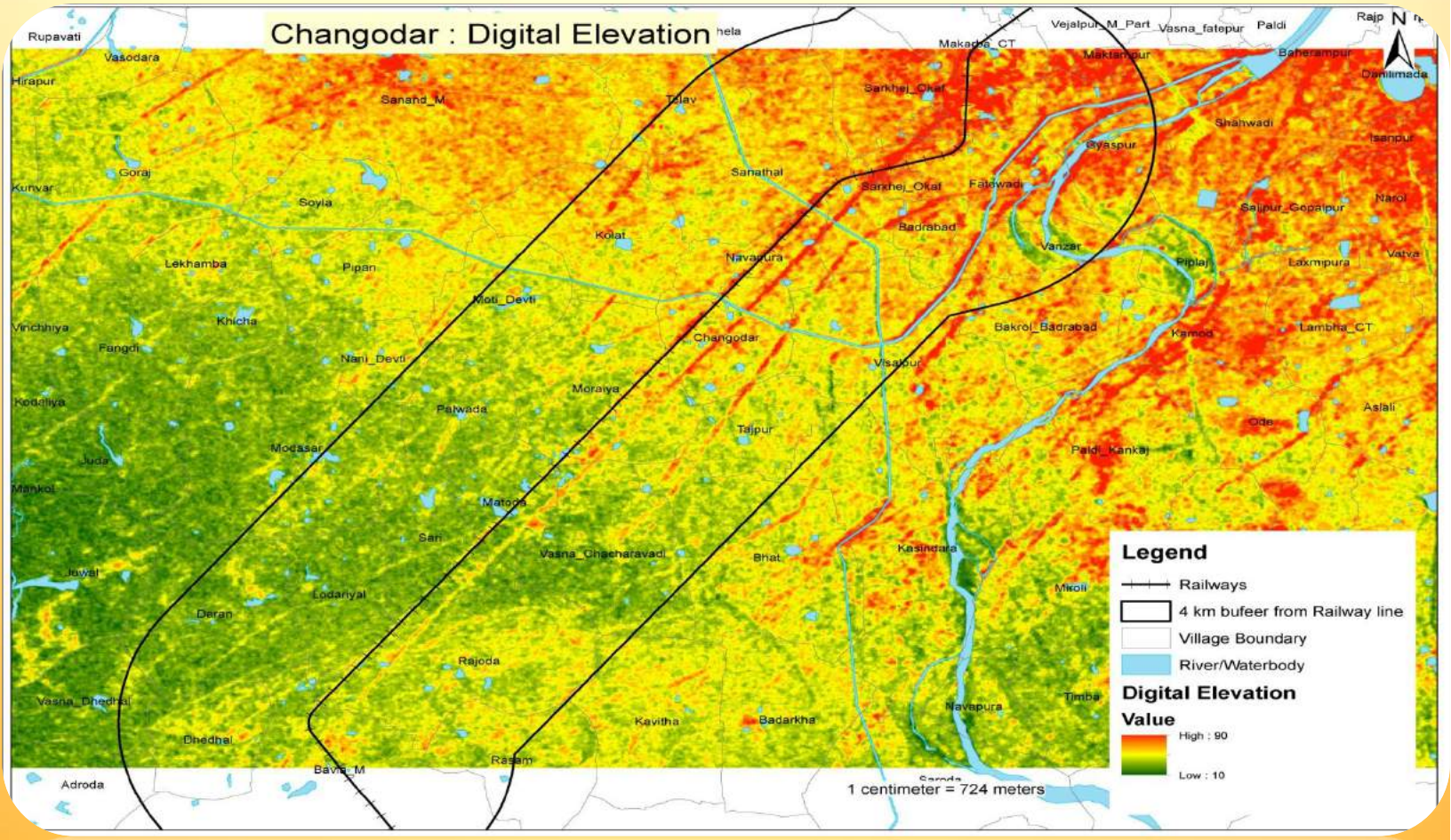
Final Report

on

Diagnosis Study of Present Environmental Issues of Changodar Industrial Area



Prepared by

Submitted to

Gujarat Cleaner Production Centre

Department of Forests and Environment (Government of Gujarat)

March 2018

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1. ABOUT THE PROJECT

Introduction of the Project

Name of Project:	Diagnosis Study of Present Environmental issues of Changodar Industrial Area
Project Target:	Identification of Major Environment related issues of Changodar Industrial Area i.e Domestic and industrial waste water, Feasibility of Common Effluent Treatment Plant for Industrial Waste Water, Feasibility of Sewage Treatment Plant for residential/commercial Waste Water, Cleaner production assessment in selected industries.
Description:	The Forests & Environment Department in the Government of Gujarat has environment wing and forest wing. The environment wing of the Department is the apex body in the Gujarat State for implementation of all the environment related matters including Environment (Protection) Act, 1986, which is an umbrella Act on environment in the country. Department of Forests and Environment, Government of Gujarat has taken various initiatives for prevention and propagation of Cleaner Production in the state of Gujarat. Under this the Department of Forests and Environment, Government of Gujarat and GCPC are working on many projects to save environment as environment is essential for industrial growth and it is their interest to clean polluted environment for industrial sustainability. Now, this year Department of Forests and Environment, GoG assigned GCPC a project of "Diagnosis Study of Present Environmental issues of Changodar Industrial Area." Changodar is located in Ahmedabad district and on the changodar- sanand border. About 2500 to 3000 small, medium and large industrial units are there and Approximately 500 units under the purview of the GPCB. But due to the recent boom in its industries, little or no environmental education, infrastructure nearly at bursting point..etc,

	environmental issues in Changodar become more serious problem every day. In fact, there is no shortage at all of government legislation protecting the environment but unfortunately it is never enforced, because this area is not under the purview of Ahmedabad Municipal Corporation (AMC), Gujarat Industrial Development Corporation (GIDC) or any other regulatory body. By taking these environmental issues of Changodar Region as a serious concern, The Department of Forests and Environment, GoG has given this project to GCPC to manage the environmental aspects of Changodar Area in the best possible manner . The main aim of the project is Diagnosis Study of present environmental issues of Changodar Industrial area, to check the feasibility of Common Effluent Treatment Plant and Sewage Treatment Plant and Cleaner Production Assessment in selected industries.

Objectives of the Project

The objectives of the projects are given below:

- Identification of pollution load of Changodar Industrial Area by Diagnosis Study of present Environmental issues of Changodar.
- Identification of domestic wastewater and industrial wastewater generated from the industries of Changodar Industrial Area.
- Identification of mechanism for proper collection of non-hazardous solid waste of Changodar Industrial Are
- To increase awareness of workers and employees of industries regarding management of wastewater and solid waste
- To improve the image of Changodar region by determining feasibility of CETP & STP in mixed land use of changodar industrial area.

- To perform cost saving through reduced wastage of both energy and materials
- To perform cost saving on End-of-Pipe waste treatment
- To improve operating efficiency of the plant
- To increase product quality and consistency
- To recover waste materials
- To improve the work environment (Health and Safety of the workers)
- To build capacity of glass industrial floor personnel
- To develop new and improved market opportunities through waste exchange

Project Activities

Scope of Work

Sr. No.	Overall Project Tasks
1.	Primary data collection of Changodar area and present environmental issues.
2.	Meeting with Gujarat Pollution Control Board
3.	Site Visit & Survey
4.	Introductory programmers for project guidance of changodar area and present environmental issue.
5.	Data collection from industries for wastewater and sewage generation
6.	Data collection from residential/commercial for sewage generation
7.	Identification of willing industries for cleaner production assessment
8.	Introductory meeting with individual industry

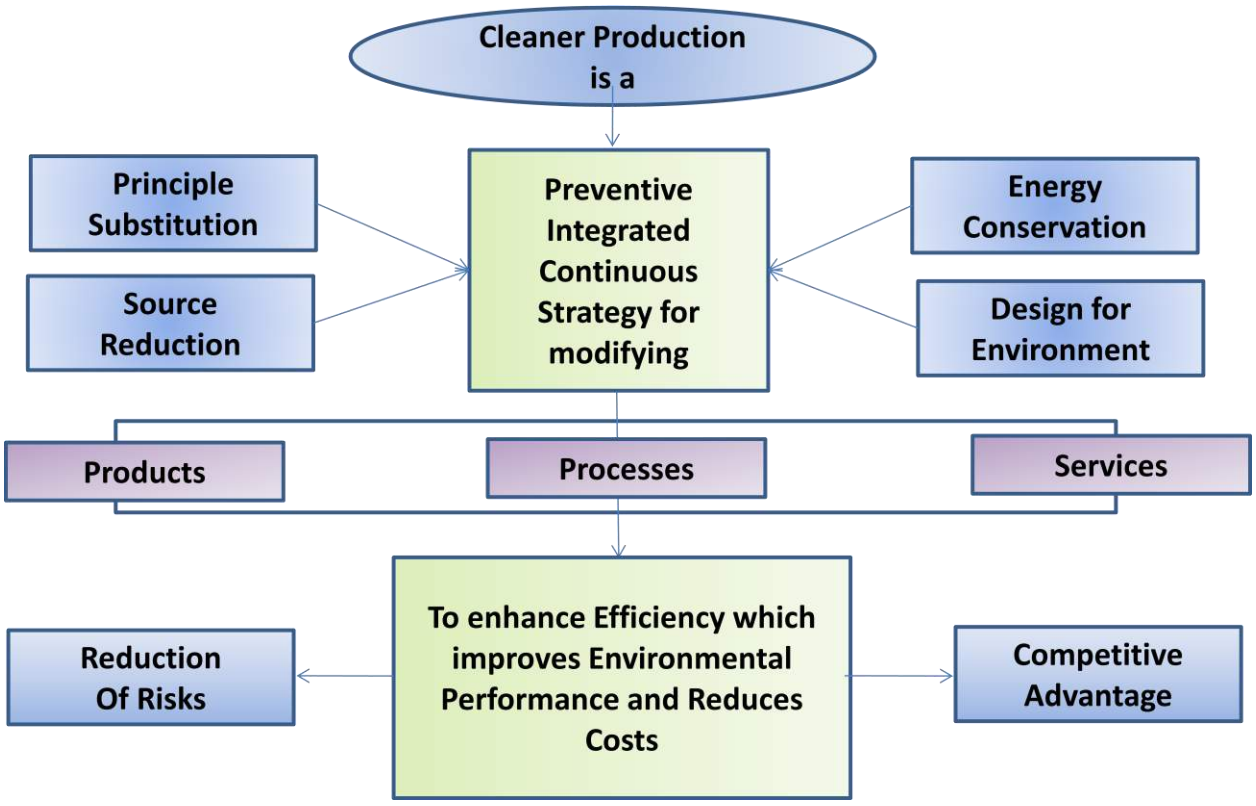
9.	Primary Data Collection for CP- Assessments.
10.	Detailed Cleaner Production Assessment
11.	Identification of Waste Generation
12.	Generation of CP options.
13.	Support for CP implementation
14.	Support for getting finance assistance for Industry under Gujarat Industrial Policy 2015
15.	Feasibility of Common Effluent Treatment plant
16.	Feasibility of Sewage Treatment Plant
17.	Suggestion for advanced wastewater treatment technology for CETP and STP.
18.	Generation of options for recycle and reuse of treated sewage from STP and treated wastewater from CETP.
19.	Feasibility of disposal of treated wastewater from CETP and disposal of treated sewage.
20.	Dissemination programme to replicate case studies in similar industries

Introduction of Cleaner Production

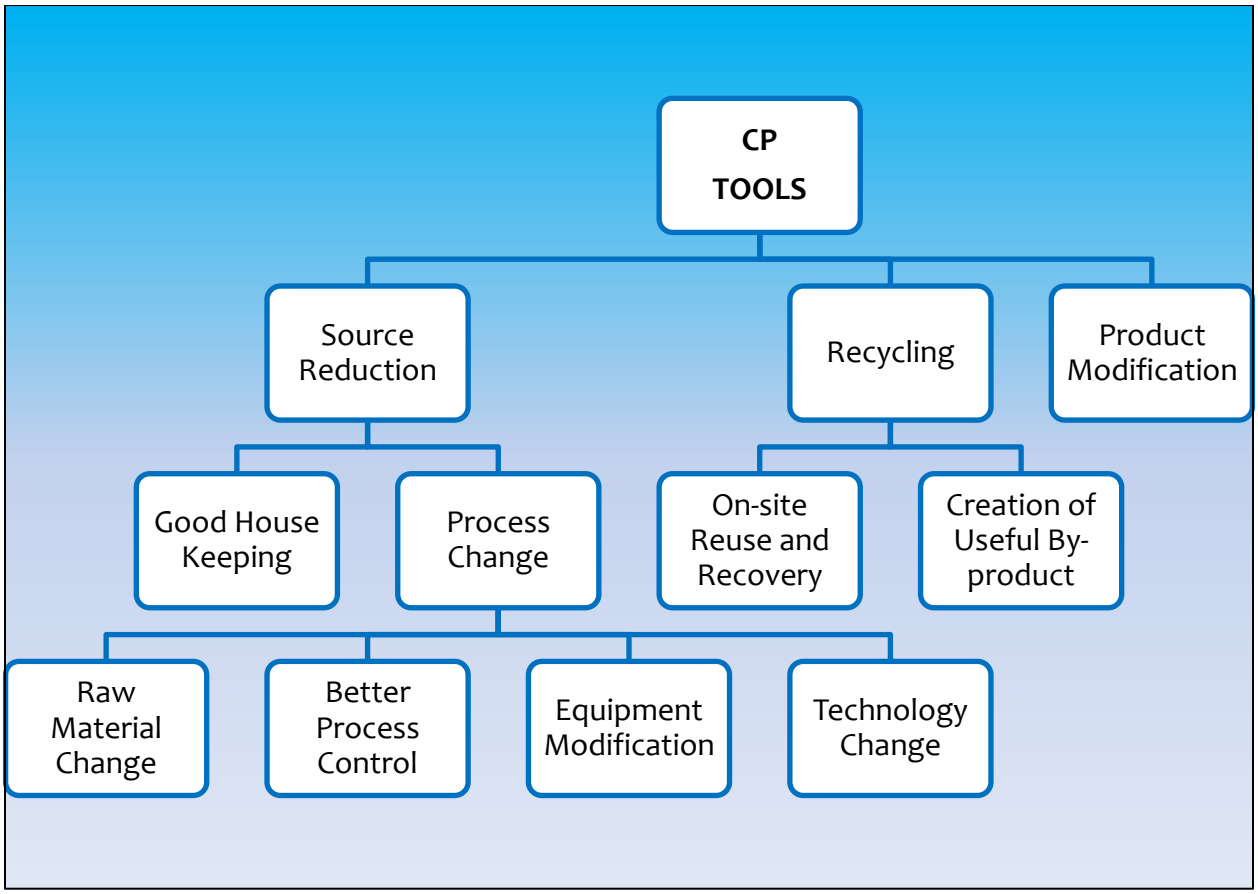
The concept of 'Cleaner Production' is very simple-prevention is better than cure. It was developed in 1992 during the preparation of the Rio Summit as a programme of UNEP (United Nations Environment Programme) and UNIDO (United Nations Industrial Development Organization) to reduce environmental impact of industry.

Cleaner Production is a 'win-win' strategy. It protects the environment, the consumer and the worker while improving industrial efficiency, profitability, and competitiveness. The key difference between pollution control and Cleaner Production is therefore one of timing. Pollution control is an after-the-event, 'react and treat' approach while Cleaner Production is a forward-looking, 'anticipate and prevent' philosophy.

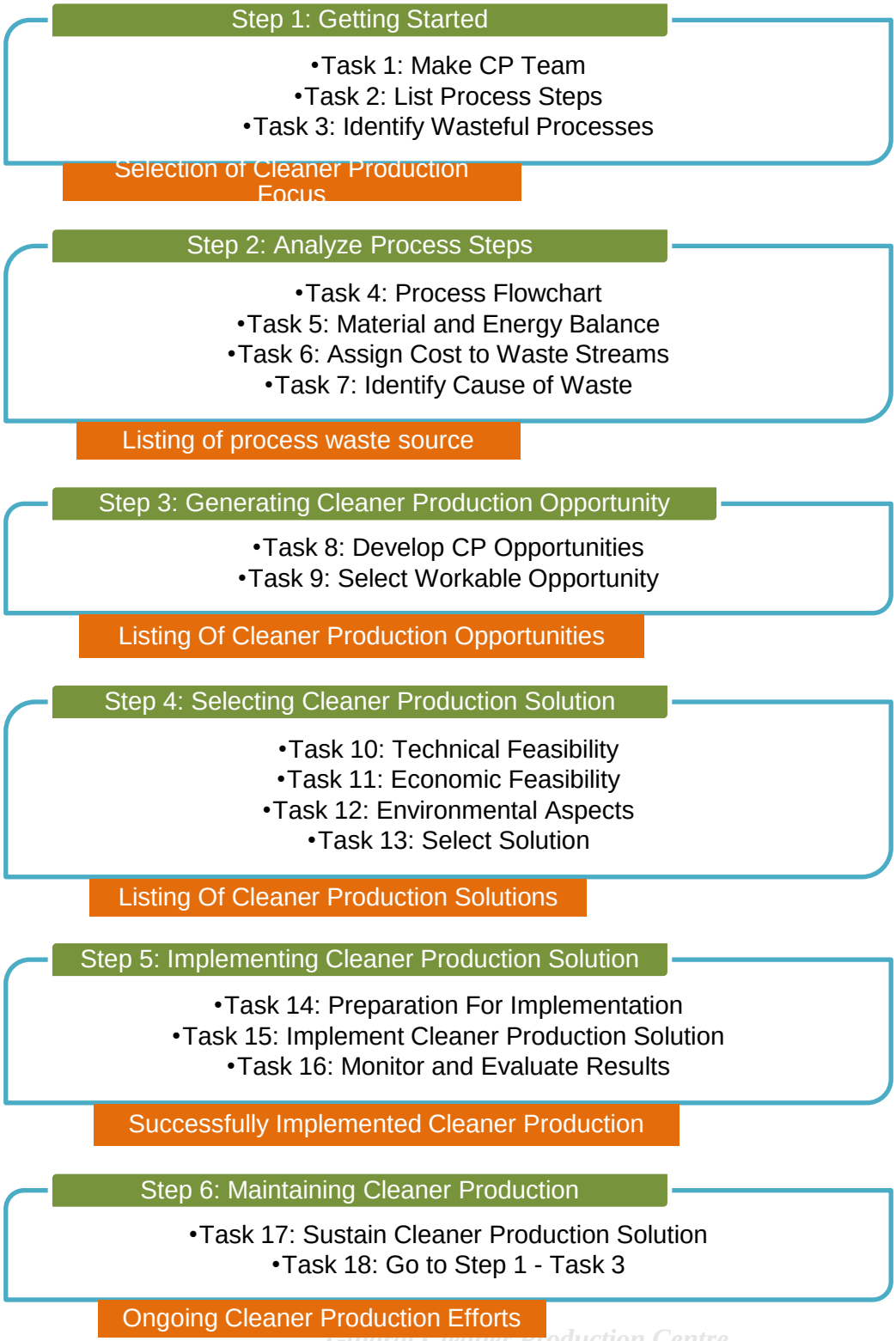
Definition of Cleaner Production (by UNEP)



CP Tools


CP
TOOLS
Source Reduction
Recycling
Product Modification
Good House Keeping
Process Change
On-site Reuse and Recovery
Creation of Useful By-product
Raw Material Change
Better Process Control
Equipment Modification
Technology Change

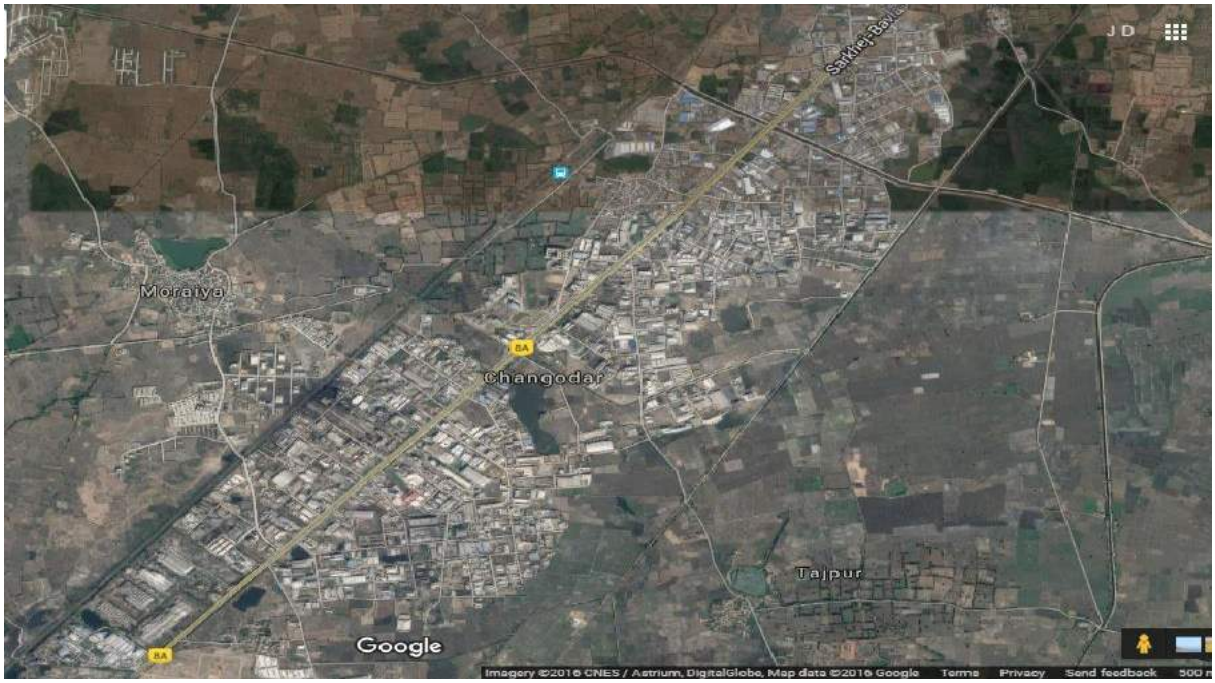
Methodology of Cleaner Production Assessment



Changodar Industrial Area – A Brief Scenario

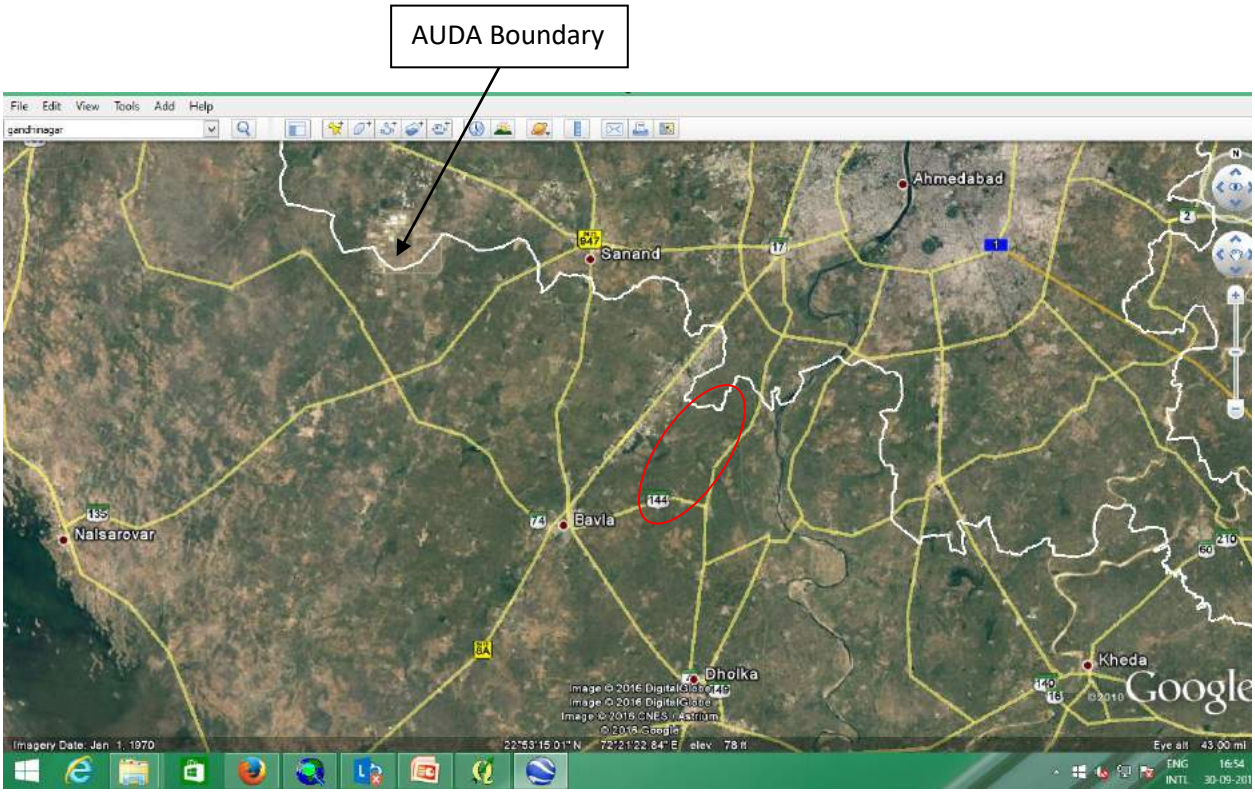
About the Site – Changodar Industrial Area

Changodar is located at a distance of 21 km from Ahmedabad. It is located in Ahmedabad district and on the changodar- sanand border. There is Haphazard dense development of industries, residential complexes, shops – cabins – lorries etc, garages, markets, hotels, restaurants etc at Changodar, Tajpur, Moraiya, Matoda, Chacharvadi, Vasana, Sari area along N. H. No. 8A and about 2500 to 3000 small, medium and large industrial units. Approx .500 units are under the purview of the GPCB. Many industries have staff quarters / hostels or workers and About 20 private industrial estates housing. Around 500 industries generating about 3.4 MLD of sewage & 5.7 MLD Industrial effluents. It is estimated that around 60000 people reside in 14 villages in this area. Average population in villages is approx 5000 and Approx 1,00,000 floating population.



Google Image of Changodar Industrial Area

Area of Interest at a Glance 12 km length



Area Connectivity

Road	Rail
➢ NH 8A connectivity to state capital and business districts of Ahmedabad. ➢ Linkage from SH-17. ➢ Connected to Bagodra - Baroda six lane road.	➢ Site passing along the western railway route of Ahmedabad-Baroda Mumbai.
Airport	**Port**
➢ Close proximity (28 km) to Ahmedabad International Airport.	➢ Logistically connected to JNPT. ➢ NH 8A directly connects to the ports of Pipavav, Kandla and Mundra.

Baseline Data

Micro-Meteorology

Temperature varies from season to season. Mean daily maximum temperature was recorded in the month of May at 41.7° C. Highest mean temperature in the month, recorded in May, was 44.6° C. From November to January, both day and night temperatures begin to decrease rapidly. January is generally the coldest month, with mean morning temperature of 11.9°C. Mean lowest in the month temperature of about 7.6° C is recorded in January. During the post-monsoon season, day temperatures remain between 33.1ºC to 36.0 ºC. In winter season, day temperatures remain between 29.6º C to 30.9º C.

Topography

As the topography of the area is sloppy, it is easy to runoff of storm water during rainy season due to surface drainage pattern. Mean Sea Level of this area is 29 meter. It falls under the Zone-III Seismic Zone which is Less Active.

Physico-Chemical Characteristics of Soil

Sr. No	Parameters	Unit	Matoda	Rajoda	Bavla	Moraiya	Modasar	Bhat	Navapura
1	Porosity	%	52	50	51	53	53	52	54
2	Water Holding Capacity	%	40	37	41	42	38	38	43
3	**Particle Size Distribution**								
4	Silt	%	15	17	15	23	18	14	16
5	Clay	%	52	20	55	45	35	73	30
6	Sand	%	33	60	30	32	45	13	54
7	Texture	---	Clay	Sandy loam	Clay	Clay	Sandy Clay loam	Clay	Sandy Clay loam

8	Cation Exchange Capacity	meq/100gm	21	23	24	21	23	24	22
9	Electrical Conductivity (1: 5 soil: water ratio)	dS/m	0.705	0.925	0.979	0.724	0.634	0.623	0.998
10	pH (1: 5 soil: water ratio)	---	8.08	8.63	7.67	7.99	8.31	8.92	7.69
11	Total OC (Organic carbon)	%	0.55	0.31	0.57	0.55	0.32	0.66	0.71
12	AV-Nitrogen	Kg/ha	222.9	244.6	215.5	205.2	182.6	258.7	219.1
13	Available P_2O_5	Kg/ha	46.12	52.91	70.47	45.05	61.89	55.75	50.36
14	Available-K_2O	Kg/ha	224.5	225.0	265.5	189.0	185.0	169.0	199.0
15	Water soluble Calcium	mg/kg	14.4	28.5	32.5	23.2	20.8	36.8	45.5
16	Water soluble Magnesium	mg/kg	8.7	13.6	13.1	11.5	6.6	23.6	26.9
17	Water soluble Sodium	mg/kg	99.4	126.5	124.9	106.3	93.2	135.5	116.5
18	Water soluble Potassium	mg/kg	22.4	32.5	66.5	28.9	58.5	36.9	29.9

Relative Humidity

Most humid conditions are found in the monsoon season. Thereafter, it decreases gradually during post monsoon, winter and summer season in that order. Mornings are more humid than evenings and humidity ranges from a high of 74 to 87% in monsoon mornings to a low of 20 to 23% in summer evenings. During post-monsoon season, morning humidity remains between 55-64% and during the evening it remains between 35 to 37%.

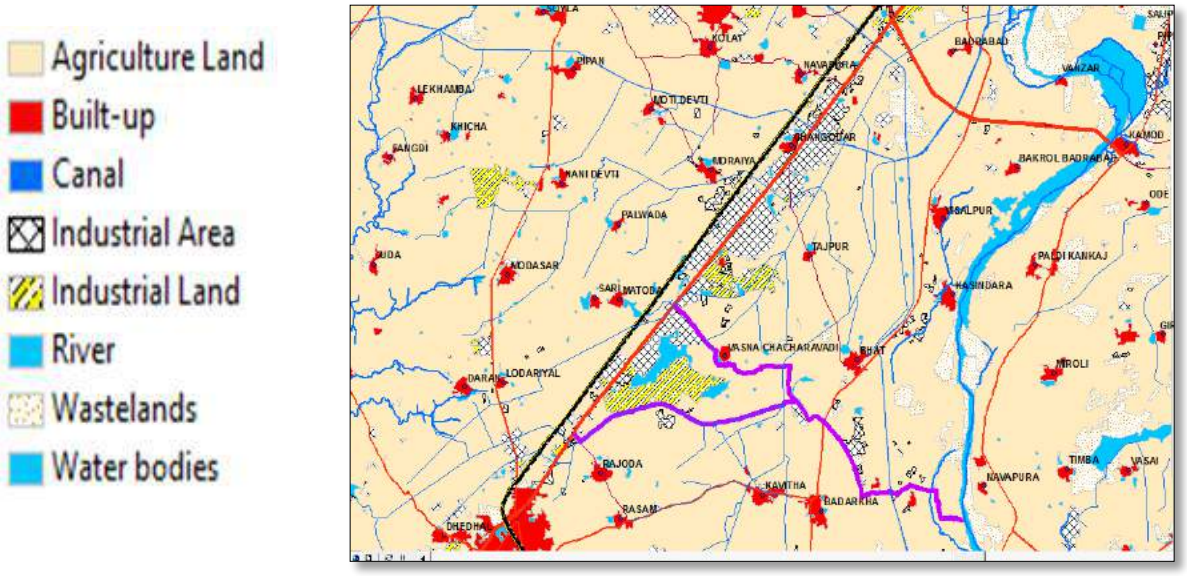
Rainfall

Average annual rainfall for the Ahmedabad station was observed 762.7 mm. Allocation of rainfall by season was 6.7 mm in winter (December, January, February), 18.8 mm in summer (March, April, May), 709.5 mm in monsoons (June, July, August, September) and 31.5 mm in post-monsoons (October to December).

Drainage

River Sabarmati is the principal river of the district. It originates from Dhebar Lake in Aravalli Range of Udaipur District, Rajasthan and finally debauches into Gulf of Khambat near Vataman village of Dholka taluka. Sabarmati forms the eastern boundary of the district flowing from NE to SW direction in Ahmedabad and Gandhinagar districts. The river Vatrak flows for a smaller length and joins Sabarmati near village Wauta of Dholka taluka. The Khari River and the Meshwo River drain Dascroi taluka. The river Bhogavo with its branches Chatori and Omkar drains Dholka and Dhandhuka talukas. The Bhadar River with its branch Goma, Lilka, Utavali and Ghela drains Dhandhuka taluka of the district. River Rodh drains Sanand and Dholka talukas. Rivers Shelwa and Andhli drain Dholka taluka. There is no river or rivulet in Viramgam taluka.

Land Use/Land Cover



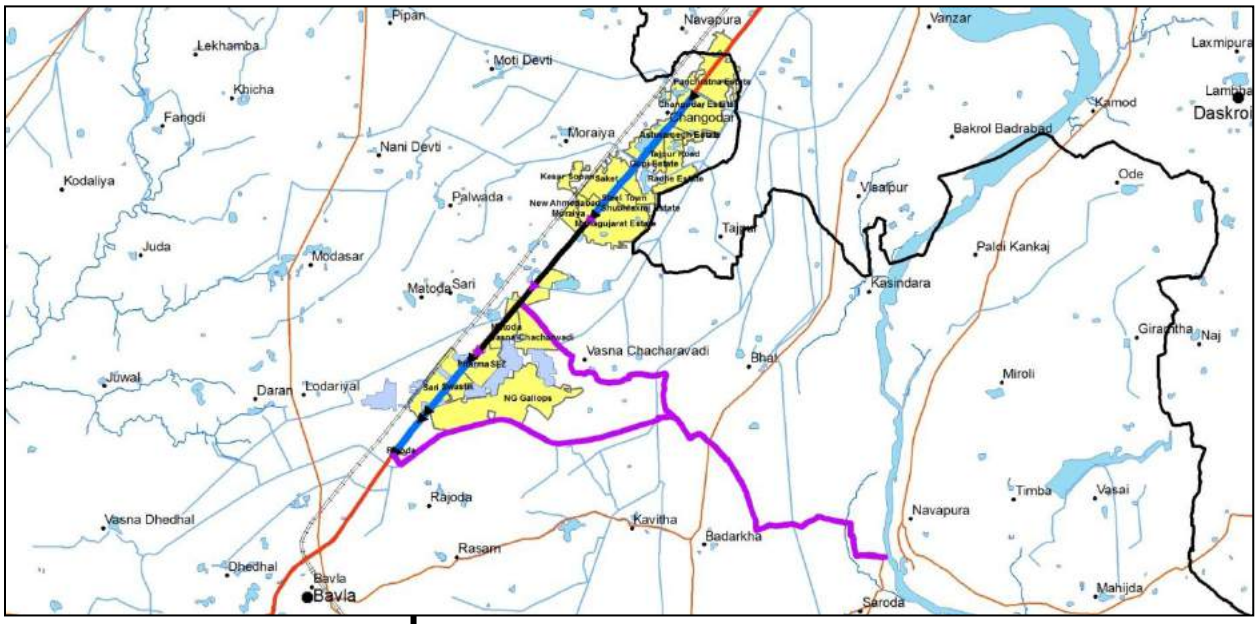
Land use Pattern

Land use within the study area has been determined with the help of satellite imagery, and broadly consists of settlements, Industrial, Tank / River / reservoir, Single crop, land with scrub, land without scrub area and mud Plot, land use is Single crop.

(***Source:*** *EIA Report for proposed expansion of CETP upto 3 MLD at Survey No.467, PHAMEZ-SEZ , Village Matoda, Talika- Sanand, District-Ahmedabad)*

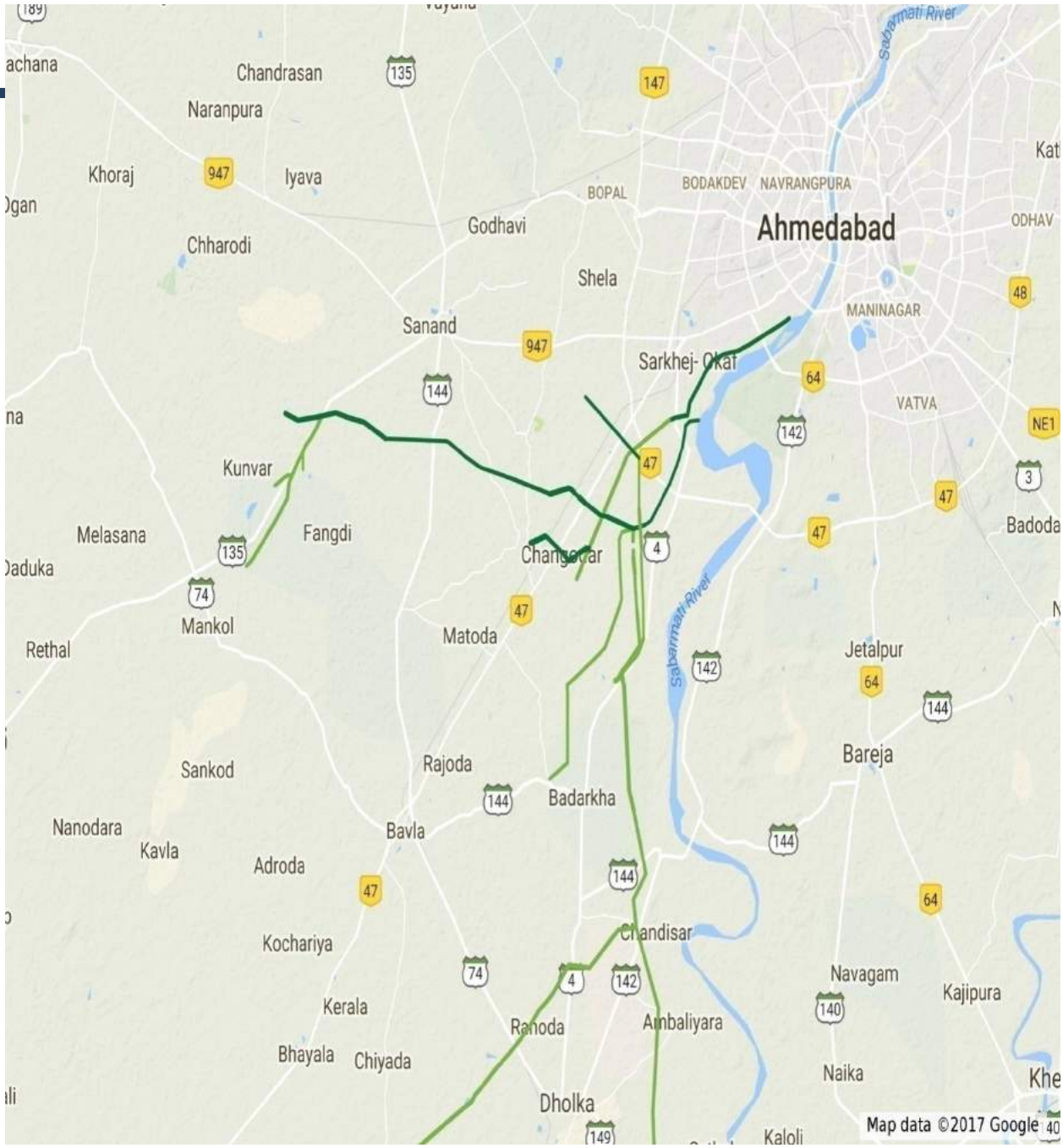
From Watershed Highway itself Ridge line Slope: 0-1%, Flow Direction: South East

Existing Storm water Drainage (7 km)



Existing storm water Drainage 7 km

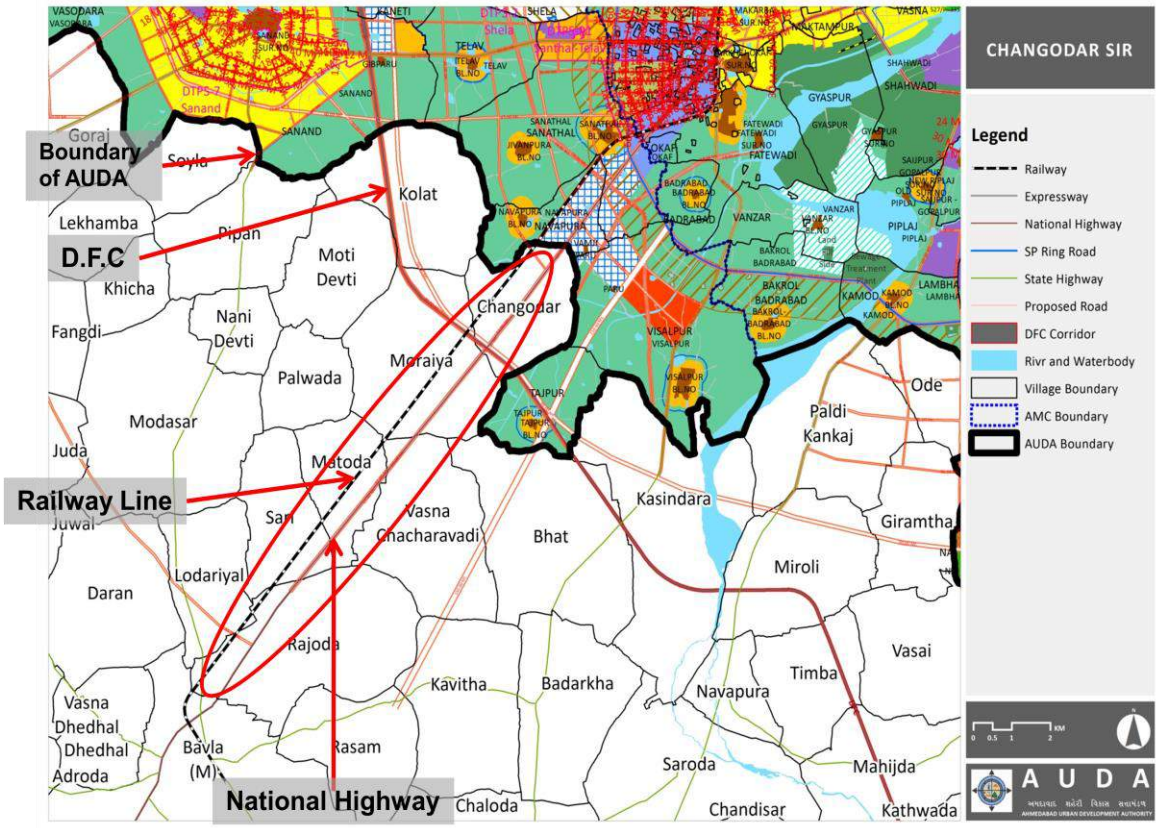
Fatehwadi Canal & its Sublets



Fatehwadi Canal

Sublets of Fatehwadi Canal

Industrial area around Changodar



Ground water in the fissured formations (Hard rocks)

Occurrence and movement of ground water is governed by the extent and thickness of weathered zone, presence and interconnections of joint and fracture systems, which provides secondary porosity. The occurrence of vesicles and amygdales in the flows of the trap rocks and solution cavities in the limestone formations and the geological contact between limestone and basalt are other factors favorable for ground water storage and movement. Ground water occurs in the weathered and fissured zones mainly under water table conditions. It occasionally occurs under semi-confined conditions in the event of comparatively deeper fracture system in these formations. These fissured formations do not form good repository of groundwater, compared to porous unconsolidated sedimentary formations. Groundwater is being developed in these formations by means of dug and dug-cum-bored wells.

Ground water in Porous Formations (Sedimentary Rocks)

Definition of Sedimentary rocks: *Sedimentary rocks are types of rock that are formed by the deposition and subsequent cementation of that material at the Earth's surface and within bodies of water. Sedimentation is the collective name for processes that cause mineral and/or organic particles (detritus) to settle in place.*

It occupies the major part (93.5%) of the district. It includes the post-Miocene alluvial deposits at the top underlined by older Miocene formations. The sedimentary formations mainly consist of fine to coarse-grained sand, gravel, silt, clay, clay stone, siltstone and kankar.

Unconfined aquifer (phreatic)

Definition of Unconfined aquifer: *A groundwater aquifer is said to be unconfined when its upper surface (water table) is open to the atmosphere through permeable material. As opposed to a confined aquifer, the water table in an unconfined aquifer system has no overlying impervious rock layer to separate it from the atmosphere.*

The unconfined aquifer occurs in the upper horizons down to a maximum depth of 60-75 mbgl (meters below ground level) consisting of medium to fine grained sand, silt with local lenses of sandy clay and clay. Medium to fine grained sands are found in the north-eastern part of the district. In this area where only phreatic aquifer is present, base of the alluvium is marked by gravel. Fine grained sands with silt are found further south and south-west at Dholka and Sanand taluka. The thickness of aquifer varies between 20 and 45 m in general, met with in the depth range of 3 and 75 mbgl (meters below ground level) and can be considered as aquifer “A". Ground water occurs under phreatic conditions in the north eastern part of the district. However, the intercalations of silt, at places, induce semi-confined conditions in the south and south western directions of Sanand and Dholka taluka. It bears potable and good quality water in the north eastern part of the district and eastern part of Dascroi taluka (east of Khari River).

*(**Source:** Ground Water Brochure for Ahmedabad District by CGWB, West Central Region Ahmedabad, March 2014)*

Drinking water wells and water supply based on groundwater sources in Bavla, Dholka and Sanand Taluka

Drinking water wells and water supply

Taluka	No. of Dugwell	No. of Tube Wells	No. of Hand Pumps	Depth Range (m)	Discharge range (LPM)
Bavla	-	48	-	150-300	400-800
Dholka	5	66	-	12-280	400-800
Sanand	-	67	-	200-300	400-800

Source: *GWS&SB, March 2014*

Type of pumps and water lifting devices for Irrigation dugwells, shallow tubewells and deep tubewells.

Taluka	Electric pumps	Diesel pumps	Wind mills	Solar pumps
Bavla	443	1114	26	1
Dholka	333	423	5	0
Sanand	1495	545	3	0

*(**Source:** Ground Water Brochure for Ahmedabad District by CGWB, West Central Region Ahmedabad, March 2014)*

Shallow Tubewells

Taluka	Electric pumps	Diesel pumps	Wind mills	Solar pumps
Bavla	79	168	0	0
Dholka	63	50	1	0
Sanand	50	71	1	0

*(**Source:** Ground Water Brochure for Ahmedabad District by CGWB, West Central Region Ahmedabad, March 2014)*

Deep Tubewells

Taluka	Submersible pumps	Turbine pumps	Others	Total
Bavla	342	0	1	343
Dholka	1525	5	9	1539
Sanand	655	5	34	694

*(**Source:** Ground Water Brochure for Ahmedabad District by CGWB, West Central Region Ahmedabad, March 2014)*

List of Industrial Estates near the Changodar Region

Sr. No.	Name of Estate
1	Panchratna
2	Changodar
3	Ashwamegh
4	Subhlaxmi
5	Mahagujarat
6	Gopi
7	Steel Town
8	Saket
9	New Ahmedabad Industrial Estate
10	Tajpur Road
11	Moraiya
12	Radhe
13	Kesar Sopan

14	Vasna-Chacharwadi
15	Sari
16	Pharma SEZ
17	Matoda
18	Rajoda
19	NG Gallops
20	Swastik

Name of Villages near Changodar Area

Villages near Changodar Area are given in below table:

Sr. No.	Name of Village	Distance from Changodar (km)
1	Taj pur	2.8
2	Moraiya	3.9
3	Navapura	5.2
4	Bhat	5.9
5	Vasna Chacharavadi	6.1
6	Matoda	6.9
7	Sari	7.9
8	Palwada	8.2
9	Visalpur	10.8
10	Kolat	10.7

11	Nani devati	11.3
12	Modasar	12.4
13	Pipan	15.1
14	Moti devati	15.3

Water Consumption Details of Houses and Mode of Disposal

Sr. No.	Name of Village	No. of Houses	Population	Facility of Toilet	Water Consumption(L /Day)	Mode of Disposal
1	Sari	1100	2040	100%	1,50,000	Soak Pit & Sewer
2	Matoda	900	2597	100%	2,00,000	Soak Pit & Sewer
3	Changodar	1205	7873	100%	1,80,000	Soak Pit & Sewer
4	Moraiya	1160	6783	100%	1,60,000	Soak Pit & Sewer
5	Vasna Chacharavadi	753	2513	100%	2,00,000	Soak Pit & Sewer
6	Rajoda	732	3232	100%	90,000	Soak Pit & Sewer
Total		**5850**				

Present Environmental Issues Associated with Changodar Industrial Area

Present Environmental issues in Changodar region (Changodar, Chacharwadi Vasna, Matoda, Tajpur, Moraiya, Sari etc) due to disposal of polluted waste water, sewage & solid wastes in and around Fatewadi canal are as under:

- Lack of Zoning of area for Residential, Commercial and Industrial sectors resulting in to haphazard & dense development in the area which includes industries, hotels & restaurants, Commercial and residential sectors.
- Lack of infrastructure for Collection , Conveyance, Treatment and Disposal of Sewage and MSW (including kitchen waste) - industrial, Hotels & Restaurants , commercial and residential sectors, which results into illegal disposal of sewage and solid wastes not into Fatewadi canal, but also on either side of the N. H. 8A.
- NHAI has laid duct line @ 4 kms in length on either side of N.H. no 8A, which opens in Fatewadi canal. Sewage generated from the habitation along the N. H. 8A is illegally discharged into this duct line, which ultimately finds its way into the Fatewadi canal.
- Unavailability of storm water drains in the area creates havoc during monsoon.
- Poor percolation rate of soil leads to formation of pools of waste/rainy water, which remains there for a long time.
- Illegal disposal of polluted water (sewage) in Fatewadi canal through tankers / storm water drains
- Illegal disposal of solid wastes (MSW) in Fatewadi canal.
- Wastewater of different industries of changodar area are being discharged into Septic tank and Soak pit and because of low absorption capacity of land, sometime this wastewater from soak pit is discharged by tanker into canal, road and open space. Therefore it contaminates the land and creates land pollution.
- Lack of CETP (Common Effluent Treatment Plant) for treatment of industrial wastewater
- Lack of STP (Sewage Treatment Plant) for treatment of domestic wastewater

- Lack of MSW (Municipal Solid Waste) Management facility for dumping of MSW

Sewage discharge in canal of Changodar area

Sewage discharge into Canal from Residential area, Changodar

Storm water discharge into Canal, Changodar

MSW dumping on highway side near Changodar

Road side open drain , Moriaya

Water Logging near Leamak Healthcare

Water logging near Gujarat Techno Park

Water logging near Astra Life-science

Water logging near Pharma SEZ

Water logging near Real Stripes

Water logging (Algae formation) near Real Stripes

Solid Waste Disposal

Road

Ponding

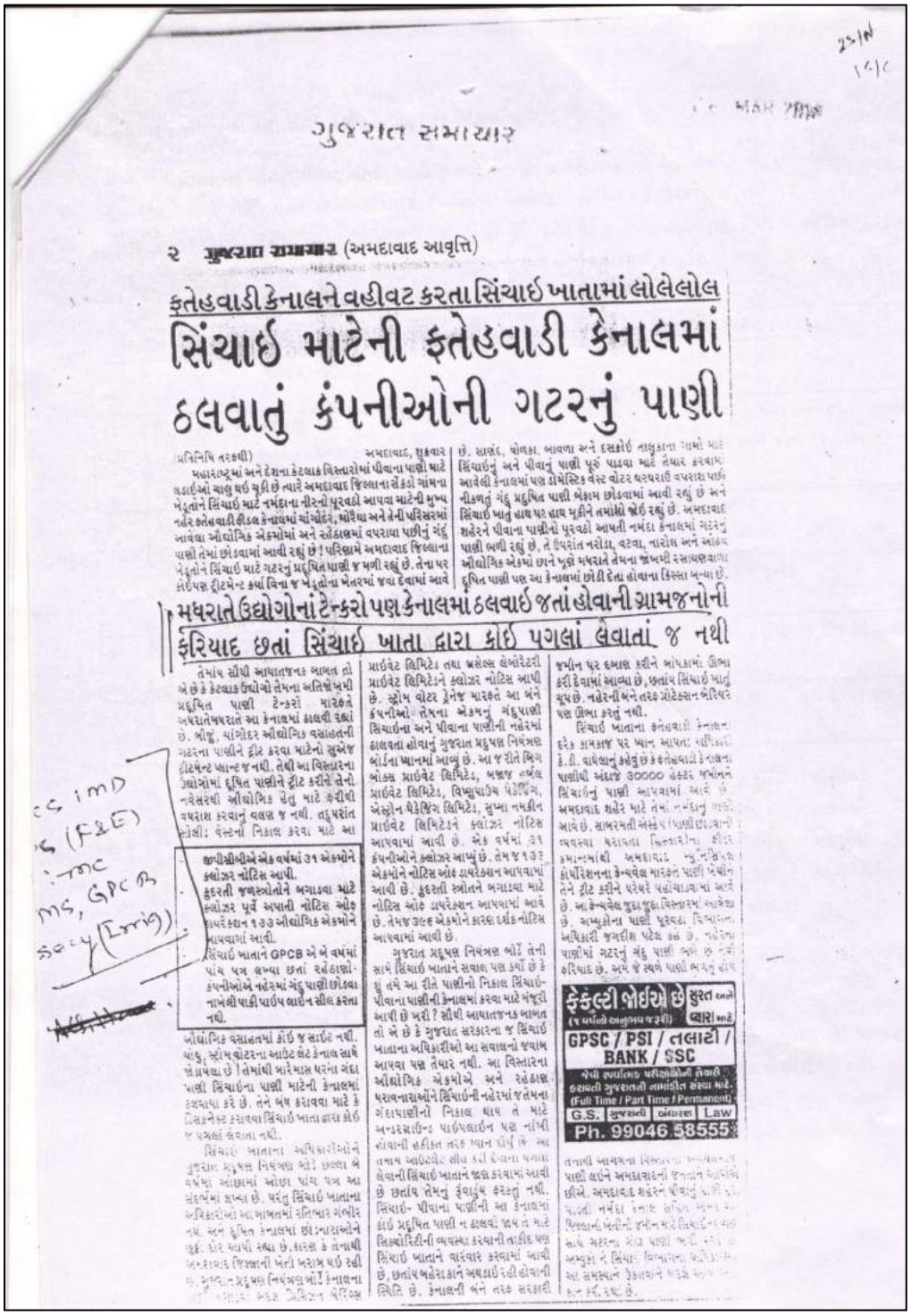
Living Conditions

Approach Roads

Available amenities

Photographs of Situation during November 2016 (17/11/2016)

Environmental Issues of Changodar highlighted in Newspaper of Gujarat Samachar



ગુજરાત સમાચાર

૨ ગુજરાત સમાચાર (અમદાવાદ આવૃત્તિ)

ફતેહવાડી કેનાલને વહીવટ કરતા સિંચાઈ ખાતામાં લોલેલોલ

સિંચાઇ માટેની ફતેહવાડી કેનાલમાં ઠલવાતું કંપનીઓની ગટરનું પાણી

પ્રતિનિધિ તરફથી)

અમદાવાદ, શુક્રવાર

મહારાષ્ટ્રમાં અને દેશના કેટલાક વિસ્તારોમાં પીવાના પાણી માટે વડાઈઓ ચાલુ થઈ ચૂકી છે ત્યારે અમદાવાદ જિલ્લાના સેંકડો ગામના ખેડૂતોને સિંચાઈ માટે નર્મદાના નીરનો પૂરવઠો આપવા માટેની મુખ્ય નહેર ફતેહવાડી કેનાલમાં ચાંગોદર, મોરૈયા અને તેની પરિસરમાં આવેલા ઔદ્યોગિક એકમોમાં અને રહેઠાણમાં વપરાયા પછીનું ગંદું પાણી તેમાં છોડવામાં આવી રહ્યું છે ! પરિણામે અમદાવાદ જિલ્લાના ખેડૂતોને સિંચાઈ માટે ગટરનું પ્રદૂષિત પાણી જ મળી રહ્યું છે. તેના પર કોઈપણ ટ્રીટમેન્ટ કર્યા વિના જ ખેડૂતોના ખેતરમાં જવા દેવામાં આવે છે. સાણંદ, ધોળકા, બાવળા અને દસક્રોઈ તાલુકાના ગામો માટે સિંચાઈનું અને પીવાનું પાણી પૂરું પાડવા માટે તૈયાર કરવામાં આવેલી કેનાલમાં પણ ડોમેસ્ટિક વેસ્ટ વોટર વરસવાટ વપરાશ પછીનું ગંદું પ્રદૂષિત પાણી બેફામ છોડવામાં આવી રહ્યું છે અને સિંચાઈ ખાતું હાથ પર હાથ મૂકીને તમાશો જોઈ રહ્યું છે. અમદાવાદ શહેરને પીવાના પાણીનો પૂરવઠો આપતી નર્મદા કેનાલમાં ગટરનું પાણી ભળી રહ્યું છે. તે ઉપરાંત નરોડા, વટવા, નારોલ અને આંકડ ઔદ્યોગિક એકમો છાને ખૂણે મધરાતે તેમના જોખમી રસાયણવાળા દૂષિત પાણી પણ આ કેનાલમાં છોડી દેતા હોવાના કિસ્સા બન્યા છે.

મધરાતે ઉદ્યોગોનાં ટેન્કરો પણ કેનાલમાં ઠલવાઈ જતાં હોવાની ગ્રામજનોની ફરિયાદ છતાં સિંચાઈ ખાતા દ્વારા કોઈ પગલાં લેવાતાં જ નથી

તેમાંય સૌથી આઘાતજનક બાબત તો એ છે કે કેટલાક ઉદ્યોગો તેમના અતિશે ખરી પ્રદૂષિત પાણી ટેન્કરો મારફતે મધરાતેમધરાત આ કેનાલમાં ઠાલવી રહ્યાં છે. બીજું, ચાંગોદર ઔદ્યોગિક વસાહતની ગટરના પાણીને ટ્રીટ કરવા માટેનો સુએજ ટ્રીટમેન્ટ પ્લાન્ટ જ નથી. તેથી આ વિસ્તારના ઉદ્યોગોમાં દૂષિત પાણીને ટ્રીટ કરીને તેની નવેસરથી ઔદ્યોગિક હેતુ માટે કરીથી વપરાશ કરવાનું વલણ જ નથી. તાજેતરમાં કોલોઈ વેસ્ટનો નિકાલ કરવા માટે આ જીપીસીબીએ એક વર્ષમાં ૩૧ એકમોને ક્લોઝર નોટિસ આપી.

કુદરતી જળસ્રોતોને બગાડવા માટે ક્લોઝર પૂર્વે આપાની નોટિસ ઓફ ડાયરેક્શન ૧૩૩ ઔદ્યોગિક એકમોને આપવામાં આવી.

સિંચાઈ ખાતાને GPCB એ બે વર્ષમાં પાંચ પત્ર લખ્યા છતાં રહેઠાણો-કંપનીઓએ નહેરમાં ગંદું પાણી છોડવા નાખેલી પાકી પાઈપ લાઈન સીલ કરતા નથી.

ઔદ્યોગિક વસાહતમાં કોઈ જ સાઈટ નથી. વાહુ, સ્ટોમ વોટરના આઉટલેટ કેનાલ સાથે જોડાયેલા છે ! તેમાંથી ગમે ત્યારે ગંદા પાણી સિંચાઈના પાણી માટેની કેનાલમાં ઠલવાયા કરે છે. તેને બંધ કરાવવા માટે કે ડિસ્કનેક્ટ કરાવવા સિંચાઈ ખાતા દ્વારા કોઈ જ પગલાં લેવાતા નથી.

સિંચાઈ ખાતાના અધિકારીઓને ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ છલ્લા બે વર્ષમાં આછામાં ઓછા પાંચ પત્ર આ સંદર્ભમાં પાઠવ્યા છે, પરંતુ સિંચાઈ ખાતાના અધિકારીઓ આ બાબતમાં રસનિયાર નથી. અને દૂષિત કેનાલમાં છોડનારાઓને ચૂપ. કોર આપી રહ્યા છે. કારણ કે તેનાથી અમદાવાદ જિલ્લાની ખેતી બરબાદ થઈ રહી છે. ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ કેનાલના

પ્રાઈવેટ લિમિટેડ તથા ઝસેલ્સ લેબોરેટરી પ્રાઈવેટ લિમિટેડને ક્લોઝર નોટિસ આપી છે. સ્ટોમ વોટર ડ્રેનેજ મારફતે આ બંને કંપનીઓ તેમના એકમનું ગંદુપાણી સિંચાઈના અને પીવાના પાણીની નહેરમાં ઠાલવતા હોવાનું ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડના ધ્યાનમાં આવ્યું છે. આ જ રીતે મિગ બોક્સ પ્રાઈવેટ લિમિટેડ, બજાજ એલ્વ પ્રાઈવેટ લિમિટેડ, વિષ્ણુપાઉચ પેકેજિંગ, એસ્ટોન પેકેજિંગ લિમિટેડ, સુખા નમકીન પ્રાઈવેટ લિમિટેડને ક્લોઝર નોટિસ આપવામાં આવી છે. એક વર્ષમાં ૩૧ કંપનીઓને ક્લોઝર આપ્યું છે. તેમજ ૧૩૩ એકમોને નોટિસ ઓફ ડાયરેક્શન આપવામાં આવી છે. કુદરતી સ્ત્રોતને બગાડવા માટે નોટિસ ઓફ ડાયરેક્શન આપવામાં આવે છે. તેમજ ૩૯૬ એકમોને કારણ દર્શક નોટિસ આપવામાં આવી છે.

ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ તેની સામે સિંચાઈ ખાતાને સવાલ પણ કર્યો છે કે શું તમે આ રીતે પાણીનો નિકાલ સિંચાઈ-પીવાના પાણીની કેનાલમાં કરવા માટે મંજૂરી આપી છે ખરી ? સૌથી આઘાતજનક બાબત તો એ છે કે ગુજરાત સરકારના જ સિંચાઈ ખાતાના અધિકારીઓ આ સવાલનો જવાબ આપવા પણ તૈયાર નથી. આ વિસ્તારના ઔદ્યોગિક એકમોએ અને રહેઠાણ પરાવનારઓને સિંચાઈની નહેરમાં જ તેમના ગંદાપાણીનો નિકાલ થાય તે માટે અન્ડરગ્રાઉન્ડ પાઈપલાઈન પણ નાખી હોવાની હકીકત તરફ ધ્યાન દોર્યું છે. આ તમામ આઉટલેટ સીલ કરી દેવાના પગલાં લેવાની સિંચાઈ ખાતાને જરૂર કરવામાં આવી છે છતાંય તેમનું ઢંધાડુંય કરતું નથી. સિંચાઈ- પીવાના પાણીની આ કેનાલમાં કોઈ પ્રદૂષિત પાણી ન ઠાલવો જોઈએ તે માટે સિક્યોરિટીની વ્યવસ્થા કરવાની તાકીદ પણ સિંચાઈ ખાતાને વારંવાર કરવામાં આવી છે, છતાંય બહેરા કાને અવાઈ રહી હોવાની સ્થિતિ છે. કેનાલની બંને તરફ સરકારી જમીન પર દબાણ કરીને બાંધકામો ઊભા કરી દેવામાં આવ્યા છે, છતાંય સિંચાઈ ખાતું ચૂપ છે. નહેરની બંને તરફ પ્રોટેક્શન બેરિયર પણ ઊભા કરતું નથી.

સિંચાઈ ખાતાના કર્તવ્યવાહી કેનાલના દરેક કામકાજ પર ધ્યાન આપતા ચીફ એ. ઈ. વાયેલાનું કહેવું છે કે ફતેહવાડી કેનાલના પાણીથી અંદાજે ૩૦૦૦૦ હેક્ટર જમીનને સિંચાઈનું પાણી આપવામાં આવે છે. અમદાવાદ શહેર માટે તેમ જ નર્મદાનું પાણી આવે છે. સાબરમતી એક્સ્પ્રેસ પાણીદાર વાની વ્યવસ્થા કરાવતા વિસ્તારોમાં ફીડર કમાન્ડમાંથી અમદાવાદ મ્યુનિસિપલ કોર્પોરેશનના કેન્ચવેલ મારફત પાણી ખેંચીને તેને ટ્રીટ કરીને ઘરેઘરે પહોંચાડવામાં આવે છે. આ કેન્ચવેલ જુદા જુદા વિસ્તારમાં આવેલા છે. અમુકોના પાણી પૂરવઠા વિભાગના અધિકારી જગદીશ પટેલ કહે છે, નહેરના પાણીમાં ગટરનું ગંદું પાણી ભળે છે તેવી ફરિયાદ છે. અમે જે સ્થળે પાણી ભરવું હોય

Questioners for Data Collection during Survey

Questioners:

1. Questioner for STP/CETP

2. Questioner Sheet for Residential Tower and Commercial Complex

3. Questioner Sheet for Villages

1. Questioner for STP/CETP

Sr. No.	General Information	
1	Name of Industry	
2	Address	
3	Name of Contact Person	
4	Phone No (Landline): Mobile No:	
5	E-mail Id:	
6	GPCB XGN ID	
7	Name of Director/Proprietor/Chairman/Partner	
8	Type of Industry (Micro/Small/Medium/Large)	
9	Nature of Industry (Sector)	
10	Number of Employees/workers	
11	Is there any residential Colony? If Yes then Mention numbers of Houses	
12	No. of Working Days	
Production Details		
1	Name of the products	

2	Annual Production Details of last 3 Years		
	Details of Fresh Water Consumption		
		Industrial (Liter/day)	**Domestic (Liter/day)**
1	Total Water consumption /day		
2	Source of water 1) Bore well 2) Tanker 3) canal 4) Any other		
3	Quantity of Wastewater Generated /day		
4	Mode of disposal	1. CETP 2. Outside Factory Premises 3. Within Factory Premises 4. Common Infrastructure 5. Gardening 6. Recycling 7. Land Irrigation	1) Sewer Line 2) Soak Pit 3) STP 4) Any Other

	Details of ETP (Effluent Treatment Plant)		
1	Whether you have ETP or not?	Yes/No	
2	Treatment Provided in ETP (Primary/Secondary/Tertiary/Advanced with name of Treatment Technology or of Treatment Unit, Incinerator, MEEs, Evaporators, RO etc)		
	Mode of disposal of Reject & Permeate of MEEs		
	Mode of disposal of Reject & Permeate of RO		
3	Whether Domestic and Industrial effluent mix in ETP?	Yes/No	
4	Outlet Quantity of Wastewater in ETP/day		
5	Mode of disposal [ZLD(Zero Liquid Discharge) or Re cycling]		
	Details of Hazardous and Non Hazardous Solid waste Generation		
6	**Type of Hazardous and Non Hazardous solid waste generation with quantity**		
	1. ETP sludge	MT/day	
	2. Residue of water purification	MT/day	
	3. Process residue	MT/day	
	4. process waste	MT/day	
	5. Off specification products	MT/day	
	6. Expired medicine	No/day	
	7. Spent carbon/catalyst	MT/day	
	8. Discarded container/barrel	No/day	
	9. Used & spent oil	MT/day	
	10. Spent solvent	MT/day	
	11. Oily rags	MT/day	

	12. Plastic waste	MT/day
	13. Any other	
	Type of Non Hazardous solid waste generation with quantity	
	1. Cotton waste	MT/day
	2. Packaging waste	MT/day
	3. Sweeping waste	MT/day
	4. Kitchen waste	MT/day
	5. Any other	
7	Management / disposal of Hazardous and Non Hazardous Solid Waste	

2. Questioner for Residential Tower and Commercial Complex

Sr. No	Particulars	Details
1	Name of Residential Tower/ Commercial Complex	
2	Name of Contact Person Phone No (Landline): Mobile No: E-mail Id:	
3	No. of Houses/shops	
4	Population	
5	Source of Water	
6	Quantity of fresh water consumption	
7	**Sewage**	
	Quantity of Sewage generation (KLD-kilo liter/day)	
	Collection (Septic Tank or any other)	
	Mode of Disposal	
8	**Municipal Solid Waste (MSW)**	
	Quantity of Municipal Solid Waste Generation (MT/day)	

	Collection	
	Mode of Disposal	

3. Questioner for Villages

Sr. No	Particulars	Details
1	Name of Villages, District, Tehsil	
2	Name of Gram Panchayat	
3	Name of Contact Person Phone No (Landline): Mobile No: E-mail Id:	
4	No. of Houses	
5	No. of Shops	
6	Approx Population	
7	Major Public Amenities (Ex,. Public Toilets, Drinking water facilities etc)	
8	Total Water Consumption	
9	No. of Bore Well	
10	**Sewage**	
	Quantity of Sewage generation (KLD-kilo liter/day)	
	Collection (Septic Tank or any other)	
	Mode of Disposal	
11	**Municipal Solid Waste**	
	Quantity of Municipal Solid waste generation (MT/day)	
	Collection	
	Mode of Disposal	

Expected Outcomes of the Project

Expected Results for Changodar Industrial Area:

- Identification of load of water pollution in Changodar Industrial Area
- Feasibility of Common Effluent Treatment Plant
- Feasibility of Sewage Treatment Plant
- Savings in the resources by performing resource optimization
- Recovery of waste material
- Conservation of energy by making energy efficient process
- Improvement in the productivity and quality
- Reduction in the health and safety hazards to the workers
- Capacity building of the floor / technical personnel of industries
- Replication of the results in other industries
- Formation of case studies for cleaner production in similar sectors (in which CP Assessment will be carried out at selected industries of Changodar Region)
- Viability of advanced wastewater treatment technology for Common Effluent Treatment Plant (CETP) and Sewage Treatment Plant (STP).

Deliverable from the project

- Inception report covering the methodology, the planned activities, schedule etc.
- Progress report as per the project activities.
- Final report that would form the basis of dissemination Programme. This report shall also include the suggestion to solve present environmental issues, suggested CP schemes, opportunities of Cleaner Production implementation in the units.
- Dissemination of case studies for cleaner production in similar sectors (in which CP Assessment will be carried out at selected industries of Changodar Region).
- Dissemination of options generated for advanced wastewater treatment technology for Common Effluent Treatment Plant (CETP) and Sewage Treatment Plant (STP).

2. EXISTING DETAILS OF CHANGODAR REGION

Introductory Programme for the project "Diagnosis Study of Present Environmental Issues of Changodar Industrial Area"

Venue: Pharma SEZ, Conference Hall

Date: 22nd August, 2017; 3.00 pm to 5:00 pm

The introductory programme on the project was organized on 22nd August, 2017. The objective of the introductory programme was to discuss about the project, present Environmental Issues and also to develop the understanding of the project among the local stakeholders and seek their contribution in further execution as well as planning of Road Map for the project.

Key attendants in the Meeting:

Dr. Bharat Jain, Member Secretary, GCPC

Mr. V. R. Patel, Retired, Deputy Chief Environmental Engineer, GPCB

Mr. Kailash Bahuguna, COO, Zydus Infrastructure Pvt. Ltd.

Mr. Punamchandra Rathod, Sr. Project Engineer, GCPC

Ms. Disha Bhavsar, Asst. Project Engineer, GCPC

Around 15 member industries of Pharma SEZ

Project Brief:

Mr. V. R. Patel welcomed all the participants in the programme and explained to all the objective of the introductory programme of this project. He introduced Dr. Bharat Jain and the organization GCPC to all the participants and briefed them about the role of GCPC, Cleaner production (CP) and importance of CP tools to reduce waste, to save energy and raw material, to save money by process optimization, equipment modification, housekeeping...etc. He informed the participants that Dr. Jain, MS, GCPC has taken a lot of initiatives and is a source of inspiration for adopting clean technologies in the state. He added that Dr. Bharat Jain is member of various state level and central level committee for Environmental issues. After that He asked all the participants to formally introduce themselves.

Next to that, Mr. V. R. Patel introduced Mr. Punamchandra Rathod, Sr. Project Engineer, GCPC to all the participants After that, Dr. Bharat Jain, Member Secretary, GCPC took over the dias and formally welcomed all the participants of member industries of Pharma SEZ. He added that it was a wonderful opportunity to come together and find solutions in mitigating the problems of waste /pollution.

After that he discussed about the project on Diagnosis Study of Present Environmental Issues of Changodar Industrial Area and shared his views on Environmental issues of Changodar Area that this Area (Changodar) is not a notified GIDC area and in past many people have made efforts to declare this area as a SIR (Special Investment Region), SEZ but due to some reason the plan was dropped out. He said that now a days industries are facing many issues and challenges in the Environmental field. He discussed on the critically polluted area, Vapi, Ankleshwar, Odhav, Vatva, Naroda… etc of Gujarat which has high CEPI (Comprehensive Environmental Pollution Index) Index. He expressed his view that in past he has made many efforts to remove these areas from the list critically polluted area. Now Ankleshwar and Vapi has been removed from the list of critically polluted area but still pollution level in this both area is high therefore there is a restriction on establishment of new industries and on expansion of existing industry. In short industrial development has been stopped at Vapi and Ankleshwar. He also discussed case of Jhagadia, where water supply scheme and Road network had been developed and industries were willing to establish there but due to higher CEPI score of that area, industries didn't establish. Dr. Bharat Jain mentioned that CEPI Index will also be calculated for Changodar Area. He emphasized that if CEPI of Changodar area will be calculated then it may be fall into critically polluted area category.

Mr. V. R. Patel alerts all the member industries regarding CEPI and critically polluted area and said that It is very difficult to come out from critically polluted area as no new establishment nor expansion to industries will be permitted in critically polluted area. Dr. Jain concerned about this

major environmental issues and said that there is no entity of Pharma SEZ as many other industrial sectors are also there in Changodar area which are highly polluting sectors.

Dr. Jain again explained about concept of cleaner production that cleaner production is waste minimization and this concept was started by UNIDO, around 10-15 Year Ago. He elaborated that CP is before pipe treatment for zero waste/wastewater generation and suggested to read the Cleaner production case studies from the GCPC website. Dr. Jain informed all the participants about Industrial Policy 2015 and told that Government are paying up to 35 Lac or 35 % of total project cost as a reimbursement cost for implementation of Cleaner technology installment/implement or for the project of cleaner production in the state of Gujarat only. Mr. P. R. Rathod added that in this year around 31 industries are recommended for financial assistance under the industrial policy 2015. Dr. Jain also added that Gujarat Government also gives GCPC Award with extended consent for 1 year through GPCB and F & E Dept to those industries which industries have adopted or implemented cleaner technology for cleaner production.

As the CEPI is concern for all industries generating pollution in Changodar industrial area, Mr. V. R. Patel gave an overview of 6 rules: 1) Solid Waste Management Rules, 2016, 2) Bio-Medical Waste Management Rules, 2, 3) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, 4) Plastic Waste Management Rules, 2016, 5) Construction and Demolition Waste Management Rules, 2016 and 6) E-Waste (Management) Rules, 2016 and he explained its seriousness to all the participants. He requested all the participants to inform to their industry about this project.

Dr. Jain threw light on the present environmental issues of changodar industrial area like, improper solid waste and liquid effluent management, improper sanitation facilities, lack of environmental infrastructure, high ground water table, improper storm water management, water logging problem due to law lying area. After discussing all this issues, he commented that people are not changing their attitude to clean environment. They are perfect within house but outside their premises, they are not worried about environment pollution. He strictly said that, industries cannot throw their rubbish outside the environment as it's a responsibility of industry to carefully discharge their waste at safe place. He added that after doing diagnosis study, GCPC has to submit report to Forests and Environment Department, GoG including solution of present environmental issues of Changodar industrial area.

Dr. Jain emphasized that there is need to propose environmental infrastructure (SPVs) like, TSDF, CETP, Incinerator..etc to take care of waste as a part of project. He added that there is also need of support/contribution of industries to respond during site visit/survey as participation of all industries is must for completion of this project.

After that Mr. V. R. Patel suggested to make a group of sector wise industries like Zydus group of industries, Intas, SEZ, Food industries..etc and asked to all the participants to take initiative from themselves. After that Dr. Jain explained that by making groups, we can send our message upto at least 50 to 60 units of changodar area regarding this project.

One participant suggested to contact to Changodar Chamber of Commerce. Mr. Patel replied that Changodar Chamber of Commerce is engaged in development activities however we will try to contact them and explain environmental situation of changodar area. He added that by doing this project Government want to make an action plan to protect changodar area from environmental issues and in future it will be very beneficial. Mr. Patel again told to make group and to arrange programme again for dissemination of information regarding project to more and more industries.

Dr. Jain mentioned that now a days people are become more conscious for environmental issues and they have started complaining to NGT or PMO Office. Hence, it's become necessary to manage environmental issues. Mr. Patel again instructed all the participants to start discussion

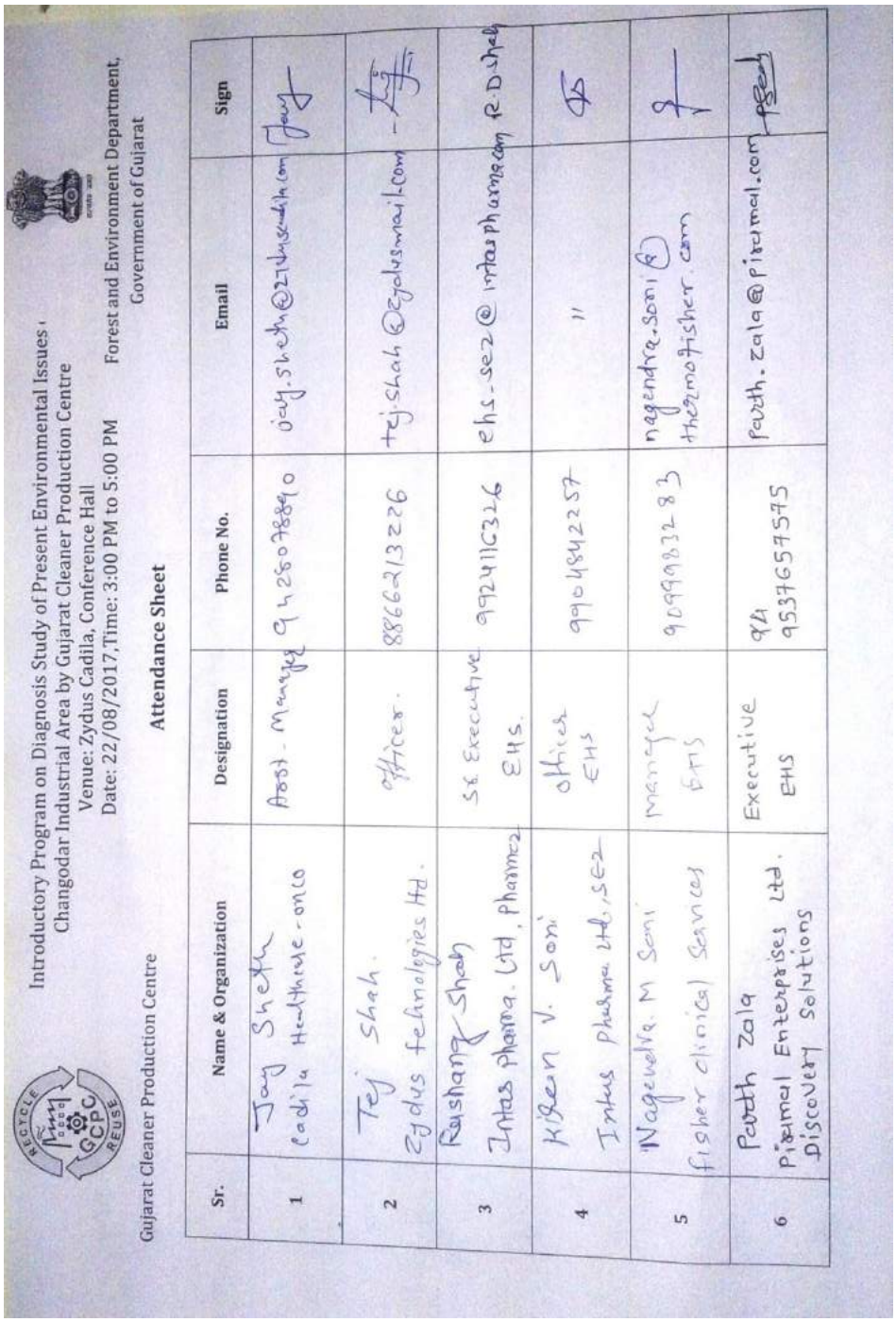
with their company's president or general manager regarding this project and instructed to plan next meeting for the same.

One participant from Zydus said that his company's non hazardous solid waste is going to incineration facility with other hazardous waste at cost. Based on that Mr. Patel gave an idea of co-processing. As plastic, paper and other waste may be co-processed. Hence, Mr. Patel said that we may propose common co-processing waste collection centre or pre-processing centre. Mr. Patel informed to all the participants about SOPs of Hazardous and Non-Hazardous solid waste for their co-processing and it's easily available from website. One participants discussed about his company's international norms that they have to compulsory reduce their wastewater generation by 10%, Air pollution by 10% and Hazardous & other waste generation by 10%. He added that they have only one way to achieve these norms is Cleaner Production. Two other participants are also agreed to conduct Cleaner Production assessment in their industries.

After all the discussion, Dr. Jain decided to make a team of different industrial groups and suggested to fix one focal point and contact GCPC for next meeting. The programme concluded with the vote of thanks by Mr. V. R. Patel.

Mr. Bahuguna, COO, Zydus Infrastructure said that they are in process of establishing recycling facility for Hazardous and other waste rules 2016. He also agreed to support the project of Diagnosis Study of Present Environmental Issues of Changodar Industrial Area.

List of Attendants of Introductory Programme at Changodar



Introductory Program on Diagnosis Study of Present Environmental Issues ;
Changodar Industrial Area by Gujarat Cleaner Production Centre
Venue: Zydus Cadila, Conference Hall
Date: 22/08/2017, Time: 3:00 PM to 5:00 PM

Forest and Environment Department,
Government of Gujarat

Gujarat Cleaner Production Centre

Attendance Sheet

Sr.	Name & Organization	Designation	Phone No.	Email	Sign
1	Jay Sheth Cadila Healthcare - ONCO	Asst. Manager	9426078890	jay.sheth@zydusweb.com	
2	Tej Shah. Zydus Technologies Ltd.	Officer.	8866213226	tej.shah@zydusmail.com	
3	Rashang Shah Intas Pharma. Ltd, Pharmez	Sr. Executive EHS.	9924116326	ehs-sez2@intaspharmacom R.D.Shah	
4	Kiran V. Soni Intas Pharma Ltd, SEZ	Officer EHS	9904942257	"	
5	Nagendra. M Soni Fisher clinical Services	Manager EHS	9099983283	nagendra.soni@thermofisher.com	
6	Parth Zala Piramal Enterprises Ltd. Discovery Solutions	Executive EHS	NA 9537657575	Parth.zala@piramal.com	

Sr.	Name & Organization	Designation	Phone No.	Email	Sign
7	Alpesh Patel Zydus Pfizer	Manager EHS	99044 75161	alpesh.patel@zydushospira.com	
8	Dharmveer Bohil Alidac Pharma.	officer EHS	728352 7863	d'bohil123@gmail.com	
9	Keyur N. Patel Mylan Laboratories Ltd	Manager EHS	99252 21500	kepatel@mylan.in	K.N.Patel
10	Baldi P Mukhwana Mylan laboratories ltd	Asst. Manager EHS	7600032585	pmahwana@mylan.in	@alud
11	Yogesh Patel Amneal Pharmaceutical	officer admin	9714713%	-	
12	Jayesh N Patel Amneal pharmaceuticals Pvt. Ltd.	Sr Executive - EHS dept.	9729 72548	sezehs@amnealindia.com	
13	Bharat A. Patel Amneal pharmaceuticals Pvt. Ltd.	DGM - EHS	9712943087	bharat.patel@amneal-india.com	
14	Bhavesh Thakar Zydus Infrastructure P. Ltd	Dy. Manager	9974051949	bhaveshthakar@zydusinfra.com	

Introduction of Private Industrial Estate in Changodar Region

Private Industrial Estates near the Changodar Region

1	Panchratna Industrial Estate
2	Changodar Industrial Estate
3	Ashwamegh Industrial Estate
4	Subhlaxmi Industrial Estate
5	Mahagujarat Industrial Estate
6	Gopi Industrial Estate
7	Steel Town Industrial Estate
8	Saket Industrial Estate
9	New Ahmedabad Industrial Estate
10	Tajpur Road Industrial Estate
11	Moraiya Industrial Estate
12	Radhe Industrial Estate
13	Kesar Sopan Industrial Estate
14	Vasna-Chacharwadi Industrial Estate
15	Sari Industrial Estate
16	Pharma SEZ Industrial Estate
17	Matoda Industrial Estate
18	Rajoda Industrial Estate
19	NG Gallops Industrial Estate
20	Swastik Industrial Estate

Industries in 20 Industrial Estates and Production Details

1. Changodar

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	39754	Aastha Tools Private Limited	Plot no. 388 Paiki-3-Near Changodar Industrial Estate,SAN-Changodar	Ferritic Nitrocarburized Steel Spherical And Cylindrical Bearing Cages - 65 M.T, Tools & Dies - 5000 Nos Sector: Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP, PS, HT, Anodize, Galvanize	M
2	10058	Acc Ltd	Plot No: Phase No: - BLOCK NO : 259, ACC CONCRETE PLANT,SAN-CHANGODAR	Ready Made Mix Concrete - 15400 M.T Sector:Readymix concrete Plants	M
3	32811	Adorn Enterprises Limited	Survey No- 195,-Nr. Claris Life Science Ltd,SAN-Changodar	Bopp Tape - 0 M.T, Corrugated Boxes - 200 M.T, Printing Sheet - 20 M.T, Strapping Patti - 1 M.T Sector: Cardboard or corrugated box and paper products (excluding paper or pulp manufacturing and without using boiler)	L
4	25337	Aia Engineering Ltd	544,542 / P/2,543/P/1,540/P/1,539& 18P-AT 20TH MILESTONE,SAN-Changodar	Unmachined High Chrome Castings - 1000 M.T Sector: Foundary Industry or process involving foundry operations	L
5	32591	Alpha Nippon Innovatives Ltd	15 & 20 plot no.- Changodar Ind. Estate,SAN-changodar	Fabrication And Machining Work - 0 M.T, Steel Metal And Heavy Fabrication - 1000 M.T Sector: Engineering & fabrication units (Investment on P & M < 10 Crores)	M
6	48875	Alpine Pharmaceuticals	7B, Changodar Industrial Estate, Sarkhej Bavla Road-Changodar Sanand,SAN-Changodar	Capsule - 150000 Nos, Churn And Lep - 10000 Nos, Oil - 15000 Nos, Ointment - 10000 Nos, Pak - Awleh - 500 Nos, Syrup - 50000 Nos, Tablet - 200000 Nos Sector: Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S

7	38958	Aluminium Industries	Plot no. 254/386-Mahagujarat Estate,SAN-Changodar		S
8	36134	Am Steel	Plot No: 4, Bloakc No: 302, -Changodar Industrial Estate,SAN-CHANGODAR	M. S. Ingots - 1000 M.T Sector: Ferrous and Non ferrous metal extraction involving different furnaces through melting ,refining, reprocessing,casting and alloy making	M
9	41801	Asahi Modi Materials Pvt.Ltd	Plot no.320,-Opp.Ankur Protein,SAN-Changodar	Resin Coated Sand - 180 M.T Sector:Emery powder(fine dust of sand) manufacturing	S
10	47225	Basil Hygienic	Plot No: 37 A & 38 B Changodar, Taluka: Sanand-Dist: Ahmedabad,SAN-Changodar	Packged Drinking Water - 240 Klt Sector:Mineralized Water.	S
11	31588	Benmoon Pharma Research Pvt. Ltd.	219, Phase -III-Mahagujarat Industrial Estate,SAN-Changodar		S
12	10673	Bhagwati Caterers Pvt Ltd	Plot No: Phase No: -OPP : HARSH ENGINEERS,SAN-Ahmedabad	Cooking (Preperation) Of Food - 0 --- Sector: Hotels (Less than 3 star) or hotels having 20 rooms or above and less than 100 rooms.	S
13	35949	Bharti Airtel Ltd	Rasmadhur Estate-Opp: Ramdev Masala Industries Estate,SAN-Changodar	Communication Service Provider - 0 --- Sector:DG Set of capacity >1 MVA but < 5 MVA)	S
14	47487	Br Global	Plot No: 1/A, Block No: 382, Changodar Ind. Estate-B/h Trivedi Marble Lane,SAN-Ahmedabad	Cloth Weaving For Synthetics And Grey - 300000 Mts Sector:Cotton spinning and weaving (medium and large scale)	M
15	10858	Brussels Laboratories Pvt.Ltd	33, Changodar, Ind. Estate-Sarkhej Bavla Road,SAN-AHMEDABAD	Capsules - 41666 Nos, Dry Powder - 3 Kgs, Liquid - 1250 Lts, Tablets - 333333 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
16	10874	Cadila Health Care Ltd.(Fine Chemical Division)	Plot No: 265, 266, 267 - 265-267,CHANGODAR,SAN-Changodar	(s)–3–{5-(4–flurophenyl)–5–oxopentanoyl–4–phenyloxazolidin–2–on} - 1 Kgs, 1 – Cyclopropyl – Piperidin – 4 – Ylamine (Cpp) - 1 Kgs, 2-(4–benzyloxyphenyl) Ethyl Methylamine Hydrochloride (Bpa) - 1 Kgs, 3,4 – Dihydroxy – 5 – Nitrobenzaldehyde (Dnb) - 1 Kgs, 4 – Chloro – 3 – Sulfamoylbenzoyl Chloride (Csbc) - 1 Kgs, 4-Hydroxy-2(N–	L

				methyl)-2h–thieno[2,3–e]1,2– hiazine3–carboxylic Methyl Ester1,1–di - 1 Kgs, 5 – Hydrazino – 2 – Methoxypyridine Dihydrochloride (Mhph) - 1 Kgs, 5-Amino – 2, 1, 3 – Benzothiadizole (Bta) - 1 Kgs, 6 – Methoxy – 2 – Methyl – 3 – Pyridineacetonitrile (Mmp) - 1 Kgs, Bortezumib,Budesonide,Capecitabi ne,Carboplatin,Cyclosporin - 1 Kgs, Dcetaxel,Erlotinib,Fluticasone,Lena lidomide,Oxaliplatin - 1 Kgs, Dl 2,6 – Pipecolicxylidide (Rpv) - 1 Kgs, Exemestane,Anastrozole,Letrozole, Bicalutamide - 1 Kgs, Gemcitabine, Imatinib, Ironotecan - 1 Kgs, Gemiflxacine (Gmfc),Sucraloze (Sur),Ciclesonide (Cic) - 1 Kgs, N – Amino – 2 – Methylindoline – Ptoluenesulfonate (Ami) - 1 Kgs, N – Isopropyl – 4 – Aminopiperidine (Ipp) - 1 Kgs, Pemetrexed,Temozolomide,Vornost at,Geffitinib - 1 Kgs, R & D Work For Fine Chemicalsd & Its Intermediates - 1 M.T, Tetrakis(1–isonitrilo–2– methoxy–2– methylpropane)copper(I)tetrafluoro borate Comlx - 1 Kgs Sector:Pharmaceuticals (Excluding Formulation).	
17	29972	Cadila Healthcare Ltd(Ointment Unit)	Plot no- 254-255, B/H Zyfine Plant-Oppo. Laxminarayan Petrol Pump,SAN-Changodar	Formulation Of Tropical Product - 250 M.T, Nasoclear - 50 M.T, Ointments - 0 M.T, Suppositories - 70 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
18	47624	Canton Textile Mills Pvt Ltd (old name-Vardhman Converters)	Plot No: 381/2, Changodar Industrial Estate-Changodar,SAN-CHANGODAR		S
19	10960	Champa Metal Industries	PLOT NO: 28--,SAN-Changodar	Aluminium Utensils - 5 M.T Sector:Aluminum Smelter.	S
20	10975	Changodar Metal Pvt.Ltd.	PLOT NO: 452--,SAN-Changodar	Alluminium Slude,Alluminium Circles, Alluminium Sheet - 50 M.T, Aluminium Tubes - 30 M.T, Various Blow Molding Articles - 0 M.T, Various	S

				Injection Molding Articles - 0 M.T Sector:Foundary Industry or process involving foundry operations	
21	44784	Dermocare Laboratories Guj Pvt Ltd	Plot no. 10, Changodar Ind. Estate-II-Sarkhej-Bavla road, Changodar,SAN-Changodar	Cream/Ointment/Lotion/Gel - 12367 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
22	11122	Dhan Laxmi Tubes & Metal Industries	74/85-CHANGODAR IND.ESTATE,SAN-Changodar	Copper Scrap - 2 M.T, Copper Scrap - 0 M.T, Copper Tubes - 25 M.T, Copper Tubes - 0 M.T Sector:Aluminium and copper extraction from scrap using oil fired furnace	S
23	11131	Dhanlaxmi Industries	4 / P-AKASHGANGA INDUSTRIAL ESTATE,SAN-		S
24	43980	Dhanshree Agro Poly Product	15/A, Changodar Industrial Estate-Sarkhej-Bavala Road,SAN-Changodar	Polythelyne Film & Cap Cover - 60000 Kgs Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
25	11151	Dhiman Steel Re-Rolling Mills	Plot No: Phase No: -68/69,CHANGODAR IND.ESTATE,SAN-CHANGODAR	Ms Bars - 0 M.T, Ms. Bars/ Angels Channels/ Flats - 175 M.T Sector:Iron And Steel (Involving Processing From Ore I Scrap I Integrated Steel	S
26	39684	Ekdant Industries Private Limited	Plot no. 34 & 35-Changodar Industrial Estate, Part 2,SAN-Changodar		S
27	11244	Elite Chemicals	Plot No: Phase No: -16,17,CHANGODAR IND.ESTATE PART II,SAN-Changodar	Aluminium Sulphate - 100 M.T, Soduim Sulphide - 100 M.T Sector:Chemicals & Products	S
28	11245	Elite Industries	PLOT NO: 27--,SAN-		S
29	11608	Harsha Engineers Ltd.	336,341,344,348,388-SARKHEJ - BAVLA ROAD,PO : CHANGODAR,SAN-CHANGODAR	Bearing Cages - 8000000.000 Nos, Brass Cages - 90000 Nos Sector:Heavy Engineering(17)	L
30	11660	Hiscan Pvt.Ltd.	Plot No: Phase No: -B.NO: 304,SAN-Changodar	Promotional Printing / Packaging Printing / Publication Printing Etc.. - 200 M.T, Statinary& Boxes Printing - 0 Nos Sector:Printing Press	M
31	38684	Innovative Infrastructure Pvt. Ltd.	340/1-340/1,Near Harsha Engineering, Opp. PWD Rest House,SAN-Changodar	Ready Mix Concrete - 0 M.T Sector:Readymix concrete Plants	S
32	45160	Jakson Hydarulic	Plot no. 304-Sarkhej-Bavla	Buffing Of Plates - 20 Nos, General	S

		Limited	road,SAN-Changodar	Machinery - 200 M.T, Hydraulic Press - 15 Nos, Hydraulic Press Parts - 500 Nos Sector:Heavy Engineering(17)	
33	40650	Jayantilal & Co.	Stone World, Besides ACC RMC Plant,-Sarkhehj - Changodar Highway,,SAN-Changodar, Sanand	Stone Cutting And Polishing & Sculpture Making - 0 Mt2 Sector:Stone crushers	S
34	43023	Jpoxy Polymers	S.no. 385/P7-Changodar IOndustrial Estate,SAN-Changodar	Modified Liquid Epoxy Polymer (Jp9001-9006) - 0 M.T, Modified Liquid Epoxy Polymer (Jr3003/Jr3004) - 0 M.T, Modified Liquid Epoxy Polymer (Jr3013/Jr3050/3010) - 0 M.T, Modified Liquid Epoxy Polymer (Jr3060/Jr3061/Jr3063) - 0 M.T, Modified Polamide Hardner (Jh1006/Jh1007/ Jh1008) - 0 M.T, Modified Polyamide Hardner (Jh1050/Jh1051/ Jh1052/Jh1053/ Jh1055/Jh1056) - 0 M.T, Modified Polyamine Hardner (Jh1001/Jh1002/ Jh1010/Jh1011) - 0 M.T, Modified Polyamine Hardner (Jh1020/Jh1060) - 0 M.T, Modified Polyamine Hardner (Jh1090/Jh1091) - 0 M.T Sector:Chemicals & Products	S
35	44528	Kadam Soap Industries	Plot no. 496/1, Cenal Raod,-B/H Water jet factory,SAN-Changodar	Soap (Without Use Of Steam Boiler) - 0 M.T Sector:Soap manufacturing (Handmade without steam boiling)	S
36	12015	Kamakshi Flexiprints Pvt.Ltd.	Block No: 42-Changodar Industrial Estate,SAN-Changodar	3-Layer Co-Extruded Laminated/Printed Polythene Film Pouches - 460 M.T Sector:Gravure printing, digital printing on flex,vinyl	L
37	12032	Kanhai Food Pvt.Ltd.	S.no.329 paiki 8-Vill. Changodar,SAN-CHANGODAR	Bread - 180 M.T, Cake - 12 M.T, Cookies - 2 M.T, Khari/Toast & Other Bakery Items & Snacks Items - 6 M.T Sector:Food & food processing including fruits & vegetable processing	S
38	12083	Keyur Impex Pvt.Ltd.	Plot No: Phase No: - BLOCK NO: 388,SAN-Changodar	Lead Ingots - 300 M.T Sector:Lead Processing And Battery Reconditioning & Manufacturing Lead Smelting.	S
39	10037	Kfc Corporation Ltd	BLOCK NO: 389-PLOT NO:51, CHANGODAR IND ESTATE,SAN-		M

			CHANGODAR		
40	44486	Kinjal Digital Imaging Solutions Pvt Ltd	S.no. 419/paiki, Vill. Changodar-Ta. Sanand,SAN-Changodar	Digital Printing Ink - 105 Klt Sector:Printing ink manufacturing	S
41	45892	Lks Bulion (Imprt & Export)private Limited	101, Sankheshwar Industrial estate, Tajpur-Vill. Changodar,SAN-Changodar	Fine Gold Bar / Lagdi (With 99.9 % Purity) - 150 Kgs Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	S
42	38225	Lucent Clean Energy Private Limited	Block no. 187-Opp: Laxminarayan petrol pump,SAN-Changodar	Solar Encapsulant Films (Specialty Film) - 216 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	M
43	25339	Maxeema Biotech Pvt Ltd	496 / 3-CHANGODAR,SAN-Changodar		S
44	13655	Mittal Sections (Unit-1) (O.N:Seema Steel Pvt.Ltd.)	Plot No: 14-B/4,TRIVEDI MARBLES,SAN-CHANGODAR	M. S.Bars, Angles/Channels, Ractangle Bars, Round Bars< Squar Bars - 2000 M.T Sector:Steel and steel products using various furnaces like blast / open hearth / induction / arc / submerged arc / basic oxygen / hot rolling using reheating furnace	S
45	25781	Mittal Sections Limited (Unit-Ii)	No. 23, Changodar Industrial Estate-Trivedi Craft Private limited ,SAN-CHANGODAR	Ms Bars, Angles, Rectangle Bars, Round Bars, Channel, Square Bars - 2000 M.T Sector:Foundary Industry or process involving foundry operations	S
46	29663	Mittal Steel	Plot no.1, Block No.382,-Changodar Industrial Estate B/h Trivedi Marbal ,SAN-Changodar	M.S Ingots - 400 M.T Sector:Foundary Industry or process involving foundry operations	M
47	12638	Monokem Laboratories	84-CHANGODAR IND.ESTATE,BAV-CHANGODAR	Capsules - 363170 Nos, Dry Syrup - 55 Kgs, Liquid - 4140 Lts, Ointment - 180 Kgs, Tablets - 2771210.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
48	12715	Narmada Biochem Pvt.Ltd.	426/2-PLOT NO: 6-7,SAN-Changodar	Ammonium Sulphate - 5000 M.T, Biozyme - 350 M.T, Npk Mix Fertiliser - 1500 M.T Sector:Fertilizer (basic) (excluding formulation)	S
49	12785	Neesa Infrastructure Ltd	Plot No:278, 261 Phase No: -VILLAGE : CHANGODAR,SAN-		L

			Changodar		
50	11989	Neesa Infrastructure Ltd-Unit 2	S.NO. 1282 PART, 1284-MOJE VISALPUR,SAN-SANAND		L
51	12795	Neptune Spinners Pvt.Ltd.	PLOT NO: 52,CHANGODAR IND.ESTATE--,SAN-		S
52	10672	Nextgen Print Pack	Opp. Mamta Machinery, Sarkhej-Bavla Road-Changodar,,SAN-Moraiya	Printed Paper - 0 --- Sector:Printing Press	S
53	29266	Nirav Chemical Industries	PLOT NO. 44/1-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	Alkyd Resin - 0 M.T, Epoxy Resin - 0 M.T, Epoxy Resin/Polyester Resin/Expoxy Hardner Solution By Formulation Only - 2000 M.T, Methanol - 0 M.T, Saturated Polyester Resin - 0 M.T, Unsaturated Polyester Resin - 0 M.T, Vinyl Ester Resin - 0 M.T Sector:Chemicals & Products	S
54	12881	Nugen Machineries Ltd.	PLOT NO: 16-18--,SAN-Changodar	Various Type Of Presses & Shearing Machineries - 6 Nos, Various Type Of Process & Hydraulic Machineries - 0 ---, Various Type Of Process & Shearing Machines - 0 --- Sector:Engineering & fabrication units (Investment on P & M < 10 Crores)	M
55	47137	P & H Food & Beverages	Plot no: 43 & 43/B, Changodar Industrial Estate-Near Bagban Tambaku,,BAV-Changodar	Aerated Water - 0 Nos Sector:Non — Alcoholic Beverages (Soft Drinks)	S
56	51811	Par Polypack India Ltd	30/31/31-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR		S
57	52085	Par Polypack India Ltd	PLOT NO. 30,31,32-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	Plastic Containers - 100 M.T, Plastic Granuals - 100 M.T Sector:Reprocessing of waste plastic (excluding PVC)	S
58	48382	Pearl Corporation	Unit-A, Pearl Industrial Estate,-opp. Neessa Food and Agro,SAN-chandogar		S
59	13053	Penguin Polyform Pvt.Ltd..	PLOT NO: 13--,SAN-Changodar	Expanded Polystryrene (Eps) - 1 M.T Sector:Thermocol manufacturing	S
60	50810	Precision Bearings Pvt. Ltd.	P.NO. 25, 26/A-B, -CHANGODAR INDUSTRIAL ESTATE, AT: CHANGODAR, TA:		L

			SANAND,SAN-CHANGODAR		
61	29671	R. R. International	54/5, -Block no -288,SAN-Changodar	Crape Paper,Colour Paper - 120 M.T Sector:Pulp & Paper (Paper Manufacturing With Or Without Pulping).	S
62	43794	Rainbow Packaging Pvt Ltd	Plot. No.15/B, Changodar Industrial Estate-Sarkhej-Bavla Highway,SAN-Changodar	Hdpe Barrels - 20000 Nos, Poly-Ethylene Film - 400 M.T, Reprocessing Of Ganules - 85 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	M
63	13265	Raj Chemicals	PLOT NO : 509--,SAN-Changodar	25 % Dye Content In Semi-Liquid Form - 25 M.T, Dyes- No Proper Details- Plant Not In Operation - 1 M.T, Repacking Of Chlorine Powder - 20 M.T, Repacking Of Chlorine Tablets - 20 M.T Sector:Dyes And Dye-Intermediates.	S
64	13310	Ramdev Food Products Pvt.Ltd	527-N.H.NO: 8,SAN-Changodar	Different Type Of Spices And Instant Mixes(Food Products) - 2000 M.T, Different Type Of Spices And Instant Mixes(Food Products) - 0 M.T, Pickle,Chutney,Papad,Khakhra,Bac kery Products &Miscellaneous Food Products - 12 M.T, Pickle,Chutney,Papad,Khakhra,Bac kery Products &Miscellaneous Food Products - 0 M.T, Spices - 0 M.T Sector:Food & food processing including fruits & vegetable processing	L
65	45635	Rasmadhur Sweet Home	Block no. 25/p,26/p to 29/p, 31/p,-opp. Ramdev masala,Sarkhej-Bavla Highway,SAN-Changodar	Fast Food - 1 M.T, Namkeen - 4 M.T, Sweets - 0 Kgs, Sweets - 3 M.T Sector:Food & food processing including fruits & vegetable processing	S
66	49999	Ravishankar Engineering Works	Changodar Industrial Estate-Sarkhej Bavla Road, Changodar,SAN-	Casting Product - 0 M.T Sector:Foundary Industry or process involving foundry operations	S
67	28216	Ricon Batteries Pvt. Ltd	PLOT NO. 38-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	Batteries(Automotive,Inverter & Two Wheeler) - 5000 Nos, Battery - 0 --- Sector:Lead Processing And Battery Reconditioning & Manufacturing Lead Smelting.	S
68	41300	Rishabh	GM-10,Sr.no.337/338-Jay	Multi Layer Film - 1 Kgs	S

		Packaging,Changodar	Mataji Compound,,SAN-Changodar	Sector:Polythene & plastic processed products manufacturing (virgin plastics)	
69	36212	Rmc Readymix (India) (A Division Of Prism Cement Ltd)	Hissa No-9 of Block No-329 (Paiki)-Behind Bhagyoday Hotel,SAN-Changodar	Readymixed Concrete - 5000 M.T Sector:Readymix concrete Plants	S
70	37095	Roop Organics Private Limited	Survey no. 195-Nr. Siddhi Oil Mill,SAN-Changodar		S
71	13465	Royal Touch Laminates Pvt.Ltd.	PLOT NO:30,31--,SAN-Changodar	Adhesives - 200 M.T, Pre Laminated Board - 225 M.T Sector:Laminated Sheets	S
72	13561	Sakar Health Care Pvt.Ltd.	PLOT NO: 13--,SAN-CHANGODAR	Bottles Filling & Labelling - 1170000.000 Nos, Bottles Filling And Labeling - 2080000.000 Nos, Capsule - 4600000.000 Nos, Dry Powder Injection - 1000000.000 Nos, Liquid Formulation - 195000 Lts, Liquid Injection - 3000000.000 Nos, Tablets - 2000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	M
73	46087	Satkar Food And Beverages	S.no. 287,288/p,Shed no.43 to 49, Krishna Estate-Vill. Changodar,SAN-Changodar	Chilly Powder - 200 M.T, Snack Pellets - 1500 M.T, Snack Pellets - 0 M.T, Spices - 0 M.T, Spices/Mix Masala/Seasoning - 300 M.T Sector:Food & food processing including fruits & vegetable processing	S
74	13641	Satya Steel Industries	Plot No: 83,-CHANGODAR IND.ESTATE,,SAN-Changodar		S
75	37496	Siddhi Beverages	Surevy No. 240-B/H. Bhagyoday Hotel, Srkhej - Bavala Road,SAN-CHANGODAR	Packed Drinking Water - 0 Lts Sector:Mineralized Water.	S
76	14121	Siddhi Décor Pvt Ltd	No. 240-B/H : BHAGYODAYA HOTEL,SAN-changodar	Decorative Laminated Sheet - 175000 Nos Sector:Laminated Sheets	M
77	14123	Siddhi Margarine Specialities Ltd	240-VILLAGE : CHANGODAR,SAN-changodar	Margarine - 500 M.T, Non Edible Oil/Waste Oil - 2200 Kgs Sector:Food & food processing including fruits & vegetable processing	S
78	14126	Siddhi Oils Ltd.	240/P-B/H BHAGYODAY HOTEL,SAN-CHANGODAR	Acid Oil - 15 M.T, Disttiled Fatty Acid - 5 M.T, Edible Refined Oil - 1500 M.T, Spent Earth - 15 M.T	S

				Sector:Vegetable oils including solvent extraction and refinery/ hydrogenated oils	
79	37495	Siddhi Steels Pvt Ltd	Surevy No. 240, -B/H. Bhagyoday Hotel, Sarkhej-Bavla Highway,SAN-CHANGODAR	Casting Work Of Engineering (Investing Casting Work) - 50 M.T, S. S. Casting - 0 --- Sector:Foundary Industry or process involving foundry operations	S
80	11190	Snowman Logistics Ltd.	329 -NEAR MULTI PACK PLAST PVT. LTD,SAN-CHANGODAR	Green Peas, Ice Cream, French Fries, Dairy Product, Sweet Corn, Chocolates, Spic - 1500 M.T Sector:Food & food processing including fruits & vegetable processing	S
81	36342	Sri Aurobindo Manufacturing Pvt. Ltd	Plot No. 37/A, 37/B-Changodar Inds. Estate,SAN-Changodar		S
82	51875	Suhradam Healthcare	183-OPP LAXMINARAYAN (IN .OIL) PETROL PUMP,SARKHEJ BAVLA HIGHWAY,SAN-CHANGODAR	Capsules - 1000000.000 Nos, Oral Liquid - 15000 Lts, Tabelts - 10000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
83	14331	Surya International	444 / P-VILLAGE : CHANGODAR,SAN-changodar	Flowering Essence - 6 M.T, Food Color - 10 M.T, Instant Powder - 10 M.T, Lemon Juice - 15 M.T, Rose Syrup - 5 M.T, Rose/Kewara Water - 10 M.T Sector: Food & food processing including fruits & vegetable processing	S
84	13474	Surya Offset (Old Name-Rupal Laminates Ltd.)	Plot No: Phase No: - BLOCK NO: 310,311,314,315,SAN-changodar	Printing Books(Pvt. & Govt.),Security & Confidential Work &Mis.Print.Materials - 2000000.000 Nos, Printing Of Books - 20000000.000 Nos Sector:Printing Press	M
85	14422	Technofin International Pvt.Ltd.	PLOT NO: 36 & 41--,SAN-CHANGODAR	S.S. Tube (3-20 M.M) - 28 M.T Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	S
86	14430	Tgb Foods Pvt.Ltd.	Plot No: Phase No: -OPP: HARSHA ENGINEERING,SAN-changodar	All Types Of Bakery & Confectionary Products - 250 M.T, Bakery Products - 0 M.T Sector:Food & food processing including fruits & vegetable processing	S
87	14466	Transpares Ltd.	PLOT NO: 14-15--,SAN-CHANGODAR	Pressed Steel Radiator - 64 M.T, Transformer Tank - 50 M.T	L

				Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	
88	14482	Trivedi Corporation Pvt.Ltd.	PLOT NO: 350,351,354,355--,ABG-Changodar	Marble Slab Tiles - 18500 Mt2, Worked/Caved Stones For Monuments/Buildings, Stone Craft Articles And & Other S - 200 Mt2 Sector:Cutting, sizing and polishing of marble stones	L
89	42220	Twince Industries	s no :240/p/1-sarkhej bavla road,SAN-changodar		S
90	14507	Uma Industries	PLOT NO: 19/A--,SAN-CHANGODAR	Acid Zinc Additives & Brightners - 4500 Lts, Acid Zinc Salt - 1500 Kgs, Blackodising - 500 Kgs, Brass Plating Chemical - 500 Kgs, Bronze Plating Chemicals - 200 Lts, Chrome Chemical Salt - 800 Kgs, Copper Salts - 500 Kgs, Electro Plating Chemicals(Zinc,Nickle,Chrome /Copper /Tin) - 0 M.T, Liquid Passivation - 1000 Lts, Metal Cleaners - 4000 Kgs, Metal Cleaners/Rust & Scale Remover, Oxidinging Salt, Brass Salt - 0 M.T, Nickel Chloride - 5 M.T, Nickel Plating Additives /Brightner/Leveller - 1000 Lts, Nickel Plating Salts - 1000 Kgs, Nickel Sulphate - 5 M.T, Passivtion (Liquid & Powder) - 0 M.T, Phosphating & Oxidizing Chemicals - 1000 Kgs, Powder Passivation - 500 Kgs, Repacking Of Barium Carbonate,Zinc Dust,Activated Carbon,Hydrogen Peroxide - 500 Kgs, Rust & Scale Removers - 1000 Lts, S. S. Electropolishing - 1100 Kgs, Silver Plating Chemicals - 200 Kgs, Stannous Sulphate,Zinc Oxide,Sodium Stannate - 500 Kgs, Strippers - 100 Kgs, Tin Plating Chemical - 500 Kgs Sector:Chemicals & Products	S
91	47623	Uma Poly Plast	Block No: 382/5-B, Changodar Industrial Estate-Changodar,SAN-		S

92	14519	Umiya Air Pack Pvt.Ltd.	PLOT NO: 40--,SAN-Changodar	Air Bubble Film Roal - 50 M.T, Hdpe/Pp Woven Fabric & Bags - 150 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
93	43948	Urmin Products Pvt Ltd	PLOT NO: 48-Changodar Ind Estate, Changodar,SAN-Changodar	Chewing Gum And Bubble Gum - 2 M.T, Chewing Tobacco (Including Perfumed Compound, Bulk Tobacco) - 375 M.T, Mouth Freshener - 4 M.T, Pan Chatni - 1 M.T, Scented Elaichi - 4 M.T, Tobacco - 0 --- Sector:Tobacco Products Including Cigarettes And Tobacco Processing.	M
94	36410	V. S. Multimetal Pvt. Ltd.	Plot no. 3, Block no. 382-Changodar Ind. Estate,SAN-Changodar	Ms Bars, Angles, Rectangle Bars, Round Bars, Channel, Square Bars - 500 M.T, Ms Carbon/Alloys/Stainlesssteel Bright Bars - 500 M.T Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	S
95	24887	Vardhman Synthesis & Bulk Drug Pvt Limited	No.36, Changodar Industrial Estate-II-Ta-Sanand,SAN-sanand		S
96	14637	Vibrant Décor Pvt.Ltd.	Plot No: Phase No: -NR: DIVYA DHAM,SAN-Changodar	Decorative Laminated Sheets - 40000 Nos Sector:Laminated Sheets	S
97	50470	Vishnu Tobacco Product(Unit-3)	Plot No-36, Changodar Industrial ESATE--,SAN-Changodar	Pouches Of Tobacco - 200000000.000 Nos Sector:Tobacco Products Including Cigarettes And Tobacco Processing.	S
98	43003	Zenith Health Care Ltd	S.no.388/34, Changodar Industrial Estate-Vill. Changodar,SAN-Changodar - 382213	Capsules - 3125000.000 Nos, Liquid - 100000 Lts, Pharmaceutical Formulation Tablets/Syrup - 0 M.T, Tablets - 14000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S

2. Ashwamegh

Sr.	GPCB	Name of	Address	Product - Capacity / Per Month	Scale

No	ID	Industry			
1	48876	1278sushen Medicamentos Private Limited	46/A, Ashwamegh Industrial Estate, Behind Gati Cargo-Changodar Cross Road, Changodar,SAN-CHANGODAR	Tablets - 16 M.T Sector: Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
2	32999	Abellon Cleanenergy Ltd-(Bio-Pallet Plant)	4,ASHWAMEGH ESTATE,NEAR BSNL TOWER-CHANGODAR,SAN-CHANGODAR	Bio Pellets - 3000 M.T Sector:Biomass Briquettes (sun drying)without toxic or hazardous wastes	S
3	10339	Amron Fillers	PLOT NO: 6-ASHWMEGH ESTATE,SAN-		S
4	49156	Arihant Remedies	Block No.- 444, Ashwamegh Ind. Estate-Near Bajaj Food,SAN-Changodar		S
5	10622	Bajaj Foods Ltd.	PLOT NO: 444--,SAN-Sanand	Roasted Butter - 250 M.T, Roasted Peanuts - 250 M.T Sector:Food & food processing including fruits & vegetable processing	S
6	10623	Bajaj Herbals Pvt Ltd	PLOT NO : 450--,SAN-Changodar	Conditioner - 1 M.T, Hair Cream & Shampoo - 100 M.T, Hair Oil - 125 M.T, Heena Powder - 3 M.T, Honey - 125 M.T Sector:Manufacturing of tooth powder, toothpaste, talcum powder and other cosmetic items	S
7	46115	Bonus Plastic Pvt Ltd	lot no. 42, Ashwmegh industrial estate-Changodar,SAN-Changodar	Polypropylene Multifilament Yarn - 50 M.T, Polypropylene Narrow Woven Fabrics - 40 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
8	12056	CABB Karnavati Rasayan Ltd.	BLOCK NO: 459,460,461-NR:BAJAJ FOOD LTD.,SAN-CHANGODAR	Hcl (By-Product) - 6398 M.T, Mono Chloro Acetic Acid - 3000 M.T, Mother Liquor (By-Product) - 768 M.T, Sodium Mono Chloro Acetate - 3600 M.T Sector:Chemicals & Products	L
9	10279	Caremax Healthcare	Plot No.56-Ashwamegh Ind.Estate, ,SAN-Changodar		S
10	42013	Creative Laminates	Plot No. 6/A, Ashwamegh Industrial Estate-Opp. M. N. Desai Petrol pump,SAN-Changodar	Laminates Sheets - 80000 Nos Sector:Laminated Sheets	S
11	40101	Crown Extrusions Pvt.Ltd,Changodar	Sr.no.434,440,452-Ashwamegh Industrial Estate,Changodar,SAN-	Aluminum Aerosol Cans - 30000 Kgs Sector:Aluminium and copper	S

			Changodar	extraction from scrap using oil fired furnace	
12	11105	Crown Metals Pvivate Limited (Old Name:Desai Packwell Pvt.Ltd.)	PLOT NO: D-48,ASHWMEGH ESTATE--,SAN-Changodar	Aluminiuim Cans For Tube - Light Starter, Capacitor Housings & Aluminium Bottles - 45 M.T, Aluminium Cans And Bottles - 0 M.T Sector:Aluminium and copper extraction from scrap using oil fired furnace	S
13	28656	Goel Strips P. Ltd	9/B-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR		S
14	37364	Gujarat Pharma Lab Pvt. Ltd (Unit-2)	BLOCK NO-447-OPP.-CHANGODAR VILLAGE, B/H KARNAVATI PACKAGING,SAN-CHANGODAR	External Product(Ointment,Lotion,Powder,Cream) - 100 M.T, Liquid Oral - 25 M.T, Repacking - 15 M.T, Tablets & Capsules - 10 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
15	12459	J.K. Lakshmi Cement Ltd.(Rmc Plant)	PLOT NO:563/2/2-Ashwamegh Ind Estate, opp. N.N.Desai petrol pump,BAV-CHANGODAR		S
16	39651	Jagat Agro	C-47-Ashwamegh ind. etate,opp- M.N. Desai petrol pump, changodar,SAN-changodar		S
17	42669	Jay Ambe Metals	plot no.26, Ashwamegh Estate,-Changodar,SAN-Changodar		S
18	36955	Jay Balaji Industries	SUB PLOT NO.-28/29, -ASHWMEGH INDUSTRIAL ESTATE, SHED NO. 1/2,,SAN-CHANGODAR		S
19	26417	Karnavati Rolling Mills Pvt Ltd	34,-ASHWAMEGH ESTATE,,SAN-Ahmedabad		S
20	39053	Knm Pharmachem	Plot No. A 23/1-Ashwamegh Industrial Estate,SAN-Moraiya		S
21	38637	Labh Flexipack Pvt. Ltd.	Plot No-65-70,-Ashwamegh Industrial Estate,,SAN-Changodar		S
22	40518	Labh Packaging	plot No. 70-Ashwamegh Ind. Estate, Changodar,SAN-Changodar		S

23	44774	Luminous Agro Industries	Plot no. 31/c, block no.405/part, -Ashwmegh ind. estate,SAN-Changodar		S
24	14580	Manipal Utility Packging Sollution Private Limited (Utility Printpack Pvt Ltd	PLOT NO: 46 / 47--,SAN-Changodar	Label/ Stuckers/ Posters/ Brochures/ Folders - 0 Nos, Paper Board-Varnished/ Laminated/Printed/ Unvarnished - 0 Nos, Printed Cartons Made Of Paper Board - 0 Nos Sector:Gravure printing, digital printing on flex,vinyl	L
25	13667	Medicare Environmental Management Pvt. Ltd.	28,ASHWAMEGH IND.ESTATE-BLOCK NO: 405,SAN-CHANGODAR		S
26	10285	New Ray Medical Inc.	Plot No.56-Ashwamegh Ind.Estate,SAN-Changodar	Cast Padding Roll - 5000 Nos, Copper Tubes - 3 M.T, Cotton Crepe Cloth - 275000 Mts, Crake Bandage (For Medical Purpose) - 0 Mts Sector:Surgical And Medical Products Involving Prophylactics And Latex.	S
27	29385	Nirav Chemicals	51-Ashwamegh Ind. Estate,,SAN-Changodar	Detergent Soap/Powder,Acid Slurry,Sodium Silicate Of Soda - 1000 M.T Sector:Chemicals & Products	S
28	34868	Patco Plast Pvt. Ltd.	A-43, BLOCK NO. 431-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	Battery Containers - 70 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
29	38047	R.S.Steel Industries,Changodar	9/C,Ashwamegh Ind. Estate-Changodar,SAN-Changodar		S
30	45658	Rigveda Minerals	Plot no. 58, Ashwamegh Industrial Estate-H/H Bajaj Food, Nr. Karnavati Rasayan,SAN-Changodar		S
31	29877	Rohan Brc Gas Equipment Pvt.Ltd	plot no -5,-Ashwamegh Industrial Estate,SAN-Changodar	Assembling Of Gas Equipment Kit, Automobile Parts, Etc. - 10000 Nos Sector:Jobbing & Machining / Assembling , Fabrication	S
32	39073	Sarvamangal Enterprise	9 A, Aswamegh Industrial Estate, Opp. Water tank, -Changodar,SAN-CHANGODAR		S
33	26422	Satluj Steel Rolling Mills Pvt Ltd	33-ASHWAMEGH INDUSTRIAL ESTATE,SAN-Changodar	Ms Tmt Bars - 500 M.T Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	S
34	36407	Satyam Concrete	Plot No. 54, Ashwamegh	Ready Mix Concrete For Rcc Work	S

		Industries	industrial Estate-Nr. UGVCL Office,SAN-Changodar	- 10000 M.T Sector:Readymix concrete Plants	
35	48284	Shiva Poly Compounds	Plot No: 5, Ashwamegh Industrial Estate, Near Nutan Nagrik-Bank Ltd., Vill: Changodar,SAN-CHANGODAR		M
36	50570	Shivpooja Oxide	Plot No. 26/1,Ashwamegh Ind. Estate-Nr.KNM Pharma,SAN-Changodar		S
37	13923	Shree Raj Exports Pvt.Ltd.	Plot No: Phase No: -23,ASHWAMEGH INDUSTRIAL ESTATE,SAN--		S
38	32185	Shree Vishwakarma Steel Re-Rolling Mills	21-ASHWAMEGH IND.ESTATE,SAN-CHANGODAR		S
39	14158	Smooth Ayurvedic Pharmacy Pvt.Ltd.	Block no444/1,445 - 2,ASHWMEGH IND.ESTATE,SAN-Changodar	Confectionery - 40 M.T, Cough Drop - 0 M.T, Digestive Drop - 0 M.T, Digestive Tablets - 0 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
40	43945	Tanish Industries Pvt Ltd	Block no.446,475/1, 476/1,-Ashwmegh industrial estate,SAN-Changodar		S
41	14471	Transweld Mechanical Enginnering Works Ltd.	Plot No: Phase No: -44/C,ASHWAMEGH IND.ESTATE,SAN-CHANGODAR	Transformer Tank - 75 M.T Sector:Engineering & fabrication units (Investment on P & M < 10 Crores)	S
42	14066	Umiya Carbon P. Ltd	PLOT NO. 16-ASHWAMEGH IND ESTATE, Changodar,,SAN-CHANGODAR	Acrylic Solid Surface Sheet - 0 M.T, Black Oil - 0 M.T, Carbon Black - 0 M.T, Pvc Foam Sheet - 100 M.T, Steel Wire - 0 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
43	14651	Vijay Enterprise Pvt.Ltd.	37/B-ASHWMEGH IND.ESTATE,SAN-Changodar	Epoxide Resin (Powder Coating) - 10 M.T Sector:Chemicals & Products	S
44	10346	Vijay Enterprises P. Ltd	PLOT NO. 39/B-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	Epoxide Resins I.E.Powde Coatng - 100 M.T Sector:Chemicals & Products	S
45	49905	Vincy Corporation	Plot No: 58, Ashwamegh Industrial Estate,-Village: Changodar, Taluka:		S

			Sanand,SAN-Changodar		
46	14706	Virgo Medicoat Pvt.Ltd.	PLOT NO: 29,ASHWMEGH INDUSTRIS ESTATE--,SAN-changodar	Tablet Coating Powder - 0 Kgs, Tablet Coating Powder (Film/Enteric/Sustained Release Coating) - 142 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
47	14710	Vishal Engineers & Galvanizer Pvt. Ltd.	Plot No: Phase No: - 73,ASHWMEGH IND.ESTATE,SAN-Sanand	Diluted Acidic Solution (By Product) - 0 Lts, Hot Dipped Galvanized Structures - 2000 M.T, Hot Dipped Galvanized Structures & Other Steel Product - 2000 M.T Sector:Steel and steel products using various furnaces like blast / open hearth / induction / arc / submerged arc / basic oxygen / hot rolling using reheating furnace	S
48	39159	Vishnu Pouch Packaging (P) Ltd. (Unit-Iv)	Surevy No. 400/2 & 434/8,7-Ashwamegh Industrial Estate, Changodar,SAN-Changodar		S
49	51532	Vishnu Samaj Seva Trust	Beside Plot No. 51-B/s Plot-51, Ashwamegh Industrial Estate, Sarkhej-Bavla Road,SAN-Changodar		S
50	41724	Vishnu Tobacco Product	7, Ashwamegh Industrial Estate,-Sarkhej-Bavla Road,,SAN-Changodar	Pouches Of Tobacco - 0 Nos, Pouches Of Tobacco - 0 Nos, Pouches Of Tobacco, - 0 Nos, Pouches Of Tobacco. - 200000000.000 Nos, Tobacco - 0 Nos Sector:Tobacco Products Including Cigarettes And Tobacco Processing.	L

3. Panchratna

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	10069	Acme Skin Care Pvt. Ltd & Acme Diet Care Pvt. Ltd	PLOT NO: 14/A-Panchratna Industrial Estate, BAV-Changodar	Ointment & Lotion - 7 M.T, Oral (Rehydration Salt) - 0 M.T, Tablets - 7 M.T Sector: Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
2	39173	Addwrap	36, Panchartna Industrial	Hdpe/Pp Fabric /Tape - 261 M.T,	S

		Packging Pvt Ltd	Estate-B/H. laxminarayan Petrol pump,SAN-Changodar	Hdpe/Pp Woven Fabric Laminated / Coated & Hdpe/Pp Tarpaulin (Tarpaulin Make Fr - 212 M.T, Laminated Fabric (Tarpaulin) - 0 --- Sector:Polythene & plastic processed products manufacturing (virgin plastics)	
3	40723	Adgums Private Limited,	11-B, Pancharatna Ind. Estate,-Sarkhej-Bavla Highway,,SAN-Changodar	Textile Printing Gums / Thickeners - 250 M.T Sector:Chemicals & Products	S
4	10122	Agro Life Science Corporation	Plot No: 26, Panchratna Ind. Estate, -Sarkhej – Bavla Highway, Changodar ,SAN-Changodar	Bio Fertilizer(Kri Gold Gr,Nzyme, Jeet) - 0 M.T, Herbicides - 160 M.T, Insecticides - 210 Mts, Pesticides - 110 M.T Sector:Pesticides/Insecticides/Fungicides/Herbicides/Agrochemical Formulation.	L
5	37080	Alf Technologies (India) Ltd	Plot No. 3-Panchratna Industrial Estate,SAN-Changodar		S
6	31973	Anjani Enterprise	Plot No 3, Panchratn Industrial Estate, -Nr. Laxminarayan Petrol Pump,SAN-Changodar	M.S. Ctd Bare, Round, Square Bars, Flat Bars, Ms Angle - 475 M.T, Ms / Ss/Alloy Steel Flat Bars/ Round Bars/Angles/ Channels/ Long Products - 10000 M.T, Ms Ctd Bars, Ms Round Bars, Ms Flat Bars, Ms Angle Etc. - 475 M.T Sector:Steel and steel products using various furnaces like blast / open hearth / induction / arc / submerged arc / basic oxygen / hot rolling using reheating furnace	S
7	10396	Ankur Protein Industries Ltd.	Plot No: Phase No: - PANCHRATNA ESTATE AT CHANGODAR,SAN-CHANGODAR	De Oiled Cake - 1757 M.T, Expeller Cake - 1920 M.T, Expeller Oil - 1020 M.T, Solvent Powder - 163 M.T Sector:Food & food processing including fruits & vegetable processing	M
8	31974	Arjun Alloys	Plot No 21 & 22, panchratan Industrial Estate-Near Laxminarayan Petrol Pump,SAN-Changodar	M.S. Ingot - 1500 M.T Sector:Foundary Industry or process involving foundry operations	S
9	10526	Ashwin Auto Cast Pvt Ltd	PLOT NO: 45,PANCHRATNA ESTATE--,SAN-CHANGODAR	Alloy Cast-Iron Casing & Steel Casting - 125 M.T, Alloy Cast-Iron Castings & Steel Casting (Machined & Unmachined) - 1 M.T Sector:Foundary Industry or process involving foundry operations	S

10	45176	Auxitech Industries	Plot no. 54/1, Panchratna Industrial estate-B/H Super color factory,SAN-Changodar	Auxilaries Like(Core Alkali Neutralizer,Water Softening Agent Etc. As Raw.Pdf - 200 M.T Sector:Chemicals & Products	S
11	34522	Bimal Orgo Chem Pvt. Ltd.	250,261-OPP. PANCHRATNA INDUSTRIAL ESTATE,SAN-CHANGODAR		S
12	14277	Contract Pharmacal Corporation India Private Limited	Plot No: 42-Panchratna Industrial estate Part-3,SAN-Changodar	Manufacturing Process For Lab Activity For Formulation Of Pharmaceutical Product - 25 Nos, Pharmaceutical Formulation (Manufacturing) - 100 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
13	51295	Embee Corporation	57/B-3, B-4-PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ BAVLA ROAD, CHANGODAR,,SAN-Ahmedabad	Photo Emulsion, Stripper, Degreaser, Screen Cleaner, Sensitizer, Retouch Lacquer - 400000 Kgs Sector:Photographic Films And Chemicals.	S
14	11282	Extube Industries	Plot No: Phase No: - 48,PANCH RATNA IND.ESTATE,SAN-changodar	Copper Tubes - 40 M.T Sector:Foundary Industry or process involving foundry operations	S
15	44981	Karl Mayer India Pvt Ltd	Plot no. 302/1, Panchratna Induatrial estate-Serkhej-Bavla Road,SAN-Changodar	Beam Creel For Sizing Machines - 20 Nos, High Speed Direct Beam Warper - 40 Nos, High Speed Multi Cylinder Sizing Machines - 20 Nos, Iso-Tense Creel - 20 Nos, Swivel Frame Creels For Filament Warpers - 40 Nos, V-Creel For Direct Warpers - 40 Nos Sector:Jobbing & Machining / Assembling , Fabrication	S
16	51558	Krishna Recyclers	Plot No.- 8-Panchratna Ind.estate,SAN-Changodar		S
17	35865	Maharshi Labels Pvt. Ltd	Plot No. : 10/B-Panchratna Inds. Estate,SAN-Changodar	Printed Paper Lables - 100000000.000 Nos Sector:	L
18	48090	Ncs (Nirvan Consulantancy Servicies)	Plot No.- 8-Panchratna Ind.estate,SAN-Sanand		S
19	13625	Neesa Agitech Pvt Ltd	279, -PANCHRATNA IND ESTATE,SAN-Changodar	Bio Fertiliser - 20 M.T, Media Based Bio Fertiliser - 33 M.T, Tissue Cultured Plants	L

				- 2000000.000 Nos Sector:Organic and inorganic nutrients (by physical mixing)	
20	13084	Oxygen Healthcare Research Pvt Ltd. (O.N:Polymer Coating)	PLOT NO : 35----,SAN-Changodar	Pharmaceuticat Research Laboratory - 1 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
21	51348	Polymer Products	57/C-PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ BAVLA ROAD, CHANGODAR,,SAN-Ahmedabad		S
22	46358	Rohan Brc Gas Equipment Pvt Ltd	Plot no. 291,304, Panchratna Industril estate-Sarkhej-Bavla Road,SAN-Changodar	Assembling Of Gas Equip Kit,Automobile Parts,Gas Solenoid,Multivalves,Gasfilters - 12000 Nos Sector:Jobbing & Machining / Assembling , Fabrication	S
23	36442	Shree Chamunda Enterprise	Plot No. 14 - A, Panchartna Industrial Estate-Vibhag- 2, Sarkej - Bavla Road,,SAN-CHANGODAR		S
24	11719	Shree Raj Enterprise	52-PANCHRATNA IND. ESTATE,SAN-CHANGODAR		S
25	39165	Sk Enterprise	Plot no. 44,45-panchratna ind. estat-1, sarkhej-bawla road,,SAN-changodar	Hd / Ld Tarpaulin - 65 M.T, Ldpr / Lldpe Lamination/Coating - 130 M.T, Waste - 5 M.T, Wovwn Fabrics - 0 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
26	43762	Solid Wheels Industries	Plot no.57-Panchratna Estate,SAN-Changodar - 382213	Solid Wheels - 0 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
27	40618	Sumip Composites Pvt. Ltd. (Unit III)	Plot No. 1 to 5,-Panchratna Industrial Estate,SAN-Changodar	Frp Cable Tray - 250000 Mts, Frp Industrial Products - 185 M.T Sector:Fibre glass production and processing (Excluding moulding)	M
28	14245	Sumip Composites Pvt.Ltd.	Plot No: Phase No: - 39/A,PANCH RATNA IND.ESTATE,SAN-Changodar	Bmc / Smc Compounding – Moulding - 0 M.T, Fro Motor Canopy - 538 Nos, Frp Cable Tray - 6086 Mts, Frp Luminaries - 594 Nos, Frp Molded Products - 3491 Nos, Frp Sections/Profiles - 190 Mts, Frp-Dmc Compound - 4278 Kgs, Handlayup - 0 M.T, Ladder - 211 Nos,	S

				Miscellaneous Products - 0 ---, Pole - 1 Nos Sector:Fibre glass production and processing (Excluding moulding)	
29	35859	Thakker Tobacco Products Private Limited (Unit:2)	Plot No. : 375/1-2-Pancharatna Ind Estate,SAN-Changodar	Tobbaco (Gutkha) Panmasala Containing Tobacco - 350000000.000 Nos Sector:Tobacco Products Including Cigarettes And Tobacco Processing.	S
30	35860	Thakker Tobacco Products Private Limited (Unit:3)	Plot No. 28/A-Panchratna Inds Estate,SAN-Changodar		S
31	14520	Umiya Bikes Pvt Ltd	Plot No: Phase No: -29, PANCHRATNA IND.ESTATE,SAN-		S
32	42671	Umiya Flexifoam Pvt.Ltd.	plot no.40/A, Panchratna Ind. Estate-B/H Vivek steel,SAN-Changodar	Aluminum Composite Panel - 150000 Mt2 Sector:Laminated Sheets	S
33	14540	Unique Tags Pvt.Ltd.	Plot No: Phase No: -4,PANCHRATNA IND.ESTATE,SAN-Changodar	Woven Labels - 2000000.000 Nos Sector:Power Looms I Handlooms (Without Dyeing & Bleaching)	L
34	37780	Vini Cosmetic Pvt. Ltd	Plot No. - 67-Panchratna Industrial Estate,,SAN-Changodar	Powder - 50 M.T, Skin Cream - 60 M.T, Skin Gel - 60 M.T Sector:Manufacturing of tooth powder, toothpaste, talcum powder and other cosmetic items	S
35	36409	Vivek Steel Co Pvt. Ltd.	Plot no., 39-Panchratna Ind. Estate,SAN-Changodar	Ms / Ss/Alloy Steel Flat Bars/ Round Bars/Angles/ Channels/ Long Products - 4500 M.T, Ms Ctd Bars, Ms Round Bars, Ms Flat Bars,Ms Angle Etc. , - 1100 M.T, Ms Ctd Bars, Ms Round Bars, Ms Flat Bars,Ms Angle Etc. ,Alloy Steel Round Bar - 1500 M.T Sector:Steel and steel products using various furnaces like blast / open hearth / induction / arc / submerged arc / basic oxygen / hot rolling using reheating furnace	S
36	14734	Vr Persul Phates Pvt Ltd	378-PANCHRATNA INDUSTRIAL ESTATE,SAN-changodar	Ammonium Persulfate - 0 M.T, Ammonium Persulfate,Potassium Persulfate,Sodium Persulfate - 0 M.T, Potassium Persulfate - 0 M.T, Sodium Persulfate - 0 M.T Sector:Chemicals & Products	M

4. Shubhlaxmi

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	31739	Corona Industries	Plot No. - 24-Shubh Laxmi Estate,SAN-Moraiya		S
2	11800	Jagdish Alluminium Pvt Ltd	1-SHUBHLAXMI INDUSTRIAL ESTATE,SAN-MORAIYA	Aluminium Coil/Foil Sheet/Scrap - 0 ---, Aluminium Coil/Foil Sheet/Waste - 0 ---, Aluminium Coil/Foil/ Sheet/ Strip/Scrap - 600 M.T Sector:Rolling Mill (oil or gas fired) and cold Rolling mill	M
3	45540	Swati Switchgears(India) Pvt Ltd	36, Subh Laxmi Industrial Estate-Sarkhej-Bavla Road,SAN-Moraiya		S
4	13776	Umiya Enterprise (O.N: Shivam Agro Tech)	PLOT NO: 10,-SHUBH LAXMI INDUSTRIAL ESTATE,SAN-		S

5. Mahagujarat

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	49976	Abm International	Plot No. 44 & 45-Mahagujarat Industrial Estate,Moraiya,SAN-Moraiya		S
2	10103	Aegis Life Science	215 / 216-MAHAGUJARAT IND ESTATE,SAN-		S
3	10110	Afzal Metal Refine Works	PLOT NO: 258-259-MAHA GUJARAT IND.ESTATE,,ABG-Moraiya	Alluminium Circle - 30 M.T Sector:Foundary Industry or process involving foundry operations	S
4	10942	Agri Growth Fertilizers & Chemicals	229-230, -Mahagujarat Industrial Estate,SAN-Moraiya	Copper Sulphate - 0 M.T, Magnesium Sulphate - 0 M.T, Micro Nutrient Mixture & N.P.K. All Grade - 250 M.T, Micronutraient Mixer 1 To 5 Grade - 0 M.T, Npk All Grade(Agriculture Department Approval) - 0 M.T, Sodium Thio-Sulfate (Anhydrous) & Sodium Acetate (Anhydrous) - 100 M.T, Sulpher Technical (Powder & Liquid) - 0 M.T, Zinc Sulphate - 0 M.T, Zinc Suplhate (Hepta & Mono Hydrate), Copper Sulphate, Manganese Sulphate - 50 M.T Sector:Fertilizer (basic) (excluding formulation)	S

5	43007	Art-O-Print	Plot no.48, Mahagujarat Industrial Estate-Opp. Sarvoday Hotel,SAN-Moraiya	Cartons, Labels, Literatures - 100000000.000 Nos Sector:Printing Press	S
6	34470	Ashutosh Metal P. Ltd (Unit Ii)	18, 21-MAHAGUJARAT IND. ESTATE,SAN-MORAIYA	M.S. Channel, Grider, Angles, Round Bars, Flats - 1500 M.T, S.S. Flats & Round Bars - 2000 M.T Sector:Ferrous and Non ferrous metal extraction involving different furnaces through melting ,refining, reprocessing,casting and alloy making	S
7	10520	Ashutosh Metal Pvt.Ltd.	PLOT NO: 255-MAHAGUJARAT IND.ESTATE,,SAN-MORAIYA	Alloy Steel Ingots, M.S. Ingots, S.S. Ingots (Flat/Round/Billates) - 500 M.T Sector:Foundary Industry or process involving foundry operations	S
8	10559	Astron Packaging Ltd.	Plot No: Phase No: - 22,23,34,MAHA GUJARAT IND.ESTATE,SAN-Moraiya	Corregulated Boxes - 3000 M.T Sector:Gravure printing, digital printing on flex,vinyl	L
9	45580	Ayukalp Uap Pharma Pvt Ltd	Plot no. 423/9, A & B-Mahagujarat Industrial estate, Moraiya,SAN-Moraiya	Asav - 10 Klt, Avleh - 20 M.T, Ayurvedic Tablets/Syrup/Liquid - 0 M.T, Bhasma - 200 Kgs, Capsule - 2000000.000 Nos, Churna - 3 M.T, Medicated Oil - 2 Klt, Ointment - 700 Kgs, Pills - 100 Kgs, Syrup - 25 Klt, Tablet - 7500000.000 Nos Sector:Ayurvedic and Homeopathic medicine	S
10	14376	Ayusiddh Health Care P.Ltd.	Sr.No.,427, Pl.No.20/21-MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	Asav - 15 M.T, Avleha - 1 M.T, Churna - 3 M.T, Syrup - 25 M.T, Tab - 1 M.T, Tablets - 1 M.T, Tel - 1 M.T Sector:Ayurvedic and Homeopathic medicine	S
11	10666	Bhagudev Floor Mill Pvt.Ltd.	427-MAHAGUJARAT IND.ESTATE, Nr. Sarvottam Hotel,SAN-moraiya	Bran - 1000 M.T, Bran - 0 M.T, Bran (After Proposed) - 0 M.T, Mendo/Soji/Atta - 2500 M.T, Mendo/Suji/Atta - 0 M.T Sector:Flour Mills (Excluding Domestic Aatta Chakki).	S
12	10725	Bharat Metal Oxide	Plot No: Phase No: - MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	Lead & Lead Alloys (Recovered) - 70 M.T Sector:Foundary Industry or process involving foundry operations	S
13	10945	Care Well Healthcare	Plot No: Phase No: - 142,MAHA GUJARAT ESTATE,SAN-CHANGODAR	Capsule - 800 Kgs, Caster - 500 ---, Distilled Water - 1000 ---, Dry Syrup - 100 Kgs, Glycerin - 1000 ---, Iso Pro Pile -	S

				400 ---, Liquid - 8000 Lts, Nilgiri Oil - 1000 ---, Ointment - 100 Kgs, Pharmaceutical Formulations - 10 Nos, Tablet - 700 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	
14	10997	Chintan Aluminium Pvt.Ltd.	PLOT NO:254, , Mahagujarat Estate-Phase – III, Sarkhej-Bavla Road,SAN-Moraiya		S
15	40608	Corrtech Energy Ltd.,Unit -1,	Plot No. 51-Mahagujarat Industrail Estate,Moraiya,SAN-Changodar	Repairing Of Gas Turbines - 10 Nos Sector:Repairing of electric motor & generator	L
16	45894	Daxal Cosmetics Pvt Ltd	Plot no. 347, Mahagujarat Industrial Estate-Sarkhej-Bavla Road, Vill. Moraiya,SAN-Moraiya	Cosmetic Cream - 45 M.T, Hair Oil - 3 M.T, Shampoo - 15 M.T, Tooth Paste - 15 M.T Sector:Manufacturing of tooth powder, toothpaste, talcum powder and other cosmetic items	M
17	25778	Dharmshil Industries Pvt Ltd	S.No. 423, Paiki 13-14, 23, Village-Moraiya-Sarkhej-Bavla Highway, Ta-Sanand,SAN-Sanand		L
18	11238	Ele Mints Pvt Ltd	Plot No: Phase No: -243 - 245,MAHAGUJARAT IND.ESTATE,SAN-		M
19	24312	Futuristic Packaging Pvt Ltd	S.NO. 423 PAIKI, 24 PAIKI 13, PLOT NO.42-Mahagujarat Ind.Estate,VILLAGE MORAIYA,SAN-MORAIYA	Alu-Alu Foil - 10 M.T, Laminated Aluminum Foil (With Poly Film Coated) . - 100 M.T, Laminated Aluminum Foil (With Vmch Film Coated) - 100 M.T, Laminated Paper (With Foil Coated) - 50 M.T Sector:Gravure printing, digital printing on flex,vinyl	M
20	11316	Flow Ink & Coatings Pvt.Ltd.	PLOT NO: 24,25--,SAN-Changodar	Plastic Printing Ink - 0 M.T, Plastic Printing Ink, Etc. - 80 M.T Sector:Printing ink manufacturing	S
21	44218	Globetech Casting Pvt Ltd	Block -D, Ganesh Industrial Estate-423/24/12, Mahagujarat Industrial Estate,SAN-Moraiya	Manufacturers Of Ferrous And Non Ferrous Casting And Components - 100 M.T Sector:Ferrous and Non ferrous metal extraction involving different furnaces through melting ,refining, reprocessing,casting and alloy making	S
22	11523	Gujarat Polymers	Plot No: Phase No: -25,		S

			MAHA GUJARAT INDUST NAGAR,SAN-Moriaye		
23	46170	Hcr Formulation Pvt Ltd	Plot no. A-38, Mahagujarat industrial estate-Moraiya,SAN-Moraiya	Ayurvedic Medicine - 0 M.T, Capsules - 5000000.000 Nos, Ointments/Powder - 2500 Kgs, Oral Liquid/Oil - 250000 Lts, Oral Liquid/Oil - 50000 Lts, Tablets - 10000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
24	11740	Integrated Coating & Seed Technology India Pvt.Ltd.	Plot No: Phase No: - 47,MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	Seed Coating Material - 10 M.T Sector:Cotton seeds delinting process	S
25	30095	K.N.M. Pharma Pvt. Ltd.	plot no- 13, Survey No.-427/P,-Mahagujarat Ind. Estate,SAN-Moraiya	Capsules - 75000000.000 Nos, Liquid - 60000 Lts, Ointment - 15000 Kgs, Tablet - 200000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
26	11722	Kachchhi Food Products	427/6-Mahagujarat Industrial Estate,SAN-Moraiya	Fruit And Vegetable Processing - 50 M.T, Tomato Sauce, Fruit Jam, Vegetable Item - 20 M.T Sector:Food & food processing including fruits & vegetable processing	S
27	11998	Kaizen Industries Pvt.Ltd.	PLOT NO:118-121, SURVEY NO: 426/P,-MAHAGUJARAT IND.ESTATE,SAN-MORAIYA	Baryte - 400 M.T, Calcite - 300 M.T, Chinaclay - 200 M.T, Dolomite - 300 M.T, Marble - 200 M.T, Soapstone/Talc - 200 M.T Sector:Stone crushers	S
28	12282	M.K.Sales Corporation	Plot No: Phase No: - 231,MAHA GUJARAT IND.ESTATE,BAV-MORAIYA	Cnsl Oil - 2500 Lts, Kor Kill - 15000 Lts, Kor Oil - 5000 Lts, Mould Paint - 2500 Lts Sector:Petrochemicals (Manufacture Of And Not Merely Use Of As Raw Material).	S
29	32793	Macons Engineers	Plot No: 7, Mahagujarat Industrial Estate-Moraiya Patia ,SAN-		S
30	42833	Microchem	plot no.57, Mahagujarat Industrial Estate-Opp. Sarvotam Hotel, ,SAN-Moraiya	Industrial Additives - 400 M.T Sector:Chemicals & Products	S

31	12637	Mona Oxide Pvt.Ltd.	PLOT NO: 171,MAHAGUJARAT ESTATE--,SAN-MORAIYA	Lead Sub-Oxide - 20 M.T Sector:Lead Processing And Battery Reconditioning & Manufacturing Lead Smelting.	S
32	12675	N.G.Realty Pvt.Ltd.	Plot No: Phase No: - 240,242,SAN-CHACHARWADI		L
33	12714	Narmada Agro Tech	Plot No: Phase No: -148, CHACHARWADI,SAN-VASNA	De-Oil Cake(By Product) - 2090 M.T, Extracted Oil - 360 M.T Sector:Food & food processing including fruits & vegetable processing	S
34	15919	Narmada Bio Chem Ltd. (Unit-II)	Survey No: 426/2, Plot No: 168,169,130,131-Maha Gujarat Ind Estate,SAN-Moraiya	N.P.K Fertilizer - 1250 M.T, Soil Conditioner - 0 M.T Sector:Npk Fertilizers/Granulation.	S
35	12915	Online Graphics Pvt.Ltd.	PLOT NO: 24-25--,SAN-Moraiya		S
36	35964	Pharmatech Process Equipments	s. n. 423, sub plot no- 9 & 10-Mahagujarat Ind. estate,SAN-moraiya		M
37	12186	PPG ASIAN PAINTS PVT LTD. OLD NAME-Krupa Paints Pvt.Ltd.	Plot No: Phase No: - 68/67,69,26 & 27,MAHA GUJ.IND.ESTATE,SAN-Moraiya	Paint & Varnishes - 120 M.T, Thinners - 30 M.T Sector:Paint (By Mixing Process Only)	M
38	13144	Prathna Chem	Plot No: 117-MAHA GUJARAT IND.ESTATE,SAN-Moraiya	Binder (Randon 400) - 60 Klt, Epoxy Resin - 18 M.T, Pva Emulsion - 30 M.T, Recovered Solvent - 200 M.T, Synthetic Adhesive - 30 M.T, Thinner - 60 Klt Sector:Chemicals & Products	S
39	44030	Premier Industries	Plot No.253-Mahagujarat Industrial Estate,,SAN-Moraiya		S
40	13267	Raj Honey Chemicals	Plot No: Phase No: - 40,MAHA GUJARAT IND.ESTATE,SAN-		S
41	17981	Rushabh Technocast Pvt. Ltd.	PLOT NO A -34/35-Mahagujarat Industrial Estate,SAN-Moraiya	Alloy Steel Castings - 397 M.T Sector:Steel and steel products using various furnaces like blast / open hearth / induction / arc / submerged arc / basic oxygen / hot rolling using reheating furnace	S
42	39516	S. K. Enterprise	Plot no. 109-Maha Gujarat Inds. Estate,SAN-Changodar		S
43	13484	S.B.Polymers	Plot No: Phase No: - 159,MAH GUJARAT IND.ESTATE,SAN-Moraiya	Alkyld Resin - 40 M.T, Cnsl Varnish - 60 M.T, Redoxide/Primer - 0 M.T Sector:Chemicals & Products	S
44	38757	Samcon	PLOT NO-137-		S

		Chemicals Private Ltd	Mahagujarat Industrial Estate,,SAN-Moraiya		
45	41899	Satyam Chemical Industries	132/1, Mahagujarat Ind. Estate, Nr. Narmada Bio Chem-Moriya,,SAN-Moraiya Changodar	Sodium Meta Silicate .5h2o - 0 M.T, Sodium Meta Silicate.9h2o - 0 M.T, Sodium Meta Silicate.Anhydrytes - 0 M.T Sector:Chemicals & Products	S
46	40795	Shah Textile	S.No.426/2/p/16/p,Plot No.225,-Mahagujarat Ind. Estate,,SAN-Moraiya	Cotton Waste (By Product) - 90 M.T, Cotton Yarn - 110 M.T Sector:Cotton spinning & weaving (small scale)	S
47	35575	Shashwat Industries	Plot No. 201,202 & 203-Maha Gujarat Industrial Estate,SAN-Moraiya		S
48	44983	Shivam Products	Plot no. 246, Mahagujarat Industrial estate-B/H Mangal murti nitfab,SAN-Moraiya	Supari - 10 M.T Sector:Food & food processing including fruits & vegetable processing	S
49	43946	Siddhivinayak Vegfoods Pvt. Ltd.	PLOT NO: 7/307-MAHAGUJARAT IND. ESTATE, MORAIYA,SAN-MORAIYA		S
50	12440	Sky Lam Pvt.Ltd	423-PLOT NO: 15,16 A-4,A-5, Magagujarat ind. Estate,ABG-Ahmedabad	Decorative Laminated Sheets - 70000 Nos, Electrical Grade Ind Laminated Shet - 1000 Nos, Paper Laminated In Mdf Board - 2000 Nos, Paper Pasted Hard Board - 3000 Nos Sector:Laminated Sheets	S
51	30446	Space Alloys Pvt. Ltd.	223/228,-Mahagujarat Industrial Estate,SAN-Moraiya	Steel / S.S Castings - 200 M.T Sector:Foundary Industry or process involving foundry operations	S
52	29141	Sunshine Industries	132-Mahagujarat Industrial Estate,B/h Sarvottam Hotel,,SAN-Moraiya	Potassium Phosphate - 5 M.T, Sodium Bi Sulphate (Citro – W) - 50 M.T, Sodium Meta Silicate - 100 M.T, Sodium Phosphate - 10 M.T Sector:Chemicals & Products	S
53	47830	Synzeal Research Private Limited	Plot No: F, Ganesh Industrial Estate, 423/24/8, -Mahagujarat Industrial Estate,SAN-Ahmedabad	Research & Development And Testing Activity In Pharma Sector - 0 --- Sector:Pharmaceuticals (Excluding Formulation).	S
54	14385	Tara Paints & Chemicals	A - 423 / 14-MAHAGUJARAT INDUSTRIAL ESTATE,SAN-Moraiya	Lacquer Material - 0 M.T, Manufacture Of Paints, Varnish & Thinners - 0 M.T, Manufacture Of Paints, Varnish & Thinners - 0 M.T, Putty Spray - 0 M.T, Synthetic Paint - 0 Lts, Thinners & Solvents - 0 Lts Sector:Paint (By Mixing Process Only)	S

55	39515	Totla Rolling Mills Pvt Ltd	Plot no. 111-Maha Gujarat Inds. Estate,SAN-Changodar		S
56	49331	Urmin Marketing Pvt. Ltd.	61, Mahagujarat Industrial Estate, Moraiya, Sarkhej Bavla -Road, Changodar,SAN-Moraiya	Chewing Tobacco - 300 M.T Sector:Tobacco Products Including Cigarettes And Tobacco Processing.	S
57	12347	Virat Petrolium	PLOT NO: 19-D-MAHAGUJARAT INDUSTRIAL ESTATE,SAN-MORAIYA	Low Boiling Oil - 35 Klt, Re-Refining Lubricant Oil - 522 Klt Sector:Reprocessing of used oils and waste oils	S

6. Tajpur Road

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	44024	Aeron Composite Pvt. Ltd.	Block No.496/P-Tajpur Road,SAN-Changodar	Frp Rod - 100 M.T, Moulded Products - 0 M.T, Moulded Products - 150 M.T, Plutruded Products - 0 M.T, Pultruded Products - 250 M.T Sector:Fibre glass production and processing (Excluding moulding)	S
2	33751	Bjs Green Tech	Block No. 487-Changodar-Tejpur road,SAN-Changodar		S
3	37919	Blue Star Ltd	Surevy No. 501/3 & 503/2,-Tajpur Road, Sarkheja - Bavla High,SAN-CHANGODAR	Deep Freezer, Bottle Cooler & Milk Cooler - 10000 Nos, Deep Freezer, Bottle Cooler & Milk Cooler Kits - 2000 Nos, Water Cooler - 6000 Nos, Water Cooler Kits - 2000 Nos Sector:Engineering & fabrication units (Investment on P & M < 10 Crores)	L
4	48285	Hindustan Agro Chemicals	472, Near Sarjan R.O, Tajpur Road-Changodar, Ahmedabad,SAN-Changodar	All Typed Of Liquid Products - 13600 Lts, All Types Of Powder Products - 10100 Kgs, Bifenthrin 10 % Ec - 0 Lts, Buprofezin 25% Sc - 100 Lts, Carbendazim 46.27 % Sc - 300 Lts, Chlorpyriphos 20% Ec - 200 Lts, Chlorpyriphos 50% Ec - 100 Lts, Cyhalofop Butyl 10 % Ec - 300 Lts, Cypermethrin 25% Ec - 300 Lts, Dichlorvas 76 % Ec - 500 Lts, Dicofol 18.5 % Ec - 200 Lts, Ethion 40 % + Cypermethrin 5 % Ec - 300 Lts, Fipronil 5%sc - 100 Lts, Glyphosate 41% Sl - 500 Lts, Hexaconazole 5 % Sc	S

				- 1000 Lts, Imidaclopride 17.8% Sl - 300 Lts, Imidaclopride 30.5 % Sc - 100 Lts, Indoxacarb 14.5 % Sc - 100 Lts, Lime Sulphur 22 % Sc - 400 Lts, Malathion 50 % Ec - 300 Lts, Monocrotophos 36% Ec - 500 Lts, Oxyflourfen 23.5 %ec (W/W) - 100 Lts, Pendimethalin 30 % Ec - 400 Lts, Pendimethalin 38.7 % Cs - 300 Lts, Phosphamidon 40 % Sl - 250 Lts, Profenophos +cypermetrin - 500 Lts, Profenophos 50%ec - 300 Lts, Propiconazole 25 % Ec - 200 Lts, Sulphur 40 % Sc - 200 Lts, Sulphur 55.16 % Sc - 200 Lts, Trizophose 40% Ec - 50 Lts Sector:Pesticides/Insecticides/Fungicides/Herbicides/Agrochemical Formulation.	
5	14138	Jayshri Propack Pvt. Ltd.	488-BEHIND SUSHMA NAMKEEN, TAJPUR ROAD,,BAV-CHANGODAR	Printed Five Layer Barrier Film - 150 M.T, Unprinted Barrier Film - 0 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	L
6	47859	Jayshri Weavetech Pvt. Ltd.	Plot No: 490, Tajpur Road, Changodar-Ahmedabad,SAN-CHANGODAR	Weaving Of Grey Cloth - 610570 Mts Sector:Cotton spinning and weaving (medium and large scale)	L
7	16337	Kejriwal Exports	501/503 A, TAJPUR ROAD,-SARKHEJ BAVLA HIGHWAY, ,SAN-CHANGODAR		S
8	45650	Kumar Spintex Pvt Ltd	Block no. 479/P-1(294),531/P,532/P,533/P, 534/P,535/,536/P,53-Tajpur road, Opp. Shushma Namkin,SAN-Changodar	Cotton Waste (By Product) - 60 M.T, Cotton Yarn - 285 M.T Sector:Cotton spinning and weaving (medium and large scale)	L
9	13066	Photokina Chemicals (P) Ltd.	556/ B-Tajpur Road, Surkhej Bavla Highway,SAN-SANAND	A-1 Emulsion - 10 M.T, Coated Plastic Film For Digital Print Application - 15 M.T, Cs- 5/Wr - 15 M.T, Pva Solution - 34 M.T, Sonakote - 35 M.T Sector:Chemicals & Products	M
10	36778	Sarla Chem,Tajpur Road,	B/H Volga Industry,Volga estate,-Tajpur Road,SAN-Changodar	Cenosphere - 0 M.T, Cenosphere. - 700 M.T, Drying Of Fly Ash - 0 M.T Sector:Fly ash export , transport and disposal facilities	S
11	13832	Sheer Chem	Plot No: 509/E, Phase No:		S

		Industries(New Name:Sheer Fine Chem Pvt.Ltd)	-TAJPUR ROAD,SAN-AHMEDABAD		
12	37530	Shital Rubber	Survey No. 496/1-Canal Tajpur road,SAN-Changodar	Rubber Flooring, Rubber Mulch & Rubber Parts, Retreated Materials, Rubbercrumb,R - 25000 M.T Sector:Rubber goods industry (with baby boiler only)	S
13	13954	Shree Shiva Enterprise	Plot No: Phase No: -14, SANKET IND ESTATE,SAN-Moraiya	Kcl Powder - 150 M.T Sector:Chemicals & Products	S
14	37538	Sushma Namkeen Pvt. Ltd	Plot No. - 484-Tajpur road,SAN-Changodar	Chiki - 0 M.T, Namkeens - 40 M.T, Waffers - 2 M.T Sector:Food & food processing including fruits & vegetable processing	S
15	24810	Time Technoplast Ltd	PLOT NO. 531, 532-TEJPUR ROAD,SAN-CHANGODAR	Plastic Moulded Products (Drums, Barrels, Accessories, Etc...) - 300 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	L
16	32253	Unick Fix-A-Form & Printers Ltd.	Plot No: 472/8 & 481/2 Tajpur Road-Changodar, Sarkhej Bavla Road,SAN-Changodar	Paper Waste (By Product) - 2 M.T, Printing Of Paper Labels - 250 M.T Sector:Gravure printing, digital printing on flex,vinyl	M
17	44978	Veerhealth Care Ltd	S.no.509/F, Opp. Sankheswar Ind. Estate-Tajpur road,SAN-Changodar	Oinment - 2 M.T, Powder - 2 M.T, Syrup - 3 M.T, Tablets - 5 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
18	45651	Vishal Spintex	Block no. 532/P,533/P,534/P,536/P,537/P-Tajpur road, Opp. Shushma Namkin,SAN-Changodar	Cotton Waste (By Product) - 60 M.T, Cotton Yarn - 285 M.T Sector:Cotton spinning and weaving (medium and large scale)	L
19	14752	Wilson Printercity Pvt.Ltd.	Plot No:501-503 , Tajpur Road,-CHANGODAR,SAN-Changodar		S

7. Saket

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	43006	Art-O-Print	PLot no.23, Saket Industrial Estate-Nr. Weight bridge,SAN-Moraiya	Corrugated Boxes - 0 Nos, Corrugated Boxes, Corrugated Partitions, Corrugated Plates - 1000000.000 Nos Sector:Cardboard or corrugated box and paper products (excluding paper or pulp	S

				manufacturing and without using boiler)	
2	11168	A Innovative International Ltd (Old Name-Dinha Export)	Plot No: Phase No: - 34,35,SAKET IND.ESTATE,BAV-MORIYA	A - 0 Nos, Abrafeed - 10 Nos, Abrafeed - 0 Nos, Water Jet / Laser / Plasma Cutting Machine & Related Accessories. - 10 Nos, Water Jet Cutting Machine - 0 Nos Sector:Jobbing & Machining / Assembling , Fabrication	S
3	10592	Azure Fabrics Pvt Ltd.	Plot No: 3 Phase No: --3, SAKET IND ESTATE,SAN- Moraiya		S
4	10946	Carewin Pharmaceuticals Gujarat Pvt.Ltd.	PLOT NO: 38,SAKET ESTATE--,SAN-Moraiya		S
5	11226	E Coli Waste Management Pvt. Ltd. (Unit-1)	Plot No: Phase No: - 14/1,SAKET IND.ESTATE,SAN-MORAIYA		S
6	50640	Facilities Management Services	PLOT NO : 4 D-Saket Estate, Changodar,RAM-Changodar	Laundry Of Clothes - 0 Nos Sector:Mechanized laundry using oil fired boiler	S
7	52087	Friends Cosmetics Pvt Ltd	16, KUSHAL INDUSTRIAL ESTATE, INSIDE SAKET INDUSTRIAL ESTATE-OPP HOF FACTORY, SARKHEJ BAVLA ROAD,CHANGODAR,SAN-CHANGODAR		S
8	47029	Gelpac	28, Saket Industrial Estate-Sarkhej-Bavla Road,BAV-Moraiya		S
9	33005	Hiren Trading Company	43-Saket industrial estate,SAN-Moraiya		S
10	41404	Knm Pharma	38/2, Saket Industrial Estate, Nr. Nova Petrochemicals Ltd-Moriya,SAN-Sanad		S
11	28607	Maitry Enterprise	PLot No. 437 paiki -Saket Industrial estate ,SAN-sandnd		S
12	49725	Microlab Pvt Ltd	Plot No:- 6,7-Sanket Industrial Estate, Near Nova Petrochem, ,SAN-Moraiya		S
13	11596	Neochem Technologies	Plot No.- 19/1-Saket Ind. estate,SAN-Ahmedabad		S
14	45893	Parshwanath Polymers	S.no.437/3,5,6,7,8, 443/1, Plot no.35-36-Saket Industrial estate, Opp. Ramdev Masala,SAN-Changodar		S
15	49522	R.R. Lubricants	Plot NO; 16, "Saket		S

		(Unit:2)	Estate', Vill: Moraiya-Dist; Ahmedabad -382213,SAN-Moraiya		
16	26493	R.R.Lubricants	5-B-SANKET INDUSTRIAL ESTATE,SAN-MORAIYA		S
17	41909	Royal Architectural Coating	Plot No.25, Saket Industrial Estate,-Near Nova Petrochemicals,,ABG-Moraiya		S
18	13464	Royal Touch Alluminium Pvt.Ltd.	plot no.30,31,Saket Ind.Estate-Nr.Nova Petro chemicals Ltd,SAN-Moraiya		L
19	37606	Sabharwal Life Science	Plot No- 28, Saket industrial Estate,-Village Moraiya,SAN-		S
20	13825	Shree Bhavani Organics Pvt.Ltd.	PLOT NO: 12 - 15--,SAN-moraiya		S
21	51953	Shree Kushal Polymers	PLOT NO 40-41, SAKET INDUSTRIAL ESTATE, -SARKHEJ BAVLA ROAD, AT MORAIYA,SAN-MORAIYA		S
22	23529	Shriji Sales Corporation	PLOT NO. 44-SAKET INDUSTRIAL ESTATE,SAN-MORAIYA		S
23	37863	Shrinathji Bag Industries	PLOT No.-63-Kushal Indstrial Estate, Opp: Ramdev masala,SAN-Moraiya		S

8. Kesar Sopan

Sr. No	GPCB ID	Name of Industry	Address	Scale
1	49548	Divine Polytech Industries	12,13, Sopan Kesar Industrial hub, NH-8 A,-Moraiya Village, Moraiya road,SAN-MORAIYA	M
2	51110	Forever Lifescience Pvt. Ltd.	74/D-Sopan Kesar Industrial Hub, Behind Hotel Sarvoday, NH-8A ,SAN-Moraiya	S
3	49079	Helix Technocast	68, Sopan Kesar Industrial Hub, Nerar Railway Crossing,-Moraiya Village Road, Moraiya,SAN-Moraiya	S
4	42078	Oracle Industries	S. No. 359/p, Plot No.- 29,-Sopan Kesar Industrial Hub, Nr. Sarvodaqy Hotel,,SAN-Moraiya	S

5	40081	Shaurya Casting Private Limited	S.No.359/P, Plot No.91,-Sopan Kesar Industrial Hub,,SAN-Moraiya	S
6	39951	V. S. Multimetal Pvt. Ltd. (Unit-2)	Plot no. 92, Survey no.359-Sopan Kesar Industrial Hub,SAN-Moraiya	S

9. Moriaya

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	10001	3m - India Ltd.	415(6)-PLOT NO: 8,MORAIYA IND.ESTATE,SAN-MORAIYA		L
2	13717	Aia Engineering Ltd	PLOT NO. : 10-PLOT NO: 10,SAN-Moraiya		S
3	10145	Aia Engineering Ltd.	PLOT NO: 39,40,70 to 77--,SAN-Moraiya		L
4	32974	Akshay Biotech	435 PAIKI 3-C/O RAJEEV FOOD,NEAR RAMDEV MASALA,SAN-MORAIYA		S
5	10222	Altus Surgical Industries	PLOT NO: 21/D--,SAN-Moraiya		S
6	10262	Ambica Chemicals	435-PLOT NO : 20,SAN-VILL MORIYA		S
7	10485	Ascent Yarns Pvt.Ltd.	PLOT NO: 14,15,16--,ABG-Moraiya		M
8	50349	Bellatrix Healthcare Llp	396 & 403-SARKHEJ-BAVLA HIGHWAY, VILLAGE-MORAIYA,SAN-MORAIYA	Sodium Bicarbonate I.P. - 200 M.T, Sodium Chloride I. P. - 200 M.T Sector:Organic manure (manual mixing).	S
9	10777	Blaze Metal Works	PLOT NO: 20--,SAN-MORAIYA		S
10	10869	Cadila Health Care Ltd. (R & D Centre)	396/P & 403/P-N.H.NO:8,SAN-MORAIYA		M
11	33202	Cadila Health Care Ltd (Zydus Biologics)	S.N: 23,25/P,37,40/P & 42-SARKHEJ - BAVLA NATIONAL HIGHWAY - 8A,SAN-CHANGODAR		L
12	10873	Cadila Health Care Ltd.	PLOT NO: 417--,SAN-MORAIYA		L
13	37749	Cadila Health Care Ltd. (Zydus Vaccines)	Survey No. 40/p, 43,44,45,46,47-Changodar,SAN-Changodar		L
14	39475	Cil Nova Petro Chemicals Ltd,Moraiya	Sr.no.396/P & 395/4(P)-Sarkhej Bavla Highway,,SAN-Moraiya		L
15	31924	Crown Alba Writing Instruments India	415, N. H. No 8- A - Sarkhej - Bavla Road,SAN-moraiya		S

		Pvt. Ltd			
16	11183	Divine Life Care Pvt Ltd	PLOT NO: 220--,SAN-Moriya		S
17	11191	Dolly Inter Exim Pvt Ltd.	431/1, 433/1-2-VILL: MORAIYA,SAN-		S
18	20005	Esdee Paint Limited	pLOT nO. 5, S.nO. 407/P-NEAR WATERMAN INDUSTRIES,SAN-MORAIYA		M
19	11260	Esdee Paints Ltd	PLOT NO: 106 - 108, 156 - 158--,ABG-MORAIYA		M
20	44567	Ess Ess Lubricants	79,80, Shri Ganesh Indstrial Estate-Opp. Hotel Survoday,, Vill Moraiya,SAN-Moraiya		S
21	51453	Euphoria Packaging Llp	396 & 403 -MORAIYA VILLAGE, SARKHEJ, BAVLA HIGHWAY, DIST:AHMEDABAD,SAN-MORAIYA	Plastic Security Bags - 50 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
22	45184	Expert Pharmaceuticals P Ltd	S.no.412/2/p1 & 415/6, - Plot no-4 & 5,SAN-Moraiya		S
23	11338	Gaggar Enterprise Pvt.Ltd.	PLOT NO: 435/SUB PLOT NO: 17--,SAN-MORAIYA		S
24	12876	GSL Nova Petrochemicals Ltd formerly Nova Petrochemicals Ltd.	396 (P),403-VILL:MORAIYA,SAN-MORAIYA		L
25	11561	H.J.Arochem Pvt.Ltd.	PLOT NO: 11/B--,SAN-MORAIYA		M
26	11607	Harsha Engineers Ltd.	427 & 431-SARKHEJ - BAVLA ROAD,SAN-MORAIYA		L
27	49499	Hexa Pharmachem	396 & 403, Moraiya Village, GSL Nova Compound-Besides Zydus Cadila Research,SAN-MARAIYA		S
28	11736	Intas Pharmaceuticals Ltd.	423 / P / A-SARKHEJ - BAVLA HIGHWAY,SAN-Moraiya		L
29	30147	Jyoti Power Transmission Pvt. Ltd	Plot No. 9/79/19-Opp. Nova Petrochem,SAN-Moraiya		S
30	12061	Kasaar Food Innovative Pvt.Ltd.	PLOT NO: 415/P,MORAIYA--,SAN-moraiya		S
31	12811	Macro Polymers Pvt.Ltd,Unit -3, formerly New Millenium Mica	PLOT NO:21 & 22--,SAN-MORAIYA		S

		Ltd.			
32	12309	Macro Polymers Pvt.Ltd.	PLOT NO: 133,134,135,136,164, 165--,SAN-Moraiya		M
33	40027	Mamata Machinery Pvt. Ltd.	Survey No. 423/P-Sarkhej-Bavla road,SAN-Moraiya		L
34	12272	Mc.Fills Enterprises Pvt.Ltd.	423-MORAIYA,SAN-		S
35	12607	Modern Denim Ltd.	Plot No: Phase No: -10K.M.MILESTONE,SAN-Moraiya		L
36	12853	Nirma Limited	Plot No: 415/p - P.O.Chacharwadi, Vill:Moraiya,Ta:Sanand,SAN-Moraiya		L
37	51785	Nirvana Consultancy Services	137/138-Sharanya Industrial Estate, B/H Hotel Sarvottam,Moraiya Road,SAN-Moraiya		S
38	33715	Param Cyliner Liners Pvt.Ltd,Moraiya	Sr.no.412/P,413/P,415/P-Moraiya Ind.Estate,SAN-Moraiya		L
39	11216	Parikh Packaging Private Limited	S.No. 423, -Opp-Rotomac Pens, Sarkhej-Bawla Highway, ,SAN-Village-Moraiya		L
40	12029	R.R.Patel Industrial Gases Pvt Ltd. (O.N:Kanadia Air Tech Pvt.Ltd.)	407-SARKHEJ-BAVLA HOGHWAY,SAN-moraiya		S
41	48951	Radhe Krishna Dairy Products	Plot No.-2, Shyam Estate-Near Astron Packaging, Moraiya,SAN-Moraiya	Mava - 0 Kgs Sector:Dairy and dairy products (small scale) (capital investment on plant & machinery < ` 1 crore)	S
42	13457	Rotomac Global Pvt. Ltd	415-MORAIYA,SAN-Changodar		S
43	13579	Samrock Murexin Chemicals India Ltd.	PLOT NO: 138--,SAN-MORAIYA		S
44	13654	Screen O Tex India Pvt Ltd.	396 / 406 PAIKI-MORAIYA - SANAND,SAN-MORAIYA		S
45	49131	Shivani Drum Company(Unit-Ii)	Plot No-423E, Ganesh Industrial Estate-Gate No-2, ,SAN-Maraiya	Decontamination Facilities With Reconditioning Of Ms/Hdpe Containers,Packing Mat - 0 Nos, Ms Sheet - 0 M.T, Plastic Lumps From Plastic Waste - 0 M.T Sector:Scrap Dealers (with washing)	S

46	13823	Shree Bhagwati Flour & Foods Pvt.Ltd.	430-OPP: NOVA PETRO CHEMICAL,SAN-Moraiya		L
47	40796	Shree Shailya Agrotech Pvt. Ltd	Plot No.15,-Gujarat Pharma Techno Park,,SAN-Changodar		M
48	14008	Shreenath Plylam	PLOT NO : 113--,SAN-Moraiya		S
49	14071	Shri Varahi Agro Industries	PLOT NO: 407/P-Moraiya village road,SAN-moraiya		S
50	33702	Shubh Laxmi Casting Pvt.Ltd,Moraiya	Plot no.20,21-Moraiya Ind.Estate,SAN-Moraiya		M
51	14111	Shyam Metals	PLOT NO: 170--,SAN-MORAIYA		S
52	14133	Silica Gel Products Mfg.Company	Plot No: Phase No:-13,MORAIYA IND.ESTATE,SAN-Moraiya		S
53	12957	Skaps Industries India P.Ltd.	423-PLOT NO: A 20,SAN-Moraiya		L
54	49009	Spiceone Food Products Pvt. Ltd.	Plot No.-407, Near Zydus-Cadila R&D Unit-Sarkhej-Bavla Highway,SAN-Sanand		M
55	35238	Sunny Agro Industries	Plot No. 421/2-Nr. Parikh Packaging,SAN-Moraiya		S
56	14467	Transformers & Rectifiers (I) Ltd	PLOT NO:427 & 431--,SAN-MORAIYA		L
57	14468	Transformers & Rectifiers (India) Ltd	Plot No: Phase No: -S.NO: 344-350,OPP: P.W.D.STORE,SAN-CHANGODAR		L
58	14484	Trivedi Tectonics	415-VILL: MORAIYA,SAN-Moraiya		M
59	42716	Tube Traders	18,-18,SILICON INDUSTRIAL HUB,NR. CIL NOVA PETROCHEMICALS,SAN-MORIYA		S
60	14681	Vimlachal Print & Pack Pvt.Ltd. (Packaging Unit)	PLOT NO: 437, 5, SAKET IND.ESTATE,-VILL:MORAIYA,,SAN-Changodar		L
61	10189	Vishnu Pouch Packaging Private Limited(Unit-12)	341, Vishal Estate-Opp Bhagudev Floor Mill,SAN-Moraiya		S
62	45986	Vishnu Pouch Packaging Pvt Lts (Unit-8)	Plot no. 4, s.no.431/p/7/p, Rachna Estate, Steel town,-vill. Moraiya,SAN-Moraiya		M
63	14719	Vishnu Pouch Packaging Pvt. Ltd.	PLOT NO : 49 / 50--,SAN-Moaraiya		L
64	38525	Vishnu Pouch	36-A, Saket Industrial		S

		Packaging Pvt. Ltd. (Unit - 2)	Estate, Sarkhej - Bavla Road-Village :- Moraiya ,SAN-Moraiya		
65	26185	Vishnu Tobacco Product (Unit-2)	S.No.406/paiki, Vill Moraiya-B/H Sarvoday Hotel,SAN-Moraiya		S
66	14745	Welknown Industries	PLOT NO : 43--,SAN-Vil. : Moraiya		S
67	35997	Zaveri & Compnay Pvt. Ltd.	Block No- A, Unit No- 8,9 & 17-Shree Ganesh Ind. esate, Besides Skapa Ind.,SAN-Moraiya		S
68	10947	Zydus Wellness Ltd formerly Carnation Neutra Analogous Foods Ltd.	PLOT NO: 7/A-B--,SAN-MORAIYA		L

10. Vasna-Chacharwadi

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	48686	varsun Foods Pvt. Ltd.	Block No: 99, Chanchrawadi Road,-Vasna-382213,Tal: Sanand,SAN-VASNA, SANAND	Biscuit - 0 ---, Candy - 150 M.T Sector:Food & food processing including fruits & vegetable processing	M
2	41925	Accretion Pharmaceuticals	Plot no. 29-Xcelon Industrial Park -1,SAN-Vasna Chacharwadi	Formulation Of Capsule - 1000000.000 Nos, Formulation Of Tablet - 15000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
3	10486	Alpha Nippon Innovation Ltd	Survey No. 96, -Nr. Chacharwadi Temple, Sarkhej- Bavla Highway,,SAN-Chacharvadi Vasana		L
4	10321	Amishi Drugs & Chemicals	192-CHACHARWADI - VASNA,SAN-		S
5	10409	Anunoy Fabric Ltd.	Plot No: Phase No: - CHACHARWADI,SAN-		S
6	13800	Arvind Rub Web Controls Ltd	BLOCK NO 198-SARKHEJ BAVLA ROAD,BAV-CHACHARVADI	Rubber Rollers & Different Rubber Coated Cylinders, Pipes - 20000 Nos Sector:Synthetic Rubber.	M
7	10553	Associated Fine Chem Pvt Ltd.	184 / P TO 186 / P-CHACHARWADI,SAN-Chacharavadi		S
8	50563	Astha Creations	104, Chacharavadi, Vasna, -Opp. Zydus Cadila,	Bed Sheet Stitching - 50000 Nos Sector:Handloom/ Carpet weaving	S

			Sarkhej-Bavla Highway,SAN-Chacharavadi-Vasna	(without dyeing and bleaching operation)	
9	48744	Celestys Pharmaceuticals Pvt. Ltd.	Xcelon Industrial Park, Block No: 193, Vasana-Chachravadi-Tal: Sanand,SAN-Vasna Chancharwadi		M
10	11014	Claris Injectables Ltd	202,204,205,206/P,207/P-CHACHARWADI,SAN-Chacharawadi	Bags - 0 Nos, Captive Power - 0 ---, Captive Power - 0 Mwh, Captive Power Plant - 0 Mwh, Corrugated Box - 0 Nos, Corrugated Boxes - 416000 Nos, Glutammune Powder In Sachet - 27500 Nos, Gluttammune Powder In Sachet - 0 Nos, Hydroxy Ethyl Starch (Hes) - 5 M.T, Hydroxy Ethyl Starch (Hes) - 13 M.T, Hydroxy Ethyl Starch (Hes) - 0 M.T, Iron Sucrose - 1 M.T, Iron Sucrose - 0 M.T, Iv Fluid In Glass Bottels - 0 Nos, Large Volume Parental - 0 Nos, Large Volume Parenterals (In Plastic Bottles, Plastic Bags, Glass Bottles) - 3000000.000 Nos, Large Volume Parenterals (In Plastic Bottles, Plastic Bags, Glass Bottles) - 0 Nos, Nutritional Powder In Sachet - 3750 Nos, Nutritional Powder In Sachet - 0 Nos, Nutritional Powder In Tin - 7085 Nos, Nutritional Powder In Tin - 0 Nos, Pamidronic Acid - 0 M.T, Pamidronic Acid - 0 M.T, Reprocessed Fine Powder - 4 M.T, Reprocessed Gorund Flakes - 0 M.T, Reprocessed Granules - 80 M.T, Reprocessed Granules - 0 M.T, Reprocessed Ground Flakes - 14 M.T, Reprocessed Ground Powder - 0 M.T, Small Volume Injectables (Glass Ampoules) - 0 Nos, Small Volume Injectables (Glass Vials) - 0 Nos, Small Volume Parental - 0 Nos, Small Volume Parenterals (In Plastic Ampoules, Glass Ampoules, Glass Vials, Glas - 0 Nos, Small Volume Parenterals (In Plastic	L

				Ampoules, Glass Ampoules, Glass, Vials, Gla - 17539200.000 Nos, Sterile Powder Injections (Glass Vials) - 0 Nos Sector:Pharmaceuticals (Excluding Formulation).	
11	41385	Claris Otsuka Pvt. Ltd	Sr.no.199 to 201,206/P,207/P,208 to 210-Near Claris Life Science Ltd,SAN-Chacharwadi	Large Volume Parenterals (In Plastic Bottles, Plastic Bags, Glass Bottles) - 18325000.000 Nos, Small Volume Parenterals (In Plastic Ampoules, Glass Ampoules, Glass Vials, Glas - 11641670.000 Nos Sector:Pharmaceuticals (Excluding Formulation).	L
12	40206	D.B.Corp Ltd, Chancharwadi-Vasna	Plot no.148,-B/H L&T Plant,SAN-Chancharwadi-Vasna	Newspaper - 1500 M.T Sector:Printing Press	L
13	30149	Envy International Private Limited	142p, 143p-Nr. Divyabhasker,SAN-Vasna Chacharwadi	Epitone Sos - 0 Nos, Gynecoll - G - 0 Nos, Gynecoll - P - 0 Nos, Hbseal Nanomolecular Fibres - 0 Nos, Hbseal Patches - 0 Nos, Hbset - Dental Blocks - 0 Nos, Hbset - Ortho - 0 Nos, Hbstrap - 0 Nos, Iv Stat - 0 Nos, Medfil Gel - 0 Nos, Medfil Ii Cake - 0 Nos, Medifil - 198450 Nos, Skin Temp - 139680 Nos, Skintemp Ii Cartridge - 0 Nos, Skintemp Ii Foam - 0 Nos, Skintemp Ii Rope - 0 Nos Sector:Pharmaceuticals (Excluding Formulation).	L
14	48664	Esdee Paints Ltd.	Block No: 174,175, Vill: Vasna Chacharwadi-Tal: Sanand,SAN-chacharwadi vasna	Adhesive - 5 M.T, N C Laquer - 338 M.T, N C Putty And Filler - 850 M.T, Rubbing Compound - 6 M.T, Synthetic Chasis Black - 9 M.T, Synthetic Enamel - 1250 M.T, Synthetic Varnish - 45 M.T, Thinner - 170 M.T, Water Based Paint - 300 M.T Sector:Paint blending & mixing (Ball mill)	L
15	46727	Fairdeal Multifilament Pvt. Ltd.	Block No: 49, Nr. Gopinath Industrial Park-Vill: Chacharwadi-Vasna,,SAN-Vasna Iyava	Polyester Pp Multifilament High Density Yarn - 225 M.T Sector:Synthetic Fiber Including Rayon, Tyre Cord, Polyester Filament Yarn.	L
16	11305	Finar Limited	PLOT NO: 184/P - 186/P--,ABG-Chacharwadi Vasna	Purification Of Solvents & Salts Of Hplc,Ar And Lr Grade For Laboratory Use - 55 M.T, Solvents Of Lr, Ar Hplc Grade - 55 M.T, Testing & Repacking Of	L

				Liquid And Solid Lab. Chemicals Of Hplc ,Lr And Ar Grade - 520 M.T, Testing And Repacking - 520 M.T Sector:Chemicals & Products	
17	51538	Flourish Foodsproducts Pvt.Ltd	Block No.204-Chacharwadi-Vasna,Bavla-Sarkhej Highway,Taluka-Sanand,SAN-Chacharwadi-Vasna	Fat Spread - 780 M.T, Flavor Milk - 1248 M.T, Fruit Drink- 1 - 749 Klt, Fruit Drink- 2 - 1295 Klt, Ghee - 39 M.T Sector:Milk Processing And Dairy Products (Integrated Project).	S
18	37006	Intas Pharmaceuticals Ltd	Plot No. 191, -Village - Chacharwadi - Vasana,SAN-Chacharwadi - Vasana	Aripiprazole - 25 Kgs, Choline Fenofibrate - 83 Kgs, Dabigatran - 83 Kgs, Desvenla Succinate - 50 Kgs, Dronaderon - 167 Kgs, Eletriptan Hydrobromide - 17 Kgs, Etoricoxib - 83 Kgs, Fesoterodine Fumarate - 50 Kgs, Lacosamide - 58 Kgs, Linezolid - 83 Kgs, Metaprolol Succinate - 425 Kgs, Paclitaxel - 3 Kgs, Palipyridone - 25 Kgs, Prasugrel Hydrochloride - 8 Kgs, Pregabaline - 150 Kgs, Rabeprazole - 50 Kgs, Rivaroxaban - 17 Kgs, Telmisartan - 425 Kgs, Trazadone Hydrochloride - 233 Kgs Sector:Pharmaceuticals (Excluding Formulation).	L
19	11166	Jay Dinesh Chemicals	PLOT NO: 184,186--,SAN-Chacharavadi-Vasna	Ammonium Bisulphite - 50 M.T, Ammonium Thiosulphate - 50 M.T, Enzyme Commoerscial (Liquid Or Powder) - 50 M.T, Potassium Meta Bisulphate - 50 M.T, Sodium Sulphate, Sodium Bisulphite, Sodium Meta Bisulphite - 170 M.T Sector:Chemicals & Products	S
20	44968	Kravour Foods Pvt Ltd	Block no. 105/P & 103/B, Vill, Chacharawadi-Vasan-Chacharawadi Temple Road,SAN-Chacharawadi	Biscuits & Bakery Products - 100 M.T Sector:Bakery Products, Biscuits Confectionery	S
21	29152	Larsen & Toubro Limited	ECC Division-144/146, Chacharwadi, Opp-Zydus Cadila Factory ,SAN-Ahmedabad	Training Institute - 0 Nos Sector:Hotels (Less than 3 star) or hotels having 20 rooms or above and less than 100 rooms.	L
22	12302	M.S.Pickling Center	198-VILLAGE : CHACHARWADI,SAN-		S
23	49726	Macro Polymers Pvt. Ltd.	Survey No. 382 and Plot No. D-01 to D-06A-	Acrylic Resins - 0 M.T, Alkyd Resins - 0 M.T, Amino Resin - 0	S

			Gallops Ind. Park 2, Village: Chacharvadi Vasna,SAN-Chacharvadi Vasna	M.T, Caustic Lye - 45% - 0 M.T, Ketonic Resin - 0 M.T, Polyamide Resins - 0 M.T, Polyester Resin - 0 M.T, Resin Esters & Derivatives - 0 M.T, Resin Modification - 0 M.T, Resin Solution - 0 M.T Sector:Synthetic resins	
24	34784	Maniyar Agro Mills Pvt. Ltd	Servey No. 184 to 186-Ahmedabad- Bavla highway,SAN-Chharwadi-Vasana	Cleaning And Grinding Of Wheat - 0 M.T Sector:Flour Mills (Excluding Domestic Aatta Chakki).	S
25	26809	Mbr Flexibles Limited	S. No- 79 / 80-Near Charcharwadi Temple,SAN-Charcharwadi- Vasna	Extruded Film - 25 M.T, Laminates Of Plastic - 150 M.T Sector:Gravure printing, digital printing on flex,vinyl	M
26	12758	Navkar Enterprise	-BLOCK NO: 185,186,SAN-Chacharvadi (Vasna)	Re-Refined Used Oil/ Waste Oil - 400 Klt Sector:Reprocessing of used oils and waste oils	S
27	12912	Omni Dye Chem Exports Ltd.	PLOT NO: 94,96--,SAN-Chacharwadi-Vasna		M
28	12916	Ordain Pharma Pvt.Ltd.	138/B-CHACHARWADI,SAN--		S
29	50299	palmlife Foods Llp	23, Tim Engineering Estate, Opposite Chacharwadi Mata Temple-Sarkhej Bavla Road, Vasna,SAN-Chacharwadi, Vasna	Basan Products,Banana Chips,Frymes - 0 M.T Sector:Food & food processing including fruits & vegetable processing	S
30	13108	Pradip Overseas Pvt Ltd	Plot No: Phase No: - BLOCK NO: 104,105,144 - 146,SAN--	Printing/ Dyeing/ Processing Of Cloth Fabric - 750000 Mts Sector:Yarn/ textile processing involving any effluent/ emission-generating process ,bleaching, dyeing, printing and scouring	L
31	13125	Prakash Solvent Extractions Ltd	106-CHACHARWADI,SAN--		S
32	45542	Raj Enterprise	Plot no. 1, Block no. 192 &211, Exiloan Ind. Estate-Vill. Chancharawadi,SAN-Chacharawadi	Re-Refined Used Oil - 150 Klt Sector:Reprocessing of used oils and waste oils	S
33	29386	Saga Laboratories	Survey No.198/3-Chacharwadi Vasna,SAN-Chacharwadi Vasna	Capsules - 0 Nos, Dry Syrup - 0 Lts, Powder - 0 M.T, Tablets - 0 Nos, Tablets/Capsule/Dry Powder - 15000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	M
34	46757	Shree Nirmal Ventures Pvt. Ltd.	Block No: 72 & 86, Chacharvadi Vasana-Dist:	Farshan, Namkeen, Fryums - 250 M.T	S

			Ahmedabad,BAV-CHANCHARVADI VASANA	Sector:Food & food processing including fruits & vegetable processing	
35	43640	Suryen Pharma	Plot no.2A, TIM Engineering Estate-Opp. Chacharawadi Temple, ,SAN-Changodar	Liquid Oral Suspansion (Syrup) - 60 Klt Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
36	50471	Vishnu Aroma Pouching Pvt Ltd.	Plot No=-106, N.H.-8, Sarkhej-Bavla Highway-Chacharavadi Vasna,SAN-Chacharavadi Vasna	Pouches Of Pan Masala (100 % Tobacco And Nicotine Free) - 0 Nos, Pouches Of Pan Masala (100 %tobacco And Nicotine Free). - 490000000.000 Nos Sector:Spice grinding (< 20 HP motor)	S

11. PharmaSEZ

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	14801	ADILAC PHARMACEUTICALS LTD	Plot No: 1A,Pharmez, Phase No:-VILLAGE : MATODA,SAN-AHMEDABAD	Carboplatin Inj - 0 Lts, Cisplatin - 0 Lts, Cyclophoshphamide Inj - 0 Lts, Daunorubicin Inj - 0 Lts, Doxorubicin Injection - 0 Lts, Etposide Inj - 0 Lts, Gem Citabine Inj - 0 Lts, Ifosamide Inj - 0 Lts, Oxapilation Inj - 0 Lts, Pharmaceuticals Oncological Injectables Formulation - 1363 Lts Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
2	29827	Amneal Life Sciences Pvt. Ltd.	Plot No. 15,16,17, Pharma-SEZ-Sarkhej Bavla Highway. N.H.-8-A,SAN-Matoda	Capsule - 0 Nos, Capsules - 0 Nos, Cartridges - 166667 Nos, Plastic Bottles (Eye Drops) - 2500000.000 Nos, Prefilled Syringes - 0 Nos, Prefilled Syringes. - 3083333.000 Nos, Tablet - 0 Nos, Vials - 0 Nos, Vials. - 3916667.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
3	24951	Bio Medical Life Science Pvt Ltd	4-PHAMEZ 'SEZ' SARKHEJ - BAVLA H/W NO:8,SAN-		L

4	30269	Cadila Healthcare Ltd.	Plot No. 1A/1 & 2, Pharmez-Sarkhej Bavla NH NO 8A,SAN-Matoda	Capsules Formulation - 0 M.T, Tablets Formulation - 8 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
5	11313	Fisher Biopharma Services (India) Pvt. Ltd.	PLOT NO: 22, PHARMEZ, SEZ-NATIONAL HIGHWAY 8A,,ABG-MATODA	Packaging Of Individual Kits For Clinical Studies - 1 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
6	11734	Intas Pharmaceuticals Limited	Plot No: 5,6,7 - PHARMA SEZ,SAN-MATODA	Capsules - 0 Nos, Tablets - 100000000.000 Nos, Vials - 0 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
7	12436	Jay Pharma Ltd (Old Name: Famy Care Pvt. Ltd.)	PLOT NO:20 & 21, Pharma SEZ,-SARKHEJ-BAVLA N.H.NO:8-A,,SAN-MATODA	Ampoules - 0 Nos, Contraceptive Ampoules - 2500000.000 Nos, Contraceptive Tablets - 20 M.T, Contraceptive Vials - 2500000.000 Nos, Tablets - 0 M.T, Vials - 0 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
8	32221	Piramal Enterprises Limited.	PLOT NO. 19-PHARMEZ,(ZYDUS SEZ),SAN-MATODA	Pharma Research & Development Fortablets And Capsules - 100 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
9	27007	Piramal Enterprises Ltd (old name-Oxygen Bio Research P. Ltd)	PLOT NO.18-PHARMACEUTICAL SEZ, NR VILLAGE MATODA,,BAV-CHANGODAR	R&D And Testing Activity In Pharma Sector - 0 ---, The Drug Like Small Organic Molecules - 300 Nos Sector:Pharmaceuticals (Excluding Formulation).	L
10	14803	Zydus Hospira Oncology Pvt.Ltd.	3, PHARMEZ, -Special Ecomomic Zone, Ta, Sanand,SAN-MATODA	Injections - 0 ---, Pharmaceutical Oncological Injectable Formulation - 22500 Lts, Various Injections - 0 --- Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L

11	14802	Zydus Infrastructure Pvt,Ltd. (Cetp)	Pharmez-Special Economic Zone.-Sarkhej Bavla Highway. N.H.-8-A,SAN-Matoda	Fresh Water - 650 Klt Sector:Common Treatment and disposal facilities (CETP, TSDF, E-Waste recycling, CBMWTF, Effluent conveyance project, incinerators, Solvent/Acid recovery plant, MSW sanitary landfill sites, STP)	L
12	24397	Zydus Technologies Limited	PLOT NO. 1 / B-PHARMEZ,SAN-MATODA	Trans Dermal Patches - 5 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L

12. Sari

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	35083	A.T.E. Enterprises Pvt Ltd	250, 251,252/1/Part,255/1/Part, 255/2/Paet-Village Sari,SAN-Sari	Pendulum Arms, Cradles, Inserts, Top Rollers - 0 Nos, Precision Textile Components Like Pendulum Arms, Cradles, Inserts Etc. - 7200000.000 Nos Sector:Jobbing & Machining / Assembling , Fabrication	L
2	10038	Aarvee Denim & Exports Ltd	217-MOJE SARI,SAN-Sari	Cotton Yarn - 450 M.T, Cpp - 0 Mwh Sector:Cotton spinning and weaving (medium and large scale)	L
3	10330	Diamond Textile Private Limited	21/1,281/P,219/1/P,219/2/P,219/3,220/1,220/2/P,222/P,223/P-Near Arvee Denim,SAN-SARI	Cloth - 0 Mts, Cotton/ Polyster Yarn - 0 M.T Sector:Cotton spinning and weaving (medium and large scale)	L
4	11257	Erhardt + Leimer (India) Pvt.Ltd.	252/1,252/2,255/1-2-VILL: SARI,SAN-VILL: SARI	Accessories For Plastic Paper & Textile Machinaries - 0 Nos Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	M
5	11521	Gujarat Pharma Techno Park	224/P TO 236-VILL: SARI,SAN-		L
6	12227	Laxcon Steels Pvt.Ltd.	PLOT NO: 235--,SAN-Sari	Ms/Ss/Alloy Steel Ingots + Rolled Products - 12500 M.T, Power Plant - 12 Mwh Sector:Foundary Industry or process involving foundry operations	L
7	12510	Medicare Hygien Pvt Ltd	240-VILLAGE : SARI,SAN-Sari	Adhesive Tap - 10000 Mts, Non-Woven Viscose Material - 15000 Mts, Peroxide Bleached Cloth - 500000 Mts, Rolled Bandage Gauge - 30000 Mts,	S

				Rolled Bandage Gauge(Surgical Dressing Material) - 30000 Mts, Rolled Bandage Material (Surgical Dressing Material) - 0 Mts Sector:Surgical And Medical Products Involving Prophylactics And Latex.	
8	13354	Real Strips Ltd.	245-VILL: SARI,SAN-SARI	Ss Coils/Strips (Cold Rolled) - 0 M.T, Stainless Steel Coils/Strips (Cold Rolled) - 2500 M.T, Stainless Steel Coils/Strips (Cold Rolles) - 0 M.T Sector:Steel and steel products using various furnaces like blast / open hearth / induction / arc / submerged arc / basic oxygen / hot rolling using reheating furnace	L
9	41473	Rimi Distributors,Sari	Sr.no.257,258,878,Opp. Gallops SEZ,-Village Sari,SAN-Sari		M
10	42571	TechTex	S.No.213, Vill. Sari-Sarkhej-Bavla Highway,SAN-Sari	Technical Textiles - 400000 Mts Sector:Yarn/ textile processing involving any effluent/ emission-generating process ,bleaching, dyeing, printing and scouring	S
11	44027	York Naturals Pvt. Ltd.	P.No. 25-26,-Gujarat Pharma Techno Park,,SAN-Vill:Sari	Extracted Oil, Extracted Liquid, Extracted Powder - 70 M.T, Pill Powder/ Fiber (Agro Waste Of Processed Fruits, Roots, Leaves, Stems, Etc.) - 0 M.T Sector:Chemicals & Products	S

13. Steel Town

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	41431	Alcon Beverages Pvt. Ltd.	Plot no. B3/A-3-Steel Town,SAN-Moraiya	Beverages - 225 Klt Sector:Non — Alcoholic Beverages (Soft Drinks)	S
2	11776	J.H.T. Power Eng Pvt Ltd.	427-P.NO : -C - 7 - 9, b/h HOF,SAN-Changodar		M
3	28187	Jht Power Engineering P. Ltd, Unit-2	PLOT NO. B-11 TO 20-"STEEL TOWN", OPP NOVA PETROCHEM P. LTD, B/h HOF,SAN-MORAIYA	Eht Towers, Substation Structures And Microwave Towers - 3000 M.T Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	M
4	35336	Kasta Bhanjan Traders	Plot No. 11, Godown No.:3-Steel Town Industrial Estate,SAN-		S

			Moraiya		
5	10934	Optimus Healthcare	Plot No.B3/A-5-Steel Town,,SAN-Moraiya		S
6	32415	Unison Pharmaceuticals Private Limited	C/6-steel town,,SAN-Moraiya	Capsules - 100 Nos, External Preparations (Liquid, Semi Solid And Solid) (Formulation) - 200000 Nos, Oral Powder (Formulation) - 200000 Nos, Tablets - 600 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
7	45485	Unison Pharmaceuticals Pvt Ltd(F & D Unit)	Plot no. B/3/A, Steel town-Opp. Nova petro,SAN-Moraiya	R&D Activity For Formulation - 0 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	M
8	36026	Unison Pharmaceuticals Pvt. Ltd.	Plot No: C-7,8,9 Steel Town, -Opp. Nova petrochemicals,SAN-Moraiya		L
9	29743	Vimlachal Print & Pack Pvt.Ltd. (Printing Ink Mfg. Unit)	431-STEEL TOWN,SAN-MORAIYA	Gravure Printing Ink - 65 M.T, Gravure Printing Ink - 35 M.T Sector:Gravure printing, digital printing on flex,vinyl	S
10	32514	Vishnu Pouch Packaging Pvt Ltd(Unit-9)	S.No-431, Plot No-31paiki, Steel Town-Vill-Moraiya,SAN-Moraiya		S

14. Swastik

Sr. No.	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	49152	Adgums Private Limited	Plot No: 1-A, Swastik Industrial Estate, Opp. Aarvee Denim-Sarkhej Bavla Highway, Vill: Sari,SAN-SARI	Textile Printing Thickeners / Gum (Modified Natural Gas) - 650 M.T Sector:Chemicals & Products	S
2	46724	Hema Remedies Private Limited	Plot no: 21, Swastik Ind. Estate-Opp. Aarvee Denims,,SAN-Village: Sari	Small Volume Parenterals (Sterile Wfi + Reconst.+formulation Of Eye/Ear Drops) - 550 Klt Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
3	48944	J V Conbuild Pvt. Ltd	S. No. 244 / P-1&2-Swastik Industrial Estate,	Printed/Coated Laminated Paper Foil/Plastic Film In Roll Form &	L

			Sari, Tal - Sanand,SAN-Sari	Pouch Form - 450 M.T Sector:Gravure printing, digital printing on flex,vinyl	
4	10198	Qutone Ceramics Pvt Ltd(In The Premises Of Revocoat India P Ltd)	plot no-23-Swastik industrial estate,SAN-sari	Multilayer Printing On Ceramic Tiles - 0 Nos, Printing, Decorating And Ornamention Ceramic Tiles - 9000 Mt2 Sector:Ceramic colour Mfg (not using boiler & wastewater recycling process)	S
5	47831	Spack Automotives Pvt. Ltd.	Plot No: 23, Swastik Industrial Estate, -Opposite Aarvee Denim Spinning Unit ,SAN-Ahmedabad	Assemblies And Subassemblies Made From Metal , Pu And Or Other Plastic Etc Parts - 50000 Nos, Bent Wires - 1000000.000 Nos, Mechanisms (Used In Seats And Other Similar Mechanical, Pneumatic And Hydraulic - 150000 Nos, Moulded Pu Foam Pads And Parts Thereof - 3500000.000 Nos, Seat & Seating Systems - 50000 Nos, Sheet Metal Fabricated Parts And Parts Thereof - 1000000.000 Nos, Suspension Assemblies (Used In Seats And Other Similar Mechanical Pneumatic An - 50000 Nos, Trim Covers Or Seat Covers And Parts Therof - 2000000.000 Nos, Wire Frames And Parts Thereof - 1000000.000 Nos Sector:Foam manufacturing	S
6	46123	Zylys Bioscience	Plot no.9, Swastik industrial estate-Sarkhej-Bavla Hoghway,SAN-Sari		S

15. New Ahmedabad

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	11281	Alka Enterprise	PLOT NO : 17-New Ahmedabad Industrial Estate,SAN-Moraiya	Hdpe Carboys - 0 Nos, Hdpe/Ldpe Carboys/Containers - 7000 Nos Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S
2	46331	Baghbanpackers Pvt Ltd	396, New Ahmedabad Ind. Estate-Sarkhej-Bavla Road, Vill. Moraiya,SAN-Moraiya	Chewing Tobacco - 240 M.T Sector:Tobacco Products Including Cigarettes And Tobacco Processing	S
3	43949	Chemo Health Care Pvt Ltd	PLOT NO: 1-New Ahmedabad Ind Estate, Moraiya,SAN-Moriya	Liquid - 5 Klt, Ointment - 0 M.T, Pharmaceutical Fomulation - 0 M.T Sector:Pharmaceutical Formulation	S

				and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	
4	45802	Corrtech Energy Limited-Unit-Ii	S.no.407, Shed no.7,SP-3, New Ahmedabad Ind estate-New Ahmedabad Ind estate,SAN-Moraiya	Manufacturing Of Gas Turbine Parts: Rotor, Stator, Igv Blades, Shrouds,Skids,Etc - 25000 Nos Sector:Heavy Engineering(17)	L
5	39752	E-Mail Infotech Pvt. Ltd	Plot no. 66, Survey no. 396-New Ahmedabad Industrial Estate,SAN-Moraiya		L
6	47537	Empire Bakery	407, New Ahmedabad Industrial Estate-Changodar,,SAN-Moraiya	Bakery Items - 0 Kgs Sector:Bakery & confectionery units with production capacity > 1 tpd]	S
7	49329	Highvolt Power & Control Systems Pvt. Ltd.	Plot No: 5/6/7, New Ahmedabad Industrial Estate-B/h Nova Petrochemicals, Vill: Moraiya,SAN-Ahmedabad	Assembly Of Diesel Generator Sets - 75 Nos, Fabrication Of Ht/Lt Electrical Control Panels Of Varying Power Supply - 0 Nos, Manufacturing Of Ht/Lt Electrical Control Panels Of Varying Power Supply - 100 Nos Sector:Diesel Generator sets (15 KVA to 1 MVA)	S
8	29019	Kalpavijay Engineering Co.	82 / 83-NEW AHMEDABAD IND.ESTATE,SAN-SANAND	Fabrication & Galvanizing Work Of Communication & Transmission Towers - 1000 M.T, Galvanised Material - 20 M.T Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	S
9	39753	M/S Atrium Infocomn Pvt.Ltd formerly E-Mall Infotech Pvt. Ltd	Plot no. 66, Survey no. 396-New Ahmedabad Industrial Estate,SAN-Moraiya		L
10	12667	Multi Shaper (India) Pvt.Ltd.	Plot No: Phase No: -81,NEW AHMEDABAD IND.AREA,SAN-MORAIYA	Job Work Of Paper Printing For Laminate - 40000 Mts, Job Work Of Paper, Printing, For Laminates - 0 Mts Sector:Pulp & Paper (Paper Manufacturing With Or Without Pulping).	S
11	29831	Nisan Electricals	S. No. 440/1/2, Vill: Moriya, New Ahmedabad Industrial-Estate, B/h Nova petrochemicals,SAN-MORIYA	Compact Fluroscent Lamp - 3000000.000 Nos Sector:Electronic And Electrical Goods	L
12	46205	Niva Flexi Prints	S.no. 394 & 478/1/2, Vill. Moraiya,-New Ahmedaad estate, B/H Nova petrochemical,SAN-Moraiya	Cpp, Foil, Pet-Foil-Poly - 20 M.T, Pet-Met Bopp - 40 M.T, Pet-Met Pet-Poly - 50 M.T, Printed Paper - 15 M.T, Printed Pvc - 25 M.T Sector:Digital printing on PVC	S

				cloth	
13	12889	Ocean Steels Pvt Ltd.	Plot No: Phase No: -68/69,NEW A'BAD IND.ESTATE,SAN-Moraiya	Annealed Pickled Coil / Strip - 400 M.T, Hot Rolled Bright Bars, Angles, Shapes, Section & Wire Rods - 1400 M.T Sector:Acid Pickling, Rolling Or Galvanizing Etc.	S
14	36945	Restech Pharmaceuticals	plot no-407/p-ahmedabad industrial estate,,SAN-moraiya	Mfg & Job Work Of Pharma Products, Tablets, Capsules. - 28 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
15	44777	Sachchade Food Pvt Ltd	S.no.407/p3, New Ahmedabad estate-Opp. IOC Petrol pump,SAN-Moraiya	Namkeen Products - 1 M.T, Puff Mammara - 1 M.T, Snacks Pellets - 1000 M.T Sector:Food & food processing including fruits & vegetable processing	L
16	40609	Shashi Industries	Plot No. 407-New AHmedabad Industrial Estate,SAN-Moraiya	Packing Of Agarbatti - 12000 Nos Sector:industry exempted from NOC	S
17	13781	Shivam Industries	PLOT NO: 19,NEW AHMEDABAD INDUSTRIES ESTATE--,SAN-MORIYA	P.V.E, / Acrelic Sizing Blinder/ Wetting Agent Emulsion - 5 M.T Sector:Chemicals & Products	S
18	13904	Shree Matangi Investment Casting Pvt.Ltd.	Plot No: Phase No: -NEW A'BAD IND.ESTATE,SAN-MORAIYA	Centrifugal Pump & Cocks & Valveparts Ms&Ci Flanges/Ssflanges,Wrenches&Itsparts - 30 M.T, Centrifugal Pump Parts (20%) - 2 M.T, Cocks And Valve Parts (25%) - 2 M.T, Ms & Ci Flanges/S.S.Flanges (50%) - 4 M.T, Wrenches And Its Parts (5%) - 0 M.T Sector:Foundary Industry or process involving foundry operations	S
19	42568	Solvex Technology	Plot No.26, S.No.395/1,2-New Ahmedabad Industrial Estate,SAN-Moraiya	Copper Cathode - 25 M.T, Copper Sulphate - 100 M.T, Magnesium Sulphate - 250 M.T, Magnesium Sulphate Sludge(Micronutrient) - 10 M.T Sector:Chemicals & Products	S
20	25237	Stp Ltd	PLOT NO. 44-NEW AHMEDABAD ESTATE,SAN-MORAIYA		S
21	14592	Vadiawala Industries	PLOT NO:24, NEW A'BAD IND ESTATE--,SAN-Moraiya	Re-Refined Base Oil - 165 Klt Sector:Reprocessing of used oils and waste oils	S
22	14685	Vinayak Industries.	Plot No: Phase No: -18, NEW AHMEDABAD IND ESTATE,SAN-Moriya	N.I. Softner - 0 ---, P.V.E. /Acrelic Sizing Binder / Wetting Agent Emulsion - 5 M.T,	S

				P.V.E. /Acrelic Sizing Binder / Wetting Agent Emulsion/Ceta Softner/ Pigment Bin - 155 M.T Sector:Chemicals & Products	
23	10545	Vishnu Aroma Pouching Pvt Ltd (unit-II)	Plot No-4-New Ahmedabad Industrial Estate, Moraiya,SAN-Moraiya	Pouches Of Pan Masala (100 % Tobacco And Nicotine Free) - 600000000.000 Nos, Washing Of Cloth - 0 Mts Sector:Spice grinding (< 20 HP motor)	S
24	45169	Vishnu Pouch Packaging Pvt Ltd	Plot no. 4, New Ahmedabad Ind. Estate-Vill. Moraiya,SAN-Moraiya		M
25	48413	Vishnu Pouch Packaging Pvt. Ltd. (Unit-10)	Plot No: 5-6, New Ahmedabad Industrial Estate, -Bavla-Sarkhej Road,SAN-Ahmedabad		S

16. Gopi

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	48462	Auto Sales	Plot No.-25-Gopi Industrial Estate,SAN-Changodar	All Types Of Battery Plates - 500000 Nos, Batteries (Automotive, Industrial & Two Wheeler) - 5000 Nos, Lead Plate - 0 Nos Sector:Lead Processing And Battery Reconditioning & Manufacturing Lead Smelting.	S
2	21007	Ayuda Herbal P. Ltd	510-GOPI INDUSTRIAL ESTATE ,SAN-CHANGODAR	Asav - 6 M.T, Avleh - 17 M.T, Bhasma - 0 M.T, Oil - 1 M.T, Syrup - 4 M.T, Tablet - 1 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S
3	10762	Bicon Corporation	Plot No: Phase No: -28/30/A, GOPI IND ESTATE,SAN-Changodar		S
4	32831	Corona Remedies Pvt. Ltd.	Plot No 19,23,24-Gopi Ind. Estate,SAN-Changodar		M
5	48663	J.M Plastopack	31, Gopi Estate,-B/h Ramdev Masala, Sarkhej-Bavla Highway,ABG-CHANGODAR	Films / Plastic Scrape (By Product) - 5 M.T, Plastic Films - 130 M.T, Self Adhesive Bopp Tape - 288000 Nos, Self Adhesive Plastic Films - 130 M.T, Stretch Film - 10 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	S

6	12512	Medicus Pharma	Plot No: Phase No: - 60,61,GOPI ESTATE,SAN-		S
7	47876	Seraphic Gravure	Plot No: 10, Gopi Industrial Estate, Nr Ramdev Masala-Sarkhej-Bavla Highway,SAN-CHANGODAR		S
8	35675	Venus Powder Product Pvt. Ltd	C- 510, 511, Gopi Industrial estate-B/h. Ramdev Masala,SAN-changodar	Aluminum Granules /Powder - 600 M.T, Aluminum Ingot/Shots - 800 M.T, Coal Granules/Powder - 600 M.T, Copper Granules/Powder - 600 M.T, Iron Granules /Powder - 900 M.T, Iron Ingot/Plates - 800 M.T, Manganese Granules/Powder - 600 M.T, Silico Manganese Granules /Powder - 600 M.T Sector:Industry Or Process Involving ALL Metal Treatment Or Process Such As Picking,Plating, EP,PS,HT,Anodize,Galvanize	S

17. NG gallops

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	50638	EAGLE CAST ALLOYS	B/7-8-Chacharavadi,SAN-CHACHARWADI	Steel Casting,Alloy Steel Casting,Non Ferrous Casting - 80 M.T Sector:Foundary Industry or process involving foundry operations	S
2	51151	Restoration Engineers	SURVEY / BLOCK NO : 56-Galops Industrial Park, Rajoda, Bavla,BAV-Rajoda	Concrete Batching Plant For Concrete - 7000 M.T Sector:Readymix concrete Plants	S
3	49890	Vestas Wind Technology India Pvt. Ltd.	Plot no. 37, Gallops Industrial park, -Vil: Rajoda, Tal: Bavla, Dist-Ahmedabad,BAV-Rajoda	Wind Turbine Blades - 98 Nos Sector:Heavy Engineering(17)	L

18. Matoda

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	41945	Highly Electrical Appliances India Private Limited	S.No.456,457/1,457/2,-Sarkhej-Bavla Highway (NH-8A),,ABG-Matoda	Air Condition Compressor - 166667 Nos, Process/Grinding Dust(By Product) - 0 M.T Sector:Heavy Engineering(17)	L
2	26265	Intas Bio Pharmaceuticals Limited	496/1/A & B, Sarkhej Bavla Highway-Village-Matoda, Tal-Sanand ,SAN-		L
3	10951	Intas	496 / 1 A & B-SARKHEJ-	Albumin - 188 Kgs, Fecton-Viii - 4	L

		Pharmaceuticals Limited	BAVLA HIGHWAY,SAN-Matoda	Kgs, Ivig - 36 Kgs, R & D Activity In Plasma Fractionation - 0 ---, Vials - 600000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	
4	11738	Intas Pharmaceuticals Ltd.	PLOT NO: 457,458-VILL: MATODA,SAN-MATODA	Ampules - 4000000.000 Nos, Azacitidine - 8 Kgs, Cabazitaxel - 4 Kgs, Capcitabine - 417 Kgs, Capsules - 15000000.000 Nos, Decitabine - 2 Kgs, Docetexal - 4 Kgs, Erlotinib Hcl - 25 Kgs, Exmestane - 8 Kgs, Gemcitabin - 42 Kgs, Imatinib Mesylate - 63 Kgs, Lapatinib Ditosylate Monohydrate - 25 Kgs, Methotrexate - 29 Kgs, Paclitaxel - 13 Kgs, Sorafenib Tosylate - 25 Kgs, Tablets - 102500000.000 Nos, Timozolamide Hcl - 17 Kgs, Topotecan Hcl - 0 Kgs, Vials - 500000 Nos Sector:Pharmaceuticals (Excluding Formulation).	L
5	41569	Jv Conbuild Private Limited	Survey no. 438/P-Opp: Intas Pharmaceuticals ,SAN-Matoda	Printed / Coated Laminated Paper Foil In Roll Form And Printed / Coated Plastic - 0 M.T, Printed/ Coated Laminated Paper Foil In Roll & Pouch Form - 400 M.T Sector:Gravure printing, digital printing on flex,vinyl	S
6	30120	Lea Prints N Laminar	S. No. 458, Nr Intas Pharmaceuticals-Matoda, Tal: Sanand,SAN-Matoda	Aluminum Foils - 0 M.T, Flexible Laminated Wrapper - 0 M.T, Lamination Of Sheets - 0 M.T, Printed Laminated Pouches - 0 M.T, Printed Pvc Candy Paper - 0 M.T, Twist Wrap Paper - 0 M.T Sector:Gravure printing, digital printing on flex,vinyl	S
7	12242	Leamak Healthcare Pvt.Ltd	Plot No: Phase No: - SARKHEJ-BAVLA HIGHWAY,SAN-Matoda	Candy - 1900 M.T, Candy/ Chew Candy/ Cough Candy/ Deposited Candy/ Eckleirs/ Variants Of Confectio - 19000 M.T, Chew Candy - 1900 M.T, Cough Drops (Candy) - 150 M.T, Deposited Candy - 1900 M.T, Ealairs (Toffees) - 150 M.T, Other Variants Of Confectionaries - 1900 M.T,	L

				Toffee - 1900 M.T Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	

19. Radhe

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	29783	Crown Laminates Pvt.Ltd,Changodar	Sr.no.419/1,419/7-Radhe Ind. Estate,SAN-Changodar	Laminated Sheet - 260000 Nos, M.F. Resin - 0 M.T, P.F. Resin - 0 M.T Sector:Laminated Sheets	L
2	35451	G. P. Sweets Pvt Ltd.	S.No.33-34,-Radhey Industrial Estate ,,SAN-Changodar	Candy - 40 M.T, Kismi (Parle Brand Job Work) - 50 M.T, Mango Bite - 30 M.T, Poppins - 180 M.T Sector:Food & food processing including fruits & vegetable processing	S
3	11972	K.M.M Foods Pvt Ltd	Plot No: Phase No: -POT NO: 33/34, RADHE ESTATE,SAN-CHANGODAR	Biscuit (Parle-G) - 1500 M.T Sector:Bakery Products, Biscuits Confectionery.	S
4	45310	Max Signage Industries Pvt Ltd	Plot no. 18, 18/A, Radhe Industrial Estate-Near crown Laminates,SAN-Changodar	Pe Corrugated Sheet - 0 M.T, Pp Corrugated Sheet - 100 M.T, Pvc Foamed Board - 550 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	L
5	45178	Savas Engineering Company Pvt Ltd	Block no. 498, Radhe Ind. Estate-Tajpur road,SAN-Changodar	Oil Filtration Plant - 15 Nos, Transformer Tank(Fabrication) - 400 M.T, Vacuum Drying Plant - 5 Nos, Vapour Phase Crying Plant - 10 Nos Sector:Heavy Engineering(17)	S
6	31221	Shree Narnarayan Ayurvedic Pharmacy	PLOT NO - 1,-Radhe Industrial Estate,SAN-Changodar	Ayurvedic Avleh - 417 Kgs, Ayurvedic Powder - 4000 Kgs, Ayurvedic Syrap - 500 Lts, Ayurvedic Tablet - 1500 Kgs, Ayurvedic Taila (Oils) - 417 Kgs Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	S

20. Rajoda

Sr. No	GPCB ID	Name of Industry	Address	Product - Capacity / Per Month	Scale
1	10269	Ambica Food Products Pvt.Ltd.	Plot No: Phase No: -VILL: RAJODA,BAV-		S
2	26387	Amneal Pharmaceuticals Company (I) Pvt. Ltd.	882/7,871-NR HOTEL KANKAVATI, ,BAV-RAJODA	Capsules - 250000000.000 Nos, Injectable – Vial/Ampoule/Injection-R&D Formulation - 500 Nos, Liquid Oral - 1 Klt, Ointment - 0 Nos, R & D Of Api - 15 Kgs, Tablets - 750000000.000 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained	L
3	10557	Astra Life Care India Pvt.Ltd.	PLOT NO: 57/P--,BAV-RAJODA	Capsules - 10000000.000 Nos, Capsules - 0 Nos, Tablets - 150000000.000 Nos, Tablets - 0 Nos Sector:Pharmaceutical Formulation and for R&D purpose(for sustained release/extended release of drugs only and not for commercial purpose)	L
4	10718	Bharat Agro Industries	800-BAVLA-SANAND HIGHWAY ROAD,BAV-VILL: RAJODA	Broken Rice (By Product) - 45 M.T, Husk - 65 M.T, Rice - 240 M.T Sector:Food & food processing including fruits & vegetable processing	S
5	10739	Bhavani Food	S.No.817-B/H H.H.Rice Mill,N.H.8-A,Rajoda,BAV-Rajoda	Mamara - 3 M.T, Pauva - 2 M.T Sector:Food & food processing including fruits & vegetable processing	S
6	30601	Big Box Containers Pvt. Ltd	Sr. No.-881/1, nr. Hotel kankavati-sarkhej- Bavla Road,,BAV-Rajoda	Corrugated Boxes (Printed & Non-Printed) - 500 M.T, Paper Waste (By Product) - 50 M.T, Related Aceesories Of Corrugated Boxes (Fitments, Plate Liner, 2 Ly Liner) - 55 M.T Sector:Gravure printing, digital printing on flex,vinyl	M
7	51388	Biomatrix Healthcare Pvt Ltd	Survey No. 869/1/2, -Rajoda,,BAV-Ahmedabad		L
8	11127	Dhanlaxmi Agro Industries	Plot No: Phase No: -VILL: RAJODA,BAV-		S
9	41740	Gardner Denver Engineered Products India Private Limited	Block no. 878-Opp : Gallops Industrial Park,BAV-Rajoda	Blowers - 25 Nos, Compressors - 1250 Nos, Vacuum Pumps - 25 Nos Sector:Engineering & fabrication units (Investment on P & M < 10 Crores)	M
10	33161	Gokul Mamra Pvt. Ltd.	NATIONAL HIGHWAY ROAD 8-A-RAJODA,BAV-RAJODA	Broken Rice - 20 M.T, Mamra - 125 M.T, Pauva - 200 M.T, Rice Husk (Bi Product) - 70 M.T	S

				Sector:Food & food processing including fruits & vegetable processing	
11	12845	Nippon Agro Ltd.	Plot No: Phase No: - N.H.NO.8A,BAV-RAJODA	Broken Rice - 125 M.T, Husk (By Product) - 100 M.T, Rice - 525 M.T Sector:Food & food processing including fruits & vegetable processing	S
12	10992	Rotomac Global Pvt.Ltd,Unit Ii,Rajoda	Sr.No.788,-Rajoda,BAV-chacharavadi vasana		L
13	46593	Skipper Ltd(Old Name-Prakurti Steels Pvt Ltd)	S.no. 823, Vill. Rajoda-Ta. Bavla,BAV-Rajoda	Upvc, Cpvc, Pvc Pipe & Fitting, Hdpe & Ldpe Water Storage Tank - 1000 M.T Sector:Polythene & plastic processed products manufacturing (virgin plastics)	M
14	14607	Vardan Industries	734-SARKHEJ - BAVLA HIGHWAY,BAV-RAJODA		S
15	48190	Vimalachal Print & Pack. Pvt. Ltd.	890/Paikki, Changodar Bavla Highway,-Mouje Rajoda, Bavla,Ahmedabad,BAV-RAJODA	Printed Papaer Rolls - 200 M.T, Printed Polyester Rolls - 750 M.T, Unprinted Paper & Polyester Rolls - 150 M.T Sector:Gravure printing, digital printing on flex,vinyl	L
16	38978	Vishnu Pouch Packaging Pvt. Ltd. (Unit -3)	plot no. 823, N. H. 8-A, Village - Rajoda,-Sarkhej - Rajkot Highway,BAV-Sarkhej		L

Identified Industrial and Commercial Units of Changodar Industrial Area as per Google Image

Following are the Identified Industrial & Commercial Units of Changodar Industrial Area as per Google Map

1. Ashray Hospital, Changodar, Gujarat 382213
2. Rollepaal Engineering, Changodar, Gujarat 382213
3. JK Lakshmi Cement – RMC, Plot No. 563/2/2 Ashwamegh Industrial Estate, Opp. M.N. Desai Petrol Pump, NH 8A, Changodar, Gujarat 382213
4. Mann and Salwa caterers Changodar, Gujarat 382213
5. Bajaj Group of Companies, 444, Ashwamegh estate, Ahmedabad, Gujarat 382210
6. Sarjan Watertech India Pvt. Ltd., Plot No 471, Tajpur Road, Behind Unique FIX A Form, Near Volga Airtech, Changodar, Gujarat 382213
7. Steefo Engineering Corporation - Rolling Mills Manufacturer, 495,Tajpur Road,, Sarkhej-Bavla Highway, Changodar, Ahmedabad, Gujarat 382210
8. Kedar Rubber Products, 30, Shankheshwar Industrial Estate, Tajpur Road,, Sarkhej Bawla Highway, Changodar, Ahmedabad - 382213
9. Spanker International Private Limited, 27, Gopi Estate, Behind Spice World, Changodar, Ahmedabad, Gujarat 382213
10. INGECO GEARS PVT LIMITED, PLOT NO 38-43, GOPI ESTATE,, SARKHEJ-BAVLA HIGHWAY, CHANGODAR, AHMEDABAD, Gujarat 382213
11. Genuine X-Ray & Radiological Equipments Pvt. Ltd, No. 3, Radhe Industrial Estate, Block No 497(P), Tajpur Road, Sarkhej-Bavala Road, Changodar, Ta. Sanand, Changodar, Gujarat 382213
12. Bluestar Limited, Changodar, Gujarat 382213
13. Bajaj Foods Limited, 444-450, Ashwamegh Industrial Estate, Opp. M. N. Desai Petrol Pump, Changodar-bavla Highway, Changodar, Ahmedabad, Gujarat 382210

14. Swati Switchgears (India) Pvt Ltd, 36 Subhlaxmi industrial estate, Vil Moraiya, Changodar, Ahmedabad, Gujarat 382210
15. Shivam Industrial Park., Opp. Sarvoday Hotel Towards Vasna Chacharwadi Gam Moraiya 4 Rasta, Nr. Changodar, Ahmedabad, Gujarat 382213
16. OM logistics ltd., Behind Kankawati hotel, Sharkhej Bavla Highway, Bavla, Gujarat 382220
17. PQS Electrolink (I) Pvt. Ltd., Survey no 431/2, A/13. Steel Town, Sarkhej-Bavla Road, Moraiya, Ahmedabad, Gujarat 382213
18. Fintube India, 143, Maha Gujarat ind. Estate, Moraiya, Changodar, Changodar, Gujarat 382213
19. Fx warehouse, Changodar, Gujarat 382210
20. Jasper Infotech Pvt Ltd, Changodar, Gujarat 382210
21. Kanani industries, Changodar, Gujarat 382210
22. Unjha Pharmacy, Changodar, Gujarat 382213
23. Sac Industries, 306 ,Mahagujarat Industries Estate Opp. Nova Petrol Pump, Changodar, Ahmedabad, Gujarat 382213
24. Sarvottam Hotel, Changodar, Gujarat 382213
25. Satyam Arcade Complex, Moraiya Patiya, Changodar, Gujarat 382213
26. Virgo UAP Pharma Pvt. Ltd., Mahagujarat Ind. Estate, Plot No.: 423 /98-B, Sarkhej Bawala Highway, Moraiya,Taluka' Sanand, Ahmedabad Cantonment, Gujarat 382213
27. Snehraj Notebook Industries, 62, Mahagujarat Industrial Nagar, Moriya, Ahmedabad, Gujarat 382215
28. Fluid Logic Systems Pvt. Ltd., 11-12 Maha Gujarat Industrial Nagar, Near Pharmalab Company, Sarkhej – Bavla Road, Moraiya., Changodar, Gujarat 382213
29. Space Alloys Private Limited, Changodar, Gujarat 382210
30. E P C Tex - Techniks Private Limited, Plot No-214, Maha Gujarat Industrial Estate, Moraiya Patiya, Via, Sarkhej-Bavla Rd, Ahmedabad, Gujarat 382213
31. Incotec India Pvt Ltd, Changodar, Gujarat 382213
32. Kolorrol, 423, Maha Gujarat Industrial Estate, Opposite Sarvoday Hotel, Near Pharma Lab, Moraiya-Changodar, Ahmedabad, Gujarat 382213

33. Godrej & Boyce Mfg. Co. Ltd. Warehouse, Krishna Farm, B/H Eicher Godown, Near Canal National Highway 8A,, Gujarat 382210
34. C Gordhandas & Co., block no. 452 bavla road, Sanathal, Ahmedabad, Gujarat 382210
35. Smt N M Padalia Pharmacy College, National Highway 8A, Gujarat 382210
36. FTF Pharma Pvt Ltd, Survey No. 183+231 ,1st Floor ,National Highway 8A, Sarjak Farm, Above Hyundai service center , Near BP Petrol Pump, Ahmedabad, Gujarat 382210
37. Crown Relocations – Ahmedabad, Navapura Patia, Sarkhej-Changodar Road, Ahmedabad, Gujarat 382110
38. Elegant Fragrances and Flavors Pvt. Ltd., Plot No. - 118, Shivam Industrial Park, Opp. Sarvoday Hotel, Chacharwadi Vasna, Moraiya, Ta : Sanand, Ahmedabad - 382213, Gujarat, INDIA., Moraiya, Gujarat 382213
39. Unicare it solution, Moraiya patiya, nr. sarvoday hotel, Ahmedabad, Gujarat 382213
40. Orion Hotel & Serviced Apartments, Sarkhej - Bavla NH No. 8A, Block No. 325 / 326, Changodar, Opp. Trivedi Marbles, Nr. - Changodar Overbridge, Ahmedabad, Gujarat 382213
41. Hotel Bhagyoday, Sarkhej - Bawla Highway, Changodar, Dist : Ahmedabad., Changodar, Gujarat 382210
42. Trivedi Corp pvt. ltd., Changodar, Gujarat 382210
43. Rameshwar Plastic Industrise, 9/B panchratna Industrial Estate, Sarkhej-Bavla Highway Changodar, Ahmedabad, Gujarat 382213
44. Jayendra's Farm, Ahmedabad, Gujarat 382210
45. Aditya Lubricants, NH 8A, Ahmedabad, Gujarat 382210
46. Apco Innovative auto pvt. ltd., Ahmedabad, Gujarat 382210
47. Shree Nath Motor Garage, NH 8A, Gujarat 382210
48. Gmmco Limited, Ahmedabad
49. Shree Sharan India Ltd., Ahmedabad, Gujarat 382210
50. Sky World Logistics, 2, Chehar Krupa Complex Sarkhej Bavla Highway Navapura Patiya Navapura, Ahmedabad, Gujarat 382213
51. Akbar Bhai K.G.N. Chicken Shop, Changodar, Gujarat 382210,
52. Aravali Pashu Aahar Udhyog, NH 8A, Changodar, Gujarat 382210

53. Neesa Agritech & Foods Ltd, 278/279P, NH 8A, Changodar, Gujarat 382210
54. Shree Sharan Business Park, Ahmedabad, Gujarat 382210
55. CPC Contract Pharmacal Corp, Plot No. 42,Pancharatna Industrial Estate Part-3, India., Changodar, Gujarat 382213
56. Oxygen Healthcare Research Pvt. Ltd.
57. Jekson Vision, Plot # 304 sarkhej bavala highway, changodar, Ahmedabad, Gujarat 382213
58. Maharshi Udyog, Plot no 1, S.V. No.: 295, Panchratna Industrial Estate, Sarkhej Bavla Highway, Ahmedabad, Gujarat 382213
59. Addwrap Packaging Pvt. Ltd., Changodar, Gujarat 382210
60. Panda Water Tech Pvt Ltd, 38/1, Oanchratna Industrial Estate, Sarkhej Bavla Highway Road, Changodar, Changodar, Ahmedabad, Gujarat 382213
61. Acme Diet Care Pvt. Ltd., 14, Panchratna Industrial Estate, Changodar, Gujarat 382213
62. Flexibond Umiya Flexifoam Pvt Ltd., NH 8A, Changodar, Gujarat 382210
63. Umiya Airpack Pvt. Ltd., panchrtna industrial estate,, Changodar, Gujarat 382210
64. Hemlon Synthetics Pvt. Ltd., 6 Panchratna Industrial Estate, Changodar Ta. Sanand, Ahmedabad, Gujarat 382216
65. Shyam 3 Industrial Hub, Shyam 3 Industrial Hub, Changodar, Gujarat 382210
66. Moon Engineering Works Pvt. Ltd, Changodar, Gujarat 382210,
67. Raj Sales Corporation, NH 8A, Changodar, Gujarat 382213
68. Kambay Aromatics, Shed No.1, Innovative Infra Ground, Besides Harsha Engineering Nr. Changodar Over bridge, Changodar, Ahmedabad, Gujarat 382213
69. Endeavour Instrument Pvt. Ltd, 45/3, Changodar industrial Estate,, Opp. S.T. Bus Stand, Surkhej Bavla Highway, Changodar, Gujarat 382213
70. KNM Pharma Pvt Ltd. 23, Ashwamegh Industrial Estate, Changodar, Ahmedabad, Gujarat 382210
71. Fluid Logic Systems Pvt. Ltd., 11-12 Maha Gujarat Industrial Nagar, Near Pharmalab Company, Sarkhej – Bavla Road, Moraiya., Changodar, Gujarat 382213
72. Highly Electrical Appliance India Pvt. Ltd., NH 8A, Matoda, Gujarat 382220

73. Mehtani Flexipack Private Limited, Plot No. 139, Chancharwadi Vasna, Opposite Moriaya, GEB Power Station, Near L & T, Sarkhej- Bavla Highway, Taluka Sanand, Ahmedabad, Gujarat 382213
74. Otsuka Pharmaceutical India Private Limited
75. Fairdeal Jumbo Packaging Pvt. Ltd., Village - Vasana - Chacharwadi, Taluka - Sanand, Ahmedabad, Gujarat 382213
76. VISHAL ENTERPRISES, 198 CHACHARVADI VASANA, Vasna Chacharavadi, Gujarat 382210
77. Macons Equipments Pvt. Ltd., Survey Block No.212/216, Mahalaxmi Estate, Matoda Patia, Nr. Claris , Vasna, Chacharwadi, Sanand, Ahmedabad, Gujarat 382220
78. Zydusbsv (P) Ltd, Ahmedabad, Gujarat 382220
79. Brukem Lifecare Nutraceuticals Plant, Vasna Chacharavadi, Gujarat 382220
80. Piramal Discovery Solution Plot18, Ahmedabad, Gujarat 382220
81. Thermo Fisher Scientific, NH 8A, Pharmez, The Pharmaceutical Special Economic Zone, Ta- Sanand, Village: Matoda, Ahmedabad, Gujarat 382213,
82. Mylan Laboratories Limited, 20/21, Pharmez, The Pharmaceutical Special Economic Zone, N H No. 8 A, Tal Sanand, Ahmedabad, Gujarat 382213
83. Ganesh PET, Plot. 6,Swastik Industrial Estate,Opp. Aarvee denim spinning unit, changoder-bavla highway, Gujrat, Bavla, Gujarat 382220
84. SPI Industries Pvt. Ltd., Survey No. 439/1+2, Opposite Chacharwadi Bus Stop, Sarkhej-Bavla Highway, Matoda, Gujarat 382213
85. Zeeta Electrical Enginnering Pvt. Ltd., Survey No: 124, Near Zydus Cadila, Opp L & T Ltd , CHANCHARVADI Mataji Na Patiya, Sarkhej-Bavla Road. Sanand, Ahmedabad, Gujarat 382213
86. Palak Petroleum, Plot No 3 ,PHARMEZ, NH 8A, Changodar, Gujarat 382213
87. NCS – Laundry, Changodar, Ahmedabad, Gujarat 382213
88. Kevin process technologies pvt. ltd., Changodar, Gujarat 382213
89. Pal Shellcast Pvt. Ltd., Changodar, Gujarat 382213
90. Alpha Roto machines Pvt Ltd, Plot No.22B Sr No. 4082P, Sarkhej-Bavla Highway Road B/h. Sarvodaya Hotel, Changodar, Gujarat 382213
91. Kalptaru Industrial Estate, Changodar, Gujarat 382213

92. Shreeji Business Park, Opposite Mamta Machinery, Sarkhej - Bavla Highway,, Moraiya, Ahmedabad, Gujarat 382213
93. Sahaj Bungalows, Moraiya, Gujarat 382213
94. RAVIM POLYPLAST INDIA PVT. LTD., Plot no. 81, Sopan Kesar Industrial Hub, Off Sarkhej Bavla Highway, Near, Changodar, Moraiya, Tal: Sanand,, Ahmedabad, Gujarat 382213
95. KBG Boilers Private Limited, 34, Sopan Kesar Infra Hub, Near Moraiya Railway Crossing, Sarkhej-Bavla Road Moraiya, Ta. Sanand, Di. Ahmedabad, Ahmedabad - 382213, Gujarat, India, NH 8A, Changodar, Gujarat 382213
96. Laxmi Polymers, 69, Sopan kesar Industrial hub, Moraiya, Gujarat 382213
97. Pingaax, 36, Sopan Kesar Industrial Estate,, Nr. Moraiya Village, Sarkhej Bawla Highway, Moraiya, Gujarat 382213
98. EXCEL FILTERATION PVT LTD, Moraiya, Gujarat 382213
99. Pacifica Aavaas, Changodar, Gujarat 382213
100. Zydus Zyfine, Changodar, Gujarat 382213
101. Gulab Weekend Farmhouse, Opp. Param Green, Next To Shilpgram-6, Kolat-Navapura Road, Kolat, Ta- Sanand, Navapura, Gujarat 382213
102. Divine Cooling System, Changodar, Gujarat 38221
103. Accelerated Warehousing Logistics Pvt Ltd, Warehouse No. 8 & 9, Prime Logistics Park, Survey No. 268,, Navapura, Next to Jayantilal & Co., Sanathal Changodar Road, Navapura Patiya, Ahmedabad, Gujarat 382210
104. KHODIYAR FARM, NAVAPURA APPROACH ROAD, Gujarat 382213

Categorywise Segregation of Industry

Scale and Category wise Industries

1. Changodar Industrial Estate

R-S	**33**
R-M	**5**
R-L	**6**
O-S	**24**
O-M	**5**
O-L	**4**
G-S	**15**
G-M	**5**
G-L	**1**
Other Miscellaneous	**0**

2. Ashwamegh Industrial Estate

R-S	**18**
R-M	**0**
R-L	**2**
O-S	**14**
O-M	**0**
O-L	**1**
G-S	**12**
G-M	**1**
G-L	**1**
Other Miscellaneous	**1**

3. Panchratna Industrial Estate

R-S	**13**
R-M	**2**
R-L	**0**

O-S	**9**
O-M	**1**
O-L	**1**
G-S	**8**
G-M	**0**
G-L	**3**
Other Miscellaneous	**0**

4. Shubhlaxmi Industrial Estate

R-S	**1**
R-M	**0**
R-L	**0**
O-S	**0**
O-M	**1**
O-L	**0**
G-S	**1**
G-M	**0**
G-L	**0**
Other Miscellaneous	**1**

5. Mahagujarat Industrial Estate

R-S	**25**
R-M	**1**
R-L	**1**
O-S	**15**
O-M	**3**
O-L	**1**
G-S	**7**
G-M	**1**
G-L	**1**
Other Miscellaneous	**1**

6. Tajpur Industrial Estate

R-S	**5**
R-M	**1**
R-L	**0**
O-S	**3**
O-M	**1**
O-L	**4**
G-S	**2**
G-M	**0**
G-L	**2**
Other Miscellaneous	**1**

7. Saket Industrial Estate

R-S	**9**
R-M	**0**
R-L	**1**
O-S	**5**
O-M	**0**
O-L	**0**
G-S	**8**
G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

8. Kesar Sopan Industrial Estate

R-S	**4**
R-M	**0**
R-L	**0**
O-S	**1**
O-M	**0**
O-L	**0**
G-S	**0**
G-M	**1**

G-L	**0**
Other Miscellaneous	**0**

9. Moriaya Industrial Estate

R-S	**16**
R-M	**6**
R-L	**9**
O-S	**9**
O-M	**3**
O-L	**7**
G-S	**10**
G-M	**2**
G-L	**5**
Other Miscellaneous	**1**

10. Vasna-Chacharwadi Industrial Estate

R-S	**10**
R-M	**2**
R-L	**8**
O-S	**4**
O-M	**3**
O-L	**2**
G-S	**4**
G-M	**1**
G-L	**1**
Other Miscellaneous	**0**

11. PharmaSEZ Industrial Estate

R-S	**0**
R-M	**0**
R-L	**2**
O-S	**0**
O-M	**0**

O-L	**10**
G-S	**0**
G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

12. Sari Industrial Estate

R-S	**3**
R-M	**1**
R-L	**2**
O-S	**0**
O-M	**1**
O-L	**3**
G-S	**0**
G-M	**0**
G-L	**1**
Other Miscellaneous	**0**

13. Steel Town Industrial Estate

R-S	**2**
R-M	**2**
R-L	**0**
O-S	**2**
O-M	**1**
O-L	**2**
G-S	**1**
G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

14. Swastik Industrial Estate

R-S	**1**
R-M	**0**
R-L	**0**
O-S	**3**
O-M	**0**
O-L	**1**
G-S	**1**
G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

15. New Ahmedabad Industrial Estate

R-S	**10**
R-M	**0**
R-L	**0**
O-S	**4**
O-M	**1**
O-L	**1**
G-S	**5**
G-M	**0**
G-L	**1**
Other Miscellaneous	**0**

16. Gopi Industrial Estate

R-S	**4**
R-M	**0**
R-L	**0**
O-S	**2**
O-M	**1**
O-L	**0**
G-S	**1**

G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

17. NG gallops Industrial Estate

R-S	**1**
R-M	**0**
R-L	**1**
O-S	**0**
O-M	**0**
O-L	**0**
G-S	**1**
G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

18. Matoda Industrial Estate

R-S	**0**
R-M	**0**
R-L	**3**
O-S	**2**
O-M	**0**
O-L	**2**
G-S	**0**
G-M	**0**
G-L	**0**
Other Miscellaneous	**0**

19. Radhe Industrial Estate

R-S	**1**
R-M	**0**
R-L	**1**
O-S	**2**

O-M	**0**
O-L	**0**
G-S	**1**
G-M	**0**
G-L	**1**
Other Miscellaneous	**0**

20. Rajoda Industrial Estate

R-S	**0**
R-M	**0**
R-L	**1**
O-S	**7**
O-M	**1**
O-L	**4**
G-S	**0**
G-M	**2**
G-L	**1**
Other Miscellaneous	**0**

Overall Categorization of Industries

	Small	Medium	Large	Total
Green	**82**	**15**	**17**	**114**
Orange	**109**	**22**	**42**	**173**
Red	**153**	**21**	**40**	**214**
Total	**344**	**58**	**99**	**501**

Sector wise Classification of Industries

Sr. No.	Sector	Total Units	Sub sector		Remarks
			Types	Units	
1	Pharmaceutical	83	API	3	
			R & D	16	
			Formulation	64	
2	Chemical	42	Organic	5	
			Inorganic	32	
			Resin	3	
			Solvent Distillation	2	
3	Textile	15	Process House	5	
			Spinning Unit	10	
4	Foundry	32	Induction Furnace	15	
			Rolling Mills	17	
5	Food Processing	37			
6	Printing Units	29			
7	Plastic	20			
8	Agro Processing	12			
9	Laminated Sheet	6			
10	Melting Units	5			
11	Packaging	10			
12	Tobacco Processing	8			
13	Ready Mixed Concrete	5			

14	Pesticide Formulation	5			
15	Paint by Mixing	5			
16	Other Units	129			Marble ,paint ,fertilizer , battery ,warehouse, etc
	Total	**501**			

Water Consumption Details of Idustry

1. Changodar

Sr. No	GPCB ID	Name of Industry	Address	WC KLD
1	39754	Aastha Tools Private Limited	Plot no. 388 Paiki-3-Near Changodar Industrial Estate,SAN-Changodar	6.500
2	10058	Acc Ltd	Plot No: Phase No: -BLOCK NO : 259, ACC CONCRETE PLANT,SAN-CHANGODAR	52.000
3	32811	Adorn Enterprises Limited	Survey No- 195,-Nr. Claris Life Science Ltd,SAN-Changodar	15.100
4	25337	Aia Engineering Ltd	544,542 / P/2,543/P/1,540/P/1,539&18P-AT 20TH MILESTONE,SAN-Changodar	7.000
5	32591	Alpha Nippon Innovatives Ltd	15 & 20 plot no.-Changodar Ind. Estate,SAN-changodar	3.000
6	48875	Alpine Pharmaceuticals	7B, Changodar Industrial Estate, Sarkhej Bavla Road-Changodar Sanand,SAN-Changodar	0.700
7	38958	Aluminium Industries	Plot no. 254/386-Mahagujarat Estate,SAN-Changodar	
8	36134	Am Steel	Plot No: 4, Bloakc No: 302, -Changodar Industrial Estate,SAN-CHANGODAR	22.000
9	41801	Asahi Modi Materials Pvt.Ltd	Plot no.320,-Opp.Ankur Protein,SAN-Changodar	4.300
10	47225	Basil Hygienic	Plot No: 37 A & 38 B Changodar, Taluka: Sanand-Dist: Ahmedabad,SAN-Changodar	13.500
11	31588	Benmoon Pharma Research Pvt. Ltd.	219, Phase -III-Mahagujarat Industrial Estate,SAN-Changodar	
12	10673	Bhagwati Caterers Pvt Ltd	Plot No: Phase No: -OPP : HARSH ENGINEERS,SAN-Ahmedabad	60.000
13	35949	Bharti Airtel Ltd	Rasmadhur Estate-Opp: Ramdev Masala Industries Estate,SAN-Changodar	0.200
14	47487	Br Global	Plot No: 1/A, Block No: 382, Changodar Ind. Estate-B/h Trivedi Marble Lane,SAN-Ahmedabad	2.000
15	10858	Brussels Laboratories Pvt.Ltd	33, Changodar, Ind. Estate-Sarkhej Bavla Road,SAN-AHMEDABAD	5.100
16	10874	Cadila Health Care Ltd.(Fine Chemical Division)	Plot No: 265, 266, 267 -265-267,CHANGODAR,SAN-Changodar	64.000
17	29972	Cadila Healthcare Ltd(Ointment Unit)	Plot no- 254-255, B/H Zyfine Plant-Oppo. Laxminarayan Petrol Pump,SAN-Changodar	55.000
18	47624	Canton Textile Mills Pvt Ltd (old name-Vardhman Converters)	Plot No: 381/2, Changodar Industrial Estate-Changodar,SAN-CHANGODAR	
19	10960	Champa Metal Industries	PLOT NO: 28--,SAN-Changodar	1.600
20	10975	Changodar Metal Pvt.Ltd.	PLOT NO: 452--,SAN-Changodar	4.550
21	44784	Dermocare Laboratories Guj Pvt Ltd	Plot no. 10, Changodar Ind. Estate-II-Sarkhej-Bavla road, Changodar,SAN-Changodar	0.800
22	11122	Dhan Laxmi Tubes & Metal	74/85-CHANGODAR IND.ESTATE,SAN-	2.550

		Industries	Changodar	
23	11131	Dhanlaxmi Industries	4 / P-AKASHGANGA INDUSTRIAL ESTATE,SAN-	
24	43980	Dhanshree Agro Poly Product	15/A, Changodar Industrial Estate-Sarkhej-Bavala Road,SAN-Changodar	0.620
25	11151	Dhiman Steel Re-Rolling Mills	Plot No: Phase No: -68/69,CHANGODAR IND.ESTATE,SAN- CHANGODAR	6.000
26	39684	Ekdant Industries Private Limited	Plot no. 34 & 35-Changodar Industrial Estate, Part 2,SAN-Changodar	
27	11244	Elite Chemicals	Plot No: Phase No: -16,17,CHANGODAR IND.ESTATE PART II,SAN-Changodar	0.700
28	11245	Elite Industries	PLOT NO: 27--,SAN-	
29	11608	Harsha Engineers Ltd.	336,341,344,348,388-SARKHEJ - BAVLA ROAD,PO : CHANGODAR,SAN-CHANGODAR	88.000
30	11660	Hiscan Pvt.Ltd.	Plot No: Phase No: -B.NO: 304,SAN-Changodar	3.100
31	38684	Innovative Infrastructure Pvt. Ltd.	340/1-340/1,Near Harsha Engineering, Opp. PWD Rest House,SAN-Changodar	20.000
32	45160	Jakson Hydarulic Limited	Plot no. 304-Sarkhej-Bavla road,SAN-Changodar	23.000
33	40650	Jayantilal & Co.	Stone World, Besides ACC RMC Plant,-Sarkhehj - Changodar Highway,,SAN-Changodar, Sanand	23.000
34	43023	Jpoxy Polymers	S.no. 385/P7-Changodar IOndustrial Estate,SAN-Changodar	0.250
35	44528	Kadam Soap Industries	Plot no. 496/1, Cenal Raod,-B/H Water jet factory,SAN-Changodar	1.000
36	12015	Kamakshi Flexiprints Pvt.Ltd.	Block No: 42-Changodar Industrial Estate,SAN-Changodar	3.000
37	12032	Kanhai Food Pvt.Ltd.	S.no.329 paiki 8-Vill. Changodar,SAN-CHANGODAR	15.500
38	12083	Keyur Impex Pvt.Ltd.	Plot No: Phase No: -BLOCK NO: 388,SAN-Changodar	1.000
39	10037	Kfc Corporation Ltd	BLOCK NO: 389-PLOT NO:51, CHANGODAR IND ESTATE,SAN-CHANGODAR	
40	44486	Kinjal Digital Imaging Solutions Pvt Ltd	S.no. 419/paiki, Vill. Changodar-Ta. Sanand,SAN-Changodar	1.000
41	45892	Lks Bulion (Imprt & Export)private Limited	101, Sankheshwar Industrial estate, Tajpur-Vill. Changodar,SAN-Changodar	0.500
42	38225	Lucent Clean Energy Private Limited	Block no. 187-Opp: Laxminarayan petrol pump,SAN-Changodar	1.500
43	25339	Maxeema Biotech Pvt Ltd	496 / 3-CHANGODAR,SAN-Changodar	
44	13655	Mittal Sections (Unit-1) (O.N:Seema Steel Pvt.Ltd.)	Plot No: 14-B/4,TRIVEDI MARBLES,SAN-CHANGODAR	4.500
45	25781	Mittal Sections Limited (Unit-Ii)	No. 23, Changodar Industrial Estate-Trivedi Craft Private limited ,SAN-CHANGODAR	4.500
46	29663	Mittal Steel	Plot no.1, Block No.382,- Changodar Industrial Estate B/h Trivedi Marbal ,SAN-Changodar	22.000
47	12638	Monokem Laboratories	84-CHANGODAR IND.ESTATE,BAV-CHANGODAR	3.000

48	12715	Narmada Biochem Pvt.Ltd.	426/2-PLOT NO: 6-7,SAN-Changodar	4.550
49	12785	Neesa Infrastructure Ltd	Plot No:278, 261 Phase No: -VILLAGE : CHANGODAR,SAN-Changodar	
50	11989	Neesa Infrastructure Ltd- Unit 2	S.NO. 1282 PART, 1284-MOJE VISALPUR,SAN-SANAND	
51	12795	Neptune Spinners Pvt.Ltd.	PLOT NO: 52,CHANGODAR IND.ESTATE--,SAN-	
52	10672	Nextgen Print Pack	Opp. Mamta Machinery, Sarkhej-Bavla Road-Changodar,,SAN-Moraiya	9.000
53	29266	Nirav Chemical Industries	PLOT NO. 44/1-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	18.500
54	12881	Nugen Machineries Ltd.	PLOT NO: 16-18--,SAN-Changodar	15.000
55	47137	P & H Food & Beverages	Plot no: 43 & 43/B, Changodar Industrial Estate-Near Bagban Tambaku,,BAV-Changodar	9.830
56	51811	Par Polypack India Ltd	30/31/31-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	
57	52085	Par Polypack India Ltd	PLOT NO. 30,31,32-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	1.600
58	48382	Pearl Corporation	Unit-A, Pearl Industrial Estate,-opp. Neessa Food and Agro,SAN-chandogar	
59	13053	Penguin Polyform Pvt.Ltd..	PLOT NO: 13--,SAN-Changodar	17.000
60	50810	Precision Bearings Pvt. Ltd.	P.NO. 25, 26/A-B, -CHANGODAR INDUSTRIAL ESTATE, AT: CHANGODAR, TA: SANAND,SAN-CHANGODAR	
61	29671	R. R. International	54/5, -Block no -288,SAN-Changodar	1.900
62	43794	Rainbow Packaging Pvt Ltd	Plot. No.15/B, Changodar Industrial Estate-Sarkhej-Bavla Highway,SAN-Changodar	6.200
63	13265	Raj Chemicals	PLOT NO : 509--,SAN-Changodar	0.760
64	13310	Ramdev Food Products Pvt.Ltd	527-N.H.NO: 8,SAN-Changodar	48.300
65	45635	Rasmadhur Sweet Home	Block no. 25/p,26/p to 29/p, 31/p,-opp. Ramdev masala,Sarkhej-Bavla Highway,SAN-Changodar	3.500
66	49999	Ravishankar Engineering Works	Changodar Industrial Estate-Sarkhej Bavla Road, Changodar,SAN-	3.000
67	28216	Ricon Batteries Pvt. Ltd	PLOT NO. 38-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	15.500
68	41300	Rishabh Packaging,Changodar	GM-10,Sr.no.337/338-Jay Mataji Compound,,SAN-Changodar	0.750
69	36212	Rmc Readymix (India) (A Division Of Prism Cement Ltd)	Hissa No-9 of Block No- 329 (Paiki)-Behind Bhagyoday Hotel,SAN-Changodar	42.500
70	37095	Roop Organics Private Limited	Survey no. 195-Nr. Siddhi Oil Mill,SAN-Changodar	
71	13465	Royal Touch Laminates Pvt.Ltd.	PLOT NO:30,31--,SAN-Changodar	16.500
72	13561	Sakar Health Care Pvt.Ltd.	PLOT NO: 13--,SAN-CHANGODAR	33.100
73	46087	Satkar Food And Beverages	S.no. 287,288/p,Shed no.43 to 49, Krishna Estate-Vill. Changodar,SAN-Changodar	22.650
74	13641	Satya Steel Industries	Plot No: 83,-CHANGODAR	

			IND.ESTATE,,SAN-Changodar	
75	37496	Siddhi Beverages	Surevy No. 240-B/H. Bhagyoday Hotel, Srkhej - Bavala Road,SAN-CHANGODAR	60.000
76	14121	Siddhi Décor Pvt Ltd	No. 240-B/H : BHAGYODAYA HOTEL,SAN-changodar	5.980
77	14123	Siddhi Margarine Specialities Ltd	240-VILLAGE : CHANGODAR,SAN-changodar	3.500
78	14126	Siddhi Oils Ltd.	240/P-B/H BHAGYODAY HOTEL,SAN-CHANGODAR	49.000
79	37495	Siddhi Steels Pvt Ltd	Surevy No. 240, -B/H. Bhagyoday Hotel, Sarkhej- Bavla Highway,SAN-CHANGODAR	0.500
80	11190	Snowman Logistics Ltd.	329 -NEAR MULTI PACK PLAST PVT. LTD,SAN-CHANGODAR	1.700
81	36342	Sri Aurobindo Manufacturing Pvt. Ltd	Plot No. 37/A, 37/B-Changodar Inds. Estate,SAN-Changodar	
82	51875	Suhradam Healthcare	183-OPP LAXMINARAYAN (IN .OIL) PETROL PUMP,SARKHEJ BAVLA HIGHWAY,SAN-CHANGODAR	2.200
83	14331	Surya International	444 / P-VILLAGE : CHANGODAR,SAN-changodar	1.600
84	13474	Surya Offset (Old Name-Rupal Laminates Ltd.)	Plot No: Phase No: -BLOCK NO: 310,311,314,315,SAN-changodar	7.600
85	14422	Technofin International Pvt.Ltd.	PLOT NO: 36 & 41--,SAN-CHANGODAR	6.500
86	14430	Tgb Foods Pvt.Ltd.	Plot No: Phase No: -OPP: HARSHA ENGINEERING,SAN-changodar	23.000
87	14466	Transpares Ltd.	PLOT NO: 14-15--,SAN-CHANGODAR	4.900
88	14482	Trivedi Corporation Pvt.Ltd.	PLOT NO: 350,351,354,355--,ABG-Changodar	17.000
89	42220	Twince Industries	s no :240/p/1-sarkhej bavla road,SAN-changodar	
90	14507	Uma Industries	PLOT NO: 19/A--,SAN-CHANGODAR	2.800
91	47623	Uma Poly Plast	Block No: 382/5-B, Changodar Industrial Estate-Changodar,SAN-	
92	14519	Umiya Air Pack Pvt.Ltd.	PLOT NO: 40--,SAN-Changodar	8.000
93	43948	Urmin Products Pvt Ltd	PLOT NO: 48-Changodar Ind Estate, Changodar,SAN-Changodar	14.000
94	36410	V. S. Multimetal Pvt. Ltd.	Plot no. 3, Block no. 382-Changodar Ind. Estate,SAN-Changodar	7.500
95	24887	Vardhman Synthesis & Bulk Drug Pvt Limited	No.36, Changodar Industrial Estate-II-Ta-Sanand,SAN-sanand	
96	14637	Vibrant Décor Pvt.Ltd.	Plot No: Phase No: -NR: DIVYA DHAM,SAN-Changodar	18.150
97	50470	Vishnu Tobacco Product(Unit-3)	Plot No-36, Changodar Industrial ESATE--,SAN-Changodar	5.100
98	43003	Zenith Health Care Ltd	S.no.388/34, Changodar Industrial Estate-Vill. Changodar,SAN-Changodar - 382213	4.100
Total				1055.34 KLD

2. Ashwamegh

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	48876	1278sushen Medicamentos Private Limited	46/A, Ashwamegh Industrial Estate, Behind Gati Cargo-Changodar Cross Road, Changodar,SAN-CHANGODAR	20	3
2	32999	Abellon Cleanenergy Ltd- (Bio-Pallet Plant)	4,ASHWAMEGH ESTATE,NEAR BSNL TOWER-CHANGODAR,SAN-CHANGODAR	3.3	2.5
3	10339	Amron Fillers	PLOT NO: 6-ASHWMEGH ESTATE,SAN-	0.8	0.2
4	49156	Arihant Remedies	Block No.- 444, Ashwamegh Ind. Estate-Near Bajaj Food,SAN-Changodar	1.15	1.5
5	10622	Bajaj Foods Ltd.	PLOT NO: 444--,SAN-Sanand	0	2
6	10623	Bajaj Herbals Pvt Ltd	PLOT NO : 450--,SAN-Changodar	3.05	1.5
7	46115	Bonus Plastic Pvt Ltd	lot no. 42, Ashwmegh industrial estate-Changodar,SAN-Changodar	0.5	8
8	12056	CABB Karnavati Rasayan Ltd.	BLOCK NO: 459,460,461-NR:BAJAJ FOOD LTD.,SAN-CHANGODAR	242	10
9	10279	Caremax Healthcare	Plot No.56-Ashwamegh Ind.Estate, ,SAN-Changodar	0.15	0.5
10	42013	Creative Laminates	Plot No. 6/A, Ashwamegh Industrial Estate-Opp. M. N. Desai Petrol pump,SAN-Changodar	12.44	1.68
11	40101	Crown Extrusions Pvt.Ltd,Changodar	Sr.no.434,440,452-Ashwamegh Industrial Estate,Changodar,SAN-Changodar	0	0.5
12	11105	Crown Metals Pvivate Limited (Old Name:Desai Packwell Pvt.Ltd.)	PLOT NO: D-48,ASHWMEGH ESTATE--,SAN-Changodar	2	0.5
13	28656	Goel Strips P. Ltd	9/B-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	3	0.5
14	37364	Gujarat Pharma Lab Pvt. Ltd (Unit-2)	BLOCK NO-447-OPP.-CHANGODAR VILLAGE, B/H KARNAVATI PACKAGING,SAN-CHANGODAR	4.85	1.3
15	12459	J.K. Lakshmi Cement Ltd.(Rmc Plant)	PLOT NO:563/2/2-Ashwamegh Ind Estate, opp. N.N.Desai petrol pump,BAV-CHANGODAR	45	3
16	39651	Jagat Agro	C-47-Ashwamegh ind. etate,opp-M.N. Desai petrol pump, changodar,SAN-changodar	0	0
17	42669	Jay Ambe Metals	plot no.26, Ashwamegh Estate,-Changodar,SAN-Changodar	0.1	0.5
18	36955	Jay Balaji Industries	SUB PLOT NO.-28/29, -ASHWMEGH INDUSTRIAL ESTATE, SHED NO. 1/2,,SAN-	23	1

			CHANGODAR		
19	26417	Karnavati Rolling Mills Pvt Ltd	34,-ASHWAMEGH ESTATE,,SAN-Ahmedabad	1	0.5
20	39053	Knm Pharmachem	Plot No. A 23/1-Ashwamegh Industrial Estate,SAN-Moraiya	1.6	2
21	38637	Labh Flexipack Pvt. Ltd.	Plot No-65-70,-Ashwamegh Industrial Estate,,SAN-Changodar	0	1.5
22	40518	Labh Packaging	plot No. 70-Ashwamegh Ind. Estate, Changodar,SAN-Changodar	0.4	1.5
23	44774	Luminous Agro Industries	Plot no. 31/c, block no.405/part, -Ashwmegh ind. estate,SAN-Changodar	1	0.4
24	14580	Manipal Utility Packging Sollution Private Limited (Utility Printpack Pvt Ltd	PLOT NO: 46 / 47--,SAN-Changodar	1.02	1.5
25	13667	Medicare Environmental Management Pvt. Ltd.	28,ASHWAMEGH IND.ESTATE-BLOCK NO: 405,SAN-CHANGODAR	4	1.5
26	10285	New Ray Medical Inc.	Plot No.56-Ashwamegh Ind.Estate,SAN-Changodar	2	0.5
27	29385	Nirav Chemicals	51-Ashwamegh Ind. Estate,,SAN-Changodar	1.05	0.5
28	34868	Patco Plast Pvt. Ltd.	A-43, BLOCK NO. 431-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	0.5	2
29	38047	R.S.Steel Industries,Changodar	9/C,Ashwamegh Ind. Estate-Changodar,SAN-Changodar	1	0.5
30	45658	Rigveda Minerals	Plot no. 58, Ashwamegh Industrial Estate-H/H Bajaj Food, Nr. Karnavati Rasayan,SAN-Changodar	0.5	1
31	29877	Rohan Brc Gas Equipment Pvt.Ltd	plot no -5,-Ashwamegh Industrial Estate,SAN-Changodar	0.05	2
32	39073	Sarvamangal Enterprise	9 A, Aswamegh Industrial Estate, Opp. Water tank, -Changodar,SAN-CHANGODAR	11	0.2
33	26422	Satluj Steel Rolling Mills Pvt Ltd	33-ASHWAMEGH INDUSTRIAL ESTATE,SAN-Changodar	1.5	1.5
34	36407	Satyam Concrete Industries	Plot No. 54, Ashwamegh industrial Estate-Nr. UGVCL Office,SAN-Changodar	8	1
35	48284	Shiva Poly Compounds	Plot No: 5, Ashwamegh Industrial Estate, Near Nutan Nagrik-Bank Ltd., Vill: Changodar,SAN-CHANGODAR	0.5	1
36	50570	Shivpooja Oxide	Plot No. 26/1,Ashwamegh Ind. Estate-Nr.KNM Pharma,SAN-Changodar	0	0.5
37	13923	Shree Raj Exports Pvt.Ltd.	Plot No: Phase No: -23,ASHWAMEGH INDUSTRIAL ESTATE,SAN--	2.5	1.5
38	32185	Shree Vishwakarma Steel Re-Rolling Mills	21-ASHWAMEGH IND.ESTATE,SAN-CHANGODAR	1	0.5
39	14158	Smooth Ayurvedic Pharmacy Pvt.Ltd.	Block no444/1,445 -2,ASHWMEGH IND.ESTATE,SAN-Changodar	2.25	1.5
40	43945	Tanish Industries Pvt Ltd	Block no.446,475/1, 476/1,-Ashwmegh industrial estate,SAN-Changodar	3.5	1.2

41	14471	Transweld Mechanical Enginnering Works Ltd.	Plot No: Phase No: -44/C,ASHWAMEGH IND.ESTATE,SAN-CHANGODAR	1.1	2
42	14066	Umiya Carbon P. Ltd	PLOT NO. 16-ASHWAMEGH IND ESTATE, Changodar,,SAN-CHANGODAR	0.1	0.5
43	14651	Vijay Enterprise Pvt.Ltd.	37/B-ASHWMEGH IND.ESTATE,SAN-Changodar	0	1
44	10346	Vijay Enterprises P. Ltd	PLOT NO. 39/B-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	0	1
45	49905	Vincy Corporation	Plot No: 58, Ashwamegh Industrial Estate,-Village: Changodar, Taluka: Sanand,SAN-Changodar		
46	14706	Virgo Medicoat Pvt.Ltd.	PLOT NO: 29,ASHWMEGH INDUSTRIS ESTATE--,SAN-changodar	0.05	1.5
47	14710	Vishal Engineers & Galvanizer Pvt. Ltd.	Plot No: Phase No: -73,ASHWMEGH IND.ESTATE,SAN-Sanand	13.6	6
48	39159	Vishnu Pouch Packaging (P) Ltd. (Unit-Iv)	Surevy No. 400/2 & 434/8,7-Ashwamegh Industrial Estate, Changodar,SAN-Changodar	0	5
49	51532	Vishnu Samaj Seva Trust	Beside Plot No. 51-B/s Plot-51, Ashwamegh Industrial Estate, Sarkhej-Bavla Road,SAN-Changodar	1.7	2
50	41724	Vishnu Tobacco Product	7, Ashwamegh Industrial Estate,-Sarkhej-Bavla Road,,SAN-Changodar	0.1	5
Total				**422.36**	**86.48**

3. Panchratna

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	**Dom**
1	10069	Acme Skin Care Pvt. Ltd & Acme Diet Care Pvt. Ltd	PLOT NO: 14/A-Panchratna Industrial Estate, BAV-Changodar	1	0.9
2	39173	Addwrap Packging Pvt Ltd	36, Panchartna Industrial Estate-B/H. laxminarayan Petrol pump,SAN-Changodar	3	1.5
3	40723	Adgums Private Limited,	11-B, Pancharatna Ind. Estate,-Sarkhej-Bavla Highway,,SAN-Changodar	2.35	0.9
4	10122	Agro Life Science Corporation	Plot No: 26, Panchratna Ind. Estate, -Sarkhej – Bavla Highway, Changodar ,SAN-Changodar	0	1
5	37080	Alf Technologies (India) Ltd	Plot No. 3-Panchratna Industrial Estate,SAN-Changodar	1.8	1.1
6	31973	Anjani Enterprise	Plot No 3, Panchratn Industrial Estate, -Nr. Laxminarayan Petrol Pump,SAN-Changodar	11	4
7	10396	Ankur Protein Industries Ltd.	Plot No: Phase No: -PANCHRATNA ESTATE AT CHANGODAR,SAN-CHANGODAR	32.5	3

8	31974	Arjun Alloys	Plot No 21 & 22, panchratan Industrial Estate-Near Laxminarayan Petrol Pump,SAN-Changodar	3	1
9	10526	Ashwin Auto Cast Pvt Ltd	PLOT NO: 45,PANCHRATNA ESTATE--,SAN-CHANGODAR	4	5
10	45176	Auxitech Industries	Plot no. 54/1, Panchratna Industrial estate-B/H Super color factory,SAN-Changodar	4	1
11	34522	Bimal Orgo Chem Pvt. Ltd.	250,261-OPP. PANCHRATNA INDUSTRIAL ESTATE,SAN-CHANGODAR	4.8	1
12	14277	Contract Pharmacal Corporation India Private Limited	Plot No: 42-Panchratna Industrial estate Part-3,SAN-Changodar	1	2.25
13	51295	Embee Corporation	57/B-3, B-4-PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ BAVLA ROAD, CHANGODAR,,SAN-Ahmedabad	2.1	1
14	11282	Extube Industries	Plot No: Phase No: -48,PANCH RATNA IND.ESTATE,SAN-changodar	10	2
15	44981	Karl Mayer India Pvt Ltd	Plot no. 302/1, Panchratna Induatrial estate-Serkhej-Bavla Road,SAN-Changodar	1	3
16	51558	Krishna Recyclers	Plot No.- 8-Panchratna Ind.estate,SAN-Changodar	5	0.5
17	35865	Maharshi Labels Pvt. Ltd	Plot No. : 10/B-Panchratna Inds. Estate,SAN-Changodar	0	2
18	48090	Ncs (Nirvan Consulantancy Servicies)	Plot No.- 8-Panchratna Ind.estate,SAN-Sanand	10	0.5
19	13625	Neesa Agitech Pvt Ltd	279, -PANCHRATNA IND ESTATE,SAN-Changodar	52	8
20	13084	Oxygen Healthcare Research Pvt Ltd. (O.N:Polymer Coating)	PLOT NO : 35----,SAN-Changodar	1.5	2
21	51348	Polymer Products	57/C-PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ BAVLA ROAD, CHANGODAR,,SAN-Ahmedabad	0	0
22	46358	Rohan Brc Gas Equipment Pvt Ltd	Plot no. 291,304, Panchratna Industril estate-Sarkhej-Bavla Road,SAN-Changodar	2	5
23	36442	Shree Chamunda Enterprise	Plot No. 14 - A, Panchartna Industrial Estate-Vibhag- 2, Sarkej - Bavla Road,,SAN-CHANGODAR	0.5	2
24	11719	Shree Raj Enterprise	52-PANCHRATNA IND. ESTATE,SAN-CHANGODAR	0	0
25	39165	Sk Enterprise	Plot no. 44,45-panchratna ind. estat-1, sarkhej-bawla road,,SAN-changodar	2	1
26	43762	Solid Wheels Industries	Plot no.57-Panchratna Estate,SAN-Changodar - 382213	1	1
27	40618	Sumip Composites Pvt. Ltd. (Unit III)	Plot No. 1 to 5,-Panchratna Industrial Estate,SAN-Changodar	0	9
28	14245	Sumip Composites Pvt.Ltd.	Plot No: Phase No: -39/A,PANCH RATNA IND.ESTATE,SAN-Changodar	0	1.8
29	35859	Thakker Tobacco Products	Plot No. : 375/1-2-Pancharatna Ind	0	5

		Private Limited (Unit:2)	Estate,SAN-Changodar		
30	35860	Thakker Tobacco Products Private Limited (Unit:3)	Plot No. 28/A-Panchratna Inds Estate,SAN-Changodar	0	0.3
31	14520	Umiya Bikes Pvt Ltd	Plot No: Phase No: -29, PANCHRATNA IND.ESTATE,SAN-	2	0.5
32	42671	Umiya Flexifoam Pvt.Ltd.	plot no.40/A, Panchratna Ind. Estate-B/H Vivek steel,SAN-Changodar	0.15	2.5
33	14540	Unique Tags Pvt.Ltd.	Plot No: Phase No: -4,PANCHRATNA IND.ESTATE,SAN-Changodar	12	11
34	37780	Vini Cosmetic Pvt. Ltd	Plot No. - 67-Panchratna Industrial Estate,,SAN-Changodar	4	0.5
35	36409	Vivek Steel Co Pvt. Ltd.	Plot no., 39-Panchratna Ind. Estate,SAN-Changodar	9.1	2
36	14734	Vr Persul Phates Pvt Ltd	378-PANCHRATNA INDUSTRIAL ESTATE,SAN-changodar	11.85	2.5
Total				**194.65**	**85.75**

4. Shubhlaxmi

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	31739	Corona Industries	Plot No. - 24-Shubh Laxmi Estate,SAN-Moraiya	1	0.3
2	11800	Jagdish Alluminium Pvt Ltd	1-SHUBHLAXMI INDUSTRIAL ESTATE,SAN-MORAIYA	0	6
3	45540	Swati Switchgears(India) Pvt Ltd	36, Subh Laxmi Industrial Estate-Sarkhej-Bavla Road,SAN-Moraiya	0	0
4	13776	Umiya Enterprise (O.N: Shivam Agro Tech)	PLOT NO: 10,-SHUBH LAXMI INDUSTRIAL ESTATE,SAN-	3	2
Total				**4**	**8.3**

5. Mahagujarat

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	49976	Abm International	Plot No. 44 & 45-Mahagujarat Industrial Estate,Moraiya,SAN-Moraiya	0.2	0.4
2	10103	Aegis Life Science	215 / 216-MAHAGUJARAT IND ESTATE,SAN-	0.5	0.5
3	10110	Afzal Metal Refine Works	PLOT NO: 258-259-MAHA GUJARAT IND.ESTATE,,ABG-Moraiya	0	1.2
4	10942	Agri Growth Fertilizers & Chemicals	229-230, -Mahagujarat Industrial Estate,SAN-Moraiya	5.3	1.5
5	43007	Art-O-Print	Plot no.48, Mahagujarat Industrial Estate-Opp. Sarvoday Hotel,SAN-Moraiya	0.5	5
6	34470	Ashutosh Metal P. Ltd (Unit Ii)	18, 21-MAHAGUJARAT IND. ESTATE,SAN-MORAIYA	2	0.5

7	10520	Ashutosh Metal Pvt.Ltd.	PLOT NO: 255-MAHAGUJARAT IND.ESTATE,,SAN-MORAIYA	7.5	2.5
8	10559	Astron Packaging Ltd.	Plot No: Phase No: -22,23,34,MAHA GUJARAT IND.ESTATE,SAN-Moraiya	3.95	1.6
9	45580	Ayukalp Uap Pharma Pvt Ltd	Plot no. 423/9, A & B-Mahagujarat Industrial estate, Moraiya,SAN-Moraiya	4.8	4
10	14376	Ayusiddh Health Care P.Ltd.	Sr.No.,427, Pl.No.20/21-MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	7.75	0.8
11	10666	Bhagudev Floor Mill Pvt.Ltd.	427-MAHAGUJARAT IND.ESTATE, Nr. Sarvottam Hotel,SAN-moraiya	7.5	2.5
12	10725	Bharat Metal Oxide	Plot No: Phase No: -MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	0.5	0.5
13	10945	Care Well Healthcare	Plot No: Phase No: -142,MAHA GUJARAT ESTATE,SAN-CHANGODAR	4	2
14	10997	Chintan Aluminium Pvt.Ltd.	PLOT NO:254, , Mahagujarat Estate-Phase – III, Sarkhej-Bavla Road,SAN-Moraiya	0	0.7
15	40608	Corrtech Energy Ltd.,Unit -1,	Plot No. 51-Mahagujarat Industrail Estate,Moraiya,SAN-Changodar	0.5	2
16	45894	Daxal Cosmetics Pvt Ltd	Plot no. 347, Mahagujarat Industrial Estate-Sarkhej-Bavla Road, Vill. Moraiya,SAN-Moraiya	12.2	9
17	25778	Dharmshil Industries Pvt Ltd	S.No. 423, Paiki 13-14, 23, Village-Moraiya-Sarkhej-Bavla Highway, Ta-Sanand,SAN-Sanand	131	2.5
18	11238	Ele Mints Pvt Ltd	Plot No: Phase No: -243 - 245,MAHAGUJARAT IND.ESTATE,SAN-	9.5	0.5
19	24312	Futuristic Packaging Pvt Ltd	S.NO. 423 PAIKI, 24 PAIKI 13, PLOT NO.42-Mahagujarat Ind.Estate,VILLAGE MORAIYA,SAN-MORAIYA	10	8
20	11316	Flow Ink & Coatings Pvt.Ltd.	PLOT NO: 24,25--,SAN-Changodar	0.25	2.75
21	44218	Globetech Casting Pvt Ltd	Block -D, Ganesh Industrial Estate-423/24/12, Mahagujarat Industrial Estate,SAN-Moraiya	5.2	2.5
22	11523	Gujarat Polymers	Plot No: Phase No: -25, MAHA GUJARAT INDUST NAGAR,SAN-Moriaye	2	1.5
23	46170	Hcr Formulation Pvt Ltd	Plot no. A-38, Mahagujarat industrial estate-Moraiya,SAN-Moraiya	5.4	0.8
24	11740	Integrated Coating & Seed Technology India Pvt.Ltd.	Plot No: Phase No: -47,MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	0.2	0.5
25	30095	K.N.M. Pharma Pvt. Ltd.	plot no- 13, Survey No.- 427/P,-Mahagujarat Ind. Estate,SAN-Moraiya	5.5	2.5
26	11722	Kachchhi Food Products	427/6-Mahagujarat Industrial Estate,SAN-Moraiya	2.5	1.2

27	11998	Kaizen Industries Pvt.Ltd.	PLOT NO:118-121, SURVEY NO: 426/P,-MAHAGUJARAT IND.ESTATE,SAN-MORAIYA	0	1
28	12282	M.K.Sales Corporation	Plot No: Phase No: -231,MAHA GUJARAT IND.ESTATE,BAV-MORAIYA	0	0.5
29	32793	Macons Engineers	Plot No: 7, Mahagujarat Industrial Estate-Moraiya Patia ,SAN-	0	1.5
30	42833	Microchem	plot no.57, Mahagujarat Industrial Estate-Opp. Sarvotam Hotel, ,SAN-Moraiya	11	0.5
31	12637	Mona Oxide Pvt.Ltd.	PLOT NO: 171,MAHAGUJARAT ESTATE--,SAN-MORAIYA	0	1
32	12675	N.G.Realty Pvt.Ltd.	Plot No: Phase No: -240,242,SAN-CHACHARWADI	0	1270
33	12714	Narmada Agro Tech	Plot No: Phase No: -148, CHACHARWADI,SAN-VASNA	5.5	2
34	15919	Narmada Bio Chem Ltd. (Unit-II)	Survey No: 426/2, Plot No: 168,169,130,131-Maha Gujarat Ind Estate,SAN-Moraiya	28.8	2.2
35	12915	Online Graphics Pvt.Ltd.	PLOT NO: 24-25--,SAN-Moraiya	0	2
36	35964	Pharmatech Process Equipments	s. n. 423, sub plot no- 9 & 10-Mahagujarat Ind. estate,SAN-moraiya	4.6	3.5
37	12186	PPG ASIAN PAINTS PVT LTD. OLD NAME-Krupa Paints Pvt.Ltd.	Plot No: Phase No: -68/67,69,26 & 27,MAHA GUJ.IND.ESTATE,SAN-Moraiya	2	4
38	13144	Prathna Chem	Plot No: 117-MAHA GUJARAT IND.ESTATE,SAN-Moraiya	2.2	0.9
39	44030	Premier Industries	Plot No.253-Mahagujarat Industrial Estate,,SAN-Moraiya	0.05	0.5
40	13267	Raj Honey Chemicals	Plot No: Phase No: -40,MAHA GUJARAT IND.ESTATE,SAN-	0	0.5
41	17981	Rushabh Technocast Pvt. Ltd.	PLOT NO A -34/35-Mahagujarat Industrial Estate,SAN-Moraiya	3.5	5.5
42	39516	S. K. Enterprise	Plot no. 109-Maha Gujarat Inds. Estate,SAN-Changodar	0	2
43	13484	S.B.Polymers	Plot No: Phase No: -159,MAH GUJARAT IND.ESTATE,SAN-Moraiya	1.8	0.2
44	38757	Samcon Chemicals Private Ltd	PLOT NO-137-Mahagujarat Industrial Estate,,SAN-Moraiya	0	0.5
45	41899	Satyam Chemical Industries	132/1, Mahagujarat Ind. Estate, Nr. Narmada Bio Chem-Moriya,,SAN-Moraiya Changodar	0.1	0.2
46	40795	Shah Textile	S.No.426/2/p/16/p,Plot No.225,-Mahagujarat Ind. Estate,,SAN-Moraiya	1	1
47	35575	Shashwat Industries	Plot No. 201,202 & 203-Maha Gujarat Industrial Estate,SAN-Moraiya	0	2
48	44983	Shivam Products	Plot no. 246, Mahagujarat Industrial estate-B/H Mangal murti nitfab,SAN-Moraiya	0	1
49	43946	Siddhivinayak Vegfoods Pvt. Ltd.	PLOT NO: 7/307-MAHAGUJARAT IND. ESTATE, MORAIYA,SAN-MORAIYA	4	1

50	12440	Sky Lam Pvt.Ltd	423-PLOT NO: 15,16 A-4,A-5, Magagujarat ind. Estate,ABG-Ahmedabad	39	5
51	30446	Space Alloys Pvt. Ltd.	223/228,-Mahagujarat Industrial Estate,SAN-Moraiya	4.5	3
52	29141	Sunshine Industries	132-Mahagujarat Industrial Estate,B/h Sarvottam Hotel,,SAN-Moraiya	0.1	0.3
53	47830	Synzeal Research Private Limited	Plot No: F, Ganesh Industrial Estate, 423/24/8, -Mahagujarat Industrial Estate,SAN-Ahmedabad	0.5	1.5
54	14385	Tara Paints & Chemicals	A - 423 / 14-MAHAGUJARAT INDUSTRIAL ESTATE,SAN-Moraiya	1	11
55	39515	Totla Rolling Mills Pvt Ltd	Plot no. 111-Maha Gujarat Inds. Estate,SAN-Changodar	0	0
56	49331	Urmin Marketing Pvt. Ltd.	61, Mahagujarat Industrial Estate, Moraiya, Sarkhej Bavla -Road, Changodar,SAN-Moraiya	0	10
57	12347	Virat Petrolium	PLOT NO: 19-D-MAHAGUJARAT INDUSTRIAL ESTATE,SAN-MORAIYA	0	1
Total				**338.4**	**1392.75**

6. Tajpur Road

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	44024	Aeron Composite Pvt. Ltd.	Block No.496/P-Tajpur Road,SAN-Changodar	1.4	3
2	33751	Bjs Green Tech	Block No. 487-Changodar-Tejpur road,SAN-Changodar	3	0.8
3	37919	Blue Star Ltd	Surevy No. 501/3 & 503/2,-Tajpur Road, Sarkheja - Bavla High,SAN-CHANGODAR	0	6
4	48285	Hindustan Agro Chemicals	472, Near Sarjan R.O, Tajpur Road-Changodar, Ahmedabad,SAN-Changodar	0	0.25
5	14138	Jayshri Propack Pvt. Ltd.	488-BEHIND SUSHMA NAMKEEN, TAJPUR ROAD,,BAV-CHANGODAR	4.44	4
6	47859	Jayshri Weavetech Pvt. Ltd.	Plot No: 490, Tajpur Road, Changodar-Ahmedabad,SAN-CHANGODAR	13	2
7	16337	Kejriwal Exports	501/503 A, TAJPUR ROAD,-SARKHEJ BAVLA HIGHWAY, ,SAN-CHANGODAR	0	10
8	45650	Kumar Spintex Pvt Ltd	Block no. 479/P-1(294),531/P,532/P,533/P,534/P,535/,536/P,53-Tajpur road, Opp. Shushma Namkin,SAN-Changodar	10	5
9	13066	Photokina Chemicals (P) Ltd.	556/ B-Tajpur Road, Surkhej Bavla Highway,SAN-SANAND	9.25	5

10	36778	Sarla Chem,Tajpur Road,	B/H Volga Industry,Volga estate,-Tajpur Road,SAN-Changodar	0	1
11	13832	Sheer Chem Industries(New Name:Sheer Fine Chem Pvt.Ltd)	Plot No: 509/E, Phase No: -TAJPUR ROAD,SAN-AHMEDABAD	8.5	1
12	37530	Shital Rubber	Survey No. 496/1-Canal Tajpur road,SAN-Changodar	0.13	1
13	13954	Shree Shiva Enterprise	Plot No: Phase No: -14, SANKET IND ESTATE,SAN-Moraiya	17	1.5
14	37538	Sushma Namkeen Pvt. Ltd	Plot No. - 484-Tajpur road,SAN-Changodar	1.2	1
15	24810	Time Technoplast Ltd	PLOT NO. 531, 532-TEJPUR ROAD,SAN-CHANGODAR	2	5
16	32253	Unick Fix-A-Form & Printers Ltd.	Plot No: 472/8 & 481/2 Tajpur Road-Changodar, Sarkhej Bavla Road,SAN-Changodar	1	1
17	44978	Veerhealth Care Ltd	S.no.509/F, Opp. Sankheswar Ind. Estate-Tajpur road,SAN-Changodar	6.5	0.5
18	45651	Vishal Spintex	Block no. 532/P,533/P,534/P,536/P,537/P-Tajpur road, Opp. Shushma Namkin,SAN-Changodar	10	2
19	14752	Wilson Printercity Pvt.Ltd.	Plot No:501-503 , Tajpur Road,-CHANGODAR,SAN-Changodar	0	1.5
				87.42	**51.55**

7. Saket

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	43006	Art-O-Print	PLot no.23, Saket Industrial Estate-Nr. Weight bridge,SAN-Moraiya	0	1.5
2	11168	A Innovative International Ltd (Old Name-Dinha Export)	Plot No: Phase No: -34,35,SAKET IND.ESTATE,BAV-MORIYA	1	4
3	10592	Azure Fabrics Pvt Ltd.	Plot No: 3 Phase No: --3, SAKET IND ESTATE,SAN- Moraiya	18	2
4	10946	Carewin Pharmaceuticals Gujarat Pvt.Ltd.	PLOT NO: 38,SAKET ESTATE--,SAN-Moraiya	1.35	0.7
5	11226	E Coli Waste Management Pvt. Ltd. (Unit-1)	Plot No: Phase No: -14/1,SAKET IND.ESTATE,SAN-MORAIYA	1.7	1.7
6	50640	Facilities Management Services	PLOT NO : 4 D-Saket Estate, Changodar,RAM-Changodar	605	0.8
7	52087	Friends Cosmetics Pvt Ltd	16, KUSHAL INDUSTRIAL ESTATE, INSIDE SAKET INDUSTRIAL ESTATE-OPP HOF FACTORY, SARKHEJ BAVLA ROAD,CHANGODAR,SAN-CHANGODAR	0	0.3
8	47029	Gelpac	28, Saket Industrial Estate-Sarkhej-Bavla Road,BAV-Moraiya	0	0.5
9	33005	Hiren Trading Company	43-Saket industrial estate,SAN-Moraiya	1.5	0.7
10	41404	Knm Pharma	38/2, Saket Industrial Estate, Nr. Nova	2	2.5

			Petrochemicals Ltd-Moriya,SAN-Sanad		
11	28607	Maitry Enterprise	PLot No. 437 paiki -Saket Industrial estate ,SAN-sandnd	0	0.05
12	49725	Microlab Pvt Ltd	Plot No:- 6,7-Sanket Industrial Estate, Near Nova Petrochem, ,SAN-Moraiya	0	0
13	11596	Neochem Technologies	Plot No.- 19/1-Saket Ind. estate,SAN-Ahmedabad	23	4
14	45893	Parshwanath Polymers	S.no.437/3,5,6,7,8, 443/1, Plot no.35-36-Saket Industrial estate, Opp. Ramdev Masala,SAN-Changodar	0	0
15	49522	R.R. Lubricants (Unit:2)	Plot NO; 16, "Saket Estate', Vill: Moraiya-Dist; Ahmedabad - 382213,SAN-Moraiya	0	1.5
16	26493	R.R.Lubricants	5-B-SANKET INDUSTRIAL ESTATE,SAN-MORAIYA	0	0.5
17	41909	Royal Architectural Coating	Plot No.25, Saket Industrial Estate,-Near Nova Petrochemicals,,ABG-Moraiya	1.1	1
18	13464	Royal Touch Alluminium Pvt.Ltd.	plot no.30,31,Saket Ind.Estate-Nr.Nova Petro chemicals Ltd,SAN-Moraiya	3	2
19	37606	Sabharwal Life Science	Plot No- 28, Saket industrial Estate,-Village Moraiya,SAN-	0	0
20	13825	Shree Bhavani Organics Pvt.Ltd.	PLOT NO: 12 - 15--,SAN-moraiya	5	0.25
21	51953	Shree Kushal Polymers	PLOT NO 40-41, SAKET INDUSTRIAL ESTATE, -SARKHEJ BAVLA ROAD, AT MORAIYA,SAN-MORAIYA	0	5
22	23529	Shriji Sales Corporation	PLOT NO. 44-SAKET INDUSTRIAL ESTATE,SAN-MORAIYA	0	1
23	37863	Shrinathji Bag Industries	PLOT No.-63-Kushal Indstrial Estate, Opp: Ramdev masala,SAN-Moraiya	0	1
Total				**662.65**	**31**

8. Kesar Sopan

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	49548	Divine Polytech Industries	12,13, Sopan Kesar Industrial hub, NH-8 A,-Moraiya Village, Moraiya road,SAN-MORAIYA	1	0.5
2	51110	Forever Lifescience Pvt. Ltd.	74/D-Sopan Kesar Industrial Hub, Behind Hotel Sarvoday, NH-8A ,SAN-Moraiya	5.2	1.3
3	49079	Helix Technocast	68, Sopan Kesar Industrial Hub, Nerar Railway Crossing,-Moraiya Village Road, Moraiya,SAN-Moraiya	1.5	0.5
4	42078	Oracle Industries	S. No. 359/p, Plot No.- 29,-Sopan Kesar Industrial Hub, Nr. Sarvodaqy Hotel,,SAN-Moraiya	0.2	1
5	40081	Shaurya Casting Private Limited	S.No.359/P, Plot No.91,-Sopan Kesar	3	0.2

			Industrial Hub,,SAN-Moraiya		
6	39951	V. S. Multimetal Pvt. Ltd. (Unit-2)	Plot no. 92, Survey no.359-Sopan Kesar Industrial Hub,SAN-Moraiya	5	0.5
Total				**15.9**	**4**

9. Moriaya

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	**Dom**
1	10001	3m - India Ltd.	415(6)-PLOT NO: 8,MORAIYA IND.ESTATE,SAN-MORAIYA	8	15
2	13717	Aia Engineering Ltd	PLOT NO. : 10-PLOT NO: 10,SAN-Moraiya	0	0.5
3	10145	Aia Engineering Ltd.	PLOT NO: 39,40,70 to 77--,SAN-Moraiya	568	30
4	32974	Akshay Biotech	435 PAIKI 3-C/O RAJEEV FOOD,NEAR RAMDEV MASALA,SAN-MORAIYA	0	1
5	10222	Altus Surgical Industries	PLOT NO: 21/D--,SAN-Moraiya	0.6	0.5
6	10262	Ambica Chemicals	435-PLOT NO : 20,SAN-VILL MORIYA	6.5	1
7	10485	Ascent Yarns Pvt.Ltd.	PLOT NO: 14,15,16--,ABG-Moraiya	68	8
8	50349	Bellatrix Healthcare Llp	396 & 403-SARKHEJ-BAVLA HIGHWAY, VILLAGE-MORAIYA,SAN-MORAIYA	10.2	0.2
9	10777	Blaze Metal Works	PLOT NO: 20--,SAN-MORAIYA	1.5	3.5
10	10869	Cadila Health Care Ltd. (R & D Centre)	396/P & 403/P-N.H.NO:8,SAN-MORAIYA	34	65
11	33202	Cadila Health Care Ltd (Zydus Biologics)	S.N: 23,25/P,37,40/P & 42-SARKHEJ - BAVLA NATIONAL HIGHWAY - 8A,SAN-CHANGODAR	94	4
12	10873	Cadila Health Care Ltd.	PLOT NO: 417--,SAN-MORAIYA	700	70
13	37749	Cadila Health Care Ltd. (Zydus Vaccines)	Survey No. 40/p, 43,44,45,46,47-Changodar,SAN-Changodar	45	5
14	39475	Cil Nova Petro Chemicals Ltd,Moraiya	Sr.no.396/P & 395/4(P)-Sarkhej Bavla Highway,,SAN-Moraiya	494.1	10
15	31924	Crown Alba Writing Instruments India Pvt. Ltd	415, N. H. No 8- A -Sarkhej - Bavla Road,SAN-moraiya	5	3.5
16	11183	Divine Life Care Pvt Ltd	PLOT NO: 220--,SAN-Moriya	1.5	0
17	11191	Dolly Inter Exim Pvt Ltd.	431/1, 433/1-2-VILL: MORAIYA,SAN-	0	0.1
18	20005	Esdee Paint Limited	pLOT nO. 5, S.nO. 407/P-NEAR WATERMAN INDUSTRIES,SAN-MORAIYA	1.5	2
19	11260	Esdee Paints Ltd	PLOT NO: 106 - 108, 156 - 158--,ABG-MORAIYA	13.5	5
20	44567	Ess Ess Lubricants	79,80, Shri Ganesh Indstrial Estate-Opp. Hotel Survoday,, Vill Moraiya,SAN-Moraiya	0	0.3
21	51453	Euphoria Packaging Llp	396 & 403 -MORAIYA VILLAGE,	0	0.3

			SARKHEJ, BAVLA HIGHWAY, DIST:AHMEDABAD,SAN-MORAIYA		
22	45184	Expert Pharmaceuticals P Ltd	S.no.412/2/p1 & 415/6, -Plot no-4 & 5,SAN-Moraiya	59	5
23	11338	Gaggar Enterprise Pvt.Ltd.	PLOT NO: 435/SUB PLOT NO: 17--,SAN-MORAIYA	40	1
24	12876	GSL Nova Petrochemicals Ltd formerly Nova Petrochemicals Ltd.	396 (P),403-VILL:MORAIYA,SAN-MORAIYA	56.1	4.5
25	11561	H.J.Arochem Pvt.Ltd.	PLOT NO: 11/B--,SAN-MORAIYA	13	3
26	11607	Harsha Engineers Ltd.	427 & 431-SARKHEJ - BAVLA ROAD,SAN-MORAIYA	65	60
27	49499	Hexa Pharmachem	396 & 403, Moraiya Village, GSL Nova Compound-Besides Zydus Cadila Research,SAN-MARAIYA	0	0.4
28	11736	Intas Pharmaceuticals Ltd.	423 / P / A-SARKHEJ - BAVLA HIGHWAY,SAN-Moraiya	57.2	25
29	30147	Jyoti Power Transmission Pvt. Ltd	Plot No. 9/79/19-Opp. Nova Petrochem,SAN-Moraiya	0.25	1.5
30	12061	Kasaar Food Innovative Pvt.Ltd.	PLOT NO: 415/P,MORAIYA--,SAN-moraiya	4.5	2.4
31	12811	Macro Polymers Pvt.Ltd,Unit -3, formerly New Millenium Mica Ltd.	PLOT NO:21 & 22--,SAN-MORAIYA	20	3
32	12309	Macro Polymers Pvt.Ltd.	PLOT NO: 133,134,135,136,164, 165--,SAN-Moraiya	20	6
33	40027	Mamata Machinery Pvt. Ltd.	Survey No. 423/P-Sarkhej- Bavla road,SAN-Moraiya	6	10
34	12272	Mc.Fills Enterprises Pvt.Ltd.	423-MORAIYA,SAN-	11	0
35	12607	Modern Denim Ltd.	Plot No: Phase No: -10K.M.MILESTONE,SAN-Moraiya	790	28
36	12853	Nirma Limited	Plot No: 415/p -P.O.Chacharwadi, Vill:Moraiya,Ta:Sanand,SAN-Moraiya	191	125
37	51785	Nirvana Consultancy Services	137/138-Sharanya Industrial Estate, B/H Hotel Sarvottam,Moraiya Road,SAN-Moraiya	5	1.5
38	33715	Param Cyliner Liners Pvt.Ltd,Moraiya	Sr.no.412/P,413/P,415/P-Moraiya Ind.Estate,SAN-Moraiya	10	5
39	11216	Parikh Packaging Private Limited	S.No. 423, -Opp-Rotomac Pens, Sarkhej-Bawla Highway, ,SAN-Village-Moraiya	12	12
40	12029	R.R.Patel Industrial Gases Pvt Ltd. (O.N:Kanadia Air Tech Pvt.Ltd.)	407-SARKHEJ-BAVLA HOGHWAY,SAN-moraiya	0	0.25
41	48951	Radhe Krishna Dairy Products	Plot No.-2, Shyam Estate-Near Astron Packaging, Moraiya,SAN-Moraiya	1.2	1
42	13457	Rotomac Global Pvt. Ltd	415-MORAIYA,SAN-Changodar	3.5	1.5
43	13579	Samrock Murexin Chemicals India Ltd.	PLOT NO: 138--,SAN-MORAIYA	2.5	1.5
44	13654	Screen O Tex India Pvt Ltd.	396 / 406 PAIKI-MORAIYA - SANAND,SAN-MORAIYA	7.78	5
45	49131	Shivani Drum Company(Unit-Ii)	Plot No-423E, Ganesh Industrial	12	2

			Estate-Gate No-2, ,SAN-Maraiya		
46	13823	Shree Bhagwati Flour & Foods Pvt.Ltd.	430-OPP: NOVA PETRO CHEMICAL,SAN-Moraiya	0.5	18
47	40796	Shree Shailya Agrotech Pvt. Ltd	Plot No.15,-Gujarat Pharma Techno Park,,SAN-Changodar	23	3
48	14008	Shreenath Plylam	PLOT NO : 113--,SAN-Moraiya	10	5
49	14071	Shri Varahi Agro Industries	PLOT NO: 407/P-Moraiya village road,SAN-moraiya	1	0.25
50	33702	Shubh Laxmi Casting Pvt.Ltd,Moraiya	Plot no.20,21-Moraiya Ind.Estate,SAN-Moraiya	11	3
51	14111	Shyam Metals	PLOT NO: 170--,SAN-MORAIYA	0.5	0.6
52	14133	Silica Gel Products Mfg.Company	Plot No: Phase No:-13,MORAIYA IND.ESTATE,SAN-Moraiya	0.04	0.8
53	12957	Skaps Industries India P.Ltd.	423-PLOT NO: A 20,SAN-Moraiya	28	7
54	49009	Spiceone Food Products Pvt. Ltd.	Plot No.-407, Near Zydus-Cadila R&D Unit-Sarkhej-Bavla Highway,SAN-Sanand	0	1
55	35238	Sunny Agro Industries	Plot No. 421/2-Nr. Parikh Packaging,SAN-Moraiya	0	0.5
56	14467	Transformers & Rectifiers (I) Ltd	PLOT NO:427 & 431--,SAN-MORAIYA	12	18
57	14468	Transformers & Rectifiers (India) Ltd	Plot No: Phase No: -S.NO: 344-350,OPP: P.W.D.STORE,SAN-CHANGODAR	6	18
58	14484	Trivedi Tectonics	415-VILL: MORAIYA,SAN-Moraiya	10	10
59	42716	Tube Traders	18,-18,SILICON INDUSTRIAL HUB,NR. CIL NOVA PETROCHEMICALS,SAN-MORIYA	0	0.3
60	14681	Vimlachal Print & Pack Pvt.Ltd. (Packaging Unit)	PLOT NO: 437, 5, SAKET IND.ESTATE,-VILL:MORAIYA,,SAN-Changodar	7	5
61	10189	Vishnu Pouch Packaging Private Limited(Unit-12)	341, Vishal Estate-Opp Bhagudev Floor Mill,SAN-Moraiya	0.1	3
62	45986	Vishnu Pouch Packaging Pvt Lts (Unit-8)	Plot no. 4, s.no.431/p/7/p, Rachna Estate, Steel town,-vill. Moraiya,SAN-Moraiya	0	5.5
63	14719	Vishnu Pouch Packaging Pvt. Ltd.	PLOT NO : 49 / 50--,SAN-Moaraiya	0	9
64	38525	Vishnu Pouch Packaging Pvt. Ltd. (Unit - 2)	36-A, Saket Industrial Estate, Sarkhej - Bavla Road-Village :- Moraiya ,SAN-Moraiya	0	2
65	26185	Vishnu Tobacco Product (Unit-2)	S.No.406/paiki, Vill Moraiya-B/H Sarvoday Hotel,SAN-Moraiya	0.1	5
66	14745	Welknown Industries	PLOT NO : 43--,SAN-Vil. : Moraiya	3.5	1.5
67	35997	Zaveri & Compnay Pvt. Ltd.	Block No- A, Unit No- 8,9 & 17-Shree Ganesh Ind. esate, Besides Skapa Ind.,SAN-Moraiya	4.9	0.5
68	10947	Zydus Wellness Ltd formerly Carnation Neutra Analogous Foods Ltd.	PLOT NO: 7/A-B--,SAN-MORAIYA	33.5	10
Total				**3589.57**	**656.4**

10. Vasna-Chacharwadi

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	48686	varsun Foods Pvt. Ltd.	Block No: 99, Chanchrawadi Road,-Vasna-382213,Tal: Sanand,SAN-VASNA, SANAND	4.5	1
2	41925	Accretion Pharmaceuticals	Plot no. 29-Xcelon Industrial Park - 1,SAN-Vasna Chacharwadi	0.3	0.35
3	10486	Alpha Nippon Innovation Ltd	Survey No. 96, -Nr. Chacharwadi Temple, Sarkhej- Bavla Highway,,SAN-Chacharvadi Vasana	4	5
4	10321	Amishi Drugs & Chemicals	192-CHACHARWADI - VASNA,SAN-	0	0
5	10409	Anunoy Fabric Ltd.	Plot No: Phase No: - CHACHARWADI,SAN-	0	10
6	13800	Arvind Rub Web Controls Ltd	BLOCK NO 198-SARKHEJ BAVLA ROAD,BAV-CHACHARVADI	3	15
7	10553	Associated Fine Chem Pvt Ltd.	184 / P TO 186 / P-CHACHARWADI,SAN-Chacharavadi	0	0.5
8	50563	Astha Creations	104, Chacharavadi, Vasna, -Opp. Zydus Cadila, Sarkhej-Bavla Highway,SAN-Chacharavadi-Vasna	0	2
9	48744	Celestys Pharmaceuticals Pvt. Ltd.	Xcelon Industrial Park, Block No: 193, Vasana-Chachravadi-Tal: Sanand,SAN-Vasna Chancharwadi	1.5	3
10	11014	Claris Injectables Ltd	202,204,205,206/P,207/P-CHACHARWADI,SAN-Chacharawadi	1075	213
11	41385	Claris Otsuka Pvt. Ltd	Sr.no.199 to 201,206/P,207/P,208 to 210-Near Claris Life Science Ltd,SAN-Chacharwadi	981	21
12	40206	D.B.Corp Ltd, Chancharwadi-Vasna	Plot no.148,-B/H L&T Plant,SAN-Chancharwadi-Vasna	5	17
13	30149	Envy International Private Limited	142p, 143p-Nr. Divyabhasker,SAN-Vasna Chacharwadi	19	2
14	48664	Esdee Paints Ltd.	Block No: 174,175, Vill: Vasna Chacharwadi-Tal: Sanand,SAN-chacharwadi vasna	10	5
15	46727	Fairdeal Multifilament Pvt. Ltd.	Block No: 49, Nr. Gopinath Industrial Park-Vill: Chacharwadi-Vasna,,SAN-Vasna Iyava	30.8	1.5
16	11305	Finar Limited	PLOT NO: 184/P - 186/P--,ABG-Chacharwadi Vasna	21.5	1.5
17	51538	Flourish Foodsproducts Pvt.Ltd	Block No.204-Chacharwadi-Vasna,Bavla-Sarkhej	0	0

			Highway,Taluka-Sanand,SAN-Chacharwadi-Vasna		
18	37006	Intas Pharmaceuticals Ltd	Plot No. 191, -Village - Chacharwadi - Vasana,SAN-Chacharwadi – Vasana	39.5	6.5
19	11166	Jay Dinesh Chemicals	PLOT NO: 184,186--,SAN-Chacharavadi-Vasna	3	5
20	44968	Kravour Foods Pvt Ltd	Block no. 105/P & 103/B, Vill, Chacharawadi-Vasan-Chacharawadi Temple Road,SAN-Chacharawadi	2.5	0.8
21	29152	Larsen & Toubro Limited	ECC Division-144/146, Chacharwadi, Opp-Zydus Cadila Factory ,SAN-Ahmedabad	0	35
22	12302	M.S.Pickling Center	198-VILLAGE : CHACHARWADI,SAN-	0.5	0.5
23	49726	Macro Polymers Pvt. Ltd.	Survey No. 382 and Plot No. D-01 to D-06A-Gallops Ind. Park 2, Village: Chacharvadi Vasna,SAN-Chacharvadi Vasna	12	25
24	34784	Maniyar Agro Mills Pvt. Ltd	Servey No. 184 to 186-Ahmedabad-Bavla highway,SAN-Chharwadi-Vasana	0.01	1.5
25	26809	Mbr Flexibles Limited	S. No- 79 / 80-Near Charcharwadi Temple,SAN-Charcharwadi- Vasna	5	1
26	12758	Navkar Enterprise	-BLOCK NO: 185,186,SAN-Chacharvadi (Vasna)	0.6	0.95
27	12912	Omni Dye Chem Exports Ltd.	PLOT NO: 94,96--,SAN-Chacharwadi-Vasna	9	2
28	12916	Ordain Pharma Pvt.Ltd.	138/B-CHACHARWADI,SAN--	6	2
29	50299	palmlife Foods Llp	23, Tim Engineering Estate, Opposite Chacharwadi Mata Temple-Sarkhej Bavla Road, Vasna,SAN-Chacharwadi, Vasna	1.5	1
30	13108	Pradip Overseas Pvt Ltd	Plot No: Phase No: -BLOCK NO: 104,105,144 - 146,SAN--	250	25
31	13125	Prakash Solvent Extractions Ltd	106-CHACHARWADI,SAN--	10	0
32	45542	Raj Enterprise	Plot no. 1, Block no. 192 &211, Exiloan Ind. Estate-Vill. Chancharawadi,SAN-Chacharawadi	0.8	1
33	29386	Saga Laboratories	Survey No.198/3-Chacharwadi Vasna,SAN-Chacharwadi Vasna	2.5	1.5
34	46757	Shree Nirmal Ventures Pvt. Ltd.	Block No: 72 & 86, Chacharvadi Vasana-Dist: Ahmedabad,BAV-CHANCHARVADI VASANA	4	2.5
35	43640	Suryen Pharma	Plot no.2A, TIM Engineering Estate-Opp. Chacharawadi Temple, ,SAN-Changodar	1.5	1
36	50471	Vishnu Aroma Pouching Pvt Ltd.	Plot No=-106, N.H.-8, Sarkhej-Bavla Highway-Chacharavadi Vasna,SAN-Chacharavadi Vasna	0.5	4
Total				**2504.51**	**414.1**

11. PharmaSEZ

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	14801	ADILAC PHARMACEUTICALS LTD	Plot No: 1A,Pharmez, Phase No:- VILLAGE : MATODA,SAN-AHMEDABAD	225	35
2	29827	Amneal Life Sciences Pvt. Ltd.	Plot No. 15,16,17, Pharma-SEZ-Sarkhej Bavla Highway. N.H.-8-A,SAN-Matoda	325	40
3	24951	Bio Medical Life Science Pvt Ltd	4-PHAMEZ 'SEZ' SARKHEJ - BAVLA H/W NO:8,SAN-	1	0.5
4	30269	Cadila Healthcare Ltd.	Plot No. 1A/1 & 2, Pharmez-Sarkhej Bavla NH NO 8A,SAN-Matoda	55	25
5	11313	Fisher Biopharma Services (India) Pvt. Ltd.	PLOT NO: 22, PHARMEZ, SEZ-NATIONAL HIGHWAY 8A,,ABG-MATODA	80.5	15
6	11734	Intas Pharmaceuticals Limited	Plot No: 5,6,7 - PHARMA SEZ,SAN-MATODA	183	60
7	12436	Jay Pharma Ltd (Old Name: Famy Care Pvt. Ltd.)	PLOT NO:20 & 21, Pharma SEZ,-SARKHEJ-BAVLA N.H.NO:8-A,,SAN-MATODA	160	0
8	32221	Piramal Enterprises Limited.	PLOT NO. 19-PHARMEZ,(ZYDUS SEZ),SAN-MATODA	110	10
9	27007	Piramal Enterprises Ltd (old name-Oxygen Bio Research P. Ltd)	PLOT NO.18-PHARMACEUTICAL SEZ, NR VILLAGE MATODA,,BAV-CHANGODAR	65	55
10	14803	Zydus Hospira Oncology Pvt.Ltd.	3, PHARMEZ, -Special Ecomomic Zone, Ta, Sanand,SAN-MATODA	280	45
11	14802	Zydus Infrastructure Pvt,Ltd. (Cetp)	Pharmez-Special Economic Zone.-Sarkhej Bavla Highway. N.H.-8-A,SAN-Matoda	70	40
12	24397	Zydus Technologies Limited	PLOT NO. 1 / B-PHARMEZ,SAN-MATODA	5	20
Total				**1559.5**	**345.5**

12. Sari

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	35083	A.T.E. Enterprises Pvt Ltd	250, 251,252/1/Part,255/1/Part, 255/2/Paet-Village Sari,SAN-Sari	8.55	10
2	10038	Aarvee Denim & Exports Ltd	217-MOJE SARI,SAN-Sari	140	20
3	10330	Diamond Textile Private Limited	21/1,281/P,219/1/P,219/2/P,219/3,220/1,220/2/P,222/P,223/P-Near Arvee Denim,SAN-SARI	85	4
4	11257	Erhardt + Leimer (India) Pvt.Ltd.	252/1,252/2,255/1-2-VILL: SARI,SAN-VILL: SARI	43.5	38
5	11521	Gujarat Pharma Techno Park	224/P TO 236-VILL: SARI,SAN-	260	90

6	12227	Laxcon Steels Pvt.Ltd.	PLOT NO: 235--,SAN-Sari	10	50
7	12510	Medicare Hygien Pvt Ltd	240-VILLAGE : SARI,SAN-Sari	8	1
8	13354	Real Strips Ltd.	245-VILL: SARI,SAN-SARI	145	15
9	41473	Rimi Distributors,Sari	Sr.no.257,258,878,Opp. Gallops SEZ,-Village Sari,SAN-Sari	0	0
10	42571	TechTex	S.No.213, Vill. Sari-Sarkhej-Bavla Highway,SAN-Sari	0.7	2.3
11	44027	York Naturals Pvt. Ltd.	P.No. 25-26,-Gujarat Pharma Techno Park,,SAN-Vill:Sari	20.7	2.5
Total				**721.45**	**232.8**

13. Steel Town

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	41431	Alcon Beverages Pvt. Ltd.	Plot no. B3/A-3-Steel Town,SAN-Moraiya	8	5
2	11776	J.H.T. Power Eng Pvt Ltd.	427-P.NO : -C - 7 - 9, b/h HOF,SAN-Changodar	1.5	3
3	28187	Jht Power Engineering P. Ltd, Unit-2	PLOT NO. B-11 TO 20-"STEEL TOWN", OPP NOVA PETROCHEM P. LTD, B/h HOF,SAN-MORAIYA	12	6
4	35336	Kasta Bhanjan Traders	Plot No. 11, Godown No.:3-Steel Town Industrial Estate,SAN-Moraiya	2	1
5	10934	Optimus Healthcare	Plot No.B3/A-5-Steel Town,,SAN-Moraiya	0.5	0.05
6	32415	Unison Pharmaceuticals Private Limited	C/6-steel town,,SAN-Moraiya	8.225	7
7	45485	Unison Pharmaceuticals Pvt Ltd(F & D Unit)	Plot no. B/3/A, Steel town-Opp. Nova petro,SAN-Moraiya	6.2	1.95
8	36026	Unison Pharmaceuticals Pvt. Ltd.	Plot No: C-7,8,9 Steel Town, -Opp. Nova petrochemicals,SAN-Moraiya	20	5.6
9	29743	Vimlachal Print & Pack Pvt.Ltd. (Printing Ink Mfg. Unit)	431-STEEL TOWN,SAN-MORAIYA	0	0.5
10	32514	Vishnu Pouch Packaging Pvt Ltd(Unit-9)	S.No-431, Plot No-31paiki, Steel Town-Vill-Moraiya,SAN-Moraiya	0.5	5
Total				**58.925**	**35.1**

14. Swastik

Sr. No.	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	49152	Adgums Private Limited	Plot No: 1-A, Swastik Industrial Estate, Opp. Aarvee Denim-Sarkhej Bavla Highway, Vill: Sari,SAN-SARI	16.5	2.5
2	46724	Hema Remedies Private Limited	Plot no: 21, Swastik Ind. Estate-Opp. Aarvee Denims,,SAN-Village: Sari	82	2
3	48944	J V Conbuild Pvt. Ltd	S. No. 244 / P-1&2-Swastik Industrial Estate, Sari, Tal - Sanand,SAN-Sari	4.635	1.95

4	10198	Qutone Ceramics Pvt Ltd(In The Premises Of Revocoat India P Ltd)	plot no-23-Swastik industrial estate,SAN-sari	0.5	2.5
5	47831	Spack Automotives Pvt. Ltd.	Plot No: 23, Swastik Industrial Estate, -Opposite Aarvee Denim Spinning Unit ,SAN-Ahmedabad	1	3
6	46123	Zylys Bioscience	Plot no.9, Swastik industrial estate-Sarkhej-Bavla Hoghway,SAN-Sari	0	0
Total				**104.635**	**11.95**

15. New Ahmedabad

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	11281	Alka Enterprise	PLOT NO : 17-New Ahmedabad Industrial Estate,SAN-Moraiya	0.05	0.2
2	46331	Baghbanpackers Pvt Ltd	396, New Ahmedabad Ind. Estate-Sarkhej-Bavla Road, Vill. Moraiya,SAN-Moraiya	0	10
3	43949	Chemo Health Care Pvt Ltd	PLOT NO: 1-New Ahmedabad Ind Estate, Moraiya,SAN-Moriya	0.07	0.4
4	45802	Corrtech Energy Limited-Unit-Ii	S.no.407, Shed no.7,SP-3, New Ahmedabad Ind estate-New Ahmedabad Ind estate,SAN-Moraiya	1	4
5	39752	E-Mail Infotech Pvt. Ltd	Plot no. 66, Survey no. 396-New Ahmedabad Industrial Estate,SAN-Moraiya	0	0
6	47537	Empire Bakery	407, New Ahmedabad Industrial Estate-Changodar,,SAN-Moraiya	0.5	1
7	49329	Highvolt Power & Control Systems Pvt. Ltd.	Plot No: 5/6/7, New Ahmedabad Industrial Estate-B/h Nova Petrochemicals, Vill: Moraiya,SAN-Ahmedabad	5	3
8	29019	Kalpavijay Engineering Co.	82 / 83-NEW AHMEDABAD IND.ESTATE,SAN-SANAND	2.2	4
9	39753	M/S Atrium Infocomn Pvt.Ltd formerly E-Mall Infotech Pvt. Ltd	Plot no. 66, Survey no. 396-New Ahmedabad Industrial Estate,SAN-Moraiya	3.7	1
10	12667	Multi Shaper (India) Pvt.Ltd.	Plot No: Phase No: -81,NEW AHMEDABAD IND.AREA,SAN-MORAIYA	3.3	2.4
11	29831	Nisan Electricals	S. No. 440/1/2, Vill: Moriya, New Ahmedabad Industrial-Estate, B/h Nova petrochemicals,SAN-MORIYA	10	2
12	46205	Niva Flexi Prints	S.no. 394 & 478/1/2, Vill. Moraiya,-New Ahmedaad estate, B/H Nova petrochemical,SAN-Moraiya	0.5	0.5
13	12889	Ocean Steels Pvt Ltd.	Plot No: Phase No: -68/69,NEW A'BAD IND.ESTATE,SAN-Moraiya	3.5	5
14	36945	Restech Pharmaceuticals	plot no-407/p-ahmedabad industrial estate,,SAN-moraiya	2.75	5
15	44777	Sachchade Food Pvt Ltd	S.no.407/p3, New Ahmedabad estate-	15.7	2.5

			Opp. IOC Petrol pump,SAN-Moraiya		
16	40609	Shashi Industries	Plot No. 407-New AHmedabad Industrial Estate,SAN-Moraiya	0.02	0.5
17	13781	Shivam Industries	PLOT NO: 19,NEW AHMEDABAD INDUSTRIES ESTATE--,SAN-MORIYA	0.2	0.5
18	13904	Shree Matangi Investment Casting Pvt.Ltd.	Plot No: Phase No: -NEW A'BAD IND.ESTATE,SAN-MORAIYA	6.2	6.5
19	42568	Solvex Technology	Plot No.26, S.No.395/1,2-New Ahmedabad Industrial Estate,SAN-Moraiya	20	2
20	25237	Stp Ltd	PLOT NO. 44-NEW AHMEDABAD ESTATE,SAN-MORAIYA	18	1
21	14592	Vadiawala Industries	PLOT NO:24, NEW A'BAD IND ESTATE--,SAN-Moraiya	2.1	1
22	14685	Vinayak Industries.	Plot No: Phase No: -18, NEW AHMEDABAD IND ESTATE,SAN-Moriya	6.4	0.5
23	10545	Vishnu Aroma Pouching Pvt Ltd (unit-II)	Plot No-4-New Ahmedabad Industrial Estate, Moraiya,SAN-Moraiya	0	5.5
24	45169	Vishnu Pouch Packaging Pvt Ltd	Plot no. 4, New Ahmedabad Ind. Estate-Vill. Moraiya,SAN-Moraiya	0	5.5
25	48413	Vishnu Pouch Packaging Pvt. Ltd. (Unit-10)	Plot No: 5-6, New Ahmedabad Industrial Estate, -Bavla-Sarkhej Road,SAN-Ahmedabad	0	15.5
Total				**101.19**	**79.5**

16. Gopi

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WC KLD**	
				Ind	**Dom**
1	48462	Auto Sales	Plot No.-25-Gopi Industrial Estate,SAN-Changodar	3.2	7
2	21007	Ayuda Herbal P. Ltd	510-GOPI INDUSTRIAL ESTATE ,SAN-CHANGODAR	4.8	1.2
3	10762	Bicon Corporation	Plot No: Phase No: -28/30/A, GOPI IND ESTATE,SAN-Changodar	0.2	2.7
4	32831	Corona Remedies Pvt. Ltd.	Plot No 19,23,24-Gopi Ind. Estate,SAN-Changodar	5	4
5	48663	J.M Plastopack	31, Gopi Estate,-B/h Ramdev Masala, Sarkhej-Bavla Highway,ABG-CHANGODAR	0.1	0.2
6	12512	Medicus Pharma	Plot No: Phase No: -60,61,GOPI ESTATE,SAN-	2.2	1
7	47876	Seraphic Gravure	Plot No: 10, Gopi Industrial Estate, Nr Ramdev Masala-Sarkhej-Bavla Highway,SAN-CHANGODAR	2.7	3
8	35675	Venus Powder Product Pvt. Ltd	C- 510, 511, Gopi Industrial estate-B/h. Ramdev Masala,SAN-changodar	2	1.2
Total				**20.2**	**20.3**

17. NG gallops

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	50638	EAGLE CAST ALLOYS	B/7-8-Chacharavadi,SAN-CHACHARWADI	0.8	1.2
2	51151	Restoration Engineers	SURVEY / BLOCK NO : 56-Galops Industrial Park, Rajoda, Bavla,BAV-Rajoda	22	2
3	49890	Vestas Wind Technology India Pvt. Ltd.	Plot no. 37, Gallops Industrial park, -Vil: Rajoda, Tal: Bavla, Dist-Ahmedabad,BAV-Rajoda	7.5	50
Total				**30.3**	**53.2**

18. Matoda

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	41945	Highly Electrical Appliances India Private Limited	S.No.456,457/1,457/2,-Sarkhej-Bavla Highway (NH-8A),,ABG-Matoda	64	45
2	26265	Intas Bio Pharmaceuticals Limited	496/1/A & B, Sarkhej Bavla Highway-Village-Matoda, Tal-Sanand ,SAN-	32	10
3	10951	Intas Pharmaceuticals Limited	496 / 1 A & B-SARKHEJ-BAVLA HIGHWAY,SAN-Matoda	30	10
4	11738	Intas Pharmaceuticals Ltd.	PLOT NO: 457,458-VILL: MATODA,SAN-MATODA	299	212
5	41569	Jv Conbuild Private Limited	Survey no. 438/P-Opp: Intas Pharmaceuticals ,SAN-Matoda	4.03	1.7
6	30120	Lea Prints N Laminar	S. No. 458, Nr Intas Pharmaceuticals-Matoda, Tal: Sanand,SAN-Matoda	0	3
7	12242	Leamak Healthcare Pvt.Ltd	Plot No: Phase No: -SARKHEJ-BAVLA HIGHWAY,SAN-Matoda	9	1
Total				**438.03**	**282.7**

19. Radhe

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	Dom
1	29783	Crown Laminates Pvt.Ltd,Changodar	Sr.no.419/1,419/7-Radhe Ind. Estate,SAN-Changodar	30.5	4.5

2	35451	G. P. Sweets Pvt Ltd.	S.No.33-34,-Radhey Industrial Estate ,,SAN-Changodar	5.5	15
3	11972	K.M.M Foods Pvt Ltd	Plot No: Phase No: -POT NO: 33/34, RADHE ESTATE,SAN-CHANGODAR	8	1
4	45310	Max Signage Industries Pvt Ltd	Plot no. 18, 18/A, Radhe Industrial Estate-Near crown Laminates,SAN-Changodar	5	7
5	45178	Savas Engineering Company Pvt Ltd	Block no. 498, Radhe Ind. Estate-Tajpur road,SAN-Changodar	0	5
6	31221	Shree Narnarayan Ayurvedic Pharmacy	PLOT NO - 1,-Radhe Industrial Estate,SAN-Changodar	6	2
Total				**55**	**34.5**

20. Rajoda

Sr. No	GPCB ID	Name of Industry	Address	WC KLD	
				Ind	**Dom**
1	10269	Ambica Food Products Pvt.Ltd.	Plot No: Phase No: -VILL: RAJODA,BAV-	36	1.5
2	26387	Amneal Pharmaceuticals Company (I) Pvt. Ltd.	882/7,871-NR HOTEL KANKAVATI, ,BAV-RAJODA	93	6
3	10557	Astra Life Care India Pvt.Ltd.	PLOT NO: 57/P--,BAV-RAJODA	14.8	3.2
4	10718	Bharat Agro Industries	800-BAVLA-SANAND HIGHWAY ROAD,BAV-VILL: RAJODA	22.4	2.4
5	10739	Bhavani Food	S.No.817-B/H H.H.Rice Mill,N.H.8-A,Rajoda,BAV-Rajoda	1	1
6	30601	Big Box Containers Pvt. Ltd	Sr. No.-881/1, nr. Hotel kankavati-sarkhej-Bavla Road,,BAV-Rajoda	16.05	3
7	51388	Biomatrix Healthcare Pvt Ltd	Survey No. 869/1/2, -Rajoda,,BAV-Ahmedabad	30	5
8	11127	Dhanlaxmi Agro Industries	Plot No: Phase No: -VILL: RAJODA,BAV-	8	0
9	41740	Gardner Denver Engineered Products India Private Limited	Block no. 878-Opp : Gallops Industrial Park,BAV-Rajoda	2	5
10	33161	Gokul Mamra Pvt. Ltd.	NATIONAL HIGHWAY ROAD 8-A-RAJODA,BAV-RAJODA	15	1.5
11	12845	Nippon Agro Ltd.	Plot No: Phase No: -N.H.NO.8A,BAV-RAJODA	16	1
12	10992	Rotomac Global Pvt.Ltd,Unit Ii,Rajoda	Sr.No.788,-Rajoda,BAV-chacharavadi vasana	3.4	3
13	46593	Skipper Ltd(Old Name-Prakurti Steels Pvt Ltd)	S.no. 823, Vill. Rajoda-Ta. Bavla,BAV-Rajoda	1	4
14	14607	Vardan Industries	734-SARKHEJ - BAVLA HIGHWAY,BAV-RAJODA	10	0
15	48190	Vimalachal Print & Pack. Pvt. Ltd.	890/Paikki, Changodar Bavla Highway,-Mouje Rajoda, Bavla,Ahmedabad,BAV-RAJODA	7	5
16	38978	Vishnu Pouch Packaging Pvt. Ltd. (Unit -3)	plot no. 823, N. H. 8-A, Village - Rajoda,-Sarkhej - Rajkot Highway,BAV-Sarkhej	0	5
Total				**275.65**	**46.6**

Type of Industries & Wastewater Generation

Sr. No.	Type	Remarks
1	Pharmaceutical	Effluent after treatment is finally evaporated-ZLD
2	Rice Mills	Majority effluent goes to CETP
3	Rolling Mills	No effluent generation
4	Plastic	No effluent generation
5	Printing	No effluent generation
6	Laminated Sheets	Effluent after treatment is finally evaporated-ZLD
7	Food Products	Evaporation or plantation
8	Engineering	No effluent generation
9	Textile (Process House)	ZLD or plantation
10	Chemical Products	ZLD

3. EXISTING ENVIRONMENTAL ISSUES OF CHANGODAR REGION

Introduction of Changodar Region

Changodar Industrial area is stipulated on Ahmedabad – Rajkot Highway. The industrial stretch starts about 10 km away from Sarkhej-Ahmedabad and ends a few Km before Bavla Town. The total length of Industrial Stretch is about 12 Km.

Because of strategic location i.e near to Ahmedabad & on Delhi – Kandla Highway, growth oriented industrial policies of the Government and availability of good infrastructure, this area has shown remarkable growth in last decade. The industrial units with higher rate of wastewater generation are having required treatment and adequate land for disposal within their premises. However, because of high water table and the nature of soil the treated water is not being accepted by land and percolation of sewage through soak pit is very slow then expected rate.

In this Report, existing storm water management, production details, industrial and domestic wastewater generation & existing municipal solid waste management in 20 private industrial estates of Changodar region and existing condition of fatehwadi canal and its sublets with observations, and overall Existing Storm Water and Solid Waste Management on National Highway 8 (NH 8) have been given.

This preliminary study aims to assess feasibility of Environmental Infrastructure. Based on the details of industrial and domestic wastewater generation and future industrialization, feasibility of Common Effluent Treatment Plant (CETP) and Sewage Treatment Plant (STP) will be identified.

Existing Storm water Management

Existing Storm water Management in All Private Industrial Estates

Existing Storm water Management in Panchratna Industrial Estate

In Panchratna Industrial Estate, Strom water drain (SWD) is provided only in 4 to 5 units which are close to Sublet of Fatehwadi Canal.

Entry Point of the Panchratna Industrial Estate

Outlet of Storm Water Drain is also the Sublet of Fatehwadi Canal.

Open SWD Provided in one unit of Panchratna IE close to Sublet of Fatehwadi Canal

Open SWD Provided in Panchratna IE close to Sublet of Fatehwadi Canal

Outlet of SWD

Sublet of Fatehwadi Canal close to Panchratna IE

Existing Storm water Management in Changodar Industrial Estate

In Changodar Industrial Estate, Strom water drain (SWD) is provided only in 4 to 5 units which are close to Sublet of Fatehwadi Canal. Outlet of Storm Water Drains discharge provided in Sublet of Fatehwadi Canal through the main SWD.

Entry Point of the Changodar IE

Open SWD Provided in Changodar IE close to Sublet of Fatehwadi Canal

Debris, soil and solid waste entry in SWD of Changodar IE

Main SWD of Changodar IE near Canal

Outlet of Main SWD in Sublet of Fatehwadi Canal at Changodar IE

SWD is not provided in other part of Changodar IE

Water Logging in Changodar IE

Existing Storm water Management in Ashwamegh Industrial Estate

In Ashwamegh Industrial Estate, Strom water drain (SWD) is not provided.

SWD is not provided in Ashwamegh IE

Water Logging and demolition waste in Ashwamegh IE

Water Logging in Ashwamegh IE

Existing Storm water Management in Tajpur Industrial Estate

Strom water drain (SWD) is not provided in Tajpur Industrial Estate.

Tajpur Industrial Estate

Existing Storm water Management in Radhe Industrial Estate

Strom water drain (SWD) is not provided in Radhe Industrial Estate.

Water Logging in Radhe Industrial Estate

Existing Storm water Management in Subhlaxmi Industrial Estate

Strom water drain (SWD) is not provided in Subhlaxmi Industrial Estate.

Subhlaxmi Industrial Estate

Water Logging in Subhlaxmi Industrial Estate

Water Logging in Subhlaxmi Industrial Estate

Existing Storm water Management in Gopi Industrial Estate

Strom water drain (SWD) is not provided in Gopi Industrial Estate.

Gopi Industrial Estate

Gopi Industrial Estate

Water Logging in Gopi Industrial Estate

Existing Storm water Management in Steel Town Industrial Estate

Strom water drain (SWD) is not provided in Steel Town Industrial Estate.

Water Logging in Steel Town Industrial Estate

Existing Storm water Management in Mahagujarat Industrial Estate

In Mahagujarat Industrial Estate, Strom water drain (SWD) is provided at only one place and there is no management for collection of storm water. At the end all the storm water runoff on the roads outside the estate.

Soil and Solid waste entry in SWD of Mahagujarat Industrial Estate

Water Logging in Mahagujarat Industrial Estate

Existing Storm water Management in Vasna-Chacharwadi Industrial Estate

Strom water drain (SWD) is not provided in Vasna-Chacharwadi Industrial Estate.

Water Logging in Vasna-Chacharwadi Industrial Estate

Water Logging in Vasna-Chacharwadi Industrial Estate

Existing Storm water Management in Matoda Industrial Estate

Strom water drain (SWD) is not provided in Matoda Industrial Estate.

Matoda Industrial Estate

Water Logging in Matoda Industrial Estate

Existing Storm water Management in Swastik Industrial Estate

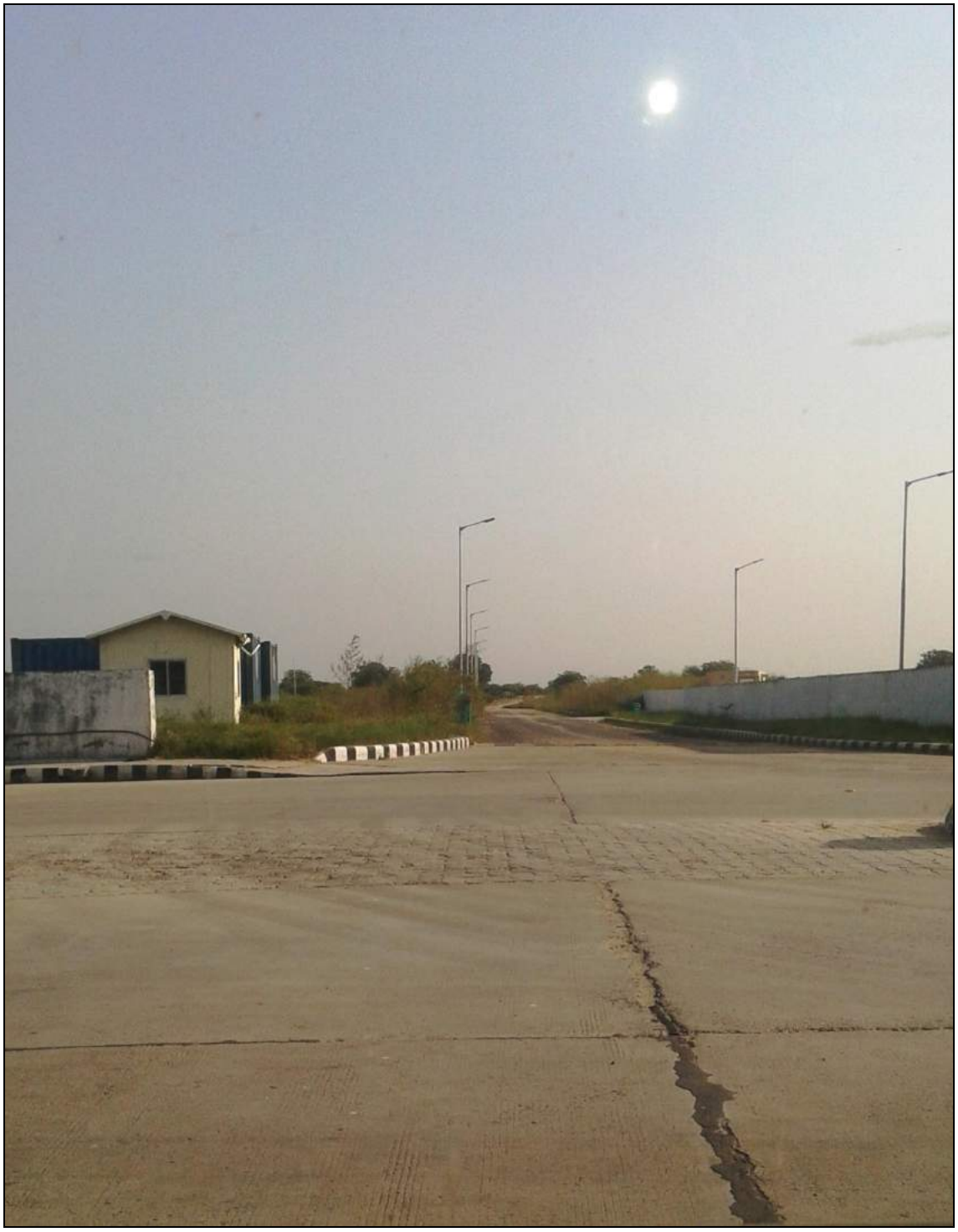
Strom water drain (SWD) is not provided in Swastik Industrial Estate.

Swastik Industrial Estate

Existing Storm water Management in NG Gallops Industrial Estate

NG Gallops Industrial Estate is well planned Industrial Estate and covered SWD is provided in this estate. But there is not any mechanism for reuse of collected storm water. Hence collected storm water is being discharged into the road side main storm water drain.

Well Planned NG Gallops Industrial Estate



Well Planned NG Gallops Industrial Estate

Covered Storm Water Drain and Tank for Collection of Storm Water

Collected storm water discharge into the road side main storm water drain

Existing Storm water Management in Rajoda Industrial Estate

SWD is not provided in Rajoda Industrial Estate.

Water Logging in Rajoda Industrial Estate

Sublets of Fatehwadi Canal at Rajoda Industrial Estate

Water Logging at the roadside of the Rajoda Industrial Estate

Existing Storm water Management in Sari Industrial Estate

SWD is provided only in one unit of this estate. There is no management for collection of storm water. At the end all the storm water runoff on the roads outside the estate.

Solid waste and soil entry in Open SWD

Water logging in Sari Industrial Estate

Existing Storm water Management in Moraiya Industrial Estate

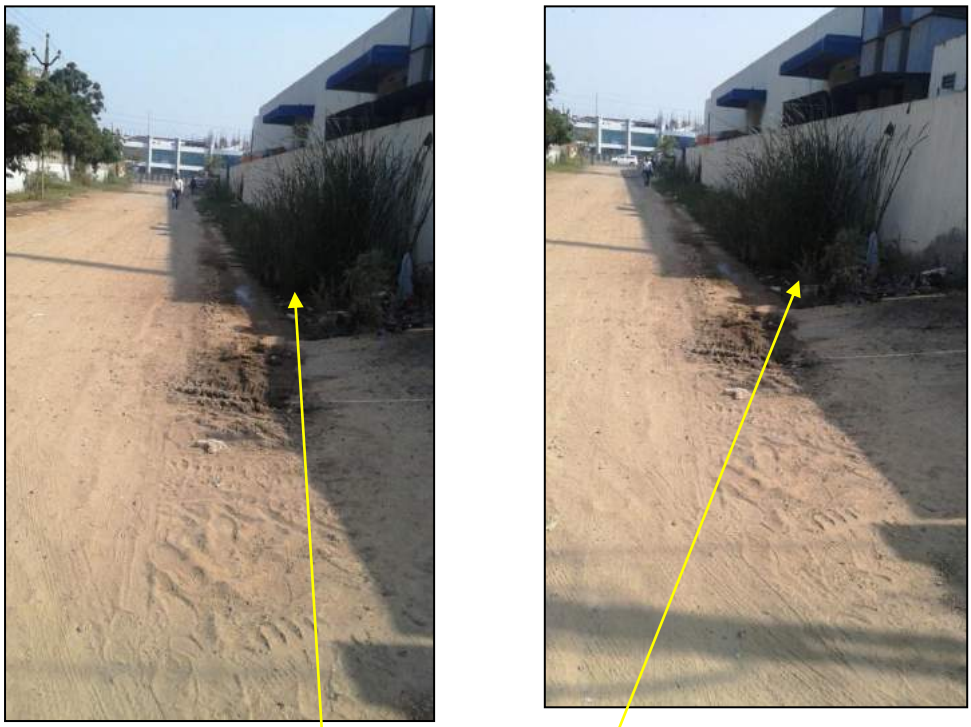
Strom water drain (SWD) is not provided in Moraiya Industrial Estate.

Water logging in Moraiya Industrial Estate

Water logging in Moraiya Industrial Estate

Existing Storm water Management in New Ahmedabad Industrial Estate

SWD is provided only in one unit of this estate. There is no management for collection of storm water. At the end all the storm water runoff on the roads outside the estate.



Open SWD at one unit of New Ahmedabad Industrial Estate

Water logging in New Ahmedabad Industrial Estate

Water logging in New Ahmedabad Industrial Estate

Existing Storm water Management in Kesar Sopan Industrial Estate

SWD is not provided in Kesar Sopan Industrial Estate.

Kesar Sopan Industrial Estate

Water logging near railway crossing in Kesar Sopan Industrial Estate

Existing Storm water Management in Saket Industrial Estate

SWD is provided in one side of this estate. There is no management for collection of storm water. At the end all the storm water runoff on the roads outside the estate

Plantation in Open SWD of Saket Industrial Estate

Open SWD of Saket Industrial Estate

Solid waste and Soil in Open SWD of Saket Industrial Estate

Existing Scenario of Storm Water Drain provided both side roads of NH 8

Solid waste and soil entry in the SWD

Eutrophication in the SWD

Solid waste in the SWD

Solid waste dumping in SWD

Solid waste dumping in SWD

Water logging at nearby area due to improper management of SWD

Eutrophication in SWD

Solid waste, soil and plant leaves in SWD

Observations

Status of Strom water Management in Changodar Industrial Area:

Sr. No.	Estate	Status of SWD	Is there requirement of Proper SWD? (Yes/No)
1	Panchratna	SWD is provided only in 4 to 5 units which are close to Sublet of Fatehwadi Canal.	Yes
2	Changodar	SWD is provided only in 4 to 5 units which are close to Sublet of Fatehwadi Canal.	Yes
3	Ashwamegh	SWD is not provided	Yes
4	Tajpur	SWD is not provided	Yes
5	Radhe	SWD is not provided	Yes
6	Subhlaxmi	SWD is not provided	Yes
7	Gopi	SWD is not provided	Yes
8	Steel Town	SWD is not provided	Yes
9	Mahagujarat	SWD is provided at only one place and there is no management for collection of storm water	Yes
10	Vasna-Chacharwadi	SWD is not provided	Yes
11	Matoda	SWD is not provided	Yes
12	Swastik	SWD is not provided	Yes
13	Pharma SEZ	SWD is provided	No
14	NG Gallops	SWD is provided	No
15	Rajoda	SWD is not provided	Yes
16	Sari	SWD is provided only in one unit of this estate. There is no management for collection of storm water	Yes
17	Moraiya	SWD is not provided	Yes
18	New Ahmedabad	SWD is provided only in one unit of this	Yes

		estate. There is no management for collection of storm water	
19	Kesar Sopan	SWD is not provided	Yes
20	Saket	SWD is provided in one side of this estate. There is no management for collection of storm water	Yes
21	Whole Changodar Region	SWD is provided at both side of road. But, it is not proper	Yes

- There is an urgent need of proper Storm water management in whole Changodar Industrial Area.

The Purpose of Strom Water Management

Storm water management is based on:

- The need to protect the health, welfare and safety of the public, and to protect property from flood hazards by safely routing and discharging storm water from developments;
- The quest to improve the quality of life of affected communities;
- The opportunity to conserve water and make it available to the public for beneficial uses;
- The responsibility to preserve the natural environment;
- The need to strive for a sustainable environment while pursuing economic development; and
- The desire to provide the optimum methods of controlling runoff in such a way that the main beneficiaries pay in accordance with their potential benefits.

Ideal Storm Water Drain

Different type of Strom water drain:

Side inlets type storm water drain

Filter cover provided in storm water drain

Side inlets type storm water drain with screen

SWD with screen

Industrial and Domestic Wastewater Generation in Changodar Industrial Area

Industrial and Domestic Wastewater Generation Details of 20 Private Industrial Estates of Changodar Industrial Area

Industrial and Domestic Wastewater Generation in 20 private industrial estate of Changodar Industrial Area is as under:

1. Changodar

Sr. No	GPCB ID	Name of Industry	Address	WWG
1	39754	Aastha Tools Private Limited	Plot no. 388 Paiki-3-Near Changodar Industrial Estate,SAN-Changodar	4.100
2	10058	Acc Ltd	Plot No: Phase No: -BLOCK NO : 259, ACC CONCRETE PLANT,SAN-CHANGODAR	0.500
3	32811	Adorn Enterprises Limited	Survey No- 195,-Nr. Claris Life Science Ltd, SAN-Changodar	7.700
4	25337	Aia Engineering Ltd	544,542 / P/2,543/P/1,540/P/1,539&18P-AT 20TH MILESTONE,SAN-Changodar	5.500
5	32591	Alpha Nippon Innovatives Ltd	15 & 20 plot no.-Changodar Ind. Estate, SAN-changodar	2.500
6	48875	Alpine Pharmaceuticals	7B, Changodar Industrial Estate, Sarkhej Bavla Road-Changodar Sanand, SAN-Changodar	0.350
7	38958	Aluminium Industries	Plot no. 254/386-Mahagujarat Estate, SAN-Changodar	
8	36134	Am Steel	Plot No: 4, Bloakc No: 302, -Changodar Industrial Estate, SAN-CHANGODAR	1.800
9	41801	Asahi Modi Materials Pvt. Ltd	Plot no.320,-Opp.Ankur Protein, SAN-Changodar	3.200
10	47225	Basil Hygienic	Plot No: 37 A & 38 B Changodar, Taluka: Sanand-Dist: Ahmedabad,SAN-Changodar	5.000
11	31588	Benmoon Pharma Research Pvt. Ltd.	219, Phase -III-Mahagujarat Industrial Estate,SAN-Changodar	
12	10673	Bhagwati Caterers Pvt Ltd	Plot No: Phase No: -OPP : HARSH ENGINEERS,SAN-Ahmedabad	50.000
13	35949	Bharti Airtel Ltd	Rasmadhur Estate-Opp: Ramdev Masala Industries Estate, SAN-Changodar	0.150
14	47487	Br Global	Plot No: 1/A, Block No: 382, Changodar Ind. Estate-B/h Trivedi Marble Lane, SAN-Ahmedabad	0.800

15	10858	Brussels Laboratories Pvt.Ltd	33, Changodar, Ind. Estate-Sarkhej Bavla Road, SAN-AHMEDABAD	2.400
16	10874	Cadila Health Care Ltd.(Fine Chemical Division)	Plot No: 265, 266, 267 -265-267,CHANGODAR,SAN-Changodar	36.000
17	29972	Cadila Healthcare Ltd(Ointment Unit)	Plot no- 254-255, B/H Zyfine Plant-Oppo. Laxminarayan Petrol Pump, SAN-Changodar	50.000
18	47624	Canton Textile Mills Pvt Ltd (old name-Vardhman Converters)	Plot No: 381/2, Changodar Industrial Estate-Changodar,SAN-CHANGODAR	
19	10960	Champa Metal Industries	PLOT NO: 28--,SAN-Changodar	0.700
20	10975	Changodar Metal Pvt.Ltd.	PLOT NO: 452--,SAN-Changodar	0.950
21	44784	Dermocare Laboratories Guj Pvt Ltd	Plot no. 10, Changodar Ind. Estate-II-Sarkhej-Bavla road, Changodar,SAN-Changodar	0.230
22	11122	Dhan Laxmi Tubes & Metal Industries	74/85-CHANGODAR IND.ESTATE,SAN-Changodar	0.950
23	11131	Dhanlaxmi Industries	4 / P-AKASHGANGA INDUSTRIAL ESTATE,SAN-	
24	43980	Dhanshree Agro Poly Product	15/A, Changodar Industrial Estate-Sarkhej-Bavala Road,SAN-Changodar	0.200
25	11151	Dhiman Steel Re-Rolling Mills	Plot No: Phase No: -68/69,CHANGODAR IND.ESTATE,SAN- CHANGODAR	1.900
26	39684	Ekdant Industries Private Limited	Plot no. 34 & 35-Changodar Industrial Estate, Part 2,SAN-Changodar	
27	11244	Elite Chemicals	Plot No: Phase No: -16,17,CHANGODAR IND.ESTATE PART II,SAN-Changodar	0.500
28	11245	Elite Industries	PLOT NO: 27--,SAN-	
29	11608	Harsha Engineers Ltd.	336,341,344,348,388-SARKHEJ - BAVLA ROAD,PO : CHANGODAR,SAN-CHANGODAR	59.000
30	11660	Hiscan Pvt.Ltd.	Plot No: Phase No: -B.NO: 304,SAN-Changodar	2.200
31	38684	Innovative Infrastructure Pvt. Ltd.	340/1-340/1,Near Harsha Engineering, Opp. PWD Rest House, SAN-Changodar	2.500
32	45160	Jakson Hydarulic Limited	Plot no. 304-Sarkhej-Bavla road, SAN-Changodar	14.000
33	40650	Jayantilal & Co.	Stone World, Besides ACC RMC Plant,-Sarkhehj - Changodar Highway, ,SAN-Changodar, Sanand	4.500
34	43023	Jpoxy Polymers	S.no. 385/P7-Changodar IOndustrial Estate,SAN-Changodar	0.200
35	44528	Kadam Soap Industries	Plot no. 496/1, Cenal Raod,-B/H Water jet factory,SAN-Changodar	0.900
36	12015	Kamakshi Flexiprints Pvt.Ltd.	Block No: 42-Changodar Industrial Estate,SAN-Changodar	2.600
37	12032	Kanhai Food Pvt.Ltd.	S.no.329 paiki 8-Vill. Changodar,SAN-CHANGODAR	6.500
38	12083	Keyur Impex Pvt.Ltd.	Plot No: Phase No: -BLOCK NO: 388,SAN-Changodar	0.500
39	10037	Kfc Corporation Ltd	BLOCK NO: 389-PLOT NO:51, CHANGODAR IND ESTATE,SAN-CHANGODAR	
40	44486	Kinjal Digital Imaging Solutions Pvt Ltd	S.no. 419/paiki, Vill. Changodar-Ta. Sanand, SAN-Changodar	0.400

41	45892	Lks Bulion (Imprt & Export)private Limited	101, Sankheshwar Industrial estate, Tajpur-Vill. Changodar,SAN-Changodar	350.000
42	38225	Lucent Clean Energy Private Limited	Block no. 187-Opp: Laxminarayan petrol pump, SAN-Changodar	0.800
43	25339	Maxeema Biotech Pvt Ltd	496 / 3-CHANGODAR,SAN-Changodar	
44	13655	Mittal Sections (Unit-1) (O.N:Seema Steel Pvt.Ltd.)	Plot No: 14-B/4,TRIVEDI MARBLES,SAN-CHANGODAR	2.000
45	25781	Mittal Sections Limited (Unit-Ii)	No. 23, Changodar Industrial Estate-Trivedi Craft Private limited ,SAN-CHANGODAR	2.000
46	29663	Mittal Steel	Plot no.1, Block No.382,- Changodar Industrial Estate B/h Trivedi Marbal ,SAN-Changodar	1.800
47	12638	Monokem Laboratories	84-CHANGODAR IND.ESTATE,BAV-CHANGODAR	1.500
48	12715	Narmada Biochem Pvt.Ltd.	426/2-PLOT NO: 6-7,SAN-Changodar	0.700
49	12785	Neesa Infrastructure Ltd	Plot No:278, 261 Phase No: -VILLAGE : CHANGODAR,SAN-Changodar	
50	11989	Neesa Infrastructure Ltd- Unit 2	S.NO. 1282 PART, 1284-MOJE VISALPUR,SAN-SANAND	
51	12795	Neptune Spinners Pvt.Ltd.	PLOT NO: 52,CHANGODAR IND.ESTATE--,SAN-	
52	10672	Nextgen Print Pack	Opp. Mamta Machinery, Sarkhej-Bavla Road-Changodar,, SAN-Moraiya	1.000
53	29266	Nirav Chemical Industries	PLOT NO. 44/1-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	6.200
54	12881	Nugen Machineries Ltd.	PLOT NO: 16-18--,SAN-Changodar	7.000
55	47137	P & H Food & Beverages	Plot no: 43 & 43/B, Changodar Industrial Estate-Near Bagban Tambaku,,BAV-Changodar	5.450
56	51811	Par Polypack India Ltd	30/31/31-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	
57	52085	Par Polypack India Ltd	PLOT NO. 30,31,32-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	0.400
58	48382	Pearl Corporation	Unit-A, Pearl Industrial Estate,-opp. Neessa Food and Agro, SAN-chandogar	
59	13053	Penguin Polyform Pvt.Ltd..	PLOT NO: 13--,SAN-Changodar	2.000
60	50810	Precision Bearings Pvt. Ltd.	P.NO. 25, 26/A-B, -CHANGODAR INDUSTRIAL ESTATE, AT: CHANGODAR, TA: SANAND,SAN-CHANGODAR	
61	29671	R. R. International	54/5, -Block no -288,SAN-Changodar	0.400
62	43794	Rainbow Packaging Pvt Ltd	Plot. No.15/B, Changodar Industrial Estate-Sarkhej-Bavla Highway, SAN-Changodar	4.000
63	13265	Raj Chemicals	PLOT NO : 509--,SAN-Changodar	0.400
64	13310	Ramdev Food Products Pvt.Ltd	527-N.H.NO: 8,SAN-Changodar	42.950
65	45635	Rasmadhur Sweet Home	Block no. 25/p,26/p to 29/p, 31/p,-opp. Ramdev masala,Sarkhej-Bavla Highway, SAN-Changodar	1.800
66	49999	Ravishankar Engineering Works	Changodar Industrial Estate-Sarkhej Bavla Road, Changodar, SAN-	2.000

67	28216	Ricon Batteries Pvt. Ltd	PLOT NO. 38-CHANGODAR INDUSTRIAL ESTATE,SAN-CHANGODAR	2.000
68	41300	Rishabh Packaging,Changodar	GM-10,Sr.no.337/338-Jay Mataji Compound,, SAN-Changodar	0.500
69	36212	Rmc Readymix (India) (A Division Of Prism Cement Ltd)	Hissa No-9 of Block No- 329 (Paiki)-Behind Bhagyoday Hotel, SAN-Changodar	2.000
70	37095	Roop Organics Private Limited	Survey no. 195-Nr. Siddhi Oil Mill,SAN-Changodar	
71	13465	Royal Touch Laminates Pvt.Ltd.	PLOT NO:30,31--,SAN-Changodar	8.580
72	13561	Sakar Health Care Pvt.Ltd.	PLOT NO: 13--,SAN-CHANGODAR	12.600
73	46087	Satkar Food And Beverages	S.no. 287,288/p,Shed no.43 to 49, Krishna Estate-Vill. Changodar,SAN-Changodar	1.600
74	13641	Satya Steel Industries	Plot No: 83,-CHANGODAR IND.ESTATE,,SAN-Changodar	
75	37496	Siddhi Beverages	Surevy No. 240-B/H. Bhagyoday Hotel, Srkhej - Bavala Road,SAN-CHANGODAR	14.600
76	14121	Siddhi Décor Pvt Ltd	No. 240-B/H : BHAGYODAYA HOTEL,SAN-changodar	1.450
77	14123	Siddhi Margarine Specialities Ltd	240-VILLAGE : CHANGODAR,SAN-changodar	0.550
78	14126	Siddhi Oils Ltd.	240/P-B/H BHAGYODAY HOTEL,SAN-CHANGODAR	20.500
79	37495	Siddhi Steels Pvt Ltd	Surevy No. 240, -B/H. Bhagyoday Hotel, Sarkhej- Bavla Highway,SAN-CHANGODAR	0.400
80	11190	Snowman Logistics Ltd.	329 -NEAR MULTI PACK PLAST PVT. LTD,SAN-CHANGODAR	0.400
81	36342	Sri Aurobindo Manufacturing Pvt. Ltd	Plot No. 37/A, 37/B-Changodar Inds. Estate,SAN-Changodar	
82	51875	Suhradam Healthcare	183-OPP LAXMINARAYAN (IN .OIL) PETROL PUMP,SARKHEJ BAVLA HIGHWAY,SAN-CHANGODAR	0.700
83	14331	Surya International	444 / P-VILLAGE : CHANGODAR,SAN-changodar	1.250
84	13474	Surya Offset (Old Name-Rupal Laminates Ltd.)	Plot No: Phase No: -BLOCK NO: 310,311,314,315,SAN-changodar	1.000
85	14422	Technofin International Pvt.Ltd.	PLOT NO: 36 & 41--,SAN-CHANGODAR	1.300
86	14430	Tgb Foods Pvt.Ltd.	Plot No: Phase No: -OPP: HARSHA ENGINEERING,SAN-changodar	3.900
87	14466	Transpares Ltd.	PLOT NO: 14-15--,SAN-CHANGODAR	2.600
88	14482	Trivedi Corporation Pvt.Ltd.	PLOT NO: 350,351,354,355--,ABG-Changodar	7.200
89	42220	Twince Industries	s no :240/p/1-sarkhej bavla road,SAN-changodar	
90	14507	Uma Industries	PLOT NO: 19/A--,SAN-CHANGODAR	1.150
91	47623	Uma Poly Plast	Block No: 382/5-B, Changodar Industrial Estate-Changodar,SAN-	
92	14519	Umiya Air Pack Pvt.Ltd.	PLOT NO: 40--,SAN-Changodar	5.000
93	43948	Urmin Products Pvt Ltd	PLOT NO: 48-Changodar Ind Estate, Changodar,SAN-Changodar	5.570
94	36410	V. S. Multimetal Pvt. Ltd.	Plot no. 3, Block no. 382-Changodar Ind. Estate,SAN-Changodar	2.400

95	24887	Vardhman Synthesis & Bulk Drug Pvt Limited	No.36, Changodar Industrial Estate-II-Ta-Sanand,SAN-sanand	
96	14637	Vibrant Décor Pvt.Ltd.	Plot No: Phase No: -NR: DIVYA DHAM,SAN-Changodar	3.550
97	50470	Vishnu Tobacco Product(Unit-3)	Plot No-36, Changodar Industrial ESATE--,SAN-Changodar	4.200
98	43003	Zenith Health Care Ltd	S.no.388/34, Changodar Industrial Estate-Vill. Changodar,SAN-Changodar - 382213	2.800
Total (KLD)				

2. Ashwamegh

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	48876	1278sushen Medicamentos Private Limited	46/A, Ashwamegh Industrial Estate, Behind Gati Cargo-Changodar Cross Road, Changodar,SAN-CHANGODAR	10.5	2.5
2	32999	Abellon Cleanenergy Ltd- (Bio-Pallet Plant)	4,ASHWAMEGH ESTATE,NEAR BSNL TOWER-CHANGODAR,SAN-CHANGODAR	0	0.1
3	10339	Amron Fillers	PLOT NO: 6-ASHWMEGH ESTATE,SAN-	0	0.2
4	49156	Arihant Remedies	Block No.- 444, Ashwamegh Ind. Estate-Near Bajaj Food,SAN-Changodar	0.1	1
5	10622	Bajaj Foods Ltd.	PLOT NO: 444--,SAN-Sanand	0	2
6	10623	Bajaj Herbals Pvt Ltd	PLOT NO : 450--,SAN-Changodar	2.68	1
7	46115	Bonus Plastic Pvt Ltd	lot no. 42, Ashwmegh industrial estate-Changodar,SAN-Changodar	0	7.5
8	12056	CABB Karnavati Rasayan Ltd.	BLOCK NO: 459,460,461-NR:BAJAJ FOOD LTD.,SAN-CHANGODAR	0	8
9	10279	Caremax Healthcare	Plot No.56-Ashwamegh Ind.Estate, ,SAN-Changodar	0	0.4
10	42013	Creative Laminates	Plot No. 6/A, Ashwamegh Industrial Estate-Opp. M. N. Desai Petrol pump,SAN-Changodar	0.3	1.55
11	40101	Crown Extrusions Pvt.Ltd,Changodar	Sr.no.434,440,452-Ashwamegh Industrial Estate,Changodar,SAN-Changodar	0	0.5
12	11105	Crown Metals Pvivate Limited (Old Name:Desai Packwell Pvt.Ltd.)	PLOT NO: D-48,ASHWMEGH ESTATE--,SAN-Changodar	1.5	0.3
13	28656	Goel Strips P. Ltd	9/B-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	0	0.3
14	37364	Gujarat Pharma Lab Pvt. Ltd (Unit-2)	BLOCK NO-447-OPP.-CHANGODAR VILLAGE, B/H KARNAVATI PACKAGING,SAN-CHANGODAR	0.7	1.6
15	12459	J.K. Lakshmi Cement Ltd.(Rmc Plant)	PLOT NO:563/2/2-Ashwamegh Ind Estate, opp. N.N.Desai petrol pump,BAV-CHANGODAR	0	1.5

16	39651	Jagat Agro	C-47-Ashwamegh ind. etate,opp-M.N. Desai petrol pump, changodar,SAN-changodar	0	0
17	42669	Jay Ambe Metals	plot no.26, Ashwamegh Estate,-Changodar,SAN-Changodar	0	0.4
18	36955	Jay Balaji Industries	SUB PLOT NO.-28/29, -ASHWMEGH INDUSTRIAL ESTATE, SHED NO. 1/2,,SAN-CHANGODAR	0	0.7
19	26417	Karnavati Rolling Mills Pvt Ltd	34,-ASHWAMEGH ESTATE,,SAN-Ahmedabad	0	0.3
20	39053	Knm Pharmachem	Plot No. A 23/1-Ashwamegh Industrial Estate,SAN-Moraiya	1.6	1.8
21	38637	Labh Flexipack Pvt. Ltd.	Plot No-65-70,-Ashwamegh Industrial Estate,,SAN-Changodar	0	1
22	40518	Labh Packaging	plot No. 70-Ashwamegh Ind. Estate, Changodar,SAN-Changodar	0	0.5
23	44774	Luminous Agro Industries	Plot no. 31/c, block no.405/part, -Ashwmegh ind. estate,SAN-Changodar	0.05	0.2
24	14580	Manipal Utility Packging Sollution Private Limited (Utility Printpack Pvt Ltd	PLOT NO: 46 / 47--,SAN-Changodar	0.2	1.5
25	13667	Medicare Environmental Management Pvt. Ltd.	28,ASHWAMEGH IND.ESTATE-BLOCK NO: 405,SAN-CHANGODAR	2.65	1
26	10285	New Ray Medical Inc.	Plot No.56-Ashwamegh Ind.Estate,SAN-Changodar	1.65	0.4
27	29385	Nirav Chemicals	51-Ashwamegh Ind. Estate,,SAN-Changodar	0	0.4
28	34868	Patco Plast Pvt. Ltd.	A-43, BLOCK NO. 431-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	0	1
29	38047	R.S.Steel Industries,Changodar	9/C,Ashwamegh Ind. Estate-Changodar,SAN-Changodar	0	0.3
30	45658	Rigveda Minerals	Plot no. 58, Ashwamegh Industrial Estate-H/H Bajaj Food, Nr. Karnavati Rasayan,SAN-Changodar	0.5	0.6
31	29877	Rohan Brc Gas Equipment Pvt.Ltd	plot no -5,-Ashwamegh Industrial Estate,SAN-Changodar	0	1.8
32	39073	Sarvamangal Enterprise	9 A, Aswamegh Industrial Estate, Opp. Water tank, -Changodar,SAN-CHANGODAR	0	0.18
33	26422	Satluj Steel Rolling Mills Pvt Ltd	33-ASHWAMEGH INDUSTRIAL ESTATE,SAN-Changodar	0	0.8
34	36407	Satyam Concrete Industries	Plot No. 54, Ashwamegh industrial Estate-Nr. UGVCL Office,SAN-Changodar	0.9	0.78
35	48284	Shiva Poly Compounds	Plot No: 5, Ashwamegh Industrial Estate, Near Nutan Nagrik-Bank Ltd., Vill: Changodar,SAN-CHANGODAR	0	0.8
36	50570	Shivpooja Oxide	Plot No. 26/1,Ashwamegh Ind. Estate-Nr.KNM Pharma,SAN-Changodar	0	0.4
37	13923	Shree Raj Exports Pvt.Ltd.	Plot No: Phase No: -23,ASHWAMEGH INDUSTRIAL	1	1

			ESTATE,SAN--		
38	32185	Shree Vishwakarma Steel Re-Rolling Mills	21-ASHWAMEGH IND.ESTATE,SAN-CHANGODAR	1	0.3
39	14158	Smooth Ayurvedic Pharmacy Pvt.Ltd.	Block no444/1,445 -2,ASHWMEGH IND.ESTATE,SAN-Changodar	0.15	1.35
40	43945	Tanish Industries Pvt Ltd	Block no.446,475/1, 476/1,-Ashwmegh industrial estate,SAN-Changodar	0.4	1
41	14471	Transweld Mechanical Enginnering Works Ltd.	Plot No: Phase No: -44/C,ASHWAMEGH IND.ESTATE,SAN-CHANGODAR	0.45	1.3
42	14066	Umiya Carbon P. Ltd	PLOT NO. 16-ASHWAMEGH IND ESTATE, Changodar,,SAN-CHANGODAR	0.1	0.4
43	14651	Vijay Enterprise Pvt.Ltd.	37/B-ASHWMEGH IND.ESTATE,SAN-Changodar	0	0.7
44	10346	Vijay Enterprises P. Ltd	PLOT NO. 39/B-ASHWAMEGH INDUSTRIAL ESTATE,SAN-CHANGODAR	0	0.7
45	49905	Vincy Corporation	Plot No: 58, Ashwamegh Industrial Estate,-Village: Changodar, Taluka: Sanand,SAN-Changodar		
46	14706	Virgo Medicoat Pvt.Ltd.	PLOT NO: 29,ASHWMEGH INDUSTRIS ESTATE--,SAN-changodar	0.05	0.9
47	14710	Vishal Engineers & Galvanizer Pvt. Ltd.	Plot No: Phase No: -73,ASHWMEGH IND.ESTATE,SAN-Sanand	5.1	5.7
48	39159	Vishnu Pouch Packaging (P) Ltd. (Unit-Iv)	Surevy No. 400/2 & 434/8,7-Ashwamegh Industrial Estate, Changodar,SAN-Changodar	0	4.2
49	51532	Vishnu Samaj Seva Trust	Beside Plot No. 51-B/s Plot-51, Ashwamegh Industrial Estate, Sarkhej-Bavla Road,SAN-Changodar	0	1.3
50	41724	Vishnu Tobacco Product	7, Ashwamegh Industrial Estate,-Sarkhej-Bavla Road,,SAN-Changodar	0	4.2
Total				**31.58**	**66.36**

3. Panchratna

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WWG**	
				Ind	**Dom**
1	10069	Acme Skin Care Pvt. Ltd & Acme Diet Care Pvt. Ltd	PLOT NO: 14/A-Panchratna Industrial Estate, BAV-Changodar	0.15	0.7
2	39173	Addwrap Packging Pvt Ltd	36, Panchartna Industrial Estate-B/H. laxminarayan Petrol pump,SAN-Changodar	0	1
3	40723	Adgums Private Limited,	11-B, Pancharatna Ind. Estate,-Sarkhej-Bavla Highway,,SAN-Changodar	0	0.72
4	10122	Agro Life Science Corporation	Plot No: 26, Panchratna Ind. Estate, -Sarkhej – Bavla Highway, Changodar ,SAN-Changodar	0	0.8

5	37080	Alf Technologies (India) Ltd	Plot No. 3-Panchratna Industrial Estate,SAN-Changodar	0.9	0.99
6	31973	Anjani Enterprise	Plot No 3, Panchratn Industrial Estate, -Nr. Laxminarayan Petrol Pump,SAN-Changodar	0	3.2
7	10396	Ankur Protein Industries Ltd.	Plot No: Phase No: -PANCHRATNA ESTATE AT CHANGODAR,SAN-CHANGODAR	9.5	2.5
8	31974	Arjun Alloys	Plot No 21 & 22, panchratan Industrial Estate-Near Laxminarayan Petrol Pump,SAN-Changodar	0	0.8
9	10526	Ashwin Auto Cast Pvt Ltd	PLOT NO: 45,PANCHRATNA ESTATE--,SAN-CHANGODAR	0	2
10	45176	Auxitech Industries	Plot no. 54/1, Panchratna Industrial estate-B/H Super color factory,SAN-Changodar	0.1	0.8
11	34522	Bimal Orgo Chem Pvt. Ltd.	250,261-OPP. PANCHRATNA INDUSTRIAL ESTATE,SAN-CHANGODAR	1.9	0.8
12	14277	Contract Pharmacal Corporation India Private Limited	Plot No: 42-Panchratna Industrial estate Part-3,SAN-Changodar	1	1.9
13	51295	Embee Corporation	57/B-3, B-4-PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ BAVLA ROAD, CHANGODAR,,SAN-Ahmedabad	0.08	0.8
14	11282	Extube Industries	Plot No: Phase No: -48,PANCH RATNA IND.ESTATE,SAN-changodar	0	2
15	44981	Karl Mayer India Pvt Ltd	Plot no. 302/1, Panchratna Induatrial estate-Serkhej-Bavla Road,SAN-Changodar	0	2.5
16	51558	Krishna Recyclers	Plot No.- 8-Panchratna Ind.estate,SAN-Changodar	5	0.3
17	35865	Maharshi Labels Pvt. Ltd	Plot No. : 10/B-Panchratna Inds. Estate,SAN-Changodar	0	1.5
18	48090	Ncs (Nirvan Consulantancy Servicies)	Plot No.- 8-Panchratna Ind.estate,SAN-Sanand	8	0.3
19	13625	Neesa Agitech Pvt Ltd	279, -PANCHRATNA IND ESTATE,SAN-Changodar	30.1	6.4
20	13084	Oxygen Healthcare Research Pvt Ltd. (O.N:Polymer Coating)	PLOT NO : 35----,SAN-Changodar	1.5	2
21	51348	Polymer Products	57/C-PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ BAVLA ROAD, CHANGODAR,,SAN-Ahmedabad	0	0
22	46358	Rohan Brc Gas Equipment Pvt Ltd	Plot no. 291,304, Panchratna Industril estate-Sarkhej-Bavla Road,SAN-Changodar	1	2.5
23	36442	Shree Chamunda Enterprise	Plot No. 14 - A, Panchartna Industrial Estate-Vibhag- 2, Sarkej - Bavla Road,,SAN-CHANGODAR	0	1.5
24	11719	Shree Raj Enterprise	52-PANCHRATNA IND. ESTATE,SAN-CHANGODAR	0	0
25	39165	Sk Enterprise	Plot no. 44,45-panchratna ind. estat-1, sarkhej-bawla road,,SAN-changodar	0	0.5

26	43762	Solid Wheels Industries	Plot no.57-Panchratna Estate,SAN-Changodar - 382213	0	1
27	40618	Sumip Composites Pvt. Ltd. (Unit III)	Plot No. 1 to 5,-Panchratna Industrial Estate,SAN-Changodar	0	8
28	14245	Sumip Composites Pvt.Ltd.	Plot No: Phase No: -39/A,PANCH RATNA IND.ESTATE,SAN-Changodar	0	1.6
29	35859	Thakker Tobacco Products Private Limited (Unit:2)	Plot No. : 375/1-2-Pancharatna Ind Estate,SAN-Changodar	0	3.5
30	35860	Thakker Tobacco Products Private Limited (Unit:3)	Plot No. 28/A-Panchratna Inds Estate,SAN-Changodar	0	0.2
31	14520	Umiya Bikes Pvt Ltd	Plot No: Phase No: -29, PANCHRATNA IND.ESTATE,SAN-	0	0.1
32	42671	Umiya Flexifoam Pvt.Ltd.	plot no.40/A, Panchratna Ind. Estate-B/H Vivek steel,SAN-Changodar	0	1.8
33	14540	Unique Tags Pvt.Ltd.	Plot No: Phase No: -4,PANCHRATNA IND.ESTATE,SAN-Changodar	0	8.8
34	37780	Vini Cosmetic Pvt. Ltd	Plot No. - 67-Panchratna Industrial Estate,,SAN-Changodar	1.1	0.4
35	36409	Vivek Steel Co Pvt. Ltd.	Plot no., 39-Panchratna Ind. Estate,SAN-Changodar	0	1.4
36	14734	Vr Persul Phates Pvt Ltd	378-PANCHRATNA INDUSTRIAL ESTATE,SAN-changodar	0	2.2
Total (KLD)				**60.33**	**65.51**

4. Shubhlaxmi

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	31739	Corona Industries	Plot No. - 24-Shubh Laxmi Estate,SAN-Moraiya	0	0.25
2	11800	Jagdish Alluminium Pvt Ltd	1-SHUBHLAXMI INDUSTRIAL ESTATE,SAN-MORAIYA	0	3.5
3	45540	Swati Switchgears(India) Pvt Ltd	36, Subh Laxmi Industrial Estate-Sarkhej-Bavla Road,SAN-Moraiya	0	0
4	13776	Umiya Enterprise (O.N: Shivam Agro Tech)	PLOT NO: 10,-SHUBH LAXMI INDUSTRIAL ESTATE,SAN-	1	1
Total (KLD)				**1**	**4.75**

5. Mahagujarat

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	49976	Abm International	Plot No. 44 & 45-Mahagujarat Industrial Estate,Moraiya,SAN-Moraiya	0	0.4
2	10103	Aegis Life Science	215 / 216-MAHAGUJARAT IND ESTATE,SAN-	0.2	0.2
3	10110	Afzal Metal Refine Works	PLOT NO: 258-259-MAHA GUJARAT IND.ESTATE,,ABG-Moraiya	0	1

4	10942	Agri Growth Fertilizers & Chemicals	229-230, -Mahagujarat Industrial Estate,SAN-Moraiya	0	1.2
5	43007	Art-O-Print	Plot no.48, Mahagujarat Industrial Estate-Opp. Sarvoday Hotel,SAN-Moraiya	0	4
6	34470	Ashutosh Metal P. Ltd (Unit Ii)	18, 21-MAHAGUJARAT IND. ESTATE,SAN-MORAIYA	0	0.5
7	10520	Ashutosh Metal Pvt.Ltd.	PLOT NO: 255-MAHAGUJARAT IND.ESTATE,,SAN-MORAIYA	1.9	1.8
8	10559	Astron Packaging Ltd.	Plot No: Phase No: -22,23,34,MAHA GUJARAT IND.ESTATE,SAN-Moraiya	0.35	1.3
9	45580	Ayukalp Uap Pharma Pvt Ltd	Plot no. 423/9, A & B-Mahagujarat Industrial estate, Moraiya,SAN-Moraiya	0.75	3
10	14376	Ayusiddh Health Care P.Ltd.	Sr.No.,427, Pl.No.20/21-MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	0.93	0.55
11	10666	Bhagudev Floor Mill Pvt.Ltd.	427-MAHAGUJARAT IND.ESTATE, Nr. Sarvottam Hotel,SAN-moraiya	0	2
12	10725	Bharat Metal Oxide	Plot No: Phase No: -MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	0.3	0.3
13	10945	Care Well Healthcare	Plot No: Phase No: -142,MAHA GUJARAT ESTATE,SAN-CHANGODAR	1.6	1.4
14	10997	Chintan Aluminium Pvt.Ltd.	PLOT NO:254, , Mahagujarat Estate-Phase – III, Sarkhej-Bavla Road,SAN-Moraiya	0	0.5
15	40608	Corrtech Energy Ltd.,Unit -1,	Plot No. 51-Mahagujarat Industrail Estate,Moraiya,SAN-Changodar	0	2
16	45894	Daxal Cosmetics Pvt Ltd	Plot no. 347, Mahagujarat Industrial Estate-Sarkhej-Bavla Road, Vill. Moraiya,SAN-Moraiya	4	5
17	25778	Dharmshil Industries Pvt Ltd	S.No. 423, Paiki 13-14, 23, Village-Moraiya-Sarkhej-Bavla Highway, Ta-Sanand,SAN-Sanand	0.1	0.8
18	11238	Ele Mints Pvt Ltd	Plot No: Phase No: -243 - 245,MAHAGUJARAT IND.ESTATE,SAN-	0.3	0.5
19	24312	Futuristic Packaging Pvt Ltd	S.NO. 423 PAIKI, 24 PAIKI 13, PLOT NO.42-Mahagujarat Ind.Estate,VILLAGE MORAIYA,SAN-MORAIYA	0	6.4
20	11316	Flow Ink & Coatings Pvt.Ltd.	PLOT NO: 24,25--,SAN-Changodar	0	2.2
21	44218	Globetech Casting Pvt Ltd	Block -D, Ganesh Industrial Estate-423/24/12, Mahagujarat Industrial Estate,SAN-Moraiya	0.5	2.3
22	11523	Gujarat Polymers	Plot No: Phase No: -25, MAHA GUJARAT INDUST NAGAR,SAN-Moriaye	0.1	1.35
23	46170	Hcr Formulation Pvt Ltd	Plot no. A-38, Mahagujarat industrial estate-Moraiya,SAN-Moraiya	0.2	0.7

24	11740	Integrated Coating & Seed Technology India Pvt.Ltd.	Plot No: Phase No: -47,MAHA GUJARAT IND.ESTATE,SAN-MORAIYA	0.15	0.4
25	30095	K.N.M. Pharma Pvt. Ltd.	plot no- 13, Survey No.- 427/P,-Mahagujarat Ind. Estate,SAN-Moraiya	1.5	1.5
26	11722	Kachchhi Food Products	427/6-Mahagujarat Industrial Estate,SAN-Moraiya	1.6	1.2
27	11998	Kaizen Industries Pvt.Ltd.	PLOT NO:118-121, SURVEY NO: 426/P,-MAHAGUJARAT IND.ESTATE,SAN-MORAIYA	0	0.8
28	12282	M.K.Sales Corporation	Plot No: Phase No: -231,MAHA GUJARAT IND.ESTATE,BAV-MORAIYA	0	0.35
29	32793	Macons Engineers	Plot No: 7, Mahagujarat Industrial Estate-Moraiya Patia ,SAN-	0	1
30	42833	Microchem	plot no.57, Mahagujarat Industrial Estate-Opp. Sarvotam Hotel, ,SAN-Moraiya	0	0.35
31	12637	Mona Oxide Pvt.Ltd.	PLOT NO: 171,MAHAGUJARAT ESTATE--,SAN-MORAIYA	0	0.6
32	12675	N.G.Realty Pvt.Ltd.	Plot No: Phase No: -240,242,SAN-CHACHARWADI	0	745
33	12714	Narmada Agro Tech	Plot No: Phase No: -148, CHACHARWADI,SAN-VASNA	0.5	0.75
34	15919	Narmada Bio Chem Ltd. (Unit-II)	Survey No: 426/2, Plot No: 168,169,130,131-Maha Gujarat Ind Estate,SAN-Moraiya	0	1
35	12915	Online Graphics Pvt.Ltd.	PLOT NO: 24-25--,SAN-Moraiya	0	1.8
36	35964	Pharmatech Process Equipments	s. n. 423, sub plot no- 9 & 10-Mahagujarat Ind. estate,SAN-moraiya	4.3	3
37	12186	PPG ASIAN PAINTS PVT LTD. OLD NAME-Krupa Paints Pvt.Ltd.	Plot No: Phase No: -68/67,69,26 & 27,MAHA GUJ.IND.ESTATE,SAN-Moraiya	0	3.2
38	13144	Prathna Chem	Plot No: 117-MAHA GUJARAT IND.ESTATE,SAN-Moraiya	0.2	0.8
39	44030	Premier Industries	Plot No.253-Mahagujarat Industrial Estate,,SAN-Moraiya	0	0.2
40	13267	Raj Honey Chemicals	Plot No: Phase No: -40,MAHA GUJARAT IND.ESTATE,SAN-	0	0.5
41	17981	Rushabh Technocast Pvt. Ltd.	PLOT NO A -34/35-Mahagujarat Industrial Estate,SAN-Moraiya	0	4.5
42	39516	S. K. Enterprise	Plot no. 109-Maha Gujarat Inds. Estate,SAN-Changodar	0	1
43	13484	S.B.Polymers	Plot No: Phase No: -159,MAH GUJARAT IND.ESTATE,SAN-Moraiya	0	0.2
44	38757	Samcon Chemicals Private Ltd	PLOT NO-137-Mahagujarat Industrial Estate,,SAN-Moraiya	0	0.3
45	41899	Satyam Chemical Industries	132/1, Mahagujarat Ind. Estate, Nr. Narmada Bio Chem-Moriya,,SAN-Moraiya Changodar	0	0.15
46	40795	Shah Textile	S.No.426/2/p/16/p,Plot No.225,-Mahagujarat Ind. Estate,,SAN-Moraiya	0	0.8

47	35575	Shashwat Industries	Plot No. 201,202 & 203-Maha Gujarat Industrial Estate,SAN-Moraiya	0	1.8
48	44983	Shivam Products	Plot no. 246, Mahagujarat Industrial estate-B/H Mangal murti nitfab,SAN-Moraiya	0	0.5
49	43946	Siddhivinayak Vegfoods Pvt. Ltd.	PLOT NO: 7/307-MAHAGUJARAT IND. ESTATE, MORAIYA,SAN-MORAIYA	0	0.8
50	12440	Sky Lam Pvt.Ltd	423-PLOT NO: 15,16 A-4,A-5, Magagujarat ind. Estate,ABG-Ahmedabad	1.25	4
51	30446	Space Alloys Pvt. Ltd.	223/228,-Mahagujarat Industrial Estate,SAN-Moraiya	0	2.8
52	29141	Sunshine Industries	132-Mahagujarat Industrial Estate,B/h Sarvottam Hotel,,SAN-Moraiya	0	0.15
53	47830	Synzeal Research Private Limited	Plot No: F, Ganesh Industrial Estate, 423/24/8, -Mahagujarat Industrial Estate,SAN-Ahmedabad	0.5	1
54	14385	Tara Paints & Chemicals	A - 423 / 14-MAHAGUJARAT INDUSTRIAL ESTATE,SAN-Moraiya	0.06	9.9
55	39515	Totla Rolling Mills Pvt Ltd	Plot no. 111-Maha Gujarat Inds. Estate,SAN-Changodar	0	0
56	49331	Urmin Marketing Pvt. Ltd.	61, Mahagujarat Industrial Estate, Moraiya, Sarkhej Bavla -Road, Changodar,SAN-Moraiya	0	6
57	12347	Virat Petrolium	PLOT NO: 19-D-MAHAGUJARAT INDUSTRIAL ESTATE,SAN-MORAIYA	0	0.8
Total (KLD)				**21.29**	**836.55**

6. Tajpur Road

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	44024	Aeron Composite Pvt. Ltd.	Block No.496/P-Tajpur Road,SAN-Changodar	0	2.6
2	33751	Bjs Green Tech	Block No. 487-Changodar-Tejpur road,SAN-Changodar	0	0.5
3	37919	Blue Star Ltd	Surevy No. 501/3 & 503/2,-Tajpur Road, Sarkheja - Bavla High,SAN-CHANGODAR	0	3.5
4	48285	Hindustan Agro Chemicals	472, Near Sarjan R.O, Tajpur Road-Changodar, Ahmedabad,SAN-Changodar	0	0.2
5	14138	Jayshri Propack Pvt. Ltd.	488-BEHIND SUSHMA NAMKEEN, TAJPUR ROAD,,BAV-CHANGODAR	0	2.5
6	47859	Jayshri Weavetech Pvt. Ltd.	Plot No: 490, Tajpur Road, Changodar-Ahmedabad,SAN-CHANGODAR	0	1.4
7	16337	Kejriwal Exports	501/503 A, TAJPUR ROAD,-SARKHEJ BAVLA HIGHWAY,	0	8

			,SAN-CHANGODAR		
8	45650	Kumar Spintex Pvt Ltd	Block no. 479/P-1(294),531/P,532/P,533/P,534/P,535/,536/P,53-Tajpur road, Opp. Shushma Namkin,SAN-Changodar	0	4.2
9	13066	Photokina Chemicals (P) Ltd.	556/ B-Tajpur Road, Surkhej Bavla Highway,SAN-SANAND	2.3	4.5
10	36778	Sarla Chem,Tajpur Road,	B/H Volga Industry,Volga estate,-Tajpur Road,SAN-Changodar	0	0.8
11	13832	Sheer Chem Industries(New Name:Sheer Fine Chem Pvt.Ltd)	Plot No: 509/E, Phase No: -TAJPUR ROAD,SAN-AHMEDABAD	5.7	0.5
12	37530	Shital Rubber	Survey No. 496/1-Canal Tajpur road,SAN-Changodar	0	0.9
13	13954	Shree Shiva Enterprise	Plot No: Phase No: -14, SANKET IND ESTATE,SAN-Moraiya	16.3	0.8
14	37538	Sushma Namkeen Pvt. Ltd	Plot No. - 484-Tajpur road,SAN-Changodar	0.25	0.8
15	24810	Time Technoplast Ltd	PLOT NO. 531, 532-TEJPUR ROAD,SAN-CHANGODAR	0	4
16	32253	Unick Fix-A-Form & Printers Ltd.	Plot No: 472/8 & 481/2 Tajpur Road-Changodar, Sarkhej Bavla Road,SAN-Changodar	0.5	0.9
17	44978	Veerhealth Care Ltd	S.no.509/F, Opp. Sankheswar Ind. Estate-Tajpur road,SAN-Changodar	0.2	0.4
18	45651	Vishal Spintex	Block no. 532/P,533/P,534/P,536/P,537/P-Tajpur road, Opp. Shushma Namkin,SAN-Changodar	0	1.8
19	14752	Wilson Printercity Pvt.Ltd.	Plot No:501-503 , Tajpur Road,-CHANGODAR,SAN-Changodar	0	0.5
Total (KLD)				**25.25**	**38.8**

7. Saket

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WWG**	
				Ind	**Dom**
1	43006	Art-O-Print	PLot no.23, Saket Industrial Estate-Nr. Weight bridge,SAN-Moraiya	0	1.35
2	11168	A Innovative International Ltd (Old Name-Dinha Export)	Plot No: Phase No: -34,35,SAKET IND.ESTATE,BAV-MORIYA	0.5	3.5
3	10592	Azure Fabrics Pvt Ltd.	Plot No: 3 Phase No: --3, SAKET IND ESTATE,SAN- Moraiya	15	1.5
4	10946	Carewin Pharmaceuticals Gujarat Pvt.Ltd.	PLOT NO: 38,SAKET ESTATE--,SAN-Moraiya	0.4	0.5
5	11226	E Coli Waste Management Pvt. Ltd. (Unit-1)	Plot No: Phase No: -14/1,SAKET IND.ESTATE,SAN-MORAIYA	0.3	0.1
6	50640	Facilities Management Services	PLOT NO : 4 D-Saket Estate, Changodar,RAM-Changodar	4.5	0.5
7	52087	Friends Cosmetics Pvt Ltd	16, KUSHAL INDUSTRIAL ESTATE, INSIDE SAKET INDUSTRIAL ESTATE-OPP HOF FACTORY, SARKHEJ BAVLA ROAD,CHANGODAR,SAN-	0	0.1

			CHANGODAR		
8	47029	Gelpac	28, Saket Industrial Estate-Sarkhej-Bavla Road,BAV-Moraiya	0	0.4
9	33005	Hiren Trading Company	43-Saket industrial estate,SAN-Moraiya	1	0.3
10	41404	Knm Pharma	38/2, Saket Industrial Estate, Nr. Nova Petrochemicals Ltd-Moriya,SAN-Sanad	0.5	1.8
11	28607	Maitry Enterprise	PLot No. 437 paiki -Saket Industrial estate ,SAN-sandnd	0	0.05
12	49725	Microlab Pvt Ltd	Plot No:- 6,7-Sanket Industrial Estate, Near Nova Petrochem, ,SAN-Moraiya	0	0
13	11596	Neochem Technologies	Plot No.- 19/1-Saket Ind. estate,SAN-Ahmedabad	17	2
14	45893	Parshwanath Polymers	S.no.437/3,5,6,7,8, 443/1, Plot no.35-36-Saket Industrial estate, Opp. Ramdev Masala,SAN-Changodar	0	0
15	49522	R.R. Lubricants (Unit:2)	Plot NO; 16, "Saket Estate', Vill: Moraiya-Dist; Ahmedabad - 382213,SAN-Moraiya	0	1
16	26493	R.R.Lubricants	5-B-SANKET INDUSTRIAL ESTATE,SAN-MORAIYA	0	0.3
17	41909	Royal Architectural Coating	Plot No.25, Saket Industrial Estate,-Near Nova Petrochemicals,,ABG-Moraiya	0	0.8
18	13464	Royal Touch Alluminium Pvt.Ltd.	plot no.30,31,Saket Ind.Estate-Nr.Nova Petro chemicals Ltd,SAN-Moraiya	0	2
19	37606	Sabharwal Life Science	Plot No- 28, Saket industrial Estate,-Village Moraiya,SAN-	0	0
20	13825	Shree Bhavani Organics Pvt.Ltd.	PLOT NO: 12 - 15--,SAN-moraiya	0	0.15
21	51953	Shree Kushal Polymers	PLOT NO 40-41, SAKET INDUSTRIAL ESTATE, -SARKHEJ BAVLA ROAD, AT MORAIYA,SAN-MORAIYA	0	5
22	23529	Shriji Sales Corporation	PLOT NO. 44-SAKET INDUSTRIAL ESTATE,SAN-MORAIYA	0	0.8
23	37863	Shrinathji Bag Industries	PLOT No.-63-Kushal Indstrial Estate, Opp: Ramdev masala,SAN-Moraiya	0	0.8
Total (KLD)				**39.2**	**22.95**

8. Kesar Sopan

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WWG**	
				Ind	**Dom**
1	49548	Divine Polytech Industries	12,13, Sopan Kesar Industrial hub, NH-8 A,-Moraiya Village, Moraiya road,SAN-MORAIYA	0	0.4
2	51110	Forever Lifescience Pvt. Ltd.	74/D-Sopan Kesar Industrial Hub, Behind Hotel Sarvoday, NH-8A ,SAN-Moraiya	0.7	1.6

3	49079	Helix Technocast	68, Sopan Kesar Industrial Hub, Nerar Railway Crossing,-Moraiya Village Road, Moraiya,SAN-Moraiya	0	0.4
4	42078	Oracle Industries	S. No. 359/p, Plot No.- 29,-Sopan Kesar Industrial Hub, Nr. Sarvodaqy Hotel,,SAN-Moraiya	0	0.8
5	40081	Shaurya Casting Private Limited	S.No.359/P, Plot No.91,-Sopan Kesar Industrial Hub,,SAN-Moraiya	0	0.18
6	39951	V. S. Multimetal Pvt. Ltd. (Unit-2)	Plot no. 92, Survey no.359-Sopan Kesar Industrial Hub,SAN-Moraiya	0	0.3
Total (KLD)				**0.7**	**3.68**

9. Moriaya

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	10001	3m - India Ltd.	415(6)-PLOT NO: 8,MORAIYA IND.ESTATE,SAN-MORAIYA	5	15
2	13717	Aia Engineering Ltd	PLOT NO. : 10-PLOT NO: 10,SAN-Moraiya	0	0.4
3	10145	Aia Engineering Ltd.	PLOT NO: 39,40,70 to 77--,SAN-Moraiya	45	23
4	32974	Akshay Biotech	435 PAIKI 3-C/O RAJEEV FOOD,NEAR RAMDEV MASALA,SAN-MORAIYA	0	0.5
5	10222	Altus Surgical Industries	PLOT NO: 21/D--,SAN-Moraiya	0.5	0.5
6	10262	Ambica Chemicals	435-PLOT NO : 20,SAN-VILL MORIYA	5	0.65
7	10485	Ascent Yarns Pvt.Ltd.	PLOT NO: 14,15,16--,ABG-Moraiya	50	7
8	50349	Bellatrix Healthcare Llp	396 & 403-SARKHEJ-BAVLA HIGHWAY, VILLAGE-MORAIYA,SAN-MORAIYA	1.6	0.15
9	10777	Blaze Metal Works	PLOT NO: 20--,SAN-MORAIYA	0	2.7
10	10869	Cadila Health Care Ltd. (R & D Centre)	396/P & 403/P-N.H.NO:8,SAN-MORAIYA	43	54
11	33202	Cadila Health Care Ltd (Zydus Biologics)	S.N: 23,25/P,37,40/P & 42-SARKHEJ - BAVLA NATIONAL HIGHWAY - 8A,SAN-CHANGODAR	82	4
12	10873	Cadila Health Care Ltd.	PLOT NO: 417--,SAN-MORAIYA	640	220
13	37749	Cadila Health Care Ltd. (Zydus Vaccines)	Survey No. 40/p, 43,44,45,46,47-Changodar,SAN-Changodar	27	0
14	39475	Cil Nova Petro Chemicals Ltd,Moraiya	Sr.no.396/P & 395/4(P)-Sarkhej Bavla Highway,,SAN-Moraiya	122.6	8
15	31924	Crown Alba Writing Instruments India Pvt. Ltd	415, N. H. No 8- A -Sarkhej - Bavla Road,SAN-moraiya	0	2.8
16	11183	Divine Life Care Pvt Ltd	PLOT NO: 220--,SAN-Moriya	1	0
17	11191	Dolly Inter Exim Pvt Ltd.	431/1, 433/1-2-VILL: MORAIYA,SAN-	0	0.1
18	20005	Esdee Paint Limited	pLOT nO. 5, S.nO. 407/P-NEAR WATERMAN INDUSTRIES,SAN-MORAIYA	0	0.6

19	11260	Esdee Paints Ltd	PLOT NO: 106 - 108, 156 - 158--,ABG-MORAIYA	0	3.7
20	44567	Ess Ess Lubricants	79,80, Shri Ganesh Indstrial Estate-Opp. Hotel Survoday,, Vill Moraiya,SAN-Moraiya	0	0.3
21	51453	Euphoria Packaging Llp	396 & 403 -MORAIYA VILLAGE, SARKHEJ, BAVLA HIGHWAY, DIST:AHMEDABAD,SAN-MORAIYA	0	0.2
22	45184	Expert Pharmaceuticals P Ltd	S.no.412/2/p1 & 415/6, -Plot no-4 & 5,SAN-Moraiya	23	4
23	11338	Gaggar Enterprise Pvt.Ltd.	PLOT NO: 435/SUB PLOT NO: 17--,SAN-MORAIYA	10	0.8
24	12876	GSL Nova Petrochemicals Ltd formerly Nova Petrochemicals Ltd.	396 (P),403-VILL:MORAIYA,SAN-MORAIYA	25.1	3
25	11561	H.J.Arochem Pvt.Ltd.	PLOT NO: 11/B--,SAN-MORAIYA	0	3
26	11607	Harsha Engineers Ltd.	427 & 431-SARKHEJ - BAVLA ROAD,SAN-MORAIYA	20	55
27	49499	Hexa Pharmachem	396 & 403, Moraiya Village, GSL Nova Compound-Besides Zydus Cadila Research,SAN-MARAIYA	0	0.3
28	11736	Intas Pharmaceuticals Ltd.	423 / P / A-SARKHEJ - BAVLA HIGHWAY,SAN-Moraiya	25.5	23.05
29	30147	Jyoti Power Transmission Pvt. Ltd	Plot No. 9/79/19-Opp. Nova Petrochem,SAN-Moraiya	0	1.35
30	12061	Kasaar Food Innovative Pvt.Ltd.	PLOT NO: 415/P,MORAIYA--,SAN-moraiya	0	0
31	12811	Macro Polymers Pvt.Ltd,Unit -3, formerly New Millenium Mica Ltd.	PLOT NO:21 & 22--,SAN-MORAIYA	25.2	2
32	12309	Macro Polymers Pvt.Ltd.	PLOT NO: 133,134,135,136,164, 165--,SAN-Moraiya	6	5
33	40027	Mamata Machinery Pvt. Ltd.	Survey No. 423/P-Sarkhej- Bavla road,SAN-Moraiya	0	6
34	12272	Mc.Fills Enterprises Pvt.Ltd.	423-MORAIYA,SAN-	0.3	0
35	12607	Modern Denim Ltd.	Plot No: Phase No: -10K.M.MILESTONE,SAN-Moraiya	640	25
36	12853	Nirma Limited	Plot No: 415/p -P.O.Chacharwadi, Vill:Moraiya,Ta:Sanand,SAN-Moraiya	0	105
37	51785	Nirvana Consultancy Services	137/138-Sharanya Industrial Estate, B/H Hotel Sarvottam,Moraiya Road,SAN-Moraiya	3	1
38	33715	Param Cyliner Liners Pvt.Ltd,Moraiya	Sr.no.412/P,413/P,415/P-Moraiya Ind.Estate,SAN-Moraiya	0	3
39	11216	Parikh Packaging Private Limited	S.No. 423, -Opp-Rotomac Pens, Sarkhej-Bawla Highway, ,SAN-Village-Moraiya	0	7.5
40	12029	R.R.Patel Industrial Gases Pvt Ltd. (O.N:Kanadia Air Tech Pvt.Ltd.)	407-SARKHEJ-BAVLA HOGHWAY,SAN-moraiya	0	0.2
41	48951	Radhe Krishna Dairy Products	Plot No.-2, Shyam Estate-Near Astron Packaging, Moraiya,SAN-Moraiya	0.8	0.5

42	13457	Rotomac Global Pvt. Ltd	415-MORAIYA,SAN-Changodar	0	1
43	13579	Samrock Murexin Chemicals India Ltd.	PLOT NO: 138--,SAN-MORAIYA	0	1
44	13654	Screen O Tex India Pvt Ltd.	396 / 406 PAIKI-MORAIYA - SANAND,SAN-MORAIYA	0.4	3
45	49131	Shivani Drum Company(Unit-Ii)	Plot No-423E, Ganesh Industrial Estate-Gate No-2, ,SAN-Maraiya	7.5	1.7
46	13823	Shree Bhagwati Flour & Foods Pvt.Ltd.	430-OPP: NOVA PETRO CHEMICAL,SAN-Moraiya	0	15
47	40796	Shree Shailya Agrotech Pvt. Ltd	Plot No.15,-Gujarat Pharma Techno Park,,SAN-Changodar	0	2.4
48	14008	Shreenath Plylam	PLOT NO : 113--,SAN-Moraiya	0.5	3
49	14071	Shri Varahi Agro Industries	PLOT NO: 407/P-Moraiya village road,SAN-moraiya	0	0.2
50	33702	Shubh Laxmi Casting Pvt.Ltd,Moraiya	Plot no.20,21-Moraiya Ind.Estate,SAN-Moraiya	0.5	2.5
51	14111	Shyam Metals	PLOT NO: 170--,SAN-MORAIYA	0	0.4
52	14133	Silica Gel Products Mfg.Company	Plot No: Phase No:-13,MORAIYA IND.ESTATE,SAN-Moraiya	0	0.6
53	12957	Skaps Industries India P.Ltd.	423-PLOT NO: A 20,SAN-Moraiya	0	6
54	49009	Spiceone Food Products Pvt. Ltd.	Plot No.-407, Near Zydus-Cadila R&D Unit-Sarkhej-Bavla Highway,SAN-Sanand	0	0.8
55	35238	Sunny Agro Industries	Plot No. 421/2-Nr. Parikh Packaging,SAN-Moraiya	0	0.3
56	14467	Transformers & Rectifiers (I) Ltd	PLOT NO:427 & 431--,SAN-MORAIYA	1.92	12
57	14468	Transformers & Rectifiers (India) Ltd	Plot No: Phase No: -S.NO: 344-350,OPP: P.W.D.STORE,SAN-CHANGODAR	0	14
58	14484	Trivedi Tectonics	415-VILL: MORAIYA,SAN-Moraiya	0	6.5
59	42716	Tube Traders	18,-18,SILICON INDUSTRIAL HUB,NR. CIL NOVA PETROCHEMICALS,SAN-MORIYA	0	0.25
60	14681	Vimlachal Print & Pack Pvt.Ltd. (Packaging Unit)	PLOT NO: 437, 5, SAKET IND.ESTATE,-VILL:MORAIYA,,SAN-Changodar	0	3.5
61	10189	Vishnu Pouch Packaging Private Limited(Unit-12)	341, Vishal Estate-Opp Bhagudev Floor Mill,SAN-Moraiya	0	2.4
62	45986	Vishnu Pouch Packaging Pvt Lts (Unit-8)	Plot no. 4, s.no.431/p/7/p, Rachna Estate, Steel town,-vill. Moraiya,SAN-Moraiya	0	4
63	14719	Vishnu Pouch Packaging Pvt. Ltd.	PLOT NO : 49 / 50--,SAN-Moaraiya	0	7
64	38525	Vishnu Pouch Packaging Pvt. Ltd. (Unit - 2)	36-A, Saket Industrial Estate, Sarkhej - Bavla Road-Village :- Moraiya ,SAN-Moraiya	0	1.2
65	26185	Vishnu Tobacco Product (Unit-2)	S.No.406/paiki, Vill Moraiya-B/H Sarvoday Hotel,SAN-Moraiya	0	4.2
66	14745	Welknown Industries	PLOT NO : 43--,SAN-Vil. : Moraiya	1.75	1.2
67	35997	Zaveri & Compnay Pvt. Ltd.	Block No- A, Unit No- 8,9 & 17-Shree Ganesh Ind. esate, Besides	4.7	0.4

			Skapa Ind.,SAN-Moraiya		
68	10947	Zydus Wellness Ltd formerly Carnation Neutra Analogous Foods Ltd.	PLOT NO: 7/A-B--,SAN-MORAIYA	6	10
Total (KLD)				**1824.87**	**693.85**

10. Vasna-Chacharwadi

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	48686	varsun Foods Pvt. Ltd.	Block No: 99, Chanchrawadi Road,-Vasna-382213,Tal: Sanand,SAN-VASNA, SANAND	0.6	0.8
2	41925	Accretion Pharmaceuticals	Plot no. 29-Xcelon Industrial Park - 1,SAN-Vasna Chacharwadi	0.3	0.28
3	10486	Alpha Nippon Innovation Ltd	Survey No. 96, -Nr. Chacharwadi Temple, Sarkhej- Bavla Highway,,SAN-Chacharvadi Vasana	0	4
4	10321	Amishi Drugs & Chemicals	192-CHACHARWADI - VASNA,SAN-	0	0
5	10409	Anunoy Fabric Ltd.	Plot No: Phase No: - CHACHARWADI,SAN-	0	8
6	13800	Arvind Rub Web Controls Ltd	BLOCK NO 198-SARKHEJ BAVLA ROAD,BAV-CHACHARVADI	0	5
7	10553	Associated Fine Chem Pvt Ltd.	184 / P TO 186 / P-CHACHARWADI,SAN-Chacharavadi	0	0.4
8	50563	Astha Creations	104, Chacharavadi, Vasna, -Opp. Zydus Cadila, Sarkhej-Bavla Highway,SAN-Chacharavadi-Vasna	0	1.8
9	48744	Celestys Pharmaceuticals Pvt. Ltd.	Xcelon Industrial Park, Block No: 193, Vasana-Chachravadi-Tal: Sanand,SAN-Vasna Chancharwadi	0.2	2.4
10	11014	Claris Injectables Ltd	202,204,205,206/P,207/P-CHACHARWADI,SAN-Chacharawadi	758	203
11	41385	Claris Otsuka Pvt. Ltd	Sr.no.199 to 201,206/P,207/P,208 to 210-Near Claris Life Science Ltd,SAN-Chacharwadi	494	122
12	40206	D.B.Corp Ltd, Chancharwadi-Vasna	Plot no.148,-B/H L&T Plant,SAN-Chancharwadi-Vasna	0.3	12
13	30149	Envy International Private Limited	142p, 143p-Nr. Divyabhasker,SAN-Vasna Chacharwadi	5	4.5
14	48664	Esdee Paints Ltd.	Block No: 174,175, Vill: Vasna Chacharwadi-Tal: Sanand,SAN-chacharwadi vasna	0	3.5
15	46727	Fairdeal Multifilament Pvt. Ltd.	Block No: 49, Nr. Gopinath Industrial Park-Vill: Chacharwadi-Vasna,,SAN-Vasna Iyava	3	1.5
16	11305	Finar Limited	PLOT NO: 184/P - 186/P--,ABG-Chacharwadi Vasna	10.75	1.3
17	51538	Flourish Foodsproducts Pvt.Ltd	Block No.204-Chacharwadi-Vasna,Bavla-Sarkhej	0	0

			Highway,Taluka-Sanand,SAN-Chacharwadi-Vasna		
18	37006	Intas Pharmaceuticals Ltd	Plot No. 191, -Village - Chacharwadi - Vasana,SAN-Chacharwadi – Vasana	14.65	5
19	11166	Jay Dinesh Chemicals	PLOT NO: 184,186--,SAN-Chacharavadi-Vasna	0	0.5
20	44968	Kravour Foods Pvt Ltd	Block no. 105/P & 103/B, Vill, Chacharawadi-Vasan-Chacharawadi Temple Road,SAN-Chacharawadi	0	0.5
21	29152	Larsen & Toubro Limited	ECC Division-144/146, Chacharwadi, Opp-Zydus Cadila Factory ,SAN-Ahmedabad	0	30
22	12302	M.S.Pickling Center	198-VILLAGE : CHACHARWADI,SAN-	0.5	0.4
23	49726	Macro Polymers Pvt. Ltd.	Survey No. 382 and Plot No. D-01 to D-06A-Gallops Ind. Park 2, Village: Chacharvadi Vasna,SAN-Chacharvadi Vasna	40	23
24	34784	Maniyar Agro Mills Pvt. Ltd	Servey No. 184 to 186-Ahmedabad-Bavla highway,SAN-Chharwadi-Vasana	0	1
25	26809	Mbr Flexibles Limited	S. No- 79 / 80-Near Charcharwadi Temple,SAN-Charcharwadi- Vasna	0	0.8
26	12758	Navkar Enterprise	-BLOCK NO: 185,186,SAN-Chacharvadi (Vasna)	1.2	0.4
27	12912	Omni Dye Chem Exports Ltd.	PLOT NO: 94,96--,SAN-Chacharwadi-Vasna	9	2
28	12916	Ordain Pharma Pvt.Ltd.	138/B-CHACHARWADI,SAN--	1	2
29	50299	palmlife Foods Llp	23, Tim Engineering Estate, Opposite Chacharwadi Mata Temple-Sarkhej Bavla Road, Vasna,SAN-Chacharwadi, Vasna	1.5	1
30	13108	Pradip Overseas Pvt Ltd	Plot No: Phase No: -BLOCK NO: 104,105,144 - 146,SAN--	420	20
31	13125	Prakash Solvent Extractions Ltd	106-CHACHARWADI,SAN--	5	0
32	45542	Raj Enterprise	Plot no. 1, Block no. 192 &211, Exiloan Ind. Estate-Vill. Chancharawadi,SAN-Chacharawadi	0	0.8
33	29386	Saga Laboratories	Survey No.198/3-Chacharwadi Vasna,SAN-Chacharwadi Vasna	2.5	1.2
34	46757	Shree Nirmal Ventures Pvt. Ltd.	Block No: 72 & 86, Chacharvadi Vasana-Dist: Ahmedabad,BAV-CHANCHARVADI VASANA	1	2
35	43640	Suryen Pharma	Plot no.2A, TIM Engineering Estate-Opp. Chacharawadi Temple, ,SAN-Changodar	0.5	0.8
36	50471	Vishnu Aroma Pouching Pvt Ltd.	Plot No=-106, N.H.-8, Sarkhej-Bavla Highway-Chacharavadi Vasna,SAN-Chacharavadi Vasna	0	3.2
Total (KLD)				**1769**	**465.08**

11. Pharma SEZ

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	14801	ADILAC PHARMACEUTICALS LTD	Plot No: 1A,Pharmez, Phase No:-VILLAGE : MATODA,SAN-AHMEDABAD	108	32
2	29827	Amneal Life Sciences Pvt. Ltd.	Plot No. 15,16,17, Pharma-SEZ-Sarkhej Bavla Highway. N.H.-8-A,SAN-Matoda	138	20
3	24951	Bio Medical Life Science Pvt Ltd	4-PHAMEZ 'SEZ' SARKHEJ - BAVLA H/W NO:8,SAN-	1	0.25
4	30269	Cadila Healthcare Ltd.	Plot No. 1A/1 & 2, Pharmez-Sarkhej Bavla NH NO 8A,SAN-Matoda	37	23
5	11313	Fisher Biopharma Services (India) Pvt. Ltd.	PLOT NO: 22, PHARMEZ, SEZ-NATIONAL HIGHWAY 8A,,ABG-MATODA	20.5	10
6	11734	Intas Pharmaceuticals Limited	Plot No: 5,6,7 - PHARMA SEZ,SAN-MATODA	140	60
7	12436	Jay Pharma Ltd (Old Name: Famy Care Pvt. Ltd.)	PLOT NO:20 & 21, Pharma SEZ,-SARKHEJ-BAVLA N.H.NO:8-A,,SAN-MATODA	25	23
8	32221	Piramal Enterprises Limited.	PLOT NO. 19-PHARMEZ,(ZYDUS SEZ),SAN-MATODA	20.9	4
9	27007	Piramal Enterprises Ltd (old name-Oxygen Bio Research P. Ltd)	PLOT NO.18-PHARMACEUTICAL SEZ, NR VILLAGE MATODA,,BAV-CHANGODAR	37	43
10	14803	Zydus Hospira Oncology Pvt.Ltd.	3, PHARMEZ, -Special Ecomomic Zone, Ta, Sanand,SAN-MATODA	162	40
11	14802	Zydus Infrastructure Pvt,Ltd. (Cetp)	Pharmez-Special Economic Zone.-Sarkhej Bavla Highway. N.H.-8-A,SAN-Matoda	30	6
12	24397	Zydus Technologies Limited	PLOT NO. 1 / B-PHARMEZ,SAN-MATODA	5	20
Total (KLD)				**724.4**	**281.25**

12. Sari

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	35083	A.T.E. Enterprises Pvt Ltd	250, 251,252/1/Part,255/1/Part, 255/2/Paet-Village Sari,SAN-Sari	0	7.5
2	10038	Aarvee Denim & Exports Ltd	217-MOJE SARI,SAN-Sari	0	20
3	10330	Diamond Textile Private Limited	21/1,281/P,219/1/P,219/2/P,219/3,220/1,220/2/P,222/P,223/P-Near Arvee Denim,SAN-SARI	5.5	1.5
4	11257	Erhardt + Leimer (India) Pvt.Ltd.	252/1,252/2,255/1-2-VILL: SARI,SAN-VILL: SARI	12.5	23.5
5	11521	Gujarat Pharma Techno Park	224/P TO 236-VILL: SARI,SAN-	208	72
6	12227	Laxcon Steels Pvt.Ltd.	PLOT NO: 235--,SAN-Sari	0	40

7	12510	Medicare Hygien Pvt Ltd	240-VILLAGE : SARI,SAN-Sari	7	0.8
8	13354	Real Strips Ltd.	245-VILL: SARI,SAN-SARI	89	12
9	41473	Rimi Distributors,Sari	Sr.no.257,258,878,Opp. Gallops SEZ,-Village Sari,SAN-Sari	0	0
10	42571	TechTex	S.No.213, Vill. Sari-Sarkhej-Bavla Highway,SAN-Sari	0	2
11	44027	York Naturals Pvt. Ltd.	P.No. 25-26,-Gujarat Pharma Techno Park,,SAN-Vill:Sari	0	2.25
Total (KLD)				**322**	**181.55**

13. Steel Town

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	**Dom**
1	41431	Alcon Beverages Pvt. Ltd.	Plot no. B3/A-3-Steel Town,SAN-Moraiya	5.5	3
2	11776	J.H.T. Power Eng Pvt Ltd.	427-P.NO : -C - 7 - 9, b/h HOF,SAN-Changodar	1.4	2.7
3	28187	Jht Power Engineering P. Ltd, Unit-2	PLOT NO. B-11 TO 20-"STEEL TOWN", OPP NOVA PETROCHEM P. LTD, B/h HOF,SAN-MORAIYA	1.5	5.4
4	35336	Kasta Bhanjan Traders	Plot No. 11, Godown No.:3-Steel Town Industrial Estate,SAN-Moraiya	0.5	0.9
5	10934	Optimus Healthcare	Plot No.B3/A-5-Steel Town,,SAN-Moraiya	0.5	0.5
6	32415	Unison Pharmaceuticals Private Limited	C/6-steel town,,SAN-Moraiya	2.3	5.6
7	45485	Unison Pharmaceuticals Pvt Ltd(F & D Unit)	Plot no. B/3/A, Steel town-Opp. Nova petro,SAN-Moraiya	2.95	3.2
8	36026	Unison Pharmaceuticals Pvt. Ltd.	Plot No: C-7,8,9 Steel Town, -Opp. Nova petrochemicals,SAN-Moraiya	14	20.5
9	29743	Vimlachal Print & Pack Pvt.Ltd. (Printing Ink Mfg. Unit)	431-STEEL TOWN,SAN-MORAIYA	0	0.3
10	32514	Vishnu Pouch Packaging Pvt Ltd(Unit-9)	S.No-431, Plot No-31paiki, Steel Town-Vill-Moraiya,SAN-Moraiya	0	3.8
Total (KLD)				**28.65**	**45.9**

14. Swastik

Sr. No.	GPCB ID	Name of Industry	Address	WWG	
				Ind	**Dom**
1	49152	Adgums Private Limited	Plot No: 1-A, Swastik Industrial Estate, Opp. Aarvee Denim-Sarkhej Bavla Highway, Vill: Sari,SAN-SARI	0	1.5
2	46724	Hema Remedies Private Limited	Plot no: 21, Swastik Ind. Estate-Opp. Aarvee Denims,,SAN-Village: Sari	21.6	1.25
3	48944	J V Conbuild Pvt. Ltd	S. No. 244 / P-1&2-Swastik Industrial Estate, Sari, Tal - Sanand,SAN-Sari	0	1.55
4	10198	Qutone Ceramics Pvt Ltd(In The Premises Of Revocoat India P	plot no-23-Swastik industrial estate,SAN-sari	0.5	2

		Ltd)			
5	47831	Spack Automotives Pvt. Ltd.	Plot No: 23, Swastik Industrial Estate, -Opposite Aarvee Denim Spinning Unit ,SAN-Ahmedabad	0	1
6	46123	Zylys Bioscience	Plot no.9, Swastik industrial estate-Sarkhej-Bavla Hoghway,SAN-Sari	0	0
Total (KLD)				**22.1**	**7.3**

15. New Ahmedabad

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	**Dom**
1	11281	Alka Enterprise	PLOT NO : 17-New Ahmedabad Industrial Estate,SAN-Moraiya	0	0.2
2	46331	Baghbanpackers Pvt Ltd	396, New Ahmedabad Ind. Estate-Sarkhej-Bavla Road, Vill. Moraiya,SAN-Moraiya	0	6
3	43949	Chemo Health Care Pvt Ltd	PLOT NO: 1-New Ahmedabad Ind Estate, Moraiya,SAN-Moriya	0.02	0.32
4	45802	Corrtech Energy Limited-Unit-Ii	S.no.407, Shed no.7,SP-3, New Ahmedabad Ind estate-New Ahmedabad Ind estate,SAN-Moraiya	0	4
5	39752	E-Mail Infotech Pvt. Ltd	Plot no. 66, Survey no. 396-New Ahmedabad Industrial Estate,SAN-Moraiya	0	0
6	47537	Empire Bakery	407, New Ahmedabad Industrial Estate-Changodar,,SAN-Moraiya	0.5	0.8
7	49329	Highvolt Power & Control Systems Pvt. Ltd.	Plot No: 5/6/7, New Ahmedabad Industrial Estate-B/h Nova Petrochemicals, Vill: Moraiya,SAN-Ahmedabad	0	2
8	29019	Kalpavijay Engineering Co.	82 / 83-NEW AHMEDABAD IND.ESTATE,SAN-SANAND	1	3
9	39753	M/S Atrium Infocomn Pvt.Ltd formerly E-Mall Infotech Pvt. Ltd	Plot no. 66, Survey no. 396-New Ahmedabad Industrial Estate,SAN-Moraiya	1.2	0.7
10	12667	Multi Shaper (India) Pvt.Ltd.	Plot No: Phase No: -81,NEW AHMEDABAD IND.AREA,SAN-MORAIYA	0.12	1.8
11	29831	Nisan Electricals	S. No. 440/1/2, Vill: Moriya, New Ahmedabad Industrial-Estate, B/h Nova petrochemicals,SAN-MORIYA	10	1
12	46205	Niva Flexi Prints	S.no. 394 & 478/1/2, Vill. Moraiya,-New Ahmedaad estate, B/H Nova petrochemical,SAN-Moraiya	0	0.4
13	12889	Ocean Steels Pvt Ltd.	Plot No: Phase No: -68/69,NEW A'BAD IND.ESTATE,SAN-Moraiya	1.6	4.6
14	36945	Restech Pharmaceuticals	plot no-407/p-ahmedabad industrial estate,,SAN-moraiya	1.55	4.5
15	44777	Sachchade Food Pvt Ltd	S.no.407/p3, New Ahmedabad estate-Opp. IOC Petrol pump,SAN-Moraiya	0.15	1.15
16	40609	Shashi Industries	Plot No. 407-New AHmedabad Industrial Estate,SAN-Moraiya	0.01	0.4

17	13781	Shivam Industries	PLOT NO: 19,NEW AHMEDABAD INDUSTRIES ESTATE--,SAN-MORIYA	0	0.5
18	13904	Shree Matangi Investment Casting Pvt.Ltd.	Plot No: Phase No: -NEW A'BAD IND.ESTATE,SAN-MORAIYA	0.35	5.9
19	42568	Solvex Technology	Plot No.26, S.No.395/1,2-New Ahmedabad Industrial Estate,SAN-Moraiya	0	2
20	25237	Stp Ltd	PLOT NO. 44-NEW AHMEDABAD ESTATE,SAN-MORAIYA	0	0.8
21	14592	Vadiawala Industries	PLOT NO:24, NEW A'BAD IND ESTATE--,SAN-Moraiya	0.9	0.8
22	14685	Vinayak Industries.	Plot No: Phase No: -18, NEW AHMEDABAD IND ESTATE,SAN-Moriya	0	0.5
23	10545	Vishnu Aroma Pouching Pvt Ltd (unit-II)	Plot No-4-New Ahmedabad Industrial Estate, Moraiya,SAN-Moraiya	0	3.8
24	45169	Vishnu Pouch Packaging Pvt Ltd	Plot no. 4, New Ahmedabad Ind. Estate-Vill. Moraiya,SAN-Moraiya	0	3.8
25	48413	Vishnu Pouch Packaging Pvt. Ltd. (Unit-10)	Plot No: 5-6, New Ahmedabad Industrial Estate, -Bavla-Sarkhej Road,SAN-Ahmedabad	0	13.8
Total (KLD)				**17.4**	**62.77**

16. Gopi

Sr. No	**GPCB ID**	**Name of Industry**	**Address**	**WWG**	
				Ind	**Dom**
1	48462	Auto Sales	Plot No.-25-Gopi Industrial Estate,SAN-Changodar	0.4	5.5
2	21007	Ayuda Herbal P. Ltd	510-GOPI INDUSTRIAL ESTATE ,SAN-CHANGODAR	0.34	0.9
3	10762	Bicon Corporation	Plot No: Phase No: -28/30/A, GOPI IND ESTATE,SAN-Changodar	0	1.5
4	32831	Corona Remedies Pvt. Ltd.	Plot No 19,23,24-Gopi Ind. Estate,SAN-Changodar	3.5	3
5	48663	J.M Plastopack	31, Gopi Estate,-B/h Ramdev Masala, Sarkhej-Bavla Highway,ABG-CHANGODAR	0	0.16
6	12512	Medicus Pharma	Plot No: Phase No: -60,61,GOPI ESTATE,SAN-	1	0.8
7	47876	Seraphic Gravure	Plot No: 10, Gopi Industrial Estate, Nr Ramdev Masala-Sarkhej-Bavla Highway,SAN-CHANGODAR	1.5	2.5
8	35675	Venus Powder Product Pvt. Ltd	C- 510, 511, Gopi Industrial estate-B/h. Ramdev Masala,SAN-changodar	0	0.6
Total (KLD)				**6.74**	**14.96**

17. NG gallops

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	50638	EAGLE CAST ALLOYS	B/7-8-Chacharavadi,SAN-CHACHARWADI	0	0.8
2	51151	Restoration Engineers	SURVEY / BLOCK NO : 56-Galops Industrial Park, Rajoda, Bavla,BAV-Rajoda	0	1
3	49890	Vestas Wind Technology India Pvt. Ltd.	Plot no. 37, Gallops Industrial park, -Vil: Rajoda, Tal: Bavla, Dist-Ahmedabad,BAV-Rajoda	0	35
Total (KLD)				**0**	**36.8**

18. Matoda

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	41945	Highly Electrical Appliances India Private Limited	S.No.456,457/1,457/2,-Sarkhej-Bavla Highway (NH-8A),,ABG-Matoda	64	40
2	26265	Intas Bio Pharmaceuticals Limited	496/1/A & B, Sarkhej Bavla Highway-Village-Matoda, Tal-Sanand ,SAN-	14.5	8
3	10951	Intas Pharmaceuticals Limited	496 / 1 A & B-SARKHEJ-BAVLA HIGHWAY,SAN-Matoda	19.6	9
4	11738	Intas Pharmaceuticals Ltd.	PLOT NO: 457,458-VILL: MATODA,SAN-MATODA	353	158
5	41569	Jv Conbuild Private Limited	Survey no. 438/P-Opp: Intas Pharmaceuticals ,SAN-Matoda	0	1.35
6	30120	Lea Prints N Laminar	S. No. 458, Nr Intas Pharmaceuticals-Matoda, Tal: Sanand,SAN-Matoda	0	2.7
7	12242	Leamak Healthcare Pvt.Ltd	Plot No: Phase No: -SARKHEJ-BAVLA HIGHWAY,SAN-Matoda	1.3	0.7
Total (KLD)				**452.4**	**219.75**

19. Radhe

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	29783	Crown Laminates Pvt.Ltd,Changodar	Sr.no.419/1,419/7-Radhe Ind. Estate,SAN-Changodar	6	3
2	35451	G. P. Sweets Pvt Ltd.	S.No.33-34,-Radhey Industrial Estate ,,SAN-Changodar	2	10
3	11972	K.M.M Foods Pvt Ltd	Plot No: Phase No: -POT NO: 33/34, RADHE ESTATE,SAN-CHANGODAR	1.75	1
4	45310	Max Signage Industries Pvt Ltd	Plot no. 18, 18/A, Radhe Industrial Estate-Near crown Laminates,SAN-Changodar	0	4

5	45178	Savas Engineering Company Pvt Ltd	Block no. 498, Radhe Ind. Estate-Tajpur road,SAN-Changodar	0	2.5
6	31221	Shree Narnarayan Ayurvedic Pharmacy	PLOT NO - 1,-Radhe Industrial Estate,SAN-Changodar	0.2	1.5
Total (KLD)				**9.95**	**22**

20. Rajoda

Sr. No	GPCB ID	Name of Industry	Address	WWG	
				Ind	Dom
1	10269	Ambica Food Products Pvt.Ltd.	Plot No: Phase No: -VILL: RAJODA,BAV-	14	1.2
2	26387	Amneal Pharmaceuticals Company (I) Pvt. Ltd.	882/7,871-NR HOTEL KANKAVATI, ,BAV-RAJODA	70.7	5
3	10557	Astra Life Care India Pvt.Ltd.	PLOT NO: 57/P--,BAV-RAJODA	12	2
4	10718	Bharat Agro Industries	800-BAVLA-SANAND HIGHWAY ROAD,BAV-VILL: RAJODA	12.3	1.2
5	10739	Bhavani Food	S.No.817-B/H H.H.Rice Mill,N.H.8-A,Rajoda,BAV-Rajoda	0.5	0.8
6	30601	Big Box Containers Pvt. Ltd	Sr. No.-881/1, nr. Hotel kankavati-sarkhej-Bavla Road,,BAV-Rajoda	0.25	2.5
7	51388	Biomatrix Healthcare Pvt Ltd	Survey No. 869/1/2, -Rajoda,,BAV-Ahmedabad	3	4
8	11127	Dhanlaxmi Agro Industries	Plot No: Phase No: -VILL: RAJODA,BAV-	3.5	0
9	41740	Gardner Denver Engineered Products India Private Limited	Block no. 878-Opp : Gallops Industrial Park,BAV-Rajoda	0	4
10	33161	Gokul Mamra Pvt. Ltd.	NATIONAL HIGHWAY ROAD 8-A-RAJODA,BAV-RAJODA	11.6	1.1
11	12845	Nippon Agro Ltd.	Plot No: Phase No: -N.H.NO.8A,BAV-RAJODA	8	0.8
12	10992	Rotomac Global Pvt.Ltd,Unit Ii,Rajoda	Sr.No.788,-Rajoda,BAV-chacharavadi vasana	0	1.8
13	46593	Skipper Ltd(Old Name-Prakurti Steels Pvt Ltd)	S.no. 823, Vill. Rajoda-Ta. Bavla,BAV-Rajoda	0	3.7
14	14607	Vardan Industries	734-SARKHEJ - BAVLA HIGHWAY,BAV-RAJODA	6	0
15	48190	Vimalachal Print & Pack. Pvt. Ltd.	890/Paikki, Changodar Bavla Highway,-Mouje Rajoda, Bavla,Ahmedabad,BAV-RAJODA	0	3.5
16	38978	Vishnu Pouch Packaging Pvt. Ltd. (Unit -3)	plot no. 823, N. H. 8-A, Village - Rajoda,-Sarkhej - Rajkot Highway,BAV-Sarkhej	0	4.2
Total (KLD)				**141.85**	**35.8**

All over Water Consumption and Wastewater Generation Details of Changodar Industrial Area

Sr. No.	Name Of Estate	No. of industries	WC (KLD)		WWG (KLD)	
			Industrial	Domestic	Industrial	Domestic
1	Changodar	98	881	349	213	277
2	Ashwamegh	49	422.36	86.48	31.58	66.36
3	Panchratna	36	194.65	85.75	60.33	65.51
4	Shubhlaxmi	4	4	8.3	1	4.75
5	Mahagujarat	57	338.4	1392.75	21.29	836.55
6	Tajpur Road	19	87.42	51.55	25.25	38.8
7	Saket	23	662.65	31	39.2	22.95
8	Kesar Sopan	6	15.9	4	0.7	3.68
9	Moraiya	68	3589.57	656.4	1824.87	693.85
10	Vasna-Chacharwadi	36	2504.51	414.1	1769	465.08
11	PharmaSEZ	12	1559.5	345.5	724.4	281.25
12	Sari	11	721.45	232.8	322	181.55
13	Steel Town	10	58.925	35.1	28.65	45.9
14	Swastik	6	104.635	11.95	22.1	7.3
15	New Ahmedabad	25	101.19	79.5	17.4	62.77
16	Gopi	8	20.2	20.3	6.74	14.96
17	NG Gallops	3	30.3	53.2	0	36.8
18	Matoda	7	438.03	282.7	452.4	219.75
19	Radhe	6	55	34.5	9.95	22
20	Rajoda	16	275.65	46.6	141.85	35.8
Total (KLD)		**500**	**12065.34**	**4221.48**	**5711.71**	**3382.61**

Observations

- There are about 500 industrial units identified during the inventory of Changodar area and the total estimated industrial wastewater generation is about 5711.71 KLD and domestic wastewater generation is about 3382.61 KLD.
- Out of 500 Units about 207 nos. of unit have only domestic wastewater generation.
- Most of Units are ZLD

Existing Municipal Solid Waste Management

Existing Municipal Solid Waste Management in All Private Industrial Estates

- **Existing Municipal Solid Waste Management in Panchratna Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Panchratna IE

Solid Waste dumping outside the Panchratna IE

Solid Waste dumping near Sublet of Fatehwadi Canal

Solid Waste dumping in Panchratna IE

- **Existing Municipal Solid Waste Management in Changodar Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Changodar IE

Solid Waste dumping along the roadside in Changodar IE

Solid Waste dumping outside the industry in Changodar I

- **Existing Municipal Solid Waste Management in Ashwamegh Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Ashwamegh IE

Solid Waste dumping in Ashwmegh IE

Waste Dumping

- **Existing Municipal Solid Waste Management in Subhlaxmi Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Subhlaxmi IE

Solid Waste dumping outside Subhlaxmi IE

Solid Waste dumping outside Subhlaxmi IE

Solid Waste dumping in Subhlaxmi IE

Solid Waste dumping in Subhlaxmi IE

- **Existing Municipal Solid Waste Management in Mahagujarat Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Mahagujarat IE

Demolition Waste dumping in Mahagujarat IE

Construction & Demolition Waste dumping in Mahagujarat IE

- **Existing Municipal Solid Waste Management in Gopi Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Gopi IE

Solid Waste dumping in Gopi IE

Solid Waste dumping in Gopi IE

- **Existing Municipal Solid Waste Management in Steel Town Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Steel Town IE

Solid Waste dumping in Steel Town IE

- **Existing Municipal Solid Waste Management in Saket Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Saket IE

Solid Waste dumping in Saket IE

Solid Waste dumping in Saket IE

Solid Waste dumping outside Saket IE

- **Existing Municipal Solid Waste Management in New Ahmedabad Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in New Ahmedabad IE

Solid Waste dumping in New Ahmedabad IE

Solid Waste dumping in New Ahmedabad IE

- **Existing Municipal Solid Waste Management in Tajpur Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Tajpur IE

Solid Waste dumping in Tajpur IE

Solid Waste dumping in Tajpur IE

Solid Waste dumping in Tajpur IE

- **Existing Municipal Solid Waste Management in Moraiya Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Moraiya IE

Solid Waste dumping in Moraiya IE

- **Existing Municipal Solid Waste Management in Radhe Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Radhe IE

Solid Waste dumping in Radhe IE

Solid Waste dumping in Radhe IE

- **Existing Municipal Solid Waste Management in Kesar Sopan Industrial Estate**

Existing Status: Municipal Solid Waste was not dumped on Roads of Kesar Sopan IE

Clean Roads of Kesar Sopan IE

- **Existing Municipal Solid Waste Management in Vasna-Chacharwadi Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Vasna-Chacharwadi IE

Construction and Demolition waste dumping near the canal of Vasna-Chacharwadi IE

- **Existing Municipal Solid Waste Management in Sari Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Sari IE

Solid waste dumping near the SWD of Sari IE

- **Existing Municipal Solid Waste Management in Matoda Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Matoda IE

Dry Land of the Matoda IE

Solid waste dumping outside the Matoda IE

- **Existing Municipal Solid Waste Management in Rajoda Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Rajoda IE

Solid waste dumping at Rajoda IE

- **Existing Municipal Solid Waste Management in NG Gallops Industrial Estate**

Existing Status: Municipal Solid Waste was not dumped on Roads of NG Gallops IE

Clean Roads of NG Gallops IE

- **Existing Municipal Solid Waste Management in Swastik Industrial Estate**

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Swastik IE

Solid waste dumped on the roads of the Swastik IE

Existing Scenario of Fatehwadi Canal and its sublets

Canal at the starting point of Changodar Region

Canal in Changodar Industrial Estate

Water logging and Ash dumped at Tajpur side canal

Solid waste dumped in sublet of Fatehwadi Canal

Sublet of Fatehwadi Canal (Tajpur side)

Observations

Status of MSW Management Mechanism in Changodar Industrial Area:

Sr. No.	Estate	Status of MSW Management	Is there requirement of Proper MSW site? (Yes/No)
1	Panchratna	Dustbins and MSW Management Mechanism are not provided	Yes
2	Changodar		Yes
3	Ashwamegh		Yes
4	Tajpur		Yes
5	Radhe		Yes
6	Subhlaxmi		Yes
7	Gopi		Yes
8	Steel Town		Yes
9	Mahagujarat		Yes
10	Vasna-Chacharwadi		Yes
11	Matoda		Yes
12	Swastik		Yes
13	Pharma SEZ	There is a proper management of MSW	No
14	NG Gallops	There is a proper management of MSW	No
15	Rajoda	Dustbins and MSW Management Mechanism are not provided	Yes
16	Sari		Yes
17	Moraiya		Yes
18	New Ahmedabad		Yes
19	Kesar Sopan	Municipal Solid Waste was not dumped on Roads of Kesar Sopan IE. But dustbins are not provided	Yes
20	Saket	Dustbins and MSW Management Mechanism are not provided	Yes
21	Whole Changodar Region	Dustbins and MSW Management Mechanism are not provided	Yes

Overall Existing Storm Water and Solid Waste Management on National Highway 8 (NH 8)

Existing Status: Municipal Solid Waste Management Mechanism is not provided in Changodar Region. Storm water logging due to poor percolation of soil and high groundwater table in Changodar Region.

Solid waste disposal and storm water logging on highway side near Changodar

Scrap dealers on highway side near Changodar

Solid waste dumping near Shree Prefas Steels Pvt Ltd.

Water logging near Real Strip

Water logging on highway side near Changodar Region

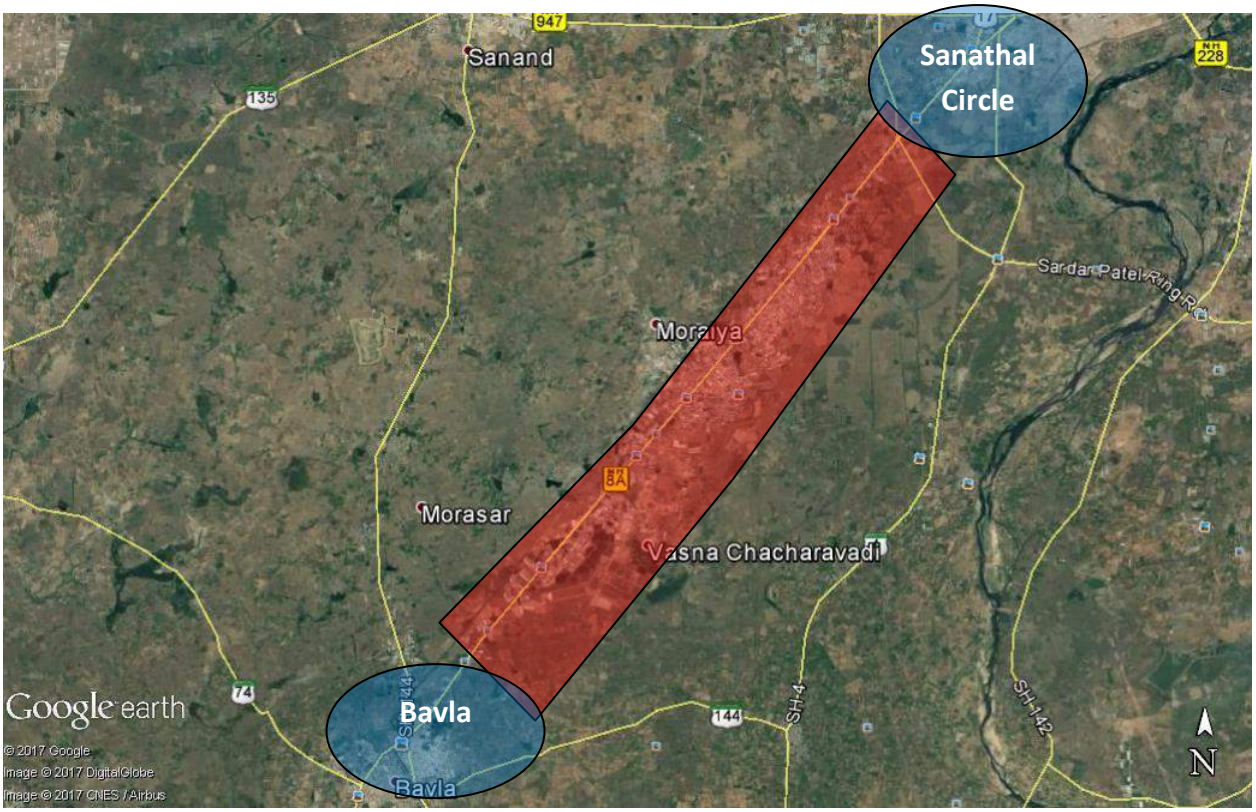
Solid waste dumping

Water logging and solid waste dumping on highway side near Changodar

Solid waste dumping

4. FEASIBILITY OF ENVIRONMENTAL INFRASTRUCTURE

Preliminary Analysis of Existing Situation Analysis of Changodar Region from the Sanathal Circle of SP Ring Road – Bavla Road (NH 8A) and Surroundings



Selection of Area of Interest (AOI)

The existing situation analysis is carried out for the Sanathal Circle on Sardar Patel (SP) Ring road to Bavla road (NH 8A) for development of the area. The AOI is selected that encompasses the interested patch. The larger area is selected to understand the natural drainage pattern of the area.

Google Earth Image with AOI Demarcation

The fig below shows the demarcation of AOI on Google Earth. Same boundary is used for study of topography and land use land cover analysis.

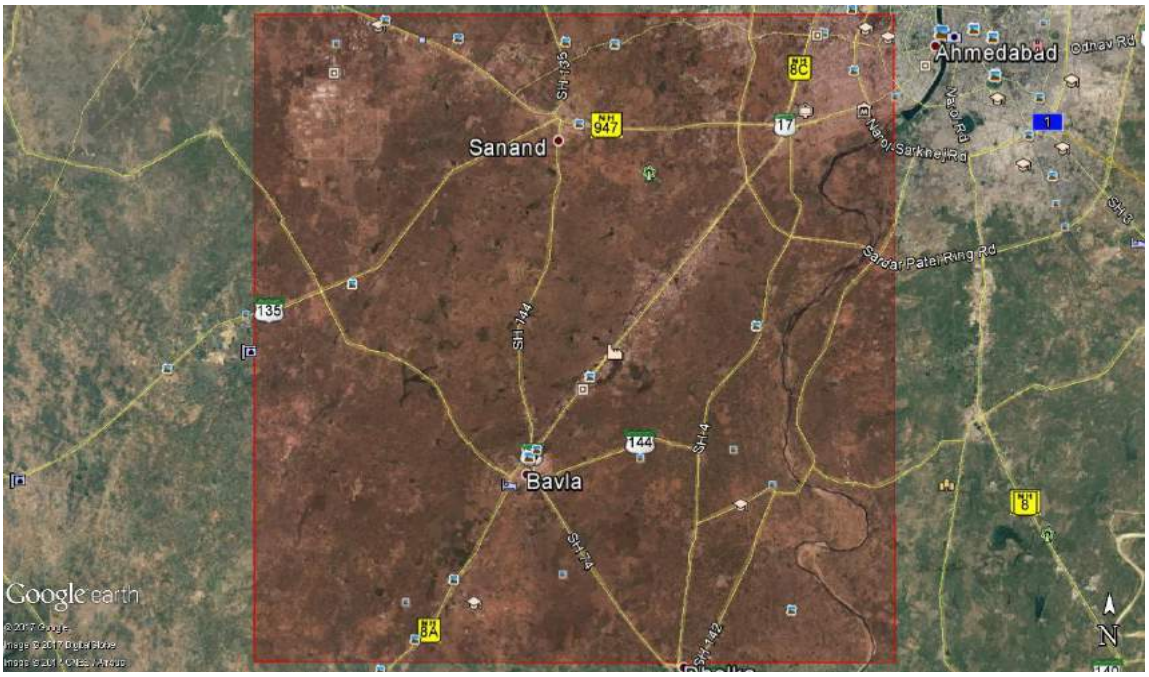


Fig.1 Area of Interest on Google Earth.

Survey of India Open Series Map

The Open series Map Sheet from the Survey of India Portal has been downloaded. The sheet is then Georeferenced to use as a layer for the base map.

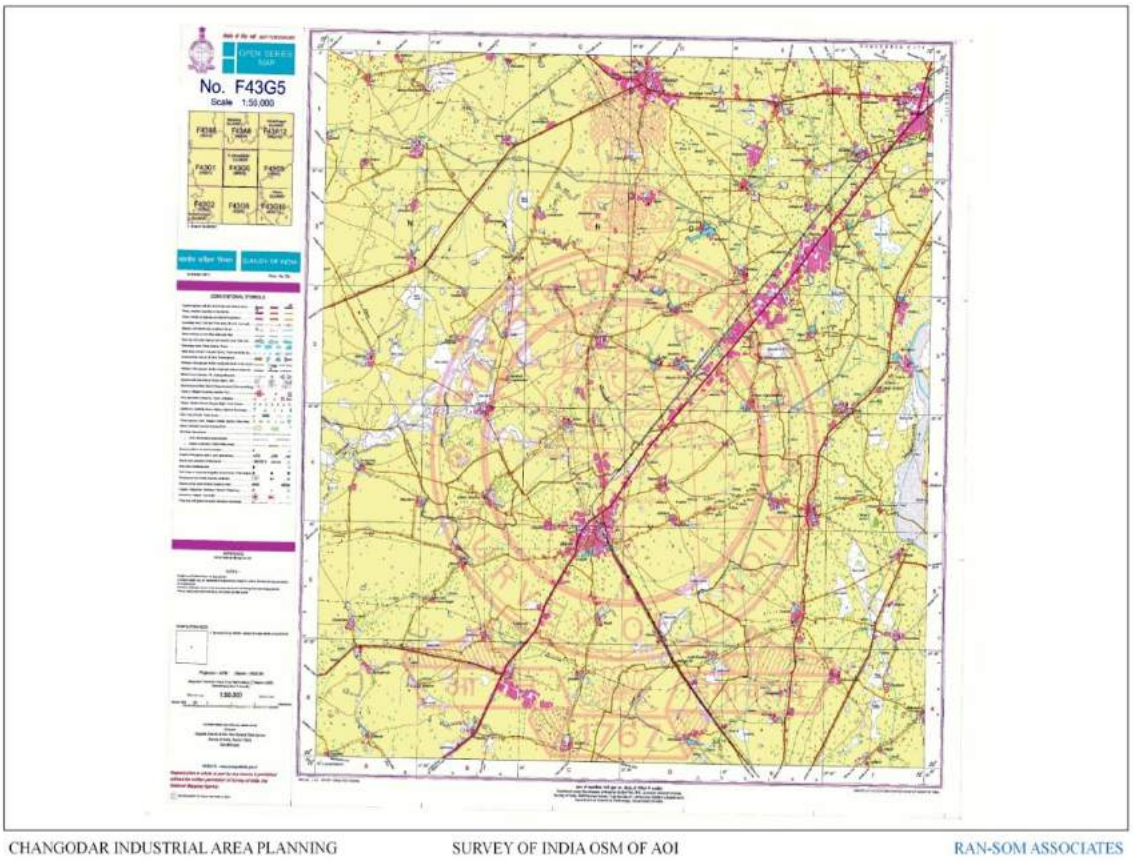


Fig.2 Survey of India OSM map.

Topographical Analysis

For carrying out topographical analysis, Shuttle Radar Topographical Mission (SRTM) data of NASA is utilized. SRTM is a bald earth elevation data and available freely from United State Geological Survey (USGS) website.

Digital Elevation Model

The Data for AOI is clopped from the data set. The levels vary from approximately 9m to 67m in the study area.

Fig.3 Base Digital Elevation Model of AOI

Slope Map

Using DEM the slope is calculated for the AOI in percentage. The slope varies from 1% to 10%. Majority of the area fall under 2 to 4 percent slope which means the area is almost flat to gentle sloping.

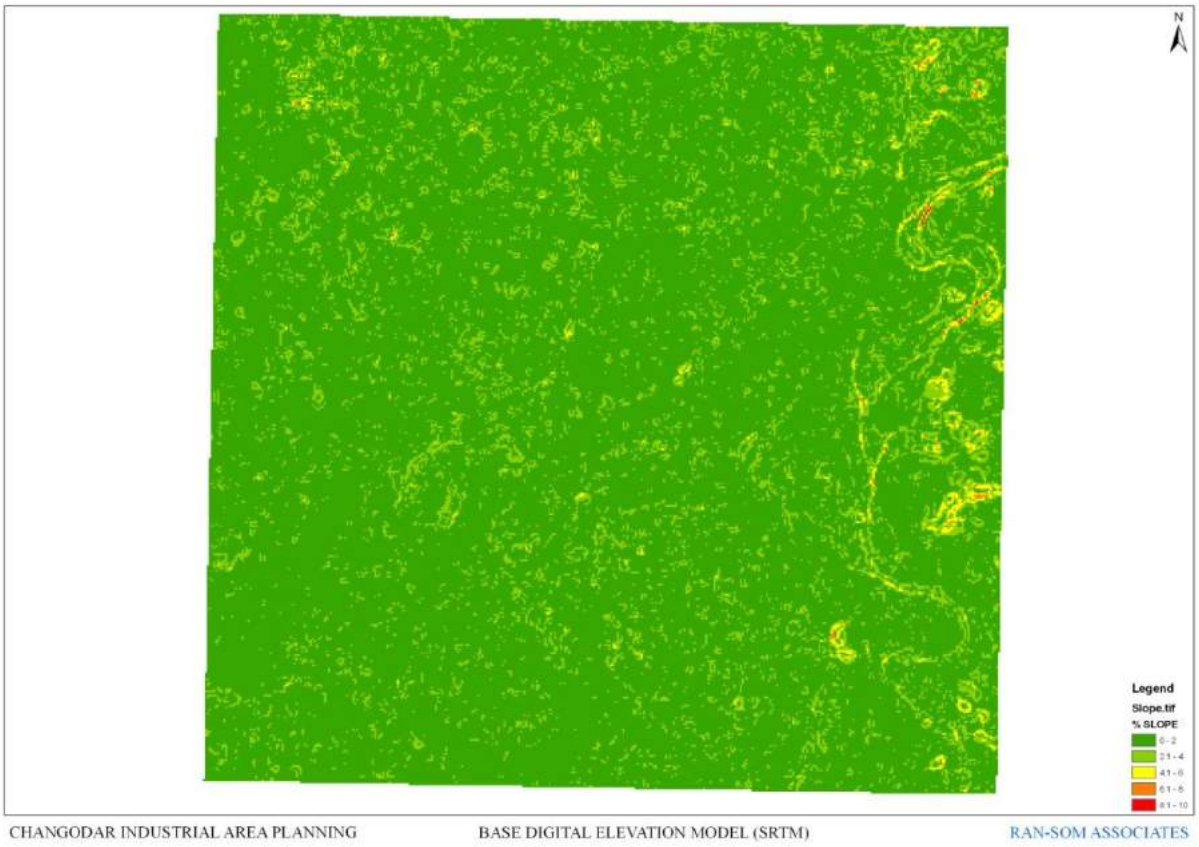


Fig.4 Slope Map of AOI

Contour Map

The contour is extracted from DEM. The contour interval is selected as 1m for contour generation. The elevation value varies from 10m to 67m. The fig given below shows the thematic contour map of the AOI.

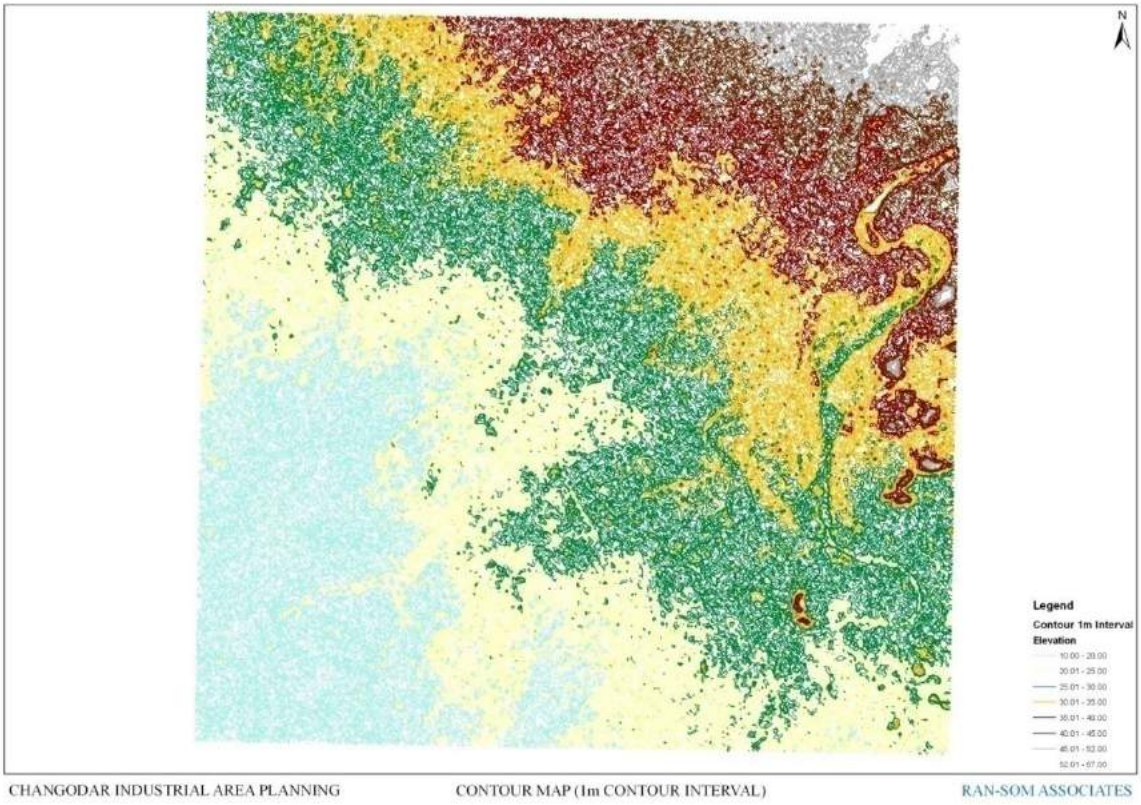


Fig.5 Contour Map of AOI

Natural Drainage Network and Watershed Map

Using DEM as a base grid detailed watershed delineation analysis has been carried out. The final result in terms of Micro Watersheds, Macro Watershed (Merged micro watershed) and Natural drainage network is shown in figure as given below.

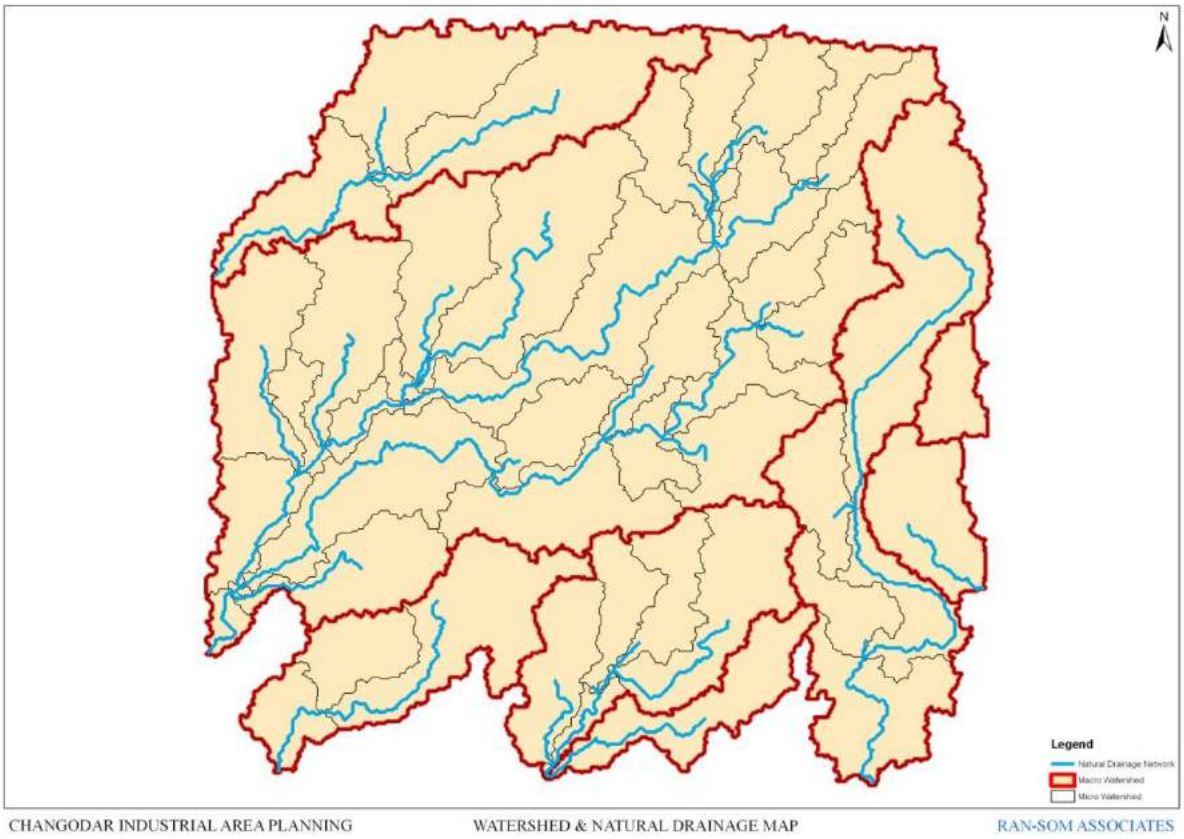


Fig.6 Natural Drainage Network & Watershed Map of AOI

Existing Road Network, Railway and Canal Network

Using Google Earth and SOI open Series map Existing Major Road Network, Railway and Canal Network is digitized.

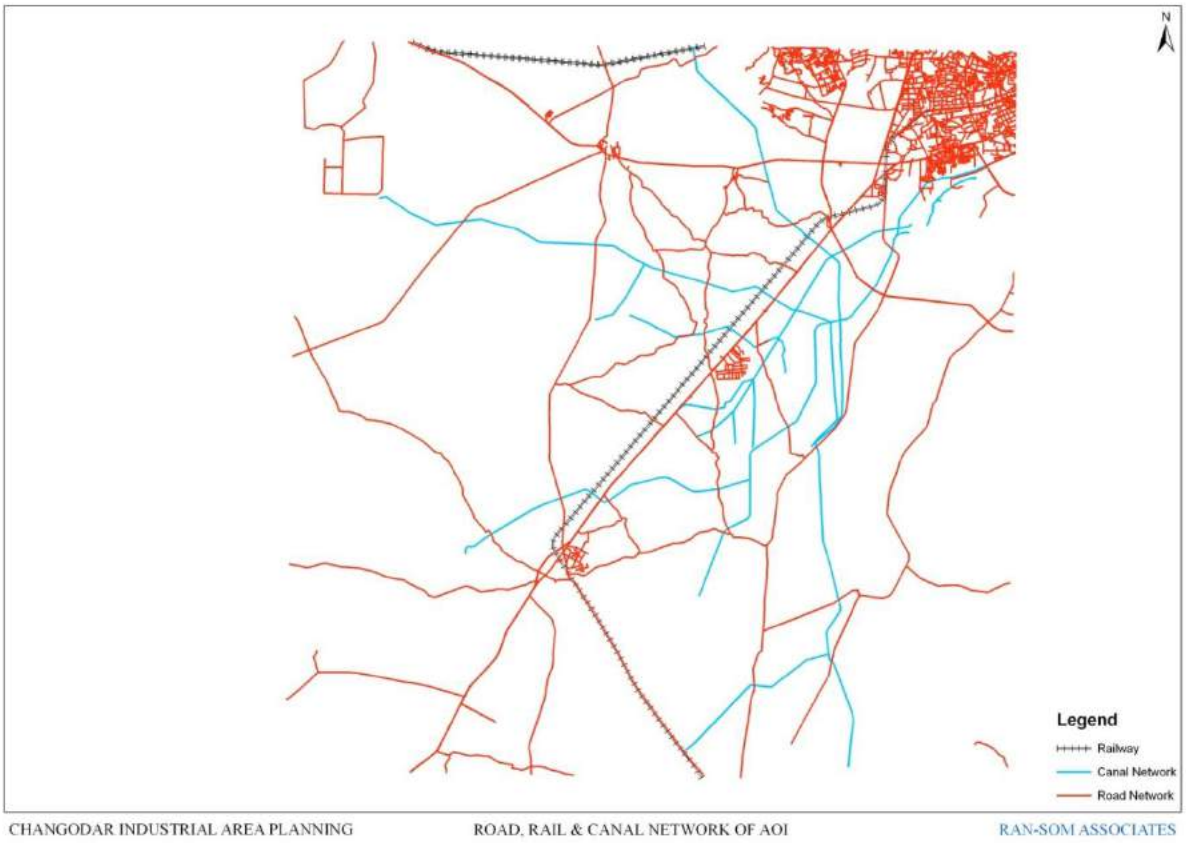


Fig.7 Road, Rail & Canal Network Map of AOI

Land use Land Cover Analysis

For Land use Land cover analysis LISS – III data of resourcesat – 1 from bhuvan portal is used. The latest available image is of February 2013 is used for analysis.

False Color Composite (FCC)

Using Band 2, 3 and 4 FCC is created for image interpretation. The figure given below shows the standard FCC of the AOI.

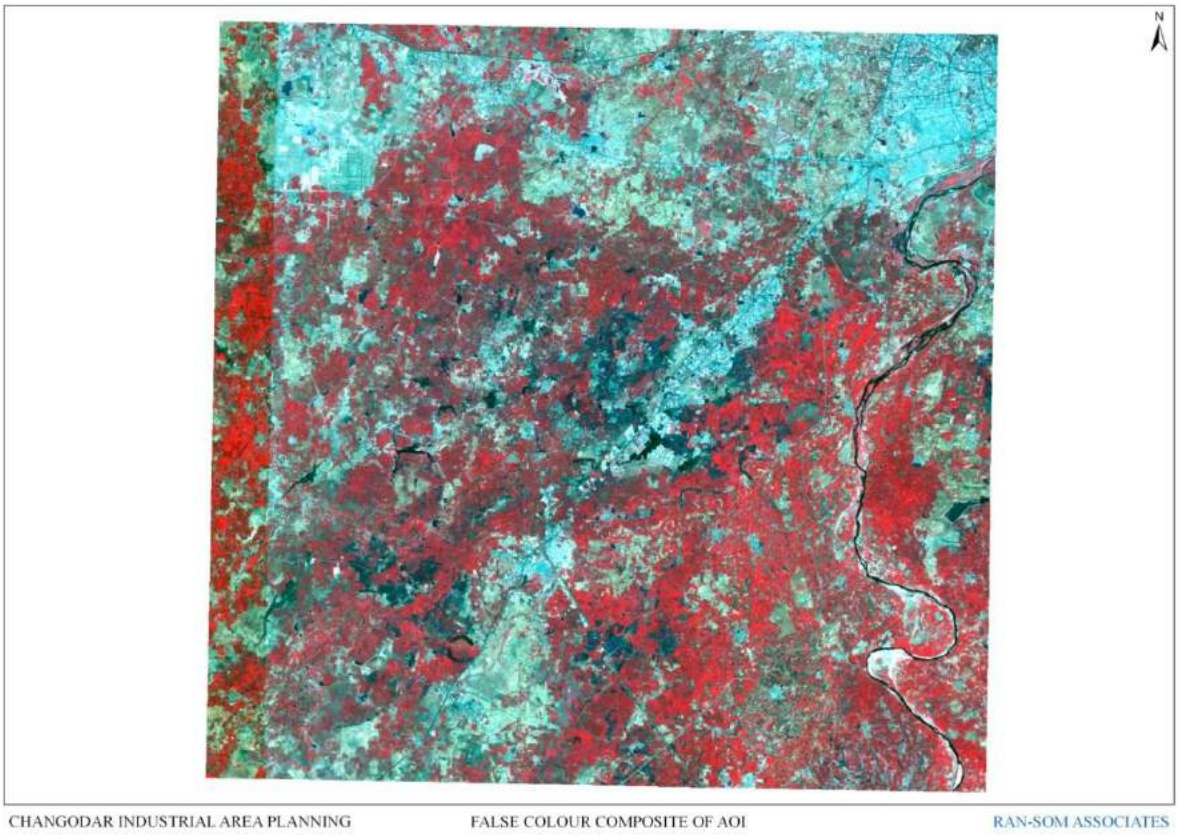


Fig.8 False Color Composite Map of AOI

Land use land cover Classification

Using above FCC image, the area is classified in to major 4 land use land cover i.e. Water Body, Vegetation, Open Land and Built up areas.

Table – 1 Area Table for AOI

Land use – Land Cover Class	Area (Ha)
Water Body	3672.92
Vegetation	51147.92
Open Land	49161.51
Built up	4034.97
TOTAL	**108017.03**

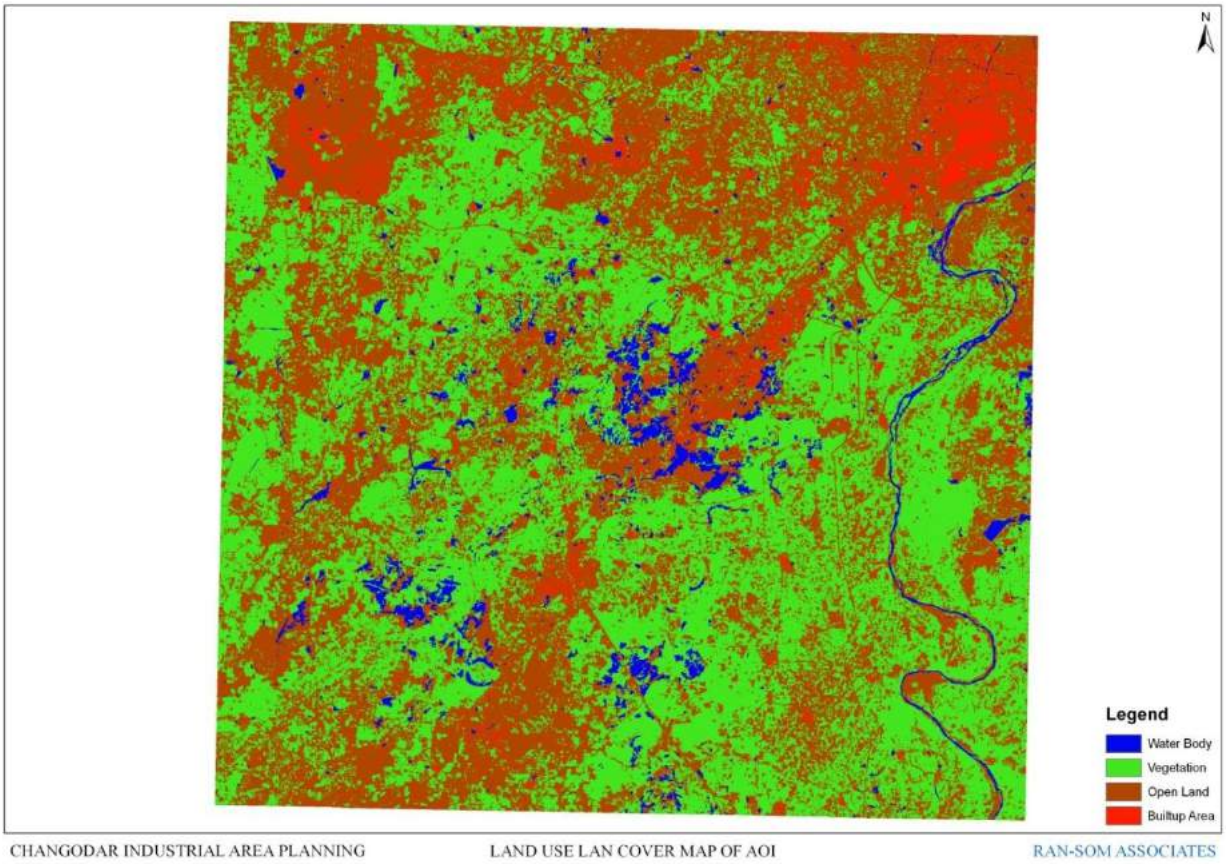


Fig.9 Land Use Land Cover Map of AOI

From above analysis, LULC map the study area is selected, North East side - Ring road junction at sanathal, South West side - junction near Bavla city, North West side - 2 km towards sanand from railway track and SH 4 and SH 144 road in South East direction.

Table – 2 Area Table for Selected Area

Land use – Land Cover Class	Area (Ha)
Water Body	933.12
Vegetation	5335.83
Open Land	4524.65
Built up	517.43
TOTAL	**11311.03**

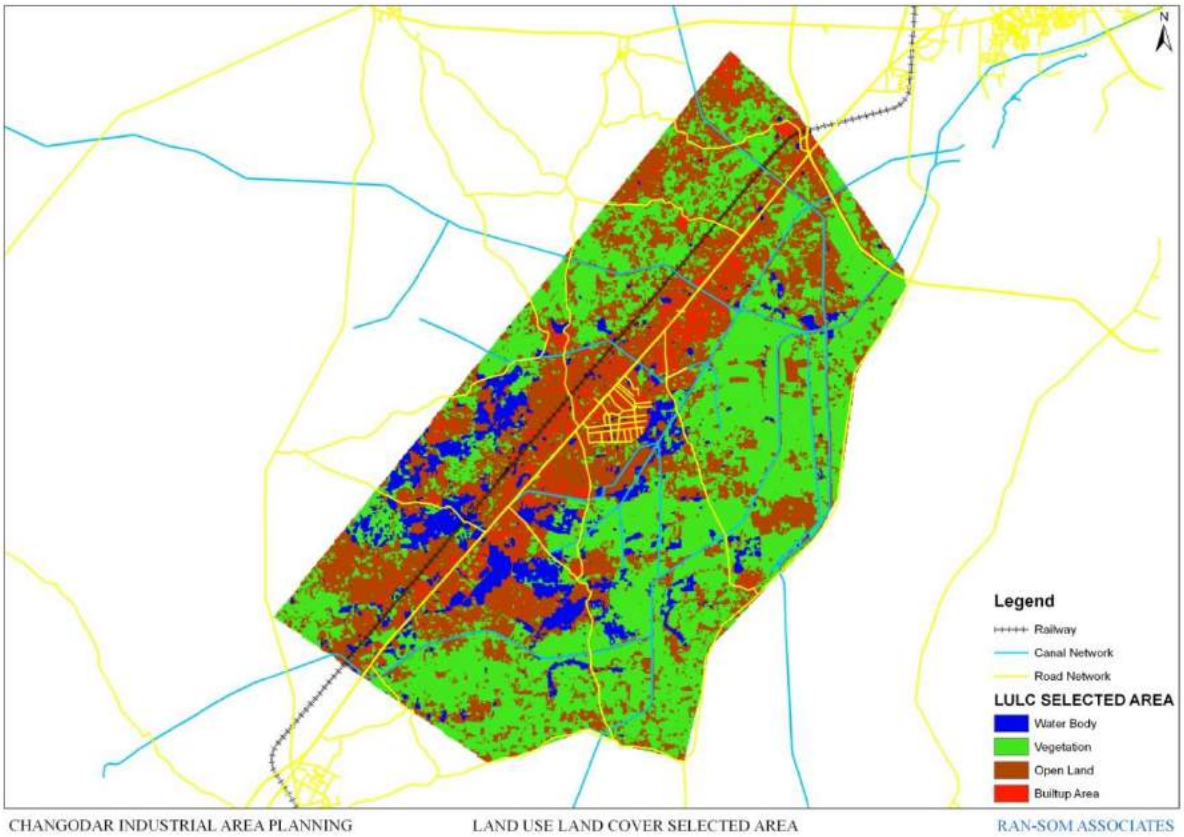


Fig.10 Land Use Land Cover Map of Selected Area

New AOI Details and Analysis for Future Development

Google Earth Image with New AOI Demarcation

The boundary of region for analysis is considered from railway line on upper portion and upto present developed area. The same is marked on Google Earth map. Also, Villages and Settlements in the area are demarcated as shown in Fig. 11. The area of new AOI is about 3385 Hectares. There are three revenue villages and four settlements in the AOI. The total length on road is about 16km. & the width of the developed belt varies from 1.2km to 3km.

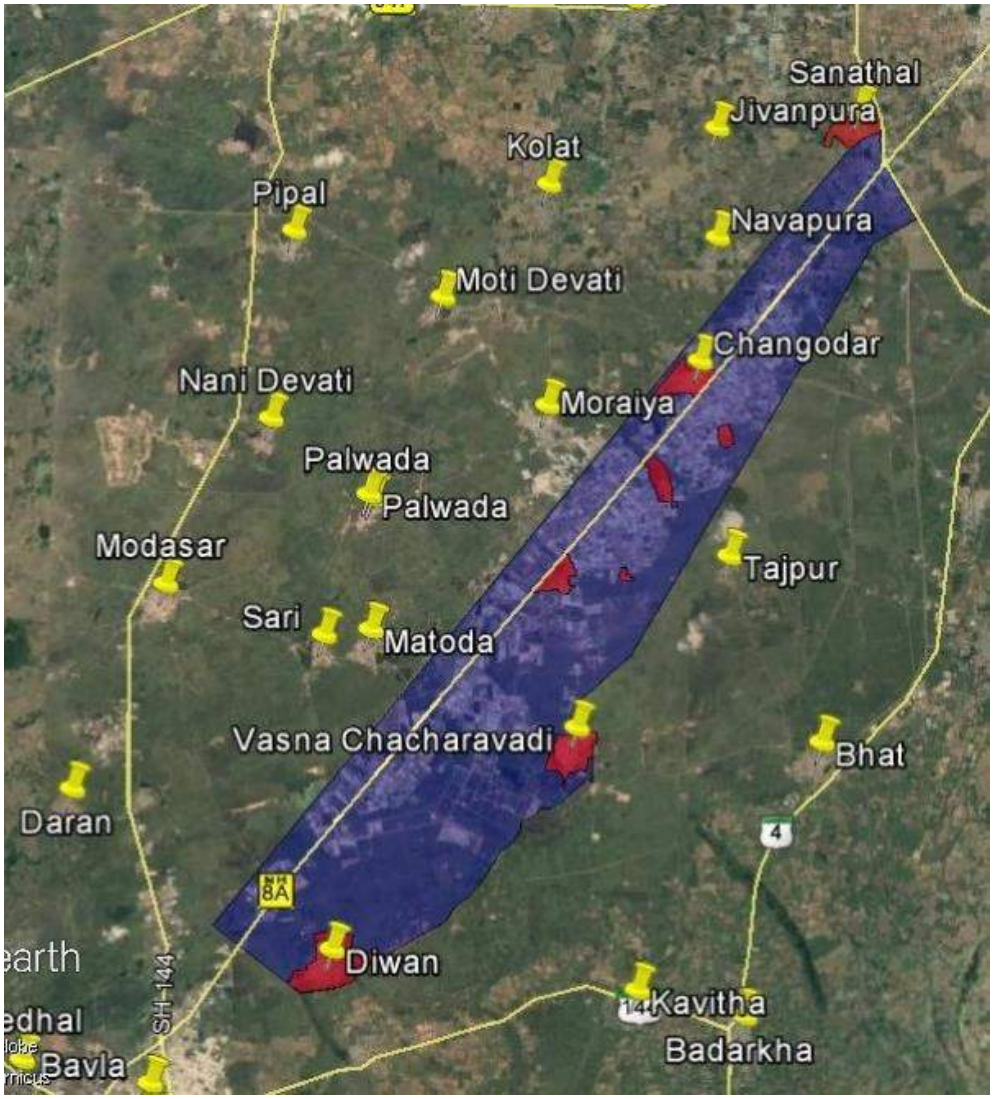


Fig.11 New Area of Interest on Google Earth

Survey of India Map with new AOI

The New AOI Boundary is now overlaid on SOI's OSM to understand the development scenario and other major infrastructure.

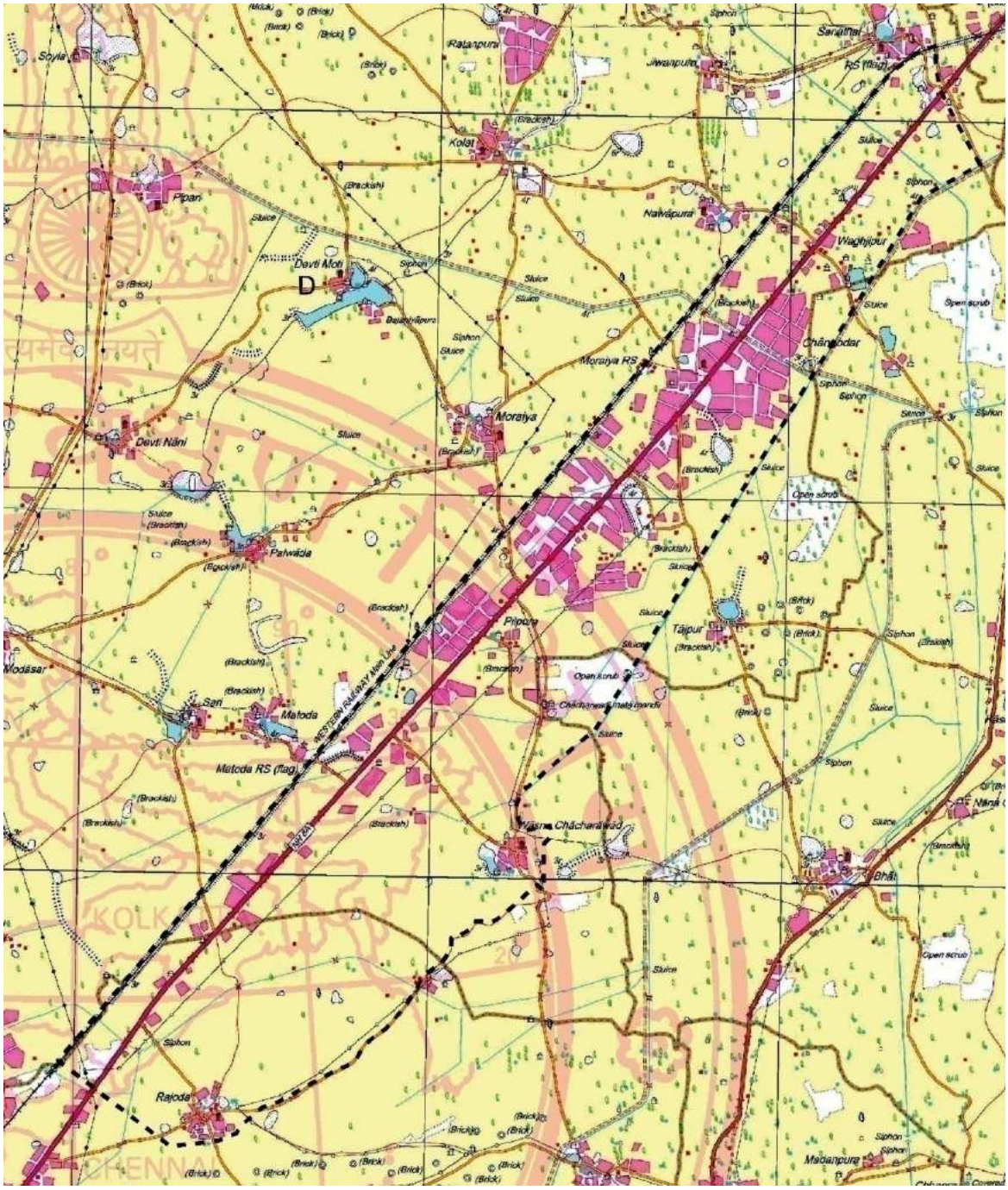


Fig.12 New Area of Interest on SOI's OSM

Topographical Analysis of the New AOI

The Topographical analysis of the new AOI is carried out using SRTM DEM. The Elevation varies from 9m to 43m as per the contours. The fig 13, 14 & 15 shows the base DEM, Contours and Watershed & Natural Drainage Pattern of the area.

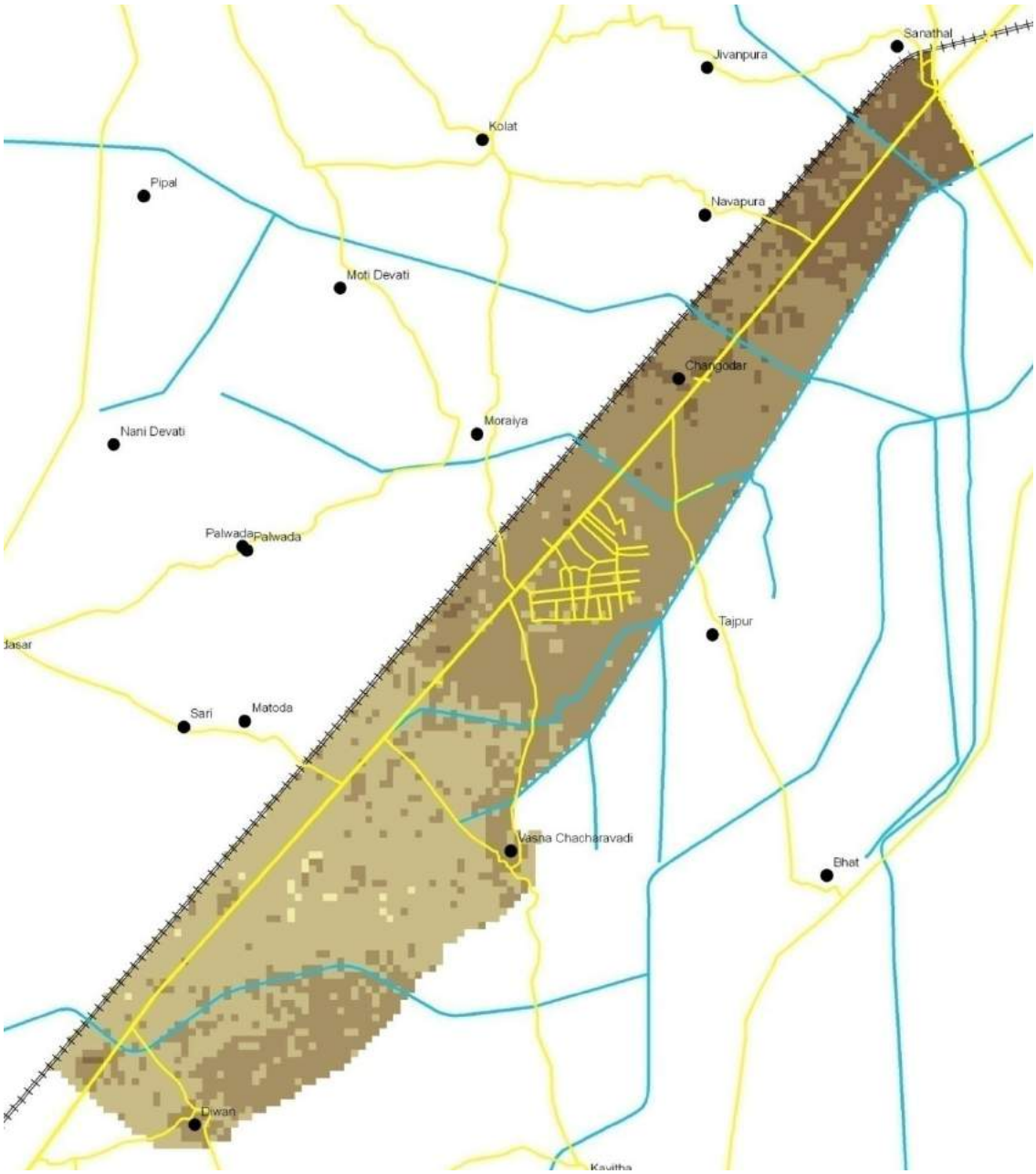


Fig.13 BASE DEM of New AOI

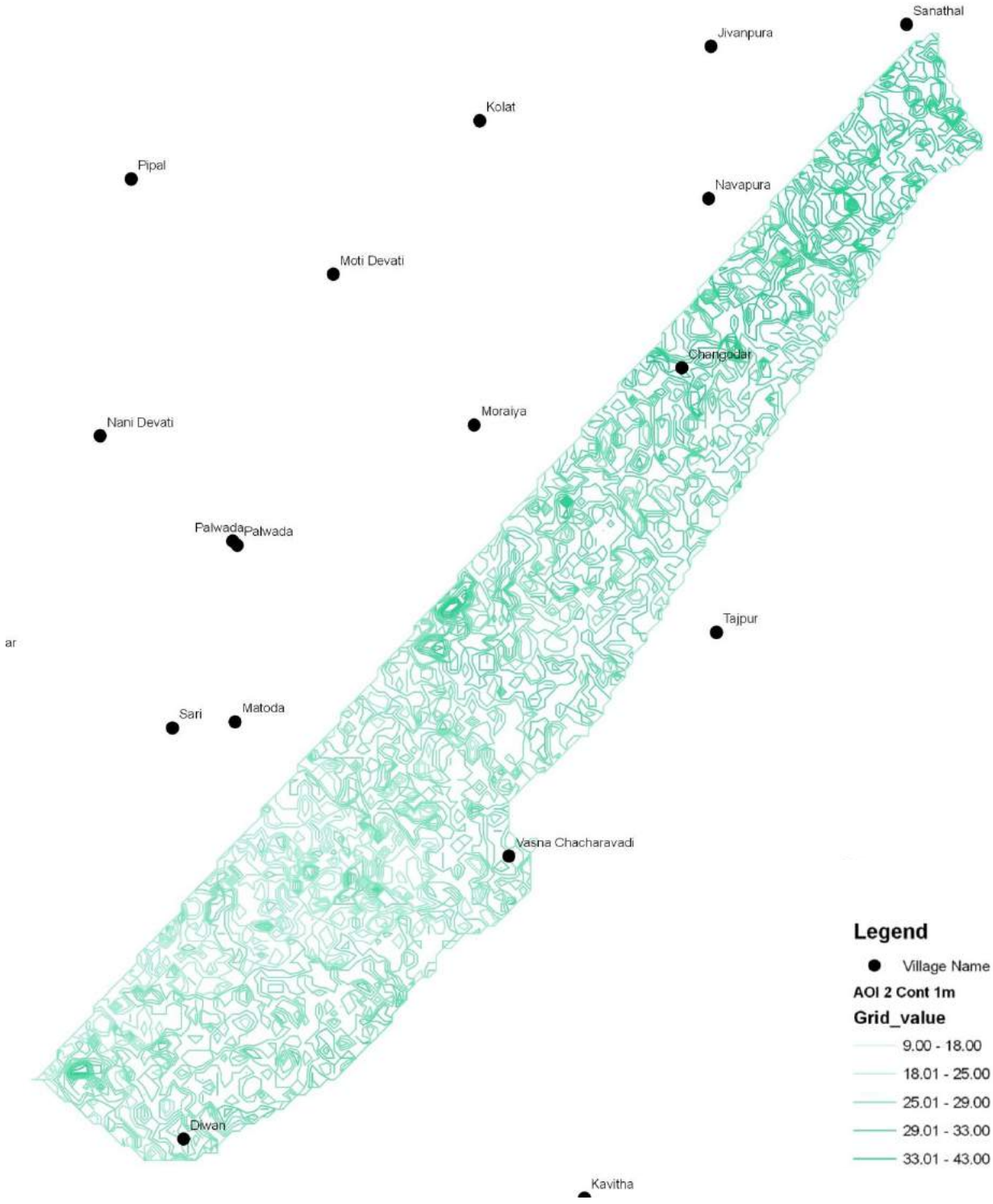


Fig.14 CONTOUR MAP of New AOI

The Watershed and natural drainage pattern shows the direction of drainage from Sanathal towards Bawla town. The area is being developed as an industrial area. It is necessary to preserve natural drain or storm, disposal system shall be developed considering the watershed & drainage pattern.

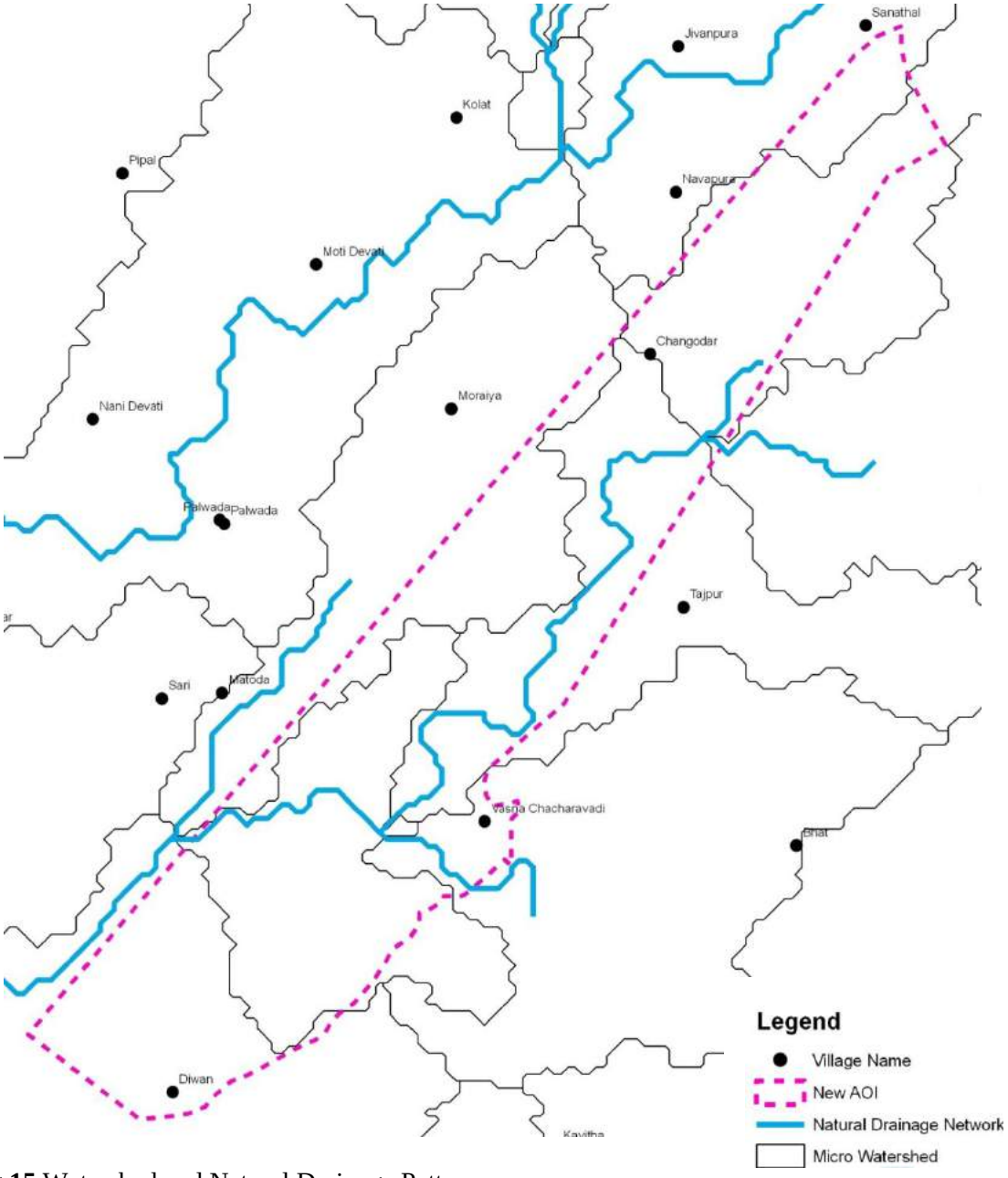


Fig.15 Watershed and Natural Drainage Pattern

Land Use Land Cover Analysis of New AOI Area

The Combined map shows all Land cover as well as already developed area, Water bodies and Developable area (Agriculture – green area & Open area). These maps are given in Fig. 16, 17, 18 & 19.

The Area of Village Settlement, Already built-up & Water bodies are considered as non developable area. Fig 17 & 18 shows non developable area due to built up & water body respectively.

Here, the total area includes the area of villages – settlements.

Table – 3 Area Table for New Selected Area

Land use – Land Cover Class	Area (Ha)
Water Body	342.86
Vegetation	859.83
Open Land	1782.84
Built up	386.00
TOTAL	**3371.53**

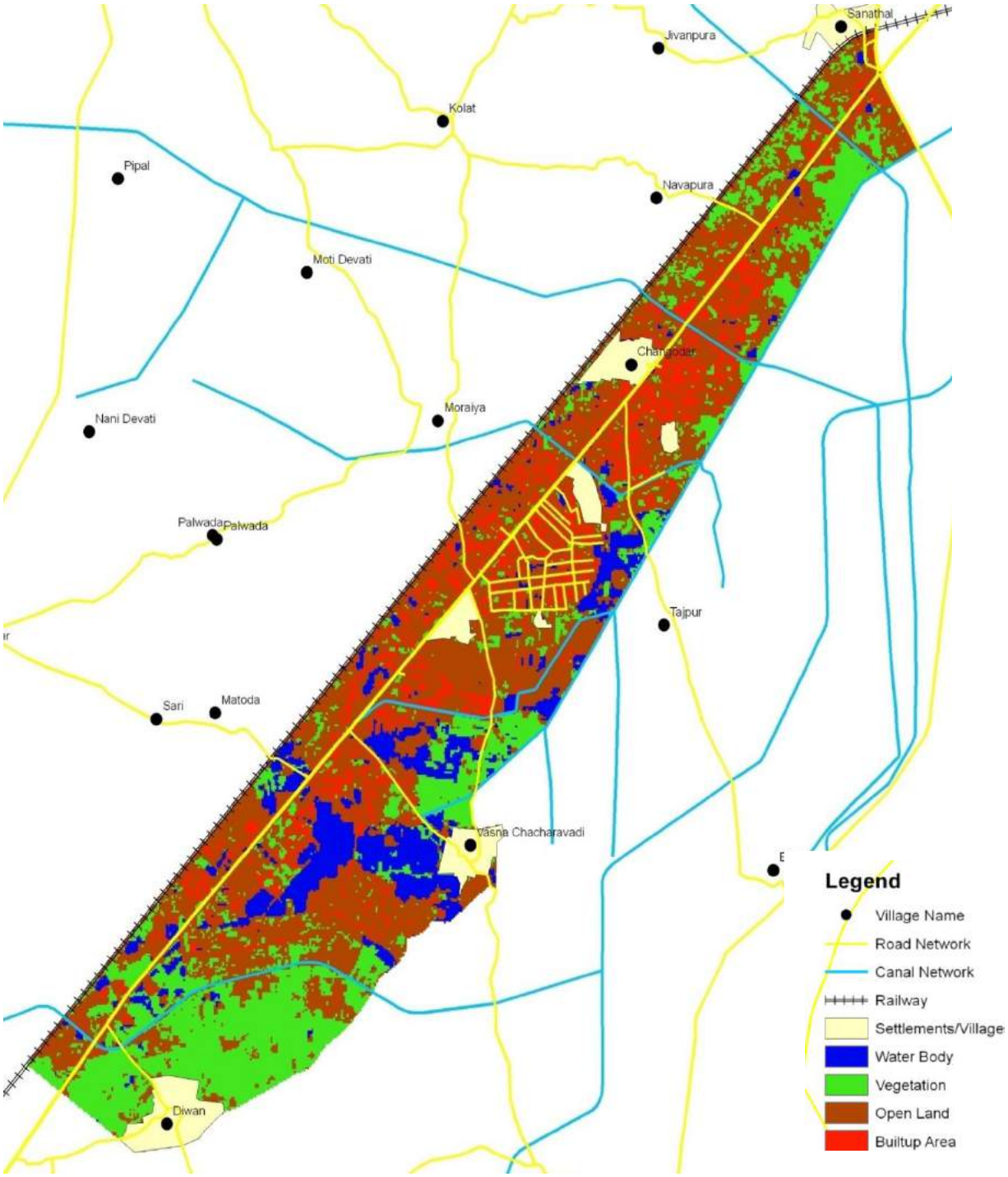


Fig.16 LULC & Villages – Settlements in new AOI

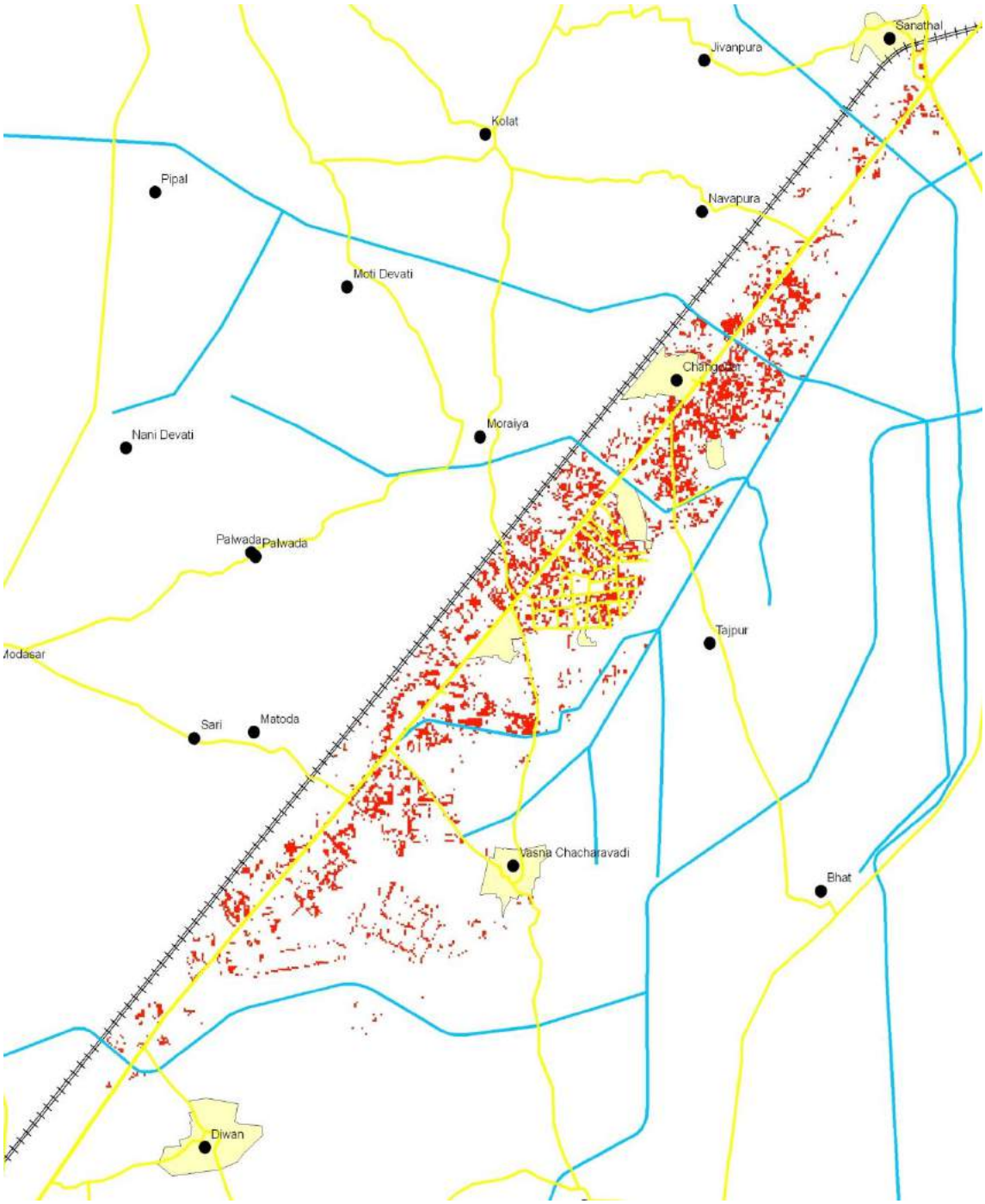


Fig.17 Built-up & Villages – Settlements in new AOI

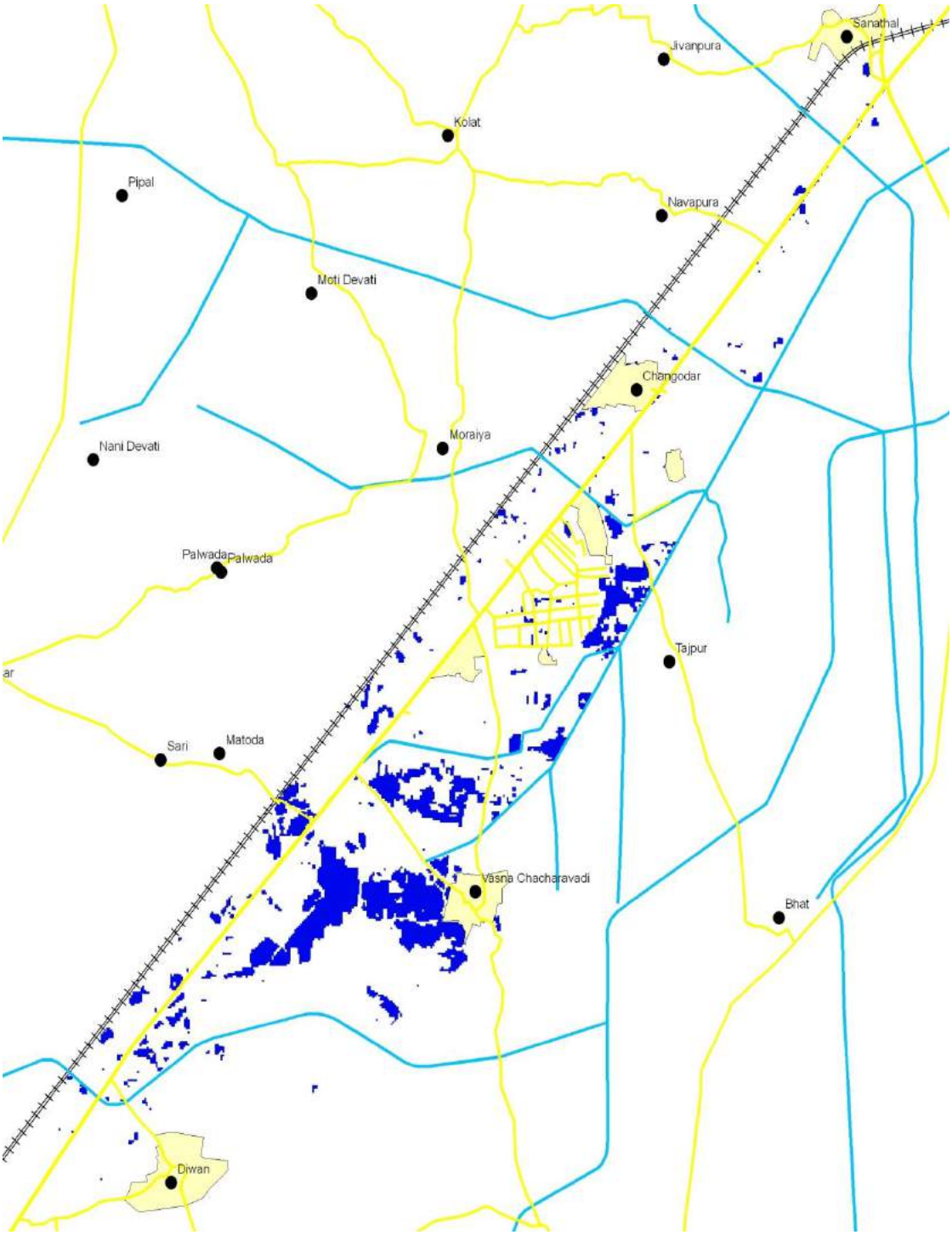


Fig.18 Water Body & Villages – Settlements in new AOI

The Open Land and Area under Agriculture – green belt can be developed and same is considered as a developable area. The Fig 19 shows the developable area.

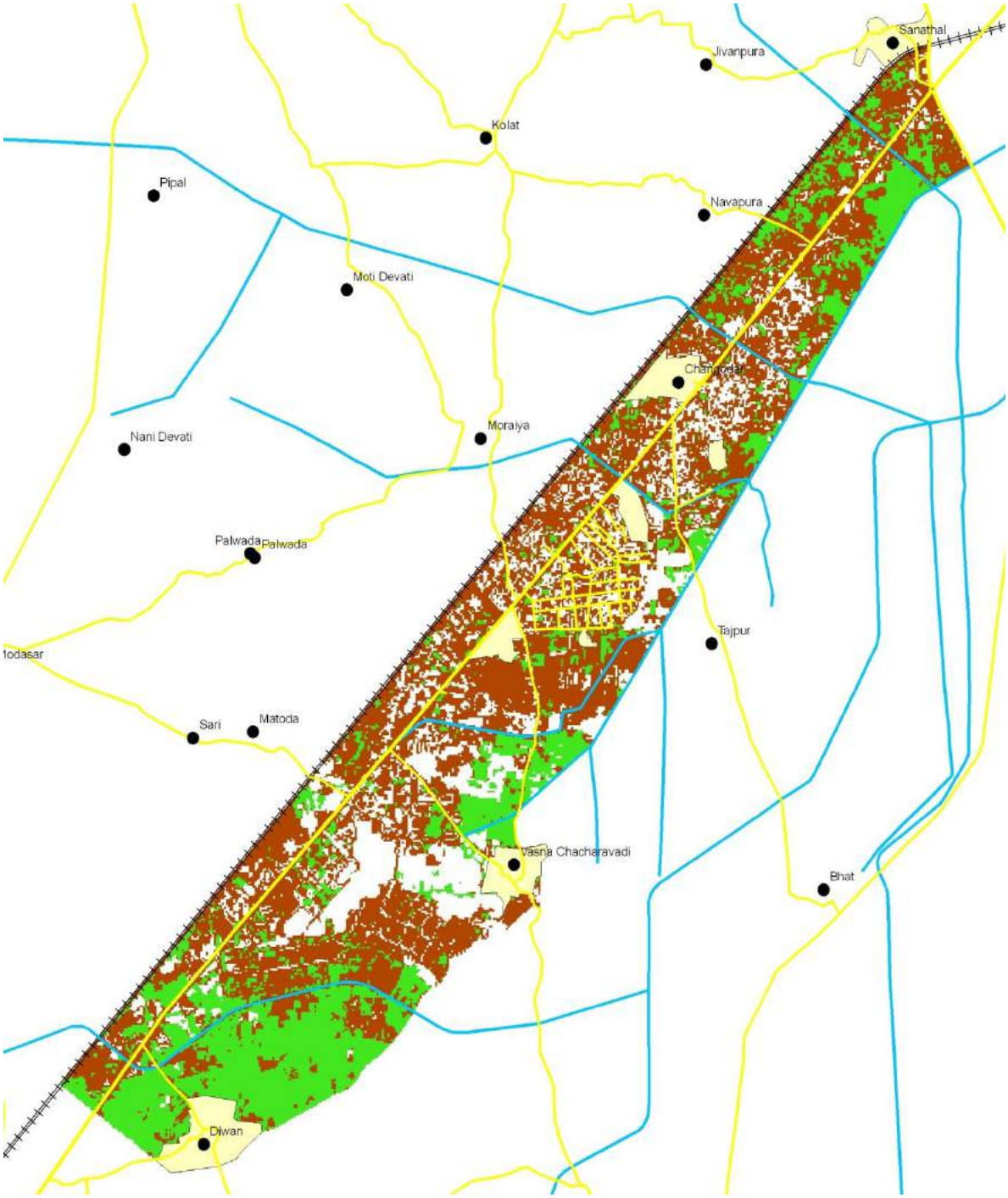


Fig.19 Open Land, Agriculture – Green Area & Villages – Settlements in new AOI

Here, further combining Elevation Profile, LULC & OSM of SOI following 2 pockets can be utilized for development of CETP for this area. Same is shown on Google Map & Other Details are shown in Fig Below.

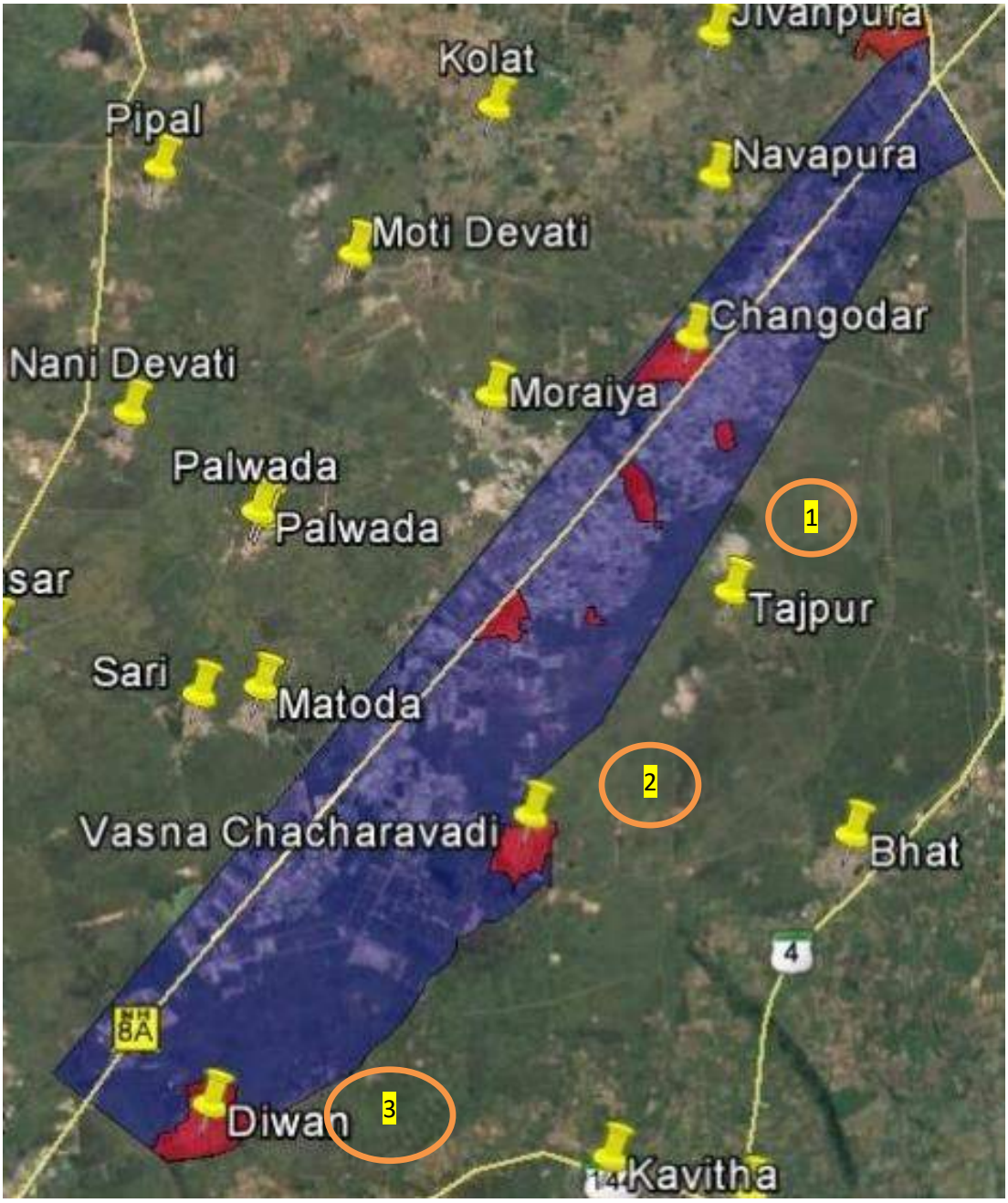


Fig.20 Identified Pockets for CETP

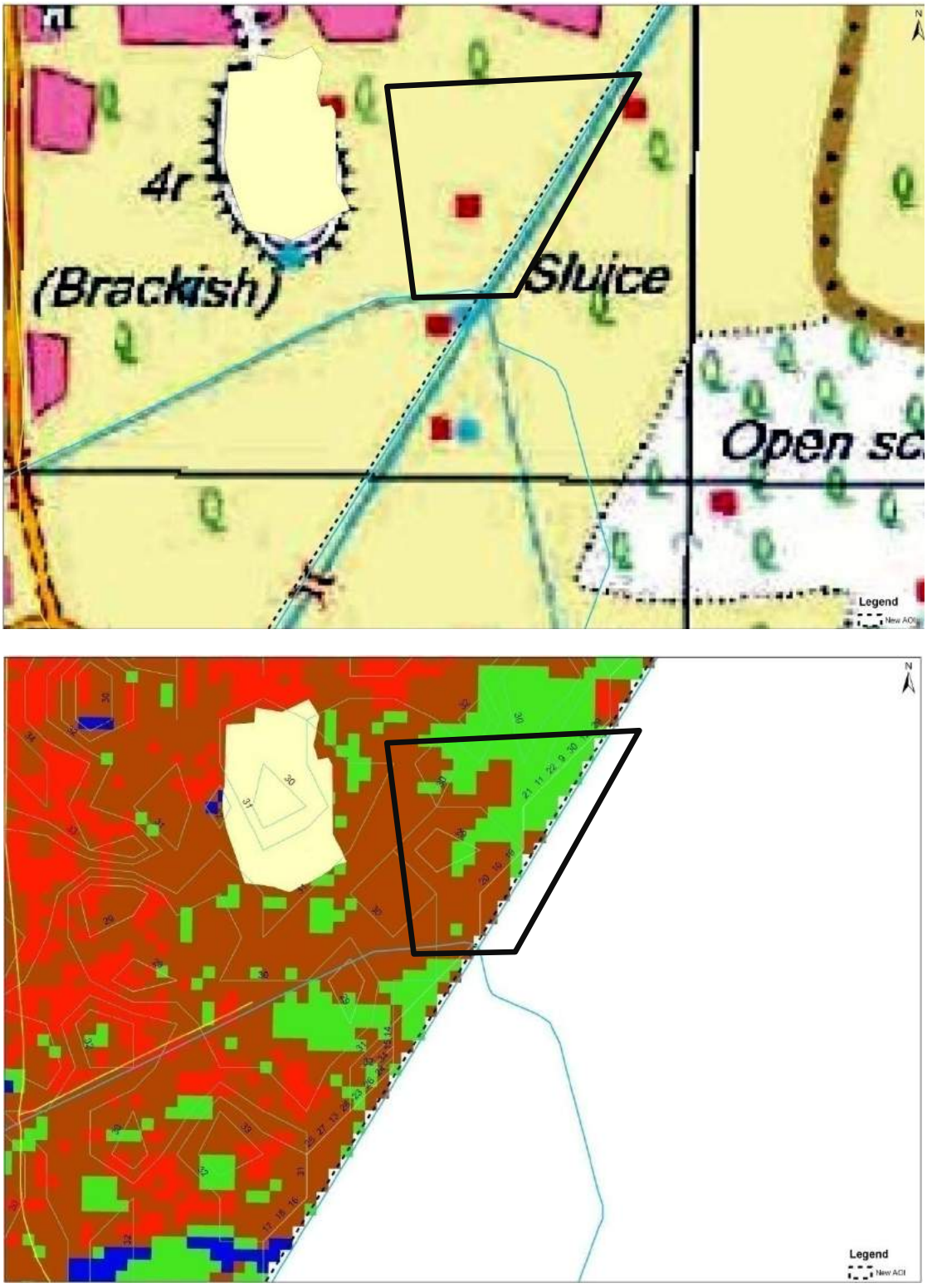


Fig.21 Details of pocket 1

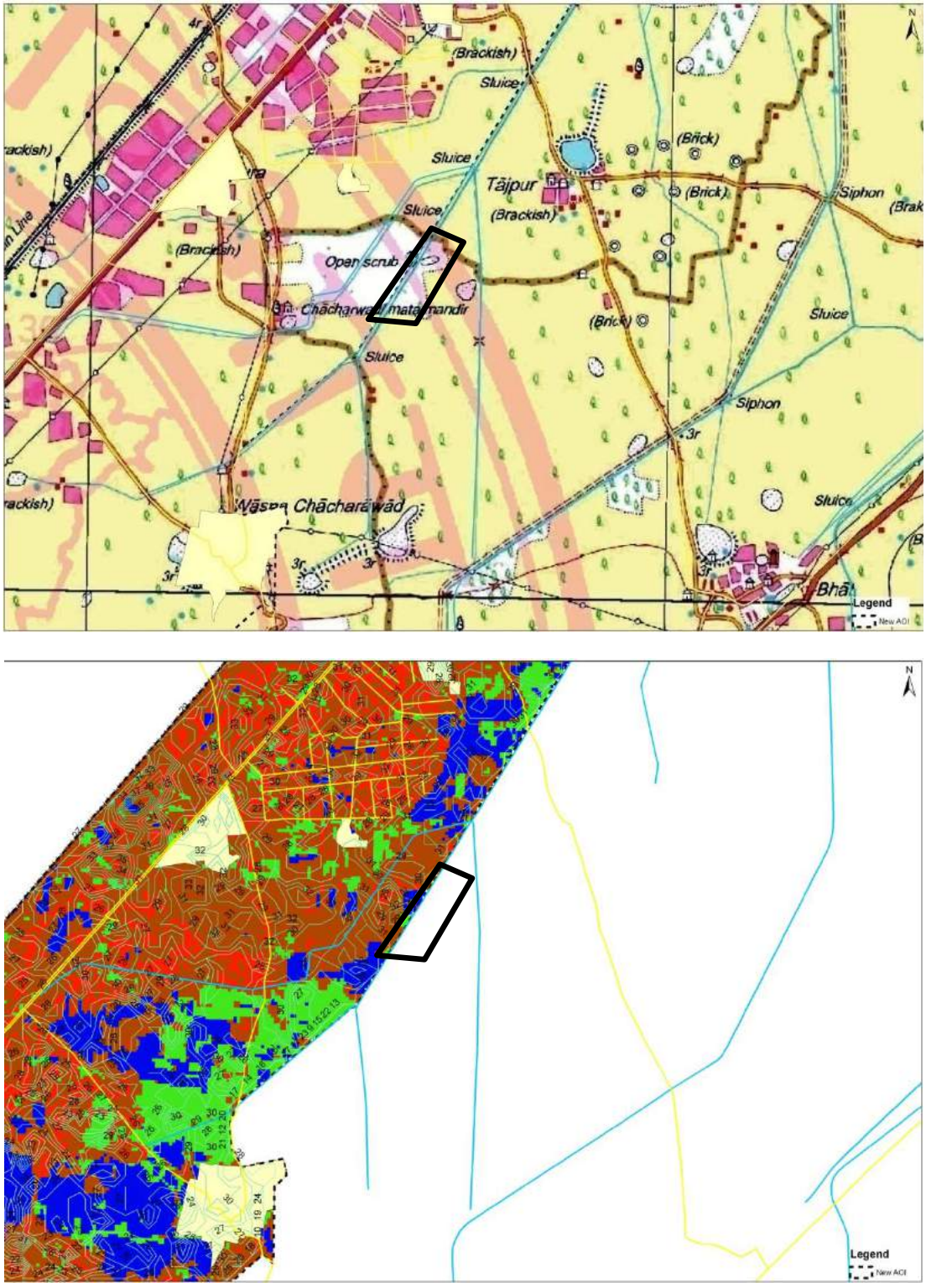


Fig.21 Details of pocket 2

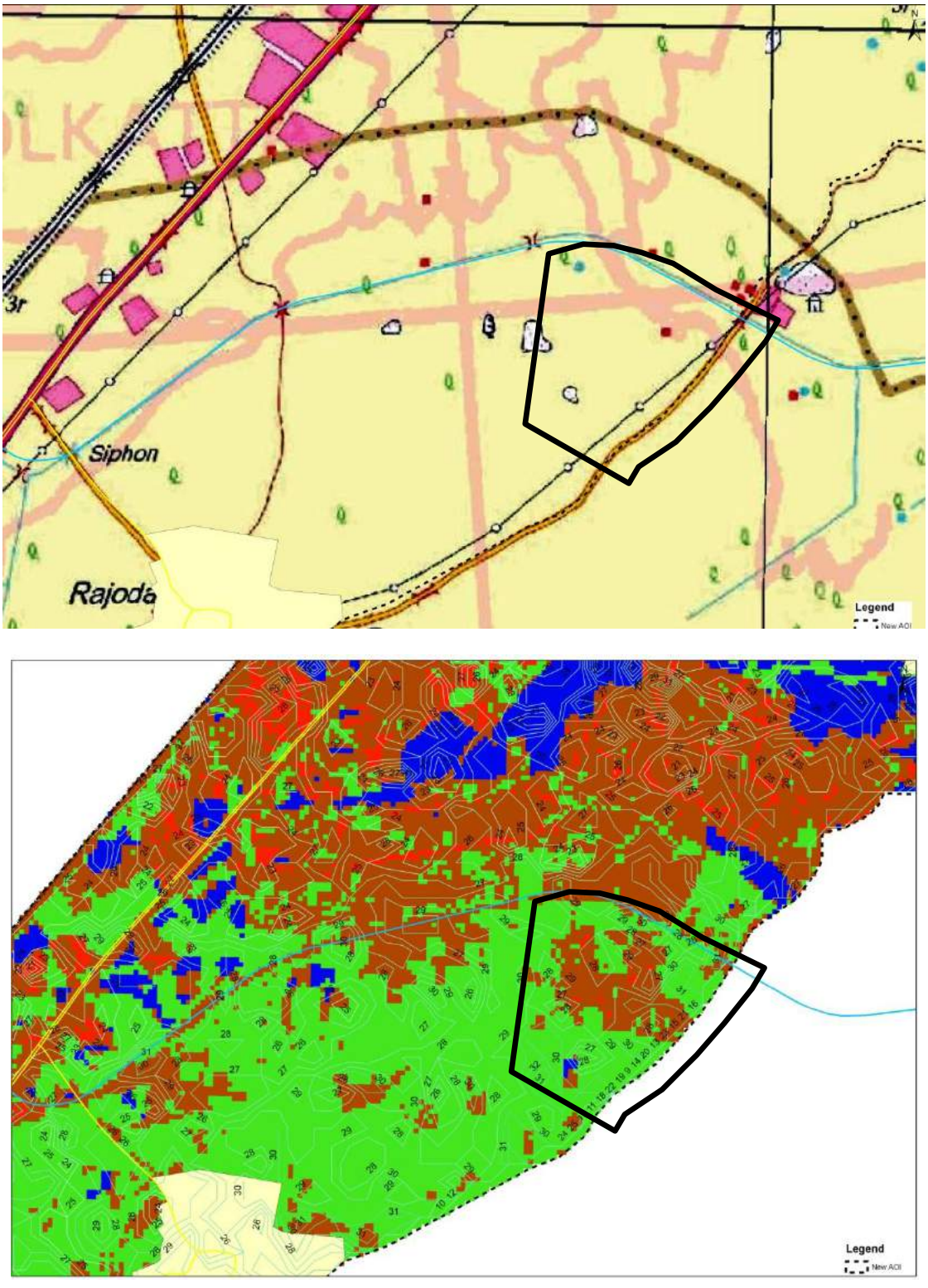
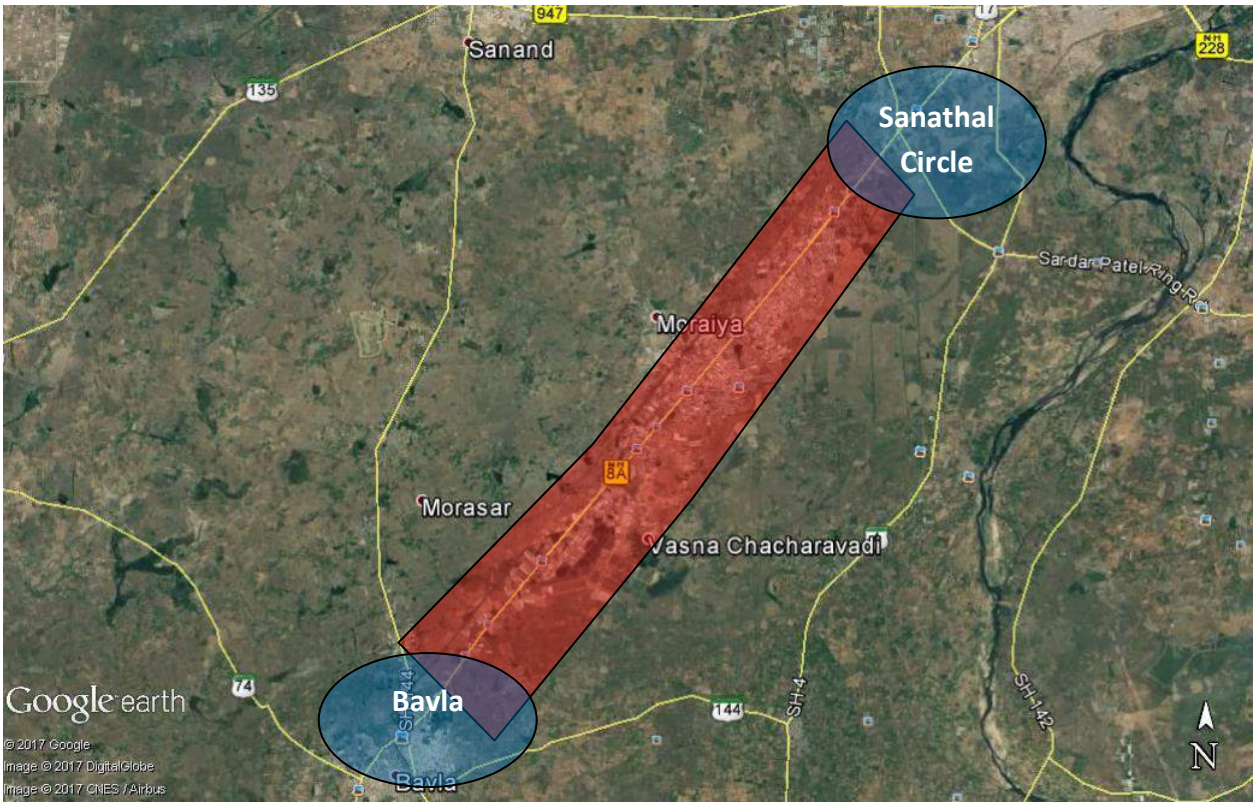


Fig.21 Details of pocket 3

Study for feasibility of CETP, STP, MSW and Waste Water Disposal Planing for Changodar Industrial Area Developed among Sanathal Circle of SP Ring Road – Bavla Road (NH 8A) and Surroundings



Project Context

Estate area is located near Ahmedabad; about 20km. away and on the boundary of Sanand; in Ahmedabad district. Based on this as well industrial development scenario area in between from the Sanathal Circle on Sardar Patel (SP) Ring road to Bavla road (NH 8A) is considered. The AOI is selected that encompasses the interested patch. The larger area is selected to understand the overall development pattern of the area.

There are about 17 private unorganized Industrial Estates; Chemical, Pharma, Plastic, & Engineering…etc. units were already established. About 2500 nos. of units within the study area.

The industrial development is taken place nearby different villages; within short vicinity. The Solid waste generated from the industries as well residential areas, waste water, effluent from the industries etc. discharges into canal, wells etc. and thereby environmental pollution is going to develop.

The above situation due to no treatment facilities i.e. STP – CETP in this area. The other factors i.e. no facility for the storm water disposal, accumulation of solid-waste in unorganized manner, no proper planning for residential and industrial development. Thus, overall unorganized development has already invited to environmental threats and day by day it is going to increase.

In context to this, before development of worst environment situation, the development needs to transform under proper planning development pattern and need to develop required infrastructure i.e. Solid waste management, storm water development, water supply, development of water resources, waste water collection and treatment facilities etc. by keeping exiting as well future development scenario.

In context to above, this study are emphases the effluent disposal capacity requirement, likely points for to establish the required infrastructure and lump sum cost for development.

Date Availability

20 nos. of Estates' name – water consumption and name of about 500 nos. of industries established in different estates were available.

Methodology for Study and Maps Development

Based on available data and area under the study, following maps are developed using Geo informatics tools.

1. Land use for the area
2. Road, river, waste land within the area
3. Digital Elevation Map for the area
4. Demarcation of Industrial Development area
5. Demarcation of possible no. of Industries' locations and Industrial Estates' locations.
6. Identification of different routes; based on elevation, from high level to low level for to identify the final discharging points.
7. Identification of higher level configuration for waste land within or adjacent to the industrial developed area for to identify the location options for Pumping station – STP etc.

Based on above the study is taken up and output generated, given here under:

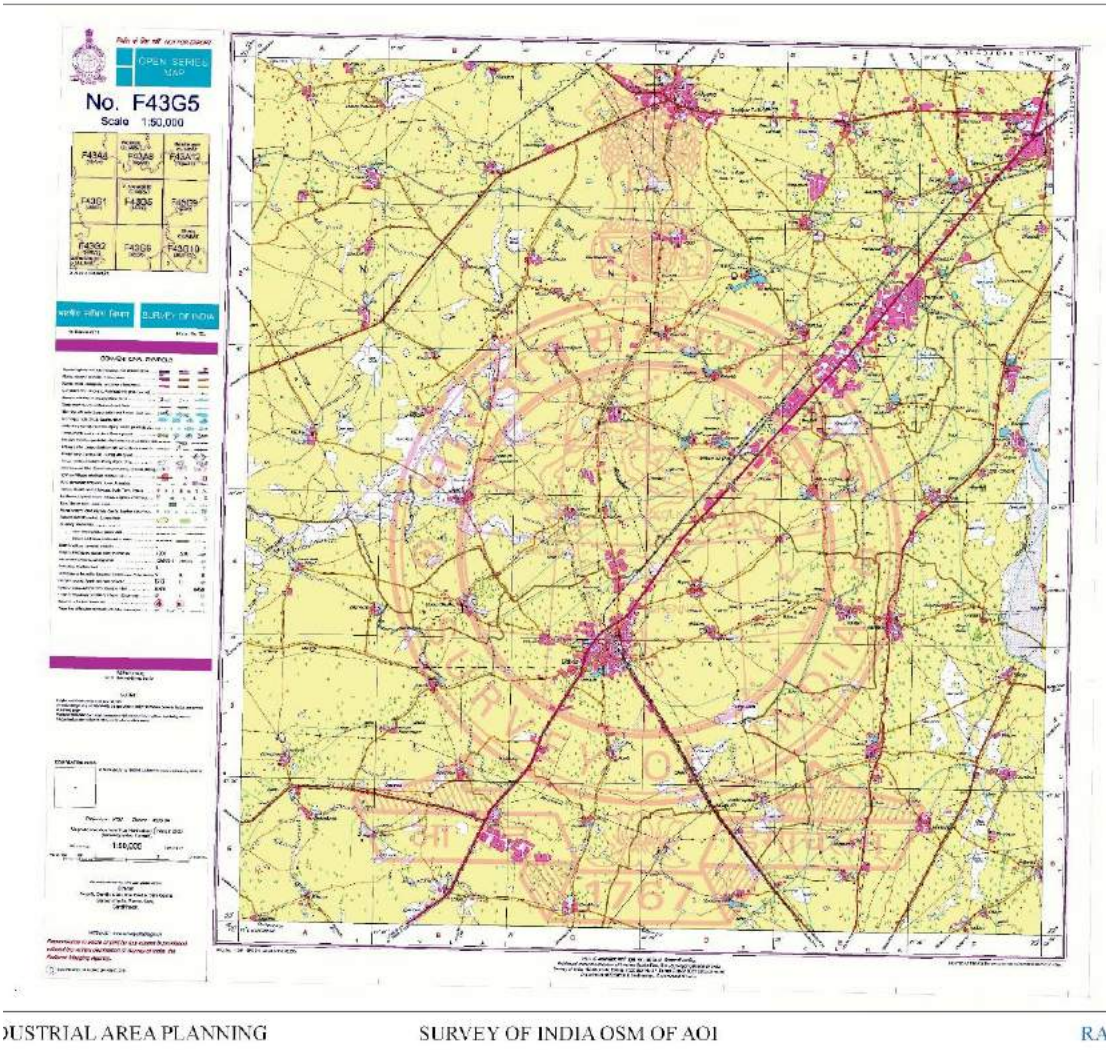
Google Earth Image with AOI Demarcation

The fig below shows the demarcation of AOI on Google Earth. Same boundary is used for study of topography and land use land cover analysis.

Fig.1 Area of Interest on Google Earth.

Survey of India Open Series Map

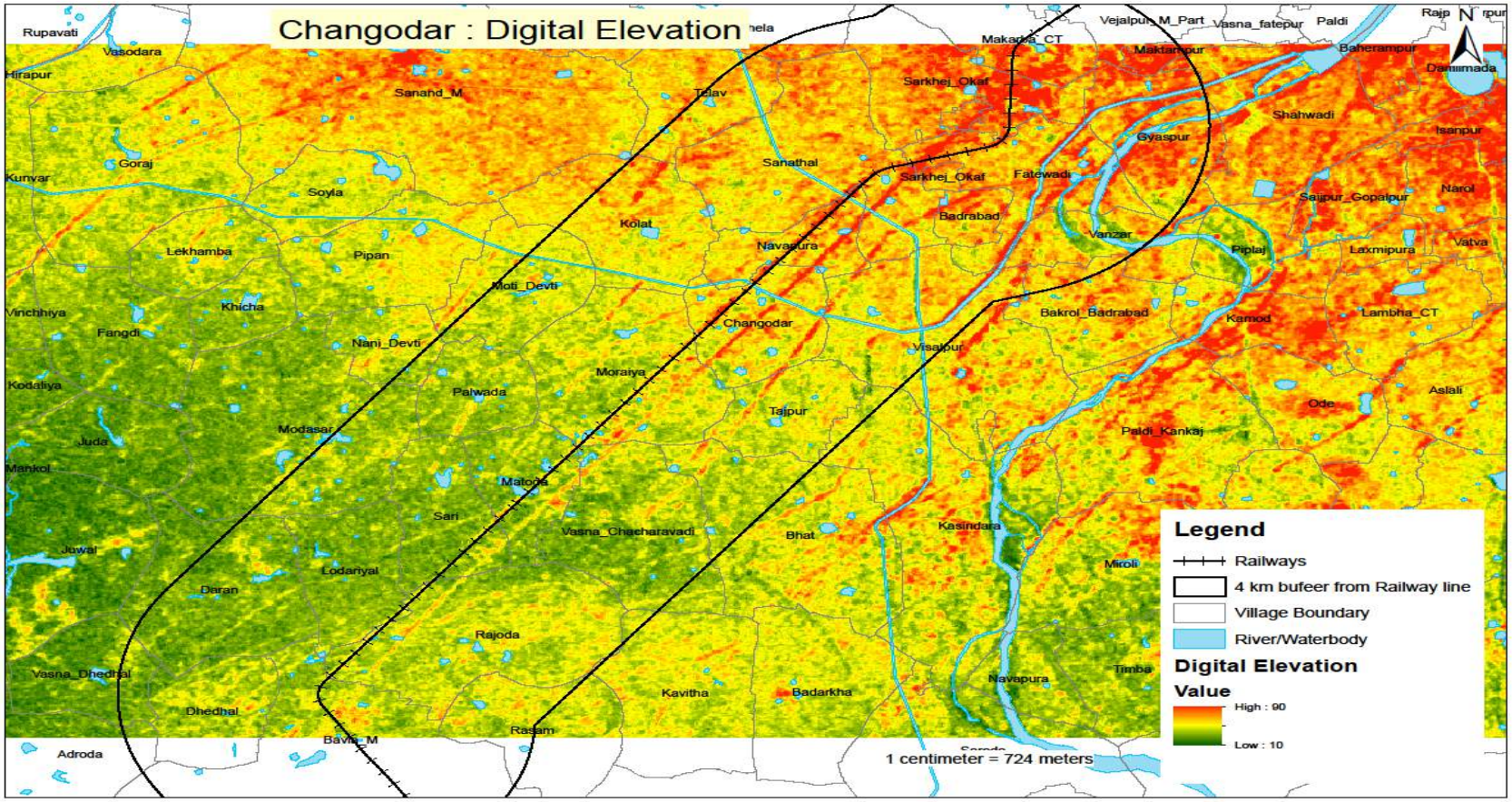
The Open series Map Sheet from the Survey of India Portal has been downloaded. The sheet is then Georeferenced to use as a layer for the base map.



)USTRIAL AREA PLANNING SURVEY OF INDIA OSM OF AOI RA

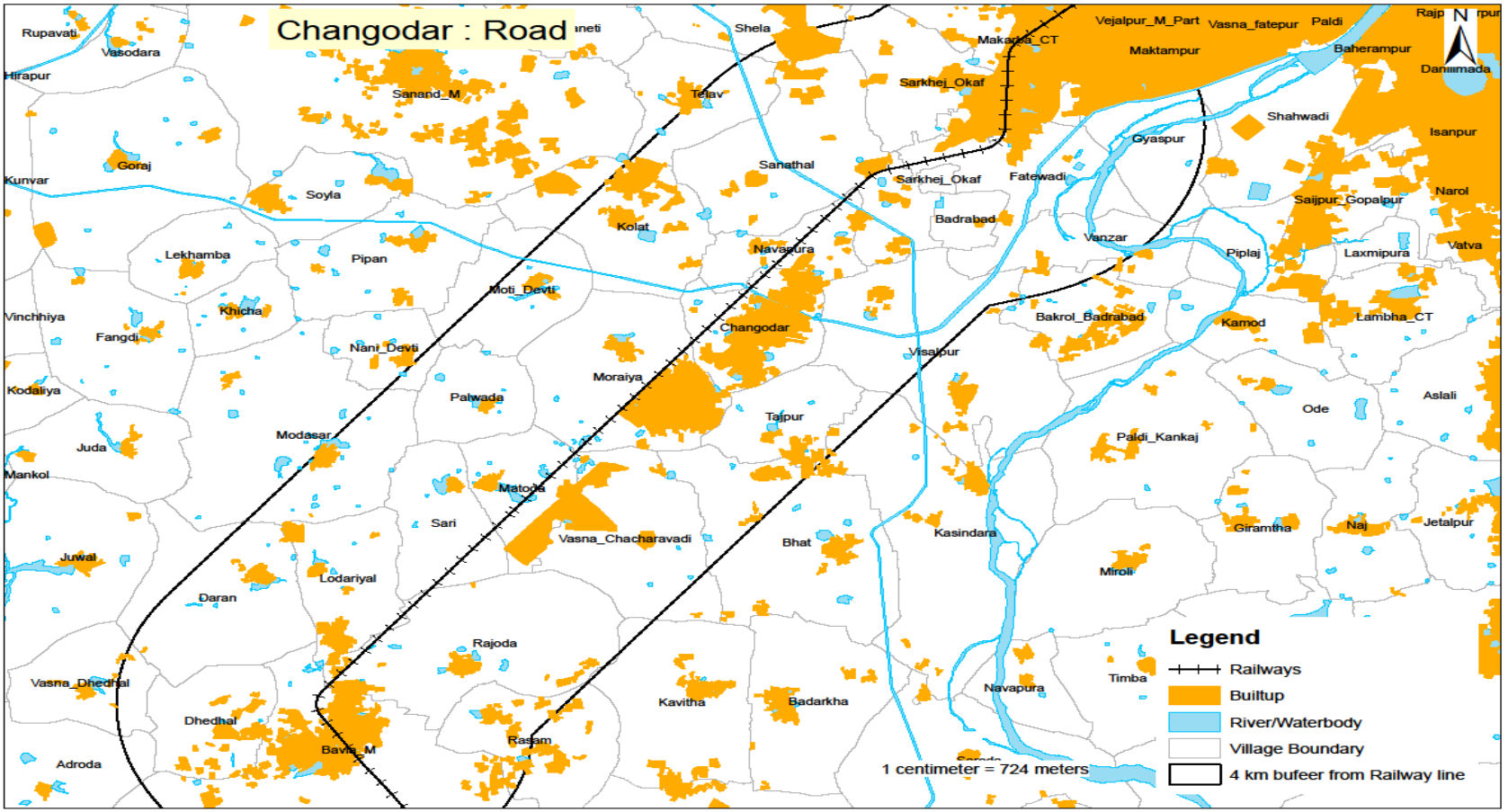
Fig.2 Survey of India OSM map.

DIGITAL ELEVATION MAP



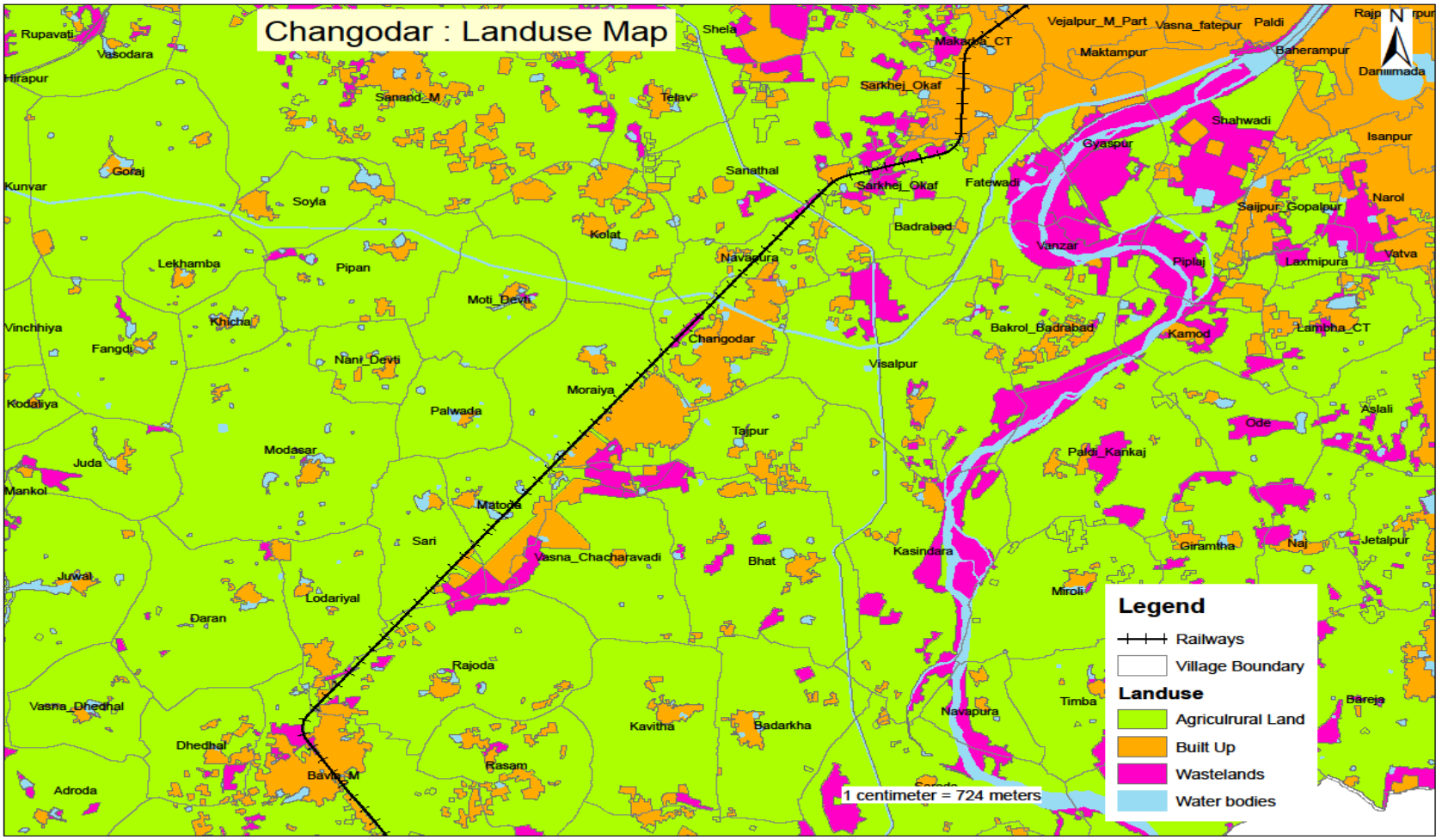
From the above, it can be concluded that the elevation value varies from 90 to 10; the configuration higher towards North and goes lower down in West and South West. In respect to the project area, higher to lower elevation is found from North to East – West direction.

BUILT UP AREA



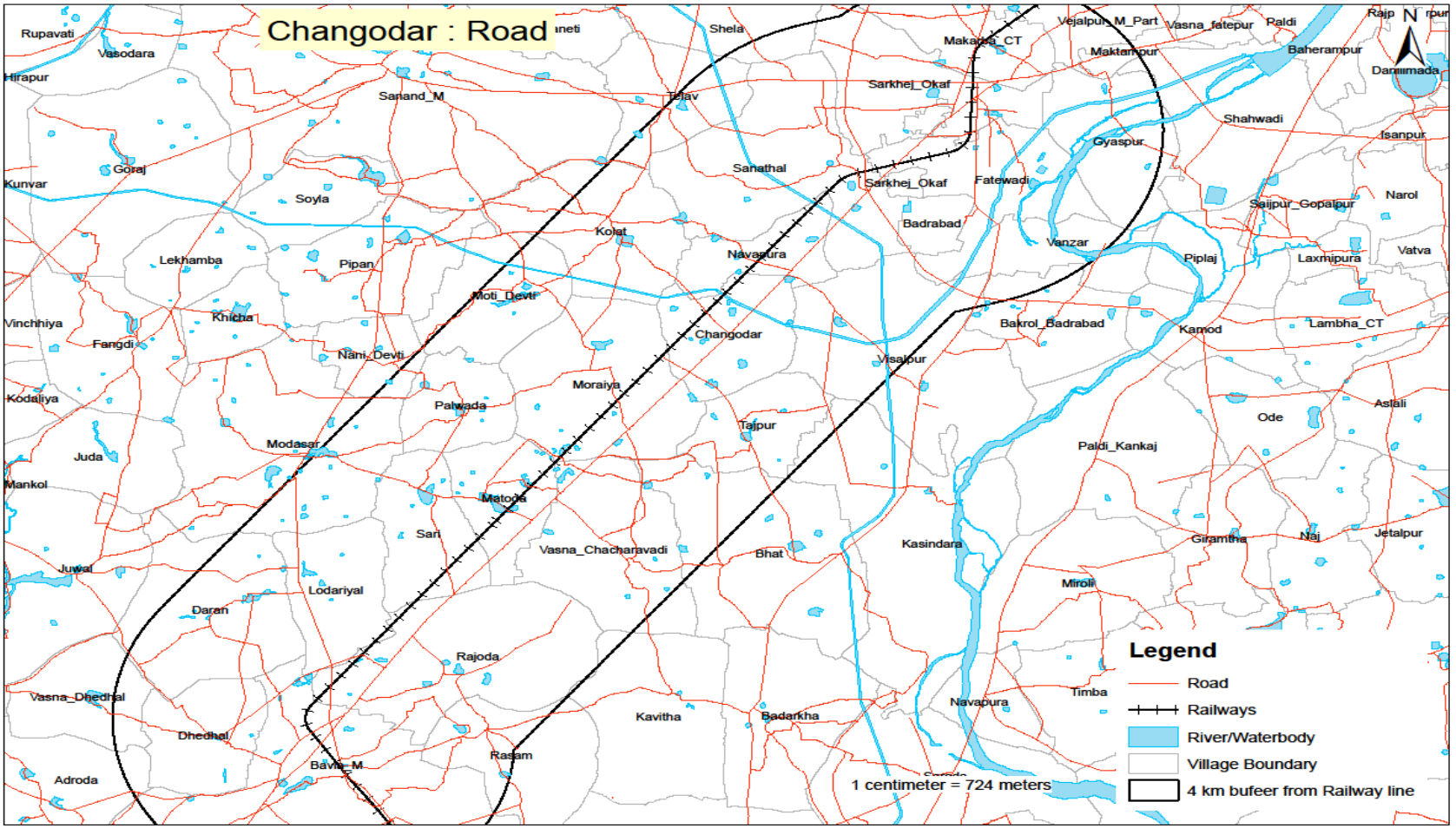
Above map shown the built area, river and water body, village boundaries. Demarcated line shows buffer area from railway line. The area is 4 km. from the railway line; for each side.

LANDUSE MAP



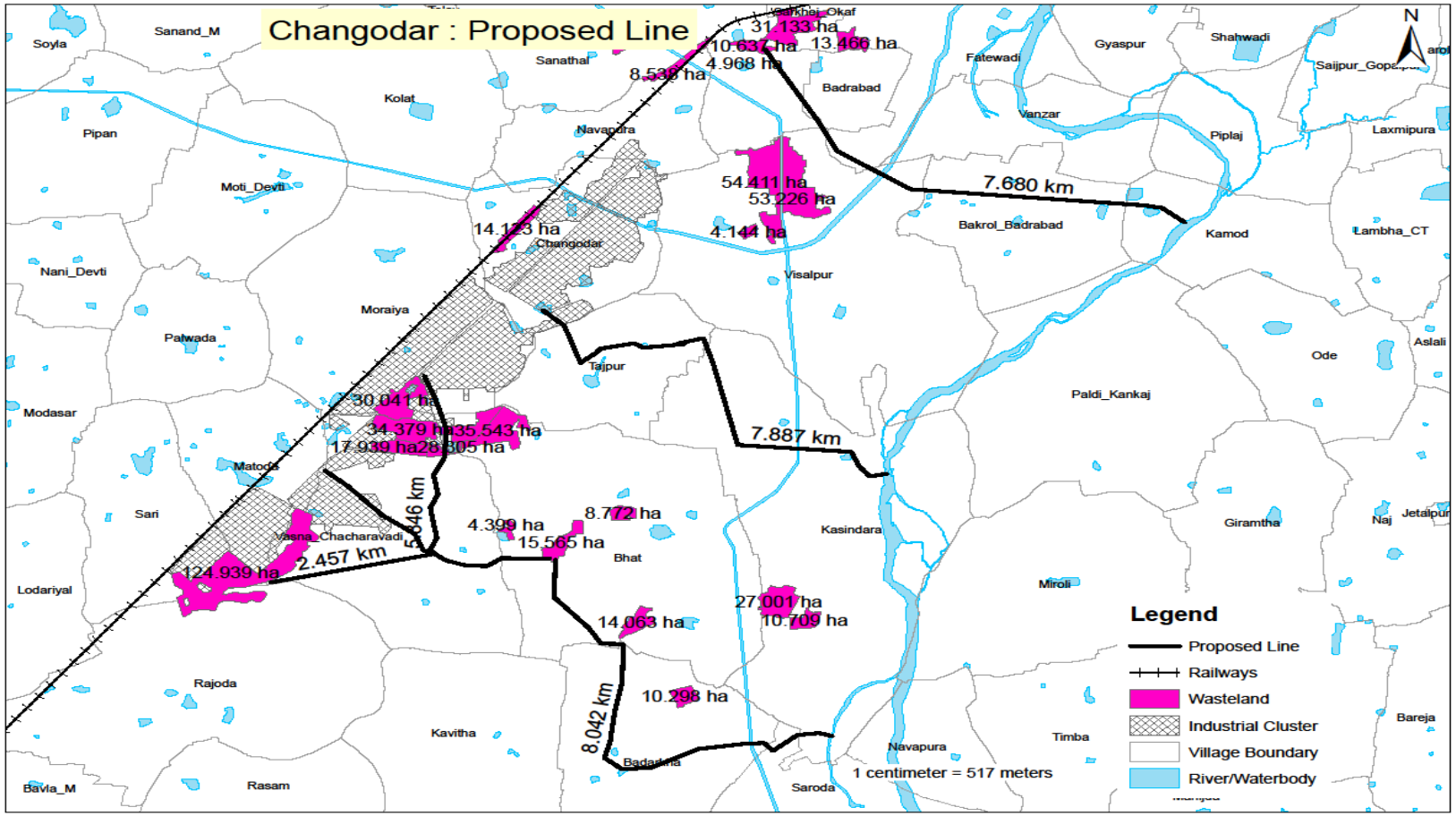
Above map shown Land use area. Land use demarcated in terms of built up area, waste lands, water bodies, agriculture land etc.

ROAD MAP



Above map shows Road network in the area.

BUILT UP AREA AND WASTE LAND



Above map shows the built up area and waste land. Length of proposed line upto discharge point with respect to topography.

From the above the following can be concluded:

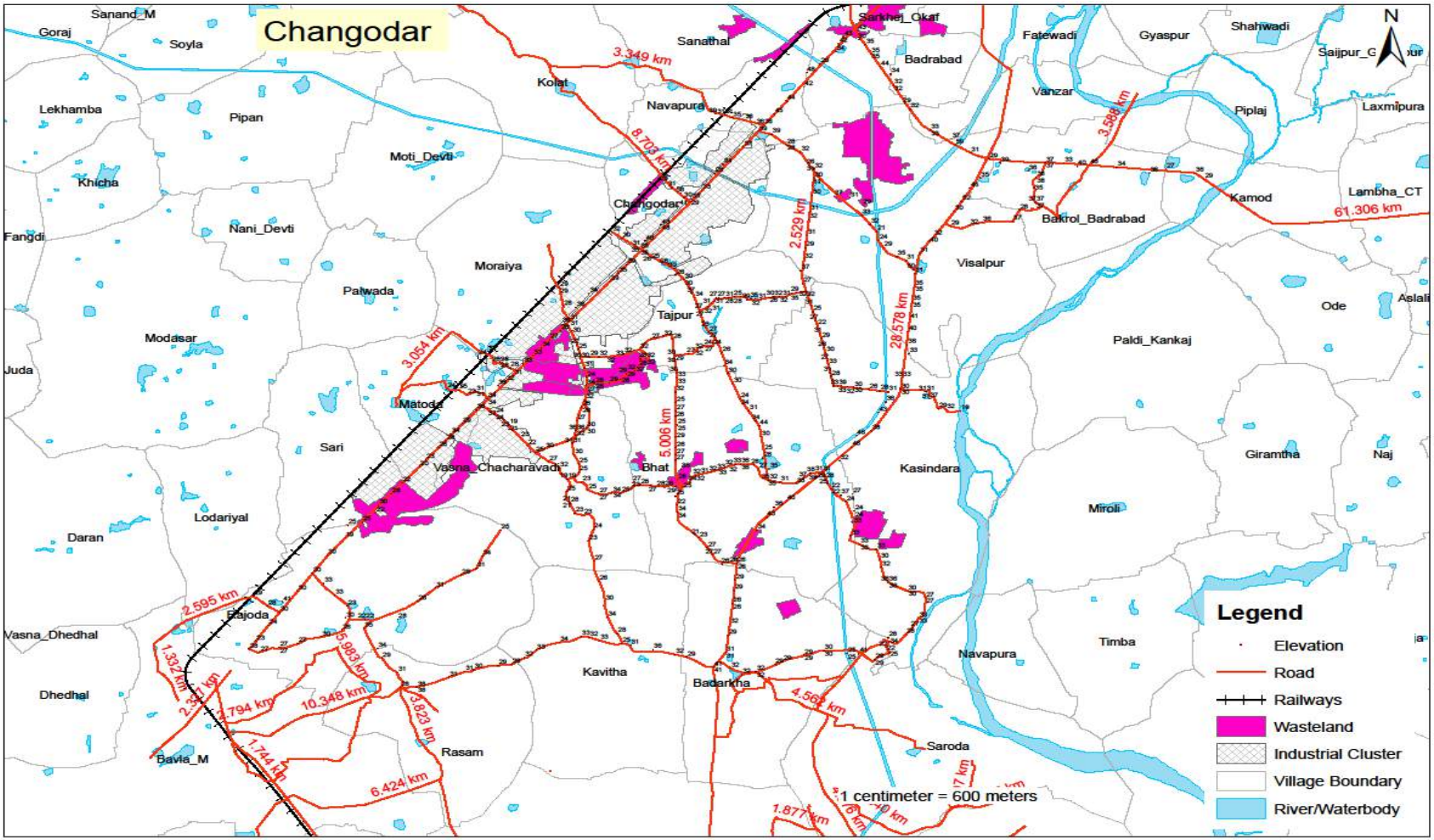
- Total industrial built up area is found about 1250ha. Adjacent to it, about 242 ha. area found as waste land, which are just adjacent to the established industrial area.

- Going through the developed scenario, the developed area can be divided into three zones / clusters.

- Based on location of waste land, all three zones further can be planned in different way, which is discussed in planning options.

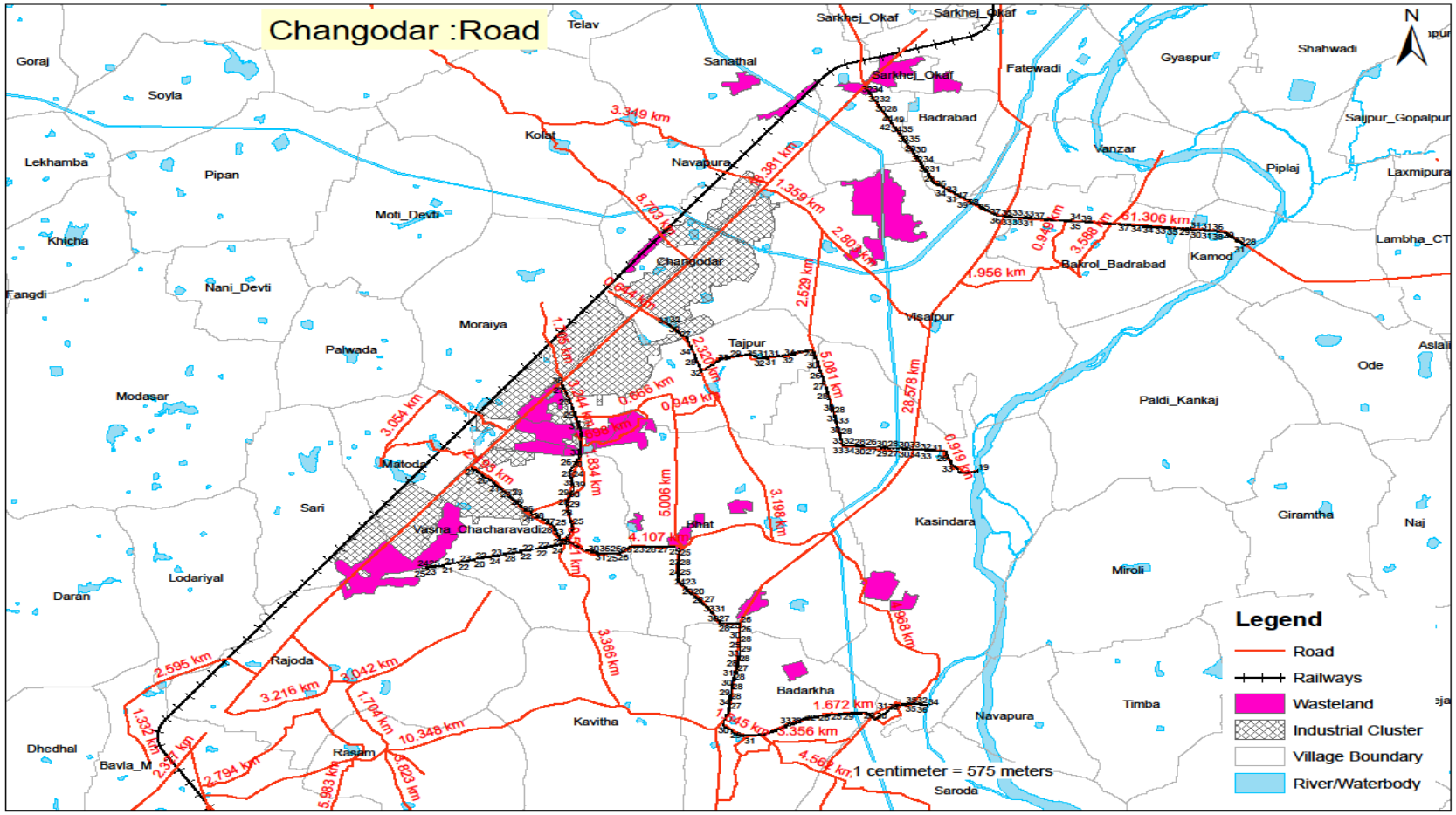
- Now, possible number of locations are identified and different maps are produced further, given hereunder;

INDUSTRIAL CLUSTER NUMBER OF ROUTES:



Above map shows that the area can be divided into three number of clusters and accordingly, number of routes upto disposal points.

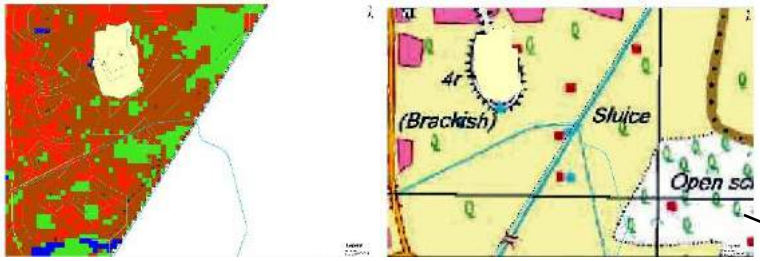
PROPOSED ROUTE FOR FINAL DISPOSAL



Form the above, it can be said that Cluster 1 & 2 OR Cluster 2 & 3 will have common STP – CETP and further pumping main either separate or common can be thought.

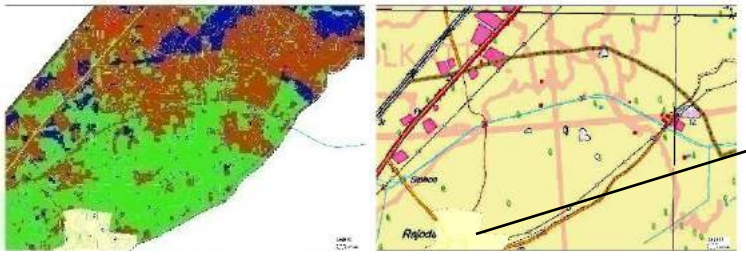
WASTE LAND USE FOR OTHER UTILITIES i.e. Solid Waste Management Site Development

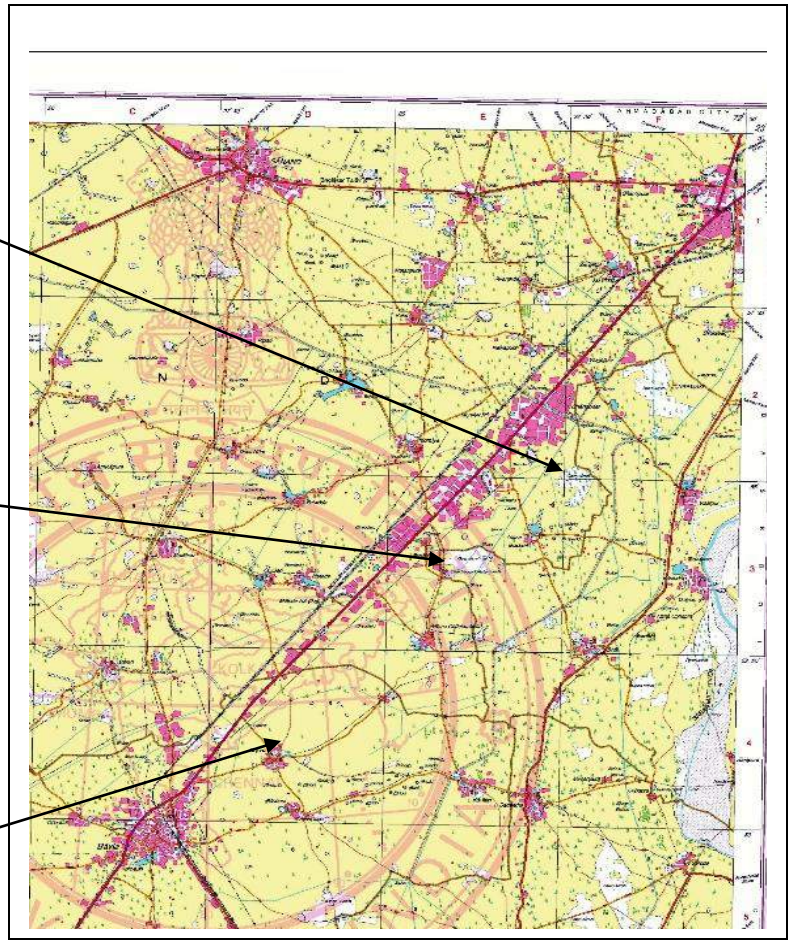
CLUSTER 1



CLUSTER 2

CLUSTER 3





Project Area

The project area demarcated along the Ahmedabad – Bavla road, from Sanathal crossing to onwards upto 12 km. The industrial development has taken place in the east of railway to the general extent. The area is now identified as "CHANGODAR INDUSTRIAL ZONE". The Chakgodar zone itself gets divided in 3 nos. of Clusters, identified as Changodar, Moraiya and Vasna; bearing approximate admeasured coverage of 1200 ha.

An eastern corridor may have an industrial development in width of about 3 kms. from railway towads fatewadi – Visalpur – Kavitha road in a stretch of about 8 to 12 kms.

Existing developed clusters can be focused as below:

No.	Cluster	Identification	Area (Ha.)	No. of Industries
1	01	Changodar	351	278
2	02	Moraiya	486	351
3	03	Vasna	323	209
	TOTAL		1160	838
	SAY		1200	

*Above table is generated based on available data from GCPC

Industrial development is in the form of Estates covering number of Industrial units as well as independent units either in group or scattered. Entire development can be said as non-planned and no possessing reliable and sustainable basic infrastructure.

In context to present admeasured developed area of 1250 ha. in a length of about 12kms. is anticipated to be double i.e. 2500 ha.

Wastewater Quantity

It is based on available data of 20 Industrial estates; having about 500 no. of industries / units; are discharging waste water quantity merely 50% of water consumption.

In context to above, the present realistic waste water quantity is estimated, considering 90% of water consumption + 25% increase. For 25% of gross area, remaining 75% area waste water quantity is estimated by considering 90% of water consumption @ 22 Kl/Ha/day as per prevailing consideration of GIDC. Varying from 11 Kl to 80 Kl/ha/day, depending on nature of industry. The details are given hereunder and accordingly estimated waste water quantity is summarized hereunder:

Overall Water Consumption and Wastewater Generation of 20 Industrial Estates							
Sr. No.	Name Of Estate	No. of industries	CLUSTER ID	WC in KLD		WWG in KLD	
				Industrial	Domestic	Industrial	Domestic
1	Changodar	98	CL-1,2,3	881.00	349.00	213.00	277.00
2	Ashwamegh	49	CL-1	422.36	86.48	31.58	66.36
3	Panchratna	36	CL-1	194.65	85.75	60.33	65.51
4	Shubhlaxmi	4		4.00	8.30	1.00	4.75
5	Mahagujarat	57	CL-2	338.40	1392.75	21.29	836.55
6	Tajpur Road	19	CL-1,2	87.42	51.55	25.25	38.80
7	Saket	23	CL-2	662.65	31.00	39.20	22.95
8	Kesar Sopan	6		15.90	4.00	0.70	3.68
9	Moraiya	68	CL-1,2	3589.57	656.40	1824.87	693.85
10	Vasna-Chacharwadi	36	CL-2,3	2504.51	414.10	1769.00	465.08
11	PharmaSEZ	12	CL-2,3	1559.50	345.50	724.40	281.25
12	Sari	11	CL-3	721.45	232.80	322.00	181.55
13	Steel Town	10		58.93	35.10	28.65	45.90
14	Swastik	6	CL-3	104.64	11.95	22.10	7.30
15	New Ahmedabad	25	CL-2	101.19	79.50	17.40	62.77
16	Gopi	8	CL-1	20.20	20.30	6.74	14.96
17	NG Gallops	3		30.30	53.20	0.00	36.80
18	Matoda	7	CL-2,3	438.03	282.70	452.40	219.75
19	Radhe	6	CL-2	55.00	34.50	9.95	22.00
20	Rajoda	16	CL-3	275.65	46.60	141.85	35.80
Total		**500**		**12065.34**	**4221.48**	**5711.71**	**3382.61**
Grand Total				**16286.82**		**9094.32**	

Overall Water Consumption and Wastewater Generation of 20 Industrial Estates

Sr. No.	Name Of Estate	No. of industries	CLUSTER ID	WC in KLD		TOTAL WC in KLD	WWG in KLD		TOTAL WWG in KLD	Percentage of TOTAL WWG
				Ind	Dom		Ind	Dom		
Cluster - I										
1	Changodar	98	CL-1	293.67	116.33	410.00	71.00	92.33	163.33	40
2	Ashwamegh	49	CL-1	422.36	86.48	508.84	31.58	66.36	97.94	19
3	Panchratna	36	CL-1	194.65	85.75	280.40	60.33	65.51	125.84	45
4	Tajpur Road	19	CL-1	43.71	25.78	69.49	12.63	19.40	32.03	46
5	Moraiya	68	CL-1	1794.79	328.20	2122.99	912.44	346.93	1259.36	59
6	Gopi	8	CL-1	20.20	20.30	40.50	6.74	14.96	21.70	54
Total		**278**		**2769.37**	**662.84**	**3432.21**	**1094.71**	**605.49**	**1700.20**	**50**
Grand Total				**3432.21**			**1700.20**			
Cluster - II										
7	Changodar	98	CL-2	293.67	116.33	410.00	71.00	92.33	163.33	40
8	Mahagujarat	57	CL-2	338.40	1392.75	1731.15	21.29	836.55	857.84	50
9	Tajpur Road	19	CL-2	43.71	25.78	69.49	12.63	19.40	32.03	46
10	Saket	23	CL-2	662.65	31.00	693.65	39.20	22.95	62.15	9
11	Moraiya	68	CL-2	1794.79	328.20	2122.99	912.44	346.93	1259.36	59
12	Vasna-Chacharwadi	36	CL-2	1252.26	207.05	1459.31	884.50	232.54	1117.04	77
13	PharmaSEZ	12	CL-2	779.75	172.75	952.50	362.20	140.63	502.83	53
14	New Ahmedabad	25	CL-2	101.19	79.50	180.69	17.40	62.77	80.17	44
15	Matoda	7	CL-2	219.02	141.35	360.37	226.20	109.88	336.08	93
16	Radhe	6	CL-2	55.00	34.50	89.50	9.95	22.00	31.95	36
Total		**351**		**5540.42**	**2529.21**	**8069.63**	**2556.80**	**1885.97**	**4442.77**	**55**
Grand Total				**8069.63**			**4442.77**			
Cluster - III										
17	Changodar	98	CL-3	293.67	116.33	410.00	71.00	92.33	163.33	40
18	Vasna-Chacharwadi	36	CL-3	1252.26	207.05	1459.31	884.50	232.54	1117.04	77
19	PharmaSEZ	12	CL-3	779.75	172.75	952.50	362.20	140.63	502.83	53
20	Sari	11	CL-3	721.45	232.80	954.25	322.00	181.55	503.55	53
21	Swastik	6	CL-3	104.64	11.95	116.59	22.10	7.30	29.40	25
22	Matoda	7	CL-3	219.02	141.35	360.37	226.20	109.88	336.08	93
23	Rajoda	16	CL-3	275.65	46.60	322.25	141.85	35.80	177.65	55
Total		**186**		**3646.42**	**928.83**	**4575.26**	**2029.85**	**800.02**	**2829.87**	**62**
Grand Total				**4575.26**			**2829.87**			
Other										
24	Shubhlaxmi	4		4.00	8.30	12.30	1.00	4.75	5.75	47
25	Kesar Sopan	6		15.90	4.00	19.90	0.70	3.68	4.38	22
26	Steel Town	10		58.93	35.10	94.03	28.65	45.90	74.55	79
27	NG Gallops	3		30.30	53.20	83.50	0.00	36.80	36.80	44
Total		**23**		**109.13**	**100.60**	**209.73**	**30.35**	**91.13**	**121.48**	**58**
Grand Total				**209.73**			**121.48**			

WASTE WATER QUANTITY FOR CHANGODAR INDUSTRIAL AREA

Case-I

Cluster	Total Area	Area @ 25% of Total Area	Water Consumption in Kld	Total Waste Water Quantity	Percentage	No of Industries	Waste Water Realistic		Likely Increase @ 25%
							@ 90%	Kld	
1	351	87.75	3432.21	1700.20	50	278	90	3088.99	3861.24
2	486	121.50	8069.63	4442.77	50	351	90	7262.67	9078.33
3	323	80.75	4575.26	2829.87	50	186	90	4117.73	5147.17
Other			209.73	121.48	50	23	90	188.76	235.95

Case-I A

Cluster	Total Area	Area @ 75% of Total Area	Water Consumption At 22 Kld/ha/day	Waste Water Realistic		Likely Increase @ 25%
				@ 90%	Kld	
1	351	263.25	5791.50	90	5212.35	6515.44
2	486	364.50	8019.00	90	7217.10	9021.38
3	323	242.25	5329.50	90	4796.55	5995.69
Other			209.73	90	188.76	235.95

TOTAL	Kld	Mld
CL-1	10376.67	10.38
CL-2	18099.71	18.10
CL-3	11142.86	11.14
Other	235.95	0.24
TOTAL	39855.18	39.86

TOTAL WASTE WATER QUANTITY

No.	Estate		Others		Total	
	Area (Ha.)	Qty. (Kld)	Area (Ha.)	Qty. (Kld)	Area (Ha.)	Qty. (Kld)
1	87.5	3861	263.25	6514	351	10378
					Say	11000
2	121.50	9080	364.5	9020	486	18100
					Say	20000
3	80.75	5383	242.25	5996	323	11379
					Say	12000
						43000
					MLD	45
				Add: for Outskirt		45
				TOTAL		90 MLD

Thus, the future waste water quantity may stands to 90 MLD – 100MLD. For which well-planned system of collection – conveyance – final disposal will be essential.

Summary for Wastewater Quantity Planning

- Total Industrial Area : 1250 ha. (Present) + 1250 ha. (Future)
- Present Area Planning : Area divided in Clusters
  Cluster 1(351 Ha.)
  Cluster 2 (486 Ha.)
  Cluster 3 (323 Ha.)
- Development Consideration : Industrial Estate : 25% area in each cluster
  Scattered Industries + Commercial + Residential: remaining 75% area
- Waste Water Quantity: For 25% area (Industrial estates): Based on actual available data
  For 75% area: @ 22KL/Ha./Day; based on GIDC norms, as no data are available
- Output : Total Waste Water Quantity: for 1250 Ha.
  - For 1250 Ha. (Present) : 45 MLD
  - For 1250 Ha. (Future) : 45 MLD

Planning

Major road exist water bodies, river and waste land as well as configuration shown on study map helps / assists for the broad planning feasibilities for waste water disposal system.

As the ground profile has falling towards South – East i.e. Changodar – Moraiya – Vasna in South and South East towards the river Sabarmati. On availability of waste land in the east of Moraiya and Vasna; which provides favorable location for Final Pumping Station and CETP as well as final disposal of treated effluent.

For the above, all existing and proposed industrial estates covering number of units shall develop the treatment collection and conveyance network within their premises. Similarly, all industries will convey their waste water in to identified collection well.

Waste water planning infrastructure comprises of conveyance system (Pumping / Gravity) to receive – convey – collect – treat - final disposal, shall have to be developed.

Based on developments, following strategies for planning consideration can be thought.

OPTION 1: The waste water collected from the Industries as well residential + commercial areas can collect in to pumping station and finally further send in to CETP and finally upto final discharge point.

OTPION 2: The waste water collected from the Industries and residential + commercial, collected in to separate pumping stations and further send in to CETP and STP respectively. The waste water in to STP will be recycled, whereas, the Industrial waste water (effluent) further send upto final discharge point.

Thus, two types of planning are considered for proposal formation.

The planning can be further divided into phases i.e. capacity can be considered in context to existing planning as a first Phase and second phase in respect to future development.

Based on waste water quantity and cluster planning, following options are summarized for proposal.

The reported water consumption vs. waste water quantity of 20 nos. of Industrial estates covering about 500 units, reveals that waste water consumption ratio 75:25 i.e. 75% waste water consumption of Industries, 25% water consumption for domestic; from which waste water quantity stands 50%.

In the case of Industrial waste and domestic waste, the CETP for industrial waste and sewage treatment plant (STP) would be required. In this context, Industrial waste water shall be treated as per the standards, by the users within their premises and then effluent shall be conveyed and collected in the auxiliary collection well and to the final pumping station through the pressurized / pumping network with the proper instrumentation - SCADA system for qualitative and quantitative measures. For the domestic waste water, separate pressurized and gravity sewer network with pumping station would be required.

This sort of planning depends on location; wither together with industrial or separate allocation in the area; having well defined infrastructure with road network with available ROU / ROW on both sides as well as favorable configuration etc.

In this context, the project can divide in two phased i.e. Phase I will be in context to present development needs and Phase II will be in context to future development needs. Accordingly, separate pumping station for Industrial and domestic waste water can develop.

Planning options are summarized hereunder;

PLANNING OPTIONS

No.	Cluster(s)	Planning Option	Capacity (Mld)		Total
			Phase 1	Phase 2	
I.	1 & 2	Total Waste water i.e. Treated effluent from Industries + Domestic + Commercia will be collected into PS and finally into CETP and further discharge upto Final Discharge point	30	30	60
	3		15	15	30
II.	1 & 2	Separate Pumping Station for effluent generated from Industries and waste water from residential + commercial areas			
		The effluent from Industries will be from PS to CETP to final discharge point.	15	15	30
		The waste water from residential + commercial will be PS to STP and propsoed to recycle for further use.	15	15	30
	3	Same as above	7.5	7.5	15
			7.5	7.5	15
	>	OPTION 1: from PS to CETP	45	45	90
	>	OPTION 2:			
		# From PS to CETP	22.5	22.5	45
		# From PS to STP	45	45	90

Proposal

OPTION I:

Phase I: 45 MLD CETP

Effluent from Cluster 1 (Changodar) and Cluster II (Moraiya) can be collected in to the Final Pumping Station (FPS 1) in the available waste land; located at East of Moraiya; bearing GL RL of 28m.

The capacity would be Say 30 MLD.

Similarly, effluent from Cluster III (Vasna) can be collected in to Final Pumping Station (FPS 2) in the waste land (South East of Vasna). The GL stands to 25m. Capacity would be 15 MLD.

CETP for the entire area can be located in South – East part; bearing RL of 25m, from where finally disposal into the river Sabarmati. The route will be along the road and length would be about 13 – 15 kms. The configuration is falling with GL RL of 25 to 22m with moderate rise and fall in-between.

In consideration to the above, for phase I, CETP of 45 MLD will receive the effluent from FPS 1 and FPS 2 and finally collected – treated effluent can be disposed through Pipe line (through Pumping). Wastewater flow will be expanded later on by increasing the surface area for the future flow of **90 MLD in Phase 2**.

Phase II: 90 MLD CETP

Effluent from Cluster 1 (Changodar) and Cluster II (Moraiya) can be collected in to the Final Pumping Station (FPS 1) in the available waste land; located at East of Moraiya; bearing GL RL of 28m.

The capacity would be 58 MLD –Say 60 MLD. About 1ha. area would be required.

Similarly, effluent from Cluster III (Vasna) can be collected in to Final Pumping Station (FPS 2) in the waste land (South East of Vasna). The GL stands to 25m. Capacity would be 30MLD.

CETP for the entire area can be located in South – East part; bearing RL of 25m, from where finally disposal into the river Sabarmati. The route will be along the road and length would be about 13 – 15 kms. The configuration is falling with GL RL of 25 to 22m with moderate rise and fall in-between.

In consideration to the above, for phase II, CETP of 90 MLD will receive the effluent from FPS 1 and FPS 2 through the 1000mm dia. (4 kms. length) and 800mm dia. (2.5 kms. length) and finally collected – treated effluent can be disposed through 1200mm dia. Pipe line (through Pumping).

OPTION II:

Phase I: 22.5 MLD CETP & 22.5 MLD STP

In this option, domestic and industrial effluent is proposed to be collected into their individual final pumping station; located in the waste land in the West of Moraiya village and similarly domestic and industrial waste is proposed to be collected into the individual pumping station. The capacity of both the pumping station would be such that the pump house will be common for entire flow, whereas wet well will be for the Phase 1 flow; which can be expanded later on by increasing the surface area.

The size of the pumping main will be 600mm dia. and 500mm dia. respectively and parallel for both pumping station. As such, effluent from the respective pumping station will be conveyed to the STP & CETP respectively.

The effluent treated in to the STP is propose for recycle within the project area, whereas the effluent from CETP will be conveyed upto the final disposal point through the 1000mm dia. pumping main. The capacity of the CETP and STP will be 22.5 MLD for the Phase 1 flow, which can be expanded for the future flow of **45 MLD**.

Phase II: 45 MLD CETP & 45 MLD STP

Surface area for wet well will be expanded for this phase II. The capacity of the CETP and STP will be expanded for the future flow of **45 MLD**.

The effluent treated in to the 45 MLD STP is proposed for recycle within the project area, whereas the effluent from 45 MLD CETP will be conveyed up to the final disposal point through the 1000mm dia. pumping main.

CONSIDERATION

- All gravity sewer network based on Manning's formula with half full – 80% full to be analyzed.
- The sewer depth to be restricted upto 5m below GL.
- Apparatus such as Manholes, Junction Manholes, Ventilating column etc. to be provided.
- Pipe Material would be HDPE / RCC / DI to be studied.
- Pumping station: 30 to 40 minutes detention period with 3m liquid depth or based on peak flow to be handled in 1 pumping cycle.
- CETP – based on GPCB norms.
- Pumping main based on optimized velocity for peak flow

In addition to above, prior to forming well planned development of such non planned developed industrial area, it would be necessary to have study of the followings:

- Ground Water Hydrological Investigation
- Detail Study of developed area for their internal network system and for which details survey will be applicable.
- Door to door survey for to ascertain the effluent quantity.

Above are primary concerns needs to be satisfied for planning success.

Cost

OPTION 1

No.	Component	Project Phase	Cost (₹. in Cr.)
1	Development Plan – Topographical Survey – MAPS	Phase 1	10.00
2	Engineering Planning – Design - DPR	Phase1 (22Cr.) + Phase 2 (15 Cr.)	37 Cr.
2	Conveyance with Collection (for 2500 ha.)	Phase 1:50%	250.00
3	Final Pumping station	Phase 1: 50%	5.00
4	Pumping mains	Phase 1: 50%	140.00
5	CETP @ ₹.1.5cr./MLD	Phase 1: 50%	150.00
6	Power	Phase 1: 50%	100.00
7	Ancillary	Phase 1: 100%	45.00
	TOTAL		737.00
	PHASE I COST		399.5
	PHASE II COST		337.5

OPTION II

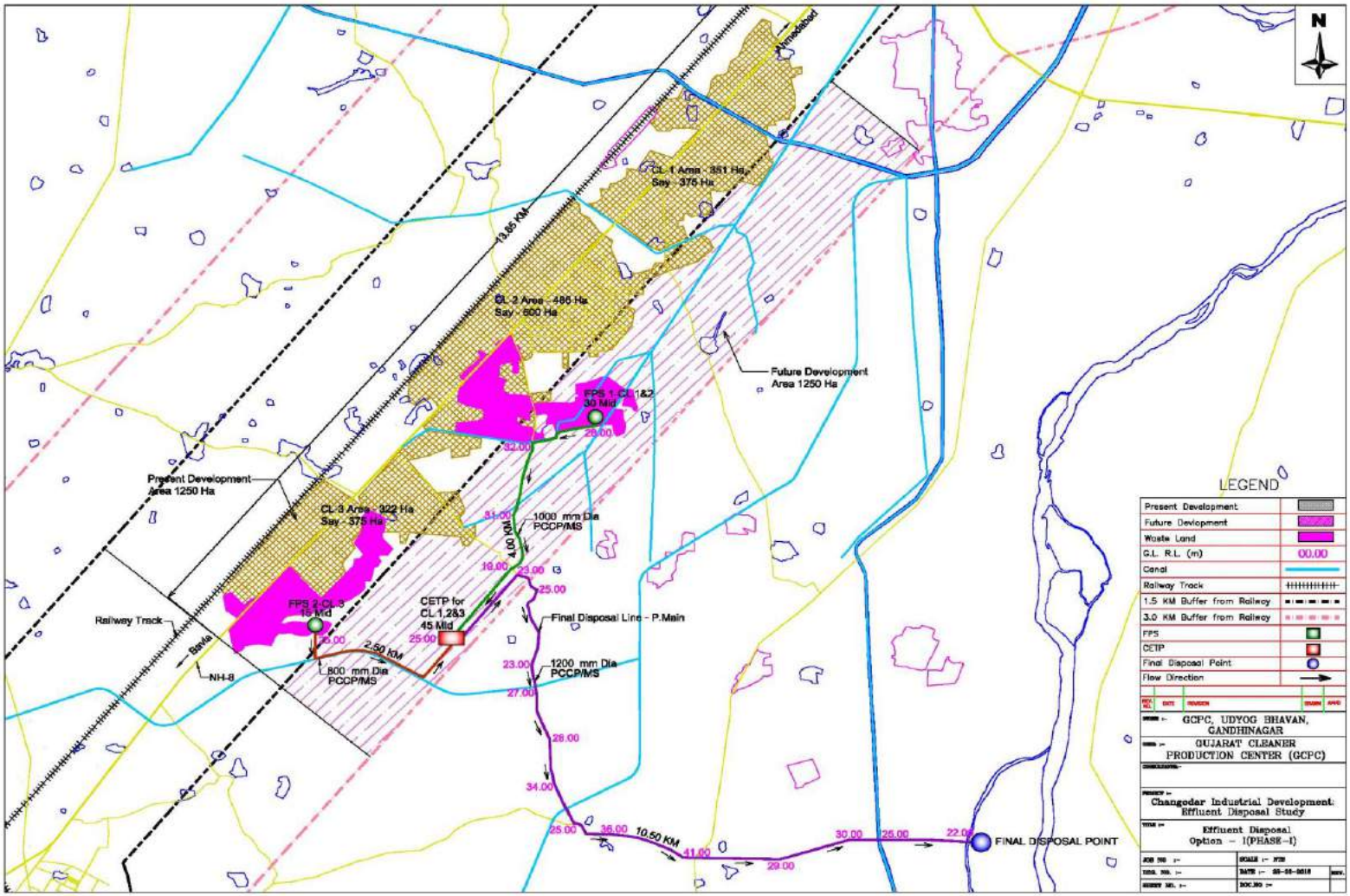
No.	Components	Cost (₹. In Cr.)	
		Phase I	Phase II
1	Development Plan - Topographucal Survey - Maps - L sections - Soil Investigation etc.	10	
2	Engineering Planning - Design i.e. preparation of DPR for: Sewer network, Conveyance system, Pumping station, STP - CETP - Final Disposal etc.	22	15
3	Conveyance System		
	> Domestic	60	60
	> Industrial	100	100
4	Pumping Station	4	4
5	Pumping mains	22	18
6	Final Disposal Line	78	
7	CETP	33.75	33.75
8	STP with recycling	21.38	21.38
9	Power	50	50
10	Anciliary works	45	
	Total Cost	446.13	302.125
	OVERALL COST	748.25	

Points for Ponder

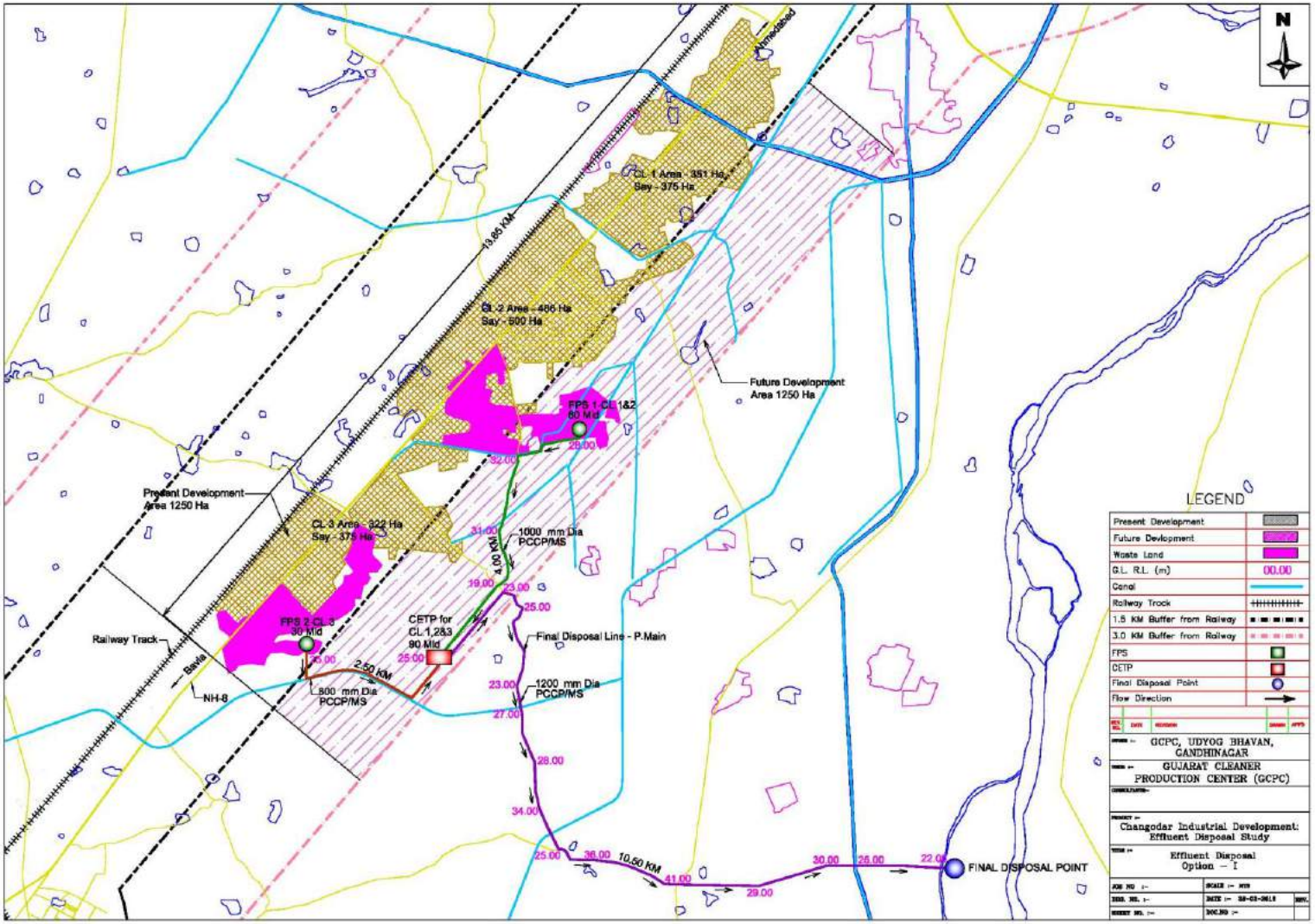
- Over all area needs proper planning for the followings:
  - # Water Supply Network
  - # Water Resources Development
  - # Sewerage Disposal – Recycle
  - # Effluent Disposal
  - # Solid Waste Management
  - # Future Development Plan
  - # Storm Water Planning: Collection – Use – Disposal

Above are minimum environment infrastructure development needs.

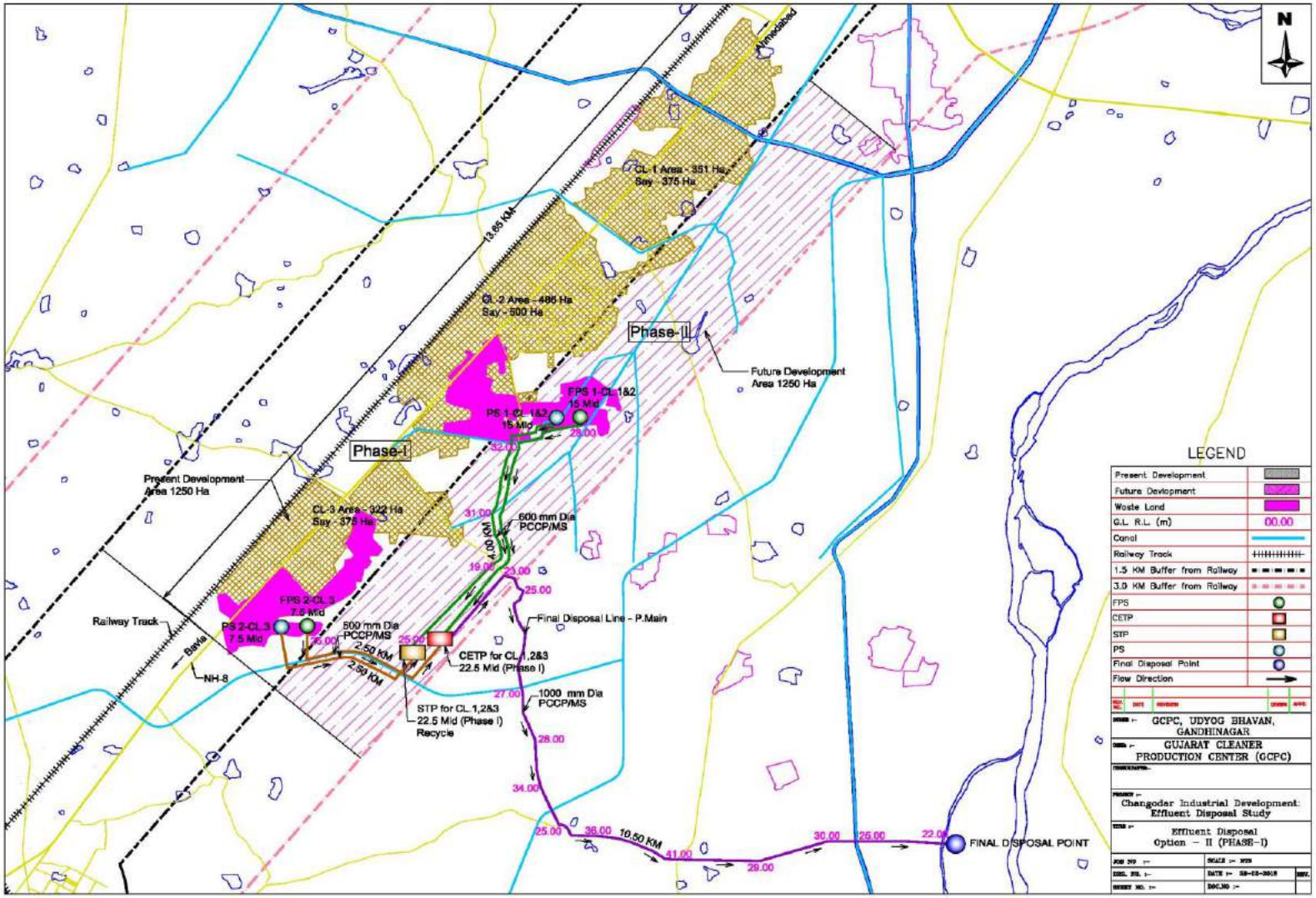
PLANNING OPTION 1 (Phase I)



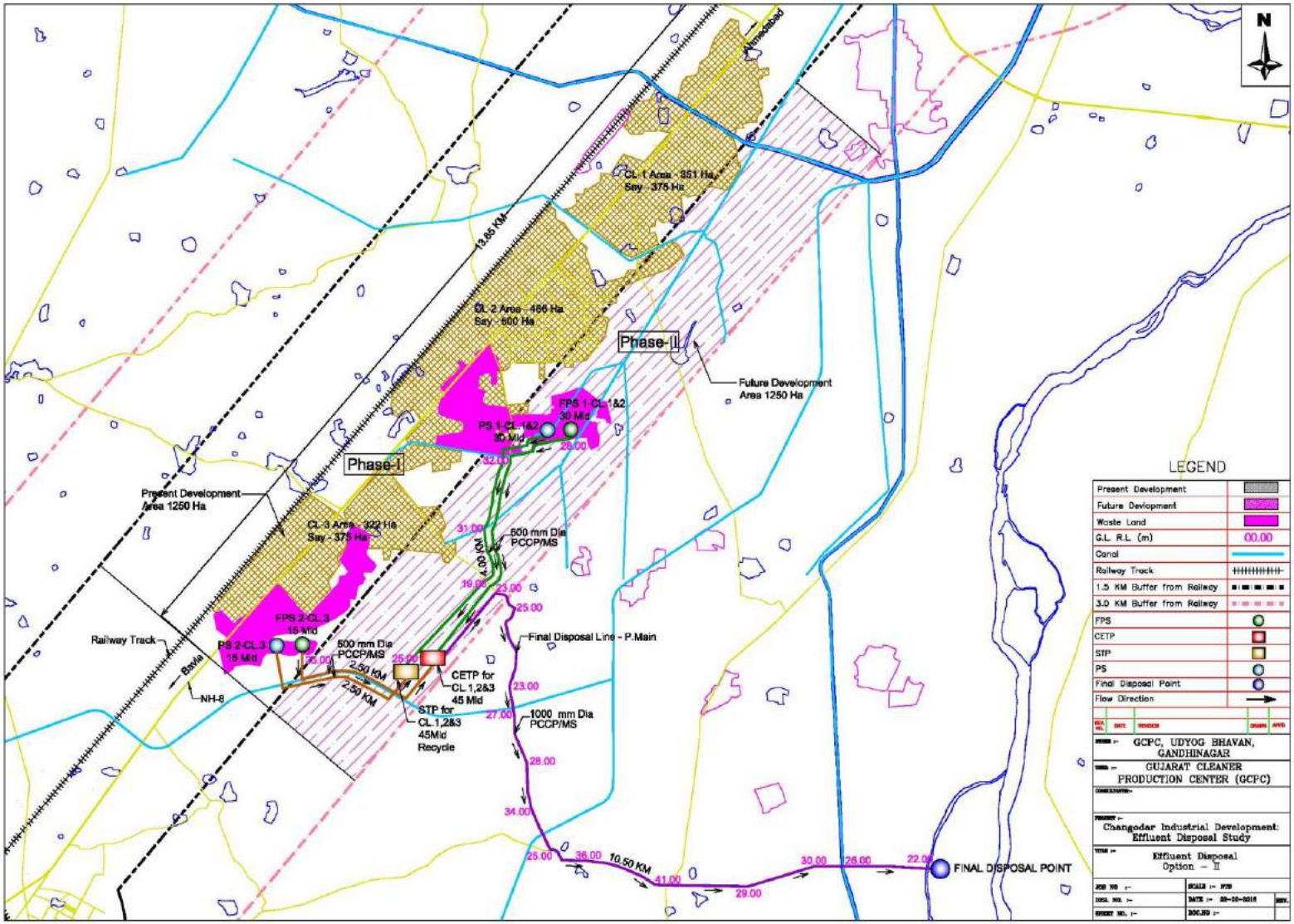
PLANNING OPTION 1 (Phase II)



PLANNING: OPTION 2 (Phase I)



PLANNING: OPTION 2 (Phase II)



Suggested Effluent Treatment Technology for Proposed CETP

The proposed alternate options for designing of CETP are as follows:

Option 1: Zero Liquid Discharge Treatment Plant

1. Collection Sump/Inlet Chamber
2. Bar Screen with gritting
3. Oil and Grease Removal Tank
4. Neutralization Tank
5. Equalization Tank
6. Flash Mixer
7. Primary Clariflocculator
8. Primary Settling Tank (Primary Clarifier)
9. MBR / SBR / MBBR
10. Decanter / Solar or thermal sludge dryer
11. Buffer Tank
12. Ultra Filtration
13. First Stage RO Plant
14. Second Stage RO Plant
15. Treated water storage tank
16. Reject Water (RO) Tank
17. Spray Dryer / MEE/ MVR

Option 2: Conventional Treatment Plant with Effluent Discharge

1. Collection Cum Equalization Tanks
2. Oil & Grease Removal tank
3. Dosing Tanks
4. Neutralization tank
5. Flash Mixer
6. Primary Clarifier
7. Aeration Tank
8. Secondary Clarifier
9. Sludge Sump House
10. Decanter / Solar or thermal sludge drying / Sludge thickener
11. Pressure Sand Filter
12. Activated carbon filter
13. Treated Water Tank

Option 3: Common Effluent Treatment Plant with Effluent Discharge

1. Screening Chamber
2. Equalization cum Conventional Oil Removal
3. Oil & Grease Removal Tank
4. Neutralization Tank
5. Dosing Tank
6. Primary Clariflocculator
7. Up-flow Anaerobic Sludge Blanket
8. Aeration Tank
9. Secondary Clarifier
10. Decanter / Solar or thermal sludge dryer / Sludge thickener
11. Pressure Sand Filter
12. Activated Carbon Filter
13. Treated Water Tank

Suggested Sewage Treatment Technology for Proposed STP

The proposed alternate options for designing of STP are as follows:

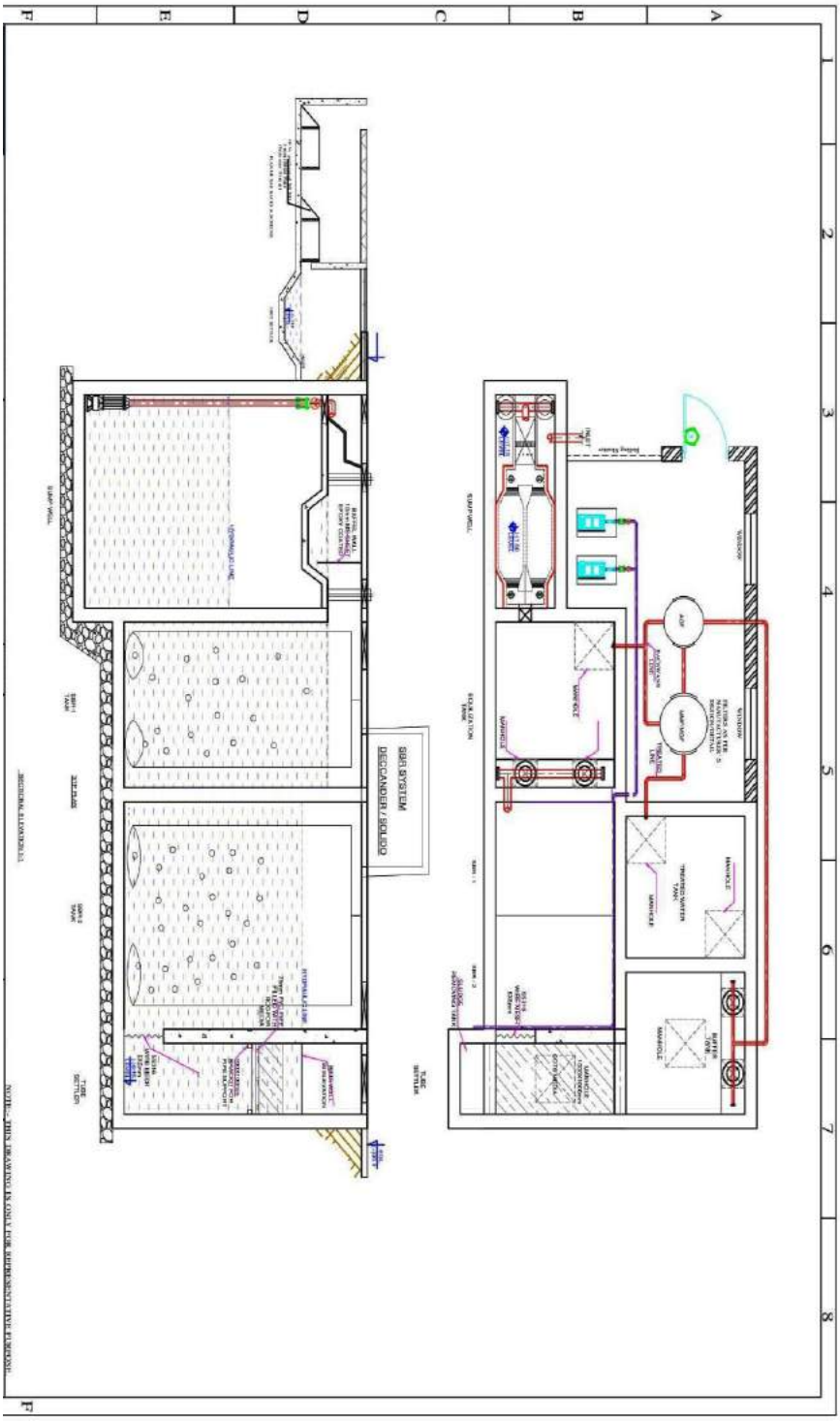
Option 1:

1. Inlet Chamber
2. Bar racks and Screen Chamber
3. Grit Chamber/Settler
4. Sump Well
5. Equalization Tank
6. MBBR
7. Tube Settler
8. Buffer Tank
9. MMF/MGF
10. ACF
11. Treated Water Tank

STP having Moving Bed Biological Rector

Option 2:

1. Inlet Chamber
2. Bar racks and Screen Chamber
3. Grit Chamber/Settler
4. Sump Well
5. Equalization Tank
6. SBR 1
7. SBR 2
8. Tube Settler
9. Buffer Tank
10. MMF/MGF
11. ACF
12. Treated Water Tank

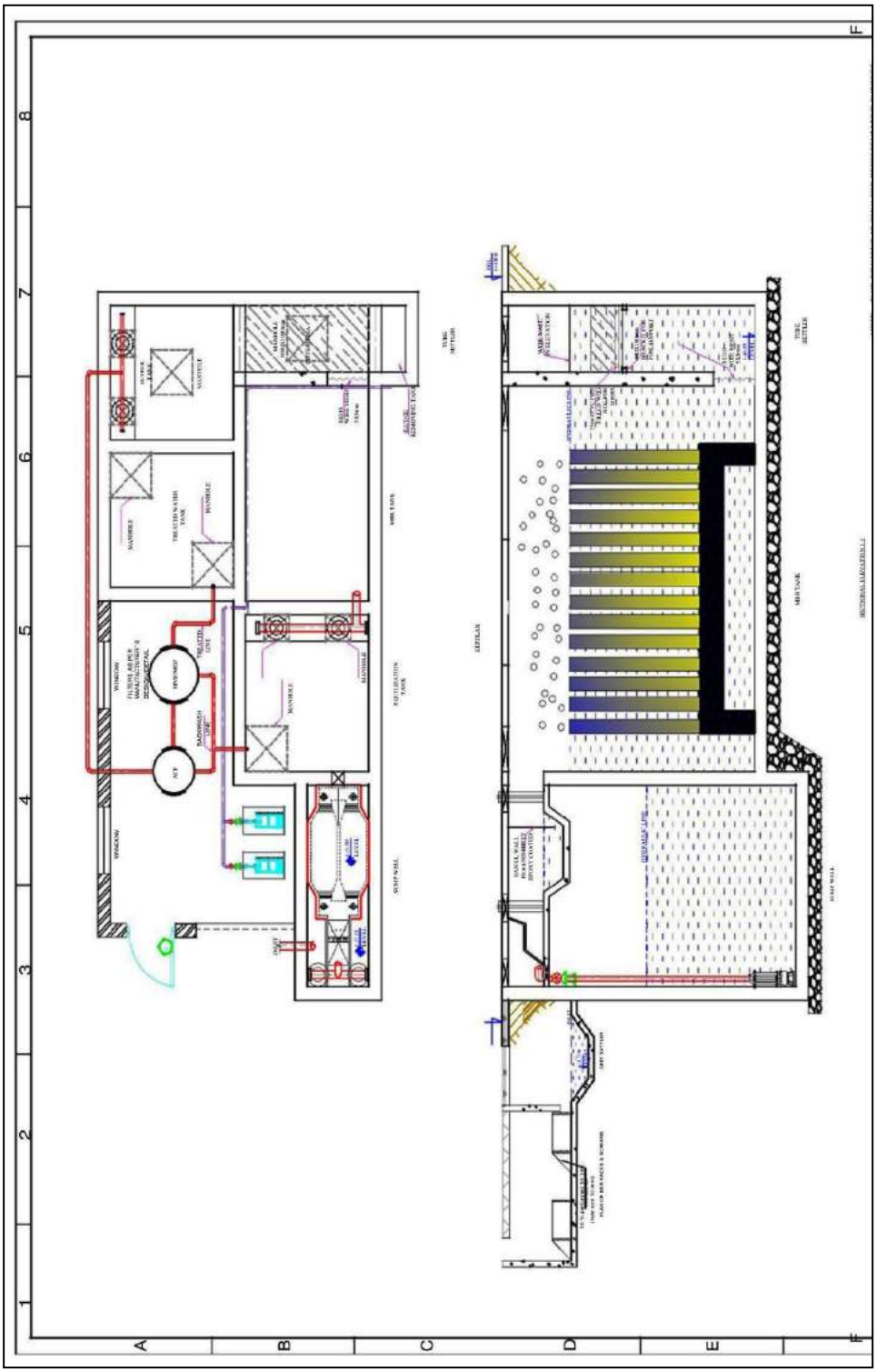


STP having Sequential Batch Rector

Option 3:

The main units are:

1. Inlet Chamber
2. Bar racks and Screen Chamber
3. Grit Chamber/Settler
4. Sump Well
5. Equalization Tank
6. MBR Tank
7. Tube Settler
8. Buffer Tank
9. MMF/MGF
10. ACF
11. Treated Water Tank



STP having Membrane Bio Rector

Feasibility of Solid Waste Management

Population of total 14 Villages of Changodar Region as per Census 2011:

Sr. No.	Name of Village	Total Population
1	Tajpur	1,200
2	Moraiya	6783
3	Navapura	2475
4	Bhat	5858
5	Vasna Chacharavadi	2513
6	Matoda	2597
7	Sari	2040
8	Palwada	1,899
9	Visalpur	4508
10	Kolat	4,327
11	Nani devati	2,458
12	Modasar	5,410
13	Pipan	3,337
14	Moti devati	3,232
Total Population as per 2011 Census		**48637**

Population Details of Ahmedabad from last 3 Decades:

Census	Population	%+
1991	3,312,200	31.7%
2001	4,525,013	36.6%
2011	5,633,927	24.5%

Calculation of population of Changodar Region from Last 3 Decades

Census	Population	%+	Increase in Population	Average increment
1991	26500	31.7%	-	**11069**
2001	36820	36.6%	10,320	
2011	48637	24.5%	11,817	

Arithmetic Increase Method:

Population after nth decade will be **Pn= P + n.C**

Pn is the population after 'n' decades and 'P' is present population

C= Average increment in Population

Hence, Population Forecast after 4 Decades for the Year 2041 = 48637 + 11069 X 4 = 92,913

Forecasting of Solid Waste Generation up to 2041

As per the Control of Urban Pollution Series Report, for Class – II town having population > 50,000 generates 0.152 kg/person/day Solid Waste.

Hence, Average Solid Waste Generation in Villages of Changodar Region in the Year 2041 will be = **92,913 X 0.152 kg/person/day = 14,122.776 = 14.12 MT/day**

Assuming 20% generation of Industrial Sold Waste

Hence, Total Solid waste Generation= 14.12 MT/day + 20%

= 16.94/day

= Approx 17MT/day

Total Solid waste Generation in 30 Years= 17 X 365 X30 + 10% additional waste generation

= 204765 MT

=Approx 2.05 Lakh MT

Feasibility of Solid Waste Management

Now, assuming that 50% of Solid Waste (1.025 Lakh MT) will be Organic Waste and 50% (1.025 Lakh MT) will Inorganic Waste.

For Organic Solid Waste, feasible treatment technologies are

1. Biogas Plant
   OR
2. Organic Waste Converter

For Inorganic Solid Waste, feasible treatment technologies is

3. Plastic Recycling Unit (5% of Inorganic Waste i.e 5125MT will be sent to Plastic Recycling Unit)
4. MSW Landfill Site (95% of Inorganic Waste i.e 97375 MT will be sent to MSW landfill site)

Feasibility of Biogas Plant

A biogas plant is the name often given to an anaerobic digester that treats organic waste. It can be produced using anaerobic digesters (air-tight tanks with different configurations). These plants can be fed with energy crops such as maize silage or biodegradable wastes including sewage sludge and food waste. During the process, the micro-organisms transform biomass waste into biogas (mainly methane and carbon dioxide).

The digestion process

Biogas is produced by putrefactive bacteria, which break down organic material under airless conditions. This process is called "anaerobic digestion".

The digestion process consists of two main phases:

- Acid formation,
- Methane formation.

In the first phase, protein, carbohydrate and fat give rise to fatty acids, amino acids and alcohols. Methane, carbon dioxide and ammonia form in the second phase. The slurry becomes somewhat thinner during the process of digestion.

The better the two phases merge into each other, the shorter the digestion process. The conditions for this are particularly favourable in the "fermentation channel" arrangement

The following types of digestion are distinguished according to the temperature in the digester:

- psychrophilic digestion (10-20 °C, retention time over 100 days),
- mesophilic digestion (20-35 °C, retention time over 20 days),
- thermophilic digestion (50-60 °C, retention time over 8 days).

Thermophilic digestion is not an option for simple plants. The pH of the fermentation slurry indicates whether the digestion process is proceeding without disturbance. The pH should be about 7. This means that the slurry should be neither alkaline nor acid. Biogas can in principle be obtained from any organic material. Cattle manure can be used as a "starter". Feed material containing lingnin, such as straw, should be precomposted and preferably chopped before digestion. More than ten days' preliminary rotting is best for water hyacinths. Gas production is substantially improved if the preliminary rotting time is twenty days.

Fermentation slurry as fertilizer

During the digestion process, gaseous nitrogen (N) is converted to ammonia (NH3). In this water-soluble form the nitrogen is available to the plants as a nutrient. A particularly nutrient-rich fertilizer is obtained if not only dung but also urine is digested. Compared with solid sludge from fermented straw and grass, the liquid slurry is rich in nitrogen and potassium. The solid fermentation sludge, on the other hand, is relatively richer in phosphorus. A mixture of solid and liquid fermented material gives the best yields. The nutrient ratio is then approximately $N:P_2O_5:K2O= 1:0.5:1$. A fermented slurry with a lower C/N ratio has better fertilizing characteristics. Compared with fresh manure, increases in yield of 5 - 15 % are possible. Particularly good harvests are obtained from the combined use of compost and fermentation slurry. The fertilization effect depends on the type of crop and on the soil. Information given in specialized literature is seldom applicable directly. Tests of one's own are always better. Reliable

information is possible only after three to five years. When fermentation slurry is used as fertilizer for years, the soil structure is improved. The proportion of organic materials in the soil is increased, enabling the soil to store more water. If fermentation slurry is to be stored before spreading on the field, it should be covered with earth in layers. This reduces evaporative nitrogen losses even further.

Biogas

Biogas is somewhat lighter than air and has an ignition temperature of approximately 700 °C (diesel oil 350 °C; petrol and propane about 500 °C). The temperature of the flame is 870 °C. Biogas consists of about 60 % methane (CH_4) and 40 % carbon dioxide (CO_2). It also contains small proportions of other substances, including up to 1% hydrogen sulphide (H_2S). The methane content and hence the calorific value is higher the longer the digestion process. The methane content falls to as little as 50% if retention time is short. If the methane content is considerably below 50 %, biogas is no longer combustile. The first gas from a newly filled biogas plant contains too little methane. The gas formed in the first three to five days must therefore be discharged unused.

Benefits of Biogas Plant

A biogas plant supplies energy and fertilizer. It improves hygiene and protects the environment. A biogas plant lightens the burden on the State budget and improves working conditions for the housewife. A biogas plant is a modern energy source. A biogas plant improves life in the country.

(Source: Biogas Plants by Ludwig Sasse, publication of GIZ)

Feasibility of Organic Waste Converter

Organic Waste Converter is used for composting.Composting is the process in which the organic waste is degraded and converted into manure by the use of culture media. Composting is done using microorganisms, fungi or earthworms. For limited quantity of waste, the seven pit method is used and operated. However, this takes a long time and requires constant monitoring. Hence for huge quantityof waste generated, organic waste converters (OWCs) are used.



Operating Details

Large volumes of food waste from pre-cooking, dry leaves meal leftovers are dumped into community bins, which are responsible for foul odour & health hazards. Organic Waste Converter homogenizes organic waste with appropriate additive & bio culture. The output from the device is a uniform coloured coarse powder which is odourless – thus, good quality organic manure is ready in two weeks of curing period.

Benefits of organic waste converters

- Large quantity of solid waste is converted to fertilizer in a very short period
- Fertilizers can be sold as compost to farmers, or used for gardening
- Machine requires less space and the efficiency is high
- Manpower and maintenance is very less
- This is one of the latest techniques of managing solid waste.

Feasibility of Plastic Recycling Unit

What is Plastic?

Plastic means material which contains as an essential ingredient a high polymer such as polyethylene terephthalate, high density polyethylene, Vinyl, low density polyethylene, polypropylene, polystyrene resins, multi-materials like acrylonitrile butadiene styrene, polyphenylene oxide, polycarbonate, Polybutylene terephthalate;

What is Plastic Waste?

Plastic Waste means any plastic discarded after use or after their intended use is over;

What is Recycling?

Recycling means the process of transforming segregated plastic waste into a new product or raw material for producing new products;

What is Waste Generator?

Waste Generator means and includes every person or group of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbour and Defense establishments which generate plastic waste;

What is Waste Management?

Waste Management means the collection, storage, transportation reduction, re-use, recovery, recycling, composting or disposal of plastic waste in an environmentally safe manner;

What is Waste Pickers?

Waste Pickers mean individuals or agencies, groups of individuals voluntarily engaged or authorized for picking of recyclable plastic waste.

Environmental concerns of plastics

Plastics have their impact on the environment through all stages of their existence from manufacture, to utilization and disposal. Manufacturing requires significant quantities of fossil fuels, a non-renewable resource. Burning of plastics releases smoke which contaminates the environment. The smoke contains small particulates, hazardous substances and green house gases. The disposal of plastics products also contributes significantly to their environmental impact. Most plastics are not biodegradable and can persist in the environment for many years. Plastics can cause blockage of drainage and sewage systems resulting in water logging, flooding and spread of water born diseases. With more and more plastics products, particularly packaging, being disposed of soon after their purchase, the landfill space required by plastics waste is a growing concern.

Why recycle plastics?

Recycling plastics has many benefits; it contributes to energy savings and the reduction of greenhouse gas emissions. It also saves non-renewable sources like oil and gas. In addition to that, recycling provides livelihood for millions of people and families in developing countries, either in the form of formal employment or informal economic activities.

Types of plastics

The six most common types of plastic can easily be recycled. The plastics industry has voluntarily devised a coding system which makes recycling plastics easier. Below Table shows these 6 types of plastics with their identification code, general properties and common uses.

Type of plastic	Identification code	General properties
Polyethylene terephthalate (PET/PETE)		• Clear • Hard • Tough • Barrier to gas and water • Resistance to heat • Resistance to grease/oil

High density polyethylene (HDPE)		• Jerry cans • "Crinkly" shopping bags • Film • Milk packaging • Toys • Buckets • Rigid pipes • Crates • Bottle caps
Polyvinyl chloride (PVC)		• Transparent • Hard, rigid (flexible when plasticized) • Good chemical resistance • Long term stability • Electrical insulation • Low gas permeability
Low density polyethylene (LDPE)		• Tough • Flexible • Waxy surface • Soft - scratches easily • Good transparency • Low melting point • Stable electrical properties • Moisture barrier
Poly propylene (PP)		• Excellent chemical resistance • High melting point • Hard, but flexible • Waxy surface • Translucent

		• Strong
Polystyrene (PS)		• Clear to opaque • Glassy surface • Rigid • Hard • Brittle • High clarity • Affected by fats and solvents
Others (Thermoset plastics, Multi layer and laminated plastic, PUF, Bakelite, Polycarbonate, Melamine, Nylon etc		Mostly not available in sufficient quantities for recycling

Why need to setup Plastic Recycling Unit in Changodar Industrial Area?

Looking to the plastic waste generation and lack of plastic waste recycling mechanism in Changodar Industrial Area, it is necessary to setup one Plastic Recycling Unit in Changodar Industrial Area.

Processes and equipment required for plastic recycling

Below given Figure gives an overview of processes which can take place in a plastic recycling plant. With each step the value of the waste material increases, as the value of waste plastic as a secondary resource depends on its purity and composition.

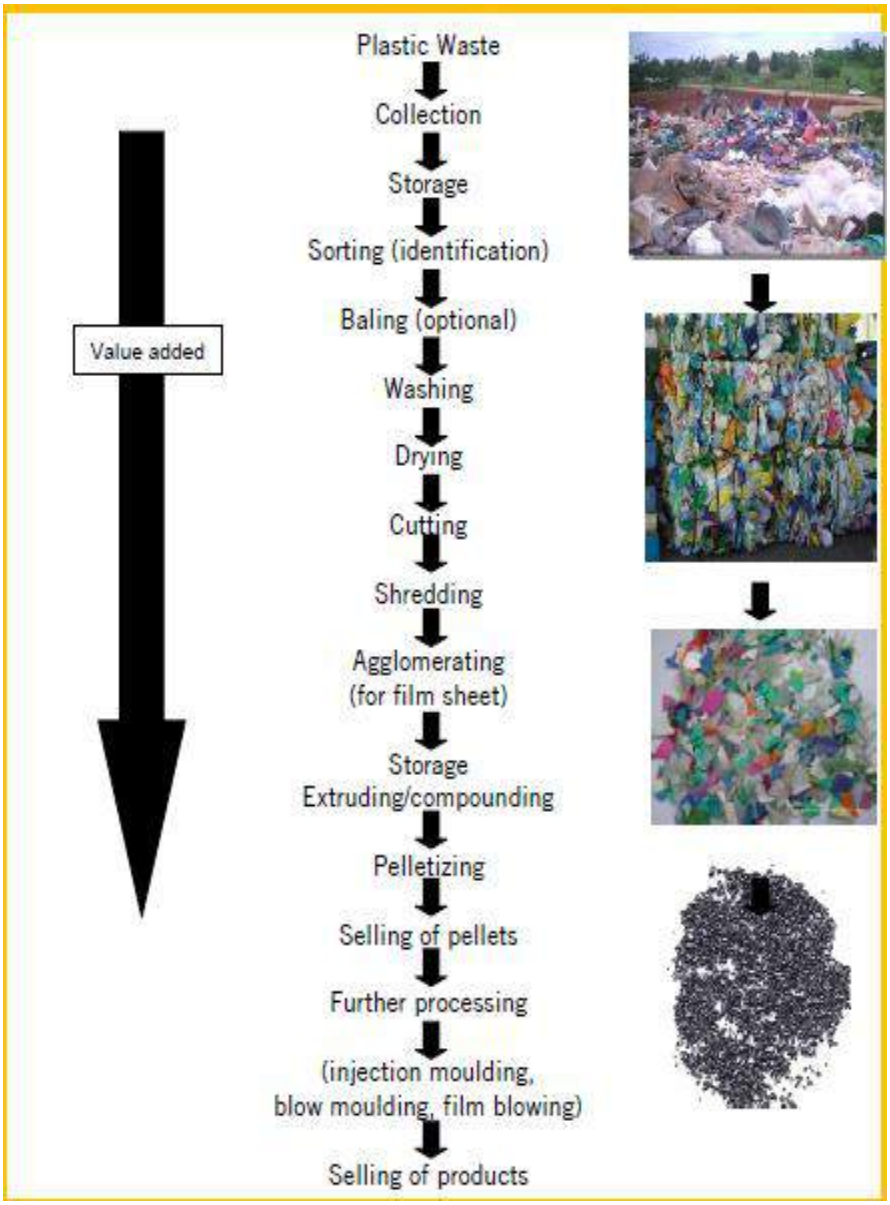


Figure: Simplified scheme of plastic recycling

Storage: The plastic recycling enterprise needs quite a large storage space in order to store all collected waste items, processed materials and finessed products. Plastic waste items, especially bottles, have a large volume and therefore a large storage place is necessary.

Sorting and identification: Plastics sorting operations may be carried out manually or automatically using appropriate means of identification. The more accurate and efficient the means of identification, sorting and separation, the better is the quality of the recovered product obtained. Best suited for sorting plastics in developing countries are those technologies that make extensive use of the (comparative) advantage of cheap labour. The secondary raw material obtained by hand sorting is of high quality and offers an excellent basis for producing high quality products by small and medium scale industry (Vest, 2000).

To aid in identification, it is now common for plastic containers to have a polymer identification code (see above given table). Unfortunately, other plastic applications do not carry such identifiers and are, therefore, more difficult to identify by polymer type without some experience. There are several simple tests that can be used to distinguish between the common types of polymers so that they may be separated for processing.

The water test: After adding a few drops of liquid detergents to some water put in a small piece of plastic and see if it floats.

Burning test: Hold a piece of the plastic in a tweezers or on the back of a knife and apply a flame. Dose the plastic burn? If so, what colour?

Fingernail test: Can a sample of the plastic be scratched with a fingernail?

Test	PE	PP	PS	PVC*
Water Burning	Floats Blue flame with yellow tip, melts and drips.	Floats Yellow flame with blue base.	Sinks Yellow, sooty flame – drips.	Sinks Yellow, sooty smoke. Does not continue to burn if flame is removed.
Smell after burning	Like candle wax.	Like candle wax – less strong than	Sweet	Hydrochloric acid

		PE		
Scratch	Yes	No	No	No

Baling: After collecting and sorting the plastic material the option exist to sell the material to (other) processing units. Especially when transporting distances are considerably, it is important to compact the waste to improve handling and save costs during transport.

Simple baler for PET bottles as used in Belarus

Washing: If the plastic is dirty, cleaning is necessary. The main cleaning steps are:

- Draining of remaining fluids from containers into prepared collection barrels.
- Rough cleaning of plastic containers and other pieces of plastic.
- Removing of paper, plastic or metal stickers.
- In the case of PET bottles removing of caps and etiquettes.
- Intensive washing in cold or hot water with addition of detergents or caustic soda. The waste water can be reused by installing a simple waste water treatment system like a sedimentation basin.

Cutting: Cutting is usually carried out for initial size reduction of large objects. It can be carried out with scissors, shears, saw, etc.

Shredding: Shredding is suitable for smaller pieces. A typical shredder has a series of rotating blades driven by an electric motor, some form of grid for size grading and a collection bin.

Materials are fed into the shredder via a hopper which is above the blade rotor. The product of shredding is a pile of coarse irregularly shaped plastic flakes which can then be further processed.

Shredder in Peru

Agglomeration: Clean film sheet is processed in an agglomerator. The agglomerator consists of a vertical crum with a set of fast moving blades in the bottom. The agglomerator chops the sheets into thin film flakes. Due to the cutting and friction energy of the process, the flakes are heated until they start to melt and form crumbs or agglomerate. This will increase the bulk density of the material which is now fit to be feed directly into the extruder.

Agglomerator operating in Benin

Pelletizing: For many purposes it is recommended to convert plastic flakes or agglomerate (crumbs) into pellets before processing. The plastic pieces are fed into the extruder, are heated and then forced through a die to form a plastic spaghetti which can then be cooled in a water bath before being chopped into pellets.

Example of a pelletizer in India

Further Processing

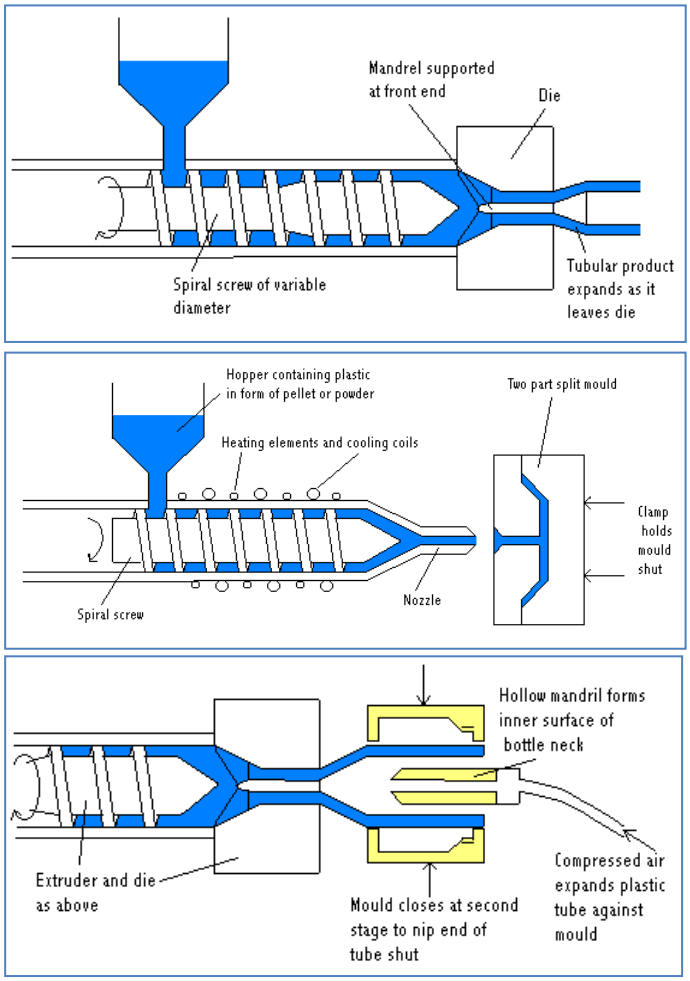
Extrusion: The extrusion process used for manufacturing new products is similar to that outlined above for the process preceding pelletisation, except that the product is usually in the form of a continuous '**tube' of plastic such as piping or hose**. The main components of the extrusion machine are shown in Figure given below. The reclaimed plastic is forced along the heated tube by an Archimedes screw and the plastic polymer is shaped around a die. The die is designed to give the required dimensions to the product and can be interchanged.

Injection Moulding: The first stage of this manufacturing process is identical to that of extrusion, but then the plastic polymer emerges **through a nozzle into a split mould**. The quantity of polymer being forced out is carefully controlled, usually by moving the screw forward in the heated barrel. A series of moulds would be used to allow continual production while cooling takes place. See Figure given below. This type of production technique is used to produce moulded products such as plates, bowls, buckets, etc.

Blow Moulding: Again the spiral screw forces the plasticised polymer through a die. A short piece of tube, or 'parison' is then enclosed between a split die -which is the final shape of the

product - and compressed air is used to expand the parison until it fills the mould and achieves its required shape. This manufacturing technique is used for manufacturing closed vessels such as bottles and other containers. See Figure given below.

Film Blowing: Film blowing is a process **used to manufacture such items as garbage bags**. It is a technically more complex process than the others described in this brief and requires high quality raw material input. The process involves blowing compressed air into a thin tube of polymer to expand it to the point where it becomes a thin film tube. One end can then be sealed and the bag or sack is formed. Sheet plastic can also be manufactured using a variation of the process described.



Plastic manufacturing techniques; extrusion (top), blow moulding (middle) and injection moulding (bottom).

(Source: Report on Recycling Plastics-Starting a Business-Practical Action by the Schumacher Centre, UK)

Feasibility of MSW Landfill Site

An MSW landfill refers to an area of land or an excavation where MSW is placed for permanent disposal. MSW landfills do not include land application units, surface impoundments, injection wells, or waste piles. Modern MSW landfills are well-engineered disposal facilities that are sited, designed, operated, and monitored to protect human health and the environment from pollutants that may be present in the solid waste stream.

MSW landfills are required to comply with Environment regulations. landfills are constructed away from environmentally-sensitive areas, including fault zones, wetlands, flood plains, or other restricted areas. Construction and operating permit applications for new landfills must be submitted to and approved by state and local regulatory agencies as part of the siting and design process. Often, states require a registered professional engineer to design the landfill.

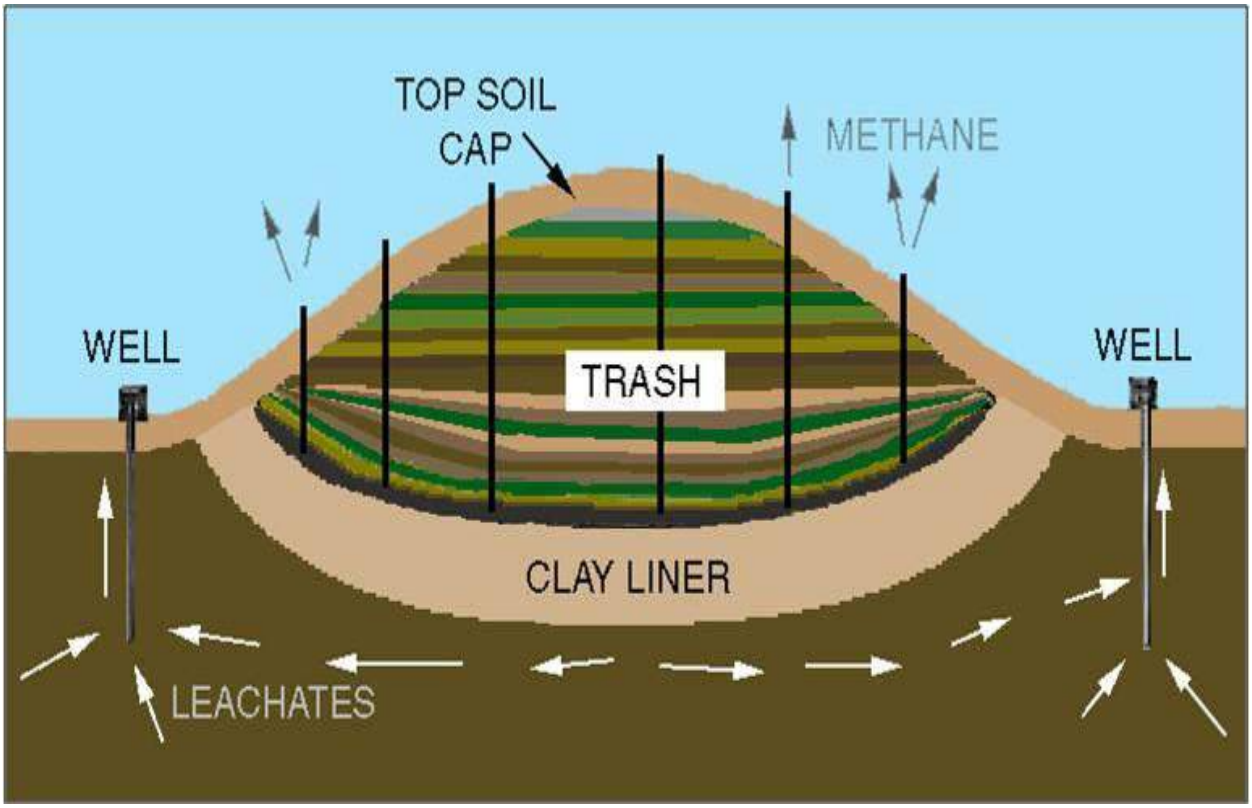
Landfill Operations

The two most common methods for active disposal of waste into landfills are the area fill method and the trench method. The area fill method involves waste placement in a large open section of a lined landfill and then spreading and compacting waste in uniform layers using heavy equipment. The trench method of filling waste in a modern landfill involves placing and compacting waste into a trench and then using material from the trench excavation as daily cover. Local conditions often determine the most appropriate method for a particular landfill, and a combination of the two methods can be utilized. The trench method is less commonly used than the area fill method, mostly due to the expense of lining side slopes of the landfill.

Landfill Closure

Once an area of the landfill, or cell, has reached its permitted height, that cell is closed and a low permeability cap made of compacted clay or synthetic material is installed to prevent infiltration of precipitation. To divert water off of the top of the landfill, a granular drainage layer is placed on top of the low-permeability barrier layer. A protective cover is placed on top of the filter blanket and topsoil is placed as the final layer to support vegetation. The final cap and cover

inhibit soil erosion and provide odor and LFG control. The required post-closure care period is **30 years** from site closure, but this can be shortened or extended if approved by state regulatory agencies.



Landfill Site

(Source: Report of MSW Landfills by US EPA)

Identified waste land for MSW Landfill Site Development in 3 cluster of Changodar Region is shown on Page No. 41 of this Report.

Approximate capacity of MSW Landfill Site will be 97375 MT, say 1 Lakh MT.

Feasibility of Storm Water Management

Rapid urban expansion, increased traffic, ageing infrastructure, greater climatic variability, and the need for enhanced sustainability of urban water resources pose significant challenges to conventional storm water management. Innovative approaches are needed in order to mitigate the risk of flooding, pollution, and aquatic ecosystem degradation, and enhance beneficial uses of urban waters.

The current storm water management system in Changodar Industrial Area is inefficient and requires modification.

Storm Water Drain

A storm drain, storm sewer, surface water drain/sewer, or storm water drain is designed to drain excess rain and ground water from impervious surfaces such as paved streets, car parks, parking lots, footpaths, sidewalks, and roofs. Storm drains vary in design from small residential dry wells to large municipal systems.

Drains are fed by street gutters on most motorways, freeways and other busy roads, as well as towns in areas which experience heavy rainfall, flooding and coastal towns which experience regular storms. Even the gutters from houses and buildings can be connected to the storm drain. Many storm drainage systems are designed as gravity sewers draining untreated storm water into rivers or streams. As a result, it is not acceptable to pour certain types of chemicals into the drains.

Storm drains are often unable to manage the quantity of rain that falls during heavy rains and/or storms. When storm drains are inundated, basement and street flooding can occur. In many areas, detention tanks are required to be installed inside a property and are used to temporarily hold rainwater runoff during heavy rains and restrict the outlet flow to the public sewer. This lessens the risk of the public sewer being overburdened during heavy rain. Some storm drains lead to a mixing of storm water (rainwater) with sewage, either intentionally – in the case of combined sewers – or unintentionally.

Different type of Strom water drain:

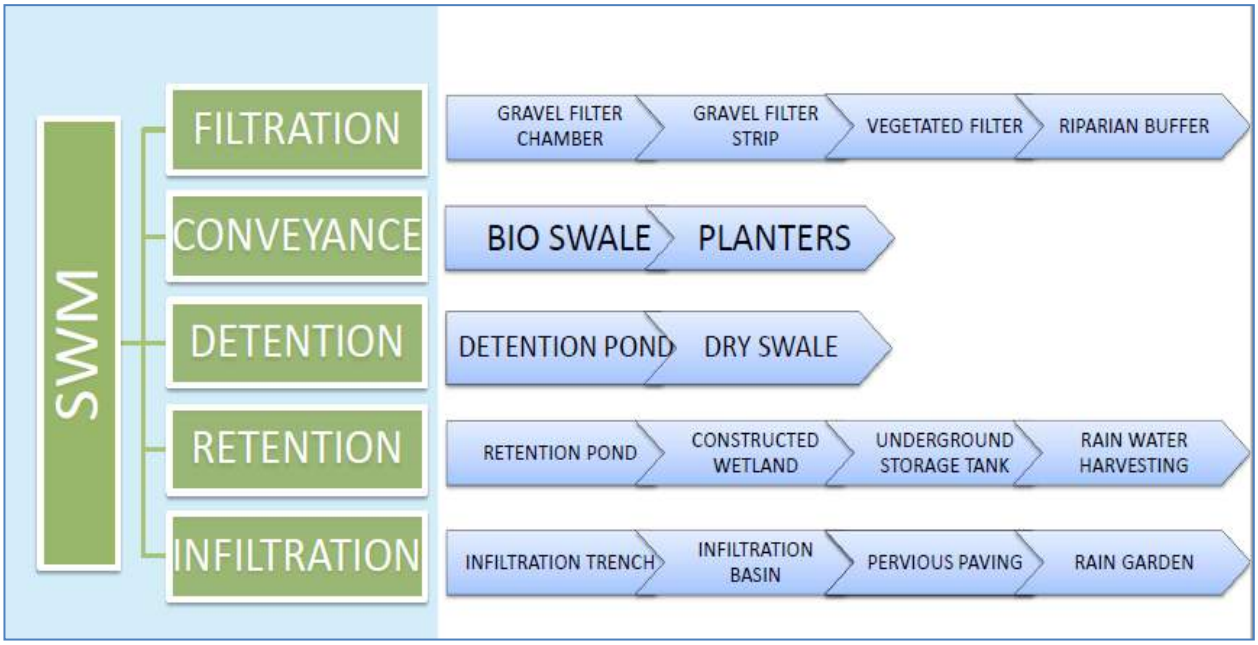
Side inlets type storm water drain

Filter cover provided in storm water drain

Side inlets type storm water drain with screen

SWD with screen

Storm Water Management Chart



Filtration

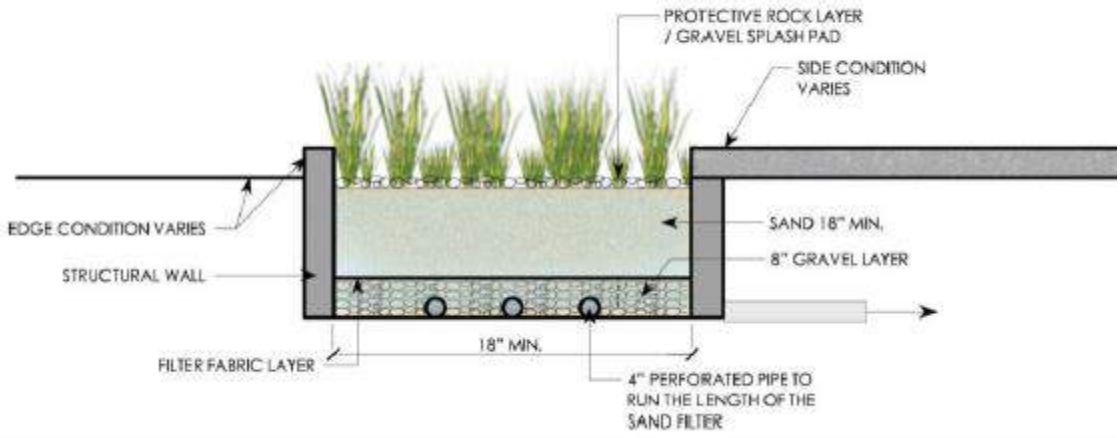
- Filtration can include rock and vegetated swales, filter strips or buffers, sand filters.
- Prevents sediments and other materials from reaching and clogging downstream facilities.
- The filtration is effective if flows are slow and depths are shallow.
- The slow movement of runoff through vegetation or gravel provides an opportunity for sediments and particulates to be filtered and degraded through biological activity.
- In draining soils, the filters also provides an opportunity for storm water infiltration, which further removes pollutants and reduces runoff volumes.
- These are especially applicable to parking lots and along highways as they can be sloped into linear grass or rock swales to collect and treat runoff from pavement surfaces. Adjacent pavement level should be slightly higher than the filtration area.

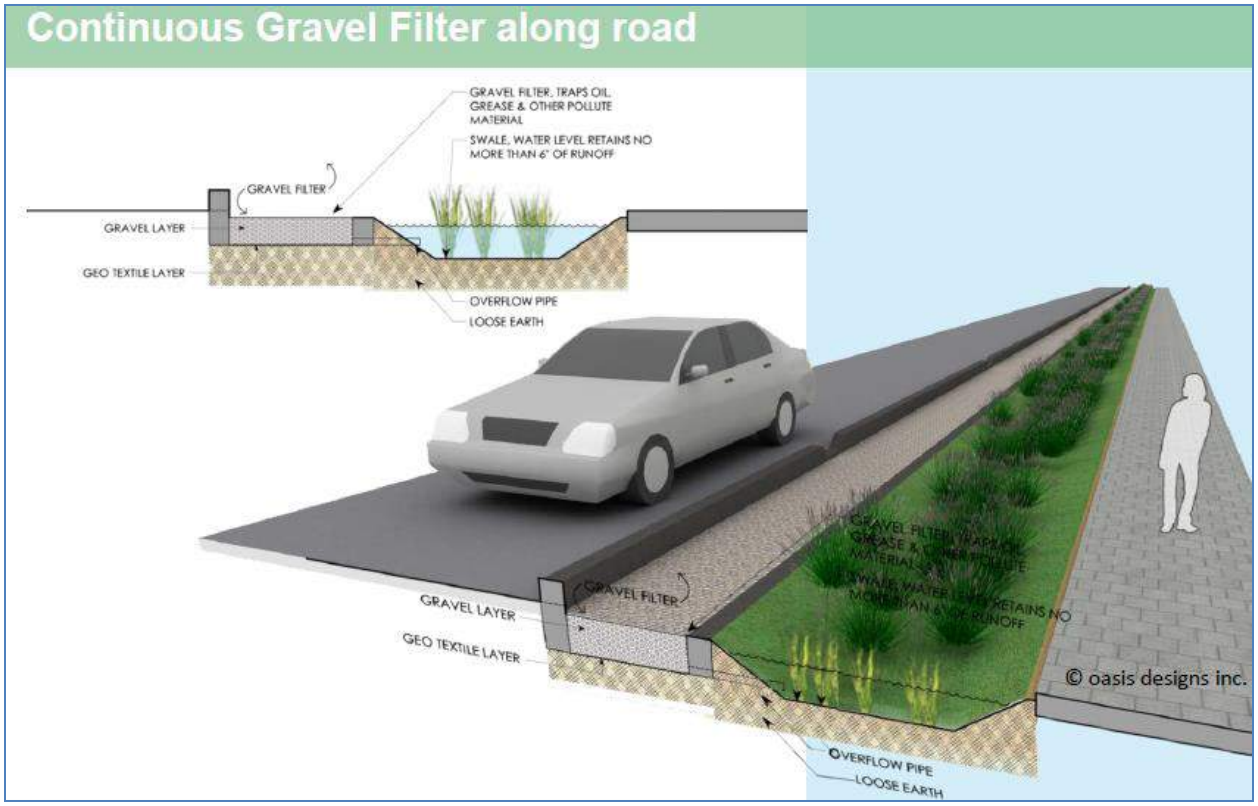
Filtration systems are:

- Gravel filter
- Vegetated filter
- Riparian buffer

Gravel filter

- Gravel filter can be designed with an impervious bottom or is placed on an impervious surface.
- Pollutant reduction is achieved as the water filters through the gravel and sand.
- Filters may be constructed in-ground or above grade, as they can include a waterproofing lining.
- Gravel filters can be used next to road kerb or foundation walls, adjacent to property lines (if less than 30^{o} in height), or on slopes.
- An overflow to an approved conveyance and disposal method will be required.
- Irrigation facilities to be given for non monsoon season.

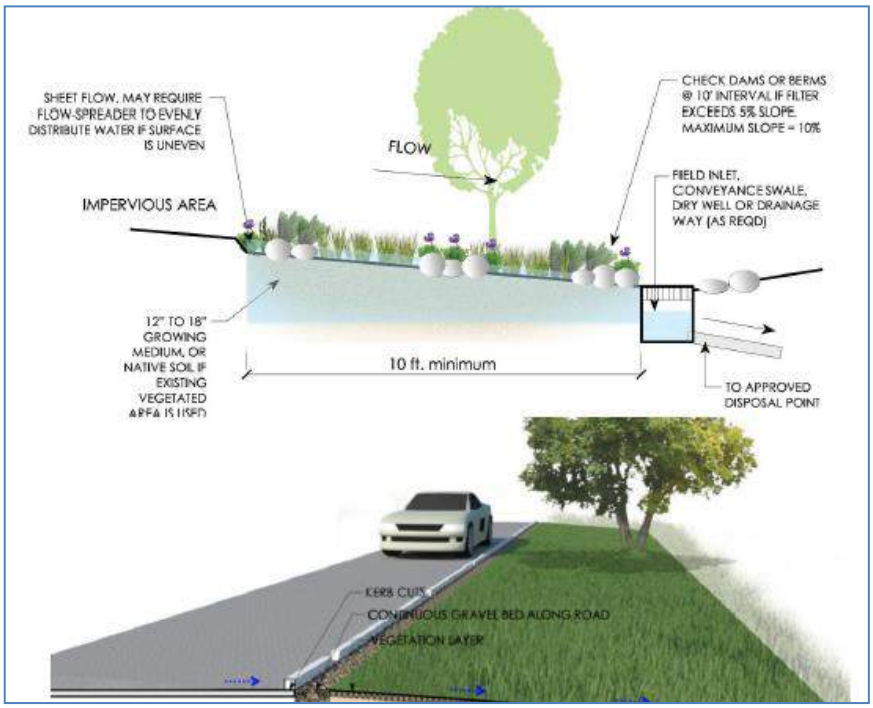



Continuous Gravel Filter along road
GRAVEL FILTER, TRAPS OIL, GREASE & OTHER POLLUTE MATERIAL
SWALE, WATER LEVEL RETAINS NO MORE THAN 6" OF RUNOFF
GRAVEL FILTER
GRAVEL LAYER
GEO TEXTILE LAYER
OVERFLOW PIPE
LOOSE EARTH
© oasis designs inc.


FILTRATION NEEDS TO STOP ALL THE DIRT & POLLUTANTS (OIL & GREASE) ENTERING THE STORM WATER CHANNEL & WATER BODIES.

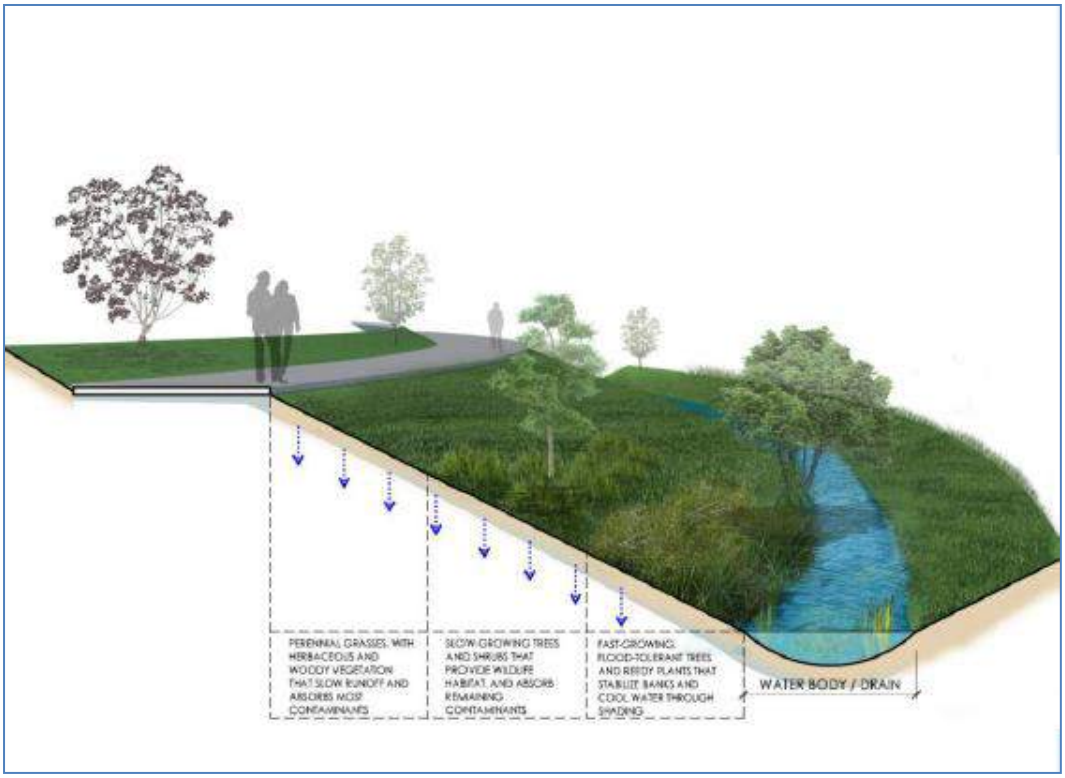
Vegetated filter

- Vegetated filter strips, or vegetated filter, are gently sloping areas used to filter, slow, and infiltrate storm water flows.
- Storm water enters the filter as sheet flow from an impervious surface. Flow control is achieved using the relatively large surface area and for slopes greater than 5%, a generous proportion of check dams or berms.
- Pollutant are removed though filtration and sedimentation.



Riparian buffer

- A Riparian buffer is a vegetated strip along the banks of flowing water
- Riparian buffer are a simple, inexpensive way to protect and improve water quality through local plant material.
- Buffer strips structurally stabilize banks and shorelines to prevent erosion. Trees and shrubs provide shade to maintain consistent water temperature necessary for the survival of some aquatic life.
- Width of the buffer is based on surrounding context, soil type, size and slope of catchment area, and vegetative cover.



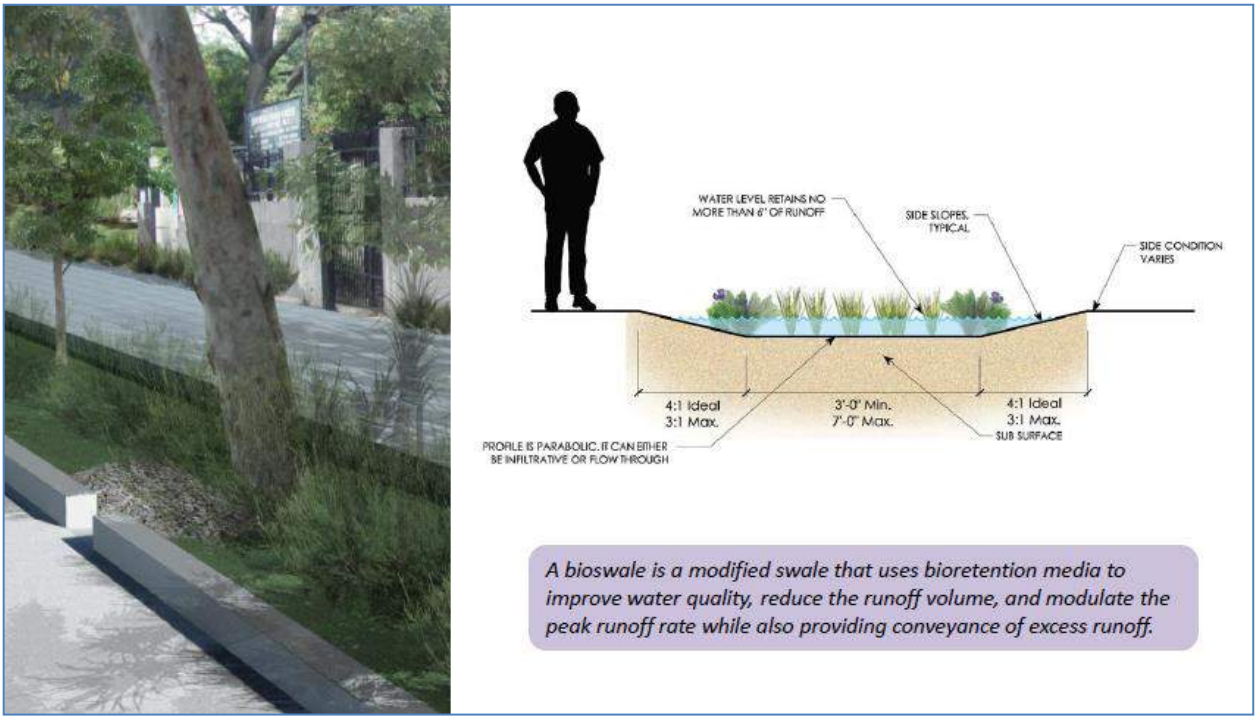
Conveyance

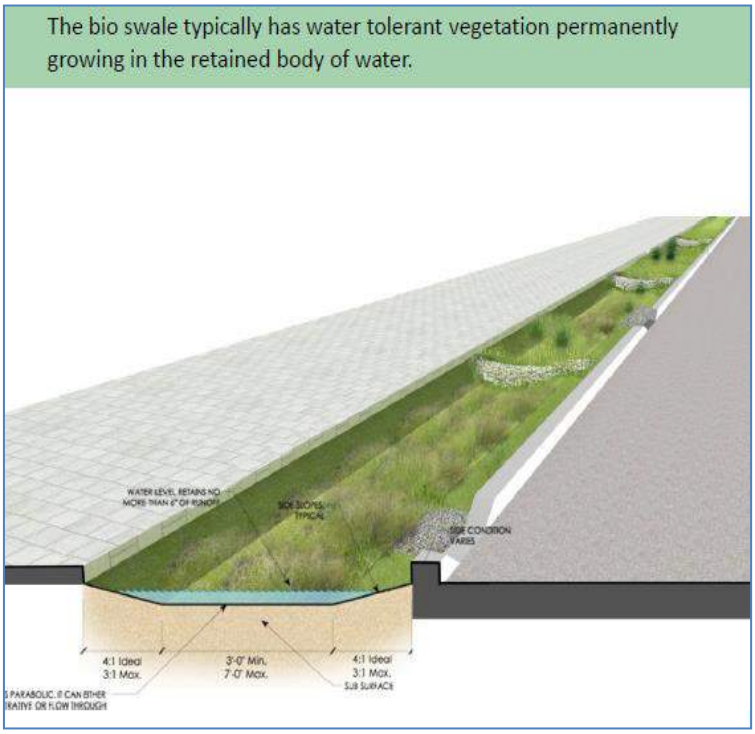
Conveyance systems help storm water run off to capture, convey and potentially infiltrate before I moves downstream.

Conveyance systems are

- Bio swale
- Planters
- Green gutter

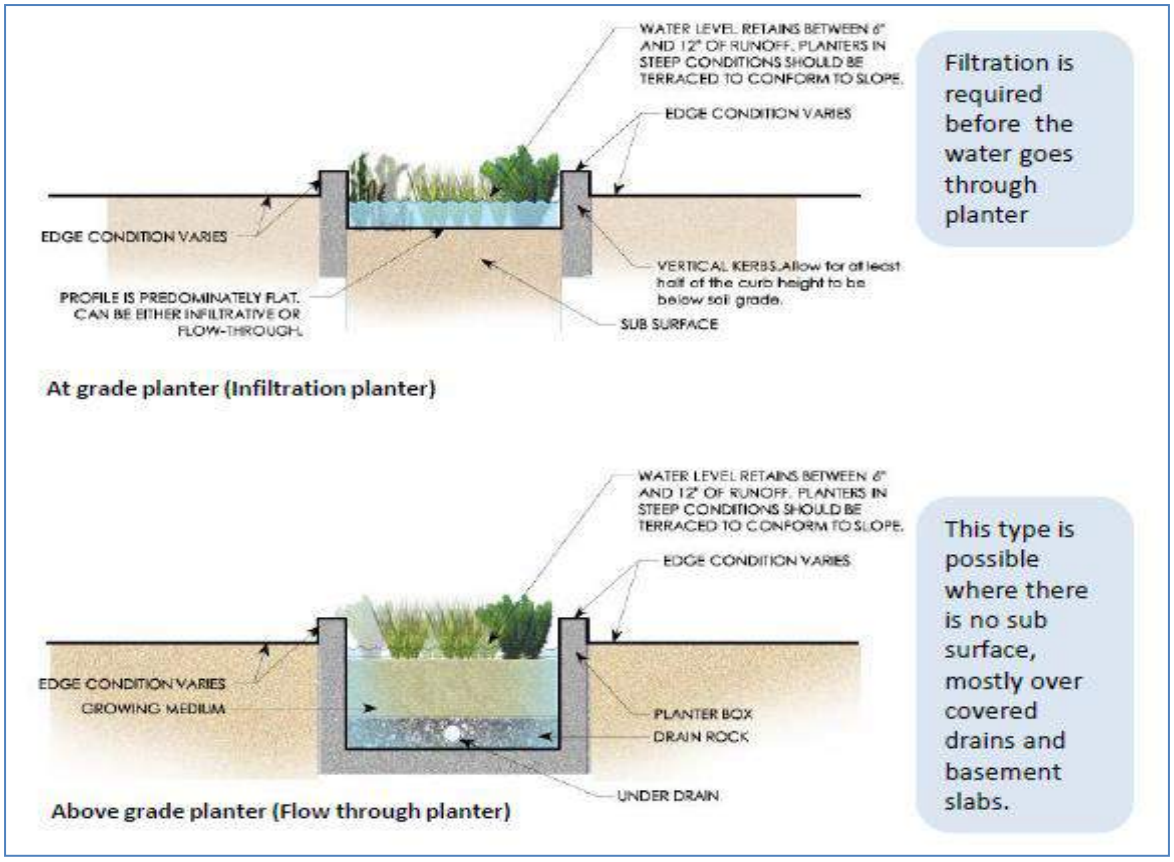
Bio Swale





- Uses biological process to remove a variety of pollutants
- Able to control flow, reduce volume
- Good retrofit capability
- Provides storm water treatment and conveyance
- Can be part of infrastructure within transportation ROW
- Can be a landscape feature
- Check dams, weirs, or stepped cells need to be used in area with steep slopes

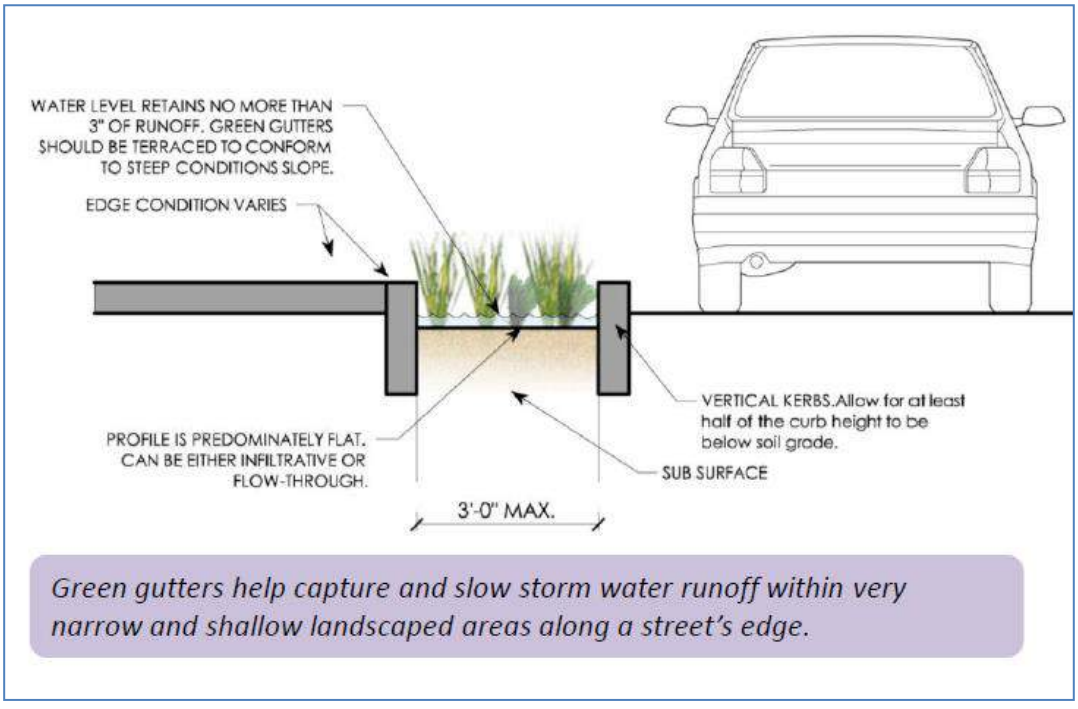
Planters



- Infiltration and flow-through planters are structural landscaped reservoirs used to collect, filter and infiltrate strom water runoff.
- They allow pollutants to settle and filter out as the water percolates through the planter soil and infiltrates into the ground.
- Flow rates and volumes can also be managed with infiltration planters.

Green gutter

- We can often significantly "green" a street with minimal investment.
- Create a more walkable street environment by providing a green buffer between road traffic and the sidewalk.
- Require a long, continuous space to effectively slow and filter pollutants.
- These are very shallow and do not retain large amounts of runoff



Green gutters help capture and slow storm water runoff within very narrow and shallow landscaped areas along a street's edge.

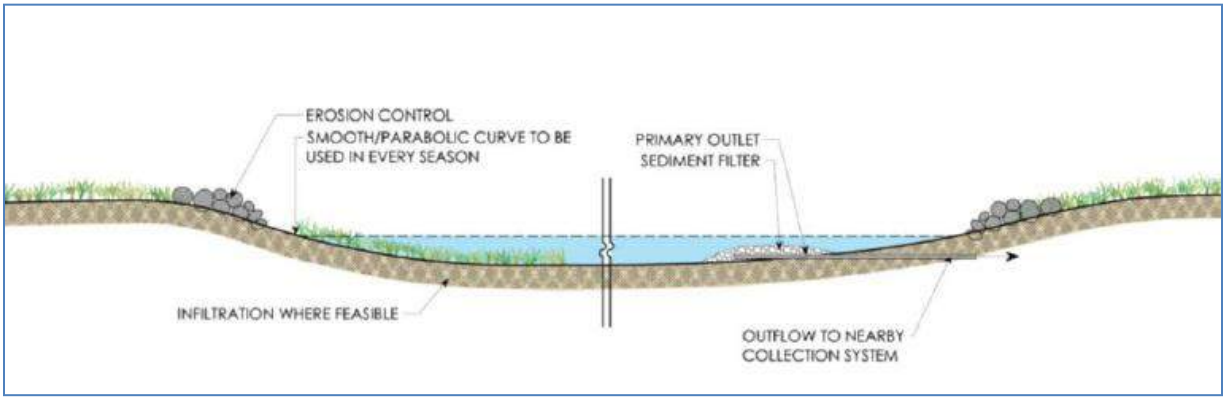
Detention

Detention systems are designed to store storm water temporarily and then release or reuse it gradually

- Storage capacity dependent on available site area
- Can be used in combination with other storm water management facilities
- Regular maintenance of vegetation and sediment removal required
- Relatively impermeable soils or impermeable liner
- Forebay (such as filtration techniques) for sediment collection and removal

Detention systems are

- Detention pond
- Dry swale



Detention ponds

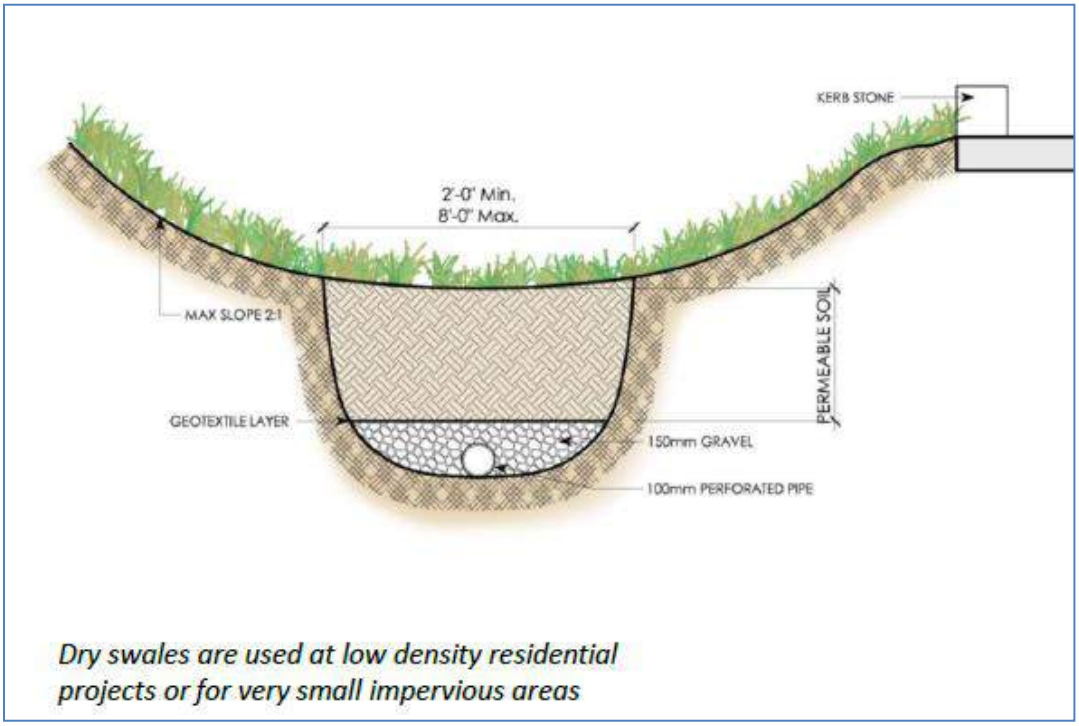
Detention ponds are temporary holding area for storm water that store peak flows and slowly release them, lessening the demand on treatment facilities during storm events and preventing flooding.

Detention ponds are designed to fill and empty within 48 hrs of a rain fall and could reduce

peak flows and runoff volumes.

They can be used to provide flood control by including additional flood detention storage.

Dry Swale



- Dry swales are simple drainage and grassed channels that primarily served to transport storm water runoff away from roadways and rights-of-way.
- This provides both quantity and quality control by facilitating storm water detention.

Retention

Retention areas are surface depressions planted with specially selected native vegetation to capture and treat storm water runoff from rooftops, streets and parking lots.

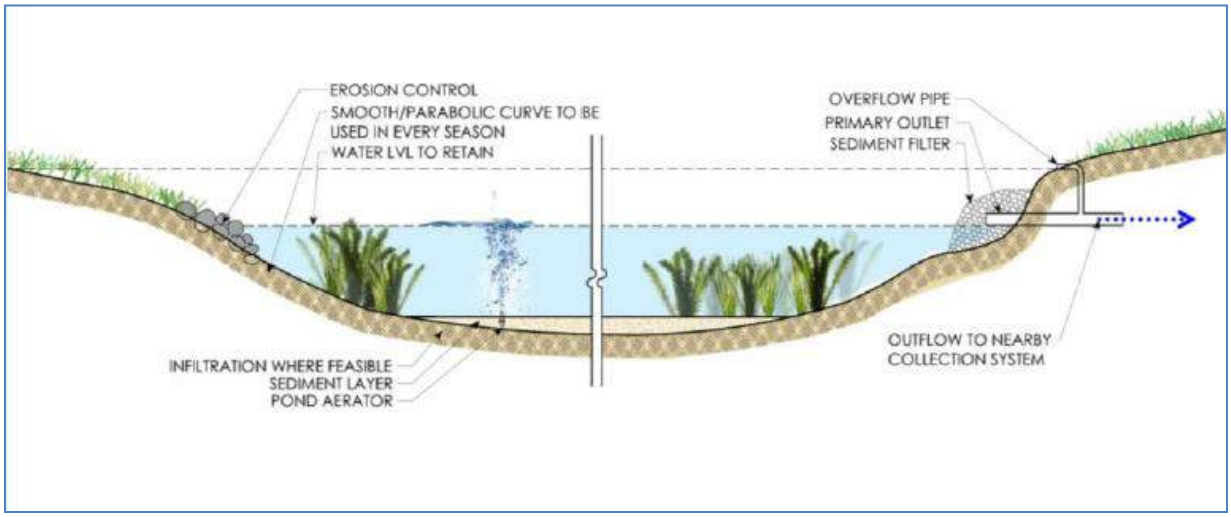
- Volume control and groundwater recharge, moderate peak rate control, filtration.
- Higher maintenance until vegetation is established.
- Limited impervious drainage area.
- Flexible in size and infiltration.
- Provide positive overflow for extreme rain fall.

- Natural high groundwater table required for wet ponds and constructed wetlands.
- Dewatering mechanism required for wet ponds and constructed wetlands.

Retention systems are

- **Retention pond**
- **Constructed wetlands**
- **Underground storage tank**
- **Rain water harvesting structure**

Retention pond

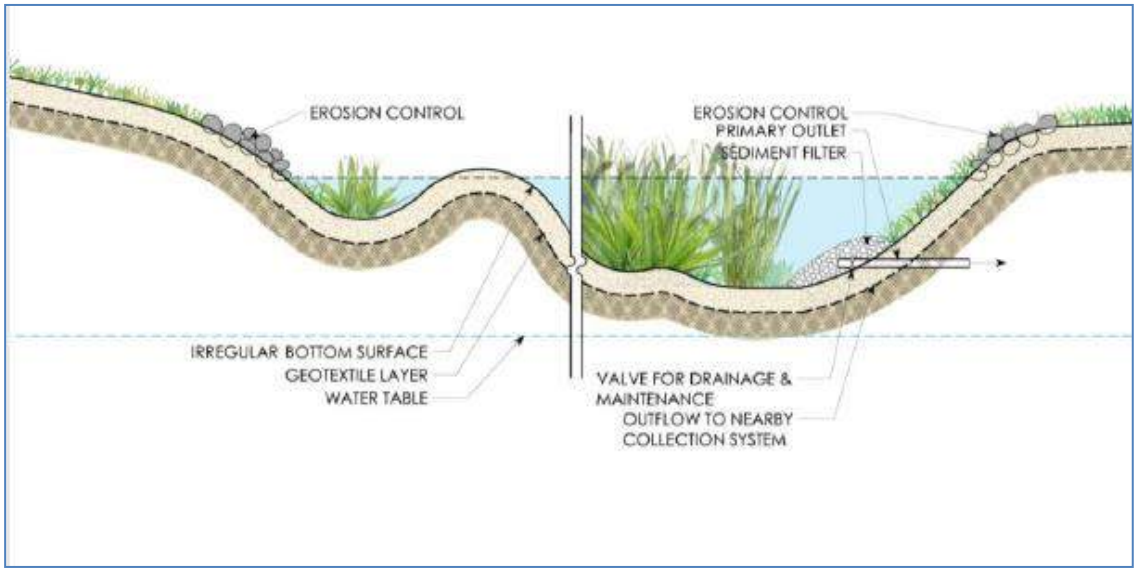


- Retention ponds maintain a permanent pool of water in addition to temporarily detaining storm water. These ponds fill with storm water and release most of it over a period of a few days, slowly returning to its normal depth of water.
- As these have to maintain a permanent pool, they can't be constructed in areas with insufficient precipitation or highly permeable soils.
- Retention ponds can have aquatic habitat if properly planted and maintained. Regular cleaning and maintenance is needed to ensure proper drainage.

Areas of possible application:

Unused open area, maidans, Open spaces in the city parks.

Constructed wetlands



- Constructed wetlands are shallow, man-made pool with vegetated systems designed to provide storm water retention and pollutant removal.
- Can be designed for enhanced nitrogen removal by creating aerobic and anaerobic zones.
- Reduces runoff temperature.
- Creates habitat, plants and wetlands helps to reduce storm water speed and allows sediments to settle out.
- These can be applied to the areas those were wetland once or low line areas of any site.
- These are different from retention ponds in their shallower depths and large vegetation coverage.

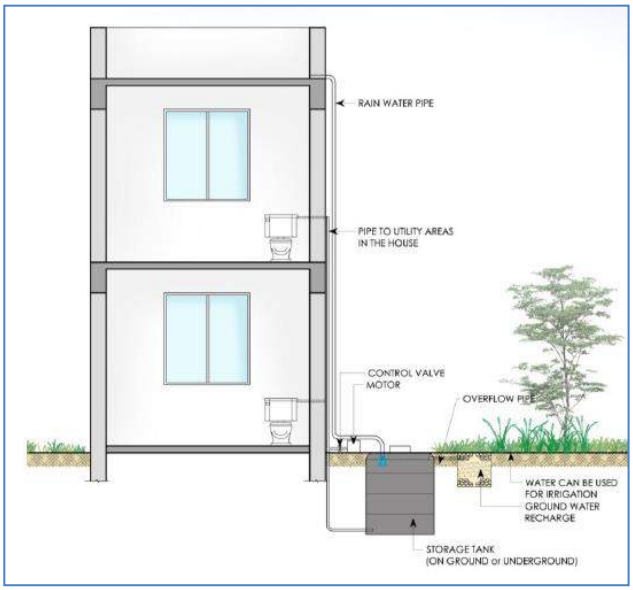
Underground storage tank

All storm water that falls on the road surface and the roadsides can be collected and managed within the ROW.

Water collected in reservoirs can be used for irrigation

Rain water harvesting structure

- Storm water can be collected and reused for non-potable water uses within a house or building, or for landscape irrigation purposed.
- Uses can include reusing water in toilets.
- This will help to reduce the water used from the city water system.
- Rainwater harvesting can be used to manage a portion of the storm water flow and lessen the overall flow control requirement.



Infiltration

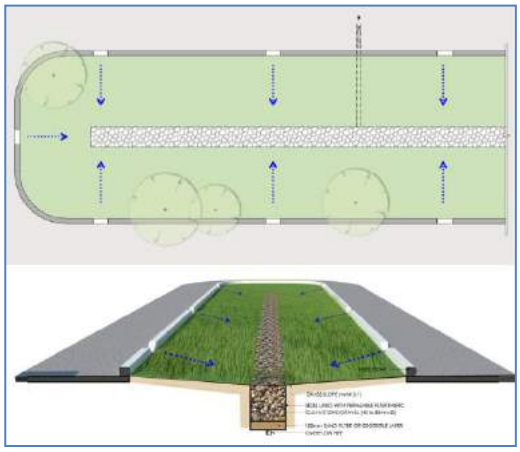
Infiltration system are natural or constructed land areas located in permeable soils that capture, store and infiltrate the volume of storm water runoff into surrounding soil.

Infiltration systems are:

- Infiltration Trench
- Infiltration Basin
- Pervious Paving
- Rain garden

Infiltration trenches

- Infiltration trenches temporarily hold storm water runoff within a sub-surface trench prior to infiltration into the surrounding soils.
- Storm water runoff is diverted into the trench and is stored until it can be infiltrated

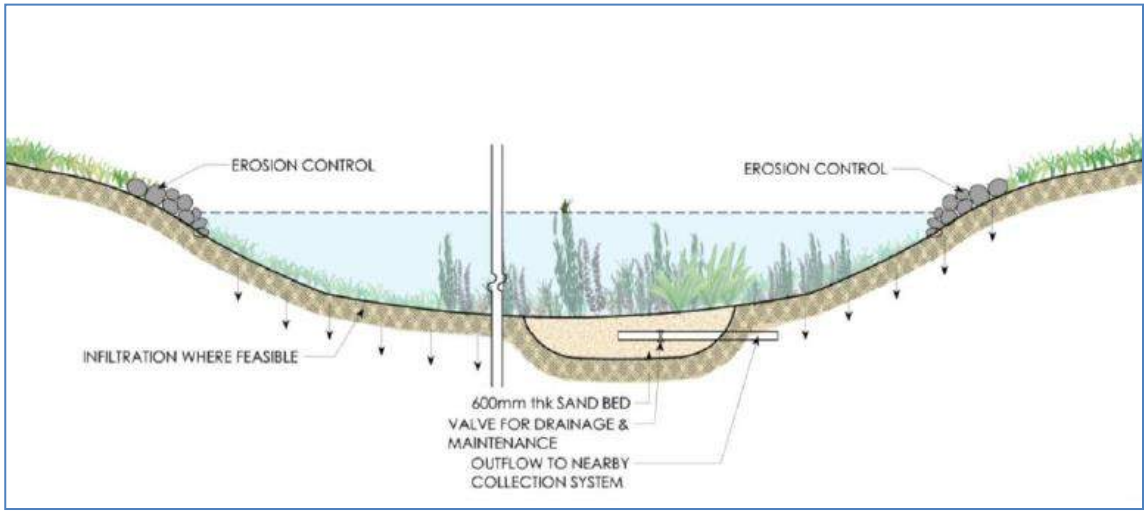


into the soil, usually over a period of several days.

Areas of possible application: Suitable for drainage areas of approximately 5 acres or less.

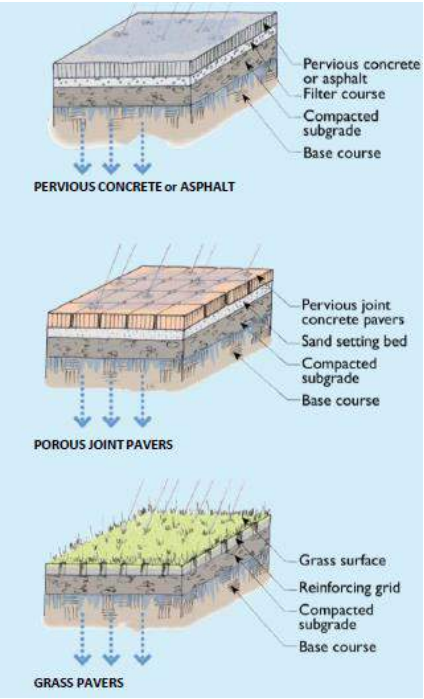
Infiltration Basin

An Infiltration basin is a shallow pond over permeable soil that captures storm water, stores it and allows it to infiltrate using the natural filtering ability of the soil to remove storm water pollutants. They are similar in function to infiltration trenches except that an infiltration basin's



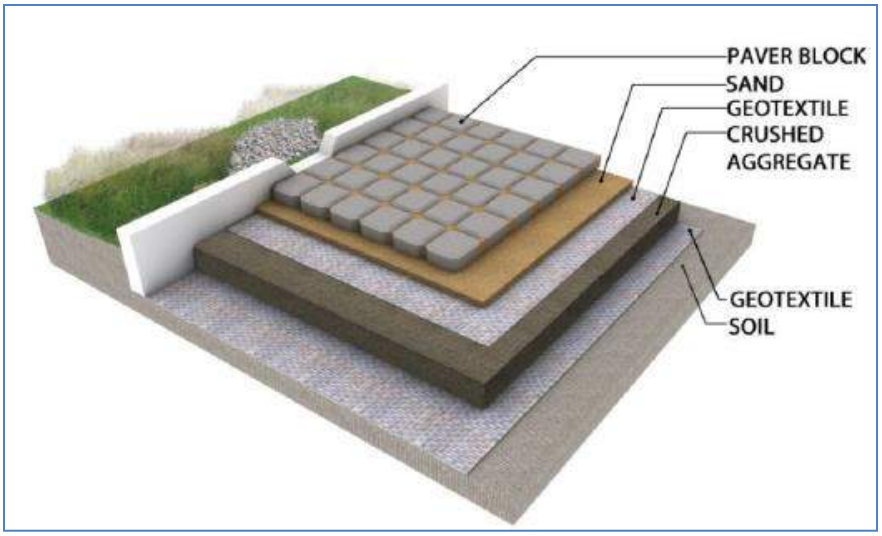
stored volume is held above ground, while an infiltration trench's stored volume is held below ground.

Previous paving

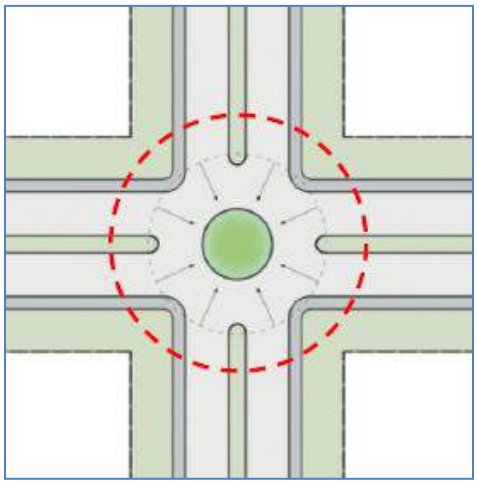


Type of Pervious Paving

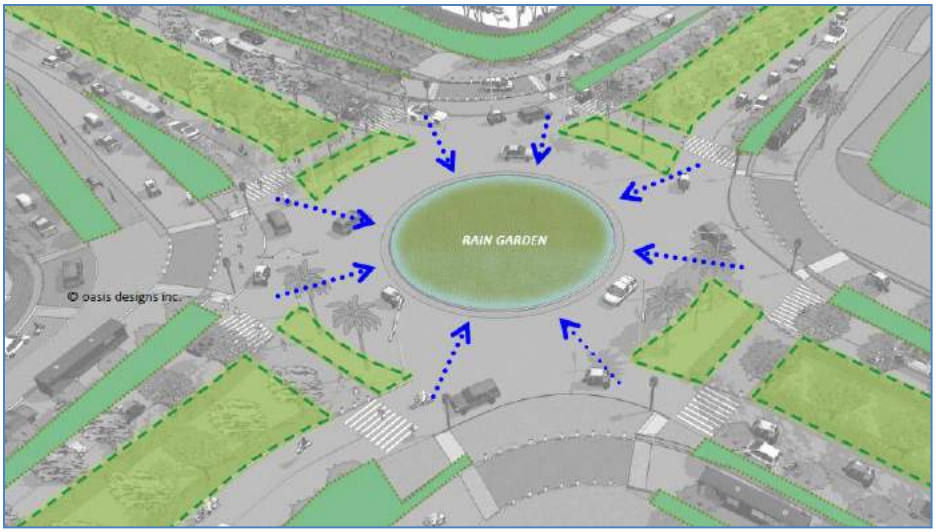
- Porous Asphalt (No fine concrete)
- Permeable pavers (Modular Paver block)
- Grass paving



Rain garden



- Rain gardens retain storm water, thereby reducing flow rate and overall volume.
- They can also allow for infiltration, depending on the capacity of the native soil.
- Rain gardens are shallow landscape areas that can collect, slow, filter and absorb large volumes of water, delaying discharge into the watershed system.



Source: Storm Water Management Report prepared by Oasis Designs Inc. for UTTIPEC (waste management)

5. RECP ASSESSMENT IN IDENTIFIED INDUSTRIES

CP ASSESSMENT IN CHANGODAR AREA

M/S. KANHAI FOODS PVT. LTD.

A. Company Introduction

M/s. Kanhai foods Pvt. Ltd. has been at the forefront of innovations and creativity in the field of manufacturing and marketing of wide range of bread and bakery products. Today, "Kalory" is the brand leader in the market of Gujarat with exciting range of products including whole wheat bread, multigrain bread,atta bread and pizzas and so on. "Kabhi B" the bakery division of the company with a chain of 49 stores providing a wide range of pastries, cakes, bar cakes and chocolate so on. From the beginning the commitment of the company towards healthy, nutrition and vegetarianism has been noteworthy. All the products of the company are hundred percent "egg less". With the aim of improving the standards, the company went in for stringent food safety norms and processes in its manufacturing.

B. Methodology for Cleaner Production Assessment

Cleaner production with great vitality and buoyancy begins a new era of pollution prevention in the history of environmental protection and will become best approach for pollution control in the new century.

Various steps involved while carrying out CP Assessment are mentioned below.

Step 1: Getting Started

- Task 1: Make CP Team
- Task 2: List Process Steps
- Task 3: Identify Wasteful Processes

Selection of Cleaner Production Focus

Step 2: Analyze Process Steps

- Task 4: Process Flowchart
- Task 5: Material and Energy Balance
- Task 6: Assign Cost to Waste Streams
- Task 7: Identify Cause of Waste

Listing of process waste source

Step 3: Generating Cleaner Production Opportunity

- Task 8: Develop CP Opportunities
- Task 9: Select Workable Opportunity

Listing Of Cleaner Production Opportunities

Step 4: Selecting Cleaner Production Solution

- Task 10: Technical Feasibility
- Task 11: Economic Feasibility
- Task 12: Environmental Aspects
- Task 13: Select Solution

Listing Of Cleaner Production Solutions

Step 5: Implementing Cleaner Production Solution

- Task 14: Preparation For Implementation
- Task 15: Implement Cleaner Production Solution
- Task 16: Monitor and Evaluate Results

Successfully Implemented Cleaner Production

Step 6: Maintaining Cleaner Production

- Task 17: Sustain Cleaner Production Solution
- Task 18: Go to Step 1 - Task 3

Ongoing Cleaner Production Efforts

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C. Cleaner Production Team

The Cleaner Production Team consists of the following members-

Sr. No.	Cleaner Production Team
1)	Dr. Bharat Jain, Member Secretary, GCPC
2)	Mr. Rajesh, Manger, Kanhai Foods Pvt. Ltd.
3)	Mr. Arpit Patel, QC Manager, Kanhai Foods Pvt. Ltd.
4)	Mr. Punamchandra Rathod, Dy. Environment Engineer, GCPC
5)	Mr. Abhi Patel, Asst. Environment Engineer, GCPC
6)	Ms. Disha Bhavsar, Asst. Environment Engineer, GCPC
7)	Ms. Tarjani Jani, Additional Asst. Environment Engineer, GCPC

D. List of Products –

Key products of the industry includes

a. Bread
b. Pav
c. Khari
d. Toast
e. Cake
f. Cookies
g. Puf
h. Cream Roll
i. Muffins
j. Kulcha
k. Chocolates

l. French Loaf
m. Samosa
n. Brownie etc.

E. Raw Material –

Key raw material for all the products above mentioned is Maida which is consumed around 8000 kg per day. Other raw material includes sugar, water, yeast, etc.)

F. Water Consumption –

Domestic Water Consumption per day – 4000 L

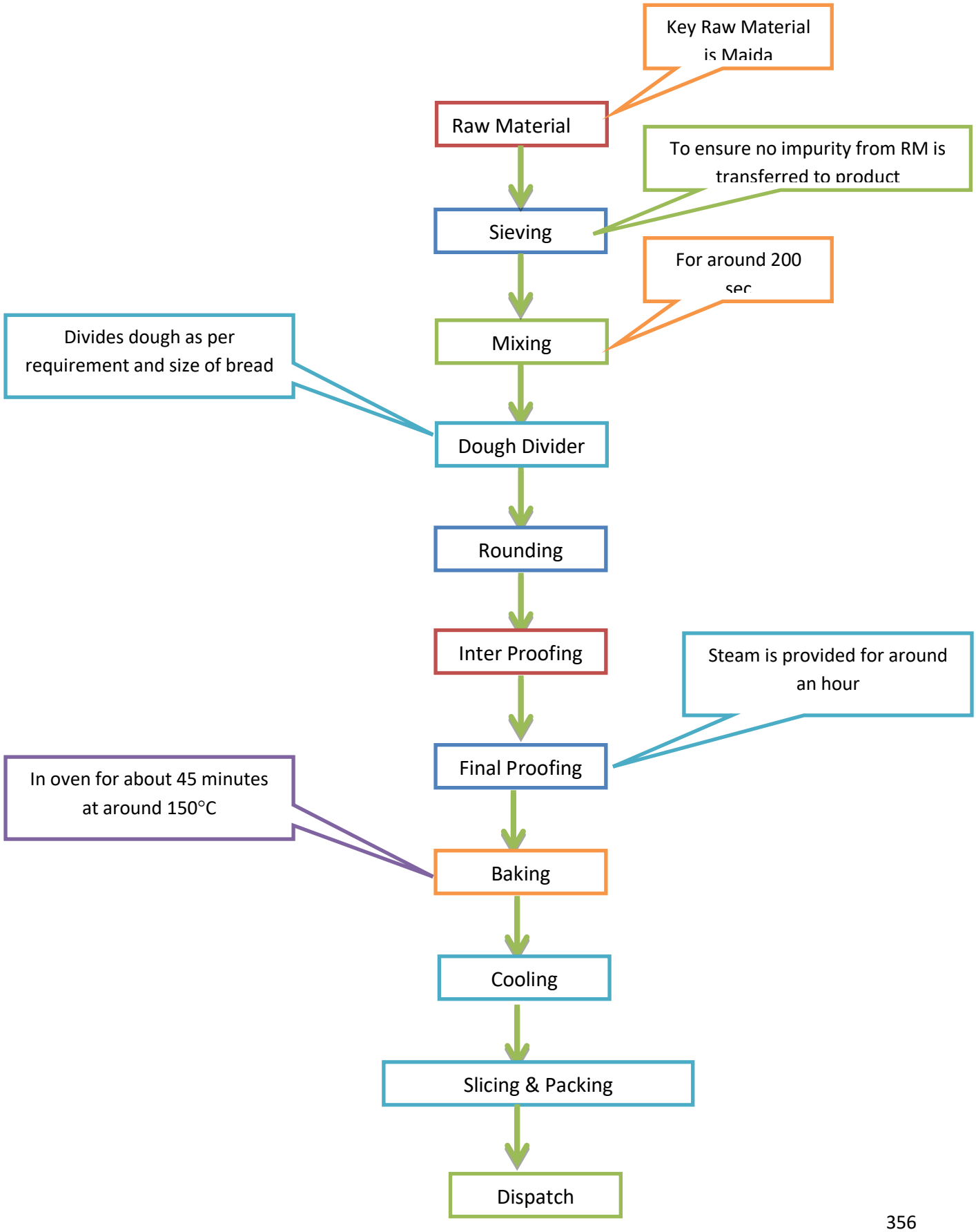
Process Water Consumption per day – 1000 L

G. Fuel Consumption –

- ✓ Gas is used as a fuel in the industry.
- ✓ Quantity of Gas used- 410 mmbtu per day

H. Process Flow Chart of Bread Manufacturing -

Manufacturing process of bread is as shown in the flow chart below-


Key Raw Material is Maida
Raw Material
To ensure no impurity from RM is transferred to product
Sieving
For around 200 sec
Mixing
Divides dough as per requirement and size of bread
Dough Divider
Rounding
Inter Proofing
Steam is provided for around an hour
Final Proofing
In oven for about 45 minutes at around 150°C
Baking
Cooling
Slicing & Packing
Dispatch

I. Process Description

- Raw material (maida) is taken in a vessel. The maida is sieved so as to ensure the purity of the product. It is weighed automatically so as to avoid human errors.

- Other raw materials such as sugar syrups, water and other ingredients are added as per the recipe.
- Mixing is done for about 200 sec to ensure proper mixing.
- The vessel is then taken to dough divider where dough are made automatically and weighed by workers to ensure the weight of the dough.
- Rounding of the dough is done along with some fresh maida.
- Final proofing for about an hour is done to ensure yeast generation. Basically, in final proofing steam is provided for yeast generation to provide yeast the required moist atmosphere.
- The dough is then baked for about 45 min at a temperature of 150°C.
- For around 2 hr., the dough is cooled with cooler.
- Slices are made and packing is done manually.

J. Observations

Sr. No.	Process	Observation
1.	**Raw Material Addition**	**Spillage of maida (the major raw material)**
2.	**Sieving**	**Absence of metal detectors**
3.	**Mixing**	**Unavailability of dustbins near the mixing area** **Spillage of valuable raw materials** **Covering the vessels containing raw materials such as sugar syrup, yeast etc.**
4.	**Dough Divider**	**Manual weighing of dough**

K. CP Options-

1. Storing of maida in silos so as to reduce the amount of spillage loss as well as to maintain a healthy environment for the workers.

Using steel silos to store instead of using warehouses provides many advantages:

- The first advantage lies in the occupied ground surface. This method requires less ground space, which is important if space is not available or if its cost is high like at ports.
- Another advantage lies in how easy it is to keep the optimum storage conditions for the grain, by controlling the temperature, insects, mould, birds, which in long term storage facilities could result in an important economic loss.
- The third advantage consists of lower costs than that incurred from using warehouses, which entails the automation of the grain transport equipment. The loading as well as the unloading can be completely automated using a SCADA system and at a lower cost.

- Another advantage is lower assembling costs, since this element is designed specifically for this purpose and weighs less than a storage facility.
- Finally, we have the fact that it is less expensive overall, and this is probably the main advantage in comparison to grain warehouses.

2. Proper rack to avoid spillage. This will also help to avoid surface contact of the raw material with the surface germs or microbes.

Handling of raw materials is important as it prevents cross contamination from the raw material to ready-to-eat food. Contaminants can be biological, chemical or physical hazards and once introduced into the raw material they can remain in the food throughout the preparation and processing procedure. Contamination can also be introduced into the food by raw material handlers.

3. Metal detectors in sieving area- They are most widely used throughout the industry to detect any trace element of metal that may have got into the food during the production process.

4. Automated weighing machines for dough dividing – This will eliminate the risk and chance of human errors. A system can be set up such that after little dough, one of the dough will be measured.

5. Atomization in mixing area to avoid qualitative mistakes - A fully automatic set up can be installed while adding yeast, sugar and other ingredients so as to attain accuracy.

6. Sanitizer at the entry of the plant- Disinfectants and Sanitizers commonly used in the Food Industry. The food production industry often use sanitizing and disinfecting chemicals to help kill bacteria and other microorganisms especially in food contact surfaces. As the workers are normally coming from low lying areas, they carry huge amount of microbes. Staff should always wash their hands thoroughly before preparing food

7. Apron for the workers-Ideally, work clothes should be long sleeved and light-cultured (to show the dirt) with no external pockets. It is also a good idea to wear a clean apron or disposable apron over work clothes. This prevents skin from touching food and helps to stop hairs, fibres and the contents of pockets (which can carry bacteria) getting into food.

8. Staff should not wear watches or jewellery when preparing food. Watches and jewellery can collect and spread dirt and harmful bacteria, or fall in the food.

9. Blowers and fans near the exit of maida unit so that the maida falls off as soon as the worker leaves from the maida unit.

10. To ensure high levels of hygiene, food preparation gloves are must on regular basis. There are three main kinds of food preparation gloves, the advantages of which are outlined below.
    - ✓ **Disposable Gloves** are gloves designed to be worn and removed frequently. These are usually made out of latex, nitrile, vinyl or polythene. Nitrile is the strongest, but will fall apart quickly when cut. Latex is the most common, but is unsuitable for those with latex allergies. Vinyl provides more dexterity, but is quite weak. Polythene is the cheapest, but is also the weakest and offers the least defense.
    - ✓ **Heat Resistant Gloves** are basically oven gloves; gloves designed to resist heat. These are used to handle hot items such as baking trays straight from the oven and are designed to protect you against burns.
    - ✓ **Chainmail Gloves** are gloves made from chainmail and offer an incredibly high level of cut protection, making them perfect for use during butchering and protecting against the high risk of injury it involves.

11. The presence of pests in any food handling premises is unacceptable. The risks posed by pests include:

• The spread of disease – pathogens are transferred from the gut or external surface of the pest

• Damage to property

• Contamination of work surfaces and foodstuffs

• Adverse public opinion and loss of reputation

• Prosecution and closure

The objective of the Pest Management Programme should be to prevent, as far as practicable, the introduction of pests onto the site and to reduce the conditions that may encourage their presence.

12. Doormat near exit area of storage of maida– To ensure that the workers moving out of the maida area does not carry maida all over the plant contaminating the foods.

13. Installation of Dustbins

14. As the unit is comparatively large, uniform for workers is suggested making it easy to recognize them in case of emergencies. It should be ensured that the uniform is full sleeved to reduce the exposure of workers engaged in various handling practices. To ensure occupational health and safety, it is mandatory to focus on design proper uniforms.

15. Mask-There are many processes and applications in the food Industries which may cause a variety of potential health risks to employees. Weighing, dispensing, mixing, cutting, cleaning transportation in- house and warehousing. It is important that employees are adequately protected against such hazards 3M have developed effective products to safeguard and protect against such hazards.

16. A whopping 15% of the accidents on the work floor are caused by slips and tricks, frequently resulting in prolonged back-, knee- and wrist pains. So the importance of

slip resistant food industry boots speaks for itself.Especially the grip and the profile of the sole are very important. Professionals in the food industry are wise enough to choose food industry boots that have a SRC certification for slip resistance, which means that the boots are tested for that property in an accredited test lab.

17. **Colour coding**is an efficient method to prevent cross-contamination between the different production units of a food factory. That's why it's always interesting to choose food industry boots that are available in different colours. Every production unit can have its specific colour and one cannot enter another production unit with the wrong coloured boots.

ENERGY ASSESSMENT REPORT

ENERGY SOURCE:

Power is available to the factory from nearby Electricity Board.

There are total 2 connection 100kw and 70kwn (Kanhai food &Bansivala food)

METERING SYSTEM:

The consumption of the power is being recorded at "Incoming meter" for Electricity board metering purpose.

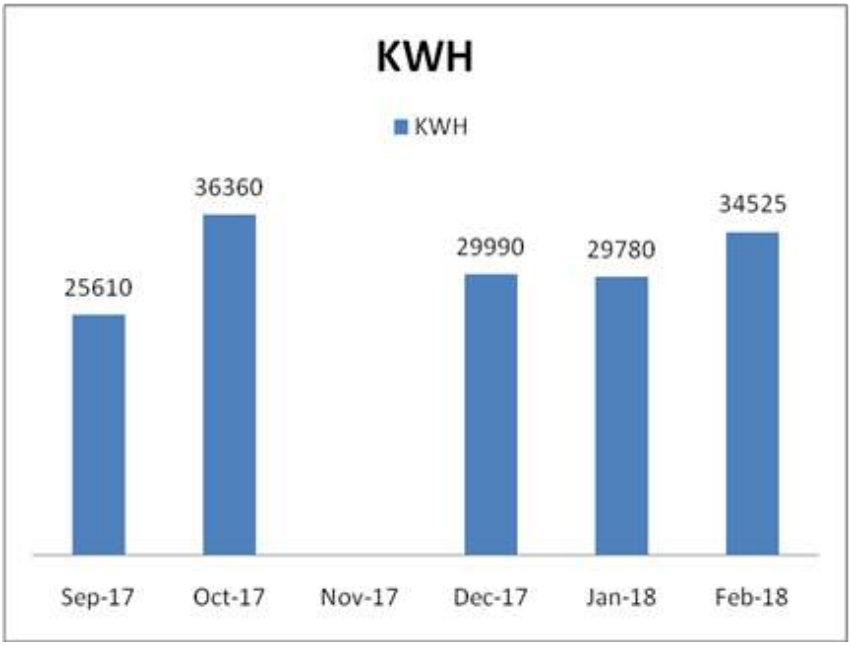
ENERGY END USE DETAILS:

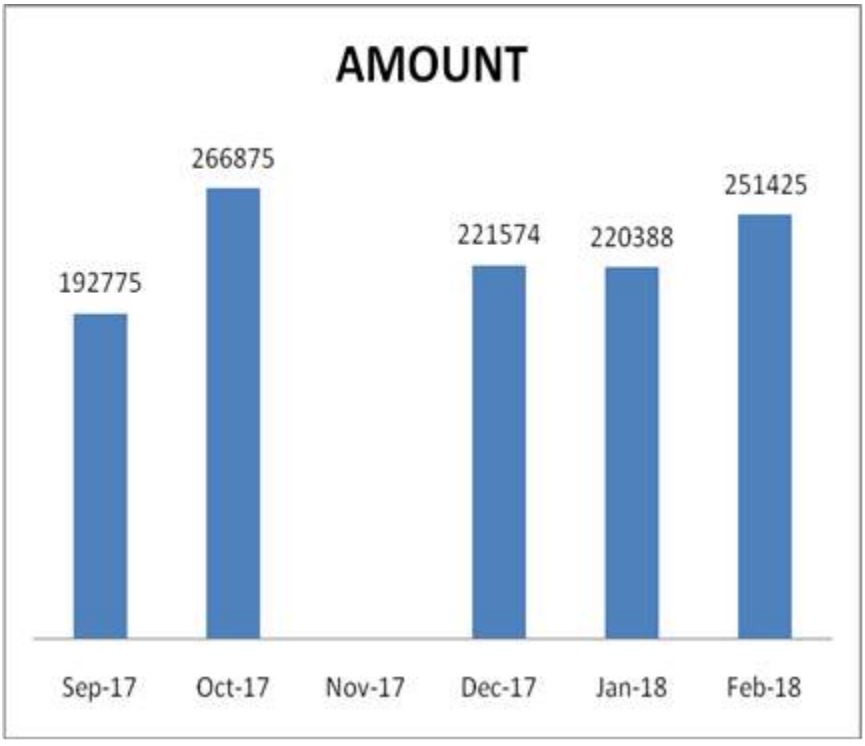
The incoming line carries 11 KV power supply from nearby substation in the customer's premises. Then after with the help LT panel, network is designed to match the application of premises.

To understand the power flow with in premises, we have Analysis the bills of the plant.

Billing Details

Months	KWH	C.D	85% Of C.D	P.F	Amount	Unit cost
Sep-17	25610	100	85		192775	7.53
Oct-17	36360	100	85		266875	7.34
Dec-17	29990	100	85		221574	7.39
Jan-18	29780	100	85		220388	7.40
Feb-18	34525	100	85		251425	7.28
Avg.	31253	100	85		230607.4	7.39
Avg. unit cost		**7.39**				


KWH
KWH
25610
36360
29990
29780
34525
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18

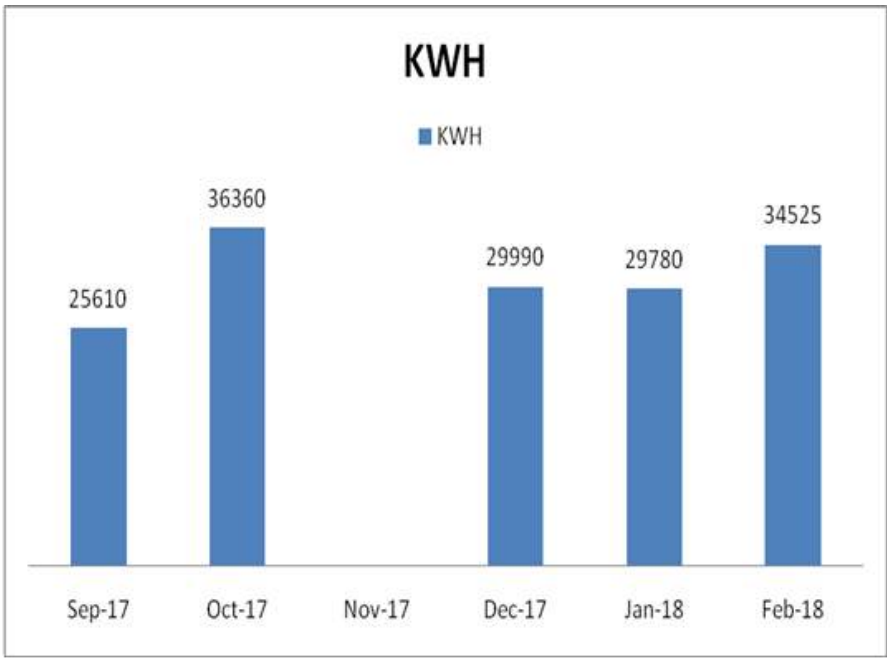

AMOUNT
192775
266875
221574
220388
251425
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18

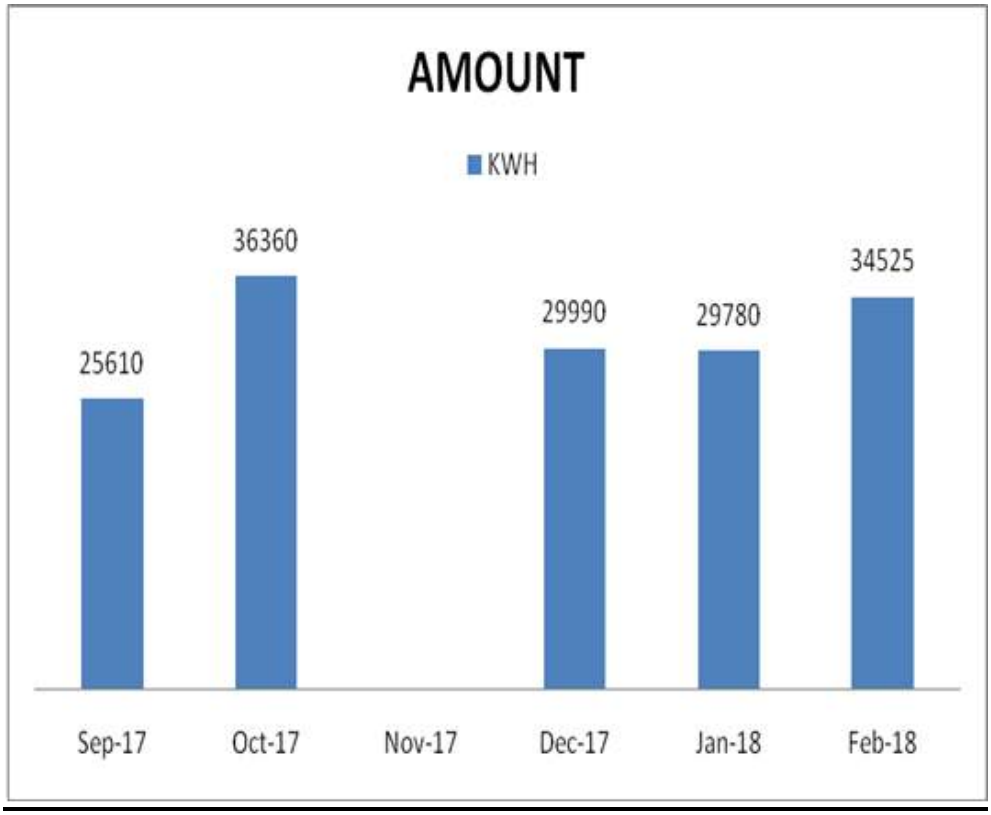
Analysis of Electricity Bill

- Units varies evenly in each Month accordingly production.
- Avg. units are 31253**/month.**
- Avg. Bill Amount is 230607**Rs./month.**
- Avg. unit rate is 7.39 (cost/unit)

Bansivala foods

Months	KWH	B.D	C.D	85% Of C.D	P.F	Amount	Unit cost
Sep-17	24480	60	70	59.5		180854	7.39
Oct-17	33490	60	70	59.5		244850	7.31
Dec-17	22660	60	70	59.5		167347	7.39
Jan-18	21899	60	70	59.5		160123	7.31
Feb-18	18360	85	100	85		138228	7.53
Avg.	24177.8	65	76	64.6		178280	7.38
Avg. unit cost			**7.38**				





Analysis of Electricity Bill

- Units varies evenly in each Month accordingly production.
- Avg. units are 24177**/month.**
- Avg. Bill Amount is 178280**Rs./month.**
- Avg. unit rate is 7.38 (cost/unit)

CAPACITORS:

APFC or Automatic Power Factor Control Panels are mainly used for the improvement of Power Factor. Power Factor can be explained as ratio of active power to apparent power and it is a key factor in measuring electrical consumption. Everyone knows that how costly electricity has become in present time. Therefore it becomes utmost important to cut down on electrical consumption for reducing expenditure.

APFC Panels can effectively and automatically manage quickly changing and scattered loads along with the retention of high Power Factor. We are renowned manufacturers of APFC Panels symbolized with quality and reliability.

The main features of APFC control panels are:

* Maintains high Power Factor constantly
* High efficiency
* In-built independent fuses
* Protection from excess power in the system.
* Prevents leading Power Factor in low load conditions
* Clearly marked buttons and indicators
* Minimizes harmonic current
* Easy to use
* Corrosion-resistant
* Long lasting
* Electrical insulation
* Protects electrical equipments

The advantages of PF improvement by capacitor addition

a) Reactive component of the network is reduced and so also the total current in the system from source end.

b) I2R power losses are reduced in the system because of reduction in current.

c) Voltage level at the load end is increased.

d) KVA loading on the source generators as also on the transformers and lines up to the capacitors reduces giving capacity relief. A higher factor can help in utilizing the full capacity of your electrical system.

	AMPERE				
KVAR	R	B	Y	LOCATION	CONDITION
10	11.6	12.3	11.8	BREAD PLANT	WORKING
10	12.2	11.8	10.1	BREAD PLANT	WORKING
10	11.8	12	12	BREAD PLANT	WORKING
5	5.8	5.9	5.9	BREAD PLANT	WORKING
15	15	15.5	15.3	BANSIVALA	WORKING
10	13.2	13.7	12.7	BANSIVALA	WORKING

Energy Conservation Analysis

Conversion of Delta to Star Connection

The induction motor with a percentage loading below 50% would operate at lower efficiency in delta mode. This efficiency at low loading can be improved by converting delta connection into star connection. The reported savings due to this conversion varies from around 3% to 10% because the rated output of motor drops to 1/3rd of delta configuration without affecting performance and the percent loading increases as compared to delta mode. This option does not require any capital investment and is one of the least cost options available for the energy conservation in induction motors.

Though the margin of saving due to this option is low, but as the plant installations normally have hundreds of motors, converting most of the under loaded motors in the plant would result into considerable savings.

Some motors operate on step loading and some on continuously variable load. The motors

which operate on step loading, techno-economic feasibility of Delta-Star Automatic Change-over Switch is to be worked out (e.g. a machine with an induction motor performs three operations in its operating cycle resulting into motor loading of 25%, 40% & 80%; in such cases permanent delta to star conversion is not possible. An automatic delta-star change-over controller could be installed there. It will connect the motor in star mode in 25% & 40% motor load operations; and in delta mode in 80% load operation). For the applications where starting torque requirement is high but otherwise the load is low, Automatic Delta to star Converter can give significant energy savings.

The motors which operate on continuously variable load, feasibility of installing Soft-Starter/Energy Saver is to be worked out.

This option of permanent Delta to Star conversion cannot be implemented for the loads where starting torque requirement is very high. While implementing permanent Delta to Star conversion, care should be taken to decrease the setting of over load protection relay to 2/3rd of the delta setting. The individual motor load study is shown in table.

POWER CONSUMPTION									
Sr. No.	**Equipment**	**Hp**	**V**	**A**	**KW**	**PF**	**KVA**	**KVAR**	**%Loading**
1	OVEN	10	408	9.57	4.9	0.73	6.76	4.66	55.8
2	EXHAUST FAN	1.5	415	8.9	1.8	0.29	6.4	6.14	136.7
3	HIGH SPEED MIXER	30	410	24.2	15.9	0.92	17.2	6.52	60.4
4	MOULDER	6	421	5.3	2.3	0.54	3.86	3.11	43.7
5	HIGH SPEED MIXER	30	416	25.1	17.5	0.97	18.1	4.56	66.5
6	OVEN (BREAD PLANT)	2	419	2.08	1.2	0.79	1.51	0.92	68.4
7	OVEN (PAW PLANT)	2	419	2.08	1.3	0.78	1.51	0.77	74.1

8	COMPRESSOR	10	416	11.8	7.99	0.94	8.5	2.91	91.0
9	COMPRESSOR	7.5	413	8.85	5.65	0.9	6.33	2.86	85.8
10	FINAL PROVERS	2	411	1.46	1	0.99	1.04	0.28	57.0
11	SPRIAL	5	396	3.41	1.27	0.53	2.34	1.96	28.9
12	BOREWELL	7.5	402	4.57	3.17	0.95	3.18	0.28	
13	KANAHAI PLANT(TOTAL)		411	127	75	0.83	90.4	50.48	
14	BREAD SECTION(TOTAL)		408	11.8	7.26	0.87	8.34	4.10	
15	TOSS SECTION(TOTAL)		386	21.7	14.1	0.96	14.5	3.41	
16	BANSIVALA PLANT(TOTAL)		423	97.5	68.9	0.96	71.4	18.85	

Conversion of Standard Motor with Energy Efficient Motor

As the efficiency of standard motor at less loading is low, its operating performance get reduces considerably. If the delta to star change over option is not suitable for improving the efficiency, replacement of existing standard motor with energy efficient motor could be very viable. The condition switch increases viability of installing energy efficient motors are as follows:

Standard motor operating at low load is replaced by a lower rated (HP) energy efficient motor

Operational hours are high (nearly continuous)

Standard motor is old, number of rewinding are more and frequent

The efficiency of the Energy efficient motor is almost constant at all percentage loadings. Due to its flat efficiency characteristics, it maintains efficiency almost constant at all loads. Normally, this option is suitable for the motors with rated capacity below 50 HP. The efficiencies of standard motors above 50 HP rating are almost similar to that of energy efficient motors. In many cases, though the initial cost of energy efficient motor is 15 to 20% higher than the standard motor, the simple payback period is less due to the savings.

Using Soft Starters & VFD

Soft starters, which have solid state electronic components, are used to control the input voltage according to the torque required by the driven equipment. Thus at almost all the load the motor operates at same efficiency and power factor.

This results in smooth starting of the motors by drawing lower current and thus avoiding the high instantaneous current normally encountered. Starting current and torque are directly related to the voltage applied when starting the motor. By reducing the line voltage when the motor is started, soft starter reduces the starting inrush current and eliminates the high impact or jerk starts that causes mechanical wear and damage. Soft starters are useful in cases where motors operate with high impact loads. Some of the applications are Cranes, Conveyors, Hoists, Compressors, etc.

Use of High Efficiency Motors

Following tables shows efficiencies of standard efficiency motors and energy efficiency motors.

Efficiencies of Standard Motors (415 V, AC, 4 Pole)

OUTPUT	**CURRENT**	**Efficiency at % shaft load**			**Power Factor at % shaft Load**		
KW	Amp	100%	75%	50%	100%	75%	50%
2.2	4.8	78	73	69	0.82	0.78	0.68
3.7	7.9	82	81	78	0.81	0.75	0.69
5.5	11	83	82	80	0.84	0.79	0.73
7.5	14.5	87	86	84	0.85	0.81	0.73
9.3	17.5	88	87	85	0.85	0.81	0.73
11	20	88	87	85	0.86	0.82	0.74
15	27	89	88	86	0.87	0.83	0.75
18.5	33	89	88	86	0.89	0.85	0.77
22	38	91	90	88	0.89	0.85	0.77

30	53	92	91	89	0.86	0.82	0.74
37	65	92.5	92	90	0.86	0.82	0.74
45	78	93	92	90	0.87	0.83	0.75

Efficiencies of Energy Efficient Motors (415 V, AC, 4 Pole) as per IEEMA

0.37	71	1.4	73
0.75	80	1.7	78
1.1	90S	2.9	83.8
2.2	100L	5.1	86.4
3.7	112M	8.1	88.3
5.5	132S	11.4	89.2
7.5	132M	15.4	90.1
11	160M	22	91
18.5	180M	36	92.2
30	200L	56	93.2
37	225S	69	93.6
45	225M	84.0	93.9
75	280S	134.0	94.7
90	280M	164.0	95.0

It may be noted that there is a 3% improvement in efficiency for an 11 KW motor if an energy efficient motor is selected. The efficiency improvement may be greater in the case of rewound motors, especially if the rewinding practices are poor. Heating of the stators above 350°C due to over-heating or use of open flame for extracting the old winding can lead to damage of the steel laminations of the core, leading to increased iron losses.

Energy efficient motors have lower slip and hence these operate at slightly higher speed. Hence in the case centrifugal / axial pumps and blowers, this may lead to slightly

higher flows and some increase in power (as power is apprx. Proportional to cube of the speed). Hence for these applications, use of energy efficient motors should be done carefully to ensure that the increased power requirement does not neutralize the reduction in motor losses. Measures like change in pulley ratios or trimming of impellers may have to be done to maintain the flow at existing levels.

General Selection criteria for Energy Efficient Motors:

- For purpose of motor for a new application, the payback period on the differential price is likely to be 1 to 2 years, depending on the rating, running hours and the tariff.
- For replacing an existing running motor, the payback period is likely to be about 2 to 3 years, after considering some salvage value for the existing motor.
- For replacing a burnt-out motor, which otherwise would have been rewound, the payback period is likely to be about 1.5 to 2.5 years.

COMPRESSOR

Sr.No.	Parameter	Comp-1
1	Motor HP	10
2	Motor RPM	
3	Motor KW	7.46
4	Measure current in load	11.8
5	Measure Current in unload	
6	Measure KW in load	7.99
7	Measure Kw in Unload	
8	Unit Cost Rs	7.39
9	load opt hrs/day	6

10	Opt. Hr/day unload	
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	116911
14	Total opt cost	116911
	Total opt cost	116925

Sr. No	**Parameter**	**Comp-1**
1	On pressure kg/cm2	8.5
2	Off Pressure Kg/cm2	10.5
3	Required Pressure setting kg/cm2	6
4	% power saving possible	30
5	Annual operating cost	116911
6	Annual monetary saving possible	35073.4
7	Total saving possible	35073.4
8	Investment	0

Sr.No.	**Parameter**	**Comp-2**
1	Motor HP	7.5
2	Motor RPM	
3	Motor KW	5.595

4	Measure current in load	8.85
5	Measure Current in unload	
6	Measure KW in load	5.65
7	Measure Kw in Unload	
8	Unit Cost Rs	7.38
9	load opt hrs/day	6
10	Opt. Hr/day unload	
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	82560.1
14	Total opt cost	82560.1
	Total opt cost	82560.1

Sr. No	**Parameter**	**Comp-2**
1	On pressure kg/cm2	5.8
2	Off Pressure Kg/cm2	9
3	Required Pressure setting kg/cm2	6
4	% power saving possible	30
5	Annual operating cost	82560.1
6	Annual monetary saving possible	24768
7	Total saving possible	24768
8	Investment	0

LIGHTINGS

INTRODUCTION:

Lighting accounts for less than 5% of the electricity consumption in most industries. In spite of the fact that lighting is a not major energy consuming center in the industry, considerable developments have taken place in this area, hence the scope for energy saving is significant. Light output is measured in lumens and the availability of light in a particular area is called luminance, which is measured in lumens/sq. m or lux. The illuminance level in Indian industry, with some rare exceptions, is generally much lower than the recommended levels. Some of the working planes and the required Lux levels are given below :

Type of interior or activity	**Min. illuminance required (lux)**
Offices	
General Offices	300
Deep-plan general offices	500
Computer workstation	300
Conference rooms and executive offices	300
Banks and building societies	
Counter and office area	300
Public area	200
Laundries	
Receiving, sorting, washing, drying, ironing,	
Dispatch, dry cleaning	200
Pressing, inspection	300
Places of public assembly	
Public room, villages halls and worship halls	200
Hotels	
Entrance halls	50
Reception, cashier’s andporters desks	200
Bars, coffee, base, dining rooms, grill rooms,	

Restaurants and lounges	125
Cloakrooms and baggage rooms	50
Libraries	
General	200
Counters	300
Book shelves	100
Reading rooms	200
Display and exhibit areas	
Exhibits insensitive to light	200
Workshops	300
Museums and art galleries	
Exhibits insensitive to light	200
Workshops	300
Sports facilities	
Multi purpose sports halls	300
Education	
Assemble halls general	200
Platform and stage	250
Lecture theatres	
General	200
Seminar rooms	300
Art rooms	300
General building areas	
Entrance	
Entrance halls, lobbies, and waiting rooms	150
Enquiry desks	300
Gatehouses	150
Circulation areas	

Lifts	50
Corridors, passageways and stairs	50
Escalators and elevators	100
Staff rooms	
Changing, locker and cleaners room, lavatories	50
Rest room	100
Staff Restaurants	
Canteens, cafeterias, dining rooms, mess room,	
Vegetable preparation, washing up areas	200
Food preparation and cooking	300
Food stores and cellars	100
Communications	
Switchboard rooms	200
Telephone apparatus rooms	100
Telex and post room	300
Car parks	
Covered parks	
Floors	10
Ramps an corners	30
Entrances an exits	50
Control booths	150
Outdoor parks	10

It may be noted that it is not always necessary to provide exactly the same illuminance level as given above. Since the issue of lighting is subjective, care should be taken to provide satisfactory lighting which will facilitate people to do their tasks, without straining their eyes.

Note : Highlights of T5 tube lights

- Upto 45% power savings and commensurate reduction in maximum demand

- Improvement in power factor from 0.5 to over 0.95 lagging at the source which earns you savings in the form of reactive power compensation.
- Reduction in KVA demand &reduction in distribution losses in the system.
- Improvement in overall power quality
- More lux output
- Flicker free starting & illumination

Following table mentions easy replacement of equivalent light source. This is for present replacement and future reference.

The replacement of the standard lamps with the energy efficient lamps is shown below:

Standard Light	Replace with
Incandescent(40 W)	CFL 9W
Incandescent(60 W)	CFL 11 W
Incandescent(100 W)	CFL 13 W
HPMV(125 W)	HPSV(70 W)
HPMV(250 W)	HPSV(100 W)
HPMV(400 W)	HPSV(250 W)

Type of lamps, their wattage and luminaries have to be selected considering the tasks being performed, the mounting height and the lamp efficacy. Apart from illuminance requirement another parameter which is important is color rendering, which is very much specific if the task involves distinguishing colors. Luminary's selection also may be done to maximize light availability in the work area. Use of mirror optics for fluorescent tube light fittings is one such example. Mirror optics is now being extensively used for office and commercial lighting.

Energy Efficient Technologies Applicability

Sr No	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment	Hours of Operation / day	Nos	Estd Potential for Savings (%) *Order of magnitude of savings margin indicated in brackets*
	Motors & Lighting					
1.	Soft Starter Energy Savers	Not App				*(3% of operating kW)*
2.	Variable Speed Drives (Hydraulic)	Not App				*(3-5% of operating kW)*
3.	Variable Speed Drives (Electronic)	Applicable	Drive	24	1	*(5-15% of operating kW)*
4.	PMDC for Variable Speed Applications	Not App				*(10-15% on average operating kW)*
5.	Maximum Demand Controller	Not App				*(Reduction of Rs./ kVA / month cost only in case of exceeding CMD)*
6.	Auto PF Controller	Not App				*(1% on Energy consumption in terms of distribution loss reduction)*

7.	Electronic Timers for Machineries and lighting	Not App				*(Direct Savings – Depe3nds on the excess hours of operation above prescribed time of operation)*
8.	Lighting Energy savers(Voltage Controller)	Not App				*(5-15% of operating kW)*
9.	Efficient lamps & Luminaries (T5, CFL, Metal Halide, HPSV)	Applicable				*(30-50% of existing lighting kW)*
10.	Transparent Roofing/ Sky lites	Not App				*(10-15% n average operating kW)*
	Cooling Towers					*()*
11.	Energy efficient water pumps	Not App				*Improvement in existing efficiency upto 75%)*
12.	FRP blades for cooling tower fans	Not App				*Being small fans reduction of 5-7% on existing fan kW drawl)*
13.	Efficient spray nozzles in cooling Towers	Not App				*(Improves spray in mist form and completely eliminates need for CT –ID fan)*

	Compressed Air systems					
14.	Auto ON/OFF Controller	Not App				*(3-5% savings in overall existing Kwh consumption)*
15.	Pressure Regulation & Reduction	Not App				*(8% reduction in motor input Kw for every 1 Kg/cm2 reduction in discharged pressure)*
16.	Leakage Reduction	Not App				*(Direct saving- leakage based on trial (or estimated) varies between 10-40%)*
17.	Tri-vector nozzles for compressed air cleaning application	Not App				*(15% reduction in compressed air end use for a particular cleaning application)*
18.	Variable Speed Drive	Not App				*(Depending on ON/OFF cycle compressor capacity can be optimized by speed reduction –by pully modification or VFD)*
	Thermal Energy Systems					
19.	Steam Traps Maintenance	Not App				*Identification of fault, leaking traps can save direct steam loss through them 910-40% on case to case basis)*

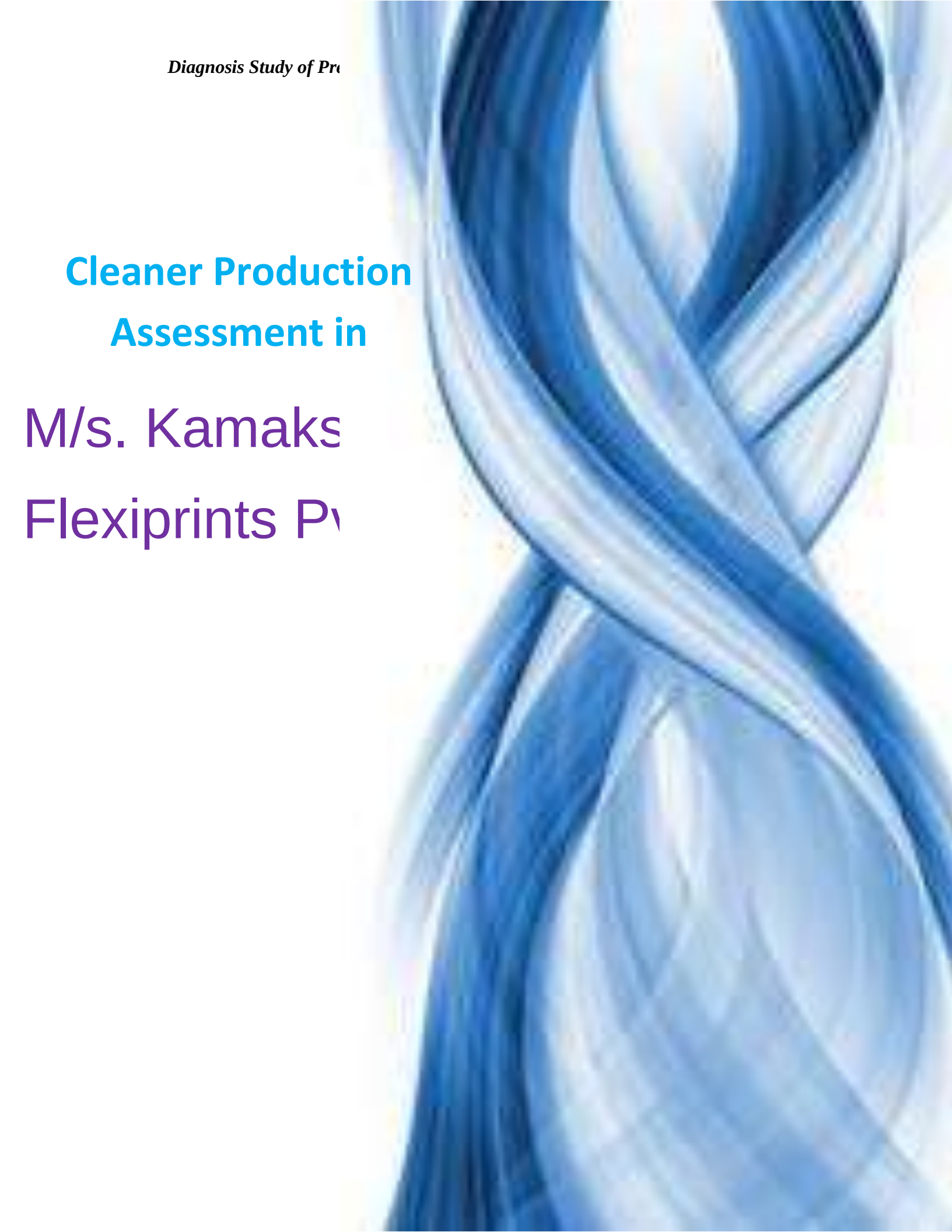
20.	WHR in Boiler system-flue gas for preheating boiler feed water and combustion air & waste steam	Not App				*(Flue gas temperature can be reduced from existing value to 170)C in case of oil fired and 13 C in case of coal fired. Minimum Delta T of flue gas should be 40-50C)*
21.	WHR in Furnace &Thermopacks	Not App				*(Flue gas temperature can be reduced from existing value to 170OC in case of oil fired and 13 C in case of coal fired. Here Delta T of flue gas will be huge and WHR potential also huge)*
22.	Condensate Recovery	Not App				*(upto 70% recovery is possible –this is direct savings as heat input to the boiler or Hot water requirement for the process)*
23.	Repairing of insulation – steam pipes, valves etc.	Not App				*(Cost of re-insulation is paid back in less than 3 months from the energy saving resulting from prevented heat loss)*
24.	Ceramics insulation for reducing heat losses from furnace surfaces	Not app				*(5-7 % of existing surface heat loss for temperature below 200 C and 10% for temperature between 300-500C)*
25.	Waste heat vapour Absorption chiller	Not App				*(Normal existing KW/TR (anywhere between1-2) will reduce to a meager 0.1 KW/TR feasible only if waste heat is used for VAR)*

EXECUTIVE SUMMARY

SR. NO.	SCHEMES	ANNUAL SAVING (IN Rs.)	ANNUAL KWH SAVING	INVESTMENT (in Rs.)	PAYBACK PERIOD
1	REDUCE AIR COMPRESSOR-1 PRESSURE SETTING	35079	4753.252033	0	0
2	REDUCE AIR COMPRESSOR-2 PRESSURE SETTING	24768	3356.097561	0	0
	Total	**59847**	8109	**0**	0.0

Cleaner Production Assessment in

M/s. Kamaks Flexiprints P



A. Company Introduction

M/s. Kamakshi Flexiprints Pvt. Ltd. has emerged as a leader in manufacturing quality flexible packaging. An ISO 9001 certified company with D & B credit rating, Kamakshi is a complete solution provider, partnering with customers in developing high quality, cost-effective and innovative packaging solutions.

M/s. Kamakshi Flexiprints Pvt. Ltd. delivers its customers highly evolved array of products.

Over the years, Kamakshi has carved a name for itself in providing special application packaging solutions to some of the best known brands and leaders in the FMCG, Food Grains, Salt, Agro Products, Pharmaceuticals, Retail Apparels and Courier Sector.

B. Methodology for Cleaner Production Assessment

Cleaner production with great vitality and buoyancy begins a new era of pollution prevention in the history of environmental protection and will become best approach for pollution control in the new century.

Various steps involved while carrying out CP Assessment are mentioned below.

Step 1: Getting Started

- Task 1: Make CP Team
- Task 2: List Process Steps
- Task 3: Identify Wasteful Processes

Selection of Cleaner Production Focus

Step 2: Analyze Process Steps

- Task 4: Process Flowchart
- Task 5: Material and Energy Balance
- Task 6: Assign Cost to Waste Streams
- Task 7: Identify Cause of Waste

Listing of process waste source

Step 3: Generating Cleaner Production Opportunity

- Task 8: Develop CP Opportunities
- Task 9: Select Workable Opportunity

Listing Of Cleaner Production Opportunities

Step 4: Selecting Cleaner Production Solution

- Task 10: Technical Feasibility
- Task 11: Economic Feasibility
- Task 12: Environmental Aspects
- Task 13: Select Solution

Listing Of Cleaner Production Solutions

Step 5: Implementing Cleaner Production Solution

- Task 14: Preparation For Implementation
- Task 15: Implement Cleaner Production Solution
- Task 16: Monitor and Evaluate Results

Successfully Implemented Cleaner Production

Step 6: Maintaining Cleaner Production

- Task 17: Sustain Cleaner Production Solution
- Task 18: Go to Step 1 - Task 3

Ongoing Cleaner Production Efforts

C. Cleaner Production Team

The Cleaner Production Team consists of the following members-

Sr. No.	Cleaner Production Team
1	Dr. Bharat Jain, Member Secretary, GCPC
2	Mr. Harish Goel, M/s. KamakshiFlexiprints Pvt. Ltd
3	Mr. Chirag Gajjar, Maintenance In charge, M/s. Kamakshi Flexiprints Pvt. Ltd
4	Mr. Punamchandra Rathod, Dy. Environment Engineer, GCPC
5	Mr. Abhi Patel, Asst. Environment Engineer, GCPC
6	Ms. Disha Bhavsar, Asst. Environment Engineer, GCPC
7	Ms. Tarjani Jani, Additional Asst. Environment Engineer, GCPC

D. List of Products –

- **Standup pouches**
- **Zipper pouches**
- **Gusseted Puches**
- **Centre Seal Pouches**
- **Vacuum Pouches**
- **Re-Usable Pouches**
- **3 Side Seal Pouches**
- **4 Side Seal Pouches**
- **Patch Handle Bags**
- **Spout Pouches**
- **Security Bags**
- **Poly film rolls**

E. Raw Material –

Key raw material for all the products above mentioned is mainly

- Polyester
- Ink of various colours
- Cylinder
- Granules of plastic

F. Water Consumption –

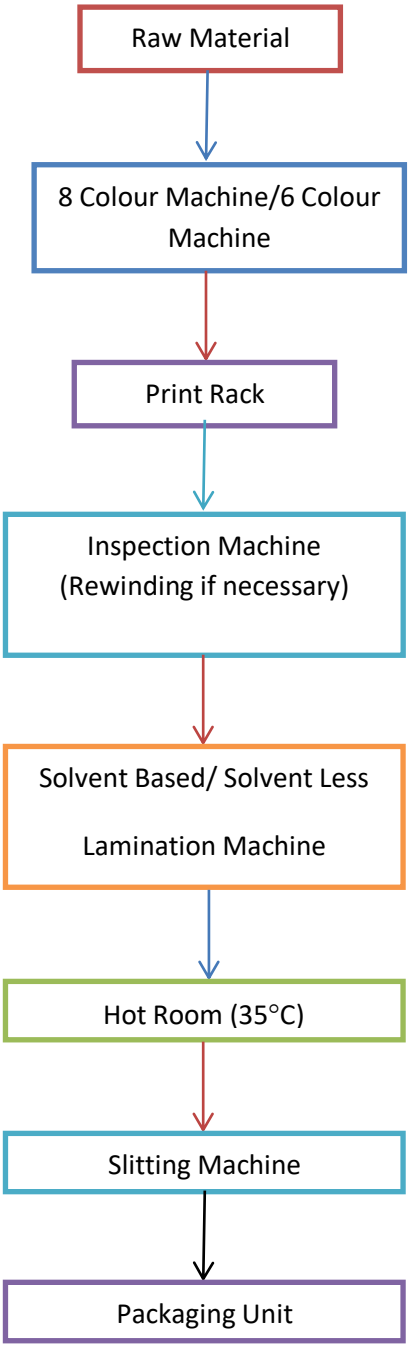
Domestic Water & Process Water Consumption per day – 5000 L

G. Fuel Consumption –

- ✓ Gas is used as a fuel in the industry.
- ✓ Quantity of Gas used- 250-300 SPM per day (taking monthly average)

H. Process Flow Chart -

Manufacturing process is as shown in the flow chart below-



I. Cleaner Production Options -

I. The hot room should be packed so as to prevent heat loses. After the solvent based or solvent less lamination the material is passed to the hot room for further heating and removing of moisture at 35 °C. To prevent heat loses and maintain the environment temperature it is necessary to close the room so as to provide proper heat to the material.

II. Changing the handling the practices of ink so as to prevent raw material loss.

III. Set up ink storage area for reusing the ink.

IV. Other general CP Options includes-

→ Installation of dustbins

→ Gloves by workers

→ Shoes for workers

→ Women empowerment

SUMMARY OF ENERGY SAVING OPPORTUNITIES

SR.NO	SCHEMES	ANNUAL SAVEING	ANNUAL KWH SAVEING	INVESTMENT	PAYBACK PERIOD
1	PROVIDE TEMPERATURE CONTROLLER IN HEATER ROOM	8242	1221	3000	4.3
2	PROVIDE TEMPERATURE CONTROLLER IN COOLING FAN	20859	3090.	3000	1.7
3	REPLACE CFL WITH ENERGY EFFICIENT TUBE LIGHT	11388	1687	10500	11
4	REDUCE AIR COMPRESSOR PRESSURE SETTING	41120	6091	0	0
5	Re use hot air of exhaust fan to hot air generator	2342000	0	50000	1
	Total	**2423609**	12090	**66500**	2.4

ELECTRICAL ENERGY MANAGEMENT & AUDITING

Electrical energy is one of the major inputs for the economic development of any country. Since the major sources of energy are depleting at a rate faster than the rate at which they are replenished it becomes imperative that the usage of energy is managed efficiently for sustainable development of the country.

Further since modern technology is so dependent on energy it is necessary that all precautions are maintained towards the safe usage of energy also. Unsafe practices could lead to both loss of life and property.

The most important tool for efficient and safe use of energy is "information", information on energy inputs, information on energy use, information on actual loaded capacity of equipment doing work etc. This brings us to the old adage "fore-warned is fore-armed". A systematic and scientific approach to the collection of information and presentation of the same is called auditing. This has taken the following shapes in due course of time depending on the depth to which the final audit is required:

- → Detailed Energy Audit
- → Electrical Safety Audit
- → Power Quality Audit

Subsequent to the collection of information a report is prepared bringing out the interpretations and recommendations to reduce the energy consumption of the facility. The Auditing program is a grand success only when the recommendations suggested and identified in the report shall be implemented on a time bound schedule and shall be closely monitored post implementation.

DETAILED ENERGY AUDIT

The preliminary step for decision making in the area of efficient energy management is an Energy Audit. Energy Audit attempts to identify all the energy streams in a facility and map the energy usage. It attempts to balance the energy inputs to the use thus identifying or eliminating wastage in the process. The Energy Audit has been defined as "the verification, monitoring and analysis of the use of energy including submission of technical report containing

recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

Thus the Detailed Energy Audit will bring out the efficiencies of all electrical energy consuming equipment based on the energy consumption. The Audit will bring out the inefficiencies in the power quality of the facility like harmonics, low power factor etc. It will bring out Energy Conservation measures (ECM) to efficiently use natural energy sources like solar energy for heating and lighting, geothermal energy for cooling etc existing energy consuming equipment. Finally it will bring out the necessary tools to be used for monitoring efficient use of energy post implementation of energy saving measures.For this purpose the information to be collected during the detailed energy audit includes:

- Energy consumption by type of energy, by department, by major energy consuming equipment
- Energy cost
- Process and material flow diagrams.
- Generation and distribution of site services (e.g. Compressed air, Thermic Fluid Heater)
- Sources of energy supply.
- Potential for fuel substitution, process modification etc.
- Energy management programs and energy training programs.
- Existing baseline information

SCOPE OF ENERGY AUDIT

For this purpose the following areas were studied in detail.

A. Electrical Distribution system
    1. Electricity distribution in various areas
    2. Study of reactive power management
    3. Options for power factor improvement
    4. Normal and emergency loads
    5. Cable loading
    6. Harmonics Study

7. Current unbalance study
8. Voltage unbalance study
9. Exploring Energy Conservation Options

B. Review of other Heavy Electrical Equipment
   1. Other Miscellaneous Loads
   2. Exploring Energy Conservation Options

C. Energy Monitoring and Accounting System
   1. Present system of metering
   2. Present system of recording and data Logging
   3. Present system of periodic performance analysis
   4. Recommendations of effective energy monitoring

ENERGY AUDIT LIMITATIONS

- The audits are based on Site inspection, detailed measurements & investigations only.
- The inspection involves visual observations also since in many cases it is not possible to dismantle equipment for measurements.
- Information obtained from the staff of the client is assumed to be true and accurate for the purposes.
- Reasonable assumptions with respect to name plate details of equipment have to be made in the absence of name plate and original design data.
- No inspection within ceilings or other concealed spaces can be undertaken.
- The audit does not address any issues with local Building laws and bye-laws.
- No allowance is made to liaise with any other external consultants or agencies for further information.
- Information obtained from other parties has been assumed true and accurate for the purposes.
- Measurements are done at the main control points assuming that all the points in the control circuit down the line are on.

MAJOR INSTRUMENTS USED FOR ENERGY AUDIT

- NANOVIP Plus Power Analyzer for measuring parameters like Voltage, Current, Power, Power factor, frequency etc. With Data logging
- Ultrasonic water flow meter
- Flue Gas Analyzer
- Digital temperature indicator for temperature measurement
- Infrared Temperature indicator for surface temperature measurement

Note: The entire Energy Audit instrument which was utilizes during the field work.

TECHNICAL SUPPLEMENT

SITE OVERVIEW

ENERGY SOURCE:

Power is available to the factory from nearby Electricity Board, substation via HT service at 11 KV. As a standby power supply

METERING SYSTEM:

The consumption of the power is being recorded at "Incoming meter" for Electricity board metering purpose.

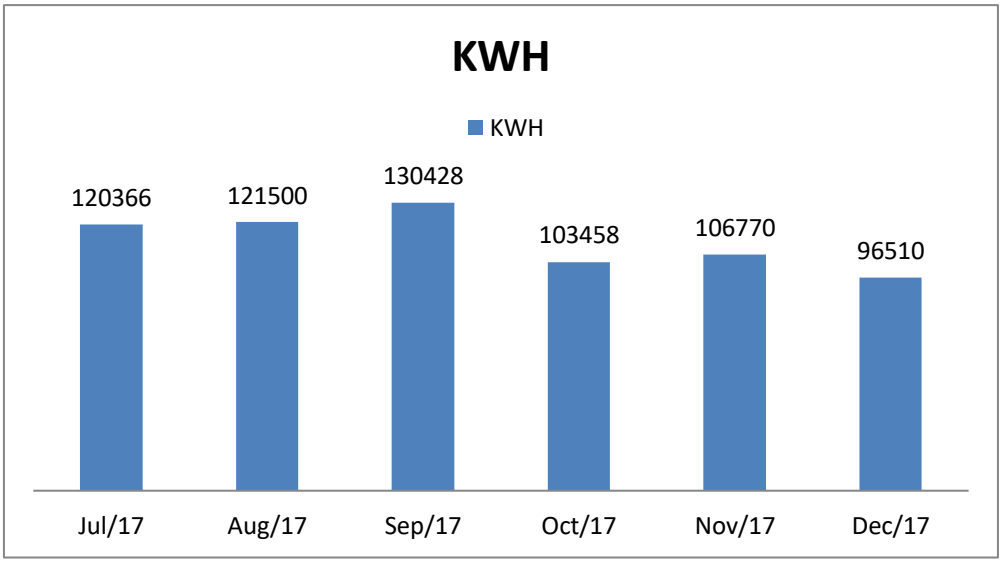
ENERGY END USE DETAILS:

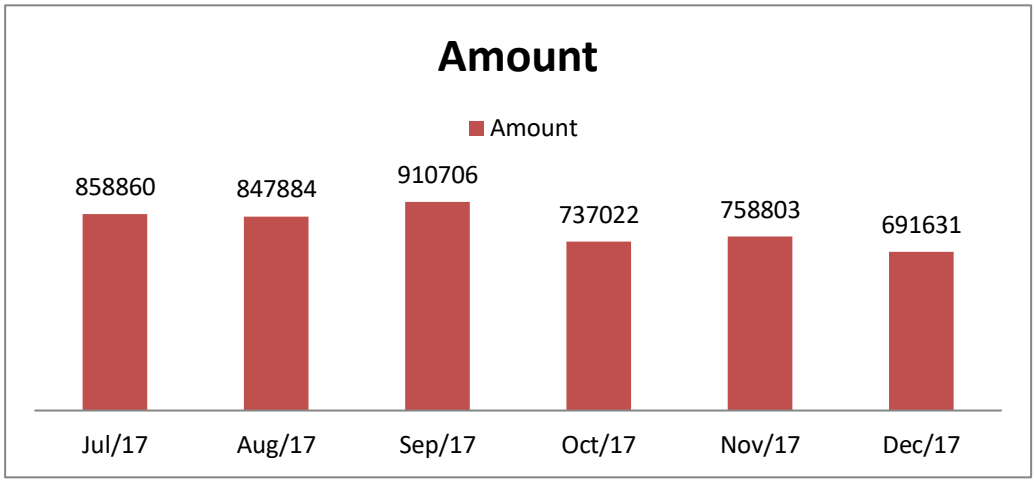
The incoming line carries 11 KV power supply from nearby substation in the customer's premises. Then after with the help LT panel, network is designed to match the application of premises.

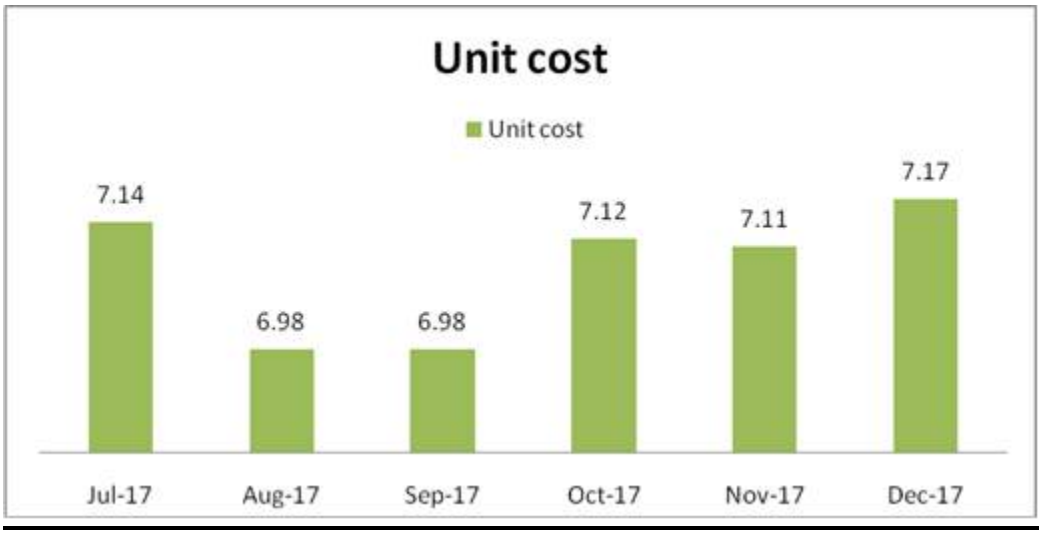
To understand the power flow with in premises, we have Analysis the bills of the plant.

Billing Details

Months	KWH	KVAR	B.D	C.D	85% Of C.D	P.F	Amount	Unit cost
Jul-17	120366	0	252	450	382.5	0.996	858860	7.14
Aug-17	121500	0	242	450	382.5	0.996	847884	6.98
Sep-17	130428	0	233	450	382.5	0.996	910706	6.98
Oct-17	103458	0	241	450	382.5	0.996	737022	7.12
Nov-17	106770	216	241	450	382.5	0.995	758803	7.11
Dec-17	96510	0	224	450	382.5	0.996	691631	7.17
Avg.	113172	36	239	450	382.5	0.996	800817.7	7.08
Avg. unit cost				**7.08**				







Analysis of Electricity Bill

- Units varies evenly in each Month accordingly production.
- Avg. units are 113172/**month.**
- Avg. Bill Amount is **Rs.800817/month.**
- Avg. unit rate 7.08 (cost/unit) is
- During site work and data analysis P.F is ok.

Suggestions

Power factor is very good. it is proposed to provide capacitor and maintain 1.00 PF. And avoid KVAR Charges in bil

CAPACITORS:

APFC or Automatic Power Factor Control Panels are mainly used for the improvement of Power Factor. Power Factor can be explained as ratio of active power to apparent power and it is a key factor in measuring electrical consumption. Everyone knows that how costly electricity has become in present time. Therefore it becomes utmost important to cut down on electrical consumption for reducing expenditure.

APFC Panels can effectively and automatically manage quickly changing and scattered loads along with the retention of high Power Factor. We are renowned manufacturers of APFC Panels symbolized with quality and reliability.

The main features of APFC control panels are:

* Maintains high Power Factor constantly
* High efficiency
* In-built independent fuses
* Protection from excess power in the system.
* Prevents leading Power Factor in low load conditions
* Clearly marked buttons and indicators
* Minimizes harmonic current
* Easy to use
* Corrosion-resistant
* Long lasting
* Electrical insulation
* Protects electrical equipments

The advantages of PF improvement by capacitor addition

a) Reactive component of the network is reduced and so also the total current in the system from source end.

b) I2R power losses are reduced in the system because of reduction in current.

c) Voltage level at the load end is increased.

d) KVA loading on the source generators as also on the transformers and lines up to the capacitors reduces giving capacity relief. A higher factor can help in utilizing the full capacity of your electrical system.

CAPACITORS

	AMPERE				
KVAR	R	Y	B	LOCATION	CONDITION
5	2.3	0	2.4	APFC PANNEL	Y PHASE NOT WORKING
10	0	0	0	APFC PANNEL	NOT WORKING
5	0	0	0	APFC PANNEL	NOT WORKING
20	27.4	27.6	28.1	APFC PANNEL	WORKING
10	8.4	8.7	0	APFC PANNEL	B PHASE NOT WORKING
25	33.2	32.6	33.1	APFC PANNEL	WORKING
25	33.3	33.2	33.4	APFC PANNEL	WORKING
25	31.3	32.4	31.6	APFC PANNEL	WORKING

ELECTRICAL MOTOR

Introduction:

Motor Losses

Power Losses in a motor are that portion of the input power that becomes heat rather than driving the load. These losses can be divided into two categories-

→ Fixed Loses
→ Variable Losses

Fixed losses are assumed to be constant at all conditions of motor loading from no load to full rated load. This is not exactly true, but it is nearly so, and little significant error is created by this approximation. Fixed losses include magnetic core losses (hysteresis and eddy current) and mechanical friction losses (bearing friction, brush friction, and air friction or windage).

Variable Losses are those that vary with the load on the motor and thus with the motor current. These losses increase as the load on the motor, and therefore the current drawn by the motor, increase. They are primarily the power lost in the resistance of the motor windings and are often called copper losses, or I2R losses.

Variable losses also include stray load losses such as minor variations in fixed losses with load and speed and other small miscellaneous losses. Variable losses are approximately proportional to the square of the motor load current.

Motor Efficiency is the output of the motor divided by the electrical input to the motor, usually expressed as a percentage .power or work output is input less losses.

$$\text{Efficiency (\%)} = \frac{\text{Watts output} \times 100}{\text{Watts input}}$$

$$= \frac{746 \times HP \times 100}{E \times I \times PF}$$

$$= \frac{\text{Input - Losses} \times 100}{\text{Input}}$$

Supply Details of Feeders

Type of Service	=	HLT
Name of source of power	=	UGVCL
Service No.	=	GEB08700

Substation & Transformer Details

Make	URJA TECHNIQUES
Capacity of T/F	500 kva
Voltage HT	11000
LT	433
HU CURRENT	26.24A
LV CURRENT	666.7A

Transformer Losses & Efficiency

The efficiency varies anywhere between 96 to 99%. The efficiency of the transformer not only depends on the design, but also, on the effective operating load. Normally best efficiency loading of the transformer is around 50% of the rated capacity.

From above analysis we observe that transformer is loaded sufficiently and performance is as per the norms.

Transformer losses consist of two parts: No load loss (Core loss) and load loss (Copper loss)

No load loss is the power consumed to sustain the magnetic field in the transformer's steel core. Core loss occurs whenever the transformer is energized; core loss does not vary with load.

Load loss (Copper) is associated with full load current flow in the transformer windings. Copper loss is power lost in the primary and secondary windings of a transformer due to the ohmic resistance. Copper loss varies with the square of load current ($P=I^2R$)

Whenever two transformers are operating in parallel, both should be technically identical in all aspects and more importantly should have the same impedance level. This will minimize the circulating current between transformers.

Energy Conservation Analysis

Conversion of Delta to Star Connection

The induction motor with a percentage loading below 50% would operate at lower efficiency in delta mode. This efficiency at low loading can be improved by converting delta connection into star connection. The reported savings due to this conversion varies from around 3% to 10% because the rated output of motor drops to $1/3^{rd}$ of delta configuration without affecting performance and the percent loading increases as compared to delta mode. This option does not require any capital investment and is one of the least cost options available for the energy conservation in induction motors.

Though the margin of saving due to this option is low, but as the plant installations normally have hundreds of motors, converting most of the under loaded motors in the plant would result into considerable savings.

Some motors operate on step loading and some on continuously variable load. The motors which operate on step loading, techno-economic feasibility of Delta-Star Automatic Change-over Switch is to be worked out (e.g. a machine with an induction motor performs three operations in its operating cycle resulting into motor loading of 25%, 40% & 80%; in such cases permanent delta to star conversion is not possible. An automatic delta-star change-over controller could be installed there. It will connect the motor in star mode in 25% & 40% motor load operations; and in delta mode in 80% load operation). For the applications where starting torque requirement is high but otherwise the load is low, Automatic Delta to star Converter can give significant energy savings.

The motors which operate on continuously variable load, feasibility of installing Soft-Starter/Energy Saver is to be worked out.

POWER CONSUMPTION											
Sr. No.	**Equipment**	**Hp**	**V**	**A**	**KW**	**PF**	**KVA**	**KVAR**	**%Loading**	**DRIVE**	**HZ**
1	8 COLOUR ROTOGRAVURE	20	404	11.4	6.54	0.82	7.98	4.57	37.3	YES	50
2	6 COLOUR ROTOGRAVURE	20	403	9.9	6.6	0.96	6.91	2.05	37.6	YES	50
3	SOLVENT LESS LAMINATION	20	407	24.7	17.2	0.99	17.4	2.71	98.0	YES	35
4	THREE LAYER BLOWN FILM	150	406	154	107	0.99	108	16.68	81.3	YES	50
5	INSPECTION MACHINE	6	403	1.46	0.96	0.94	1.02	0.34	18.2	YES	
6	SLITTER REWINDER	10	404	0.52	0.34	0.91	0.36	0.13	3.9	YES	
7	COMPRESSOR	30	402	29.5	20.1	0.98	20.5	4.23	76.3	YES	48
8	CENTRE SEAQL POUCH MAKING		409	10.4	7.2	0.98	7.37	1.56		YES	30
9	POUCH MAKING MACHINE	7.5	403	10.6	7.1	0.98	7.4	2.08	107.9	YES	
10	COOLING TOWER FAN	1	411	1.83	0.93	0.72	1.3	0.91	106.0	NO	
11	COOLING TOWER PUMP	3	410	4.47	3.05	0.96	3.17	0.88	115.8	NO	
12	INPUT BLOWER	10	410	11.6	7.6	0.92	8.24	3.18	86.6	YES	50
13	EXHAUST BLOWER	15	410	18.1	12.1	0.94	12.9	4.34	91.9	YES	50
14	HOT ROOM HEATER		401	6.08	4.12	0.98	4.22	0.93		NO	
15	HOT ROOM BLOWER		400	1.13	0.38	0.49	0.78	0.68		NO	
16	TOTAL PLANT		402	262	182	1	182	12.39			

This option of permanent Delta to Star conversion cannot be implemented for the loads where starting torque requirement is very high. While implementing permanent Delta to Star conversion, care should be taken to decrease the setting of over load protection relay to 2/3rd of the delta setting. The individual motor load study is shown in table

Conversion of Standard Motor with Energy Efficient Motor

As the efficiency of standard motor at less loading is low, its operating performance get reduces considerably. If the delta to star change over option is not suitable for improving the

efficiency, replacement of existing standard motor with energy efficient motor could be very viable. The condition switch increases viability of installing energy efficient motors are as follows :

Standard motor operating at low load is replaced by a lower rated (HP) energy efficient motor

Operational hours are high (nearly continuous)

Standard motor is old, number of rewinding are more and frequent

The efficiency of the Energy efficient motor is almost constant at all percentage loadings. Due to its flat efficiency characteristics, it maintains efficiency almost constant at all loads. Normally, this option is suitable for the motors with rated capacity below 50 HP. The efficiencies of standard motors above 50 HP rating are almost similar to that of energy efficient motors. In many cases, though the initial cost of energy efficient motor is 15 to 20% higher than the standard motor, the simple payback period is less due to the savings.

Using Soft Starters & VFD

Soft starters, which have solid state electronic components, are used to control the input voltage according to the torque required by the driven equipment. Thus at almost all the load the motor operates at same efficiency and power factor.

This results in smooth starting of the motors by drawing lower current and thus avoiding the high instantaneous current normally encountered. Starting current and torque are directly related to the voltage applied when starting the motor. By reducing the line voltage when the motor is started, soft starter reduces the starting inrush current and eliminates the high impact or jerk starts that causes mechanical wear and damage. Soft starters are useful in cases where motors operate with high impact loads. Some of the applications are Cranes, Conveyors, Hoists, Compressors, etc.

Use of High Efficiency Motors

Following tables shows efficiencies of standard efficiency motors and energy efficiency motors.

Efficiencies of Standard Motors (415 V, AC, 4 Pole)

OUTPUT	**CURRENT**	**Efficiency at % shaft load**			**Power Factor at % shaft Load**		
KW	Amp	100%	75%	50%	100%	75%	50%
2.2	4.8	78	73	69	0.82	0.78	0.68
3.7	7.9	82	81	78	0.81	0.75	0.69
5.5	11	83	82	80	0.84	0.79	0.73
7.5	14.5	87	86	84	0.85	0.81	0.73
9.3	17.5	88	87	85	0.85	0.81	0.73
11	20	88	87	85	0.86	0.82	0.74
15	27	89	88	86	0.87	0.83	0.75
18.5	33	89	88	86	0.89	0.85	0.77
22	38	91	90	88	0.89	0.85	0.77
30	53	92	91	89	0.86	0.82	0.74
37	65	92.5	92	90	0.86	0.82	0.74
45	78	93	92	90	0.87	0.83	0.75

Efficiencies of Energy Efficient Motors (415 V, AC, 4 Pole) as per IEEMA

0.37	71	1.4	73
0.75	80	1.7	78
1.1	90S	2.9	83.8
2.2	100L	5.1	86.4
3.7	112M	8.1	88.3
5.5	132S	11.4	89.2
7.5	132M	15.4	90.1

11	160M	22	91
18.5	180M	36	92.2
30	200L	56	93.2
37	225S	69	93.6
45	225M	84.0	93.9
75	280S	134.0	94.7
90	280M	164.0	95.0

It may be noted that there is a 3% improvement in efficiency for an 11 KW motor if an energy efficient motor is selected. The efficiency improvement may be greater in the case of rewound motors, especially if the rewinding practices are poor. Heating of the stators above 350°C due to over-heating or use of open flame for extracting the old winding can lead to damage of the steel laminations of the core, leading to increased iron losses.

Energy efficient motors have lower slip and hence these operate at slightly higher speed. Hence in the case centrifugal / axial pumps and blowers, this may lead to slightly higher flows and some increase in power (as power is apprx. Proportional to cube of the speed). Hence for these applications, use of energy efficient motors should be done carefully to ensure that the increased power requirement does not neutralize the reduction in motor losses. Measures like change in pulley ratios or trimming of impellers may have to be done to maintain the flow at existing levels.

General Selection criteria for Energy Efficient Motors:

- For purpose of motor for a new application, the payback period on the differential price is likely to be 1 to 2 years, depending on the rating, running hours and the tariff.
- For replacing an existing running motor, the payback period is likely to be about 2 to 3 years, after considering some salvage value for the existing motor.
- For replacing a burnt-out motor, which otherwise would have been rewound, the payback period is likely to be about 1.5 to 2.5 years.

Compressor

Sr.No.	Parameter	Comp-1
1	Motor HP	30
2	Motor RPM	
3	Motor KW	22.38
4	Measure current in load	29.5
5	Measure Current in unload	17.9
6	Measure KW in load	20
7	Measure Kw in Unload	12.2
8	Unit Cost Rs	7.08
9	load opt hrs/day	22
10	Opt. Hr/day unload	2
11	Annual Opt day	330
12	Annual Unload opt cost	57008.16
13	Annual Load opt cost	1028016
14	Total opt cost	1085024
	Total opt cost	1085024

Sr. No	Parameter	Comp-1
1	On pressure kg/cm2	7
2	Off Pressure Kg/cm2	7.5
3	Required Pressure setting kg/cm2	7

4	% power saving possible	4
5	Annual operating cost	1028016
6	Annual monetary saving possible	41120.64
7	Total saving possible	41120.64
8	Investment	0

If we reduce pressure setting from 7.5 kg to 7.0 kg around 4% saveing can be achived.

Approx. 40000 rs per annum can be saved.

LIGHTINGS

INTRODUCTION:

Lighting accounts for less than 5% of the electricity consumption in most industries. In spite of the fact that lighting is a not major energy consuming center in the industry, considerable developments have taken place in this area, hence the scope for energy saving is significant. Light output is measured in lumens and the availability of light in a particular area is called luminance, which is measured in lumens/sq. m or lux. The illuminance level in Indian industry, with some rare exceptions, is generally much lower than the recommended levels. Some of the working planes and the required Lux levels are given below:

Type of interior or activity	**Min. illuminance required (lux)**
Offices	
General Offices	300
Deep-plan general offices	500
Computer workstation	300
Conference rooms and executive offices	300
Banks and building societies	
Counter and office area	300
Public area	200
Laundries	
Receiving, sorting, washing, drying, ironing,	
Dispatch, dry cleaning	200
Pressing, inspection	300
Places of public assembly	
Public room, villages halls and worship halls	200
Hotels	
Entrance halls	50

Reception, cashier's andporters desks	200
Bars, coffee, base, dining rooms, grill rooms,	
Restaurants and lounges	125
Cloakrooms and baggage rooms	50
Libraries	
General	200
Counters	300
Book shelves	100
Reading rooms	200
Display and exhibit areas	
Exhibits insensitive to light	200
Workshops	300
Museums and art galleries	
Exhibits insensitive to light	200
Workshops	300
Sports facilities	
Multi purpose sports halls	300
Education	
Assemble halls general	200
Platform and stage	250
Lecture theatres	
General	200
Seminar rooms	300
Art rooms	300
General building areas	
Entrance	
Entrance halls, lobbies, and waiting rooms	150
Enquiry desks	300

Gatehouses	150
Circulation areas	
Lifts	50
Corridors, passageways and stairs	50
Escalators and elevators	100
Staff rooms	
Changing, locker and cleaners room, lavatories	50
Rest room	100
Staff Restaurants	
Canteens, cafeterias, dining rooms, mess room,	
Vegetable preparation, washing up areas	200
Food preparation and cooking	300
Food stores and cellars	100
Communications	
Switchboard rooms	200
Telephone apparatus rooms	100
Telex and post room	300
Car parks	
Covered parks	
Floors	10
Ramps an corners	30
Entrances an exits	50
Control booths	150
Outdoor parks	10

It may be noted that it is not always necessary to provide exactly the same illuminance level as given above. Since the issue of lighting is subjective, care should be taken to provide satisfactory lighting which will facilitate people to do their tasks,

without straining their eyes.

Cost benefit Analysis :

Sr. No	Parameter	% Saving
1	% power saving	50
2	Total tube light	30
3	Consumption of tubelinght	0.054
4	Unit cost Rs	6.75
5	Annual opt cost	86605.2
6	Annual saving Rs	43302.6
7	Cost of one tube light	350
8	Total investment Rs	10500
9	Simple payback period	2.9

Note: Highlights of T5 tube lights

- Upto 45% power savings and commensurate reduction in maximum demand
- Improvement in power factor from 0.5 to over 0.95 lagging at the source which earns you savings in the form of reactive power compensation.
- Reduction in KVA demand &reduction in distribution losses in the system.
- Improvement in overall power quality
- More lux output
- Flicker free starting & illumination

Following table mentions easy replacement of equivalent light source. This is for present replacement and future reference.

The replacement of the standard lamps with the energy efficient lamps is shown below:

Standard Light Replace with

Incandescent(40 W)	CFL 9W
Incandescent(60 W)	CFL 11 W
Incandescent(100 W)	CFL 13 W
HPMV(125 W)	HPSV(70 W)
HPMV(250 W)	HPSV(100 W)
HPMV(400 W)	HPSV(250 W)

Type of lamps, their wattage and luminaries have to be selected considering the tasks being performed, the mounting height and the lamp efficacy. Apart from illuminance requirement another parameter which is important is color rendering, which is very much specific if the task involves distinguishing colors. Luminary's selection also may be done to maximize light availability in the work area. Use of mirror optics for fluorescent tube light fittings is one such example. Mirror optics is now being extensively used for office and commercial lighting.

PROVIDE TEMPERATURE CONTROLLER IN HEATER ROOM.

In this plant there is a hot room, where the final product are kept. A heater blower is kept to maintain the temperature of the room. But the temperature is not maintained properly because the room is in open condition and there is no temperature controller to maintain the temperature and to save the power. Temperature controller is a thing where we can set the required temperature and when the required temperature is achived the blower goes in cut off position. By this mean the power of the heater can be saved.At the site visit when we wear analyzing the data we found the temperature of the hot room and the plant area are having the same temperature. So, there was no any effect of the heater in the hot room. So, in this condition we suggest to install temperature controller in hot room. By installing the temperature controller the saving details are as below.

Parameter	Value
Power consumption of heater KW	0.98
Power consumption of blower KW	0.49

Total power of blower KW	1.47
% of saving after installing temp. controller	10
Electricity cost per unit Rs.	7.08
Working hours per day	24
Total operation day	330
Total saving in monitory terms(RS.)	8242.8192
Investment of temperature controller	3000
Simple payback period	4.3674378

Provide temperature in cooling tower fans.

In this plant there is a cooling tower. where the cooling water is used to cool the extruder. The cooling tower fan of 1 HP is running continuously 24 hours. So, we suggest to install a temperature controller so that according to temperature when is set the fan will operate automatically. By which the energy of the fan can be saved the saving potential is mentioned below.

SN	Parameter	Value
1	Power consumption of Cooling fan KW	0.93
2	% of saving after installing temp. controller	40
3	Electricity cost per unit Rs.	7.08
4	Working hours per day	24
5	Total operation day	330
6	Total saving in monitory terms(RS.)	20859
7	Investment of temperature controller	3000

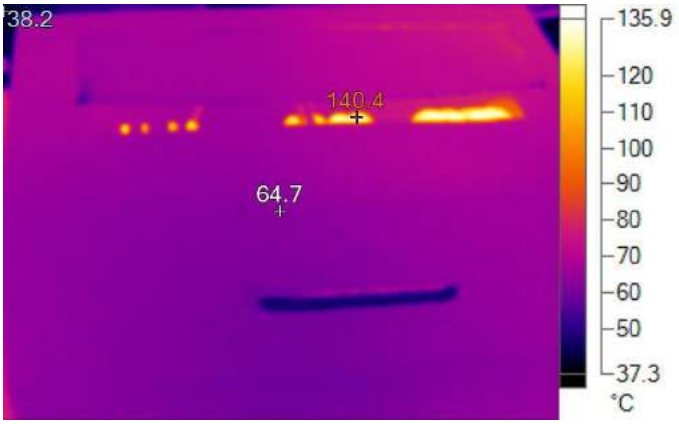
8	Simple payback period	1.7258

Reuse exhaust gas as feed to hot air generator.

In this plant there are to hot air generator. This hot air is used on printing m/c. after use this hot air was exhaust by help of fan to the atmosphere. We measured this exhaust gas temp is approximately 65 C. and hot air generator temp is 120 C. so we suggested to recover this exhaust gas and reuse in hot air generator. This will save fuel in hot air generator saving and economics are given below.

SN	Parameter	Value
1	Power consumption of heater KW	0.98
2	Temperature of the fresh air	35
3	Temperature of the exhaust air	65
4	Flow rate of the air m3/s	5.35
5	Flow rate of the air kg/s	6.55375
6	Heat saving per kcal	47.187
7	Heat saving per kcal/hr	169873.2
8	Total heat saving per day 50% saving is achievable	2038478.4
9	Unit cost of gas	35
10	GCV value of gas	10050
11	Total fuel saving per day	202.83
12	Total operation day	330
13	Total saving in monitory terms(RS.)	2342729

THERMOGRAPHY



INNER EXTRUDER
1/20/2018 1:19:15 PM

Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	64.7°C	0.95	18.0°C
Hot	140.4°C	0.95	18.0°C
Cold	38.2°C	0.95	18.0°C

Image Info

File name	INNER EXTRUDER
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
Average Temperature	67.1°C
Image Range	38.2°C to 140.4°C
IR Sensor Size	160 x 120
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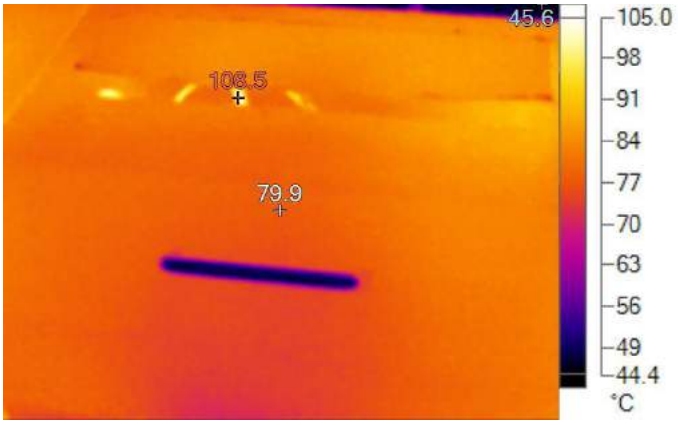

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Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	79.9°C	0.95	18.0°C
Hot	108.5°C	0.95	18.0°C
Cold	45.6°C	0.95	18.0°C

Image Info

File name	INNER EXTRUDER
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
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Image Range	45.6°C to 108.5°C
IR Sensor Size	160 x 120
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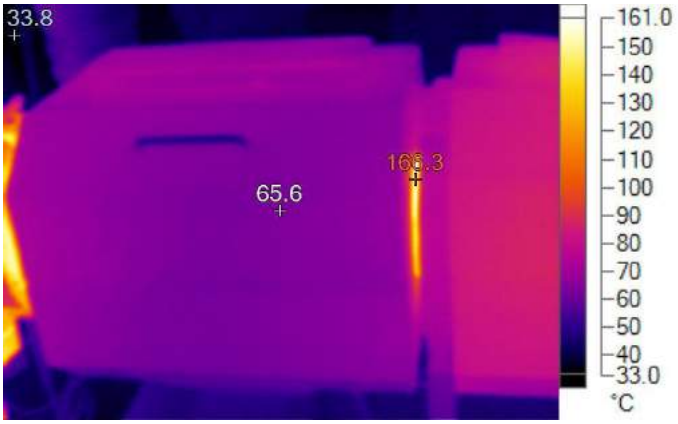

OUTER EXTRUDER
1/20/2018 1:20:30 PM

Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	65.6°C	0.95	18.0°C
Hot	166.3°C	0.95	18.0°C
Cold	33.8°C	0.95	18.0°C

Image Info

File name	OUTER EXTRUDER
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
Average Temperature	67.5°C
Image Range	33.8°C to 166.3°C
IR Sensor Size	160 x 120
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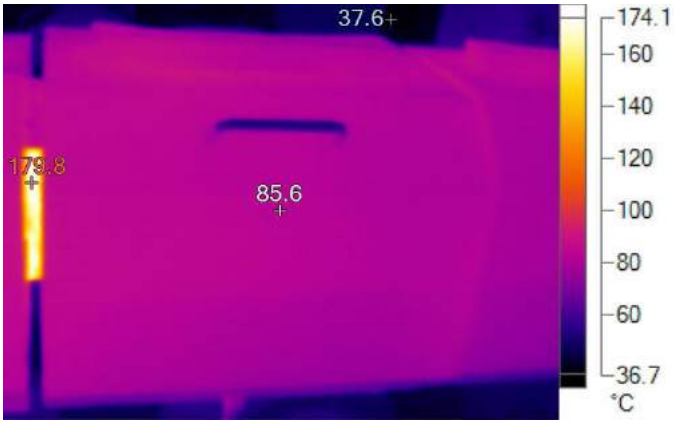

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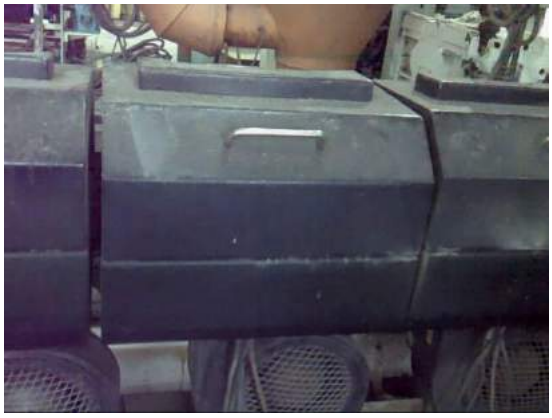

Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	85.6°C	0.95	18.0°C
Hot	179.8°C	0.95	18.0°C
Cold	37.6°C	0.95	18.0°C

Image Info

File name	OUTER EXTRUDER
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
Average Temperature	79.1°C
Image Range	37.6°C to 179.8°C
IR Sensor Size	160 x 120
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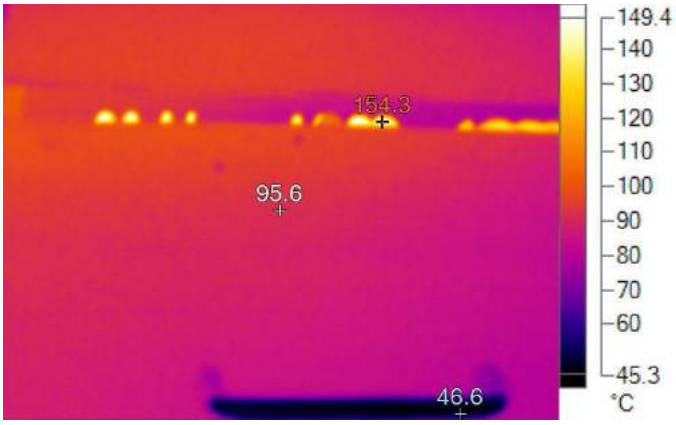

MIDDLE EXTRUDER
1/20/2018 1:20:43 PM

Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	95.6°C	0.95	18.0°C
Hot	154.3°C	0.95	18.0°C
Cold	46.6°C	0.95	18.0°C

Image Info

File name	MIDDLE EXTRUDER
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
Average Temperature	92.4°C
Image Range	46.6°C to 154.3°C
IR Sensor Size	160 x 120
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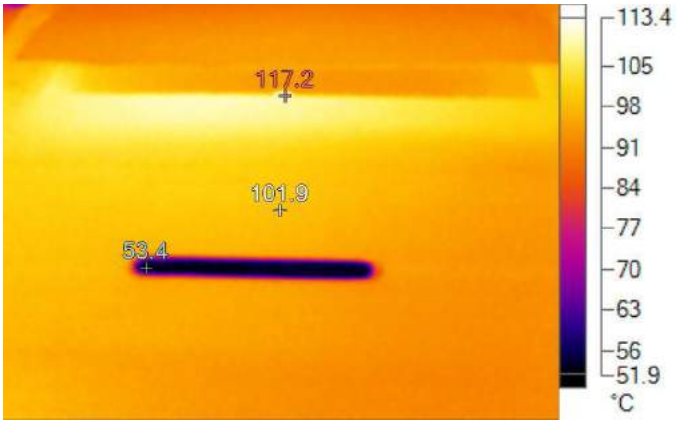

MIDDLE EXTRUDER
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Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	101.9°C	0.95	18.0°C
Hot	117.2°C	0.95	18.0°C
Cold	53.4°C	0.95	18.0°C

Image Info

File name	MIDDLE EXTRUDER
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
Average Temperature	98.6°C
Image Range	53.4°C to 117.2°C
IR Sensor Size	160 x 120
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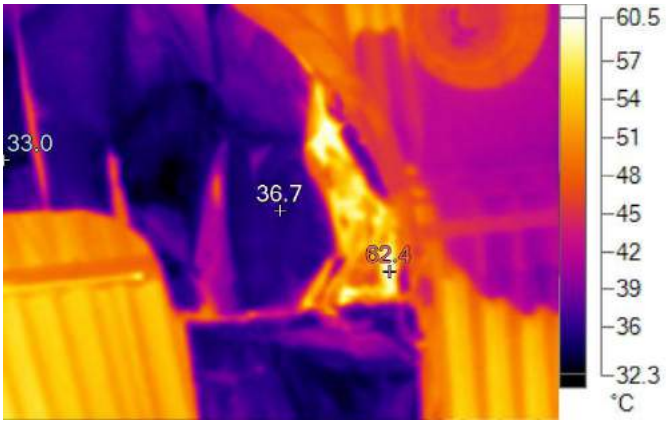

6 COLOUR INLET LINE
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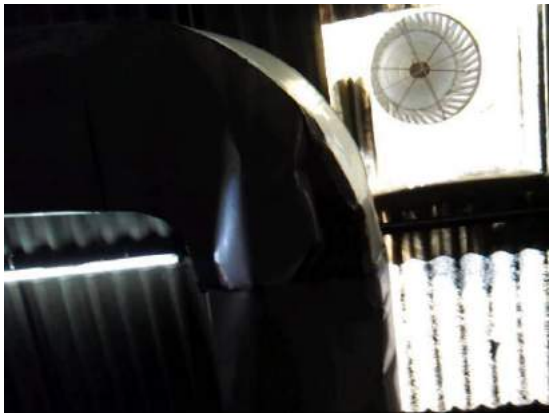


Visible Light Image

Main Image Markers

Name	Temperature	Emissivity	Background
Centerpoint	36.7°C	0.95	18.0°C
Hot	62.4°C	0.95	18.0°C
Cold	33.0°C	0.95	18.0°C

Image Info

File name	6 COLOUR INLET LINE
Background temperature	18.0°C
Emissivity	0.95
Transmission	1.00
Average Temperature	44.3°C
Image Range	33.0°C to 62.4°C
IR Sensor Size	160 x 120
Image Time	1/20/2018 1:22:24 PM

Energy Efficient Technologies Applicability

Sr No	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment	Hours of Operation / day	Nos	Estd Potential for Savings (%) *Order of magnitude of savings margin indicated in brackets*
	Motors & Lighting					
1	Soft Starter Energy Savers	Not App				*(3% of operating kW)*
2	Variable Speed Drives (Hydraulic)	Not App				*(3-5% of operating kW)*
3	Variable Speed Drives (Electronic)	Applicable	Drive	24	1	*(5-15% of operating kW)*
4	PMDC for Variable Speed Applications	Not App				*(10-15% on average operating kW)*
5	Maximum Demand Controller	Not App				*(Reduction of Rs./ kVA / month cost only in case of exceeding CMD)*
6	Auto PF Controller	Not App				*(1% on Energy consumption in terms of distribution loss reduction)*

7	Electronic Timers for Machineries and lighting	Not App				*(Direct Savings – Depe3nds on the excess hours of operation above prescribed time of operation)*
8	Lighting Energy savers(Voltage Controller)	Not App				*(5-15% of operating kW)*
9	Efficient lamps & Luminaries (T5, CFL, Metal Halide, HPSV)	Applicable				*(30-50% of existing lighting kW)*
10	Transparent Roofing/ Sky lites	Not App				*(10-15% n average operating kW)*
	Cooling Towers					*0*
11	Energy efficient water pumps	Not App				*Improvement in existing efficiency upto 75%)*
12	FRP blades for cooling tower fans	Not App				*Being small fans reduction of 5-7% on existing fan kW drawl)*
13	Efficient spray nozzles in cooling Towers	Not App				*(Improves spray in mist form and completely eliminates need for CT – ID fan)*

	Compressed Air systems					
14	Auto ON/OFF Controller	Not App				*(3-5% savings in overall existing Kwh consumption)*
15	Pressure Regulation & Reduction	Not App				*(8% reduction in motor input Kw for every 1 Kg/cm2 reduction in discharged pressure)*
16	Leakage Reduction	Not App				*(Direct saving- leakage based on trial (or estimated) varies between 10-40%)*
17	Tri-vector nozzles for compressed air cleaning application	Not App				*(15% reduction in compressed air end use for a particular cleaning application)*
18	Variable Speed Drive	Not App				*(Depending on ON/OFF cycle compressor capacity can be optimized by speed reduction –by pully modification or VFD)*
	Thermal Energy Systems					
19	Steam Traps Maintenance	Not App				*Identification of fault, leaking traps can save direct steam loss through them 910-40% on case to case basis)*

20	WHR in Boiler system-flue gas for preheating boiler feed water and combustion air & waste steam	Not App				*(Flue gas temperature can be reduced from existing value to 170)C in case of oil fired and 13 C in case of coal fired. Minimum Delta T of flue gas should be 40-50C)*
21	WHR in Furnace &Thermopacks	Not App				*(Flue gas temperature can be reduced from existing value to 170OC in case of oil fired and 13 C in case of coal fired. Here Delta T of flue gas will be huge and WHR potential also huge)*
22	Condensate Recovery	Not App				*(upto 70% recovery is possible –this is direct savings as heat input to the boiler or Hot water requirement for the process)*
23	Repairing of insulation – steam pipes, valves etc.	Not App				*(Cost of re-insulation is paid back in less than 3 months from the energy saving resulting from prevented heat loss)*
24	Ceramics insulation for reducing heat losses from furnace surfaces	Not app				*(5-7 % of existing surface heat loss for temperature below 200 C and 10% for temperature between 300-500C)*
25	Waste heat vapour Absorption chiller	Not App				*(Normal existing KW/TR (anywhere between1-2) will reduce to a meager 0.1 KW/TR feasible only if waste heat is used for VAR)*

GENERAL TIPS FOR BETTER ENERGY CONSERVATION FOR INDUSTRIES

THERMAL UTILITIES

Boilers

• Preheat combustion air with waste heat
(22 ^{0}C reduction in flue gas temperature increases boiler efficiency by 1%).

• Use variable speed drives on large boiler combustion air fans with variable flows.

• Burn wastes if permitted.

• Insulate exposed heated oil tanks.

• Clean burners, nozzles, strainers, etc.

• Inspect oil heaters for proper oil temperature.

• Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.

• Improve oxygen trim control (e.g. -- limit excess air to less than 10% on clean fuels).
(5% reduction in excess air increases boiler efficiency by 1% or: 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)

• Automate/optimize boiler blowdown. Recover boiler blowdown heat.

• Use boiler blowdown to help warm the back-up boiler.

• Optimize deaerator venting.

• Inspect door gaskets.

• Inspect for scale and sediment on the water side
(A 1 mm thick scale (deposit) on the water side could increase fuel consumption by 5 to 8%).

• Inspect for soot, flyash, and slag on the fire side
(A 3 mm thick soot deposition on the heat transfer surface can cause an increase in fuel consumption to the tune of 2.5%.)

• Optimize boiler water treatment.

• Add an economizer to preheat boiler feed water using exhaust heat.

• Recycle steam condensate.

• Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple boilers.

• Consider multiple or modular boiler units instead of one or two large boilers.

• Establish a boiler efficiency-maintenance program. Start with an energy audit and follow-up, then make a boiler efficiency-maintenance program a part of your continuous energy management program.

ELECTRICAL UTILITIES

Electricity Distribution System

• Optimise the tariff structure with utility supplier

• Schedule your operations to maintain a high load factor

• Shift loads to off-peak times if possible.

• Minimise maximum demand by tripping loads through a demand controller

• Stagger start-up times for equipment with large starting currents to minimize load peaking.

• Use standby electric generation equipment for on-peak high load periods.

• Correct power factor to at least 0.90 under rated load conditions.

• Relocate transformers close to main loads.

• Set transformer taps to optimum settings.

• Disconnect primary power to transformers that do not serve any active loads

• Consider on-site electric generation or cogeneration.

• Export power to grid if you have any surplus in your captive generation

• Check utility electric meter with your own meter.

• Shut off unnecessary computers, printers, and copiers at night.

Motors

• Properly size to the load for optimum efficiency.
(High efficiency motors offer of 4 - 5% higher efficiency than standard motors)

• Use energy-efficient motors where economical.

• Use synchronous motors to improve power factor.

• Check alignment.

• Provide proper ventilation
(For every 10 ^{o}C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)

• Check for under-voltage and over-voltage conditions.

• Balance the three-phase power supply.
(An imbalanced voltage can reduce 3 - 5% in motor input power)

• Demand efficiency restoration after motor rewinding.
(If rewinding is not done properly, the efficiency can be reduced by 5 - 8%)

Drives

• Use variable-speed drives for large variable loads.

• Use high-efficiency gear sets.

• Use precision alignment.

• Check belt tension regularly.

• Eliminate variable-pitch pulleys.

• Use flat belts as alternatives to v-belts.

• Use synthetic lubricants for large gearboxes.

• Eliminate eddy current couplings.

• Shut them off when not needed.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimise bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.

- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Compressors

- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.
- Periodically inspect compressor intercoolers for proper functioning.
- Use waste heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.

• Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

Compressed air

• Install a control system to coordinate multiple air compressors.

• Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple air compressors.

• Avoid over sizing -- match the connected load.

• Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)

• Turn off the back-up air compressor until it is needed.

• Reduce air compressor discharge pressure to the lowest acceptable setting.
(Reduction of 1 kg/cm^2 air pressure (8 kg/cm^2 to 7 kg/cm^2) would result in 9% input power savings. This will also reduce compressed air leakage rates by 10%)

• Use the highest reasonable dryer dew point settings.

• Turn off refrigerated and heated air dryers when the air compressors are off.

• Use a control system to minimize heatless desiccant dryer purging.

• Minimize purges, leaks, excessive pressure drops, and condensation accumulation.
(Compressed air leak from 1 mm hole size at 7 kg/cm^2 pressure would mean power loss equivalent to 0.5 kW)

• Use drain controls instead of continuous air bleeds through the drains.

• Consider engine-driven or steam-driven air compression to reduce electrical demand charges.

• Replace standard v-belts with high-efficiency flat belts as the old v-belts wear out.

• Use a small air compressor when major production load is off.

• Take air compressor intake air from the coolest (but not air conditioned) location.
(Every 5^{0}C reduction in intake air temperature would result in 1% reduction in compressor power consumption)

• Use an air-cooled after cooler to heat building makeup air in winter.

• Be sure that heat exchangers are not fouled (e.g. -- with oil).

• Be sure that air/oil separators are not fouled.

• Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.

• Use a properly sized compressed air storage receiver. Minimize disposal costs by using lubricant that is fully demulsible and an effective oil-water separator.

• Consider alternatives to compressed air such as blowers for cooling, hydraulic rather than air cylinders, electric rather than air actuators, and electronic rather than pneumatic controls.

• Use nozzles or venturi-type devices rather than blowing with open compressed air lines.

• Check for leaking drain valves on compressed air filter/regulator sets. Certain rubber-type valves may leak continuously after they age and crack.

• In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.

• Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

Cooling towers

• Control cooling tower fans based on leaving water temperatures.

• Control to the optimum water temperature as determined from cooling tower and chiller performance data.

• Use two-speed or variable-speed drives for cooling tower fan control if the fans are few. Stage the cooling tower fans with on-off control if there are many.

• Turn off unnecessary cooling tower fans when loads are reduced.

• Cover hot water basins (to minimize algae growth that contributes to fouling).

• Balance flow to cooling tower hot water basins.

• Periodically clean plugged cooling tower water distribution nozzles.

• Install new nozzles to obtain a more-uniform water pattern.

• Replace splash bars with self-extinguishing PVC cellular-film fill.

• On old counterflow cooling towers, replace old spray-type nozzles with new square-spray ABS practically-non-clogging nozzles.

• Replace slat-type drift eliminators with high-efficiency, low-pressure-drop, self-extinguishing, PVC cellular units.

• If possible, follow manufacturer's recommended clearances around cooling towers and relocate or modify structures, signs, fences, dumpsters, etc. that interfere with air intake or exhaust.

• Optimize cooling tower fan blade angle on a seasonal and/or load basis.

• Correct excessive and/or uneven fan blade tip clearance and poor fan balance.

• Use a velocity pressure recovery fan ring.

• Divert clean air-conditioned building exhaust to the cooling tower during hot weather.
• Re-line leaking cooling tower cold water basins.

• Check water overflow pipes for proper operating level.

• Optimize chemical use.

• Consider side stream water treatment.

• Restrict flows through large loads to design values.

• Shut off loads that are not in service.

• Take blowdown water from the return water header.

• Optimize blowdown flow rate.

• Automate blowdown to minimize it.

• Send blowdown to other uses (Remember, the blowdown does not have to be removed at the cooling tower. It can be removed anywhere in the piping system.)

• Implement a cooling tower winterization plan to minimize ice build-up.

• Install interlocks to prevent fan operation when there is no water flow.

- Establish a cooling tower efficiency-maintenance program. Start with an energy audit and follow-up, then make a cooling tower efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching, delamping, etc. (Know the electrical effects before doing delamping.)

- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.

- Install efficient alternatives to incandescent lighting, mercury vapor lighting, etc. Efficacy (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapor, incandescent.

- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.

- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts

- Consider daylighting, skylights, etc.

- Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.

- Use task lighting and reduce background illumination.

- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.

- Change exit signs from incandescent to LED.

DG sets

- Optimise loading

- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.

- Use jacket and head cooling water for process needs

- Clean air filters regularly

- Insulate exhaust pipes to reduce DG set room temperatures

• Use cheaper heavy fuel oil for capacities more than 1MW

Water & Wastewater

• Recycle water, particularly for uses with less-critical quality requirements.

• Recycle water, especially if sewer costs are based on water consumption.

• Balance closed systems to minimize flows and reduce pump power requirements.

• Eliminate once-through cooling with water.

• Use the least expensive type of water that will satisfy the requirement.

• Fix water leaks.

• Test for underground water leaks. (It's easy to do over a holiday shutdown.)

• Check water overflow pipes for proper operating level.

• Automate blowdown to minimize it.

• Provide proper tools for wash down -- especially self-closing nozzles.

• Install efficient irrigation.

• Reduce flows at water sampling stations.

• Eliminate continuous overflow at water tanks.

• Promptly repair leaking toilets and faucets.

• Use water restrictors on faucets, showers, etc.

• Use self-closing type faucets in restrooms.

• Use the lowest possible hot water temperature.

• Do not use a central heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.

• Consider the installation of a thermal solar system for warm water.

• If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.

• Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.

• Use freeze protection valves rather than manual bleeding of lines.

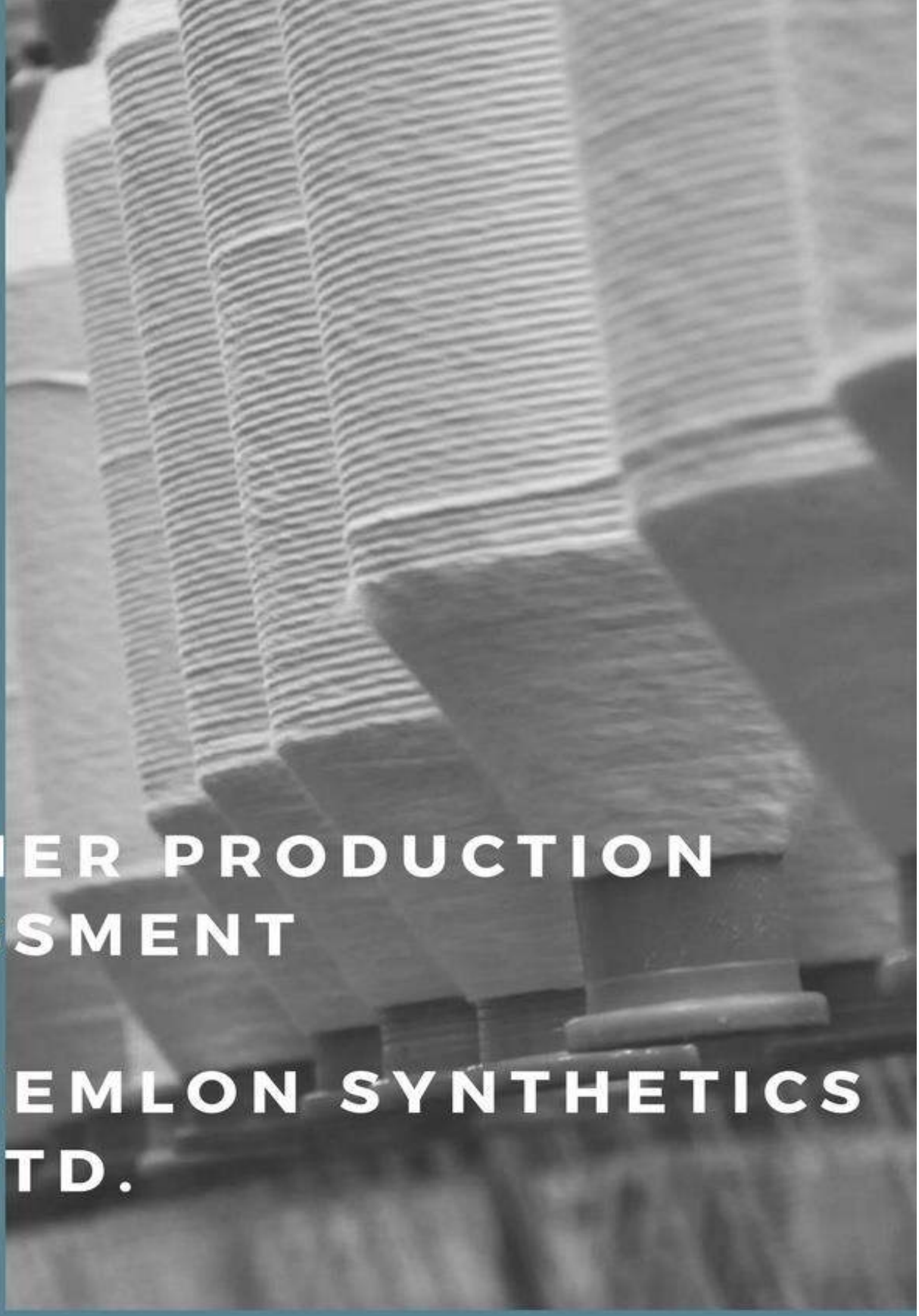
• Consider leased and mobile water treatment systems, especially for deionized water.

• Seal sumps to prevent seepage inward from necessitating extra sump pump operation.

• Install pretreatment to reduce TOC and BOD surcharges.

• Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)

• Verify the sewer flows if the sewer bills are based on them



CLEANER PRODUCTION ASSESSMENT IN M/S. HEMLON SYNTHETICS PVT. LTD.

A. Company Introduction

M/s. Hemlon Synthetics Pvt. Ltd is indulged in business of manufacturing and trading of Texturised Synthetic Yarns. The company has installed capacity of 4500 Metric Tons per Annum with quality range from 50 Deniers to 1250 Deniers.

B. Methodology for Cleaner Production Assessment

Cleaner production with great vitality and buoyancy begins a new era of pollution prevention in the history of environmental protection and will become best approach for pollution control in the new century.

Various steps involved while carrying out CP Assessment are mentioned below.

Step 1: Getting Started

- Task 1: Make CP Team
- Task 2: List Process Steps
- Task 3: Identify Wasteful Processes

Selection of Cleaner Production Focus

Step 2: Analyze Process Steps

- Task 4: Process Flowchart
- Task 5: Material and Energy Balance
- Task 6: Assign Cost to Waste Streams
- Task 7: Identify Cause of Waste

Listing of process waste source

Step 3: Generating Cleaner Production Opportunity

- Task 8: Develop CP Opportunities
- Task 9: Select Workable Opportunity

Listing Of Cleaner Production Opportunities

Step 4: Selecting Cleaner Production Solution

- Task 10: Technical Feasibility
- Task 11: Economic Feasibility
- Task 12: Environmental Aspects
- Task 13: Select Solution

Listing Of Cleaner Production Solutions

Step 5: Implementing Cleaner Production Solution

- Task 14: Preparation For Implementation
- Task 15: Implement Cleaner Production Solution
- Task 16: Monitor and Evaluate Results

Successfully Implemented Cleaner Production

Step 6: Maintaining Cleaner Production

- Task 17: Sustain Cleaner Production Solution
- Task 18: Go to Step 1 - Task 3

Ongoing Cleaner Production Efforts

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C. Cleaner Production Team

The Cleaner Production Team consists of the following members-

Sr. No.	Cleaner Production Team
1	Dr. Bharat Jain, Member Secretary, GCPC
2	Mr. Jayesh A. Majmundar, Chairman and Directo M/s. Hemlon Synthetics Pvt. Ltd
3	Mr. Punamchandra Rathod, Dy. Environment Engineer, GCPC
4	Mr. Abhi Patel, Asst. Environment Engineer, GCPC
5	Ms. Disha Bhavsar, Asst. Environment Engineer, GCPC
6	Ms. Tarjani Jani, Additional Asst. Environment Engineer, GCPC

D. List of Products –

Denier/Filament	Ply	Type
97, 170, 220, 330, 480, 680 Stretch Yarn with Spandex/Lycra®	2/3	SD,BRT,DYED
75/36,80/36,150/36,330/96	2	SD,BRT
630/144,480/144,330/72, 150/36	2	SD,BRT,DYED
80/72,150/36	1/2/3/4	SD,BRT,CATONIC
160,330	2	POLYESTER+ CATONIC (GRANITE)
100,130,160	2	POLYESTER+ CATONIC (BYSHRINKAGE)
330,480,630	2	MILANGE(BLACK/DOFF DYED WITH BRIGHT/SD)
44/10,70/24,140/48 450/96 Roto 460/97 Roto	1/2 4 4	Nylon 6 With/Without Spandex/ Lycra (R) Nylon 6 Nylon 6 With Spandex

E. Raw Material –

Key raw material for all the products above mentioned is mainly

- Partially Oriented yarn
- Oil
- Lycra Yarn
- Spandex Yarn

F. Energy Consumption –

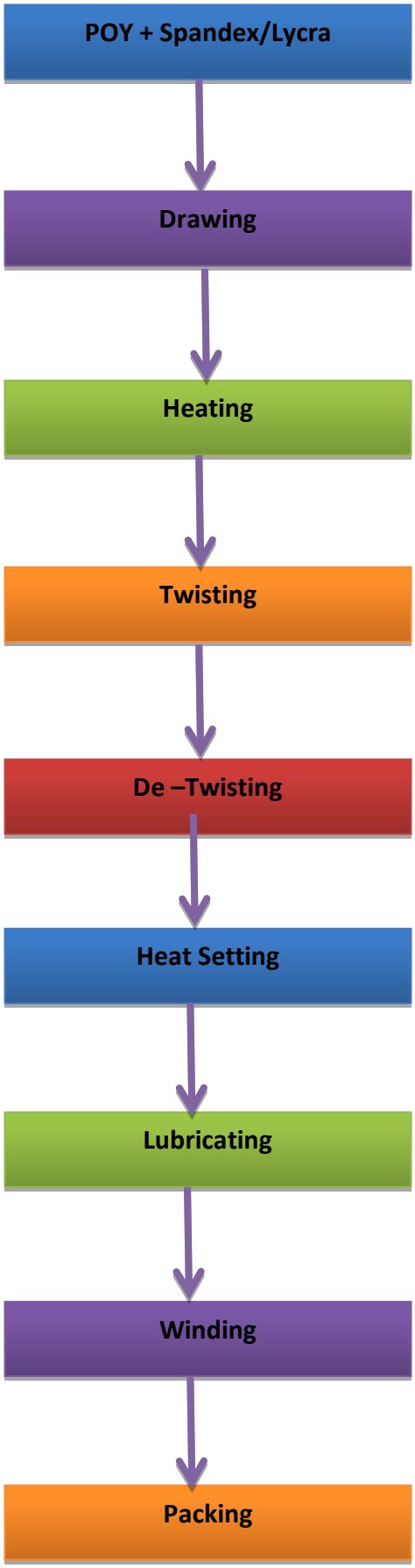
Solar plant of 64 KW.

G. Fuel Consumption –

The fuel for the industry is electricity.

H. Process Flow Chart -

Manufacturing process is as shown in the flow chart below-


POY + Spandex/Lycra
Drawing
Heating
Twisting
De –Twisting
Heat Setting
Lubricating
Winding
Packing

I. Process Description

- Raw material is passed through the first speed roller. This roller is made from rubber.
- It is then passed through the heater for softening at around 200 °C.
- The yarn is cooled into a cooling pipe.
- Twisting Zone- The material is twisted.
- And in the twisting zone lycra yarn is added for elongation.
- Speed rollers rotating at a speed higher than the first one are situated after the twisting zone.
- Air Jet is provided for punching.
- For providing punching consistency 2B roller are provided.
- The material is then passed through the secondary heater having a temperature of 160°C approximately.
- Stabilizing Rollers or 3rd Speed Rollers are situated after the secondary heater.
- Stabilizing rollers are provided so as to increase the slackness of the material.
- For the purpose of lubrication, oil rollers are provided and the material is passed through it.
- Winding is done after the material passes through the oil rollers.

J. Waste Identification-

- The waste identified in the process is around 0.7 to 1% of the production.
- Around 40-50 kg waste is generated per day.

K. CP Options-

1. REWOUND MOTOR EFFICIENCY

Rewound motors are working at reduced efficiency. The Efficiency Bell curve indicates peak efficiency of a standard motor at its three quarter loading. Here in rewound motor, the efficiency peaks at the lower loading level only. And the slippage in the motor increases nearing its full

load. Hence keep an eye on these motors thermal characteristic, we must not fully load the motor, but match our process to its reduced efficiency.

2. MOTOR PARAMETERS DAILY MEASURE

In a running plant, condition based monitoring on motors based on Infra red pyro, skin measuring RTD monitor, stroboscope, clamp on power, pf, amp, voltmeter will give us many readings on motor. By daily monitoring with the above non-contact gadgets we infer hot bearings, DE & NDE side, skid, skin, rib temperature, misalignment, variation in speed in motor & load ends, active ventilation, other hot spots in motor and driven system on all 3, 6, 9, 12 O clock positions of shaft etc and take corrective action during planned breakdowns. This gives input to Performance Monitoring too. The no load parameters like current, power, slip rpm etc give us the productive value of the given existing motor. Bearing is the location wherein high temp, sound generates in abnormal condition and the same is detected by gadgets. Hence instead of All Purpose Grease application on bearings, High temperature greasing gives longer temperature withstanding capability in this 8760-hour pa run motors. The spindle Bolster surface temperature is an indication of the health of spindle, its oil level condition, its bearings' lubrication level and the same can be measured with skin temperature measuring RTD monitor. To improve the efficiency of motor for the given motor & load characteristics, we must advise the user to bring down the motor body temperature for better efficiency. Cleanliness of fins, scaling, visible obstructions, starved surroundings, want of air breeze across the fins all-round, do matter.

3. IMPROVING MOTOR EFFICIENCY

We have to take care of the motor with positive active ventilation all over. For the same, we ensure strong axial air throw along the ribs of motor so the overall surrounding temperature of the motor comes down. Now the motor breathes normally with the shrouded fan effect at its one end and its efficiency improvement is seen in the long run. The loss to the motor due to this retrofit is very minimal, but overall efficiency of the motor improves due to the above force cooling of fins & the motor itself.

4. AIR PIPING LOSSES:

Similar to electrical T & D losses, the breakup of losses in main air header is less compared to distribution losses. Precisely the loss increases in branch Tees and elbows, fittings and in Hose connections. Hence the industry started to replace the Elbow fittings in headers and other CA lines with the standard L bends. We are aware that 70 % frictional loss arises in the Elbow fittings compared to the Standard bends as per PCRA bulletins. The elbowing of process in pipes increases turbulence in process; similarly in human relations too in the industry, turbulence starts when knee-jerked reactions spring up instead of streamlined flow of relationship. The leakage starts more in hose connections than fixed main & branch headers. That's why mills have switched over from nylon braided hoses and clamps to Poly urethane hoses used in helical form and mating connections done with compression type fittings (visualize modern auto garage with helically coiled colorful PU hoses fitted with condo nozzle air guns used for cleaning of vehicles) to avoid distribution leakage. In the existing MS headers (long back mills started to switch over from GI to MS) wherever welding is not possible, they use branded soft and thin Teflon tape to reduce air leaks to bare minimum (as we all know Teflon is the slipperiest substance known to science), and this serves as good buffer in the fitting connections to arrest leak.

General Cleaner Production Options-

a) Green Space
b) Installation of Dustbins
c) Shoes for workers
d) Steam leakages
e) Earplugs for workers
f) Pipe Covering to ensure worker's safety
g) Rain Water Harvesting

SUMMARY OF ENERGY SAVING OPPORTUNITIES

SR.NO	SCHEMES	ANNUAL SAVEING	ANNUAL KWH SAVEING	INVESTMENT	PAYBACK PERIOD
1	IMPROVE POWER FACTOR	27247	4037	10000	4.4
2	REPLACE NORMAL TUBE LIGHTS WITH ENERGY EFFICIENT TUBE LIGHT	43302	6415	10500	2.9
3	REDUCE AIR COMPRESSOR-1 PRESSURE SETTING	372972	55255	0	0.0
4	REDUCE AIR COMPRESSOR-2 PRESSURE SETTING	123572	18307	0	0.0
	Total	**567093**	84014	**20500**	0.4

ENERGY SOURCE:

Power is available to the factory from nearby Electricity Board, substation via HT service at 11 KV. As a standby power supply

METERING SYSTEM:

The consumption of the power is being recorded at “Incoming meter” for Electricity board metering purpose.

ENERGY END USE DETAILS:

The incoming line carries 11 KV power supply from nearby substation in the customer’s premises. Then after with the help LT panel, network is designed to match the application of premises.

To understand the power flow with in premises, we have Analysis the bills of the plant.

Billing Details

Months	KWH	KVAR	B.D	C.D	85% Of C.D	P.F	Amount	Unit cost
Jul-17	238974	48156	438	475	403.75	0.973	1607549	6.73
Aug-17	265800	11802	452	475	403.75	0.998	1784854	6.72
Sep-17	239538	19014	404	475	403.75	0.995	1622982	6.78
Oct-17	234714	20208	404	475	403.75	0.995	1599903	6.82
Nov-17	235068	14604	404	475	403.75	0.996	1582907	6.73
Dec-17	251484	22452	404	475	403.75	0.995	1699638	6.76
Avg.	244263	22706	418	475	403.75	0.992	1649639	6.75
Avg. unit cost				**6.75**				

Analysis of Electricity Bill

- Units varies evenly in each Month accordingly production.
- Avg. units are 244263/**month.**
- Avg. Bill Amount is **Rs.1649639/month.**
- Avg. unit rate 6.75 (cost/unit) is
- During site work and data analysis P.F is ok.

Suggestions

Power factor is very good. it is proposed to provide capacitor and maintain 1.00 PF. And avoid KVAR Charges in bill

Improve power factor	
Parameter	
Present P.F	0.99
Avg. Monthly kvar charge	22706
Proposed P.F	1
if power factor is improveredkvar charges save	
	22706
Total improvement required in %age	1.0
Total rebit in Rs./ Months	2271
Annual saving in Rs	27247
Investment	
Improve capacitors and replace faulty capacitors	10000
Simple payback Period	4.40

CAPACITORS:

APFC or Automatic Power Factor Control Panels are mainly used for the improvement of Power Factor. Power Factor can be explained as ratio of active power to apparent power and it is a key factor in measuring electrical consumption. Everyone knows that how costly electricity has become in present time. Therefore it becomes utmost important to cut down on electrical consumption for reducing expenditure.

APFC Panels can effectively and automatically manage quickly changing and scattered loads along with the retention of high Power Factor. We are renowned manufacturers of APFC Panels symbolized with quality and reliability.

The main features of APFC control panels are:

* Maintains high Power Factor constantly
* High efficiency
* In-built independent fuses
* Protection from excess power in the system.
* Prevents leading Power Factor in low load conditions
* Clearly marked buttons and indicators
* Minimizes harmonic current
* Easy to use
* Corrosion-resistant
* Long lasting
* Electrical insulation
* Protects electrical equipments

The advantages of PF improvement by capacitor addition

a) Reactive component of the network is reduced and so also the total current in the system from source end.

b) I2R power losses are reduced in the system because of reduction in current.

c) Voltage level at the load end is increased.

d) KVA loading on the source generators as also on the transformers and lines up to the capacitors reduces giving capacity relief. A higher factor can help in utilizing the full capacity of your electrical system.

	AMPERE				
KVAR	R	Y	B	LOCATION	CONDITION
25	0	0	0	APFC PANNEL	NOT WORKING
25	0	0	0	APFC PANNEL	NOT WORKING
25	0	27.6	27.7	APFC PANNEL	R PHASE NOT WORKING

25	31.7	29.4	28.9	APFC PANNEL	WORKING
25	0	0	0	APFC PANNEL	NOT WORKING
25	31.8	32.2	30.7	APFC PANNEL	WORKING
25	0	0	0	APFC PANNEL	NOT WORKING
25	0	27.3	26.7	APFC PANNEL	R PHASE NOT WORKING
50	49.2	50.3	53.6	PLANT	WORKING
50	42	42.6	43.2	PLANT	WORKING

ELECTRICAL MOTOR

Motor Losses

Power Losses in a motor are that portion of the input power that becomes heat rather than driving the load. These losses can be divided into two categories-

- Fixed Loses
- Variable Losses

Fixed losses are assumed to be constant at all conditions of motor loading from no load to full rated load. This is not exactly true, but it is nearly so, and little significant error is created by this approximation. Fixed losses include magnetic core losses (hysteresis and eddy current) and mechanical friction losses (bearing friction, brush friction, and air friction or windage).

Variable Losses are those that vary with the load on the motor and thus with the motor current. These losses increase as the load on the motor, and therefore the current drawn by the motor, increase. They are primarily the power lost in the resistance of the motor windings and are often called copper losses, or I2R losses.

Variable losses also include stray load losses such as minor variations in fixed losses with load and speed and other small miscellaneous losses. Variable losses are approximately proportional to the square of the motor load current.

Motor Efficiency is the output of the motor divided by the electrical input to the motor, usually expressed as a percentage .power or work output is input less losses.

Efficiency (%) = Watts output x 100

Watts input

= 746 x HP x 100
E x I x PF

= Input - Losses x 100
Input

Supply Details of Feeders

Type of Service	=	HLT
Name of source of power	=	UGVCL
Service No.	=	HTBDOOOO43

Substation & Transformer Details

Make	=	SKP TRANSFORMERS,
Capacity of T/F	=	630 kva
Voltage HT	=	11000
LT	=	433
HU CURRENT	=	33A

LV CURRENT = 840A

Transformer Losses & Efficiency

The efficiency varies anywhere between 96 to 99%. The efficiency of the transformer not only depends on the design, but also, on the effective operating load. Normally best efficiency loading of the transformer is around 50% of the rated capacity.

From above analysis we observe that transformer is loaded sufficiently and performance is as per the norms. Transformer losses consist of two parts : No load loss (Core loss) and load loss (Copper loss)

No load loss is the power consumed to sustain the magnetic field in the transformer's steel core. Core loss occurs whenever the transformer is energized; core loss does not vary with load.

Load loss (Copper) is associated with full load current flow in the transformer windings. Copper loss is power lost in the primary and secondary windings of a transformer due to the ohmic resistance. Copper loss varies with the square of load current ($P=I^2R$)

Whenever two transformers are operating in parallel, both should be technically identical in all aspects and more importantly should have the same impedance level. This will minimize the circulating current between transformers.

Energy Conservation Analysis

Conversion of Delta to Star Connection

The induction motor with a percentage loading below 50% would operate at lower efficiency in delta mode. This efficiency at low loading can be improved by converting delta connection into star connection. The reported savings due to this conversion varies from around 3% to 10% because the rated output of motor drops to $1/3^{rd}$ of delta configuration without affecting performance and the percent loading increases as compared to delta mode. This option does not require any capital investment and is one of the least cost options available for the energy conservation in induction motors.

Though the margin of saving due to this option is low, but as the plant installations

normally have hundreds of motors, converting most of the under loaded motors in the plant would result into considerable savings.

Some motors operate on step loading and some on continuously variable load. The motors which operate on step loading, techno-economic feasibility of Delta-Star Automatic Change-over Switch is to be worked out (e.g. a machine with an induction motor performs three operations in its operating cycle resulting into motor loading of 25%, 40% & 80%; in such cases permanent delta to star conversion is not possible. An automatic delta-star change-over controller could be installed there. It will connect the motor in star mode in 25% & 40% motor load operations; and in delta mode in 80% load operation). For the applications where starting torque requirement is high but otherwise the load is low, Automatic Delta to star Converter can give significant energy savings.

The motors which operate on continuously variable load, feasibility of installing Soft-Starter/Energy Saver is to be worked out.

This option of permanent Delta to Star conversion cannot be implemented for the loads where starting torque requirement is very high. While implementing permanent Delta to Star conversion, care should be taken to decrease the setting of over load protection relay to 2/3rd of the delta setting. The individual motor load study is shown in table.

POWER CONSUMPTION											
Sr. No.	**Equipment**	**Hp**	**V**	**A**	**KW**	**PF**	**KVA**	**KVAR**	**% Loading**	**DRIVE**	**HZ**
1	MACHINE-A										
	HEATER	50	433	45.1	33.7	0.99	33.8	2.88	76.8		
	TOTAL	150	436	121	90.7	0.99	91.4	11.07	68.9	YES	21
2	MACHINE-B										
	HEATER	54	431	45.7	34.1	1	34.1	1.00	72.0	NO	
	TOTAL	156	435	84.9	62.5	0.99	64	13.61	45.6	YES	35
3	COMPRESSOR-1 (ESD 302)	215	442	301	182	0.79	230	141.33	96.5	NO	
4	COMPRESSOR-3 (CSD 102)	74	436	91.6	60.3	0.87	69.2	33.89	92.8	NO	
5	OFFICE LIGHTING		247	15.6	3.1	0.75	6.67	5.91			
6	PLANT LIGHTING		249	5.71	1.36	0.6	2.46	2.05			
7	BLOWER OF MACHINE A	5	430	4.05	2.65	0.88	3.02	1.44		NO	
8	BLOWER OF MACHINE B	5	431	4.85	2.93	0.81	3.62	2.13		NO	
9	TOTAL PLANT		441	588	359	0.82	449	269.99			

Conversion of Standard Motor with Energy Efficient Motor

As the efficiency of standard motor at less loading is low, its operating performance get reduces considerably. If the delta to star change over option is not suitable for improving the efficiency, replacement of existing standard motor with energy efficient motor could be very viable. The condition switch increases viability of installing energy efficient motors are as

follows :

Standard motor operating at low load is replaced by a lower rated (HP) energy efficient motor. Operational hours are high (nearly continuous). Standard motor is old, number of rewinding are more and frequent.

The efficiency of the Energy efficient motor is almost constant at all percentage loadings. Due to its flat efficiency characteristics, it maintains efficiency almost constant at all loads. Normally, this option is suitable for the motors with rated capacity below 50 HP. The efficiencies of standard motors above 50 HP rating are almost similar to that of energy efficient motors. In many cases, though the initial cost of energy efficient motor is 15 to 20% higher than the standard motor, the simple payback period is less due to the savings.

Using Soft Starters & VFD

Soft starters, which have solid state electronic components, are used to control the input voltage according to the torque required by the driven equipment. Thus at almost all the load the motor operates at same efficiency and power factor.

This results in smooth starting of the motors by drawing lower current and thus avoiding the high instantaneous current normally encountered. Starting current and torque are directly related to the voltage applied when starting the motor. By reducing the line voltage when the motor is started, soft starter reduces the starting inrush current and eliminates the high impact or jerk starts that causes mechanical wear and damage. Soft starters are useful in cases where motors operate with high impact loads. Some of the applications are Cranes, Conveyors, Hoists, Compressors, etc.

Use of High Efficiency Motors

Following tables shows efficiencies of standard efficiency motors and energy efficiency motors.

Efficiencies of Standard Motors (415 V, AC, 4 Pole)

OUTPUT	**CURRENT**	**Efficiency at % shaft load**	**Power Factor at % shaft Load**

KW	Amp	100%	75%	50%	100%	75%	50%
2.2	4.8	78	73	69	0.82	0.78	0.68
3.7	7.9	82	81	78	0.81	0.75	0.69
5.5	11	83	82	80	0.84	0.79	0.73
7.5	14.5	87	86	84	0.85	0.81	0.73
9.3	17.5	88	87	85	0.85	0.81	0.73
11	20	88	87	85	0.86	0.82	0.74
15	27	89	88	86	0.87	0.83	0.75
18.5	33	89	88	86	0.89	0.85	0.77
22	38	91	90	88	0.89	0.85	0.77
30	53	92	91	89	0.86	0.82	0.74
37	65	92.5	92	90	0.86	0.82	0.74
45	78	93	92	90	0.87	0.83	0.75

Efficiencies of Energy Efficient Motors (415 V, AC, 4 Pole) as per IEEMA

0.37	71	1.4	73
0.75	80	1.7	78
1.1	90S	2.9	83.8
2.2	100L	5.1	86.4
3.7	112M	8.1	88.3
5.5	132S	11.4	89.2
7.5	132M	15.4	90.1
11	160M	22	91
18.5	180M	36	92.2
30	200L	56	93.2
37	225S	69	93.6

45	225M	84.0	93.9
75	280S	134.0	94.7
90	280M	164.0	95.0

It may be noted that there is a 3% improvement in efficiency for an 11 KW motor if an energy efficient motor is selected. The efficiency improvement may be greater in the case of rewound motors, especially if the rewinding practices are poor. Heating of the stators above 350°C due to over-heating or use of open flame for extracting the old winding can lead to damage of the steel laminations of the core, leading to increased iron losses.

Energy efficient motors have lower slip and hence these operate at slightly higher speed. Hence in the case centrifugal / axial pumps and blowers, this may lead to slightly higher flows and some increase in power (as power is apprx. Proportional to cube of the speed). Hence for these applications, use of energy efficient motors should be done carefully to ensure that the increased power requirement does not neutralize the reduction in motor losses. Measures like change in pulley ratios or trimming of impellers may have to be done to maintain the flow at existing levels.

General Selection criteria for Energy Efficient Motors:

- For purpose of motor for a new application, the payback period on the differential price is likely to be 1 to 2 years, depending on the rating, running hours and the tariff.
- For replacing an existing running motor, the payback period is likely to be about 2 to 3 years, after considering some salvage value for the existing motor.
- For replacing a burnt-out motor, which otherwise would have been rewound, the payback period is likely to be about 1.5 to 2.5 year

Compressor

Sr.No.	Parameter	Comp-1
1	Motor HP	215
2	Motor RPM	1490
3	Motor KW	160.39
4	Measure current in load	301
5	Measure Current in unload	0
6	Measure KW in load	182
7	Measure Kw in Unload	0
8	Unit Cost Rs	6.75
9	load opt hrs/day	23
10	Opt. Hr/day unload	0
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	9324315
14	Total opt cost	9324315
	Total opt cost	9324329

Sr. No	Parameter	Comp-1
1	On pressure kg/cm^2	4.8
2	Off Pressure Kg/cm^2	5.2
3	Required Pressure setting kg/cm^2	4.7
4	% power saving possible	4

5	Annual operating cost	9324315
6	Annual monetary saving possible	372972.6
7	Total saving possible	372972.6
8	Investment	0

Sr. No.	Parameter	Comp-2
1	Motor HP	74
2	Motor RPM	2965
3	Motor KW	55.204
4	Measure current in load	91.6
5	Measure Current in unload	0
6	Measure KW in load	60.3
7	Measure Kw in Unload	0
8	Unit Cost Rs	6.75
9	load opt hrs/day	23
10	Opt. Hr/day unload	0
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	3089319.75
14	Total opt cost	3089319.75
	Total opt cost	3089319.75

Sr. No	Parameter	Comp-2
1	On pressure kg/cm^2	4.8
2	Off Pressure Kg/cm^2	5.2
3	Required Pressure setting kg/cm^2	4.7
4	% power saving possible	4
5	Annual operating cost	3089319.75
6	Annual monetary saving possible	123572.79
7	Total saving possible	123572.79
8	Investment	0

If we reduce pressure setting from 5.2 kg to 4.7 kg around 4% saving can be achieve.

Approx. 500000 rs per annum can be saved.

LIGHTINGS

INTRODUCTION:

Lighting accounts for less than 5% of the electricity consumption in most industries. In spite of the fact that lighting is a not major energy consuming center in the industry, considerable developments have taken place in this area, hence the scope for energy saving is significant. Light output is measured in lumens and the availability of light in a particular area is called luminance, which is measured in lumens/sq. m or lux. The illuminance level in Indian industry, with some rare exceptions, is generally much lower than the recommended levels. Some of the working planes and the required Lux levels are given below :

Type of interior or activity **Min. illuminance required (lux)**

Offices

General Offices	300
Deep-plan general offices	500
Computer workstation	300
Conference rooms and executive offices	300
Banks and building societies	
Counter and office area	300
Public area	200
Laundries	
Receiving, sorting, washing, drying, ironing,	
Dispatch, dry cleaning	200
Pressing, inspection	300
Places of public assembly	
Public room, villages halls and worship halls	200
Hotels	
Entrance halls	50
Reception, cashier's andporters desks	200
Bars, coffee, base, dining rooms, grill rooms,	
Restaurants and lounges	125
Cloakrooms and baggage rooms	50
Libraries	
General	200
Counters	300
Book shelves	100
Reading rooms	200
Display and exhibit areas	
Exhibits insensitive to light	200
Workshops	300
Museums and art galleries	
Exhibits insensitive to light	200

Workshops	300
Sports facilities	
Multi purpose sports halls	300
Education	
Assemble halls general	200
Platform and stage	250
Lecture theatres	
General	200
Seminar rooms	300
Art rooms	300
General building areas	
Entrance	
Entrance halls, lobbies, and waiting rooms	150
Enquiry desks	300
Gatehouses	150
Circulation areas	
Lifts	50
Corridors, passageways and stairs	50
Escalators and elevators	100
Staff rooms	
Changing, locker and cleaners room, lavatories	50
Rest room	100
Staff Restaurants	
Canteens, cafeterias, dining rooms, mess room,	
Vegetable preparation, washing up areas	200
Food preparation and cooking	300
Food stores and cellars	100
Communications	
Switchboard rooms	200

Telephone apparatus rooms	100
Telex and post room	300
Car parks	
Covered parks	
Floors	10
Ramps an corners	30
Entrances an exits	50
Control booths	150
Outdoor parks	10

It may be noted that it is not always necessary to provide exactly the same illuminance level as given above. Since the issue of lighting is subjective, care should be taken to provide satisfactory lighting which will facilitate people to do their tasks, without straining their eyes.

Lighting

Type of lighting = LED,TUBE LIGHT

Nos. of lights = 40,30nos.

Power consumption of each = 40 watt

Opt hr/day = 24hr/day

Replace the existing 40 W CFL by T5 (18 W) LED Tube lights.

Cost benefit Analysis :

Sr. No	Parameter	
1	% age power saving	50
2	Total tube light	30
3	Consumption of tubelight	0.054

4	Unit cost Rs	6.75
5	Annual opt cost	86605.2
6	Annual saving Rs	43302.6
7	Cost of one tube light	350
8	Total investment Rs	10500
9	Simple payback period	2.9

Note: Highlights of T5 tube lights

- **Upto 45% power savings and commensurate reduction in maximum demand**
- **Improvement in power factor from 0.5 to over 0.95 lagging at the source which earns you savings in the form of reactive power compensation.**
- **Reduction in KVA demand &reduction in distribution losses in the system.**
- **Improvement in overall power quality**
- **More lux output**
- **Flicker free starting & illumination**

Following table mentions easy replacement of equivalent light source. This is for present replacement and future reference.

The replacement of the standard lamps with the energy efficient lamps is shown below:

Standard Light	Replace with
Incandescent(40 W)	CFL 9W
Incandescent(60 W)	CFL 11 W
Incandescent(100 W)	CFL 13 W
HPMV(125 W)	HPSV(70 W)
HPMV(250 W)	HPSV(100 W)
HPMV(400 W)	HPSV(250 W)

Type of lamps, their wattage and luminaries have to be selected considering the tasks being performed, the mounting height and the lamp efficacy. Apart from illuminance requirement another parameter which is important is color rendering, which is very much specific if the task involves distinguishing colors. Luminary's selection also may be done to maximize light availability in the work area. Use of mirror optics for fluorescent tube light fittings is one such example. Mirror optics is now being extensively used for office and commercial lighting.

2.3 :: Energy Efficient Technologies Applicability

Sr No	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment	Hours of Operation / day	Nos	Estd Potential for Savings (%) *Order of magnitude of savings margin indicated in brackets*
	Motors & Lighting					
1	Soft Starter Energy Savers	Not App				*(3% of operating kW)*
2	Variable Speed Drives (Hydraulic)	Not App				*(3-5% of operating kW)*
3	Variable Speed Drives (Electronic)	Applicable	Drive	24	1	*(5-15% of operating kW)*
4	PMDC for Variable Speed Applications	Not App				*(10-15% on average operating kW)*

5	Maximum Demand Controller	Not App				*(Reduction of Rs./ kVA / month cost only in case of exceeding CMD)*
6	Auto PF Controller	Not App				*(1% on Energy consumption in terms of distribution loss reduction)*
7	Electronic Timers for Machineries and lighting	Not App				*(Direct Savings – Depe3nds on the excess hours of operation above prescribed time of operation)*
8	Lighting Energy savers(Voltage Controller)	Not App				*(5-15% of operating kW)*
9	Efficient lamps & Luminaries (T5, CFL, Metal Halide, HPSV)	Applicable				*(30-50% of existing lighting kW)*
10	Transparent Roofing/ Sky lites	Not App				*(10-15% n average operating kW)*
	Cooling Towers					*0*
11	Energy efficient water pumps	Not App				*Improvement in existing efficiency upto 75%)*

12	FRP blades for cooling tower fans	Not App				*Being small fans reduction of 5-7% on existing fan kW drawl)*
13	Efficient spray nozzles in cooling Towers	Not App				*(Improves spray in mist form and completely eliminates need for CT – ID fan)*
	Compressed Air systems					
14	Auto ON/OFF Controller	Not App				*(3-5% savings in overall existing Kwh consumption)*
15	Pressure Regulation & Reduction	Not App				*(8% reduction in motor input Kw for every 1 Kg/cm2 reduction in discharged pressure)*
16	Leakage Reduction	Not App				*(Direct saving- leakage based on trial (or estimated) varies between 10-40%)*
17	Tri-vector nozzles for compressed air cleaning application	Not App				*(15% reduction in compressed air end use for a particular cleaning application)*
18	Variable Speed Drive	Not App				*(Depending on ON/OFF cycle compressor capacity can be optimized by speed reduction –by pully modification or VFD)*

	Thermal Energy Systems					
19	Steam Traps Maintenance	Not App				*Identification of fault, leaking traps can save direct steam loss through them 910-40% on case to case basis)*
20	WHR in Boiler system-flue gas for preheating boiler feed water and combustion air & waste steam	Not App				*(Flue gas temperature can be reduced from existing value to 170)C in case of oil fired and 13 C in case of coal fired. Minimum Delta T of flue gas should be 40-50C)*
21	WHR in Furnace &Thermopacks	Not App				*(Flue gas temperature can be reduced from existing value to 170OC in case of oil fired and 13 C in case of coal fired. Here Delta T of flue gas will be huge and WHR potential also huge)*
22	Condensate Recovery	Not App				*(upto 70% recovery is possible –this is direct savings as heat input to the boiler or Hot water requirement for the process)*
23	Repairing of insulation – steam pipes, valves etc.	Not App				*(Cost of re-insulation is paid back in less than 3 months from the energy saving resulting from prevented heat loss)*
24	Ceramics insulation for reducing heat losses from furnace surfaces	Not app				*(5-7 % of existing surface heat loss for temperature below 200 C and 10% for temperature between 300-500C)*
25	Waste heat vapour Absorption chiller	Not App				*(Normal existing KW/TR (anywhere between1-2) will reduce to a meager 0.1 KW/TR feasible only if waste heat is used for VAR)*

GENERAL TIPS FOR BETTER ENERGY CONSERVATION FOR INDUSTRIES

THERMAL UTILITIES

Boilers

• Preheat combustion air with waste heat
(22 ^{0}C reduction in flue gas temperature increases boiler efficiency by 1%).

• Use variable speed drives on large boiler combustion air fans with variable flows.

• Burn wastes if permitted.

• Insulate exposed heated oil tanks.

• Clean burners, nozzles, strainers, etc.

• Inspect oil heaters for proper oil temperature.

• Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.

• Improve oxygen trim control (e.g. -- limit excess air to less than 10% on clean fuels).
(5% reduction in excess air increases boiler efficiency by 1% or: 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)

• Automate/optimize boiler blowdown. Recover boiler blowdown heat.

• Use boiler blowdown to help warm the back-up boiler.

• Optimize deaerator venting.

• Inspect door gaskets.

• Inspect for scale and sediment on the water side
(A 1 mm thick scale (deposit) on the water side could increase fuel consumption by 5 to 8%).

• Inspect for soot, flyash, and slag on the fire side
(A 3 mm thick soot deposition on the heat transfer surface can cause an increase in fuel consumption to the tune of 2.5%.)

• Optimize boiler water treatment.

• Add an economizer to preheat boiler feedwater using exhaust heat.

• Recycle steam condensate.

• Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple boilers.

• Consider multiple or modular boiler units instead of one or two large boilers.

• Establish a boiler efficiency-maintenance program. Start with an energy audit and follow-up, then make a boiler efficiency-maintenance program a part of your continuous energy management program.

ELECTRICAL UTILITIES

Electricity Distribution System

• Optimise the tariff structure with utility supplier

• Schedule your operations to maintain a high load factor

• Shift loads to off-peak times if possible.

• Minimise maximum demand by tripping loads through a demand controller

• Stagger start-up times for equipment with large starting currents to minimize load peaking.

• Use standby electric generation equipment for on-peak high load periods.

• Correct power factor to at least 0.90 under rated load conditions.

• Relocate transformers close to main loads.

• Set transformer taps to optimum settings.

• Disconnect primary power to transformers that do not serve any active loads

• Consider on-site electric generation or cogeneration.

• Export power to grid if you have any surplus in your captive generation

• Check utility electric meter with your own meter.

• Shut off unnecessary computers, printers, and copiers at night.

Motors

• Properly size to the load for optimum efficiency.
(High efficiency motors offer of 4 - 5% higher efficiency than standard motors)

• Use energy-efficient motors where economical.

• Use synchronous motors to improve power factor.

• Check alignment.

• Provide proper ventilation
(For every 10 ^{o}C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)

• Check for under-voltage and over-voltage conditions.

• Balance the three-phase power supply.
(An imbalanced voltage can reduce 3 - 5% in motor input power)

• Demand efficiency restoration after motor rewinding.
(If rewinding is not done properly, the efficiency can be reduced by 5 - 8%)

Drives

• Use variable-speed drives for large variable loads.

• Use high-efficiency gear sets.

• Use precision alignment.

• Check belt tension regularly.

• Eliminate variable-pitch pulleys.

• Use flat belts as alternatives to v-belts.

• Use synthetic lubricants for large gearboxes.

• Eliminate eddy current couplings.

• Shut them off when not needed.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimise bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.

- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Compressors

- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.
- Periodically inspect compressor intercoolers for proper functioning.
- Use waste heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.

• Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

Compressed air

• Install a control system to coordinate multiple air compressors.

• Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple air compressors.

• Avoid over sizing -- match the connected load.

• Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)

• Turn off the back-up air compressor until it is needed.

• Reduce air compressor discharge pressure to the lowest acceptable setting.
(Reduction of 1 kg/cm^2 air pressure (8 kg/cm^2 to 7 kg/cm^2) would result in 9% input power savings. This will also reduce compressed air leakage rates by 10%)

• Use the highest reasonable dryer dew point settings.

• Turn off refrigerated and heated air dryers when the air compressors are off.

• Use a control system to minimize heatless desiccant dryer purging.

• Minimize purges, leaks, excessive pressure drops, and condensation accumulation.
(Compressed air leak from 1 mm hole size at 7 kg/cm^2 pressure would mean power loss equivalent to 0.5 kW)

• Use drain controls instead of continuous air bleeds through the drains.

• Consider engine-driven or steam-driven air compression to reduce electrical demand charges.

• Replace standard v-belts with high-efficiency flat belts as the old v-belts wear out.

• Use a small air compressor when major production load is off.

• Take air compressor intake air from the coolest (but not air conditioned) location.
(Every 5^{0}C reduction in intake air temperature would result in 1% reduction in compressor power consumption)

• Use an air-cooled aftercooler to heat building makeup air in winter.

• Be sure that heat exchangers are not fouled (e.g. -- with oil).

• Be sure that air/oil separators are not fouled.

• Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.

• Use a properly sized compressed air storage receiver. Minimize disposal costs by using lubricant that is fully demulsible and an effective oil-water separator.

• Consider alternatives to compressed air such as blowers for cooling, hydraulic rather than air cylinders, electric rather than air actuators, and electronic rather than pneumatic controls.

• Use nozzles or venturi-type devices rather than blowing with open compressed air lines.

• Check for leaking drain valves on compressed air filter/regulator sets. Certain rubber-type valves may leak continuously after they age and crack.

• In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.

• Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

Cooling towers

• Control cooling tower fans based on leaving water temperatures.

• Control to the optimum water temperature as determined from cooling tower and chiller performance data.

• Use two-speed or variable-speed drives for cooling tower fan control if the fans are few. Stage the cooling tower fans with on-off control if there are many.

• Turn off unnecessary cooling tower fans when loads are reduced.

• Cover hot water basins (to minimize algae growth that contributes to fouling).

• Balance flow to cooling tower hot water basins.

• Periodically clean plugged cooling tower water distribution nozzles.

• Install new nozzles to obtain a more-uniform water pattern.

- Replace splash bars with self-extinguishing PVC cellular-film fill.
- On old counterflow cooling towers, replace old spray-type nozzles with new square-spray ABS practically-non-clogging nozzles.
- Replace slat-type drift eliminators with high-efficiency, low-pressure-drop, self-extinguishing, PVC cellular units.
- If possible, follow manufacturer's recommended clearances around cooling towers and relocate or modify structures, signs, fences, dumpsters, etc. that interfere with air intake or exhaust.
- Optimize cooling tower fan blade angle on a seasonal and/or load basis.
- Correct excessive and/or uneven fan blade tip clearance and poor fan balance.
- Use a velocity pressure recovery fan ring.
- Divert clean air-conditioned building exhaust to the cooling tower during hot weather.
- Re-line leaking cooling tower cold water basins.
- Check water overflow pipes for proper operating level.
- Optimize chemical use.
- Consider side stream water treatment.
- Restrict flows through large loads to design values.
- Shut off loads that are not in service.
- Take blowdown water from the return water header.
- Optimize blowdown flow rate.
- Automate blowdown to minimize it.
- Send blowdown to other uses (Remember, the blowdown does not have to be removed at the cooling tower. It can be removed anywhere in the piping system.)
- Implement a cooling tower winterization plan to minimize ice build-up.
- Install interlocks to prevent fan operation when there is no water flow.

- Establish a cooling tower efficiency-maintenance program. Start with an energy audit and follow-up, then make a cooling tower efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching,delamping, etc. (Know the electrical effects before doing delamping.)

- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.

- Install efficient alternatives to incandescent lighting, mercury vapor lighting, etc. Efficacy (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapor, incandescent.

- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.

- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts

- Consider daylighting, skylights, etc.

- Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.

- Use task lighting and reduce background illumination.

- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.

- Change exit signs from incandescent to LED.

DG sets

- Optimise loading

- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.

- Use jacket and head cooling water for process needs

- Clean air filters regularly

- Insulate exhaust pipes to reduce DG set room temperatures

• Use cheaper heavy fuel oil for capacities more than 1MW

Water & Wastewater

• Recycle water, particularly for uses with less-critical quality requirements.

• Recycle water, especially if sewer costs are based on water consumption.

• Balance closed systems to minimize flows and reduce pump power requirements.

• Eliminate once-through cooling with water.

• Use the least expensive type of water that will satisfy the requirement.

• Fix water leaks.

• Test for underground water leaks. (It's easy to do over a holiday shutdown.)

• Check water overflow pipes for proper operating level.

• Automate blowdown to minimize it.

• Provide proper tools for wash down -- especially self-closing nozzles.

• Install efficient irrigation.

• Reduce flows at water sampling stations.

• Eliminate continuous overflow at water tanks.

• Promptly repair leaking toilets and faucets.

• Use water restrictors on faucets, showers, etc.

• Use self-closing type faucets in restrooms.

• Use the lowest possible hot water temperature.

• Do not use a central heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.

• Consider the installation of a thermal solar system for warm water.

• If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.

• Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.

• Use freeze protection valves rather than manual bleeding of lines.

• Consider leased and mobile water treatment systems, especially for deionized water.

• Seal sumps to prevent seepage inward from necessitating extra sump pump operation.

• Install pretreatment to reduce TOC and BOD surcharges.

• Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)

• Verify the sewer flows if the sewer bills are based on them

CLEANER PRODUCTION ASSESSMENT IN M/S. SUMIP COMPOSITES PVT. LTD.

A. Company Introduction

Sumip Composites Pvt. Ltd. is known for the quality performance of its fiberglass products be it Cable Trays, Street Light Poles, Ladders, Trefoil clamp, Luminaries, Subox Enclosure Systems Etc. It is a company promoted by a group manufacturing industrial electrical and instrumentation products for last three decades, specially designed for the use in various applications. Fiberglass products were specifically developed due to demand from the valued clients.

B. Methodology for Cleaner Production Assessment

Cleaner production with great vitality and buoyancy begins a new era of pollution prevention in the history of environmental protection and will become best approach for pollution control in the new century.

Various steps involved while carrying out CP Assessment are mentioned below.

Step 1: Getting Started

- Task 1: Make CP Team
- Task 2: List Process Steps
- Task 3: Identify Wasteful Processes

Selection of Cleaner Production Focus

Step 2: Analyze Process Steps

- Task 4: Process Flowchart
- Task 5: Material and Energy Balance
- Task 6: Assign Cost to Waste Streams
- Task 7: Identify Cause of Waste

Listing of process waste source

Step 3: Generating Cleaner Production Opportunity

- Task 8: Develop CP Opportunities
- Task 9: Select Workable Opportunity

Listing Of Cleaner Production Opportunities

Step 4: Selecting Cleaner Production Solution

- Task 10: Technical Feasibility
- Task 11: Economic Feasibility
- Task 12: Environmental Aspects
- Task 13: Select Solution

Listing Of Cleaner Production Solutions

Step 5: Implementing Cleaner Production Solution

- Task 14: Preparation For Implementation
- Task 15: Implement Cleaner Production Solution
- Task 16: Monitor and Evaluate Results

Successfully Implemented Cleaner Production

Step 6: Maintaining Cleaner Production

- Task 17: Sustain Cleaner Production Solution
- Task 18: Go to Step 1 - Task 3

Ongoing Cleaner Production Efforts

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C. Cleaner Production Team

The Cleaner Production Team consists of the following members-

Sr. No.	Cleaner Production Team
1	Dr. Bharat Jain, Member Secretary, GCPC
2	Mr. Punamchandra Rathod, Dy. Environment Engineer, GCPC
3	Mr. Abhi Patel, Asst. Environment Engineer, GCPC
4	Ms. Disha Bhavsar, Asst. Environment Engineer, GCPC
5	Ms. Tarjani Jani, Additional Asst. Environment Engineer, GCPC
6	Mr. Mitesh Shah ,Sumip Composites Pvt. Ltd.

D. List of Products –

I. Fibre glass cable trays
II. Fibre glass poles
III. Fibre glass luminaries
IV. Fibre glass ladders
V. Motor canopies
VI. Trefoil clamps

E. Raw Material –

The key raw material is the combomat with surface veil.

The other raw material is the roving sheet and the last is the slurry or the resin.

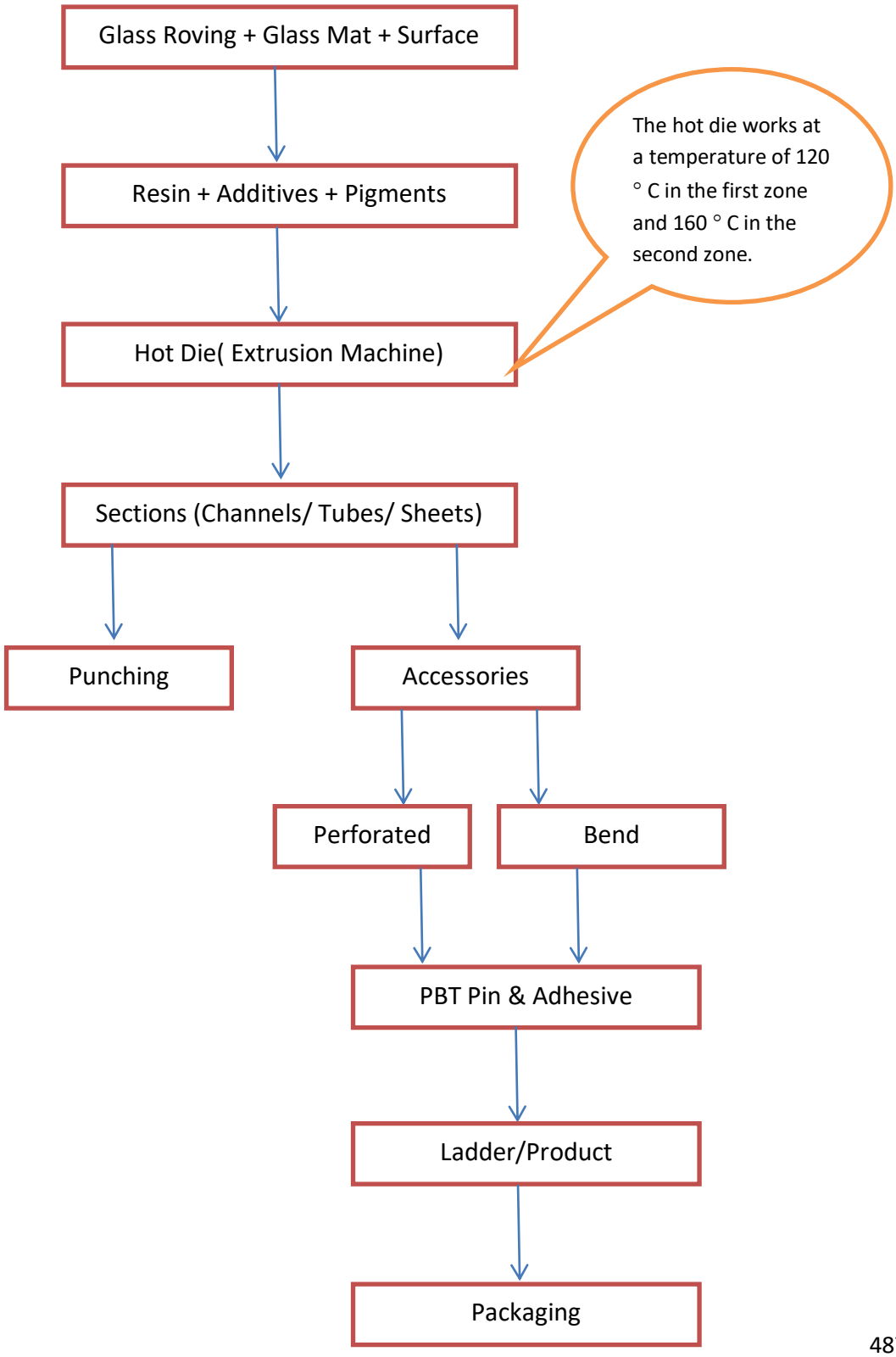
F. Annual Production –

The annual production is 188240 mt or 1419741 kg approximately.

G. Water Consumption –

The water consumption is usually for the domestic purpose only.

H. Process Flow Chart –



I. CP Options-

I. Masks for the workers
II. Dust controllers for minimizing the dust emissions
III. Dustbins in the premises
IV. Shoes for workers
V. Gloves
VI. Solar system as they have a wide rooftop
VII. Need to empower women employment
VIII. Capillaries to save heat

SUMMARY OF ENERGY SAVING OPPORTUNITIES

SR.NO	SCHEMES	ANNUAL SAVEING	ANNUAL KWH SAVEING	INVESTMENT	PAYBACK PERIOD
1	REDUCE BILLING DEMAND	90000	0	0	0
2	REDUCE AIR COMPRESSOR PRESSURE SETTING	34000	4658	0	0.0
3	INSERT VFD IN PULLTRUSION MACHINES	360000	49315	100000	3.3
4	INSULLATE ELECTRIC HEATERS	105000	14384	10000	1.1
	Total	**589000**	5808	**120000**	2.5

ELECTRICAL ENERGY MANAGEMENT & AUDITING

Electrical energy is one of the major inputs for the economic development of any country. Since the major sources of energy are depleting at a rate faster than the rate at which they are replenished it becomes imperative that the usage of energy is managed efficiently for sustainable development of the country.

Further since modern technology is so dependent on energy it is necessary that all precautions are maintained towards the safe usage of energy also. Unsafe practices could lead to both loss of life and property.

The most important tool for efficient and safe use of energy is "information", information on energy inputs, information on energy use, information on actual loaded capacity of equipment doing work etc. This brings us to the old adage "fore-warned is fore-armed". A systematic and scientific approach to the collection of information and presentation of the same is called auditing. This has taken the following shapes in due course of time depending on the depth to which the final audit is required:

- Detailed Energy Audit
- Electrical Safety Audit
- Power Quality Audit

Subsequent to the collection of information a report is prepared bringing out the interpretations and recommendations to reduce the energy consumption of the facility. The Auditing program is a grand success only when the recommendations suggested and identified in the report shall be implemented on a time bound schedule and shall be closely monitored post implementation.

DETAILED ENERGY AUDIT

The preliminary step for decision making in the area of efficient energy management is an Energy Audit. Energy Audit attempts to identify all the energy streams in a facility and map the energy usage. It attempts to balance the energy inputs to the use thus identifying or eliminating wastage in the process. The Energy Audit has been defined as "the verification, monitoring and analysis of the use of energy including submission of technical report containing

recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

Thus the Detailed Energy Audit will bring out the efficiencies of all electrical energy consuming equipment based on the energy consumption. The Audit will bring out the inefficiencies in the power quality of the facility like harmonics, low power factor etc. It will bring out Energy Conservation measures (ECM) to efficiently use natural energy sources like solar energy for heating and lighting, geothermal energy for cooling etc existing energy consuming equipment. Finally it will bring out the necessary tools to be used for monitoring efficient use of energy post implementation of energy saving measures.

For this purpose the information to be collected during the detailed energy audit includes:

- Energy consumption by type of energy, by department, by major energy consuming equipment
- Energy cost
- Process and material flow diagrams.
- Generation and distribution of site services (e.g. Compressed air, Thermic Fluid Heater)
- Sources of energy supply.
- Potential for fuel substitution, process modification etc.
- Energy management programs and energy training programs.
- Existing baseline information

SCOPE OF ENERGY AUDIT

The scope of the present audit was to carry out a detailed and comprehensive study of the energy consumption and usage by.. Energy conservation methods were to be identified. Investment proposals required for implementation of the recommendations were to be brought out in the report along with the economic payback calculations.

For this purpose the following areas were studied in detail.

D. Electrical Distribution system

10. Electricity distribution in various areas
11. Study of reactive power management
12. Options for power factor improvement
13. Normal and emergency loads
14. Cable loading
15. Harmonics Study
16. Current unbalance study
17. Voltage unbalance study
18. Exploring Energy Conservation Options

E. Review of other Heavy Electrical Equipment

3. Other Miscellaneous Loads
4. Exploring Energy Conservation Options

F. Energy Monitoring and Accounting System

5. Present system of metering
6. Present system of recording and data Logging
7. Present system of periodic performance analysis
8. Recommendations of effective energy monitorin

ENERGY AUDIT LIMITATIONS

- The audits are based on Site inspection, detailed measurements & investigations only.
- The inspection involves visual observations also since in many cases it is not possible to dismantle equipment for measurements.
- Information obtained from the staff of the client is assumed to be true and accurate for the purposes.
- Reasonable assumptions with respect to name plate details of equipment have to be made in the absence of name plate and original design data.
- No inspection within ceilings or other concealed spaces can be undertaken.
- The audit does not address any issues with local Building laws and bye-laws.

- No allowance is made to liaise with any other external consultants or agencies for further information.
- Information obtained from other parties has been assumed true and accurate for the purposes.
- Measurements are done at the main control points assuming that all the points in the control circuit down the line are on.

MAJOR INSTRUMENTS USED FOR ENERGY AUDIT

- NANOVIP Plus Power Analyzer for measuring parameters like Voltage, Current, Power, Power factor, frequency etc. With Data logging
- Ultrasonic water flow meter
- Flue Gas Analyzer
- Digital temperature indicator for temperature measurement
- Infrared Temperature indicator for surface temperature measurement

Note: The entire Energy Audit instrument which was utilizes during the field work.

TECHNICAL SUPPLEMENT

ENERGY SOURCE:

Power is available to the factory from nearby Electricity Board, substation via HT service at 11 KV.

METERING SYSTEM:

The consumption of the power is being recorded at "Incoming meter" for Electricity board metering purpose.

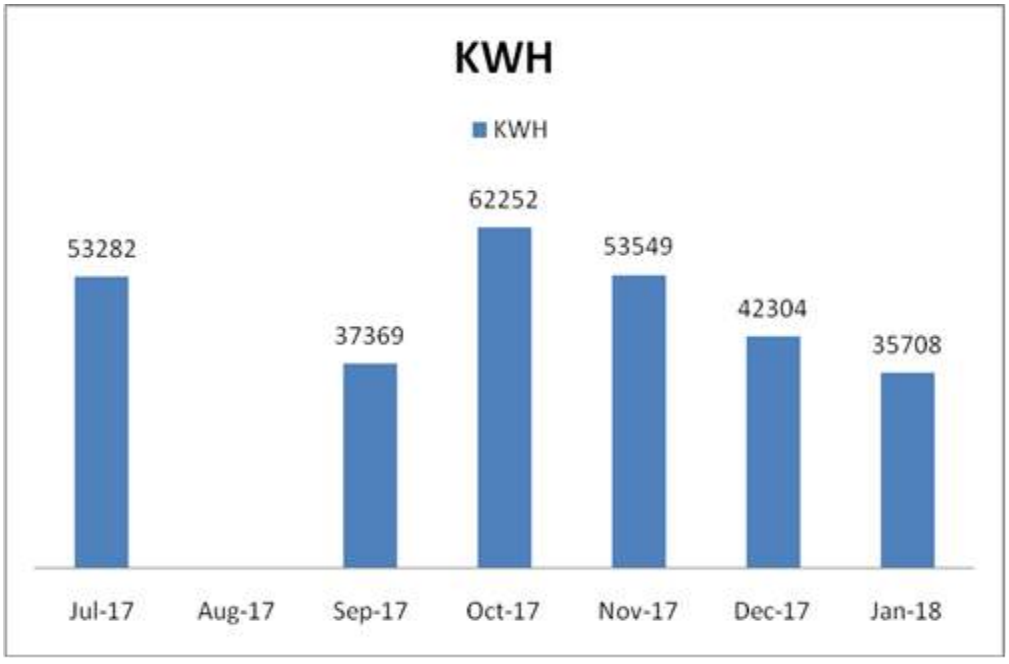
ENERGY END USE DETAILS:

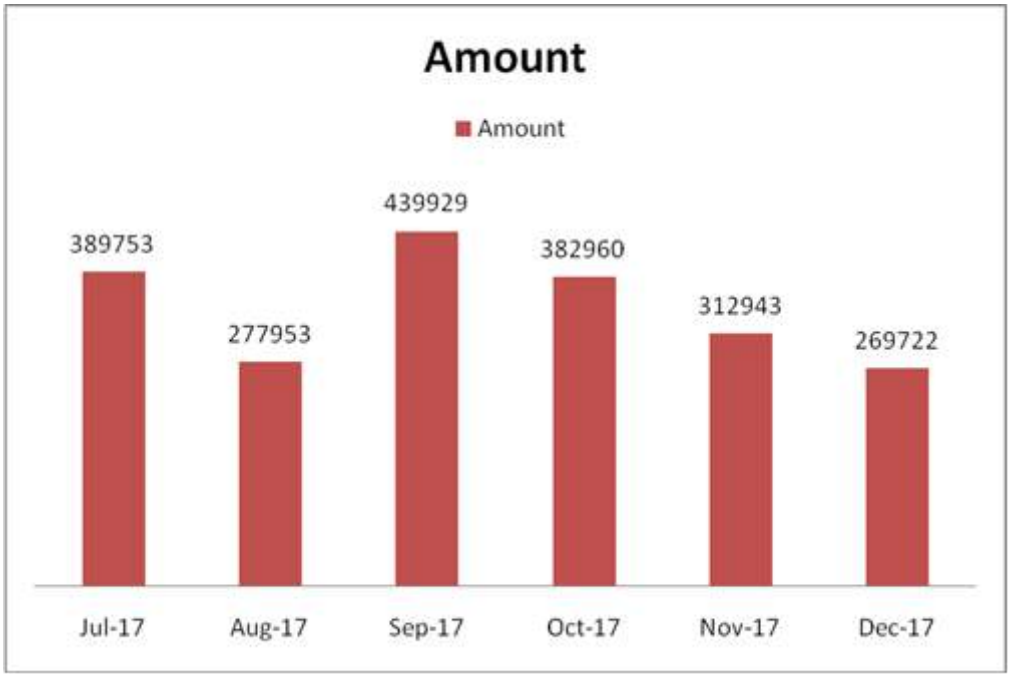
The incoming line carries 11 KV power supply from nearby substation in the customer's premises. Then after with the help LT panel, network is designed to match the application of premises.

To understand the power flow with in premises, we have Analysis the bills of the plant

Billing Details

Months	KWH	KVAR	B.D	C.D	85% Of C.D	P.F	Amount	Unit cost
Jul-17	53282	9917	164	225	191	0.97	389753	7.31
Sep-17	37369	1996	138	225	191	0.992	277953	7.44
Oct-17	62252	5235	179	225	191	0.99	439929	7.07
Nov-17	53549	4809	142	225	191	0.988	382960	7.15
Dec-17	42304	9599	133	225	191	0.933	312943	7.40
Jan-18	35708	10502	91	225	191	0.92	269722	7.55
Avg.	47410	7010	141	225	191	0.966	345543.3	7.32
Avg. unit cost				**7.32**				





Analysis of Electricity Bill

- Units varies evenly in each Month accordingly production.
- Avg. units are 47410/**month.**
- Avg. Bill Amount is **Rs.345543/month.**

- Avg. unit rate is 7.3 (cost/unit)

Suggestions

Power factor is OK.

During the bill analysis we found billing demand is very high against the actuchal billing demand. This is due to high contract demand. So we suggest to reduce contract demand up to 50 kva and save excess charges. Saving and calculation are given below.

Reduce contract demand

Parameter	
Present contract demand	225
Minimum contract demand (85% of C.D)	191
Actual billing demand avg.	141
Billing demand charges Rs/kva	150
Excess billing demand	50
Excess billing demand charges /months	7500
Annual monetary saving possible	90000
Investment	nil

CAPACITORS:

APFC or Automatic Power Factor Control Panels are mainly used for the improvement of Power Factor. Power Factor can be explained as ratio of active power to apparent power and it is a key factor in measuring electrical consumption. Everyone knows that how costly electricity has become in present time. Therefore it becomes utmost important to cut down on electrical consumption for reducing expenditure.

APFC Panels can effectively and automatically manage quickly changing and scattered loads along with the retention of high Power Factor. We are renowned manufacturers of APFC Panels symbolized with quality and reliability.

The main features of APFC control panels are:

* Maintains high Power Factor constantly
* High efficiency
* In-built independent fuses
* Protection from excess power in the system.
* Prevents leading Power Factor in low load conditions
* Clearly marked buttons and indicators
* Minimizes harmonic current
* Easy to use
* Corrosion-resistant
* Long lasting
* Electrical insulation
* Protects electrical equipments

The advantages of PF improvement by capacitor addition

a) Reactive component of the network is reduced and so also the total current in the system from source end.

b) I2R power losses are reduced in the system because of reduction in current.

c) Voltage level at the load end is increased.

d) KVA loading on the source generators as also on the transformers and lines up to the capacitors reduces giving capacity relief. A higher factor can help in utilizing the full capacity of your electrical system.

	AMPERE				
KVAR	R	Y	B	LOCATION	CONDITION
20	27.1	26.8	27.8	APFC PANNEL	WORKING
40	51.6	51.8	52.1	APFC PANNEL	WORKING
10	12.9	12.8	12.9	APFC PANNEL	WORKING
5	6.2	5.1	6.3	APFC PANNEL	WORKING
20	26.4	26.6	26.4	APFC PANNEL	WORKING
40	43.2	43.2	43.1	APFC PANNEL	WORKING
10	12.6	12.8	12.4	APFC PANNEL	WORKING
5	5.8	6.2	6.1	APFC PANNEL	WORKING

ELECTRICAL MOTOR

3.1.1 Introduction:

Motor Losses

Power Losses in a motor are that portion of the input power that becomes heat rather than driving the load. These losses can be divided into two categories-

- Fixed Loses
- Variable Losses

Fixed losses are assumed to be constant at all conditions of motor loading from no load to full rated load. This is not exactly true, but it is nearly so, and little significant error is created by this approximation. Fixed losses include magnetic core losses (hysteresis and eddy current) and mechanical friction losses (bearing friction, brush friction, and air friction or windage).

Variable Losses are those that vary with the load on the motor and thus with the motor current.

These losses increase as the load on the motor, and therefore the current drawn by the motor, increase. They are primarily the power lost in the resistance of the motor windings and are often called copper losses, or I2R losses.

Variable losses also include stray load losses such as minor variations in fixed losses with load and speed and other small miscellaneous losses. Variable losses are approximately proportional to the square of the motor load current.

Motor Efficiency is the output of the motor divided by the electrical input to the motor, usually expressed as a percentage .power or work output is input less losses.

$$\text{Efficiency (\%)} = \frac{\text{Watts output} \times 100}{\text{Watts input}}$$

$$= \frac{746 \times HP \times 100}{E \times I \times PF}$$

$$= \frac{\text{Input - Losses} \times 100}{\text{Input}}$$

3.1.1 Supply Details of Feeders

Type of Service	=	HLT
Name of source of power	=	UGVCL
Service No.	=	UGHT5A 002822

3.1.2 Substation & Transformer Details

Make	=	AMES IMPEX ELECTRICALS,
Capacity of T/F	=	315 kva
Voltage HT	=	11000

LT = 433

Transformer Losses & Efficiency

The efficiency varies anywhere between 96 to 99%. The efficiency of the transformer not only depends on the design, but also, on the effective operating load. Normally best efficiency loading of the transformer is around 50% of the rated capacity.

From above analysis we observe that transformer is loaded sufficiently and performance is as per the norms. Transformer losses consist of two parts: No load loss (Core loss) and load loss (Copper loss) No load loss is the power consumed to sustain the magnetic field in the transformer's steel core. Core loss occurs whenever the transformer is energized; core loss does not vary with load.

Load loss (Copper) is associated with full load current flow in the transformer windings. Copper loss is power lost in the primary and secondary windings of a transformer due to the ohmic resistance. Copper loss varies with the square of load current ($P=I^2R$)

Whenever two transformers are operating in parallel, both should be technically identical in all aspects and more importantly should have the same impedance level. This will minimize the circulating current between transformers.

Energy Conservation Analysis

Conversion of Delta to Star Connection

The induction motor with a percentage loading below 50% would operate at lower efficiency in delta mode. This efficiency at low loading can be improved by converting delta connection into star connection. The reported savings due to this conversion varies from around 3% to 10% because the rated output of motor drops to $1/3^{rd}$ of delta configuration without affecting performance and the percent loading increases as compared to delta mode. This option does not require any capital investment and is one of the least cost options available for the energy conservation in induction motors.

Though the margin of saving due to this option is low, but as the plant installations

normally have hundreds of motors, converting most of the under loaded motors in the plant would result into considerable savings.

Some motors operate on step loading and some on continuously variable load. The motors which operate on step loading, techno-economic feasibility of Delta-Star Automatic Change-over Switch is to be worked out (e.g. a machine with an induction motor performs three operations in its operating cycle resulting into motor loading of 25%, 40% & 80%; in such cases permanent delta to star conversion is not possible. An automatic delta-star change-over controller could be installed there. It will connect the motor in star mode in 25% & 40% motor load operations; and in delta mode in 80% load operation). For the applications where starting torque requirement is high but otherwise the load is low, Automatic Delta to star Converter can give significant energy savings.

The motors which operate on continuously variable load, feasibility of installing Soft-Starter/Energy Saver is to be worked out.

This option of permanent Delta to Star conversion cannot be implemented for the loads where starting torque requirement is very high. While implementing permanent Delta to Star conversion, care should be taken to decrease the setting of over load protection relay to 2/3rd of the delta setting. The individual motor load study is shown in table.

POWER CONSUMPTION											
Sr. No.	**Equipment**	**Hp**	**V**	**A**	**KW**	**PF**	**KVA**	**KVAR**	**% Loading**	**DRIVE**	**HZ**
1	PULL TRUSION-8		402	7.8	5.3	0.98	5.43	1.19		YES	30
2	PULL TRUSION-1		406	7.4	5.1	0.97	5.2	1.03		YES	24
3	PULL TRUSION-5	16	406	15.2	10.5	0.99	10.7	2.00	74.8	NO	
4	PULL TRUSION-7	14	401	15.4	10.6	0.98	10.7	1.43	86.3	NO	
5	PULL TRUSION-9	16	402	15.6	10.3	0.99	10.9	3.45	73.3	NO	
6	DUST COLLECTOR	7.5	407	6.2	3.3	0.75	4.37	2.87	50.1	NO	
7	DUST COLLECTOR	7.5	401	4.1	2.3	0.78	2.85	1.68	34.9	NO	

8	POWER PRESS-5	5	401	9.4	3.6	0.6	6.53	5.45	82.0	NO	
9	COMPRESSOR-1	10	406	10.3	5.7	0.8	7.24	4.47	64.9	NO	
10	COMPRESSOR-2	5	402	5.8	2.5	0.64	4.04	3.17	57.0	NO	
11	COMPRESSOR-3	10	401	12.1	6.7	0.82	8.4	5.07	76.3	NO	
12	COMPRESSOR-4	7.5	401	9.1	4.7	0.76	6.32	4.23	71.4	NO	
13	BORE	12	405	19.1	11.6	0.86	13.4	6.70	110.1	NO	
14	MOULDING PRESS-3	10	410	8.1	5.6	0.99	5.75	1.31	63.8	NO	
15	MOULDING PRESS-1	10	409	13.8	9.7	0.99	9.78	1.21	110.5	NO	
16	MOULDING PRESS-6	10	400	18.6	11.2	0.99	12.9	6.37	127.6	NO	
17	MOULDING PRESS-2	7.5	408	12.6	8.8	0.99	8.9	1.36	133.7	NO	
18	MOULDING PRESS-8	75	410	2.9	1.8	0.99	2.06	1.00	2.7	NO	
19	MOULDING PRESS-4	20	401	34.1	19.2	0.94	23.7	13.87	109.4	NO	
20	INJECTION MOULDING	20	407	17.3	9.7	0.77	12.2	7.39	55.3	NO	

Conversion of Standard Motor with Energy Efficient Motor

As the efficiency of standard motor at less loading is low, its operating performance get reduces considerably. If the delta to star change over option is not suitable for improving the efficiency, replacement of existing standard motor with energy efficient motor could be very viable. The condition switch increases viability of installing energy efficient motors are as follows:

Standard motor operating at low load is replaced by a lower rated (HP) energy efficient motor

Operational hours are high (nearly continuous)

Standard motor is old, number of rewinding are more and frequent

The efficiency of the Energy efficient motor is almost constant at all percentage loadings. Due to its flat efficiency characteristics, it maintains efficiency almost constant at all loads. Normally, this option is suitable for the motors with rated capacity below 50 HP. The efficiencies of standard motors above 50 HP rating are almost similar to that of energy efficient motors. In many cases, though the initial cost of energy efficient motor is 15 to 20% higher than the

standard motor, the simple payback period is less due to the savings.

Using Soft Starters & VFD

Soft starters, which have solid state electronic components, are used to control the input voltage according to the torque required by the driven equipment. Thus at almost all the load the motor operates at same efficiency and power factor.

This results in smooth starting of the motors by drawing lower current and thus avoiding the high instantaneous current normally encountered. Starting current and torque are directly related to the voltage applied when starting the motor. By reducing the line voltage when the motor is started, soft starter reduces the starting inrush current and eliminates the high impact or jerk starts that causes mechanical wear and damage. Soft starters are useful in cases where motors operate with high impact loads. Some of the applications are Cranes, Conveyors, Hoists, Compressors, etc.

Use of High Efficiency Motors

Following tables shows efficiencies of standard efficiency motors and energy efficiency motors.

Efficiencies of Standard Motors (415 V, AC, 4 Pole)

OUTPUT	**CURRENT**	**Efficiency at % shaft load**			**Power Factor at % shaft Load**		
KW	Amp	100%	75%	50%	100%	75%	50%
2.2	4.8	78	73	69	0.82	0.78	0.68
3.7	7.9	82	81	78	0.81	0.75	0.69
5.5	11	83	82	80	0.84	0.79	0.73
7.5	14.5	87	86	84	0.85	0.81	0.73
9.3	17.5	88	87	85	0.85	0.81	0.73
11	20	88	87	85	0.86	0.82	0.74
15	27	89	88	86	0.87	0.83	0.75
18.5	33	89	88	86	0.89	0.85	0.77

22	38	91	90	88	0.89	0.85	0.77
30	53	92	91	89	0.86	0.82	0.74
37	65	92.5	92	90	0.86	0.82	0.74
45	78	93	92	90	0.87	0.83	0.75

Efficiencies of Energy Efficient Motors (415 V, AC, 4 Pole) as per IEEMA

0.37	71	1.4	73
0.75	80	1.7	78
1.1	90S	2.9	83.8
2.2	100L	5.1	86.4
3.7	112M	8.1	88.3
5.5	132S	11.4	89.2
7.5	132M	15.4	90.1
11	160M	22	91
18.5	180M	36	92.2
30	200L	56	93.2
37	225S	69	93.6
45	225M	84.0	93.9
75	280S	134.0	94.7
90	280M	164.0	95.0

It may be noted that there is a 3% improvement in efficiency for an 11 KW motor if an energy efficient motor is selected. The efficiency improvement may be greater in the case of rewound motors, especially if the rewinding practices are poor. Heating of the stators above 350°C due to over-heating or use of open flame for extracting the old winding can lead to damage of the steel laminations of the core, leading to increased iron losses.

Energy efficient motors have lower slip and hence these operate at slightly higher speed.

Hence in the case centrifugal / axial pumps and blowers, this may lead to slightly higher flows and some increase in power (as power is apprx. Proportional to cube of the speed). Hence for these applications, use of energy efficient motors should be done carefully to ensure that the increased power requirement does not neutralize the reduction in motor losses. Measures like change in pulley ratios or trimming of impellers may have to be done to maintain the flow at existing levels.

We suggest to installvfd drive in pull trusion machine.

Total power consumption of pull trusion machine no:5,7,9 is 31 kw.if we install vfd in this machine we can get 20%savesing approximately**.**

Sr.No	Parameters	Data
1	Power consumption of pull trusion machine 5,7,9	31
2	Operating hr/day	24
3	Unit cost	7.3
4	Annual working days	330
5	%age saving possible	0.2
6	Annual monetary saving	358459
7	Investment of VFD	100000
8	Simple payback period	3.3477

General Selection criteria for Energy Efficient Motors:

- For purpose of motor for a new application, the payback period on the differential price is likely to be 1 to 2 years, depending on the rating, running hours and the tariff.
- For replacing an existing running motor, the payback period is likely to be about 2 to 3

years, after considering some salvage value for the existing motor.

- For replacing a burnt-out motor, which otherwise would have been rewound, the payback period is likely to be about 1.5 to 2.5 years

Compressor

Sr.No.	Parameter	10 HP(IR)
1	Motor HP	10
2	Motor RPM	
3	Motor KW	7.46
4	Measure current in load	10.3
5	Measure Current in unload	0
6	Measure KW in load	5.7
7	Measure Kw in Unload	0
8	Unit Cost Rs	7.30
9	load opt hrs/day	9
10	Opt. Hr/day unload	0
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	123581.7
14	Total opt cost	123581.7
	Total opt cost	123595.7

Sr.	Parameter	10 HP

No		
1	On pressure kg/cm2	6
2	Off Pressure Kg/cm2	8
3	Required Pressure setting kg/cm2	7
4	% power saving possible	8
5	Annual operating cost	123595.7
6	Annual monetary saving possible	9887.656
7	Total saving possible	9887.656
8	Investment	0

Sr.No.	Parameter	10 HP
1	Motor HP	10
2	Motor RPM	
3	Motor KW	7.46
4	Measure current in load	12.1
5	Measure Current in unload	0
6	Measure KW in load	6.7
7	Measure Kw in Unload	0
8	Unit Cost Rs	7.30
9	load opt hrs/day	9
10	Opt. Hr/day unload	0
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	145262.7

14	Total opt cost	145262.7
	Total opt cost	145262.7

Sr. No	Parameter	10 HP
1	On pressure kg/cm2	6
2	Off Pressure Kg/cm2	8
3	Required Pressure setting kg/cm2	7
4	% power saving possible	8
5	Annual operating cost	145262.7
6	Annual monetary saving possible	11621.016
7	Total saving possible	11621.016
8	Investment	0

Sr.No.	Parameter	7.5 HP
1	Motor HP	7.5
2	Motor RPM	
3	Motor KW	5.595
4	Measure current in load	9.1
5	Measure Current in unload	0
6	Measure KW in load	4.7
7	Measure Kw in Unload	0
8	Unit Cost Rs	7.30

9	load opt hrs/day	9
10	Opt. Hr/day unload	0
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	101900.7
14	Total opt cost	101900.7
	Total opt cost	101914.7

Sr. No	**Parameter**	**7.5 HP**
1	On pressure kg/cm2	6
2	Off Pressure Kg/cm2	8
3	Required Pressure setting kg/cm2	7
4	% power saving possible	8
5	Annual operating cost	101914.7
6	Annual monetary saving possible	8153.176
7	Total saving possible	8153.176
8	Investment	0

Sr.No.	**Parameter**	**5 HP**
1	Motor HP	5
2	Motor RPM	
3	Motor KW	3.73
4	Measure current in load	5.8
5	Measure Current in unload	0

6	Measure KW in load	2.5
7	Measure Kw in Unload	0
8	Unit Cost Rs	7.30
9	load opt hrs/day	9
10	Opt. Hr/day unload	0
11	Annual Opt day	330
12	Annual Unload opt cost	0
13	Annual Load opt cost	54202.5
14	Total opt cost	54202.5
	Total opt cost	54202.5

Sr. No	**Parameter**	**5 HP**
1	On pressure kg/cm2	6
2	Off Pressure Kg/cm2	8
3	Required Pressure setting kg/cm2	7
4	% power saving possible	8
5	Annual operating cost	54202.5
6	Annual monetary saving possible	4336.2
7	Total saving possible	4336.2
8	Investment	0

LIGHTINGS

INTRODUCTION:

Lighting accounts for less than 5% of the electricity consumption in most industries. In spite of the fact that lighting is a not major energy consuming center in the industry, considerable developments have taken place in this area, hence the scope for energy saving is significant. Light output is measured in lumens and the availability of light in a particular area is called luminance, which is measured in lumens/sq. m or lux. The illuminance level in Indian industry, with some rare exceptions, is generally much lower than the recommended levels. Some of the working planes and the required Lux levels are given below :

Type of interior or activity	**Min. illuminance required (lux)**
Offices	
General Offices	300
Deep-plan general offices	500
Computer workstation	300
Conference rooms and executive offices	300
Banks and building societies	
Counter and office area	300
Public area	200
Laundries	
Receiving, sorting, washing, drying, ironing,	
Dispatch, dry cleaning	200
Pressing, inspection	300
Places of public assembly	
Public room, villages halls and worship halls	200
Hotels	
Entrance halls	50

Reception, cashier's and porters desks	200
Bars, coffee, base, dining rooms, grill rooms,	
Restaurants and lounges	125
Cloakrooms and baggage rooms	50
Libraries	
General	200
Counters	300
Book shelves	100
Reading rooms	200
Display and exhibit areas	
Exhibits insensitive to light	200
Workshops	300
Museums and art galleries	
Exhibits insensitive to light	200
Workshops	300
Sports facilities	
Multi purpose sports halls	300
Education	
Assemble halls general	200
Platform and stage	250
Lecture theatres	
General	200
Seminar rooms	300
Art rooms	300
General building areas	

Entrance	
Entrance halls, lobbies, and waiting rooms	150
Enquiry desks	300
Gatehouses	150
Circulation areas	
Lifts	50
Corridors, passageways and stairs	50
Escalators and elevators	100
Staff rooms	
Changing, locker and cleaners room, lavatories	50
Rest room	100
Staff Restaurants	
Canteens, cafeterias, dining rooms, mess room,	
Vegetable preparation, washing up areas	200
Food preparation and cooking	300
Food stores and cellars	100
Communications	
Switchboard rooms	200
Telephone apparatus rooms	100
Telex and post room	300
Car parks	
Covered parks	
Floors	10
Ramps an corners	30
Entrances an exits	50
Control booths	150
Outdoor parks	10

It may be noted that it is not always necessary to provide exactly the same illuminance level as given above. Since the issue of lighting is subjective, care should be taken to provide satisfactory lighting which will facilitate people to do their tasks, without straining their eyes.

Note: Highlights of T5 tube lights

- **Upto 45% power savings and commensurate reduction in maximum demand**
- **Improvement in power factor from 0.5 to over 0.95 lagging at the source which earns you savings in the form of reactive power compensation.**
- **Reduction in KVA demand &reduction in distribution losses in the system.**
- **Improvement in overall power quality**
- **More lux output**
- **Flicker free starting & illumination**

Following table mentions easy replacement of equivalent light source. This is for present replacement and future reference.

The replacement of the standard lamps with the energy efficient lamps is shown below:

Standard Light	Replace with
Incandescent(40 W)	CFL 9W
Incandescent(60 W)	CFL 11 W
Incandescent(100 W)	CFL 13 W
HPMV(125 W)	HPSV(70 W)
HPMV(250 W)	HPSV(100 W)
HPMV(400 W)	HPSV(250 W)

Type of lamps, their wattage and luminaries have to be selected considering the tasks being performed, the mounting height and the lamp efficacy. Apart from illuminance requirement another parameter which is important is color rendering, which is very much specific if the task involves distinguishing colors. Luminary's selection also may be done to maximize light

availability in the work area. Use of mirror optics for fluorescent tube light fittings is one such example. Mirror optics is now being extensively used for office and commercial lighting.

INSULATE ELECTRIC HEATER

During audit we found that there where no insulation on electric heater of pull tansion machine This low insulation position have high radiation heat loss. So we suggest to insulate the heater with proper insulation to avoid heat loss.

INSULATE HEATER		
Sr.No	**Parameters**	
1	Total ununisulate area m2	1.6
2	Avg. Surface Temp	125
3	Enthalpy of heat kcal/ c/ hr	1560
4	operating time	24
5	Annual working days	330
6	kcal of 1 kw	859.85
7	heat loss /day in kcal/day	37440
9	Daily energy saving kwh	43.54248
10	Annual energy saving in kwh	14369.02
11	unit cost	7.3
12	Annual monetary saving in Rs	104893.8

Energy Efficient Technologies Applicability

Sr No	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment	Hours of Operation / day	Nos	Estd Potential for Savings (%) *Order of magnitude of savings margin indicated in brackets*
	Motors & Lighting					
1	Soft Starter Energy Savers	Not App				*(3% of operating kW)*
2	Variable Speed Drives (Hydraulic)	Not App				*(3-5% of operating kW)*
3	Variable Speed Drives (Electronic)	Applicable	Drive	24	1	*(5-15% of operating kW)*
4	PMDC for Variable Speed Applications	Not App				*(10-15% on average operating kW)*
5	Maximum Demand Controller	Not App				*(Reduction of Rs./ kVA / month cost only in case of exceeding CMD)*
6	Auto PF Controller	Not App				*(1% on Energy consumption in terms of distribution loss reduction)*

6	Electronic Timers for Machineries and lighting	Not App				*(Direct Savings – Depe3nds on the excess hours of operation above prescribed time of operation)*
7	Lighting Energy savers(Voltage Controller)	Not App				*(5-15% of operating kW)*
8	Efficient lamps & Luminaries (T5, CFL, Metal Halide, HPSV)	Applicable				*(30-50% of existing lighting kW)*
9	Transparent Roofing/ Sky lites	Not App				*(10-15% n average operating kW)*
	Cooling Towers					*0*
10	Energy efficient water pumps	Not App				*Improvement in existing efficiency upto 75%)*
11	FRP blades for cooling tower fans	Not App				*Being small fans reduction of 5-7% on existing fan kW drawl)*
12	Efficient spray nozzles in cooling Towers	Not App				*(Improves spray in mist form and completely eliminates need for CT – ID fan)*

	Compressed Air systems					
13	Auto ON/OFF Controller	Not App				*(3-5% savings in overall existing Kwh consumption)*
14	Pressure Regulation & Reduction	Not App				*(8% reduction in motor input Kw for every 1 Kg/cm2 reduction in discharged pressure)*
15	Leakage Reduction	Not App				*(Direct saving- leakage based on trial (or estimated) varies between 10-40%)*
16	Tri-vector nozzles for compressed air cleaning application	Not App				*(15% reduction in compressed air end use for a particular cleaning application)*
17	Variable Speed Drive	Not App				*(Depending on ON/OFF cycle compressor capacity can be optimized by speed reduction –by pully modification or VFD)*
	Thermal Energy Systems					
18	Steam Traps Maintenance	Not App				*Identification of fault, leaking traps can save direct steam loss through them 910-40% on case to case basis)*

19	WHR in Boiler system-flue gas for preheating boiler feed water and combustion air & waste steam	Not App				*(Flue gas temperature can be reduced from existing value to 170)C in case of oil fired and 13 C in case of coal fired. Minimum Delta T of flue gas should be 40-50C)*
20	WHR in Furnace &Thermopacks	Not App				*(Flue gas temperature can be reduced from existing value to 170OC in case of oil fired and 13 C in case of coal fired. Here Delta T of flue gas will be huge and WHR potential also huge)*
21	Condensate Recovery	Not App				*(upto 70% recovery is possible –this is direct savings as heat input to the boiler or Hot water requirement for the process)*
22	Repairing of insulation – steam pipes, valves etc.	Not App				*(Cost of re-insulation is paid back in less than 3 months from the energy saving resulting from prevented heat loss)*
23	Ceramics insulation for reducing heat losses from furnace surfaces	Not app				*(5-7 % of existing surface heat loss for temperature below 200 C and 10% for temperature between 300-500C)*
24	Waste heat vapour Absorption chiller	Not App				*(Normal existing KW/TR (anywhere between1-2) will reduce to a meager 0.1 KW/TR feasible only if waste heat is used for VAR)*

GENERAL TIPS FOR BETTER ENERGY CONSERVATION FOR INDUSTRIES

THERMAL UTILITIES

Boilers

• Preheat combustion air with waste heat
(22 0C reduction in flue gas temperature increases boiler efficiency by 1%).

• Use variable speed drives on large boiler combustion air fans with variable flows.

• Burn wastes if permitted.

• Insulate exposed heated oil tanks.

• Clean burners, nozzles, strainers, etc.

• Inspect oil heaters for proper oil temperature.

• Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.

• Improve oxygen trim control (e.g. -- limit excess air to less than 10% on clean fuels).
(5% reduction in excess air increases boiler efficiency by 1% or: 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)

• Automate/optimize boiler blowdown. Recover boiler blowdown heat.

• Use boiler blowdown to help warm the back-up boiler.

• Optimize deaerator venting.

• Inspect door gaskets.

• Inspect for scale and sediment on the water side
(A 1 mm thick scale (deposit) on the water side could increase fuel consumption by 5 to 8%).

• Inspect for soot, flyash, and slag on the fire side
(A 3 mm thick soot deposition on the heat transfer surface can cause an increase in fuel consumption to the tune of 2.5%.)

• Optimize boiler water treatment.

- Add an economizer to preheat boiler feedwater using exhaust heat.
- Recycle steam condensate.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple boilers.
- Consider multiple or modular boiler units instead of one or two large boilers.
- Establish a boiler efficiency-maintenance program. Start with an energy audit and follow-up, then make a boiler efficiency-maintenance program a part of your continuous energy management program.

ELECTRICAL UTILITIES

Electricity Distribution System

- Optimise the tariff structure with utility supplier
- Schedule your operations to maintain a high load factor
- Shift loads to off-peak times if possible.
- Minimise maximum demand by tripping loads through a demand controller
- Stagger start-up times for equipment with large starting currents to minimize load peaking.
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.90 under rated load conditions.
- Relocate transformers close to main loads.
- Set transformer taps to optimum settings.
- Disconnect primary power to transformers that do not serve any active loads
- Consider on-site electric generation or cogeneration.
- Export power to grid if you have any surplus in your captive generation
- Check utility electric meter with your own meter.
- Shut off unnecessary computers, printers, and copiers at night.

Motors

• Properly size to the load for optimum efficiency.
(High efficiency motors offer of 4 - 5% higher efficiency than standard motors)

• Use energy-efficient motors where economical.

• Use synchronous motors to improve power factor.

• Check alignment.

• Provide proper ventilation
(For every 10 oC increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)

• Check for under-voltage and over-voltage conditions.

• Balance the three-phase power supply.
(An imbalanced voltage can reduce 3 - 5% in motor input power)

• Demand efficiency restoration after motor rewinding.
(If rewinding is not done properly, the efficiency can be reduced by 5 - 8%)

Drives

• Use variable-speed drives for large variable loads.

• Use high-efficiency gear sets.

• Use precision alignment.

• Check belt tension regularly.

• Eliminate variable-pitch pulleys.

• Use flat belts as alternatives to v-belts.

• Use synthetic lubricants for large gearboxes.

• Eliminate eddy current couplings.

• Shut them off when not needed.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimise bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.

- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Compressors

- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.
- Periodically inspect compressor intercoolers for proper functioning.
- Use waste heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.

• Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

Compressed air

• Install a control system to coordinate multiple air compressors.

• Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple air compressors.

• Avoid over sizing -- match the connected load.

• Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)

• Turn off the back-up air compressor until it is needed.

• Reduce air compressor discharge pressure to the lowest acceptable setting.
(Reduction of 1 kg/cm2 air pressure (8 kg/cm2 to 7 kg/cm2) would result in 9% input power savings. This will also reduce compressed air leakage rates by 10%)

• Use the highest reasonable dryer dew point settings.

• Turn off refrigerated and heated air dryers when the air compressors are off.

• Use a control system to minimize heatless desiccant dryer purging.

• Minimize purges, leaks, excessive pressure drops, and condensation accumulation.
(Compressed air leak from 1 mm hole size at 7 kg/cm2 pressure would mean power loss equivalent to 0.5 kW)

• Use drain controls instead of continuous air bleeds through the drains.

• Consider engine-driven or steam-driven air compression to reduce electrical demand charges.

• Replace standard v-belts with high-efficiency flat belts as the old v-belts wear out.

• Use a small air compressor when major production load is off.

• Take air compressor intake air from the coolest (but not air conditioned) location.
(Every 50C reduction in intake air temperature would result in 1% reduction in compressor power consumption)

• Use an air-cooled aftercooler to heat building makeup air in winter.

- Be sure that heat exchangers are not fouled (e.g. -- with oil).
- Be sure that air/oil separators are not fouled.
- Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.
- Use a properly sized compressed air storage receiver. Minimize disposal costs by using lubricant that is fully demulsible and an effective oil-water separator.
- Consider alternatives to compressed air such as blowers for cooling, hydraulic rather than air cylinders, electric rather than air actuators, and electronic rather than pneumatic controls.
- Use nozzles or venturi-type devices rather than blowing with open compressed air lines.
- Check for leaking drain valves on compressed air filter/regulator sets. Certain rubber-type valves may leak continuously after they age and crack.
- In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.
- Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

Cooling towers

- Control cooling tower fans based on leaving water temperatures.
- Control to the optimum water temperature as determined from cooling tower and chiller performance data.
- Use two-speed or variable-speed drives for cooling tower fan control if the fans are few. Stage the cooling tower fans with on-off control if there are many.
- Turn off unnecessary cooling tower fans when loads are reduced.
- Cover hot water basins (to minimize algae growth that contributes to fouling).
- Balance flow to cooling tower hot water basins.
- Periodically clean plugged cooling tower water distribution nozzles.

- Install new nozzles to obtain a more-uniform water pattern.
- Replace splash bars with self-extinguishing PVC cellular-film fill.
- On old counterflow cooling towers, replace old spray-type nozzles with new square-spray ABS practically-non-clogging nozzles.
- Replace slat-type drift eliminators with high-efficiency, low-pressure-drop, self-extinguishing, PVC cellular units.
- If possible, follow manufacturer's recommended clearances around cooling towers and relocate or modify structures, signs, fences, dumpsters, etc. that interfere with air intake or exhaust.
- Optimize cooling tower fan blade angle on a seasonal and/or load basis.
- Correct excessive and/or uneven fan blade tip clearance and poor fan balance.
- Use a velocity pressure recovery fan ring.
- Divert clean air-conditioned building exhaust to the cooling tower during hot weather.
- Re-line leaking cooling tower cold water basins.
- Check water overflow pipes for proper operating level.
- Optimize chemical use.
- Consider side stream water treatment.
- Restrict flows through large loads to design values.
- Shut off loads that are not in service.
- Take blowdown water from the return water header.
- Optimize blowdown flow rate.
- Automate blowdown to minimize it.
- Send blowdown to other uses (Remember, the blowdown does not have to be removed at the cooling tower. It can be removed anywhere in the piping system.)
- Implement a cooling tower winterization plan to minimize ice build-up.
- Install interlocks to prevent fan operation when there is no water flow.

- Establish a cooling tower efficiency-maintenance program. Start with an energy audit and follow-up, then make a cooling tower efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching,delamping, etc. (Know the electrical effects before doing delamping.)

- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.

- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficacy (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.

- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.

- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts

- Consider day lighting, skylights, etc.

- Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.

- Use task lighting and reduce background illumination.

- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.

- Change exit signs from incandescent to LED.

DG sets

- Optimise loading

- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.

- Use jacket and head cooling water for process needs

- Clean air filters regularly

- Insulate exhaust pipes to reduce DG set room temperatures

• Use cheaper heavy fuel oil for capacities more than 1MW

Water & Wastewater

• Recycle water, particularly for uses with less-critical quality requirements.

• Recycle water, especially if sewer costs are based on water consumption.

• Balance closed systems to minimize flows and reduce pump power requirements.

• Eliminate once-through cooling with water.

• Use the least expensive type of water that will satisfy the requirement.

• Fix water leaks.

• Test for underground water leaks. (It's easy to do over a holiday shutdown.)

• Check water overflow pipes for proper operating level.

• Automate blow down to minimize it.

• Provide proper tools for wash down -- especially self-closing nozzles.

• Install efficient irrigation.

• Reduce flows at water sampling stations.

• Eliminate continuous overflow at water tanks.

• Promptly repair leaking toilets and faucets.

• Use water restrictors on faucets, showers, etc.

• Use self-closing type faucets in restrooms.

• Use the lowest possible hot water temperature.

• Do not use a central heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.

• Consider the installation of a thermal solar system for warm water.

• If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.

• Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.

• Use freeze protection valves rather than manual bleeding of lines.

• Consider leased and mobile water treatment systems, especially for deionized water.

• Seal sumps to prevent seepage inward from necessitating extra sump pump operation.

• Install pre-treatment to reduce TOC and BOD surcharges.

• Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)

• Verify the sewer flows if the sewer bills are based on them

Cleaner Production Assessment in M/s. Harsha Engineers Ltd.

A. Company Introduction

Harsha Engineers expresses itself as a core engineering company which consistently focuses on continuous learning and experience to produce world class products. Since its inception in 1972, Harsha has leveraged continuous customer engagement to embed world class manufacturing practices thriving on an ecosystem of precision engineering.

From an early start as the manufacturer of taper roller bearing cages, the company runs multiple manufacturing base for brass, steel, and polyamide cages as well a capability to deliver stamping components primarily for the automotive sector. Using manufacturing flexibility and cost competitiveness as its biggest strengths, Harsha has created an emphatic global footprint while adhering to key compliances for manufacturing and environmental standards.

B. Methodology for Cleaner Production Assessment

Cleaner production with great vitality and buoyancy begins a new era of pollution prevention in the history of environmental protection and will become best approach for pollution control in the new century.

Various steps involved while carrying out CP Assessment are mentioned below.

Step 1: Getting Started

- Task 1: Make CP Team
- Task 2: List Process Steps
- Task 3: Identify Wasteful Processes

Selection of Cleaner Production Focus

Step 2: Analyze Process Steps

- Task 4: Process Flowchart
- Task 5: Material and Energy Balance
- Task 6: Assign Cost to Waste Streams
- Task 7: Identify Cause of Waste

Listing of process waste source

Step 3: Generating Cleaner Production Opportunity

- Task 8: Develop CP Opportunities
- Task 9: Select Workable Opportunity

Listing Of Cleaner Production Opportunities

Step 4: Selecting Cleaner Production Solution

- Task 10: Technical Feasibility
- Task 11: Economic Feasibility
- Task 12: Environmental Aspects
- Task 13: Select Solution

Listing Of Cleaner Production Solutions

Step 5: Implementing Cleaner Production Solution

- Task 14: Preparation For Implementation
- Task 15: Implement Cleaner Production Solution
- Task 16: Monitor and Evaluate Results

Successfully Implemented Cleaner Production

Step 6: Maintaining Cleaner Production

- Task 17: Sustain Cleaner Production Solution
- Task 18: Go to Step 1 - Task 3

Ongoing Cleaner Production Efforts

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C. Cleaner Production Team

The Cleaner Production Team consists of the following members-

Sr. No.	Cleaner Production Team
1	Dr. Bharat Jain, Member Secretary, GCPC
2	Mr. Punamchandra Rathod, Dy. Environment Engineer, GCPC
3	Mr. Abhi Patel, Asst. Environment Engineer, GCPC
4	Ms. Disha Bhavsar, Asst. Environment Engineer, GCPC
5	Ms. Tarjani Jani, Additional Asst. Environment Engineer, GCPC

D. List of Products –

Key products of the industry includes

- Brass Cages
- Steel cages
- Polyamide Cages
- Stamped Componenets

L. CP Options-

(1). Use of Kerosene for Splash Cleaning for Assembled Bearing and Swab Cleaning of Individual Parts.

(2). Inspection of Contamination level of the Bearing not inspected.

(3). Dust free Room/Assembly shop of Bearing not maintained.

(4) Erroneous measurement of parallelism, concentricity, flatness, taper, straightness, radial and Axial clearance.

(5) Non Uniform Temp. in Shaker Hearth Furnace

(6) Mar Quenching Oil is being used for Quenching, but Mar Quenching Salt is not the Practice.

(7) Blackening Salt is full of Contamination.

(8) Sampling System is Erroneous.

(9) Roundness Testing is used for setting parameter of M/c.

(10) Micro Structure Like Type of Martensite, Retained Austenite, Benetic Structure, is not being inspected.

(11) Sub-Zero Treatment is not being done in the cluster

(12) Micro Hardness measurement is not practice.

(13) Speed, Feed and Depth of cut for Turning and grinding are not optimum.

(14) Precision Measuring Instrument are all shop made.

(15) Fatigue Testing of Bearing not being carried out.

(16) No phosphating of Inner and outer ring.

(17) Go-No-Go gauges practice is not existed.

ENERGY ASSESSMENT REPORT

SUMMARY OF ENERGY SAVING OPPORTUNITIES

SR.NO	SCHEMES	ANNUAL SAVING	ANNUAL KWH SAVING	INVESTMENT	PAYBACK PERIOD
1	REPLACE TUBE LIGHTS WITH ENERGY EFFICIENT TUBE LIGHT	61727	8101	40000	7.8
2	REPLACE CEALING FANS WITH ENERGY EFFICIENT 28W FANS	27432	3600	55000	24.1
	Total	**89159**	**11701**	**95000**	12.8

ELECTRICAL ENERGY MANAGEMENT & AUDITING

Electrical energy is one of the major inputs for the economic development of any country. Since the major sources of energy are depleting at a rate faster than the rate at which they are replenished it becomes imperative that the usage of energy is managed efficiently for sustainable development of the country.

Further since modern technology is so dependent on energy it is necessary that all precautions are maintained towards the safe usage of energy also. Unsafe practices could lead to both loss of life and property.

The most important tool for efficient and safe use of energy is “information”, information on energy inputs, information on energy use, information on actual loaded capacity of equipment doing work etc. This brings us to the old adage “fore-warned is fore-armed”. A systematic and scientific approach to the collection of information and presentation of the same is called auditing. This has taken the following shapes in due course of time depending on the depth to which the final audit is required:

- Detailed Energy Audit
- Electrical Safety Audit

- Power Quality Audit

Subsequent to the collection of information a report is prepared bringing out the interpretations and recommendations to reduce the energy consumption of the facility. The Auditing program is a grand success only when the recommendations suggested and identified in the report shall be implemented on a time bound schedule and shall be closely monitored post implementation.

DETAILED ENERGY AUDIT

The preliminary step for decision making in the area of efficient energy management is an Energy Audit. Energy Audit attempts to identify all the energy streams in a facility and map the energy usage. It attempts to balance the energy inputs to the use thus identifying or eliminating wastage in the process. The Energy Audit has been defined as "the verification, monitoring and analysis of the use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

Thus the Detailed Energy Audit will bring out the efficiencies of all electrical energy consuming equipment based on the energy consumption. The Audit will bring out the inefficiencies in the power quality of the facility like harmonics, low power factor etc. It will bring out Energy Conservation measures (ECM) to efficiently use natural energy sources like solar energy for heating and lighting, geothermal energy for cooling etc existing energy consuming equipment. Finally it will bring out the necessary tools to be used for monitoring efficient use of energy post implementation of energy saving measures.

For this purpose the information to be collected during the detailed energy audit includes:

- Energy consumption by type of energy, by department, by major energy consuming equipment
- Energy cost
- Process and material flow diagrams.
- Generation and distribution of site services (e.g. Compressed air, Thermic Fluid Heater)

- Sources of energy supply.
- Potential for fuel substitution, process modification etc.
- Energy management programs and energy training programs.
- Existing baseline information

SCOPE OF ENERGY AUDIT

The scope of the present audit was to carry out a detailed and comprehensive study of the energy consumption and usage by Bikanervala Foods Pvt. Ltd.. Energy conservation methods were to be identified. Investment proposals required for implementation of the recommendations were to be brought out in the report along with the economic payback calculations.

For this purpose the following areas were studied in detail.

G. Electrical Distribution system
    19. Electricity distribution in various areas
    20. Study of reactive power management
    21. Options for power factor improvement
    22. Normal and emergency loads
    23. Cable loading
    24. Harmonics Study
    25. Current unbalance study
    26. Voltage unbalance study
    27. Exploring Energy Conservation Options

H. Review of other Heavy Electrical Equipment
    5. Other Miscellaneous Loads
    6. Exploring Energy Conservation Options

I. Energy Monitoring and Accounting System
    9. Present system of metering
    10. Present system of recording and data Logging
    11. Present system of periodic performance analysis
    12. Recommendations of effective energy monitorin

ENERGY AUDIT LIMITATIONS

- The audits are based on Site inspection, detailed measurements & investigations only.
- The inspection involves visual observations also since in many cases it is not possible to dismantle equipment for measurements.
- Information obtained from the staff of the client is assumed to be true and accurate for the purposes.
- Reasonable assumptions with respect to name plate details of equipment have to be made in the absence of name plate and original design data.
- No inspection within ceilings or other concealed spaces can be undertaken.
- The audit does not address any issues with local Building laws and bye-laws.
- No allowance is made to liaise with any other external consultants or agencies for further information.
- Information obtained from other parties has been assumed true and accurate for the purposes.
- Measurements are done at the main control points assuming that all the points in the control circuit down the line are on.

MAJOR INSTRUMENTS USED FOR ENERGY AUDIT

- NANOVIP Plus Power Analyzer for measuring parameters like Voltage, Current, Power, Power factor, frequency etc. With Data logging
- Ultrasonic water flow meter
- Flue Gas Analyzer
- Digital temperature indicator for temperature measurement
- Infrared Temperature indicator for surface temperature measurement

Note: The entire Energy Audit instrument which was utilizes during the field work.

SITE OVERVIEW

ENERGY SOURCE:

Power is available to the factory from nearby Electricity Board, substation via HT service at 11 KV. As a standby power supply

METERING SYSTEM:

The consumption of the power is being recorded at "Incoming meter" for Electricity board metering purpose.

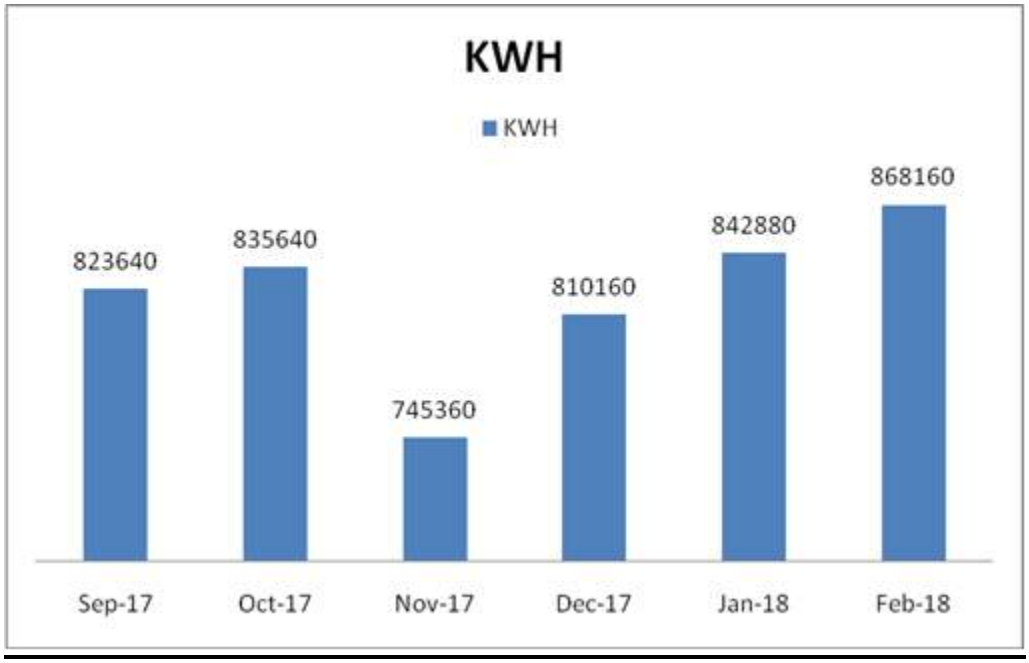
ENERGY END USE DETAILS:

The incoming line carries 11 KV power supply from nearby substation in the customer's premises. Then after with the help LT panel, network is designed to match the application of premises.

To understand the power flow with in premises, we have Analysis the bills of the plant.

Billing Details

Months	KWH	B.D	C.D	85% Of C.D	PF	Amount	Unit cost
Sep-17	823640	1751	1900	1615	0.999	6311601	7.66
Oct-17	835640	1753	1900	1615	0.999	6389058	7.65
Nov-17	745360	1687	1900	1615	0.998	5734446	7.69
Dec-17	810160	1751	1900	1615	0.998	6212932	7.67
Jan-18	842880	1694	1900	1615	0.998	6403438	7.60
Feb-18	868160	1703	1900	1615	0.998	6478639	7.46
Avg.	820973	1723	1900	1615	0.998	6255019	7.62
Avg. unit cost			**7.62**				


KWH
KWH
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Sep-17
Oct-17
Nov-17
Dec-17
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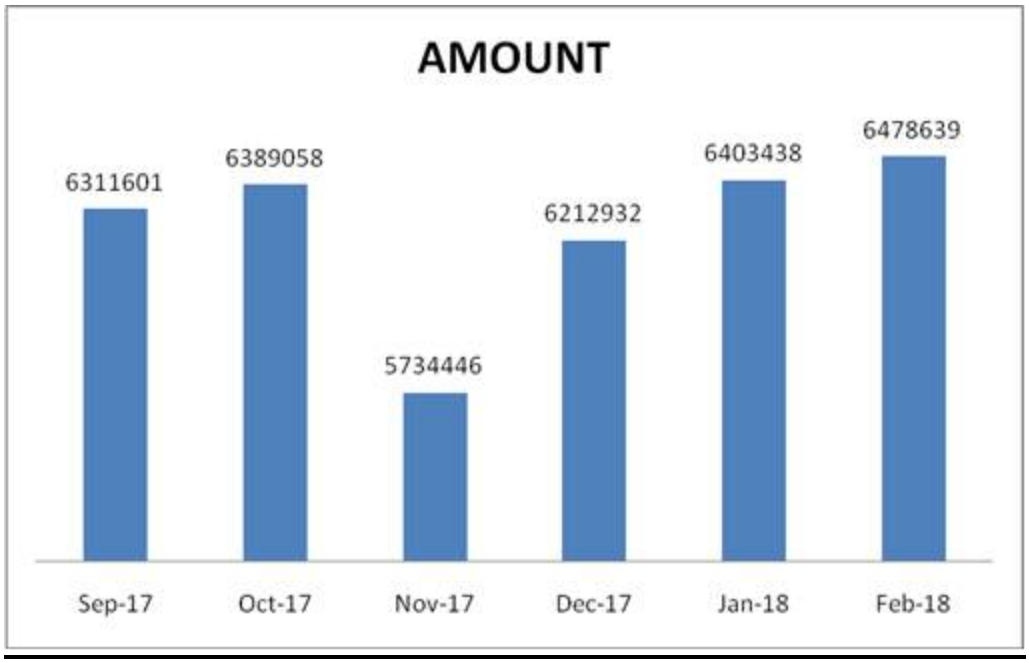
Feb-18


AMOUNT
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Sep-17
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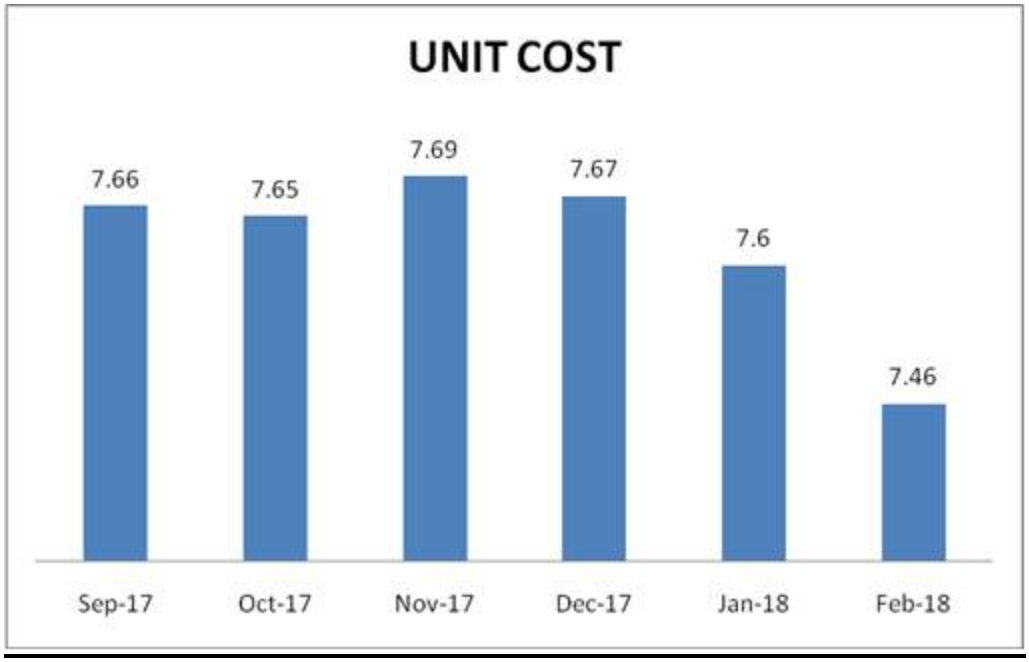

Analysis of Electricity Bill

- Units varies evenly in each Month accordingly production.
- Avg. units are 820973/**month.**
- Avg. Bill Amount is **Rs.6255019/month.**
- Avg. unit rate 7.62 (cost/unit) is
- During site work and data analysis P.F is ok.

Suggestions

Power factor is very good. it is proposed to provide capacitor and maintain 1.00 PF. And avoid KVAR Charges in bill

CAPACITORS:

APFC or Automatic Power Factor Control Panels are mainly used for the improvement of Power Factor. Power Factor can be explained as ratio of active power to apparent power and it is a key factor in measuring electrical consumption. Everyone knows that how costly electricity has become in present time. Therefore it becomes utmost important to cut down on electrical consumption for reducing expenditure.

APFC Panels can effectively and automatically manage quickly changing and scattered loads along with the retention of high Power Factor. We are renowned manufacturers of APFC Panels symbolized with quality and reliability.

The main features of APFC control panels are:

* Maintains high Power Factor constantly
* High efficiency
* In-built independent fuses
* Protection from excess power in the system.
* Prevents leading Power Factor in low load conditions
* Clearly marked buttons and indicators
* Minimizes harmonic current
* Easy to use
* Corrosion-resistant
* Long lasting
* Electrical insulation
* Protects electrical equipments

The advantages of PF improvement by capacitor addition

a) Reactive component of the network is reduced and so also the total current in the system from source end.

b) I2R power losses are reduced in the system because of reduction in current.

c) Voltage level at the load end is increased.

d) KVA loading on the source generators as also on the transformers and lines up to the capacitors reduces giving capacity relief. A higher factor can help in utilizing the full capacity of your electrical system.

ELECTRICAL MOTOR

Introduction:

Motor Losses

Power Losses in a motor are that portion of the input power that becomes heat rather than driving the load. These losses can be divided into two categories-

1. Fixed Loses
2. Variable Losses

Fixed losses are assumed to be constant at all conditions of motor loading from no load to full rated load. This is not exactly true, but it is nearly so, and little significant error is created by this approximation. Fixed losses include magnetic core losses (hysteresis and eddy current) and mechanical friction losses (bearing friction, brush friction, and air friction or windage).

Variable Losses are those that vary with the load on the motor and thus with the motor current. These losses increase as the load on the motor, and therefore the current drawn by the motor, increase. They are primarily the power lost in the resistance of the motor windings and are often called copper losses, or I2R losses.

Variable losses also include stray load losses such as minor variations in fixed losses with load and speed and other small miscellaneous losses. Variable losses are approximately proportional to the square of the motor load current.

Motor Efficiency is the output of the motor divided by the electrical input to the motor, usually expressed as a percentage .power or work output is input less losses.

$$\text{Efficiency (\%)} = \frac{\text{Watts output} \times 100}{\text{Watts input}}$$

$$= \frac{746 \times HP \times 100}{E \times I \times PF}$$

$$= \frac{\text{Input - Losses} \times 100}{\text{Input}}$$

Supply Details of Feeders

Type of Service	=	HLT
Name of source of power	=	UGVCL
Service No.	=	17844

Substation & Transformer Details

C & C TRANSFORMER DETAILS

Make	=	TRANSFORMER & RECTIFIER
Capacity of T/F	=	1500 kva
Voltage HT	=	11000
LT	=	433
HU CURRENT	=	7873
LV CURRENT	=	2000

FOUNDARY TRANSFORMER DETAILS

Make	=	TRANSFORMER & RECTIFIER
Capacity of T/F	=	1000 kva
Voltage HT	=	11000
LT	=	433
HU CURRENT	=	52.49

LV CURRENT	=	677

NEW BRASS TRANSFORMER DETAILS

Make	=	TRANSFORMER & RECTIFIER
Capacity of T/F	=	2000 kva
Voltage HT	=	11000
LT	=	433
HU CURRENT	=	104.98
LV CURRENT	=	2666.67

NEW BRASS TRANSFORMER DETAILS

Make	=	TRANSFORMER & RECTIFIER
Capacity of T/F	=	2000 kva
Voltage HT	=	11000
LT	=	433
HU CURRENT	=	104.98
LV CURRENT	=	2666.67

Transformer Losses & Efficiency

The efficiency varies anywhere between 96 to 99%. The efficiency of the transformer not only depends on the design, but also, on the effective operating load. Normally best efficiency loading of

the transformer is around 50% of the rated capacity.

From above analysis we observe that transformer is loaded sufficiently and performance is as per the norms.

Transformer losses consist of two parts : No load loss (Core loss) and load loss (Copper loss)

No load loss is the power consumed to sustain the magnetic field in the transformer's steel core. Core loss occurs whenever the transformer is energized; core loss does not vary with load.

Load loss (Copper) is associated with full load current flow in the transformer windings. Copper loss is power lost in the primary and secondary windings of a transformer due to the ohmic resistance. Copper loss varies with the square of load current ($P=I^2R$)

Whenever two transformers are operating in parallel, both should be technically identical in all aspects and more importantly should have the same impedance level. This will minimize the circulating current between transformers.

Energy Conservation Analysis

Conversion of Delta to Star Connection

The induction motor with a percentage loading below 50% would operate at lower efficiency in delta mode. This efficiency at low loading can be improved by converting delta connection into star connection. The reported savings due to this conversion varies from around 3% to 10% because the rated output of motor drops to $1/3^{rd}$ of delta configuration without affecting performance and the percent loading increases as compared to delta mode. This option does not require any capital investment and is one of the least cost options available for the energy conservation in induction motors.

Though the margin of saving due to this option is low, but as the plant installations normally have hundreds of motors, converting most of the under loaded motors in the plant would result into considerable savings.

Some motors operate on step loading and some on continuously variable load. The motors which operate on step loading, techno-economic feasibility of Delta-Star Automatic Change-over

Switch is to be worked out (e.g. a machine with an induction motor performs three operations in its operating cycle resulting into motor loading of 25%, 40% & 80%; in such cases permanent delta to star conversion is not possible. An automatic delta-star change-over controller could be installed there. It will connect the motor in star mode in 25% & 40% motor load operations; and in delta mode in 80% load operation). For the applications where starting torque requirement is high but otherwise the load is low, Automatic Delta to star Converter can give significant energy savings.

The motors which operate on continuously variable load, feasibility of installing Soft-Starter/Energy Saver is to be worked out.

This option of permanent Delta to Star conversion cannot be implemented for the loads where starting torque requirement is very high. While implementing permanent Delta to Star conversion, care should be taken to decrease the setting of over load protection relay to 2/3rd of the delta setting. The individual motor load study is shown in table.

Conversion of Standard Motor with Energy Efficient Motor

As the efficiency of standard motor at less loading is low, its operating performance get reduces considerably. If the delta to star change over option is not suitable for improving the efficiency, replacement of existing standard motor with energy efficient motor could be very viable. The condition switch increases viability of installing energy efficient motors are as follows:

Standard motor operating at low load is replaced by a lower rated (HP) energy efficient motor

Operational hours are high (nearly continuous)

Standard motor is old, number of rewinding are more and frequent

The efficiency of the Energy efficient motor is almost constant at all percentage loadings. Due to its flat efficiency characteristics, it maintains efficiency almost constant at all loads. Normally, this option is suitable for the motors with rated capacity below 50 HP. The efficiencies of standard motors above 50 HP rating are almost similar to that of energy efficient motors. In

many cases, though the initial cost of energy efficient motor is 15 to 20% higher than the standard motor, the simple payback period is less due to the savings.

Using Soft Starters & VFD

Soft starters, which have solid state electronic components, are used to control the input voltage according to the torque required by the driven equipment. Thus at almost all the load the motor operates at same efficiency and power factor.

This results in smooth starting of the motors by drawing lower current and thus avoiding the high instantaneous current normally encountered. Starting current and torque are directly related to the voltage applied when starting the motor. By reducing the line voltage when the motor is started, soft starter reduces the starting inrush current and eliminates the high impact or jerk starts that causes mechanical wear and damage. Soft starters are useful in cases where motors operate with high impact loads. Some of the applications are Cranes, Conveyors, Hoists, Compressors, etc.

Use of High Efficiency Motors

Following tables shows efficiencies of standard efficiency motors and energy efficiency motors.

Efficiencies of Standard Motors (415 V, AC, 4 Pole)

OUTPUT	**CURRENT**	**Efficiency at % shaft load**			**Power Factor at % shaft Load**		
KW	Amp	100%	75%	50%	100%	75%	50%
2.2	4.8	78	73	69	0.82	0.78	0.68
3.7	7.9	82	81	78	0.81	0.75	0.69
5.5	11	83	82	80	0.84	0.79	0.73
7.5	14.5	87	86	84	0.85	0.81	0.73
9.3	17.5	88	87	85	0.85	0.81	0.73
11	20	88	87	85	0.86	0.82	0.74
15	27	89	88	86	0.87	0.83	0.75

18.5	33	89	88	86	0.89	0.85	0.77
22	38	91	90	88	0.89	0.85	0.77
30	53	92	91	89	0.86	0.82	0.74
37	65	92.5	92	90	0.86	0.82	0.74
45	78	93	92	90	0.87	0.83	0.75

Efficiencies of Energy Efficient Motors (415 V, AC, 4 Pole) as per IEEMA

0.37	71	1.4	73
0.75	80	1.7	78
1.1	90S	2.9	83.8
2.2	100L	5.1	86.4
3.7	112M	8.1	88.3
5.5	132S	11.4	89.2
7.5	132M	15.4	90.1
11	160M	22	91
18.5	180M	36	92.2
30	200L	56	93.2
37	225S	69	93.6
45	225M	84.0	93.9
75	280S	134.0	94.7
90	280M	164.0	95.0

It may be noted that there is a 3% improvement in efficiency for an 11 KW motor if an energy efficient motor is selected. The efficiency improvement may be greater in the case of rewound motors, especially if the rewinding practices are poor. Heating of the stators above 350°C due to over-heating or use of open flame for extracting the old winding can lead to damage of the steel laminations of the core, leading to increased iron losses.

Energy efficient motors have lower slip and hence these operate at slightly higher speed. Hence in the case centrifugal / axial pumps and blowers, this may lead to slightly higher flows and some increase in power (as power is apprx. Proportional to cube of the speed). Hence for these applications, use of energy efficient motors should be done carefully to ensure that the increased power requirement does not neutralize the reduction in motor losses. Measures like change in pulley ratios or trimming of impellers may have to be done to maintain the flow at existing levels.

General Selection criteria for Energy Efficient Motors:

- For purpose of motor for a new application, the payback period on the differential price is likely to be 1 to 2 years, depending on the rating, running hours and the tariff.
- For replacing an existing running motor, the payback period is likely to be about 2 to 3 years, after considering some salvage value for the existing motor.
- For replacing a burnt-out motor, which otherwise would have been rewound, the payback period is likely to be about 1.5 to 2.5 years.

LIGHTINGS

INTRODUCTION:

Lighting accounts for less than 5% of the electricity consumption in most industries. In spite of the fact that lighting is a not major energy consuming center in the industry, considerable developments have taken place in this area, hence the scope for energy saving is significant. Light output is measured in lumens and the availability of light in a particular area is called luminance, which is measured in lumens/sq. m or lux. The illuminance level in Indian industry, with some rare exceptions, is generally much lower than the recommended levels. Some of the working planes and the required Lux levels are given below :

Type of interior or activity	**Min. illuminance required (lux)**
Offices	
General Offices	300
Deep-plan general offices	500

Computer workstation	300
Conference rooms and executive offices	300
Banks and building societies	
Counter and office area	300
Public area	200
Laundries	
Receiving, sorting, washing, drying, ironing,	
Dispatch, dry cleaning	200
Pressing, inspection	300
Places of public assembly	
Public room, villages halls and worship halls	200
Hotels	
Entrance halls	50
Reception, cashier's andporters desks	200
Bars, coffee, base, dining rooms, grill rooms,	
Restaurants and lounges	125
Cloakrooms and baggage rooms	50
Libraries	
General	200
Counters	300
Book shelves	100
Reading rooms	200
Display and exhibit areas	
Exhibits insensitive to light	200

Workshops	300
Museums and art galleries	
Exhibits insensitive to light	200
Workshops	300
Sports facilities	
Multi purpose sports halls	300
Education	
Assemble halls general	200
Platform and stage	250
Lecture theatres	
General	200
Seminar rooms	300
Art rooms	300
General building areas	
Entrance	
Entrance halls, lobbies, and waiting rooms	150
Enquiry desks	300
Gatehouses	150
Circulation areas	
Lifts	50
Corridors, passageways and stairs	50
Escalators and elevators	100
Staff rooms	
Changing, locker and cleaners room, lavatories	50
Rest room	100
Staff Restaurants	
Canteens, cafeterias, dining rooms, mess room,	

Vegetable preparation, washing up areas	200
Food preparation and cooking	300
Food stores and cellars	100
Communications	
Switchboard rooms	200
Telephone apparatus rooms	100
Telex and post room	300
Car parks	
Covered parks	
Floors	10
Ramps an corners	30
Entrances an exits	50
Control booths	150
Outdoor parks	10

It may be noted that it is not always necessary to provide exactly the same illuminance level as given above. Since the issue of lighting is subjective, care should be taken to provide satisfactory lighting which will facilitate people to do their tasks, without straining their eyes.

Cost benefit Analysis :

Sr. No	Parameter	
1	% age power saving	50
2	Total tube light	100
3	Consumption of tubelinght	0.054
4	Unit cost Rs	7.62
5	Annual opt cost	123444
6	Annual saving Rs	61722

7	Cost of one tube light	400
8	Total investment Rs	40000
9	Simple payback period	7.8

- **Upto 45% power savings and commensurate reduction in maximum demand**
- **Improvement in power factor from 0.5 to over 0.95 lagging at the source which earns you savings in the form of reactive power compensation.**
- **Reduction in KVA demand &reduction in distribution losses in the system.**
- **Improvement in overall power quality**
- **More lux output**
- **Flicker free starting & illumination**

Following table mentions easy replacement of equivalent light source. This is for present replacement and future reference.

The replacement of the standard lamps with the energy efficient lamps is shown below:

Standard Light	Replace with
Incandescent(40 W)	CFL 9W
Incandescent(60 W)	CFL 11 W
Incandescent(100 W)	CFL 13 W
HPMV(125 W)	HPSV(70 W)
HPMV(250 W)	HPSV(100 W)
HPMV(400 W)	HPSV(250 W)

Type of lamps, their wattage and luminaries have to be selected considering the tasks being performed, the mounting height and the lamp efficacy. Apart from illuminance requirement another parameter which is important is color rendering, which is very much specific if the task involves distinguishing colors. Luminary's selection also may be done to maximize light

availability in the work area. Use of mirror optics for fluorescent tube light fittings is one such example. Mirror optics is now being extensively used for office and commercial lighting.

CEILING FAN

Ceiling fan is by default the most used appliance at your home. People are not aware of how much power does ceiling fan consume. An antique and old fan might give a home an antique finish but it can actually result in an additional expense of upto Rs 200 per fan every month.
Ceiling fan is a commonly used house hold appliance. People usually neglect ceiling fan and focus on lightings to save electricity, but the fact is ceiling fan consumes more power than the lightings. Precisely a normal T12 tube light consumes around 55 watts, whereas a old ceiling fan consumes around 80 to 90 watts.

Ceiling Fan Power Consumption is the draw in watts of the ceiling fan on the highest speed excluding the light fixture. The power consumption of a ceiling fan depends on the size and type of motor used in ceiling fan. An ordinary ceiling fan would consume more power as compared to Energy Efficient Ceiling Fan.
To help people make electricity consumption as deciding factor and reduce their electricity bill, we have listed below selected brands in India based on their power consumption.

20 to 32 Watt Ceiling Fans

Typically Energy Star, BLDC or DC Motor ceiling fans are going to be found in this category. These fans consume drastically less energy than any other ceiling fans in the market. Low power consumption means more savings in Electricity.

POWER SAVING BY 28 W Energy Efficienct Fan	
Power consumption of Energy Efficient fan in watts	**28**
Power consumption of existing Fans	**60**
Est. Qty. of Fan required to change	**25**
no of operating hrs	**18**

power consumption savings in kwh	**14.4**
Annual power saving in kwh	**3600**
Hence Daily Power Saving by Fan in Rs.(Unit cost Rs 9.4)	**109.728**
Annual power saving in Rs.	**27432**
Approx. Rate of Fan in Rs.	**2200**
Hence Total investment in Rs.	**55000**
Simple Payback in Months	**24**

2.3 :: Energy Efficient Technologies Applicability

Sr No	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment	Hours of Operation / day	Nos	Estd Potential for Savings (%) *Order of magnitude of savings margin indicated in brackets*
	Motors & Lighting					
1	Soft Starter Energy Savers	Not App				*(3% of operating kW)*
2	Variable Speed Drives (Hydraulic)	Not App				*(3-5% of operating kW)*
3	Variable Speed Drives (Electronic)	Applicable	Drive	24	1	*(5-15% of operating kW)*

4	PMDC for Variable Speed Applications	Not App				*(10-15% on average operating kW)*
5	Maximum Demand Controller	Not App				*(Reduction of Rs./ kVA / month cost only in case of exceeding CMD)*
6	Auto PF Controller	Not App				*(1% on Energy consumption in terms of distribution loss reduction)*
7	Electronic Timers for Machineries and lighting	Not App				*(Direct Savings – Depe3nds on the excess hours of operation above prescribed time of operation)*
8	Lighting Energy savers(Voltage Controller)	Not App				*(5-15% of operating kW)*
9	Efficient lamps & Luminaries (T5, CFL, Metal Halide, HPSV)	Applicable				*(30-50% of existing lighting kW)*
10	Transparent Roofing/ Sky lites	Not App				*(10-15% n average operating kW)*

	Cooling Towers					*0*
11	Energy efficient water pumps	Not App				*Improvement in existing efficiency upto 75%)*
12	FRP blades for cooling tower fans	Not App				*Being small fans reduction of 5-7% on existing fan kW drawl)*
13	Efficient spray nozzles in cooling Towers	Not App				*(Improves spray in mist form and completely eliminates need for CT – ID fan)*
	Compressed Air systems					
14	Auto ON/OFF Controller	Not App				*(3-5% savings in overall existing Kwh consumption)*
15	Pressure Regulation & Reduction	Not App				*(8% reduction in motor input Kw for every 1 Kg/cm2 reduction in discharged pressure)*
16	Leakage Reduction	Not App				*(Direct saving- leakage based on trial (or estimated) varies between 10-40%)*

17	Tri-vector nozzles for compressed air cleaning application	Not App				*(15% reduction in compressed air end use for a particular cleaning application)*
18	Variable Speed Drive	Not App				*(Depending on ON/OFF cycle compressor capacity can be optimized by speed reduction –by pully modification or VFD)*
	Thermal Energy Systems					
19	Steam Traps Maintenance	Not App				*Identification of fault, leaking traps can save direct steam loss through them 910-40% on case to case basis)*
20	WHR in Boiler system-flue gas for preheating boiler feed water and combustion air & waste steam	Not App				*(Flue gas temperature can be reduced from existing value to 170)C in case of oil fired and 13 C in case of coal fired. Minimum Delta T of flue gas should be 40-50C)*
21	WHR in Furnace &Thermopacks	Not App				*(Flue gas temperature can be reduced from existing value to 170OC in case of oil fired and 13 C in case of coal fired. Here Delta T of flue gas will be huge and WHR potential also huge)*
22	Condensate Recovery	Not App				*(upto 70% recovery is possible –this is direct savings as heat input to the boiler or Hot water requirement for the process)*
23	Repairing of insulation – steam pipes, valves etc.	Not App				*(Cost of re-insulation is paid back in less than 3 months from the energy saving resulting from prevented heat loss)*

24	Ceramics insulation for reducing heat losses from furnace surfaces	Not app				*(5-7 % of existing surface heat loss for temperature below 200 C and 10% for temperature between 300-500C)*
25	Waste heat vapour Absorption chiller	Not App				*(Normal existing KW/TR (anywhere between1-2) will reduce to a meager 0.1 KW/TR feasible only if waste heat is used for VAR)*

GENERAL TIPS FOR BETTER ENERGY CONSERVATION FOR INDUSTRIES

THERMAL UTILITIES

Boilers

• Preheat combustion air with waste heat
(22 0C reduction in flue gas temperature increases boiler efficiency by 1%).

• Use variable speed drives on large boiler combustion air fans with variable flows.

• Burn wastes if permitted.

• Insulate exposed heated oil tanks.

• Clean burners, nozzles, strainers, etc.

• Inspect oil heaters for proper oil temperature.

• Close burner air and/or stack dampers when the burner is off to minimize heat loss up the stack.

• Improve oxygen trim control (e.g. -- limit excess air to less than 10% on clean fuels).
(5% reduction in excess air increases boiler efficiency by 1% or: 1% reduction of residual oxygen in stack gas increases boiler efficiency by 1%.)

• Automate/optimize boiler blowdown. Recover boiler blowdown heat.

• Use boiler blowdown to help warm the back-up boiler.

• Optimize deaerator venting.

• Inspect door gaskets.

• Inspect for scale and sediment on the water side
(A 1 mm thick scale (deposit) on the water side could increase fuel consumption by 5 to 8%).

• Inspect for soot, flyash, and slag on the fire side
(A 3 mm thick soot deposition on the heat transfer surface can cause an increase in fuel consumption to the tune of 2.5%.)

• Optimize boiler water treatment.

- Add an economizer to preheat boiler feedwater using exhaust heat.
- Recycle steam condensate.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple boilers.
- Consider multiple or modular boiler units instead of one or two large boilers.
- Establish a boiler efficiency-maintenance program. Start with an energy audit and follow-up, then make a boiler efficiency-maintenance program a part of your continuous energy management program.

ELECTRICAL UTILITIES

Electricity Distribution System

- Optimise the tariff structure with utility supplier
- Schedule your operations to maintain a high load factor
- Shift loads to off-peak times if possible.
- Minimise maximum demand by tripping loads through a demand controller
- Stagger start-up times for equipment with large starting currents to minimize load peaking.
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.90 under rated load conditions.
- Relocate transformers close to main loads.
- Set transformer taps to optimum settings.
- Disconnect primary power to transformers that do not serve any active loads
- Consider on-site electric generation or cogeneration.
- Export power to grid if you have any surplus in your captive generation
- Check utility electric meter with your own meter.
- Shut off unnecessary computers, printers, and copiers at night.

Motors

• Properly size to the load for optimum efficiency.
(High efficiency motors offer of 4 - 5% higher efficiency than standard motors)

• Use energy-efficient motors where economical.

• Use synchronous motors to improve power factor.

• Check alignment.

• Provide proper ventilation
(For every 10 oC increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)

• Check for under-voltage and over-voltage conditions.

• Balance the three-phase power supply.
(An imbalanced voltage can reduce 3 - 5% in motor input power)

• Demand efficiency restoration after motor rewinding.
(If rewinding is not done properly, the efficiency can be reduced by 5 - 8%)

Drives

• Use variable-speed drives for large variable loads.

• Use high-efficiency gear sets.

• Use precision alignment.

• Check belt tension regularly.

• Eliminate variable-pitch pulleys.

• Use flat belts as alternatives to v-belts.

• Use synthetic lubricants for large gearboxes.

• Eliminate eddy current couplings.

• Shut them off when not needed.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimise bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.

- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Compressors

- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.
- Periodically inspect compressor intercoolers for proper functioning.
- Use waste heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.

• Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

Compressed air

• Install a control system to coordinate multiple air compressors.

• Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple air compressors.

• Avoid over sizing -- match the connected load.

• Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)

• Turn off the back-up air compressor until it is needed.

• Reduce air compressor discharge pressure to the lowest acceptable setting.
(Reduction of 1 kg/cm2 air pressure (8 kg/cm2 to 7 kg/cm2) would result in 9% input power savings. This will also reduce compressed air leakage rates by 10%)

• Use the highest reasonable dryer dew point settings.

• Turn off refrigerated and heated air dryers when the air compressors are off.

• Use a control system to minimize heatless desiccant dryer purging.

• Minimize purges, leaks, excessive pressure drops, and condensation accumulation.
(Compressed air leak from 1 mm hole size at 7 kg/cm2 pressure would mean power loss equivalent to 0.5 kW)

• Use drain controls instead of continuous air bleeds through the drains.

• Consider engine-driven or steam-driven air compression to reduce electrical demand charges.

• Replace standard v-belts with high-efficiency flat belts as the old v-belts wear out.

• Use a small air compressor when major production load is off.

• Take air compressor intake air from the coolest (but not air conditioned) location.
(Every 50C reduction in intake air temperature would result in 1% reduction in compressor power consumption)

• Use an air-cooled aftercooler to heat building makeup air in winter.

- Be sure that heat exchangers are not fouled (e.g. -- with oil).
- Be sure that air/oil separators are not fouled.
- Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.
- Use a properly sized compressed air storage receiver. Minimize disposal costs by using lubricant that is fully demulsible and an effective oil-water separator.
- Consider alternatives to compressed air such as blowers for cooling, hydraulic rather than air cylinders, electric rather than air actuators, and electronic rather than pneumatic controls.
- Use nozzles or venturi-type devices rather than blowing with open compressed air lines.
- Check for leaking drain valves on compressed air filter/regulator sets. Certain rubber-type valves may leak continuously after they age and crack.
- In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.
- Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

Cooling towers

- Control cooling tower fans based on leaving water temperatures.
- Control to the optimum water temperature as determined from cooling tower and chiller performance data.
- Use two-speed or variable-speed drives for cooling tower fan control if the fans are few. Stage the cooling tower fans with on-off control if there are many.
- Turn off unnecessary cooling tower fans when loads are reduced.
- Cover hot water basins (to minimize algae growth that contributes to fouling).
- Balance flow to cooling tower hot water basins.
- Periodically clean plugged cooling tower water distribution nozzles.

- Install new nozzles to obtain a more-uniform water pattern.
- Replace splash bars with self-extinguishing PVC cellular-film fill.
- On old counterflow cooling towers, replace old spray-type nozzles with new square-spray ABS practically-non-clogging nozzles.
- Replace slat-type drift eliminators with high-efficiency, low-pressure-drop, self-extinguishing, PVC cellular units.
- If possible, follow manufacturer's recommended clearances around cooling towers and relocate or modify structures, signs, fences, dumpsters, etc. that interfere with air intake or exhaust.
- Optimize cooling tower fan blade angle on a seasonal and/or load basis.
- Correct excessive and/or uneven fan blade tip clearance and poor fan balance.
- Use a velocity pressure recovery fan ring.
- Divert clean air-conditioned building exhaust to the cooling tower during hot weather.
- Re-line leaking cooling tower cold water basins.
- Check water overflow pipes for proper operating level.
- Optimize chemical use.
- Consider side stream water treatment.
- Restrict flows through large loads to design values.
- Shut off loads that are not in service.
- Take blowdown water from the return water header.
- Optimize blowdown flow rate.
- Automate blowdown to minimize it.
- Send blowdown to other uses (Remember, the blowdown does not have to be removed at the cooling tower. It can be removed anywhere in the piping system.)
- Implement a cooling tower winterization plan to minimize ice build-up.
- Install interlocks to prevent fan operation when there is no water flow.

- Establish a cooling tower efficiency-maintenance program. Start with an energy audit and follow-up, then make a cooling tower efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching,delamping, etc. (Know the electrical effects before doing delamping.)

- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.

- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficacy (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.

- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.

- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts

- Consider day lighting, skylights, etc.

- Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.

- Use task lighting and reduce background illumination.

- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.

- Change exit signs from incandescent to LED.

DG sets

- Optimise loading

- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.

- Use jacket and head cooling water for process needs

- Clean air filters regularly

- Insulate exhaust pipes to reduce DG set room temperatures

• Use cheaper heavy fuel oil for capacities more than 1MW

Water & Wastewater

• Recycle water, particularly for uses with less-critical quality requirements.

• Recycle water, especially if sewer costs are based on water consumption.

• Balance closed systems to minimize flows and reduce pump power requirements.

• Eliminate once-through cooling with water.

• Use the least expensive type of water that will satisfy the requirement.

• Fix water leaks.

• Test for underground water leaks. (It's easy to do over a holiday shutdown.)

• Check water overflow pipes for proper operating level.

• Automate blow down to minimize it.

• Provide proper tools for wash down -- especially self-closing nozzles.

• Install efficient irrigation.

• Reduce flows at water sampling stations.

• Eliminate continuous overflow at water tanks.

• Promptly repair leaking toilets and faucets.

• Use water restrictors on faucets, showers, etc.

• Use self-closing type faucets in restrooms.

• Use the lowest possible hot water temperature.

• Do not use a central heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.

• Consider the installation of a thermal solar system for warm water.

• If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.

• Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.

• Use freeze protection valves rather than manual bleeding of lines.

• Consider leased and mobile water treatment systems, especially for deionized water.

• Seal sumps to prevent seepage inward from necessitating extra sump pump operation.

• Install pre-treatment to reduce TOC and BOD surcharges.

• Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)

• Verify the sewer flows if the sewer bills are based on them

6. CHANGODAR BANE CHANDANVAN

"Changodar Bane Chandanvan"

A meeting was held at Pharma SEZ, Changodar on 22nd August, 2017, where the objective of project, scope of work, activities and the basic environmental issues of Changodar region related to solid waste, industrial and domestic wastewater collection, treatment and disposal, water logging etc were discussed.

In that meeting, it was discussed and proposed to start "Changodar bane Chandanvan" Abhiyan under banner of "Swachchh Bharat Mission" of Government of India. The objective behind this abhiyan is to make Changodar Clean and Green.

Under this, various activities like Cleanliness Drive for cleaning of roads, provision of dustbins, and provision of MSW management facility etc for solid waste management will be carried out.

Looking to experience of **COO, Zydus Infrastructure Private Limited, it was proposed that COO can become** Brand Ambassador and provide more vision and support for "Changodar Bane Chandanvan" Abhiyan.

Scan Copy of Letter sent to COO, ZIPL

File No: GCPC/CHANGODAR ENV. ISSUES/2017/270-A/ 495.

Date: 05/02/2018

To,
Chief Operating Officer
Zydus Infrastructure Private Limited
"PHARM SEZ" Sarkhej –Bawla Road,
Village Matoda,
Tal. Sanand District, Ahmedabad

Sub: Diagnosis Study of Present Environmental Issues of Changodar Industrial Area.
Ref: Meeting held at Pharma SEZ, Changodar, dated: 22nd August, 2017

Dear Sir,

As you are aware that Gujarat Cleaner Production Centre (GCPC) has been established by Industries & Mines Department, Government of Gujarat, with technical guidance of United Nations Industrial Development Organization (UNIDO) and since 1998 the centre is actively engaged in the promotion of Cleaner Production (CP)/Clean Technology (CT) through its various activities such as Orientation/Awareness programmes, CP Assessment projects, CP Demonstration projects, CP Dissemination programme etc. Contributions of GCPC over the years towards promotion of CP / CT in the state of Gujarat to improve the productivity and reduce the environmental problems faced by SMEs have been significant.

GCPC with the support of Department of Forests and Environment, Government of Gujarat is working on the project of "Diagnosis Study of Present Environmental issues of Changodar Industrial Area". This Diagnosis study includes Identification of Major Environment related issues of Changodar Industrial Area i.e Domestic and industrial waste water, Feasibility of Common Effluent Treatment Plant for Industrial Waste Water, Feasibility of Sewage Treatment Plant for residential/commercial Waste Water, Cleaner production assessment in selected industries.

The objectives of this project are: (1) Identification of pollution load (Industrial & Domestic Wastewater and Storm water of Changodar Industrial Area (2) Identification of Hazardous and

other waste, Municipal Solid waste generated from the industries of Changodar Industrial Area (3) Identification of mechanism for Environmental Management System for collection, treatment, conveyance and disposal of waste in Changodar Industrial Area. (4) Cleaner Production Assessment in selected industries

With reference to above, a meeting was held at Pharma SEZ, Changodar on 22nd August, 2017, where the basic environmental issues of Changodar region related to solid waste, industrial and domestic wastewater collection, treatment and disposal, water logging etc was discussed.

As discussed, it is proposed to start "Changodar bane Chandanvan" Abhiyan under banner of "Swachcch Bharat Mission" of Government of India. The objective behind this abhiyan is to make Changodar Clean and Green.

Under this, various activities like Cleanliness Drive for cleaning of roads, provision of dustbins, provision of MSW management facility etc for solid waste management will be carried out.

Looking to your interest and enthusiasm, I take an opportunity to invite you to initiate these activities as a Brand Ambassador and provide more vision and support for "Changodar Bane Chandanvan" Abhiyan.

Looking forward to receive your acceptance letter with some concrete suggestion.

Thanking You.

Yours Faithfully,

Member Secretary

GCPC

7. STUDY TOUR OF ENGINEERING COLLEGE STUDENT

Study tour of final year students/faculties of Chemical Engineering Department of SAL Institute of Technology & Engineering Research at Zydus Cadila, R & D Centre, Changodar, Ahmedabad

Department of Forests and Environment, Government of Gujarat and GCPC is working on a project of "Diagnosis Study of Present Environmental issues of Changodar Industrial Area". One of the project activities is to disseminate the good initiative in the field of environmental pollution prevention to industries & academia.

Under this, a study tour of final year students / faculties (around 30-35 participants) of Chemical Engineering Department of SAL Institute of Technology & Engineering Research was organized on 22/03/2018 to improve their knowledge and also helps the students and faculty to get the over view of actual practices involving Unit processes and Unit operations applied to convert the basic raw materials to useful products, minimization of wastes, reuse and recycle technology and conservation of the environment and also learn the industrial discipline and behavior.

Study Tour Schedule

Time	Activity
11.00 to 12.30	Site Visit of Unit
12.30 to 1.30	Lecture and discussion
1.30 onwards	Lunch

This visit has enriched the students and the faculty members in this challenging field and provided opportunities to interact with experts.

Study tour of final year students/faculties of Chemical Engineering Department of Vishwakarma Government Engineering College, Ahmedabad

at

Zydus Cadila, R & D Centre, Changodar, Ahmedabad

Also a study tour of final year students / faculties (around 30-35 participants) of Chemical Engineering Department of **Vishwakarma Government Engineering College, Ahmedabad** was organized on 23/03/2018 to improve their knowledge and also helps the students and faculty to get the over view of actual practices involving Unit processes and Unit operations applied to convert the basic raw materials to useful products, minimization of wastes, reuse and recycle technology and conservation of the environment and also learn the industrial discipline and behavior.

Study Tour Schedule

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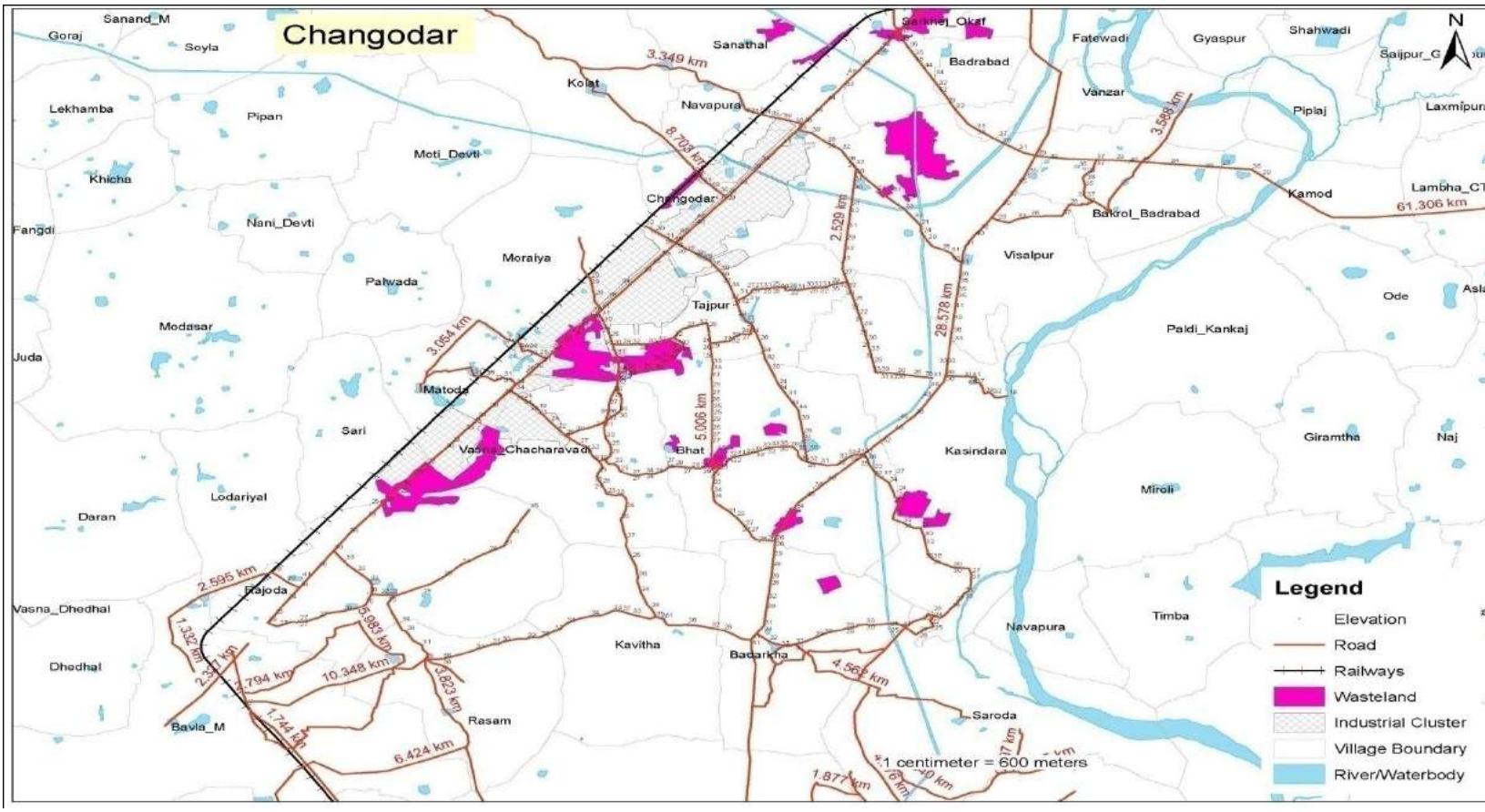
This visit has enriched the students and the faculty members in this challenging field and provided them the opportunities to interact with experts.

8. DISSEMINATION PROGRAMME

DISSEMINATION PROGRAM ON

Diagnosis Study of Present Environmental issues of Changodar Industrial Area



Venue: Conference Hall, Changodar Chamber of commerce, Changodar

Date: 11th January, 2018, **Time:** 11:00 am to 1:00 pm

A dissemination programme inviting various industries from Changodar Industrial Area was organized at Conference Hall, Changodar Chamber of commerce, Changodar on 11th January, 2018

Meeting was attended by following:

- Mr. Raju Shah, President Changodar Chamber of Commerce, along with some member of the chamber
- Mr. V. R. Patel, Retired Deputy Chief Environmental Engineer, GPCB and adviser of GCPC
- Mr. Punamchandra Rathod, Sr. Project Engineer, GCPC
- Ms. Disha Bhavsar, Asst. Project Engineer, GCPC

  and representatives of different industries located at Changodar industrial region.

The program started with welcome address by Mr. Raju Shah, President Changodar Chamber of Commerce

Mr. Punamchandra Rathod explained the background of GCPC and gave a brief introduction to the objective of organizing the program. He gave a brief introduction of the project by saying that Department of Forests and Environment, Government of Gujarat and GCPC is working on the project of "Diagnosis Study of Present Environmental issues of Changodar Industrial Area". This Diagnosis study included: 1) Identification of Major Environment related issues of Changodar Industrial Area like Domestic and industrial waste water and solid waste collection, treatment and disposal, 2) Feasibility of Common Effluent Treatment Plant for Industrial Waste Water, 3) Feasibility of Sewage Treatment Plant for residential/commercial Waste Water and, 4) Feasibility of Non Hazardous Solid Waste Management and Storm Water Management and 5) Cleaner production and energy assessment in selected industries.

Mr. V. R. Patel gave a brief introduction about the project and also informed the audience about the objective, scope of work and the activities undertaken for this project. He mentioned about the industrial growth of Changodar in recent decades and increased related Environmental issues. He highlighted major Environmental Issues of Changodar Industrial Area:

- Lack of zoning of area for Residential, Commercial & Industrial sectors due to Haphazard Development
- Water logging due to lack of proper Storm Water Drains and high ground water table
- high TDS level in ground water
- Lack of proper Road Network
- Lack of Hazardous and Non Hazardous Waste Management facility in this area.
- Lack of proper domestic and industrial wastewater collection, treatment and disposal plan in this area

Mr. Rathod told that GCPC had completed data collection and survey of Changodar Area with the help of GPCB and showed some photographs of Existing Storm Water Management and Municipal Solid Waste Management in all Private Industrial Estate, Existing Scenario of Storm Water Drain provided both side roads of NH 8 with Fatehwadi Canal and its sublets, Existing Conditions of Roads. He also expressed the urgent need of development of MSW site, *CETP*, STP in Changodar and feasibility for this is being prepared by GCPC.

He also spoke on results of the project by saying that "after doing this diagnosis study and based on the data collection and water consumption of 20 Industrial Estate situated in Changodar, the estimated wastewater generation considering present and future scenario will be 90 **MLD** (this quantity will include domestic and process industrial wastewater).

He showed the tentative locations for implementation of both the options". He also told that as per rapid urban expansion, increased traffic, ageing infrastructure, greater climatic variability, and the need for enhanced sustainability of urban water resources pose significant challenges to conventional storm water management. The current storm water management system in Changodar Industrial Area is inefficient and requires modification. Innovative approaches are needed in order to mitigate the risk of flooding, pollution, and aquatic ecosystem degradation, and enhance beneficial uses of urban waters. Looking to this, he discussed feasible storm water management methods/technology like, Storm Water Drain, Filtration systems, Conveyance of storm water through planters or green gutter, Detention of water through Detention pond, Infiltration etc.

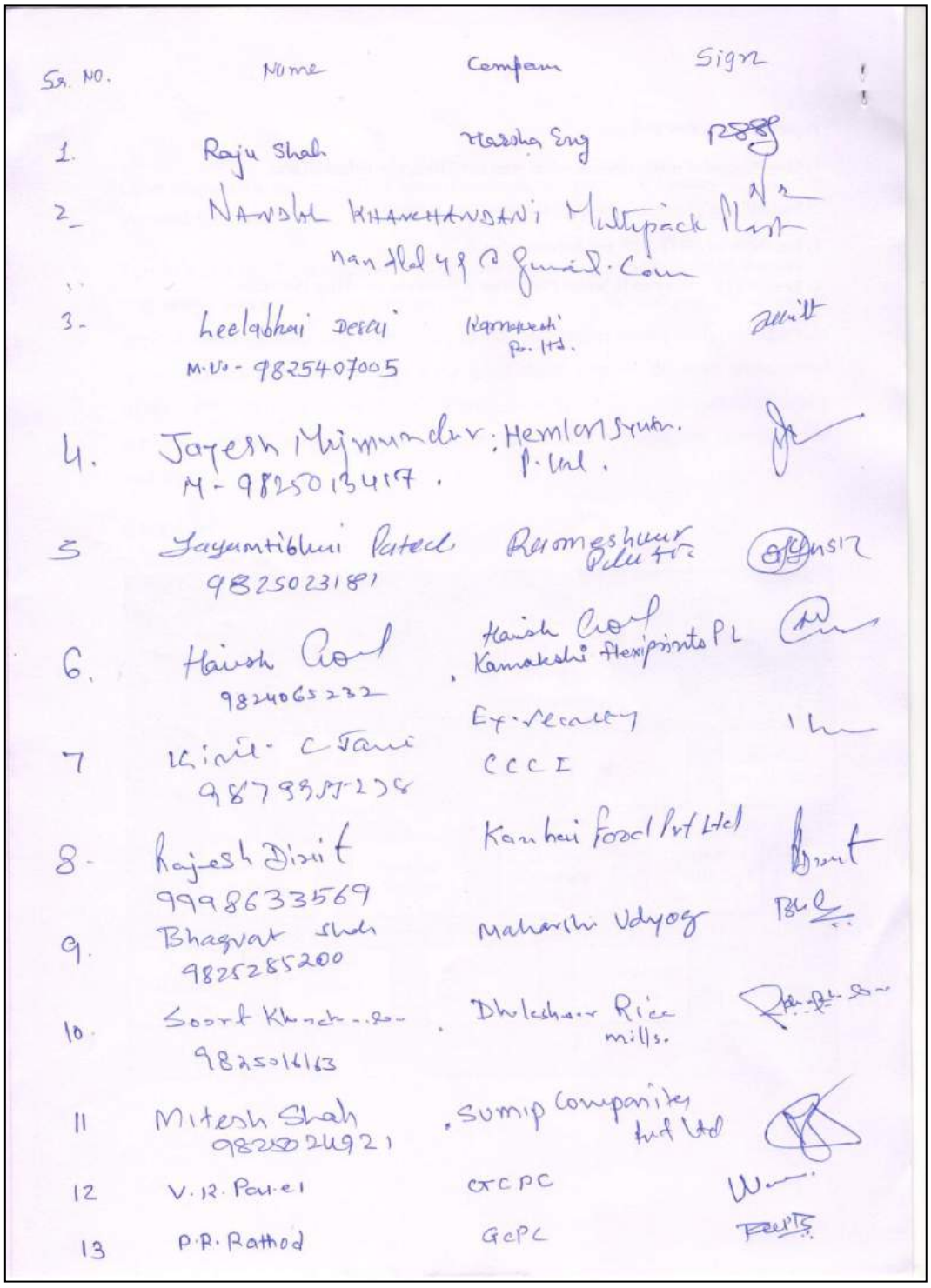
With such words, Mr. Rathod appreciated the audience for participating in such kind of programs.

Mr. Raju Shah, President Changodar Chamber of Commerce told that they will provide necessary support to GCPC and Forests and Environment Department, GOG for this project in Changodar Industrial Area.

Mr. V. R. Patel further told that for non-hazardous solid waste management, it is estimated that the current total non-hazardous solid waste generation is 17 MT/Day. Hence, considering next 30 year period, the current total non-hazardous solid waste generation up to 2041 will be approximately 2.05 Lakh MT and out of 2.05 Lakh MT MSW 50% of Solid Waste (1.025 Lakh MT) will be Organic Waste and 50% (1.025 Lakh MT) will Inorganic Waste". He mentioned that for treatment of Organic Solid Waste, feasible treatment technologies are Biogas Plant or Organic Waste Converter and for Inorganic Solid Waste, feasible treatment technologies are 1) Plastic Recycling Unit (considering 5% of Inorganic Waste i.e 5125MT will be sent to Plastic Recycling Unit) and 2) MSW Landfill Site (considering 95% of Inorganic Waste i.e 97375 MT will be sent to MSW landfill site). Therefore, approximate capacity of MSW Landfill Site will be 97375 MT, say 1 Lakh MT. He showed different pockets identified for development of MSW site in 3 cluster of Changodar Region.

Mr. Rathod also mentioned about scope of RECP and Walkthrough Energy Assessment in Five selected industries of Changodar to perform cost saving through reduced wastage of both energy and materials, to perform cost saving on End-of-Pipe waste treatment, to improve operating efficiency of the plant, to increase product quality and consistency, to recover waste materials, to improve the working environment and to develop new and improved market opportunities through waste exchange. He concluded that after this diagnosis study, it is recommended to have an entity who can take further detailed study based on this study and implement this feasibility options for Sustainable Industrial Development.

Attendance Sheet:



Sr. NO.	Name	Company	Sign
1.	Raju Shah	Harsha Eng	
2.	Nanshi Khanchandani	Multipack Plast nanshi49@gmail.com	
3.	Leelabhai Desai M.No - 9825407005	Kamakshi Pvt. Ltd.	
4.	Jayesh Mujmundar M - 9825013417.	Hemlata Synth. Pvt. Ltd.	
5	Jayantibhai Patel 9825023181	Rameshwar Plastic	
6.	Harish Asrani 9824065232	Harish Asrani Kamakshi Flexiprints Pvt Ltd	
7	Vinit C Jani 9879955258	Ex. Secretary CCCI	
8.	Rajesh Dixit 9998633569	Kanhai Fosol Pvt Ltd	
9.	Bhagvat Shah 9825285200	Maharishi Udyog	
10.	Sanat Khandelwal 9825016163	Dholeshwar Rice mills.	
11	Mitesh Shah 9825024921	Sumip Companies Pvt Ltd	
12	V.R. Patel	GCPC	
13	P.R. Rathod	GCPC	

Photos of the Event:

9. CONCLUSION

Conclusion

This Changodar Industrial Area has been developed as a large industrial hub from last 15 Years including 20 Private Industrial Estates and large industries like Intas, Cadila, Harsha Engineers Ltd, Agro Life Science Corporation etc are function there. In absence of any entity like GIDC at Changodar, the scenario of unplanned and haphazard industrialization resulted in lack of technical, environmental and social infrastructure facilities. As a result the area is facing problems such as Site Master Planning, water supply distribution system, lack of zoning of area for Residential, Commercial & Industrial Sectors, proper road network, infrastructure for Collection, Conveyance, Treatment and Disposal of Sewage and Municipal Solid Waste like kitchen waste, garden waste, Packaging waste, Sweeping waste from industrial, Hotels & Restaurants, commercial and residential sectors, storm water drains. As per GPCB Report though all industries are ZLD, industrial wastewater in canal was found.

After doing this diagnosis study it is concluded that, based on the data collection and water consumption of 20 Industrial Estate situated in Changodar, the estimated wastewater generation considering present and future scenario will be 90 MLD (this quantity will include domestic and process industrial wastewater). Also, considering the Feasibility of CETP and STP, two options have been proposed:

Option 1

I. Phase I: 45 MLD CETP in with 45 MLD Disposal Line
II. Phase II: 90 MLD CETP with 90 MLD Disposal Line (*Up gradation from 45 MLD to 90MLD*) in Phase II

Option 2

I. Phase I: 22.5 MLD CETP and 22.5 MLD STP in Phase I with 45 MLD Disposal Line
II. Phase-II: 45 MLD CETP and 45 MLD STP with 90 MLD Disposal Line (*Up gradation from 22.5 MLD to 45MLD for both CETP and STP*) including recycle and reuse of treated sewage.

The tentative locations for implementation of both the options are shown on Page No. 273-276.

For non-hazardous solid waste management, it is estimated that the current total non-hazardous solid waste generation is 17 MT/Day. Hence, considering next 30 year period, the current total non-hazardous solid waste generation up to 2041 will be approximately 2.05 Lakh MT.

Now, Out of 2.05 Lakh MT MSW 50% of Solid Waste (1.025 Lakh MT) will be Organic Waste and 50% (1.025 Lakh MT) will Inorganic Waste.

For treatment of Organic Solid Waste, feasible treatment technologies are Biogas Plant or Organic Waste Converter and for Inorganic Solid Waste, feasible treatment technologies are 1) Plastic Recycling Unit (considering 5% of Inorganic Waste i.e 5125MT will be sent to Plastic Recycling Unit) and 2) MSW Landfill Site (considering 95% of Inorganic Waste i.e 97375 MT will be sent to MSW landfill site). Therefore, approximate capacity of MSW Landfill Site will be 97375 MT, say 1 Lakh MT. For development of MSW site different pockets of wasteland have been identified. Identified waste land for MSW Landfill Site Development in 3 cluster of Changodar Region is shown on Page No.290 of this Report.

Now as per Rapid urban expansion, increased traffic, ageing infrastructure, greater climatic variability, and the need for enhanced sustainability of urban water resources pose significant challenges to conventional storm water management. The current storm water management system in Changodar Industrial Area is inefficient and requires modification. Innovative approaches are needed in order to mitigate the risk of flooding, pollution, and aquatic ecosystem degradation, and enhance beneficial uses of urban waters.

Looking to this, feasible storm water management methods/technology like, Storm Water Drain, Filtration systems, Conveyance of storm water through planters or green gutter, Detention of water through Detention pond, Infiltration etc have been identified and given on Page No 337 of this Report.

Also there is scope of RECP and Walkthrough Energy Assessment in Five selected industries of Changodar to perform cost saving through reduced wastage of both energy and materials, to perform cost saving on End-of-Pipe waste treatment, to improve operating efficiency of the

plant, to increase product quality and consistency, to recover waste materials, to improve the working environment and to develop new and improved market opportunities through waste exchange. Options of RECP and Walkthrough Energy Assessment are given in Chapter No.5

After this diagnosis study, it is recommended to have an entity who can take further detailed study based on this study and implement the feasible options for Sustainable Industrial Development.

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