Half Yearly EC Compliance Report WFDP Submission for Period April'23 to Sept. 23

Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>

Thu 11/30/2023 2:58 PM

To:eccompliance-guj@gov.in <eccompliance-guj@gov.in>;iro.gandhingr-mefcc@gov.in <iro.gandhingr-mefcc@gov.in>
Cc:ec-rdw.cpcb@gov.in <ec-rdw.cpcb@gov.in>;ro-gpcb-kute@gujarat.gov.in <ro-gpcb-kute@gujarat.gov.in>;ms-gpcb@gujarat.gov.in <ms-gpcb@gujarat.gov.in>;mefcc.ia3@gmail.com <mefcc.ia3@gmail.com>;monitoring-ec@nic.in <monitoring-ec@nic.in>;direnv@gujarat.gov.in <direnv@gujarat.gov.in>;Charanjit Singh <Charanjit.Singh@adani.com>;Sujalkumar Shah <sujal.shah@adani.com>

1 attachments (20 MB)

EC Compliance Report_WFDP 2009_Apr'23 to Sep'23.pdf;

adani
Ports and Logistics

APSEZL/EnvCell/2023-24/063 **Date:** 28.11.2023

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: eccompliance-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 April 2023 to September 2023 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**

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.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

adani

Ports and
Logistics

APSEZL/EnvCell/2023-24/063 **Date:** 28.11.2023

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: eccompliance-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 April 2023 to September 2023 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**

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.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

adani
Ports and Logistics

Environmental Clearance Compliance Report

Waterfront Development Project, Mundra, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited Mundra, Kutch

For the period of
April-2023 to September-2023

Index

adani Ports and Logistics	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'23 To : Sep'23

Status of the conditions stipulated in Environment and CRZ Clearance

The 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 Mm^3. Overall dredging to the tune of 123 Mm^3 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.

adani Ports and Logistics	**Adani Ports and Special Economic Zone Limited, Mundra.**	**From : Apr'23** **To : Sep'23**
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.

Compliance Report of Environmental 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 30-09-2023
Specific Conditions		
i	No existing mangroves shall be destroyed during construction / operation of the Project.	Complied. **<u>Conservation of mangroves:</u>** • 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. As per MoEF&CC directive, 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. 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.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• 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 (attached as Annexure-1), 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</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th colspan="3">Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td></td><td></td><td>during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.
• 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.

Summary of Mangrove mapping and monitoring (from 2011 to 2021):
<table>
<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>%</th></tr>
<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</td><td>2670</td><td>74</td><td>2.85%</td></tr>
<tr><td>2019 to 2021 till March</td><td>2723</td><td>53</td><td>1.99%</td></tr>
<tr><td>Total</td><td>2723</td><td>629</td><td>28 %</td></tr>
</table></td></tr>
<tr><td></td><td></td><td>2.</td><td>Tidal observation in creeks in and around APSEZ</td><td>• 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.</td></tr>
<tr><td></td><td></td><td>3.</td><td>Removal of Algal and Prosopis growth from mangrove areas</td><td>• 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 INR 2.35 Lacs during the FY 2022-23. The details of Removal of Algal and Prosopis growth from mangrove areas was submitted during the last compliance period Oct'22 to Mar'23.</td></tr>
<tr><td></td><td></td><td>4.</td><td>Awareness of mangroves importance in</td><td>• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023

		surrounding communities	community regarding importance of mangroves. Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 32372 Cattels / 2707 farmers and hence enhancing cattle productivity during FY 2023-24 till Sep'23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 90.20 Lacs during FY 2023-24 till Sep'23, 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 is attached as **Annexure - 2.** • Refer CSR report attached as **Annexure – 3**.

Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21.

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

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		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 is 23.60 Lacs (Including Taxes), which was paid by APSEZ. 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 is attached as **Annexure-1.** 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. Hence overall mangrove cover was considered as 2594 Ha in year 2019. Now, according to GUIDE Mangrove monitoring study report November 2023 (attached as **Annexure-1**), 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

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		2019 was 2670 ha which has increased to 2723 ha during the year 2021. 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%).
ii	There shall be no filling up of the creek and reclamation of the creeks.	Complied. **Conservation of creeks:** • 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 recent 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. • 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 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.	Complied. **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.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		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-4**.
iv	Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the High Current in the area.	Complied. 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. 1. 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. 2. The breasting dolphins have been designed in such a configuration so as to provide appropriate lead to the vessels mooring ropes. 3. The berth being in line with the current flow will facilitate Pilotage operation and provide better maneuverability of vessels. 4. The strength of the berth structure has been calculated to absorb the energy transferred to fenders while berthing of tanker vessels at the terminal. 5. Navigational buoys and lead lights marking the channel and clearing distance off the breakwater are installed. 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. 7. Sufficient depths are maintained at all times to ensure 10% UKC at the time of berthing / un-berthing. 8. The capstans / winches / bollards are of adequate strength with respect to the vessels being handled. 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. 10. Berths have been planned close to the breakwater as there is a reduced strength of current along the coastline.
v	The shore line changes in the area shall be and monitored periodically the report submitted every 6	Complied. Shore line change aspect has been studied in detail as part of following two studies;

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
	months to Regional Office Bhopal.	• 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. 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. Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years. 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 is INR 17.39 Lacs. 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. 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.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>
The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarized in below table.
<table>
<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>
<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>
</table>

The Shoreline Change Assessment Study report of GUIDE was submitted during the last compliance period Oct'22 to Mar'23.

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.

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 2018. AMBUR Methodology was used to study the historical analysis.

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.
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		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. 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. Please refer **Annexure – B** (Compliance of MoEF&CC Order dated 18th Sep, 2015) for further details regarding the mentioned studies.
vi	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.	Complied. 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. 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. LPG is being handled from the existing multipurpose terminal. A detailed risk assessment study as per MoEF&CC letter no. 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 Oct'18 to Mar'19. Reports of the same were submitted to MoEF & CC along with half yearly compliance report for the period 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. There are no other activities which attract requirement of Risk Assessment.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
vii	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.	Complied. 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. To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 3890 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 1070.8lakh. Details on Mangroves afforestation & Green belt development carried out by APSEZ till Sep'23 is annexed as **Annexure – 5**. 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 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. 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.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>Please refer attached Annexure – 3 for CSR activity report carried out by Adani Foundation.</td></tr>
<tr><td>viii</td><td>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.</td><td>Complied.

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.

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 four persuasions as below.

❖ Education
❖ Community Health
❖ Rural Infrastructure
❖ Sustainability Livelihood

Brief information about activities in the main four persuasions is mentioned below. Activities carried out for the same are summarized as below.

<table>
<tr><th>Area</th><th>Activity</th></tr>
<tr><td>Community Health</td><td>• Mobile Heath Care Units and Rural Clinics
• 07 Rural Clinics
• 06 villages of Mundra & 01 village Mandvi block has benefited by rural clinic service.
• Total Patients Benefitted FY 23-24 upto Sep 23: - 10629 (direct & indirect).
• 2 financially challenged patients has been supported with Dialysis treatment at 58 Times which added day in their Life.
• Shaping Lives: From Pagdiya Fishing to Prosperity: 01 people benefitted for oral cancer treatment.

Health camp:</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			• 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): - 1489 Patients Benefited. • General health camp: - 1448Patients benefited. • Blood Donation Camp: 1558 people have donated blood. • Women's Health: Provided health services to more than 2230 women benefitted through gynec health checkup. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 58 Times which added day in their Life. • Medical Supports: 1007 beneficiary in 35 village. • Eradicate cataract-related vision for senior citizen: benefited 473 peoples of 9 villages. • **Ayushman card facilitation:** Ayushman card issued to 5584 for 25 village. • 1071 –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 16000 cattle benefitted.
		Sustainable Livelihood – Fisher folk, Agriculture & Women	• **Vehicle Transportation Facilities:** extend vehicle transportation services to school-going children from Luni and Randh Fishermen Settlements to the AVMB School, Bhadreshwar Similarly, we ensure for Juna Bandar Fisherfolk Students to the nearest Government School (Total 218 nos. students benefitted). • **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). • **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.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			• 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 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. • **Awareness Sessions at Village Level:** Spreading awareness on natural farming benefits and address their concerns and 250 farmers benefitted. • **Hands-On Training & Exposures:** Arranged Workshop and training to emphasizing on real-world techniques (5 workshop). • **Link with Government Scheme**: facilitation of govt. Cow Nurturing scheme to promote eco-friendly farming practices (857 nos. formers benefitted). • To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield. • Adani foundation and Agri Department jointly organized district level workshop on Natural Farming Practice with Gram Seva. • **Natural farming-** 1392 farmers benefitted by 20 nos of training from which 60 farmers chemical usage is reduced to half extent in 500 Acres approximately. • 257 nos. of Facilitation of Home Biogas-under Gobardhan Yojna during FY2023-24 till Sep'23. • **Natural Farming Certification: O**btained natural farming certification through the Gujarat Organic Product Certification Agency (GOPCA) for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali. • **Marketing Assistance:** Provide platforms and resources ensuring fair prices and broader consumer reach.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			• **Dates Restoration:** Due to Bipor Joy cyclone, farming community faced a severe setback as numerous Date, Mango, and other fruit plants were damaged and uprooted. These plants, which served as a vital source of income for farmers, were left in shambles. As of the current date, 615 Date plants have been successfully restored. • **Kitchen Garden Kit:** 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. • Benefited 837 people linkages with Govt. cow based Nurturing Scheme. • Supported 1500 farmers for barrel & wormi compost. • 19 nos. of Market Linkage for supporting to Green carnival at Samudra Township & Shantivan colony Now 302+ farmers are collaborated with Mandli. • 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. • Adani Foundation has also provided 7.99 lacs kg Dry Fodder and 23.53 lacs kg Green fodder in 24 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. 90.20 Lacs during FY 2023-24 upto Sep'23. • 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. • **Grass Land development:** AF converted 213 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara, Siracha, Gundal , Kukadsar village to transform into Fodder Sustain village. **Women Empowerment:** • **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 Rs 31 Lacs. • **Making SHG Self Reliant:** ➢ 16 SHG are on pathways of self-reliance. ➢ Various handicraft, dry and fresh food making, stitching, tie and die etc.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			➢ 160+ women - Monthly average income @ 7000 of each member over Month. • **Job Sourcing – Govt:** ➢ 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:** ➢ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company. ➢ 387 Women supported till date for job sourcing of 18 villages. ➢ Average income 10200 Per Month. • **Social Empowerment:** ➢ 2 Livlihood Enhancement Training through RSETI. ➢ Financial support for business set up. ➢ Legal rights and domestic violence workshops. ➢ Family counselling for Job sourcing. • During FY2023-24 till Sep'23 Approx. INR 51.75 lakh were spent for Fisherfolk Amenities work in different core areas. • Till FY 2023-24 till Sep'23, Adani Foundation has done total expenditure of INR 1389.94lakh 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.
		Education	• Conduct baseline assessment of 6314 Students, 2541 Students were progressive learner (3 to 7 Std.). • Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office. • Exposure Visit of Project officers from three different locations to learn about the best practices. • Computer Classes in High school: 200 Students took advantage of this computer classes. • Career Counselling in 8 Utthan High Schools. • Plastic Bag Free village workshop in all High schools. • Remedial classes during summer break. • **Day Celebration:** World Book Day, World Environment Day, National Reading Day, International Yoga Day, National Plastic, Bag Free Day, Raksha Bandhan, Independence Day & Celebration of Sports Day. Planned various Capacity Building Program (CBP) & Exposure visit for Utthan Sahayak & Students.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			• **Achievements:** • Utthan sahayak motivate mothers to open an account of Sukanya Samrudhi Yojana • Utthan supported Taluka levels Kala Utsav in Primary & High Schools. • Utthan Sahayak supported Taluka level Science Fair. •06 students selected in District Level Sports School (DLSS). • Planned various Capacity Building Program (CBP) & Exposure visit for Utthan Sahayak & Students. • Provided facility for preparing JNV, NMMS & PSE examination. 877 Students preparing Competitive Exam. 354 JNV, 273 PSE & 250 NMMS.. • **Empowering Communities through Free and Compulsory Education:** Adani Vidya Mandir, Bhadreshwar, was established in June 2012 with the goal to have access of quality and cost free Education with essential amenities like food, uniforms, and books, to Financial Weaker community children of the Mundra Block. The school boasts excellent infrastructure and resources necessary for the holistic development of each student. Children are admitted to the school form Senior Kg to 10th Standard. • **Few notable points:** • We are empowering economically disadvantaged families through free and quality education. • We are fostering an environment of academic excellence. • Pioneering Excellence: The First Gujarati Medium School in Gujarat Accredited by NABET • Over 600 Students Learning Each Year in AVMB • More than 35% of enrolled students in AVMB come from the Fisherfolk community. Workshop was conducted on Mental Health and behavioral change. • AVMB got 1st rank in Vaadan, Gayan and drawing in Kala Maha Kumbh competition and selected for Next block level competition. • AVMB selected for district level Kho-kho Match competition organized by SGFI-School Game Federation of India, • 2 students selected for District Level Athletic Competition. • 100% Success: Adani Vidya Mandir Bhadreshwar's Remarkable Achievement in Gujarat Board Standard 10th Examination. • **Training Skill Development:** Conducted skill development programs for women in various fields such as tailoring, handicrafts, and food processing These training programs helped women develop their skills and start their own businesses We have trained

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			over 91 women in various skills, and many of them have started their own businesses. • Total 182 nos. of male & female trained in various skill development programme.
		Rural Infrastructure & Environmental Sustainability	Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. **WORK COMPLETED** Below tabulated Water Conservation Projects completed during Compliance period:

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 farmer's 120+Acre Area of Agri land can be Irrigated

- Home Biogas: Current year FY 2023-24 upto Sep'23 we process to facilitate 258 Gobardhan unit through Gov.
- 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.

- **Earlier Completed Activities/Project:**40 RRWHS structure have been completed.
- Total 229 nos. Bore-well recharging activity is completedPercolation 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.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			• 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. • Developed of Cricket Ground at Hatdi Village **ENVIRONMENT SUSTAINABILITY PROJECTS till Compliance period:** • **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. • **Massive Public Plantation Drives:** Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 25,000 trees were planted. • **Prakrurath:** This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 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 1.27 Lac tree plantation have been done that has enriched the local ecosystem and also significantly contributed to carbon sequestration

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023

- **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 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,
- 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 325 farmers are supported with Biogas as sustainable environment protection.
- As per SORI use of biogas each farmer can save Rs.23400/year.

Water Conservation Projects –
Below tabulated Water Conservation Projects completed during Compliance period:

Sr. No.	Project	Unit	Outcome	Impact
1	Check dam Restrengthen ing-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

Earlier Completed Activities/Projects:

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023	
			• 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.
		Skill Development	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. **<u>ASDC, Mundra</u>** • **Digital Literacy:** Digital literacy training was provided to seven students at Bhujpur Government High School, and as a part of the DEO project, certificates were distributed. • **RTG Crane operator:** RTG crane operator training is successfully given to 15 candidates. • **Beauty therapist:** The distribution of certificates for beauty therapist training celebrated the successful culmination of the program. • **Mud work:** After the mud work training in Dhrab Village, a certificate distribution ceremony was held, benefiting a total of 30 female participants. • **Advance Excel training:** Eighteen employees from Sumitomo India Ltd. Co. underwent advanced Excel training, significantly boosting their skills.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		• **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. ASDC and Thermax Foundation Done MoU. **ASDC, Bhuj:** • **Digital Literacy:** ASDC has partnered with Tally as the Knowledge Partner for its Tally - GST course. The first batch, consisting of 16 students from Bhuj location, achieved a remarkable 100% pass rate. • **Real-time exposure:** Twenty-five Nursing Assistant trainees gained valuable real-time experience in Emergency services through interactions with 108 Ambulance services and an industry visit. • We offer on-the-job training to nursing students to build their confidence and prepare them for delivering high-quality patient care. • **Hydrography training:** Provided practical Hydrography training to nine participants. • **Entrepreneurship Development Programme (EDP):** Conducted EDP training in collaboration with CED, Gandhinagar, for a total of 30 trainees. • **Placement:** We successfully hosted a placement drive at our center on April 23rd, where 11 out of 15 candidates secured positions at KK Patel Hospital with an impressive average monthly salary of Rs. 17,000. • **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 –this will give them identity, confidence and right to speak in any decision for home, village and working area. Please refer **Annexure – 3** 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 374.81 lakh is spent during the FY 2023-24 till Sep'23.
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	Complied.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td>during construction of breakwater and dredging /disposal operation.</td><td>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 Apr'23 to Sep'23 is mentioned below.

Total Sampling Locations & frequency: 09 Nos.
(Frequency: Once a month)

<table>
<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>Average</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>pH</td><td>--</td><td>7.95</td><td>8.27</td><td>8.14</td><td>7.81</td><td>8.15</td><td>7.98</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>94</td><td>154</td><td>120.26</td><td>72</td><td>128</td><td>101.04</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>2.2</td><td>3.8</td><td>3.01</td><td>BDL(MDL:1.0)</td><td>BDL(MDL:1.0)</td><td>BDL(MDL:1.0)</td></tr>
<tr><td>DO</td><td>mg/L</td><td>5.85</td><td>6.37</td><td>6.15</td><td>5.52</td><td>6.22</td><td>5.83</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>34.89</td><td>36.94</td><td>36.00</td><td>35.62</td><td>37.84</td><td>36.73</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>35860</td><td>37844</td><td>36675</td><td>36540</td><td>38124</td><td>37299</td></tr>
</table>
*BDL – Below Detection Limit
*MDL – Minimum Detection Limit

Please refer Annexure – 6 for detailed analysis reports. Approx. INR 5.08 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ, Mundra till Sep'23.

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 – 6.

Summary of ecological parameters of M/s. Adani Power (Mundra) Limited is given below:</td></tr>
</table>

		PLANKTON 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 from Apr'23 to Sep'23 (June 2023) the phytoplankton population in the coastal waters of APL-Mundra, Mundra was diverse and represented with a total of 33 phytoplankton genera (Table) belonging to diatoms (27 genera) and dinoflagellates (6 genera). Diatoms Species belonged to Amphorprora sp., Asterionella sp., Bacillaria sp., Chaetoceros sp. Corethron sp., Coscinodiscus sp., Cyclotella sp., Cylindrotheca sp., Cymbella sp., Diploneis sp., Ditylum sp., Guinardia sp., Gyrosigma sp., Lauderia sp., Leptocylindrus sp., Licmophora sp., Lithodesmium sp., Navicula sp., Nitzschia sp., Odontella sp., Pinnularia sp., Pleurosigma sp., Pseudo-nitzschia sp., Rhizosolenia sp., Synedra sp., Thalassiosira sp. and Thalassionema sp. The phytoplankton abundance in the study region was ranged from 100 to 199 cells x 10^2 L-1. The highest phytoplankton abundance was observed at Station 2 in the surface (199 cells x 10^2 L-1) and then at Station 5 in surface water (166 cells x 10^2 L-1). The lowest phytoplankton abundance (100 cells x 10^2 L-1) was observed at Station 2 in bottom water. The study shows that the marine water around was enriched with the diverse phytoplankton population. **BENTHIC DIVERSITY:** During the present study, more macrobenthos abundance and biomass were reported at subtidal stations than at intertidal stations at APL-Mundra, Mundra. The macrobenthos density ranged from 700 no./m2 to 1100 nos./m2 at sampling stations. The biomass of the microbenthic community in the study region was ranged from 1.1 g/ m2 to 1.9 g/ m^2 in the study region. The maximum abundance of benthic microorganisms was reported at Station 4 (1100 nos./m^2). The highest biomass of microbenthic species was observed at Station 5 (1.9 g/m^2). In species composition, Polychaete species (Phylum Annelida) belonging to the family Paraonidae, Pilargidae, Capitillidae, Cossuridae, Glyceridae, Ciratullidae, Nephthys sp, 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.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td>xi</td><td>Regular Monitoring of air quality shall be done in the settlement areas around the Project site and appropriate safeguard measures shall be taken.</td><td>
Complied.

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 Apr'23 to Sep'23 is mentioned below:

Air sampling locations & frequency: 12 nos. (twice a week including surrounding villages)

<table>
<tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th><th>Perm. Limit$</th></tr>
<tr><td></td><td colspan="5">AAQM</td></tr>
<tr><td>PM10</td><td>µg/m3</td><td>31.93</td><td>89.85</td><td>72.14</td><td>100</td></tr>
<tr><td>PM2.5</td><td>µg/m3</td><td>11.29</td><td>49.84</td><td>31.20</td><td>60</td></tr>
<tr><td>SO2</td><td>µg/m3</td><td>5.47</td><td>42.18</td><td>22.04</td><td>80</td></tr>
<tr><td>NO2</td><td>µg/m3</td><td>8.13</td><td>48.83</td><td>26.63</td><td>80</td></tr>
<tr><td colspan="6">Noise sampling locations & frequency: 9 nos. (once in a month)</td></tr>
<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>
<tr><td>Day Time</td><td>dB(A)</td><td>54.90</td><td>69.90</td><td>64.50</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>54.10</td><td>64.80</td><td>59.89</td><td>70</td></tr>
</table>
$ as per NAAQ standards, 2009
* as per CC&A granted by GPCB
Values recorded confirms to the stipulated standards.

Please refer Annexure – 6 for detailed analysis reports. Approx. INR 5.08Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ, Mundra till Sep'23.

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 – 6.

Following safeguard measures are taken for abatement of dust / fugitive emissions.

• Regular water sprinkling on road and other open area
• Regular cleaning of roads through mechanized equipment
</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>

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

</td></tr>
<tr><td>xii</td><td>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.</td><td>
Complied.

Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.

<table>
<tr><th>Location</th><th>Capacity</th><th>Quantity of Treated Water (Avg. from Apr'23 to Sep'23)</th><th>Type of ETP / STP</th></tr>
<tr><td>LT</td><td>265 KLD</td><td>107.1 KLD</td><td>Activated Sludge</td></tr>
<tr><td>West Port</td><td>55 KLD</td><td>16.4 KLD</td><td>FAB</td></tr>
</table>

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 Apr'23 to Sep'23 is mentioned below.

<table>
<tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th><th>Perm. Limit$</th></tr>
<tr><td colspan="6">Industrial Effluent / Sewage (For ETP)</td></tr>
<tr><td>pH</td><td>--</td><td>6.74</td><td>7.52</td><td>7.29</td><td>6.5 – 8.5</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>18</td><td>32</td><td>24</td><td>100</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>732</td><td>1106</td><td>852</td><td>2100</td></tr>
<tr><td>COD</td><td>mg/L</td><td>72.60</td><td>89.40</td><td>79.50</td><td>100</td></tr>
<tr><td>BOD (3 Days @ 27°C)</td><td>mg/L</td><td>20</td><td>27</td><td>24</td><td>30</td></tr>
<tr><td>Ammonical Nitrogen as NH_3-N</td><td>mg/L</td><td>20.60</td><td>28.80</td><td>24.50</td><td>50</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		Domestic Sewage (For STP) pH -- 7.09 7.46 7.32 6.5 – 8.5 TSS mg/L 20 32 25.17 100 BOD (3 Days @ 27 °C) mg/L 15 20 17.33 30 Residual Chlorine ppm 0.62 0.91 0.79 Min. 0.5 Fecal Coliform MPN/ 100 ml 60 130 88.33 <1000 $ as per CC&A granted by GPCB Values recorded confirms to the stipulated standards. 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. Please refer **Annexure – 6** for detailed analysis reports. Approx. INR 5.08 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ Mundra till Sep'23. 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 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.	Complied. APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation. The species such as *Ficus Infectoria, Ficus religiosa, Terminalia arjuna, Cocos nucifera, Washingtonia fillifera, Casurina spp., Azadirachta Indica, Eucalyptus spp., Jatropha curacus, Ficus bengalensis, Subabool spp., Casia fistula, Date Palm* and *Delonix regia* are grown within APSEZ area. 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

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		plantation of more than 9.06 Lacs saplings within the APSEZ area. Please refer **Annexure – 6** 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. Out of which, Approx. INR 628 lakh are spent during the FY 2023-24 till Sept'23.
xiv	There shall be no withdrawal of Ground Water in CRZ area for this Project.	Complied. 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 4.14 MLD during compliance period i.e. Apr'23 to Sep'23.
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 this regard shall be furnished to this Ministry's Regional Office at Bhopal within 3 months.	Complied. 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. 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 Apr'19 to Sep'19. During FY 2023-24 till Sep'23 monsoon Approx. 4.58 ML of rainwater has been recharged to increase the ground water table. 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 Oct'18 to Mar'19. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>
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.

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.

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.

Our water conservation work is as below.
Below tabulated Water Conservation Projects completed during Compliance period:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<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>
</table>
Earlier Completed Activities/Projects:

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.

</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		• 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. With the objective of to preserve the rain water 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 – 3** for full details of CSR activities carried out by Adani Foundation in the Kutch region.
xvi	Land Reclamation shall be carried out only to the extent that it is essential for this Project.	Complied. 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 last compliance report submission for the period 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	Complied.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td>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.</td><td>All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification.

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:

• 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

The copies of these letters were submitted as part of the compliance report submission for the period Apr'16 to Sep'16.

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.
<table>
<tr><th>S. No.</th><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr>
<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 – WFDP</td><td>AWH-113458</td><td>01.02.27</td></tr>
<tr><td>7</td><td>CC&A – Renewal</td><td>Mundra Port Terminal</td><td>AWH-117045</td><td>20.11.26</td></tr>
<tr><td>8</td><td>CC&A - Correction</td><td>Mundra Port Terminal</td><td>PC/CCA-KUTCH-39(8)/GPCB ID 17739/592900</td><td>20.11.26</td></tr>
</table>
The permissions mentioned above (Sr. 1 to 6) were submitted along with earlier compliance report submission. The permission copies (Sr. No. 7) were submitted in previous compliance report submission for the period of Oct'21 to</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		Mar'22. The permission copy (Sr. No. 8) of CC&A – Correction letter is attached as **Annexure – 7.**
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.	Not applicable 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.
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 and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.	Complied. 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 5.08 Lakh is spent for all environmental monitoring activities during the FY 2023-24 for overall APSEZ, Mundra till Sep'23. Please refer Specific Conditions no. x, xi & xii for further details regarding environmental monitoring. **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. **Waste Management** – 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. **Non-Hazardous Solid Waste**: 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

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		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). APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUVRheinland India Pvt. Ltd. (valid up to 31.05.2024). Details of the same were submitted as as part of compliance report submission for the duration of Apr'21 to Sep'21. **Hazardous & Other Waste:** • 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. Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem - Bhavnagar. It is also being reused within organization for lubrication purpose. • 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 is being

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>
sold to authorized recycler namely M/s. Mundra Oil Pvt. Ltd., Mundra for recycling. However during the compliance period, there was no disposal of downgrade chemicals.
• Expired paint materials is being disposed by incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau. However, during the compliance period, there was no disposal of downgrade chemicals.
• Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals.
• 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 received or disposal of Slope Oil.
• 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.

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.

The following table summarizes the waste management practice (from Apr'23 to Sep'23) for different types of wastes at APSEZ:

<table>
<tr><th>Type of Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr>
<tr><td colspan="3">Hazardous Waste</td></tr>
<tr><td>Pig Waste</td><td>3.70</td><td rowspan="2">Co-processing at cement industries</td></tr>
<tr><td>Oily Cotton waste</td><td>52.64</td></tr>
<tr><td>Used / Spent Oil</td><td>82.93</td><td>Sell to registered recycler</td></tr>
<tr><td>ETP/CETP Sludge</td><td>12.71</td><td>Co-processing at cement industries</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
		<table><tr><td>Discarded Containers / Barrels</td><td>1.90</td><td>Sell to registered recycler</td></tr><tr><td colspan="3">Other Waste</td></tr><tr><td>E-Waste</td><td>31.37</td><td>Sell to registered recycler</td></tr><tr><td>Battery Waste</td><td>7.95</td><td>Sell to registered recycler</td></tr><tr><td>Bio Medical Waste</td><td>3.29</td><td>To approved CBWTF Site</td></tr><tr><td colspan="3">Non-Hazardous Waste</td></tr><tr><td>Recyclables Dry Waste / Scrap</td><td>1377.09</td><td>After recovery sent for recycling / Reuse within premises</td></tr><tr><td>Non-Recyclable Dry Waste (RDF)</td><td>253.54</td><td>Co-processing at Cement Industries</td></tr><tr><td>Wet Waste (Food waste + Organic waste)</td><td>459.04</td><td>Converted to Manure for Horticulture use / Biogas for cooking purpose</td></tr><tr><td>Horticulture Waste</td><td>405.30</td><td>Used for making of manure and utilize for horticulture purpose</td></tr></table>
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 commissioning of the Project and copy of each of these shall be sent to this Ministry.	Complied. All construction activities were carried out confirming to the existing rules and regulation and as per the CRZ notification. Please refer General condition no. i for permission granted from state pollution control board regarding the same.
v	The sand dunes, corals, and mangroves, if any, on the site shall not be disturbed in any way.	Complied 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. Please refer specific condition no i above for details regarding the same.
vi	A copy of the clearance letter will be marked to the concerned Panchayat /	Complied.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td>Local NGO, if any from whom any suggestions /representations has been received while processing the proposal.</td><td>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.</td></tr>
<tr><td>vii</td><td>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.</td><td>Complied.

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.

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 823.48 lakh are spent during the year FY 2023-24 till Sep'23. Detailed breakup of the expenditures for the past 3 years is attached as Annexure – 8.

Details regarding the past six compliance report submissions are mentioned below:

<table>
<tr><th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>Apr'20 to Sep'20</td><td>26.11.2020</td></tr>
<tr><td>2</td><td>Oct'20 to Mar'21</td><td>25.05.2021</td></tr>
<tr><td>3</td><td>Apr'21 to Sep'21</td><td>30.11.2021</td></tr>
<tr><td>4</td><td>Oct'21 to Mar'22</td><td>30.05.2022</td></tr>
<tr><td>5</td><td>Apr'22 to Sep'22</td><td>30.11.2022</td></tr>
<tr><td>6</td><td>Oct'22 to Mar'23</td><td>30.05.2023</td></tr>
</table>
</td></tr>
<tr><td>viii</td><td>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</td><td>Complied

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.

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 as part of compliance report submission for the duration of Apr'21 to Sep'21.</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
	reports in respect of mitigative measures and other environmental Protection activities.	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 in the last compliance period Apr'22 to Sep'22. 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 major non-compliance observed. 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. 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.
ix	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	Complied. 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.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
	ensuring environmental protection.	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 Oct'17 to Mar'18.
x	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.	Point noted and agreed.
xi	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.	Complied As part of the directions given by MoEF&CC vide order dated 18th Sep, 2015, following studies were proposed. • 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. Please refer **Annexure – B** for further details regarding the mentioned studies.
xii	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	Complied. 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.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
	at the website of the Ministry of Environment & Forest at http://www.envfornic.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.	
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,	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 31.03.2024 2. Mundra LPG Terminal Pvt. Ltd.: Valid till 31.03.2024

Sr. No.	Conditions as per clearance letter	Compliance Status as on 30-09-2023
	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 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.	The copy of updated/renewed PLI policy of APSEZ – Liquid Terminal & Mundra LPG Terminal Pvt. Ltd was submitted along with (last) compliance report submission for the period Oct'22 to Mar'23.

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

ANNEXURE – A

CRZ Recommendation Compliance Report of WFDP

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2023
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.

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2023
	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.	Complied. No effluent or sewage is discharged in to the CRZ area. Please refer specific condition no xii of the EC and CRZ clearance for details regarding this point.
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.	Complied. Compliance report of environmental management plan and mitigation measures proposed as part of the EIA report is attached as **Annexure – 9**.
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.	Complied. All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. 1254 ha area identified as mangrove conservation area is being conserved by APSEZ. Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.
9	The construction activities and dredging shall be carried out under the supervision/monitoring of the NIO or any such institute of repute.	Complied. 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.

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2023
		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 and no erosion is observed. 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 is 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	Complied.

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2023
	disposed of into the sea, creek or in the CRZ areas. The construction is over and shall be disposed off in low lying areas in consultation with NIO, NEERI or any such institute of repute.	All construction and operation activities as well as dredging and reclamation activities are being carried 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 Onsite emergency plan is attached as **Annexure - 10**. 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

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2023
		of the Committee of Secretaries and has been in operation since 1996. Oil Spill Contingency Response Plan (OSCRP) is prepared in accordance with the NOSDCP. Latest Regional Level Pollution Response exercise **"SWACHCHH SAMUDRA-NW 2022"** was carried out by Indian Coast Guard on 19th April, 2023 at Mundra, Gujarat. All participants from various Oil Handling Agencies and Stakeholders (HEML, IOCL, APSEZ, Deendayal Kandla Port (KPT), Coast Guard) were participated in this exercise. Details of the same is attached as **Annexure - 11**. Mock drills are conducted regularly by APSEZ. Last Oil Spill Mock drill was conducted on 18 & 19.04.2023. Oil Spill Mock Drill report is enclosed as **Annexure – 11**.
17	The MPSEZL shall participate and contribute for the Vessel Traffic Management System to be developed for the Gulf of Kutchh being developed.	Complied. A VTMS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India. 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. Mundra port has subscribed and taking VTMS feed from Kandla from link www.vts.gov.in.
18	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.	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.

adani Ports and Logistics	**Adani Ports and Special Economic Zone Limited, Mundra.**	**From : Apr'23** **To : Sep'23**
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 30-09-2023
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.	Point Noted & Complied 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.
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.	Complied This reply covers condition no ii, iv and v. Based on the MoEF&CC directions, 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.
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 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	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. Details of above chronology were submitted along with half yearly compliance report for the period Apr'19 to Sep'19. The site survey carried out by NCSCM includes: 1. Bathymetry survey of creeks 2. Topography survey of intertidal areas

Sr. No.	Condition	Compliance Status as on 30-09-2023
	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.	3. Mangrove survey (health and area demarcation) 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 In addition to the site surveys, NCSCM has procured satellite images for analysis of mangrove cover.
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.	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. Based on the final study report, outcome is summarized in to following points : 1. There is no obstruction to any water stream (creeks / branches of creeks / rivers) 2. Presently, mangrove cover in and around APSEZ is 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. 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 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 as a part of half yearly EC compliance report for the period Oct'20 to Mar'21.

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• 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 (attached as Annexure-1), 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</td></tr>
</table></td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2023		
				2670 ha which has increased to 2723 ha during the year 2021. • 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. **The Summary of Mangrove mapping and monitoring (from 2011 to 2021):**
		2.	Tidal observation in creeks in and around APSEZ	• 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	• 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 INR 2.35 Lacs. The details of algal & prosopis removal was submitted during the last compliance period Oct'22 to Mar'23.
		4.	Awareness of mangroves importance in	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the

Mangrove mapping Year	Mangrove cover total Area (Ha.)	Mangrove cover area Increased	
		Hac.	%
2011	2094	-	-
2011 to 2016-17	2340	246	11.75%
2017 to 2019 till March	2596	256	10.94%
2019	2670	74	2.85%
2019 to 2021 till March	2723	53	1.99%
Total	**2723**	**629**	**28 %**

Sr. No.	Condition	Compliance Status as on 30-09-2023
		surrounding communities: community regarding importance of mangroves. Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 32372 Cattels / 2707 farmers and hence enhancing cattle productivity during FY 2023-24 till Sep'23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 90.20 Lacs during FY 2023-24 till Sep'23, 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 is attached as **Annexure - 2** • Refer CSR report attached as **Annexure – 3.** Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21. 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 during the previous compliance period Oct'21 to Mar'22.

Sr. No.	Condition	Compliance Status as on 30-09-2023
		As per the approved map of CZMP Kutch region APSEZ has demarcated the HTL boundary line within APSEZ area. Photographs of the demarcated HTL boundary line is attached as **Annexure – 12.** 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 will be paid by APSEZ. 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 is attached as **Annexure-1**. 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 2594 Ha in year 2019. Now, according to GUIDE Mangrove monitoring study report November 2023 (attached as **Annexure-1**), the distribution of

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>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.

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%).</td></tr>
<tr><td>iii</td><td>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.</td><td>Complied

During the said site visits from various regulatory authorities and as per the compliance certification received, there was no non-compliance observed.

<table>
<tr><th>Sr. No.</th><th>Authority</th><th>Date of Visit</th><th>Purpose of Visit</th></tr>
<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.</td></tr>
</table></td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2023
		<table><tr><td></td><td></td><td></td><td>Copy of last EC compliance verification certificate is attached as **Annexure – 13**.</td></tr></table> It may also be noted that GPCB, Regional Office does regular site visit of APSEZ area and no non-compliance observed. 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 as part of compliance report submission for the duration of Apr'21 to Sep'21. Last visit of Regional Office, GPCB was done on 23.03.2022 for Main port and APSEZL has submitted the reply report vide letter dated 05.04.2022. Details of the same were submitted in the last compliance period Apr'22 to Sep'22.
vi	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.	Complied 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 *"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."* Copy of the order was submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18. Considering the above status and in line to submission of compliance of all the directions under this order, this condition is closed.
vii	APSEZ will submit specific action plan to protect the livelihood of fishermen along with budget.	Complied. 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. Various initiatives, as stated below are discussed in detail in the report namely "Silent Transformation of Fisher folk at Mundra".

Sr. No.	Condition	Compliance Status as on 30-09-2023
		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. Till, Sep'23 approx. 13.89 Cr. INR, has already been invested fisherfolk livelihood. Further, details regarding the expenditure incurred against the commitment are attached as **Annexure – 14**. APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes: • **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. School focusses on nutrition food, uniform and other services to the children for free. • **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

Sr. No.	Condition	Compliance Status as on 30-09-2023
		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 be at sea to earn their livelihood puts the lives of many fishermen at risk. • **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. 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 four persuasions as below. ❖ Education ❖ Community Health

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>
❖ Rural Infrastructure
❖ Sustainability Livelihood

Brief information about activities in the main four persuasions is mentioned below. Activities carried out for the same are summarized as below.
<table>
<tr><th>Area</th><th>Activity</th></tr>
<tr><td>Community Health</td><td>
• Mobile Heath Care Units and Rural Clinics
• 07 Rural Clinics
• 06 villages of Mundra & 01 village Mandvi block has benefited by rural clinic service.
• Total Patients Benefitted FY 23-24 upto Sep 23: - 10629 (direct & indirect).
• 2 financially challenged patients has been supported with Dialysis treatment at 58 Times which added day in their Life.
• Shaping Lives: From Pagdiya Fishing to Prosperity: 01 people benefitted for oral cancer treatment.

Health camp:
• 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): - 1489 Patients Benefited.
• General health camp: - 1448Patients benefited.
• Blood Donation Camp: 1558 people have donated blood.
• Women's Health: Provided health services to more than 2230 women benefitted through gynec health checkup.
• Dialysis Support: During this year, 2 patients were supported for regular dialysis with 58 Times which added day in their Life.
• Medical Supports: 1007 beneficiary in 35 village.
• Eradicate cataract-related vision for senior citizen: benefited 473 peoples of 9 villages.
• Ayushman card facilitation: Ayushman card issued to 5584 for 25 village.
• 1071 –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 16000 cattle benefitted.
</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2023	
		Sustainable Livelihood – Fisher folk, Agriculture & Women	• **Vehicle Transportation Facilities:** extend vehicle transportation services to school-going children from Luni and Randh Fishermen Settlements to the AVMB School, Bhadreshwar Similarly, we ensure for Juna Bandar Fisherfolk Students to the nearest Government School (Total 218 nos. students benefitted). • **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). • **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 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. • **Awareness Sessions at Village Level:** Spreading awareness on natural farming benefits and address their concerns and 250 farmers benefitted. • **Hands-On Training & Exposures:** Arranged Workshop and training to emphasizing on real-world techniques (5 workshop). • **Link with Government Scheme**: facilitation of govt. Cow Nurturing scheme to promote eco-friendly farming practices (857 nos. formers benefitted). • To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield.

Sr. No.	Condition	Compliance Status as on 30-09-2023	
			• Adani foundation and Agri Department jointly organized district level workshop on Natural Farming Practice with Gram Seva. • **Natural farming-** 1392 farmers benefitted by 20 nos of training from which 60 farmers chemical usage is reduced to half extent in 500 Acres approximately. • 257 nos. of Facilitation of Home Biogas-under Gobardhan Yojna during FY2023-24 till Sep'23. • **Natural Farming Certification: O**btained natural farming certification through the Gujarat Organic Product Certification Agency (GOPCA) for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali. • **Marketing Assistance:** Provide platforms and resources ensuring fair prices and broader consumer reach. • **Dates Restoration:** Due to Bipor Joy cyclone, farming community faced a severe setback as numerous Date, Mango, and other fruit plants were damaged and uprooted. These plants, which served as a vital source of income for farmers, were left in shambles. As of the current date, 615 Date plants have been successfully restored. • **Kitchen Garden Kit:** 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. • Benefited 837 people linkages with Govt. cow based Nurturing Scheme. • Supported 1500 farmers for barrel & wormi compost. • 19 nos. of Market Linkage for supporting to Green carnival at Samudra Township & Shantivan colony Now 302+ farmers are collaborated with Mandli. • 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. • Adani Foundation has also provided 7.99 lacs kg Dry Fodder and 23.53 lacs kg Green fodder in 24 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. 90.20 Lacs during FY 2023-24 upto Sep'23. • 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. • **Grass Land development:** AF converted 213 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara, Siracha, Gundal , Kukadsar village to transform into Fodder Sustain village. **Women Empowerment:** • **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

Sr. No.	Condition	Compliance Status as on 30-09-2023	
			develop income generating activities and improve their livelihoods Through this initiative, we have empowered over 850 women to become self-reliant with Savings of Rs 31 Lacs. • **Making SHG Self Reliant:** ➢ 16 SHG are on pathways of self-reliance. ➢ Various handicraft, dry and fresh food making, stitching, tie and die etc. ➢ 160+ women - Monthly average income @ 7000 of each member over Month. • **Job Sourcing – Govt:** ➢ 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:** ➢ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company. ➢ 387 Women supported till date for job sourcing of 18 villages. ➢ Average income 10200 Per Month. • **Social Empowerment:** ➢ 2 Livlihood Enhancement Training through RSETI. ➢ Financial support for business set up. ➢ Legal rights and domestic violence workshops. ➢ Family counselling for Job sourcing. • During FY2023-24 till Sep'23 Approx. INR 51.75 lakh were spent for Fisherfolk Amenities work in different core areas. • Till FY 2023-24 till Sep'23, Adani Foundation has done total expenditure of INR 1389.94lakh 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.
		Education	• Conduct baseline assessment of 6314 Students, 2541 Students were progressive learner (3 to 7 Std.). • Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office. • Exposure Visit of Project officers from three different locations to learn about the best practices. • Computer Classes in High school: 200 Students took advantage of this computer classes. • Career Counselling in 8 Utthan High Schools. • Plastic Bag Free village workshop in all High schools. • Remedial classes during summer break.

Sr. No.	Condition	Compliance Status as on 30-09-2023	
			• **Day Celebration:** World Book Day, World Environment Day, National Reading Day, International Yoga Day, National Plastic, Bag Free Day, Raksha Bandhan, Independence Day & Celebration of Sports Day. Planned various Capacity Building Program (CBP) & Exposure visit for Utthan Sahayak & Students. • **Achievements:** • Utthan sahayak motivate mothers to open an account of Sukanya Samrudhi Yojana • Utthan supported Taluka levels Kala Utsav in Primary & High Schools. • Utthan Sahayak supported Taluka level Science Fair. •06 students selected in District Level Sports School (DLSS). • Planned various Capacity Building Program (CBP) & Exposure visit for Utthan Sahayak & Students. • Provided facility for preparing JNV, NMMS & PSE examination. 877 Students preparing Competitive Exam. 354 JNV, 273 PSE & 250 NMMS. • **Empowering Communities through Free and Compulsory Education:** Adani Vidya Mandir, Bhadreshwar, was established in June 2012 with the goal to have access of quality and cost free Education with essential amenities like food, uniforms, and books, to Financial Weaker community children of the Mundra Block. The school boasts excellent infrastructure and resources necessary for the holistic development of each student. Children are admitted to the school form Senior Kg to 10th Standard. • **Few notable points:** • We are empowering economically disadvantaged families through free and quality education. • We are fostering an environment of academic excellence. • Pioneering Excellence: The First Gujarati Medium School in Gujarat Accredited by NABET • Over 600 Students Learning Each Year in AVMB • More than 35% of enrolled students in AVMB come from the Fisherfolk community. Workshop was conducted on Mental Health and behavioral change. • AVMB got 1st rank in Vaadan, Gayan and drawing in Kala Maha Kumbh competition and selected for Next block level competition. • AVMB selected for district level Kho-kho Match competition organized by SGFI-School Game Federation of India, • 2 students selected for District Level Athletic Competition. • 100% Success: Adani Vidya Mandir Bhadreshwar's Remarkable Achievement in Gujarat Board Standard 10th Examination. • **Training Skill Development:** Conducted skill development programs for women in various fields such as tailoring, handicrafts, and food processing These training programs helped women develop their skills and start their own businesses We have trained over 91 women in various skills, and many of them have started their own businesses.

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>• Total 182 nos. of male & female trained in various skill development programme.</td></tr>
<tr><td>Rural Infrastructure & Environmental Sustainability</td><td>Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area.

<u>WORK COMPLETED</u>
Below tabulated Water Conservation Projects completed during Compliance period:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<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 farmer's 120+Acre Area of Agri land can be Irrigated</td></tr>
</table>
• Home Biogas: Current year FY 2023-24 upto Sep'23 we process to facilitate 258 Gobardhan unit through Gov.
• 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.

Earlier Completed Activities/Project:

• 40 RRWHS structure have been completed.
• Total 229 nos. Bore-well recharging activity is completedPercolation 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.</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2023	
			• 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. • Developed of Cricket Ground at Hatdi Village **ENVIRONMENT SUSTAINABILITY PROJECTS till Compliance period:** • **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. • • **Massive Public Plantation Drives:** Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 25,000 trees were planted. • **Prakrurath:** This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 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 1.27 Lac tree plantation have been done that has enriched the local ecosystem and also 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.

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 30-09-2023</th></tr>
<tr><td></td><td></td><td>

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 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,
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 325 farmers are supported with Biogas as sustainable environment protection.
As per SORI use of biogas each farmer can save Rs.23400/year.

Water Conservation Projects –
Below tabulated Water Conservation Projects completed during Compliance period:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<tr><td>1</td><td>Check dam Restrengthen ing-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 Check damat 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>
</table>
Earlier Completed Activities/Projects:

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

</td></tr>
</table>

Sr. No.	Condition	Compliance Status as on 30-09-2023	
			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.
		Skill Development	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. **ASDC, Mundra** • **Digital Literacy:** Digital literacy training was provided to seven students at Bhujpur Government High School, and as a part of the DEO project, certificates were distributed. • **RTG Crane operator:** RTG crane operator training is successfully given to 15 candidates. • **Beauty therapist:** The distribution of certificates for beauty therapist training celebrated the successful culmination of the program. • **Mud work:** After the mud work training in Dhrab Village, a certificate distribution ceremony was held, benefiting a total of 30 female participants. • **Advance Excel training:** Eighteen employees from Sumitomo India Ltd. Co. underwent advanced Excel training, significantly boosting their skills. • **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. ASDC and Thermax Foundation Done MoU. **ASDC, Bhuj:** • **Digital Literacy:** ASDC has partnered with Tally as the Knowledge Partner for its Tally - GST course. The first batch, consisting of 16 students from Bhuj location, achieved a remarkable 100% pass rate. • **Real-time exposure:** Twenty-five Nursing Assistant trainees gained valuable real-time experience in Emergency services through interactions with 108 Ambulance services and an industry visit.

Sr. No.	Condition	Compliance Status as on 30-09-2023
		• We offer on-the-job training to nursing students to build their confidence and prepare them for delivering high-quality patient care. • **Hydrography training:** Provided practical Hydrography training to nine participants. • **Entrepreneurship Development Programme (EDP):** Conducted EDP training in collaboration with CED, Gandhinagar, for a total of 30 trainees. • **Placement:** We successfully hosted a placement drive at our center on April 23rd, where 11 out of 15 candidates secured positions at KK Patel Hospital with an impressive average monthly salary of Rs. 17,000. • **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 –this will give them identity, confidence and right to speak in any decision for home, village and working area. 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 374.81 lakh is spent during the FY 2023-24 till Sep'23. Till Sep'23, Adani Foundation has done total expenditure of INR 163.35 Cr. for CSR activities in Kutch region since its inception.
viii	APSEZ will voluntarily return the grazing land, if any, in their possession.	Point noted. 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 Apr'19 to Sep'19. As per recommendations given in Joint Review Committee visit report dated 1st December 2021, APSEZ has approached M/s. Indian Grassland and Fodder Research Institute (IGFRI), Jhansi

Sr. No.	Condition	Compliance Status as on 30-09-2023
		to get the consultancy work for enhancing / upscaling the forage production in Gauchar Land at Zarpara in 400 acres. Proposal received from IGFRI was submitted in the last compliance period Apr'22 to Sep'22. 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 compliance report of its recommendation are attached as **Annexure – 15 & 16** respectively.
ix x.	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. 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.	Complied This reply covers direction no ix and x. 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. Details of above chronology were submitted along with half yearly compliance report for the period Apr'19 to Sep'19.

Sr. No.	Condition	Compliance Status as on 30-09-2023
		Total cost of the study is approx. INR 1.3 cr. which is financed by APSEZ. The stated study was carried out in following 3 phases. • 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. As part of the study, following modelling exercises / technical studies have been carried out to study the impacts on all environmental attributes: • Ambient air quality • Marine (Hydrodynamic, Thermal & Salinity dispersion, Sediment transport) • Noise level • 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 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. 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

Sr. No.	Condition	Compliance Status as on 30-09-2023
		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. 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 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. 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 as a part of half yearly EC compliance report for the period Oct'20 to Mar'21. Presentation done before GCZMA on 31.10.2021 and 16.02.2021 to discuss proposed EMP of CIA study in detail and way forward. 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 in the last compliance period Apr'22 to Sep'22. 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 – 17**.

Annexure – 1

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,
Kachchh-370001, Gujarat

November- 2023

Project Personnel

Project Co-Ordinator

Dr. V. Vijay Kumar, Director

Principal Investigator

Mr. Dayesh Parmar, Project Officer

Co-Principal Investigator

Dr. Kapilkumar Ingle, Project Scientist

Team Member

Mr. Deep Dudiya, JRF

Mr. Raj Joshi

Mr. Arjan Rabari

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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 km^2 facilitates a rich fishery resource.

Kachchh coast supports the mangrove extent of 798.74 km^2, constituting 68% of state's mangroves (1175 km^2) 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 tobe 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 km^2 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. Koylavali 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.

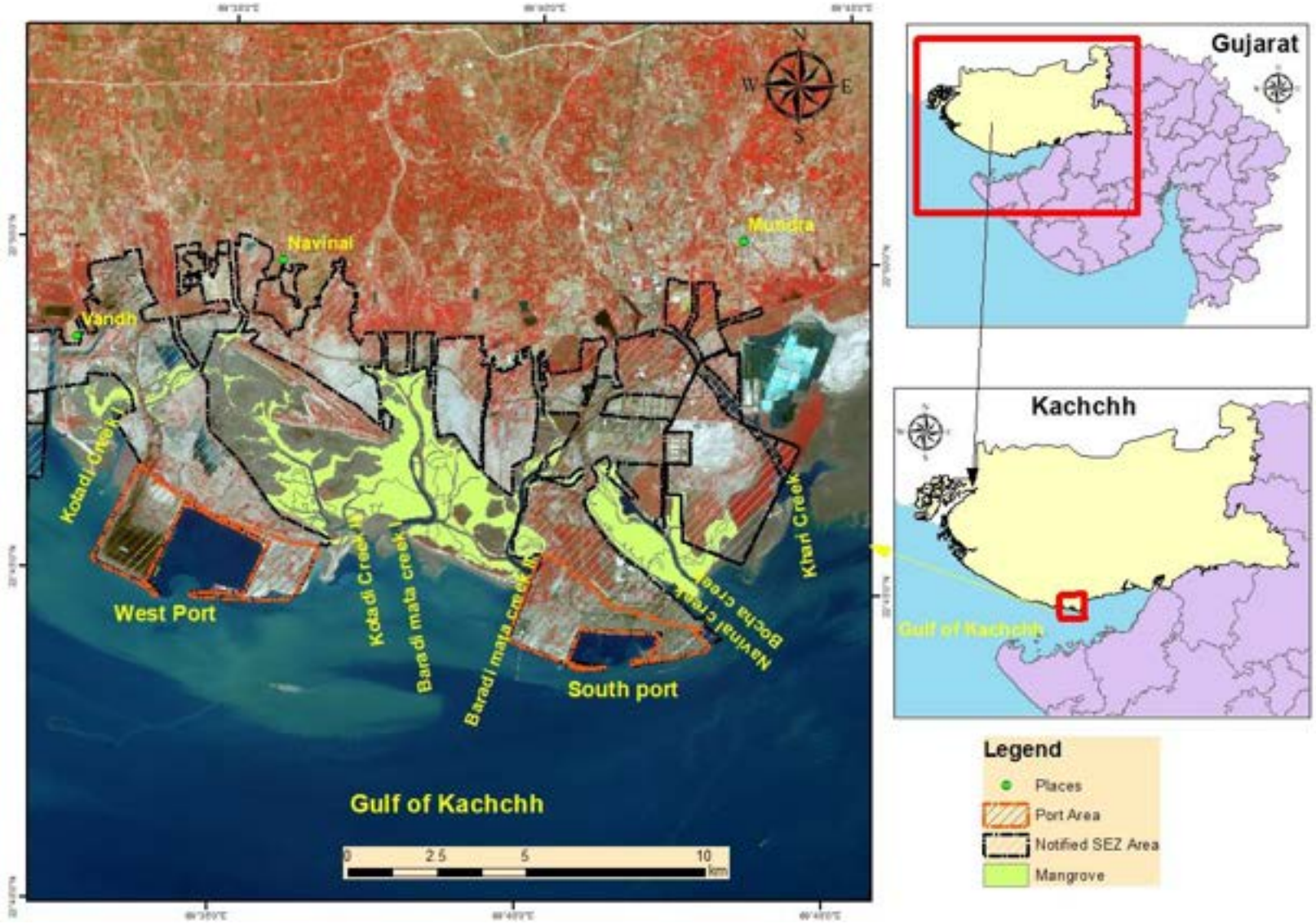


Figure 2.1: Location Map of The Study Area

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 36^0C. The dry bulb temperature goes up to 47.8^0C, 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 ^{0}C 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 45^0 during flood and 220^0 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^oC 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 evaloved 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 quadrate was 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 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.

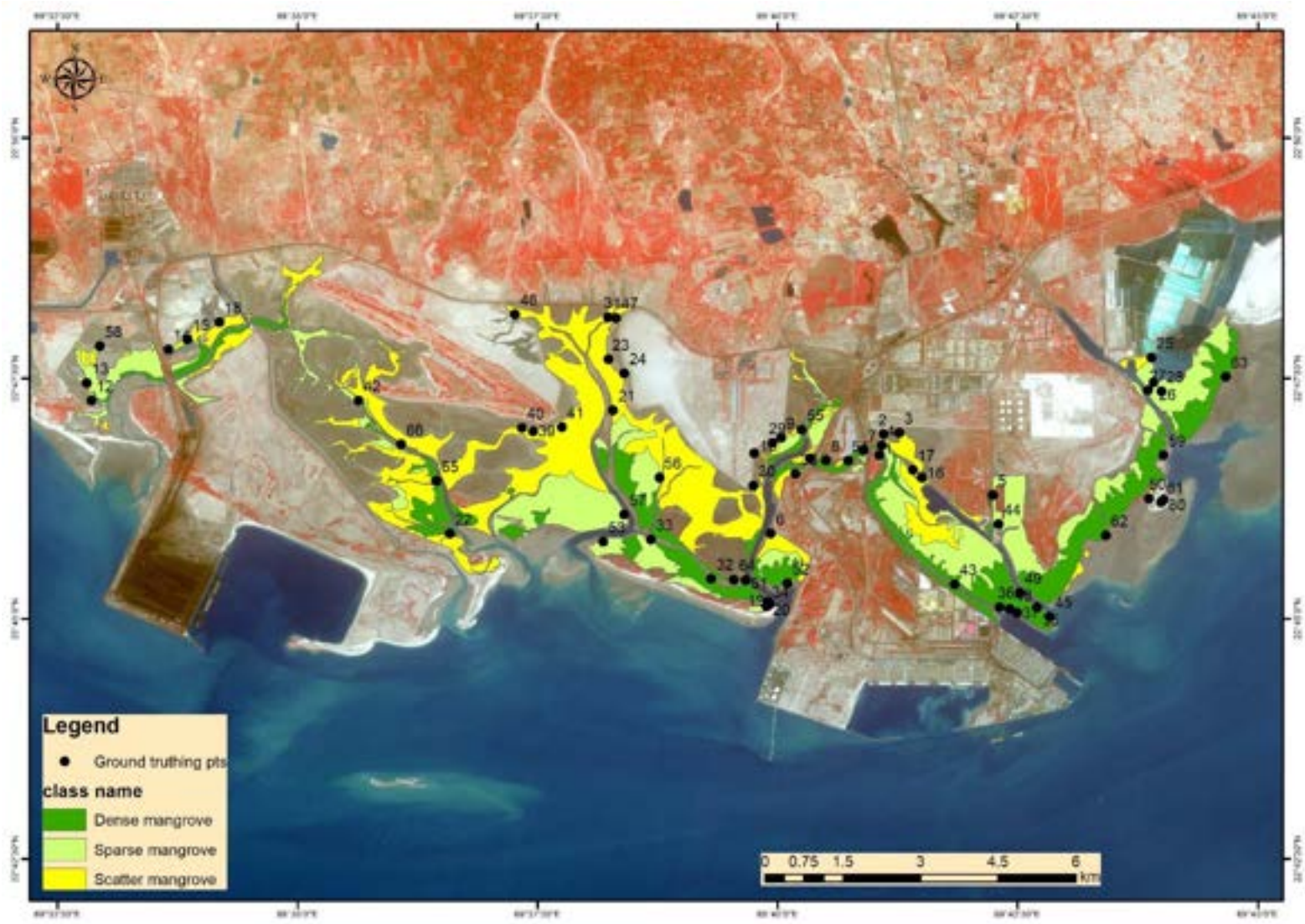


Figure 3.3: Ground Truthing Data and Mangrove Data Collection Points

Kotadi Creek Block	
Dense Mangrove	
	
Sparse Mangrove	
	
Scattered Mangrove	
	

Baradi mata Creek Block	
Dense Mangrove	
	
Sparse Mangrove	
	
Scattered Mangrove	
	

Bocha-Navinal Creek Block	
Dense Mangrove	
	
Sparse Mangrove	
	
Scattered Mangrove	
	

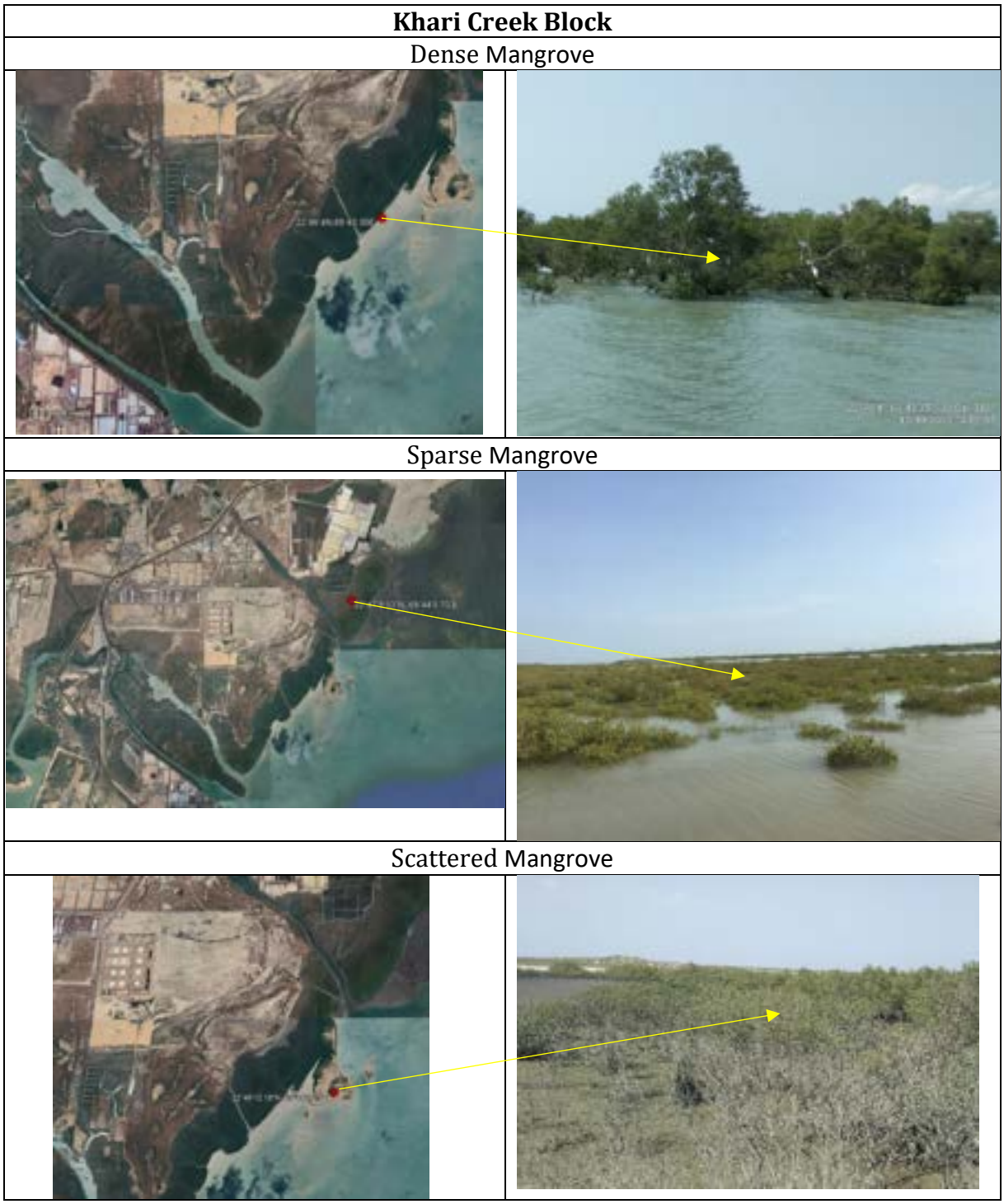


Figure 3.4: Surveyed and Collected Ground Truthing Data Various Categories of Mangroves

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 4.1and 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

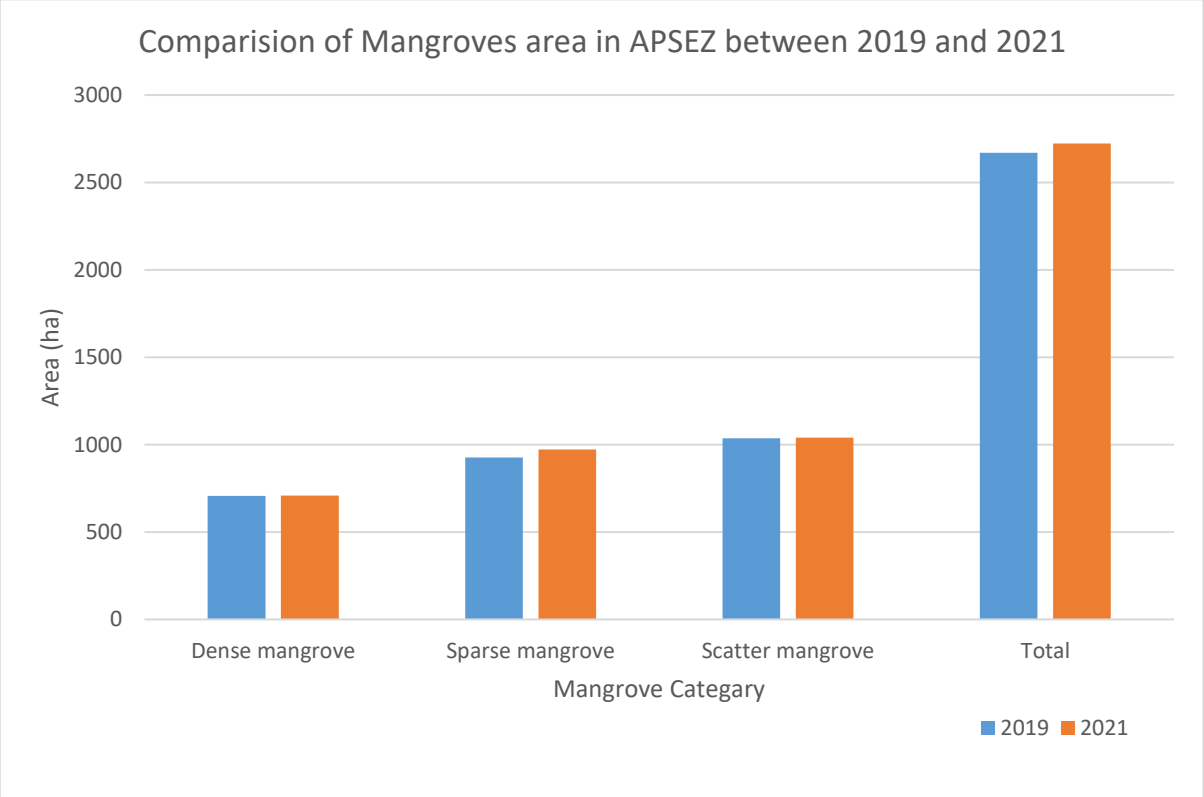


Figure 4.1: Comparison of Various Categories of Mangroves in APSEZ Between 2019 and 2021

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

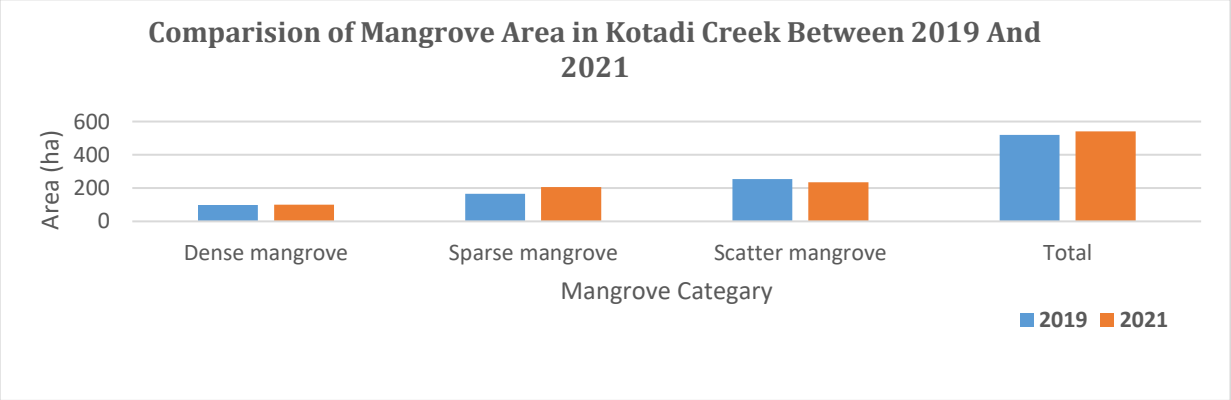


Figure 4.4: Comparison of Various Categories of Mangroves in Kotadi Creek Zone Between 2019 and 2021

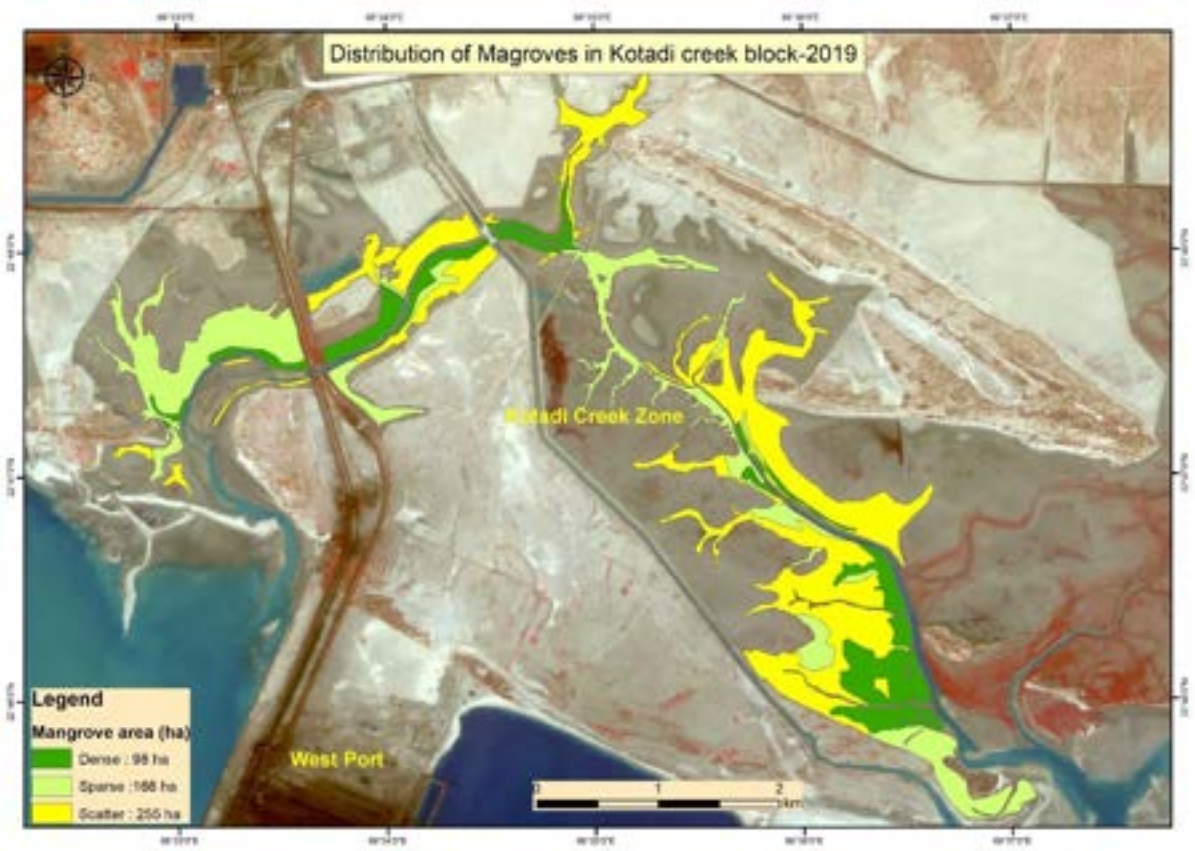


Figure 4.5: Distribution of Mangroves in 2019 in Kotdi Creek Zone System.

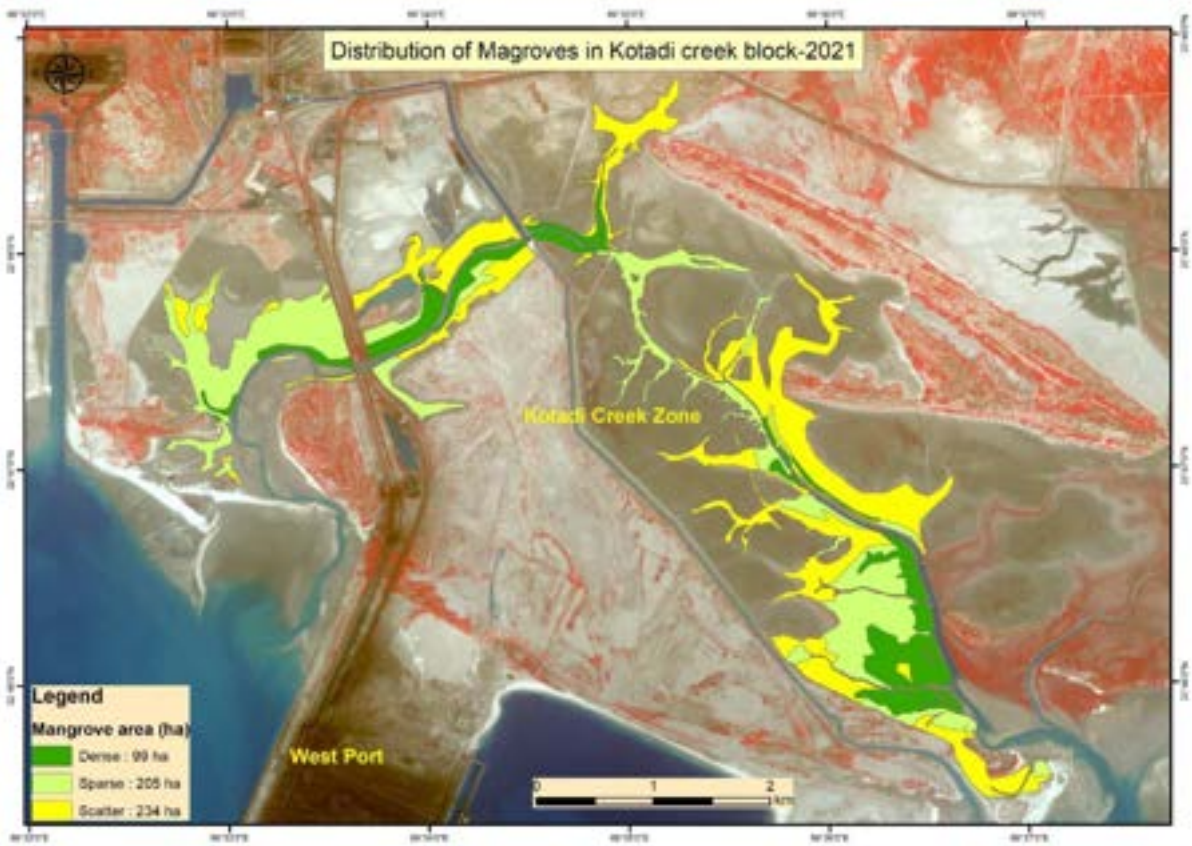


Figure 4.6: Distribution of Mangroves in 2021 in Kotdi Creek Zone System.

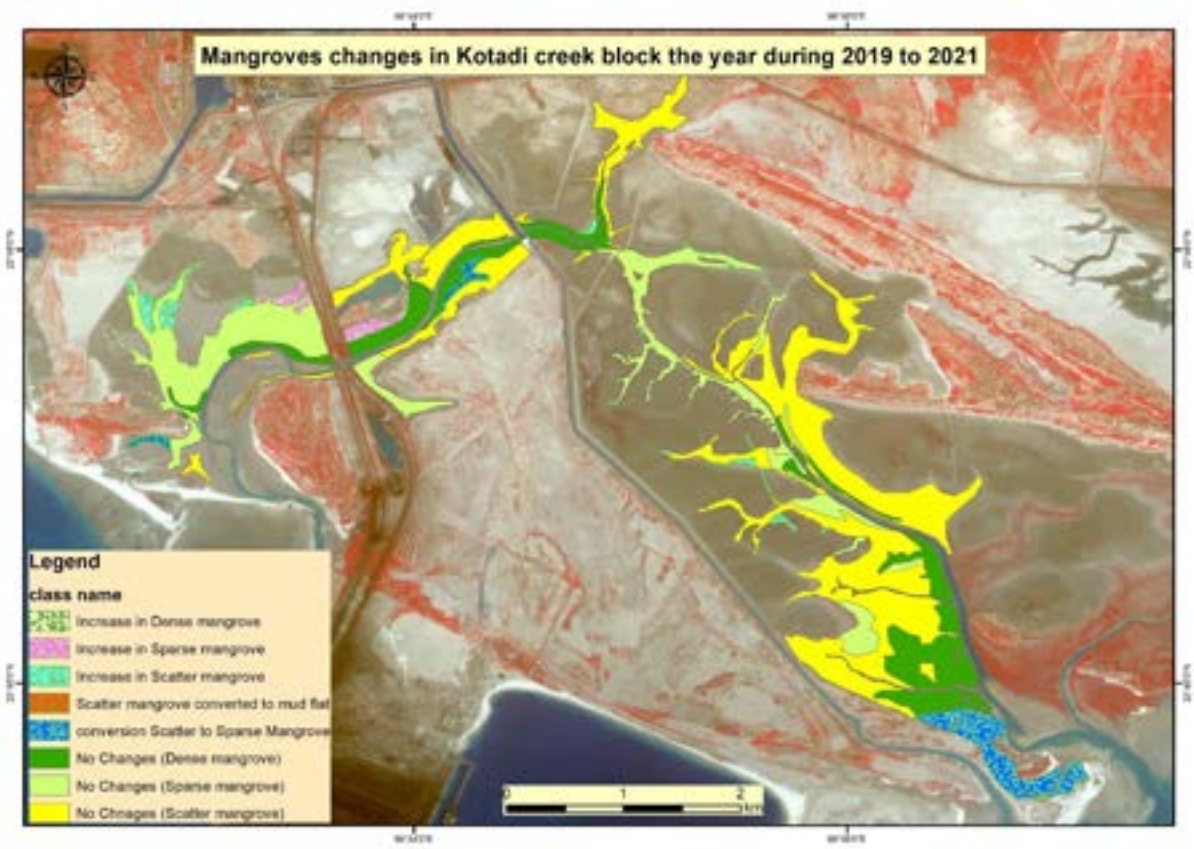


Figure 4.7: Change Analysis from 2019 to 2021 on Categories of Mangroves in Kotadi Creek System

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

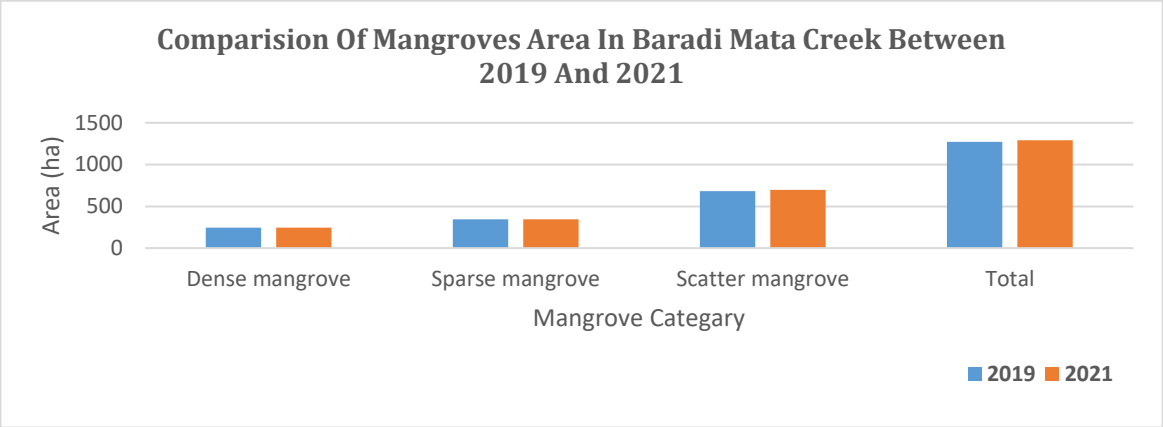


Figure 4.8: Comparison of Various Categories of Mangroves in Baradi Mata Creek Zone Between 2019 and 2021

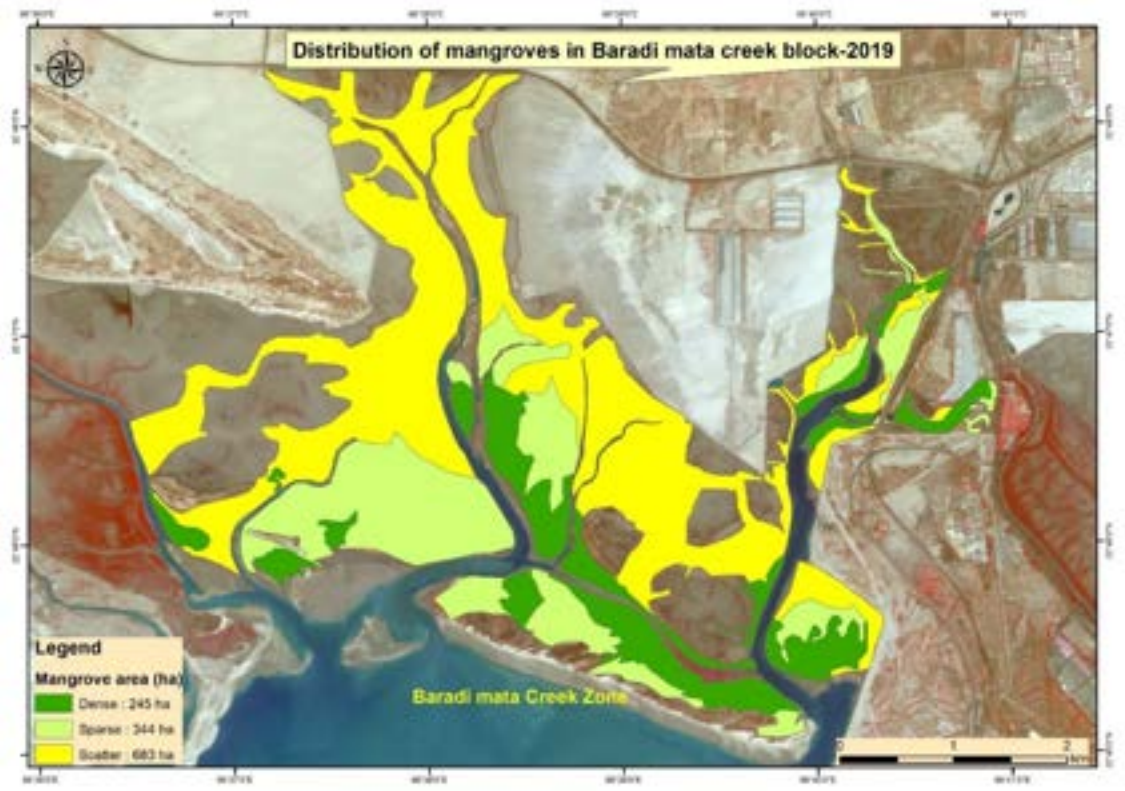


Figure 4.9: Distribution of Mangroves at Baradi Mata Creek Zone in 2019

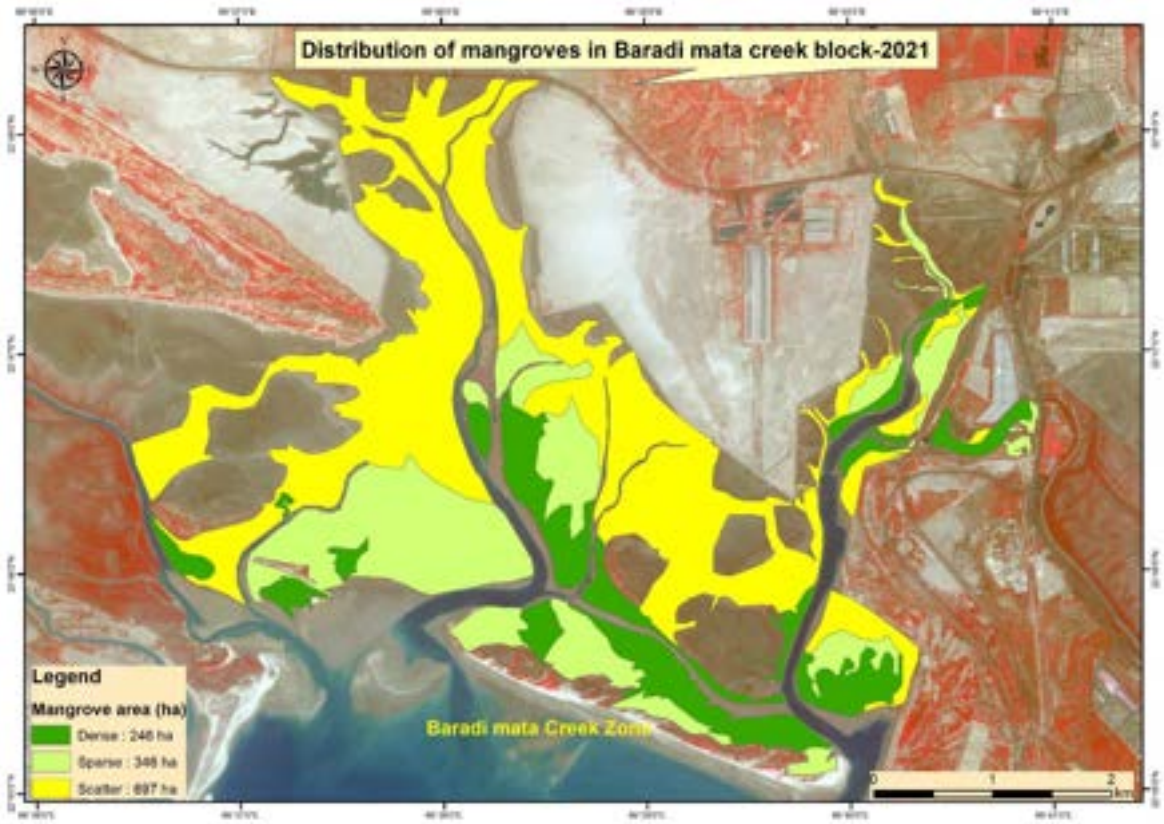


Figure 4.10: Distribution of Mangroves at Baradi mata Creek Zone in 2021

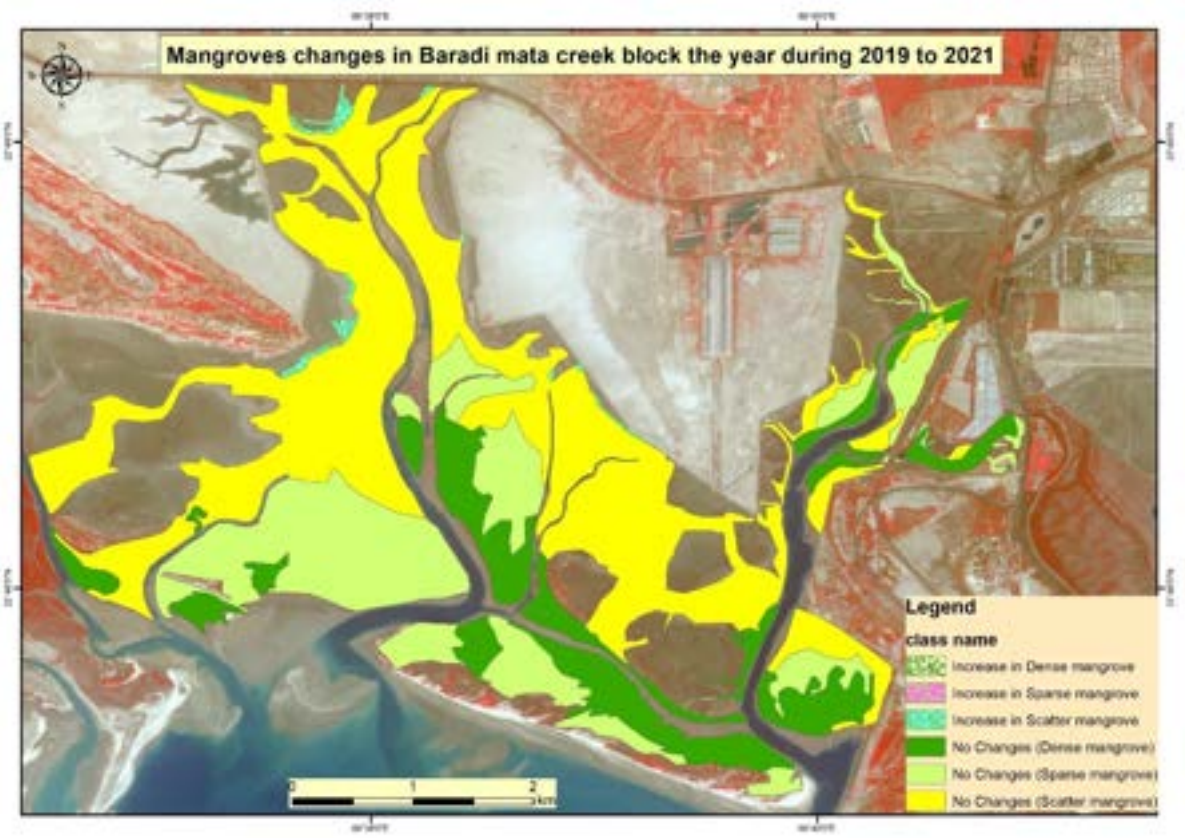


Figure 4.11: Change Analysis From 2019 To 2021 On Categories of Mangroves in Baradi Mata Creek System

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

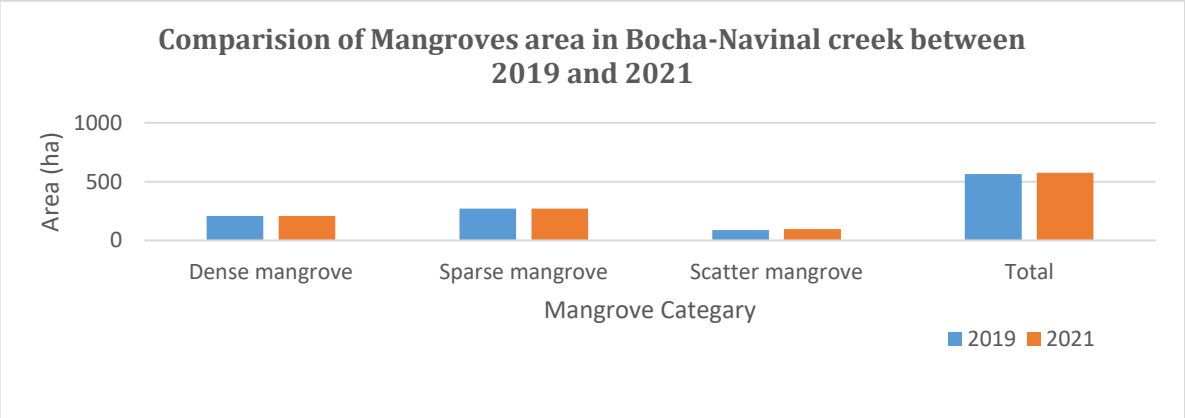


Figure 4.12: Comparison of Various Categories of Mangroves in Bocha-Navinal Creek Zone Between 2019 and 2021

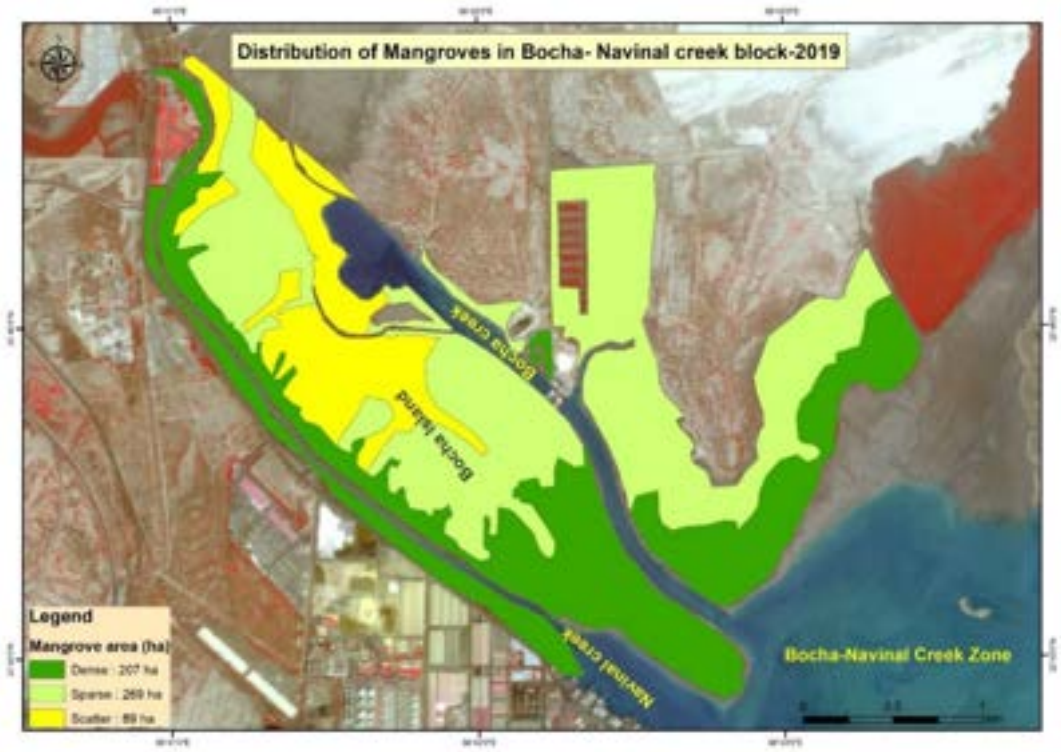


Figure 4.13: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone System for The Year 2019

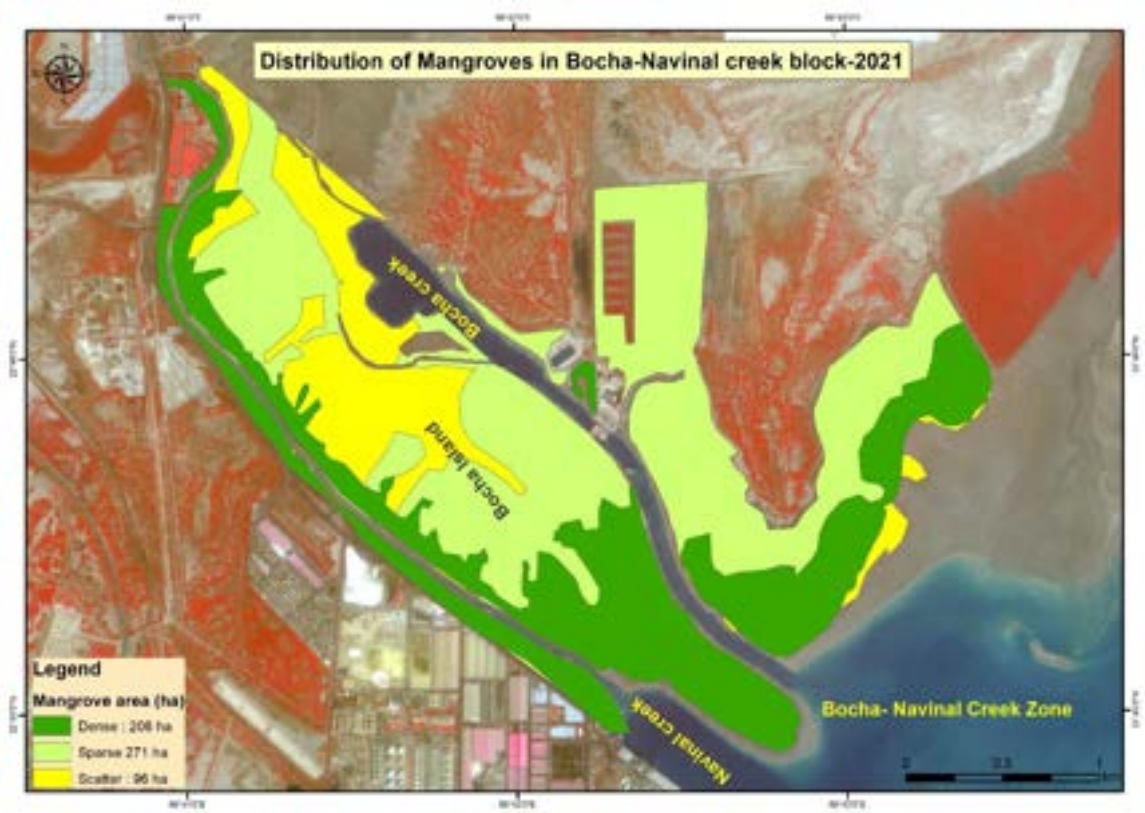


Figure 4.14: Distribution of Various Categories of Mangroves in Bocha - Navinal Creek Zone System for The Year 2021

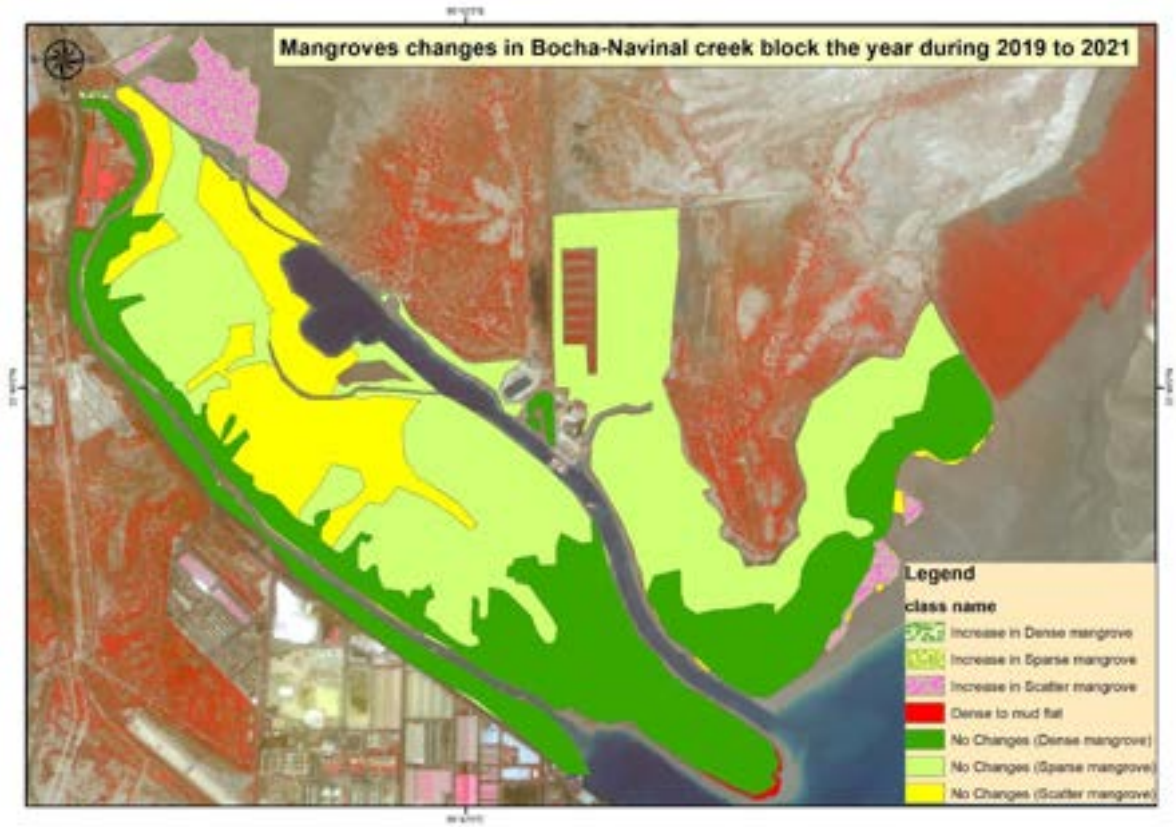


Figure 4.15: Change Analysis From 2019 To 2021 On Categories of Mangroves in Bocha- Navinal Creek System

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

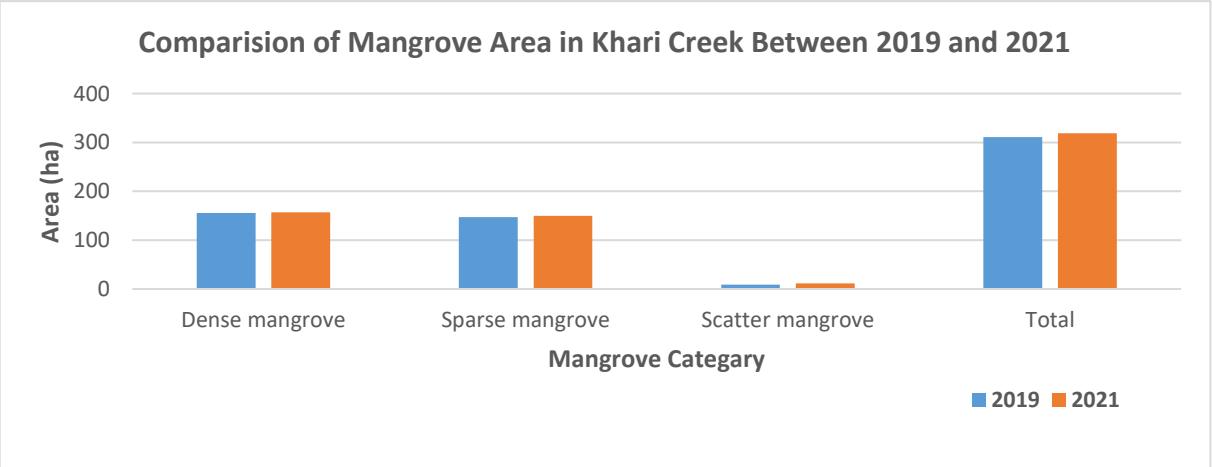


Figure 4.16 : Comparison of Various Categories of Mangroves in Khari Creek Zone Between 2019 and 2021

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

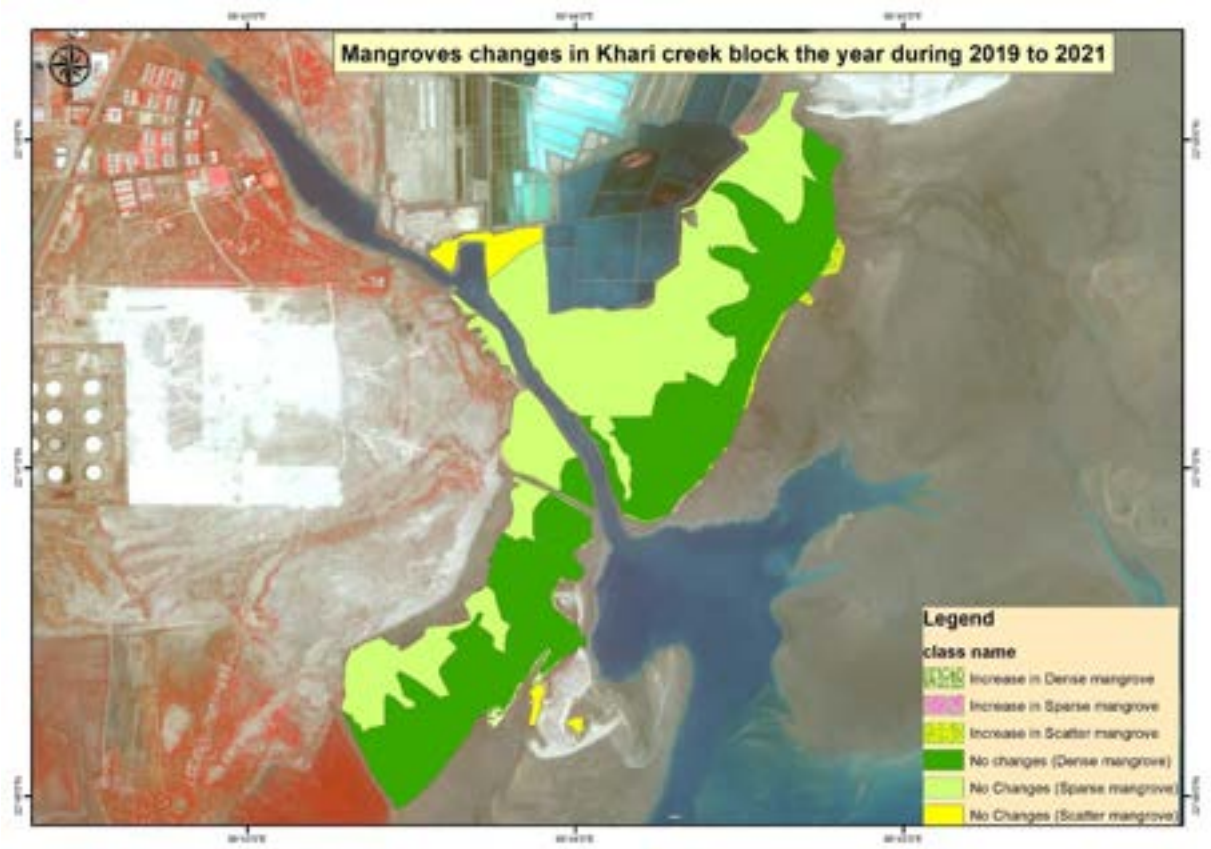


Figure 4.19: Change Analysis From 2019 To 2021 On Categories of Mangroves in Khari Creek System

4.3. Mangrove Vegetation

In India, the state of Gujarat encompasses the longest coastline (1650 km) and largest coastal area (28,000 km^2), 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	Longitude	Latitude	No of Tree Per Ha
12	69.547500	22.787778	1100
13	69.546667	22.790833	1100
14	69.560833	22.796667	500
15	69.564149	22.798420	600
18	69.569722	22.801389	0
22	69.609722	22.764722	2500
42	69.593889	22.787778	700
58	69.548977	22.797262	400
65	69.608763	22.773687	2500
66	69.601263	22.780209	1800
Average			1120

Table 4.7: Density of Trees in the Baradi mata Area

Q. Number	Longitude	Latitude	No of Tree per Ha
6	69.665460	22.764762	1200
7	69.681579	22.779167	1700
8	69.675048	22.777429	1200
9	69.667222	22.781389	1800
10	69.662609	22.778661	1200
11	69.672222	22.777778	600
19	69.665278	22.752500	2000
20	69.664964	22.752988	600
21	69.638056	22.786111	400
23	69.637289	22.795008	2400
24	69.640015	22.792505	3300
29	69.665774	22.780467	600
30	69.662420	22.773036	800
31	69.637222	22.802222	1300
32	69.655064	22.756944	1700
33	69.644627	22.763737	2300
34	69.664734	22.752103	1600
38	69.669723	22.775127	1200
39	69.624167	22.782500	2100
40	69.622222	22.783056	1400
41	69.629180	22.783226	1700
46	69.621047	22.802786	800
47	69.638582	22.802132	300
51	69.661111	22.756667	2900
52	69.668330	22.756143	2800
53	69.636389	22.763333	1900
54	69.678886	22.777405	4400
55	69.670833	22.782778	700
56	69.646111	22.774444	900
57	69.640000	22.768056	700
64	69.659048	22.756698	2000
Average			1565

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

Q. Number	Longitude	Latitude	No of Tree per Ha
1	69.684285	22.778333	200
2	69.685000	22.781944	200
3	69.687778	22.782222	1000
4	69.684722	22.780000	2100
5	69.704032	22.771389	2600
16	69.691667	22.774444	1500
17	69.690076	22.775833	1200
35	69.711667	22.751944	1800
36	69.705211	22.751960	1500
37	69.708234	22.751012	1500
43	69.697381	22.755925	1800
44	69.705000	22.766389	1100
45	69.713889	22.750278	1200
48	69.706944	22.751667	900
49	69.708669	22.754522	700
62	69.723611	22.764444	800
Average			1256

Table 4.9: Density of Trees in the Khari Creek Area

Q. Number	Longitude	Latitude	No of Tree per Ha
25	69.731567	22.795235	1800
26	69.731936	22.790986	3500
27	69.730976	22.789617	1700
28	69.733272	22.789417	1200
50	69.731111	22.770833	1800
59	69.733611	22.778333	1600
60	69.733611	22.770556	2200
61	69.733231	22.770205	2500
63	69.744444	22.791944	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 creak 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	Longitude	Latitude	Regeneration	Recruitment
1	12	69.547500	22.787778	10000	0
2	13	69.546667	22.790833	40000	10000
3	14	69.560833	22.796667	350000	10000
4	15	69.564149	22.798420	60000	15000
5	18	69.569722	22.801389	90000	17500
6	42	69.593889	22.787778	100000	32500
7	58	69.548977	22.797262	30000	10000
8	65	69.608763	22.773687	30000	15000
9	66	69.601263	22.780209	0	17500
Average				78,889	14167

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

Sr No	Q. Number	Longitude	Latitude	Regeneration	Recruitment
1	6	69.665460	22.764762	170000	7500
2	7	69.681579	22.779167	30000	10000
3	8	69.675048	22.777429	60000	20000
4	9	69.667222	22.781389	140000	10000
5	10	69.662609	22.778661	80000	0
6	11	69.672222	22.777778	40000	5000
7	19	69.665278	22.752500	0	7500
8	21	69.638056	22.786111	60000	17500
9	29	69.665774	22.780467	30000	2500
10	30	69.662420	22.773036	90000	12500
11	31	69.637222	22.802222	30000	10000
12	39	69.624167	22.782500	30000	5000
13	40	69.622222	22.783056	50000	7500
14	41	69.629180	22.783226	20000	7500
15	46	69.621047	22.802786	30000	20000
16	47	69.638582	22.802132	40000	37500
17	52	69.668330	22.756143	10000	0
18	53	69.636389	22.763333	20000	7500
19	54	69.678886	22.777405	10000	0
20	55	69.670833	22.782778	40000	5000
21	56	69.646111	22.774444	60000	7500
22	57	69.640000	22.768056	100000	10000
23	64	69.659048	22.756698	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	Longitude	Latitude	Regeneration	Recruitment
1	1	69.684285	22.778333	10000	5000
2	2	69.685000	22.781944	20000	7500
3	3	69.687778	22.782222	110000	10000
4	4	69.684722	22.780000	140000	12500
5	5	69.704032	22.771389	260000	5000
6	16	69.691667	22.774444	140000	10000
7	17	69.690076	22.775833	50000	17500
8	43	69.697381	22.755925	40000	15000
				96,250	10,313

Table 4.13: Density of Younger Class in Khari creek

Sr No	Q. Number	Longitude	Latitude	Regeneration	Recruitment
9	50	69.731111	22.770833	20000	2500
10	59	69.733611	22.778333	20000	10000
11	60	69.733611	22.770556	20000	0
12	61	69.733231	22.770205	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.

References:

G.A.Thivakaran, Pranav J. Pandya, G.Thirumaran, and Devi Velusamy. 2015. "Conservation and Monitoring for Natural Mangrove Stands at Mundra."

Himmelstoss, Emily A., Rachel E. Henderson, Meredith G. Kratzmann, and Amy S. Farris. 2018. "Digital Shoreline Analysis System (DSAS) Version 5.0 User Guide." Report 2018–1179. Open-File Report. Reston, VA. USGS Publications Warehouse. https://doi.org/10.3133/ofr20181179.

Hitesh B Patel, Subhash Bhandari. 2018. "Shoreline Change Analysis along Eastern Part of Kachchh Coast, Western India." *International Journal of Creative Research Thoughts(IJCRT))* 6 (1). https://doi.org/January 2018.

ICMAM. 2004. "Model Integrated Coastal and Marine Area Management Plan for Gulf of Kachchh." Department of Ocean Development, Ministry of Earth Sciences,ICMAM Project Directorate, Chennai, Government of India.

Jodhani, Keval, Pulkit Bansal, and Priyadarshna Jain. 2020. "Shoreline Change Observations in Gulf of Khambhat Using Satellite Images." *Available at SSRN 3552461*.

Kannan, Jayakumar, and S. Malarvannan. 2016. "Assessment of Shoreline Changes over the Northern Tamil Nadu Coast, South India Using WebGIS Techniques." *Journal of Coastal Conservation* 20 (December). https://doi.org/10.1007/s11852-016-0461-9.

Kathiresan, K. (2022). Mangrove Forests of India: An Overview. In: Das, S.C., Pullaiah, Ashton, E.C. (eds) Mangroves: Biodiversity, Livelihoods and Conservation . Springer, Singapore. https://doi.org/10.1007/978-981-19-0519-3_11

Misra, Ankita, and Balaji Ramakrishnan. 2015. "A Study on the Shoreline Changes and LAND-Use/ Land-Cover along the South Gujarat Coastline." *Procedia Engineering* 116 (December): 381–89. https://doi.org/10.1016/j.proeng.2015.08.311.

NIO. 2009. "Marine Environmental Impact Assessment for Discharge Channel of 4000 MW Ultra Mega Power Project Near Mundra, Gulf of Kachchh." National Institute of Oceanography.

Sutikno, Sigit, Ari Sandhyavitri, Muhammad Haidar, and Koichi Yamamoto. 2017. "Shoreline Change Analysis of Peat Soil Beach in Bengkalis Island Based on GIS and RS." *International Journal of Engineering and Technology* 9 (January): 233–38. https://doi.org/10.7763/IJET.2017.V9.976.

Sweet, William (William VanderVeer), Robert Kopp E., Christopher P. Weaver, J. T. B. Obeysekera, Radley M. Horton, E. Robert (Edward Robert) Thieler 1965-, and Chris Eugene Zervas 1957-. 2017. "Global and Regional Sea Level Rise Scenarios for the United States." Edited by Center for Operational Oceanographic Products and Services (U.S.), NOAA technical report NOS CO-OPS ; 83, . https://doi.org/10.7289/v5/tr-nos-coops-083.

Tamassoki, E, H Amiri, and Z Soleymani. 2014. "Monitoring of Shoreline Changes Using Remote Sensing (Case Study: Coastal City of Bandar Abbas)." *IOP Conference Series: Earth and Environmental Science* 20 (June): 012023. https://doi.org/10.1088/1755-1315/20/1/012023.

Annexure – 2

adani

Ports and Logistics

APSEZ, Mundra Celebrating the "International Day for the Conservation of the Mangrove Ecosystem" on 26th July-2023

About the Celebration:

APSEZ, Mundra has celebrated Mangrove Plantation & Awareness Programme at Luni Village coastal area for Students of Luni Govt. Villages & Adani Vidya Mandir, Bhadreswar and Online training awareness program to employees by Gujarat Institute of Desert Ecology, Bhuj on the occasion of **"International Day for the Conservation of the Mangrove Ecosystem" on 26th July 2023.**

Mangroves are extraordinary eco-systems found in coastal areas across the globe. They play a vital role in protecting our coastlines, supporting marine life, and com-bating climate change. World Mangrove Day is an annual celebration dedicated to raising awareness about the importance of mangroves and the need for their conservation.

Participant:

- Mangrove Plantation & Awareness Programme at Luni Village: 90 nos. of Students

Online training awareness program to employees: 65 nos.

PHOTOGRAPHS OF MANGROVE PLANTATION AND AWARENESS AT LUNI VILLAGE COASTAL AREA

APSEZ, Mundra Celebrating the "World Nature Conservation Day" on 28th July-2023

adani
Ports and Logistics

About the Celebration:

APSEZ, Mundra has conducted Mangrove Plantation Programme at coastal area near Bhadreswar Village and Online Awareness Training program on Nature & Mangrove conservation by **Dr. Jayendra J. Lakhamapurkar (Dy. Director- Gujarat Ecology Society)** the occasion of **"World Nature Conservation Day Celebration" on 28th July 2023** under the theme **"Forests and Livelihoods: Sustaining People and Planet"**

Activities:

- **Mangrove Plantation:** 2000 nos. of Saplings
- **Online Training Participants:** 30 nos.

PHOTOGRAPHS OF MANGROVE PLANTATION AND AWARENESS AT BHADRESWAR COASTL AREA

Annexure – 3

Kutch CSR

Six Monthly Report

2023-24

Adani Foundation
Adani House, Port Road, Mundra – Kutch 370 421
[info@adanifoundation.com] [www.adanifoundation.com]

Preface

Taking inspiration from the philosophy of our Chairman of trusteeship, the Adani Foundation strives to create sustainable opportunities. It does so by facilitating quality education, enabling the youth with income-generating skills, promoting a healthy society by women empowerment and supporting infrastructure development.

With an aim to contribute to the holistic development of communities, the Adani Foundation is contributing to the global agenda of meeting Sustainable Development Goals (SDGs).

Adani Foundation Gujrat sites are catalyst for rural communities residing in villages of Kutch,, Surat and Bharuch District. AF has transformed thousands of lives by serving community to uplift their standard of living by performing CSR activities in various in terms of Infrastructure, Social development, Education, Agriculture, Women empowerment, Water conservation and management and empowering fishermen and Tribal community.

Pankti Shah
Head CSR Gujrat
Adani Foundation

INDEX

CSR Kutch

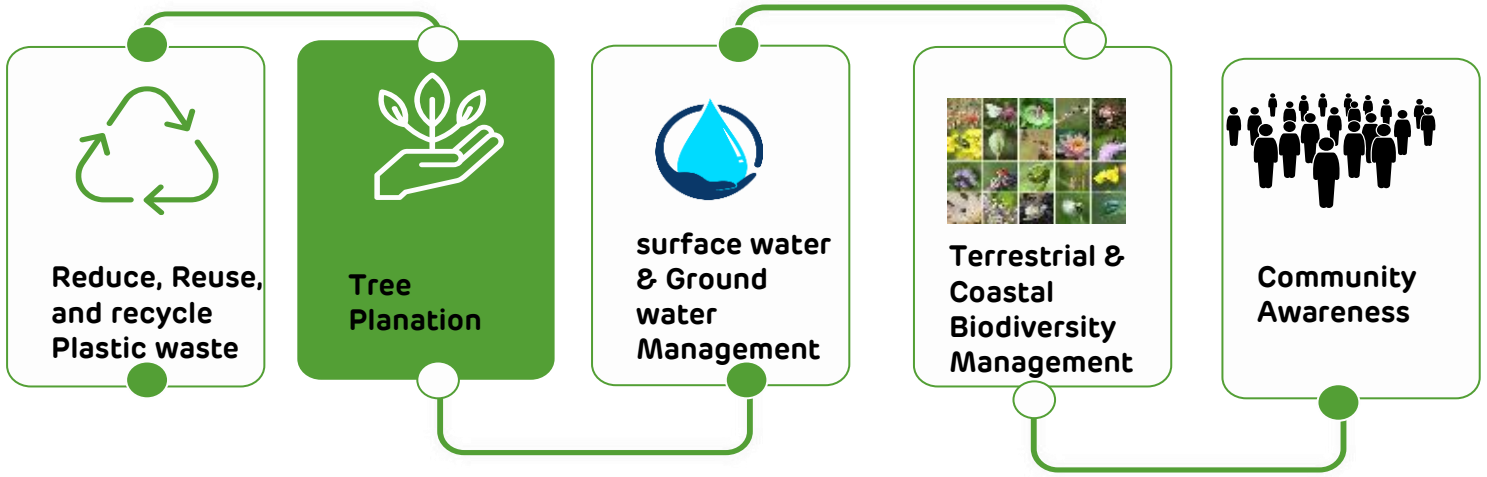
Demographic Details

Block	Villages	No. of HHs	Population
Mundra	61 Village and 9 Fishermen Vasahat	35192	153179
Anjar	3 Villages	4350	18500
Nakhtrana	8 Villages	4093	16373
Bite – 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 Panel Making Unit
7. Green to PVC Mundra Limited
8. Adani Kandla Bulk Terminal Port Pvt Limited
9. Adani Solar Limited – Bitta, Abdasa
10. Adani Green Energy Limited – Nakhatrana
11. Adani Green Energy Limited - Khavda
12. Adani Transmission Limited – Mandvi

Environment Sustainability

Action to environment Sustainability



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, groundwater recharging, and water conservation.

Environment Sustainability

Water Conservation Project

The water landscape of our Business periphery villages has undergone a significant transformation due to our proactive approach to groundwater and surface water conservation and management work. Our mission is clear – to nurture and sustain water resources. We are primarily focusing on initiatives such as pond deepening, reinforcing check dams, implementing Rainwater Harvesting Systems (RRWHS), setting up borewells, and cleaning river inlets.

These efforts have led to enhanced water storage, ensured consistent water access for drinking and agricultural use.

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 sea side.	35 farmer's 120+Acre Area of Agri land can be Irrigated

*** Funded by -Mundra Petro chem Limited**

Impact

- **483** Total area covered (Acre)
- **335** Total Farmers benefitted (No)
- **7%** TDS Reduction
- **7.2%** Increase Revenue %
- **1150** Reduce in health expenses Monthly

Environment Sustainability

Vruksh Se Vikas – Massive Drive

Since 2014, we has embarked a transformative journey to execute a wide range of tree plantation drive in collaborating with local communities and forestry departments .

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

2.Massive Public Plantation Drives: Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 25,000 trees were planted.

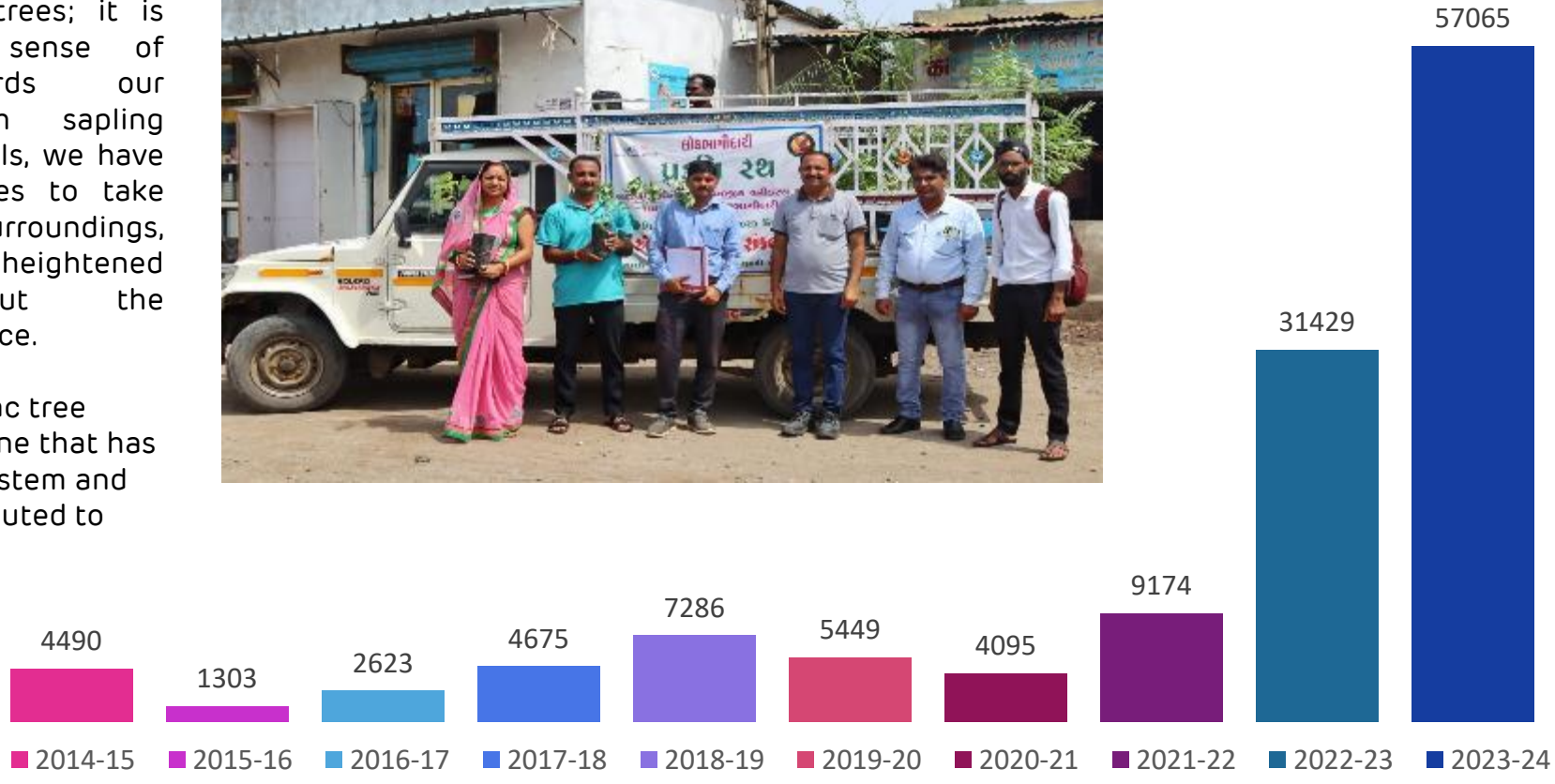
Environment Sustainability

Vruksh Se Vikas – Massive Drive

1.27 Lac tree plantation

Prakrurath: This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 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 1.27 Lac tree plantation have been done that has enriched the local ecosystem and also significantly contributed to carbon sequestration



Environment Sustainability

Home Bio Gas

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.

Phase	unit	Unit Cost In Rs.	AF Support in Lac	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**

*** Funded by -Mundra Petro chem Limited**

Environment Sustainability

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

- **Spices of Mangroves** — **4+**
- **Coastal Spices as habitat preservation** — **60+**
- **Hector Avicennia marine plantation** — **160+**
- **Hector Biodiversity park** — **20+**

* Funded by -Mundra Petro chem Limited

Mangrove Plantation Work Detail

Sr. No	Year	Number	Men 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**	

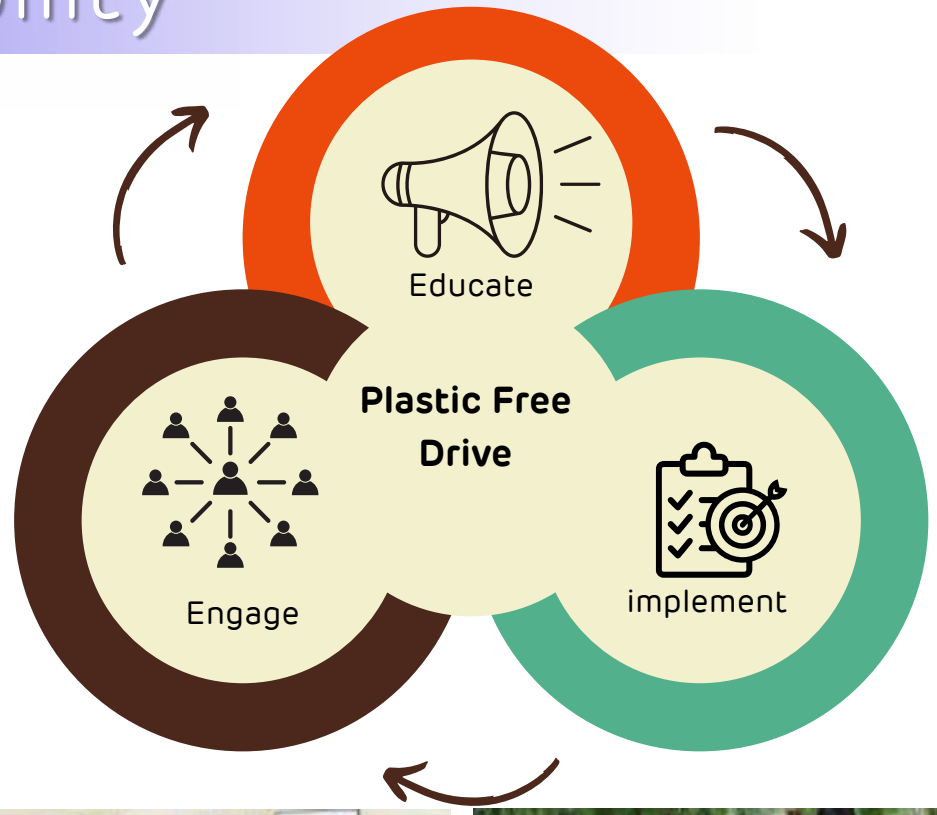
Environment Sustainability

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 to APSEZ plastic waste management plant.

Outreach :-
10000 Students of Primary Schools.
990 Students of Secondary Schools of Mundra Block.



* Funded by -Mundra Petro chem Limited

Environment Sustainability

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.
Funded By GPVC- Mundra Petro chemical limited

250 Farmers	05 exposure	857 Farmers	257 Gobardhan	35 Farmers	Rs.7.47 Lacs RG
• **Awareness Sessions at Village Level:** Spreading awareness on natural farming benefits and address their concerns.	• **Hands-On Training & Exposures :** Arranged Workshop and training to emphasizing on real-world techniques.	• **Link with Government Scheme**: facilitation of govt. Cow Nurturing scheme to promote eco-friendly farming practices.	• **Bio-gas Support:** Link with Gov Gobar Dhan Biogas Unit Nutrient-rich slurry serves as an essential organic fertilizer for natural farming	• **Natural Farming Certification Process** to obtain natural farming certification through the Gujarat Organic Product Certification Agency (GOPCA) for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali.	• **Marketing Assistance:** Provide platforms and resources ensuring fair prices and broader consumer reach.

UTTHAN – FLAGSHIP EDUCATION PROGRAM OF ADANI FOUNDATION

Project Utthan, launched by the Adani Foundation in 2018–19, is an innovative intervention to enhance students' learning capabilities, provide facilities to schools, and achieve better learning outcomes at the grassroots level. The project adopts government primary schools to convert it as model schools, tutors' progressive learners, introduces English as a third language, and conducts various academic and co-curricular activities to enhance quality of education. It also works on staff capacity building and engages educators, SMC members and parents, especially mothers, to improve children's basic literacy and numeracy skills.

*** Funded by – Kutchh Copper Limited**

- Adopting government primary schools
- Main streaming Progressive learners
- Enhancing Learning Outcomes
- Arresting dropout rates
- Introducing English as a Third Language
- Enabling Joyful Learning Spaces
- Collaborating for teachers' capacity building

UTTHAN OBJECTIVES

- Strengthening Government primary schools
- Appointing an Utthan Sahayak in each school who acts as a catalyst and facilitator
- Providing resources and facilities
- Literacy, numeracy and skills for life
- Government school teachers' capacity building
- Special focus on 'Priya' Vidyarthi's (progressive learners)
- Training students for Competitive exam

UTTHAN REACH

10499	999	250	150	150	3000
69	8	2	5	5	2
Primary School	High School	Adani Evening Education Centre	Adani Competitive Coaching Centre	Adani English Coaching Centre	IT On Wheels

PROGRESSIVE LEARNER

2541 Progressive Learner; Assessment of 6314 Students (3 to 7 Std.)

MOTHERS MEET

400+ Mothers Meet : 10000+ Mothers Joined.

COMPETITIVE EXAM

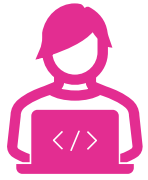
877 Students preparing Competitive Exam. 354 JNV, 273 PSE & 250 NMMS

ENGLISH : THIRD LANGUAGE

5000+ Facilitating English from Classes 1-4.

LIBRARY ACTIVITY

72000+ Book Issued : 924 Library Activities, OASIS 200+ Reading Workshop



IT ON WHEELS

4170 students Empowered with digital skills & knowledge.

SUMMER CAMP

4300+ students of Primary & High Schools participated .

Our other various initiatives include:

- ✓ Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office.
- ✓ Exposure Visit of Project officers from three different locations to learn about the best practices.
- ✓ Computer Classes in High school : 200 Students took advantages of this computer classes.
- ✓ Career Counselling in 8 Utthan High Schools.
- ✓ Plastic Bag Free village workshop in all High schools.
- ✓ Remedial classes during summer break.
- ✓ Day Celebration : World Book Day, World Environment Day, National Reading Day, International Yoga Day, National Plastic, Bag Free Day, Raksha Bandhan, Independence Day & Celebration of Sports Day.
- ✓ Planned various Capacity Building Program (CBP) & Exposure visit for Utthan Sahayak & Students.
- ✓ Achievements : • Utthan sahayak motivate mothers to open an account of Sukanya Samrudhi Yojana • Utthan supported Taluka levels Kala Utsav in Primary & High Schools. •Utthan Sahayak supported Taluka level Science Fair. •06 students selected in District Level Sports School (DLSS).

Utthan in High Schools

Utthan Aligned With GoI & GoG

NEP 2020 | Samagra Shiksha | Nipun Bharat | RTE

Utthan in High Schools

8 High school

2 teachers hired, (1 Math's & Science, and 1 English)

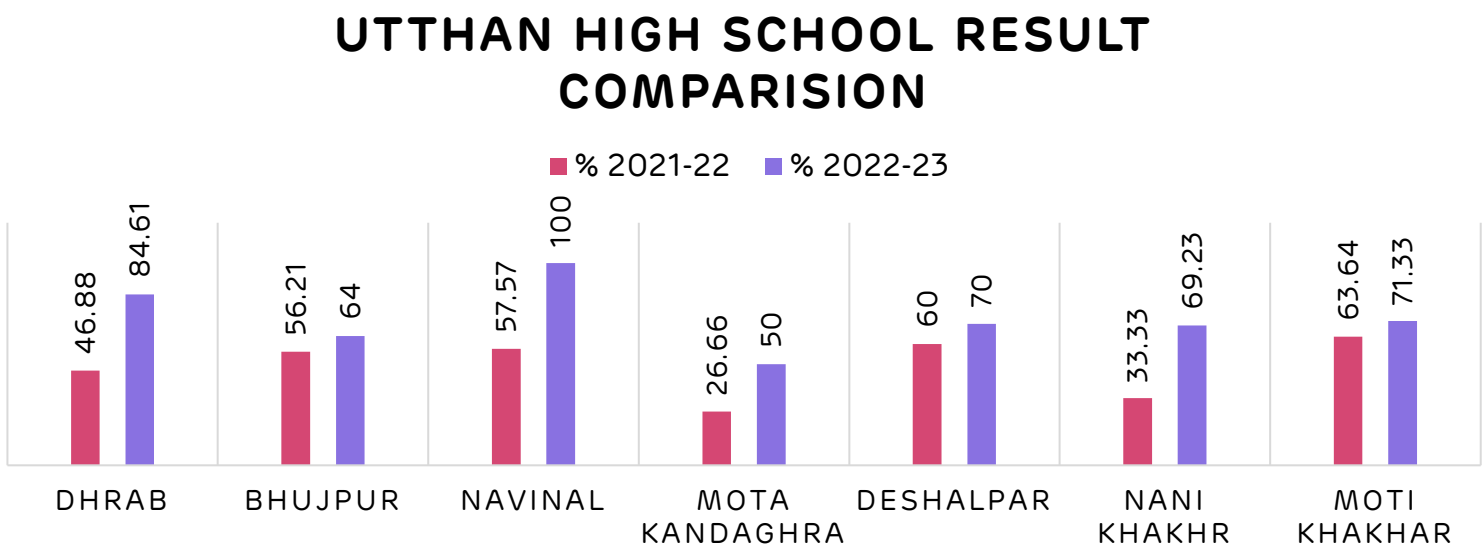
Goal is to improve the students' fundamental skills in these subjects.

2 AEEC

help students improve their academic performance by revising the syllabus and clearing their doubts

Our trained teachers and volunteers provide personalized guidance and feedback to the students in a conducive learning environment these programs will boost the confidence and skills of the students and prepare them for a brighter future.

Good Board Result



Adani Education Evening Centre is running in 2 centers, where Utthan Sahayak teaches Maths, Science & English for an additional 2 hours. This has had an impact on the board results.

Adani Vidya Mandir, Bhadreshwar

Empowering Communities through Free and Compulsory Education

Adani Vidya Mandir, Bhadreshwar, was established in June 2012 with the goal to have access of quality and cost free Education with essential amenities like food, uniforms, and books, to Financial Weaker community children of the Mundra Block.. The school boasts excellent infrastructure and resources necessary for the holistic development of each student. Children are admitted to the school form Senior Kg to 10th Standard.

Few notable points:

- We are empowering economically disadvantaged families through free and quality education
- We are fostering an environment of academic excellence.
- Pioneering Excellence: The First Gujarati Medium School in Gujarat Accredited by NABET
- Over 600 Students Learning Each Year in AVMB
- More than 35% of enrolled students in AVMB come from the Fisherfolk community.

- Work shop was conducted on Mental Health and behavioral change
- AVMB got 1st rank in Vaadan, Gayan and drawing in Kala Maha Kumbh competition and selected for Next block level competition
- AVMB selected for district level Kho-kho Match competition organized by SGFI-School Game Federation of India,
- 2 students selected for District Level Athletic Competition

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

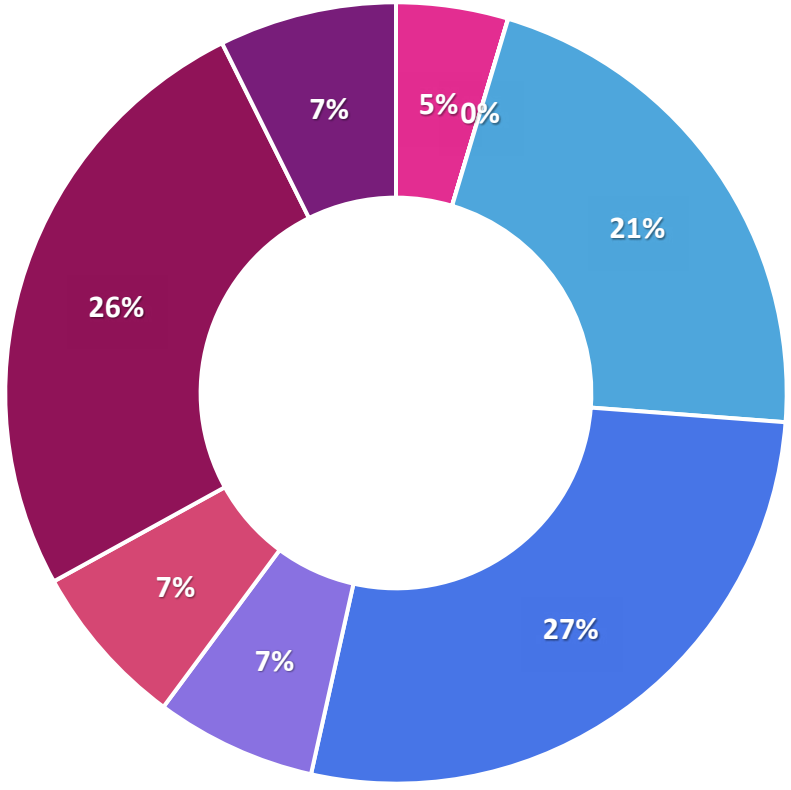
100% Success: Adani Vidya Mandir Bhadreshwar's Remarkable Achievement in Gujarat Board Standard 10th Examination.

Community Health

Quality healthcare is not just about addressing illness; it's about providing everyone an equal opportunity to not just long life, but also rich in quality.

At the Adani Foundation, our steadfast commitment is to offer accessible and affordable healthcare. Through Our diverse healthcare initiatives which are dedicated to cultivating a healthier society to the develop strong and vibrant nation."

CH MIS Data Month April to Sep - 2023		
Sr. No.	**Projects**	**Total**
1	Medical Supports	**1007**
2	Diaylsis	**58**
3	Mobile Van	**4690**
4	Rural Clinice	**5939**
5	Health Camp	**1448**
6	Speciality Health Camp	**1489**
7	Ayushman Card	**5584**
8	Blood Donation Camp	**1598**
Total		**21757**



Our Mobile Health Care Units and Rural Clinic Services have made significant strides in delivering essential healthcare to remote rural areas and underserved populations Since the inception.

MHCU Outreach :- 29 Villages -31 Stoppage
Rural Clinic:- 7 Villages Of Mundra And Mandavi Block

SROI 1:541 (Ref.Soulace impact assessment report)

- **10629 individuals** benefited from the services.
- **35 villages** villages covered.
- **20 %** average savings on healthcare-related costs.
- **25%** People are aware and become health Conscious

29-Villages
31-MHCU
Stoppage
7-Rural clinic

Medical Support Poor Patients.
Adani Foundation's Medical support program is a beacon of hope for the less fortunate, offering aid for a diverse range of ailments, from kidney problems to heart conditions and beyond at Our Adani Hospital Mundra.

In the critical cases, after stabilizing patients we refre them to GKGH, Bhuj, for advanced treatment with ened to end co-ordination

Live Impacted -1008 People

Community Health

Dialysis Support:
In Mundra, where water quality challenges contribute to a higher prevalence of urinary infection lead to kidney failure cases. Our Dialysis Support Program is designed to assist those in extreme need and Financial weaker.
The program is not only alleviating their financial burden but also enabling them to lead healthier lives.

Live Impacted:- Two Patients 58 Times

Our health camp initiatives are designed to bridge healthcare gaps in underserved regions, offering a holistic approach for community well-being with combining Preventive and Precautionary measure through Awareness session , Health check Camp, screening and treatment.

The "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.

Outreach:- 9 Villages
Lives Impacted:-473

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

As well as we arranged gynecological and ophthalmic and general health camp at Village level in collaboration with KCL limited, GKGH Bhuj, and THO Mundra,

CH MIS Data Month April to Sep - 2023

Sr.	Projects	Total
1	Health Camp	1448
2	Speciality Health Camp	1489
3	Blood Donation Camp	1598
	Total	**4535**

*Funded by – Kutchh Copper Limited

Community Health

Ayushman card facilitation

Ayushman Bharat PM-JAY is a global healthcare milestone, offering an unprecedented health cover of Rs. 5 lakhs per family annually for secondary and tertiary care. Adani Foundation has started 100% Ayushman Card coverage in all villages of Mundra in coordination with the District Health Department.

Villages -25 Villages
Live Impacted:- 5,584 Ayushman cards have been Issue.

25 Village

5,584 Ayushman cards Issue

Women Health & Well Being
Outreach-18 Village
Lives Impacted:-2230+ women.

- **Gynec Health Check-ups:** Conducted thorough check-ups, with GKGK referrals when necessary.

Sustainable Livelihood Development

"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.

We have started green Carnival to provided a platform for these farmers to sell their agricultural produce in our two colonies in Mundra. Encouraged by positive feedback, the farmers have set-up a organic Agri produce shop in Mundra, It serves as an inspiration for others to embrace eco-friendly agricultural practices. Now 302+ farmers are collaborated with Mandli.

Previously, these farmers used to sell their produce in bulk to vendors. Now, they are able to sell directly to consumers, leading to a 35% increase in their income. Furthermore, they have applied for the "GOPCA" certificate from the Gujarat Organic Product Certification Agency, highlighting their commitment to organic farming practices.

They have started Collective organic farming in the 200 acre of agri land with proper fencing and technique.

Rajshakti Prakrut sahakari Mandali had Opportunity to meeting with honorable Governor of Gujarat Achrya devvrat at Gandhinagar on 30 August. As well as had exposure to Gautirth vidhyapith Bansi ghar Gaushala,Ahmedabad.

Sustainable Livelihood Development

Dates Restoration

In the aftermath of the devastating Bipor Joy cyclone, our farming community faced a severe setback as numerous Date, Mango, and other fruit plants were damaged and uprooted. These plants, which served as a vital source of income for farmers, were left in shambles.

To address this crisis and provide a ray of hope, we embarked on the Dates Restoration Project in collaboration with Krishi Vigyan Kendra (KVK) and other agricultural experts. This project aimed to rejuvenate and revive the fallen Date plants.

As of the current date, 615 Date plants have been successfully restored. These plants are now on the path to recovery and are expected to bear fruit in the upcoming season this will providing significant financial relief to farmers.

Kitchen Garden Kit

We have ve 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.

Tree Restored : 500 Unit

Each Date trees is projected to yield approximately Rs. 25,000, Total Yield in Next Season:-Rs.1.53 Cr.

* Funded by – Mundra Petrochemicals Limited

Sustainable Livelihood Development

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

Grassland Development Program
We have started Grass land development with a primary objective to create a self-sustaining village by converting common pastureland (Gauchar) into fertile and productive grasslands to ensure a reliable source of fodder for the community, especially during challenging times.

Total area :- 213 acres of gauchar land has been cleaned and allocated for Grass land development with strong Community Contribution and Mobilization.

Villages : Zarpara ,Siracha, Gundal , Kukadsar
Out put:- Cattle relayed for one Month due to fodder Production

Cattle Health camp
we had arranged Cattle Health Camps, in close coordination with Government Veterinary doctors and the Animal Husbandry Department, dedicated to ensuring the crucial veterinary care to a significant number of cattle, effectively addressing their immediate health needs. To date, we have successfully treated more than 500 cattle, ensuring their health and vitality.

799413 Kg Dry Fodder Support

2353303 Lac Kg Green Fodder Support

24 Beneficiary Villages

16000 Cattle benefitted :-

Sustainable Livelihood –Fisherfolk Community

Education

Vehicle Transportation Facilities
We extend vehicle transportation services to school-going children from Luni and Randh Fishermen Settlements to the AVMB School, Bhadreshwar Similarly, we ensure for Juna Bandar Fisherfolk Students to the nearest Government School and enable them to school for regularity and easy to reach school.

Funded By AF	-	165 Students
Funded By	-	53 Students

Education Kits Support
Education Kits including notebooks, guides, and bags, to fisherfolk students studying in 9th to 12th standard to enhance their learning experience

Funded By AF	-	15 Students
Funded By GPVC	-	42 Students

Outcome

- Increased Attendance- 75%
- Enhanced Learning: 20%
- Parental Engagement:- 25%
- Cultural Shift:-10%

Educational awareness sessions were conducted in four Fisherfolk Vasahat of GPVC Villages to highlight the importance of education, with a particular focus on promoting girl-child education.

Primary Schools	- 445 Students
Secondary Students	- 42 Students

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.

Scholarship Support
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."

*** Funded by – Mundra Petrochemicals Limited**

Sustainable Livelihood –Fisherfolk Community

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

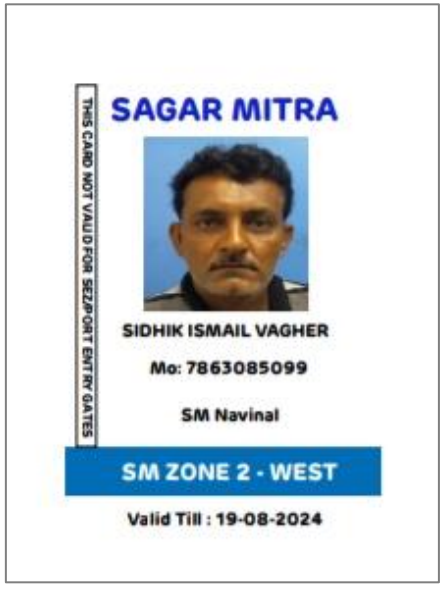
Providing access of potable Drinking water Facilities to Nine sherfolk vasahat on Daily bases, either By Water tanker or Linkage with Nearest Gram panchayat.

More than 5000 Fisherfolk Population are getting benefit which impact on their health and efficiency.

Sr. no	Vashat Name	Population	Water Quantity in KL
1	Luni Bandar	401	15000
2	Bavdi Bandar	535	20000

Sagar Mitra

We have 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."



Women Empowerment

Project Saheli

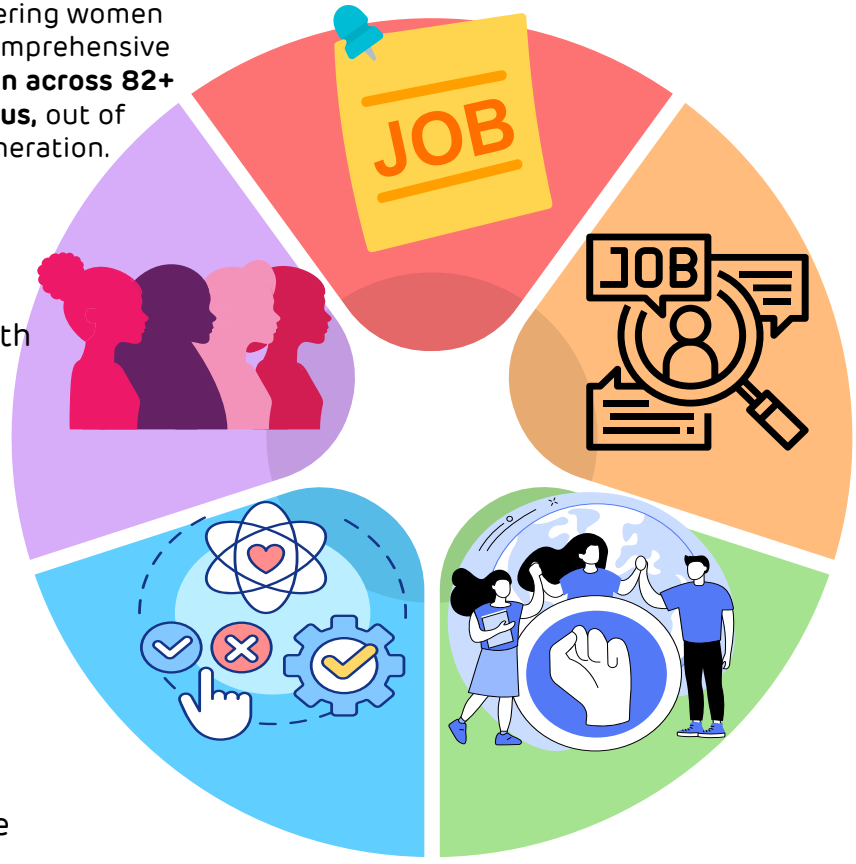
- Kutch Copper Limited is dedicated to empowering women both financially and socially. To that end, a comprehensive training program that has reached **850 women across 82+ Self Help Groups with 30+ Lacks saving Corpus,** out of which 5 groups have outstanding revenue generation.

Self Help Groups

- 82 Self Help Groups in coordination with National Rural Livlihood Mission.
- 850+ Members
- 31 Lacs Saving Amount Corpus

Making SHG Self Reliant

- 16 SHG are on path ways of self reliance.
- Various handicraft, dry and fresh food making, stitching, tie and die etc.
- 160+ women - Monthly average income @ 7000 of each member oer Month



Job Sourcing - Govt

- 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

- Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company
- 387 Women supported till date for job sourcing of 18 villages
- Average income 10200 Per Month

Social Empowerment

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

*** Funded by – Kutchh Copper Limited**

Women Empowerment

Menstrual Hygiene Awareness

Objective :-
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."

18 Villages

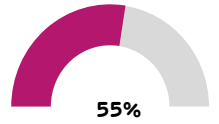
1587 Women participated

494 School girls

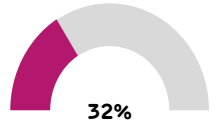
Till date 36% women had never used sanitary Napking single time now they started using due to our intervention. This will reduce UTI @ 22%. As our sample survey

Process

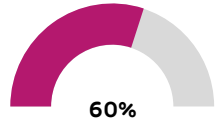
- Conducted Awareness Session at Village level
- Awareness Session at Schools
- Provide Sanitary pad
- Feed back and Evolution



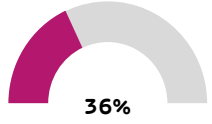
Women Never heard about Menstrual hygiene



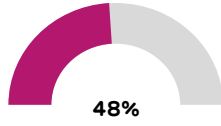
Women faced mild infection in life-time



were using cloths on regular basis



Women had never Used sanitary pads



Women had no information about UTI

Source :Women Sample Survey Report July 2023

*** Funded by – Kutchh Copper Limited**

Women Empowerment

Millet Program

Village Name	Women Participated	Millet dish prepared
Bidada	67	22
Moti Bhujpur	61	12
Mundra	50	20
Mota Bhadiya	50	22
Mandvi	50	24
Siracha	40	14
Tragdi	24	13
Nani Bhujpur	37	23
Kandagra	36	15
Navinal	36	24
Nani-Khakhar	36	18
Nana Bhadiya	25	12
Deshalpar	33	17
Total	**545**	**236**

*** Funded by – Kutchh Copper Limited**

International year of Millets-2023

With the vision of promoting the culture touch, awareness, benefits and consumption of millets in Mundra, we conducted Millet competition in Nine villages.

- Never heard about millets or it's befits 60%
- Never used millets in diet 30%
- Unhealthy lifestyle 75%
- Learned new and healthy dishes 80%
- Weight Management 55%
- Other disease 35%

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, and facilitating access to clean drinking water for villagers.

GPVC

Restrengthening & Desilting of Check dam – 720+ Benefited

Road Renovation and Civil Maintenance Work at Fisherman Vasahat – 600+ Benefited

Construction of Pipe Culvert – 400+ Benefited

River Cleaning and JCB Support - 2250+ Benefited

10 JCB Support for 45 days to Farmers for Cleaning Vadi vistar after cyclone – 1650+ Benefited

6 Percolation Bore well Recharge – 4000+ Benefited

KCL

4 location Pipe Support – 4800+ Benefited

Renovation of High School at Zaarapa – 2200+ Benefited

Renovation of Approach road Vadi Vistar at Mota bhadiya village.- 7200 Benefited

3 Villages - Renovation of Godown and Gaushala Shed

Community Infrastructure Development

377 - AC Roof sheet support to Fisherfolk Vasahat – 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

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.

Connect With Government & community

Health teams and ambulances on standby in case of emergency.

Health Team

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

AWAZ DE

4500+ Workforce migration with basic amenities.

Relocate to a secure location

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

Duty delegation

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-oridnate with Gram pancahayat 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

Some Glimpses of BiporJoy Relief Work

PROJECT UDAAN

202 institutes visit

5 Corporate visit

13226 Participants

The Project Uddan is an educational initiative led by the Adani Foundation, with the overarching goal of inspiring students to think big through a comprehensive educational mission. As part of this initiative, educational tours are organized, allowing school and college to visit various Adani Group facilities, including Adani Port, Adani Power, and Adani Wilmar refineries at different locations. These tours provide valuable insights for students to aspire for great achievements in their own lives. Moreover, the project enhances students' learning experiences and encourages them to envision themselves as future entrepreneurs, innovators, and leaders.

During six month Udaan project had conducted 202 institutes visit and 5 corporate visit. Total 13226 participants (7688 Male Students, 4861 Female Students and 677 Faculties).

Adani Skill Development Centre

Total Admission in Both centre 2023-24

Mundra

Courses	Female	Male	Total	Revenue Generated
Digital literacy	4	3	7	4130
Hydrography	-	3	3	15,000
Advance Excel training	-	18	18	18,850
RTG Crane Operator	-	15	15	1,50,000
Mud work	30	-	30	Fees Received on F.Y. 2022-23
Solar Technician	-	-	Training Completed on F.Y. 2022-23	42260
Total	**34**	**39**	**73**	**2,30,240**

Bhuj

Courses	Female	Male	Total	Revenue Generated
Digital literacy	34	10	44	25960
Hydrography	-	9	9	45,000
EDP – Tie up with CED	09	21	30	14500
GDA	14	09	23	1,35,280
5 S	-	01	01	590
Interview Skills	-	01	01	00
Industrial Safety	-	01	01	3540
Total	**57**	**52**	**109**	**2,24,870**

Adani Skill Development Centre, Mundra

Digital Literacy

Digital literacy training was provided to seven students at Bhujpur Government High School, and as a part of the DEO project, certificates were distributed .

RTG Crane operator

RTG crane operator training is successfully given to 15 candidates.

Beauty therapist

The distribution of certificates for beauty therapist training celebrated the successful culmination of the program

Mud work

After the mud work training in Dhrab Village, a certificate distribution ceremony was held, benefiting a total of 30 female participants.

Advance Excel training

Eighteen employees from Sumitomo India Ltd. Co. underwent advanced Excel training, significantly boosting their skills.

Adani Skill Development Centre, Bhuj

Digital Literacy

ASDC has partnered with Tally as the Knowledge Partner for its Tally - GST course. The first batch, consisting of 16 students from Bhuj location, achieved a remarkable 100% pass rate.

Real-time exposure

Twenty-five Nursing Assistant trainees gained valuable real-time experience in Emergency services through interactions with 108 Ambulance services and an industry visit.

We offer on-the-job training to nursing students to build their confidence and prepare them for delivering high-quality patient care.

Hydrography training

Provided practical Hydrography training to nine participants.

Entrepreneurship Development Programme (EDP)

Conducted EDP training in collaboration with CED, Gandhinagar, for a total of 30 trainees.

Placement

We successfully hosted a placement drive at our center on April 23rd, where 11 out of 15 candidates secured positions at KK Patel Hospital with an impressive average monthly salary of Rs. 17,000.

AKBPTL - TUNA

ADANI KANDLA BULK TERMINAL PVT LTD -TUNA

Potable Water Distribution
Potable water (17.5 KL per Day) Distribution to Vira and Dhavlvaro Bandar on regular base through Water tanker Regularly through **AKBTPL and GWIL**

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

Total 7410 Kg Dry and 447473 Green Fodder Distribution 1228 3 Villages1228.

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.

The paver block work at Vandi and Tuna Common Gathering which enhances their usability and convenience for the community. During the monsoon season, certain areas of Wandi village get waterlogged , .we took measures to clean and address the issue Immediately.

AGEL-Dayapar

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, it 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, PTC India

Sr. No.	CSR Activities	Beneficiaries	
1	Ayushman Health card Camp	86	Nana Valaka & Mota Valka
2	General health camp	267	Nana Valaka & Mota Valka Ghadani, Paneli
3	Animal Health camp	1,500+	Gahadani
4	Tree Plantation	5,435	AGEL Surrounding Villages

Village Name									
Village Detail	Mota Valka	Paneli	Ghadani	Ludbay	Amara	Muru	Deshalpar	Haroda	Total
Total Household	224	87	357	278	700	218	351	120	2335
Population	926	520	2224	1509	1913	1329	2025	718	11164
Male	473	261	1110	807	943	696	1026	379	5695
Female	453	259	1114	702	970	633	999	339	5469
BPL	79	34	155	83	180	123	138	24	816
ICDS-Anganwadi	2	1	2	1	2	1	1	1	11
Children Number	180	18	112	35	65	35	32	15	492
Primary School	2	1	2	1	2	1	1	1	11
Students	298	61	242	145	325	143	237	40	1491
Higher secondary School	No	No	No	No	1	No	1	1	3
Students					35		63	20	118
Disable Person	3	3	11	7	5	2	6	5	42
Pond/Chackdams	9	12	8	8	8	6	4	7	62
Two Wheeler	125	40	100	37	80	47	117	40	586
Four Wheeler	25	10	30	15	30	21	38	3	172
Loading Vehicle	1	2	1	6	3	7	9	4	33
Cattle Poppulation	3905	672	1937	3911	1375	1250	1375	1250	15675
Cow	100	166	180	100	175	230	80	100	1131
Buffalo	3750	162	367	3756	350	220	325	250	9180
Sheep/Goat	55	344	1390	55	850	800	970	900	5364
Total Milk Production-(Ltr)	1520	1000	1100	1400	514	700	550	600	7384
Dairy	2	1	2	1	2	1	1	1	11
Land Details (Accor)	2112	3009	2914	268	3154	5678	2015	2043	21193
Farming Land (irrigated)	452	447	805	10	914	317	715	450	4110
Non Irrigated	345	300	510	94	720	335	93	110	2507
Gauchar & Other Land	1315	2262	1599	164	1520	5026	1207	1483	14576
Health Facilities									0
PHC	1	1	1	1	1	1	1	No	7
CHC	No	No	No	No	1	No	1	No	2
Drinking Water									
Home connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Sanitation									
Toilet facilities	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Electric Facilities									
Individual home connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Women SHG	7	3	8	2	1	5	11	No	37

AGL Khavda

Adani 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 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[1].

It is expected to play a major role in fulfilling India's vision of generating 450 gigawatts (GW) of renewable power by 2030

Tree plantation:- We distributed 650 tree saplings to primary schools along with an awareness session highlighting the importance of trees.

Ayushman Card Facilitation to Dinara, Khavda, Birndiyari, Gorivalli Villages. Total 311 Card Issued.

We have conducted Primary baseline assessments and created Village profile of 07 villages and identify their specific needs, aspirations, and developmental potential.
Though we have started some entry point activities and Based on Village profile data Initially we will start Project Utthan and Some Health and Livelihood projects.

Village Name								
Village Detail	Mota & Kotada	Kuran	Mota Dinara	Nana Dinara	Khavda	Tuga & Jam Kunariya	Khari	Total
Total Poppulation	5500	1800	7500	4000	11000	3300	3600	36700
Total Family	700	300	3000	2500	800	673	470	8443
SC	NO	YES	NO	NO	YES	NO	YES	
ST	NO	NO	NO	NO	YES	NO	NO	
OBC	YES	YES	YES	YES	YES	YES	YES	
General	NO	YES	NO	NO	YES	NO	YES	0
BPL	35	60	500	300	37	500	100	1532
ICDS-Anganwadi	YES	YES	YES	YES	YES	YES	YES	
Children Number	250	45	350	200	300	300	150	1595
Primay School	YES	YES	YES	YES	YES	YES	YES	
Secondary School	NO	YES	NO	YES	YES	YES	NO	
Higher secondary School	NO	YES	NO	NO	YES	NO	NO	
Above 18 to 30 Yrs: 10th pass	15	200	60	12	40	50	40	417
Disable Person	40	12	100	17	10	15	25	219
Senior cityzone	100	100	100	500	500	80	300	1680
Widow	50	60	60	50	20	30	60	330
Unemployed Youth	200	45	40	20	50	120	100	575
Two Wheeler	150	150	250	50	300	70	200	1170
Four Wheeler	15	50	50	25	80	15	20	255
Loading Vehicle	10	43	50	90	100	57	30	380
Cattle Poppulation								
Cow	3400	400	4000	6000	250	8000	3000	25050
Buffalo	3000	350	3000	300	1500	600	10000	18750
Sheep	200	100	1000	1500	50	360	150	3360
Goat	600	2000	2500	200	800	3300	2500	11900
Total Milk Production-(Ltr)	1500	600	2000	6000	3000	3200	4000	20300
Dairy	2	2	3	4	2	2	2	17
Land Details (Accor)								
Farming Land	1000	2500	12500	3200	741	2000	600	22541
Gauchar	200	4500	2000	1800	100	412	480	9492
Health Facilities								
Sub-PHC	NO	YES	YES	NO	NO	NO	YES	
PHC	NO	NO	NO	YES	NO	NO	NO	
CHC	NO	NO	NO	NO	YES	NO	NO	
Drinking Water								
Home connection	YES	YES	YES	YES	YES	YES	YES	
Sanitation								
Toilet facilities	NO	YES	YES	YES	YES	YES	YES	
Electric Facilities	YES	YES	YES	YES	YES	YES	YES	
Individual home connection	YES	YES	YES	YES	YES	YES	YES	
Women SHG	NO	NO	NO	NO	NO	NO	NO	
Sakhi mandal	NO	NO	NO	NO	NO	NO	NO	

Sanghi Cement

Sanghi Cement, located near Moti ber village of Abdasa block , in Kutch, Gujarat. stands as a notable player in the cement industry. The company's presence in the region has a significant impact on the local economy and community.

We have conducted Primary baseline assessments of sanghi Cement Periphery 10 villages. The primary objective of this initiative is to gain a deep understanding of the socio-economic and environmental conditions of these villages, to identify their specific needs, aspirations, Based on that We will design Comprehensive CSR Projects in the core of education, healthcare, livelihood enhancement, women's empowerment,.

6.6 MMTPA capacity Clinker Plant

6.1 MMTPA capacity Cement Plant

143 MW capacity power plants

Village Name											
Village Detail	Nani Ber	Moti ber	Vayor	Hothaiy	Aakri Moti	Nava Vas	Golay	Pakho	Jadva	Pipar	Total
Total House Hold	137	606	1129	116	227	79	288	39	732	192	3545
Poppulation	478	2205	4027	534	426	215	642	130	254	881	9792
Male	248	1272	2715	266	224	111	316	72	373	429	6026
women	230	933	1312	268	202	104	326	58	359	452	4244
BPL											
0-16 Roster	17	24	39	7	51	13	8	9	12	41	221
0-20 Roster	53	56	76	18	70	20	44	11	25	76	449
others	36	21									57
ICDS-Anganwadi	1	3	4	1	2	1	2	0	1	1	16
Children Number	32	122	284	66	34	27	87	0	31	26	709
Boy	20	80	169	35	22	15	45	0	20	15	421
Girl	12	42	115	22	13	12	32	0	11	11	270
Primay School	1	3	2	1	2	1	1	1	1	4	17
Studnets Number	114	401	407	93	59	21	136	19	141	203	1594
Boy	64	213	219	35	33	11	74	8	72	100	829
Girl	50	188	188	22	26	10	62	11	69	103	729
Secondary School	NO	NO	1	NO	No	No	No	NO	No	No	1
Studnets Number	4	4	55	0	5	0	3	0	8	6	85
Boy	0	0	37	0		0		0			37
Girl	0	0	18	0		0					18
Higher secondary School	NO	NO	YES	NO	NO	No	No	0			0
Arts stream-Students	8	5	18	0	0	0		0	10	0	41
Science Stream	No	0	4	0	0	0		0			4
Agriculture											0
Farmers	55	85	151	35	84	15	63	0	53	43	584
Gruh Udhuog	1	0	0	0	0		0	0			1
Cattle Poppulation											0
cow	137	430	366	61	212	350	276	180	1228	581	3821
Buffalo	429	537	426	310	224	43	551	227	1127	841	4715

Village Name											
Village Detail	Nani Ber	Moti ber	Vayor	Hothaiy	Aakri Moti	Nava Vas	Golay	Pakho	Jadva	Pipar	Total
Land Details (Hector)											
Forest	195	191	0	0	0	432	1098	513	0	0	2429
not usable	128	35	406	0	705	116	23	399	1020	4236	7068
Non agri	386	323	35	466	35	0	16	478	1543	9	3291
barred	444	760	209	154	893	24	0	60	96	634	3274
Farming Land	710	281	1083	134	710	66	1167	0	338	400	4889
Gauchar	0	83	113	48	1142	0	32	128	398	98	2042
others					118						118
Irrigation Land-(Hector)		0									0
Canal	102	0	0	0		0	0	0	0		102
well	35	80	50	44	3	0	0	0	0	200	412
lift irrgation	15	44	0	0		0	16	0	56		131
Health Facilities											0
Sub-PHC	No	1	2	No	No	No	No	No	No	1	4
PHC	No	No	1	No	No	No	No	No	No	No	1
CHC	No	No	No	No	No	No	No	No	No	No	0
District Hospital	No	No	No	No	No	No	No	No	No	No	0
Drinking Water											0
Home connection	85	227	990	116	172	79	288	39	254	102	2352
without connection	52		139	0	25	0					216
Sanitation		227									227
Toilet facilities	137	227	990	116	167	60	288	39	200	100	2324
without drainage connection	50		840	0	30	19			54		993
Electric Facilities											0
individual home connection	137	227	990	116	113	60	91	37	240	100	2111
Agri connection	35		10	7	7	0		10	30	2	101
Women SHG	2	2	3	0	1	0		0	3	2	13
Sakhi mandal	11	12	23	4	1	0	5	0	4	15	75
Others											0
Senior Citizen card	5	3		2	21	2	2	0	2	10	47
Widow Penson	1	1		4	3		1	1	26	8	45
Ayushman Card	20	35		32	24		0	0	0	0	111
Disable Pension			3		0		1	0	2	0	6
LPG Gas	58	1	780	10	19	10	60		100	15	1053

ATL-Mandvi & Rapar Block Villages

Adani Transmission is a company active in the power transmission and distribution sector in India and internationally. It holds a significant position as one of India's largest private sector power transmission companies, with a combined network spanning over 12,000 circuit kilometers. We wil start CSR initiatives in 12 villages located within the Mandavi and Rapar Block areas, intersected by the Adani Transmission Line."

We have conducted Primary baseline assessments and created Village profile of 12 villages and identify their specific needs, aspirations, and developmental potential. Based on that We have started CSR Activities in the core of education, healthcare, livelihood enhancement, women's empowerment,.

Village Name							
Village Detail	Kidiyanagar	Bhimasar	Moti khakhar	Gangapar	Moti Bhadai	Nani Bhadai	Total
Total House Hold	1300	1765	436	80	250	116	3947
Poppulation	9000	15000	2139	272	1171	498	28080
BPL	250	290	50	1	31	10	
ICDS-Anganwadi	10	10	1	0	1	1	23
Children Number	30	600	34	0	38	20	722
Primay School	10	13	2	1	1	1	28
Studnets Number	1083	1547	246	6	160	160	3202
Secondary and high secondry School	125	245	144	0	120	NA	634
Agriculture							0
Farmers	650	750	150	80	200	105	1935
Gruh Udhuog	1	0	1	NA	NA	NA	2
Cattle Poppulation							
Cow	400	750	700	100	686	600	3236
Buffalo	2600	1000	500	NA	768	188	5056
Sheep	1500	2500	1000	NA	100	NA	5100
Goat	1500	2500	1000	NA	200	NA	5200
Land Details (acers)	16702	4777	1000	3000	10460.00	4637	40576
Forest	0	100	NA	50	0	NA	150
not usable	1500	100	NA	200	1000	NA	2800
Non agri	NA	386	NA	300	1000	2537	4223
barred	NA	444	NA	450	NA	NA	894
Farming Land	11500	3500	600	1800	7800	2000	27200
Gauchar	3000	237	400	200	600	100	4537
Irrigation Land-(Hector)		0					
well	550	650	150	80	200	105	1735
lift irrgation	100	100	100	60	150	80	590
Health Facilities							0
Sub-PHC	1	1	1	NA	NA	NA	3
PHC	1	1		NA	NA	NA	2
CHC	No	No		NA	NA	NA	0
District Hospital	No	No		NA	NA	NA	0
Drinking Water	1300	1765	436	80	250	116	3947
Home connection	1300	1765	436	NA	250	116	3867
without connection	0	0	0			NA	0
Sanitation							0
Toilet facilities	1200	1650	400	80	200	100	3630
without drainage connection	100	115	36	NA	50	16	317
Electric Facilities							0
individual home connection	1300	1765	436	80	250	116	3947
Agri connection	600		1	80	NA	105	786
Women SHG	2	2	1	NA	200	0	205
Sakhi mandal	10	12	3	NA	1	1	27
Others						0	0
Widow Penson	400	400	40	5	50	25	920
Disable Pension	60	55	13	2	11	10	151

Events

Mother's Day Celebration

On May 14th, we celebrated Mother's Day in Mundra. Mrs. Chhaya ben Gadhvi, former District Education Chairperson of Kutch, delivered an inspiring speech about the importance of mothers in shaping families and our nation's future. More than 200 Mother had participated.

Inauguration of Ground water Recharging projects

On May 17th, Inaugurated a groundwater recharging project involving 21 percolation wells. We were honored to have notable attendees, including Mr. S.K. Prajapati (DDO Kutch), Mr. Rakshit Shah (EDM, APSEZ, Mundra), Mr. Mahendra Gadhvi (Chairman, Kutch Jilla Panchayat), and local Taluka Panchayat Presidents at the event.

Employee Volunteer Program

On May 14th and 15th, 2023, in Samudra Township, Mundra, the Adani Foundation organized a "Joy of giving" in partnership with the Indian Coast Guard Station, Mundra, with the noble aim to assisting those in need with essential items. We gathered old but usable clothes, utensils, and books to provide support to those less fortunate.

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 open market

Events

Launching Of "Prakruti Rath"

On June 2nd, 2023, Adani Foundation Mundra and Kutch Copper Limited, along with the Government of Gujarat's Social Forestry Department, launched "Prakruti Rath," a 30-day environmental initiative aimed to distribute 50,000 tree saplings to 61 villages via an innovative vehicle that educates about environmental awareness.

Vegetables Kitchne Garden Kits Distribution

On June 3rd, Mundra Petrochemical and Adani Foundation celebrated World Environment Day in collaboration with the District Horticulture Department and distributed kitchen garden kits to over 500 farmers. In the Esteemed presenece of Mr.Amit Arora Collector Kutch.

State-level Kabaddi Tournament

State-level Kabaddi tournament was scheduled through The Maharana Pratap Group of Bhujpur ,more than 21 teams had participated from across Gujarat. We sponsored Rs. 25,000 to The winning team Rs. 15,000 to runner sup Team . We continue to support and encourage young talents for their growth and achievements..

Inauguration of Dates Restoration

Adani Foundation surveyed cyclone-caused agricultural crop damage, particularly date trees. They initiated a comprehensive project in partnership with KVS to restore the trees, commencing on June 24th in the presence of Mr. Anirudh Dave, MLA of Mundra-Mandvi, and Mr. Rakshit Shah, Executive Director of APSEZ, Mundra.

Events

Education Kits Distribution

On June 23rd, Mundra Petrochemicals organized a special program to distribute education kits to students in grades 9 to 12 from the Fisherfolk community. Mr. Omprakash Sir, representing Mundra Petrochemicals, shared an inspiring message about the Important of education. 40 students had benefited.

Inauguration Of Vegetable Market

Adani Foundation developed the Vegetable Market in Mundra, offering 195 stalls for convenient vegetable trading. It was handed over to Mundra Nagarpalika on June 24th, with Mr. Anirudh Dave (MLA Mundra-Mandavi) and Mr. Rakshit Shah (Executive Director of APSEZ, Mundra) present.

Guru Purnima Day Celebration

On July 3rd, Project Uthhan Mundra celebrated Guru Purnima Day across 69 primary schools and 8 high schools. The day commenced with a special prayer dedicated to the teachers (Gurus), followed by engaging activities such as drama performances and elocution competitions among the students.

Millet Food Competition

AF organized a Millet Dish competition on July 14th. in Collaboration of ICDS Department.Top three winners were recognized, and rewarded them, encouraging millet-based cooking

Events

Conservation of the Mangrove Ecosystem

On July 26th, Mundra Petrochemical celebrated Mangrove Day with spreading awareness over 9th and 10th-grade students and Fisherfolk The session ended with a Mangrove plantation. 150 + People had participated.

Kala Utsav Program

Kalautsav program was organized in collaboration with the District Education Department, on the 11th of August. The event was featured with various competitions, including drawing, singing, and instrumental playing. 70+ students from secondary and higher secondary schools from42 School of Mundra had participated..

Rakshabadhan Celebration

On Rakshabandhan, eco-friendly Rakhi making competition took place in all Utthan schools of Mundra. 46 exceptional girl students tied their Rakhis to BSF soldiers in Jakhau as a gesture of respect and gratitude.

Dr. Priti G Adani mam's 58th Birthday

On August 29th, Mundra Petrochem Ltd. marked Dr. Priti G Adani's 58th birthday with three impactful initiatives: 8,000 tree plantings in Deshalpar village, 500 sapling distributions at Government High School, and a workshop for 60 farmers on sustainable farming, all geared towards enhancing the local ecology and community resilience.

VVIP and VIP visits

Kajal Oza – Vaidhya

Famous Gujarati author and motivational speaker Mrs. Kaajal Oza Vaidya visited our Natural farming fields in Mangra village.

Fulcrum Batch 0

HODs of different business group of Adani came for CSR visit of Batch-0 as part of Fulcrum Leadership Development Program at Mundra.

Jay Vasavda Visit

Famous Gujarati writer and orator Mr. Jay Vasavada had visited our CSR work.

Pranav Adani Sir's Visit

Mr. Pranav Adani, along with other VIP guests, visited the Mangrove Plantation area in Luni coastal.

VVIP and VIP visits

VIP Visit : Ms. Lisa

Mrs Lisa MacCallum, Independent Director of Adani Energy Solution had visited our CSR work at Mundra.

VIP Visit – Sairam Dave

Mr. Sairam Dave, a renowned humorist and educationalist, visited Uthhan to inspire and motivate the students and teachers.

Journalist Visit

All journalist team came from Jarkhand ref by Ms. Varsha Chainani. They visited Women Empowerment and Agriculture Projects

AVMB Visit – Sairam Dave

Mr. Sairam Dave, a renowned humorist and educationalist, visited AVMB to inspire and motivate the students and teachers.

Award & Recognized

The Gujarat State Disaster Management Authority has acknowledged Adani Ports and SEZ for their outstanding support in establishing the world's top-ranking Miyawaki forest at Smruti Van, Bhuj. The Adani Foundation team actively monitored the project's advancement and made frequent site visits to ensure effective coordination..

Mr. Rajubhai, a team member of the Adani Foundation, was honored with the District Level Van Mitra Award by the District Administration during the 74th Van Mahotsav for his outstanding contributions to intensive tree plantation initiatives.

Case Study

A Breath of Change: Soanbai's Bio Gas Journey

Sonbai Vishram, a diligent 46-year-old woman, resides with her close-knit family in Vadi Vistar, Zarapara. She oversees a herd of 13 cattle with enthusiasm while caring for her seven family members. However, her life was far from easy. Every day, she would wake up at the crack of dawn and head into the dense farm to gather firewood. The Chulha, a traditional clay stove, was her only means of cooking, but it came with a hefty price.

Chopping wood and inhaling the thick smoke took a toll on Sonbai's health. Her eyes stung, her chest felt heavy, and she often found herself coughing uncontrollably. Furthermore, a lot of time is consumed by cutting wood. She deeply longs for more moments with her family, rather than devoting all her time to woodcutting; this sometimes leads to feelings of regret and sadness.

Seeing her mother's condition, her daughter Jetbai felt deeply disheartened. Fortunately, she learned that Mundra Petrochem was distributing biogas through a government-funded project "Gobardhan" to assist those in needs. She reached out to the Mundra Petrochem team, and upon witnessing her helplessness, they extended their support. They took full responsibility for all the documentation, registration, banking work, and installation. They also cover 50% of beneficiaries' biogas expenses. Additionally, they offered comprehensive training in biogas usage and maintenance, along with regular follow-up visits.

As soon as the biogas stove was up and running, Sonbai's life began to transform. Cooking became a breeze, and the air in her kitchen was free of choking smoke. Now, after eight months of using biogas, Sonbai's health has shown remarkable improvement, and she feels more energetic than she has in years.

She couldn't believe the remarkable transformations that had occurred in her life. Now, whenever she meets our team, she expresses her gratitude, and witnessing her radiant smile and heartfelt thanks, we find the true reward for our efforts.

Rising Above the Menstrual Taboo

This is a story of Laxmiben and many women like her living in Zarpara village. As women, they have the incredible gift of giving birth, but they also go through the monthly menstrual cycle. However, in many villages, including Zarpara, menstruation is considered a taboo topic. Women are often hesitant to talk about their personal experiences, and many don't even know about the menstrual cycle and its science.

Seeing the challenges faced by these women, Devalben and Roopaben, with the support of the Adani Foundation, organized a menstrual hygiene awareness camp in Zarpara. In this camp, they provided education about menstrual health to all the women. In just a short session, women began to open up and talk freely about their experiences. They revealed that they had never used menstrual products and typically relied on old, used cloths. In addition to this, their daughters had to miss school due to a lack of resources and the uncomfortable feeling during their periods.

Hearing these stories, Devalben and Roopaben explained the harmful effects of using old cloths and not maintaining proper hygiene during menstruation. They introduced the women to different menstrual products and taught them how to use and dispose of them correctly. They also discussed the various health issues that could arise from poor menstrual hygiene. Many women realized that they had experienced symptoms of these health problems but had never paid attention to them.

To help the women understand better, they showed an informative video about the menstrual cycle. After the session, the women felt grateful for the knowledge they had gained. Many of them admitted that they had never taken menstruation seriously before but were now committed to practicing proper menstrual hygiene. Those with symptoms of menstrual health issues decided to seek medical advice and treatment. All the women pledged to use sanitary pads regularly and ensure that their children's health and education were not affected by menstruation.

Our team was equally delighted that these women had broken free from the menstrual taboo and were determined to prioritize their menstrual hygiene.

Mayuri's Journey: A Tale of Determination and Hope

Mayuri comes from a simple middle-class family with four sisters. Her mother is a homemaker, while her father is a wage earner. They didn't have a lot of money, and life was tough.

Despite the financial hardships, Mayuri applied for the PSE exam, hoping it would open doors for her future education. She embarked on this journey alone, being the sole girl in her class brave enough to take on the competitive exam.

Mayuri's life took a hopeful turn when she crossed paths with Utthan Sahayak. This mentor provided her with a comprehensive guide for the PSE exam. This guide was like a lifeline for her. It made her feel more confident and less confused.

Mayuri was determined to succeed. She worked really hard. She found books and old exam papers to study from. She even watched videos on YouTube to learn more. She spent 2-3 hours studying every day, sometimes giving up fun things to focus on her studies. She didn't keep all that knowledge to herself; she shared what she learned with her friends and even during school prayers.

Mayuri went to the library often and used teaching and learning materials to learn more. She read a lot and practiced so much that she became really good at school competitions and public speaking. Her general knowledge improved and she became an expert in Gujarati grammar.

But, despite all her hard work, Mayuri didn't get the top score in the PSE exam. It was really disappointing for her. She had worked so hard, and it felt like all her efforts were in vain. But, it wasn't all bad. This experience taught her to never give up and to keep hoping for a better future.

The Magic of Practice: a remarkable Handwriting Transformation

Buchiya Nita, a diligent third-grade student at Gundala Kanya School, faced a deep-seated issue - her handwriting. Despite the correctness of her content, her messy handwriting often cast a shadow on her answers, making them appear incorrect. She held a belief that her handwriting would never improve and that it didn't hold much significance.

One fateful day, a compassionate Utthan Sahayak named Chauhan Kinjalba stepped in to assist her. Kinjalba aimed to aid Nita in enhancing her handwriting and enlighten her about its importance. Kinjalba noticed the errors Nita made while writing and gently pointed them out, allowing Nita to rectify them independently.

Nita's daily homework included writing a paragraph. Through persistent practice and unwavering commitment, her handwriting gradually became neater over several months. The ultimate test arrived when a calligraphy competition was organized. To the delight of everyone, Nita secured the second position in the competition, and her heart brimmed with joy at the remarkable improvement in her handwriting.

From a mischievous troublemaker to a responsible scholar

The teacher-student relationship is like the two wheels of a cart. When both wheels work together smoothly, the cart goes forward without any interruption. However, if one wheel comes loose, the cart stops in its tracks.

One such story revolves around Kumbhar illiyash, a student at Gundala Kumar School. Utthan Sahayak learned from teachers and fellow students that Illiyash was quite mischievous. He occasionally took items from other kids in class, sometimes bothered his classmates, disrupted the class with his behavior, and frequently seemed disinterested in his lessons.

Utthan Sahayak decided to have a loving and understanding conversation with Illiyash to encourage him to change his behavior. They would sit together every day, and she would teach him new habits and engage him in various activities. Gradually, Illiyash started developing an interest in learning, and with consistent effort and engaging activities, his active mind was redirected toward education, leading to a positive change in his behavior.

Just as milk and curd complement each other, Illiyash, once a mischievous child, has transformed into a well-behaved student today.

Raisingh's Inspiring Journey: Overcoming Disability to Find Independence

This is the story of Raysi maheshwari, who lives in Mota Kapaya village. When he was just 2 years old, he was affected by polio, and as he grew, 75% of one of his legs became nonfunctional. His childhood was different from other kids, he faced a lot of difficulties in doing daily tasks and had to depend on others. It's truly hard to put into words the profound difficulties he endured because of his condition. In the face of disability, Raysi's thirst for education and his refusal to depend on others for his livelihood remained unwavering. His determination was unbreakable, and he fearlessly confronted every obstacle that crossed his path.

Raysi completed his education up to the 12th grade and started searching for a job to become financially independent. However, transportation was a big challenge for him. He had to walk long distances many times, even though it hurt because of his disability.

Fortunately, in 2021, he learned about a job fair organized by the Adani Foundation on World Divyank Day. He decided to participate and impressed the interview panel with his skills. As a result, he got a job as a Gate operator at Rangoli Gate, Adani Port with a monthly salary of Rs. 13,000. Because of his dedication and hard work, his salary was later increased to Rs. 18,000 within a short time.

In addition to the job, he received medical certificates and continuous support from our team. Raysi is married now and has two children. His wife is also disabled, and the Adani Foundation supported her with a wheelchair. Now, she can efficiently manage household chores in less time.

Raysi and his family deeply appreciate these assistances. He now earns enough to provide for his family and support his children's education. The family is no longer financially dependent on anyone and lives with dignity and happiness. The Adani Foundation feels fortunate to witness the positive changes in the lives of people like Raysi, and consider it as the most meaningful reward for their efforts.

Shaping Lives:
From Pagdiya Fishing to Prosperity

Fisherman of Luni Village, a father of four boys and a girl, toiled tirelessly in the trade of Pagdiya fishing to ensure his family's survival. Despite the inherent vulnerability and daily hardships, he nurtured a singular dream - to provide his children with education and a better quality of life.

Through immense sacrifice and unwavering determination, he managed to educate his children up to the primary level. However, as their education progressed, financial constraints became a significant impediment. Unfortunately, two of his children had to drop out after completing the seventh year of their education due to these financial limitations.

Upon learning about their struggles, our organization reached out to him, extending scholarships to support the further education of his children. This assistance rekindled hope, allowing his second child to rejoin high school. Subsequently, it paved the way for the third and fourth child to continue their studies up to the twelfth grade.
However, our support did not end after their high school graduation. We maintained consistent contact, providing guidance and mentorship to tailored their individual interests and strengths, with the aim of helping them establish their careers.

As a result of our interventions, the children have experienced a remarkable transformation. The eldest, Mr. Altaf, attended RTG training for three months and is now employed as an RTG Operator at Adani Port, earning a salary of Rs. 22,000 per month. The second son found employment at MICT as a supervisor, earning Rs. 17,000 per month. The third child pursued his passion for photography and started his own photography studio, earning more than Rs. 20,000 per month.

Their father, Ali Mammad, expressed his heartfelt gratitude towards the Adani Foundation for their scholarship support, which served as a beacon in shaping their children's lives.

Breaking Waves of Poverty: Empowering Fisher folk through Education

The Fisher folk community resides a significant distance from the main city. Their primary means of sustaining themselves centers on fishing. This community experiences financial hardship and lacks access to education. They are hesitant to explore other professions because they have no education, awareness, or support. The challenging circumstances of their parents also affect the well-being and future prospects of their children.

Due to financial struggles, the children in the fishing community could only manage to complete their primary education before being compelled to join their parents in fishing jobs. This heart-wrenching cycle not only robbed them of the opportunity for a brighter future but also kept their community trapped in the clutches of relentless poverty.

Upon discovering their dire circumstances, the Adani Foundation Team with Mundra Petrochemical empathetically engaged with the children, who tearfully expressed their deep desire for education but sadly acknowledged the lack of sufficient resources to afford the necessities for school.

In an effort to uplift underprivileged children in the community, our team decided to provide them with vital learning materials to alleviate their financial burden. We provided students in grades 9 to 12 with essential educational materials, including textbooks, notebooks, and school bags. This initiative benefited a total of 61 students from the villages: Navinal, Modva, Tragdi, and Zarapara.

As a result of our support, both the children and their parents found substantial financial relief concerning education. This resulted in a decrease in school dropouts, and the children started attending school consistently. They now study without the burden of financial constraints and have a renewed determination to chase their dreams and secure stable jobs.

We consider ourselves incredibly fortunate to have been able to assist these children. Our longstanding wish has been for the children of fisher folk not to be confined to the path of becoming fishermen but to instead pursue education and secure stable jobs, thus breaking the cycle of poverty.

Unleashing Potential: Education beyond Boundaries

Modhva is a small village in Mandvi having a handful population, the life here revolves around the gentle rhythm of fishing. Families struggle with making ends meet as meager earnings barely cover daily expenses. The children in the village receive a basic education, advancing only to classes 5 or 6. Unfortunately, after this stage, a significant number of these young learners are bound to leave school and join their parents in the fishing trade.

Acknowledging the plight of undereducated students, Adani Foundation in coordination with GPVC team organized distinct meetings with both the students and their parents. In a heartfelt confession, the students expressed their eagerness to attend school but due to the lack of a local high school and financial constraints, they were unable to attend the nearby high schools. The parents clarified that their village serves as the last settlement along the coastline. Consequently, because of its remote location, there are no available transportation facilities. Their means of livelihood barely cover their essential expenses, leaving them unable to afford personal vehicles or rely on daily public transportation. Many parents wish to educate their children but feel helpless to do so.

Recognizing the economic challenges faced by the parents and driven by a commitment to educate these vulnerable children, our team stepped forward to assist by offering a complimentary transportation solution. Through firm dedication, we secured a van capable of accommodating twelve students, which has now been provided to the villagers in need. A local resident has been entrusted with the role of the driver, receiving a fair wage for their service.

Since June 2023, a group of six girls and five boys have shown unwavering commitment to attending school in the village of Gondiyali, situated 16 km away from Modhva. The fear of dropping out no longer casts its shadow, and parents are relieved of the burden of transportation expenses.

Upholding the belief that education is a boundless right accessible to all, GPVC team wholeheartedly extend our wishes for a future brimming with opportunities and success for these children.

Shaping Lives:
From Pagdiya Fishing to Prosperity

Imagine finding yourself trapped in the clutches of old age, battling declining health, and struggling with dire financial constraints. What would be Next ? However, within these challenging and circumstances, there are some remarkable stories of individual ,Through his journey, we witness how timely intervention and unwavering support can breathe new life into individuals and their families, igniting a flame of hope, healing, and renewed optimism.
One such story is that of Siddique Bhai Khatri, a 63-year-old resident of Mundra, Kutch fighting a relentless battle with tobacco addiction, succumbs to the merciless grip of oral cancer. As he receives the devastating biopsy report, it not only reveals the grim reality of his failing health but also serves as a stark reminder of his near-empty bank balance. With the exorbitant cost of the necessary operation hovering around 2 lakhs, Siddique Bhai finds himself teetering on the precipice of desperation.

Recognizing the Adani Foundation as a trusted ally in times of health-related crises, Siddique Bhai connected to Kishor Bhai, a representative from the foundation. personally visited Siddique Bhai's home on same day, This gesture of care provided much-needed solace to Siddique Bhai and his worried wife, who openly shared their financial predicament and concerns about the illness.

Understanding the urgency of Siddique Bhai's situation, Kishor Bhai assisted him in swiftly obtaining the Ayushman Card. **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY), offers comprehensive healthcare coverage of up to 5 lakhs for various hospitalization** within a remarkable 8-hour timeframe. This prompt response and timely access successfully underwent Sidikbhai to the much-needed operation at Adani GK General Hospital.

After a recovery period of 8 days, Siddique Chacha returned home, reinvigorated and ready to face life's challenges anew. Today, two months later, he can be seen in the marketplace, his eyes twinkling with joy and gratitude. Meeting Kishor Bhai, Siddique Chacha's eyes speak volumes, conveying his deep appreciation for the Ayushman Card and the support provided by the Adani Foundation.

As of the date, over 5584 Ayushman cards have been issued, enabling individuals to access essential healthcare services.

Press Note

દિવ્ય ભાસ્કર

કચ્છ ભાસ્કર 25-06-2023

મુન્દ્રામાં નવી શાકમાર્કેટ અઠવાડિયામાં ધમધમતી થશે

નગર અને બારોઇરોડના તમામ લારીધારકોને સ્થાયી થવા પાલિકાનું આહવાન

સ્ટોલ દીઠ રૂા.4500 ભાડું : લાઇટ બિલ પાલિકા ભોગવશે

ગૌતમભાઈ અદાણી ના ૬૧ માં જન્મદિવસની કચ્છ સ્થિત વિવિધ પ્રકલ્પો દ્વારાવિવિધ સેવાકીય કર્યો કરી ઉજવણી કરવામાં આવી

મુંદ્રા તાલુકાના તમામ લોકોને 'આયુષ્યમાન' હેઠળ આવરી લેવાશે

વાવાઝોડાનાં અસરગ્રસ્તોને ભોજન, આરોગ્ય સહિતની અદાણી જૂથની સેવા

ફાઉન્ડેશન દ્વારા લોકોને હજારો કુડ પેકેટ અપાયા : રેસ્કયુ ટીમ ખડેપગે રખાઈ

ઉમરપાડામાં ટીબીનાં ૭૦ દર્દીઓને ધારાસભ્ય ગણપત વસાવાના હસ્તે પૌષ્ટિક કીટનું વિતરણ

અદાણી ફાઉન્ડેશન દ્વારા ઉમરપાડાના ટીબીના દર્દીઓને છ મહિના સુધી કીટ આપવામાં આવશે

અદાણી ફાઉન્ડેશન દ્વારા મુંદ્રાના મહિલા સ્વસહાય જૂથને ગૌ દાન !

ગાય આધારિત ઉત્પાદનો લાભાર્થીઓ માટે 'કામધેનુ' સમાન

Press Note

રાજ્યપાલનું પ્રાકૃતિક ખેતી માટે આહ્વાન

મુંદરા સ્થિત અદાણી ફાઉ. સાથે શ્રી રાજશક્તિ પ્રાકૃતિક ખેતી મંડળીના ખેડૂતોએ મુલાકાત લીધી

રાજ્યપાલ આચાર્ય દેવવ્રતજીની કચ્છની સૌપ્રથમ શ્રી રાજશક્તિ પ્રાકૃતિક ખેતી સરકારી મંડળીના ખેડૂતોએ મુલાકાત લીધી હતી. તેમની સાથે અદાણી ફાઉન્ડેશનના ગુજરાત સીએસઆર વડા પંક્તિબેન શાહ અને પારાસભ્ય અનિરુદ્ધભાઇ દવે રહ્યા હતા.

ભુજ, તા. ૩૧ : અહીંના અદાણી ફાઉન્ડેશને ખેડૂતો પ્રાકૃતિક ખેતી અપનાવતા થાય અને લોકોને કેમિકલ યુક્ત પણ ખોરાક મળી રહે તેવા ઉમદા ઉદ્દેશને સાકાર કરવા બીડું ઝડપ્યું છે. આ સંદર્ભે મહત્ત્વપૂર્ણ માર્ગદર્શન મેળવવા ગુરુવારે ગુજરાતના રાજ્યપાલ આચાર્ય દેવવ્રતજીની મુલાકાતનું આયોજન કરાયું હતું.

કચ્છની સૌ પ્રથમ શ્રી રાજશક્તિ પ્રાકૃતિક ખેતી સહકારી મંડળીના ખેડૂતોએ રાજ્યપાલની ફળદ્રુપ મુલાકાત લઇ પોતાના પ્રાકૃતિક ઉત્પાદનો દેવવ્રતજીને અર્પણ કરી પ્રાકૃતિક ખેતીના અનુભવોનું આદાન-પ્રદાન કર્યું હતું. આ મુલાકાત બાદ ખેડૂતોમાં નવી ઊર્જાનો સંચાર થયો હતો.

રાજ્યપાલે જણાવ્યું કે 'ખેડૂતોમાં મનમાં વાવેલા પ્રાકૃતિક ખેતીના વિચારો આજે મને ઊગી રહેલા દેખાય છે. મને પ્રાકૃતિક ખેતી કરતો ખેડૂત કદી દુઃખી જોવા નથી મળ્યો. આપ સૌ ખેતી કામ કરતી બહેનોને સાથે લાવ્યાં તે બદલ અભિનંદન આપું છું.' તેમણે ઉમેર્યું કે 'બહેનો અઠવાર જે નક્કી કરી લે છે તેને જીવનભર પાળે છે. આપ સૌમાં સહેલો પ્રકૃતિપ્રેમ રાજભવન સુધી ખેંચી લાવ્યો છે.' તદુપરાંત જે ખેડૂતોના ખેતરનો ઓર્ગેનિક કાર્બન ૨.૦થી વધુ છે તેઓને અભિનંદન આપ્યા હતા.

દેવવ્રતજીએ મુંદરા તાલુકાને પ્રાકૃતિક ખેતી તરફ લઈ જવાની સામૂહિક જવાબદારી ઉપાડવા ખેડૂતોને આહ્વાન કર્યું હતું. એટલું જ નહીં, પ્રાકૃતિક ખેતીના પાંચ આયામો જીવામૃત, ધન જીવામૃત, અગ્નિયા, આચ્છાદન અને પંચગવ્ય ઘરે જ બનાવી ખેતીમાં તેનો ઉપયોગ કરી ઉત્તમ ઉત્પાદનો મેળવવા સૂચન કર્યું હતું.

આ મુલાકાત માટે માંડવીના પારાસભ્ય અનિરુદ્ધભાઇ દવેએ ખેડૂતોને પ્રોત્સાહન પૂરું પાડતાં જણાવ્યું કે 'કચ્છ દરેક બાબતની પહેલ કરવામાં હંમેશાં અગ્રેસર છે ત્યારે મને વિશ્વાસ છે કે આપણા ખેડૂતો આ બાબતે પાછીપાની નહીં કરે. આપના ઉત્પાદનોને ઉત્તમ બજાર મળી રહે તે માટે આપણે સૌ સહિયારા પ્રયાસો કરીશું.'

આ પ્રસંગે અદાણી ફાઉન્ડેશનના સી.એસ.આર. હેડ પંક્તિબેન શાહે રાજ્યપાલને આભારસહ ખાતરી આપતાં જણાવ્યું કે 'પ્રકૃતિ પ્રત્યેનું ઋણ અદા કરવામાં અદાણી પરિવાર ક્યારેય પાછીપાની નહીં કરે. હંમેશાં ખેડૂતોની પડખે રહીને ઉદ્યોગગૃહના સામાજિક ઉત્તરદાયિત્વને નિભાવશે.'

ખેડૂતોએ ગૌવંશ આધારિત ખેતી માટે બંસીગીર ગોશાળા ખાતે ગોપાલ સુતરિયા પાસેથી પણ માર્ગદર્શન મેળવ્યું હતું. એટલું જ નહીં, દેશ-વિદેશમાં પ્રાકૃતિક ખેતઉત્પાદનોની માંગ વધી રહી છે ત્યારે તેની વેચાણ વ્યવસ્થાને સમજવા અમદાવાદ સ્થિત 'મુષ્ટિ ઇનોવેશન'ની મુલાકાત પણ લીધી હતી.

અદાણી ફાઉન્ડેશન દ્વારા હાથ ધરાયેલી પહેલોના પરિણામે શ્રી રાજશક્તિ પ્રાકૃતિક ખેતી સહકારી મંડળીની સ્થાપના કરવામાં આવી હતી. ૩૦ ખેડૂતોથી શરૂ કરાયેલી સંસ્થા આજે ૨૨૫થી વધુ સભ્ય સંખ્યા સાથે પ્રગતિના પંથે છે.

अदाणी फाउंडेशन, दहेज द्वारा 'पेड़ों के माध्यम से विकास' ग्रामीण विकास अभियान

लोकतेज
epaper.loktej.com
29 Jul 2023 - Page 3

फलदार पौधों से आने वाले वर्षों में किसान की आय में वृद्धि होगी

અદાણી ફાઉન્ડેશન અને અદાણી ગ્રીન એનર્જી દ્વારા લખપતમાં આરોગ્ય કેમ્પ યોજાયા

આયુષ્યમાન કાર્ડ, તબીબી સારવાર અને પશુધનને રસીકરણ કરાયું

અદાણી નવચેતન વિદ્યાલય, જૂનાગામમાં કળાઉ છોડ અને શૈક્ષણિક કીટ આપી શાળા પ્રવેશોત્સવ

ભરૂચના પૂરગ્રસ્ત ત્રણ ગામમાં અદાણી ફાઉન્ડેશન દ્વારા રાશનકીટનું વિતરણ

અદાણી ફાઉન્ડેશન દ્વારા ભિદડામાં મધ્યસ્થ-રે ઉજવણી અંતર્ગત મિલેટ્સની વાનગી બનાવવાની હરીફાઈનું કરાયેલું આયોજન

અદાણી ફાઉ. દ્વારા મુંદ્રામાં પશુધનની સુરક્ષા માટે પશુ આરોગ્ય કેમ્પનું આયોજન

૨૦,૦૦૦ પશુઓને તંદુરસ્ત અને નિરોગી રાખવા અનોખી પહેલ

અદાણી ફાઉન્ડેશન અને કચ્છ ગ્રેયર લિમિટેડના સહયોગથી મુંદ્રામાં પશુ આરોગ્ય કેમ્પનું આયોજન કરવામાં આવ્યું છે. જિલ્લા પંચાયત સંચાલિત પશુ દવાખાના દ્વારા પશુઓને રસીકરણ તથા ઉપયોગી સારવાર કરવામાં આવી રહી છે. મુંદ્રા તાલુકાના ૨૦,૦૦૦ જેટલા પશુઓને તંદુરસ્ત અને નિરોગી રાખવાના આ પહેલ કરવામાં આવી છે. પશુપાલકોની સુવિધા માટે આ કામગીરી તેમને ઘરઆંગણે જ પૂરી પાડવામાં આવે છે. પશુધનનું આરોગ્ય અને ઉત્પાદકતા જાળવી રાખવા નિયમિત પણે જ તેમને રસીકરણ કરવામાં આવે છે. આરોગ્ય કેમ્પમાં કૃમિનાશક દવાઓ, નાના જીવો માટે ડિવર્મિંગ અને બેચી વર્ગીકરણને અટકાવવા અસરકારક કામગીરી કરવામાં આવી રહી છે. જેમાં સ્થાનિકો, પશુપાલકો અને ગ્રામ પંચાયતોનો પૂરતો સહયોગ સાંપડી રહ્યો છે. અદાણી ફાઉન્ડેશન દ્વારા પશુઓની સારવાર માટે દવાઓ અને વ્યવસ્થા પૂરી પાડવામાં આવી છે. જ્યારે જિલ્લા પંચાયતના પશુપાલન વિભાગના પશુ ડોક્ટર્સ સેવા આપી રહ્યા છે. તો કચ્છ ગ્રેયરનું કોન્ટ્રાક્ટર કંપની, સરહદ ડેરી, સ્થાનિક ગ્રામ પંચાયતો તેમજ ગોચર, ગૌસેવા સમિતિના સાથ -સહકારથી અડભૂત કામગીરી ચાલી રહી છે. મુંદ્રાના સિરાચા, નવીનાળ, ડગરિયા, ઝરપરા, ભ્રમ, ભુજપુર, મોટી ખાખર વગેરે ગામોના ૮૩૦૦ પશુધનને સારવારની કામગીરી પૂર્ણ કરાઈ છે, જ્યારે આજીના ગામોમાં આ કામગીરી ચાલુ છે. આરોગ્ય કેમ્પની સાથોસાથ પશુ પોષણ માટે ઉત્તમ પાકસાચા એન.બી.-૨૧ નું વાવેતર, ખિનરાલ મિશ્ર અને ચેપી વર્ગીકરણ નિયંત્રણની કામગીરી પણ્યવત જારી છે. કચ્છમાં ખેતી અને પશુપાલન એ મુખ્ય વ્યવસાય છે, આ પહેલથી તેને મજબૂત બનાવવા માટેના પ્રયાસો થઈ રહ્યા છે. અદાણી ફાઉન્ડેશન દ્વારા પશુપાલનના મુખ્ય વ્યવસાયોનો પશુ સંવર્ધન,પશુ પોષણ, પશુ આરોગ્ય અને પશુ વ્યવસાયને મજબૂત બનાવવા ભરસક પ્રયાસો કરવામાં આવી રહ્યા છે. જેથી ખેડૂતો પ્રાકૃતિક ખેતી તરફ પ્રેરાય તે માટે બેઠકો અને ટ્રેનીંગ દ્વારા માર્ગદર્શન કરવામાં આવે છે.

બાળકોના ભવિષ્યને ઉજ્જવળ બનાવવા અદાણી ફાઉન્ડેશનના ભગીરથ પ્રયાસો

મોરબીથી બાલાસોર સુધી 'જ્ઞાન-ઉદય' અને 'ઉત્થાન'ની ઉજાસ

Annexure – 4

Legal Matters- Mudra: November 2023

S.No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on.....)	Current Status as on 28.11.2023	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/brief))
1	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	• 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	**Tentatively listed on 02.01.2024**	Matter pending Hon'ble at Supreme Court.		• APSEZ has already submitted as part of their submission to the Committee that there are 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	

	5. MOC&I, New Delhi 6. Collector, Bhuj 7. Principal Secretary, Gujarat	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				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 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.	

		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 Narayan Committee to relook in to this matter and submit their report. • 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.					
2.	Kheti Vikas Seva Trust Vs UoI & Others CA 9124 of 2011 in WPPIL 12 of 2011	• 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	**N.A**	**Matter pending before Gujarat High Court (not listed since 2021)**		• **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**	

		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				**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.**	

		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)					

Annexure – 5

Details of Greenbelt Development at APSEZ, Mundra

	Total Green Zone Detail till Up to September 2023				
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
Total			**3890**			

Annexure – 6

RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	WFDP WEST PORT STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Apr-23		May-23		Jun-23			
			10-04-2023	20-04-2023	13-05-2023	29-05-2023	12-06-2023	22-06-2023		
1.	pH @ 25 ° C	--	7.09	7.18	7.32	7.26	7.19	7.39	6.5 to 9	APHA 23rd Ed.,2017,4500-H^+B
2.	Total Suspended Solids	mg/L	22	24	28	20	24	28	100	APHA 23rd Ed.,2017,2540 - D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	18	16	15	17	18	19	30	APHA 23rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.82	0.88	0.91	0.86	0.74	0.78	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
5.	Fecal Coliform	MPN Index/100ml	130	80	130	90	80	60	1000	IS 1622: 1981

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	WFDP WEST PORT STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Jul-23		Aug-23		Sep-23			
			13-07-2023	25-07-2023	11-08-2023	23-08-2023	12-09-2023	21-09-2023		
1.	pH @ 25 ° C	--	7.35	7.42	7.38	7.46	7.39	7.38	6.5 to 9	APHA 23rd Ed.,2017,4500-H^+B
2.	Total Suspended Solids	mg/L	26	32	24	28	22	24	100	APHA 23rd Ed.,2017,2540 -D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	15	16	18	17	20	19	30	APHA 23rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.84	0.62	0.74	0.82	0.74	0.68	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
5.	Fecal Coliform	MPN Index/100ml	90	110	70	90	60	70	1000	IS 1622: 1981

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

RESULTS OF ETP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL						GPCB Limit	TEST METHOD
			Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23		
			21-04-2023	29-05-2023	29-06-2023	25-07-2023	25-08-2023	14-09-2023		
1.	Colour	Pt. Co. Scale	50	40	50	40	50	50	100	IS 3025(Part 4)
2.	pH @ 27 ° C	--	7.41	6.74	7.26	7.36	7.44	7.52	6.5 to 8.5	APHA 23rd Ed.,2017,4500-H^+B
3.	Temperature	^0C	30	31	30.5	30	30	30	40	IS 3025(Part 9)1984
4.	Total Suspended Solid	mg/L	22	24	26	24	18	32	100	APHA 23rd Ed.,2017,2540 –D
5.	Total Dissolved Solids	mg/L	1106	732	804	810	822	840	2100	APHA 23rd Ed.,2017,2540- C
6.	COD	mg/L	72.6	76.2	74.3	89.4	80.9	83.6	100	IS 3025(Part 58)2006
7.	BOD (3 days at 27 ^0C)	mg/L	20	23	25	27	24	23	30	IS 3025(Part 44)1993Amd.01
8.	Chloride (as Cl) $^-$	mg/L	480.9	332.5	420.1	411.5	391	337.3	600	IS 3025(PART 32) 1988
9.	Oil & Grease	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	10	IS 3025(Part39)1991, Amd. 2
10.	Sulphate (as SO_4)	mg/L	102	43.3	40.2	36.6	42.2	46.4	1000	IS 3025(Part 24)1986
11.	Ammonical Nitrogen	mg/L	22.2	28.4	24.2	22.8	20.6	28.8	50	IS 3025(Part 34)1988,
12.	Phenolic Compound	mg/L	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	1	IS 3025(Part 43)1992, Amd.2
13.	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	3	IS 3025(Part 42)1992amd.01,
14.	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	0.1	APHA 23rd Ed.,2017,3111-B

Continue…

SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL						GPCB Limit	TEST METHOD
			Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23		
			21-04-2023	29-05-2023	29-06-2023	25-07-2023	25-08-2023	14-09-2023		
15.	Sulphide as S	mg/L	0.62	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	2	APHA 23rd Ed.,2017,4500 S^{-2} F
16.	Cadmium as Cd	mg/L	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	2	APHA 23rd Ed.,2017,3111-B
17.	Fluoride as F	mg/L	1.03	0.82	0.94	0.86	0.74	0.66	2	APHA 23rd Ed.,2017,4500 F, D
18.	Residual Chlorine	mg/L	0.74	0.88	0.78	0.64	0.94	0.82	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
19.	Percent Sodium	%	48.51	48.05	46.74	45.72	46.93	46.94	60	By Calculation
20.	Sodium Absorption ratio	--	3.51	3.09	2.67	2.86	2.64	2.61	26	By Calculation

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.22	8.06	8.18	8.05	8.06	7.92	7.98	7.91	8.01	7.89	8.05	7.92	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30	30.3	30.2	30.2	30.1	30	29.9	30	29.9	29.9	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	118	96	122	114	124	110	118	102	128	110	144	118	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	2.9	BDL	3	BDL	3.1	BDL	3.2	BDL	2.9	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.32	6.02	6.37	5.96	6.3	5.89	6.22	5.82	6.32	6.02	5.95	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.89	37.18	36.52	37.48	35.84	36.56	35.74	36.33	35.76	36.42	35.24	35.7	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	3.19	2.54	2.98	2.67	2.84	2.59	2.93	2.76	3.71	3.39	3.06	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.388	0.259	0.422	0.336	0.345	0.3	0.3	0.235	0.348	0.304	0.391	0.37	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.15	2.93	3.45	3.1	2.49	2.06	2.54	2.45	3.42	3.39	3.32	3.26	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.73	0.65	0.6	0.47	0.517	BDL	1.16	1.05	1.26	1.16	1.68	1.47	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.728	5.729	6.852	6.106	5.675	4.95	5.77	5.445	7.478	7.084	6.771	6.53	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	37050	37640	37156	37890	36860	37422	36430	37106	36524	37156	36630	37102	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24.07	12.04	27.97	11.99	32.26	16.13	24.31	12.16	28.31	12.13	15.95	7.98	APHA 23rd 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	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	3.01	2.56	2.98	3.22	3.05	2.66	2.36	3.24	3.12	3.02	2.99	3.41	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.98	1.03	1.23	1.44	1.56	1.69	1.42	2.14	1.85	1.15	1.47	2.11	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	79	84	84	142	98	178	125	124	99	105	108	120	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Nitzschia*	*Navicula*	*Nitzschia*	*Navicula*	*Rhizosolenia*	*Ceratium*	*Melosira*	*Biddulphia*	*Ceratium*	*Cyclotella*	*Coscinodiscus*	*Nitzschia*	APHA (23rd Ed. 2017)10200 F
			Pinnularia	*Fragillaria*	*Navicula*	*Fragillaria*	*Biddulphia*	*Pinnularia*	*Pinnularia*	*Rhizosolenia*	*Diploneis*	*Pinnularia*	*Diploneis*	*Pinnularia*	
			Odontella	*Thalassiothrix*	*Odontella*	*Thalassiothrix*	*Skeletonema*	*Odontella*	*Skeletonema*	*Coscinodiscus*	*Odentella*	*Skeletonema*	*Rhizosolenia*	*Odontella*	
			Dinophysis	*Grammatophora*	*Dinophysis*	*Grammatophora*	*Thallassiosira*	*Thalassiothrix*	*Rhizosolenia*	*Skeletonema*	*Grammatophora*	*Thallassiosira*	*Dinophysis*	*Dinophysis*	
			Surirella	*Surirella*	*Thallassiosira*	*Surirella*	*Thalassionema*	*Thallassiosira*	*Pleurosigma*	*Thallassiosira*	*Melosira*	*Thalassionema*	*Thalassionema*	*Surirella*	

B	Zooplankton								
1	Abudance(Population)	noX103/ 100 m3	63	33	40	33	33	41	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Decapoda*	*Decapoda*	*Egg(Fish and Shrimps)*	*Crustacean Larvae*	
			Oikoplura	*Oikoplura*	*Copepods*	*Copepods*	*Oikoplura*	*Egg(Fish and Shrimps)*	
			Copepods nauplii	*Copepods nauplii*	*Crustacean Larvae*	*Crustacean Larvae*	*Copepods nauplii*	*Copepods*	
			Crustacean	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	
			Bivalve Larvae	*Bivalve Larvae*	*Oikoplura*	*Oikoplura*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	15.32	14.25	15.36	16.58	15.86	16.54	

Continue…

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	150		210		278		266		286		254		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	40		52		44		54		68		51		APHA 23rd Ed.2017,9222-B
3	Ecoli	/100ml	30		36		23		36		41		35		IS :15185:2016
4	Enterococcus	/100ml	25		22		19		22		29		20		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.51	0.42	0.47	0.46	0.42	0.48	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	544.4	490.8	476.5	480.8	464.5	482.4	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	%	3.91	4.01	4.11	4.02	3.95	3.97	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	138	114.4	117.2	112.2	115.6	118.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	580.1	594.4	612.4	627.1	590.4	606.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.86	3.92	3.96	3.89	3.85	3.89	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	55.28	48.6	41.2	44.28	45.34	41.38	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	46.35	41.24	36.24	32.64	33.42	36.54	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	110.8	128.5	119.5	124.2	130.5	124.4	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.31	2.42	2.49	2.41	2.34	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

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	*Amphipods*	*Amphipods*	*Polychates*	*Amphipods*	*Gastropods*	*Isopods*	APHA (23rd Ed. 2017)10500 C
			Decapod Larvae	*Sipunculids*	*Gastropods*	*Decapod Larvae*	*Isopods*	*Polychates*	
			Isopods	*Isopods*	*Isopods*	*Isopods*	*Amphipods*	*Sipunculids*	
			Gastropods	*Gastropods*	*Sipunculids*	*Gastropods*	*Sipunculids*	*Amphipods*	
2	MeioBenthos	--	*Turbellarians*	*Decapod Larvae*	Herpectacoids	Foraminiferan	*Polychates*	*Herpectacoids*	
			Herpectacoids	*Herpectacoids*	*Polychates*	*Turbellarians*	*Herpectacoids*	*Decapods Larvae*	
3	Population	no/m²	356	333	368	244	250	333	

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.15	7.91	8.24	8.09	8.16	7.98	8.09	7.96	8.14	7.85	8.11	7.88	IS 3025 (Part11)1983
2.	Temperature	°C	30.1	30.2	30.3	30.2	30.2	30.1	30.1	30	30	29.9	29.8	29.7	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	142	114	128	106	132	110	108	98	142	122	128	106	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	3.1	BDL	2.9	BDL	3.2	BDL	3.3	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.22	5.92	6.27	5.86	6.2	5.79	6.12	5.72	6.32	5.81	5.85	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.94	37.24	36.57	37.62	36.24	37.11	36.12	36.48	36.18	36.52	34.89	35.62	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	2.97	2.37	3.32	2.8	3.23	2.8	3.45	2.76	3.55	3.06	3.23	2.74	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.259	0.19	0.371	0.267	0.379	0.344	0.431	0.345	0.456	0.413	0.435	0.391	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.49	3.23	4.31	3.79	3.96	2.93	2.84	2.49	3.48	3.39	3.39	3.26	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.47	0.43	0.43	BDL	0.56	0.6	1.47	1.37	1.58	1.37	2.11	1.9	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.719	5.79	8.001	6.857	7.569	6.074	6.721	5.595	7.486	6.863	7.055	6.391	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36700	36930	37110	37640	36860	37520	36288	37124	36308	37142	36340	37160	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	20.06	8.02	35.96	7.99	40.32	12.1	20.26	8.1	24.26	12.13	19.94	7.98	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	3.12	2.78	2.63	2.89	2.56	3.02	3.02	2.59	3.02	2.84	3.15	3.56	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.54	0.89	0.87	1.36	1.22	2.02	1	1.45	1.4	1.77	1.35	2.47	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	105	63	86	102	102	102	145	86	125	96	120	127	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Odentella*	*Ceratium*	*Biddulphia*	*Ceratium*	*Thallassiosira*	*Surirella*	*Cyclotella*	*Pinnularia*	*Pinnularia*	*Coscinodiscus*	*Thalassiothrix*	*Odentella*	APHA (23rd Ed. 2017)10200 F
			Rhizosolenia	*Diploneis*	*Rhizosolenia*	*Diploneis*	*Melosira*	*Thalassiothrix*	*Pinnularia*	*Dinophysis*	*Thalassionema*	*Diploneis*	*Surirella*	*Rhizosolenia*	
			Coscinodiscus	*Odentella*	*Coscinodiscus*	*Odentella*	*Nitzschia*	*Navicula*	*Skeletonema*	*Rhizosolenia*	*Navicula*	*Rhizosolenia*	*Navicula*	*Coscinodiscus*	
			Grammatophora	*Grammatophora*	*Skeletonema*	*Grammatophora*	*Rhizosolenia*	*Skeletonema*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Dinophysis*	*Thallassiosira*	*Grammatophora*	
			Thallassiosira	*Melosira*	*Thallassiosira*	*Melosira*	*Pleurosigma*	*Thallassiosira*	*Thalassionema*	*Coscinodiscus*	*Skeletonema*	*Thalassionema*	*Skeletonema*	*Thallassiosira*	

B	Zooplankton								
1	Abudance(Population)	noX103 / 100 m3	45	52	63	60	55	23	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Crustacean Larvae*	*Crustacean Larvae*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Crustacean Larvae*	*Copepods nauplii*	
			Egg(Fish and Shrimps)	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Egg(Fish and Shrimps)*	*Crustacean Larvae*	
			Copepods	*Copepods*	*Copepods nauplii*	*Copepods nauplii*	*Copepods*	*Oikoplura*	
			Crustacean	*Copepods nauplii*	*Crustacean*	*Crustacean*	*Crustacean*	*Bivalve Larvae*	
			Bivalve Larvae	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Oikoplura*	
3	Total Biomass	ml/100 m³	17.41	16.35	17.59	16.88	16.45	14.25	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	136		180		268		288		186		200		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	43		35		41		31		25		25		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	27		20		22		26		14		27		IS :15185:2016
4	Enterococcus	/100ml	13		11		13		19		10		12		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
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	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.59	0.48	0.41	0.44	0.48	0.44	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	538.4	554.2	572.2	580.4	568.5	574.6	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	%	3.95	4.04	4.12	4.08	4.02	3.98	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	153.4	159.4	155.1	164.2	155.2	159.7	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	602.4	642.2	671.8	694.2	648.6	660.8	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.05	4.15	4.12	4.09	4.02	4.08	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	49.21	41.03	40.38	41.21	42.36	41.62	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	41..64	41.15	40.33	41.46	42.62	41.23	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	88.02	102.2	110.4	131.2	134.4	140.6	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.44	2.31	2.24	2.31	2.22	2.09	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

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Gastropods*	*Decapod Larvae*	*Amphipods*	*Amphipods*	*Sipunculids*	*Decapods Larvae*	APHA (23rd Ed. 2017)10500 C
			Isopods	Isopods	*Polychates*	*Polychates*	*Decapods Larvae*	Isopods	
			Amphipods	*Amphipods*	*Isopods*	*Isopods*	*Polychates*	*Amphipods*	
			Sipunculids	*Sipunculids*	*Gastropods*	*Gastropods*	*Isopods*	*Sipunculids*	
2	MeioBenthos	--	*Polychates*	*Polychates*	*Decapods Larvae*	*Decapods Larvae*	*Turbellarians*	*Foraminiferan*	
			Herpectacoids	*Turbellarians*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	
3	Population	no/m²	301	268	300	360	264	244	

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.14	8.01	8.27	8.11	8.21	8.06	8.11	7.96	8.14	7.88	8.16	7.97	IS 3025 (Part11)1983
2.	Temperature	°C	30.1	30	30.3	30.2	30.1	30	30	29.9	30.1	30	29.9	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	102	94	110	86	96	74	104	88	114	94	102	86	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.1	BDL	3	BDL	2.6	BDL	2.8	BDL	2.9	BDL	2.7	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.02	5.81	6.17	5.76	6.1	5.69	6.02	5.62	6.22	5.92	6.05	5.85	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.29	37.02	36.24	37.19	36.18	36.88	35.94	36.28	35.98	36.42	35.24	35.81	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	2.63	2.45	3.1	2.67	3.23	2.59	2.67	2.33	2.9	2.58	2.74	2.58	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.345	0.302	0.431	0.397	0.293	0.259	0.325	0.235	0.391	0.37	0.456	0.413	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	2.93	2.8	3.1	2.67	3.97	3.84	2.67	2.58	3.32	3.23	3.42	3.32	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.43	BDL	0.82	0.6	0.56	BDL	1.37	1.26	1.26	1.05	1.58	1.47	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	5.905	5.552	6.631	5.737	7.493	6.689	5.665	5.145	6.611	6.18	6.616	6.313	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36200	37120	36820	37622	36210	37330	35860	36540	35910	36572	36080	36640	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	16.05	8.02	31.97	19.98	36.29	24.19	16.21	8.1	20.22	12.13	15.95	7.98	APHA 23rd 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	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.1	2.45	2.45	2.22	3.2	2.47	2.69	2.98	2.56	2.88	2.57	2.83	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	2.35	0.96	1.65	1.24	1.56	1.44	1.12	1.63	1.32	1.99	1.65	1.52	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	112	124	101	96	140	66	100	88	109	100	147	109	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Pinnularia*	*Pinnularia*	*Pinnularia*	*Pinnularia*	*Dinophysis*	*Rhizosolenia*	*Grammatophora*	*Odentella*	*Melosira*	*Pinnularia*	*Pinnularia*	*Pinnularia*	APHA (23rd Ed. 2017)10200 F
			Biddulphia	*Thalassionema*	*Dinophysis*	*Thalassionema*	*Pinnularia*	*Pinnularia*	*Rhizosolenia*	*Rhizosolenia*	*Pinnularia*	*Biddulphia*	*Biddulphia*	*Biddulphia*	
			Navicula	*Navicula*	*Rhizosolenia*	*Navicula*	*Thalassiothrix*	*Thalassiothrix*	*Nitzschia*	*Coscinodiscus*	*Skeletonema*	*Navicula*	*Navicula*	*Navicula*	
			Thallassiosira	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Grammatophora*	*Grammatophora*	*Thalassionema*	*Grammatophora*	*Rhizosolenia*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	
			Skeletonema	*Skeletonema*	*Coscinodiscus*	*Skeletonema*	*Ceratium*	*Ceratium*	*Pleurosigma*	*Thallassiosira*	*Pleurosigma*	*Skeletonema*	*Skeletonema*	*Skeletonema*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	39		40		52		50		50		63		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Crustacean*		*Crustacean*		*Crustacean Larvae*		*Crustacean Larvae*		*Crustacean*		*Copepods*		
			Copepods nauplii		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Copepods nauplii*		*Oikoplura*		
			Crustacean Larvae		*Crustacean Larvae*		*Copepods*		*Copepods*		*Crustacean Larvae*		*Crustacean Larvae*		
			Crustacean		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	17.45		15.24		15.78		17.45		15.26		15.69		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	200		190		200		198		254		188		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	45		20		31		30		42		25		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	21		16		20		22		31		14		IS :15185:2016
4	Enterococcus	/100ml	16		10		12		8		20		13		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.52	0.54	0.41	0.44	0.52	0.48	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	.582.2	574.5	562.2	574.1	566.6	570.4	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	%	3.84	3.91	3.95	3.98	4.06	4.01	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	164.2	142.8	129.5	134.8	144.2	138.4	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	614.9	610.4	618.6	604.4	610.2	616.1	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.14	4.06	4.09	4.12	4.06	4.09	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	56.32	52.2	48.6	44.61	44.25	41.63	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	36.82	37.14	35.2	36.84	35.54	36.12	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	84.65	91.24	101.2	109.1	111.4	114.9	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.81	2.76	2.65	2.44	2.25	2.39	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

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	Sipunculids	*Polychates*	*Sipunculids*	*Gastropods*	*Isopods*	*Polychates*	APHA (23rd Ed. 2017)10500 C
			Decapods Larvae	*Decapods Larvae*	*Polychates*	*Isopods*	*Polychates*	*Gastropods*	
			Amphipods	*Amphipods*	*Gastropods*	*Amphipods*	*Sipunculids*	*Isopods*	
			Isopods	*Isopods*	*Isopods*	*Sipunculids*	*Amphipods*	*Sipunculids*	
2	MeioBenthos	--	*Turbellarians*	*Foraminiferan*	*Herpectacoids*	*Polychates*	*Polychates*	*Herpectacoids*	
			Herpectacoids	*Herpectacoids*	*Foraminiferan*	*Herpectacoids*	*Foraminiferan*	*Polychates*	
3	Population	no/m²	355	355	347	258	368	298	

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.21	8.06	8.26	8.09	8.24	8.01	8.16	8.07	8.14	8.02	8.11	7.96	IS 3025 (Part11)1983
2.	Temperature	°C	30.1	30	30.2	30.1	30.1	30	29.9	29.8	30	29.9	29.8.	29.7.	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	128	114	142	118	126	108	112	106	138	116	132	104	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3	BDL	2.9	BDL	3.1	BDL	3.3	BDL	3.4	BDL	2.8	BDL	IS 3025(Part 4)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.32	6.22	6.17	5.86	6.1	5.79	6.02	5.72	6.12	5.81	5.95	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.67	37.21	35.89	37.44	35.81	36.98	36.14	36.52	36.21	36.64	35.94	36.12	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	3.19	2.33	3.71	3.1	3.45	2.8	2.49	2.32	3.39	3.06	3.06	2.74	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.388	0.345	0.517	0.422	0.345	0.276	0.259	0.215	0.326	0.283	0.435	0.391	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.49	3.19	3.45	2.93	3.28	3.1	2.28	2.16	3.53	3.42	3.53	3.39	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.56	0.43	0.52	BDL	0.65	BDL	1.68	1.47	1.9	1.68	2.11	1.79	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.068	5.865	7.677	6.452	7.075	6.176	5.029	4.695	7.246	6.763	7.025	6.521	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36480	37260	36944	37486	36860	37140	36150	36890	36168	36910	36180	37102	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	28.08	12.04	15.98	7.99	20.16	12.1	28.36	12.16	28.31	12.13	15.95	7.98	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	3.41	2.74	3.02	3.26	2.66	3.26	3	3.26	2.98	3.11	3.25	3.68	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.25	1.45	1.87	1.33	1.74	1.45	1.63	2.03	2.01	1.88	1.44	1.56	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	101	86	142	99	132	99	99	114	120	102	109	156	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Coscinodiscus*	*Melosira*	*Coscinodiscus*	*Melosira*	*Thalassiothrix*	*Coscinodiscus*	*Thalassiothrix*	*Pinnularia*	*Cyclotella*	*Navicula*	*Coscinodiscus*	*Coscinodiscus*	APHA (23rd Ed. 2017)10200 F
			Diploneis	*Pinnularia*	*Surirella*	*Pinnularia*	*Surirella*	*Diploneis*	*Surirella*	*Biddulphia*	*Pinnularia*	*Skeletonema*	*Diploneis*	*Diploneis*	
			Rhizosolenia	*Skeletonema*	*Rhizosolenia*	*Skeletonema*	*Navicula*	*Rhizosolenia*	*Navicula*	*Navicula*	*Skeletonema*	*Rhizosolenia*	*Rhizosolenia*	*Rhizosolenia*	
			Dinophysis	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Thallassiosira*	*Dinophysis*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Dinophysis*	*Dinophysis*	*Dinophysis*	
			Thalassionema	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Skeletonema*	*Thalassionema*	*Skeletonema*	*Skeletonema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	

B	Zooplankton								
1	Abudance(Population)	noX103 / 100 m3	52	48	44	38	62	48	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods nauplii*	*Copepods nauplii*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Copepods nauplii*	*Egg(Fish and Shrimps)*	
			Crustacean Larvae	*Crustacean Larvae*	*Oikoplura*	*Oikoplura*	*Crustacean Larvae*	*Oikoplura*	
			Oikoplura	*Oikoplura*	*Copepods nauplii*	*Copepods nauplii*	*Oikoplura*	*Copepods nauplii*	
			Bivalve Larvae	*Bivalve Larvae*	*Crustacean*	*Crustacean*	*Bivalve Larvae*	*Crustacean*	
			Oikoplura	*Oikoplura*	*Bivalve Larvae*	*Bivalve Larvae*	*Oikoplura*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	15.66	14.26	16.25	18.52	17.32	17.58	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	152		234		254		240		256		250		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	28		32		47		35		50		48		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	15		21		23		20		35		30		IS :15185:2016
4	Enterococcus	/100ml	10		10		16		12		24		21		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.62	0.54	0.62	0.74	0.62	0.58	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	555.1	574.4	582.7	680	658.5	642.6	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	4.12	4.08	4.16	4.05	3.96	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	135	132.4	142.2	137.4	142.2	138.9	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	580.4	594.6	602.2	644	618	621.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.94	3.89	3.91	3.94	3.84	3.88	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	44.21	41.6	42.2	48.6	44.5	48.32	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	50.54	45.62	41.6	38.9	387.6	38.25	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	74.5	84.2	92.4	102.2	114.2	118.2	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.22	2.38	2.24	2.61	2.51	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

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	*Isopods*	*Amphipods*	*Foraminiferan*	*Sipunculids*	*Foraminiferan*	Foraminiferan	APHA (23rd Ed. 2017)10500 C
			Polychates	*Gastropods*	*Decapods Larvae*	*Decapods Larvae*	*Decapods Larvae*	*Gastropods*	
			Sipunculids	*Sipunculids*	*Amphipods*	*Amphipods*	*Amphipods*	*Isopods*	
			Amphipods	*Amphipods*	*Polychates*	*Isopods*	*Polychates*	*Sipunculids*	
2	MeioBenthos	--	*Polychates*	*Polychates*	*Turbellarians*	*Turbellarians*	Turbellarians	*Herpectacoids*	
			Foraminiferan	*Foraminiferan*	*Foraminiferan*	*Herpectacoids*	*Foraminiferan*	*Polychates*	
3	Population	no/m^2	300	289	387	288	342	360	

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.16	7.94	8.08	7.91	7.99	7.91	7.96	7.88	8.12	7.94	8.18	8.05	IS 3025 (Part11)1983
2.	Temperature	°C	30.1	30	30.3	30.2	30.1	30	30	29.9	29.9	28.8	29.8	29.7	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	114	94	130	112	116	76	98	72	108	84	96	76	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	2.8	BDL	2.2	BDL	3.5	BDL	3.2	BDL	2.9	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.32	6.12	6.07	5.65	5.99	5.59	5.92	5.52	6.22	5.81	6.05	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.85	37.11	35.66	37.62	35.62	37.32	35.68	36.24	35.78	36.46	35.12	35.84	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	2.63	2.46	2.8	2.37	2.5	2.41	2.37	2.16	2.74	2.42	2.9	2.58	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.388	0.302	0.431	0.336	0.448	0.431	0.207	0.189	0.261	0.217	0.326	0.304	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.23	3.1	3.79	2.93	3.36	3.28	2.75	2.62	3.74	3.59	3.59	3.39	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.86	0.65	1.16	0.82	BDL	BDL	BDL	BDL	1.16	1.05	1.68	1.47	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.248	5.862	7.021	5.636	6.308	6.121	5.327	4.969	6.741	6.227	6.816	6.274	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36650	37100	36990	37668	36670	37450	36310	37108	36324	37164	35940	36720	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24.07	BDL	23.98	11.99	28.22	16.13	24.31	16.21	28.31	16.18	23.93	11.96	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.69	2.36	3.12	2.66	3.62	2.74	3.44	3.06	3.01	3.12	3.47	2.96	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.34	1.85	1.23	1.63	2.01	1.25	1.85	1.98	1.57	1.87	1.63	1.75	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	123	140	111	127	156	142	132	133	88	111	100	109	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Pinnularia*	*Cyclotella*	*Rhizosolenia*	*Rhizosolenia*	*Cyclotella*	*Diploneis*	*Navicula*	*Coscinodiscus*	*Grammatophora*	*Pinnularia*	*Diploneis*	*Ceratium*	APHA (23rd Ed. 2017)10200 F
			Biddulphia	*Pinnularia*	*Biddulphia*	*Pinnularia*	*Pinnularia*	*Rhizosolenia*	*Fragillaria*	*Diploneis*	*Rhizosolenia*	*Biddulphia*	*Rhizosolenia*	*Diploneis*	
			Navicula	*Skeletonema*	*Thalassiothrix*	*Melosira*	*Skeletonema*	*Nitzschia*	*Thalassiothrix*	*Rhizosolenia*	*Nitzschia*	*Navicula*	*Nitzschia*	*Odentella*	
			Thallassiosira	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Thalassiothrix*	*Grammatophora*	*Dinophysis*	*Thalassionema*	*Thallassiosira*	*Cyclotella*	*Grammatophora*	
			Skeletonema	*Thalassionema*	*Coscinodiscus*	*Grammatophora*	*Thalassionema*	*Pleurosigma*	*Surirella*	*Thalassionema*	*Pleurosigma*	*Skeletonema*	*Pleurosigma*	*Melosira*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	51		38		50		41		54		52		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Egg(Fish and Shrimps)*		*Copepods nauplii*		*Oikoplura*		*Oikoplura*		*Crustacean Larvae*		*Crustacean Larvae*		
			Copepods		*Copepods*		*Copepods nauplii*		*Copepods nauplii*		*Egg(Fish and Shrimps)*		*Decapoda*		
			Crustacean Larvae		*Crustacean Larvae*		*Crustacean Larvae*		*Crustacean Larvae*		*Copepods*		*Copepods*		
			Oikoplura		*Oikoplura*		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	14.56		13.25		14.25		16.36		15.78		14.6		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	190		216		256		254		178		196		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	36		30		65		70		56		63		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	27		17		41		45		49		42		IS :15185:2016
4	Enterococcus	/100ml	15		10		19		21		29		22		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.61	0.52	0.49	0.46	0.58	0.55	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	537.4	546.3	551.4	542.6	564.2	542.3	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	%	4.04	4.11	4.12	4.08	3.92	3.95	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	91.8	102.4	112.1	118.5	127.5	130.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	534.1	554.2	560.8	574.2	580.5	602.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.09	3.98	4.02	3.97	4.08	4.11	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	42.64	44.38	42.31	44.12	45.38	45.31	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	49.06	42.64	43.35	48.64	51.24	48.65	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	88.47	95.34	101.2	104.2	111.6	114.8	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.38	2.44	2.49	2.62	2.54	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

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Amphipods*	*Amphipods*	*Foraminiferan*	*Isopods*	*Foraminiferan*	*Amphipods*	APHA (23rd Ed. 2017)10500 C
			Decapod Larvae	*Decapod Larvae*	*Gastropods*	*Polychates*	*Gastropods*	*Polychates*	
			Isopods	*Isopods*	*Isopods*	*Sipunculids*	*Isopods*	*Isopods*	
			Gastropods	*Gastropods*	*Sipunculids*	*Amphipods*	*Sipunculids*	*Gastropods*	
2	MeioBenthos	--	Foraminiferan	Foraminiferan	Herpectacoids	Polychates	Herpectacoids	*Decapods Larvae*	
			Herpectacoids	*Turbellarians*	*Polychates*	*Foraminiferan*	*Polychates*	*Herpectacoids*	
3	Population	no/m²	320	288	257	308	264	308	

GUJARAT VAPI

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	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.06	7.86	8.14	7.92	8.03	7.94	7.97	7.93	7.95	7.86	8.07	7.91	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30.1	30.3	30.2	30	29.9	29.9	29.8	29.9	29.8	29.8	29.7	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	150	122	134	116	124	102	116	104	134	116	128	102	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	3.3	BDL	2.7	BDL	3.8	BDL	3.5	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.22	6.02	6.37	5.86	6.3	5.79	6.22	5.72	6.32	5.81	5.95	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.66	37.06	36.12	37.84	35.89	37.25	35.77	36.25	35.84	36.38	35.31	35.81	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	2.54	2.37	2.8	2.67	2.67	2.33	3.36	3.02	4.19	3.55	3.23	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.345	0.302	0.371	0.336	0.325	0.235	0.632	0.31	0.435	0.37	0.609	0.543	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.32	3.23	4.31	3.45	2.67	2.58	3.84	3.62	3.95	3.69	3.48	3.32	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	1.03	0.86	1.08	0.95	0.91	0.73	1.9	1.68	2.11	1.79	2.42	2.32	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.205	5.902	7.481	6.456	5.665	5.145	7.832	6.95	8.575	7.61	7.319	6.763	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	37460	37780	37532	38060	37110	37680	36840	37060	36766	36952	36420	37070	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	20.06	4.01	39.96	19.98	28.22	16.13	20.26	4.05	24.26	12.13	11.96	3.99	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.87	2.87	2.26	3	2.55	3.21	3.21	3.65	2.47	3.05	3.02	3.48	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.74	1.75	0.74	2.03	1.31	2.14	1.33	2.36	1.09	2.89	1.36	2.59	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	121	126	145	117	187	108	150	145	91	158	96	168	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Coscinodiscus*	*Grammatophora*	*Coscinodiscus*	*Grammatophora*	*Coscinodiscus*	*Nitzschia*	*Ceratium*	*Thalassiothrix*	*Ceratium*	*Coscinodiscus*	*Nitzschia*	*Fragillaria*	APHA (23rd Ed. 2017)10200 F
			Diploneis	*Rhizosolenia*	*Diploneis*	*Rhizosolenia*	*Diploneis*	*Grammatophora*	*Diploneis*	*Surirella*	*Diploneis*	*Diploneis*	*Pinnularia*	*Thalassionema*	
			Rhizosolenia	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Diploneis*	*Odentella*	*Navicula*	*Odentella*	*Rhizosolenia*	*Odontella*	*Navicula*	
			Dinophysis	*Thalassionema*	*Dinophysis*	*Thalassionema*	*Dinophysis*	*Thalassiothrix*	*Grammatophora*	*Thallassiosira*	*Grammatophora*	*Dinophysis*	*Dinophysis*	*Thallassiosira*	
			Thalassionema	*Pleurosigma*	*Skeletonema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Melosira*	*Skeletonema*	*Melosira*	*Thalassionema*	*Surirella*	*Skeletonema*	
B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	40		47		55		50		39		47		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Oikoplura*		*Oikoplura*		*Decapoda*		*Decapoda*		*Egg(Fish and Shrimps)*		*Nitzschia*		
			Copepods nauplii		*Copepods nauplii*		*Copepods*		*Copepods*		*Oikoplura*		*Pinnularia*		
			Crustacean Larvae		*Crustacean Larvae*		*Crustacean Larvae*		*Crustacean Larvae*		*Copepods nauplii*		*Odontella*		
			Crustacean		*Egg(Fish and Shrimps)*		*Crustacean*		*Crustacean*		*Crustacean*		*Dinophysis*		
			Bivalve Larvae		*Crustacean*		*Oikoplura*		*Oikoplura*		*Bivalve Larvae*		*Surirella*		
3	Total Biomass	ml/100 m³	15.32		16.41		17.45		15.42		16.35		15.68		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	180		260		198		202		180		166		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	42		40		52		49		45		40		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	21		31		22		25		20		29		IS :15185:2016
4	Enterococcus	/100ml	20		22		14		19		18		22		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.19	7.86	8.27	8.14	8.24	8.15	8.12	8.02	8.17	8.08	8.24	8.06	IS 3025 (Part11)1983
2.	Temperature	°C	30.1	30.1	30.3	30.2	30.2	30.1	30	29.9	29.9	28.8	29.8	29.7	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	104	122	116	106	112	92	118	94	104	80	94	84	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.5	BDL	3.4	BDL	2.6	BDL	2.9	BDL	3.2	BDL	2.7	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.12	6.02	6.27	5.86	6.2	5.79	6.12	5.72	6.22	5.81	5.95	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.04	37.06	36.24	37.53	36.32	37.11	36.06	36.47	36.24	36.58	35.61	36.02	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	2.97	2.37	4.05	3.58	3.23	2.59	3.45	2.8	4.03	3.55	3.06	2.74	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.431	0.302	0.422	0.336	0.413	0.379	0.345	0.276	0.391	0.326	0.456	0.391	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.19	3.23	3.1	2.93	3.66	2.93	3.28	3.1	4.06	3.8	3.39	3.26	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.52	0.86	BDL	BDL	0.65	BDL	1.47	1.26	1.68	1.58	2	1.79	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.591	5.902	7.572	6.846	7.303	5.899	7.075	6.176	8.481	7.676	6.906	6.391	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36800	37780	37224	38108	36340	37460	36090	36990	35950	36760	36144	36800	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	20.06	4.01	31.97	11.99	44.35	24.19	20.26	4.05	28.31	8.09	7.98	3.99	APHA 23rd Ed.,2017, 5220-B

Continue…

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.25	2.47	3.25	2.55	3.25	2.36	2.36	3.05	2.77	2.48	3.05	2.47	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.12	0.96	1.36	1.01	1.22	1.45	0.85	2.11	1.07	2.18	1.87	1.99	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	104	67	111	112	128	144	80	156	87	79	106	98	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Thalassiothrix*	*Skeletonema*	*Diploneis*	*Nitzschia*	*Pinnularia*	*Odentella*	*Pinnularia*	*Navicula*	*Odentella*	*Pinnularia*	*Odentella*	*Grammatophora*	APHA (23rd Ed. 2017)10200 F
			Surirella	*Grammatophora*	*Melosira*	*Grammatophora*	*Biddulphia*	*Rhizosolenia*	*Thalassionema*	*Skeletonema*	*Rhizosolenia*	*Biddulphia*	*Rhizosolenia*	*Rhizosolenia*	
			Navicula	*Nitzschia*	*Navicula*	*Odentella*	*Navicula*	*Coscinodiscus*	*Navicula*	*Rhizosolenia*	*Coscinodiscus*	*Navicula*	*Coscinodiscus*	*Nitzschia*	
			Thallassiosira	*Thalassiothrix*	*Rhizosolenia*	*Thalassiothrix*	*Thallassiosira*	*Grammatophora*	*Thallassiosira*	*Dinophysis*	*Grammatophora*	*Thallassiosira*	*Grammatophora*	*Thalassionema*	
			Skeletonema	*Pleurosigma*	*Skeletonema*	*Melosira*	*Skeletonema*	*Thallassiosira*	*Skeletonema*	*Thalassionema*	*Thallassiosira*	*Skeletonema*	*Thallassiosira*	*Pleurosigma*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	36		51		39		43		41		69		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Crustacean Larvae*		*Crustacean Larvae*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Copepods nauplii*		
			Decapoda		*Oikoplura*		*Oikoplura*		*Oikoplura*		*Oikoplura*		*Crustacean Larvae*		
			Copepods		*Copepods*		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		*Oikoplura*		
			Crustacean		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		*Bivalve Larvae*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Oikoplura*		
3	Total Biomass	ml/100 m³	16.32		17.36		14.66		17.52		15.86		17.36		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	262		148		166		268		220		190		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	28		20		35		35		29		31		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	20		8		15		15		16		26		IS :15185:2016
4	Enterococcus	/100ml	12		6		11		11		8		10		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.52	0.57	0.48	0.51	0.46	0.41	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	538	544.2	562.2	546.4	580.3	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	%	3.81	3.92	3.96	3.89	3.95	4.03	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	102.2	114.3	116.2	112.4	118.6	122.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	564.2	580.4	587.2	604.5	590.4	602.8	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.02	3.86	3.89	3.91	3.94	4.06	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	44.61	46.57	39.8	40.24	41.25	42.88	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	43.35	40.36	42.61	44.25	42.6	44.68	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	103.3	105.7	110.4	124.1	138.4	142	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.61	2.56	2.31	2.37	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

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Sipunculids*	*Decapod Larvae*	*Sipunculids*	*Decapod Larvae*	*Polychates*	*Polychates*	APHA (23rd Ed. 2017)10500 C
			Polychates	*Polychates*	*Polychates*	*Isopods*	*Decapods Larvae*	*Decapods Larvae*	
			Gastropods	*Gastropods*	*Gastropods*	*Amphipods*	*Isopods*	*Isopods*	
			Isopods	*Isopods*	*Isopods*	*Sipunculids*	*Sipunculids*	*Sipunculids*	
2	MeioBenthos	--	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	*Polychates*	*Herpectacoids*	*Herpectacoids*	
			Polychates	*Turbellarians*	Turbellarians	Turbellarians	Turbellarians	*Turbellarians*	
3	Population	no/m²	260	303	320	358	240	290	

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

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	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.19	7.98	8.18	7.96	8.17	7.98	8.14	7.97	8.16	8.01	8.17	8.05	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30.1	30.3	30.2	30.1	30	29.9	29.8	29.8	29.7	29.8	29.7	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	124	108	118	92	106	86	114	88	154	128	142	118	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.4	BDL	3.5	BDL	3.2	BDL	2.7	BDL	3.3	BDL	2.6	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.12	6.02	6.07	5.76	5.99	5.69	5.92	5.62	6.12	5.81	5.85	5.75	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.88	36.3	35.52	37.23	35.49	36.87	36.34	36.88	36.35	36.94	35.41	35.97	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	2.63	2.37	3.32	2.97	2.84	2.59	2.93	2.76	3.71	3.23	2.9	2.74	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.302	0.19	0.336	0.267	0.474	0.31	0.3	0.235	0.304	0.283	0.37	0.348	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	2.93	2.8	3.1	2.67	2.41	1.89	2.54	2.45	3.59	3.42	3.42	3.23	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.47	BDL	0.6	0.52	0.78	BDL	1.79	1.47	2	1.68	2.32	2.11	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	5.862	5.36	6.756	5.907	5.724	4.79	5.77	5.445	7.604	6.933	6.69	6.318	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	37010	37420	37640	38020	37210	37640	36970	37124	36744	37210	36350	36988	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	16.05	8.02	23.98	11.99	36.29	16.13	16.21	8.1	12.13	4.04	11.96	BDL	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.2	2.41	2.99	3.21	3.06	2.86	2.2	1.66	2.87	2.09	2.98	2.69	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	2.23	2.14	1.45	2.33	1.45	1.34	1.74	0.9	1.84	1.06	1.12	1.45	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	100	104	98	58	124	100	109	94	110	63	111	109	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Navicula*	*Ceratium*	*Navicula*	*Ceratium*	*Navicula*	*Skeletonema*	*Rhizosolenia*	*Melosira*	*Skeletonema*	*Coscinodiscus*	*Dinophysis*	*Diploneis*	APHA (23rd Ed. 2017)10200 F
			Skeletonema	*Melosira*	*Skeletonema*	*Melosira*	*Skeletonema*	*Grammatophora*	*Pinnularia*	*Pinnularia*	*Grammatophora*	*Diploneis*	*Pinnularia*	*Rhizosolenia*	
			Rhizosolenia	*Odentella*	*Rhizosolenia*	*Odentella*	*Rhizosolenia*	*Nitzschia*	*Thalassiothrix*	*Skeletonema*	*Nitzschia*	*Rhizosolenia*	*Thalassiothrix*	*Nitzschia*	
			Dinophysis	*Dinophysis*	*Dinophysis*	*Dinophysis*	*Dinophysis*	*Thalassiothrix*	*Grammatophora*	*Thallassiosira*	*Thalassiothrix*	*Dinophysis*	*Grammatophora*	*Cyclotella*	
			Thalassionema	*Pleurosigma*	*Thalassionema*	*Fragillaria*	*Thalassionema*	*Pleurosigma*	*Ceratium*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Ceratium*	*Pleurosigma*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	47		50		47		39		56		38		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Decapoda*		*Decapoda*		*Crustacean Larvae*		*Crustacean Larvae*		*Decapoda*		*Egg(Fish and Shrimps)*		
			Copepods		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Copepods*		*Oikoplura*		
			Crustacean Larvae		*Crustacean Larvae*		*Copepods*		*Copepods*		*Crustacean Larvae*		*Copepods nauplii*		
			Crustacean		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		
			Oikoplura		*Oikoplura*		*Bivalve Larvae*		*Bivalve Larvae*		*Oikoplura*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	14.78		16.52		17.33		18.63		17.42		14.25		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	190		232		278		254		296		264		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	41		50		44		40		52		44		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	26		22		23		29		32		30		IS :15185:2016
4	Enterococcus	/100ml	21		15		18		15		22		15		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.08	7.81	8.21	8.06	8.18	7.98	8.16	7.96	8.14	8.03	8.18	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30.1	30.2	30.1	30.1	30	29.9	29.8	30	29.9	29.9	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	104	90	116	102	124	104	132	106	118	102	106	84	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.2	BDL	3.6	BDL	3.1	BDL	2.9	BDL	3.4	BDL	2.5	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.02	5.81	6.37	6.07	6.2	5.79	6.22	5.92	6.32	6.02	6.15	5.95	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.74	37.13	36.04	37.23	35.92	36.94	36.21	36.67	36.45	36.88	35.34	35.81	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	3.19	2.97	3.71	3.32	2.59	2.32	2.84	2.59	3.87	3.55	3.06	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.388	0.302	0.517	0.431	0.56	0.431	0.474	0.31	0.522	0.478	0.652	0.565	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.49	3.19	3.79	3.45	2.49	2.24	2.41	1.89	3.39	3.26	3.32	3.23	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	0.6	0.47	0.43	BDL	0.73	0.86	1.26	1.05	1.47	1.26	1.79	1.58	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.068	6.462	8.017	7.201	5.64	4.991	5.724	4.79	7.782	7.288	7.032	6.695	APHA 23rd 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 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	37120	37500	37844	38124	37520	38040	37160	37642	36980	37460	36248	36828	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	12.04	BDL	39.96	19.98	28.22	16.13	12.16	BDL	16.18	8.09	15.95	3.99	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.21	3.1	3	2.33	2.56	3.05	2.88	2.55	2.12	1.69	2.36	2.34	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.56	0.98	2.01	1.22	1.44	1.78	1.65	1.26	0.94	1.01	1.23	1.56	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	102	86	102	88	127	158	152	106	75	102	86	118	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Melosira*	*Biddulphia*	*Melosira*	*Biddulphia*	*Melosira*	*Ceratium*	*Coscinodiscus*	*Thallassiosira*	*Ceratium*	*Coscinodiscus*	*Ceratium*	*Thallassiosira*	APHA (23rd Ed. 2017)10200 F
			Pinnularia	*Fragillaria*	*Dinophysis*	*Fragillaria*	*Dinophysis*	*Pinnularia*	*Diploneis*	*Melosira*	*Pinnularia*	*Surirella*	*Pinnularia*	*Melosira*	
			Skeletonema	*Odontella*	*Skeletonema*	*Ceratium*	*Skeletonema*	*Odontella*	*Rhizosolenia*	*Nitzschia*	*Odontella*	*Rhizosolenia*	*Odontella*	*Nitzschia*	
			Thallassiosira	*Grammatophora*	*Thallassiosira*	*Nitzschia*	*Thallassiosira*	*Thalassiothrix*	*Dinophysis*	*Rhizosolenia*	*Thalassiothrix*	*Pinnularia*	*Thalassiothrix*	*Rhizosolenia*	
			Thalassionema	*Melosira*	*Thalassionema*	*Melosira*	*Thalassionema*	*Thallassiosira*	*Thalassionema*	*Pleurosigma*	*Thallassiosira*	*Thalassionema*	*Thallassiosira*	*Pleurosigma*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	35	43	49	40	40	25	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Decapoda*	*Decapoda*	*Copepods nauplii*	*Copepods nauplii*	*Egg(Fish and Shrimps)*	*Grammatophora*	
			Oikoplura	*Oikoplura*	*Copepods*	*Copepods*	*Crustacean Larvae*	*Rhizosolenia*	
			Crustacean Larvae	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Copepods nauplii*	*Nitzschia*	
			Bivalve Larvae	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Crustacean*	*Thalassionema*	
			Oikoplura	*Crustacean*	*Crustacean*	*Crustacean*	*Bivalve Larvae*	*Pleurosigma*	
3	Total Biomass	ml/100 m³	15.47	14.56	16.22	15.45	16.23	13.65	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Apr-23		May-23		Jun-23		Jul-23		Aug-23		Sep-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	214		200		144		260		274		202		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	41		32		30		50		44		50		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	25		20		12		29		30		42		IS :15185:2016
4	Enterococcus	/100ml	12		8		10		11		13		19		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 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	85.89	47.24	34.78	40.47	2.47	--	NOT DETECTED
2.	06-04-2023	86.64	49.73	32.89	43.62	1.74	6.13	NOT DETECTED
3.	10-04-2023	89.75	43.55	37.27	45.92	1.04	4.62	NOT DETECTED
4.	13-04-2023	84.59	46.79	31.83	38.36	1.38	2.98	NOT DETECTED
5.	17-04-2023	89.13	41.32	36.13	42.76	0.93	3.67	NOT DETECTED
6.	20-04-2023	85.19	39.13	31.48	40.17	0.78	5.37	NOT DETECTED
7.	24-04-2023	88.98	41.24	29.68	36.95	0.85	4.14	NOT DETECTED
8.	27-04-2023	87.38	44.47	34.89	41.46	1.16	2.98	NOT DETECTED
9.	01-05-2023	87.82	47.87	39.95	44.62	1.27	4.96	NOT DETECTED
10.	04-05-2023	81.46	44.28	38.52	41.29	1.23	4.16	NOT DETECTED
11.	08-05-2023	85.49	49.84	42.18	48.63	1.36	6.94	NOT DETECTED
12.	11-05-2023	78.13	45.28	39.61	45.15	1.3	5.39	NOT DETECTED
13.	15-05-2023	86.94	41.57	32.78	39.73	1.24	5.16	NOT DETECTED
14.	18-05-2023	89.84	37.05	28.37	35.96	1.2	4.69	NOT DETECTED
15.	22-05-2023	72.41	43.49	36.51	39.72	1.15	5.25	NOT DETECTED

Continue…

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	79.44	35.81	27.59	32.78	1.17	3.72	NOT DETECTED
17.	29-05-2023	86.91	41.2	31.64	37.16	1.3	4.38	NOT DETECTED
18.	01-06-2023	88.69	44.76	36.24	43.58	1	6.37	NOT DETECTED
19.	05-06-2023	84.09	40.36	31.48	39.74	1	5.98	NOT DETECTED
20.	08-06-2023	81.39	48.52	39.91	47.43	0.5	6.75	NOT DETECTED
21.	12-06-2023	86.85	37.62	31.37	36.28	0.7	4.62	NOT DETECTED
22.	15-06-2023	83.56	36.44	22.44	28.15	0.20	4.83	NOT DETECTED
23.	19-06-2023	78.96	27.15	18.15	23.1	0.1	2.58	NOT DETECTED
24.	22-06-2023	70.15	26.14	16.23	21.54	0.08	2.25	NOT DETECTED
25.	26-06-2023	62.15	25.16	14.26	18.53	0.1	4.74	NOT DETECTED
26.	29-06-2023	57.84	23.1	12.34	17.15	0.05	3.14	NOT DETECTED
27.	03-07-2023	70.17	32.48	22.61	28.27	0.08	--	NOT DETECTED
28.	06-07-2023	76.42	35.61	24.89	29.73	0.15	4.15	NOT DETECTED
29.	10-07-2023	67.38	30.88	19.52	22.39	0.05	3.46	NOT DETECTED
30.	13-07-2023	62.39	27.51	17.39	21.62	0.05	3.1	NOT DETECTED
31.	17-07-2023	70.51	31.28	20.63	25.81	0.1	4.63	NOT DETECTED

Continue…

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	83.29	33.62	24.57	29.64	0.21	5.41	NOT DETECTED
33.	24-07-2023	77.31	30.49	21.37	26.93	0.15	3.98	NOT DETECTED
34.	27-07-2023	86.62	36.31	25.54	29.16	0.25	4.38	NOT DETECTED
35.	31-07-2023	80.13	34.68	22.49	25.43	0.2	3.13	NOT DETECTED
36.	03-08-2023	68.85	27.9	25.38	29.54	0.74	3.25	NOT DETECTED
37.	07-08-2023	82.61	35.88	31.65	35.23	0.9	3.76	NOT DETECTED
38.	10-08-2023	74.77	29.78	28.69	32.14	0.86	4.62	NOT DETECTED
39.	14-08-2023	80.63	34.13	33.56	37.01	0.94	3.68	NOT DETECTED
40.	17-08-2023	87.56	36.61	35.12	38.65	1	4.96	NOT DETECTED
41.	21-08-2023	72.94	40.98	37.17	40.31	1.08	5.16	NOT DETECTED
42.	24-08-2023	85.67	41.18	39.52	43.95	1.14	5.79	NOT DETECTED
43.	28-08-2023	88.67	36.59	34.38	37.47	1	4.13	NOT DETECTED
44.	31-08-2023	81.53	39.87	38.51	42.32	1.1	5.92	NOT DETECTED
45.	04-09-2023	74.72	33.38	28.61	31.47	1.03	4.36	NOT DETECTED
46.	07-09-2023	78.51	35.62	31.49	34.26	1	4.79	NOT DETECTED
47.	11-09-2023	81.29	36.42	32.46	37.52	1.05	5.03	NOT DETECTED

Continue…

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	83.48	38.63	35.22	40.1	1.1	5.23	NOT DETECTED
49.	18-09-2023	76.29	34.61	27.87	32.42	0.95	3.63	NOT DETECTED
50.	21-09-2023	74.61	31.94	25.17	29.86	0.91	3.37	NOT DETECTED
51.	25-09-2023	79.71	35.66	30.83	35.26	0.97	3.91	NOT DETECTED
52.	28-09-2023	76.38	32.41	28.73	32.55	0.95	3.75	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	86.23	44.38	34.27	41.46	1.17		NOT DETECTED
2.	06-04-2023	89.85	38.52	30.67	16.73	1.12	3.65	NOT DETECTED
3.	10-04-2023	83.67	34.41	27.53	31.68	0.95	2.37	NOT DETECTED
4.	13-04-2023	75.89	37.88	31.13	38.52	1.12	3.16	NOT DETECTED
5.	17-04-2023	87.19	46.56	34.73	39.84	1.21	5.24	NOT DETECTED
6.	20-04-2023	85.49	36.19	27.68	32.47	0.92	2.79	NOT DETECTED
7.	24-04-2023	80.39	38.32	29.54	35.11	1.07	4.26	NOT DETECTED
8.	27-04-2023	87.96	34.89	26.14	31.97	0.75	3.15	NOT DETECTED
9.	01-05-2023	80.78	39.34	38.48	42.19	1	5.13	NOT DETECTED
10.	04-05-2023	85.97	44.63	41.12	47.73	1.21	6.72	NOT DETECTED
11.	08-05-2023	74.38	41.29	36.83	42.19	1.1	4.78	NOT DETECTED
12.	11-05-2023	88.79	36.15	32.78	38.63	1.15	3.51	NOT DETECTED
13.	15-05-2023	71.26	31.84	29.58	32.14	0.92	2.98	NOT DETECTED
14.	18-05-2023	80.72	38.79	31.25	37.47	1.19	4.52	NOT DETECTED
15.	22-05-2023	84.99	33.63	26.49	32.16	0.9	3.14	NOT DETECTED

Continue…

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	75.68	39.03	33.19	37.41	1.2	4.58	NOT DETECTED
17.	29-05-2023	82.33	35.17	24.51	29.67	1	2.27	NOT DETECTED
18.	01-06-2023	81.73	42.75	37.29	41.35	1.24	6.26	NOT DETECTED
19.	05-06-2023	85.37	38.59	31.37	35.19	1.15	5.1	NOT DETECTED
20.	08-06-2023	88.52	44.27	34.68	39.74	1.17	6.38	NOT DETECTED
21.	12-06-2023	89.73	36.06	30.82	34.65	1.05	3.72	NOT DETECTED
22.	15-06-2023	86.23	30.24	21.25	27.56	1.00	4.72	NOT DETECTED
23.	19-06-2023	72.35	27.56	17.23	22.14	0.91	4.38	NOT DETECTED
24.	22-06-2023	62.14	25.23	15.2	20.35	0.86	3.62	NOT DETECTED
25.	26-06-2023	58.12	23.1	13.15	16.98	1.00	4.78	NOT DETECTED
26.	29-06-2023	55.23	21.4	11.78	16.56	0.94	3.51	NOT DETECTED
27.	03-07-2023	61.38	29.42	17.14	21.83	0.74	--	NOT DETECTED
28.	06-07-2023	57.34	25.76	14.15	17.42	0.50	1.82	NOT DETECTED
29.	10-07-2023	68.24	28.57	18.49	22.73	0.71	2.36	NOT DETECTED
30.	13-07-2023	72.14	30.47	19.83	23.41	0.43	2.74	NOT DETECTED
31.	17-07-2023	66.49	28.54	17.59	20.75	0.66	2.41	NOT DETECTED

Continue…

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	60.35	26.48	16.35	19.52	0.54	2.33	NOT DETECTED
33.	24-07-2023	71.25	31.31	19.53	24.41	0.70	3.15	NOT DETECTED
34.	27-07-2023	63.92	28.53	17.42	21.38	0.62	3.75	NOT DETECTED
35.	31-07-2023	68.64	29.01	19.52	23.54	0.68	3.53	NOT DETECTED
36.	03-08-2023	76.36	29.75	24.49	29.63	0.87	1.58	NOT DETECTED
37.	07-08-2023	83.27	33.54	26.49	31.58	0.93	1.94	NOT DETECTED
38.	10-08-2023	81.73	30.65	23.69	28.56	0.85	1.64	NOT DETECTED
39.	14-08-2023	88.61	34.87	28.5	33.62	0.95	2.13	NOT DETECTED
40.	17-08-2023	73.93	39.71	33.93	39.27	1.07	2.74	NOT DETECTED
41.	21-08-2023	86.45	42.53	35.23	41.83	1.1	2.95	NOT DETECTED
42.	24-08-2023	81.27	46.67	36.99	43.51	1.15	3.62	NOT DETECTED
43.	28-08-2023	72.46	38.53	32.15	38.76	1	3.15	NOT DETECTED
44.	31-08-2023	79.51	40.11	29.75	34.02	1.12	3.76	NOT DETECTED
45.	04-09-2023	80.31	34.63	27.48	30.32	0.92	2.73	NOT DETECTED
46.	07-09-2023	85.42	37.14	31.37	34.58	1	3.65	NOT DETECTED
47.	11-09-2023	83.59	35.91	30.53	33.96	0.95	3.37	NOT DETECTED

Continue…

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	86.35	40.11	32.49	36.67	1.03	3.92	NOT DETECTED
49.	18-09-2023	70.17	31.47	25.73	29.91	1.1	2.85	NOT DETECTED
50.	21-09-2023	73.28	33.65	27.84	32.47	1.14	3.18	NOT DETECTED
51.	25-09-2023	77.52	34.89	28.54	34.17	1.17	3.26	NOT DETECTED
52.	28-09-2023	80.69	36.75	30.51	35.83	1.21	3.51	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	85.83	38.85	29.51	33.82	0.97	--	NOT DETECTED
2.	06-04-2023	82.59	45.83	35.66	39.35	1.38	3.52	NOT DETECTED
3.	10-04-2023	87.68	41.96	32.05	36.12	1.25	2.96	NOT DETECTED
4.	13-04-2023	81.26	43.75	33.14	40.53	1.21	3.75	NOT DETECTED
5.	17-04-2023	85.49	34.29	27.56	32.83	0.92	1.58	NOT DETECTED
6.	20-04-2023	84.38	39.74	30.18	36.51	1.13	4.13	NOT DETECTED
7.	24-04-2023	79.64	46.88	37.73	45.19	1.52	5.38	NOT DETECTED
8.	27-04-2023	81.29	35.16	29.15	33.27	1.12	3.48	NOT DETECTED
9.	01-05-2023	86.55	41.74	32.67	43.25	1.14	5.26	NOT DETECTED
10.	04-05-2023	89.64	39.65	31.89	38.63	1.18	3.87	NOT DETECTED
11.	08-05-2023	82.15	41.29	26.52	36.81	1.26	4.17	NOT DETECTED
12.	11-05-2023	74.84	47.88	36.73	45.78	1.18	6.27	NOT DETECTED
13.	15-05-2023	79.62	44.93	35.61	42.37	1.13	6.01	NOT DETECTED
14.	18-05-2023	83.76	39.16	29.77	36.98	1	5.48	NOT DETECTED
15.	22-05-2023	86.49	35.83	27.42	35.99	0.93	3.15	NOT DETECTED

Continue…

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	81.09	43.29	36.53	43.56	1.14	4.27	NOT DETECTED
17.	29-05-2023	78.98	37.15	32.69	39.16	1.12	4.16	NOT DETECTED
18.	01-06-2023	86.29	43.28	35.71	41.38	1	6.48	NOT DETECTED
19.	05-06-2023	81.85	46.51	38.48	45.73	0.80	5.18	NOT DETECTED
20.	08-06-2023	89.53	39.32	33.73	39.26	0.75	3.96	NOT DETECTED
21.	12-06-2023	73.57	37.91	30.27	36.18	0.5	3.28	NOT DETECTED
22.	15-06-2023	84.13	31.25	24.5	30.23	0.1	5.12	NOT DETECTED
23.	19-06-2023	78.25	30.25	18.25	23.14	0.05	3.17	NOT DETECTED
24.	22-06-2023	65.14	27.58	17.55	22.18	0.08	2.53	NOT DETECTED
25.	26-06-2023	70.23	25.21	15.23	19.26	0.03	4.58	NOT DETECTED
26.	29-06-2023	61.21	22.15	14.25	18.35	0.04	3.66	NOT DETECTED
27.	03-07-2023	68.53	30.14	22.62	25.17	0.03	--	NOT DETECTED
28.	06-07-2023	62.69	28.53	19.86	23.49	0.02	2.53	NOT DETECTED
29.	10-07-2023	75.37	32.55	23.62	28.24	0.05	3.96	NOT DETECTED
30.	13-07-2023	79.51	33.73	25.1	30.61	0.06	4.13	NOT DETECTED
31.	17-07-2023	70.38	29.41	21.52	24.36	0.05	3.24	NOT DETECTED

Continue…

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	64.76	28.64	18.24	22.13	0.02	2.41	NOT DETECTED
33.	24-07-2023	58.63	27.41	15.73	19.57	NOT DETECTED	2.1	NOT DETECTED
34.	27-07-2023	67.42	29.61	18.32	23.67	NOT DETECTED	3.52	NOT DETECTED
35.	31-07-2023	71.28	28.53	20.36	24.51	0.04	4.58	NOT DETECTED
36.	03-08-2023	82.57	32.19	28.42	35.65	0.94	2.97	NOT DETECTED
37.	07-08-2023	89.64	36.86	32.58	38.15	1	3.46	NOT DETECTED
38.	10-08-2023	78.24	38.27	34.66	40.73	1.1	3.58	NOT DETECTED
39.	14-08-2023	84.83	40.53	35.01	42.57	1.13	4.63	NOT DETECTED
40.	17-08-2023	72.95	42.57	37.65	45.32	1.15	4.27	NOT DETECTED
41.	21-08-2023	80.14	39.48	32.5	37.42	1	3.58	NOT DETECTED
42.	24-08-2023	89.25	41.94	36.61	44.76	1.21	4.38	NOT DETECTED
43.	28-08-2023	82.58	37.65	34.74	40.61	1.12	3.17	NOT DETECTED
44.	31-08-2023	87.51	42.28	40.51	46.32	1.25	5.13	NOT DETECTED
45.	04-09-2023	84.51	37.24	32.57	37.42	1	3.29	NOT DETECTED
46.	07-09-2023	87.53	40.51	34.13	40.62	1.05	3.93	NOT DETECTED
47.	11-09-2023	89.41	42.74	37.54	44.75	1.2	4.68	NOT DETECTED

Continue…

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	85.39	39.61	35.18	41.48	1.15	4.25	NOT DETECTED
49.	18-09-2023	74.29	34.62	28.57	34.92	0.94	2.74	NOT DETECTED
50.	21-09-2023	77.53	37.15	31.37	37.83	1	3.48	NOT DETECTED
51.	25-09-2023	75.1	35.75	30.56	35.91	0.95	3.13	NOT DETECTED
52.	28-09-2023	78.25	36.91	33.28	39.79	0.98	3.76	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	87.86	41.73	29.17	34.84	0.78	--	NOT DETECTED
2.	06-04-2023	79.28	35.17	27.46	32.58	0.63	2.59	NOT DETECTED
3.	10-04-2023	89.64	29.58	24.19	28.88	0.97	4.15	NOT DETECTED
4.	13-04-2023	85.49	37.27	28.35	33.05	0.84	3.98	NOT DETECTED
5.	17-04-2023	89.27	40.63	32.55	37.63	1.12	5.13	NOT DETECTED
6.	20-04-2023	71.42	36.92	28.73	31.18	0.74	1.98	NOT DETECTED
7.	24-04-2023	83.06	46.17	35.95	38.67	1.14	3.65	NOT DETECTED
8.	27-04-2023	87.35	34.18	26.63	31.28	0.88	4.17	NOT DETECTED
9.	01-05-2023	78.53	41.53	29.27	35.61	1.14	5.14	NOT DETECTED
10.	04-05-2023	86.41	38.76	26.89	31.47	1.00	4.62	NOT DETECTED
11.	08-05-2023	87.52	31.96	22.84	28.62	0.95	2.48	NOT DETECTED
12.	11-05-2023	77.09	35.21	28.46	34.89	0.98	3.86	NOT DETECTED
13.	15-05-2023	89.68	39.17	32.87	37.14	1.15	5.53	NOT DETECTED
14.	18-05-2023	81.38	34.26	29.81	35.1	1.12	3.54	NOT DETECTED
15.	22-05-2023	85.87	31.49	26.57	31.26	0.92	2.84	NOT DETECTED

Continue…

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	76.46	28.38	21.75	26.51	0.84	3.15	NOT DETECTED
17.	29-05-2023	88.97	34.69	24.33	29.84	1.00	2.92	NOT DETECTED
18.	01-06-2023	87.52	39.26	27.53	32.81	1.15	5.9	NOT DETECTED
19.	05-06-2023	89.42	35.81	24.7	28.47	0.98	4.25	NOT DETECTED
20.	08-06-2023	84.68	37.95	26.88	29.96	1.13	5.38	NOT DETECTED
21.	12-06-2023	85.98	33.17	22.56	27.29	1.00	4.75	NOT DETECTED
22.	15-06-2023	76.23	25.1	18.12	22.14	0.05	3.28	NOT DETECTED
23.	19-06-2023	65.25	21.98	15.35	18.14	0.02	3.67	NOT DETECTED
24.	22-06-2023	62.15	20.45	14.2	18.25	0.10	4.12	NOT DETECTED
25.	26-06-2023	56.98	18.52	12.15	15.35	0.10	3.47	NOT DETECTED
26.	29-06-2023	52.12	17.15	10.25	14.12	0.20	3.87	NOT DETECTED
27.	03-07-2023	46.48	19.15	12.64	15.87	0.05	--	NOT DETECTED
28.	06-07-2023	57.92	22.54	13.96	17.42	0.10	3.27	NOT DETECTED
29.	10-07-2023	61.28	23.71	15.53	20.03	0.14	3.58	NOT DETECTED
30.	13-07-2023	57.53	20.77	12.65	15.47	0.10	3.41	NOT DETECTED
31.	17-07-2023	66.85	23.52	14.48	18.35	0.15	3.1	NOT DETECTED

Continue…

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	75.31	25.69	17.53	21.47	0.21	4.15	NOT DETECTED
33.	24-07-2023	68.4	23.11	15.91	20.65	0.15	3.96	NOT DETECTED
34.	27-07-2023	77.63	26.54	18.54	23.2	0.28	4.38	NOT DETECTED
35.	31-07-2023	84.51	29.65	21.43	24.64	0.32	4.81	NOT DETECTED
36.	03-08-2023	77.63	31.25	22.76	26.92	1.00	3.86	NOT DETECTED
37.	07-08-2023	83.67	35.81	24.63	29.15	1.10	4.26	NOT DETECTED
38.	10-08-2023	89.11	37.63	25.96	31.63	1.13	4.79	NOT DETECTED
39.	14-08-2023	83.59	40.11	28.46	32.99	1.15	5.74	NOT DETECTED
40.	17-08-2023	75.48	42.76	31.57	36.83	1.20	6.17	NOT DETECTED
41.	21-08-2023	81.27	45.83	34.79	39.15	1.24	7.43	NOT DETECTED
42.	24-08-2023	89.41	41.67	30.42	34.57	1.17	6.83	NOT DETECTED
43.	28-08-2023	87.51	36.17	26.5	31.11	1.10	5.42	NOT DETECTED
44.	31-08-2023	83.46	39.36	29.42	34.84	1.15	5.59	NOT DETECTED
45.	04-09-2023	73.48	33.91	24.47	29.13	1.05	4.38	NOT DETECTED
46.	07-09-2023	77.32	36.83	27.12	32.63	1.20	4.75	NOT DETECTED
47.	11-09-2023	74.91	34.49	26.76	30.94	1.10	4.52	NOT DETECTED

Continue…

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	79.83	37.11	29.82	34.69	1.23	5.19	NOT DETECTED
49.	18-09-2023	64.29	29.68	21.57	26.42	0.96	3.27	NOT DETECTED
50.	21-09-2023	70.73	33.36	24.67	29.71	1.00	3.6	NOT DETECTED
51.	25-09-2023	66.92	31.28	23.1	28.53	0.95	3.46	NOT DETECTED
52.	28-09-2023	75.39	35.74	25.27	30.58	1.05	4.13	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
1.	03-04-2023	73.28	21.57	12.38	14.83	NOT DETECTED
2.	06-04-2023	78.54	31.48	16.53	19.67	--
3.	10-04-2023	81.48	28.64	11.93	15.36	--
4.	13-04-2023	72.96	23.61	10.48	14.91	--
5.	17-04-2023	85.48	21.32	13.27	16.48	--
6.	20-04-2023	73.18	29.86	15.73	19.82	--
7.	24-04-2023	88.79	26.71	11.46	16.37	--
8.	27-04-2023	76.48	31.37	16.83	21.43	--
9.	01-05-2023	89.53	30.38	14.59	19.66	--
10.	04-05-2023	84.67	27.92	11.57	16.21	--
11.	08-05-2023	71.59	23.42	10.86	13.69	--
12.	11-05-2023	76.31	33.96	18.84	23.46	--
13.	15-05-2023	83.84	28.59	15.17	19.38	--
14.	18-05-2023	88.94	31.27	12.36	16.07	--
15.	22-05-2023	69.28	21.43	10.62	15.16	--

Continue…

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
16.	25-05-2023	78.37	26.54	13.67	17.63	--
17.	29-05-2023	82.57	29.88	16.54	22.92	--
18.	01-06-2023	84.28	28.42	15.39	19.63	--
19.	05-06-2023	75.49	25.93	12.76	15.38	--
20.	08-06-2023	81.35	28.13	14.45	17.05	--
21.	12-06-2023	73.64	23.7	11.93	13.56	--
22.	15-06-2023	60.5	22.36	8.25	12.44	--
23.	19-06-2023	50.24	18.54	8.25	11.63	--
24.	22-06-2023	52.36	16.1	7.25	10.25	--
25.	26-06-2023	48.25	14.26	8.25	12.37	--
26.	29-06-2023	45.27	15.23	7.15	11.56	--
27.	03-07-2023	35.37	13.84	6.13	8.45	NOT DETECTED
28.	06-07-2023	42.83	16.32	7.63	11.87	--
29.	10-07-2023	38.39	14.63	6.42	9.53	--
30.	13-07-2023	31.93	11.29	5.47	8.62	--
31.	17-07-2023	40.62	14.56	7.15	10.17	--

Continue…

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
32.	20-07-2023	46.31	16.28	7.86	11.69	--
33.	24-07-2023	37.28	13.5	6.42	9.51	--
34.	27-07-2023	44.65	15.33	8.54	12.28	--
35.	31-07-2023	52.82	17.41	9.11	14.52	--
36.	03-08-2023	67.41	22.76	9.53	12.84	--
37.	07-08-2023	72.89	24.13	10.26	14.37	--
38.	10-08-2023	77.53	25.91	11.57	15.74	--
39.	14-08-2023	74.69	23.47	10.41	13.97	--
40.	17-08-2023	81.17	27.58	13.75	17.53	--
41.	21-08-2023	72.55	31.25	16.74	21.45	--
42.	24-08-2023	79.76	33.62	18.74	23.56	--
43.	28-08-2023	81.34	27.21	14.38	18.14	--
44.	31-08-2023	84.64	29.85	15.36	21.41	--
45.	04-09-2023	70.41	24.15	10.58	13.93	--
46.	07-09-2023	75.62	26.74	12.36	15.61	--
47.	11-09-2023	78.93	29.38	14.65	18.27	--

Continue…

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
48.	14-09-2023	74.18	25.64	12.81	14.92	--
49.	18-09-2023	65.72	21.28	8.85	11.67	--
50.	21-09-2023	68.61	24.54	10.26	13.68	--
51.	25-09-2023	64.28	20.96	8.12	10.79	--
52.	28-09-2023	70.41	24.22	12.63	15.32	--
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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	84.38	41.20	38.42	45.72	1.93	--	NOT DETECTED
2.	06-04-2023	81.26	36.18	32.54	36.92	1.47	3.58	NOT DETECTED
3.	10-04-2023	74.72	35.82	26.48	33.24	1.18	5.62	NOT DETECTED
4.	13-04-2023	78.41	39.16	29.64	36.41	1.16	2.48	NOT DETECTED
5.	17-04-2023	82.57	40.86	32.28	38.74	1.38	2.51	NOT DETECTED
6.	20-04-2023	76.38	37.55	27.94	34.19	0.97	4.87	NOT DETECTED
7.	24-04-2023	81.53	34.27	31.62	37.47	1.12	2.78	NOT DETECTED
8.	27-04-2023	75.28	36.91	28.47	34.69	0.95	3.94	NOT DETECTED
9.	01-05-2023	72.59	38.73	36.57	41.38	1.28	6.32	NOT DETECTED
10.	04-05-2023	78.42	34.65	31.48	35.63	1.16	4.76	NOT DETECTED
11.	08-05-2023	84.61	41.13	37.64	44.13	1.39	6.58	NOT DETECTED
12.	11-05-2023	86.74	31.38	30.19	33.53	1.10	4.37	NOT DETECTED
13.	15-05-2023	80.15	26.78	34.15	39.53	1.15	4.16	NOT DETECTED
14.	18-05-2023	77.58	34.71	37.14	41.95	1.17	4.85	NOT DETECTED
15.	22-05-2023	71.31	29.85	26.54	29.36	1.15	3.28	NOT DETECTED

Continue…

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	75.47	37.53	34.29	39.74	1.28	4.61	NOT DETECTED
17.	29-05-2023	67.53	31.36	31.11	36.98	1.32	4.74	NOT DETECTED
18.	01-06-2023	86.95	32.73	29.58	32.56	1.00	4.81	NOT DETECTED
19.	05-06-2023	87.39	29.63	25.19	27.41	0.80	3.12	NOT DETECTED
20.	08-06-2023	82.47	35.38	32.46	35.71	0.50	6.02	NOT DETECTED
21.	12-06-2023	85.25	30.76	28.38	31.25	0.70	5.68	NOT DETECTED
22.	15-06-2023	75.23	28.12	16.15	22.98	0.05	4.38	NOT DETECTED
23.	19-06-2023	62.35	22.12	13.52	17.36	0.05	4.19	NOT DETECTED
24.	22-06-2023	54.23	20.18	10.44	13.48	0.10	3.45	NOT DETECTED
25.	26-06-2023	58.10	23.15	8.26	13.54	0.05	3.22	NOT DETECTED
26.	29-06-2023	52.47	20.12	7.25	12.97	0.03	3.89	NOT DETECTED
27.	03-07-2023	55.63	19.27	13.58	16.41	NOT DETECTED	--	NOT DETECTED
28.	06-07-2023	61.28	23.85	16.43	20.58	NOT DETECTED	NOT DETECTED	NOT DETECTED
29.	10-07-2023	58.39	20.51	13.10	17.32	NOT DETECTED	NOT DETECTED	NOT DETECTED
30.	13-07-2023	67.52	23.46	17.59	21.45	NOT DETECTED	1.57	NOT DETECTED
31.	17-07-2023	55.21	21.99	14.12	18.93	NOT DETECTED	NOT DETECTED	NOT DETECTED

Continue…

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	62.48	24.51	16.53	20.71	NOT DETECTED	NOT DETECTED	NOT DETECTED
33.	24-07-2023	70.62	26.86	19.25	23.66	NOT DETECTED	2.31	NOT DETECTED
34.	27-07-2023	64.50	23.45	15.59	18.35	NOT DETECTED	1.86	NOT DETECTED
35.	31-07-2023	74.38	24.16	17.42	21.63	NOT DETECTED	2.74	NOT DETECTED
36.	03-08-2023	78.42	27.17	23.85	28.17	0.51	3.10	NOT DETECTED
37.	07-08-2023	83.74	29.82	24.98	30.52	0.73	3.86	NOT DETECTED
38.	10-08-2023	73.29	33.52	27.43	32.65	0.91	4.38	NOT DETECTED
39.	14-08-2023	89.54	30.79	25.14	29.67	0.84	3.95	NOT DETECTED
40.	17-08-2023	84.82	34.65	28.06	34.29	1.00	4.63	NOT DETECTED
41.	21-08-2023	87.57	37.25	33.96	38.11	1.10	5.82	NOT DETECTED
42.	24-08-2023	80.41	35.76	31.45	36.74	1.06	5.21	NOT DETECTED
43.	28-08-2023	88.65	31.38	28.91	32.50	0.92	3.40	NOT DETECTED
44.	31-08-2023	82.18	33.82	30.24	34.62	1.00	4.27	NOT DETECTED
45.	04-09-2023	80.43	30.14	25.38	29.71	0.74	3.89	NOT DETECTED
46.	07-09-2023	85.28	33.87	27.49	32.12	0.87	4.26	NOT DETECTED
47.	11-09-2023	87.36	35.81	31.57	36.79	0.96	5.36	NOT DETECTED

Continue…

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	84.10	31.27	29.14	34.62	0.81	4.92	NOT DETECTED
49.	18-09-2023	73.79	26.94	23.41	26.63	0.65	3.24	NOT DETECTED
50.	21-09-2023	78.52	29.63	26.54	30.21	0.80	4.28	NOT DETECTED
51.	25-09-2023	75.18	28.42	25.77	29.83	0.72	3.85	NOT DETECTED
52.	28-09-2023	81.84	32.56	29.91	34.52	0.84	4.10	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	76.48	31.73	26.14	32.87	0.86	--	NOT DETECTED
2.	06-04-2023	89.53	38.79	29.47	35.63	0.99	3.12	NOT DETECTED
3.	10-04-2023	85.10	42.18	33.86	39.25	1.10	2.96	NOT DETECTED
4.	13-04-2023	78.46	37.67	26.24	31.63	0.89	3.63	NOT DETECTED
5.	17-04-2023	88.24	45.64	37.11	44.91	1.13	5.1	NOT DETECTED
6.	20-04-2023	81.39	40.71	33.79	36.15	1.12	3.78	NOT DETECTED
7.	24-04-2023	86.73	36.28	24.87	27.61	1.00	3.16	NOT DETECTED
8.	27-04-2023	89.74	39.56	27.71	31.36	1.10	4.85	NOT DETECTED
9.	01-05-2023	88.16	41.58	34.82	37.16	1.18	4.87	NOT DETECTED
10.	04-05-2023	83.84	38.47	31.98	34.64	1.15	3.68	NOT DETECTED
11.	08-05-2023	86.48	34.21	26.14	31.99	0.97	3.16	NOT DETECTED
12.	11-05-2023	77.59	39.69	36.83	40.71	1.17	4.28	NOT DETECTED
13.	15-05-2023	89.36	36.71	29.56	34.41	1.00	2.95	NOT DETECTED
14.	18-05-2023	83.17	31.58	24.75	28.78	0.93	3.48	NOT DETECTED
15.	22-05-2023	80.49	39.78	33.05	38.51	1.13	4.17	NOT DETECTED

Continue…

Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	87.51	35.93	25.48	31.64	1.00	3.57	NOT DETECTED
17.	29-05-2023	81.26	38.46	31.95	38.62	1.14	4.28	NOT DETECTED
18.	01-06-2023	87.83	36.37	27.41	30.13	0.80	3.26	NOT DETECTED
19.	05-06-2023	80.38	39.61	31.46	35.57	0.50	4.37	NOT DETECTED
20.	08-06-2023	85.27	43.58	35.82	37.42	1.00	4.94	NOT DETECTED
21.	12-06-2023	89.53	37.77	29.64	32.85	0.75	2.90	NOT DETECTED
22.	15-06-2023	80.53	28.15	17.14	21.54	0.05	3.57	NOT DETECTED
23.	19-06-2023	56.21	22.10	14.5	19.65	0.02	3.02	NOT DETECTED
24.	22-06-2023	60.55	18.54	13.56	17.48	0.10	2.35	NOT DETECTED
25.	26-06-2023	51.48	17.00	10.25	14.52	0.10	3.35	NOT DETECTED
26.	29-06-2023	50.28	16.25	9.85	13.25	0.50	2.56	NOT DETECTED
27.	03-07-2023	58.64	20.27	14.73	17.32	0.02	--	NOT DETECTED
28.	06-07-2023	51.39	19.64	12.75	15.43	NOT DETECTED	1.24	NOT DETECTED
29.	10-07-2023	62.75	23.54	16.42	19.66	NOT DETECTED	2.15	NOT DETECTED
30.	13-07-2023	66.34	25.61	17.47	22.92	0.04	2.57	NOT DETECTED
31.	17-07-2023	72.48	28.64	20.51	25.46	0.08	3.12	NOT DETECTED

Continue…

Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	64.96	26.13	18.37	22.45	0.02	2.84	NOT DETECTED
33.	24-07-2023	60.65	25.83	17.32	20.84	NOT DETECTED	3.00	NOT DETECTED
34.	27-07-2023	69.27	27.61	19.03	24.58	NOT DETECTED	3.37	NOT DETECTED
35.	31-07-2023	77.17	29.76	23.53	27.24	0.10	3.89	NOT DETECTED
36.	03-08-2023	64.97	27.61	20.13	24.86	0.91	1.59	NOT DETECTED
37.	07-08-2023	74.65	30.14	22.97	26.49	0.95	2.16	NOT DETECTED
38.	10-08-2023	71.59	28.70	21.38	23.75	0.82	1.91	NOT DETECTED
39.	14-08-2023	87.64	31.85	24.73	28.05	0.97	2.48	NOT DETECTED
40.	17-08-2023	89.62	38.61	31.28	37.82	1.13	4.73	NOT DETECTED
41.	21-08-2023	81.47	32.57	28.82	33.67	1.04	3.84	NOT DETECTED
42.	24-08-2023	76.73	35.88	30.31	36.47	1.10	4.24	NOT DETECTED
43.	28-08-2023	87.46	30.93	26.42	31.28	0.95	2.38	NOT DETECTED
44.	31-08-2023	82.15	33.73	28.28	34.65	1.00	3.55	NOT DETECTED
45.	04-09-2023	75.62	28.36	24.71	27.35	0.73	2.84	NOT DETECTED
46.	07-09-2023	78.57	31.82	25.61	29.13	0.85	3.15	NOT DETECTED
47.	11-09-2023	83.16	34.77	28.45	32.81	0.92	3.78	NOT DETECTED

Continue…

Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	80.58	32.19	27.31	31.42	0.71	3.52	NOT DETECTED
49.	18-09-2023	67.33	26.42	21.54	24.77	0.53	1.38	NOT DETECTED
50.	21-09-2023	74.92	29.71	25.64	29.13	0.75	2.04	NOT DETECTED
51.	25-09-2023	70.74	27.25	23.58	26.83	0.63	1.84	NOT DETECTED
52.	28-09-2023	77.28	31.82	26.16	30.32	0.91	3.11	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	80.47	37.25	29.74	34.28	1.14	--	NOT DETECTED
2.	06-04-2023	77.92	45.27	39.16	42.78	0.94	3.16	NOT DETECTED
3.	10-04-2023	86.74	35.83	31.58	38.64	0.91	2.44	NOT DETECTED
4.	13-04-2023	81.39	46.93	41.11	48.83	1.17	5.12	NOT DETECTED
5.	17-04-2023	88.26	36.34	34.26	37.56	1.12	3.73	NOT DETECTED
6.	20-04-2023	79.39	38.15	30.16	34.92	0.93	1.97	NOT DETECTED
7.	24-04-2023	84.82	44.79	36.81	39.14	1.00	4.16	NOT DETECTED
8.	27-04-2023	87.13	39.36	33.43	36.36	0.98	3.37	NOT DETECTED
9.	01-05-2023	77.48	42.53	33.48	39.64	1.17	4.62	NOT DETECTED
10.	04-05-2023	83.70	38.65	29.29	32.48	1.00	3.58	NOT DETECTED
11.	08-05-2023	79.46	48.49	36.82	43.76	1.23	5.95	NOT DETECTED
12.	11-05-2023	73.19	44.76	34.03	39.71	1.15	5.13	NOT DETECTED
13.	15-05-2023	86.79	41.37	27.42	33.91	1.10	3.82	NOT DETECTED
14.	18-05-2023	80.48	46.42	37.58	41.36	1.17	4.79	NOT DETECTED
15.	22-05-2023	76.51	40.51	31.49	36.15	1.15	3.67	NOT DETECTED

Continue…

Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	81.49	38.13	28.67	33.26	1.12	4.18	NOT DETECTED
17.	29-05-2023	78.41	35.48	25.15	29.69	1.00	3.64	NOT DETECTED
18.	01-06-2023	87.48	44.85	31.36	38.57	1.00	5.23	NOT DETECTED
19.	05-06-2023	83.96	46.41	36.74	43.55	0.80	5.78	NOT DETECTED
20.	08-06-2023	87.52	40.78	29.65	36.28	0.75	4.58	NOT DETECTED
21.	12-06-2023	76.89	36.13	26.25	32.19	0.50	4.02	NOT DETECTED
22.	15-06-2023	88.56	30.15	14.56	20.98	0.05	3.67	NOT DETECTED
23.	19-06-2023	60.52	24.14	12.51	17.54	0.02	3.10	NOT DETECTED
24.	22-06-2023	62.35	21.15	11.28	15.23	0.10	2.59	NOT DETECTED
25.	26-06-2023	55.14	18.53	9.25	12.89	0.10	2.96	NOT DETECTED
26.	29-06-2023	56.23	17.55	10.25	14.56	0.50	3.14	NOT DETECTED
27.	03-07-2023	61.28	23.57	18.76	22.35	0.03	--	NOT DETECTED
28.	06-07-2023	67.42	26.78	19.32	21.57	0.06	2.97	NOT DETECTED
29.	10-07-2023	58.37	21.72	15.48	18.43	NOT DETECTED	1.25	NOT DETECTED
30.	13-07-2023	64.19	25.91	18.43	21.88	NOT DETECTED	2.36	NOT DETECTED
31.	17-07-2023	55.10	19.58	14.46	17.85	NOT DETECTED	1.13	NOT DETECTED

Continue…

Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	69.52	22.47	19.93	22.41	0.02	2.70	NOT DETECTED
33.	24-07-2023	73.38	25.79	21.31	25.05	0.10	3.16	NOT DETECTED
34.	27-07-2023	78.53	28.31	20.68	23.36	0.05	3.76	NOT DETECTED
35.	31-07-2023	65.27	24.65	17.21	21.10	0.03	2.57	NOT DETECTED
36.	03-08-2023	71.36	30.18	21.57	24.16	0.93	2.96	NOT DETECTED
37.	07-08-2023	78.65	32.38	22.96	26.02	0.97	3.36	NOT DETECTED
38.	10-08-2023	86.93	36.61	25.74	27.97	1.00	3.85	NOT DETECTED
39.	14-08-2023	81.27	34.06	23.58	26.19	0.95	3.04	NOT DETECTED
40.	17-08-2023	70.43	37.59	28.83	31.65	1.04	4.25	NOT DETECTED
41.	21-08-2023	76.53	38.83	31.25	35.61	1.10	4.63	NOT DETECTED
42.	24-08-2023	88.61	41.41	34.64	38.45	1.12	5.12	NOT DETECTED
43.	28-08-2023	82.37	37.49	30.91	33.78	1.00	4.73	NOT DETECTED
44.	31-08-2023	89.52	34.31	27.88	31.94	0.97	3.62	NOT DETECTED
45.	04-09-2023	78.35	31.56	23.73	26.38	1.00	4.37	NOT DETECTED
46.	07-09-2023	81.75	33.38	26.36	30.54	1.04	5.16	NOT DETECTED
47.	11-09-2023	76.38	30.61	22.95	25.17	1.00	4.58	NOT DETECTED

Continue…

Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	83.16	34.65	26.79	30.98	1.05	5.05	NOT DETECTED
49.	18-09-2023	72.48	27.89	21.56	24.35	0.92	3.13	NOT DETECTED
50.	21-09-2023	76.51	30.35	24.66	27.42	1.00	3.37	NOT DETECTED
51.	25-09-2023	81.49	32.78	27.90	31.67	1.05	4.26	NOT DETECTED
52.	28-09-2023	85.65	36.27	31.52	34.66	1.10	4.75	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-04-2023	81.59	32.37	12.74	18.52	0.47	--	NOT DETECTED
2.	06-04-2023	72.67	26.17	16.53	24.87	1.00	3.19	NOT DETECTED
3.	10-04-2023	79.71	28.64	11.77	15.14	0.69	3.47	NOT DETECTED
4.	13-04-2023	85.43	31.38	15.94	19.26	0.56	1.63	NOT DETECTED
5.	17-04-2023	74.71	24.15	10.68	14.83	0.45	1.29	NOT DETECTED
6.	20-04-2023	89.12	34.78	18.34	23.18	0.74	4.02	NOT DETECTED
7.	24-04-2023	70.88	25.12	13.28	17.85	0.38	3.27	NOT DETECTED
8.	27-04-2023	76.59	23.37	11.25	15.92	0.49	1.76	NOT DETECTED
9.	01-05-2023	89.16	32.08	14.56	18.34	1.12	2.85	NOT DETECTED
10.	04-05-2023	73.45	36.51	21.13	26.12	0.85	4.16	NOT DETECTED
11.	08-05-2023	86.54	28.12	15.76	19.58	1.00	3.31	NOT DETECTED
12.	11-05-2023	82.61	31.28	20.12	25.74	0.92	5.03	NOT DETECTED
13.	15-05-2023	85.47	38.64	23.12	27.89	1.00	4.58	NOT DETECTED
14.	18-05-2023	82.73	29.24	15.48	21.95	0.95	2.84	NOT DETECTED
15.	22-05-2023	74.91	25.10	12.46	16.32	1.07	2.36	NOT DETECTED

Continue…

Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	25-05-2023	69.55	22.47	14.36	17.85	0.90	2.14	NOT DETECTED
17.	29-05-2023	76.82	28.53	11.34	15.62	1.10	3.64	NOT DETECTED
18.	01-06-2023	83.49	34.61	17.32	22.92	1.00	3.70	NOT DETECTED
19.	05-06-2023	86.37	31.79	14.37	17.42	0.95	3.42	NOT DETECTED
20.	08-06-2023	81.94	27.37	12.47	16.33	0.07	3.10	NOT DETECTED
21.	12-06-2023	85.65	29.48	15.89	18.62	0.05	2.68	NOT DETECTED
22.	15-06-2023	72.56	25.14	13.21	17.25	0.02	2.55	NOT DETECTED
23.	19-06-2023	52.12	20.15	10.25	15.23	0.04	3.14	NOT DETECTED
24.	22-06-2023	54.12	17.25	9.25	14.30	0.05	2.36	NOT DETECTED
25.	26-06-2023	48.53	15.23	8.25	12.78	0.02	2.05	NOT DETECTED
26.	29-06-2023	45.25	14.28	7.60	11.21	0.05	2.54	NOT DETECTED
27.	03-07-2023	49.42	18.68	11.42	14.37	NOT DETECTED	--	NOT DETECTED
28.	06-07-2023	54.31	21.63	7.48	10.31	NOT DETECTED	NOT DETECTED	NOT DETECTED
29.	10-07-2023	46.78	17.42	6.30	8.54	NOT DETECTED	NOT DETECTED	NOT DETECTED
30.	13-07-2023	40.32	14.69	5.87	8.13	NOT DETECTED	NOT DETECTED	NOT DETECTED
31.	17-07-2023	43.25	15.74	7.53	12.74	NOT DETECTED	NOT DETECTED	NOT DETECTED

Continue…

Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	20-07-2023	51.99	17.53	10.18	13.89	NOT DETECTED	NOT DETECTED	NOT DETECTED
33.	24-07-2023	57.47	21.71	13.52	17.85	NOT DETECTED	NOT DETECTED	NOT DETECTED
34.	27-07-2023	49.74	18.63	11.57	14.38	NOT DETECTED	NOT DETECTED	NOT DETECTED
35.	31-07-2023	55.39	20.95	14.42	18.61	NOT DETECTED	NOT DETECTED	NOT DETECTED
36.	03-08-2023	57.93	22.48	14.23	19.45	NOT DETECTED	NOT DETECTED	NOT DETECTED
37.	07-08-2023	63.67	23.95	16.83	22.49	0.57	1.37	NOT DETECTED
38.	10-08-2023	69.72	25.65	19.70	25.18	0.84	1.95	NOT DETECTED
39.	14-08-2023	76.82	28.10	21.16	27.54	0.96	2.84	NOT DETECTED
40.	17-08-2023	88.54	31.79	18.28	23.93	0.73	3.16	NOT DETECTED
41.	21-08-2023	71.91	34.92	22.57	28.88	1.00	4.73	NOT DETECTED
42.	24-08-2023	76.48	37.63	25.91	31.45	1.13	5.28	NOT DETECTED
43.	28-08-2023	86.54	29.35	20.77	24.14	0.93	3.54	NOT DETECTED
44.	31-08-2023	81.38	26.59	17.24	23.45	0.81	3.12	NOT DETECTED
45.	04-09-2023	67.38	24.75	16.26	20.81	0.63	2.18	NOT DETECTED
46.	07-09-2023	73.26	27.42	18.91	23.74	0.74	2.65	NOT DETECTED
47.	11-09-2023	69.87	25.94	17.43	21.65	0.57	2.38	NOT DETECTED

Continue…

Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	14-09-2023	75.13	29.41	20.87	25.36	0.83	3.18	NOT DETECTED
49.	18-09-2023	63.69	21.83	14.27	18.50	0.41	1.86	NOT DETECTED
50.	21-09-2023	68.26	23.71	16.32	20.81	0.59	2.11	NOT DETECTED
51.	25-09-2023	72.47	24.60	17.91	22.53	0.80	2.87	NOT DETECTED
52.	28-09-2023	76.19	26.74	20.45	25.18	0.87	3.41	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)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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					
		20-04-2023	18-05-2023	19-06-2023	20-07-2023	21-08-2023	21-09-2023
1	06:00 to 07:00	63.5	62.9	64.4	61.2	60.6	66.4
2	07:00 to 08:00	66.8	65.4	68.8	63.8	62.7	63.8
3	08:00 to 09:00	69.7	63.7	65.3	64.8	65.3	65.7
4	09:00 to 10:00	66.1	66.7	68.5	61.3	63.1	67.4
5	10:00 to 11:00	68.9	65.4	62.3	65.7	64.8	68.1
6	11:00 to 12:00	64.6	68.2	66.1	66.9	65.1	69.4
7	12:00 to 13:00	63.8	65.1	61.8	64.2	66.4	68.6
8	13:00 to 14:00	61.7	68.3	65.5	64.9	65.3	67.5
9	14:00 to 15:00	66.9	67.5	68.5	68.7	67.1	69.1
10	15:00 to 16:00	65.8	62.7	64.5	63.6	64.6	67.4
11	16:00 to 17:00	63.7	61.9	68.3	61.9	62.6	66.3
12	17:00 to 18:00	62.6	63.5	65.6	68.4	67.5	64.2
13	18:00 to 19:00	67.4	66.1	67.2	63.6	63.6	67.4
14	19:00 to 20:00	69.6	67.8	68.5	62.7	64.7	65.4
15	20:00 to 21:00	65.3	59.4	66.7	64.8	62.3	62.8
16	21:00 to 22:00	63.1	58.5	62.8	61.3	60.2	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					
		20-04-2023	18-05-2023	19-06-2023	20-07-2023	21-08-2023	21-09-2023
1	22:00 to 23:00	61.9	62.8	63.7	56.5	58.1	62.1
2	23:00 to 24:00	62.8	60.4	61.6	57.2	60.1	60.5
3	24:00 to 01:00	60.5	59.4	60.8	55.5	56.4	58.6
4	01:00 to 02:00	59.6	60.2	62.9	55.2	58.4	59.3
5	02:00 to 03:00	58.5	61.3	59.8	54.1	56.3	61.2
6	03:00 to 04:00	59.7	60.4	59.3	59.5	57.2	60.8
7	04:00 to 05:00	60.5	60.5	58.5	60.2	59.3	58.2
8	05:00 to 06:00	59.6	62.8	58.1	58.4	56.2	61.9
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Noise Level Monitoring

Location Name		West Port – Horti Culture					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		24-04-2023	22-05-02023	22-06-2023	24-07-2023	24-08-2023	25-09-2023
1	06:00 to 07:00	62.8	63.5	63.9	60.8	61.8	65.7
2	07:00 to 08:00	63.5	62.8	69.2	63.6	64.2	66.5
3	08:00 to 09:00	64.5	64.5	67.8	68.2	67.1	68.3
4	09:00 to 10:00	66.9	63.5	69.5	68.8	65.8	65.7
5	10:00 to 11:00	66.5	62.8	68.5	69.1	68.4	66.8
6	11:00 to 12:00	66.7	60.5	69.1	67.4	64.7	68.5
7	12:00 to 13:00	68.5	65.3	67.5	69.3	64.8	64.9
8	13:00 to 14:00	65.6	62.8	66.9	67.5	66.2	65.3
9	14:00 to 15:00	65.2	64.2	67.2	68.6	68.3	65.9
10	15:00 to 16:00	68.2	61.8	65.5	62.4	63.7	67.6
11	16:00 to 17:00	64.2	60.5	68.2	62.1	63.9	67.1
12	17:00 to 18:00	67.2	65.8	64.7	67.8	64.8	65.8
13	18:00 to 19:00	66.5	68.9	63.2	64.3	62.9	66.8
14	19:00 to 20:00	68.5	69.5	58.5	67.8	64.6	67.4
15	20:00 to 21:00	63.2	64.3	58.3	67.2	63.8	64.5
16	21:00 to 22:00	59.7	62.1	59.5	64.9	63.7	61.7
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					
		24-04-2023	22-05-02023	22-06-2023	24-07-2023	24-08-2023	25-09-2023
1	22:00 to 23:00	60.5	62.5	61.6	63.9	61.9	58.4
2	23:00 to 24:00	59.5	61.9	60.5	64.2	64.7	58.9
3	24:00 to 01:00	60.5	62.8	59.5	61.7	63.8	60.2
4	01:00 to 02:00	58.1	60.5	62.8	62.5	64.8	61.4
5	02:00 to 03:00	60.5	59.6	60.5	61.3	62.5	63.7
6	03:00 to 04:00	62.3	62.5	59.6	64.2	60.2	60.1
7	04:00 to 05:00	59.5	62.8	57.8	63.9	61.7	59.7
8	05:00 to 06:00	60.6	61.7	60.2	60.1	58.9	60.3
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Noise Level Monitoring

Location Name		WEST PORT - PMC OFFICE					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		27-04-2023	25-05-2023	26-06-2023	27-07-2023	28-08-2023	28-09-2023
1	06:00 to 07:00	61.8	62.3	64.2	60.2	59.9	63.9
2	07:00 to 08:00	63.8	65.5	62.5	62.3	61.4	65.3
3	08:00 to 09:00	66.7	66.3	64.5	65.7	64.7	67.5
4	09:00 to 10:00	65.3	65.5	62.9	65.9	66.4	64.9
5	10:00 to 11:00	66.7	66.2	67.5	62.7	63.6	67.4
6	11:00 to 12:00	66.9	65.2	68.6	64.8	65.1	69.3
7	12:00 to 13:00	66.5	66.5	61.3	67.5	68.5	67.5
8	13:00 to 14:00	66.7	66.1	60.4	63.4	64.7	66.4
9	14:00 to 15:00	68.5	67.3	62.1	67.1	66.8	68.3
10	15:00 to 16:00	65.5	63.4	64	64.7	65.3	65.4
11	16:00 to 17:00	62.6	65.5	62.7	67.5	66.3	66.8
12	17:00 to 18:00	66.7	62.8	60.8	62.4	60.9	63.6
13	18:00 to 19:00	65.4	61.8	60.1	62.5	63.7	65.3
14	19:00 to 20:00	68.2	60.1	65.2	58.5	60.8	63.8
15	20:00 to 21:00	65.1	60.2	64.1	62.8	64.7	65.1
16	21:00 to 22:00	68.3	59.6	61.2	60.2	61.9	63.5
Day Time		<75 dB (A)					

Continue…

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

Location Name		WEST PORT - PMC OFFICE					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		27-04-2023	25-05-2023	26-06-2023	27-07-2023	28-08-2023	28-09-2023
1	22:00 to 23:00	63.8	58.2	62.5	61.3	63.1	61.2
2	23:00 to 24:00	64.1	57.5	62.3	60.8	61.4	63.5
3	24:00 to 01:00	61.9	55.2	62.3	63.6	63.8	62.1
4	01:00 to 02:00	62.4	64.2	61.9	62.8	62.9	62.9
5	02:00 to 03:00	63.9	62.8	61.8	55.1	58.7	61.5
6	03:00 to 04:00	60.4	62.5	60.4	55.8	56.4	59.7
7	04:00 to 05:00	62.3	60.8	60.5	59.5	58.3	56.3
8	05:00 to 06:00	58.7	61.2	58.1	59.3	55.7	59.7
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Noise Level Monitoring

Location Name		LPG Terminal Substation					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		17-04-2023	15-05-2023	14-06-2023	17-07-2023	17-08-2023	18-09-2023
1	06:00 to 07:00	60.7	64.5	61.5	63.2	62.9	63.7
2	07:00 to 08:00	62.8	63.3	66.7	67.7	66.4	65.2
3	08:00 to 09:00	67.3	65.5	68.5	68.5	65.8	67.5
4	09:00 to 10:00	63.9	63.2	65.5	62.9	62.6	64.8
5	10:00 to 11:00	63.7	61.9	66.1	68.6	66.3	65.6
6	11:00 to 12:00	66.8	62.5	60.6	62.4	62.4	66.3
7	12:00 to 13:00	64.1	64.2	61.8	63.8	64.7	67.2
8	13:00 to 14:00	63.8	68.5	62.5	67.1	65.1	64.8
9	14:00 to 15:00	67.3	66.2	63.2	64.8	64.8	67.4
10	15:00 to 16:00	65.4	65.2	65.4	67.5	65.9	64.8
11	16:00 to 17:00	62.9	66.5	66.4	68.3	68.1	65.8
12	17:00 to 18:00	64.1	66.1	62.6	62.5	64.3	67.4
13	18:00 to 19:00	63.8	63.5	65.5	66.8	65.4	66.8
14	19:00 to 20:00	66.9	66.1	63.1	64.1	62.5	63.5
15	20:00 to 21:00	63.5	67.8	61.8	63.8	64.6	61.9
16	21:00 to 22:00	61.3	62.4	60.9	60.9	62.4	63.5
Day Time		<75 dB (A)					

Continue...

Location Name		LPG Terminal Substation					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		17-04-2023	15-05-2023	14-06-2023	17-07-2023	17-08-2023	18-09-2023
1	22:00 to 23:00	59.6	61.9	64.6	58.5	60.7	58.4
2	23:00 to 24:00	60.3	62.7	64.1	56.8	62.8	61.3
3	24:00 to 01:00	63.5	63.8	63.8	59.3	64.1	64.1
4	01:00 to 02:00	62.4	62.5	63.4	59	62.8	63.5
5	02:00 to 03:00	60.2	62.8	62.7	57.8	59.8	56.8
6	03:00 to 04:00	64.2	61.7	59.7	56.3	60.5	58.1
7	04:00 to 05:00	58.2	60.5	58.5	59.7	61.8	57.8
8	05:00 to 06:00	62.1	61.2	58.6	61.1	59.5	60.5
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

Results of Noise Level Monitoring

Location Name		Adani Guest House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		28-04-2023	31-05-2023	28-06-2023	29-07-2023	29-08-2023	27-09-2023
1	06:00 to 07:00	62.9	62.5	58.5	59.4	57.3	58.4
2	07:00 to 08:00	64.2	63.5	60.5	62.7	60.4	60.3
3	08:00 to 09:00	62.5	62.8	62.5	65.4	63.8	66.4
4	09:00 to 10:00	63.6	64.5	63.5	63.7	61.8	63.7
5	10:00 to 11:00	60.6	63.5	62.8	62.1	63.7	64.2
6	11:00 to 12:00	63.5	62.8	64.5	64.5	66.8	66.4
7	12:00 to 13:00	63.5	60.5	63.5	64.7	67.3	67.1
8	13:00 to 14:00	66.7	65.3	65.3	62.8	63.7	63.2
9	14:00 to 15:00	65.5	62.8	62.8	61.1	62.1	65.7
10	15:00 to 16:00	68.2	64.2	64.2	64.8	65.8	64.2
11	16:00 to 17:00	64.5	61.6	61.7	63.9	65.7	65.9
12	17:00 to 18:00	66.7	58.7	59.5	63.3	61.9	63.2
13	18:00 to 19:00	62.4	60.5	58.9	67.5	65.6	60.5
14	19:00 to 20:00	61.5	58.7	61.8	64.7	62.3	64.2
15	20:00 to 21:00	63.2	56.3	59.4	62.4	61.9	59.5
16	21:00 to 22:00	61.7	54.9	58.5	62.5	60.3	57.6
Day Time		<75 dB (A)					

Continue...

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Location Name		Adani Guest House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		28-04-2023	31-05-2023	28-06-2023	29-07-2023	29-08-2023	27-09-2023
1	22:00 to 23:00	59.4	57.9	57.4	58.6	57.9	58.9
2	23:00 to 24:00	60.4	59.8	61.3	56.2	60.5	61.6
3	24:00 to 01:00	57.4	56.7	60.2	56.8	61.6	57.4
4	01:00 to 02:00	58.5	57.2	59.4	54.3	58.9	59.2
5	02:00 to 03:00	57.1	55.5	60.6	58.4	62.6	60.6
6	03:00 to 04:00	59.9	58.4	60.8	58.5	57.9	57.4
7	04:00 to 05:00	56.7	59.8	58.7	59.4	60.3	59.4
8	05:00 to 06:00	59.5	56.5	56.5	58.4	55.9	61.7
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		CT3 RMU-2					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		13-04-2023	11-05-2023	12-06-2023	13-07-2023	14-08-2023	14-09-2023
1	06:00 to 07:00	64.1	62.5	63.5	60.9	61.3	65.1
2	07:00 to 08:00	66.7	61.5	66.9	63.1	64.8	67.4
3	08:00 to 09:00	68.3	60.5	67.5	65.4	65.4	64.8
4	09:00 to 10:00	64.3	62.3	68.6	63.7	63.7	67.4
5	10:00 to 11:00	67.8	60.5	61.5	63.9	64.3	69.7
6	11:00 to 12:00	62.9	63.4	66.4	67.0	68.5	67.4
7	12:00 to 13:00	67.9	64.2	68.9	67.8	66.2	68.3
8	13:00 to 14:00	64.5	65.5	69.5	63.8	64.2	67.1
9	14:00 to 15:00	68.3	64.9	64.5	63.2	65.7	69.9
10	15:00 to 16:00	62.9	63.6	66.2	64.2	63.2	65.4
11	16:00 to 17:00	67.5	65.3	60.2	62.4	62.4	67.5
12	17:00 to 18:00	67.1	62.8	65.5	61.6	61.6	63.7
13	18:00 to 19:00	68.4	63.4	68.9	65.9	64.1	65.3
14	19:00 to 20:00	64.6	65.5	68.5	69.9	63.2	65.7
15	20:00 to 21:00	67.4	62.8	63.2	67.2	65.4	63.1
16	21:00 to 22:00	62.6	60.5	59.7	64.1	62.5	62.8
Day Time		<75 dB (A)					

Continue...

Location Name		CT3 RMU-2					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		13-04-2023	11-05-2023	12-06-2023	13-07-2023	14-08-2023	14-09-2023
1	22:00 to 23:00	62.8	62.5	60.5	60.3	62.4	60.1
2	23:00 to 24:00	60.4	62.3	59.8	63.2	64.8	63.5
3	24:00 to 01:00	59.4	62.3	59.8	61.7	63.8	62.7
4	01:00 to 02:00	58.8	61.6	60.3	62.1	61.7	60.2
5	02:00 to 03:00	59.8	57.8	58.5	60.4	62.7	57.6
6	03:00 to 04:00	58.5	55.9	60.5	64.5	59.4	59.3
7	04:00 to 05:00	57.5	55.5	60.5	62.5	60.3	60.4
8	05:00 to 06:00	58.9	58.2	59.4	58.4	58.1	59.8
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

Results of Noise Level Monitoring

Location Name		Near Fire Station					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		06-04-2023	04-05-2023	05-06-2023	06-07-2023	07-08-2023	07-09-2023
1	06:00 to 07:00	63.8	63.4	63.5	64.3	65.1	64.2
2	07:00 to 08:00	67.4	65.2	64.2	67.5	68.4	66.8
3	08:00 to 09:00	62.1	64.2	62.5	63.2	65.3	67.5
4	09:00 to 10:00	64.2	60.7	64.5	64.9	66.8	68.1
5	10:00 to 11:00	69.7	60.5	62.9	62.1	64.3	66.8
6	11:00 to 12:00	63.2	62.7	66.7	67.5	68.1	65.3
7	12:00 to 13:00	65.8	60.6	65.3	63.8	64.9	67.7
8	13:00 to 14:00	67.3	59.7	66.7	65.9	67.1	66.9
9	14:00 to 15:00	67.1	58.5	62.9	67.1	65.2	68.5
10	15:00 to 16:00	64.9	61.2	64.2	62.4	63.5	66.4
11	16:00 to 17:00	61.9	65.3	62.5	67.5	66.8	67.5
12	17:00 to 18:00	64.1	62.8	69.2	64.8	62.9	64.3
13	18:00 to 19:00	63.6	64.2	64.5	61.2	63.6	62.6
14	19:00 to 20:00	64.8	61.8	62.3	60.9	58.6	62.9
15	20:00 to 21:00	61.2	60.5	60.6	64.7	62.4	63.7
16	21:00 to 22:00	63.6	59.5	60.1	63.4	61.5	60.6
Day Time		<75 dB (A)					

Continue...

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Location Name		Near Fire Station					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		06-04-2023	04-05-2023	05-06-2023	06-07-2023	07-08-2023	07-09-2023
1	22:00 to 23:00	58.2	61.8	60.1	60.3	61.5	55.4
2	23:00 to 24:00	56.9	64.5	59.7	61.8	59.7	59.2
3	24:00 to 01:00	57.2	63.9	60.5	62.8	61.8	63.5
4	01:00 to 02:00	60.2	64.5	54.2	60.7	62.9	62.8
5	02:00 to 03:00	57.6	57.5	64.5	61.4	60.3	60.2
6	03:00 to 04:00	55.3	59.2	57.8	63.6	62.4	57.3
7	04:00 to 05:00	55.5	60.5	56.2	64.5	60.1	55.4
8	05:00 to 06:00	57.8	62.5	58.9	62.7	59.5	59.3
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

Results of Noise Level Monitoring

Location Name		ADANI PORT – TUG Berth 600 KL Pupm House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		10-04-2023	08-05-2023	08-06-2023	10-07-2023	10-08-2023	11-09-2023
1	06:00 to 07:00	61.3	61.5	62.6	62.7	63.7	63.8
2	07:00 to 08:00	64.9	60.5	68.3	65.4	66.2	65.3
3	08:00 to 09:00	63.2	62.3	64.2	63.9	66.9	67.1
4	09:00 to 10:00	67.4	60.5	69.8	67.0	68.4	66.8
5	10:00 to 11:00	65.9	63.4	62.2	67.8	65.4	68.4
6	11:00 to 12:00	63.5	64.2	68.8	63.8	62.5	65.2
7	12:00 to 13:00	61.3	69.5	65.2	63.2	61.8	66.8
8	13:00 to 14:00	64.8	69.2	66.1	62.4	64.6	65.3
9	14:00 to 15:00	69.5	69.5	60.6	62.5	63.2	68.3
10	15:00 to 16:00	66.3	68.2	61.8	67.1	66.9	67.2
11	16:00 to 17:00	68.1	67.5	62.5	63.9	65.3	69.2
12	17:00 to 18:00	59.8	68.5	63.2	64.2	65.1	67.4
13	18:00 to 19:00	64.9	64.2	65.4	62.6	64.7	63.8
14	19:00 to 20:00	63.2	61.8	62.1	63.3	63.6	63.5
15	20:00 to 21:00	64.6	60.1	60.2	66.1	64.5	62.6
16	21:00 to 22:00	60.1	63.5	58.9	59.9	60.1	61.3
Day Time		<75 dB (A)					

Continue...

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Location Name		ADANI PORT – TUG Berth 600 KL Pupm House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		10-04-2023	08-05-2023	08-06-2023	10-07-2023	10-08-2023	11-09-2023
1	22:00 to 23:00	60.6	57.5	61.9	63.9	60.8	57.7
2	23:00 to 24:00	60.5	55.6	62.7	62.3	61.8	60.1
3	24:00 to 01:00	56.7	57.2	63.8	55.3	63.8	61.4
4	01:00 to 02:00	63.5	55.8	64.5	58.3	62.1	61.9
5	02:00 to 03:00	62.8	54.2	60.5	56.5	58.3	58.3
6	03:00 to 04:00	64.5	54.9	63.2	58.8	56.9	55.2
7	04:00 to 05:00	62.3	61.2	60.4	60.7	59.1	56.7
8	05:00 to 06:00	61.5	59.5	60.1	60.1	57.3	58.6
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Noise Level Monitoring

Location Name		PUB/Adani House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		03-04-2023	01-05-2023	01-06-2023	03-07-2023	03-08-2023	04-09-2023
1	06:00 to 07:00	67.5	61.9	61.3	62.5	60.5	62.8
2	07:00 to 08:00	63.2	63.5	63.5	60.9	62.7	63.9
3	08:00 to 09:00	67.4	66.1	66.7	63.2	64.1	65.3
4	09:00 to 10:00	64.8	67.8	67.5	67.4	65.4	63.7
5	10:00 to 11:00	65.3	62.4	68.6	65.2	68.4	63.1
6	11:00 to 12:00	69.1	65.4	61.5	68.9	67.3	64.7
7	12:00 to 13:00	67.4	63.9	66.4	64.8	63.2	66.1
8	13:00 to 14:00	66.9	64.5	68.9	62.3	62.3	63.7
9	14:00 to 15:00	68.4	64.3	66.7	68.6	65.8	64.6
10	15:00 to 16:00	65.7	65.8	67.1	61.2	60.3	62.8
11	16:00 to 17:00	62.7	69.4	68.5	67.2	64.3	64.1
12	17:00 to 18:00	65.9	65.4	68.5	65.5	66.7	65.3
13	18:00 to 19:00	61.5	66.1	66.9	63.4	62.4	62.7
14	19:00 to 20:00	64.6	63.8	62.5	64.7	63.8	63.2
15	20:00 to 21:00	63.6	63.5	63.3	61.4	60.4	64.6
16	21:00 to 22:00	64.9	62.6	58.9	60.1	59.7	61.4
Day Time		<75 dB (A)					

Continue...

Location Name		PUB/Adani House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		03-04-2023	01-05-2023	01-06-2023	03-07-2023	03-08-2023	04-09-2023
1	22:00 to 23:00	58.6	58.5	60.2	56.8	58.2	56.8
2	23:00 to 24:00	57.5	58.3	62.5	59.4	60.1	56.9
3	24:00 to 01:00	58.2	57.5	60.4	60.2	60.7	58.4
4	01:00 to 02:00	56.9	57.8	60.4	57.1	58.3	61.3
5	02:00 to 03:00	58.5	55.9	60.5	57.3	57.3	59.7
6	03:00 to 04:00	57.5	55.5	59.6	62.9	59.4	55.4
7	04:00 to 05:00	56.5	58.2	58.5	60.2	61.2	58.2
8	05:00 to 06:00	57.2	57.5	59.7	59.8	57.3	56.1
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring

Sr. No.	Parameter	Unit	Sep – 2023		GPCB LIMIT	Method of Test
			D.G.Set No. S-1 (1500 KVA)	D.G.Set No. S-2 (1500 KVA)		
			15-09-2023	15-09-2023		
1	Particulate Matter	mg/Nm^3	21.89	21.37	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO_2	ppm	17.57	17.11	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NO_X	ppm	23.41	22.65	**50**	**IS 11255 (Part - 7)**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Stack Monitoring								
Monitoring Peridod: April - 2023 to September - 2023								
Sr. No.	Parameter	Unit	D.G. Set-6, 7 & 8 (1250 KVA - CT2) Common Stack	D.G. Set-9 (1500 KVA - CT3)	D.G. Set-10 (1500 KVA - CT3)	D.G. Set-11 (1500 KVA - CT3)	GPCB LIMIT	Method of Test
			Sep-23	Aug-23				
			22-09-2023	04-08-2023	04-08-2023	04-08-2023		
1	Particulate Matter	mg/Nm3	25.48	18.42	20.81	19.32	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO2	ppm	9.96	15.27	17.65	15.75	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NOX	ppm	19.32	27.58	29.14	22.49	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	4.19	4.1	3.8	3.6	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	UERL/AIR/SOP/27

Sr. No.	Parameter	Unit	D.G. Set-12 (1500 KVA) - CT4	D.G. Set-13 (1500 KVA) - CT4	D.G. Set-14 (1500 KVA) - CT4	D.G. Set-1 (500 KVA) - DG House - MPT	GPCB LIMIT	Method of Test
			Aug-23					
			05-08-2023	05-08-2023	05-08-2023	06-08-2023		
1	Particulate Matter	mg/Nm3	24.39	27.83	21.95	22.74	150	IS 11255 (Part - 1)
2	Sulfur Dioxide as SO2	ppm	9.65	9.96	9.34	8.58	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NOX	ppm	21.26	23.54	19.11	28.63	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	3.8	5.12	4.1	3.16	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	UERL/AIR/SOP/27

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Sr. No.	Parameter	Unit	D.G. Set-2 (500 KVA) - DG House - MPT	D.G. Set-3 (500 KVA) - DG House - MPT	D.G. Set-4 (500 KVA) - DG House - MPT	D.G. Set-5 (500 KVA) - DG House - MPT	GPCB LIMIT	Method of Test
			Aug-23					
			06-08-2023	06-08-2023	06-08-2023	06-08-2023		
1	Particulate Matter	mg/Nm3	26.35	23.74	28.53	22.61	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	7.26	9.89	9.48	8.48	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	30.41	29.38	29.61	26.54	**50**	**IS 11255 (Part - 7)**
4	Carbon Monoxide	mg/Nm3	3.93	5.12	5.84	3.91	--	**UERL/AIR/SOP/18**
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	**UERL/AIR/SOP/27**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring

Monitoring Peridod: April - 2023 to September - 2023

Sr. No.	Parameter	Unit	Hot Water System-1 (Liquid Terminal)	Hot Water System-2 (Liquid Terminal)	Thermic Fluid Heater (Bitumin-1)	Thermic Fluid Heater (Bitumin-2)	GPCB LIMIT	Method of Test
Apr-23								
1	Particulate Matter	mg/Nm3	22.86	19.76	21.38	19.06	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	6.10	6.53	8.69	8.17	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	19.34	21.84	20.17	21.35	**50**	**IS 11255 (Part - 7)**
May-23								
1	Particulate Matter	mg/Nm3	20.15	19.14	22.85	21.35	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	6.38	6.23	7.46	8.68	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	21.64	20.37	18.87	22.31	**50**	**IS 11255 (Part - 7)**
Jun-23								
1	Particulate Matter	mg/Nm3	21.35	16.39	21.13	21.87	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	8.68	6.57	7.28	8.90	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	22.31	19.36	19.45	21.18	**50**	**IS 11255 (Part - 7)**
Jul-23								
1	Particulate Matter	mg/Nm3	21.87	17.68	19.52	20.75	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	8.90	5.95	5.79	7.59	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	21.18	16.26	16.41	19.63	**50**	**IS 11255 (Part - 7)**
Aug-23								
1	Particulate Matter	mg/Nm3	19.18	20.15	22.37	23.61	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	8.10	6.08	8.13	9.82	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	22.85	18.57	20.42	22.45	**50**	**IS 11255 (Part - 7)**
Sep-23								
1	Particulate Matter	mg/Nm3	17.84	18.93	20.47	21.11	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO2	ppm	7.65	6.00	7.28	9.20	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NOX	ppm	21.10	17.26	18.57	19.89	**50**	**IS 11255 (Part - 7)**

Sr. No.	Parameter	Unit	Sep-23	GPCB LIMIT	Method of Test
			D.G. Set-1 (2000 KVA)		
			22-09-2023		
1	Particulate Matter	mg/Nm3	26.24	**150**	**IS 11255 (Part - 1)**
2	Sulphur Dioxide	ppm	11.97	**100**	**IS 11255 (Part - 2)**
3	Oxide of Nitrogen	ppm	23.17	**50**	**IS 11255 (Part - 7)**
4	Carbon Monoxide	mg/Nm3	4.38	--	**UERL/AIR/SOP/18**
5	Non Methyl Hydro Carbon	ppm	Not Detected	--	**UERL/AIR/SOP/27**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

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 ^{0}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	--	--

Annexure – 7

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN, SECTOR 10-A,
GANDHINAGAR - 382010,
(T) 079-23232152

By R.P.A.D.

NO: PC/ CCA- KUTCH-39(8)/ GPCB ID: 17739/748148 Date: -18/07/2023

Correction in Consolidated Consent & Authorization order no AWH-117045 date of issue 09/03/2022 (Under the provisions/rules of Environmental acts)

To,
M/s. Adani Ports & Special Economic Zone Limited,
Plot no. 169/P, At Navinal Island,
Tal: Mundra,
Dist: Kutch - 370 421.

Subject : Correction of Consolidated Consent and Authorization of this Board.
Reference : 1. This office has issued CCA order no. **AWH—117045** issued vide order no. GPCB/CCA-KUTCH-39(7)/ ID-17739/625051 dated 09/03/2022.
2 Your application CTN inward ID 7001067 dated 30/03/2022.

In exercise of the power conferred under section-27 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous & Other Waste (Management &Transboundary Movement) Rules-2016 & as amended framed under the Environmental (Protection) Act-1986 and without reducing your responsibility under the said Acts/Rules in anyway. The Board had granted CCA vide order no. **AWH – 117045** issued vide letter no. GPCB/CCA-KUTCH-39(7)/ ID-17739/625051 dated 09/03/2022.

And whereas Board is empowered to amended/ corrected consent order conditions. Accordingly, considering your request for correction in the said CCA order vide CTN inward ID 7001067 dated 30/03/2022, the said CCA order no. AWH-117045 is hereby corrected/ amended as below;

1. **The condition no. 3.5 of the said order is amended as below:**
   3.5 The quantity of domestic waste water shall not exceed 263 KL/Day.
2. **The condition no. 5.2 of the said order is amended as below:**
   5.2 **M/s. Adani Ports & Special Economic Zone Ltd.,** is hereby granted an authorization based on the enclosed signed inspection report for generation, collection, treatment, storage, transport of hazardous waste on the premises situated at **Plot no. 169/P, At Navinal Island, Taluka: Mundra, Dist: Kutch.**

Sr. No.	Waste	Quantity per Annum	Schedule &Category	Facility
1	Used/ Spent Oil	360 MT	I- 5.1	Collection, storage, Transportation, Disposal by selling out to registered recyclers/ reprocessor and/ or reuse within premises.
2	ETP Sludge	109.5 MT	I-35.3	Collection, storage, Transportation & disposal by sent out for co processing at cement industries and/ or CHWIF site.

3	Sludge & filters contaminated with oil	5 MT	I-3.3	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site
4	Waste Residue containing Oil/ oily rags	150 MT	I-33.2	Collection, storage, Transportation & disposal by sent out for co processing at cement industries and/ or CHWIF site.
5	Pig Waste	24 MT	I-3.1	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site
6	Tank Bottom sludge	Whatever Quantity generated	I-3.2	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site/ or recycling to registered recycler.
7	Discard containers/ barrels	25 MT	I-33.3	Collection, storage, Transportation, Disposal by reuse within premises and / or selling out to registered decontamination.
8	Asbestoses Waste	Whatever Quantity generated	I-15.1	Collection, storage, Transportation, Disposal at CHWIF site.
9	Glass Wool Waste	Whatever Quantity generated	II/C-9	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or incineration at CHWIF site and / or recycling through registered recycler.
10	Downgrade Chemical	Whatever Quantity generated	I-20.2	Collection, storage, Transportation, Disposal by reuse within premises and / or selling out to authorized solvent recover.
11	Waste Oil	1,80,000 MT (0.18 MMTA)	I-5.2	Collection, storage, Transportation,, Disposal by selling out to registered recyclers
12	Expired Paint Material	10 MT	I-21.1	Collection, storage, Transportation, Disposal by co-processing at cement industries and/or CHWIF site

3. Rest of conditions of CCA order no. AWH—117045 issued vide order no. GPCB/CCA-KUTCH-39(7)/ ID-17739/625051 dated 09/03/2022 shall remain unchanged & industry shall comply with the same judiciously.

For and on behalf of
Gujarat Pollution Control Board

(T.C. Patel)
Unit Head

Annexure – 8

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2021 – 22	2022 – 23	2023 – 24 (till Sep'23)	2023 – 24
1.	Environmental Study / Audit and Consultancy	6.82	7.32	16.19	27
2.	Legal & Statutory Expenses	10.52	12.32	00	13
3.	Environmental Monitoring Services	14.31	15.32	5.08	19.20
4.	Hazardous / Non-Hazardous Waste Management & Disposal	107.09	104.035	65.81	148.68
5.	Environment Days Celebration and Advertisement / Business development	4.04	2.53	2.30	11.50
6.	Treatment and Disposal of Bio-Medical Waste	2.14	2.29	1.14	2.28
7.	Mangrove Plantation, Monitoring & Conservation	53.6	35.0	0	15.0
8.	Other Horticulture Expenses	921	956	628	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	79.73	212.9
10.	Expenditure of Environment Dept. (Apart from above head)	149.8	90.136	25.228	182.917
	Total	**1371.79**	**1366.28**	**823.48**	**1536.48**

Annexure – 9

adani
Ports and Logistics

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.	All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. Please refer condition no. 8 & 9 of the CRZ recommendation compliance report for further details.
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.	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. Please refer general condition no. ii of the EC & CRZ clearance for further details.
✍ **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.	Entire quantity of sewage generated from APSEZ premises is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
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.	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. Adequate safeguard measures are being taken for abatement of dust emissions.

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

ON SITE EMERGENCY PLAN

AUGUST 2023

PRODUCER

ADANI PORTS AND SEZ LTD

P.O Box No: 1, Mundra - 370421
(KUTCHH)

:: COMPILED BY ::

M.J.PATEL & ASSOCIATES
HAPPY ASSOCIATES
DISH approved Comp.Persons & Safety Proffessionals
6-A, NEW RANGSAGAR SOCIETY, NEAR GOVT. TUBE WELL, BOPAL, AHMEDABAD - 380058, MOB: 9825060783

INDEX
SECTIONS: 1 CHAPTERS - I TO VI

SECTION – II : ANNEXURES 1 TO 33

ANNEXURES		PAGE NO.
25. Other Arrangements	…	167
26. Alarms & Sirens	…	168
27. Internal Phones	…	170
28. External Telephone Numbers	…	172
29. Nominated Persons to declare Major Emergency	…	173

PREFACE

Adani Port Mundra is the seamless integration of 3 verticals consisting of Ports, Logistics and Special Economic Zone. APSEZ Mundra with the flagship port in the Gulf of Kachchh, is India's largest commercial port. Adani Port handles a wide variety of cargo ranging from coal, crude, containers to fertilizers, agri products, steel & project cargo, edible oil, chemicals, automobiles etc. A corporate agenda for APSEZ is to deliver overarching principle of tipple bottom-line. Adani Ports is striving to become Green Port by managing port operations and services responsibly, creating safe, secure and eco-friendly working environment.

Adani Port - Mundra has infrastructure to handle containers Pan-India. We have container terminals operational. Deep draft berth facilitates berthing of largest container vessels arriving at the ports and best-in-class infrastructure ensures world class productivity, fast turnaround of vessels and efficient evacuation of containers from the port.

The Port operates two Single Point Mooring (SPM) facilities to evacuate imported crude oil. These SPMs can handle Very Large Crude Carriers (VLCC) and Ultra Large Crude Carriers (ULCC) up to 360,000 DWT. The crude is transported to refineries in North India through cross country pipeline network.

Adani Port - Mundra has capabilities and infrastructure to handle liquid cargo at Mundra. Multiple berths are equipped with different types & sizes of pipelines from jetty to tank farm to ensure safe and efficient handling of liquid products in big parcels. The tank farms can store multiple types of liquid cargo including vegetable oil, chemicals & petroleum, oil & lubricants (POL) products. The infrastructure at the Liquid terminal ensures best in class storage, safe and contamination free handling of liquid cargo.

Adani Port - Mundra is equipped with adequate infrastructure to handle coal. **Adani Port** handle all types and grades of coal including steam coal, imported coking coal & thermal coal, sourced from domestic sources. It has installed high speed ship unloaders / mobile harbour cranes for faster discharge of coal cargo and mechanized storage yards & integrated conveyor system to handle huge volumes of coal cargo.

Adani Port - Mundra is well equipped to handle minerals. Minerals & related cargo including Bauxite, Bentonite, Cement, Clay, Industrial salt, Iron ore fines, Rock phosphate and Gypsum, amongst others are handled here. Dedicated infrastructure, including specially demarcated concrete storage yards ensure zero ground loss. All necessary measures, with regards to equipment & storage are taken to ensure that there is no cargo loss or contamination.

Adani Port - Mundra has excellent capabilities to handle agri- cargo. Agri-commodities handled at the port include Yellow Peas, Chick Peas, Sugar, Wheat, de-oiled cakes, Barley, Sorghums, Maize & Rice, among others. Stringent standards concerning handling of Agri-products are followed at the port. Separate dedicated berths and specialized facilities ensure clean and contamination free handling of Agri-cargo along with abundant storage facilities and labour. Rail connectivity ensures that imported Agri-cargo is transported to distant areas within the country.

Adani Port - Mundra has capabilities and infrastructure to handle fertilizers. The fertilizers handled here include all types and grades including Granular Urea, Prilled Urea, DAP, DAP Lite, MOP Red, MOP White, NP, NPK etc. The Port team understands the delicate nature of fertilizer cargo and therefore employs the best method to handle fertilizer cargo, even during the peak season, ensuring full customer satisfaction. Dedicated berths, dedicated fleets of equipment's, abundant covered storage facilities and adequate labour are available for handling fertilizer cargo at Mundra has state-of-the-art dedicated mechanized infrastructure for handling fertilizer cargo which is capable of loading ten rakes daily.

Adani Port - Mundra can capably handle all types & grades of steel cargo including Plates, Beams, Coils, Pipes, Slabs, Bars, Billets & over dimension Steel Plates / Beams or Pipes, amongst others, requiring specialized operations. The Mundra port has state-of-the-art technology Goliath cranes attached with vacuum lifters for scratch free handling of quality sensitive cargo and a best-in-class steel yard spread across 1.5 lacs sq. mtrs to handle 6 MMT/ year.

Adani Port - Mundra has the requisite infrastructure to handle project cargo. We are specialized in handling over-sized and overweight project cargo. The port has loaded / discharged, heavy/oversized machinery / equipment like Boilers, Rail Wagons (of Delhi metro), Heavy Transformers, complete Windmills and Heavy Machineries.

Adani Port - Mundra has the perfect infrastructure to handle timber. The port handles timber logs of different kinds for different customers. It has earmarked a storage area capable of 350,000MT timber storage.

Mundra port established the RoRo terminal in 2009 and since then has been serving as a gateway port for automobile companies situated in Delhi NCR, Rajasthan and Gujarat region. Mundra port handles exports of Cars, Buses, and Trucks.

Adani Port - Mundra is committed to uphold high standards of health and safety practices far beyond satisfying legal or regulatory requirements & promoting a culture seeking continuous improvement in the Health & Safety performance of the organization.

In view of presence of various materials handled, hazardous nature of liquids, due to situation of the port, various types of hazards exist in handling, storage and logistic activities. Hence, it is desirable and also statutory to prepare an emergency action plan for any emergency which may affect plant personnel, property as well as neighbouring areas and population.

Therefore, we have prepared this book which incorporates all required matters along with on site emergency plan. Our safety policy dictates that we will take all precautions and preventive steps to see that our workers carry out their job in a safe and healthy working condition. We have taken reasonably practicable preventive measures to avoid any accident. Necessary testing, checking, inspections, maintenance are carried out regularly.

It is also obvious that systematic and methodical action in any emergency would reduce and mitigate risk to life, property not only of the port but also of the surrounding area and environment. This on site emergency plan is prepared to carry out a systematic and methodical action in the event of any emergency. It gives different pre-emergency, emergency time and post emergency actions to be taken in a planned way. Such actions would go a long way in preventing or mitigating risk to life, environmental and property in emergency.

We are responsible to carryout planning and do everything reasonably practicable to comply with requirements of this plan and revise and amend from our experience. This plan will also be circulated to all senior personnel for their knowledge, information and subsequent action.

For **ADANI PORT & SEZ LTD.** MUNDRA

(Auth.Sign)

(This emergency action plan has been prepared for **Adani Port, Mundra** as per the guidelines laid down by the office of Director, Industrial Safety & Health. The source of data regarding Gas Dispersion and other information is based upon the book of Major Hazard Control – published by International Labour Organization).

CHAPTER–1

PRELIMINARY

CONTENTS

1.0 INTRODUCTION OF THE PLAN

Today in this world many kind of chemicals, oils, minerals & materials are handled & transported in enormous quantities, probably beyond safe manageable levels and that too in many cases with record speed. People working in ports & industries, storing, handling, transporting and using various chemicals & other material are constantly exposed to hazards like fire, explosion, toxic gas releases, spillage of dangerous substances, exposure etc. Disaster means accidents causing catastrophic situation, in which day to-day pattern of life is in many instances, suddenly disrupted and people are plunged into helplessness and suffering, as a result need protection, clothing, shelter, medical and social care and other necessities of life. Disaster may occur by natural phenomena, by man or by mans impact upon the environment.

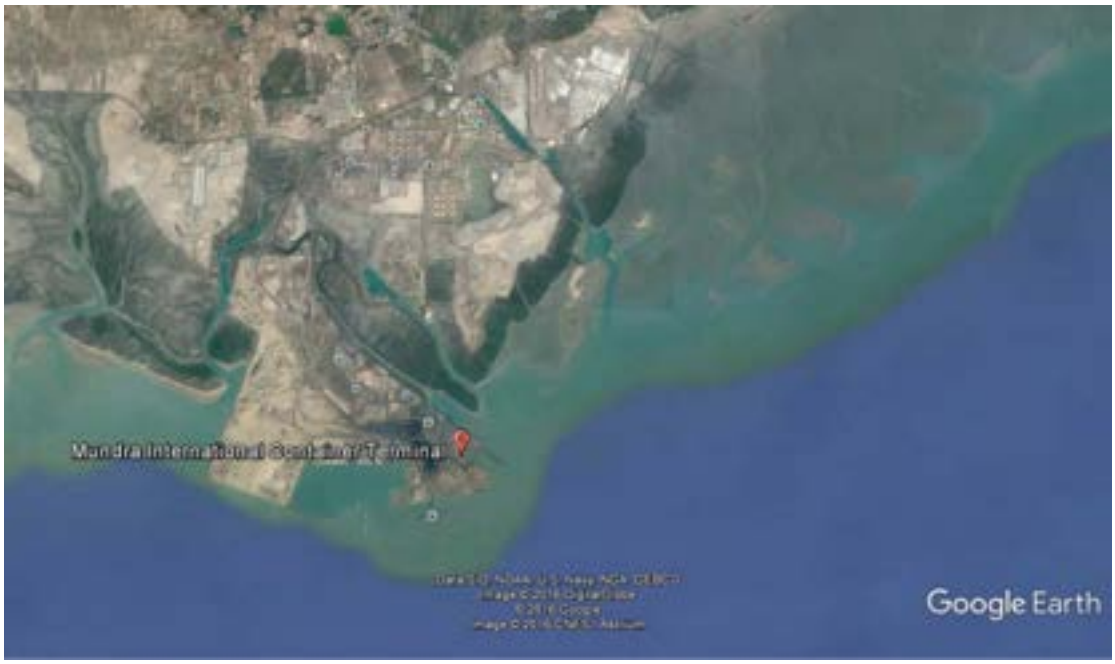
This emergency action plan has been prepared based upon the specific needs of the site for dealing with those emergencies which, it is foreseen, may still arise despite taking of all reasonably practicable precautions. An emergency element of the plan must be the provision to attempt to make safe the port. Emergency incidents considered are ranging from small event which can be dealt with by port personnel, without the help of outside services to the worst event which involves outside public, emergency services agencies etc. This plan is in two sections; the first section explains basic requirements as below:

A – Definitions
B – Objectives
C – Hazard identification
D – Risk analysis and environmental impact
E – Organizational set-up
F – Communication system
G – Action on-site
H – Off-site emergency plan
I – Training, rehearsal and record aspect

The second section is annexure section. This 33 number annexure are designed to give specific information required during emergency. A considerable time can be saved due to handy information at the time of emergency. This information can also be helpful to the government in preparing district contingency plan.

1.1 IDENTIFICATION OF THE FACTORY

Adani Port at Mundra consisting of Ports, Logistics and Special Economic Zone. APSEZ handles a wide variety of cargo ranging from coal, crude, containers to fertilizers, agri products, steel & project cargo, edible oil, chemicals, automobiles etc.



Adani Port near Mundra is 7 Kms from the town of Mundra which is about 9 km from the Gulf of Kachchh, the ancient Mundra Town is the headquarter of the Mundra Taluka, about 70 km away form the Dist. Headquarter of Bhuj, Dist. Kachchh. Mundra is directly linked to the National Highway NH-8A (ext.), State Highway SH-6 and SH-48. Gandhidham railway station is the nearest passenger rail head 50 km away. Mandavi airstrip (about 30 km), Kandla airstrip (about 45 km) and Bhuj Airport (about 70 km) are the airstrips/airports in the vicinity. Mundra was a small town with agriculture and minor commerce dominating its socio-economic character about a decade back. Mundra was devastated like other towns and villages in the earthquake that struck Kuchchh on January 26, 2001. With the reconstructive spirit of the people and economic incentive packages given by the Govt. of Gujarat as well as Govt. of India for the Kachchh distt., Mundra is now witnessing a spate of industrial activity. The industrial and entrepreneurial potential of the town started unfolding with the Adani Group setting up its Port on the Mundra sea front in 1998.

IDENTIFICATION

Port Commissioned :	1998
Port & APSEZ area:	Mundra SEZ - 18000 ha, Notified SEZ area 8481.2784 ha.
Village :	Mundra
Nearest City:	Bhuj
Nearest Railway station	Bhuj, 6 0 Km
Nearest Airport	APSEZ Private Airstrip

SITE LOCATION		
State		Gujarat State
Nearest Important Town & Distance		Mundra – 10 Kms
Nearest Railway Station & Distance		Gandhidham – 50 Kms
Nearest Port & Distance		Kandla Port Trust - 60 Kms
Nearest Airport & Distance		Mandavi airstrip (about 30 km), Kandla airstrip (about 45 km) and Bhuj Airport (about 70 km) are the airstrips/airports in the vicinity
Nearest Highway Milestone & Distance		National Highway 8A Extn. & State Highways 6 & 48.
Approach Road		4-Lane Rail-over-Bridge to ensure that two modes of transportation i.e. road & rail, do not impede each other‘s movement.
GEOGRAPHICAL DATA		
Height above mean sea level		14 meter
Site characteristics (Terrain Type)		Coastal Area
Location of APSEZ		Geographically, located between 22°.4451.73 North latitude and 69°.41.41.60 East Latitude
Seismic Zone		Zone 5, as per IS : 1893 -2002
METEOROLOGICAL DATA		
Climate of Area		Dry, Arid Coastal Climate
Highest Daily maximum Temperature		46.1 °C
Max. dry & wet bulb temperature		37.7 / 26.8 °C
Wind Regime		Summer - SW & W, Monsoon - SW, Winters - N, NW
Annual Rainfall		268.5 mm
Visibility		Good through out of the year
Relative Humidity %		
	Max	80
	Min	22
Wind Velocity Average		32.4 km/hr study period (Dec-05 to Feb 06).

Wind Velocity	Max	90 Km/ hr
Wind velocity during monsoon		50 KM/hr
WATER SUPPLY		
Source of Water		Well nearby area.

Adani Port - Mundra is committed to uphold high standards of health and safety practices far beyond satisfying legal or regulatory requirements & promoting a culture seeking continuous improvement in the Health & Safety performance of the organization.

Annexure – 1 attached in the report gives remaining detail of the port such as name of the occupier, manager, with their residence address and telephone numbers. Persons to be contacted in respective shifts etc. is mentioned. We have for our all the activities made the identification of hazards and relevant actions are taken as stated in Chapter – 2 of this plan.

1.2 MAP OF THE AREA

A map of the surrounding area of our Port & SEZ is enclosed marked as Annexure – 2, showing following locations of port such as:

- **A.** Exact location of the Port & SEZ
- **B.** Surrounding area
- **C.** Approach roads
- **D.** Off-site emergency services
- **E.** Company owned Fire Station, Police Station
- **F.** North direction

This map is useful to know the surrounding area, location of above facilities in advance and identify the area which could be affected due to an emergency, if turned into off-site emergency and if evacuation of workers and others is necessary. Another map is attached marked as **Annexure – 3, Factory layout** showing all vital detail of the unit such as (1) Hazardous storage & process area (2) Other Process Plants Departments & Machines (3) Location of Assembly points (4) location of Emergency Control Centre (5) location of firefighting equipment's, entry, exit gates etc.

1.3 IMPORTANT DEFINITIONS

All important definitions stated in the guidelines by DISH, are adhered to in preparation of this plan. These definitions are accepted by all the concerned government, semi-government bodies and institutions as mentioned relevant to the emergency planning.

1.4 ABOUT OBJECTIVES OF THE EMERGENCY PLAN

An emergency cannot always be prevented but controlled within limits and its effects minimized by using the best available resources at the time. Emergency planning is a management function and it should not be considered in isolation. Management should evaluate the activities, operations and process carried out within the works before starting to plan an emergency operation.

A check must be made to ensure that all required steps have already been taken are included in emergency planning. Considering the number of employees, material and process, availability of resources, location of site, size and complexity of the works, we have prepared this plan. In this plan, we have given clear instructions without overlap or confusion for all concerned staff members. The same details are prepared as per annexures.

In spite of various preventive and precautionary measures taken in the plant, the possibility of a mishap cannot be totally ruled out. Hence, the need to prepare a Contingency Plan for dealing with incidences which may still occur and are likely to affect LIFE and PROPERTY both within the plant and in the immediate neighbourhood.

Such an emergency could be the result of malfunction of the Plant & Equipment or non-observance of operating instructions. It could, at times, be the consequence of acts outside the control of plant management like severe storm, flooding, or deliberate acts of arson or sabotage.

OBJECTIVES OF THE PLAN

1. To control the emergency, localize it and if possible eliminate it.
2. To avoid confusion, panic and to handle the emergency with clear cut actions.
3. To minimize loss of life and property to the plant as well as to the neighbourhood.
4. To make head count and carry out rescue operations.
5. To treat the injured persons.
6. To preserve records and to take steps to prevent recurrence.

7. To restore normalcy.

The **On Site Emergency Plan (OSEP)** explains the code of conduct of all personnel in the plant along with the actions to be carried out in the event of an Emergency. This plan gives the guidelines for employees, contractors, transporters, etc. It not only defines responsibilities but also inform about prompt rescue operations, evacuations, rehabilitation, co-ordination and communication.

EMERGENCY

An emergency is a situation which may lead to or cause large scale damage or destruction of life, property or environment within or outside the factory. Such an unexpected situation may be too difficult to handle for the normal work-force within the plant.

NATURE OF EMERGENCY

The emergency specified in the OEP refers to the occurrence of one or more of the following events:

1. Fire/Explosion
2. Major accident such as structural or building collapse, overturning of road tanker containing chemicals.
3. Natural calamities like storm, flood, earth quake, etc.
4. Sabotage act of terrorism, civil commotion, air raid etc.

On Site Emergency Plan (ONLY PORT AREA)
Adani Ports and Special Economic Zone Limited
Code for Declaration of Emergency
Siren for one minute followed by 5 sec gap repeated four times.
Code for Declaration of All Clear
Continuous siren for two minute
Schedule of Siren Testing
4th and 19th Every Month – 1000 hours (Port) & 1100 hours (West Basin)

CONTACT IN EMERGENCY (Intercom Numbers):

FIRE – 52400 [MPT], 52985 [WB] QHSE – 52778 [MPT], 52974 [WB]

SECURITY – 52300 [MPT], 52900 [WB] OHC – 52444 [MPT], 52984 [WB]

ISCR – 52100 [MPT]POC [MPT] – 52442, 52762 [MPT] CCR [WB] – 52934

CONTACT IN EMERGENCY (Landline Numbers): STD CODE – 02838

FIRE – 289101 [MPT], 255985 [WB] QHSE – 255778[MPT], 255974 [WB]

SECURITY –289322 [MPT], 255900 [WB] OHC – (02838) 289267 [MPT], 255984 [WB]

POC [MPT] – 289371 / 72 CCR WB – 255934

CHAPTER NO. II

INTRODUCTION OF RISK AND ENVIRONMENTAL IMPACT ASSESSMENT

CONTENTS

2.00 INTRODUCTION OF RISK & ENVIRONMENTAL IMPACT ASSESSMENT

In this chapter all vital information such as Port installations, machinery, quantum of substance stored – Its storage and handling, loading-unloading practices, Its potential to damage the work place, its potential to create an emergency, its potential to damage the environment and life, nature of process carried out, types of emergency likely to take place, provisions to control such emergencies, are given. Hazard identification is made based upon handling of various substances and relevant steps to avoid probable hazards.

2.01 FACTORY LAYOUT

Layout of the port is enclosed as annexure-3, which shows following important locations for emergency planning.

1. Main approach to the port & main gate
2. Liquid Terminal having 100 tanks for storage of different liquid commodities
3. Closed Godowns
4. Open storage yards
5. Fertilizer Cargo Complex
6. Steel Yard for handling steel cargo
7. The SPM facility
8. Berths & Jetty for Liquid cargo
9. Docks alongside its berths for handling dry bulk & break bulk cargo
10. Security Cabin / Exit & Entrance routes
11. The container terminals having a combined infrastructure consisting of 2.1 km of quay length
12. Admin buildings, canteens
13. Control buildings,
14. Other various building consists of offices
15. Fire stations,
16. Medical centres & occupational health centres
17. Internal Roads & railway line

The Port layout plan is kept in the Emergency Control Centre (ECC) so that proper and immediate actions can be taken by the concerned personnel.

2.02 IDENTIFICATION OF HAZARDS IN STORAGE & CONTROL MEASURES

In **ADANI PORT - Mundra**, huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminal for further transport. By its nature, in which dangerous chemicals are handled (storage/transportation) carries the probability of an accident and gives rise to the laying out of different accident scenarios.

In addition to observe safe standards for the operation of Port, close attention shall be paid to overall site security arrangements. Highly flammable Substances such as: High Speed Diesel, Vinyl Acetate Monomer, Furnace Oil, Naphtha, De-natured Ethyl Alcohol, Methanol, Low Aromatic White Spirit are stored in giant capacity tanks. Besides above some intermediate compounds & chemicals such has Styrene Monomer, Linear Alkyl Benzene, Acetic Acid, Acetic Anhydride are stored. Other than above chemicals some mineral oils & other oil compounds such as Mineral Turpentine Oil, Alpha Plus, CBFS, Crude Soyabean Oil are stored. All above are very hazardous substances, even while handling in small quantity, safety should be the prime consideration.

As fire is likely in the case of Methanol, Naphtha, VAM, solvents & HSD due to leakage, ignition, spark, vapour dispersal, materials are kept isolated from any source of fire-ignition. Bonding, Earthing & grounding to all pipes, joints, tanks to mitigate static charges. Their handling is strictly monitored.

Hazardous Chemical	Storage · Location	Major hazards	Physical Form	Maximum Quantity Stored Onsite kl
Motor spirit	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	15042
Naphtha	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2944
Gasoil	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	461122

Methanol	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	18000
Toluene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	3000
Acetic acid	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	2960
P- Xylene	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion	Liquid	6460
Vinyl Acetate Monomer	Liquid terminal Tank farm	pool fire, flash fire, unconfined vapor cloud explosion, toxic gas	Liquid	1458
Styrene Monomer	Liquid terminal Tank farm	pool fire, dispersion of toxic styrene vapour	Liquid	4500

In addition of above raw materials, there are various open & closed godowns, scattered fuel storages for D.G. Sets, Coal Yards.

In spite of all controlling measures, accident can happen due to dangerous physical properties of above substances – Risk of fire, leak of chemical and subsequent toxic atmosphere**.** Although, the port operations are running since quite a long time without any incidence of fire or leak due to sound handling practices & laid down safety systems.

In Port Operations it is likely that some of the accidents occur due to all following mentioned reasons:

- **Falls from height:** can occur whilst carrying out trimming, sheeting and container lashing, securing loads, accessing ships, working on board a ship or working on heavy machinery.

- **Falling Objects:** Whilst carrying out loading and unloading operations and stacking and stowing goods there is a risk of falling objects. Items may be loose and incorrectly or poorly slung or stacked. Fittings and fixtures used during lashing operations may be dropped. Loads or objects may collapse or fall having become unstable during transport or having been poorly loaded.

- **Fatigue:** Dock operations can be prone to unexpected events and delays over which there may be little control. Fatigue can develop slowly and will not always be obvious. It can increase the risk of accidents through poor perception or physical exhaustion.

- **Mooring Hazards:** Mooring can be a hazardous activity as there is a risk of a person getting caught in a line or a winch. The lines can be very heavy and awkward, particularly if they are wet, and may break and snap back.

- **Lifting Equipment's:** Container Lifting & material loading/unloading are very much dependent on lifting equipment's. If proper inspection, maintenance is not followed, these operations may cause severe accidents.

- **Fire/Electrocution:** All electrical equipment and installations if not designed, constructed, installed, maintained, protected and used properly, it can lead to fire, electrocution accidents.

- **Hazardous or Asphyxiate Substances:** Workers loading and unloading solid bulk cargoes may be exposed to dust or respiratory sensitizers that can cause asthma. Cargoes may be flammable, toxic, poisonous or corrosive. Some cargoes, for example grain, may have been fumigated. Some solid bulk cargoes in the hold may not be hazardous themselves, for example fishmeal or bark, but may produce gases due to decomposition or bacterial action. Vehicle exhaust emissions in the ship's hold may also give rise to hazardous fumes.

- **Moving Vehicles and Equipment:** An appropriate traffic management system must be in place and will aid both safety and operational control of the port.

- **Night Work:** Night work/shift work can contribute to or produce negative biological effects (heart and stomach disorders), psychosocial effects (fatigue, increased accidents, stress) and individual effects (disrupted family life, isolation, stress).

- **Noise:** Equipment and engines may produce noise which is augmented when they are operated in a ship's hold or a warehouse. As a rule of thumb you may be at risk if you have to shout to be clearly heard by someone 2 metres away, if your ears are still ringing after leaving the workplace or if there are noises due to impacts such as those caused by hammering.

- **Slips and Trips:** The majority of dock accidents reported to the HSA are due to slips, trips and falls on the same level.

- **Tidal and Environmental Hazards:** The weather can have an adverse effect on port and dock operations and can reduce visibility. Cold and wet weather can reduce concentration and make manual work more difficult. Hot weather may result in heat exhaustion, sunburn or sunstroke. Wind, ice and fog can all increase the risk of slips, trips and falls. Tidal movements can affect access and egress to the ships, cause difficulties during loading operations and result in collisions between dockside equipment and a ship.

- **Severe weather and other natural hazards**
  - ✓ Ports may suffer from a variety of natural events. These include:
  - ✓ High winds and severe storms;
  - ✓ Flooding from tides, river water, land water or a combination of both;
  - ✓ Temperature extremes;
  - ✓ Earthquakes;

The ports regularly operate in temperatures over 40°C. Exposure to extremely high is likely to affect the ability of port workers to continue to work safely and without endangering their health. At this Mundra port, large cargo of dangerous chemicals (toxic or flammable) are unloaded from the ships and stored in liquid terminal. Unloaded dangerous chemicals are transferred to the storage tanks through the pipelines. Storage tanks are provided to store finished products which receive from the ship prior to transfer to consumer end for their processing. Huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminal for further transport. Petroleum products, hazardous chemicals are transported to consumer by rail wagons, road tankers and cross country pipelines. The industrial and commercial activities in the area heavily pollute the environment.

2.03 IDENTIFICATION OF HAZARDS IN STORAGE / PROCESS & CONTROL MEASURES.

FIRE HAZARD

- ❖ Flammable substances are stored and handled in large quantity.
- ❖ Static electricity due to weak/loose earthing
- ❖ Slight /intermittent or steady leak causing flammable vapour cloud and any stray ignition.
- ❖ Accidental fire in Combustible materials godowns

TOXIC HAZARD

- Due to toxic physical properties of chemicals handled
- All above mentioned chemicals are stored and used in relatively sound quantity in storage tank. Transferred mechanically.
- There are chances of corrosion of pipes, tanks, receiver tanks due to materials as also external corrosive atmosphere.
- Leakage of toxic-corrosive substance in large amount – dispersion of toxic – corrosive chemical vapour - mist in the surrounding area of the unit.
- Splash of chemical and/or its exposure to any working person due to mishandling or by accident

EXPLOSION HAZARD

- Sudden outburst of fire, heat or steam, finding inadequate or no escape may cause bursting or explosion.
- Other Pressure equipment's (pneumatic operations, utilities, air receivers containing compressed air & gas in utility may cause such a situation

2.4 PROCESS DESCRIPTION

A port is a facility at the edge of an ocean, for receiving ships and transferring cargo to and from them. The term seaport is used for ports that handle ocean-going vessels Ports have specially-designed equipment to help in the loading and unloading of vessels. In fact, it can be stated that a port is an intermodal node where goods are loaded/unloaded to/from vessels and sent to their destination, be it onshore or offshore.

A port system could be thought of as a complex, often huge, environment where several transport operations are carried out, including. not only maritime transport, but also unloading and, of course, storage of goods, along with typical process activities. Ports are normally located near a city, unless they are isolated terminals serving a process plant or a pipeline. Many cities have in fact been founded and have grown around spots that offered shelter for fishing boats, and later, with the growth of commerce and sea-exploration, have become port-cities Transport includes ships and barges as well as Lorries, trains, and pipelines. Process operations embrace mainly storage, which can be of different types: solid bulks in silos, stacks, warehouses, packages; liquid bulks in tanks; containerized goods of any kind. Bulk carriers, used to transport bulk solids such as (iron) ore, coal, coke, bauxite/alumina, food staples (rice, grain, etc.), cement, sugar,

quartz, phosphate rock, fertilizers, sulphur, scrap, and similar cargo. They can be recognized by the large box-like hatches on their deck, designed to slide outboard for loading. Bulk carrier's discharge at terminals provided with proper cranes; ore and coal can be stored in heaps. Tankers are usually large ships which carries petroleum products or chemicals in bulk. Apart from pipeline transport, tankers are the only method of transporting large quantities of vegetable oils around the world. Among the chemicals transported by sea, the most important are methanol, ethanol, toluene, acetic acid, caustic soda lye, naphtha, gasoil, motor spirit etc. Land transport activities, which are carried out by lorry, train and pipelines. - Storage, warehouses, container terminals, car parks, bulk solid wharves, etc. Chemical releases from tank farms on site are the most probable. It includes highly flammable and toxic chemicals. The latter is at approximately atmospheric pressure so that even a catastrophic failure should not result in the formation of a large flammable vapor cloud. The causes for overpressure may be overheating due to a neighbouring fire, overfilling or rollover. Overfilling is a common phenomenon in storage installations and has one of the highest probabilities of occurrence values. Another possibility is the liquid catching fire due to a local incident or operation, which may lead to stress rupture of the tanks. Severe mechanical damage may occur from impacts from projectiles from disintegration of nearby vessels, aircraft impacts or nearby railway accident due to derailment. The tank farm storing of non-boiling liquids can be affected by pool fires and unconfined vapor cloud explosions. These spills may also result in the direct formation of a flammable vapor cloud. The latent heat required for evaporation has to be provided by the surroundings and the ground. The rate of evaporation will be initially high but decreases rapidly as the available heat from the surroundings is exhausted.

Liquid Terminal:

Liquid terminal comprises of tank farm area, pump house, and loading bays. Flammable Chemicals / petroleum products receive from the bulk ship carriers and transfer to intermediate storage tank for further distribution to the customer. Tank farm area comprises of finished petroleum products

2.5 OTHER HAZARDS AND CONTROLS

In the plant, in addition to the hazards from storage handling and usage of flammable substances and other substances, there are certain other hazards likely due to failure of machinery and equipment’s. Such hazards are listed below:

- Machineries and equipment’s failure
- Structural collapse
- Hazards during maintenance of plant

- Health hazards & Physical injuries
- Failure of electrical Installations
- Natural calamities (Earthquake, fall of lightening, floods, Tsunami, cyclones, storms) or manmade hazards. Causes of such other hazards, their effects on plant and the surrounding area, their preventive measures etc. are stated in ANNEXURE - 7

2.6 TRADE WASTE DISPOSAL

In Port Operations, no production activities are available. No hazardous trade waste is likely to generate in daily basis. Though effluent treatment plant has been provided for some of the identified waste.

In air pollution, the source of emission is from DG stack has been provided at sufficient height. Periodical monitoring of stack is done. Periodical Noise monitoring, ambient air monitoring are carried-out and records maintained.

We are having consolidated consent from the Gujarat Pollution Control Board : which is valid for 5 years. Other detail is furnished in Annexure – 8.

2.7 RECORD OF PAST INCIDENTS

So far, no incident has occurred in the past at our Port. However, due to port operations, handling of various hazardous chemicals at liquid terminals, container terminals & at various dry ports certain undesired situations have occurred at other ports in the world. Hence, from those incidents, we have already taken preventive steps, controlling measures. Regular checking, maintenance, tests are carried out to avoid any unwanted situations taking place.

2.8 GAS DISPERSION CONCENTRATION

Using Gaussian formula, as there are more chances of ground level release, assuming small leak rate to the worst event i.e. rupture of the tank and release, its down wind concentration is calculated at wind speed 2.0 M/second and Annexure – 10 is compiled. Subsequent to this, Evacuation Table, Annexure-11 is prepared to provide a quick guide to an On Site personnel to take proper actions. Moreover, such data are stated in Risk Assessment, but it is a crude approach and may not be fully appropriate for decision making as change of wind velocity and weather conditions may cause certain variations.

2.9 RISK ASSESSMENT

Identification of hazards constitutes the first step in the task of hazard analysis, which in turn produces a basis for risk assessment.

Points 2.2 to 2.7 give us the hazard identification in the unit. Probability of frequency of such hazards will give risks and analysis, how they could occur and estimation to the extent, magnitude and likelihood of any harmful effects or consequences will give risk analysis. Fire risk shall be calculated considering the worst event which can be used as guideline at the time of an emergency.

The main objective of the Risk Assessment (QRA) is to identify the potential hazardous scenarios and assess the impact of major accident hazards from the liquid terminal as well as from the tanker loading and ship unloading facilities on the Mundra port and property within and outside the battery limit of the facilities. The study was initiated by Mundra Port SEZ Pvt. Ltd to evaluate the potential hazardous situation in the liquid terminal, its consequences and impact over onsite and offsite areas, to investigate and determine the overall risks to health and safety arising from any possible major interactions between existing or proposed installation in the area, where the significant quantities of dangerous substances are stored, handled, and transported including the loading and unloading of such substance to and from vessels, to assess the risks. The Canvey reports were the first significant contribution to industrial port environment QRAs, and they are still relevant today however, it is an attempt at standardizing the process of risk assessment of navigation and unloading operations for a generic port terminal. The focus of entire study was on accidents where a serious loss of containment could result in production of large cloud of flammable or toxic substances. The general method adopted is described as follows: (Courtesy: **The QRA Report data taken from CHILWORTH Global**)

- To identify potentially hazardous materials and establish maximum total inventories and location. This information was gathered through conducting visits to each of the installation involved and holding discussions with site personnel
- To consider the behaviour of the dangerous substances on release, on the basis of information on material properties and process/ storage conditions
- To identify ways in which serious losses of containment could occur, presenting a hazard to the local population
- To assess the level of risk and the probable impact to the surroundings for certain port areas
- To assess the probability and consequences of selected failure events Liquid terminal and jetty areas are required to produce a contingency plan for accidental marine hydrocarbon pollution, including a study of the effects of possible spills and of their evolution.

The QRA results are immense use in developing onsite offsite emergency plan. The study covers liquid terminals, pump house and loading bays. Accidents occurring during the (external) approach of the tankers to the port were not taken into account. Possible sabotage-related scenarios and accidents likely to occur during tanker maintenance operations were excluded from the analysis. Hazardous flammable chemicals, liquid hydrocarbons were considered for the study. Moreover, only bulk transportation and handlings are included within the scope of the study in Mundra port huge quantities of dangerous chemicals are handled and kept for intermediate temporary storage in liquid terminals for further transport. By its nature, in which dangerous chemicals are handled (storage/transportation) carries the probability of an accident and gives rise to the laying out of different accident scenarios. The industrial and commercial activities in the Mundra port area heavily pollute the environment. Some chemicals are present for years in these sites, due to enterprising problems. In general, many incidents have occurred in various chemical storage facilities during the past few years with considerable consequences to neighbouring populations. The study team identified 49 numbers of Maximum Credible Loss Scenarios (MCLS), DNV- PHASTRISK software has been used for estimating the potential impact to surrounding environment. The types of accident that may take place in the Mundra port are: fire, explosion, release and dispersion of toxic gases/vapours or a combination of these. The thermal/toxic compound doses were first computed. The types of damage investigated were burns of various degrees, acute poisoning, or even death. The types of accident considered in the scenarios of this study are analysed below

Jet fire:

When pressurized flammable liquids are released from storage tanks or pipelines, the materials discharging through the hole will form a gas jet that entrains and mixes with the ambient air. If the material encounters an ignition sources while it is in the flammable range, a jet fire may occur

Pool fire

The continuous release of a flammable liquid usually results in a pool fire. When the liquid is spilled in a confined space, the pool size is also confined and the amount of air that sustains the fire is limited, because the ventilation is controlled by the vent ducts In this case the type of the fire is characterized as 'confined'. When the liquid is spilled in an open area, it covers a large surface area and the amount of air is unlimited.

UCVE

Then the fire is referred to as 'unconfined' Unconfined Vapor Cloud Explosion (UVCE) This type of explosion takes place when a sufficient amount of flammable material (gas or liquid having high vapor pressure) is released and mixed with air to form a flammable cloud, such that the average concentration of the compound in the cloud is higher than the lower limit of explosion. The explosion occurs in an open space and the resulting overpressure affects humans and buildings through a blast wave covering large distances.

BLEVE

BLEVE (Boiling Liquid Expanding Vapor Explosion) is a phenomenon resulting from the failure of a vessel containing a liquid at a temperature significantly above its boiling point at normal atmospheric pressure. The main hazard posed by BLEVE of a container filled with a flammable volatile liquid is a fireball and the resulting radiation, due to instantaneous ignition of the flammable vapor cloud. Release and dispersion of toxic gases and vapours During the combustion of a flammable material a lot of chemical compounds are produced and travel large distances downwind, forming a combustion gas cloud. Some of them (CO, NOx) are toxic and even fatal to humans at sufficiently high doses. In this way the particles are carried away by these gases traveling some distance into the heavy gas cloud and affect inhabitants before they meet the ground

Consequence Analysis Results Summary

In general, it was observed that effect of catastrophic rupture of storage tank in enclosures extends beyond the tolerable range. It is also observed that in these enclosures, only full bore rupture of the pipe lines and catastrophic rupture of the storage tanks are of main concern for high risk. For the catastrophic failure of the storage tank, one of the main causes is escalation of minor events.

Jet fire: Jet fires can arise from gas, two-phase, or liquid releases. The worst-case jet fires are likely to be from the pump house and mainly from the maximum credible accident scenarios in the critical pipeline failure in pump house and tanker loading bays. The following jet fire results obtained from the DNV PHAST software are presented below:

Naphtha transfer pump discharge line rupture scenario which results into jet fire flame radiation intensity of 37.5 kW/m2 to the distance of 127 meter impinges directly to the adjacent pumps in the pump house and associated pipelines carrying hydrocarbons to the loading bays

Vinyl Acetate Monomer discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m2 to the distance of 75 meters, impinges directly to pipelines carrying to the loading bays

Gasoil pump discharge line rupture scenario, which results into jet fire flame radiation intensity of 37.5 kW/m2 to the distance of 41 meters, impinges directly to pipelines carrying to the loading bays

Pool fire: Pool fires can arise from any site that handles liquid hydrocarbons. The worst case is likely to be in the tank farm. Mostly tank farm pool fire is contained within the tank bund itself. Oil spills on ground from the pipelines handling hydrocarbons may result into pool fire and may affect adjacent equipment resulting into domino effects (BLEVE).

Scenario No	MCLS	Radiation intensity kW/m^2	Distance, m
1	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	12.5	214
10	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	37.5	408
13	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	37.5	285
16	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	37.5	303
19	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	37.5	226
31	Loss of containment from P-Xylene tanker 30 MT	37.5	126
40	Loss of containment from P- Xylene tanker 20 MT	37.5	117
47	P-Xylene pump P-39 discharge line full bore rupture	37.5	117

Failure Events	Leak Scenarios	Weather	Pool Diameter (m)	Pool Fire: Distance downwind (4 kW/m²) (m)	Pool Fire: Distance downwind (12.5 kW/m²) (m)	Pool Fire: Distance downwind (37.5 kW/m²) (m)
Failure - Tank T-08 : Styrene Storage Tank	7 mm	3/F	9.15	32.35	21.52	10.00
		10/D	8.99	34.13	25.11	11.11
	25 mm	3/F	32.75	57.72	27.99	22.41
		10/D	32.22	64.44	27.80	23.01
	F&R	3/F	100.00	128.13	66.08	56.97
		10/D	98.53	145.90	64.91	57.27

Failure Events	Leak Scenarios	Weather	Pool Diameter (m)	Pool Fire		
				Distance downwind (4 kW/m²) [m]	Distance downwind (12.5 kW/m²) [m]	Distance downwind (37.5 kW/m²) [m]
Failure – P-18 : Styrene transfer pump	7 mm	3/F	10.86	35.61	23.27	10.92
		10/D	10.66	37.96	27.97	12.27
	25 mm	3/F	38.88	65.16	32.37	26.86
		10/D	38.24	73.32	31.71	27.47
	FBR	3/F	79.09	108.75	56.16	48.19
		10/D	77.91	123.65	55.07	48.66

Vapor cloud explosion:

In general, catastrophic gas explosions happen when considerable quantities of flammable material are released and dispersed with air to form an explosive vapor cloud before ignition takes place. A vapor cloud explosion (VCE) occurs if a cloud of flammable gas burns sufficiently quickly to generate high overpressures. The following vapor cloud explosion results obtained from the DNV PHAST software are presented below:

Catastrophic failure of Naphtha storage tank T-01 is a worst case scenario, which results into dispersion of naphtha (flammable mixture) in the atmosphere; it may generate overpressure (0 .2608 bar) to the distance of 1235 meter and affecting the adjacent storage tanks as well as to the nearby enclosures

The following vapor cloud explosion results obtained from the DNV PHAST software in which overpressure blast waves affecting the adjacent storage tanks, as well as major impact to adjacent enclosures.

Scenario No	MCLS	Overpressure (bar)	Distance, m
7	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	0.2068	124
10	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	0.2068	121
13	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	0.2068	433
16	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	0.2068	257
19	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	0.2068	226
22	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	0.2068	465
31	Loss of containment from Naphtha tanker 30 MT	0.2068	147
37	Loss of containment from Naphtha tanker 20 MT	0.2068	126

46	Naphtha pump P- 01 discharge line full bore rupture	0.2068	257
48	Toluene pump P-122 discharge line full bore rupture	0.2068	93
49	VAM pump P-24 discharge line full bore rupture	0.2068	110

Toxic Gas Release:

In case of release of toxic gas, when a gas that is heavier than air is released, it initially behaves very differently from a neutrally buoyant gas. The heavy gas will first "slump," or sink, because it is heavier than the surrounding air. As the gas cloud moves downwind, gravity makes it spread; this can cause some of the vapor to travel upwind of its release point. Farther downwind, as the cloud becomes more diluted and its density approaches that of air, it begins behaving like a neutrally buoyant gas. This takes place when the concentration of heavy gas in the surrounding air drops below about 1 percent (10,000 parts per million). For many small releases, this will occur in the first few yards (meters). For large releases, this may happen much further downwind. A gas that has a molecular weight greater than that of air will form a heavy gas cloud if enough gas is released. Gases that are lighter than air at room temperature, but that are stored in a cryogenic (low temperature) state, can also form heavy gas clouds. Many substances that are gases under normal pressures and temperatures are stored under pressures high enough to liquefy them. When a tank rupture or broken valve causes a sudden pressure loss in a tank of liquefied gas, the liquid boils violently and the tank contents foam up, filling the tank with a mixture of gas and fine liquid droplets (called aerosol). Flash boiling is the term for that sudden vaporization of a liquid caused by a loss of pressure. When the liquid and gas phases of a chemical escape together from a ruptured tank, the release is called a two-phase flow. When a two-phase mixture escapes from storage, the release rate can be significantly greater than that for a release of pure gas. The two-phase mixture that escapes into the atmosphere may behave like a heavy gas cloud. The cloud is heavy in part because it is initially cold, and therefore denser than it would be at ambient temperatures, and also because it consists of a two-phase mixture. The tiny aerosol droplets mixed into the cloud act to weigh the cloud down and make it denser than a pure gas cloud, and their evaporation cools the cloud. Toxic materials that become airborne are carried by the wind and transported away from the spill site. While being transported downwind, the airborne chemical(s) mix with air and disperse. Gases and two-phase liquid-vapor mixtures are divided into three general classes:

• Positively buoyant
• Neutrally buoyant
• Negatively buoyant.

These classifications are based on the density difference between the released material and its surrounding medium (air). The classifications are influenced by release temperature, molecular weight, presence of aerosols, ambient temperature at release, and relative humidity.

Ignition Sources:

In order for a fire or explosion to start there must be an ignition source of sufficient heat intensity to cause an ignition. Ignition causes a release of flammable liquid or gas to become a fire Uet fire, flash fire, pool fire etc.) or explosion. There are many possible sources of ignition and those that are most likely will depend on the release scenario. Sources of ignition include electrical sparks, static electricity, naked flames, hot surfaces, impact, friction, etc. The following Ignition sources identified in a QRA under several categories including: **Hot Surfaces**- unlagged surfaces on hot equipment can act as sources of ignition; **Current Electricity**- electrical equipment and cables can act as sources of ignition if sparks are generated at contact points or where wires overheat; e.g. electrical equipment sparking **Static Electricity** - static electricity can build up on any unearthed equipment and generate sparks. Static is commonly found on vehicles, vessels handling particulate solids and manned areas with nonconductive floor or footwear unearthed floors; e.g. electrostatic discharges **Naked Flames** - all naked flames (including cigarettes) are potential sources Configuration; this category also includes welding, flame-cutting and other hot work, fired furnaces and flares; e.g. Open flame heaters (boilers and flame heaters) **Friction** - equipment with moving parts in contact can generate heat through friction if not properly lubricated. This includes all rotating equipment and cold cutting devices such as drills, lathes and saws; Mechanical sparking **Impact** - impact between hard surfaces, particularly metal-to-metal contact, can generate sparks. This includes lifted objects lowered to a metal floor too quickly and the use of hand tools such as hammers; and **Chemical ignition**- some chemicals can spontaneously ignite if exposed to air, while oxidizing agents such as oxygen gas and peroxides can cause flammable materials to ignite at ambient temperatures.

Meteorology:

Atmospheric stability plays an important role in the dispersion of chemicals. Stability means, its ability to suppress existing turbulence or to resist vertical motion". Variations in thermal and mechanical turbulence and in wind speed are greatest in the atmospheric layer in contact with the surface. These turbulences have been influenced greatly by the air temperature and air temperature decreases with the height. The rate at which the temperature of air decreases with height is called Environment Lapse Rate (ELR). It will vary from time to time and from place to place. The atmosphere is said to be stable, neutral or unstable according to ELR less than, equal to or greater than Dry Adiabatic Lapse Rate (DALR), which is a constant value of 0.98° C per 100 meters.

Pasquill Stability Classes :

Pasquill has defined 6 stability classes.

A Extremely unstable.
B Moderately unstable
C Slightly unstable.
D Neutral
E Slightly stable.
F Moderately stable.

Three prime factors that defines Stability

1. Solar radiation
2. Night-time sky over
3. Surface wind

When the atmosphere is unstable and wind speeds are moderate or high or gusty, rapid dispersion of vapors will occur. Under these conditions, air concentrations will be moderate or low and the material will be dispersed rapidly. When the atmosphere is stable and wind speed is low, dispersion of material will be limited and air concentration will be high. Six stability classes from A-F are defined while wind speed can take any one of numerous values.

Results for Different Weather Conditions:

For the flammable and toxic releases which reaches off-site of the plant, calculations iterated with different weather conditions, since wind speed and stability have a great effect on cloud dispersion. Stable weather gives the greatest effect distances considered for the most stable weather conditions that occur at the site, as well as the most common weather conditions. The key meteorological data required for consequence modeling are wind and temperature. The wind speed and stability define the dispersion of a material, whilst the temperature defines the evaporation rate. The data utilized here for the base case QRA model were a temperature of 35°C.

Ambient temperature:

Maximum	Normal/average	Minimum
43 deg C	28 deg C *I* 30 deg C	17 deg C

Relative humidity%: 65% to 90%

CLIMATOLOGICAL TABLE:

S.No	Month	Maximum wind speed (kmph)	Average wind speed
1.	January	18	3
2.	February	20	5
3.	March	24	6
4.	April	22	7
5.	May	20	1
6.	June	24	1
7.	July	18	8
8.	August	67	7
9.	September	17	5
10.	October	18	3
11.	November	13	2
12.	December	18	2

These wind speed and stability class are used in consequence modelling:

Stability class	**F**	**D**	**C/D**	**C/D**
Wind speed m/s	2	3	5	9

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	UFL	264	223	189	0.02068	2380	2004	1803
		LFL	757	617	549	0.1379	1312	1045	896
		LFL-50%	1001	837	785	0.2068	1235	980	844
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	8.48	8.38	8.07	0.02068	182	156	134
		LFL	57.79	50.84	40.7	0.1379	99	92	79
		LFL-50%	75	71	60	0.2068	92	87	74
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	UFL	4.57	4.34	3.62	0.02068	73	63	46
		LFL	28	21	12	0.1379	41	38	26
		LFL-50%	39	33	26	0.2068	38	36	25
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	UFL	6.88	6.88	6.88	0.02068	NH	NH	NH
		LFL	6.9	6.9	7.57	0.1379	NH	NH	NH
		LFL-50%	15.6	15.7	18.2	0.2068	NH	NH	NH
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	UFL	5.46	5.45	5.39	0.02068	-	-	-
		LFL	5.53	5.53	5.52	0.1379	-	-	-
		LFL-50%	5.55	5.56	5.55	0.2068	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	UFL	3.43	3.27	3.03	0.02068	-	-	-
		LFL	4.10	4.06	3.96	0.1379	-	-	-
		LFL-50%	4.27	4.26	4.22	0.2068	-	-	-
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	UFL	28	28	30	0.02068	459	448	453
		LFL	44	36	47	0.1379	148	140	146
		LFL-50%	130	62	90	0.2068	124	117	122
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.24	0.23	0.28	0.02068	-	36	-
		LFL	3.46	3.18	3.03	0.1379	-	16	-
		LFL-50%	9.85	10.16	7.88	0.2068	-	15	-
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	UFL	0.13	0.09	0.11	0.02068	-	-	-
		LFL	1.38	1.27	1.25	0.1379	-	-	-
		LFL-50%	3.27	3.38	2.83	0.2068	-	-	-
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	UFL	29	29	31	0.02068	272	268	263
		LFL	52	49	48	0.1379	130	118	112
		LFL-50%	118	110	113	0.2068	121	111	106
11.	Major leak(25 mm) in P-Xylene storage tank T-39 (1460kl)	UFL	4.91	4.95	4.86	0.02068	-	-	-
		LFL	4.94	5.04	4.93	0.1379	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	5.21	5.05	4.94	0.2068	-	-	-
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	UFL	3.35	3.39	3.08	0.02068	-	-	-
		LFL	3.51	3.97	4.04	0.1379	-	-	-
		LFL-50%	3.53	4.02	4.09	0.2068	-	-	-
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	UFL	33	33	36	0.02068	898	828	802
		LFL	240	212	195	0.1379	463	400	364
		LFL-50%	347	307	295	0.2068	433	372	337
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24(1458 kl)	UFL	4.77	4.68	4.71	0.02068	32	21	23
		LFL	9.23	7.45	5.53	0.1379	23	13	13
		LFL-50%	23.8	19.5	15.03	0.2068	22	12	12
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	UFL	3.11	2.92	2.69	0.02068	-	-	-
		LFL	4.29	3.94	4.21	0.1379	-	-	-
		LFL-50%	11.8	6.91	4.67	0.2068	-	-	-
16.	Catastrophic rupture of methanol storage tank T-119 (5000 kl)	UFL	80	75	88	0.02068	857	857	937
		LFL	83	78	97	0.1379	290	284	309
		LFL-50%	153	145	261	0.2068	247	240	259

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	UFL	6.07	5.56	4.91	0.02068	-	-	-
		LFL	6.93	7.06	6.95	0.1379	-	-	-
		LFL-50%	9.35	8.20	7.03	0.2068	-	-	-
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	UFL	2.56	2.47	2.36	0.02068	-	-	-
		LFL	4.81	4.78	4.89	0.1379	-	-	-
		LFL-50%	5.32	5.08	5.14	0.2068	-	-	-
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	UFL	57	55	59	0.02068	531	521	575
		LFL	101	87	107	0.1379	232	204	231
		LFL-50%	252	217	224	0.2068	225	193	226
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	UFL	6.31	6.30	6.34	0.02068	-	-	-
		LFL	6.39	6.38	6.58	0.1379	-	-	-
		LFL-50%	6.40	6.40	6.61	0.2068	-	-	-
21.	Minor leak (10 mm) in P-Xylene storage tank T-115 (5000 kl)	UFL	3.7	4.02	3.58	0.02068	-	-	-
		LFL	4.3	4.9	4.8	0.1379	-	-	-
		LFL-50%	4.4	5.03	4.93	0.2068	-	-	-
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	UFL	45	44	48	0.02068	929	855	819
		LFL	260	230	220	0.1379	495	425	387

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	388	355	346	0.2068	465	398	362
23.	Major leak (25 mm) in toluene storage tank T-122 (3000 kl)	UFL	5.38	5.35	5.30	0.02068	17.5	17.4	17.7
		LFL	6.68	6.13	5.60	0.1379	11.9	11.9	12.0
		LFL-50%	15.9	13.3	10.1	0.2068	11.51	11.48	11.55
24.	Minor leak (10 mm) in toluene storage tank T-122 (3000 kl)	UFL	3.8	4.2	3.8	0.02068	-	-	-
		LFL	4.4	4.8	5.04	0.1379	-	-	-
		LFL-50%	7.54	5.73	5.09	0.2068	-	-	-
25.	Catastrophic rupture of gasoil storage tank T-101 (15040 kl)	UFL	55	48	47	0.02068	980	965	990
		LFL	110	106	116	0.1379	480	484	490
		LFL-50%	180	178	192	0.2068	185	192	196
26.	Major leak (25 mm) in gasoil storage tank T-101 (15040 kl)	UFL	5.8	5.8	5.8	0.02068	31	31	22
		LFL	8.7	7.6	6.1	0.1379	22	22	13
		LFL-50%	25.5	23.2	17.2	0.2068	22	22	12
27.	Minor leak (10 mm) in gasoil storage tank T-101 (15040 kl)	UFL	3.54	3.38	3.12	0.02068	-	-	-
		LFL	4.3	4.35	4.76	0.1379	-	-	-
		LFL-50%	4.4	4.42	4.81	0.2068	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	UFL	245	232	198	0.02068	1830	1960	1642
		LFL	780	712	708	0.1379	1421	1034	900
		LFL-50%	980	825	812	0.2068	1123	1025	985
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	8.56	9.12	9.01	0.02068	210	195	165
		LFL	63	58	42	0.1379	184	162	114
		LFL-50%	95	92	90	0.2068	94	83	62
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	UFL	5.23	5.12	4.98	0.02068	150	148	132
		LFL	38	41	34	0.1379	60	51	38
		LFL-50%	28	24	20	0.2068	38	30	24
31.	Loss of containment from Naphtha tanker 30 MT	UFL	31	28	25	0.02068	363	344	335
		LFL	82	83	86	0.1379	161	152	147
		LFL-50%	101	111	121	0.2068	147	140	136
32.	Loss of containment from Acetic acid tanker 30MT	UFL	4.65	4.71	4.88	0.02068	-	-	-
		LFL	4.69	4.76	4.92	0.1379	-	-	-
		LFL-50%	4.71	4.77	4.94	0.2068	-	-	-
33.	Loss of containment from methanol tanker 30MT	UFL	4.52	4.57	4.74	0.02068	93	90	88
		LFL	55.5	53.3	55.9	0.1379	81	65	74

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	190	134	159	0.2068	81	64	73
34.	Loss of containment from P-Xylene tanker 30 MT	UFL	3.54	3.59	3.71	0.02068	122	40	NH
		LFL	76	22	3.75	0.1379	96	32	NH
		LFL-50%	131	54	58	0.2068	94	32	NH
35.	Loss of containment from toluene tanker 30 MT	UFL	3.30	3.34	3.46	0.02068	1029	46	76
		LFL	28	29	27	0.1379	56	47	43
		LFL-50%	42	46	52	0.2068	52	46	42
36.	Loss of containment from VAM tanker 30 MT	UFL	4.11	4.16	4.3	0.02063	150	127	121
		LFL	33	32	29	0.1379	68	59	54
		LFL-50%	50	51	51	0.2068	62	55	51
37.	Loss of containment from Naphtha tanker 20 MT	UFL	26	24	22	0.02063	315	301	292
		LFL	70	72	74	0.1379	139	132	127
		LFL-50%	87	97	108	0.2068	126	120	117
38.	Loss of containment from acetic acid tanker 20 MT	UFL	3.99	4.04	4.17	0.02063	-	-	-
		LFL	4.02	4.08	4.20	0.1379	-	-	-
		LFL-50%	4.04	4.09	4.22	0.2068	-	-	-

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
39.	Loss of containment from methanol tanker 20 MT	UFL	3.87	3.92	4.05	0.02068	79	83	84
		LFL	48.9	54	54	0.1379	64	65	73
		LFL-50%	161	166	128	0.2068	63	64	72
40.	Loss of containment from P- Xylene tanker 20 MT	UFL	3.03	3.07	3.16	0.02068	87	NH	NH
		LFL	58	3.10	14.02	0.1379	74	NH	NH
		LFL-50%	110	45	48	0.2068	73	NH	NH
41.	Loss of containment from Toluene tanker 20 MT	UFL	2.82	2.86	2.94	0.02068	91	72	65
		LFL	23	24	22	0.1379	45	40	34
		LFL-50%	37	37	46	0.2068	42	38	33
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	UFL	3.52	3.57	3.67	0.02068	133	116	104
		LFL	28	27	24	0.1379	59	52	46
		LFL-50%	43	47	44	0.2068	54	47	42
43.	Acetic acid pump P-40 discharge line full bore rupture	UFL	8.12	7.92	7.3	0.02068		15.3	15.4
		LFL	8.2	8.02	7.36	0.1379		11.3	11.4
		LFL-50%	9.83	10.0	10.2	0.2068		11.07	11.4
44.	Gasoil pump P-101 discharge line full bore rupture	UFL	9.2	8.8	9.3	0.02068	111	84	122
		LFL	36	28	40	0.1379	80	51	83

Scenario No.	Scenario Description	Hazard Distances- Flash Fire				Explosion Results			
		Concentration	Distance in meters			Over pressure in bar	Distance in meters		
			2F	3 D	5 C/D		2F	3D	5 C/D
		LFL-50%	77	47	75	0.2068	78	49	80
45.	Methanol pump P-119 discharge line full bore rupture	UFL	9.12	10.38	10.9	0.02068	80	78	99
		LFL	24.4	24.3	29.4	0.1379	50	49	70
		LFL-50%	43.5	40.3	70.9	0.2068	48	47	67
46.	Naphtha pump P- 01 discharge line full bore rupture	UFL	31	30	32	0.02068	484	480	429
		LFL	172	158	129	0.1379	238	271	237
		LFL-50%	221	214	179	0.2068	233	257	222
47.	P-Xylene pump P-39 discharge line full bore rupture	UFL	8.4	8.2	8.2	0.02068	39	62	48
		LFL	14	15	13	0.1379	25	45	34
		LFL-50%	27	45	38	0.2068	23	44	33
48.	Toluene pump P-122 discharge line full bore rupture	UFL	8.12	8.74	8.07	0.02068	118	146	134
		LFL	37	46	43	0.1379	67	97	86
		LFL-50%	58	80	73	0.2068	63	93	82
49.	VAM pump P-24 discharge line full bore rupture	UFL	8.88	8.74	9.29	0.02068	212	175	158
		LFL	70	57	50	0.1379	116	104	92
		LFL-50%	102	87	74	0.2068	110	99	87

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
1.	Catastrophic rupture of Naphtha storage tank T-01 (2944 kl)	4	289	290	295	4	-	-	-
		12.5	211	209	214	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
2.	Major leak (25 mm) in Naphtha storage tank T-01 (2944 kl)	4	29	29	29	4	65	62	59
		12.5	22	23	23	12.5	49	46	43
		37.5	NR	NR	NR	37.5	40	37	34
3.	Minor leak (10 mm) in Naphtha storage tank T-01 (2944 kl)	4	20.6	20.6	20.9	4	28	27	25
		12.5	15.7	16	16.9	12.5	21	20	19
		37.5	11.4	12	13.8	37.5	17	16	15
4.	Catastrophic rupture of Acetic acid storage tank T-40 (2960 kl)	4	26	26	29	4	-	-	-
		12.5	15	16	19	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
5.	Major leak (25 mm) in Acetic acid storage tank T-40 (2960 kl)	4	26	27	27	4	17	17	16
		12.5	16	16	17	12.5	14	13	13
		37.5	NR	NR	NR	37.5	NR	NR	NR

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
6.	Minor leak (10 mm) in acetic acid storage tank T-40 (2960 kl)	4	22	22	22	4	-	-	-
		12.5	13	13	14	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
7.	Catastrophic rupture of methanol storage tank T-32 (1000 kl)	4	30	30	32	4	-	-	-
		12.5	20	21	25	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
8.	Major leak (25 mm) in methanol storage tank T-32 (1000 kl)	4	55	59	68	4	29	34	36
		12.5	40	46	57	12.5	12.5	6.89	19.5
		37.5	29	34	45	37.5	NR	NR	NR
9.	Minor leak (10 mm) in methanol storage tank T-32 (1000 kl)	4	20	23	25	4	4.69	8.90	9.66
		12.5	14	18	20	12.5	NR	NR	NR
		37.5	NR	NR	NR	37.5	NR	NR	NR
10.	Catastrophic rupture of storage tank P-Xylene T-39 (1460 kl)	4	943	948	951	4	-	-	-
		12.5	593	599	609	12.5	-	-	-
		37.5	377	390	408	37.5	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
11.	Major leak(25 mm) in P-Xylene storage tank T-39 (1460kl)	4	55	56	56	4	17	16	16
		12.5	36	37	38	12.5	13	13	12
		37.5	22	24	26	37.5	11	10	10
12.	Minor leak (10 mm) in P-xylene storage tank T-39 (1460 kl)	4	54	55	55	4	8.78	8.52	8.17
		12.5	35	36	37	12.5	6.74	6.46	6.12
		37.5	20	23	25	37.5	6.23	5.82	4.54
13.	Catastrophic rupture of Vinyl Acetate Monomer VAM storage tank T-24 (1458 kl)	4	637	639	646	4	-	-	-
		12.5	406	414	424	12.5	-	-	-
		37.5	250	263	285	37.5	-	-	-
14.	Major leak (25 mm) in storage tank Vinyl Acetate Monomer VAM T-24(1458 kl)	4	33	33	34	4	33	32	30
		12.5	22	23	24	12.5	26	25	24
		37.5	10	11	11	37.5	21	20	19
15.	Minor leak (10 mm) in storage tank Vinyl Acetate Monomer (VAM) T-24 (1458 kl)	4	31	32	33	4	16	15	14
		12.5	20	22	24	12.5	13	12	11
		37.5	9.8	10.1	11	37.5	NR	NR	NR
16.	Catastrophic rupture of methanol storage tank T-	4	602	598	610	4	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	119 (5000 kl)	12.5	426	429	447	12.5	-	-	-
		37.5	295	289	303	37.5	-	-	-
17.	Major leak (25 mm) in methanol storage tank T-119 (5000 kl)	4	29	30	30	4	36	34	32
		12.5	21	22	23	12.5	28	27	26
		37.5	NR	NR	NR	37.5	NR	NR	NR
18.	Minor leak (10 mm) in Methanol storage tank T-119 (5000 kl)	4	25	25	26	4	17	16.5	15.4
		12.5	17	18	19	12.5	NR	NR	NR
		37.5	NR	NR	NR	37.5	NR	NR	NR
19.	Catastrophic rupture of storage tank P-Xylene T-115 (5000 kl)	4	1621	1627	1634	4	-	-	-
		12.5	1028	1036	1053	12.5	-	-	-
		37.5	666	683	711	37.5	-	-	-
20.	Major leak (25 mm) in P-xylene storage tank T-115 (5000 kl)	4	21	20	20	4	58	59	59
		12.5	16	16	15	12.5	39	40	41
		37.5	13	13	12	37.5	24	26	29
21.	Minor leak (10 mm) in P-Xylene storage tank T-	4	56	58	58	4	10.8	10.5	10.08

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	115 (5000 kl)	12.5	37	38	39	12.5	8.43	8.07	7.58
		37.5	22	25	27	37.5	7.21	6.7	6.08
22.	Catastrophic rupture of Toluene storage tank T-122 (3000 kl)	4	410	430	463	4	-	-	-
		12.5	226	225	230	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
23.	Major leak (25 mm) in toluene storage tank T-122 (3000 kl)	4	37	37	39	4	28	27	26
		12.5	23	25	27	12.5	22	21	20
		37.5	11	11	11	37.5	19	17	16
24.	Minor leak (10 mm) in toluene storage tank T-122 (3000 kl)	4	36	37	38	4	15	15	14
		12.5	22	24	26	12.5	12	11	10
		37.5	10	11	11	37.5	9.9	9.4	8.78
25.	Catastrophic rupture of gasoil storage tank T-101 (15040 kl)	4	320	318	291	4	-	-	-
		12.5	230	229	220	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
26.	Major leak (25 mm) in gasoil storage tank T-101	4	44	46.5	48.2	4	24	23	23

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	(3000 kl)	12.5	23	24.8	26.8	12.5	18	18	17
		37.5	NR	NR	NR	37.5	15	14	13
27.	Minor leak (10 mm) in gasoil storage tank T-101 (3000 kl)	4	36	36	38	4	11.8	11.5	11.12
		12.5	22	23	26	12.5	9.16	8.8	8.32
		37.5	12	12	12	37.5	7.4	7	6.5
28.	Catastrophic rupture of motor spirit storage tank T-01 (2944 kl)	4	285	291	289	4	-	-	-
		12.5	204	201	215	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
29.	Major leak (25 mm) in motor spirit storage tank T-01 (2944 kl)	4	31	34	30	4	72	68	61
		12.5	26	24	23	12.5	48	43	48
		37.5	NR	NR	NR	37.5	38	37	31
30.	Minor leak (10 mm) in motor spirit storage tank T-01 (2944 kl)	4	24	22	19	4	41	43	38
		12.5	18	13	17	12.5	28	26	21
		37.5	NR	NR	NR	37.5	17	19	21
31.	Loss of containment from Naphtha tanker 30 MT	4	20	21	21	4	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	14	14	15	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
32.	Loss of containment from Acetic acid tanker 30MT	4	101	103	104	4	-	-	-
		12.5	64	67	72	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
33.	Loss of containment from methanol tanker 30MT	4	123	123	124	4	-	-	-
		12.5	81	84	87	12.5	-	-	-
		37.5	49	49	49	37.5	-	-	-
34.	Loss of containment from P-Xylene tanker 30 MT	4	330	332	331	4	-	-	-
		12.5	204	207	212	12.5	-	-	-
		37.5	126	133	141	37.5	-	-	-
35.	Loss of containment from toluene tanker 30 MT	4	112	120	130	4	-	-	-
		12.5	47	48	50	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
36.	Loss of containment from VAM tanker 30 MT	4	213	215	217	4	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
		12.5	133	137	141	12.5	-	-	-
		37.5	74	80	89	37.5	-	-	-
37.	Loss of containment from Naphtha tanker 20 MT	4	20	21	21	4	-	-	-
		12.5	14	14.2	15.6	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
38.	Loss of containment from acetic acid tanker 20 MT	4	84	85	87	4	-	-	-
		12.5	52	56	59	12.5	-	-	-
		37.5	NR	NR	NR	37.5	-	-	-
39.	Loss of containment from methanol tanker 20 MT	4	102	103	104	4	-	-	-
		12.5	67	70	72	12.5	-	-	-
		37.5	40	40	40	37.5	-	-	-
40.	Loss of containment from P- Xylene tanker 20 MT	4	274	276	276	4	-	-	-
		12.5	170	173	177	12.5	-	-	-
		37.5	104	110	117	37.5	-	-	-
41.	Loss of containment from Toluene tanker 20 MT	4	95	102	111	4	-	-	-

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results				
		Radiation Levels (KW/m2)	Distance in meters			Radiation Levels (KW/m2)	Distance in meters			
			2F	3D	5C/D		2F	3D	5C/D	
		12.5	39	40	41	12.5	-	-	-	
		37.5	NR	NR	NR	37.5	-	-	-	
42.	Loss of containment from vinyl acetate monomer (VAM) tanker 20 MT	4	178	179	181	4	-	-	-	
		12.5	111	115	118	12.5	-	-	-	
		37.5	60	65	73	37.5	-	-	-	
43.	Acetic acid pump P-40 discharge line full bore rupture	4	93	94	95	4	41	39	40	
		12.5	61	64	67	12.5	33	32	32	
		37.5	NR	NR	NR	37.5	NR	NR	NR	
44.	Gasoil pump P-101 discharge line full bore rupture	4	93	98	104	4	66	64	68	
		12.5	45	45	47	12.5	51	48	50	
		37.5	NR	NR	NR	37.5	41	38	40	
45.	Methanol pump P-119 discharge line full bore rupture	4	100	101	103	4	103	104	99	
		12.5	69	72	75	12.5	84	86	81	
		37.5	45	46	46	37.5	NR	NR	NR	
46.	Naphtha pump P- 01 discharge line full bore	4	65	67	66	4	211	213	208	

Scenario No.	Scenario Description	Pool Fire Results				Jet Fire Results			
		Radiation Levels (kW/m2)	Distance in meters			Radiation Levels (kW/m2)	Distance in meters		
			2F	3D	5C/D		2F	3D	5C/D
	rupture	12.5	43	45	46	12.5	158	158	151
		37.5	NR	NR	NR	37.5	127	125	118
47.	P-Xylene pump P-39 discharge line full bore rupture	4	263	265	264	4	49	51	47
		12.5	166	169	172	12.5	38	39	35
		37.5	105	110	117	37.5	31	32	28
48.	Toluene pump P-122 discharge line full bore rupture	4	97	105	112	4	72	77	75
		12.5	44	45	46	12.5	56	59	56
		37.5	NR	NR	NR	37.5	46	48	45
49.	VAM pump P-24 discharge line full bore rupture	4	177	179	180	4	116	112	112
		12.5	113	117	120	12.5	91	87	86
		37.5	65	70	77	37.5	75	72	71

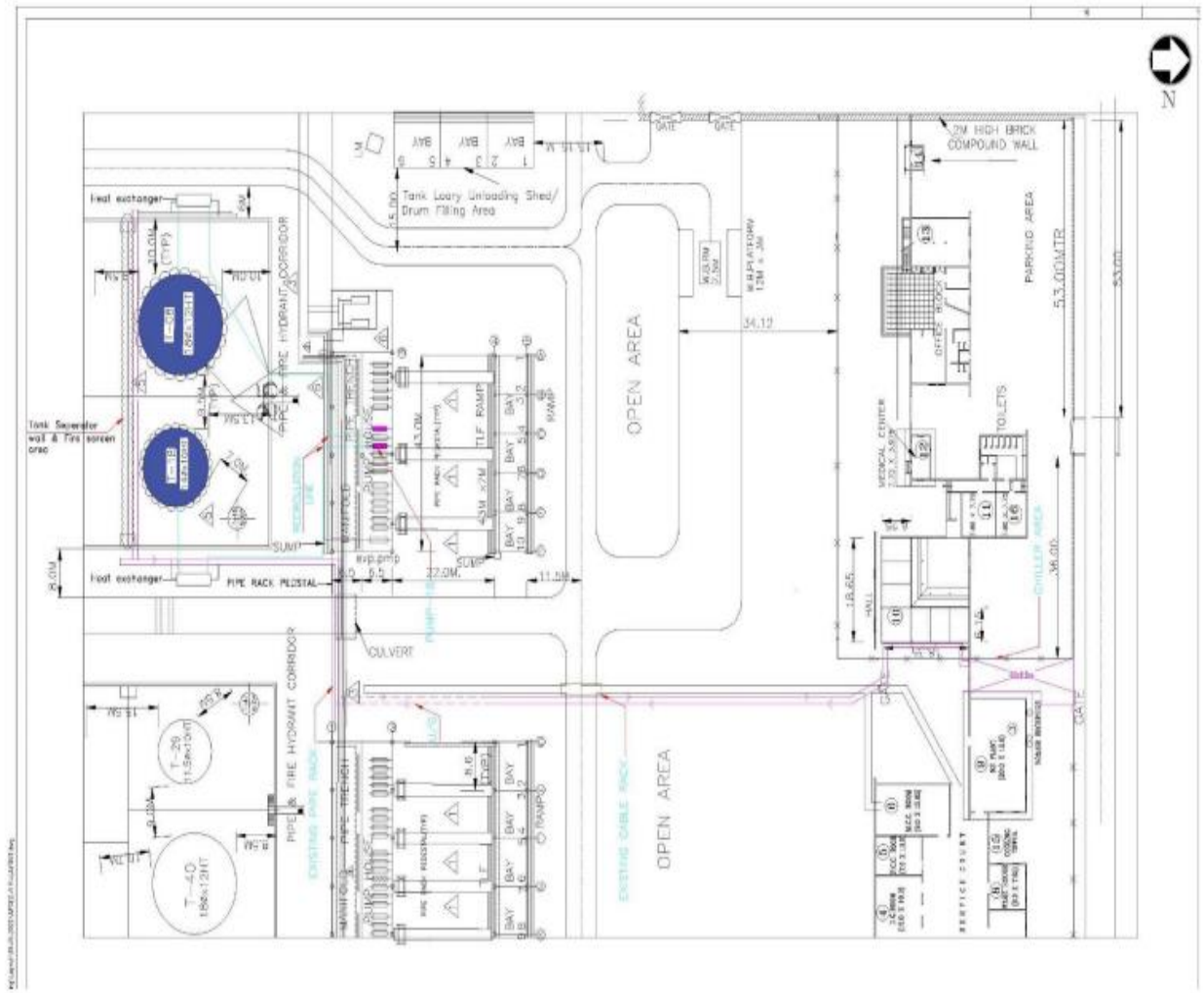
TABLE 4: CONSEQUENCE RESULTS FOR POOL FIRE AT STYRENE STORAGE AND TRANSFER PUMP AREA

Failure Events	Leak Scenarios	Weather	Pool Diameter (m)	Pool Fire		
				Distance downwind (4 kW/m²) [m]	Distance downwind (12.5 kW/m²) [m]	Distance downwind (37.5 kW/m²) [m]
Failure - Tank T-08 : Styrene Storage Tank	7 mm	3/F	9.15	32.35	21.52	10.00
		10/D	8.99	34.13	25.11	11.11
	25 mm	3/F	32.75	57.72	27.99	22.41
		10/D	32.22	64.44	27.80	23.01
	FBR	3/F	100.00	128.13	66.08	56.97
		10/D	98.53	145.90	64.91	57.27
Failure - Tank T-18 : Styrene	7 mm	3/F	9.15	32.35	21.52	10.00
		10/D	8.99	34.13	25.11	11.11

Failure Events	Leak Scenarios	Weather	Pool Diameter (m)	Pool Fire	
				Distance downwind (4 kW/m²) [m]	Distance downwind (12.5 kW/m²) [m]	Distance downwind (37.5 kW/m²) [m]
Storage Tank	25 mm	3/F	32.75	57.72	27.99	22.41
		10/D	32.22	64.44	27.80	23.01
	FBR	3/F	100.00	128.13	66.08	56.97
		10/D	98.53	145.90	64.91	57.27
Failure – P-08 : Styrene transfer pump	7 mm	3/F	10.86	35.61	23.27	10.92
		10/D	10.66	37.96	27.97	12.27
	25 mm	3/F	38.88	65.16	32.37	26.86
		10/D	38.24	73.32	31.71	27.47
	FBR	3/F	79.09	108.75	56.16	48.19
		10/D	77.91	123.65	55.07	48.66

Failure Events	Leak Scenarios	Weather	Pool Diameter (m)	Pool Fire		
				Distance downwind (4 kW/m²) [m]	Distance downwind (12.5 kW/m²) [m]	Distance downwind (37.5 kW/m²) [m]
Failure – P-18 : Styrene transfer pump	7 mm	3/F	10.86	35.61	23.27	10.92
		10/D	10.66	37.96	27.97	12.27
	25 mm	3/F	38.88	65.16	32.37	26.86
		10/D	38.24	73.32	31.71	27.47
	FBR	3/F	79.09	108.75	56.16	48.19
		10/D	77.91	123.65	55.07	48.66

Styrene Storage Tank and Transfer Pump Facility, Mundra



Failure - Tank T-08 : Pool Fire Contour – 7 mm Leak

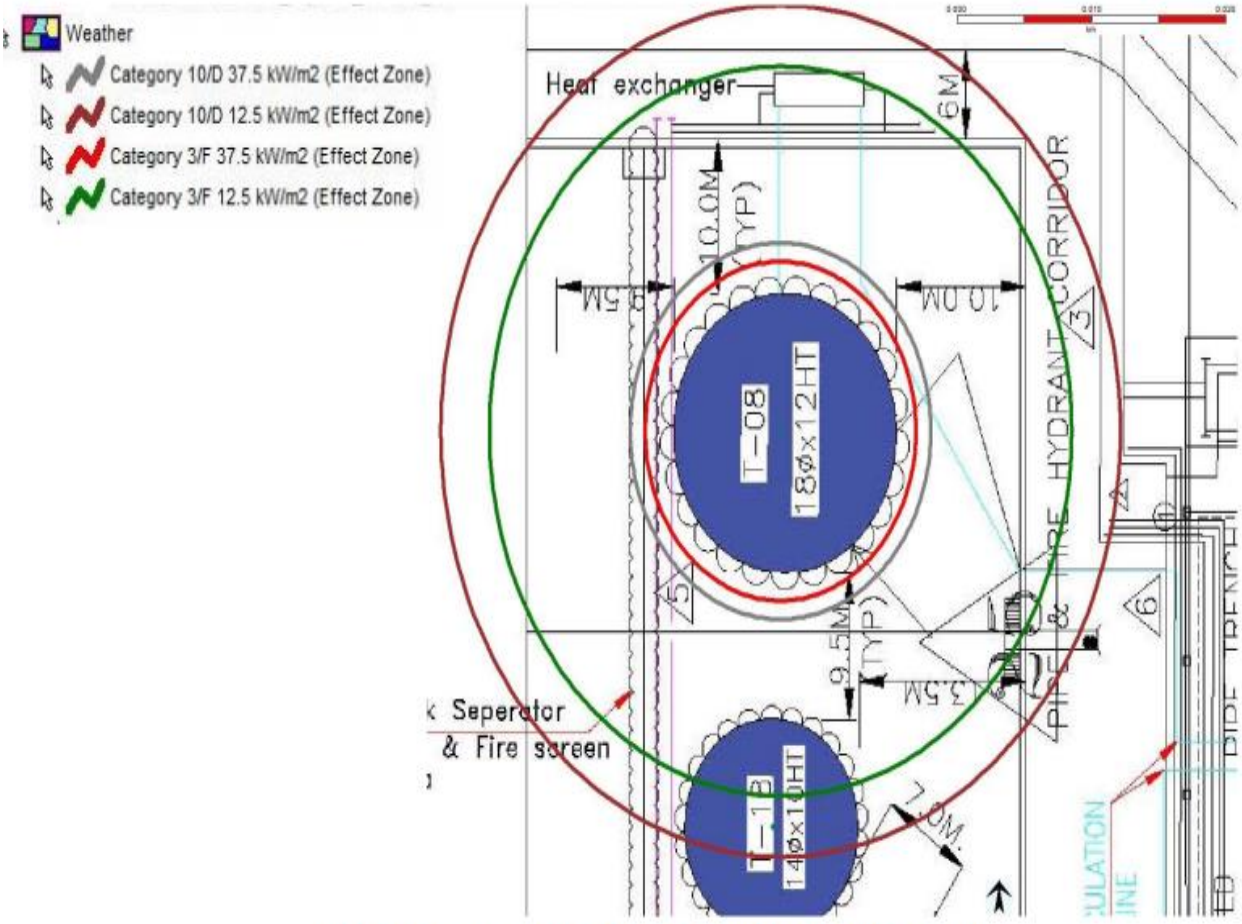


FIGURE 7: FAILURE - TANK T-08 : POOL FIRE CONTOUR – 7 MM LEAK

Failure - Tank T-08 : Pool Fire Contour – 25 mm Leak

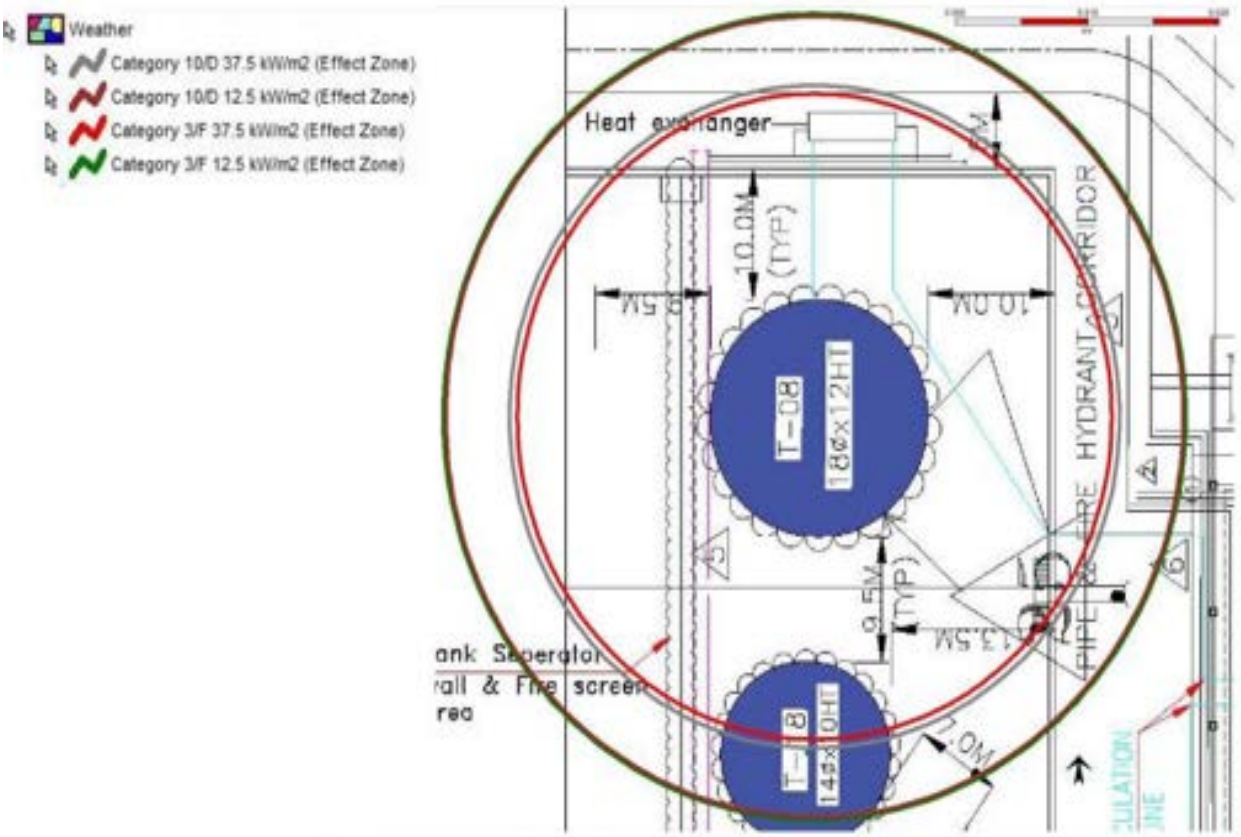


FIGURE 9: FAILURE - TANK T-08 : POOL FIRE CONTOUR – 25 MM LEAK

Failure - Tank T-18 : Pool Fire Contour – 7 mm Leak

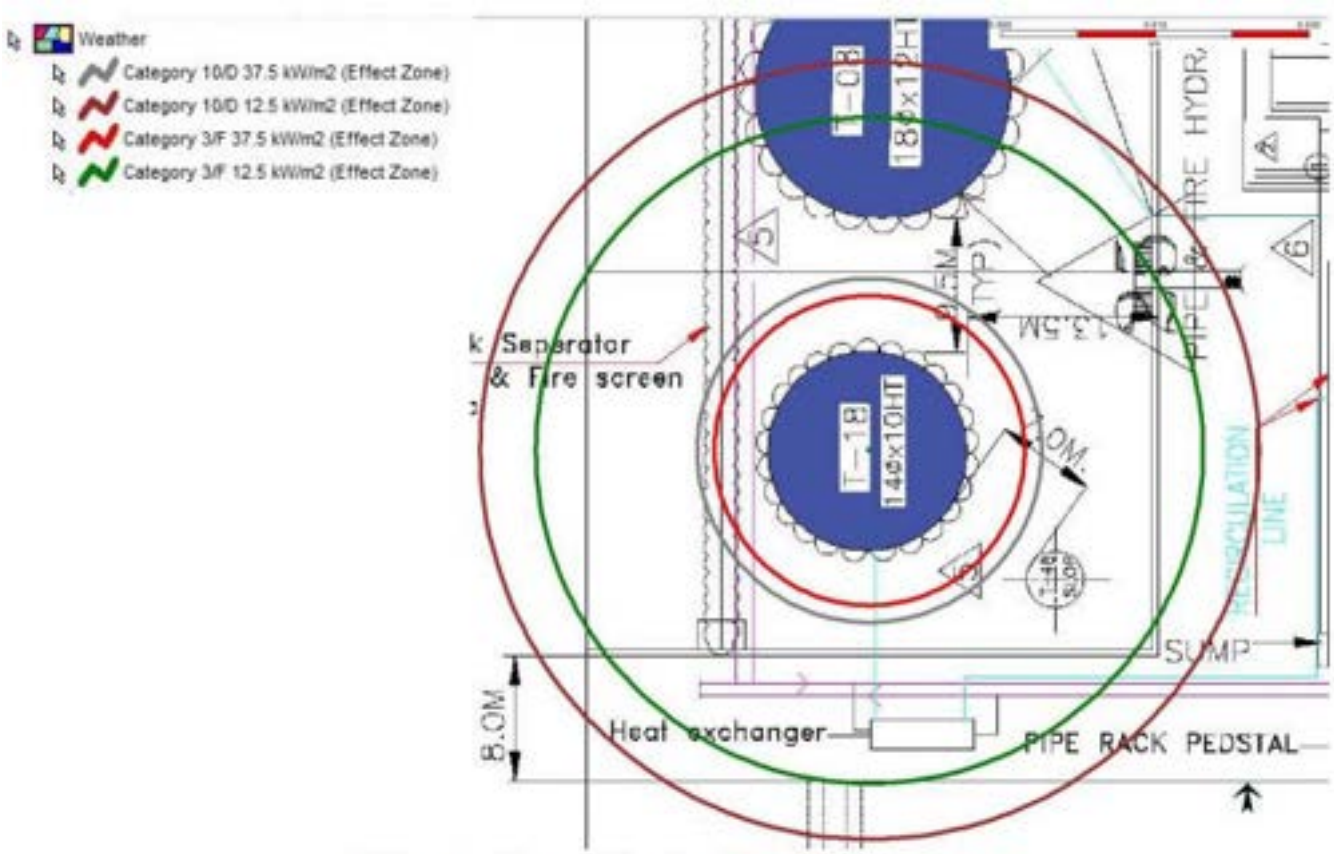


FIGURE 11: FAILURE - TANK T-18 : POOL FIRE CONTOUR – 7 MM LEAK

Failure - Tank T-18 : Pool Fire Contour – 25 mm Leak

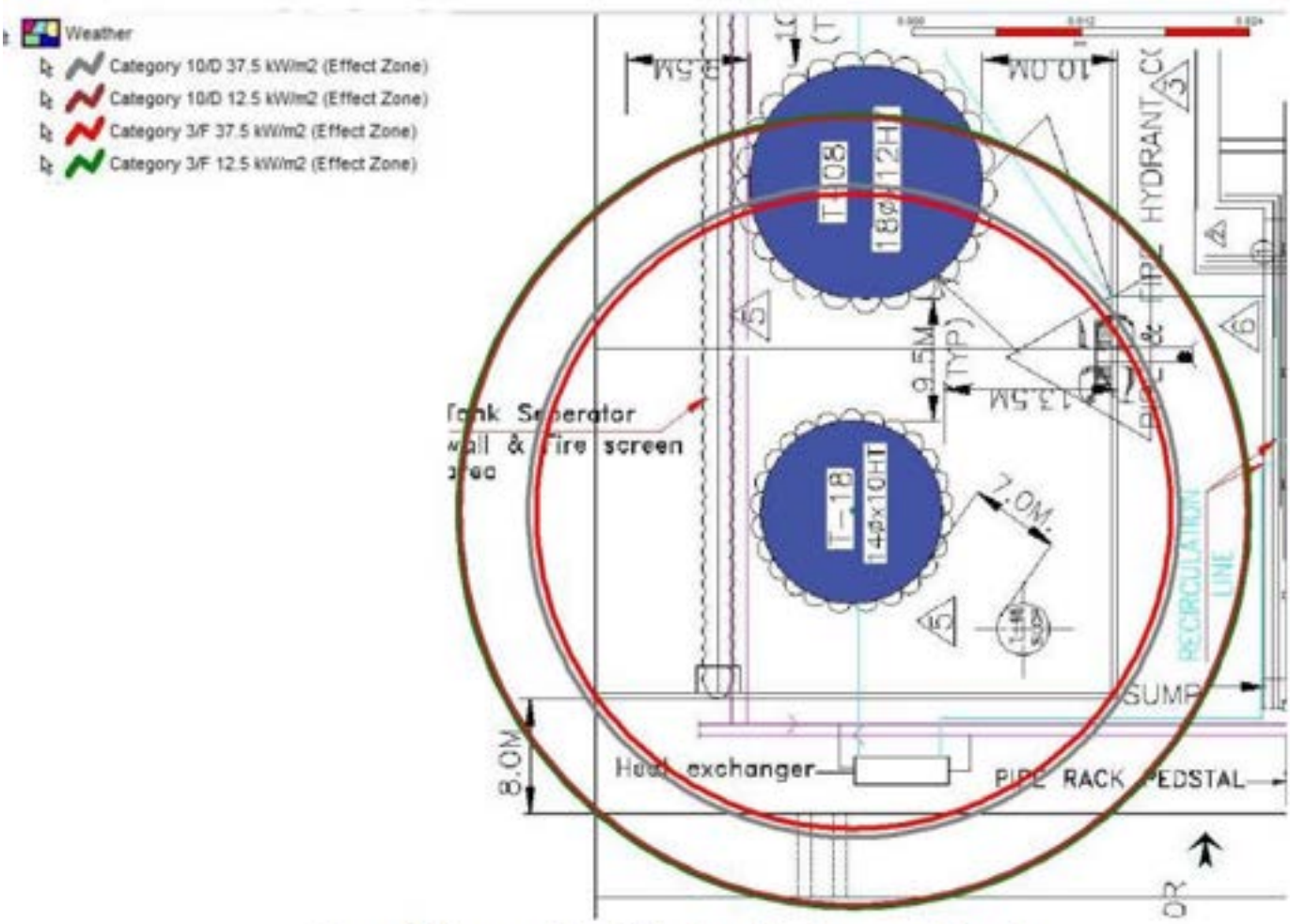


FIGURE 13: FAILURE - TANK T-18 : POOL FIRE CONTOUR – 25 MM LEAK

Failure – Pump P-08 : Pool Fire Contour – 7 mm Leak

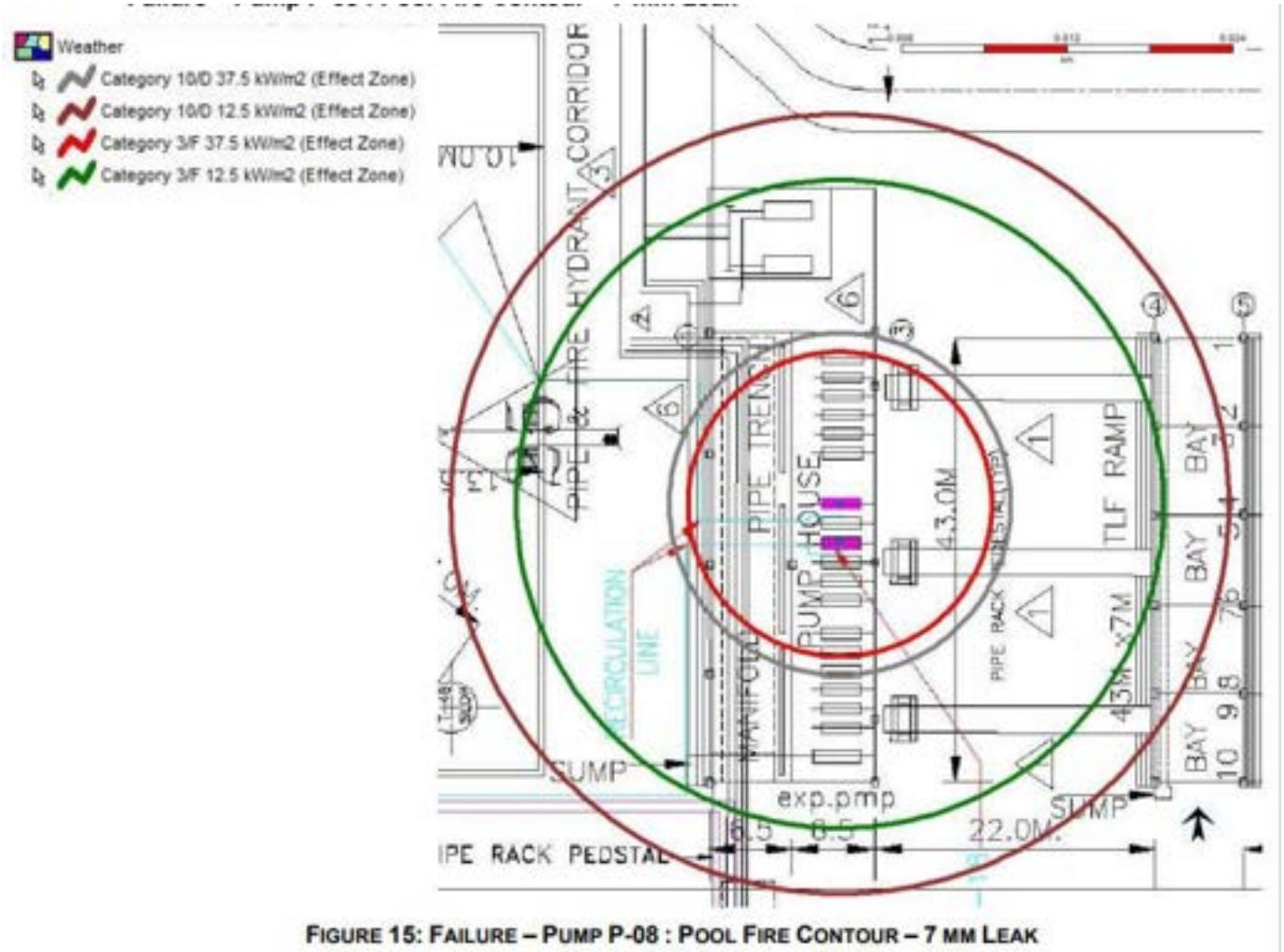


FIGURE 15: FAILURE – PUMP P-08 : POOL FIRE CONTOUR – 7 MM LEAK

Failure – Pump P-08 : Pool Fire Contour – 25 mm Leak

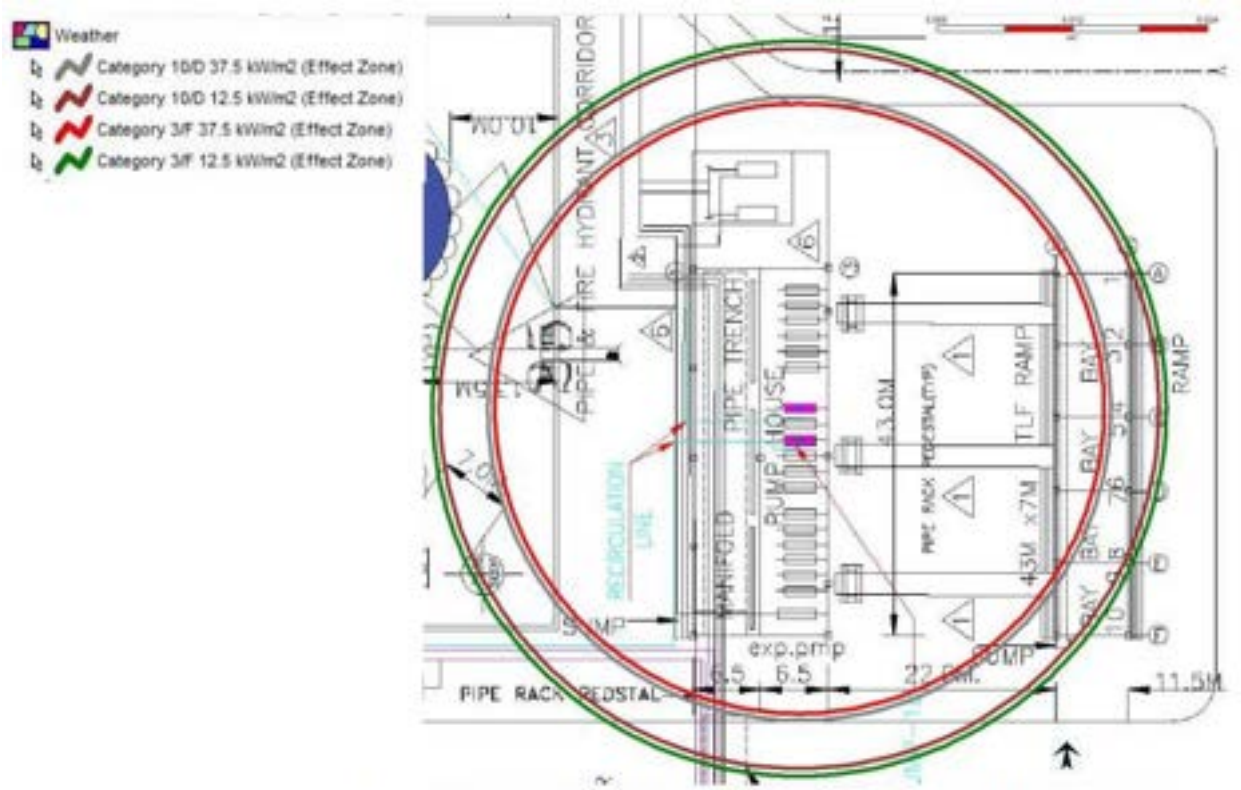


FIGURE 17: FAILURE – PUMP P-08 : POOL FIRE CONTOUR – 25 MM LEAK

Failure - Tank T-08 : As worst case scenario of rapid heating : Toxic styrene vapour dispersion downwind – IDLH 700 ppm

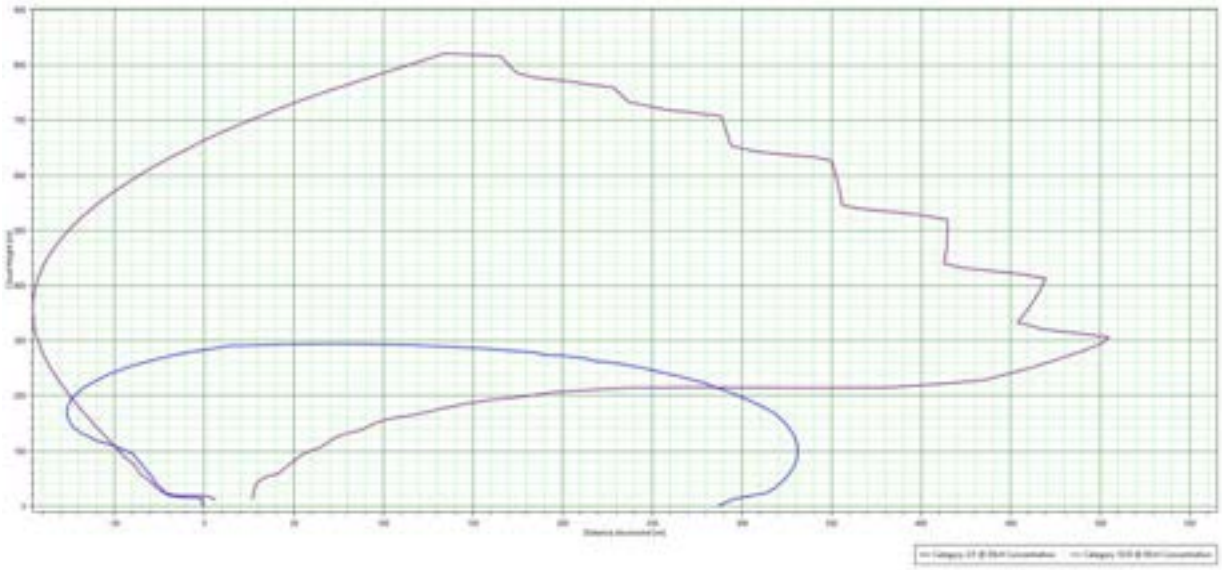


FIGURE 23: FAILURE - TANK T-08 : AS WORST CASE SCENARIO OF RAPID HEATING : TOXIC STYRENE VAPOUR DISPERSION DOWNWIND – IDLH 700 PPM

Toxic styrene vapour dispersion downwind Distance (IDLH 700 ppm) for 3/F : 331.18 m

Toxic styrene vapour dispersion downwind Distance (IDLH 700 ppm) for 10/D : 504.89 m

Failure - Tank T-18 : As worst case scenario of rapid heating : Toxic styrene vapour dispersion downwind – IDLH 700 ppm

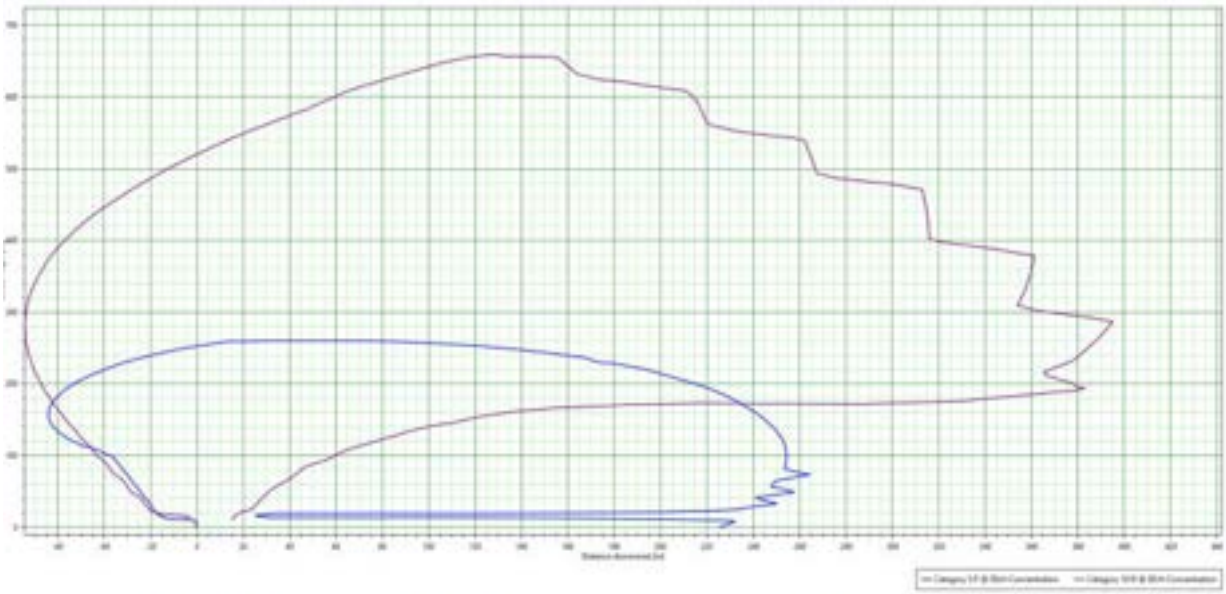
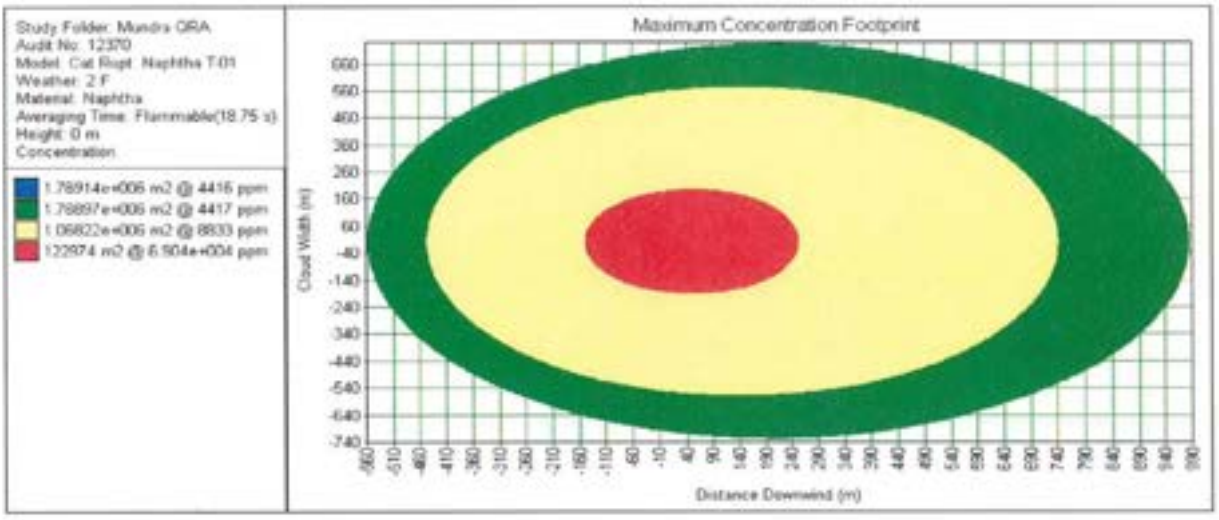


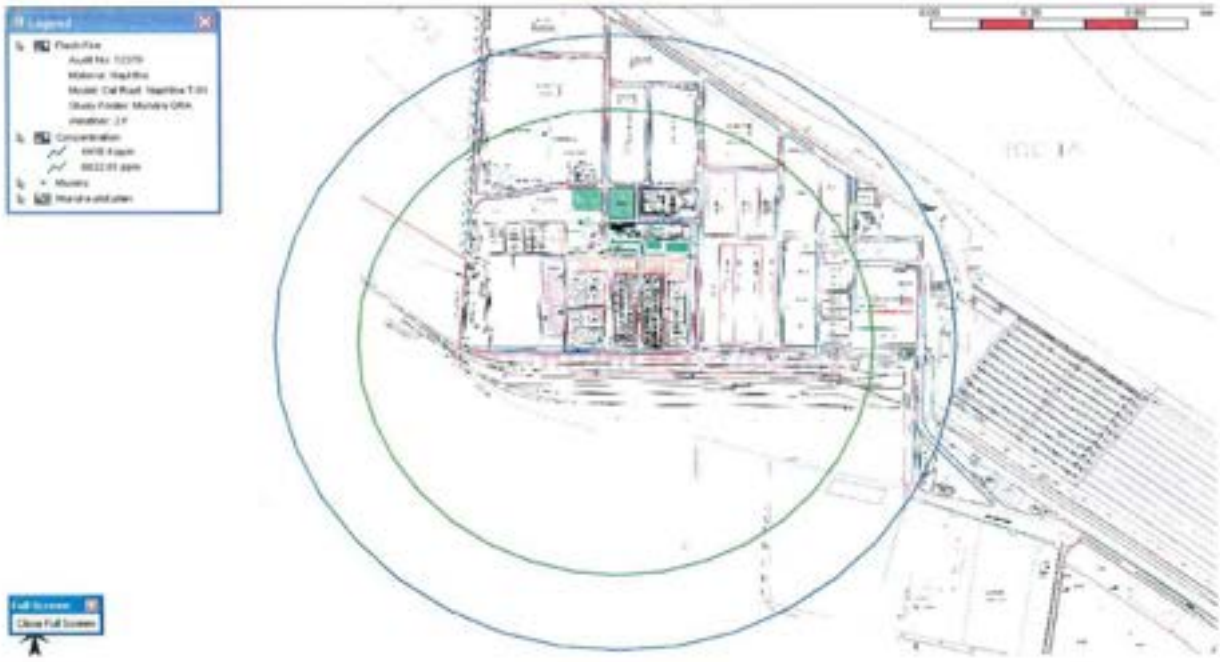
FIGURE 24: FAILURE - TANK T-18 : AS WORST CASE SCENARIO OF RAPID HEATING : TOXIC STYRENE VAPOUR DISPERSION DOWNWIND – IDLH 700 PPM

Toxic styrene vapour dispersion downwind Distance (IDLH 700 ppm) for 3/F : 264.63 m

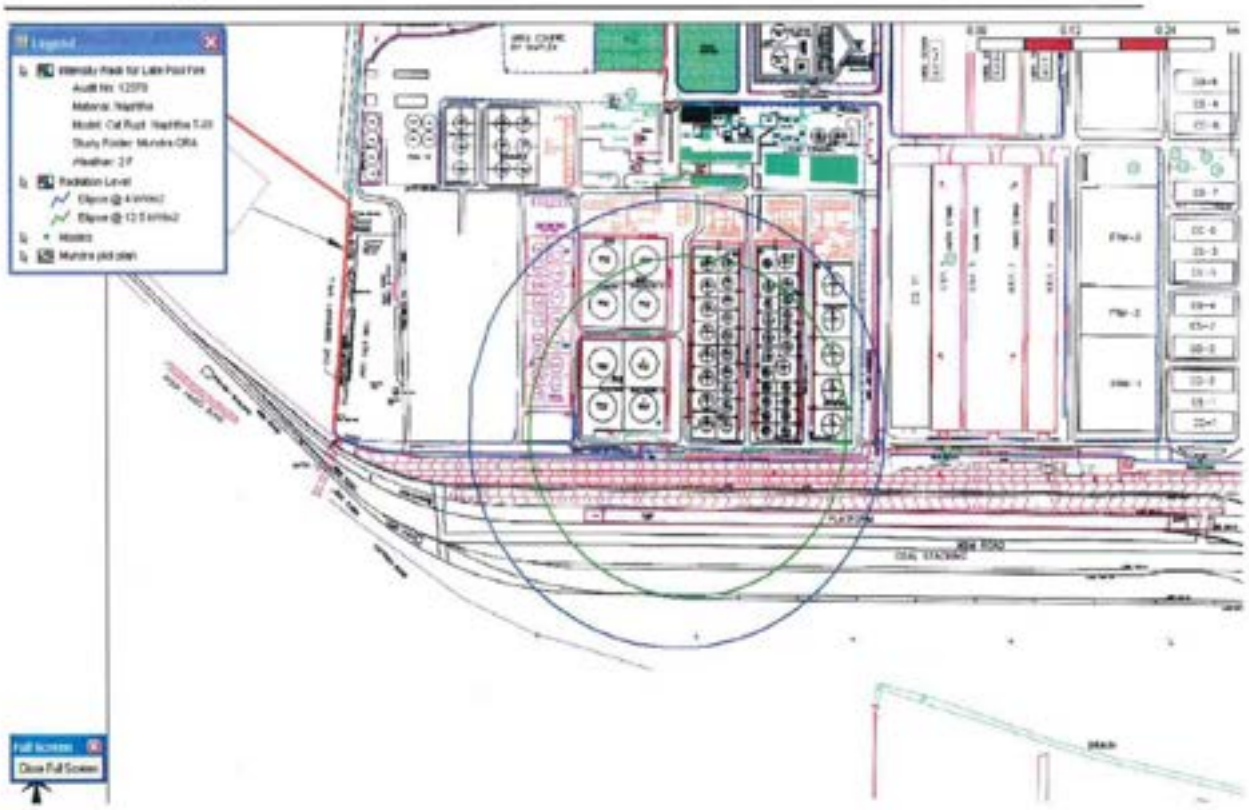
Toxic styrene vapour dispersion downwind Distance (IDLH 700 ppm) for 10/D : 395.06 m

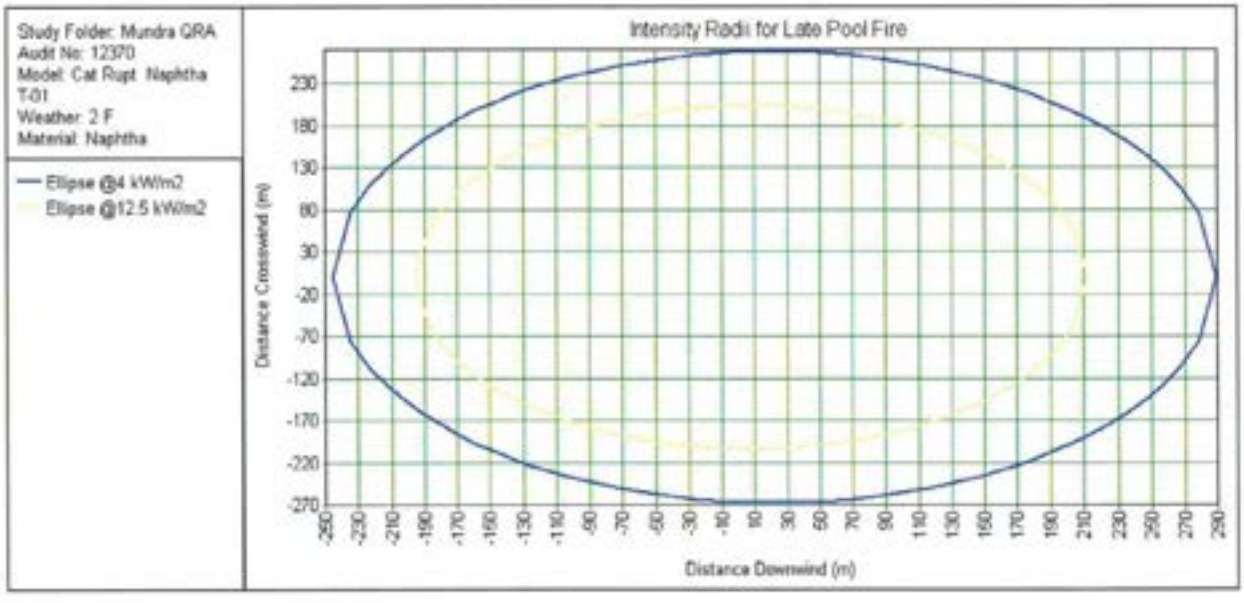
Scenario No.:1

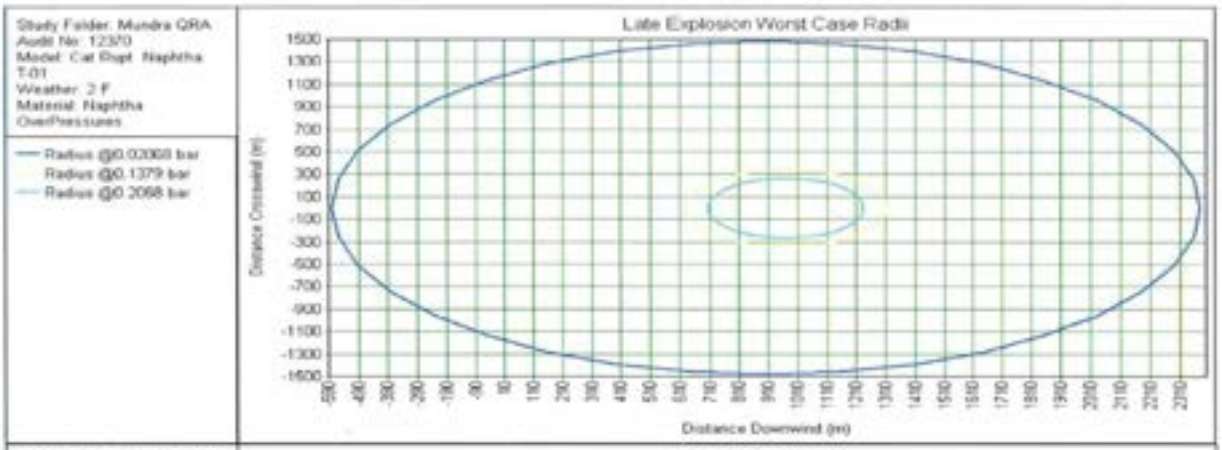


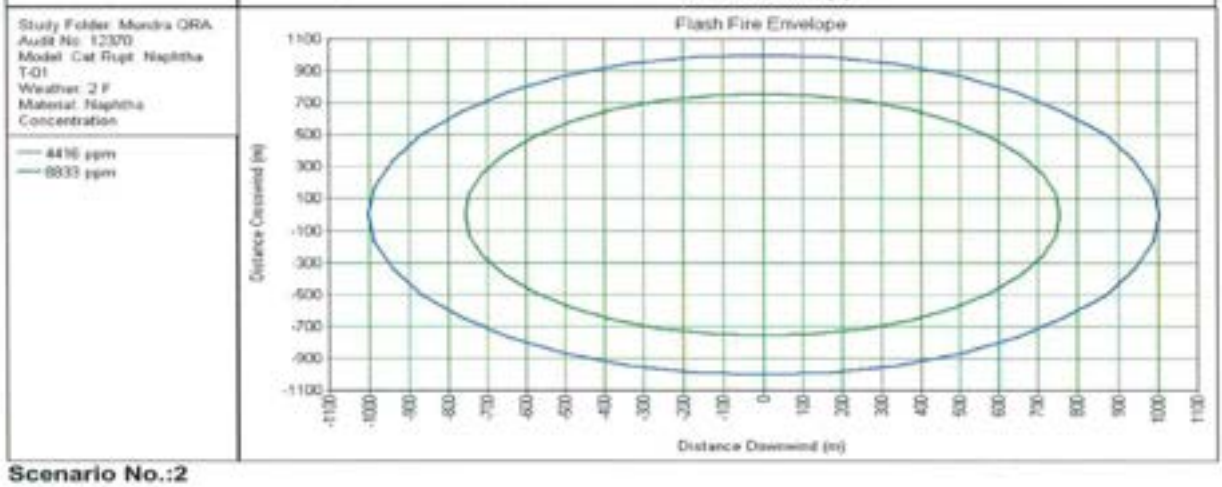


Mundra QRA Study

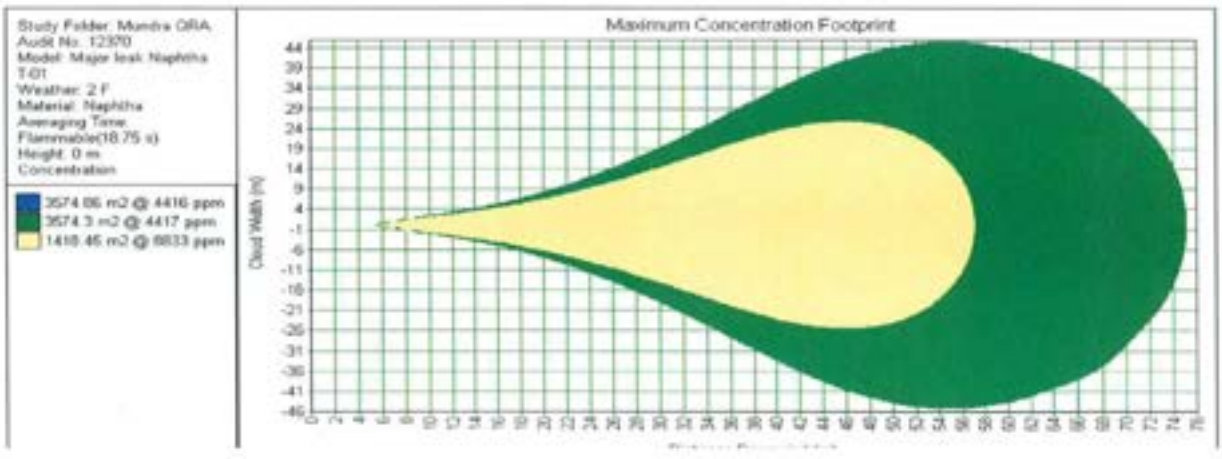


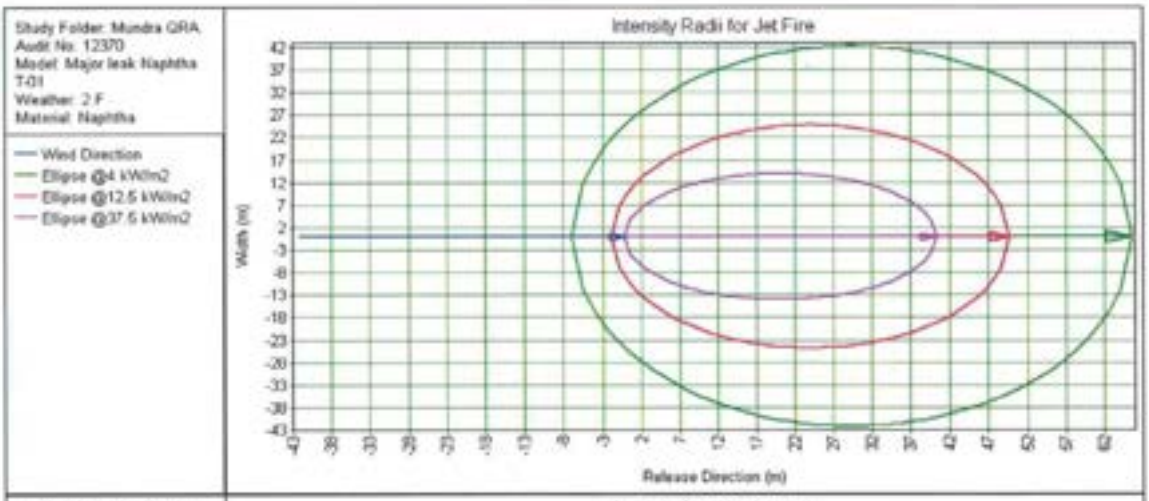


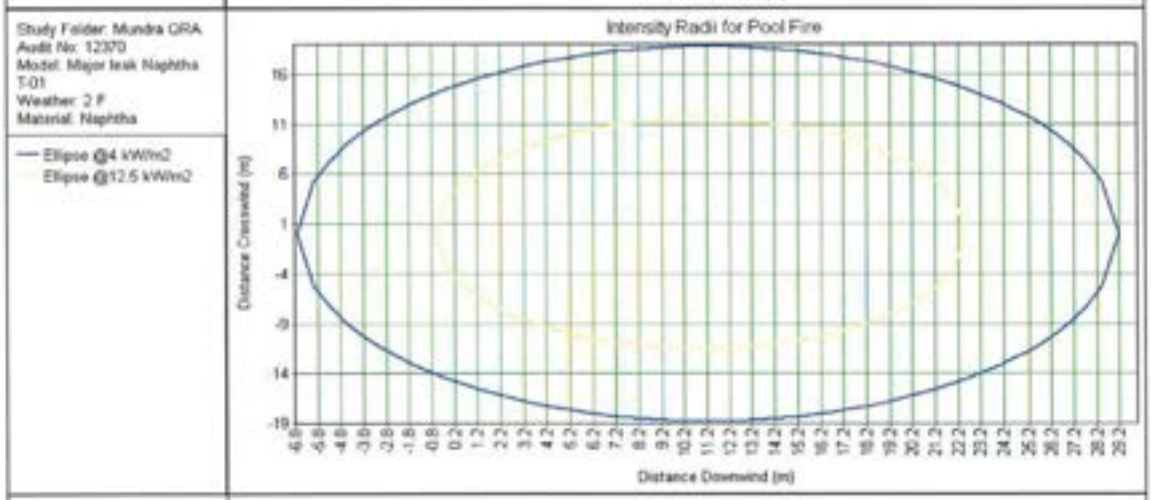


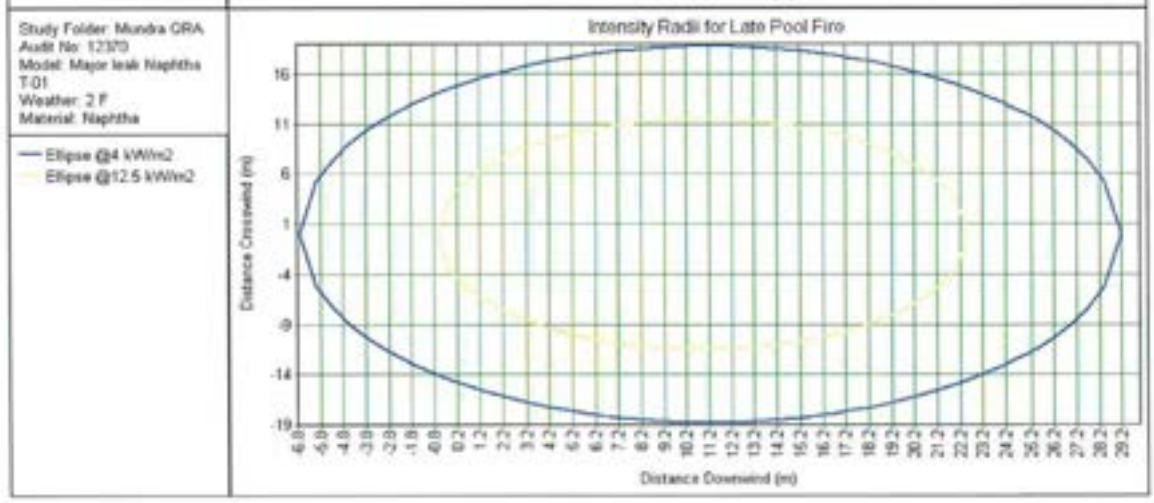


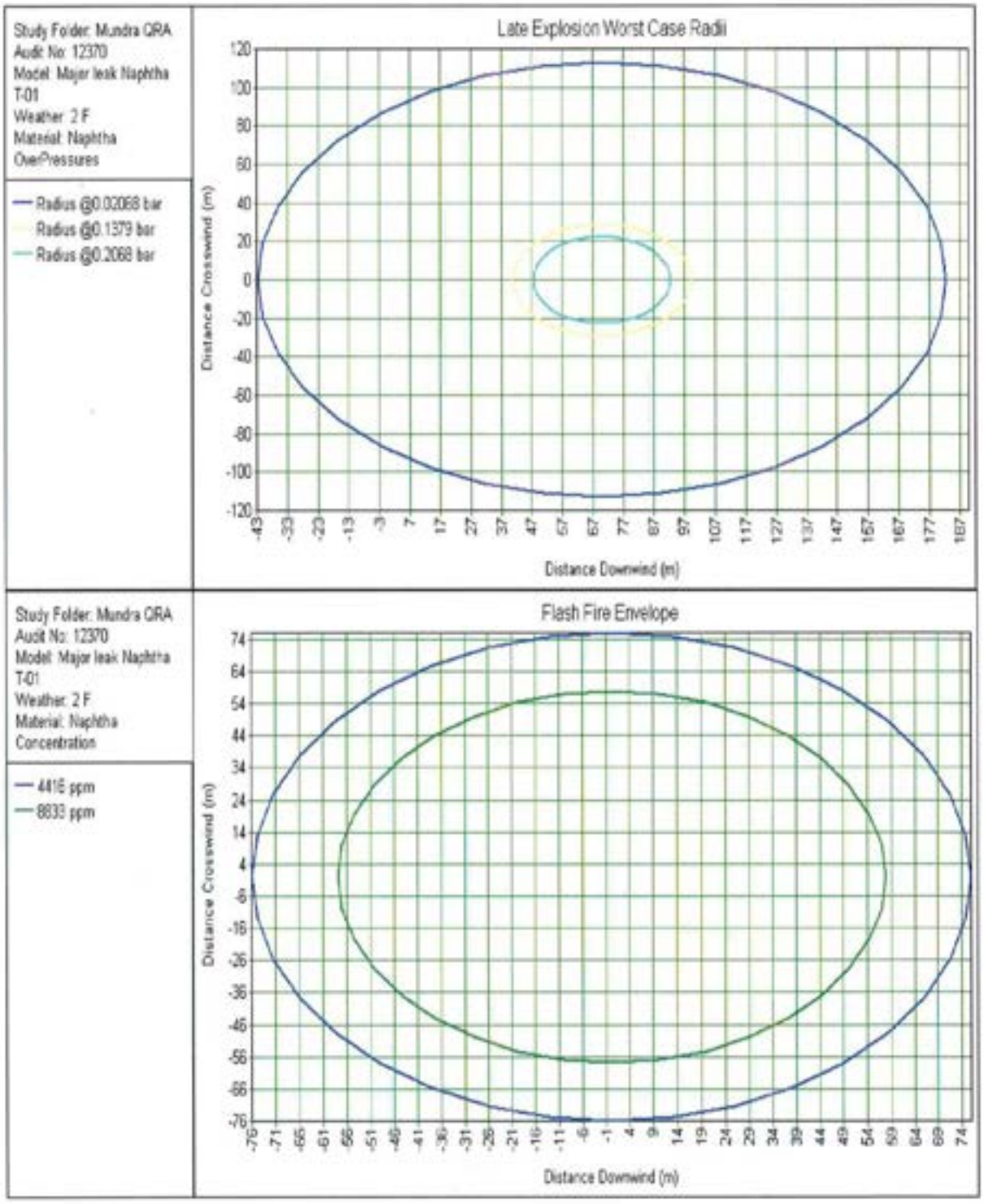
Scenario No.:2

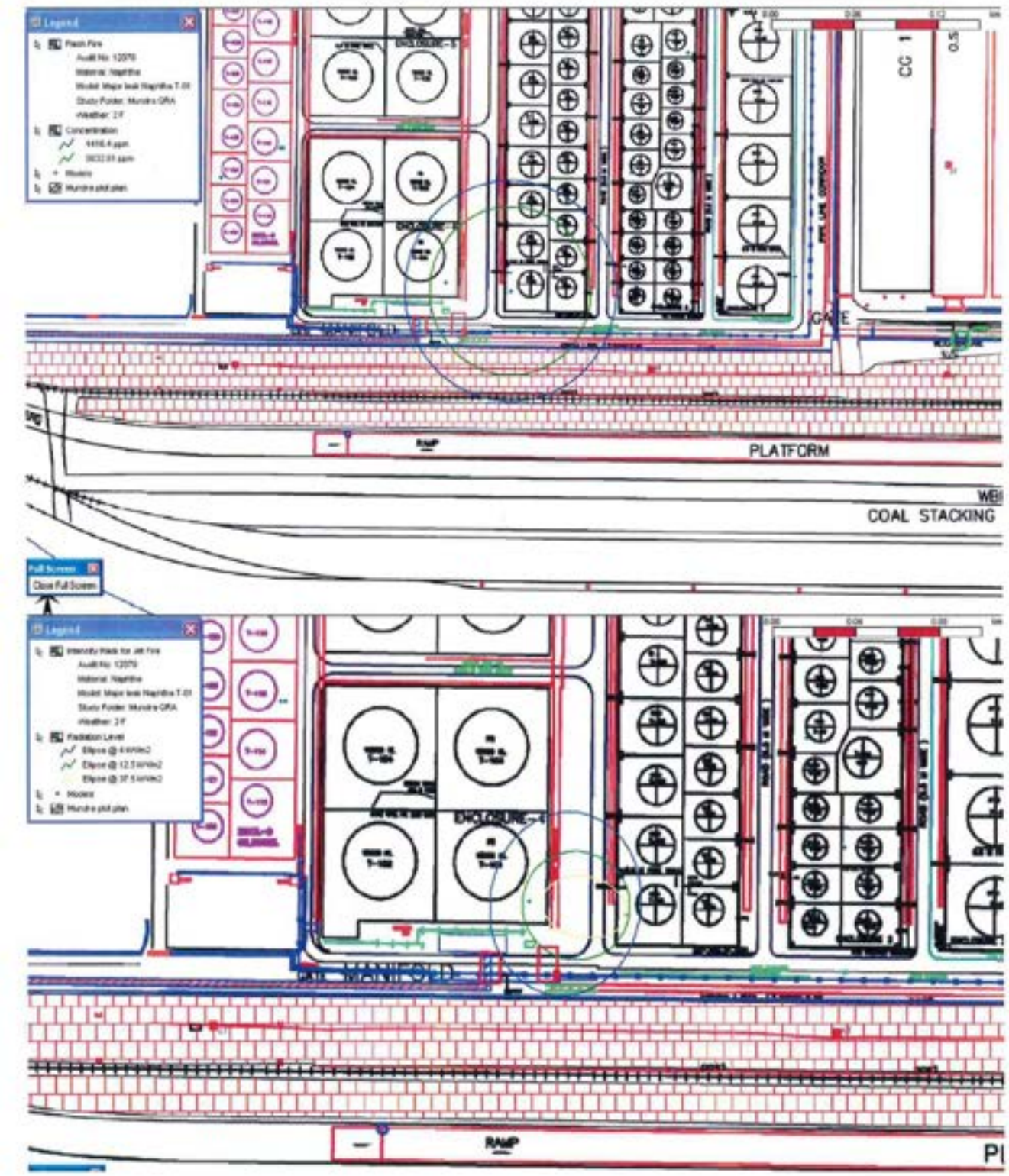


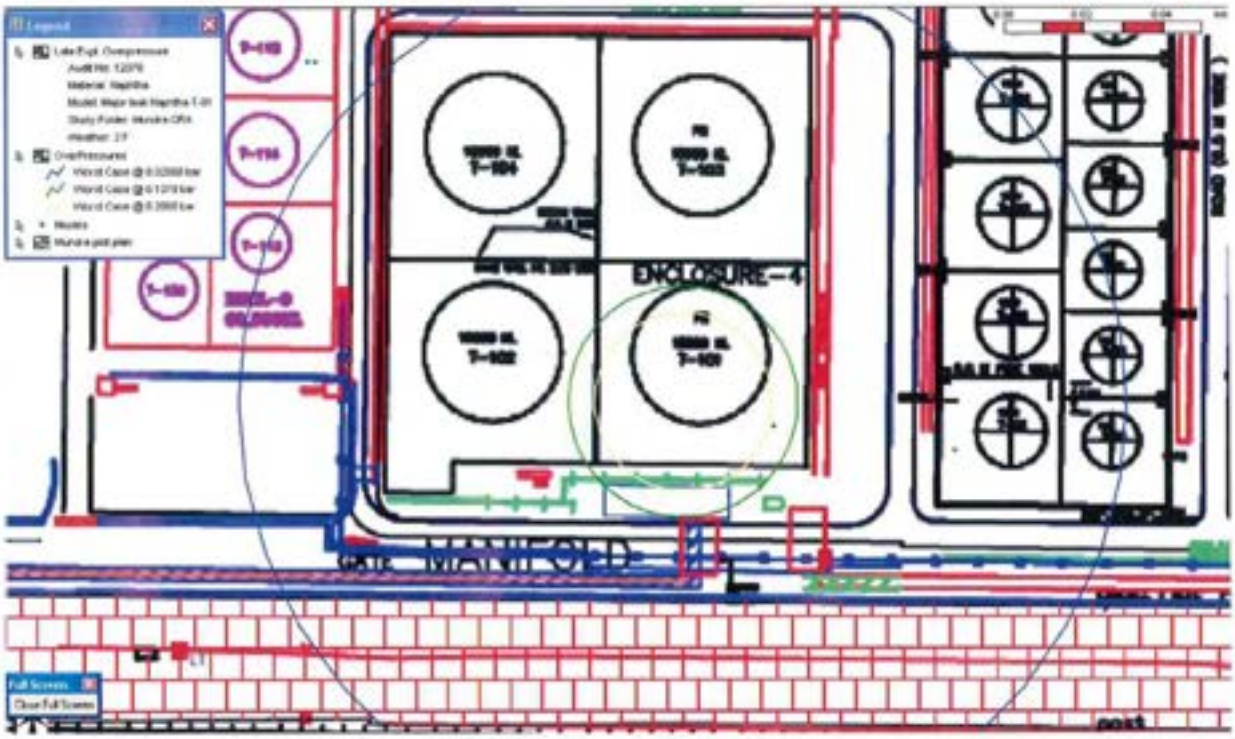

Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Wind Direction
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Jet Fire
Width (m)
Release Direction (m)

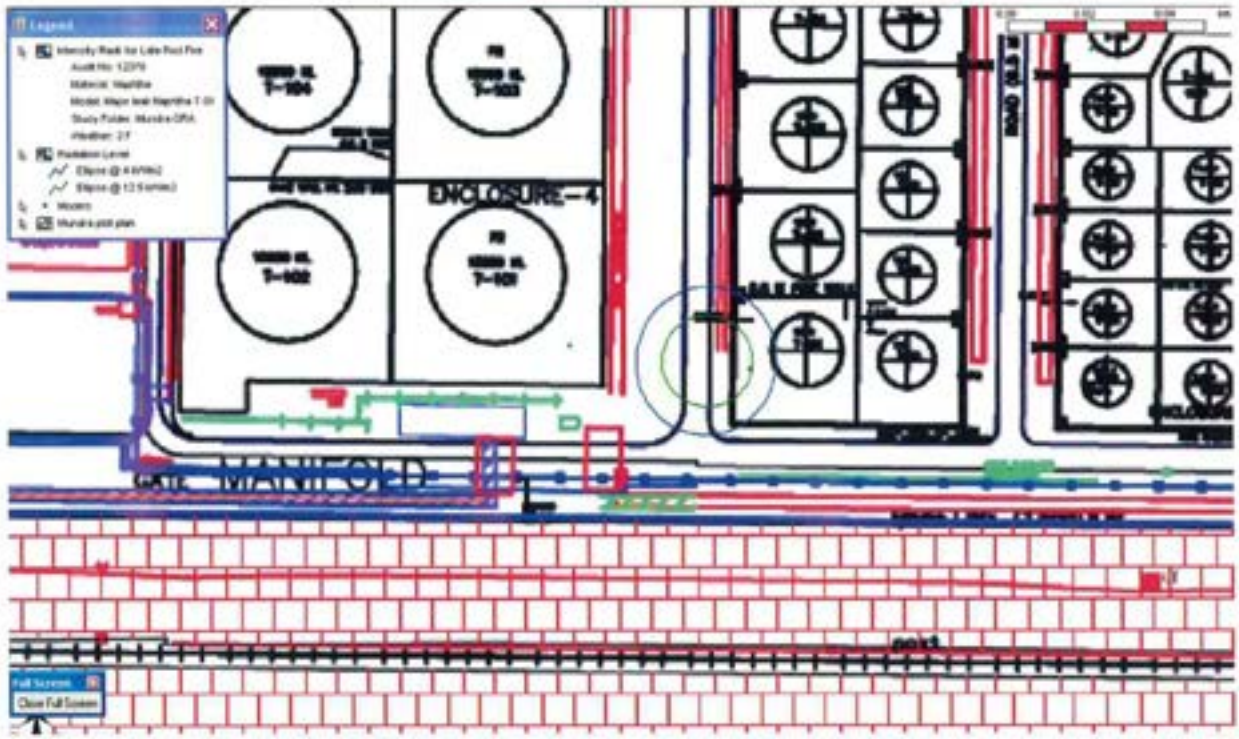

Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Pool Fire
Distance Crosswind (m)
Distance Downwind (m)


Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)


Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
OverPressures
Radius @0.02068 bar
Radius @0.1379 bar
Radius @0.2068 bar
Late Explosion Worst Case Radii
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Concentration
4416 ppm
8833 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)


PLATFORM
COAL STACKING
RAMP

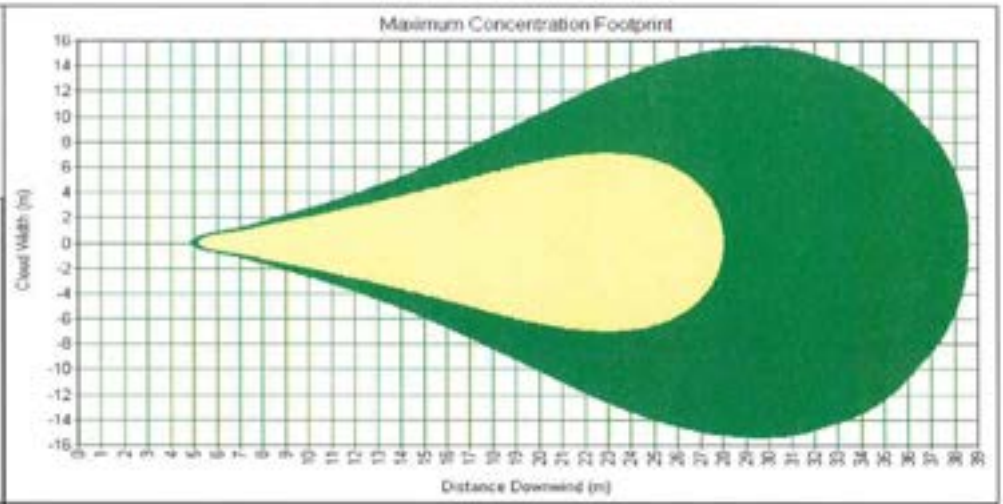

ENCLOSURE-4
MANIFOLD


ENCLOSURE-4
MANIFOLD

Scenario No.:3

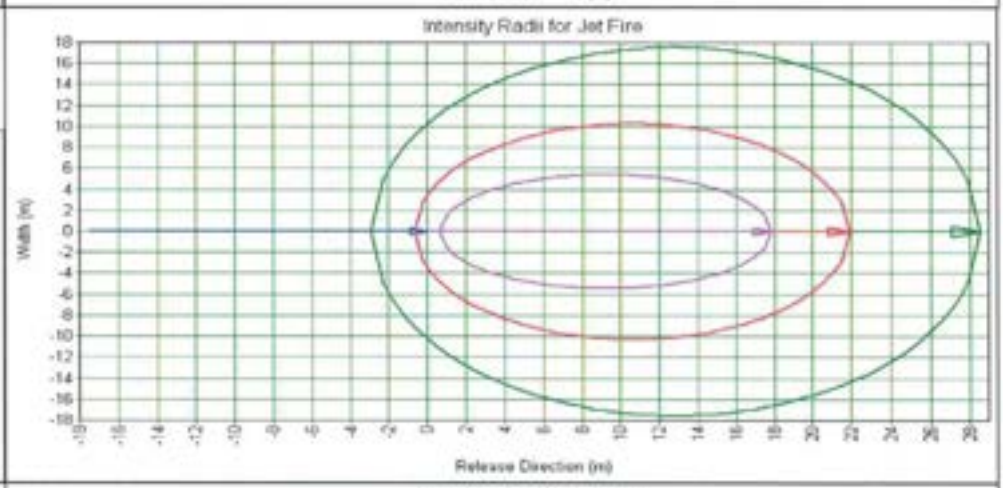
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Averaging Time: Flammable(18.75 s)
Height: 0 m
Concentration

617.874 m2 @ 4416 ppm
617.761 m2 @ 4417 ppm
192.56 m2 @ 8833 ppm



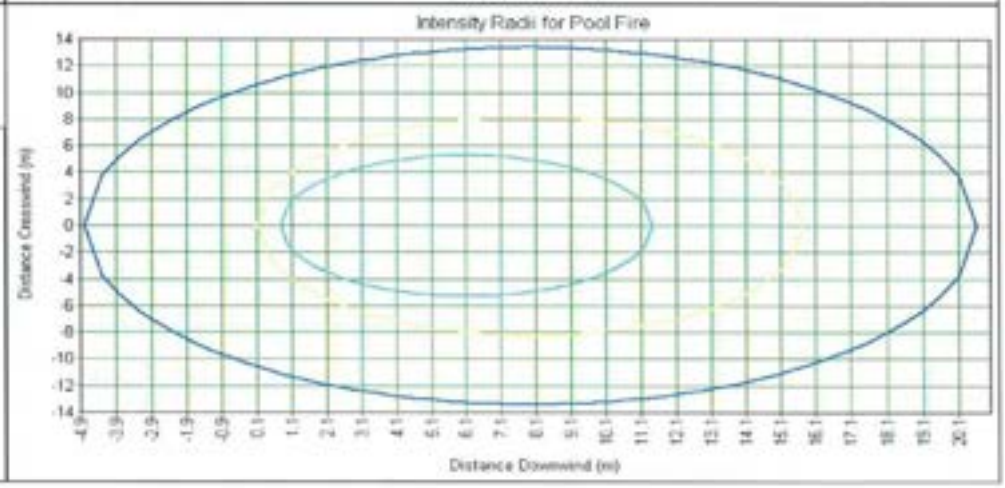
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha

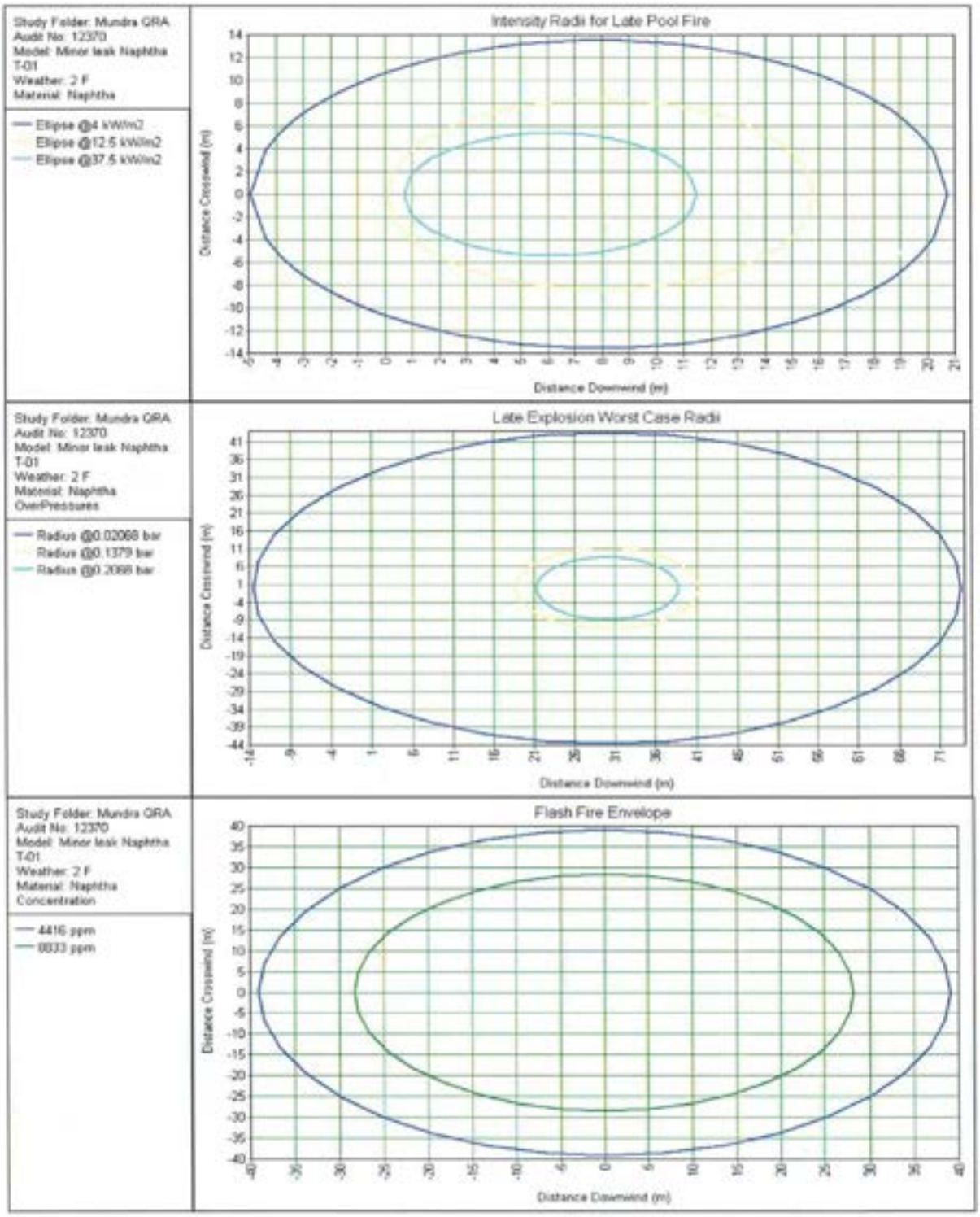
Wind Direction
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2

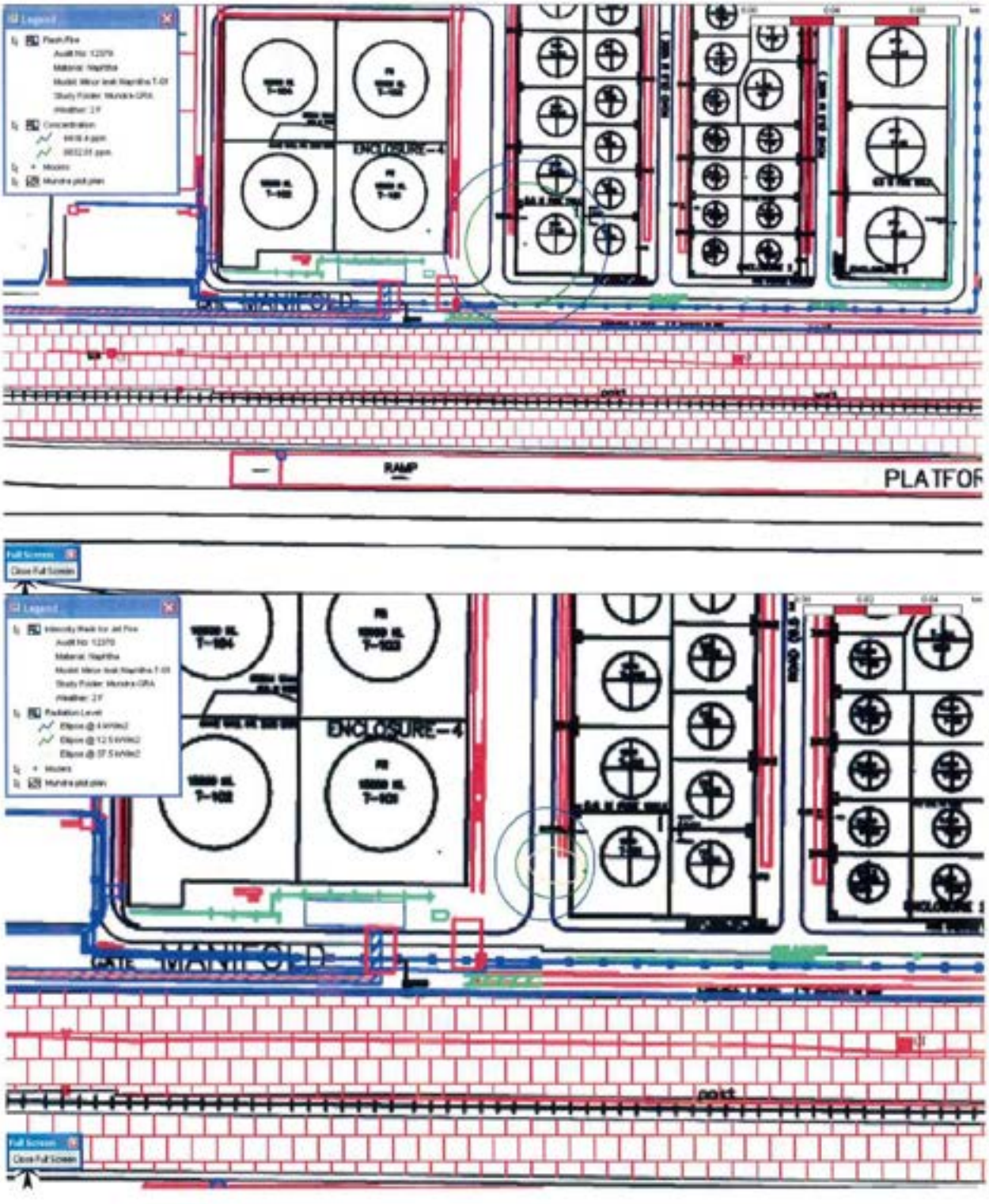


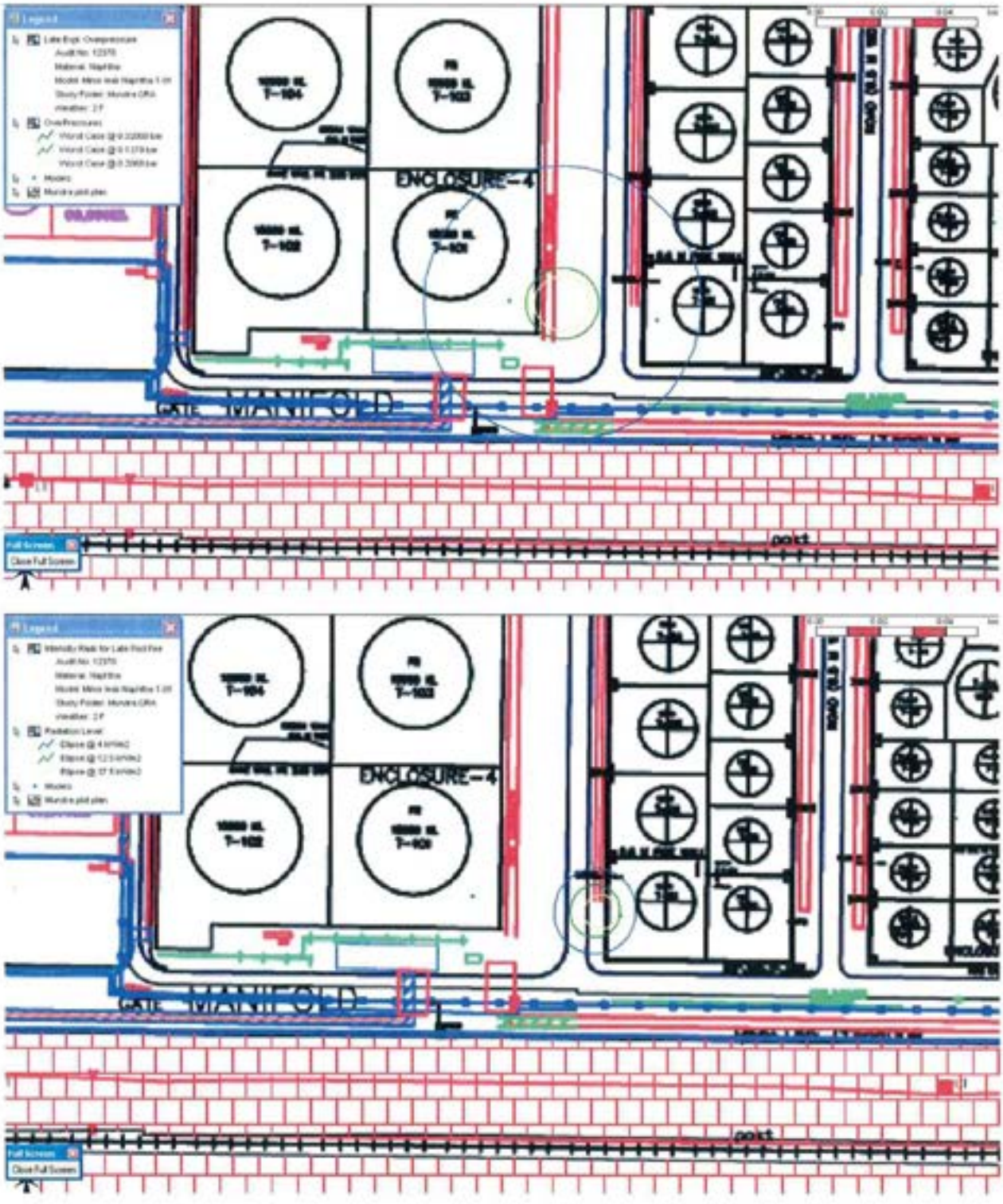
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha

Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2

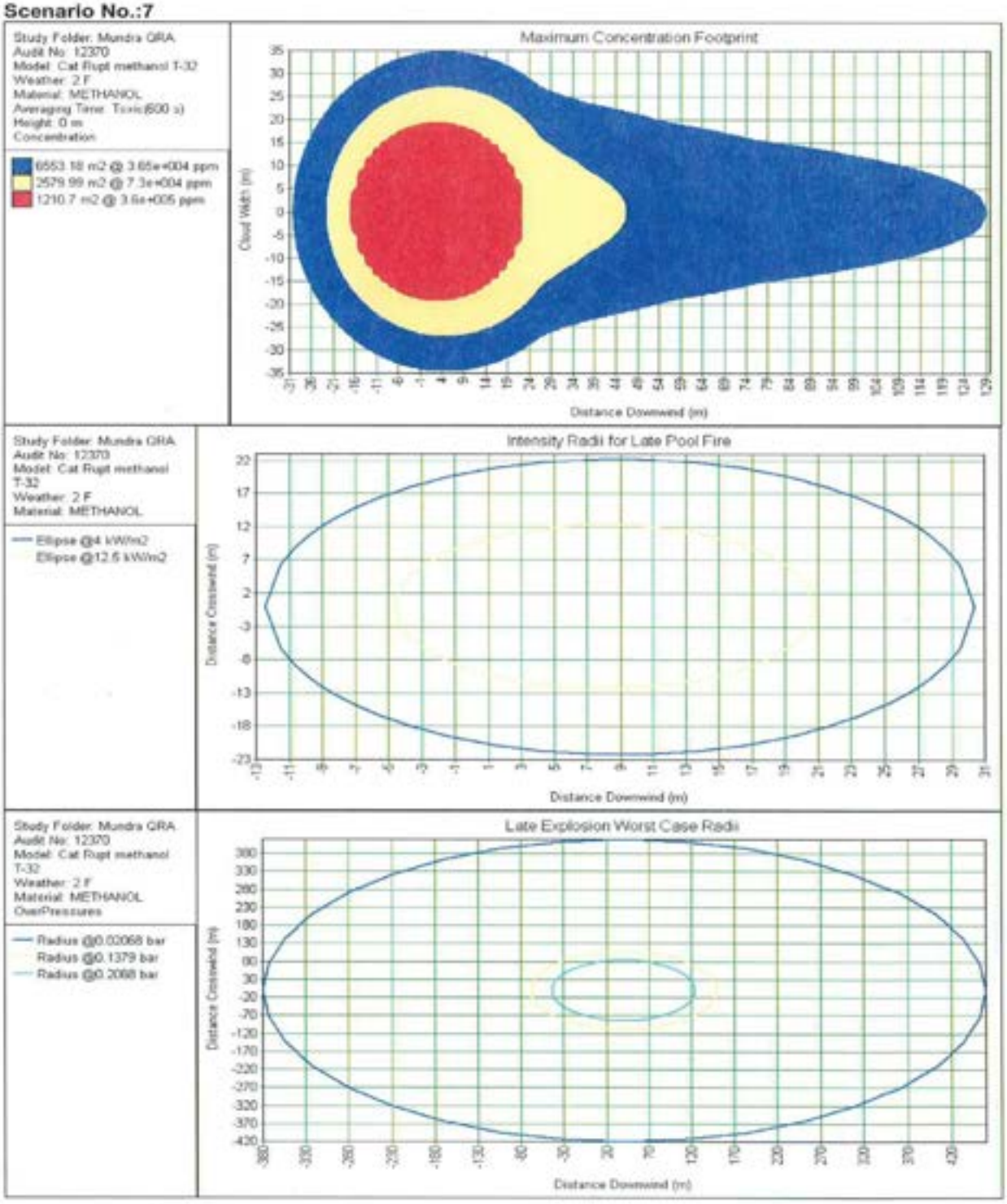


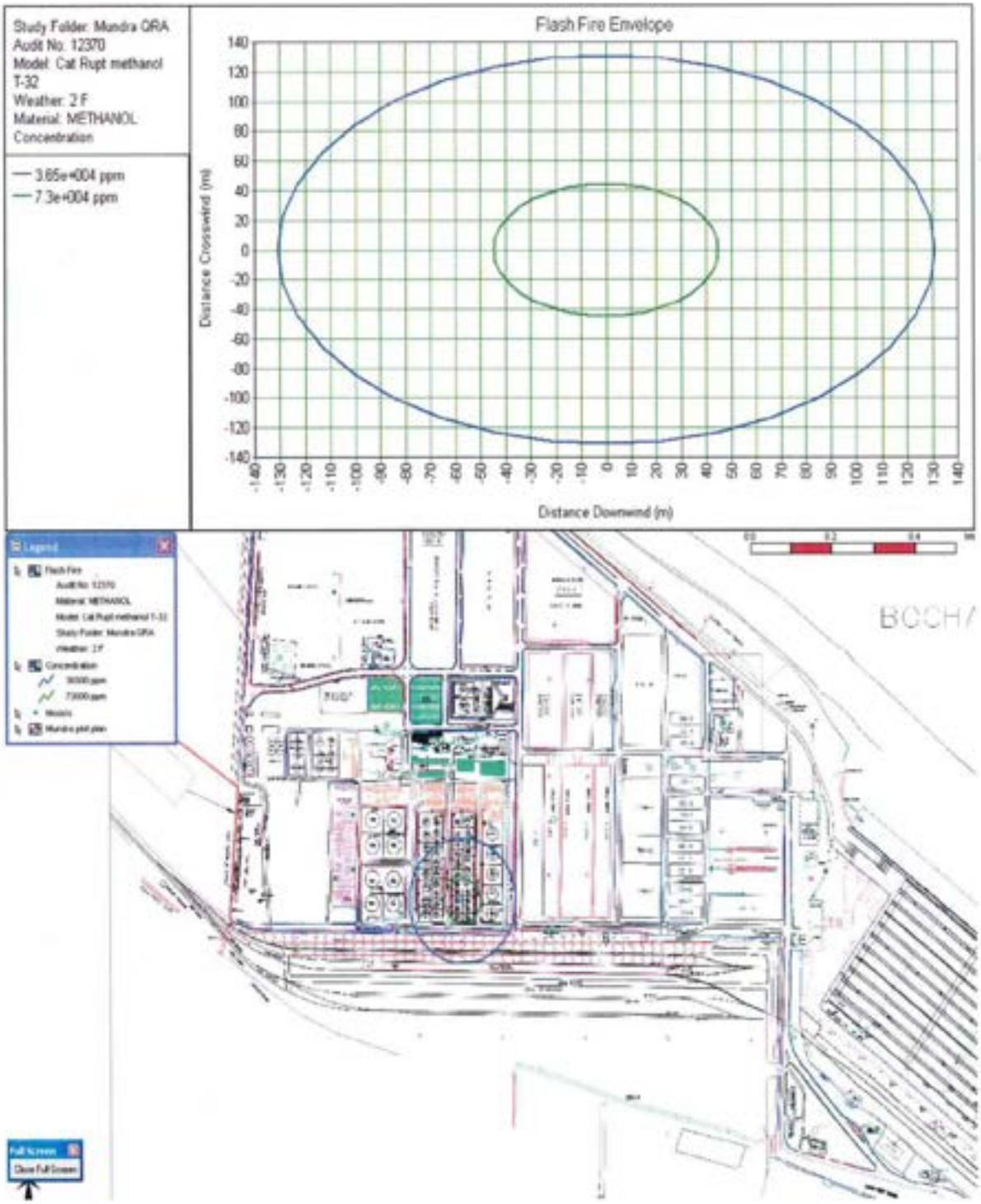

Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
OverPressures
Radius @0.02068 bar
Radius @0.1379 bar
Radius @0.2068 bar
Late Explosion Worst Case Radii
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak Naphtha T-01
Weather: 2 F
Material: Naphtha
Concentration
4416 ppm
8833 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

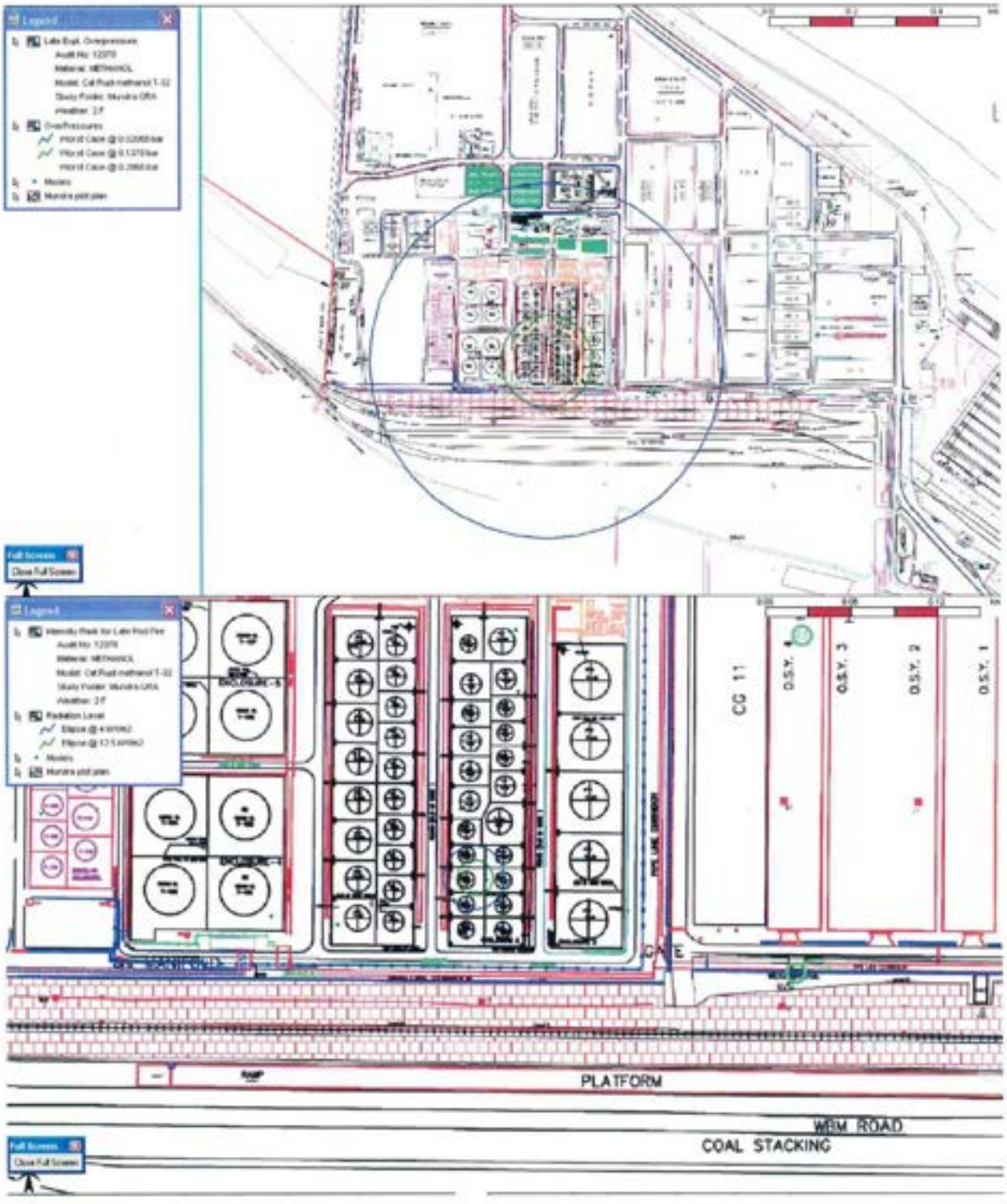

ENCLOSURE – 4
RAMP
PLATFOR
ENCLOSURE – 4
MAIN GATE
post

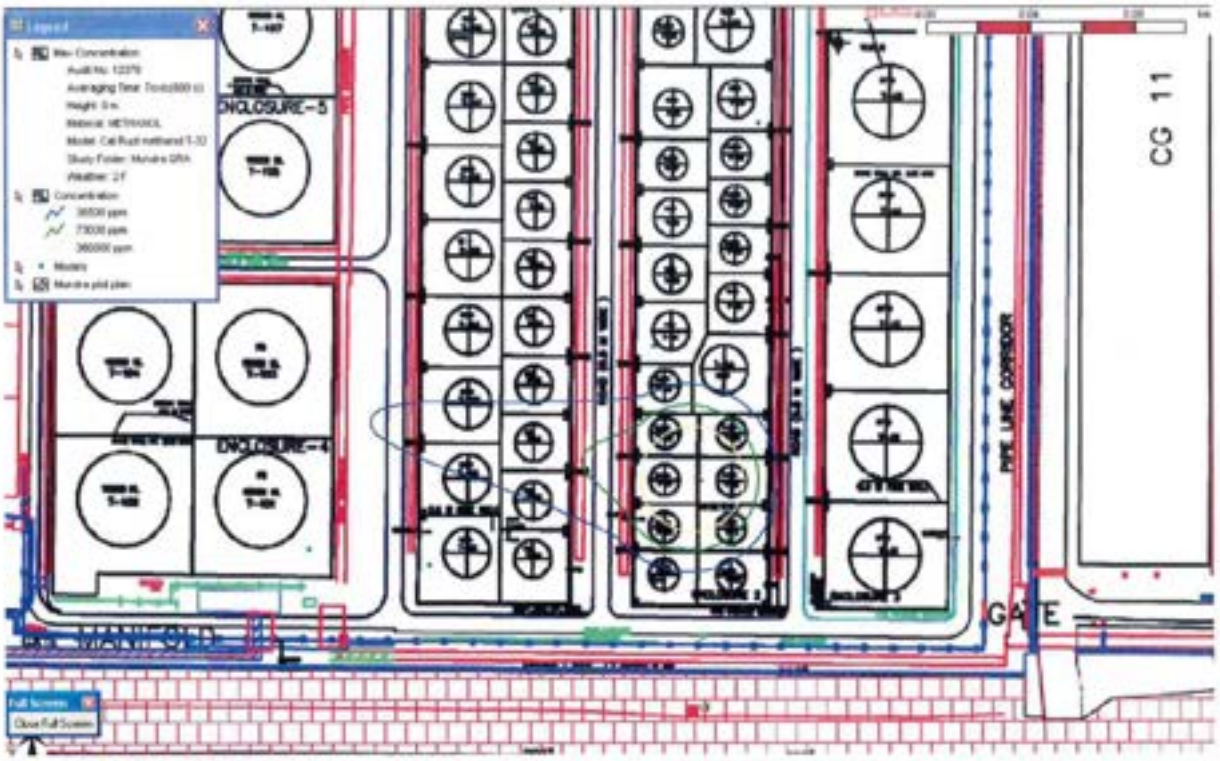

ENCLOSURE-4
MANIFOLD
ENCLOSURE-4
MANIFOLD

Scenario No.:7

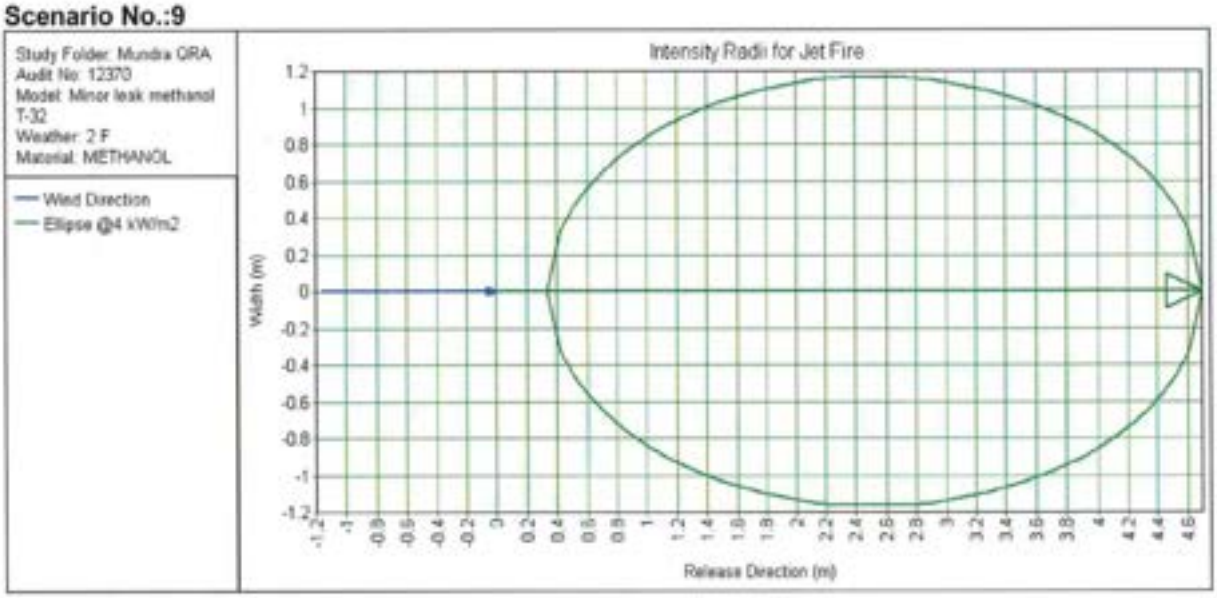


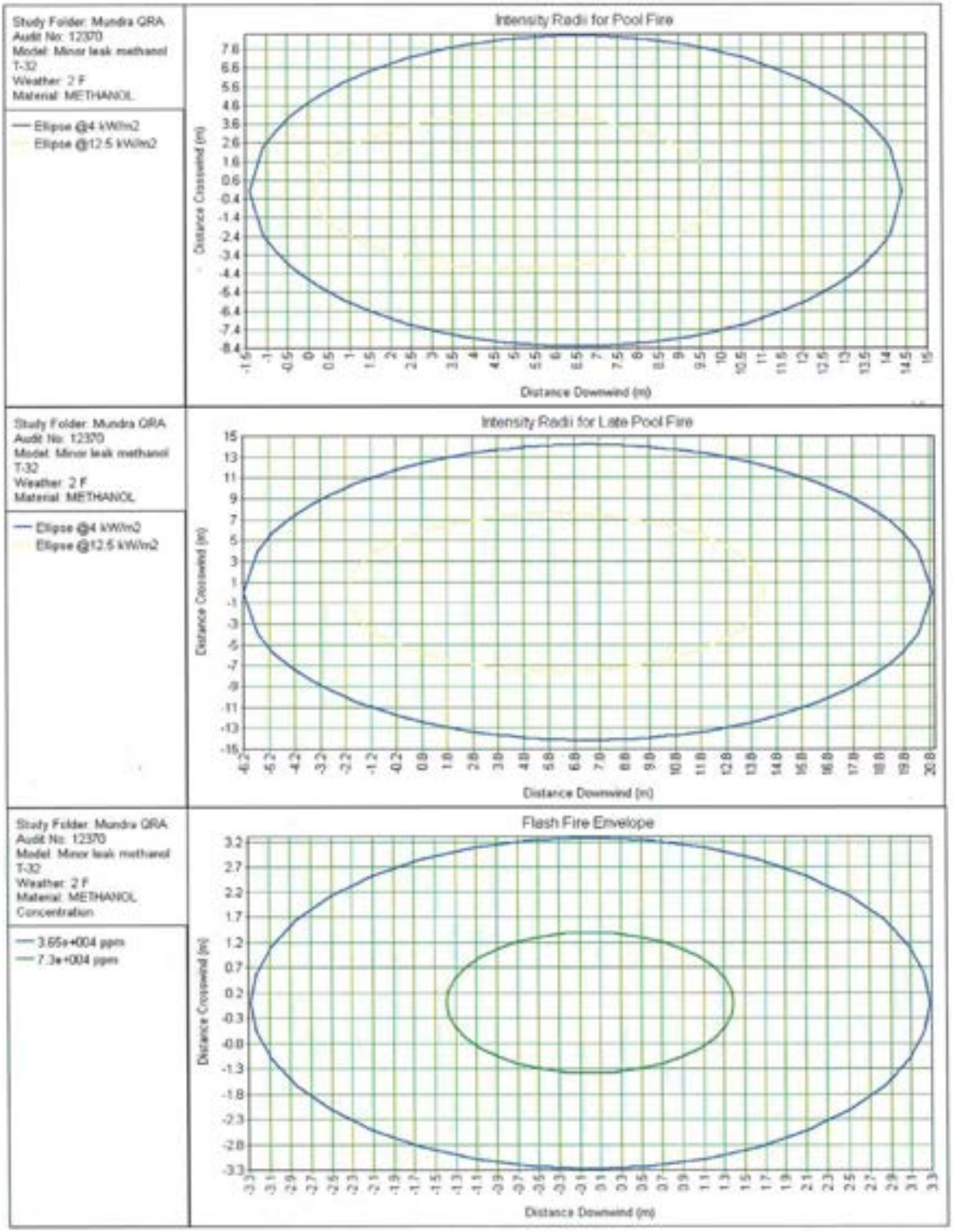

Study Folder: Mundra QRA
Audit No: 12370
Model: Cat Rupt methanol T-32
Weather: 2 F
Material: METHANOL
Concentration
3.65e+004 ppm
7.3e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

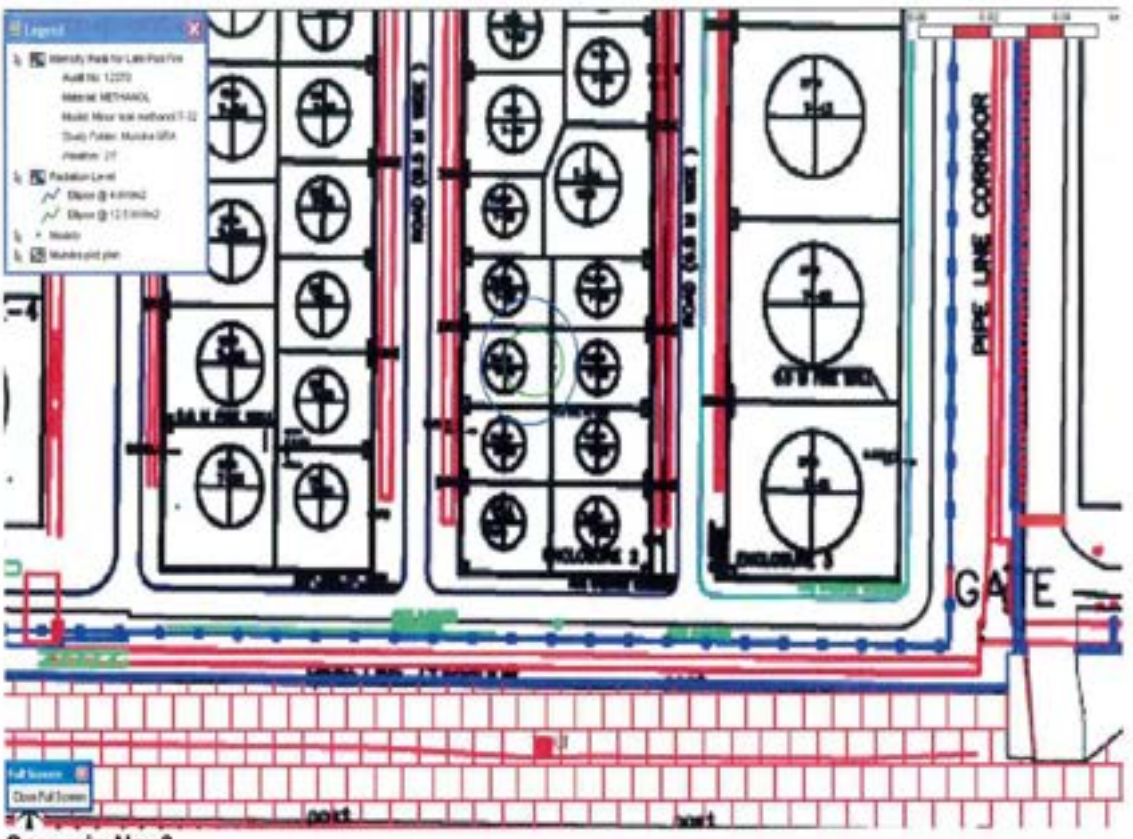

CG 11
O.S.Y. 4
O.S.Y. 3
O.S.Y. 2
O.S.Y. 1
PLATFORM
WBM ROAD
COAL STACKING



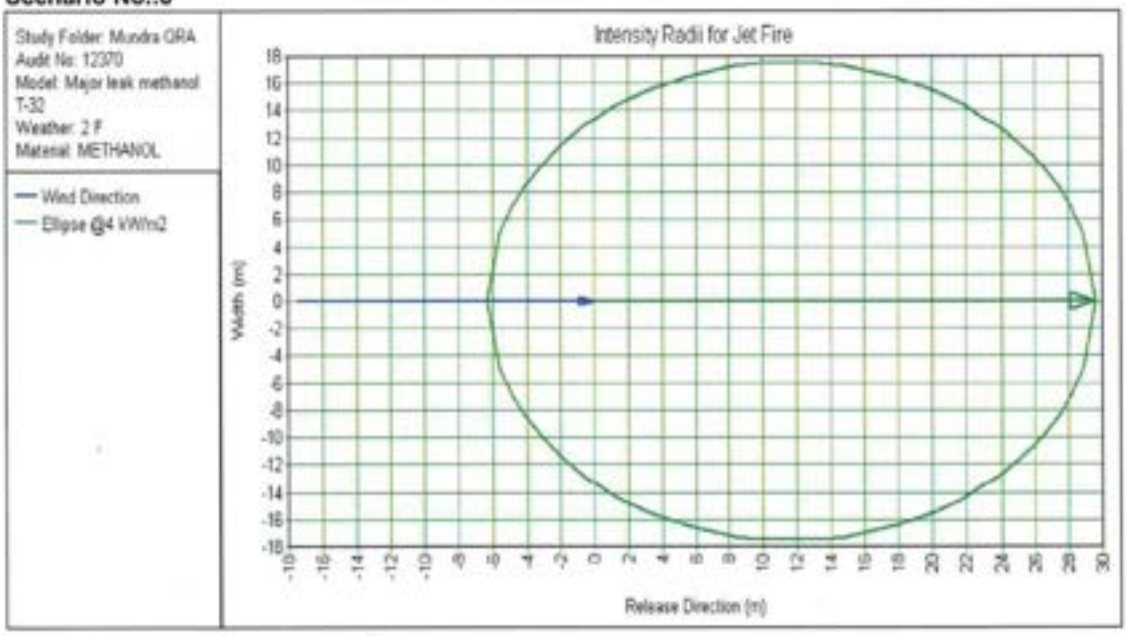
Scenario No.:9

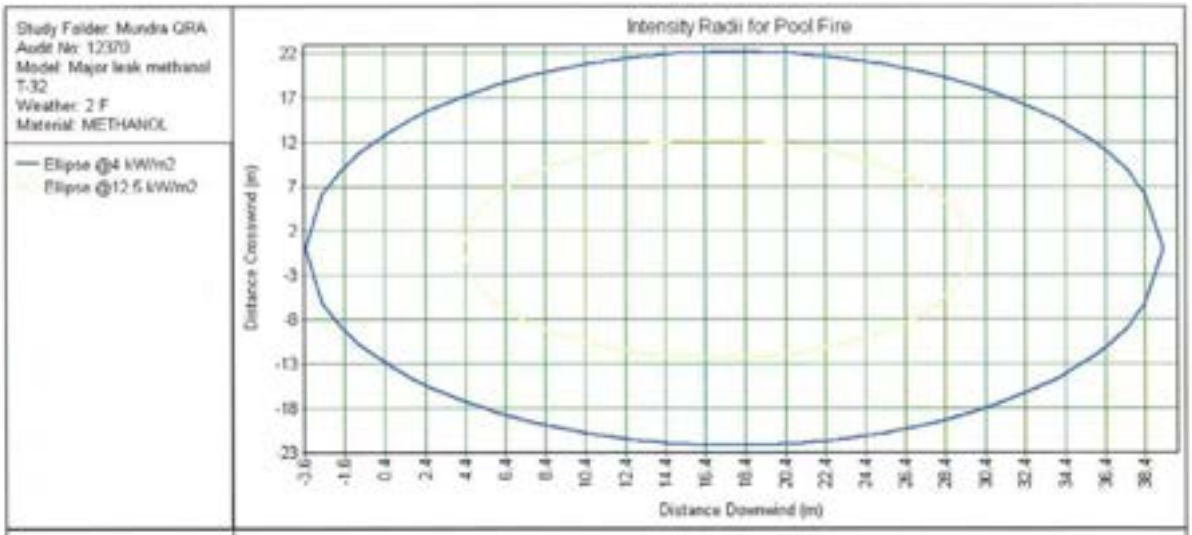


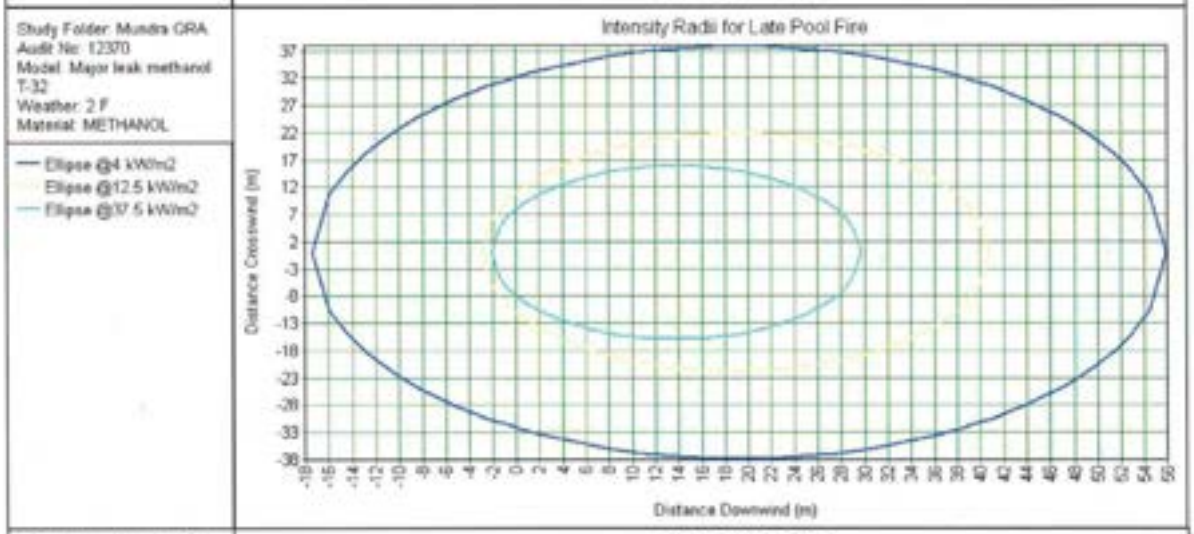

Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Minor leak methanol T-32
Weather: 2 F
Material: METHANOL
Concentration
3.65e+004 ppm
7.3e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

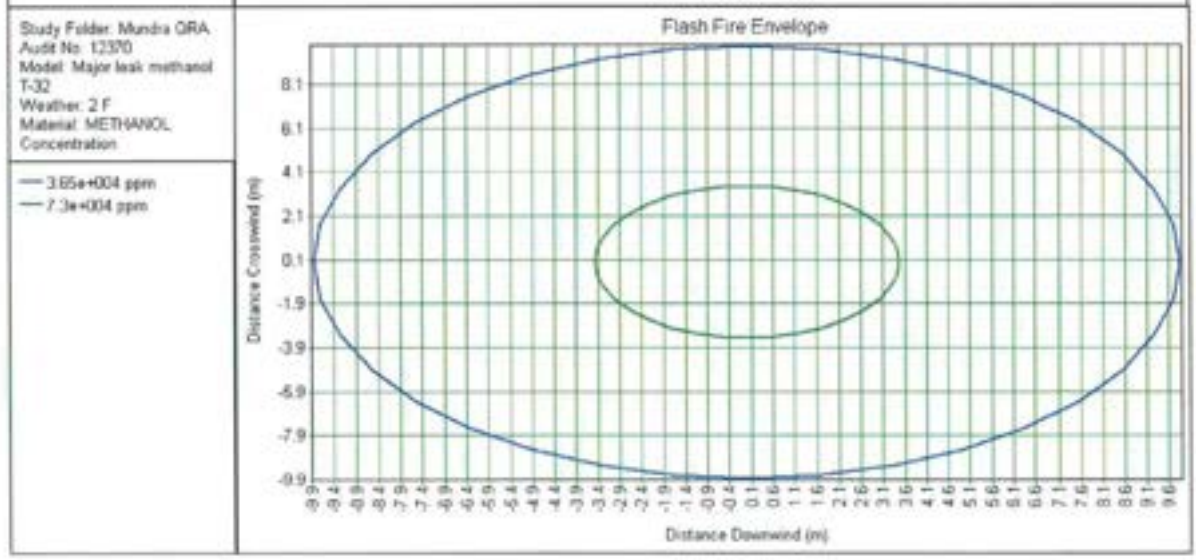


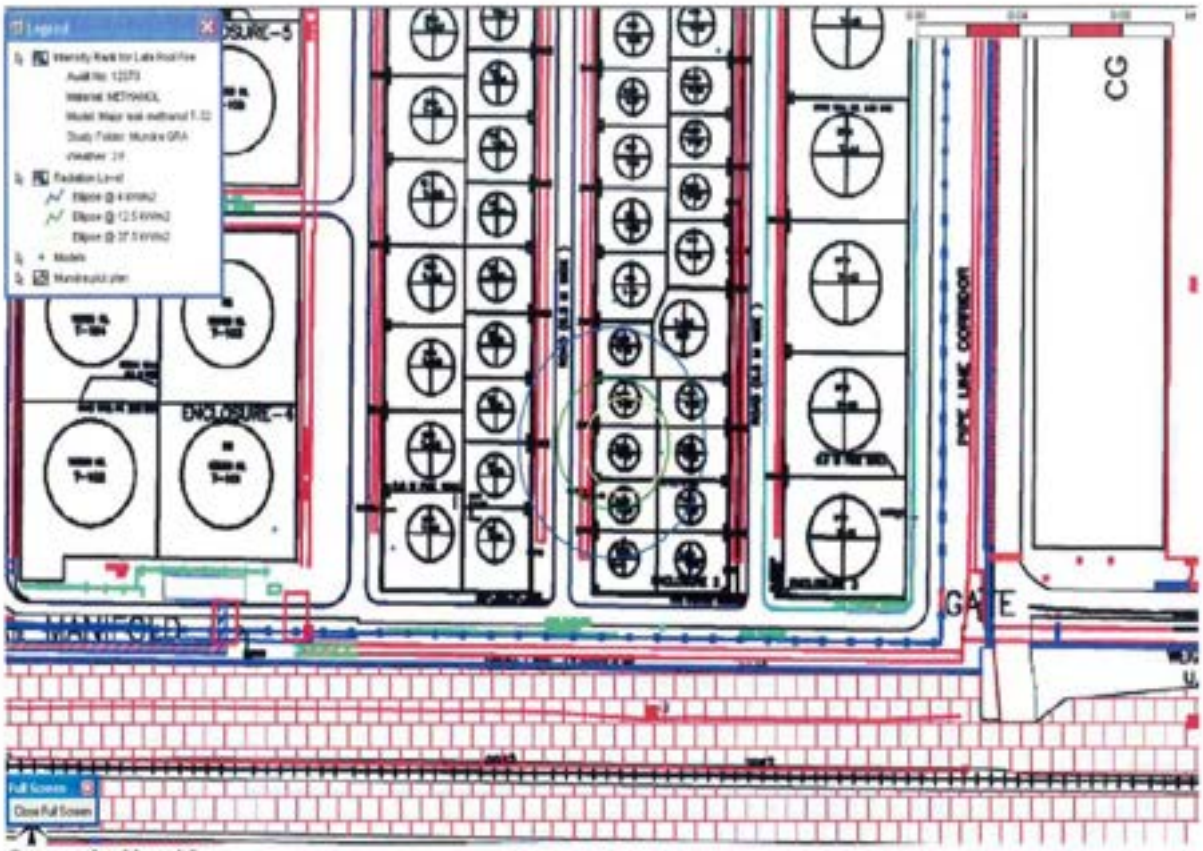
Scenario No.:8



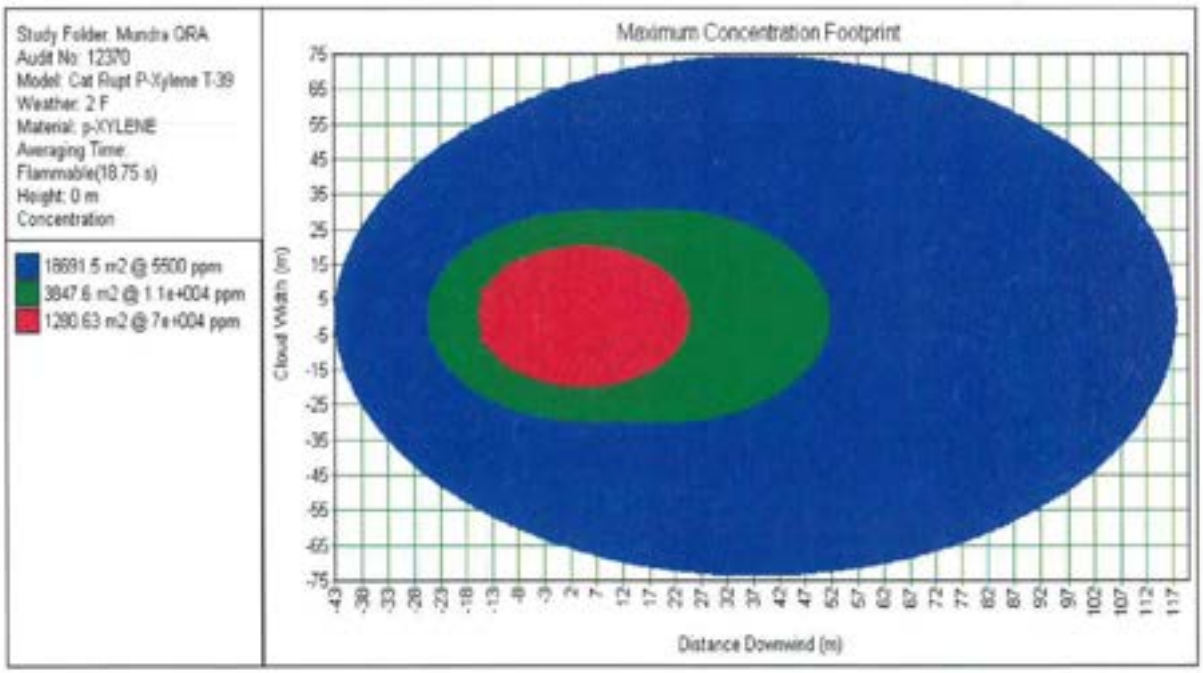

Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Intensity Radii for Pool Fire
Distance Crosswind (m)
Distance Downwind (m)

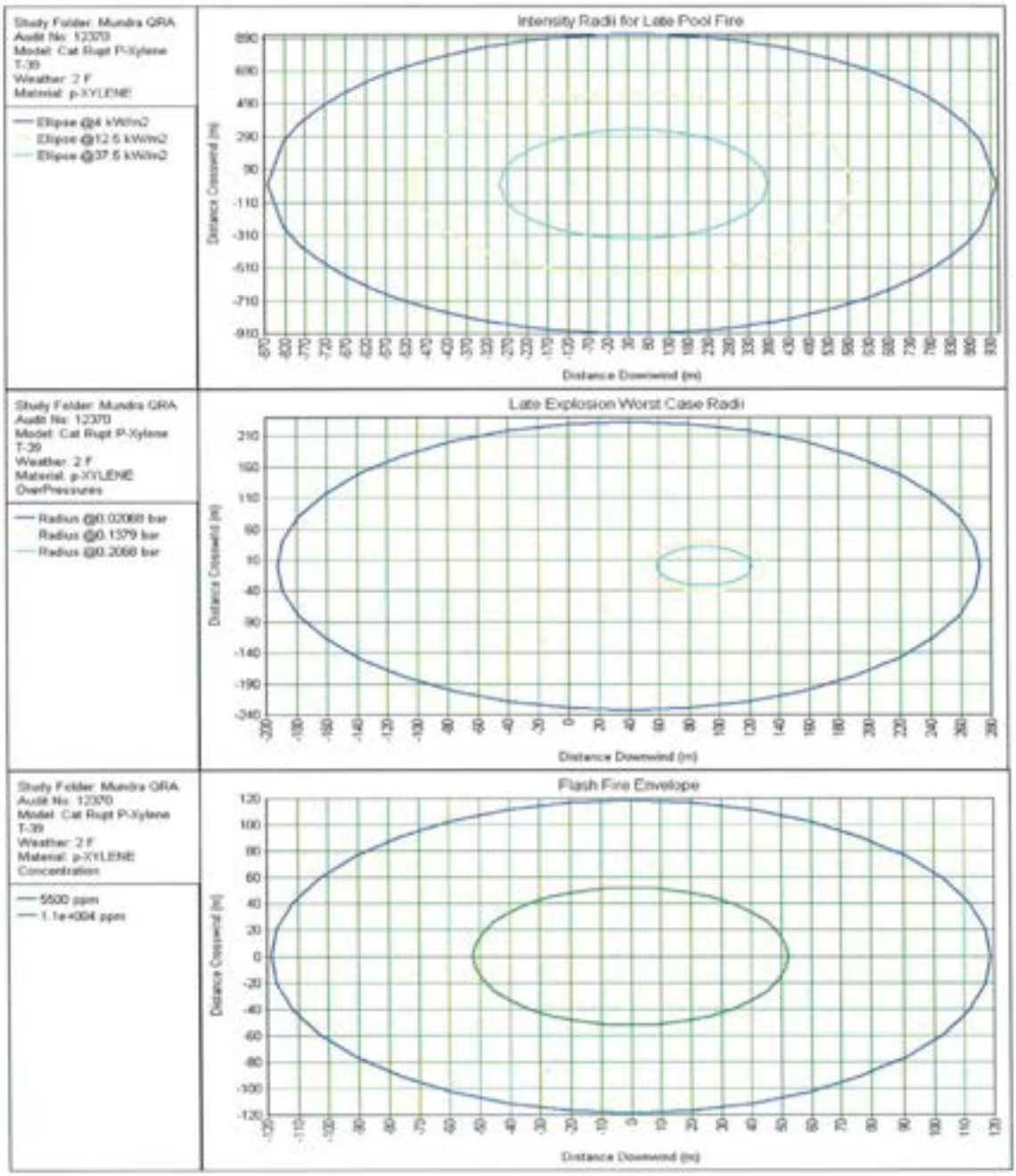

Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak methanol T-32
Weather: 2 F
Material: METHANOL
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)

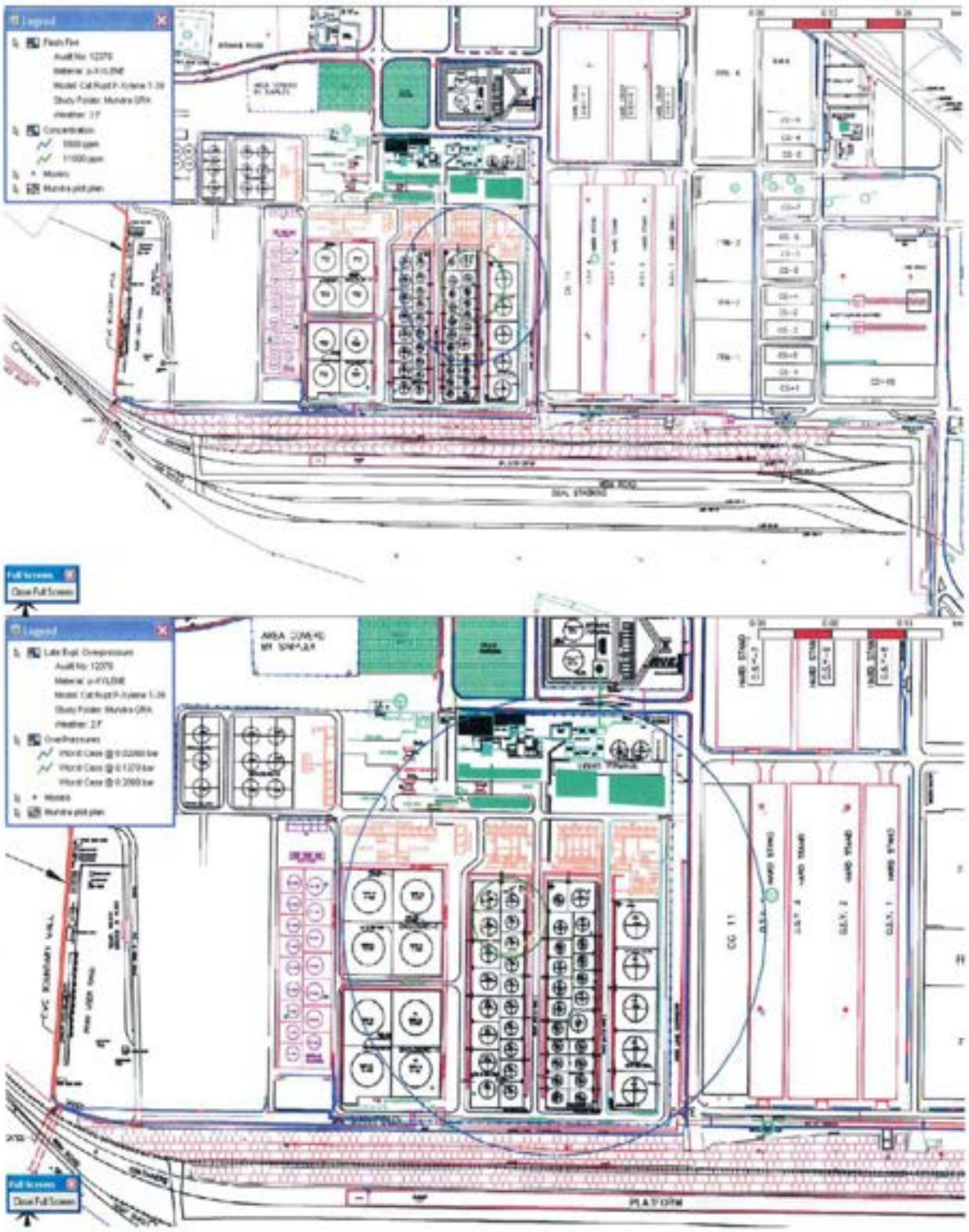

Study Folder: Mundra QRA
Audit No: 12370
Model: Major leak methanol T-32
Weather: 2 F
Material: METHANOL
Concentration
3.65e+004 ppm
7.3e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

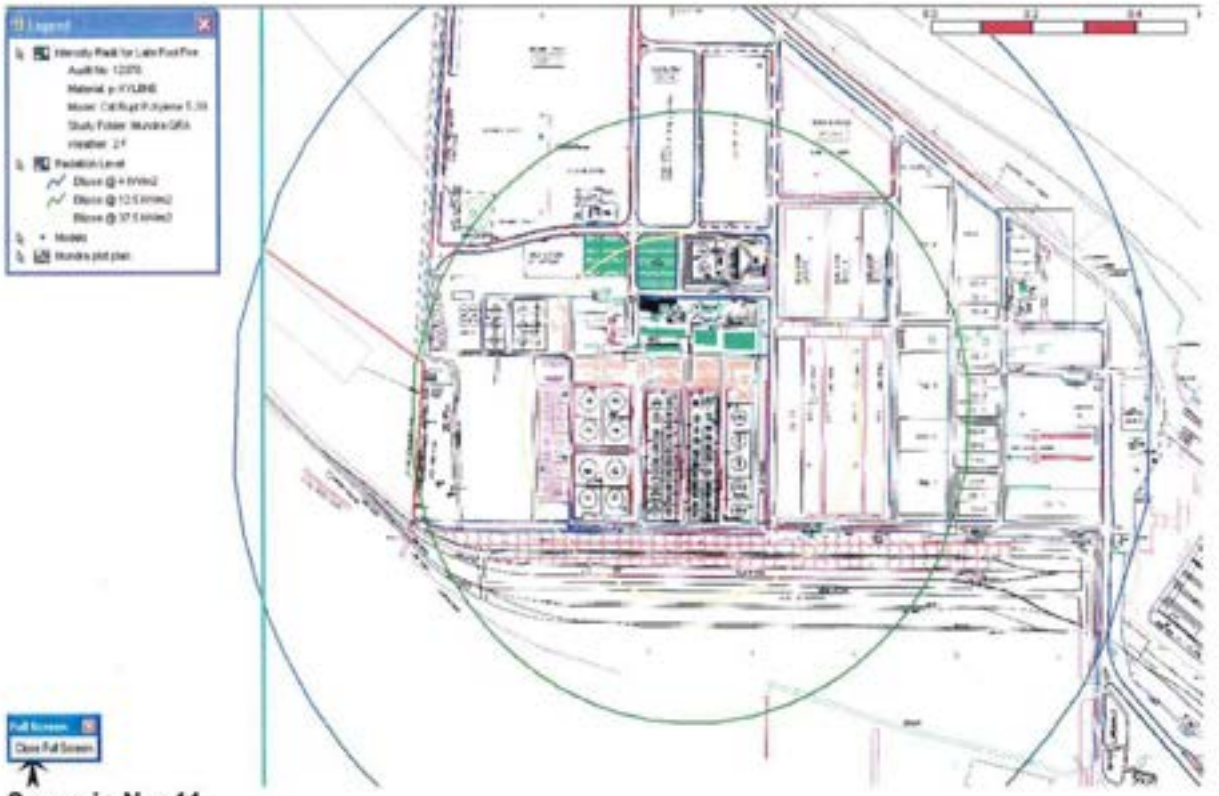


Scenario No.:10

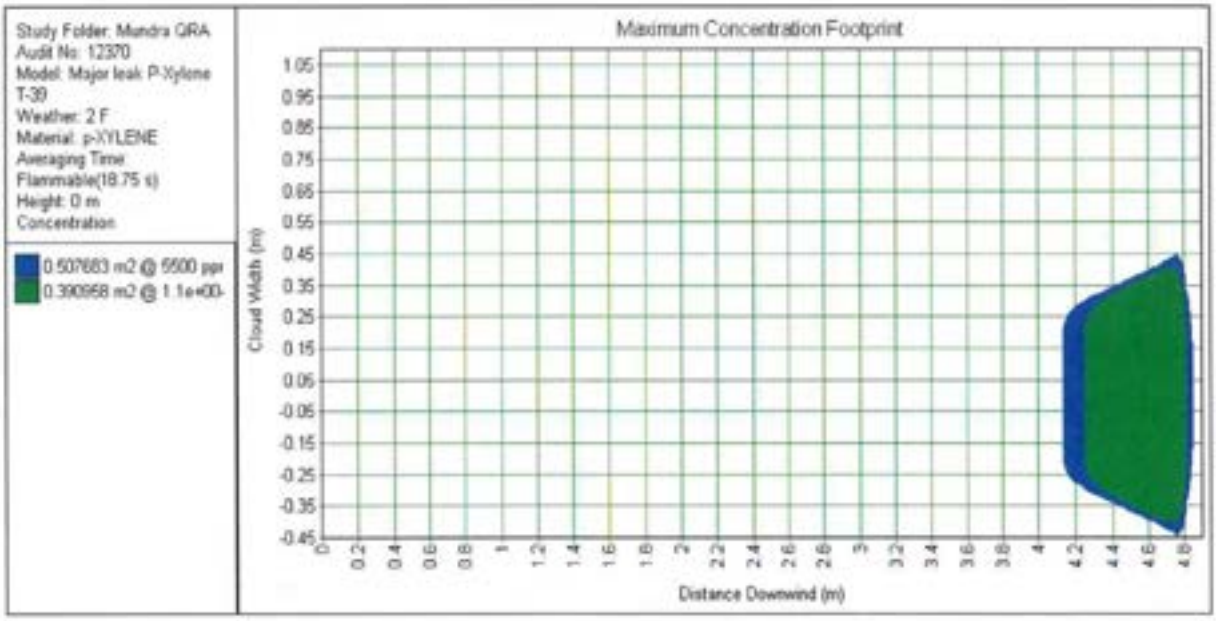



Study Folder: Mundra QRA
Audit No: 12370
Model: Cat Rupt P-Xylene
T-39
Weather: 2 F
Material: p-XYLENE
Ellipse @4 kW/m2
Ellipse @12.5 kW/m2
Ellipse @37.5 kW/m2
Intensity Radii for Late Pool Fire
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Cat Rupt P-Xylene
T-39
Weather: 2 F
Material: p-XYLENE
OverPressures
Radius @0.02068 bar
Radius @0.1379 bar
Radius @0.2068 bar
Late Explosion Worst Case Radii
Distance Crosswind (m)
Distance Downwind (m)
Study Folder: Mundra QRA
Audit No: 12370
Model: Cat Rupt P-Xylene
T-39
Weather: 2 F
Material: p-XYLENE
Concentration
5500 ppm
1.1e+004 ppm
Flash Fire Envelope
Distance Crosswind (m)
Distance Downwind (m)

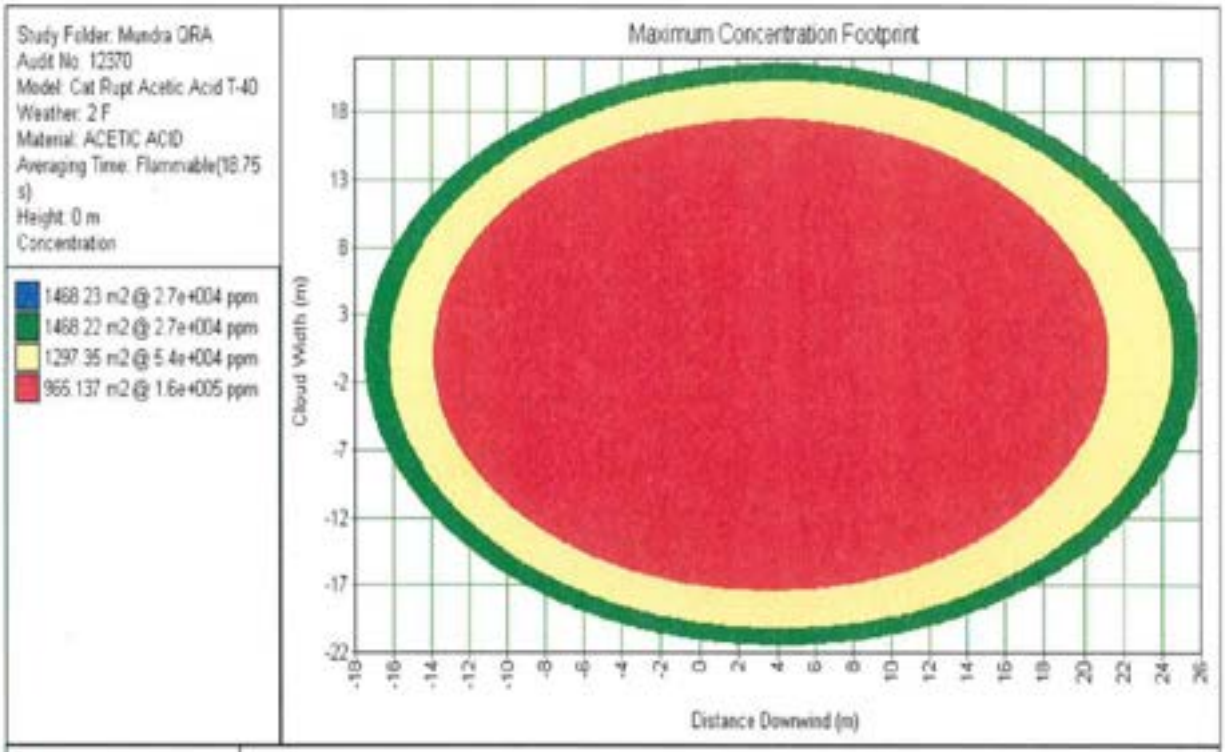


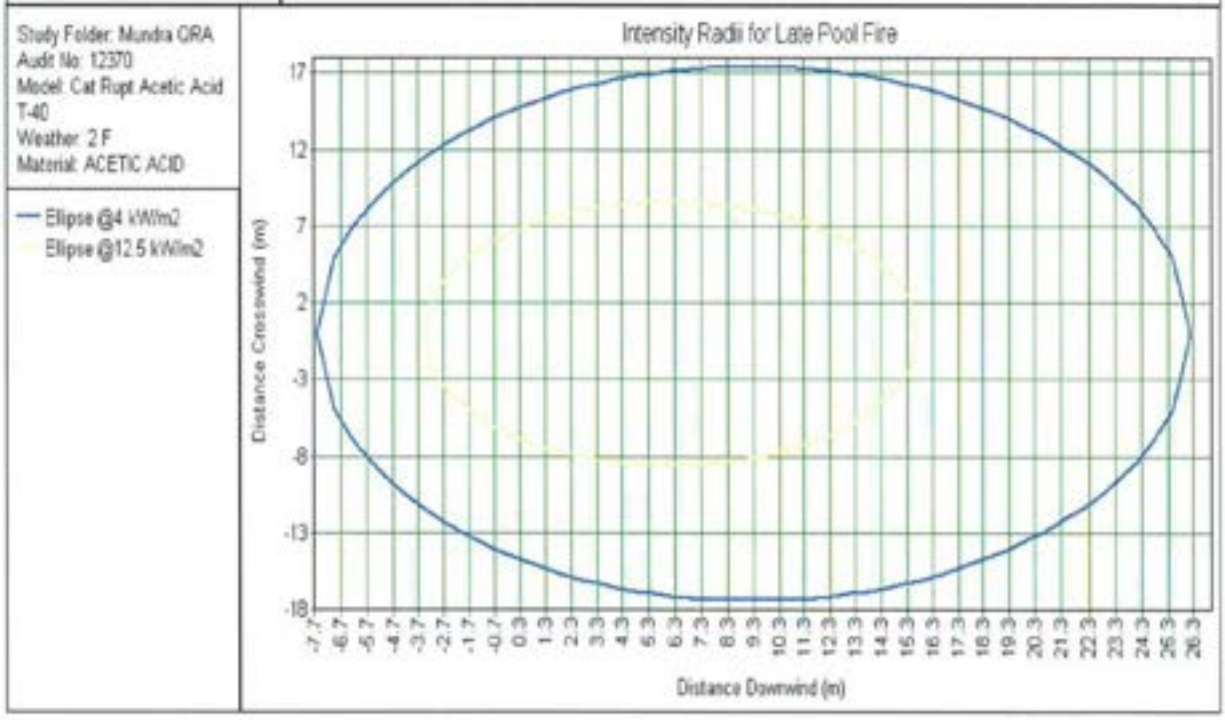


Scenario No.:11



Scenario No.: 4





Overall Risk Contours Of Styrene Storage Tank And Transfer Pump Area

LSIR Contour : Failure - Tank T-08

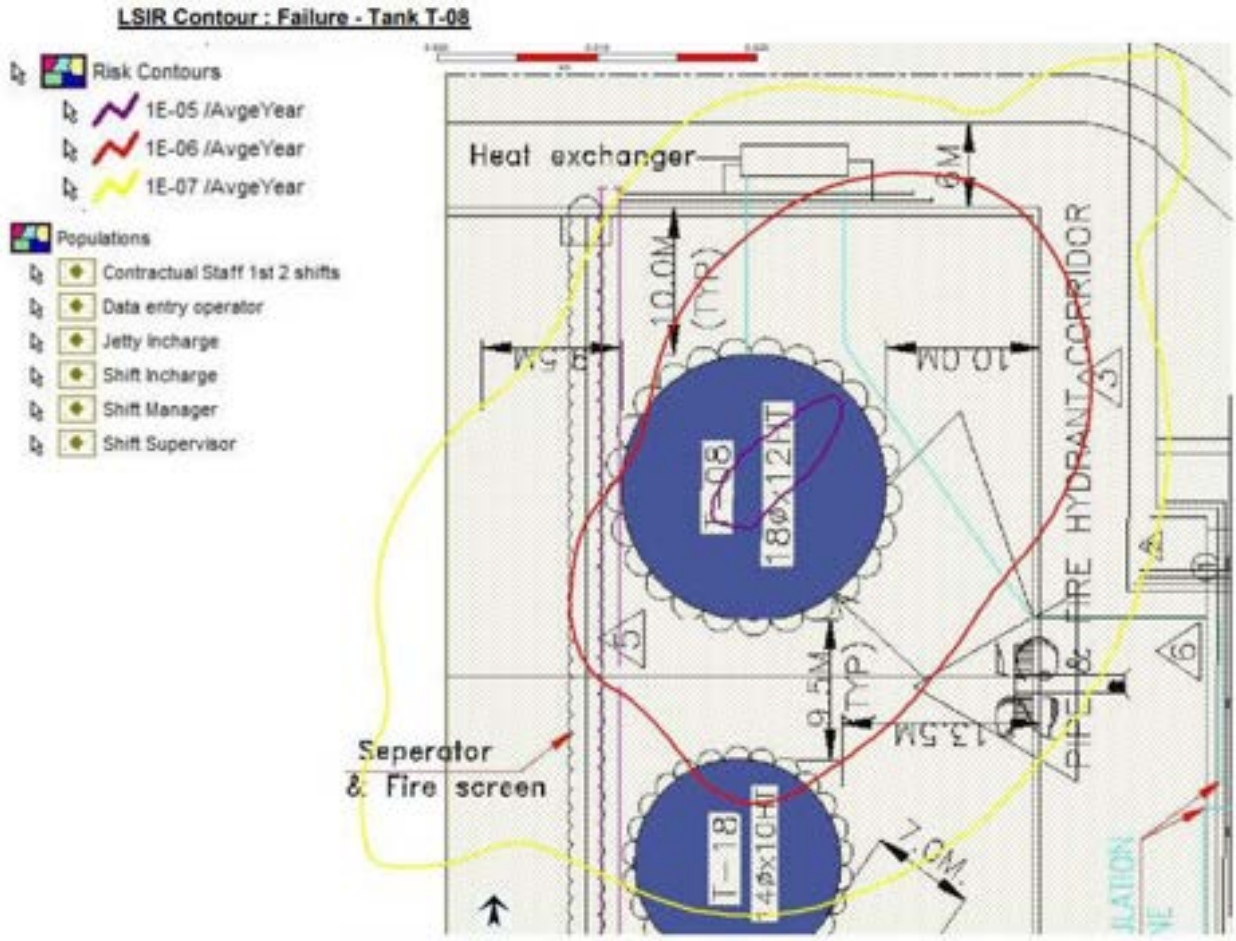


FIGURE 25: LSIR CONTOUR : FAILURE - TANK T-08

LSIR Contour : Failure - Tank T-18

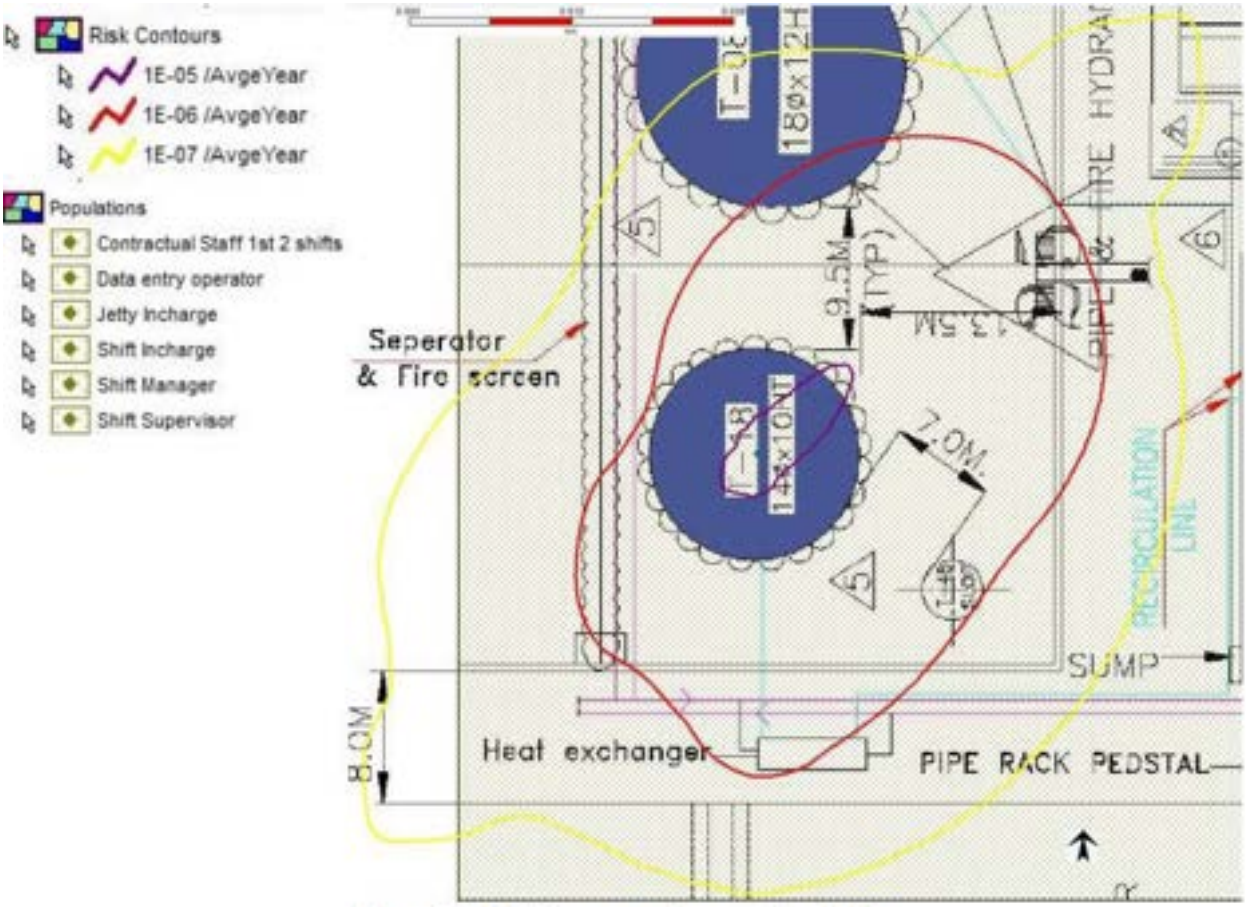


FIGURE 26: LSIR CONTOUR : FAILURE - TANK T-18

LSIR Contour : Failure - Pump P-08

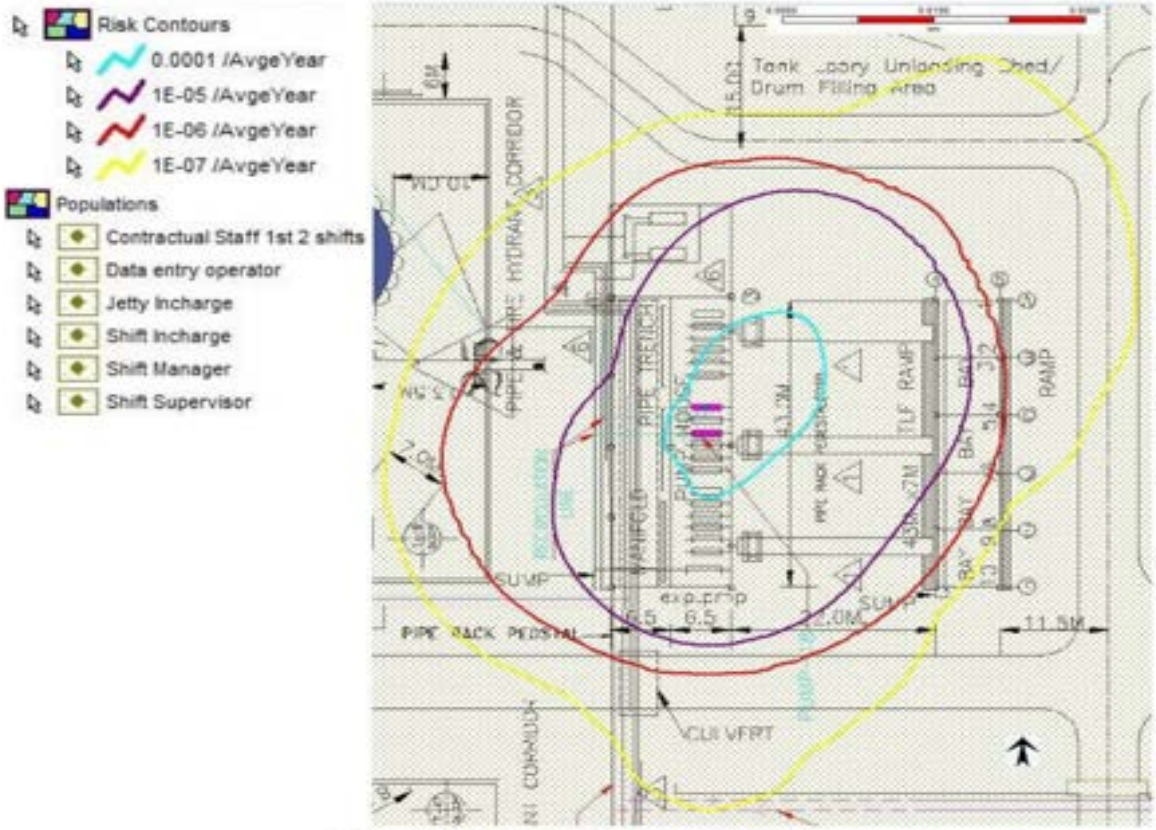


FIGURE 27: LSIR CONTOUR : FAILURE - PUMP P-08

LSIR Contour : Failure - Pump P-18

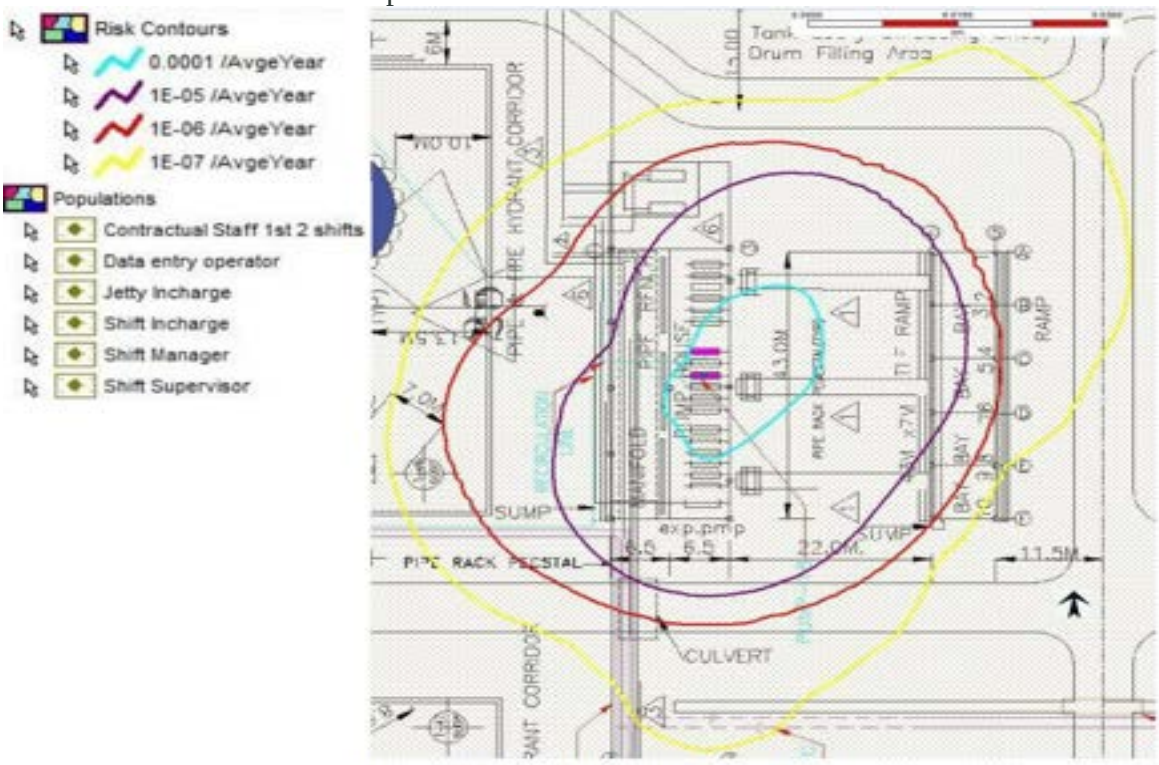


FIGURE 28: LSIR CONTOUR : FAILURE - PUMP P-18

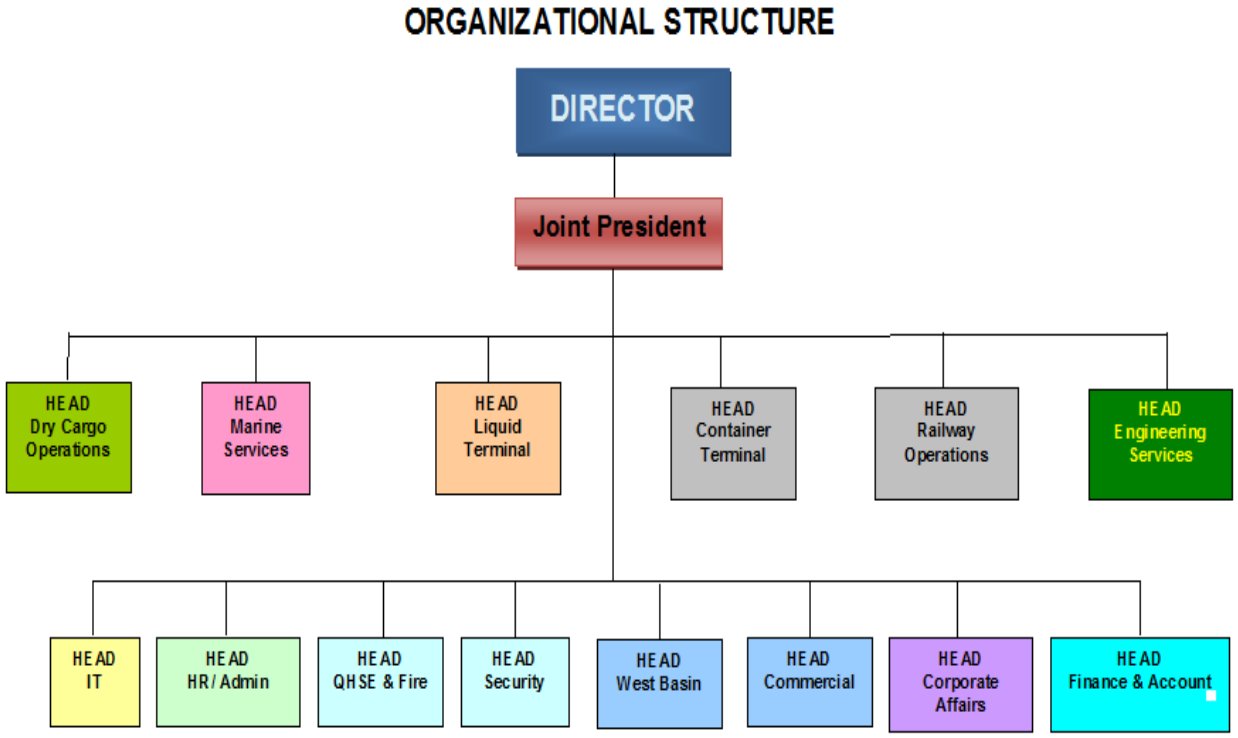
CHAPTER NO. III

ABOUT EMERGENCY ORGANISATION

CONTENTS

3.0 EMERGENCY ORGANIZATION

Emergency organization is the main aim behind preparing this plan. Due weight is added to select and assign suitable responsibilities to the most appropriate persons of the **Adani Port, Mundra** from respective departments. Care is taken to earmark emergency duties from their day-today responsibilities. The organization shall prove effective if activities are carried-out in a defined way. To get maximum advantage of emergency organization, we have defined the activities of various workers in the following way.



TERMS	DEFINITION
Emergency Control Center	In the event of an emergency, Port ISCR (Integrated Security Control Room) has been declared as Emergency Control Center. **ISCR is situated at 2nd Floor | Security Operations | Adani House, Adani Ports & SEZ Ltd.**

Coordinator	HOD or senior most functionaries in the respective services and other critical personnel available at site at the time of an emergency. They will report at the Emergency Control Center, unless and otherwise instructed by the site main controller.
Plant Key Person	Head of Department of individual process plant(s). {Should assume charge of Site Incident Controller in case of an emergency in their respective plant(s)}.
Non-Essential Personnel	Consists of employees, contractor‘s employees, visitors etc. (other than emergency response personnel) present at the incident site. In the event of an emergency, these persons shall assemble at the emergency assembly point of the plant/ area and shall respond as instructed by the site incident controller.

3.01 SCOPE & PURPOSE

SCOPE :: The very purpose of this plan is to activate the emergency response organization smoothly and effectively, once the emergency is declared. The plan details the arrangements for responding to emergency scenarios, covering in details the following aspects:

- To assess and define emergency including level of risk.
- To contain the incident and bring it under control.
- To coordinate with mutual aid members and Government authorities.
- To minimize damage to lives, property and the environment.
- To rescue and evacuate workers to safe areas.
- To provide necessary assistance to casualties.

PURPOSE :

The purpose of this plan is to:

- Establish & define roles of coordinators, key personnel and other emergency response personnel.

- Establish guidelines for effective response to any emergency.
- Ensure a smooth interface between various emergency procedures and the APSEZ Emergency Action Plan.

For this plan to be effective, it is necessary that:

- Coordinators, key personnel and other emergency response personnel are familiarized with this action plan.
- On-site resources are mobilized in minimum time.
- Assistance from outside agencies is readily available.
- The drills for identified emergencies are regularly exercised.
- The emergency responses are reviewed and updated based on latest developments, other information and requirements in order to improve effectiveness of the APSEZ EAP.

3.02 THE NEED OF DISASTER PLANNING AT APSEZ (Port Area)

Disaster at The Port: A major emergency in Port is one, which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the port. Sometimes, it would require the assistance of outside emergency services to handle it effectively. Although an emergency may be caused by a number of different factors, viz plant failure, human error, earthquake, Cyclone, flood, vessel collide, vehicle crash, major spillage or sabotage, it will normally manifest itself in three basic forms viz - Fire, Explosion or toxic release.

Need of Disaster Planning: In spite of universal acceptance of excellent codes of practices for design and operation of plants and storage, there have been occurrences of a number of losses due to major incidents of varying degree of severity. In fact, no industrial plant or office and no commercial or mercantile organization can be totally immune from disaster. These disasters could be attributed to various causes including failure of adherence to codes of practice. The first few minutes after an emergency situation occurs are generally the most critical. The wrong action or a few seconds delayed action in crises can make all the difference. A quick and effective response at that time can have tremendous significance on whether the situation is controlled with little loss or whether it turns into a disaster. Contingency planning increases thinking accuracy and reduces thinking time in an emergency, which reduces loss. The effectiveness of what we should do if disaster strikes will depend upon how well we have prepared the contingency plans and trained the people who will have to implement them. Even if the plans generated and equipment provided are never used, the very fact that the

plans have been developed and equipment have been provided creates confidence among employees and from an economic point, may reduce the insurance rates. The Social and legal consequences of ―Bhopal‖ Gas Tragedy have sufficiently demonstrated that these considerations alone are important enough to persuade management of hazardous plants to develop suitable plans. Thus disaster is a situation generally arising with little or no warning and causing or threatening death, injury or serious disruption to people and services which cannot be controlled, by fire, police and services operating alone. The incident will require special mobilization and co-operation of other bodies and voluntary organization.

3.03 EMERGENCIES - CLASSIFICATION OF EMERGENCES

Different types of emergencies that may arise at the Port can be broadly classified as:

a) Nature – I (On – Site Emergency) – It can be further subdivided into two levels:

Level – I The emergency is perceived to be a kind of situation arising due to an incident which is confined to a small area and does not pose an immediate threat to life and property and this can be handled with resources available within premises.

Level – II The emergency is perceived to be a kind of situation arising due to an incident which poses threat to human lives and/ or property, having potential to affect large area within the factory premises. This kind of situation is beyond the control of internal resources and requires mobilization of additional resources from other sections/ departments and help from outside agencies. The situation requires declaration of On – Site emergency.

b) Nature – II (Off – Site Emergency)

The emergency is perceived to be a kind of situation arising out of an incident having potential threat to human lives and property not only within Port but also in surrounding areas and environment. It may not be possible to control such situations with the resources available within APSEZ. The situation may demand prompt response of multiple emergency response groups as have been recognized under the District Emergency plan for Kutch. A similar situation in neighbouring industry that may affect The Port Area and also falls under this category.

POTENTIAL EMERGENCIES

Sr. No.	Emergencies
1.	Cyclonic Storm/ Hurricane
2.	Earthquake
3.	Tsunami
4.	Flood
5.	Industrial unrest
6.	Bomb Threat
7.	War
8.	Food/ Water Poisoning
9.	Fire , Transportation Incidents involving Hazardous Materials
10.	Major Release of Flammable/ Toxic Chemicals
11.	Major Release of Flammable/ Toxic Gases
12.	Transportation Incidents involving Hazardous Material
13.	Marine Emergency

3.04 EMERGENCY RESPONSE ORGANIZATION

For control of an emergency, **Adani Port - Mundra** has established an emergency response organization headed by **COO (alternate – next Sr. Officer In-charge),** who shall be the Site Main Controller. This emergency response organization will provide the command and control structure to coordinate and direct the response to an emergency, and depending on the circumstances of the emergency will consists of:

Management Team

Director / CEO / COO (Site Main Controller)
QHSE – HOD or senior most functionary of the department
Site Incident Controller – Head of Department or Senior most functionaries available at site in respective both Day and Night hours.
Deputy Site Incident Controller – Section Head or Next Senior most functionaries available at site in respective both Day and Night hours.

Primary Support Team

Coordinators (HOD or senior most functionaries)

- **–Fire Services**
- **–QHSE**
- **–Security Services**
- **–Occupational Health Center**
- **–Engineering Services**
- **–Human Resource**
- **–Administration**

Secondary Support Team

Coordinators (HOD or senior most functionaries)

- **– Finance & Accounts**
- **– Commercial**
- **– Administration (Transport Cell)**
- **– Administration (Welfare & Canteen)**
- **– Corporate Communication**

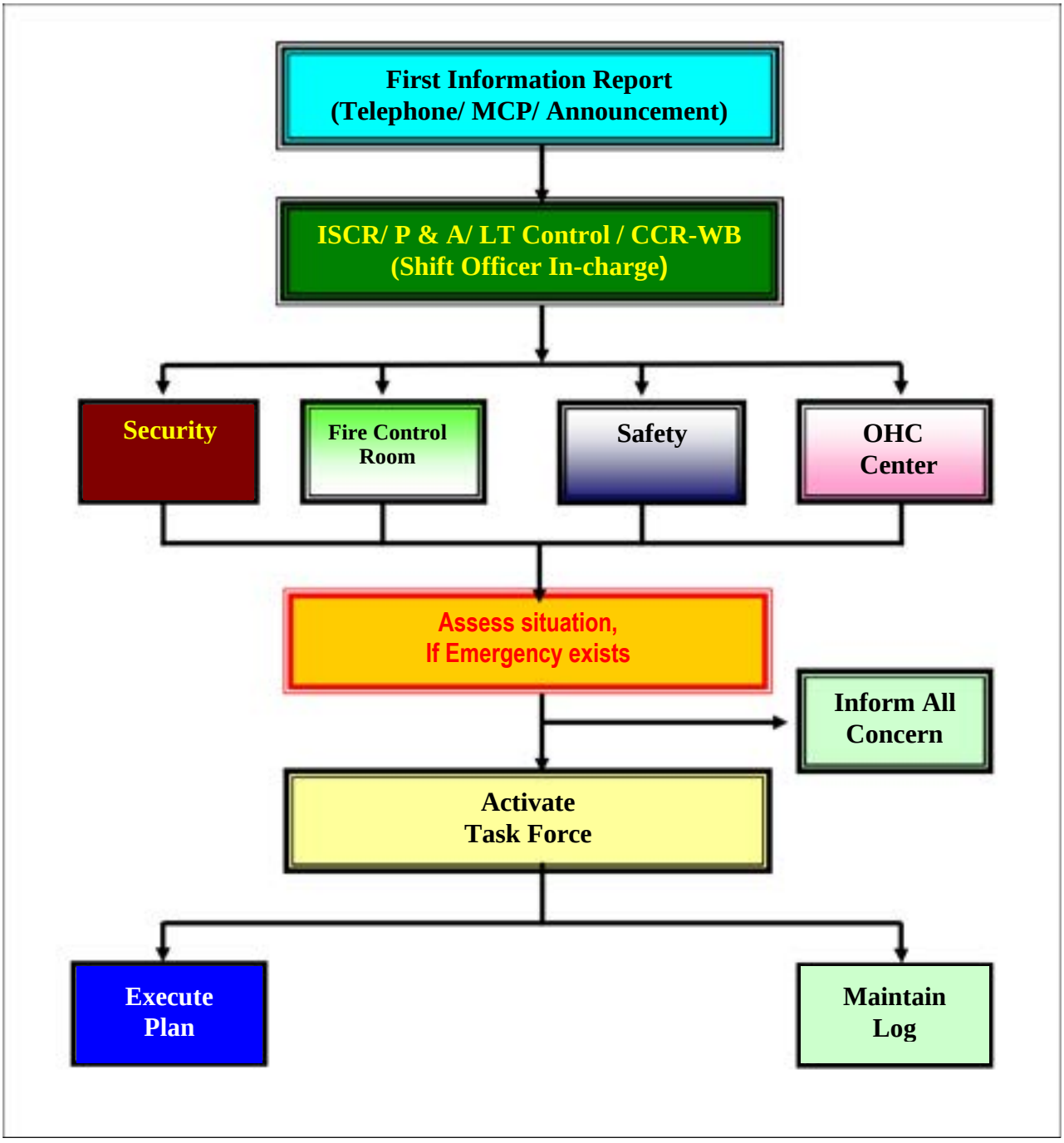
Only Site Main controller can activate the emergency response organization. An Emergency Control Center has been established in the office of Site Main Controller **(Alternate – ISCR 2nd Floor l Security Operation l Adani House (APSEZ Mundra).**

The primary role of the emergency response organization in an emergency shall be:

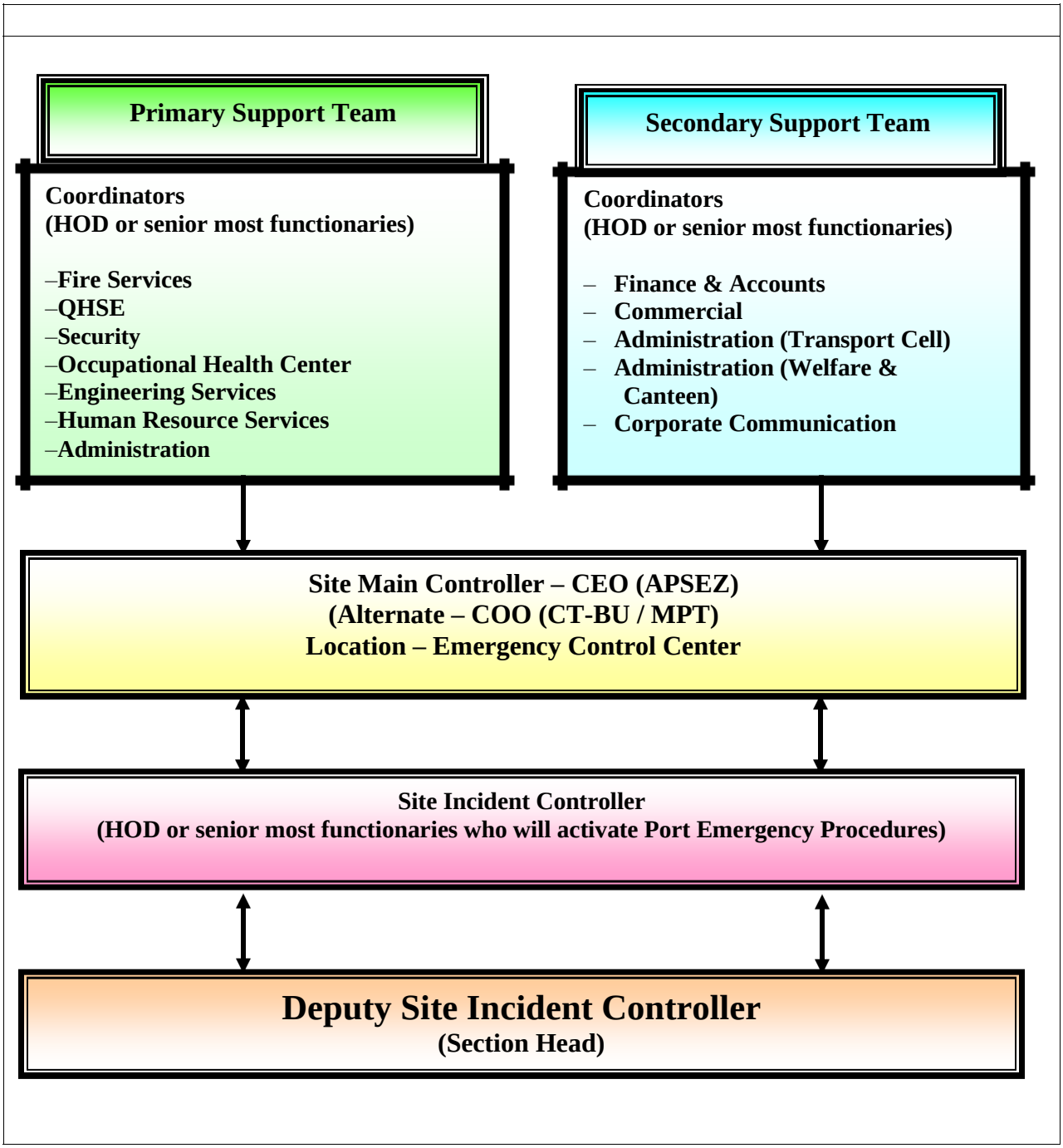
- Determine the degree to which the emergency response organization shall be activated.
- Determine extent of actual action required, organize and render assistance to Site Incident Controller.
- Coordinate with all other concerned.

Emergency Reporting Line is as outlined in **Chart B**.
Emergency Task Force is as outlined in **Chart C**.
Emergency Assembly Points are as outlined in **Chart D**.

3.05 EMERGENCY REPORTING LINE



EMERGENCY TASK FORCE (Applicable for 24 X 7 including night hours)



3.06 ASSEMBLY POINTS

ASSEMBLY POINT

		 EMERGENCY ASSEMBLY POINT	
		Port Emergency Assembly Points	
PORT AREA			
ZONE	AREA		
ZONE – 1	Marine House		
ZONE – 2	CG–7		
ZONE – 3	Driver Canteen		
ZONE – 4	Old Administration Canteen		
ZONE – 5	Railway Building (R & D Yard)		
ZONE – 6	Terminal – 2 (Security Gate)		
ZONE – 7	Container Terminal - 2 (Security Gate)		
ZONE – 8	Main Gate		
ZONE – 9	Port User Building		
ZONE – 10	Adani House		
ZONE – 11	Terminal – 03 (Security Gate)		
ZONE – 12	South Basin (Security Gate)		
		WEST BASIN AREA	
ZONE – 1	SS-1		
ZONE – 2	PMC Office		
ZONE – 3	GIS (Near DG House)		
ZONE – 4	Main Gate		
ZONE – 5	Approach - 03		
ZONE – 6	Amenities Building		

Non-essential personnel shall assemble at Emergency Assembly Point as announced by Site Incident Controller.

3.07 CATEGORIES OF EMERGENCIES

The general action plan to deal with:

- Emergencies (Category wise) are as outlined in **Chart –E.**
- Emergencies (Occurrence - with due warning) are as outlined in **Chart –F.**
- Emergencies (Occurrence – sudden) are as outlined in **Chart –G**.

EMERGENCIES CATEGORY WISE

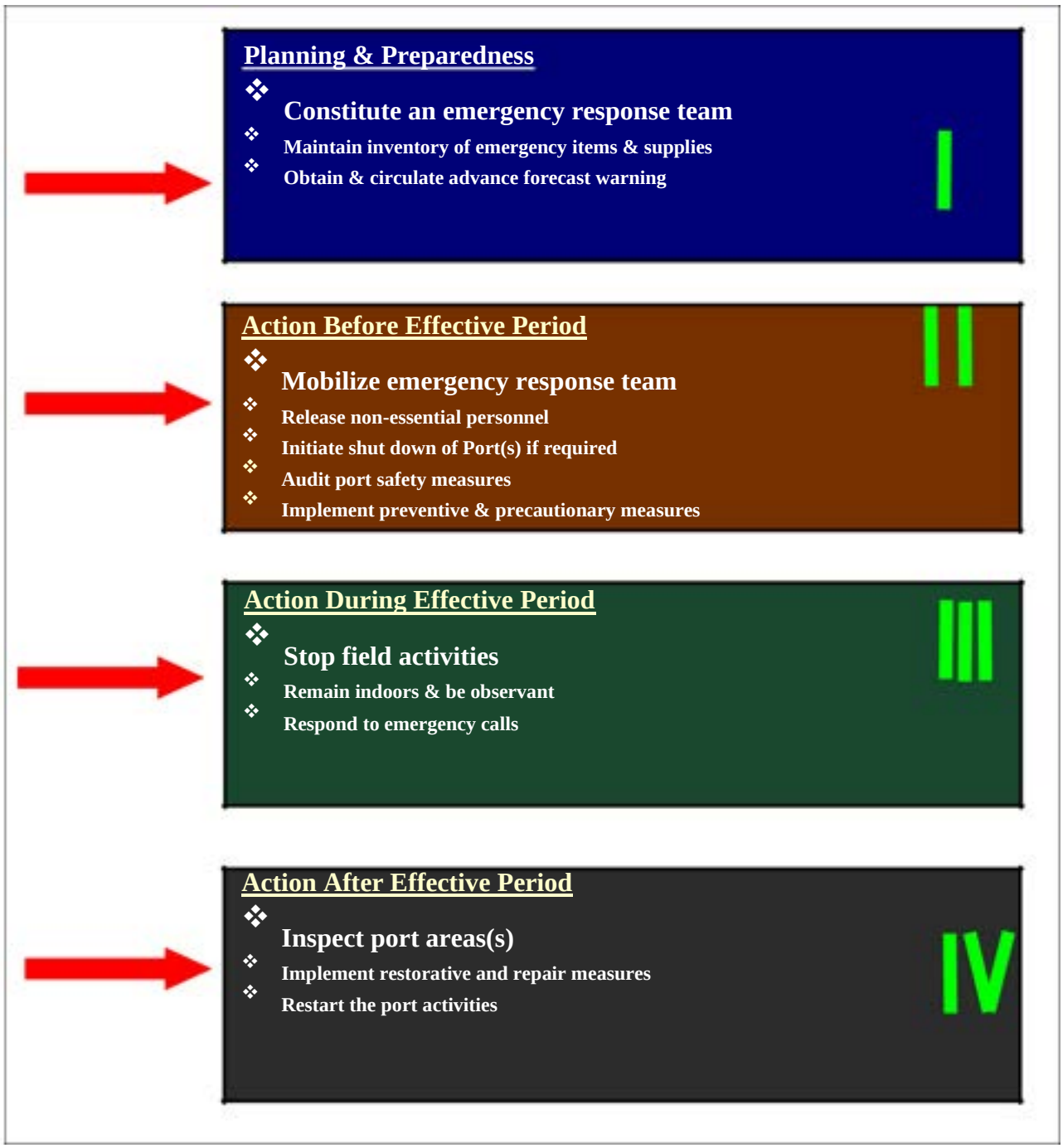
Emergencies (Occurrence – with due warning)

- **Cyclonic Storm/ Hurricane**
- **Earthquake**
- **Flood**
- **Tsunami**
- **Industrial Unrest**
- **Bomb Threat**
- **War**

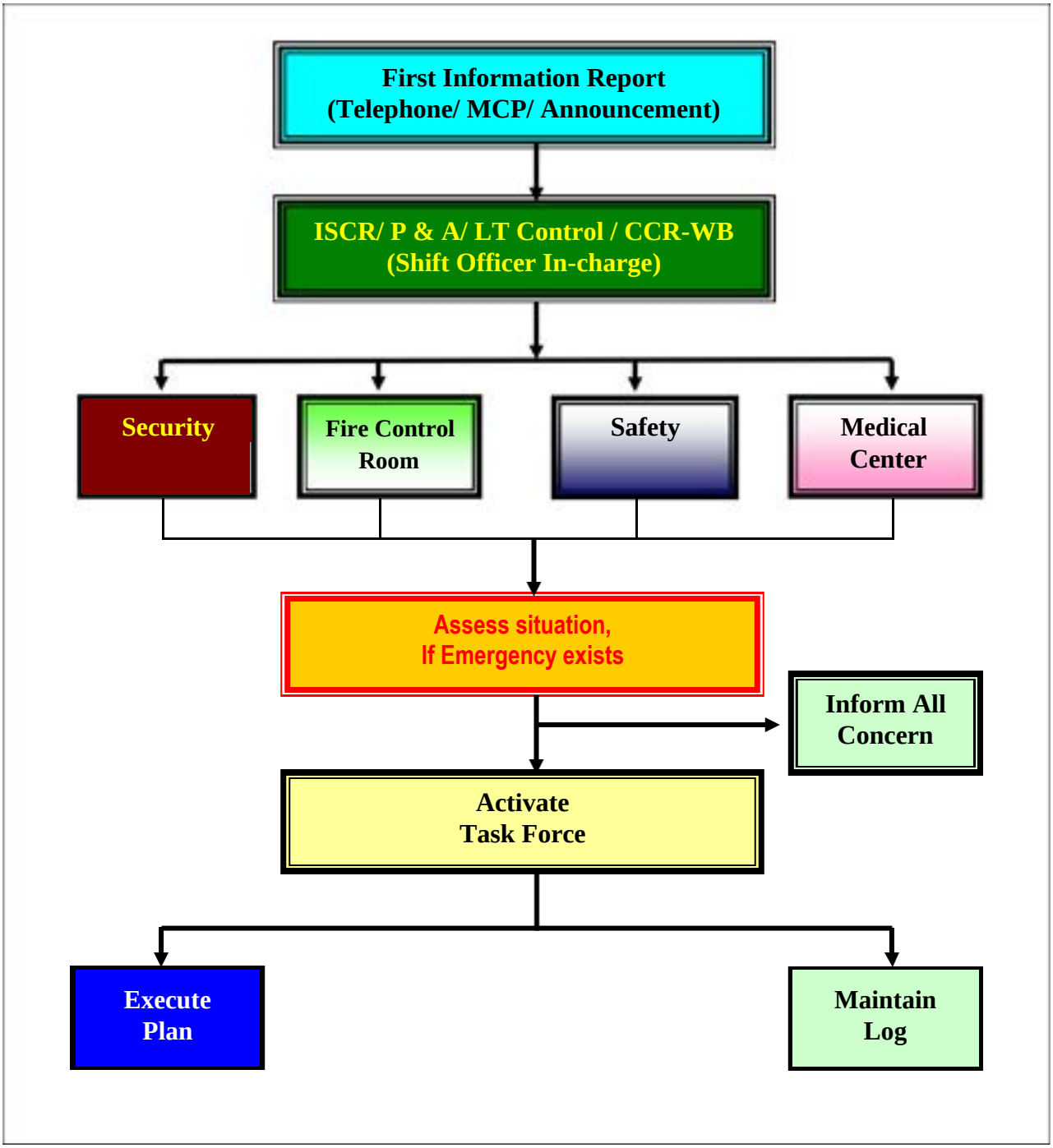
Emergencies (Occurrence – without warning)

- **Food/ Water Poisoning**
- **Fire**
- **Major Release of Flammable/ Toxic Chemicals**
- **Major Release of Flammable/ Toxic Gases**
- **Transportation incidents involving Hazardous Materials**
- **Marine Emergency**

GENERAL ACTION PLAN – EMERGENCIES (OCCURRENCE – WITH DUE WARNING)



GENERAL ACTION PLAN – EMERGENCIES (OCCURRENCE – WITHOUT WARNING / SUDDEN)



3.08 DUTIES & RESPONSIBILITIES

3.8.1 Site Main Controller:

- Has overall responsibility for the conduct of all emergency operations within the port complex.
- Shall immediately assess the situation plus its consequences, formally declare the level of emergency and order appropriate action.
- Shall direct all emergency operations within the port premises with the following priority:
  - Safety of personnel, property and equipment
  - Pollution and environmental impact control
  - Damage and loss control
  - Minimum curtailment of port activities
- Shall ensure all possible assistance to personnel affected for medical attention and hospitalization as appropriate.
- Shall ensure that all local and statutory authorities are kept advised of the facts and status.
- Shall ensure that normalcy is declared only when considered absolutely safe to do so.
- Shall be responsible for making available all possible company resources for emergency operations within Mundra Taluka and Bhuj District, if required/ requested by the appropriate Government Authority or ―Mutual Aid‖ organization.

3.8.2 Site Incident Controller

- Shall immediately assess the scale of emergency and report to Site Main Controller for instructions/ directions.
- Shall be responsible for operations in affected area with priorities as under:
  - Safety of personnel, property and equipment
  - Pollution and environmental impact control
  - Damage and loss control
  - Minimum curtailment of port activities
- Shall liaise with other heads of department for their support and assistance.
- Shall ensure continual reporting of situation to Site Main Controller and shall recommend calling for external resources as appropriate.

3.8.3 Emergency Support Officers

- Shall report to Site Incident Controller immediately and assist him as required (all possible portable emergency equipment, resources and personnel to incident location).
- Shall liaise closely with Head- Administration to facilitate the transfer of equipment, resources and personnel to incident location as appropriate.

3.8.4 Emergency Support Officers (Cont.)

- Shall carefully evaluate the risks, effects and possible consequences of:
  - the incident to his area of responsibility and propose further course of action to the Site Incident Controller with particular concern about safety of personnel, protection of environment and control of operation
- If the emergency situation involves Railways (locomotives, tracks and/or sidings), shall inform the Area Manager of Western Railways for assistance and mobilization of the Railways Emergency Team.

3.8.5 HOS – Administration (Transport Cell, Welfare & Canteen)

- Shall report to Site Incident Controller immediately and assist him as directed.
- Shall coordinate the activities of administration units.
- Shall inform and liaise with local bodies and authorities and police department in respect of the incident/ emergency.
- Shall arrange for transportation of whatever nature for use in the situation.
- Shall ensure that internal and external communication systems are available.
- Arrange for hot drinks/ snacks/ foods as requires at incident location.
- Shall arrange for assistance, if required from the ―**Mutual Aid**‖ system if available and as directed by Incident Controller.

3.8.6 HOD – Human Resources

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure Assembly Points are manned and all persons reporting there properly identified.
- Shall arrange to record full details of all persons affected by the incident and to inform next of kin as appropriate.
- Shall arrange for the transfer of all affected persons to suitable places for first aid or further medical attention as appropriate.
- Shall arrange for the evacuation, from the location of incident of all personnel not essential.
- Shall arrange to depute company personnel to each location where affected persons are being treated or are gathered for whatever reasons, to render assistance.
- Shall arrange to keep regularly informed of status and facts pertaining to incident to the families of company personal in its residential area.
- Shall inform to Government Authorities (DISH, GPCB etc.)
- Liaison with Government Authorities (DISH, GPCB etc.)

3.8.7 HOD – Corporate Affairs

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall assume the role of Public Relation Officer (PRO) for communication, dissemination of information, status and facts (preparation of communiqués, statements etc.) Shall co-
- ordinate with business related statutory and Government organization.

3.8.8 HOD – Engineering Services

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure activation of departmental damage limitation activities.
- Shall ensure immediate electrical isolation of the incident location thereafter; arrange availability of power after ascertaining safety of doing so.
- Shall make available all support that may be possible for the extrication/ evacuation of persons from the affected area.
- Shall liaise with the Engineering Services of organizations in close neighborhood for sourcing of supplemental equipment resources and assistance.
- Shall depute all available personnel to assist administration department.

3.8.9 HOD – Commercial

- Ensure availability of materials required by the Site Incident Controller.
- Issue materials from central stores round-the-clock (if required).
- Arrange emergency procurements from local dealers/ vendors or from neighboring industries.
- Arrange transportation of materials from central stores to the site of incident in coordination with the Coordinator (Transport Cell).

3.8.10 HOD – Finance & Accounts

- Shall report immediately to Site Incident Controller and assist him as directed.
- Shall ensure availability of funds and cash for all emergent requirements.
- Shall depute all available department personnel to assist HR in their activities.
- Shall ensure that under writers, shareholders, lenders, bankers and other Financial Institutions and statutory bodies are kept advised of the situation as appropriate.

3.8.11 HOD – Security

- Close the visitors ‘gate.
- Instruct the security to occupy pre-determined post for controlling security of installation.
- Call up additional help from Barracks.

Ensure that unauthorized persons / vehicles do not enter the gate.

3.8.12 HOD – Security (Cont.)

- Ensure that unauthorized persons / vehicles do not enter the gate.
- Provide security men for firefighting & rescue.
- Arrange for transport of higher authorities to the terminal.
- Transport vehicles would be provided near emergency control center.
- Depute two security guards for controlling traffic at scene of disaster.
- Produce a list of port staff on duty in co-ordination with time office.
- Ensure availability of security men at gates so that they can lead authorities to disaster site.
- Ensure that non-essential persons do not crowd affected area.

3.8.13 HOS – Fire Services

- He will report to Site Incident Controller and has the single motive – concern for safety of personnel during emergency response operations. He will normally function as an advisor to the Site Incident Controller.
- He will not be directing any activity, issuing or relaying orders/ information.

3.8.14 HOD/ HOS – Safety

- Report at Emergency Control Center and assist Site Main Controller with necessary information, support and resources.
- Mobilize off-duty personnel for assistance.
- Coordinate with the Coordinator – Commercial to mobilize additional resources, viz. spill containment equipment/ firefighting equipment/ personal protective equipment, spare breathing air cylinders etc., as may be required at the site of incident.

3.8.15 HOS – Occupational Health Center

- Contact Site Main Controller. Report at Emergency Control Center or at Occupational Health Center as instructed by the Site Main Controller.
- Organize first aid arrangements for the affected persons at the site of incident (cold zone) as may be necessary.
- Ensure that adequate paramedical staff, equipment and medicines are available at the Occupational Health Center. Mobilize additional resources (if necessary).
- Liaise with the local medical authorities and city hospitals, if the casualties are high and situation demands external medical help.
- Coordinate with the Coordinator - Transport for transporting victims to various hospitals.

3.09 EXTERNAL AID

In case of an emergency, which poses threat to human lives or/ and property, within **Adani Port - Mundra** as well as in the surrounding neighborhood areas, it may not be possible to control such situations with the resources available at APSEZ. In such situations, additional resources are mobilized from other agencies, which include:

- Neighbouring Industries (Mutual Aid Members)
- Government Authorities

External Aid Providers are as outlined in **Chart H**.

Note: Agreement is under process.

3.10 MUTUAL AID MEMBERS

Adani Port has entered into an agreement for mutual aid with following units for help/ assistance in the event of an emergency.

- Indian Oil Corporation Limited,
- Hindustan Petroleum Corporation Limited,
- Jindal SAW Ltd. (IBU),
- Adani Power Limited,
- Costal Gujarat Power Limited,
- Hindustan Mittal Energy Limited

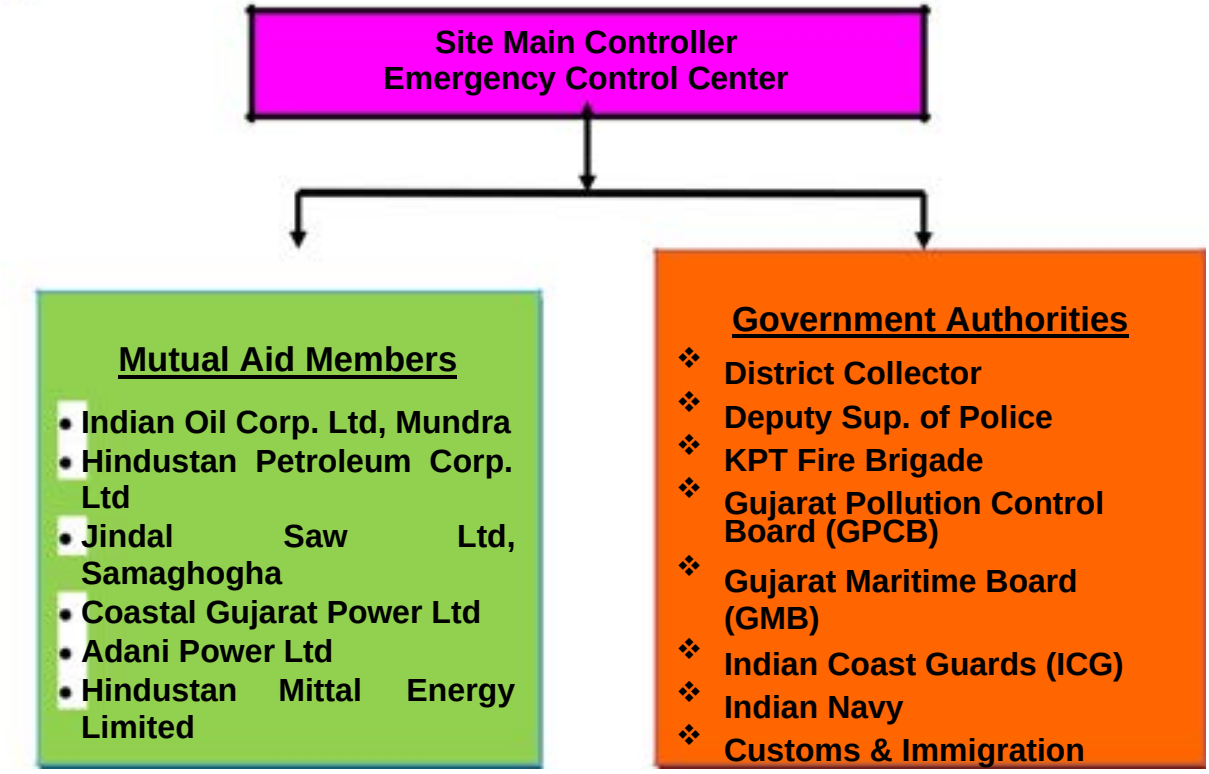
The mutual aid members shall:

- Respond promptly to the emergency call as and when communicated.
- Send their fire tenders/ crewmembers along with necessary supplies/ materials at the site of incident (as requested) and report at the **Adani Port** Security Gate and get instructions from security personnel on duty. These resources and personnel shall be deployed as directed by Site Incident Controller.
- The crew in–charges of the mutual aid members shall be responsible for safety of their crew engaged in emergency operations.

3.11 GOVERNMENT AUTHORITIES

If the situation demands response from multiple groups/ teams, APSEZ may seek assistance from various Government Authorities as have been recognized under the District Disaster Management Plan. These may include:

- District Collector
- Fire Brigade
- Police Commissioner
- Gujarat Pollution Control Board (GPCB)
- Gujarat Maritime Board (GMB)
- Indian Coast Guards (ICG)
- Indian Navy
- Immigration & Customs



3.12 REPORTING & INVESTIGATION

REPORTING: Any incident (whether minor or major) shall be reported. The main objective of incident reporting is to:

- Provide first-hand information to all the concerned
- Initiate investigation
- Prepare failure analysis report
- Report to the Government authorities (if required)

References

- Procedure for Incident Reporting
- Incident Report Format
- Work Injury Report

INVESTIGATION: All incidents (whether minor or major) shall be investigated. The main objectives of incident investigation are to:

- Identify the root cause(s) of the incident.
- Take appropriate preventive measures to prevent recurrence.
- To comply with the statutory requirements.

References

Incident Investigation Procedure

3.13 COMMUNICATION & PUBLIC AFFAIRS

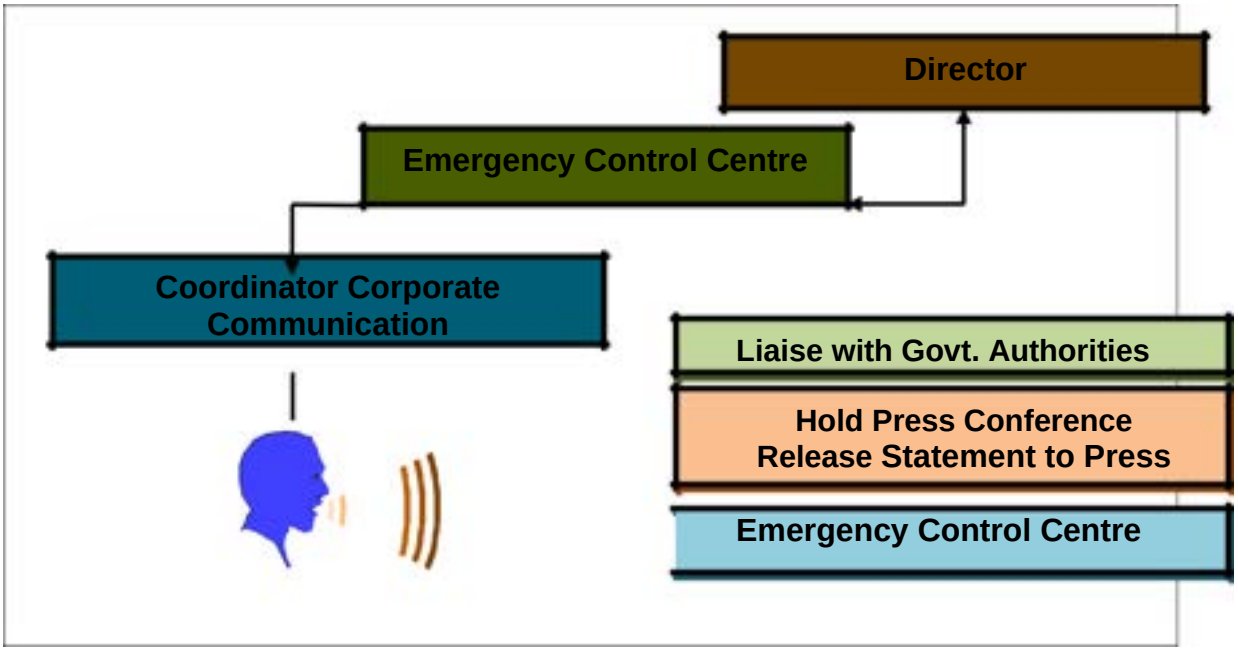
COMMUNICATION: Communication, an integral part for handling any emergency, helps in taking quick decisions, efficient & effective control of the emergency. Communication between the Emergency Control Center & the Field Command Post is established by means of:

- Telephone
- Mobile
- Port Announcement System
- Wireless VHF / UHF Radio
- E – Mail
- Emergency Vehicle

Communication between the Emergency Control Center and external authorities will be by:

- Telephone
- E – Mail
- Fax
- Emergency Vehicle

3.14 PUBLIC AFFAIRS



CHAPTER - 4

EMERGENCY PLANNING

4.01 DRILLS & TRAINING

Emergency response drills are conducted once a month to ensure effective response by not only the staff within **Adani Port** complex but also by external aid members (as required). The participation & actions will depend on the level of emergency drill planned, as per following table:

Drill	Duration	Port Level	Complex Level	District Level	Frequency	Notes
Siren Testing Drill	1 Minute	X	--	--	Twice in a Month	Test communication, check availability of personnel and evaluate response time.
Emergency Response Drill	1 – 2 hours	--	X	--	Monthly	Consists of interactive discussions of a simulated scenario among members of emergency response team but does not involve mobilization of personnel & equipment

4.02 TRAINING

The importance of training to personnel involved in responding to any emergency scenario is recognized and acknowledged. The training to employees at APSEZ is as per following table:

Course	Duration	New Recruit	Existing Staff	Frequency	Notes
Induction Training	4 Days	X	--	On joining the organization	All employees on joining the organization shall undergo the training at Learning Center

4.03 EMERGENCY PLANS

INDIVIDUAL PLANS ARE REQUIRED TO DEVELOP EMERGENCY PLANS AS PER GUIDELINES PROVIDED IN SAMPLE PLANS

4.3.1 CYCLONIC STORMS / HURRICANE

Cyclonic storms/ hurricanes are intense depressions, which develop in tropical latitudes and are often the cause of very high winds and seas. The wind blows around the center of a tropical storm in a spiral flow inward, anti-clockwise in Northern Hemisphere and clockwise in Southern Hemispheres. Plan for tackling cyclonic storm/ hurricane can be broadly divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** - **Port Engineer (01), Fire Team Member (01), Port Operators (02),□Electrician (01)** Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Maintain inventory of emergency items & supplies as necessary, including but not limited to:** □ Torches, Ropes, lines, wires, tarpaulins, plastic sheets, Tool kit, duct tapes, assorted gears, First aid box, Sand bags etc. ➢ The list is subject to updating depending on the requirements of the individual plant. ❑ **Liaise with HOD – ES for Civil & Mechanical Support (including supply of spares).** ❑ **Liaise with HOD – HR for food stock, water, blankets & bedding and medicine.** ❑ Liaise with Port Operation Control.

CYCLONIC STORMS/HURRICANE (Cont.)		
Action By		**Activity**
ACTION BEFORE EFFECTIVE PERIOD		

Port Key Person	❑ **Liaise with Site Main Controller** ❑ **Mobilize Emergency Response Team(s).** Note ➢ Members to be briefed about the emergency. ➢ Members to be informed that they may be required to stay at site during & after the emergency. ❑ **Release non-essential personnel.** ➢ Port key person reserves prerogative on the release of employees. ➢ Personnel to be briefed on the possible time of return to work. ❑ **Initiate Port shut down based in:** ❖ Consultation with Site Main Controller. ❑ ***Audit Port area(s) for safety measures to ensure that:*** ❖ *Loose items are secured.* *Electric machinery is covered and protected against water ingress.* ❖ Storm water drains are cleared of any obstructions. ❑ ***Implement preventive & precautionary measures (including but not limited) to ensure:*** ❖ *Inventory of emergency supplies is maintained.* ❖ *Material and equipment that can possibly be damaged by water ingress is elevated.* ❖ *Windows & doors are weather tight.* ❖ *Roof mounted equipment are braced.* ❖ *Material & equipment that cannot be moved are covered.* ❖ Sandbags are placed in doorways where flooding from storm water can occur. ***In flood as consequence of Cyclonic Storm/ Hurricane is anticipated, ensure:*** ❖ *Dyke valves of Hydrocarbon storage tanks are open.* ❖ Oil Spill Management Plan is actuated.

CYCLONIC STORMS/HURRICANE (Cont.)

Action By	Activity
ACTION DURING EFFECTIVE PERIOD	
Port Key Person **Emergency Response Team** **Port Key Person**	❑ **Stop** ❖ All field activities. ❖ All permits to work. **Note** ➢ All personnel to be notified against venturing out during effective period. ❑ **Ensure all personnel remain indoor, observant and be alert to:** ❖ Detect any damage to equipment or buildings. ❖ Development of unsafe conditions. **Note** ➢ In case of any emergency warranting immediate response, communicate to Site Main Controller. ❑ **In consultation with Site Main Controller:** ❖ Make all possible efforts to reach the site of incident/ damage. ❑ **Act appropriately to control prevalent incident/ damage**.
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person & Emergency Response Team **Port Maintenance Group** **Port Process Group**	❑ Audit Port area(s) for damage assessment & prepare report ❑ Undertake restorative measures & repairs based on audit report on: ❖ Damaged equipment & buildings. ❖ Unsafe conditions. **Note** ➢ Clearance report to be submitted to Site Main Controller through Port Key Person. ❑ Initiate restart up of the Port.

CYCLONIC STORMS/HURRICANE (Cont.)

Department Wise Emergency Action Plan for Cyclone

Dry Cargo Department	❑ Remove all fine grained cargo stored at open storage yard and store at indoor warehouse. ❑ Secure the fine grained cargo stored at open storage yards with Tarpaulin. ❑ Stop all stevedoring activities, bring all Mobile Harbour cranes to shore, safely park the cranes and down its booms. ❑ Inform all contractors to remove all their equipment from jetty area and safely park at shore, in case of crane down its boom. ❑ Arrest all barge / ship loaders, and Mobile truck loading hoppers at its wheel to prevent horizontal movement due to wind and secure from its top by arranging guy ropes. ❑ Stop loading / unloading of ship and measure the ship cargo quantities along with clients surveyor and communicate Marine Dept. / shipping agencies to take the ship to anchorage area.
Marine Department	❑ In coordination with dry cargo instruct all ship captains to take the ships anchorage. ❑ Stop all activities at jetty area. ❑ Ensure the jetty areas are free from loose and unsecured materials / equipment. ❑ Update all departments about the latest whether conditions. ❑ Ensure TUG‘s are shored and secured. ❑ Stop SPM operation remove pipes connections from the ship and conform to maintain safe distance from SPM.
Liquid Terminal Department	❑ Stop loading / unloading of ship, take ullage with clients surveyor, detach hose connections with the shipping vessels and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area. ❑ Remove all loose materials and equipment from jetty area. ❑ Stop all activities, remove all tanker Lorries from liquid terminal and do not allow any tanker Lorries to enter the liquid terminal area.

Department Wise Emergency Action Plan for Cyclone	
Container Terminal / RORO Department	❑ Stop loading / unloading of ship take stock of containers along with surveyor, and communicate Marine Dept. / Shipping agencies to take the ship to anchorage area. ❑ Stop all activities and park the RTGC and RMQC at specified location and secure in all respect to prevent horizontal movement and topping. Ensure crane operators come out of crane after safely parking the cranes. ❑ Remove all loose materials and equipment‘s from Quay area. ❑ Ensure the height of container stock piling safe withstand the wind force, if it unsafe restrict the stock pile height. ❑ Stop trailer loading and remove all trailer from CT and do not allow any trailer to enter CT. ❑ Secure the all cars stationed at buffer yard by putting blocks on all the wheels.

Security Department	❑ Close the gate ant stop allowing visitors and transport trucks either inward or out ward. ❑ Ensure vehicles are parked at designed parking areas, with wheels are blocked. ❑ Instruct all drivers to take shelter at canteens (concrete buildings).
Fire Department	❑ Equip the fire tenders with rescue equipment, safely park the fire tenders and secure its wheel by providing blocks.
Project Management Cell (PMC**)**	❑ Stop all activities, park the cranes and equipment's at safe location, lower the booms of cranes and secure them. ❑ Ensure all erected structures are secured with guy ropes and ties are provided. ❑ Remove all loose materials from top of buildings and structures or secure them. ❑ Ensure all workmen are sheltered at safe locations like canteens (concrete buildings). ❑ Secure the Jetty area piling rigs and cranes by tying with guy ropes. ❑ Stop all project vehicle movements and ensure the vehicles are parked at safe location with wheels are blocked. ❑ Ensure the barge type floating cranes are off loaded and brought to shore and its boom is downed. ❑ Ensure all vehicles and cranes are removed from break water embankments.

4.3.2 EARTHQUAKE

Earthquake is most likely to occur without pre-warning and so its severity and destructive potential are highly unpredictable. Earthquake can result in collapse of buildings, structures & elevated equipment, heavy casualties apart from fracture of underground pipelines and uprooting of energized wires etc. The plan to deal with earthquake can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ **Port Engineer (01), Fire Team Member (01), Port Operators (02),□Electrician (01)** ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOD – HR to identify control centers equipped with:** ❖ Communication facilities. ❖ Emergency vehicles/ equipment. ❖ List of emergency contacts & suppliers. ❖ Medical facilities.
ACTION DURING EFFECTIVE PERIOD	

Individuals	❑ Do not panic. ❑ Avoid standing near windows, external walls. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
ACTION AFTER EFFECTIVE PERIOD	
Site Incident Controller **Port Key Person**	❑ Take head count. Activate Port emergency plan. ❑ Liaise with Site Main Controller for shut down of Port(s) if required. ❑ Liaise with HOS – Fire Services to initiate search & rescue. ❑ Liaise with – Occupational Health Center Services to provide first aid to the victims and remove causalities (if any). ❑ Report at site. ❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS –Occupational Health Centre to follow up on causalities.

4.3.3 TSUNAMI

Tsunami is Japanese for "harbor wave which is a huge ocean wave that can travel at speeds up to 600 mi/hr (965 km/hr) can have heights of up to 30 m (98 ft), wavelengths of up to 200 km (124 mi) and long periods, usually between 10 and 60 minutes. Sometimes incorrectly called a tidal wave, a tsunami is usually caused by an underwater earthquake or volcanic eruption and often causes extreme destruction when it strikes land. It is a series of waves which travel outward on the ocean surface in all directions in a kind of ripple effect. Since the waves can start out hundreds of miles long and only a few feet high, they would not necessarily be noticeable to a passing ship or a plane flying overhead. The plan to deal with Tsunami can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** **Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01), Marine Control Officer (01), POC Officer (01), ISCR (01)** ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOD – Security to identify control centers equipped with:** ❖ Communication facilities. ❖ Emergency vehicles/ equipment (tugs, speed/mooring boat). ❖ List of emergency contacts (ISCR, POC, Marine Control, Deputy PFSO, Port Security) ❖ Occupational Health Facilities.
ACTION DURING EFFECTIVE PERIOD	

Individuals	❑ Do not panic. ❑ Avoid standing near to sea side. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
ACTION AFTER EFFECTIVE PERIOD	
Site Incident Controller **Port Key Person**	❑ Liaise with Site Main Controller for shut down of Port(s) if required. ❑ Liaise with HOS – Security and HOS – Fire Services to search & rescue. ❑ Liaise with HOS – Occupational Health Center to provide first aid to the victims and remove causalities (if any). ❑ Report at site. ❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOD – Human Resources & Administration**.**

4.3.4 FLOOD

An overflowing of water onto land that is normally dry. A flood tide is an abundant flow or outpouring. It is a temporary rise of the water level, as in a river or lake or along a seacoast, resulting in its spilling over and out of its natural or artificial confines onto land that is normally dry. Floods are usually caused by excessive runoff from precipitation or snowmelt, or by coastal storm surges or other tidal phenomena. Floods are sometimes described according to their statistical occurrence. A fifty-year flood is a flood having a magnitude that is reached in a particular location on average once every fifty years. In any given year there is a two percent statistical chance of the occurrence of a fifty-year flood and a one percent chance of a hundred-year flood.

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ Constitute Emergency Response Team(s) comprising of at least: □Port Engineer (01), Fire Team Member (01), Port Operators (02),□Electrician (01) ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOD – HR to identify control centers equipped with:** ❖ Communication facilities. ❖ Emergency vehicles/ equipment. ❖ List of emergency contacts & supplier ❖ Medical facilities.
ACTION DURING EFFECTIVE PERIOD	

Individuals	❑ Do not panic. ❑ Avoid standing near to sea side. ❑ Stand near columns or duck under sturdy furniture. ❑ Assemble at emergency assembly point.
ACTION AFTER EFFECTIVE PERIOD	
Site Incident Controller **Port Key Person**	❑ Liaise with Site Main Controller for shut down of Port(s) if required. ❑ Liaise with HOS – Security and HOS – Fire Services to search & rescue. ❑ Liaise with HOS – Occupational Health Center Services to provide first aid to the victims and remove causalities (if any). ❑ Report at site. ❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOD – Human Resources & Administration.

4.3.5 INDUSTRIAL UNREST

Industrial relation between personnel and management may deteriorate because of any reason. Problems, which may arise due to industrial unrest, include:

- ❖ Dharna/ Strike/ Hunger strike
- ❖ Unofficial gatherings/ Gate meetings/ Forceful entry
- ❖ Work to rule/ Go slow/ Disobedience
- ❖ Gherao/ Rasta roko
- ❖ Intimidation & Use of force
- ❖ Support from local & criminal elements
- ❖ Sabotage

In such a scenario, to ensure smooth operation of Port, protection of lives and property, well-coordinated effort is needed from all concerned. Plan to deal with industrial unrest can be broadly divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** **Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)** Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Plan 8 hours shift. ❑ Liaise with HOD – HR for food stock, water, blankets & bedding and medicine.
INDUSTRIAL UNREST (Cont.)	
Action By	Activity

ACTION BEFORE EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Site Main Controller ❑ Liaise with HOD – Security for security & vigilance requirements. ❑ Liaise with HOD – HR for planning of accommodation of additional personnel and transport for additional requirements of vehicle (if any).
ACTION DURING EFFECTIVE PERIOD	
Port Key Person	❑ **Liaise with HOD – Security for** ❖ Strengthening security at sensitive points. ❖ Ensuring protection of lives & property. ❖ Vigilance & patrolling. ❖ Maintaining law & order. ❑ **Liaise with Site Main Controller for** ❖ Updates on the situation.
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ **Assess damage (if any).** ❑ **Liaise with Site Main Controller for restoring normalcy.**

4.3.6 BOMB THREAT

Bombs can have devastating effect not only on the Adani Port but also on neighboring areas. Hence, any threat received regarding plantation of the bomb shall be viewed seriously. Plan to deal with bomb threat can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Search Team(s) comprising of at least:** ❖ Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Increase awareness in the Port personnel regarding threat perception (not to handle suspicious objects, report suspicious movements by unknown persons).
ACTION BEFORE EFFECTIVE PERIOD	

Port Key Person	❑ Inform all personnel to provide information regarding unidentified or suspicious objects/ persons. ❑ Liaise with Port Operation Centre. ❑ Liaise with HOD – Security for Intensifying vigilance & patrolling. Initiating bomb search. Making arrangements to minimize effects. Making arrangements for evacuation.
ACTION DURING EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Site Main Controller for any action to be taken on case to case
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Site Main Controller for restoring normalcy (if bomb recovered/ no untoward incident occurs). If blast occurs ❑ Assess damage (if any). ❑ Take restorative measures. ❑ Liaise with Site Main Controller.

4.3.7 WAR

During an outbreak of war, bombarding by enemy planes at Mundra site can have devastating effects. Plan to deal with bomb threat can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ Constitute Emergency Response Team(s) comprising of at least: Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01) Based on total strength of the individual plant, more than one team may be constituted. Each member of the team shall have a designated alternate member. ❑ Make arrangements for camouflage the flares. ❑ Liaise with HOD – Security to increase awareness in the Port personnel regarding war.
ACTION BEFORE EFFECTIVE PERIOD	
Port Key Person	❑Liaise with Port Operation Centre. ❑Liaise with HOD – Security for ❖ Intensifying vigilance & patrolling.
ACTION DURING EFFECTIVE PERIOD	

Port Key Person	❑ **Liaise with Site Main Controller for minimizing light (during night) & obtaining updated information.** ❑ **Liaise with HOD – Security for evacuation of non-essential personnel.**
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ Assess damage (if any). ❑ Liaise with Site Main Controller to restore normalcy**.**

4.3.8 FOOD/WATER POISIONING

Plan to deal with food/ water poisoning can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ Liaise with HOS – Occupational Health Services: ❖ To impart training regarding food/ water poisoning. ❖ For supply of medicines, saline water etc.
ACTION DURING EFFECTIVE PERIOD	
Port Key Person	❑ Liaise with Site Main Controller & HOS – Occupational Health Services ❖ Identify the contaminant source. ❖ Seize contaminated material. ❖ Take preventive measures to avoid recurrence. ❖ Inform all concerned. ❖ Arrange sample analysis & alternate supplies. ❖ Arrange medical assistance to the victims.
ACTION AFTER EFFECTIVE PERIOD	
Port Key Person	❑ **Liaise with Site Main Controller & HOS – Occupational Health Services to:** Conduct epidemiological investigation to identify the cause. Take preventive measures to avoid recurrence. Follow up on causalities.

4.3.9 FIRE / Chemical Tank Farm Fire

Plan to deal with fire can be divided in following stages:

Action By	Activity
PLANNING & PREPAREDNESS	

Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** **Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)** ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Liaise with HOS – Fire Services to:** ❖ Maintain adequate fleet of fire tenders & firefighting equipment. ❖ Maintain patrolling to eliminate potential sources of fire hazard. ❖ Impart regular refresher training to auxiliary fire squad members.
ACTION DURING EFFECTIVE PERIOD	
Emergency Response Team	❑ Activate alarm. Try & contain fire. ❑ Liaise with Site Main Controller, HOS – Fire and HOS – Occupational Health Services to: ❖ Evacuate non-essential personnel. ❖ Ensure search & rescue ❖ Ensure causalities receive attention. ❑ Liaise with HOD – Security to restrict movement in affected area.
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Implement fire preventive measures. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS – Occupational Health Services to follow up on causalities.

4.3.10 MAJOR RELEASE OF FLAMMABLE/TOXIC CHEMICALS AT CHEMICAL TANK FARM (Including night operations)

Plan to deal with major release of flammable/ toxic chemicals can be divided in stages:

Action By	Activity
PLANNING & PREPAREDNESS	
Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ **Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)** ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ **Maintain under flow baffle, over flow baffle, blocking gates & dykes.** ❑ **Liaise with HOD – QHSE for:** ❖ Conducting regular audits. ❖ Training of persons regarding various aspects of spillage. ❖ Identifying locations to set up blockages. ❑ Liaise with HOS – Fire Services for acquiring equipment for recovery.

ACTION BEFORE EFFECTIVE PERIOD	
Emergency Response Team	❑ Control, block or contain flow of spillage. ❑ Suspend all hot work in the vicinity & isolate electric powers to affected area(s). ❑ Recover or direct spill material to effluent pit. ❑ Liaise with HOS – Fire/ Occupational Health Services to: ❖ Evacuate non-essential personnel. ❖ Administer first aid to victims. ❑ Liaise with HOD – Security to restrict movement in the area. ❑ Liaise with Site Main Controller for external assistance required (if any).
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Implement fire preventive measures. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS – Occupational Health Services to follow up on causalities.

Onshore Oil Spill Collection Plan

Onshore Oil spills are classified into three categories

- ❑ Leakage within the enclosure and oil spill is retained by the dyke wall.
- ❑ Leakage from the pipe lines.
- ❑ Leakage from the tanker truck carrying the oil.

Facilities available

- ❑ As the enclosure tanks are stored with various oil products the bund walls are provided to retain the product individually for every tank.
- ❑ For the storage of spilled product, slop tanks are available in each enclosure.
- ❑ 2 nos. Portable pumps of intrinsically safe are available.
- ❑ The tank farm drain point valves are kept closed.
- ❑ Pipe lines are available to transfer the spilled product to slop tank.
- ❑ Spill collection kit is available. (6 nos. Drip trays, 4nos. Empty barrels, 4nos. Carboys, 4nos. Funnels, 2nos. Barrel shifting trolleys and 10nos. Soaking pads, 4 nos. Bonding wire with clamps 20mts long).
- ❑ Emergency response team to collect the spilled oil is available in each shift.
- ❑ PPE‘s are available.

Leakage within the enclosure and oil spill is retained by the dyke wall

Sr. No.	Corrective Action	Action By
1.	Inform Security and stop all vehicles entering the Liquid Terminal and stop all vehicles inside and remove unwanted workmen from the liquid terminal.	LT Shift Incharge/ Security
2.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
3.	Ensure necessary PPE‘s are worn by the emergency response team.	LT Shift Incharge
4.	Shift the intrinsically safe portable pump to nearby location to facilitate pumping of the product to slop tank.	LT Shift Incharge

5.	Shift the spill collection kit to the location.	LT Shift Incharge
6.	Inform fire department to perform standby with firefighting facility.	LT Shift Incharge
7.	Lay the pump suction line foot valve in the pool of spilled liquid.	LT Shift Incharge
8.	Connect the pump discharge line to pipe line network leading to slop tank.	LT Shift Incharge
9.	Ensure jumpers/ bonding is provided if other than wire breaded hose is used or PVC/ Rubber hoses are used (from foot valve to pump & pump to pipe line).	LT Shift Incharge
10.	Give power supply to the pump and run the pump.	LT Shift Incharge
11.	Switch off the pump once the spilled oil level goes below the foot valve and air sucks in.	LT Shift Incharge
12.	Collect the remaining oil with the help of soaking pad, carboys and put it in barrels.	LT Shift Incharge
13.	Pump the oil collected in barrels to slop tank.	LT Shift Incharge
Leakage from the pipe lines during pipeline transfer operation		
Sr. No.	**Corrective Action**	**Action By**
1.	Stop the leakage by switching off the pump. Arrest the leakage by closing the valve or plugging the leakage point.	LT Shift Incharge
2.	Inform security and establish security posts at the junction of roads where the pipe line is leaking.	LT Shift Incharge/ Security
3.	Road blockage shall be established at least 200mts away from the leakage point.	Security
4.	Ensure vehicles are stopped or rerouted 200mts away from leakage point.	Security
5.	Do not allow to switch on or switch off any electrical equipment within 200mts radius of leakage point.	Security
6.	Do not allow mobile phones within the radius of 200mts.	Security
7.	Inform fire department to perform standby duty with fire fighting facility.	LT Shift Incharge
8.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
9.	Ensure necessary PPE‘s are worn by the emergency response team.	LT Shift Incharge
10.	Shift the spill collection kit to the location.	LT Shift Incharge
11.	With the help of soaking pad collect the spilled oil in carboys and barrels.	LT Shift Incharge
12.	Shift the barrels to waste oil storage area and dispose it through vendors.	LT Shift Incharge
13.	Put sand or saw dust and clean the area.	LT Shift Incharge

14.	Take action to permanently arrest the pipe line leakage.	LT Shift Incharge
Leakage from the tanker truck carrying the oil / chemicals		
1.	Arrest the leakage by closing the particular tanker compartment valve or plugging the leakage point.	LT Shift Incharge
2.	Inform security and establish security posts at the junction of roads where the tanker truck is parked.	LT Shift Incharge/ Security
3.	Road blockage shall be established at least 200mts away from the leakage point.	Security
4.	Ensure vehicles are stopped or rerouted 200mts away from the leakage point.	Security
5.	Do not allow to switch on or switch off any electrical equipment within 200mts radius of leakage point.	Security
6.	Do not allow mobile phones within the radius of 200mts.	Security
7.	Inform fire department to perform standby duty with fire fighting facility.	LT Shift Incharge
8.	Inform and assemble the Emergency Response Team at spillage site.	LT Shift Incharge
9.	Ensure necessary PPE's are worn by the emergency response team.	LT Shift Incharge
10.	Shift the spill collection kit to the location.	LT Shift Incharge
11.	With the help of soaking pad collect the spilled oil in carbouys and barrels.	LT Shift Incharge
12.	Shift the barrels to waste oil storage area and dispose it through vendors.	LT Shift Incharge
13.	Put sand or saw dust and clean the area.	LT Shift Incharge

- In all emergencies LT Shift incharge shall inform QHSE department and QHSE department shall monitor everything is happening as per the action plan and guide where ever required.
- For the purpose of Emergency Response Team HOD Liquid Terminal shall ensure at least two staffs are identified and they are available in each shift. The work force for collecting the spill is arranged by stopping some of the LT activities and also can be obtained from Fire Department.
- Fire department shall spare at least four persons (firemen) for spill collection purpose and they shall work under the guidance of LT shift incharge.
- Fire department shall also perform standby duty with firefighting arrangements during the entire course of spill collection operation.

4.3.11 MAJOR RELEASE OF FLAMMABLE/TOXIC GASES AT CHEMICAL TANK FARM (Including night operations)

Plan to deal with major release of flammable/ toxic gases can be divided in following stages:

Action By		Activity
PLANNING & PREPAREDNESS		

Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** **Port Engineer (01), Fire Team Member (01), Port Operators (02),□Electrician (01)** Note ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Maintain pressure relief valves & vents. ❑ Identify location to isolate, redirect the lines to flares or re-circulation. ❑ Liaise with HOD – QHSE for: ❖ Conducting regular audits. ❖ Training of persons regarding various aspects gas leakage. ❑ Liaise with HOS – Fire Services for personnel protective equipment**.**
ACTION DURING EFFECTIVE PERIOD	
Emergency Response Team	❑ Control, block or contain leakage. ❑ Suspend all hot work in the vicinity & isolate electric powers to affected area(s). ❑ Isolate and redirect the lines to flares or re-circulation. ❑ Liaise with HOS – Fire/ Occupational Health Services to: ❖ Evacuate non-essential personnel. ❖ Administer first aid to victims. ❑ Liaise with HOD – Security to restrict movement in the area. ❑ Liaise with Site Main Controller for external assistance required (if any).
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Implement fire preventive measures. ❑ Undertake restorative measures & repairs. ❑ Liaise with Coordinator – Occupational Health Services to follow up on causalities.

4.3.12 INCIDENTS INVOLVING TRANSPORTATION OF HAZARDOUS MATERIAL

Various hazardous materials are normally transported to and from **Adani Port** by tank lorries. These tank lorries have the potential to mechanical failures & road incidents (within and/ or outside the complex) resulting in the possible scenarios viz. spillage, leakage, fire & explosion that might pose an imminent danger to vehicular traffic and surrounding populations [mostly in built-up areas] apart from threat to an environment. The plan to deal with transportation incidents involving hazardous material may be divided in following stages:

Action By		Activity
PLANNING & PREPAREDNESS		

Port Key Person	❑ **Constitute Emergency Response Team(s) comprising of at least:** ❖ **Port Engineer (01), Fire Team Member (01), Port Operators (02), Electrician (01)** ➢ Based on total strength of the individual plant, more than one team may be constituted. ➢ Each member of the team shall have a designated alternate member. ❑ Collect information about the product and specification/ design of the tanker for the product. ❑ Liaise with HOD – Security for: ❖ Ensuring safety equipment & fitness certificates are valid. ❖ Auditing the tankers. ❖ Awareness program for transporters, drivers'etc.
ACTION DURING EFFECTIVE PERIOD	
Emergency Response Team	❑ **Liaise with HOD – Security/ Driver/ Transporter to:** ❖ Ascertain extent of damage and impact. ❖ Control, block or contain leakage. ❖ Inform various agencies. ❖ Request for assistance. ❖ Restrict movement in the affected area.
ACTION AFTER EFFECTIVE PERIOD	
Emergency Response Team	❑ Assess damage. ❑ Undertake restorative measures & repairs. ❑ Liaise with HOS – Occupational Health Services to follow up on causalities

4.3.13 MARINE EMERGENCY

Shipping fleet operates outside the premises of **Adani Port** and is subject to international, national and local rules. Marine emergencies are classified into:

On-shore Emergency (Nature I & Nature II)

- May occur in Jetty/ Shipping Division area.
- Shall be handled as per the Adani Port Emergency Action Plan.
- Senior most functionaries to take charge as Emergency Coordinator (Site Incident Controller).
- Radio Room shall function as Marine Control Center.

On-site Emergency (Nature I - Level-I or Nature I – Level II)

- May occur on board APSEZ vessels (not requiring external help)
- Master shall assume charge on board vessel
- Senior most functionaries to take charge as Emergency Coordinator (Site Incident Controller).

Off-Site Emergency (Nature-II)

- Shall be handled as per Contingency Manual & Single Point Mooring Operations Manual.
- Master shall assume charge on board vessel.
- Senior most functionaries on shore to take charge as Emergency Coordinator (Site Incident Controller).

In case of an Oil Spill, the action plan shall be as per "Oil & Chemical Spillage Response Plan" During any of the above-classified marine emergencies:

MARINE EMERGENCY (Cont.)

- During working hours
  - Key Person or senior most functionary to assume charge of Site Incident Controller
  - Next senior most functionary to assume charge of Deputy Site Incident Controller
  - Coordinators to report at Site Shift Managers Office
- During silent hours
  - Radio Officer in duty to assume charge of Site Incident Controller
  - Shift Officer to assume charge of Deputy Site Incident Controller
  - Coordinators to report at Site Shift Managers Office
- Oil & Chemical Spillage Response Plan

CHAPTER – 5

EMERGENCY PREPAREDNESS

5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

5.1.2 LIQUID TERMINAL

5.1.3 DRY CARGO AREA

5.1.4 TERMINAL – 2:

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

5.1.7 TERMINAL – 1:

5.1.8 WEST BASIN:

5.1.9 ADANI HOUSE & PUB:

5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH ADANI PORT

5.01 FIRE FIGHTING FACILITIES AVAILABLE WITH ADANI PORT, MUNDRA

Adequate firefighting systems are provided for protection of berths, buildings and facilities of the port. The firefighting facilities are based upon TAC and NFPA guidelines.

The pumps and fire water pipe network system are provided to serve hydrants suitably located around the entire premises with Extinguishers, Hydrants, Hose boxes and Monitors. The Fire & Safety staff of the **Adani Port** covers the entire premise and provides suitable fire protection coverage with mobile equipment, personnel, etc. The capacity of the fire water system is sized to fight a fire hazard at the proposed berth. A general guideline for the fire hydrant system is as given below:

5.1.1 FIRE FIGHTING SYSTEM AT THE JETTY

The firefighting systems at all the berths are designed to be combined with foam concentrate systems. 08 Water/Foam Monitors are installed on the four berths, so that the manifold area of the maximum tanker size (including the tanker drift movements) is included in their throw pattern. An additional Jumbo Jet Water Curtain Nozzle installed at berth no. 01 & 02 to isolate the Valve manifold area or the tanker, in case of fire at one or the other.

- Adequate foam storage is provided to ensure firefighting in all areas for a minimum period as in accordance with Indian Standards or NFPA but on no account less than 30 minutes.
- All the firefighting systems is designed in accordance with the Indian and NFPA standards.
- The system follows the minimum design criteria as stipulated in the Guidelines, which are summarized hereunder:

  - In case of fire, the ship will be towed to the open sea and the firewater protection for the ship will be treated as first aid until towing is done.
  - One single largest risk is considered for providing fire protection facilities.
  - Sea water, which is available at the location, will be conveniently used.
  - As port terminals handling ships of size less than 50,000 DWT, one set of firewater pumps are provided this will cater to both monitors as well as hydrant service and water curtains.
  - The firewater pressure system is designed for a minimum residual pressure of 7 kg/m^2 at the hydraulically remotest point of application in the terminal.
  - Fire water flow rate will be the aggregate of the following:
  - Water flow for Water/Foam Monitors for protection of loading arms/piping manifold and ship;
  - Water flow for areas segregation through water curtains between ship and loading arms and hydrant service.
  - The water network laid to ensure multi-directional flow wherever possible. Isolation valves are provided in the network to enable isolation of any section of the network.

The major components of the firefighting system for the berths are as follows:

1. **Monitors:**
   Two monitors with an adequate capacity with suitable horizontal throw. The positions of the monitors are so designed to cover the entire area of largest tanker berthed at Jetty.

2. **Curtain nozzles:**
   These nozzles are provided between unloading arms and the tanker at berth no. 01 & 02 for segregation of the two with a water curtain.

3. **Water hydrants:**
   Water hydrants are stand post type and are double headed. One hydrant post is provided for every 30 meters length on the jetty. These are located alongside berths for easy accessibility. 6" hydrant heads with standard twin 63 mm hydrant valves are used.

4. **Mobile Monitor:**
   One unit of Mobile Monitor with 800 ltrs foam in tank kept at jetty to reinforce firefighting system during handling of Chemicals /Hydrocarbons.

5. Foam-concentrate drums are provided for the foam monitors (with 3% concentrate). A total of 3310 ltrs of AR-AFFF concentrate are stored in easily cartable Jerry cans of 20-ltrs and 200 ltrs capacity drum kept at Marine Terminal.

6. Firewater network ring main is of 300 mm diameter.

5.1.2 LIQUID TERMINAL

Presently there are 97 tanks at Liquid Terminal and the area of the tank farm is divided in three zones. They are CTF (61 fixed roof tanks), POL (8 tanks including two floating roof tank), EOL (25 fixed roof tanks) and Bitumen Terminal (3 fixed roof tanks) The Firefighting systems at the Liquid Terminal area is fully approved by the TAC. It is designed to meet the demand of two major fires at distinct locations. The essence of the systems is quick knock down of fire at the earliest instance. The firefighting systems consists of six electric pumps, four diesel pumps and two Jockey pump and ring main of 300/250 mm dia. each tank of CTF, POL and Bitumen Terminal is protected with devoted foam and water protection system. All the loading bays and enclosure are suitably covered with Water Monitors and Hydrants.

The major components of the firefighting system for the Liquid Terminal is as follows:

a. Foam Pourers:

All the fixed roof & floating roof tanks of CTF, POL & Bitumen Terminal are covered by Foam Pourer System. The Foam could be operated by quick opening type butterfly valve positioned near each tank. In case of bitumen tanks foam have to feed in the line from external source.

b. Water Spray Rings:

All the tanks of CTF and EOL are protected by medium velocity water spray system all around the tanks. The discharge rate of water spray is 3 lpm/m^2 for the effective cooling against radiation heat. The water sprays are also operated by quick opening type butterfly valves.

c. Water Monitors:

All the Loading Bays, Tank enclosures are adequately covered by the Water Monitors. The water monitors are strategically positioned to cover maximum area. the monitors are manually operated by the valves placed with each monitor.

d. Hydrants:

Double headed Hydrants are evenly positioned all over the Terminal area in accordance with TAC and NFPA guidelines

5.1.3 DRY CARGO AREA

The Dry Cargo area is the zone of moderate risk hence only fully pressurized Hydrant system is provided. The well designed Single and Double outlet type hydrant posts are located all around the open storage yards and the covered godowns.

a. Hydrants:

All the open and covered type of storage areas are covered by Single or double type Hydrant posts. The hydrant system is kept fully pressurized at 7 Kg/cm^2 with a minimum operating pressure of 6 Kg/cm^2 at any point in the system.

FIRE STATION

The Fire station is the nerve center of the Fire concerned matters. The Fire Station Control Room is continuously 24 hours a day, 365 days a year. The control room is equipped with modern communication gadgets like, Wireless set, internal telephone & Mobile phones. Apart from the communication systems, the Fire fighting vehicle Foam Tender and Fire Engine are also stationed there. All sorts of firefighting equipment and appliances are stowed in the Fire Station.

The bellow given is the list of some of the equipment's stowed at Fire Station.

- Spare fire extinguishers and foam compound drums
- Delivery Hose pipe
- Different types of Branch Pipes & Foam making equipment.
- First aid Firefighting extinguishers
- Mobile Foam Monitors
- Foam Mobile Units
- Fire suits
- First aid kit
- Safety belts
- Ropes
- Cutting tools
- SCBA
- Safety helmets

PPEs - goggles, Apron, shoes, gloves, nose mask, gumboots

5.1.4 TERMINAL – 2:

- Fire Control Room : Fire Station
- Emergency Siren : 1.6 km range manually operated siren
- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m^3/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m^3/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 2 and back-up yard.

Fixed Fire Fighting System: 14 no. of Double Headed Fire Hydrant at jetties, 18 nos. of Single Headed Fire Hydrants at Terminal – 2 back-up yard and 10 nos. of Delivery Hose kept at pump house for fire prevention.

Fire Extinguishers:
Dry Chemical Powder Fire Extinguishers: 03 no. of 50 kg., 20 no. of 10 kg., 10 no. of 2 kg
CO2 Fire Extinguishers: 15 no. of 4.5 kg.

5.1.5 CONTAINER TERMINAL – 2 [ADANI MUNDRA CONTAINER TERMINAL]:

- Fire Control Room : Fire Station
- Emergency Siren : 1.6 km range manually operated siren

- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m^3/hr discharge X 1 no. of Vertical Turbine Electric Driven Main Pump and 273 m^3/hr discharge X 01 no. of Vertical Turbine Diesel Driven Pump and 25 m^3/hr discharge X 1 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at AMCT.

Fixed Fire Fighting System: 33 no. of Single Headed Fire Hydrant, 10 no. of Water Monitors and 20 nos. of Delivery Hose with Hose Station for fire prevention.

Fire Extinguishers:
DCP Fire Extinguishers: 40 Nos. (2 kg), 10 Nos. (9 kg), 5 Nos. (10 kg), 3 Nos. (50 kg) CO2 Fire Extinguishers 70 no. (4.5 kg), 24 (3.5 kg) for QC, RTG, Other Area.

5.1.6 CONTAINER TERMINAL – 3 [SOUTH BASIN]:

- Fire Control Room : Fire Station
- Fire Control Plan : As Mentioned Below

Fire Extinguishers: for for QC, RTG and other area CT 3.
CO2 Fire Extinguishers: 65 Nos (2 kg), 45 Nos (4.5 Kg) for for QC, RTG and other area CT 3.
DCP Fire Extinguishers: 40 Nos (2 kg), 13 Nos (5 Kg), 10 Nos (10 Kg)

Fire Tender: Multipurpose Fire Tender

5.1.7 TERMINAL – 1:

- Fire Control Room : Fire Station
- Emergency Siren : 5 km range manually operated siren
- Fire Control Plan : As Mentioned Below

Fire Pump: 273 m^3/hr discharge X 02 nos. of Vertical Turbine Diesel Driven Pump and 30 m^3/hr discharge X 01 no. of Vertical Turbine Electric Driven Jockey Pump for fire prevention at Terminal- 1.

Fixed Fire Fighting System:
33 no. of Double Headed Fire Hydrant at jetties, at Terminal – 1 and 70 nos. of Delivery Hose kept at pump house for fire prevention. 8 no. of Water / Foam Monitor.

Fire Extinguishers:
DCP Fire Extinguishers: 16 no (50 kg). 15 no (10 kg), 8 no (2 kg)
CO2 fire extinguishers: 12 no (4.5 kg)

5.1.8 WEST BASIN:

- Fire Control Room : Porta Cabin, Fire Station
- Emergency Siren : 1 at SS – 1 Building [Range 1.6 km], Manual Siren [Range 1.6 km] at Fire Station
- **Fire Control Plan : As Mentioned Below**

Fire Pump: 273 m^3/hr discharge X 2 no. of Horizontal end suction type Electric Driven Main Pump and 273 m^3/hr discharge X 01 no. of Horizontal end suction type Diesel Driven Pump and 10.8 m^3/hr discharge X 1 no. of Back pull out type Electric Driven Jockey Pump for fire prevention at West Basin.

Fixed Fire Fighting System: 122 no. of Single Headed Fire Hydrant, 99 no. of Water Monitors and 250 no. of Delivery Hose for fire prevention.

Fire Extinguishers:
DCP Fire Extinguishers: 16 no (50 kg). 15 no (10 kg), 8 no (2 kg)
CO2 fire extinguishers: 12 no (4.5 kg)

Fire Tender:
- Water Tank capacity (in built) - 6000 liters
- Pump discharge - 2250 LPM
- Aluminized Suit - 01 no.
- Water Jel Blanket - 01 no.
- Delivery Hose - 20 nos.
- 35‖ Aluminium Extension Ladder - 01 no.
- Self-contained Breathing Apparatus Set - 03 no.

Other firefighting related equipment.

5.1.9 ADANI HOUSE & PUB :

- Fire Control Room : Fire Station
- Emergency Siren : Adani house & PUB

- Fire Control Plan :

Fire Pump:

96.10 m^3/hr discharge X 01 no. of Electric Driven Main Pump,
10.8 m^3/hr discharge X 01 no. of Electric Driven Jockey Pump for fire prevention.

Fixed Fire Fighting System:

- **Adani House:** 9 nos of Single Headed Fire Hydrant, 5 nos of Hose Reel Hose, 18 nos of Delivery Hose kept at Adani House.
- **PUB:** 19 nos of Single Headed Fire Hydrant, 15 nos of Hose Reel Hose, 38 nos of Delivery Hose.

Fire Extinguishers:

- DCP Fire Extinguishers: 22 nos of 10 kg
- CO2 Fire Extinguishers: 40 nos of 4.5 kg, 8 nos of 9 kg, 2 nos of 22.5kg

Auto Flooding System: NAF S125 Flooding System at IT Server Room and UPS Room connected with Fire Detection System to protect from fire.

Fire Detection System:

- Smoke Detector System in Entire Adani House.
- Separate Fire Alarm System for PUB buildings

5.2.0 SAFETY EQUIPMENTS & PERSONAL PROTECTIVE EQUIPMENTS AVAILABLE WITH APSEZ

HAZARD KIT
The following items of hazard kits are under procurement/have been procured.
Protective Clothing

- Chemical protective suits
- Proximity suit
- Neoprene 14" gloves
- Natural rubber gloves
- Surgical gloves
- High voltage lineman's gloves
- Overalls
- Goggles (polycarbonate lens)
- Hardhats with headband suspensions
- Face shield (full) 10-x19-x.060
- Boots (neoprene, steel toe and modsole)
- Safety harness
- Ear Muffs

Breathing Apparatus

- Emergency Oxygen Bottles.
- Positive pressure self contained breathing apparatus
- Spare cylinders
- Full-face cartridge type respirators

Leak Control Equipment

- Drums
- Epoxy kit
- Patch Kit
- Wooden plug kit
- Rubber plug kit
- Mastic

First Aid Equipment

- Extinguishers capable for handling Class A, B, C and D fires.
- First aid kit (36 units)
- Resuscitator (B.W.S. CPR Portable with aspirator P/N 900 0 002 - 111 - 01 woolen fire blankets.

Miscellaneous

- Teflon thread tape
- Electrical tape
- Pipe pieces, assorted.
- Pipe union, assorted.
- Pipe caps, assorted Hose clamps, assorted.
- Saddle clamps, assorted.
- Couplings (galvanized), assorted.
- Hand cleaner (waterless)
- Flashlight (NS)
- Reflective triangles
- Quick setting cement
- Frontier barriers & safety cones.

Absorbents and Containers

- Absorbent pads
- Plastic can liners / bags
- Recovery drum sets
- Diatomaceous earth bag
- Sponges

Monitoring Equipment

- Combustible gas detector (Explosive meter, Range:0-100 LEL & 0-5ppm)
- Oxygen detector (0-25% oxygen, PAC III, Drage make)
- Organic vapour detector (PAC III, Drager make)
- pH paper (0-14) (Ydrin, 1/2 x 50 with dispenser)
- Indication wind system AC-DC recording cup & vane anemometer with meter telescoping mast.

Miscellaneous

- Portable flood lights (4 Nos.)
- Emergency suits (2 Nos.)
- SCBA - 4 Nos.
- Loud Hailer (battery operated)
- Portable DCP extinguisher
- Emergency Rescue Cage

Tools and hardware

- Drill (electrical)
- Drill set, assorted sizes (short length)
- Drill set, assorted sizes (length)
- Punch set, assorted sizes
- Wire brush
- Paint brushes
- Tape measure steel tape
- Foot ruler (metal)
- Welding kit
- Pipe cutters
- Drum trolleys
- Chemical buckets
- Dust pans
- Hacksaw
- Hacksaw blades

Oxygen Trauma, First-Aid & Emergency Box Kit (Medical)

- Oxygen Cylinder
- Water Jel Blankets
- Rescue Blankets
- Oxygen breathing kit
- Instant Glucose
- Paramedic Scissors
- Forceps
- Gloves
- Ring cutter
- Cervical collar
- Eye pads
- Tourniquets
- Multi-trauma dressings
- Adaptec dressing
- Flexible Bandages
- Pocket Masks - Eyewash bottle
- Bag mask resuscitator
- Portable respirator
- Portable lamps / torches
- Mouth-to-mask
- Blood pressure Equipment

Adequate number of fire tender

- There are three nos of fire tenders one is Foam Tender with water, foam, DCP and CO_2 facility having a centrifugal fire pump. Pump is of gunmetal and stainless steel also with 60 mtrs. long hose and nozzle provided above the pump panel.

- CO_2 gas cylinders of sufficient capacity are mounted for expelling the75 kg DCP extinguishers. The foam tender also carries 6 x 22.5 kg. nos. of CO_2 Cylinder.

- Water Tender of 12000 ltrs water capacity with adequate numbers of firefighting equipment and rear mounted portable pump of 450 ltr / pmt capacity

Neutralising Agents

- Acid neutralizing agent (neutrasorb 100 = box)
- Neutrasol two
- 2-1/2 gallon container / carton)
- Neutralizer Neutrality
- Clorox

5.03 ABOUT ON-SITE EMERGENCY PLAN

Following three stage activities are planned to perform, as these activities are co-related, provide better ideas for emergency preparedness, and emergency actions with subsequent follow-ups.

a) Pre-emergency activities
b) Emergency time activities
c) Post emergency activities

In Pre Emergency Activities: Following activities are carried-out: Internal Safety Surveys, Mock Drills & Training : Joint Mock Drills are performed engaging Mutual Aid Units. Arrangement is made to acquire emergency aid in the form of First Aid, chemical leak control, Evacuation, Vehicle for Transportation of affected. Moreover, from Fire Brigade is liaised with. (if the emergency is uncontrollable by the internal resources at the unit).

5.04 ABOUT POST EMERGNECY ACTIVITIES

A) collection of records
B) Making insurance claim
C) Conducting inquiries and taking preventive measures
D) Rehabilitation of affected persons within and outside plant
E) Restart of plant

CHAPTER NO.VI

OFF-SITE EMERGENCY PLAN

CONTENTS

6.01 ABOUT OFF-SITE EMERGENCY PLAN

Ours is a **PORT**, Importing and exporting various goods including liquid chemicals, petroleum products.. Various substances, chemicals are stored at the terminals. Leak of chemicals, fire may lead to a serious off site emergency. In view of this, it is necessary to prepare an off-site emergency plan to deal with any emergency methodically and systematically to control and reduce its effects. In this connection, we have formed a EMERGENCY ORGANIZATION as per Chapter - 3

Incident controllers, Deputy Incident Controllers, Site Main Controllers are appointed and their emergency duties are determined. Arrangements are made for communication with external authorities. Safe assembly points and Emergency Control Centers are determined. Pre-emergency, emergency time and post emergency activities are formulated. A list of all important telephone numbers is prepared. Arrangement is made to get / provide emergency help with mutual aid units. Special knowledge, advise, experts will be available. Liaison will be made with off-site emergency authorities.

6.02 STRUCTURE OF OFF-SITE EMERGENCY

BASIC ACTIONS IN EMERGENCIES

Immediate Actions

Immediate action is the most important factor in emergency control because the first few seconds count, as a fire develops and spreads very quickly unless prompt and efficient actions are taken. In the event of fire in the Port/terminal, the following actions shall be taken as quickly as possible.

- Take immediate steps to stop leakage/fire and raise alarm simultaneously.
- Initiate action as per FIRE ORGANIZATION PLAN or Disaster Management Plan, based on gravity of the emergency.
- Stop all operations and ensure closure of all valves and isolation valves
- All out efforts should be made to contain the spread of leakage/fire.
- Saving of human life shall get priority in comparison to stocks/assets.
- Plant personnel without specific duties should assemble at the nominated place
- All vehicles except those required for emergency use should be moved away from the operating area, in an orderly manner at pre-nominated route.
- Electrical system except for control supplies, utilities, lighting and firefighting system should be isolated.
- If the feed to the fire cannot be cut off, the fire must be controlled and not extinguished.
- Start water spray system at areas involved in or exposed to fire risks.
- In case of leakage of chemicals without fire and inability to stop the flow, take all precautions to avoid source of ignition.
- Block all roads in the adjacent area and enlist Police support for the purpose if warranted.

Fire Fighting Operations

- Enlist support of local fire brigade and neighbouring industries.
- If escaping vapor cannot be stopped, jets of water should be directed at the point of leakage to asset controlled release of vapor and in between water fog should be used for dilution and rapid dispersion of vapor cloud.
- Fire fighting personnel working in or close to un-ignited vapor clouds or close to fire must wear protective clothing and equipment including safety harness and manned life line. They must be protected continuously by water sprays. Water protection for fire fighters should never be shut off even though the flames appear to have been extinguished until all personnel are safely out of the danger area.
- Exercise care to ensure that static charge is not generated in vapor cloud. For this purpose, solid jets of water must be avoided, instead for nozzles should be used.
- Fire fighters should advance towards a fire down – wind if possible.
- Cylinder fire should be approached using proper barricades / protection to avoid direct hit from flying cylinders.
- If the only valve that can be used to stop the leakage is surrounded by fire, it may not be possible to close it manually. The attempt should be directed by trained persons only. The person attempting the closure should be continuously protected by means of water spraying (through fog nozzles), fire entry suit, water jet blanket or any other approved equipment. The person must be equipped with a safety harness and manned life line.
- Any rapid increase in pressure or noise level of product discharged through safety relief vale of the vessel/pipeline should be treated as a warning of over pressurization. In such cases all personnel should be evacuated immediately
- As in case of any emergency situation, it is of paramount importance to avoid endangering human life in the event of fire involving or seriously exposing equipment containing chemicals or serious leakage of chemicals without the fire.

Action in the event of chemical leakage without fire

- Take basic action as detailed in (1) above
- If escaping is not on fire, close any valve which will stop the flow.

Action in the event of fire

- Take basic action as detailed in (1) above.
- Extinguish Fires – A small fire at the point of leakage should be extinguished by enveloping with a water spray. However, it is against, stressed that fire should not, except in special circumstances explained earlier, be extinguished until the escape of product has been stopped.
- Fire fighting procedure – Fire fighting procedures would vary depending upon various factors such as nature, sources sizes, location etc of fire. Basic fire fighting techniques have been explained earlier in section (2). However, for the purpose of guidelines, fire fighting techniques for few common cases are as follows:
- Cylinder Fire If a cylinder is involved in fire, internal pressure may start rising and if not relieved the built up pressure could rise and ultimately rupture the container. Ignition of the escaping gas would aggravate the fire but the release of pressure would reduce the possibility of rupture of the container. No attempt should be made to extinguish the burning gas. But the container and other containers in the vicinity should be kept cool by water sprays until the

contents of the container have burnt away. If the gas leakage does not ignite, the container should be approached from upwind (if in the open air) and be removed to a place of safety remote from sources of ignition.

- Cylinders not directly involved in the fire should be moved away from heat exposure, while applying cooling water sprays on cylinder directly involved.
- Fire on storage vessel: If a pressure vessel is exposed to radiant heat from external fire, it should be kept cool by water sprays to prevent excessive pressure rise in the vessel. Cooling water sprays must be applied without delay in the heat affected areas using fixed water sprinkler system or equivalent spray water coverage, through fixed monitors or other equipment. Cooling the vessel with water sprays reduces the heat input to the vessel and thereby reduces the pressure, thus reducing the rate of discharge from the relief valves.

Fire Fighting Organization Plan

A plan of action for use in the event of a major leakage of with a fire or risk of fire is essential. Such a plan must be carefully prepared for each area. It should be fully understood by all the Port supervisory personnel and other personnel's 'responsibilities for action as per plan. It shall be based on the following:

- Port personnel shall be fully trained for specialized techniques necessary for combating leakages and fires.
- If leakage and / or fire occurs, all personnel should use the equipment provided and to carry out their allotted tasks as detailed in the firefighting organization plan.
- Personnel should be conversant with fire control equipment and also its location.
- Port personnel should be familiar with the standard recognition markings of the control, first-aid and all safety equipment, must know the location of emergency exits, and they should know the location of water points/monitors and must be familiar with the sound of the emergency (fire) alarm.
- The firefighting organization plan together with layout of fire fighting and safety devices shall be displayed at prominent places and explained to all personnel. It shall include the following functions, expanded to suit the location facilities / equipment:
- Sounding the emergency (fire) alarm.
- Shutting off the supply to any leakage point / fire.
- Summoning the fire brigade / police
- Fire control, with first-aid, firefighting equipment
- Closing down all operations in the area pertaining to emergency
- Preventing all sources of ignition in case flammable substance leak occurs
- Evacuation of vehicles
- Evacuation and mustering of personnel
- Establishing an emergency fire-control center
- Traffic control
- Stations and duties of all personnel
- Policing of affected areas
- Any other specialized duties
- Display of fire brigade, ambulance, Police telephone numbers etc.
- All clear signal by competent person.

Liaison with local Fire Brigade

Close co-operation with the local fire authorities is essential and shall take the following form:

- Fire brigade other than of Port should be made familiar with layout of plant and the location of important equipment / facilities provided, and their method of use. Mock fire drills / exercise jointly by plant personnel and outside fire brigades shall be planned.
- Firefighting equipment at the plant shall be compatible with the outside fire brigade equipment, otherwise adopters shall be kept ready for hoses,
- The outside fire brigade shall be aware of the ports firefighting organization plan and the views held at the plan regarding the most effective fire control method. (Water insoluble)
- In the event of an emergency / fire, the Port manager and / or his representative shall advise the Fire Officer about particular or potential hazards that may be present at that particular point of time.

Fire Drills & Training

- Drills for all plant personnel, making use of the Fire Fighting Organization plan and practicing the specialized techniques required for fighting fires or dispensing / diluting vapor shall be held minimum once in a month.
- The drills should cover various types of incidents, e.g. Major spillage, leak / fire, cylinder fire etc.
- Extinguishers due for recharging due for hydro testing shall be discharged during drills and replenished subsequently 50% (Min.) stock of refills as replenishment for Fire Extinguishers should be maintained.
- The fire pump should be run, sprinkler system activated, emergency systems tested, water hoses run out and spray / set techniques practiced during drills.
- Fire alarm shall be sounded / tested / neighbouring areas and the fire brigade shall be warned in advance of this test).
- Protective clothing, mask and any other specialized safety equipment available shall be tried out during drills to train all concerned in their application.
- The local fire brigade should be encouraged to participate in fire drills periodically.
- Any shortcoming, noticed during the drill shall be rectified.

ON-SITE EMERGENCY PLAN (DISASTER MANAGEMENT PLAN)

It is basically a pre-plan to handle any emergency situation of a higher magnitude arising out of factors listed below:

- Major fire / explosions
- Lighting
- Heavy floods
- Earthquakes
- Sabotage/ terrorist outrage
- War situation

Due to varying risk potentials and also varying hazards at / around each location _ON SITE EMERGENCY PLAN for each location shall be drawn up individually based on the outline given below:

- Identify disaster scenario i.e. the situations under which the plan would become operational. Plan for the worst possible scenario.
- Identify resources required from each of the outside agencies.
- Establish outside agencies, role of each agency and obtain their commitment for rendering assistance in crises situation as per the agreed plan.
- Establish organogram for ON SITE EMERGENCY PLAN based on available manpower in various groups and identify the leader and alternative leader for each of the groups and the role to be played by each team in various likely crises situations.
- Identify Disaster Control room / group.
- Furnish detailed data and drawings relevant for the crises management.
- Mock drills to be conducted minimum once a year.
- Modify the plan based on the experience gained through mock drills and try out the modified plan through subsequent mock drills.
- The plan shall be updated as and when the changes recorded in the plan occur and communication sent to all concerned.

Communication organogram

As a part of ON SITE EMERGENCY PLAN, communication organogram shall be drawn up giving flow of communication from the originating location to various local agencies and also to Statutory Authorities and upwards within the organization to mobilize support and to consider alternatives for maintaining essential supplies. **(As mentioned in Chapter 3.13 & 3.14 Communication & Public Affairs)**

MANAGER (SITE MAIN CONTROLLER)

1. Rush to the port on receiving the message of the incident
2. Call other persons if required.
3. Inform hospitals, doctor, police, dist. Authorities, Director, Industrial Safety & Health
4. Arrange for roll call of workers and find if anyone missing
5. Arrange for first aid of injured and hospitalization
6. Arrange food / water for persons controlling the emergency
7. Arrange for money
8. Assess situation & determine area likely to be affected

OCCUPIER

1. Prepare a statement for press & public release and take responsibilities of press and public relationship
2. Plan out rehabilitation / post emergency activities

6.03 ROLE OF MANAGEMENT

A copy of this on-site emergency to be submitted in duplicate to Deputy Director, Industrial Safety & Health, District Authority.

6.04 ROLE OF POLICE AND EVACUTION AUTHORITY

Police may be required for maintaining low and order outside the factory and on the approach road.

6.05 ROLE OF MUTUAL AID UNITS

Agreement with nearby units is to be made for providing help, aid, assistance, vehicle, expert to overcome the situation.

SECTION – II
ANNEXURES

CONTENTS

Annexure – 1

IDENTIFICATION OF FACTORY

Full Name & Address of factory		**ADANI PORTS and SEZ LIMITED P.O. Box 1, Mundra – 370 421 (KUTCH) Gujarat, India.**	
Phone	02838-255000	**Office**	
Fax No.	02838-226301	**E-mail**	**info@mundraport.com**
Full Name & Address of the Occupier		**DR. MALAY MAHADEVIA C/O. ADANI PORTS & S.E.Z. LIMITED NAVINAL ISLAND, MUNDRA.**	
Phone No.		**Office**	**Residence**
		--	**--**
Full Name & Address of the Manager		**CEO. SUJALKUMAR SHAH C/O. ADANI PORTS & S.E.Z. LTD., NAVINAL ISLAND, MUNDRA**	
Phone No.		**Office**	**Residence**
		02838-255000	--
Manufacturing Process		Handling of Dry and Liquid Cargo in Bulk	

Name of the Shift	**Maximum Worker at a time**			
	Male	**Female**	**Total**	In "Workers" include all Employees, Contract Workers, Trainees ,Apprentices, etc.
General Shift – G	1187	42	1229	
Shift – A	402		402	
Shift – B	402		402	
Shift – C	380		380	
Total Shifts:	**2371**	**42**	**2413**	

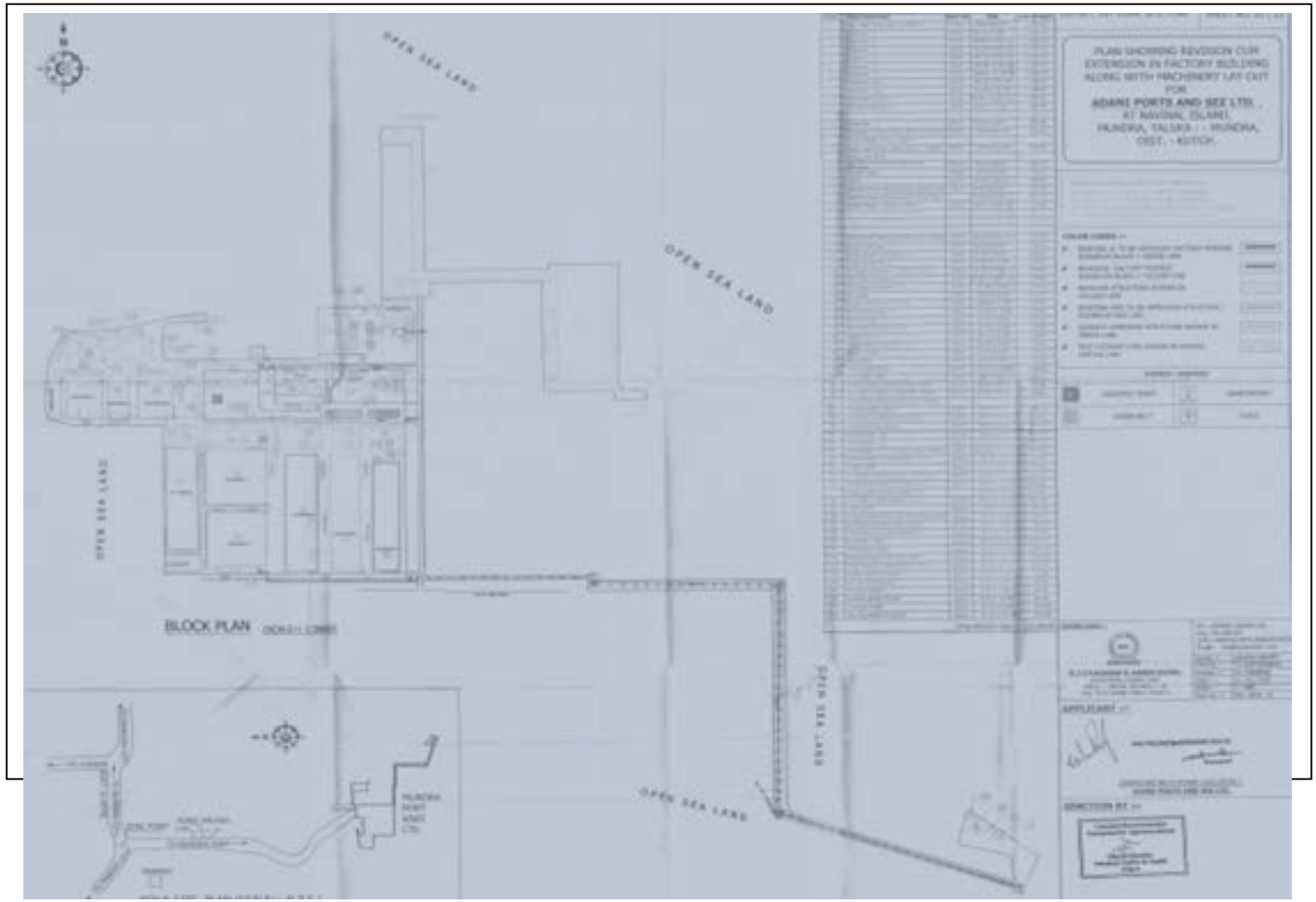
First Person to be contacted in case of emergency :

Name of the shift	**Name & Designation**	**Place of Availability**	**Phone No.**		
			Mobile	**In Factory**	**Residence**
(A),(B),(C) shifts	PORT ISCR (Integrated Security Control Room)	PORT ISCR	8980011811	02838-255100 Ext. 52100	-

Any Other information, if any : Any of the persons will be available round the clock :

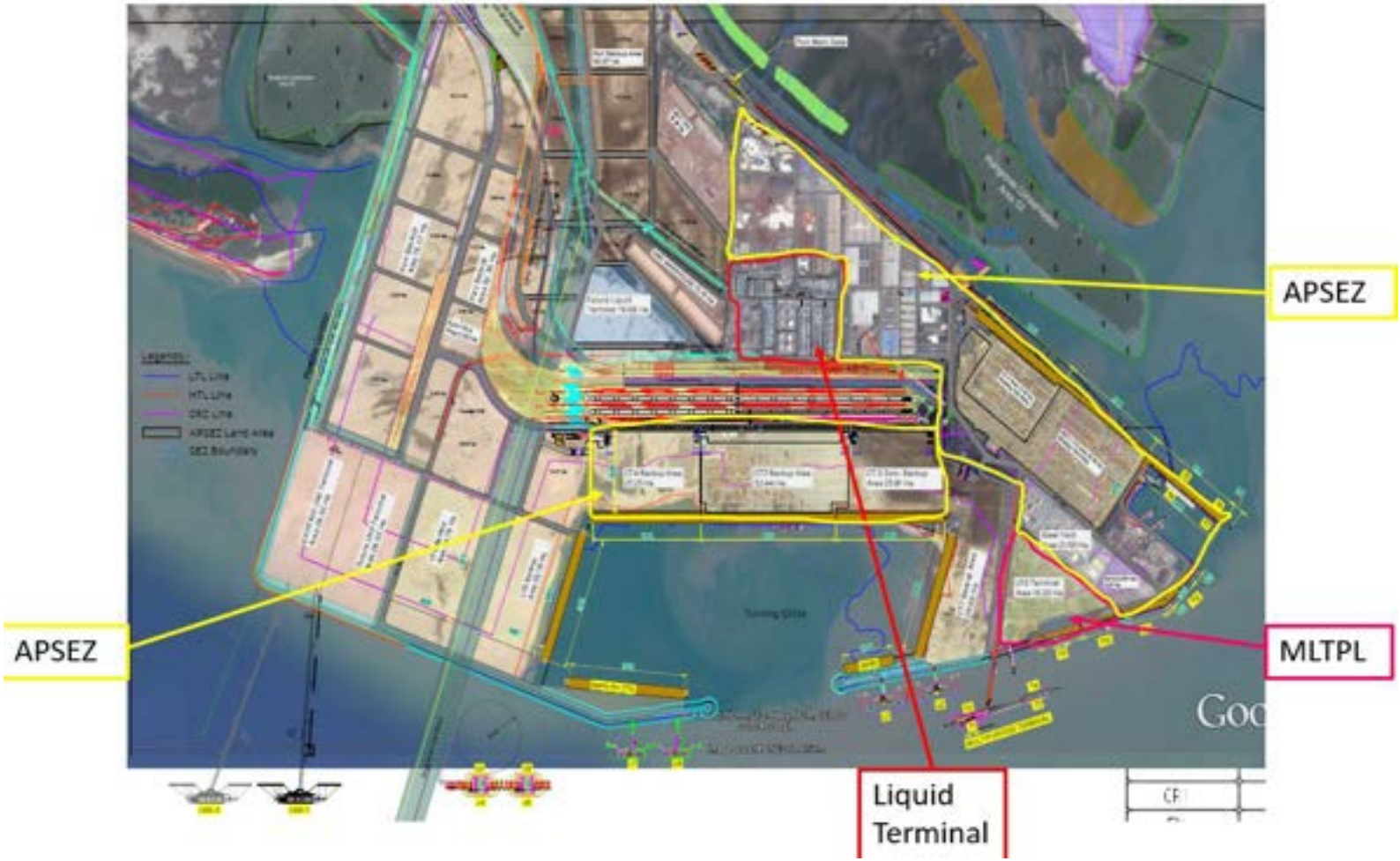
Annexure – 2

FACTORY LAY OUT



Annexure – 3

LOCATION PLAN OF FACTORY



Annexure – 4

STORAGE HAZARDS & CONTROL

Name of the hazardous substance (Mention concentration if any)	Sr. No. of the MSDS enclosed	Quantity		Place of its storage	Operating pressure & Temp.	Type of Hazards possible (Fire, explosion, Toxic release, Spill etc.)	Control Measures Provided	In charge Person	
		Maximum That can be stored	Actually stored (Including in process & handling)					Name & Designation	Phone No.
1	2	3	4	5	6	7	8	9	10
A. Raw Materials:	Available	Storage of Liquid 3.25 Lac KL	185135 MT as on 04.01.22	Liquid Storage Tanks	Ambient Temperature and Pressure	Fire, explosion, Toxic Release, Spill	Water Sprinkler, Foam Pourer, Hydrant System	Mr. Gaurang Chudasama (Head – LT)	8980802997
B. Finished Product:	--	--	--	--	--	--	--	--	--
C. Intermediates	--	--	--	--	--	--	--	--	--
D. Bye-Products	--	--	--	--	--	--	--	--	--
E. Other: (E.g. Catalysts, inhibitors etc.)	--	--	--	--	--	--	--	--	--

Note: There is no process or manufacturing activity only storage handling of dry and liquid cargo in bulk.

3

Annexure – 5

THE MSDS OF HAZARDOUS CHEMICALS

Sr. No	Name Of HAZARDOUS CHEMICALS	Page No
1	Motor spirit	**MSDS Attached at the end of Annexures**
2	Naphtha	Do
3	Gasoil	Do
4	Methanol	Do
5	Toluene	Do
6	Acetic acid	Do
7	P- Xylene	Do
8	Vinyl Acetate Monomer	Do
9	Styrene Monomer	Do

Annexure – 6

PROCESS & VESSEL HAZARDS AND CONTROLS

Sr. No.	Name of the Plant, Department or place	Name of the hazardous process and operation	Materials in the process/ operation with their quantity	Name of the vessel and its location	Operating parameters: (Pressure, Temp. etc.)	Type of hazards possible (exothermic, run away, pressure release, toxic release, fire, explosion etc.)	Control Measures provided	In charge Person	
								Name	Tele. No.
1	2	3	4	5	6	7	8	9	10
1	Air compressor (LT workshop)	Air compression	Compressed Air	Air driers & Air Receivers	Pressure	High Pressure release	Safety Valve,	Mr. Gaurang Chudasama (Head – LT)	8980802997
2	Nitrogen compressor (LT workshop & Near ISPS Gate)	Nitrogen compression	Nitrogen	Nitrogen Receiver	Pressure	Nitrogen release with high pressure	Safety valve		

Annexure – 7

OTHER HAZARDS & CONTROLS

Sr. No	Name of the possible hazard or emergency	Its source and reasons	Its effects on persons, property & environment	Place of effect	Control measures provided	In charge personal	
						Name and Designation	Telephone No (internal)
1	2	3	4	5	6	7	8
1	Utility Systems Emergency	Diesel fuel, Steam Boiler, Chemical storage for cooling water Treatment.	Burn Injury, Property Damage	Process Area	F&G system, FFS is available, MSDS is Available, PPE is available Safe handling of chemical operation available	Mr. Rama Rao Kondappa	9925203436
2	Electricity, Short Circuit	Substation	Shock, Fire	Electrical Sub station	As per electricity rules (Restricted Entry, Transformer Maintenance, etc.)	Ketan Joshi	8980015057
3	Fire	Fuel storages	Fire	Storeroom, DG set area	All provisions as per laid down rules Classified storag0065	Ratnadip Trivedi	8979203595
4	Natural calamities					Mr. Rama Rao Kondappa	9925203436

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
1.	Used/Spent Oil	300.0 MT	All the departments	Reception, Collection, Storage, Transportation & Disposal by selling out to registered recycler/ re-processor	Send to authorized recycler	-----	Disposal by selling out to registered recycler/ re-processor	Mr. Kamal Saliya, Central Store 9099211149 (M)
2.	ETP Sludge	1.095 MT	Liquid Terminal	Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Gaurang Chudasama Liquid Terminal 980802997 (M)

7

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental release or release in excessive proportion	Monitoring & Control measures provided	In charge person's name, Address & Phone No.
1	2	3	4	5	6	7	8	9
3.	Sludge & Filters contaminated with oil	5.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL		Disposal by co-processing at cement industries	Mr. Kamal Saliya, Central Store 9099211149 (M)

Annexure – 8

TRADE WASTE DISPOSAL

Sr. No.	Type and Name of the trade waste	Generation per Annum	Place of its generation	Place of its safe disposal	Treatment method adopted for safe disposal	Alarm indicating accidental	Monitoring & Control measures	In charge person's name, Address & Phone No.

8

						release or release in excessive proportion	**provided**	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
4.	Waste Residue Containing Oil	100.0 MT	All the Departments	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Sanghi Cement / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Bhagwat Swaroop Sharma Environment 7622947676 (M)
5.	Bottom sludge	Whatever quantity generated	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Gaurang Chudasama Liquid Terminal 8980802997 (M)

Annexure – 8

TRADE WASTE DISPOSAL

9

Sr. No.	Type And Name Of The Trade Waste	Generation Per Annum	Place Of Its Generation	Place Of Its Safe Disposal	Treatment Method Adopted For Safe Disposal	Alarm Indicating Accidental Release Or Release In Excessive Proportion	Monitoring & Control Measures Provided	In Charge Person's Name, Address & Phone No.
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
6.	Pig Waste	24.0 MT	Liquid Terminal	Collection, Collection, Storage, Transportation & Disposal by co-processing at cement industries	Disposal by co-processing at cement industries through SEPPL / RSPL / Ambuja Cement		Disposal by co-processing at cement industries	Mr. Gaurang Chudasama Liquid Terminal 8980802997 (M)

Annexure – 9

RECORDS OF PAST INCIDENTS

Sr. No	Type Of Incident (Major Accident) Emergency Or Disaster	Date &Time Of Occur	Its Place	Dura Tion	Time Required In Controlling It	No. Of Worker S Working At That Time	Person Affect0053		Person Died		Effects On the Survivors		Subsequent Step For Safety Provide D	Other Details If Any (E.G. Antidotes Used Etc.)
							Inside The Facto Ry	Outside The Factory	Inside The Facto Ry	Outside The Factor Y	Immediate	Delayed		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No Major Undesirable Incident Occurred So Far														

ANNEXURE – 10

GAS DISPERSION CONCENTRATION

As Per Attached Pages.

ASSURING LEAK RATE (0) = 3 Kg. /Sec, I.E.,3*10^6 G/Sec AND VELOCITY (U)=2 & N/Sec., DOWNNING CONCENTRATIONS OF SOME GASES AT VAROUS DISTANCE ARE CALCULATED AND TABULATED AS FOLLOWS:

Product: Maximum Concentration (Ppm) In Downing Direction At Distance X, Wind Velocity= 2m/Sec, For Most Unstable After-Noon Weather Condition (A).

	100 M	200 M	300 M	400 M	500 M	600 M	1 KM	2 KM	3 KM	4 KM	5 KM
1.											

Note: For Other Weather Condition Respective Curve Should Be Chosen

Product: Maximum Concentration (Ppm) In Downing Direction At Distance X, Wind Velocity=5m/Sec, For Most Unstable Weather Condition (A).

	100 M	200 M	300 M	400 M	500 M	600 M	1 KM	2 KM	3 KM	4 KM	5 KM
1.											

Note: For Other Weather Condition Respective Curve Should Be Chosen.

Above Data Is Given For Information Only As None Is Applicable To Us.

ANNEXURE – 11

EVACUATION TABLE

Evacuation Table Based On Prevailing Wind of 6 To 12 MPM
(2.7 To 5.4 M/S)

Material	Radius of Immediate Danger Area (Km)	Dimension Of Evacuation Area	
		Downwind (Km)	Crosswind (Km)
1. Motor spirit			
2. Naphtha.			
3. Acetic acid			
4. P- Xylene			
5. Styrene Monomer			
6. Methanol			
7. Toluene			
8. Gasoil			
9. Vinyl Acetate Monomer			

Source: Emergency Action Guide for Selected Hazardous Materials. U.S. Department Of Transportation.1978.

ANNEXURE – 12

ENVIRONMENTAL IMPACT ASSESSMENTS

Sr. NO	Distance (Radius) From The Factory	Environment (Employees Hutment. Neighboring Factory. Village. Water Courses. River. School Hospital. Public Place Vegetable/Food Market Crops. Tall Structure. Flora. Fauna Etc.)	Population With Composition						Possible Consequences & Assessment					Type Of Control Measures Necessary	
			Day Time			Nigh Time			Type Of Risk & Effect Possible	Dur Tion Of Risk.	Risk Assessment			Available In The Factory	Required From Outside
			Healthy	Vulnerable	Total	Healthy	Vulnerable	Total			No. Of People Name & Amount (Rs) Of Property & Other Environment That May Be Affected	Frequency Of The Hazard (I.E., One Such Incident In What Time)	Acceptable Crite - Ria		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	More than 10 Km	More than 10 Km away from factory. No water course, river, school hospital public place vegetable market crops, flora, fauna nearby area.	--	--	--	--	--	--							

Annexure – 13

WEATHER CONDITIONS

Sr. No.	Period of the year Month	Wind Velocity, M/Sec.	Wind Direction	Weather conditions	Pasquill classification A to F
1	2	3	4	5	6
1	JANUARY	5-7	NNE / NE	CALM	D
2	FEBRUARY	5-7	NNE / NE	CALM	D
3	MARCH	7-9	SSW / SW	CALM	D
4	APRIL	9-10	SSW / SW	CALM	D
5	MAY	10-12	WSW / SW	SLIGHT	D
6	JUNE	10-12	WSW / SW	MODERATE / ROUGH	D
7	JULY	12-15	WSW / SW	ROUGH	D
8	AUGUST	12-15	WSW / SW	ROGH / MODERATE	D
9	SEPTEMBER	8-10	WSW / SW	SLIGHT	D
10	OCTOBER	8-9	WSW / SW	CALM	D
11	NOVEMBER	5-7	WSW / SW	CALM	D
12	DECEMBER	5-7	NNE / NE	CALM	D

Legend:
A: Extremely Unstable
B: Moderately Unstable
C: Slightly Unstable
D: Natural
E: Slightly Stable
F: Moderately Stable

Annexure – 14

INCIDENT CONTROLLERS

Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Building	Samudra Township	98792 03599 02838-255870	--	Mr. Mahavirsinh Jhala	Tug Berth Building	9687639228 02838-255838
2	Mr. Gaurang Chudasama	Head - LT	Liquid Terminal	Shantivan Colony	8980802997 02838 - 255742	4459	Mr. K R Rao	Liquid Terminal	99252 03436 02838-255872
3	Capt. Pradeep Ramachandran	Head – AMCT	(AMCT) CT2 Building	Samudra Township	6358940439 02838 – 255732	--	Mr. Prakash Pillai	(AMCT) CT2 Building	7574894335 02838 - 255917
4	Mr. Cherian Abraham	Head - AICTPL	(AICTPL) CT3 – Building	Samudra Township	8980048850 02838 – 255732	--	Mr. Jignesh Bhatt	(AICTPL) CT3 – Building	7069083202 02838 - 255551
5	Mr. Gajanan Govekar	Head - ACMTPL	(ACMTPL) CT4 – Building	Samudra Township	7069013836 02838 - 255809	4458	Mr. Vijay Patel	(ACMTPL) CT4 – Building	8980016436 02838 - 255409
6	Mr. Mavji Vaghamshi	Head - ES	Tug Berth Building	Shantivan Colony	97277 84691 02838-255949	--	Mr. Kuldipsinh Zala	Tug Berth Building	9727784692 02838 - 255949
7	Capt. Sachin Srivastava	Head – Marine	Tug Berth Building	Shantivan Colony	6359883102 02838 – 255727	4629 / 4630	Capt. Rajat Garg	Tug Berth Building	9717527583 02838- 255947

8	Mr. Jawed Iqbal	Head- Railway Services	Railway Building	Shantivan Colony	98982 91000 02838 – 255763	4477	Mr. O P Sharma	Railway Building	98253 00413 02838 - 255765
9	Mr. Vikas Arora	Head – Howe	PUB Building	Shantivan Colony	98792 03557 02838 – 255581	4721	Mr. Harit Mehta	PUB Building	98792 03557 02838 - 259142
10	Mr. Snehasish Bhattacharyya	Head-HR	Adani House	Shantivan Colony	8826363738 02838 - 255723	4635 / 4636	Mr. Namit Kapoor	Adani House	6358945030 02838 - 255164

Annexure – 14B (West Basin)

INCIDENT CONTROLLERS

Sr. No.	Incident Controller's						Runner's		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Vivek Singh	Head – West Basin Port	SS-1	Shantivan Colony	8980015440 02838 - 255708	4623 4624	Mr. Kashyap Pandya	SS-1	9925223632
2	Mr. Kashyap Pandya	DGM – ES	SS-1	Shantivan Colony	9925223632	--	Mr. Vishal Bhavsar	SS-1	9879203580
3	Mr. Nitin Joshi	Associate Manager – DC	SS-1	Shantivan Colony	8980015365	B-block	Mr. Shivabhai Vanjar	SS-1	7574894352

Annexure – 15

DEPUTY INCIDENT CONTROLLERS

Sr. No.	Deputy Incident Controller's						Persons to be called if IC & Dy-IC both are not available.		
	Name	Designation	Place of Availability		Phone No.		Name	Place of Availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	3	4	6	7	8	9	10	11	12
1	Mr. Mahavirsinh Jhala	Manager – Dry Cargo	Tug Berth Building	Shantivan Colony	89800 15471 02838-255939	--	Mr. Umesh Padaliya	FCC	8980015040 02838-255987
2	Mr. K R Rao	DGM – LT	Liquid Terminal	Shantivan Colony	99252 03436 02838 - 255745	4501	Mr. Manish Jain	Liquid Terminal	98796 14715 02838 - 284419
3	Mr. Umang Makwana	Manager – AMCT	(AMCT) CT2- New Building	Samundra Township	7069013835 02838 - 62511	--	Duty Superintendent	(AMCT) CT2- New Building	96876 39248
4	Mr. Jignesh Bhatt	Senior Manager – AICTPL	(AICTPL) CT3 – Building	Samundra Township	7069083202 02838 – 255551	--	Duty Superintendent	(AICTPL) CT3 – Building	89800 48857
5	Mr. Vijay Patel	Associate Manager - AICTPL	(ACMTPL) CT4 – Building	Samundra Township	7069013836 02838 - 255408	4466	Duty Superintendent	(ACMTPL) CT4 – Building	70690 83090
6	Mr. Kuldipsinh Zala	DGM - AGM	Tug Berth Building	Shantivan Colony	9727784692 02838 - 255949	4506	Mr. Devendra Dubey	Tug Berth Building	98792 03578 2838-255832
7	Capt. Rajat Garg	DGM- Marine	Tug Berth Building	Shantivan Colony	9717527583 02838- 255947	4444	Capt. Girish Chandra	Tug Berth Building	6357231712 02838-255787

8	Mr. O P Sharma	AGM – Railway	Railway Building	Shantivan Colony	98253 00413 02838 - 255765	4428	Mr. Paresh Palan	Railway Building	99252 03424 02838-255787
9	Mr. Vikas Arora	DGM – Howe	PUB Building	Shantivan Colony	98792 03557 02838 - 259142	4482	Mr. Harit Mehta	PUB Building	98792 03557 02838 – 255719
10	Mr. Namit Kapoor	GM-Admin	Adani House	Shantivan Colony	6358945030 02838 - 255164	--	Mr. Supratim Sengupta	Adani House	9979855956 02838 - 255158

Annexure – 15B (West Basin)

DEPUTY INCIDENT CONTROLLERS

Deputy Incident Controller's						**Persons to be called if IC & Dy-IC both are not available.**		
Name	**Designation**	**Place of Availability**		**Phone No.**		**Name**	**Place of Availability**	**Phone No.**
		In Factory	**Residence Address**	**In the Factory**	**Residence**			
2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Mr. Kashyap Pandya	DGM – WB	SS-1	Shantivan Colony	9925223632	4517	Mr. Nital Bhut	SS-1	8980015358
Mr. Nitin Joshi	Asso Manager - DC	SS-1	Samudra Township	89800 15282	B – Block	Mr. Shivabhai Vanjar	SS-1	75748 94352
Mr. Kashyap Pandya	DGM – WB ES – MHS	SS-1	Shantivan Colony	97277 84692	4472	Mr. Mayur Sadhu	SS-1	8980 015121
Mr. Nital Bhut	Dy. Manager ES – MHS	SS-1	Samudra Township	89800 15358	B – Clock	Mr. Vishal Bhavsar	SS-1	98792 03580
Supporting Staff of Chennai Radha [Engineering Services]								

Name	Designation	Place of Availability in Factory	Residence	Phone No.
Mr. Ravi V	RM – Chennai Radha	Workshop	Mundra	8607700609
Mr. Tapankumar Sarkar	Operation Head - Chennai Radha	Workshop	Mundra	9726412631
Mr. Mahesh Kumar	Maintenance Head – Chennai Radha	Workshop	Mundra	9726418881
Mr. Arha Chakrabarty	HOS E & I - Chennai Radha	Workshop	Mundra	9726429031
Mr. Lakshmanan T	Mechanical Head - Chennai Radha	Workshop	Mundra	8683800531

Annexure – 16

SITE MAIN CONTROLLERS

Sr. No.	Site Main Controllers						Alternate Site Main Controllers		
	Name	Designation	Place of Availability		Phone No.		Name & Designation	Place of availability	Phone No.
			In Factory	Residence Address	In the Factory	Residence			
1	2	3	4	5	6	7	8	9	10
1	Mr. Sujalkumar Shah	CEO	Adani House	Shantivan Colony	6358015565 02838 - 255002	4568 / 4569	Mr. Manoj Katar COO	Tug Berth	9879614724 02838 – 255404
							Mr. Pradeep Jayaraman COO	ACMTPL	9152036949 02838 – 255410

Annexure – 17

KEY PERSONNEL

EMERGENCY CONTACT NUMBERS

Sr. NO.	NAME	Designation	Place of Availability		Phone No		
			Factory	Residence	Land line	Residence	Mobile
1	2	3	4	5	6	7	8
1	Mr. Sujalkumar Shah	CEO	Adani House	Shantivan Colony	02838 – 255002		6358015565
2	Mr. Manoj Katar	COO	Tug Berth	Shantivan Colony	02838 – 255404		9879614724

3	Mr. Pradeep Jayaraman	COO	ACMTPL	Samudra Township	02838 – 255410		9152036949
4	Mr. Vivek Singh	Head - WB	SS – 01 WB	Shantivan Colony	--	4623 / 4624	8980015440
5	Mr. Rakshit Shah	ED	Adani House	Shantivan Colony	02838 - 255001	52497	99791 21111
6	Mr. Mavji Vaghamshi	Head-ES	Tug Berth Bld.	Shantivan Colony	02838 - 255713	--	97277 84691
7	Mr. Gaurang Chudasama	Head- LT	Liquid Terminal	Shantivan Colony	02838 - 255742	4459	8980802997
8	Mr. Snehasish Bhattacharyya	Head - HR	Adani House	Shantivan Colony	02838 - 255723	--	8826363738
9	Capt. Pradeep Ramachandran	Head – AMCT	CT2- New Bld.	Samudra Township	02838 – 255732	4617 / 4618	6358940439
10	Mr. Cherian Abraham	Head – AICTPL	CT3 Bld.	Shantivan Colony	02838 - 255733	--	8980048850
11	Mr. Gajanan Govekar	Head - ACMTPL	CT4 Bld.	Samudra Township	02838 – 255727	4629 / 4630	6358940439
12	Capt. Sachin Srivastava	Head – Marine	Tug Berth Bldg.	Shantivan Colony	02838 – 255727	4629 / 4630	7069013836
13	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Bldg.	Samudra Township	02838-255870	--	98792 03599
14	Mr. Jawed Iqbal	Head - Railway	Rly. Building	Shantivan Colony	02838 – 255763	--	90999 91319
15	Mr. Manan Bhatt	Head – OHS	CT2- New Bld.	Samudra Township	02838-255777	--	9979855922
16	Dr. Rakesh Chaturvedi	Head – Fire	Fire Station	Samudra Township	2838 255857		7069083035
17	Col. Nirmal Dhaliwal	Head - Security	Adani House	Shantivan Colony	02838-255800	--	9109988165
18	Mr. Mukul Varshney	SEZ Utilities	Adani House	Samudra Township	02838-255828	--	9981994709
19	Mr. Paresh Gohel	SEZ Operations	Adani House	Shantivan Colony	02838-255112		9879206539
20	Mr. Gireesh Sharma	Commercial Services	Adani House	Shantivan Colony	02838-255150		9099991164

Annexure – 18

ESSENTIAL WORKERS

Auxiliary Fire Squad, Central Safety Department Cell, Other Helpful members from other departments (MLTPL & LTM)

Shifts	Group No. (Any One. Shall Be Available In Each Shift& On Holiday On Call)	Sr. No	Name & Designation	Trained For	Place Of Availability		Phone No		Personal Protective equipment's Required
					In The Factory	Residence Address	Factory	Residential	
I- Shift II- Shift III-Shift	OHC Staff Safety Department. Fire Department Security staff		1 ERT MEMBERS 2. FIRST AID TRAINED PERSONNEL 3. FIRE FIGHTING PERSONNEL 4.Security, ISCR team	FIRST AID Medical Help To help Fire Brigade FIRE FIGHTING Evacuation of affected persons Informing surrounding factories etc. Shutting down plant Law & order within premises	In Plant & APSEZ	As per Company Record, MOA	As per Company Record, MOA		

Note: 1. The shift may change, but the group will be available against each shift
2. Prepare 2 to 3 groups even if there is only one or two shifts.

Annexure – 19

SAFE ASSEMBLY POINTS

Identification Sr. No. of the Assembly Point	Location	Accommodation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential address		
1	2	3	4	5	6	7	8	9
Zone 1.	Terminal -1 (Sec. Gate)	100	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 2.	CG 7	200	Mr. Manan Bhatt	Head – OHS & F	CT2 New bld.	Samudra Township	02838 – 255777	9979855922
Zone 3.	Driver Canteen	200	Mr. Gaurang Chudasama	Head – LT	LT	Shantivan Colony	02838 - 255742	8980802997
Zone 4.	LT - Behind Encl-09	200	Mr. Gaurang Chudasama	Head – LT	LT	Shantivan Colony	02838 - 255742	8980802997
Zone 5.	Old Admin Canteen	200	Mr. Bhagwat Upadhaye	Head – Dry Cargo	Tug Berth Bld.	Samudra Township	02838 - 255870	9879203599
Zone 6.	Railway. Building	200	Mr. Jawed Iqbal	Head – Rly	Rly. Building	Shantivan Colony	02838 – 255763	98982 91000
Zone 7.	Terminal 2 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102
Zone 8.	AMCT CT-2 (Sec. Gate)	200	Capt. Pradeep Ramachandran	Head – AMCT	CT2 New bld.	Shantivan Colony	02838 – 255732	6358940439
Zone 9.	Main Gate	500	Mr. Nirmal Dhaliwal	AGM - Security	Main Gate	Shantivan Colony	02838 - 255800	9981994709
Zone 10.	PUB	500	Mr. Vikas Arora	Head Howe	PUB	Shantivan Colony	02838 - 255932	9879203557
Zone 11.	Adani House	200	Mr. Snehasish Bhattacharyya	Head – HR	Adani House	Shantivan Colony	02838 - 255723	8826363738
Zone 12.	Terminal – 3 (Sec. Gate)	200	Capt. Sachin Srivastav	Head-Marine	Tug Berth Bld.	Shantivan Colony	02838 – 255727	63598 83102

Zone 13.	AICTPL (Sec. Gate)	500	Mr. Cherian Abraham	Head - AICTPL	CT – 03 (AICTPL)	Shantivan Colony	02838 - 255733	89800 48850
Zone 14.	ACMTPL (Sec. Gate)	500	Mr. Gajanan Govekar	Head – ACMTPL	CT – 04 (ACMTPL)	Samudra Township	02838 - 255809	7069013836

Annexure – 19B (West Basin)

SAFE ASSEMBLY POINTS

Identification Sr. No. of the Assembly Point	Location	Accommodation Capacity	At the time of Emergency					
			Person In charge				Land line Nos.	Mobile Nos.
			Name	Designation	Place of availability			
					In the factory	Residential Address		
1	2	3	4	5	6	7	8	9
Zone 1	Opp. SS-1	100	Mr. Vimal Baldaniya	AM-ES	SS-1	---	----	89800 15123
			Mr. Jignesh Kansara	Junior Officer – DC	SS-1	Mundra	02838 – 252936	99132 43060
Zone 2	Nr. Howe Office	100	Mr. Bharat Pokar	Officer –Safety	Howe office	Mundra	----	89800 15467
Zone 3	GIS	100	Mr. Vishal Bhavsar	Manager – E & I	SS-1	Shantivan Colony	----	89800 15057
			Shift In charge – E & I	----	SS-1	----	----	89800 15212
Zone 4	Nr. Main Gate	100	Mr. Khadim Hussain	Officer, Security	Main Gate	----	----	84609 28563
			Security Shift Incharge	----	Main Gate	----	02838 – 252900	97277 84645
Zone 5	Approach-3	100	Mr. Kashyap Pandya	DGM – MHS	SS-1	Shantivan Colony	02838 – 255973	99252 23632
			Mr. Nitin Joshi	Ass Manager. – DC	SS-1	Samudra Township	02838 – 255924	89800 15365
Zone 6	Amenities Building	100	Mr. Narendrasinh Jadeja	AM -ES	SS-1	Shantivan Colony	02838 – 2562381	89800 16461
			Mr. Paresh Gadhavi	Assistant-Admin	SS-1	Mundra	02838 – 255969	89800 16462

Annexure – 20

EMERGENCY CONTROL CENTRE: ECR

Location of the Centre: Port ISCR (Integrated Security Control Room)

Telephone numbers of the Centre: external: 8980011811 / 02838-255100 Ext. 52100 internal:

Sr. No.	Items kept in the Centre	Numbers or quantity	Person who will handle/operate this item	Its period of operation		Notes
				Last	Present	
1	2	3	4	5	6	7
1.	Self-Breathing Apparatus	2	Fire combat team members	Nil	Nil	None
2.	Fire Extinguishers	6	Do			
3.	First Aid Box	1	Do			
4.	General Personal Protective Equipment	5	Do			
5.	Torch, Raincoat, Umbrella, Mask, Helmet	5 set	Do			
6.	A copy of factory plan, On Site Emer. Plan	Yes, One	Do			
7.	Notebooks, Pen, Emergency Message form.	Yes	Do			
8.	Potable Gas Detectors	2	Do			

Annexure – 21

FIRE & TOXICITY CONTROL ARRANGEMENTS

Fire Water & Other sources	Nos. of Reservoir	02 (U/G water reservoir)	Nos. of Tanks	04 (O/H water storage tank)	Total Quantity				19358 KL	Nos. of CO2 Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reals & Total Length	No. of fire tenders and capacity	No. of Sprinklers/Monitors					
					Fixed		Portable		Alternative power arrangement	
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11
Sea Water & Narmada Water	385	Diesel pump: 06 no. – 273 M^3/hr 02 no. – 410 M^3/hr	60 mtr lengths – 30 nos.	04 no. fire tender	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm^2	60 mtr horizontal & 40 mtr vertical throw	7 kg/cm^2	Diesel Generator backup	500 Nos.

		02 no. – 616 M³/hr Electric pump: 03 no. – 273 M³/hr 02 no. – 410 M³/hr 04 no. – 616 M³/hr 01 no. – 100 M³/hr Jockey pump: 06 no. – 20 to 40 M³/hr 01 no. – 96 M³/hr		Capacity: 1) Water tender – 6 KL Water 2) Foam tender 01 - 6 KL Water & 3 KL Foam 3) Foam tender 02 - 5 KL water & 1 KL foam 4)Multipurpose fire tender - 8 Kl Water - 3 KL Foam - 45 Kg CO2 - 150 Kg DCP						

Dry Powder Type		**Foam Type**		**Water Jet Product**		**Other Extinguisher**		**Personal protective equipments**			
Type of powder & total quantity	**No. of portable Extinguisher**	**Type of foam & total quantity**	**No. of portable Extinguisher**	**No. & size of blankets**	**Other Jet products**	**Type**	**Number or Quantity**	**Respiratory**		**Non-respiratory**	
								Type	**No.**	**Type**	**No.**
12	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**

Sodium bicarbonate; 2000 kg	700 Nos.	AFFF & AR-AFFF 28 KL with system & 2 Kl storage	08 Nos.	163 cm X 152 cm 04 nos.	Nil	Nil	Nil	1) Self-Contained Breathing Apparatus Set 2) Airline Self-Contained Breathing Apparatus Set	1) 12 nos. 2) 01 Nos.	Safety Helmet Gumboot	50 nos. 25 Nos.

Annexure – 21B (West Basin)

FIRE & TOXICITY CONTROL ARRANGEMENTS

Fire Water & Other sources	Nos. of Reservoir	00 (U/G water reservoir)	Nos. of Tanks	02 (O/H water storage tank)	Total Quantity				1100 KL	Nos. of CO_2 Extinguishers
	No. of hydrant Points	No. of fire pumps, type & Capacity	No. of hose reals & Total Length	No. of fire tenders and capacity	No. of Monitors 101 nos.				Alternative power arrangement	
					Fixed [99]		Portable [02]			
					Lifting height	Pressure	Lifting height	Pressure		
1	2	3	4	5	6	7	8	9	10	11

Sea Water & Narmada Water	Reservoir capacity is 1100 KL Nos. of Hydrant 122	Diesel pump: 01 no. – 273 M^3/hr Electric pump: 02 no. – 273 M^3/hr Jockey pump: 02 no. – 10.8 M^3/hr	15mts lengths – 250 nos.	01 no.	30 mtr head	7 kg/cm^2	20 mtr head	7 kg/cm^2	Diesel Generator backup	2Kg – 36 4.5Kg – 128
				Capacity: 1) 5 KL water						

Dry Powder Type		Foam Type		Water Jet Product		Other Extinguisher		Personal protective equipment			
Type of powder & total quantity	No. of portable Extinguisher	Type of foam & total quantity	No. of portable Extinguisher	No. & size of blankets	Other Jet products	Type	Number or Quantity	Respiratory		Non-respiratory	
								Type	No.	Type	No.
12	13	14	15	16	17	18	19	20	21	22	23

Sodium bicarbonate; 700 kg	2Kg – 62 5Kg – 15 9Kg – 44 10 Kg – 16 50Kg – 4	AFFF 200 liter	9 Ltr – 7 45 Ltr – 5	01 no.	Nil	Water CO2 type	9 Ltr – 5	Self-Contained Breathing Apparatus Set	03 no	• Safety Helmet • Gumboot • Fire Proximity Suit	25 no. 20 no. 01 no.

MUTUAL AID ARRANGEMENT

Name & Address of the factories & Fire stations	Approx. distance	Contact		FFE available		PPE available		No. of experts & trained persons available	Decontamination substances available	Gas detectors available	Other equipment's available
		Person	Phone No.	Type	Quantity	Type	Quantity				
24	25	26	27	28	29	30	31	32	33	34	35
Indian Oil Corporation Limited, Mundra-Panipat Pipeline, Post Box No. – 1, P.O. Mundra, Old Port Road, Mundra, District – Kutch, Gujarat, PIN-370421.	**12 km**	**Mr. Satosh kumar / Mr. Fate kumar**	**967210211 / 9041069414**	--	--	--	--	--	--	--	--
Hindustan Petroleum Corporation Limited, Mundra-Delhi Pipeline, P.O. Mundra, IOCL Link Road, Mundra, District – Kutch, Gujarat, PIN-370421.	**06 km**	**M R Chauhan / Mr. Surabh bhatt**	**9920173377 / 9687606093**	--	--	--	--	--	--	--	--

Jindal SAW Ltd. (IBU), Village – Samaghoga, Taluka – Mundra, District – Kutch, Gujarat, PIN-370421.	**28 km**	**Mr Girish Kumar / Mr Dipak Kumar**	**900595 8965 / 968767 8052**	--	--	--	--	--	--	--	--
Adani Power Limited, Adani Power Site, Tunda-Wandh, Mundra-Mandvi Highway, Siracha, Mundra, District – Kutch, Gujarat, PIN-370435.	**25 km**	**Mr. Anil C Datar / Mr. Dinesh Mishra**	**968766 0356 / 789440 6485**	--	--	--	--	--	--	--	--
Costal Gujarat Power Limited, Ultra Mega Power Project, Tunda Vandh Road, Tunda Village, Mundra, District – Kutch, Gujarat, PIN-370435.	**28 km**	**Mr. Pramod Singh /Mr. Jignesh Kumar**	**922729 5495 / 909999 5701**	--	--	--	--	--	--	--	--
Hindustan Mittal Energy Limited Plot no.06 (2), Old port road, Mundra, District -Kutch Gujarat, PIN-370435.	**06 Km**	**Mr Partha Chakrvaborty / Mr. Vipin Yadav**	**989960 0434 / 706900 2406**	-	-	-	-	-	-	-	-

Annexure – 22

MEDICAL ARRANGEMENTS

First-aid Centers / Ambulance room / OHC / Hospital								Ambulance van or alternate arrangement				
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipment's	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
				Phone	Address							
1	2	3	4	5	6	7	8	9	10	11	12	13
1	OHC – NR. LT APSEZ LTD	02838 255710 89800 15070	On Duty Dr.	8511078 199	Samdra Township	All equipment's as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2.Subash Moond 3. Gulam Khatri 4. Radheshyam 5. Deepu Sharma 6. Dindayal Sharma	OHC – Nr. LT APSEZ LTD	4 Bed capacity	All equipment's as per Factory Act 1948	1.Bharat Dhafada (Gundala-Mundra-9925203405) 2.Bhavesh L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhavesh A Maheshwari 9.Yogendrasinh
2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838-255899	Dr. Vatsal Pandya	8980802 842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near Saundra Township	100 Bed capacity	All equipment's as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095

Annexure – 22B (West Basin)

MEDICAL ARRANGEMENTS

First-aid Centers / Ambulance room / OHC / Hospital								Ambulance van or alternate arrangement				
Sr No.	Name & Location	Phone No.	In charge person			Facilities & equipment	Antidotes available	First aiders available	Place of availability	Capacity	Facilities in the van	Driver's name & Address
			Name & Designation	Residence								
				Phone	Address							
1	2	3	4	5	6	7	8	9	10	11	12	13
1	OHC – Nr. SS-1 Building	02838-255984 8980015155	Medical Officer	96876 39281	Samudra Township	All equipment as per Factory Act 1948	All Antidotes are available	24 Hours 1.Sanajy Rathod 2. Subash Moond 3. Gulam Khatri 4. Radheshyam 5. Deepu Sharma 6. Dindayal Sharma	OHC – Nr. SS-1 Building	consulting	All equipment as per Factory Act 1948	1.Bharat Dhafada (Gundala-Mundra-9925203405) 2.Bhavesh L Maheshwari 3.Nizar Ali 4.Jaspal Zala 5.Jitendra Gadhvi 6.Ashish Anshora 7.Jitubha Zala 8.Bhavesh A Maheshwari 9.Yogendrasinh
2	Adani Hospital, Samundra Township, Old Bander Road, Mundra Kutch	02838-255899	Dr. Vatsal Pandya	8980802842	Samundra Township	ICU on Wheel, X ray, Sonography, Physiotherapy, Laboratory, Pharmacy and telemedicine etc.	All Antidotes are available	Adani Hospital Staff	In APSEZ near samundra Township	100 Bed capacity	All equipments as per Factory Act 1948	Mr. Vinay Pratap Singh 9099858095

Annexure – 23

TRANSPORT & EVACUATION ARRANGEMENT

Type of siren, if any, for evacuation	**Steam & Electrical hooter type siren**

Own Transport Center					**Own Vehicles**				
Name of Location	Phone No.	In charge person			Sr. No.	Type & No.	Capacity	No & Type of public warning instruments	Driver's name & Address
		Name & Designation	Residence						
			Phone	Address					
Mundra	9909927251	Mr. Archan Bhat	99099272 51	Mundra	**During Day Time (0700 hrs. to 1800 hrs.)**				
					1 2	HMV LMV	56 seater x 8 54 Seater x 13 7 seater x 25 (Available at different location)	Nil	All drivers available
					During Night Time (1800 hrs. to 0700 hrs.)				

					1 2 3 4	HMV HMV LMV Ambulance	56 Seater x 3 (at SVC) 13 Seater x 2 (at CT 2 & CT3) 7 seater x 30 (Dry Cargo – 01, LT – 02, CT 2 – 04, Engg. Service – 01,Marine-03,Safety-01, Fire-01, Railway-01, Security-16) 05 (02 at Port, 01 WP, 01 SEZ, 01 at SVC)	Nil	Naran, Rupsinh, Tulsi Vijay raj, Mulji, Mintoo, Satendra, Pravin, Kapil, (All available at Port, SVC and Drivers Rest room)

Outside shelters for evacuated persons							
Sr. No.	**Name, address & distance**	**Phone. No.**	**In charge Person**			**Accommodation capacity**	**Facilities available**
			Name & Designating	Residence			
				Phone	Address		
11	12	13	14	15	16	17	18
1	Shantivan Colony	6358945030	Mr. Namit Kapoor	52814	Shantivan Colony	1500	Open ground available at SV Colony (Cricket ground and Rang Manch), Shopping Complex available
2	Samundra Township	6358945030	Mr. Namit Kapoor	52814	Samundra Township	2500	Open ground available at Samundra Township (Children Park and utility park), Shopping Complex available

Annexure – 24

POLLUTION CONTROL ARRANGEMENTS

Water Pollution Control			**Air Monitoring**				
Type & Capacity of effluent treatment plant	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	Type & parameters of tests	Wind direction	Instrument available.	In charge person's name, address & Phone No.
1	**2**	**3**	**4**	**5**	**6**	**7**	**9**

265 KLD	2 sample per month	Mr. Gaurang Chudasama CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)	Twice a Week	Type Ambient Air Monitoring Parameters PM 10, PM 2.5, SO2, NOx, CO, Hydrocarbon, Benzene	Wind vane	Respirable Dust Sampler & Fine Particulate Dust Sampler	Mr. Gaurang Chudasama CTF Building, Liquid Terminal, APSEZ 90990 05225 (M)		
Stack Monitoring				**Scrubbers, Incinerators etc.**				**Land Pollution Controls**		**Pollution control Board**	
No. of sample monitoring & its frequency	Type & parameters of tests	Instrument available.	In charge person's name, address & Phone No	Location	Type & Capacity	For What	In charge person's name, address & Phone No.	No. of sample monitoring & its frequency	In charge person's name, address & Phone No.	Permission obtained?	Conditions fulfilled?
11 sample per month	SO_2, NOx, SPM	Stack Monitoring kit.	As above	---------- N A ----------				2 sample per month	As above	Yes (As per CC&A)	Yes (As per CC&A)

Annexure –25

OTHER ARRANGEMENTS

For Key Personnel and Essential Workers See Annexure -17 & 18

Sr. No.	Type and name of arrangements available	Qty.	Place of availability	Phone no.	Incharge person's			Mutual aid arrangements					
					Name & designation	Residence		Place from where the same thing is available	Quantity available	Incharge person's			Address
						Phone	Address			Name & designation	Phones		
											Office	Resi.	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1.	Alternatives power arrangements		Liquid Terminal	8980802997	Mr. Gaurang Chudasama		Shantivan Colony	GSPC/LNG		Mr. Dineshchandra Shah / Plant Head	9909914844		
2	Additional firefighting support		Fire Station	7069083035	Dr. Rakesh Chaturvedi		Samudra Township	APL		Mr. Anil Datar / DGM Head Safety & Fire	9687660359		
3	Special engineering support		Tug Berth Bld.	9727784691	Mr. Mavji Vaghamshi		Shantivan Colony	IOCL		Mr. Kumar Mukesh Rajan	981s1537164		
4	Additional administrative support		Adani House	8826363738	Mr. Snehasish Bhattacharyya		Shantivan Colony	HMPL		Mr. N Karthikeyan	9982288833		
5	Additional Environmental support		Adani House	6357231713	Mr. Bhagwat Swaroop Sharma		Shantivan Colony	HPCL		Mr. Vijay M Darot	8936919000		

Annexure –26

ALARMS & SIRENS

Sr. No.	Plant wise alarm points						The alarm (signal) is heard (seen) at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	Liquid Terminal	1) LT Control room, 2) Ground floor of LT office	1 & 2	Roof of the first floor	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
2	Dry Cargo area	Ground floor	3	Roof of fire pump house	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
3	Marine Terminal	Ground floor fire p/h	4	Roof of Marine Terminal building	Wailing	Twice in a month	5 km range	All Type of Emergency	Hooter	As per siren code	Wailing
4	Adani House	Ground floor	5	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Hooter	As per siren code	Wailing

5	PUB Building	Ground floor	6, 7 & 8	Each floor	Wailing	Twice in a month	500 mtr range	All Type of Emergency	Hooter	As per siren code	Wailing
6	ES - Building	Ground floor	9	Roof of ES building	Wailing	Twice in a month	8 km range	All Type of Emergency	Hooter	As per siren code	Wailing
7	AMCT / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
8	Terminal-2	Ground floor fire P/H	11	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
9	AICTPL / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing
10	ACMTPL / CT2	Ground floor fire P/H	10	Ground floor	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	As per siren code	Wailing

Annexure –26B (West Basin)

ALARMS & SIRENS

Sr. No.	Plant wise alarm points						The alarm (signal) is heard at	Sound difference if any			
	Plant/Dept./Location		Sr. No. of the alarm point	Its place of location (With floor No. if any)	Type of the alarm of siren	Its Period of checking		Type of emergency	Type of alarm or siren	Duration of sounding	Type of sound of alarm /siren
	Name & Location	No. of floor									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	SS-1	Top floor	1	Roof of SS-1 building	Wailing (Electric)	Twice in a month	8 km range	All Type of Emergency	Hooter	02 minute (all clear)	Wailing
2	Fire Dept.	Ground floor	1	Fire porta cabin	Wailing (Manual)	Twice in a month	1.6 km range	All Type of Emergency	Hooter	02 minute (all clear)	Wailing

Code of Siren:

- **Emergency** : Wailing Siren continuous for one minute with gap Siren for one minute followed by five second gap. Repeated four times.
- **Testing** : Continuous Siren for one minute (4th and 19th of Every Month at 1100 hrs.).
- **All Clear** : Continuous Siren for two minutes.

Annexure – 27

INTERNAL PHONES

Sr. No.	Name & Location of the plant, departmen of area (including internal emergency service)	Phone No. (Internal)	Person available on this phone				
			Name	Designation	Designation or duty under on-site / offsite emergency plan, if any.	Residence	
						Phone No. (Internal)	Address
1	2	3	4		6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4258	SHANTIVAN COLONY
2	FIRE CONTROL ROOM	52801	SHIFT INCHARGE	FIRE OPERATOR	DR. RAKESH CHATURVEDI	4731	SAMUDRA TOWNSHIP
3	MEDICAL	52710	INCHARGE	MEDICAL OFFICER	MEDICAL OFFICER	--	--
4	SECURITY	52300	DUTY OFFICER	OFFICER	COL. NIRMAL DHALIWAL	4504	SHANTIVAN COLONY
5	MARINE CONTROL	52761	SHIFT INCHARGE	HEADMARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY
6	SAFETY OFFICER	52777	SAFETY OFFICER	SAFETY OFFICER	MR. MANAN BHATT	--	SHANTIVAN COLONY
7	LT CONTROL ROOM	52744	SHIFT INCHARGE	AGM	MR. GAURANG CHUDASAMA	4459	SHANTIVAN COLONY
8	DRY CARGO	52932	SHIFT INCHARGE	HEAD-DC	MR. BHAGWAT UPADHAYE	--	SAMUDRA TOWNSHIP
9	ELECTRICAL & ISTR.	52826	SHIFT INCHARGE	AGM	MR. MAVJI VAGHAMSHI	4506	SHANTIVAN COLONY

10	PORT OFFICE CONTROL	52762	SHIFT INCHARGE	HEAD MARINE	CAPT. SACHIN SRIVASTAVA	4629 / 4630	SHANTIVAN COLONY

Annexure – 27B (West Basin)

INTERNAL PHONES

Sr. No.	Name & Location of the plant, department of area (including internal emergency service)	Phone No. (Internal)	Person available on this phone				
			Designation or duty under on-site / offsite emergency plan, if any.	Designation	Name	Residence	
						Phone No. (Internal)	Address
1	2	3	4	5	6	7	8
1	TELEPHONE EXCHANGE	99	SHIFT INCHARGE	SR.OFFICER	MR. PRADEEP TRIVEDI	4181	Shantivan Colony
2	FIRE CONTROL ROOM	52900	SHIFT INCHARGE	AGM	DR. RAKESH CHATURVEDI	4731	Samudra Township
3	MEDICAL	52984	INCHARGE	MEDICAL OFFICER	---	4460	Shantivan Colony
4	SECURITY	52939, 52900	DUTY OFFICER	SR.MANAGER	COL. NIRMAL DHALIWAL	--	Shantivan Colony
5	MARINE CONTROL	52933	SHIFT INCHARGE	GM	CAPT. SACHIN SRIVASTAVA	4726	Shantivan Colony
6	LT CONTROL ROOM		SHIFT INCHARGE	AGM	MR. GAURANG CHUDASAMA	4459	Shantivan Colony
7	DRY CARGO	52936	SHIFT INCHARGE	MANAGER	MR. NITIN JOSHI	4439	Shantivan Colony
8	ELECTRICAL & INS.	52932	SHIFT INCHARGE	DGM	MR. KASHYAP PANDYA	4506	Shantivan Colony
9	CENTRAL CONTROL ROOM	52932	SHIFT INCHARGE	DGM	MR. KASHYAP PANDYA	4044	Shantivan Colony

Annexure – 28

EXTERNAL PHONES

Sr. No.	Name & Address of the dept. / Service / Person (including external emergency services)	Phone No. (External)	Person available	
			Designated person	Services Expected Under On-site / off –site Emergency plan
1.	Bhuj Fire Station	02832 – 222590, 101	Fire Officer	Fire fighting Service
2.	Gandhidham Fire Station	02836-231610, 101	Fire officer	Fire fighting Service
3.	Fire & Ambulance serv.	108	Medical Off.	Fire fighting Service
4.	Kandla Fire Station	02836 - 270176, 270178	Chief Fire Off.	Fire fighting Service
5.	Factory Inspector	02836 – 260020, 260262	Asst. Director	Legal Advisory Service
6.	Collector Office	02832 – 250020, 251805	Collector	Administration Service
7.	Civil Defense	02832-220703	Dy. Collector	Evacuation Service
8.	Hospital, Bhuj	02832 – 221610, 250150	Civil Surgeon	Medical Service
9.	KPT- Hospital, Kandla	02836- 270205, 270633	Medical officer	Medical Service
10.	Police	02832 -250511, 250444	DSP	Law & Order
11.	Police control City	100	Control room	Law & Order
12.	Gujarat Maritime Board	02838-22136	Port Off.	Marine Service
13.	Indian Navy, Porbandar	0286-2240954	Navy Officer	Security service (WAR)
14.	Indian Coast Guards	02831-286430,31(Jhakhau)	Cost Guard officer	Security service
		0286-2240958 (Porbandar)		

Annexure – 29

NOMINATED PERSONS TO DECLARE MAJOR EMERGENCY

Sr. No.	Name of the plant, department or location	Name & Designation of the nominated persons to declare major emergency	Duty of designation given, if any, under the onsite / off-site emergency plan	Phone No.	Residence	
					Phone No.	Address
1	Mr. Sujalkumar Shah	CEO	Site Main Controller	02838 – 255002	63580 15565	Shantivan colony
2	Mr. Manoj Katar	COO	Site Main Controller	02838 – 255404	98796 14724	Shantivan colony
3	Pradeep Jayaraman	COO	Site Main Controller	02838 – 255410	91520 36949	Samudra Township

Annexure – 30

FORM TO RECORD EMERGENCY TELEPHONE CALL

PART A: ESSENTIAL INFORMATION

DETAILS OF CALL AS REPORTED	
CALLER'S NAME & DESIGNATION_____DATE_____TIME_____PHONE NO._____	
PURPOSE OF CALL IS ANY PARTICULAR ADVICE REQUIRED IMMEDIATELY?	
NAME OF CHEMICALS. TO BE SPELT OUT CLEARLY	
BRIF DESCRIPTION OF INCIDENT. FIRE/ EXPLOSION /LIQUID SPILL/GAS RELEASE. QUANTITY INVOLVED. PACKAGING/STORING/HOLDING/USING DETAILS. LOCATION OF INCIDENT. CAUSE. IF KNOW, IN BRIEF.	

PART B: INFORMATION TO BE ORTAINED IF READELY AVAILABLE.

HAS ANYONE BEEN INJURED?	YES/NO	IF YES, HOW MANY?
AFFECTED BY CHEMICALS?	YES/NO	IF YES, HOW MANY?
WHAT FIRST-AID HAS BEEN GIVEN?		
HAS ANY ONE BEEN TAKEN TO HOSPITAL?	YES/NO	
IF YES, ADDRESS OF THE HOSPITAL.		
IS THE ROAD BLOCKED? YES/NO. CLOSED TO TRAFFIC? YES/NO		
WHO OWNS THE CHIMECALS? YES/NO HAS THE ONNER BEEN INFORMED?		
IF CAUSED BY VEHICLE, VHICLE NUMBER_____AND NAME & ADDRESS OF THE ONNER_____ HAS THE ONNER BEEN INFORMED? YES/NO TO WHON WAS THE LOAD COSIGMED?		

Annexure – 31

STATUTORY COMMUNICAION

Prior to start of terminal printed booklet and communication given to workforce

STATUTORY INFORMAION TO BE GIVEN TO:	PERIODICITY OF SUCH INFORMAION TO BE GIVEN (STATUTORY OR SELF DECIDED)	DATE OF LAST INFORMATION GIVEN	TO HOW MANY PERSONS	SUGGESTIONS RECEIVED IF ANY	LAST DATE OF IMPLEMENTATION OF USEFUL SUGGESTIONS
1	2	3	4	5	6
The workers	Information to workers once a month Safety Information Booklet as per	N/A	N/A	N/A	N/A
The general public & neighboring firms	Information to be furnished to General Public In vicinity as per GFR-41B.	N/A	N/A	N/A	N/A
District Emergency Authority	Yes, as and when asked for	N/A	N/A	N/A	N/A
Factory Inspector	Yes, as and when asked for 1 copy of onsite emergency plan / GFR 68-L to be given.	N/A	N/A	N/A	N/A

Annexure – 32

SEPARATION DISTANCE

SR. NO.	SUBSTANCE	TANKS		SEPARATION DISTANCE REQUIRED (M)	DISTANCE AT PRESENT (M)
		CAPACITY (T)	NUMBERS		
1	2	3	4	5	6
1.	Storage of Liquid Petroleum Product in atmospheric Tank	As per Annexure - 4	Two	15 Meters	18 Meters
2	Storage of Liquid Acetic acid in atmospheric Tank	As per Annexure - 4	Two	N/A	N/A

Note: Layout of the installations conform to safe distances and is duly approved & licensed by the Office of Director, Industrial Safety & Health.

Annexure – 33

EMERGENCY INSTRUCTION BOOKLET

Sr No	Role to be played as (Name emergency designation Viz, incident controller, particular key person or essential worker doing the job of)	His emergency duties/functions (Narrate in short and clear sentence and in 1:2:3)	Also refer document of (other relevant the factory Viz. Safety manual etc.)	He should report at (the incident Place or contract route etc.)
1	2	3	4	5
1	Incident Controllers (IC)	1.Assess scale of emergency and accordingly activate emergency plant. 2. Assume duties of SMC in his absence and depute DIC in his place. 3. Direct plant-shut-down evacuation, call in outside. 4. Call key-personnel. 5. Direct rescues & fire fighting. 6. Direct all operations in affected area giving priority to safety of personnel plant / property and environment. 7. Search for causalities. 8. Evacuate non-essential workers to safe assembly point. 9. Establish communication with ECC. 10. Provide necessary information fire bridge / outside service. 11. Brief SMC about developments. 12. Preserve evidence necessary for investigation. 13.Act as alarm raiser		ECC / Place of Incident
2	Deputy Incident Controller (DIC)	1. Assume the role of IC in his absence, send runner to call IC. 2. Help IC in shutting down the plant, controlling the incident fire - fighting etc. 3. Implement all the instructions from IC. 4. Report developments to IC. 5. Act as alarm raiser.		Place of Incident
3	Site Main Controller (SMC)	1. Relieve IC of overall main control. 2. Consultant IC and decide if a major emergency exists, if so, call in outside emergency services, mutual aid teams fire-brigade and if necessary, activate off-site plan, inform nearby factories/general public and DEA police, Factory Inspectorate.		

		3. Ensure that key personnel are called in. 4. Exercise direct operational control of parts of works outside affected area. 5. Consult IC and key persons & if necessary direct safe close down, evacuation of plant people as well as neighboring population. 6. Ensure medical help for causalities/victims. Ensure that their families. Relatives are informed. 7. Inform and liaison with fire, officers, DEA, Police, Hospital Inspectorate. 8. Contract meteorological officer for weather predictions, if emergency is prolonged. 9. Ensure head count is done and arrange rescue for missing. 10. Arrange for chronological record of events to be maintained. 11. Arrange for catering facilities. 12. Issue authorized statements to news/media. 13. Ensure evidence is preserved. 14. Control rehabilitation of affected areas and ensure safety of plant before re-entry. 15. Control traffic movement within the factory. 16. Act as alarm raiser.		
4	Key Personnel	1. To provide advice / information to SMS. 2. To implement decision taken by SMC. 3. Help SMC in evacuation, emergency engineering work supply of equipment's utilities, carrying out atmospheric tests, arranging medical-aid, transportation, listing with DEA police, Factory Inspectorate and other area as the need be. 4. Act as alarm raiser.		ECC
5	Essential Workers	Carryout instructions of IC/DIC in 1. Firefighting, gas leak and spill control. 2. Helping fire brigade and mutual aid teams. 3. Shutting down plant and making it safe. 4. Emergency engineering work. 5. Providing emergency power water equipment's etc. 6. Moving equipment and vehicles from the affected area. 7. Search evacuation, rest welfare 8. Giving first aid / medical help. 9. Carrying out atmospheric test and pollution control. 10. Manning assembly points, outside shelters and look after welfare of evacuated persons.	IC / DI of fire Toxicity Control Station	Incident area

		11. Recording details of causalities. 12. Handling telephone calls acting as messenger. 13. Controlling traffic within the factory. 14. Informing surrounding factories and general public. 15. Act as alarm raiser		
6	Assembly Point in - charge	1. Mark the position of assembly points by clear notice. 2. Ensure that the assembly point is safe. 3. Record the names and departments of those reporting there as well as those leaving. 4. Establish communication with SMC. 5. Arrange for suitable P.P.E. if these are required for reaching assembly points of ECC. 6. Act as alarm raiser		
7	E.C.C. In Charge	1. To equip E.C.C. with proper means of communication and stationery and dates logging equipment's. 2. Procure latest telephone directory and a separate list of important telephone numbers. 3. walking-talkie or P.A.S. system. 4. Sets of various maps and drawings showing the area the factory layout, hazardous storage, flammable areas, effluent, treatment plant, first-aid center, assembly point, E.C.C. Canteen fire- fighting station etc. 5. Mark affected areas within and outside the factory. 6. Keep available the copies of this on-site and off-site emergency plan. 7. Keep real role of employees with their address, blood group information etc. 8. Arrange tape recorder and if possible, video to record the incident. 9. Arrange pads, pens pencils and stationery. 10. Keep ready gas detractors (if required) self-breathing apparatus sets of PPE'S, torches umbrellas, raincoats etc. 11.Act as alarm raiser		
8	Fire and toxicity control In-Charge	**Before Emergency** 1.Keeping a separate place (small room) ready with fire - fighting equipment's, gas leak control equipment's and P.P. E'S. 2.Checking periodically that this equipment's are functional. 3. Checking that warning system for fire / toxic release is in working order. **During Emergency** A. Proceed to the scene of emergency.	Fire / Toxicity	Control Station

		B. Use corrective of fire extinguisher & control fire with the help of essential workers. C. In case of gas release use safety kit to control the same. D. Ask IC / SMC for mutual-aid external aid if necessary. E. Act as alarm raiser		
9	Medical arrangements In-charge	**Before Emergency** 1.Putting permanent notice for location of first-aid center, dispensary, ambulance room. 2. Checking adequacy of area of first aid center for the organization and advice management accordingly. 3. Ensuring availability of first aid medicines, antidotes and staff. 4. Maintaining health record including blood-group information of all the workers. 5. Leasing with Hospital / Doctors in the vicinity. **During Emergency** A. With the help of first aids give first aid to victims. B. Arrange hospitalization of call doctors at site as per need. C. Act as alarm raiser. D. Arranging outside shelters before emergency.		
10	In charge of transport and evacuation arrangement	1. Keeping ready company's Vehicle. 2. Keeping readies, a list with address & phone nos. of public transport companies offering vehicles for men and goods. 3. Informing transporters to send vehicles and using own vehicles. 4. Informing "Mutual-aid-companies “about transport requirements 5.Arranging medicines, food clothing etc., at outside shelters, during emergency. 6. Act as alarm raiser		
11	In-Charge of pollution control arrangement	**Before Emergency** 1.Checking adequacy of pollution control arrangements by checking quality of liquid and gaseous effluents. Providing extra capacity if necessary. 2. Checking workability of arrangements and making them functional. 3. Ensuring regular preventive maintenance of such arrangements. 4. Keeping reagents ready. 5. Ensuring through logbooks regular monitoring. **During Emergency** 1.Analysing the effluent and so needful to treat it. 2. Ensuring quality of liquid & gaseous effluent before discharge.	Site and Effluent	Treatment Plant

		3. Monitoring air in and around unit in case of toxic release before rehabilitation. 4.Act as alarm raiser		

Schedule: 5: MATERIAL SAFETY DATA SHEET:

See Rule 68-J 2(2) & 2(3)

Annexure – 11

ANNEXURES

ANNEXURE 1	**INITIAL OIL SPILL REPORT**	
Particulars of person, office reporting	Capt. Sachin Srivastava- HOD Marine Capt. Rajat Garg - HOS marine, APSEZ	
Tel No.	+91 6359883102	
Date & time of incident	19.04.2023 / 1046 hrs	
Spill location	IOCL SPM	
Likely cause of spill	Leakage from J tube flange of SPM.	Witness – Tug Victor
Initial response action	Initiated OSCRP	
Any other information	NO	

Identity of informant	Tug Victor
Time of FIR	1046
Source of spill	IOCL SPM
Cause of spill	Looseness of J-tube flange bolts.
Type of spill	Crude Oil
Color code information (from CG)	Silver
Radius of slick	10-12 m
Tail	15 m
Volume	0.5 to 0.7 cubic meter approx.
Quantity	500 to 600 L
Weather	SW’ Ly x 10-12 knots.
Tide / current	Flooding / 0.1 to 0.2 knots.
Density	0.2 to 0.86 kg/m3 approx.
Layer thickness	0.02 mm approx.
Air / Sea temp.	36 deg C / 34 deg C
Predicted slick movement	NE’ly
Size of spill classification (Tier 1, 2 or 3)	Tier 1

ANNEXURE 2 **POLREP**

In case of an oil spill, MPSEZ 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 Victor
2.	Time of information receipt	1046
3.	Source of Spill	IOCL SPM
4.	Cause of Spill	Looseness of J-tube flange bolts
5.	Type of oil	Crude Oil
6.	Colour code information	Silver
7.	Configuration	-
8.	Radius	10 to 12 m
9.	Tail	15 m
10.	Volume	0.5 to 0.7 cubic meter approx.
11.	Quantity	500 to 600 L
12.	Weathered or Fresh	Fresh
13.	Density	0.2 to 0.86 kg/m3 approx.
14.	Viscosity	53.36 CST@25 deg centigrade
15.	Wind	SW’ Ly x 10 - 812 knots.
16.	Wave Height	0.1 to 0.2 m
17.	Current	0.1 to 0.2 knots.
18.	Layer Thickness	0.2 to 0.4 mm approx.
19.	Ambient air temperature	36 deg C
20.	Ambient sea temperature	34 deg C
21.	Predicted slick movement	NE’ly
22.	Confirm Classification of spill size	Tier 1

Log Sheet of Drill

Page Number: 1 of 1	**Date**: 19 -04-2023
Name: Salim Sayyad	**Position:** Radio Officer
Contact Number: 9825228673	**Signature:**

Activity Timeline:

0948 – Dol 11 and Dol 4 casted off from RORO for SPM

1045 – Dol 11 reached at IOCL SPM

1046 - Dol 11 informed on VHF that Tug Victor reported oil coming from SPM side

1047- Informed Dol 11 to report same to SPM & Diving In charge onboard,

1048- Informed HOD Marine / HOD-Marine Technical/ HOS

1049- Diving Team started inspection & found source of leakage from J tube flange.

1050- Bolts tightening of J tube flange started by SPM diving team.

1051- Informed POC & Tech team (Mr. Jimish).

10:53- Environment dept. & Marine executives informed.

1054- Jetty Team informed for Requirement of Hydra & Manpower.

1055- Tide Flooding (LW-0730-0.88, HW- 1343- 5.76.), Wind SWly 10-12 kts

1055- Instruct Dol 2 & 15 at WB to prepare OSD boom and stand by to cast off.
(OSD ROB- Dol 2- 4.7 KL, Dol 4-0.9KL, Dol 18-3.1KL, Dol 16-4.8KL)

1056- Informed security/safety/medical/dredging by POC.

1100- Informed Corporate/Legal/Commercial by POC.

1105- Dol 11 reported commenced boom lowered.

1105- All bolts tightened by SPM diving team. Leakage stopped.

1115- Skimmer ready for deployment

1121- Dol 11 reported boom lowered 250 m, started making J formation.

1148-J Formation completed. Skimmer lowered.

1152- Oil recovery commenced.

1202- All inspection carried out found Normal.

1205-Boom recovery stated.

1244-Boom recovery completed

1310-Drill called off.

1312-Informed all concern.

Personnel & Boats Participated in Drill

Off Shore

01 Capt Girish Chandra

02 Mr. Yogesh Nandaniya

03 Mr. Sudhakar Singh

04 Mr Arpan Chowdhury

05 Mr. Ramdas Pawale

06 Mr. Upinder Samkaria

07 Mr. Shashikant Padave

08 Mr. Santosh Rasam

09 Mr. Vishwanath Chauhan

10 Mr. Dharamveer Yadav

11 Mr Bharmal Bishoni-Diver

12 Mr. Abhilash Kumar – HMEL

13 03 Members from Sea Care

14 Crew of Tug Dolphin 11

15 Crew of Tug Victor

16 Crew of Boat Al Dariyah

17 Tug Dol 4

18 ICG Mundra – 04

19 Capt Lalji Meena, Harbour Master DPA

20 Mr. Ashvin Kumar Patni

21 Mr. Bhagwat Swaroop Sharma

22 Mr Radheshyam Singh

23 Liquid Team- 08 Persons

Onshore:

1. Capt Sachin Srivastava
2. Capt Rajat Garg
3. Mr Salim Sayyad
4. Mr Bhavesh
5. Mr Anish

Drill Performance Monitoring:

Sl. 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 Dol 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.	35 min.
5	Time taken for J/U formation and deployment of skimmer.	27 min.

Observations:

SR. NO.	POINTS	ACTION TAKEN	TARGET DATE	RESPONSIBILITY	REMARKS
1	The communication flow between onsite, jetty and Control Room was clear and satisfactory.	NA	NA	NA	

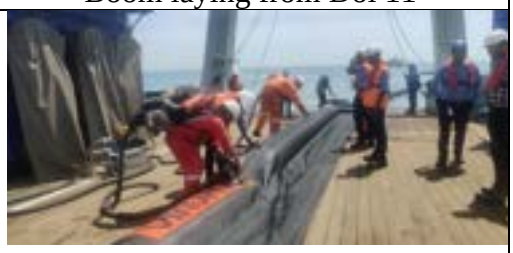
Drill snap – 18 - 19 Apr 2023

Date 18 April 2023 Tabletop Exercise	
Tabletop Exercise Team -1	Tabletop Exercise Team -2
	
Tabletop Team Participants	
	

Date 19 April 2023 OSR Drill at IOCL SPM

Pre Drill Briefing

Boom laying from Dol 11



J formtion making in progress

J formtion making in progress

Skimmer Operations

Skimmer Operations

OSR Team on Tug Dolphin -11

Annexure – 12

adani Ports and Logistics	Adani Ports and Special Economic Zone Limited, Mundra.

SOME PHOTOGRAPHS OF HTL BOUNDARY DEMARCATION DISPLAY BOARD

Annexure – 13

डॉ. एम. सुरेश कुमार /Dr. M. Suresh Kumar
मुख्य वैज्ञानिक तथा प्रमुख/Chief Scientist & Head
प्रोफेसर एसीएसआईआर/Professor AcSIR
पर्यावरणीय प्रभाव एवं संधारणीय प्रभाग
Environmental Impact & Sustainability Division
Ph/Off : (91) (712) 2247844
EPABX : (91) (712) 2249885-90(Ext.354)
Fax : (91) (712) 2249896
E.Mail : ms_kumar@neeri.res.in
eisd@neeri.res.in

सीएसआईआर–राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंधान संस्थान
नेहरू मार्ग
नागपुर 440 020
(भारत)

CSIR-National Environmental Engineering Research Institute
Nehru Marg
Nagpur 440 020
INDIA

No: ECCA-AP&SEZ/CSIR-NEERI/08

Date: 01/11/2023

To,
Head-Environment,
M/s. Adani Ports and Special Economic Zone Limited,
Adani House, P.O. Box No.1,
Mundra, Kutch - 370421.

Sub: Status of SEZ Environment Clearance Compliances
Ref:

1. SEZ Environment Clearance bearing MoEF letter No. 10-138/2008-I A.III, dated 15th July, 2014 (Specific Condition No. vii)
2. SO No. 5702004926, dated: 27.01.2022
3. Site Visit dated 20-21.09.2023

With reference to the above stated subject and references, work has been awarded to us for studies through Environment Clearance compliance audit at Multi Product SEZ of M/s. Adani Ports & SEZ Limited, Mundra with reference to EC Specific Condition No. (vii).

Accordingly, the site visit was conducted on 20th to 21th September, 2023 and the compliance report (October 2022 - March, 2023) was reviewed by us. It was further assessed from the monitoring reports submitted to us and site visit carried out, as part of the compliance report that all the environmental norms meet the applicable standards.

It has been concluded all the conditions stipulated in Environment Clearances are being complied and there is no violation of any condition. The existing practices shall be continued in future as well to ensure meeting with the applicable norms.

With Regards,

01/11/2023

(M. Suresh Kumar)

Annexure – 14

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	Sep-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	364,000	4,821,638	48.22
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	2,700,000	32,118,379	321.18
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	632,000	12,165,780	121.66
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 Shuddha Jal Yojana	2,236,050	2,700,000	2,038,000	1,773,000	2,348,300	1,936,575	2,096,050	252,000	15,379,975	153.80
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 training Center & 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**	**5,175,000**	**138,994,034**	**1,389.94**

Annexure – 15

Consultancy Project Report

On

Grassland Development in Mundra Region, Gujarat

Submitted to

Adani Ports & SEZ limited (APSEZ)

Submitted by

ICAR-Indian Grassland and Fodder Research Institute,
Gwalior Road, Jhansi UP 284003

Background

Consultancy work about providing technical guidance and evaluation of ongoing grassland developmental activities in Gauchar land in Jarpara village, Mundra region of Gujarat was conceptualized after Mr. Anshul Sandhuja; Manager-Environment, Adani Ports & SEZ Ltd. contacted Director ICAR-IGFRI through e-mail dated 01.12.2021 and 12.09.2022.

Host Organization

Adani Port & Special Economic Zone Ltd (APSEZ) is India's largest private port and special economic zone which was incorporated as Gujarat Adani Port Limited in the year 1998. APSEZ has presence across 13 locations along the Indian coast which plays a major role in contributing to India's economy. APSEZ has presence across seven maritime states of Gujarat. Goa. Kerala, Andhra Pradesh. Tamil Nadu. Maharashtra and Odisha with the most widespread national footprint with deepened hinterland connectivity.

APSEZ has majorly developed waterfront development projects in the form of port and related infrastructure developments at Mundra. APSEZ is the number one multi-location private port developer and operator. It owns and operates the Mundra Port since 1998, a crown jewel of the Adani Group, which is located in Mundra, Kutch district of Gujarat, and is today the country's largest multi-cargo private commercial port

APSEZ has conceptualized Port based Special Economic Zone, developed a master plan over an area of approximately 18000 ha land near Mundra, Kutch region which was required to be progressively converted in a phased manner for future expansion of SEZ /Industrial Parks/ Port backup activities. At present. Ministry of Environment. Forest and Climate Change (MoEFCCC) has accorded Environmental and CRZ clearance of -8481.27 ha of SEZ to APSEZ at Mundra.

Adani Foundation is the Corporate Social Responsibility arm of the Adani Group. For over two decades now, Adani Foundation has been working to uplift communities by playing the role of a facilitator. It is committed to community Education, Health, Sustainable Livelihood, and Community Infrastructure, Saksham, Swachhagraha, Udaan, SuPoshan, Employee Volunteering Programme etc.

IGFRI (Indian Grassland and Fodder Research Institute)

IGFRI, a national Institute under the administrative control of Indian Council of Agricultural Research, Department of Agriculture Research and Education, Ministry of Agriculture & Farmers Welfare, Government of India, is mandated to conduct basic, strategic, applied and adaptive research; development and training in forage production and its utilization. The Institute has highly experienced and internationally trained human resources engaged in need-led, participatory, inter-disciplinary approaches. With more than 60 years of experience in forage research and development, IGFRI today stands as the premier R&D institution in South Asia for sustainable agriculture through quality forage production for improved animal productivity.

The Indian Grassland and Fodder Research Institute, established in 1962, has been instrumental in fostering research, training and extension programmes on all aspects of forage production and utilization through inter-disciplinary approach.

It has provided technologies, human resource development skills, consultancy and technical services on forage production and utilization to government and non-government organizations, agri-business and farmers. This has been possible due to the benign patronage and guidance of Dr. Himanshu Pathak, Secretary DARE and Director General, ICAR, New Delhi. It has three Regional stations to cater to forage related location specific R&D needs of

humid tropics (at Dharwad), semi-arid and arid (at Avikanagar) and temperate (at Srinagar/ Palampur).

Terms of Reference

Scope of work as requested by APSEZ (Host organization)

1. Site visit to the Gauchar land (if required)
2. Testing of representative soil samples of Gauchar land
3. Review of approach & methodology adopted by APSEZ
4. Submission of the technical report on the approach & methodologies submitted by APSEZ along with the recommendations

APSEZ shall provide all the administrative support to ICAR-IGFRI, Jhansi in fulfilling the above scope of work and APSEZ shall acknowledge the consultancy services provided by ICAR-IGFRI at various platforms such as hoardings/display boards at the Gauchar land, reports published by APSEZ, Environmental clearance compliance report to MoEFCCC etc.

Review of Approach & Methodology adopted by APSEZ

The following methodology adopted by Adani Foundation for the development of grassland at Gauchar land

- Area cleaning work by removing Gando baval (*Prosopis juliflora*) from the identified area through JCB or Hitachi.
- Trees like Desi baval, Kerda, Khijro, Neem and other trees will not be removed from the gauchar land.
- People who live in or around the village can use the Gando baval as fuel or sell it or dispose of it with the consent of village panchayats.
- Construct a cattle-proof trench of 1.5 m wide and 1 m deep around the cleared area.
- Make plots of 8 to 20 acres in cleared areas according to the slope of water flow (natural drainage) so that rainwater is stored in each plot and moisture content is maintained for

a long time for increased grass growth. In addition, protection from loose animals grazing is also required.

- Sowing of good quality local grass seeds like Dhraman, Zinjwo or other local grass seeds in the plot.
- Sowing of seeds of Khijro, Krakach, Desi Acacia, Neem, etc. on the ridges around the plot so that it grows naturally during monsoon rains.
- Planting of local grasses on the ridge inside the plot.
- Planting wad umbra, pepper, pipal, and neem trees at closed spacings in small plots within the original plot to provide shade to the animals during grazing.
- In the interval of three months for continuous two years, organize a program of Shramdan with the help of villagers to remove the small mad acacia that grows.
- Periodically water the trees planted in the plot.

Action Taken

Visit duration: 8-10 May, 2023

Places visited: Jarapara 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.

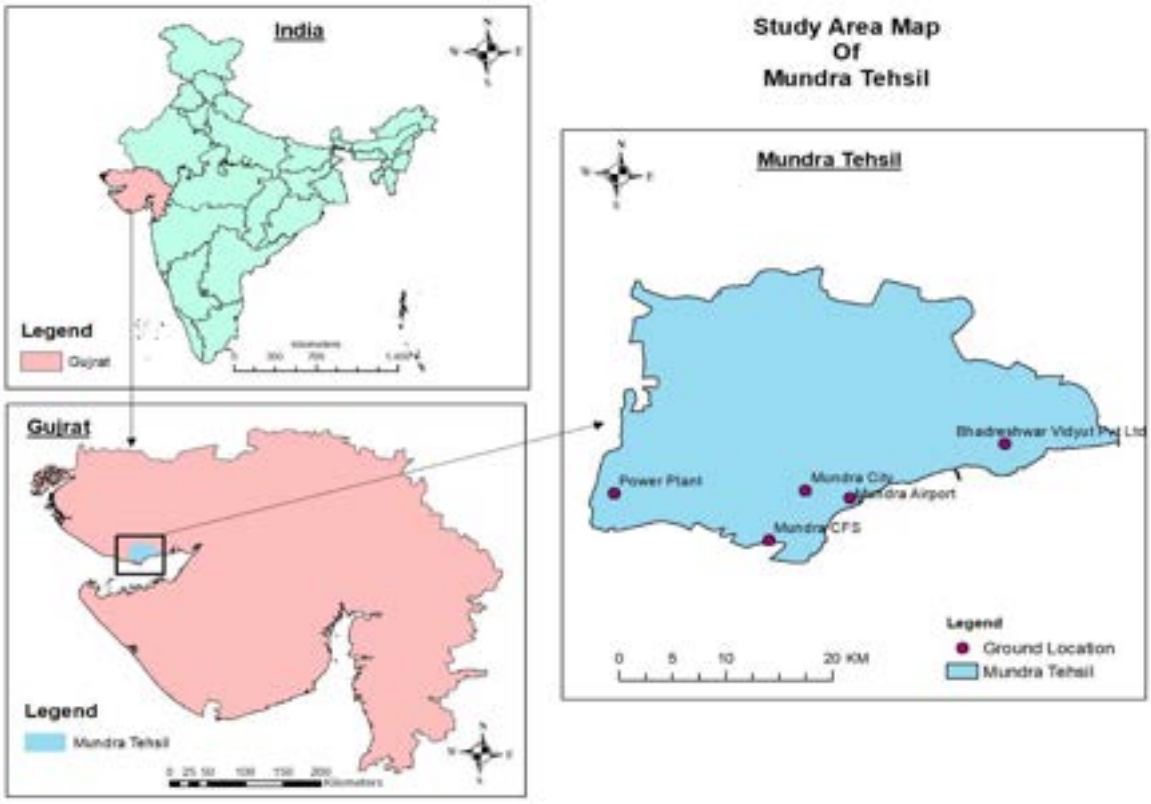
ICAR-IGFRI Visiting Team:

1. Dr. Amaresh Chandra, Director, ICAR-IGFRI, Jhansi
2. Dr. A. K. Roy, PS & Ex-Project Coordinator (AICRP on Forage Crops & Utilization)
3. Dr. R. V. Kumar, PS & Ex-Head (Grassland & Silvipasture Management Division)
4. Dr. Amit K Singh, Scientist, Grassland & Silvipasture Management Division

APSEZ officials Shri Anshul Sandhuja, Manager (Environment), APSEZ and Shri Bhagwat Swarup Sharma, Site Head, APSEZ accompanied the visiting team to the site.

Present status

Major part of the site is infested with *Prosopis juliflora*, an invasive non-palatable shrubby species. The field has undulating topography which causes hindrance in mechanized operations. Last year after minor field work using farm implements, the field was sown with collected seeds of *Cenchrus setigerus* and *Cenchrus ciliaris*. The grasses have not germinated well. Most of the grasses present were non-palatable ones.



Soil sample analysis and interpretation

	Soil pH	EC (ms m^{-1})	SOC (%)	Available N (Kg/ha)	Available P (Kg/ha)	Available K (Kg/ha)
1	8.92	99.7	0.23	106.476	8.24	275.52
2	9.91	94.4	0.32	103.674	5.49	318.08
3	9.78	26.1	0.33	92.466	8.42	393.12
4	9.2	142.9	0.17	92.466	5.86	263.20
5	8.94	91.9	0.23	64.446	5.31	286.72
6	9.22	67.2	0.28	42.03	5.31	202.72
7	9.45	252	0.41	64.446	7.87	159.04
8	9.18	91.8	0.28	89.664	6.04	189.28
9	9.06	136.7	0.18	61.644	5.68	210.56
10	9.08	134.5	0.25	70.05	5.86	331.52
Mean	**9.27**	**113.72**	**0.27**	**78.74**	**6.41**	**262.98**

Soil samples were analyzed at 19^0C laboratory temperature. Based on the analysis of 10 soil samples, it was observed that the soil was mostly alkaline in reaction with pH more than 8.9 and mean pH 9.27. The salinity was detected to be very high. The soil was low in organic carbon status, having as low as 0.17%. However, the mean soil organic carbon content was very low (0.27%), with as low as 0.17% in many places. . Plant-available nitrogen and phosphorus in the analyzed soil samples were also very low (78 and 6.41 kg ha^{-1}). However, in some soils, plant available potassium content was detected to be higher, possibly due to seawater intrusion. To improve the soil status, strategic grassland development could be a viable option.

Recommendation

1. **Area cleaning work**

For the removal of *Prosopis juliflora* **(**Gando baval), cleaning of bushes should be done at least two consecutive years so that small regenerating bushes should also get removed.

2. **Site protection:** Fencing either using barbed wire, trenches or bio**-f**ence 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.

- 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.

3. **Choice of species:** selected **s**pecies should be suitable for climatic and edaphic conditions. Moreover, they should be fast-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:

Suitable Grass Species		
	Botanical Name	**Common Name**
1.	*Cenchrus ciliaris*	Anjan (H) Buffel Grass (E)
2.	*Cenchrus setigerus*	Dhaman (H) Bird Wood Grass (E)
3.	*Dichanthiium annulatum*	Chhijhavo (G) Marvel Grass (E)
4.	*Lasiurus sindicus*	Sewan Grass (H)
5.	*Brachiaria mutica*	Para Grass (E) Buffalo Grass (E)
6.	*Megathyrus maximus*	Guinea Grass (E)
7.	*Chloris guyana*	Rhodes Grass (E)
8.	*Bothriochloa pertusa*	Fulkara (H) Forest blue Grass (E)
Suitable legume Species		
9.	*Desmanthus virgatus*	Dashrath Ghas (H) Hedge lucerne
10.	*Atylosia scarabaeoides*	Bankulthi (H)
11.	*Lablab purpureus*	Dolichos (E) Lablab Bean (E) Sem (H)
12.	*Macroptillium atropurpureum*	Siratro (E)

❖ **Please see Annexure I for detailed field operations**

4. **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 kg/ha. Sowing of grasses and legumes is carried out during the month of July.

4.1 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.

Establishment of Nursery

- 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 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.
- 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.

4.2 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.

The nursery beds should be watered copiously before pulling out the seedlings. The seedlings should be pulled out with ease and without damage to their root systems. Timely planting is necessary for good growth and yield. Two seedlings are transplanted per hull at a distance of 50 x 30cm between rows and plants respectively. The soil, around the seedlings should be pressed gently to remove the air.

5. **Combining grasses and legumes:** mixed sowing of grasse*s* 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.

6. Fertilizer application: Initially for grasses and legumes, fertilizers like nitrogen, phosphorus and potassium are applied for ensuring high biomass production. Pelleting 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.

7. 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.

8. 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 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

season. The frequency of cutting should be species-specific and should be decided based upon species growth, regeneration capacity.

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, reseeding of forage legumes should be done as its population declines with age. In case of grasses, reseeding is to be carried out after 7-8 years due to decline in their production.

9. 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.

Suitable Fodder Tree Species

Botanical Name	Common Name
Acacia nilotica	*Desi Babul*
Ailanthus excelsa	*Ardu*
Azadirachta indica	*Neem*
Leucaena leucocephala	Subabul
Harwickia binata	Anjan
Prosopis cineraria	Khejri
Zizyphus numularia	Indian jujube

- Team visited the BN hybrid field where it was suggested to incorporate the Leucern (Rijka) crop in inter spaces to ensure effective utilization of space and soil fertility in long term.


- Another suggestion for propagation BN hybrid instead of stem cuttings, rooted slips may be utilized by the farmers.

Conclusion

APSEZ already executing the work sincerely there. The site can be developed as grassland using the recommendation made through this report. In the recommendation part suggestions like the timing of the field operation, preparation of grass nursery, use of rooted slips, using good quality of seeds have been incorporated for successful implementation of the project.

Acknowledgement

The team acknowldege Dr Avijit Ghosh, Incharge GSM Ecology Lab, ICAR-IGFRI, Jhansi for soil sample analysis.

ANNEXURE I

	Seed Rate (kg ha^{-1}) and Spacing (cm)	Fertilizer (kg ha^{-1})	Management
Grasses			
Anjan Ghaas	4- 5 kg ha^{-1}& 30-50 cm	N-P-K 40-20-0	In the first year of establishment, only one cut is to be taken in mid-October. From first year onward grass gives 3-4 cuts And legume 2-3 cut.
Dhaman	7-8 kg ha^{-1}& 30-50 cm	N-P-K 30-30-0	
Chhijhavo	4-6 kg ha^{-1} & 30-50 cm	N-P-K 20-20-0 100 Kg Calcium Ammonium Nitrate	
Sewan Grass	5-7 kg ha^{-1} & 30-50 cm	20 kg P at the time sowing 20 kg N ha^{-1} at 30-40 DAS	
Para Grass	4-5 kg ha^{-1} & 30-50 cm	5 tonnes FYM as Basal Dose 90 kg ha-1 through Ammonium sulphate	
Guinea Grass	3-5 kg ha^{-1} & 50-100 cm	30 kg P as basal dose 50-60 kg N per ha in two doses after each cut	
Rhodes Grass	4-5 kg ha^{-1} & 30-50 cm	30 kg P as basal dose 20 kg N per ha as top dressing	
Fulkara	4-5 kg ha^{-1} & 30-50 cm	N-P-K 120-60-0	
Legume			
Dashrath Ghas	**2-3** kg ha^{-1} & 30-50 cm	N-P-K 15-30-0	
Bankulthi	10 kg as monocrop For Grass legume mixture : 6 kg per ha^{-1}	N-P-K 10 – 30 -0	
Lablab Bean	20-30 kg ha^{-1} & 100 cm	N-P-K 15 – 45 -20	
Siratro	12 kg as monocrop For Grass legume mixture : 6 kg per ha^{-1}	N-P-K 10 – 30 -0	

- **It is essential to mix 6-10 ton per ha Farmyard Manure before sowing.**

ICAR-IGFRI Consultancy Team

	Designation	Role in the Project	Signature
Amit K Singh	Scientist Grassland and Silvipasture Management (GSM) Division	PI	
RV Kumar	Principal Scientist & Ex-Head Grassland and Silvipasture Management (GSM) Division	Co-PI	
Sunil Kumar	Principal Scientist Grassland and Silvipasture Management (GSM) Division	Co-PI	
AK Roy	Principal Scientist & Ex-Project Coordinator; All India Coordinated Research Project Forage Crops	Co-PI	
Amaresh Chandra	Director ICAR-Indian Grassland and Fodder Research Institute. Jhansi	Co-PI	

Annexure - 16

GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

ICAR-INDIAN GRASSLAND AND FODDER RESEARCH INSTITUTE, RECOMMENDATION COMPLIANCE

Site Visit Date: 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

<table>
<tr><th>Sr. No.</th><th>IFGRI Recommendation</th><th>Compliance as on 30.09.2023</th></tr>
<tr><td>1.</td><td>Area cleaning work:
For the removal of Prosopis juliflora (Gando baval), cleaning of bushes should be done at least two consecutive years so that small regenerating bushes should also get removed.</td><td>Partially Complied.

Phase wise removal of Prosopis juliflora (Gando Baval) and bushes has been done from 10 acre area for grass land development. Project progress report is attached as Annexure – a.</td></tr>
<tr><td>2.</td><td>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 7 establishment of the site. Initial protection from grasslands and pastures ensure better establishment and higher biomass production.
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.</td><td>Partially Complied.

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 is attached as Annexure – a).

And Bio fence work with bamboo or other relevant species will be done phase wise.</td></tr>
<tr><td>3.</td><td>Choice of species:
Selected species should be suitable for climatic and edaphic conditions. Moreover, they should be fast-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:

<table><tr><th colspan="3">Suitable Grass Species</th></tr><tr><th>Sr. No.</th><th>Botanical Name</th><th>Common Name</th></tr></table></td><td>Partially Complied.

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.</td></tr>
</table>

	1.	*Cenchrus ciliaris*	Anjan (H) Buffel Grass (E)	• Per acre 3 to 4 tons organic manure in fodder development plot. • Liquid fertilizer – Jivamrut & Gaukrupa Amrutam • Per acre 200 to 300 liters
	2.	*Cenchrus setigerus*	Dhaman (H) Bird Wood Grass (E)	
	3.	*Dichanthiium annulatum*	Chhijhavo (G) Marvel Grass (E)	
	4.	*Lasiurus sindicus*	Sewan Grass (H)	
	5.	*Brachiaria mutica*	Para Grass (E) Buffalo Grass (E)	
	6.	*Megathyrus maximus*	Guinea Grass (E)	
	7.	*Chloris guyana*	Rhodes Grass (E)	
	8.	*Bothriochloa pertusa*	Fulkara (H) Forest blue Grass (E)	
	Suitable legume Species			
	9.	*Desmanthus virgatus*	Dashrath Ghas (H) Hedge lucerne	
	10.	*Atylosia scarabaeoides*	Bankulthi (H)	
	11.	*Lablab purpureus*	Dolichos (E) Lablab Bean (E) Sem (H)	
	12.	*Macroptillium atropurpureum*	Siratro (E)	
4.	**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 kg/ha. Sowing of grasses and legumes is carried out during the month of July. **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		For fodder support to village cattle's the Sorghgam (Jwar) is being showing in 5 acre area out of 10 acre area (1st phase developing area). Project progress report is attached as **Annexure – a.** Nursery & other development work is under discussion with Adani foundation & Sarpanch of PRI- Zarapara with PRI-Member and will be done after budget approval.

	seedlings/rooted slips are the only alternate source for establishing the pasture these seeding are raised in nursery. **Establishment of Nursery:** • 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 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. • 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. **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.	
5.	**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.	Point noted & will be complied. This activity is under discussion with Adani foundation & Sarpanch of PRI- Zarapara with PRI-Member and will be done after budget approval.
6.	**Fertilizer application:** Initially for grasses and legumes, fertilizers like nitrogen, phosphorus and potassium are applied for ensuring high biomass production. Pelleting 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.	In first phase 10 acre area is being developing for grass land. The Sorghgam (Jwar) is being growing in 5 acre area out of 10 acre area (1st phase developing area) for fodder support and bio fertilizer (Cow Dung) is being using for growing the fodder.
7.	**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.	Point noted and is being complied. Weeding activity is being done in 1st phase developing area (10 acre).
8.	**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 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. 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, reseeding of	Point noted & will be complied. Presently 10 acre area is being developing for grass land. The Sorghgam (Jwar) is being growing in 5 acre area out of 10 acre area (1st phase developing area) for fodder support and with using Organic Manure/Bio-fertilizer is being using for growing the fodder. • Per acre 3 to 4 tons organic manure in fodder development plot. • Liquid fertilizer – Jivamrut & Gaukrupa Amrutam • Per acre 200 to 300 liters

<table>
<tr><td></td><td>forage legumes should be done as its population declines with age. In case of grasses, reseeding is to be carried out after 7-8 years due to decline in their production.</td><td></td></tr>
<tr><td>9.</td><td>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.

Suitable Fodder Tree Species

<table>
<tr><th>Botanical Name</th><th>Common Name</th></tr>
<tr><td>Acacia nilotica</td><td>Desi Babul</td></tr>
<tr><td>Ailanthus excelsa</td><td>Ardu</td></tr>
<tr><td>Azadirachta indica</td><td>Neem</td></tr>
<tr><td>Leucaena leucocephala</td><td>Subabul</td></tr>
<tr><td>Harwickia binata</td><td>Anjan</td></tr>
<tr><td>Prosopis cineraria</td><td>Khejri</td></tr>
<tr><td>Zizyphus numularia</td><td>Indian jujube</td></tr>
</table>
</td><td>Point noted & will be complied.

This activity is under discussion with Adani foundation & Sarpanch of PRI- Zarapara with PRI-Member and will be done after budget approval.</td></tr>
</table>

PHOTOGRAPHS OF SITE PROTECTION

Cattle-proof trench

Barbed Wire Fencing

PHOTOGRAPHS OF GROWN FODDER SORGHGAM (JWAR)

GRASSLAND DEVELOPMENT PROJECT VILLAGE: ZARPARA, MUNDRA (KUTCH)

PHOTOGRAPHS OF ORGANIC MANURE

ANNEXURE - a

Fodder Plot Development

Village :- Zarapara

Taluka :- Mundra

Dist. :- Kutch

Fodder plot Development

Village : Zarapara Taluka : Mundra Dist :- Kutch

Total Land : 10 Acre

Fodder Plot Development

- Planning of fodder plot development.
- Meeting with PRI
- PRI latter
- Proposal
- Plan & Estimate
- Permission & Budget plan
- Work process

Fodder plot Shubharambh

Presence Sarpanch of PRI-Zarapara Mr. Khimjibhai & PRI Members & Villagers

Step of Fodder plot Developing

- Fodder Plot Marking

Plowing 10 Acre land

Land leveling

- Land Leveling for better crop.

Rotavator soil preparation

- 10 acre land

Digging for protection wall


Protection wall 10 acre land.

Organic Manure

Green Manure by Tractor

NB-21 Grass

Organic Manure in proper line

- Per acre 3 to 4 tons organic manure in fodder development plot.
- Liquid fertilizer – Jivamrut & Gaukrupa Amrutam
- Per acre 200 to 300 liters

Organic Manure in proper sowing line.

NB-21 variety of fodder (Super Napier)

Cutting for Sowing

- NB-21 Grass cutting
- Require per acre : 750 kg.
- 18 to 20 Man (40 Kg.) per acre.

Sowing NB-21 Grass



First Irrigation to NB- 21 Grass

FP-Visit with village people

NB-21 Grass sowing process

Discussion with PRI members & Gau sameeti for planning.

NB-21 Grass

Ma Sonal SmrutiVan- In Fodder Plot -551 Plants.

Annexure – 17

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 & Magnitude1	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	It is predicted that the built up land in the rural areas would increase by an order 50% from the baseline 2015. New settlements near the SEZ area might create slums. Unorganized urban development leading to poor sanitation and proliferation	Level - 1	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.	The existing townships will be expanded to accommodate about 4 lakh people when the APSEZ is fully developed.	APSEZ	As and when Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2032 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 92.57% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ. At present 71 nos. of industries (processing & non-processing) are present within the SEZ (54 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. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities. The existing social infrastructure facilities are adequate for present development at APSEZ. The existing townships with associated facilities will be

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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, ASPEZ 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			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 is attached as **Annexure-18.** During compliance period FY 2023-24 till Sep'23, 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 de-silting activities in the natural steams 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			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 3890 ha. area across the coast of Gujarat till date. Total expenditure for the same till date is INR 1070.8 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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 eco-system.		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				INR 3.15 Cr. 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. Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is **502 Ha** between 2011 and 2019. 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. As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities. **Sr. No.** / **Recommendations** / **Compliance**

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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.	Mangrove mapping and monitoring in and around APSEZ	• 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
									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 (attached as **Annexure-1**), 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
									total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021. • 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. **Summary of Mangrove mapping and monitoring (from 2011 to 2021):**

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th colspan="3">Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<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>%</th></tr>
<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</td><td>2670</td><td>74</td><td>2.85%</td></tr>
<tr><td>2019 to 2021 till March</td><td>2723</td><td>53</td><td>1.99%</td></tr>
<tr><td>Total</td><td>2723</td><td>629</td><td>28 %</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2.</td><td>Tidal observation in creeks in and around APSEZ</td><td>• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
									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	• 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 INR 2.35 Lacs during the FY 2022-23. The details of Removal of Algal and Prosopis growth from mangrove areas was submitted during the last compliance period Oct'22 to Mar'23.
							4.	Awareness of mangroves importance in	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
								surrounding communities	the community regarding importance of mangroves. Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 32372 Cattels / 2707 farmers and hence enhancing cattle productivity during FY 2023-24 till Sep'23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 90.20 Lacs during FY 2023-24 till Sep'23, 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 is attached as **Annexure - 2.** • Refer CSR report attached as **Annexure – 3**. 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 will be paid by APSEZ. 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 is attached as **Annexure-1.** 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 2594 Ha in year 2019. Now, according to GUIDE Mangrove monitoring study report November 2023 (attached as **Annexure-1**), 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. 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%). 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-

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 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, 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.
1.4	Development activities along the coast might cause certain changes in hydro-dynamic characteristics along the		Detailed hydro-dynamic modelling and shoreline change prediction for a fully developed APSEZ facility has	It is recommended to map the coastal morphology (Shoreline) at least once in three years	APSEZ	Continual Process	Shore line change aspect has been studied in detail as part of following two studies; • 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. 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		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 ± 0.5 m/year. which reconfirms that the waterfront development activities of APSEZ would pose insignificant impact on the Mundra 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. Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years. 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 is INR 17.39 Lacs. The said study is under progress. 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 is INR 17.39 Lacs. 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. 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

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>initiation of the activities (September 2015) for short-term variation for the year 2015-2022 using EPR method has been carried out.

The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarized in below table.

<table>
<tr><td>Period</td><td>Name of the block</td><td>Average Shoreline Change(M/Year)</td><td>Shoreline</td></tr>
<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>
</table>

The Shoreline Change Assessment Study report of GUIDE was submitted during the last compliance period Oct'22 to Mar'23.

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.

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</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							2018. AMBUR Methodology was used to study the historical analysis. 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. 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. 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.
2	**Regional Traffic Management Plan**						
2.1	The projected traffic data as per the EIA Report of Multi-Product Special	Level-1	As per the master plan of APSEZ, eight artillery roads will be connected to either state highway or	Additional road as per master plan will be built in future based on the overall progress of the project. Currently about	APSEZ	As and When Required	Presently, ~ 51.7 % of the total SEZ is developed. Based on technical studies, 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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. There could be a possible increase in traffic congestions		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 APSEZ is estimated to be about 16,000 PCU/hr as	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.			considering future development. 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	on village-highway intersections and road accidents.		against the envisaged peak traffic volume of 4,500 PCU/hr. Out of eight artillery roads considered in APSEZ master plan, seven roads were already developed and functional.				
			APSEZ has been imparting Driver Training Programs to all their contractors to enhance awareness	APSEZ can undertake technical feasibility of implementing Intelligent Transport System (ITS) for the freight carriers	APSEZ & GSRDC*	Long Term	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: ✓ Basic induction Training for drivers ✓ ITV Driver Training ✓ ITV Driver Induction for Supervisor ✓ Defensive Driving for LMV & HMV ✓ Defensive Driving & BBS

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			on road safety.	associated with their development activities.			✓ 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 Approx. 3020 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period Apr'23 to Sep'23. The same will be continued in future also. APSEZ has also implemented the Remote traffic management system (RTMS) to manage the traffic movements and capturing the violations to further improve the system. Following steps were taken by APSEZ to reduce the accidents. ✓ 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							✓ 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 doziness 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. ✓ 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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.
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 m3/day (430 MLD). APSEZ will be sourcing majority of the water from the captive desalination plants, which will be	No-Impact	APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site. Necessary water allocation from concerned authorities was obtained and	As per the master plan and permissions granted under EC, APSEZ will be developing progressively 4,50,000 m3/day (450 MLD) of desalination plants to meet the future demand. Hence stress on regional water resources due to these developmental projects will be less significant.	APSEZ	As and When Required	Presently there are two fresh water sources available with APSEZ. **Desalination Plant** – 47 MLD **Narmada water through GWIL** – 9 MLD (sanctioned capacity). Current water demand for APSEZ along with SEZ industries including Adani Power Plant is an avg. of 23.07 MLD. So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ including member units. The desalination plant of additional capacities will be installed on modular basis considering future requirement of APSEZ.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	developed in progressive manner.		the same will be renewed from time to time as per the directions of state government.				
3.2	Existing water demand in the Mundra taluk is estimated as 8500 m3/day (@55 lpcd) and the potable and sanitation water needs would increase to 37,000 m3/day (@125 lpcd) in future when	Level-2	Adani Foundation has been contributing to various watershed development projects in the Mundra region to enhance ground water resources in the area. Adani Foundation has contributed about Rs.	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 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. 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.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td>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 largely depending on the ground water in the study area. Mundra block is</td><td></td><td>300 Lakhs so far for the development of 18 check dams.</td><td></td><td></td><td></td><td>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.

<u>WORK COMPLETED:</u>

Below tabulated Water Conservation Projects completed during Compliance period:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<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 Check</td><td>1</td><td>prevent water runoff into seaside.</td><td>35 farmer's 120+Acre Area of Agri</td></tr>
</table></td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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.						damat Bhujpur | | | land can be Irrigated **Earlier Completed Activities/Projects:** • 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 Rain Water Harvesting 145 Nos. (40 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Bore well 208 Nos which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1506 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 bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • Pond Pipe line work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. 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. Adani foundation has spent approx. INR 7949.35 lakhs from April – 2018 to September– 2023 for CSR activities which also includes water conservation projects as mentioned above.
3.3	It is estimated that about 60,000 m3/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 induvial member units. Out of 54, 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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.			as per specific permission granted by SPCB. APSEZ also granted permission to treat 2.5 MLD of sewage generated from Mundra village through CETP and STP. Presently avg. 2.29 MLD of wastewater (in to ETP, STPs & CETP) is treated and being utilized on land for horticulture purpose within APSEZ premises during Apr'23 to Sep'23. Existing wastewater treatment plants are adequate to treat and handle the total effluent / sewage load considering current development. Existing wastewater treatment facilities will be augmented, or new plants will be developed on modular basis considering future requirement.
4	**Air quality management Plan**						
4.1	Although all the regulated activities in the study area will be adopting promulgated emission norms, total air emission	Level-2	APSEZ and other thermal power plants have obtained valid consent to operate and have been operating	All existing and new industrial establishments will obtain requisite consents from GPCB and adhere to the stipulated emission norms regulations and guidelines issued	APSEZ And Other Industries	Continual Process	APSEZ has been granted requisite permissions from the concerned authorities with stipulated norms for air emission (flue gas as well as ambient air). 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 to the concerned authorities on regular basis.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td>mass discharge from the study area would increase.</td><td></td><td>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 the thermal</td><td>by authorities from time to time.</td><td></td><td></td><td>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.

The AAQM summary for last six months (Apr'23 to Sep'23) are as below.

Locations: 16 Nos. (APSEZ – 13 + APL – 3 including 4 villages)
Frequency: Twice in a week
<table>
<tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th><th>Perm. Limit$</th></tr>
<tr><td>PM_{10}</td><td>µg/m³</td><td>31.53</td><td>89.85</td><td>71.64</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>µg/m³</td><td>11.14</td><td>49.84</td><td>29.64</td><td>60</td></tr>
<tr><td>SO_2</td><td>µg/m³</td><td>5.15</td><td>42.18</td><td>20.12</td><td>80</td></tr>
<tr><td>NO_2</td><td>µg/m³</td><td>7.23</td><td>48.83</td><td>24.61</td><td>80</td></tr>
</table>
$ as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Approx. INR 5.08 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24 till Sep'23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.

Other industries located within the SEZ have obtained</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			power plants located within the study area have installed continuous emission and air quality monitoring instruments as per CPCB directive.				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 August to September, 2023 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. 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.
				A common air quality management committee may be framed under the guidance of the State Pollution Control Board and district	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: • Identification of sources of air & noise emission and its dispersion in surrounding villages

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
				administration to manage regional level emission inventory data that can help to manage regional level air quality management goals.			• 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. Last committee meeting was conducted on dated 10/10/2023 and below was the point of discussion for way forward. • 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 & Magnitude1	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
							• 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. 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.
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	Following safeguard measures are taken by APSEZ for abatement of dust emissions. • 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,

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td>PM2.5 concentration in the background air. This could pose some health impacts such as asthma and COPD etc. among the local communities.</td><td></td><td>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,</td><td>Pollution Control Board from time to time.</td><td></td><td></td><td>transfer towers and conveyor belts
• 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

Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions are implemented within the thermal power plant.

The stack monitoring summary for last six months (Apr'23 to Sep'23) are as below.

Total Nos. of Stacks: 23 Nos.
Frequency: Monthly / Half Yearly
<table>
<tr><th>Parameter</th><th>Unit</th><th>GPCB Limit</th><th>Min</th><th>Max</th><th>Avrg.</th></tr>
<tr><td>PM</td><td>mg/ Nm^3</td><td>150</td><td>15.26</td><td>28.53</td><td>21.27</td></tr>
<tr><td>SO_2</td><td>Ppm</td><td>100</td><td>5.79</td><td>17.65</td><td>8.96</td></tr>
</table>
</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			covered conveyor belts, regular sprinkling on coal heaps,				<table><tr><td>NO_x</td><td>ppm</td><td>50</td><td>16.26</td><td>36.41</td><td>22.82</td></tr></table> Values recorded confirms to the stipulated standards. Approx. INR 5.08 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24 till Sep'23, which also includes ambient air quality monitoring for overall APSEZ, Mundra. 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.
			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 co-ordinate the approach to coal dust management and	APSEZ and Other Industries, Concerned Stake holders, District Administration*	Long Term	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. The dry cargo is being handled by mechanized system and transported by covered conveyer system, trucks and rail wagons. Wind breaking wall is provided around the coal storage yards of APSEZ as well as Adani Power Plant. Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			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	monitoring			provisions within the thermal power plant for proper dispersion of pollutants. 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. Last committee meeting was conducted on dated 10/10/2023 and below were the points of discussion for way forward. • 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			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.				• 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	Ships are one of the significant sources of SO2 and NOX emissions in the study area. Marine diesel	Level-2	A Standard Operating Procedure (SOP) has be developed to be included	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	APSEZ and Ship Owners	Long Term	The ships coming to the APSEZ is complying with MARPOL and other shipping rules and regulations. 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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		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.			

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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)6 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
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	APSEZ, has procured 217 nos. of Electrical Vehicle for internal cargo movement and 183 nos. E-ITV's are in operation. As well as procured 10 nos. LMV E-Vehicles for manpower movement and all are in operation. Electrification of Rail Corridor from Dhrub Railway Station to Adipur Railway Station has completed and movement started by electric locomotive. It will to reduce the gaseous emission and increase efficiency of transportation by rail.
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	Below Safeguard measures are already taken for abatement of noise emissions. • 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.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td>5.1</td><td>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.</td><td>Level-1</td><td>, 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</td><td>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.</td><td></td><td></td><td>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.

The noise monitoring summary for last six months (Apr'23 to Sep'23) are as below.

Locations: 13 Nos.
Frequency: Once in a month (24 hourly)
<table>
<tr><th>Noise</th><th>Unit</th><th>Leq Min</th><th>Leq Maxn</th><th>Leq Avr.</th><th>Leq Perm. Limit[$]</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>54.9</td><td>69.9</td><td>64.6</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>53.1</td><td>64.8</td><td>59.6</td><td>70</td></tr>
</table>
[$] as per GPCB standards

Approx. INR 5.08 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24 till Sep'23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.

All the results are well within the standards. From this it can be inferred that there no impacts on the</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			were found to be well within the designated noise standards for Industrial facilities.				surrounding community. 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. Further, till date APSEZ has not received any grievances/notice for noise issues from any of the stakeholders.
				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	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. Last committee meeting was conducted on dated 10/10/2023 and below were the point of discussion for way forward. • 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
				zones.			• 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. No grievance received for noise related issues, and it is observed that ambient noise level are well within the permissible standards.
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	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. Currently, CETP receives 978.92 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. Out of 54 only 4 industries within SEZ are sending their

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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.			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. The capacities of CETP will be enhanced on modular basis as per future requirement. Presently avg. 2.29 MLD (from CETP, ETP & STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period Apr'23 to Sep'23 and no discharge is made to any other source.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			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	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. Presently entire quantity of treated water from CETP is used for gardening / horticulture purpose within APSEZ premises.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>bodies as on date..</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>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</td><td>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</td><td>APSEZ</td><td>Continual</td><td>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.

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.

The marine water quality monitoring summary for last six months (Apr'23 to Sep'23) is as per below.

Locations: 14 Nos. (APSEZ – 9 + APL – 5)
Frequency: Once in a Month / Half Yearly
<table>
<tr><th>TEST PARAMETERS</th><th>UNIT</th><th colspan="3">Cumulative Surface</th><th colspan="3">Cumulative Bottom</th></tr>
<tr><th></th><th></th><th>Min</th><th>Max</th><th>Average</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>pH</td><td>--</td><td>7.8</td><td>8.27</td><td>8.04</td><td>7.7</td><td>8.15</td><td>7.95</td></tr>
<tr><td>BOD</td><td>mg/L</td><td>2.2</td><td>3.8</td><td>2.98</td><td>3.</td><td>4.2</td><td>3.68</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td>storm water-drains.</td><td></td><td></td><td>
<table>
<tr><td>TSS</td><td>mg/L</td><td>62.</td><td>154.</td><td>98.93</td><td>72.</td><td>128.</td><td>93.82</td></tr>
<tr><td>DO</td><td>mg/L</td><td>4.2</td><td>6.37</td><td>5.8</td><td>3.8</td><td>6.22</td><td>5.53</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>34.89</td><td>36.94</td><td>36.16</td><td>35.62</td><td>37.84</td><td>36.69</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>35860</td><td>37844</td><td>36675</td><td>36540</td><td>38124</td><td>37299</td></tr>
<tr><td>Temperature</td><td>oC</td><td>29.8</td><td>30.3</td><td>30.055</td><td>28.8</td><td>30.2</td><td>29.</td></tr>
</table>
BDL – Below Detection Limit
MDL – Minimum Detection Limit

Approx. INR 5.08 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24 till Sep'23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</td></tr>
<tr><td></td><td></td><td></td><td>Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil disposal practices,</td><td>Good dredging practices shall be adopted by APSEZ:
(i).Improving the dredging accuracy
(ii).Improving onboard automation and monitoring, (iii). Reduce spill and</td><td>APSEZ</td><td>Long Term</td><td>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.

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.

Marine monitoring is being carried out once in a month</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			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	loss, (iv). 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			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. The same practice will be continued in future also as per direction by MoEF&CC as well as GPCB. Monitoring will be focused near ecological sensitive area in case of need to carryout capital dragging near such areas.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			basis.	the directions 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	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 m3/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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	Mundra 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	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	APSEZ will co-operate and comply with the directions from concerned regulatory authorities. APSEZ does not draw any ground water for the fresh water requirement. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. 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. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>disturbed.
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</td><td></td><td></td><td></td><td>project “Sanrakshan” in coordination with GUIDE and Sahjeevan.
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.

<u>WORK COMPLETED:</u>

Below tabulated Water Conservation Projects completed during Compliance period:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<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</td><td>1</td><td>prevent water runoff into seaside.</td><td>35 farmer’s 120+Acre Area of Agri</td></tr>
</table>
</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			Mundra and 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><tr><td></td><td>Checkdamat Bhujpur</td><td></td><td></td><td>land can be Irrigated</td></tr></table> **Earlier Completed Activities/Projects:** • 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 Rain Water Harvesting 145 Nos. (40 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Bore well 208 Nos which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1506 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 bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year.Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. 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. 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.
				While the individual			APSEZ (9 Locations – half yearly) & Adani Power Ltd. (5 Locations – quarterly) is carrying out ground water

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td>industries in the study area will continue to undertake ground water quality monitoring as per the environmental clearances issued for the respective projects, a regional level ground water conservation action committee can be formed under the guidance of state ground water board and district Administration.</td><td>All Concerned Stakeholders, District Administration and CGWB*</td><td>Continual Process</td><td>sampling and reports of the same are being submitted to the regulatory authorities on regular basis.

The summary of APSEZ ground water quality monitoring for last six months (Apr'23 to Sep'23) are as below.
Nos. of Location: 09

<table>
<tr><th>Parameters</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>pH @ 25 ° C</td><td>--</td><td>7.11</td><td>8.49</td><td>7.91</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>0.37</td><td>21.11</td><td>5.20</td></tr>
<tr><td>Oil & Grease</td><td>mg/L</td><td>BDL(MDL:2.0)</td><td>BDL(MDL:2.0)</td><td>BDL(MDL: 2.0)</td></tr>
<tr><td>Hydrocarbon</td><td>mg/L</td><td>Not Detected</td><td>Not Detected</td><td>Not Detected</td></tr>
<tr><td>Lead as Pb</td><td>mg/L</td><td>BDL(MDL:0.01)</td><td>BDL(MDL:0.01)</td><td>BDL(MDL: 0.01)</td></tr>
<tr><td>Arsenic as As</td><td>mg/L</td><td>BDL(MDL:0.01)</td><td>BDL(MDL:0.01)</td><td>BDL(MDL: 0.01)</td></tr>
<tr><td>Nickel as Ni</td><td>mg/L</td><td>0.03</td><td>0.78</td><td>0.20</td></tr>
<tr><td>Total Chromium as Cr</td><td>mg/L</td><td>0.17</td><td>0.17</td><td>0.17</td></tr>
<tr><td>Cadmium as Cd</td><td>mg/L</td><td>0.01</td><td>0.45</td><td>0.11</td></tr>
<tr><td>Mercury as Hg</td><td>mg/L</td><td>BDL(MDL:0.001)</td><td>BDL(MDL:0.001)</td><td>BDL(MDL: 0.001)</td></tr>
<tr><td>Zinc as Zn</td><td>mg/L</td><td>0.06</td><td>0.26</td><td>0.12</td></tr>
<tr><td>Copper as Cu</td><td>mg/L</td><td>0.10</td><td>0.10</td><td>0.10</td></tr>
<tr><td>Iron as Fe</td><td>mg/L</td><td>0.15</td><td>1.26</td><td>0.48</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Insecticides/ Pesticides</td><td>µg/L</td><td>Absent</td><td>Absent</td><td>Absent</td></tr>
<tr><td>Depth of Water Level from Ground Level</td><td>meter</td><td>1.90</td><td>2.20</td><td>2.09</td></tr>
</table>
BDL – Below Detection Limit
MDL – Minimum Detection Limit

Approx. INR 5.08 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24 till Sep'23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.

The freshwater requirement of all the industries within SEZ is being satisfied through APSEZ. All the industries are encouraged to monitor ground water quality as per the permissions granted by competent authorities.

As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited and other member units, having role and responsibilities as defined above.

APSEZ will co-operate and comply with the directions from concerned regulatory authorities for ground water management.</td></tr>
<tr><td>8</td><td colspan="6">Waste Management</td><td></td></tr>
<tr><td></td><td>Solid waste</td><td></td><td>APSEZ has</td><td>APSEZ will</td><td></td><td></td><td>Presently APSEZ has implemented Zero waste</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
8.1	will be generated from industrial 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	Level-2	been adopting Zero waste Initiatives 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.	continue to adopt Zero Waste Initiative and wastes will 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.	APSEZ	Continual Process	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 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. APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUVRheinland 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	organized source segregation programs and material recycling strategies and infrastructure facilities, these wastes will enter into environment and would pose long term health impacts.						APSEZ is being done proper solid waste management in his operational area with 5R principle as per Waste Management Plan.
8.2	Considering an average solid waste generation of 0.25 Kg/person/day, the estimated	Level-2	APSEZ has made a provision for central waste management facilities within the existing site based on the	The existing waste segregation and material recycling facilities will be augmented to dispose safely the wastes generated from	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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	solid waste from facilities within APSEZ will be in the order of 100 TPD (36,500 TPA).		future needs. As part of the Zero Waste Initiatives, no landfill facilities will be installed at APSEZ.	APSEZ areas. Solid Waste Management Program shall be 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	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	

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			and non-recyclable waste shall be disposed 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 -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	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	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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	level of changes in the biodiversity in the study area.		the shrub forests that are applied for land 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	afforestation program through a scientific manner, the 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.			

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			designated forest land parcel. Hence there 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	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	Mangrove footprint and health status shall be monitored annually	APSEZ	Continual Process	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. 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. Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is **502 Ha** between 2011 and 2019.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td>pose certain ecological risk.</td><td></td><td>2800 ha at various locations across the 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</td><td></td><td></td><td></td><td>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.

As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.

<table><tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr></table></td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
			region.				1.	Mangrove mapping and monitoring in and around APSEZ	• 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
									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 (attached as **Annexure-1**), 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
									total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021. • 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. **Summary of Mangrove mapping and monitoring (from 2011 to 2021):**

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th colspan="3">Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><th>Mangrove mapping Year</th><th>Mangrove cover total Area (Ha.)</th><th colspan="2">Mangrove cover area Increased</th></tr>
<tr><th></th><th></th><th>Hac.</th><th>%</th></tr>
<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</td><td>2670</td><td>74</td><td>2.85%</td></tr>
<tr><td>2019 to 2021 till March</td><td>2723</td><td>53</td><td>1.99%</td></tr>
<tr><td>Total</td><td>2723</td><td>629</td><td>28 %</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2.</td><td>Tidal observation in creeks in and around APSEZ</td><td>• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
									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	• 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 INR 2.35 Lacs during the FY 2022-23. The details of Removal of Algal and Prosopis growth from mangrove areas was submitted during the last compliance period Oct'22 to Mar'23.
							4.	Awareness of mangroves importance in	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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		
								surrounding communities	the community regarding importance of mangroves. Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 32372 Cattels / 2707 farmers and hence enhancing cattle productivity during FY 2023-24 till Sep'23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 90.20 Lacs during FY 2023-24 till Sep'23, 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 is attached as **Annexure - 2.** • Refer CSR report attached as **Annexure – 3**. 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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. 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 is attached as **Annexure-1.** 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 2594 Ha in year 2019. Now, according to GUIDE Mangrove monitoring study report November 2023 (attached as **Annexure-1**), 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. 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%). 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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 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, 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 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							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.
9.3	Outfall from the thermal power plants desalination and CETP would pose certain level of impact on the marine environment.	Level-1	A detailed marine hydro-dynamic and dispersion modelling of the study area indicates that the background temperature and salinity at mangrove conservation area will not increase from the prevailing background levels as the outfalls are	All approved marine outfalls shall be monitored for salinity, temperature and other designated parameters as per consent to establish issued by GPCB. Existing marine environmental monitoring program shall be continued.	APSEZ and Concerned Industry	Continual Process	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. 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 concerned authorities on regular basis. 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. The comparison of marine water results between CIA and current monitoring data are as below.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>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 environmental and ecological parameters.</td><td></td><td></td><td></td><td><table>
<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>
<tr><td>Temp.</td><td>^{0}C</td><td>30.3</td><td>30</td><td>28.8</td><td>30.30</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>37.8</td><td>36.6</td><td>34.9</td><td>35.2</td></tr>
</table>
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.</td></tr>
<tr><td>9.4</td><td>Terrestrial Ecology: Study area doesn't have any notified national parks or</td><td>Level-1</td><td>APSEZ has developed greenbelt in an area of 550ha as against the committed area of 430ha. A</td><td>The compensatory afforestation area to be monitored annually to check the survival rate of</td><td>APSEZ</td><td>Continual Process</td><td>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</td></tr>
</table>

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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.		dedicatenursery is set up to promote plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.	the plantation.			regular basis to check the survival rate of plantation. Total expenditures of the horticulture dept. of APSEZ during the FY 2023-24 till Sep'23 within APSEZ is INR 628 lakhs.
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).	Level-1	Dedicated townships are developed within APSEZ area with necessary community infrastructures such as hospital,	The existing townships will be expanded to accommodate about 4lakh people when the project activity is fully developed.	APSEZ	As and When Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2032 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 92.57% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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.		school, recreational facilities, sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the principal themes such as education, community health, sustainable livelihood and rural infrastructure. About Rs. 97 Cr has been spent on various CSR activities in the Mundra				At present 54 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. 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. • Multi-Specialty Hospital • School • Commercial complex • Religious place 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. • Community Health • Sustainability Livelihood – Fisher Folk • Education

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			region since 2010. Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.				• Rural Infrastructures Adani foundation has spent approx. INR 7949.35 lakhs from April – 2018 to September – 2023 for CSR activities which also includes cost of rural infrastructure projects. Major works carried out since April 2018 as a part of CSR activities are as below. **<u>Current FY 2023-24 infrastructure development activities:</u>** • 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. **<u>Last FY 2022-23 infrastructure development activities:</u>** • 40 RRWHS structure have been completed • 208 Bore-well recharging activity is completed.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• 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 & Dhrub 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. Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.
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	Level-2	Adani foundation is taking up several girl child education programs as part of CSR activities to	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	APSEZ, Other development projects and District Administration*	Long Term	Major works carried out since April 2018 as a part of CSR activities to create awareness about girl child protection are as below. • 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:**

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	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.		create awareness about girl child protection.	Social Responsibility programs in association with district authorities.			➢ 10499 nos. Students 69 Government primary school.. ➢ 999 nos. students of 8 High school. ➢ 250 nos. students of 2 Adani Evening Education Centre. ➢ 150 nos. students benefited through 5 Adani Competitive Coaching Centre. ➢ 150 nos. students benefited through 5 Adani English Coaching Centre. ➢ 3000 nos. students benefitted through 2 IT On Wheels. • Uthhan Project promotes girl child education, creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samriddhi 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."

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• 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. • 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. ✓ 204 beneficiaries covered in Breastfeeding Week ✓ 320 beneficiaries covered in National Deworming Day

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							✓ 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 dignitiaries remained present and appreciated the efforts to overcome malnourishment in Mundra and Bitta. • 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.

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							About INR 7949.35 lakhs has been spent on various CSR activities in the Mundra region since April 2018 to till September 2023 including cost of community health and education for woman and girl child.
10.4	Due to economic growth leading to rapid urbanization, which prompts the 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	Level-2	Adani hospitals, Mundra is setup by Adani group near Samudra township with a goal to provide 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	APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the growth scenario at APSEZ development.	APSEZ	Long Term	Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township. Primary health center and community health center are in place within the Mundra taluka. Other than this Adani foundation is doing various activities as part of community health. The details of last year are as below. • Mobile Heath Care Units and Rural Clinics • 07 Rural Clinics • 06 villages of Mundra & 01 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 upto Sep 23: - 10629 (direct & indirect). • 2 financially challenged patients has been supported with Dialysis treatment at 58 Times which added day in their Life. **Health camp:** • Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
	developed scenario), total hospitals facilities with about 540 beds would be required.		ranging from wellness and preventative care.				other are conducted in core villages as well as in labour colonies. • Specialty health (Gynec, ophthalmic, specialty health camp): - 1489 Patients Benefited. • General health camp: - 1448Patients benefited. • Blood Donation Camp: 1558 people have donated blood. • Women's Health: Provided health services to more than 2230 women benefitted through gynec health checkup. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 58 Times which added day in their Life. • Medical Supports: 1007 beneficiary in 35 village. • Eradicate cataract-related vision for senior citizen: benefited 473 peoples of 9 villages. • **Ayushman card facilitation:** Ayushman card issued to 5584 for 25 village. • 1071 –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 16000 cattle benefitted. •

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• 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. APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the future development at APSEZ.
10.5	Due to rapid economic development in the region, several employment opportunities can be generated to the local people. When the area is fully developed by		APSEZ has been giving preferences to people from Gujarat for providing employment opportunities based on eligibility and skills. In Mundra, special programmes have been	APSEZ is committed to 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.	APSEZ	Short Term	**<u>Current FY 2023-24 fishermen livelihood activities development activities:</u>** • **Vehicle Transportation Facilities:** extend vehicle transportation services to school-going children from Luni and Randh Fishermen Settlements to the AVMB School, Bhadreshwar Similarly, we ensure for Juna Bandar Fisherfolk Students to the nearest Government School (Total 218 nos. students benefitted). • **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). • **Cement Roof Sheet Support:** fisherfolk Home were significantly damaged by the **Bipor Cyclone**. In response to that we provided 2696 cement sheets to

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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 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.		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 these centres, youth can join and get vocational training for a number of technical and non-technical skills.				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 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. • 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:**

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
			An industrial Training Institute is set up at APSEZ, Mundra, to enhance the skill levels of the local youth to maximum possible extent.				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." • During FY2023-24 till Sep'23 Approx. INR 51.75 lakh were spent for Fisherfolk Amenities work in different core areas • Till FY 2023-24 till Sep'23, Adani Foundation has done total expenditure of INR 1389.94 lakh for Fisherfolk Amenities work in different core areas. APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes: • 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

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	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
							• Sughad Yojana • Machhimar Akshay kiran Yojana • Machhimar Suraksha Yojana • Machhimar Ajivika Uparjan Yojana • Bandar Svachhata Yojana 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", Till, FY 2023-24 (Sep'23) approx. 13.90 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 – 14**.

Annexure - 18

UniStar
Environment and Research Labs Pvt. Ltd.

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

TEST REPORT

Report No.	**URC /23/07/Water/APL-0001**		
Name & Address of Customer	**M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port)** PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.	Date of Report	**22/07/2023**
		Customer's Ref.	**As Per W.O.**
Sample Details	**Pond Water**	Location	--
Sample Qty.	**5 Lit.**	Appearance	**Colorless**
Sampling Date	**14/07/2023**	Sample Received Date	**15/07/2023**
Test Started Date	**15/07/2023**	Test Completion Date	**21/07/2023**
Sampled By	**UERL Lab**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**23/07/Water/APL-0001**		

TEST RESULTS:

Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
1.	Colour	IS 3025(Part 4):2021	Pt. Co. Scale	5
2.	Odour	IS 3025(Part 5):1983	--	Agreeable
3.	Total Suspended Solids	APHA 23rd Ed.,2017,2540 –D	mg/L	66
4.	pH @ 25 ° C	APHA 23rd Ed.,2017,4500-H^+B	--	7.64
5.	Temperature	IS 3025(Part 9):1984	^{0}C	29.5
6.	Oil & Grease	IS 3025(Part 39):1991	mg/L	BDL(MDL:2.0)
7.	Total Residual Chlorine	IS 3025(Part 26):2021	mg/L	3.2
8.	Ammonical Nitrogen	IS 3025(Part 34):1988,	mg/L	BDL(MDL:2.0)
9.	BOD (3 days at 27 ^{0}C)	IS 3025(Part 44):1993	mg/L	44
10.	COD	IS 3025(Part 58):2006	mg/L	156.9
11.	Arsenic (as As)	APHA 23rd Ed.,2017,3114-C	mg/L	BDL(MDL:0.01)
12.	Mercury (as Hg)	APHA 23rd Ed.,2017, 3112-B	mg/L	BDL(MDL:0.001)
13.	Lead (as Pb)	IS 3025 (Part 47):1994	mg/L	BDL(MDL:0.01)
14.	Cadmium (as Cd)	IS 3025(Part 41):1992	mg/L	BDL(MDL:0.003)
15.	Hexavalent Chromium	APHA 23rd Ed.,2017,3500CrB	mg/L	BDL(MDL:0.05)
16.	Total Chromium (as Cr)	IS 3025 (Part 52):2003	mg/L	BDL(MDL:0.05)
17.	Copper (as Cu)	IS 3025 (Part 42):1992	mg/L	BDL(MDL:0.05)
18.	Zinc (as Zn)	IS 3025(Part 49):1994	mg/L	BDL(MDL:0.05)

Note: This report is subject to terms and conditions mentioned overleaf.

TEST REPORT

Report No.	**URC /23/07/Water/APL-0001**		
Name & Address of Customer	**M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port)** PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.	Date of Report	**22/07/2023**
		Customer's Ref.	**As Per W.O.**
Sample Details	**Pond Water**	Location	--
Sample Qty.	**5 Lit.**	Appearance	**Colorless**
Sampling Date	**14/07/2023**	Sample Received Date	**15/07/2023**
Test Started Date	**15/07/2023**	Test Completion Date	**21/07/2023**
Sampled By	**UERL Lab**	Sampling Method	**UERL/CHM/SOP/116**
UERL Lab ID. No.	**23/07/Water/APL-0001**		

TEST RESULTS:

Sr. No.	Parameters	Test Method Permissible	Unit of Measurement	Results
19.	Selenium (as Se)	IS 3025(Part 56):2003	mg/L	BDL(MDL:0.01)
20.	Nickel (as Ni)	APHA 23rd Ed.,2017,3111-B	mg/L	BDL(MDL:0.02)
21.	Cyanide (as CN)	IS 3025(Part 27):1986	mg/L	BDL(MDL:0.05)
22.	Fluoride (as F)	IS 3025(Part 60):2008	mg/L	1.28
23.	Dissolved Phosphate (as P)	APHA 23rd Ed.,2017,4500-P, D	mg/L	0.15
24.	Sulphide as S	APHA 23rd Ed.,2017,4500 S^{-2} F	mg/L	BDL(MDL:0.05)
25.	Phenolic Compound	IS 3025(Part 43):2020	mg/L	BDL(MDL:0.01)
26.	Bio Assay test (%)	IS:6582-1971	%	90 % survival of fish after 96 hrs. in 100% effluent
27.	Manganese (as Mn)	APHA 23rd Ed.,2017, 3500 Mn B	mg/L	BDL(MDL:0.1)
28.	Iron (as Fe)	IS 3025(Part 53):2003	mg/L	0.187
29.	Vanadium (as V)	APHA 23rd Ed.2017-3500 – V	mg/L	N.D.
30.	Nitrate (as NO3-N)	APHA 23rd Ed.,2017,4500 NO3-B	mg/L	0.7
Remarks: BDL= Below Detection Limit, **MDL** = Minimum Detection Limit				
Opinion & Interpretation (If required):				

*********End of Report *********

Checked By

(Nilesh C. Patel)
(Sr. Chemist)

Authorized By

(Nitin B. Tandel)
(Technical Manager)

Note: This report is subject to terms and conditions mentioned overleaf.