दूर.: 0744-2490885

क्षेत्रीय कार्यालय
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल
प्लॉट–2(ए), रोड नं. 6, इन्द्रप्रस्थ औद्योगिक क्षेत्र, कोटा –324004
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क्रमांक : राप्रनिम/क्षेका कोटा/के–2472/843 दिनांक : 3/5/19

श्रीमान् जिला कलक्टर,
कार्यालय जिला कलेक्टर, कोटा

महाप्रबंधक
जिला उद्योग केन्द्र, कोटा

मुख्य कार्यकारी अधिकारी,
जिला परिषद, कोटा

विकास अधिकारी,
पंचायत समिति, लाडपुरा, कोटा

श्रीमान्,
पर्यावरण विभाग, सचिवालय, जयपुर

विषयः– मैसर्स M/s Acechamps Industrial Park Private Limited C/o Oriental Power Cable Limited, NH-12 Cable Nagar, Kota द्वारा Innowise Park with CETP (total area 4.04,687 Sq m i e. 100 acre) at Khasra no. 35, village-Alnia, Tehsil Ladpura District Kota परियोजना हेतु पर्यावरणीय स्वीकृती बावत् प्रस्तावित जन सुनवाई के संबंध में।

संदर्भः–वन एवं पर्यावरण मंत्रालय भारत सरकार की पर्यावरणीय प्रभाव मूल्यांकन अधिसूचना दिनांक 14/09/2006।

महोदय,

उपरोक्त विषयान्तर्गत निवेदन है कि मैसर्स M/s Acechamps Industrial Park Private Limited C/o Oriental Power Cable Limited, NH-12 Cable Nagar, Kota द्वारा Innowise Park with CETP (total area 4.04,687 Sq m i e. 100 acre) at Khasra no. 35, village-Alnia, Tehsil Ladpura District Kota परियोजना हेतु पर्यावरणीय स्वीकृती बावत् जन सुनवाई दिनांक 19.06.2019 (बुधवार) को भारत निर्माण राजीव गांधी सेवा केन्द्र आलनिया तहसील लाडपुरा में समय दोपहर 03:.00 नियत है।

वन एवं पर्यावरण मंत्रालय, भारत सरकार की पर्यावरणीय प्रभाव मूल्यांकन अधिसूचना दिनांक 14/09/2006 के प्रावधानो के अनुसार परियोजना प्रस्तावक द्वारा प्रस्तुत पर्यावरणीय प्रभाव मूल्यांकन अध्ययन एवं कार्याकारी सारांश की प्रति हिन्द एवं अंग्रेजी में (सॉफ्ट एवं हार्ड कापी) पत्र के साथ संलग्न कर सार्वजनिक परामर्श एवं निरीक्षण हेतु प्रेषित है।

संलग्नः–उपरोक्तानुसार

IT

3171
9/5/19

भवदीय

(अमित जुयाल)
क्षेत्रीय अधिकारी

प्रतिलिपीः–ए.सी.पी.,राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, जयपुर को पर्यावरणीय प्रभाव मूल्यांकन अध्ययन एवं कार्याकारी सारांश की प्रति हिन्द एवं अंग्रेजी (सॉफ्ट एवं हार्ड कापी) भेज लेख है कि अध्ययन एवं कार्याकारी सारांश को व्यापक प्रचार प्रसार हेतु राज्य मण्डल की वेबसाईट पर अपलोड करने बावत् आवश्यक निर्देश प्रदान करावें ।

क्षेत्रीय अधिकारी

CHAPTER-1: INTRODUCTION

1.0 Introduction

A prosperous nation needs well-developed industries to provide the amenities of life to its citizens. The industries have played a significant role for the development of Indian economy. Economic development of any nation is totally depends on industries. Without industries, economic development is not possible. Ensuring steady industrial growth helps to compliment and sustain continued economic development. A well developed industrial sector, covering various different areas is vital to the economic development of a country. With a variety of different industrial sectors that feed off each other, a well balanced industrial sector is at the centre of economic development.

Pollution from small and medium size industries is a major problem in India. Nearly half of wastewater generated by the most polluting industries in India comes from the small and medium size industries.

M/s Acechamps Industrial Park Pvt. Ltd. is a registered company under Indian Company Act, 1956 and having registered office at C/o Oriental Power Cables Ltd., NH-12, Cable Nagar, Kota (Raj.)

The lease deed was made between M/s Oriental Power Cable Limited and Acechamps Industrial Park Pvt. Ltd. on dated 27th June, 2013. The project is coming up at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan) over an area of 4,04,687 sq.m.

The project involves development of Industrial Park which is categorized under Item 7 (c) along with the CETP which is categorized under Item 7(h) of the Schedule-Gazette Notification. There no A category industries only B category industries (as covered under the EIA Notification, 2006 and subsequent amendments) comes under the project.

1.1 Purpose of The Report

The project is coming up at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan) over an area of 4,04,687 sq.m. The location of the proposed site is shown in **Figure 1.1.**

The project involves development of Industrial Park which is categorized under Item 7 (c) along with the CETP which is categorized under Item 7(h) of the Schedule-Gazette Notification. There no A category industries only B category industries (as covered under the EIA Notification, 2006 and subsequent amendments) comes under the project and

requires a prior environmental clearance from State Environmental Impact Assessment Authority (SEIAA), Rajasthan.

M/s Acechamps Industrial Park Pvt. Ltd. has retained the services of Gaurang Environmental Solutions, Jaipur to undertake Environmental Impact Assessment (EIA) studies for assessing the impact of the proposed Group housing project "industrial park" with CETP (based on FAB technology) on various environmental parameters in the study area and to prepare an Environment Management Plan (EMP) for negating the adverse impacts of the project to obtain Environment Clearance from SEIAA, Rajasthan.

The application for prior environmental clearance (Form-1) was submitted to SEIAA, Rajasthan and the proposal was considered by the State Expert Appraisal Committee (SEAC) during its 173rd meeting of SEAC held on 6th December, 2017, for determination of the Terms of References (ToR) and towards the preparation of EIA/EMP report for the proposed Group housing project "industrial park" with CETP. The SEAC prescribed the TORs for undertaking detailed EIA study vide letter No F1 (4)/ SEIAA/SEAC-Raj/Sectt/Project / Cat. 7(c) & 7(h) B1 (15380)/16-17/ 7866 dated 15th December 2017 which is enclosed as **Annexure -1.1.**

This Environmental Impact Assessment (EIA) report has been prepared to provide information on the potential environmental, social and economic impacts of the project. It also aims to make recommendations for mitigation of the potential negative impacts and enhancement of the positive ones. Baseline data generation including detailed field survey was carried out and potential environmental impacts of the project activities were identified, assessed and documented. This report has been prepared as per the Terms of References (standard and as issued by SEIAA, Rajasthan), EIA Notification dated 14th September, 2006 as amended on dated 17th April 2015 for the proposed Group housing project "Innowise industrial park and CETP" as guiding documents.

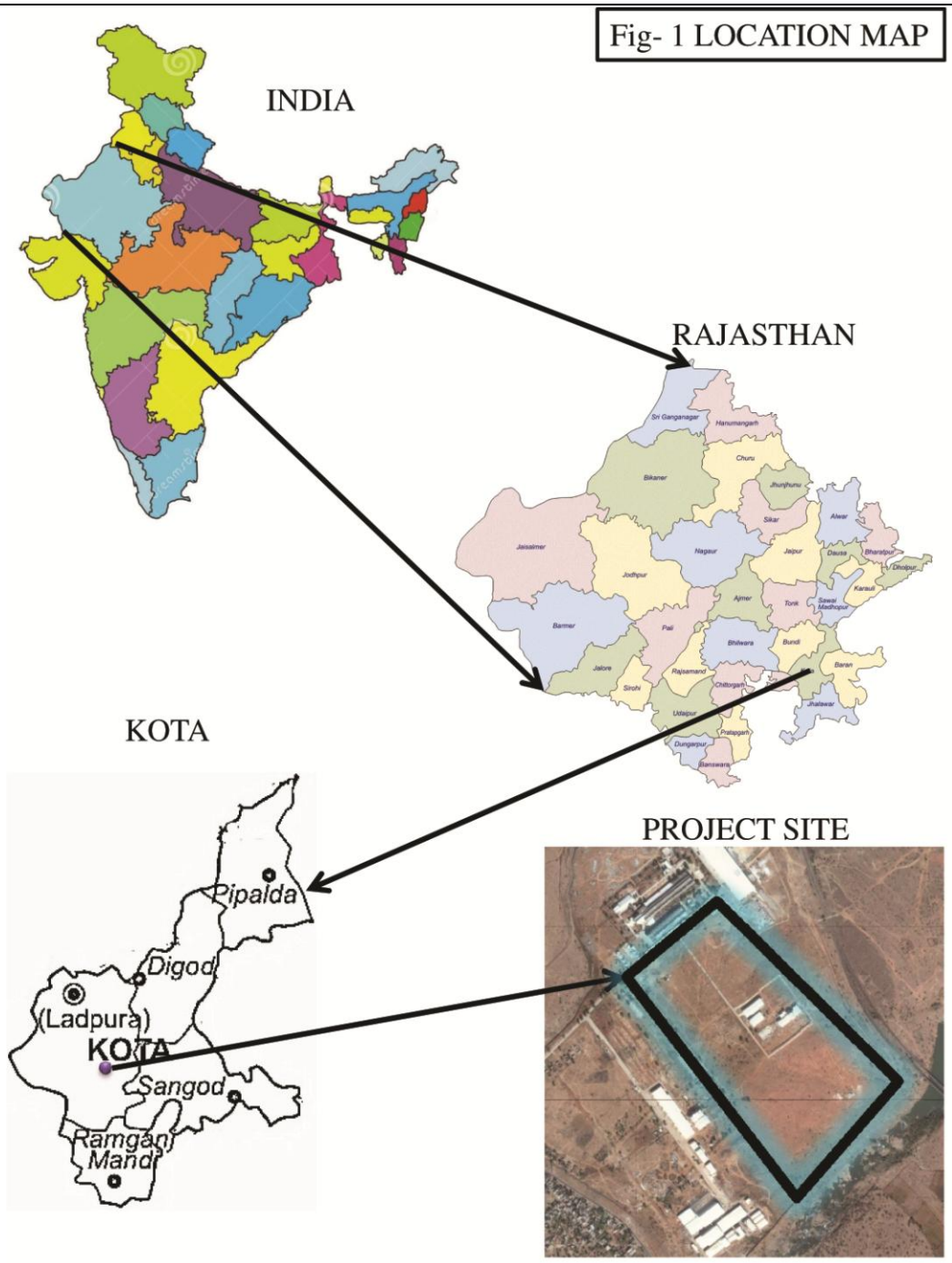

FIGURE 1.1. LOCATION MAP

1.2 Identification of Project & Project Proponent

1.2.1 Identification of Project

A well developed industrial sector, covering various different areas is vital to the economic development of a country. With a variety of different industrial sectors that feed off each other, a well balanced industrial sector is at the centre of economic development. Development of industries is not only indispensable for India, but there is also good scope

for the development of industries in India. There are a wide range of industries located in kota namely kota Supreme, thermal power plant, kota doria sari manufacturing units, DSCL, kota stone, NTPC kota, Chambal fertilizers and chemicals limited etc. Number of other industrial product manufacturers has been demanding of a well planned industrial area in kota district.

Acechamps Industrial Park Pvt. Ltd has hence proposed to set up an industrial area with CETP (based on FAB technology) for general industries at village Alnia, Kota (Rajasthan). The total plot area of the industrial area will be 4,04,687 sq. m.(40.4687 ha). There are total of 259 industrial plots in the proposed industrial area.

1.2.2 Project Proponent

M/s Acechamps Industrial Park Pvt. Ltd. is a registered company under Indian Company Act, 1956 and having registered office at C/o Oriental Power Cables Ltd., NH-12, Cable Nagar, Kota (Raj.)

Address of Project Proponent:

Mr. Mukesh Kasera S/o Shri Parshu Ram Kasera

M/s Acechamps Industrial Park Pvt. Ltd

Cable Nagar, Alnia, Ladpura, Kota, Rajasthan

Address of Project Correspondence:

M/s Acechamps Industrial Park Pvt. Ltd
C/o Oriental Power Cables Ltd. NH-12, Cable Nagar,
Kota-324003, Rajasthan

1.3 Brief Description of Project

1.3.1 Nature of the Project

The project involves development of Industrial Park which is categorized under Item 7 (c) along with the CETP which is categorized under Item 7(h) of the Schedule-Gazette Notification. There is no A category industries only B category industries (as covered under the EIA Notification, 2006 and subsequent amendments) comes under the project.

1.3.2 Size of the Project

Proposed project of 'Innowise Industrial Park' by M/s Acechamps Industrial Park Private Limited for an area of 4,04,687 sq.m. Khasra No 35, near village - Alnia, Tehsil - Ladpura, District – Kota, State - Rajasthan **.** The salient features of the project are given in **Table-1.1**.

Table-1.1 Salient Features of the project

Name of the project		**'Innowise Industrial Park'**
Promoter		M/s Acechamps Industrial Park Pvt. Ltd.
Location of Industry	Village	Alnia
	Tehsil	Ladpura
	District	Kota
	State	Rajasthan
Khasra details		35
Total Plot Area		404687 sq. m

S. No.	Particulars	Area in sq. m.	%
1.	Total Plot Area	4,04,687.00	100
2.	Area of Common Facilities	1,25,682.67	31.05
3.	Allocable Area	27,9,004.33	68.95
Detailed bifurcation of the allocable area			
(i)	Plots as per Ind. Park Scheme 2002 para 6 sub clause (c)	1,85,300	66.41
(ii)	Area earmarked for commercial use	24,553.5	8.80
(iii)	Rest of the area for industrial use as per INC 1987 code	69,150.83	24.79

Water Requirement and Source	225 KLD (drinking purpose only) Ground water supply

Power Requirement	Power demand: 15 MVA from 132 kV GSS within the site. Power back up = 700 KVA one DG set
Manpower Requirement	5000 workers
Estimated Project cost	Rs. 23.0 Crores
Nearest Railway Station	Alnia Railway Station (~1.0 km towards NNE) Kota Railway Station (~22.0 km towards North)
Nearest Highway	NH-12 - 900 m towards SW NH-76 - 9.0 Km towards NNW SH-51 - 12.3 Km towards NE
Nearest Airport	Kota Airport – 16.0 km NNW Jaipur International Airport - 200 km towards NNE
Coordinates	

Pillars	Latitude	Longitude
A	25^0 01'5.62"N	75^0 54' 37.58"E
B	25^0 01'30.97"N	75^0 54' 15.89"E
C	25^0 01'39.47"N	75^0 54' 26.46"E
D	25^0 01'17.93"N	75^0 54' 49.56"E

1.3.3 Anticipated Life of Project and Cost of the Project

The projected life of the project is 20 years. Total cost of the proposed project is estimated to be Rs. 23.0 crores.

1.3.4 Location of the Project

The project site is coming up at Khasra No 35, near village - Alnia, Tehsil - Ladpura, District – Kota, State - Rajasthan. The latitude of the project site is as under:

Pillars	Latitude	Longitude
A	25^0 01'5.62"N	75^0 54' 37.58"E
B	25^0 01'30.97"N	75^0 54' 15.89"E
C	25^0 01'39.47"N	75^0 54' 26.46"E
D	25^0 01'17.93"N	75^0 54' 49.56"E

The project site falls in Survey of India Toposheet No. 45 O/16, 54 C/4, 45 P/13 and 54 D/1. Geographical location of the project site is shown in **Figure-1.2**.

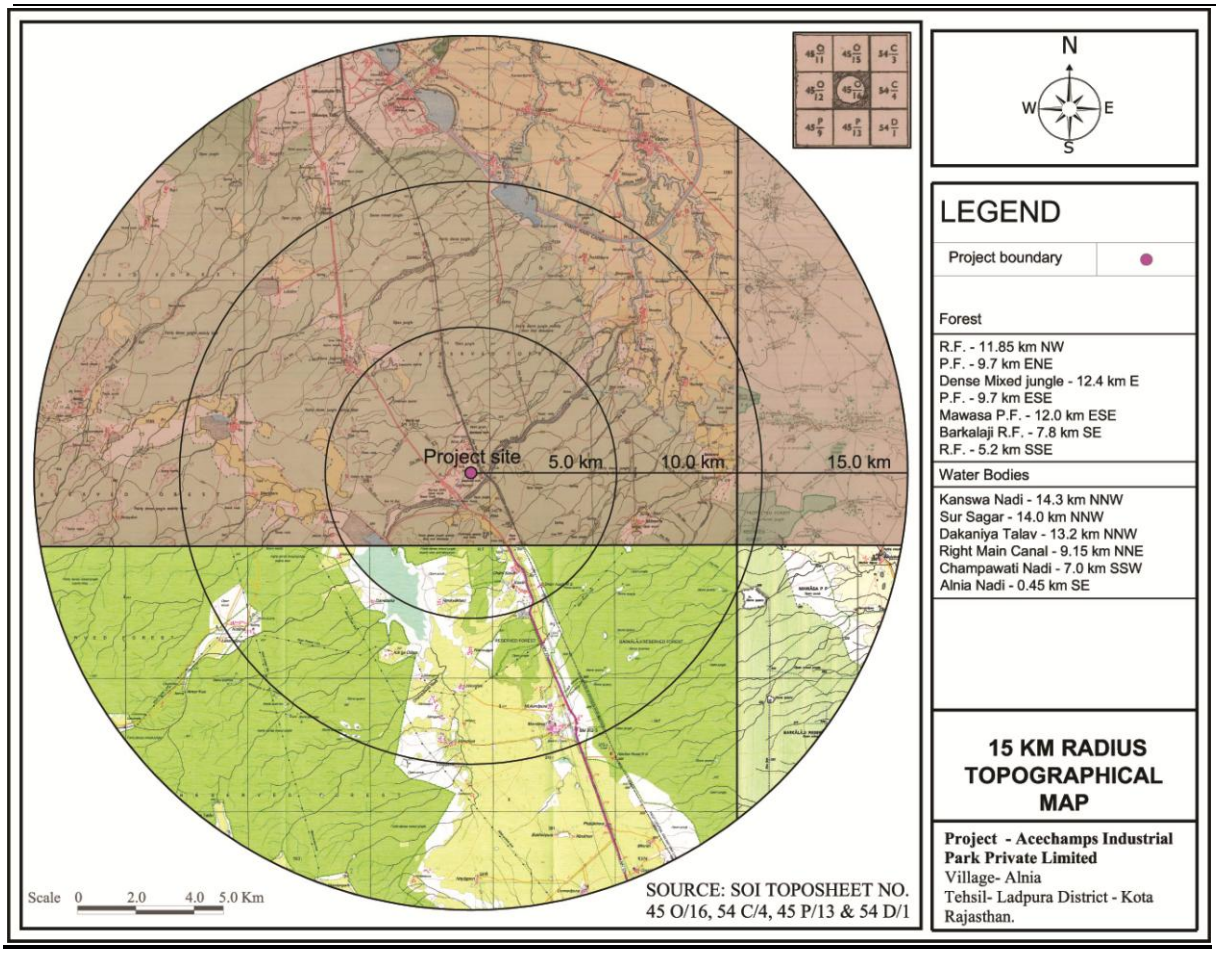

FIGURE-1.2: GEOGRAPHICAL LOCATION OF THE PROJECT

1.3.5 Importance to the Country & Region

The development of industrial parks is an important issue for economy because of the large investments. The industrial park project is important to give employment. Rajasthan is producer of all the raw materials which are used in this industry. An Industrial Estate can be defined as a tract of land developed and sub divided into plots, according to a comprehensive plan with provision for roads, transport and public utilities with or without built up factories, sometimes with common facilities and sometimes without them, for the use of a group of industrialists. Industrial Estate is an important tool for stimulating industrial growth, providing cost-effective infrastructure and communal services.

Contributions of Industrial Estate to Economic and Industrial Development:

- To promote more rapid industrialization of the country
- To increase national and local employment
- To promote the development of small and medium industries

- To encourage more effective use or resources through the development of industrial complexes, including diversified industries of all sizes.
- To bring industries and industrial employments to rural areas
- To train labours and increase its productivity

As part of urban and regional planning, Industrial Estate serves:

- To achieve economies in the provisions of urban services and utilities
- To increase the economic, productive and employment base of regional communities
- To promote decentralization by preventing or checking excessive concentration in or growth of single urban areas, especially large metropolitan areas.
- To minimize distance to work and to reduce load on the transport system
- To maximize efficient land usage and reduce the cost of land and land development.

Thus the industrial area proposed to be developed by M/s Acechamps Industrial Park Pvt. Ltd is required for industrial development in Kota region. The area will enhance and promote industrial growth in the area.

Establishment of effluent treatment plants for individual industries especially in the small scale sector in the various industrial estates in India, to produce the effluent of desired quality before discharge is not feasible in the Indian context. Firstly, because it is expensive on both the capital and operating cost front and secondly, there is no guarantee of performance by the individual industries. Further, the disposal of treated effluents is also problematic as every individual industry cannot reach the water body through its own pipeline nor can it purchase land for inland irrigation. Thus, Government of India floated the idea of Common effluent treatment plant to overcome these problems. Accordingly Ministry of Environment, Forest & Climate Change, Government of India instructed the various State Pollution Control Boards to examine the possibilities of establishing CETP's in various industrial estates. In response to the directive issued by the Central Governments, the State Governments started identifying the various locations for CETP's. Establishment of CETP has following advantages:

- Saving in Capital and Operating cost of treatment plant. The Common treatment is always cheaper than small scattered treatment units.
- Contribution of nutrient and diluting potential make the complex industrial waste more amenable to degradation.
- The neutralization and equalization of heterogeneous waste makes its treatment techno-economically viable.

- Professional and trained staff can be made available for operation of CETP which is not possible in case of individual plants.
- Disposal of treated wastewater & sludge becomes more organized.
- Reduced burden of various regulatory authorities in ensuring pollution control requirement.

Water is our most important resource. The available supply of fresh water is an absolute deadline beyond which no community, state or nation can ever go. When humanity runs out of clean water, everything stops. That is the end of road for a man and his activities. Saving our clean water is thus a must. When untreated or inadequately treated waste waters are discharged, these have adverse affect on the body of water into which these wastes are disposed. The type of treatment of waste water would depend upon the use of effluent itself or of receiving body of water into which effluent is discharged. The degree of treatment of waste water would further depend upon the discharge of receiving body of water. If small quantity of waste water is discharged in a river or into the sea, the degree of treatment would be much less than if the same quantity of waste water is discharged into a small stream. When receiving body of water is already polluted because of discharge of waste into it, the extent of new discharge of waste into it would be limited.

1.4 Scope of the Study

The zone comprising of 15 km radius around the project site is considered as the study area. The study area map is shown in **Figure-1.3**.

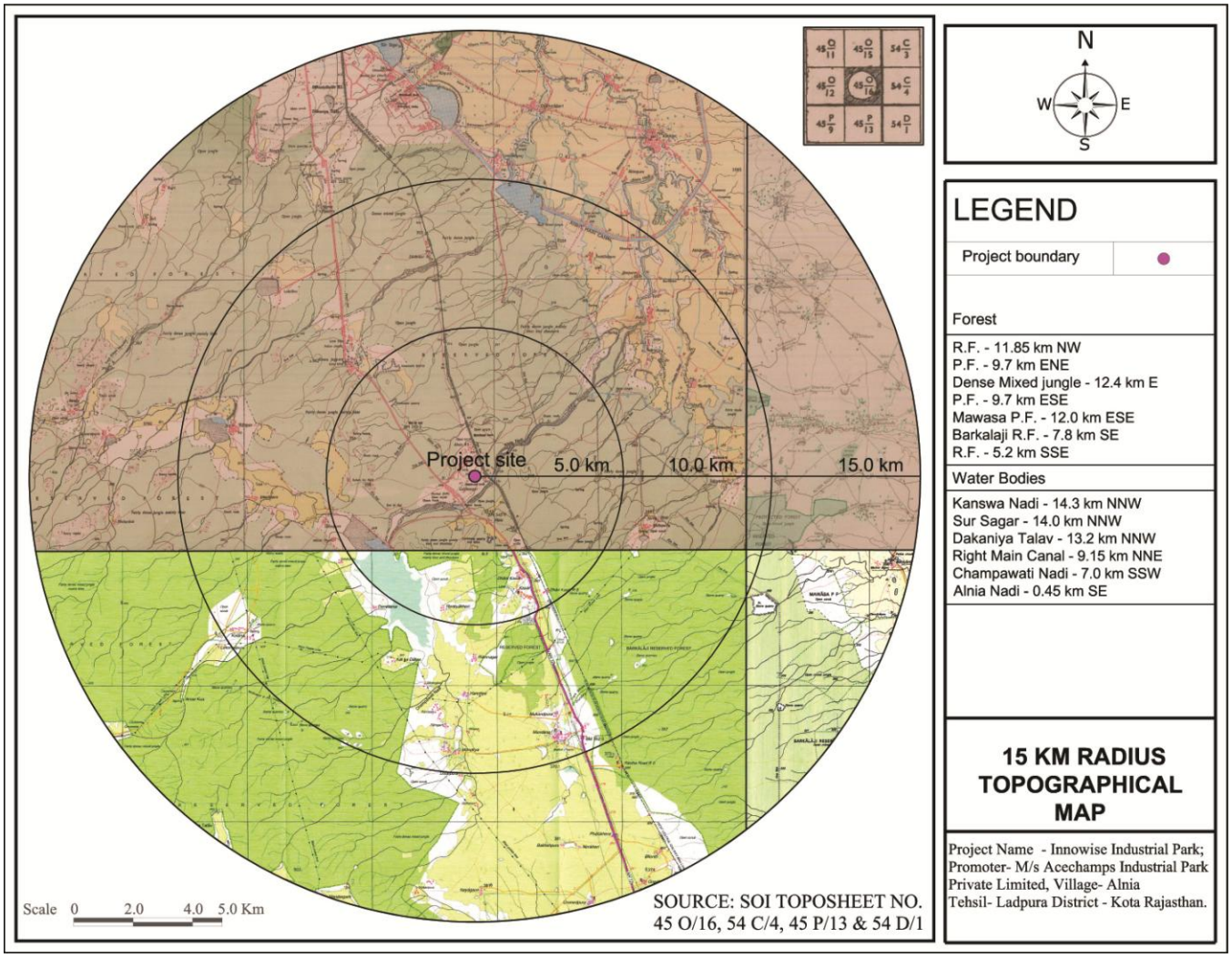

FIGURE-1.3 STUDY AREA MAP

1.4.1 The scope of study broadly includes:

- To conduct literature review and to collect data relevant to the study area;
- Establishing the baseline environmental aspects in and around the project area;
- Identifying various existing pollution loads;
- Predicting incremental levels of pollutants in the study area due to the proposed project operations;
- Evaluating the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies;
- To prepare an Environment Management Plan (EMP), outlining the measures for improving the environmental quality in view of proposed enhanced mining & allied activities for environmentally sustainable development; and
- Identifying critical environmental attributes that are required to be monitored in the post-project scenario.

To determine existing conditions of various environmental attributes, field studies have been conducted during December' 2017 to February' 2018.

The EIA/EMP report has been prepared in line with standard Terms of Reference (TOR) letter dated 15th December, 2017 attached as **Annexure 1.1.** The compliance of Terms of Reference (regulatory scoping carried out as per TOR) in following **Table-1.2.**

TABLE – 1.2

COMPLIANCE TO TERMS OF REFERENCE

S. No.	Items in the letter of the Terms of References	Reply / Response by the PP
1.	The pp should clarify categorically if any violence has accured as per the provision in the EIA Notification 2006, amendments therein, notification dated 14.03.2017, circulars, OM, guidelines etc. The pp needs to submit an affidavit in this regards.	The copy of affidavit regarding the same is enclosed as ***Annexure-VIII.***
2.	No category "A" projects will come in the industrial area. The PP will come up with the	There is no A category industries only B category industries (as covered under the EIA

	kinds of industrial units, their nature and water consumption and waste water at the time of final EIA presentation.	Notification, 2006 and subsequent amendments) comes under the proposed industrial park. The type of industries that are coming in the proposed industrial park majorly of chemical, fabrication, furniture wood work, godown etc. The total plot area of the project as per the Revenue record is 4,04,687 sq.m. (40 ha) which is 100 acres. The total no of Industrial Plots proposed is 259. The capital cost of the propsed project will be Rs.23 Crores.
3.	Compare the parallel existing common effluent treatment technology to the extent of reusing the entire treated waste water in the process keeping zero liquid discharge.	5 MLD capacity of Common Effluent Treatment Plant is proposed to establishment for treatment of industrial wastewater from member units and treatment of domestic waste water STP will be installed respectively. Since the industries and commercial areas in the IA would not be setup immediately and would be done in phases, therefore these phases wise CETP and STP would effectively handle the effluent and sewage loads. Wastewater will be generated from different sources in the proposed industrial park and domestic wastewater from admin buildings. The industrial wastewater and domestic wastewater will be collected through separate pipelines and treated in CETP & STP. The treated water will be reused for green belt development and for industrial activities (floor washing, dust suppression and cooling etc.).
4.	Monitoring results of inlet and outlet of both the CETPs.	Not applicable as this is a proposed project.
5.	Give details of all the industries for which CETP facility is proposed including quantity of raw materials used and product manufactured including details of machineries duly verified by	Not applicable as this is a proposed project. At present there is no industry.

	the Regional Officer of the RSPCB.	
6.	Expected quantity of waste water from each industry and justification for selecting the proposed capacity of treatment plant/modules.	Not applicable as this is a proposed project. At present there is no industry.
7.	The treated water from reverse osmosis plant shall be reused by the industry through a foolproof water recycling network and shall reduce the fresh water requirement there by adding in conservation of water sources, keeping zero discharge from the premises. The pp will install Multiple Effect Evaporator (MEE) at the plant for RO rejects.	The details about STP and CETP are elaborated in chapter – 4.3.4 of section – IV.
8.	Characteristics of effluent and proposed segregation of streams, if any, from individual member industry.	Expected characteristics of effluent before and after treatment is mentioned in Section 2.5.1 of Chapter – 2, Page No. 2- 33. At present there is no industry. The industrial wastewater and domestic wastewater will be collected through separate pipelines and treated in CETP & STP.
9.	Details of mode of effluent collection system (including monitoring protocol) by closed conduits and proposed trouble shooting mechanism.	The industrial wastewater and domestic wastewater will be collected through separate pipelines and treated in CETP & STP.
10.	Details of physical, chemical and biological characteristics of the combined effluent and its concentrations and the basic from the same.	The details are elaborated in section-2.6 of chapter – 2 in draft EIA/EMP report.
11.	Size of treated water sump tank (storing treated waste water of the CETP) should be at least for 24 hours storage capacity; with continuous monitoring facilities for characteristics of treated waste water. The detention period of the treated waste water of the CETP in the collection pit should be such that its quality should not deteriorate further and should be in the range of required quality for intake by the	In case of circumstances like maintenance / repairing of effluent conveying pipeline or CETP itself, emergency storage is provided in collection tank, secondary treated effluent sump and tertiary treated effluent sump. The capacity of collection tank is kept such that in case of emergency situation, it could store 24 hour effluent.

	RO plant.	
12.	Details of the proposed treatment schemes supported by the treatability studies including possible separation of streams for better treatment by the RO.	The details about CETP are mentioned in chpter-2.
13.	Details of built in flexibility provisions to deal with quantitative and qualitative fluctuations so that the minimal flow towards the CETP can be effectively treated as per the standards.	In case of circumstances like maintenance / repairing of effluent conveying pipeline or CETP itself, emergency storage is provided in collection tank, secondary treated effluent sump and tertiary treated effluent sump. The capacity of collection tank is kept such that in case of emergency situation, it could store 24 hour effluent.
14.	Details of organizational set up for collection of pre treated effluent, treatment and disposal of treated effluent, etc and development of qualified/skilled manpower.	Sufficient man power (5000 numbers) to be deployed consisting of qualified experts and technicians, semiskilled and skilled personnel.
15.	Details of O&M for maximum utilization of the designed capacity of the plant including monitoring protocol for stage wise quality control w.r.t various characteristics and maintenance schedule followed for all rotating equipments including lubricating/oil fill, operational chemicals and laboratory chemicals.	The details of CETP management and maintenance are mentioned in Section 7.2 of Chapter – 7 in draft EIA/EMP report. Proposed monitoring plan is mentioned in chapter-6.
16.	For any sensitive environmental parameters such as heavy metals, fluoride etc details on improved material of construction of tanks and other equipments such as corrosion resistance, allowances etc should be submitted.	All the sensitive environmental parameters such as heavy metals, fluorides, etc. are considered and material of construction has been selected accordingly at the time of designing stage.
17.	Details of power break up for uninterrupted operation of treatment plant.	The estimated power requirement for the project will be approx 15 MVA. The same will be met through 132 kV GSS within the site. DG sets of 700 kVA will be used as backup during power failure for CETP and STP (industrial park lavel). Individual industries will

		use their own backup facilities.
18.	Complete description of the proposed air pollutions generating unit should be provided.	Not applicable
19.	Details of the elements of development, highlighting the areas to be reserved for construction, waste management and green belt development should be provided.	The details for the same are mentioned in the chapter-4 of draft EIA/EMP report.
20.	Identification of the major environmental issue of concern through the presentation of baseline data, which will include physical, biological and socio economic considerations, should be under taken.	Baseline data of air, water, noise and soil are elaborated in the Chapter-3. Socio economic and Biological environment details are also elaborated in the section-3.9 and 3.10 of chapter-3 in draft EIA/EMP report.
21.	Outline of the Legislations and Regulations relevant to the project should be given.	Elaborated in the chapter 1
22.	Prediction of the likely impacts of the development on the described environment, including direct and indirect impacts, indicating their relative importance to the design of the development facilities should be submitted.	The details about the same are elaborated in chapter – 4 of draft EIA/EMP report.
23.	Identification of mitigation action to be taken to minimize adverse impacts and enhance the positive impacts should be carried out.	The details about the same are elaborated in chapter-4 of draft EIA/EMP Report.
24.	An elaborate and concrete Environmental Management Plan and Environmental Monitoring Plan should be prepared with particular considerations to the estimation of the generation and the management of laboratory and other types of wastes (be in municipal/hazardous/BMW or some other types of waste). Plan for active participation of the management for the development of local skills should be included. Item wise and activity wise funds required for the implementation of entire EMP should be estimated and P.P. should undertake to provide such amount for the	The Environmental Management Plan is elaborated in chapter 9 of draft EIA/EMP report. The Environmental Monitoring Plan is elaborated in Chapter-6 of draft EIA/EMP report. Total cost for Environmental Protection Measures - 1 Crores Cost for Labor welfare and Infrastructure – 50 lakhs.

	purpose.	
25.	Quantitative Risk Assessment & Disaster Management Plan should be submitted.	Risk Assessment & Disaster Management Plan is elaborated in chapter-7 of draft EIA/EMP Report.
26.	Details of parking with special consideration to the heavy vehicles coming to and going out of the project area should be worked out. The details relating built up area; ground coverage; FAR; number of floors and height of the buildings etc should also be given.	Parking plan is enclosed as ***Annexure-VII***. The land use breakup is given in section – 2.4.2 of chapter-2 of draft EIA/EMP report.
27.	The PP should provide details of the types and numbers of industrial units proposed to be setup, project dealing, including EMP/DMP, merits and demerits of the projects, cost analysis of the project etc.	The total no of Industrial Plots proposed is 259. As present there is no industry.
28.	The PP should provide detailed project, architectural and utility plan.	Complied with
29.	The PP should ensure that, all the plans and maps are clear and legible.	Complied with
30.	The PP should work out water requirement and water balance, including recycling; otherwise the PP should provide the basic of calculation of water demand.	Approx 225 KLD water for domestic purposes (@45 LPCD x 5000 workers) will be required. The water supply will be met through ground water supply. Water balance is shown in section – 2.4.3 of chapter-2 in draft EIA/EMP report.
31.	The PP should submit details relating hydraulic design of ETP/STP. Also provide the list of projects/places where the STP based on proposed technology are installed and operational. The ETP/STP should be laced with flow metering devices both at the inlet and outlet. The location site of the CETP/STP should be revised as it is closed to the river. A wide strip of land 30m wide all along the river should be earmarked for plantation. This is to	Wastewater will be generated from different sources in the proposed industrial park and domestic wastewater from admin buildings. The industrial wastewater and domestic wastewater will be collected through separate drains and treated in CETP & STP. The treated water will be reused for green belt development and for industrial activities (floor washing, dust suppression and cooling etc.).

	ensure that no treated/untreated waste water finds its way in the river.	
32.	The CETP should be functional prior to the generation of industrial waste water discharge from any industry.	Complied with
33.	Entire waste water after treatment from CETP shall be reused for industrial/other use in the industrial land itself keeping zero liquid discharge. A network of closed conduit pipeline should be laid to take untreated waste water from the industries to the CETP and also for treated waste water to the industries for its reuse.	Complied with
34.	The PP should submit the permission of the competent authority for procuring water.	Abstraction of ground water application has been applied in application no 21-4/10341/RJ/INF/2018 dated 28/06/2018. The copy of the same is enclosed as ***Annexure-V.***
35.	The PP should submit the copied of land allotment orders, sale, deeds of private land acquired, land use change orders, jamabandi (revenue record), indicating relevant khasra numbers of land in possession of the PP.	The copy of lease deed is enclosed as ***Annexure-II.***
36.	The PP should submitted energy conservation plan with the use of solar energy.	Complied with
37.	The PP should provide details traffic movement and parking plans depicting clearly the free movement of fire tenders (particularly in the corners).	The copy of parking plan is enclosed as ***Annexure-VII***.
38.	The PP should work put and submit an effective action plan to address social commitments with relevant funds allocation for the purpose with emphasis on creating permanent structures/sustainable system including an effective social monitoring plan with future plan within 10 km radius (mandatory study area).	Total cost for Environmental Protection Measures - 1 Crores Cost for Labor welfare and Infrastructure – 50 lakhs

39.	The PP should provide an action plan for disaster management with risk analysis including details of the fire fighting arrangements depicting clearly the free movement of fire tenders (particularly in the corner).	Disaster Management Plan is elaborated in section – 7.3.4 of chapter-7 in draft EIA/EMP report.
40.	The PP should provide and work out an action plan including the quantification, conservation and regular monitoring of energy.	Complied with
41.	The PP should submit plantation plan along with details of the plantation taking care of the native species.	The details about the same are given in section-10.3.7 of chapter-10 in draft EIA/EMP report.
42.	The PP would provide proposal for 3 no of peizometric wells at suitable locations in the industrial area and quarterly monitoring of these wells water should be started before allotment of plots to the industries.	The same will be complied with. Plan showing the location of peizometric wells enclosed as **Annexure.**
43.	The socio economic survey of the population in local surrounding area, to assess their felt needs may be carried out in pre and post project implementation period. Based upon the finding of this survey, plans for addressing the issue according to felt needs pertaining to social upliftment, habitat, drinking water , sanitation, health, educational, employment, livelihood activities etc. for the benefit to the society, may be prepared and financial provision for the same may be kept in the project. The socio economic influence to the local community shall be elaborated including CSR activities. Details in this regard may be provided in the EIA/EMP report. The PP may explore to initiate CSR activities in the area along with EIA studies as per related annexure sent with the meeting notice.	The Socio-Economic Environment is elaborated in section-3.9 of chapter-3 in draft EIA/EMP report.

44.	Facilities should be provided for the labors like shelter, health facility, safe drinking water, sanitation facility, fuel/LPG for cooking, education for their children, crèche, recreation etc. details as per the need based should be separately given along with budgetary provision and commitment thereof. Details and registrations no of registered labors should be submitted.	Local people will be employed during construction and operation phase.
45.	Details of activity to be taken under EMP should be submitted along with proposed budget.	Total Cost for Environmental Protection Measures- 1 crores Cost for Labor welfare and Infrastructure – 50.0 lakhs
Points included in the TOR as per MoEF circular No J-11013/41/2006-IA.II (I)-Pt.Dt.19.05.2011 Corporate Environmental Responsibility.		
46. (a)	Does the company have a well laid down Environmental Policy approved by its Board of Directions? If so, it may be detailed in the EIA report.	Noted and followed the same
(b)	Does the Environment Policy prescribe for standard operating process/procedures to bring into focus any infringement/deviation/violation of the Environment or Forest norms/conditions? If so, it may be detailed in the EIA.	Noted and followed the same
47.	What is the hierarchical system of Administration order of the company to deal with the environment issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	Noted and followed the same
48.	Does the company have system of reporting of non-compliances/violation of environmental norms to the Board of Directors of the company and /or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report.	There is no violation against the project.
49.	After preparing the Draft Environmental Assessment report (as per generic structure prescribed in Appendix-III of the	The present draft EIA-EMP report is being prepared for submission to

	EIA Notification, 2006) covering the above mentioned issues, the PP shall submit the draft EIA report along with its Executive summery to the Rajasthan State Pollution Control Board for public hearing as stipulated in the Environmental Impact Assessment Notification, 2006 and subsequent amendments and circulars and the get the public hearing conducted (strictly following the procedure laid down in the Appendix IV of the Amendment Notification dt 01.12.2009 and MoEF circular no J-15012/29/2010/IA.II(M) dated 19.04.2010). in this regard due care would be taken in (i) deciding the venue of public hearing (at the project site or its closed approximately, to ensure widest possible public participation). (ii) forwarding the drafts EIA reports with executive summery reports and notice for hearing to various authorities / offices, specifically to Urban Local Bodies (municipal Council/Board)/Panchayti Raj. Institutions (i.e. Zila Parishad, Panchayat Samiti & Gram Panchayat)/ Development Authorities (i.e. U.I.T., J.D.A. etc) (iii) adequate publicity regarding date, place and time of public hearing among local public, (iv) recording requisite "certificate" at the end of the public hearing proceddings/report and (v) displaying the report in the office of Gram Panchayat, Zilla Parishad, Collactrate etc. After completing the public hearing process as described above, final Environmental Impact Assessment Report, should address all the material environmental concerns expressed during the process of public hearing and appropriate changes should be made in the Environmental Impact Assessment and EMP. Thereafter, the proponent shall take further necessary action for obtaining environmental clearance and submit the final EIA/EMP report along with all the requisite document to SEAC at the earliest for environmental appraisal and taking an appropriate view in the matter in accordance with the procedure prescribed under the EIA Notification, 2006 and	Rajasthan State Pollution Control Board for conducting the public hearing. The report will be updated with public hearing minutes after it is completed, and eventually submitted to SEAC for obtaining environmental clearance.

	subsequent amendments and circulars.	
50.	A certificate should be submitted to the Regional Officer Pollution Control Board that the process followed for Public Hearing was adequate as required in reference to contents of MoEF O.M. no J-15012/29/2010-IA-II(M) dated 19.04.2010.	Noted and followed the same
51.	Besides the above the following general points will also be followed:	
(i)	The Questionnaire/Performa for Environmental Appraisal of Industrial Estates sector as devised earlier by the MoEF should be submitted.	Noted and followed the same
(ii)	All documents to be properly referenced with index, page number and continuous page numbering.	Noted and followed the same
(iii)	Where data are presented in the report especially in table, the Period in which these were collected and the source should be indicated.	Noted and followed the same
(iv)	Where the documents provided in a language other than English, an English translation should be provided.	Noted and followed the same
(v)	The name of the Environmental Consultant/ EIA Coordinator and Functional Area Experts for the project shall be clearly indicated on the cover page \ 2nd page of the report.	Noted and followed the same
(vi)	All the documents should have been signed and seal by PP as well as consultant.	Noted and followed the same
(vii)	In the final EIA/EMP report, Compliance of TORs should be reported point wise in a statement of three columns as indicated below: S. NO. | Item in the letter of the TORs | Reply/Response by the PP	Noted and followed the same

1.5 Structure of the Report

This EIA Report has been structured as follows:

Chapter 1: Introduction: Provides a background to the project, identification of the project and project proponent, brief description of the project, details of the project proponent, scope of the study and structure of this report.

Chapter 2: Project description: Provides details of project, infrastructure required, technology and process description of bio medical waste management, information on the needs and desirability of the project and sources of pollution with pollution control measures

Chapter 3: Baseline Environmental Status: Provides description of the receiving Environment details, the specialist study baseline conditions identified for the project within 10 km radius from the project site.

Chapter 4: Anticipated Environmental Impact and Mitigation Measures describes the EIA methodology and impacts identified during the EIA process, providing the anticipated impacts during the various project phases.

Chapter 5: Project Alternatives provides the different site and technology alternatives which were considered for the project.

Chapter 6: Environment Monitoring program provides the monitoring schedule and implementation plan during the construction and operation phase of the project.

Chapter 7: Additional Studies has the information about risk and hazard assessment and details of disaster management plan.

Chapter 8: Project benefits associated with the proposed project are discussed in this chapter.

Chapter 9: Environment Management Plan for the formulation, implementation and monitoring of environmental protection measures during and after commissioning of projects.

Chapter 10: Summary and Conclusion

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CHAPTER-2

PROJECT DESCRIPTION

2.0 Introduction

This chapter deals with the technical details of the Proposed "Innowise industrial park and CETP", process and technology description and details of infrastructure.

2.1 Type of Project

The proposed project is a "Innowise industrial park & CETP" to be established at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan).

2.2 Need for the Project

The development of industrial parks is an important issue for economy because of the large investments. The industrial park project is important to give employment. Rajasthan is producer of all the raw materials which are used in this industry. An Industrial Estate can be defined as a tract of land developed and sub divided into plots, according to a comprehensive plan with provision for roads, transport and public utilities with or without built up factories, sometimes with common facilities and sometimes without them, for the use of a group of industrialists. Industrial Estate is an important tool for stimulating industrial growth, providing cost-effective infrastructure and communal services.

Contributions of Industrial Estate to Economic and Industrial Development:

- To promote more rapid industrialization of the country
- To increase national and local employment
- To promote the development of small and medium industries
- To encourage more effective use or resources through the development of industrial complexes, including diversified industries of all sizes.
- To bring industries and industrial employments to rural areas
- To train labours and increase its productivity

As part of urban and regional planning, Industrial Estate serves:

- To achieve economies in the provisions of urban services and utilities
- To increase the economic, productive and employment base of regional communities
- To promote decentralization by preventing or checking excessive concentration in or growth of single urban areas, especially large metropolitan areas.
- To minimize distance to work and to reduce load on the transport system
- To maximize efficient land usage and reduce the cost of land and land development.

Thus the industrial area proposed to be developed by M/s Acechamps Industrial Park Pvt. Ltd is required for industrial development in Kota region. The area will enhance and promote industrial growth in the area.

Establishment of effluent treatment plants for individual industries especially in the small scale sector in the various industrial estates in India, to produce the effluent of desired quality before discharge is not feasible in the Indian context. Firstly, because it is expensive on both the capital and operating cost front and secondly, there is no guarantee of performance by the individual industries. Further, the disposal of treated effluents is also problematic as every individual industry cannot reach the water body through its own pipeline nor can it purchase land for inland irrigation. Thus, Government of India floated the idea of Common effluent treatment plant to overcome these problems. Accordingly Ministry of Environment, Forest & Climate Change, Government of India instructed the various State Pollution Control Boards to examine the possibilities of establishing CETP's in various industrial estates. In response to the directive issued by the Central Governments, the State Governments started identifying the various locations for CETP's. Establishment of CETP has following advantages:

- Saving in Capital and Operating cost of treatment plant. The Common treatment is always cheaper than small scattered treatment units.
- Contribution of nutrient and diluting potential make the complex industrial waste more amenable to degradation.
- The neutralization and equalization of heterogeneous waste makes its treatment techno-economically viable.
- Professional and trained staff can be made available for operation of CETP which is not possible in case of individual plants.
- Disposal of treated wastewater & sludge becomes more organized.
- Reduced burden of various regulatory authorities in ensuring pollution control requirement.

Water is our most important resource. The available supply of fresh water is an absolute deadline beyond which no community, state or nation can ever go. When humanity runs out of clean water, everything stops. That is the end of road for a man and his activities. Saving our clean water is thus a must. When untreated or inadequately treated waste waters are discharged, these have adverse affect on the body of water into which these wastes are disposed. The type of treatment of waste water would depend upon the use of effluent itself or of receiving body of water into which effluent is discharged. The degree of treatment of waste water would further depend upon the discharge of receiving body of water. If small quantity of waste water is discharged in a river or into the sea, the degree of treatment would be much less than if the same quantity of waste water is discharged into a small stream. When receiving body of water is already polluted because of discharge of waste into it, the extent of new discharge of waste into it would be limited.

2.3 Location of the Project

The project site is coming up at Khasra No. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan). The location map of the project is shown in **Figure 2.1,** which provides a regional location map of the proposed site relative to its surroundings. The site is located near NH-12 at a distance of 900 m towards SW. Site will be enforced with secured entrance procedures. The entire footprint of the site will be fenced off with security fencing.

The details of environmental setting are given in **Table-2.1**.

Table-2.1 Environmental Setting of the Site

<table>
<tr><th>S. No.</th><th>Particulars</th><th>Details</th></tr>
<tr><td rowspan="4">1</td><td colspan="2">CBWTF Location</td></tr>
<tr><td>Village</td><td>Alnia</td></tr>
<tr><td>District</td><td>Kota</td></tr>
<tr><td>State</td><td>Rajasthan</td></tr>
<tr><td>2</td><td>Coordinates</td><td>Are as under:
<table>
<tr><th>Pillars</th><th>Latitude</th><th>Longitude</th></tr>
<tr><td>A</td><td>25^0 01’5.62”N</td><td>75^0 54’ 37.58”E</td></tr>
<tr><td>B</td><td>25^0 01’30.97”N</td><td>75^0 54’ 15.89”E</td></tr>
<tr><td>C</td><td>25^0 01’39.47”N</td><td>75^0 54’ 26.46”E</td></tr>
<tr><td>D</td><td>25^0 01’17.93”N</td><td>75^0 54’ 49.56”E</td></tr>
</table></td></tr>
</table>

S. No.	Particulars	Details
3	Plant site elevation above MSL	340 m above MSL
4	Geographical location in Survey of India toposheet	Toposheet No. 45 O/16, 54 C/4, 45 P/13, 54 D/1
5	Plant site topography	Plain
6	Present land use at the site	Industrial land
7	Nearest highway	NH-12 ~ 900 m towards SW direction NH-76 ~ 9.0 Km towards NNW direction SH-51 ~ 12.3 Km towards NE direction
8	Nearest railway station	Alnia Railway Station ~1.0 km towards NNE direction Kota Railway Station ~22.0 km towards North direction
9	Nearest airport	Kota Airport – 16.0 km NNW direction Jaipur International Airport ~ 200 km towards NNE direction
10	Nearest village	Alnia village – 1.56 km towards South direction
11	Villages within 1 km radius	None
12	Hills/valleys	None
13	Archaeologically important places	None
14	Protected areas as per Wildlife Protection Act,1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Ummedganj Conservation Reserve 9.1 km towards NNE
15	Reserved / Protected Forests	Reserve Forest – 11.85 km towards NW Protected Forest – 9.7 km towards ENE Dense Mixed Jungle – 12.4 km towards E Protected Forest – 9.7 km towards ESE Mawasa P.F. – 12.0 km towards ESE Barkalaji R.F. – 7.8 km towards SE Reserve Forest n/v Ramnagar – 5.2 km towards SSE

S. No.	Particulars	Details
16	Water Bodies	Alnia River: 45 m towards SE (Adjacent to project site) Kanswa River: 14.3 km towards NNW Sur Sagar: 14.0 km towards NNW Dakaniya Talav: 13.2 km towards NNW Right Main Canal: 9.15 km towards NNE Champawati River: 7.0 km towards SSW
17	Seismicity	Seismic Zone-II as per IS 1893 (Part I): 2002
18	Defence Installations	None
19	List of Industries in the surrounding	None
20	Soil type	Clayey loam to clay, generally non calcareous, colour varies from brown to dark brown.
21	Depth of water table	Pre monsoon : 1.92 to 20.72 mbgl (approximately) Post monsoon: 0.76 to 14.25 mbgl (approximately)
22	Major crops	Wheat, Barley, Rice, Pulses, Jowar, Maize, Condiments & Spices
23	Socio-economic factors	No R&R issues involved

2.3.1 Layout of the Proposed Project

The project involves development of Industrial Park and CETP. Project layout (Site plan) is providing in **Figure-2.2.**

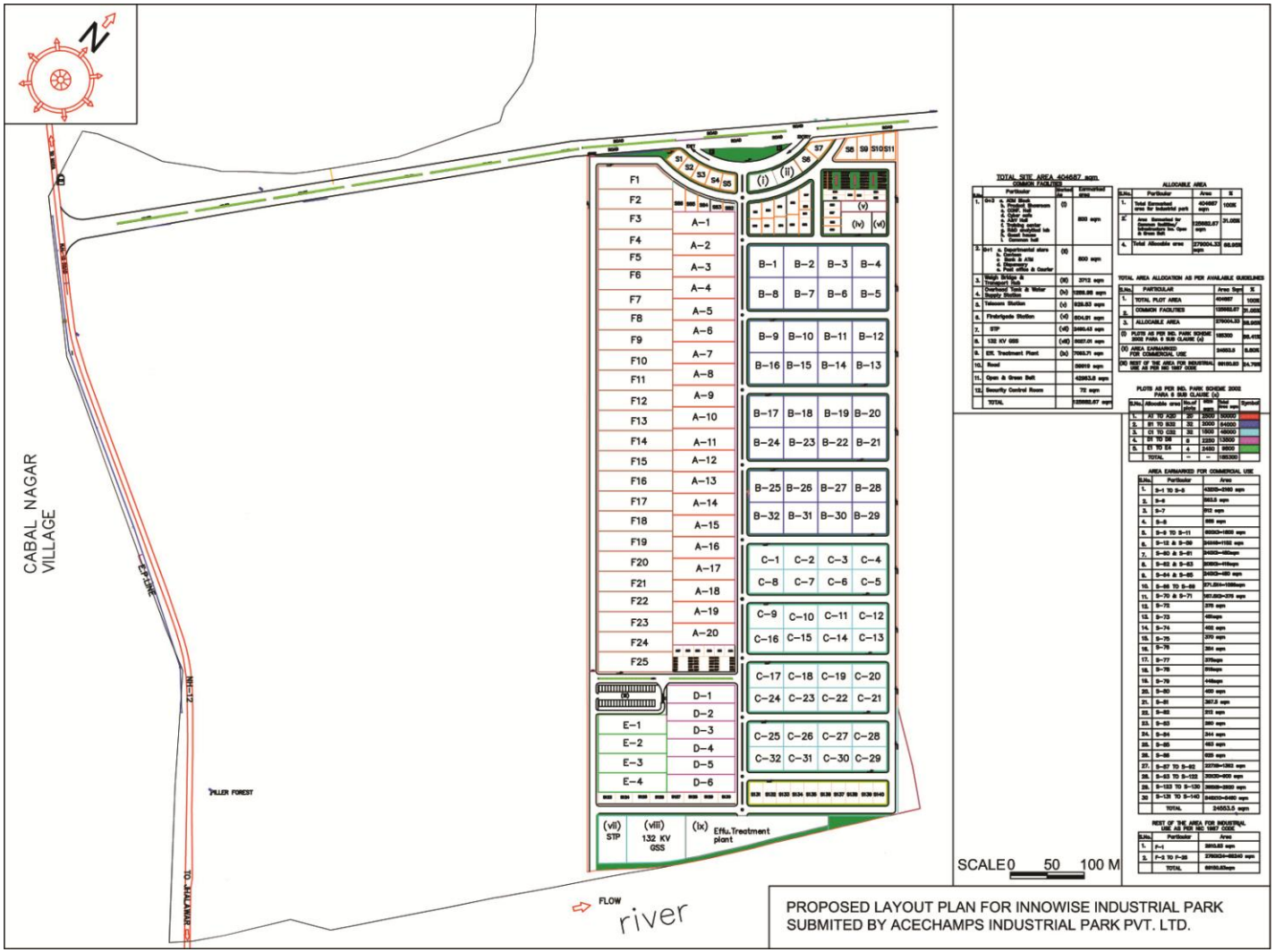


Figure-2.2: Plant Layout

2.4 Magnitude of Operation

The salient features of the proposed project are presented in **Table-2.2**.

TABLE-2.2 Details of The Proposed Facilities

S. No.	Parameter	Description
1	Land	4,04,687 sq. m.
2	Land-Use	Industrial Land
3	Water Requirement	225 KLD (domestic use only)
4	Source of Water	Ground water supply
5	Power Requirement	15 MVA One DG set of capacity – 700 KVA (power backup)
6	Source of Power	132 kV GSS within the site. HSD – 150 l/hr
7	Employment	5000 nos.
8	Project Cost	Rs 23.0 crores

2.4.1 Infrastructure

This is a proposed Industrial Park & CETP project. No infrastructure facilities exist within the area. A well equipped first aid facility is proposed to be available at there. Permanent rest shelter, urinal and latrine are proposed. Water will be sourced by ground water supply. Amenities / Facilities will be provided for construction workers by the industry owners. There will be no separate designated temporary sites for construction workers. There will be provisions of Common Effluent treatment plant and Sewage treatment Plant within the project site.

Fig- 1 LOCATION MAP

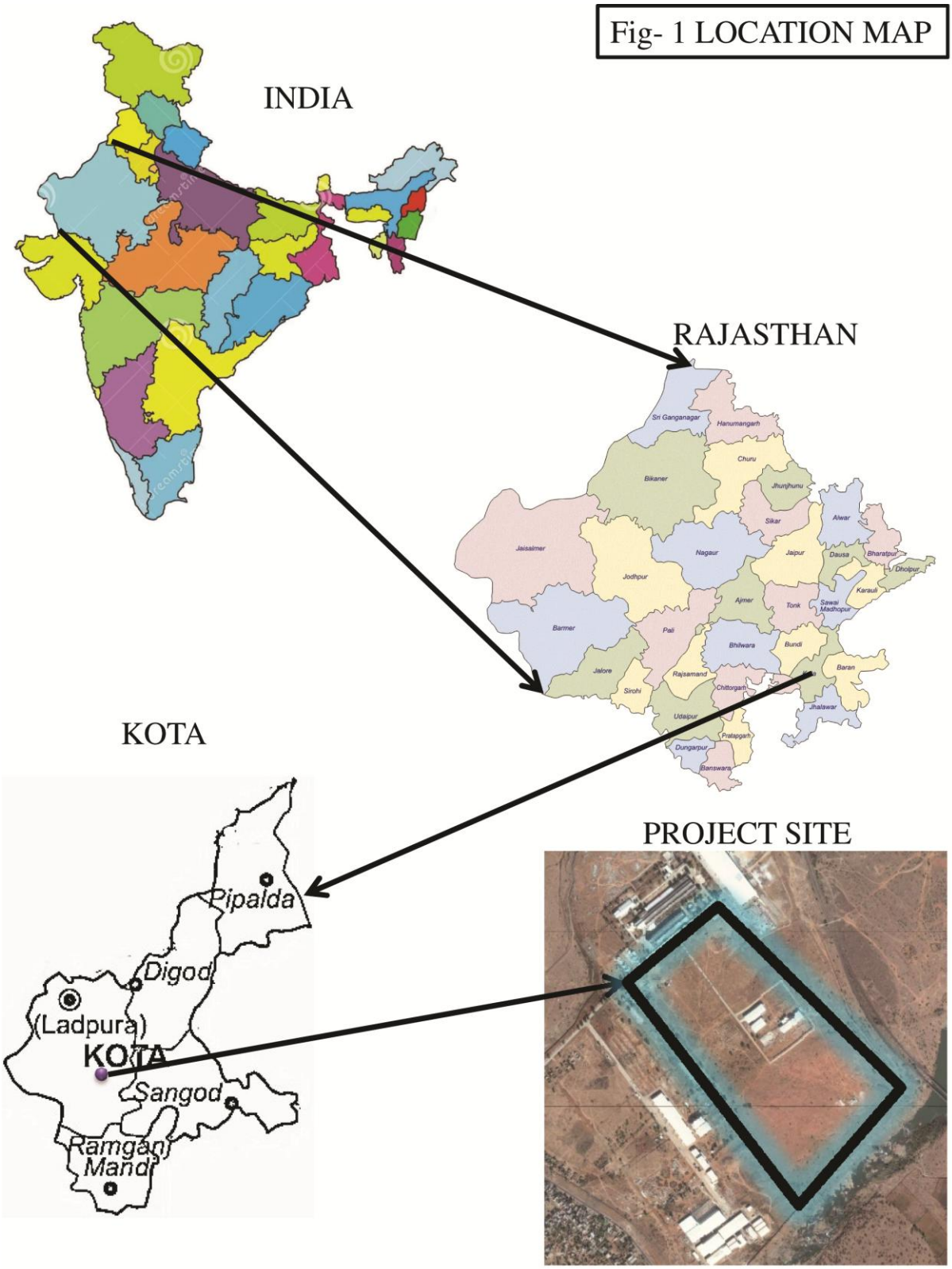


Figure-2.1 Location of the Site

2.4.2. Land Requirement

The total plot area of the project as per the Revenue record is 4,04,687 sq.m. (40 ha) which is 100 acres. The total no of Industrial Plots proposed is 259. The lease deed is given as **Annexure 1.2.** The bifurcation is given as under. The land use break up is provided below in **Table-2.3.**

TABLE-2.3 Land Use Breakup

S. No.	Particulars	Area in sq. m.	%
1.	**Total Plot Area**	**404687.00**	**100**
2.	Area of Common Facilities	125682.67	31.05
3.	Allocable Area	279004.33	68.95
Detailed bifurcation of the allocable area			
(i)	Plots as per Ind. Park Scheme 2002 para 6 sub clause (c)	185300	66.41
(ii)	Area earmarked for commercial use	24553.5	8.80
(iii)	Rest of the area for industrial use as per INC 1987 code	69150.83	24.79

Area of Common Facilities

S. No	Particulars	Area (sq.m.)
1.	G+3 ➢ Admin Block ➢ Product Showroom ➢ Conference hall ➢ Cyber café ➢ A&V hall ➢ Training centre ➢ R&D analytical lab ➢ Guest house ➢ Common hall	800
2.	G+1 ➢ Departmental store ➢ Canteen ➢ Bank & ATM ➢ Dispensary	800

	➢ Post office & Courier	
3.	Weigh Bridge & Transport hub	3712
4.	Overhead tank &water supply station	1269.98
5.	Telecom station	929.83
6.	Fire brigade station	604.91
7.	STP	2490.43
8.	132 KV GSS	5027.01
9.	CETP	7093.71
10.	Road	59919
11.	Open & green area	42963.8
12.	Security Control Room	72
	Total	**125682.67**

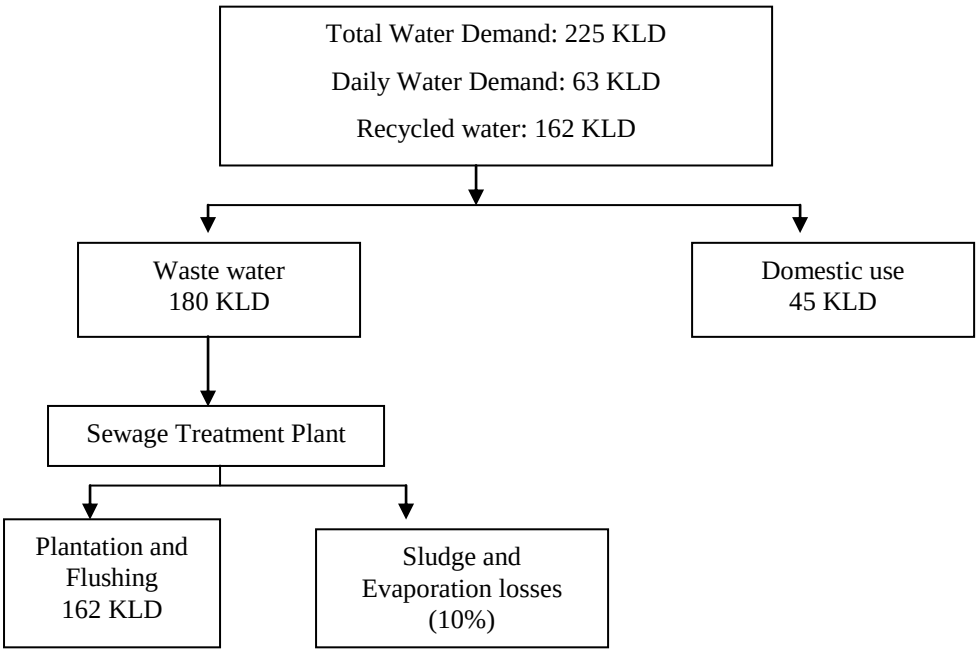
Details of industrial plots

S. No	Allocable area	No of Plots	Size per Plot	Total area
Plots as per Ind. Park Scheme 2002 para 6 sub clause (c):				
1.	A1 to A20	20	2500	50000
2.	B1 to B 32	32	2000	64000
3.	C1 to C32	32	1500	48000
4.	D1 to D6	6	2250	13500
5.	E1 to E4	4	2450	9800
Total				**1,85,300**
Area earmarked for industrial use				
1.	F1	1	2910.83	2910.83
2.	F2 to F 25	24	2760	66240
Total				**69150.83**
Area earmarked for commercial use				
1.	S1 to S5	5	432	2160
2.	S 6	1	563.5	563.5
3.	S7	1	512	512
4.	S 8	1	655	655
5.	S9 to S11	3	600	1800
6.	S12 to S 59	48	24	1152
7.	S60 to S 61	2	24	480
8.	S 62 to S63	2	208	416

9.	S 64 to S 65	2	240	480
10.	S 66 to S 69	4	271.5	1086
11.	S 70 to S 71	2	187.5	375
12	S 72	1	375	375
13.	S73	1	451	451
14.	S74	1	402	402
15.	S75	1	370	370
16.	S76	1	354	354
17.	S77	1	375	375
18.	S78	1	516	516
19.	S79	1	448	448
20.	S80	1	400	400
21.	S81	1	367.5	367.5
22.	S82	1	212	212
23.	S83	1	260	260
24.	S84	1	344	344
25.	S85	1	463	463
26.	S86	1	625	625
27.	S87 TO S 92	6	227	1362
28.	S 93 TO S 122	30	30	900
29.	S123 TO S 130	8	365	2920
30.	S131 TO S 140	10	546	5460
Total		**140**		**24553.5**

2.4.3 Water Requirement

Approx 225 KLD water will be required for domestic purposes (@45 LPCD x 5000 workers). The water supply will be met through ground water. Abstraction of ground water application has been applied in application no 21-4/10341/RJ/INF/2018 dated 28/06/2018. Member industry will manage their own water demand according to manufacturing process. Water balance for domestic uses is shown as under:-



WATER BALANCE

2.4.4 Power Requirement

The estimated power requirement for the project will be approx 15 MVA. The same will be met through 132 kV GSS within the site.

One D G set of capacity 700 KVA will be installed for power backup. 150 l/hr HSD will be required as fuel.

2.4.5 Manpower

The proposed project will require skilled and semi-skilled personal during construction and operational phase. Many of the people from neighboring villages of kota may, if found suitable get the opportunity for employment during construction and operational phase. The total manpower requirement during operation phase will be around 5000 persons.

2.5 Proposed Schedule and Approval for Implementation

2.5.1 Proposed Schedule for Implementation

The implementation schedule for the proposed project is twenty four months from the date of sanction.

2.5.2 Approval for Implementation

The ground activities will be started after receipt of Environment Clearance from SEIAA, Rajasthan and subsequent Consent to Establish from Rajasthan State Pollution Control Board.

2.6 Technology and Process Description of Common Effluent Treatment Plant

RAW EFFLUENT CHARACTERISTICS

The following effluent characteristics for design purposes are given below in Table.

pH	:	4.5 – 9.0
TSS	:	<1200 mg/L
BOD at 20^0 C	:	450 mg/L.
COD	:	900 mg/L
Oil & Grease.	;	100 mg/ L
Chromium total	:	< 5 mg/L
Phenolic compound	:	< 5 mg/L

Expected Characteristics of treated Effluent after Biological Treatment (outlet of Sec. Clarifier)

S. No.	Parameters	Measure	Values
1	pH	--	7.5-8.0
2	Total Suspended Solids (TSS)	mg/l	Less than 100
3	Chemical Oxygen Demand (COD)	mg/l	Less than 200
4	Biochemical Oxygen Demand (BOD, 3-days, 27^0C)	mg/l	Less than 25
5	Oil and Grease	mg/l	Less than 10

Expected Characteristics of final treated effluent

S. No.	Parameters	Measure	Values
1	pH	--	6.0 - 8.5
2	Total Suspended Solids (TSS)	mg/l	Less than 50
3	Chemical Oxygen Demand (COD)	mg/l	Less than 200
4	Biochemical Oxygen Demand (BOD, 3-days, 27^0C)	mg/l	Less than 20
5	Oil and Grease	mg/l	Less than 10
6	Total Residual Chlorine	mg/l	Less than 1

The treated effluent would meet the effluent discharge standards (shown in above Table); as specified in Environment (Protection) Act 1986.

EFFLUENT TREATMENT SCHEME

It is stipulated that the proposed CETP shall be based on physical & chemical treatment for removal of excessive inorganic COD, TSS & BOD beside removal of color & maintenance of equalized & constant PH & Flow rate prior to Fixed Aerated Bioreactor principal with tertiary treatment to achieve the parameters.

The proposed common effluent treatment plant is based on Fixed Aerated Bioreactor system. This is a Common Effluent Treatment Plant facility that will be treating the waste water from the member industries within the area. Member industries of CETP will be required to monitor specified quality parameters and flow rate of the effluent on daily basis and to submit the monitoring data to the CETP operator on regular basis. Continuous flow meters will also be installed at the outlet of the CETP to monitor the outlet effluent quantity. The effluents from its member industries will be lifted through dedicated pipeline system. The design basis of Proposed CETP is as follows:

S. No	Unit Name
1.	Raw effluent intake & bar screen chamber
2.	Collection cum-Pumping tank
3.	Oil / grease and Grit Removal Tank
4.	Equalization tank
5.	Equalized effluent pump house
6.	Flow measurement channel
7.	Chemical House
8.	Solution Preparation and dosing system
9.	Flash mixing chambers
10.	Flocculation chamber
11.	Primary clarifiers
12.	Aeration Tanks
13.	Secondary clarifiers
14.	Return activated sludge (RAS) tank-cum-Pump sump
15.	Wet sludge pit

16.	Sludge dewatering system
17.	Filter press and Volute Press
18.	Pre-filtration Storage Tank
19.	Granular Activated Carbon pressure Filters
20.	Chlorine Contact Tank
21.	Chlorinators and Tonners
22.	Dry Sludge storage Shed
23.	Treated Water storage, reuse and Disposal / Pump Tank

Common physical unit operations include among other processes screening, Grit Chamber, Parshall flume, Oil and Grease removal Tank, Flow Equalization Sedimentation etc.

A. Screening

A screen with openings of uniform size is used to remove large solids such as cloths, rags, papers, plastics etc. which may damage process equipment, reduce the effectiveness of the common effluent treatment plant.

Grit Chamber

Grit includes sand, dust and other materials in wastewater that are non-putrescible and are heavier than organic matter. It is necessary to remove these materials in order to 1) protect moving mechanical equipment and pumps from unnecessary wear abrasion, (2) prevent clogging in pipes and heavy deposits in channels.

Oil and Grease Removal

Oil and grease removal unit removes oil and grease from the incoming effluent prior to the further biological process.

Flow Equalization

CETP's are designed to treat wastewater that has a more or less constant flow and quality that fluctuates. The equalization tank overcomes this by collecting and storing the waste, allowing it to mix and become a regular homogeneous quality before it is pumped to the treatment units at a constant rate. To determine the require volume of

an equalization tank the hourly variation of flows needs to be determined. The equalization tank has submersible mixers for efficient equalization of organic load.

B. Primary Treatment (Chemical Unit Process)

Chemical unit processes are always used with physical operations and may also be used with biological treatment processes, although it is possible to have a purely physico-chemical plant with no biological treatment. Chemical processes use the addition of chemicals to the wastewater to bring about changes in its quality. They include pH control, coagulation, chemical precipitation for the removal of heavy metals and oxidation.

Neutralization Tank (pH control)

Effluent from various industries is rarely pH neutral. It is therefore necessary to adjust the pH in the treatment process to adjust the pH neutral. This is particularly important if biological treatment is being used, as a microorganisms used in biological treatment require a pH in the range of 6-8 and will be killed by highly acidic or alkali wastewater. For the acidic wastes (low pH) calcium hydroxide is added among other things. For the alkali wastes (high pH) sulphuric acid or hydrochloric acid may be added. The equalized volume of flow shall be pumped to the Neutralization tanks followed by Flash mixer for pH correction where heavy metals will be removed by maintaining different pH values. The neutralization tanks shall have air spargers for stripping ammonia at 9.5 pH. In the neutralization section, pH of the effluent is raised to @ 9.5 by mixing with lime slurry under agitation for precipitating out heavy metals as metal hydrauxides. Air is passed through the first two reaction tanks of neutralization tanks through a sparger, which removes the ammonical nitrogen upto 35%. Higher removal of ammonical nitrogen is also possible by further raising the pH to about 10 – 10.5.

Primary Clariflocculator (chemical coagulation and flocculation)

In this system an effluent after flash mixer shall be subjected to Primary Clariflocculation. Coagulation is a complex process but generally refers to collecting into a larger mass the minute solids particles dispersed in a liquid. Chemical

coagulants such as poly alumimium chloride or ferrous Sulphate may be added to waste water to improve the attraction of fine particles so that they come together and form larger particles called flocs. A chemical flocculent, usually a polyelectrolyte, enhances the flocculation process by bringing together particles to form larger flocs, which settle out more quickly. This also helps in removal of heavy metals as hydroxides and color. Flocculation is aided by gentle mixing which causes the particles to collide. The Clariflocculator shall be provided with flocculator and Clarifier Mechanism. The sludge from the clariflocculator shall be taken to Sludge Thickener through Primary Sludge Pumps.

C. Biological Unit processes

From the clariflocculator, an effluent shall be sent to single stage biological treatment called advanced Oxidation ditch based on FAB type activated sludge process. The objective of a biological treatment of industrial wastewater is to remove or reduce the concentration of, organic and inorganic compounds. Biological treatment process can take many forms but are all based around microorganisms, mainly bacteria. These microorganisms use component of the effluent as their "food" and in doing so break them down into less complex and less hazardous compounds. In the process he microorganisms increase in number.

There are FAB technology will be adopted. The FBR process is the latest advance in attached growth aerobic biological treatment technology. In Fluidized Bed Reactors, the liquid to be treated is pumped through a bed of small media at a sufficient velocity to cause fluidization. In the fluidized state the media provide a large specific surface for attached biological growth and allow biomass concentrations in the range 10-40 kg/m^3 to develop.

For aerobic treatment processes the reactor is aerated. This is done by recalculating the liquid from the reactor to an oxygenator where air, or possibly oxygen, is bubbled. To overcome problems related to high re-circulation rates, needed when there is high oxygen demand in the reactor, the reactor might be aerated directly. The basis for the use of fluidized bed systems is the immobilization of bacteria on solid surfaces. Many species of bacteria (and also other microorganisms) have the ability for adhering to supporting matrices. In this process, a volume of Ring Pac media is immersed in water

and is fluidized (kept in constant motion) through the movement of gas and liquid in the treatment reactor. As the media supports a biomass concentration several times that achievable in activated sludge systems, treatment is significantly more productive.

Advantages

- The FBR requires very less hydraulic retention time (HRT) compared to an extended aeration or activated sludge process to perform the same BOD reduction duty.
- High resident biomass concentration, intense mass transfer conditions and aggressive biomass-sloughing action enable the process to rapidly respond to variations in process load
- Less footprint area required for installation.
- Less operation and maintenance cost during plant operations.

Secondary Clarifier: Biologically treated effluent from ditch shall be sent to the secondary clarifier for separation and return of activated sludge back to the aeration tank for maintaining MLSS. Balance quantity of activated sludge is drained into secondary sludge storage tank. The overflow from the secondary clarifier shall be sent. The aeration tank and secondary clarifier units are provided along with the sludge re-circulation arrangement. From the aeration tanks, the effluent shall be taken to Secondary Clarifiers wherein the sludge shall be settled out and overflow shall be taken to secondary treated effluent collection sump. The biologically treated effluent shall be subjected to further tertiary treatment. The treated effluent after tertiary treatment shall be discharged to existing final pumping station (FPS).

The sludge from the bottom of the secondary clarifier shall be collected in the Sludge Sump from where it is recirculated back to the inlet of the aeration tank through Sludge Recirculation Pumps. The excess sludge along with primary sludge shall be collected in Thickener Unit from where after thickening the sludge will be collected in the sludge sump and then it will be pumped to the Membrane filter press unit for dewatering.

The Polyelectrolyte shall be injected from its dosing tanks through Metering Pumps. The dewatered cake from the Membrane filter press shall be collected in the Tractor Trolley for disposal.

Overflow of sludge thickener and filtrate from Filter press shall flow by gravity to the Leachate collection cum backwashed water sump.

D. Tertiary Treatment Scheme:

The untreated effluent contains ammonical nitrogen as one of the major pollutant and sometimes refractory COD, and residual color, which cannot be degraded biologically under aerobic conditions and therefore require tertiary treatment after secondary treatment.

Removal of Ammonical Nitrogen: Balance ammoniacal nitrogen is removed by super chlorination in the tertiary treatment section. The treated effluent from secondary section is pumped into a static mixer, wherein chlorine gas is first measured through a rota-meter, mixed with lime slurry in a ventuary, and the calcium hypo chlorite so prepared is mixed with the effluent. pH is controlled by addition of lime slurry whereas chlorine dozing is monitored by ORP control.

The excess chlorine is treated with sodium bisulfite in static mixer; pH is controlled by addition of lime slurry. The effluent is further treated with activated carbon and then the effluent is passed through a Clariflocculator, wherein PE is dozed to remove suspended solids.

The clarified effluent is passed through decline type gravity sand filter and activated carbon filter and finally discharged into final pumping station. Any residual color is removed by activated carbon.

Sludge Handling

The chemical sludge generated from the physico-chemical treatment would be collected into Wet sludge Pit attached to Sludge Pump house. The wet sludge (TSS range 8.0 to 10.0 g/L) shall be pumped at constant rate for dewatering through filter press and volute press (new / proposed). Existing centrifuge, installed at elevated platform is not in working conditions. The dewatered sludge cake would drop (under gravity) into the trolley and shall be stored into dry sludge storage collection shed for

a period of about three months. Later, the dry sludge shall be transported to sludge disposal site. This is pertinent to mention here that excess bio-sludge from the biological treatment, though less in quantity, is biodegradable and rich in nutrients. This can be used as manure and water for plantation within CETP and industrial area, if not mixed with chemical sludge.

Final Disposal of Treated Effluent

The treated effluent from CETP shall be pumped for preparation of chemicals solution, required for chemical house of this CETP and watering the plantation / horticulture in CETP premises. A part of treated effluent may be used for construction activities, after mixing with fresh water.

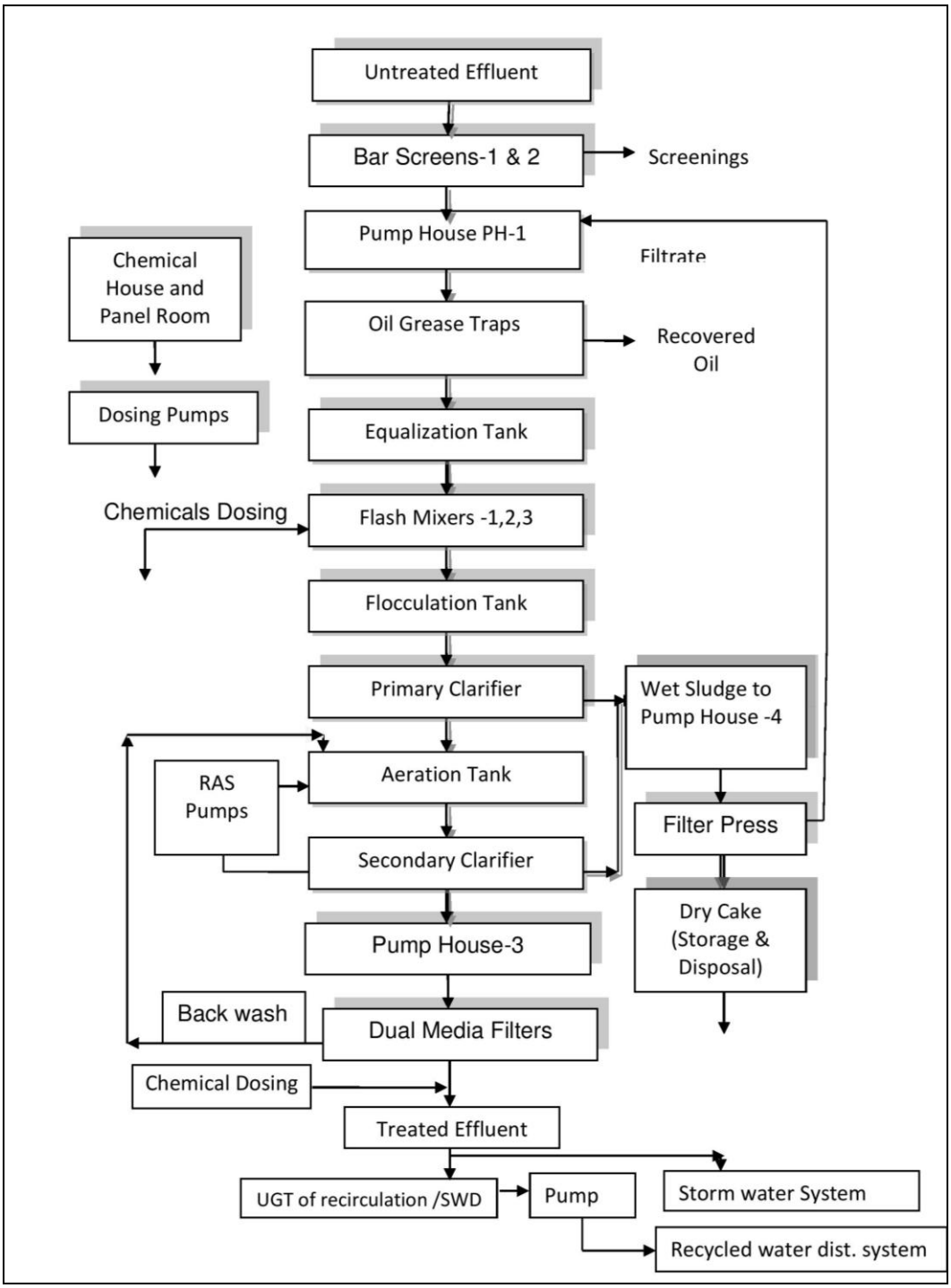


Fig: Schematic of ETP

2.7 RAW MATERIAL (Quantity and Source), PRODUCT AND MODE OF TRANSPORT

2.7.1 Raw Material

Raw material required for construction and setting up of Common Effluent Treatment Plant are cement, steel, aggregates & sand for civil works. Approximately 200 tons of steel will be required for construction purpose.

In addition, raw materials required for the proposed project will be chemicals namely lime, $FeSO_4$, Polymer, HCl, Urea, DAP, Chlorine etc for treatment purpose. Which are easily available and does not have any significant hazardous effect. All these raw materials shall be received in bags (lime), drums and rubber lined tankers. All the raw materials shall be stored within premises in separate storage area. The details of the same are given as under:

Chemical Details

S.No	Chemical	Flow	Unit	Dosage	Unit	Qty Kg/day
1	Lime	5	MLD	70	mg/l	180.00
2	FeSO4	5	MLD	120	mg/l	310.00
3	Polymer	5	MLD	2	mg/l	7.00
4	HCl	5	MLD	14	mg/l	38.00
5	Urea	5	MLD	30	mg/l	80.00
6	DAP	5	MLD	14	mg/l	45.00
7	Dewatering Polymer for Chemical Sludge	0.7	MT	1.0	Kg/MT	2.5
8	Dewatering Polymer for Biological Sludge	0.20	MT	1.5	Kg/MT	1.0
9	Chlorine	5	MLD	3	mg/l	9.00

2.8 Sources of Pollution

The various types of pollution envisaged from the proposed project:

1) Air pollution;
2) Water pollution;
3) Solid waste generation;
4) Noise pollution

The project will be provided with necessary pollution control facilities to keep the gaseous emission, liquid effluent and noise emission within the permissible limits prescribed by Central and State Pollution Control Board. Details of emissions from the proposed activity are given in the following sections.

The details of impacts and mitigation measures are discussed in Section 4.3 of Chapter of this report.

2.8.1 Air Pollution

The sources of air pollution from the proposed industrial area will be process emission from member industry, DG set, Vehicular movement etc. The member industry will provide appropriate air pollution control device for reducing the pollutants and also a stack of 30 meter height is provided for proper dispersion of the air pollutants. Adequate stack height will be provided on DG set. PUC certified vehicles will be used.

2.8.2 Water Pollution

The effluent generated from the member units will reach the CETP by pipelines. Domestic effluent will be treated in STP.

2.8.3 Noise Pollution

The source of noise pollution will be pumps, blowers, D.G. set (standby), etc. Extensive oiling & lubrication and preventive maintenance will be carried out to reduce noise generation at source to the permissible limit. However, at place where noise levels can exceed the permissible limit, Earplugs and Earmuffs will be provided to those working in such area.

2.8.4 Solid Waste Generation

There will be generation of solid as well as liquid waste during the operational phase of the project which will be responsibly managed by respective industry only. CETP facilities will be provided within the project site for the management/disposal of solid or liquid waste. The estimated quantity of Municipal waste (domestic and or commercial wastes) generated from the industrial site will be 660 kg/day (@0.4 kg/worker/day) which is proposed to be sent and disposed off at the district municipal corporation site. The

Industrial process may also lead to generation of hazardous waste as defined under HWM Rules. However the same will be disposed off to the CTDF at Udaipur. Industrial solid waste (ISW) will be generated from the industrial process which is proposed to be disposed off suitably. Construction waste like soil, brick bits, etc will be utilized in leveling of land and road making. Used oil from lubrication of equipment, Discarded Containers and Oil & Grease from skimming will be stored in scientifically designed and constructed hazardous waste storage area within the premises and send for disposal to secured land fill site, registered recyclers and registered refiners.

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CHAPTER-3

DESCRIPTION OF ENVIRONMENT

3.0 Introduction

The anthropogenic activities related to proposed industrial area and CETP activities cause impacts on environmental components in and around the project site. However, the intensity of environmental impacts vary from project to projects, depends upon several factors like; physical, chemical, and other factors involved in the project, processing capacity (scale / size of the project), type and extent of pollution control measures, project location surrounding geomorphology etc. To assess environmental impacts from proposed project (specific), it is essential to monitor the environmental quality prevailing in the surrounding area prior to implementation of the proposed project. The environmental status (baseline status) within the study area is used for prediction of anticipated environmental impact assessment study. The impacts from proposed industrial area and CETP project on its surrounding environment are due to the nature of pollutants, their quantities discharged to the environment, existing environmental quality, assimilative capacity of the surrounding environment and topography.

A regional background to the baseline data is being presented at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as air, noise, land, ecological and socio-economic status of the study area.

As per the EIA notification 2006 guidelines for preparing EIA report, baseline study of 10 km radius area surrounding the project site shall be covered under the study and the same is denoted as study area. As part of the study, description of biological environment and human environment such as environmental settings, demography & socio-economics, land-use/land cover, ecology & biodiversity have been carried out for entire 10 km radius. However, as a universally accepted methodology of EIA studies, physical and environmental attributes such as meteorology, ambient air

quality, water quality, soil quality, noise levels, hydro-geology and solid waste generation have been studied at selective locations representing various land use such as industrial, rural/ residential, commercial and sensitive locations including the densely populated areas, agricultural lands, forest lands and other ecologically sensitive areas, if any falling within 10 km radius study area. Secondary data deemed necessary was collected from various Government organizations and Institutes.

The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. Field monitoring studies to evaluate the baseline status of the project site has been carried out during the period of ***December 2017 to February 2018*** covering winter season. The test reports are enclosed as **Annexure 3.1.**

Table 3.1 Environmental Attributes

S. No	Attribute	Parameter	Source of Data
1	Land Use	Trend of land use change for different categories	Secondary data sources; Kota Municipality
2	Water quality	Physical, chemical and biological parameters	Grab samples are collected during monitoring period from 7 locations including site (ground water 4 locations and surface water 3 locations)
3	Ambient air quality	PM 2.5, PM 10, SO2, NOX, CO	Ambient air quality monitoring at 7 locations including site
4	Noise levels	Noise levels in dB(A)	Noise level monitoring at 5 locations including site
5	Ecology	Existing terrestrial flora and faun within the project site	Sample collected from site and identified through secondary sources
6	Geology	Geological history	Secondary sources
7	Soil	Soil type and samples analyzed for physical and chemical parameters	Data collected from secondary sources and soil analysis at project site
8	Socio – economic	Socio-economic characteristics o	Based on field survey and data

	aspects	the affected area	collected from secondary sources

3.1 Monitoring Methodology

- **Ambient Air Quality:** Fine particulate sampler (FPS) has been used for sampling $PM_{2.5}$. Respirable Dust Sampler (RDS) with gaseous attachment have been used for sampling PM_{10}. RDS with gaseous attachment assembly is used for the collection of gaseous pollutants such as SO_2, NOx and other gaseous pollutants.
- **Meteorological Data:** An auto weather monitoring station was installed during the study period to record various meteorological parameters on hourly basis to understand the wind pattern, temperature variation, and relative humidity variation.
- **Water:** Ground and surface water samples were collected as per CPCB standards, and analysis was carried out as per standard methods.
- **Noise:** Instant sound level meter is used for the collection of data related to noise at an interval of one hour per reading. Noise level for 24 hours was conducted during one week period at pre decided locations.
- **Soil:** Representative soil samples were collected from for analysis of physico-chemical characteristic. Standard procedures, as per CPCB and other published methods were followed for sampling and analysis.

3.2 Locations of Monitoring Stations

Seven monitoring stations including site were selected for monitoring of Ambient Air. Five monitoring stations including site were selected for monitoring of Noise. Four monitoring stations including site were selected for monitoring of ground water. Seven monitoring stations including site were selected for monitoring of soil analysis. The monitoring stations were selected on the selected on the basis of surface influence, demographic influence and metrological influence. The list of monitoring locations along with their latitude and longitude is given below Table no. 3.1

3.2.1 Ambient Air Monitoring Stations

The air monitoring stations were finalized as per the wind rose during the months of December to February. The wind rose diagram prepared from IMD Kota for the season is provided as **Figure 3.1.**

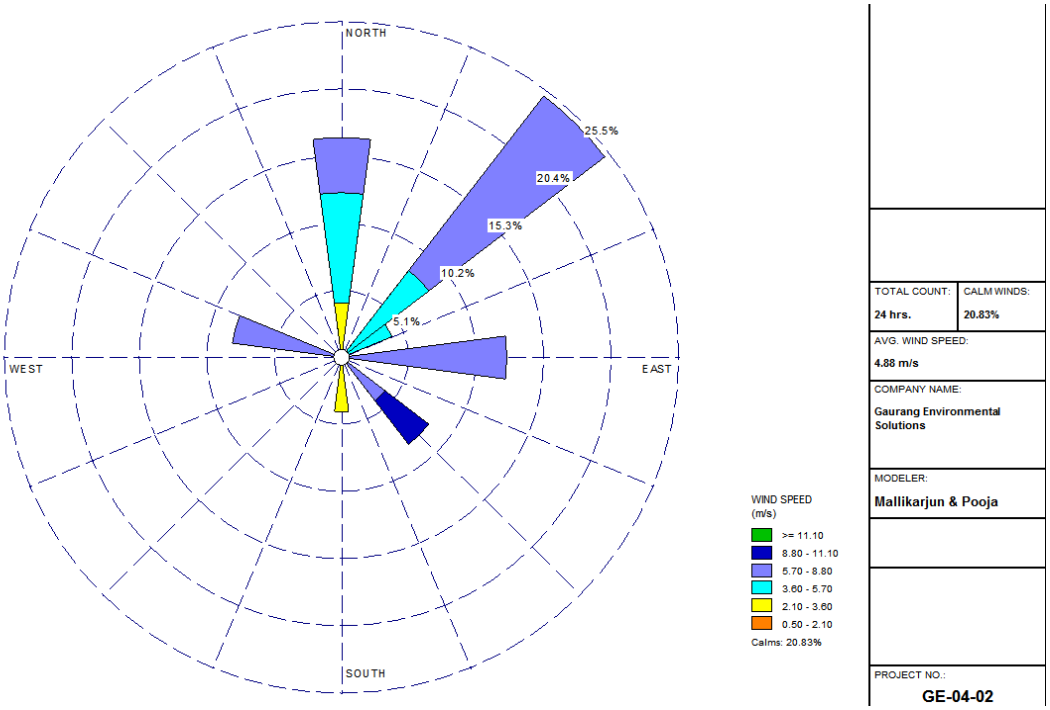


Figure – 3.1 Wind Rose Diagram

The list of ambient air monitoring locations along with their distance & direction from the project site is given below **Table No. 3.2a** and figure showing the locations are provided as **Figure No 3.2.**

Table No. 3.2a: List of monitoring locations – Ambient Air Quality

S. No.	Location Code	Location Name	Frequency	Latitude & Longitude	Distance
1	AAQ-1	Project Site	Twice a week for one season (12 weeks)	$25^0$01’29.90” N, $75^0$54’13.79”E	--
2	AAQ-2	Kaser		$24^0$59’38.46” N, $75^0$55’28.02”E	4.4 km towards SSE
3	AAQ-3	Renkyakheri		$24^0$59’01.55” N, $75^0$53’66.60”E	4.63 km towards SSW
4	AAQ-4	Shampura		$25^0$00’32.35” N,	5.37 km towards WSW

				$75^0$51'32.71"E	
5	AAQ-5	Khera jagpura		$25^0$03'26.19" N, $75^0$52'06.69"E	5.55 km towards NW
6	AAQ-6	Khanpuria		$25^0$00'27.72" N, $75^0$58'01.97"E	6.0 km towards ESE
7	AAQ-7	Mawasa		$25^0$04'30.90" N, $75^0$58'05.12"E	8.0 km towards NE

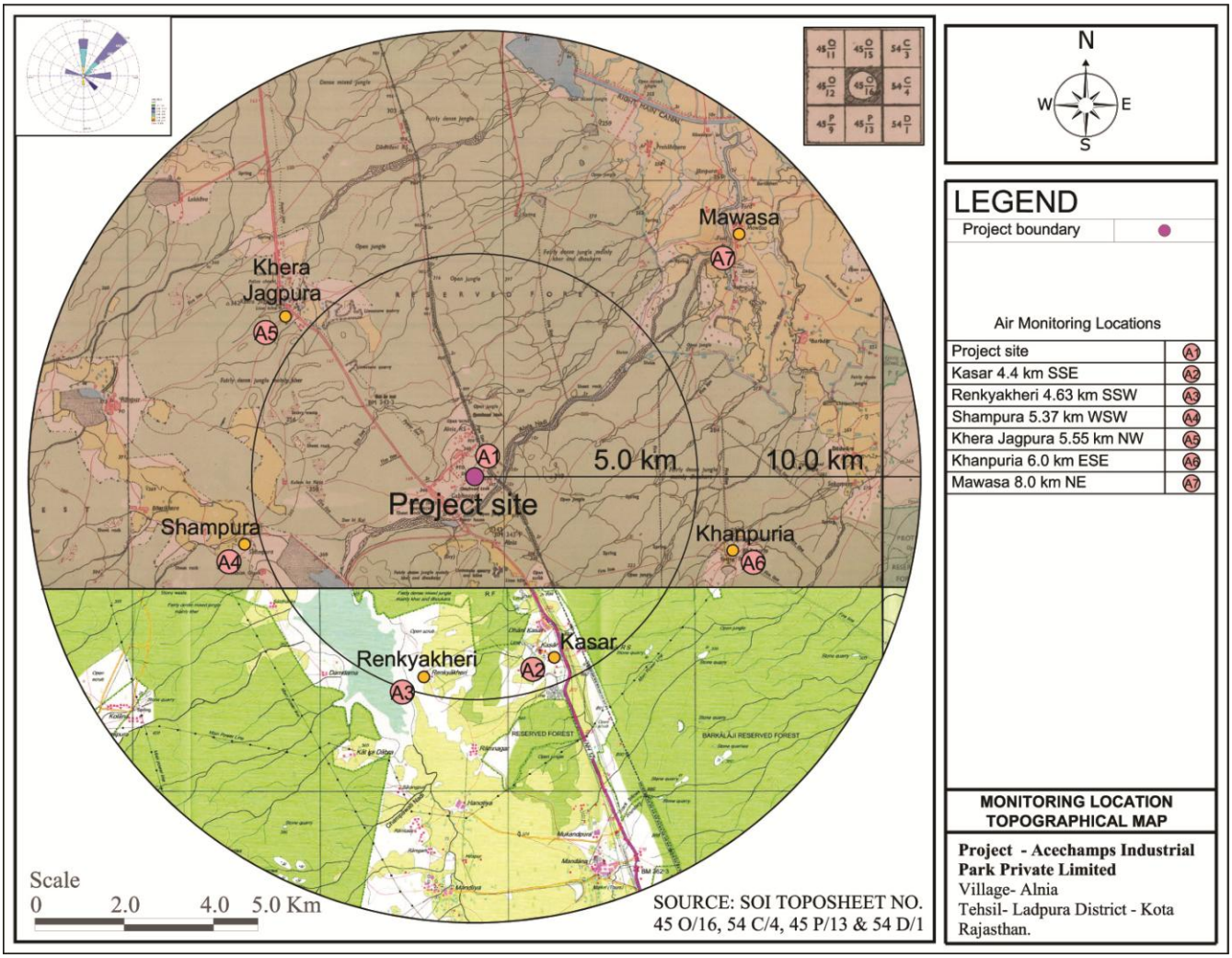


FIGURE 3.2 AMBIENT AIR MONITORING LOCATIONS

3.2.2 Location of Water Sampling Stations

Water samples were collected from four location for ground water and three locations for surface water. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards as prescribed for drinking water (IS:10500). The list of ground water and surface water sampling locations are given below in **Table 3.2b** respectively. The figure showing the sampling locations is provided as **Figure 3.3.**

Table No. 3.2b: List of monitoring locations – Water

S. No.	Location Code	Location Name	Frequency	Latitude & Longitude	Distance

1	GW-1	Project Site	Once in a season	$25^0$01'29.44" N, $75^0$54'12.38"E	--
2	GW-2	Renkyakheri		$24^0$58'59.94" N, $75^0$53'56.46"E	4.63 km towards SSW
3	GW-3	Khera jagpura		$24^0$03'22.78" N, $75^0$52'05.65"E	5.55 km towards NW
4	GW-4	Ramnagar		$25^0$04'47.00" N, $75^0$58'06.46"E	9.4 km towards NE
5	SW-5	Alniya Dam		$25^0$00'03.84" N, $75^0$52'50.19"E	1.0 km towards NE
6	SW-6	Renkyakheri		$24^0$58'20.76" N, $75^0$54'04.11"E	4.63 km towards SSW
7	SW-7	Right Main Canal		$25^0$04'47.44" N, $75^0$58'06.48"E	9.0 km towards NNE

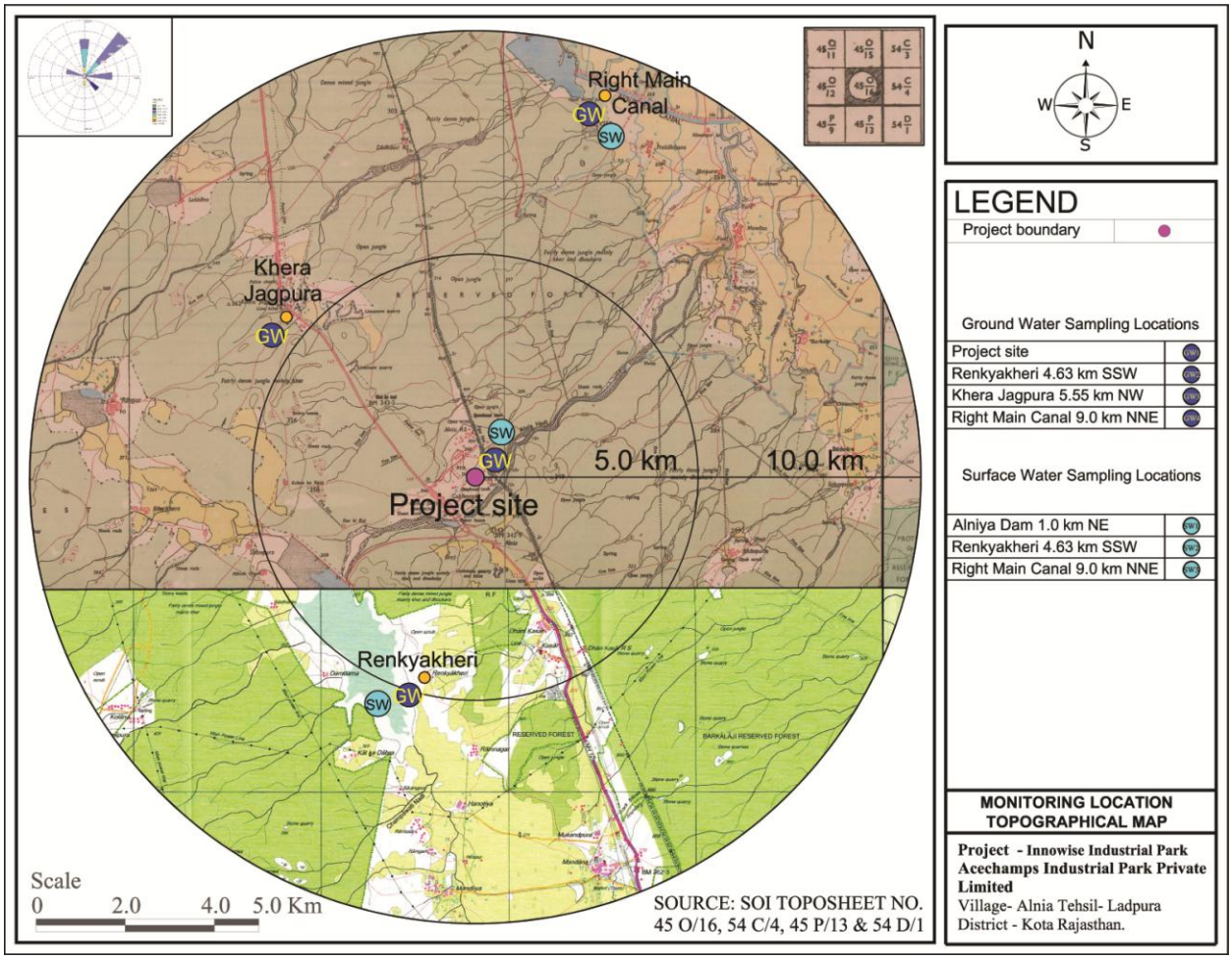


FIGURE 3.3 GROUND WATER AND SURFACE WATER MONITORING LOCATIONS

3.2.3 Location of Ambient Noise Monitoring Stations:

Ambient Noise monitoring stations are marked at populated areas and schools etc. to evaluate the effect of noise. The details of noise monitoring stations are provided in **Table 3.2c.** The figure showing the Noise monitoring locations is provided as **Figure 3.4**

Table No. 3.2c: List of monitoring locations – Noise

S. No.	Location Code	Location Name	Frequency	Latitude & Longitude	Distance
1	N-1	Project Site	Once in a season for 24	$25^0$01’29.90” N, $75^0$54’13.79”E	--

2	N-2	Bhagat Public Senior Secondry School, Aalniya	hour continuous	$25^0$00'28.55" N, $75^0$54'50.48"E	1.8 km towards SSE
3	N-3	Shampura		$25^0$00'32.35" N, $75^0$51'32.71"E	5.37 km towards WSW
4	N-4	Khanpuria		$25^0$00'27.72" N, $75^0$58'01.97"E	6.0 km towards ESE
5	N-5	Maharshi Arvind Publc School, Ranpur		$25^0$04'10.73" N, $75^0$51'06.29"E	7.5 km towards NW

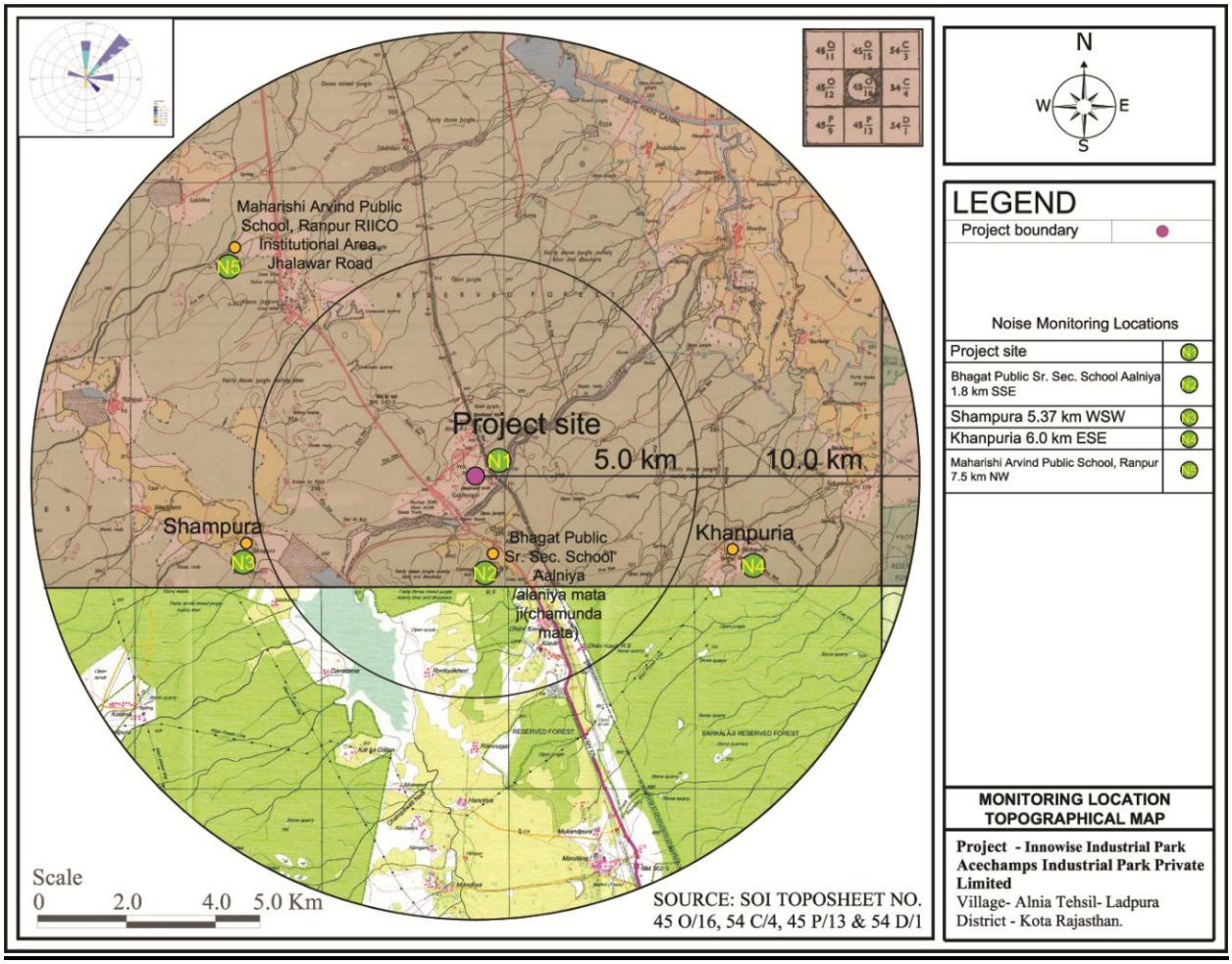


FIGURE 3.4 NOISE MONITORING LOCATIONS

3.2.4 Location of Soil Sampling Stations:

Locations of soil sampling station are provide below in **Table 3.2d.** The figure showing the soil sampling locations is provided as **Figure 3.5.**

Table No. 3.2d: List of monitoring locations – Soil

S. No.	Location Code	Location Name	Sample collection Details	Latitude & Longitude	Distance
1	S-1	Project Site	Near site office gate	$25^0$01’30.29” N, $75^0$54’12.93”E	--
2	S-2	Kasar	Agricultural	$24^0$59’37.93” N, $75^0$55’28.44”E	4.4 km towards SSE
3	S-3	Renkyakheri	Agricultural	$24^0$58’59.08” N,	4.63 km towards SSW

				75^{0}54’05.75”E	
4	S-4	Shampura	Agricultural	25^{0}00’31.21” N, 75^{0}51’30.09”E	5.37 km towards WSW
5	S-5	Khera jagpura	Agricultural	25^{0}03’28.87” N, 75^{0}52’04.48”E	5.55 km towards NW
6	S-6	Khanpuria	Agricultural	25^{0}00’26.20” N, 75^{0}57’54.11”E	6.0 km towards ESE
7	S-7	Mawasa	Agricultural	25^{0}05’45.56” N, 75^{0}58’17.15”E	8.0 km towards NE

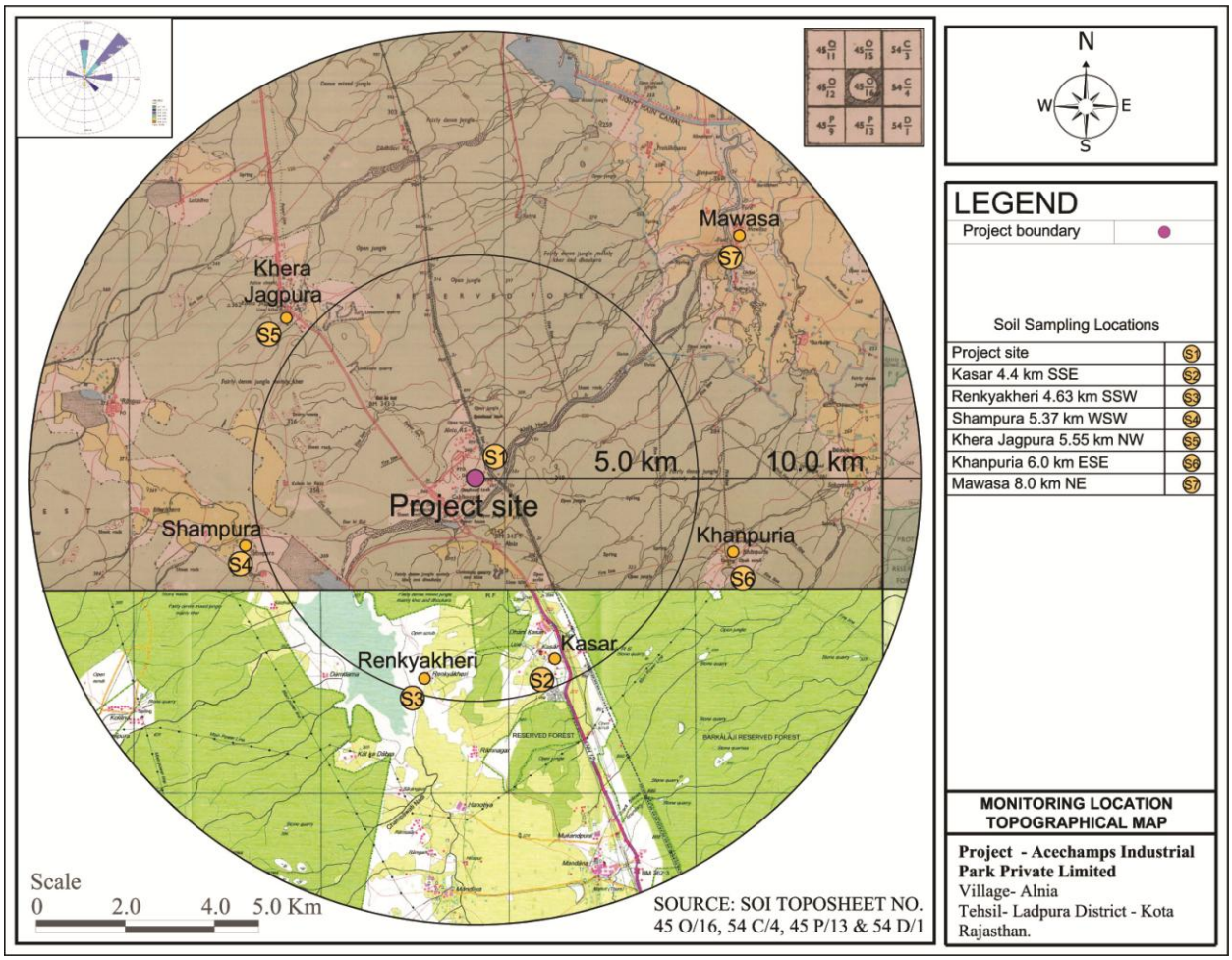


FIGURE 3.5 SOIL MONITORING LOCATIONS

3.3 Land Environment

3.3.1 Land use /Land Cover Map

3.3.1.1 Material and methods

The details of study area, collection of relevant satellite images, ground-truth observation, and the use of software and analytical tools used in the current study.

3.3.2 Geographical location of the study area

The study area comprising of khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan) .The total geographical area of study area is 4,04,687 sq.m (100 Acres) . The survey of India Open Series Map (OSM) 45O/16, 54 C/4, 45 P/13 and 54D/1 was used for geo referencing the study area.

3.3.3 Materials

The equipment used during the present investigation includes ground truth hand held GARMIN 12 GPS receiver for ground truth collection, besides the visual observation and analysis.

Garmin 12 GPS receiver: - Global Positioning System is based on a constellation of 24 satellites orbiting the Earth at a very high altitude of 20,200 km, which allows anyone with a GPS receiver to determine the precise 3-D location. It offers advantages of accuracy, speed, versatility and economy while in use as an aid for position based data collection. GPS owes its popularity to the dependable high accuracy with which position and time can be determined. The termination of selective availability from first May 2000 has instantly increased the accuracy of stand-alone mode GPS to at least five fold and things are going to get even better in the near future. The GPS was conceived as a ranging system from known positions of satellites in space to unknown positions on land, sea and space. GPS uses pseudo ranges derived from the broadcast satellites. The pseudo ranges were derived either from measuring the travel time of the (coded) signal and multiplying it by its velocity or by measuring the phase of the signal. The antenna detects the electromagnetic waves arriving from the satellites, converts the wave energy into an electric current, amplifies the signal strength and sends the signals to the receiver electronics. The GARMIN 12 GPS Receiver in stand-alone mode was used to collect the

information regarding the geographical location of the ground truth sites during the present investigation.

Satellite data: - The Indian Remote Sensing satellite IRS-1C/1D/P6 LISS III was used for present analysis. One scene of IRS P6 LISS III covered the entire study area.

Topographical maps of the study area: - The survey of India Open Series Map (OSM) 45O/16, 54 C/4, 45 P/13 and 54D/1 was used for geo referencing the study area on 1:50,000 scale covering Kota District of Rajasthan, was used as reference map for geo-referencing of the remote sensing data. These maps helped to select the ground truth collection sites.

Ancillary data: - Information derived from the remotely sensed data can only be verified using field data. Field data is used to improve the information extraction, to calibrate either data or the information and to assess the accuracy of the derived information. Field data used in the study was of different types such as maps of Survey of India, data collected in the field sampling, and information derived from statistical data from revenue department.

Computer hardware and software: - HP P-4 dual core PC with ERDAS IMAGINE 8.5 image analysis software was used for processing and analysis of the remote sensing data. Arc GIS version 10.2 was used for making land use maps.

Spatial observations: - Spatial measurements were made with the help of hand held GPS to get the spatial coordinated along with type of land use.

The raw LISS III spectral information's was collected in the three bands as detailed below:

Band 2: Green region, 520-570 nm

Band 3: Red region, 620-680 nm and

Band 4: Near infrared region, 770-860 nm

3.3.4 Data & Methodology

For the present land use study LISS-III sensor data of IRS-P6 satellite has been used which has a spatial resolution of 5.8 m, which is good enough for Level-II classification.

National Remote Sensing Centre (NRSC), Hyderabad classification scheme has been followed for present land use study. First of all the .tiff file is imported to .img format, geometric corrections were performed and data prepared for further process was done. Unsupervised classification method has been adopted followed by visual interpretation technique for 10 km radius and a total of 6 classes have been obtained.

3.3.4.1 Digital image analysis

The various steps involved in the digital image analysis of remote sensing data area follows.

For digital image processing and analysis, preliminary work like collection of maps, reports, remote sensing images, collection and study of collateral and ground truth data were done first. Among all, ground truth data collection is very important for subsequent digital analysis. The HP P-4 dual core PC with ERDAS IMAGINE 8.5 software was used for processing and analysis of remote sensing data. The toposheets of the study area on1:50,000 scales were scanned and were geometrically corrected in the DATA PREPARATION panel of ERDAS IMAGINE 8.5. The IRS P6 LISS III Image of the study area was loaded into the ERDAS IMAGINE using the IMPORT option. Later, geometric correction of the image was done with the help of the geometrically corrected SOI Toposheets and Ground Control Points (GCPs) collected with the GPS receiver. The raw image data when viewed on the display showed the difficulty indistinguishing all features. Preliminary interpretation of the satellite data was conducted and GCPs, which were distributed randomly throughout the image with minimum root mean square (rms) error of less than 0.5 were selected. Polynomial transformation of 1st order was used because the correction program runs faster with it and it also avoids geometric distortion in areas of very few GCPs. After completing geometric correction of the image, study area boundary overlay was done. The study area boundary was digitized from SOI toposheets using AOI tools polygon and vector options, saved as AOI layers. This AOI layer was used as administrative boundary mask and the subsets of the respective blocks was prepared using subset image option of data preparation panel. The unsupervised classification was used to prepare the LULC map of the study area.

3.4 Air Environment

The ambient air quality with respect to the study zone around the proposed Industrial Park and CETP project site forms the baseline information of the air environment. The various sources of air pollution in the region are traffic, urban and rural activities. This will also be useful for assessing the conformity to standards of the ambient air quality during operation. 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 from December 2017 to February 2018 (winter season) are presented below.

3.4.1 Meteorological Environment

The data on meteorological parameters in the study area were monitored for the period December 2017 to February 2018. The data was monitored from an automated weather-monitoring station. The instrument was located to allow free exposure to atmosphere all through the study period. The summary of meteorological data obtained at the site is given in **Table 3.3(a)** and the summary of the meteorological data from IMD Kota is provided as **Table 3.3(b).**

3.4.2 Wind Pattern during the Season

Wind speed and direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Based on the meteorological data obtained from the region, wind roses that is the diagrammatic representation of wind speed and wind direction along with their persistence for a fractional period of occurrence at a given location is constructed.

Wind roses on sixteen sector basis have been drawn. The winds were predominantly recorded from south West with and averaged wind speed for the period is 4.88 m/s.

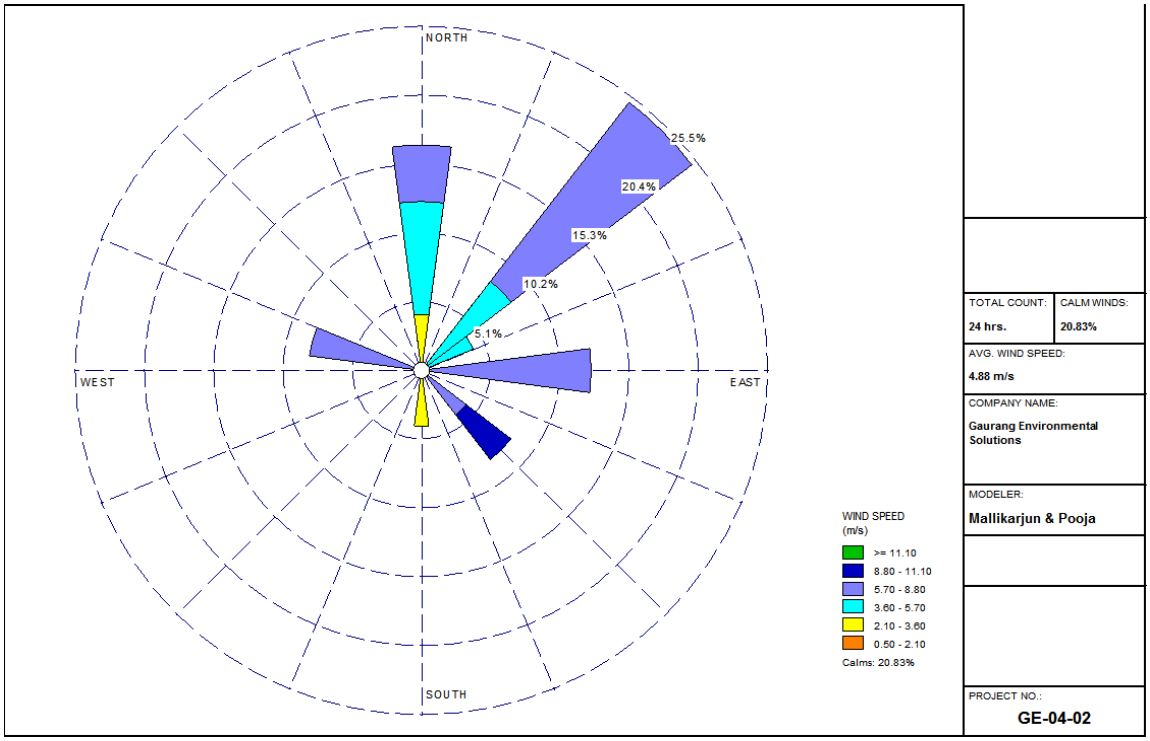


Figure 3.1: Wind Rose of Study Period

3.4.3 Selection of Sampling Locations

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 on synoptic scale;
- The methodology for conducting the baseline environmental survey and selection of sampling locations considered the guidelines given in the EIA manual of the MoEF & CC ;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status; and
- Representatives of likely impact areas.

Ambient Air Quality Monitoring (AAQM) stations were set up at seven locations. The details of the monitoring location are given in above **Table No. 3.2 (a,b,c,d).** The topographical map showing the monitoring locations is given in **Figure No. 3.2**

3.4.4 Frequency and Parameters for Sampling

Ambient air quality monitoring has been carried out with a frequency of two days per week during study period. The duration of sampling of PM_{10}, $PM_{2.5}$, SO_2, and NO_x was done twenty four hourly continuous sampling per day and CO was sampled for 8 hours continuous thrice in 24 hour duration monitoring. The baseline data of air environment was monitored for parameters mentioned below as per latest Gazette Notification of the Central Pollution Control Board (CPCB) on NAAQ dated 18th November 2009. The ambient air quality parameters along with their frequency of sampling are given in **Table-3.4**

Table No.3.4 Monitored parameters and frequency of sampling

Parameters	Sampling Frequency
Particulate Matter (PM_{10})	24 hourly sample twice a week for three months
Respirable Particulate Matter ($PM_{2.5}$)	24 hourly sample twice a week for three months
Sulphur dioxide (SO_2)	24 hourly sample twice a week for three months
Nitrogen dioxide (NO_2)	24 hourly sample twice a week for three months
Carbon Mono-oxide	8 hourly samples for 24 hour twice a week for three months

3.4.5 Method of Analysis

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB), IS: 5184 and American Public Health Association (APHA). The techniques used for ambient air quality monitoring and minimum detectable levels are given in **Table-3.5.**

Table No. 3.5 Techniques used for ambient air quality monitoring

Parameters	Test Method
Particulate Matter (PM_{10})	IS : 5182 Part-23
Respirable Particulate Matter ($PM_{2.5}$)	FRM Method/Low volume sampling (Gravimetric)
Sulphur dioxide (SO_2)	IS : 5182 (P-2) Improved West & Geake
Nitrogen dioxide (NO_2)	IS : 5182 (P-6)
Carbon Mono oxide	IS : 5182 (P-10) NDRI Spectroscopy

3.4.6 Presentation of AAQ Data

Various statistical parameters like average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. The results of monitoring carried out for study period from October 2017 to January 2018. The parameters has been studied and determined quantitatively through planned monitoring. Respirable dust sampler FPS (APM) of ENVIROTECH make, Respirable Dust Sampler (APM 460 BL) of ENVIROTECH make, Gaseous sampler of ENVIROTECH make, Model APM 850 were used for monitoring of Ambient Air quality at all the identified locations. The summary of these results for each location representing pre-monsoon season are presented in **Table No. 3.6** .The results are compared with the standards prescribed by Central Pollution Control Board (CPCB) for industrial and rural /residential zone.

Figure: 3.9 Respirable Dust Sampler used for monitoring of Ambient Air quality

Table 3.6: Summary of Ambient Air Quality Results

S. No.	Sampling Location		PARAMETERS				
			PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_x (µg/m^3)	CO (µg/m^3)
1.	Project Site - A1	Average	61.2	36.3	8.4	11.2	755.9
		Minimum	50.3	29.8	6.3	7.7	573.0
		Maximum	71.6	43.4	11.8	15.3	916.0
		98th % ile	70.8	42.4	11.2	14.9	916.0
2.	Kasar -A2	Average	55.1	33.6	7.8	8.4	630.0
		Minimum	48.9	27.6	6.8	6.6	458.0
		Maximum	62.3	41.5	9.7	10.6	916.0
		98th % ile	62.2	40.2	9.6	10.4	859.0
3.	Renkyakheri – A3	Average	52.9	31.8	6.9	7.2	568.3
		Minimum	47.2	28.5	6.1	6.0	458.0
		Maximum	58.7	35.2	7.7	8.1	687.0
		98th %ile	58.4	35.0	7.6	8.0	687.0
4.	Shampura- A4	Average	52.4	31.3	6.7	7.4	590.3
		Minimum	46.2	26.5	6.0	6.0	458.0
		Maximum	57.2	34.2	7.7	8.3	687.0
		98th % ile	57.0	34.1	7.7	8.3	687.0
5.	Khera Jagpura – A5	Average	54.0	32.6	7.3	7.8	577.1
		Minimum	45.0	27.5	6.0	6.5	458.0
		Maximum	61.3	37.7	8.9	9.3	802.0
		98th % ile	60.6	37.5	8.6	9.1	744.5
6.	Khanpuria – A6	Average	49.9	30.1	6.2	6.4	546.3
		Minimum	41.2	24.4	6.0	6.0	458.0
		Maximum	55.9	34.1	6.7	7.6	687.0
		98th % ile	55.3	34.0	6.6	7.4	687.0
7.	Mawasa-A7	Average	54.0	32.7	6.9	7.7	607.9
		Minimum	47.6	28.7	6.0	6.0	458.0

		Maximum	63.8	38.9	8.9	9.6	687.0
		98th % ile	61.9	38.3	8.6	9.5	687.0
NAAQ STANDARDS			**100**	**60**	**80**	**80**	**04**

3.4.7 Interpretation

The observations based on a perusal of the results for study period are summarized below:

3.4.7.1 Particulate Matter (PM_{10})

A maximum value of 71.6 µg/m^3 was observed at project site and minimum value of 41.2 µg/m^3 was observed at Khanpuria. The average values were observed to be in the range of 49.9 µg/m^3 to 61.2 µg/m^3. All the values are below prescribed limit of CPCB.

3.4.7.2 Particulate Matter ($PM_{2.5}$)

A maximum value of 43.4 µg/m^3 was observed at project site and minimum value of 24.4 µg/m^3 was observed at Khanpuria. The average values were observed to be in the range of 30.1 µg/m^3 to 36.3 µg/m^3. All the values are below prescribed limit of CPCB.

3.4.7.3 Sulphur Dioxide (SO_2)

A maximum value of 11.8 µg/m^3 was observe at project site and minimum value of 6.0 µg/m^3 was observed at Khanpuria. The average values were observed to be in the range of 6.2 µg/m^3 to 8.4 µg/m^3. All the values are below the prescribed limit of CPCB.

3.4.7.4 Nitrogen Dioxide (NO_2)

A maximum value of 15.3 µg/m^3 was observed at project site and minimum value of 6.0 µg/m^3 was observed at Khanpuria. The average values were observed to be in the range of 6.4 µg/m^3 to 11.2 µg/m^3. All the values are below prescribed limit of CPCB.

3.4.7.5 Carbon Monoxide (CO)

A maximum value of 916 μg/m^3 was observed at Project site and minimum value of 458 μg/m^3 was observed at Khanpuria. The average values were observed to be in the range of 546.3 μg/m^3 to 755.9 μg/m^3. All the values are below prescribed limit of CPCB.

3.5 Hydrogeology

3.5.1 Introduction

Kota district is located in the southeastern part of Rajasthan. It is bounded in the north by Sawai Madhopur district, in the east by Baran district and the state of Madhya Pradesh, in the south by Jhalawar and Chittaurgarh districts along with state of Madhya Pradesh and finally in the west by Bundi district. It stretches between 24° 32' 02.17" to 25° 51' 19.33" north latitude and 75° 36' 55.19'' to 76° 34' 57.10'' east longitude covering an approximate area of 5,122.3 sq kms. The whole district is the part of 'Chambal River Basin'.

3.5.2 Climate & Rainfall

Climate of the district can be classified as semi arid type. The summers are hot and dry and winters are cold. The cold season prevails from December to February followed by hot season from March to mid of June. After summers the rainy season starts with the onset of monsoon rains lasting till the end of September. The period September to November constitutes post monsoon period. January is the coldest month with mean daily maximum temperature at 24.3°C and a mean daily minimum temperature at 10.6°C. Mean daily maximum temperature during summers is 46.2°C and mean daily minimum temperature is 29.7°C. The average rainfall is 652.17 mm.

The average annual rainfall in the Kota district is 660.6 mm. Most of the rainfall can be attributed to the southwest monsoon which has its beginning around the last

week of June and may last till mid-September. Pre-monsoon showers begin towards the middle of June with post-monsoon rains occasionally occurring in October. The winter is largely dry, although some rainfall does occur as a result of the Western Disturbance passing over the region.

3.5.3 Geomorphology

Physiographically, the district is characterized by undulating topography with gentle plains. The land slopes from south to north and is drained by the river Chambal and its tributaries. In the south there is 145 km long Mumundra range of Vindhyan hills. The physiography is rugged and the tributaries of Chambal river drain through undulating plains which slope from SSE to NNW. The maximum height of the hills in the district is 517 m amsl at village Borabas, block Ladpura and minimum height is 207mamsl at Khatoli in block Itawa. Chambal is the principal perennial river in the district. Its tributaries are Kalisindh, Parvan and Parvati, which are all perennial in nature.

3.5.4 Ground Water Scenario

In Kota district, ground water occurs in mainly four hydrogeological formations. These hydrogeological formations are alluvium, sandstone, shale and limestone and among these formations alluvium is the most important formation as it covers the maximum area and also it is the most potential among different hydrogeological formations.

3.5.4.1 Hydrogeology

Occurrence of ground water depends upon topography, physiography and structural features of the geological formations. The movement of the ground water in hard rock areas is governed by size, openness, interconnection and continuity of structurally weak planes while in unconsolidated rocks, ground water movement takes place through pore spaces between grains. In the district, ground water occurs under water table condition both in unconsolidated and consolidated formations.

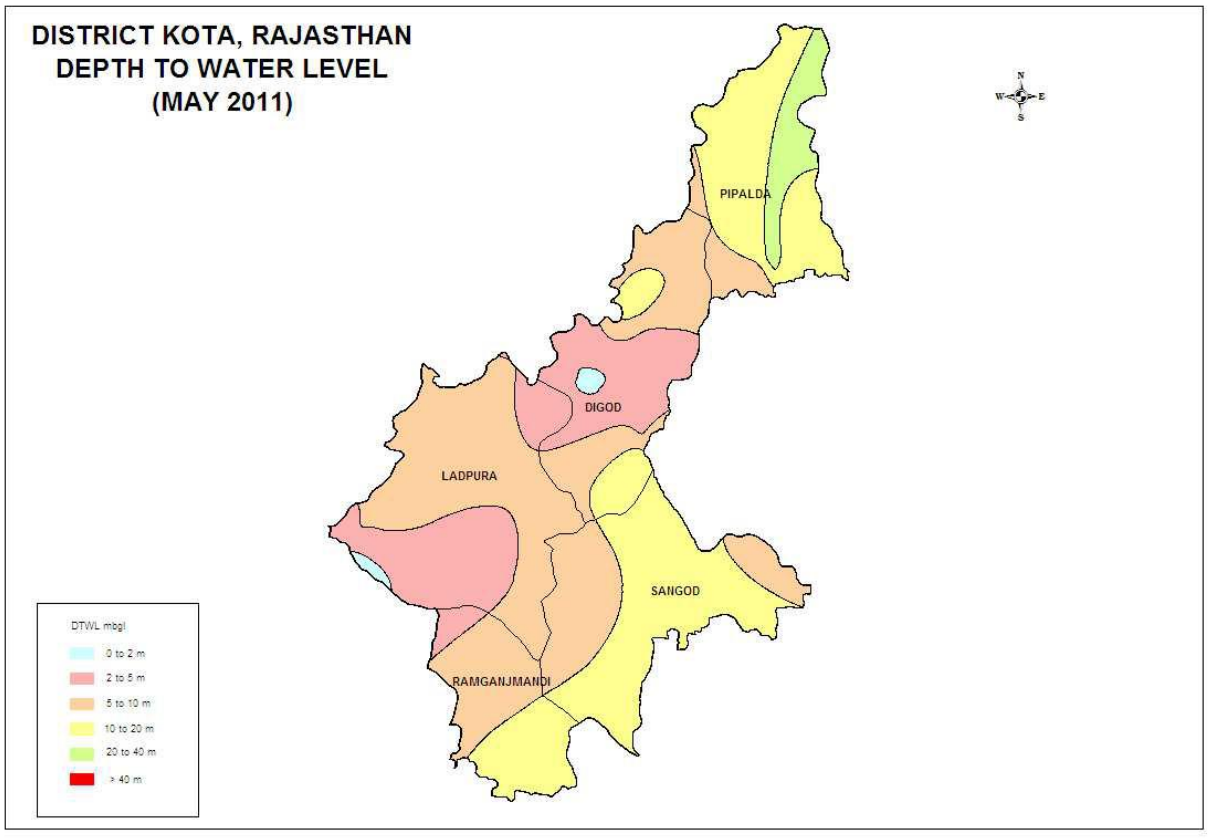
The main hydrogeological units are alluvium, limestones, sandstones and shales. Shale also occurs as intercalations with both limestone and sandstone. Limestone,

sandstone and shale cover an area of 5123.17 sq.km out of which 2111.77 sq.km area falls under command area. Most of the command area is irrigated by Chambal Canal and comparatively small area by canals of Alniya, Sawan Bhadon and Harish Chandra Sagar Dams.

3.5.4.2 Depth to water level (pre monsoon 2011)

The depth to water level varies widely depending upon topography, drainage, bedrock geology etc. The depth to water level during premonsoon (May, 2011) varied form 1.92 m to 20.72 mbgl In major part of the district water levels were between 2 and 10 mbgl (Figure 2). Depth to water level in the range of 10 to 20 mbgl were observed in southern

half of Khairabad block, major parts of Sangod and Itawa blocks and some parts of Sultanpur block. Deeper water levels (20 -40 mbgl) have been observed in localised pocket along the eastern border of Itawa block.

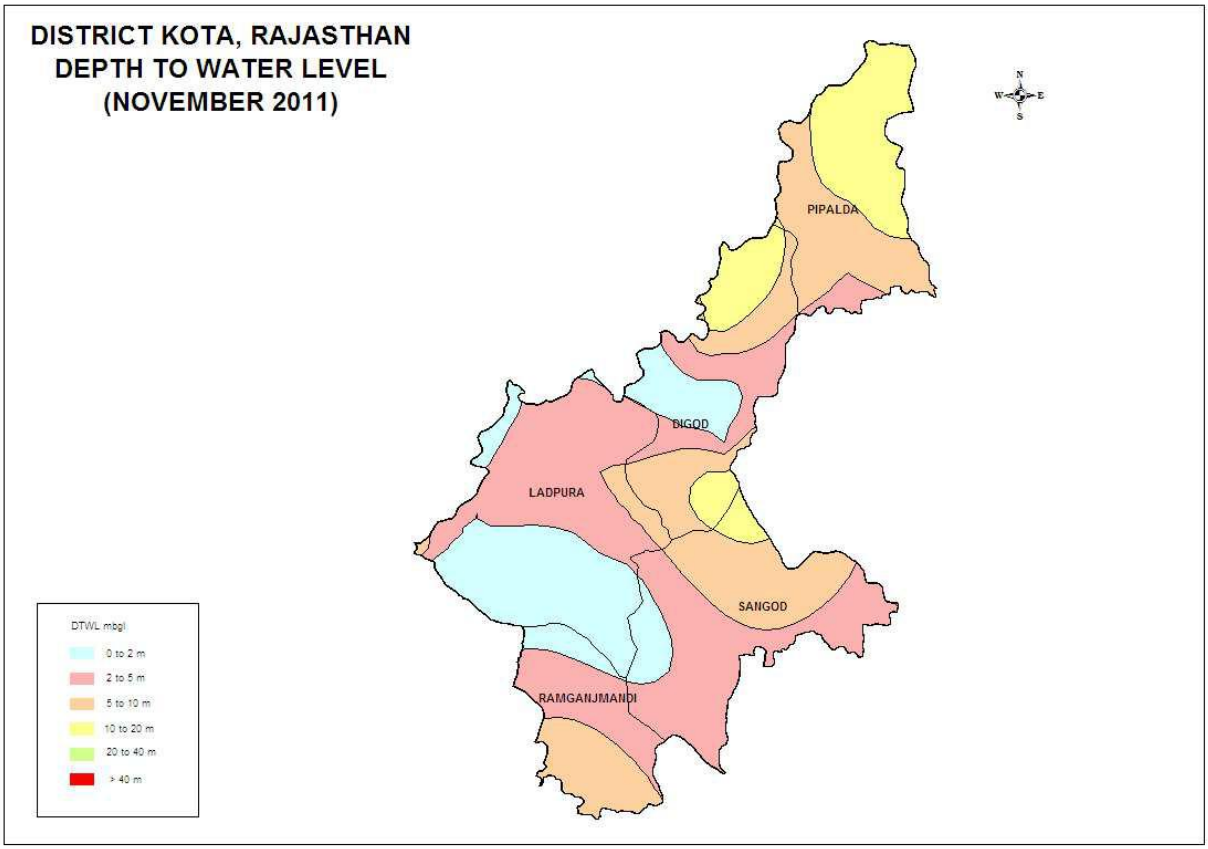


Source: CGWB Publication

Figure 3.5: Depth to water level (May 2011)

3.5.4.3 Post-monsoon (November 2011)

During post-monsoon period (November, 201), the depth to water level varied from 0.76 m to 14.25 m (post- monsoon). In major part of the district water levels were shallow ranging between 0 and 10 mbgl (Figure 3). Water levels in the range of 0 to 2 mbgl have been observed in parts of Ladpura, Khairanad and Sultanpur blocks. Depth to water levels between 10 and 20 mbgl have been reported from parts of Sangod, Sultanpur and Itawa blocks.



Source: CGWB Publication

Fig. 3.6: Depth of water level Post Monsoon (November 2011)

3.5.4.4 Water Level Fluctuation

Seasonal fluctuation in water level based on Pre and Post-monsoon' 2011 indicates that there has been exceptionally rise in water level in entire district (Figure 4). Perusal of the fluctuation data indicates that extent of rise in water levels varies from 0.2 to 14.4 m. Majority of wells (75%) in the district have registered rise in water level in the range of 0 to 4 m (75%) and the remaining wells (25%) have registered rise of more than 4 m.

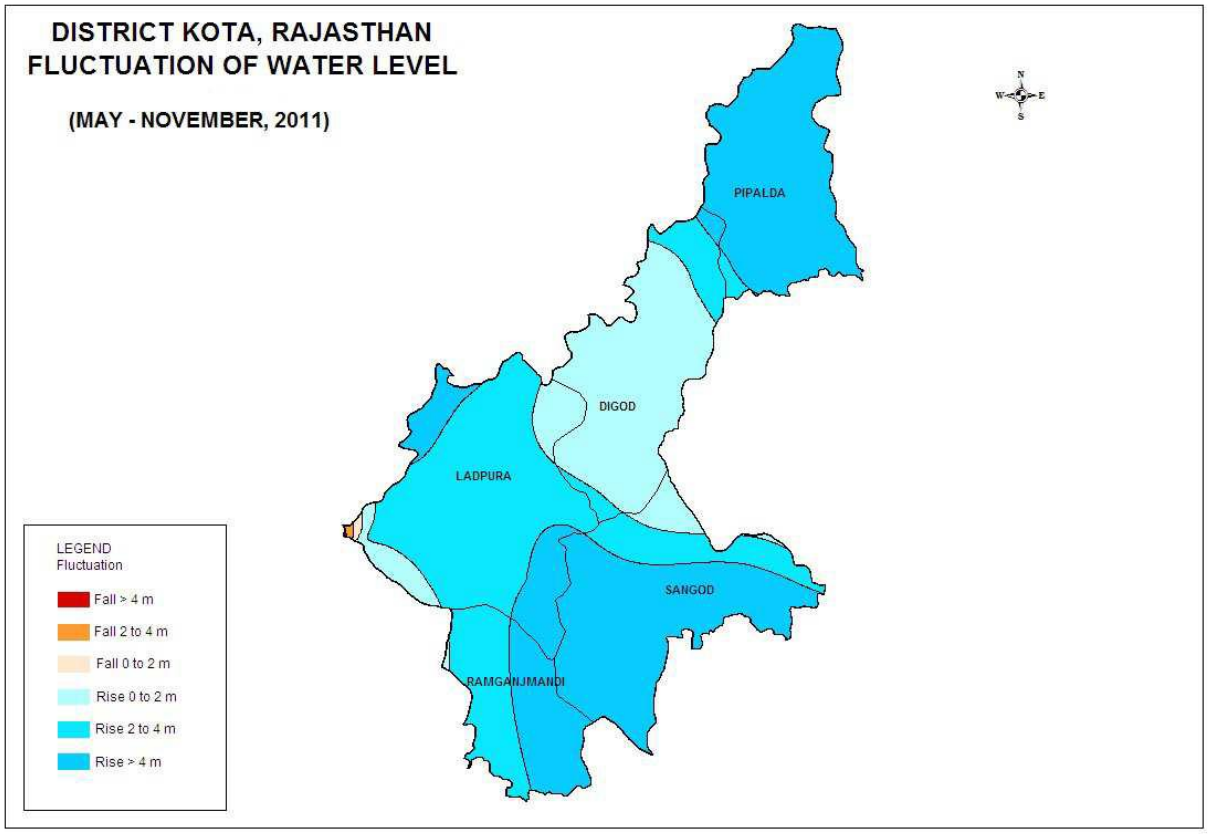


Figure 3.7: Seasonal water level fluctuation map (May – November, 2011)

Analysis of decadal pre-monsoon water level data indicates that there has been rising trend of upto 25cm/year in water levels in major parts of Ladpura, Khairabad, Sangod and Sultanpurt blocks and some parts of Itawa block (Figure 5). Declining trend of upto 25cm/year has been registered in water levels in major part of Itawa block and some parts of Ladpura and Sangod blocks.

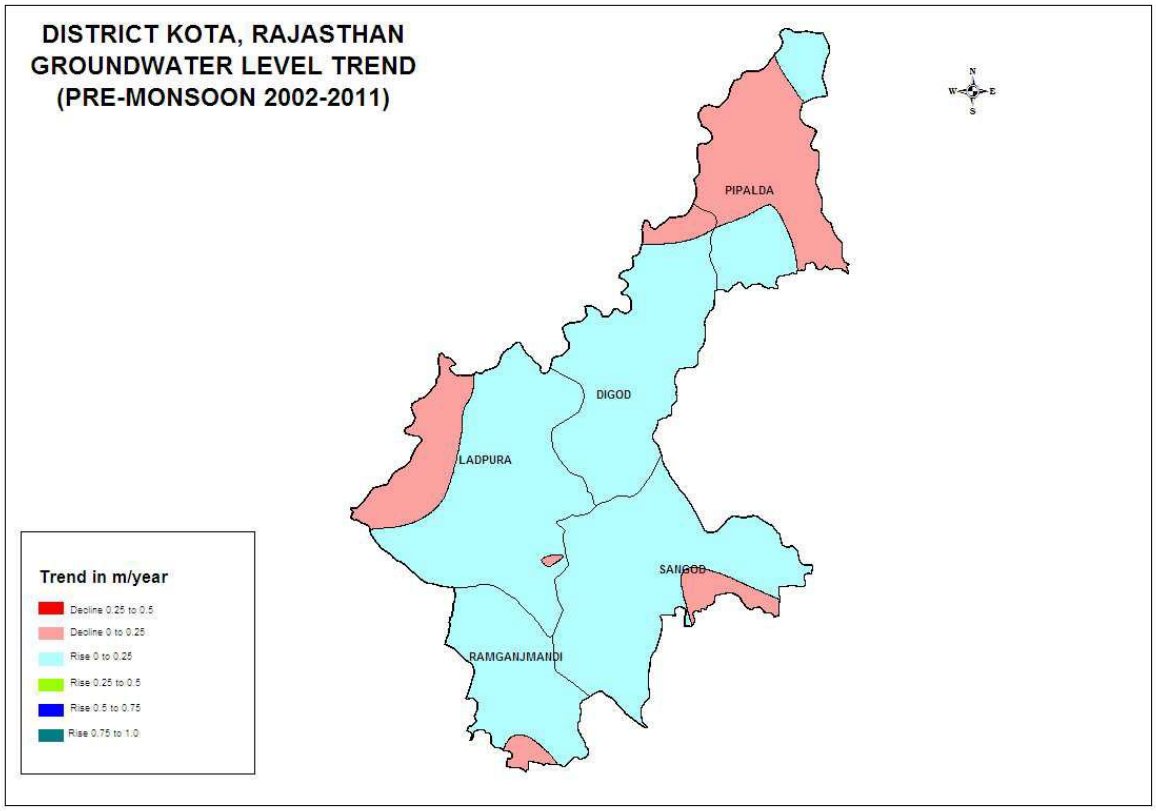


Figure-3.8: Decadal Pre-monsoon water level trend map (May, 2002 – May, 2011)

3.5.4.5 Status of Ground Water Development

Rainfall in the district is the main source of ground water recharge. Due to less rainfall and increased ground water withdrawals, ground water levels are declining in some parts of the district particularly in the northern part. Increasing urbanization and change in lifestyle have led to increased demand of water. Increasing urbanization also leads to reduced recharge. Further ground water is also an important source for irrigation in the district. The stage of ground water development for the district as a whole has reached 90% as on 31.03.2009. Out of five blocks in the district, two blocks viz. Khairabad and Sangod are overexploited and the remaining three blocks viz. Itawa, Ladpura and Sultanpur fall under Semicritical category. There is practically no scope left for further ground water development in over-exploited blocks in the district.

3.6 Water Environment

Understanding the water quality is essential in preparation of environmental impact assessment and to identify critical issues with a view to suggest appropriate mitigation measures for implementation. Ground water resources and surface water in the study area have been studied for assessing the water environment and evaluate anticipated impact of the proposed Group housing project "industrial park" with CETP.

The purpose of this study is to:

- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity; and
- Predict impact on water quality by this project and related activities.

The information required has been collected through primary surveys and secondary sources.

3.6.1 Methodology

Reconnaissance survey was undertaken and monitoring locations were finalized based on:

- Location of residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions.

Four ground water samples including project site were drawn from the study area. The samples drawn were examined for physico-chemical, heavy metals and bacteriological parameters in order to assess the present ground water quality of the area. The samples were analyzed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).

Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO_3. Parameters like temperature, Dissolved Oxygen (DO) and pH were analyzed at the time of sample collection. The analytical techniques adopted for the testing the water presented below in **Table 3.7.**

Analytical Techniques

Table 3.7

Analytical Protocol followed for Water Quality Monitoring and Analysis

S. No	Parameter	Protocol Followed	Detection Limit
1.	True Colour, Hazen Unit	IS:3025 (Part-4)	1
2.	Odour	IS:3025 (Part-5)	-
3.	Taste	IS:3025 (Part-7&8)	-
4.	Turbidity, NTU	IS:3025 (Part-10)	1
5.	pH	IS:3025 (Part-11)	2
6.	Total Hardness (as $CaCO_3$), mg/l	IS:3025 (Part-21)	6.6
7.	Iron (as Fe), mg/l	IS:3025 (Part-53)	0.3
8.	Chlorides (as Cl), mg/l	IS:3025 (Part-32)	1
9.	Fluoride (as F), mg/l	IS:3025 (Part-23)	0.1
10	Total Dissolved solids, mg/l	IS:3025 (Part-16)	25
11	Magnesium (as Mg), mg/l	IS:3025 (Part-46)	10
12	Calcium (as Ca), mg/l	IS:3025 (Part-40	1
13.	Copper (as Cu), mg/l	IS:3025 (Part-42)	0.01
14.	Manganese as Mn, mg/l	IS:3025 (Part-35)	0.01
15.	Sulphate (as SO4), mg/l	IS:3025 (Part-24)	1
16.	Nitrate (as NO3), mg/l	IS:3025 (Part-34)	1
17.	Phenolic Compounds (as C_6H_5OH), mg/l	IS:3025 (Part-43)	0.001
18.	Mercury (as Hg), mg/l	IS:3025 (Part-48) Mercury Analyzer	0.001
19.	Cadmium (as Cd), mg/l	IS:3025 (Part-41)	0.002
20	Selenium (as Se), mg/l	IS:3025 (Part-56)/IS 15303	0.01
21.	Arsenic (as As), mg/l	IS:3025 (Part-37)	0.01
22.	Cyanide (as CN), mg/l	IS:3025 (Part-27)	0.002
23.	Lead (as Pb), mg/l	IS:3025 (Part-47)	0.01
24.	Zinc (as Zn), mg/l	IS:3025 (Part-49)	0.2
25.	Anionic Detergents (MBAS), mg/l	Annex. K , IS 13428	0.1

S. No	Parameter	Protocol Followed	Detection Limit
26.	Chromium (as Cr+6), mg/l	IS:3025 (Part-52)	0.01
27.	Mineral Oil, mg/l	APHA 5520 C & IS 3025 (Part 39)	0.1
28.	Alkalinity (as CaCO3), mg/l	IS:3025 (Part-23)	0.5
29.	Aluminium (as Al), mg/l	IS:3025 (Part-55)	0.01
30.	Boron (as B), mg/l	IS:3025 (Part-29)	0.01
31.	Barium	Annex. F, IS 13428 / IS 15302	0.01
32.	Molybdenum (as Mo)	APHA Method	0.01
33.	Sulphide (as H_2S)	IS:3025 (Part-29)	0.05
34.	Nickel (as Ni)	IS:3025 (Part-54)	0.01
35.	TPH	ASTM D3921-96-2011	1
37.	MPN Coliform/ 100 ml	IS : 1622, 1981 (2003)	2
38..	Tests for detection of E.Coli	IS : 1622, 1981 (2003)	2
39.	Dissolved Oxygen, mg/l	APHA 4500 O-C	0.1
40.	Salinity, parts per thousand	APHA 2520 B	0.0155
41.	Chemical Oxygen Demand, mg/l	APHA 5220 B	4
42	Biochemical Oxygen Demand (at 20°C for 5 days), mg/l	IS:3024 (Part-44)	0.1

Table 3.8: Primary Water Quality Criteria for Designated-Best-Use-Classes

Designated-Best-Use	Category	Criteria Description
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20^{o}C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20^{o}C 3mg/l or

		less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20^{o}C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25^{o}C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria
Source: CPCB		

3.6.2 Water Sampling Locations

Water samples were collected from four location for ground water and three locations for surface water. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards as prescribed for drinking water (IS:10500). The water sampling location details are given above **Table No. 3.2b**.

3.6.3 Presentation of Results

The analytical results of water samples are given in **Table No.3.9 (a) and 3.9 (b)** for the ground water samples and surface water samples. The quality of ground water samples were compared with IS: 10500 standards.

Table No. 3.9 (a) Ground water analysis result of the study area

S.No.	Parameter	Unit	project site (GW1)	Renkyakheri (GW2)	Khera Jagpura (GW3)	Ramnagar (GW4)
1	pH	-	6.94	7.08	7.62	6.84
2	Color	Hazen	<1	<1	<1	<1
3	Odours	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable
5	Turbidity	NTU	<1	2.2	1.1	<1
6	TDS	mg/l	484	2215	612	280
7	Hardness	mg/l	272	1040	304	156
8	Calcium	mg/l	83.20	224.0	83.2	43.20
9	Magnesium	mg/l	15.55	116.64	23.33	11.66
10	Alkalinity	mg/l	192	296	228	132
11	Chloride	mg/l	37.99	299.91	69.98	17.99
12	Residual Chorine	mg/l	<0.2	<0.2	<0.2	<0.2
13	Phonic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	<0.001	<0.001
14	Fluoride	mg/l	0.38	0.58	0.49	0.24
15	Sulphate	mg/l	55.84	221.45	96.86	18.97
16	Nitrate	mg/l	38.50	421.20	71.63	20.19
17	Zinc	mg/l	<0.01	<0.01	<0.01	<0.01
18	Lead	mg/l	<0.01	<0.01	<0.01	<0.01
19	Manganese	mg/l				
20	Iron	mg/l	<0.01	<0.01	<0.01	<0.01
21	Cadmium	mg/l	<0.003	<0.003	<0.003	<0.003
22	Mercury	mg/l	<0.001	<0.001	<0.001	<0.001
23	Boron	mg/l	<0.1	<0.1	<0.1	<0.1
24	Copper	mg/l	<0.01	<0.01	<0.01	<0.01
25	Sulphide	mg/l	<0.2	<0.2	<0.2	<0.2
26	Aluminium	mg/l	<0.01	<0.01	<0.01	<0.01
27	Nickel	mg/l	<0.01	<0.01	<0.01	<0.01
28	Arsenic	mg/l	<0.005	<0.005	<0.005	<0.005
29	Selenium	mg/l	<0.01	<0.01	<0.01	<0.01
30	Total chromium	mg/l	<0.01	<0.01	<0.01	<0.01
31	E coli	mg/l	Absent	Absent	Absent	Absent

Table No. 3.9 (b) Surface water analysis result of the study area

S. No.	Parameter	Unit	Alniya Dam (SW1)	Renkyakheri (SW2)	Right Main Canal (SW3)
1	pH		7.49	7.48	7.44
2	Turbidity	NTU	<1	1.0	1.6
3	Odours		Agreeable	Agreeable	Agreeable
4	Taste		Agreeable	Agreeable	Agreeable
5	Total Hardness	mg/l	120	76	244
6	Total Alkalinity	mg/l	108	68	180
7	Chloride	mg/l	12.00	10.00	18.00
8	Sulphate	mg/l	19.32	20.31	71.46
9	Nitrate	mg/l	4.06	7.07	48.76
10	Fluoride	mg/l	0.26	0.28	0.70
11	BOD	mg/l	3.5	2.0	7.7
12	COD	mg/l	13	9	23
13	Phonic Compounds as (C_6H_5OH)	mg/l	< 0.001	< 0.001	< 0.001
14	Lead	mg/l	< 0.01	< 0.01	< 0.01
15	Iron	mg/l	< 0.01	< 0.01	< 0.01
16	Arsenic	mg/l	< 0.005	< 0.005	< 0.005
17	Cadmium	mg/l	< 0.003	< 0.003	< 0.003
18	Total Chromium	mg/l	< 0.01	< 0.01	< 0.01
19	Mercury	mg/l	< 0.001	< 0.001	< 0.001
20	Copper	mg/l	< 0.01	< 0.01	< 0.01
21	Zinc	mg/l	< 0.01	< 0.01	< 0.01
22	Selenium	mg/l	< 0.01	< 0.01	< 0.01
23	Oil & Grease	mg/l	<5	<5	<5
24	Colour	Hazen	<1	<1	<1
25	Dissolved Solids	mg/l	208	144	423
26	Residual Free Chlorine	mg/l	<0.2	<0.2	<0.2
27	Boron	mg/l	<0.1	<0.1	<0.1

28	Calcium	mg/l	32.0	19.20	78.40
29	Magnesium	mg/l	9.72	6.80	11.66
30	Dissolved Oxygen	mg/l	3.7	3.2	3.8

3.6.4 Interpretation

3.6.4.1 Ground Water

- During Study period, pH values observed were in the range of 6.84 to 7.62 with total dissolved solids in the range of 280 mg/l to 2215 mg/l. Total hardness was in the range of 156 mg/l to 1040 mg/l. The concentration of chlorides, & sulphates in all the samples was less than prescribed limits recommended for drinking water source.
- The TDS of all the ground water samples is above the desirable limit but within permissible limit with highest value at Renkyakheri village (2215 mg/L). Similarly, the total hardness of the samples is above the desirable limit with highest value at location Renkyakheri village (1040 mg/L). The value of Calcium is found higher at Renkyakheri village (224.0mg/L) and the values are above desirable limit but within permissible limit in all the locations.
- The values of chlorides are found higher at Renkyakheri village. No traces of heavy metals were found at the sampling locations. The water quality at most of the sampling locations has shown similar characteristics and shows slightly deranged values which is expected be due to anthropogenic or geogenic sources.
- The concentration of chlorides, sulphates, and hardness and Total Dissolved solids doesn't show many lateral variations. They are found to be below the permissible limits of the recommended drinking water standards.
- The ground water analysis results are compared with the drinking water quality standards of IS: 10500-2012. The water analysis results indicate that the ground water at all locations is free from heavy metals.

3.6.4.2 Surface Water

- During the study period, pH values observed were in the range of 7.44 to 7.49 with total dissolved solids in the range of 144 mg/l to 208 mg/l. The dissolved oxygen values are in between 3.2 mg/l to 3.8 mg/l, while the BOD levels are in the range of 2.0 to 7.7 mg/l.

- The surface water analysis results are compared with the surface water quality standards of CPCB and results indicate that the surface water at all locations is Category A (Drinking water source without conventional treatment but after disinfection). heavy metals.

3.7 Soil Quality

Soil may be defined as a thin layer of earth's crust which serves as a natural medium for the growth of plants. It is unconsolidated mineral matter that has been subjected to and influenced by genetic and environmental factors, such as parent material climate organism and physiochemical action of wind, water and sunlight all acting over a long period of time. Soil differs from the parent materials in the morphological, physical, chemical and biological properties.

For studying soil quality of the region, a sample was collected to assess the existing soil conditions in and around the project area.

The sample was collected by ramming a core-cutter into the soil up to a depth of 90 cm. The present study on the soil quality establishes the baseline characteristics and identifies the incremental concentrations if any, due to the proposed project. The objective of the sampling is:

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

The soil sample was collected from three different depths viz. 30 cm, 60 cm and 90 cm. The samples was then packed in a polythene plastic bag and sealed.

3.7.1 Data Generation Methodology

For studying soil profile of the region, sampling locations were selected to assess the existing soil conditions in and around the plant area representing various land use conditions. The physical, chemical and heavy metal concentrations were determined.

The present study of the soil profile establishes the baseline characteristics and this will help in future identification of the incremental concentrations if any, due to the operation of the proposed industrial park and CETP.

Seven locations in and around the proposed project were selected for soil sampling. The details of the monitoring locations are given in **Table No. 3.2d.** At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm and 90 cm below the surface and are homogenized. This is in line with IS: 2720 and IS: 9497 and Hand book of Method in Environmental Studies by S.K. Maiti. The homogenized samples were analyzed for physical and chemical characteristics. The samples have been analyzed as per the established scientific methods for physico-chemical parameters.

The analytical results of soil samples are given in **Table No.3.10.**

Table 3.10: Soil analysis results (December 2017 to February 2018)

S.NO.	PERAMETAR	UNIT	S1	S2	S3	S4
1	Colour	-	Brown	Brown	Brown	Brown
2	pH (1:5 solution)	-	6.89	7.80	7.44	6.72
3	Electrical Conductivity	µs/cm	264	224	205	303
4	Bulk Density	Gm/cm^3	1.39	1.35	1.12	1.45
5	Organic Carbon	%	0.22	0.35	0.79	0.12
6	Sodium (Na)	%	0.074	0.061	0.024	0.074
7	Potassium (K)	%	0.0046	0.012	0.03	0.037
8	Moisture Content	%	16.36	11.44	11.35	19.26
9	Total Nitrogen	%	0.10	0.20	0.23	0.183
10	Available Phosphorus	Kg/ha	4.34	1.80	1.43	3.11
11	Organic Matter	%	0.39	0.60	1.37	0.20
12	Total Soluble Chloride	mg/kg	750	300	200	750
13	Total Soluble Sulphate	%	0.93	0.56	0.29	2.03
14	Clay	%				
15	Silt	%				
16	Sand	%				

Table No. 3.11
Standard Soil Classification

S. No.	Soil Test	Classification
1.	pH	<4.5 Extremely acidic 4.51- 5.50 Very strongly acidic 5.51-6.00 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 Neutral 7.31-7.80 slightly alkaline 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline 9.01 very strongly alkaline
2.	Salinity Electrical Conductivity (Mmhos/cm) (1ppm = 640 Mmho/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 (%)	Up to 0.2: very less 0.21-0.4: less 0.41-0.5 medium 0.51-0.8: on an average sufficient 0.81-1.00: 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

Source: Hand Book of Agriculture, Indian Council of Agricultural Research

3.7.4 Interpretation

The nitrogen concentrations are in the range of 0.10 to 0.23% indicating that soil has good to better quantities of nitrogen. The phosphorous concentrations are in the range of 0.88 Kg/Ha to 4.34 Kg/Ha indicating that soil has average to sufficient quantities of phosphorus.

3.8 Noise Environment

The environmental assessment of noise from the project activity and vehicular traffic can be undertaken by taking into consideration various factors like potential damage to hearing, physiological responses and annoyance and general community responses.

The impact of noise sources on the communities depend on the following:

- Characteristics of noise sources (instantaneous, intermittent or continuous in nature). It can be observed that steady noise is not as annoying as one which is continuously varying in loudness;
- The time of day at which noise occurs, for example high noise levels at night in residential areas are not acceptable because of sleep disturbance; and
- The location of the noise source, with respect to noise sensitive land use, which determines the loudness and period of exposure.

The main objective of noise monitoring in the study area is to establish the baseline noise levels, and assess the impact of the total noise expected to be generated by the construction and operation of the project activity around it.

3.8.1 Identification of Sampling Locations

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in and around the proposed plant site area. Noise at different noise generating sources has been identified based on the activities in the village area and ambient noise due to traffic.

The noise monitoring has been conducted for determination of ambient noise levels at eight locations in the study area for the study. The noise levels at each location were recorded for 24 hours. The details of noise monitoring locations in eight areas are given in above **Table No.3.2c.**

3.8.2 Method of Monitoring

Noise levels are more annoying in the night time particularly in the residential areas. The environmental impact of noise can have several effects varying from annoyance to hearing loss depending on loudness of noise levels. The monitoring for noise levels were

done in 8 locations keeping considering the population and traffic of the area. The locations are depicted in **Figure 3.2c** and levels recorded stated in **Table 3.12.**

3.8.3 Presentation of Results

The noise level recorded in the study area is given in **Table 3.12.**

Table 3.12

S. No.	Sampling Location	Date Of Sampling	Parameters		
			Leq Day	Leq Night	Ldn Day And Night
1.	N-1 Project Site	10.12.2017	67.5	46.6	65.8
2.	N-2 Bhagat Public Sr. Secondary School, Alniya	12.12.2017	51.6	42.6	51.1
3.	N-3 Shampura	14.12.2017	50.3	42.4	49.1
4.	N-4 Khanpuria	16.12.2017	48.8	42.0	47.8
5.	N-5 Maharishi Arvind Public School, Ranpur	18.12.2017	52.8	41.9	51.9

Table 3.13: Noise Level as Per CPCB Norms

Sr. No.	Category of Area	Noise Level Leq. dB (A)	
		Day time	*Night time*
1.	Industrial area	*75*	*70*
2.	Commercial area	*65*	*55*
3	Residential area	*55*	*45*
4	Silence Zone	*50*	*40*

Note: 1.Day time is reckoned in between 6 a.m. and 9 p.m.
2.Night time is reckoned in between 9 p.m. and 6 a.m.

3.Silence zone is referred as areas upto 100 meters around such premises as hospitals,educational institutions and courts.The Silence zones are to be declared by the Competent Authority.
Use of vehicular horns,loudspeakers and bursting of crackers shall be banned in these zones.
4.Mixed categories of areas should be declared as one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.

3.8.4 Interpretation

Ambient noise levels were measured at 5 locations around the proposed project site. Minimum and maximum noise levels recorded during the day time were from 48.8 Leq dB and 67.5 Leq dB respectively and Minimum and maximum level of noise during night time was 41.9 Leq dB and 46.6 Leq dB respectively. Thus noise levels at all locations were observed to be within the prescribed limits.

3.9 Socio-Economic Environment

This section of the EIA report deals with Socio-Economic Impact Assessment of the Proposed “Innowise Industrial Park" at Khasra No: 35, Village: Alnia, Tehsil: Ladpura, District: Kota (Rajasthan).to be developed by M/s Acechamps Industrial Pvt. Ltd. The broad objectives of the socio-economic impact assessment are as follows:

a) To study the socio-economic status of the people living in the study area of the Proposed “Innowise Industrial Park".

b) To assess the impact on socio-economic environment due to Proposed “Innowise Industrial Park".

c) To assess the impact of the project on State Gross Domestic Product (SGDP)

d) To evaluate the community development measures proposed to be taken up by the Project proponent, if any.

e) To suggest Community Development measures needs to be taken for the study area

3.9.1 Methodology

The methodology adopted for impact assessment is as follows:

a) The details of the activities and population structure have been obtained from Census 2011 and analyzed.
b) Primary data was collected by a door-to-door survey in urban area and household's living therein. The data collected during the above survey was analyzed to evaluate the prevailing socio-economic profile of the area.
c) Based on the above data, impacts due to construction operation on the community have been assessed and recommendations for further improvement have been made.

3.9.2 Concept & Definition

a) Study Area: The study area, also known as impact area has been defined as the sum total of core area/project area and buffer area with a radius of 10 Kilometers from the periphery of the core area/project is. The study area includes all the land marks both natural and manmade falling herein.

b) Household: A group of persons who normally live together and take their meals from a common kitchen are called a household. Persons living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated persons live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each such person is treated as a separate household. There may be one member households, two member households or multi-member households.

c) Sex ratio: Sex ratio is the ratio of males to females in a population. It is expressed as number of females per 1000 males.

d) Literates: All persons aged 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.

e) Literacy rate: Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.

f) Labour Force: The labour force is the number of people employed and unemployed in ageographical entity. The size of the labour force is the sum total of persons employed and unemployed. An unemployed person is defined as a person not employed but actively seeking work. Normally, the labour force of a country consists of everyone of working age (around 14to 16) and below retirement (around-65) that are participating workers, that is people actively employed or seeking employment. People not counted under labour force are students, retired persons, stay-at home parents, people in prisons and discouraged workers.

g) Work: Work is defined as participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. The work may be part time or full time or unpaid work in a farm, family enterprise or in any other economic activity.

h) Worker: All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation or milk production even solely for domestic consumption are also treated as workers.

i) Main Workers: Those workers who had worked for the major part of the reference period (i.e. 6 months or more) are termed as Main Workers.

j) Marginal Workers: Those workers who did not work for the major part of the reference period (i.e. less than 6 months) are termed as Marginal Workers

k) Work participation rate: The work participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

3.9.3 Findings of the study

Description of the Study Area:

The study area of the Proposed **"Innowise Industrial Park"** at Khasra No: 35, Village: Alnia, Tehsil: Ladpura, District: Kota (Rajasthan). to be developed by **M/s Acechamps**

Industrial Pvt. Ltd. falls in district Kota. Ladpura Tehsil of Kota District area is also falling in the 10 KM radius of the project site. Detailed administrative setup is given in figure 3.1. The study area is involves villages,2 Villages are falling within 2 Km radius of project site and 43villages& 2 urban settlement are from 2 to 10 Km buffer zone, Total 40 villages, 2 urban settlement & 5 uninhabited villages within study area.

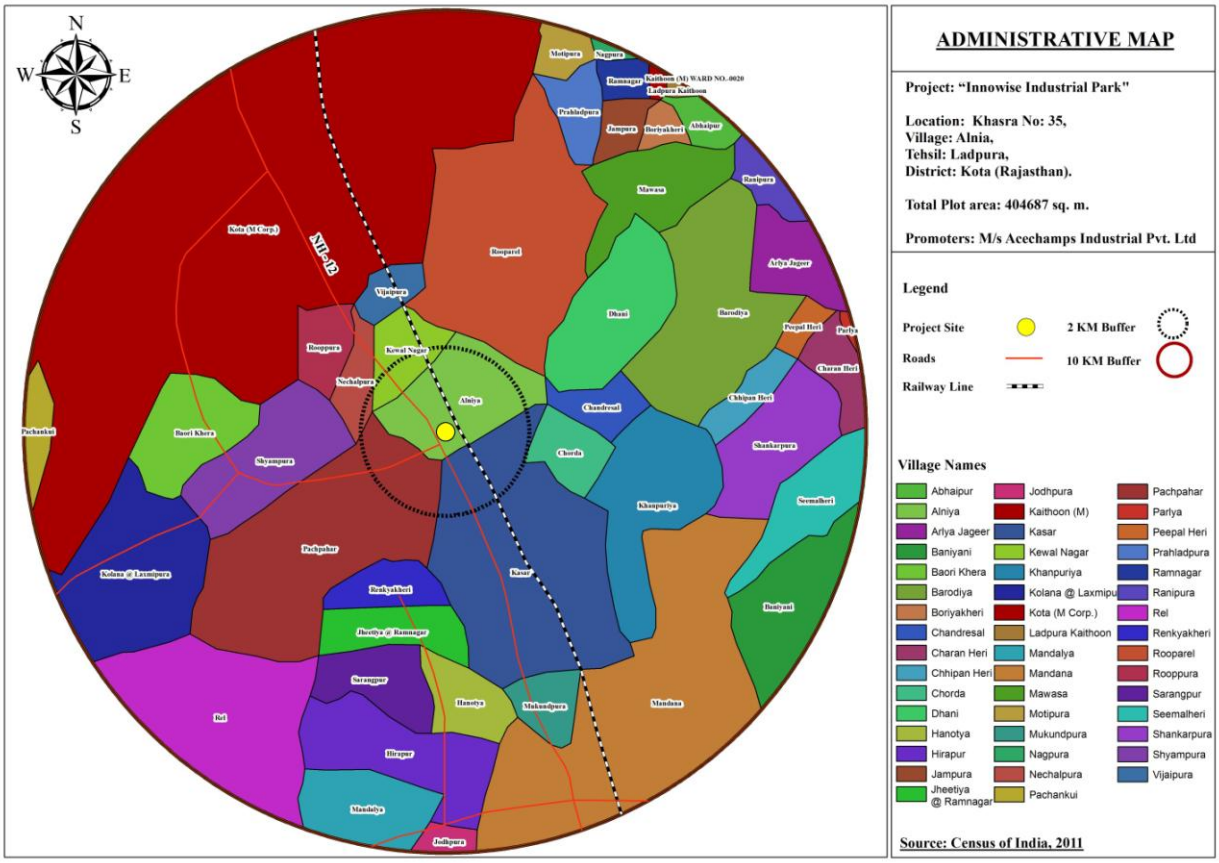


Figure 3.9Thematic Map depicting Administrative Setup

Table 3.14 Demographic Profile of the Villages in the study area

S/n	Demographic Feature	Study area		
		Core zone (Project area)	0-2 Km Buffer	2-10 Km Buffer
1	Total Population	0	4191	1046695
2	Household	0	846	218809
3	Children	0	648	129154

S/n	Demographic Feature	Study area		
		Core zone (Project area)	0-2 Km Buffer	2-10 Km Buffer
4	Worker	0	1473	346053
5	Non Worker	0	2718	700642
6	Main Worker	0	1409	308011
7	Cultivator	0	151	9150
8	Agricultural labour	0	134	7393
9	Household worker	0	26	11340
10	Other Worker	0	1098	280128

*****figures in parenthesis represent percent value

Demographic composition:

According to Census 2011, Core zone doesn't have any human habitation however 2 Km buffer and 10km buffer have the total population of 4191Individuals &1046695Individuals respectively. The distribution of population is depicted in figure-3.1. 53 percent of total population is male and 47 percent are female,this creates a gender gap of 6percent. The study area also involves rural villages of Kota District, Rajasthan as depicted in **Figure 3.1.**

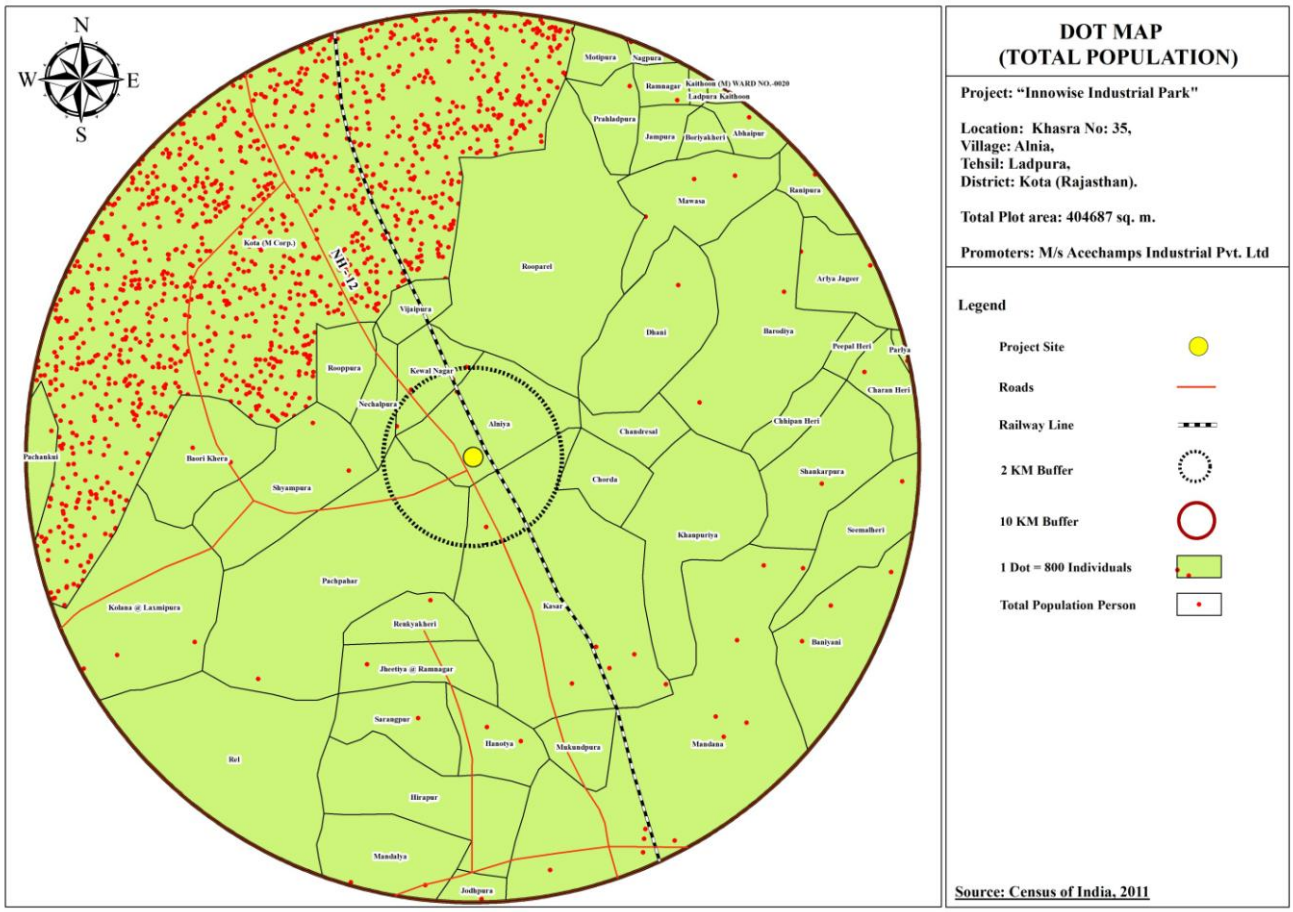


Figure 3.10Thematic Map depicting Population distribution

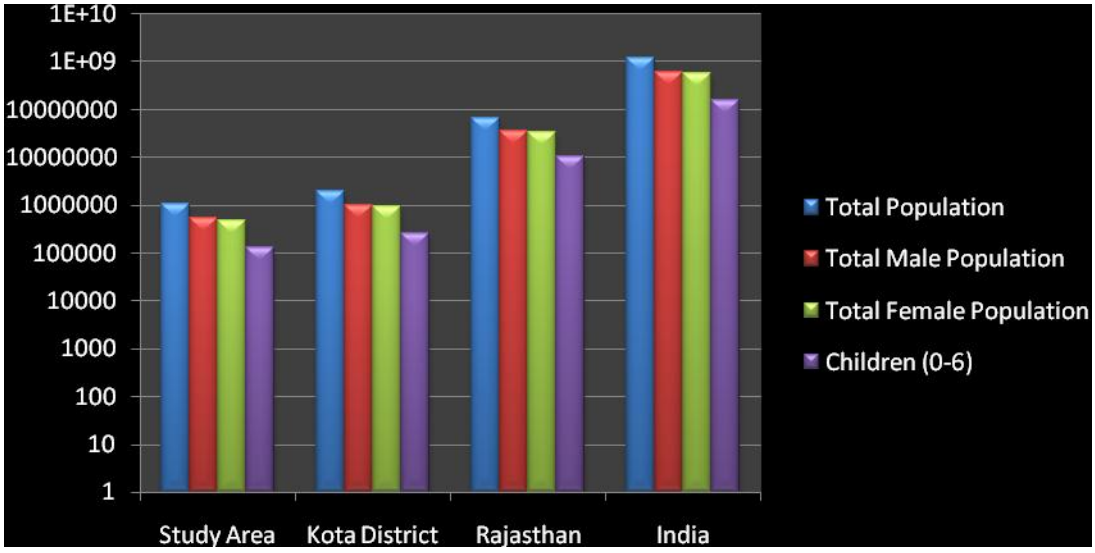


Figure 3.11 Total Populations of Study Area, District, State and India

Sex Ratio: The sex ratio works out to 897 females per 1000 males for 2 Km buffer and 897 for 10 Km buffer. The sex ratio of Kota District is 911&Rajasthan State is 928. The sex ratio less than 928 females per thousand males were in 17villages.

The distribution of sex ratio is given in figure- 3.4& 3.5. The details are given in table 3.2.

Table 3.15 Male & Female of the Villages in the study area

S/n	Demographic Feature	Study area		
		Core zone (Project area)	0-2 Km Buffer	2-10 Km Buffer
1	Male	0	2209	551853
2	Female	0	1982	494842
3	Sex ratio	0	897	897

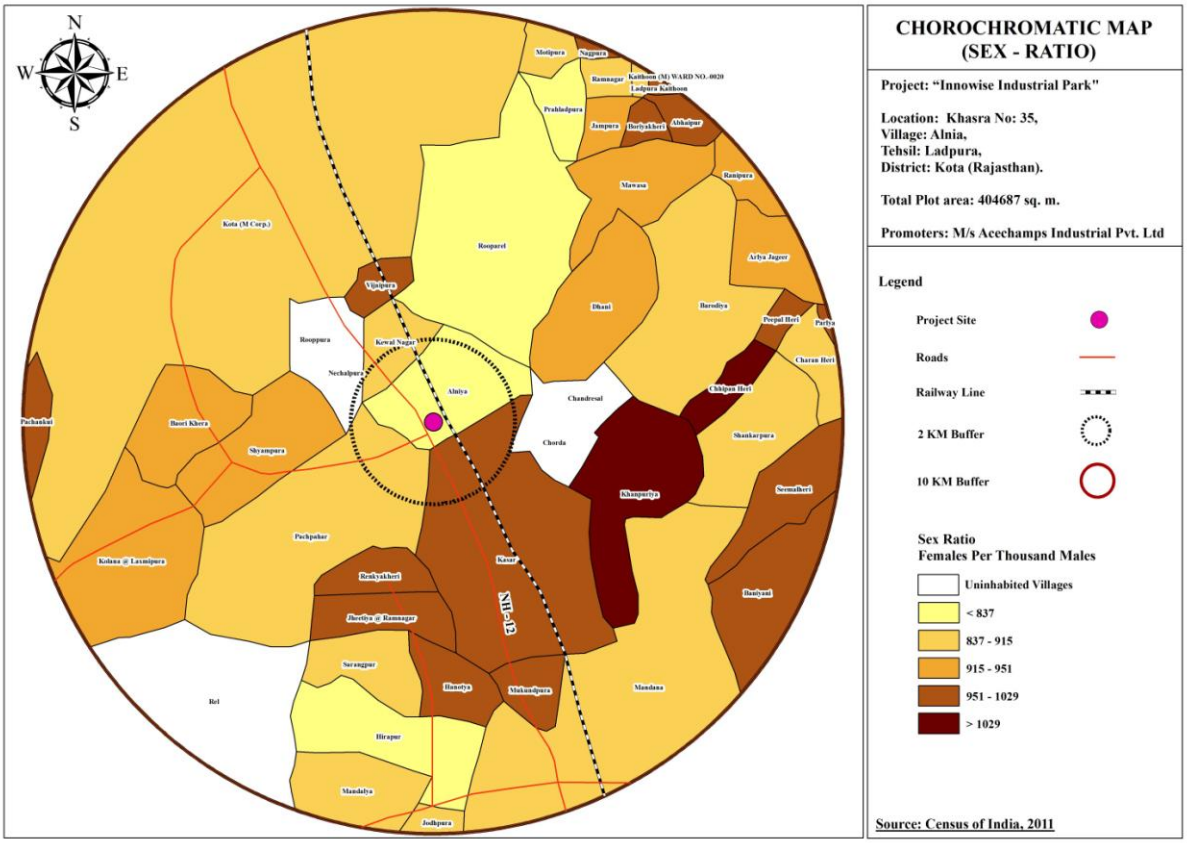


Figure 3.12Thematic Map depicting Distribution of Sex-ratio

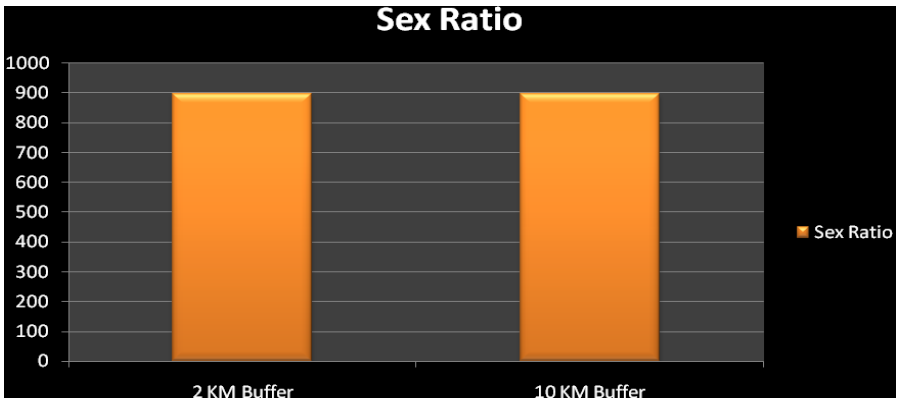


Figure 3.13 Chart Depicting Sex Ratio in 2 & 10 Km Buffer

Literates and literacy rate:

The illiteracy in the 2 Km and 10 Km buffer zone of study area are 39&28 percent respectively, while district Kota and state Rajasthan have illiteracy percentage as 33% and 34 % respectively. The literates 2 Km and 10 Km buffer zone of study area are 61&72percentage respectively. Literates are 67 % in district Kota while 66 % in Rajasthan. Distributions of Literates & Illiterates are given in Figure-3.6 & 3.7.

Table 3.16 Literate & Illiterate in the Villages of the study area

S/n	Demographic Feature	Study area		
		Core zone (Project area)	2 Km Buffer	2-10 Km Buffer
	Literate	0	2573(61)	753850 (72)
	Illiterate	0	1618 (39)	292845(28)

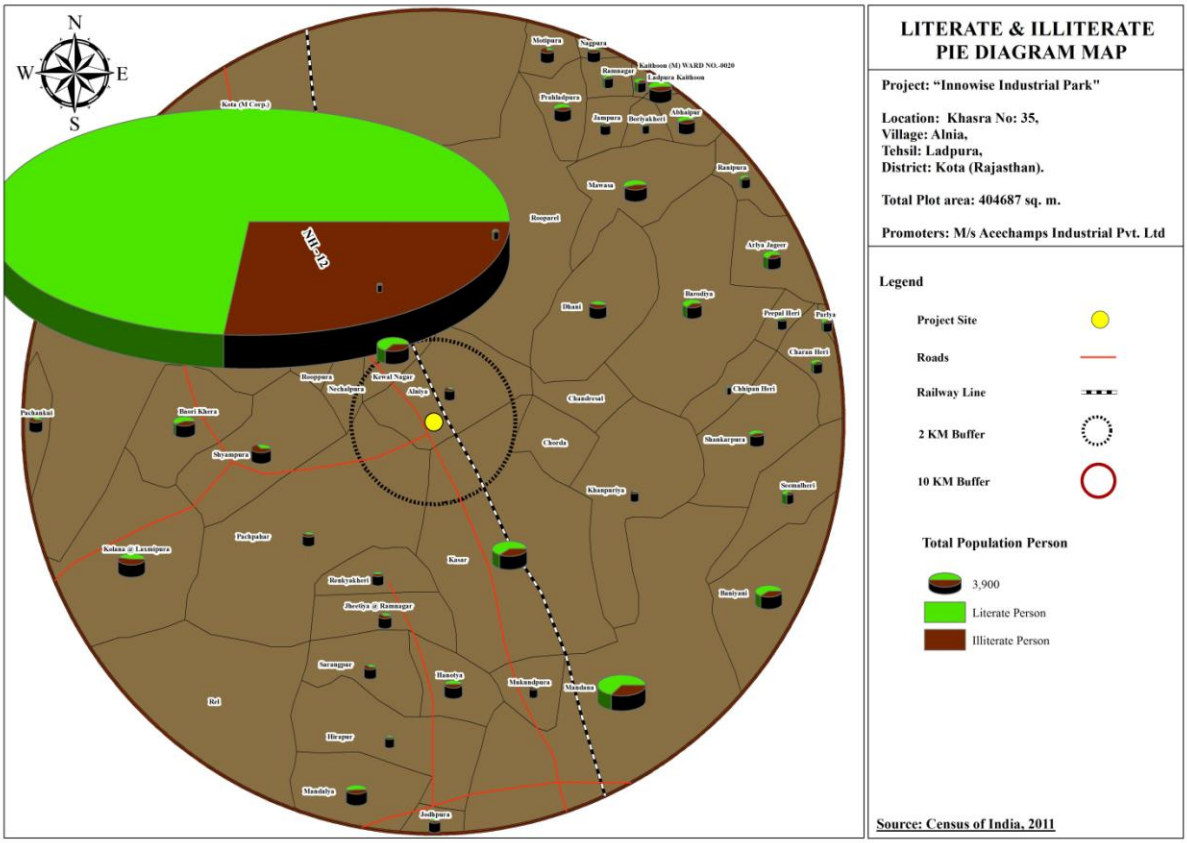


Figure 3.14 Thematic Map depicting Literate & Illiterate

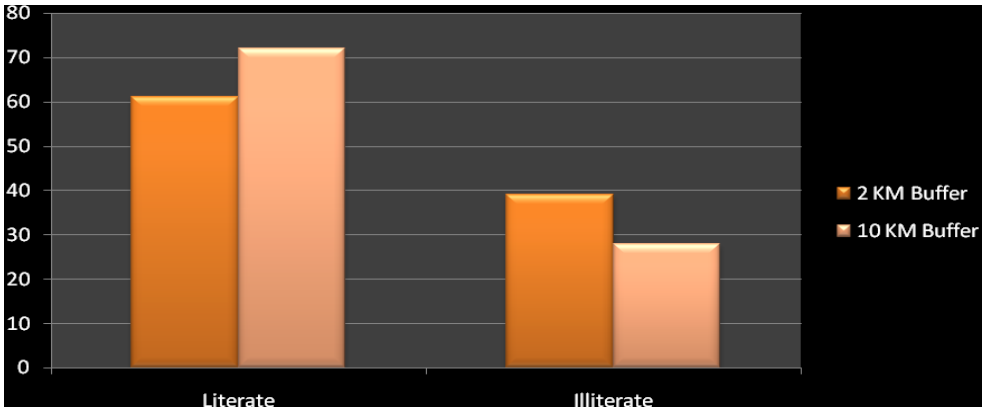


Figure 3.15 iterates& Illiterates in 2 & 10 Km Buffer

Table 3.17 Demography of Study Area, District Kota, Rajasthan, India

S/n	Item	Number of Individuals	%	Number of Individuals	%	Number of Individuals	%	Number of Individuals	%
1	Name of area	**Study area**		**KotaDistrict***		**Rajasthan***		**India***	
2	Type of Population	Rural & Urban							
3	Number of Household	219655		396501					
4	Total Population	1050886		1951014		68548437		1.2×10^9	
5	Total Male Population	554062	53	1021161	52	35550997	52	6.2×10^8	52
6	Total Female Population	496824	47	929853	48	32997440	48	5.9×10^8	48
7	Persons (0-6)	129802	12	255056	13	10649504	16	1.6×10^8	13

8	Total workers	347526	33	748811	38				
9	Main workers	309420	89	577548	77				
10	Non workers	703360	67	1202203	62				

Source: Census of India 2011

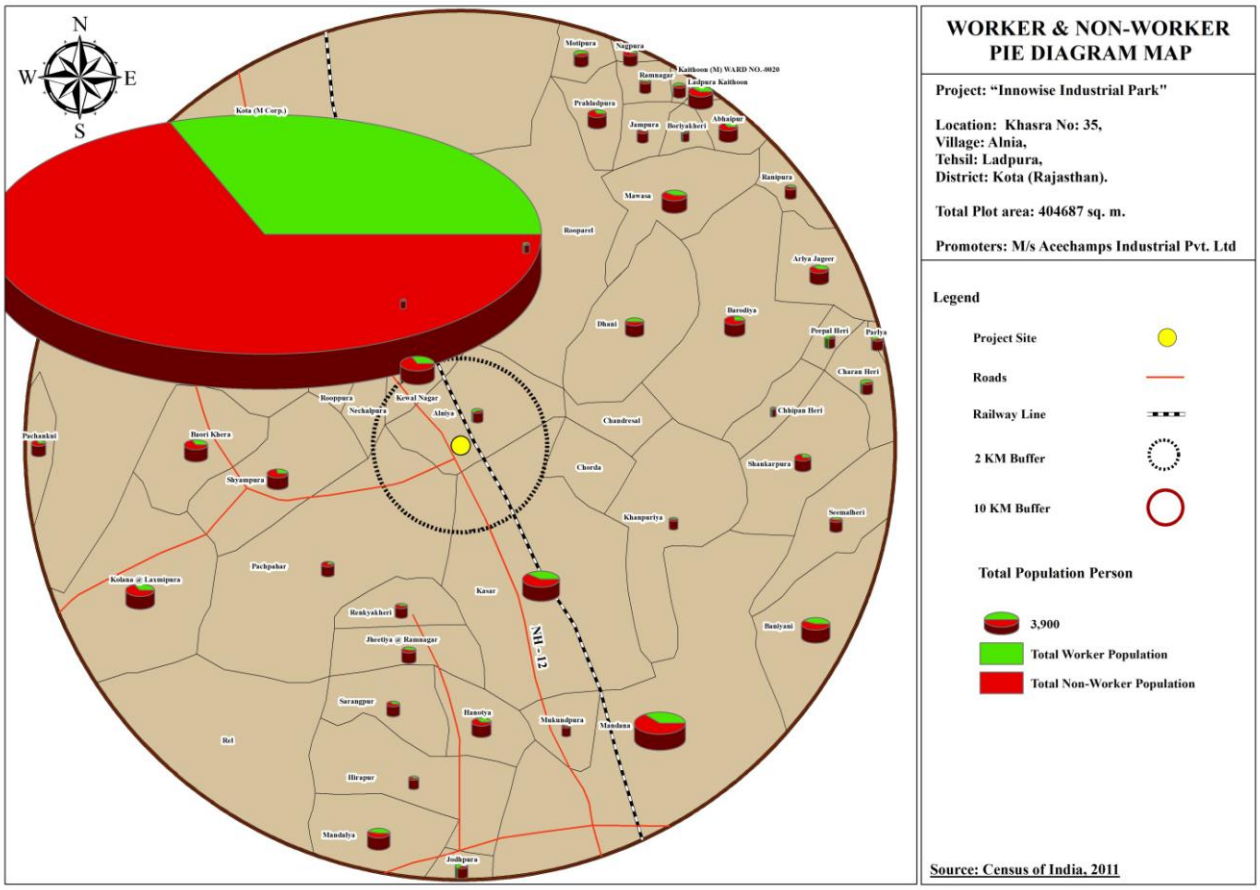


Figure 3.16 Thematic Map depicting Distribution of Worker & Non Worker

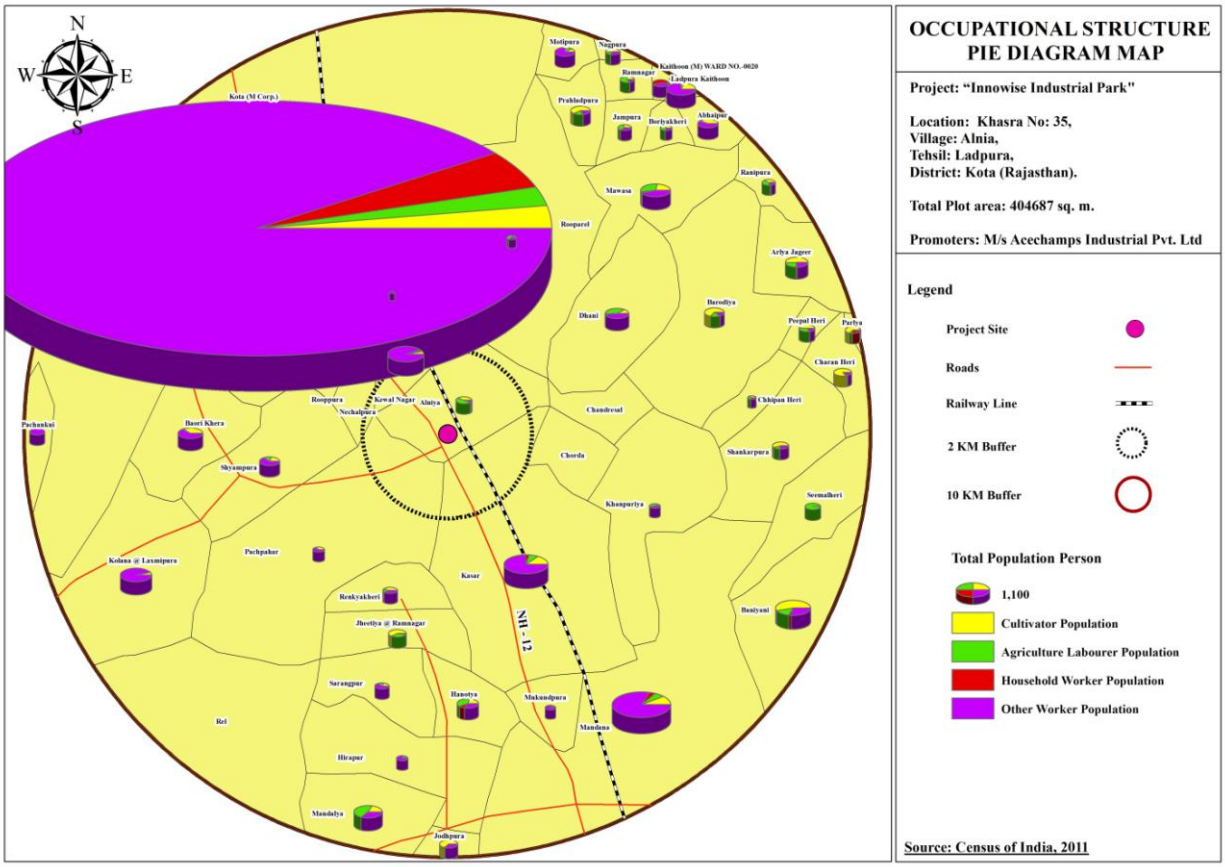


Figure 3.17 Thematic Map depicting Distribution of Occupational Structure

3.9.4 Social Infrastructure Available:

The Proposed **"Innowise Industrial Park"**at Khasra No: 35, Village: Alnia, Tehsil: Ladpura, District: Kota (Rajasthan). To be developed by **M/s Acechamps Industrial Pvt. Ltd.**The project site is in district Kota.

Site surroundings and Connectivity details of the proposed project are given in **Table-3.18**.

Table-3.18 Site Surroundings and Connectivity Details

S. No.	Connectivity & Site Surroundings

	Description		**Distance and Direction**
1	Nearest Railway Station	AlniyaRailway Station	0.50 km towardsNorth
2	Nearest Airport	Kota Airport	15.35 Km towards North West
3	Nearest Village	Alniya Kewal Nagar Kasar Nechalpura	1.50 km towards South East 0.75 km towardsWest 3.55km towardsSouth East 2.50km towards West
4	State Boundary	Rajasthan –Madhya Pradesh Border	30.80km towards South West.
5	Nearest Highway	NH-12	0.50km towards SouthWest
6	Water Bodies	Chandrelohi River	0.65 km South East
7	Nearest School & College	Alpha School Kewal Nagar Adrash State High School Kewal Nagar Bhagat Public Sen Sec School	0.90 km towards South West 1.05km towards South West 1.90 km towards South East
8	Nearest Hospital	Rajkiy Aayurvedic Chikitsalay, jagpura Sudha Hospital Shubham Clinic RajkiyaPrathmikSwasthya Kendra	4.95 km towards North West 4.25km towards North West 7.20 km towards West 5.50 km towards South East
9	Places of worship	Shree Devnarayan mandir Chattaneshwar Mahadev TejaJi Temple Alniya Station MataJi TempleAlniya Hanuman Ji Temple	1.00km towards South West 1.10km towards North East 0.75 km towards North East 1.50km towards South East 4.30 km towards South East

Source: Google Earth The socio economic data from all the study villages is given in table ***3.24***

3.10 Biological Environment

Biodiversity study of the proposed project area was carried out to understand the status of predominant floral and faunal groups *i.e.* trees, shrubs, herbs, grasses, herpetofauna, avifauna and mammals. To collect data and information on specific components of the ecological system and pertinent issues widely used standard scientific methods were adopted. Rapid field surveys were undertaken during Dec. 2017 for collecting relevant data.

The objectives of the present study were as follows:

- To identify the floral and faunal diversity,
- To assess nature and distribution of the vegetation in the area,
- To identify the endangered species of flora and fauna, if any
- To prepare conservation plan for Schedule I fauna , if any

3.10.1 Methodology

Extensive literature review was carried out to indentify the representative spectrum of threatened species, population and ecological communities listed by IUCN, WCMC, ZSI, BSI and Indian wild Life Protection act, 1972. Biodiversity study of the Proposed "innowise industrial park & CETP" at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan), was carried out to understand the status of predominant floral and faunal groups i.e. trees, shrubs, herbs, grasses, herpetofauna, avifauna and mammals.

Table 3.25 Methods used for study of flora & fauna

Taxa	Sampling Methods
Plants	Quadrate sampling and enumeration
Butterflies	Transect, Visual encounter survey
Amphibians	Visual encounter survey (search)
Reptiles	Visual encounter survey (search)
Birds	Point count, opportunistic observation
Mammals	Tracks and signs, and visual encounter survey

3.10.2 Fauna:

3.10.2.1 Avifauna

Species search and census: Standard methods were followed to survey the avifauna. Point count method was followed for counting the birds. Opportunistic surveys were also carried out with respect to avifaunal checklist. Identification by calls was also made for species which were not directly encountered or were hidden in the vegetation or canopy. Secondary data collected from the literature was also included in the present given list.

3.10.2.2 Herpetofauna

Amphibians and reptiles recorded during area searches were identified by visual characteristics. Aquatic searches involved examining each type of aquatic habitat.

3.10.2.3 Mammals

Presence of mammals was documented by using both direct sightings and indirect evidences i.e. animal burrows/holes, scats, pellets, droppings and tracks Opportunistic sightings were also included. Circular Plots were used to search indirect evidences.

Floristic studies were conducted during Dec. 2017 to know the presence of any endangered/threatened/endemic plant species study area of the existing industry (10-km radius).

The data collected in the field was analyzed for secondary parameters such as density, frequency and abundance following standard phyto-sociological methods. Shannon-Wiener diversity index (Shannon and Wiener, 1963) was calculated for all life forms as follows:

Table 3.26 Estimation of phyto-sociological parameters	
1	Frequency (%) = (No. of quadrats of occurrence of the species X 100) / Total No. of quadrats sampled

2	Abundance = Total No. of individuals of the species / No. of quadrats of Occurrence
3	*Density = Total No. of individuals of the species / Total No. of quadrats sampled
4	Relative Frequency = (Frequency of the given species X 100) / Sum of all frequencies
5	Relative Density = (Density of the given species X 100) / Sum of all densities
6	Relative Abundance = (Abundance of species X 100) / Sum of all abundances
7	Basal Area = $(GBH)^2$ / 4Π
8	Dominance = Total Basal Area / Total area sampled
9	Relative Dominance = (Dominance of given species X 100) / Dominance of all species
10	Important Value Index (I.V.I.) = Relative Density + Relative Frequency + Relative Dominance
Note: *Density refers to the number of individuals per unit area of a site.	

3.10.3 Statistical Analysis

Shannon-Wiener diversity index (Shannon and Wiener, 1963) was calculated for all life forms following:

Shannon- Wiener Information Function: $D = -\Sigma\ pi\ ln\ pi$

Where: i = an index for the number of species sampled, $p_i = n_i/N$ =percentage of species i in the entire sample (N) of individuals, and ln = natural log. Multiply the percentage (or proportion) of each species in the sample times the natural log of that same value, sum the products across all species, and then multiply by minus 1.

3.10.4 Biodiversity Profile of The Core Zone (Project Site)

Khejari, Neem and Subabool were found along with the boundary and within the site premises.

Table -3.27 Plants reported from Core Zone (Project site)

Trees			
S.No.	**Common name**	**Vernacular Name**	**Family**
1	Neem	*Azadirachta indica*	Meliaceae
2	Subabool	*Leucaena leucocephala*	Fabaceae (Mimosoideae)

3	Khejari	*Prosopis cineraria*	Fabaceae
Shrubs			
1	Kaner	*Nerium oleander*	Apocynaceae
2	Jhar Beri	*Ziziphus nummularia*	Buckthorns
3	Aak	*Calotropis procera*	Dogbanes
Herbs			
1	Pili Kantili	*Argemone Mexicana*	Papaveraceae
2	Tarwar	*Cassia auriculata*	Caesalpinioideae
3	Dhatura	*Datura stramonium*	Solanaceae
Grass			
1	Doob ghas	*Cynodon dactylon*	Poaceae
2	Makra	*Dactyloctenium aegyptium*	Poaceae

A total of 3 species of trees (with the boundary wall and within the site premises) ware found during the survey, trees which are coming into the center will be uprooted.

CORE ZONE

Low abundance of vegetation at site does not support many fauna however some common bird species (i.e. four species) found / observed flying across site were, Common crow, Common myna, Red vented bulbul and Green bee eater.

3.10.5 Biodiversity profile of Buffer Zone (i.e. 10 km radius from the periphery of the project)

3.10.5.1 Flora:

Project buffer area recorded with 107 species of flora in which consist of 51 tree species, 30 herbs & shrubs, 13 grasses and climber species each. Detail list is given below table.

Table - 3.32 List of floral species recorded in the Buffer Zone

S. No.	Habit	Scientific Name	Local Name	Family
1	Tree	*Acacia catechu*	Khair	Leguminaceae
2	Tree	*Acacia leucophloea*	Ronz	Mimosaceae
3	Tree	*Acacia nilotica*	Mitha babul	Mimosaceae
4	Tree	*Acacia Senegal*	Khumtha, Kumat	Mimosaceae
5	Tree	*Acacia tortilis*	--	Leguminaceae
6	Tree	*Aegle Marmelos*	Bel	Rutaceae
7	Tree	*Albizia procera*	Garra	Mimosaceae
8	Tree	*Anogeissus latifolia*	Dhuvda	Combretaceae
9	Tree	*Anogeissus pendula*	Kaldhl	Combrelaceae
10	Tree	*Anona squamosa*	Shitafar	Anaonaceae
11	Tree	*Azadirachta indica*	Neem	Meliaceae
12	Tree	*Bauhinia racemosa*	Jhingha, katmauli	Caesalpiniaceae
13	Tree	*Bauhinia vareigata*	Khachnar	Caesalpiniaceae
14	Tree	*Bombax malabaricum*	Semal	Bombacaceae
15	Tree	*Butea monosperma*	Dhak, Palas, Tesu	Fabaceae
16	Tree	*Cassia flstula*	Amaltas	Ceasalpiniaceae
17	Tree	*Casuarina equisetifolia*	Saru	Casuarinaceae
18	Tree	*Delbergia latffolia*	Sisam	Papilionaceae
19	Tree	*Delonix regia*	Gulmohar	Caesalpiniaceae
20	Tree	*Dichrostachys cinerea*	Khairi	Mimosaceae
21	Tree	*Diospirous melanoxylon*	Tendu	Leguminaceae
22	Tree	*Diospyrous cordifolia*	Bistendu, Kala dhao	Laguminaceae
23	Tree	*Emblica officinalis*	Aawla	Phyllanthaceae
24	Tree	*Eucalyptus Spp.*	Safeda	Myclaceae

25	Tree	*Ficus bangalensis*	Bhargat	Moraceae
26	Tree	*Ficus hispida*	Kala umber	Moraceae
27	Tree	*Ficus racemosa*	Gular	Moraceae
28	Tree	*Ficus religiosa*	Pipal	Moraceae
29	Tree	*Flacourtia indica*	Bilangada	Salicaceae
30	Tree	*Hardwickia binata*	Aanjan	Caesalpiniaceae
31	Tree	*Lannea coromandelica*	Mohin	Anacardiaceae
32	Tree	*Mangifera indica*	Aam	Anacardiaceae
33	Tree	*Maytenus emarginata*	Baikal, Hengan	Celastraceae
34	Tree	*Mitragyna parvifolia*	Kaim	Rubiaceae
35	Tree	*Moringa oleifera*	Seja	Moringaceae
36	Tree	*Morus alba*	Shatute	Moraceae
37	Tree	*Pongamia pinnata*	Kharanj	Fabaceae
38	Tree	*Prosopis cinerafia*	Khejdi	Mimosaceae
39	Tree	*Senna siamea*	Khasod	Caesalpiniaceae
40	Tree	*Syzygium cumini*	Jamun	Myrtaceae
41	Tree	*Tamarindus indica*	Imli	Caesalpiniaceae
42	Tree	*Tecomella undulata*	Rohida	Bignoniaceae
43	Tree	*Tectona grandis*	Sagwan	Verbanaceae
44	Tree	*Terminalia arjuna*	Arjun	Combretaceae
45	Tree	*Terminalia bellerica*	Baheda	Combretaceae
46	Tree	*Terminalia paniculata*	--	Combretaceae
47	Tree	*Terminalia tomentosa*	Asan	Combretaceae
48	Tree	*Ziziphus mauritiana*	Ber	Rhamaceae
49	Tree	*Zizyphus xylocarpa*	Ghat ber	Rhamnaceae
50	Tree	*Madhuca indica*	Mahua	Sapotaceae
51	Tree	*Prosopis juliflora*	Vilayati babul	Fabaceae
52	Herbs	*Oxalis corniculata*	Vepatti, Armul	Oxalidaceae
53	Herbs	*Xanthium strumarium*	Chota dhatura	Asteraceae
54	Shrub	*Achyranthes aspera*	Chirchita, Latjira	Amaranthaceae
55	Shrub	*Adhatoia vasica*	Aadusa	Acanlhaceae
56	Shrub	*Ageratum conyzoides*	Uvanti, Jangli pudina	Asteraceae
57	Shrub	*Argemone mexicana*	Saytanasi	Papaveraceae

58	Shrub	*Calotropis gigantea*	Safed aak	Asclepiadaceae
59	Shrub	*Calotropis procera*	Aak, Ankda	Asclepiadaceae
60	Shrub	*Capparis decidua*	Ker	Capparaceae
61	Shrub	*Carissa spinarum*	Karonda	Apocynaceae
62	Shrub	*Cassia auriculata*	Awal	Caesalpiniaceae
63	Shrub	*Cassia tora*	Panwar, Chakunda	Caesalpiniaceae
64	Shrub	*Cuculigo orchioides*	Dholi musli	Hypoxidaceae
65	Shrub	*Datura metal*	Datura	Solaneceae
66	Shrub	*Dendrocalamus stricus*	Bans	Poaceae
67	Shrub	*Euphorbia hirta*	Dudha	Euphorbiaceae
68	Shrub	*Euphorbia royleana*	Chhun, Danda thor	Euphorbiaceae
69	Shrub	*Ipomoea fistula*	Besharam	Apocynaceae
70	Shrub	*Lantena camera*	Jhurmari	Lamiaceae
71	Shrub	*Lawsonia Inermis*	Mehandi	Lythraceae
72	Shrub	*Ocimum americanum*	Bapachi, Kali tulsi	Lamiaceae
73	Shrub	*Ocimum sanctum*	Tulsai	Lamiaceae
74	Shrub	*Papaver somniferum*	Tijara, Aphim	Papaveraceae
75	Shrub	*Pogostemon benghalensis*	Van tulsai	Lamiaceae
76	Shrub	*Scilla spinarum*	Koli kandi	Liliaceae
77	Shrub	*Solanum nigrum*	Makoy	Solanaceae
78	Shrub	*Tamarix dioica*	Jhan	Tamaricaceae
79	Shrub	*Vitex negundo*	Nagadh, Nirgundi	Verbenaceae
80	Shrub	*Ziziphus nummularia*	Zhdhi kher, Zar beri	Rhamnaceae
81	Shrub	*Clerodendrum infortunatum*	Titabhamt, Bhant	Verbenaceae
82	Grasses	*Alphuda mutica*	Polda	Poaceae
83	Grasses	*Aristida depressa*	Lampals	Poaceae
84	Grasses	*Aristida laseum*	Gandel	Poaceae
85	Grasses	*Aristida setacea*	Garra	Poaceae
86	Grasses	*Cenchrus setigerus*	Bharut	Poaceae
87	Grasses	*Chrysopogon fulvus*	Seran	Poaceae
88	Grasses	*Dactyloctenium aglypticum*	Makra	Poaceae
89	Grasses	*Dichanthium Annulalum*	Karad	Poaceae
90	Grasses	*Eremopogon foreolatus*	Buhari	Poaceae

91	Grasses	*Heteropogon contortus*	Surwala	Poaceae
92	Grasses	*Imperata cylindrica*	Dab	Poaceae
93	Grasses	*Sorghum habepensa*	Baru	Poaceae
94	Grasses	*Themeda quadrivalvis*	Ratda	Poaceae
95	Climbers	*Abrus precatorius*	Chimru	Fabaceae
96	Climbers	*Asparagus dumosus*	Narkanta, Shatavari	Asparagaceae
97	Climbers	*Butea parviflora*	Palasbel, Malini, Bando	Fabaceae
98	Climbers	*Butea superb*	Palasbel	Fabaceae
99	Climbers	*Cayratia carnosa*	Katumba	Vitaceae
100	Climbers	*Crotolaria orisensis*	Aonl Bel	Fabaceae
101	Climbers	*Cryptolepis bunchanani*	Bichhubel	Periplocaceae
102	Climbers	*Cuscuta reflexa*	Amarbel	Convolvulaceae
103	Climbers	*Ichnocarpus frutescens*	Kali Dudhi, Shyamlata	Apocynaceae
104	Climbers	*Momordica charantia*	Karela	Cucurbitaceae
105	Climbers	*Mucuna pruriens*	Kiwach	Fabaceae
106	Climbers	*Tinospora cordifolia*	Neemgiloy	Tiliaceae
107	Climbers	*Viscum orientale*	Gudbel	Santalaceae

3.10.5.2 Fauna

From surrounding area of project site, entirely 87 species of birds, 20 mammals and 24 reptiles / amphibian species were enlisted collectively from actual survey and secondary (reported) information. Fauna reported from different taxa from buffer area of the proposed site is tabulated in the following tables.

Table 0-1: List of Birds - Buffer zone Area

S. No.	Common English name	Scientific Name	Common Name	IWPA & IUCN status	
1	Ashy Crowned Finch Lark	*Eremopterix grisea*	Junglee Bhatya	IV	LC
2	Bank Myna	*Acridotheres ginginianus*	Myana	IV	LC
3	Bar Headed Goose	*Anser indicus*	-	IV	LC
4	Bee-Ealer	*Merops apiaster*	Pabinga	IV	LC
5	Black Drongo	*Dicrurus adsimilis*	Kolabal	IV	LC
6	Black Headed Myna	*Sturnus pagodarum*	Brahminy Myna	IV	LC

7	Black Redstart	*Phoenicurus ochruros*	Dhir Dhlra	IV	LC
8	Black Winged Kite	*Elanus caeruleus*	Kapasl	IV	LC
9	Black Winged Stilt	*Himantopus himantopus*	Singhur	IV	LC
10	Bronze-Winged Jacana	*Metopidius indicus*	-	IV	LC
11	Blue Rock Pigeon	*Columba livia*	Kabutar	IV	LC
12	Cattle Egret	*Bubulcus ibis*	Kilchlya	IV	LC
13	Collared Bush-Chat	*Saxicola torquata*	-	IV	LC
14	Common Babbler	*Turdoides caudate*	Chilchil	IV	LC
15	Common Green Bee-Eater	*Merops orientalis*	Patringa	IV	LC
16	Common Indian Nighijar	*Caprimulgus asiaticus*	Chatpka	IV	LC
17	Common Kingfisher	*Alcedo atthis*	Chota Kilkila	IV	LC
18	Common Myna	*Acridotheres tristis*	Deshi Myna	IV	LC
19	Chestnut-Bellied Sandgrouse	*Pterocles exustus*	Liler	IV	LC
20	Coppersmith Barbet	*Megalaima haemacephala*	Chota Bhasant	IV	LC
21	Crested Bunting	*Melophus lathami*	Pahar Chidiya	IV	LC
22	Eurasian Curlew	*Numenius arquata*	Baha Gulinda	IV	NT
23	Dusky Crag Marlin	*Hirundo concolor*	Bandul	IV	LC
24	Savanna Nightjar	*Caprimulgus affinis*	Babila Chapka	IV	LC
25	Black-Rumped Flameback	*Dinopium benghalense*	Kantfoda	IV	LC
26	Golden Oriole	*Oriolus kundoo*	Peelak	IV	-
27	Green Pegion	*Treron pompadora*	Hariyal	IV	LC
28	Grey Heron	*Ardea cinerea*	Anjan	IV	LC
29	Grey Partridge	*Francolinus pondicerianus*	Safed Titer	IV	LC
30	Grey Shrike	*Lanius excubitor*	Safe Lalora	IV	LC
31	Great Tit	*Parus major*	Ram Babra	IV	LC
32	Grey Waglail	*Motacilla cinerea*	-	IV	LC
33	Hoopoe	*Upupa epops*	Hud-Hud	IV	LC
34	House Crow	*Corvus splendens*	Kaw	V	LC
35	House Sparrow	*Passer domesticus*	Ghoraiya	IV	LC
36	House Swift	*Apus affinis*	-	IV	LC
37	Oriental Darter	*Anhinga melanogaster*	Pandubl	IV	LC
38	Indian Peafowl	*Pavo cristatus*	Mor	I	LC

39	Indian Ring Dove	*Streptopelia capicola*	Fakhala	IV	LC
40	Indian Robin	*Copsychus fulicatus*	Kal Chldl	IV	-
41	Indian Roller	*Coracias benghalensis*	Neelkanlh	IV	LC
42	Indian Tree_Pie	*Dendrocitta vagabunda*	Mahalar	IV	LC
43	Jungle Bush Quail	*Perdicula asiatica*	-	IV	LC
44	Jungle Crow	*Corvus macrorhynchos*	Junglee Cauva	IV	LC
45	King Vulture	*Sarcoramphus papa*	Raj Gidli	IV	LC
46	Koel	*Eudynamys scolopacea*	Koel	IV	LC
47	Large Pied Wagtail	*Motacilla maderaspatensis*	Sanjan	IV	-
48	Lesser Whistling Duck	*Dendrocygna javanica*	Seatibag	IV	LC
49	Laughing Dove	*Streptopelia senegalensis*	Chola Fakhala	IV	LC
50	Little Cormorant	*Phalacrocorax niger*	Pankauwa	IV	LC
51	Little Egret	*Egretta garzetta*	Surkhiya Bagla	IV	LC
52	Little Grebe	*Podiceps ruficollis*	Dubdubi	IV	-
53	Little Stint	*Calidris minuta*	Runi	IV	LC
54	Oriental Magpie-Robin	*Copsychus saularis*	Daya	IV	LC
55	Moorhen	*Gallinula chloropus*	Jalmurgi	IV	LC
56	Palm Swift	*Cypsiurus parvus*	-	IV	LC
57	Pheasant-Tailed Jacana	*Hydrophasianus chirurgus*	-	IV	LC
58	Pied Bush Chat	*Saxicola caprata*	Kala Pldda	IV	LC
59	Pied Ktngfisher	*Ceryle rudis*	Koryala Kirkira	IV	LC
60	Pintail	*Anas acute*	-	IV	-
61	Pond Heron	*Ardeola grayii*	Andha Bagla	IV	LC
62	Purple Heron	*Ardea purpurea*	-	IV	LC
63	Red Rumped Swallow	*Hirundo daurica*	-	IV	LC
64	Red Vented Bulbul	*Pycnonotus cafer*	Bulbul	IV	LC
65	Red Wattled Lapwing	*Vanellus indicus*	Ntahari	IV	LC
66	River Tern	*Sterna aurantia*	Kun	IV	NT
67	Rose Ringed Parakeet	*Psittacula krameri*	Popat	IV	LC
68	Orange Minivet	*Pericrocotus flammeus*	-	IV	LC
69	Shikara	*Accipiter badius*	Shikra	IV	LC
70	Small Minivet	*Pericrocotus cinnamomeus*		IV	LC

71	Spotted Owlet	*Athene brama*	Chibri, Ghuvad	IV	LC
72	Eurasian Stone Curlew	*Burhinus oedicnemus*	-	IV	LC
73	Tawny Eagle	*Aquila rapax*	-	IV	LC
74	Baya Weaver	*Ploceus philippinus*	Baya	IV	LC
75	White-Rumped Vulture	*Gyps bengalensis*	Sefed Gidh	I	CR
76	While Breasted Kingfisher	*Halcyon smymensis*	-	IV	-
77	While Breasted Watemen	*Amaurornis phoenicurus*	-	IV	LC
78	Egyptian Vulture	*Neophron percnopterus*	-	IV	EN
79	White Wagtail	*Motacilla alba*	Dhoban	IV	LC
80	Wiretailed Swallow	*Hirundo smithii*	Bishara Chupkah	IV	LC
81	Wood Sand Piper	*Tringa glareola*	-	IV	LC
82	Yellow Cheeked Tit	*Parus xanthogenys*	Pani Ka Pilkiya	IV	LC
83	Yellow Headed Waglail	*Motacilla citreola*	--	IV	LC
84	Yellow Throated Sparrow	*Petronia xanthocollis*	-	IV	LC
85	Yellow-Wattled Lapwing	*Vanellus malabaricus*	Jirdhi	IV	LC
86	Sarus Crane	*Grus antigone*	Sarus	IV	VU
87	Purple Sunbird	*Nectarinia asiatica*		IV	LC

Table 0-2: Mammalian Fauna - Buffer zone Area

S. No.	Common English Name	Scientific Name	Common Name	IWPA & IUCN status	
1	Indian Flying Fox	*Pteropus giganteus*	Chamgadar	V	LC
2	Blue Bull	*Boselaphus tragocamelus*	Nilgal	III	LC
3	House Rat	*Rattus rattus*	Chuha	V	LC
4	Common Langur	*Prasbytis entellus*	Langur	II	LC
5	Common Mongoose	*Herpestes edwardsii*	Newla	II	LC
6	Common Palm Civet	*Paradoxurus hermaphroditus*	Biju	II	LC
7	Five Stripped Palm Squirrell	*Funambulus pennantii*	Gilahari	IV	LC
8	Grey Musk Shrew	*Suncus murinus*	Chachundar	V	LC
9	Indian Fox	*Vulpes bengalensis*	Lomadi	II	LC
10	Indian Gazella	*Gazella gazelle*	Chllikara	I	VU

11	Indian Hare	*Lepus nigricollis*	Kharghosh	IV	LC
12	Indian Porcupine	*Hystrix indica*	Sahi	IV	LC
13	Indian Wild Boar	*Sus scrofa*	Junglee suar	III	LC
14	Jackal	*Canis aureus*	Siyar	II	LC
15	Jungle Cal	*Felis chaus*	Jungle billi	II	LC
16	Panther	*Panthera pardus*	Tendua	I	VU
17	Rhesus Macaque Monkey	*Macaca mulatta*	Bandar	II	LC
18	Sloth Bear	*Melursus ursinus*	Rinch	II	VU
19	Smooth Indian Otter	*Lutra perspicillata*	-	II	VU
20	Striped Hyaena	*Hyaena hyaena*	Jarakh	III	NT

Table 0-3: Reptile and Amphibian Fauna -Buffer zone Area

S. No.	Common English Name	Scientific Name	IWPA & IUCN status	
1	Fan-throated lizard	*Sitana ponticeriana*	IV	LC
2	Garden lizard	*Calotes versicolor*	IV	-
3	House lizard	*Hemidactylus flaviviridis*	-	-
4	Rough-tailed Gecko	*Cyrtopodion scabrum*	-	LC
5	Indian chameleon	*Chamaeleo zeylanicus*	II	LC
6	Monitor Lizard	*Varanus bengalensis*	I	LC
7	Indian crocodile	*Crocodylus palustris*	I	VU
8	Common skink	*Mabuya carinata*	II	LC
9	Ghariyal	*Gavialis gangeticus*	I	CR
10	*Common Indian Toad*	Duttaphrynus melanostictus	IV	LC
11	*Skittering Frog*	Euphlyctis cyanophlyctis	IV	LC
12	Indian Flap Shell Turtle	*Lissemys punctata*	I	LRlc
13	Starred tortoise	*Geochelone elegans*	IV	VU
14	Common Indian grass snake	*Nalrix slolala*	IV	-
15	Indian python	*Python molurus*	I	VU
16	Tree snake	*Dendrelaphis tristis*	IV	-
17	Indian Rat Snake	*Ptyas mucosa*	II	-
18	Checkered Keelback Water	*Xenochrophis piscator*	II	-

	Snake			
19	Indian Cobra	*Naja naja*	II	-
20	Common Indian Krait	*Bungarus caeruleus*	IV	-
21	Green kedback	*Macropisthodon plumbicolor*	II	-
22	Russell's viper	*Vipera russelli*	II	-
23	Saw scaled viper	*Echis carinata*	IV	-
24	Red Sand Boa	*Eryx Johnii*	IV	-

Status of Aquatic Biodiversity

Phytoplanktons Reported from Study Area

Table 0-4: Phyoplankton - Buffer zone Area

S. No.	Family	Algal species
1.	Cyanophyceae	*Oscillaloria*
2.	Chlorophyceae	*Horrnidium subtHe*
		Scenedesmus
		Euglena cicus
		Ulothrix lonala
3.	Bacillarophyceae	*Synedra*
		Diatom sp.
		Naviculla
		Nitzchia
		Pinnularia

Zooplanktons Reported from Study Area

Table 0-5: Phyoplankton - Buffer zone Area

S. No.	Family	Algal species
1	*Protozoa*	*Csratanium*
2	*Copepods*	*Cyclops*
		Diatomus
		Nauplius

		Epichura
3	*Clodocera*	*Daphnia*
		Latonopsis occidentaJis
		Scapholeberis mucro
		Cerodaphria
4	*Rotlrera*	*Brachionus*
		Keratella

Fishes Reported From the Study Area

According to information from fisheries department, fishes found in the study area includes i) Catla ii) Rohu iii) Mrigal iv) Calbose v) Labeo genious (Puti) vi) labeo bata (Bata) vii) lanchi viii) Singhara ix) Pabda x) Patola xi) Silan, xii) Sanwal. xiii) Girai xiv) Sarsi xv) Torstor xvi) Mahaser xvii) Bam etc. among these, Catla rohu, Mrigal, Shighra, Lanchi, Sanwal, Bam and Pabda are commercially important fishes.

Threatened Species in Study Area

A tree species called Dhokla or Khakhara is listed in RET plant list by Rajasthan Biodiversity Board. A bird species Peacock is Schedule-I species as mentioned in wildlife protection act and Sarus Crane is categorized as Vulnerable on the IUCN Red list 2007 in India and it occur mostly outside protected areas. All other birds belong to Schedule IV category. Similarly, among herpetofauna, Indian Flap shell Turtle and Monitor lizard, crocodile and Gharial is also Schedule –I category of wildlife protection act. Among recorded faunal species, none of the species can be designated as an endemic to the area.

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CHAPTER - 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 Introduction

This chapter presents identification and appraisal of various impacts from the proposed industrial park and CETP in the study area based on the inventory of pollution sources as well as the baseline environmental setting described in **Chapter 3** of the EIA report.

Various sources of pollution with respect to wastewater, the flue gas/process emission, hazardous/solid waste and noise generation along with their qualitative and quantitative analysis as well as measures taken to control them are discussed herein with details. The network method will be adopted to identify potential impact, which involves understanding of cause-condition-effect relationship between an activity and environmental parameters.

The environmental impacts associated due to the proposed industrial park and CETP are classified into two phases and the possible impacts are assessed.

- During the construction phase which may be regarded as temporary or short term; and
- During the operation phase which would have long term effects.

The construction and operation of the proposed project comprises various activities each of which may have an impact on some or other environmental parameters. Various impacts during the construction and operation phase on the environment parameters have been studied to estimate the impact on the environment and are discussed briefly below and elaborated in the subsequent sections.

Mitigation measures at the source level and an overall management plan at the study area level are elicited so as to improve the supportive capacity of the study area and also to preserve the assimilative capacity of the receiving bodies.

4.1 Impacts During Construction Phase

This includes the impact on the following environmental attributes related to leveling of site, construction of plants and other related structures and other related equipment.

- Land use
- Soil quality
- Air quality
- Water resources and quality and
- Noise levels

4.1.1 Impact on Land use

The total plot area of the project as per the Revenue record is 4,04,687 sq.m. (40 ha) which is 100 acres. The total no of Industrial Plots proposed is 259. The proposed project is coming up on an industrial land. The land was leased to Oriental Power Cable Limited by the Government of Rajasthan under, Rajasthan Industrial area allotment Rules, 1959 measuring an land area 371 acres opposite Alina river on 27th April 1963 and after that lease deed was made between Acechamps Industrial Park Pvt Ltd and Oriental Power Cables Pvt Ltd on 27, June 2013 for the land measuring 100 acre for the development of industrial area. Hence, there is no additional land acquisition process and no R & R issues involved in the proposed project.

There will be permanent change in the land cover as the project site is dominated with scattered vegetation. The land use pattern of the site will be converted to industrial usage due to construction activities of industrial park and CETP. The earthen material generated during excavation and site grading periods, shall be properly dumped and slope stabilization shall be taken. The topsoil generated during construction shall be preserved and reused for plantations. The natural drainage pattern of the site and surroundings will not be disturbed and due care will be taken during the construction.

The proposed plant site is suitably located considering availability of transportation, communication, residence and manpower. The project will not involve displacement of any population. Electricity, water, roads, all basic amenities and infrastructure are available for the proposed project.

4.1.2 Impact on Soil

Potential impacts on soil during the construction phase are during the site clearing and earth work. The natural soil profile and horizon sequences may be disturbed which could cause the natural functioning of soils in terms of a growth medium and habitat for fauna and flora to cease. Disturbance of the natural soil profile and horizon sequences reduce soil fertility and function, and potential soil pollution would occur, if backfill material is mixed with contaminated material. Changes to the physical, chemical and biological properties of the soil due to stockpiling and subsequent mixing of soil layers during handling in construction phase is also envisaged.

Mitigation measures for construction impacts to soil include;

- Establishing specific procedures for soils handling and storage with the objective of maintaining the physical and chemical properties of stock piled soils for use in green belt development;
- Reducing or preventing erosion by scheduling activities to avoid heavy rainfall periods (i.e., during the dry season), and
- Modifying or suspending activities during extreme rainfall and high winds to the extent practical.

The topsoil layer (0-900 mm) should therefore be stockpiled and may not be used for the construction of wall embankments etc.

4.1.3 Impact on Air Quality

Upgradation of existing roads and construction of new roads approaching the proposed industrial park involves cutting and filling of the earth. Within the proposed industrial park, cutting and leveling activity would be required for providing roads, sewage network, storm water system, administrative buildings for proposed project.

The potential source of air quality impact arising from the establishment/construction of the proposed project is fugitive dust generation. The dust, measurable as particulate matter ($PM_{2.5}$ µm, PM_{10} µm), sulphur dioxide (SO_2), oxides of nitrogen (NOx), would be generated as a result of construction activities. The potential dust sources associated with the constructional activities are loading and unloading of the materials, top soil removal, vehicular movement over unpaved roads, and wind

erosion etc. The possible constructional activities that contribute to the environmental impacts broadly given below:

- Dust generation during leveling of earth
- Dust generation due to the movement of vehicles on unpaved roads
- Emission of pollutants from vehicular exhaust
- Unloading of raw materials and removal of unwanted waste material
- Accumulation of excavated earth material

The impact of the above mentioned activities would be temporary and will be restricted to the constructional phase. However, the impact is generally confined to the proposed industrial park with CETP and is expected to be negligible outside the boundary. Nevertheless, the following mitigation measures will be adopted to limit the environmental impact during constructional phase.

- Regular water sprinkling will be done to avoid the dust materials entering into the atmosphere. Furthermore during windy days the frequency of the water sprinkling will be increased.
- The vehicular movement will be minimized with a planned scheduling to reduce the emission of pollutants.
- Temporary thin sheets of sufficient height (3m) will be erected around the proposed site as a barrier for dust control.
- The excavated material shall be reused within the boundary and the movement of cut and fill material will be limited.
- Plantation of trees around the proposed boundary and it will be initiated at the early stages by plantation of 2 to 3 years old saplings using drip irrigation so that the area will be moist for most part of the day.
- All the vehicles carrying raw materials will be covered with tarpaulin/plastic sheet; unloading and loading activity will be stopped during windy period.

4.1.4 Impact on Water Resources and Quality

Water requirement will be met through tankers during period of the construction. Impact on water quality during construction phase may be due to non-point discharges of solids from soil loss and sewage generated from the construction work force stationed at the

site. Further, the construction in the project will be more related to mechanical fabrication, assembly and the erection, hence the water requirements would be small. Temporary sanitation facilities (septic tanks and soak pits) will be set up for disposal of sanitary sewage generated by the work force as per the prevailing labor laws. Since, most of the construction work force will constitute of floating population, the demand for water and sanitation facilities will be small and temporary and it will be managed by providing drinking water facility and sanitation facilities at the site during construction phase.

The overall impact on water environment during construction phase due to proposed plant is likely to be short term and insignificant.

4.1.5 Impact on Noise Levels

The major activities, which produce periodic noise, during construction phase, are as follows:

- Foundation works
- Fabrication of structures
- Plant erection
- Operation of construction equipment
- Movement of vehicles

The impact on noise environment can be made insignificant by adopting the following mitigation measures

- Noise generating equipment will be used during day time for a brief period as per requirements.
- Where ever possible the noise generating equipment will be kept away from the human habituation.
- Temporary tin sheets of sufficient height (3m) will be erected around the proposed site as barrier for minimizing the noise travel to surrounding area.
- All the vehicles entering into the proposed site will be informed to maintain speed limits, and not to blow horns unless it is required.

4.2 Impacts During Operational Phase

Operation of the project may have potential to affect quality of life, air, noise, water, land and flora, fauna and human by increase in air, noise and water pollution, by increase in hazardous waste generation, by pollution from spillage/surface run-off, by disturbance to flora and fauna, by loss of trees resulting from increased assess, by increase in land values threatening agriculture, etc. During the operation phase, the following activities are considered significant.

- Topography and drainage
- Land use;
- Soil quality;
- Solid waste;
- Air quality;
- Water resources and quality;
- Noise levels;
- Socio economics;
- Terrestrial ecology;
- Biology;
- Traffic load; and
- Infrastructural facilities.

4.2.1 Impact on Topography and Drainage

The proposed project is coming up towards NNW of village Alnia, Tehsil Ladpura, District Kota, Rajasthan. Topographically, the applied area is plain area. There is no forestland within the lease area.

There will be permanent change in the land cover as the project site is dominated with scattered vegetation. The study area is characterized by a relatively plain terrain with an elevation upto 340 meters above sea level. For this proposed Industrial Park and CETP project, no surface drainage is required to be modified/diverted; as such no disturbance shall be caused to the natural drainage system. Hence, the impact on the topography and drainage of the core zone will be insignificant. Alnia river is at a distance of 45meters towards SE from the project boundary.

The major topographical changes envisaged would be the manmade structures for member industry like erection of plant sheds, raw material storage space, civil structures, water reservoirs, etc. However, it will also invite some positive benefits in the form of up gradation of existing roads, land leveling, tree plantations, greenbelt development, etc., in the proposed project vicinity.

Being an industrial park, the impact on the climate due to the exhaust gas could be envisaged. However, the impact on the climatic conditions from the proposed industrial park will be marginal which can be nullified / reduced by developing green belt and by adopting pollution prevention equipment's like cyclone, multi cyclones, maintaining stack height meeting MoEFCC standards.

4.2.2 Impact on Land use

The total plot area of the project as per the Revenue record is 4,04,687 sq.m. (40 ha) which is 100 acres. The total no of Industrial Plots proposed is 259. The bifurcation is given as under. The land use break up is provided below in **Table-4.1.**

TABLE-4.1 Land Use Breakup

S. No.	Particulars	Area in sq. m.	%
1.	**Total Plot Area**	**404687.00**	**100**
2.	Area of Common Facilities	125682.67	31.05
3.	Allocable Area	279004.33	68.95
Detailed bifurcation of the allocable area			
(i)	Plots as per Ind. Park Scheme 2002 para 6 sub clause (c)	185300	66.41
(ii)	Area earmarked for commercial use	24553.5	8.80
(iii)	Rest of the area for industrial use as per INC 1987 code	69150.83	24.79

Area of Common Facilities

S. No	Particulars	Area (sq.m.)
1.	G+3 ➢ Admin Block ➢ Product Showroom ➢ Conference hall ➢ Cyber café ➢ A&V hall ➢ Training centre ➢ R&D analytical lab ➢ Guest house ➢ Common hall	800
2.	G+1 ➢ Departmental store ➢ Canteen ➢ Bank & ATM ➢ Dispensary ➢ Post office & Courier	800
3.	Weigh Bridge & Transport hub	3712
4.	Overhead tank &water supply station	1269.98
5.	Telecom station	929.83
6.	Fire brigade station	604.91
7.	STP	2490.43
8.	132 KV GSS	5027.01
9.	ETP	7093.71
10.	Road	59919
11.	Open & green area	42963.8
12.	Security Control Room	72
	Total	**125682.67**

Details of industrial plots

S. No	Allocable area	No of Plots	Size per Plot	Total area
Plots as per Ind. Park Scheme 2002 para 6 sub clause (c):				
1.	A1 to A20	20	2500	50000
2.	B1 to B 32	32	2000	64000

3.	C1 to C32	32	1500	48000
4.	D1 to D6	6	2250	13500
5.	E1 to E4	4	2450	9800
Total				**1,85,300**
Area earmarked for industrial use				
1.	F1	1	2910.83	2910.83
2.	F2 to F 25	24	2760	66240
Total				**69150.83**
Area earmarked for commercial use				
1.	S1 to S5	5	432	2160
2.	S 6	1	563.5	563.5
3.	S7	1	512	512
4.	S 8	1	655	655
5.	S9 to S11	3	600	1800
6.	S12 to S 59	48	24	1152
7.	S60 to S 61	2	24	480
8.	S 62 to S63	2	208	416
9.	S 64 to S 65	2	240	480
10.	S 66 to S 69	4	271.5	1086
11.	S 70 to S 71	2	187.5	375
12	S 72	1	375	375
13.	S73	1	451	451
14.	S74	1	402	402
15.	S75	1	370	370
16.	S76	1	354	354
17.	S77	1	375	375
18.	S78	1	516	516
19.	S79	1	448	448
20.	S80	1	400	400
21.	S81	1	367.5	367.5
22.	S82	1	212	212
23.	S83	1	260	260
24.	S84	1	344	344
25.	S85	1	463	463

26.	S86	1	625	625
27.	S87 TO S 92	6	227	1362
28.	S 93 TO S 122	30	30	900
29.	S123 TO S 130	8	365	2920
30.	S131 TO S 140	10	546	5460
Total		**140**		**24553.5**

4.2.3 Impact on Soil

The impact is confined to the proposed industrial park and CETP only Due care will be taken for minimum damage of top soil. The proposed greenbelt plantation will act as an effective barrier for control of dust. The following management measures shall be adopted:

- As soon as construction is completed, the surplus earth shall be utilized to fill up the low lying areas, the rubbish is to be cleared and all un-built surfaces be reinstated;
- The top soil from the construction areas shall be preserved in separate stacks for re-use during the plantation;
- Green belt development shall be taken up along with the construction work so that plantation will grow to adequate height by the time of plant commissioning. Thus, green belt will be effective in containing the pollutants due to the plant operation;
- Entire industrial area shall be aesthetically landscaped and as much as feasible natural gradient shall be maintained;
- There shall be minimum concreting of the top surfaces such that there is a scope for maximum ground water recharge due to rainfall; and
- The hazardous wastes generation from proposed project like ETP Sludge from Common Effluent Treatment Plant, Used oil from lubrication of equipment, Discarded Containers and Oil & Grease from skimming. These Hazardous wastes will be stored in scientifically designed and constructed hazardous waste storagearea within the premises with leachate collection system and send for disposal to secured land fill site, registered recyclers and registered refiners. Hence, there will be marginal impact on the soil environment.

- Traffic load will be increased but approach roads are sufficient to support the extra traffic load. However, the individual industries will also co-operate with Govt. time to time in strengthening of approach roads.

4.2.4 Impact of Solid Waste

There will be generation of solid as well as liquid waste during the operational phase of the project which will be responsibly managed by respective industry only. CETP facilities will be provided within the project site for the management/disposal of solid or liquid waste. The estimated quantity of Municipal waste (domestic and or commercial wastes) generated from the industrial site will be 660 kg/day (@0.4 kg/worker/day) which is proposed to be sent and disposed off at the district municipal corporation site. The Industrial process may also lead to generation of hazardous waste as defined under HWM Rules. However the same will be disposed off to the CTDF at Udaipur. Industrial solid waste (ISW) will be generated from the industrial process which is proposed to be disposed off suitably. Construction waste like soil, brick bits, etc will be utilized in leveling of land and road making. Used oil from lubrication of equipment, Discarded Containers and Oil & Grease from skimming will be stored in scientifically designed and constructed hazardous waste storage area within the premises and send for disposal to secured land fill site, registered recyclers and registered refiners.

STORAGE OF HAZARDOUS WASTE:

- Hazardous waste shall be stored at a designated Onsite-secured area that offers protection from sun, rain fall, spreading of leachate, mixing of wastes etc.
- Designated storage area with RCC flooring and cover shed shall be provided for storage of Hazardous waste.
- Hazardous waste shall not be stored for a period more than 90 days. CETP shall maintain records and make them available for inspection.
- Transportation of properly packed & labelled waste through dedicated vehicle to a captive facility/ authorized TSDF facility.
- Provision of solid/Hazardous waste collection system & storage area confirming the guidelines provided by CPCB for Solid/hazardous waste generation.
- Regular Training of employees engaged in solid waste management works.

4.2.5 Impact on Air Quality

The ambient air quality with respect to the buffer zone of 10 km radius around the periphery of proposed industrial park and CETP represents rural, commercial and industrial environment.

The following activities are likely to cause impact on air quality during the operational phase:

- Stack/point source emissions from manufacturing process of member industry and DG set; and
- Emissions from vehicular traffic used for the transportation.
- Process and utility emissions from CETP

Sulphur dioxide, particulate matter, nitrogen oxides, carbon monoxide are identified as pollutants of potential concern that impact the air quality during the operation phase of proposed industrial park. The emissions of the above contaminants were evaluated to determine whether they may result in changes in ambient air quality in the vicinity of the proposed Industrial Park.

To support the application for the project, an assessment including an air dispersion modeling study (to evaluate the effects from the emissions from the project under normal operations) and surrounding baseline levels on the ambient air quality was performed. Predictions were made for maximum ground level concentrations of the pollutants of concern.

The modeling scenario considered is as follows:

- Emergency power generation where a diesel generator of 700 KVA is used to produced power in an event of power failure of 132 kV GSS within the site.

The Ground level concentrations were modeled within the modeling domain using cartesian grids with different spacing of receptor points. The map showing the various settlements / sensitive receptors considered is given as Figure 3.2 which has the details of baseline details of ambient air quality in the study area.

4.3 Air Pollution Mitigation Measures during Operation Phase.

The main raw materials required for the proposed industrial park are water and power. PM, SO_2, NOx and chlorine gases are major air pollutant generated from the proposed industrial park, D.G. set and CETP.

Mitigation measures

During operation phase member industries will use best available technology to abate the environmental pollution. Though, RSPCB will regulate industries to provide green belt area as per the term & condition of CTE/CTO to attune the pollution. However, PM, SO_2 and NO_x emissions are generated from DG set is properly dispersed into the atmosphere by providing the stack at sufficient height. Periodical testing of environmental dust and thermal conditions be carried out and a record of this be maintained properly. All internal roads will be of concrete and will be well maintained. PUC certified vehicles will be used.

For effective prevention and control of fugitive emissions following measures will be adopted:

- Enclosures are provided for all the loading and unloading operations, if possible.
- All transfer points are fully enclosed.
- Airborne dust is controlled by sprinkling of water.
- Preventive measures are employed to minimize dust build up on road.
- Maintenance of air pollution control equipment is done regularly.
- All the workers are provided with the dust mask.
- Green belt will be developed around the plant to arrest the fugitive emissions.
- Regular training is given to the personnel operating and maintaining fugitive emissions control system

4.3.1 Impact of Odour on Air Quality

Odour-producing compounds are hydrogen sulfide, ammonia, carbon disulfide, mercaptans, phenols and some petroleum hydrocarbons. Most offensive odour is created by the anaerobic decay of wet organic matter. Warm temperature enhances anaerobic decay and foul odour production. Odour sources can be classified as:

- Point Sources: Point sources are confined emissions from vents, stacks and exhausts.
- Area Sources: Area sources may be unconfined like sewage treatment plant, waste water treatment plant etc.
- Fugitive Sources: In this source of odour, emissions are of fugitive nature like odour emissions from soil bed or bio-filter surface.

Mitigation Measures

Mitigation measure for odour related impacts depends on type of sources – Area source or Point source.

Some of the control measures from odour emitting from **Area Source** such as holding ponds, lagoons and effluent treatment plants are:

1. Developing green buffer around source
2. Nozzles and Sprayers containing chemicals (eg. Chlorine dioxide)
3. Rotary water atomizers

In case of **Point Sources** such as that of industries, the odour-causing gas stream can be treated after collecting through piping and ventilation system..

4.3.2 Impact of off-Site Traffic on Air Quality

The impact on traffic during operation phase of the proposed industrial area is depends upon the type of activities and industries which are coming in the industrial area. The industrial area is adjacent to existing NH-12 which is 900 m towards SW direction from the proposed site. The impact of the traffic is assessed on the basis of:

1. Incremental traffic due to the proposed project;
2. Impact on air quality;
3. Adequacy of the existing highway road network;
4. Adequacy of the existing internal road network; and
5. Adequacy of parking facilities

The proposed industrial park would approximately require around 100 vehicles for (based on industries). Adequate road transport facility is already available in the area connecting the National Highway 12, which will be sufficient to cater the needs of vehicular movement. Hence the incremental ground level concentrations due additional traffic from the proposed facility will be negligible.

4.3.3 Impact on Water Resources and Quality

4.3.3.1 Water Consumption and Sourcing Details

Approx 225 KLD water will be required for domestic purposes (@45 LPCD x 5000 workers). The water supply will be met through ground water. The effluent generated from the member units will reach the CETP by pipelines. Domestic effluent will be treated in STP. Since the industries and commercial areas in the IA would not be setup immediately and would be done in phases, therefore these phases wise CETP and CSTP would effectively handle the effluent and sewage loads.

4.3.3.2 Waste Water Generation, Treatment and Disposal

Wastewater will be generated from different sources in the proposed industrial park, which are mainly industrial wastewater from different industries within the industrial park and domestic wastewater from admin buildings. The industrial wastewater and domestic wastewater will be collected through separate drains and treated in CETP & STP. The treated water will be reused for green belt development and for industrial activities (floor washing, dust suppression etc.). Overall there won't be any significant adverse impact due to proposed activity on the water environment.

COMMON EFFLUENT TREATMENT PLANT (CETP)

RAW EFFLUENT CHARACTERISTICS

The following effluent characteristics for design purposes are given below in Table.

pH	:	4.5 – 9.0
TSS	:	<1200 mg/L
BOD at 20^0 C	:	450 mg/L.
COD	:	900 mg/L
Oil & Grease.	;	100 mg/ L
Chromium total	:	< 5 mg/L
Phenolic compound	:	< 5 mg/L

Expected Characteristics of treated Effluent after Biological Treatment (outlet of Sec. Clarifier)

S. No.	Parameters	Measure	Values
1	pH	--	7.5-8.0
2	Total Suspended Solids (TSS)	mg/l	Less than 100
3	Chemical Oxygen Demand (COD)	mg/l	Less than 200
4	Biochemical Oxygen Demand (BOD, 3-days, 27^0C)	mg/l	Less than 25
5	Oil and Grease	mg/l	Less than 10

Expected Characteristics of final treated effluent

S. No.	Parameters	Measure	Values
1	pH	--	6.0 - 8.5
2	Total Suspended Solids (TSS)	mg/l	Less than 50
3	Chemical Oxygen Demand (COD)	mg/l	Less than 200
4	Biochemical Oxygen Demand (BOD, 3-days, 27^0C)	mg/l	Less than 20
5	Oil and Grease	mg/l	Less than 10
6	Total Residual Chlorine	mg/l	Less than 1

The treated effluent would meet the effluent discharge standards (shown in above Table); as specified in Environment (Protection) Act 1986.

EFFLUENT TREATMENT SCHEME

It is stipulated that the proposed CETP shall be based on physical & chemical treatment for removal of excessive inorganic COD, TSS & BOD beside removal of color & maintenance of equalized & constant PH & Flow rate prior to Fixed Aerated Bioreactor principal with tertiary treatment to achieve the parameters.

The proposed common effluent treatment plant is based on Fixed Aerated Bioreactor system. This is a Common Effluent Treatment Plant facility that will be treating the waste water from the member industries within the area. Member industries of CETP will be required to monitor specified quality parameters and flow rate of the effluent on daily basis and to submit the monitoring data to the CETP operator on regular basis. Continuous flow meters will also be installed at the outlet of the CETP to monitor the outlet effluent quantity. The effluents from its member industries will be

lifted through dedicated pipeline system. The design basis of Proposed CETP is as follows:-

S. No	Unit Name
1.	Raw effluent intake & bar screen chamber
2.	Collection cum-Pumping tank
3.	Oil / grease and Grit Removal Tank
4.	Equalization tank
5.	Equalized effluent pump house
6.	Flow measurement channel
7.	Chemical House
8.	Solution Preparation and dosing system
9.	Flash mixing chambers
10.	Flocculation chamber
11.	Primary clarifiers
12.	Aeration Tanks
13.	Secondary clarifiers
14.	Return activated sludge (RAS) tank-cum-Pump sump
15.	Wet sludge pit
16.	Sludge dewatering system
17.	Filter press and Volute Press
18.	Pre-filtration Storage Tank
19.	Granular Activated Carbon pressure Filters
20.	Chlorine Contact Tank
21.	Chlorinators and Tonners
22.	Dry Sludge storage Shed
23.	Treated Water storage, reuse and Disposal / Pump Tank

Common physical unit operations include among other processes screening, Grit Chamber, Parshall flume, Oil and Grease removal Tank, Flow Equalization Sedimentation etc.

A. Screening

A screen with openings of uniform size is used to remove large solids such as cloths, rags, papers, plastics etc. which may damage process equipment, reduce the effectiveness of the common effluent treatment plant.

Grit Chamber

Grit includes sand, dust and other materials in wastewater that are non-putrescible and are heavier than organic matter. It is necessary to remove these materials in order to 1) protect moving mechanical equipment and pumps from unnecessary wear abrasion, (2) prevent clogging in pipes and heavy deposits in channels.

Oil and Grease Removal

Oil and grease removal unit removes oil and grease from the incoming effluent prior to the further biological process.

Flow Equalization

CETP's are designed to treat wastewater that has a more or less constant flow and quality that fluctuates. The equalization tank overcomes this by collecting and storing the waste, allowing it to mix and become a regular homogeneous quality before it is pumped to the treatment units at a constant rate. To determine the require volume of an equalization tank the hourly variation of flows needs to be determined. The equalization tank has submersible mixers for efficient equalization of organic load.

B. Primary Treatment (Chemical Unit Process)

Chemical unit processes are always used with physical operations and may also be used with biological treatment processes, although it is possible to have a purely physico-chemical plant with no biological treatment. Chemical processes use the addition of chemicals to the wastewater to bring about changes in its quality. They include pH control, coagulation, chemical precipitation for the removal of heavy metals and oxidation.

Neutralization Tank (pH control)

Effluent from various industries is rarely pH neutral. It is therefore necessary to adjust the pH in the treatment process to adjust the pH neutral. This is particularly important if biological treatment is being used, as a microorganisms used in biological treatment require a pH in the range of 6-8 and will be killed by highly acidic or alkali wastewater. For the acidic wastes (low pH) calcium hydroxide is added among other

things. For the alkali wastes (high pH) sulphuric acid or hydrochloric acid may be added. The equalized volume of flow shall be pumped to the Neutralization tanks followed by Flash mixer for pH correction where heavy metals will be removed by maintaining different pH values. The neutralization tanks shall have air spargers for stripping ammonia at 9.5 pH. In the neutralization section, pH of the effluent is raised to @ 9.5 by mixing with lime slurry under agitation for precipitating out heavy metals as metal hydrauxides. Air is passed through the first two reaction tanks of neutralization tanks through a sparger, which removes the ammonical nitrogen upto 35%. Higher removal of ammonical nitrogen is also possible by further raising the pH to about 10 – 10.5.

Primary Clariflocculator (chemical coagulation and flocculation)

In this system an effluent after flash mixer shall be subjected to Primary Clariflocculation. Coagulation is a complex process but generally refers to collecting into a larger mass the minute solids particles dispersed in a liquid. Chemical coagulants such as poly alumimium chloride or ferrous Sulphate may be added to waste water to improve the attraction of fine particles so that they come together and form larger particles called flocs. A chemical flocculent, usually a polyelectrolyte, enhances the flocculation process by bringing together particles to form larger flocs, which settle out more quickly. This also helps in removal of heavy metals as hydroxides and color. Flocculation is aided by gentle mixing which causes the particles to collide. The Clariflocculator shall be provided with flocculator and Clarifier Mechanism. The sludge from the clariflocculator shall be taken to Sludge Thickener through Primary Sludge Pumps.

C. Biological Unit processes

From the clariflocculator, an effluent shall be sent to single stage biological treatment called advanced Oxidation ditch based on FAB type activated sludge process. The objective of a biological treatment of industrial wastewater is to remove or reduce the concentration of, organic and inorganic compounds. Biological treatment process can take many forms but are all based around microorganisms, mainly bacteria. These microorganisms use component of the effluent as their “food” and in doing so break

them down into less complex and less hazardous compounds. In the process he microorganisms increase in number.

There are FAB technology will be adopted. The FBR process is the latest advance in attached growth aerobic biological treatment technology. In Fluidized Bed Reactors, the liquid to be treated is pumped through a bed of small media at a sufficient velocity to cause fluidization. In the fluidized state the media provide a large specific surface for attached biological growth and allow biomass concentrations in the range 10-40 kg/m^3 to develop.

For aerobic treatment processes the reactor is aerated. This is done by recalculating the liquid from the reactor to an oxygenator where air, or possibly oxygen, is bubbled. To overcome problems related to high re-circulation rates, needed when there is high oxygen demand in the reactor, the reactor might be aerated directly. The basis for the use of fluidized bed systems is the immobilization of bacteria on solid surfaces. Many species of bacteria (and also other microorganisms) have the ability for adhering to supporting matrices. In this process, a volume of Ring Pac media is immersed in water and is fluidized (kept in constant motion) through the movement of gas and liquid in the treatment reactor. As the media supports a biomass concentration several times that achievable in activated sludge systems, treatment is significantly more productive.

Advantages

- The FBR requires very less hydraulic retention time (HRT) compared to an extended aeration or activated sludge process to perform the same BOD reduction duty.
- High resident biomass concentration, intense mass transfer conditions and aggressive biomass-sloughing action enable the process to rapidly respond to variations in process load
- Less footprint area required for installation.
- Less operation and maintenance cost during plant operations.

Secondary Clarifier

Biologically treated effluent from ditch shall be sent to the secondary clarifier for separation and return of activated sludge back to the aeration tank for maintaining

MLSS. Balance quantity of activated sludge is drained into secondary sludge storage tank. The overflow from the secondary clarifier shall be sent. The aeration tank and secondary clarifier units are provided along with the sludge re-circulation arrangement. From the aeration tanks, the effluent shall be taken to Secondary Clarifiers wherein the sludge shall be settled out and overflow shall be taken to secondary treated effluent collection sump. The biologically treated effluent shall be subjected to further tertiary treatment. The treated effluent after tertiary treatment shall be discharged to existing final pumping station (FPS).

The sludge from the bottom of the secondary clarifier shall be collected in the Sludge Sump from where it is recirculated back to the inlet of the aeration tank through Sludge Recirculation Pumps. The excess sludge along with primary sludge shall be collected in Thickener Unit from where after thickening the sludge will be collected in the sludge sump and then it will be pumped to the Membrane filter press unit for dewatering.

The Polyelectrolyte shall be injected from its dosing tanks through Metering Pumps. The dewatered cake from the Membrane filter press shall be collected in the Tractor Trolley for disposal.

Overflow of sludge thickener and filtrate from Filter press shall flow by gravity to the Leachate collection cum backwashed water sump.

D. Tertiary Treatment Scheme

The untreated effluent contains ammonical nitrogen as one of the major pollutant and sometimes refractory COD, and residual color, which cannot be degraded biologically under aerobic conditions and therefore require tertiary treatment after secondary treatment.

Removal of Ammonical Nitrogen

Balance ammoniacal nitrogen is removed by super chlorination in the tertiary treatment section. The treated effluent from secondary section is pumped into a static mixer, wherein chlorine gas is first measured through a rota-meter, mixed with lime slurry in a ventuary, and the calcium hypo chlorite so prepared is mixed with the

effluent. pH is controlled by addition of lime slurry whereas chlorine dozing is monitored by ORP control.

The excess chlorine is treated with sodium bisulfite in static mixer; pH is controlled by addition of lime slurry. The effluent is further treated with activated carbon and then the effluent is passed through a Clariflocculator, wherein PE is dozed to remove suspended solids.

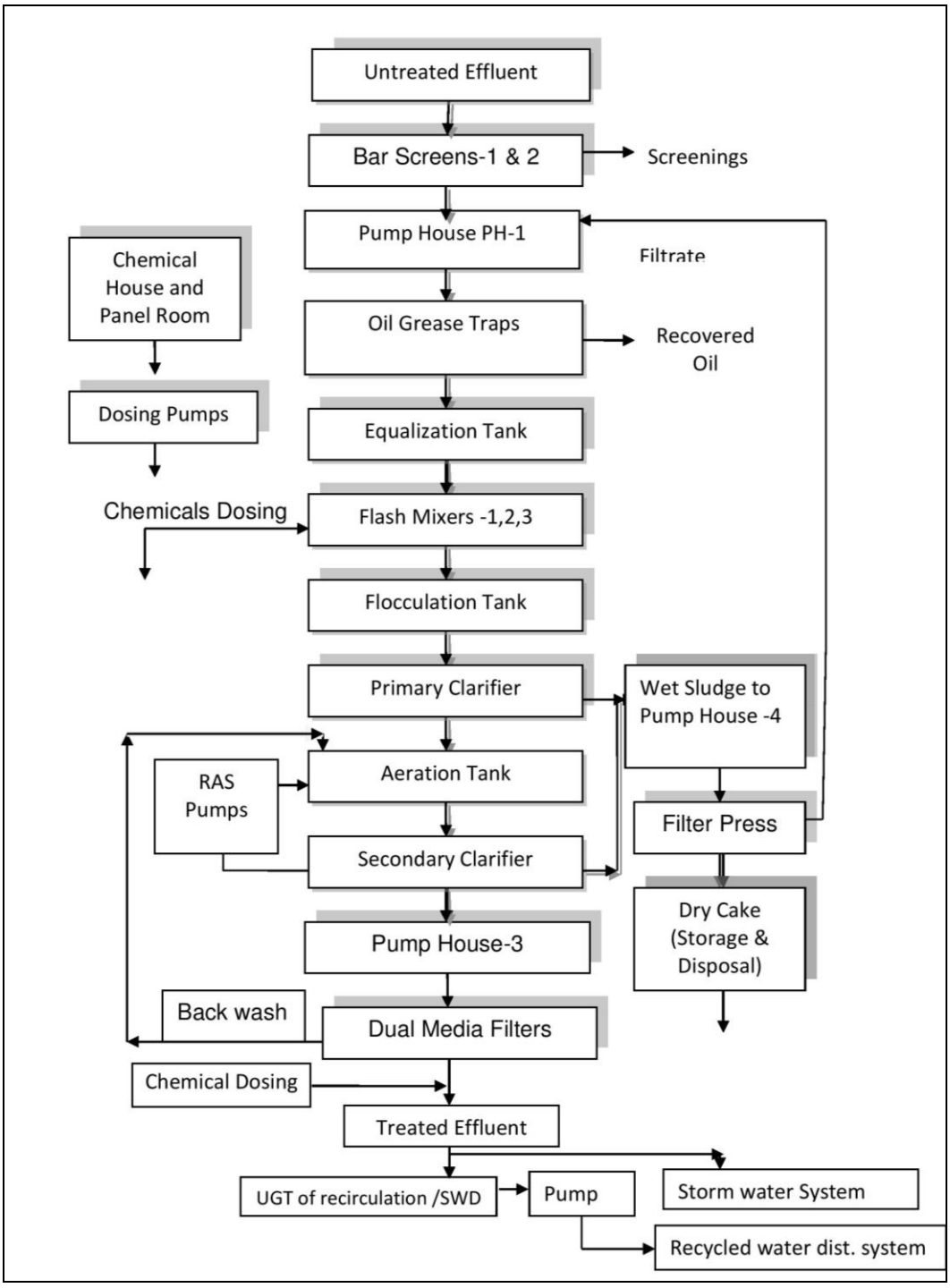
The clarified effluent is passed through decline type gravity sand filter and activated carbon filter and finally discharged into final pumping station. Any residual color is removed by activated carbon.

Sludge Handling

The chemical sludge generated from the physico-chemical treatment would be collected into Wet sludge Pit attached to Sludge Pump house. The wet sludge (TSS range 8.0 to 10.0 g/L) shall be pumped at constant rate for dewatering through filter press and volute press (new / proposed). Existing centrifuge, installed at elevated platform is not in working conditions. The dewatered sludge cake would drop (under gravity) into the trolley and shall be stored into dry sludge storage collection shed for a period of about three months. Later, the dry sludge shall be transported to sludge disposal site. This is pertinent to mention here that excess bio-sludge from the biological treatment, though less in quantity, is biodegradable and rich in nutrients. This can be used as manure and water for plantation within CETP and industrial area, if not mixed with chemical sludge.

Final Disposal of Treated Effluent

The treated effluent from CETP shall be pumped for preparation of chemicals solution, required for chemical house of this CETP and watering the plantation / horticulture in CETP premises. A part of treated effluent may be used for construction activities, after mixing with fresh water.



Sewage Treatment Plant

The treatment of sewage is a multi-stage process to renovate the wastewater before it either it reenters a body of water or is applied to the land or is reused. The goal is to reduce or remove organic matter, metals, solids, nutrients, disease-causing organisms

and other various forms of pollutants. The typical processes involved in wastewater treatment are preliminary treatment, primary treatment, secondary treatment and final treatment. During each of the first three processes settled solids, or sludge, is removed from the liquid waste stream and further treated within a sludge digester.

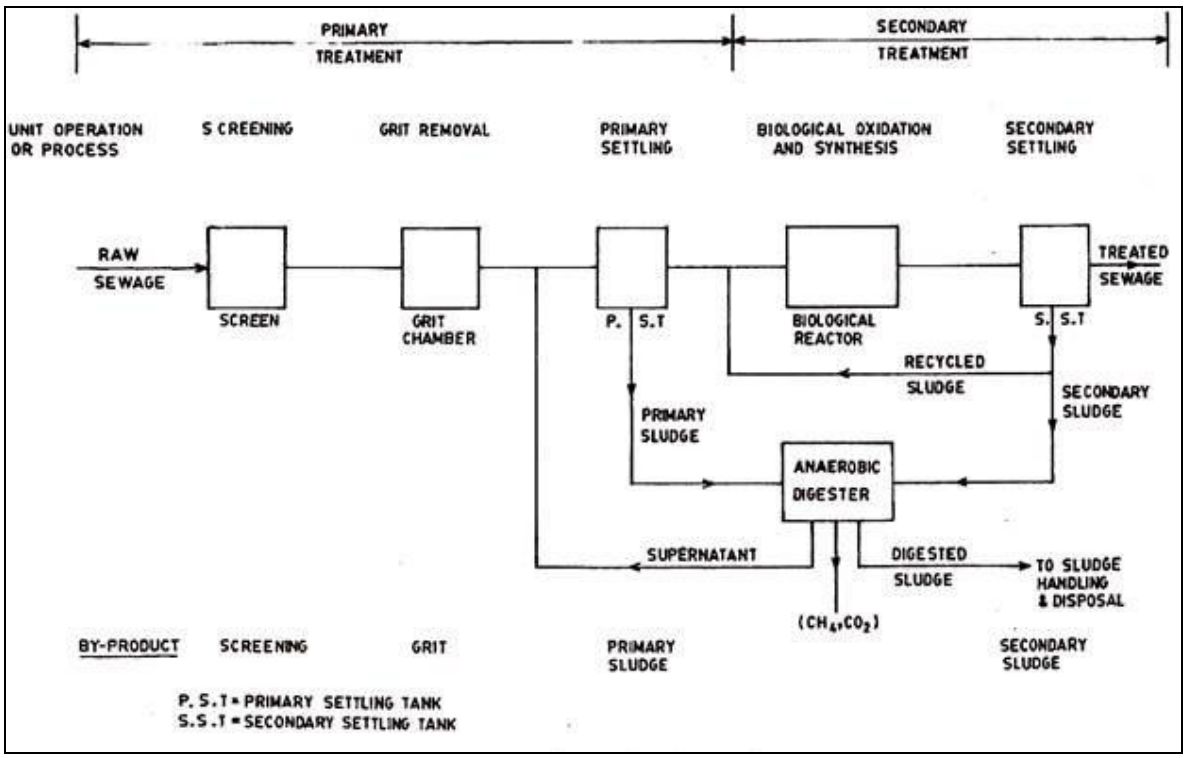
1. Preliminary Treatment: This is the first stage of sewage treatment plant process and its main objective is the removal of coarse solids and other large materials often found in raw wastewater. Preliminary treatment operations typically include large filtering screens, grit removal and, in some cases, breaking of large objects. Excess grit cause severe pump blockages thereby affecting a range of subsequent treatment pumps. Flow measurement devices, often standing-wave flumes, are always included at the preliminary treatment stage.

2. Primary Treatment: The main purpose of this treatment is to reduce any heavy solids (organic & inorganic) that settle to the bottom by sedimentation while oil, grease & lighter solids float to the surface by skimming. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to the next stage i.e. secondary treatment. Primary treatment removes about 60% of suspended solids from wastewater.

3. Secondary Treatment: The prime objective is the further treatment of the effluent from primary treatment to remove dissolved and suspended biological matter. The biological solids removed during secondary sedimentation, called secondary or biological sludge, are normally combined with primary sludge for sludge processing. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment. Secondary treatment removes more than 90% of suspended solids.

4. Tertiary/Advanced Treatment: Tertiary treatment generally follows secondary treatment and aids the removal of those wastewater constituents which cannot be removed in secondary treatment. Treated wastewater is sometimes disinfected

chemically or physically (for example, by lagoons and microfiltration) prior its reuse for green belt development.



Process flow diagram of Sewage Treatment Plant

pH	:	6.5 – 9.0
TSS	:	50 mg/L
BOD	:	30 mg/L.
Fecal Coliform	:	1000 MPN

Standards for Sewage Treatment Plant

4.3.4 Impact on Noise Levels

The major source of noise generating source from proposed project will be process plant/industry operation, D.G.set, CETP, STP, transportation of vehicles etc.

Mitigation Measures

The following mitigation measures will be adopted:

- Using less noise generating machines

- The noise levels in the workspace environment will be monitored periodically and if necessary corrective action will be taken.
- All necessary modern noise reducing gadgets will be attached like silencers, anti-vibration pads; closed room enclosures will be arranged.
- Sound proofing of admin buildings and sensitive areas.
- Restricting the movement of vehicles to specific time.
- Vehicular movement carrying raw materials will be avoided during night time.
- The vehicles will be regularly maintained and optimum use of the same will be made.
- Adequate PPE's (ear plugs, ear muffs, helmet, mask etc) will be provided to the workers.
- All possible measures will be taken to minimize the noise.
- The insulation provided for prevention and loss of heat and personnel safety shall also act as noise reducer.
- Foundations and structures will be designed to minimize vibrations and noise.
- Regular equipment maintenance and better work habits will be adopted.
- In the proposed project, noise from operation of equipments will likely to arise. Noise level is will be kept below the prescribed limit by CPCB.

4.3.5 Prediction of Impacts on Socio-Economics

4.3.5.1 Impacts on Employment Generation

- The proposed project will require skilled and semi-skilled personal during construction and operational phase. Many of the people from neighboring villages of kota may, if found suitable get the opportunity for employment during construction and operational phase. The total manpower requirement during operation phase will be around 5000 persons. This is a positive socio-economic development for the region. There is a marginal general up-liftment of standard of living in the region
- Growth in industrial sector of local area
- Increase in consumer prices of indigenous produce and services, land prices, house rent rates and Labour prices.

- Improvement in socio cultural environment of the study area.
- Improvement in transport, communication, health and educational services.
- Increase in employment due to increased business, trade and commerce and service sector.

The overall impact on the socio economic environment will be beneficial.

4.3.5.2 Impact on Traffic

The impact of the traffic is assessed on the basis of adequacy of the existing road network. The proposed project would add an additional 100 (based in industry) PCU's only. Therefore, the impact on traffic is negligible on the existing road network during the operation phase on road connecting to NH-12 ~ 900 m towards SW direction.

4.3.5.3 Greenbelt and Plantation

- ***Measures to Improve Ecological Aspects***

A belt of trees with thick canopy will be created inside and along the site boundary to intercept dust, gaseous pollutants and noise. The species viz. Neem, Casia, Shisham, and other suitable species capable of surviving in the climate of the area will be planted. Regular maintenance of plants is carried out as watering, weeding and hoeing etc.

Further plantation will be done over 42963.8in phase wise manner bringing 10.6% of the plant area under greenbelt.

4.3.6 Biological Environment

The baseline flora and fauna has been depicted in Chapter-3. There are no reserved forests, wildlife corridors and wildlife sanctuary in 10 km area around the plant boundary. No loss of forest resource is envisaged due to the project. No medicinal plants exist in the area. The impacts on flora are briefly described in the following sections:

4.3.6.1 Impact on Terrestrial Ecology

- ***Flora***

There is no forest area in the core zone. The vegetation in the buffer zone is mainly of the shrub variety. As the project activity is restricted to the core zone no impact on the flora of the buffer zone due to the proposed development of industrial area and CETP is anticipated.

The impact on terrestrial ecology will be due to emission of gaseous pollutant like NOx. The pollutant at a very low dose acts as an atmospheric fertilizer for the vegetation. However, at higher doses, they are injurious to both vegetation as well as animals.

NOx emissions are mainly due to burning of diesel in vehicles and from proposed insudtry. As described in Chapter-3 on air quality, the low concentrations of NOx due to operation of the project will have insignificant impact on ambient air quality and within the NAAQ standards. Therefore, the impact of these emissions on the surrounding agro-ecosystem will be insignificant.

It is proposed to include *Azadirachta indica, Ficus religosa, Pongamia glabra* and *Ficus recimosa* in the plantation program as they serve as sinks for gaseous emissions. Extensive plantation comprising of pollutant resistant trees will be undertaken, which will serve not only as pollution sink but also as a noise barrier. It is expected that with the adoption of these mitigatory measures, the impact due to operation of the industrial park and CETP will be minimal on the terrestrial ecosystem.

- ***Fauna***

The adverse impacts on fauna would be mainly due to:

* Human activity;
* Noise; and
* Land Degradation.

The impact on the fauna of the buffer zone due to the smelter activity will be marginal. The proposed progressive plantation with over a period of time will create conditions favourable for fauna.

4.3.6.2 Impact on Aquatic Ecology

Zero wastewater discharge is envisaged from the proposed development of industrial park and CETP operations. The waste water is treated and reused. Hence, no impact is envisaged from the proposed project on aquatic bodies.

4.3.6.3 Mitigation Measures

No impact is envisaged on biological environment of the area. However, extensive greenbelt/ green cover will be developed in and around plant area as described above.

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CHAPTER-5

ANALYSIS OF ALTERNATIVE TECHNOLOGY & SITE

5.0 Introduction

The identification of alternatives forming part of the EIA process, inter alia pursues the legal principle of best practicable environmental options and by implication to minimize the effect of the generation of waste on the environment.

The alternatives that form part of this EIA process include the consideration of technology alternatives, site selection criteria and a "No-go" alternative.

5.1 Analysis of Site

The total plot area of the project as per the Revenue record is 4,04,687 sq.m. (40 ha) which is 100 acres. The total no of Industrial Plots proposed is 259. The proposed project is coming up on an industrial land. The land was leased to Oriental Power Cable Limited by the Government of Rajasthan under, Rajasthan Industrial area allotment Rules, 1959 measuring an land area 371 acres opposite Alina river on 27th April 1963 and after that lease deed was made between Acechamps Industrial Park Pvt Ltd and Oriental Power Cables Pvt Ltd on 27, June 2013 for the land measuring 100 acre for the development of industrial area. Hence, there is no additional land acquisition process and no R & R issues involved in the proposed project. The project involves development of Industrial Park which is categorized under Item 7 (c) along with the CETP which is categorized under Item 7(h) of the Schedule-Gazette Notification. There no A category industries only B category industries (as covered under the EIA Notification, 2006 and subsequent amendments) comes under the project.

Location criteria for the proposed project are provided below in Table 5.1.

Table-5.1Site analysis

Parameter	Criteria	Observation
Lake or pond	Should not be within 200 m	**No major lake or pond** within 1 km from the plot/site
River	Should not be within 100 m	Alnia River - 45 m towards SE (Adjacent to project site)

Parameter	Criteria	Observation
Flood plain	Should not be within 100 year flood plain	**No**t in the flood plain
High way – State or National	Should not be within 500 m	NH-12 ~ 900 m towards SW direction NH-76 ~ 9.0 Km towards NNW direction SH-51 ~ 12.3 Km towards NE direction
Habitation – Notified habituated area	Should not be within 500 m	Village Alnia - 1.56 km towards South direction
Public Parks	Should not be within 500 m	**No public parks** within 500 m
Critical habitat area – area in which one or more endangered species live	Not suitable	There are **no endangered species** in the site Ummedganj Conservation Reserve 9.1 km towards NNE
Reserved Forest area	Not suitable	Reserve Forest – 11.85 km towards NW Protected Forest – 9.7 km towards ENE Dense Mixed Jungle – 12.4 km towards E Protected Forest – 9.7 km towards ESE Mawasa P.F. – 12.0 km towards ESE Barkalaji R.F. – 7.8 km towards SE Reserve Forest n/v Ramnagar – 5.2 km towards SSE
Wet lands	Not suitable	**Not a wet land**
Air Port	Should not be within zone around the airport(s)	Kota Airport – 16.0 km NNW direction Jaipur International Airport ~ 200 km towards NNE direction
Water supply	No Water supply well within 500 m	**No water supply** wells exists within 500m
Coastal Regulation Area	Not suitable	**Not** in the CRZ area
Presence of monuments /religious structures	Not suitable	**No monuments** / religious structure exists

5.2 Technology Alternatives

M/s Acechamps Industrial Park Pvt. Ltd. has proposed "Innowise Industrial Park with CETP". The details regarding designing of CETP is given in **Chapter 2** of this EIA report.

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CHAPTER-6

ENVIRONMENT MONITORING PROGRAMME

6.0 Introduction

This chapter presents the details of environmental monitoring, schedule, institutional arrangements for pollution control, cost for environmental protection measures and details of greenbelt development for the proposed project.

6.1 Environment Monitoring

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding area are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program. Environmental Monitoring Program will be implemented once the project activity commences.

6.1.1 Environmental Monitoring Program includes:

1) Environmental surveillance
2) Analysis and interpretation of data
3) Preparation of reports to support environmental management system and
4) Organizational set up responsible for the implementation of the programme.

Environmental Monitoring will be taken up for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA and Consent to Operate issued by the Rajasthan State Pollution Control Board. Compliance of same will be submitted to respective authorities on regular basis.

The main objectives of environmental monitoring are:

- To assess the change in the environmental conditions;
- To monitor the effective implementation of mitigation measures;
- To facilitate compliance with applicable acts, regulations and guidelines;

- To recognize that social responsibility and environmental management are among the highest corporate priorities;
- To assign clear accountability and responsibility for environmental protection and social responsibility to management and employees;
- To facilitate environmental and social planning throughout the project life cycle;
- To provide a process for achieving targeted performance levels;
- To provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an on-going basis; and
- Evaluate environmental performance and social responsibility against E Tech Project's environmental and other policies, objectives and targets and seek improvement where appropriate.

The attributes, which merit regular monitoring, are specified underneath:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil quality; and
- Ecological preservation and afforestation.

The post project monitoring to be carried out at the industry level is discussed below:

6.1.2 Monitoring and Reporting Procedure

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of environment during plants operation. With the knowledge of baseline conditions, the monitoring programme can serve as an indicator for any deterioration in environmental conditions due to operation of the plants and suitable mitigatory steps could be taken in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. The following routine monitoring programme would therefore be implemented.

The environmental attributes shall be monitored as given below:

- **Air Pollution and Meteorological Aspects**

- The ambient air quality shall be monitored twice in a week in line with the guidelines of Central Pollution Control Board at four locations for PM_{10}, $PM_{2.5}$, SO_2, NOx and CO.
- On line stack emissions monitoring shall be carried out for parameters like Stack, CO, PM, HCl, HF, SO2, NOx, TOC, Mercury, Heavy metals, dioxins and furans as prescribed in CFE /CTE. In addition, flow rate, temperature, velocity shall also be monitored for better interpretation of the results;
- Automatic weather monitoring shall be carried out within the plant premises. The frequency of monitoring shall be one hourly. The parameters shall include wind speed, wind direction, temperature, relative humidity, atmospheric pressure, rainfall, evaporation rate, solar radiation and cloud cover.

➢ **Water and Wastewater Quality**

- The wells in the villages shall be identified based on the ground level contours and ground water flow and water quality shall be monitored.

➢ **Noise Levels**

- Noise levels in the work zone environment of member industry and common effluent treatment plant shall be monitored. The frequency shall be once in three months in the work zone. Similarly, ambient noise levels at four locations in the surroundings shall be monitored on a seasonal basis.

➢ **Soil Quality**

Soil quality shall be monitored in the industrial area and also in the buffer zone in 10 km radius study area. The parameters shall include physico-chemical parameters and heavy metals.

The environmental monitoring cell shall co-ordinate all monitoring programmes at site and data thus generated shall be regularly furnished to the State regulatory agencies and to the Regional office of MoEF. The monitoring schedule is presented in **Table-6.1**.

The monitoring results provide the basis for auditing, i.e. to identify unexpected changes. The monitoring program will have two phases: Construction phase and Operation phase.

Construction Phase

The major construction activities involved in setting up the industrial park and CETP are construction of sheds for treatment units, stores, administrative blocks, canteen etc., major components in the industry are diesel generator and other civil, mechanical and electrical equipment. The construction activities require clearing of vegetation, mobilization of construction material and equipment. The construction activities are expected to last for few months.

During construction stage of the CETP facility at every stage quality of construction will be monitored viz. base preparation, installation of equipments. The generic environmental measures that need to be undertaken during project construction stage are given in the following **Table 6.1.**

Table-6.1

Environmental measures during construction site

S. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1	Air Emissions	All equipments are operated within specified design parameters.	Random checks of equipment logs/ manuals	Periodic
		Vehicle trips to be minimized to the extent possible	Vehicle logs	Periodic during site clearance & construction activities
		Any dry, dusty materials Stored in sealed containers or prevented from blowing.	Stockpiles or open containers of dusty materials.	Periodic during construction activities
		Compaction of soil during various construction activities	Construction logs	

		Maintenance of construction DG set emissions to meet stipulated standards	Gaseous emissions (SO_2, HC, CO, NOx)	Periodic emission monitoring
		Ambient air quality within the premises & adjacent villages of the proposed unit to be monitored.	PM_{10} $PM_{2.5}$, SO_2, NOx, and CO	As per CPCB/ SPCB requirements
2	Noise	List of all noise generating machinery onsite along with age to be prepared.	Equipment logs, noise reading	Regular during construction activities
		Night working is to be minimized.	Working hour records	Periodic during construction activity
		Generation of vehicular Noise	Maintenance of records of vehicles	
		Implement good working Practices (equipment selection and sating) to minimize noise and also reduce its impacts on human health (ear muffs, safe distances, and enclosures).	Site working practices records, noise reading	
		No machinery running when not required.		
		Acoustic mufflers / enclosures to be provided in large engines	Mufflers / enclosures shall be in place.	Prior to use of equipment.
		Noise to be monitored in ambient air within the plant premises.	Instant Noise recording	As per CPCB/SPCB requirements
		The Noise level will not exceed the permissible limit both during day and		

		night times.		
		All equipment's operated within specified design Parameters.	Random checks of equipment logs/ manuals	Periodic during construction activities
		Vehicle trips to be minimized to the extent Possible	Vehicle logs	
3	Wastewater Discharge	No direct discharge of wastewater to be made to surface water, groundwater or soil.	No discharge hoses shall be in vicinity of watercourses.	Periodic during construction Activities
		The discharge point would be selected properly and sampling and analysis would be undertaken prior to discharge.	Discharge norms for effluents as given in Permits	
		Take care in disposal of Wastewater generated such that soil and groundwater resources are protected.	Discharge norms for effluents as given in permits	
4	Drainage and effluent Management	Ensure drainage system and specific design measures are working effectively. Design to incorporate existing drainage pattern and avoid disturbing the same.	Visual inspection of drainage and records thereof	Periodic during construction phase
5	Water Quality and Water Levels	Monitoring used water quality & groundwater quality and levels (4 season)	Comprehensive monitoring as per IS 10500 Ground water level bgl	Periodic during construction phase
6	Soil Erosion	Minimize area extent of site clearance, by staying within the defined	Site boundaries not extended / breached as per plan	Periodic during construction activities

		boundaries	document.	
		Protect topsoil stockpile	Effective cover in place.	
7	Non-routine events and accidental releases	Plan will be drawn, considering likely emergencies and steps required to prevent / limit consequences.	Mock drills and records of the same	Periodic during construction Activities
8	Health	Employees and migrant labor health check ups	All relevant parameters including HIV parameters	Regular checkups as per factory act

Operation Phase

During operational stage period air emissions from member industry, DG set and vehicular movement, wastewater characteristics, etc. are monitored. The following attributes which merit regular monitoring based on the environmental setting and nature of project activities are listed below:

- Point Source emissions and ambient air quality in nearby villages;
- Groundwater Levels and ground water quality;
- Water & wastewater quality & quantity;
- Solid waste characterization (leachate treatment plant ,sludge);
- Soil quality;
- Noise levels (equipment and machinery noise levels, occupational exposures ambient noise levels); and
- Ecological preservation and afforestation

The generic environmental measures that need to be undertaken during project operation stage are given in the following Table 6.2

Table-6.2 Environmental measures during operation stage

S. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1.	Air Emissions	Stack emissions from	Temperature,	Continuous

		member unit (process)	Pressure, CO, Excess Oxygen, Particulates, HCl, SO_2, NOx, HF, TOC Mercury, Heavy metals, dioxins & furans	Monitoring Once in Month Twice in a year
		Stack emissions from DG sets.	As per CFE conditions PM, SO_2, NOx	As per CFE conditions
		AAQ within the project premises and adjacent areas (3 places at 120º) to be monitored. All vehicles to be PUC certificate.	As per CFE conditions / NAAQ Standards Vehicle logs to be maintained	
		Meteorological data	Wind speed, direction, temp., relative humidity and rainfall.	
2.	Noise	Noise generated from operation of member unit, D G set, etc to be monitored	Spot Noise Level recording;	Periodic during operation phase Once in month by third party
3.	Surface water quality	pH, TDS, TSS, Sulphate, Chloride, Colour, BOD3, COD, Oil and Grease	Water use based standards of CPCB	Once in a season
	Analysis of treated effluent	Parameters prescribed by CPCB	Parameters prescribed by CPCB	Daily by CETP Once in a quarter by NABL Accredited laboratory.

4.	Solid waste/Hazardous waste	Check compliance to HWM rules	Quality & quantity monitoring	Periodically / CPCB norms.
5.	Ground water quality	Monitoring ground water quality, around plant site and piezometers	Comprehensive monitoring as per IS 10500 Groundwater level BGL	Periodically & as per CPCB norms.
6.	Flora & Fauna	Vegetation, greenbelt / green cover envelopment	No. of plants, species	Once a year
7.	Soil Quality	Checking & Maintenance of good soil quality around	Physico-chemical parameters and metals.	Once a year
8.	Health	Employees and migrant labour health check ups	All relevant parameters (BP, Sugar, chest X-ray, Eye vision, etc.)	Regular checkups as per factories act.

6.2 Implementation Schedule of Mitigation Measures

The mitigation measures as delineated will be implemented so as to reduce the impact on environment due to the operations of the proposed industrial park and CETP. In order to facilitate easy implementation, mitigation measures are phased as per the priority implementation as given in **Table-6.3**.

Table-6.3 Implementation Schedule

S. No	Recommendations	Time Requirement (Months)	Immediate	Progressive	Depending on the discretion of the management of the proposed plant
1	Air pollution control Measures	Before commissioning of respective units	*	--	--
2	Water Pollution	Before	*	--	--

S. No	Recommendations	Time Requirement (Months)	Immediate	Progressive	Depending on the discretion of the management of the proposed plant
	Control Measures	commissioning of the plant			
3	Noise Control Measures	Along with the commissioning of the plant	*	--	--
4	Ecological Preservation and Upgradation	Stage-wise implementation	*	*	--

Note (*) indicates implementation of recommendations

6.3 Monitoring Schedule – Operation Phase

Regular Monitoring of all the environmental parameters viz, air, water, noise and soil as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year in order to detect any changes from the baseline status. Monitoring schedule as shown in **Table 6.4**.

Table-6.4 Monitoring Schedule

S. No.	Description	Schedule Of Monitoring
1.	Air Quality	Quarterly except Monsoon season
2.	Water Quality (Surface and Ground Water)	Once in a season for all four seasons in a year.
3.	Noise Level	Six monthly
4.	Soil Quality	Yearly
5.	Socio-economic Condition	Once in 5 Years
6.	Plantation Monitoring	Once in a season,

6.3.1 Pollution Monitoring Facilities

DG set stack should have provision of platform and port hold to stack sampling meeting MOEF & CC standards with necessary power supply point. Environmental

laboratory shall have equipment/instruments to analyze air and wastewater parameters.

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring program at site and data thus generated shall be regularly furnished to the State regulatory agencies. The frequency of reporting shall be on six monthly bases to the Rajasthan state PCB officials and to Regional office of MoEF& CC. The project will also be provided with online pollutant monitoring facilities. The Environmental Audit reports shall be prepared for the entire year of operations and shall be regularly submitted to regulatory authorities.

6.4 Environmental Management Cell

In order to maintain the environmental quality with in the stipulated standards, regular monitoring of various environmental components is necessary which will complied as per conditions. For this individual authorities will taken decision to formulate an Environment Policy of the proposed industry and constitute an Environmental Management Cell and committed to operate the proposed project with the objectives mentioned in approved Environment Policy. The System of reporting of NC/violation of any Environmental law/Policy will be as per quality management system. The internal audit will be conducted on periodic basis and any non-conformities/violation to environment law will be closed and discussed in Management Review Meeting of Board of Director/Partners.

6.4.1 Organizational Structure

The Plant Manager / EHS Manager will look after all environmental issues and ensure compliance with Environmental Clearance conditions/SPCB norms. EHS Manager will report to the Lessee directly and discuss the non-compliance if so any. An immediate solution will be arrived to ensure compliance with norms.

6.4.2 Responsibilities of Environmental Management Cell

A Senior Manager (Env) will be in-charge of the Environment Management cell supported by engineers and chemists and horticulturist along with other technicians.

The department shall be the nodal agency to co-ordinate and provide necessary services on environmental issues during construction and operation of the project. This environmental group is responsible for implementation of environmental management plan, interaction with the environmental regulatory agencies, reviewing draft policy and planning. This department interacts with MoEF, Central Pollution Control Board (CPCB) and other environment regulatory agencies. The department shall also interact with local people to understand their problems and to formulate appropriate community development plan.

6.5 Environmental Budget

The In order to comply with the environmental protection measures as suggested in the above sections, the project management has made budgetary provision for environmental protection and safety measures. The total capital cost towards EMP is Rs. 40 Lac and the recurring cost will be Rs. 20.0 Lac. The annual expenditure to be incurred on plantation, maintenance, monitoring and analysis of ambient air, effluent water and soil etc is Rs. 1 crore as shown in **Table-6.5**.

Table-6.5

Annual Expenditure Of Environmental Protection Measures

S. No.	Pollution control system	Cost (Rs. Lakhs)	Recurring Cost (Rs. Lakhs)
1	Air pollution control (Stack for DG set)	40	20
2	Water pollution (CETP and STP)		
3	Environment lab and monitoring		
4	Occupational Health (PPE)		
5	Green Belt		

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CHAPTER-7
ADDITIONAL STUDIES

7.0 Introduction

This chapter explains the basis of Risk Assessment and its objectives and public Hearing.

7.1 Public Hearing

The proposed industrial park with CETP project will be established at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan). The present report is being prepared for submission to Rajasthan State Pollution Control Board for conducting the public hearing. The report will be updated with public hearing minutes after it is completed, and eventually submitted to SEAC for obtaining environmental clearance.

7.2 Activities at CETP

7.2.1 Activities to be Performed

Activities to be carried out in CETP for treatment of effluent includes following :

- Operation of treatment plant.
- Handling of treatment chemicals.
- ETP sludge handling.
- Control of flow and processing of wastewater.
- Monitoring of control panel.
- Adjustments of valves and gates through SCADA or manually.
- Observation of variations in operating conditions.
- Starting and stopping of pumps and other equipment.
- Maintenance work of CETP units.
- Sampling and testing of effluent samples.

7.2.2 Instruments & Equipments Handling

The workforce of Treatment plant is anticipated to handle following instruments/equipment:

- Laboratory equipment.

- Measuring and metering devices.
- Mechanized lifting and disposal equipment.
- Portable mechanical working tools.
- Pumps and blowers.

CETP installation needs to equipped itself with proper protocol for O & M. The first step in preparation for O & M is preparing inventory of maintenance requirements. This inventory is generally included in the Operation & Maintenance (O&M) Manual written down for the installation by the contractor who designs and builds the installation. He on completion of the work hands over this manual to the Principal for whom he builds the installation. The following sections of the O & M Manual would lay down the maintenance requirements:

1. Maintenance of Equipment: This section provides schedules that list periodic maintenance requirements for the various equipments and also includes record-keeping forms as necessary. A list of equipment suppliers and service representatives along with telephones is also given therein. Also, the manufacturer's O&M requirement is provided in this section. The CETP maintenance staff / the Operation & Maintenance contractor should particularly review this section of the O&M Manual.

2. Storeroom and Spare Parts Inventory: It includes a list of critical replacement parts that may have long delivery times associated with them. Contact details of manufacturers or dealers of various equipment used in the installation, who are located nearby is helpful in seeking recommendations/ guidance. This section also indicates where the spares are to be stored. To optimise spare parts inventory, the CETP Staff/ O&M Contractor can make/ procure computerized maintenance software programs to help keep track of spares, supplies and lubricants.

3. Manufacturer's O&M Literature. In the O & M manual, cut-sheets and other manufacturer's literature are also contained. CETP staff/ O & M Contractor should familiarize itself with all these documents to ensure proper planning and execution of O & M activities.

In case these documents are not available the same should be prepared based on study of the plant, process, equipments, past experience, and interaction with manufacturers/ suppliers.

The manpower requirement for CETP O & M can broadly be listed as follows:

Plant Manager: is an individual with environmental engineering or science background with experience of at least three years on similar plant(s). He must have thorough understanding of unit operations and application of microbiology and environmental chemistry in the effluent/ sewage treatment. He should be able to take decisions to divert / bypass/ distribute the flow in the event of disruptions / breakdown of mechanical or electrical equipment until resumption is in place and repairs / replacements are successfully carried out. He should understand and be able to plan a forecast and use of chemicals / nutrients for the plant operations and the laboratory. He should be well versed in working out dosages of chemicals and nutrients based on the raw effluent quality and change it as the treatment progresses and results start forthcoming. AS CETP Manager, he should prepare a weekly roster of duties for each individual and broadly lay down in writing the duties and responsibilities of each category of staff. He should ensure that the staff on plant should get rotated in various shifts during each month. Needless to mention that he is the backbone of CETP operation.

Plant Operator(s): comprise a team of qualified / trained operators who work in shifts in operating and maintaining screens, grit removal devices, pumps, aerators, valves, etc. in directing the effluent and settled sludge to various units for / after treatment.

They should be able to sense troubles and act as ears and eyes of the Plant manager. They should also assist the electrical / mechanical maintenance technician(s) in carrying out the preventive and breakdown maintenance tasks.

Electrical / Mechanical Technician (s): form team of qualified maintenance technicians with the ability and experience of diagnosing health of equipment and motors with the aim of taking these on for preventive maintenance, assigning causes and reasons for faults and ultimate failure, quickly carrying out minor repairs / replacements by reaching, removing, stripping / opening, repairing, assembling of routine electrical and mechanical machines / equipment including piping and valves.

Laboratory Analyst: is a qualified individual who has knowledge of water and waste water chemistry and is trained in preparation of laboratory chemicals, use of laboratory instruments, collection and preservation of water / waste water samples and analysis for various environmental parameters such as pH, SS, BOD, COD, TDS etc.

Labour / Helpers: In addition to the above trades, labour / helpers are required to assist the above individuals and upkeep and maintenance of the various units, structures, areas, floors, rooms, equipment, tanks, vessels, beds etc. and removal, loading, haulage/carriage of wastes, screenings, stores and chemicals and other such material as the need be.

It is essential that each CETP staff shall be well trained in related tasks and be equipped in resources such as tools, spares and tackles.

CETP O & M skills are acquired mostly through on-job training. Trainees usually start as attendants or operators-in-training and learn their skills on the job under the direction of an experienced operator. They learn by observing and doing routine tasks such as recording meter readings, taking samples of liquid waste and sludge, and performing simple maintenance and repair work on pumps, electric motors, valves, and other plant equipment. CETP Operators need mechanical aptitude and should have knowledge of basic mathematics, chemistry, and biology. They must have the ability to apply data to formulas prescribing treatment requirements, flow levels, and concentration levels.

CETP operation is a team work. It requires proper team selection, training need assessment, training, on-job moulding, laboratory and statistical analysis for ensuring desired performance, trouble forecasting and trouble shooting. O & M staff profile should address all these requirements.

Since it is not feasible to position a Repair/Maintenance Shop at the site to carry out major overhauls / repairs to electrical and mechanical equipment, it is essential to identify back-up workshop facilities. A good CETP operating contractor may have his own central resources in place within workable co-ordinates which will help to carry out such heavy repairs and maintenance or he may have agreement to move such resources, own or from trade, to the site with matching capability to establish temporarily for completion of task. This should be taken in to account if CETP operation is to be outsourced.

7.3 RISK ASSEMENT AND ITS MANAGEMENT

7.3.1 Types of Hazards in CETP

Risk is a probability that damage to life, health and / or the environment. Risk will occur as a result of the hazard. Hazard is an inherent property of a substance, agent, and source of energy or situation having potential of causing undesirable consequences.

The following two methods of hazard identification have been employed in the study:

- Identification of major hazards based on Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989 Government of India, as amended till date.
- Primary Hazard Analysis.

The following are the various hazards considered during different phases of the project i.e. construction and operation phase.

A) Natural Hazards:

Several natural hazards like flooding, earthquake, lightening, etc. may be possible and may cause danger to surrounding environment.

B) Activity Hazards:

The following activity hazards along with proposed safeguard measures were studied for construction and operation phase of the project.

(i) Chemical Hazards:

As CETP, there is no such chemical used except alum, poly-electrolyte, activated carbon, and the quantity required is very less, so there are no any hazards associated with handling of chemicals. However, for further reduction in the chemical hazards, following measures should be follow.

Safety Measures for Chemical Hazards:

- Development of safe working procedures.
- Reduction of number of workers exposed to hazards & duration and frequency of exposure.
- Use of personal protective equipment.

• Regular environmental and medical monitoring.

Accident Hazards:

Different accident hazards associated with CETP construction and operation activities are as follows:

• Fire hazards,

•Electrical hazards,

• Slips, Trips, and Falls at work, and

• Biological hazards.

Fire Hazards:

Accidental fires due to electrical short circuit represent minor hazards. Special precautions must be taken for electrical fitting and appliances uses. Sources of ignition for fire hazards are direct flames, Heat radiation, and Electric spark.

Safety Measures for Fire Hazards:

- Automatic fire detection system and control system should be provided.
- Emergency back-up power like D.G. Sets should be provided for the automatic systems.
- Matches, cigarettes, etc. should be prohibited.
- Soldering, welding or cutting torches should be used after taking hot work permit from the consent authority.
- Being a CETP project, in case of fire treated water reservoir will be use for emergency operation.

Electrical Hazards:

Poor electrical installations and faulty electrical appliances can lead to fires which may also cause death or injury to workers. Hazards involved with electrical network are:

• Contact with live parts causing shock and burns

• Faults which could cause fires

Safety Measures for Electrical Hazards:

• Ensure safety of electrical installation and its maintenance.

• Provision of safe and suitable equipment.

• Provision of safety device.

• Carry out preventive maintenance.

Slips, Trips, & Falls at Work:

Slips and trips are the most common cause of fatal injuries as well as non-fatal major injuries. The hazards related to slip and trips at work can be reduced through good housekeeping as well as health and safety arrangements.

Safety Measures for Slips, Trips, & Falls at Work:

The risk associated with slip and trip hazards can be reduced by avoid spillages in workplace, especially on uneven floors, and trailing cables, and by maintaining good housekeeping. However, for further reduction in the slips and trips, following measures should be follow.

• Safety railing / grills, and safety stairs should be provided.

• Safety operating procedure should be followed for tank cleaning, pipeline maintenance work at depth or height, chemical handling, and doing regular maintenance work.

Biological Hazards:

The workers working in the CETP are prone to following biological hazards:

• Diseases caused by infectious agents present in raw effluent.

• Diseases caused by insects or rodents proliferating in the sludge drying beds.

Safety Measures for Biological Hazards (infection & illness):

• Employees shall understand the risks through proper instruction, training and supervision, there will be no any direct contact with chemicals.

• Provisions and use of suitable personal protective measures.

•Provision of adequate welfare and sanitation facilities as well as first-aid measures considering the heavy contamination.

• Provision of separate eating facilities to avoid food poisoning.

• Effective arrangement for monitoring health of staff.

7.3.2 Fire Fighting System

• According to BOCW (Building & other construction workers) ACT,NBC-2005,relevant BIS standard like BIS-14489 and other related sets out the law on Construction site general fire safety.

• The Statutory requires that a 'responsible person' must carry out, and keep up to date, a risk assessment and implement appropriate measures to minimize the risk to life and property from fire. The responsible person will usually be the main or principal contractor in control of the site.

• You should identify sources of fuel and ignition and establish general fire precautions including, means of escape, warning and fighting fire, based on your fire risk assessment.

• In occupied buildings such as offices, make sure the work does not interfere with existing escape routes from the building, or any fire separation, alarms, dry risers, or sprinkler systems.

Key issues are:

• Risk assessment

• Means of escape

• Means of giving warning

• Means of fighting fire

• Construction of timber frame will require significant additional measures

Risk and Hazard Assessment

In most cases, conducting a risk assessment will be a relatively straightforward and simple task that may be carried out by the responsible person, or a person they nominate, such as a consultant.

There are five steps in carrying out a fire risk assessment:

1. Identify hazards: consider how a fire could start and what could burn;

2. People at risk: employees, contractors, visitors and anyone who is vulnerable e.g. disabled;

3. Evaluation and action: consider the hazards and people identified in 1 and 2 and act to remove and reduce risk to protect people and premises;

4. Record, plan and train: keep a record of the risks and action taken. Make a clear plan for fire safety and ensure that people understand what they need to do in the event of a fire; and

5. Review: your assessment regularly and check it takes account of any changes on site.

Means of escape

Key aspects to providing safe means of escape on construction sites include:

• **Routes:** your risk assessment should determine the escape routes required, which must be kept available and unobstructed;

• **Alternatives**: well-separated alternative ways to ground level should be provided where possible;

• **Protection:** routes can be protected by installing permanent fire separation and fire doors as soon as possible;

• **Assembly:** make sure escape routes give access to a safe place where people can assemble and be accounted for. On a small site the pavement outside may be adequate; and

• **Signs:** will be needed if people are not familiar with the escape routes. Lighting should be provided for enclosed escape routes and emergency lighting may be required.

Means of giving warning

Set up a system to alert people on site. This may be temporary or permanent mains operated fire alarm (tested regularly), a klaxon, an air horn or a whistle, depending on the size and complexity of the site.

The warning needs to be distinctive, audible above other noise and recognizable by everyone.

Means of fighting fire

Fire extinguishers should be located at identified fire points around the site. The extinguishers should be appropriate to the nature of the potential fire:

•Wood, paper and cloth – water extinguisher;

• Flammable liquids – dry powder or foam extinguisher;

• Electrical – carbon dioxide (C02) extinguisher.

Nominated people should be trained in how to use extinguishers.

Process fire risks

The Regulatory Reform (Fire Safety) and National Building Code sets out the law on construction site general fire safety, including means of escape.

The CDM Regulations 2015 also impose duties including the requirement to prevent risk from fire. The fire risk from site activities must be assessed and precautions taken to control:

• **Combustible material** – the quantity of combustible materials on site should be kept to the minimum and all such materials safely stored and used.

• **Ignition sources** – action is needed to eliminate, reduce and control ignition sources on site.

• Construction of timber frame buildings will require significant additional measures to those outlined here. You should refer to the specific guidance listed in Resources, below.

A) Combustible material

Many solids, liquids and gases can catch fire and burn. It only takes a source of ignition, which may be a small flame or an electrical spark, together with air. Preventive actions that can be taken include:

• **Quantity:** fire risk can be reduced by controlling the amount of combustible material in the work area until it is needed;

• **Flammability:** it may be possible to specify materials that are less combustible. Remember that when worked on, materials may become more easily ignited e.g. solids turned to dust or crumb;

• **Storage**: combustible materials should ideally be stored outside buildings under construction, especially volatile materials e.g. LPG. Internal storage must be planned and located where it will not put workers at risk;

• **Rubbish:** good housekeeping and site tidiness are important to prevent fire and to ensure that emergency routes do not become obstructed;

• **Volatile flammable materials**: extra precautions are needed for flammable liquids, gases and oxygen cylinders especially when internally stored;

• Coverings and sheeting: protective coverings and scaffold sheeting may add to fire risk. This can be reduced by use of flame retardant materials;

• Tanks and services: demolition projects can involve an increased risk of fire and explosion. Dismantling of tank structures may cause ignition of flammable residues or disruption and ignition of buried gas services.

• Ignition sources

• It is important that you take action to control ignition sources including:

•Hot work: all hot work generating heat, sparks or flame can cause a fire.

Precautions include:

• Clearing the area of combustible materials;

• Suitable fire extinguishers; and

• maintaining a careful watch throughout the work.

• A permit to work (PTW) system can help manage the risk on larger projects.

• Plant and equipment: select electrical and engine driven plant of suitable capacity to prevent overheating. Fasten lamps to a solid backing and, if mounted on tripods, make sure the tripod is stable. Electrical equipment in flammable atmospheres must be suitable for the nature and extent of the flammable atmosphere;

• Smoking: bring the rules on smoking to the attention of all workers and visitors to the site and enforce them;

• Electrical installations: should be of sufficient capacity for the intended use and designed, installed, inspected and maintained by competent people;

A) Event Classification and Modes of Failure

Component failures are the initiating events for the failure scenarios, which can escalate to consequences like fires, explosions and equipment damage. Eventual failures could be in the form of small gasket leaks in a flange joint or guillotine failure of a pipeline or even rupture / catastrophic failure of equipment. Major failure modes identified in this project are:

• Pipeline - small/large leaks;

• Storage tank - small/large leaks

B) Power Failure / Load Shedding

Operational difficulties may be experienced at CETP plant when there will be power failure. Since, there is a provision made for DG sets for running plant during power failure, there will not be significant effect on the treatment efficiency of the CETP.

Standby generator of total capacity of 700 KVA will be provided during power failure or load shedding period, which would reduce the chances of inadequate treatment of the effluent.

Training programme for plant operation and maintenance activities have been included as part of the project's technical assistance programme.

7.3.3 Health & Safety Measures

During the operation of CETP and during handling chemicals, a practice of preventive and protective maintenance will be adopted to take care of employee's health. The various safety equipments like breathing apparatus, gum boots, goggles and helmet will be provided to the workers/operators. Besides, all the first aid, firefighting devices will also be inspected, tested and maintained all the time in ready to use condition.

Health of all the employees in plant area will be regularly monitored by the physician. If any abnormality is found, necessary treatment will be given from time to time. Necessary of the safety measures proposed to be carried out to ensure prevention of occupational hazards is delineated below.

• Safety equipments and fittings for handling of chemicals.

• Housekeeping of the plant as per prescribed norms. Floors, platforms, staircases, passages will be kept free of any obstruction.

• All operations will be explained to the workers. They will be periodically trained on the processes.

• Should impart safety training to the employees engaged.

• Only authorized persons will be allowed inside the plant.

•All instruments and safety devices will be checked and calibrated during installation and at frequent intervals.

• All electrical equipments will be installed as per prescribed standards.

• All the equipments of the plant will be periodically tested as per standard and results will be documented. All equipments will undergo preventive maintenance schedule.

• Number of fire extinguishers will be installed at different locations within premises.

• Adequate ventilation arrangement will be provided for safe and better working in the plant as per the standard.

• Sufficient access for firefighting will be provided in the plant.

• Protection against lightning will be taken care in the plant

7.3.4 Disaster Management Plan

An accident is an unplanned event which has a probability of causing personal injury or property damage or both. It may result in physical harm (injury of disease) to personnel and also damage to property, loss to the company, a new miss or combination of these effects.

7.3.4.1 Major accident

It will be a sudden, unexpected, unplanned event, resulting from uncontrolled developments during an industrial activity, which causes, or has the potential to cause;

• Serious adverse effect immediately or delayed (death, injuries, poisoning or hospitalization) to number of people inside the installation and/or to persons outside the establishments or,

• Significant damage to crops, plant or animals, or significant contamination of land, water or air or,

• An emergency intervention outside the establishment (ex. Evacuation of local population, stopping of local traffic) or,

• Significant changes in the process operating conditions, such as stoppage or suspension or normal work in the concerned plan for a significant period of time, or

• Any combination of above effects.

7.3.4.2 Emergency

It could be defined as any situation which presents a threat of safety of persons or/and property. Itmay require outside help also. Emergency due to operating conditions (small fire, spill, failure of power, water, air etc.) and which can be locally handled by plant personnel alone (without outside help) will be considered as emergency.

Objectives of the On Site Emergency Plan

1. To define & assess emergencies, including risk & environment impact assessment.

2. To control & contain incidents.
3. To safeguard employees, visitors & other people in the vicinity.
4. To minimize damage to property &/or the environment.
5. To inform employees, the general public and the authorities about the hazards/ risk assessed safeguard provided residual risk if any and the role to be played by them in the vent of emergency.
6. To be ready for the mutual aid if need rises to help the neighboring unit. Normal jurisdiction of an OEP(on-site emergency plan) will the own premises only, but looking to the time factor in the arriving the external help of off-side plan agency, the jurisdiction must be extended outside to the extent possible in case of emergency occurring outside.
7. To inform authorities and mutual aid centers to come for help.
8. To affect rescue and treatment of causalities to count injured.
9. To identify and list any dead.
10. To inform and help relatives.
11. To secure the safe rehabilitation of affected area and to restore normalcy.
12. To provide authoritative information to the news media.
13. To preserve records, equipments, etc., and to organize investigation into the cause of the emergency and preventive measure to stop its recurrence.
14. To ensure safely of the works before personnel re-enter and resume work.
15. To work out a plan with all provisions to handle emergencies and to provide for emergency preparedness and the periodical rehearsal of the plan.

In order to meet the above objectives, detailed procedure for handling On Site Emergency has been prepared, which will intended to cover all foreseeable eventualities even those leading to the evacuation of the site.

Emergency Organization

No plan will succeed without effective emergency organization. Key personnel to combat emergency should be nominated with specific responsibilities according to the set procedures and making the best use of the resources available with different department and to avoid confusion. Respective department's key personnel are important part to combat emergency as part of organization. Such key personnel

include Incident controller, Site main controller, Communication officer, messenger,Essential workers etc.

Assembly point for non essential workmen, occupational health center, emergency control room, firefighting arrangement, first aid arrangement and other arrangement and persons to manage them and also important part of emergency organization. Other key personnel will be required to provide advice to and implement the decisions made by the Site Main Controller (SMC) in the light of information received on the developing situation at the emergency. Such key personnel (i.e. Fire fighters, First-Aider, Emergency rescue, Communication officer, messenger, security people, P&A officer etc.) will included from various department. All key personnel will responded on instruction given by Site Main Controller / Incident Controller. Their roles and responsibilities will mention bellow;

Incident Controller (IC)

Responsibility of Incident Controller

•Rush to accident site, ask field person to close the required valves.

•Inform control room from field to take required action.

•Take charge at the scene of incident and assess the scale of emergency.

•Decide for continuing the operation of the plant.

•Decide the need of external help.

•Ensure that outside emergency services have been called in.

•Ensure that SMC and Key personnel have been called in.

•Direct firefighting operations to internal as well as external agencies

Deputy Incident Controller (Dy. LC)

Responsibility of Dy. Incident Controller

- Immediately reach at the scene of Incident and help IC
- Will act as IC in his absence
- Will ensure about the emergency internal communication to utilities, security, effluent plant &other departments
- Will act as a link with ECC (SMC) and IC (Accident Site)
- Arrange for any control devices to stop the leakage

Site Main Controller (SMC)

Responsibility of Site Main Controller

- In consultation with IC will declare major emergency.
- Ensure for mutual aid help to neighboring industries.
- Will direct key personnel for transportation, evacuation, medical help, traffic control help.
- Will appraise government and statutory authorities
- Take actions for rehabilitation of victims at hospitals

Key Personnel (KP)

Responsibility of KP

- Individual key person will act in his respective pre-assigned duties to help control emergency.
- Come at site with all required equipments and gadgets.
- Will take other directives from IC and SMC

Essential Workers (EW)

Responsibility of EW

- On hearing the siren, will rush to the scene of incident to take directives from IC
- Help in Fire Fighting, First Aid and other work
- Check the wind direction & rush to the scene of incident with personal protective equipment

Fire & Security Team

Responsibility of Fire Fighter

- Team consists of employees on duty in general shift/ shifts.
- Will rush to the scene of incident immediately after sounding the siren
- Help to control emergency & fire.
- Confirm about emergency on telephone.
- Direct outside services to the scene.

First Aid Team

Responsibility of First Aid Team

- On hearing the siren, send vehicle in the plant.
- Be prepared for any causality to treat.
- Inform medical officer about emergency & probable causalities

Telephone Operator

Responsibility of Telephone Operator

- Keeping ready the forms for recording telephone directory and list of important telephone numbers
- Informing SMC/IC if they will not on site. Operating mobile system to inform SMC & Key Personals.
- Contacting and giving message about emergency to these needed at site without waiting.
- Being precise, sharp, attentive and quick in noting down the message.
- Inform External Agencies for the required aid on Hot Lines/ Wireless communication system.

Non- Essential Workers

Responsibility of Non-Essential Workers

- Take instructions from shift in-charge for the plant activities.
- Assemble at assembly point if situation demands.
- Do not get panic.
- Do not obstruct any activity being done for controlling emergency.
- Do not engage any phone to know about emergency.
- Be alert to hear instructions from speakers/ loud phones

a) Major Emergency

Major Emergency could be defined as any situation which may affect several departments within and/ or may cause serious injuries, loss of life, extensive damage to property of serious disruption outside the work. It will require the use of outside resources to handle it effectively.

Usually the result of a malfunction of the normal operating procedure, it may also be participated by the intervention of an outside agency, such as severs electrical storm, flooding, crashed aircraft or deliberate acts of arson or sabotage.

b) Disaster

It will a catastrophic situation in which the day to day patterns of life are, in many instances, suddenly disrupted and people are plugged into helplessness, suffering and as a result need protection, clothing, shelter, medical & social care and other necessities of life such as: Disaster resulting from natural phenomena like earthquakes, volcanic eruptions, storm, surges, cyclones, tropical storms, floods, landsides, forest fires and massive infect infestation. Also in this group, violent drought which will cause a creeping disaster leading to famine disease and death must be included.

Second group includes disastrous events occasioned by man or by man's impact upon the environment, such as armed conflict, industrial accidents, fires, explosions and escape of toxic gases or chemical substances, rivers, pollution, mining / deep excavations or other structural collapse, air, sea, rail and road transport accident, aircraft crashes, collisions of carrying inflammable liquids, oil spills at sea and dam failures.

c) Risk

The likelihood of an undesired event (i.e. accident, injury or death) occurring within a specified period or under specified circumstances. It may be either a frequency or a probability depending on the circumstances.

d) Hazard

Hazard is a physical situation which may cause human injury, damage to property or the environmental or combination of these criteria.

7.4 Hazard during Construction &Operation

Increased urban development and requirements for strict control of the quality of effluents discharged into streams, rivers, estuaries and coastal water has led to the need to set up individual wastewater/effluent treatment plant and common effluent treatment plants.

The wastewater treatment ranks of industrial occupations where on-the-job injuries are frequent. The wastewater treatment plant operators are exposed to a variety of hazardous chemical agents contained within the effluent and the reagents used in the water processing or generated during the wastewater treatment which may cause poisoning and a number of ailments in the operators.

The operators are also exposed to hazards related to work in confined spaces, which include electric shocks, explosions, entanglement in moving machinery, etc Against natural calamities like floods, earthquakes, lightening, possible accidental hazards Fire & explosion hazards − Electricity − Slips, trips and falls at work , chemical hazards, biological hazards and ergonomic, psychological and organization factors and the preventive measures required in common effluent treatment plants.

Risk and Hazard during Construction:

Excavation: Any person-made cut, cavity, trench depression in an earth surface, formed by earth Trench:

A narrow excavation with its depth greater than width, but the width at the bottom is not greater than top.

Competent Person: One who is capable of identifying existing and predictable hazards in the surrounding working conditions that are unsanitary, hazardous and dangerous Hazards

- Excavation cave-ins
- Underground and overhead utilities
- Materials falling into excavations
- Hazardous atmosphere of work.
- Vehicle movement and equipment operation
- Water accumulation.
- No protective system
- Ladder is not angled working height (vertical)
- Poor housekeeping
- The excavated soil is close to the edge and not retained to prevent from falling into the trench/excavated area.
- Overnight rain can make excavated area unsafe.

Hazards of Mechanized Excavators

• Struck by vehicle

• Blind spot

• Toppling of the equipment

• Contact with power transmission

Basic Safety Requirements

• Sloping or benching for excavations deeper shall be designed.

• Means of access/egress (ladder) required if it is 4 feet deep or more.

• Spoil dirt must remain at least 1 meter from of the trench/excavation.

• Trench/ Excavations are to be identified and barricaded.

• Personnel are not permitted to work in trench excavations where water is accumulating.

• Fall Protection is required for walkways over deeper than 2 feet.

• Identification, isolation, protection of underground utilities and structures nearby to be taken care.

Electrical safety in construction

The law says you must take precautions against the risk of death or injury from electricity. Electrical equipment must be safe, and properly maintained. Only in exceptional circumstances should work be carried out on live systems, and then only by a competent authorized person.

• Electrical systems in buildings - Refurbishment work in buildings presents the greatest risk and must be planned, managed and monitored to ensure that workers are not exposed to risk from electricity.

• Overhead power lines - Any work near electric overhead power lines must be carefully planned and carried out to avoid danger from accidental contact or close proximity to the lines.

• Underground cables - Damage to underground electrical cables can cause fatal or severe injury you must take precautions to avoid danger. These precautions include a safe system of work based on planning, use of plans, cable locating devices and safe digging practices.

Personal Protective Equipment (PPE)

Always wear the proper gloves when working with acids. Neoprene and rubber gloves are effective against most acids and bases. Polyvinyl chloride (PVC) is also effective for most acids. A rubber coated apron and goggles should also be worn. If splashing is likely to occur, wear a face shield over the goggles. Always use corrosives in a chemical fume hood.

While planning the list of PPE, the following types of situations should be catered for:

1. Impact / Penetration / Compression while doing maintenance tasks
2. Chemical Handling
3. Heat/cold and wetting
4. Harmful dust
5. Oxygen deficiency
6. Obnoxious odours of decomposing matter
7. Hydrogen Sulphide presence
8. Light (optical) radiation
9. Biological exposure from raw / treated effluents and sludge handling
10. Noise of machines and vibrations.
11. Electric shock
12. Rain / Storm

Checklist for PPE

1. Safety Boots with non-skid soles and Steel Toes.
2. Electrical Hazard safety Toe shoes
3. Gas Masks and Face Shields
4. Oxygen meters for ascertaining type of atmosphere in a confined area.
5. Single-use Ear Plugs / Ear-muffs
6. Safety Goggles
7. Helmets / Hard Hats
8. Latex Rubber/ Butyl Rubber/ Fabric / Chemical Resistant Gloves
9. Overall Clothing
10. Safety Belts
12. First Aid Box

13. Fire extinguishers
14. Respiratory Protective mask with man pack cylinders

DO'S & DONT'S FOR HANDLING OF CHEMICALS, MATERIAL HANDLING, FIRE PREVENTION AND HOUSEKEEPING

Handling of Chemicals

Do's	Don'ts
• Know the hazards of the chemical before handling. • Know the antidotes for chemical, which you are handling. • Do keep material safety data sheet in locations where chemicals are being handled and study it. • Use appropriate personal protective equipment like gloves, aprons, and respirator; face shield etc. depending upon nature of the work. • Label every chemical that you use and tightly close the container. • Use eye wash fountain / safety shower in case of splash of chemicals in the eye or body for at least 15 minutes. • Segregate toxic, flammable chemicals and keep them under control. • In addition to draining and closing valves, lines should be blanked before taking up maintenance work. • Provide proper ventilation at the chemical handling area to limit their concentration within prescribed level.	• Do not store the chemicals that are incompatible with other chemicals. • Do not spill the chemicals. • Do not dispose chemical without neutralizing. • Do not keep large inventory of chemicals. • Do not allow empty containers of hazardous chemicals to be used by others. • Do not use compressed air for transferring chemicals. • Do not stand near chemical transfer pump while it is in operation with temporary hose connection. • Pouring of chemicals by hand or doing siphoning by mouth should never be adopted. • Chemicals drums should never be moved without protection. • Do not attempt to neutralize the acid / alkali on the skin. Use water only. • Do not use solvent for cleaning hands.

Fire Prevention

Do's	Don'ts
• Follow 'NO SMOKING' sign. • Deposit oily rags and waste combustible material in the identified containers and dispose them suitably. • Fire Hose used for any other purpose should be permanently marked and taken out of fire hydrant system. • Keep minimum inventory of flammable and combustible substances. • Take permission before breaking or removal of fire barrier and ensure subsequent relocation of fire barrier. • Check periodically the operability of fixed fire fighting system. • Attend any abnormality / deficiency with fire protection system promptly. • Provide earthling or bonding to prevent accumulation of static charges to tanks where flammable chemicals are stored / handled. • Use instruments that are intrinsically safe in explosive atmosphere.	• Do not leave flammable material like acetone, kerosene etc. used as cleaning agent at the work area. • Do not over tighten fire hydrant valves with F-lever. • Do not allow wild grass growth around storage of the gas cylinders and switchyard. • Do not obstruct accessibility to the fire related equipment. • Do not destroy the inspection tag provided with the fire equipment. • Do not misuse fire-fighting equipment other than intended purpose. • Do not store the flammable material in the open container. • Do not use instruments that are not intrinsically safe in the explosive atmosphere.

Material Handling

Do's	Don'ts
• Use proper lifting tool and tackle having adequate capacity. • Only authorized persons should operate material handling equipments. • Each tool, tackle or equipment should have number and safe working load (SWL) marked on it. • Assess weight of the material, distance to be carried and hazards etc. before lifting the load. • Inspect and test all the lifting tools and tackles regularly as per Factory Rules. • Wear Personal Protective Equipments while handling of material. • Wherever possible, mechanized material handling shall be adopted. • While lifting a load physically, keep the load as near as possible to the body with feet properly placed for body balance. • Bend knees, keep back straight, keep the load closed to the body and lift the load.	• Do not use the equipment for the purpose other than its design intention. • Do not allow personnel to move underneath lifted load. • Do not load the equipment above its safe working load. • Do not use makeshift arrangements for lifting equipment without inspection and test. • Do not use defective tool and tackles. • Keep the tools & tackles free from adverse effect of atmosphere by applying suitable protective coating. • The angle between the legs of two leg sling should not exceed 90 degree. • Do not allow male and female adult to lift a load manually higher than 55 kgs and 30 kgs respectively. • Do not hold the load with tip of the fingers; grasp the load firmly with palm.

House Keeping

Do's	Don'ts
• Assign places for everything and maintain things at assigned places. • Clean the area after completion of work. • Use aisle space free for personnel and material movement. • Ensure adequate illumination and ventilation for the job. • Drop paper, plastic, glass, metal and bio-medical waste in a separate bin kept for this purpose. • Know the location where emergency equipment such as first aid box, fire fighting equipment, SCBA, Stretchers are kept. • Arrest all types of spills such as chemical, water, oil, air / gas, steam etc. and clean up the area immediately. • Ensure exits are indicated / painted for use during emergency.	• Do not leave combustible materials in the work area. • Do not smoke in the area of work. • Do not allow dust bin to overflow. • Do not generate extra waste. • Do not disturb the safety equipment from assigned location. • Do not block emergency switches and on/off switches of the equipment by storming of materials in front of work. • Do not leave cleaning agent like acetone, isopropyl alcohol, kerosene etc. at the work area after completion of work. • Do not block fire exit point by storing materials or by means. • Do not leave a spillage unattended.

7.5 Conclusion

Risk assessment should be carried out in order to identify the needs in handling these hazards. Risk assessment shall include : Identifying the possible hazards˙ The Receptors who would be harmed because of the hazards˙ Adequacy of the existing precautionary measures˙ Reviewing and revising the assessment from time to time˙ Identifying the greater risk of damage˙ based on Recognize, Evaluate and Control. In evaluation we have to adopt both Qualitative and Quantitative Analysis.

To adopt Japanese PDCA model this insists us to

PLAN

DO

CORRECT

ACT

Testing the electrical appliances regularly .After completion of risk assessment, following
findings can be used for reducing the risks.
Safe installation of electrical appliances as per standards.

- Use of safe and suitable equipments for the working environment
- Provision for safety devices for detecting faults
- Preventive maintenance by testing the equipments and visual inspection
- Safe working conditions considering underground power cables overhead power lines

These are the most common causes of non-fatal injuries at work but may cost workers heavily. Slip and trip hazards can be reduced through good health and safety arrangements of the workers/employers.

There should be adequate information on appropriate use of the safety equipments provided. A good management system for health and safety shall include : planning for minimizing or removing risks by identifying the risk areas organization setup with responsibilities to ensure safe working conditions control on working practices and processes by record keeping and maintenance to ensure good health and safety monitoring and reviewing the reports regularly based on experi ence and improving the existing conditions. good working practices by choosing suitable floor surfaces, lighting levels, provision for footwear, removing obstructions, warn signs, etc.

Chemical hazards Sources of chemical hazards can be exposure to chemicals and toxic effects of chemicals. Exposure to chemicals .The heaviest exposure to some chemicals often occurs during industrial activities. The four main exposure routes where chemicals enter the body are through inhalation (breathing), absorption (skin or eye), ingestion (swallowing, eating) and Accidental.

Most of the chemicals in the workplace have the potential to be dispersed into the air as dust, droplets or as gas or vapor or inhalation. The most important routes of exposure in the workplace leading to systemic effects are inhalation and skin absorption. Also, ingestion is a potential source through contaminated food or drink in the workplace.

Toxic effects of chemicals. The toxicity in chemicals may poison the body of the person exposed. The toxic chemical exposure may lead to acute, chronic, reversible, irreversible, local, systematic and synergism effect. The toxicity of chemicals can be classified as corrosive, irritant, sensitizer, asphyxiant, carcinogen, mutagen, teratogen and fetotoxicant. To avoid these toxic risk assessment should be carried out which involves identification of hazard based on chemicals of concern, adverse effects, target populations, risk characterization, assessing, exposure and estimating the risk.

Develop material safety data sheets (MSDS) for all the chemicals used in the workplace − Ensure whether chemical products clearly indicate their harmful effects and provide guidance on how to use the products as safely as possible − Instruct workers on labels and MSDS − Workers should have the right to refuse to work with chemicals which does not have safety information about the chemical . To prevent , control or eliminate the risk – all the workers are required to implement effective safety procedures for protection against chemical hazards agreed jointly by employer and workers through – Regular inspections with standard checklists for particular chemicals and chemical processes.

Substitution

The most effective way is to remove the chemical entirely and replace it with less hazardous chemical, wherever possible. Similarly, dangerous processes can also be substituted to avoid the production of toxic intermediates.

Engineering controls

In case, the chemical hazard cannot be removed from the workplace by substitution then the best solution is to physically enclose the hazard to prevent it from coming into contact with either workers or the environment. Dilute or local exhaust ventilation systems can be used to remove contaminated air from the workplace.

Biological hazards: Exposure to wastewater may result in number of illnesses when entered into the body. Some of these illnesses are: Gastroenteritis – Cramping stomach pain, diarrhea and vomiting.

As the micro-organisms are inherent in wastewater they cannot be removed or eliminated. However, exposure to wastewater can be minimized to avoid these

biological hazards. The following measures can be taken to reduce risk of infection and illness: Awareness on risks through instructions, training and supervision use of personal protective equipment such as water proof gloves, footwear, eye and respiratory protection, face visors, etc. workers should be of 20 to 50 years age group and must not have asthma and tuberculosis provide the workers with adequate welfare facilities such as clean water, soaps, disposable paper towels, showers, etc. Inspection and maintenance of safety equipments provision for adequate first aid facilities effective arrangements for monitoring health and safety. Ergonomic and psychological hazards: These hazards can be raised due to stress during work. Some of the problems which may lead to stress are: Boring job repetitive job too little or too much work to do too little time too little or too much training for the job selecting right person to fit into the task poor relationship with others bullying, racial or sexual harassment inflexible work schedules poor physical working conditions lack of communication and consultation lack of support for individuals to develop their skills lack of control over work activities negative work culture. These hazards can be minimized by following measures: clarity in defined objectives and responsibilities of an individual linked to business objectives selection of appropriate person for the assigned tasks prioritizing the jobs, training the individuals based on interpersonal skills and increasing the scope of work for the trained · increase the variety of tasks rearrange people between the jobs in order not to get bored with the single task working in group to improve the performance setting up of an effective system to prevent and stop harassments working in shifts to ensure flexible working hours provision for regular health checkups provision for adequate control measures opportunity to contribute individual ideas in planning and organizing the jobs introducing clear business objectives, good communications and employee involvement particularly during period of change any individual should be honest and respect others support the individuals to develop their skills.

Hazardous air pollution Solvents in huge quantities are used in pharmaceutical, chemical, dyes & dye intermediate units. The recovery and reuse of these solvents in such units is very poor because of the indigenous technology, equipment adds to pollution load in CETP.

Especially in connection with high levels of fine particulates, noxious gases like methane, CO2, SO2 and NOx can lead to respiratory diseases. The duration of exposure is decisive.

Injurious heavy metals (e.g., lead, mercury and cadmium) can enter the food chain and, hence, the human organism by way of drinking water and vegetable and animal products.

Climatic changes such as warming and acidification of surface waters, forest depletion, etc., can occur due to acid rain and/or the greenhouse effect of methane and CO_2 and other trace gases can have long-term detrimental effects on human health. Similarly important are the effects of climatic changes on agriculture and forestry (and thus on people's standard of living), e.g., large-scale shifts of cultivation to other regions and/or deterioration of crop yields due to climate change impacts.

In view of the above we have to have to avoid/mitigate the Risk and hazard both during construction phase and operational phase of common Effluent treatment plant we have to adopt 3E system which is basically Engineering Control- for sound engineering Education and training- To improve awareness Enforcement- to follow statute and also maintain discipline.

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CHAPTER-8
PROJECT BENEFITS

8.0 Introduction

A prosperous nation needs well-developed industries to provide the amenities of life to its citizens. The industries have played a significant role for the development of Indian economy. Economic development of any nation is totally depends on industries. Without industries, economic development is not possible. Ensuring steady industrial growth helps to compliment and sustain continued economic development. A well developed industrial sector, covering various different areas is vital to the economic development of a country. With a variety of different industrial sectors that feed off each other, a well balanced industrial sector is at the centre of economic development.

Pollution from small and medium size industries is a major problem in India. Nearly half of wastewater generated by the most polluting industries in India comes from the small and medium size industries.

8.1 Construction Phase

8.1.1 Employment

The major benefit due to the proposed project will be in the sphere of generating temporary employment for substantial number of personnel. The construction phase of the plant is expected to span over 12 months. Approximately, an indirect employment for about 100 people will be created by the proposed project during the construction phase, which will last for over one year from the start of project execution activities at site. These construction workers will be taken from the study area to the extent possible. Hence, the proposed project will benefit locals to a great extent.

8.1.2 Community Services

M/s Acechamps Industrial Park Pvt. Ltd. will employ local people to the extent possible. In addition, M/s Acechamps Industrial Park Pvt. Ltd will provide necessary infrastructure like water supply, sewerage, medical facility, etc. for catering to the

needs of the project personnel and their families, which will also be beneficial to the locals residing in the area.

8.1.3 Transportation

Construction phase of Industrial park and CETP will involve movement of material of great magnitude. The material to be transported includes earthwork, concrete, steel, equipment and other materials. The proposed project will result in improving the infrastructure facilities of the area.

8.2 Operational Phase

8.2.1 Population

During the operational phase, about 5000 person will be employed. The proposed project will require skilled and semi-skilled personal will be from within the study area. Many of the people from neighboring villages of kota may, if found suitable get the opportunity for employment. The proposed project would add to the population in the study area, which would result in better scope for indirect employment.

8.2.2 Education

Skilled/unskilled people and limited skilled people (depending on availability) will be hired from local population. Especially skilled people expected to come to the study area from outside are expected to be educated. These factors will be beneficial to locals residing in the study area.

8.2.3 Employment

The manpower requirement for the operational phase will be approximately 5000 people. In addition, there will be an indirect employment for skilled/ semi skilled people with implementation of this project. An employment for about 100 people will be created by the proposed project during the construction phase, which will last for one year from the start of project execution activities at site.

All attempts will be made to employ locally available skilled personnel from the study area. In case of non-availability of skilled persons, people will be hired from out side

the study area. Requirement of un-skilled / semi-skilled people will be mostly met from the local population.

8.2.4 Transportation

There will also be increase in the vehicular traffic due to passenger transport by member industry. This increase in traffic will be less and necessary road network is already available.

8.2.5 Other Benefits

As part of the Corporate Social Responsibility/ Corporate Environmental Responsibility, Acechamps Industrial Park Pvt. Ltd will develop education, health, infrastructure development, livelihood, social mobilization, women empowerment, sports and vocational training facilities in neighboring villages

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CHAPTER-9

Environmental Cost Benefit Analysis

9.0 Environmental Cost Benefit Analysis is not recommended for the proposed project.

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CHAPTER-10

ENVIRONMENTAL MANAGEMENT PLAN

10.0 Introduction

The Environment Management Plan (EMP) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

Preparation of environmental management plan is required for formulation, implementation and monitoring of environmental protection measures during and after commissioning of projects. The plans should indicate the details as to how various measures have been or are proposed to be taken including cost components as may be required.

10.1 Components of EMP

Following elements are the major components of Environment Management Plan:

Commitment and policy: The proposed project will strive to provide and implement the environment management plan that incorporates all issues related to air, land and water.

Planning: This head includes identification of environmental impacts, legal r equirements and setting environmental objectives.

Implementation: This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken.

Measurement and evaluation: This includes monitoring, corrective actions and record keeping.

Following elements are included during installation and operating stages of the project:

- Air Pollution Control and management
- Water Pollution & control
- Storm Water Management
- Noise control and Management

- Hazardous and solid waste management
- Plantation, landscaping and land management
- Environmental Management Plan

10.2 Environment Management During Installation And Construction Phase

10.2.1 Air Environment

Upgradation of existing roads and construction of new roads approaching the proposed industrial park involves cutting and filling of the earth. Within the proposed industrial park, cutting and leveling activity would be required for providing roads, sewage network, storm water system, administrative buildings for proposed project.

The potential source of air quality impact arising from the establishment/construction of the proposed project is fugitive dust generation. The dust, measurable as particulate matter ($PM_{2.5}$ µm, PM_{10} µm), sulphur dioxide (SO_2), oxides of nitrogen (NOx), would be generated as a result of construction activities. The potential dust sources associated with the constructional activities are loading and unloading of the materials, top soil removal, vehicular movement over unpaved roads, and wind erosion etc. The possible constructional activities that contribute to the environmental impacts broadly given below:

- Dust generation during leveling of earth
- Dust generation due to the movement of vehicles on unpaved roads
- Emission of pollutants from vehicular exhaust
- Unloading of raw materials and removal of unwanted waste material
- Accumulation of excavated earth material

The impact of the above mentioned activities would be temporary and will be restricted to the constructional phase. However, the impact is generally confined to the proposed industrial park with CETP and is expected to be negligible outside the boundary. Nevertheless, the following mitigation measures will be adopted to limit the environmental impact during constructional phase.

- Regular water sprinkling will be done to avoid the dust materials entering into the atmosphere. Furthermore during windy days the frequency of the water sprinkling will be increased.

- The vehicular movement will be minimized with a planned scheduling to reduce the emission of pollutants.
- Temporary thin sheets of sufficient height (3m) will be erected around the proposed site as a barrier for dust control.
- The excavated material shall be reused within the boundary and the movement of cut and fill material will be limited.
- Plantation of trees around the proposed boundary and it will be initiated at the early stages by plantation of 2 to 3 years old saplings using drip irrigation so that the area will be moist for most part of the day.
- All the vehicles carrying raw materials will be covered with tarpaulin/plastic sheet; unloading and loading activity will be stopped during windy period.

10.2.2 Water Environment

Water requirement will be met through tankers during period of the construction. Impact on water quality during construction phase may be due to non-point discharges of solids from soil loss and sewage generated from the construction work force stationed at the site. Further, the construction in the project will be more related to mechanical fabrication, assembly and the erection, hence the water requirements would be small. Temporary sanitation facilities (septic tanks and soak pits) will be set up for disposal of sanitary sewage generated by the work force as per the prevailing labor laws. Since, most of the construction work force will constitute of floating population, the demand for water and sanitation facilities will be small and temporary and it will be managed by providing drinking water facility and sanitation facilities at the site during construction phase.

The overall impact on water environment during construction phase due to proposed plant is likely to be short term and insignificant.

10.2.3 Noise Environment

The major activities, which produce periodic noise, during construction phase, are as follows:

- Foundation works

- Fabrication of structures
- Plant erection
- Operation of construction equipment
- Movement of vehicles

The impact on noise environment can be made insignificant by adopting the following mitigation measures

- Noise generating equipment will be used during day time for a brief period as per requirements.
- Where ever possible the noise generating equipment will be kept away from the human habituation.
- Temporary tin sheets of sufficient height (3m) will be erected around the proposed site as barrier for minimizing the noise travel to surrounding area.
- All the vehicles entering into the proposed site will be informed to maintain speed limits, and not to blow horns unless it is required.

10.3 Environment Management During Operation Phase

10.3.1 Air Environment

The main raw materials required for the proposed industrial park are water and power. PM, SO_2, NOx and chlorine gases are major air pollutant generated from the proposed industrial park, D.G. set and CETP.

Mitigation measures

During operation phase member industries will use best available technology to abate the environmental pollution. Though, RSPCB will regulate industries to provide green belt area as per the term & condition of CTE/CTO to attune the pollution. However, PM, SO_2 and NO_x emissions are generated from DG set is properly dispersed into the atmosphere by providing the stack at sufficient height. Periodical testing of environmental dust and thermal conditions be carried out and a record of this be maintained properly. All internal roads will be of concrete and will be well maintained. PUC certified vehicles will be used.

For effective prevention and control of fugitive emissions following measures will be adopted:

- Enclosures are provided for all the loading and unloading operations, if possible.
- All transfer points are fully enclosed.
- Airborne dust is controlled by sprinkling of water.
- Preventive measures are employed to minimize dust build up on road.
- Maintenance of air pollution control equipment is done regularly.
- All the workers are provided with the dust mask.
- Green belt will be developed around the plant to arrest the fugitive emissions.
- Regular training is given to the personnel operating and maintaining fugitive emissions control system

10.3.2 Water Environment

Approx 225 KLD water will be required for domestic purposes (@45 LPCD x 5000 workers). The water supply will be met through ground water. The effluent generated from the member units will reach the CETP by pipelines. Domestic effluent will be treated in STP. Since the industries and commercial areas in the IA would not be setup immediately and would be done in phases, therefore these phases wise CETP and CSTP would effectively handle the effluent and sewage loads.

Wastewater will be generated from different sources in the proposed industrial park, which are mainly industrial wastewater from different industries within the industrial park and domestic wastewater from admin buildings. The industrial wastewater and domestic wastewater will be collected through separate drains and treated in CETP & STP. The treated water will be reused for green belt development and for industrial activities (floor washing, dust suppression and cooling etc.). Records of analysis results of treated and untreated wastewater should also be maintained. Record of the wastewater generation and recycle shall be maintained on printed logbook/computer. Proper housekeeping shall be adopted to prevent spillages and contaminated surface runoff going to storm water drains.

MANAGEMENT AND MAINTENANCE OF CONVEYANCE SYSTEM

Following are the special provisions made in conveyance system to protect the environment from any malfunction and for smooth conductance.

- The management and maintenance of effluent conveyance system will be maintained by M/s Acechamps Industrial Park Pvt. Ltd.
- Only pipeline network will be utilized for collection of effluent from various industries in CETP.
- Proper Inspection of pipeline will be carried out.
- Cleaning of pipeline will be carried out as per requirement.
- The routine monitoring of entire pipeline shall be carried out.

10.3.3 Noise Environment

The major source of noise generating source from proposed project will be process plant/industry operation, D.G.set, CETP, STP, transportation of vehicles etc.

The following mitigation measures will be adopted:

- Using less noise generating machines
- The noise levels in the workspace environment will be monitored periodically and if necessary corrective action will be taken.
- All necessary modern noise reducing gadgets will be attached like silencers, anti-vibration pads; closed room enclosures will be arranged.
- Sound proofing of admin buildings and sensitive areas.
- Restricting the movement of vehicles to specific time.
- Vehicular movement carrying raw materials will be avoided during night time.
- The vehicles will be regularly maintained and optimum use of the same will be made.
- Adequate PPE's (ear plugs, ear muffs, helmet, mask etc) will be provided to the workers.
- All possible measures will be taken to minimize the noise.
- The insulation provided for prevention and loss of heat and personnel safety shall also act as noise reducer.
- Foundations and structures will be designed to minimize vibrations and noise.

- Regular equipment maintenance and better work habits will be adopted.
- In the proposed project, noise from operation of equipments will likely to arise. Noise level is will be kept below the prescribed limit by CPCB.

10.3.4 Land Environment

The impact is confined to the proposed industrial park and CETP only Due care will be taken for minimum damage of top soil. The proposed greenbelt plantation will act as an effective barrier for control of dust. The following management measures shall be adopted:

- As soon as construction is completed, the surplus earth shall be utilized to fill up the low lying areas, the rubbish is to be cleared and all un-built surfaces be reinstated;
- The top soil from the construction areas shall be preserved in separate stacks for re-use during the plantation;
- Green belt development shall be taken up along with the construction work so that plantation will grow to adequate height by the time of plant commissioning. Thus, green belt will be effective in containing the pollutants due to the plant operation;
- Entire industrial area shall be aesthetically landscaped and as much as feasible natural gradient shall be maintained;
- There shall be minimum concreting of the top surfaces such that there is a scope for maximum ground water recharge due to rainfall; and
- The hazardous wastes generation from proposed project like ETP Sludge from Common Effluent Treatment Plant, Used oil from lubrication of equipment, Discarded Containers and Oil & Grease from skimming. These Hazardous wastes will be stored in scientifically designed and constructed hazardous waste storagearea within the premises with leachate collection system and send for disposal to secured land fill site, registered recyclers and registered refiners. Hence, there will be marginal impact on the soil environment.

Traffic load will be increased but approach roads are sufficient to support the extra traffic load. However, the individual industries will also co-operate with Govt. time to time in strengthening of approach roads.

10.3.5 Odour Control

Odour-producing compounds are hydrogen sulfide, ammonia, carbon disulfide, mercaptans, phenols and some petroleum hydrocarbons. Most offensive odour is created by the anaerobic decay of wet organic matter. Warm temperature enhances anaerobic decay and foul odour production. Odour sources can be classified as:

- Point Sources: Point sources are confined emissions from vents, stacks and exhausts.
- Area Sources: Area sources may be unconfined like sewage treatment plant, waste water treatment plant etc.
- Fugitive Sources: In this source of odour, emissions are of fugitive nature like odour emissions from soil bed or bio-filter surface.

Mitigation Measures

Mitigation measure for odour related impacts depends on type of sources – Area source or Point source.

Some of the control measures from odour emitting from **Area Source** such as holding ponds, lagoons and effluent treatment plants are:

1. Developing green buffer around source
2. Nozzles and Sprayers containing chemicals (eg. Chlorine dioxide)
3. Rotary water atomizers

In case of **Point Sources** such as that of industries, the odour-causing gas stream can be treated after collecting through piping and ventilation system.

10.3.6 Solid Waste Management

There will be generation of solid as well as liquid waste during the operational phase of the project which will be responsibly managed by respective industry only. CETP facilities will be provided within the project site for the management/disposal of solid or liquid waste. The estimated quantity of Municipal waste (domestic and or commercial wastes) generated from the industrial site will be 660 kg/day (@0.4 kg/worker/day) which

is proposed to be sent and disposed off at the district municipal corporation site. The Industrial process may also lead to generation of hazardous waste as defined under HWM Rules. However the same will be disposed off to the CTDF at Udaipur. Industrial solid waste (ISW) will be generated from the industrial process which is proposed to be disposed off suitably. Construction waste like soil, brick bits, etc will be utilized in leveling of land and road making. Used oil from lubrication of equipment, Discarded Containers and Oil & Grease from skimming will be stored in scientifically designed and constructed hazardous waste storage area within the premises and send for disposal to secured land fill site, registered recyclers and registered refiners.

STORAGE OF HAZARDOUS WASTE:

- Hazardous waste shall be stored at a designated Onsite-secured area that offers protection from sun, rain fall, spreading of leachate, mixing of wastes etc.
- Designated storage area with RCC flooring and cover shed shall be provided for storage of Hazardous waste.
- Hazardous waste shall not be stored for a period more than 90 days. CETP shall maintain records and make them available for inspection.
- Transportation of properly packed & labelled waste through dedicated vehicle to a captive facility/ authorized TSDF facility.
- Provision of solid/Hazardous waste collection system & storage area confirming the guidelines provided by CPCB for Solid/hazardous waste generation.
- Regular Training of employees engaged in solid waste management works.

10.3.7 Green Belt Development

Green belt with properly selected plant species can serve as a useful buffer to contain the menace of pollution from the different sources. As a control measure of atmospheric pollution, as a barriers noise generated in the plant premises and to utilize the wastewater generated as treated effluent, it is recommended to develop green belt around the periphery of the plant, along the road side and other area available for the plantation.

Guidelines for plantation

The plant species identified for greenbelt development shall be planted using pitting technique. The pit size will be either 45 cm x 45 cm x 45 cm or 60 cm x 60 cm x 60 cm. bigger pit size will be considered at marginal and poor quality soil. Soil used for filling the pit should be mixed with well decomposed farm yard manure or sewage sludge at the rate of 2.5 kg (on dry weight basis) and 3.6 kg (on dry weight basis) for 45cm x 45 cm x 45 cm and 60 cm x 60 cm x 60 cm size pits respectively. The filling of soil should be completed at least 5-10 days before actual plantation. Healthy sapling of identified species should be planted in each pit with the commencement of monsoon. Provision for regular and liberal watering during the summer period during the commissioning stage of the plant will be arranged from the local available resources. The authorities responsible for plantation will also make adequate measures for the protection of the saplings.

While making choices of plant species for cultivation in green belts, weightage has been given to the natural native species, bio climatic condition, plants which can be grown as per normal horticultural practices.

Plant species identified for greenbelt development, considering the bio-climatic and soil condition.

Recommended Plants for Green Belt Development

Greenbelt is an effective mode of control of air pollution, where green plants form a surface capable of absorbing air pollutants and forming a sink of pollutants. Leaves with their vast area in a tree crown, sorbs pollutants on their surface, thus effectively reduce pollutant concentration in the ambient air. Often the adsorbed pollutants are incorporated in the metabolic pathway and the air is purified. Plants grown to function as pollution sink are collectively referred as greenbelts.

An important aspect of a greenbelt is that the plants are living organism with their varied tolerance limit towards the air pollutants. A green belt is effective as a pollutant sink only within the tolerance limit of constituent plants. Planting few, known pollutant sensitive species along with the tolerant species within a green belt however, do carry out an important function of indicator species

Apart from function as pollution sink, greenbelt would provide other benefit like aesthetic improvement of the area and providing suitable habitats for birds and animals.

Selection of Plants for Green Belts

The main limitation for plants to function as scavenger of pollutants are, plant's interaction to air pollutants, sensitivity to pollutants, climatic conditions and soil characteristics. While making choice of plants species for cultivation in green belts, due consideration has to be given to the natural factor of bio- climate. Xerophytes plants are not necessarily good for greenbelts; they with their sunken stomata can withstand pollution by avoidance but are poor absorber of pollutants. Character of plants mainly considered for affecting absorption of pollutant gases and removal of dust particle are as follows

For absorption of gases:

- Tolerance towards pollutants in question, at concentration, that are not too high to be instantaneously lethal
- Longer duration of foliage
- Freely exposed foliage
- Adequate height of crown
- Openness of foliage in canopy
- Big leaves(long and broad laminar surface)
- Large number of stomatal apertures

For removal of suspended particular matter

- Height and spread of crown.
- Leaves supported on firm petiole
- Abundance of surface on bark and foliage
- Roughness of bark
- Abundance of auxiliary hairs
- Hairs or scales on laminar surface
- Protected Stomata

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CHAPTER-11

SUMMARY & CONCLUSION

11. 0 Introduction

M/s Acechamps Industrial Park Pvt. Ltd proposes an innowise industrial park and CETP at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan). The project covers an area of approximately 4,04,687 sq.m. The project involves development of Industrial Park which is categorized under Item 7 (c) along with the CETP which is categorized under Item 7(h) of the Schedule-Gazette Notification. There no A category industries only B category industries (as covered under the EIA Notification, 2006 and subsequent amendments) comes under the project.

The lease deed was made between M/s Oriental Power Cable Limited and Acechamps Industrial Park Pvt. Ltd. on dated 27th June, 2013 for development of industrial park and CETP. The project site is plain land. The site is well connected by road network, power supply and other necessary facilities.

11.1. Project Description

11.1.1 Project Details

Particulars	Details
Name of the company	M/s Acechamps Industrial Park Pvt. Ltd
Total project cost	23.0 crore

11.1.2 Project Requirement

Land requirement	4,04,687 sq. m.
Water requirement & its source	225 KLD (domestic use only) Source: Ground water
Power Requirement & Source of Power	Power Requirement : 15 MVA (Back up source - one DG set of 700 kVA) 132 kV GSS within the site
Manpower requirements	5000 personnel are employed. First preference is given to local people as far as possible.

11.1.3 Waste Water Generation

Approx 225 KLD water will be required for domestic purposes (@45 LPCD x 5000 workers). The water supply will be met through ground water. The effluent generated from the member units will reach the CETP by pipelines. Domestic effluent will be treated in STP.

11.1.4 Air Emission & Air Pollution Control Measures Details

Emissions generated during process activities will be properly managed by the member units. However, PM, SO_2 and NO_x emissions are generated from proposed industrial park and DG set will be properly dispersed into the atmosphere by providing the stack at sufficient height.

11.1.5 Solid Waste Generation & Disposal

There will be generation of solid as well as liquid waste during the operational phase of the project which will be responsibly managed by respective industry only. CETP facilities will be provided within the project site for the management/disposal of solid or liquid waste. The estimated quantity of Municipal waste (domestic and or commercial wastes) generated from the industrial site will be 660 kg/day (@0.4 kg/worker/day) which is proposed to be sent and disposed off at the district municipal corporation site. The Industrial process may also lead to generation of hazardous waste as defined under HWM Rules. However the same will be disposed off to the CTDF at Udaipur. Industrial solid waste (ISW) will be generated from the industrial process which is proposed to be disposed off suitably. Construction waste like soil, brick bits, etc will be utilized in leveling of land and road making.

11.2. Description of the Environment

11.2.1 Introduction

The baseline environmental quality of Air, water, soil, noise, socioeconomic status and ecology has been assessed in the period of December 2017 to February 2018 in the study area of 10 km radial distance from the project site.

10.2.2 Environmental Setting

S. No.	Particulars	Details
1	Nearest village	Alnia village – 1.56 km towards South direction
2	Nearest highway	NH-12 ~ 900 m towards SW direction NH-76 ~ 9.0 Km towards NNW direction SH-51 ~ 12.3 Km towards NE direction
3	Nearest railway station	Alnia Railway Station ~1.0 km towards NNE direction Kota Railway Station ~22.0 km towards North direction
4	Nearest airport	Kota Airport – 16.0 km NNW direction Jaipur International Airport ~ 200 km towards NNE direction
5	Protected areas as per Wildlife Protection Act,1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Ummedganj Conservation Reserve 9.1 km towards NNE
6	Reserved / Protected Forests	Reserve Forest – 11.85 km towards NW Protected Forest – 9.7 km towards ENE Dense Mixed Jungle – 12.4 km towards E Protected Forest – 9.7 km towards ESE Mawasa P.F. – 12.0 km towards ESE Barkalaji R.F. – 7.8 km towards SE Reserve Forest n/v Ramnagar – 5.2 km towards SSE

11.2.3 Base Line Data

Baseline study was carried out during December 2017 to February 2018.

11.2.4 Ambient Air Quality

The ambient air samples were collected from seven locations and analyzed for PM_{10}, $PM_{2.5}$, SO_2, NOx, CO. During baseline monitoring, the average values of PM_{10} varied between 49.9 $\mu g/m^3$ to 61.2 $\mu g/m^3$. The average values of $PM_{2.5}$ varied between 30.1 $\mu g/m^3$ to 36.3 $\mu g/m^3$. The average values for SO_2 was 6.2 $\mu g/m^3$ to 8.4 $\mu g/m^3$. The average values of NOx varied between 6.4 $\mu g/m^3$ to 11.2 $\mu g/m^3$. The average values of CO varied between 546.3 $\mu g/m^3$ to 755.9 $\mu g/m^3$. From the above mentioned studies it is observed that PM_{10}, $PM_{2.5}$, SO_2, NOx, CO_2, & CO concentrations were found well below the stipulated standards of CPCB.

11.2.5 Water **Quality Monitoring**

Ground Water Quality Monitoring

Four numbers of ground water and three numbers of surface water samples in the study area have been collected from different villages and analyzed during December 2017 to February 2018.

- During Study period, pH values observed were in the range of 6.84 to 7.62 with total dissolved solids in the range of 280 mg/l to 2215 mg/l. Total hardness was in the range of 156 mg/l to 1040 mg/l. The concentration of chlorides, & sulphates in all the samples was less than prescribed limits recommended for drinking water source.
- The TDS of all the ground water samples is above the desirable limit but within permissible limit with highest value at Renkyakheri village (2215 mg/L). Similarly, the total hardness of the samples is above the desirable limit with highest value at location Renkyakheri village (1040 mg/L). The value of Calcium is found higher at Renkyakheri village (224.0mg/L) and the values are above desirable limit but within permissible limit in all the locations.
- The values of chlorides are found higher at Renkyakheri village. No traces of heavy metals were found at the sampling locations. The water quality at most of the

sampling locations has shown similar characteristics and shows slightly deranged values which is expected be due to anthropogenic or geogenic sources.

- The concentration of chlorides, sulphates, and hardness and Total Dissolved solids doesn't show many lateral variations. They are found to be below the permissible limits of the recommended drinking water standards.

Surface water

- During the study period, pH values observed were in the range of 7.44 to 7.49 with total dissolved solids in the range of 144 mg/l to 208 mg/l. The dissolved oxygen values are in between 3.2 mg/l to 3.8 mg/l, while the BOD levels are in the range of 2.0 to 7.7 mg/l.

11.2.6 Background Noise Level

Ambient noise levels were measured at 5 locations around the proposed project site. Minimum and maximum noise levels recorded during the day time were from 48.8 dB and 67.5 dB respectively and Minimum and maximum level of noise during night time was 41.9 dB and 46.6 dB respectively. Thus noise levels at all locations were observed to be within the prescribed limits.

11.2.7 Soil Quality

Total of seven numbers of samples have been collected from the study area and tested in the laboratory. The nitrogen concentrations are in the range of 0.10 to 0.23% indicating that soil has good to better quantities of nitrogen. The phosphorous concentrations are in the range of 0.88 Kg/Ha to 4.34 Kg/Ha indicating that soil has average to sufficient quantities of phosphorus.

11.2.9 Socio Economic Study

53 percent of total population is male and 47 percent are female. The illiteracy in the 2 Km and 10 Km buffer zone of study area are 39&28 percent respectively, while district Kota and state Rajasthan have illiteracy percentage as 33% and 34 % respectively. The

literates 2 Km and 10 Km buffer zone of study area are 61 & 72percentage respectively. Literates are 67 % in district Kota while 66 % in Rajasthan.

11.2.10 Biological Environment

There is no National park, wild life sanctuary present within the study area of 10 km radius of the project site but there is Ummedganj Conservation Reserve is about 9.1 km towards NNE from the site. Barkalaji R.F is about 7.8 km towards SE from the site.

11.2.10.1 Floral Diversity of the Study Area

The tree species commonly occurring in the study area were Neem, Khair, Khejdi, Amaltash, Tendu, Shisham, Pipal and Gular. Among the tree, highest IVI values were seen for Neem and Khejdi respectively no rare or endangered flora was observed. A tree species called Dhokla or Khakhara is listed in RET plant list by Rajasthan Biodiversity Board.

11.2.10.2 Faunal Biodiversity of the Study Area

For the documentation of the faunal biodiversity of the study area with respect to birds, reptiles, amphibians, and butterfly species, Phyoplankton, fish species, a detailed survey had been conducted. A bird species Peacock is Schedule-I species as mentioned in wildlife protection act and Sarus Crane is categorized as Vulnerable on the IUCN Red list 2007 in India and it occur mostly outside protected areas. All other birds belong to Schedule IV category. Similarly, among herpetofauna, Indian Flap shell Turtle and Monitor lizard, crocodile and Gharial is also Schedule –I category of wildlife protection act. Among recorded faunal species, none of the species can be designated as an endemic to the area.

11.3. Anticipated Environmental Impacts & Mitigation Measures

Due to development of industrial park and CETP, there will be increment in the air pollution due to the air emissions like PM, SO_2, NOx from the stack attached to member industry process facility and DG set. Entire industrial waste water generated from the member units will be treated through CETP and domestic waste water will

be treated through STP. Treated water will be used in the development of internal green belt to follow zero discharge concept. The estimated quantity of Municipal waste (domestic and or commercial wastes) generated from the industrial site will be 660 kg/day (@0.4 kg/worker/day) which is proposed to be sent and disposed off at the district municipal corporation site. The Industrial process may also lead to generation of hazardous waste as defined under HWM Rules. However the same will be disposed off to the CTDF at Udaipur. Industrial solid waste (ISW) will be generated from the industrial process which is proposed to be disposed off suitably.

11.4. Environmental Monitoring Programme

Regular monitoring of environmental parameters like air, water, noise and soil as well as performance of pollution control devices and safety measures in the facility proper environmental management is carried out periodically as recommended for proper environmental management.

11.5. Additional Studies

11.5.1 Risk Assessment

The management is very much aware of their obligation to protect all persons at work and others in the neighborhood that may be affected by an unfortunate and unforeseen incidence occurring at the proposed industrial park with CETP. Any hazard either to employees or others arising from activities at the facility shall, as far as possible, be handled by the management of the company and prevented from spreading any further.

11.5.2 Public Consultation

The proposed innowise industrial park with CETP project will be established at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan). The present report is being prepared for submission to Rajasthan State Pollution Control Board for conducting the public hearing. The report will be updated with public hearing minutes after it is completed, and eventually submitted to SEAC for obtaining environmental clearance.

11.6. PROJECT BENEFITS

11.6.1 Physical Infrastructure

As a project, M/s Acechamps Industrial Park Pvt. Ltd. undertakes CSR activities to improve status of socio economic scenario of the area.

11.6.2 Corporate Social Responsibility (CSR)

Proposed unit will carried out the CSR activities in the field of Safe Drinking Water Facility & Sanitation, Health Care Facility, Awareness Programmes, Promoting Education, Development of village schools, Plantation, Park / Playground, Sports etc.

11.7. ENVIRONMENTAL MANAGEMENT PLAN

The management team is very much concerned about environmental issues. All the environmental Components are looked out. Mitigation of environmental impacts has to be implemented according to the suggestions and is monitored regularly to prevent any lapse.

11.8. CONCLUSION

Company is committed to implement all the pollution control measures to protect the surrounding Environment. Projects like this certainly improve the living standard of local people. The implementation of this project definitely improves the physical and social infrastructure of the surrounding area.

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CONSULTANT ENGAGED

Environmental Impact Assessment Study of the Proposed "Innowise Industrial Park" at khasra no. 35, Village Alnia, Tehsil Ladpura, Dist. Kota, (Rajasthan) of **M/s Acechamps Industrial Park Pvt. Ltd.** conducted by,

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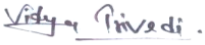
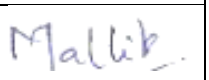
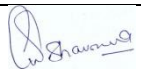
Status of accreditation with : Listed on S. No. 69 of List of Accredited EIA

Functional area experts:

Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
AP*	• Mr. Ms. Ginni Barotia • Mr. Yogendra Krishna Yadav -FAA	• Selecting parameters for monitoring. • Suggesting measures of reducing fugitive emission. • Identifying and assessing quantum of emissions • Identification of probable impacts of the different air emissions from the proposed project • Identification of suitable control device	
WP*	• Mr. Pradyumna Arvind Deshpande • Ms. Pooja Bunker-FAA	• Designing of water balance and developing schemes for cascading use (recycle, reuse) of water • Identification of probable impacts of effluent/ waste water discharges in to the receiving environment/ water bodies	
SHW*	• Ms. Ginni Barotia	• Suggesting Methodologies for segregation and collection of Solid waste as per SWM Rules, 2016. • Methodologies of gainful utilization of MSW • Suggesting measures for handling waste.	

SE*	• Mr. Kapil Sharma • Mr. Vinod Kumar Verma-FAA	• Conducting baseline socio-economic survey • Conduct social needs assessment studies • Preparing need-based CSR plan.	
EB*	• Mr. Abhishek Gautam • Mr. Yogendra Krishna Yadav-FAA	• To survey flora – fauna. • To identify ecologically important areas around project location. • To identify threatened species in the project area. • To identify impact of proposed project on flora – fauna. • To recommend mitigations / greenbelt development	
HG*	• Mr. Vidya Bhushan Trivedi	• Analysis of surface hydrological data • Computation of ground water recharge, flow rate and direction • Preparation of RWH planning & designing.	
SC*	Mr. Pradyumna Arvind Deshpande	• Assessment of fertility/ productivity of soil, nutrient availability • Controlling degradation of soil/soil conservation	
AQ*	• Mr. Mallikarjuna Murthy Guttula	• Analyzing micro meteorological data for use in modeling • Collecting and using secondary data on meteorology like cloud cover, inversion related data, mixing heights etc., for modeling • Application of relevant air quality models in prediction of dispersion of pollutants, • Plotting of isopleths of GLCs representing incremental pollution levels, on suitable maps showing both, the sources of pollution as well as the environmentally sensitive receptors.	
NV*	Mr. Pawan Sut Sharma	• Probable impacts of noise and vibration on communities, buildings, structures etc. • Impacts of noise and vibration on fauna from projects in ecologically sensitive areas	

		• Control of noise emanating from project activities.	
LU*	• Mr. Kapil Sharma • Mr. Vinod Kumar Verma-FAA	• Generation and analysis of data related to land use pattern • Integration of land use related data/ information for assessing environmental impacts of developmental projects • Assessment of land use and land cover.	
RH*	Ms. Ginni Barotia	• Assessment and mitigation of probable impacts • Suggesting PPE for construction workers • Measures for risk assessment.	

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