insurance covering the same liability, then the Company shall not be liable to pay or contributes more than its ratable proportion of such liability.
- (6) This Policy may be cancelled by the Insured Owner by giving 30 days notice in writing to the Company in which event the Company will retain premium at short period scale subject to there not having occurred an accident during the policy period which may give rise to a claim(s), failing which no refund of premium shall be allowable.
- (7) This Policy may also be cancelled by the Insurer by giving 30 days notice in writing to the Insured Owner in which event the Company shall be liable to repay on demand a rateable proportion of the premium for the unexpired term from the date of cancellation.
- (8) If the Company shall disclaim liability to the Insured Owner for any claim hereunder and such claim shall not within 12 calendar months from the date of such disclaimer have been made the subject matter of a suit in a competent court of law, then the claim for all practicable purposes shall be deemed to have been abandoned and shall not thereafter be recoverable hereunder or be made the subject matter of any suit.
- (9) The Company shall not be liable to make any payment in respect of any claim if such claim shall be in any manner fraudulent or supported by any person on behalf of the Insured and/or if the insurance has been continued in consequence of any material mis-statement or non-disclosure of any material information by or on behalf of the Insured. In such a case, if the Company pays any amount to the claimant due to any statutory provisions, such amount shall be recoverable from the Insured.
- (10) The Policy and the Schedule shall be read together as one contract and any word or expression to which a specific meaning has been assigned in the Act and the Rules framed thereunder or this Policy shall bear such specific meaning.
- (11) Any dispute regarding interpretation of the terms, conditions and exceptions of this Policy shall be determined in accordance with the law and practice of a court of competent jurisdiction within India.

GRIEVANCE OR COMPLAINT

In case of any grievance, **We** can be contacted at:

Website: <https://www.iffcotokio.co.in/customer-services/grievance-redressal>
Toll free: 1800-103-5499
E-mail: support@iffcotokio.co.in
Courier: Chief Grievance Officer
IFFCO-Tokio General Insurance Co Ltd
IFFCO Tower, Plot no. 3
Sector -29, Gurgaon – 122001

For updated details of grievance officer, kindly refer the link
<https://www.iffcotokio.co.in/customer-services/grievance-redressal>.

Grievance may also be lodged at IRDAI Integrated Grievance Management System
- <https://bimabharosa.irdai.gov.in/>

CONTRACT OF INSURANCE

INSURED NAME: ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED



INSURER: IFFCO TOKIO General Insurance Company Limited

Policy Type - Public Liability - Act

Policy Period - (01/04/2024 to 31/03/2025)

Servicing Branch : AHMEDABAD
Policy Issuing Office : IFFCO TOKIO GEN INSU. CO. LTD. Ground Floor, IFFCO Bhavan Bh Maruti Arcade, Shivranjani Cross Rd, Satellite AHMEDABAD , GUJARAT - 380015 , GSTIN - 24AAACI7573H1ZI
Issuing Office GSTIN : 24AAACI7573H1ZI
Corporate Office : IFFCO TOKIO GEN INSU. CO. LTD.4th - 5th Floor, IFFCO TowersPlot No 3, Sector 29, GURGAON (HARYANA) - 122001
Policy No : 41088954
Unique Invoice No : 41088954
Invoice Date : 15/04/2024
SAC : 997139
Intermediary Details : ACE INSURANCE BROKERS PVT LTD

POLICY SCHEDULE CUM TAX INVOICE

Insured	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED																												
GSTIN	24AAACG7917K1ZH																												
Address	Adani Corporate House,																												
	4th Floor, North Block,																												
	Gujarat, 370421 - India																												
	Khodiyar																												
	India																												
	Pin Code	382421																											
Place of Supply	GUJARAT																												
CKYC Number	NA																												
Contact No	*****090																												
Email	te*****@iffcotokio.co.in																												
Business Description	Port operation, cargo handling, stevedoring																												
Policy Period	01/04/2024- 31/03/2025																												
Co Insurance Details	NA																												
Limit of Liability	Cover																												
	50,000,000 per occurrence and 150,000,000 in the aggregate																												
Deductible	NA																												
Territorial Limits	INDIA																												
Jurisdiction	INDIA																												
Turnover Details	INR 64,080,000,000																												
Policy Type	Occurrence Based																												
Premium	<table border="0"> <tr> <td>Premium Excluding Taxes:</td> <td>INR</td> <td>9,697.00</td> </tr> <tr> <td>CESS (0%):</td> <td>INR</td> <td>0.00</td> </tr> <tr> <td colspan="3">GST</td> </tr> <tr> <td>- SGST (9%):</td> <td>INR</td> <td>872.73</td> </tr> <tr> <td>- UGST (0%):</td> <td>INR</td> <td>0.00</td> </tr> <tr> <td>- CGST (9%):</td> <td>INR</td> <td>872.73</td> </tr> <tr> <td>- IGST (0%):</td> <td>INR</td> <td>0.00</td> </tr> <tr> <td>ERF Amount:</td> <td>INR</td> <td>9,697.00</td> </tr> <tr> <td>Total Premium / Invoice Value :</td> <td>INR</td> <td>21,139.00</td> </tr> </table>		Premium Excluding Taxes:	INR	9,697.00	CESS (0%):	INR	0.00	GST			- SGST (9%):	INR	872.73	- UGST (0%):	INR	0.00	- CGST (9%):	INR	872.73	- IGST (0%):	INR	0.00	ERF Amount:	INR	9,697.00	Total Premium / Invoice Value :	INR	21,139.00
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Toll Free: 1-800-103-5499; SMS "claim" to 56161
SAC Code: 9971
Regd. Office: IFFCO SADAN, C1 Distt Centre, Saket, New Delhi -110017
Corporate Identification Number (CIN) U74899DL2000PLC107621, IRDA Reg. No. 106
Consolidated Stamp Duty Deposited as per the order of Government of National Capital Territory of Delhi

For IFFCO-Tokio General Insurance Company Limited



Authorised Signatory

Regd. Office : IFFCO Sadan
C-1 Dist, Centre, Saket,
New Delhi-110017
CIN: U74899DL2000PLC107621

POLICY FORM
(PUBLIC LIABILITY INSURANCE – ACT ONLY POLICY)

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NOW THIS POLICY WITNESSETH that subject to the terms, exceptions and conditions contained herein or endorsed hereon, the company will indemnify the insured owner against the statutory liability arising out of accidents occurring during the currency of the policy due to handling hazardous substances as provided for in the said act and the rules framed thereunder.

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- d) "Hazardous Substance" means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act, 1986, and exceeding such quantity as may be specified, by notification, by the Central Government.
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 - (i) in the case of a firm, any of its partners;
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- (8) If the Company shall disclaim liability to the Insured Owner for any claim hereunder and such claim shall not within 12 calendar months from the date of such disclaimer have been made the subject matter of a suit in a competent court of law, then the claim for all practicable purposes shall be deemed to have been abandoned and shall not thereafter be recoverable hereunder or be made the subject matter of any suit.
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GRIEVANCE OR COMPLAINT

In case of any grievance, **We** can be contacted at:

Website: <https://www.iffcotokio.co.in/customer-services/grievance-redressal>
Toll free: 1800-103-5499
E-mail: support@iffcotokio.co.in
Courier: Chief Grievance Officer
IFFCO-Tokio General Insurance Co Ltd
IFFCO Tower, Plot no. 3
Sector -29, Gurgaon – 122001

For updated details of grievance officer, kindly refer the link
<https://www.iffcotokio.co.in/customer-services/grievance-redressal>.

Grievance may also be lodged at IRDAI Integrated Grievance Management System
- <https://bimabharosa.irdai.gov.in/>

Annexure – 9

Compliance Report of EMP & Mitigation Measures

Sr. No.	Suggested Measures	Compliance Status
✎ Construction Phase:		
1	Proper care is warranted while dredging which should be in a controlled manner. It should also be insured that reclamation, dredging, widening and slop stabilization measures do not significantly alter the stabilized erosional-accretional regime and prevailing rate of exchange of water between the outer area of the intricate creek system as well as the free flow of tidal water, to protect the mangroves.	<p>All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals.</p> <p>Please refer condition no. 8 & 9 of the CRZ recommendation compliance report for further details.</p>
2	Good sanitation, water and fuel should be made available to the work force. Labour colonies should be set-up landward of the HTL and away from mangrove.	<p>Most of the construction labours resides in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. are provided by APSEZ. Details were submitted as a part of compliance report submission for the period Apr'17 to Sep'17.</p> <p>Please refer general condition no. ii of the EC & CRZ clearance for further details.</p>
✎ Operation Phase:		
1	Wastewater such as generated during cleaning of jetties, floor washing, domestic use etc. should be collected in a settling pond and released to marine environment only after ascertaining that it is free from oil and SS. The toilets on the jetties must have compact sewage treatment facilities.	<p>Entire quantity of sewage generated from APSEZ premises is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.</p> <p>Please refer specific condition no. xii of the EC & CRZ clearance or further details.</p>
2	Dust should be routinely monitored at the vantage points and corrective measures such as water sprinkling should be practiced if it increases beyond permissible limits.	<p>Ambient Air Quality (twice in a week) monitoring is being carried out by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi.</p> <p>Adequate safeguard measures are being taken for abatement of dust emissions.</p>

Sr. No.	Suggested Measures	Compliance Status
		Please refer specific condition no. xi of the EC & CRZ clearance or further details.
3	It should be ensured that the effluent released into the Gulf meets the prescribed GPCB criteria at all times.	Entire quantity of effluent / sewage generated from APSEZ premises is being treated in designated ETP / STP and treated water is being utilized on land for Horticulture purposes after compliance with GPCB standards. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
4	Appropriate spill response scheme (Tier-1 to Tier-3) should be in place to minimize impacts on marine environment, should a spill occur.	Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan updated on 31.07.2022 is in place and implemented. Updated Oil spill contingency response plan was submitted in the last compliance period Apr'22 to Sep'22.
5	MPSEZL should commit mangrove restoration programme through afforestation in a defined time frame over larger and promising areas and should monitored periodically and protect from anthropogenic pressures.	APSEZ has carried out mangrove afforestation in 3890 ha. area across the coast of Gujarat. Please refer specific condition no. i & vii of the EC & CRZ clearance or further details.
6	A comprehensive marine quality monitoring programme with periodic investigations at predetermined locations should be undertaken by a specialized agency.	Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Please refer specific condition no. ix of the EC & CRZ clearance or further details.
7	The dust and noise levels at pre-decided locations including the jetty sites should be periodically monitored and remedial action taken if the levels exceed the prescribed norms.	Ambient Air Quality (twice in a week) and Noise (once in a month) monitoring are being carried out by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Please refer specific condition no. xi of the EC & CRZ clearance or further details.
8	MPSEZL should establish an Environment Management Cell	M/s APSEZL has a well-structured Environment Management Cell, staffed

Sr. No.	Suggested Measures	Compliance Status
	(EMC) directly under the control of the Chief Executive.	with qualified manpower for implementation of the Environment Management Plan at site. Site team report to Sr. Manager (Environment) at Corporate, who heads the Environment Management Cell who directly reports to the top management. Environment Management Cell Organogram were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21. And there is no further change.

Annexure – 10

NATIONAL POLLUTION RESPONSE EXERCISE NATPOLREX (IX)

REPORT

Venue: Off Vadinar

Date: 25th Nov 2023

Exercise conducted by: Indian Coast guard

Resource agencies and stake holders involved:

1. M/S Adani Port & SEZ, Mundra
2. Indian Oil Corporation LTD, Jamnagar
3. M/S Nayara Energy LTD VOTL, Vadinar
4. M/S Reliance Industries LTD, Sikka Jamnagar
5. M/S Essar Bulk Terminal, Salaya

Attendees:

1. Capt. Hemant Dhruv
2. Capt. Peeyush Suwalka
3. Dol 11 Crew with Master
4. Mr. Yogesh Nandaniya
5. Mr. MP Choudhary with his team
6. HMEL Team
7. SRS Team
8. Sea Care Team

Statement of facts

0650 hrs.: Tug Victor left SPM & started proceeding to Vadinar for exercise.

0700 hrs.: Tug Dol 11 with crew and attendees left for Vadinar for NATPOLREX exercise from Ro-Ro pontoon.

0810 hrs.: Tug Dol 11 informed Vadinar Port Control that Tug Dol 11 & Victor will be entering Vadinar port limit for NATPOLREX exercise.

0845 hrs.: Briefing of drill carried out.



0855 hrs.: Informed ICG Commander Mishra on phone that Tug Dol 11 arrived at specified location 22 31.00 N 069 39.00 E. Commander Mishra advised to keep watch on VHF CH 71 for further communication with ICG vessel (Call sign: Coastguard Sajag)

0945 hrs.: Tug Dol 11 communicated with Coastguard Sajag for launching boom to demonstrate 'J' shape boom configuration. Coastguard Sajag advised to commence launching boom.

0948 hrs.: Commence lowering boom.

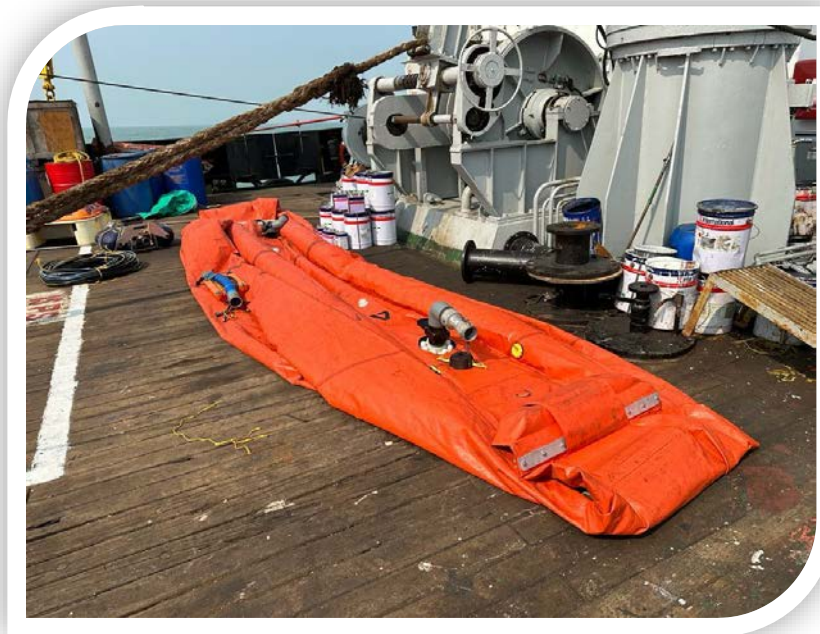


1015 hrs.: Completed lowering boom (5 section 250 m in length)

1035 hrs.: J-formation of boom completed. Same informed to Coastguard Sajag. Sajag advised maintaining position with 'J' shape boom configuration.



1045 hrs.: Skimmer deployed in water. The floating storage tank was kept ready on Dol 11 deck. The Overside OSD spray was pressurized and demonstrated with water only.



1150 hrs.: The whole operation observed by Coastguard Samarth & Sajag and appreciated the quick and professional response from Dol-11. The Coast guard advised to start securing gears & break off from position.



1152 hrs.: Secured all deployed equipment and started recovering boom.

1236 hrs.: Completed recovering boom and vessel started proceeding to Mundra. Same informed to Vadinar port control and Coast guard vessel Sajag.

1245 hrs.: Debriefing of drill carried out.



1430 hrs.: Dol 11 arrived Mundra port. Tug Victor arrived at IOCL SPM.

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

ANNEXURES

ANNEXURE 1		INITIAL OIL SPILL REPORT	
Particulars of person, office reporting	Capt. Sachin Srivastava- HOD Marine Capt. Girish Chandra - HOS marine, APSEZ		
Tel No.	+91 6359883102		
Date & time of incident	19.01.2024 / 0900 hrs.		
Spill location	IOCL SPM		
Likely cause of spill	Hose rupture	Witness – Tug Dol 11	
Initial response action	Initiated OSCRP		
Any other information	NO		
Identity of informant	Tug Dol 11		
Time of FIR	0900 hrs.		
Source of spill	IOCL SPM		
Cause of spill	Floating Hose rupture		
Type of spill	Crude Oil		
Color code information (from CG)	Sheen		
Radius of slick	30-40 m		
Tail	15 m		
Volume	175 cubic meter approx.		
Quantity	150 tones		
Weather	N'Ely x 5-6 knots.		
Tide / current	Ebbing / 0.8 to 1.2 knots.		
Density	0.2 to 0.86 kg/m ³ approx.		
Layer thickness	0.02 mm approx.		
Air / Sea temp.	22 deg C /27 deg C		
Predicted slick movement	S'Wly		
Size of spill classification (Tier 1, 2 or 3)	Tier 1		

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

ANNEXURE 2

POLREP

In case of an oil spill, APSEZ will provide information to Commandant Coast Guard District 1 Porbandar COMDIS 1 and Coast Guard Station Vadinar CGS Vadinar in the following format:

SN.	Parameter	Data
1.	Identity of the informant	Tug Dol 11
2.	Time of information receipt	0900 hrs.
3.	Source of Spill	IOCL SPM
4.	Cause of Spill	Floating Hose rupture
5.	Type of oil	Crude Oil
6.	Colour code information	Sheen
7.	Configuration	-
8.	Radius	30-40 m
9.	Tail	15 m
10.	Volume	175 cubic meter approx.
11.	Quantity	150 tones
12.	Weathered or Fresh	Fresh
13.	Density	0.2 to 0.86 kg/m ³ approx.
14.	Viscosity	53.36 CST@25 deg centigrade
15.	Wind	N'Ely x 5-6 knots.
16.	Wave Height	0.1 to 0.2 m
17.	Current	0.8 to 1.2 knots.
18.	Layer Thickness	0.2 to 0.4 mm approx.
19.	Ambient air temperature	22 deg C
20.	Ambient sea temperature	27 deg C
21.	Predicted slick movement	S'Wly
22.	Confirm Classification of spill size	Tier 1

Drill Log Sheet

Page Number: 1 of 1	Date: 19 -01-2024
Name: Vikram Pratap Singh	Position: Radio Officer
Contact Number: 9825228673	Signature:

Activity Timeline:

- 0900 hrs.: Tug Victor reported oil spill at IOCL SPM to Tug Dol 11.
- 0901 hrs.: Tug Dol 11 immediately reported to Marine Control and Diving Supervisor.
- 0901 hrs.: Marine Control informed all concerned departments including IOCL.
- 0902 hrs.: Tug Dol 11 proceeded to IOCL SPM.
- 0905 hrs.: Tug Dol 11 reached IOCL SPM and all SPM valves closed by diving team.
- 0906 hrs.: IOCL SPM team observed oil spillage from floating hose of IOCL SPM.
- 0906 hrs.: Tug Dol 11 commenced boom deployment and same time informed to control.
- 0907 hrs.: Tug Dol 11 requested Marine Control for Barge BB-10 for storage of recovered oil.
- 0907 hrs.: Marine Control deployed Barge BB-10 along with Tug Dol 2 to IOCL SPM.
- 0908 hrs.: Barge BB-10 underway with Tug Dol 2.
- 0910 hrs.: Marine Control informed to all vessels at anchor regarding oil spill near IOCL SPM area. The control room requested all underway vessels to pass 5 miles from IOCL SPM. Unberthing operations suspended.
- 0910 hrs.: Capt. Girish Chandra informed Commandant Konark Sharma ICGS Mundra about the incident through phone.
- 0912 hrs.: Tug Dol 11 requested to keep one tug stand by with additional boom at short notice.
- 0914 hrs.: Marine Control informed Tug Dol 10 & 15 to standby with OSD.
- 0915 hrs.: Informed commercial team (Mr. Jagdish Rabadia) and environment cell (Mr. Radhe Shyam Singh) by Mr. Sudhakar Singh.
- 0921 hrs.: Tug Dol 11 reported 150m boom deployed and continued to deploy remaining 100 meters.

0925 hrs.: Marine Control informed jetty team to be stand by with crew for mooring the Barge BB-10 at B-12 berth. Jetty supervisor also informed to deploy one hydra for loading/unloading of OSR equipment at SPM Store and jetty.

0932 hrs.: Dol 11 informed that spill is spread in an area of around 30-40 m².

0933 hrs.: Tug Dol 11 reported 250 m boom deployment completed and commenced J-formation.

0931 hrs.: Mr. Mahendra Singh Solanki from Corporate affairs informed DM Bhuj office about the incident.

0936 hrs.: Mr. Sudhakar Singh informed HMEL team Mr. Ashok Tiwari about the incident through phone.

0936 hrs.: Initial intimation mail sent to GMB/MMD Kandla/Coast Guard Station/MRCC.

0940 hrs.: Patrolling boat Dol 19 reported underway with Capt. Girish Chandra and proceeding to IOCL SPM.

0944 hrs.: Tug Dol 11 reported J-formation completed, and oil containment is in progress and commenced skimmer deployment.

0949 hrs.: Barge BB-10 arrived at IOCL SPM with Tug Dol 2.

0950 hrs.: Skimmer lowered and commenced recovering of spilled oil to floating tank.

0950 hrs. Liquid team informed commercial department for 6 no. tanker/bowser for transportation of recovered oil from jetty to OWS unit. The team also informed to keep motor pump and other equipment stand by at berth B-12.

0956 hrs.: Barge BB-10 secured P/S of Tug Dol 11 and commenced transferring of oil in barge BB-10.

0959 hrs.: Tug Dol 11 reported approx. 10 T of recovered oil loaded in barge BB-10.

1000 hrs.: HMEL informed readiness for assisting to IOCL team for same.

1003 hrs.: Marine Control informed Tug Dol 17 with second set of booms to proceed for IOCL SPM.

1010 hrs.: Tug Dol 17 underway with second set of booms.

1020 hrs.: Liquid team informed Marine Control that motor pump and other equipment is standby at berth B-12.

1025 hrs.: Liquid team informed Marine Control that 6 no. of Tanker/bowser arrived and standby at berth B-12.

1046 hrs.: Joint Inspection team (ICG and OISD) boarded on Tug Dol 11.

1100 hrs.: Recovery of spilled oil completed (150 T).
1100 hrs.: Drill called off and same time informed all concern.
1101 hrs.: BB-10 cast off and proceed to B-12 berth for transfer of oil for disposal.
1102 hrs.: Boom recovery started.
1107 hrs.: Area assessed by diving team for recovered oil and confirmed all clear.
1108 hrs.: Informed environment team for water sampling of spillage area.
1124 hrs.: Environment team informed that area is clear of oil and no harm for sea.
1125 hrs.: BB-10 arrived at B-12 berth.
1130 hrs.: Liquid team started loading oil from BB-10 to tankers for disposal.
1145 hrs.: Tanker loaded with oil departed from B12 for disposal of oil at Oil Water Separator unit.
1202 hrs.: Tanker reached Oil Water Separator unit.
1225 hrs.: Recovered oil transfer from tanker to OWS unit completed.
1230 hrs.: Environment team informed that GPCB approved recycler has executed disposal.

Personnel & Boats Participated in Drill

Offshore

1. Capt. Hemant Dhruv
2. Capt. Girish Chandra
3. Capt. Peeyush Suwalka
4. Mr. Yogesh Nandaniya
5. Mr. Ramdas Pawale
6. Mr. Upinder Samkaria
7. Mr. Shashikant Padave
8. Mr. Santosh Rasam
9. Mr. Vishwanath Chauhan
10. Mr. Dharamveer Yadav
11. Members from Sea Care
12. Crew of Tug Dolphin 11
13. Crew of Tug Victor
14. Crew of Boat Al Dariya
15. Tug Dol 2 and BB10
16. ICG Mundra – 04
17. Mr. Bhagwat Swaroop Sharma- Head Environment
18. Mr. Radheshyam Singh-Environment
19. Mr. Mayur Kasundra - Liquid Team

Onshore:

1. Capt. Sachin Srivastava
2. Sudhakar Singh
3. Mr. Chandrashekhar Kumar
4. Mr. Vikram Pratap Singh
5. Mr. Rupesh Pandey
6. Mr. Anish
7. Mr. Arshdeep

Drill Performance Monitoring:

SI. No	Activity	Time Taken
1.	Time taken to shift OSR equipment from SPM Store to load on DSV tugs	NA / 200-meter Fence boom and 1- skimmer is kept 24 x 7 on Tug DoI 11.
2.	Time taken for Tug cast off from time information given.	NA
3.	Time taken from tug cast off to Reach at Location.	NA
4.	Time taken for deploying 250-meter boom and skimmer after reaching at site.	27 min.
5	Time taken for J/U formation and deployment of skimmer.	11 min.

Observations:

SR. NO.	POINTS	ACTION TAKEN	TARGET DATE	RESPONSIBILITY	REMARKS
1	All discharge pipes of skimmer should be connectable in advance.	Point discussed with team during drill debriefing.	NA	NA	

Drill snap - 19 Jan 2024

Date 19 Jan 2024 OSR Drill at IOCL SPM

Pre Drill Briefing



Boom laying from Dol 11



J formation making in progress



Skimmer Operations



Inspection by ICG and OISD team



Discussion with ICG and APSEZ team



Joint Inspection (ICG and OISD) and APSEZL Mundra team on DSV Dolphin 11



APSEZL Mundra OSR Team on Tug Dolphin -11



Annexure – 11

Expense Details for Fisherfolk Amenities work in different core areas

Sr. No.	Details	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	TOTAL	AMT IN LACS
Expenditure Details (Amount in Rs.)											
1	Vidya Deep Yojana	2,069,300	193,000	2,087,000	1,771,000	110,225	580,103	969,660	-	7,780,288	77.80
2	Vidya Sahay Yojana	552,580	495,000	691,000	708,000	504,336	659,709	847,013	563,000	5,020,638	50.21
3	Adani Vidya Mandir – Shaping Lives	4,200,000	4,030,000	3,472,000	6,434,020	1,593,805	3,737,700	5,950,854	7,452,390	36,870,769	368.71
4	Senio Citizen Health Card	--	8,430,000	1,750,000	2,975,000	1,750,000	-	-	-	14,905,000	149.05
5	Financial Support to Poor Patients	4,439,507	1,275,000	813,000	1,296,063	763,800	1,255,000	1,691,410	1,620,000	13,153,780	131.54
6	Machhimar Kaushalya Vardhan Yojana	188,708	200,000	397,000	73,000	--	226,000	134,070	-	1,218,778	12.19
7	Machhimar Sadhan Sahay Yojana	--	--	315,000	522,000	--	-	-	-	837,000	8.37
8	Machhimar Awas Yojana	4,592,106	1,165,000	--	2,311,000	2,424,016	2,480,000	712,000	1,227,000	14,911,122	149.11
9	Machhimar Shudhh Jal Yojana	2,236,050	2,700,000	2,038,000	1,773,000	2,348,300	1,936,575	2,096,050	1,370,000	16,497,975	164.98
10	Sughad Yojana	1,367,300	170,000	--	192,000	30,000	-	-	-	1,759,300	17.59
11	Machhimar Akshay kiran Yojana	860,850	100,000	68,000	--	--	-	-	-	1,028,850	10.29
12	Machhimar Ajivika Uparjan Yojana- Mangroves plantation	1,558,800	500,000	1,382,000	1,400,000	1,900,272	2,069,432	1,914,432	-	10,724,936	107.25
13	Bandar Svachhata Yojana	106,400	50,000	--	--	367,000	145,000	25,000	-	693,400	6.93
14	Cricket league and Cycle Marathon	432,000	657,119	638,000	610,800	--	-	-	-	2,337,919	23.38
15	Sports Material For Children & Youth at Vasahats	197,797	--	--	--	--	-	-	-	197,797	1.98
16	New Pilot Initiative for Polyculture	398,240	160,000	--	--	--	-	-	-	558,240	5.58
17	New Pilot Initiative for Cage farming Asian Seabass & Lobster	864,000	660,000	--	--	--	-	-	-	1,524,000	15.24
18	Sea Weed Culture Project	--	--	--	200,000	--	-	-	-	200,000	2.00
19	Mangrove Biodiversity Project	--	--	1,890,000	684,000	499,210	997,642	1,135,000	-	5,205,852	52.06
20	Approach Road restoration at 9 vasahat	--	--	--	--	599,000	942,780	1,011,000	-	2,552,780	25.53
21	Community trening Centor & Maintenance work	--	--	--	--	--	6,022,000	2,051,000	-	8,073,000	80.73
TOTAL		24,063,638	20,785,119	15,541,000	20,949,883	12,889,964	21,051,941	18,537,489	12,232,390	146,051,424	1,460.51

Annexure – 12

GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

ICAR-INDIAN GRASSLAND AND FODDER RESEARCH INSTITUTE, RECOMMENDATION COMPLIANCE

Site Visit Date by IFGRI: 8-10 May, 2023

Places visited: Zarapara Village, Mundra, Gujarat

Purpose: To assess the physical status of site, assess the palatable grass and legume diversity and develop location specific plan for development of grasslands.

Initiated By: Adani Foundation, Mundra

Period of Compliance Report: Oct'23 to Mar'24

Sr. No.	IFGRI Recommendation	Compliance as on 31.03.2024
1.	<p>Area cleaning work: For the removal of <i>Prosopis juliflora</i> (Gando baval), cleaning of bushes should be done at least two consecutive years so that small regenerating bushes should also get removed.</p>	<p>Partially Complied.</p> <p>Phase wise removal of <i>Prosopis juliflora</i> (Gando Baval) and bushes has been done from 10 acre area for grass land development. Project progress report of 10 ha area was submitted during the Compliance report for the period Apr'23 to Sep'23.</p> <p>Balance project area will be clean phase wise & need basis.</p>
2.	<p>Site protection: Fencing either using barbed wire, trenches or bio-fence species (bamboo, bushes and thorny shrubs, etc.) should be carried out to ensure proper establishment of the site. Initial protection from grasslands and pastures ensure better establishment and higher biomass production.</p> <ul style="list-style-type: none"> • Cattle-proof trench should be of 2 m width and 1.5-meter depth. • Bio fence options like bamboo species may also be tried for the long term as it takes 5-6 years for complete protection of the site. 	<p>Partially Complied.</p> <p>Project site has been fenced by barbed wire in 10-acre area as well as Cattle proof trench (1.5 m width & 1.0 m depth) has been provided around 40 acre grass land development project area. Project progress report of 10 ha area was submitted during the Compliance report for the period Apr'23 to Sep'23.</p> <p>Balance project area will be clean phase wise & need basis.</p> <p>And Bio fence work with bamboo or other relevant species will be done phase wise.</p>
3.	<p>Choice of species: Selected species should be suitable for climatic and edaphic conditions. Moreover, they should be fast-</p>	<p>Partially Complied.</p>

GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

	<p>growing, easy to establish, nutritious, and easy to manage. List of suitable grasses and legumes species for the establishment of grassland and pasture at the site under this region have been provided below:</p>	<p>Land leveling & plowing work has been done 10 Acre land and Zinzwa & Dharaman grass species is being growing with using Organic Manure/Bio-fertilizer with coordination with Adani foundation & Sarpanch of PRI- Zarapara with PRI-Member.</p> <ul style="list-style-type: none"> Per acre 3 to 4 tons organic manure in fodder development plot. Liquid fertilizer – Jivamrut & Gaukrupa Amrutam (Photo Attached with Report) Per acre 200 to 300 liters 																																													
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Suitable Grass Species</th> </tr> <tr> <th style="width: 10%;">Sr. No.</th> <th style="width: 40%;">Botanical Name</th> <th style="width: 50%;">Common Name</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td><i>Cenchrus ciliaris</i></td> <td>Anjan (H) Buffel Grass (E)</td> </tr> <tr> <td>2.</td> <td><i>Cenchrus setigerus</i></td> <td>Dhaman (H) Bird Wood Grass (E)</td> </tr> <tr> <td>3.</td> <td><i>Dichanthium annulatum</i></td> <td>Chhijhavo (G) Marvel Grass (E)</td> </tr> <tr> <td>4.</td> <td><i>Lasiurus indicus</i></td> <td>Sewan Grass (H)</td> </tr> <tr> <td>5.</td> <td><i>Brachiaria mutica</i></td> <td>Para Grass (E) Buffalo Grass (E)</td> </tr> <tr> <td>6.</td> <td><i>Megathyrus maximus</i></td> <td>Guinea Grass (E)</td> </tr> <tr> <td>7.</td> <td><i>Chloris guyana</i></td> <td>Rhodes Grass (E)</td> </tr> <tr> <td>8.</td> <td><i>Bothriochloa pertusa</i></td> <td>Fulkara (H) Forest blue Grass (E)</td> </tr> <tr> <th colspan="3">Suitable legume Species</th> </tr> <tr> <td>9.</td> <td><i>Desmanthus virgatus</i></td> <td>Dashrath Ghas (H) Hedge lucerne</td> </tr> <tr> <td>10.</td> <td><i>Atylosia scarabaeoides</i></td> <td>Bankulthi (H)</td> </tr> <tr> <td>11.</td> <td><i>Lablab purpureus</i></td> <td>Dolichos (E) Lablab Bean (E) Sem (H)</td> </tr> <tr> <td>12.</td> <td><i>Macroptillium atropurpureum</i></td> <td>Siratro (E)</td> </tr> </tbody> </table>	Suitable Grass Species			Sr. No.	Botanical Name	Common Name	1.	<i>Cenchrus ciliaris</i>	Anjan (H) Buffel Grass (E)	2.	<i>Cenchrus setigerus</i>	Dhaman (H) Bird Wood Grass (E)	3.	<i>Dichanthium annulatum</i>	Chhijhavo (G) Marvel Grass (E)	4.	<i>Lasiurus indicus</i>	Sewan Grass (H)	5.	<i>Brachiaria mutica</i>	Para Grass (E) Buffalo Grass (E)	6.	<i>Megathyrus maximus</i>	Guinea Grass (E)	7.	<i>Chloris guyana</i>	Rhodes Grass (E)	8.	<i>Bothriochloa pertusa</i>	Fulkara (H) Forest blue Grass (E)	Suitable legume Species			9.	<i>Desmanthus virgatus</i>	Dashrath Ghas (H) Hedge lucerne	10.	<i>Atylosia scarabaeoides</i>	Bankulthi (H)	11.	<i>Lablab purpureus</i>	Dolichos (E) Lablab Bean (E) Sem (H)	12.	<i>Macroptillium atropurpureum</i>	Siratro (E)	
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4.	<p>Sowing: In the case of legumes, direct sowing is carried out and in case of grasses either rooted slips/nursery raised plants are planted in the field or direct sowing is carried out. If grass legume mixture is to be grown then it is preferred in the ratio 2:1. Grasses should be sown at 50 × 50 cm spacing and when grown as a mixture with legumes spacing should be 100 × 100 cm and in the interspace of two rows of grass; one line of legume is to be sown. Sowing depth is very essential for proper seed germination. Depth of sowing for grasses should be between 0.5- 1.0 cm; for legumes sowing depth should be 2-4 cm. For grasses with light seeds, seed rate is 4-6 kg/ha and for grasses with heavy seeds seed rate is kept as 8-10</p>	<p>For fodder support to village cattle's the Sorgham (Jwar) is being showing in 5 acre area out of 10 acre area (1st phase developing area). Project progress report of 10 ha area was submitted during the Compliance report for the period Apr'23 to Sep'23.</p> <p>Balance project area will be clean phase wise & need basis.</p>																																													

GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

<p>kg/ha. Sowing of grasses and legumes is carried out during the month of July.</p> <p>Techniques for Grass Nursery Raising: The seed is the primary material for establishing the grasslands (pastures in forage species particularly grasses, and the seed production varies from species to species. When the seed becomes a ting faster seedlings/rooted slips are the only alternate source for establishing the pasture these seeding are raised in nursery.</p> <p>Establishment of Nursery:</p> <ul style="list-style-type: none"> • Nursery beds should carefully be prepared and cleaned from all rank growth including weeds by pulling out and burning. Generally, the nursery is raised during May (5-6 week old seedlings are required) and for this 6m x 6m beds are common. • The bed should be thoroughly ploughed and 30 kg Farm Yard Manure, 0.25 kg urea, 0.5 kg Single Super Phosphate and 50g BHC may be mixed thoroughly as a basal dose in each bed. • The bed is watered for 4 to 6 days, so weeds would come up which are to be removed. About 2g Bavistin is mixed with sun-dried seeds. • For proper sowing sand is mixed with seeds and then the seeds are sown 5-6 mm deep in line. The distance from the line to the line should be 10 cm. • After sowing it may be covered with a thin layer of soil immediately and the bed may be mulched with straw/wet gunny bags or any locally available material for a period of 4-6 days continuously to allow the seed germination. • Watering may be done twice a day in the morning and evening with a rose can. • The germination starts from 3rd day and get completed within a week. After full germination mulch/gunny bags are removed. In places where the day temperature is very high, it may be necessary to provide shade to seed beds in order to protect delicate seedlings The shade may be removed after 30 days of sowing but the beds are watered every alternate day with necessary weeding. • Germination of dehusked seeds is recorded as 94-98 percent as compared to husked seeds, which is 35-42 percent. The stored seeds show better 	<p>The nursery & seed collection work is being under progress by Adani foundation with coordination of Sarpanch of PRI-Zarapara & PRI-Member.</p>
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GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

	<p>germination as compared to freshly collected ones. About 40-50 g of grass seeds are used for each bed. Such 12 beds are required to provide seedlings for one hectare land.</p> <ul style="list-style-type: none"> For better growth of seedlings the crop should be top dressed with Calcium Ammonium Nitrate (10 kg N/ha) Grass seedlings will be ready for transplanting after 4 to 6 weeks when they attain 15 to 25 cm height. <p>Planting Technique: Seedlings/rooted slips are transplanted in a well-prepared field immediately after the onset of monsoon. Land preparation is done through desi plough, two to three ploughings are sufficient Farm Yard manure @ 10-12 cartloads per hectare and BHC (10%) are mixed at the time of land ploughing.</p>	
5.	<p>Combining grasses and legumes: mixed sowing of grasses and legumes ensures enhanced production per hectare basis and the quality of the feed increases by 4-5 times which is prerequisite for gaining higher livestock production. These legumes in degraded grasslands, pastures, waste and barren lands also increase the duration of availability of green forage biomass from 3-4 to 7-8 months owing to longer growing period of legumes.</p>	<p>Point noted & being complied.</p> <p>Under this activity Jinjawa / Marvel grass is being growing to enhance production of fodder by Adani foundation with coordination of Sarpanch of PRI-Zarapara & PRI-Member. The Photographs of the same are enclosed as below with compliance report.</p>
6.	<p>Fertilizer application: Initially for grasses and legumes, fertilizers like nitrogen, phosphorus and potassium are applied for ensuring high biomass production. Pelletting of 2-3 grass seeds together with cow dung, tank silt or clay and sand (1:1:3:1) to form a ball of 4-5 mm diameter should be done to facilitate sowing and germination of light seeds of the grasses.</p>	<p>In first phase 10-acre area has been developed for grass land. The Sorghgam (Jwar) is being growing in 10-acre area (1st phase developing area) for fodder support and bio fertilizer (Cow Dung) & Jivamrut Amrutam is being using for growing the fodder.</p>
7.	<p>Weeding: Initial weeding to remove undesired species should be carried out especially just after the germination of grasses and legumes to ensure their proper establishment.</p>	<p>Point noted and is being complied.</p> <p>Presently weeding activity is being done in 1st phase developing area (10 acre).</p> <p>Same activity will be adopted for balance developing area as per phase wise/need basis.</p>
8.	<p>Harvesting and management: Application of recommended doses of N P K Fertilizer for grasses and legumes species is essential. Potassium and phosphorus should be applied as basal dose and nitrogen in two/three split doses. In case of legumes nitrogen can also be</p>	<p>Point noted & will be complied.</p> <p>Presently 10-acre area is being developing for grass land. The Sorghgam (Jwar) is being</p>

GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

	<p>applied as a basal dose. Harvesting/Cutting of grasses and legumes should be carried out based on their maturity stage and growth. Harvesting of forage biomass should be carried out before dormancy so that there is sufficient reserve available for ensuring successful re-growth in next 11 season. The frequency of cutting should be species-specific and should be decided based upon species growth, regeneration capacity.</p> <p>If grazing is to be allowed, then rotation grazing should be followed and over stocking should be avoided. During the first year, legume crops should be allowed to set and shed seeds so that a high population of legumes can be ensured in the coming year. After 4-5 years, reseedling of forage legumes should be done as its population declines with age. In case of grasses, reseedling is to be carried out after 7-8 years due to decline in their production.</p>	<p>growing in 5 acre area out of 10 acre area (1st phase developing area) for fodder support and with using Organic Manure/Bio-fertilizer & Jivamrut Amrutam is being using for growing the fodder.</p> <ul style="list-style-type: none"> • Per acre 3 to 4 tons organic manure in fodder development plot. • Liquid fertilizer – Jivamrut & Gaukrupa Amrutam (Photographs is attached with report) • Per acre 200 to 300 liters 																
<p>9.</p>	<p>Incorporation of fodder trees on grasslands and pastures: During winter and summer seasons, grasses enter the dormancy phase and there is no green fodder available for livestock. In such a situation, fodder trees owing to their protein, mineral, macro and micronutrient-rich leaves can ensure supply of green fodder. Local fodder tree species can be planted 5-7 meters apart on grasslands during the monsoon season. The fodder from the trees is available after 5-6 years depending on species and location.</p> <p>Suitable Fodder Tree Species</p> <table border="1"> <thead> <tr> <th>Botanical Name</th> <th>Common Name</th> </tr> </thead> <tbody> <tr> <td><i>Acacia nilotica</i></td> <td><i>Desi Babul</i></td> </tr> <tr> <td><i>Ailanthus excelsa</i></td> <td><i>Ardu</i></td> </tr> <tr> <td><i>Azadirachta indica</i></td> <td><i>Neem</i></td> </tr> <tr> <td><i>Leucaena leucocephala</i></td> <td>Subabul</td> </tr> <tr> <td><i>Harwickia binata</i></td> <td>Anjan</td> </tr> <tr> <td><i>Prosopis cineraria</i></td> <td>Khejri</td> </tr> <tr> <td><i>Zizyphus numularia</i></td> <td>Indian jujube</td> </tr> </tbody> </table>	Botanical Name	Common Name	<i>Acacia nilotica</i>	<i>Desi Babul</i>	<i>Ailanthus excelsa</i>	<i>Ardu</i>	<i>Azadirachta indica</i>	<i>Neem</i>	<i>Leucaena leucocephala</i>	Subabul	<i>Harwickia binata</i>	Anjan	<i>Prosopis cineraria</i>	Khejri	<i>Zizyphus numularia</i>	Indian jujube	<p>Point noted & will be complied.</p> <p>Under this activity Various types of fodder trees was planted for supporting of fodder availability during the winter & summer season by Adani foundation with corporation of Sarpanch of PRI-Zarapara & PRI-Member. The Photographs of the same are enclosed as below with compliance report.</p>
Botanical Name	Common Name																	
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GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

PHOTOGRAPHS OF GRASS LAND DEVELOPMENT PROJECT ACTIVITY

DISPLAY BOARD



JIVAMRUT AMRUTAM PREPARATION



GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

PHOTOGRAPHS OF FODDER TREES & NURSARY



GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

PHOTOGRAPHS OF FODDER SORGHGAM (JWAR) CUTTING FOR CATTELS FEEDING



GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

PHOTOGRAPHS OF GREEN FODDER FEEDING FOR CATTLES



Annexure – 13

Compliance Report of CIA Study Environment Management Plan

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude ¹	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
1	Land Use Change						
1.1	<p>It is predicted that the built up land in the rural areas would increase by an order 50% from the baseline 2015.</p> <p>New settlements near the SEZ area might create slums.</p> <p>Unorganized urban development leading to poor sanitation and proliferation</p>	Level - 1	<p>APSEZ has developed two townships (Shantivan and Samudra) presently accommodating 1668 households. Necessary permissions from concerned authorities were already obtained for the development of townships and Associated infrastructure facilities.</p>	<p>The existing townships will be expanded to accommodate about 4 lakh people when the APSEZ is fully developed.</p>	APSEZ	As and when Required	<p>APSEZ has developed two townships (Shantivan and Samudra) accommodating 2302 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 95.57% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ.</p> <p>At present 60 nos. of industries (processing & non-processing) are present within the SEZ (46 nos. are in operation). Township facilities are also made by some of SEZ industries within Mundra town for their employees with basic infrastructure facilities and requirements.</p> <p>Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities.</p> <p>The existing social infrastructure facilities are adequate for present development at APSEZ. The existing townships with associated facilities will be</p>

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	of vectors and disease.						expanded as per requirement. APSEZ has also been granted permission for receiving domestic sewage @ 2.5 MLD from Mundra village (which was earlier discharged into open area within Mundra region) into wastewater treatment plant for treatment and disposal. APSEZ has already started receiving of domestic sewage from Mundra, which abates the poor sanitation and unhygienic condition within Mundra region. Total project cost for laying domestic sewage underground pipeline with other associated facilities from Mundra to APSEZ is 362 Lacs.
1.2	Once the project is fully developed, due to increase in built up land in the APSEZ area, there will be an increase in the storm water runoff from the facility.	Level-1	The study area experiences scanty rainfall less than 400 mm/year. Considering the natural gradient, APSEZ have designed and implemented storm water	Technical feasibility study can be carried out to explore the possibility of developing storm water collection ponds to utilize maximum possible storm water runoff for dust suppression in the coal yard areas during non-rainy days.	APSEZ	Technical Study - one time, Implementation - Continual process	Presently, ~ 51.7 % of the total SEZ is developed. Based on technical studies, At present all existing coal yards are designed with drain, for collection of water during water sprinkling and rainfall, which is carried away to dump pond. Supernatant water from dump pond is being collected and used for dust suppression activities or after sedimentation, discharged to sea. Details of drain and dump pond has been submitted in along with EC compliance report (Oct 19 to March 20). Analysis of said water discharging into sea during monsoon season is being carried out (twice in a year during monsoon) through NABL / MoEF&CC accredited laboratory. Analysis report of the same shows there is

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			drains in the existing facility to meet the peak daily rainfall of 440 mm/hr. Hence flooding of water in the neighboring areas is not envisaged.				no any contamination. The report of the same were submitted during the last compliance period Apr'23 to Sep'23. During compliance period FY 2023-24 total recorded rain fall was 844 mm observed, which was much less than the design capacity of existing storm water drainage system. So our existing storm water management facility is adequate to handle the storm water runoff from the area. Hence flooding of water in the neighboring areas is not envisaged.
			As per the directions given in the environmental clearance issued for the proposed Multi-Product SEZ and CRZ clearance for Desalination, sea water intake, outfall	The channel depth in all the natural streams shall be maintained to accommodate peak flood flow during the monsoon and periodical desilting activities in the natural streams passing through the APSEZ area	APSEZ, District Administration* and Irrigation department	As and When Required	Presently there is no Desalination plant, sea water intake and outfall facility developed as part of EC & CRZ clearance of Multiproduct SEZ. The project will be designed and implemented as per requirement without disturbing the natural flow of rainwater in all the seasonal streams.

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			facility and pipeline project, the master plan of the project was designed and being implemented without disturbing the natural flow of rainwater in all the seasonal streams.				
1.3	Due to conservation and protection of mangroves in the designated conservation area, it has been predicted	Positive Impact with ecological benefits	In addition to conservation of the identified 1254 ha mangrove areas around Mundra port and SEZ, APSEZ has taken up large scale	APSEZ will continue mangrove afforestation as per the commitment made with concerned regulatory authority	APSEZ	Short Term	APSEZ has carried out mangrove afforestation in 4140 ha. area across the coast of Gujarat till date. Total expenditure for the same till date is INR 1592.8 lakh. No further mangrove afforestation is pending w.r.t. commitment made with concerned regulatory authority for APSEZ, Mundra project. As per study conducted by NCSCM, Chennai in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was

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	<p>that the current mangrove footprint area would marginally increase in next 15 years due to natural growth. This will enhance the overall biodiversity in the local coastal ecosystem.</p>		<p>mangrove afforestation activities in an area of more than 2800 ha at various locations across the coast of Gujarat state in consultation with various organizations</p>				<p>INR 3.15 Cr.</p> <p>Last study was carried out in the year 2019 and based on that there is an increase of mangrove cover between March 2017 (Total 2340) and September 2019 with an extent of 256 Ha (Total 2596 Ha Area) which is about 10.94% rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.</p> <p>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</p> <p>Analysis of data between categories indicated that there was an increase in dense mangroves along with the conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Recommendations</th> <th>Compliance</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Sr. No.	Recommendations	Compliance			
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							1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"> • APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island. • As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.94%. • This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of

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								<p>mangroves in a progressive direction.</p> <ul style="list-style-type: none"> Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. The cost of the said study was INR 23.56 Lacs incurred by APSEZ. According to GUIDE Mangrove monitoring study report November 2023 (report was submitted during the last compliance report submission Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%)

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance												
									<p>compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <ul style="list-style-type: none"> Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). The cost of the said study was INR 23.60 Lacs incurred by APSEZ. <p>Summary of Mangrove mapping and monitoring (from 2011 to 2021):</p> <table border="1"> <thead> <tr> <th rowspan="2">Mangrove mapping Year</th> <th rowspan="2">Mangrove cover total Area (Ha.)</th> <th colspan="2">Mangrove cover area Increased</th> </tr> <tr> <th>Ha c.</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>2011</td> <td>2094</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Mangrove mapping Year	Mangrove cover total Area (Ha.)	Mangrove cover area Increased		Ha c.	%	2011	2094	-	-
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2011 to 2016-17	2340	246	11.75%																								
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							2.	Tidal observation in creeks in and around APSEZ																			

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									<ul style="list-style-type: none"> The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. The cost of the said activity was INR 1.0 Lacs.
							3.	Removal of Algal and Prosopis growth from mangrove areas	<ul style="list-style-type: none"> Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. The cost of the said activity was Rs. 80000 during the FY 2023-24. The report of algal removal is attached as Annexure - 1.
							4.	Awareness of mangroves importance in surrounding communities	Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. Adani Foundation provides Good Quality dry and green fodder to 29 Villages. Project is covering total 16000 Cattles

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								<p>/ 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg.</p> <ul style="list-style-type: none"> • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. • Grass Land development: 213 acres of gauchar land has been cleaned and allocated for Grass land development with strong Community Contribution and Mobilization. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas.

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								<ul style="list-style-type: none"> • APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on 28th July 2023 to raise awareness of the importance of mangrove ecosystems as “a unique, special and vulnerable ecosystem”. The report of day celebration was submitted along with half yearly compliance report for the period of Apr’23 to Sep’23. • Since PhD scholars and students frequently visit this area for study. we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist. • Refer CSR report attached as Annexure - 2.

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							<p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial disputes and no proper response from NCSCM side regarding resolution, the work order has been revoked.</p> <p>After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis for a better review of the mangroves, APSEZ issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work is 23.60 Lacs (Including Taxes), which was paid by APSEZ.</p> <p>GUIDE has completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of the report of Monitoring and Distribution of the Mangroves was submitted during the last EC compliance report submission Apr'23 to Sep'23</p> <p>According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradi Mata, Navinal, Bocha and Khari creeks and also</p>

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							<p>in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. Hence overall mangrove cover was considered as 2596 Ha in year 2019.</p> <p>According to GUIDE Mangrove monitoring study report November 2023 (Report was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi Mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total</p>

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							<p>mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <p>Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%).</p> <p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</p> <p>Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hecter plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE,</p> <p>These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem.</p>

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1.4	Development activities along the coast might cause certain changes in hydro-dynamic characteristics along the shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		Detailed hydro-dynamic modelling and shoreline change prediction for a fully developed APSEZ facility has been studied. The study reveals that the erosion and accretion in the study area at the end of 15th year will be within the designated criteria of \pm	It is recommended to map the coastal morphology (Shoreline) at least once in three years	APSEZ	Continual Process	<p>Shore line change aspect has been studied in detail as part of following two studies;</p> <ul style="list-style-type: none"> • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. <p>As per the outcome of these studies, no erosion is observed on the coast of the project area. As part of the Regional Impact Assessment study, the possible changes in shoreline that may occur due to the proposed developments in 10 km area on either side of the waterfront development project have been predicted. It has been inferred from the modelling study that the shift in the shoreline will be less than 0.5 m/year, which reconfirms that the APSEZ facility would pose insignificant impact on the Mundra shoreline. Accretion is observed at South port and at West port due to approved reclamation activities.</p> <p>Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years.</p>

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			0.5 m/year. which reconfirms that the waterfront development activities of APSEZ would pose insignificant impact on the Mundra shoreline.				<p>APSEZ has already awarded work to the agency namely M/s. Gujarat Institute of Desert Ecology, Bhuj for carrying out Shoreline Change Assessment Study for Mundra region vide P.O. No. 4802013270 dated 30.03.2022. The cost of said study was INR 17.39 Lacs. The said study is under progress.</p> <p>Shoreline change study was carried out by M/s. Gujarat Institute of Desert Ecology, Bhuj in 2022 as a part of the Environmental Management Plan (EMP) compliance with the CIA study. The cost of said study was INR 17.39 Lacs.</p> <p>In the present study, the rate of shoreline changes statistics on a time series of multiple shoreline positions of a totally 43 km coastline stretches (16 km on the west side and 27 km on the east side of Adani main port) on either side of Adani Ports and Special Economic Zone Ltd (APSEZL) has been taken into account for the calculation by using satellite images.</p> <p>As a part of the NGT direction, the shoreline change analysis has been carried out for the years 2015-2022 to study the immediate changes after the commissioning of the port and initiation of the activities (September 2015) for short-term variation for the year 2015-2022 using EPR method has been carried out.</p>

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							<p>The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarized in below table.</p> <table border="1"> <thead> <tr> <th>Period</th> <th>Name of the block</th> <th>Average Shoreline Change(M/Year)</th> <th>Shoreline</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td>Maximum Accretion</td> </tr> <tr> <td rowspan="2">2015-2022</td> <td>West Port</td> <td>-11.43</td> <td>39.86</td> </tr> <tr> <td>Eastern side</td> <td>-26.60</td> <td>191.32</td> </tr> </tbody> </table> <p>The Shoreline Change Assessment Study report of GUIDE was submitted along with six monthly compliance report for the period Oct'22 to Mar'23.</p> <p>Shoreline change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) also as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study are as below.</p> <p>To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and</p>	Period	Name of the block	Average Shoreline Change(M/Year)	Shoreline				Maximum Accretion	2015-2022	West Port	-11.43	39.86	Eastern side	-26.60	191.32
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							<p>2018. AMBUR Methodology was used to study the historical analysis.</p> <p>10 km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition.</p> <p>The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively.</p> <p>The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 05 m/yr and 0.82 m/yr respectively.</p>
2	Regional Traffic Management Plan						
2.1	The projected traffic data	Level-1	As per the master plan of APSEZ,	Additional road as per master plan will be built	APSEZ	As and When Required	Presently, ~ 51.7 % of the total SEZ is developed. Based on technical studies,

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	<p>as per the EIA Report of Multi-Product Special Economic Zone, the peak vehicular traffic from the port and SEZ operations (including supporting facilities and colony) could be in the order of 18,300 and 10,400 vehicles per day respectively .</p> <p>There could</p>		<p>eight artillery roads will be connected to either state highway or national highway for evacuating the goods from APSEZ. None of these roads are passing through settlements, thereby avoiding traffic Congestions in the respective villages. The carrying capacity of the eight artillery roads connecting</p>	<p>in future based on the overall progress of the project. Currently about 25% of cargo from APSEZ is transported by Rail and the same will be enhanced to 40% when the facility is fully developed in future. This will further reduce the traffic volumes on the regional road network.</p>			<p>Existing road/rail/conveyer infrastructure facilities are adequate to evacuate the existing cargo. Further, APSEZ's cargo evacuation through rail / conveyer / pipeline has ~23.87%,Additional road facilities will be built as per master plan considering future development.</p> <p>The facilities for transportation of cargo other than road will be enhanced considering future development, which will reduce the traffic volumes on the regional road Network.</p>

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	<p>be a possible increase in traffic congestions on village-highway intersections and road accidents.</p>		<p>APSEZ is estimated to be about 16,000 PCU/hr as against the envisaged peak traffic volume of 4,500 PCU/hr.</p> <p>Out of eight artillery roads considered in APSEZ master plan, seven roads were already developed and functional.</p>				
			<p>APSEZ has been imparting Driver Training</p>	<p>APSEZ can undertake technical feasibility of implementing</p>	<p>APSEZ & GSRDC*</p>	<p>Long Term</p>	<p>APSEZ is being imparting the regular in-house training awareness program in different mode i.e., classroom, on-job training, virtual platform & Assessment by internal & external trainer to all drivers and employees on below topics:</p>

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			<p>Programs to all their contractors to enhance awareness on road safety.</p>	<p>Intelligent Transport System (ITS) for the freight carriers associated with their development activities.</p>			<ul style="list-style-type: none"> ✓ Basic induction Training for drivers ✓ ITV Driver Training ✓ ITV Driver Induction for Supervisor ✓ Defensive Driving for LMV & HMV ✓ Defensive Driving & BBS ✓ Driver Assessment ✓ Road accident & rescue ✓ Traffic Management & Road Signage ✓ Driving safety training ✓ RORO Driver training ✓ Road Safety ✓ Defensive Driving & Emergency Action Plan ✓ Drivers Responsibilities & Safe driving ✓ Emergency Rescue (Vehicle) Training <p>Approx. 7530 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period Oct'23 to Mar'24. The same will be continued in future also.</p> <p>APSEZ has also implemented the Remote traffic management system (RTMS) to manage the traffic movements and capturing the violations to further improve the system.</p> <p>Following steps were taken by APSEZ to reduce the accidents.</p>

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							<ul style="list-style-type: none"> ✓ Handling and escorting of the ODC for ensuring the smooth movement on the roads. ✓ Traffic Awareness programs for the drivers and regular briefing of the drivers in the parking areas. ✓ Incident handling and root cause analysis for taking necessary action in order to avoid such incidents. ✓ BAC checks for the drivers in order to identify the intoxicated drivers and necessary action is being taken against them. ✓ Water spray drive at gates are being conducted on regular basis during night hours to avoid dozing by the driver while driving. ✓ RTMS devices are being installed at 08 critical locations in order to capture speed violations and enforcing road safety regulations. ✓ Display of traffic signages and lane markings on road in coordination with the Civil team for ensuring road safety rules are being followed by the road users. ✓ We have approx. 100+ cameras which are being utilized for monitoring of traffic movement through CCTV and timely response in order to avoid any congestion and during traffic incidents. ✓ Regular traffic checks by Traffic Marshalls in order to ensure road safety rules (Wearing seat belt/Wearing helmet/Carrying driving license/Speed checks/Documents) is being followed by the drivers.

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							<ul style="list-style-type: none"> ✓ Installation of Road furniture's (Cones/Water filled barriers/Cats eye/Spring Posts/Jersey Barriers) for lane segregation, Channelizing the traffic, at Junctions and indicating Caution for the road users. ✓ In case on any Vehicle found breakdown in main roads, we arrange the security crane / lifting machines to remove /relocated the vehicle. Which help for smooth passage to other vehicles. ✓ Ensuring Drivers must wear near necessary PPEs, for that we have arranged a PPE's Stall at APMS parking area (issued on chargeable basis). ✓ Night Patrolling and PA announcement by Traffic DSO to manage traffic condition. ✓ Safety briefing via PA system at Security Gate.
3	Water resources Management and sewage treatment & disposal Plan						
3.1	For a fully developed APSEZ facility, water demand will be in the order of 4,30,000 m ³ /day (430 MLD). APSEZ will be sourcing	No-Impact	APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	As per the master plan and permissions granted under EC, APSEZ will be developing progressively 4,50,000 m ³ /day (450 MLD) of desalination plants to meet the future demand. Hence	APSEZ	As and When Required	<p>Presently there are two fresh water sources available with APSEZ.</p> <p>Desalination Plant – 47 MLD Narmada water through GWIL – 9 MLD (sanctioned capacity).</p> <p>Current water demand for APSEZ along with SEZ industries including Adani Power Plant is an avg. of 31.49 MLD.</p> <p>So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ</p>

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	majority of the water from the captive desalination plants, which will be developed in progressive manner.		Necessary water allocation from concerned authorities was obtained and the same will be renewed from time to time as per the directions of state government.	stress on regional water resources due to these developmental projects will be less significant.			including member units. The desalination plant of additional capacities will be installed on modular basis considering future requirement of APSEZ.
3.2	Existing water demand in the Mundra taluk is estimated as 8500 m ³ /day (@55 lpcd) and the potable and sanitation	Level-2	Adani Foundation has been contributing to various watershed development projects in the Mundra region to enhance ground	Adani Foundation is planning to implement the various water resource conservation programs in next ten years under various schemes.	APSEZ and CGWB*	Long Term	Water needs of APSEZ is being met through existing Desalination Plant of APSEZ and GWIL which may be further enhanced on modular basis. At present Ground water is not utilized for any activities within APSEZ. However various works are being carried out by Adani Foundation continuously under Water Conservation Work to achieve water security in Mundra region by Adani Foundation. Following works are carried out as a part of water conservation work since April – 2018. Water conservation Projects i.e. Roof Top Rainwater Harvesting, Desilting of Check dams, Bore Well

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	<p>water needs would increase to 37,000 m³/day (@125 lpcd) in future when the area is fully grown into larger municipality due to induced economic growth. Water demand of the local communities is met through Narmada water supply system to some extent, but</p>		<p>water resources in the area. Adani Foundation has contributed about Rs. 300 Lakhs so far for the development of 18 check dams.</p>				<p>Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up.</p> <p>To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan.</p> <p>Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures.</p> <p><u>WORK COMPLETED:</u></p> <p>Below tabulated Water Conservation Projects completed during Compliance period:</p> <p><u>Water Conservation Projects:</u></p> <p><u>Swajal Project:</u></p> <ul style="list-style-type: none"> ➤ Aim: The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district. ➤ Water Security Plan: Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological

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	largely depending on the ground water in the study area. Mundra block is reported to be a safe ground block as on date. Due to influx of people and rapid urbanization due to the economic development, there could be some stress on the ground water resources in future.						<p>condition and water demand, water security plan has been prepared for the Seven villages.</p> <table border="1"> <thead> <tr> <th>Block Name</th> <th>Water conservation structure</th> <th>Total no. of Structure</th> <th>Total Capacity Created (CUM)</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Mundra</td> <td>Check Dam</td> <td>23</td> <td>6,07,332.80</td> </tr> <tr> <td>Pond Deepening</td> <td>66</td> <td>1,89,121.08</td> </tr> <tr> <td>RRWHS</td> <td>275</td> <td>2750</td> </tr> <tr> <td>Recharge Borewell</td> <td>209</td> <td>-</td> </tr> <tr> <td>Percolation Well</td> <td>24</td> <td>-</td> </tr> </tbody> </table> <p>Earlier Completed Activities/Projects:</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Project</th> <th>Unit</th> <th>Outcome</th> <th>Impact</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Check dam Restrengthening-Nana Kapaya</td> <td>1</td> <td>Water Storage Capacity increased by 48000 Cum</td> <td>60 + farmer's 120+Acre Area of Agri land can be Irrigated</td> </tr> <tr> <td>2</td> <td>Recharge Borewell</td> <td>21</td> <td>Reduce Salinity ingress, and preventing water run</td> <td>150+ farmer's 260+ Acre Area of Agri land for Irrigated</td> </tr> </tbody> </table>	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)	Mundra	Check Dam	23	6,07,332.80	Pond Deepening	66	1,89,121.08	RRWHS	275	2750	Recharge Borewell	209	-	Percolation Well	24	-	Sr. No.	Project	Unit	Outcome	Impact	1	Check dam Restrengthening-Nana Kapaya	1	Water Storage Capacity increased by 48000 Cum	60 + farmer's 120+Acre Area of Agri land can be Irrigated	2	Recharge Borewell	21	Reduce Salinity ingress, and preventing water run	150+ farmer's 260+ Acre Area of Agri land for Irrigated
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							<table border="1"> <tr> <td>3</td> <td>Pipe Culvert at Checkdamat Bhujpur</td> <td>1</td> <td>prevent water runoff into seaside.</td> <td>35 farmers' 120+Acre Area of Agriculture land can be irrigated</td> </tr> </table> <ul style="list-style-type: none"> • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 66 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. 	3	Pipe Culvert at Checkdamat Bhujpur	1	prevent water runoff into seaside.	35 farmers' 120+Acre Area of Agriculture land can be irrigated
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							<ul style="list-style-type: none"> • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. <p>With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water.</p> <p>Adani foundation has spent approx. INR 8515.06 lakhs from April – 2018 to March– 2024 for CSR activities which also includes water conservation projects as mentioned above.</p>
3.3	It is estimated that about 60,000 m ³ /day (60 MLD) of sewage will be generated from the APSEZ facility when the	No Impact	Seven sewage treatment plants with an aggregate capacity of 3.1 MLD have already built at APSEZ. Treated sewage is utilized for greenbelt	APSEZ is permitted to develop decentralized sewage treatment plants of total 62 MLD capacities. Existing sewage treatment facilities will be augmented progressively	APSEZ	As and When Required	Current installed capacity of wastewater treatment plants is 6.255 MLD (ETP, STPs & CETP) for treatment of effluent & sewage generated at various locations of APSEZ excluding wastewater treatment plants installed within indivial member units. Out of 46 only 4 operational industries within the SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming to CETP inlet norms for further treatment and final disposal. Other SEZ industries have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises

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	project is fully developed.		development and sewage is not discharged into either seasonal natural streams or marine environment.	based on the development at APSEZ in future. Similar to existing practices, treated sewage will be utilized for greenbelt development.			<p>as per specific permission granted by SPCB.</p> <p>APSEZ also granted permission to treat 2.5 MLD of sewage generated from Mundra village through CETP and STP.</p> <p>Presently avg. 2.26 MLD of wastewater (in to ETP, STPs & CETP) is treated and being utilized on land for horticulture purpose within APSEZ premises during Oct'23 to Mar'24. Existing wastewater treatment plants are adequate to treat and handle the total effluent / sewage load considering current development.</p> <p>Existing wastewater treatment facilities will be augmented, or new plants will be developed on modular basis considering future requirement.</p>
4	Air quality management Plan						
4.1	Although all the regulated activities in the study area will be adopting promulgated emission norms, total	Level-2	APSEZ and other thermal power plants have obtained valid consent to operate and have been	All existing and new industrial establishments will obtain requisite consents from GPCB and adhere to the stipulated emission norms regulations and	APSEZ And Other Industries	Continual Process	<p>APSEZ has been granted requisite permissions from the concerned authorities with stipulated norms for air emission (flue gas as well as ambient air).</p> <p>Ambient Air Quality monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi for APL as per NAAQ standards, 2009. Stack emission monitoring is also being carried out on regular basis. Reports of the same are being submitted</p>

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	air emission mass discharge from the study area would increase.		operating the facilities as per the emission norms stipulated in respective consent orders. APSEZ and other two power plants are monitoring the ambient air quality on regular intervals as per GPCB/CPCB guidelines and the data is analyzed and presented to GPCB on monthly basis. Both	guidelines issued by authorities from time to time.			<p>to the concerned authorities on regular basis.</p> <p>Adani power plant has installed continuous emission and air quality monitoring instruments as per CPCB Directive and submitting the reports also. Another power plant of CGPL is outside APSEZ area.</p> <p>The AAQM summary for last six months (Oct'23 to Mar'24) are as below.</p> <p>Locations: 18 Nos. (APSEZ – 15 + APL – 3 including 4 villages) Frequency: Twice in a week</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Min</th> <th>Max</th> <th>Average</th> <th>Perm. Limit⁵</th> </tr> </thead> <tbody> <tr> <td>PM₁₀</td> <td>µg/m³</td> <td>40.80</td> <td>87.32</td> <td>74.45</td> <td>100</td> </tr> <tr> <td>PM_{2.5}</td> <td>µg/m³</td> <td>14.49</td> <td>43.22</td> <td>30.97</td> <td>60</td> </tr> <tr> <td>SO₂</td> <td>µg/m³</td> <td>8.35</td> <td>38.91</td> <td>22.12</td> <td>80</td> </tr> <tr> <td>NO₂</td> <td>µg/m³</td> <td>11.21</td> <td>44.25</td> <td>26.73</td> <td>80</td> </tr> </tbody> </table> <p>⁵ as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards.</p> <p>Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</p>	Parameter	Unit	Min	Max	Average	Perm. Limit ⁵	PM ₁₀	µg/m ³	40.80	87.32	74.45	100	PM _{2.5}	µg/m ³	14.49	43.22	30.97	60	SO ₂	µg/m ³	8.35	38.91	22.12	80	NO ₂	µg/m ³	11.21	44.25	26.73	80
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PM ₁₀	µg/m ³	40.80	87.32	74.45	100																																
PM _{2.5}	µg/m ³	14.49	43.22	30.97	60																																
SO ₂	µg/m ³	8.35	38.91	22.12	80																																
NO ₂	µg/m ³	11.21	44.25	26.73	80																																

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
			the thermal power plants located within the study area have installed continuous emission and air quality monitoring instruments as per CPCB directive.				<p>Other industries located within the SEZ have obtained requisite permissions from the competent authorities for their respective plant and they also carried out environmental monitoring within their premises to comply with the permission granted. The same has been ensured by APSEZ as well as SPCB during their regular visits. APSEZ carries out regular visits/inspections of member industries within SEZ and last visit was conducted during March, 2024 for EMS & compliance verification. During compliance verification, it was verified that monitoring of air emission was well within the permissible standards based on analysis reports. Same will be continued in future also.</p> <p>The monitoring reports of industries within SEZ are also being submitted to the regulatory authorities as a part of half yearly Compliance report of EC for Multi-Product SEZ.</p>
				A common air quality management committee may be framed under the guidance of the State Pollution Control	APSEZ and Other Industries, Stakeholders, District Administration and GPCB*	Long Term And Continual	APSEZ will co-operate and comply with the directions from concerned regulatory authorities for air quality management within APSEZ area. However, at present, APSEZ has formed Internal Environment Monitoring Committee, involving officials from APSEZ, Adani Power Limited and other SEZ member units with following role and responsibilities:

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				Board and district administration to manage regional level emission inventory data that can help to manage regional level air quality management goals.			<ul style="list-style-type: none"> • Identification of sources of air & noise emission and its dispersion in surrounding villages • Remedial measures to eliminate, control, reduce or capture air & noise emission. • Identify available resource to abate the air and noise emission. • Required additional resources for control of air and noise emission. • Drinking water and its testing of all the available fresh water sources in surrounding villages • Identify any surrounding villages affected by organization's improper waste disposal mechanism. <p>Last committee meeting was conducted on dated 19/04/2024 and below was the point of discussion for way forward.</p> <ul style="list-style-type: none"> • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions. • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
							<ul style="list-style-type: none"> Discussed about the management of rain water & proper cleaning of the common storm water drainage system. Discussed about proper segregation & disposal of solid waste material. Discussed about to increase more green belt area inside plant premises of SEZ units. Discussed about disposal of minor qty. of generated hazardous waste materials at authorized recycler/vendor. <p>APSEZ and all the industries within SEZ are complying to NAAQS and same is being ensured by APSEZ. The monitoring reports of industries within SEZ are being submitted to the regulatory authorities as part of half yearly Compliance report of EC for Multi-Product SEZ.</p>
4.2	Release of particulate emissions from handling and storage of coal at the port and power plants would influence PM10 and	Health Impact	APSEZ has been implementing the following management plan to control emissions as per the applicable regulations and similar	All industries located in the APSEZ shall adhere to the emissions norms and minimum stack height guidelines issued by CPCB and consent to operate issued by Gujarat	APSEZ and Other Industries	Continual Process	<p>Following safeguard measures are taken by APSEZ for abatement of dust emissions.</p> <ul style="list-style-type: none"> Adequate stack heights to the Boilers, D.G. Sets, TFHs & HWGs for proper dispersion of pollutants within APSEZ Using of liquid & Gaseous fuels instead of solid fuels in Boilers, Thermic fluid heaters and hot water generators. Regular sprinkling on road and other open area Regular cleaning of roads Dry fog Dust Suppression System (DSS) in hopper,

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance																		
	PM2.5 concentration in the background air. This could pose some health impacts such as asthma and COPD etc. among the local communities.		practices will be adopted in future: Entire bulk material handling facilities are mechanized. Regular water sprinkling on road and other open areas, regular cleaning of roads, dry fog dust suppression systems (DSS) in hoppers, transfer towers and conveyor belts, use of water mist canon,	Pollution Control Board from time to time.			<p>transfer towers and conveyor belts</p> <ul style="list-style-type: none"> • Use of water mist canon • Closed type conveyor belts • Regular sprinkling on coal heaps • Covering other types of dry bulk cargo heaps • Installation of wind breaking wall • Development of greenbelt along the periphery of the storage yards/back up area • Mechanized handling system for coal and other dry bulk cargo • Wagon loading and truck loading through closed silo <p>Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions are implemented within the thermal power plant.</p> <p>The stack monitoring summary for last six months (Oct'23 to Mar'24) are as below.</p> <p>Total Nos. of Stacks: 23 Nos. Frequency: Monthly / Half Yearly</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>GPCB Limit</th> <th>Min</th> <th>Max</th> <th>Avrg.</th> </tr> </thead> <tbody> <tr> <td>PM</td> <td>mg/Nm³</td> <td>150</td> <td>16.27</td> <td>27.23</td> <td>21.61</td> </tr> <tr> <td>SO₂</td> <td>Ppm</td> <td>100</td> <td>6.13</td> <td>15.49</td> <td>8.96</td> </tr> </tbody> </table>	Parameter	Unit	GPCB Limit	Min	Max	Avrg.	PM	mg/Nm ³	150	16.27	27.23	21.61	SO ₂	Ppm	100	6.13	15.49	8.96
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			covered conveyor belts, regular sprinkling on coal heaps,				<table border="1"> <tr> <td>NO_x</td> <td>ppm</td> <td>50</td> <td>16.92</td> <td>32.62</td> <td>23.06</td> </tr> </table> <p>Values recorded confirms to the stipulated standards.</p> <p>Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</p> <p>All other industries located within SEZ are adhere to provide adequate stack height and pollution control measures for proper dispersion of pollutants as per respective permissions granted by the board. The same is being inspected and ensured by APSEZ as well as SPCB officials on regular basis.</p>	NO _x	ppm	50	16.92	32.62	23.06
NO _x	ppm	50	16.92	32.62	23.06								
			covering of other types of dry bulk cargo heaps by protective materials, installation of wind breaking wall, development of greenbelt along the	An internal Coal Dust Management Working Group shall be formed by APSEZ to effectively coordinate the approach to coal dust management and	APSEZ and Other Industries, Concerned Stake holders, District Administration*	Long Term	<p>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, with specific role and responsibilities as defined above.</p> <p>The dry cargo is being handled by mechanized system and transported by covered conveyer system, trucks and rail wagons.</p> <p>Wind breaking wall is provided around the coal storage yards of APSEZ as well as Adani Power Plant.</p> <p>Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights</p>						

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			<p>periphery of the storage yards/back up area and mechanized handling system for coal and other dry bulk cargo and Wagon loading and truck loading through closed silo. Both thermal power plants in the study area have installed electrostatic precipitators on the boilers and are meeting the emission norms as per the</p>	<p>monitoring</p>			<p>provisions within the thermal power plant for proper dispersion of pollutants.</p> <p>Green belt / plantation is provided around the periphery of dry cargo storage area and regular water sprinkling is also being done to abate the dust emission from coal hips.</p> <p>Last committee meeting was conducted on dated 19/04/2024 and below were the points of discussion for way forward.</p> <ul style="list-style-type: none"> • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions. • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & proper cleaning of the common storm water drainage system. • Discussed about proper segregation & disposal of solid waste material.

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			<p>respective ECs granted. Due to installation of tall stacks as per CPCB guidelines and EC conditions, the relative air pollution impacts due to release of emissions from two power plants is insignificant.</p>				<ul style="list-style-type: none"> Discussed about to increase more green belt area inside plant premises of SEZ units. Discussed about disposal of minor qty. of generated hazardous waste materials at authorized recycler/vendor.
4.3	<p>Ships are one of the significant sources of SO₂ and NO_x emissions in the study area. Marine diesel</p>	Level-2	<p>A Standard Operating Procedure (SOP) has been developed to</p>	<p>The current global limit for Sulphur content of ships fuel oil is 3.5 % m/m (mass by mass). According to MARPOL, the new global cap</p>	APSEZ and Ship Owners	Long Term	<p>The ships coming to the APSEZ is complying with MARPOL and other shipping rules and regulations.</p> <p>APSEZ has already started providing shore power supply to the tugs (11 Nos.), dredgers (2 Nos.) and barges (1 No.). The feasibility of shore power will be explored and implemented on large scale for the visiting vessels to reduce idling stage ship emissions.</p>

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	engines on the ships often utilize fuel oils that might contain higher sulphur content. As per the international best practices, these marine diesel engines are designed to meet MARPOL regulations with NOX emissions less than 14.4 gram/Kwhr of engine. Due to		be included as a part of APSEZ environment management plan to verify that all ships anchored at the port are adopting the MARPOL4 regulations.	on sulphur in the marine vessel fuels will be 0.50% m/m by the 1st January 2025. APSEZ should explore the possibility of providing shore power to the ships at the port to reduce idling stage ship emissions.			

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	lower stack heights of the marine diesel engine, ship emissions often gets dispersed in the local environment and might pose risk of fumigation during the early morning and evening hours due to atmospheric inversion break-up periods.						
	Road vehicle		Not	Due to implementation of Bharat VI fuels (MoEF&CC) in near future the vehicular and	APSEZ		Presently, cargo evacuation through rail / conveyer / pipeline is ~23.87 % of overall cargo evacuation. Vehicles having valid PUC certificate are only being allowed to enter within APSEZ area.

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4.4	emissions will be other major contributors to the air pollution in the region when the facility is fully developed.	Level-2	Applicable	diesel engine emissions will be reduced by about 50% from the current national levels. APSEZ should develop a robust contractor environmental policy to ensure that Bharat Stage VI emission norms are adopted by all their contractors and sub-contractors.	and All Industries	Short Term	<p>APSEZ, has procured 217 nos. of Electrical Vehicle for internal cargo movement and 183 nos. E-ITV's are in operation.</p> <p>As well as procured 10 nos. LMV E-Vehicles for manpower movement and all are in operation.</p> <p>Electrification of Rail Corridor from Dhrub Railway Station to Adipur Railway Station has completed and movement started by electric locomotive. It will leads to reduce the gaseous emission and increase efficiency of transportation by rail.</p>
5	Noise emissions						
	Noise emissions are envisaged from port operations,		Due to adoption of various mechanized operations at the waterfront development	APSEZ, all the tenant industries and facilities within APSEZ are required to undertake noise monitoring at their facilities to	APSEZ	Continual Process	<p>Below Safeguard measures are already taken for abatement of noise emissions.</p> <ul style="list-style-type: none"> • Development of greenbelt along the periphery of the operational area. • D.G. Sets having Acoustic enclosures. • Maintenance of plant machineries and equipment's on regular frequency.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude ^{e1}	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance																		
5.1	industrial operations and power plants in the study area. Any increase in noise levels beyond three decibels from the background levels would be perceived as noise nuisance (USEPA)7.	Level-1	, the noise emissions from the port cargo handling will be minimal. An adequate greenbelt is being developed by APSEZ to further reduce any residual impacts due to noise emissions from the facility. Periodic noise level monitoring programs were adopted by APSEZ. Predicted noise levels	demonstrate the compliance with the Noise level standards. Continuous noise recording units can be installed by APSEZ at facility boundary to address the community grievances, when ever required. To assess the overall site wide compliance and also to address any community grievances related to noise issues due to operation of APSEZ facilities.			<p>Noise monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi as per permission granted and reports are being submitted to the concerned authorities on regular basis.</p> <p>The noise monitoring summary for last six months (Oct'23 to Mar'24) are as below.</p> <p>Locations: 15 Nos. Frequency: Once in a month (24 hourly)</p> <table border="1"> <thead> <tr> <th>Noise</th> <th>Unit</th> <th>Leq Min</th> <th>Leq Maxn</th> <th>Leq Avr.</th> <th>Leq Perm. Limit[§]</th> </tr> </thead> <tbody> <tr> <td>Day Time</td> <td>dB(A)</td> <td>57.4</td> <td>69.9</td> <td>64.7</td> <td>75</td> </tr> <tr> <td>Night Time</td> <td>dB(A)</td> <td>53.8</td> <td>64.8</td> <td>60.5</td> <td>70</td> </tr> </tbody> </table> <p>[§] as per GPCB standards</p> <p>Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</p> <p>All the results are well within the standards. From this it can be inferred that there no impacts on the</p>	Noise	Unit	Leq Min	Leq Maxn	Leq Avr.	Leq Perm. Limit [§]	Day Time	dB(A)	57.4	69.9	64.7	75	Night Time	dB(A)	53.8	64.8	60.5	70
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			were found to be well within the designated noise standards for Industrial facilities.				<p>surrounding community.</p> <p>All other industries located in the APSEZ are adhere to monitor and control the ambient noise level as per permission granted by SPCB and same is being confirmed by APSEZ as well as SPCB on regular basis.</p> <p>Further, till date APSEZ has not received any grievances/notice for noise issues from any of the stakeholders.</p>
				In order to address the public grievances related to noise from the facility, an internal Noise Management Committee can be formed by APSEZ to investigate the root cause and to develop and implement noise mitigation plans in the specific	APSEZ	Continual Process	<p>As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, having role and responsibilities as defined above.</p> <p>Last committee meeting was conducted on dated 19/04.2024 and below were the point of discussion for way forward.</p> <ul style="list-style-type: none"> • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions. • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste.

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				zones.			<ul style="list-style-type: none"> Discussed about the cleaning of outside of the SEZ units. Discussed about the management of rain water & proper cleaning of the common storm water drainage system. Discussed about proper segregation & disposal of solid waste material. Discussed about to increase more green belt area inside plant premises of SEZ units. Discussed about disposal of minor qty. of generated hazardous waste materials at authorized recycler/vendor. <p>No grievance received for noise related issues, and it is observed that ambient noise level are well within the permissible standards.</p>
6	Surface water quality (Terrestrial and Marine)						
6.1	In general, release of untreated wastewater from industrial facilities would pose threat to water quality of	Level -1	As per the master plan of APSEZ, 67 MLD of wastewater is expected to be generated from the fully developed project scenario, for	As per the master plan of APSEZ, the existing CETP shall be augmented to 67 MLD in progressive manner based on the future demand. The facility should limit the marine	APSEZ	As and When Required	<p>APSEZ has installed Common Effluent Treatment Plant (CETP) having 2.5 MLD capacities for treatment of partially treated effluent and sewage generated from industries within SEZ.</p> <p>Currently, CETP receives 940.21 KLD (Avg.) hydraulic load and considering the current development scenario, existing CETP is adequate to treat and handle the total effluent load coming from industries within SEZ.</p> <p>Out of 46 operational units only 4 industries within</p>

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	streams, estuaries and marine water bodies.		which necessary permissions to set up decentralized CETPs of various capacities are already obtained. Presently a CETP capacity of 2.5 MLD is in place. Presently member units treat their effluents to meet the CETP inlet norms and then send it to CETP. Treated wastewater from CETP	discharge of treated industrial wastewater to 16 MLD as per the permits. Remaining treated wastewater shall be utilized for horticulture purpose.			<p>SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming CETP inlet norms for further treatment and final disposal. Other industries within SEZ have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per permission granted by SPCB.</p> <p>The capacities of CETP will be enhanced on modular basis as per future requirement.</p> <p>Presently avg. 2.26 MLD (from CETP, ETP & STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period Oct'23 to Mar'24 and no discharge is made to any other source.</p>

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			meets the stipulated discharge norms for utilization for greenbelt development within the APSEZ areas.				
			Online wastewater quality monitoring systems are installed at CETP to ensure quality of treated effluent meets the requisite discharge norms. No wastewater from CETP is discharged into natural	Efforts shall be made to recycle complete treated wastewater for port operations and industrial operations of APSEZ in future based on a detailed techno-economic feasibility study.	APSEZ	Based on outcome Techno-feasibility Study	<p>Online continuous effluent monitoring system (CEQMS) installed at the discharge point of CETP to track any deviation from discharge norms. CEQMS is connected with CPCB/GPCB server & data is continuous transferring in both servers.</p> <p>Presently entire quantity of treated water from CETP is used for gardening / horticulture purpose within APSEZ premises.</p>

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			bodies as on date..																																		
			Runoff during monsoon from coal storage yards is collected in sedimentation ponds (dump pond) to remove any residual dust particulates for further disposal into sea	Storm water runoff from the facility during the first rain shall be sampled and analyzed for the presence of heavy metals or other criteria pollutants to adopt corrective and preventive actions to protect the marine water quality. All red and hazard category industry within APSEZ shall adopt spill prevention and control program and no effluents shall be discharged into	APSEZ	Continual	<p>There are provision of drains around coal stack yard to carry to runoff water to dump ponds. This water is either used for dust suppression or after sedimentation (to remove residual dust), is allowed disposal to sea.</p> <p>Presently Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi for APSEZ & APL both. The analysis reports of the same are being submitted to the concerned authorities on regular basis.</p> <p>The marine water quality monitoring summary for last six months (Oct'23 to Mar'24) is as per below.</p> <p>Locations: 14 Nos. (APSEZ – 9 + APL – 5) Frequency: Once in a Month / Half Yearly</p> <table border="1"> <thead> <tr> <th rowspan="2">TEST PARAMETERS</th> <th rowspan="2">UNIT</th> <th colspan="3">Cumulative Surface</th> <th colspan="3">Cumulative Bottom</th> </tr> <tr> <th>Min</th> <th>Max</th> <th>Average</th> <th>Min</th> <th>Max</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>--</td> <td>7.9</td> <td>8.24</td> <td>8.09</td> <td>7.86</td> <td>8.2</td> <td>8.04</td> </tr> <tr> <td>BOD</td> <td>mg/L</td> <td>2.2</td> <td>5.1</td> <td>3.84</td> <td>0</td> <td>5.2</td> <td>4.82</td> </tr> </tbody> </table>	TEST PARAMETERS	UNIT	Cumulative Surface			Cumulative Bottom			Min	Max	Average	Min	Max	Average	pH	--	7.9	8.24	8.09	7.86	8.2	8.04	BOD	mg/L	2.2	5.1	3.84	0	5.2	4.82
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				storm water-drains.			<table border="1"> <tr> <td>TSS</td> <td>mg/L</td> <td>76</td> <td>152</td> <td>107.45</td> <td>78</td> <td>128</td> <td>107.46</td> </tr> <tr> <td>DO</td> <td>mg/L</td> <td>5.3</td> <td>6.5</td> <td>5.98</td> <td>4.2</td> <td>6.25</td> <td>5.41</td> </tr> <tr> <td>Salinity</td> <td>ppt</td> <td>35.24</td> <td>39</td> <td>36.94</td> <td>36.15</td> <td>40</td> <td>37.82</td> </tr> <tr> <td>TDS</td> <td>mg/L</td> <td>35864</td> <td>36610</td> <td>36225</td> <td>34500</td> <td>37540</td> <td>37077</td> </tr> <tr> <td>Temperature</td> <td>oC</td> <td>24.7</td> <td>29.8</td> <td>27.38</td> <td>24.2</td> <td>29.7</td> <td>26.92</td> </tr> </table> <p style="text-align: right;">MDL – Minimum Detection Limit</p> <p>Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</p>	TSS	mg/L	76	152	107.45	78	128	107.46	DO	mg/L	5.3	6.5	5.98	4.2	6.25	5.41	Salinity	ppt	35.24	39	36.94	36.15	40	37.82	TDS	mg/L	35864	36610	36225	34500	37540	37077	Temperature	oC	24.7	29.8	27.38	24.2	29.7	26.92
TSS	mg/L	76	152	107.45	78	128	107.46																																								
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TDS	mg/L	35864	36610	36225	34500	37540	37077																																								
Temperature	oC	24.7	29.8	27.38	24.2	29.7	26.92																																								
			Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil disposal practices,	Good dredging practices shall be adopted by APSEZ: (i).Improving the dredging accuracy (ii).Improving onboard automation and monitoring, (iii). Reduce spill and loss, (iv).	APSEZ	Long Term	<p>No capital dredging has been done, since Apr 2015. Dredged material generated during maintenance dredging is being disposed at designated locations within deep sea as identified by NIO.</p> <p>Dredging Management plan is adopted for carrying out dredging and management of dredge material. Presently there are 3 nos. (2 Nos. Cutter suction + 1 No. Trailer suction) of dredgers are in operation for dredging.</p> <p>Marine monitoring is being carried out once in a month</p>																																								

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			<p>sea water intake and outfall facilities and desalination plant outfall etc have shown insignificant impact on the marine eco-system. As part of the comprehensive environmental monitoring program, APSEZ has been adopting marine water and sediment quality monitoring on monthly</p>	<p>evaluating the need for installing silt screens near mangrove areas during the dredging phase operations, (v). Environment friendly dredging activities can be undertaken in such a way that the overall turbidity levels near the mangrove and ecologically sensitive zones shall not exceed 100 NTU or 200 mg/l of TSS (10% lethal level of fish) Existing marine monitoring program shall be continued as per the directions</p>			<p>by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. The analysis reports of the same are being submitted to the concerned authorities on regular basis. Summary of marine water for the last six months is as mentioned above.</p> <p>The same practice will be continued in future also as per direction by MoEF&CC as well as GPCB.</p> <p>Monitoring will be focused near ecological sensitive area in case of need to carryout capital dragging near such areas.</p>

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			basis.	of MoEF&CC and GPCB.			
7	Groundwater quality and salinity ingress						
7.1	While Mundra block is enjoying safe ground water status as on date (based on the data published by CGWB), due to induced economic and population growth, use of ground water resources by the local people might increase in Mundra	Level-2	APSEZ is not utilizing ground water for any type of use. APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	A dedicated desalination plant of capacity 4,50,000 m ³ /day (450 MLD) will be developed in progressive manner to meet the APSEZ requirements.	APSEZ	As and When Required	Present source of water for various project activities is desalination plant of APSEZ and/or through Gujarat Water Infrastructure Limited (GWIL) and same is sufficient to meet the present water demand. APSEZ does not draw any ground water. The desalination plant of additional capacities will be installed on modular basis considering future development and requirement.

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	region. This might increase the TDS and chloride levels in the ground water in future.						
7.2	Due to induced growth in the region, pressure on the available ground water source would increase and this could pose some threat to salinity ingress.	Level-2	Ground water is not drawn by APSEZ for its operations. Natural streams (seasonal rivers) passing through the APSEZ area will not be disturbed, the micro-watershed in the area will not be disturbed.	The Govt. of Gujarat, Narmada, Water Resources, Water Supply & Kalpsar Dept.,(WRD)12 has been implementing various salinity ingress prevention projects	District Administration*	Long Term	<p>APSEZ will co-operate and comply with the directions from concerned regulatory authorities.</p> <p>APSEZ does not draw any ground water for the fresh water requirement.</p> <p>However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals.</p> <p>Water conservation Projects i.e. Roof Top Rainwater Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up.</p> <p>To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch</p>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance											
			<p>Due to the above reasons, the possibility of salinity ingress due to APSEZ development is not envisaged. Mundra and Anjar blocks fall under fresh water to medium salinity zones. It can be observed that little variation was observed in the ground water salinity levels from year 2013 to 2016 across the Mundra and</p>				<p>project "Sanrakshan" in coordination with GUIDE and Sahjeevan.</p> <p>Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures.</p> <p>WORK COMPLETED:</p> <p>Below tabulated Water Conservation Projects completed during Compliance period:</p> <p>Water Conservation Projects:</p> <p>Swajal Project:</p> <ul style="list-style-type: none"> ➤ Aim: The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district. ➤ Water Security Plan: Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared for the Seven villages. <table border="1"> <thead> <tr> <th>Block Name</th> <th>Water conservation structure</th> <th>Total no. of Structure</th> <th>Total Capacity Created (CUM)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Mundra</td> <td>Check Dam</td> <td>23</td> <td>6,07,332.80</td> </tr> <tr> <td>Pond Deepening</td> <td>66</td> <td>1,89,121.08</td> </tr> </tbody> </table>	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)	Mundra	Check Dam	23	6,07,332.80	Pond Deepening	66	1,89,121.08
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			Anjar blocks. This aspect confirms that the overall salinity ingress from the shore into the land due to existing APSEZ facilities and power plant outfalls are less significant.				<table border="1"> <tr> <td>RRWHS</td> <td>275</td> <td>2750</td> </tr> <tr> <td>Recharge Borewell</td> <td>209</td> <td>-</td> </tr> <tr> <td>Percolation Well</td> <td>24</td> <td>-</td> </tr> </table> <p>Earlier Completed Activities/Projects:</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Project</th> <th>Unit</th> <th>Outcome</th> <th>Impact</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Check dam Restrengthening-Nana Kapaya</td> <td>1</td> <td>Water Storage Capacity increased by 48000 Cum</td> <td>60 + farmer's 120+Acre Area of Agri land can be irrigated</td> </tr> <tr> <td>2</td> <td>Recharge Borewell</td> <td>21</td> <td>Reduce Salinity ingress, and preventing water run</td> <td>150+ farmer's 260+ Acre Area of Agri land for irrigated</td> </tr> <tr> <td>3</td> <td>Pipe Culvert at Checkdam at Bhujpur</td> <td>1</td> <td>prevent water runoff into seaside.</td> <td>35 farmers' 120+Acre Area of Agri land can be irrigated</td> </tr> </tbody> </table>	RRWHS	275	2750	Recharge Borewell	209	-	Percolation Well	24	-	Sr. No.	Project	Unit	Outcome	Impact	1	Check dam Restrengthening-Nana Kapaya	1	Water Storage Capacity increased by 48000 Cum	60 + farmer's 120+Acre Area of Agri land can be irrigated	2	Recharge Borewell	21	Reduce Salinity ingress, and preventing water run	150+ farmer's 260+ Acre Area of Agri land for irrigated	3	Pipe Culvert at Checkdam at Bhujpur	1	prevent water runoff into seaside.	35 farmers' 120+Acre Area of Agri land can be irrigated
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							<ul style="list-style-type: none"> • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. <p>With the objective of to preserve the rainwater to</p>

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							<p>reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water.</p> <p>Narmada Water Resources, Water Supply & Kalpsar Dept., (WRD)1 has been implementing various salinity ingress prevention projects. Under Sardar Sarovar canal project, Govt. of Gujarat has proposed to implement about 8200 Km stretch of water canal and the project is at various stages of implementation. Under this project about 112,000 ha of land in about 180 villages will be benefitted with irrigation needs. This will significantly reduce the pressure on the ground water resources in the region.</p>
				<p>While the individual industries in the study area will continue to undertake ground water quality monitoring as per the</p>	<p>All Concerned Stakeholders, District Administration and CGWB*</p>	<p>Continual Process</p>	<p>APSEZ (9 Locations – half yearly) & Adani Power Ltd. (5 Locations – quarterly) is carrying out ground water sampling and reports of the same are being submitted to the regulatory authorities on regular basis.</p> <p>The summary of APSEZ ground water quality monitoring for last six months (Oct'23 to Mar'24) are as below. Nos. of Location: 09</p>

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from Ground Level												
8	Waste Management											
8.	Solid waste will be generated from industrial	Level-2	APSEZ has been adopting Zero waste Initiatives	APSEZ will continue to adopt Zero Waste Initiative and wastes will	APSEZ	Continual	Presently APSEZ has implemented Zero waste Initiatives as per 5R (Reduce, Reuse, Recycle, Recover & Reprocess) principles of waste management. At present, APSEZ has developed material recovery facility for 6.0 TPD capacities. A well-established					

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1	activities of APSEZ and other permitted facilities in the study area including Mundra town. These wastes would contain recyclable material, construction debris, organic waste, inert material and e-waste etc. In the absence of any organized source segregation programs		and the entire waste generated from existing operations is segregated and disposed to recycling vendors, thereby APSEZ has achieved zero landfill status as on date.	be segregated at source and disposed to various recycling vendors, co-processing in cement plants. This initiative helps not only to reduce the waste to landfill significantly, but also to recycle the materials there by avoiding ecological impacts.		Process	<p>system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plants for Co-processing as RDF (Refused Derived Fuel). The same practice will be continued in future also. APSEZ has also been recognized for Zero Waste to Landfill certification from reputed organization.</p> <p>APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUV Rheinland India Pvt. Ltd. (valid up to 31.05.2024). Details of the same were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21.</p> <p>APSEZ is being done proper solid waste management in his operational area with 5R principle as per Waste Management Plan.</p>

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	and material recycling strategies and infrastructure facilities, these wastes will enter into environment and would pose long term health impacts.						
8.2	Considering an average solid waste generation of 0.25 Kg/person/day, the estimated solid waste from facilities within	Level-2	APSEZ has made a provision for central waste management facilities within the existing site based on the future needs. As part of the Zero Waste	The existing waste segregation and material recycling facilities will be augmented to dispose safely the wastes generated from APSEZ areas. Solid Waste Management Program shall be	APSEZ	Continual Process	Industries located within the SEZ area are also complying with the waste management rules stipulated by statutory authorities and same is also being confirmed by APSEZ as well SPCB on regular basis.

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	APSEZ will be in the order of 100 TPD (36,500 TPA).		Initiatives, no landfill facilities will be installed at APSEZ.	adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016			
8.3	About 35 TPD (13,000 TPA) of solid waste would be generated from the proposed industrial areas located outside the APSEZ area.	Level-2	As per the MSW Rules 2016 all the industrial facilities and SEZs are required to adopt waste segregation facilities at the respective properties and non-recyclable waste shall be disposed	Solid Waste Management Program shall be adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016	All Industries	Continual Process	

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			to landfill sites.				
9	Ecological aspects (terrestrial and marine)						
9.1	About 1576 ha of shrub forest land contiguous to APSEZ area is applied for land diversion for various developmental activities. This might have certain level of changes in the biodiversity	Level -1	It is noted that the designated forest land is free from any native vegetation and comprises of Prosopis juliflora. It is also noted that no endangered species are present at the shrub forests that are applied for land	APSEZ has approached concerned authorities for diversion of designated forest land. Suitable compensatory afforestation plan shall be adopted based on the recommendations and directions of the concerned authorities. Due to adoption of compensatory afforestation program through a scientific manner, the	APSEZ/State Forest Department*	Long Term	Stage – 1 Forest clearance granted for diversion of 1576.81 Ha Forest land. APSEZ has applied for getting EC & CRZ clearance for SEZ / Industrial Park in 1576.81 Ha Forest land. ToR accorded by MoEF&CC on 30.11.2021 and draft EIA is being carried out through NABET accredited consultant.

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	in the study area.		<p>diversion. It is also noted that no forest produce is reported from this designated forest land parcel due to lack of economic importance of plant species reported in the shrub forest. It is also noted that no tribal lands are located in the designated forest land parcel. Hence there</p>	<p>overall ecological footprint in the district will be increased. Due to plantation of native tree species as part of greenbelt development, the overall biodiversity of the region will increase considerably when the project is fully developed.</p>			

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			will not be any change in biodiversity due to the proposed diversion.				
9.2	Mangrove conservation areas are located adjacent to the APSEZ area. Accidental discharges of industrial effluents into the marine environment would pose certain ecological risk.	Level -1	No development activities will be undertaken within mangrove conservation areas. APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations across the	Mangrove footprint and health status shall be monitored annually	APSEZ	Continual Process	<p>As per study conducted by NCSCM in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr.</p> <p>Last study was carried out in the year 2019 and based on that there is an increase of mangrove cover between March 2017 (Total 2340) and September 2019 with an extent of 256 Ha (Total 2596 Ha Area) which is about 10.94% rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.</p> <p>Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.</p> <p>Analysis of data between categories indicated that there was an increase in dense mangroves along with the conversion of scattered into sparse, that shows the</p>

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			<p>coast of Gujarat state in consultation with various organizations The Adani Foundation introduced 'Mangrove Nursery Development and Plantation' scheme in the area as an alternative income generating activity for the people of the region.</p>				<p>growth of mangroves in a progressive direction.</p> <p>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Recommendations</th> <th>Compliance</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Mangrove mapping and monitoring in and around APSEZ</td> <td> <ul style="list-style-type: none"> APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island. As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.94%. </td> </tr> </tbody> </table>	Sr. No.	Recommendations	Compliance	1.	Mangrove mapping and monitoring in and around APSEZ	<ul style="list-style-type: none"> APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island. As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.94%.
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								<p>mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <ul style="list-style-type: none"> Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). The cost of the said study was INR 23.60 Lacs incurred by APSEZ.

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								2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.
							2.	<p>Tidal observation in creeks in and around APSEZ</p> <ul style="list-style-type: none"> • APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. • The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. • The cost of the said activity was INR 1.0 Lacs.
							3.	<p>Removal of Algal and Prosopis growth from mangrove areas</p> <ul style="list-style-type: none"> • Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was Rs. 80000 Lacs during the FY 2022-23/2023-24.

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									<p>The report of algal removal is attached as Annexure - 1.</p> <p>4. Awareness of mangroves importance in surrounding communities</p> <p>Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. Adani Foundation provides Good Quality dry and green fodder to 29 Villages. Project is covering total 16000 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg.</p> <ul style="list-style-type: none"> Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. Grass Land development: 213 acres of gauchar land has been cleaned and allocated for Grass land

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									<p>development with strong Community Contribution and Mobilization.</p> <ul style="list-style-type: none"> • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. • APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on 28th July 2023 to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The report of day celebration was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23.. • Refer CSR report attached as Annexure - 2.

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							<p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial disputes and no proper response from NCSCM side regarding resolution, the work order has been revoked.</p> <p>After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis for a better review of the mangroves, APSEZ issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work was 23.60 Lacs (Including Taxes), which was paid by APSEZ.</p> <p>GUIDE has completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of the report of Monitoring and Distribution of the Mangroves was submitted during the last EC compliance report submission Apr'23 to Sep'23.</p>

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							<p>According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradi Mata, Navinal, Bocha and Khari creeks and also in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. Hence overall mangrove cover was considered as 2596 Ha in year 2019.</p> <p>Now, according to GUIDE Mangrove monitoring study report November 2023 (The Report was submitted during last EC compliance report submission Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi Mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021. The mangrove cover in the creeks in and around APSEZ</p>

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							<p>showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.</p> <p>Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%).</p> <p>To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</p> <p>Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hecter plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE,</p> <p>These plantations are diligently maintained and</p>

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							<p>continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem.</p> <p>Mangrove plantation done at Luni Sea coast with school students on "International Day for the Conservation of the Mangrove Ecosystem" on 26th July-2023 and Bhareswar sea coast area with fisher folk community on "World Nature Conservation Day" on 28th July-2023.. Web talk show was organized on the occasion of "International Mangrove days On Multi species Mangrove biodiversity with Joint effort of GUIDE and Adani Foundation, Mundra. 8th June is celebrated as world ocean day. Adani foundation had celebrated the world ocean day by coastal cleaning activity at Mandvi Beach.</p>
9.3	Outfall from the thermal power plants desalination and CETP would pose	Level-1	A detailed marine hydro-dynamic and dispersion modelling of the study area indicates that the	All approved marine outfalls shall be monitored for salinity, temperature and other designated parameters as per consent to	APSEZ and Concerned Industry	Continual Process	<p>Presently marine monitoring is being carried out by the Adani power plant at the marine outfall locations and reports are being submitted to the concerned authorities on regular basis.</p> <p>APSEZ is carrying out Marine monitoring once in a month at 9 locations in deep sea by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. The analysis reports of the same are being submitted to the</p>

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	certain level of impact on the marine environment.		background temperature and salinity at mangrove conservation area will not increase from the prevailing background levels as the outfalls are located far away. APSEZ and respective power plants in the study area have been monitoring the marine water quality status on monthly basis for the stipulated environment	establish issued by GPCB. Existing marine environmental monitoring program shall be continued.			<p>concerned authorities on regular basis.</p> <p>Adani power plant is also doing marine water quality at 5 locations (2 locations at outfall location) in deep sea by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment & Research Labs Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. The summary of marine water quality is shown above.</p> <p>The comparison of marine water results between CIA and current monitoring data are as below.</p> <table border="1"> <thead> <tr> <th rowspan="2">Parameter</th> <th rowspan="2">Unit</th> <th colspan="2">Max</th> <th colspan="2">Min</th> </tr> <tr> <th>CIA</th> <th>Present</th> <th>CIA</th> <th>Present</th> </tr> </thead> <tbody> <tr> <td>Temp.</td> <td>°C</td> <td>29.8</td> <td>30</td> <td>24.2</td> <td>30</td> </tr> <tr> <td>Salinity</td> <td>ppt</td> <td>40</td> <td>36.7</td> <td>35.2</td> <td>7</td> </tr> </tbody> </table> <p>As per above results, it can be seen that there is no major deviation in the concentration of parameters and thus indicates that impacts are insignificant.</p>	Parameter	Unit	Max		Min		CIA	Present	CIA	Present	Temp.	°C	29.8	30	24.2	30	Salinity	ppt	40	36.7	35.2	7
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			al and ecological parameters.				
9.4	Terrestrial Ecology: Study area doesn't have any notified national parks or ecological sanctuaries. Since the area falls under dry deciduous shrubs. Due to scanty rains in the area, the overall natural green-cover/vegetation in the area is very small.	Level-1	APSEZ has developed greenbelt in an area of 550ha as against the committed area of 430ha. A dedicated nursery is set up to promote plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.	The compensatory afforestation area to be monitored annually to check the survival rate of the plantation.	APSEZ	Continual Process	APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial plantation/greenbelt development. APSEZ, Individual SEZ Industries and Adani Power Plant has developed approx. 700 Ha. area as greenbelt within the APSEZ area including SEZ industries & Adani Power Plant. Dedicated horticulture department is maintaining and monitoring the terrestrial green belt development on regular basis to check the survival rate of plantation. Total expenditures of the horticulture dept. of APSEZ during the FY 2023-24 within APSEZ is INR 904 lakhs.

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10	Socio-economic aspects						
10.1	Population growth in the Mundra region was reported to be in the order of 85% during the past decade (2001-2011). Further expansion of the urban area could be possible due to induced economic growth in the region. Increase in population will have a additional need for public infrastructure in the region.	Level-1	Dedicated townships are developed within APSEZ area with necessary community infrastructure s such as hospital, school, recreational facilities, sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the principal themes such	The existing townships will be expanded to accommodate about 4lakh people when the project activity is fully developed.	APSEZ	As and When Required	<p>APSEZ has developed two townships (Shantivan and Samudra) accommodating 2302 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 95.57% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ.</p> <p>At present 46 nos. of industries (processing & non-processing) are operating within the SEZ. Township facilities are also made by SEZ industries within Mundra town for their employees having basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities.</p> <p>The existing social infrastructure facilities are adequate to accommodate the people considering present APSEZ development. The existing townships with associated facilities will be expanded as per requirement. Other infrastructure facilities have been developed for people are as follows.</p> <ul style="list-style-type: none"> • Multi-Specialty Hospital • School

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			<p>as education, community health, sustainable livelihood and rural infrastructure. About Rs. 97 Cr has been spent on various CSR activities in the Mundra region since 2010. Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.</p>				<ul style="list-style-type: none"> • Commercial complex • Religious place <p>APSEZ is actively working with local community (including fishermen community) around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation in the main five persuasions is mentioned below.</p> <ul style="list-style-type: none"> • Community Health • Sustainability Livelihood – Fisher Folk • Education • Rural Infrastructures • Skill Development <p>Adani foundation has spent approx. INR 8515.06 lakhs from April – 2018 to March – 2024 for CSR activities which also includes cost of rural infrastructure projects.</p> <p>Major works carried out since April 2018 as a part of CSR activities are as below.</p> <p><u>Current FY 2023-24 infrastructure development activities:</u></p> <ul style="list-style-type: none"> • 377 - AC Roof sheet support to Fisherfolk Vasaha 1700+ Benefited.

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							<ul style="list-style-type: none"> • 2 Development of Common Gathering flooring work – 4000+ Benefited. • 195 Stall – Vegetable market– 900+ Benefited. • Solar Panel System at Mundra – 600+ Benefited. • Maintenance, Fencing & Material Support - 30+ Benefited. Renovation of Shed at Shekranpir Bhopavandh - 2000+ Benefited. • Renovation Check dam and CC road work at Nani Khakhar – 200+ Benefited. • Renovation of High School at Zaarapa – 2200+ Benefited. • Construction of Pipe Culvert – 400+ Benefited. • Construction of chain-link fencing at Mangra village – 300 people benefited. • Gaushala Shed at Zarapara village – 400 cattle benefited. • Renovation of approach road, Zarpara – benefiting 400 villagers. • Renovation of Civil and Electrical Work at ITI, Mundra - 500 students benefited. • Construction of 21 Borewell Recharge in Nagmati River - 150+ farmer benefited. • Check dam Desilting and restoration at Nana Bhadiya – 100+ farmers benefited. • Renovation of Check dam at Pavadiyara village - 300 people benefited. • Renovation of Balwadi at Juna bandar & Luni bandar.

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							<ul style="list-style-type: none"> • 185 RRWHS construction is ongoing in various villages - will benefit 1300+ residents. • Supply & installation of Solar panel (3.25 KV) at CGP, Mundra – benefiting 1200 people. • Development of Model Farm in Zarpara, Siracha & Mangra – Benefiting 300 people. • Renovation of approach road at various fisherfolk vasahat. <p><u>Last FY 2022-23 infrastructure development activities:</u></p> <ul style="list-style-type: none"> • 40 RRWHS structure have been completed • 208 Bore-well recharging activity is completed. • Percolation well Recharging work at Bhadiya & Mota Kandgra village. • Sluice gate Construction to Control Flood during Flooding at Khoydivadi Vistar Bhujpur. • Pond Beatification and Bund Strengthening at Bhujpur village. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • commissioning of Community Training Centre at Shekhadiya. • Two Pond Deepening at Zarpara under Amrut Sarovar Yojna. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan.

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							<ul style="list-style-type: none"> • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • JCB & Hitachi Machine Support for Pre-Monsoon activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • 3 Re-strengthening of Approach Road. • Renovate Blood storage Lab CHC Mundra • Renovation Blood storage Lab CHC Mundra. • Constructed 2 nos. of CC Road of 700 mtr. • Constructed Community Training center Shekadiya. • Constructed 2 nos. Disable Widow Toilet Block • Installed R.O. Plant at Mokha with capacity 1000ltr /HR. • Constructed 4 nos. Common gathering Open Shed • Constructed 03 nos. of Water Tank at Luni Bandar. • Developed of Cricket Ground at Hatdi Village • Pond Deepening work at Vadala & Mota Bhadiya • Artificial recharge borewell in Borana, Mangara & Dhruh village. • Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total 50 beds are constructed, drinking water and sanitation plus recreational – TV Facilities.

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10.2	The overall sex ratio was found to reduce by 28% in the Mundra taluk (study area) during the period 2001 - 2011. This could be attributed to increase in influx of working men in the region due to rapid economic development. Similar trend might continue in future due to induced economic growth in the region.	Level-2	Adani foundation is taking up several girl child education programs as part of CSR activities to create awareness about girl child protection.	Suitable regional level awareness programs on the girl child protection and encouragement programs in line with state and national policies shall be adopted under Corporate Social Responsibility programs in association with district authorities.	APSEZ, Other development projects and District Administration*	Long Term	<p>Major works carried out since April 2018 as a part of CSR activities to create awareness about girl child protection are as below.</p> <ul style="list-style-type: none"> The Adani Foundation provided scholarship support to motivation and encouragement of fishermen boys and girls for higher education under this program. We extend 100% fee support to female candidates and 80% to male candidates."W. Student Benefitted Under Uthhan Project: <table border="1"> <thead> <tr> <th>Utthan Initiatives</th> <th>Benefitted</th> </tr> </thead> <tbody> <tr> <td>Strengthening government Primary & High schools</td> <td>31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.</td> </tr> <tr> <td>Appointing an Utthan sahayak</td> <td>70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.</td> </tr> <tr> <td>Mainstreamed Progressive learner</td> <td>Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.</td> </tr> <tr> <td>Providing required resources and facilities</td> <td>Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.</td> </tr> <tr> <td>Enabling joyful learning spaces</td> <td>Smart Class with Navneet software+ Bala painting + Activity base learning.</td> </tr> </tbody> </table>	Utthan Initiatives	Benefitted	Strengthening government Primary & High schools	31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.	Appointing an Utthan sahayak	70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.	Mainstreamed Progressive learner	Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.	Providing required resources and facilities	Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.	Enabling joyful learning spaces	Smart Class with Navneet software+ Bala painting + Activity base learning.
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							<ul style="list-style-type: none"> • Uthhan Project promotes girl child education, creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samridhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it. • AVMB School Bhadreswar where Free of Cost education is provide to Poor and Needy Family Child up 10 standards More than 500 Students are benefiting every year. • Separate sanitation facilities for girl child in schools. • Menstrual Hygiene Awareness: To educate and empower rural girls and women about menstrual health, break down negative social views on menstruation, supply to enhance their overall health, education, and empowerment." • Till date 36% women had never used sanitary Napking single time now they started using due to our intervention. This will reduce UTI @ 22%. As our sample survey. 1587 Women and 494 School girls from 18 nos. of villages. • Beti Vadhavo Programme was organized in 32 Villages in the presence of Village Sarpanch and other leaders in year 2017-18. We explained people about the various topics i.e. importance of girl child, Sex Ratio, Gender Equality and laws regarding Child abortion. This initiative was well accepted by community and we have observed a visible change in their mindset.

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							<ul style="list-style-type: none"> • During the year various activity like, Covid-19 awareness in village & Slum Area, Menstrual Hygiene Day, Breastfeeding Week, National Deworming Day, National Nutrition Month had been celebrated. • Project Suposhan is initiated with the Motive to focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescents under this Project and brought them to considerable status. Curb malnutrition amongst Children, Adolescent girls and Women in our CSR villages. <ul style="list-style-type: none"> ✓ 204 beneficiaries covered in Breastfeeding Week ✓ 320 beneficiaries covered in National Deworming Day ✓ 20 villages covered in celebration of NATIONAL NUTRITION MONTH ✓ 42 FAMILY COUNSELLING ✓ 2059 Women participated in celebration of Women's Day week. • To reduce malnutrition and anemia amongst Children 95 % & adolescent girls and pregnant & lactating women by 70 % in three years • Reduction IMR and MMR • Support Awareness & Cover 100 % Vaccination taken by Child & women. • SuPoshan Thanksgiving program was organized. In this webinar DDO, CDPO Mundra and other

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							<p>dignitaries remained present and appreciated the efforts to overcome malnourishment in Mundra and Bitta.</p> <ul style="list-style-type: none"> The National girl child day was celebrated with ICDC Department with Vahli Dikri Yojna form filling, paediatric health camp and Baby health kit distribution at Mundra. Mrs. Ashaben-CDPO Mundra was remain present in this event. Total 61 forms has received approval letter from GOG and 15 forms filled upon the same day. Adani Foundation is working with 15 Self-help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area. <p>About INR 8515.06 lakhs has been spent on various CSR activities in the Mundra region since April 2018 to till March 2024 including cost of community health and education for woman and girl child.</p>
10.4	Due to economic growth leading to rapid urbanization, which prompts the	Level-2	Adani hospitals, Mundra is setup by Adani group near Samudra township with a goal to provide	APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the growth scenario at	APSEZ	Long Term	<p>Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township.</p> <p>Primary health center and community health center are in place within the Mundra taluka.</p>

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	<p>need for healthcare facilities in the region. For an influx of 6 lakh people from APSEZ operations and additional 3 Lakh from induced growth by the year by 2030 (fully developed scenario), total hospitals facilities with about 540 beds would be required.</p>		<p>primary and secondary health care services to Adani group employees and the local populace of Mundra. The existing 100 bed Adani hospital at Mundra has been catering the services ranging from wellness and preventative care.</p>	<p>APSEZ development.</p>			<p>Other than this Adani foundation is doing various activities as part of community health. The details of last year are as below.</p> <ul style="list-style-type: none"> • Mobile Health Care Units and Rural Clinics • 07 Rural Clinics • 05 villages of Mundra & 02 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 : -23327 (direct & indirect) by Mobile van and rural clinic • 2 financially challenged patients has been supported with Dialysis treatment at 124 Times which added day in their Life. • Provided 41,546 medical health services and conducted health awareness camps for 763 High school students. • Cataract-Free Mundra: The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below. <p>Lives Impacted: - 1131</p> <ul style="list-style-type: none"> ➤ Comprehensive Eye Screenings at Village level ➤ Cataract Surgeries to GKGH, Bhuj ➤ Post-Operative Care and Follow-up ➤ 5 successful Operation

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							<p>Health camp:</p> <ul style="list-style-type: none"> • Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and other are conducted in core villages as well as in labour colonies. • Specialty health (Gynec, ophthalmic, specialty health camp): - 5795 Patients Benefited. • General health camp: - 1618 Patients benefited. • Blood Donation Camp: 1715 people have donated blood. • Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being. • Women's Health: Provided health services to more than 2610 women benefitted through Menstrual & Mental Health Awareness Drive. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 124Times which added day in their Life. • Medical Supports: 1007 beneficiary in 35 village. • International year of Millets – 2023: To promote millet culture and raise awareness about its benefits in Mundra, we organized a Millet Competition across nine villages. Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this

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							<p>initiative, 300 indigenous millet recipes were showcased, highlighting the potential for sustainable and nutritious dishes in our daily diets.</p> <ul style="list-style-type: none"> • Ayushman card facilitation: Ayushman card issued to 5584 for 25 village of 686.50 Cr. health insurance. • Preventive health Campaign the Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body. • Sample Survey Report 2023-24 <ul style="list-style-type: none"> ○ 55% Never heard about Menstrual hygiene. ○ 60% Are using cloths on regular basis. ○ 36% Had never used sanitary pads. ○ 68% Had no information about UTI. ○ 30% Never used millets in their diet. ○ 60% Never heard about millets or it's benefits. • 2222 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 7 villages and Super specialist

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							<p>camp which benefitted more than 4690 patients of Mundra & Mandvi Taluka.</p> <ul style="list-style-type: none"> • Cattle Health Camp: Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages with total 18903 cattle benefitted, and 18870 cattle vaccinated. Total 982 cattle owners benefited for Preventive Health Care & Fodder Support Program • Present Hospital facilities are adequate to avail the medical treatment for Mundra region considering present development. Other Occupational Health centres, primary health centres and community health centres are also in place in Mundra to take care the people residing in Mundra. Adani group is also operating high quality health care services to the people of Kutch at G. K. General Hospital, Bhuj having 750 beds facilities on public private partnership (PPP) model, which is 60 km far from Mundra. <p>APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the future development at APSEZ.</p>
	Due to rapid economic development in the region, several		APSEZ has been giving preferences to people from Gujarat for	APSEZ is committed to			<p><u>Current FY 2023-24 fishermen livelihood activities development activities:</u></p> <p><u>Overall Persistent efforts for Fisherman development:</u></p>

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10.5	<p>employment opportunities can be generated to the local people.</p> <p>When the area is fully developed by the end of 2030, the working population of the Mundra taluk would increase from current level of 55,000 to as high as 4,00,000, which will be 45% of the total envisaged population in Mundra Taluk by the end of 2030.</p>		<p>providing employment opportunities based on eligibility and skills. In Mundra, special programmes have been conducted by Adani Foundation to enhance the employability of youth from fisherfolk communities. Based on the need assessment results, several livelihood options have been introduced by the Adani Skill Development Centre, Mundra. In</p>	<p>provide support for fishermen livelihood activities and has submitted a detailed 5 years plan to MoEF&CC with a total budget of Rs.13.5 Cr.</p>	APSEZ	Short Term	<ul style="list-style-type: none"> • 598 Education Kit Support • 273 Fisherman Shelter Support • 1,247 Vehicle transportation support of Mundra and Mandvi taluka • 106 Cycle Support to high school going students. • 613 Scholarship Support • 419 Youth Employment • 195 Linkages with Fisheries Scheme • 3,534 Ramatotsav Community Engagement • 56,523 Man days Mangroves Plantation • Vehicle Transportation Facilities: 146 Students supported Mundra Taluka and 58 Students supported at Mandvi Taluka during the compliance period. • Education Kits Support: Education Kits including notebooks, guides, and bags, to fisherfolk students studying in 9th to 12th standard to enhance their learning experience (57 nos. students benefitted). • Educational Awareness Sessions: Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on advancing girl-child education. (487 Students motivated for high school Education). • Scholarship Support: Provide scholarship support to 31 deserving students, covering their higher

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			<p>these centres, youth can join and get vocational training for a number of technical and non-technical skills.</p> <p>An industrial Training Institute is set up at APSEZ, Mundra, to enhance the skill levels of the local youth to maximum possible extent.</p>				<p>secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates.</p> <ul style="list-style-type: none"> • Cycle Support: Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease. • Assisting During Emergencies: Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery. (336 Fisherfolk house benefited) • Fostering Youth Employment: At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future. (115+ Fisherfolk youth employed) • Strengthening Fisherfolk women: Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support. (449 Women benefited)

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							<ul style="list-style-type: none"> • Potable Water Distribution: Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity. (5000+ Population benefited). • Cement Roof Sheet Support: fisherfolk Home were significantly damaged by the Bipor Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery." • Potable water Distribution: Providing access of potable Drinking water Facilities to Nine fisherfolk vasahat on Daily bases, either By Water tanker or Linkage with Nearest Gram panchayat. • More than 5000 Fisherfolk Population are getting benefit which impact on their health and efficiency. • Water distribution to Luni & Bavadi Bandar Fisherfolk Vasahat: 35000 KL water for 936 people. • Sagar Mitra Card: Introduced the 'Sagar Mitra Card' to simplify access for Fisherfolk to specific fishing routes within APSEZ. This digital card is connected to a digital punching machine located at designated entry points. Initially, we have implemented this system for Navinal

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							<p>Fisherfolk, and so far, we have issued a total of 57 Sagar Mitra Cards."</p> <ul style="list-style-type: none"> Government scheme Awareness session was held in association with Fisheries department Bhuj to facilitate pagadiya fishermen by providing fishing kits to seven Fishermen. The coordination was made by Adani Foundation to process application. More than 35% of enrolled students in AVMB come from the Fisherfolk community. Youth Employment: Our main objective is to offer sustainable employment opportunities to the local fishing community in APSEZ Mundra. We bridge the gap between industries and Fisherfolk youth by facilitating job placements. Currently, we have successfully engaged a total of 12 Fisherfolk youth in this endeavor. Vidya Sahay Yojana – Scholarship Support: All basic education supportive facilities have been created to promote education in fisher folk community. We are deeply committed to empowering the future of fisherfolk communities through education. To this end, we provide scholarship support to 30 deserving students, covering their actual school fees. In our unwavering commitment to promoting gender equality and advancing girl child education, we extend 100% fee support to female candidates and 80% to male candidates."

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							<ul style="list-style-type: none"> • During FY2023-24 Approx. INR 122.32 lakh were spent for Fisherfolk Amenities work in different core areas • Till FY 2023-24 , Adani Foundation has done total expenditure of INR 1460.51 lakh for Fisherfolk Amenities work in different core areas. <p>APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes:</p> <ul style="list-style-type: none"> • Vidya Deep Yojana • Vidya Sahay Yojana – Scholarship Support • Adani Vidya Mandir • Fisherman Approach in SEZ • Machhimar Arogya Yojana • Machhimar Kaushalya Vardhan Yojana • Machhimar Sadhan Sahay Yojana • Machhimar Awas Yojana • Machhimar Shudhh Jal Yojana • Sughad Yojana • Machhimar Akshay kiran Yojana • Machhimar Suraksha Yojana • Machhimar Ajivika Uparjan Yojana • Bandar Svachhata Yojana <p>These initiatives are planned for the period 2016 – 2021 with a committed expense of INR 13.5 Cr as submitted earlier in detail in the report namely "Silent Transformation of Fisher folk at Mundra",</p>

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							Till, FY 2023-24 approx. 14.61 Cr. INR, has already been spent in support for fishermen livelihood activities. Further, details regarding the expenditure incurred against the commitment are attached as Annexure - 11 .