DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

For the Proposed Modification of Existing Infrastructure
To a capacity of 0.038 T/M

By

NURAY CHEMICALS PRIVATE LIMITED

S.F.Nos: 157 & 158
Kakkalur Village
Thiruvallur Taluk
Thiruvallur District.
TAMIL NADU.

Category 'B'
Environmental Clearance under EIA Notification 2006

Report Prepared by

TEAM LABS AND CONSULTANTS
B-115, Annapurna Block
Aditya Enclave, Ameerpet,
Hyderabad – 500 038
(QCI/NABET approval as per MoEF O.M J-11013/77/2004 –IA-II(I) dt 30.09.2011)
List 'A' –No: 92

CONTENTS

DR. H.MALLESHAPPA ,I.F.S.,
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, TAMILNADU,
3rd Floor, Panagal Maaligai,
No.1 Jeenis Road, Saidapet,
Chennai-15.

Letter No.SEIAA-TN/F ,No.757/ M-XLII/ TOR - 151 /2013 Dt.14.08.2013

To

Thiru. J.Jayaseelan
Director,
M/s. Nuray Chemicals Pvt. Ltd.,
New No. 25, 12th Cross Street,
Shastri Nagar, Adyar,
Chennai – 600 020.

Sir / Madam,

Sub: SEIAA, Tamilnadu - Environmental Clearance – M/s. **Nuray Chemicals Pvt. Ltd.**- Proposed Pharmaceutical unit with a capacity of 0.038 T/M over an extent of 1.498 ha at S.No.157 and 158, Plot No.111, SIDCO Industrial Estate, Kakkalur Village, Thiruvallur Taluk, Thiruvallur District under Category - **B 1** and Schedule S.No. **5(f)** – TOR for the preparation of EIA report – issued - Reg.

Ref: 1. Your Application for EC Dt. 28.01.2013
2. T/O. letter No. SEIAA/TN/F-757/2013/M-XLII/ dt. 9.07.2013
3. Minutes of the 42nd SEAC meeting held on 24.07.2013 & 25.07.2013

- - - - -

Kindly refer to your proposal submitted to the State Level Impact Assessment Authority for Environmental Clearance.

The above proposal was considered in the 42nd SEAC meeting held on 24.07.2013 & 25.07.2013. The Committee observed that the above project comes under Item No 5(f) of the Schedule and **located in the Kakkalur SIDCO Industrial Estate.** Hence the Committee **decided to exempt the project from Public Consultation Process.**

Based on the re- presentation made by the proponent, the Committee **decided to issue the following TORs** for the preparation of EIA report .

1. Executive summary of the project. Existing facility shall also be described.
2. Justification of the project.
3. Project location and plant layout.
4. Promoters and their back ground.

5. Regulatory framework.
6. A map indicating location of the project and distance from severely polluted area.
7. Infrastructure facilities including power sources.
8. Total cost of the project along with total capital cost and recurring cost/annum for environmental pollution control measures.
9. Project site location along with site map of 10 km area and site details providing various industries, surface water bodies, forests etc.
10. Present land use based on satellite imagery for the study area of 10 km radius.
11. Location of National Park/Wild life sanctuary/Reserve Forest within 10 km radius of the project.
12. Details of the total land and break-up of the land use for green belt and other uses.
13. List of products along with the production capacities.
14. Detailed list of raw material required and source, mode of storage and transportation.
15. Manufacturing process details along with the chemical reactions and process flowchart.
16. Site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall is necessary.
17. Ambient air quality monitoring at 6 locations within the study area of 5 km., aerial coverage from project site as per NAAQES notified on 16th September, 2009.Location of one AAQMS in downwind direction.
18. One season site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall and AAQ data (except monsoon) for PM10, SO2, NOx including HC and VOCs should be collected. The monitoring stations should take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests. Data for water and noise monitoring should also be included.
19. Air pollution control measures proposed for the effective control of gaseous emissions within permissible limits.
20. Name of all the solvents to be used in the process and details of solvent recovery system.
21. Design details of ETP, incinerator, boiler, scrubbers /bag filters etc.
22. Details of water and air pollution and its mitigation plan.
23. Action plan to control ambient air quality as per NAAQES Standards notified by the Ministry on 16th September, 2009.
24. An action plan to control and monitor secondary fugitive emissions from all the sources.

25. Determination of atmospheric inversion level at the project site and assessment of ground level concentration of pollutants from the stack emission based on site specific meteorological features. Air quality modelling for the proposed plant.
26. Source and permission for the drawl of water from the competent authority. Water balance chart including quantity of effluent generated recycle and reused and discharged.
27. Action plan for 'Zero' discharge of effluent should be included.
28. Ground water quality monitoring minimum at 6 locations should be carried out. Geological features and Geo-hydrological status of the study area and ecological status (Terrestrial and Aquatic).
29. The details of solid and hazardous wastes generation, storage, utilization and disposal particularly related to the hazardous waste calorific value of hazardous waste and detailed characteristics of the hazardous waste. Details on accumulated solid waste if any due to previous activity.
30. Action plan for the management of fly ash generated from boiler should be included. Tie-up or agreement with brick manufacturer to be provided.
31. Precautions to be taken during storage and transportation of hazardous chemicals should be clearly mentioned and incorporated.
32. A copy of the Memorandum of Understanding signed with cement manufacturers indicating clearly that they will utilized all the organic solid waste generated.
33. A copy of 'Memorandum of Understanding' (MoU) signed with coal supplier for imported coal and brick manufacturers for management of fly ash.
34. Authorization/Membership for the disposal of liquid effluent in CETP and solid/hazardous waste in TSDF, if any.
35. Material Safety Data Sheet for all the Chemicals are being used/will be used.CAS No./RTECS No./DOT/UN etc to be mentioned against each chemicals.
36. Authorization/Membership for the disposal of solid/hazardous waste in TSDF.
37. Risk assessment for storage for chemicals/solvents. Action plan for handling &safety system.
38. An action plan to develop green belt in 33 % area. Layout plan for green belt shall be provided.
39. Action plan for rainwater harvesting measures at plant site shall be included to harvest rainwater from the roof tops and storm water drains to recharge the ground water.
40. Details of occupational health programme.
    i. To which chemicals, workers are exposed directly or indirectly.

ii. Whether these chemicals are within Threshold Limit Values (TLV)/

iii. Permissible Exposure Levels as per ACGIH recommendation.

iv. What measures company have taken to keep these chemicals within PEL/TLV.

v. How the workers are evaluated concerning their exposure to chemicals during pre-placement and periodical medical monitoring.

vi. What are onsite and offsite emergency plan during chemical disaster.

vii. Liver function tests (LFT) during pre-placement and periodical examination.

viii. Details of occupational health surveillance programme.

41. Socio-economic development activities should be in place.

42. Note on compliance to the recommendations mentioned in the CREP guidelines.

43. Detailed Environment management Plan (EMP) with specific reference to details of air pollution control system, water & wastewater management, monitoring frequency, responsibility and time bound implementation plan for mitigation measure should be provided.

44. EMP should include the concept of waste-minimization, recycle / reuse / recover techniques, Energy conservation, and natural resource conservation.

45. Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof.

46. A tabular chart with index for point wise compliance of above TORs. The following general points shall be noted:

i. All documents shall be properly indexed, page numbered. Period/date of data collection shall be clearly indicated.

ii. Authenticated English translation of all material provided in Regional languages.

iii. The letter/application for EC shall quote the MOEF file No. and also attach a copy of the letter.

iv. The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.

v. The final EIA-EMP report submitted to the Ministry must incorporate the issues in this letter. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report.

vi. Certificate of Accreditation issued by the QCI to the environmental consultant shall be included.

The Committee prescribed the above ToRs for preparation of EIA/EMP reports. The proponent should prepare EIA/EMP Report based on the above TORs and submit the same to

the SEIAA, TN . The EIA/EMP Report should be as per the generic structure given in Appendix-III of EIA Notification, 2006. The concerns raised along with the replies during the Public Hearing/Consultation should be incorporated in the EIA/EMP Report and the final EIA/EMP submitted to the Ministry for obtaining environmental clearance.

The prescribed TORs would be valid for a period of two years for submission of the EIA/EMP reports, as per the O.M. No. J-11013/41/2006-IA. II(I) dated 22.3.2010.

Further, the Committee called for the following details.

1. CGWC approval for drawl of ground water.
2. Source segregation of high TDS and low TDS effluent and revised separate appropriate treatment system.
3. Agreement with TSDF for disposal of Hazardous waste.
4. Base line data on VOC emission.
5. Risk Assessment studies for storage and handling of hazardous chemicals.
6. Details on industries located in and around the project.
7. Details on specific CSR activities along with fund allocation (capital cost and recurring cost) and item wise break up for each activity.

MEMBER SECRETARY,
SEIAA-TN.

. Copy to :

1. Principal Secretary to Government,
   Environment & Forests Dept, Govt. of Tamil Nadu,
   Fort St. George, Chennai - 9.
2. The Member Secretary,
   Tamilnadu Pollution Control Board,
   76, Mount Salai, Guindy, Chennai - 600 032.
3. The Chief Conservator of Forest, Regional Office,
   Ministry of Environment and Forest(SZ),
   Kandriya Sadan, IV Floor, E&F Wings,
   17th Main Road, Koramangala, II Block,
   Bangalore - 560 034.
4. The Adviser,
   Ministry of Environment & Forests,
   Government of India,
   ParyavaranBhawan, CGO Complex,
   Lodhi Road, New Delhi - 110 003.
5. Stock file.

Chapter 1. INTRODUCTION

1.0 Introduction

Nuray Chemical Private Limited**,** proposed to establish a pharmaceutical unit with the capacity of 0.038 T/M at S.F. Nos. 157 & 158 Kakkalur Village, Thiruvallur Taluk, Thiruvallur District, which is located 3 km away from Thiruvallur town. It is in-between the road connecting Thiruvallur and Avadi. The site is located southern direction of this road. The nearest railway station is Thiruvallur.

1.1 About the Company

M/s. Nuray Chemicals Private Limited has purchased the existing unit of **M/s.Fischer Chemic Limited.**

M/s. Fischer Chemic Limited already has a valid consent order from TNPCB (Vide No. F.TLR0087/US/DEE/TNPCB/TLR/W/2012 dated 03.07.2012 valid up to 30.06.2013). M/s. Nuray Chemicals Private Limited now proposed to go for small modifications with existing building structures with the capacity of 0.038 T/M at S.F. Nos. 157 & 158, Kakkalur Village, Thiruvallur Taluk, Thiruvallur District, which is located 3 km away from Thiruvallur town. It is in-between the road connecting Thiruvallur and Avadi. The site is located southern direction of this road. The nearest railway station is Thiruvallur.

(i) EMPLOYMENT GENERATION (DIRECT AND INDIRECT) DUE TO THE PROJECT

The proposed unit will have the strength of 50 people for its normal activity.

1.2 Need for the project

The Indian pharmaceutical industry ranks among the top five countries by volume (production) and accounts for about 10% of global production. The industry's turnover has grown from a mere US$ 0.3 bn in 1980 to about US$ 21.73 bn in 2009-10. Low cost of skilled manpower and innovation are some of the main factors supporting this growth. According to the Department of Pharmaceuticals, the Indian pharmaceutical industry employs about 340,000 people and an estimated400,000 doctors and 300,000 chemists.

The Indian pharmaceutical industry ranks 14th in the world by value of pharmaceutical products. With a well-established domestic manufacturing base and low-cost skilled manpower, India is emerging as a global hub for pharma products and the industry continues to be on a growth trajectory. Moreover, India is significantly ahead in providing chemistry services such as analogue preparation, analytical chemistry and structural drug design, which will provide it ample scope in contract research and other emerging segments in the pharmaceutical industry. Some of the major factors that would drive growth in the industry are as follows:

Increase in domestic demand: More than half of India's population does not have access to advanced medical services, as they usually depend on traditional medicine practices. However, with increase in awareness levels, rising per capita income, change in lifestyle due to urbanisation and increase in literacy levels, demand for advanced medical treatment is expected to rise. Moreover, growth in the middle class population would further influence demand for pharmaceutical products.

Rise in outsourcing activities: Increase in the outsourcing business to India would also drive growth of the Indian pharmaceutical industry. Some of the

factors that are likely to influence clinical data management and bio-statistics markets in India in the near future include

1) cost efficient research vis-à-vis other countries

2) highly-skilled labour base

3) cheaper cost of skilled labour

4) presence in end-to-end solutions across the drug-development spectrum

5) robust growth in the IT industry.

Growth in healthcare financing products: Development in the Indian financial industry has eased healthcare financing with introduction of products such as health insurance policy, life insurance policy and cashless claims. This has resulted in increase in healthcare spending, which in turn, has benefitted the pharmaceutical industry

.

Demand in the generics market: During 2008-2015, prescription drugs worth about US$ 300 bn are expected to go off patent, mostly from the US. Prior experience of Indian pharmaceutical companies in generic drugs would provide an edge to them.

Demand from emerging segments: Some of the emerging segments such as contract research and development, bio-pharma, clinical trials, bio-generics, medical tourism and pharma packaging are also expected to drive growth of the Indian pharmaceutical industry.

1.3 Environmental Clearance Process

In terms of the Notification dated 14th September 2006, as amended on December 2009, of the MoEF, Industrial projects are categorized under Category A & B based on production capacity in the Schedule, including expansion and modernization of existing projects or activities, shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification;

Project or Activity	**Category with Threshold Limit**	
	Category – A	**Category – B**
Thermal Power Plants	≥500MW (Coal/Lignite/Naphtha & Gas based) ≥ 50 MW (Pet Coke Diesel and all other fuels including refinery residual oil waste except Biomass)* ≥20MW (based on Biomass or non hazardous municipal waste as fuel)*	<500MW Coal/Lignite/Naphtha & Gas based) <50MW ≥ 5MW (Pet Coke Diesel and all other fuels including refinery residual oil waste except Biomass)* <20MW >15MW (based on Biomass or non hazardous municipal waste as fuel)*
***Note:** (i) Power plants up to 15 MW based on Biomass using auxiliary fuel such as Coal. Lignite/ Petroleum products upto 15% are exempt (ii) Power plants upto 15 MW, based on non hazardous municipal and using auxiliary fuel such as Coal. Lignite/ Petroleum products upto 15% are exempt (iii) Power plants using waste heat boiler without any auxiliary fuel are exempt		
General Condition shall apply "Any project or activity specified in Category 'B' will be treated as Category 'A' if located in whole or in part within 10 km from the boundary of: (i) Protected areas notified under the Wildlife (Protection) Act, 1972; (ii) Critically polluted areas as notified by the Central Pollution Control Board from time to time; (iii) Eco-sensitive areas as notified under section 3 of the Environment (Protection) Act, 1986, such as, Mahabaleswar Panchangi, Matheran, Pachmarhi, Dahanu, Doon Valley and (iv) inter-state boundaries and international boundaries		

Provided that the requirement regarding distance of 10km of the inter-state boundaries can be reduced or completely done away with by an agreement between the respective states or U.Ts sharing the common boundary in the case the activity does not fall within 10 kilometers of the areas mentioned at item (i), (ii) and (iii) above

The environmental clearance process for new projects will comprise of a maximum of three stages. These three stages in sequential order are:

Stage (1)- Scoping

'Scoping' refers to the process by which the EAC in the case of Category 'A' projects or activities, including applications for expansion and/or modernization and/or change in product mix of existing projects or activities, determine detailed and comprehensive TOR addressing all relevant environmental concerns for the preparation of an EIA report in respect of the project or activity for which prior environmental clearance is sought. The EAC concerned should determine the ToR on the basis of information furnished in the prescribed application Form 1 including ToR proposed by the applicant, a site visit by a sub-group of EAC concerned only if considered necessary by the EAC concerned and other information that may be available with the EAC concerned.

Stage (2) - Public consultation

"Public consultation" refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impact of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.

After completion of the public consultation, the applicant shall address all the material environmental concerns expressed during this process, and make appropriate changes in the draft EIA and EMP. The final EIA report, so prepared, shall be submitted by the applicant to the concerned regulatory authority for appraisal. The applicant may alternatively submit a supplementary report to draft EIA and EMP addressing all the concerns expressed during the public consultation.

Stages (3) – Appraisal

Detailed scrutiny by the EAC of the application and other document like the Final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned

for grant of EC

1.1.1 Methodology of EIA

The EIA study encompasses the area within 10 km radius of the project.

1.1.1.1 Scope of EIA

The scope of study includes detailed characterization of existing status of environment in the study area for various environmental components viz. air, noise, water, land, biological and socio-economic components and other parameters of interest. The envisaged scope of EIA is as follows:

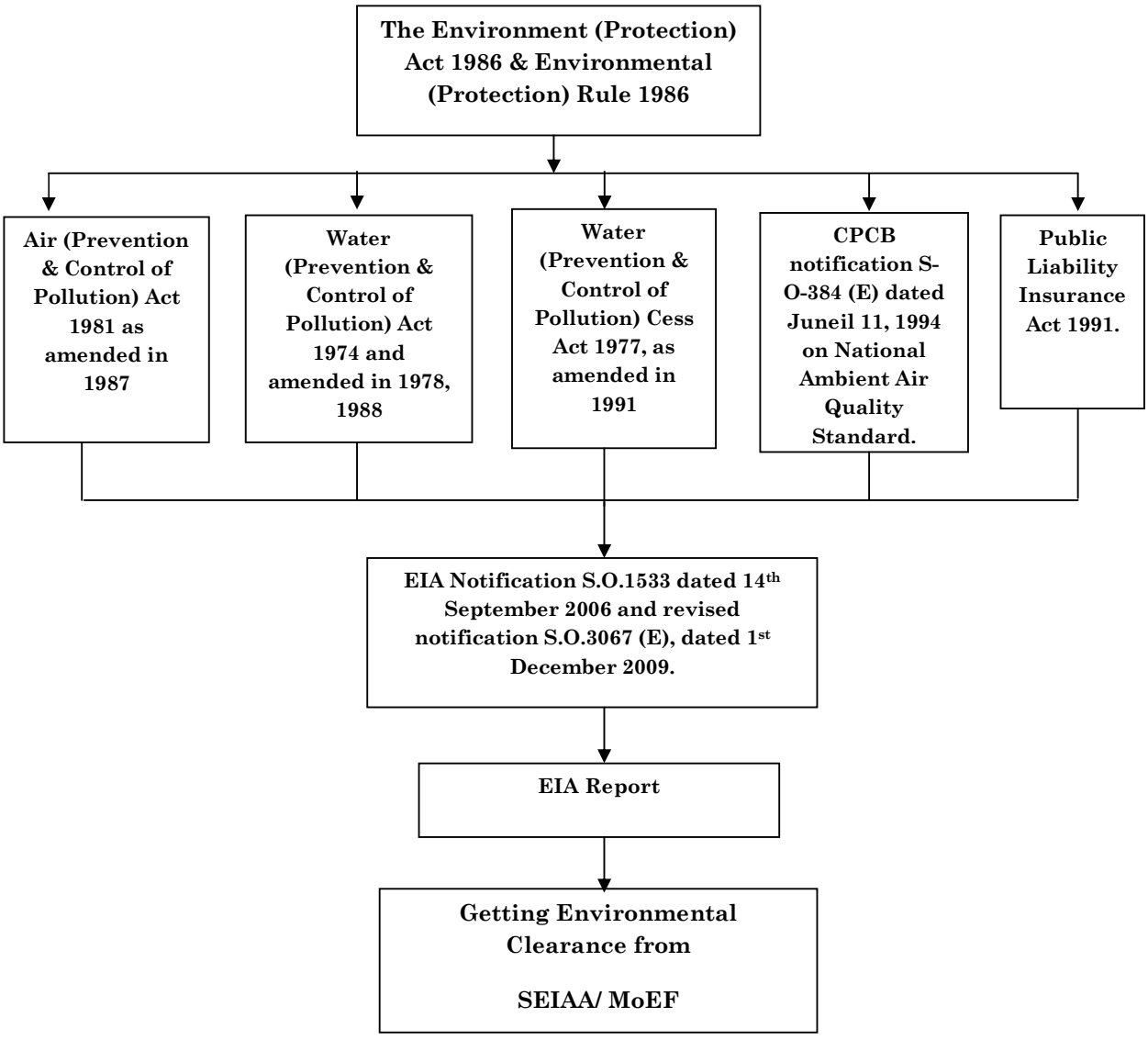
- To assess the present status of air, noise, water, land, biological and socio- economic components of environment.
- Identification and quantification of significant impacts from project operations on various components of environment.
- Evaluation of pollution control facilities.
- Preparation of sound Environmental Impact Assessment (EIA) outlining additional control technologies to be adopted for mitigation of adverse impacts, if any.

1.1.1.2 Methodology for EIA

The methodology is based on existing guidelines and has the following distinct features.

- The existing environmental quality in the project area has to be assessed.
- Potential sources of pollution have to be identified.
- Potential environmental impacts have to be identified and assessed qualitatively. The changes in the quality of environment have to be identified.

- An REIA has to be drawn up to maintain and enhance the environmental quality around the proposed project area.
- A post-project environment monitoring plan has to be suggested to monitor the changes in environmental quality after the implementation of the project.
- Potential benefits of REIA have to be discussed.



1.1.1.3 Study Period

For preparation of EIA report for the proposed pharmaceutical unit Nuray Chemicals Private Limited, the baseline data was collected during April to June 2013 in the study area. The meteorological parameters like Wind speed, wind direction, Minimum & Maximum temperatures and relative humidity, which were collected from IMD station, Nungabakkam, Chennai

1.1.1.4 Air Environment

For the environmental impact studies, an area covering 10 km radial distance surrounding the project is identified as study area (Impact Zone). The studies were carried out on each individual components were briefly reported below and the details are reported in subsequent chapters.

The topographical information on project site, study area and details about different activities related to the project operation was collected. Different air pollution parameters like PM_{10} and $PM_{2.5}$, SO_2 and NO_2 etc., were identified as related to the project activities for representing baseline status of ambient air quality within the study area.

Pre-calibrated High Volume Sampler with Respirable Dust Sampling (RDS) facility has been used for monitoring all the air pollutants.

1.1.1.5 Noise Environment

Excessive noise levels cause an adverse effect on human beings and associated environment including domestic animals, wild life, natural eco-system and structures. Hence noise survey is carried out at the project site and nearby locations. Noise levels (A-Weighted) were measured by using precision sound level meter. The principle of propagation of sound waves was used to estimate the noise levels at various locations.

1.1.1.6 Water Environment

Information on water resources in the study area was collected. The water resource in the study area mainly comprises of groundwater, surface water sources etc. The parameters of prime importance for water quality studies were selected under physical and chemical groups etc. and were analyzed. Samples were collected at different locations in the study area.

1.1.1.7 Land Environment

Soil samples were collected from the project site, not only at its immediate vicinity but also in the surrounding locations in study area. Physico-chemical properties of the soils were analyzed. Information on land use pattern in the study area was also collected.

1.1.1.8 Eco-system

Information on eco-system within study area was collected from the State Agricultural and Forest departments. The important flora species native to the area is enumerated. A test check survey was also under taken to judge the correctness of the data collected.

1.1.1.9 Socio-Economic Environment

A field survey was conducted within study area of the site and the surrounding impact zone. The parameters selected under socio-economic component were demographic structure of the study area, provision of basic amenities, industries likely to come up in the study area, welfare facilities by the project proponent, safety training and management, community and occupational health hazards. Relevant information was collected from selected locations and analyzed.

Chapter 2. PROJECT DESCRIPTION

2.0 Project description

Nuray Chemical Private Limited**,** proposed to establish a pharmaceutical unit with the capacity of 0.038 T/M at S.F. Nos. 157 & 158 Kakkalur Village, Thiruvallur Taluk, Thiruvallur District.

2.1 Plant Location

Nuray Chemicals Private Limited**,** proposed to establish a pharmaceutical unit with the capacity of 0.038 T/M at S.F. Nos. 157 & 158, Kakkalur Village, Thiruvallur Taluk, Thiruvallurr District, which is located 3km away from Thiruvallur town. It is in-between the road connecting Thiruvallur – Avadi. The site is located southern direction of this road. The nearest railway station is Thiruvallur.

PROJECT SUMMARY

Promoter	**Nuray chemicals Private Limited (Pharmaceutical unit)**
Location	S.F.Nos : 157 158 Village: Kakkalur Taluk: Thiruvallur District : Thiruvallur State: Tamil Nadu.
Geographical Location	Latitude : 13^{o} 07’52”N Longitude : 79^{O} 55’52”E
Mean Sea Level (MSL)	145 feet
Land Use Classification	SIDCO Industrial Area

Plant Capacity	0.038 T/M
Source of water	SIDCO water supply
Nearest Town	Thiruvallur (3 Km from the project site)
Populated areas	Thiruvallur (3 Km from the project site)
Land available	0.749 Hectares
Project Cost	**Rs. 12.88 Crores**

2.1.1 Land use planning

Building area	0.375 Hectare
Road Area	0.136 Hectare
Green belt area	0.190 Hectare
Vacant area	0.048 Hectare
Total area	0.749 Hectare

The micrometeorological conditions prevailing in the region are as follows:

Predominant wind direction : W/SW (Quadrants)

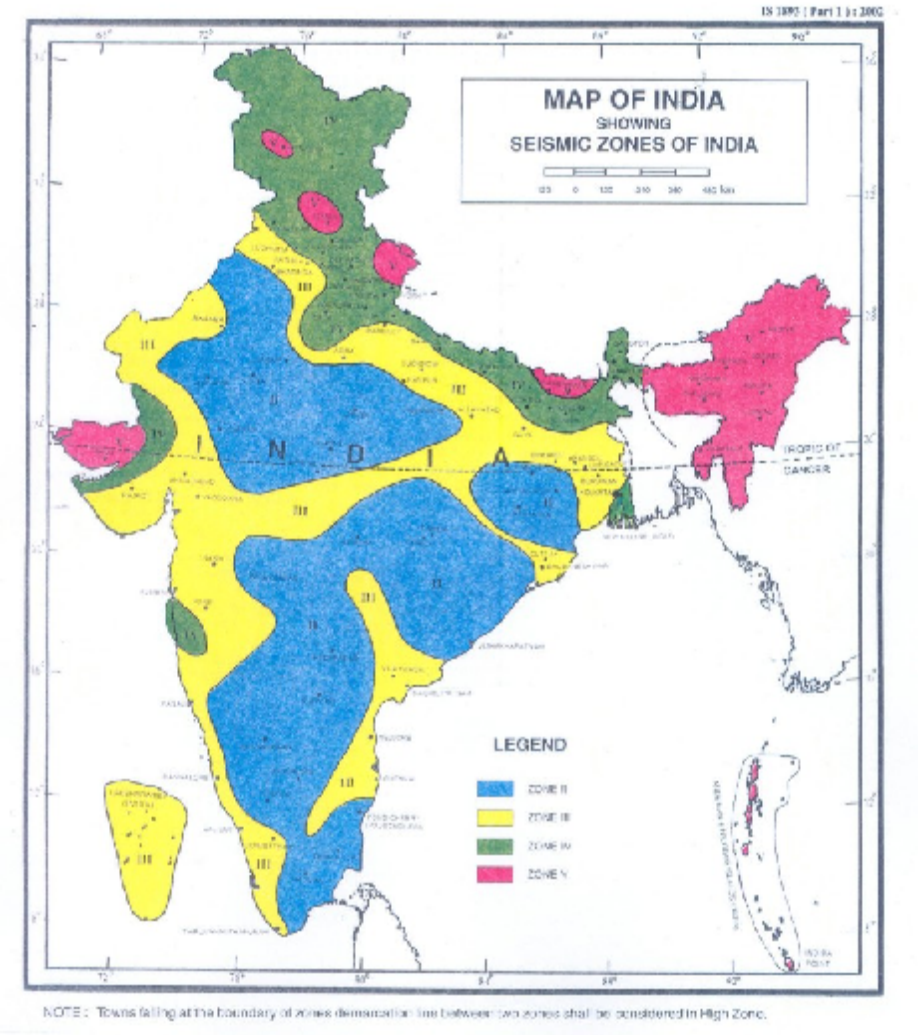
Wind speed : 13 kmph (Mean 6.1 kmph)

Temperature : Max 40.3^0C and Min 20.8^0C

Relative Humidity : Max 88% and Min 54%

Rainfall : Max 1128.2mm

Seismic Zone : II (Low intensity zone-VI or less)



Seismic Zone	Intensity on MM scale
II (Low intensity zone)	VI (or less)
III (Moderate intensity zone)	VII
IV (Severe intensity zone)	VIII
V (Very severe intensity zone)	IX (and above)

2.2 Soil classification and Quality

The Plant site is located in Deep, well drained, gravelly clay soils. The pH of the samples collected in the study area, were found in neutral range. Electrical Conductivity of the samples were ranging from 291 to 1269 mmhos/cm. NPK values were found to be present in significant concentrations. Water content was monitored in the range 1.8-9.0%. The soil texture was clay loam in nature. The

rate of infiltration was ranging from 1-5 mm/hr. In general, the soil in the study area would support vegetation if modified suitably.

2.3 Hydro Geology

The Study area forms part of the porous formations of the tertiary period, aquifers can be grouped into shallow aquifers with zones within the depth of 100 m bgl and deeper aquifers between the depth range of 100 – 450 m bgl. In other places, the granular zones are present between 60 – 100 m depth. In case of deeper aquifers, the exploration has revealed that the presence of 2 to 22 aquifer zone with a total thickness varying between 21.43 and 314.5 m.

2.4 Connectivity

- **Railways**

  The nearest railway station is at Thiruvallur.

- **Roads**

  The site is connected by the Thiruvallur – Avadi road. The necessary transportation can be done by this route.

- **Airways**

  The nearest airport is at Chennai around 30 Km away from the project site.

- **Communication**

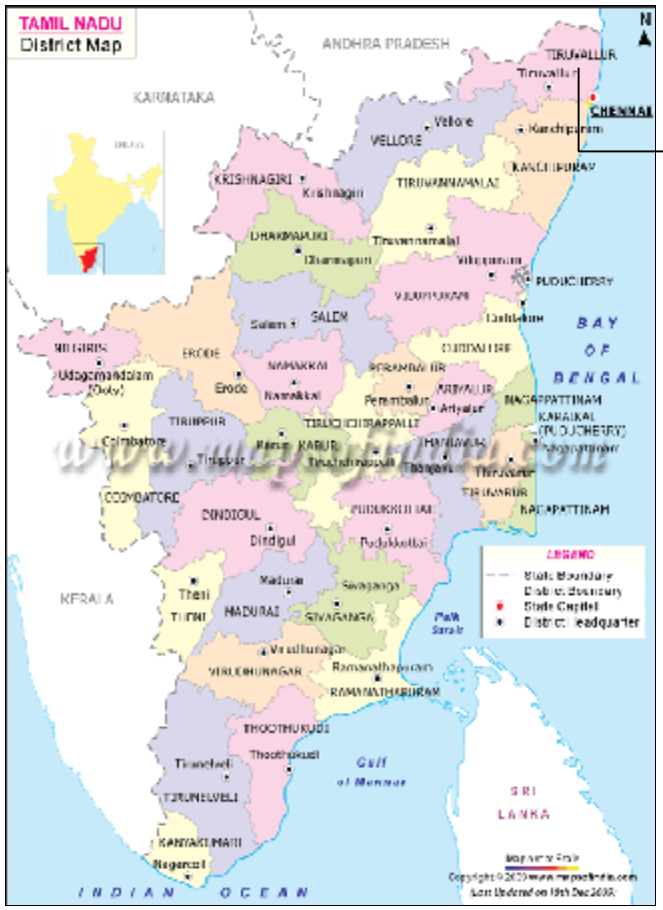
Already this area is well connected with the district head quarters Thiruvallur. So there will not be any constraints for communications like telephone, telefax, telex etc.

SITE DETAILS

Distance from Nuray Chemicals Private Limited		
Description	**Actual Distance**	**Regulatory Requirements**
Coastal areas	47 km (Bay of Bengal)	>25 km
Railway Station	1.1 km	0.5 km
Highway	2.1 km	100 m
Ecologically Sensitive Areas	NIL	>25.0 km

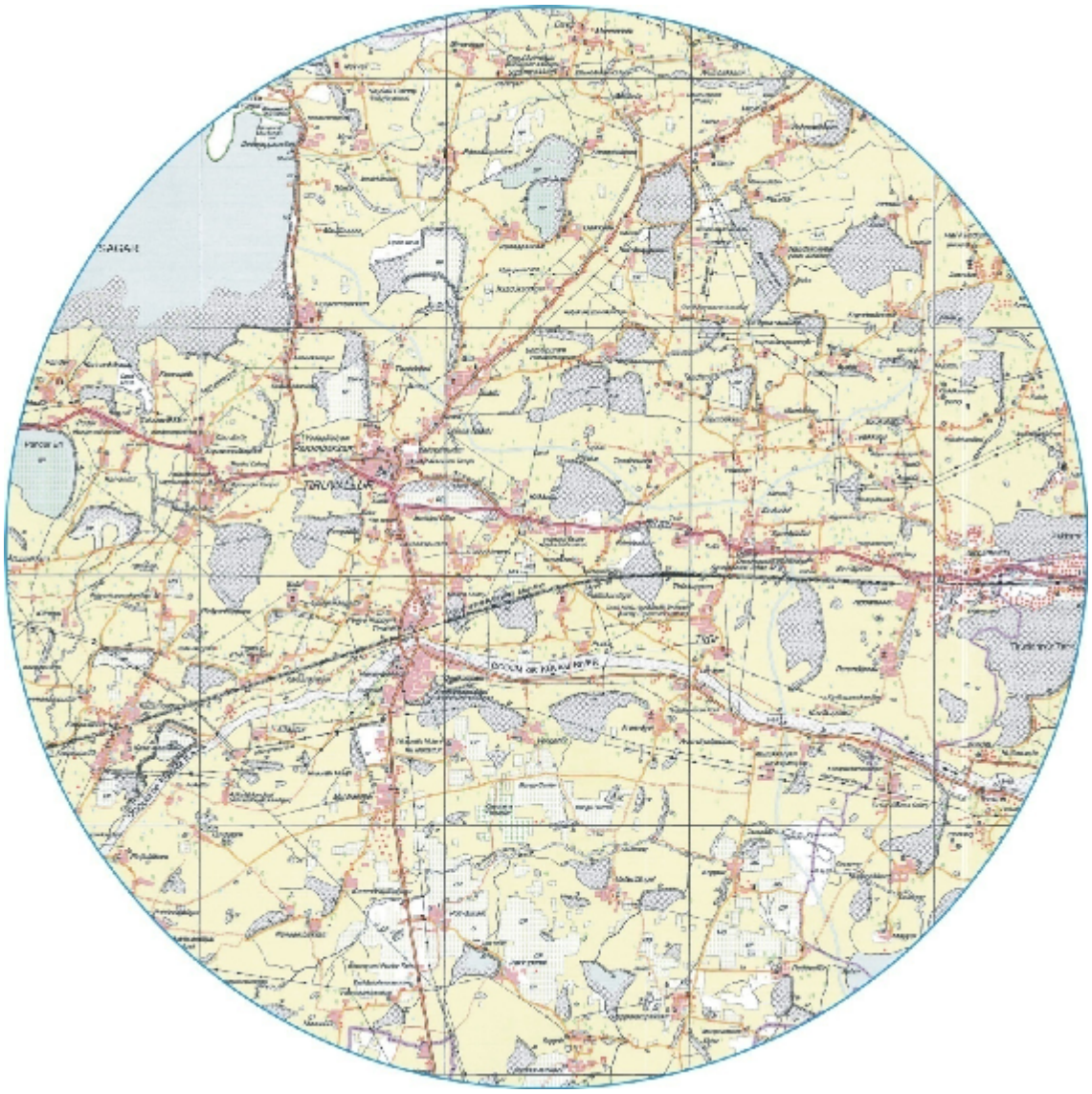
Industries nearby Nuray Chemicals Private Limited		
Name of the Industry	**Location and Distance**	**Type of Industry/Product**

Tamilnadu State Map showing Thiruvallur District and The Project Site



Thiruvallur District Map

Topo Map of the Project site (10 km Radius)



Topo Map of the Project Site (5 km Radius)

Google Map of the Project site

PLANT LAYOUT

#	DESCRIPTION	SIZE IN METERS
1	SECURITY OFFICE	6.0 x 3.0
2	CAFETERIA	8.5 x 8.5
3	ADMIN	13.48 x 8.3
4	REST ROOM	6.0 X 3.2
5	GF-PILOT PLANT,PP AREA	11.0 x 12.5
5	FF-PILOT PLANT,WGU-1	11.0 x 12.5
6	GF - [illegible] ROOM	10.6 x 5.8
6	FF- [illegible]	10.6 x 5.8
7	GF-QC-1	5.30 X 7.92
8	GF-QC-2	29 x 13
8	FF- SYNTHETIC R&D	26 x 13

#	DESCRIPTION	SIZE IN METERS
9	MV PANEL ROOM	3.95 x 11.50
10	BOILER HOUSE	12.0 x 9.0
11	GENERATOR ROOM	9.0 x 9.0
12	FABRICATION SHED	18.0 x 9.0
13	CHILLING PLANT/AIR COMP	18.0 x 9.0
14	ANALYTICAL R&D	13.0 x 9.0
15	COOLING TOWER	8.0 x 2.0
16	INTERMEDIATE BLOCK	14.0 x 14.0
17	CHILLING PLANTS	3.0 x 2.0 - Nos.
18	ALL GLASS UNITS	12.0 x 12.0
19	PRODUCTION BLOCK-1	12.0 x 12.0

#	DESCRIPTION	SIZE IN METERS
20	WARE HOUSE	5.0 x 10.0
21	REST ROOM	3.0 x 1.5
22	EFFLUENT TREATMENT PLANT	16.0 x 8.0
23	REST ROOM	3.0 x 11.0
24	SHED-1	3.0 x 8.0
25	SHED-2	8.0 x 8.0
26	SHED-3	8.0 x 8.0
27	CHEM. STORE	17.2 x 11.2
28	SCRAP YARD	38.7 x 33.8
29	GF-RECEPTION	19.8 x 9.8
29	FF-CONFERENCE HALL	19.8 x 9.8
30	ASSEMBLY POINT	

N

NURAY CHEMICALS PVT. LTD

GENERAL PLANT LAYOUT

2.5 Raw materials

S.No.	Name of the Raw Material	Quantity (T/M)	Category
1	Ferric Chloride hexahydrate	0.003	Hazard
2	Citric acid monohydrate	0.006	Non Hazard
3	Acetonitrile	0.009	Hazard
4	Acetone	0.05	Hazard
5	Tramadol Base	0.007	Non Hazard
6	Iso Propyl alcohol	0.022	Hazard
7	Dry HCl	0.04	Hazard
8	2-{4-[(4-Chloro-phenyl)-phenyl-methyl]-piperazin-1-yl}-ethanol	0.06	Hazard
9	Sodiummonochloroacetate	0.002	Hazard
10	Toluene	0.106	Hazard
11	Sodium Hydroxide	0.001	Hazard
12	Phenyl Butyric acid	0.004	Non Hazard
13	Glycerol	0.001	Non Hazard
14	PTSA	0.002	Non Hazard
15	7-(4-Chloro-butoxy)-3,4-dihydro-1H-quinolin-2-one (7 CBQ)	0.005	Hazard
16	1-(2,3-Dichloro-phenyl) -piperazine.Hydrochloride (DCCP)	0.001	Non Hazard
17	Isopropyl alcohol	0.004	Non Hazard
18	5-Vinyl-2-Pyrrolidinone	0.001	Hazard

19	Triethylamine	0.0003	Hazard
20	Tetra hydro Pyrido indol-1one	0.0002	Non Hazard
21	Dimethylsulphate	0.0002	Hazard
22	Methyl imidazole methanol HCl	0.0001	Hazard
23	N-Methyl pyrrolidinone	0.0007	Non Hazard
24	Sodium bicarbonate	0.0002	Non Hazard

2.5 Man Power

The proposed unit will have the strength of 50 people for its normal activity.

2.6 Source of Water/ Energy and Power requirement

The total requirement of raw water for the proposed unit will be 15 KLD. The entire raw water for the unit is to be met from SIDCO water supply.

WATER REQUIREMENT

S.No.	Source	Quantity (in KLD)
1	Boiler Make up	7.5
2	Cooling make up	6.0
3	Purified make up	10.0
4	Domestic	2.5
5	Greenbelt	1.5
	Total Water Requirement	**27.5**
	Less : Recycled water from RO plant & mechanical evaporator	**12.5**
	Actual water requirement	**15**

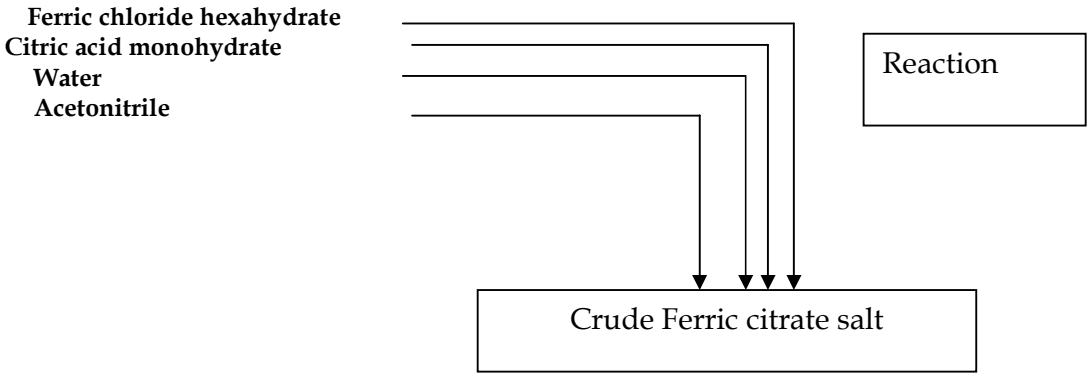
(i) Project description with Process Details

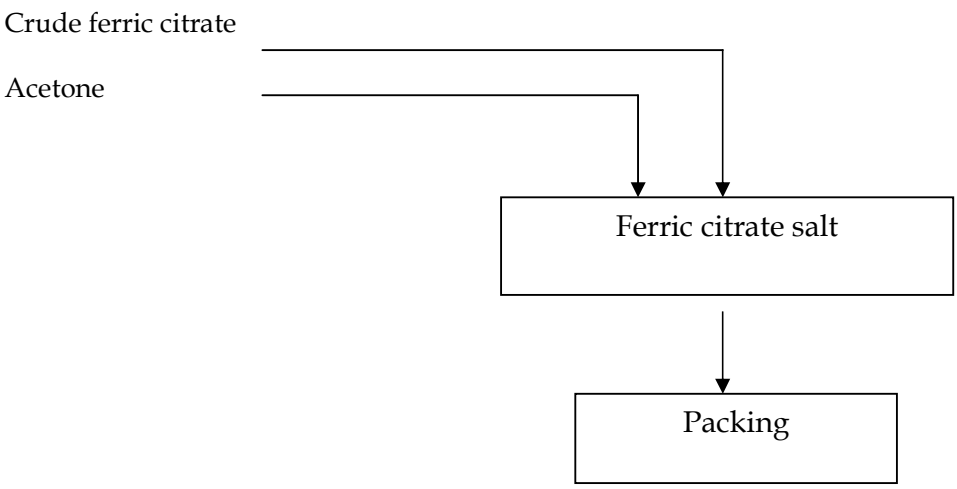
(1) Ferric Citrate Hydrate

a. Process details

- Citric acid was added to a stirred solution of Ferric hydroxide in water at 80Degree Centigrade for 2 hours.
- Reaction mass was cooled to Room Temperature and hen Acetonitrile added to get crude Ferric Citrate
- The Crude Ferric Citrate was purified by using Acetonea

a. Flow Chart



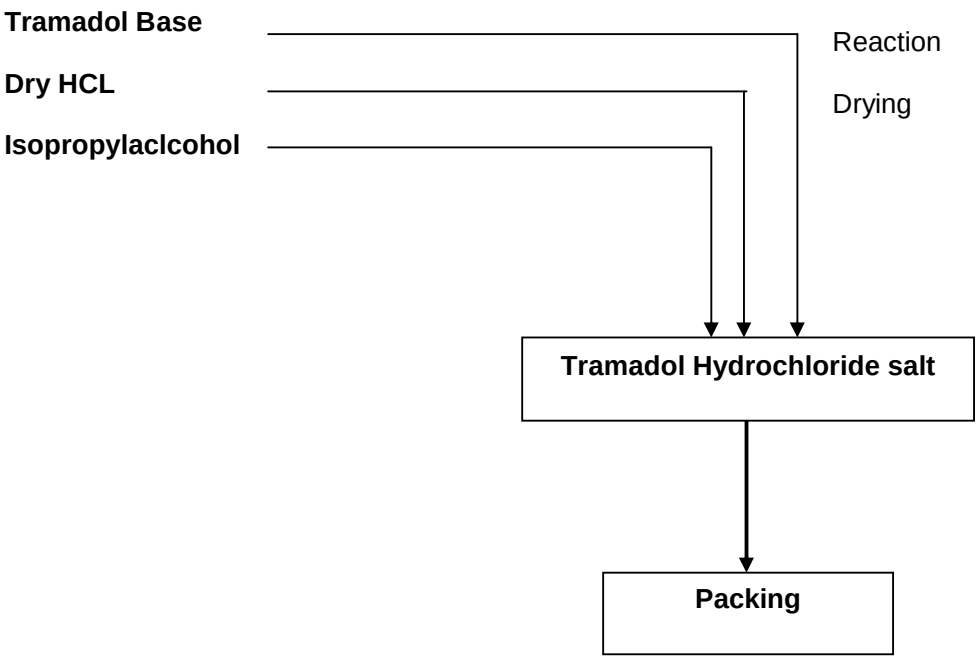


(2) Tramadol Hydrochloride:

a. Process details:

- The solution of Tramadol base in Isopropyl alcohol is reacted with Dry Hydrochloric acid at room temperature to afford solid
- The solid again washed with isopropyl alcohol and suck dried to give Tramadol Hydrochloride

b Flow Chart:

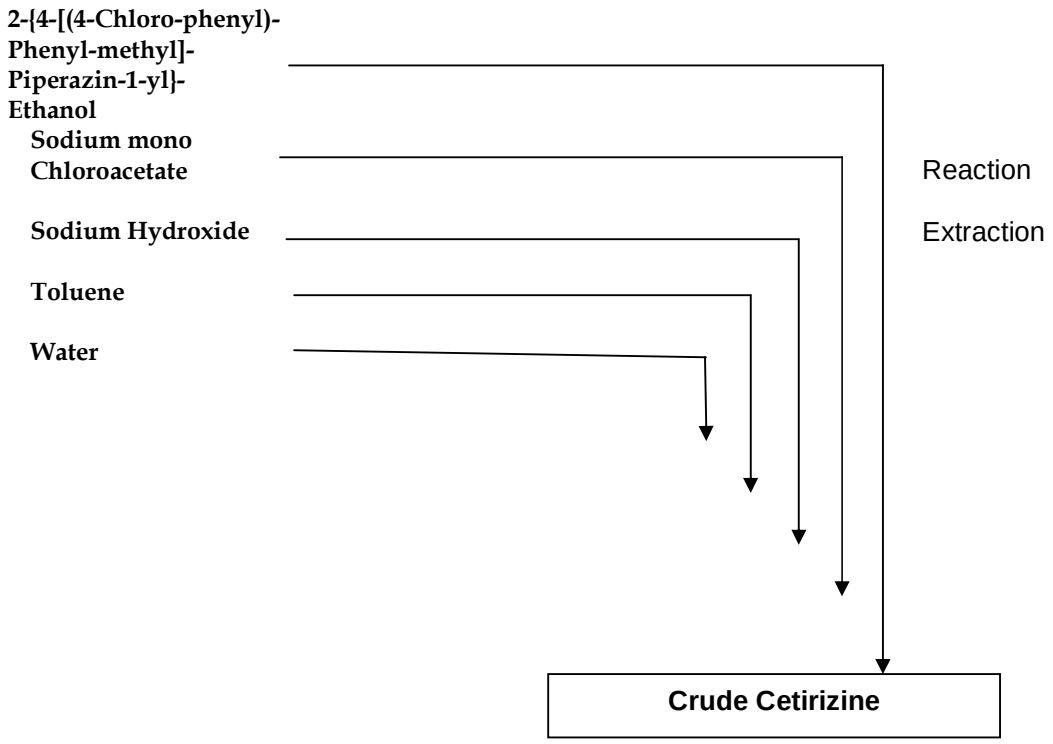


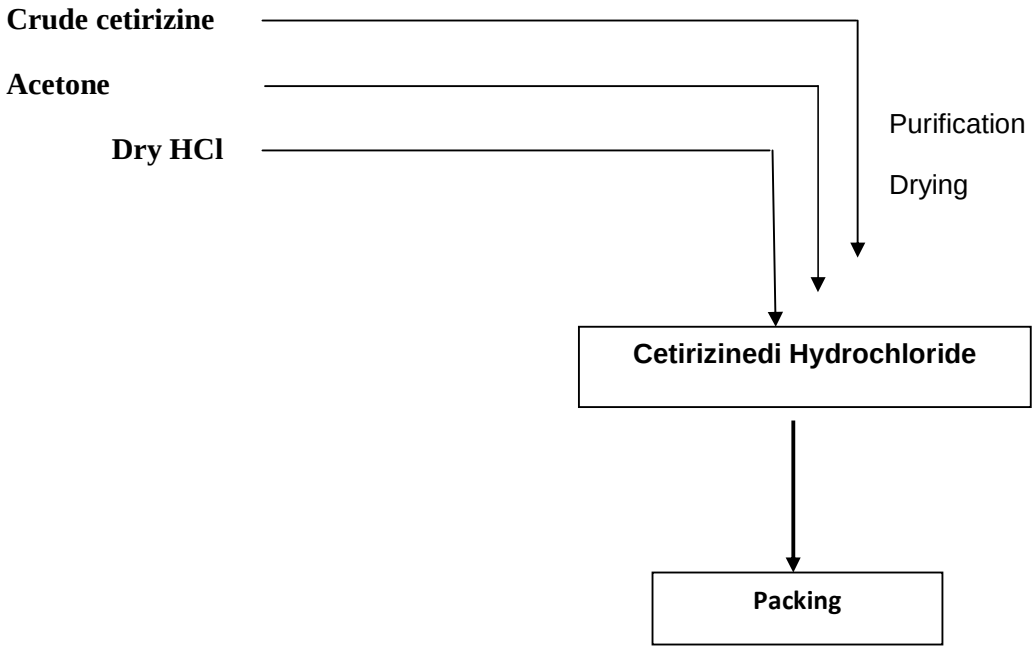
(3) Cetirizine dihydrochloride:

a. Process Details:

- 2-{4-[(4-Chloro-phenyl)-phenyl-methyl]-piperazin-1-yl}-ethanol was taken in toluene
- Toluene solution reacted with sodium mono chloroacetate in presence of sodium hydroxide to give cetirizine base
- Ceitrizine base in acetone is treated with dry Hydrochloride gas to yield Cetirizine hydrochloride salt

b. Flow Chart:


2-{4-[(4-Chloro-phenyl)-Phenyl-methyl]-Piperazin-1-yl}-Ethanol
Sodium mono Chloroacetate
Sodium Hydroxide
Toluene
Water
Reaction
Extraction
Crude Cetirizine

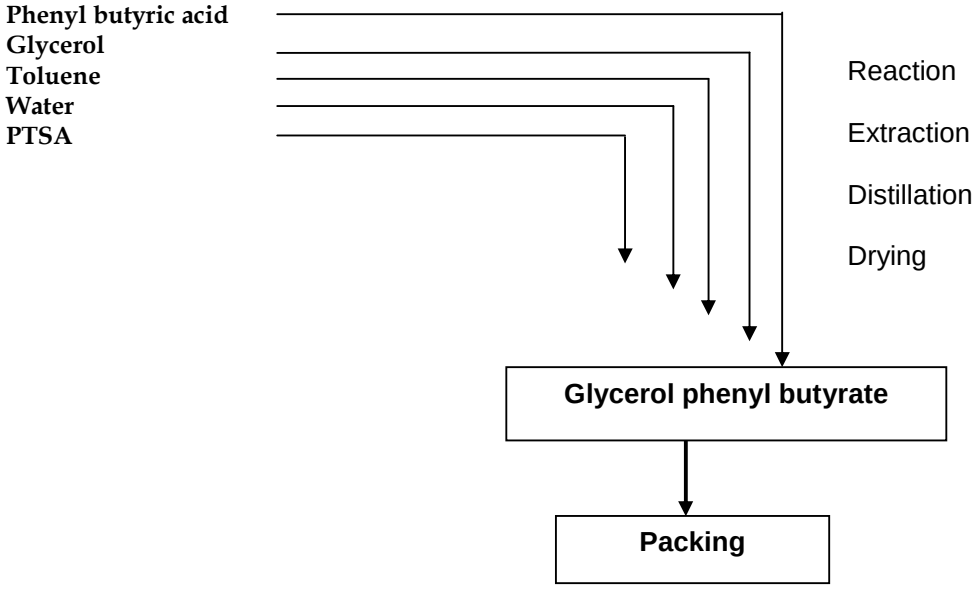

Crude cetirizine
Acetone
Dry HCl
Purification
Drying
Cetirizinedi Hydrochloride
Packing

(4) Glycerol phenyl butyrate

a. Process Details:

- To a stirred solution of Phenyl butyric acid in toluene, P-toluene sulfonic acid was added at room temperature and stirred
- To that solution Glycerol was added and heated to 120°C for 24 h, cooled to room temperature.
- Solvent distilled to get Glycerol Phenyl butyrate

B Flow Chart :

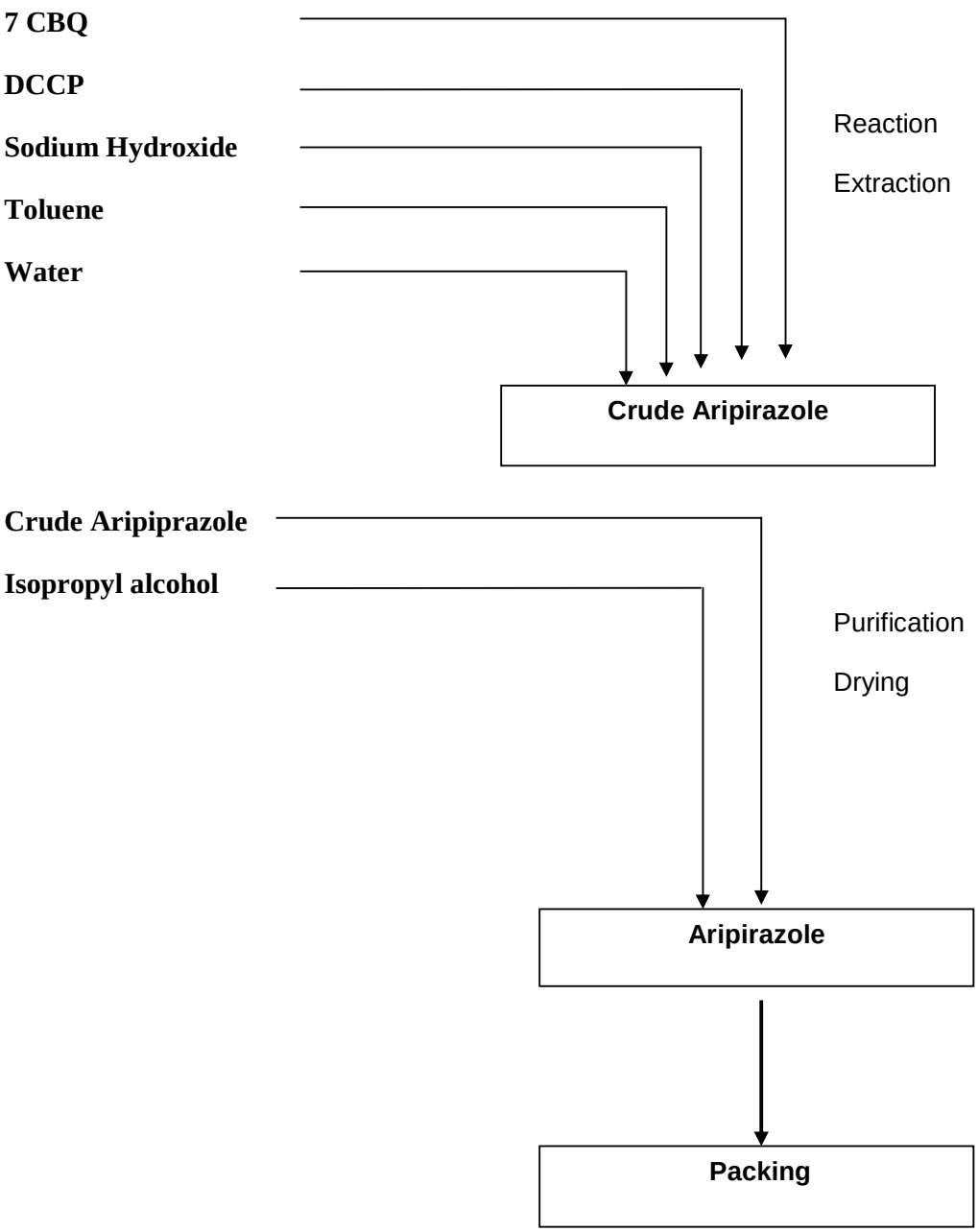


(5) Aripirazole:

a. Process Details:

- To a stirred solution of 7-(4-Chloro-butoxy)-3,4-dihydro-1H-quinolin-2-one in toluene
- Sodium hydroxide was added at RT and then 1-(2, 3-Dichloro-phenyl)-piperazine was added and Stirred for about 6h
- Toluene Distilled to get crude Aripirazole, which was further purified by isopropyl alcohol

b. Flow sheet

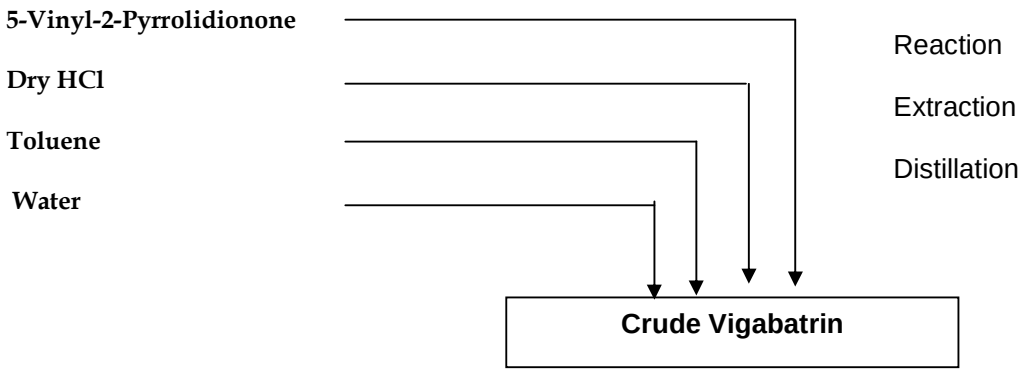

7 CBQ
DCCP
Sodium Hydroxide
Toluene
Water
Reaction
Extraction
Crude Aripirazole
Crude Aripiprazole
Isopropyl alcohol
Purification
Drying
Aripirazole
Packing

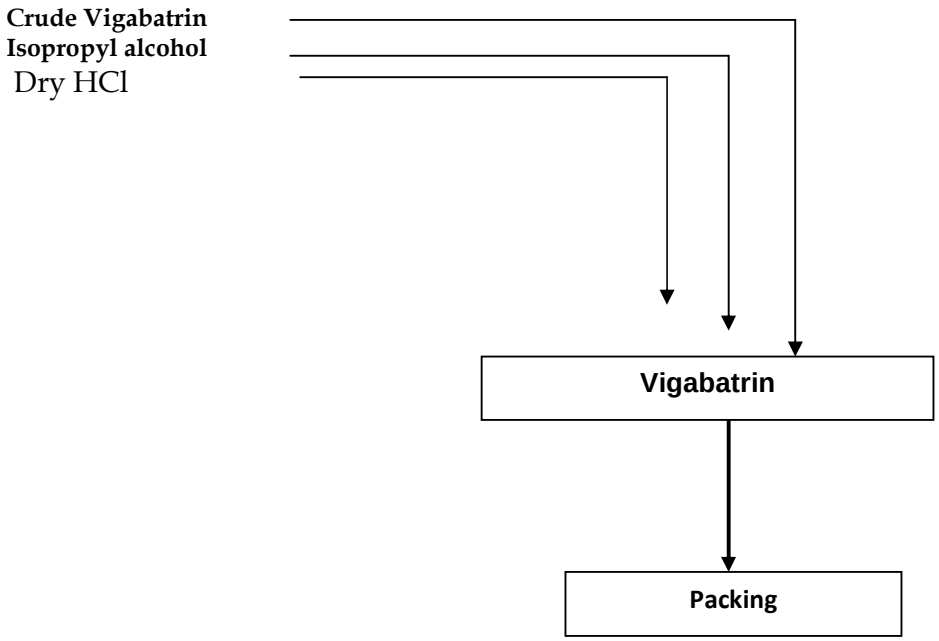
(6) Vigabatrin

a. Process Details:

- To a stirred solution of 5-Vinyl-2-pyrrolidinone in water, Hydrochloric acid was added and heated to 60° C for 4h
- Reaction mass cooled to RT, Isopropyl alcohol was added and layer separated
- Isopropyl alcohol was distilled to get crude
- crystallized with isopropyl alcohol to get vigabatrin

b. Flow Chart



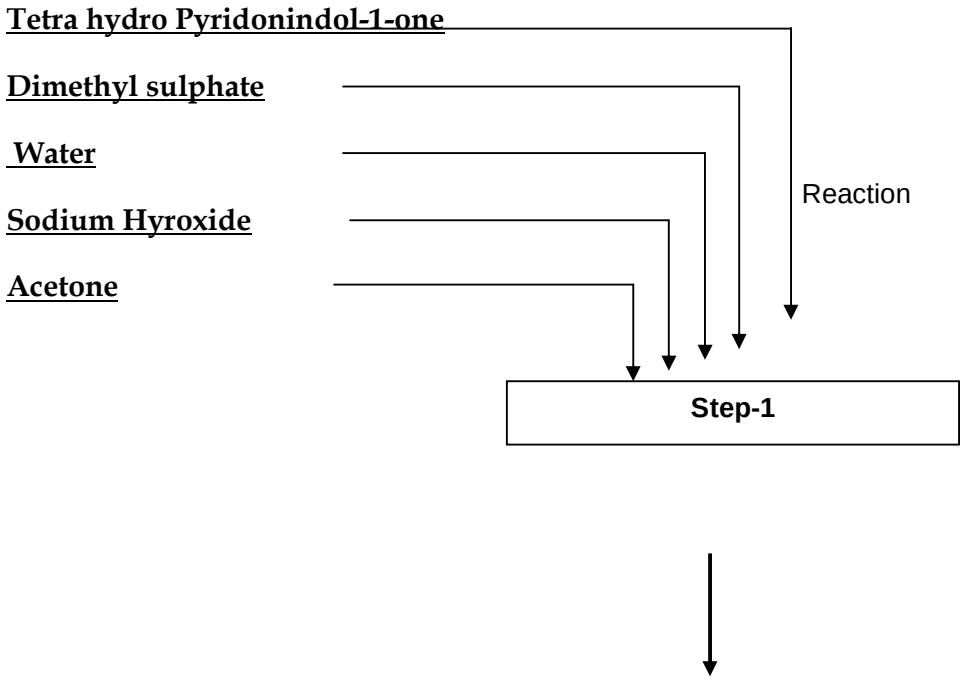


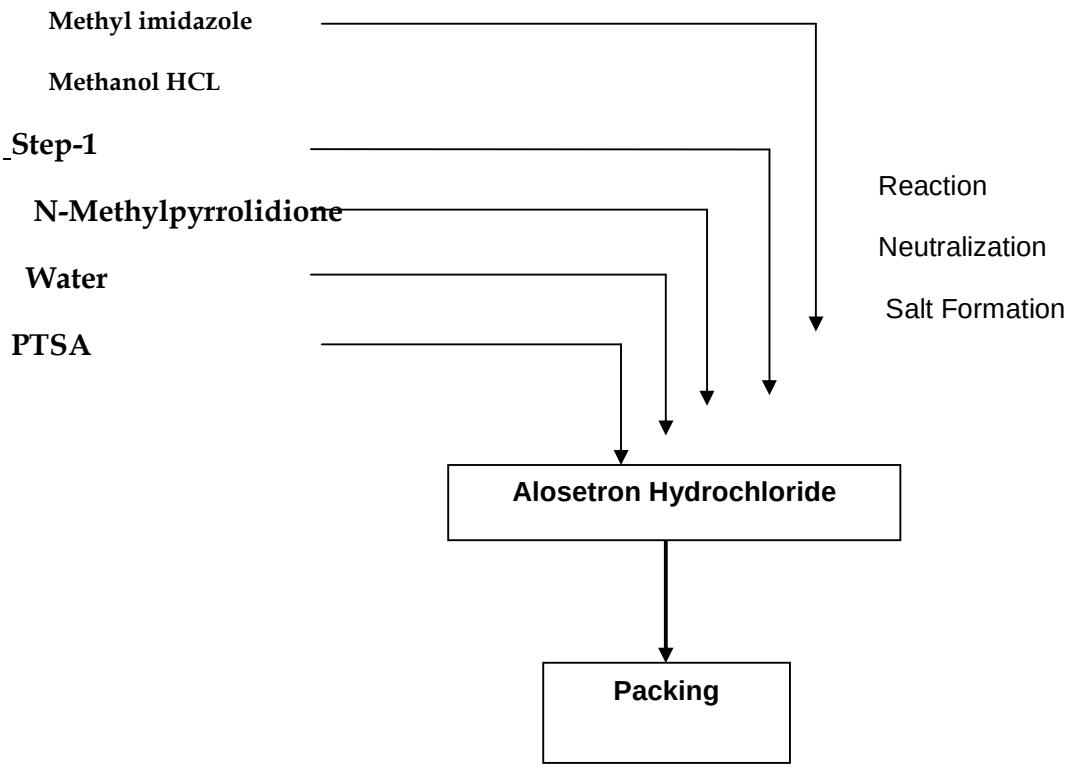
(7) Alosetron

a. Process Details:

- Tetra hydro Pyridoindol-1-one was taken in acetone, sodium hydroxide and water stirred for 30mins.
- Dimethylsulphate was added and stirred for 2hrs. Water and formed solid Filtered to get N-Methyl- Tetra hydro Pyridoindol-1-one
- N-Methyl- Tetra hydro Pyridoindol-1-one and Methyl imidazole methanol HCl condensed in presence of N-Methylpyrrolidione, PTSA to get Alosetron
- Formed Alosetron treated with Dry Hydrochloric acid in presence of Acetone to get Alosetron Hydrochloride salt.

b .Flow Chart




Methyl imidazole
Methanol HCL
Step-1
N-Methylpyrrolidione
Water
PTSA
Reaction
Neutralization
Salt Formation
Alosetron Hydrochloride
Packing

Production Capacity

S.No.	Product Name	Capacity (T/M)	Type	Application
1	Ferric Citrate hydrate	0.01	Bulk Drug	Hyperphosphatemia (Increase the phosphate level in the blood)
2	Tramadol Hydrochloride	0.01		Analgesic (Pain)
3	Cetirizine dihydrochloride	0.01		Allergy & Fever
4	Glycerol Phenyl butrate	0.004		Urea cycle disorders
5	Aripiprazole	0.001		Antipsychotic agent
6	Vigabatrin	0.001		Antiepileptic drug
7	Alosetron	0.002		Irritable bowel syndrome

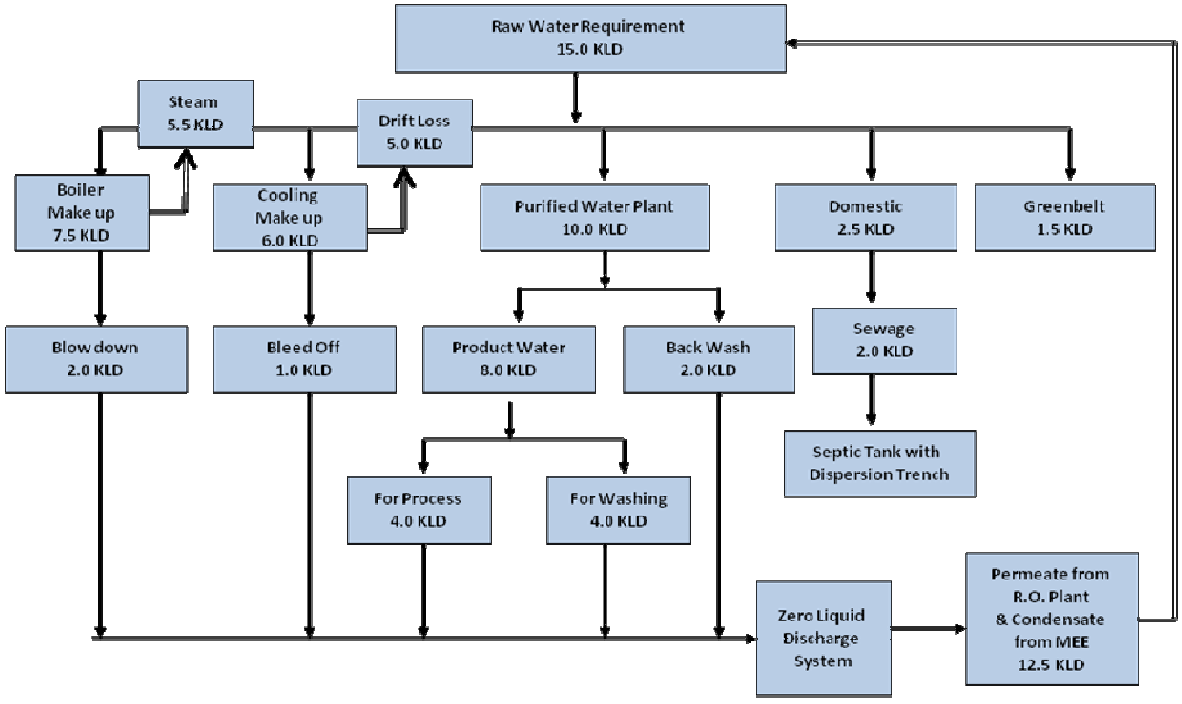
Quantity of Wastes to be generated

2.6.1 Wastewater Generation

Category	Quantity (m^3 /day)	Method of treatment and Disposal
Waste water from Process	4.0	Treated by the Effluent Treatment Plant followed by the R.O. Plant Stage I & II and R.O. Reject evaporated by the Mechanical Evaporator.
Waste water from Washing	4.0	

Boiler Blow down	2.0	
Cooling tower bleed off	1.0	
Back Wash of Purified Water System	2.0	
Sewage	2.0	Disposed through septic tank with dispersion trench.

2.6.2 Water Balance Diagram



2.6.3 Solid waste Generation

S.No.	Particulars	Quantity	Mode of Use
(a) Non-Hazardous Waste			
1.	General Scrap	200 kg/M	Sold out.
2.	Ash from Boiler	10 kg/M	Used as manure
(b) Hazardous Waste			
1.	Sludge from ETP	500 kg/M	Collected, stored and disposed to TSDF for landfill.

2.	Salt from Evaporator	150 kg/M	
3.	Residue from Solvent distillation	15 kg/M	Collected, stored and disposed to TSDF for incineration.
4.	Waste Oil	150 kg/M	Disposed through authorized recyclers.

2.6.4 Air Pollution Control measures

S. No.	Description	Air Pollution Control Measures
1	Wood Fired Boiler (0.5 T/hr)-2 Nos.	15 m height and 0.2 m dia of common stack
2	D.G.Set (125 KVA)	7 m height and 0.15 m dia of exhaust pipe with acoustic measures

2.7 Noise Pollution

Noise pollution from turbine, fans, centrifugal pumps, electric motors etc., shall be kept below the permissible level of 90 dB at 1mt away from the source by proper design. Noise from safety valves, start up vents steam jet ejectors of condenser etc., are reduced by providing silencers at the outlet of down steam piping.

Chapter 3. EXISTING ENVIRONMENTAL STATUS

3 Existing Environmental Status

With rapid strides in economic development, particularly in urban areas, the need for rationalizing and upgrading the transport system is imperative. In the process of development, there has been intensive use of natural resources. Very often the process of development has adversely affected the environment, leading to ecological imbalances. The importance of conserving and enhancing the environmental assets has assumed urgency. Apart from land use, conservation of flora and fauna and planning urban transportation is an important aspect of eco development. The compilation of environmental baseline data is essential to assess the impact on environment due to the project activities. The environment includes water, land, air, ecology, noise, socio – economic issues etc. The information presented in the chapter has been collected from desk research, other secondary sources and field studies. Majority of data on water quality, vegetation, air and noise quality was collected during field studies in Juneil to June 2013.

Environmental Component

Considering the environmental setting of the project, project activities and their interaction, environmental regulations and standards, following Environmental attributes have been included for the EIA study. Study Area will be covering 10 km Radius from project boundary.

- Site specific micrometeorological data for the parameters Wind Speed & direction, Temperature, Humidity, Cloud Cover and Rainfall.

- Ambient Air Quality (at 8 locations) for the parameters: PM_{10}, $PM_{2.5}$, SO_2, and NO_2.
- Noise Level Measurements at 8 Locations for both Leq-Day and Leq-Night values.
- Water Quality-both Surface Waters and Ground Waters (8 Locations) for IS: 10500 Norms.
- Soil Quality (8 Locations) for Textural & Physical Parameters, Nutrients, etc.
- Present & Post-project Land Use Pattern based on Satellite Imagery.
- Biotic Attributes: Flora & Fauna -Core zone & Buffer zone-Diversity Index.
- Socio-Economic Profile (2001 Census): Total Population, Household Size, Age, Gender Composition, SC/ST, Literacy Level, Occupational Structure, etc.

Sampling Locations

Locations of sampling stations for micrometeorology, air, noise, and water and soil quality are presented in Fig 3.1 - 3.3 respectively.

Micrometeorology

As a part of the study, the micrometeorology and microclimatic parameters were recorded by installing a weather monitoring station in the Plant site at 9 m height. Data of wind velocity, wind direction, ambient temperature, relative humidity, cloud cover and atmospheric pressure were recorded at hourly intervals along with rainfall for 24 hours throughout the monitoring period.

Micrometeorological Data (On Project Area)

Meteorological Data-Project Site								
For the month ofApril 2013								
S.No.	*Date*	*Temperature (^{o}C)*		*Relative Humidity*		*Wind Direction*	*Wind Velocity (Km/hr)*	*Rain Fall in mm*
		Max	*Min*	*Max %*	*Min %*			
1	1-June-13							
2	2-June-13							
3	3-June-13							
4	4-June-13							
5	5-June-13							
6	6-June-13							
7	7-June-13							
8	8-June-13							
9	9-June-13							
10	10-June-13							
11	11-June-13							
12	12-June-13							
13	13-June-13							
14	14-June-13							
15	15-June-13							
16	16-June-13							
17	17-June-13							
18	18-June-13							
19	19-June-13							
20	20-June-13							
21	21-June-13							
22	22-June-13							
23	23-June-13							
24	24-June-13							
25	25-June-13							
26	26-June-13							
27	27-June-13							
28	28-June-13							
29	29- June-13							
30	30-June- 13							

Meteorological Data-Project Site								
For the month of May 2013								
S.No.	*Date*	*Temperature (oC)*		*Relative Humidity*		*Wind Direction*	*Wind Velocity (Km/hr)*	*Rain Fall in mm*
		Max	*Min*	*Max %*	*Min %*			
1	1-May-13							
2	2-May-13							
3	3-May-13							
4	4-May-13							
5	5-May-13							
6	6-May-13							
7	7-May-13							
8	8-May-13							
9	9-May-13							
10	10-May-13							
11	11-May-13							
12	12-May-13							
13	13-May-13							
14	14-May-13							
15	15-May-13							
16	16-May-13							
17	17-May-13							
18	18-May-13							
19	19-May-13							
20	20-May-13							
21	21-May-13							
22	22-May-13							
23	23-May-13							
24	24-May-13							
25	25-May-13							
26	26-May-13							
27	27-May-13							
28	28-May-13							
29	29-May-13							
30	30-May-13							
31	31-May-13							

Meteorological Data-Project Site								
For the month of June 2013								
S.No.	*Date*	*Temperature (^oC) Max*	*Min*	*Relative Humidity Max %*	*Min %*	*Wind Direction From-->To*	*Wind Velocity (Km/hr)*	*Rain Fall in mm*
1	1--13							
2	2-June-13							
3	3-June-13							
4	4-June-13							
5	5-June-13							
6	6-June-13							
7	7-June-13							
8	8-June-13							
9	9-June-13							
10	10-June-13							
11	11-June-13							
12	12-June-13							
13	13-June-13							
14	14-June-13							
15	15-June-13							
16	16-June-13							
17	17-June-13							
18	18-June-13							
19	19-June-13							
20	20-June-13							
21	21-June-13							
22	22-June-13							
23	23-June-13							
24	24-June-13							
25	25-June-13							
26	26-June-13							
27	27-June-13							
28	28-June-13							
29	29-June-13							
30	30-June-13							

Temperature

The average daily maximum and minimum temperature for each of the 12 months for the period of 2008-2011 recorded at IMD Station, Nungabakkam has been furnished in the Table 3.2.

May is the hottest month with maximum temperature of 40.3. December is the coolest month with minimum temperature of 20.8^{0}C.

Rainfall

The rainfall data collected for the period from 2008 to 2011 are presented in Table 3.2. While the predominant rainy season is the north-east monsoon (Oct – Dec). The region is also influenced to some extent by south-west monsoon (June - Sep). While maximum rainfall of 1128.7 mm is received during the month of November 2009, the minimum of traces is received during June& July. Monthly average rain fall & yearly average rainfall are shown in Table 3.2.

The wind rose diagram for Nungabakkam region has been obtained from IMD station, Chennai. The morning (08:30) and evening (17:30) wind roses for the period are shown in the Fig.3.5.1 and Fig.3.5.2 respectively.

Wind Speed

The minimum average speed was 5 km/h and the maximum average speed was 13 km/h is presented in Table 3.2. The Pasquill stability class for wind speed is given in Table 3.1.

Table 3.1 Pasquill Stability Class

Surface Wind Speed (m/s) (at 10m)	Day			Night	
	Incoming Solar Radiation				
	Strong	Moderate	Slight	Thinly overcast or ≥4/8 low cloud	≤ 3/8 cloud
< 2	A	A-B	B	E	F
2-3	A-B	B	C	E	F
3-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
> 6	C	D	D	D	D

Note: A = extremely unstable, B = moderately unstable, C = slightly unstable, D = neutral, E = slightly stable, F = moderately stable. Neutral class D should be assumed for overcast conditions during day or night.

Table 3.2 Meteorological Data

GOVERNMENT OF INDIA

INDIA METEOROLOGICAL DEPARTMENT

STATION: CHENNAI (NUNGAMBAKKAM)

PERIOD: JANUARY 2003 TO 2011

1. ELEMENT: MONTHLY MEAN MAXIMUM TEMPERATURE (DEG C)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	29.9	31.5	33.2	35.3	39.0	39.1	34.8	34.5	35.3	33.1	30.8	29.9
2004	29.5	30.8	33.3	35.6	35.5	36.9	35.9	36.9	33.7	31.9	30.4	30.2
2005	30.6	32.1	33.6	34.0	37.3	38.3	36.2	35.8	34.9	32.0	29.4	28.6
2006	31.9	31.5	33.2	36.3	38.0	37.4	37.1	37.5	35.1	34.6	31.8	29.9
2007	30.4	31.2	32.9	34.6	39.2	35.8	35.3	34.0	34.2	32.7	30.9	29.5
2008	29.8	31.4	32.3	34.9	40.3	37.2	36.4	34.5	34.5	32.3	30.8	30.1
2009	30.1	32.2	34.1	36.3	38.4	39.3	37.8	35.7	35.0	34.3	30.4	29.0
2010	29.9	31.3	33.9	35.4	36.6	35.3	33.7	33.6	33.0	33.4	30.7	28.7
2011	29.9	30.9	32.9	35.1	37.5	38.3	36.4	35.3	34.7	33.2	30.3	29.4

2. ELEMENT: MONTHLY MEAN MINIMUM TEMPERATURE (DEG C)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	20.8	22.7	23.8	26.5	28.4	28.5	25.7	25.3	25.9	24.7	23.4	21.7
2004	20.8	20.9	23.7	27.2	26.7	27.1	26.5	27.4	25.2	24.4	22.9	21.1
2005	21.7	22.2	25.2	26.6	28.0	28.8	26.9	26.6	25.9	24.6	22.4	21.9
2006	22.7	21.6	23.8	25.4	28.1	26.5	26.7	25.1	25.4	23.7	21.5	22.7

2007	21.5	22.4	24.2	26.7	29.1	27.2	26.1	25.4	25.8	24.9	22.6	22.4
2008	21.3	22.7	24.0	26.4	27.8	27.6	26.7	26.0	25.5	24.5	23.3	22.3
2009	21.1	21.7	23.8	26.5	27.7	28.1	27.7	26.1	25.7	25.2	23.9	22.3
2010	21.2	21.8	24.0	26.9	26.8	25.5	24.7	26.1	25.7	25.5	23.9	22.0
2011	21.1	21.3	23.5	26.5	27.2	28.6	26.4	26.1	25.7	24.6	23.1	22.2

3. ELEMENT: MONTHLY MEAN R.H. AT 0830 HRS IST (%)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	78	80	76	73	65	62	81	81	73	81	81	81
2004	81	79	77	74	73	61	67	60	79	83	83	77
2005	79	78	75	77	70	57	68	70	72	84	86	88
2006	80	81	78	76	75	65	72	75	80	82	81	79
2007	77	74	77	76	62	71	73	79	73	79	80	85
2008	85	84	81	75	57	61	66	74	72	82	84	83
2009	82	82	79	73	68	55	58	70	73	73	85	87
2010	84	82	79	72	71	75	79	79	81	80	87	86
2011	82	81	77	75	64	72	73	78	81	83	85	86

4. ELEMENT: MONTHLY MEAN R.H. AT 1730 HRS IST (%)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	66	69	65	68	66	67	70	67	65	73	73	70
2004	68	59	65	72	68	62	61	59	74	77	75	65
2005	65	62	68	73	69	55	67	67	68	79	75	80
2006	66	70	66	69	71	58	63	60	71	69	71	72

2007	88	93	84	88	76	96	98	93	92	96	97	96
2008	67	65	66	66	56	51	60	65	62	72	75	67
2009	62	58	61	63	62	54	45	65	66	62	79	77
2010	68	65	68	69	69	72	74	71	71	71	79	76
2011	60	61	59	65	58	54	68	74	75	78	76	81

5. ELEMENT: MONTHLY TOTAL RAINFALL (MM)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	0.1	0.0	6.2	TR	0.5	22.9	101.1	140.5	155.3	149.1	85.0	77.4
2004	51.5	0.0	0.2	2.4	210.6	28.8	50.6	47.1	246.5	285.3	280.2	6.8
2005	2.0	5.2	0.0	83.2	30.9	30.6	151.2	53.7	101.3	1077.8	608.4	421.5
2006	3.5	2.8	0.1	73.4	40.3	36.1	164.7	48.9	112.7	1128.2	584.6	396.5
2007	0.0	6.6	0.0	0.2	0.1	94.2	243.9	170.9	167.7	274.9	95.0	256.3
2008	75.9	14.1	175.2	18.6	5.6	57.5	44.5	97.8	123.8	456.6	724.6	8.3
2009	34.2	0.0	2.1	0.0	40.3	16.1	68.4	143.5	182.3	43.1	646.1	214.9
2010	5.2	0.4	0.0	0.0	204.0	136.7	155.5	235.8	120.1	195.7	274.0	287.1
2011	10.8	88.9	0.0	12.1	76.5	61.3	146.2	225.8	115.3	968.4	876.5	188.1

6. ELEMENT: MONTHLY MEAN WINDSPEED (KMPH)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	7	6	5	6	7	7	6	7	6	5	7	8
2004	7	6	6	7	7	8	8	9	5	6	7	8
2005	6	6	6	6	7	9	8	7	7	6	7	8
2006	7	6	5	6	7	7	9	8	6	5	7	9

2007	7	5	5	6	7	7	7	7	6	6	6	7
2008	5	6	5	7	9	8	8	7	6	4	5	4
2009	5	5	6	8	9	9	9	7	6	6	3	5
2010	6	4	5	6	7	6	5	5	4	4	4	5
2011	13	12	5	6	7	8	7	7	5	6	6	8

3.1 AMBIENT AIR QUALITY

The ambient air quality with respect to the study zone of 10 km radius around the project site forms the baseline information. The prime objective of the baseline air quality study was to assess the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the operation of the proposed project. The study area represents mostly residential environment. This section describes the selection of sampling locations, methodology adopted for sampling, analytical techniques and frequency of sampling. The results of monitoring carried out for study period of April to June2013.

3.1.1 Ambient Air Quality Standards

Ambient Air Quality standards has been notified by the MoEF vide Gazette Notification dated 18th November 2009 are presented in Table 3.9.

NATIONAL AMBIENT AIR QUALITY STANDARDS
CENTRAL POLLUTION CONTROL BOARD
NOTIFICATION

New Delhi, the 18th November, 2009

No.B-29016/20/90/PCI-L—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No. 14 of 1981), and in super session of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and Other Area	Ecologically sensitive area (notified by Central Govt.)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	• Improved West and Geake • Ultraviolet fluorescence
		24 hours**	80	80	
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	• Modified Jacob & Hochheiser (Na-Arsenite) • Chemiluminescence
		24 hours**	80	80	
3	Particulate Matter (size less than 10 µm) or PM_{10}µg/m³	Annual*	60	60	• Gravimetric • TOEM • Beta attenuation
		24 hours**	100	100	
4	Particulate Matter (size less than 2.5 microns) or $PM_{2.5}$ µg/m³	Annual*	40	40	• Gravimetric • TOEM • Beta attenuation
		24 hours**	60	60	
5	Ozone (O_3) µg/m³	8 hours **	100	100	• UV photometric • Chemiluminescence • Chemical method
		1 hour **	180	180	
6	Lead (Pb) µg/m³	Annual*	0.5	0.5	• AAS / ICP method after sampling on EPM 2000 or equivalent filter paper • ED XRF using Teflon filter
		24 hours**	1.0	1.0	

(1)	(2)	(3)	(4)	(5)	(6)
7	Carbon Monoxide (CO) mg/m^3	8 hours**	2	2	Non Dispersive Infra RED (NDIR) Spectroscopy
		1 hour**	4	4	
8	Ammonia (NH_3) µg/m^3	Annual*	100	100	• Chemiluminescence • Indophenol blue method
		24 hours**	400	400	
9	Benzene (C_6H_6) µg/m^3	Annual*	5	5	• Gas chromatography based continuous analyser • Adsorption and desorption followed by GC analysis
10	Benzo (a) Pyrene (BaP) particulate phase only ng/m^3	Annual*	1	1	Solvent extraction followed by HPLC / GC analysis
11	Arsenic (As) ng/m^3	Annual*	6	6	AAS / ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni) ng/m^3	Annual*	20	20	AAS / ICP method after sampling on EPM 2000 or equivalent filter paper

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

** 24 hourly or 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.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

3.1.2 Selection of sampling location

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality monitoring network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions are synoptic scale
- Topography of the study area
- Representative of regional background air quality for obtaining baseline status
- Representatives of likely impact areas

Ambient Air Quality Monitoring (AAQM) stations were set up at eight locations with due consideration to the above mentioned points. The AAQM locations are depicted in Figure 3.6.

3.1.3 Particulate Matter (PM_{10} and $PM_{2.5}$)

The PM_{10} and $PM_{2.5}$ among the eight sampling stations covering the study region varied from 40 to 63 µg/m^3 and 14 to 26 µg/m^3 respectively. These results are presented in Table 3.10 and 3.11

3.1.4 Sulphur Dioxide (SO_2)

During the present study SO_2 concentration is from 11 to 28 µg/ m^3 presented in Table 3.12.

3.1.5 Oxides of Nitrogen (NO_2)

Nitrogen dioxide was in the range of 21 to 39 µg/ m^3 presented in Table 3.13.

3.1.6 Carbon Monoxide (CO)

CO during the present study was below the detectable limit.

Air Sampling Locations

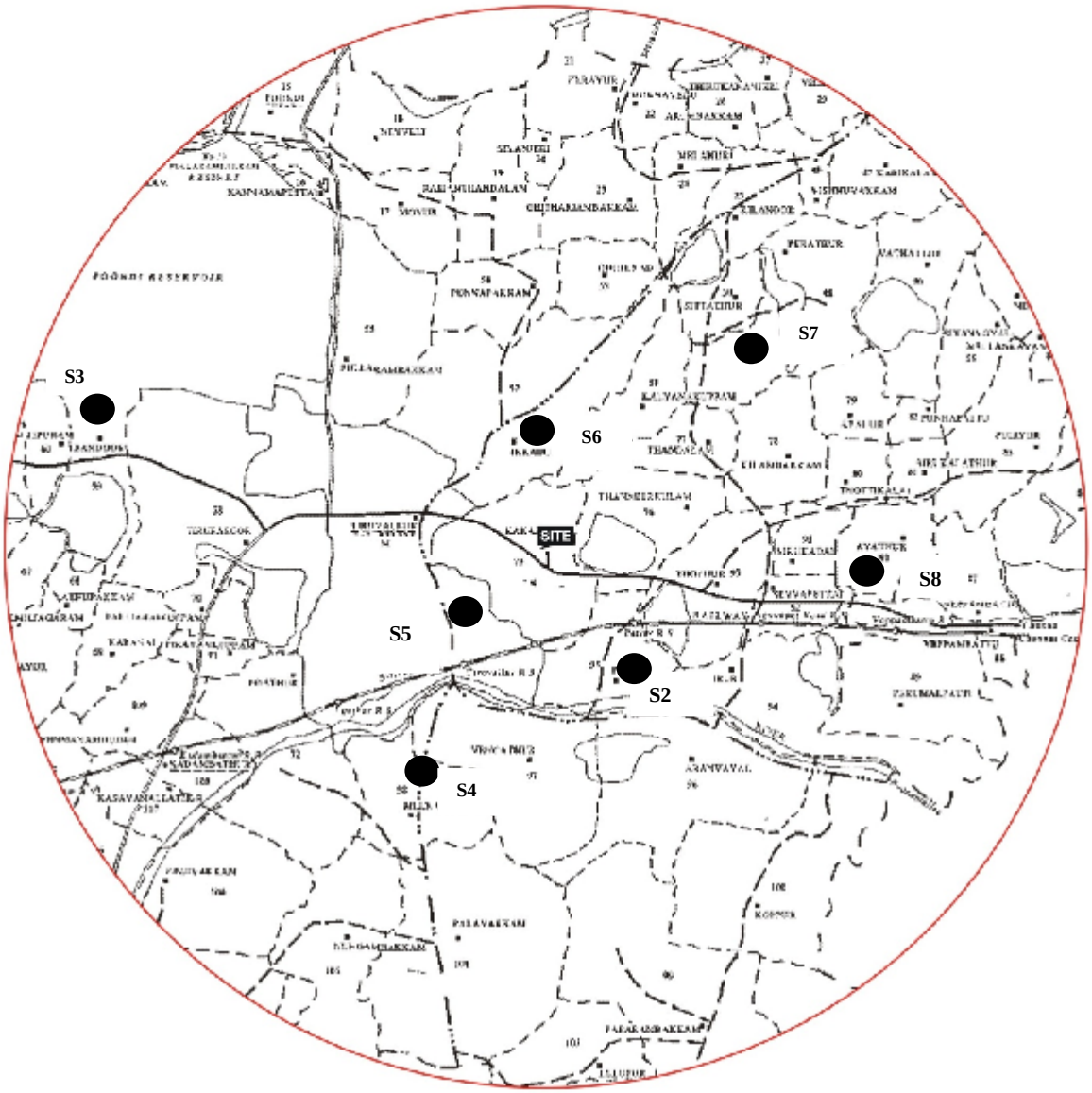


Table 3.10–Ambient Air Quality Status (PM_{10}) – (April – June2013)

Averaging Time: 24 Hrs

Unit: µg/m^3

SA. No.	Sampling Station	Bearing*	Distance * (KM)	Max	Min	Arithmetic Mean	Standard Deviation	98th Percentile
SA1	Project site	-						
SA2	Putlur	SE						
SA3	Pandoor	NW						
SA4	Melnallathur	SW						
SA5	Thiruvallur	SW						
SA6	Ikkadu	N						
SA7	Kalyankuppam	NE						
SA8	Ayathur	SE						

*- With respect to project site

Permissible limit for industrial, Residential, Rural and other area 100 µg/m^3

Table 3.11–Ambient Air Quality Status ($PM_{2.5}$) – (April – June 2013)

Averaging Time: 24 Hrs

Unit:µg/m^3

SA. No.	Sampling Station	Bearing*	Distance* (KM)	Min	Max	Arithmetic Mean	Standard Deviation	98th Percentile
SA1	Project site	-						
SA2	Putlur	SE						
SA3	Pandoor	NW						
SA4	Melnallathur	SW						
SA5	Thiruvallur	SW						
SA6	Ikkadu	N						
SA7	Kalyankuppam	NE						
SA8	Ayathur	SE						

*- With respect to project site

Permissible limit for industrial, Residential, Rural and other area 60 µg/m^3

Table 3.12 – Ambient Air Quality Status (SO_2) – (April to June 2013)

Averaging time: 24 hrs. **Unit : µg/m^3**

SA. No.	Sampling Station	Bearing*	Distance* (KM)	Min	Max	Arithmetic Mean	Standard Deviation	98th Percentile
SA1	Project site	-						
SA2	Putlur	SE						
SA3	Pandoor	NW						
SA4	Melnallathur	SW						
SA5	Thiruvallur	SW						
SA6	Ikkadu	N						
SA7	Kalyankuppam	NE						
SA8	Ayathur	SE						

* With respect to project site

Permissible limit of SO_2 for Industrial, Residential, Rural and other area = 80 µg/m^3

Table 3.13 – Ambient Air Quality Status (NO_2) - (April – June 2013)

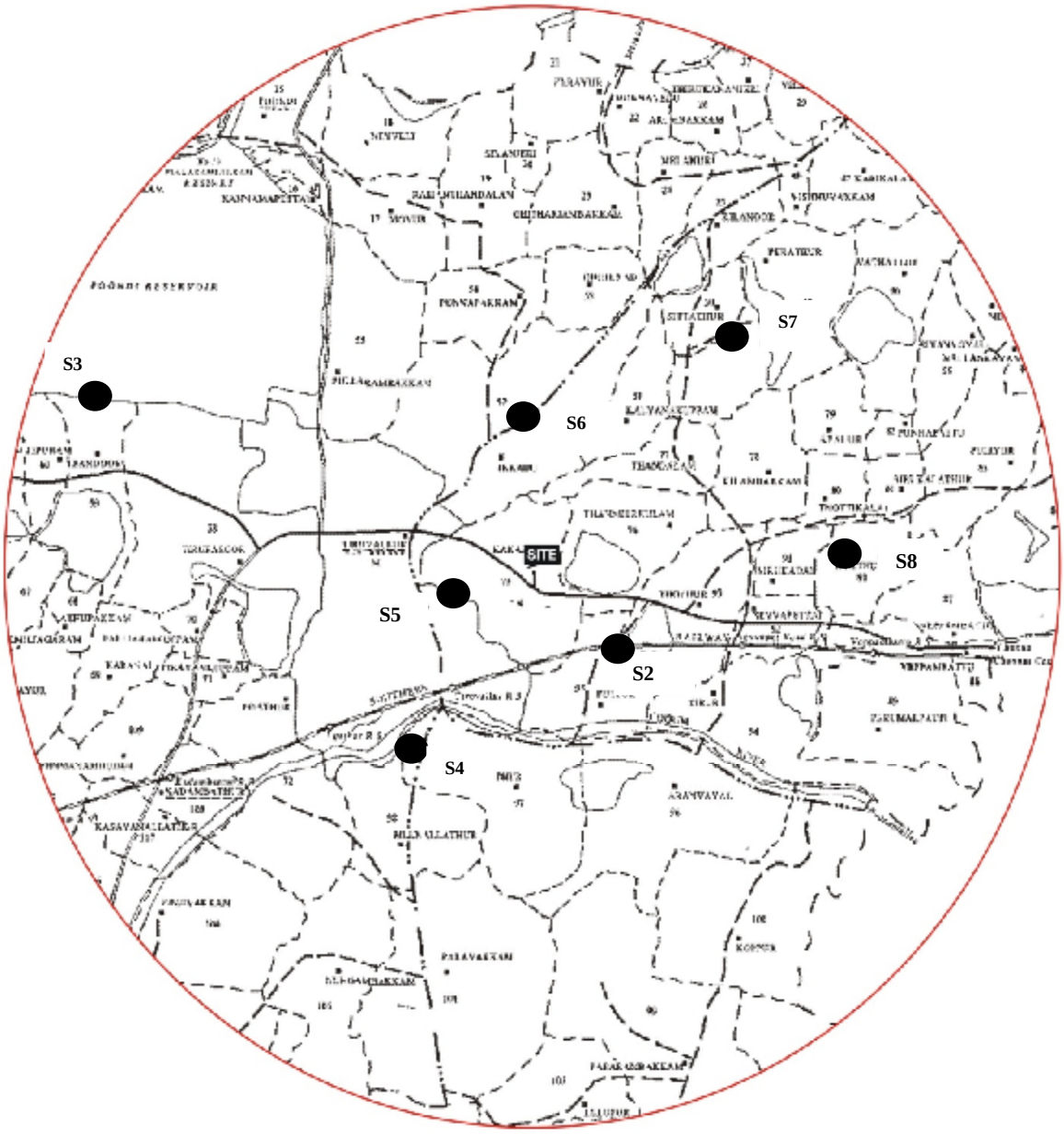
Averaging Time: 24 hrs. **Unit: µg/m^3**

S.A No.	Sampling Station	Bearing*	Distance *	Min	Max	Arithmetic Mean	Standard Deviation	98th Percentile
SA1	Project site	-						
SA2	Putlur	SE						
SA3	Pandoor	NW						
SA4	Melnallathur	SW						
SA5	Thiruvallur	SW						
SA6	Ikkadu	N						
SA7	Kalyankuppam	NE						
SA8	Ayathur	SE						

* With respect to project site

Permissible limit of NO_2 for Industrial, Residential, Rural and other area =80 µg/m^3

Noise Sampling Stations



3.1.7 Noise Environment

The noise monitoring has been conducted for the determination of noise levels at eight locations around the study area. Levels of noise have been monitored during 6am to 10pm and night levels during 10pm to 6am. In the residential cum rural areas equivalent day night noise levels ranges from 56 to 41 dB (A). The details of sampling locations with respect to the plant site and the equivalent day night levels are tabulated in Table 3.14.

Table 3.14 – Equivalent Day-Night Noise Level Details

SA. No.	Sampling Stations	Bearing *	Distance *	Equivalent Levels dB(A)	
				Day Time	Night Time
SN1	Project site	-			
SN2	Putlur	SE			
SN3	Pandoor	NW			
SN4	Melnallathur	SW			
SN5	Thiruvallur	SW			
SN6	Ikkadu	N			
SN7	Kalyankuppam	NE			
SN8	Ayathur	SE			

		Day	Night
Permissible limit for Industrial Area	-	75	70
Permissible limit for Rural Area		- 55	45

3.1.8 Ambient Noise Standards

Ambient Noise level standards have been notified by the MoEF vide Gazette

Notification dated 26th December 1989 and also in the Schedule III of the Environmental (Protection) Rules 1986. It is based on the 'A' weighted equivalent noise level (Leq). These are presented in Table 3.14

Table 3.15: National Ambient Noise Standards

Category of Zones	Leq in dB(A)	
	Day *	Night+
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone **	50	40

Source: Central Pollution Control Board

Note:-

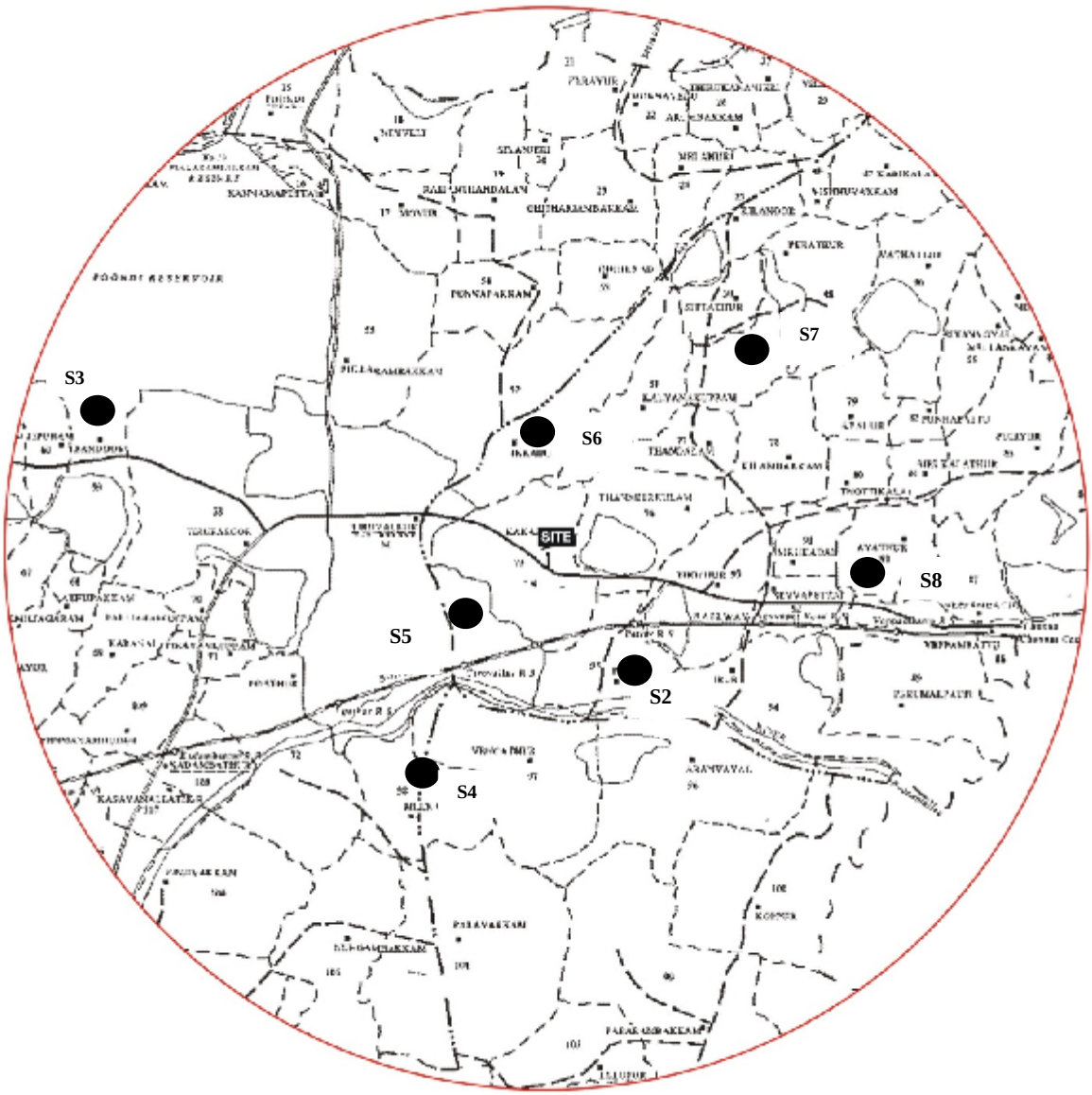
1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority and the corresponding standards shall apply

3.1.9 Identification of Sampling Locations

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the study area. Noise at different noise generating sources have been identified based on the activities in the surrounding area,

ambient noise due to small scale industries, traffic and noise at sensitive areas like hospitals and schools.

Water Sampling Stations



3.2. WATER QUALITY

The water samples are collected from eight locations in the study area. We have submitted the permissible limit for the drinking purposes as well as the permissible limits in the absence of alternative sources. Generally, the desirable limit is obtained by the river water only, whereas we have received the water samples from bore well & open wells. The water from sampled location falls in the range mentioned for drinking water when there is no alternative source.

Table 3.16 – Water Analysis Results

S.No	PARAMETERS	UNITS	SAMPLING SITES & RESULTS							
			WA – 1	WA - 2	WA – 3	WA - 4	WA – 5	WA - 6	WA - 7	WA – 8
1.	pH@25^{0}C	No.								
2.	Colour (Visual)	Hazen								
3.	Odour	---								
4.	Taste	---								
5.	Turbidity (NTU)	NTU								
6.	Total dissolved solids	mg/l								
7.	Total hardness ($CaCo_3$)	mg/l								
8.	Calcium (Ca)	mg/l								
9.	Magnesium (Mg)	mg/l								
10.	Iron (Fe)	mg/l								
11.	Chlorides (Cl)	mg/l								
12.	Sulphates (SO_4)	mg/l								

13.	Fluorides (F)	mg/l								
14.	Nitrates (NO_3)	mg/l								
15.	Copper (Cu)	mg/l								
16.	Nitrogen (N)	mg/l								
17.	Lead (Pb)	mg/l								
18.	Manganese (Mn)	mg/l								
19.	Phenolic Compound (C_6H_5OH)	mg/l								
20.	Total Chromium	mg/l								
21.	Zinc	mg/l								
22.	Arsenic	mg/l								

Sample 1 –Project site

Sample 2 – Putlur

Sample 3- Pandoor

Sample 4 – Melnallathur

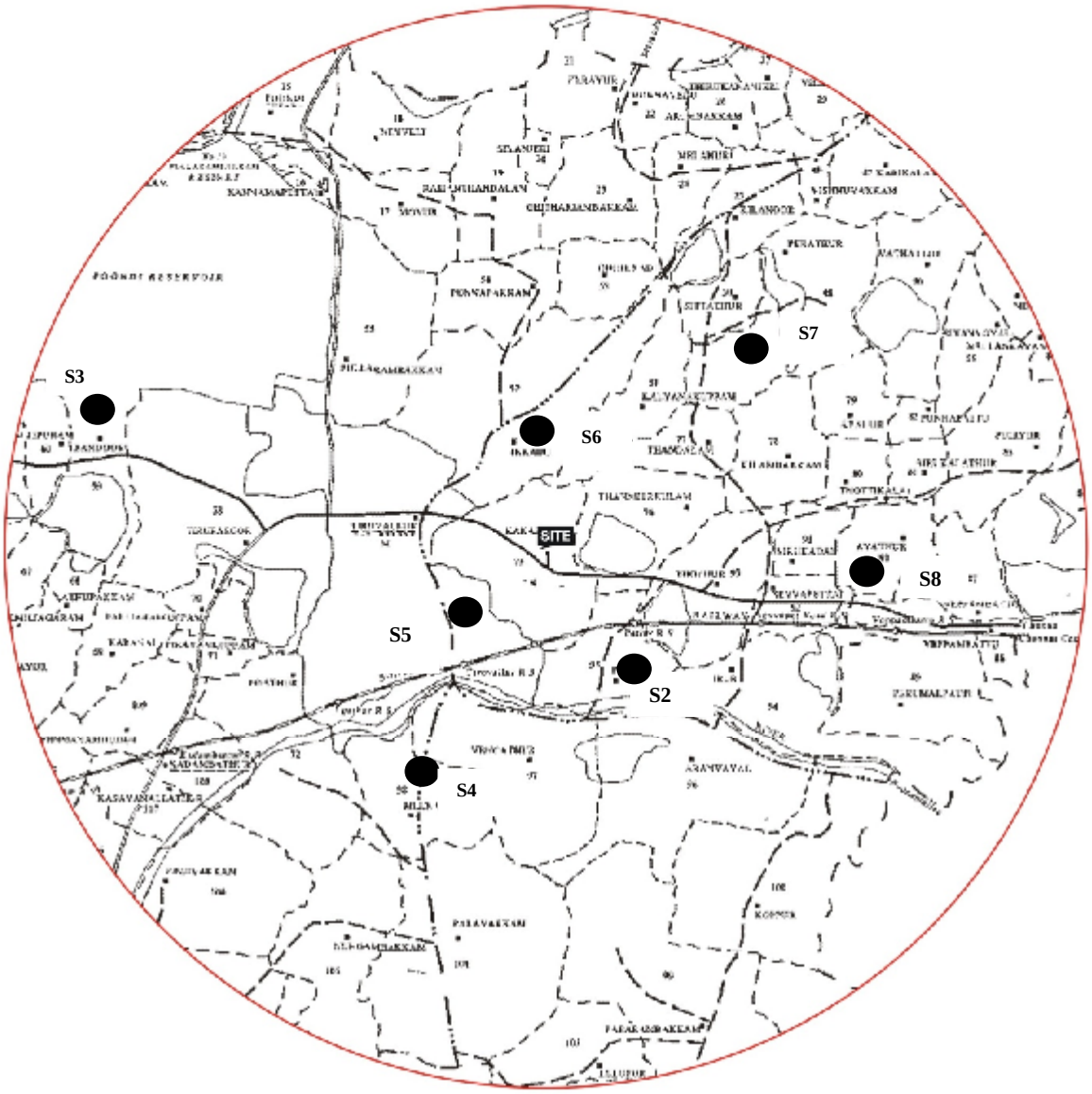
Sample 5 –Thiruvallur

Sample 6- Ikkadu

Sample 7 - Kalyankuppam

Sample 8 - Ayathur

Soil Sampling Station



3.3. SOIL QUALITY

It is essential to determine the potential of soil in the area and identify the impacts of urbanization and industrialization on soil quality. Accordingly, a study of assessment of the soil quality has been carried out.

3.3.1 Data Generation

For studying soil profile of the region, sampling location was selected to assess the existing soil condition in and around the plant representing various land use conditions. The physical, chemical and heavy metal concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 90 cm. Simultaneously, in-situ infiltration test using double ring infiltrometer was carried out at all location to determine the permeability.

The present study on the soil profile establishes the baseline characteristics and identifies the incremental concentrations if any, due to the existing and proposed activities.

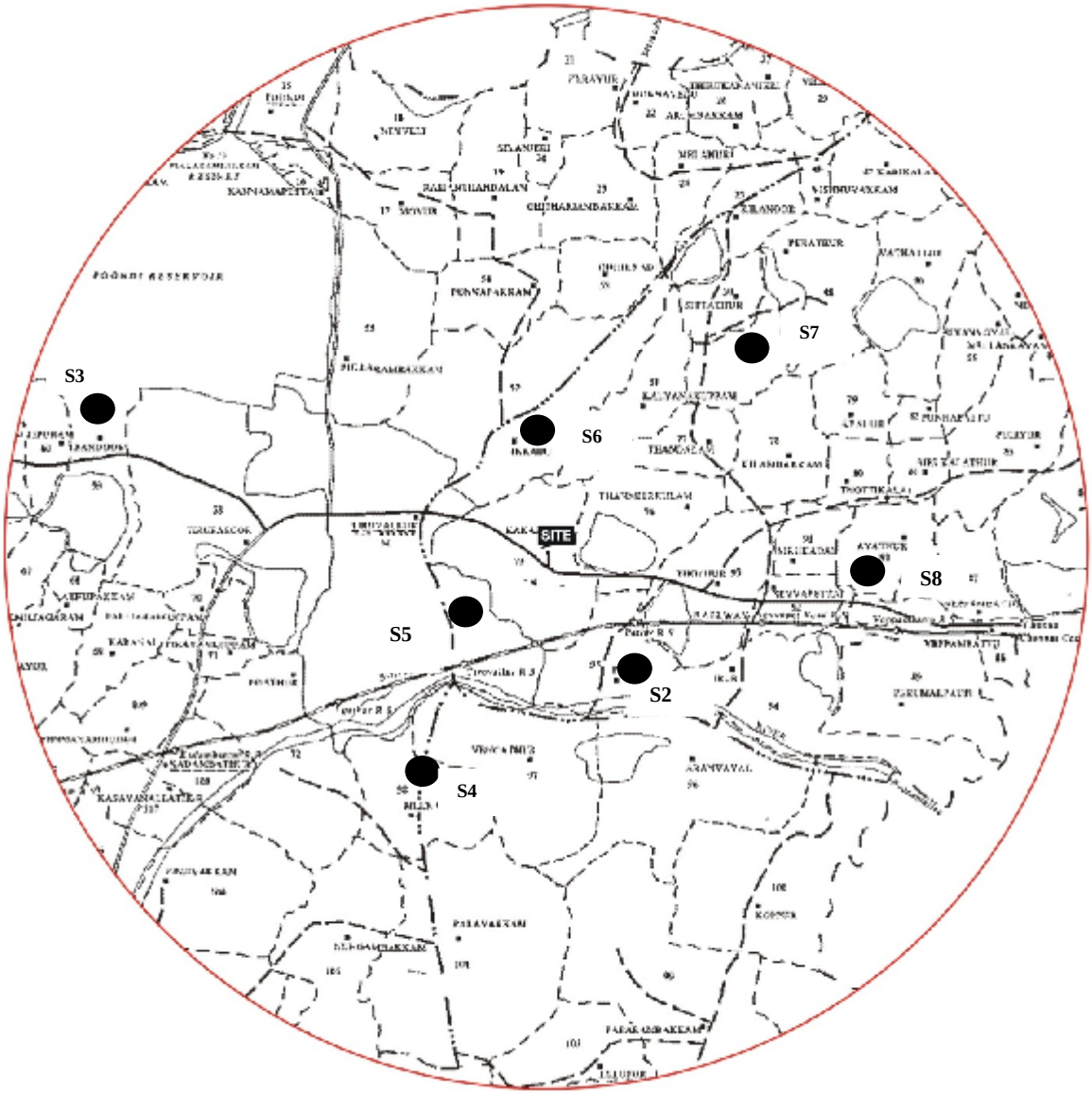
The sampling locations have been identified with the following objectives:

- To determine the baseline soil characteristics of the study area;
- To determine the impact on soil more importantly from agricultural productivity point of view.

Eight locations within 10 km radius of the plant site were selected for soil sampling. At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm, and 90 cm below the surface and homogenized. The homogenized samples were taken during April - June 2013 to identify soil conditions.

The details of the sampling location are given in Table – 3.17 and are shown in Figure – 3.9.

Soil Sampling Locations



3.3.2 Baseline Soil Status

It has been observed that the texture of soil is mostly 'Sandy clay loam' in the area. The common color of the soil ranged from light brown to black. It has been observed that the pH of the soil quality ranged from 6.4 to 6.9 indicating that the soil is usually neutral to slightly basic in nature.

The standard of soil classification is given in Table 3.17.

Table 3.17 – Soil Quality

S.No	PARAMETERS	UNITS	RESULTS							
			SA-1	SA-2	SA-3	SA-4	SA-5	SA - 6	SA-7	SA-8
1	pH	No.								
2	EC	mmhos/cm								
3	Water Content	%								
4	Texture	---								
Macro Nutrients:										
5	Nitrogen	%								
6	Phosphorus	%								
7	Potassium	Kg/Ac								
Micro Nutrients:										
8	Iron	mg/Kg								
9	Manganese	mg/Kg								
10	Zinc	mg/Kg								
11	Copper	mg/Kg								

Sample 1 –Project site

Sample 2 – Putlur

Sample 3 – Pandoor

Sample 4 – Melnallathur

Sample 5 – Thiruvallur

Sample 6 – Ikkkadu

Sample 7 - Kalyankuppam

Sample 8 - Ayathur

Table – 3.18 – Standards of Soil Classification

S.No.	Soil Test	Classification
1.	pH	<4.5 Extremely acidic 4.51 – 5.00 Very strongly acidic 5.51 – 6.0 moderately acidic 6.01 – 6.50 slightly acidic 6.51 – 7.30 Neutral 7.31 – 7.80 slightly alkaline 7.381 – 8.50 moderately alkaline 8.51 – 9.0 strongly alkaline 9.01 very strongly alkaline
2.	Salinity Electrical Conductivity (mmhos/cm)	Up to 1.00 Average 1.01 – 2.00 Harmful to germination 2.01 – 3.00 Harmful to crops (Sensitive to salts)
3.	Organic Carbon	Upto 0.2 : Very less 0.21 – 0.4 : Medium, 0.51 – 0.8 : On an average sufficient 0.81 – 1.0 : Sufficient > 1.0 : More than sufficient
4.	Nitrogen (kg/ha)	Up to 50 : Very less 51 – 100 : Less 101 – 150 : Good 151 – 300 : Better > 300 : Sufficient
5.	Phosphorus (kg/ha)	Up to 15 Very less 16 -30 Less 31 – 50 Medium, 51 – 65 On an average sufficient 66 – 80 Sufficient > 80 More than sufficient
6.	Potash (kg/ha)	0 - 120 Very less 120 – 180 Less 181 – 240 Medium 241 – 300 Average 301 – 360 better > 360 More than sufficient

3.4. LAND ENVIRONMENT

3.4.1 Introduction

The site is located at Kakkalur village, Thiruvallur Taluk, Thiruvallur District, Tamilnadu

3.4.2 Topography

The project site is plain with flat topography.

3.4.3 Drainage

The area exhibits vast flat topography and the average elevation of the area is about 145 feet from Mean Sea Level (MSL). River Cooum is about 2.5 Km from the project site. The detailed Topo Map for 10 Km radius is in Fig 2.1

3.5 BIOLOGICAL ENVIRONMENT

3.5.1 Biological Environment Assessment

A habitat or an area comprises of different kinds of plants and animals within its boundary. The distribution of flora and fauna in the given area represents the biological environment. The biological portion of the environment includes, what is present in the study area, its values, and its responses to impacts description of community uniqueness, the dominant species, and an evaluation of rare or endangered species.

Natural vegetation is scanty and the bio-diversity of the area is low and it forms a part of deciduous area. Species diversity and food web index of the

surrounding area will be negligible. However, the proposed reclamation of mining areas using proper re-vegetation techniques and development of green belt around the ultimate pit limit, the impact on the terrestrial environment will be nominal.

The unit has earmarked more than 33% of total area of plant about 0.190 Hectare for developing the Green Belt and Lawns as per the existing Environmental Quality Policy of the Company. The proposed Green Belt will have significant long term impact during the Operation Phase.

Flora-fauna: An ecological survey of the study area was conducted particularly with reference to recording the existing biological resources. The objectives of the survey were intended to:

- Generate baseline data from field observations from various terrestrial ecosystems,
- Collect secondary data from Government records,
- Compare the data so generated with authentic past records to understand changes,
- Understand the impact of the proposed activity on vegetational structure in the site.

To accomplish the above objectives, a general ecological survey covering an area of 10 km radius area was conducted. The locations were identified for phyto-sociological aspects to assess the current status. Phyto-sociological studies were carried out by using **least count quadrate** method. Trees species were surveyed by taking quadrates of 100 m x 10 m distributed randomly. Shrub species were surveyed by taking quadrates of 10 m x 10 m. Herb species were surveyed by taking quadrates of 1 m x 1 m. The data obtained

was further used to estimate Relative Dominance, Relative Density (RD), Relative Frequency (RF) and Importance Value Index (IVI) as per the formula.

Faunal survey covers the Terrestrial Fauna, Avian Fauna and Aquatic Fauna. The survey was based on Personal observation, Enquiry with local population and Records available. This survey will include identification of endangered and rare species as per Red Book.

Flora and Fauna

Survey Methodology

An ecological survey of the study area was conducted particularly with reference to recording the existing biological resources. The objectives of the survey were intended to:

- Generate baseline data from field observations from various terrestrial ecosystems,
- Collect secondary data from Government records,
- Compare the data so generated with authentic past records to understand changes,
- Understand the impact of the proposed activity on vegetational structure in the site.

To accomplish the above objectives, a general ecological survey covering an area of 10 km radius area was conducted. The locations were identified for phyto-sociological aspects to assess the current status. Phyto-sociological studies were carried out by using least count quadrate method. Trees species were surveyed by taking quadrates of 100 m x 10 m distributed randomly. Shrub species were surveyed by taking quadrates of 10 m x 10 m. Herb species were surveyed by taking quadrates of 1 m x 1 m. The data obtained

was further used to estimate Relative Dominance, Relative Density (RD), Relative Frequency (RF) and Importance Value Index (IVI) as per the formula.

Faunal survey covers the Terrestrial Fauna, Avian Fauna and Aquatic Fauna. The survey was based on Personal observation, Enquiry with local population and Records available. This survey will include identification of endangered and rare species as per Red Book.

The flora and fauna studies were carried out in the entire study area of 10 km radius around the proposed site. The diversified plant genera distributed in this area. The natural vegetation of the study area had more population with variety of species. Many varieties of plant species were growing naturally.

The overall aerial and close observations lead to the conclusion that the diversity of plant species was more in the buffer zone.

Flora: The Study of flora involved intensive sample survey of vegetation in the project site and other locations applying standard methods (e.g., Greig-Smith 1983, Caustan 1988). To examine the trees and shrubs, quadrats of 25 x 25 m and for herbs 2 x 2 m were laid. In each of the larger quadrats (i) Species (ii) their number, and (iii) Girth at Breast Height (GBH), were measured. (Chaturvedi and Khanna,1982). The species of vegetation found in each station were identified and listed according to their families, both in dicotyledons and monocotyledons of the plant kingdom. The plant species were classified as per the classifications of "Bentham and Hooker" and identified by using Gambles book on "Flora of Madras Presidency" and Mathew's book on "Flora of the Tamil Nadu Carnatic".

Fauna: Both direct and indirect observation methods were used to survey the fauna. Visual encounter (search) method was employed to record vertebrate species. Additionally survey of relevant literature was also done to consolidate the list of vertebrate fauna distributed in the area (Smith 1933-43, Ali and Ripley 1983, Daniel 1983, Prater 1993, Murthy and Chandrasekhar1988). Since birds may be considered as indicators for monitoring and understanding human impacts on ecological systems (Lawton, 1996) attempt was made to gather quantitative data on the group.

Point Survey Method: Observations were made in each site for 15 minutes duration.

Road Side Counts: The observer traveled from site to site, all sightings were recorded (this was done both in the day and night time). An index of abundance of each species was also established.

Pellet and Track Counts: All possible animal tracks and pellets were identified and recorded (South Wood, 1978).

Based on the Wildlife Protection Act, 1972 (WPA 1972, Anonymous 1991, Upadhyay 1995, Chaturvedi and Chaturvedi 1996) species were short-listed as Schedule II or I and considered herein as endangered species. Species listed in Ghosh (1994) are considered as Indian Red List species.

Baseline Status-Fauna

The list of Flora is given below:

S. No	BOTANICAL NAME	COMMON NAME
1	Hibiscus rosa-sinensis	Shoeback plant
2	Carica papaya	Papaya
3	Tamarindus indicum	Tamarind Tree
4	Prosopis julifera	Bayahonda blanca
5	Azadirachta indica	Neem tree
6	Pongamia glabra	Indian beech
7	Cocos nucifera	Coconut palm
8	Borassus	Palmyra palm
9	Musa paradisica	Banana
10	Delonix regia	Royal Poinciana
11	Samanea samen	Rain tree
12	Lantana camara	'Pink Caprice' Lantana
13	Ficus religiosa	Sacred fig
14	Terminalia cattapa	Indian almond
15	Ricinus communis	Castor
16	Passiflora edulis	Golden Grana
17	Cissus quadranqualaris	Veld grape
18	Cassia siamea	Yellow cassia
19	Cassia auriculata	Tanners cassia
20	Opuntia	Tuna
21	Calotropis gigantia	Giant rubber bush
22	Vitex negundo	Chaste tree

23	Theprosia	Turkey pea
24	Euphorbia canariensis	Canary island spurge
25	Bougainvillea spectabilis	Bougainvillea

The list of fauna is given below

S.No	ZOOLOGICAL NAME	COMMON NAME
1	Brachylagus idahoensis	Pygmy rabbit
2	Callosciurus notatus	Plantain squirrel
3	Cryptomys hottentotus	African Mole Rat
4	Vulpes bengalensis	Indian Fox
5	Canis lupus pallipes	Indian Wolf
6	Ovis aries	Sheep
7	Capra aegagrus hircus	Domestic goat
8	Canis lupus familiaris	Domestic Dog
9	Felis catus	Domestic Cat
10	Bos taurus	Domestic cow
11	Macaca radiate	Monkey
12	Corvus splendens	Crow
13	Acridotheres tristis	Indian Myna
14	Loriculus vernalis	Vernal Hanging Parrot
15	Collocalia esculenta	White – Bellied Swiftlet
16	Tyto alba	Barn Owl
17	Columba rupestris	Blue Hill Pigeon
18	Dicrurus macrocercus	Black Drongo

19	Naja naja oxiana	Indian Cobra
20	Chamaeleo gracilis	Chameleons

Source : DFO

3.6 TERRESTRIAL ECOLOGY

The site is proposed in a remote dry and predominantly barren lands covered with some thorny bushes in patches. There is no tree cutting or removal of plantations is anticipated. There is no forest land is involved. There is no Wild Life Sanctuary or National Park or Biosphere or Hotspots, Elephant/Tiger reserves, Migratory Routes within the study area of 10 km.

3.7 SOCIOECONOMIC ENVIRONMENT

The Socio-economic conditions of the area are described in the following paragraphs.

Demographic Details

Total population of the selected 11 villages within 10 km radius from the project site is 79057. The male to female ratio is 100:98. The population in the age group of 6 constitutes about 11.2% of the population. The details of population is given in the below Table 3.19.

Table 3.19 Population Status (As per 2001 census)

S.No	***Name of the Villages***	***No. of House Holds***	***Male***	***Female***	***Total***	***Literates***		***Cultivators***		***Agriculture Labours***	
						Male	***Female***	***Male***	***Female***	***Male***	***Female***
1.	Kakkalur	2103	4535	4407	8942	3609	2896	62	12	139	41
2.	Selai	642	1389	1448	2837	1048	824	45	9	104	30
3.	Pirayankuppam	205	475	443	918	344	233	36	1	118	59
4.	Palliaraikuppam	70	179	179	358	129	113	7	1	23	13
5.	Karanai	254	537	538	1075	344	236	53	9	206	174
6.	Attupakkam	116	211	219	430	97	70	26	1	70	19
7.	Nemiliagaram	45	90	88	178	84	60	25	0	1	0
8.	Keelvilagam	95	225	219	444	126	87	41	0	1	1
9.	Melvilagam	42	94	96	190	60	46	20	5	4	3
10.	Thiruvallur	14241	31789	31019	62808	25843	21469	147	25	468	215
11.	Kalianur	234	432	445	877	305	265	45	8	46	59

Drinking Water Supply

Adequate facilities are available for tapping drinking water in all of the villages. Most of the villagers depend on underground water resources such as from well, tank etc.

Power Supply

All the villages are provided with electricity.

3.10 Baseline Status Summary

The findings of baseline environmental status of the study area are summarized below :

- The monitored ambient air quality in the study area was found to be in compliance with the National Ambient Air Quality (NAAQ) Norms of 100µg PM_{10}/m^3, 60µg $PM_{2.5}/m^3$, 80µg SO_2/m^3 and 80µg NO_2/m^3 for Residential, Rural and other areas.
- Ambient equivalent noise levels (Leq) during day and night times were found to be well within the MoEF Norms.
- The water quality of surface waters was found to be in compliance with CPCB norms.
- The ground water quality was found to be in compliance with the IS:10500 Norms.
- The absence of Oil & Grease, Phenols, Cyanides, low BOD & COD levels, trace metals below their detectable limits, etc. confirm the fact that the water quality in the vicinity was not getting polluted due to any industrial activity.
- The soil in the study area would very well support vegetation after amending it suitably.
- Presence of number of phanerophytes (shrubs and trees) and therophytes (annuals) indicates semiarid vegetation structure in the study area.
- There is no Wild Life Sanctuary or National Park or Biosphere or Hotspots within the study area of 10 km.
- Domesticated animals and common fauna only exist in the study area.
- The area is thinly populated. All the villages are electrified, road connected and provided with water supply. The basic amenities are there almost at all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

The project is proposed in an industrially backward area. There are significant numbers of non-workers in the area and the project would provide direct or indirect job opportunities to them. Also, there will be some migration of labour force from outside also during construction phase which may result in social stress on the local settlements. However, this impact is envisaged to be marginal and temporary in nature.

Thus, the **overall impact** on environment during construction phase due to the proposed Project **would be short term and insignificant**.

CHAPTER 4 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.1 INTRODUCTION

The predictions of impact scenario along with baseline status of environment helps in identification of appropriate mitigate measures in the planning stage to minimize environmental damage.

It is therefore necessary to identify the critical likely impacts due to setting up of this project for various attributes of environment, if no pollution control measures are adopted.

This project would create impacts on the environment in two distinct phases.

a) During construction phase which may be regarded as temporary or short term.
b) The other during the operational phase, which would have long-term effects.

The environmental impacts in this study have, as such, been discussed separately for the construction phase and operational phase of the project.

4.2 POTENTIAL IMPACTS

All the potentially significant environmental impacts from the project are grouped as below.

Air Environment

- Impact on ambient air quality
- Impact on ambient noise

Water Environment

- Impacts on surface water quality

Land Environment

- Impacts on land use
- Impacts on soil fertility
- Impacts on agriculture
- Impacts on forests and wildlife

4.2.1 Prediction of Impacts

The impacts assessment is carried out for the following phases and presented in the following paragraphs.

- Impacts during construction phase
- Impacts during operation phase

4.3 IMPACTS DUE TO CONSTRUCTION PHASE

The construction phase impacts are expected to be minimal, as for as construction of the main projects are concerned. During the construction phase, the following activities among others are considered to be important towards development of impact.

a) Site preparation
b) Excavation and back filling
c) Mixing of concrete and mortar
d) Concrete construction
e) Erection of steel structures
f) Road construction
g) Painting and finishing
h) Cleanup operations
i) Landscaping and afforestation

In our project proper planning work of construction will be engaged, so that the impact due to construction phase will be very low.

4.3.1 Land Transportation and Construction

Construction does not involve any heavy construction equipment. Transportation of raw material through trucks may not affect traffic in the main roads.

4.3.2 Land Use

The land acquired for this proposed site falls under SIDCO Industrial area.

4.3.3 Water Resources and Water Quality

Raw water will be taken from private water suppliers. Water will be consumed for construction activities depends upon the requirement.

4.3.4 Air Quality

Some dust may arise during earthwork and masonry work. However, the effect is much localized and not having any impact on air quality. Water spraying will be done if required to minimize fugitive emission.

4.3.5 Biological Conditions

The present site is devoid of trees and shrubs. The only vegetation covered on the land is grass, which will be disturbed and some part will be lost in construction activity. Trees / shrubs will be planted for green cover.

4.3.6 Transportation System

It may not affect traffic even if it intends to ship out the materials in peak hours.

4.3.7 Noise

Noise will be created in the site due to construction activity. However, noise effect is localized and no impact outside the plant building.

4.3.8 Community Structure

Community structure will be benefited by generation of Employment. Around 50 jobs will be created during the construction period.

4.3.9 Accident Risk

Accidents may occur during construction which could be avoided with proper supervision and hiring skilled labor along with proper planning.

4.3.10 Resources

Fuel resource will meet by trucks during construction period. Purchasing the raw material in nearest place and proper planning of routes could minimize this. Water resources are conserved by adopting new techniques with new materials like concrete blocks instead of bricks, which needs less water compared with the latter.

4.3.11 Impact during Construction

The impact during construction phase will be minimal, however water spraying, avoiding night work, taking proper measures will be engaged. Hence the impact will be negligible.

4.4 OPERATIONAL PHASE

In the operational phase, the important activities contributing to environmental impacts, either adverse or beneficial are as follows.

a) Consumption of Water
b) Waste Discharge and Control
c) Atmospheric Emission
d) Air Pollution Control Measures
e) Noise pollution
f) Employment of Personnel

4.4.1 Land Transportation and Construction

Implementation of the project will improve erodibility and soil stability with revegetation.

Production of solid and Hazardous waste

S.No.	Particulars	Quantity	Mode of Use

(a) Non-Hazardous Waste			
1.	General Scrap	200 kg/M	Sold out.
2.	Ash from Boiler	10 kg/M	Used as manure
(b) Hazardous Waste			
1.	Sludge from ETP	500 kg/M	Collected, stored and disposed to TSDF for landfill.
2.	Salt from Evaporator	150 kg/M	
3.	Residue from Solvent distillation	15 kg/M	Collected, stored and disposed to TSDF for incineration.
4.	Waste Oil	150 kg/M	Disposed through authorized recyclers.

Change in surface permittivity and grading

Construction of plant and roads will change the natural characteristic of the surface. Addition of impervious surface could add to marginal increase in runoff, which in turn could lead to soil erosion in case that soil is improperly vegetated.

Aesthetics

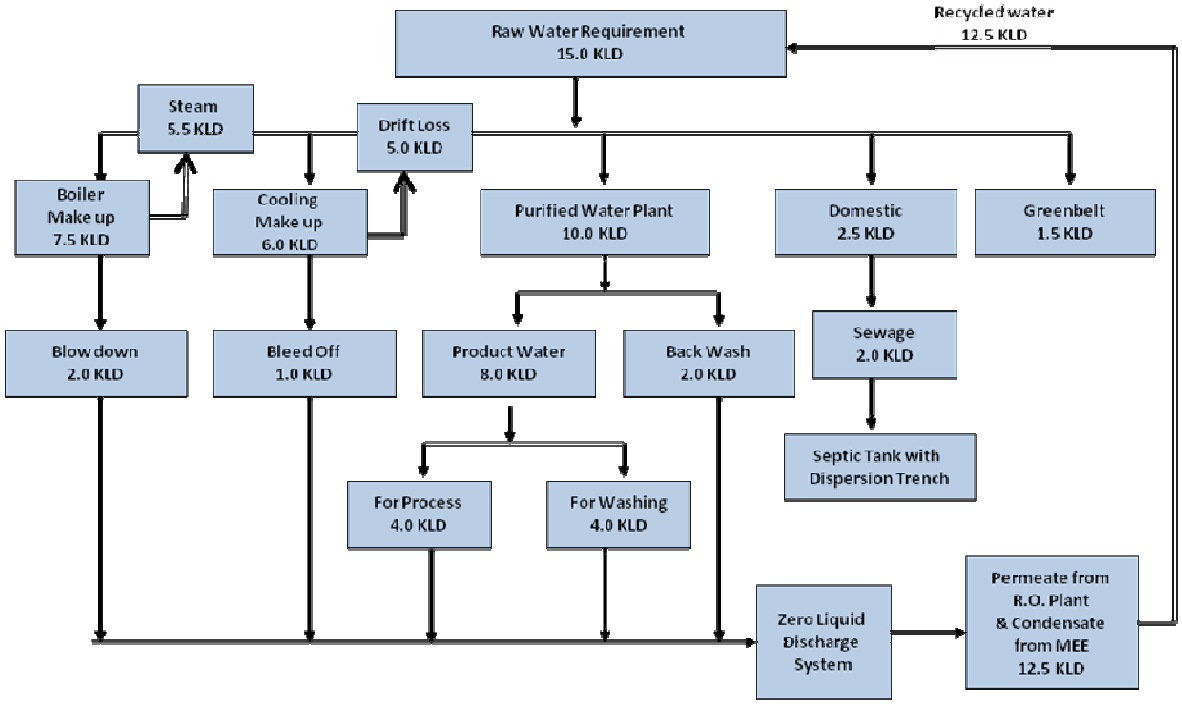
Developing greenbelt inside and outside the project will give aesthetic value. The green cover in the vacant space will also give pleasant aesthetics value.

4.4.2 Water Resources

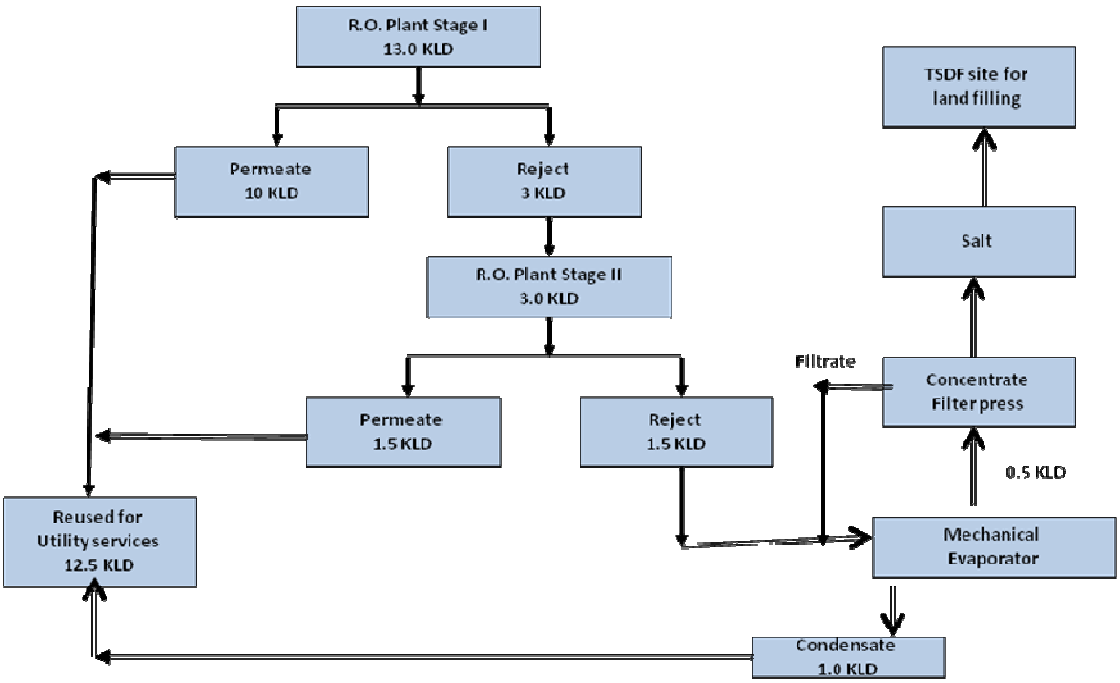
Water supply will be expected to fulfil the entire requirement.

Total water requirement:

This unit will consume 15 KLD of raw water for its cooling and non-process uses. The entire raw water required will be procured from SIDCO water suppliers.



Zero Liquid Discharge System



4.4.3 Water Impact

Category	Quantity (m^3/day)	Method of treatment and Disposal
Waste water from Process	4.0	Treated by the Effluent Treatment Plant followed by the R.O. Plant Stage I & II and R.O. Reject evaporated by the Mechanical Evaporator.
Waste water from Washing	4.0	
Boiler Blow down	2.0	
Cooling tower bleed off	1.0	

Back Wash of Purified Water System	2.0	
Sewage	2.0	Disposed through septic tank with dispersion trench.

4.4.4 Air Environment

Following are the air pollution control schemes that would be followed to minimize and control the emission of air pollutants as well as their effective dispersion into the atmosphere.

S. No.	Description	Air Pollution Control Measures
1	Wood Fired Boiler (0.5 T/hr)-2 Nos.	15 m height and 0.2 m dia of common stack
2	D.G.Set (125 KVA)	7 m height and 0.15 m dia of exhaust pipe with acoustic measures

4.4.5 Transportation System

It may not affect traffic even if it intends to ship out the materials in peak hours.

4.4.6 Noise Impact

The noise level within the plant building at a distance of one meter from the source shall be maintained at less than 85 dB(A). Noise level at the nearest plant boundary is expected to be about 50 dB(A). Thus, the noise levels will be well within the permissible limit for residential areas and as such no impact is envisaged.

4.4.7 Aesthetics

Any structure built in the centre of plain area will look aesthetically unpleasant. To overcome this, a green screen of tall trees will be added which also will help in several other ways.

4.4.8 Impact on Flora and Fauna

Natural vegetation is scanty and the bio-diversity of the area is low and it forms a part of deciduous area. Species diversity and food web index of the surrounding area will be negligible. However, using proper re-vegetation techniques and development of green belt around the ultimate pit limit, the impact on the terrestrial environment will be nominal. The unit will provide about 33% of total area of the Plants for developing the Green Belt and Lawns as per the existing Environmental Quality Policy of the Company. The proposed Green Belt will have significant long term impact during the Operation Phase.

4.4.9 Impact on Safety

Well planned and systematic safety management practices will provide safe working conditions. Careful storage and handling of chemicals and materials

will ensure safety in the proposed project. Proper fire fighting and fire safety measures were ensured in the project area.

4.4.10 Socio-Economic Environment

The Project does not involve resettlement/rehabilitation. The Socio-Economic profile of the population living in study area has been prepared based on Census 2001 data as well as Household Questionnaires.

4.5 POSITIVE ENVIRONMENTAL IMPACTS

Based on project particulars and existing environmental conditions, potential impacts have been identified that are likely to result from the proposed project and where possible these have been quantified. The positive environmental impacts are listed below:

- Impacts on traffic
- Impacts on infrastructure
- Impacts on Employment
- Increased health environment
- Impacts on cultural resources
- Impacts on aesthetics

4.6 NEGATIVE ENVIRONMENTAL IMPACTS

Based on project particulars and existing environmental conditions, potential negative impacts likely to result from the proposed development have been quantified. Negative impacts have been listed under the following headings:

- Impacts due to construction works
- Impacts due to project operation like generation of noise

CHAPTER 5 ANALYSIS OF ALTERNATIVES

5.1 INTRODUCTION

If the scoping results in need for alternatives, a clear description of the each alternative, and summary of the impact - adverse and positive with each site, and selection of alternatives are to be explained in detail.

Alternative sites and design process should be critically examined to maintain the positive environmental impact, socio-economic benefits & profitability and minimize the temporary adverse impact. Normally, the extent of displacement of people, the loss of agricultural land, relocation of flora & fauna and irreversible loss of natural resources permanently, will be deciding factors in selection/rejection of site. Project planning and the design process need to be flexible enough to adopt the modified basic project alternatives. The following steps will help in this process.

5.2 CONSIDERED SITE ALTERNATIVES

Since this is modification of existing infrastructure , the execution will be done within the premises. There is no alternative site is considered for the same.

5.3 ANALYSIS OF ALTERNATIVE TECHNOLOGIES

Since this project will be a change of product, the execution will be carried out as per the ENVIRONMENTAL MONITORING PROGRAMME

This Chapter includes the technology in detail as mentioned in Chapter II.

aspects of monitoring the effectiveness of mitigation measures (including measurement methodologies, data analysis, reporting schedules, emergency procedures, detailed budget & procurement schedules). The details include summary matrix of environmental monitoring during construction and operation stage; requirement of monitoring facilities and frequency, location, parameters of monitoring; compilation and analysis of data; comparison with base line data and compliance to accepted norms and reporting system and plantation monitoring program.

CHAPTER 6 ENVIRONMENTAL MONITORING PROGRAMME

6.1 ENVIRONMENTAL MANAGEMENT SYSTEM

Environmental policy at Industry level is yet to be defined formally. Standards are stipulated by various regulatory agencies to limit the emission of pollutants in air and water. The unit itself is not sufficient since this does not provide an assurance that its Environmental performance not only meets, will continue to meet, legislative and policy requirements.

Hence Environmental Management System (EMS) are suggested at the industry level for ensuring that the activities, products and services of the region confirm to the carrying capacity (Supportive and Assimilative capacity) of the Environment. Since this is more in line with the quality systems, it is proposed to develop one as outlined in the following sub sections. The EMS- its set-up, role and responsibilities – is given below.

6.1.1 Formation of an Environmental Management System

The environmental management system for the pharmaceutical unit will enable it to maximize its beneficial effects and minimize its adverse effects with emphasis on prevention. It will:

- Identify and evaluate the environmental effects arising from the plant's activities;
- Identify and evaluate the environmental effects arising from incidents, accidents and potential emergency situations;
- Identify the relevant legislative and regulatory requirements;

- Enable priorities to be identified and pertinent environmental objectives and targets to be set;
- Facilitate planning, control, monitoring, auditing and review of activities to ensure that the policy is complied with; and
- Allow periodic evaluation to suit changing circumstances so that it remains relevant.

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The top management of the Pharmaceutical unit is committed to develop its activities in an environmentally sound manner and supports all efforts in achieving this objective. In pursuance of this, formal environmental management system shall be established during the operating phase of the plant which shall carry out periodic environmental review, covering the following four areas:

- Legislative and regulatory requirements;
- Evaluation and registration of significant parameters and their environmental impacts;
- Review of environmental management practices and procedures being proposed; and
- Assessment of feedback from investigation of previous environmental incidents and non compliance with legislation, regulations or existing policies and procedures.

The environmental review shall address the following:

- The nature and extent of problems and deficiencies;
- The priorities to be accorded to rectify them; and
- An improvement program designed to ensure that the personnel and material resources required are identified and made available.

Environment Management Records

The Pharmaceutical unit shall establish and maintain a system of records to demonstrate compliance with the environmental management systems and the extent of achievement of the environmental objectives and targets. In addition to the other records (legislative, audit and review reports), management records shall address the following:

- Details of failure in compliance and corrective action;
- Details of complaints and follow-up action
- Appropriate contractor and supplier information;
- Inspection and maintenance reports;
- Monitoring data; and
- Environmental training records

Environmental Management Reviews

The senior management shall periodically review the Environmental Management System (EMS) to ensure its suitability and effectiveness. The need for possible changes in the environmental policy and objectives for continuous improvement shall be ascertained and revisions made accordingly.

Implementation Schedule of Mitigation Measures

The mitigation measures suggested in Chapter – 4 shall be implemented so as to reduce the impact on environment due to the operations of the proposed project. In order to facilitate easy implementation of mitigation measures, the phased priority of implementation is given in the below Table-6.1

Table- 6.1. Implementation Schedule

SI.No	Recommendations	Time Requirement	Schedule
1	Air Pollutions Control Measure	Before Commissioning of the plant	Immediate
2	Water Pollution control measures	Before Commissioning of the plant	Immediate
3	Noise Control Measures	Along with the commissioning of the plant	Immediate
4	Ecological Preservation and up gradation	Stagewise implementation	Immediate & Progressive

6.3 ENVIRONMENTAL MONITORING

(a) A technical plan which spells out in detail the methodologies for measurement, the required frequencies of measurement, the planned location of measurement, data storage and analysis, reporting schedules and emergency procedures, and

(b) Detailed budgets and procurement schedules for, necessary equipment and supplies, technical and administrative manpower.

The environmental monitoring for the proposed plant operations shall be conducted as follows:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil Quality; and
- Greenbelt Development.

6.4 ENVIRONMENTAL MONITORING CELL

A Centralized environmental monitoring cell will be established for monitoring of important and crucial environmental parameters which are of immense importance to assess the status of environment during Plant operation. With the knowledge of baseline conditions, the monitoring program can serve as an indicator for any deterioration in environmental conditions due to operation of the plant, and helps in planning suitable mitigatory steps that of control of pollution since the efficiency of control measures can only be determined by monitoring. The following routine monitoring program will be implemented under the post-project monitoring in the proposed plant. The Monitoring program proposed to be implemented is given below.

6.5 POST PROJECT MONITORING SCHEDULE OF ENVIRONMENTAL PARAMETERS

Environmental Monitoring Programme

The environment, safety and health monitoring programme in the factory are as follows:

Particulars	Parameter	Frequency of Monitoring
Stack Emissions	SPM, SO_2, NOx	Monthly
Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Monthly
Noise monitoring	Noise Levels	Monthly
Ecology	Vegetation density and Biodiversity	Once a year
Safety and Occupational Health	--	Once a year

6.6 MONITORING EQUIPMENTS AND CONSUMABLES

A well-equipped laboratory (NABL Certified) with consumable items will be provided for the monitoring of Environmental parameters.

The following equipments will be provided for the monitoring of Environmental parameters.

EQUIPMENT DETATILS FOR ENVIRONMENTAL MANAGEMENT

Name of the Equipment	Purpose
High Volume/ Respirable Dust Sampler	AAQ Monitoring
Stack Monitoring Kit	Particulates, SO_2, NOx and Fluoride
Automatic Weather monitor	Meteorological data collection at Site
Sound level meter	Noise levels

6.7 BUDGETARY ALLOCATION FOR ENVIRONMENTAL PROTECTION

Budgetary Allocation for Environmental Management

S.No.	Description	Capital Cost	Annual Operating Cost
		(Rupees in lakhs)	
1	Air pollution management	15	1.0
2	Water and wastewater management	50	4.0
3	Solid waste management	25	1.0
4	Greenbelt	10	0.5
5	Environmental monitoring	15	2.5
	Total	**115**	

CHAPTER 7 ADDITIONAL STUDIES

7.1 Risk Assessment

Any new industrial activity involving any hazardous chemical named or classified in the various schedules under the Environment (Protection) Act, 1986/Hazardous Waste (Management and Handling) Rules 1989 attracts compliance with the rules. Though there is no handling of any hazardous chemicals in the proposed pharmaceutical unit, a brief risk assessment study was undertaken for the proposed Plant.

The major elements of the Risk Assessment include:

- Hazard & Operability (HAZOP) Studies for identification of hazards and vulnerable sections of the storage,
- Consequence Analysis for various release scenarios,
- Presentation of damage contour for worst damage from fire or explosion,
- Risk Assessment and
- Provision of guidelines for emergency preparedness based on the findings of the risk analysis.

The details of the present study are:

1) Hazard Identification and Visualization of Credible Accident Scenarios

- Identification of hazards,
- Analysis of past accident data to develop the credibility of worst accident scenarios and
- Visualization of Credible Accident scenarios (CAS).

2) Analysis of CAS

Analysis of identified CAS and quantification of effects pertaining to the cases of:

- Outflow and releases
- Heat radiation
- Explosion
- Application of damage criteria for heat radiation and explosion.
- Presentation of damage contours for worst damages from fire or explosion.
- Effect of the proposed project on neighboring areas (including cascade effects if any).

3) Risk Assessment based on the individual Risk Contour Plots and

4) Guidelines for emergency planning and other safety recommendations based on the studies.

7.2 Hazard Identification using PHA Techniques

Hazard is present in any system, plant or process that handles flammable materials. The mere existence of hazards, however, does not automatically imply the existence of risk. Screening and ranking methodologies based on **Preliminary Hazard Analysis (PHA)** techniques have to be adopted at different stages of the project before risk can be evaluated.

The proposed plant will be assessed for its potential to initiate and propagate an unintentional event or sequence of events that can lead to an accident or emergency.

7.2.1 Based on Fire & Explosion Index

The next stage of hazard identification involves the estimation of Fire & Explosion Indices for the unit in the facility to give the relative severity of the unit from the fire angle. These are evaluated from the knowledge of the Material Factor, General Process Hazard (GPH) and Special Process Hazard (SPH) factors. Material Factor (MF) is the measure of the energy potential of a particular chemical or its mixture with other chemicals. GPH and SPH are evaluated by taking into account the exotherm or endotherm of a reaction, material handling and transfer hazards, accessibility, severity of process conditions and possibilities, dust and other explosions, inventory level of flammable material, etc. The F&EI value is then calculated as the product of MF, GPH and SPH. Detailed fire and explosion indexing were carried out for the major sections of the proposed plant.

Fire & Explosion Indices (F&EI) for the entire unit in the Plant have been estimated to give the relative degree of severity of the units using the criteria given below:

Index Range	**Degree of Hazard**
1-60	Light
61- 96	Moderate
97-127	Intermediate
128-158	Heavy
>159	Severe

7.2.2 HAZOP Studies

Hazard and Operability Study (HAZOP) is a powerful tool for identifying hidden design inadequacies and understanding operational mistakes that may lead to incidents or accidents. This will, in turn, help in taking suitable remedial measures. Since natural gas is a fire hazardous gas and so HAZOP study is conducted for the major sections of the plant.

The principle of HAZOP is that accidents occur when operations are conducted under conditions that deviate from the design intentions. Therefore, HAZOP starts by understanding the design intentions of a particular line or a vessel and finds out meaningful deviations that can occur in the process. The process then is to understand these deviations and the consequences of these deviations, and detect which of these consequences will result in a major hazard.

The unit will use the following hazardous chemical as most of the raw material & will be stored and handled as per the safety procedures for handling hazardous material. Hence, the community shall not have any danger on the unit.

S.No.	Name of the Raw Material	Quantity (T/M)
1	Ferric Chloride hexahydrate	0.003
3	Acetonitrile	0.009
4	Acetone	0.05
6	Iso Propyl alcohol	0.022
7	Dry HCl	0.04

8	2-{4-[(4-Chloro-phenyl)-phenyl-methyl]-piperazin-1-yl}-ethanol	0.06
9	Sodium mono chloro acetate	0.002
10	Toluene	0.106
11	Sodium Hydroxide	0.001
15	7-(4-Chloro-butoxy)-3,4-dihydro-1H-quinolin-2-one (7 CBQ)	0.005
16	5-Vinyl-2-Pyrrolidinone	0.001
17	Triethylamine	0.0003
18	Tetra hydro Pyrido indol-1one	0.0002
19	Dimethylsulphate	0.0002
20	Methyl imidazole methanol HCl	0.0001

7.2.3 Hazop Work Sheets

Each node is considered for divergences from normal operating practices. The main PARAMETERS, considered along with the applied DEVIATIONS from normal operating conditions, have been presented in the following Table.

Details of HAZOP Worksheets

Parameters	Deviations	Intention
FLOW	No Flow More Flow	To Convey natural gas at required rate to Power plant

	Less Flow Reverse Flow	
PRESSURE	High Pressure Low Pressure	To Convey natural gas at required rate to Power plant
MAINTENANCE	Poor Maintenance	To provide good maintenance for transfer of natural gas

7.2.4 Results of the Hazop Study

The consequence and the corresponding causes as identified in the HAZOP study are summarized here:

Results of HAZOP study

Guide Word	Deviation	Causes		Consequences		Safeguards		Recommendations	
More	Flow of gas	1	Over pressure of compressor	1	Piping pressure raises	1.	Control valve	1	Suitable NRV (Non return valve) will be provided.
Less	Less Flow of gas	2	Compressor failure	2	Pipe line pressure decreases		Control valve	2	Suitable NRV (Non return valve) will be provided.

Node	Causes	Consequences	Hazard	Recommendations

Pipelines	• Rupture of line • Gasket failure • Leak at flanges	Release of pressurized natural gas into atmosphere	Fire and Explosion	Suitable shut off valve will be provided at drawal point

7.3 Disaster Management Plan

7.3.1 DMP Cell

Disaster Management Plan for an industrial Unit is necessarily a combination of various actions which are to be taken in a very short time but in a present sequence to deal effectively and efficiently with any disaster, emergency or major accident with an aim to keep the loss of men, material, Plant / Machinery etc. to the minimum. A cell has to be formed for an effective implementation of disaster management plan.

The main functions of the Disaster Management Cell are monitoring a detailed disaster management plan which includes:

- Identification of various types of expected disasters depending upon the type of the industrial unit.
- Identification of various groups, agencies departments etc, necessary for dealing with a specific disaster effectively.
- Preparation by intensive training of relevant teams/groups within the organization to deal with a specific disaster and kept them in-readiness.
- Establishment of an early detection system for the disasters.

- Development of a reliable instant information / communication system.
- Organization and mobilization of all the concerned departments/ organizations/ groups and agencies instantly when needed

7.3.2 Onsite Emergency Plan

To meet any major emergency, the following on site plan are laid down. Emergency personnel's responsibilities during normal working hours are as follows:

Plant Incharge / Site Controller: He will retain overall responsibility of the factory and its personnel. As soon as he is informed of the emergency he shall proceed to the control room. His duties are:

- Assess the magnitude of situation and decide for evacuation of staff etc. from their assembly points.
- Direct operational control over areas other than those affected.
- Maintain continuous review of possible development and assess in consultation with and other responsible persons for further actions.
- Contact senior officers of Fire Brigade, police, medical and factory inspector etc.
- Issues authorized statements to news media and ensure that evidence is preserved for enquiries.

Departmental Heads: They will report to site controller and provide assistance as required. They will decide which member of their staff, they require at the scene.

Engineer in-charge and Electricians: They will report to the site of incident and close down the services as requested by the site Controller.

Fire pump attendant: On hearing the fire alarm they will proceed to the pump house and ensure that pumps are operating and standby to maintain them. Emergency personnel's responsibilities outside normal working hours of the factory.

Shift in-charge: Immediately after he becomes aware of the emergency and its location, he will assess the scale of the incident and direct all operations within the affected areas with following properties:

- Minimize damage to plant, environment, minimize loss of materials
- Inform other engineers, assistants as to what services will or will not be required.
- Hand over charge of operations to the site controller when he arrives on scene.

First Aid Team: Member of the first aid team will report to the shift in-charge /incident controller on hearing the incident. The first aider shall inform the shift executive in-charge, giving the name of the patient and destination i.e. the hospital or doctor's room and request the site controller to inform the destination (hospital etc.) advising them about the casualties reaching there.

CHAPTER 7 PROJECT BENEFITS

7.1 INTRODUCTION

This chapter includes the benefits accruing to the locality, neighbourhood, region and nation as a whole. It should bring out details of benefits by way of:

- Improvements in the physical infrastructure by way of addition of project infrastructure, ancillary industries that may come up on account of the project
- Improvements in the social infrastructure like roads, railways, townships, housing, water supply, electrical power, drainage, educational institutions, hospitals, improved waste disposal systems, improved environmental conditions, etc.
- Employment potential -skilled; semi-skilled and unskilled labour both during construction and operational phases of the project with specific attention to employment potential of local population as well as necessity for imparting any specialized skills to them to be eligible for such employment in the project on a long term basis i.e., during operational and maintenance stages of the project and Other tangible benefits like improved standards of living, health, education etc.

7.2 BENEFITS OF THE PROJECT

7.2.1 EMPLOYMENT

Community structure will be benefited by generation of Employment. Around 50-60 jobs will be created during the construction period.

7.3 OPERATION PHASE

7.3.1 Population

Total population of the selected 11 villages within 10 km radius from the project site is 79057. The male to female ratio is 100:98. The population in the age group of 6 constitutes about 11.2% of the population. The details of population is given in the below Table 3.19.

7.3.2 Education and Awareness Programme

The unit shall extend social benefits like drinking water health care measure, educational benefits to the neighboring villagers in addition to his own employees. Further, this project is expected to yield a positive impact on the socio-economic environment of the region. It helps in sustainable development of this area including further development of physical infrastructural facilities.

7.3.3 Employment

During operational phase, the unit will create around 50 jobs.

7.4 ACTION PLAN FOR COMMUNITY DEVELOPMENT

7.4.1 CORPORATE ENVIRONEMNTAL POLICY (CREP)

- Operate the plant and facilitate in a manner that preserves the environment and protect the health and safety of employees and the public.
- Recognise and respond to community concerns about the operations.

- Give priority for environment, safety and health consideration in the planning for new products and process.

- Cooperate with the Government in developing laws and regulations to safeguard the community, the workplace and the environment and to ensure that such laws are implemented.

- Promote and disseminate Safety consciousness among employees.

7.4.2 CORPORATE SOCIAL RESPONSIBILITIES

Budgetary Allocation for Corporate Social Responsibilities

CSR financial commitment for proposed project

Sl.No.	CSR Activities	Budget allocation (Rs.in lakhs)
1.	Purified Drinking water facilities provided for Schools, Bus Stand etc.	5.0
2.	Conducting Medical Camps, Eye camp etc.	2.5
3.	Conducting Awareness Programme for Public and Schools	1.5
4.	Sanitary Facilities provided for nearby Villages	5.5
5.	Distribution of Free Saplings to the Villages	0.5
6.	Greenbelt development in road area, surrounding villages etc.	2.0
7.	Medical Equipments to Government Hospital and Public Health Centre.	6.5
8.	Construction of buildings and toilet to Schools	7.0

9.	Distribution of Note Books, Furniture for Schools and Libraries	3.0
	Total	**33.5**

CHAPTER 8 ENVIRONMENTAL COST BENEFIT ANALYSIS

Environmental Cost Benefit Analysis is an Evaluation and comparison of capital and environmental costs of a project to estimate its relative merits and demerits.

CHAPTER 10 ENVIRONMENTAL MONITORING PLAN

In order to minimize the impact due to the proposed project on the environment and to keep the air and water quality within limits as stipulated by regulatory authorities, a comprehensive environmental management plan is proposed. The Environmental Management Plan (EMP) additionally recommends a system by which all environments and ecology related issues will be resolved suitably.

10.1 ENVIRONMENTAL MANAGEMENT PLAN

The EMP includes formulation, implementation and monitoring of environmental protection measures during and after commissioning the project with 0.038 T/M capacity. These are identified and dealt within the following phases.

- Implementation Phase
- Operation Phase
- Environmental Monitoring & Management

10.1.1 Project Phase

The project activities are as follows:

- Land / Site clearing, road making
- Foundation, structural and concrete work
- Mechanical erection
- Transportation of machinery
- Temporary shed construction etc.

10.1.2 Operation Phase

a) Air Environment

The major emission sources are:

- Roads within the plant are properly maintained and water spraying will be done regularly.
- New concrete roads will be formed inside the premises replacing mud roads.
- Saplings will be planted
- All leakage point will be plugged thoroughly.
- In short, the fugitive emission shall be controlled by installation of dust extraction and / or dust suppression systems.

b) Noise Environment

The impact of noise generated from this unit on the general population is expected to be insignificant.

c) Water Environment

The Effluent from the process is treated by Effluent Treatment Plant and is used for gardening and toilet flushing.

d) Land Environment

There would be a slightly positive impact, as the proposal would involve in the development the greenbelt thus improving the land use and soil chemistry.

e) Green Belt

Greenbelt will be developed inside the factory premises covering a total area of about 0.190 hectares. The unit will also develop the nearby area around the industry for greenbelt. The inter-spaces are laid with shrubs. The inter-space between trees planted is about 5m. It is proposed to double the tree density in future.

Occupational Health, Safety & Protective measures

For protective of Occupational and relative hazards the Management will implement the following measures to protective its works forces.

1. Pre-employment Medical Examination.
2. Periodical Medical Examination.
3. Provision of First-Aid and treatment of common ailments
4. Counseling and Health education to the employees and their wards

<u>Occupational Health Safety</u>

- Pre-periodic post medical checks for Employees
- Occupational health and Audit surveillance will be carried for workers
- Medical surveillance as prescribed in the section 41C of Factories act 1948
- For safety of working personnel the following steps will be undertaken
    - Training for all working personnel
    - All moving parts will be fully fenced
    - Arrangement for prompt power cut from transmission equipment
    - Hoist Crane etc., maintained and examined at intervals
    - All working places will have safe means of access and exit
    - PPEs use will be mandatory in the required places

Post Project Monitoring

- Periodical monitoring of the ambient air quality, stack emissions, noise levels, water and soil quality, etc. in and around the Plants shall be undertaken as per the MoEF/TNPCB Norms either departmentally or by appointing external agencies wherever necessary.

Environmental Monitoring Programme

(a) The environment, safety and health monitoring programme in the factory are as follows:

Particulars	Parameter	Frequency
Stack Emissions	SPM, SO_2, NOx	Monthly
Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Monthly
Noise monitoring	Noise Levels	Monthly
Safety and Occupational Health	--	Yearly

CHAPTER 11 SUMMARY & CONCLUSIONS

10.1 Project Description

10.1.1 Introduction

M/s. Nuray Chemicals Private Limited is proposed to install the pharma unit with the capacity of 0.038 T/M at S.F. Nos. 157 & 158, Kakkalur Village, Thiruvallur Taluk, Thiruvallur District, which is located 3 km away from Thiruvallur town

.

10.1.2 Plant Location

M/s. Nuray Chemicals Private Limited has purchased the existing unit of **M/s.Fischer Chemic Limited.**

M/s. Fischer Chemic Limited already has a valid consent order from TNPCB (Vide No. F.TLR0087/US/DEE/TNPCB/TLR/W/2012 dated 03.07.2012 valid up to 30.06.2013). M/s. Nuray Chemicals Private Limited now proposed to go for small modifications with existing building structures with the capacity of 0.038 T/M at S.F. Nos. 157 & 158, Kakkalur Village, Thiruvallur Taluk, Thiruvallur District, which is located 3 km away from Thiruvallur town. It is in-between the road connecting Thiruvallur and Avadi. The site is located southern direction of this road. The nearest railway station is Thiruvallur.

10.1.3 Products & Production Capacity

S.No.	Product Name	Capacity (T/M)	Type	Application
1	Ferric Citrate hydrate	0.01	Bulk Drug	Hyperphosphatemia (Increase the phosphate level in the blood)
2	Tramadol Hydrochloride	0.01		Analgesic (Pain)
3	Cetirizine dihydrochloride	0.01		Allergy & Fever
4	Glycerol Phenyl butrate	0.004		Urea cycle disorders
5	Aripiprazole	0.001		Antipsychotic agent
6	Vigabatrin	0.001		Antiepileptic drug
7	Alosetron	0.002		Irritable bowel syndrome

10.1.4 Raw Material

S.No.	Name of the Raw Material	Quantity (T/M)	Category
1	Ferric Chloride hexahydrate	0.003	Hazard
2	Citric acid monohydrate	0.006	Non Hazard
3	Acetonitrile	0.009	Hazard
4	Acetone	0.05	Hazard
5	Tramadol Base	0.007	Non Hazard

6	Iso Propyl alcohol	0.022	Hazard
7	Dry HCl	0.04	Hazard
8	2-{4-[(4-Chloro-phenyl)-phenyl-methyl]-piperazin-1-yl}-ethanol	0.06	Hazard
9	Sodiummonochloroacetate	0.002	Hazard
10	Toluene	0.106	Hazard
11	Sodium Hydroxide	0.001	Hazard
12	Phenyl Butyric acid	0.004	Non Hazard
13	Glycerol	0.001	Non Hazard
14	PTSA	0.002	Non Hazard
15	7-(4-Chloro-butoxy)-3,4-dihydro-1H-quinolin-2-one (7 CBQ)	0.005	Hazard
16	1-(2,3-Dichloro-phenyl) -piperazine.Hydrochloride (DCCP)	0.001	Non Hazard
17	Isopropyl alcohol	0.004	Non Hazard
18	5-Vinyl-2-Pyrrolidinone	0.001	Hazard
19	Triethylamine	0.0003	Hazard
20	Tetra hydro Pyrido indol-1one	0.0002	Non Hazard
21	Dimethylsulphate	0.0002	Hazard
22	Methyl imidazole methanol HCl	0.0001	Hazard
23	N-Methyl pyrrolidinone	0.0007	Non Hazard

24	Sodium bicarbonate	0.0002	Non Hazard

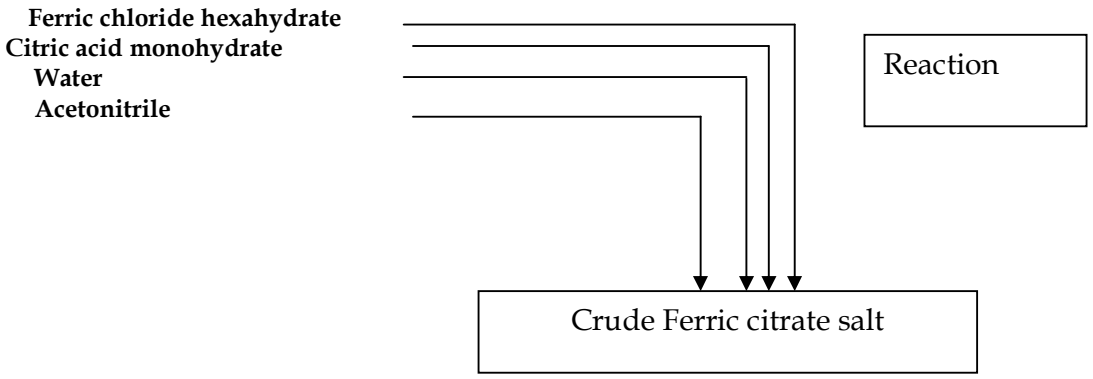
10.1.5 Manufacturing Process

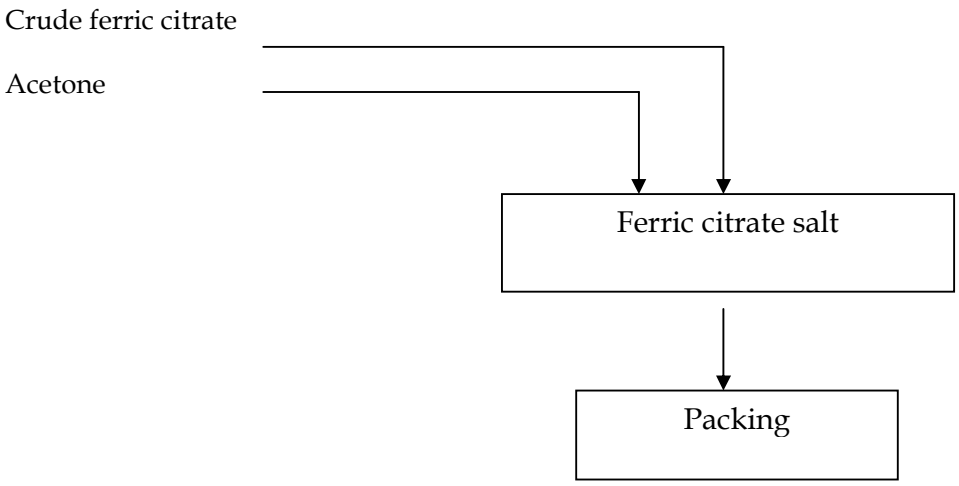
1.Ferric Citrate Hydrate

Process details

- Citric acid was added to a stirred solution of Ferric hydroxide in water at 80Degree Centigrade for 2 hours.
- Reaction mass was cooled to Room Temperature and hen Acetonitrile added to get crude Ferric Citrate
- The Crude Ferric Citrate was purified by using Acetonea

b. Flow Chart



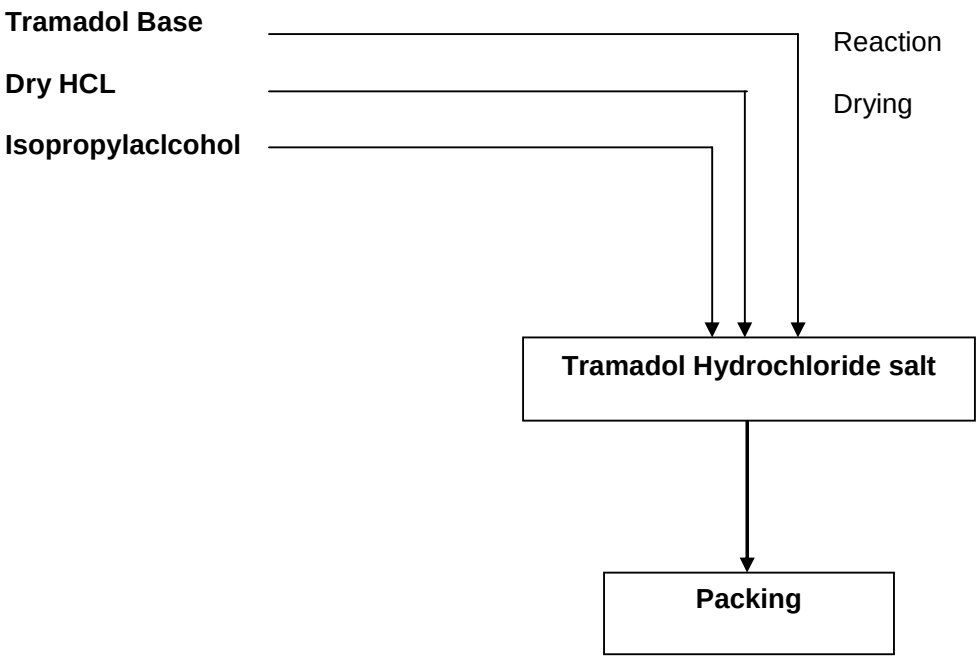


2.Tramadol Hydrochloride:

a. Process details:

- The solution of Tramadol base in Isopropyl alcohol is reacted with Dry Hydrochloric acid at room temperature to afford solid
- The solid again washed with isopropyl alcohol and suck dried to give Tramadol Hydrochloride

b Flow Chart:

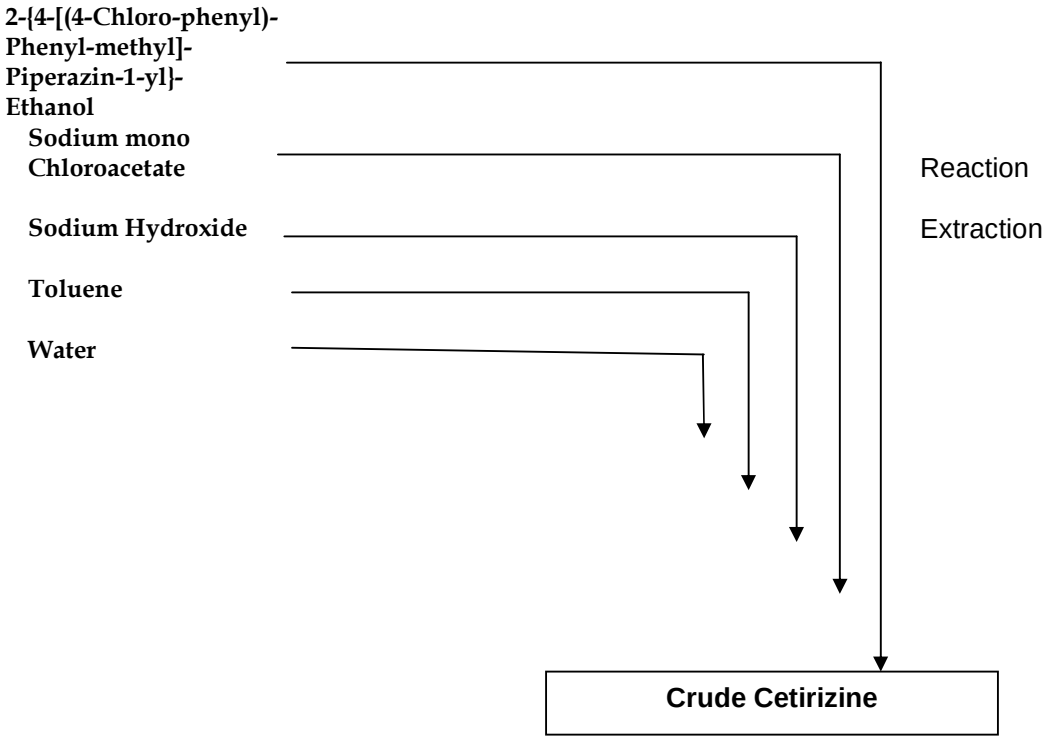


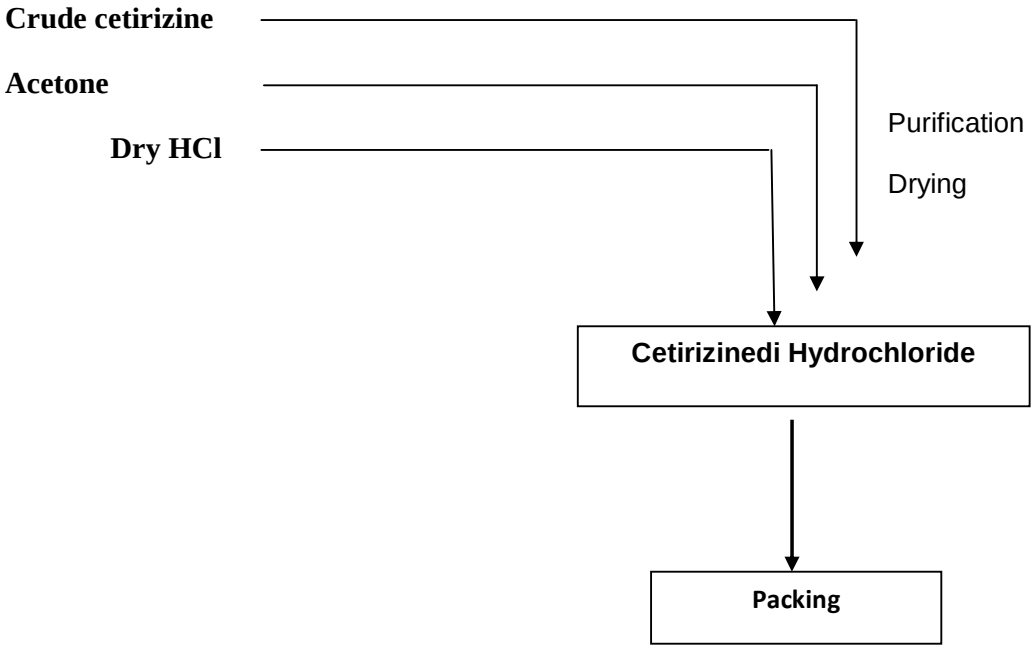
3.Cetirizine dihydrochloride:

a Process Details:

- 2-{4-[(4-Chloro-phenyl)-phenyl-methyl]-piperazin-1-yl}-ethanol was taken in toluene
- Toluene solution reacted with sodium mono chloroacetate in presence of sodium hydroxide to give cetirizine base
- Ceitrizine base in acetone is treated with dry Hydrochloride gas to yield Cetirizine hydrochloride salt

b Flow Chart:


2-{4-[(4-Chloro-phenyl)-Phenyl-methyl]-Piperazin-1-yl}-Ethanol
Sodium mono Chloroacetate
Sodium Hydroxide
Toluene
Water
Reaction
Extraction
Crude Cetirizine

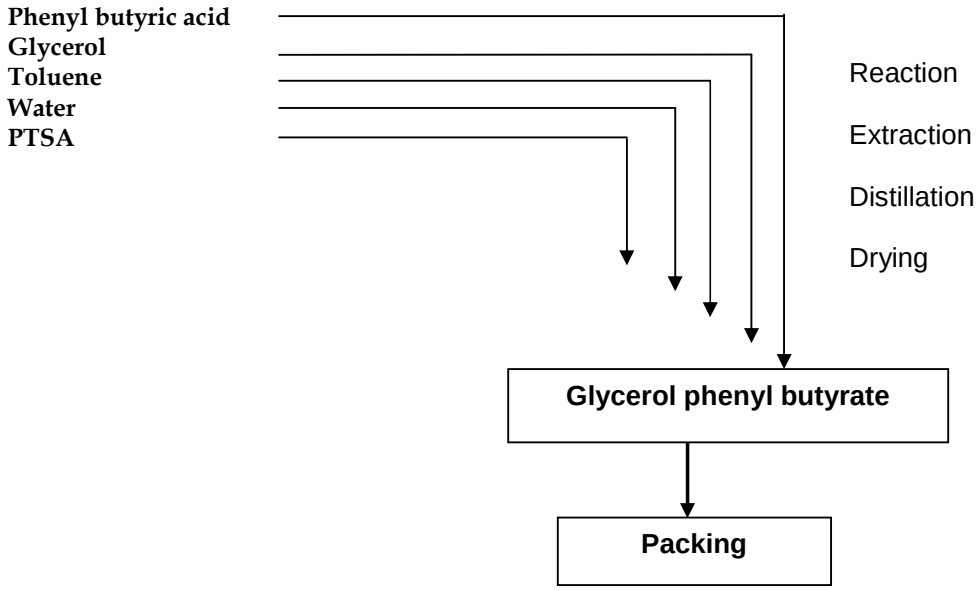

Crude cetirizine
Acetone
Dry HCl
Purification
Drying
Cetirizinedi Hydrochloride
Packing

4.Glycerol phenyl butyrate

a Process Details:

- To a stirred solution of Phenyl butyric acid in toluene, P-toluene sulfonic acid was added at room temperature and stirred
- To that solution Glycerol was added and heated to 120°C for 24 h, cooled to room temperature.
- Solvent distilled to get Glycerol Phenyl butyrate

b Flow Chart :

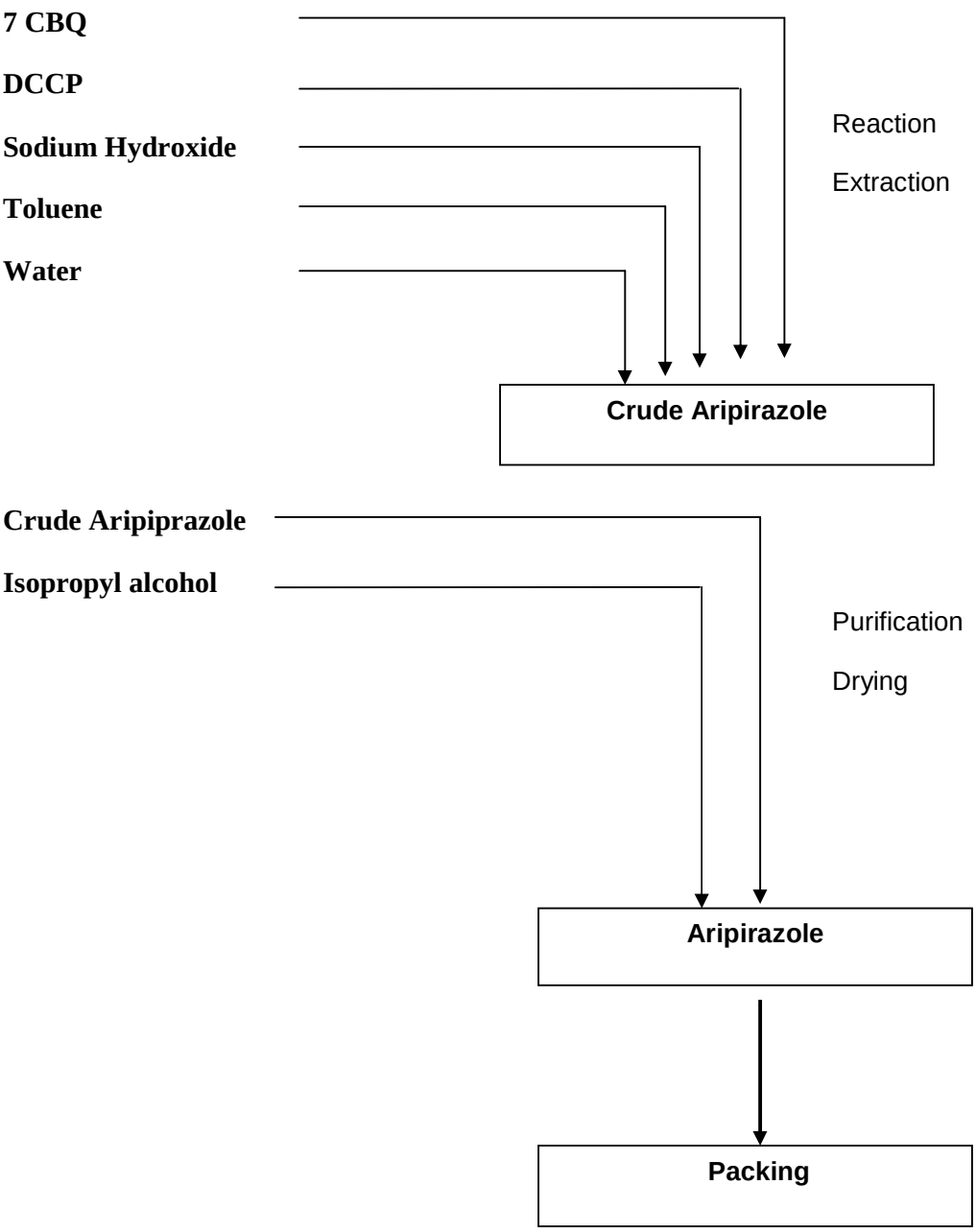


5. Aripirazole:

a. Process Details:

- To a stirred solution of 7-(4-Chloro-butoxy)-3,4-dihydro-1H-quinolin-2-one in toluene
- Sodium hydroxide was added at RT and then 1-(2, 3-Dichloro-phenyl)-piperazine was added and Stirred for about 6h
- Toluene Distilled to get crude Aripirazole, which was further purified by isopropyl alcohol

b. Flow chart

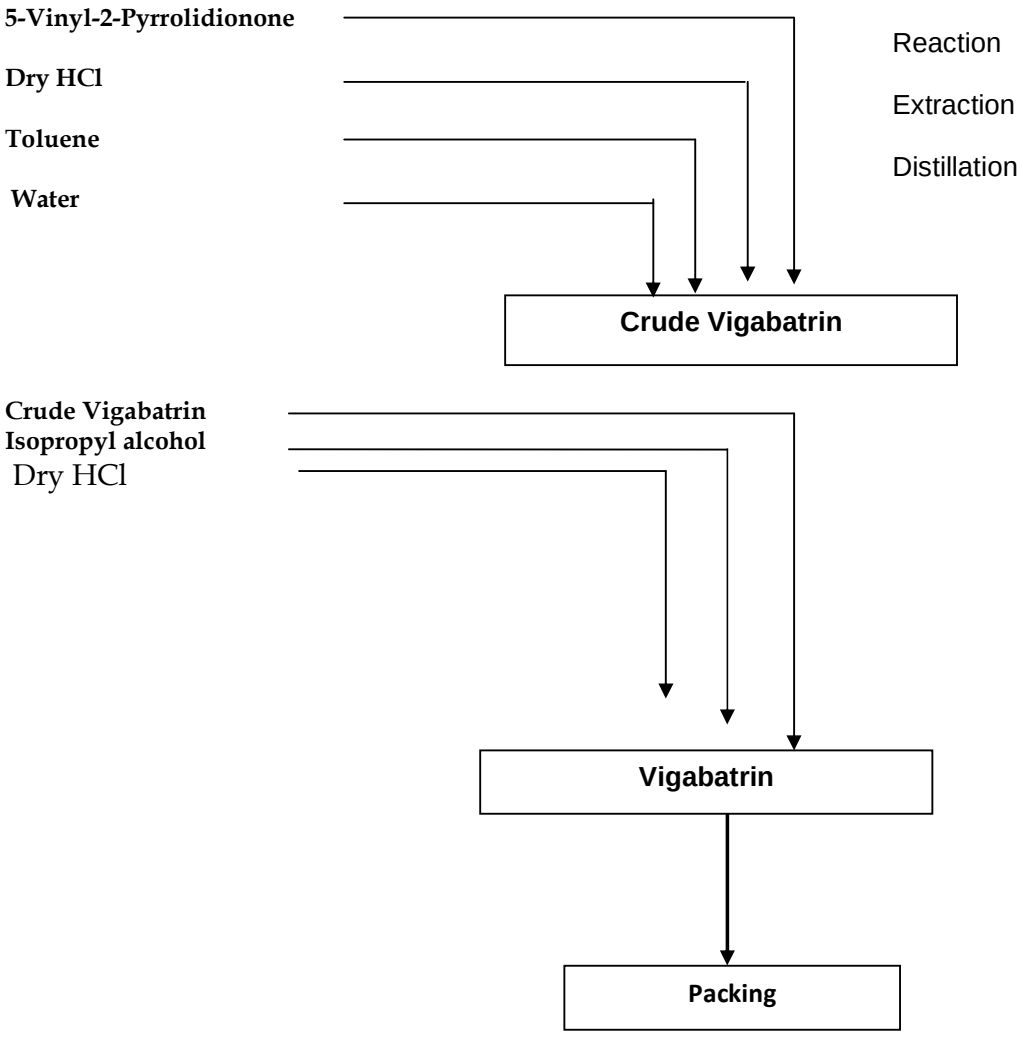

7 CBQ
DCCP
Sodium Hydroxide
Toluene
Water
Reaction
Extraction
Crude Aripirazole
Crude Aripiprazole
Isopropyl alcohol
Purification
Drying
Aripirazole
Packing

6. Vigabatrin

a Process Details:

- To a stirred solution of 5-Vinyl-2-pyrrolidinone in water, Hydrochloric acid was added and heated to 60° C for 4h
- Reaction mass cooled to RT, Isopropyl alcohol was added and layer separated
- Isopropyl alcohol was distilled to get crude
- crystallized with isopropyl alcohol to get vigabatrin

b Flow Chart

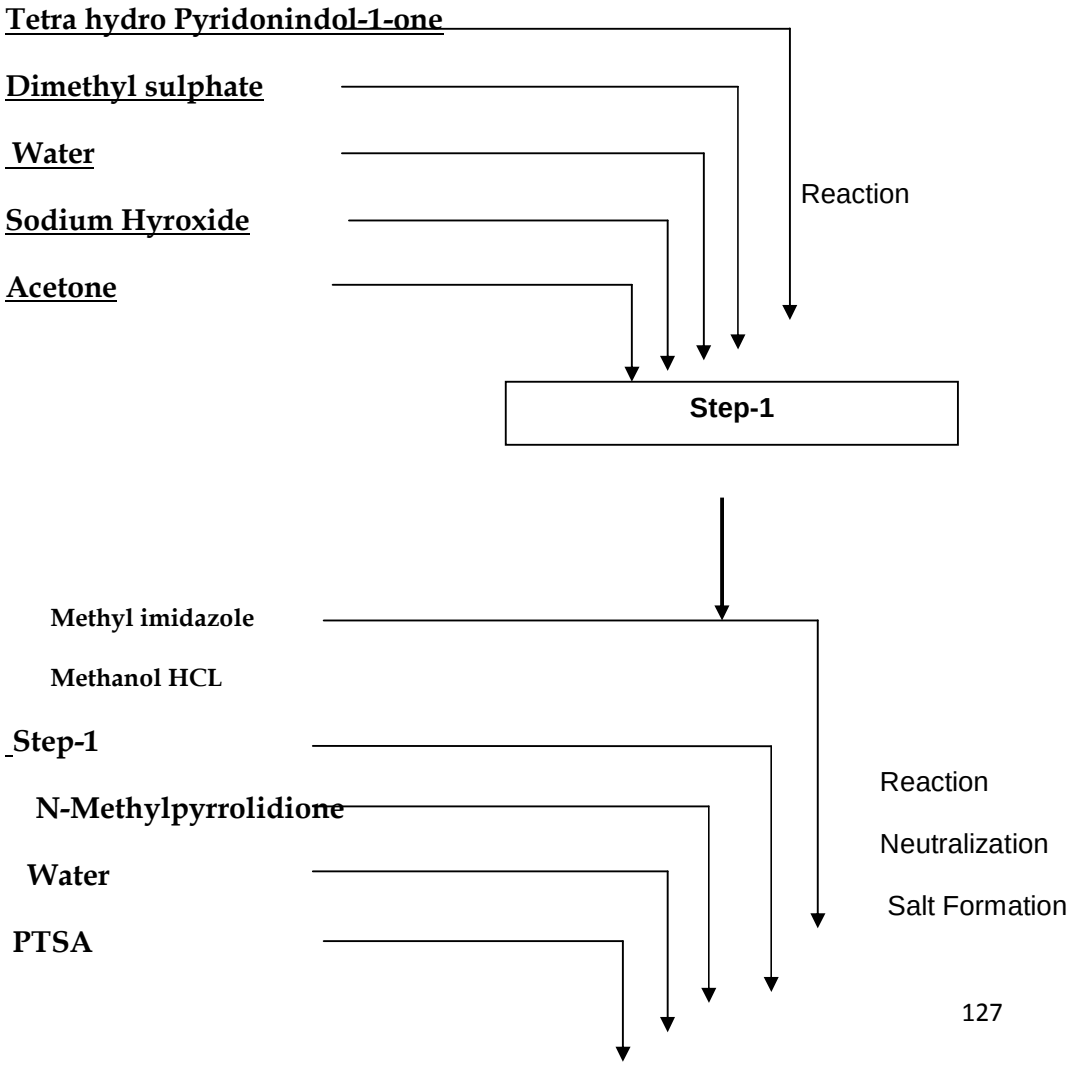


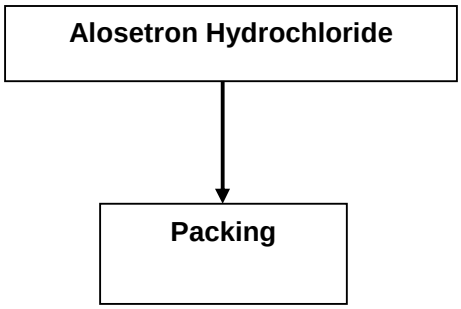
7. Alosetron

a. Process Details:

- Tetra hydro Pyridoindol-1-one was taken in acetone, sodium hydroxide and water stirred for 30mins.
- Dimethylsulphate was added and stirred for 2hrs. Water and formed solid Filtered to get N-Methyl- Tetra hydro Pyridoindol-1-one
- N-Methyl- Tetra hydro Pyridoindol-1-one and Methyl imidazole methanol HCl condensed in presence of N-Methylpyrrolidione, PTSA to get Alosetron
- Formed Alosetron treated with Dry Hydrochloric acid in presence of Acetone to get Alosetron Hydrochloride salt.

b .Flow Chart





10.1.6 Power and Fuels

The total power requirement of this unit will be 140 HP. During shutdown/maintenance power will be drawn from in house diesel generator for the capacity of 125 KVA.

10.1.7 Raw Water

This unit proposes to consume 15 m3/day of raw water for its process and non-process uses. The entire raw water requirement for the unit will be purchased from SIDCO water suppliers.

10.1.8 Land

The total area allotted for thisunit is 0.749 hectares.

10.1.9 Manpower

The pharmaceutical unit will have about 50 employees for its normal working.

10.1.10 Organization Structure

The General Manager is responsible for the factory operations. There are several executives for various sections such as Operation, Human Resource, Purchase, Accounts, Environmental & Safety, Maintenance, and Quality Control etc.

10.2 Description of the Environment

10.2.1 Climate

The study area is situated in the warm climatic belt with moderate humidity. May is the hottest month with maximum temperature of 40.3^0C. January is the coolest month with minimum temperature of 20.8^0C. The rainfall is mostly due to the NE and SW monsoon season with the average precipitation of 1300 mm per year. The maximum rainfall is generally experienced in the months of August, September and October.

10.2.2 Ecology

There is no endangered species of flora and fauna noticed in this area. The area does not shelter any specific wildlife.

10. 2.3 Hydrological Conditions

10.2.3.1 Surface Water

The run-off during monsoon period contributes to the surface water. These villages get water due to rain in rainy season.

10.2.3.2 Ground water

Ground water drawn through hand pumps, open wells and private water supply systems at selected towns are the main sources for domestic use.

10.2.4 Water Quality

Water samples were collected from different locations, and the following parameters were monitored for pH, Colour (Visual), Odour, Turbidity (NTU), Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids, Chlorides (as Cl), Sulphates (asSO4), Calcium (as Ca), Magnesium (as Mg), Total Hardness(as CaCO3), Phenolphthalein Alkalinity(as CaCO3), Total Alkalinity (as CaCO3), Iron (as Fe).

10.2.5 Ambient Air Quality and Noise Levels

The ambient air quality was studied for various locations. It is found that the Particulate Matter (PM_{10}) is found to vary from 40 □g/m^3 to a maximum of 62□g/m^3. The concentration of NO_2 and SO_2 are found to be very low. The noise levels recorded at various locations indicate that it is mostly less than 56 dB (A).

10. 2.6 Land Use Pattern

This Site is classified as SIDCO Industrial Area by the Tamilnadu Government.

10.3 Anticipated Environmental Impacts and Mitigation Measures

10.3.1 Air Emissions and Control Measures

S. No.	Description	Air Pollution Control Measures
1	Wood Fired Boiler (0.5 T/hr)-2 Nos.	15 m height and 0.2 m dia of common stack
2	D.G.Set (125 KVA)	7 m height and 0.15 m dia of exhaust pipe with acoustic measures

10.3.2 Wastewater Generation and Method of Treatment

Category	Quantity (m^3/day)	Method of treatment and Disposal
Waste water from Process	4.0	Treated by the Effluent Treatment Plant followed by the R.O. Plant Stage I & II and R.O. Reject evaporated by the Mechanical Evaporator.
Waste water from Washing	4.0	
Boiler Blow down	2.0	

Cooling tower bleed off	1.0	
Back Wash of Purified Water System	2.0	
Sewage	2.0	Disposed through septic tank with dispersion trench.

10.3.3 Solid Waste generation and method of disposal

S.No.	Particulars	Quantity	Mode of Use
1.	General Scrap	200 kg/M	Sold out.
2.	Ash from Boiler	10 kg/M	Used as manure

10.3.4 Hazardous Waste Generation & mode of Disposal

S.No.	Particulars	Quantity	Mode of Use
1.	Sludge from ETP	500 kg/M	Collected, stored and disposed to TSDF for landfill.
2.	Salt from Evaporator	150 kg/M	
3.	Residue from Solvent distillation	15 kg/M	Collected, stored and disposed to TSDF for incineration.

4.	Waste Oil	150 kg/M	Disposed through authorized recyclers.

10.3.5 Noise Level

The noise level inside & outside the factory will be maintained at low level.

10.4 Environmental Monitoring Programme

10.4.1 Environmental Monitoring

The environment, safety and health monitoring programme in the factory are as follows:

Particulars	Parameter	Frequency
Stack Emissions	SPM, SO_2, NOx	Monthly
Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2 & CO	Monthly
Noise monitoring	Noise Levels	Monthly
Safety and Occupational Health	--	Yearly

10.4.2 Budgetary Allocation for Environmental Management

S.No.	Description	Capital Cost	Annual Operating Cost
		(Rupees in lakhs)	
1	Air pollution management	15	1.0
2	Water and wastewater management	50	4.0
3	Solid waste management	25	1.0
4	Greenbelt	10	0.5
5	Environmental monitoring	15	2.5
	Total	**115**	**9.0**

10.5 Additional Studies

10.5.1 Socio-economic Conditions

There is no habitation or settlement nearby the site. The nearest village Kakkalur is having a population of 8943 with 4535 males and 4407 females as per 2001 census data.

10.6 Project Benefits

10.6.1 Socio-economic benefit

The proposed project on implementation will generate 50 potential jobs directly, and will also generate many indirect job opportunities.

Due to the proposed project, indirect employment to the extent of 50 will be generated. The Government revenue from the project will increase by way of direct and indirect taxes, duties, etc. The infrastructure development will get an impetus with this industrial growth. Communications, transport, schools, hospitals, trade and commerce will indirectly get an impetus.

10.7 Environmental Management Plan

10.7.1 Land Degradation

Since, only small quantity of wastewater will be generated from domestic usages, the chances of contamination of soil will be nil. The vacant area in the industry will be used for tree plantation to improve the surrounding environment of the industry.

10.7.2 Greenbelt Plan

Greenbelt is to be developed inside the factory premises covering a total area of about 0.190 hectare. The unit will also develop the nearby area around the industry for greenbelt. The inter-spaces are laid with shrubs. The inter-space between trees planted is about 5m. It is proposed to double the tree density in future.

10.6 Conclusion

The proposed pharmaceutical unit has certain level of marginal impacts on the local environment. However, with the implementation of the proposed control and environment management measures, even the minor impacts anticipated due to construction and operation of the proposed unit will be mitigated. Further, development activities like employment generation, social benefits through Corporate Social responsibility will improve the surrounding system. The generation capacity of pharmaceutical unit will meet the demand of drugs & in turn improving the health of peoples.

The overall assessment shows that the adverse effects on environment are insignificant when compare with their benefits and advantages to the region and Nation through its proposed activity.

CHAPTER 12 DISCLOSURE OF CONSULTANTS ENGAGED

Team Labs and Consultants is the consultant involved in the EIA/EMP study and report preparation based on the TOR obtained by SEAC, Tamilnadu

About Team Labs and Consultants:

Team Labs and Consultants is an independent company that offers environmental engineering consultancy, laboratory services, resettlement and rehabilitation, and safety and health studies like risk assessment and disaster management plan. We work with public and private sector clients in a range of markets, including process industry sector,

engineering industry sector, power sector, mining sector, irrigation, and infrastructure sectors. A total of about 25 environmentally and socially committed Team labs personnel implement various projects of Testing, Evaluation, Assessment, and Monitoring. We deliver client services through a small central core of highly experienced professionals, supplemented by a team of outstanding individuals in their respective fields and, where appropriate, an international network of associates.

Team Labs and Consultants have its Laboratory and office at Hyderabad and have experience of conducting field jobs all over Andhra Pradesh and various states in India.

Team Labs and Consultants also aims at working together with the client's own staff if possible, and with other national and international consultants. In that way the project implementation also results in a transfer of knowledge and technology, which can be emphasized by including a specific training or institution/human resource development aspect in the project.

Accreditation

Team Labs and Consultants were registered as a laboratory with the Andhra Pradesh Pollution Control Board, Hyderabad. The company is in the process obtaining registration from the Ministry of Environment and Forests, government of India. Team Labs and Consultants have state of the art laboratory facilities for conducting extensive analysis for various environmental parameters.

SERVICES PROVIDED

Team Labs and Consultants services include preparation of Environmental Impact Assessment, Environment Management Plan, Risk Assessment, Disaster Management Plan, Safety Audit, Waste Minimization Audit, Eco Counseling, feasibility studies for Effluent Treatment Plants, design and engineering, preparation of technical specifications and contract documents, ETP Project management, construction supervision, rehabilitation and up-gradation and operational management of Air and water pollution control measures. Team Labs was able to benefit from the increasing demand for environmental and integrated services in Indian market.

ENVIRONMENTAL CONSULTANCY SERVICES

Environmental consultancy services are offered to conduct various studies based on the operating guidelines of World Bank, Asian development bank and the statutory acts of Ministry of Environment and Forests, Government of India and the guidelines of Central Pollution Control Board.

- Environmental Impact Assessment
- Environment Management Plan
- Social Assessment
- Need assessment
- Resettlement and Rehabilitation plan
- Land Acquisition plan
- Corporate social Responsibility plan

Sustainability Report

- Environmental Baseline Data Generation
- Environmental Audit
- Risk Assessment and Disaster Management Plan

- Health Risk Assessment
- Design and Engineering Services
- Eco-Counseling
- Laboratory services

ENVIRONMENTAL MONITORING AND ANALYTICAL SERVICES

Environmental Monitoring and analytical services are provided by our laboratory which was registered with the AP State Pollution Control Board. The monitoring and analysis are conducted based on the guidelines and methods provided by Bureau of Indian Standards, Central Pollution control Board, American Public Health Association and US Environment Protection Agency.

- Air Quality Studies
- Water Quality Studies
- Soil & Solid Waste quality Studies
- Noise Pollution
- Environmental Baseline Data Generation
- Ecological Studies

CLIENTS LIST

For Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)

1. Ranbaxy laboratories Ltd., Toansa, Nawanshahar, Punjab
2. Vivimed labs Ltd., Boyyapalem Village, Visakhapatnam, Andhra Pradesh
3. Loven Labs ltd., Vijayanagaram dist.
4. Andhra Sugars Limited, Tanuku, West Godavari District, AP

5. Vasant Chemicals Private Limited Western Sector, AP-SEZ, Atchutapuram
6. Venshiv Pharma Chem. Pvt. Ltd., Industrial Estate, Cuddapah District, Andhra Pradesh
7. Andra Medi Pharma India Pvt. Ltd., Veeravalli village, Bapulapadu Mandal, Krishna District, Andhra Pradesh
8. Venlar Labs Pvt. Ltd., Dhotigudem Village, Pochampally Mandal, Nalgonda District, Andhra Pradesh
9. SVR Laboratories Pvt. Ltd., Nalgonda District, Andhra Pradesh.
10. Frinze Laboratories Pvt. Ltd., Pishini village, Srikakulam District, Andhra Pradesh
11. Chemisphere APIIC Adoni, Kurnool District
12. Lantech Pharmaceuticals Ltd., Chitivalasa village, Pydi Bhimavaram panchayat, Ranastalam mandal, Srikakulam District, Andhra Pradesh
13. Pochiraju Industries IDA Nadikudi, Guntur District
14. Sri radhas Biotech India Pvt. Ltd.
15. Dr. Reddy's Laboratories Limited (API-SEZ) IDA, Pydibhimavaram panchayat, Srikakulam District, Andhra Pradesh
16. Vansar Laboratories Private Ltd. Tupakulagudem, west godavari District.
17. Vensub Laboratories Private Ltd. Tupakulagudem, west godavari District.
18. Deepak Nitrate Limited API - SEZ Unit III IDA Jeedimetla, Ranga Reddy District, Hyderabad, Andhra Pradesh
19. Deepak Nitrate Limited API - SEZ Unit II IDA Jeedimetla, Ranga Reddy District, Hyderabad, Andhra Pradesh
20. Deepak Nitrate Limited API - SEZ Unit I IDA Jeedimetla, Ranga Reddy District, Hyderabad, Andhra Pradesh
21. J.C Biotech Pvt. Ltd. Unit II, Ongole Growth Centre, Prakasam District, AP

22. Neo Poly Industries Chinna Shivnoor, Chegunta Mandal, Medak District
23. Neutra Specialities Private Limited Chandrapadia, Vinjamuru Mandal, Nellore District, Andhra Pradesh
24. Doctor Organic Chemicals Ltd. K.Illindalaparru village, Irragavaram mandal, West Godavari District, Andhra Pradesh
25. People's Biological Drugs Pvt. Ltd. Brahmanakoduru, Guntur District
26. Tyche Industries Ltd. Sarpavaram, Kakinada East Godavari Dist
27. BASF India Ltd. Mangalore, Dakshina Kannada dt, Karnataka
28. Glory Pharma Chem Pvt Ltd, Gajulamanyam, Renigunta, Chittoor district
29. BASF India Ltd. Mangalore Dakshina Kannada, Karnataka
30. Hetero Drugs Ltd., Nakkapalli Visakhapatnam
31. Hetero Labs Limited, Nakkapalli Visakhapatnam
32. Symed Laboratories Ltd., Nakkapalli Visakhapatnam
33. Cyrex Nakkapalli Visakhapatnam
34. Hetero Labs Limited, Nakkapalli Visakhapatnam
35. Saraca Laboratories Ltd., Srikakulam district, AP
36. Vani chemicals Ltd., IDA Bidar, Karnataka
37. Noven Life Science pvt ltd., Rampur IDA, Warangal
38. Ceflon Drugs, Rachanapalli Village, Ananthapur Rural mandal, Ananthapur District
39. Manasa Organics Pvt Ltd., IDA NEllimarla, Vizianagaram district.
40. Saraca Laboratories Ltd., Srikakulam district, AP
41. Andhra Organics Limited, Srikakulam District
42. New Era Laboratories Limited, Pashamilaram, Medak district