

FINAL EIA/EMP REPORT

FOR

ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC
SURFACTANT CHEMICAL MANUFACTURING UNIT

AT

MOUZA KULEPAIRI, P.S. BANGAN, DIST-HOWRAH, WEST BENGAL

PRODUCTION MANUFACTURING

CAPACITY-82,400 MTA

BASELINE STUDY PERIOD: DECEMBER 2023-FEBRUARY 2024

MCPL/EMD/CHEM/2019-20/09/03/(FEIA)..... March 2024

TOR LETTER NO. & DATE: IA-J-11011/1/2020-IA-II(I) dated 10.03.2020

Date of P.H- 23.08.2021

PROJECT PROPONENT

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(DCEPL)

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ENVIRONMENTAL CONSULTANT



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(QCI Accredited EIA Consultant certificate No.: NABET/EIA/23-26/RA 0305_April 20, 2026)

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Annexure II	:	Land Document
Annexure III	:	Material Safety Datasheet
Annexure IV	:	Water approval
Annexure V	:	HAZOP Work Sheet

ABBREVIATIONS

AAQM	:	Ambient Air Quality Modelling
AMSL	:	Above Mean Sea Level
BGL	:	Below Ground Level
CPCB	:	Central Pollution Control Board
CTE	:	Consent to Establish
CTO	:	Consent to Operate
DFO	:	Divisional Forest Officer
DCEPL	:	Detergeo Chem (EAST) Private Limited
EAC	:	Expert Appraisal Committee
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
GLC	:	Ground Level Concentration
IMD	:	Indian Metrological data
KLD	:	Kilolitres per Day
LOS	:	Level of service
M bgl	:	Meter below ground level
MoEF&CC	:	Ministry of Environment Forests and Climate Change
MRL	:	Mean Reference Level
NOC	:	No objection Certificate
SPCB	:	State Pollution Control Board
TOR	:	Terms of Reference
TPA	:	Tons Per Annum
VOC	:	Volatile Organic Compounds
WBPCB	:	West Bengal Pollution Control Board
ZLD	:	Zero Liquid Discharge



Undertaking by Project Proponent

The Environmental Impact Assessment Report for the establishment of new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal prepared by Mantec Consultants Pvt. Ltd has been reviewed thoroughly at our end before submission. I, on behalf by M/s Detergeo Chem (EAST) Private Limited (DCEPL) hereby undertake that the data and information provided in the report are correct to the best of our understanding, and we own responsibility for correctness of contents of the EIA report.

For Detergeo Chem (East) Pvt. Ltd.



Director

M/s Detergeo Chem (EAST) Private Limited (DCEPL)

UNDERTAKING BY ACCREDITED CONSULTANT ORGANIZATION

I, **A. S. Brara**, hereby confirm that this EIA EMP Report for the establishment of new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL).

I also confirm that I shall be fully accountable for any mis-leading information mentioned in this Report.

Signature

:



Name

: Mr. A. S. Brara

Designation

: CMD

Name of the EIA Consultant Organization: Mantec Consultants Pvt. Ltd., Noida-201301

NABET Certificate No. NABET/EIA/2326/RA 0305 Validity April 20, 2026.

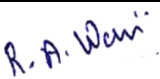
DISCLOUSER OF CONSULTANT

Declaration by Experts contributing to the EIA for for the **establishment of new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL).**


Declaration by Experts contributing to the EIA:

I, hereby, certify that I was part of the EIA team in the following capacity that developed the above EIA.


EARLIER EIA Coordinator:

Name	Mr. Ramdas A. Wani
Period of Involvement	Nov. 2019 - Oct. 2021
Signature	





CURRENT EIA Coordinator:



Name	Mr. Nilesh Vitthal Potdar
Period of Involvement	February 2024 onwards
Signature	


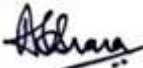
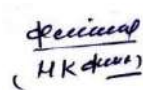
EIA Coordinator (Team Member)



Name	Mr. Gajanad Mallick
Period of Involvement	August 2023 to till Date
Signature	

FUNCTIONAL AREA EXPERT

S.No.	Functional Areas	Name of the Experts	Involvement (task & period)	Signature & Date
1	AP*	Mr. A.S. Brara	Feb 2019-till now; <ul style="list-style-type: none"> Review of primary air quality monitoring report and analysis Addressing air quality issues in EIA Report and suggesting mitigation measures for impacts due to air pollution and review Review and analysis of primary meteorological data 	
2	WP*	Mr. A.S. Brara	Jan 2019- till now ; <ul style="list-style-type: none"> Counter checking of analysis of data by literature study and consultation with local people and concerned departments Identification of water quality by analysis report study and detection of potential hazards due to developmental activity Checking of water availability by literature study and by interacting concerned Govt. Officials like GWB and irrigation dept. 	
3	SHW*	Mr. Ramdas A. Wani	March, 2019- Oct. 2021; <ul style="list-style-type: none"> Estimated the waste generation quantity due to various construction activity Devising measures to minimize wastes; recycle and disposal Identification methods of recycling and reuse Ensured incorporation of the same into the EIA report. 	
4	SE*	Mr. Anil Kumar	March 2019- April 2020; <ul style="list-style-type: none"> Design and develop format/questionnaire for baseline survey, social changes arising out of development projects and assessment of data so collected Evaluation of socio economic status of tribal/ non- tribal areas Assessment of social impact 	

			<ul style="list-style-type: none"> Collection of secondary information Survey tool design Reconnaissance study, transect walk Community participation, Mitigation plan Stakeholder consultation 	
5	EB	Dr. Rajdeep	<p>March 2019- March 2020;</p> <ul style="list-style-type: none"> Visited site to identify the ecological condition of project area by direct field study and identification of major floral and faunal species Identification of potential impact due to the project interventions and developing mitigation measures by direct field study and consulting the stakeholders like forest and wildlife officials, local people etc. 	Rajdeep
6	HG*	Mr. R. K. Khanna	<p>March 2019-till now;</p> <ul style="list-style-type: none"> Identification of the water sources and drainage pattern Analyze them to identify the likely impacts Devise mitigation measures and assisted in preparation of the EIA report. 	
7	GEO*	Mr. B.M. Sinha	<p>March 2019-Nov 2022;</p> <ul style="list-style-type: none"> Identification of nature of geology of the project area Identification of areas likely to be affected by soil erosion Devised protection measures for embankment slope and water bodies 	
8	SC*	Dr. Rajdeep	<p>March 2019- March 2020;</p> <ul style="list-style-type: none"> Identification of soil quality and soil type for establishing the baseline conditions Assessing the impact on soil due to various activities of the project Suggest mitigation measures to control the adverse impact Preparation of report for incorporation in the EIA 	Rajdeep

9	AQ*	Mr. A.S. Brara	<p>March 2019-till now;</p> <ul style="list-style-type: none"> • Analysis of air quality data, meteorological data, traffic data etc. as per the requirements of Pollution Dispersion model (ISCST3) • Assessment of secondary data requirements for modeling, collection of secondary data like mixing height, stability class etc. • Predict air quality using pollution dispersion model (ISCST3) • Interpretation, analysis and presentation of predicted results of pollution dispersion modeling • Review and finalization of report 	
10	NV*	Mr. A.S. Brara	<p>March 2019-till now;</p> <ul style="list-style-type: none"> • Identification of Noise Quality Monitoring Network and noisesensitive location along the project stretch • Supervision of ambient noise quality monitoring • Review of noise quality monitoring report • Addressing noise related issues in EIA report and suggesting measures for impacts due to noise pollution • Analysis of noise quality data, traffic data etc. as per the requirement of mathematical model of FHWA-TNM Interpretation, analysis and presentation of predicted results. 	
		Mr. H.K. Sharma	<p>March 2019- March 2021;</p> <ul style="list-style-type: none"> • Identification of Noise Quality Monitoring Network and noisesensitive location along the project stretch • Supervision of ambient noise quality monitoring • Review of noise quality monitoring report • Addressing noise related issues in EIA report and suggesting measures for impacts due to noise pollution • Analysis of noise quality data, traffic data etc. as per the requirement of mathematical model of FHWA-TNM 	

			Interpretation, analysis and presentation of predicted results.	
11	LU*	Mr. Manoj Kr. Singh	<p>March 2019- March 2023;</p> <ul style="list-style-type: none"> • Identification and collection of satellite images and other associated maps for the project area • Creation of GIS data base and processing of satellite imageries • Devised measure to save sensitive and productive land uses by suggesting option of realignment, bypass and eccentric widening • Analysis of land use map and incorporation of land use details into EIA 	
12	RH*	Mrs. Ashvani	<p>March 2019-April 2021;</p> <ul style="list-style-type: none"> • Identification of the potentially hazardous material and events that might occur during various phases of the project • Devising contingency plan for each type of hazard • Incorporation of the same in the EIA report 	

***One TM against each FAE may be shown.**

****Please attach additional sheet if required.**

TOR COMPLIANCES

Point wise compliance of ToR issued by MOEF&CC vide letter no. IA-J-11011/1/2020-IA-II(I) dated 10.03.2020 (copy enclosed as Annexure-I) for the Proposed project. Compliance of TOR is discussed below:

S.No.	ToR Point	Action to be taken	Reference
1.	Executive Summary		
2.	Introduction		
I.	Details of the EIA Consultant including NABET accreditation	Mantec Consultants Pvt. Ltd, is an accredited organization by Quality Council of India/NABET certificate no. <i>NABET/EIA/23-26/RA 0305_ Rev. 01</i> dated January 31,2024 valid up to April 20, 2026.	Chapter-12, page no. 157
II.	Information about the project proponent	Applicant: Mr. Raman Arora (Owner) Regd. Office: M/s Detergeo Chem (East) Private Limited, A-29, Block B1 Ext. Mohan Co-op. Industrial Estate, New delhi-1110044 Mobile no: +91-9999696943 Mail id: raman@newindiachem.com	Chapter-1, page no. 2
III.	Importance and benefits of the project	<ul style="list-style-type: none"> The project will generate permanent employment for 40 person during operational phase and temporary employment for 160 person during constructional phase.Hence the total employment produced 200 person. CER budget of Rs. 40.0 Lakhs will be utilized under the consultation of the sarpanch/gram Pradhan of nearby village (Kulepairi) & in consultation with the District Administration 	--
3.	Project Description		
I.	Cost of project and time of completion.	Capital Cost of the Project- Rs. 20 Crores The proposed project will be executed within 12 months after grant of Environment Clearance and other Statuary clearance.	Chapter-2, section-2.9 page no. 28



II.	Products with capacities for the proposed project.	The proposed project is for the manufacturing of natural and synthetic chemical surfactants of 82400 MTPA The details of each product capacity are given in chapter-2 of Draft EIA Report.	Chapter-2, Table-2.1 page no. 10
III.	If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.	Not applicable as this is a green field project. The total land available under the ownership of Detergeo Chem (EAST) Private Limited.	--
IV.	List of raw materials required and their source along with mode of transportation.	The details of raw material required along with their likely sources are incorporated in chapter-2 of Draft EIA Report.	Chapter-2, section-2.5.1, Table-2.2 page no. 10
V.	Other chemicals and materials required with quantities and storage capacities	Details of all other chemicals and materials quantity are chapter-2 of Draft EIA Report.	Chapter-2, section-2.5, Table-2.3, Figure No.-2.5 page no. 11
VI.	Details of emission effluent, hazardous waste generation and their management	The details of emission effluent, hazardous waste generation and their management are incorporated in Chapter-4 of Draft EIA Report	Chapter-2, section-2.7.1 & 2.7.2, page no. 26-27
VII.	Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	Total fresh water requirement: 203 KLD Source: The company shall apply for ground water permission upon grant of Environment Clearance. State approved water tanker suppliers shall be used as a backup source. Power Requirement: 1000 KW sourced through WBSEDCL 2 No. of DG sets each of capacity 910 KVA, 500 KVA. Manpower requirement: 200 (permanent employment - 40 person during operational phase and temporary employment - 160 person during constructional phase). Water balance diagram is given in Chapter-2 of Draft EIA report	Chapter-2, section-2.5.2, Table-2.3, 2.4 page no. 11-13



VIII.	Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided	Process description and process flow sheet from raw material to product are incorporate Chapter-2 of Draft EIA Report Major equipment list is also mentioned Chapter-2 of Draft EIA Report.	Chapter-2, section-2.6, page no. 19.
IX.	Hazard identification and details of proposed safety systems.	Hazard identification and details of proposed safety systems are incorporated in the Chapter-7 of Draft EIA Report EIA.	Chapter-7, section-7.4, page no. 113.
X.	Expansion/modernization proposals:	Not applicable as this is a green field project.	--
	a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30 th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing Iexisting operation of the project from SPCB shall be	Not applicable as this is a green field project.	--



	attached with the EIA-EMP report.		
	b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.	Not applicable as this is a green field project.	--
4.	Site Details		
I.	Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.	The Project location: DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141, Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal". Proposed project shall be established over the purchased land and copy of land documents as an Annexure II.	Chapter-2, section-2.3 page no. 7-8



II.	A toposheet of the study area of radius of 10km and site location 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)	Toposheet of the study area is incorporated in the EIA.		Chapter-1, Figure-1.1, page no 4	
III.	Details w.r.t. option analysis for selection of site	The proposed Greenfield project shall be developed on the existing land, which is already owned by DCEPL, therefore no analysis for selection of site will considered		--	
IV.	Co-ordinates (lat-long) of all four corners of the site.	Points	Latitude	Longitude	--
		1	22°31'49.49"N	87°55'44.51"E	
		2	22°31'47.21"N	87°55'44.87"E	
		3	22°31'49.07"N	87°55'51.13"E	
		4	22°31'50.64"N	87°55'50.90"E	
		5	22°31'50.80"N	87°55'52.29"E	
		6	22°31'51.20"N	87°55'52.13"E	
		7	22°31'50.98"N	87°55'50.85"E	
		8	22°31'51.30"N	87°55'50.81"E	
		9	22°31'50.66"N	87°55'48.60"E	
		10	22°31'50.46"N	87°55'48.66"E	
		11	22°31'50.05"N	87°55'47.22"E	
12	22°31'50.25"N	87°55'47.16"E			
V.	Google map-Earth downloaded of the project site.	Google map-Earth downloaded of the project site is incorporated in Chapter-2 of Draft EIA.		Chapter-2, Figure-2.2, page no. 8.	
VI.	Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an	Layout map is incorporated in EIA report. NA, the proposed project area is not located within the industrial area.		Chapter-2, Figure-2.3, page no. 9.	



	Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.		
VII.	Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.	Photographs of the proposed project site is incorporated in Chapter-2 of Draft EIA.	Chapter-2, Figure-2.4, page no. 10.
VIII.	Landuse break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included (not required for industrial area)	Landuse break-up of total land of the project site is incorporated in Chapter-2 of Draft EIA.	Chapter-2, section 2.5.6 page no. 14-15.
IX.	A list of major industries with name and type within study area shall be incorporated. Land use details of the study area.	List of other industries within in study area is given in chapter 1 of Draft EIA EMP Report. Land use details of the study area are incorporated in Chapter-3 of Draft EIA EMP Report.	Chapter-1, section-1.4, Table- 1.1, page no. 2-3
X.	Geological features and Geo-hydrological status of the study area shall be included.	The Geological features and Geo-hydrological status of the study area are incorporated in the EIA.	Chapter-3, section-3.9.2, page no. 51
XI.	Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak	Drainage Map of study area (10km area) is attached in EIA report. The major rivers in the study area are mentioned below: - <ul style="list-style-type: none"> • Rupnarayan river- 3.6 Kms • Damodar kata Nadi (Hurhur khal)-2.7 Kms • Mendeshwari River-3.8 Kms • Kanashabat Nadi- 49 Kms 	--



	rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)	<ul style="list-style-type: none"> • Damodar River- 4.0 Kms • Gaighata Khal -1.1 Km 	
XII.	Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	The land is already acquired by the project proponent and under the complete land is under the possession. The land documents are attached as Annexure II .	Annexure-II.
XIII	R&R details in respect of land in line with state Government policy.	Not applicable as the land is already under the possession of proponent & free from any forest land.	--
5.	Forest and wildlife related issues		
I.	Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department.	Not applicable, as no forest land is involved in the proposed project site.	--
II.	Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forest land (in case of projects involving forest land more than 40 ha)	Not Applicable as no forest land is involved	--
III.	Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.	Not applicable, as no forest land is involved in the proposed project site.	--



IV.	The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon	No national parks, sanctuaries, biosphere reserves, migratory corridors of wild animals are present within 10 km radius of the proposed project site.					--
V.	Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.	Not Applicable. Since, No schedule I fauna is present in the study area.					--
VI.	Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.	Not Applicable					--
6	Environmental Status						
I.	Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.	Months	Temp (°C)		Relative Humidity (%)	Average wind speed (Km/h)	Total Rainfall (mm)
			Max	Min	Average	Average	
		Dec. 2023	27	18	46	9.5	



		Jan. 2024	28	16	40	8.8	7.77	
		Feb. 2024	31	19	46	10.5	6.05	
II.	AAQ data (except monsoon) at 8 locations for PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.	The monitoring stations are selected based on CPCB guideline. Nearest populated habitat, water body, protected/reserved forest are also been considered.						Chapter-3, section-3.4.1, Table-3.2, page no 31-32.
III.	Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQPM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.	Raw data of AAQ parameters PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ & VOC of 8 locations for 12 weeks of all stations measured twice a week are given in Chapter-3 of Draft EIA Report.						Chapter-3, section-3.5.4, Table-3.6, page no 36-37.
IV.	Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.	Surface water quality data of 6 locations is incorporated in Chapter-3 of Draft EIA Report.						Chapter-3, section 3.8, Table-3.14 page no 47-48.
V.	Whether the site falls near to polluted stretch of river identified by	Not Applicable						--



	the CPCB/MoEF&CC, if yes give details		
VI.	Ground water monitoring at minimum at 8 locations shall be included.	Ground water samples from 8 different locations & the results are incorporated in Chapter-3 of Draft EIA Report.	Chapter-3, section 3.8, Table-3.15 page no 48-50
VII.	Noise levels monitoring at 8 locations within the study area.	Noise levels monitoring at 8 locations within the study area are incorporated in Chapter-3 of Draft EIA Report.	Chapter-3, section 3.6.5, Figure-3.8, page no 41-42.
VIII.	Soil Characteristic as per CPCB guidelines.	For studying the soil types and soil characteristics, 8 sampling locations were selected to assess the existing soil conditions representing various land use conditions and geological features and soil quality monitoring results is Chapter-3 of Draft EIA Report.	Chapter-3, section 3.9.4, Table-3.17-3.18 page no 54-57.
IX.	Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.	Detailed traffic study of the area along with type & frequency of the heavy vehicles and additional traffic due to proposed project has been carried out and incorporated in Chapter-3 of Draft report.	Chapter-3, section 3.7, page no 43.
X.	Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species.	Detailed description of flora and fauna found in the study area are furnished Chapter-3 of Draft report.	Chapter-3, section 3.11.2, page no 60.
XI.	Socio-economic status of the study area.	Detailed description of Socio-economic status of the study area are incorporated in Chapter-3 of Draft report.	Chapter-3, section 3.12, page no 71.
7.	Impact and Environment Management Plan		
I.	Assessment of ground level concentration of pollutants from the stack emission based on site-specific	Air Quality Modeling U.S. EPA AERMOD dispersion model, Lakes Environmental Software, Version 9.5.0 has been used for this report.	Chapter-4, table 4.2, page no - 89.



	meteorological features. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	The details are incorporated in chapter-4 of EIA report.	
II.	Water Quality modeling-in case of discharge in water body	No Waste water or Treated water will be discharge in to water body.	--
III.	Impact of the transport of the raw materials and end products on the surrounding environment hall be assessed and provided.	The LOS value from the proposed project may be same as earlier value "Excellent" for NH-6 and 'Very Good' for SH-15. So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.	--
IV.	A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included.	The details scheme of ETP is incorporated in chapter-4 of Draft EIA Report.	Chapter-4, section 4.2.5, page no 94.
V.	Details of stack emission and action plan for control of emissions to meet standards.	Stack emission details are given in Chapter-4 of Draft EI/EMP Report.	Chapter-2, section-2.5.12, page no 19.
VI.	Measures for fugitive emission control	Measure for fugitive emission control is given Chapter-4 of Draft EIA Report.	Chapter-4, section 4.2.2, page no 82.



VII.	Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included.	All the Solid & hazardous waste generated, will be collected, stored separately and disposed off as per the guidelines issued by CPCB & West Bangal Pollution Control Board.	--
VIII.	Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	Not Applicable	--
IX.	Action plan for the green belt development plan in 33 % area. Giving details of species, width of plantation, planning schedule	33% of total area as per MoEF&CC stipulated norms will be developed as the green belt. The plant density of 150 trees per hectare with local native species will be implemented. The greenbelt will be developed in an area of 3019 sq.m (33%) of the total land area of 13,493 sq.m.	Chapter-10, section-10.4, page no 144.
X.	Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the rooftops and storm water drains to recharge the ground water.	Details of rainwater harvesting are given in Chapter-10 of draft EIA/EMP.	Chapter-10, section-10.3.5, page no 142-143.
XI.	Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	The total capital investment on environmental control measures is envisaged to be about Rs 150 Lakhs and Recurring Cost is envisaged to about Rs. 17 Lakhs/yr out of a total project cost of Rs. 20 Crores.	Chapter-10, section-10.7 page no 148.
XII.	Action plan for post-project environmental monitoring shall be submitted	A detailed monitoring of emissions and effluent sources for different environmental parameters will be carried out as per the present norms and any further notification/direction from West Bengal State Pollution Control Board (WBPCB), Central Pollution Control Board (CPCB) and MoEF&CC. Monitoring methodologies will follow standard methods prescribed by Central Pollution Control Board (CPCB), Bureau of Indian Standards (BIS) etc.	Chapter-6, Table-6.1&6.2 page no 103 & 105



XIII.	Onsite and Offsite Disaster, Preparedness and Emergency Management Plan	Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster, which limits the damage to the minimum, and follow the on-site & off-site emergency planning.	Chapter-7, section-7.6.3 and 7.6.4, page no 125.
8	Occupational health		
I.	Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers	Rs. 5.0 Lakhs/yr will be kept for to ensure safety of all Employees including contract & casual workers	Chapter-10, section-10.3.7, Table-10.2, page no 143.
II.	Details of exposure specific health status evaluation of worker.	Workers' health shall be evaluated by pre designed format, for chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision. colorvision and any other ocular defect) ECG, during pre placement and periodical examinations that will give the details of the same.	--
III.	Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL).	Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved, are in corporate in the EIA.	--
IV.	Annual report of health status of workers with special reference to Occupational Health and Safety.	Not applicable	--
9	Corporate Environment Policy		
I.	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	Environment Policy is given in Chapter-10 of Draft EIA/EMP Report.	Chapter-10, section-10.5 page no 145.
II.	Does the Environment Policy prescribe for standard operating process / procedures to bring into	Yes, All the Environmental policy is followed for SOPs and procedures so that any violation regarding environmental or forest norms will be	Chapter-10, section-10.5 page no 145.



	focus any infringement / deviation / violation of the environmental or forest norms / conditions?	avoided. For that scheduled internal audits and management review meeting shall be done.	
III.	What is the hierarchical system or Administrative order of the company to deal with the environmental issues	Hierarchical system of the company is shown in Environmental Policy, attached as an annexure	Chapter-10, section-10.5, Figure- 10.1 , page no.146
IV.	Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large?	The system of reporting of Non-conformances/ violation of any Environmental Law/Policy will be as per quality management system. The internal audit will be conducted on periodic basis, and any Non-conformances/ violation to Environmental Law/Policy will be closed and discussed during Management Review Meetings of board of directors/partners and Environment Policy for this is given in Chapter-10 of Draft EIA Report.	Chapter-10, section-10.5 page no 146.
10	Details regarding infrastructure facilities such as sanitation, fuel etc	Sanitation and rest rooms will be available for the casual workers and truck drivers.	--
11	Enterprise Social Commitment (ESC)	The proposed CER activities along with their budgetary provision are given in Chapter-8 of Draft EIA/EMP Report. The company has separately earmarked Rs. 40.00 lakhs (2% of Project cost) towards the Corporate Environment Responsibility (CER) Activities as per OM (CER) F. No. 22- 65/2017-IA.III dated 01.05.2018. The Expenditure of CER will be decided after Public Consultation.	Chapter-8, section 8.5, page no. 138
i.	Adequate funds (at least 2.5 % of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item wise details	The proposed CER activities along with their budgetary provision are given in Chapter-8 of Draft EIA/EMP Report.	Chapter-8, section 8.5, page no. 138



	along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.		
12	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	Not Applicable	--
13	'A tabular chart with index for point wise compliance of above TOR.	Complied	--
	SPECIFIC TERMS OF REFERENCEF		
I.	Details on solvents to be used, measures for solvent recovery and for emissions control	Not Applicable	--
II.	Details of process emissions from the proposed unit and its arrangement to control.	The details of process emission from the proposed unit and its arrangement to control is incorporated in the EIA.	Chapter-4, section 4.2.2, page no 82.
III.	Ambient air quality data should include VOC, other process-specific pollutants* like NH ₃ *, chlorine*,	Ambient air quality data include the VOC and other process-specific pollutants* like NH ₃ . The results are incorporated in Chapter-3 of Draft EIA Report.	Chapter-3, section 3.5.4, Table-3.6, page no 36-37. Chapter-4, section 4.2.2,



	HCl*, HBr*, H ₂ S*, HF*,etc., (*as applicable)		page no 82.
IV.	Work zone monitoring arrangements for hazardous chemicals	Work place monitoring to be done regularly & Detectors will be installed. Hazardous chemicals will be stored separately.	--
V.	Detailed effluent treatment scheme including segregation of effluent streams for units adopting 'Zero' liquid discharge	Effluent Treatment plant followed By Tertiary treatment is proposed for the Unit to achieve the 'Zero Liquid Discharge'.	Chapter-2, section 2.5.2, Table 2.4, page no. 12
VI.	Action plan for odour control to be submitted.	Scrubber is installed for scrubbing the residual Formaldehyde from the main product stream which also controls the odour problem. Green belt will be maintained to control the odour problem, About 33% of the total area is under the green cover. About 125 no of trees will be planted under GB development program.	Chapter-4, section 4.2.2 , page no.85. Chapter-10, section 10.4, page no 144.
VII.	A copy of the Memorandum of Understanding signed with cement manufacturers indicating clearly that they co-process organic solid/hazardous waste generated	Not Applicable	--
VIII.	Authorization/Membership for the disposal of liquid effluent in CETP and solid/hazardous waste in TSDF, if any.	Company will collected, stored separately and disposed off solid/hazardous waste at TSDF site. will take the Membership of TSDF facility after the grant of Environmental Clearance	--
IX.	Action plan for utilization of MEE/dryers salts.	Not Applicable	--
X.	Material Safety Data Sheet for all the Chemicals are being used/will be used	Material safety data sheet for all the chemicals are attached as Annexure III.	Annexure- III



XI.	Authorization/Membership for the disposal of solid/hazardous waste in TSDF	Company will take the Authorization/Membership of TSDF facility after the grant of Environmental Clearance Company will take the Membership of TSDF facility after the grant of Environmental Clearance.	--
XII.	Details of incinerator if to be installed	Not Applicable	--
XIII.	Risk assessment for storage and handling of hazardous chemicals/solvents. Action plan for handling & safety system to be incorporated.	Risk assessment for storage and handling of hazardous chemicals/solvents and Action plan for handling & safety system is incorporated in chapter-7 of Draft EIA Report.	Chapter-7, section-7.5.5 page no. 116.
XIV.	Arrangements for ensuring health and safety of workers engaged in handling of toxic materials	Various arrangements have been made for ensuring the health and safety of worker engaged in handling of toxic materials are mention in the Draft EIA Report.	Chapter-7, section-7.7 page no. 132.



CHAPTER-1 : INTRODUCTION

1.1 PREAMBLE

The Environment Impact Assessment report has been prepared for identification of the impacts imposed on the Environment by the implementation of the proposed project and to assess the beneficial and adverse impacts of the proposed project on the existing environmental parameters, so that suitable control measures could be taken to reduce impacts. Thus, the EIA report is a summarized presentation of baseline information of Air, Water, Soil, Noise, Flora, Fauna, Socio-economic study and the prevailing environmental scenario of the project activity and the likely impacts due to proposed project, so as to decide the suitable mitigation measures for implementation to maintain healthy working environment and contain pollution within permissible limits.

1.2 PURPOSE OF REPORT

The proponent, M/s Detergeo Chem (EAST) Private Limited (DCEPL) is proposing to set up a new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal.

As per the EIA Notification dated 14th September 2006, as amended from time to time; it is mandatory to have the Environmental Clearance for any new industry or the expansion of the industry from Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India, New Delhi for which EIA is required be conducted as per the guidelines of MoEF&CC, New Delhi.

In this regard, M/s Detergeo Chem (EAST) Pvt. Ltd has appointed M/s Mantec Consultants Private Limited, Noida to conduct Environmental Impact Assessment study for the proposed project as per the TOR issued by MOEF&CC Vide Letter No. IA-J-11011/1/2020-IA-II(I) Dated 10.03.2020 for preparing Environmental Impact Assessment (EIA). The purpose of EIA Study is to address the information on the nature and extent of potential environmental impacts, both negative and positive during the construction and operation phase of the proposed project and related activities taking place concurrently.

1.3 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

Identification of Project

The proposed project is for the establishment of new natural and synthetic surfactant chemical manufacturing unit at DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141, Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (East) Private Limited (DCEPL). The unit planned for the production of Linear Alkylbenzene Sulphonic Acid, Alpha Olefin Sulphonate, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate, Cocoamidopropyl Betaine, Cocamide Monoethanolamine, Cocamide Diethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate.

Screening Category

As per EIA Notification dated 14th Sept., 2006 and amended from time to time, the proposed project of falls under Activity 5(f) for project covered under "Synthetic Organic Chemicals Industry".

As the project site is located outside a notified industrial estate this project falls under 'A' category and will be appraised at MOEF&CC.

Project Proponent

The Applicant details are gives below-

S. No.	Name of the Project	Applicant	Proponent Name
1.	Establishment of new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL)	M/s Detergeo Chem (East) Private Limited. (DCEPL) Reg. add. A-29, Block B1 Ext. Mohan Co-op. Industrial Estate, New delhi-1110044	Mr. Raman Arora (Owner) e-mail id: raman@newindiachem.com

M/s Detergeo Chem (East) Private Limited (DCEPL) is a fully owned subsidiary of New India Group. New India Group is a fourth generation family-owned and professionally managed diversified business group. The group was founded in 1947 and is primarily into manufacturing and trading of dyes, chemical and textiles. The group has been manufacturing surfactants since the year 1990. The group's mission is to best serve the needs of its valuable customers by conducting business in line with its core values of integrity and reliability.

1.4 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COMPANY REGION

Table 1.1: Brief Description of the Project

S. No.	Particulars	Details	
A.	Nature and Size of the Project	Establishment of new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL)	
B.	Location		
	Name of Unit	Khasra Number	Area of Block in ha
	M/s Detergeo Chem (EAST) Private Limited (DCEPL)	DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141,	1.3493
	Total		1.3493
	Village	Mouza Kulepairi,	
	Tehsil	P.S. Bagnan	
	District	Howrah	
	State	West Bengal	
	Geographical Coordinates	22°31'49.08"N & 87°55'47.78"E	
	Toposheet (OSM) No.	73N/14, 73N/15, 79B/2 & 79B/3.	
C.	Cost Details		
	Cost of the project	Rs. 20 Crores	
	Cost for EMP	Rs. 150 Lakhs (capital cost), Rs. 17 Lakhs /Yr (Recurring cost)	
	Cost for CER	Rs. 40 Lakhs	
	OH&S	Rs. 5.0 Lakhs/Yr	
D.	Environmental Settings of the area		
	Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius	No such area is located within 10km radius.	

Inter-state boundary within 5 Km radius	No such area is located within 10 km radius.
Nearest Town/ Major City with 200000 population	Bagnan~7.4 Km, SE
Nearest Railway Station	Bagnan~ 8.7 Km, SE
Nearest State Highway/ National Highway	NH-16 ~7.4 Km, SE SH-15 ~5.7 Km, SE
Nearest Airport	Netaji Subhash Chandra Bose International Airport~ 54 Km, E
Medical Facilities	Rural Hospital, Bagnan~7.8, SE
Education Facilities	DMB high school, Mankur~1.90km, SW
Seismic Zone	Zone II
Water Body	Rupnarayan river- 3.6 Kms Damodar kata Nadi (Hurhur khal)-2.7 Kms Mendeshwari River-3.8 Kms Kanashabat Nadi- 49 Kms Damodar River- 4.0 Kms Gaighata Khal -1.1 Km
List of industries/ Project activities	M/s. Tandhan Cotton Mills Private Limited- Textile M/s. Tandhan biochemical Private Limited M/s Mohan Boards Pvt Ltd

(Source: Site visit /Baseline Data and Pre-feasibility Report)

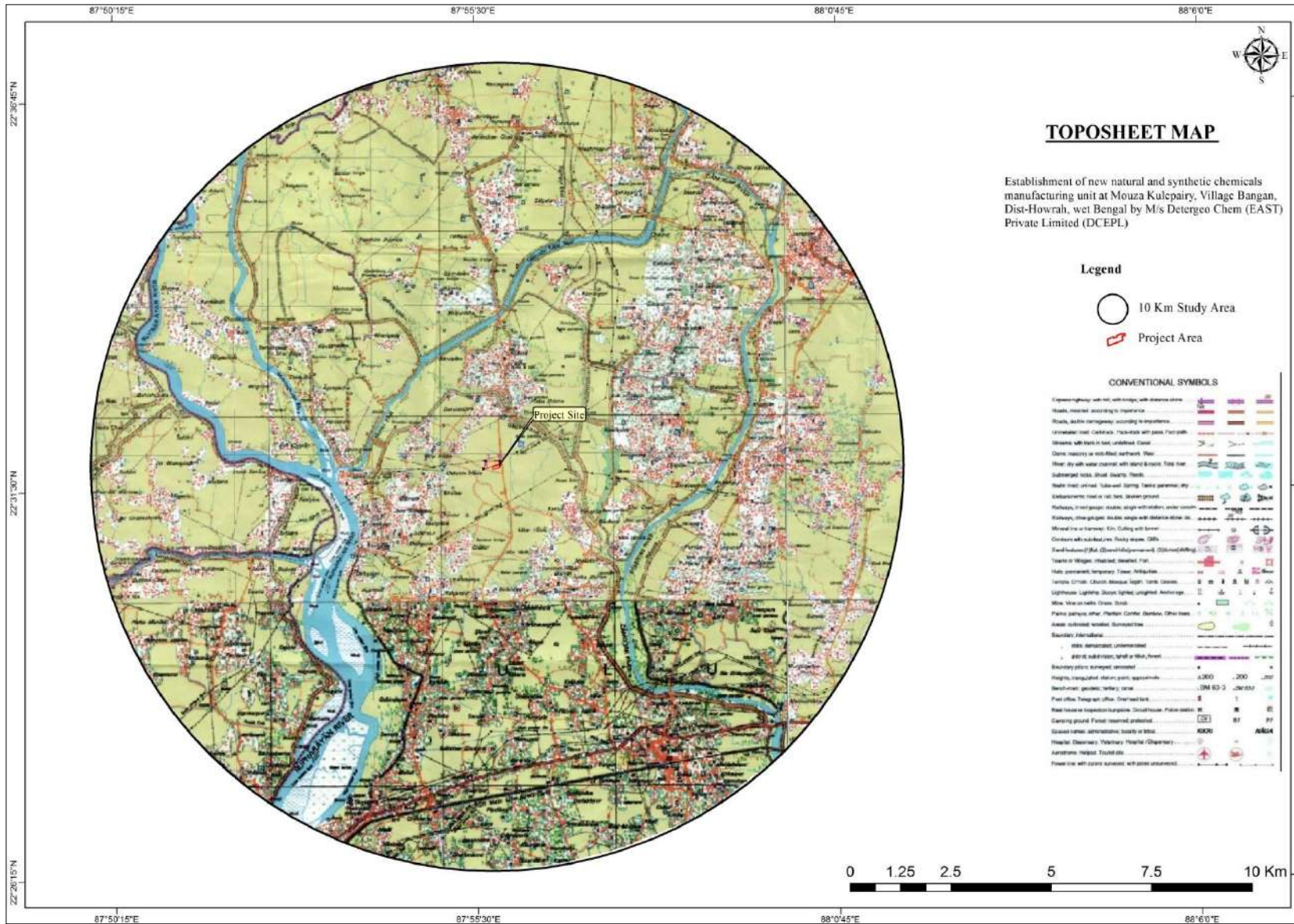


Figure 1.1: Environment Sensitivity Map



1.5 SCOPE OF THE STUDY

The Project Proponent has submitted online (dated-03.01.2020) information along with hard copies in the prescribed format Form-1 along with Pre-feasibility Report to the Expert Appraisal Committee (Industry-2) of MoEF&CC. The Standard ToR was issued on 10.03.2020 Based on the issued ToR, EIA report is prepared & the reply of the Conditions is given as ToR Compliance.

Structure of the Report

The entire EIA report is prepared based on the generic structure of EIA document given at APPENDIX III of the Notification No. S.O. 1533 dated 14th September, 2006 at MoEF&CC, New Delhi.

The report has been divided into twelve chapters as described below:

Chapter 1 – Introduction

This Chapter gives information about the project proponent i.e. M/s Detergeo Chem (EAST) Private Limited and the proposed project including its location and justification/importance, brief details around the surrounding area and details about site selection criteria considered. It also outlines the statutory requirement of obtaining prior Environment Clearance, steps to be followed for the same and basic purpose, scope and methodology of EIA study.

Chapter 2 – Project Description

This chapter provides information on project and capacity; need for the project; location; size or magnitude of operation; technology and process description; maps showing project layout, component of projects etc.

Chapter 3– Description of the Environment

This chapter deals with the methodology and findings of field studies undertaken with respect to ambient air, meteorology, water, soils, noise levels, ecology to define the various existing environmental status in the area of the project. This also deals with the infrastructural development as a part of project and sources of pollution from the proposed project.

Chapter 4 – Anticipated Environmental Impacts and Mitigation Measures

In this chapter, the potential impacts of the proposed allied activities, which could cause significant environmental concerns, are identified and discussed. This discussion will form the basis for environmental management activities.

Chapter 5 – Analysis of Alternatives (Technology and Site)

This chapter will include a comparison of alternatives in this chapter to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost effective options, if any.

Chapter 6 – Environmental Monitoring Program

This chapter will include ascertaining the environmental impacts; state of pollution within the study area; planning for predictive or corrective actions in respect of pollution to keep it within permissible limits.

Chapter 7 – Additional Studies

This chapter will include outcomes of public consultation, risk assessment, social impact assessment, R&R action plan, biodiversity conservation plan, watershed management etc.

Chapter 8 – Project Benefits

This chapter deals with improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits due to proposed project activity.

Chapter 9 – Environmental Cost Benefit Analysis

This chapter includes environmental value enhancement (biodiversity, crop productivity, eco tourism etc.)

Chapter 10 – Environmental Management Plan

This chapter will include the description of administrative aspects of ensuring that the mitigation measures suggested are implemented and their effectiveness is monitored, after approval of the EIA.

Chapter 11 – Summary

This will constitute the summary of EIA Report.

Chapter 12 – Disclosure of Consultant

This will includes the names of the consultants engaged in preparation of EIA and nature of consultancy rendered.

1.5.1 Laws Applicable To This Project

- EIA Notification, dated 14th September 2006, as amended on 1st December, 2009.
- Environment (Protection) Act, 1986 Environment (Protection) Rules, 1986
- Air (Prevention and Control of Pollution) Act, 1987 (as amended) with Rules.
- Water (Prevention and Control of Pollution) Act, 1974 with Rules.
- Noise Pollution (Regulation and Control) Rules, 2006 (as amended)
- Municipal Solid Waste (Management and Handling) Rules, 2000
- Solid Wastes (Management and Handling) Rules, 2016
- Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 (as amended)
- Chemical Accident (Emergency Planning, Preparedness and Response) Rules, 1996
- Hazardous and Other Wastes (Management and Tran boundary Movement) Rules, 2016
- Public Liability Insurance Rules,1992
- The Boiler Acts 1923 & Rules 1950
- The Factory Act 1881
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989.

CHAPTER-2 : PROJECT DESCRIPTION

2.1 TYPE OF PROJECT

The proposed project is for the manufacturing of natural and synthetic surfactant chemical with proposed capacity of 82,400 MT/A. As per EIA Notification dated 14th Sep, 2006, as amended from time to time; the project falls under Category "A", Project or Activity 5(f) as the project is located outside the notified industrial area.

The total project cost estimated to be Rs. 20 crores. The proposed project will be executed within 12-24 months after grant of Environment Clearance and other Statutory clearance.

2.2 NEED FOR THE PROJECT

The increase in population, disposable income and living standards has resulted in an increased usage of soaps, shampoos and detergents by people, thus its market has good prospective and bright future. So, we need a raw material from which the soaps, shampoos and detergents could be made safely and easily. Linear Alkyl benzene Sulphonic Acid and Alpha Olefin Sulphonate is used to manufacture detergents whereas the other products such as Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate, Cocoamidopropyl Betaine, Cocamide Mono-ethanolamine, Cocamide Diethanol amine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate are used in personal-care and oral-care products like shampoos, toothpastes, body washes and shaving creams. There is always demand for these products in the domestic market and as well as global market.

Therefore, DCEPL has planned to set up a new manufacturing unit intended for the production of Linear Alkylbenzene Sulphonic Acid, Alpha Olefin Sulphonate, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate, Cocoamidopropyl Betaine, Cocamide Monoethanol amine, Cocamide Diethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal.

2.3 LOCATION (MAPS SHOWING GENERAL LOCATION, SPECIFIC LOCATIONS, PROJECT BOUNDARY AND PROJECT SITE LAYOUT)

DCEPL has planned to set up a new natural and synthetic surfactant chemical manufacturing unit intended for the production of Linear Alkyl benzene Sulphonic Acid, Alpha Olefin Sulphonate, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate, Cocoamido propyl Betaine, Cocamide Mono ethanolamine, Cocamide Di-ethanol amine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate) at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal. The satellite Imagery of the site is shown in Figure 2.1. The view of the project site location is represented in Figure 2.2. Layout of the project is given as Figure 2.3 and photograph of the site is given as Figure 2.4.

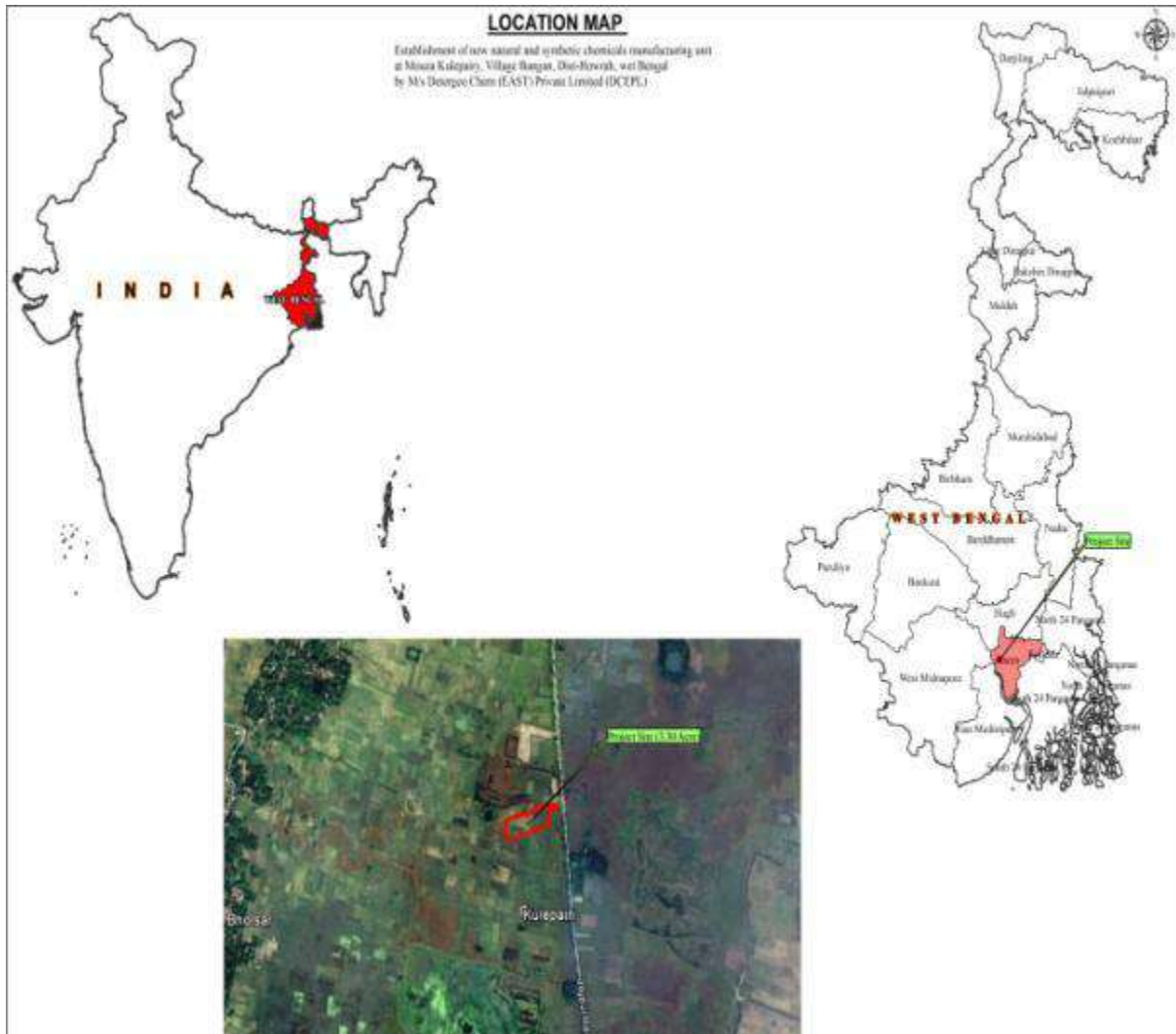


Figure 2.1: Location of the Project



Figure 2.2: View of the Project site

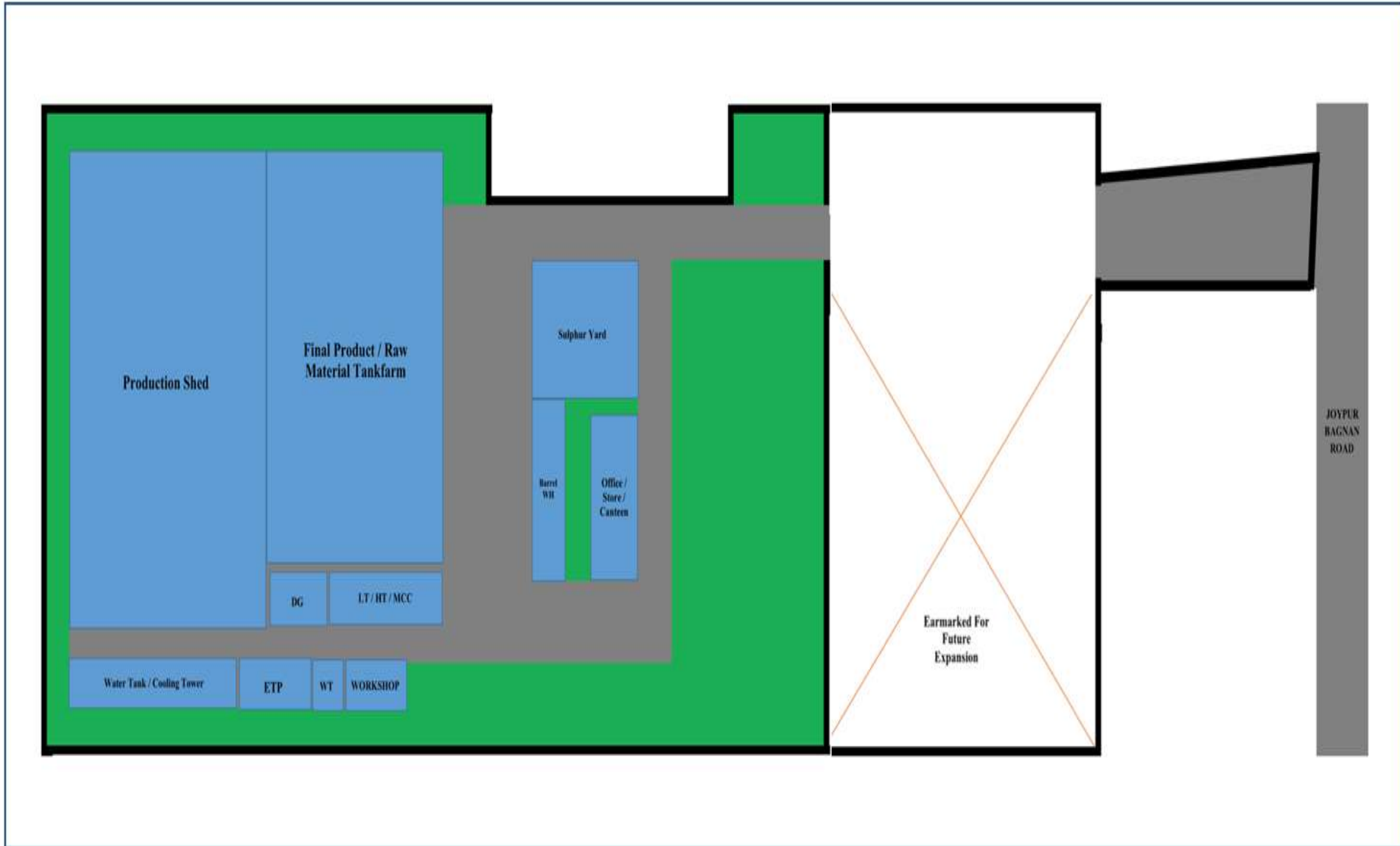


Figure 2.3: Layout Plan of the Project site



Figure 2.4: Site Photos

2.4 SIZE OR MAGNITUDE OF OPERATION

Production capacities of the products, has been estimated as 82,400 MT/A. The total area is 1.3493 ha. Project proponent already acquired the land & land documents are attached as Annexure-II.

The list of the products, production capacity and mode of transport are given in Table 2.1.

Table 2.1: List of Products

S. No.	Product Name	Proposed Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene Sulphonic Acid 96%	12,000	MS Tanker
2.	Linear Alkyl Benzene Sulphonic Acid 90%	12,000	MS Tanker
3.	Alpha Olefin Sulphonate	1,000	SS Tanker
4.	Sodium Lauryl Ether Sulphate	24,000	SS Tanker
5.	Sodium Lauryl Sulphate	6,000	SS Tanker
6.	Cocoamidopropyl Betaine	3,000	Truck
7.	Cocamide Monoethanolamide	3,000	Truck
8.	Cocamide Diethanolamide	3,000	Truck
9.	Ethylene Glycol Distearate	3,000	Truck
10.	Ethylene Glycol Monostearate	3,000	Truck
11.	Dilute Sulphuric Acid	12,000	MS Tanker
12.	Sodium Sulphate	400	
Total Capacity		82,400	

2.5 REQUIREMENTS FOR THE PROJECT

2.5.1 Raw Material Requirement

Raw material required for the manufacturing of new natural and synthetic surfactant chemical are given in Table 2.2 and their storage details in Table 2.3.

Table 2.2: Raw Materials Requirement

S. No.	Raw Product Name	Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene	17,215	MS Tanker
2.	Alpha Olefin	560	ISO Tanks
3.	Lauryl Ether	13,200	ISO Tanks
4.	Lauryl Alcohol	3,150	ISO Tanks
5.	Sulfuric Acid 98%	12,000	MS Tanker

S. No.	Raw Product Name	Manufacturing Capacity (MTA)	Mode of Transport
6.	Caustic Soda	4,052	MS Tanker
7.	Sulfur	3,487	Truck
8.	Coconut Fatty Acid	5,028	ISO Tank
9.	Dimethylaminopropylamine	264	ISO Tank
10.	Monochloroacetic acid	243	Truck
11.	Monoethanolamine	732	ISO Tank
12.	Diethanolamine	1029	ISO Tank
13.	Stearic Acid	5490	ISO Tank
14.	Ethylene Glycol	870	MS Tanker

Table 2.3: Storage Details

S. No.	Material Description	Physical Form	Type of Storage	Storage Capacity (MT)	Sourcing
➤ RAW MATERIAL					
1	Linear Alkyl Benzene	Liquid	MS Tank	500	Import
2	Alpha Olefin	Liquid	SS Tank	100	Import
3	Lauryl Ether	Liquid	SS Tank	750	Import
4	Lauryl Alcohol	Liquid	SS Tank	100	Import
5	Sulfuric Acid	Liquid	MS Tank	420	Domestic
6	Caustic Soda Liquid	Liquid	SS Tank	650	Domestic
7	Sulfur	Solid	Closed Yard	1000	Domestic / Import
8	Coconut Fatty Acid	Liquid	SS Tank	200	Import
9	Dimethylaminopropylamine	Liquid	SS Tank	36	Import
10	Monochloroacetic acid	Solid	Closed Yard	30	Domestic
11	Monoethanolamine	Liquid	SS Tank	36	Domestic
12	Diethanolamine	Liquid	SS Tank	36	Domestic
13	Stearic Fatty Acid	Liquid	SS Tank	200	Import
14	Ethylene Glycol	Liquid	SS Tank	36	Domestic
➤ FINISHED PRODUCT					
1	Linear Alkyl Benzene Sulphonic Acid	Liquid	MS Tank	300	
2	Alpha Olefin Sulfonate	Liquid	SS Tank	120	
3	Sodium Lauryl Ether Sulphate	Liquid	SS Tank	300	
4	Sodium Lauryl Sulphate	Liquid	SS Tank	120	
5	Cocoamidopropyl Betaine	Liquid	SS Tank	42	
6	Cocamide Monoethanolamine	Solid	Closed Yard	40	
7	Cocamide Diethanolamine	Liquid	SS Tank	42	
8	Ethylene Glycol Distearate	Solid	Closed Yard	40	
9	Ethylene Glycol Monostearate	Solid	Closed Yard	40	
10	Dilute Sulphuric Acid	Liquid	MS Tank	420	

2.5.2 Water Requirement

The unit proposes to consume 203 KLD of Fresh water. The source for the water will be state approved water tankers, for which permission has been obtained from the concerned authorities. The same has been attached as **Annexure-IV**. The details of water consumption is given in Table 2.4 and Water Balance Diagram as Figure 2.5.

Table 2.4: Details of Water Requirement

WATER BALANCE		
S. No.	Particulars	Water Consumption (KLPD)
1	Domestic	2
2	Industrial	
	Process - Dilution / RO Reject / Washings	13
	Cooling Tower Makeup Water	168
	Boiler Makeup Water	20
	Alkali Scrubber (Recycle Water)	5
3	Gardening	5.5
Actual Water Requirement (KLPD)		203

WATER CONSUMPTION IN PROCESS		
S. No.	Particulars	Water Consumption (KLPD)
1	LABSA 96% Hydrolysis- Mixed With Final Product	1.6
2	LABSA 90% Separation and Dilution- Mixed With Final Product	1.5
3	CAPB Hydrolysis - Mixed With Final Product	4.3
4	RO Plant Reject- Sent to ETP	4
5	Softner Regeneration- Sent to ETP	1
6	Equipment Wash- Sent to ETP	0.7
Total Water Consumption in Process		13

WATER CONSUMPTION IN COOLING TOWER	
Particulars	Water Consumption (KL)
Startup: One Time Water Feed	700
Evaporation Loss @ 0.98% / hour	6.86
Evaporation Loss / Day	165
Cooling Tower Bleed Off / Day	3
Total Cooling Tower Makeup Water / Day	168
Cooling Tower Recycle Water	532

Initiatives for water reduction:

- The plant will implement a scheme for source reduction of water coming from washings by articulating a recycle and reuse scheme.
- The plant will have cool atmospheric air in most of the heat exchanger instead of water.
- The plant will have a zero discharge and will successfully recycle the entire water back to plant use.
- Water harvesting system will be installed to collect natural water.

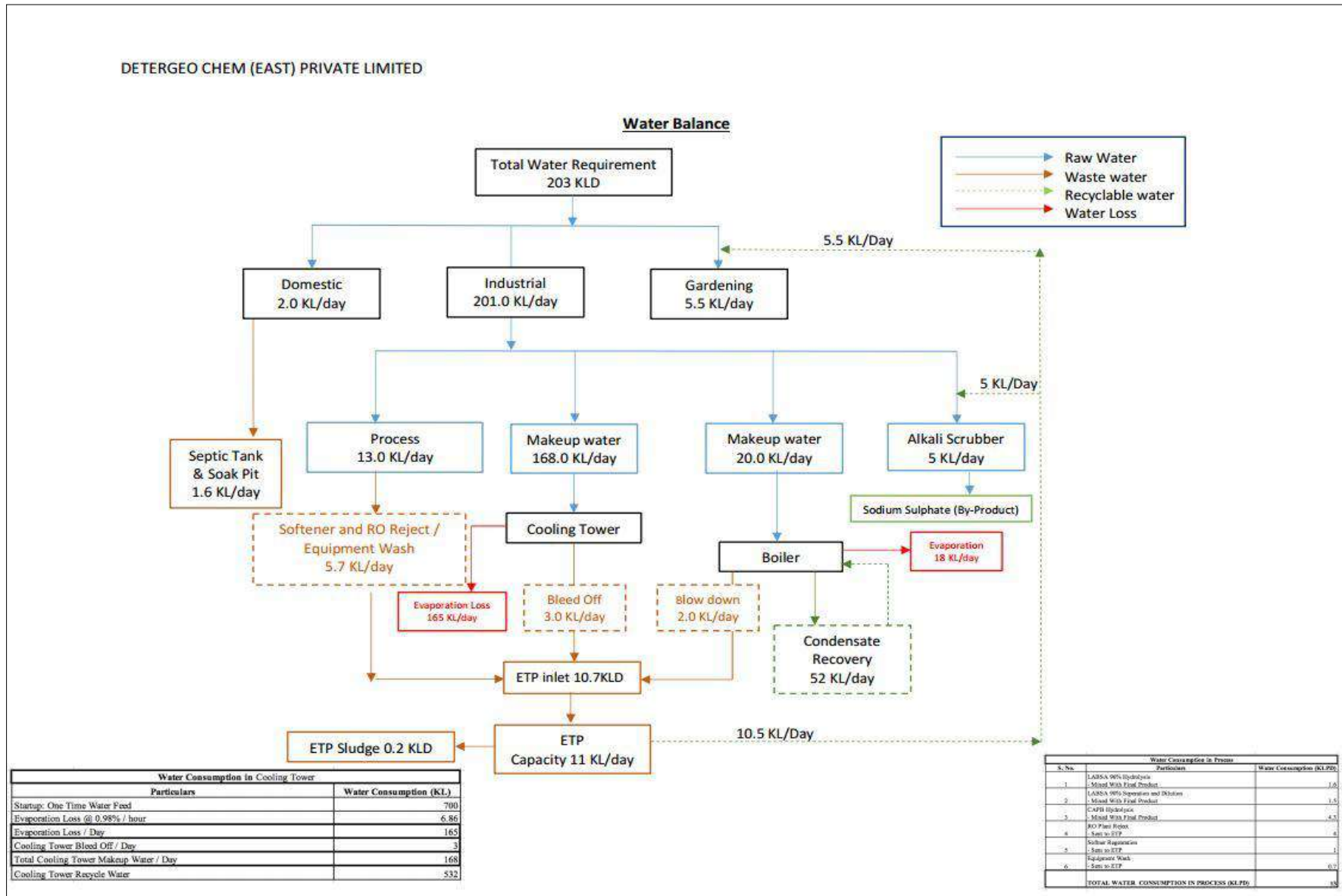


Figure 2.5: Water Balance



2.5.3 Power Requirement

The Power requirement will be 1000 KW sourced through WBSEDCL. Two DG set will be installed as standby power source. Capacity of DG set are given below-

S. No.	Equipment	Capacity
1.	DG Set	910 KVA
2.	DG Set	500 KVA

2.5.4 Manpower

The project will generate permanent employment for 40 person during operational phase and temporary employment for 160 person during constructional phase. Hence the total employment produced 200 person. The details of direct manpower is given in Table 2.5.

Table 2.5: List of Manpower

Detail	Number
Factory managers	01
Plant Operator	06
Yard Supervisor	01
Labour	12
Weighbridge Operator	02
Maintenance Manager	01
Welder	01
Fitter	01
Electrician and Instrument Technician	01
Chemist	05
Accountant	02
Peon	01
Security Supervisor	01
Security	04
Production Manager	01
Temporary employment	160
Total	200

2.5.5 Fuel Requirement

Table 2.6: Details of Fuel Requirement

S. No.	Name of Fuel	Use	Quantity
1.	HSD	DG Set 1	100 L/hr
2.	Sulfur	Sulphonation Plant	500 KG/hr
3.	LDO	2tph Boiler	155 L/hr

2.5.6 Land Requirement

Total land of 13,493.00 Sq.mt (1.3493 ha.) has been allotted in favour of M/s Detergeo Chem (EAST) Private Limited (DCEPL). Land agreement for the same has been enclosed as **Annexure-II**.

The details of land requirement for the project are as follows:-

Details	Area (Sq. Mt.)	% Ratio
Production Shed	1820	20%
Tank Farm	1395	15%
DG Room	60	1%
Electrical Room	120	1%
UG Water Sump	180	2%

Details	Area (Sq. Mt.)	% Ratio
ETP	78	1%
Toilet	36	0%
Workshop	66	1%
Sulphur Yard	285	3%
Barrel Warehouse	120	1%
Office/Store/Canteen	162	2%
Roads	1741	19%
Green Belt	3019	33%
Total Builtup Area	9,082.00	
Earmarked For Future Projects	4,411.00	
Total Land Area	13,493.00	

Land Ownership: The land plot is owned by M/s Detergeo Chem (EAST) Pvt. Ltd.

2.5.7 Infrastructure Requirements

i. Air Drying Plant

The process air is first compressed to a pressure of approximately 1 kg/cm², and chilled to a temperature of 16°C in the air chiller vessel. The chilled air is then dried in automatic desiccant-type air dryers to a guaranteed dew point of 60°C. The dual air dryers are equipped with 11 individual bubble tight control valves. This ensures absolutely no interruption of process air when changing dryers and a smooth pressure transition when changing to regeneration. On power failure, these valves are designed to automatically close to prevent back up of corrosive gas into the dryers and to keep moist atmospheric air from reaching the dryers and gas plant. The cooling air blower supplies cool air to the regenerated (off-line) air dryer to reduce the bed temperature to an acceptable level, prior to bringing the regenerated air dryer back on-line.

ii. SO₃ Gas Plant

Sulfur burning in equipment specifically designed to produce SO₃ gas for sulfonation Converter gas from a sulfuric acid plant contains 10–12% SO₃ and appears to be a potential SO₃ source for Sulphonation. Molten sulphur is supplied to the sulphur burner by a submersible pump from the sulphur melter. A steam and condensate system is utilized to supply the necessary tracing circuits for all the sulphur piping and sulphur melter.

The molten sulphur is delivered to the refractory-lined atomizing sulphur burner where combustion with the dry process air, generates sulphur dioxide (SO₂). The sulphur dioxide gas leaving the burner is cooled and delivered to a four-stage Vanadium oxide catalytic converter, where the gas is filtered and converted to sulphur trioxide (SO₃). An injection air system is used to cool the gas between the converter stages. When the conversion efficiency of the converter approaches 98%, the sulphur trioxide gas leaving the converter is cooled to nearly ambient temperature in a cascade cooler prior to entering the Brinktype inlet mist eliminator which removes traces of sulphuric acid or oleum. Heat recovered from the SO₂ and SO₃ coolers is used to regenerate the air dryers, thus eliminating the need for an external heat source. A Continuous source of dry air-SO₃ gas is required for film Sulphonation and sulfation.

iii. Sulphonation Plant

The Sulfonic acid forms in the unit when an SO₃-in-air mixture is injected into a multi-tube reactor, simultaneously with the desired organic feed. The removable organic distribution flanges are factory calibrated prior to installation in the reactor. Uniform distribution of the air-SO₃ gas is the result of symmetrical gas flow through the reactor. Reaction temperature is also a very important parameter



of control in sulfonation and sulfation process. Cooling jackets in the reactor remove heat of reaction. Organic feed rate to the reactor vessels is measured by means of a highly accurate mass flow meter and controlled by a control valve and centrifugal pump. The organic feed rate is controlled based on the preset sulphur-to-organic mole ratio.

iv. Exhaust Gas Treatment System

The excess/vent gas is separated from the sulphonic acid stream and is directed to the Exhaust Gas Treatment System. The Exhaust Gas Treatment System consists mainly of the following: Wet Electrostatic Precipitator (ESP) and Alkali Scrubber.

The electrostatic precipitator (ESP) employs a proprietary electrode design in an air jacketed bank of collection tubes. The High Intensity Toroidal Electron Corona (HITEC) produced by the electrode charges the inlet particulars, which are collected at the passive tube wall. Coalesced organic acids (bottoms) discharge at the bottom of the vessel. The Alkali Scrubber is used to neutralize the SO_x gases.

v. Hydrolyser

The sulfonic acid stream is diverted to the hydrolyzer vessel for ageing after leaving the reactor outlet. Hydration water is injected and mixed with the sulfonic acid, leaving the digesters to remove anhydrides.

vi. Neutralization Chamber

A continuous neutralizer system is used to make the sulphonates and sulphates. The neutralizer combines sulfonic acid or organo-sulfuric acid with a neutralizing agent, additives, and diluent (water), in dominant bath neutralization.

vii. Auto Control Systems

A typical sulfonation plant control system consists of two components that are integrated into a single system: A main instrument control panel (ICP) and a motor control center (MCC). When properly designed and installed, this system not only allows operation of the sulfonation plant but also improves the operators' understanding of the plant's operation through graphic interfaces. Better control results in improved product consistency and quality. The ICP integrates the loop control, logic control, data acquisition, and operator interface into a single system. The motor control center (MCC) includes a main power disconnect, a lighting transformer, motor starters, variable frequency speed controllers, and disconnects as required for the equipment.

viii. Jacketed Batch Reactors For Sulphate Free Products

There will be four jacketed batch reactors (with agitator) for the production of sulphate-free products. The MOC of these reactors shall be Stainless Steel to ensure highest purity of the products. These jackets of these reactors are connected to the boiler and cooling tower to allow for accurate temperature control. These reactors are designed for an operational temperature upto 300C for maximum safety.

viii. Jacketed Batch Reactors For LABSA 90%

There will be a single jacketed batch reactor having capacity of 35KL for production of LABSA 90%. The MOC of the reactor shall be MS. The reactor will have an agitator along with a provision to circulate the reaction mass using centrifugal pumps. The reactor jacket will be connected to the cooling tower to ensure effective heat removal from the reaction mass.

ix. Gravity Separator For LABSA 90%



There will be a gravity separator for separation of LABSA 90% and Dilute Sulphuric Acid. The MOC of the gravity separator will be MS and it will be coated with a corrosion resistant lining.

x. Flaker For Sulphate Free Products

There will be a flaker that shall be used to convert liquids into dried products, as these are easier to handle and store. The MOC of the flaker shall be Stainless Steel to avoid any contamination of the product.

xi. Stainless Steel (SS) and Mild Steel (MS) Tanks

These tanks are required for storage raw materials and finished products

B. UTILITIES AND OTHERS

1. Pumps
2. Cooling Towers
3. Effluent Treatment Plant
4. Firefighting Systems
5. Administration Building & Security Area
6. Parking Area
7. Green Belt

2.5.8 Availability of Infrastructure

Availability of infrastructure and facilities denote the level of overall development in the study area. The list of industries, schools, colleges and hospitals located near the study area are given below-

S No.	Infrastructure detail	Direction	Distance
1	Bainan Baman Das High School (H.S)	SW	3.41 km
2	Schools	SW	3.78 km
3	Quality PVC Industries	W	4.9 km
4	Life Line Hospital	SSW	8.6 km

2.5.9 List of Equipments

Table 2.7: List of Equipments

S. No.	Description	Quantity	Capacity
1.	Sulfur Trioxide Gas Generation Plant	1	1250 kg/hr
2.	Air Drying Unit	1	9000 CMPH
3.	Film Sulphonation/Sulphation Reactor	1	5000 kg/hr
4.	Neutralization Unit	1	5000 kg/hr
5.	Water Purification Plant	1	10 kl/hr
6.	Cooling Tower	3	700 m3/hr (Total)
7.	Vent Gas Treatment System with ESP	1	6000 CMPH
8.	Screw Chiller	2	100 TR
9.	Waste Heat Recovery Boiler	1	850 kg/hr
10.	Electricity Generator	1	1000KW
11.	Weigh Bridge	1	100 MT
12.	Pumps	As Per Requirements	
13.	Water Hydrants System	As Per Requirements	
14.	LABSA 90% Batch Reactor	1	35 KL
15.	LABSA 90% Seperator	1	35 KL
16.	Reactors with Agitators	4	15 KL
17.	Flaker	1	1500 kg/hr



S. No.	Description	Quantity	Capacity
18.	Nitrogen Generator	1	200 Nm3
19.	Oil Based Boiler	1	2000 kg/hr

2.5.10 Reactor Vessel Specifications

S. No.	Process Unit	Vessel Parameters	Values	Unit
1.	Multi-tube Film Sulphonation Reactor (Used For LABSA 96%, AOS, SLS, SLES)	Material of Construction	SS316L	8mm
		Volume	5000	KG/hr
		Operating Pressure	800-1000	mmwc
		Type	Multitube-continuous Type (Shell-Tube)	
		Stirrer	Nil	
		Design Temperature	120	Celcius
		Operating Temperature	40-60	Celcius
2.	"Amidation / Esterification Batch Reactor (Used For CMEA, CAPB, CDEA, EGDS, EGMS)"	Material Of Construction	Main Shell-SS316L Jacket- MS	Shell- 10mm Jacket-6mm
		Volume	15 x 3	KL x nos
		Operating Pressure	200-300	mmhg (vacuum)
		Type	Jacketed-Batch Type	
		Stirrer	100	RPM
		Design Temperature	300	Celcius
		Operating Temperature	40-150	Celcius
3.	Quaternisation Reactor (Used For CAPB)	Material Of Construction	Main Shell-MS Lining- Glass	Shell- 12mm Lining- 2mm
		Volume	15 x 1	KL x nos
		Operating Pressure	740-760 (Atmospheric)	mmHg
		Type	Batch Type	
		Stirrer	100	RPM
		Design Temperature	300	Celcius
		Operating Temperature	40-150	Celcius
4.	Batch Sulphonation Reactor (Used For LABSA 90%)	Material Of Construction	MS	Shell- 16mm Jacket- 8mm
		Volume	35	KL
		Operating Pressure	740-760 (Atmospheric)	mmHg
		Type	Jacketed-Batch Type	
		Stirrer	Nil	
		Design Temperature	120	Celcius
		Operating Temperature	50-60	Celcius
5.	Alkali Scrubber For Sulphonation Plant (Other Emmision protection)	Material Of Construction	FRP	
		Srbbing Media	NaOH	
		Capacity	10,000.00	m3/hr

	devices- ESP & Cyclone Separator)	Type	Packed Column - PP	
		Stack Height	30	metre

2.5.11 Boiler Specification

S. No.	Process Unit	Vessel Parameters	Values	Unit
1	Oil Fired Boiler	Capacity	2	mt / hr
		Pressure	8-10	Bar
		Fuel	LDO	
		Fuel Consumption (at 100% Capacity)	155	litres / hr
		Stack	30	metre
2	Waste Heat Recovery Boiler	Capacity	1500	kg / hr
		Pressure	4-5	Bar
		Fuel	Sulfur	
		Fuel Consumption	500	kg / hr
		Stack (same as sulphnation plant stack)	30	metre

2.5.12 Stack Specifications

S. No.	Stack Details	Stack Parameters	Values	Unit
1.	Sulphonation Plant (Vent Gas from ESP & Scrubber)	MOC	MS	
		Diameter	600	mm
		Height	30	metre
		Exit Gas Temperature	30-40	Celcius
2.	Oil Fired Boiler (Bag Filter)	MOC	MS	
		Diameter	450	mm
		Height	30	metre
		Exit Gas Temperature	180	Celcius
3.	Diesel Generator 1 x 910 Kva 1 x 500 Kva	MOC	MS	
		Diameter	250	mm
		Height	11	metre
		Exit Gas Temperature	As per DG Standards	

2.6 PROJECT DESCRIPTION WITH PROCESS DETAILS

SULPHATES

Sulfur Trioxide Gas Generation

Sulfur trioxide gas is generated by burning sulfur at high temperature and sulfur dioxide then formed in presence of air which later converted to sulfur trioxide in presence of a catalyst in a well closed loop system. Industrially SO₃ is made by the contact process. Sulfur dioxide, which in turn is produced by the burning of sulfur. After being purified by filtration, the SO₂ is then oxidized by atmospheric oxygen at between 400 and 600°C over a catalyst. A typical catalyst consists of vanadium pentoxide (V₂O₅) activated with potassium oxide K₂O on kieselguhr or silica support. The heat generated during this process is utilized for steam generation. This steam is consumed in various uses like sulfur melting, Air-drying and water chilling etc.

Sulphonation / Sulphation Unit

The Sulfonic acid forms in the unit when an SO₃-in-air mixture is injected into a multi-tube reactor, simultaneously with the desired organic feed. The removable organic distribution flanges are factory calibrated prior to installation in the reactor. Uniform distribution of the air-SO₃ gas is the result of symmetrical gas flow through the reactor. Reaction temperature is also a very important parameter of control in sulfonation and sulfation process. Cooling jackets in the reactor remove heat of reaction. Organic feed rate to the reactor vessels is measured by means of a highly accurate mass flow meter and controlled by a control valve and centrifugal pump. The organic feed rate is controlled based on the preset sulphur-to-organic mole ratio. Exhaust gas is separated from the acid recycle stream in the liquid separator and cyclone vessels. For the production of sulfonic acid, the acid product is fed directly to the digestion system where reaction with absorbed SO₃ goes to completion.

Neutralization

The Sulphonic acids produced after Sulphonation of LAB/AO/LE/LA is neutralized to make their respective sodium salt.

This process takes place by mixing Sulphonic acid with liquid sodium hydroxide solution up to getting neutral pH of the product. This reaction is exothermic hence, proper cooling is provided to the neutralization vessel. The product is formed as paste, which then diluted with pure water to get desired concentration of liquid.

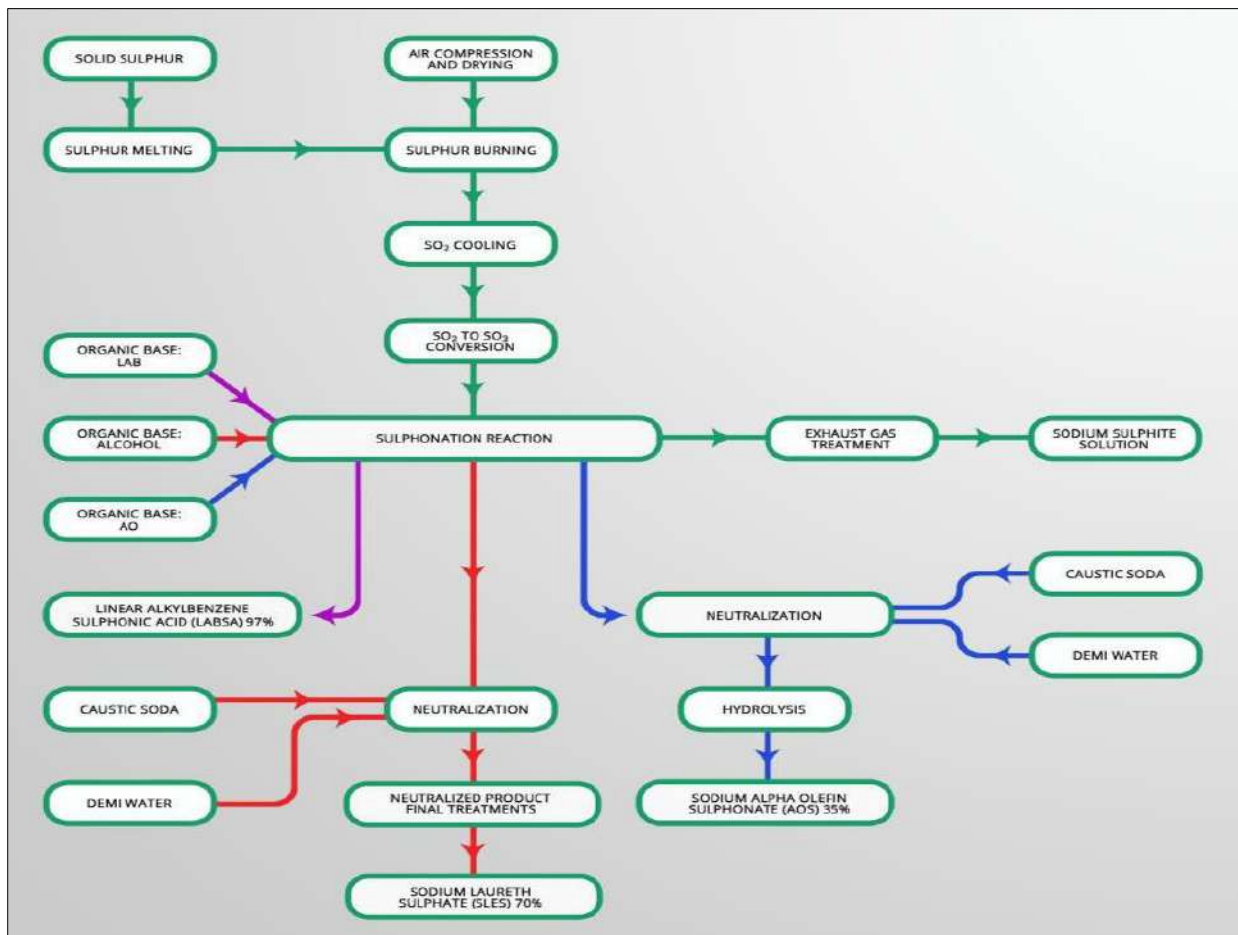


Figure 2.6: Line Diagram of Continuous Sulphonation Plant

BATCH SULPHONATION PROCESS

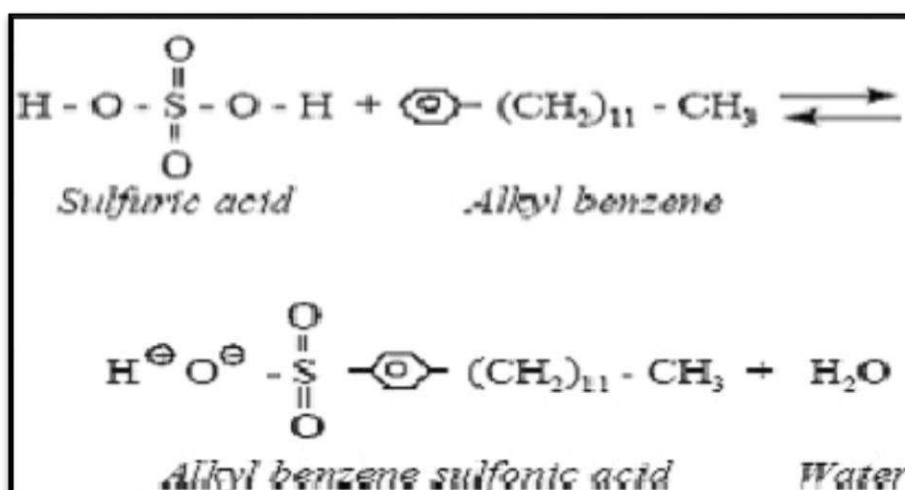


LABSA 90% is produced by sulphonating Linear Alkyl Benzene (LAB) with Sulphuric Acid (98%). The equipment used are MS/SS reactor vessels. The required amount of LAB is transferred to Reaction Vessel and Sulfuric Acid is added gradually. The reaction is highly exothermic and the acid addition rate is determined by the ability to remove the heat of reaction. The temperature should be maintained below 65°C for optimum product quality. The temperature is controlled by circulating water in jacket of the vessel. The mixture is continuously stirred to ensure homogenous mixing and completion of reaction between LAB and Sulphuric Acid. The mixture now contains LAB Sulphonate (LABSA) and Sulphuric Acid. To facilitate the separation of LABSA and Sulphuric Acid, water has to be added to the total mass. The water addition (typically about 6 to 8% by weight of the reaction mixture) causes a phase separation to occur between the sulfonic acid and the diluted sulfuric acid. The separation takes place in a separate, lined vessel and occurs over a period of about 30 minutes. The Dilute Sulphuric Acid (80-85%) forms the bottom layer and is transferred to a storage tank. LABSA forms top layer and is transferred to a separate storage tank. The Dilute Sulphuric Acid (80-85%) is sold to authorized end users for further beneficial uses like: SSP Fertilizer, Zinc Sulphate, Magnesium Sulphate and Alum.

This is a highly exothermic reaction; therefore, effective heat removal is very important to get a high quality final product. The reactants increase in viscosity between 15 and 300 times as the organic feedstock is converted to the sulfonic acid. This large increase in viscosity makes heat removal difficult. The high viscosity of the formed products reduces the heat transfer coefficient from the reaction mass. Effective cooling of the reaction mass is essential because high temperatures promote side reactions that produce undesirable by-products. Also, precise control of the molar ratio of SO₃ to organic is essential because any excess SO₃, due to its reactive nature, contributes to side reactions and by-product formation. Therefore, commercial scale sulfonation reactions require special equipment and instrumentation that allows tight control of the mole ratio of SO₃ to organic and rapid removal of the heat of reaction. Sulfuric acid (H₂SO₄) is widely used as sulphonating agent. It is an equilibrium process, as water is formed in the reaction and the resultant water dilutes the sulfuric acid. This process has the dual advantage of low SO₃ cost and low capital equipment cost as compared to the gas sulphonation route.

The raw material consumption for per ton of LABSA 90% is as follows:
LAB: 680 +/- 10 KG

Sulphuric Acid 98% : 1000+ / 100 kg.



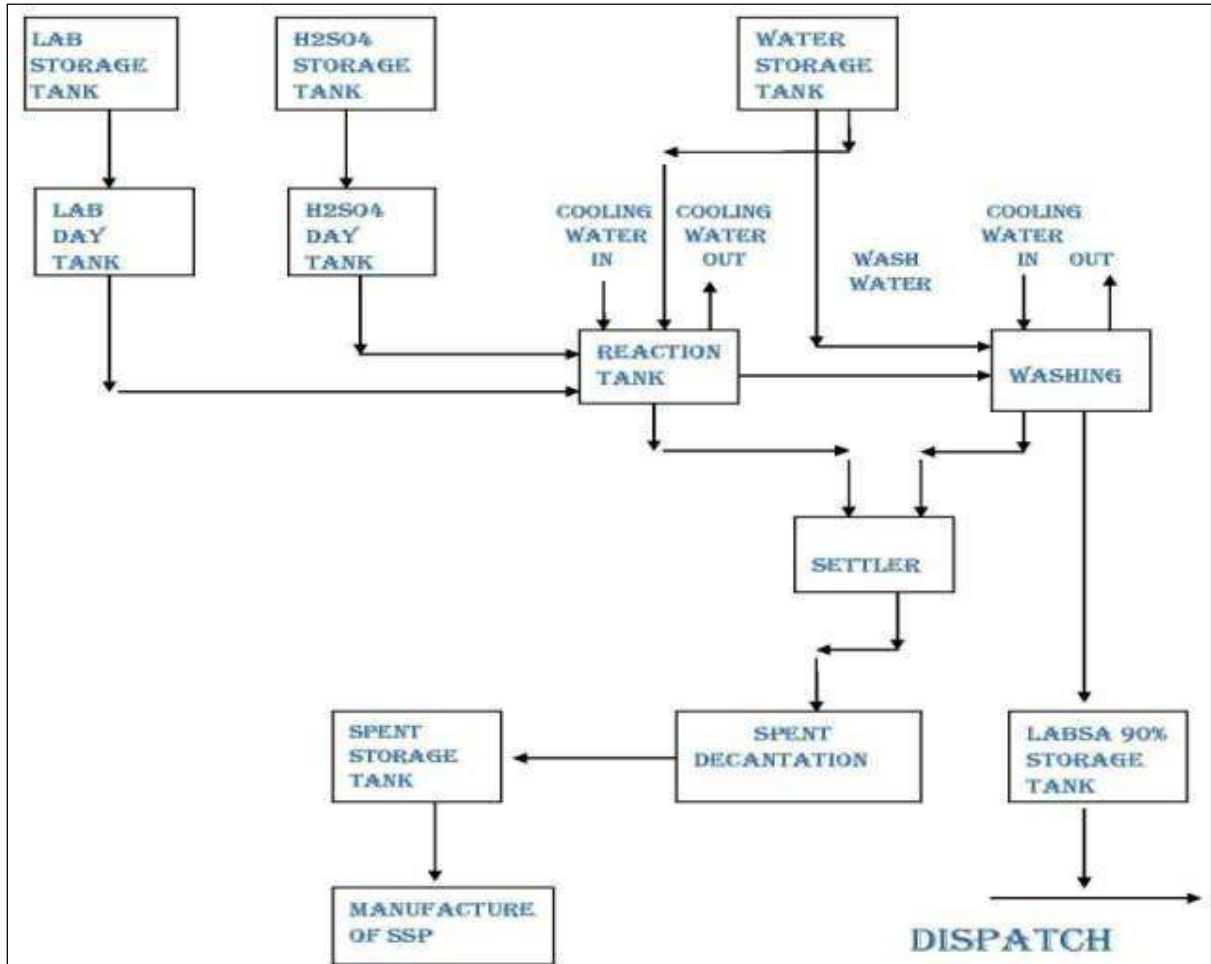


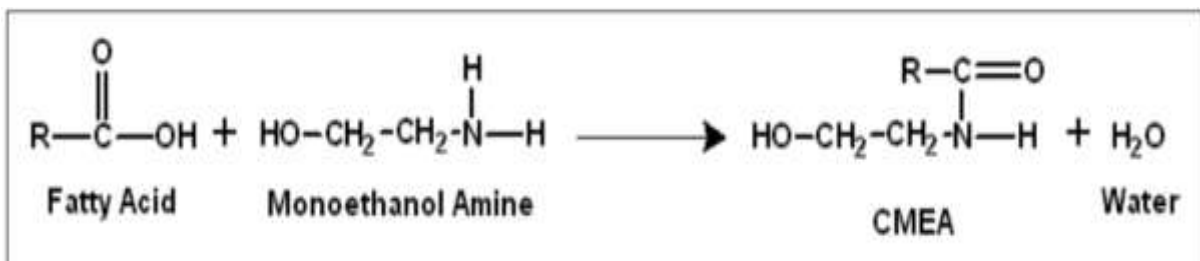
Figure 2.7: Line Diagram of Continuous Sulphonation Plant

SULPHATE-FREE

The sulphate-free products, i.e., Coco-amido-propyl Betaine, Cocamide Mono-ethanol-amide, Cocamide Di-ethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate, are produced in an agitated batch reactor. The same reaction system is used for all products however the raw materials differ based on the final product that needs to be produced.

Cocamide Mono-ethanolamine

Esterification of Coco Fatty acid with Monoethanolamine is carried out at 140 -160°C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



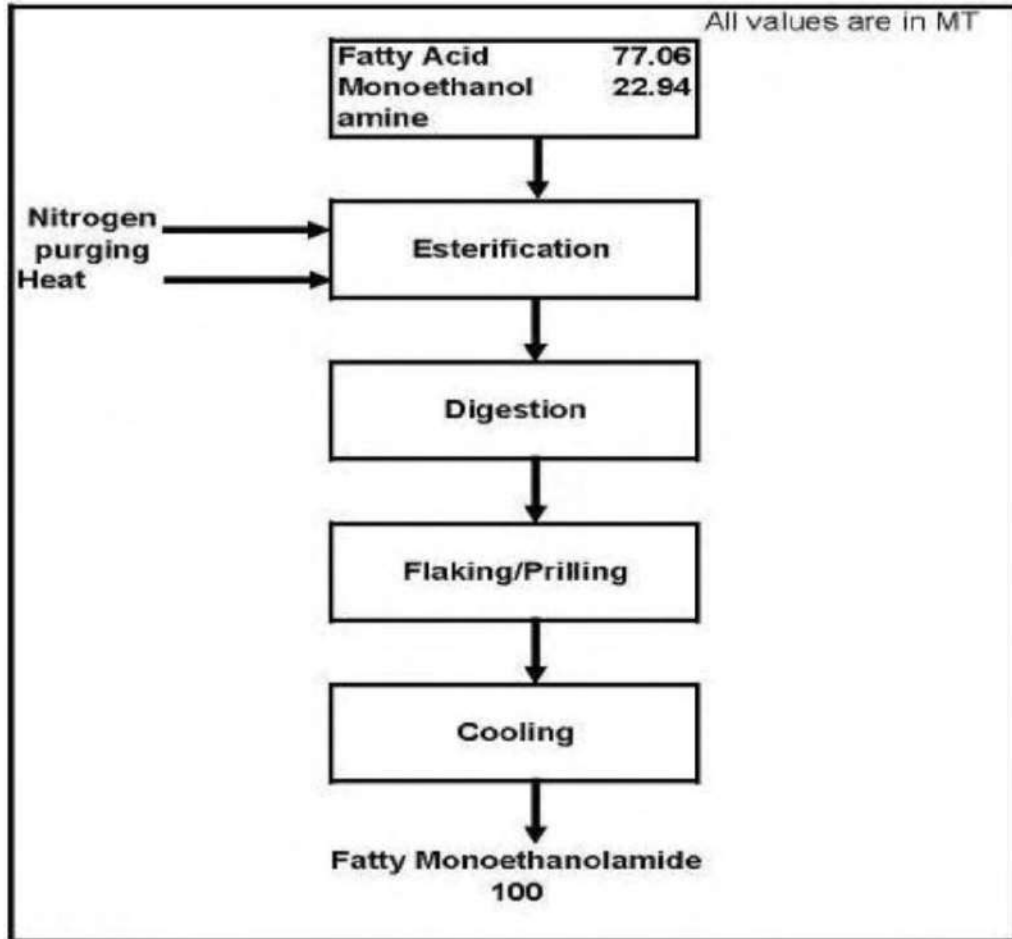
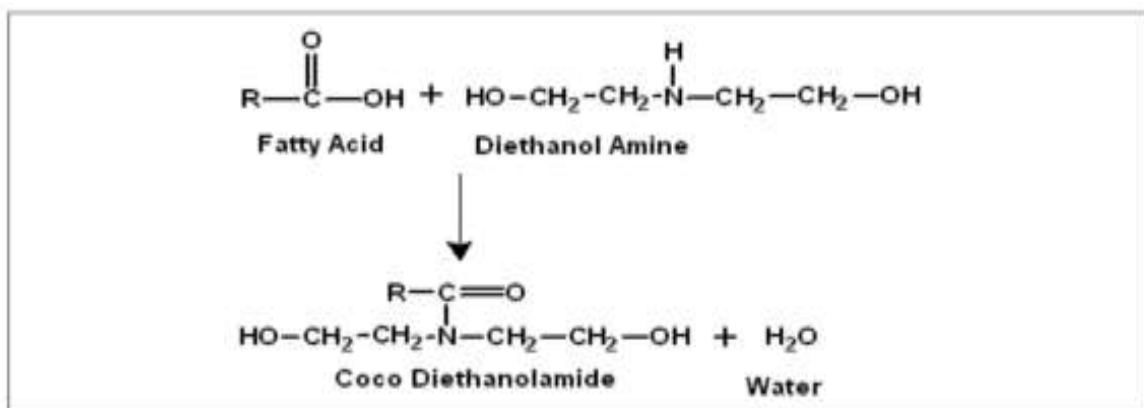


Figure2.8: Line Diagram of CMEA Plant

Cocamide Di-ethanol-amide

Esterification of Fatty acid with Di ethanolamine is carried out at 140-160°C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed is directly filled in containers.



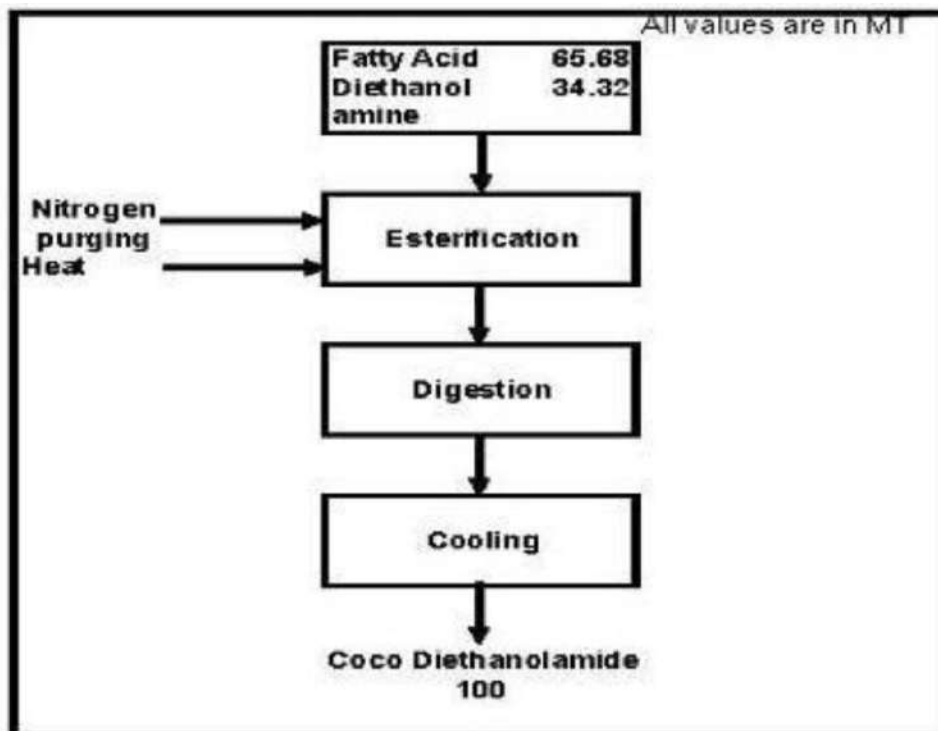
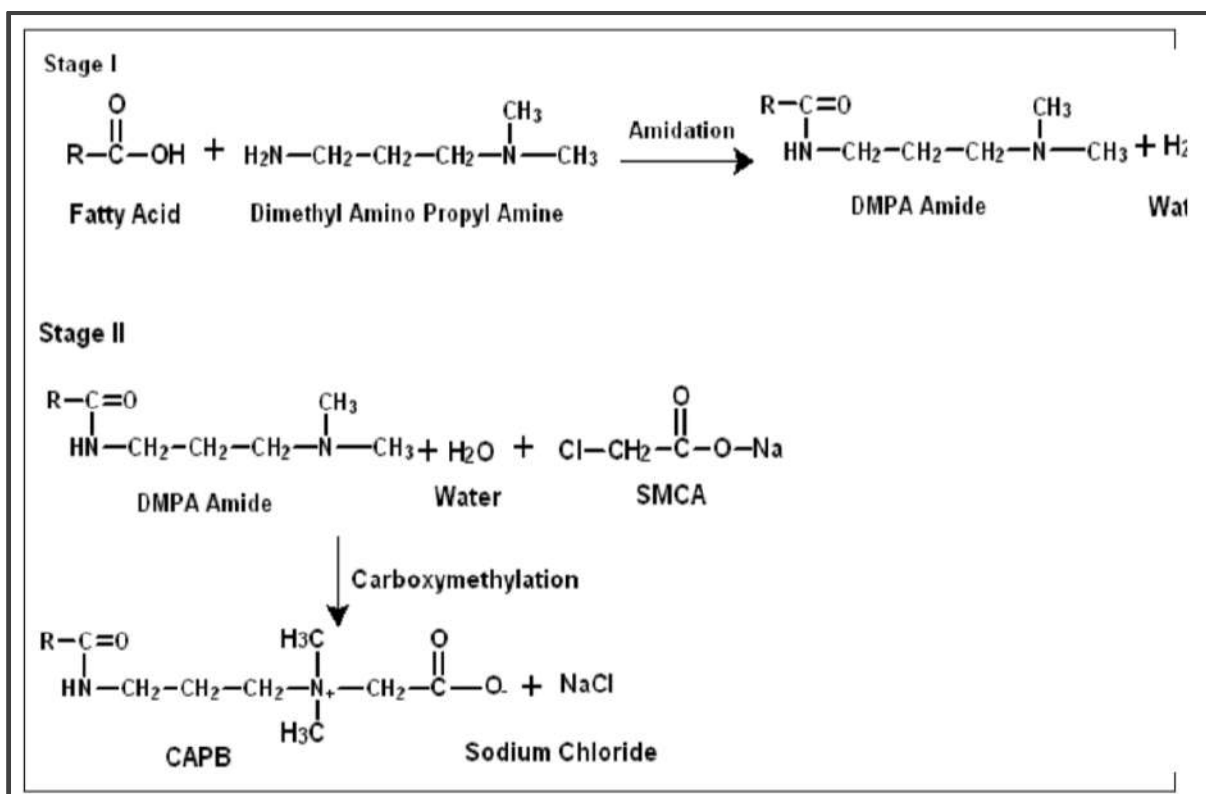


Figure 2.9: Line Diagram of CDEA Plant

Coco-amido-propyl Betaine

Amidation of Fatty acid is carried out with Di-methyl-amino-propyl-amine at 140 -160°C in presence of Nitrogen. The amide formed is quaternized with mono-chloroacetic acid and Sodium Hydroxide 48%. Water is added to make the product in liquid form. After the quaternization is over, pH of the product is adjusted if required. The Liquid product is directly filled in containers.



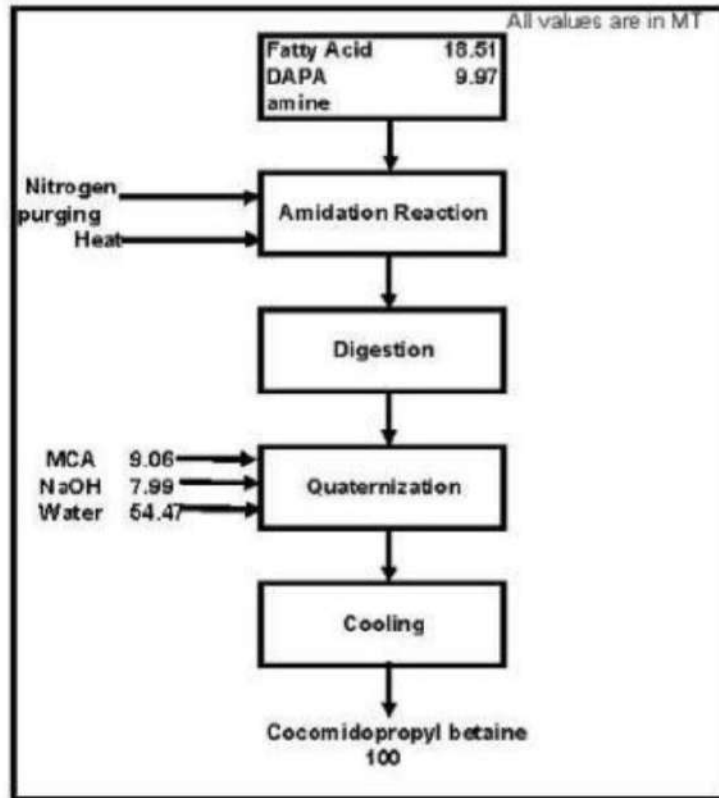


Figure 2.10: Line Diagram of CAPB Plant

Ethylene Glycol Monostearate

Esterification of stearic acid is carried out using ethylene glycol at 140-160°C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.

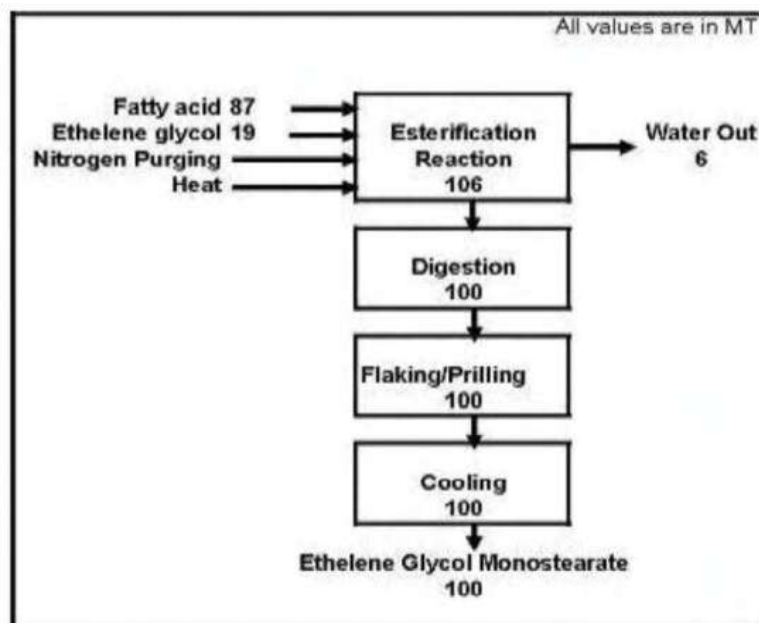
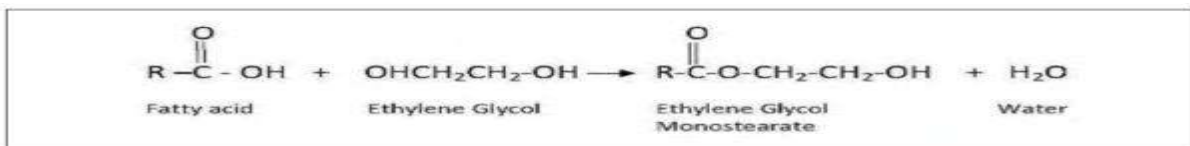


Figure 2.11: Line Diagram of EGMS Plant

Ethylene Glycol Distearate

Esterification of 2 moles of stearic acid is carried out using 1 mole of ethylene glycol at 140-160°C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.

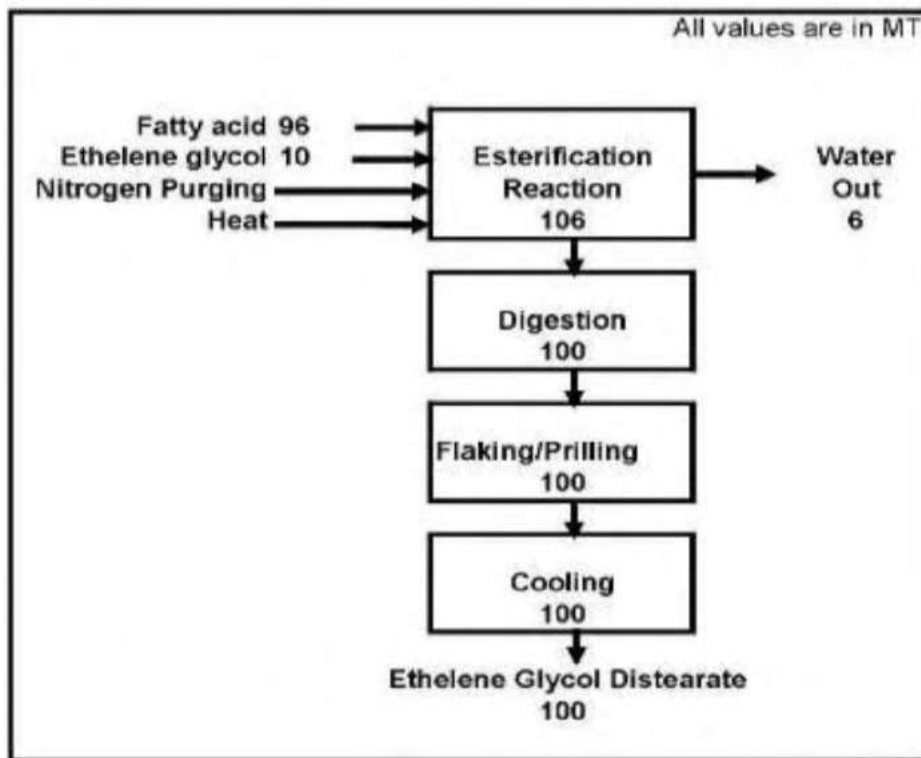
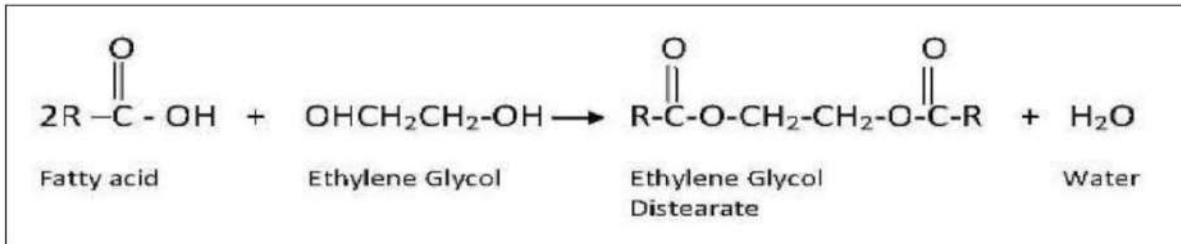


Figure 2.12: Line Diagram of EGDS Plant

2.7 QUANTITY OF WASTES TO BE GENERATED AND SCHEME FOR THEIR MANAGEMENT/ DISPOSAL

2.7.1 Waste Water Generation Details & Management

Table 2.8: Details of Waste Water

S. No.	Particulars	Water Consumption (KLPD)	Treatment
1	Domestic Sewage	1.6	Septic Tank / Soak Pit
2	Utilities and Process		
	Cooling Tower Blowdown	3	ETP
	Boiler Blowdown	2	ETP
	Softner Regeneration	1	ETP
	RO Reject	4	ETP
	Equipment Wash	0.7	ETP

The total waste water generation is 10.7 KLPD which will be treated in our in-house ETP and this treated water will be re-used in the scrubber and for gardening purpose

2.7.2 Solid Waste (Hazardous & Non-hazardous wastes)

The solid waste generated from proposed project will be as follows:

Details of Hazardous Waste

S. No.	Name of Waste	Quantity (MTPA)	Waste Type	Disposal Method	Source of Waste	Physical Status
1.	ETP Sludge (Category 35.3)	1.0 MTPA	Incinerable	Give to TSDF	ETP Filter	Solid
2.	Sulphur Ash	1.0 MTPA	Utilise for further beneficial use	Sell to fertilizer industry	Expired Raw Material	Solid
3.	Spent Oil (Category 5.1)	15 lt/yr	Recyclable	Sell to authorized oil reclamation plant	Pumps, DG, Equipment Seals	Oily

Details of Non-Hazardous Waste

S. No.	Name of Waste	Quantity	Waste Type	Disposal Method	Source Of Waste	Physical Status
1.	Discarded Plastic Bags	100 Bags/Yr	Recyclable	Give to authorized recyclers	Stores/Offices	Solid
2.	Used HDPE Drums	500/Yr	Recyclable	Re-use / Give to authorized recyclers	Plant / Warehouse	Solid

2.8 POLLUTION CONTROL & MITIGATION MEASURES

2.8.1 Summary of Control & Mitigation Measures

A brief statement of the pollution control and mitigation measures, incorporated in the project proposal to meet Environmental Standard, Environmental Operating Conditions and other relevant requirements, is presented in Table 2.9. Detailed descriptions of the main pollution control & mitigation system are provided in subsequent sections.

Table 2.9: Summary of Pollution Control & Mitigation Measures

S. No.	Particulars	Mitigation measures to be adopted
1.	Air Environment	<ul style="list-style-type: none"> The emission sources will be D.G. Set, sulphonation process and are designed with adequate stack heights and air pollution control measures to meet the standards set by the WBPCB / CPCB. The air emissions generated from the sulphonation plant will be treated in the Wet Electrostatic Precipitator (WESP) and Wet Alkali Scrubber System. Chemical Storages tanks will be closed and only breathing vent will be there, as such there will be no fugitive emission there. Process reactor vent with Cyclone Separato, ESP (Electro Static Precipitator) and Alkali scrubber to remove all fugitive emissions. The boiler will be provided with bag filters to collect the PM particles. Online Air monitoring system for stack emission (for Particulate Matter) will be installed and transmission of online data to WBPCB and CPCB will be done. Greenbelt development (33%) of total area.



S. No.	Particulars	Mitigation measures to be adopted
2.	Water Environment	<ul style="list-style-type: none"> Domestic sewage to be treated in septic tank and disposed in soak pit. The blow down from boiler and circulating cooling water system will be process in ETP. The entire process effluent will be treated in ETP and the treated water will be used in Alkali Scrubber and Gardening. The facilities will be operated with zero effluent discharge. Online effluent quality monitoring system to be installed at the outlet of the unit for measurement of the parameters flow, pH, COD, BOD & TSS etc. and transmission of online data to SPCB and CPCB to be done.
3.	Solid/Hazardous Waste Environment	<ul style="list-style-type: none"> ETP Sludge from ETP Filter will be collected and disposed at TSDF site. Spent oil to be sold to authorized oil reclamation plant. Used HDPE Drums to be Re-use/ sold to authorized recyclers. Discarded Plastic Bags sold to authorized recyclers. Used lead Acid batteries will be exchanged for new batteries. Electrical and electronic waste will be sold to authorized recyclers.
4.	Noise Environment	<ul style="list-style-type: none"> The Noise free machines of latest technology will be installed. The green belt will (plantation of dense trees across the boundary) help in reducing noise levels, generated as a result of attenuation of noise generated due to plant operations, and transportation. Earmuffs would be used while working in noisy area D.G sets are provided with acoustic enclosures to control the noise level within the prescribed limit. A high standard of maintenance and proper lubricants will be practiced for plant machinery and equipment's, which helps to avert potential noise problems.
5.	Odour management	<ul style="list-style-type: none"> Scrubber system is used to control the odour. The remedial measures will be taken such as better house-keeping by regular steaming of all the equipment's. Temperature will be kept under control during the process. The green belt will (plantation of dense trees across the boundary)

2.9 PROJECT COST

The cost for the proposed project is estimated at 20.0 Crores. After obtaining Environmental Clearance (EC) and Consent to Establish for the proposed project, construction activity will be commenced.

CHAPTER-3 : DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

This chapter illustrates the description of the existing environmental status of the study area with reference to the major environmental attributes. The existing environmental setting is considered to establish the baseline conditions, which are described with respect to physical environment, air environment, water environment, noise environment, traffic pattern and density, land environment, biological environment and socio economic environment.

The monitoring of environmental parameters was conducted within the core zone and buffer zone (10 km radial distance) from project site located at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal, in accordance with the guidelines issued by the MoEF&CC, CPCB, and SPCB during the study period (Dec. 2023-Feb 2023).

Baseline Environmental status in and around the proposed, depicts the existing quality of Air, Noise, Water, Soil, Ecology & Biodiversity and Socio-economic environment. Based on the baseline data, environmental impact assessment is carried out and Environmental Management Plan is prepared.

3.2 STUDY AREA AND STUDY PERIOD

Studies of various environmental parameters have been done within 10 km radius area of the proposed project site. The impact identification always commences with the collection of baseline data such as Ambient Air Quality, Micro-Meteorology, Ground and Surface Water Quality, Noise levels, Soil Quality, Land use pattern, Biological Environment, Socio-economic Environment, Geology and Hydrology within the study zone of 10 km radius.

STUDY PERIOD

The baseline environmental study was done during post monsoon season, i.e. December 2023 to February 2024 by Mantec Laboratory, NABL Accredited Lab and Certificate No. TC-6440 dated 11.06.2022 valid until 10.06.2024 in accordance with the Guidelines for EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. Secondary data was also collected from different government sources/Authorities.

3.3 ENVIRONMENTAL ASPECTS

The scope of establishing pre-project environmental setting is as per standard TOR issued by MoEF&CC vide its File No. J-11011/1/2020-IA-II(I) dated 10.03.2020. As part of the study, description of biological environment and human environment such as environmental settings, demography & socio-economics, land-use/ land cover, ecology & biodiversity have been carried out for entire 10 km radius.

- Land Environment
- Air Environment
- Noise Environment
- Soil Environment
- Water Environment
- Biological Environment
- Socio-economic Environment

3.3.1 Methodology

The data was collected from both primary and secondary sources. Secondary meteorological data of the nearest IMD station, Howrah was considered for the selection of air monitoring stations. Micrometeorological data at site was also recorded using Automatic Weather Station. Apart from these, secondary data have been collected from Census Handbook, Revenue Records, Statistical Department, Soil Survey and Land use Organization, District Industries Centre, Forest Department, Central Ground Water Authority, etc.

The sampling locations were identified based on:-

- Existing topography and meteorological conditions
- Location of human habitation and other sensitive areas present in the vicinity of the project site.
- Representative areas for baseline conditions
- Accessibility for sampling

The scoping and the extent of data generation were formulated based on interdisciplinary team discussions, and professional judgment keeping in view of TOR assigned by EAC, New Delhi. The various parameters surveyed and studied for the baseline study are tabulated below-

Table 3.1: Environmental components and their methodologies

S. No.	Environmental components	Parameters	Methodology
1	Air	Meteorology (Temp., RH, WS, WD, RF)	USEPA(Meteorological Monitoring guidance for regulatory modeling applications)
		Ambient Air Quality (PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO)	IS-5182 part-14, CPCB (guidelines for measurement of Ambient Air Pollutants).
2	Water	Water Quality (Surface & Ground)	Standard limits: Surface- CPCB Water quality criteria Ground-IS 10500:2012 Sampling Methodology- IS:3025 Part-1
3	Noise	Ambient Noise Quality (L _{max} , L _{min} , Leq)	IS:9989(Assessment of noise with respect to community response)
4	Soil	Soil Quality (pH, EC, BD, , Texture, SAR, Key nutrients, OM, OC)	Sampling Methodology and Analysis- IS: 2720/soil chemical analysis by M.L Jackson
5	Land Use	Land use types, Land schedules, Satellite imagery	Bhuvan, NRSA
6	Ecology	Ecology studies (Floristic diversity, Terrestrial ecosystem sustainability, Green belt development, sinking capacity of pollutants)	Field Study / Secondary Data
7	Socio Economic	Demography and Occupational details, agricultural situation etc.	Census, District report, Public Consultation by Questionnaire survey
8	Hydrology & Geology	Geological, Hydrological, Geo-morphological studies	Geological Survey of India, NRSC
9	Traffic Study	PCU/hr, LOS	IRC 64:1990, ARAI, CPCB.

3.4 AIR ENVIRONMENT

The design of monitoring network in the air quality surveillance program was based on the following considerations:

- Meteorological conditions
- Topography of the study area
- Representation of regional background levels
- Representation of site
- Representation of cross sectional distribution in the downward direction
- Inclusion of major distinct villages to collect the baseline status

3.4.1 Meteorological data

The study area is located in district Howrah. The maximum temperature recorded was 31°C and the minimum temperature was 18°C have been recorded.

Historical data of meteorological parameters also plays an important role in identifying the general meteorological status of the region before the start of baseline study. The data generated in the field is compared with the historical data in order to identify changes, which may have taken place during the course of time.

3.4.2 Micro-meteorological data Primary Data

Micro-meteorological data within the project area during the air quality survey period is an indispensable part of air pollution study.

The meteorological data recorded during study period is very useful for proper interpretation of the baseline information as well as for input to predictive models for air quality impacts for collection of Primary data. An Automatic Weather Station was installed at the site, for three months (December 2023 to February 2024) and it has recorded hourly observations for the parameters like Maximum and Minimum Temperature (°C), Relative Humidity (%), Wind Speed (Km/hr), Wind direction and Rainfall (mm). The hourly-recorded observations (wind velocity and wind directions) during 12 weeks study period are used in computing percentage frequencies and are depicted in the form of “wind roses” (Figure. 3.1). The summarized meteorological data is provided in Table 3.2.

Table 3.2: Onsite Meteorological Data (Period: December 2023- February 2024)

Months	Temp (°C)		Relative Humidity (%)	Average wind speed (Km/h)	Total Rainfall (mm)
	Max	Min	Average	Average	
Dec. 2023	27	18	46	9.5	10.63
Jan. 2024	28	16	40	8.8	7.77
Feb. 2024	31	19	46	10.5	6.05

During the study period wind rose diagram indicates predominant wind direction is from NW to NE.



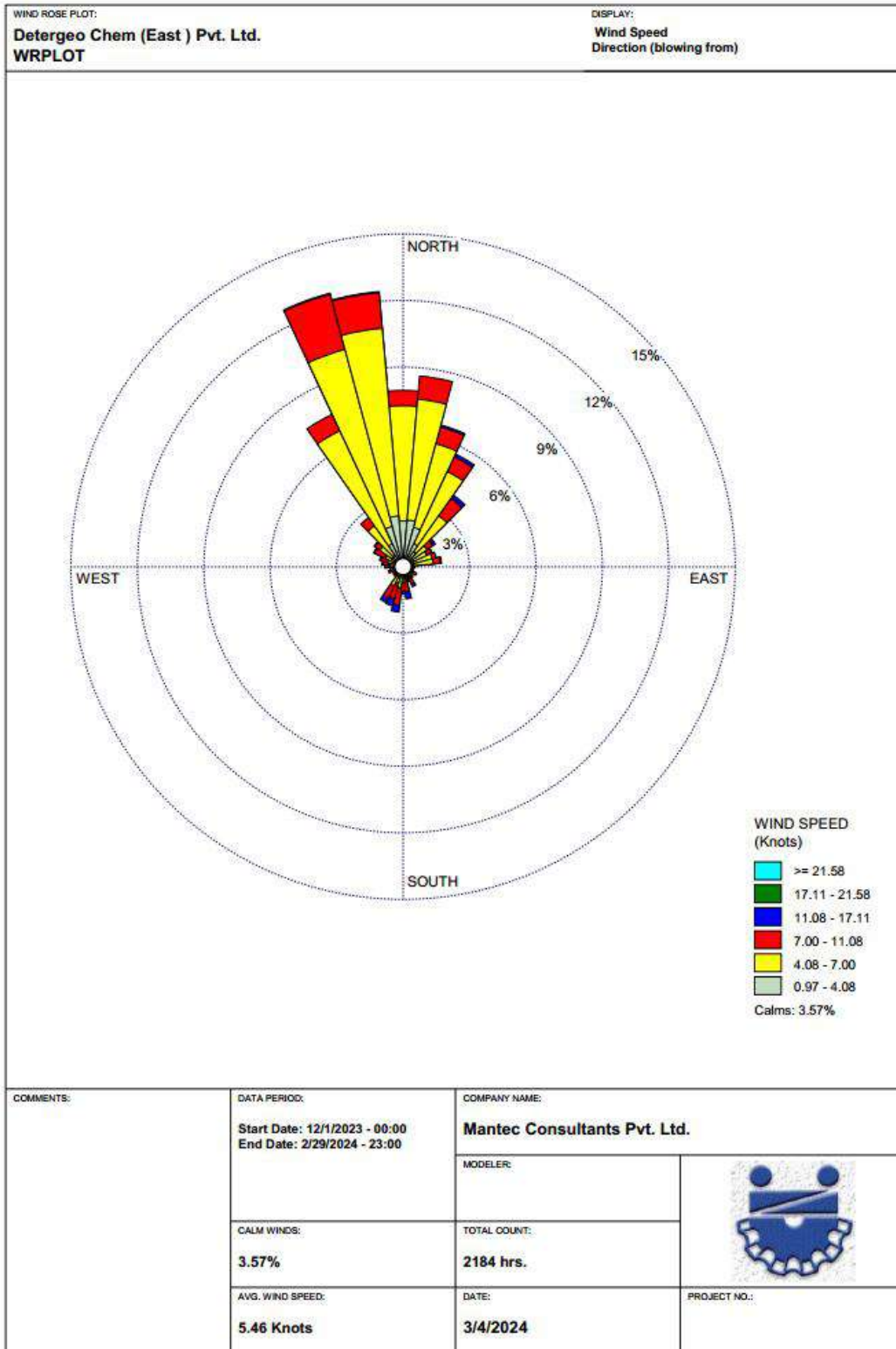


Figure 3.1: Wind Rose Diagram of Study Period

3.5 AMBIENT AIR QUALITY

Ambient air quality monitoring is done to determine the general background concentration levels of pollutant. The prime objective of the ambient air quality study is to assess the existing air quality of study area and to establish the existing ambient air quality within the study area and its conformity to NAAQS.

3.5.1 Selection of Sampling Locations

The sources of air pollution in the region are small scale and medium scale industries, vehicular traffic, dust arising from unpaved village roads and domestic fuel burning. The due consideration during the selection of sampling locations was given to the likely affected zones during Project activity. Eight (8) numbers of monitoring stations were set up to assess the existing air quality of the study area. One station was located inside the proposed project site (core zone) and remaining seven others, outside (buffer zone) the proposed project site. The locations of the monitoring stations were based on the frequent wind directions (secondary data) in order to site the stations as close as feasible to the anticipated maximum pollutant deposition areas moreover duly considering human habitation and proximity to sensitive zones within the study area. Logistic considerations as ready accessibility, security, availability of reliable power supply etc. were examined while finalizing the monitoring locations. The Ambient Air Quality Monitoring locations have been presented in Figure. 3.2.

Table 3.3: Showing Ambient Air Monitoring Locations

S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site
AQ-1	Project site	22°31'50.82"N	87°55'50.48"E	---
AQ-2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N
AQ-3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km, W
AQ-4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW
AQ-5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S
AQ-6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE
AQ-7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E
AQ-8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE

3.5.2 Methodology

As per the scope of work, 8 ambient air quality monitoring stations were monitored for specific air pollutants during the study period. All the instruments (samplers) were installed between 1 to 4 m above ground level, which was free from any obstructions. The sampling and analysis of required parameters were carried out as per IS:5182 and NAAQS Monitoring & Analysis Guideline, Volume 1. Following are the parameters monitored during the study period.

Particulate Matter (PM₁₀ and PM_{2.5})

Sulphur dioxide (SO₂)

Nitrogen dioxide (NO_x)

Carbon Monoxide (CO)

Table 3.4: Techniques Adopted/Protocols for Ambient Air Quality Monitoring

S. No.	Parameters	Techniques	Technical Protocol
1	Sulphur Dioxide (SO ₂)	West & Geake	IS:5182(P2)
2	Nitrogen Dioxide(NO ₂)	Jacob & Hochheiser	IS:5182(P6)
3	ParticulateMatterPM ₁₀	Gravimetric	IS:5182(P15)
4	ParticulateMatterPM _{2.5}	Gravimetric	IS:5182 Part-24
5	Carbon-monoxide as CO	NDIR	IS:5182(P-10)

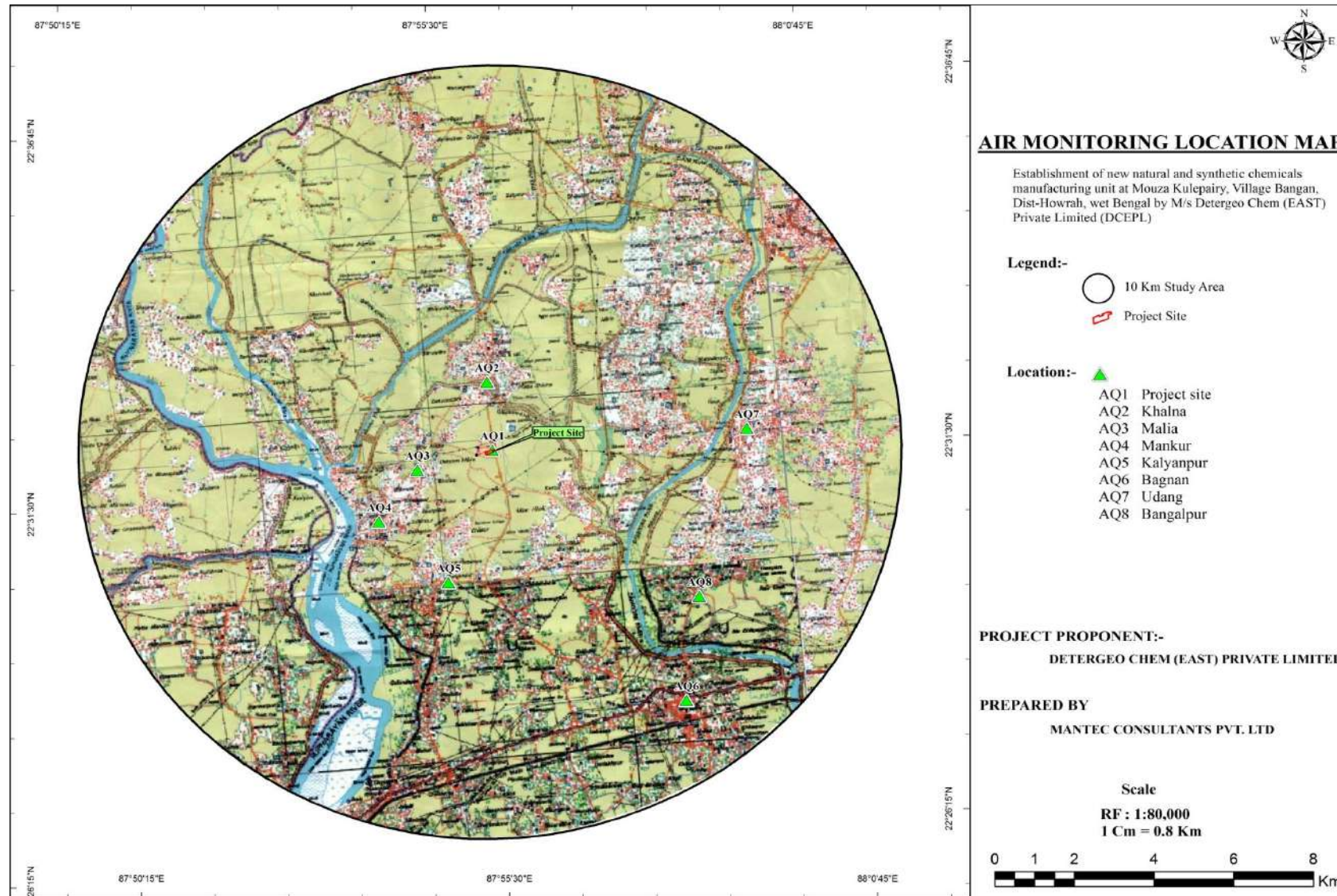


Figure 3.2: Ambient Air Quality Monitoring Location

3.5.3 Air Quality Standards

The National Ambient Air Quality Standards for the above mentioned pollutants, notified vide NAQS Notification dated 18th November, 2009, are presented in **Table 3.5**.

Table 3.5: Ambient Air Quality Standards

S. No.	Pollutant	Time weighted Average	Concentration in air	
			Industrial, residential, rural and other areas	Ecologically sensitive area (notified by Central Govt.)
1.	Sulphur dioxide (SO ₂), µg/m ³	Annual*	50	20
		24 Hours**	80	80
2.	Nitrogen dioxide (NO ₂), µg/m ³	Annual*	40	30
		24 Hours**	80	80
3.	Particulate matter PM ₁₀ , µg/m ³	Annual*	60	60
		24 Hours**	100	100
4.	Particulate matter PM _{2.5} , µg/m ³	Annual*	40	40
		24 Hours**	60	60
5.	Carbon monoxide (CO), mg/m ³	8 Hours**	02	02
		1 Hour**	04	04
6.	Ammonia (NH ₃), µg/m ³	Annual*	100	100
		24 Hours**	400	400

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly or at uniform interval.

** 24 hourly, 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

3.5.4 Data Analysis

The Ambient Air Quality survey has been carried out at 8 locations within 10 km radius around the proposed project site. Measurement of Particulate pollutant (PM₁₀ & PM_{2.5}) and gaseous pollutants (SO₂, NO_x and CO) levels helps to understand the existing environmental scenario. The results of all the locations were further computed for statistical parameters like Minimum, Maximum concentrations and Arithmetic mean (AM). The results are shown in Table No.-3.6.

Table 3.6: Ambient Air Quality Data

LOCATIONS	POLLUTANTS	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
	NAAQS	100 (µg/m ³)	60 (µg/m ³)	80 (µg/m ³)	80 (µg/m ³)	2 (mg/m ³)
AQ1	Max	78	45	16	30	0.97
	Min	60	34	10	18	0.58
	Avg	70.42	40.25	12.21	24.04	0.77
	98 percentile	78	45	15.54	30	0.93
AQ2	Max	72	42	14	27	0.94
	Min	52	30	9	17	0.58
	Avg	65.96	35.08	11.54	22.25	0.73
	98 percentile	72	41.08	14	27	0.92
AQ3	Max	76	44	15	30	0.85
	Min	58	28	9	17	0.58
	Avg	66.75	35.46	11.21	22.54	0.73

	98 percentile	76	43.08	14.54	29.08	0.84
AQ4	Max	78	45	16	32	0.86
	Min	66	34	10	18	0.54
	Avg	72.46	39.13	13.08	25.58	0.72
	98 percentile	78	44.54	15.54	31.08	0.86
AQ5	Max	76	42	16	32	0.91
	Min	58	31	10	21	0.65
	Avg	67.58	35.67	12.54	24.96	0.78
	98 percentile	76	41.08	15.54	31.54	0.89
AQ6	Max	79	46	16	26	0.94
	Min	58	28	10	15	0.63
	Avg	65.71	35.71	12.25	19.67	0.78
	98 percentile	77.16	44.16	16	26	0.94
AQ7	Max	74	42	16	30	0.94
	Min	56	28	10	18	0.57
	Avg	64.83	34.75	12.25	24.13	0.76
	98 percentile	74	42	15.54	30	0.94
AQ8	Max	72	42	16	32	0.89
	Min	54	25	10	20	0.57
	Avg	64.83	33.38	12.88	25.21	0.72
	98 percentile	72	41.08	15.54	31.08	0.87

(Source: Mantec Laboratory)

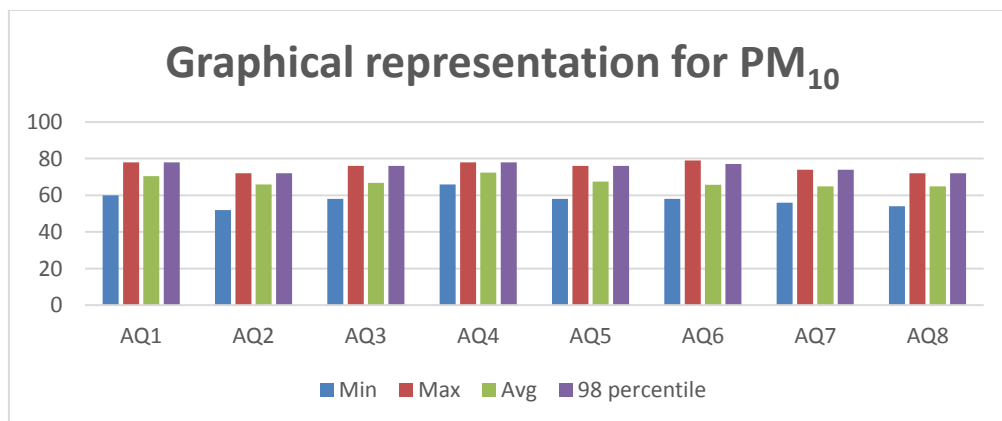


Figure 3.3 Graphical representations of PM₁₀

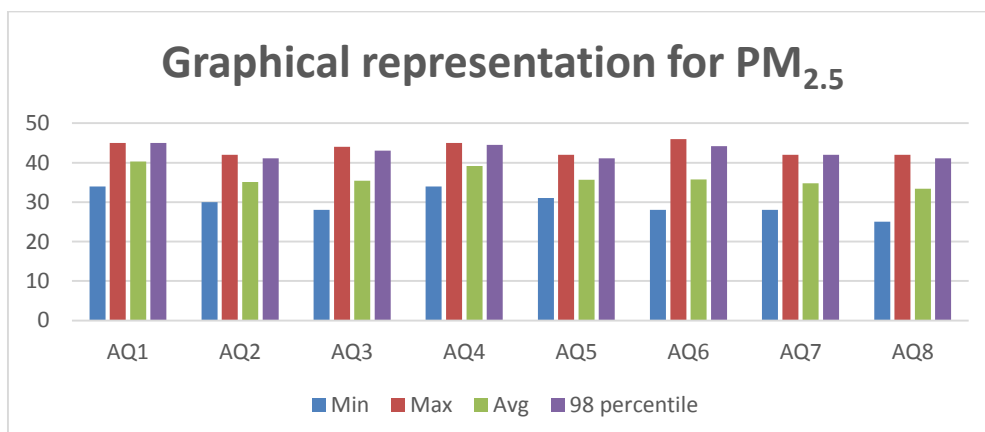


Figure 3.4 Graphical representations of PM_{2.5}

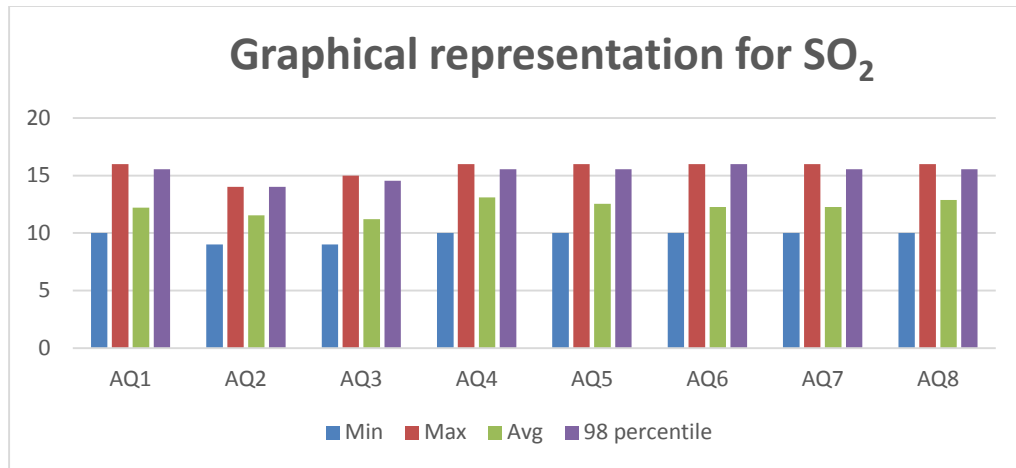


Figure 3.5 Graphical representation of SO₂ pollutant

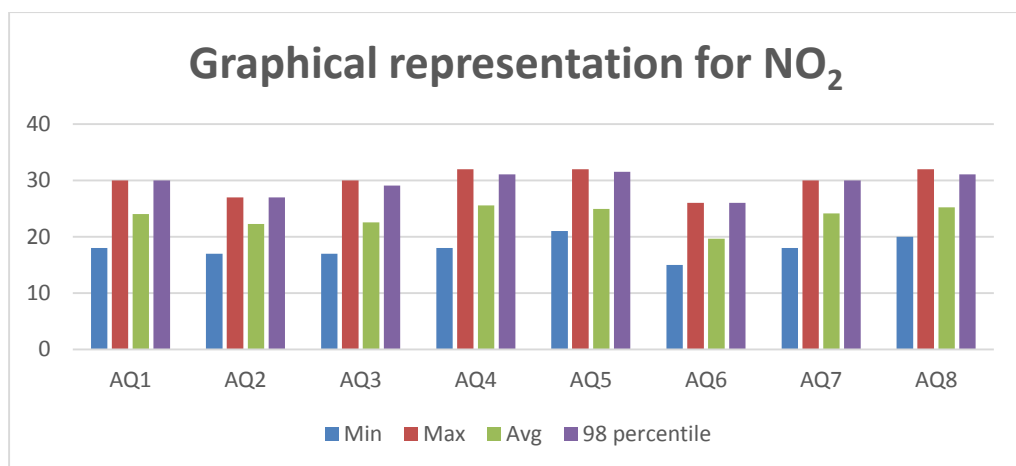


Figure 3.6 Graphical representation of NO₂ pollutant

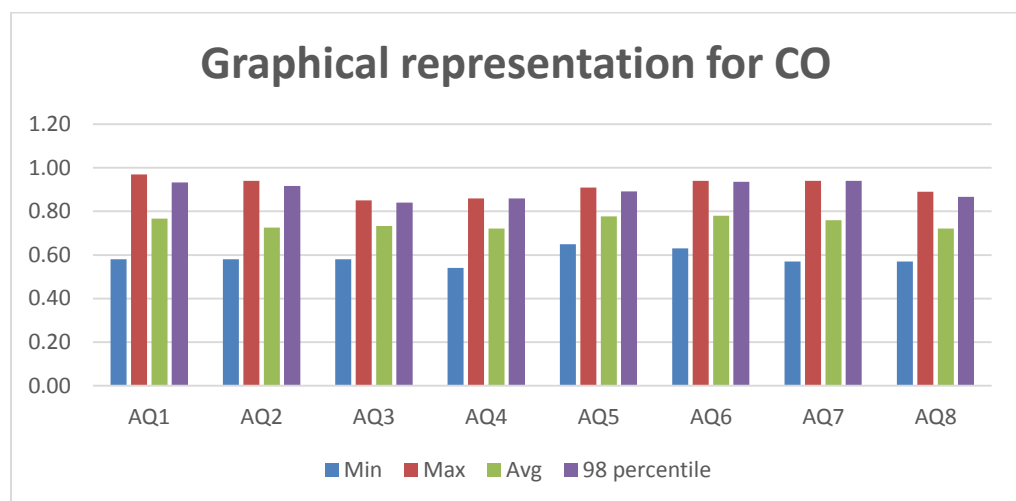


Figure 3.7 Graphical representation of CO pollutant

3.5.5 Interpretation:

Ambient Air Quality Monitoring reveals that the **minimum** and **maximum concentrations of PM₁₀** for all the 8 Air Quality monitoring stations were found to be **52µg/m³** and **79µg/m³** respectively, while for **PM_{2.5}** varies between **25µg/m³** and **46µg/m³**. As far as the gaseous pollutants SO₂, NO₂, & CO are concerned, the prescribed limits under NAAQ Standards for residential and rural areas has never surpassed at any station. The **minimum** and **maximum concentrations of NO₂** were found to be **15 µg/m³** and **32 µg/m³** respectively. The **minimum** and **maximum concentrations of SO₂** were



found to be **9 µg/m³** and **16 µg/m³** respectively. The **minimum** and **maximum concentrations of CO** were found to be **0.54 mg/m³** and **0.97 mg/m³** respectively. The prescribed limits of SO₂ and NO₂ are 80 µg/m³ and CO is 2mg/m³ for residential and rural areas has never surpassed at any monitoring station.

As per the analytical reports of the 10 Km study area the ambient air quality are well below the NAAQS limits. However, after commissioning of the project the prevailing baseline status of area will be distributed so to maintain the ambient air quality of the area, the latest/modern air pollution control measurements along with suitable EMP will be adopted, which will be elaborated in Chapter-4 of the report.

3.6 NOISE ENVIRONMENT

3.6.1 General

Noise can be defined as unwanted sound or sound in the wrong place at the wrong time. Noise can also be defined as any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. It has an adverse effect on human beings and their environment, including land, structures and domestic animals. Noise can also disturb natural wildlife and ecological systems.

Environmental noise can have several effects varying from hearing loss to annoyance. Sufficiently loud noise may -

- Cause hearing loss or health damage;
- Interfere with work tasks, specially those involving concentration of mind;
- Interfere with speech communication;
- Affect inter-room privacy;
- Interfere with sleep; and
- Cause annoyance.

3.6.2 Standards for Ambient Noise Level

The Ministry of Environment, Forests and Climate Change has notified the ambient air quality standards in respect of noise for different area categories vide gazette notification dated February 14th, 2000 under the Environment Protection Act (1986). These standards are given in Table-3.7.

Table 3.7: Ambient Noise Quality Standards

Area Code	Category of Area	Noise dB(A) Leq	
		Daytime*	Nighttime*
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. Day Time is reckoned between 6AM and 9PM
2. Night Time is reckoned between 9PM and 6AM.
3. Silence Zone is defined as area upto 100 metres around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority. Use of vehicular horns, loudspeakers and bursting of crackers shall be banned in these zones.



4. *Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.*
- *dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is related to human hearing.*
 - *“A”, in dB(A), denotes the frequency weighing in the measurement of noise and corresponds to frequency response characteristics of the human ear.*

3.6.3 Noise Monitoring Locations

The statistical analysis (Table-3.9) is done for recorded noise levels at 8 locations. The location of Noise Quality Monitoring stations are depicted in Figure. 3.8.

Table 3.8: Ambient Noise Quality Monitoring Station

S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site	Category of Area
NQ-1	Project site	22°31'50.82"N	87°55'50.48"E	---	Industrial
NQ-2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N	Residential
NQ-3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km, W	Residential
NQ-4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW	Residential
NQ-5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S	Residential
NQ-6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE	Residential
NQ-7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E	Residential
NQ-8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE	Residential

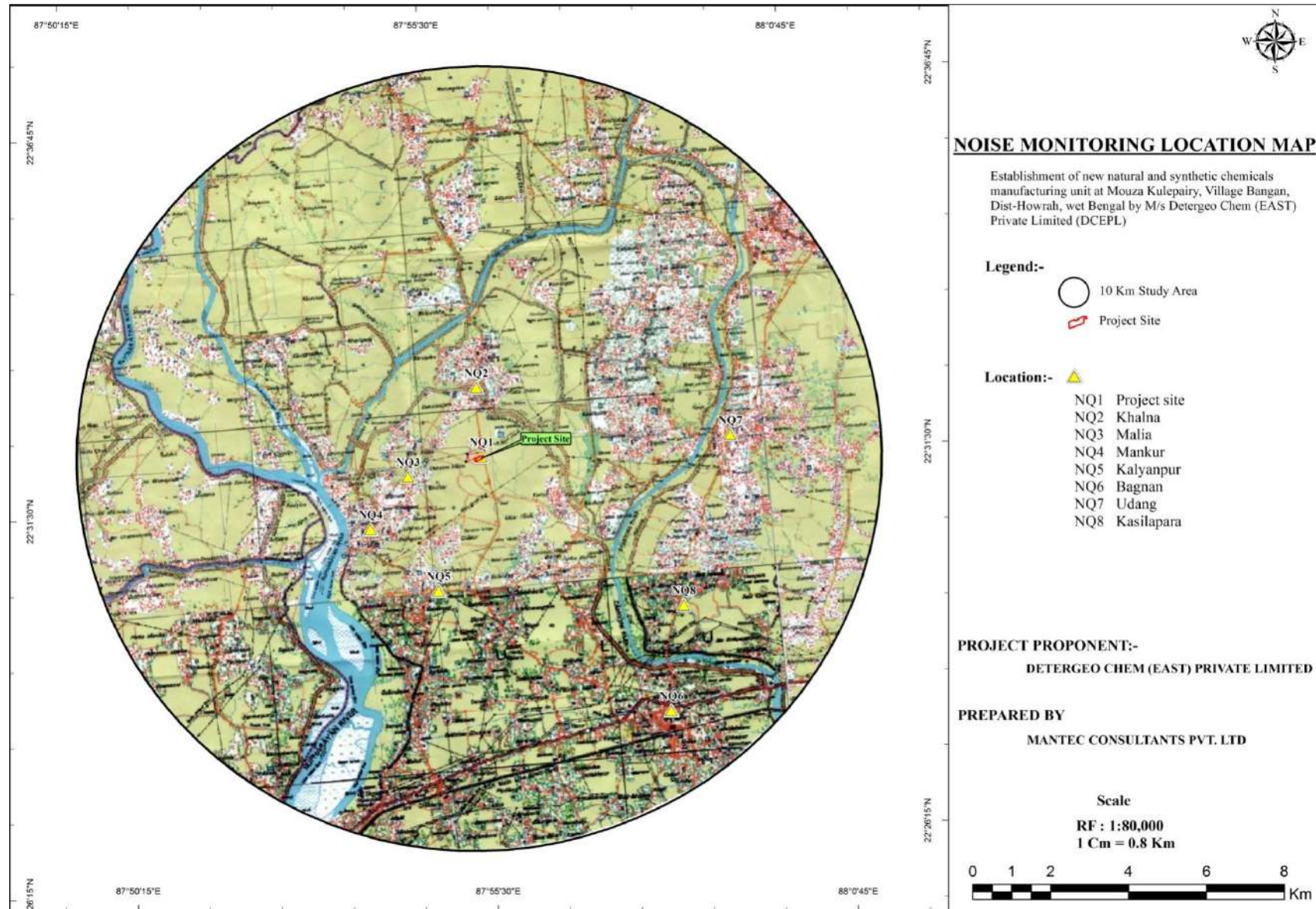


Figure 3.8: Noise Quality Monitoring Locations

3.6.4 Methodology

The intensity of sound energy in the environment is measured on a logarithmic scale and is expressed in a decibel (dB) scale. Ordinary sound level meter measures the sound energy that reaches the microphone by converting it into electrical energy and then measures the magnitude in dB. In a sophisticated type of sound level meter, an additional circuit (filters) is provided, which modifies the received signal in such a way that it replicates the sound signal as received by the human ear and the magnitude of sound level in this scale is denoted as dB(A). The sound levels are expressed in dB(A) scale. Noise levels were measured using an Integrating sound level meter, with an indicating mode of Lp and Leq. Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in “A” weighting set the sound level meter was run for one hour time and Leq was measured at all locations. Day time Leq and night time Leq values were computed from these measured 1 hour Leq values. The day noise levels represent the value during 6.00am to 10.00 pm and night noise levels, during 10.00pm to 6.00am at all the six locations covered under the study.

3.6.5 Results and discussion

The values observed during the study have been presented separately for day-time and night-time. The observed values have also been presented graphically in Figure 3.9.

S. No.	Noise Location	DOS	Standards of Noise Level			Noise Level db(A)	
			Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
1	Project Site	01.02.2024	Industrial	75	70	62.3	48.6
2	Khalna	04.02.2024	Residential	55	45	42.5	39.7
3	Malia West	08.02.2024	Residential	55	45	50.4	46.5
4	Mankur	02.02.2024	Residential	55	45	52.3	41.8
5	Kalyanpur	05.02.2024	Residential	55	45	46.7	38.2
6	Bainan	09.02.2024	Residential	55	45	52.8	42.6
7	Udang	03.02.2024	Residential	55	45	46.2	39.2
8	Bangalipur	06.02.2024	Residential	55	45	44.5	38.1

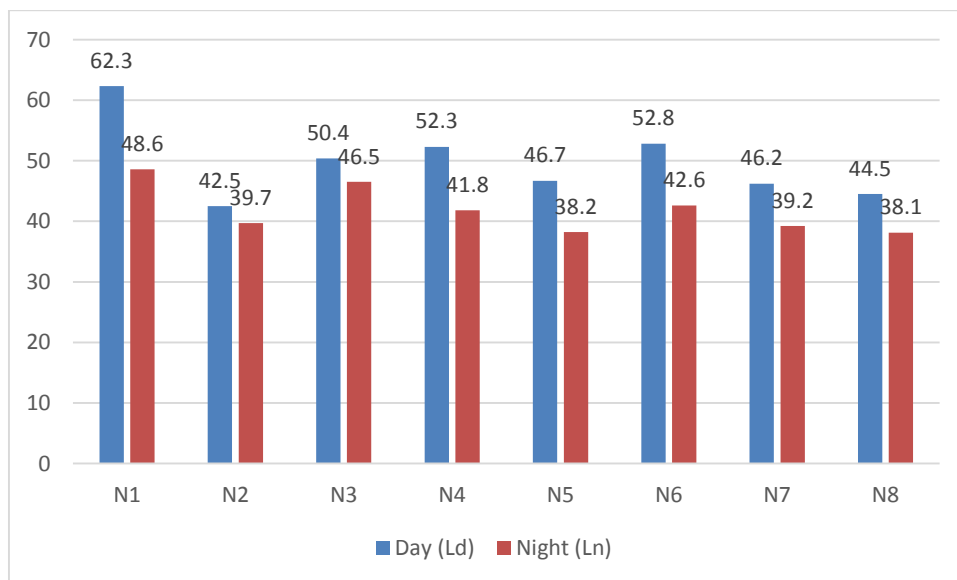


Figure 3.9: Equivalent Noise Levels at all locations

3.6.6 Interpretation

- The noise levels at project site is found to be 42.5 - 62.3Leq dB (A) for day and 38.1 - 48.6Leq dB (A) night time respectively.
- The high levels of noise in day for project site can be attributed due to constuction, operation, and vehicular activities. The night levels of Noise are low in residential area as well as industrial area. The Noise Levels are low in residetantial areas due to less vehicular activies.
- The noise levels at all location are well below the NAAQS standards w.r.t. noise.

3.7 TRAFFIC STUDY

Traffic study measurements were performed at National Highway-06 and SH-15 from Amta to Bagnan to assess impact on local transport infrastructure due to this proposed project.

National Highway-06 is present approximately at 7.5 Km from the plant, which is used, for the transportation purpose only, proper tuning of vehicles shall be ensured to avoid the traffic congestion.

Table 3.9: Existing Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
SH-15	135	700	0.19	A
NH-6	320	1500	0.21	B

Source: Capacity as per IRC: 106-1990

V= Volume of Vehicles in PCU's/hour& C= Capacity of Road in PCU's/hour.

The existing Level of Service (LOS) is "A" i.e. excellent for MDR & "B" i.e. Very Good for NH-60.

V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor

S. No.	Type of Vehicle	Additional Vehicle per day	PCU	Total Number of Vehicle in PCU/day	Total Number of Vehicle in PCU/hour
1.	Truck	42	3	126	5.25
2.	2 Wheeler	24	0.5	12	0.5
3.	Bus	4	3	12	0.5
4.	Car	30	1	30	1.25
Total				180	7.5 or say 8

Table 3.10: Modified Traffic Scenario & LOS

Road	Increased PCU's	V	C	Modified V/C Ratio	LOS
SH-15	135+7	142	700	0.20	A
NH-6	320+7	327	1500	0.21	B

3.7.1 Conclusion:

From the traffic study it is observed that there is not much load on the existing roads and highways. Therefore, the additional load on the carrying capacity of the concerned roads is not likely to have

any adverse effect on the LOS. The LOS value from the proposed project may be change for SH-15 NH-06, which is showing Excellent & Very Good condition.

3.8 WATER ENVIRONMENT

Water of high quality is essential to human life, and water of acceptable quality is essential for agricultural, industrial, domestic and commercial uses; in addition, most recreation is water based; therefore, major activities having potential effects on surface water are certain to be of appreciable concern to the consumers.

3.8.1 Methodology

Water samples were collected from 14 locations (6 Surface Water & 8 Ground water) (Figure3.10). Samples were collected as per IS:3025 (Part 1) methodology. Necessary precautions were taken while collecting, preserving and transporting. The parameters like pH, temperature and DO were measured at the site while collecting the sample. For analyzing other parameters the samples were brought to Head Laboratory situated in Noida. All the parameters were analyzed as per "Methods of Sampling and Test (Physical and Chemical) for water and waste water" IS:3025 and 'Standard Methods for the Examination of Water and Wastewater' APHA. The results are then compared with the CPCB Water Quality Criteria of water. Water samples were collected from the study area to assess the water quality during the study period. The locations of ground water and surface water sampling stations are described in Table 3.11 and Table 3.12, respectively.

Table 3.11: Monitoring Location of Surface Water

S. No.	Location	Dist (Km)	Dir.	Latitude	Longitude
SW1	Rupnarayan river	3.8	W	22°31'31.56"N	87°53'32.22"E
SW2	Damodar River	4	SE	22°30'44.44"N	87°57'51.51"E
SW3	Mendeshwari River	4.8	NW	22°32'33.83"N	87°53'1.71"E
SW4	Kanashabat Nadi	6.2	SW	22°30'39.40"N	87°52'19.88"E
SW5	Hurhur Khal	3.8	N	22°33'56.45"N	87°55'46.07"E
SW6	Gaighata Khal	1	NE	22°32'26.13"N	87°56'1.93"E

Table 3.12: Monitoring Location of Ground Water

S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site
GW-1	Project site	22°31'50.82"N	87°55'50.48"E	---
GW -2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N
GW -3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km , W
GW -4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW
GW -5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S
GW -6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE
GW -7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E
GW -8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE

Table 3.13: Surface Water Quality Criteria for Different Uses

S. No.	Water Quality Parameter	Characteristic Surface of Water Body				
		A *	B *	C *	D *	E *
1.	Dissolved oxygen, mg/l, minimum	6	5	4	4	3
2.	Biochemical Oxygen Demand, mg/l (max)	2	3	3	-	-
3.	Total Coliform organisms ** MPN/100ml (max)	50**	500	500	-	-

S. No.	Water Quality Parameter	Characteristic Surface of Water Body				
		A *	B *	C *	D *	E *
4.	Total Dissolved Solids (TDS)mg/l (max)	500	-	1500	-	2100
5.	Chlorides (as Cl ⁻) mg/l (max)	250	-	600	-	600
6.	Colour, Hazen units (max)	-	10	300	300	-
7.	Sodium Absorption Ratio(max)	-	-	-	-	20
8.	Boron (as B), mg/l (max)	-	-	-	-	-
9.	Sulphates (as SO ₄ ⁻²), mg/l (max)	400	-	400	-	1000
10.	Nitrates (as NO ₃ ⁻) mg/l (max)	20	-	50	-	-
11.	Free Ammonia (as NH ₃) mg/l(max)	-	-	-	1.2	-
12.	Conductivity at 25°C micromhos/cm (max)	-	-	-	1100	2500
13.	pH value	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.0-8.5
14.	Arsenic (as As), mg/l (max)	0.05	0.2	0.2	-	-
15.	Iron (as Fe), mg/l (max)	0.3	-	-	0.5	-
16.	Fluoride (as F), mg/l (max)	1.5	1.5	1.5	-	-
17.	Lead (as Pb), mg/l (max)	0.1	-	0.1	-	-

Note:

* Classes of water use

A: Drinking water source without conventional treatment but after disinfection

B: Outdoor bathing (organised)

C: Drinking water source with conventional treatment followed by disinfection.

D: Propagation of wild life, fisheries.

E: Irrigation, industrial cooling, controlled waste disposal.

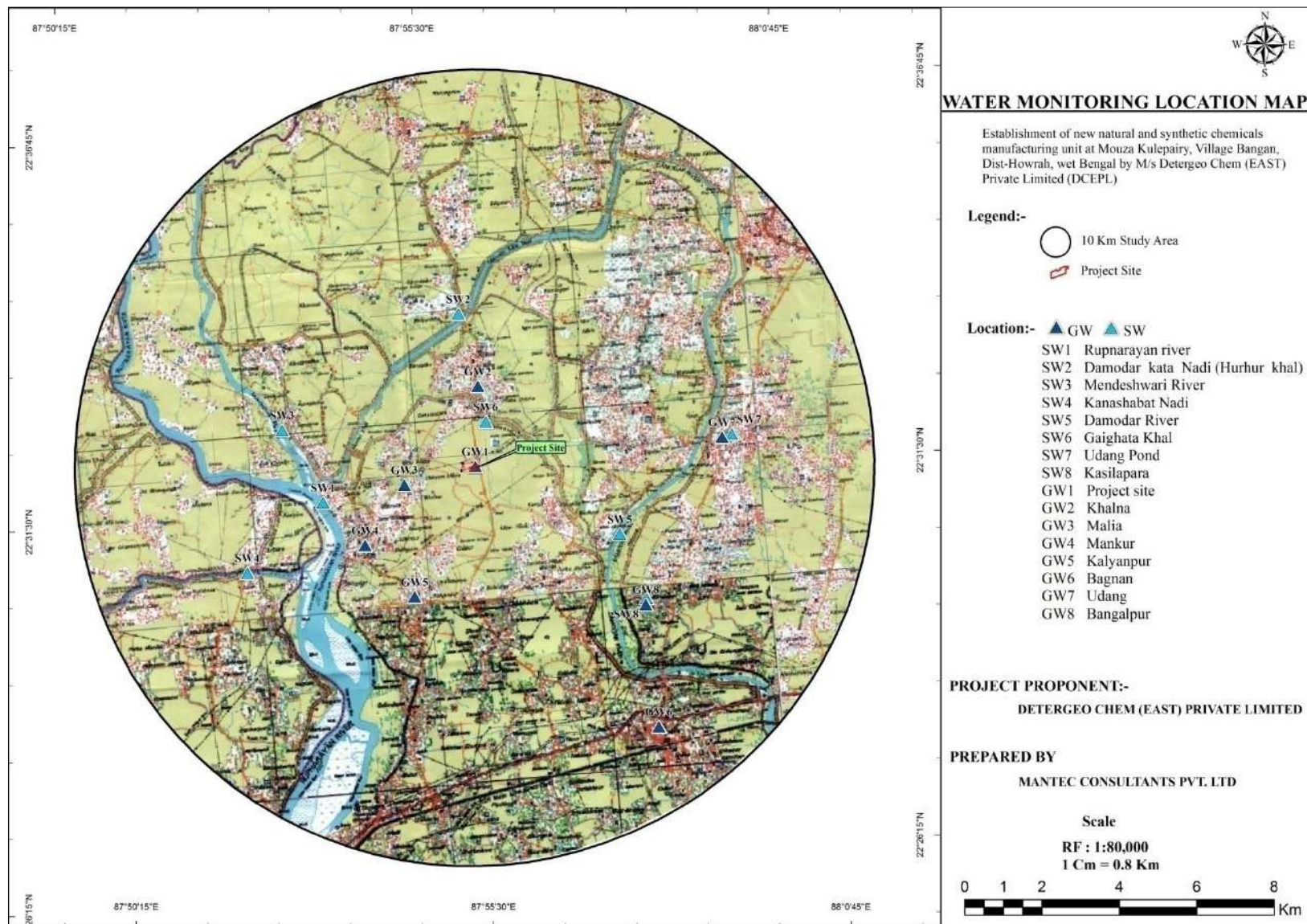


Figure 3.10: Map showing Water Sampling Location

Table 3.14: Surface Water Quality Data

			Roopnarayan River	Damodar Kata River	Mundeshwari River	Damodar River	Kanashabat River	Gaighata Khal
S. No.	Parameter	Units of Measurements	Feb	Feb	Feb	Feb	Feb	Feb
1	Colour	Hazen Units	<5	<5	<5	<5	<5	<5
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	2.3	2.5	3.2	2.6	1.9	2.2
5	pH	-	7.67	7.39	6.95	7.82	7.91	7.86
6	Temperature	°C	20	21	21	22	20	21
7	Conductivity	µmhos/cm	283	315	260	305	302	343
8	Alkalinity as CaCO ₃	mg/l	112	122	98	116	108	124
9	Total Dissolved Solids	mg/l	184	205	169	198	196	223
10	Total Hardness as CaCO ₃	mg/l	124	146	118	136	128	154
11	Calcium as CaCO ₃	mg/l	92	110	86	98	94	122
12	Magnesium as CaCO ₃	mg/l	32	36	32	38	34	32
13	Chloride as Cl	mg/l	20	24	22	26	26	30
14	Phosphate as PO ₄	mg/l	0.33	0.45	0.42	0.41	0.44	0.39
15	Nitrate as NO ₃	mg/l	6.80	7.40	6.20	7.40	9.20	8.40
16	Sulphate as SO ₄	mg/l	16	18	14	16	18	20
17	Fluoride as F	mg/l	0.38	0.31	0.28	0.41	0.39	0.34
18	Phenolic Compound	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Copper as Cu	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
20	Cadmium	mg/l	<0.002	0.0021	<0.002	<0.002	0.0031	<0.002
21	Mercury as Hg	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

22	Selenium as Se	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
23	Total Arsenic as As	mg/l	0.0054	<0.005	0.006	<0.005	<0.005	<0.005
24	Lead as Pb	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
25	Zinc as Zn, Max	mg/l	0.024	0.029	0.034	<0.02	0.03	0.05
26	Chromium as Cr⁺⁶	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Aluminium as Al	mg/l	0.018	0.045	<0.005	0.028	<0.005	0.015
28	Manganese as Mn	mg/l	<0.005	0.007	<0.005	0.0052	<0.005	<0.005
29	Boron as B	mg/l	<0.1	<0.1	0.564	<0.1	<0.1	0.91
30	Iron as Fe	mg/l	0.076	0.094	<0.02	0.062	<0.02	0.066
31	Sodium as Na	mg/l	14	12	10	14	15	14
32	Potassium as K	mg/l	2	2	3	2	3	3
33	Dissolved Oxygen	mg/l	6.3	6.5	5.8	6.9	6.6	6.2
34	BOD	mg/l	8	10	13	7	9	11
35	COD	mg/l	70	84	110	60	76	90
36	Total Coliform	MPN/100ml	1300	940	1090	1200	1480	1410
37	Faecal Coliform	MPN/100ml	790	460	490	700	840	630

Table 3.15: Ground Water Quality Data

S. No.	Parameters	Units of Measurements	Project Site	Khalna	Malia West	Mankur	Kalyan pur	Bainan	Udang	Bangalipur
			Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb
1	Colour	Hazen Units	<5	<5	<5	<5	<5	<5	<5	<5
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	pH	-	7.65	7.52	7.72	7.43	7.30	7.41	7.32	7.39

5	Temperature	°C	22	23	21	24	22	20	22	21
6	Conductivity	µmhos/cm	717	1039	866	762	756	793	739	758
7	Alkalinity as CaCO₃	mg/l	246	374	298	254	276	284	266	272
8	Total Dissolved Solids	mg/l	466	675	563	495	492	516	480	492
9	Total Hardness as CaCO₃	mg/l	354	510	428	360	368	388	352	378
10	Calcium as Ca	mg/l	96.8	144.8	120.0	100.8	101.6	104.0	95.2	104.8
11	Magnesium as Mg	mg/l	27.21	35.96	31.10	26.24	27.70	31.10	27.70	28.18
12	Chloride as Cl	mg/l	98	136	120	110	98	104	90	100
13	Phosphate as PO₄	mg/l	0.47	0.62	0.56	0.38	0.53	0.61	0.55	0.52
14	Nitrate as NO₃	mg/l	8.6	9.8	9.2	9	8.8	9.6	8.6	8.4
15	Sulphate as SO₄	mg/l	30	38	34	28	26	30	34	28
16	Fluoride as F	mg/l	0.34	0.42	0.37	0.39	0.33	0.28	0.43	0.32
17	Phenolic Compound	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
18	Copper as Cu	mg/l	0.0057	<0.005	<0.005	0.0061	0.0054	0.006	<0.005	<0.005
19	Mercury as Hg	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
20	Cadmium as Cd	mg/l	<0.002	<0.002	<0.002	<0.002	0.0025	<0.002	<0.002	0.0029
21	Total Arsenic as As	mg/l	0.0052	<0.005	<0.005	<0.005	0.0057	0.006	0.0055	<0.005
22	Lead as Pb	mg/l	<0.005	0.0067	0.0059	<0.005	<0.005	<0.005	0.0062	0.0055
23	Total Chromium as Cr	mg/l	<0.005	<0.005	<0.005	0.0051	0.0064	<0.005	<0.005	<0.005
24	Iron as Fe	mg/l	0.026	0.037	<0.02	0.03	0.045	0.038	0.052	0.029
25	Sodium as Na	mg/l	20	32	26	28	25	26	28	22
26	Potassium as K	mg/l	4	5	3	5	3	3	2	2

30	Total Coliform	MPN/100 ml	<2	<2	<2	<2	<2	<2	<2	<2
31	Faecal Coliform	MPN/100 ml	<2	<2	<2	<2	<2	<2	<2	<2

3.8.2 Interpretation of Surface Water Results

- The analysis results indicate that the pH value is 6.95 to 7.91 which is well within the specified standard of 6.5 to 8.5.
- The TDS was observed as 169 to 223 mg/l.
- The chlorides were found as 20 to 30 mg/l.
- The sulphate were found as 14 to 20 mg/l. It is observed that sulphate are within limits.
- Total hardness ranges between 118 to 154 mg/l.
- Metals: Iron is found in between <0.02 to 0.094 mg/l.

Analysis results of Ground Water reveal the following:

- The analysis results indicate that the pH value is 7.30 to 7.72 which is well within the specified standard of 6.5 to 8.5.
- The TDS was observed as 466 to 675 mg/l.
- The chlorides were found as - 90 to 136 mg/l.
- The sulphate were found as 26 to 38 mg/l. It is observed that sulphate are within limits;
- Total hardness ranges between 352 to 510 mg/l.
- Metals: Iron is found in between <0.02 to 0.052 mg/l.

3.9 LAND ENVIRONMENT

3.9.1 Topography

The topography of the land is more or less flat without undulations.

3.9.2 Geology

Howrah district is underlain by unconsolidated Quaternary alluvium laid down by the south flowing Bhagirathi- Hoogli river system. The alluvial sediments in the form of flood plain deposits consists of the sands of various grades, silt and clay with occasional gravel beds. The sands are fines to coarse grained and sub-rounded. Immediately below the land surface a thick layer of sticky clay ranging in thickness between 30-70m and often broken either by sand lenses or silt is encountered. Exploratory drilling carried out in parts of the district has revealed the presence of clay bed even around a depth of 300m bgl. which continue even beyond a depth of 548m bgl. apart from persistence of clay beds at deeper levels, the exploration has also brought to light occurrence of potential and fresh aquifer zones of considerable thickness down to a depth of 300m bgl.

3.9.3 Land use/ Land cover

Data Used:

Indian Remote Sensing satellite IRS-P6, LISS III, multi-spectral digital data has been used for the preparation of land use/ land cover map of present study. Survey of India reference map on 1:50,000 scales have been used for the preparation of base map and geometric correction of satellite data. Ground truth has been carried out to validate the interpretation accuracy and reliability of remotely sensed data, by enabling verification of the interpreted details and by supplementing with the information, which cannot be obtained directly on satellite imagery.

Methodology:

The methodology used for the study consists of following components.

- **Base Map Preparation:** Base map was prepared using Survey of India reference map on 1:50,000 scale. Interpreted thematic details were transferred on the base map. Besides, other supporting data like project reports and statistical data published by various Government departments have also been used.
- **Ground Truth Data Collection:** Ground data on geo-environmental components of the study area was collected for verification of information about the different features on the study areas, which are responsible for the occurrence of specific spectral reflectance behavioral patterns. During the ground truth detailed information on agricultural practices, wastelands, industrial area etc. was collected along with other land features.
- **Interpretation of Remote Sensing Data:** A hybrid technique has been used i.e. visual interpretation and digital processing for identification of different land use /land cover classes based on the image characteristics like tone, size, shape, pattern, texture, location and association etc. An image interpretation key was developed based on such image characteristics, which enables interpretation of satellite images for land use/land cover features. Further, the land use / land cover and other baseline layers was put in GIS database for integration, analysis, statistics generation and final out in the form of land use land cover map.
- **Observation of Land Use Study:** In the present study, both digital image processing and using visual interpretation technique were used to generate output of Land use / Land cover map of study area on 1:50,000 scale (as shown in Figure 3.11) and Land use pattern of the study area (10 Km distance from the project site) & Land Use/Land Cover Chart as shown in Figure 3.12.

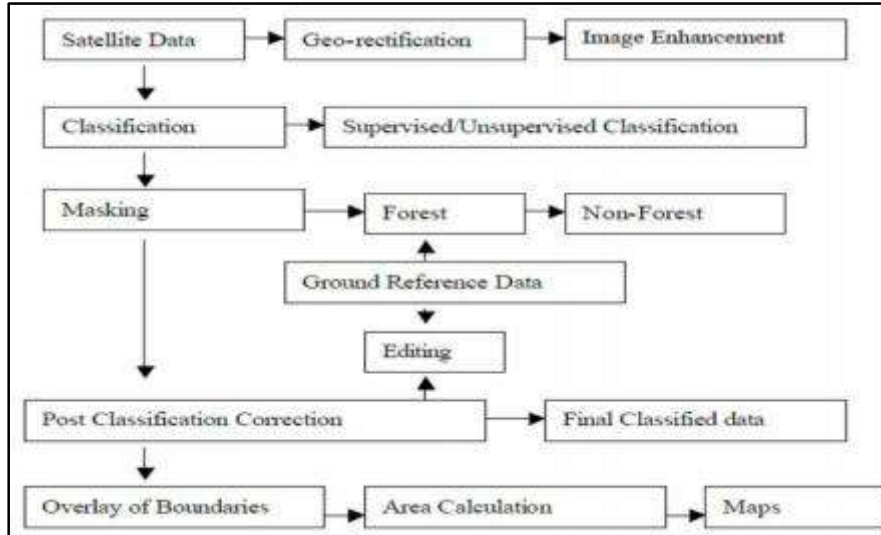


Figure 3.11: Methodology Used for Land use Classification and Mapping

Results:

The land use map of the study area is presented as Figure-3.12. Details of land use and land cover, derived from the map are presented in Table 3.16. It can be seen that major part of the study area (68.29%) is used for agricultural purpose. Settlements and water bodies cover 20.88% and 7.56%, respectively, of the study area. Only 2.06% of the study area is covered by vegetation and 1.22% is waste land.

Table 3.16: Detail of Land use/Land cover

S. No	Classes	Area (sq.km)	Area in %
1	Settlement	69.70	20.88
2	Agriculture Land	227.96	68.29
3	Vegetation	6.88	2.06
4	Water Bodies	25.23	7.56
5	Waste Land	4.06	1.22
Total		333.83	100.00

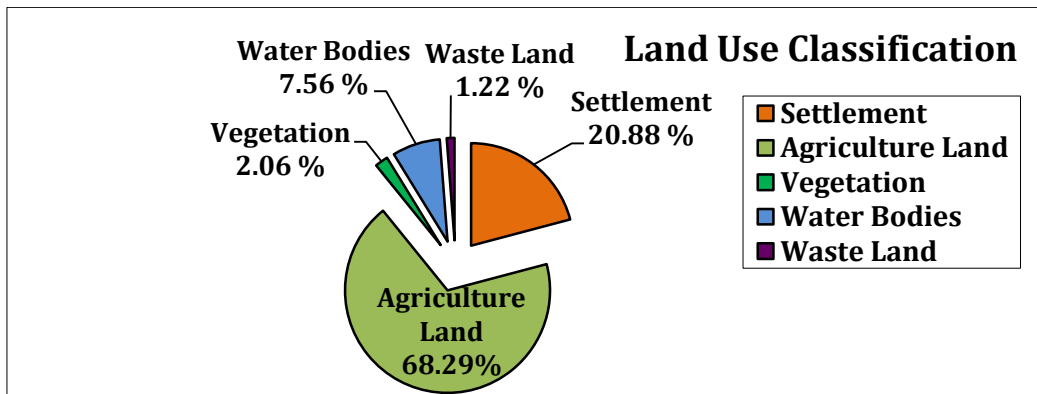


Figure 3.12: Land-Use Classification of the Study Area

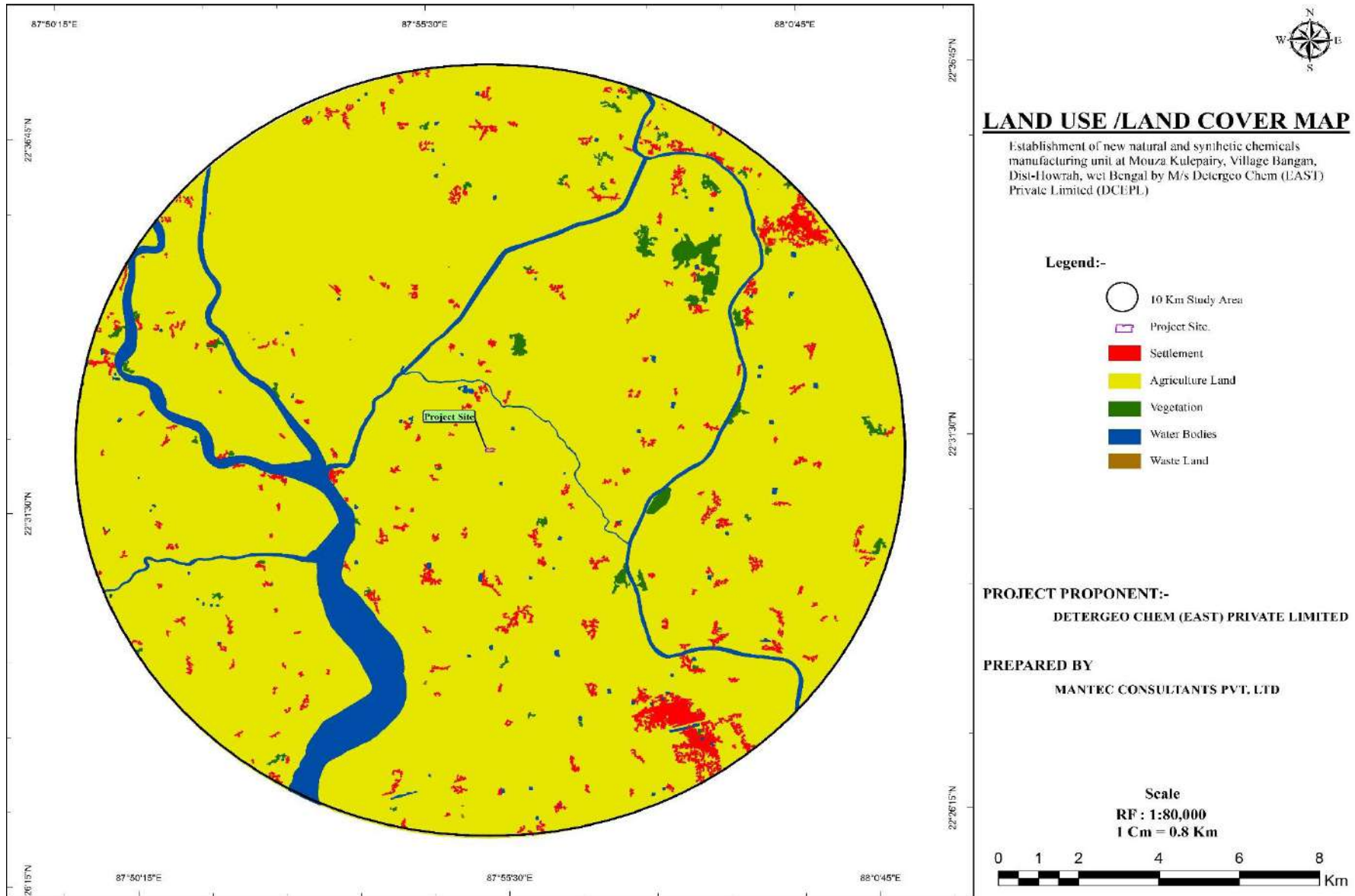


Figure 3.13: Land Use Map of the Study Area

3.9.4 Soil Characteristics

3.9.4.1 Methodology Adopted For Soil Characterization

A number of parameters were determined, which are indicative of physical, chemical and fertility characteristics. Sampling and analysis was conducted as per established standard methods and procedures prescribed in IS 2720 and ASTM. Soil samples were collected from agricultural fields by ramming a hand auger into the soil upto a depth of 90 cm. At each of the sampling location, soil samples were collected from three different depth viz. 30 cm, 60 cm and 90 cm below the surface and homogenized. The homogenized samples were then packed in a polythene plastic bag and sealed. The sealed samples were sent to the Laboratory for analysis. The physical and chemical characteristics were determined for all the samples.

Soil sampling locations

The Soil characterization was determining the various parameters at eight different locations within the study area, including within the project site and seven at other locations in the study area. The locations of the Soil Quality Monitoring are described in Table 3.17 and shown on the study area map in Figure 3.14. The sampling locations are chosen based on the proximity of the location to the project site.

Table 3.17: Soil Sampling Locations

S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site
S1	Project site	22°31'50.82"N	87°55'50.48"E	---
S2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N
S3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km, W
S4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW
S5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S
S6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE
S7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E
S8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE

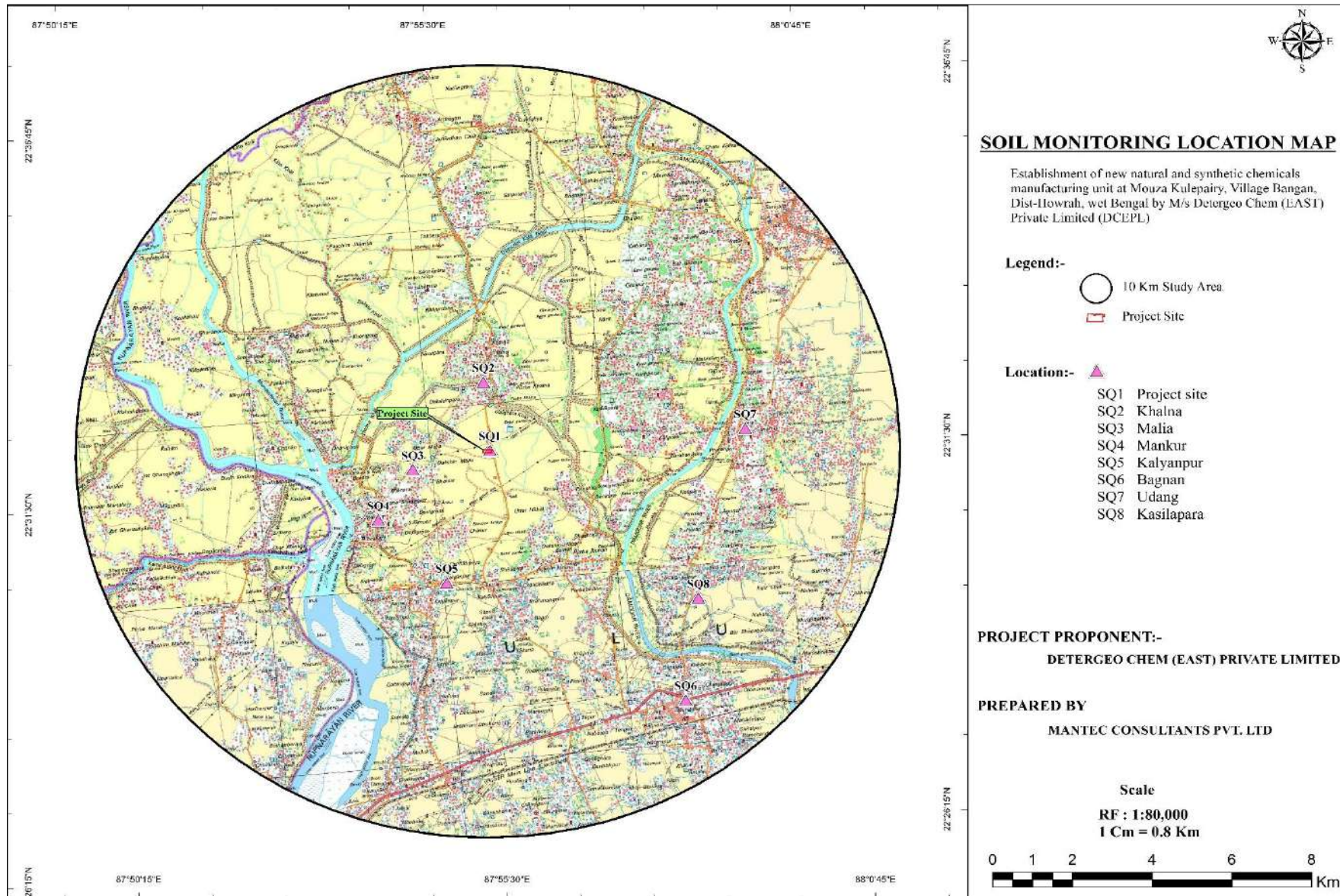


Figure 3.14: Map Showing Soil Sampling Locations

Analytical results:

The characteristics of soil samples collected from the 8 locations during February 2024 are presented in Table 3.3.

Table 3.18: Soil Sampling Results

S. No.	Parameters	Units	Project Site	Khalna	Malia West	Mankur	Kalyanpur	Bagnan	Udang	Bangalpur
1	pH	-	7.31	7.25	7.48	7.32	7.61	7.42	7.38	7.56
2	Bulk Density	gm/cm ³	1.84	2.14	2.08	1.96	2.26	2.12	1.98	2.32
3	Conductivity	Micro mhos/cm	324	258	286	348	250	308	412	264
4	Moisture	%	6.2	5.4	6.3	5.6	6.1	5.8	6.4	5.2
5	Texture	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
6	Sand	%	64	62	60	58	60	58	62	60
7	Clay	%	18	22	20	22	18	24	16	24
8	Silt	%	18	16	20	20	22	18	22	16
9	CEC	meq/100gm	13.88	15.76	14.36	16.34	12.92	17.64	13.08	17.52
10	Nitrogen	mg/100gm	14.49	14.36	14.62	13.91	14	14.22	14.4	14.58
11	Phosphorous	mg/100gm	0.8	0.76	0.93	0.67	0.84	0.71	0.8	0.93
12	Potassium	mg/100gm	9.81	9.72	10.16	9.63	9.9	9.99	10.07	10.21
13	Sodium	mg/100gm	3.8	4.2	3.6	4.6	4.3	4.5	3.7	4.1
14	Organic Matter	%	2.44	2.38	2.18	2.67	1.96	2.82	2.54	2.76
15	Ca	meq/100gm	3.1	2.8	2.7	3.6	3.1	3	3.4	3.2
16	Mg	meq/100gm	2.08	1.88	1.64	1.77	1.68	1.54	1.81	2.14
17	SAR	-	0.41	0.47	0.42	0.49	0.49	0.52	0.4	0.43

3.9.5 Interpretation

- The analysis results show that soil is basic in nature as pH value ranges from 7.25 to 7.61 with organic matter 1.96 to 2.82%.

- The concentration of Nitrogen (13.91 to 14.62 mg/100gm) Phosphorus (0.67 to 0.93 mg/100gm) and Potassium (9.63 to 10.21 mg/100gm) has been found to be in good amount in the soil samples. The soil is found to be suitable for the agricultural purpose.
- The soil will not be affected by proposed project since the project & its allied activities will not affect the nearby soil quality of area.

3.10 HYDROGEOLOGY

Ground water in Howrah district, occurs under both water table and confined to semi-confined conditions in aquifer, which starts from 4.236m bgl. The shallow aquifer are tapped by dug wells, while the deeper aquifers are tapped by medium to heavy duty tubewells. Dug wells in the district generally vary in depth from 5-15m bgl. The majority of them being restricted to 10m depth. Some open wells tend to dry up in summer as they are restricted either to the silty clay Zone or tapped vary little upper part of the aquifer zones. The northern parts of the district comprising the blocks of Udynaraynpur, Amta I & II, Jagatballabhpur and domjur blocks are characterized by water table aquifer. The fresh ground water bearing aquifers occurs between 150-300m bgl in the above 9 blocks.

3.11 BIOLOGICAL ENVIRONMENT

The study of biological environment is one of the important aspects in Environmental Impact Assessments. Biotic components comprise of plant and animal communities which interact within the community and between themselves but also with the abiotic components (physical and chemical) of the environment. Biological community of an area is dependent on the environmental conditions and available resources and therefore susceptible to the changes in the environment. Considering this fact, it is an essential practice under EIA to assess the flora and fauna resources of the project area to understand the possibility of harm/changes to the biological diversity in order to minimize the negative impacts.

3.11.1 Methodology to Assess the Biological Environment

Ecology & biodiversity study was carried out during dec 2023- feb 2024 to assess the existing ecological status of the project site. The area is mainly dominated by the agricultural fields and water streams without any noticeable forest patch. Therefore, present study was carried out by the movements along the roads in the different areas and directions. Sampling were made at 8 locations as mentioned in the Table 3.19 dividing the area into 0-500m, 500m-5km and 5-10 km radius range from the centre of the proposed activity site (Table 3.19 and Figure 3.15).

Table 3.19: Coordinates for Line Transect Survey for Biodiversity Assessment

Range	S. No.	Sampling code	Nearest Location	Latitude	Longitude
Within 0-1 Km	1	TL1	Kulepairi	22°31'41.66"N	87°55'53.54"E
	2	TL2	Dakshin Khalna	22°32'8.76"N	87°55'51.28"E
Within 1- 5 Km	3	TL3	Malia / Dakhin Malia	22°31'40.66"N	87°54'53.99"E
	4	TL4	Purbba Khalan	22°32'18.04"N	87°56'33.18"E
	5	TL5/Aqua1	Pashchim Khalna	22°33'7.71"N	87°54'53.00"E
	6	TL6/Aqua2	Purbba Bainan	22°30'17.65"N	87°57'33.29"E
Within 5-10 km	7	TL7	Khariop	22°35'17.79"N	87°59'19.68"E
	8	TL8/ Aqua3	Faridpur	22°28'33.15"N	87°53'32.52"E

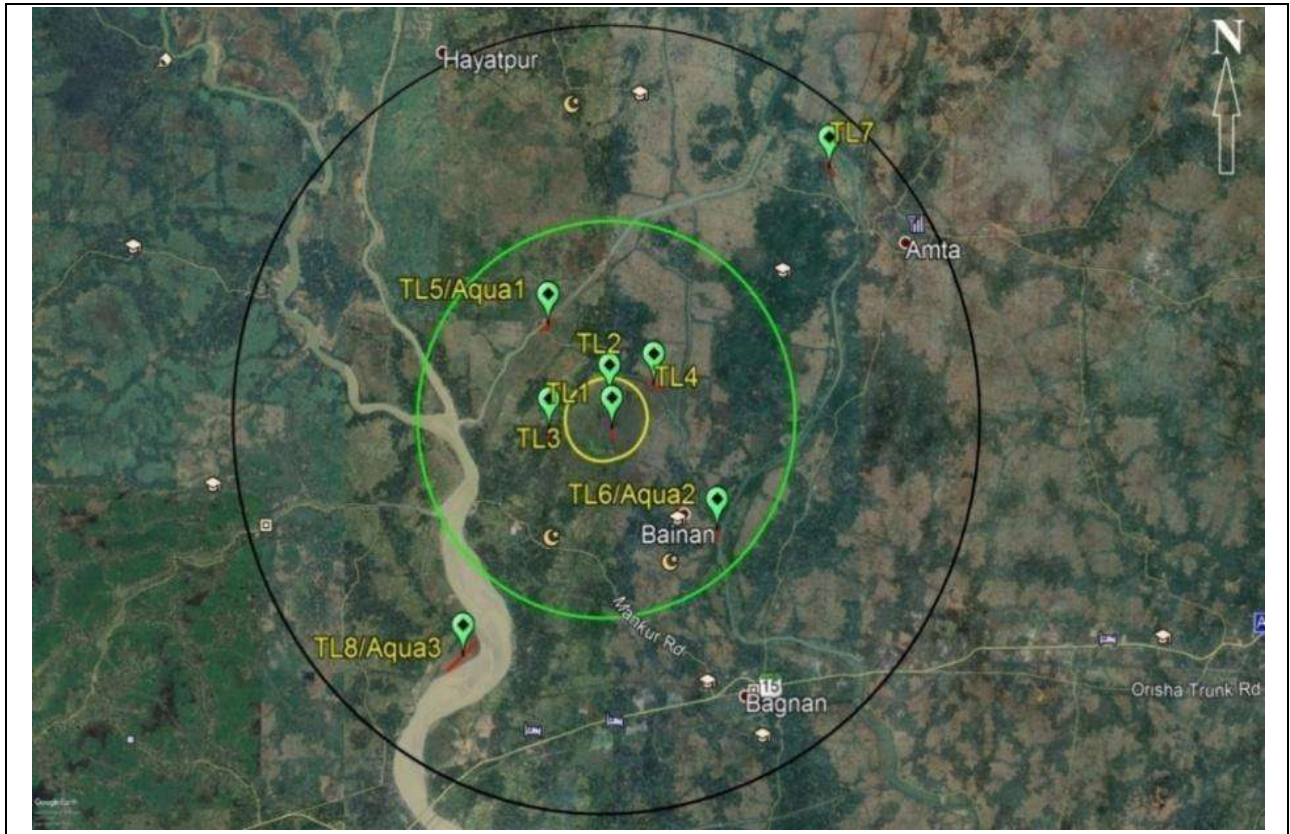


Figure 3.15: Map Showing sampling locations for Biodiversity Assessment

The plant species were identified with the help of plant taxonomy manual, Published Literatures, Reports and Websites (BSI, ZSI and State/District Forest Departments). In addition, besides the collection of plant species, information was also collected with vernacular names of plant species made by local inhabitants.

Faunal species (terrestrial, aerial and aquatic) of the project area also have been developed through direct sighting and through secondary means like; nests, roosts, pug marks, droppings etc.

Moreover, authentic secondary information (Table 3.20) have also been referred. Local people were consulted to verify the presence of the flora and fauna species with their common names. Ecological sensitivity along with critical habitats (National Park, Sanctuary, Ecological Sensitive Area, Migratory Corridor, habitat of endangered, vulnerable and range restricted species *etc.*) in the project area has also been worked out.

Table 3.20: References of Authentic Secondary Sources Consulted in Ecological Study of the Area

- Anonymous, 2016. Birds of Rabindra Sarovar. Kolkata Improvement Trust.
- Bose, S.R. 1918. Description of fungi in Bengal I. Proc. Indian Assoc. Cult. Sci. 4: 109–114.
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- BSI, 1997. Flora of West Bengal. Vol. 1. Botanical Survey of India, Calcutta. Bennet,
- Champion, H.G. & Seth, S.K. 1968. A Revised Survey of Forest Types of India. Govt. of India Press, Delhi.
- FSI 2019. State of Forest Report 2019, Forest Survey of India, Dehradun
- Ghosh, S. 2010. Urban Biodiversity of Kolkata: Flowering Plants, Butterflies, Birds and Mammals. Zoological Survey of India (Occasional Paper no. 327).
- Bennet S. S. R. 1979. Flora of Howrah district. Periodical Expert Book Agency, New Delhi.
- Dwari S & Kumar A. 2015. Mondal butterflies diversity of agricultural fields of Howrah district, West Bengal, India with special reference to their host plants in agro ecosystem. I.J.S.N., VOL.6 (3): 389-396 ISSN 2229 – 6441.
- <http://www.howrah.gov.in/Agriculture/index.html>
- <http://www.howrahkvk.org/> Howrah Krishi Vigyan Kendra

Identification and classification of species recognized as critically endangered, endangered, threatened *etc.* as per IUCN Red list and Scheduled Species as per WPA (1972).

The water bodies and stream in the area were assessed for the status of the aquatic life and fishes.

3.11.2 Type of Vegetation and Forests

As per Champian and Seth (1968 and FSI, 2013), the vegetation type of in region falls mainly in the following four types;

- a) Eastern Tarai Sal Forest (3C/C1c)
- b) Eastern Heavy Alluvium Plain Sal [3C/C2d (iii)]
- c) West Gangetic Moist Mixed Deciduous Forest (3C/C3a)
- d) Secondary Euphorbiaceous Scrub (3C/2S2)

The topography of the Hawra district is highly diverse including swamp area, fertile plain, flood zone, alluvial depositions as well as intense web of the water streams. Howrah district consists of flat alluvial plain, with a gradual rise towards north and northwest, the general flow of drainage consequently to the south and south-east. The principal rivers of the district are the Bhagirathi (Hooghli) and its tributary, the Saraswati; the Damodar and its two branches, the Kana Damodar (or Kausiki) and the Old Damodar; and the Rupnarayan. Numerous khals or creeks also intersect the district.

The main use of land in the area is agriculture with no noticeable natural forested area. Trees are found along the roads, streams and planted in/along agricultural fields, as orchards and as found in the human settlements.

In the primary survey it was found that trees like Ash-sheora (*Glycosmis pentaphylla*), Bhat (*Clerodendrum infortunatum*), Banyan (*Ficus benghalensis*), Red cotton tree (*Bombax malabaricum*), Mango (*Mangifera indica*), Jiyal (*Odina wodier*), Khejur (*Phoenix sylvestris*), Sal (*Shorea robusta*) and Tal (*Borassus flabellifer*) are dominating the human habitations whereas Varendra (*Jatropha gossypifolia*), Ban-okra (*Urena lobata*), Kul (*Zizyphus mauritiana*) are also observed. Some economically important floral species are; Alkushi (*Mucuna prurita*), Amaltas (*Cassia fistula*), Asan (*Terminalia tomentosa*), Kul (*Zizyphus mauritiana*), Bel (*Aegle marmelos*), Bag bharendra (*Jatropha curcas*), Bichuti

(*Tragia involucrata*), Bahera (*Terminalia belerica*), Dhatura (*Datura stremonium*), Dhaman (*Cordia macleodii*), Gab (*Diospyros embryopteris*), Tentul (*Tamarindus indica*), Kuchila (*Strychnos nuxvomica*), Mahua (*Bassia latifolia*), Palas (*Butea monosperma*) and Sajina (*Moringa oleifera*) etc.

Based on the information gathered, an inventory of the terrestrial vascular plants belonging to the area has been made (Table 3.21) that includes 132 species (32 trees, 26 shrubs, 17 climbers, 15 grasses and 42 herbs) under 55 families. On the basis of number of species and genera, most diverse families include Fabaceae, Asteraceae, Euphorbiaceae, Poaceae, Moraceae, Acanthaceae, Malvaceae, Rutaceae and Convolvulaceae etc.

Table 3.21: List of Trees, Shrubs, Herb and Climbers Found in the Study Area

Families		Botinical Name		Common Name	Habit	Importance
1	Acanthaceae	1	<i>Andrographis paniculata</i>	Kalmegh	H	Med
		2	<i>Justicia gendarussa</i>	Jagatmadan	S	Med
		3	<i>Justicia prostrata</i>	Bell Weed	H	Med
2	Amaranthaceae	4	<i>Achyranthes aspera</i>	Apamarga	H	Med
		5	<i>Amaranthus spinosus</i>	Kantanotyta	H	Med & Eco
3	Anacardiaceae	6	<i>Lannea coromandelica</i>	Jiola	T	Med
		7	<i>Mangifera indica</i>	Aama /Mango	T	Ed
4	Annonaceae	8	<i>Annona squamosa</i>	Custard Apple	T	Ed
5	Apiaceae	9	<i>Centella asiatica</i>	Brahmamanduki	H	Med
6	Apocynaceae	10	<i>Allamanda cathartica</i>	Harkakra	S	Orna
		11	<i>Alstonia scholaris</i>	Chattim	T	Med
		12	<i>Dregea volubilis</i>	Titakunga	Clim	Med
		13	<i>Rauvolfia tetraphylla</i>	Gandhanakuli	S	Med
		14	<i>Wattakaka volubilis</i>	Jukti Phul	Clim	Med
		15	<i>Colocasia esculenta</i>	Banakochu	H	Ed
8	Arecaceae	16	<i>Borassus flabellifer</i>	Tal	T	Ed
17		<i>Phoenix sylvestris</i>	Khejur	T	Ed	
9	Asclepiadaceae	18	<i>Calotropis gigantea</i>	Safed Aak	S	Med
		19	<i>Pergularia daemia</i>	Ajasrangi	Clim	Med
10	Asteraceae	20	<i>Ageratum conyzoides</i>	Uchunti	H	W & Med
		21	<i>Chrysanthemum indicum</i>	Chandramalika	H	Orna & Med
		22	<i>Parthenium hysterophorus</i>	Congress Grass	H	W
		23	<i>Tridax procumbens</i>	Kanaiya	H	W
		24	<i>Xanthium strumarium</i>	Common Cocklebur	H	W & Med
11	Bignoniaceae	25	<i>Crescentia alata</i>	Jicaro	S	Orna & Med
12	Boraginaceae	26	<i>Heliotropium indicum</i>	Hatisura	H	Med
13	Caesalpiniaceae	27	<i>Bauhinia racemosa</i>	Banraj	T	Orna
		28	<i>Cassia fistula</i>	Amultas	T	Med & Eco
		29	<i>Tamarindus indica</i>	Amli, Tentul	T	Ed & Med
14	Cannaceae	30	<i>Canna indica</i>	Sarbajaya	H	Orna
15	Combretaceae	31	<i>Terminalia bellirica</i>	Baheda	T	Med
		32	<i>Terminalia tomentosa</i>	Matti	T	Med & Eco
16	Commelinaceae	33	<i>Commelina benghalensis</i>	Bengal Dayflower	H	W

Families		Botinical Name		Common Name	Habit	Importance
17	Convolvulaceae	34	<i>Cuscuta reflexa</i>	Swarna Lata	Clim	Para, W/Med
		35	<i>Evolvulus alsinoides</i>	Dwarf Morning Glory	H	W & Med
		36	<i>Ipomoea obscura</i>	Kurakalami	H	Orna & Ed
18	Crassulaceae	37	<i>Kalanchoe pinnata</i>	Kop Pata	H	Orna & Med
19	Cucurbitaceae	38	<i>Coccinia grandis</i>	Telkocha	Clim	Ed
		39	<i>Hodgsonia macrocarpa</i>	Lard seed	Clim	Ed & Med
		40	<i>Trichosanthes cucumerina</i>	Snake Gourd	Clim	Med & Eco
20		Cyperaceae	41	<i>Cyperus rotundus</i>	Motha	H
	42		<i>Kyllinga bulbosa</i>	Spikesedges	H	Med
21	Dipterocarpaceae	43	<i>Shorea robusta</i>	Sal	T	Med
22	Euphorbiaceae	44	<i>Croton bonplandianus</i>	Ban Tulsi	H	Med
		45	<i>Diospyros malabarica</i>	Gab	T	Med
		46	<i>Euphorbia hirta</i>	Barokarni	H	W & Med
		47	<i>Jatropha curcas</i>	Bag bharenda	S	Med
		48	<i>Jatropha gossypifolia</i>	Varenda	S	Med
		49	<i>Jatropha integerrima</i>	Jatropha Ful	H	Orna
		50	<i>Jatropha podagrica</i>	Physic Nut	H	Orna
		51	<i>Manihot esculenta</i>	Mandioca	S	Orna & Ed
		52	<i>Ricinus communis</i>	Veranda	S	Med & Eco
		53	<i>Tragia involucrata</i>	Bichuti	H	W
23	Fabaceae	54	<i>Abrus precatorius</i>	Chunahati	S	Med
		55	<i>Butea monosperma</i>	Palash	T	Med
		56	<i>Mucuna pruriens</i>	Akolchi	Clim	Med & Eco
		57	<i>Senna occidentalis</i>	Kalkashunda	S	Med
		58	<i>Senna tora</i>	Panevar	H	Med
		59	<i>Vigna trilobata</i>	Wild Gram	H	Ed
24	Lamiaceae	60	<i>Anisomeles indica</i>	Gobura	H	W & Med
25	Loganiaceae	61	<i>Strychnos nuxvomica</i>	Kuchila	T	Med
26	Lygodiaceae	62	<i>Lygodium flexuosum</i>	Maidenhair Creeper	Clim	Med
27	Lythraceae	63	<i>Punica granatum</i>	Pomegranate	S	Ed
28	Malvaceae	64	<i>Abutilon indicum</i>	Potari	H	Med
		65	<i>Bombax ceiba</i>	Red Cotton Tree	T	Eco
		66	<i>Hibiscus rosa-sinensis</i>	China Rose	S	Orna & Med
		67	<i>Malvaviscus arboreus</i>	Lanka Jaba	S	Orna & Med
		68	<i>Sida cordata</i>	Berela	H	Med
		69	<i>Sida rhombifolia</i>	Svetbarela	H	Med
		70	<i>Urena lobata</i>	Ban-okra	S	Med
29		Meliaceae	71	<i>Azadirachta indica</i>	Neem	T
30	Menispermaceae	72	<i>Cocculus hirsutus</i>	Huyer	Clim	Med
		73	<i>Tiliacora racemosa</i>	Tiliacord	Clim	Med
31	Mimosaceae	74	<i>Acacia catechu</i>	Khayer	T	Eco
32	Moraceae	75	<i>Artocarpus heterophyllus</i>	Kathal	T	Ed
		76	<i>Ficus benghalensis</i>	Banyan Tree	T	Med
		77	<i>Ficus pumila</i>	Creeping Fig	Clim	Orna
		78	<i>Ficus religiosa</i>	Asbattha	T	Med

Families		Botinical Name		Common Name	Habit	Importance
33	Moringaceae	79	<i>Moringa oleifera</i>	Drumstick Tree	T	Ed
34	Musaceae	80	<i>Musa acuminata</i>	Banana	H	Ed
35	Myrtaceae	81	<i>Eucalyptus globulus</i>	Eucalyptus	T	Eco
		82	<i>Psidium guajava</i>	Peyara	T	Ed
36	Nyctaginaceae	83	<i>Boerhavia diffusa</i>	Punarnova	H	Med
		84	<i>Bougainvillea spectabilis</i>	Baganbilas	S	Orna
37	Oleaceae	85	<i>Jasminum multiflorum</i>	Chameli	S	Orna
38	Oxalidaceae	86	<i>Oxalis corniculata</i>	Amrulshak	H	Med
39	Pandanaceae	87	<i>Pandanus odorifer</i>	Ketaki	S	Orna
40	Papaveraceae	88	<i>Argemone mexicana</i>	Siyalakanta	H	Med
41	Passifloraceae	89	<i>Passiflora foetida</i>	Jhumka Lota	Clim	Med
42	Poaceae	90	<i>Axonopus compressus</i>	Broadleaf Carpet grass	G	W
		91	<i>Bambusa tulda</i>	Bans	G	Eco
		92	<i>Bambusa ventricosa</i>	Basini Bans	G	Orna & Eco
		93	<i>Bambusa vulgaris</i>	Sonali Bans	G	Eco
		94	<i>Brachiaria mutica</i>	Para Grass	G	W
		95	<i>Cynodon dactylon</i>	Bermuda Grass	G	Med
		96	<i>Digitaria sanguinalis</i>	Large Crabgrass	G	W
		97	<i>Eleusine indica</i>	Indian Goose Grass	G	W
		98	<i>Eragrostis amabilis</i>	Love Grass	G	W
		99	<i>Leersia hexandra</i>	Southern Cut Grass	G	W
		100	<i>Oplismenus compositus</i>	Running Grass	G	W
		101	<i>Panicum paludosum</i>	Torpedo Grass	G	W
		102	<i>Pseudosasa japonica</i>	Dwarf Bamboo	G	Orna
		103	<i>Saccharum officinarum</i>	Sugar Cane	G	Ed
		104	<i>Setaria glauca</i>	Wild Foxtail Millet	G	W
43	Polygonaceae	105	<i>Rumex maritimus</i>	Golden Dock	H	W
44	Pteridaceae	106	<i>Pteris vittata</i>	Chinese Brake	H	Orna
45	Rhamnaceae	107	<i>Zizyphus mauritiana</i>	Kul	S	W & Med
46	Rosaceae	108	<i>Rosa sp.</i>	Rose	S	Orna
47	Rubiaceae	109	<i>Anthocephalus cadamba</i>	Kadam	T	Med
		110	<i>Dentella repens</i>	Creeping Dentella	H	W
48	Rutaceae	111	<i>Aegle marmelos</i>	Bel	T	Ed
		112	<i>Glycosmis pentaphylla</i>	Ash-Shorea	T	Med
		113	<i>Murraya koenigii</i>	Barsunga	S	Ed
		114	<i>Murraya paniculata</i>	Orange Jasmin	S	Orna
49	Sapotaceae	115	<i>Madhuca longifolia</i>	Mahua	T	Med
50	Simaroubaceae	116	<i>Ailanthus excelsa</i>	Coramandel Ailanto	T	Med
51	Solanaceae	117	<i>Nicotiana plumbaginifolia</i>	Tex-Mex Tobacco	H	W
		118	<i>Physalis minima</i>	Bantepariya	H	Med
		119	<i>Solanum nigrum</i>	Nightshade	H	Med
52	Urticaceae	120	<i>Pouzolzia zeylanica</i>	Graceful Pouzolz's Bush	H	W



Families		Botinical Name		Common Name	Habit	Importance
53	Verbenaceae	121	<i>Clerodendrum infortunatum</i>	Bhat	T	Med
		122	<i>Clerodendrum splendens</i>	Bleeding Heart Vine	Clim	Orna
		123	<i>Duranta erecta</i>	Sky Flower	S	Orna
		124	<i>Gmelina arborea</i>	Gamhar	T	Med
		125	<i>Lantana camara</i>	Raimuniya	S	W
		126	<i>Petrea volubilis</i>	Nilmanilata	Clim	Orna
		127	<i>Tectona grandis</i>	Saguna	T	Eco
		128	<i>Vitex negundo</i>	Nishinda	S	Med
54	Vitaceae	129	<i>Cayratia pedata</i>	Birdfoot Treebine	Clim	W & Med
		130	<i>Cayratia trifolia</i>	Amal-Lata	Clim	W & Med
		131	<i>Cissus quadrangularis</i>	Harajora	S	Med
55	Xanthorrhoeaceae	132	<i>Aloe vera</i>	Aloe	H	Med
Abbrivations: T=Trees,S= Shrubs, H=Herb, Cli=Climbers, G= Grass, Med= Medicinal, Eco= Economic, Orna= Ornamental, W= weed, Ed= Edible						

3.11.3 Ecological Sensitive Area

No Eco-Sensitive areas (National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger/Elephant Reserve, Wildlife Corridor *etc.*) falls within 10km radius of the project site.

3.11.4 Agricultural flora in the study area

The agro-ecological condition of the Howrah district recognized as hot moist sub-humid with annual rainfall between 1100 to 1500 mm (75-80% received June to September). The mean annual temperature fluctuates from 40.2° to 10.8° C with relative humidity ranges between 66 to 85 %.

The soils of this district have been formed from the alluvium deposited by Ganga and its tributaries and sub tributaries viz. Ajoy, Damodar, Kansabati, Bhagirathi, Haldi, Rupnarayan *etc.* Therefore, the low-lying area of the district suffer with frequent inundation and water-logging every year. However, soil of this sub-region has high nutrient content and mineral resource with a high potential for a large variety of agricultural and horticultural crops.

Paddy (Aus, Aman and Boro), jute and potato are the major crops while pulses like gram, lentil and oilseeds (mustard, sesame, and groundnut) are also grown by the farmars. Water chestnut, madur kathi, water lilly and lotus are also cultivated in some low-lying marshy land areas of the district (*Source: Primary survey and Howrah Krishi Vigyan Kendra website*).

3.11.5 Terrestrial Fauna of the Study Area

The surrounding of the proposed project site enjoys the agricultural (paddy cultivation) as major landuse. There are no considerable patches of the natural vegetation like forests area, national parks, wildlife sanctuaries, biosphere reserve and Important Bird Areas (IBAs) found in 10 km radius from the center of the identified project site. Therefore, the area is not a suitable habitat for any rare/endangered/threatened (RET) wildlife creatures that belong to Schedule-I of the Indian Wildlife (Protection) Act, 1972. All major groups of fauna spotted and reported in the study area have been enlisted in the Table 3.22 to Table 3.23.

Table 3.22: Mamalian Species Reported from the Study Area

S. No.	Scientific Name	Common Name	WPA/IUCN Status
1	<i>Bandicota indica</i>	Large Bandicoot Rat	IV/LC
2	<i>Cynopterus sphinx</i>	Short-Nosed Fruit Bat	IV/LC

3	<i>Funambulus palmarum/</i>	Three Striped Squirrel	LC
4	<i>Golundaellioti</i>	Indian Bush Rat	IV/LC
5	<i>Herpestes edwardsii</i>	Indian Grey Mongoose	II/LC
6	<i>Macaca mulatta</i>	Rhesus Monkey	II/LC
7	<i>Mus booduga</i>	Little Indian Field Mouse	IV/LC
8	<i>Mus musculus</i>	Home Mouse	IV/LC
9	<i>Nesokia indica</i>	Bandicoot Rat	IV/LC
10	<i>Plecotus auritus</i>	Common Long-Eared Bat	LC
11	<i>Rattus rattus</i>	Black Rat	IV/LC
12	<i>Suncus etruscus</i>	Etruscan Pygmy Shrew	LC
13	<i>Suncus murinus</i>	House Shrew	LC

Abbreviation: LC= Least Concerned, CR= Critically Endangered, VU= Vulnerable, DD= Data Deficient, NT= Near Threatened, EN= Endangered, Endemic

Table 3.23: Reptiles Species Reported from the Study Area

S. No.	Scientific Name	Common Name	WPA/IUCN Status
1	<i>Bungarus caeruleus</i>	Common Indian Krait	-
2	<i>Calotes versicolor</i>	Oriental Garden Lizard	-
3	<i>Chrysopelea taprobanica</i>	Indian Flying Snake	-
4	<i>Dryophis nasutus</i>	Common Vine Snake	-
5	<i>Echis carinatus</i>	Saw Scaled Viper	-
6	<i>Geochelone elegans</i>	Indian Star Tortoise	IV/VU
7	<i>Hemidactylus flaviviridis</i>	Northern House Gecko	-
8	<i>Naja naja</i>	Cobra	II
9	<i>Ptyas mucosa</i>	Rat snake	II
10	<i>Typhlops diardii</i>	Large Blind Snake	LC
11	<i>Typhlops porrectus</i>	Slender Worm Snake	-
12	<i>Varanus bengalensis</i>	Common Indian Monitor	I/LC
13	<i>Daboia russelii</i>	Russell's Viper	II

Abbreviation: LC= Least Concerned, CR= Critically Endangered, VU= Vulnerable, DD= Data Deficient, NT= Near Threatened, EN= Endangered, Endemic

Table 3.24: Amphibians Species Reported from the Study Area

S. No.	Scientific Name	Common Name	IWPA/IUCN Status
1	<i>Duttaphrynus melanostictus</i>	Common Indian Toad	LC
2	<i>Hoplobatrachus tigerinus</i>	Indian Bullfrog	IV/LC
3	<i>Hyla arborea</i>	Tree Frog	LC
4	<i>Euphlyctis hexadactylus</i>	Green Pond Frog	IV/LC
5	<i>Sphaerotheca breviceps</i>	Indian Burrowing Frog	LC
6	<i>Polypedates maculatus</i>	Common Indian Tree Frog	LC

Abbreviation: LC= Least Concerned, CR= Critically Endangered, VU= Vulnerable, DD= Data Deficient, NT= Near Threatened, EN= Endangered, Endemic

Table 3.25: Butterfly Species Reported from the Study Area

S. No.	Family	Scientific Name	Common Name	WPA, 1972 Status
1	Hesperiidae	<i>Baoris farri</i>	Paintbrush Swift	Sch. IV
2		<i>Matapa aria</i>	Common Redeye	-
3		<i>Oriens goloides</i>	Common Dartlet	-
4		<i>Pelopidas mathias</i>	Small Branded Swift	-
5		<i>Suastus gremius</i>	Indian Palm Bob	-

6		<i>Telicota bambusae</i>	Dark Palm Dart	-	
7	Lycaenidae	<i>Anthene emolus</i>	Common Ciliate Blue	-	
8		<i>Anthene lycaenina</i>	Pointed Ciliate Blue	Sch. II Part II	
9		<i>Castalius rosimon</i>	Common Pierrot	-	
10		<i>Catochrysops strabo</i>	Forget- me-not	-	
11		<i>Chilades lajus</i>	Lime Blue	-	
12		<i>Chilades pandava</i>	Plains Cupid	-	
13		<i>Cigaritis vulcanus</i>	Common Silverline	-	
14		<i>Euchrysops cnejus</i>	Gram Blue	Sch. II Part II	
15		<i>Iraota timoleon</i>	Silverstre ak Blue	-	
16		<i>Lampides boeticus</i>	Pea Blue	Sch. II Part II	
17		<i>Leptotes plinius</i>	Zebra Blue	-	
18		<i>Neopithecops zalmora</i>	Quaker	-	
19		<i>Prosotas nora</i>	Common Lineblue	-	
20		<i>Pseudozizeeria maha</i>	Pale Grass Blue	-	
21		<i>Rapala manea</i>	Slate Flash	-	
22		<i>Rathinda amor</i>	Monkey Puzzle	-	
23		<i>Zizula hylax</i>	Tiny Grass Blue	-	
24		<i>Zizzeria karsandra</i>	Dark Grass Blue	-	
25		Nymphalidae	<i>Acraea violae</i>	Tawny Coster	-
26			<i>Ariadne ariadne</i>	Angled Castor	-
27			<i>Ariadne merione</i>	Common Castor	-
28			<i>Charaxes solon</i>	Black Rajah	-
29			<i>Danaus chrysippus</i>	Plain Tiger	-
30			<i>Danaus genutia</i>	Striped Tiger	-
31	<i>Elymnias hypermnestra</i>		Common Palmfly	-	
32	<i>Euploea core</i>		Common Crow	-	
33	<i>Euthalia aconthea</i>		Common Baron	-	
34	<i>Hypolimnas bolina</i>		Great Eggfly	-	
35	<i>Junonia almana</i>		Peacock Pansy	-	
36	<i>Junonia atlites</i>		Grey Pansy	-	
37	<i>Melanitis leda</i>		Common Evening Brown	-	
38	<i>Moduza procris</i>		Comman der	-	
39	<i>Mycalesis mineus</i>		Dark- brand Bushbro wn	-	
40	<i>Neptis jumbah</i>		Chestnut- streaked Sailer	-	
41	<i>Phalanta phalantha</i>		Common Leopard	-	
42	<i>Tirumala limniace</i>		Blue Tiger	-	
43	<i>Ypthima baldus</i>		Common Five-ring	-	
44	<i>Ypthima huebneri</i>		Common Four-ring	-	
45	Papilionidae		<i>Atrophaneura aristolochiae</i>	Common Rose	-
46		<i>Graphium agamemnon</i>	Tailed Jay	-	
47		<i>Papilio clytia</i>	Common Mime	-	
48		<i>Papilio demoleus</i>	Lime	-	
49		<i>Papilio polytes</i>	Common Mormon	-	
50	Pieridae	<i>Appias libythea</i>	Striped Albatross	Sch. IV	
51		<i>Catopsilia pomona</i>	Common Emigrant	-	
52		<i>Catopsilia pyranthe</i>	Mottled Emigrant	-	
53		<i>Cepora nerissa</i>	Common Gull	-	
54		<i>Delias eucharis</i>	Common Jezebel	-	
55		<i>Eurema hecabe</i>	Common Grass Yellow	-	
56		<i>Leptosia nina</i>	Psyche	-	

57		<i>Pareronia valeria</i>	Common Wanderer	-
Abbreviation: LC= Least Concerned, CR= Critically Endangered, VU= Vulnerable, DD= Data Deficient, NT= Near Threatened, EN= Endangered, End= Endemic				

Table 3.26: Diversity of Odonata (Dragonflies & Damselflies) Reported from the Study Area

S. No.	Family	Scientific Name	Common Name
1	Coenagrionidae	<i>Agriocnemis pygmaea</i>	Pygmy artlet
2		<i>Ischnura senegalensis</i>	Senegal Golden
3		<i>Onychargia atrocyana</i>	Black Marsh Dart
4		<i>Pseudagrion rubriceps</i>	Saffron- faced Blue Dart
5	Libellulidae	<i>Brachythemis contaminata</i>	Ditch Jewel
6		<i>Crocothemis servilia</i>	Ruddy Marsh Skimmer
7		<i>Orthetrum sabina</i>	Slender Skimmer/Green Marsh Hawk
8		<i>Rhodothemis rufa</i>	Rufous Marsh Glider
9		<i>Rhyothemis variegata</i>	Common Picture Wing
10		<i>Trithemis pallidinervis</i>	Long- legged Marsh Glider

Table 3.27: Birds Species Spotted or Reported from the Study Area

S. No.	Family	Scientific Name	Common Name	IWPA/ IUCN Status	Migratory Status
1	Accipitridae	<i>Accipiter badius</i>	Shikra/ Turki Baj	LC	R
2	Alcedinidae	<i>Alcedo atthis</i>	Common Kingfisher/ Chhoto Machhranga	IV/LC	R
3		<i>Halcyon smyrnensis</i>	White-throated Kingfisher/ Sadabuk Machhranga	IV/LC	R
4	Ardeidae	<i>Bubulcus ibis</i>	Cattle Egret/ Go-bok	IV/LC	R
5		<i>Egretta garzetta</i>	Little Egret	LC	
6	Cisticolidae	<i>Prinia inornata</i>	Plain Prinia	LC	R
7	Columbidae	<i>Columba livia</i>	Common Pigeon/ Gola Payra	LC	R
8		<i>Stigmatopelia</i>	Spotted Dove/ Tile Ghughu	IV/LC	R
9		<i>Streptopelia decaocto</i>	Eurasian Collared Dove/ Konthi Ghughu	IV/LC	R
10	Corvidae	<i>Corvus splendens</i>	House Crow/ Patikak	LC	R
11		<i>Dendrocitta vagabunda</i>	Rufous Treepie/ Handichacha/ Takachor	IV/LC	R
12	Cuculidae	<i>Centropus sinensis</i>	Greater Coucal/ Kubo	IV/LC	R
13		<i>Eudynamis scolopaceus</i>	Asian Koel/ Kokil	IV/LC	R
14	Daniidae	<i>Lanius excubitor</i>	Northern Shrike	LC	
15	Dicruridae	<i>Dicrurus macrocercus</i>	Black Drongo/ Phinge	IV/LC	R
16	Megalaimidae	<i>Megalaima haemacephal</i>	Coppersmith Barbet/ Chhoto Boshonto Bouri	IV/LC	R
17	Meropidae	<i>Merops orientalis</i>	Green Bee-Eater	LC	

18	Monarchidae	<i>Terpsiphone paradisi</i>	Asian Paradise-flycatcher/ Phite-bulbul/ Dudhraj	LC	R
19	Motacillidae	<i>Motacilla alba</i>	White Wagtail/ Khonjona	LC	LDM
20		<i>Motacilla flava</i>	Yellow Wagtail	LC	
21	Muscicapidae	<i>Saxicoloides fulicatus</i>	Indian Robin/ Kalishama	LC	R
22	Nectariniidae	<i>Nectarinia asiatica</i>	Purple Sunbird	IV/LC	
23	Passeridae	<i>Passer domesticus</i>	House Sparrow/ Chodai	LC	R
24	Phalacrocoracidae	<i>Phalacrocorax sp.</i>	Little Cormorant/ Chhoto Pankoudi	IV/LC	R
25	Phylloscopidae	<i>Phylloscopus fuscatus</i>	Dusky Warbler/ Godhuli Shakha Phutki	LC	LDM
26	Psittacidae	<i>Psittacula cyanocephala</i>	Plum-Headed Parakeet	LC	
27		<i>Psittacula krameri</i>	Rose-ringed Parakeet/ Tiya	IV/LC	R
28	Pycnonotidae	<i>Pycnonotus cafer</i>	Red-vented Bulbul/ Bulbuli	IV/LC	R
29	Rallidae	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen/ Dahuk	LC	R
30		<i>Gallinula chloropus</i>	Common Moorhen/ Jolmurgi	LC	LM
31	Strigidae	<i>Athene brama</i>	Spotted Owlet/ Kuture Pancha	IV/LC	R
32	Sturnidae	<i>Acridotheres tristis</i>	Common Myna/ Shalik	IV/LC	R
33		<i>Sturnia pagodarum</i>	Brahminy Starling/ Bamun Shalik	IV/LC	R
34	Timaliidae	<i>Turdoides striata</i>	Jungle Babbler/ Chhatara	IV/LC	R
35	Turdidae	<i>Zoothera dauma</i>	Scaly Thrush/ Sonali Giridama	IV/LC	LM
36	Upupidae	<i>Upupa epops</i>	Common Hoopoe/ Mohonchuda	LC	LM
Abbreviation: LC= Least Concerned, CR= Critically Endangered, VU= Vulnerable, DD= Data Deficient, NT= Near Threatened, EN= Endangered, End= Endemic, R= Resident, LM= Local Migrant, LDM= Long Distance Migrant					

3.11.6 Aquatic Life

There are various kinds of water bodies present in the study area (buffer zone) and therefore rich in all kind of aquatic life. All major aquatic groups and species as found in the primary survey and collected from the secondary sources have been enlisted in the Tables (3.28 to 3.30) hereafter.

Table 3.28: Protozoans Found in the Water Bodies of the Study Area

S. No.	Family	Scientific Name
1	Colepidae	<i>Coleps hirtus</i>
2	Colpodidae	<i>Colpoda aspera</i>
3	Holophryidae	<i>Holophrya annandalei</i>
4		<i>Holophrya bengalensis</i>

5	Leptopharyngidae	<i>Leptopharynx torpen</i>
6	Loxodidae	<i>Loxodes striatus</i>
7		<i>Loxodes vorax</i>
8	Nassulidae	<i>Nassula ornata</i>
9	Prorodontidae	<i>Prorodon discolor</i>

Table 3.29: Phytoplanktons and Zooplanktons Found in the Water Bodies of the Study Area

S. No.	Class	Scientific Name	
Phytoplankton			
1	Bacillariophyceae	<i>Rhopalodia sp.</i>	
2	Charaophyceae	<i>Chara sp.</i>	
3	Chlorophyceae	<i>Chlamydomonas sp.</i>	
4		<i>Cladophora glomerata</i>	
5		<i>Oedogonium sp.</i>	
6		<i>Tetraëdron sp.</i>	
7		<i>Volvox sp.</i>	
8		Cyanophyceae	<i>Anabaena sp.</i>
9			<i>Nostoc sp.</i>
10	<i>Oscillatoria sp.</i>		
11	<i>Spirulina sp.</i>		
12	Dinophyceae	<i>Peridinium sp.</i>	
13	Euglenophyceae	<i>Euglena sp.</i>	
14		<i>Trachelomonas sp.</i>	
15	Zygnematophyceae	<i>Closterium sp.</i>	
16		<i>Spirogyra sp.</i>	
Zooplankton			
1	Bosminidae	<i>Bosmina longirostris</i>	
2		<i>Macrothrix triserialis</i>	
3	Brachionidae	<i>Brachionus angularis</i>	
4	Calanidae	<i>Heliodiaptos muscontortus</i>	
5	Chydoridae	<i>Alona pulchella</i>	
6		<i>Alona quadrangularis</i>	
7		<i>Pleuroxus similis</i>	
8	Cyprididae	<i>Cypris subglobosa</i>	
9	Filinidae	<i>Filinia longesita</i>	
10	Lecanidae	<i>Lecane lunulata</i>	
11	Moinidae	<i>Monia micrura</i>	
12	Mytilidae	<i>Mytilina ventratis</i>	
13	Notommatidae	<i>Cephalodel lagibba</i>	
14	Philodinidae	<i>Rotatoria neptunia</i>	
15	Sididae	<i>Diaphanos omaexcisum</i>	
16		<i>Diaphanos omasarsi</i>	
17		<i>Sida crystallina</i>	
18	Testudinellidae	<i>Testudinella patina</i>	

Table 3.30: List of Fishes Reported in Rivers and Tanks in the of the Study Area

S. No.	Family	Scientific Name	Common Name	IUCN/WPA Status
1	Ambassidae	<i>Chanda nama</i>	Lomba Chanda	LC
2		<i>Parambassis ranga</i>	Ronga	LC
3	Bagridae	<i>Mystus vittatus</i>	Tengara	LC

4	Belontiidae	<i>Xenentodon cancila</i>	Kakila	LC
5	Channidae	<i>Channa marulius</i>	Giant Snakehead/ Shal	LC
6		<i>Channa striata</i>	Shoal	LC
7	Cichlidae	<i>Oreochromis aureus</i>	Tilapia	LC
8		<i>Oreochromis niloticus</i>	Tilapia	LC
9	Cyprinidae	<i>Barilius bendelisis</i>	Khoksa	LC
10		<i>Catla catla</i>	Katla	LC
11		<i>Cirrhinus mrigala</i>	Mrigal	LC
12		<i>Danio rerio</i>	Anju	LC
13		<i>Hypophthalmichthys molitrix</i>	Silver Carp	NT
14		<i>Labeo calbasu</i>	Kalibaus	-
15		<i>Labeo rohita</i>	Rohu, Ruee	LC
16		<i>Puntius sophore</i>	Spotted Barb	LC
17		<i>Systemus sarana</i>	Olive Barb	LC
18	Gobiidae	<i>Glossogobius giuris</i>	Balia	LC
19	Heteropneustidae	<i>Heteropneustes fossilis</i>	Singee	LC
20	Mastacembelidae	<i>Mastacembelus armatus</i>	Bami	LC
21	Palaemonidae	<i>Macrobrachium malcolmsonii</i>	Prawn	-
22		<i>Macrobrachium rosenbergii</i>	Prawn	LC
23	Schilbeidae	<i>Silonia silonia</i>	Silond	LC
24	Siluridae	<i>Wallago attu</i>	Boal	VU
25	Sisoridae	<i>Nangra viridescens</i>	Kosi Hara	LC

LC= Least Concerned, CR= Critically Endangered, VU= Vulnerable, DD= Data Deficient, NT= Near Threatened, EN= Endangered, End= Endemic



Azadirachta indica (T)



Mangifera indica (T)



Aegle marmelos (T)



Ailanthus excelsa(T)





	
<p><i>Abrus precatorius</i> (S)</p>	<p><i>Vitex negundo</i> (S)</p>
	
<p><i>Jatropha curcas</i> (S)</p>	<p><i>Aloe vera</i> (H)</p>

Figure 3.16: Photograph of flora species

3.12 SOCIO-ECONOMIC IMPACT ASSESSMENT

3.12.1 Introduction

Socio-Economic Impact Assessment (SEIA) refers to systematic analysis of various social and economic characteristics of human being living in a given geographical area (study area/impact area). The prime objective of SEIA is to identify and evaluate potential socio-economic and cultural impacts of a proposed development project on the lives & conditions of people, their families and communities. If the potential impacts are significant and adverse, SEIA assist the developers and other stakeholders to reduce, remove or prevent these impacts from happening. Also, it examined how a development project changes the lives of local residents. The outcome of the study relies on both quantitative and qualitative measure of impacts. The impacts are evaluated in terms of changes in community demographics, housing, employment, market effects, public services, retail business, quality of life and artistic qualities of the community. Further, assessing proposed developments in socio-economic context help the community leaders and local people identify potential social equity issues, evaluate the adequacy of social services and determine whether the project has adverse effects on overall social well-being or not.

SEIA also provides a forum for planning how to maximize the beneficial impacts of a proposed development. Beneficial impacts can include:

- a) A better standard of living due to increased access to employment, business opportunities, training, education & health
- b) Greater access to and from a community and

- c) Increase funding to improve social infrastructure and cultural maintenance.

Objectives of the Study

The objectives of Socio-Economic Impact Assessment of the project are as follows:

- a) To comprehend socio-economic status of the people living there in.
- b) To assess probable impact of the project on social and economic aspects.
- c) To measure the impact of the project on quality of life of the people.
- d) To ensure sustainability of positive impacts.
- e) To suggest mitigation measures and agency responsible for taking action in case of adverse impact.

Steps taken to prepare the SEIA Report

- ☞ Literature Review.
- ☞ Identification of the study area and important landmarks therein.
- ☞ Preparation of list of habitations located in the study area.
- ☞ Firming up of approach and methodology.
- ☞ Collection of Secondary Data from Census Report, district profile, published and un-published literatures, administrative records etc.
- ☞ Data Entry and Data Validation.
- ☞ Generation of Tables.
- ☞ Data Analysis and preparation of report.

Methodology

For Socioeconomic Impact Assessment of the proposed project we recourse to systematic analysis By Geoinformatics application of village level dynamic studies in various socioeconomic characteristics, both in terms of quality and quantity. Accordingly, both qualitative and quantitative data of the study area was collected through various sources.

For collection of information, we approached Census of India for published data/information, visited state & district portals and referred to administrative records of the state & district administration. Codes were extensively used during collection of qualitative data. They were decoded after data processing to facilitate data analysis and report writing.

Study Area

The study area defines the circle radius of 10 Km buffer zone around the Project site . The study area is falling in district Howrah in state of West Bengal. In the 10Km buffer zone of the study area 212 habitation village are identified. Given in the Map and table below:

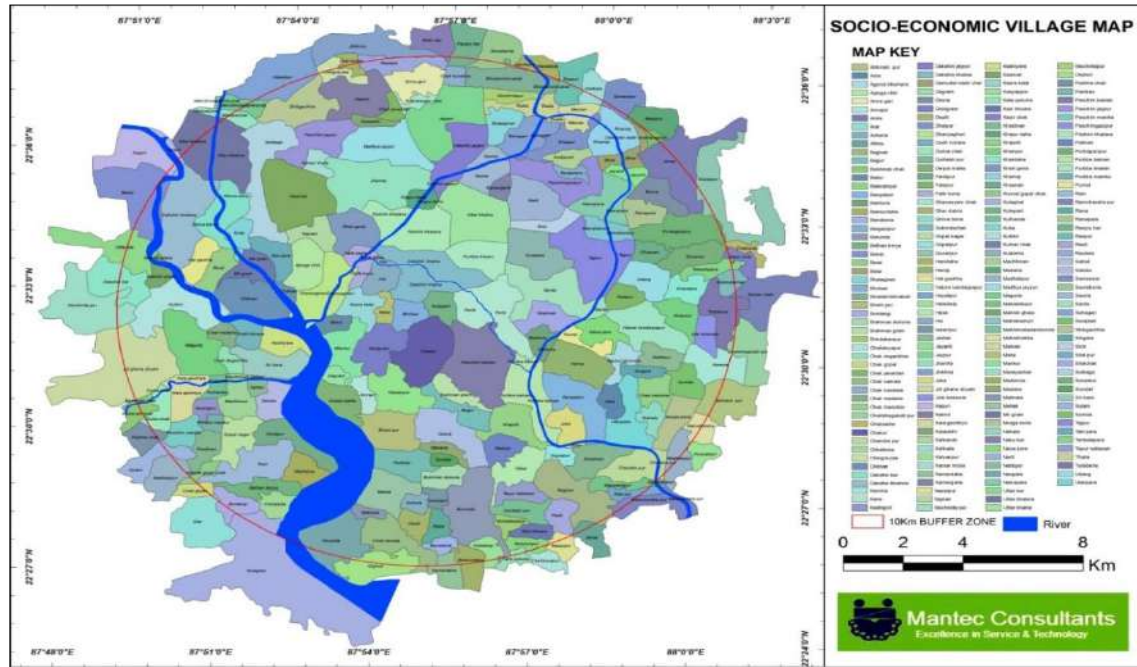


Figure3-17: Socio-Economic Village Map

Table 3.31: List of Habitations identified in the Study Area

S. No.	Name of (Village / Town)	Sub-district	S. No.	Name of (Village / Town)	Sub-district
1	Ranjoy bar	Amta	107	Natibpur	Bagnan-i
2	Jhikhira	Amta	108	Purbba bainan	Bagnan-i
3	Naku bar	Amta	109	Kalyanpur	Bagnan-i
4	Saoraberia	Amta	110	Degram	Bagnan-i
5	Ghar dubra	Amta	111	Singara	Bagnan-i
6	Rautara	Amta	112	Amrajol	Bagnan-i
7	Chingra jola	Amta	113	Brahman gram	Bagnan-i
8	Hanidaha	Amta	114	Dwipa malita	Bagnan-i
9	Raspur	Amta	115	Bangalpur	Bagnan-i
10	Amra gari	Amta	116	Bagur	Bagnan-i
11	Binalakrishnabati	Amta	117	Ulanpara	Bagnan-i
12	Chak kundalia	Amta	118	Chak manohar	Bagnan-i
13	Kakrol	Amta	119	Adra	Bagnan-i
14	Shibgachhia	Amta	120	Murga beria	Bagnan-i
15	Kalikata	Amta	121	Khajutti	Bagnan-i
16	Jaypur	Amta	122	Sabsit	Bagnan-i
17	Sameswar	Amta	123	Biram pur	Bagnan-i
18	Chak janardan	Amta	124	Joka	Bagnan-i
19	Nischintapur	Amta	125	Nahala	Bagnan-i
20	Marayachak	Amta	126	Patinan	Bagnan-i
21	Ghanasyam chak	Amta	127	Masiara	Bagnan-i
22	Thalia	Amta	128	Sondail	Bagnan-i
23	Uttar bhatara	Amta	129	Panitras	Bagnan-i
24	Bhatoghari	Amta	130	Hijlak	Bagnan-i
25	Mainan	Amta	131	Khadinan	Bagnan-i
26	Kalasdih	Amta	132	Gopalpur	Bagnan-i
27	Khariop	Amta	133	Chandra pur	Bagnan-i
28	Solbaga	Amta	134	Bagnan	Bagnan-i
29	Madaria	Amta	135	Mellak	Bagnan-i

30	Paschim jaypur	Amta	136	Brahman dukuria	Bagnan-i
31	Madhya jaypur	Amta	137	Barunda	Bagnan-i
32	Sehagari	Amta	138	Mahadebpur	Bagnan-i
33	Dhaipur	Amta	139	Tepur nabasan	Bagnan-i
34	Dakshin jaypur	Amta	140	Iswaripur	Bagnan-i
35	Damodar nadir char	Amta	141	Asharia	Bagnan-i
36	Amta	Amta	142	Sital pur	Bagnan-i
37	Serajbati	Amta	143	Ramchandra pur	Bagnan-i
38	Kamar khola	Amta	144	Matinala	Bagnan-i
39	Guzarpur	Amta	145	Durllabh pur	Bagnan-i
40	Saoria	Amta	146	Rasti	Bagnan-i
41	Jhamta	Amta	147	Naupala	Bagnan-i
42	Kasmali	Amta	148	Deulti	Bagnan-i
43	Dakshin bhatora	Amta	149	Rana	Bagnan-i
44	Kalbansh	Amta	150	Chak kamala	Bagnan-i
45	Betai	Amta	151	Brindabanpur	Bagnan-i
46	Paschimgazipur	Amta	152	Kazi bhuara	Bagnan-i
47	Bargazipur	Amta	153	Athila	Bagnan-i
48	Ghora beria	Amta	154	Bansberia	Bagnan-i
49	Jayanti	Amta	155	Nazarpur	Bagnan-i
50	Kamargaria	Amta	156	Heledwip	Bagnan-i
51	Nawapara	Amta	157	Balarampur	Bagnan-i
52	Narit	Amta	158	Bankurdaha	Bagnan-i
53	Uttar khalna	Amta	159	Orphuli	Bagnan-i
54	Deora	Amta	160	Kata pukuria	Bagnan-i
55	Khajur daha	Amta	161	Kamardaha	Bagnan-i
56	Pashim khalana	Amta	162	Chaitanyapur	Bagnan-i
57	Sirol	Amta	163	Kaijuri	Daspur
58	Khari geria	Amta	164	Benai	Daspur
59	Ranapara	Amta	165	Uttar bar	Daspur
60	Kulia	Amta	166	Mahish ghata	Daspur
61	Nignan	Amta	167	Dakshin bar	Daspur
62	Hat gachha	Amta	168	Nischinda pur	Daspur
63	Mahishamuri	Amta	169	Kultikri	Daspur
64	Tajpur	Amta	170	Maguria	Daspur
65	Purbagazipur	Amta	171	Chak madaria	Daspur
66	Taki para	Amta	172	Kashiyara	Daspur
67	Kusberia	Amta	173	Dudh konara	Daspur
68	Ajanga chhi	Amta	174	Jot ghana shyam	Daspur
69	Purbba khalan	Amta	175	Chak dogachhia	Daspur
70	Beral	Amta	176	Sri bara	Daspur
71	Mir gram	Amta	177	Hayatpur	Khanakul
72	Fatik beria	Amta	178	Mahishnaladamkunda	Khanakul
73	Dakshin khalna	Amta	179	Kulhanda	Kolaghat
74	Dhanyaghari	Amta	180	Jashar	Kolaghat
75	Khasnan	Amta	181	Durba chati	Kolaghat
76	Sonamui	Amta	182	Kala gechhya	Kolaghat
77	Hio	Amta	183	Machhinan	Kolaghat
78	Chaksadar	Amta	184	Saluka	Kolaghat
79	Udang	Amta	185	Baishnab chak	Kolaghat
80	Kazir chak	Amta	186	Kashigori	Kolaghat

81	Sarda	Amta	187	Paschim manika	Kolaghat
82	Chitnan	Amta	188	Purbba manika	Kolaghat
83	Tentuliapara	Amta	189	Gopal nagar	Kolaghat
84	Gobindachak	Amta	190	Padima chak	Kolaghat
85	Khardaha	Amta	191	Faridpur	Kolaghat
86	Kumar chak	Amta	192	Khadinan	Kolaghat
87	Fatepur	Amta	193	Sulani	Kolaghat
88	Sitalchak	Amta	194	Rain	Kolaghat
89	Bankura	Amta	195	Madhabpur	Kolaghat
90	Karia	Bagnan-i	196	Kismat gopal chak	Kolaghat
91	Kasra katai	Bagnan-i	197	Marberya	Kolaghat
92	Malia	Bagnan-i	198	Bathan berya	Kolaghat
93	Kulepairi	Bagnan-i	199	Chak gopal	Kolaghat
94	Bholsar	Bagnan-i	200	Bordangi	Kolaghat
95	Khanpur	Bagnan-i	201	Arar	Kolaghat
96	Baksi	Bagnan-i	202	Chhatinda	Kolaghat
97	Hature kandarpapur	Bagnan-i	203	Kolaghat	Kolaghat
98	Mankur	Bagnan-i	204	Baishnab chak	Kolaghat
99	Jote bireswar	Bagnan-i	205	Tulsiberia	Uluberia-i
100	Chakur	Bagnan-i	206	Chakbhagabati pur	Uluberia-i
101	Deulgram	Bagnan-i	207	Kamina	Uluberia-i
102	Paschim bainan	Bagnan-i	208	Sumda	Uluberia-i
103	Naoa para	Bagnan-i	209	Abhiram pur	Uluberia-i
104	Purnal	Bagnan-i	210	Mahishrekha	Uluberia-i
105	Harop	Bagnan-i	211	Madhabpur	Uluberia-i
106	Agunsi bhuinara	Bagnan-i	212	Kasyappur	Uluberia-i
Total					212

The main agricultural commodities in the study area are Paddy, Jute, Oil seeds, Pulses, Coconut, Mesta, etc. also fishing activity households population in study area.

Baseline Data

The baseline data with respect to population and amenities available in the study area has been worked out as under:

I. Demographic particulars/population details:

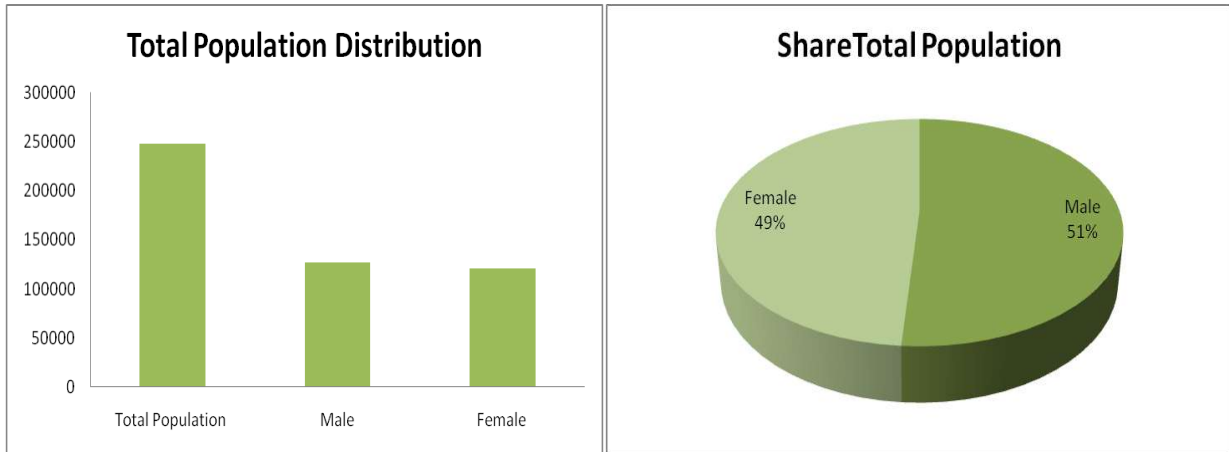
Table 3.32: Demographic Particulars/Population Details of the Study Area

S. No.	Description	Number	Percentage to Respective Total
1	Total Population	248181	100
	Male	127038	51.19
	Female	121143	48.81
	Sex Ratio	954	
2	Population (0-6 age group)	35699	100
	Male	18262	51.16
	Female	17437	48.84
	Sex Ratio	955	
3	Population Scheduled Caste	65882	100
	Male	33529	51.00
	Female	32353	49
	Sex Ratio	965.00	

S. No.	Description	Number	Percentage to Respective Total
4	Population Tribe Caste	1704	100
	Male	854	50.12
	Female	850	49.88
	Sex Ratio	995	
5	Total Literates	153507	100
	Male	88587	57.71
	Female	64920	42.29
	Overall Literacy Rate West Bengal	76.26%	
	Male	81.69%	
	Female	70.54%	
	Gender Gap in Literacy Rate	11.15%	
6	Total Workers	86235	100
	Male	69454	80.54
	Female	16781	19.46
	Gender Gap in Work Participation Rate	61.08	
7	Main Workers	63390	100
	Male	56618	89.37
	Female	6772	10.68
	Gender Gap in Work Participation Rate	78.69	
8	Marginal Workers	13986	100
	Male	13424	95.98
	Female	562	4.02
	Gender Gap in Work Participation Rate	91.96	
9	Household Industrial Workers	3941	100
	Male	1618	41.06
	Female	2323	58.94
10	Total Agricultural Workers	9348	100
	Male	6536	69.92
	Female	2812	30.08
10 (a)	Cultivators	2901	100
	Male	1441	49.67
	Female	1460	50.33
10(b)	Agricultural Labour	6447	100
	Male	3610	56.19
	Female	837	43.81
12	'Other Workers'	6654	100
	Male	3240	48.68
	Female	3415	51.32

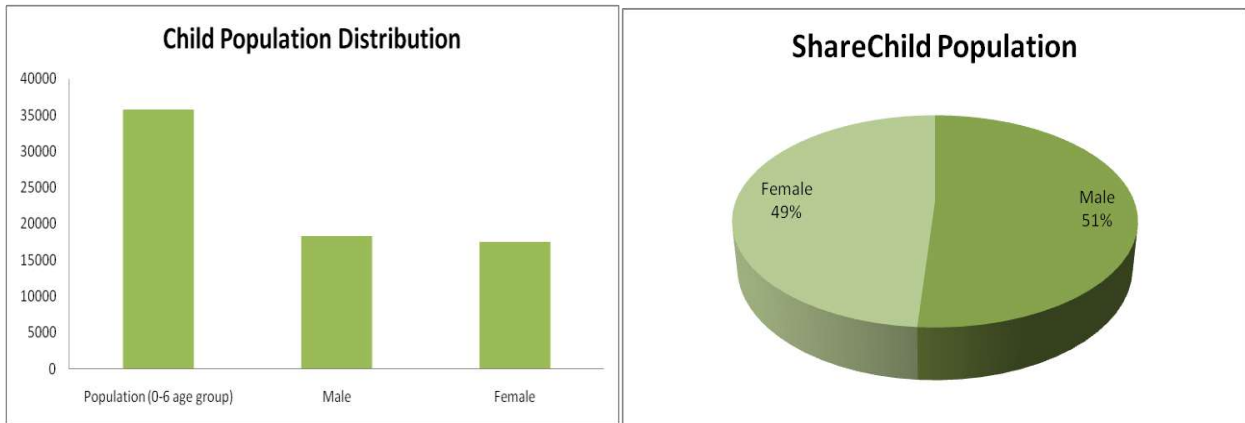
3.12.2 Population Composition

According to Census 2011, total population of the study area zone has been worked out to **248181** in which 127038 (51.19 %) are males and remaining 121143 (48.81%) are females. The overall sex ratio in the study area has been worked out to **954** females per 1,000 males which is More than the State sex ratio (950 females per 1000 males).



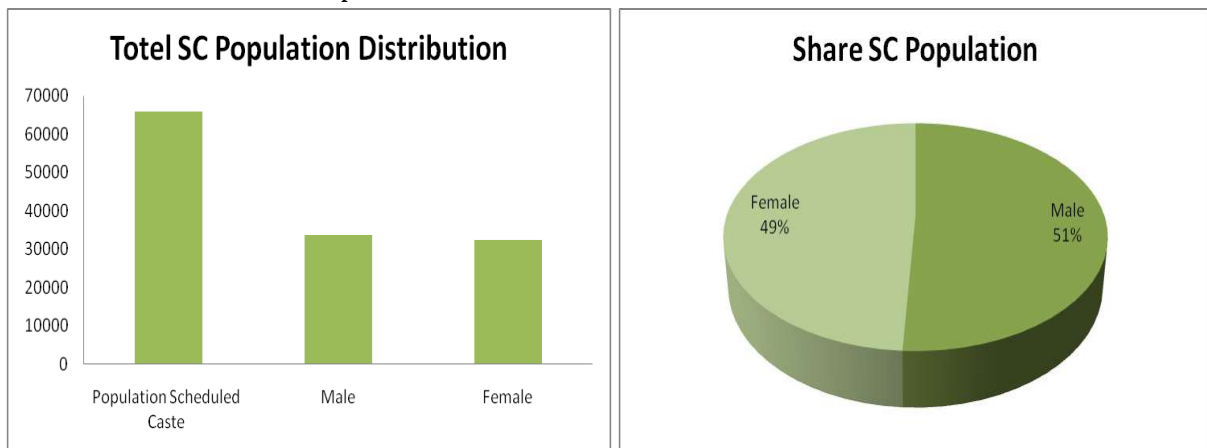
Child Population Distribution

In the study area, the total child population of age group of 0-6 year has been worked out to **35699** which constitute about 14.38 percent of the total population. Of the total child population, 51.16 percent are boys and remaining 48.84 percent are girl child. The sex ratio of population in this age group is 955 girls per 1,000 boys which is less than the state child sex ratio (956 girls per 1000 boys) in the same age group.

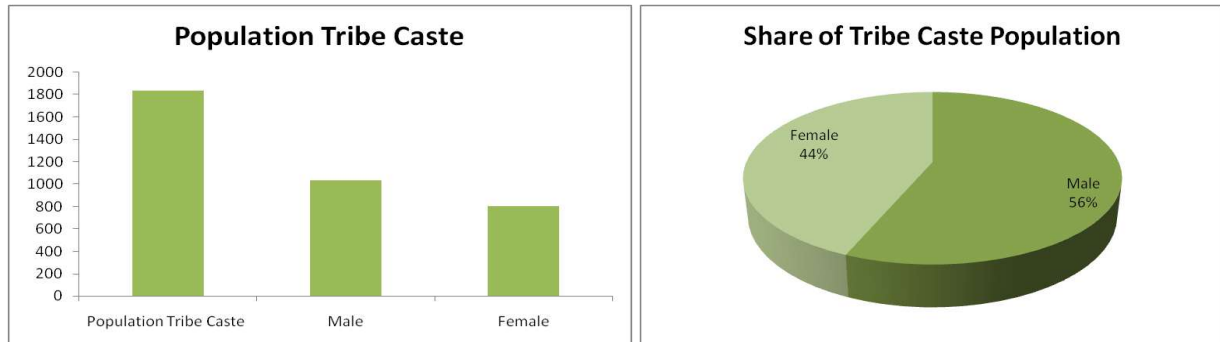


Social Group Population Distribution

In the study area, Scheduled Caste population is 65882 which constitute 26.55 percent of the total population of the study area which is almost more to 23 % SC Population in the State and 51.00 percent is male and 49 percent is female. The sex ratio among Scheduled Caste population has been worked out to 965 females per 1,000 males.



There are **1835** people belonging to Scheduled Tribe population in the study area which constitute 0.69 percent less than the State ST Population (5.8%) to the total population. Of this, 50.12 percent is male and remaining 49.88 percent is female. The sex ratio among this population group has been worked out to 995 females per 1,000 males.

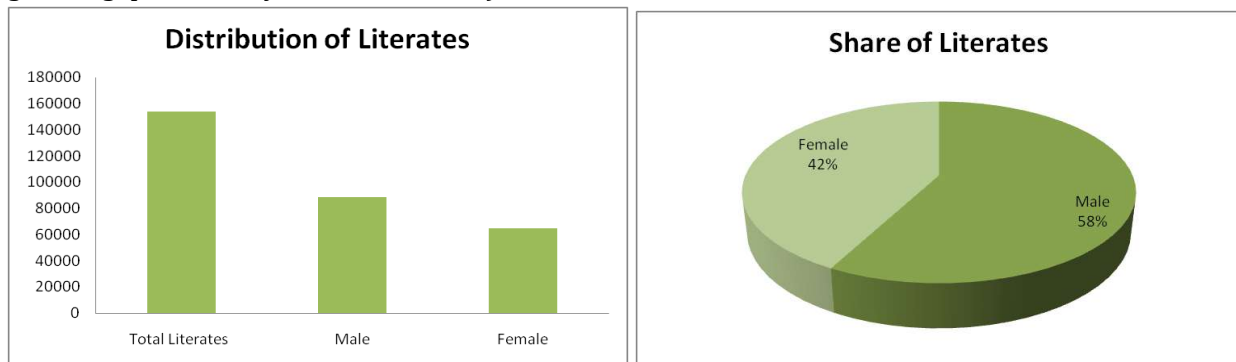


Household and Household Size

The entire population of the study area is distributed into approx. 33799 households and the average household size is five.

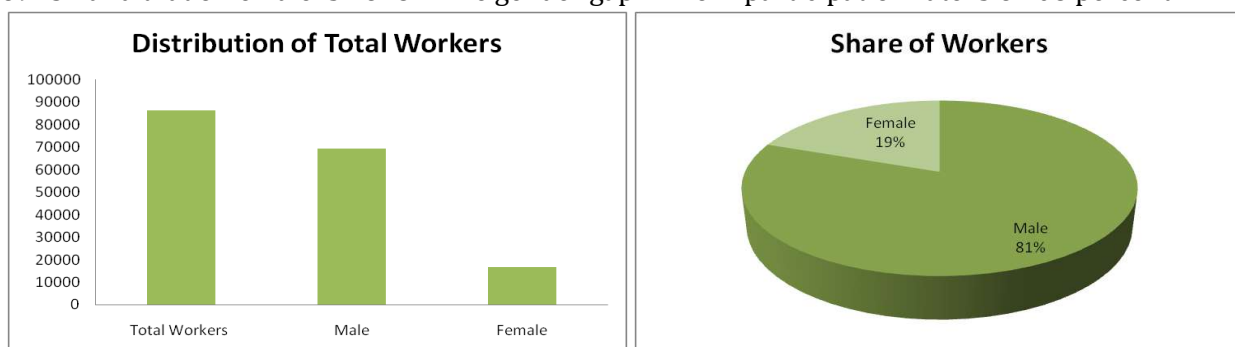
Literates, Literacy Rate and Gender Gap in Literacy Rate

In the study area, 61.85 percent of the population is literate in which 57.71 percent are male and 42.29 percent are female literates. The overall literacy rate has been worked out to 61.85 percent which is less than State literacy rate 76.26 %. The male literacy rate is 81.69 percent and female literacy rate is 70.54 percent, creating a gender gap in literacy rate of 15.42 percent (more than State gender gap of literacy rate i.e. 11.14 %).

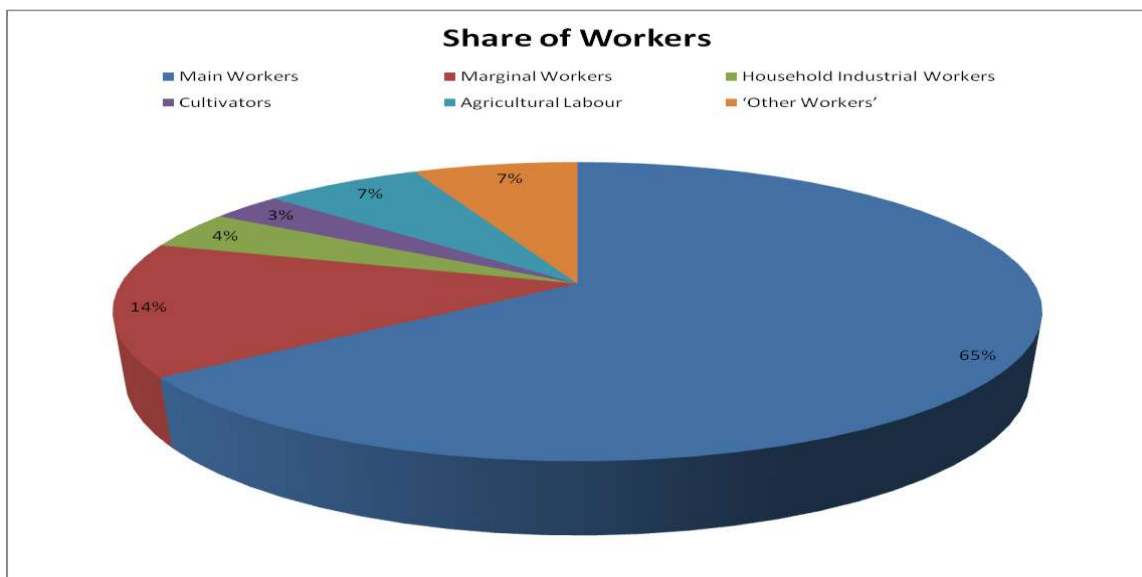
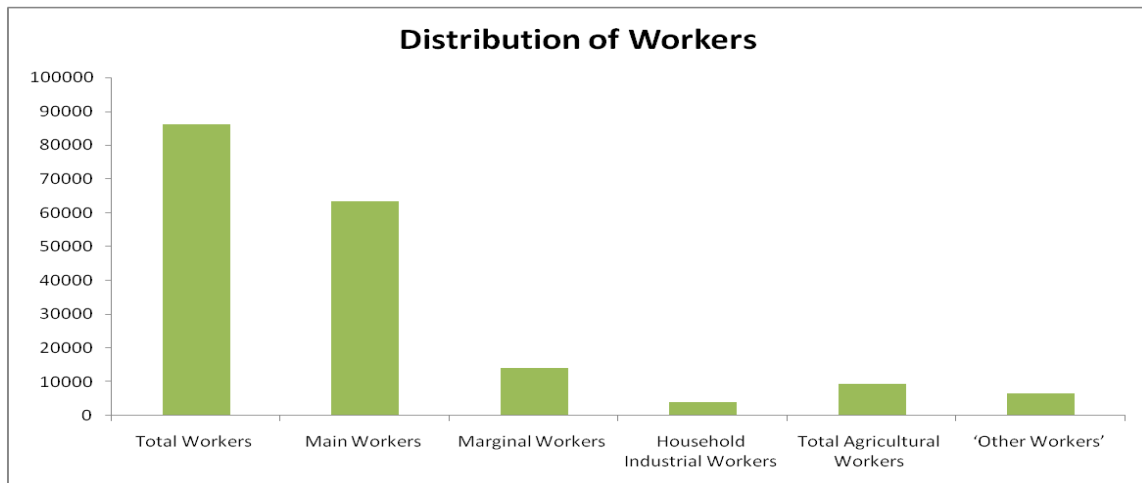


Workers and Work Participation Rate

Based on Census 2011, total number of workers in the study area has been worked out to **86235** which constitute 34.75 percent of the total population. Of the total workers, 80.54 percent are males and the remaining 19.46 percent are females. In absolute term, the total number of male workers is 69454 and that of female is 16781. The gender gap in work participation rate is 61.08 percent.



Further, Number of the total workers 86235, 73.51 percent are main workers and the remaining 16.22 percent is marginal workers. Of the total main workers, 89.37 percent are male and remaining 10.68 percent are female which creates a gender gap in work participation of 78.69 percent. In case of marginal workers, 95.98 percent are male and 4.02 percent are female that creates a gender gap of 91.96 percent in this segment of work participation. The workers are further divided into Agricultural Workers, Household Industrial Workers and 'Other Workers'. Their shares in the total workers are 10.84 percent, 4.57 percent and 7.72 percent respectively.



Of the people working in agricultural sector, 26.49 percent are Cultivators 31.03 percent and remaining 68.96 percent are Agricultural Labour of total working in agricultural sector. From the above distribution of workers, it is clear that the economy of the study area is mainly dependent on agriculture, either cultivators or agricultural labourers.

II. BASIC AMENITIES:

Table 3.33: Basic Amenities Available in the Study Area (Number and Percentage of House Hold)

EDUCATION			
Educational Institutions	Type of Institutes		Number
	Pre- Primary School (Pvt.)		NA
	Primary School (Govt. & Pvt.)		36
	Middle School (Govt. & Pvt.)		11

	Secondary School (Govt. & Pvt.)	5
HEALTH		
Health Facilities	Type of Facilities	Number
	Primary Health Sub-Centre, ASHA, Anganwadi Centre (Nutritional Centre), Nutritional Centre (ICDS), Non-govt. Medical Facilities for out patient	16
WATER		
Drinking Water	Means of Drinking Water	No of Habitations
	Tap (Treated)	3
	Tap (Untreated)	6
	Hand Pump	9
	Well (Covered)	7
	Well (Uncovered)	8
	Tube Well	10
ELECTRICITY		
Electricity Supply	Power for Domestic Uses	
	Power for Agriculture Uses	
	Power for Commercial or Industrial Uses	
ROAD		
Approach Road	Black Topped (Paved/Pucca) Road	
	Gravel (Mud/Kachcha) Road	
	Water Bounded Macadam (WBM)	
	Footpath Road	
	Ferry boat	
TRANSPORTATION		
Road Transportation	Auto/Modified Auto Services	
	Bus Services (Public & Pvt.)	
OTHER AMENITIES		
Other Amenities	Public Distribution System (PDS) Shop	
	Drainage System (Open & Closed)	
	Sports Field	
	Birth & Death Registration Office	

(Source: Desk Research & Census of India)

CHAPTER-4 : ANTICIPATED ENVIRONMENTAL IMPACT AND ITS MITIGATION MEASURES

4.1 INTRODUCTION

Prediction of impacts is the most important component in the Environmental Impact Assessment studies. Several scientific techniques and methodologies are available to predict impacts of developmental activities on physical, ecological and socio-economic environments. Such predictions are superimposed over the baseline (pre-project) status of environmental quality to derive the ultimate (post-project) scenario of environmental conditions. The prediction of impacts helps to minimize the adverse impacts on environmental quality during pre and post project execution. Generally, the environmental impacts can be categorized as either primary or secondary. Primary impacts are those, which are attributed directly by the project and secondary impacts are those, which are indirectly induced and typically include the associated investment and changed patterns of social and economic activities by the proposed actions.

The primary function of an environmental impact assessment is to ascertain the potential impacts of project on environmental components such as air, water, noise, soil, flora, fauna, land and Socio-economic and their magnitude during construction and operation for adoption of possible mitigation measure.

The Impacts of project are divided into two categories i.e. impacts during construction phase and impacts during operation phase. Major project impacts will occur during operation phase as construction work will be done in a staggered manner within a small area and for that duration.

Environmental parameters considered for impact analysis are:

- Land environment
- Air Environment
- Water Environment
- Noise Environment
- Biological Environment
- Socioeconomic Environment

4.2 IDENTIFICATION OF IMPACTS

4.2.1 Land Environment

4.2.1.1 Construction Phase

The proposed project is a new manufacturing unit of new natural and synthetic surfactant chemical located in outside industrial area. During construction, top soil generated from various activities like excavation etc will be stored and preserved to use it during restoration period as far as possible. There will be no disposal of wastewater on land. Hazardous wastes will be stored at earmarked area with impervious flooring, shed and spillages/leakage collection system to eliminate rainwater contamination, chances of overflow/spillages going on to the land and thus land/soil contamination. Hazardous wastes will be disposed as per the Hazardous Waste Rules.

4.2.1.2 Operation Phase

The storage and handling of raw materials shall be done properly to prevent any spillage. The hazardous waste generated during the operation phase, will properly disposed so that there is no

spill and contamination of land. The Solid hazardous waste will be sent for disposal to authorized TSDF site.

4.2.2 Air Environment

4.2.2.1 Construction phase impacts

The potential impact on air quality due to proposal project will be temporary rise in SPM and RSPM level likely to result from

- Fugitive dust emissions at the construction site.
- Use of unpaved roads and trucks tracks by the construction activities.

There might be some impact on air quality that may take place during construction, which would be caused by emission of dust during excavation as well as from the earth material stored at the site. The potential for dust in the form of particulate matter to be emitted during construction site strongly depends on the type of activities taking place, such as the movements of vehicles, speed, soil stripping, excavation, back filling and reinstatement. Sprinkling water on the deposited earth material shall minimize emissions of particulate. The rate of emissions of dust, its predicted rates of deposition and the temporary nature of the dust generating activities is expected to be well within acceptable limits. Also vehicles transporting earth and other construction material to the site will be covered to ensure their dust particles do not escape into the air. During construction all earth material will be kept covered to minimize impact on the ambient air quality.

Traffic to the site during construction will be slightly more intensive than at present. The present road conditions are good for the proposed additional movement of vehicular traffic.

These pollutants can affect the surrounding vegetation and nearby agricultural crops. Construction activity is limited only to the project site and hence unlikely to cause any change in the ambient air quality around the proposed project. As the emission level is very low and intermittent, quantitative predictions are not possible due to limitations of the dispersion model. Therefore, considering all the air pollutants, it is not expected that air emissions due to construction will exceed air quality standards (NAAQMS)

Hence, the impacts on the ambient air quality during construction phase will be temporarily for short duration and reversible in nature and restricted to small area.

4.2.2.2 Operation Phase Impacts

During operation phase, intermittent gaseous emissions are anticipated from Reactors, Spray Dryer, Boiler & DG sets which will be set up with adequate APC measures as per CPCB guidelines to achieve natural dispersion of pollutants. The APC measures will be designed for the proposed production capacity which will be installed to achieve the standard emission level. Increase in vehicular emissions is anticipated due to truck/ movement. To control vehicular emissions, vehicles engaged will essentially have Pollution under Control Certificate (PUCC) to minimize vehicular emissions.

During operation phase, fugitive emission sources like Chemical storages, Chemical transfer/charging from drums, Process reactor vent and Laboratory testing will be equipped with proper system to avoid the impact on air environment.

Therefore, during operation phase the impacts on the ambient air quality will be within CPCB/MoEFCC/WBPCB norms.

Mitigation Measures

- Good housekeeping, providing adequate air pollution control measures and stack of adequate heights will be provided.
- The emission sources for the proposed project i.e. Boiler, DG set, Alkali Scrubber will be designed with adequate stack heights and air pollution control measures to meet the standards set by the WBPCB / CPCB.

For the proposed plant the following measures will be taken up for control of gaseous emissions:

4.2.2.2.1 Air Pollution Management (Scrubber Design)

Stack emissions and fugitive emissions from the process as well as storage areas may contribute to increase in concentrations of PM, SO₂, NO_x, H₂S, VOCs and acid mist. Adequate and efficient control measures will be installed to keep the gaseous emissions to a minimum.

The principal air pollution control systems proposed for the sulphonation plant are Electrostatic Precipitator (ESP) and Alkali Scrubber. The SO₂ and Acid mist released during the sulphonation process would be cleaned by taking the gas through an ESP to remove the acid mist followed by alkali scrubber to remove the SO₂ gas. The clean gas will be discharged into atmosphere through a stack of 30.0 m height.

4.2.2.2.2 Electrostatic Precipitator System

The Electrostatic Precipitator employs a proprietary electrode design in an air jacketed bank of collection tubes. The High Intensity Torroidal Electron Corona (HITEC) produced by the electrode charges the inlet particulates, which are collected at the passive tube wall.

Coalesced organic acids (bottoms) discharge at the bottom of the vessel. Heating or cooling air may be circulated through the collection tube jacket (shell side) to promote tube-side drainage for more viscous materials.

All charged parts of the electrostatic precipitator are constructed of 316 series stainless steel, and the design includes an internal spray washing system for cleaning the electrodes and vessel internals. Safety interlocks and access way locks are to be provided to ensure the safe operation and maintenance of the unit. The schematic diagram of Electrostatic Precipitator System is shown in Figure 4.1.

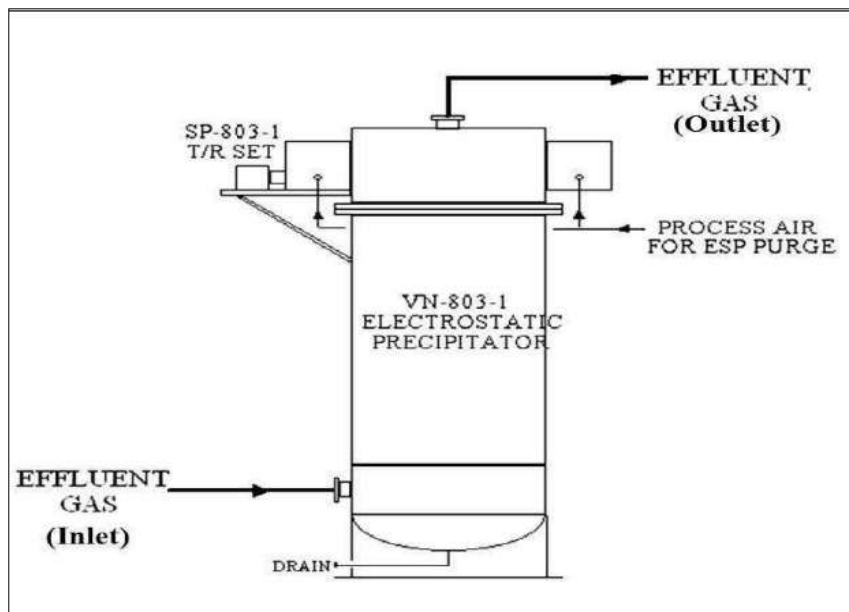


Figure 4.1: HITEC Electrostatic Precipitator (ESP) System

The ESP vessel is designed in several sections with specialized functions. The bottom section contains a gas distribution plate. Gases entering the bottom section are distributed across the vessel into the collection tubes that are mounted vertically in the central section of the ESP vessel. The collection tubes are sealed into a tube sheet at each end so that gases passing through the collection tubes are conveyed to the upper section. The vessel casing of the tube section forms a jacket around the tubes, much like the shell side of a shell and tube heat exchanger. Centered in each collection tube is an electrode mast with seven (7) electrode discs located along its axis. An electric corona discharge is developed around the discs and an electrostatic field drives charged particles from the mast to the tube wall. Mist particles acquire a surface charge from the corona and migrate to the tube wall as a result of the electric field within the tube. Droplets coalesce at the tube wall into a liquid film which drains by gravity, and drips into the bottom head. A steady state liquid discharge begins after several hours of operation. Cleaned gases leave the upper section of the ESP.

The high voltage rectifier and the insulator support housing are located on the top of the ESP tube sheet. To prevent mists of corrosive and conductive materials from wetting the insulators and connections, the heated purge air from the shell of the ESP is used to purge the upper section containing the insulators. The purge blower supplies sufficient air flow around the insulators to protect them from fouling.

Purge Air System

The purge air blower must be kept ON whenever an ESP is in use. The ESP transformer is also interlocked to the main process air blower. A time delay relay is used to allow sufficient time to purge the ESP.

Transformer/Rectifier and Control Panel

Mounted on a supporting steel brace at the vessel top is the Transformer/Rectifier (T/R) Set. This unit converts AC line voltage primary power to high voltage DC power. The T/R set functions in response to the controller circuitry located within the ESP Control Panel. The Control Panel is usually mounted in the control room area, but may be located for convenience near the ESP if desired. The T/R set and the Control Panel each have disconnect switches fitted with key locks. These function to ensure that power is disconnected from the T/R and Control Panel (locked off) whenever the ESP vessel is serviced.

Alkali Scrubber

Effluent process gases leaving the sulfonation system are free of residual SO₃, but may contain any unconverted SO₂ gas and entrained particulate anionic materials (acidic mists of sulfonic acid). This gas stream is not suitable for direct discharge to atmosphere. The exhaust gases from the ESP are passed through an alkali scrubber system. The packed tower SO₂ scrubber system is designed to operate with minimal operator attention as a semi-continuous batch recycle scrubber. The recycle tank is charged with a dilute caustic soda solution which is recirculated to the top of the absorber tower. The gas contacts the scrubbing solution counter-currently as it passes upward through the tower to the final stack. The SO₂ gas present in the effluent stream is absorbed in the scrubbing solution and reacts with the caustic soda forming Na₂SO₃. As the caustic soda is consumed, the pH of the scrubbing solution falls, and a pH sensing/transmitter eventually activates an alarm to alert the operation that a new batch of scrubbing solution must be charged to the tank. The batch time is planned so that under normal steady state running conditions, the recycle tank requires caustic and make-up water addition of not more than once per shift. When caustic is added, the tank is pumped down and recharged with fresh make-up water. The packed tower SO₂ absorber, or "caustic scrubber," is the final piece of effluent gas-conditioning apparatus in the plant. It follows the

electrostatic precipitator and is used to absorb SO_2 in the exhaust gas. The SO_2 absorber consists of a packed tower, recycle tank, a pump for recirculating the scrubbing solution with pH, temperature and pressure monitoring equipment. The schematic diagram of SO_2 scrubber system is shown in Figure 4.2.

In operation, a dilute caustic solution is re-circulated through the packed tower where it contacts and absorbs the SO_2 in the effluent gas. The caustic reacts to form sodium Sulphate, which is then oxidized to Sodium Sulphate in the absorber. Dilute solutions must be used to prevent salt buildup in the tower during operation. During normal operation, a batch typically lasts six to eight hours. Re-circulation of caustic solution should be set so that the gas pressure drop through the tower is 15 to 20 cm of water. The pH of the scrubbing solution should be maintained above a pH of eight. Typically, when the pH falls below 9 or 10, the spent scrubbing solution is pumped away and the recycle tank is recharged. A pH low alarm alerts the operator to batch out the solution. The packed tower is filled with packing constructed from polypropylene. Under normal operating conditions, the inlet gas temperature will be about 37°C to 43°C , and the tower exhaust temperature will be slightly lower due to evaporative cooling.

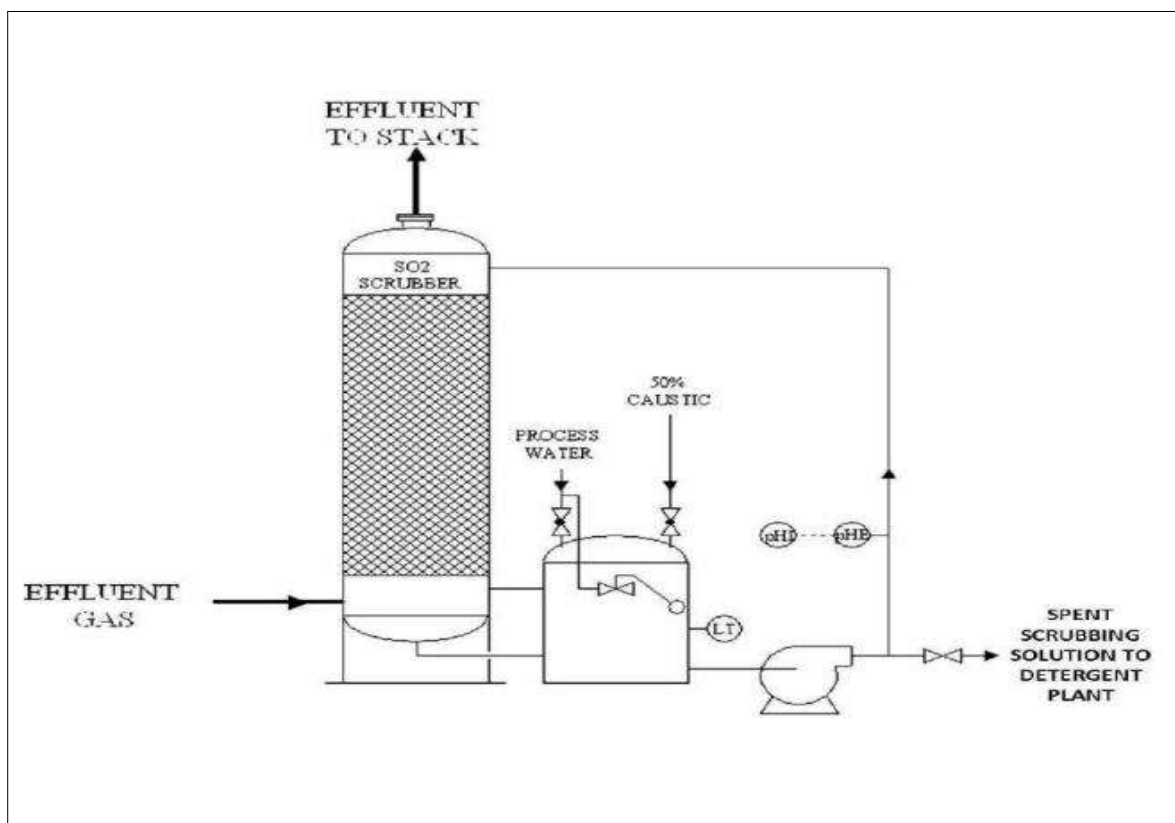


Figure 4.2: SO_2 Scrubber System

Odour Control Management

The principal air pollution and odour control systems proposed for the Sulphonation plant will be Electrostatic Precipitator (ESP) and Alkali Scrubber. The SO_2 , acid mist and other volatile gases coming from the Sulphonation process will be cleaned by taking the gas through an ESP to remove the acid mist followed by alkali scrubber to remove the SO_2 gas contaminants. The clean gas will be discharged into atmosphere through a stack of 38.0 m height.

Effluent Gas Treatment System

Effluent process gases leaving the Sulphonation system or SO_3 absorber are virtually free of residual SO_3 , but may contain unconverted SO_2 gas and entrained particulate anionic materials (acidic mists of sulfonic acid). However to remove the traces of SO_3 , a filter vessel using candle filter element is installed, where fresh LAB is sprayed to absorb SO_3 gas and the gas system becomes virtually free of SO_3 gas.

To remove the acid mist particles which have escaped from acid mist eliminator, a vessel called ESP is installed. The recommended system employs a proprietary electrostatic precipitator designed to collect particulate mists. A packed tower scrubber will be installed further to absorb SO_2 gas in a dilute caustic solution. Final effluent gases are suitable for discharge to the atmosphere.

Air Pollution Control Measures:

- Highly improved ceramic packing will be used in towers for proper absorption; Improved cesium based catalyst which are highly active and kindle even at low temperatures with high conversion efficiency particularly used in 3rd and 4th pass completely to ensure 99.5% conversion and above;
- Avoiding sharp bends in design to avoid leakage, by usage of good quality materials in fabrication;
- Individual acid circulation pumps for all the three towers separately to ensure complete absorption and drying of air;
- Caustic lye water wash tower for washing the tail gases before it enters to chimney;
- Proper online SO_2 analyser will be installed at the chimney outlet point;
- Providing ambient air monitoring station on corners of industry.

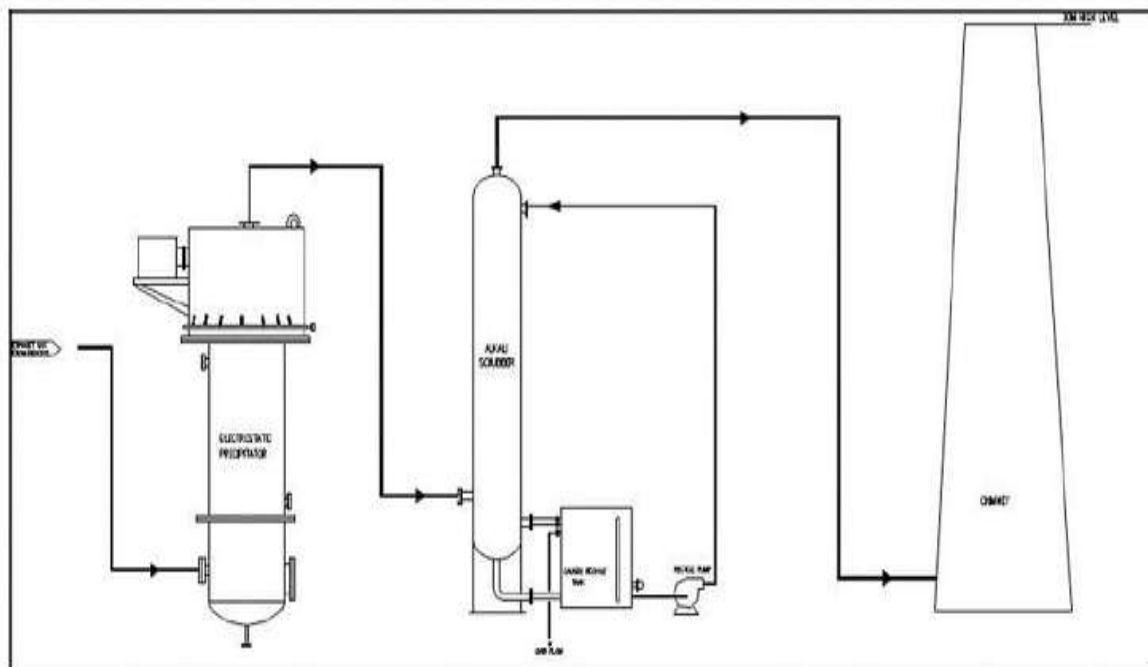


Figure 4-3: Effluent Gas Treatment System

4.2.2.3 Dispersion modelling

Dispersion modeling of air emissions was done to obtain the incremental ground level concentrations of PM_{10} , SO_2 and NO_x . The resultant maximum incremental concentrations were superimposed over the observed (present) maximum concentrations of these pollutants to forecast the worst case ambient air quality during post operational phase of the project.

Dispersion model:

The AMS/EPA REGULATORY MODEL (AERMOD) dispersion-modeling package was used for dispersion of air emissions and prediction of impacts during operation phase of the project. The model was specially designed to support the Environmental Regulatory Modeling Programs in the USA, and it incorporates the popular USEPA Models, ISCST3 and ISC-PRIME into one interface without any modifications to the models. These models are used extensively to assess pollution concentration and deposition from a wide variety of sources.

AERMOD is a regulatory steady-state modeling system with three separate components;

- AERMOD (AERMIC Dispersion Model);
- AERMAP (AERMOD Terrain Preprocessor);and
- AERMET (AERMOD) Meteorological Preprocessor.

The AERMOD model includes a wide range of options for modeling air quality impacts of pollution sources, making it popular choice among the modeling community for a variety of applications. AERMOD requires two types of meteorological data files, a file containing surface scalar parameters and a file containing vertical profiles. These two files are provided by AERMET meteorological preprocessor program.

- PRIME building downwash algorithms based on the ISC-PRIME model have been added to the AERMOD model;
- Use of arrays for data storage;
- Incorporation of EVENT processing for analyzing short-term source culpability;
- Explicit treatment of multiple – year meteorological data files and the annual average; and
- Options to specify emissions that vary by season, hour-of-day and day-of-week.

Deposition algorithms have been implemented in the AERMOD model – results can be output for concentration, total deposition flux, dry deposition flux, and / or wet deposition flux. The model contains algorithms for modeling the effects of settling and removal of large articulates and for modeling the effects of precipitation scavenging for gases or particulates.

Aermet

In order to conduct a refined air dispersion modeling project using the AERMOD short term air quality dispersion model, it is necessary to process the meteorological data representative of the study area being modeled. The collected meteorological data is not always in the format supported by the model; therefore, the meteorological data needs to be pre-processed using AERMET program.

The AERMET program is a meteorological preprocessor, which prepares hourly surface data and upper air data for use in the AERMOD air quality dispersion model. AERMET is designed to allow future enhancements to process other types of data and to compute boundary layer parameters with different algorithms. AERMET processes meteorological data in three stages and from this process two files are generated for use with the AERMOD model. A surface file of hourly boundary layer parameters estimates a profile file of multiple-level observations of wind speed, wind direction, temperature and standard deviation of the fluctuating wind components.

Application of AERMOD

AERMOD model with the following options has been employed to predict the cumulative ground level concentrations due to emissions from the proposed activity.

- All terrain dispersion parameters are considered;
- Predictions have been carried out to estimate concentration values over radial distance of 10km around the project area;
- Uniform polar receptor network has been considered;
- Emission rates from the sources were considered as constant during the entire period;
- The ground level concentrations computed without any consideration of decay coefficient;
- Calm winds recorded during the study period were also taken into consideration;
- 24 hourly mean ground level concentrations were estimated using the entire meteorological data collected during the study period; and
- The study area is used to represent the graphical output of the GLC's using the terrain processor.

Meteorological Data

The hourly meteorological data recorded at site is converted to the mean hourly meteorological data as specified by CPCB and the same has been used in the model. Hourly mixing heights are taken from the "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India" published by India meteorological department, 2008, New Delhi. The meteorological data recorded during study period continuously on wind speed, wind direction, temperature etc., have been processed to extract the data required for simulation by AERMOD using AERMET.

Presentation of Results

In the present study, simulations have been carried for the monitoring period using the hourly ripple Joint Frequency data viz., stability, wind speed, mixing height and temperature. Short-term simulations were carried to estimate concentrations at the receptors to obtain an optimum description of variations in concentrations over the site in 10 km radius covering 16 directions. The isopleths for the highest 24-hr average incremental concentrations. The highest predicted 24-hourly incremental concentrations are presented in **Table 4.1**.

The model was also run to predict the seasonal average incremental concentrations of the pollutants, and the isopleths of incremental ground level concentration of SO₂, NO_x and PM are presented in **Figures 4.4, 4.4 and 4.5** respectively.

The maximum incremental GLCs due to the proposed project for PM, SO₂ and NO_x are superimposed on the maximum baseline PM, SO₂ and NO_x concentrations recorded during the study period to arrive at the likely resultant concentrations after implementation of the proposed power plant. The cumulative concentrations (baseline+incremental) after implementation of the project are tabulated below in **Table 4.2**.

Table 4.1: Predicted 24-Hr. Average Maximum Incremental Concentrations

Rank	Peak Incremental Concentration (µg/m ³)			Distance of point of max. GLC from source, (m)	
	SO ₂	NO _x	PM ₁₀	X-axis	Y-axis
1 st	0.00517	0.04234	0.00282	3169.21	1962.94
2 nd	0.00486	0.03976	0.00265	1531.07	1017.16
3 rd	0.00441	0.03610	0.00241	3447.91	1365.29
4 th	0.00482	0.03413	0.00163	3447.91	1365.29
5 th	0.00386	0.03162	0.00211	3169.21	1962.94
6 th	0.00475	0.03413	0.00161	3447.91	1365.29



7 th	0.00319	0.02610	0.00174	3447.91	1365.29
8 th	0.00439	0.03246	0.00148	3447.91	1365.29
Season	0.00076	0.00625	0.00042	3169.21	1962.94

Resultant Concentrations after Implementation of the Project

Table 4.2: Resultant Maximum GLC during Operation Phase

Pollutant	Maximum AAQ Concentrations Recorded During the Study ($\mu\text{g}/\text{m}^3$)	Incremental Concentration ($\mu\text{g}/\text{m}^3$)	Resultant Concentration ($\mu\text{g}/\text{m}^3$)	National Ambient Air Quality Standards($\mu\text{g}/\text{m}^3$)
SO ₂	16	0.0052	16.0052	80
NO _x	32	0.04142	32.04142	80
PM	79	0.0028	79.0028	100

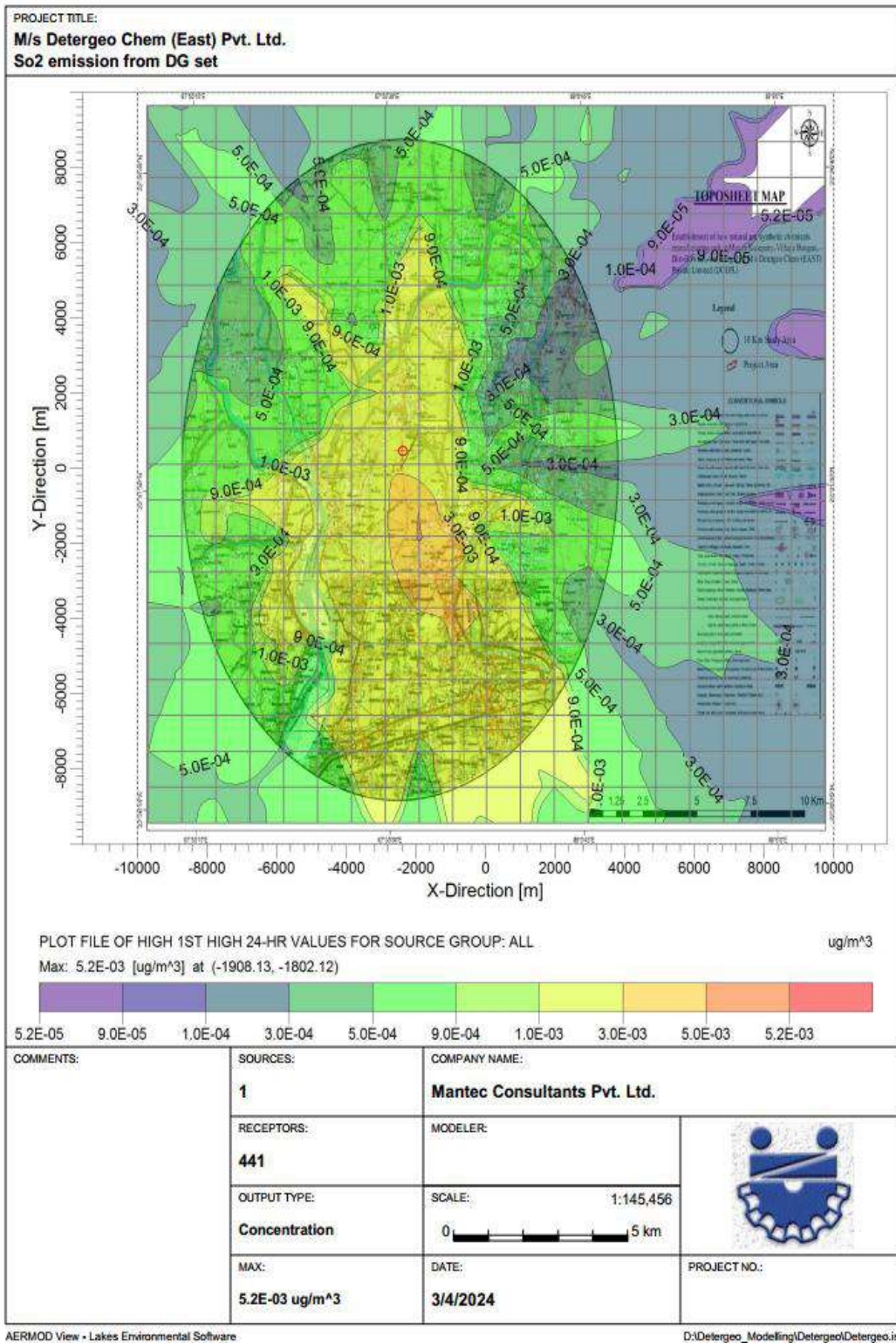


Figure 4.3: Isopleths of Maximum 24-hr average Incremental SO₂ Concentrations

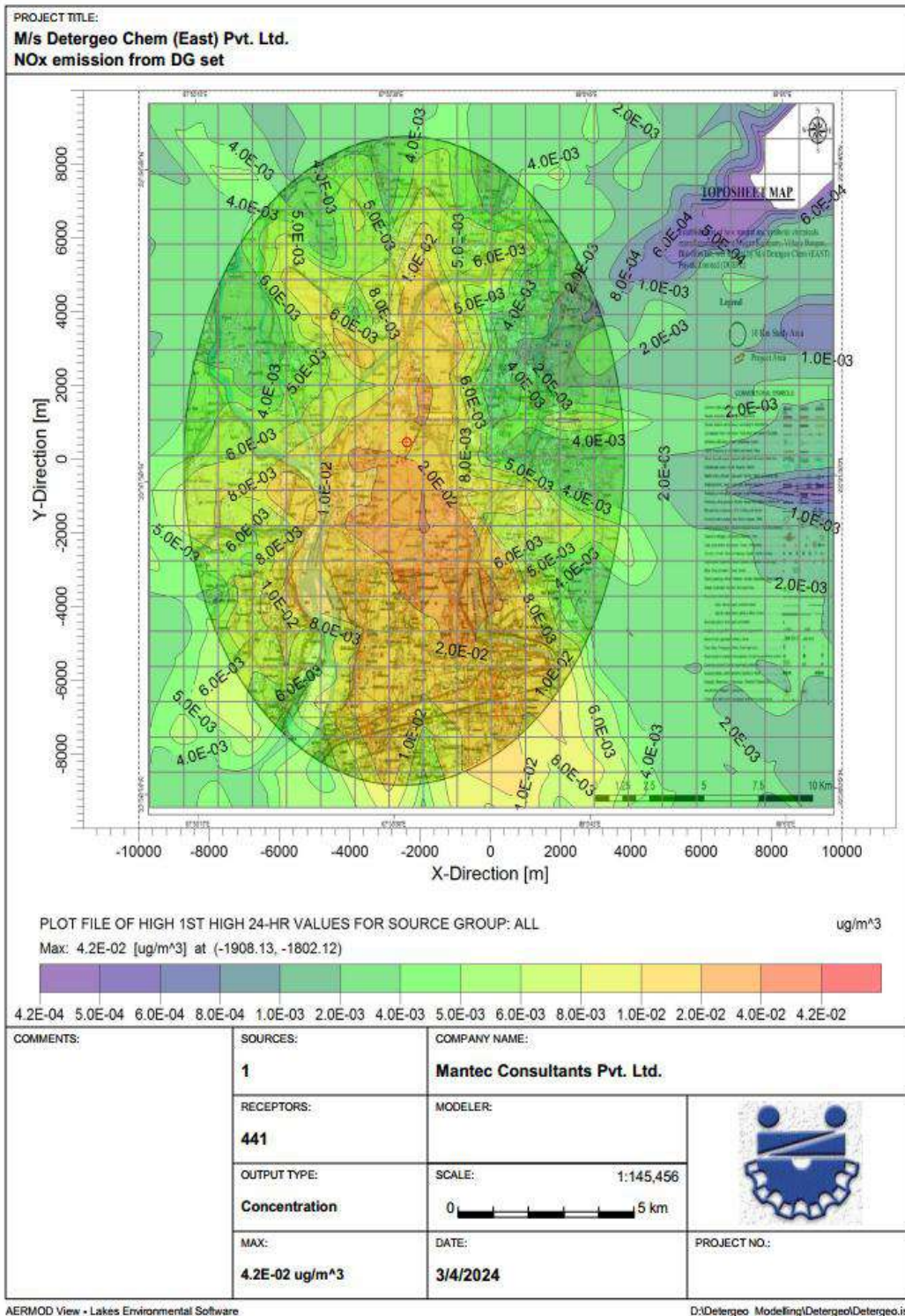


Figure 4.4: Isopleths of Maximum 24-hr average Incremental NO_x Concentrations

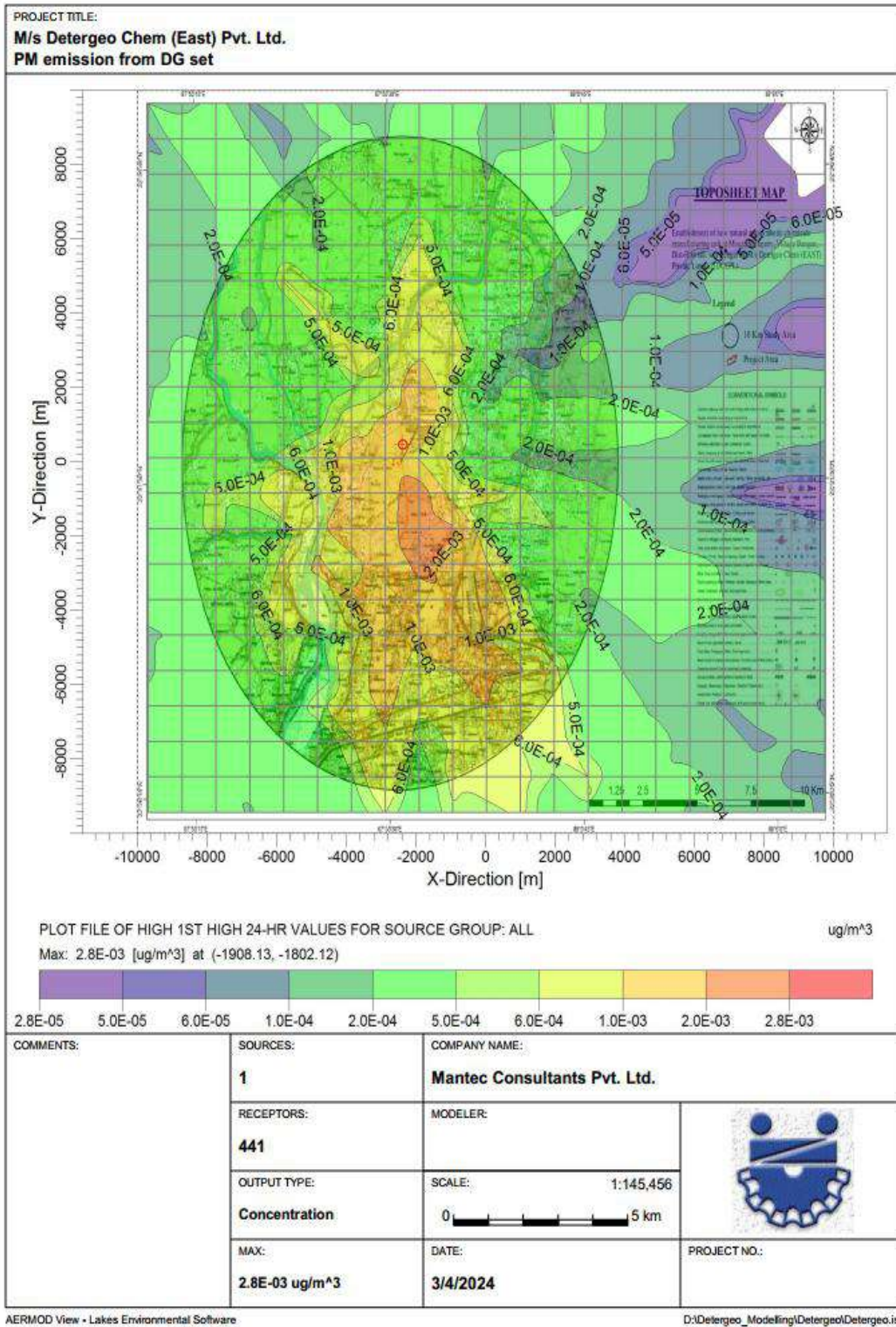


Figure 4.5: Isopleths of Maximum 24-hr average Incremental PM Concentrations

4.2.3 Noise Environment

Construction Phase

During construction phase, there will be noise generation due to use of bulldozers, JCB, vehicle movement, vibrators, heavy fabrication work for erecting major plant equipment including crane, hydra etc. The ear plug/muffs will be provided to the workers and use shall be ensured. The noise will be localized and will be intermittent during construction stage and hence no significant impact is envisaged.

Operation phase

The main source of noise generation during operation stages are mainly from pumps, blowers, compressors, DG sets, vehicle movement for transportation of raw materials, finished goods etc. DG sets will be provided with acoustics enclosures.

It is expected that noise level at the plant boundary will be within the prescribed norms of CPCB due to operation of the proposed project and no significant impact on noise environment is expected.

Mitigation Measures

- Noise levels from plant will not reach its boundary as dense green belt will be developed around the plant, which will work as an effective noise barrier.
- DG sets room will be acoustically treated to control noise levels as per CPCB guidelines.

4.2.4 Impacts due to Vehicular Traffic

A marginal increase in the vehicular traffic will be envisaged due to the transportation of raw materials, chemicals etc in the proposed project. The LOS value from the proposed project may be same as earlier value "Excellent" for NH-6 and 'Very Good' for SH-15. So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect on the surrounding environment.

4.2.5 Water Environment

Construction Phase

The water requirement during construction will be met from Private Tanker. During construction period, the water may be affected due to the construction work and loosening of topsoil, which increase the suspended solids in the run-off during heavy precipitation. In order to reduce the impact on water quality, temporary sedimentation tanks were constructed for the settlement of the suspended matter.

Sanitation

Sufficient and suitable toilet facilities for workers in the construction site was provided to meet the proper standards of hygiene. These facilities were maintained to ensure minimum environmental impact.

Sanitation facilities such as Septic Tank will be set up for disposal of sanitary sewage generated by the workforce, drivers, cleaners and visitors. Workers from nearby localities will be employed and so no temporary housing for construction workers is required. The demand for water and sanitation facilities will also be small and is considered manageable at the site itself.

Mitigation Measures

- The excavation work will be minimal.
- All the debris generated from construction site will be collected and disposed suitably.

- Sewage generated from the site will be treated through septic tank followed by soak pit.
- Earthworks will be avoided during rainy season and will be completed during summer season.
- Construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken.
- The development of green belt in and around plant will be taken up. Use of water will be minimized during the construction phase.

Operation Phase

The proposed plant will require 203 KLD quality of fresh water for Plant operations. Water requirement will be made available through hired water tanker.

Effluent

The main sources of effluent will be process Effluent/General Cleaning Water, Floor washings, Alkali Scrubber, Boiler and cooling tower.

Mitigation Measures

Achieving ZLD scheme without disposing any treated water inside or outside the premises.

Details of ETP (Effluent Treatment Plant)

The raw effluent will be received at the inlet of the bar screen to trap any floating particles and debris. A belt type oil skimmer and grease trap will be provided to remove the floating oil and grease.

The oil free effluent will be pumped to the flash mixer where lime dolomite will be added to precipitate the dissolved solids, sulphates and other organic impurities present in the effluent. The effluent from the flash mixer overflows to the settling tank where poly will be added and the impurities are removed as sludge from the bottom of the tank.

The sludge will be sent to sludge drying beds. The clear supernatant overflows to the Clarified Water tank where Hypo will be dosed for disinfection. Filter Feed pumps transfer the clarified water to the downstream Pressure Media filter and Activated Carbon filter for removal of suspended solids and any traces of organics.

Pressure Sand Filter:

The system is provided with Gravels, Pebbles Sand Media Filter. The main purpose of the filter is to remove the Suspended Solids & reduce Turbidity. The Filter is provided within Inlet Distributor, Bottom collector & various Filtration Media like pebbles, gravels, sand to achieve effective filtration.

Externally, the filter has Mesh of Valve to assist in various service requirements like Filtration, Backwash & Rinse.

Activated Carbon Filter:

The system is provided with Activated Carbon Filter. The main purpose of the filter is to remove free Chlorine, balance organics, color etc. The Filter is provided with Inlet Distributor, Bottom Collector & filtration media like fine silex and activated Carbon.

Externally, the filter has Mesh of Valve to assist in various service requirements like Filtration, Backwash & Rinse.

The treated water is used for floor washing/process applications.

Design Capacity

Effluent treatment plant: 5 KLD Flow



Rate: 1m³/hr

Service Cycle: 5 hrs

4.2.6 Biological Environment

The proposed project is a manufacturing unit for new natural and synthetic surfactant chemical that will process, produce and waste many type of chemical species. Under this senerio, following impacts on the biological eneviroment, may take place;

- The project unit is proposed to be established on the private land peice where no landuse will be changed or no harm to any natural vegetation take place. Only small herbs and shrubs will be cleared for the purpose while saving any tree if can be done so while constructing the unit. Therefore a negligible loss of biodiverslty will take place.
- There will be chances of some temporary as well as some continuous disturbance to the surrounding fauna due to the trespassing, machanical noise, vechiluar movement and lights during the construction period as well as the running period. Degrree of these disturnabces will depend on the the mangmnt of work and quality of the mechanery and process involved.
- There will be some evacavation work involved where aland will be dug out for the foundation work and some underground mechanrery establishment and tank formation etc. This will disturb the top soil and will create significant loss of fertile aluuvial soil if due care and post utilization is not taken into the planning and activity.
- The proposed project envisaged the manufacturing of the sulphar free cosmetics therefore this unit will utilize and process different kind of chemicals. Therefore, there will be generation of fumes, soild waste, hazaradaus chemical waste and waste water containg various chemicals. This will have to be handled in the best possible manner to not to directly exposed to the enviornemnt with out any and control and treatment.

Thus, this can be concluded that there will be no positive impact on the biological environment out of this proposed project, however, some negative impact on the biological environment will take place if precautions and mitigation measures will not be considered.

Mitigation Measures to Minimize the Negative Impact on the Biological Environment

As it has been already discussed in the impact assuming part of this report, there are possibilities of some negative impacts on the biological environment that will take place in the lack of careful expedition. Therefore, following precautions and mitigation measures are suggested to minimize such impacts:

- The disturbance due to noise, movement, air and water pollution will also be minimized for the flora and fauna of the surroundings as these aspacts are supposed to be dealt under proper mitigations in the planning/design as suggested in the EIA report in relavnt sections.
- The disturbance to the flora, fauna and insects as well as microorganisms (living in the soil) can further be minimize with careful expedition of the work while taking care of top-soil management and least harm to the floral species beyond the stretch of work.
- The diggied out top soil which will not be used in the refilling must be kept stored for the different uses on the site or may be transferred to the other locations wherever it can be used suitably. There must be proper care taken to not let the spilling of soil along with the movmnets or to get washed out in the rain or eroded by the air gusts.
- The greenery enhancement is recommended in the available spaces on the private land and premises subject to this project. This will ameliorate the environment, reduce soil erosion, minimize the pollution and dust effect, will provide the scenic beauty while providing medicine,

fruits, fodder shade etc. From the ecological point of view, it will also provide an improved habitat for the birds, insects, reptiles and their predators.

4.2.7 Socio Economic Environment

Impact on Demographic Composition

There will be no significant increase in overall population of the study area as preferably local people will be recruited for employment. Hence, there will be no significant impact on the population composition in the study area. Since there will be no significant change in population, the overall sex ratio will remain more or less same.

Impact on Employment Opportunities

It is expected that a satisfactory number of people may get direct employment opportunities including skilled and unskilled workers along with some indirect employment opportunities. The benefits of employment to the job seekers are expected to include, at a household and individual level, in increase in socio-economic and health status, improvement to their quality of life & living condition, and the benefits from greater household expenditure on education & healthcare resources.

Industrial Development

It may expect that due to the proposed project, the scope for further industry movement will increase towards the similar projects in the states and across the nation.

Impact on Law & Order

No major law & order problem is envisaged due to the proposed project. It is expected that the workers will attend to their duties from their residences and return to their homes after the day's work.

4.2.7.1 Corporate Environmental Responsibility (CER)

The following development activities are proposed as the Corporate Environmental Responsibilities (CER) which can impart significant positive impact on socio-economic environment:

- Providing Drinking Water Facility in the schools located in the nearby villages.
- Health Camps for workers and villagers in the nearby villages.
- Skill development training to the local youths.
- Installation of dustbins for collecting waste materials for maintaining cleanliness in the areas.
- Distribution of Sanitary Pads for women in the village.
- Plantation in the community areas of the study area.

4.2.8 Conclusion

The proposed project activities would contribute to the local economy by providing direct or indirect employment opportunities and recycled revenues through the local economy. Indirect impacts could occur as a result of new economic development (e.g., new jobs at businesses that support the expanded workforce or that provide project materials). The opportunity for further industry development may increase towards the similar kind of projects to support production of the natural and synthetic surfactant chemical products. An improvement in social development in the area can also be expected due to the proposed development activities. With the implementation of the project, the occupational pattern of the people in the area may change making more people engaged in

industrial & business activities due to which in coming time local people may get opportunity to enhance their social & economic status.

Aside, the study area has ample scope for further development or improvement in education and health sectors in addition to provide better education & health facilities for achieving better quality or standard of life to the people residing in the area. Based on the observation, the institutions for basic health facilities as Primary Health Centre (PHC), Hospital/ Dispensaries, Maternity & Child Welfare Centre and Community Health Centre etc. can be establish or increase & enhanced in context to provide better health facilities in the area.

4.2.9 Occupational Health & Safety

4.2.9.1 OH&S Hazards

The main chemicals affecting the health will be VOC's, CO. MSDS of all hazardous chemicals will be made available for concerned personnel. The following general measures will be taken:

- Establishment of Safety Policy.
- Compulsory use of PPE's.
- Regular monitoring of work place environment with respect to air, light, humidity, temperature.
- Installation of fire extinguisher.
- Separate area for container decontamination.
- Provision of part time qualified M.O as per Factory Act.
- Pre medical & periodic medical checkup of workers as per Factory Act.
- Monitoring of Occupational hazardous like noise, vibration & chemical exposure.
- Displaying various instruction boards, cautionary notices etc.

4.2.9.2 Public Health

During operation phase, the water will be provided basic amative such as safe developing water, sanitation facilities, first aid and the regulatory PPE's under the CER activities, the unit will provide medical, public health facilities & Green Belt Development which will in public health in the surrounding area. Hence, the project will benefit the area socio-economically.

4.2.9.3 Critical Safety Measures

These will be process technology and the equipment itself. These measures will be included in the purchased specifications. Some of the critical safety measures to be practiced are:

- Process parameters to be controlled by SOP's.
- Any upset conditions in the process will be confined to reaction vessel itself.
- Materials will be either transferred by pumps or through vacuum.
- All reactions vessels to be connected to vapors condensers.
- Only trained persons will be deployed for jobs involving handling of hazardous materials.
- All vessels will be periodically examined for their worthiness.
- All vessels/equipment to be properly earthed against static electricity.
- Temperature indicators near all reactors & distillation system
- All plant personnel provided PPE's. MSDS for raw materials & products display on shop floor.

4.3 IMPACT MATRIX

4.3.1 Impact matrix during construction phase

Table 4.3: Identification of Impact Matrix During Construction Phase

Activities	Environmental Attributes										
	Air	Water	Soil	Noise	LULC	Hydro geology	Geology	SHW	Risk Hazardous	Ecology and Biodiversity	Socio Economic
Material Supply (Transportation)	✓	-	-	✓	-	-	-	-	✓	-	✓
Storage	✓	-	-	✓	-	-	-	✓	✓	-	✓
Movement of Machinery	✓	-	-	✓	-	-	-	✓	✓	-	✓
Land Development/ Green belt Development	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Construction of Building	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓
Garbage Disposal	✓	-	✓	✓	-	✓	-	✓	✓	✓	-
Operation of DG set	✓	-	-	✓	-	-	-	✓	✓	✓	✓
Painting and Finishing	-	-	-	✓	-	-	-	✓	✓	✓	✓

4.3.2 Impact matrix during operation phase:

Table 4.4: Identification of Impact Matrix During operational phase

Receptor / Activity	Air	Water	Land	Noise	Ecology	Health & Safety	Socio-Economic
Raw Material & product Storage & Handling	ST (negative)	-----	-----	-----	-----	ST (negative)	-----
Transportation of Raw material & products	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----	ST (negative)	-----
Production & utilization	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----	ST (negative)	-----
Emergency & Disaster	ST (negative)	ST (negative)	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----
Breakdown of Critical	ST (negative)	ST (negative)	ST (negative)	ST (negative)	-----	ST (negative)	-----
Employment	-----	-----	-----	-----	-----	LT (positive)	LT (positive)



Green Belt Development	LT (positive)	LT (positive)	LT (positive)	LT (positive)	LT (positive)	-----	LT (positive)
Infrastructure & CER activation	-----	-----	-----	-----	-----	LT (positive)	LT (positive)

*ST -Short Term

*LT - Long Term



CHAPTER-5 : ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 INTRODUCTION

The proposed project is for the establishment of new natural and synthetic surfactant chemical manufacturing unit by M/s Detergeo Chem (EAST) Private Limited (DCEPL). It is proposed to establish the facilities at at DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141 of Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal The land was already been acquired by the project proponent.

5.2 ANALYSIS OF ALTERNATIVES RELATED TO TECHNOLOGY

M/s Detergeo Chem (EAST) Private Limited (DCEPL) has proposed new natural and synthetic surfactant chemical manufacturing unit to produce manufacture a total of 11 products, out of which 9 products (namely, Linear Alkyl Benzene Sulphonic Acid, Alpha Olefin Sulfonate, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate, Cocoamidopropyl Betaine, Cocamide Monoethanolamine, Cocamide Diethanolamine, Ethylene Glycol Distearate, Ethylene Glycol Monostearate) are synthetic organic chemicals. The technology for the manufacture of chemical is procured from India, domestically under the make-in-India concept to promote swadeshi moment, was launched by the Government of India on 25th September, 2014 to encourage employment & growth in Indian economy and the details regarding manufacture process is given in **Chapter 2 of this EIA report**.

5.3 SITE SELECTION CRITERIA

Site selection was guided by many factors like infrastructure in the area, availability of land, water sources, fuel transportation, power availability etc. The land indentified for the proposed project will be 1.3493 ha. The following are the salient features of the project site.

- The plant is located near high demand area.
- There is no residential development in the vicinity of the Plant.
- Possible mutual aid in emergency will be available from nearby factories.
- There is potential for future growth in demand.
- Adequate availability of land for future expansion.
- Hence, no alternative sites were considered.

Based on the above details, the site has been selected for establishment of new natural & synthetic surfactant chemical manufacturing unit. The site is in accordance with the MoEF&CC guidelines. Hence no alternative sites are considered.

5.4 ALTERNATIVE FOR TECHNOLOGY AND OTHER PARAMETERS

Some alternatives considered during EIA study are discussed below:

Technology Alternative:

Particular	Proposed Technology	Alternatives
Water	Wastewater from the process will be treated in ETP and flulent will be sent to TSDF site. Domestic wastewater will be disposed off through septic tank.	Proposed ETP is adequate to achieve zero discharge.
Air	ESP, wet scrubber	Proposed APCM is adequate to keep emission within limit

Solid/ Hazardous waste	Solid & Haz. Waste will be stored in separate storage area and finally disposed to approve TSDF site, to reuse of waste & disposal by selling to registered recycle.	As proposed disposal, facilities are safe disposal facilities and also guided by authority. No thoughts are required to switching on other alternative
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5.5 ENVIRONMENTAL ASPECTS

The site selected is feasible w.r.t. following listed points below:-

- No forest land involved at site.
- No displacement of people
- No requirement of cutting of trees
- No cultivable land involved at site.
- No archeological sites nearby.
- Away from core zone of biosphere reserve.
- Away from tiger reserve/elephant reserve/turtle nestling grounds/ Away from national park and wildlife sanctuaries

CHAPTER-6 : ENVIRONMENTAL MONITORING PROGRAMME

6.1 INTRODUCTION

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding area are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program. Environmental Monitoring Program will be implemented once the project activity commences. Environmental Monitoring Program includes: (i) environmental surveillance (ii) analysis and interpretation of data (iii) preparation of reports to support environmental management system and (iv) organizational set up responsible for the implementation of the programme. Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC and Consent to Operate issued by the State Pollution Control Board. Compliance of same will be submitted to respective authorities on regular basis.

6.2 ENVIRONMENT MONITORING PROGRAM

The Continuous monitoring of Environmental parameters like air, water, noise, soil, and meteorological data and performance of pollution control facilities and safety measures in the plant are vital for Environmental management of any industrial project.

Therefore, the company shall create environmental monitoring facilities by the environmental and safety department to monitor air and water pollutants as per the guideline. Moreover, air, noise, drinking water, ETP and soil shall be monitored by outside agencies authorized by Pollution Control Board at regular frequencies. This department shall also carry out periodically check of fire and safety equipment.

6.3 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

In order to maintain the environmental quality within the standards, regular monitoring of various environmental components is necessary. M/s Detergeo Chem (EAST) Private Limited (DCEPL) will form an Environment Management Cell (EMC) for environment monitoring and control. The EMC team takes care of pollution monitoring aspects and implementation of control measures.

A group of qualified and efficient engineers with supporting staff have been deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working at the best of their efficiencies.

6.4 RESPONSIBILITIES OF EMC

The responsibilities of the EMC include the following:

- i. Environment monitoring of the surrounding area.
- ii. Timely commissioning of pollution control equipments and facilities.
- iii. Specifications and regulations of maintenance schedules for pollution control equipments.
- iv. Ensuring that standards are maintained.
- v. Developing the green belt.
- vi. Ensuring optimum water usage.
- vii. Carrying out the Environment Management Plan.
- viii. Organizing meetings of environment management committee and preparation of report and submission of such reports to management.

6.5 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The key aims of environmental monitoring are:

- To ensure that results/conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.
- To verify the evaluations made during the planning process, in particular with risk and impact assessments and standards and target setting and to measure operational and process efficiency.
- Monitoring will also be required to meet compliance with statutory and corporate requirements.

Finally, monitoring results provide the basis for auditing, *i.e.* to identify unexpected changes.

6.6 ENVIRONMENTAL MONITORING SCHEDULE

Table 6.1: Monitoring Methodologies and Parameters

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
A. Air Environment				
Meteorology Wind speed Wind direction Dry bulb temperature Wet bulb temperature Relative humidity Rainfall	Minimum 1 site in the project impact area	Regularly twice in a week by Weather Monitoring Station	Mechanical/automatic weather station	-
Pollutants PM ₁₀			Gravimetric method	-
SO ₂	8 locations in the project impact area (Minimum 2 locations in upwind side, more sites in downwind side / impact zone)	Revised National Ambient Air Quality Standards (NAAQS) vide MoEF&CC circular, dated 16.11.2009	EPA Modified West and Geake method	Absorption in Potassium Tetra Chloromercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO ₂			Arsenite modified Jacob and Hochheiser	Absorption in dil NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nephthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).

CO			Non Dispersive Infra RED (NDIR) Spectroscopy	EPA 40CFR part-50
VOCs			GC- method	EPA 21 PID
B. Water Environment				
pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic compounds	Set of grab samples during winter season for 6 surface water location and 8 Ground water location within 10 km study area.	Once in the study period	As per IS 3025 (Part-I)	Samples for water quality should be collected and analyzed as per : IS : 10500 methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health Association.
C. Noise				
Noise levels at Day and night time -Leq dB (A)	Project Boundary, High noise generating areas within the lease.	Quarterly	As per CPCB norms	As per CPCB norms
D. Soil				
pH, Bulk Density, Soil texture, Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical Conductivity, Organic Matter, Chloride	8 locations in the project impact area	Quarterly	As per CSSRI, IISWC Method	As per CSSRI, IISWC Method
E. Socioeconomic Status				
<ul style="list-style-type: none"> • Demographic structure • Infrastructure resource base • Economic resource base • Health status: Morbidity pattern • Cultural and aesthetic attributes • Education 	Socio-economic survey is based on proportionate, stratified and random sampling method	Yearly	Primary data collection through questionnaire	Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies.
F. Ecological Impact				
• Green Belt Development	Survey	Yearly	Primary data collection.	Secondary data from statistical hard books, topo-sheets and



• Conservation of Wild Life				relevant official records available with Govt. agencies
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6.7 MONITORING SCHEDULE

Regular Monitoring of all the environmental parameters *viz.*, air, water, noise and soil as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year in order to detect any changes from the baseline status.

Table 6.2: Monitoring Schedule

S. No.	Item	Parameters	Frequency
1.	Ambient Air quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO, VOC etc.	Monthly
2.	Stationary Emission from Stack	PM, SO ₂ , NO _x	Monthly
3.	Process emission	Fugitive (PM) and gaseous pollutant expected	Monthly
4.	Water and Wastewater	pH, Temperature, EC, Turbidity, Total Dissolved Solids, Calcium, magnesium, Total hardness, Total Alkalinity, Chlorides, Sulphates, Nitrates, DO, COD, BOD, oil and Grease, Metals expected in effluent.	Monthly
5.	Treated Sewage / Effluent	pH, BOD, COD, TSS, TDS, oil and Grease, Metals expected in effluent.	Monthly
6.	Noise	Equivalent noise level- dB (A)	Monthly
7.	Soil and Solid wastes	pH, Humidity, Texture, Organic matter, N, P, K, Sulphate, Calcium, Magnesium, C:N ratio	Quarterly
8.	Greenbelt	Number of plantation (Units), Number of Survived plants/ trees, Number of poor plants/ Trees	Ongoing- round the year
9.	Environmental Audit	As per Direction of ISO 14001	Once in a Year

6.8 BUDGET ALLOCATION FOR MONITORING

To maintain the environmental parameters within the stipulated standards, regular monitoring of various environmental components is necessary which will be complied as per conditions. A sum of Rs.11.5 lakhs has been provided for environmental monitoring.

6.9 REPORTING AND DOCUMENTATION

The records of the monitoring program shall be kept on regular basis for all aspects of the monitoring. Separate records for water, wastewater, solid wastes, air emission, soil and manure / compost shall be prepared and preserved regularly. Immediately upon the completion of monitoring as per the planned schedule, report shall be prepared and necessary documents shall be forwarded to the concerned person. Methodology of monitoring (sampling and analysis) shall be prepared as separate documents as SOP (Standard Operating Procedure) wherever required. The records showing results/outcome of the monitoring programs shall be prepared as per the requirement of the schedule mentioned above. Regularly, these documents and records shall be reviewed for necessary improvement of the monitoring plan/ mitigation measures/environmental technologies as well as for necessary actions of Environmental Management Cell.

CHAPTER-7 : ADDITIONAL STUDIES

7.1 GENERAL

The scope of the report includes the study of storage, handling and transportation activities of the raw materials of the proposed plant with respect to hazard identification, risk assessment and preparation of disaster management plan. Based on the hazard identification and analysis the major disaster scenarios would be worked out to estimate consequence of failure. A disaster management plan would also be derived to meet the emergency.

7.2 PUBLIC CONSULTATION

Public hearing is very significant part of the process of public participation envisaged under the guidelines issued by MoEF&CC, Government of India. It facilitates involvement of all the stake holders of the project which is essential for ensuring smooth running of project and benefitting all sections of society in the process of economic development of the region.

7.2.1 Public Hearing Advertisement

सूचना
पश्चिम बंगाल प्रदूषण नियंत्रण बोर्ड

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार की अधिसूचना सं. एम.ओ. 1533 (ई) दिनांक 14.09.2006 के अनुपालन में एतद्वारा यह विज्ञापित किया जाता है कि मेसर्स डिटर्जेयो केम (ईस्ट) प्रा. लि. द्वारा मौजा-कुलेपैरी, थाना-बगनान, जिला-हावड़ा, पश्चिम बंगाल में न्यू नेचुरल एंड सिंथेटिक सर्फैक्टेंट केमिकल मैन्यूफैक्चरिंग यूनिट के प्रस्तावित संस्थापना हेतु सार्वजनिक सुनवाई जो मूलतः 22.01.2021 को अनुसूचित थी एतद्वारा 23.08.2021 के दोपहर 12.30 बजे न्यू श्री कृष्णा भवन, बगनान, मुकुन्दा दिघी, खलना मोड़, थाना- बगनान, हावड़ा, पश्चिम बंगाल में पुनः अनुसूचित हुई है।

सार्वसाधारण निम्न उल्लिखित गुगल मीट लिंक का व्यवहार कर वचुल सार्वजनिक सुनवाई में जुड़ने हेतु सक्षम होंगे।

गुगल मीट लिंक : <https://meet.google.com/ruj-txor-faa>
यूजर आईडी : WBPCB.Detergeo@gmail.com
पासवर्ड : D3t\$rg3#

यह सूचना 'वर्तमान', 'दि टाइम्स ऑफ इंडिया' एवं 'सन्मार्ग' में दिनांक 21.12.2020 को पूर्व में प्रकाशित सूचना के तदनुक्रम में जारी किया जा रहा है।

सदस्य सचिव
पश्चिम बंगाल प्रदूषण नियंत्रण बोर्ड

NOTICE
West Bengal Pollution Control Board

In compliance with Notification No. S.O.1533(E) dated 14.09.2006 of Ministry of Environment, Forests & Climate Change, Govt. of India, it is hereby notified that the Public Hearing for the proposed establishment of new natural and synthetic surfactant chemical manufacturing unit at Mouza – Kulepairi, PS – Bagnan, District – Howrah, West Bengal by M/s. Detergeo Chem (East) Pvt. Ltd. which was originally scheduled on 22.01.2021 is hereby rescheduled on 23.08.2021 at 12:30 p.m. at the New Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Khalna More, PS – Bagnan, Howrah, West Bengal.

The general public shall be able to join the virtual Public Hearing using the below mentioned Google Meet link:

Google Meet Link: <https://meet.google.com/ruj-txor-faa>
User ID: WBPCB.Detergeo@gmail.com
Password: D3t\$rg3#

This notice is being issued in continuation to the earlier notice published in 'Bartaman', 'The Times of India' and 'Sanmarg' dated 21.12.2020.

Member Secretary,
West Bengal Pollution Control Board

বিজ্ঞপ্তি
পশ্চিমবঙ্গ দূষণ নিয়ন্ত্রণ পর্ষদ

পরিবেশ, বন ও জলবায়ু পরিবর্তন মন্ত্রক, ভারত সরকার-এর বিজ্ঞপ্তি নম্বর এস.ও.১৫৩৩(ই) তারিখ ১৪.০৯.২০০৬ অনুসারে, এতদ্বারা বিজ্ঞপ্তি জারি করা হচ্ছে যে, মেসার্স ডিটার্জেয়ো কেম (ইস্ট) প্রা. লি. কর্তৃক প্রস্তাবিত মৌজা-কুলেপাইরি, থানা-বাগনান, জেলা-হাওড়া, পশ্চিমবঙ্গে স্থিত নতুন ন্যাচারাল এবং সিংথেটিক সারফ্যাক্ট্যান্ট কেমিকেল ম্যানুফ্যাকচারিং ইউনিট স্থাপনের জন্য জনশুনানি যা প্রাথমিকভাবে ২২.০১.২০২১ তারিখে ধার্য করা হয়েছিল, এখন ২৩.০৮.২০২১ বেলা ১২.৩০ টায় নিউ শ্রীকৃষ্ণ ভবন, বাগনান, মুকুন্দা দিঘি, খালনা মোড়, থানা-বাগনান, হাওড়া, পশ্চিমবঙ্গে ধার্য করা হয়েছে।

সাধারণ জনগণ প্রকাশ্য শুনানিতে গুগল মিটের মাধ্যমেও যোগ দিতে পারেন :

গুগল মিট লিঙ্ক : <https://meet.google.com/ruj-txor-faa>
ইউজার আইডি : WBPCB.Detergeo@gmail.com
পাসওয়ার্ড : D3t\$rg3#

এই সংশোধনী বিজ্ঞপ্তিটি গত ২১.১২.২০২০ তারিখে 'বর্তমান', 'দি টাইমস অফ ইন্ডিয়া' এবং 'সন্মার্গ' পত্রিকায় পূর্ব প্রকাশিত বিজ্ঞপ্তির ধারাবাহিক সংশোধনী রূপে গণ্য হবে।

সদস্য সচিব
পশ্চিমবঙ্গ দূষণ নিয়ন্ত্রণ পর্ষদ

7.2.2 Photographs of Public Hearing



7.2.3 Minutes of Public Hearing

Annexure-II

PROCEEDINGS OF THE PUBLIC HEARING HELD ON 23.08.2021 AT 12:30 PM AT New Sri Krishna Bhavan, Mukunda Dighi, Khaina More, P.O. Kalyanpur, P.S-Bagnan, District- Howrah, Pin-711303, State- West Bengal, FOR PROPOSED ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC SURFACTANT CHEMICAL MANUFACTURING UNIT OF M/s DETERGEO CHEM (EAST) PRIVATE LIMITED AT VILLAGE & P.O.-KULAPAIRY, MOUZA-KULAPAIRY, J.L. NO.-7, BEARING DAG NOS.-42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 136, 139, 141, KHAITAN NO.- 849, BAKSHIHAT GRAM PANCHAYAT, P.S.-BAGNAN, DISTRICT-HOWRAH, WEST BENGAL.

M/s Detergeo Chem (East) Private Limited submitted an application to the West Bengal Pollution Control Board (herein after referred to as the State board) for conducting a Public Hearing for Proposed Establishment of new natural and synthetic surfactant chemical manufacturing unit of M/s Detergeo Chem (East) Private Limited at Village and P.O.-Kulapairy, J.L.No.7, Bearing Dag Nos. -42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139, 141, Khaitan No. 849, Bakshihat Gram Panchayat, P.S Bagnan, District- Howrah, West Bengal. As per the notification S.O. 1533 dated 14th September, 2006 of the MoEF & CC, Govt. of India, Environment Clearance (EC) for the said project is required to be obtained from the Ministry of Environment, Forest & Climate Change, Government of India, after conducting Public Hearing.

Accordingly, the State Board after observing all the formalities conducted the Public Hearing on **23.08.2021 at 12:30P.M.** at New Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Khaina More P.S Bagnan, District- Howrah, State- West Bengal. Sri Chiranjib Dawn and Sri Sanjoy Mukherjee, both Assistant Environmental Engineers of Howrah Regional Office, WBPCB were present and Sri Chiranjib Dawn welcomed the audience and panel member. Sri Chiranjib Dawn requested Smt. Debarati Ghosh, ADM-L.R., Howrah District, who was present online, to preside over the public hearing, informed about the purpose of said public hearing and briefed about the project and its probable impact on the environment-ambient air, flora fauna, vegetation, soil etc. before and after the project as per the EIA report submitted by the project proponent. He also requested the ADM to deliver permission for power point presentation of the proposed project by the project proponent with the help of their technical team.

Smt. Debarati Ghosh, ADM-L.R., Howrah District presided over the hearing, welcomed the proponent for deliberation of presentation and requested the audience to express their opinion and thoughts freely after the presentation. List of the panel members and others present during the Public Hearing is enclosed in annexure - I)

Sri Chiranjib Dawn, Asst. Env. Engr., Howrah R.O., WBPCB then requested the project proponent to present the details about the proposed project, giving emphasis on the environmental aspects in particular as directed by the Additional District Magistrate- LR, for the knowledge and awareness of the audience present in the hearing.

NABET accredited consultant M/s Mantec Consultants Private Limited of Noida, Uttar Pradesh is engaged by the project proponent. On their behalf, representative of project proponent Mr. Sanjivul Hoque presented brief detail of the project in local language in powerpoint and gave emphasis on investment, land, employment, pollution mitigation, green belt development and CSR activity etc. (Brief details given under).

PROJECT SUMMARY				
Proposed Project	ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC SURFACTANT CHEMICAL MANUFACTURING UNIT OF M/s DETERGEO CHEM (EAST) PRIVATE LIMITED AT VILLAGE AND P.O.-KULAPAIRY J.L.NO.7, BEARING DAG NO. 42, KHAITAN NO. 849, BAKSHIHAT GRAM PANCHAYAT, P.S BAGNAN, DISTRICT- HOWRAH, WEST BENGAL.			
Project Proponent	M/s. Detergeo Chem (East) Private Limited			
Project Location	VILLAGE & P.O.-KULAPAIRY, MOUZA KULAPAIRY J.L. NO. 7, BEARING DAG NO. 42, KHAITAN NO. 849, BAKSHIHAT GRAM PANCHAYAT, P.S. BAGNAN, DISTRICT-HOWRAH, WEST BENGAL.			
Latitude & Longitude	22°31'49.08"N & 87°59'47.78"E			
Main Plant & Product	S. No.	Product Name	Proposed Manufacturing Capacity (MTA)	Mode of Transport
	1.	Linear Alkyl Benzene Sulphonic Acid 96%	12,000	MS Tanker
	2.	Linear Alkyl Benzene Sulphonic Acid 90%	12,000	MS Tanker
	3.	Alpha Olefin Sulphonate	2,000	SS Tanker
	4.	Sodium Lauryl Ether Sulphate	20,000	SS Tanker
	5.	Sodium Lauryl Sulphate	6,000	SS Tanker
	6.	Cocamidopropyl Betaine	3,000	Truck
	7.	Cocamide Monothanolamide	3,000	Truck
	8.	Cocamide Diethanolamide	3,000	Truck
	9.	Ethylene Glycol Distearate	3,000	Truck
	10.	Ethylene Glycol Monooleate	3,000	Truck
	11.	Ortho Sulphonic Acid	12,000	MS Tanker
	12.	Sodium Sulphate	400	
		Total Capacity	82,400	
Land	1.3483 ha			
Project Cost	Rs. 23 crores			
Total Cost of Pollution Control Devices	Rs. 1.5 crores			
EMP Cost for Social & Infrastructure Development	Rs. 150 Lakhs (CAPITAL COST), Rs. 17 Lakhs/Yr (RECURRING COST)			
Makeup Water	203 KLD			
Man Power	200 Numbers			
Power Requirement	1000KW			
Waste Water Discharge	The total waste water generation is 10.7 KLD which will be treated in our in-house ETP and this treated water will be re-used in the scrubber and for gardening purpose.			

After the completion of power point presentation by the project proponent the following queries raised by the audience are presented below:

1. Janab Monirul Islam of Village- Shyampur, Subsit welcomed the project and questioned about the water wastage. The project proponent answered that no water will be discharged out of the plant area as the project has been conceived as ZLD.
2. Sk Aheed Ali of Village- Subsit (Paschim) welcomed the proposed project and questioned about the greenery development to be done by the project proponent. The project proponent said that adequate plantation will be done to maintain a greenbelt and to comply with the environmental norms.
3. Sk. Manirul Ali of Village-Bagur (Subsit) welcomed the proposed project and asked about the possible noise pollution that can be caused by the project. The project proponent said that adequate measures will be taken to attenuate noise arising out of the project so that it meets noise standards.
4. Janab Jahiruddin Ali of Village- Patinan, welcomed the proposed project and questioned about the employment prospect of the project. The project proponent said that both skilled and unskilled workers will be employed from the local areas and also proper training will be imparted so that they can develop themselves as per the project requirement as well as for private entrepreneurship.
5. Janab Jiyarul Hussain of Village- Kemat Brahman, welcomed the proposed project asked about the prospect of local employment in the project. The project proponent said that out of total work strength, 60% (approx. 120) will be from the local areas.

As there were no more questions and no objections were raised by the local people, the public hearing was concluded thanking the audience as well as all the panel members by Sri Chiranjib Dawn, Asst. Env. Engr., Howrah Regional office, WBPCB taking consent from Smt. Debarati Ghosh, ADM-L.R., Howrah District as well as Chairperson of the said hearing.

Sanjay Mukherjee 14/9/21
Sri Sanjoy Mukherjee,
Asst. Env. Engr., Howrah R.O., WBPCB.

Chiranjib Dawn 14/9/21
Sri Chiranjib Dawn,
Asst. Env. Engr., Howrah R.O., WBPCB.

Debarati Ghosh
Smt. Debarati Ghosh,
ADM-L.R., Howrah District.



7.2.4 Public Hearing Attendance

Public Hearing of M/s. Detergeo Chem (East) Pvt. Ltd. held at Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Kalna More, P.S.-Bagnan, Howrah-711303 on 23.08.2021 at 12.30pm.

ATTENDANCE SHEET FOR PANEL MEMBERS

Sl.No	Name & Designation	Department	Contact No/Mobile No	Signature
1	Debarati Ghosh	ADM LR- Howrah	9831085249	Debarati Ghosh
2	CHRISTIE DAWN, ASST. ENV. ENGR.	HOWRAH R.O., WBPCB	(033)-24482219 / 9220510257	Christie Dawn
3	SANJOY HUKHERJEE, AEE,	HOWRAH R.O., WBPCB	(033)-24482219 / 7890273871	Sanjoy Hukherjee
4	Sk. Sankham	Pradhman, Subst-1	9735362981	Sk Sankham
5	Sk. Mustufa Ali	Pradhman, Baghchhat	7103868897	Sk Mustufa Ali
6	Dhruv Arora	Director, Detergeo Chem	7779696773	Dhruv Arora
7	Amit Kr. Singh	Manager (CD)	7992448925	Amit Kr. Singh
8	Arjun Nand Meetei	Director, Detergeo Chem	8506398195	Arjun Nand Meetei
9	Priyabrata Panja	Member Panchayat	9800020295	Priyabrata Panja
10	Saminul Hossain	Tech. Manager	9938786192	Saminul Hossain
11	Debarati Nair	Manager Compliance	9874252057	Debarati Nair
12	Prasanta Maity	Dy. LR- Howrah	833696366	Prasanta Maity

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Kalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

Sl. No.	Name	Address	Signature
1	BISWAJIT MONDA	Subst, Bagnan, Howrah, Mukunda Dighi	Biswajit Mondal
2	UTTAM PATRA	Subst, Bagnan, Howrah, Mukunda Dighi	UTTAM PATRA
3	MILAN BERA	Subst, Bagnan, Howrah	MILAN BERA
4	SK SAIDUL HAQUE	Subst, Bagnan, Howrah	SK Saidul Haque
5	SADDAM JAMADAR	Subst, Bagnan, Howrah	Saddam Jamadar
6	DUDKUMAR BAR	Subst, Bagnan, Howrah, Mukunda Dighi	DUDKUMAR BAR
7	SK JAHANGIR ALI	Subst, Bagnan, Howrah	SK JAHANGIR ALI
8	SK ABU TAHER	Subst, Bagnan, Howrah	SK ABU TAHER
9	SK HASAN	Subst, Bagnan, Howrah	SK HASAN
10	SK ANIF ALI	Subst, Bagnan, Howrah	SK ANIF ALI
11	SK AKRAM ALI	Subst, Bagnan, Howrah	SK AKRAM ALI
12	SK. MUKUL	Subst, Bagnan, Howrah	SK. MUKUL
13	MID MASJIDUL	Subst, Bagnan, Howrah	MID MASJIDUL
14	M.D TANJIM	Subst, Bagnan, Howrah	M.D TANJIM
15	BR. MANIRUL	Subst, Bagnan, Howrah	BR. MANIRUL
16	BAKUL	Subst, Bagnan, Howrah	BAKUL
17	ASRAFUL	Subst, Bagnan, Howrah	ASRAFUL
18	SK ASRAF	Subst, Bagnan, Howrah	SK ASRAF
19	MURSELIM	Subst, Bagnan, Howrah	MURSELIM
20	SAHABUL KHAN	Subst, Bagnan, Howrah	SAHABUL KHAN

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Kalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

Sl. No.	Name	Address	Signature
21	TAHIDUL	Subst, Bagnan, Howrah	TAHIDUL
22	SK SANAM	Subst, Bagnan, Howrah	SK SANAM
23	SK SARIJUL	Subst, Bagnan, Howrah	SK SARIJUL
24	PIYA ALI	Subst, Bagnan, Howrah	PIYA ALI
25	MURJANAR	Subst, Bagnan, Howrah	MURJANAR
26	SK MONIRUL	Subst, Bagnan, Howrah	SK MONIRUL
27	SK Lakshmi Islam	Subst, Bagnan, Howrah	SK Lakshmi Islam
28	SK Rashid Islam	Subst, Bagnan, Howrah	SK Rashid Islam
29	SUBHANUBA	Subst, Bagnan, Howrah	SUBHANUBA
30	JYAUUL HOSSAIN	Kishna Bhavan, Bagnan	JYAUUL HOSSAIN
31	SK JAIUDDIN	Subst, Bagnan, Howrah	SK JAIUDDIN
32	SK RASU	Subst, Bagnan, Howrah	SK RASU
33	ARIF	Subst, Bagnan, Howrah	ARIF
34	SWAPAN PATRA	Subst, Bagnan, Howrah	SWAPAN PATRA
35	SK RAFUDDIN	Subst, Bagnan, Howrah	SK RAFUDDIN
36	SK JAKIR	Subst, Bagnan, Howrah	SK JAKIR
37	SK MEERAS	Subst, Bagnan, Howrah	SK MEERAS
38	SK. SHAM	Subst, Bagnan, Howrah	SK. SHAM
39	SK. Saiful Haque	Subst, Bagnan, Howrah	SK. Saiful Haque
40	AMIRUL	Subst, Bagnan, Howrah	AMIRUL



Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Khalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

Sl. No.	Name	Address	Signature
41	BISWAJIT PAHWA	Subsit Bagnan Howrah	Biswanath
42	SK MIRZ	Subsit Bagnan, Howrah	SK MIRZ
43	SK SAIFUL ALI	Khalna more, Bagnan	SK SAIFUL ALI
44	SK SAFIKUL	BAGNA, Bagnan, Bagnan	SK SAFIKUL
45	ASHADUL ALI	Godi, Bagnan, Howrah	ASHADUL ALI
46	SARIDUL	Godi Bagnan, Howrah	SARIDUL
47	SIRAJ	Bagnan, Bagnan, Howrah	SIRAJ
48	MOFIJUL	Khalna more, Bagnan	MOFIJUL
49	SAIFUL ALI	Bhambhan Bagnan	SAIFUL ALI
50	M.D HBIJUL	Subsit Bagnan, Howrah	M.D HBIJUL
51	PIJUSH	Subsit Bagnan, Howrah	PIJUSH
52	ARIYO BAR	Godi, Bagnan, Howrah	ARIYO BAR
53	SK SAHID	Subsit Bagnan	SK SAHID
54	ASIJUL	Chalidhauria, Bagnan	ASIJUL
55	MUJAMIL	Subsit Bagnan	MUJAMIL
56	HASATN	Subsit Bagnan	HASATN
57	SK Monim Ali	Godi, Bagnan	SK Monim Ali
58	SURAT KHAN	Godi, Bagnan	SURAT KHAN
59	SK SAHADUL	Subsit Bagnan	SK SAHADUL
60	RAJU	Godi, Bagnan	RAJU

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Khalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

Sl. No.	Name	Address	Signature
61	OSIAR MONDAL	Godi Bagnan Howrah	OSIAR MONDAL
62	SK JALLAUDDIN	Godi Bagnan, Howrah	SK JALLAUDDIN
63	BABLU BERA	CHALIDHAURIA	BABLU BERA
64	RINTU GHOSH	CHALIDHAURIA	RINTU GHOSH
65	SANIRAM MANDAL	MUKUNDADIGHI	SANIRAM MANDAL
66	PARAJAY BAR	MUKUNDADIGHI	PARAJAY BAR
67	DIJAK PATRA	MUKUNDADIGHI	DIJAK PATRA
68	BIKRAM MATH	CHAKUR, Bagnan	BIKRAM MATH
69	BAPI MATH	CHAKUR, Bagnan	BAPI MATH
70	SANDIP JANA	CHAKUR, Bagnan	SANDIP JANA
71	ASHADUL	CHAKUR, Bagnan	ASHADUL
72	SK SAMIN	Bagnan, Bagnan	SK SAMIN
73	SK ANISUR	Godi, Bagnan	SK ANISUR
74	MANIRUL	Godi, Bagnan	MANIRUL
75	HASIBULKHAL	Godi, Bagnan	HASIBULKHAL

7.2.5 Action Plan

Public hearing is conducted on 23.08.2021 at 12:30 P.M at New Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Khalna More P.S Bagnan, District- Howrah, State- West Bengal.

Issue raised and their reply with action plan and budgetary allocation as per the TOR is given in the table no. 7.1

Table 7.1- Public hearing Points Raised and Commitment of the project Proponent

S. No.	Name of the Person	Points Raised	Replies and Action Plan	Budet
1.	Janab Monirul Islami Village- Shyampur,	He welcomed the project and asked about the wastage of the water.	The project proponent answered that no water will be discharged out of the plant area as the project has been conceived as ZLD.	1.0 Lakh/year
2.	S.K Ahed Ali Village- Subsit (Paschim)	He welcomed the proposed project and questioned about the greenery development to be done by the project proponent.	The project proponent replied that the adequate plantation will be done to maintain a greenbelt and to comply with the environmental norms.	



S. No.	Name of the Person	Points Raised	Replies and Action Plan	Budet
3.	S.K Manirul Ali Village- Bagur (Subsit)	He welcomed the proposed project and asked about the possible noise pollution that can be caused by the project	The project proponent said that the adequate measures will be taken to attenuate noise arising out of the project so that it meets ambient noise standards.	
4.	Janab Jahiruddin Ali Village- Patinan	He welcomed the proposed project and asked about the prospect of local employment in the project.	The project proponent replied that both skilled and unskilled workers will be employed from the local areas and also proper training will be imparted so that they can develop themselves as per the project requirement as well as for private entrepreneurship	2.0 Lakh/year
5.	Janab Jiyarul Hussain Village- Kismat Brahman	He welcomed the proposed project and asked about the prospect of lo	The project proponent replied that the total work strength, 60% will be from the local areas.	

7.3 RISK ASSESSMENT

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the proposed project. On the other hand, risk analysis deals with the identification and quantification of risks, the plant equipment and personnel are exposed to, due to accidents resulting from the hazards present in the plant.

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of populations etc.

In the sections below, the identification of various hazards, probable risks in the Surfactant chemical manufacturing plant, maximum credible accident analysis, and consequence analysis are addressed which gives a broad identification of risks involved in the plant. Based on the risk estimation for fuel and chemical storage, Disaster Management Plan (DMP) has also been presented.

Risk Analysis involves identification of hazards and the associated risks, if any, involved in the plant. Recognition of all possible hazards and analysis of the associated risks is an important first step to improve the safety and reliability of any installation. Such an analysis would provide the necessary inputs for the safe operation of the Plant. The risk analysis study is designed to identify the hazards in terms of the types of materials handled their inventories and vulnerable practices and operations. The chemicals and their quantities involved in the plant are well below the threshold quantities mentioned in the MSIHC rules.

Depending on the type of liquid handled and process conditions, one or more of the following potential hazards/consequences could be encountered due to loss of containment of storages:

- Un-ignited release;
- Pool Fire;
- Thermal radiation;
- Vapour Cloud Explosion; and
- Toxic Impact

Based on the chemical properties of the raw material and products, Loss of containment of fuels (HSD) and consequent Thermal radiation on encountering an ignition source is analyzed using ALOHA. The modelling and consequence results of the study are presented below:

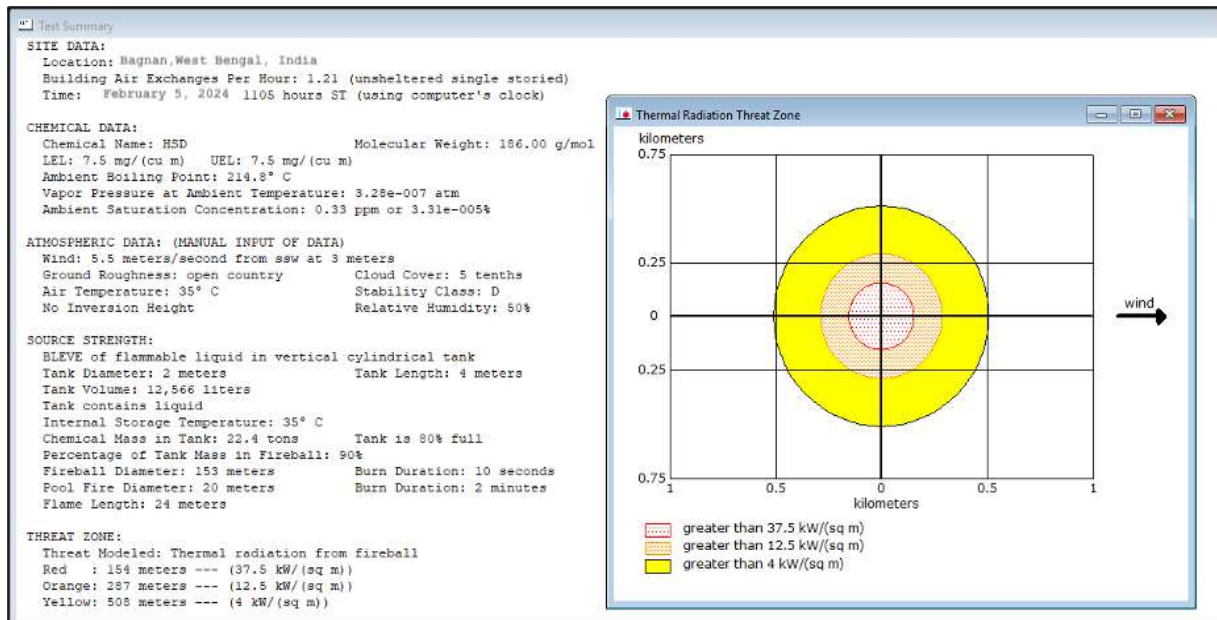


Figure 7.1 Thermal Radiation Consequence Contour for Diesel Tank (Rupture)

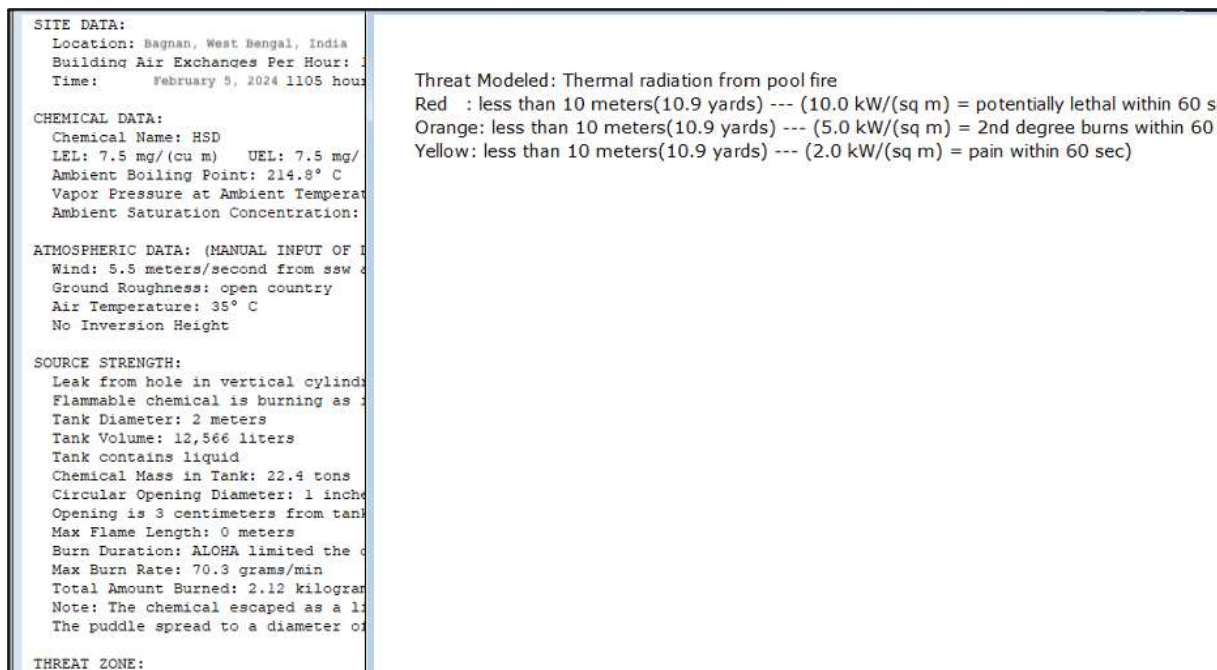


Figure 7.2: Pool Fire Consequence Contour for Diesel Tank (Rupture)

7.3.1 Approach to the Study

Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of potential hazard areas;
- Identification of representative failure cases;
- Visualization of the resulting scenarios in terms of fire (thermal radiation) and explosion;
- Assessment of the overall damage potential of the identified hazardous events and the impact zones from the accidental scenarios;
- Assessment of the overall suitability of the site from hazard minimization and disaster mitigation point of view;
- Furnishing specific recommendations on the minimization of the worst accident possibilities; and
- Preparation of broad DMP, On-site and Off-site Emergency Plan, which includes occupational Health and Safety Plan.

7.4 HAZARD IDENTIFICATION

Identification and quantification of hazards in the Surfactant chemical manufacturing plant is of primary significance in the risk analysis, quantification and cost effective control of accidents. A classical definition of hazard states that hazard is in fact the characteristic of system/plant/process that presents potential for an accident.

Hence, all the components of a system/plant/process need to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident. The following two methods for hazard identification have been employed in the study:

- Identification of major hazardous units based on Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 of Government of India (GOI Rules, 1989); as amended in 2000; and
- Identification of hazardous units and segments of plants and storage units based on relative ranking technique, viz. Fire-Explosion and Toxicity Index (FE&TI).

7.4.1 Classification of Major Hazardous Units

Hazardous substances may be classified into three main classes namely Flammable substances, unstable substances and toxic substances. The storage of the hazardous substance in the proposed project is given in **Table 7.1**.

Table 7.1: Category - Wise Schedule of Storage Tanks

S. No.	Product	No of Tanks	Classification	Design Capacity
1	HSD	1	Flammable	20 KL
2	H ₂ SO ₄	1	Corrosive	420 MT

Hazardous characteristics of the major flammable materials employed in the proposed project are listed in **Table 7.2**.

Table 7.2 : Properties of storage fuels

Chemical	Codes/Label	TLV	FBP	MP	FP	UEL	LEL
			°C			%	
HSD	Flammable liquid	5mg/m ³	400	338	32.96	7.5	0.6

TLV : Threshold Limit Value

FBP : Final Boiling Point

MP	:	Melting Point	FP	:	Flash Point
UEL	:	Upper Explosive Limit	LEL	:	Lower Explosive Limit

7.4.2 Identification of Major Hazard Installations Based on GOI Rules, 1989

Following the accidents in the chemical industry in India over a few decades, a specific legislation covering major hazard activities has been enforced by Govt. of India in 1989 in conjunction with Environment Protection Act, 1986. This is referred here as GOI rules 1989. For the purpose of identifying major hazard installations the rules employ certain criteria based on toxic, flammable and explosive properties of chemicals.

A systematic analysis of the fuels/chemicals and their quantities of storage has been carried out, to determine threshold quantities as notified by GOI Rules, 1989 and the applicable rules are identified. Applicability of storage rules is summarized in **Table -7.3**.

Table 7.3: Applicability of GOI rules to fuel storage

S. No.	Chemical / Fuel	Listed in Schedule	Total Quantity	Threshold Quantity (T) for Application of Rules	
				5, 7-9, 13-15	10-12
1	HSD	3 (1)	20 KL	25 MT	200 MT

7.5 HAZARD ASSESSMENT AND EVALUATION

7.5.1 Methodology

An assessment of the conceptual design is conducted for the purpose of identifying and examining hazards related to feed stock materials, major process components, utility and support systems, environmental factors, proposed operations, facilities, and safeguards.

7.5.2 Preliminary Hazard Analysis (PHA)

A preliminary hazard analysis is carried out initially to identify the major hazards associated with storages and the processes of the plant. This is followed by consequence analysis to quantify these hazards. The various process activities involved in the unit are purely chemical operations; those are not complex or hazardous. Hence, no major hazards with potential for any emergency situation exist in the plant. The preliminary hazard related to the proposed plant in general is given in **Table 7.4**. The preliminary hazard related to the storage tanks are given in **Table 7.5** respectively.

Table 7.4: Preliminary Hazard Analysis in General

PHA Category	Description of Plausible Hazard	Recommendation	Provision
Environmental Factors	If there is any leakage and eventuality of source of ignition.	---	All electrical fittings and cables will be provided as per the specified standards. All motor starters will be flame proof.
	Highly inflammable nature of the chemicals may cause fire hazard in the storage facility.	A well designed fire protection including AFFF foam, water sprinkler system, dry powder, CO2 extinguisher will be provided.	Fire extinguisher of small size and big size will be provided at all potential fire hazard places. In addition to the above, fire hydrant network will also provided.

Table 7.5: Preliminary Hazard Analysis for Process and Storage Areas

Equipment	Process	Potential Hazard	Provision
Generator	Converts mechanical energy into electrical energy	Mechanical hazards and fire hazards in Lube oil system Cable galleries Short circuits	Safety interlocks and manhole locks are provided to ensure safe operation and maintenance of the unit.
Power Transformers	-	Fire and explosion	All electrical fittings and cables are provided as per the specified standards.
Switch Yard control room	-	Fire in cable galleries and switch	As above
HSD Storage	Used as start-up fuel for DG sets, and also will be used for vehicular transportation	Fire & explosion	Leaks detection system will be provided.

7.5.3 Hazard Identification in Tank Farm

The chemicals used in the Plant are Linear Alkyl Benzene, Alpha olefin, Lauryl ether, Lauryl alcohol, Sulphuric Acid, Caustic Soda Liquid, Sulfur, Coconut Fatty Acid, Dimethyl aminopropylamine, Monochloroacetic acid, Monoethanolamine, Diethanolamine, Stearic Fatty Acid, Ethylene Glycol. The material safety data sheets are attached as **Annexure -III**.

7.5.4 Hazard Analysis for Tank Farm

The materials involved in storage and transfer system have flammable and toxic hazards. Potential failure scenarios involving loss of containment of the materials are as follows:

- Large spillage of the liquid from above- ground storage tanks into the dykes area due to overflow from tank or leakage from tank and connected piping;
- Spillage of liquid during tanker unloading or transfer to process unit; and
- Spillage of the liquid contained in underground tanks from discharge line of transfer pump.

The causes of hazardous liquid release in tank farm, their consequences and safeguards provided are indicated in Table - 7.6.

Table 7.6: Hazard Identification for Tank Farm

S. No.	Causes	Consequences	Safeguards
1	<ul style="list-style-type: none"> ➤ Leakage from unloading hose ➤ Damaged hose ➤ Improper hose connection ➤ Flange gasket leak ➤ Movement of tanker during unloading 	Exposure to toxic chemical Fire/explosion hazard due to flammable liquid release Loss of chemical Soil/Water contamination	<ul style="list-style-type: none"> ✓ Regular inspection & replacement of chemical hoses. ✓ Maintenance system for gaskets, flange & hose connections including leak check. ✓ Procedure to immobilize tanker before start of unloading. ✓ Paved area for tanker unloading with berm for spill containment. ✓ Unloading checklist and display board in local



S. No.	Causes	Consequences	Safeguards
			language. ✓ Use of PPE for unloading.
2	➤ Leakage from pump seal	Exposure to toxic chemical Fire/explosion hazard due to flammable liquid release. Loss of chemical Soil/water contamination	✓ Reliable type of mechanical seal for pump. ✓ Stand-by pump ✓ Regular maintenance of pumps
3	➤ Overflow from storage tank by excess filling due to malfunction of tank level instrument.	Exposure to toxic chemical Fire/explosion hazard due to flammable liquid release Loss of chemical Soil/water contamination	✓ Reliable type tank level instrumentation ✓ Multiple level instruments to provide overflow protection for tank ✓ Regular monitoring of tank inventory
4	➤ Leakage from flange joint in piping connected to tank bottom	Exposure to toxic chemical. Fire/explosion hazard due to flammable liquid release Loss of chemicals Soil/water contamination	✓ Remote operated shut off valve in tank bottom connection with push button in control room and safe location outside the dyke.

7.5.5 Safety And Fire Fighting Planing

Safety Measures in Storage Facilities

Risk for storage units depends not on the extent of the consequence, but also on the probability of the failure of the safety measures and provisions provided. The safety measures to be provided in storage facilities in the proposed plant are given below:

Substance Stored	Safe Guard
Sulphuric Acid	<ul style="list-style-type: none"> • Dyke wall of height - 1.0 m and thickness-230 mm will be constructed around the storage tank for acid spillage containment. • Also the provision for automatic emergency shower will be provided.
High Speed Diesel (HSD)	Following Fire Fighting measures will be provided: <ul style="list-style-type: none"> • DCP (Dry Chemical Powder) Extinguisher; • AFFF (Aqueous Film Forming Foam) Extinguisher; • Water cum Foam Monitor; and d) Sand Bucket

General Safety Measures for Chemicals Storage & Handling.

Following safety measures for chemicals storage and handling will be provided.

- Availability of MSDS (Material Safety Data Sheets) information for all chemicals
- Proper layout of tank farm and other storage areas for chemicals.

- Proper segregation of chemicals storage taking into account compatibility Matrix Instrumentation and control system for tanks, Sulphonator etc. SO₂ and SO₃ Gas detection and fire protection systems.
- Periodic inspection and maintenance system Standard operating procedures and check lists Training of operation and maintenance personnel Safety work permit system.
- Electrical hazardous area classification for process units and storage areas Incident investigation and implementation of recommendations.

7.5.6 Risk Analysis for chemical storage

Details of Chemical storage

Details of raw material & products are shown in Table-7.7.

Table 7.7: Details of Raw Material & Products

S. No.	Description	Physical Form	Type of Storage	Capacity, MT	Flash Point (°C)	Possible Effects as per MSDS
Raw Materials						
1.	Linear Alkyl Benzene	Liquid	MS Tank	500	140	Non- toxic, Non-Flammable
2.	Alpha Olefin	Liquid	SS Tank	100	135	Non- toxic, Non-flammable, Contact with eyes and skin can cause irritation.
3.	Lauryl Ether	Liquid	SS Tank	750	162	Non- toxic, Nonflammable. Skin Corrosion/Irritation
4.	Sulfuric Acid	Liquid	MS Tank	420	-	Carcinogenic to humans(IARC Group-1)
5.	Caustic Soda Liquid	Liquid	SS Tank	650	-	Skin burns and eye irritant
6.	Sulfur	Solid	Closed Yard	1000	207	Corrosive to metals
7.	Coconut Fatty Acid	Liquid	SS Tank	200	>100	Not flammable, non-explosive, No reactivity hazard
8.	Dimethylaminopro pylamine	Liquid	SS Tank	36	30.5	flammable, corrosive
9.	Monochloroacetic acid	Solid	Closed Yard	30	126	Non flammable, toxic if swallowed
10.	Monoethanolamine	Liquid	SS Tank	36	91	Corrosive, skin irritation
11.	Diethanolamine	Liquid	SS Tank	36	138	Irritation of eyes and skin
12.	Stearic Fatty Acid	Liquid	SS Tank	200	200	Non toxic, non flammable
13.	Ethylene Glycol	Liquid	SS Tank	36	111	Must be preheated before ignition can occur.
Products						
1.	Linear Alkyl Benzene Sulphonic Acid LABSA 96%	Liquid	MS Tank	300	>200	Non- toxic, Nonflammable and harmful if swallowed.

S. No.	Description	Physical Form	Type of Storage	Capacity, MT	Flash Point (°C)	Possible Effects as per MSDS
Raw Materials						
2.	Alpha Olefin Sulfonate 38%	Liquid	SS Tank	120	>93.9	Non-flammable. Contact with eyes and skin can cause irritation.
3.	Sodium Lauryl Ether Sulphate 28%	Liquid	SS Tank	300	>93.9	Non-flammable Mist can be irritating to nose, throat & upper respiratory tract
4.	Sodium Lauryl Sulphate 28%	Liquid	SS Tank	120	170	Non- toxic, Non-flammable
5.	Cocoamidopropyl Betaine	Liquid	SS Tank	42	>100	Slightly flammable,
6.	Cocamide Monoethanolamine	Solid	Closed Yard	40	>150	Harmful if swallowed
7.	Cocamide Diethanolamine	Liquid	SS Tank	42	>93.3	May be combustible at high temperature.
8.	Ethylene Glycol Distearate	Solid	Closed Yard	40	297.9	Non flammable, Non explosive
9.	Ethylene Glycol Monostearate	Solid	Closed Yard	40	>400	May be combustible at high temperature
10.	Dilute Sulphuric Acid	Liquid	MS Tank	420	-	Corrosive

7.5.7 Hazard Identification

The chemical raw materials and products (LAB, AO, LE, LA, LABSA, AOS, SLS & SLES) with high flash point (about 100 °C or higher) do not have any significant flammable hazard. Nor are they associated with toxic dispersion hazards.

Sulphur is stored in solid forms. Solid sulphur in the storage yard may be ignited by sparks or hot surfaces in machinery. However, solid sulphur burns slowly and such sulphur fires can be easily detected by the fumes of sulphur dioxide. Incipient fires in storage piles may be smothered by gently shoveling sulphur onto them.

7.5.8 Consequence Analysis

Damage Effects of Pool Fire Radiation

The effect from jet fire and pool fire is thermal radiation intensity on the receptor surface as shown in **Table-7.8**.

Table 7.8: Damage Effects due to Pool Fire Radiation

Heat Radiation Intensity (kW/m ²)	Observed Effect
4	Sufficient to cause pain to personnel if unable to reach cover within 20 seconds; 0% lethality.
12.5	Minimum energy required for piloted ignition of wood, melting of plastic tubing.
37.5	Sufficient to cause damage to process equipment.

- Thermal radiation intensity exceeding 37.5kW/m² may cause escalation due to damage of other equipment.

- Thermal radiation intensity exceeding 12.5 kW/m^2 may cause ignition of combustibles on buildings and impairment of escape route.
- Thermal radiation intensity exceeding 4 kW/m^2 may cause burn injury on personnel injury.

7.5.9 Consequence Analysis Results

Consequence analysis for the identified failure scenario is carried out using the renowned PHAST software of DNV-GL. The results of consequence analysis are summarized in **Table-7.9** and consequence analysis result in graphical form for the worst cases are shown in **Figure-7.1 & Figure-7.2**.

Table 7.9: Summary of Consequence Analysis Results

Scenario considered	Pasquill stability class	LFL concentration PPM	Flash fire At LFL concentration distance (m)	Overpressure			Pool Fire		
				Damage distance for various heat loads (m)			Damage distance for various heat loads (m)		
				0.020 68 bar	0.13 79 bar	0.206 8 bar	4 kW/ m ²	12.5 kW/ m ²	37.5 kW/ m ²
HSD Tank Rupture	2F	8000	11.66	53.92	18.53	16.4	32.87	17.84	6.64
	3D		12.18	51.59	18.08	16.06	33.84	19.93	6.72
	5D		12.54	53.02	18.36	16.27	35.11	22.41	6.81
HSD Tank (Leak 50mm)	2F	8000	2.32	NR	NR	NR	29.80	17.96	6.79
	3D		2.41	NR	NR	NR	30.54	19.56	7.08
	5D		2.47	NR	NR	NR	31.52	21.22	7.27
HSD storage Tank (Leak 10mm)	2F	8000	1.92	NR	NR	NR	11.61	8.02	4.46
	3D		2.04	NR	NR	NR	11.92	8.46	4.91
	5D		2.15	NR	NR	NR <td 12.16	8.95	5.47	

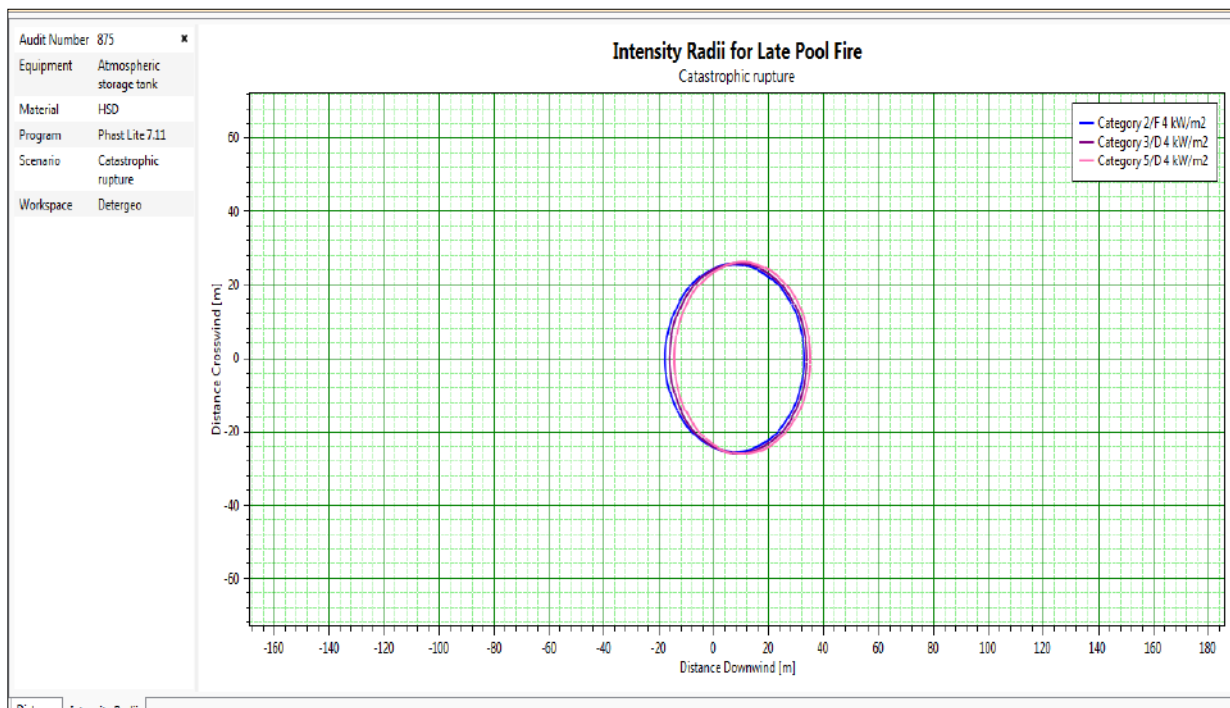


Figure 7.3: Graph showing intensity radii for pool fire for HSD Storage Tank of 20 KL



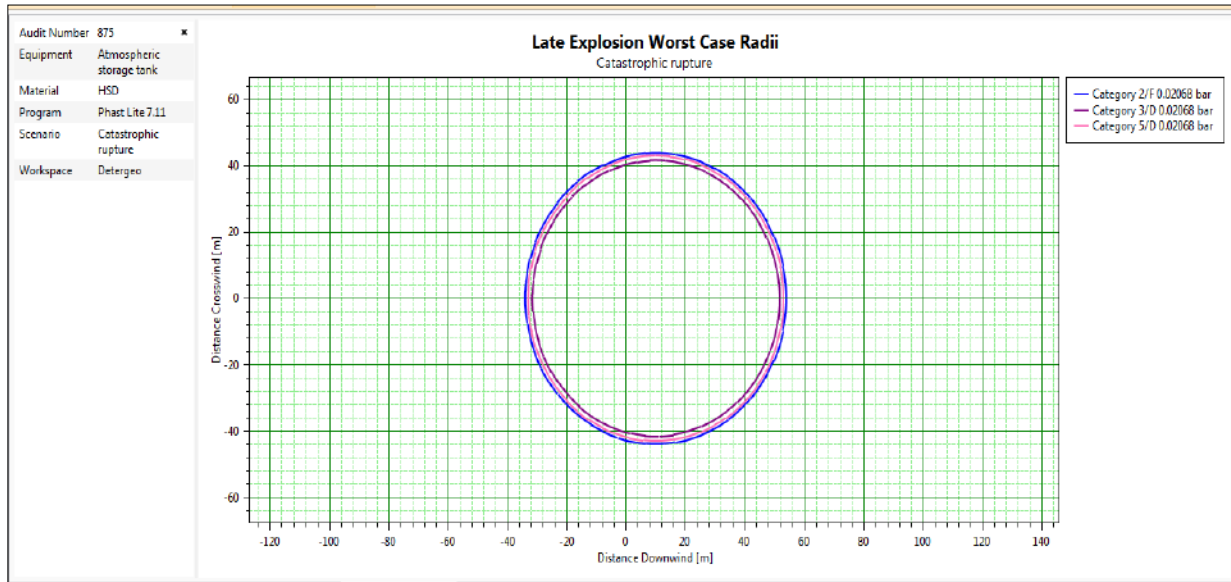


Figure 7.4: Graph showing explosion worst-case radii for HSD Storage Tank of 20 KL

Recommendations

The following recommendations are provided for the purpose of minimizing risk due to HSD tank and chemicals storage.

- Provision of foam pourer in the HSD tank will be useful to fight tank fire with the help of foam generating branch pipe.
- The flexible hoses used for road tanker unloading (chemicals) should be maintained and checked regularly to prevent leaks.
- Road tanker unloading operation should be covered by written standard operating procedure (SOP). The instructions in local language should be displayed on a board at each unloading station.
- Good housekeeping is required in sulphur yard to prevent accumulation of sulphur dust on structural members. Compressed air should not be used for removal of sulphur dust.
- Proper ventilation system need to be provided to avoid the accumulation of sulphur dust.

7.5.10 Risk Mitigation Measures to be adopted at Sulphonation Plant

Hazard Control Measures

Apart from the above other mitigation measures are given below:-

- Procedures and actions will be well defined and known to all operating personnel's for safe shut down of plant incase of failure of any power, instrumentation, cooling water, air, etc;
- All the vessels and tanks will be provided with temperature indicator, pressure gauge and safety valves as depending upon the process and operating parameters;
- Plant specific HAZOP studies will be carried out using P&IDs (Piping and Instrumentation Diagrams) for identification of hazards during operation considering deviation of operational parameters, their possible cause and consequence and safe guards;
- Interlocks and DCS (Distributed Control System) control will be provided during reaction process;
- All the reactors which will not working at atmospheric temperature will be provided with glass wool lagging to contain the heat;
- All the motors and other rotating equipment machines will be provided with suitable safety guards;

- First Aid Fire extinguishers will also be installed in the plant area;
- Flame arrestors will be provided at all vent lines at solvent tanks;
- Suitable first aid fire extinguishers, such as, DCP (Dry Chemical Powder), CO2 & foam type will be kept in every plant area at easily approachable spots and in sufficient numbers;
- Fire hydrant points with sufficient length of hose reel will be provided at major emergency spots;
- Emergency Safety shower will be installed at crucial places;
- Sufficient space will be provided for free movement in the plant area;
- Safe distances have been considered in designing of plant layout;
- Regarding all components of the plant proper certificate will be taken. Also testing and inspection will not be compromised before deliveries;
- Certificate of structure stability will be taken from competent person;
- Insulation of piping will be provided as per requirement;
- All elevated structures will be provided with lightening arrestors;
- All exposed parts of moving machineries will be provided with suitable guards for personnel safety;
- All piping and equipment will be provided with earthing connection and it will be tested regularly;
- Safety valves & rupture disc will be provided to prevent over pressurization of vessels and reactors; and
- SOP (Standard Operating Procedure) will be available of safe shut -down of plant during any emergency situation.

Spillages, Leakages: Controls

Depending on the leaking rate/source the following actions will be taken:

- Isolation/cutting of supply at the leaking point, transfer to some other vessel/equipment, and using protective appliances like hand gloves, helmets, PVC suits etc;
- Efforts will be made, to prevent the spread of spillage by neutralization/ earth barriers; and
- Outgoing effluents will have to be blocked and taken to effluent collection tanks. It will be taken for treatment.

Hazard and Operability Study (HAZOP):

A hazard and operability study (HAZOP) is a structured and systematic examination of a complex system, usually a process facility, in order to identify hazards to personnel, equipment or the environment, as well as operability problems that could affect operations efficiency.

The study data of HAZOP in sulphonation plant is attached as **ANNEXURE-IV**.

7.5.11 Risk Mitigation Measures to be adopted During Transport

S. No	Improvement Areas	Risk Mitigation Measures
1	Driver Management	Driver training shall be mandated through Detergeo approved DTI.
		Driver medical shall be mandated through Detergeo approved medical centers.
		Defensive driving training to errant driver
		Minimum age of Driver is required to be 25 Years
2	Journey Management	Keep a record of the substances being transported i.e., shipping papers and written emergency instructions are critical for safety
		Buyer/customer to be informed to define route with proper rest stations. Customer to submit the document to Detergeo. Detergeo may review and provide input. Customer shall review and release



S. No	Improvement Areas	Risk Mitigation Measures
		<p>final document to Detergeo and communicate to all transporters and driver by the customers, via Journey Route Management document for every journey.</p> <p>Journey management documents should also take care of details like on route nearby Hospital, Crane provider etc. A sample format may be shared by Detergeo to customer.</p> <p>Restrict night time driving (12:00 am – 5:00 am) inclusive of empty vehicles which is the most accident-prone time zone</p> <p>Mandate resting time of at least 30 minutes for drivers after continuous driving of maximum of 4 hours.</p> <p>Vehicles are not allowed to driver more than 60 Km/hr.</p> <p>24x7 Proactively monitor all safety violations and provide timely alerts to drivers/ SPOC for controlling any possible damage through VTS compatible with Detergeo System</p>
3	Vehicle Management	<p>All the vessels and tanks will be provided with temperature indicator, pressure gauge and safety valves as depending upon the material being transported and operating parameters</p> <p>Suitable fire extinguishers, such as, DCP (Dry Chemical Powder), CO2 & foam type to be kept in the transporter vehicle at easily approachable spots and in sufficient numbers</p> <p>Inspect the vehicle's general condition, including tires, condition of valves, electrical wiring, adequate sealing, condition of wipers, headlights, signal lights, etc.</p> <p>Following the dangerous goods segregation rules for carrying mixed classes of hazardous chemicals; chemicals must be separated when being transported/stored to ensure incompatible chemicals do not mix if there is a spill</p> <p>Placards are standard hazmat identifiers, designed to meet individual specifications, will be placed on outer containers, trucks, cylinders, or other vehicles used for transport</p> <p>Have an emergency kit readily available with safety goggles, chemical information sheets, and MSDS</p> <p>Securing container tanks against movement on transportation vehicles i.e., proper loading and bracing all containers so they do not fall, slide, or bounce around during transportation</p> <p>Suraksha certification from Detergeo authorized center for liquid tankers</p> <p>Periodic Testing of Safety Relief Valve (SRV) and EFCV/IEFCV (Excess Flow/Internal Excess Flow Check Valve) under Rule 18 and Tanker testing under Rule 19 for Tanker integrity testing through Hydrotesting through DETERGEO approved centers along with TPI presence during testing.</p> <p>Speed Governor Speed limiting devices can avoid the risk of accidents due to over-speeding</p> <p>ABS (Anti-Lock Braking system) and EBS in Trailers with ESC – Electronic Stability Controller</p> <p>RUPD/SUPD should be available in the vehicle. The rear bumper should not extend beyond the RUPD.</p> <p>Vehicle Age: Age of vehicle restricted up to 10 yrs. to improve distribution safety and sustainability</p>
4	Emergency Response	<p>Customer should have their own Offsite Transport Emergency Response Plan</p>

7.5.12 Risk Reduction Measures

Based on hazard identification, consequence analysis and safety measures to be adopted at the plant, following suggestions for improvement of safety at the plant are emerged.

For risk mitigation/reduction, attempts should be made to either reduce inventories that could get released in the event of loss of containment or failure likelihood's or both as feasible. Risk analysis identifies the major risk contributors, which enables prioritization of the plant that deserve special attention in terms of inspection and maintenance in particular and over all safety management as a whole.

For the risk reduction at the proposed plant, the following salient suggestions and recommendations are made:

- A written process safety information document may be compiled for general use.
- Personnel especially contractor workers at the plant should be made aware about the hazardous substance stored at the plant and risk associated with them.
- The process design information in the process safety information compilation must include P&IDs/PFDs (Process Flow Diagrams); process chemistry; maximum intended inventory; acceptable upper and lower limits, pressures, flows and compositions and process design and energy balances.
- The document compilation should include an assessment of the hazards presented including (i) toxicity information (ii) permissible exposure limits. (iii) physical data (iv) thermal and chemical stability data (v) reactivity data (vi) corrosivity data (vii) information on process and mechanical design.
- The adequate numbers of heat and smoke detectors may be provided at strategic locations in the plant and indication of detectors/sensors should be provided in main control room.
- Predictive and preventive maintenance schedule should be prepared for equipment, piping, pumps, etc. and thickness survey should be done periodically as per standard practices.
- Safety measures in the form of Dos and Don'ts should be displayed at strategic locations especially in Bengali and English language.
- Safe work practices should be developed to provide for the control of hazards during operation and maintenance.
- The plant should check and ensure that all instruments provided in the plant are in good condition and documented.
- Apart from occupational health centre, first aid boxes including eye wash containers will be placed in all the work areas for immediate first aids.

7.6 DISASTER MANAGEMENT PLAN

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Disaster Management Plan, it should be widely circulated and personnel training should be provided through rehearsals/drills.

To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a Disaster Management Plan has to be formulated and this planned emergency document is called "Disaster Management Plan".

The objective of the Industrial Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;



- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area;
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

In effect, it is to optimize operational efficiency to rescue, rehabilitate and render medical help and to restore normalcy.

7.6.1 Emergencies

7.6.1.1 General and Industrial Emergencies

The emergencies that could be envisaged in the plant and tank farm are as follows:

- A situation of fire at the tank farm of all storages;
- Slow isolated fires;
- Fast spreading fires;
- Structural failures;
- Contamination of food/water; and
- Sabotage/Social disorder.

7.6.1.2 Specific Emergencies Anticipated

Fire and Explosion

Fire consequences can be disastrous, since they involve huge quantities of fuel either stored or in dynamic inventory in pipelines or in nearby areas. Toxic releases can affect persons working around. Preliminary hazard Analysis has provided a basis for consequence estimation.

7.6.2 Emergency Organization

The DCEPL will set up an Emergency Organization. A senior executive who has control over the affairs of the plant would be heading the Emergency Organization. He would be designated as Site Controller. As per the General Organization chart, Chief Operating Officer will be the Site Controller. General Manager will be designated as the Incident Controller. All the Incident Controllers would be reporting to the Site Controller.

All the department heads, fire & security officer, communication officer and personal manager will be reporting to the Incident Controller. This team will be responsible for controlling the incidence with the personnel under their control. Shift In charge will be the reporting officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller. The team co-ordinates during eventualities and responsible for fire fighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, security in charge, personnel department, and essential services personnel are engaged. All these personnel will be designated as key personnel.

In each shift, electrical supervisor, electrical fitters, pump house in charge and other maintenance staff will be drafted for emergency operations. In the event of power or communication system failure, some of staff members in the office/plant offices will be drafted and their services would be utilized as messengers for quick passing of communications.

7.6.2.1 Emergency Communication

Whoever notices an emergency situation such as fire, escalation of fire, leakage etc will inform his immediate superior and Emergency Control Center. A place nearer to the security office shall be identified as Emergency Control Center. The person on duty in the Emergency Control Center would appraise the Site Controller. Site Controller verifies the situation from the Incident Controller of that area or the Shift In-charge and takes a decision about an impending On Site Emergency. This would be communicated to all the Incident Controllers, Emergency Co-ordinators. Simultaneously, the emergency warning system would be activated on the instructions of the Site Controller.

7.6.3 Onsite Emergency Preparedness and Response for Accidents

7.6.3.1 Emergency Responsibilities

The responsibilities of the key personnel are appended below:

Site Controller:

On receiving information about emergency he would rush to Emergency Control Center (ECC) and take charge of ECC and the situation and;

- Assesses the magnitude of the situation on the advice of incident Controller and decides, whether the affected area needs to be evacuated,
- Whether personnel who are at assembly points need to be evacuated,
- Declare Emergency and order for operation of emergency siren,
- Organizes announcement by public address system about location of emergency,
- Assesses which areas are likely to be affected, or need to be evacuated or need to be alerted,
- Maintains a continuous review of possible development and assesses the situation in consultation with Incident Controller and other Key Personnel as to whether shutting down the plant or any section of the plant is required and if evacuation of persons is required,
- Directs personnel for rescue, rehabilitation, transport, fire brigade, medical and other designated mutual support systems locally available, for meeting emergencies.
- Controls evacuation of affected areas, if the situation is likely to go out of control or effects are likely to go beyond the premises of the factory, informs the District Emergency Authority, Police, Hospital and seeks their intervention and help,
- Informs the Inspector of Factories, Deputy Chief Inspector of Factories, WBPCB and other statutory authorities,
- Gives a public statement if necessary,
- Keeps record of chronological events and prepares an investigation report and preserve evidence,
- On completion of On Site Emergency and restoration of normalcy, declares all clear and orders for all clear warning.

Incident Controller:

- Assembles the incident control team.
- Directs operations within the affected areas with the priorities for safety to personnel minimize damage to the plant, property and environment and minimize the loss of materials.
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency.
- Ensure that key personnel help is sought.
- Provides advice and information to the Fire and Security Officer and the Local Fire Services as and when they arrive.

- Ensures that all non-essential workers/staff of the affected areas evacuated to the appropriate assembly points, and the areas are searched for casualties.
- Has regard to the need for preservation of evidence so as to facilitate any inquiry into the causes and circumstances, which caused or escalated the emergency.
- Co-ordinates with emergency services at the site.
- Provides tools and safety equipment to the team members.
- Keeps in touch with the team and advice them regarding the method of control to be used.
- Keeps the Site Controller of Emergency informed of the progress being made

Emergency Coordinator - Rescue, Fire Fighting:

- Helps the incident Controller in containment of the emergency;
- Ensures fire pumps are in operating conditions and instructs pump house operator to be ready for any emergency with standby arrangement;
- Guides the fire fighting crew i.e. firemen, trained plant personnel and security staff;
- Organizes shifting of the fire fighting facilities to the emergency site, if required;
- Takes guidance of the Incident Controller for firefighting as well as assesses the requirements of outside help;
- Arranges to control the traffic at the gate and the incident area;
- Directs the security staff to the incident site to take part in the emergency operations under his guidance and supervision;
- Evacuates the people in the plant or in the nearby areas as advised by Site Controller;
- Searches for casualties and arranges proper aid for them;
- Assembles search and evacuation team;
- Arranges for safety equipment for the members of this team;
- Decides which paths the evacuated workers should follow;
- Maintains law and order in the area, and if necessary seeks the help of police.

Emergency Coordinator-Medical, Mutual Aid, Rehabilitation, Transport and Communication:

- In the event of failure of electric supply and thereby internal telephone, sets up communication point and establishes contact with the ECC;
- Organizes medical treatment to the injured and if necessary will shift the injured to nearby hospitals;
- Mobilizes extra medical help from outside, if necessary;
- Keeps a list of qualified first aid providers of the factory and seek their assistance;
- Maintains first aid and medical emergency requirements;
- Makes sure that all safety equipment is made available to the emergency team;
- Assists Site Controller with necessary data and to coordinate the emergency activities;
- Assists Site Controller in updating emergency plan, organizing mock drills verification of inventory of emergency facilities and furnishing report to Site Controller;
- Maintains liaison with Civil Administration;
- Ensures availability of canteen facilities and maintenance of rehabilitation center;
- He will be in liaison with Site Controller/Incident Controller;
- Ensures transportation facility;
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure;
- Controls rehabilitation of affected areas on discontinuation of emergency;
- Ensures availability of diesel/petrol for transport vehicles engaged in emergency operation.

Emergency Coordinator - Essential Services:

- He would assist Site Controller and Incident Controller.
- Maintains essential services like Diesel Generator, Water, Fire Water, Compressed Air/Instrument Air, power supply for lighting.
- He would plan alternate facilities in the event of power failure, to maintain essential services such as lighting, refrigeration plant etc.
- He would organize separate electrical connections for all utilities and emergency services so that in the event of emergency or fires, essential services and utilities are not affected.
- Gives necessary instructions regarding emergency electrical supply, isolation of certain sections etc. to shift in-charge and electricians.
- Ensures availability of adequate quantities of protective equipment and other emergency materials, spares etc.

General Responsibilities of Employees during an Emergency:

During an emergency, it becomes more enhanced and pronounced when an emergency warning is raised, the workers if they are in-charge of process equipment should adopt safe and emergency shut down and attend any prescribed duty as essential employee. If no such responsibility is assigned, he should adopt a safe course to assembly point and await instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

7.6.3.2 Emergency Facilities**Emergency Control Center (ECC):**

For the time being, Office Block or a place nearer to the security office is identified as Emergency Control Center. It would have external Telephone, Fax, and Telex facility. All the Site Controller/ Incident Controller Officers, Senior Personnel would be located here. Also, it would be an elevated place.

The following information and equipment are to be provided at the Emergency Control Center (ECC).

- Intercom, telephone
- P and T telephone
- Safe contained breathing apparatus
- Fire suit/gas tight goggles/gloves/helmets
- Hand tools, wind direction/velocities indications
- Public address megaphone, hand bell, telephone directories
- (Internal P and T) factory layout, site plan
- Emergency lamp/torch light/batteries
- Plan indicating locations of hazard inventories, plant control room, sources of safety equipment, work road plan, assembly points, rescue location vulnerable zones, escape routes.
- Hazard chart
- Emergency shut- down procedures
- Nominal roll of employees
- List of key personnel, list of essential employees, list of Emergency Co-ordinators
- Duties of key personnel.
- Address with telephone numbers and key personnel, emergency coordinator, essential employees.

Important address and telephone numbers including Government agencies, neighboring industries and sources of help, outside experts, chemical fact sheets population details around the factory.

Assembly Point:

Number of assembly points depending upon the plant location would be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water etc. would be organized. In view of the size of plant, different locations are ear marked as assembly points. Depending upon the location of hazard, the assembly points are to be used.

Fire Fighting Facilities:

First Aid Fire fighting equipment suitable for emergency should be maintained in each section in the plant. This would be as per statutory requirements. However, fire hydrant line covering major areas would be laid. It would be maintained at 6- 7 kg/cm² pressure. Fire alarms would be located in the bulk storage areas. Fire officer will be the commanding officer of fire fighting services.

Location of Wind Sock:

On the top of the Administration block and the top of each production blocks, windsocks shall be installed to indicate direction of wind for emergency escape.

Emergency Medical Facilities:

Stretchers, gas masks and general first aid materials for dealing with fire burns would be maintained in the medical center as well as in the emergency control room. Medical superintendent of the township will be the head of the casualty services ward. Private medical practitioners help would be also are sought. Government hospital would be approached for emergency help.

Apart from plant first aid facilities, external facilities would be augmented. Names of Medical Personnel, Medical facilities in the area would be prepared and updated. Necessary specific medicines for emergency treatment of Burns for Patients and for those affected by toxicity would be maintained. Breathing apparatus and other emergency medical equipment would be provided and maintained. The help of near by industrial management in this regard would be taken on mutual support basis.

Ambulance:

An ambulance with driver availability in all the shifts and an emergency shift vehicle would be ensured and maintained to transport injured or affected persons. Number of persons would be trained in first aid so that, in every shift, first aid personnel would be available.

7.6.3.3 Emergency Actions**Emergency Warning**

Communication of emergency would be made familiar to the personnel inside the plant and people outside. An emergency warning system shall be established.

Emergency Shutdown

There are number of facilities which can be provided to help deal with hazardous conditions, when a tank is on fire. The suggested arrangements are:

- Stop the production;
- Dilute contents;
- Remove heat;
- Deluge with water; and
- Transfer contents.

Whether a given method is appropriate depends on the particular case. Cessation of agitation may be the best action in some instances but not in others. Stopping of the feed may require the provision of by pass arrangements. Methods of removing additional heat include removal through the normal cooling arrangements or use of an emergency cooling system. Cooling facilities, which use vapouring



liquid, may be particularly effective, since a large increase in vaporization can be obtained by dropping pressure.

Evacuation of Personnel:

There could be more number of persons in the storage area and other areas in the vicinity. The area would have adequate number of exits and staircases. In the event of an emergency, unconnected personnel have to escape to assembly point. Operators have to take emergency shutdown procedure and escape. Time Office maintains a copy of deployment of employees in each shift, at ECC. If necessary, persons can be evacuated by rescue teams.

All Clear Signal:

Also, at the end of an emergency, after discussing with Incident Controllers and Emergency Coordinators, the Site Controller orders an all clear signal. When it becomes essential, the Site Controller communicates to the District Emergency Authority, Police, Fire service personnel regarding help required or development of the situation into an Off-Site Emergency.

Employee Information:

During an emergency, employees would be warned by raising siren in specific pattern. Employees would be given training of escape routes, taking shelter, protecting from toxic effects. Employees would be provided with information related to fire hazards, antidotes and first aid measures. Those who would be designated as key personnel and essential employees should be given training to emergency response.

Public Information and Warning:

The industrial disaster effects related to this plant may mostly be confined to the plant area. The detailed risk analysis has indicated that the pool fire effects would not be felt outside. However, as an abundant precaution, the information related to chemicals in use would be furnished to District Emergency Authority for necessary dissemination to general public and for any use during an off site emergency. Factories of this size and nature are in existence in our state since long time.

Co-ordination with Local Authorities:

Keeping in view of the nature of emergency, two levels of coordination are proposed. In the case of an On Site Emergency, resources within the organization would be mobilized and in the event of extreme emergency, local authorities help should be sought.

In the event of an emergency developing into an off site emergency, local authority and District emergency Authority (normally the Collector) would be appraised and under his supervision, the Off Site Disaster Management Plan would be exercised. For this purpose, the facilities that are available locally, i.e. medical, transport, personnel, rescue accommodation, voluntary organizations etc. would be mustered. Necessary rehearsals and training in the form of mock drills should be organized.

Mutual Aid:

Mutual aid in the form of technical personnel, runners, helpers, special protective equipment, transport vehicles, communication facility etc should be sought from the neighboring industrial management.

Mock Drills:

Emergency preparedness is an important step in planning of Industrial Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel should be trained in the operations.

Important Information:



Once the Plant goes into stream, important information such as names and addresses of key personnel, essential employees, medical personnel, outside the plant, transporters address, address of those connected with Off Site Emergency such as Police, Local Authorities, Fire Services, District Emergency Authority should be prepared and maintained.

7.6.4 Off-Site Emergency Preparedness Plan

Introduction

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency situation go beyond the plant boundaries, it becomes an off -site emergency. Off-site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighboring population.

The off- site plan in detail will be based on those events, which are most likely to occur, but other less likely events, which have severe consequence, will also be considered. Incidents which have very severe consequences yet have a small probability of occurrence should also be considered during the preparation of the plan. However, the key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.

The roles of the various parties who will be involved in the implementation of an off - site plan are described below. Depending on local arrangements, the responsibility for the off- site plan should be either rest with the works management or, with the local authority. Either way, the plan should identify an emergency coordinating officer, who would take the overall command of the off-site activities. As with the on-site plan, an emergency control center should be setup within which the emergency coordinating officer can operate.

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors:

- In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire likely need to be evacuated, although a severe smoke hazard may require this to be reviewed periodically;
- If a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people should be advised to stay indoors and shield them from the fire. This latter case particularly applies if the installation at risk could produce a fireball with very severe thermal radiation effects;
- For release or potential release of toxic materials, limited evacuation may be appropriate down wind, if there is time. The decision would depend partly on the type of housing "at risk".

Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty house, which exist close to factories, offer little or no protection.

The major difference between releases of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say 300 m per minute covers a large area of land very quickly.

Any consideration of evacuation should take this into account. Although the plan will have sufficient flexibility built in to cover the consequences of the range of accidents identified for the on-site plan,

it will cover in some detail the handling of the emergency to a particular distance from each major hazard works.

Aspects Proposed to be considered in the Off-Site Emergency Plan

The main aspects, which should be included in the emergency plan are:

Organization

Details of command structure, warning systems, implementation procedures, emergency control centers.

Names and appointments of incident controller, site main controller, their deputies and other key personnel.

Communications

Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

Specialized knowledge

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized chemical knowledge and laboratories.

Voluntary organizations

Details of organizers, telephone numbers, resources etc.

Chemical information

Details of the hazardous substances stored or procedure on each site and a summary of the risks associated with them.

Meteorological information

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts.

Humanitarian arrangements

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances and temporary mortuaries.

Public information

Arrangements for dealing with the media press office and informing relatives, etc.

Assessment of emergency plan

Arrangements for: (a) Collecting information on the causes of the emergency; (b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.6.4.1 Role of the Emergency Co-ordinating Officer

The various emergency services should be co-ordinated by an Emergency Co-ordinating Officer (ECO), who will be designated by the district collector. The ECO should liaison closely with the site main controller. Again, depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

7.6.4.2 Role of the Local Authority

The duty to prepare the off-site plan lies with the local authorities. The Emergency Planning Officer (EPO) appointed should carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO should liaison with the works, to obtain the information to provide the basis for the plan. This liaison should ensure that the plan is continually kept up to date.



It will be the responsibility of the EPO to ensure that all those organizations, which will be involved in off-site handling of the emergency situation, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off- site plans should be organized by the EPO.

7.6.4.3 Role of Police

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements.

Their functions should include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

7.6.4.4 Role of Fire Authorities

The control of a fire should be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions and toxic release.

Fire authorities in the region should be appraised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They should be involved in on-site emergency rehearsals both as participants, and on occasion, as observers of exercises involving only site personnel.

7.6.4.5 Role of Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, should have a vital part to play following a major accident, and they should form an integral part of the emergency plan. For major fires, injuries should be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. For major toxic releases, the effects vary according to the chemical in question, and the health authorities should be appraised about the likely toxic releases from the plant, which will enable them in dealing with the aftermath of a toxic release with treatment appropriate to such casualties.

Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical "mutual aid" scheme should exist to enable the assistance of neighboring authorities to be obtained in the event of an emergency.

7.6.4.6 Role of Government Safety Authority

This will be the factory inspectorate available in the region. Inspectors are likely to satisfy themselves that the organization responsible for producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well-documented procedures and evidence of exercise undertaken to test the plan.

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. These may vary from keeping a watching brief to a close involvement in advising on operations in case involvement in advising on operations. In cases where toxic gases may have been released, the factory inspectorate may be the only external agency with equipment and resources to carry out tests.

7.7 OCCUPATIONAL HEALTH AND SAFETY

Large industries, in general and chemical plants in particular where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance, the men,

materials and machines are the basic inputs. Along with the boons, the industrialization generally bring several problems like occupational health and safety.

The industrial planner, therefore, has to properly plan and take the steps to minimize the impacts of industrialization and to ensure appropriate occupational health and safety plan including fire plans. All these activities again may be classified under construction and erection, operation and maintenance. The proposed safety plan is given below:

7.7.1 Occupational Health

Occupational health needs attention both during construction and erection and operation and maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

Erection Phase

The occupational health problems envisaged at this stage can mainly be due to constructional accident and noise. To overcome these hazards, in addition to arrangements to reduce it within TLV's, personal protective equipment should also be supplied to workers.

Operation and Maintenance

The problem of occupational health, in the operation and maintenance phase is due to noise hearing losses. Suitable personnel protective equipment should be given to employees. The working personnel should be given the following appropriate personnel protective equipment.

- Industrial Safety Helmet
- Crash Helmets
- Face shield with replacement acrylic vision
- Zero power plain goggles with cut type filters on both ends
- Zero power goggles with cut type filters on both sides and blue color glasses
- Welders equipment for eye and face protection
- Cylindrical type earplug
- Ear muffs
- Canister Gas mask
- Self contained breathing apparatus
- Leather apron
- Aluminized fiber glass fix proximity suit with hood and gloves
- Safety belt/line man's safety belt
- Leather hand gloves
- Asbestos hand gloves
- Acid/Alkali proof rubberized hand gloves
- Canvas cum leather hand gloves with leather palm
- Lead hand glove
- Electrically tested electrical resistance hand gloves
- Industrial safety shoes with steel toe
- Electrical safety shoes without steel toe and gum boots

Full-fledged hospital facilities should be made available round the clock for attending emergency arising out of accidents, if any. All working personnel shall be medically examined every six months and at the end of his term of employment. This is in addition to the pre-employment medical examination. The fund allocation for occupational health and safety are presented in Table 7.10

Table 7.10: Details of Fund Allocation for Health and Safety

S. No.	Particulars	Fund Allocation/Year (In Lakhs)
1	Periodic Health Screening for Employees	1,20,000
2	Workplace Safety Responsibility	2,00,000
3	Employees Health and Hygiene	1,80,000
Total		5,00,000

Source: DCPL

7.7.2 Safety Plan

Safety of both men and materials during construction and operation phases is of concern. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan. The disaster in sulphonation plant is possible due to leakage of hazardous chemicals, collapse of structures and fire/explosion etc.

The details of the fire fighting equipments to be installed are given below;

- Dry Chemical Powder (DCP) Fire Extinguisher
- CO₂ Fire Extinguisher
- Foam type Fire Extinguisher
- Soda acid type Fire Extinguisher
- Fire buckets
- Fire Hydrants

Keeping in view the safety requirement during construction, operation and maintenance phases at sulphonation plant, safety policy should be formulated with the following regulations:

- To allocate sufficient resources to maintain safe and healthy conditions of work.
- To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of plants, machinery and equipment.
- To ensure that adequate safety instructions are given to all employees.
- To provide necessary protective equipment, safety appliances and clothing wherever necessary and to ensure their proper use.
- To inform employees about materials, equipment or processes used in their work, which are known to be potentially hazardous to health or safety.
- To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety.
- To provide appropriate facilities for first aid and prompt treatment of injuries and illness at work.
- To provide appropriate instruction, training, retraining and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters.
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service.
- To organize collection, analysis and presentation of data on accident, sickness and incident involving personal injury or injury to health with a view to taking corrective, remedial and preventive action.
- To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees.
- To publish/notify regulations, instructions and notices in the common language of employees.
- To prepare separate safety rules for each types of occupation/processes involved in a project.
- To ensure regular safety inspection by a competent person at suitable intervals of all buildings, equipment, work places and operations.

7.7.3 Safety Organization

7.7.3.1 Erection Phase

A qualified and experienced safety officer should be appointed. The responsibilities of the safety officers include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He is also responsible to ensure compliance of Safety Rules/ Statutory Provisions. In addition to employment of safety officer by sulphonation plant, every contractor, who employs more than 250 workers, should also employ one safety officer to ensure safety of the worker, in accordance with the conditions of contract.

7.7.3.2 Operation and Maintenance Phase

When the construction is completed the posting of safety officers should be in accordance with the requirement of Factories Act and their duties and responsibilities should be as defined thereof.

7.7.3.3 Safety Circle

In order to develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety circles would be constituted in each area of work. The circle would consist of 5-6 employees from that area. The circle normally should meet for about an hour every week.

7.7.3.4 Safety Training

A full-fledged training center should be set up at the plant. Safety training should be provided by the Safety Officer with the assistance of faculty members called from Corporate Center, Professional Safety Institutions and Universities. In addition to regular employees, limited contractor labors should also be provided safety training. To create safety awareness safety films should be shown to workers and leaflets etc. should be distributed. Some of the precautions and remedial measures proposed to be adopted to prevent fires are:

- Compartmentation of cable galleries, use of proper sealing techniques of cable passages and crevices in all directions would help in localizing and identifying the area of occurrence of fire as well as ensure effective automatic and manual fire fighting operations;
- Spread of fire in horizontal direction would be checked by providing fire stops for cable shafts;
- Reliable and dependable type of fire detection system with proper zoning and interlocks for alarms are effective protection methods for conveyor galleries.
- Housekeeping of high standard helps in eliminating the causes of fire and regular fire watching system strengthens fire prevention and fire fighting; and
- Proper fire watching by all concerned would be ensured.

7.7.4 Health and Safety Monitoring Plan

All the potential occupational hazardous work places such as fuel storage, material handling areas should be monitored regularly. The health of employees working in these areas should be monitored once in a month for early detection of any ailment due to exposure to hazardous chemicals.

7.7.4.1 Medical Surveillance

The industry has tie up with the medical center for all the employees health monitoring. All the employees will be examined periodically by the standard qualified doctors once in a month to determine the health status of the workers in respect of occupational health hazard to which they are exposed.

- Hazardous area wise list will be prepared by the medical officers to perform the specific test for the working employees.
- No person will be sign up to operate the crane, locomotive or work- lift or give signals unless his eye sight and color vision will be properly examined by the concern ophthalmologist.

7.7.4.2 Industrial Medical Center Responsibilities

- Surveillance of workers health in relation to work;
- Surveillance of working environments;
- Identification and evaluation of environmental factors which may affect the worker's health;
- Assessment of conditions of occupational workers health; and
- Observance of safety norms and reduce/eliminate exposure to hazardous environs.

7.7.4.3 Employees Training Programme

The industry will provide the certain training program to the working employees. The training programme will includes the hazardous operation, usage of the nose mask and earplugs, Engineering Act and working process in connection with their jobs roles.

7.7.4.4 List of Test for Working Employees

List of test are being conducted for every month to the workers such as:

- X-ray Chest View
- Electro Cardiogram (ECG)
- Eye Fitness
- Spirometry Test
- Audiogram Test

7.7.4.5 Medical Examination

The DCPL will take up medical examination activities periodically to assess hazards due to gases, dusts, vibrations, radiations etc.

7.8 R & R ACTION PLAN

There is no habitation in the proposed project site. Hence, no Rehabilitation & Resettlement Action Plan has been envisaged in the proposed project.

CHAPTER-8 : PROJECT BENEFITS

8.1 GENERAL

The execution of the project brings overall improvement in the locality, neighborhood and the State by bringing industry, roads, employment and hence improving living standard and economic growth.

The proposed project of manufacturing plant of New Natural and Synthetic Surfactant Chemicals will be established at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL). The growth of the industry significantly contributes to economic growth as it generates employment both directly and also due to development of downstream industries. Peripheral development takes place and due to more influx of money through the area, overall importance of the area increases and overall the infrastructure improves.

The following benefits are expected due to the implementation of the said project:

1. The easy availability of infrastructure, manpower, raw materials will reduce the production cost as well as demand supply gap. The same will bring revenue to the state exchequer by way of Duties and Taxes.
2. The development of green belt in and around the plant premises will improve on the aesthetics of the area. Moreover, it will help in reducing the noise levels within the plant boundary.
3. The setting up of the proposed plant will help in providing employment to local people.
4. There will be an increase in indirect employment & earnings of the small time shop owners like tea vendors, transporters, etc.

8.2 IMPROVEMENT IN THE PHYSICAL INFRASTRUCTURE

The impact due to the proposed unit on the civic amenities will be substantial after. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed to the community, providing drinking water and sanitation facilities to the villages, building/strengthening of existing roads, social forestry and other community infrastructure as per the community needs in the area. The project promoters will take such initiatives, either by providing or by improving the existing facilities in the area, which will help in uplifting the living standards of local communities. The medical facilities would also be available to local people in the surrounding in case of emergencies. Apart from this the local un-employed and under employed youth would get direct and indirect employment opportunities.

8.3 IMPROVEMENT IN THE SOCIAL INFRASTRUCTURE

Economic infrastructure is essential for improving the productive capacity of the nation but infrastructure is also required to improve the quality of human resources. It consists of services like education, medical facilities, sanitation, housing, drinking water supply etc. these all together constitute the social infrastructure of an economy. The project promoters are keen to satisfy the basic requirements of the social infrastructure via CER activities.

8.4 EMPLOYMENT POTENTIAL –SKILLED, SEMI-SKILLED AND UNSKILLED

The proposed project activities will provide employment to persons of different skills and trades. The local population will be given preference.

The total manpower will be 200 (permanent employment during operational phase is 40 and temporary employment during constructional phase is 160). In addition, contractual labour and indirect employment opportunities will also be generated.

This project is expected to yield a positive impact on the socio-economic environment of the region.

8.5 CORPORATE ENVIRONMENT RESPONSIBILITY (CER)

Details of CER to be made as part of EMP as per Ministry's O.M dated 30.09.2020.

As per the Office Memorandum F.No. 22-65/2017-IA.III dated 30.09.2020 of the Ministry of Environment, Forest and Climate Change regarding "Corporate Environment Responsibility" (CER), the project proponents are required to allocate funds towards environment development activities as proposed by the project proponent or prescribed by EAC or SEAC, as the case may be, shall be apart of EMP and the commitments made by project proponent to address the concerns raised during Public consultation.

As such, a provision of **Rs.3 lakhs** has been made under Public Hearing Budget towards provision of scheme of Zero Liquid Discharge (ZLD) (1 lakhs) and for awareness and training programme for local employment (2 lakhs) based on the commitment made under Public hearing meeting held on 23.08.2021.

8.6 DETAILS OF INFRASTRUCTURE FACILITY

Most of the labor force during construction and operation phase hired from the local areas. Sanitation and rest rooms are available for the casual workers and truck drivers. Sufficient toilet facility i.e. one toilet for ten persons is there.

8.7 LITIGATION AND PENDING CASES

Neither any litigation is pending against the project nor any directions /order has everbeen passed by any court of law/environmental technologies as well as for necessary actions of Environmental Management Cell.

CHAPTER-9 : ENVIRONMENTAL COST BENEFIT ANALYSIS

- No specific TOR has been issued by MOEF&CC pertaining to Environmental Cost Benefit Analysis.
- At scoping stage Environmental Cost Benefit analysis has not been prescribed. All environmental measures will be implemented and operated to comply with norms.

CHAPTER-10 : ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

Environmental management plan (EMP) describes the administrative aspects of ensuring that mitigation measures are implemented and their effectiveness monitored, after grant of EC.

The major objective and benefit of utilising Environmental Impact Assessment in project planning stage itself is to prevent avoidable losses of environmental resources and values as a result of Environmental Management. Environmental Management includes protection/mitigation/enhancement measures as well as suggesting post project monitoring programme. Environmental management may suggest revision of plant site or operation to avoid adverse impacts or more often additional project operations may have to be incorporated in the conventional operation.

Environment Management Plan (EMP) is required to ensure sustainable development in the study area of the project. Hence it needs to be an all encompassive plan for which the proposed industry, Government, regulating agencies like Pollution Control Board working in the region and more importantly the concerned population of the study area need to extend their cooperation and contribution.

It has been evaluated that the study area is likely to get further economical fillip. The affected environmental attributes in the region are air quality, water quality, soil, land use, ecology and public health.

The Management Action Plan aims at controlling pollution at the source level to the possible extent with the available and affordable technology followed by treatment measures before they are discharged. Environmental Management aims at the preservation of ecosystem by considering the pollution abatement facilities at the plant inception. In the upcoming modern distillery plants, pollution abatement has become an integral part of planning and design along with techno economic factors.

10.2 MANAGEMENT DURING CONSTRUCTION PHASE

Environmental pollution is inevitable during the construction phase. The project proponent will take appropriate steps to control pollution during this stage. The following are the factors requiring control during construction phase:

10.2.1 Site Preparation

At the time of construction there will be a substantial quantity of soil and debris and construction activities would produce large quantities of unstable material. The disturbed slopes shall be well stabilized before the onset of monsoon. The leveling operation would also involve piling up of backfill materials. Use of dust suppressant spraying to minimize fugitive dust during construction activities is recommended. Dust masks will be provided to all workers working in the dust prone areas. Good housekeeping and proper maintenance will be practiced which will help in further controlling the dust emissions during construction phase.

10.2.2 Water Supply and Sanitation

The employees at the proposed project site will be provided with water for their requirement and for the construction activities. The proposed construction site will be provided with sufficient and suitable toilet facilities to allow proper standards of hygiene. These facilities would preferably be connected to a septic tank and will be maintained properly to have least environmental impact. The existing facilities will be used during construction phase.

10.2.3 Noise

The noise generated during the constructed phase will be due to the movement of vehicles and construction equipment. Construction equipments and transport vehicles would be properly maintained so that noise generation is minimized. Regular maintenance schedule will be adopted for all construction equipment and vehicles.

10.2.4 Solid Waste Management

Waste management is crucial for ensuring a clean, safe, and healthy environment. Proper waste management also significantly contributes to a better economy owing to judicious land use planning and improved infrastructure that can keep pollution at bay and help sustain favorable living conditions. Ensuring that industrial development does not happen at the cost of the living environment must always be on top of the priority list for any industry.

The solid waste will be collected, segregated and will be disposed off as per norms.

10.2.5 Sanitation, Welfare and Safety Measures for Construction Workers

Construction workers will be made aware of possible hazards and safety measures that need to be taken during construction activities through routine training. Personal Protective Equipments (PPEs) such as dust masks, goggles, earplugs/earmuffs, safety gloves, safety belts, shoe with toe protection, gumboots will be made available at construction site. Construction workers and vehicle drivers will be provided with drinking water, canteen and toilet/washroom facility. Rest room facility for truck drivers will be provided.

10.3 POST CONSTRUCTION MANAGEMENT

10.3.1 Air Emission Management

The emission sources for the proposed project i.e. Boiler, DG set, Alkali Scrubber, Reactor will be designed with adequate stack heights and air pollution control measures to meet the standards set by the WBPCB/CPCB. Good housekeeping, providing adequate air pollution control measures and stack of adequate heights will be provided.

10.3.2 Air Quality Management Plan

HSD fuel will be used as the fuel for DG set and the gaseous emission will be discharged through the stack, so the adequate stack height will be provided as per CPCB norms.

- Local exhaust ventilation system will be provided for chemicals/powders transferring to control fugitive emissions.
- For all chemicals charging through drums or other chemical containers chemical charging will be in closed environment and connected to scrubber. VOC is monitored continuously in the area.
- The main Reactors will be attached with Scrubbers.
- The sprinkling of water will be done along the internal roads in the plant in order to control the dust arising due to the movement of vehicular traffic.

10.3.3 Noise Management Plan

Although there are no major sources of noise & vibration except the DG Set for emergency lighting and office use, yet adequate measures for their control have been provided. These include:

- Installation of noise barriers/ absorbers for stationary noise sources & anti-vibration pad for equipments with high vibration.
- Periodic checking and servicing of noisy equipments.



- Timely oiling, lubrication & preventive monitoring of machines & equipments.
- Proper PPE e.g. ear plugs/ muffs to workers.
- Transportation in PUC Vehicles.
- Regular monitoring of noise.
- Green Belt Development will be taken up with the start of construction phase.

10.3.4 Water and Waste Water Management Plan

- The plant will implement a scheme for source reduction of water coming from washings by articulating a recycle and reuse scheme.
- The plant will have a zero discharge and will successfully recycle the entire water back to plant use.
- These are the four waste water streams will be generated. Washing/Spillage Effluent, utilities and process waste water will be collected and fed into the Effluent treatment plant appropriately.
- The domestic sewage will be treated through septic tank and soak pits. The treated water from ETP will be reused for Alkali Scrubber.
- Water harvesting system will be installed to collect natural water.

10.3.5 Rainwater Harvesting Pits

The rainwater will create surface run-off from the proposed project during monsoon season. The run-off will be of two types i.e. run-off from the open surface area of the plant site and run-off from the built-up area of the plant. The run-off from the building area of the proposed plant facilities will be routed through a carefully designed piping network and collected in the roof water collection sump and the excess water will be connected along with the open storm water network.

The run-off from the open surface area will be routed directly to the rainwater harvesting structures constructed at suitable locations as per the contours. For augmenting the ground water resources in the proposed plant area, adequate number of rainwater harvesting pits will be constructed and the internal drains where rainwater flows in excess will be diverted to these pits. These structures will facilitate percolation of water into the ground and thus augmenting the groundwater sources. This will result in increase in Ground Water Level (GWL) and to some extent the ground water quality will be improved.

Rain harvesting system

Keeping in mind the importance of water and its scarcity it is proposed to conserve water by rainwater harvesting by which the subsoil water condition/moisture content is maintained/ improved to a great extent.

Run off from the project site is calculated using rational formula:

$$Q = C \times I \times A$$

Where,

$$Q = \text{Run-off (m}^3\text{/hr)}$$

A = Catchment area (Roof area, Landscaped area, Road & parking area)

C = Coefficient of Run-off (0.9, 0.2 & 0.6 respectively)

I = Intensity of Rainfall = 100 mm/hr.

Run-off for 15 min rainfall of peak intensity (as per CPWD) = 25 mm = 0.025 m

The rainwater harvesting measures and quantity with regards to the various components of the project are presented in Table 10.1

Table 10.1: Calculation for Rain Water to be harvested

S. No.	Category	Area (sq.m.)	Intensity of Rainfall mm/ hr	Runoff Coefficient	Total vol. of water available for RWH (m ³ /hr)	Total vol. of water available for RWH (m ³ /15 min)
1.	Building area	564	100	0.9	50.76	12.69
2.	Landscaped area (Green area, Vacant area)	7430	100	0.2	148.6	37.15
3.	Road/Paved area	5499	100	0.6	329.94	82.48
Total		13493			529.30	132.32

Note: The above-calculated volume of harvestable water will be separately collected in rainwater collection tanks and will be used in the plant mainly for fire fighting, greenbelt maintenance and plant operation, during non-rainy days to conserve fresh water and reduce the water requirement from other sources.

The total calculated peak run-off from landscaped areas, road and open area is 132.32 cu.m.

This run-off is proposed to be channelized through storm water drains to individual recharge pits and the rainwater will be recharged into underground aquifers.

Considering the constant co-efficient factor of 0.80 (for all situations) for evaporation, spillage and first flush wastage (Source: Rain Water Harvesting & Conservation Manual, CPWD)

Harvestable Water = 0.80 x 132.32 = 105.85 cu.m

A percolation rate of 0.51 is considered with percolation depth as 10m

Run-off = 105.85 x (1 - 0.51) = 51.86m

Size of percolation pit = 2.0 x 2.0 m and depth is 2 m

No. of percolation pits required = 51.86/12 ≈ 6.48

7 Nos. of percolation pits will be constructed along the periphery of the plant for ground water recharge.

Note: The above calculation was carried out based on Rainwater Harvesting & Conservation Manual, CPWD.

10.3.6 Solid and Hazardous Waste Disposal Management

Domestic solid wastes such as food and garbage, wooden, packaging waste and scraps etc.

- Total hazardous waste will be generated from used and spent oil, Pump Seal Oil Transformer Oil, Expired Raw Materials, Empty Raw material Drums, Bag liners which are contaminated with chemical powders, Effluent Treatment Plant sludge and ETP -Evaporator Residue. These waste are stored safely and will be send for disposal to WBPCB authorized vendors & recyclers.

10.3.7 Occupational Health and Safety

The main chemicals affecting health will be VOC's. MSDS of all hazardous chemicals will be made available for concerned personnel. The following general measures will be taken:

- Establishment of safety policy.

- Compulsory use of PPE's.
- Regular monitoring of workplace environment with air, length, density, & temperature.
- Installation of fire extinguisher.
- Separate area for container decontamination.
- Provision of part time qualified M.O. as per factory act.
- Pre medical & periodic medical checkup of workers as per Factory Act.
- Monitoring of hazards like noise, ventilation, & chemical exposure.
- Display various instruction boards, cautionary notices etc.

All working personnel shall be medically examined every six months and at the end of his term of employment. This is in addition to the pre-employment medical examination. The fund allocation for occupational health and safety are presented in Table – 10.2.

Table 10.2: Details of Fund Allocation for Health and Safety

S. No.	OH&S Requirement	Budget/ Yr (Lakhs)
1.	Health awareness Program and Training	1.00
2.	PPE	1.50
3.	Workplace Safety Training to Workers	0.50
4.	First Aid Training	0.50
5.	EHS Audit	1.50
Total		5

10.4 DEVELOPMENT OF GREEN BELT

M/s DCEPL will be developed green belt (33% of total plant area) within the project site.

10.4.1 Greenbelt Development Plan

Development of Green Belt along the boundary of the project area is considered most effective and multipurpose biological measure. Plantation minimizes the impact of noise, dust and very effective to check erosion and improves the macroclimate as well as provides the habitation for birds and butterflies. Therefore, the main objectives of green belt development plan are:

- Reduction of impacts of air pollution and dust
- Attenuate the air emissions from the boiler and the fugitive dust emissions
- Attenuation of noise
- Checking of soil erosion

Floral Species Recommended for Plantation and Green Belt

Plantation ameliorates the environment, minimize the pollution and dust effect, will provide the scenic beauty while providing medicine, fruits, fodder shade *etc.* Moreover, it will also provide a micro habitat to shelter to all kind of faunal species.

However, this project, being of small scale, attracts only least possibilities for the plantation. Still, names of few native species of tree and shrubs are suggested that can be used to fulfill the possibilities of the plantation with better survival and low-cost-maintenance.

(I) Trees: *Polyalthia longifolia* (Ashok), *Aegle marmelos* (Bel), *Albizia lebbeck* (Safed Siris), *Azadirachta indica* (Neem), *Bauhinia purpurea* (Kaniar), *Bauhinia variegata* (Kachnar), *Cassia fistula* (Amaltas), *Dalbergia sissoo* (Shisham), *Ficus benghalensis* (Barh), *Mangifera indica* (Aam), *Morus alba* (Shahtoot) and *Tamarindus indica* (Imli),

(II) Shrubs: *Ziziphus nummularia* (Jhar Beri), *Duranta repens* (Nilkanta), *Ipomea fistulosa* (Behaya), *Nerium oleander* (Kaner), *Lawsonia inermis* (Mehendi) and *Crotalaria burhia* (Saniya).

Greenbelt development plan

A 1 m wide greenbelt, consisting of at least 3 tiers around the plant boundary shall be developed as greenbelt and green cover as per Central Pollution Control Board, PPCC/ Ministry of Environment, Forest and Climate Change (MoEF & CC), New Delhi guidelines, as per the Terms of Reference and 33% green cover.

The plant density of 1500 trees per hectare with local native species will be implemented. The expenditure on development and maintenance of green belt is of revenue nature and sufficient fund shall be provided to meet the requirement. The plantation schedule will be completed within five years from the construction period of the project. The following shall be designed and implemented as per the latest CPCB guidelines.

The greenbelt will be developed in an area of 3019 sq.m (33%) of the total land area of 13,493 sq.m.

10.5 ENVIRONMENT POLICY

M/s. Detergeo Chem (EAST) Private Limited (DCEPL) has a well-defined policy to keep the Environment clean and green. The company has decided that all effective steps shall be taken to ensure that flow of information from working level to top level should flow in a smooth and coordinated manner, so that in case any deficiency is noted, it is brought to the notice of top management and preventive and corrective action is initiated in a systematic manner.

M/s. Detergeo Chem (EAST) Private Limited (DCEPL), is committed to:-

- Follow the National laws and regulations related to Environment Protection and Prevention & Control of Pollution.
- Design, construct and operate the plant by adopting technology and process that are sustainable and environmentally acceptable in the country.
- Adoption of State of the Art technology for prevention and control of impacts.
- Take steps to prevent, minimize and control releases to air, water and land of substances which could adversely affect human health and the environment.
- Operate facilities and conduct activities taking into consideration the efficient use of natural resources.
- Provide and maintain healthy and safe working condition for all employees.
- Ensure the protection of the health and safety of workers.
- Adopt measures to ensure that all its contractors and business associates also comply with National laws and regulations related to Environment & Control of Pollution.
- Focus on continual improvement of environmental performance and ensure involvement of employees at all levels by providing training & awareness.

For effective and efficient implementation of Environment Policy, Company shall:-

- ❖ Ensure the allocation of sufficient financial, human and technological resources along with organizational infrastructure for its implementation.
- ❖ Prepare and maintain site specific, list of all the applicable regulations legal records, compliance requirements and compliance status.
- ❖ Develop and implement innovative processes focused on reducing consumption of energy and water and minimizing quantity of waste dispose.
- ❖ Review facilities and programs on a regular basis and establish monitorable targets, quantified as appropriate for continual improvement of our environmental performance.
- ❖ As far as practicable, purchase products and services that will have minimum impact on the environment.

- ❖ Communicate the environmental commitment and performance of the organization to the stakeholders.

Establish an organizational structure to oversee the effective implementation of corporate environment policy. Define key responsibilities with the various levels of organization for policy implementation.

Hierarchy to implement environment Policy

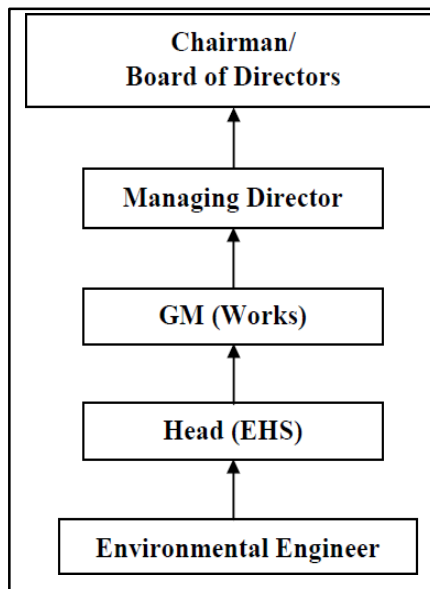
The Environmental Management Group would consist of executives and supporting staff headed by senior official reporting to CEO. During the construction of the project, Project Review Team (PRT) meetings will be held every month wherein officials from the project and corporate centre will participate and discuss the progress and problems related to implementation of schedules of activities for construction, completion and commissioning. It will be ensured that all pollution control measures identified are implemented in a coordinated manner, linking the overall project implementation plans.

Monthly Operation Review Team (ORT) meetings for the project will be held during project operation. In these meetings in addition to routine Operation and Maintenance (O&M) problems issues related to environment will also be discussed. Dedicated groups for operation & maintenance of major systems like Bag Filters, Waste Treatment Plant, Solid Waste Utilization, etc. shall be formed. The issues related to the compliance of environmental norms including problems associated with the mitigation measures identified will be included in the agenda for quarterly review meetings, wherein action plan for remedial measures will be drawn and monitored. Company has developed Environment Policy and well laid Standard Operating Procedures to bring in any deviation / violation of the environment norms as prescribed by regulatory authorities.

The Head-Environment will brief the ORT about the environmental performance of the plant and all compliances/non-compliances are brought to the notice of MD. Action plan is drawn for rectifying the NC, budget is sanctioned (CAPEX & OPEX) and approval is obtained in the meeting itself. Minutes of the Meeting are prepared. In the next weekly review meeting, the action plan is discussed and the NC is closed.

The MD includes Environmental Performance as an Agenda in the monthly Board Meetings and circulates the MOMs. In this manner the Board of Directors are appraised of the Non- Compliances and CAPA taken to address the NC's.

System of Reporting Environmental Non-Compliances / Violations To The Board Of Directors are shown below:-



10.6 ENVIRONMENT MANAGEMENT SYSTEM

For the effective implementation of the mitigation measures and consistent functioning of the proposed project, an Environmental Management System (EMS) will be proposed.

- The EMS will include the following:
- Environmental Management Cell
- Environmental Monitoring Program
- Personnel Training
- Regular Environmental Audits and Corrective Action Plan
- Documentation – Standard operating procedures of Environmental Management
- Plans and other records

10.6.1 Structure of the Cell

The Sulphonation plant will be supervised and controlled by the General Manager supported by DGMs/AGMs and adequate team of technically and statutorily qualified personnel apart from the operating staff of skilled, semi skilled, unskilled and other categories Environment Management Cell will be headed by the General Manager. The organizational structure of the plant is presented in **Figure -10.1**.

The Environmental Engineer/Officer will be responsible for Environment management activities in the sulphonation plant. As Conscious of this, DCPL will create an Environmental Management Cell consisting of officers from various disciplines to coordinate the activities concerned with the management and implementation of the environmental control measures.

Basically, this cell will supervise the monitoring of environmental pollution levels viz. ambient air quality, water and effluent quality, noise level either departmentally or by appointing external agencies wherever necessary. In case the monitored results of environmental pollution found to exceed the allowable limits, the Environmental Management Cell will suggest remedial action and get these suggestions implemented through the concerned authorities.

The environmental management cell will also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and green belt development.

A permanent organizational set up will be formed to ensure the effective implementation of mitigation measures and to conduct environmental monitoring. The major duties and responsibilities of Environmental Management Cell will be as follows:

- To implement the Environmental Management Plan
- To ensure regular operation and maintenance of pollution control devices
- To assure regulatory compliance with all relevant rules and regulations
- To minimize environmental impacts of operations by strict adherence to the EMP
- To initiate environmental monitoring as per approved schedule
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit
- Maintain documentation of good environmental practices and applicable environmental laws as ready reference.
- Maintain environmental related records Coordination with regulatory agencies, external consultants and monitoring laboratories
- Maintaining log of public complaints and the action take

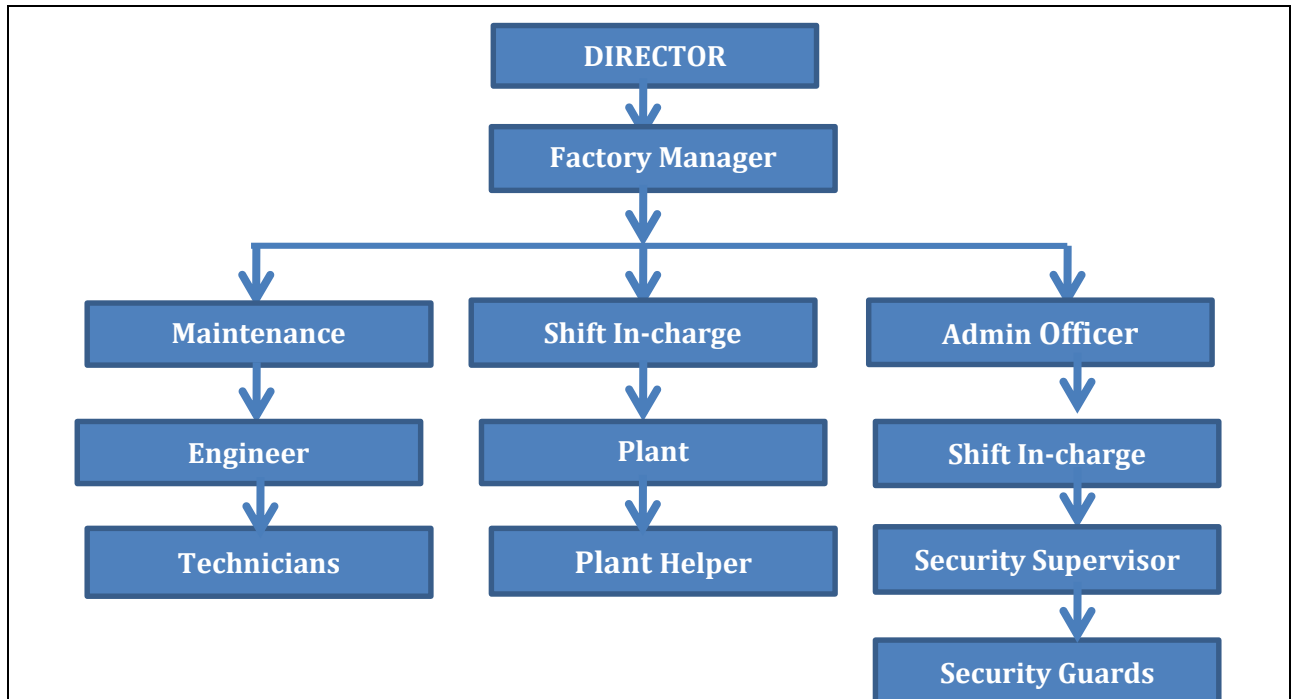


Figure 10.1: Organizational Structure

10.7 COST OF EMP MEASURES

The budget for implementation of mitigation measures and environmental management plan to mitigate the potential adverse environmental impacts during the construction and operation phase will be given below.

So for amount of 150 Lakhs for Capital and 17.0 Lakhs amount will be incurred for Environmental Management activities

Table 10.3: Environmental Management Plan–Budget

S. No.	Infrastructure	Capital cost (lakhs)	Recurring cost (lakhs per annum) Including power and O&M
1.	Air Pollution Control	75.0	2.0
2.	Effluent Treatment Plant (ETP) & Rain water harvesting measures	17.0	2.5
3.	Environment Monitoring and Management	10.0	1.5
4.	Solid and Hazardous Waste Management (Membership & Facility development)	10.0	3.0
5.	Occupational Health & Safety	25.0	5.0
6.	Green belt Development	13.0	3.0
Total		150.0	17.0

CHAPTER-11 : SUMMARY & CONCLUSION

11.1 PROJECT NAME, LOCATION AND ENVIRONMENTAL SETTINGS

The project proponent M/s. Detergeo Chem (East) Private Limited, New Delhi, (*Hereon referred to as, DCEPL*) is engaged in the production of natural and synthetic surfactants. These surfactants are used in personal-care and home-care formulations such as laundry detergents, shampoos, toothpastes, shaving creams, etc. DCEPL is proposing to set up a surfactant manufacturing facility near Kolkata to cater to the raw material demand of the home-care, personal-care and oral-care industry in East India.

DCEPL has selected the following surfactants for its product portfolio:-

Sulphates

Linear Alkylbenzene Sulphonic Acid, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate and Alpha Olefin Sulphonate. All these products will be manufactured on the same plant (continuous type) however organic feedstock shall change depending on the final product.

Sulphate-free

Cocoamidopropyl Betaine, Cocamide Monoethanolamine, Cocamide Diethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate. All these products will be manufactured on the same plant (batch-type) however, raw materials shall change based on the final product.

Table-11.1: Project and Environmental Settings

S. No.	Particulars	Details
1.	Nature and size of the Project	Establishment of new natural and synthetic surfactant chemical manufacturing unit at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal. Proposed capacity- 82000 MT/A
2.	Location details	DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141, Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal
	Geographical Cordinates	22°31'49.08"N & 87°55'47.78"E
	Toposheet number	73N/14, 73N/15, 79B/2 & 79B/3.
3.	Area Details	
	Total Project Area	1.3493 Ha.
4.	Environmental Setting Details (with approximate aerial distance and direction from the project site)	
	Nearest City	Bagnan~7.4 Km, SE
	Nearest Highway	NH-06 ~7.4 Km, SE SH-15 ~5.7 Km, SE
	Nearest Railway Station	Bagnan~ 8.7 Km, SE
	Nearest Airport	Netaji Subhash Chandra Bose International Airport~ 54 Km, E
	National Parks/ Wild Life Sanctuaries/ Biosphere Reserves/ RF and PF within 10km radius	There is no National Park and Biosphere Reserve within 10 Km radius. No RF/PF within the 10 KM of the project site.
	Nearest Water Bodies	Rupnarayan river- 3.6 Kms Damodar kata Nadi (Hurhur khal)-2.7 Kms Mendeshwari River-3.8 Kms Kanashabat Nadi- 49 Kms Damodar River- 4.0 Kms

		Gaighata Khal -1.1 Km
	Interstate Boundary	None
	Seismic Zone	Zone II
5.	Cost Details	
	Project Cost	Rs. 20. Crores
	Cost for Environmental Protection Measures	Capital cost Rs. 150 Lakhs, recurring cost- 17 Lakhs,
	Cost for CER	Rs. 40.00 Lakhs
	Cost of OH&S	Rs. 5.0 Lakhs/Yr

11.2 PRODUCTS AND CAPACITIES

The proposed quantities for the manufacturing of products are given in table 11.2.

Table-11.2: List of Proposed Manufacturing Products

S. No.	Product Name	Proposed Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene Sulphonic Acid 96%	12,000	MS Tanker
2.	Linear Alkyl Benzene Sulphonic Acid 90%	12,000	MS Tanker
3.	Alpha Olefin Sulphonate	1,000	SS Tanker
4.	Sodium Lauryl Ether Sulphate	24,000	SS Tanker
5.	Sodium Lauryl Sulphate	6,000	SS Tanker
6.	Cocoamidopropyl Betaine	3,000	Truck
7.	Cocamide Monoethanolamide	3,000	Truck
8.	Cocamide Diethanolamide	3,000	Truck
9.	Ethylene Glycol Distearate	3,000	Truck
10.	Ethylene Glycol Monostearate	3,000	Truck
11.	Dilute Sulphuric Acid	12,000	MS Tanker
12.	Sodium Sulphate	400	
Total Capacity		82,400	

11.3 RAW MATERIAL REQUIREMENT

Raw material required for the manufacturing of new natural and synthetic surfactant chemical are given in below table;

S. No.	Product Name	Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene	17,215	MS Tanker
2.	Alpha Olefin	560	ISO Tanks
3.	Lauryl Ether	13,200	ISO Tanks
4.	Lauryl Alcohol	3,150	ISO Tanks
5.	Sulfuric Acid 98%	12,000	MS Tanker
6.	Caustic Soda	4,052	MS Tanker
7.	Sulfur	3,487	Truck
8.	Coconut Fatty Acid	5,028	ISO Tank
9.	Dimethylaminopropylamine	264	ISO Tank
10.	Monochloroacetic acid	243	Truck
11.	Monoethanolamine	732	ISO Tank
12.	Diethanolamine	1029	ISO Tank

13.	Stearic Acid	5490	ISO Tank
14.	Ethylene Glycol	870	MS Tanker

11.4 WATER REQUIREMENT

The unit proposes to consume 203 KLD of Fresh water. The entire quantity of raw water will be supplied by state approved water tanker suppliers. Water balance table for the operation of the proposed plant is as follows:

- Process – For Dilution: 13.0 KLPD
- Make-up cooling water: 168.0 KLPD
- Boiler Makeup Water: 20.0 KLPD
- Alkali Scrubber (Recycle Water): 5.0 KLPD
- Domestic: 2.0 KLPD
- Gardening : 5.5 KLPD

11.5 POWER/ELECTRICITY

The Power requirement will be 1000 KW sourced through WBSEDCL. DG set will be installed of 1000 KW in case of power failer.

11.6 MANPOWER DETAILS

Total manpower will be 200(permanent employment during operational phase is 40 and temporary employment during constructional phase is 160) .

11.7 MANUFACTURING PROCESS FLOW DIAGRAM

SULPHATES

Sulfur Trioxide Gas Generation

Sulfur trioxide gas is generated by burning sulfur at high temperature and sulfur dioxide then formed in presence of air which later converted to sulfur trioxide in presence of a catalyst in a well closed loop system. Industrially SO₃ is made by the contact process. Sulfur dioxide, which in turn is produced by the burning of sulfur. After being purified by filtration, the SO₂ is then oxidized by atmospheric oxygen at between 400 and 600 °C over a catalyst. A typical catalyst consists of vanadium pentoxide (V₂O₅) activated with potassium oxide K₂O on kieselguhr or silica support. The heat generated during this process is utilized for steam generation. This steam is consumed in various uses like sulfur melting, Air drying and water chilling etc.

Sulphonation / Sulphation Unit

The Sulfonic acid forms in the unit when an SO₃-in-air mixture is injected into a multi-tube reactor, simultaneously with the desired organic feed. The removable organic distribution flanges are factory calibrated prior to installation in the reactor. Uniform distribution of the air-SO₃ gas is the result of symmetrical gas flow through the reactor. Reaction temperature is also a very important parameter of control in sulphonation and sulfation process. Cooling jackets in the reactor remove heat of reaction. Organic feed rate to the reactor vessels is measured by means of a highly accurate mass flow meter and controlled by a control valve and centrifugal pump. The organic feed rate is controlled based on the preset sulphur-to-organic mole ratio. Exhaust gas is separated from the acid recycle stream in the liquid separator and cyclone vessels. For the production of sulfonic acid, the acid product is fed directly to the digestion system where reaction with absorbed SO₃ goes to completion.

Neutralization



The Sulphonic acids produced after Sulphonation of LAB/AO/LE/LA is neutralized to make their respective sodium salt.

This process takes place by mixing Sulphonic acid with liquid sodium hydroxide solution up to getting neutral pH of the product. This reaction is exothermic hence proper cooling is provided to the neutralization vessel. The product is formed as paste which then diluted with pure water to get desired concentration of liquid.

BATCH SULPHONATION PROCESS

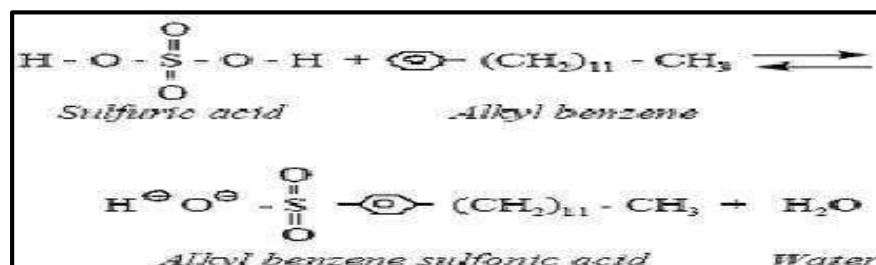
LABSA 90% is produced by sulphonating Linear Alkyl Benzene (LAB) with Sulphuric Acid (98%). The equipment used are MS/SS reactor vessels. The required amount of LAB is transferred to Reaction Vessel and Sulfuric Acid is added gradually. The reaction is highly exothermic and the acid addition rate is determined by the ability to remove the heat of reaction. The temperature should be maintained below 65°C for optimum product quality. The temperature is controlled by circulating water in jacket of the vessel. The mixture is continuously stirred to ensure homogenous mixing and completion of reaction between LAB and Sulphuric Acid. The mixture now contains LAB Sulphonate (LABSA) and Sulphuric Acid. To facilitate the separation of LABSA and Sulphuric Acid, water has to be added to the total mass. The water addition (typically about 6 to 8% by weight of the reaction mixture) causes a phase separation to occur between the sulfonic acid and the diluted sulfuric acid. The separation takes place in a separate, lined vessel and occurs over a period of about 30 minutes. The Dilute Sulphuric Acid (80-85%) forms the bottom layer and is transferred to a storage tank. LABSA forms top layer and is transferred to a separate storage tank. The Dilute Sulphuric Acid (80-85%) is sold to authorized end users for further beneficial uses like: SSP Fertilizer, Zinc Sulphate, Magnesium Sulphate and Alum.

This is a highly exothermic reaction; therefore, effective heat removal is very important to get a high quality final product. The reactants increase in viscosity between 15 and 300 times as the organic feedstock is converted to the sulfonic acid. This large increase in viscosity makes heat removal difficult. The high viscosity of the formed products reduces the heat transfer coefficient from the reaction mass. Effective cooling of the reaction mass is essential because high temperatures promote side reactions that produce undesirable by-products. Also, precise control of the molar ratio of SO₃ to organic is essential because any excess SO₃, due to its reactive nature, contributes to side reactions and by-product formation. Therefore, commercial scale sulfonation reactions require special equipment and instrumentation that allows tight control of the mole ratio of SO₃ to organic and rapid removal of the heat of reaction. Sulfuric acid (H₂SO₄) is widely used as sulfonating agent. It is an equilibrium process, as water is formed in the reaction and the resultant water dilutes the sulfuric acid. This process has the dual advantage of low SO₃ cost and low capital equipment cost as compared to the gas sulphonation route.

The raw material consumption for per ton of LABSA 90% is as follows:

LAB: 680 +/- 10 KG

Sulphuric Acid 98% : 1000+ /100kg.

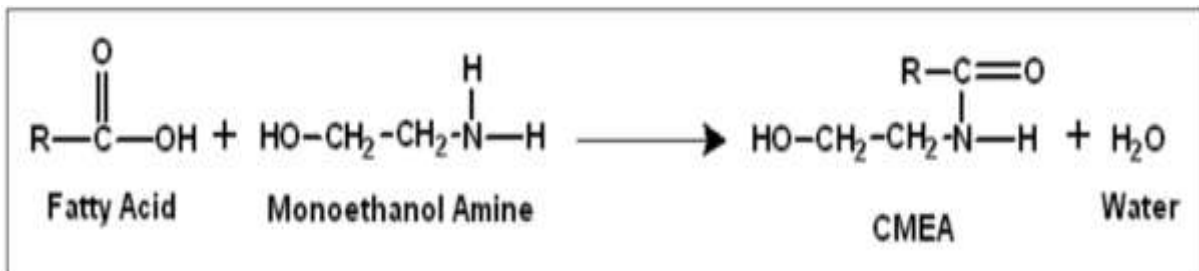


SULPHATE-FREE

The sulphate-free products, i.e., Coco-amido-propyl Betaine, Cocamide Mono-ethanol-amide, Cocamide Di-ethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate, are produced in an agitated batch reactor. The same reaction system is used for all products however the raw materials differ based on the final product that needs to be produced.

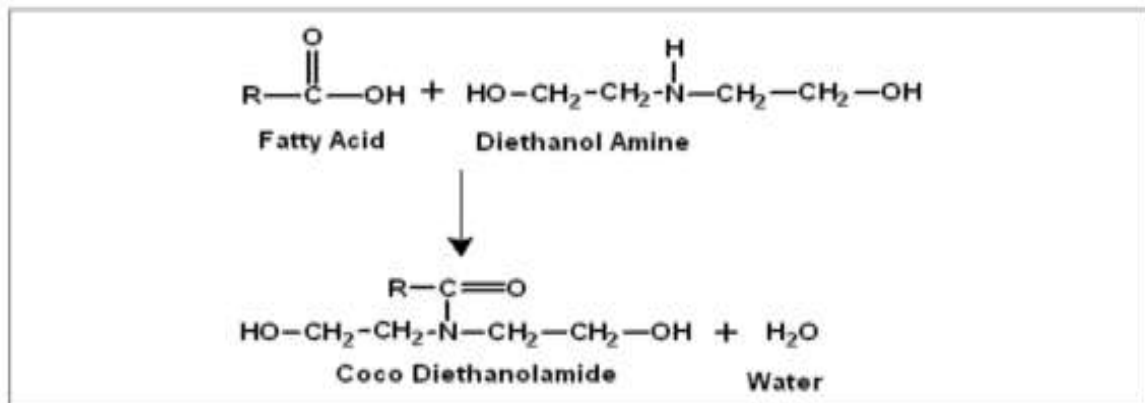
Cocamide Mono-ethanolamine

Esterification of Coco Fatty acid with Monoethanolamine is carried out at 140 -160C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



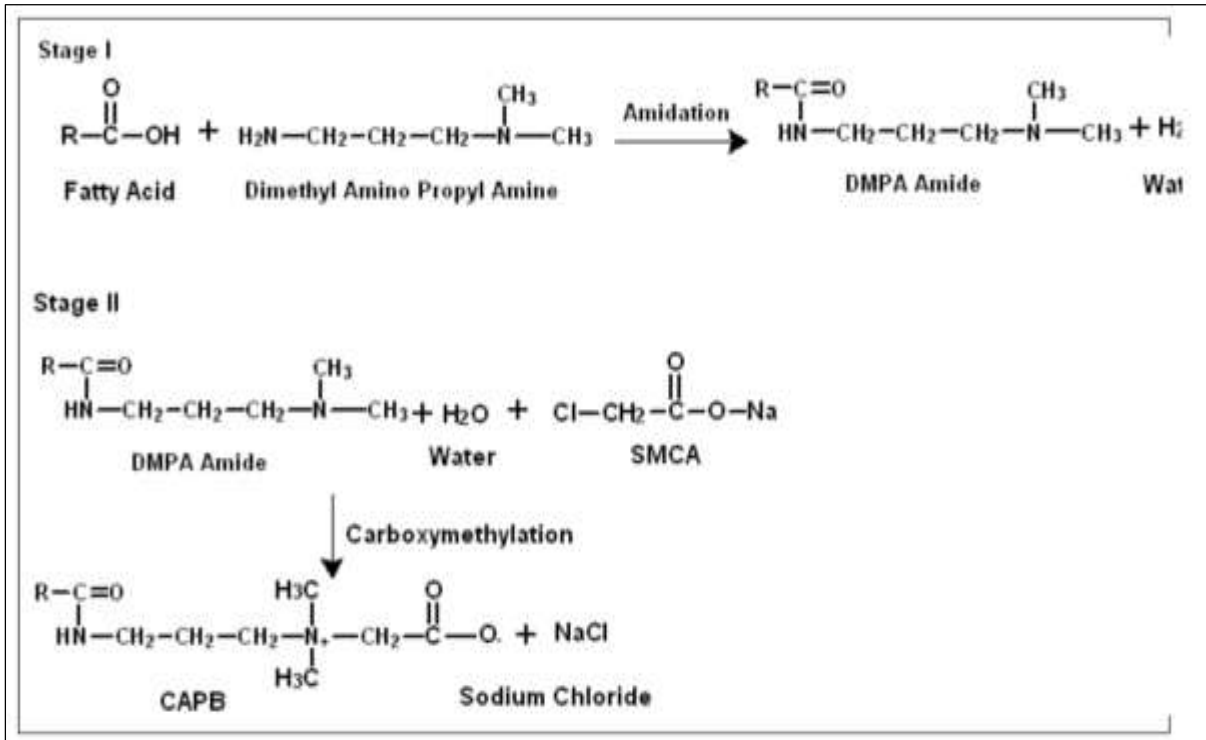
Cocamide Di-ethanol-amide

Esterification of Fatty acid with Di ethanolamine is carried out at 140 -160o C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed is directly filled in containers.



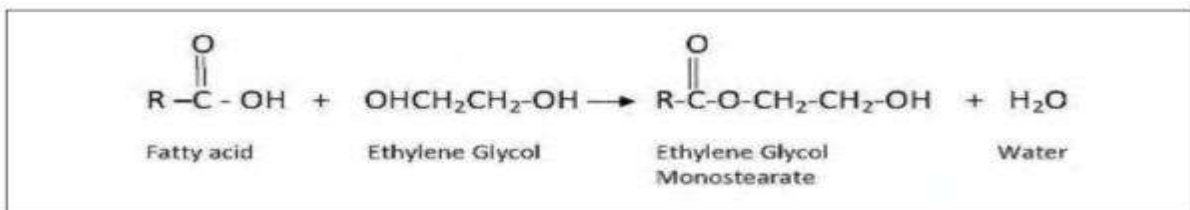
Coco-amido-propyl Betaine

Amidation of Fatty acid is carried out with Di-methyl-amino-propyl-amine at 140 -160C in presence of Nitrogen. The amide formed is quaternized with mono-chloroacetic acid and Sodium Hydroxide 48%. Water is added to make the product in liquid form. After the quaternization is over, pH of the product is adjusted if required. The Liquid product is directly filled in containers.



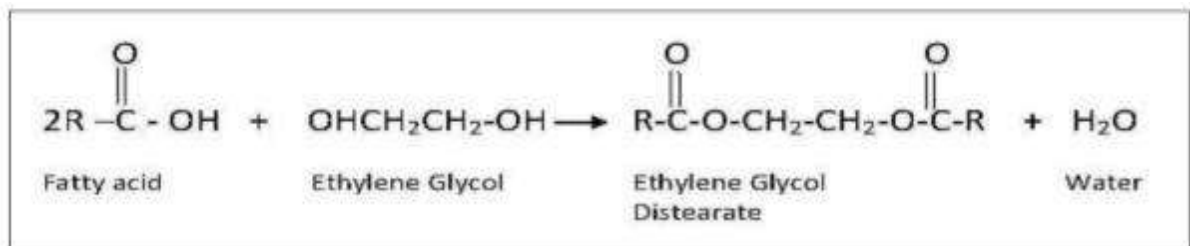
Ethylene Glycol Monostearate

Esterification of stearic acid is carried out using ethylene glycol at 140-160C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



Ethylene Glycol Distearate

Esterification of 2 moles of stearic acid is carried out using 1 mole of ethylene glycol at 140-160C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



11.8 ENVIRONMENTAL BASELINE STUDY

Various Environmental factors as existing in the study area which are liable to be affected by the activities have been assessed both quantitatively and qualitatively. Baseline environmental data generation of study area was carried out during the period from Dec 2023 to Feb 2024.



Parameters	No. of Sites	Description	Permissible Level
Air Quality	8	PM 10 - 52µg/m ³ and 79µg/m ³ PM 2.5 - 25µg/m ³ and 46µg/m ³ SO ₂ - 9µg/m ³ to 16µg/m ³ NO ₂ - 15µg/m ³ to 32µg/m ³ CO - 0.54µg/m ³ to 0.97µg/m ³	100 µg/ m ³ 60 µg/ m ³ 80 µg/ m ³ 80 µg/ m ³ 2 mg/ m ³
Ground Water Quality	8	pH- 7.30 to 7.72. Total Hardness - 352 to 510 mg/l. TDS - 466 to 675 mg/l.	6.5-8.5 200-600 mg/l 500-2000 mg/l
Surface Water Quality	6	pH- 6.95 to 7.91. Total Hardness - 118 to 154 mg/l. TDS - 169 to 223 mg/l. Chloride - 20 to 30 mg/l. Sulphate -14 to 20 mg/l. Metal: Iron- <0.02 to 0.094 mg/l.	---
Soil Quality	8	pH- 7.25 to 7.61. Organic Matter - 1.96 to 2.82% Concentration of Nitrogen - 13.91 to 14.62 mg/100gm Phosphorus - 0.67 to 0.93 mg/100gm Potassium - 9.63 to 10.21 mg/100gm	---
Noise Level	8	Noise Level (Day) - 42.5 to 62.3 Leq dB (A) Noise Level (Night) - 38.1 to 48.6 Leq dB(A)	75 Leq dB (A) 70 Leq dB (A)

11.9 ECOLOGICAL ENVIRONMENT

Ecological data has been collected through secondary sources and by site visits. The tree species kikar, Jamun, Peepal and Mango etc are the dominant plant species of the study area. Mongoose, porcupine, jungle cat, cobra, krait, snakes, hare, pigeon and variety of birds are the common animals of the study area. No endangered species of plants and animals are found in the study area, so no impact on ecological environment.

11.10 SENSITIVE ECOSYSTEM

Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, and elephant reserve, migratory corridors of wild elephant, wetland, national park and wildlife sanctuary are present within 10km distance of the project site. There is no Reserve and Protected Forests present around the project site of 10 km. Agriculture and industrial workers dominate the occupation structure of the study area. Several induction furnaces, rolling mills, ferroalloy plants, brick kilns, and other small units are present in the study area.

11.11 SOCIOECONOMIC CONDITION

Socioeconomic status has been studied through secondary sources and by site visits. The social requirements identified such as Drinking water requirement, Promotion of Educational institutions and Medical facilities to the villagers (especially Senior Citizens and infants or pregnant ladies). Community centers, recreation facilities etc will also be developed as part of social responsibility.

11.12 CER ACTIVITIES (CORPORATE ENVIRONMENTAL RESPONSIBILITY)

Proposed project will result in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Special emphasis on Financial and Social benefits will be given to the local people.

The company has separately earmarked **Rs. 40.00 Lakhs (2% of Projectcost)** towards the Corporate Environment Responsibility (CER) Activities as per OM (CER) F. No. 22-65/2017-IA.III dated 01.05.2018.

The Expenditure of CER will be decided after Public Consultation.

11.13 GREEN BELT DEVELOPMENT

- Out of the total project area, 33% will be utilized for green belt development.
- Plantation will be done as per Central Pollution Control Board (CPCB) Norms & in consultation with the DFO/DM.
- The plantation in and around the project site will help to attenuate the pollution level.
- Native species will be given priority for Avenue plantation.
- The periphery will be devoted to generation of green belt area.
- The plantation would start along with the start of the construction activities of the proposed unit.

11.14 MITIGATION MEASURES

S. No.	Particulars	Mitigation measures to be adopted
1.	Air Environment	<ul style="list-style-type: none"> • The particulate emissions are controlled through installation of multiple dust cyclone separators. • Scrubber is installed for scrubbing the residual Formaldehyde from the main product stream which also controls the odour problem. • Online Air monitoring system for stack emission (for Particulate Matter) will be installed and transmission of online data to WBPCB and CPCB will be done. • Greenbelt development (33%) of total area.
2.	Water Environment	<ul style="list-style-type: none"> • Domestic sewage to be collected in septic tank & used for gardening. • Treated water will be used for water sprinkling and Floor washing. • Online effluent quality monitoring system to be installed at the outlet of the unit for measurement of the parameters flow, pH, COD, BOD & TSS etc. and transmission of online data to SPCB and CPCB to be done.
3.	Solid/Hazardous Waste Environment	<ul style="list-style-type: none"> • Boiler ash stored separately & sells to farmer. • Used oil to be sold to registered recycler. • Spent catalyst to be sold to registered recycler.

S. No.	Particulars	Mitigation measures to be adopted
4.	Noise Environment	<ul style="list-style-type: none"> The Noise free machines of latest technology will be installed. The green belt will (plantation of dense trees across the boundary) help in reducing noise levels, generated as a result of attenuation of noise generated due to plant operations, and transportation. Earmuffs would be used while running the equipment's of the plant. D.G sets are provided with acoustic enclosures to control the noise level within the prescribed limit. A high standard of maintenance and proper lubricants will be practiced for plant machinery and equipment's, which helps to avert potential noise problems.
5.	Odour management	<ul style="list-style-type: none"> Scrubber system is used to control the odour from the exit gases. The remedial measures will be taken such as better housekeeping by regular steaming of all the equipment's. Temperature will be kept under control during the process. The green belt will (plantation of dense trees across the boundary).

11.15 CONCLUSION

M/s DCEPL will generate a fair amount of direct, indirect and induced employment in the region. The local economy will receive a boost due to employee spending and services generated by the company. Due to the implementation of the project activity there shall be improvement in the standard of living viz. better education, improved health, sanitation facilities etc. This is envisaged as a major positive benefit. The company's management shall recruit semi-skilled and unskilled workers from the nearby villages due to availability of local labors. The employment provided due to the proposed project would rapidly increase the social status of the villagers.

Company commitment towards environment & using the latest technology, along with optimal usage of available resources will reduce the impact and makes the project viable.

CHAPTER-12 : DISCLOSURE OF CONSULTANT ENGAGED

12.1 INTRODUCTION OF ORGANIZATION

Mantec Consultants Pvt. Ltd., established in 1979, is a multi-disciplinary consulting firm offering infrastructural, environmental, management, technical and IT services.

Our team consists of technical and management experts coming from the top echelons of various professional services. The in-house capabilities are augmented and strengthened by our panel of associates who are well known experts in their respective fields.

We provide a complete range of environmental and social impact assessment services with an expert In-house team of professionals and associates. Mantec is an ISO9001:2015 & OHSAS certified company, having a full-fledged Environmental Laboratory duly recognized by the Ministry of Environment Forest & Climate Change (MoEF&CC) and accredited by NABL (National Accreditation Board for Testing Calibration Laboratory). We are accredited by NABET/QCI for conducting the EIA studies.

Commitment to excellence has been the company's credo since the day of its inception and forms the central emphasis in all our operations.

12.2 SERVICES OFFERED

We Mantec is providing various environmental services in more than 15 industries/sectors including infrastructure, mining, irrigation, river valley projects, power plants, refineries, ports, airports, highways, residential colonies, hazardous waste sites, forestry and rural development projects etc.

1. Environmental Impact Assessment Studies
2. Environment Management Plans
3. Social Impact Assessment Studies
4. Rehabilitation and Resettlement Studies and Resettlement Action Plans
5. Safety Audits & Environmental Audits
6. Risk Analysis and Disaster Management Plans
7. Environmental Monitoring of Air, Water, Noise, Soil, Solid and Wastes
8. Environmental Monitoring of Industrial emissions, industrial effluents, ambient air etc.
9. Waste Water Management Both domestic (sewage) and industrial
10. Ground & Surface Water Treatment and Supply
11. Design and implementation of Wastewater Treatment Plants as well as Common Effluent Treatment Plants
12. Studies on River, Lake and Forest ecosystems
13. Watershed and Waste land management
14. Solid Waste Management including Hazardous and Biomedical Waste Management
15. Oil Spill Response
16. Rehabilitation of Mines
17. Remote sensing and GIS survey.



12.3 LABORATORY FACILITY & EQUIPMENTS

Mantec Environmental Laboratory (Recognized by MoEF&CC and Accredited by NABL)

Monitoring & Analytical Capabilities for;

- Ambient Air
- Stack Gas emissions
- Process and work zone
- Indoor Air
- Volatile organic compounds (VOC's)
- PAH's in Ambient Air
- Hydrocarbon in Ambient Air and Stack
- Heavy metals in Ambient Air, water, Soil
- Ultimate and proximate analysis. (C.H.N.S.O)
- Air Modeling
- Drinking Water, Raw Water and Process Water Analysis
- ETP and STP Water Analysis
- Soil, Sludge and Hazardous Waste Analysis

Lab Equipments

- Dust Samplers and PM_{2.5} Sampler
- Stack Monitoring Kit
- Organic Vapor Sampler
- Non Dispersive Infrared Spectrophotometer (NDIR)
- Atomic Absorption Spectrophotometer
- Gas Chromatograph
- UV Spectrophotometer
- Flame Photometer
- Mercury Analyser
- COD Digester
- Micro meteorological Station
- ICP OES
- ORSAT
- CO Analyzer
- Bacteriological Chamber
- Digital Ultrasonic
- Multigas Analyzer

12.4 ADDRESS & CONTACTS

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E-Mail: envmantec@yahoo.co.in

Environment Division,

D-36, Sector-VI, Noida- 210301

Email: mantec@vsnl.com,

Ph: 0120 - 4215804, 4215000 Fax: 0120-4215809

12.5 ESTEEMED CLIENTELE

- | | |
|--|--|
| 1. BHARAT HEAVY ELECTRICALS LIMITED | 5. INDIAN OIL CORPORATION LIMITED |
| 2. BHARAT ELECTRONICS LIMITED | 6. NTPC LIMITED |
| 3. FCI ARAVALI GYPSUM AND MINERALS INDIA LIMITED | 7. NATIONAL HYDROELECTRIC POWER CORPORATION |
| 4. HINDUSTAN PETROLEUM CORPORATION LIMITED | 8. INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION |



9. ISHIKA FERTILIZER LIMITED
10. JAI PRAKASH ASSOCIATES
11. JUBILANT AGRI AND CONSUMERS PVT. LTD.
12. TATA CHEMICALS LIMITED
13. NATIONAL HIGHWAY AUTHORITY OF INDIA
14. NATIONAL FERTILIZERS LIMITED
15. PUNJAB ALKALIES AND CHEMICALS LTD.
16. RAJASTHAN STATE MINES AND MINERALS INDIA LIMITED
17. MYSORE MINERALS LIMITED
18. KANDLA PORT TRUST
19. KARNATAKA POWER CORPORATION LIMITED
20. KUMAON MANDAL VIKAS NIGAM LIMITED
21. SAURASHTRA CHEMICALS LIMITED, GUJARAT
22. UTTARAKHAND FOREST DEVELOPMENT CORPORATION
23. SUMAN ENTERPRISES
24. JAI YAMUNA JI DEVELOPERS
25. MARKANDESHWAR CONSTRUCTION COMPANY
26. M.P. STATE MINING CORPORATION LTD.
27. JINDAL MECTEC PVT. LTD.
28. HARYANA MINING CO.
29. ELDECO INFRASTRUCTURE
30. ANSAL PROPERTY & INFRASTRUCTURE
31. DELHI STATE INDUSTRIAL AND INFRASTRUCTURE DEVELOPMENT CORPORATION (DSIIDC)
32. EXOTICA HOUSING LTD.
33. LOUIS BERGER GROUP
34. AMBUJA CEMENT
35. WAPCOS LTD.
36. INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION
37. IL&FS TRANSPORTATION NETWORK LTD.
38. THDC INDIA LTD.
39. MADHYA PRADESH ROAD DEVELOPMENT CORPORATION
40. VEDANTA RESOURCES
41. RAVI TAWI IRRIGATION COMPLEX, GOVT. OF J&K
42. INSTITUTE OF CHEMICAL TECHNOLOGY
43. JHARKHAND ISPAT PVT LTD
44. KARNATAKA VETERINARY ANIMAL AND FISHERIES SCIENCES UNIVERSITY
45. ESSAR STEEL INDIA LTD.
46. WELCOME FOOTWEAR
47. COIM INDIA PVT. LTD.
48. HARYANA STATE ROADS AND BRIDGES DEVELOPMENT CORPORATION LIMITED
49. ULTRATECH CEMENT LTD.
50. AXISCADES ENGINEERING TECHNOLOGIES LTD.
51. INVESTIGATION DESIGN & RESEARCH BOARD (IDRB), KERALA
52. WATER RESOURCE DEPARTMENT, RAJASTHAN
53. BHARAT PETROLEUM CORPORATION LIMITED
54. ADOR FONTECH LTD.
55. PUBLIC WORKS DEPARTMENT DELHI
56. THE INDIAN EXPRESS
57. WATER RESOURCES DEPARTMENT, GOVT. OF JHARKHAND
58. SUN PETRO CHEMICALS PVT.LTD.
59. TANCEM
60. FCI ARAVALI
61. SATLUJ JAL VIDYUT NIGAM (SJVN)



12.6 OUR CREDENTIALS



भारतीय गुणवत्ता परिषद्
QUALITY COUNCIL
OF INDIA
Creating an Ecosystem for Quality



NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

Mantec Consultants Pvt. Ltd., Noida

D-36, Sector-6, Noida, Uttar Pradesh-110019

The organization is accredited as **Category-A** under the **QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3** for preparing EIA/EMP reports in the following Sectors.

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals-opencast mining only	1	1 (a) (i)	A
2.	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3.	River Valley projects	3	1 (c)	A
4.	Thermal power plants	4	1 (d)	A
5.	Petroleum refining industry	10	4 (a)	A
6.	Chemical fertilizers	16	5 (a)	A
7.	Pesticides industry and pesticide specific intermediates (excluding formulations)	17	5 (b)	A
8.	Synthetic organic chemicals industry	21	5 (f)	A
9.	Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks/ sanctuaries/coral reefs /ecologically sensitive areas including LNG terminal	27	6 (a)	A
10.	Isolated storage & handling of Hazardous chemicals	28	-	B
11.	Air ports	29	7 (a)	A
12.	Ports, harbours, break waters and dredging	33	7 (e)	A
13.	Highways	34	7 (f)	A
14.	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
15.	Building and construction projects	38	8 (a)	B
16.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated September 15, 2023, and Supplementary Assessment minutes dated December 22, 2023 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/2942 dated October 11, 2023. The accreditation needs to be renewed before the expiry date by Mantec Consultants Pvt. Ltd., Noida following due process of assessment.

Issue Date
January 31, 2024



Mr. Ajay Kumar Jha
Sr. Director, NABET



Valid up to
April 20, 2026

Certificate No.
NABET/EIA/23-26/RA 0305_Rev.01



Prof (Dr) Varinder S Kanwar
CEO-NABET

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.





National Accreditation Board for
Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

MANTEC ENVIRONMENTAL LABORATORY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

**"General Requirements for the Competence of Testing &
Calibration Laboratories"**

for its facilities at

D-36, SECTOR -06, NOIDA, GAUTAM BUDDHA NAGAR, UTTAR PRADESH, INDIA

in the field of

TESTING

Certificate Number: TC-6440

Issue Date: 11/06/2022

Valid Until: 10/06/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity : MANTEC CONSULTANTS PVT. LTD.

Signed for and on behalf of NABL



N. Venkateswaran
Chief Executive Officer



EDS REPLY

Detergeo Chem (EAST) Private Limited
[CIN: U24299DL2019PTC353798]
Regd. Office: A-29, Block B1 Ext., Mohan Co-operative Industrial Estate,
New Delhi-110 044, India
[T]: +91-11-40664444; [E]: info@newindiachem.com

To,

Date: 08.03.2024

The Member Secretary,

Expert Appraisal Committee (Industry-3)

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

Indira Paryavaran Bhawan, New Delhi

Subject: Reply of Essential Details Sought for grant of Environmental Clearance for the establishment of new natural and synthetic chemical manufacturing unit at Mouza Kulepairi, Village Bangan, Dist-Howrah, west Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL).

Dear Sir,

With reference to the EDS generated on Parivesh web portal dated 21.02.2022, we are hereby submitting the point wise reply of EDS for the establishment of new natural and synthetic chemical manufacturing unit at Mouza Kulepairi, Village Bangan, Dist-Howrah, west Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL).

S. No.	Observations	Reply
i.	In Form 2 at S.No.15(i), PP has not uploaded the CGWA application, however it is mentioned that the CGWA will be taken before the commencement of the Unit. Since the Unit is not in Industrial Estate, PP needs to apply first the CGWA application. It is also not clear that PP got TOR in March 2020 and still they had not applied for Water Approval.	CGWA application is being attached as ANNEXURE-I
ii.	Details of land conversion document for industrial purpose needs to be uploaded on parivesh portal as the instant Unit is not in notified industrial area.	Land Conversion Documents is being attached as ANNEXURE-II
iii.	Details of PH proceedings is not legible which were uploaded at S.No. 7.1 of Form 2. Please resubmit the same with legible copy alongwith all the documents. Also upload the Action Plan with budgetary provisions and time lines on the issues raised during PH.	PH Proceeding and Action Plan is being attached as ANNEXURE-III
iv.	Details of onsite/offsite emergency plan/DMP and its approval needs to be submitted. PP in	Details of onsite/offsite emergency plan/DMP is attached as ANNEXURE-IV

Detergeo Chem (EAST) Private Limited
[CIN: U24299DL2019PTC353798]
Regd. Office: A-29, Block B1 Ext., Mohan Co-operative Industrial Estate,
New Delhi-110 044, India
[T]: +91-11-40664444; [E]: info@newindiachem.com

	chapter 7, has submitted very generic DMP. Please revise accordingly.	
v.	Copy of undertaking w.r.t. not proposing any banned products, needs to be submitted.	Undertaking is being attached as ANNEXURE-V
vi.	Details of court cases and SCN issued by the SPCB, if any, needs to be submitted.	N/A
vii.	As per s.no. 39 of form 2, presentation is not uploaded as per template provided by the EAC. Please revise the same.	PPT is being attached in ANNEXURE-VI
viii.	Details of Raw material and its linkage and its mitigation measure during transportation needs to be submitted at S. No. 13.1 of Form 2.	Details of Raw material and its linkage and its mitigation measure during transportation is being attached as ANNEXURE-VII.
ix.	Membership of TSDF please upload on portal.	Detergeo Chem (East) Pvt. Ltd. shall obtain TSDF membership before obtaining CTE from West Bengal Pollution Control Board and before commissioning of the unit. The company shall obtain membership of the local TSDF based on the solid waste generation and disposal quantities permitted in the Environment Clearance (EC) and shall abide by any other conditions imposed by the MoEFCC in this regards.
x.	All old CTEs/CTOs/ HW Authorization to be uploaded to verify the violation, if any. The details of products need to be submitted in tabular form showing its details of CTO/EC vis-à-vis production capacity.	Green field project. No violation has been done.
xi.	It is mentioned that the processing of EC proposal, in the Ministry, is through Parivesh Portal only, therefore providing the requisite information /documents shall be in compliance as per Form 2 and accordingly the	The requisite information/document is being updated in the EIA Report according to the Form -2.

Detergeo Chem (EAST) Private Limited
[CIN: U24299DL2019PTC353798]
Regd. Office: A-29, Block B1 Ext., Mohan Co-operative Industrial Estate,
New Delhi-110 044, India
[T]: +91-11-40664444; [E]: info@newindiachem.com

	<p>PP/Consultant are kindly requested to revise the application in the Form 2 alongwith EIA/EMP Report and resubmit the same. The EIA/EMP Report shall match with the information as filled in Form 2 for further appraisal by the EAC. It is also mentioned that after acceptance the Proposal, EIA/EMP report/Form 2 cannot be revised. Therefore, PP/Consultant is requested to kindly do needful.</p>	
--	---	--

We hope you would find the same in order for your kind perusal necessary action.

Authorized Signatory

For Detergeo Chem (East) Pvt. Ltd.



Director

On behalf of

M/s Detergeo Chem (EAST) Private Limited (DCEPL)

EDS (i): In Form 2 at S.No.15 (i), PP has not uploaded the CGWA application, however it is mentioned that the CGWA will be taken before the commencement of the Unit. Since the Unit is not in Industrial Estate, PP needs to apply first the CGWA application. It is also not clear that PP got TOR in March 2020 and still they had not applied for Water Approval.

REPLY: Detergeo Chem (East) Pvt. Ltd. shall procure water from West Bengal state-approved water tanker service provider – “Lokenath Water Tanker Supplier”. The agreement with the provider is attached along with their license.



LOKENATH WATER TANKER SUPPLIER

As 286 Bl K Mathpara Teghoria Kolkata, West Bengal, 700059

Mobile: 7980548637 PAN Number: BPKPR3674H

Date: 04.01.2024

To:
M/s Detergeo Chem (East) Private Limited
Mouza Kulepairy, P.S. Bagnan,
Dist. Howrah, West Bengal

Subject: Water Supply For Proposed Factory at Mouza Kulepairy, P.S. Bagnan, Dist. Howrah, West Bengal

We are pleased to supply 250 KL/day of water in West Bengal-state approved tankers for your captive consumption at your proposed factory at Mouza Kuleipairy for a period of 5 years starting 1st January 2025. Please note that this is not drinkable water.



**AUTHORISED SIGNATORY FOR
LOKENATH WATER TANKER SUPPLIER**



Certificate of Enlistment cum e-Receipt
Licence Department,Kolkata Municipal Corporation
Certificate of Enlistment

Printed On: 02/09/2023

RECEIPT INFORMATION

Financial Year :	Receipt No :	Receipt Date :
2023-2024	E/05/2023/1174507	28/06/2023 17:23:10

Transaction Id : 0520230000161884
 C.E. No : 0010 9201 1864
 Demand Type : Renewal
 Demand Nature : PRIMARY(0)
 Assessee No :
 M/S : LOKENATH WATER TANKER SUPPLIER
 Name of CE Holder: SUNNY ROY
 Buisness Address : 2, PEARY MOHAN SUR LANE GROUND FLOOR, KOLKATA 700006
 Ward No : 016
 Nature of Trade : SUPPLIER OF NON FOOD ITEMS - WATER TANKER

Parameter Unit Value
 AREA 100
 WITH AC N

Section No	Description (As per KMC Act, 1980)	Amount(Rs)
199	Certificate of Enlistment	100.00
435/435A	Non-Residential Use	120.00
	Processing Fee	50.00

Total Amount Paid(Rs) : 270.00

Amount in Words : Rupees Two Hundred Seventy only

Note: This Receipt is to be treated as Payment Receipt cum Certificate of Enlistment and Valid upto 31/03/2024
 Concerned Authorities/Agencies/Institutions can Verify the Validity of the Receipt cum C.E from KMC web portal.



E. and O.E.

This document being an e-Receipt cum Certificate of Enlistment, does not require any signature

For Receipt Authentication visit url : <https://www.kmcgov.in/KMCPortal/jsp/LicenseReceipt.jsp>

EDS(ii): Details of land conversion document for industrial purpose needs to be uploaded on parivesh portal as the instant Unit is not in notified industrial area.

REPLY: As per the provisions of MoeFCC (OMs attached) and West Bengal State norms (OMs Attached), the conversion of land use can only be done upon receipt of CTE from WBPCB.

F.No. 22-76/2014-IA-III
Government of India
Ministry of Environment, Forests and Climate Change
Impact Assessment Division

.....

Indira Paryavaran Bhawan,
Jor Bagh Raod, Aliganj
New Delhi-110 003

Dated the 7th October, 2014

OFFICE MEMORANDUM

Subject: Status of land acquisition w.r.t. project site while considering the case for environment clearance under EIA Notification, 2006-regarding

It has been brought to the notice of this Ministry that in the absence of any guidelines, different EACs/SEACs adopt different criteria about the extent to which the land w.r.t. the project site should be acquired before the consideration of the case for environment clearance (EC). Some of the Ministries in the Government of India and some industrial associations have represented that full acquisition of land for the project site should not be insisted upon before consideration of the case for EC and instead initiation of land acquisition process should be sufficient for the consideration of such cases. The argument being that land acquisition process can go on in parallel and that consideration of EC need not await full land acquisition.

2. The matter has been examined in the Ministry. The EC granted for a project or activity under the EIA Notification 2006, as amended, is site specific. While full acquisition of land may not be a pre-requisite for the consideration of the case for EC, there should be some credible document to show the status of land acquisition w.r.t project site when the case is brought before the concerned EAC/SEAC for appraisal. It has been accordingly decided that the following documents relating to acquisition of land w.r.t. the project site may be considered as adequate by EACs/SEACs at the time of appraisal of the case for EC:

- (i) In case the land w.r.t. the project site is proposed to be acquired through Government intervention, a copy of preliminary notification issued by the concerned State Government regarding acquisition of land as per the provisions of Land Acquisition, Rehabilitation and Resettlement , Act, 2013.

[Signature]
2/-

- (ii) In case the land is being acquired through private negotiations with the land owners, credible document showing the intent of the land owners to sell the land for the proposed project.

3. It may, however, be noted that the EC granted for a project on the basis of aforesaid documents shall become invalid in case the actual land for the project site turns out to be different from the land considered at the time of appraisal of project and mentioned in the EC.

4. This issues with the approval of the competent authority.


(Dr. Satish C. Garkoti)
Scientist 'F'

Copy to:

1. All the officers of IA Division
2. Chairperson/ Member Secretaries of all the SEIAAs/SEACs
3. Chairman of all the Expert Appraisal Committees
4. Chairman, CPCB
5. Chairpersons/ Member Secretaries of all SPCBs/ UTPCCs

Copy for information:

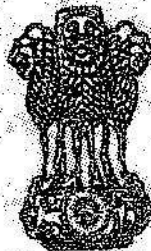
1. PS to MOS(Independent Charge)
2. PPS to Secretary(EF&CC)
3. PPS to AS(SS)
4. PS to JS(AT)
5. Website, MoEF&CC
6. Guard File

Registered No. WB/SC-247

No. WB(Part-1)/2009/SA-1-223

Kolkata

The



सत्यमेव जयते

Gazette

Extraordinary
Published by Authority

ASADHA 10)

WEDNESDAY, JULY 1, 2009

ISAK (193)

PART I—Orders and Notifications by the Governor of West Bengal, the High Court, Government Treasury, etc.

GOVERNMENT OF WEST BENGAL

Land and Land Reforms Department

Land Reforms Branch

Writers' Buildings, Kolkata - 700 001.

NOTIFICATION

No.2969-LR/IA-05/07 GE(M), the 1st day of July, 2009. The following draft amendments which the Governor in exercise of the power conferred by section 60 of the West Bengal Land Reforms Act, 1955 (West Ben. Act X of 1956) (hereinafter referred to as the said Act), proposes to make in the West Bengal Land Reforms Rules, 1965, as subsequently amended (hereinafter referred to as the said rules), are hereby published, as required by sub-section (1) of section 60 of the said Act, for information of persons likely to be affected thereby.

The draft will be taken into consideration on or after the expiry of thirty days from the date of publication of this notification in the *Official Gazette*, and any objection or suggestion with respect thereto, which may be received by the undersigned before the expiry of the said period, shall be considered.

Draft amendments

In the said rules, -

(1) for rule 5A, substitute the following rule:-

"5A. Manner of change of character, conversion or alteration in mode of use of land held by *raiyat*. (1) Any *raiyat* intending to change the character, convert or alter the mode of use of any land held by him, shall make an application to the officer concerned empowering, in writing, to discharge the function of the Collector of such change, conversion or alteration under section 4C, in Form 1A and shall be accompanied by such documents as are mentioned in the said Form 1A.

(2) If the application as mentioned in sub-rule (1) relates to permission for change, conversion or alteration of any land having water body of any description or size, such application shall be accompanied by an affidavit in Form 1B for creation of compensatory water body of equal or larger size of such water body which is sought to be changed, converted or altered in the same *mouza* or in the adjoining *mouza*."

(2) after Form I, insert the following Forms:-

FORM IA

Application for change of character, conversion or alteration in the mode of use of land
(See sub-rule (1) of rule 5A)

FROM :

.....
[State Name and Address of the applicant(s)]

To: The District Land and Land Reforms Officer/
Sub-divisional Land and Land Reforms Officer/
Block Land and Land Reforms Officer.

Sub: Application for permission for change of character, conversion or alteration in the mode of use of land.

Sir,

I/We have the honour to apply for permission for change of character, conversion or alteration in the mode of use of the land/land having water body for the purpose of

2. The particulars of the land/land having water body with respect to which such permission is required are furnished below:-

- (1) Name of the District
- (2) Name of the Block
- (3) Name of the police station
- (4) Name of the *mouza*
- (5) Jurisdiction List No.
- (6) *Khatian* No. (R. S. & L. R.)
- (7) Plot No. (R.S. & L.R.)
- (8) Area of the Plot (R. S. & L. R.)
(If part plot, specify the area and portion)
- (9) Existing Classification of the Plot

3. The following documents, in duplicate, are enclosed with this application:-

- (1) Copy of mutation certificate or copy of current record-of-rights.
- (2) Copy of current rent receipt.
- (3) Sketch map showing the plot in question with side measurement and its surroundings including approach road (may not be to the scale).
- (4) Affidavit for creation of compensatory water body.
(Applicable in cases where the application relates to change or conversion of the land having water body of any description or size).
- (5) Copy of no objection certificate of the West Bengal Pollution Control Board.
(Applicable only in such cases wherever such certificate is required).

FORM 1A

Application for change of character, conversion or alteration in the mode of use of land
(See sub-rule (1) of rule 5A)

FROM :
.....
.....
[state Name & Address of the applicant(s)]

TO : The District Land & Land Reforms Officer /
The Sub-divisional Land & Land Reforms Officer
The Block Land & Land Reforms Officer.

Sub. Application for permission for change of character, conversion or alteration in the mode of use of land.

Sir,

I / We have the honour to apply for permission for change of character, conversion or alteration in the mode of use of the land / land having water body for the purpose of

2. The particulars of the land / land having water body with respect to which such permission is required is furnished below:-

- (1) Name of the District :
- (2) Name of the Block :
- (3) Name of the police station :
- (4) Name of the *mouza* :
- (5) Jurisdiction List No. :
- (6) *Khatian* No. (R.S & L.R) :
- (7) Plot No. (R.S & L.R) :
- (8) Area of the Plot (R.S & L.R) :
[If part plot, specify the area and portion]
- (9) Existing classification of the Plot :

3. The following documents, in duplicate, are enclosed with this application:-

- (1) Copy of mutation certificate or copy of current record-of-rights.
- (2) Copy of current rent receipt
- (3) Sketch map showing the plot in question with side measurement and its surroundings including approach road (may not be to the scale)
- (4) Affidavit for creation of compensatory water body
(Applicable in cases where the application relates to change or conversion of the land having water body of any description or size)
- (5) Copy of no objection certificate of the West Bengal Pollution Control Board
(Applicable only in such cases wherever such certificate is required)

(6) Copy of Detailed Project Report (DPR) duly vetted by the
Competent Authority
(Applicable only in cases where the application relates to change,
conversion or alteration of land for industrial, commercial or
housing complex)

(4) I / We also declare and undertake –

1. That the land, in question shall be used strictly for the purpose for which such permission shall be granted;
2. That there is no *bargadar*, in the land, in question;
3. That no work shall be done on the land, in question that may lead to conversion of the same unless permission as sought for is granted;
4. That necessary approval or permission or licence shall be obtained from the appropriate authority as required for execution of the work on the land, in question as soon as permission for conversion as sought for is granted;

(5) I / We further declare –

1. That the land, in question is under peaceful possession of myself / ourselves and it is free from all encumbrances;
2. That the land, in question is not involved in any proceeding for vesting under the provisions of any law;
3. That the land, in question is not involved in any court case which prohibits such conversion, change or alteration in the mode of use of the land.

(6) I / We also declare and undertake that in case it is proved at any point of time that the documents furnished and statements made hereinabove are not true and correct, I / We am / are liable for any legal action which will be taken by the competent authority in this regard including cancellation of order granting change of character, conversion or alteration in the mode of use of land as sought for.

Encl. As stated above

Yours faithfully,

Place :
Date :

(Full signature of the applicants(s)
with seal, if any.)

EDS(iii): Details of PH proceedings is not legible which were uploaded at S.No. 7.1 of Form 2. Please resubmit the same with legible copy alongwith all the documents. Also upload the Action Plan with budgetary provisions and time lines on the issues raised during PH.

REPLY:Copy of PH Proceeding and action plan with the budgetary provisions on the issue raised.



SPEED POST

WEST BENGAL POLLUTION CONTROL BOARD

(Department of Environment, Govt. of West Bengal)

Paribesh Bhawan, 10A, Block - LA, Sector-III

Bidhannagar, Kolkata-700 106, India

Tel : 2335 - 9088 / 7428 / 8211 / 6731 / 0261 / 8861 / 1625

Fax : 2335 - 2813

City Code : 33, Country Code : 91

Website: www.wbpcb.gov.in

Memo No. -2N-15/2020(E)

Dated: .09.2021

To,
The Member Secretary
Expert Appraisal Committee (Industrial Projects-2)
Ministry of Environment, Forests & Climate Change,
Govt. of India, Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj, New Delhi – 110 003.

Sub: Public Hearing for the proposed establishment of new natural and synthetic surfactant chemical manufacturing unit at Dag No.42, Mouza – Kulepairi, Joypur-Bagnan Road, PS – Bagnan, District – Howrah, PIN – 711303, West Bengal by **M/s. Detergeo Chem (East) Private Limited.**

Sir,

Enclosed please find herewith the following documents for the above mentioned project towards environmental clearance by the Ministry of Environment, Forests & Climate Change, Government of India.

1. Chronology of events leading to Public Hearing. (Annexure – I).
2. Minutes of Public Hearing dated 23.08.2021 at the New Sri Krishna Bhavan Bagnan, Mukunda Dighi, Khalna More, PS – Bagnan, Howrah, West Bengal. (Annexure – II).
3. Copy of attendance of panel members and others in Public Hearing. (Annexure – III).
4. One pen drive containing the videography of the public hearing. (Annexure – IV).

Yours faithfully,

Sd/-

Senior Environmental Engineer (EIM Cell)
West Bengal Pollution Control Board

Encl: As stated.

Memo No. 621(i)-2N-15/2020(E)

Dated: 17 .09.2021

Copy to:

Mr. Raman, M/s. Detergeo Chem (East) Pvt. Ltd., A-29, Block B1, Ext. Mohan Co-operative Industrial Estate, New Delhi – 110064, India.

Senior Environmental Engineer (EIM Cell)
West Bengal Pollution Control Board

Chronology of events leading to Public Hearing

1. Copy of the letter from the District Magistrate, Dist – Howrah dated 06.07.2021 (copy enclosed).
2. Letter of circulation of copies of Executive Summary and EIA / EMP of the project on 23.07.2021 (copy enclosed).
3. Notification of Public Hearing in three local dailies published on 21.07.2021 (copy enclosed).
4. Holding Public Hearing at the New Sri Krishna Bhavan Bagnan, Mukunda Dighi, Khalna More, PS – Bagnan, Howrah, West Bengal on 23.08.2021.

Copies of Executive Summary with EIA/EMP report were available for public scrutiny in the offices of:

1. Office of the District Magistrate, Howrah, Govt. of West Bengal.
2. Office of the Additional District Magistrate (LR), Dist – Howrah.
3. Office of the Sub-Divisional Officer, Uluberla Sub-Division, Dist – Howrah.
4. Office of the Block Development Officer, Bagnan-I Development Block, Dist – Howrah.
5. Office of the General Manager, D.I.C., Howrah.
6. Office of the Sabhadhipati, Howrah Zilla Parishad, Howrah.
7. Office of the Bagnan-I Panchayat Samity, Dist – Howrah.
8. Office of the Baksihat Gram Panchayat, Howrah.
9. Office of the Chief Engineer (O & E), Paribesh Bhawan, 10A, Block-LA, Sector-III, Bidhannagar, Kolkata – 700 106.
10. Office of the Environmental Engineer, Howrah Regional Office, Minority Bhawan, 5th Floor, Alipore, Kolkata – 700 027.
11. Department of Environment, Govt. of West Bengal, Pranisampad Bhawan, 5th Floor, LB-2, Sector – III, Bidhannagar, Kolkata 700 106.
12. Ministry of Environment & Forests, Eastern Zonal Office, A/3, Chandra Sekharpur, Bhubaneswar-751023, Odisha.
13. Head Office of West Bengal Pollution Control Board, Paribesh Bhawan, 10A, Block-LA, Sector-III, Bidhannagar, Kolkata – 700 106.

Annexure-I (Sl. No. 1)

EIM-BO71

20/07/2021



Govt of West Bengal
Office of the District Magistrate & Collector, Howrah
Rishi Bankim Chandra Road
Howrah-711 101

Memo No: 1234

Date: 06-07-2021

To

Kind Attn: Mr. Debasish Sarkar

The Member Secretary,
West Bengal Pollution Control Board,
Paribesh Bhawan, Beliaghata,
Kolkata-700106.



Sub: Public Hearing for establishment of new natural and synthetic surfactant chemical manufacturing unit Mouza Kulepatri, PS Bagnan, Dist Howrah, by M/S Detergeo Chem (East) Private Limited (DCPEL).

Sir,

In reference to the above noted subject, this is to inform you that the Addl District Magistrate (LR), will act as presiding over the public hearing process in virtual mode (through google meet) for the proposed construction of new natural and synthetic surfactant chemical manufacturing unit, Mouza Kulepatri, PS Bagnan, Dist Howrah, West Bengal.

The date of public hearing is fixed on 23.08.2021 at 12.30 PM.

You are requested to please share the ID/Password and also to publish the of the meeting in two leading newspaper.

Handwritten notes: "MR (D.M.)" with an arrow pointing to the signature area, and "copy sent" with a checkmark and initials "A.D." and "L.G.H." below it.

Yours faithfully,

District Magistrate,
Howrah

Date: 06-07-2021

Memo No: 1234(A)

Copy forwarded for information to the:

1. Addl District Magistrate(LR) Howrah
2. The Senior Environment Engineer (EIM Cell), WBPCB.
3. The M/S Detergeo Chem(East) Private Limited, Bagnan for information and necessary action.
4. CA to District Magistrate, Howrah

District Magistrate,
Howrah

Handwritten signature of the District Magistrate, Howrah.



Annexure-I (Sl. no. 2)

25

WEST BENGAL POLLUTION CONTROL BOARD
(Department of Environment, Govt. of West Bengal)
Paribesh Bhawan, 10A, Block - LA, Sector-III
Bidhannagar, Kolkata-700 106, India
Tel : 2335 - 9088 / 7428 / 8211 / 6731 / 0261 / 8861 / 5868 / 1625
Fax : 2335 - 5868 / 2813
City Code : 33, Country Code : 91
Website: www.wbpcb.gov.in

Memo No. 509(1-13) -2N-15/2020(E)

Dated: 23.07.2021

C I R C U L A R

It is hereby informed that a Public Hearing will be rescheduled on **23.08.2021** at **12:30 p.m.** at the New Sri Krishna Bhavan Bagnan, Mukunda Dighi, Khalna More, PS - Bagnan, Howrah, West Bengal for the proposed establishment of new natural and synthetic surfactant chemical manufacturing unit at Mouza - Kulepairi, PS - Bagnan, District - Howrah, West Bengal by **M/s. Detergeo Chem (East) Pvt. Ltd.** Paper notification in this respect may kindly be seen in "The Times of India", "Bartaman" and "Sanmarg" dated 21.12.2020 and 21.07.2021.

In this regard copies of the draft EIA / EMP report and Executive Summary of the project along with soft copies have already been sent vide memo no. 478(1-13)-2N-15/2020(E) & 479(1-3)-2N-15/2020(E) dated 25.12.2020 for record and for access to the general public for their information and participation of locally affected persons in the Public Hearing on **23.08.2021**. As communicated earlier through above mentioned circular dated 25.12.2020, the concerned authorities are once again requested to take special care against any damage or pilferage of the draft EIA / EMP report and Executive Summary copies should be taken as these are very much limited in number.

Samit In
23/07/2021
Senior Environmental Engineer (EIM Cell)
West Bengal Pollution Control Board


etc

Copies of the Executive Summary in English & Bengali & one EIA/EMP report, along with the soft copies have already been sent vide memo no. 478(1-13)-2N-15/2020(E) & 479(1-3)-2115/2020(E) dated 25.12.2020 to the following offices :-

- | | |
|---|---|
| 1. Office of the District Magistrate, Howrah, Govt. of West Bengal. | 1 Set of Executive summary in English & Bengali and one draft EIA / EMP report have already been sent on 25.12.2020 |
| 2. Office of the Additional District Magistrate (LR), Dist – Howrah. | - Do - |
| 3. Office of the Sub-Divisional Officer, Uluberia Sub-Division, Dist – Howrah. | - Do - |
| 4. Office of the Block Development Officer, Bagnan-I Development Block, Dist – Howrah. | - Do - |
| 5. Office of the General Manager, D.I.C., Howrah. | - Do - |
| 6. Office of the Sabhadhipati, Howrah Zilla Parishad, Howrah. | - Do - |
| 7. Office of the Bagnan-I Panchayat Samity, Dist – Howrah. | - Do - |
| 8. Office of the Baksihat Gram Panchayat, Howrah. | - Do - |
| 9. Office of the Chief Engineer (O & E), Paribesh Bhawan, 10A, Block-LA, Sector-III, Bidhannagar, Kolkata – 700 106. | - Do - |
| 10. Office of the Environmental Engineer, Howrah Regional Office, Minority Bhawan, 5 th Floor, Alipore, Kolkata – 700 027. | - Do - |
| 11. Department of Environment, Govt. of West Bengal, Pranisampad Bhavan, 5 th Floor, LB-2, Sector – III, Bidhannagar, Kolkata 700 106. | - Do - |
| 12. Ministry of Environment & Forests, Eastern Zonal Office, A/3, Chandra Sekharpur, Bhubaneswar-751023, Odisha. | - Do - |
| 13. Head Office of West Bengal Pollution Control Board, Paribesh Bhawan, 10A, Block-LA, Sector-III, Bidhannagar, Kolkata – 700 106. | - Do - |

Copies forwarded for information and necessary actions:-

1. Office of the District Magistrate, Howrah, Govt. of West Bengal.
2. Office of the Additional District Magistrate (LR), Dist – Howrah.
3. Office of the Sub-Divisional Officer, Uluberia Sub-Division, Dist – Howrah.
4. Office of the Block Development Officer, Bagnan-I Development Block, Dist – Howrah.
5. Office of the General Manager, D.I.C., Howrah.
6. Office of the Sabhadhipati, Howrah Zilla Parishad, Howrah.
7. Office of the Bagnan-I Panchayat Samity, Dist – Howrah.
8. Office of the Baksihat Gram Panchayat, Howrah.
9. Office of the Chief Engineer (O & E), Paribesh Bhawan, 10A, Block-LA, Sector-III, Bidhannagar, Kolkata – 700 106.
10. Office of the Environmental Engineer, Howrah Regional Office, Minority Bhawan, 5th Floor, Alipore, Kolkata – 700 027.
11. Department of Environment, Govt. of West Bengal, Pranisampad Bhavan, 5th Floor, LB-2, Sector – III, Bidhannagar, Kolkata 700 106.
12. Ministry of Environment & Forests, Eastern Zonal Office, A/3, Chandra Sekharpur, Bhubaneswar-751023, Odisha.
13. Head Office of West Bengal Pollution Control Board, Paribesh Bhawan, 10A, Block-LA, Sector-III, Bidhannagar, Kolkata – 700 106.

 Samit Jn 23/07/2021
Senior Environmental Engineer (EIM Cell)
West Bengal Pollution Control Board

Bartaman: 21.07.2021

বিজ্ঞপ্তি
পশ্চিমবঙ্গ দূষণ নিয়ন্ত্রণ পর্ষদ

পরিবেশ, বন ও জলবায়ু পরিবর্তন মন্ত্রক, ভারত সরকার-এর বিজ্ঞপ্তি নম্বর এস.ও.১৫৩৩(ই) তারিখ ১৪.০৯.২০০৬ অনুসারে, এতদ্বারা বিজ্ঞপ্তি জারি করা হচ্ছে যে, মেসার্স ডিটারজিও কেম (ইস্ট) প্রা. লি. কর্তৃক প্রস্তাবিত মৌজা-কুলেপাইরি, থানা-বাগনান, জেলা-হাওড়া, পশ্চিমবঙ্গে স্থিত নতুন ন্যাচারাল এবং সিহেটিক সারফ্যাক্ট্যান্ট কেমিকেল ম্যানুফ্যাকচারিং ইউনিট স্থাপনের জন্য জনশুনানি যা প্রাথমিকভাবে ২২.০১.২০২১ তারিখে ধার্য করা হয়েছিল, এখন ২৩.০৮.২০২১ বেলা ১২.৩০ টায় নিউ শ্রীকৃষ্ণ ভবন, বাগনান, মুকুন্দা দিঘি, খালনা মোড়, থানা-বাগনান, হাওড়া, পশ্চিমবঙ্গে ধার্য করা হয়েছে।

সাধারণ জনগণ প্রকাশ্য শুনানিতে গুগল মিটের মাধ্যমেও যোগ দিতে পারেন :

গুগল মিট লিঙ্ক : <https://meet.google.com/ruj-txor-faa>

ইউজার আইডি : WBPCB.Detergeo@gmail.com

পাসওয়ার্ড : D31\$rg3#

এই সংশোধনী বিজ্ঞপ্তিটি গত ২১.১২.২০২০ তারিখে 'বর্তমান', 'দি টাইমস অফ ইন্ডিয়া' এবং 'সন্মার্গ' পত্রিকায় পূর্ব প্রকাশিত বিজ্ঞপ্তির ধারাবাহিক সংশোধনী রূপে গণ্য হবে।

সদস্য সচিব
পশ্চিমবঙ্গ দূষণ নিয়ন্ত্রণ পর্ষদ

The Times of India: 21.07.2021

NOTICE

West Bengal Pollution Control Board

In compliance with Notification No. S.O.1533(E) dated 14.09.2006 of Ministry of Environment, Forests & Climate Change, Govt. of India, it is hereby notified that the Public Hearing for the proposed establishment of new natural and synthetic surfactant chemical manufacturing unit at Mouza - Kulepairi, PS - Bagnan, District - Howrah, West Bengal by M/s. Detergeo Chem (East) Pvt. Ltd. which was originally scheduled on 22.01.2021 is hereby rescheduled on 23.08.2021 at 12:30 p.m. at the New Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Khaina More, PS - Bagnan, Howrah, West Bengal.

The general public shall be able to join the virtual Public Hearing using the below mentioned Google Meet link:

Google Meet Link: <https://meet.google.com/ruj-txor-faa>

User ID: WBPCB.Detergeo@gmail.com

Password: D31\$rg3#

This notice is being issued in continuation to the earlier notice published in 'Bartaman', 'The Times of India' and 'Sainmarg' dated 21.12.2020.

Member Secretary,
West Bengal Pollution Control Board

Sanmarg: 21.07.2021

সূচনা

পশ্চিম বঙ্গাল প্রদূষণ নিয়ন্ত্রণ বোর্ড

পরিবেশ, বন এবং জলবায়ু পরিবর্তন মন্ত্রালয়, ভারত সরকার की अधिसूचना सं. एस.ओ. 1533 (ई) दिनांक 14.09.2006 के अनुपालन में एतद्वारा यह विज्ञापित किया जाता है कि मेसर्स डिटर्जियो केम (ईस्ट) प्रा. लि. द्वारा मौजा-कुलेपैरी, थाना-बागनान, जिला-हावड़ा, पश्चिम बंगाल में न्यू नेचुरल एंड सिंथेटिक सर्फैक्टेंट केमिकल मैन्युफैक्चरिंग यूनिट के प्रस्तावित संस्थापना हेतु सार्वजनिक सुनवाई जो मूलतः 22.01.2021 को अनुसूचित थी एतद्वारा 23.08.2021 के दोपहर 12.30 बजे न्यू श्री कृष्ण भवन, बागनान, मुकुंदा दिघी, खलना मोड़, थाना- बागनान, हावड़ा, पश्चिम बंगाल में पुनः अनुसूचित हुई है।

सार्वसाधारण निम्न उल्लिखित गुगल मीट लिंक का व्यवहार कर वर्चुअल सार्वजनिक सुनवाई में जुड़ने हेतु सक्षम होंगे।

गुगल मीट लिंक : <https://meet.google.com/ruj-txor-faa>

यूजर आईडी : WBPCB.Detergeo@gmail.com

पासवर्ड : D31\$rg3#

इस सूचना 'वर्तमान', 'दि टाइम्स ऑफ इंडिया' एवं 'सन्मार्ग' में दिनांक 21.12.2020 को पूर्व में प्रकाशित सूचना के तारतम्य में जारी किया जा रहा है।

✓

सदस्य सचिव
पश्चिम बंगाल प्रदूषण निয়ंत्रण बोर्ड

PROCEEDINGS OF THE PUBLIC HEARING HELD ON 23.08.2021 AT 12:30 PM AT New Sri Krishna Bhavan, Mukunda Dighi, Khalna More, P.O.-Kalyanpur, P.S-Bagnan, District- Howrah, Pin-711303, State- West Bengal, FOR PROPOSED ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC SURFACTANT CHEMICAL MANUFACTURING UNIT OF M/s DETERGEO CHEM (EAST) PRIVATE LIMITED AT VILLAGE & P.O-KULAPAIRY, MOUZA-KULAPAIRY, J.L. NO.-7, BEARING DAG NOS.-42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139, 141. KHAITAN NO.- 849, BAKSHIHAT GRAM PANCHAYAT, P.S.-BAGNAN, DISTRICT-HOWRAH, WEST BENGAL.

M/s Detergeo Chem (East) Private Limited submitted an application to the West Bengal Pollution Control Board (herein after referred to as the State board) for conducting a Public Hearing for Proposed Establishment of new natural and synthetic surfactant chemical manufacturing unit of M/s Detergeo Chem (East) Private Limited at Village and P.O-Kulapairy, J.L No. 7, Bearing Dag Nos. -42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139, 141, Khaitan No. 849, Bakshihat Gram Panchayat, P.S Bagnan, District- Howrah, West Bengal. As per the notification S.O. 1533 dated 14th September, 2006 of the MoEF & CC, Govt. of India, Environment Clearance (EC) for the said project is required to be obtained from the Ministry of Environment, Forest & Climate Change, Government of India, after conducting Public Hearing.

Accordingly, the State Board after observing all the formalities conducted the Public Hearing on 23.08.2021 at 12:30P.M. at New Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Khalna More P.S Bagnan, District- Howrah, State-West Bengal. Sri Chiranjib Dawn and Sri Sanjoy Mukherjee, both Assistant Environmental Engineers of Howrah Regional Office, WBPCB were present and Sri Chiranjib Dawn welcomed the audience and panel member. Sri Chiranjib Dawn requested Smt. Debarati Ghosh, ADM-L.R., Howrah District, who was present online, to preside over the public hearing, informed about the purpose of said public hearing and briefed about the project and its probable impact on the environment- ambient air, flora, fauna, vegetation, soil etc. before and after the project as per the EIA report submitted by the project proponent. He also requested the ADM to deliver permission for power point presentation of the proposed project by the project proponent with the help of their technical team.

Smt. Debarati Ghosh, ADM-L.R., Howrah District presided over the hearing, welcomed the proponent for deliberation of presentation and requested the audience to express their opinion and thoughts freely after the presentation. List of the panel members and others present during the Public Hearing is enclosed in annexure - I

Sri Chiranjib Dawn, Asst. Env. Engr., Howrah R.O., WBPCB then requested the project proponent to present the details about the proposed project, giving emphasis on the environmental aspects in particular as directed by the Additional District Magistrate- LR, for the knowledge and awareness of the audience present in the hearing.

NABET accredited consultant M/s Mantec Consultants Private Limited of Noida, Uttar Pradesh is engaged by the project proponent. On their behalf, representative of project proponent Mr. Saminul Hoque presented brief detail of the project in local language in powerpoint and gave emphasis on investment, land, employment, pollution mitigation, green belt development and CSR activity etc. (Brief details given under).

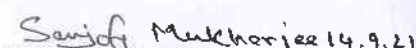
PROJECT SUMMARY

Proposed Project	ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC SURFACTANT CHEMICAL MANUFACTURING UNIT OF M/S DETERGEO CHEM (EAST) PRIVATE LIMITED AT VILLAGE AND P.O-KULAPAIRY J.L. NO.7, BEARING DAG NO. 42, KHAITAN NO. 849, BAKSHIHAT GRAM PANCHAYAT, P.S BAGNAN, DISTRICT- HOWRAH, WEST BENGAL			
Project Proponent	M/s. Detergeo Chem (East) Private Limited			
Project Location	VILLAGE & P.O- KULAPAIRY, MOUZA KULAPAIRY J.L. NO. 7, BEARING DAG NO. 42, KHAITAN NO. 849, BAKSHIHAT GRAM PANCHAYAT, P.S. BAGNAN, DISTRICT-HOWRAH, WEST BENGAL			
Latitude & Longitude	22°31'49.08"N & 87°55'47.78"E			
Main Plant & Product	S. No.	Product Name	Proposed Manufacturing Capacity (MTA)	Mode of Transport
	1.	Linear Alkyl Benzene Sulphonic Acid 96%	12,000	MS Tanker
	2.	Linear Alkyl Benzene Sulphonic Acid 90%	12,000	MS Tanker
	3.	Alpha Olefin Sulphonate	1,000	SS Tanker
	4.	Sodium Lauryl Ether Sulphate	24,000	SS Tanker
	5.	Sodium Lauryl Sulphate	6,000	SS Tanker
	6.	Cocoamidopropyl Betaine	3,000	Truck
	7.	Cocamide Monoethanolamide	3,000	Truck
	8.	Cocamide Diethanolamide	3,000	Truck
	9.	Ethylene Glycol Distearate	3,000	Truck
	10.	Ethylene Glycol Monostearate	3,000	Truck
	11.	Dilute Sulphuric Acid	12,000	MS Tanker
	12.	Sodium Sulphate	400	
	Total Capacity		82,400	
Land	1.3493 ha			
Project Cost	Rs. 20 crores			
Total Cost of Pollution Control Devices	Rs. 1.5 crores			
EMP Cost for Social & Infrastructure Development	Rs. 150 LAKHS (CAPITAL COST), Rs. 17 LAKHS/YR (RECURRING COST)			
Makeup Water	203 KLD			
Man Power	200 Numbers			
Power Requirement	1000KW			
Waste Water Discharge	The total waste water generation is 10.7 KLPD which will be treated in our-in house ETP and this treated water will be re-used in the scrubber and for gardening purpose.			

After the completion of power point presentation by the project proponent the following queries raised by the audience are presented below:

1. Janab Monirul Islam of Village- Shyampur, Subsit welcomed the project and questioned about the water wastage. The project proponent answered that no water will be discharged out of the plant area as the project has been conceived as ZLD.
2. Sk Ahed Ali of Village- Subsit (Paschim) welcomed the proposed project and questioned about the greenery development to be done by the project proponent. The project proponent said that adequate plantation will be done to maintain a greenbelt and to comply with the environmental norms.
3. Sk. Manirul Ali of Village-Bagur (Subsit) welcomed the proposed project and asked about the possible noise pollution that can be caused by the project. The project proponent said that adequate measures will be taken to attenuate noise arising out of the project so that it meets noise standards.
4. Janab Jahiruddin Ali of Village- Patinan, welcomed the proposed project and questioned about the employment prospect of the project. The project proponent said that both skilled and unskilled workers will be employed from the local areas and also proper training will be imparted so that they can develop themselves as per the project requirement as well as for private entrepreneurship.
5. Janab Jiyarul Hussain of Village- Kismat Brahman, welcomed the proposed project asked about the prospect of local employment in the project. The project proponent said that out of total work strength, 60% (approx. 120) will be from the local areas.

As there were no more questions and no objections were raised by the local people, the public hearing was concluded thanking the audience as well as all the panel members by Sri Chiranjib Dawn, Asst. Env. Engr., Howrah Regional office, WBPCB taking consent from Smt. Debarati Ghosh, ADM-L.R., Howrah District as well as Chairperson of the said hearing.


Sri Sanjoy Mukherjee,
Asst. Env. Engr., Howrah R.O., WBPCB


Sri Chiranjib Dawn,
Asst. Env. Engr., Howrah R.O., WBPCB


Smt. Debarati Ghosh,
ADM-L.R., Howrah District

Public Hearing of M/s. Detergeo Chem (East) Pvt. Ltd. held at Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Kalna More, P.S-Bagnan, Howrah-711303 on 23.08.2021 at 12.30pm.

ATTENDANCE SHEET FOR PANEL MEMBERS

Sl No	Name & Designation	Department	Contact No/Mobile No	Signature
1	Debarati Ghosh	ADM LR - Howrah	9831085249	Debarati Ghosh
2	CHIKANTIB DAWN, ASST. ENV. ENGR.	HOWRAH R.O., WSPCB	(033)-2448 2219 / 9230510757	Chikanti Dawn 23/8/21
3	SANJOY MUKHERJEE, AEE,	HOWRAH R.O., WSPCB	(033)-2448-2219 / 7890273872	Sanjoy Mukherjee 23/8/21
4	S.K. Sarkar	Pradhman, Substl-	9735362381	SU
5	Sh. Murtuzza Ali	Pradhman, Baghchikhat	9903868897	Am 23/08/2021
6.	Dhruv Arora	Director, Detergeo Chem	9999696773	Am 25/08/2021
7.	Amit.k.r. Singh	Manager (SD)	7992448925	Amit.k.r
8.	Gajananand Walekar	Manjee Consultants D-36, Sector-06 Huda	8506998195	Walekar
9	Priyobrata Panigrahy	Member Panchoyut	9800020295	Priyobrata Panigrahy
10	Samirul Haque	Tech. Manager	9938786192	Haque
11.	Debasish Naha	Manager Compliance	9874282057	Naha
12	Prasanta Maity	Dy. LR - Howrah	83369 16366	Prasanta Maity

Annexure
Date
23/08/21
(11)

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Khalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

Sl. No.	Name	Address	Signature
1	BISWASIT MONDA	Subsit, Bagnan, Howrah MUKUNDADIHATI	Biswasit Mondal
2	UTTAM PATRA	Subsit, Bagnan, Howrah MUKUNDADIHATI	UTTAM PATRA
3	MILAN BERA	Subsit, Bagnan, Howrah	MILAN BERA
4	SK SAIDUL HAQ	Subsit, Bagnan, Howrah	SK Saidul Haq
5	SADDAM JAMADAR	Subsit, Bagnan, Howrah	Saddam Jamadar
6	DUDKUMAR BAR	Subsit, Bagnan, Howrah MUKUNDADIHATI	DUDKUMAR BAR
7	SK JAHANGIR ALI	Subsit, Bagnan, Howrah	SK Jahangir Ali
8	SK ABU TAHER	Subsit, Bagnan, Howrah	SK Abu TaHER
9	SK HASAN	Subsit, Bagnan, Howrah	SK Hasan
10	SK HANIF ALI	Subsit, Bagnan, Howrah	SK Hanif. Ali
11	SK AKRAM ALI	Subsit Bagnan, Howrah	SK Akram
12	SK. MUKUL	Subsit, Bagnan, Howrah	SK MUKUL
13	M.D MASIDUL	Subsit, Bagnan, Howrah	M.D Masudul
14	M.D TANJIM	Subsit, Bagnan, Howrah	M.D. Tanjim
15	DR. MANIRUL	Subsit, Bagnan, Howrah	DR. Manirul
16	BAKUL	Subsit, Bagnan, Howrah	BAKUL
17	ASRAFUL	Subsit, Bagnan, Howrah	ASRAFUL
18	SK ASRAF	Subsit, Bagnan, Howrah	SK ASRAF
19	MURSELM	Subsit, Bagnan, Howrah	MURSELM
20	SAHABUL KHAN	Subsit, Bagnan, Howrah	SAHABUL KHAN

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Khalna More, P.S. Bagnan, Howrah – 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

SL. No.	Name	Address	Signature
21	TAHIBUL	Subsit, Bagnan, Howrah	Tahibul Islam
22	SK SANAM	subsit, Bagnan, Howrah	SK SANAM
23	SK. SARIKUL	SUBSIT Bagnan, Howrah	SK SARIKUL
24	DIYA AZI	Subsit Bagnan Howrah	BEJOY NURSAHMA
25	MURJANAN	subsit Bagnan, Howrah	SK MONIRUL
26	SK MONIRUL	subsit	SK MONIRUL
27	SK Lokhibul Islam	subsit, Bagnan, Howrah	Law
28	sk Rosidul Islam	subsit, Bagnan, Howrah	Rosidul Islam
29	SUSANMUL B	SUBSIT	SUSANMUL B
30	JY AUL HOSSAIN	Kishmat Brahmo	Jyaul Hossain
31	SK JAIUDDIN	subsit Bagnan Howrah	SK JAIUDDIN
32	SK. RAJU	Subsit Bagnan Howrah	SK. RAJU
33	ARIF	Subsit Bagnan, Howrah	ARIF
34	SWAPAN PATRA	Subsit Bagnan, Howrah	SWAPAN PATRA
35	SK SAIFUDDIN	Subsit Bagnan, Howrah	SK SAIFUDDIN
36	SK. JAKIR	Subsit Bagnan, Howrah	SK JAKIR
37	SK. MEERAJ	Subsit Bagnan, Howrah	SK MEERAJ
38	SK. SONAM	subsit Bagnan, Howrah	SK. SONAM
39	SK. Saiful Haque	Subsit Bagnan Howrah	SK. Saiful Haque
40	AMIRUL	Subsit Bagnan Howrah	AMIRUL

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Khalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

SL. No.	Name	Address	Signature
41	Biswasjit Patra	Subsit Bagnan Howrah	Biswasjit Patra
42	SK MIRIS	Subsit Bagnan, Howrah	SK MIRIS
43	SK SAIFUL ALI	Khalna more, Bagnan	SK SAIFUL ALI
44	SK SAFIKUL	BAGUR, BAGRAN Bagnan	SK SAFIKUL
45	ASHADUL ALI	Godi, Bagnan, Howrah	ASHADUL ALI
46	SARIDUL	Godi Bagnan, Howrah	SARIDUL
47	SIRAJ	BAGUR, Bagnan, Howrah	SIRAJ
48	MOFIJUL	Khalna more, Bagnan	MOFIJUL
49	MOFIJUL	Borambhan Golum,	MOFIJUL
50	M. I. H. BIBUL	Subsit, Bagnan, Howrah	M. I. H. BIBUL
51	PIJUSH	Subsit Bagnan, Howrah	PIJUSH
52	PRIYO BAR	Godi, Bagnan, Howrah	PRIYO BAR
53	SK SAHID	Subsit, Bagnan	SK SAHID
54	AJIJUL	Chalidhouda, Bagnan	AJIJUL
55	MUJAMIL	Subsit, Bagnan,	MUJAMIL
56	HASSAN	Subsit, Bagnan	HASSAN
57	SK Monimul Ali	Godi, Bagnan,	SK Monimul Ali
58	SURAT KHAN	Godi, Bagnan,	SURAT KHAN
59	SK SAHADUL	Subsit, Bagnan,	SK SAHADUL
60	RAJU	Godi, Bagnan,	RAJU

Public Hearing of M/s Detergeo Chem (East) Private Limited held at Sri Krishna Bhavan, Bagnan, Mukhuda Dighi, Khalna More, P.S. Bagnan, Howrah - 711303 on 23.08.2021 at 12:30 pm

ATTENDANCE SHEET

Sl. No.	Name	Address	Signature
61	OSIAR MONDAL	Godi Bagnan Howrah	373000031500
62	SK. JALLAUDDIN	Godi Bagnan, Howrah	SK Jalaluddin
63	BABLU BERA	CHALIDHAURIA	बबलू बेरा
64	RINTU GHOSH	CHALIDHAURIA	Rintu Ghosh
65	SANHRAM MONDAL	MUKUNDA DIGHI	Sanhram Mondal
66	PARAJAY BAR	MUKUNDA DIGHI	পারজয় বার
67)	DIPAK PATRA	MUKUNDA DIGHI	দীপক পাত্র
68)	BIKRAM MATH	CHAKUR, BAGNAN	Bikram Math
69)	BAPI MATH	CHAKUR, BAGNAN	Rajkumar Math
70)	SANDIP JANA	Chakur, Bagnan	Sandip Jana
71)	ASHADUL	Chakur, Bagnan	আশাদুল
72)	SK SAMIN	Bagnan, Bagnan	SK Samin
73)	SK. ANISUR,	Godi, Bagnan	SK Anisur
74)	MANIRUL	Godi, Bagnan	মানিরুল
75)	HASIBULKHAN	Godi, Bagnan	হাসিবুলখান

ACTION PLAN:

Public hearing is conducted on 23.08.2021 at 12:30 P.M at New Sri Krishna Bhavan, Bagnan, Mukunda Dighi, Khalna More P.S Bagnan, District- Howrah, State- West Bengal.

Issue raised and their reply with action plan and budgetary allocation as per the TOR is given below:

S. No.	Name of the Person	Points Raised	Replies and Action Plan	Budet
1.	Janab Monirul Islami Village- Shyampur,	He welcomed the project and asked about the wastage of the water.	The project proponent answered that no water will be discharged out of the plant area as the project has been conceived as ZLD.	1.0 Lakh/year
2.	S.K Ahed Ali Village- Subsit (Paschim)	He welcomed the proposed project and questioned about the greenery development to be done by the project proponent.	The project proponent replied that the adequate plantation will be done to maintain a greenbelt and to comply with the environmental norms.	
3.	S.K Manirul Ali Village- Bagur (Subsit)	He welcomed the proposed project and asked about the possible noise pollution that can be caused by the project	The project proponent said that the adequate measures will be taken to attenuate noise arising out of the project so that it meets ambient noise standards.	

S. No.	Name of the Person	Points Raised	Replies and Action Plan	Budet
4.	Janab Jahiruddin Ali Village- Patinan	He welcomed the proposed project and asked about the prospect of local employment in the project.	The project proponent replied that both skilled and unskilled workers will be employed from the local areas and also proper training will be imparted so that they can develop themselves as per the project requirement as well as for private entrepreneurship	2.0 Lakh/year
5.	Janab Jiyarul Hussain Village- Kismat Brahman	He welcomed the proposed project and asked about the prospect of lo	The project proponent replied that the total work strength, 60% will be from the local areas.	





EDS(viii): Details of onsite/offsite emergency plan/DMP and its approval needs to be submitted. PP in chapter 7, has submitted very generic DMP. Please revise accordingly.

REPLY: Details of onsite/offsite emergency plan/DMP and its approval are as follows:

DISASTER MANAGEMENT PLAN

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Disaster Management Plan, it should be widely circulated and personnel training should be provided through rehearsals/drills.

To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a Disaster Management Plan has to be formulated and this planned emergency document is called "Disaster Management Plan".

The objective of the Industrial Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area;
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

In effect, it is to optimize operational efficiency to rescue, rehabilitate and render medical help and to restore normalcy.

Emergencies

General and Industrial Emergencies

The emergencies that could be envisaged in the plant and tank farm are as follows:

- A situation of fire at the tank farm of all storages;
- Slow isolated fires;
- Fast spreading fires;
- Structural failures;
- Contamination of food/water; and
- Sabotage/Social disorder.

Specific Emergencies Anticipated

Fire and Explosion



Fire consequences can be disastrous, since they involve huge quantities of fuel either stored or in dynamic inventory in pipelines or in nearby areas. Toxic releases can affect persons working around. Preliminary hazard Analysis has provided a basis for consequence estimation.

Emergency Organization

The DCEPL will set up an Emergency Organization. A senior executive who has control over the affairs of the plant would be heading the Emergency Organization. He would be designated as Site Controller. As per the General Organization chart, Chief Operating Officer will be the Site Controller. General Manager will be designated as the Incident Controller. All the Incident Controllers would be reporting to the Site Controller.

All the department heads, fire & security officer, communication officer and personal manager will be reporting to the Incident Controller. This team will be responsible for controlling the incidence with the personnel under their control. Shift In charge will be the reporting officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller. The team co-ordinates during eventualities and responsible for firefighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, security in charge, personnel department, and essential services personnel are engaged. All these personnel will be designated as key personnel.

In each shift, electrical supervisor, electrical fitters, pump house in charge and other maintenance staff will be drafted for emergency operations. In the event of power or communication system failure, some of staff members in the office/plant offices will be drafted and their services would be utilized as messengers for quick passing of communications.

Emergency Communication

Whoever notices an emergency situation such as fire, escalation of fire, leakage etc will inform his immediate superior and Emergency Control Center. A place nearer to the security office shall be identified as Emergency Control Center. The person on duty in the Emergency Control Center would appraise the Site Controller. Site Controller verifies the situation from the Incident Controller of that area or the Shift In- charge and takes a decision about an impending On Site Emergency. This would be communicated to all the Incident Controllers, Emergency Co-ordinators. Simultaneously, the emergency warning system would be activated on the instructions of the Site Controller.

Onsite Emergency Preparedness and Response for Accidents

Emergency Responsibilities

The responsibilities of the key personnel are appended below:

Site Controller:

On receiving information about emergency he would rush to Emergency Control Center (ECC) and take charge of ECC and the situation and;

- Assesses the magnitude of the situation on the advice of incident Controller and decides, whether the affected area needs to be evacuated,



- Whether personnel who are at assembly points need to be evacuated,
- Declare Emergency and order for operation of emergency siren,
- Organizes announcement by public address system about location of emergency,
- Assesses which areas are likely to be affected, or need to be evacuated or need to be alerted,
- Maintains a continuous review of possible development and assesses the situation in consultation with Incident Controller and other Key Personnel as to whether shutting down the plant or any section of the plant is required and if evacuation of persons is required,
- Directs personnel for rescue, rehabilitation, transport, fire brigade, medical and other designated mutual support systems locally available, for meeting emergencies.
- Controls evacuation of affected areas, if the situation is likely to go out of control or effects are likely to go beyond the premises of the factory, informs the District Emergency Authority, Police, Hospital and seeks their intervention and help,
- Informs the Inspector of Factories, Deputy Chief Inspector of Factories, WBPCB and other statutory authorities,
- Gives a public statement if necessary,
- Keeps record of chronological events and prepares an investigation report and preserve evidence,
- On completion of On Site Emergency and restoration of normalcy, declares all clear and orders for all clear warning.

Incident Controller:

- Assembles the incident control team.
- Directs operations within the affected areas with the priorities for safety to personnel minimize damage to the plant, property and environment and minimize the loss of materials.
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency.
- Ensure that key personnel help is sought.
- Provides advice and information to the Fire and Security Officer and the Local Fire Services as and when they arrive.
- Ensures that all non-essential workers/staff of the affected areas evacuated to the appropriate assembly points, and the areas are searched for casualties.
- Has regard to the need for preservation of evidence so as to facilitate any inquiry into the causes and circumstances, which caused or escalated the emergency.
- Co-ordinates with emergency services at the site.
- Provides tools and safety equipment to the team members.
- Keeps in touch with the team and advice them regarding the method of control to be used.
- Keeps the Site Controller of Emergency informed of the progress being made

Emergency Coordinator - Rescue, Fire Fighting:

- Helps the incident Controller in containment of the emergency;



- Ensures fire pumps are in operating conditions and instructs pump house operator to be ready for any emergency with standby arrangement;
- Guides the firefighting crew i.e. firemen, trained plant personnel and security staff;
- Organizes shifting of the firefighting facilities to the emergency site, if required;
- Takes guidance of the Incident Controller for firefighting as well as assesses the requirements of outside help;
- Arranges to control the traffic at the gate and the incident area;
- Directs the security staff to the incident site to take part in the emergency operations under his guidance and supervision;
- Evacuates the people in the plant or in the nearby areas as advised by Site Controller;
- Searches for casualties and arranges proper aid for them;
- Assembles search and evacuation team;
- Arranges for safety equipment for the members of this team;
- Decides which paths the evacuated workers should follow;
- Maintains law and order in the area, and if necessary seeks the help of police.

Emergency Coordinator-Medical, Mutual Aid, Rehabilitation, Transport and Communication:

- In the event of failure of electric supply and thereby internal telephone, sets up communication point and establishes contact with the ECC;
- Organizes medical treatment to the injured and if necessary will shift the injured to nearby hospitals;
- Mobilizes extra medical help from outside, if necessary;
- Keeps a list of qualified first aid providers of the factory and seek their assistance;
- Maintains first aid and medical emergency requirements;
- Makes sure that all safety equipment is made available to the emergency team;
- Assists Site Controller with necessary data and to coordinate the emergency activities;
- Assists Site Controller in updating emergency plan, organizing mock drills verification of inventory of emergency facilities and furnishing report to Site Controller;
- Maintains liaison with Civil Administration;
- Ensures availability of canteen facilities and maintenance of rehabilitation center;
- He will be in liaison with Site Controller/Incident Controller;
- Ensures transportation facility;
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure;
- Controls rehabilitation of affected areas on discontinuation of emergency;
- Ensures availability of diesel/petrol for transport vehicles engaged in emergency operation.

Emergency Coordinator - Essential Services:

- He would assist Site Controller and Incident Controller.
- Maintains essential services like Diesel Generator, Water, Fire Water, Compressed Air/Instrument Air, power supply for lighting.



- He would plan alternate facilities in the event of power failure, to maintain essential services such as lighting, refrigeration plant etc.
- He would organize separate electrical connections for all utilities and emergency services so that in the event of emergency or fires, essential services and utilities are not affected.
- Gives necessary instructions regarding emergency electrical supply, isolation of certain sections etc. to shift in-charge and electricians.
- Ensures availability of adequate quantities of protective equipment and other emergency materials, spares etc.

General Responsibilities of Employees during an Emergency:

During an emergency, it becomes more enhanced and pronounced when an emergency warning is raised, the workers if they are in-charge of process equipment should adopt safe and emergency shut down and attend any prescribed duty as essential employee. If no such responsibility is assigned, he should adopt a safe course to assembly point and await instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

Emergency Facilities

Emergency Control Center (ECC):

For the time being, Office Block or a place nearer to the security office is identified as Emergency Control Center. It would have external Telephone, Fax, and Telex facility. All the Site Controller/ Incident Controller Officers, Senior Personnel would be located here. Also, it would be an elevated place.

The following information and equipment are to be provided at the Emergency Control Center (ECC).

- Intercom, telephone
- P and T telephone
- Safe contained breathing apparatus
- Fire suit/gas tight goggles/gloves/helmets
- Hand tools, wind direction/velocities indications
- Public address megaphone, hand bell, telephone directories
- (Internal P and T) factory layout, site plan
- Emergency lamp/torch light/batteries
- Plan indicating locations of hazard inventories, plant control room, sources of safety equipment, work road plan, assembly points, rescue location vulnerable zones, escape routes.
- Hazard chart
- Emergency shut- down procedures
- Nominal roll of employees
- List of key personnel, list of essential employees, list of Emergency Co-ordinators
- Duties of key personnel.
- Address with telephone numbers and key personnel, emergency coordinator, essential employees.



Important address and telephone numbers including Government agencies, neighboring industries and sources of help, outside experts, chemical fact sheets population details around the factory.

Assembly Point:

Number of assembly points depending upon the plant location would be identified wherein employees who are not directly connected with the disaster management would be assembled for safety and rescue. Emergency breathing apparatus, minimum facilities like water etc. would be organized. In view of the size of plant, different locations are ear marked as assembly points. Depending upon the location of hazard, the assembly points are to be used.

Fire Fighting Facilities:

First Aid Firefighting equipment suitable for emergency should be maintained in each section in the plant. This would be as per statutory requirements. However, fire hydrant line covering major areas would be laid. It would be maintained at 6- 7 kg/cm² pressure. Fire alarms would be located in the bulk storage areas. Fire officer will be the commanding officer of firefighting services.

Location of Wind Sock:

On the top of the Administration block and the top of each production blocks, windsocks shall be installed to indicate direction of wind for emergency escape.

Emergency Medical Facilities:

Stretchers, gas masks and general first aid materials for dealing with fire burns would be maintained in the medical center as well as in the emergency control room. Medical superintendent of the township will be the head of the causality services ward. Private medical practitioners help would be also are sought. Government hospital would be approached for emergency help.

Apart from plant first aid facilities, external facilities would be augmented. Names of Medical Personnel, Medical facilities in the area would be prepared and updated. Necessary specific medicines for emergency treatment of Burns for Patients and for those affected by toxicity would be maintained. Breathing apparatus and other emergency medical equipment would be provided and maintained. The help of nearby industrial management in this regard would be taken on mutual support basis.

Ambulance:

An ambulance with driver availability in all the shifts and an emergency shift vehicle would be ensured and maintained to transport injured or affected persons. Number of persons would be trained in first aid so that, in every shift, first aid personnel would be available.

Emergency Actions

Emergency Warning

Communication of emergency would be made familiar to the personnel inside the plant and people outside. An emergency warning system shall be established.



Emergency Shutdown

There are number of facilities which can be provided to help deal with hazardous conditions, when a tank is on fire. The suggested arrangements are:

- Stop the production;
- Dilute contents;
- Remove heat;
- Deluge with water; and
- Transfer contents.

Whether a given method is appropriate depends on the particular case. Cessation of agitation may be the best action in some instances but not in others. Stopping of the feed may require the provision of bypass arrangements. Methods of removing additional heat include removal through the normal cooling arrangements or use of an emergency cooling system. Cooling facilities, which use vapouring liquid, may be particularly effective, since a large increase in vaporization can be obtained by dropping pressure.

Evacuation of Personnel:

There could be more number of persons in the storage area and other areas in the vicinity. The area would have adequate number of exits and staircases. In the event of an emergency, unconnected personnel have to escape to assembly point. Operators have to take emergency shutdown procedure and escape. Time Office maintains a copy of deployment of employees in each shift, at ECC. If necessary, persons can be evacuated by rescue teams.

All Clear Signal:

Also, at the end of an emergency, after discussing with Incident Controllers and Emergency Co-ordinators, the Site Controller orders an all clear signal. When it becomes essential, the Site Controller communicates to the District Emergency Authority, Police, Fire service personnel regarding help required or development of the situation into an Off-Site Emergency.

Employee Information:

During an emergency, employees would be warned by raising siren in specific pattern. Employees would be given training of escape routes, taking shelter, protecting from toxic effects. Employees would be provided with information related to fire hazards, antidotes and first aid measures. Those who would be designated as key personnel and essential employees should be given training to emergency response.

Public Information and Warning:

The industrial disaster effects related to this plant may mostly be confined to the plant area. The detailed risk analysis has indicated that the pool fire effects would not be felt outside. However, as an abundant precaution, the information related to chemicals in use would be furnished to District Emergency Authority for necessary dissemination to general public and for any use during an off-site emergency. Factories of this size and nature are in existence in our state since long time.



Co-ordination with Local Authorities:

Keeping in view of the nature of emergency, two levels of coordination are proposed. In the case of an On Site Emergency, resources within the organization would be mobilized and in the event of extreme emergency, local authorities help should be sought.

In the event of an emergency developing into an off-site emergency, local authority and District emergency Authority (normally the Collector) would be appraised and under his supervision, the Off Site Disaster Management Plan would be exercised. For this purpose, the facilities that are available locally, i.e. medical, transport, personnel, rescue accommodation, voluntary organizations etc. would be mustered. Necessary rehearsals and training in the form of mock drills should be organized.

Mutual Aid:

Mutual aid in the form of technical personnel, runners, helpers, special protective equipment, transport vehicles, communication facility etc. should be sought from the neighboring industrial management.

Mock Drills:

Emergency preparedness is an important step in planning of Industrial Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel should be trained in the operations.

Important Information:

Once the Plant goes into stream, important information such as names and addresses of key personnel, essential employees, medical personnel, outside the plant, transporters address, address of those connected with Off Site Emergency such as Police, Local Authorities, Fire Services, District Emergency Authority should be prepared and maintained.

Off-Site Emergency Preparedness Plan**Introduction**

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency situation go beyond the plant boundaries, it becomes an off -site emergency. Off-site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighboring population.

The off- site plan in detail will be based on those events, which are most likely to occur, but other less likely events, which have severe consequence, will also be considered. Incidents which have very severe consequences yet have a small probability of occurrence should also be considered during the preparation of the plan. However, the key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.



The roles of the various parties who will be involved in the implementation of an off - site plan are described below. Depending on local arrangements, the responsibility for the off- site plan should be either rest with the works management or, with the local authority. Either way, the plan should identify an emergency coordinating officer, who would take the overall command of the off-site activities. As with the on-site plan, an emergency control center should be setup within which the emergency coordinating officer can operate.

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors:

- In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire likely need to be evacuated, although a severe smoke hazard may require this to be reviewed periodically;
- If a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people should be advised to stay indoors and shield them from the fire. This latter case particularly applies if the installation at risk could produce a fireball with very severe thermal radiation effects;
- For release or potential release of toxic materials, limited evacuation may be appropriate down wind, if there is time. The decision would depend partly on the type of housing "at risk".

Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty house, which exist close to factories, offer little or no protection.

The major difference between releases of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say 300 m per minute covers a large area of land very quickly.

Any consideration of evacuation should take this into account. Although the plan will have sufficient flexibility built in to cover the consequences of the range of accidents identified for the on-site plan, it will cover in some detail the handling of the emergency to a particular distance from each major hazard works.

Aspects Proposed to be considered in the Off-Site Emergency Plan

The main aspects, which should be included in the emergency plan are:

Organization

Details of command structure, warning systems, implementation procedures, emergency control centers.

Names and appointments of incident controller, site main controller, their deputies and other key personnel.

Communications



Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

Specialized knowledge

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized chemical knowledge and laboratories.

Voluntary organizations

Details of organizers, telephone numbers, resources etc.

Chemical information

Details of the hazardous substances stored or procedure on each site and a summary of the risks associated with them.

Meteorological information

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts.

Humanitarian arrangements

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances and temporary mortuaries.

Public information

Arrangements for dealing with the media press office and informing relatives, etc.

Assessment of emergency plan

Arrangements for: (a) Collecting information on the causes of the emergency; (b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

Role of the Emergency Coordinating Officer

The various emergency services should be coordinated by an Emergency Coordinating Officer (ECO), who will be designated by the district collector. The ECO should liaison closely with the site main controller. Again, depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

Role of the Local Authority

The duty to prepare the off-site plan lies with the local authorities. The Emergency Planning Officer (EPO) appointed should carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO should liaison with the works, to obtain the information to provide the basis for the plan. This liaison should ensure that the plan is continually kept up to date.



It will be the responsibility of the EPO to ensure that all those organizations, which will be involved in off-site handling of the emergency situation, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off- site plans should be organized by the EPO.

Role of Police

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements.

Their functions should include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

Role of Fire Authorities

The control of a fire should be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions and toxic release.

Fire authorities in the region should be appraised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They should be involved in on- site emergency rehearsals both as participants, and on occasion, as observers of exercises involving only site personnel.

Role of Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, should have a vital part to play following a major accident, and they should form an integral part of the emergency plan. For major fires, injuries should be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. For major toxic releases, the effects vary according to the chemical in question, and the health authorities should be apprised about the likely toxic releases from the plant, which will enable them in dealing with the aftermath of a toxic release with treatment appropriate to such casualties.

Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical "mutual aid" scheme should exist to enable the assistance of neighboring authorities to be obtained in the event of an emergency.

Role of Government Safety Authority

This will be the factory inspectorate available in the region. Inspectors are likely to satisfy themselves that the organization responsible for producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well- documented procedures and evidence of exercise undertaken to test the plan.

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. These may vary from keeping a watching brief to a close involvement in advising on operations in case



involvement in advising on operations. In cases where toxic gases may have been released, the factory inspectorate may be the only external agency with equipment and resources to carry out tests.

Hazard and Operability Study (HAZOP):

A hazard and operability study (HAZOP) is a structured and systematic examination of a complex system, usually a process facility, in order to identify hazards to personnel, equipment or the environment, as well as operability problems that could affect operations efficiency.

The study data of HAZOP in sulphonation plant is given below:



HAZOP WORK SHEET

System No		System Name		Client	Detergeo Chem (East) Private Limited	
Date		3-Jan-24		Report By		
Study Node:1		Sulphur melting		Ref:	P & ID- Drg.No.	LABSA SLES AOS SLS
					Sheet No 1 of 1	
					REV-A	
Line Description/Equipment Description			Capacity:			
No.	Parameter	Deviation	Possible Causes	Possible Consequences	Safe guards available	Recommendations
1	Level 1	Low Level	1. Low level in sulphur melting tank (01V1C)	1. Possible liquid sulphur pump cavitation 2. Sulphur melting tank temperature increases	1. Temperature element (TE), Temperature indicators (TI), Temperature high alarm is available. 2.High temperature interlock will trip gear pump	
		High Level	1. Sulphur melting tank level high	1. More sulphur flow to sulphur melting tank (01V1A) 2.Possible increase in level at the melting tank	1. Level indicator in sulphur melting tank 2. TI Available	Ensure SOP is available during Plant Commissioning and start-up .Proper safety gears should be in place.



				3. Temperature decreases due to more level 4. More steam addition due to temperature decreases.		
			2. Failure of Gear pump (01T1AB)	1. Level high in melting tank 2. Possible low flow to downstream	1. Gear pump running indication in control room 2. PI in the pump discharge	
	Flow	Low flow	1. Low flow to sulphur melting tank	1. Possible liquid sulphur pump cavitation 2. Sulphur melting tank temperature increases	1. High temperature interlock will trip gear pump 2. Temperature element, Temperature indicators, Temperature high alarm is available. 3. Low flow interlock with FICASO3 is available	
	Temperature	Low Temperature	1. Low steam flow to sulphur melting tank	1 Possible decrease in temperature of melting tank 2. More condensation due to low temperature	1. Steam trap with filter is available to remove condensate 2. Pressure indicator available on steam header	



		High Temperature	1. High temperature of sulphur melting tank due to low level or more steam flow	1. Possible increase of temperature of sulphur melting tank may trip product pump (Gear pump)	1. Temperature indicator available 2. Flow indicator in control room	
		Maintenance	1. Failure of steam condensate trap	1. Condensate hold may cause hammering on the steam lines 2. Condensate Filter level increases 3. Possible personnel injuries and break away of flanges due to hammering	1. Provisional manual draining of condensate 2. PPE to workers 3. SOPs available.	
			2. Failure to carry out filter maintenance	1. Possible increase differential pressure of the filter may cause condensate build up on the lines.	1. Periodical maintenance of filter as per SOPs	

HAZOP WORK SHEET

System No		System Name		Client	Detergeo Chem (East) Private Limited	
Date				Report By		
Study Node:2	SO ₃ Generation			Ref:	P & ID-	LABSA SLES AOS SLS (02)



Line Description/Equipment Description		Capacity:				
No.	Parameter	Deviation	Possible Causes	Possible Consequences	Safe guards available	Recommendations
1	Flow	Low Flow	1. Low flow from upstream(melting tank) and possible failure of gear pump	1. Low sulphur to sulphur combustion furnace 2. Possible increase in temperature may damage furnace internals and less heat recovery.	1. Flow indicator available and temperature indicator with low alarm 2. Furnace high and low alarm	
			2. Low diesel flow to start up pre heater	1. Low combustion leading to sulphur furnace temperature low	1. Pressure indicator on diesel pump discharge.	
		High Flow	1. Sulphur flow from gear pump discharge high	1. Possible decrease in combustion discharge may cause low recovery of SO ₂	1. Flow indicator available and temperature indicator with low alarm 2. Furnace high and low alarm	



			2. High air flow from cooling air fan	1. Possibility of pre heater failure due to high air flow	1. Pressure indicator on diesel pump discharge.	
	Level	Low Level	1. Diesel tank level low	1. Low flow to pre heater may cause start up pre heater trip. 2. Possible failure of diesel pump may cause no flow pre heater	1. Pressure indicator and level indicator is available 2. Diesel low flow trip	
	Temperature	Low Temperature	1. Low temperature in combustion furnace.	1. Possible catalyst failure in O1R3 converter. 2. Conversion of SO3 will be affected 3. Nitrogen oxide reduction efficiency will come down due to low temperature	1. Temperature indicator on catalytic convertor and pre heater / Combustion furnace.	
		High Temperature	1. High temperature in catalytic converter due to more heat in pre heater	1. High temperature conditions may cause forming very thin liquid layer on the surface of the catalyst which may affect lifetime of	1. High temperature alarm is available in convertor and SO 3 cooler (1&2)	





Environmental Clearance for the establishment of new natural and synthetic surfactant chemical manufacturing unit at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL)

Draft EIA/EMP REPORT

				catalyst efficiency. 2. The efficiency of SO3 Cooler will come down		
		Maintenance	1. Failure to adhere SOPs	1. Possible deterioration of catalyst may end up with low generation of SO3.	1. SOPs should be followed 2. Periodical maintenance	

HAZOP WORK SHEET

System No		System Name		Client	Detergeo Chem (East) Private Limited	
Date				Report By		
Study Node:3	Air drying and Aging & stabilisation			Ref:	P & ID-Drg.No.	LABSA SLES AOS SLS
					Sheet No 1 of 1	
					REV-A	
Line Description/Equipment Description						
No.	Parameter	Deviation	Possible Causes	Possible Consequences	Safe guards available	Recommendations



1	Flow	Low Flow	1. Process air blower failure	1. Air flow to refrigerant exchanger and glycol tank is less may cause temperature in air water cooler. 2. Air glycol exchange temperature increases.	1. Temperature indicator, pressure indicator and process air blower provided with flow indicator.	
		High Flow	1. More regeneration air flow to air dryer unit	1. Possible over loading of air dryer unit may cause frequent changeover of dryer unit	1. Automatic changeover of air dryer unit on higher Differential pressure. 2. Temperature indicator is available	
	Pressure	High differential pressure	1. High differential pressure caused in air dryers 2. SO3 mist filter differential pressure high.	1. Possible liquid accumulation on air dryer bed may lead to frequent changeover of air dryers. 2. Possible carryover of oleum to gas liquid separator 2. Possible low recovery of oleum	1. Provision of automatic changeover of dryers in case of high differential pressure.	



	Temperature	High temperature	1. Air flow to air water cooler temperature high	1. Process air temperature high may cause frequent makeover of glycol in glycol tank	1. Temperature indicator on the hot air line	
		Maintenance	1. Failure of cooling water recirculation pump	1. Less flow to reactor 03R1 may lead to improper washing. 2. Off spec product (Sulphonic acid)	1. Temperature indicator in reactor and level indicator in oil liquid separator.	
	Level	Low Level	1. Low level in aging vessel (03A1)	1. Flow to Sulphonic acid cooler will be less may cause improper heat exchange.	1. Temperature indicator, Level indicator and pressure indicator in the vessel.	

HAZOP WORK SHEET						
System No		System Name		Client	Detergeo Chem (East) Private Limited	
Date				Report By		
Study Node:4	Exhaust Gas Treatment			Ref:	P & ID-Drg.No.	LABSA SLES AOS SLS
					Sheet No 1 of 1	
					REV-A	
Line Description/Equipment Description						
No.	Parameter	Deviation	Possible Causes	Possible Consequences	Safe guards available	Recommendations



1	Flow	Low Flow	1. Exhaust gas low flow from Sulphonation unit 2. Low air flow from electrode guard blower	1. Improper contact of exhaust gas and caustic soda may lead to off- Spec product.	1. Pressure indicator in the washing circulation pump discharge.	
	Temperature	Low Temperature	1. Steam flow to 03f4 is partially cut -off	1. Improper pre heating, More condensate due to low temp.	TI indicator in both up & downstream	
		Others	Washing circulation pump failure (03P6)	Circulation flow to scrubber stopped may cause washing system failure	PI is indicator is available	
			Power failure	All running pumps Failure	pump running Indication in control room	

HAZOP WORK SHEET

System No		System Name		Client	Detergeo Chem (East) Private Limited	
Date	3-Aug-19			Report By		
Study Node:5	Waste heat recovery			Ref:	P & ID- Drg.No.	LSA Unit
					Sheet No 1 of 1	
					REV-A	
Line Description/Equipment Description						
No.	Parameter	Deviation	Possible Causes	Possible Consequences	Safe guards available	Recommendations



1	Flow	Low	Soft water tank Low level	Hot water Flow to Steam generator low cause low steam generation .Possible tube rupture, soft water pump cavitation.	LIC available , TI & PI available	
2		High	Flow from soft water pump high	Possible level increase in Steam generator, Steam temp will decrease	FI. Temp Indicator available	
3	Level	Low	LV failed to open	Possible level decreases in Steam generator , possible Tube rupture due to high temp	Level indicator / Temp Indicator	
4		High	LV failed to close	Possible level increase in Steam generator, Steam temp will decrease	TI. PI, LI available in steam generator	
5	Temp	Low	As same as Level Low			
6		High	As same as Level High			
7	Other		Soft water quality not meeting the standards	Possible scaling / corrosion in steam generator TUBING.	Periodical sampling as per SOP. Periodical Maintenance.	

EDS(v): Copy of undertaking w.r.t. not proposing any banned products, needs to be submitted.

REPLY: Scanned copy of Letter of undertaking w.r.t. not proposing any banned products.

Detergeo Chem (EAST) Private Limited
[CIN: U24299DL2019PTC353798]
Regd. Office: A-29, Block B1 Ext., Mohan Co-operative Industrial Estate,
New Delhi-110 044, India
[T]: +91-11-40664444; [E]: info@newindiachem.com

Date: 22.01.2024

To:
The Member Secretary,
Expert Appraisal Committee (Industry-3)
Ministry of Environment, Forest and Climate Change (MoEF&CC)
Indira Paryavaran Bhawan, New Delhi

Sub.: Declaration to not produce any banned products at new natural and synthetic surfactant chemical manufacturing unit located at Mouza Kulepairi, P.S. Bangan, District-Howrah, West Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL) in view of consideration for grant of Environmental Clearance.


Ref: 1 Proposal no - IA/WB/IND3/256360/2020
2. File No. No.IA-J-11011/1/2020-IA-II(I)

Dear Sir,

This is to declare and certify that **M/s Detergeo Chem (EAST) Private Limited (DCEPL)** is not proposing production of any banned products at its new natural and synthetic surfactant chemical manufacturing unit located at Mouza Kulepairi, P.S. Bangan, District-Howrah, West Bengal

Yours faithfully,
For M/s Detergeo Chem (EAST) Private Limited (DCEPL)

For Detergeo Chem (East) Pvt. Ltd.


Director

EDS(vii): As per s.no. 39 of form 2, presentation is not uploaded as per template provided by the EAC. Please revise the same.

REPLY: As per s.no. 39 of form 2, presentation is as follows:

WELCOMES HON'BLE CHAIRMAN, MEMBER SECRETARY & MEMBERS OF EAC, MoEF&CC

IN THE PRESENTATION FOR GRANT OF EC

FOR

**ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC SURFACTANT CHEMICAL MANUFACTURING
AT**

MOUZA KULEPAIRI, P.S. BAGNAN, DIST.-HOWRAH, WEST BENGAL

(CATEGORY "A" AS PER EIA NOTIFICATION 2006 AND ITS CONTINUOUS AMENDMENTS)

Date of Application Submission: 07/02/2024	Detail of Public Hearing : 23/08/2021
EDS raised on - 21/02/2022	Status of forest clearance (FC) : N/A
Date of acceptance :	Applicability of Coastal regulatory zone (CRZ) if any - N/A
Project Type : Industry project-3	Certified Compliance submitted: N/A
Wildlife Sanctuary :N/A	EIA Co-ordinator : Mr. Nilesh Vitthal Potdar
Mantec Consultants Pvt. Ltd.	
NABET Certificate No.: NABET/EIA/23-26/RA 0305_Rev.01	Validity: April 20,2026



Environmental Consultant
Mantec Consultants Private Limited

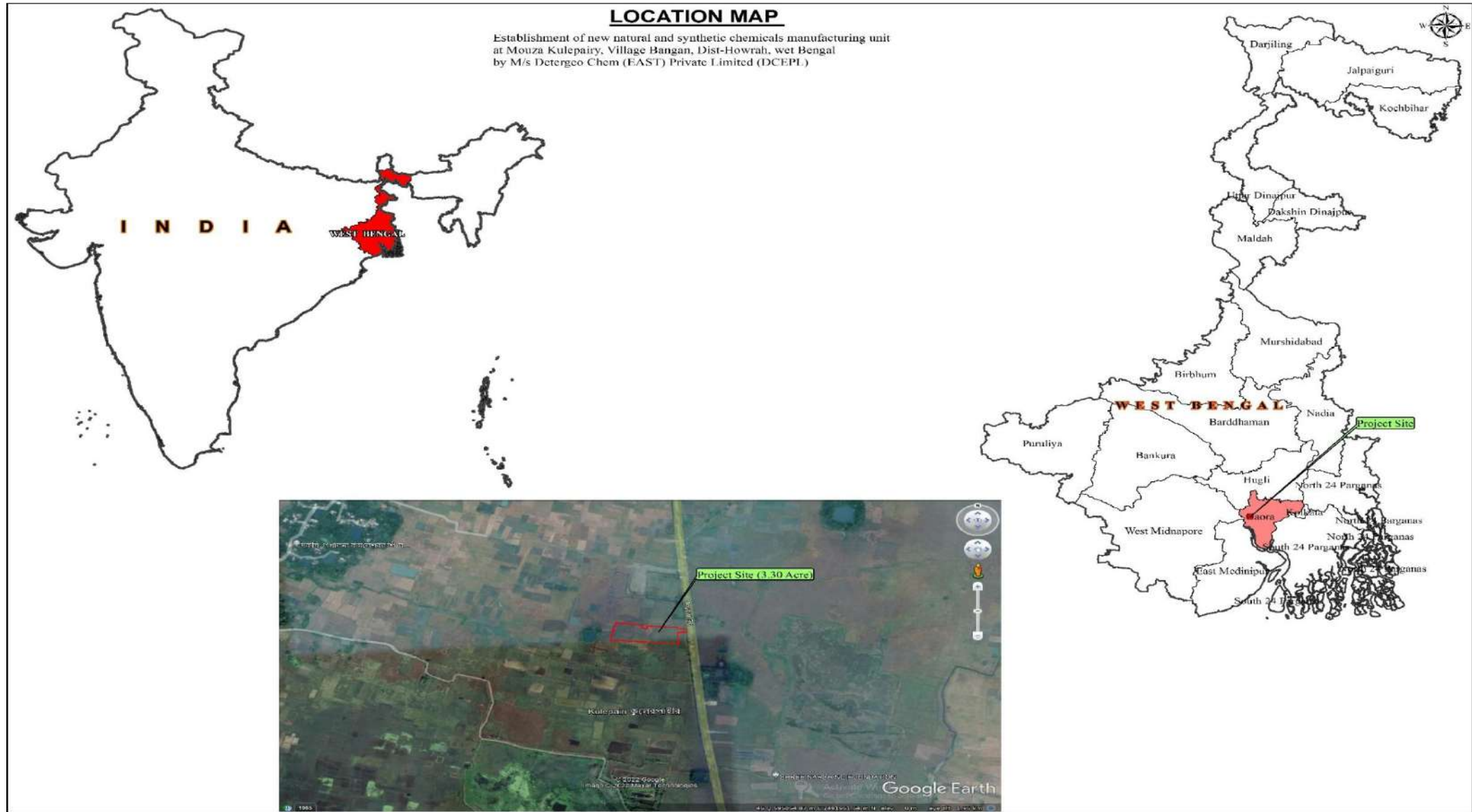


- ❑ M/s Detergeo Chem (East) Private Limited (DCEPL) is a **fully owned subsidiary of New India Group**.
- ❑ New India Group is a **fourth generation family-owned and professionally managed** diversified business group.
- ❑ The group was **founded in 1947** and is primarily into manufacturing and trading of dyes, chemical and textiles.
- ❑ The group has been **manufacturing surfactants since the year 1990**.
- ❑ The group's mission is to best serve the needs of its valuable customers by conducting business in line with its core values of integrity and reliability.
- ❑ Proposed project is for the establishment of **new natural and synthetic surfactant chemical manufacturing** unit at DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141, **Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal by M/s Detergeo Chem (East) Private Limited (DCEPL)**.

- ❑ The unit planned for the production of Linear Alkylbenzene Sulphonic Acid, Alpha Olefin Sulphonate, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate, Cocoamidopropyl Betaine, Cocamide Monoethanolamine, Cocamide Diethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate.
- ❑ As per EIA Notification dated 14th Sep.,2006, the proposed project of falls under **Activity 5(f)** for project covered **under “Synthetic Organic Chemicals Industry” and falls under ‘A’ category.**
- ❑ M/s Detergeo Chem (East) Private Limited (DCEPL) is a fully owned subsidiary of New India Group.
- ❑ **Production capacities** , has been estimated as **82,400 MT/A.**
- ❑ **The total area** of the project is **1.3493 ha.**
- ❑ The unit proposes to **consume 203 KLD of Fresh water from state water tankers.**
- ❑ **33% of the Total Project Area (i.e. 3019 sq. m)** is for green belt development.
- ❑ D.G. Set and Sulphonation process emissions are the main sources of air pollution.
- ❑ Noise generated due to plant operations, and transportation are the main sources of noise pollution.
- ❑ Average **cost** of the project be **Rs. 20 Crores.**
- ❑ **The total man power requirement** of the project will be **200** men.
- ❑ **The CER Cost** of the project is **Rs. 40 Lakhs.**

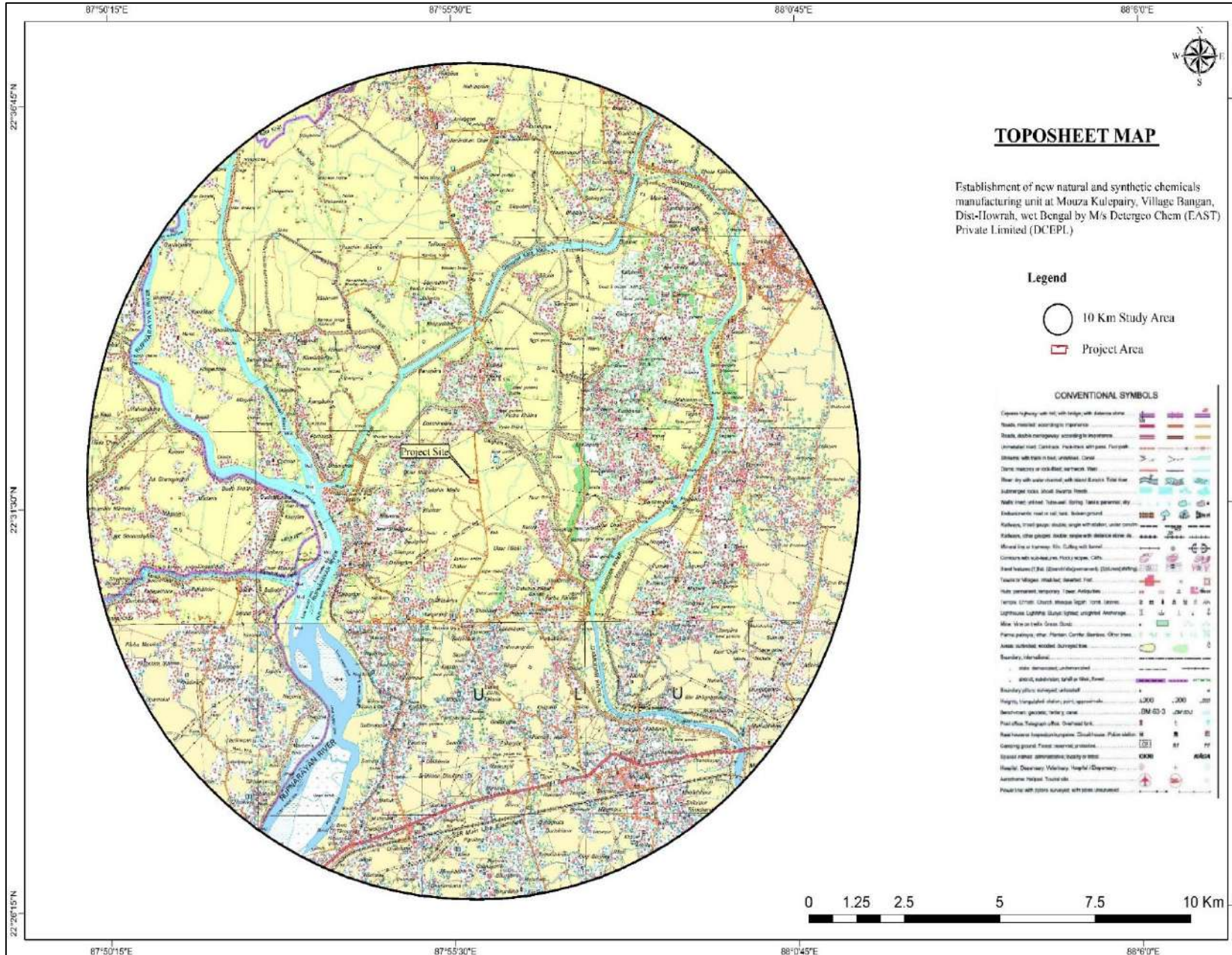
Name of the Project	M/s Detergeo Chem (EAST) Private Limited (DCEPL)	
Location	Village	Mouza Kulepairi,
	Tehsil	P.S. Bagnan
	District	Howrah
	State	West Bengal
	Geographical Coordinates	22°31'49.08"N & 87°55'47.78"E
	Toposheet (OSM) No.	73N/14, 73N/15, 79B/2 & 79B/3.
Size of the Project	1.3493 Ha	
% of green belt provided	33% of the Total Project Area , 3019 sq. m	
Category of Project	5(f) Category "A" of EIA notification	
Manpower	200 men {operational phase-40(permanent) & construction phase-160(temporary)}	
Estimated Project Cost	Average cost of the project be Rs. 20 Crores	
EMP Cost	Rs. 150 Lakhs (capital cost), Rs. 17 Lakhs /Yr (Recurring cost)	
CER Cost	Rs. 40 Lakhs	

Water Consumption/day	203 KLPD	
Source of water	Water Tanker	
Kind of Fuel used	Name of Fuel	Use
	HSD	DG Set 1
	Sulfur	Sulphonation Plant
	LDO	2tph Boiler
Quantity of fuel used	Name of Fuel	Quantity
	HSD	100 L/hr
	Sulfur	500 KG/hr
	LDO	155 L/hr
Waste Water Generated/day	The total waste water generation is 10.7 KLPD which will be treated in in-house ETP and this treated water will be re-used in the scrubber and for gardening purpose.	
Mode of discharge	Zero Discharge and will successfully recycle the entire water back to plant use.	
Energy Consumption	1000 KW sourced through WBSEDCL. DG set will be installed of 1000 KW in case of power failer.	



Geographical Coordinates

22°31'49.08"N & 87°55'47.78"E

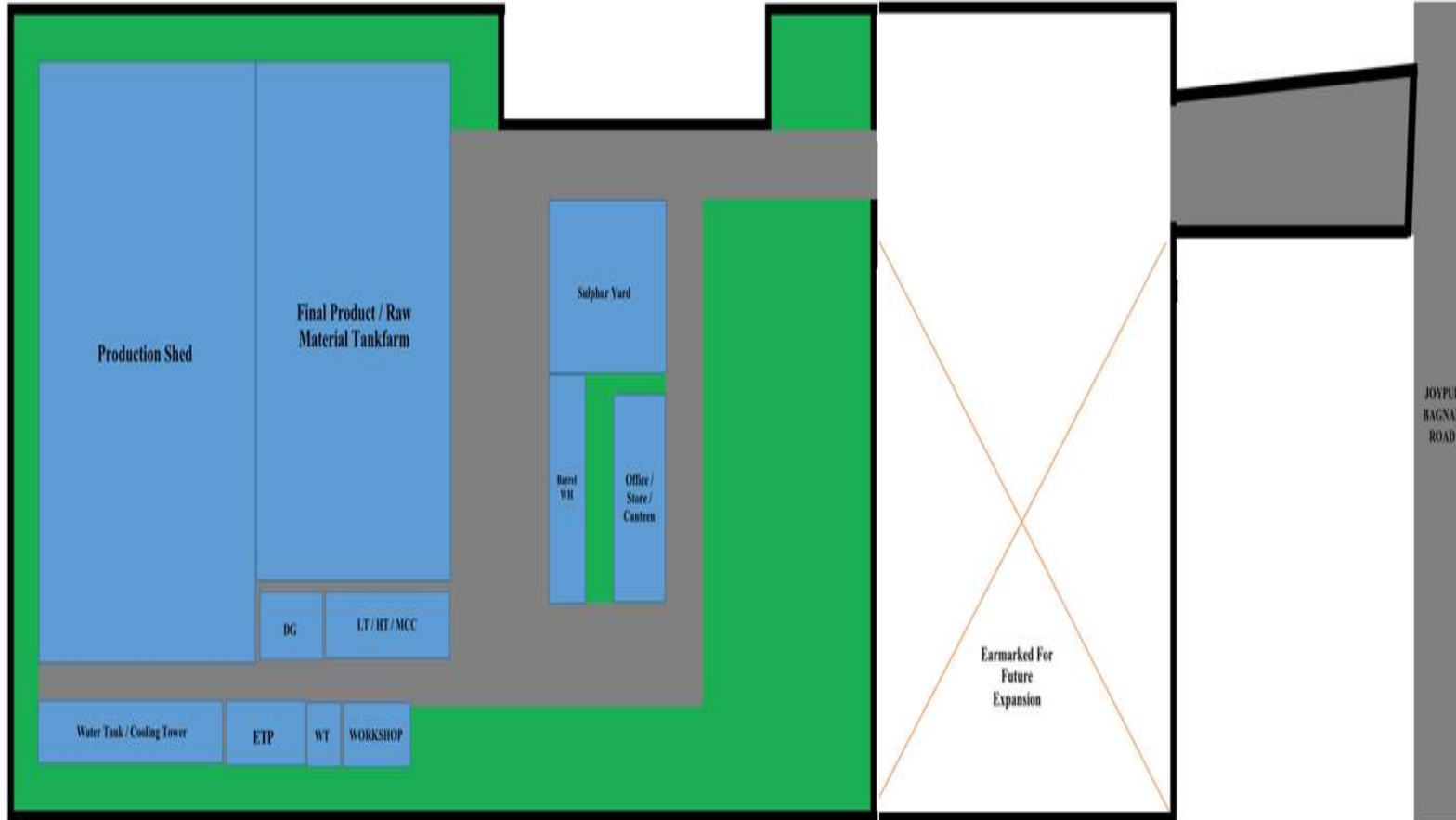


Particulars	Details & Direction
Water Bodies	1. Rupnarayan river- 3.6 Kms
	2. Damodar kata Nadi (Hurhur khal)-2.7 Kms
	3. Mendeshwari River- 3.8 Kms
	4. Kanashabat Nadi- 49 Kms
	5. Damodar River- 4.0 Kms
	6. Gaighata Khal -1.1 Kms

Toposheet (OSM) No.	73N/14, 73N/15, 79B/2 & 79B/3.
----------------------------	---

Nearest Airport	Netaji Subhash Chandra Bose International Airport~ 54 Km, E
Nearest Railway Station	Bagnan~ 8.7 Km, SE
Nearest State Highway/ National Highway	NH-16 ~7.4 Km, SE SH-15 ~5.7 Km, SE
Seismic Zone	Zone II
Water Body	Rupnarayan River- 3.6 Kms Damodar Kata Nadi (Hurhur Khal)-2.7 Kms Mendeshwari River-3.8 Kms Kanashabat Nadi- 49 Kms Damodar River- 4.0 Kms Gaighata Khal -1.1 Km
Nearest Town/ Major City with 200000 population	Bagnan~7.4 Km, SE
Medical Facilities	Rural Hospital, Bagnan~7.8, SE
Education Facilities	DMB high school, Mankur~1.90km, SW
List of industries/ Project activities within 10 Km radius	M/s. Tandhan Cotton Mills Private Limited- Textile M/s. Tandhan biochemical Private Limited M/s Mohan Boards Pvt Ltd



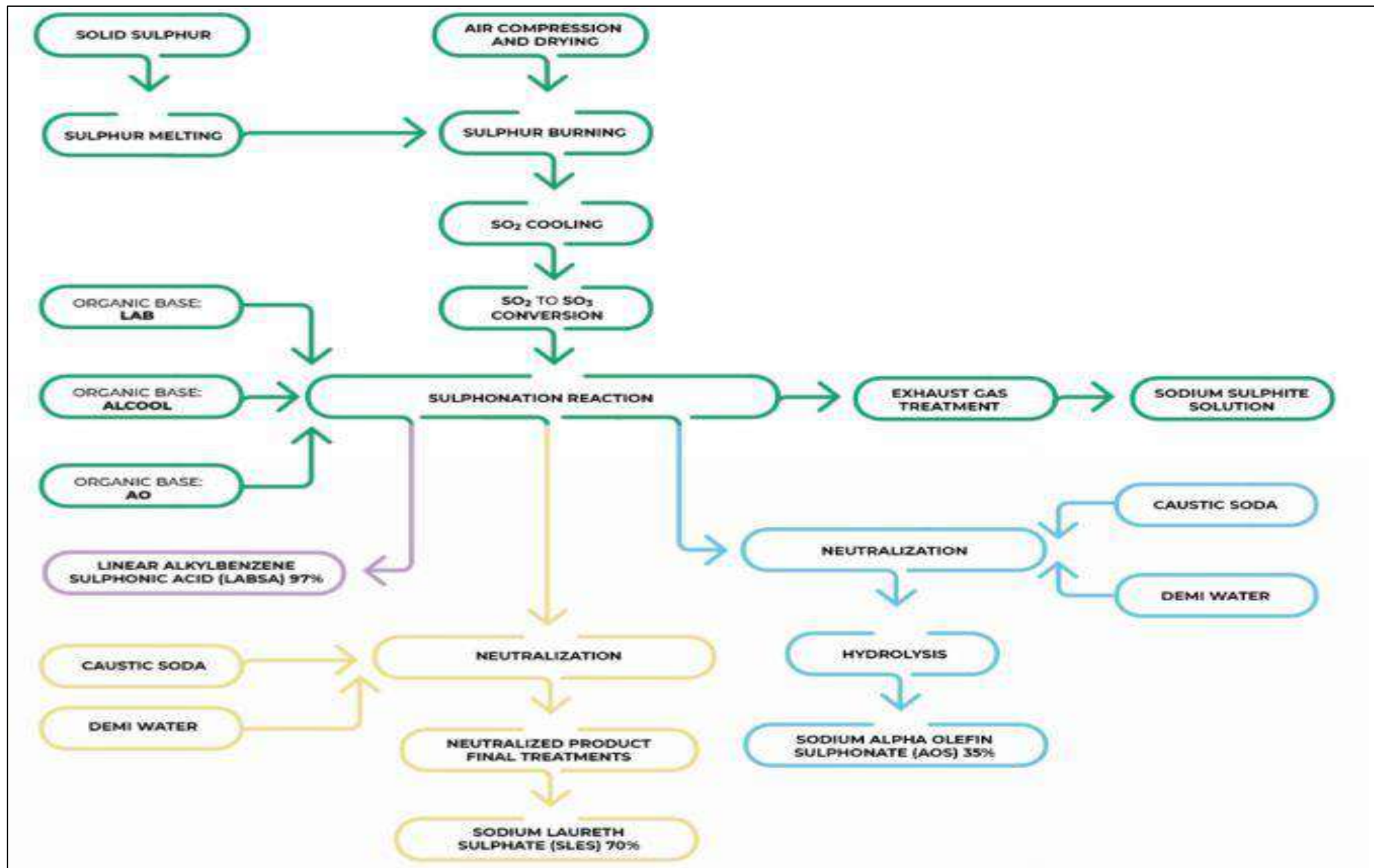


PROJECT LAYOUT



SITE PHOTOS





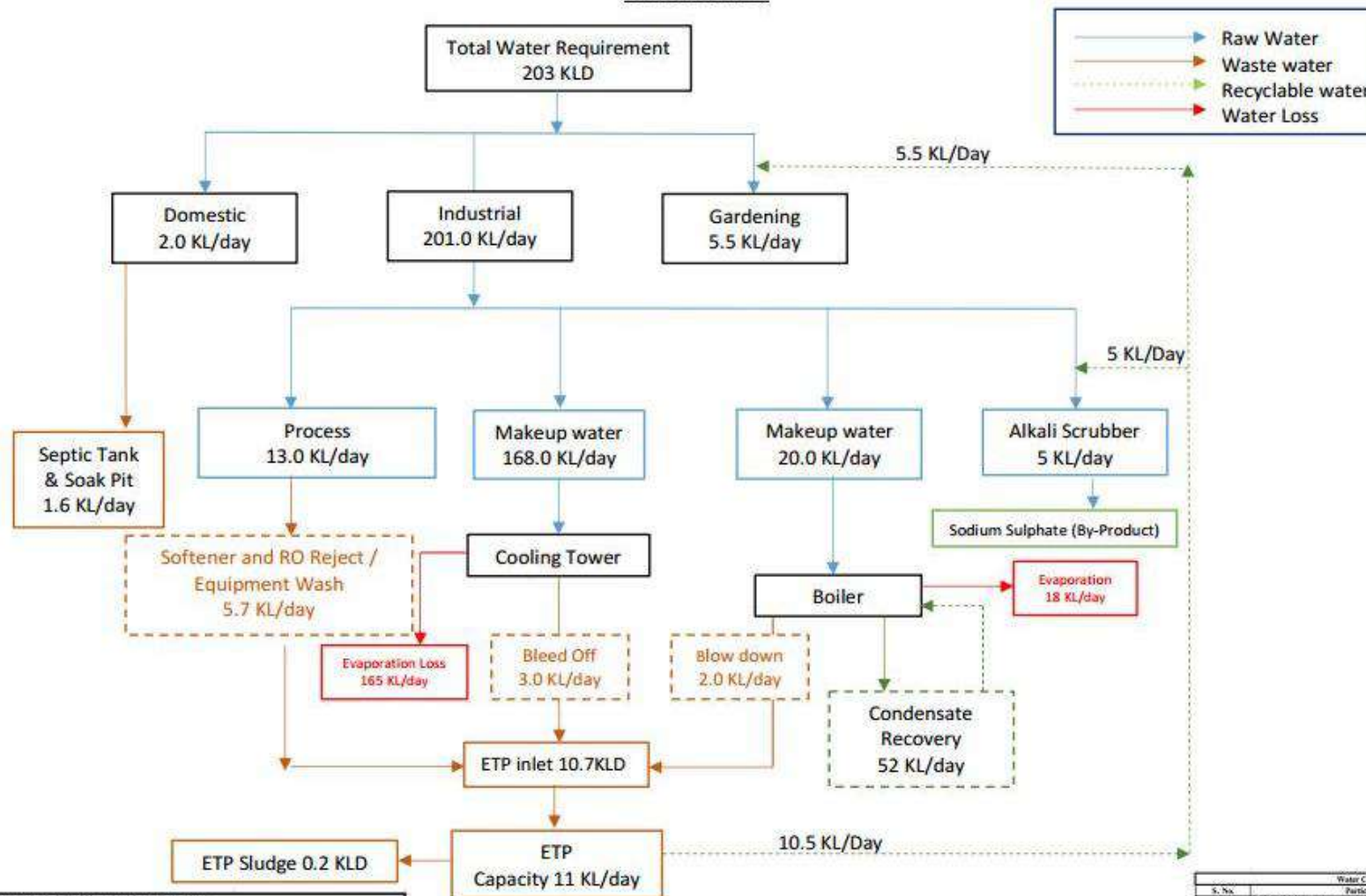
S. No.	Product Name	Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene	17,215	MS Tanker
2.	Alpha Olefin	560	ISO Tanks
3.	Lauryl Ether	13,200	ISO Tanks
4.	Lauryl Alcohol	3,150	ISO Tanks
5.	Sulfuric Acid 98%	12,000	MS Tanker
6.	Caustic Soda	4,052	MS Tanker
7.	Sulfur	3,487	Truck
8.	Coconut Fatty Acid	5,028	ISO Tank
9.	Dimethylaminopropylamine	264	ISO Tank
10.	Monochloroacetic acid	243	Truck
11.	Monoethanolamine	732	ISO Tank
12.	Diethanolamine	1029	ISO Tank
13.	Stearic Acid	5490	ISO Tank
14.	Ethylene Glycol	870	MS Tanker

Source of Water is State Water tanker and the approval has been taken from the authority.

WATER BALANCE		
S. No.	Particulars	Water Consumption (KLPD)
1	Domestic	2
2	Industrial	
	Process - Dilution / RO Reject / Washings	13
	Cooling Tower Makeup Water	168
	Boiler Makeup Water	20
	Alkali Scrubber (Recycle Water)	5
3	Gardening	5.5
Actual Water Requirement (KLPD)		203

DETERGEO CHEM (EAST) PRIVATE LIMITED

Water Balance



Water Consumption in Cooling Tower	
Particulars	Water Consumption (KL)
Startup: One Time Water Feed	700
Evaporation Loss @ 0.98% / hour	6.86
Evaporation Loss / Day	165
Cooling Tower Bleed Off / Day	3
Total Cooling Tower Makeup Water / Day	168
Cooling Tower Recycle Water	532

Water Consuming Gas In Process		
S. No.	Particulars	Water Consumption (KL/Day)
1	LABSA 90% Hydrolysis - Mixed With Final Product	1.0
2	LABSA 90% Separation and Distillation - Mixed With Final Product	1.5
3	CAFS Hydrolysis - Mixed With Final Product	4.3
4	RO Plant Reject - Sent to ETP	4
5	Sodium Regeneration - Sent to ETP	1
6	Equipment Wash - Sent to ETP	0.9
TOTAL WATER CONSUMPTION IN PROCESS (KL/Day)		12.2

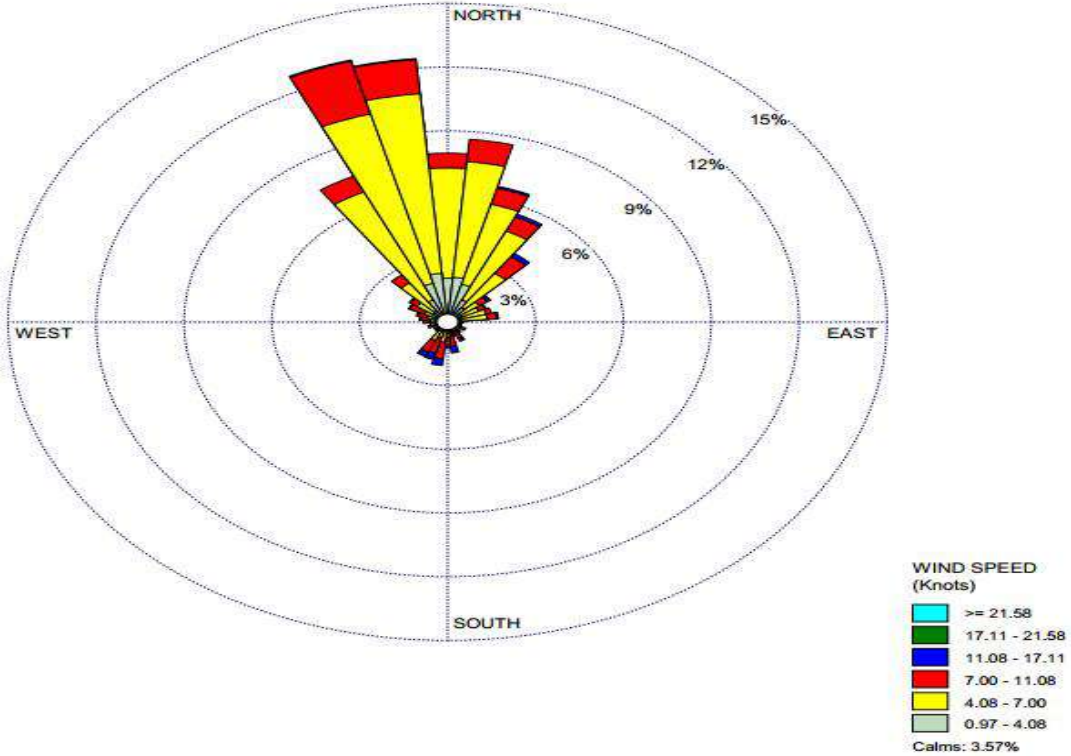
S. No.	Particulars	Water Consumption (KLPD)	Treatment
1	Domestic Sewage	1.6	Septic Tank / Soak Pit
2	Utilities and Process		
	Cooling Tower Blow down	3	ETP
	Boiler Blow down	2	ETP
	Softener Regeneration	1	ETP
	RO Reject	4	ETP
	Equipment Wash	0.7	ETP
The total waste water generation is 10.7 KLPD which will be treated in our in-house ETP and this treated water will be re-used in the scrubber and for gardening prupose			

- Domestic sewage to be treated in septic tank and disposed in soak pit.
- The blow down from boiler and circulating cooling water system will be process in ETP.
- The entire process effluent will be treated in ETP and the treated water will be used in Alkali Scrubber and Gardening.
- The facilities will be operated with zero effluent discharge.
- Online effluent quality monitoring system to be installed at the outlet of the unit for measurement of the parameters flow, pH, COD, BOD & TSS etc. and transmission of online data to SPCB and CPCB to be done.

Period: DEC 2023-FEB 2024

WIND ROSE PLOT:
Detergeo Chem (East) Pvt. Ltd.
 WRPLOT

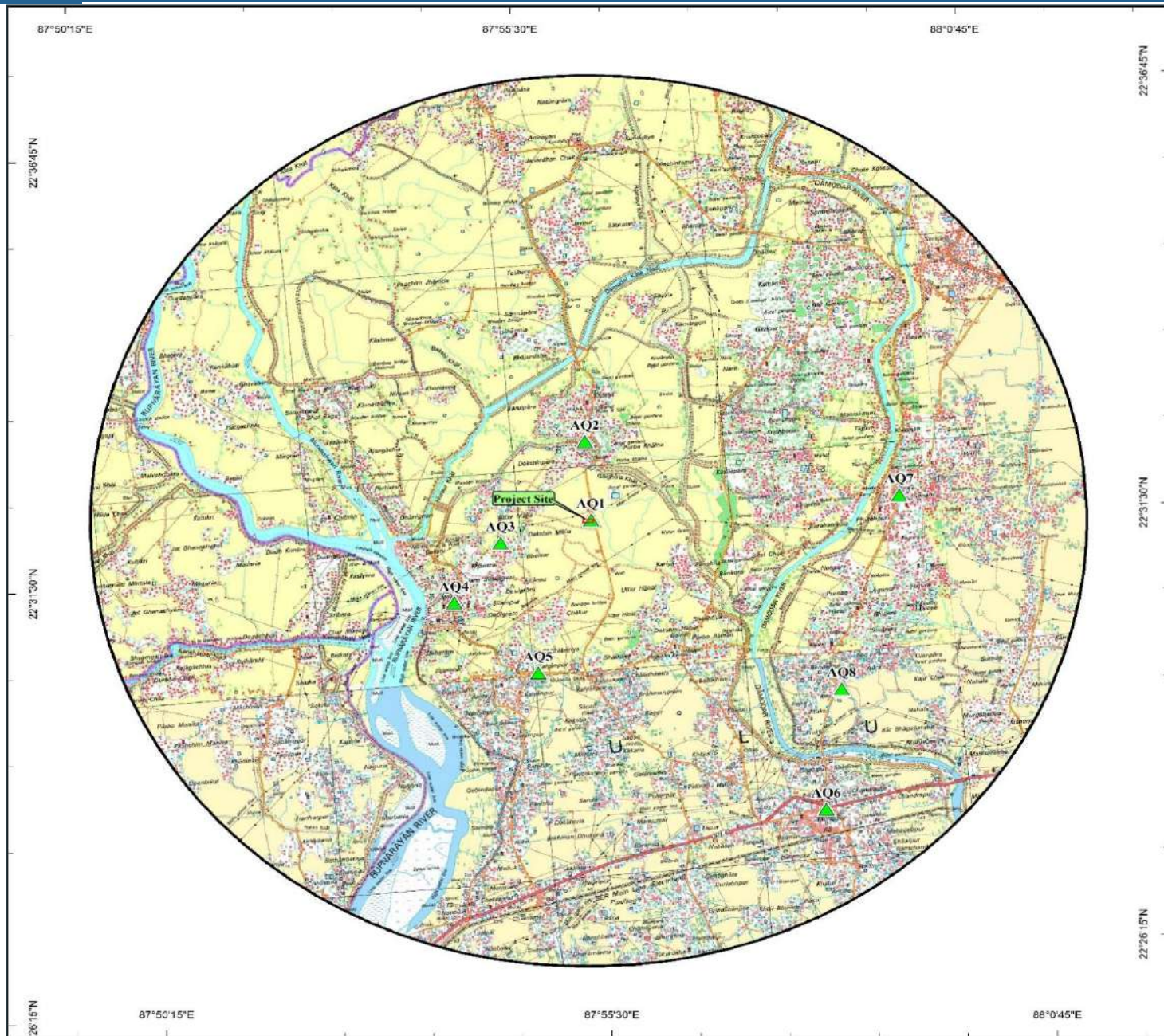
DISPLAY:
 Wind Speed
 Direction (blowing from)



Month s	Temp (°C)		Relative Humidity (%)	Average wind speed (Km/h)	Total Rainfall (mm)
	Max	Min	Average	Average	
Dec. 2023	27	18	46	9.5	10.63
Jan. 2024	28	16	40	8.8	7.77
Feb. 2024	31	19	46	10.5	6.05

COMMENTS:	DATA PERIOD: Start Date: 12/1/2023 - 00:00 End Date: 2/29/2024 - 23:00	COMPANY NAME: Mantec Consultants Pvt. Ltd.
	CALM WINDS: 3.57%	MODELER:
	AVG. WIND SPEED: 5.46 Knots	TOTAL COUNT: 2184 hrs.
		PROJECT NO.:





AIR MONITORING LOCATION MAP

Establishment of new natural and synthetic chemicals manufacturing unit at Mouza Kulepaury, Village Bangan, Dist-Howrah, wet Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL)

Legend:-

- 10 Km Study Area
- Project Site

Location:-

- AQ1 Project site
- AQ2 Khalna
- AQ3 Malia
- AQ4 Mankur
- AQ5 Kalyanpur
- AQ6 Bagnan
- AQ7 Udang
- AQ8 Bangalpur

PROJECT PROPONENT:-
DETERGEO CHEM (EAST) PRIVATE LIMITED

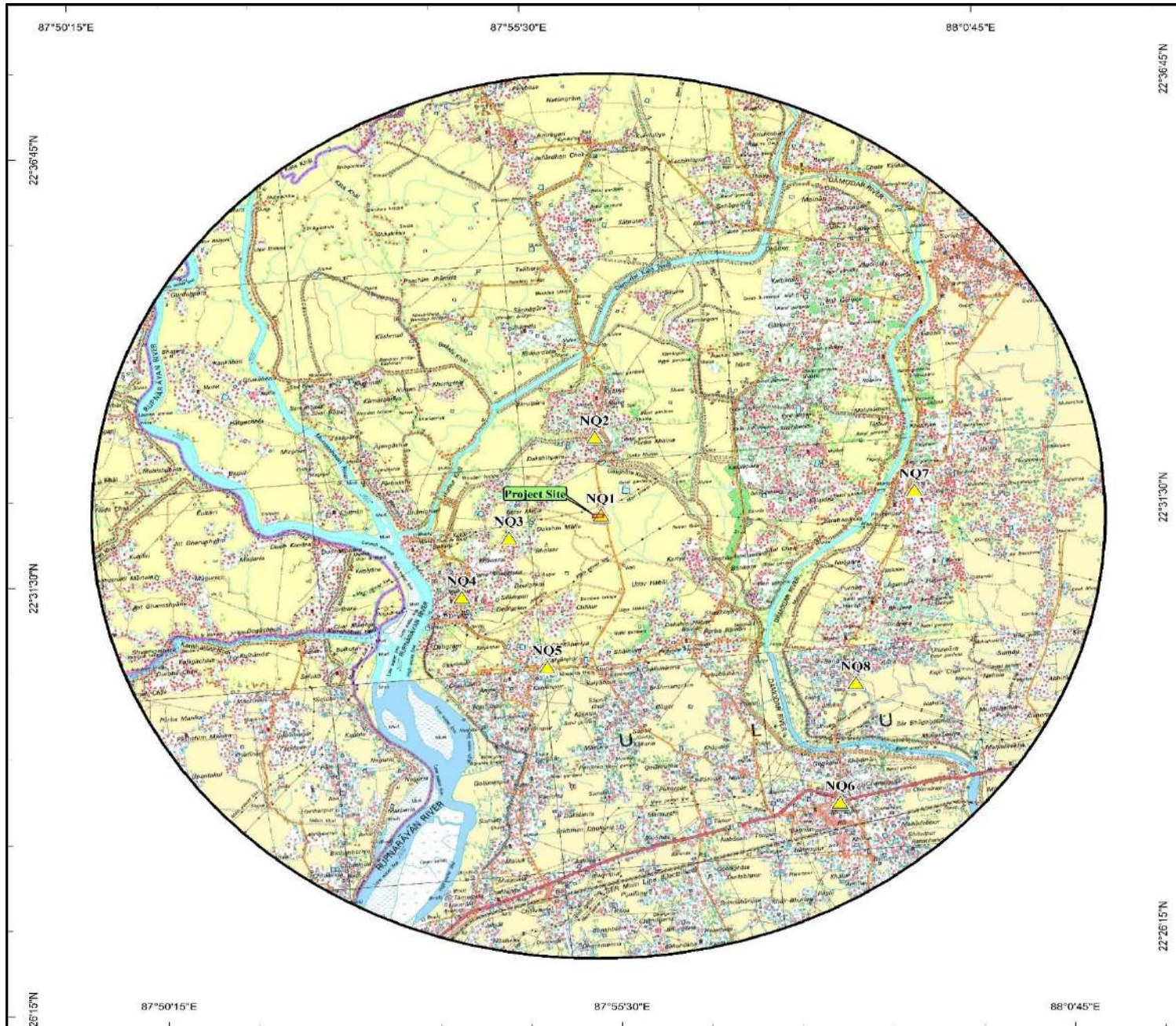
PREPARED BY
MANTEC CONSULTANTS PVT. LTD

Scale
RF : 1:80,000
1 Cm = 0.8 Km



S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site
AQ-1	Project site	22°31'50.82"N	87°55'50.48"E	---
AQ-2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N
AQ-3	Malia West	22°31'39.25"N	87°54'44.74"E	1.7 Km , W
AQ-4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW
AQ-5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S
AQ-6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE
AQ-7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E
AQ-8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE

Parameters	Description	Permissible Level
Ambient Air Quality	PM₁₀ - 52µg/m³ and 79µg/m³ PM_{2.5} - 25µg/m³ and 46µg/m³ SO₂ - 9µg/m³ to 16µg/m³ NO₂ - 15µg/m³ to 32µg/m³ CO - 0.54µg/m³ to 0.97µg/m³ All above results are within permissible limit	100 µg/ m ³ 60 µg/ m ³ 80 µg/ m ³ 80 µg/ m ³ 2 mg/ m ³



NOISE MONITORING LOCATION MAP

Establishment of new natural and synthetic chemicals manufacturing unit at Mouza Kulepaury, Village Bangan, Dist-Howrah, wet Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL)

Legend:-

- 10 Km Study Area
- Project Site

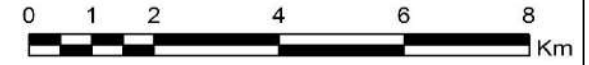
Location:-

- NQ1 Project site
- NQ2 Khalna
- NQ3 Malia
- NQ4 Mankur
- NQ5 Kalyanpur
- NQ6 Bagnan
- NQ7 Udang
- NQ8 Kasilapara

PROJECT PROPONENT:-
DETERGEO CHEM (EAST) PRIVATE LIMITED

PREPARED BY
MANTEC CONSULTANTS PVT. LTD

Scale
RF : 1:80,000
1 Cm = 0.8 Km



NOISE MONITORING LOCATIONS

S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site	Category of Area
NQ-1	Project site	22°31'50.82"N	87°55'50.48"E	---	Industrial
NQ-2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N	Residential
NQ-3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km , W	Residential
NQ-4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW	Residential
NQ-5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S	Residential
NQ-6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE	Residential
NQ-7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E	Residential
NQ-8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE	Residential

Parameters	Description	Permissible Level
Ambient Noise Quality	Noise Level (Day) - 42.5 to 62.3 Leq dB (A) Noise Level (Night) - 38.1to 48.6 Leq dB(A)	For industrial: 75 (day) – 70 (night)
		For commercial: 65 (day) – 55 (night)
		For residential: 55 (day) –45 (night)
		For silence zone: 50 (day) – 40 (night)



WATER MONITORING LOCATION MAP

Establishment of new natural and synthetic chemicals manufacturing unit at Mouza Kulepairy, Village Bangan, Dist-Howrah, west Bengal by M/s Detergeo Chem (EAST) Private Limited (DCEPL)

Legend:-

- 10 Km Study Area
- Project Site

Location:-

- SW GW
- SW1 Rupnarayan River
- SW2 Damodar kata Nadi
- SW3 Mendeshwari River
- SW4 Kanashabat Nadi
- SW5 Damodar River
- SW6 Gaighata Khal
- GW1 Project Site
- GW2 Khalna
- GW3 Malia
- GW4 Mankur
- GW5 Kalyanpur
- GW6 Bagnan
- GW7 Udang
- GW8 Bangalpur

PROJECT PROPONENT:-

DETERGEO CHEM (EAST) PRIVATE LIMITED

PREPARED BY

MANTEC CONSULTANTS PVT. LTD

Scale

RF : 1:80,000
1 Cm = 0.8 Km



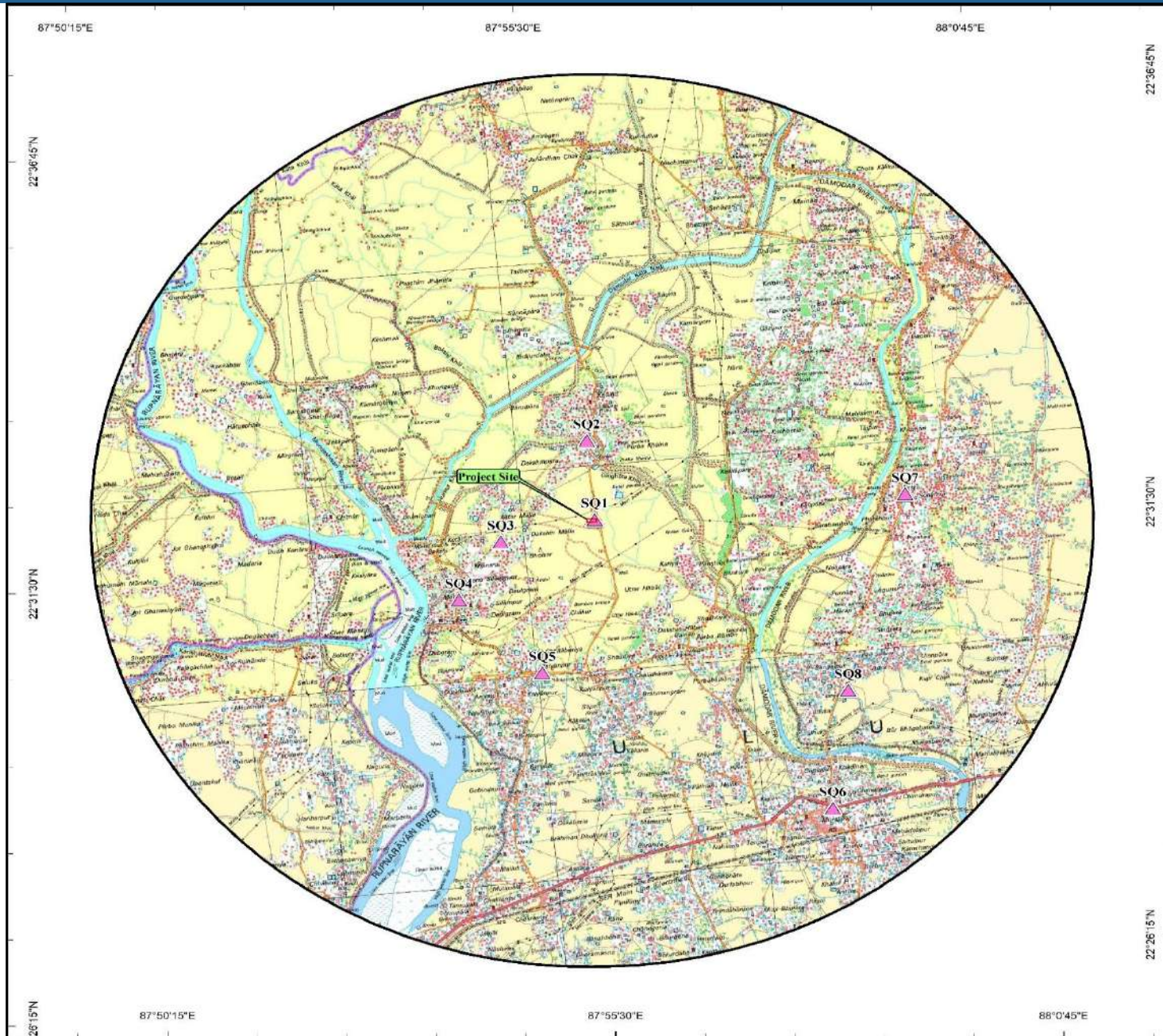
S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site
GW-1	Project site	22°31'50.82"N	87°55'50.48"E	---
GW -2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N
GW -3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km , W
GW -4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW
GW -5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S
GW -6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE
GW -7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E
GW -8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE

Parameters	Description	Permissible Level
Ground Water Quality	<p>Ground Water: All the Parameters Like</p> <p>pH- 7.30 to 7.72.</p> <p>Total Hardness - 352 to 510 mg/l.</p> <p>TDS - 466 to 675 mg/l.</p> <p>Chloride - 90 to 136 mg/l.</p> <p>Sulphate -26 to 38 mg/l.</p> <p>Metal: Iron- <0.02 to 0.052 mg/l.</p> <p>All are under permissible limit.</p>	<p>6.5-8.5</p> <p>200-600 mg/l</p> <p>500-2000 mg/l</p> <p>250-1000 mg/l</p> <p>200-400 mg/l</p> <p>< 0.3 mg/l.</p>

SURFACE WATER MONITORING LOCATIONS

S. No.	Location	Dist (Km)	Dir.	Latitude	Longitude
SW1	Rupnarayan river	3.8	W	22°31'31.56"N	87°53'32.22"E
SW2	Damodar River	4	SE	22°30'44.44"N	87°57'51.51"E
SW3	Mendeshwari River	4.8	NW	22°32'33.83"N	87°53'1.71"E
SW4	Kanashabat Nadi	6.2	SW	22°30'39.40"N	87°52'19.88"E
SW5	Hurhur Khal	3.8	N	22°33'56.45"N	87°55'46.07"E
SW6	Gaighata Khal	1	NE	22°32'26.13"N	87°56'1.93"E

Parameters	Description	Permissible Level
Surface Water Quality	<p>Surface Water: All the Parameters Like pH- 6.95 to 7.91. Total Hardness - 118 to 154 mg/l. TDS - 169 to 223 mg/l. BOD- 7 to 13 mg/l. COD- 60 to 110 mg/l. All are under permissible limit.</p>	<p>6.5-8.5 DO >4 mg/l</p> <p>Designated Class D</p>



SOIL MONITORING LOCATION MAP

Establishment of new natural and synthetic chemicals manufacturing unit at Mouza Kulepairy, Village Bangan, Dist-Howrah, wet Bengal by M/s Deterge Chem (EAST) Private Limited (DCEPL)

Legend:-

- 10 Km Study Area
- Project Site

Location:-

- SQ1 Project site
- SQ2 Khalna
- SQ3 Malia
- SQ4 Mankur
- SQ5 Kalyanpur
- SQ6 Bagnan
- SQ7 Udang
- SQ8 Kasilapara

PROJECT PROPONENT:-
DETERGEO CHEM (EAST) PRIVATE LIMITED

PREPARED BY
MANTEC CONSULTANTS PVT. LTD

Scale
RF : 1:80,000
1 Cm = 0.8 Km



S. No.	Monitoring Locations	Latitude	Longitude	Location w.r.t site
S1	Project site	22°31'50.82"N	87°55'50.48"E	---
S2	Khalna	22°32'48.48"N	87°55'51.43"E	1.8 Km, N
S3	Malia	22°31'39.25"N	87°54'44.74"E	1.7 Km , W
S4	Mankur	22°30'58.27"N	87°54'7.81"E	3.2 Km, SW
S5	Kalyanpur	22°30'2.23"N	87°55'2.49"E	3.5 Km, S
S6	Bagnan	22°28'6.19"N	87°58'16.83"E	8.0 Km, SE
S7	Udang	22°31'51.41"N	87°59'30.22"E	6.3 Km, E
S8	Bangalpur	22°29'33.07"N	87°58'36.13"E	6.3 Km, SE

Parameters	Description	Permissible Level
Soil Sampling	<p>All the Parameters Like</p> <p>pH- 7.25 to 7.61.</p> <p>Organic Matter – 1.96 to 2.82%</p> <p>Concentration of Nitrogen – 13.91 to 14.62 mg/100gm</p> <p>Phosphorus – 0.67 to 0.93 mg/100gm</p> <p>Potassium – 9.63 to 10.21 mg/100gm</p>	-



Range	S. No.	Sampling code	Nearest Location	Latitude	Longitude
Within 0-1 Km	1	TL1	Kulepairi	22°31'41.66"N	87°55'53.54"E
	2	TL2	Dakshin Khalna	22°32'8.76"N	87°55'51.28"E
Within 1- 5 Km	3	TL3	Malia / Dakhin Malia	22°31'40.66"N	87°54'53.99"E
	4	TL4	Purbba Khalan	22°32'18.04"N	87°56'33.18"E
	5	TL5/Aqua1	Pashchim Khalna	22°33'7.71"N	87°54'53.00"E
	6	TL6/Aqua2	Purbba Bainan	22°30'17.65"N	87°57'33.29"E
Within 5-10 km	7	TL7	Khariop	22°35'17.79"N	87°59'19.68"E
	8	TL8/ Aqua3	Faridpur	22°28'33.15"N	87°53'32.52"E

- ❑ A **1 m wide greenbelt, consisting of at least 3 tiers around the plant boundary** shall be developed as greenbelt and green cover as per the Terms of Reference and 33% green cover.
- ❑ The **plant density of 1500 trees per hectare with local native species** will be implemented.
- ❑ The expenditure on development and maintenance of green belt is of revenue nature and sufficient fund shall be provided to meet the requirement.
- ❑ The **plantation schedule will be completed within five years from the construction period** of the project.
- ❑ **The greenbelt** will be developed in an **area of 3019 sq.m (33%) of the total land area of 13,493 sq.m.**
- ❑ The plantation **in and around the project site** will help to attenuate the pollution level.
- ❑ **Native species** will be given priority for **Avenue plantation.**
- ❑ The plantation would **start along with the start of the construction** activities of the proposed unit.

SOCIO-ECONOMIC ENVIRONMENT

S. No.	Description	Number	Percentage to Respective Total
1	Total Population	248181	100
	Male	127038	51.19
	Female	121143	48.81
	Sex Ratio	954	
2	Population Scheduled Caste	65882	100
	Male	33529	51.00
	Female	32353	49
	Sex Ratio	965.00	
3	Population Tribe Caste	1704	100
	Male	854	50.12
	Female	850	49.88
	Sex Ratio	995	
4	Total Literates	153507	100
	Male	88587	57.71
	Female	64920	42.29
	Overall Literacy Rate West Bengal	76.26%	
	Male	81.69%	
	Female	70.54%	
	Gender Gap in Literacy Rate	11.15%	
7	Total Workers	86235	100
	Male	69454	80.54
	Female	16781	19.46
	Gender Gap in Work Participation Rate	61.08	

S. No.	Description	Number	Percentage to Respective Total
8	Main Workers	63390	100
	Male	56618	89.37
	Female	6772	10.68
	Gender Gap in Work Participation Rate	78.69	
9	Marginal Workers	13986	100
	Male	13424	95.98
	Female	562	4.02
	Gender Gap in Work Participation Rate	91.96	
10	Household Industrial Workers	3941	100
	Male	1618	41.06
	Female	2323	58.94
11	Total Agricultural Workers	9348	100
	Male	6536	69.92
	Female	2812	30.08
11 (a)	Cultivators	2901	100
	Male	1441	49.67
	Female	1460	50.33
11 (b)	Agricultural Labour	6447	100
	Male	3610	56.19
12	Female	837	43.81
	'Other Workers'	6654	100
	Male	3240	48.68
	Female	3415	51.32

❖ **Details of CER to be made as part of EMP as per Ministry's O.M dated 30.09.2020.**

As per the Office Memorandum F.No. 22-65/2017-IA.III dated 30.09.2020 of the MOEFCC regarding "Corporate Environment Responsibility" (CER), the project proponents are required to allocate funds towards environment development activities as the case may be, shall be apart of EMP and the commitments made by project proponent to address the concerns raised during Public consultation.

- A provision of **Rs.3 lakhs** has been made under **Public Hearing Budget** towards provision of **scheme of Zero Liquid Discharge (ZLD) (1 lakhs)** and for **awareness and training programme for local employment (2 lakhs)** based on the commitment made under **Public hearing meeting held on 23.08.2021.**

❖ Air Quality Management Plan:

- Local exhaust ventilation system will be provided for chemicals/powders transferring to control fugitive emissions.
- For all chemicals charging through drums or other chemical containers chemical charging will be in closed environment and connected to scrubber. VOC is monitored continuously in the area.
- The main Reactors will be attached with Scrubbers.
- The sprinkling of water will be done along the internal roads in the plant in order to control the dust arising due to the movement of vehicular traffic.

❖ Noise Management Plan:

- Installation of noise barriers/ absorbers for stationary noise sources & anti-vibration pad for equipments with high vibration.
- Periodic checking and servicing of noisy equipments.
- Timely oiling, lubrication & preventive monitoring of machines & equipments.
- Proper PPE e.g. ear plugs/ muffs to workers.
- Transportation in PUC Vehicles.
- Regular monitoring of noise.
- Green Belt Development will be taken up with the start of construction phase.

❖ Water and Waste Water Management Plan

- Implement a scheme for source reduction of water coming from washings by articulating a recycle and reuse scheme.
- The plant will have a zero discharge and will successfully recycle the entire water back to plant use.
- These are the four waste water streams will be generated. Washing/Spillage Effluent, utilities and process waste water will be collected and fed into the Effluent treatment plant appropriately.
- The domestic sewage will be treated through septic tank and soak pits. The treated water from ETP will be reused for Alkali Scrubber.
- Water harvesting system will be installed to collect natural water.

❖ Solid and Hazardous Waste Disposal Management

- Total hazardous waste will be generated from used and spent oil, Pump Seal Oil Transformer Oil, Expired Raw Materials, Empty Raw material Drums, Bag liners which are contaminated with chemical powders, Effluent Treatment Plant sludge and ETP -Evaporator Residue. These waste are stored safely and will be send for disposal to WBPCB authorized vendors & recyclers.

For amount of 150 Lakhs for Capital and 17.0 Lakhs amount will be incurred for Environmental Management activities.

S. No.	Infrastructure	Capital cost (lakhs)	Recurring cost (lakhs per annum) Including power and O&M
1.	Air Pollution Control	75.0	2.0
2.	Effluent Treatment Plant (ETP) & Rain water harvesting measures	17.0	2.5
3.	Environment Monitoring and Management	10.0	1.5
4.	Solid and Hazardous Waste Management (Membership & Facility development)	10.0	3.0
5.	Occupational Health & Safety	25.0	5.0
6.	Green belt Development	13.0	3.0
Total		150.0	17.0

❖ **List of Hazardous Substances and quantity stored.**

S. No.	Product	No of Tanks	Classification	Design Capacity
1	HSD	1	Flammable	20 KL
2	H ₂ SO ₄	1	Corrosive	420 MT

❖ **Consequence Analysis in worst scenario.**

Scenario considered	Pasquill stability class	LFL concentration PPM	Flash fire At LFL concentration distance (m)	Pool Fire Damage distance for various heat loads (m)
				37.5 kW/m ²
HSD Tank Rupture	2F	8000	11.66	6.64
	3D		12.18	6.72
	5D		12.54	6.81
HSD Tank (Leak 50mm)	2F	8000	2.32	6.79
	3D		2.41	7.08
	5D		2.47	7.27
HSD storage Tank (Leak 10mm)	2F	8000	1.92	4.46
	3D		2.04	4.91
	5D		2.15	5.47

❖ Preliminary Hazard Analysis in General:

PHA Category	Description of Plausible Hazard	Recommendation	Provision
Environmental Factors	If there is any leakage and eventuality of source of ignition.	---	All electrical fittings and cables will be provided as per the specified standards. All motor starters will be flame proof.
	Highly inflammable nature of the chemicals may cause fire hazard in the storage facility.	A well designed fire protection including AFFF foam, water sprinkler system, dry powder, CO2 extinguisher will be provided.	Fire extinguisher of small size and big size will be provided at all potential fire hazard places. In addition to the above, fire hydrant network will also provided.

❖ Preliminary Hazard Analysis for Process and Storage Areas:

Equipment	Process	Potential Hazard	Provision
Generator	Converts mechanical energy into electrical energy	Mechanical hazards and fire hazards in Lube oil system Cable galleries Short circuits	Safety interlocks and manhole locks are provided to ensure safe operation and maintenance of the unit.
Power Transformers	-	Fire and explosion	All electrical fittings and cables are provided as per the specified standards.
Switch Yard control room	-	Fire in cable galleries and switch	As above
HSD Storage	Used as start-up fuel for DG sets, and also will be used for vehicular transportation	Fire & explosion	Leaks detection system will be provided.

S. No	Improvement Areas	Risk Mitigation Measures
1	Driver Management	<ul style="list-style-type: none"> • Driver training shall be mandated through Detergeo approved DTI. • Driver medical shall be mandated through Detergeo approved medical centers. • Defensive driving training to errant driver • Minimum age of Driver is required to be 25 Years • Keep a record of the substances being transported i.e., shipping papers and written emergency instructions are critical for safety
2	Journey Management	<ul style="list-style-type: none"> • Buyer/customer to be informed to define route with proper rest stations. Customer to submit the document to Detergeo. Detergeo may review and provide input. Customer shall review and release final document to Detergeo and communicate to all transporters and driver by the customers, via Journey Route Management document for every journey. • Journey management documents should also take care of details like on route nearby Hospital, Crane provider etc. A sample format may be shared by Detergeo to customer. • Restrict night time driving (12:00 am – 5:00 am) inclusive of empty vehicles which is the most accident-prone time zone • Mandate resting time of at least 30 minutes for drivers after continuous driving of maximum of 4 hours. • Vehicles are not allowed to driver more than 60 Km/hr. • 24x7 Proactively monitor all safety violations and provide timely alerts to drivers/ SPOC for controlling any possible damage through VTS compatible with Detergeo System

S. No	Improvement Areas	Risk Mitigation Measures
3	Vehicle Management	<ul style="list-style-type: none"> • All the vessels and tanks will be provided with temperature indicator, pressure gauge and safety valves as depending upon the material being transported and operating parameters • Suitable fire extinguishers, such as, DCP (Dry Chemical Powder), CO2 & foam type to be kept in the transporter vehicle at easily approachable spots and in sufficient numbers • Inspect the vehicle's general condition, including tires, condition of valves, electrical wiring, adequate sealing, condition of wipers, headlights, signal lights, etc. • Following the dangerous goods segregation rules for carrying mixed classes of hazardous chemicals; chemicals must be separated when being transported/stored to ensure incompatible chemicals do not mix if there is a spill • Placards are standard hazmat identifiers, designed to meet individual specifications, will be placed on outer containers, trucks, cylinders, or other vehicles used for transport • Have an emergency kit readily available with safety goggles, chemical information sheets, and MSDS • Securing container tanks against movement on transportation vehicles i.e., proper loading and bracing all containers so they do not fall, slide, or bounce around during transportation • Suraksha certification from Detergeo authorized center for liquid tankers • Periodic Testing of Safety Relief Valve (SRV) and EFCV/IEFCV (Excess Flow/Internal Excess Flow Check Valve) under Rule 18 and • Tanker testing under Rule 19 for Tanker integrity testing through Hydrotesting through DETERGEO approved centers along with TPI presence during testing. • Speed Governor Speed limiting devices can avoid the risk of accidents due to over-speeding • ABS (Anti-Lock Braking system) and EBS in Trailers with ESC – Electronic Stability Controller • RUPD/SUPD should be available in the vehicle. The rear bumper should not extend beyond the RUPD. • Vehicle Age: Age of vehicle restricted up to 10 yrs. to improve distribution safety and sustainability
4	Emergency Response	<ul style="list-style-type: none"> • Customer should have their own Offsite Transport Emergency Response Plan

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Disaster Management Plan, it should be widely circulated and personnel training should be provided through rehearsals/drills.

The objective of the Industrial Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area;
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

General Safety Measures for Chemicals Storage & Handling.

Following safety measures for chemicals storage and handling will be provided.

- Availability of MSDS (Material Safety Data Sheets) information for all chemicals Proper layout of tank farm and other storage areas for chemicals.
- Proper segregation of chemicals storage taking into account compatibility Matrix Instrumentation and control system for tanks, Sulphonator etc. SO₂ and SO₃ Gas detection and fire protection systems.
- Periodic inspection and maintenance system Standard operating procedures and check lists Training of operation and maintenance personnel Safety work permit system.
- Electrical hazardous area classification for process units and storage areas Incident investigation and implementation of recommendations.

Hazard and Operability Study (HAZOP):

A hazard and operability study (HAZOP) is a structured and systematic examination of a complex system, usually a process facility, in order to identify hazards to personnel, equipment or the environment, as well as operability problems that could affect operations efficiency.

TOR COMPLIANCE

ToR-1: Executive Summary.

Compliance: Complied

ToR-2: Introduction

I. Details of the EIA Consultant including NABET accreditation.

II. Information about the project proponent.

III. Importance and benefits of the project.

Compliance:

- I. Mantec Consultants Pvt. Ltd, is an accredited organization by Quality Council of India/NABET certificate no. *NABET/EIA/23-26/RA 0305_ Rev. 01* dated January 31,2024 valid up to April 20, 2026.
- II. Applicant: Mr. Raman Arora (Owner)
Regd. Office: M/s Detergeo Chem (East) Private Limited, A-29, Block B1 Ext. Mohan Co-op. Industrial Estate, New delhi-1110044
Mobile no: +91-9999696943
Mail id: raman@newindiachem.com.
- III. The project shall generate direct and indirect employment for **about 200 people**. **CER budget of Rs. 40.0 Lakhs** will be utilized under the consultation of the sarpanch/gram Pradhan of nearby village (Kulepairi) & in consultation with the District Administration.

ToR-3: Project Description.**I. Cost of project and time of completion.**

Compliance: Capital Cost of the Project- Rs. 20 Crores . The proposed project will be executed within 12 months after grant of Environment Clearance and other Statuary clearance.

II. Products with capacities for the proposed project.

Compliance: The proposed project is for the manufacturing of natural and synthetic chemical surfactants of 82400 MTPA.

S. No.	Product Name	Proposed Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene Sulphonic Acid 96%	12,000	MS Tanker
2.	Linear Alkyl Benzene Sulphonic Acid 90%	12,000	MS Tanker
3.	Alpha Olefin Sulphonate	1,000	SS Tanker
4.	Sodium Lauryl Ether Sulphate	24,000	SS Tanker
5.	Sodium Lauryl Sulphate	6,000	SS Tanker
6.	Cocoamidopropyl Betaine	3,000	Truck
7.	Cocamide Monoethanolamide	3,000	Truck
8.	Cocamide Diethanolamide	3,000	Truck
9.	Ethylene Glycol Distearate	3,000	Truck
10.	Ethylene Glycol Monostearate	3,000	Truck
11.	Dilute Sulphuric Acid	12,000	MS Tanker
12.	Sodium Sulphate	400	-
Total Capacity		82,400	

ToR-3(III): If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.

Compliance: Not applicable as this is a green field project. The total land available under the ownership of Detergeo Chem (EAST) Private Limited.

ToR-3(IV): List of raw materials required and their source along with mode of transportation.

Compliance:

S. No.	Material Description	Physical Form	Type of Storage	Storage Capacity (MT)	Sourcing
1	Linear Alkyl Benzene	Liquid	MS Tank	500	Import
2	Alpha Olefin	Liquid	SS Tank	100	Import
3	Lauryl Ether	Liquid	SS Tank	750	Import
4	Lauryl Alcohol	Liquid	SS Tank	100	Import
5	Sulfuric Acid	Liquid	MS Tank	420	Domestic
6	Caustic Soda Liquid	Liquid	SS Tank	650	Domestic
7	Sulfur	Solid	Closed Yard	1000	Domestic / Import
8	Coconut Fatty Acid	Liquid	SS Tank	200	Import
9	Dimethylaminopropylamine	Liquid	SS Tank	36	Import
10	Monochloroacetic acid	Solid	Closed Yard	30	Domestic
11	Monoethanolamine	Liquid	SS Tank	36	Domestic
12	Diethanolamine	Liquid	SS Tank	36	Domestic
13	Stearic Fatty Acid	Liquid	SS Tank	200	Import
14	Ethylene Glycol	Liquid	SS Tank	36	Domestic

ToR-3(V): Other chemicals and materials required with quantities and storage capacities .

Compliance:

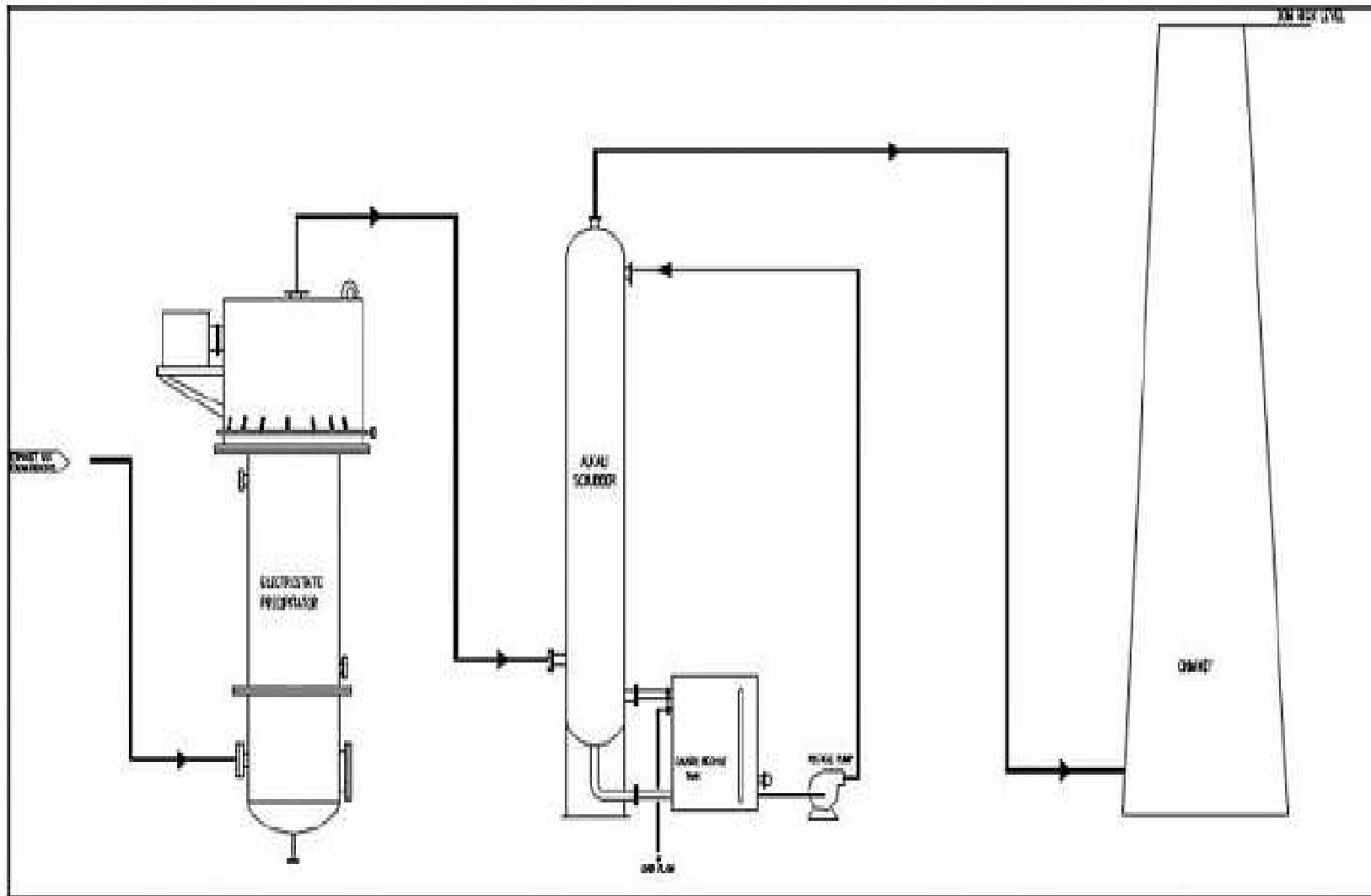
S. No.	Material Description	Physical Form	Type of Storage	Storage Capacity (MT)
1	Linear Alkyl Benzene Sulphonic Acid	Liquid	MS Tank	300
2	Alpha Olefin Sulfonate	Liquid	SS Tank	120
3	Sodium Lauryl Ether Sulphate	Liquid	SS Tank	300
4	Sodium Lauryl Sulphate	Liquid	SS Tank	120
5	Cocoamidopropyl Betaine	Liquid	SS Tank	42
6	Cocamide Monoethanolamine	Solid	Closed Yard	40
7	Cocamide Diethanolamine	Liquid	SS Tank	42
8	Ethylene Glycol Distearate	Solid	Closed Yard	40
9	Ethylene Glycol Monostearate	Solid	Closed Yard	40
10	Dilute Sulphuric Acid	Liquid	MS Tank	420

ToR-3(VI): Details of emission effluent, hazardous waste generation and their management .**Compliance: Details of Non-Hazardous Waste**

S. No.	Name of Waste	Quantity	Waste Type	Disposal Method	Source Of Waste	Physical Status
1.	Discarded Plastic Bags	100 Bags/Yr	Recyclable	Give to authorized recyclers	Stores/Offices	Solid
2.	Used HDPE Drums	500/Yr	Recyclable	Re-use / Give to authorized recyclers	Plant / Warehouse	Solid

❖ Details of Hazardous Waste

S. No.	Name of Waste	Quantity (MTPA)	Waste Type	Disposal Method	Source of Waste	Physical Status
1.	ETP Sludge (Category 35.3)	1.0 MTPA	Incinerable	Give to TSDF	ETP Filter	Solid
2.	Sulphur Ash	1.0 MTPA			Expired Raw Material	Solid
3.	Spent Oil (Category 5.1)	15 lt/yr	Recyclable	Sell to authorized oil reclamation plant	Pumps, DG, Equipment Seals	Oily



❖ Effluent Gas Treatment System

ToR-3(VII): Requirement of water, power, with source of supply, status of approval, water balance diagram man-power requirement (regular and contract).

Compliance: Total fresh water requirement: 203 KLD.

Source: State approved water tanker suppliers will be used. Refer slide-27

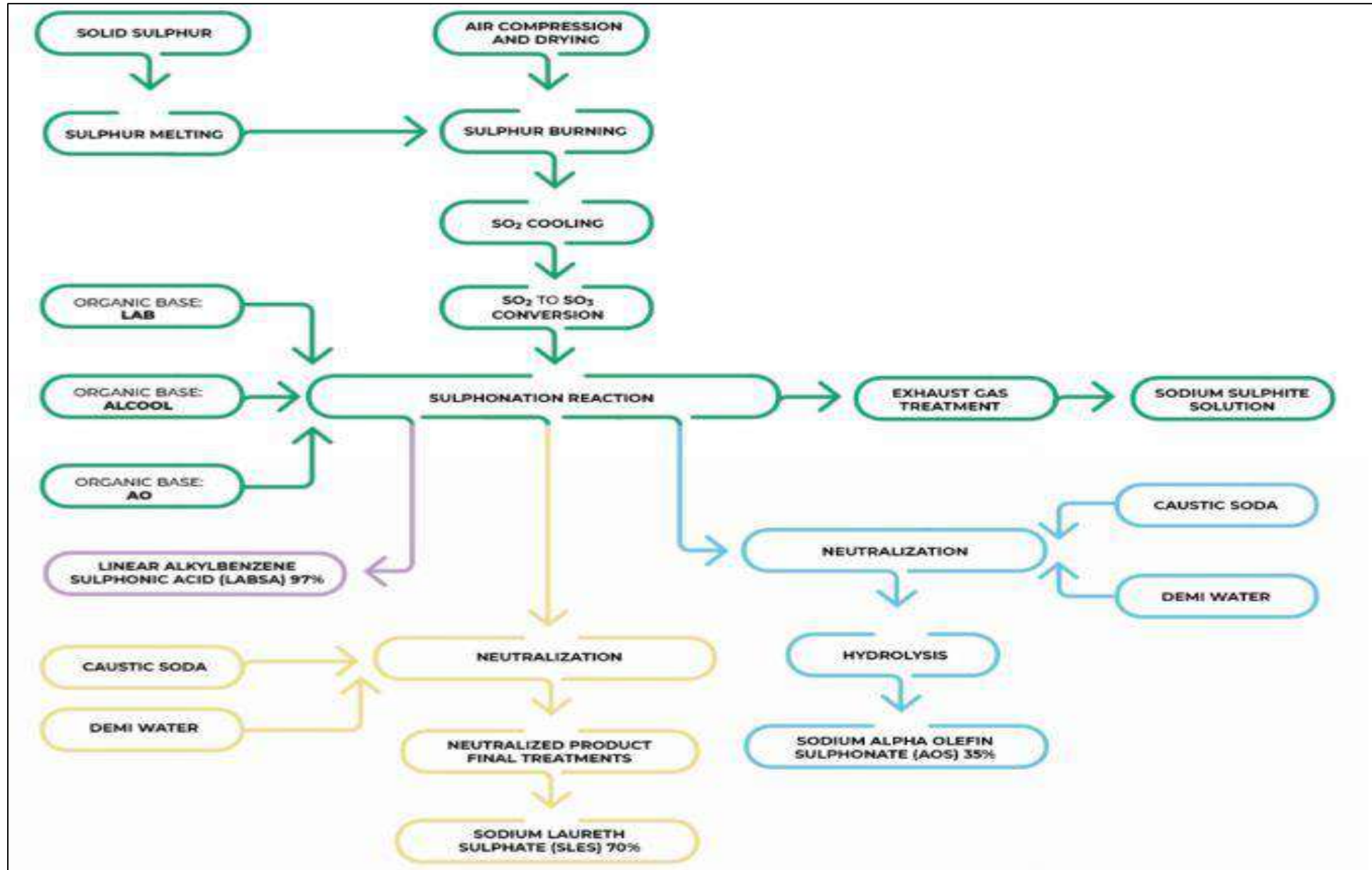
Power Requirement: 1000 KW sourced through WBSEDCL.

S. No.	Equipment	Capacity
1.	DG Set	910 KVA
2.	DG Set	500 KVA

Manpower requirement: 200 {operational phase-40(permanent) & construction phase-160(temporary)}

ToR-3(VIII):Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided.

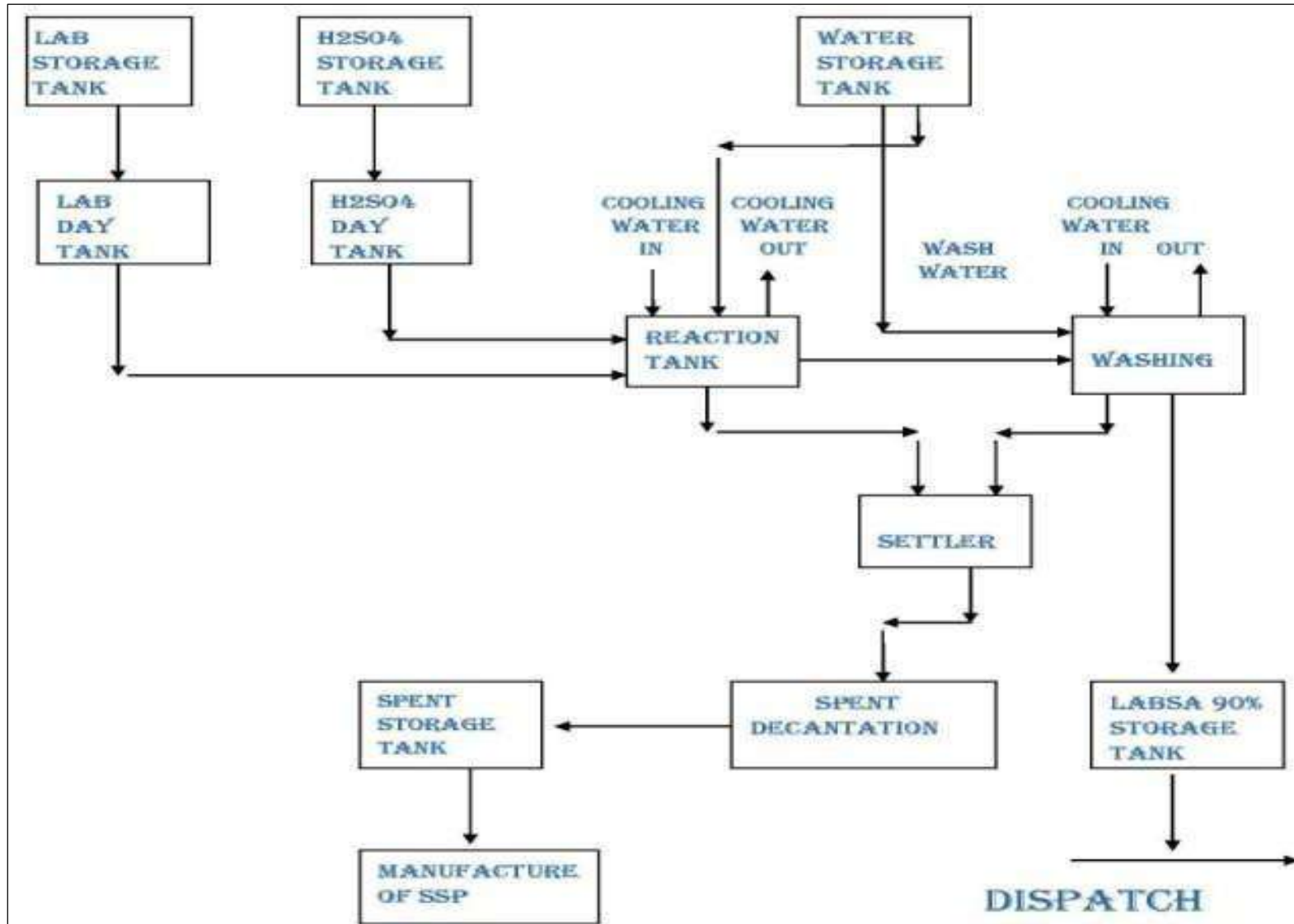
Compliance: The process flow sheet in the next slide.



❖ List of Equipment

S. No.	Description	Quantity	Capacity
1.	Sulfur Trioxide Gas Generation Plant	1	1250 kg/hr
2.	Air Drying Unit	1	9000 CMPH
3.	Film Sulphonation/Sulphation Reactor	1	5000 kg/hr
4.	Neutralization Unit	1	5000 kg/hr
5.	Water Purification Plant	1	10 kl/hr
6.	Cooling Tower	3	700 m ³ /hr (Total)
7.	Vent Gas Treatment System with ESP	1	6000 CMPH
8.	Screw Chiller	2	100 TR
9.	Waste Heat Recovery Boiler	1	850 kg/hr
10.	Electricity Generator	1	1000KW
11.	Weigh Bridge	1	100 MT
12.	Pumps	As Per Requirements	
13.	Water Hydrants System	As Per Requirements	
14.	LABSA 90% Batch Reactor	1	35 KL
15.	LABSA 90% Seperator	1	35 KL
16.	Reactors with Agitators	4	15 KL
17.	Flaker	1	1500 kg/hr
18.	Nitrogen Generator	1	200 Nm ³
19.	Oil Based Boiler	1	2000 kg/hr

❖ Line Diagram of Continuous Sulphonation Plant



ToR-3(IX): Hazard identification and details of proposed safety systems.

Compliance: Classification of Major Hazardous Units: Hazardous substances may be classified into three main classes namely Flammable substances, unstable substances and toxic substances.

S. No.	Product	No of Tanks	Classification	Design Capacity
1	HSD	1	Flammable	20 KL
2	H ₂ SO ₄	1	Corrosive	420 MT

Substance Stored	Safe Guard
Sulphuric Acid	<ul style="list-style-type: none"> Dyke wall of height - 1.0 m and thickness-230 mm will be constructed around the storage tank for acid spillage containment. Also the provision for automatic emergency shower will be provided.
High Speed Diesel (HSD)	<p>Following Fire Fighting measures will be provided:</p> <ul style="list-style-type: none"> DCP (Dry Chemical Powder) Extinguisher; AFFF (Aqueous Film Forming Foam) Extinguisher; Water cum Foam Monitor; and d) Sand Bucket.

❖ Hazard Identification for Tank Farm (cont.)

S. No.	Causes	Consequences	Safeguards
1	<ul style="list-style-type: none"> ➤ Leakage from unloading hose, ➤ Damaged hose, ➤ Improper hose connection, ➤ Flange gasket leak, ➤ Movement of tanker during unloading. 	<p>Exposure to toxic chemical</p> <p>Fire/explosion hazard due to flammable liquid release</p> <p>Loss of chemical</p> <p>Soil/Water contamination</p>	<ul style="list-style-type: none"> • Regular inspection & replacement of chemical hoses. • Maintenance system for gaskets, flange & hose connections including leak check. • Procedure to immobilize tanker before start of unloading. • Paved area for tanker unloading with berm for spill containment. • Unloading checklist and display board in local language. • Use of PPE for unloading.
2	<ul style="list-style-type: none"> ➤ Leakage from pump seal 	<p>Exposure to toxic chemical</p> <p>Fire/explosion hazard due to flammable liquid release.</p> <p>Loss of chemical</p> <p>Soil/water contamination</p>	<ul style="list-style-type: none"> • Reliable type of mechanical seal for pump. • Stand-by pump • Regular maintenance of pumps
3	<ul style="list-style-type: none"> ➤ Overflow from storage tank by excess filling due to malfunction of tank level instrument. 	<p>Exposure to toxic chemical</p> <p>Fire/explosion hazard due to flammable liquid release</p> <p>Loss of chemical</p> <p>Soil/water contamination</p>	<ul style="list-style-type: none"> • Reliable type tank level instrumentation • Multiple level instruments to provide overfill protection for tank • Regular monitoring of tank inventory
4	<ul style="list-style-type: none"> ➤ Leakage from flange joint in piping connected to tank bottom 	<p>Exposure to toxic chemical.</p> <p>Fire/explosion hazard due to flammable liquid release</p> <p>Loss of chemicals Soil/water contamination</p>	<ul style="list-style-type: none"> • Remote operated shut off valve in tank bottom connection with push button in control room and safe location outside the dyke.

ToR-3(X): Expansion/modernization proposals:

Compliance: N/A as this is a green field project.

ToR-3(Xa): Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing lexisting operation of the project from SPCB shall be attached with the EIA-EMP report.:

Compliance: N/A

ToR-3(Xb): In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.


Compliance: N/A as this is a green field project.

ToR-4(I): Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.

Compliance: The Project location: DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141, Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal".

Proposed project shall be established over the purchased land and copy of land documents as follows.

Annexure 'A'



भारतीय गैर न्यायिक

दस रुपये
रु.10

TEN RUPEES
Rs.10

INDIA NON JUDICIAL

पश्चिम बंगाल WEST BENGAL 35AB 017736

Ruchika Bansa
Ruchika Bansa
Anima Bansa

ANANDI PROPERTIES PRIVATE LIMITED
Bansa
Director

AGREEMENT FOR SALE

THIS AGREEMENT FOR SALE is made on this 5th Day of September, 2019 of the Christian Era

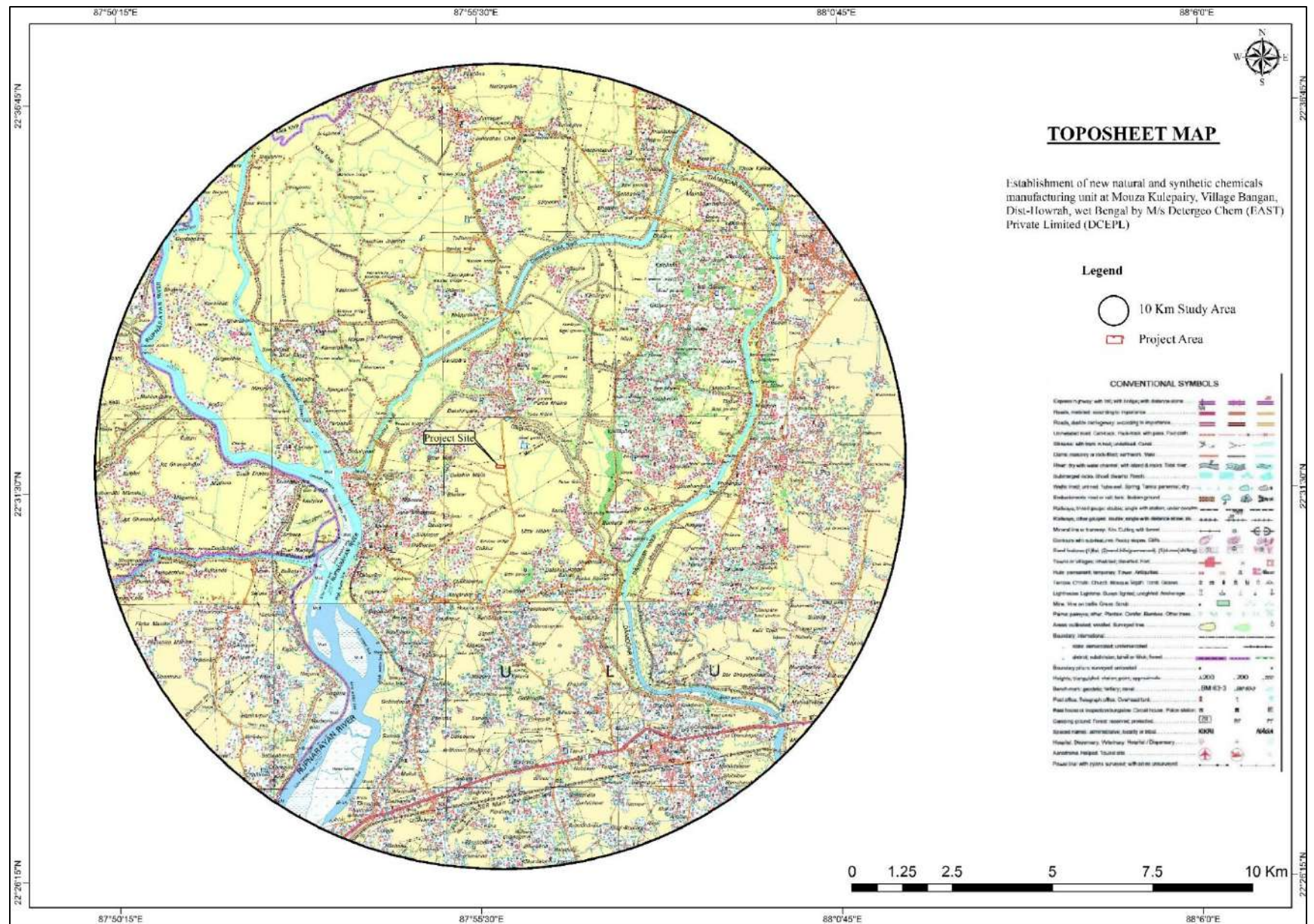
For Detergeo Chem (East) Pvt. Ltd.
Director

NOTARY
NARENDRA PRASAD GUPTA
NOTARY, GOVERNMENT OF INDIA
REGD. NO. 13823/16
WEST BENGAL, INDIA

NARENDRA PRASAD GUPTA
NOTARY, GOVERNMENT OF INDIA
REGD. NO. 13823/16
&
ADVOCATE, HIGH COURT CHANDIYA
REGD. NO. THAKUR DAS CHANDIYA
WEST BENGAL, INDIA
MOB-8910274574
9883132893

ToR-4(II): A toposheet of the study area of radius of 10km and site location 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)

Compliance:



ToR-4(III): Details w.r.t. option analysis for selection of site.

Compliance: The proposed **Greenfield project** shall be developed on the existing land, which is already owned by DCEPL, therefore no analysis for selection of site will considered.

ToR-4(IV): Co-ordinates (lat -long) of all four corners of the site.**Compliance:**

Points	Latitude	Longitude
1	22°31'49.49"N	87°55'44.51"E
2	22°31'47.21"N	87°55'44.87"E
3	22°31'49.07"N	87°55'51.13"E
4	22°31'50.64"N	87°55'50.90"E
5	22°31'50.80"N	87°55'52.29"E
6	22°31'51.20"N	87°55'52.13"E
7	22°31'50.98"N	87°55'50.85"E
8	22°31'51.30"N	87°55'50.81"E
9	22°31'50.66"N	87°55'48.60"E
10	22°31'50.46"N	87°55'48.66"E
11	22°31'50.05"N	87°55'47.22"E
12	22°31'50.25"N	87°55'47.16"E

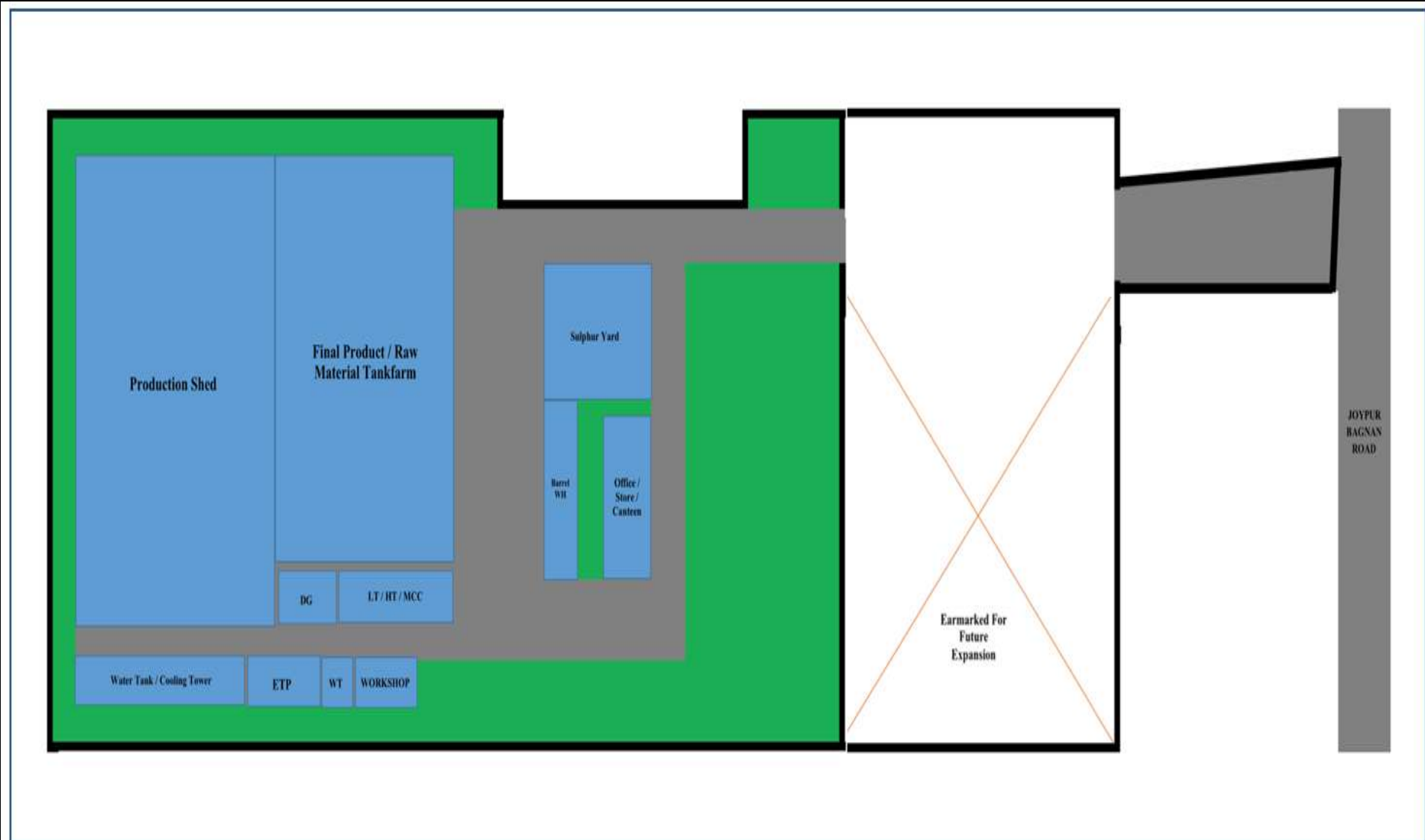
ToR-4(V): Google map-Earth downloaded of the project site.

Compliance: Google map of the Project site



ToR-4(VI): Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

Compliance:



ToR-4(VII): Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.

Compliance:



SITE PHOTOGRAPHS

ToR-4(VIII): Landuse break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included (not required for industrial area).

Compliance: Total land of 13,493.00 Sq.mt (1.3493 ha.) has been allotted in favour of M/s Detergeo Chem (EAST) Private Limited (DCEPL). The details of land requirement for the project are as follows:-

Details	Area (Sq. Mt.)	% Ratio
Production Shed	1820	20%
Tank Farm	1395	15%
DG Room	60	1%
Electrical Room	120	1%
UG Water Sump	180	2%
ETP	78	1%
Toilet	36	0%
Workshop	66	1%
Sulphur Yard	285	3%
Barrel Warehouse	120	1%
Office/Store/Canteen	162	2%
Roads	1741	19%
Green Belt	3019	33%
Total Builtup Area	9,082.00	
Earmarked For Future Projects	4,411.00	
Total Land Area	13,493.00	

ToR-4(IX): A list of major industries with name and type within study area shall be incorporated. Land use details of the study area.

Compliance:

List of industries/ Project activities	M/s. Tandhan Cotton Mills Private Limited- Textile M/s. Tandhan biochemical Private Limited M/s Mohan Boards Pvt Ltd
---	--

Detail of Land use/Land cover:

S. No	Classes	Area (sq.km)	Area in %
1	Settlement	69.70	20.88
2	Agriculture Land	227.96	68.29
3	Vegetation	6.88	2.06
4	Water Bodies	25.23	7.56
5	Waste Land	4.06	1.22
Total		333.83	100.00

ToR-4(X): Geological features and Geo-hydrological status of the study area shall be included.

Compliance: Complied.

ToR-4(XI): Details of Drainage of the project upto 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)

Compliance: Drainage Map of study area (10km area) is attached in EIA report.

The major rivers in the study area are mentioned below: -

- Rupnarayan river- 3.6 Kms
- Damodar kata Nadi (Hurhur khal)-2.7 Kms
- Mendeshwari River-3.8 Kms
- Kanashabat Nadi- 49 Kms
- Damodar River- 4.0 Kms
- Gaighata Khal -1.1 Km

ToR-4(XII): Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.

Compliance: The land is already acquired by the project proponent and under the complete land is under the possession.

ToR-4(XIII): R&R details in respect of land in line with state Government policy.

Compliance: N/A.

ToR-5: Forest and wildlife related issues.

(I) Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department.

Compliance: N/A, as no forest land is involved in the proposed project site.

(II): Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forest land (in case of projects involving forest land more than 40 ha)

Compliance: N/A.

(III): Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

Compliance: N/A, as no forest land is involved in the proposed project site.

(IV): The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.

Compliance: N/A, as no national parks, sanctuaries, biosphere reserves, migratory corridors of wild animals are present within 10 km radius of the proposed project site.

ToR-5(V): Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.

Compliance : N/A. Since, No schedule I fauna is present in the study area.

ToR-5(VI): Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.

Compliance : N/A.

ToR-6: Environmental Status:

(I) Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

Compliance :

Months	Temp (°C)		Relative Humidity (%)	Average wind speed (Km/h)	Total Rainfall (mm)
	Max	Min	Average	Average	
Dec. 2023	27	18	46	9.5	10.63
Jan. 2024	28	16	40	8.8	7.77
Feb. 2024	31	19	46	10.5	6.05

ToR-6(II):AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

Compliance: the monitoring has been done at 8 locations. The map and locations has been attached in slide no.13

ToR-6(III):Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQPM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

Compliance:

LOCATIONS	POLLUTANTS	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
	NAAQS	100 (µg/m ³)	60 (µg/m ³)	80 (µg/m ³)	80 (µg/m ³)	2 (mg/m ³)
AQ1	Max	78	45	16	30	0.97
	Min	60	34	10	18	0.58
	Avg	70.42	40.25	12.21	24.04	0.77
	98 percentile	78	45	15.54	30	0.93
AQ2	Max	72	42	14	27	0.94
	Min	52	30	9	17	0.58
	Avg	65.96	35.08	11.54	22.25	0.73
	98 percentile	72	41.08	14	27	0.92

COMPLIANCE OF TOR

Cont.

LOCATIONS	POLLUTANTS	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
	NAAQS	100 (µg/m ³)	60 (µg/m ³)	80 (µg/m ³)	80 (µg/m ³)	2 (mg/m ³)
AQ3	Max	76	44	15	30	0.85
	Min	58	28	9	17	0.58
	Avg.	66.75	35.46	11.21	22.54	0.73
	98 percentile	76	43.08	14.54	29.08	0.84
AQ4	Max	78	45	16	32	0.86
	Min	66	34	10	18	0.54
	Avg.	72.46	39.13	13.08	25.58	0.72
	98 percentile	78	44.54	15.54	31.08	0.86
AQ5	Max	76	42	16	32	0.91
	Min	58	31	10	21	0.65
	Avg.	67.58	35.67	12.54	24.96	0.78
	98 percentile	76	41.08	15.54	31.54	0.89
AQ6	Max	79	46	16	26	0.94
	Min	58	28	10	15	0.63
	Avg.	65.71	35.71	12.25	19.67	0.78
	98 percentile	77.16	44.16	16	26	0.94
AQ7	Max	74	42	16	30	0.94
	Min	56	28	10	18	0.57
	Avg.	64.83	34.75	12.25	24.13	0.76
	98 percentile	74	42	15.54	30	0.94
AQ8	Max	72	42	16	32	0.89
	Min	54	25	10	20	0.57
	Avg.	64.83	33.38	12.88	25.21	0.72
	98 percentile	72	41.08	15.54	31.08	0.87

ToR-6(IV):Surface water quality of nearby River (100m upstream and downstream of discharge point) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

Compliance: Details of Surface Water Quality Location is given in Slide no. 18 and Monitoring Location Map is given in Slide no. 16

BASELINE DATA OF SURFACE WATER QUALITY:

S. No.	Parameter	Units of Measurements	Roopnarayan River	Damodar Kata River	Mundeshwari River	Damodar River	Kanashabat River	Gaighata Khal
1	Colour	Hazen Units	<5	<5	<5	<5	<5	<5
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	2.3	2.5	3.2	2.6	1.9	2.2
5	pH	-	7.67	7.39	6.95	7.82	7.91	7.86
6	Temperature	°C	20	21	21	22	20	21
7	Conductivity	µmhos/cm	283	315	260	305	302	343
8	Alkalinity as CaCO ₃	mg/l	112	122	98	116	108	124
9	Total Dissolved Solids	mg/l	184	205	169	198	196	223
10	Total Hardness as CaCO ₃	mg/l	124	146	118	136	128	154

BASELINE DATA OF SURFACE WATER QUALITY (CONT.) :

S. No.	Parameter	Units of Measurements	Roopnarayan River	Damodar Kata River	Mundeshwari River	Damodar River	Kanashaba t River	Gaighata Khal
11	Calcium as CaCO ₃	mg/l	92	110	86	98	94	122
12	Magnesium as CaCO ₃	mg/l	32	36	32	38	34	32
13	Chloride as Cl	mg/l	20	24	22	26	26	30
14	Phosphate as PO ₄	mg/l	0.33	0.45	0.42	0.41	0.44	0.39
15	Nitrate as NO ₃	mg/l	6.80	7.40	6.20	7.40	9.20	8.40
16	Sulphate as SO ₄	mg/l	16	18	14	16	18	20
17	Fluoride as F	mg/l	0.38	0.31	0.28	0.41	0.39	0.34
18	Phenolic Compound	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
19	Copper as Cu	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
20	Cadmium	mg/l	<0.002	0.0021	<0.002	<0.002	0.0031	<0.002
21	Mercury as Hg	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
22	Selenium as Se	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
23	Total Arsenic as As	mg/l	0.0054	<0.005	0.006	<0.005	<0.005	<0.005
24	Lead as Pb	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
25	Zinc as Zn, Max	mg/l	0.024	0.029	0.034	<0.02	0.03	0.05

BASELINE DATA OF SURFACE WATER QUALITY (CONT.) :

S. No.	Parameter	Units of Measurements	Roopnarayan River	Damodar Kata River	Mundeshwari River	Damodar River	Kanashaba t River	Gaighata Khal
26	Chromium as Cr ⁺⁶	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Aluminium as Al	mg/l	0.018	0.045	<0.005	0.028	<0.005	0.015
28	Manganese as Mn	mg/l	<0.005	0.007	<0.005	0.0052	<0.005	<0.005
29	Boron as B	mg/l	<0.1	<0.1	0.564	<0.1	<0.1	0.91
30	Iron as Fe	mg/l	0.076	0.094	<0.02	0.062	<0.02	0.066
31	Sodium as Na	mg/l	14	12	10	14	15	14
32	Potassium as K	mg/l	2	2	3	2	3	3
33	Dissolved Oxygen	mg/l	6.3	6.5	5.8	6.9	6.6	6.2
34	BOD	mg/l	8	10	13	7	9	11
35	COD	mg/l	70	84	110	60	76	90
36	Total Coliform	MPN/100ml	1300	940	1090	1200	1480	1410
37	Faecal Coliform	MPN/100ml	790	460	490	700	840	630

ToR-6(V): Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC, if yes give details

Compliance: N/A.

ToR-6(VI): Ground water monitoring at minimum at 8 locations shall be included.

Compliance: Details of Ground Water Quality Location is given in Slide no. 17 and Ground Water Monitoring Location Map is given in Slide no. 16

BASELINE DATA OF GROUND WATER QUALITY:

S. No.	Parameters	Units of Measurements	Project Site	Khalna	Malia West	Mankur	Kalyanpur	Bainan	Udang	Bangalipr
1	Colour	Hazen Units	<5	<5	<5	<5	<5	<5	<5	<5
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	pH	-	7.65	7.52	7.72	7.43	7.30	7.41	7.32	7.39
5	Temperature	°C	22	23	21	24	22	20	22	21
6	Conductivity	µmhos/cm	717	1039	866	762	756	793	739	758
7	Alkalinity as CaCO ₃	mg/l	246	374	298	254	276	284	266	272
8	Total Dissolved Solids	mg/l	466	675	563	495	492	516	480	492

BASELINE DATA OF GROUND WATER QUALITY (CONT.):

S. No.	Parameters	Units of Measurements	Project Site	Khalna	Malia West	Mankur	Kalyan pur	Bainan	Udang	Bangalipur
9	Total Hardness as CaCO ₃	mg/l	354	510	428	360	368	388	352	378
10	Calcium as Ca	mg/l	96.8	144.8	120.0	100.8	101.6	104.0	95.2	104.8
11	Magnesium as Mg	mg/l	27.21	35.96	31.10	26.24	27.70	31.10	27.70	28.18
12	Chloride as Cl	mg/l	98	136	120	110	98	104	90	100
13	Phosphate as PO ₄	mg/l	0.47	0.62	0.56	0.38	0.53	0.61	0.55	0.52
14	Nitrate as NO ₃	mg/l	8.6	9.8	9.2	9	8.8	9.6	8.6	8.4
15	Sulphate as SO ₄	mg/l	30	38	34	28	26	30	34	28
16	Fluoride as F	mg/l	0.34	0.42	0.37	0.39	0.33	0.28	0.43	0.32
17	Phenolic Compound	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
18	Copper as Cu	mg/l	0.0057	<0.005	<0.005	0.0061	0.0054	0.006	<0.005	<0.005
19	Mercury as Hg	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
20	Cadmium as Cd	mg/l	<0.002	<0.002	<0.002	<0.002	0.0025	<0.002	<0.002	0.0029

ToR-6(VII):Noise levels monitoring at 8 locations within the study area.

Compliance: Details of Noise Monitoring Location is given in Slide no. 15 and

Noise Monitoring Location Map is given in Slide no. 14

BASELINE DATA OF NOISE QUALITY MONITORING:

S. No.	Noise Location	DOS	Standards of Noise Level			Noise Level db(A)	
			Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
1	Project Site	01.02.2024	Industrial	75	70	62.3	48.6
2	Khalna	04.02.2024	Residential	55	45	42.5	39.7
3	Malia West	08.02.2024	Residential	55	45	50.4	46.5
4	Mankur	02.02.2024	Residential	55	45	52.3	41.8
5	Kalyanpur	05.02.2024	Residential	55	45	46.7	38.2
6	Bainan	09.02.2024	Residential	55	45	52.8	42.6
7	Udang	03.02.2024	Residential	55	45	46.2	39.2
8	Bangalipur	06.02.2024	Residential	55	45	44.5	38.1

ToR-6(VII):Soil Characteristic as per CPCB guidelines.

Compliance: For studying the soil types and soil characteristics, 8 sampling locations were selected to assess the existing soil conditions representing various land use conditions and geological features and soil quality monitoring results. Soil samples collected from the 8 locations during February 2024.

Details of Soil Sampling Location is given in Slide no. 20 and

Soil Sampling Location Map is given in Slide no. 19

BASELINE DATA OF SOIL SAMPLING RESULTS :

		Location	Project Site	Khalna	Malia West	Mankur	Kalyanpur	Bagnan	Udang	Bangalpur
S. No.	Parameters	Units	Value	Value	Value	Value	Value	Value	Value	Value
1	pH	-	7.31	7.25	7.48	7.32	7.61	7.42	7.38	7.56
2	Bulk Density	gm/cm ³	1.84	2.14	2.08	1.96	2.26	2.12	1.98	2.32
3	Conductivity	Micro mhos/cm	324	258	286	348	250	308	412	264
4	Moisture	%	6.2	5.4	6.3	5.6	6.1	5.8	6.4	5.2
5	Texture	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
6	Sand	%	64	62	60	58	60	58	62	60
7	Clay	%	18	22	20	22	18	24	16	24
8	Silt	%	18	16	20	20	22	18	22	16

BASELINE DATA OF SOIL SAMPLING RESULTS (CONT.) :

		Location	Project Site	Khalna	Malia West	Mankur	Kalyanpur	Bagnan	Udang	Bangalpur
S. No.	Parameters	Units	Value	Value	Value	Value	Value	Value	Value	Value
9	CEC	meq/100g m	13.88	15.76	14.36	16.34	12.92	17.64	13.08	17.52
10	Nitrogen	mg/100gm	14.49	14.36	14.62	13.91	14	14.22	14.4	14.58
11	Phosphorous	mg/100gm	0.8	0.76	0.93	0.67	0.84	0.71	0.8	0.93
12	Potassium	mg/100gm	9.81	9.72	10.16	9.63	9.9	9.99	10.07	10.21
13	Sodium	mg/100gm	3.8	4.2	3.6	4.6	4.3	4.5	3.7	4.1
14	Organic Matter	%	2.44	2.38	2.18	2.67	1.96	2.82	2.54	2.76
15	Ca	meq/100g m	3.1	2.8	2.7	3.6	3.1	3	3.4	3.2
16	Mg	meq/100g m	2.08	1.88	1.64	1.77	1.68	1.54	1.81	2.14
17	SAR	-	0.41	0.47	0.42	0.49	0.49	0.52	0.4	0.43

ToR-6(IX): Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.

Compliance: Traffic Study Data of project site is given as follows:

S. No.	Type of Vehicle	Additional Vehicle per day	PCU	Total Number of Vehicle in PCU/day	Total Number of Vehicle in PCU/hour
1.	Truck	42	3	126	5.25
2	2 Wheeler	24	0.5	12	0.5
3.	Bus	4	3	12	0.5
4	Car	30	1	30	1.25
Total				180	7.5 or say 8

ToR-6(X): Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species.

Compliance: Based on the information gathered, an inventory of the terrestrial vasculars plants belonging to the area has been made that includes **132 species (32 trees, 26 shrubs, 17 climbers, 15 grasses and 42 herbs) under 55 families.** On the basis of number of species and genera, **most diverse families include Fabaceae, Asteraceae, Euphorbiaceae, Poaceae, Moraceae, Acanthaceae, Malvaceae, Rutaceae and Convolvulaceae etc.**

ToR-6(XI): Socio-economic status of the study area.

Compliance: Socioeconomic status has been studied through **secondary sources and by site visits**. The social requirements identified such as Drinking water requirement, Promotion of Educational institutions and Medical facilities to the villagers (especially Senior Citizens and infants or pregnant ladies). Community centers, recreation facilities etc. will also be developed as part of social responsibility.

ToR-7: Impact and Environment Management Plan.

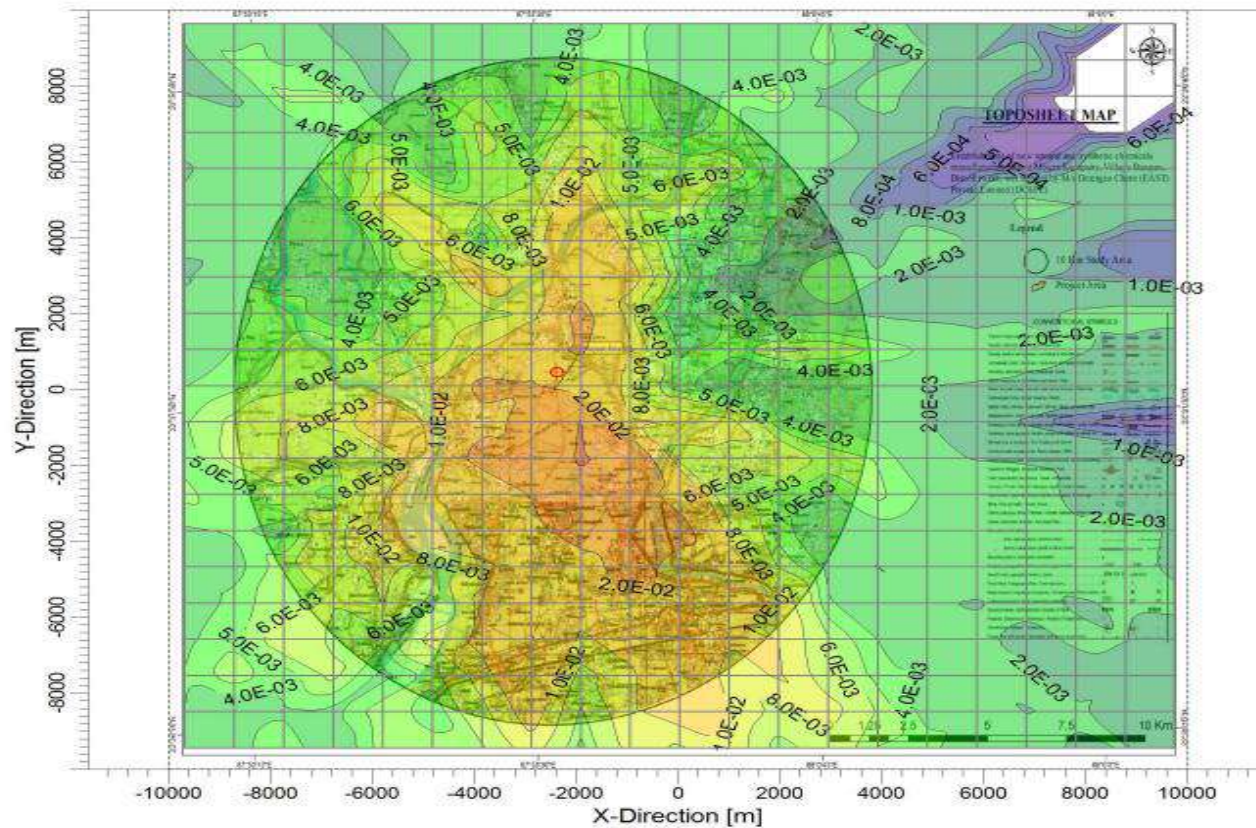
(I) Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.

Compliance: U.S. EPA AERMOD dispersion model, has been used for this report. **Isopleths of Nox, Sox and PM₁₀ are given in the next slide.**

❖ ISOPLETH OF NOx:

PROJECT TITLE:

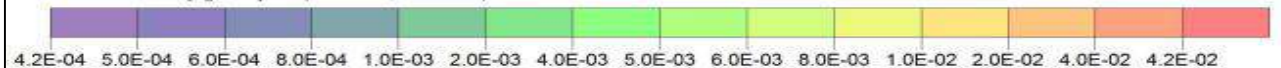
**M/s Detergeo Chem (East) Pvt. Ltd.
NOx emission from DG set**



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

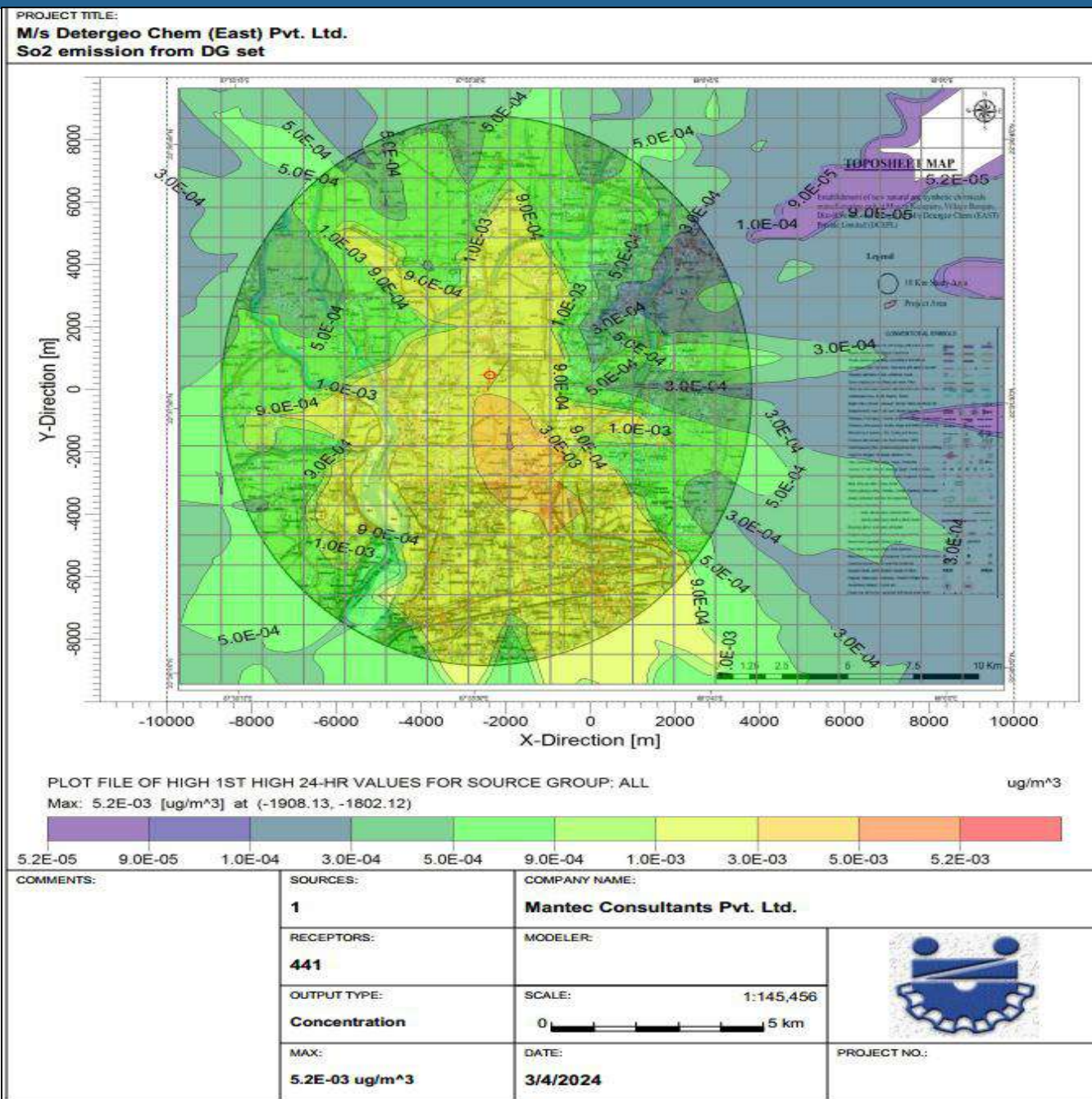
Max: 4.2E-02 [ug/m³] at (-1908.13, -1802.12)

ug/m³



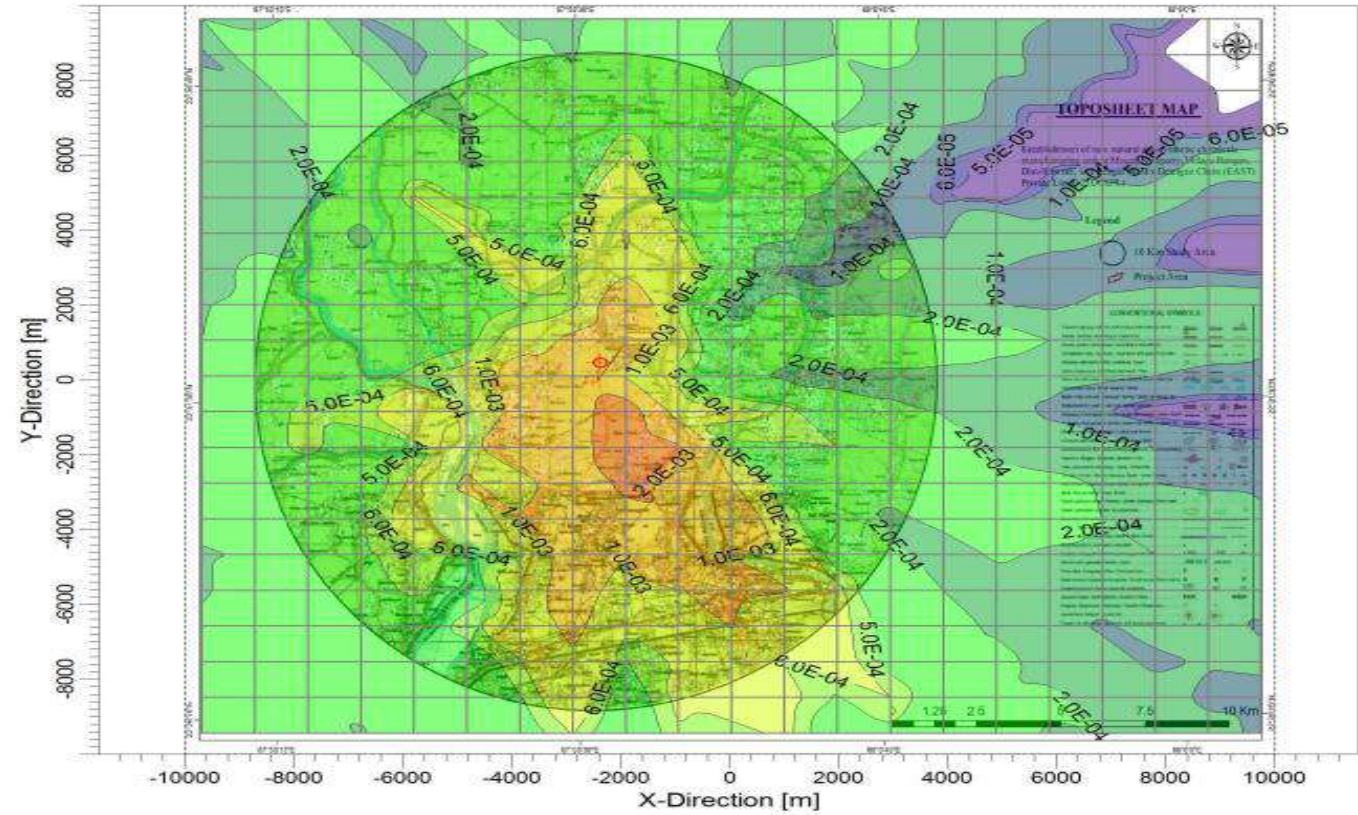
COMMENTS:	SOURCES:	COMPANY NAME:	
	1	Mantec Consultants Pvt. Ltd.	
	RECEPTORS:	MODELER:	
	441		
OUTPUT TYPE:	SCALE:	1:145,456	
Concentration	0	5 km	
MAX:	DATE:	PROJECT NO.:	
4.2E-02 ug/m³	3/4/2024		

❖ ISOPLETH OF SO2:



❖ ISOPLETH OF PM:

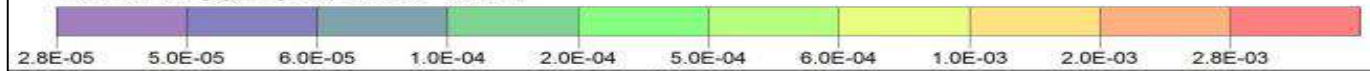
PROJECT TITLE:
M/s Detergeo Chem (East) Pvt. Ltd.
PM emission from DG set



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

Max: 2.8E-03 [ug/m³] at (-1908.13, -1802.12)

ug/m³



COMMENTS:

SOURCES:

1

COMPANY NAME:

Mantec Consultants Pvt. Ltd.

RECEPTORS:

441

MODELER:

OUTPUT TYPE:

Concentration

SCALE:

1:145,456

0

5 km

MAX:

2.8E-03 ug/m³

DATE:

3/4/2024

PROJECT NO.:



ToR-7(II): Water Quality modeling-in case of discharge in water body.

Compliance: No Waste water or Treated water will be discharge in to water body.

ToR-7(III): Impact of the transport of the raw materials and end products on the surrounding environment hall be assessed and provided.

Compliance: The LOS value from the proposed project may be same as earlier value “Excellent” for NH-6 and ‘Very Good’ for SH-15. So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.

ToR-7(IV): A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included.**Compliance: Details of ETP (Effluent Treatment Plant):**

The raw effluent will be received at the inlet of the bar screen to trap any floating particles and debris. A belt type oil skimmer and grease trap will be provided to remove the floating oil and grease.

The oil free effluent will be pumped to the flash mixer where lime dolomite will be added to precipitate the dissolved solids, sulphates and other organic impurities present in the effluent. The effluent from the flash mixer overflows to the settling tank where poly will be added and the impurities are removed as sludge from the bottom of the tank.

The sludge will be sent to sludge drying beds. The clear supernatant overflows to the Clarified Water tank where Hypo will be dosed for disinfection. Filter Feed pumps transfer the clarified water to the downstream Pressure Media filter and Activated Carbon filter for removal of suspended solids and any traces of organics.

Pressure Sand Filter:

The system is provided with Gravels, Pebbles Sand Media Filter. The main purpose of the filter is to remove the Suspended Solids & reduce Turbidity. The Filter is provided within Inlet Distributor, Bottom collector & various Filtration Media like pebbles, gravels, sand to achieve effective filtration.

Externally, the filter has Mesh of Valve to assist in various service requirements like Filtration, Backwash & Rinse.

Activated Carbon Filter:

The system is provided with Activated Carbon Filter. The main purpose of the filter is to remove free Chlorine, balance organics, color etc. The Filter is provided with Inlet Distributor, Bottom Collector & filtration media like fine silex and activated Carbon.

Externally, the filter has Mesh of Valve to assist in various service requirements like Filtration, Backwash & Rinse.

The treated water is used for floor washing/process applications.

Design Capacity

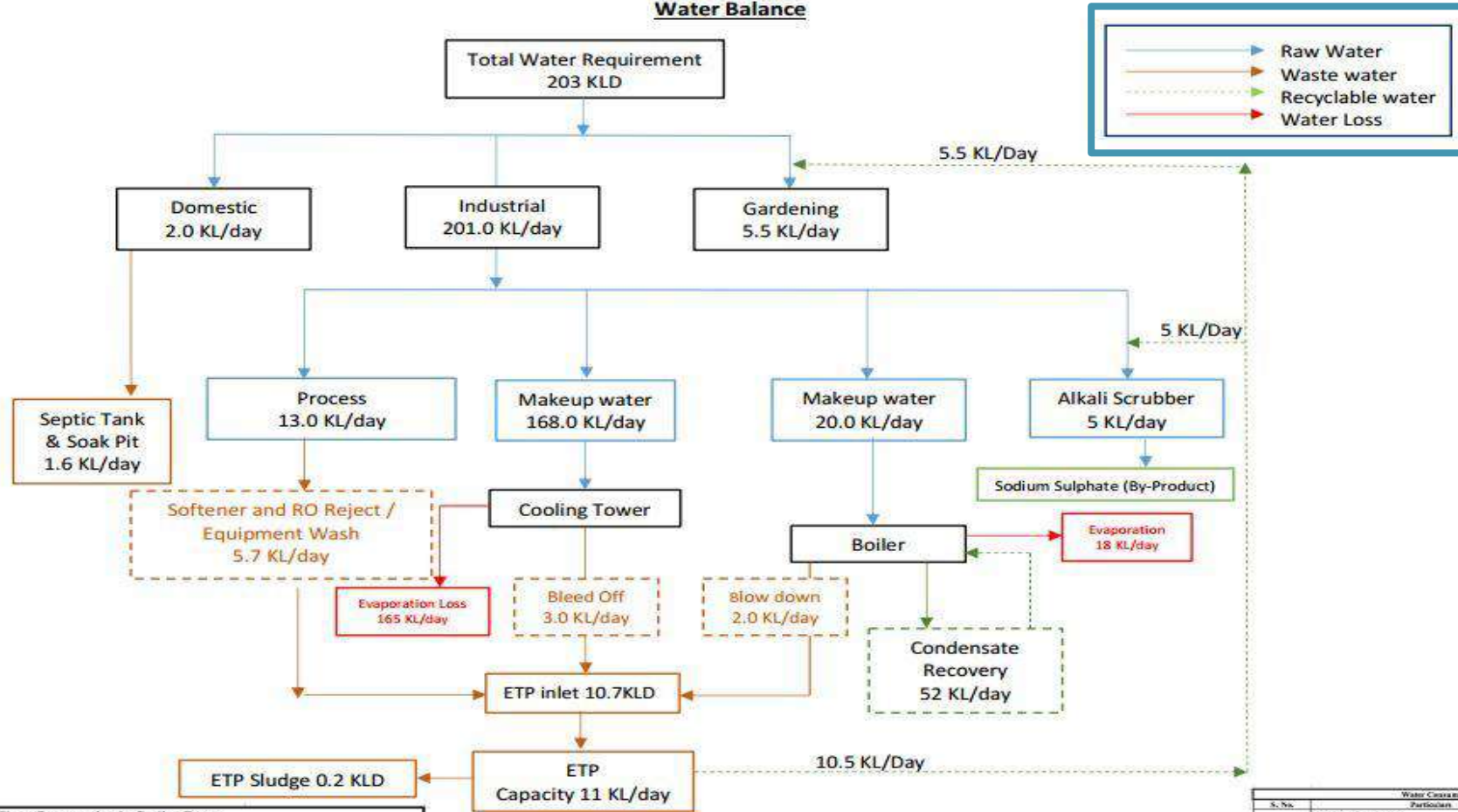
Effluent treatment plant: 5 KLD Flow

Rate: 1m³/hr

Service Cycle: 5 hrs

DETERGEO CHEM (EAST) PRIVATE LIMITED

Water Balance



Water Consumption in Cooling Tower	
Particulars	Water Consumption (KL)
Startup: One Time Water Feed	700
Evaporation Loss @ 0.98% / hour	6.86
Evaporation Loss / Day	165
Cooling Tower Bleed Off / Day	3
Total Cooling Tower Makeup Water / Day	168
Cooling Tower Recycle Water	532

Water Consumed In Process		
S. No.	Particulars	Water Consumption (KL/Day)
1	LABSA 90% Hydrolysis - Mixed With Final Product	1.0
2	LABSA 90% Separation and Drying - Mixed With Final Product	1.5
3	CAPP Hydrolysis - Mixed With Final Product	4.7
4	RO Plant Reject - Sent to ETP	4
5	Sodium Regeneration - Sent to ETP	1
6	Equipment Wash - Sent to ETP	0.7
TOTAL WATER CONSUMPTION IN PROCESS (KL/Day)		13

ToR-7(V): Details of stack emission and action plan for control of emissions to meet standards.

Compliance: Stack specification:

S. No.	Stack Details	Stack Parameters	Values	Unit	
1.	Sulphonation Plant (Vent Gas from ESP & Scrubber)	MOC	MS		
		Diameter	600	mm	
		Height	30	metre	
		Exit Gas Temperature	30-40	Celcius	
2.	Oil Fired Boiler (Bag Filter)	MOC	MS		
		Diameter	450	mm	
		Height	30	metre	
		Exit Gas Temperature	180	Celcius	
3.	Diesel Generator				
		1 x 910 Kva	Diameter	250	mm
		1 x 500 Kva	Height	11	metre
			Exit Gas Temperature	As per DG Standards	

- The emission sources for the proposed project i.e. Boiler, DG set, Alkali Scrubber, Reactor will be designed with adequate stack heights and air pollution control measures to meet the standards set by the WBPCB/CPCB. Good housekeeping, providing adequate air pollution control measures and stack of adequate heights will be provided.
- Online Air monitoring system for stack emission (for Particulate Matter) will be installed and transmission of online data to WBPCB and CPCB will be done.

ToR-7(VI): Measures for fugitive emission control.**Compliance: Measures for fugitive emission control:**

- The principal air pollution control systems proposed for the sulphonation plant are Electrostatic Precipitator (ESP) and Alkali Scrubber.
- The SO₂ and Acid mist released during the sulphonation process would be cleaned by taking the gas through an ESP to remove the acid mist followed by alkali scrubber to remove the SO₂ gas.
- The clean gas will be discharged into atmosphere through a stack of 30.0 m height.

ToR-7(VII): Details of hazardous waste generation and their storage, utilization and management. Copies of MOU regarding utilization of solid and hazardous waste in cement plant shall also be included.**Compliance: Details of hazardous waste generation and their storage:** Refer slide-24.**Utilization and Management of hazardous waste generation :** Refer slide-25.**ToR-7(VIII): Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.****Compliance:** N/A**ToR-7(IX): Action plan for the green belt development plan in 33 % area. Giving details of species, width of plantation, planning schedule.****Compliance:** 33% of total area as per MoEF&CC stipulated norms will be developed as the green belt. The plant density of 150 trees per hectare with local native species will be implemented. The greenbelt will be **developed in an area of 3019 sq.m (33%) of the total land area of 13,493 sq.m.**

ToR-7(X): Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the rooftops and storm water drains to recharge the ground water.

Compliance: The rainwater harvesting measures and quantity with regards to the various components of the project are as follows:

S. No.	Category	Area (sq.m)	Intensity of Rainfall mm/hr.	Runoff Coefficient	Total vol. of water available for RWH (m ³ /hr)	Total vol. of water available for RWH (m ³ /15 min)
1.	Building area	564	100	0.9	50.76	12.69
2.	Landscaped area (Green area, Vacant area)	7430	100	0.2	148.6	37.15
3.	Road/Paved area	5499	100	0.6	329.94	82.48
Total		13493			529.30	132.32

The total calculated peak run-off from landscaped areas, road and open area is 132.32 cu.m.

This run-off is proposed to be channelized through storm water drains to individual recharge pits and the rainwater will be recharged into underground aquifers.

ToR-7(XI): Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.

Compliance: The total capital investment on environmental control measures is envisaged to be **about Rs.150 Lakhs and Recurring Cost is envisaged to about Rs.17 Lakhs/yr. out of a total project cost of Rs.20 Crores.**

ToR-7(XII): Action plan for post-project environmental monitoring shall be submitted.

Compliance: A detailed monitoring of emissions and effluent sources for different environmental parameters will be carried out as per the present norms and any further notification/direction from West Bengal State Pollution Control Board (WBPCB), Central Pollution Control Board (CPCB) and MoEF&CC. Monitoring methodologies will follow standard methods prescribed by Central Pollution Control Board (CPCB), Bureau of Indian Standards (BIS) etc.

ToR-7(XIII): Onsite and Offsite Disaster, Preparedness and Emergency Management Plan.

Compliance: Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster, which limits the damage to the minimum, and follow the on-site & off-site emergency planning. DMP hyperlink.

ToR-8: Occupational health:

(I): Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

Compliance: Rs.5.0 Lakhs/yr. will be kept for to ensure safety of all Employees including contract & casual workers.

(II): Details of exposure specific health status evaluation of worker.

Compliance: Workers' health shall be evaluated by pre designed format, for chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colorvision and any other ocular defect) ECG, during pre placement and periodical examinations that will give the details of the same.

ToR-8(III): Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL).

Compliance: The main chemicals affecting the health will be VOC's, CO. MSDS of all hazardous chemicals will be made available for concerned personnel. The following general measures will be taken:

- Establishment of Safety Policy.
- Compulsory use of PPE's.
- Regular monitoring of work place environment with respect to air, light, humidity, temperature.
- Installation of fire extinguisher.
- Separate area for container decontamination.
- Provision of part time qualified M.O as per Factory Act.
- Pre medical & periodic medical checkup of workers as per Factory Act.
- Monitoring of Occupational hazardous like noise, vibration & chemical exposure.
- Displaying various instruction boards, cautionary notices etc.

ToR-8(IV): Annual report of health status of workers with special reference to Occupational Health and Safety.

Compliance: N/A

ToR-9: Corporate Environment Policy.

(I): Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

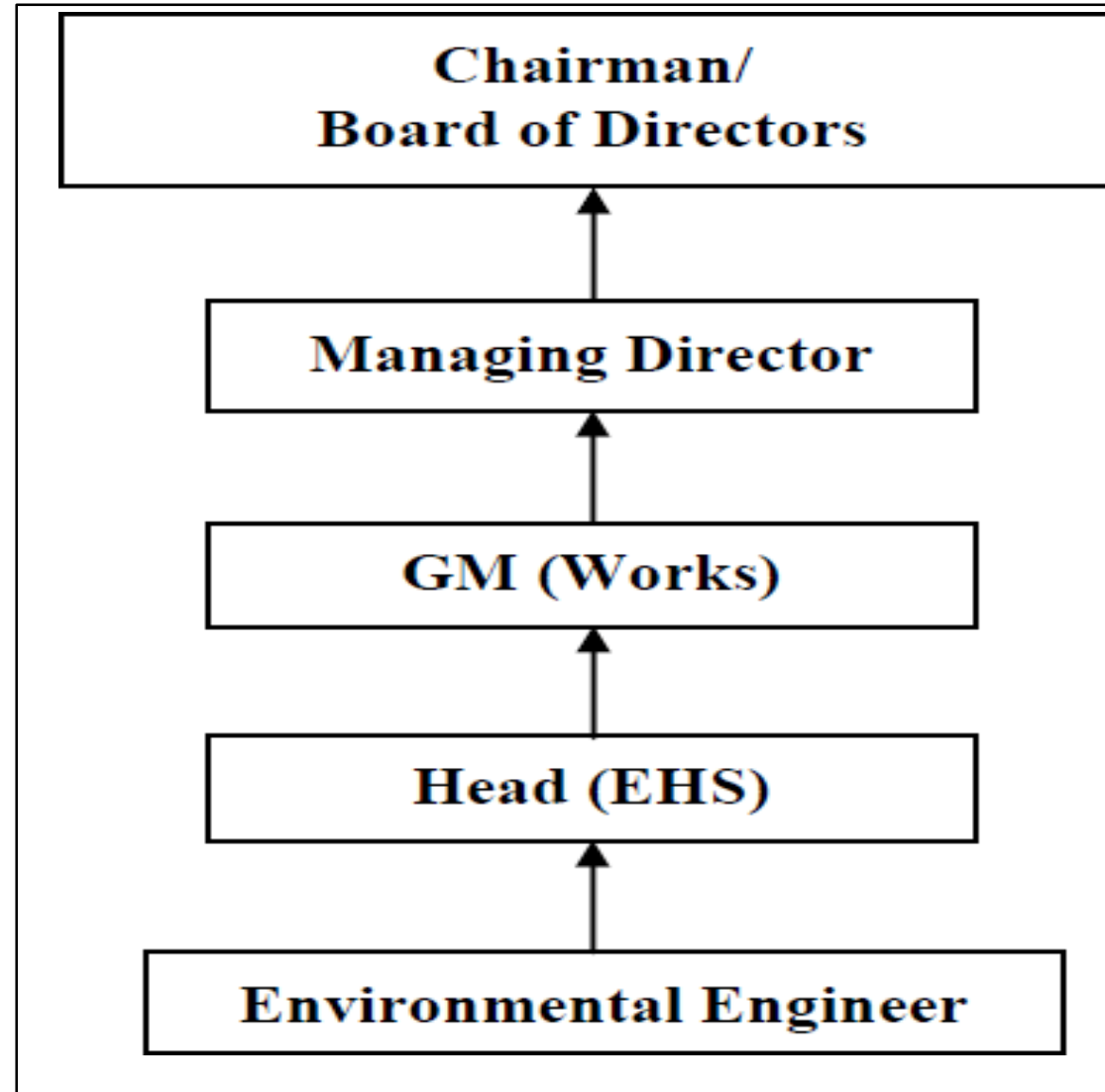
Compliance: The company had a well laid environment policy and is detailed in the EIA Report.

(II): Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions?

Compliance: Yes, All the Environmental policy is followed for SOPs and procedures so that any violation regarding environmental or forest norms will be avoided. For that scheduled internal audits and management review meeting shall be done.

(III): What is the hierarchical system or Administrative order of the company to deal with the environmental issues.

Compliance: Hierarchy of the company is well laid and its schematic representation is in the next slide.

❖ HIERARCHY SYSTEM:

ToR-9(IV): Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large?

Compliance: The system of reporting of Non-conformances/ violation of any Environmental Law/Policy will be as per quality management system.

The internal audit will be conducted on periodic basis, and any Non-conformances/ violation to Environmental Law/Policy will be closed and discussed during Management Review Meetings of board of directors/partner.

ToR-10: Details regarding infrastructure facilities such as sanitation, fuel etc.

Compliance: Most of the labor force during construction and operation phase hired from the local areas. Sanitation and rest rooms will be provided for the casual workers and truck drivers.

ToR-11: Enterprise Social Commitment (ESC)

Compliance: The company has separately earmarked **Rs. 40.00 lakhs (2% of Project cost)** towards the Corporate Environment Responsibility (CER) Activities as per OM (CER) F. No. 22- 65/2017-IA.III dated 01.05.2018.

ToR-11(I): Adequate funds (at least 2.5 % of the project cost) shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item wise details along with time bound action plan shall be included. Socio-economic development activities need to be elaborated upon.

Compliance: A provision of **Rs.3 lakhs has been made under Public Hearing Budget** towards provision of scheme of Zero Liquid Discharge (ZLD) (1 lakhs) and for **awareness and training programme for local employment (2 lakhs)** based on the commitment made under Public hearing meeting held on 23.08.2021.

ToR-12: Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

Compliance: N/A.

ToR-13: A tabular chart with index for point wise compliance of above TOR.

Compliance: Complied.

SPECIAL ToR COMPLIANCE

SToR-(i): Details on solvents to be used, measures for solvent recovery and for emissions control.

Compliance: N/A.

SToR-(ii):Details of process emissions from the proposed unit and its arrangement to control.

Compliance: Details of process emissions:

Impact on air quality due to proposal project will be temporary rise in SPM and RSPM level likely to result from:

- Fugitive dust emissions at the construction site.
- Use of unpaved roads and trucks tracks by the construction activities.

SToR-(iii): Ambient air quality data should include VOC, other process-specific pollutants* like NH₃*, chlorine*, HCl*, HBr*, H₂S*, HF*,etc., (*as applicable).

Compliance: For AAQ data Refer slide no.-61

SToR-(iv): Work zone monitoring arrangements for hazardous chemicals

Compliance: Work place monitoring to be done regularly & Detectors will be installed. Hazardous chemicals will be stored separately.

SToR-(v): Detailed effluent treatment scheme including segregation of effluent streams for units adopting 'Zero' liquid discharge.

Compliance: Effluent Treatment plant followed By Tertiary treatment is proposed for the Unit to achieve the 'Zero Liquid Discharge'. And for water balance refer slide-27.

SToR-(vi): Action plan for odour control to be submitted.

Compliance: Scrubber is installed for scrubbing the residual Formaldehyde from the main product stream which also controls the odour problem.

Green belt will be maintained to control the odour problem, About 33% of the total area is under the green cover. About 125 no of trees will be planted under GB development program.

SToR-(vii): A copy of the Memorandum of Understanding signed with cement manufacturers indicating clearly that they co-process organic solid/hazardous waste generated.

Compliance: N/A.

SToR-(viii): Authorization/Membership for the disposal of liquid effluent in CETP and solid/hazardous waste in TSDF, if any.

Compliance: Company will collect, store separately and dispose off solid/hazardous waste at TSDF site and will take the Authorization/Membership of TSDF facility after the grant of Environmental Clearance

SToR-(ix): Action plan for utilization of MEE/dryers salts.

Compliance: N/A.

SToR-(x): Material Safety Data Sheet for all the Chemicals are being used/will be used.

Compliance: Material safety data sheet for all the chemicals will be used.

SToR-(xi): Authorization/Membership for the disposal of solid/hazardous waste in TSDF.

Compliance: Company will take the Authorization/Membership of TSDF facility after the grant of EC.

SToR-(xii): Details of incinerator if to be installed.

Compliance: N/A.

SToR-(xiii): Risk assessment for storage and handling of hazardous chemicals/solvents. Action plan for handling & safety system to be incorporated.

Compliance: Risk for storage units depends not on the extent of the consequence, but also on the probability of the failure of the safety measures and provisions provided. The safety measures to be provided in storage facilities in the proposed plant are given below:

General Safety Measures for Chemicals Storage & Handling.

Following safety measures for chemicals storage and handling will be provided.

- Availability of MSDS (Material Safety Data Sheets) information for all chemicals Proper layout of tank farm and other storage areas for chemicals
- Proper segregation of chemicals storage taking into account compatibility Matrix Instrumentation and control system for tanks, Sulphonator etc. SO₂ and SO₃ Gas detection and fire protection systems
- Periodic inspection and maintenance system Standard operating procedures and check lists Training of operation and maintenance personnel Safety work permit system.
- Electrical hazardous area classification for process units and storage areas Incident investigation and implementation of recommendations.

SToR-(xiv): Arrangements for ensuring health and safety of workers engaged in handling of toxic materials.**Compliance:**

- Personnel especially contractor workers at the plant should be made aware about the hazardous substance stored at the plant and risk associated with them.
- To overcome these hazards, in addition to arrangements to reduce it within TLV's, personal protective equipment should also be supplied to workers.

- M/s DCEPL will generate a fair amount of direct, indirect and induced employment in the region.
- The local economy will receive a boost due to employee spending and services generated by the company. Due to the implementation of the project activity there shall be improvement in the standard of living viz. better education, improved health, sanitation facilities etc. This is envisaged as a major positive benefit.
- The company's management will recruit semi-skilled and unskilled workers from the nearby villages due to availability of local labors. The employment provided due to the proposed project would rapidly increase the social status of the villagers.
- Company commitment towards environment & using the latest technology, along with optimal usage of available resources will reduce the impact and makes the project viable.

THANK YOU

EDS(viii): Details of Raw material and its linkage and its mitigation measure during transportation needs to be submitted at S. No. 13.1 of Form 2.

REPLY:

No.	Raw Material / Fuel	Quantity	Unit	Other Unit	Source (incase of Import. please specify country and Name of the port from which Raw Material / Fuel is received)	Mode of Transport	Other Mode of Transport	Distance of Source from Project Site (in Kilometres) (In case of import, distance from the port from which the raw material / fuel is received)	Type of Linkage	Other Type of Linkage
1	Coconut Fatty Acid	5028	Others	MTA	Import	Others	ISO Tank	500	Open Market	
2	Monochloroacetic acid	243	Others	MTA	Domestic	Others	Truck	500	Open Market	
3	Sulphuric Acid (98%)	12000	Others	MTA	Domestic	Others	MS Tanker	50	Open Market	
4	Caustic Soda	4052	Others	MTA	Domestic	Others	MS Tanker	10	Open Market	
5	Stearic Acid	5490	Others	MTA	Import	Others	ISO Tank	500	Open Market	
6	Lauryl Alcohol	3150	Others	MTA	Import	Others	ISO Tanks	50	Open Market	
7	Alpha Olefin	560	Others	MTA	Import	Others	ISO Tanks	500	Others	Open market
8	Monoethanolamine	732	Others	MTA	Domestic	Others	ISO Tank	50	Open Market	
9	Lauryl Ether	13200	Others	MTA	Import	Others	ISO Tanks	500	Others	Open market
10	Sulfur	3487	Others	MTA	Domestic/import	Others	Truck	10	Open Market	
11	Dimethylaminopropylamine	264	Others	MTA	Import	Others	ISO Tank	500	Open Market	

12	Ethylene Glycol	870	Others	MTA	Domestic	Others	MS Tanker	50	Others	Open market
13	Linear Alkaline Benzene (LAB)	17215	Others	MTA	Import	Others	MS Tanker	500	Open Market	
14	Di Ethanolamine	1029	Others	MTA	Domestic	Others	ISO Tank	50	Open Market	

COPY OF LINKAGE BEING ATTACHED BELOW:

The annual raw material consumption quantities along with their sourcing arrangements i.e. whether “import” or “domestic”, have been given in the final EIA report. Since, the industry and it’s sister concerns are already running similar plant and have been into this segment since more than 2 decades, it’s existing supplier relations will be used to source the raw material, therefore no separate contract has been entered into for this subject plant for sourcing the raw material.

Risk Mitigation Measures to be adopted During Transport

S. No	Improvement Areas	Risk Mitigation Measures		
1	Driver Management	Driver training shall be mandated through Detergeo approved DTI.		
		Driver medical shall be mandated through Detergeo approved medical centers.		
		Defensive driving training to errant driver		
		Minimum age of Driver is required to be 25 Years		
		Keep a record of the substances being transported i.e., shipping papers and written emergency instructions are critical for safety		
2	Journey Management	Buyer/customer to be informed to define route with proper rest stations. Customer to submit the document to Detergeo. Detergeo may review and provide input. Customer shall review and release final document to Detergeo and communicate to all transporters and driver by the customers, via Journey Route Management document for every journey. Journey management documents should also take care of details like on route nearby Hospital, Crane provider etc. A sample format may be shared by Detergeo to customer.		
		Restrict night time driving (12:00 am – 5:00 am) inclusive of empty vehicles which is the most accident-prone time zone		
		Mandate resting time of at least 30 minutes for drivers after continuous driving of maximum of 4 hours.		
		Vehicles are not allowed to driver more than 60 Km/hr.		
		24x7 Proactively monitor all safety violations and provide timely alerts to drivers/ SPOC for controlling any possible damage through VTS compatible with Detergeo System		
		3	Vehicle Management	All the vessels and tanks will be provided with temperature indicator, pressure gauge and safety valves as depending upon the material being transported and operating parameters
				Suitable fire extinguishers, such as, DCP (Dry Chemical Powder), CO2 & foam type to be kept in the transporter vehicle at easily approachable spots and in sufficient numbers
Inspect the vehicle's general condition, including tires, condition of valves, electrical wiring, adequate sealing, condition of wipers, headlights, signal lights, etc.				
Following the dangerous goods segregation rules for carrying mixed classes of hazardous chemicals; chemicals must be separated when being transported/stored to ensure incompatible chemicals do not mix if there is a spill				
Placards are standard hazmat identifiers, designed to meet individual specifications, will be placed on outer containers, trucks, cylinders, or other vehicles used for transport				
Have an emergency kit readily available with safety goggles, chemical information sheets, and MSDS				
Securing container tanks against movement on transportation vehicles i.e., proper loading and bracing all containers so they do not				

		fall, slide, or bounce around during transportation
		Suraksha certification from Detergeo authorized center for liquid tankers
		Periodic Testing of Safety Relief Valve (SRV) and EFCV/IEFCV (Excess Flow/Internal Excess Flow Check Valve) under Rule 18 and Tanker testing under Rule 19 for Tanker integrity testing through Hydrotesting through DETERGEO approved centers along with TPI presence during testing.
		Speed Governor Speed limiting devices can avoid the risk of accidents due to over-speeding
		ABS (Anti-Lock Braking system) and EBS in Trailers with ESC – Electronic Stability Controller
		RUPD/SUPD should be available in the vehicle. The rear bumper should not extend beyond the RUPD.
		Vehicle Age: Age of vehicle restricted up to 10 yrs. to improve distribution safety and sustainability
4	Emergency Response	Customer should have their own Offsite Transport Emergency Response Plan

