ENVIRONMENTAL APPRAISAL

FOR

TDI CITY

RESIDENTIAL COMPLEX AT FATEHABAD ROAD

AGRA,

UTTAR PRADESH,

INDIA

AGRA Monday June 6, 2006

ELOBORATED BY:

PROJECT MANAGEMENT CONSORTIUM – ENVIRONMENT

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1.1 Preliminary:

Name of New Town: TDI CITY , Agra

Location: Fatehabad Road,(Mauza Miyapur, Mauza Bahadur ka Nagla, Basai Mustquil, Mauza Lakawali Tehsil / Agra Subdivision…Agra District, Agra, State: Uttar Pradesh.

Access by rail: Nearest railway station 12 KM Agra Cantt, Agra

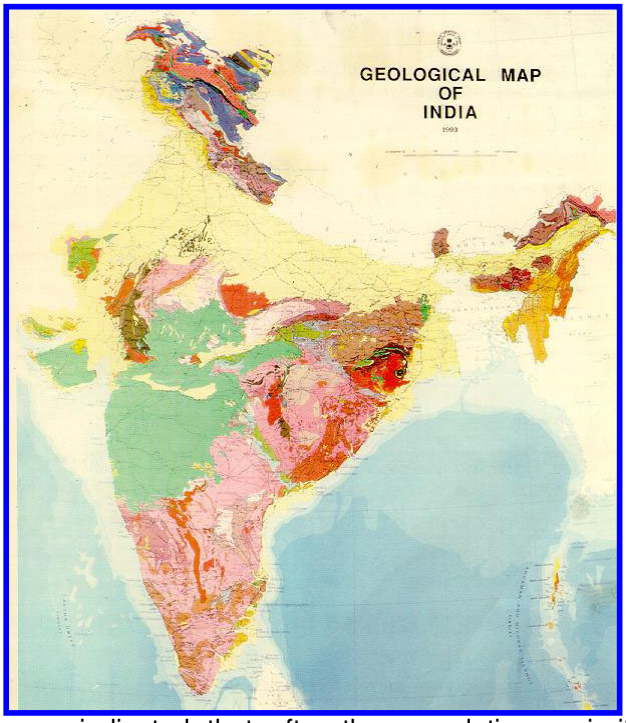
By road: Connected with Fatehabad road by Master Plan Zonal Road

By air: Agra civil air Port is Approximately 18 Km (By Road.).

Agency Establishing the New Town : RIDGE VIEW DEVELOPERS PVT. LTD.1/2 EAST PATEL NAGAR, NEW DELHI.

Purpose which the New Town will serve: To fulfill the residential requirements of Agra Town, Project is targeted for middle income Group consumers..

MAP 1.1



1.2 Background Information

Ridgeview Developers Pvt. Ltd. is a real estate Delhi based company. The marketing research department of developers predicted that by 2009 the demand for Middle income housing will increase in Agra in tandem of National urban growth pattern, which predicates by 2021, 40% of India’s population will be relocated to Urban areas.

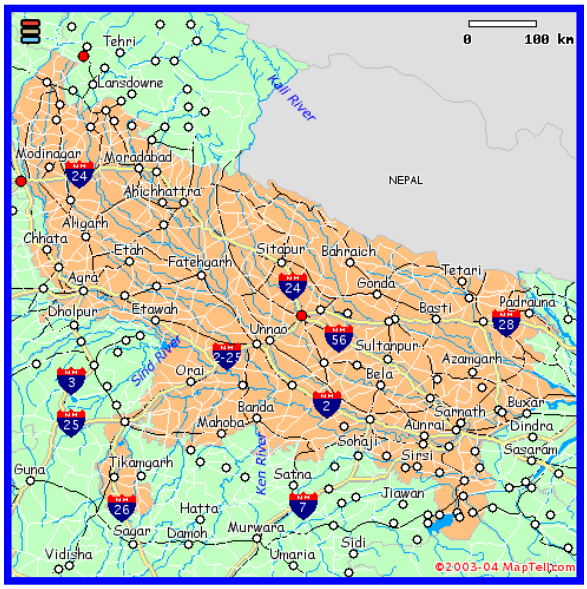
Announcement of Taj express way indicated that after the completion majority surface transport will be through Noida Agra Express way, thus the end of Taj express way is Ideal for future Urban Development. Thus the developer decided to develop mentioned area for residential colony for middle income group. Besides this the above mentioned area is also indicated as residential area in Urban master Plan of Agra for 2021.

1.3 Existing State of Environment

A. Situation: (Regional)

Origin and Development

MAP 1.2



Agra is the city of the inimitable Taj Mahal. The story of Agra begins much earlier then the Taj, However it finds mention in the epic Mahabharata when it was called Agrabana . Ptolemy, the famous second century A.D. geographer, marked it on his map of the world as Agra. Tradition and legend ascribe the present city of Raja Badal Singh (around 1475 A.D.) whose Fort, Badalgarh, Stood on or near the site of the present Fort. However, the 12th century A.D. Persian poet Salman, too, speaks of a desperate assault on the fortress of Agra, then held by one King Jaipal, by sultan Mahmud of Ghazni. It was Mughals who finally nurtured Agra with the finest monuments architects could design : The Taj Mahal of Shah Jahan, Agra Fort of Akbar, Atmad-Ud-Daulah and neighboring Sikandra are but few of the many that spangle the city, each of which stands in mute testimony to the city's grandeur over the ages.

1.4 General Topography:

MAP 1.3

Location, Boundaries and Weather :-The Agra district is situated in western U.P., between 27.11' degree Latitude North and 78.0' degree to 78.2' degree Longitude East. Its Altitude is 169 meters above sea level. On the North, it is bounded by Mathura District, On the South, it is bounded by Dhaulpur District, On

the East, it is bounded by Firozabad District and On the West, it is bounded by Bharatpur. Agra is situated on the bank of Yamuna river.

Normal slope land is towards river Yamuna, Contour Survey is attached **Map 1.5** indicate that south & western part is higher than to the remaining part. Most of watershed area has natural drains (known as Nallah) carries the rain run off and wastewater towards river Yamuna towards North East and East.

The city of Agra is divided in to 25 Zones with population of 9.48 Lac as per the 1991cencus and spread over 141 Sq. Km. resulting a population density of 6,724 persons per Sq. Km. The maximum temperature of Agra rises to 47 ^{o}C and drops down to 3 ^{o}C during winter seasons. The average annual rain fall at Agra is about 685 mm. The ground level of Agra varies from 170M to 150 M from Sikandra to Trans Yamuna. The underground stratum consists of mainly of loam, sandy soil and subsoil. water table is generally 20 to 30 meter below ground.

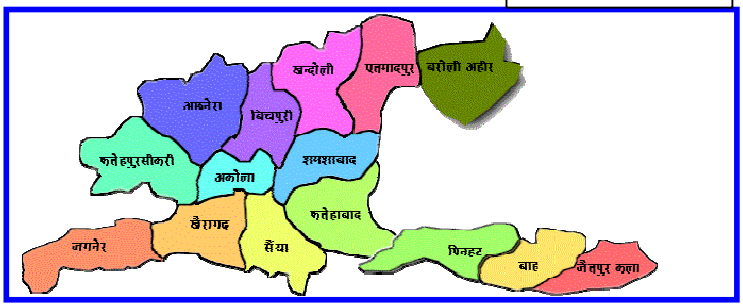
1.5 Area and Population (of Agra District)

According to Census 1991, the area of Agra district is 4027.00 sqr. km., Where Rural area is 3838.60 sqr. km. and Urban area is 188.40 sqr. km.. Its Total Population is 27,51,021 out of which Males are 15,01,927 and Females are 12,49,094. Of the Total Population, 16,39,935 constitute the Rural Population and 11,11,086 are makes the Urban Population.

1.6 Infrastructure

The Agra district is divided into Six Tehsils and 15 Blocks. Total number of Nayay Panchayats in the district are 114 while Gram Sabhas stands at 636. The total populated villages are 904. The total number of police stations in the district are 41 out of which 16 are in Urban area and 25 are in Rural area. The total number of Railway Stations (including Halts) are 29 and Bus Stands/Bus Stops are 144. Total length of Broad Guage lines is 196 K.M. and Meter Guage is 35 K.M..

MAP 1.4

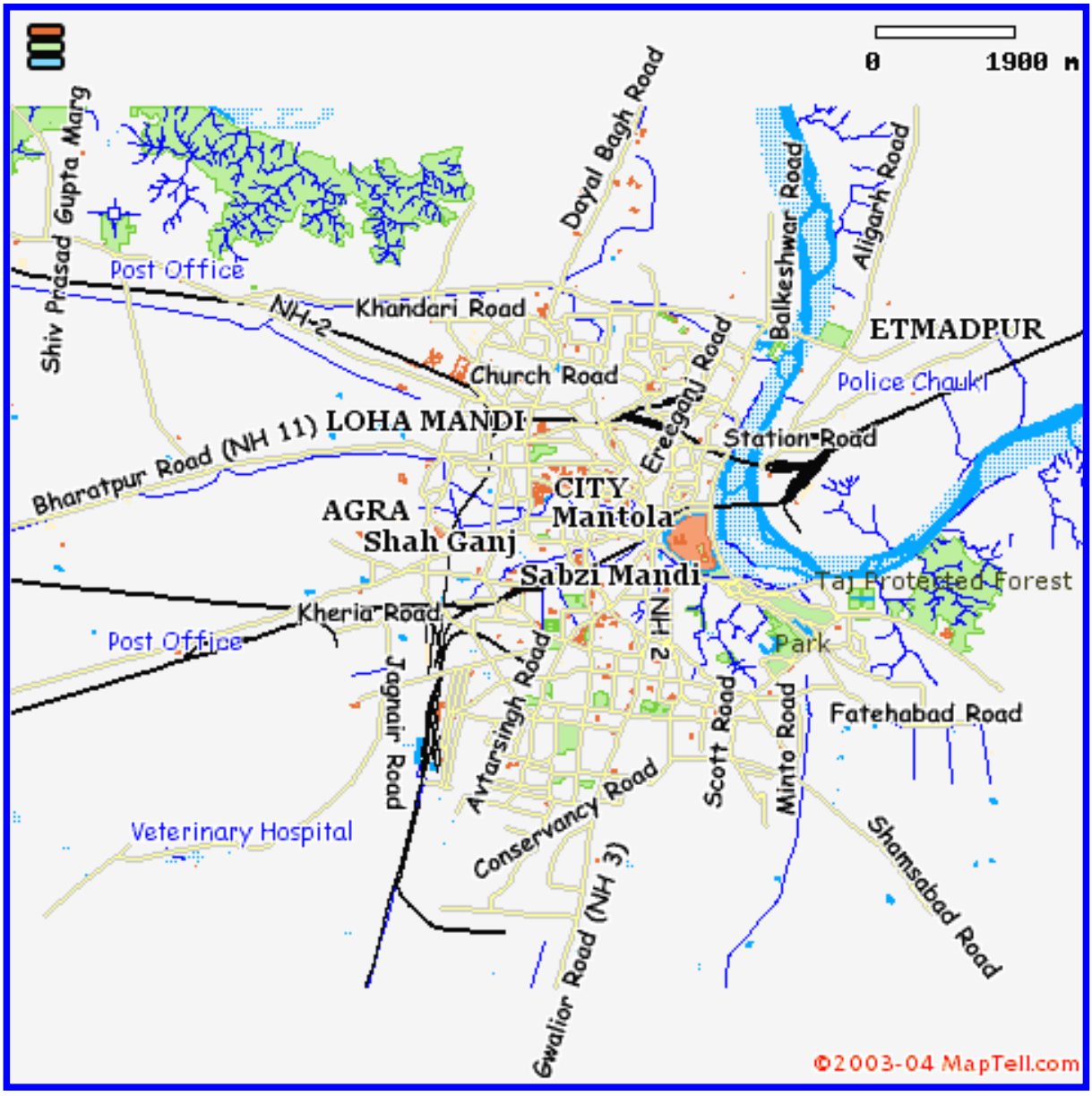


1.7 General features of land

: As per the Survey report of M/s. SGS Pvt. Ltd., the list of vegetation found is enclosed in **enclosure A 6**

Over View of Agra

MAP 1.5



1.8 **Fauna:** As per the Survey report of M/s. SGS Pvt. Ltd. the list of fauna found is enclosed in **enclosure A 6 .**

1.9 **Flood prone**: Not a flood prone area. Nearly 3 m above danger level of river Yamuna.

1.10 **Transport Systems**: Agra is well connected by Road, Rail and Air as per following

Rail: has divisional office of NC Railways, having three major railway Stations i.e. Agra cannt., Raja Ki Mandi and Agra Fort, and two minor railway stations i.e. Idgah and Agra City.

1.11 **Road:** well connected, as it is situated on NH 2 and starting point of Agra Bombay Road.

Air: Agra civil air Port at Kheria.

1.12 **Land Use**: Since Agra is historic town , it has typical growth pattern with a nucleus and satellite habitats. Agra District has Master plan for yr. 2000-2021. This was developed by Agra Development Authority, which has clear demarcation of residential and industrial zones. Area outside the Town is mostly used in Agriculture and related use except some parts of Bah and Fatehabad which has ravines near bank of River Yamuna and River Chambal.

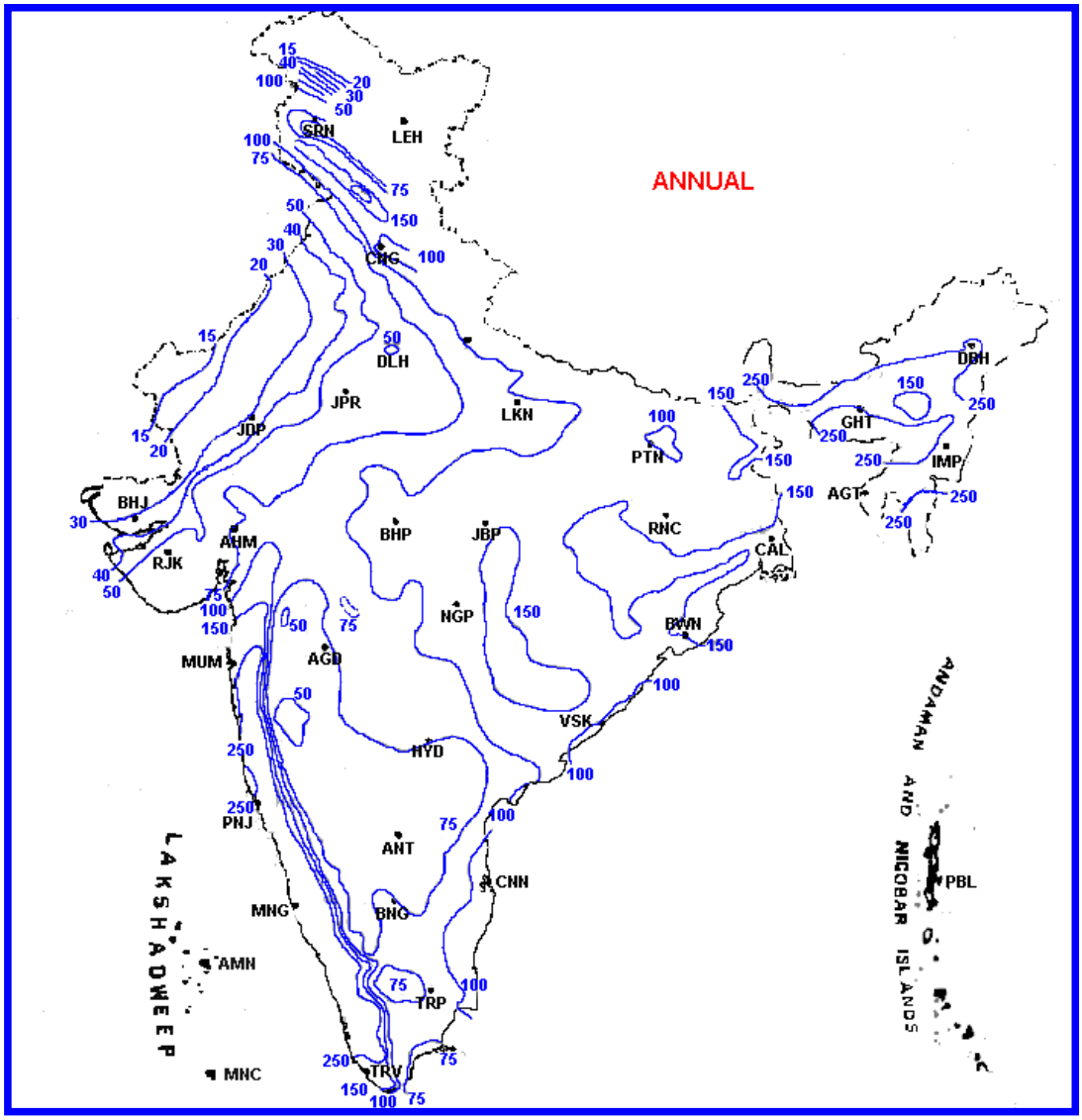
AGRICULTURE			
NET TOWN AREA	**HECTARE**	**1997-98**	**288**
NET IRRIGATED AREA	**HECTARE**	**1997-98**	**219**
GROSS IRRIGATED AREA	**HECTARE**	**1997-98**	**237**

NUMBER OF VILLAGES			
NUMBER OF HABITATED VILLAGE	**NUMBER**	**1991**	**904**
NUMBER OF INHABITATED VILLAGE	**NUMBER**	**1991**	**36**
FOREST GRAM	**NUMBER**	**1991**	**0**
TOTAL	**NUMBER**	**1991**	**940**

Source : ZSP-1999, Agra

1.13 Rain fall: Agra has normal rain fall as 750 mm per year. Please refer to the rainfall map from MDI.

MAP 1.6



Source: M.D.I. Web site

1.14 Settlement Status: Agra has population of 9.8 Lac as per the last census. About 5 lac lives in town and nearby townships, remaining in the Villages. Few of the settlement are dating back to Historic times such as Fatehpur Sikari, Kirawali etc.

1.15 Industrial Development: Industrial scene of Agra is traditionally dominated by small scale industries based on local skills and resources. There are two notified Industrial area near Agra Town comprises mostly units related to Generators, Foundry, Casting and lather footwear units etc. Of late there is substantial shift towards food industry mostly Petha, edible oil and Milk processing Units.

1.16 Main Schemes Running at District Industries Centre, Agra

- Eakul Mej Vayvastha
- Prime Minister Rozgar Yojna
- Udhmita Vikas Prashikhan Karyakram
- Zila Stariya Udyog Bandhu
- Niryat Protsahan
- Laghu Udyog Adhunikikarn Yojna
- Rugn Evam Bimar Ekaiyon ka Punarvasan
- Prakirya Saha Uthapadan Vikas Kendra
- Hastshilp Udyog

1.17 Main Industrial Area of Agra District

- Industrial Estate, **Nunhai** , Major Industrial Area was established at Nunhai, Agra, over 71 acre of land. The 71 plots and 112 sheds were developed there, all are allotted now and various units are working there.
- Mini Industrial Estate, **Achnera**. This industrial area was also setup in Achnera, having 30 Plots in two acre of land.

1.18 U.P. S.I.D.C. Industrial Areas

1. **Foundry Nagar** : This Industrial area was setup at Foundry Nagar over 65 acre of land. The 234 plots were developed there.
2. **Sikandra A &.B.** : This industrial area was setup at Sikandra over 65 acre of land. The 112 plots were developed there.
3. **Sikandra C** : This industrial area was setup at Sikandra over 142 acre of land. The 297 plots were developed there.

1.19 Main Industries of District Agra

1.19.1. Major Industries

There are 12 units in the district those comes under major & medium scale industries. They produce

Electrical Goods

Fans

Pipes

C.I. Casting

Floor

Leather Goods and Shoes

Steel Rolling

Packing

Milk Products

1.19.2. Small Industries

In this category ,7200 units are working at Agra, they produces

Cotton and Textile

Wood Paper Products and Stationery

Leather Goods and Metal Products

Auto and Engine Parts

Electrical Goods etc.

1.19.3. Handicrafts Works

In Handicrafts, Zari Zardozi, Marvel, Stone carving and Inlay work Carpets about 13000 people are working. About 116 are exporting units and two Padam Shree Award winners are Mr. Sekh Samruddin and Shri Hari Kishan Badal.

1.19.4. Shoes Industries

Above 1.5 Lac pairs of shoes per day manufactured in

Agra by large ,cottage, small scale and medium scale footwear units. Here are about 60 organized footwear units, 3000 tiny manufacturing units and about 30000 house holds artisans units. There are a large number of ancillary industries, supporting footwear industries in Agra. (About 20 small scale machinery manufactures and 100 various kinds of footwear component manufacturer). About 65% of total domestic requirement of shoes in India is supplied from Agra.

There are around 70 export units in Agra in which two golden cards holders and three silver card holders units. Total export turn over of Agra is about Rs. 450 crores.

Source: ZSP-1999, Agra

1.20 Special features of Interest::

As Agra has documented history dated back to 600 years of human habitats, thus have lot of historical places in and around Agra Town. It has world famous Taj Mahal, Agra Fort, Sikandra, Etmatudaulla etc. Agra District has world renounced Fatehpur sikri for township planning. Besides Bateshwar, Agra has many places of interest of Jains and Hindus.

1.21 Environmental Problems:

The region does not faces major environmental threats except such as lowering water table due to excessive withdraw and higher runoff rate, due to soil structure, topological slopes of area and air pollution due to vehicular movement passing through Agra and captive power generation by industry and resident, due to erratic power supply.

2.1 TDI CITY- OVERVIEW

(Local and immediate vicinity – within 7 km)

2.2 General Description: TDI city is surrounded by 57 habitats, with in 7 Km of proposed township for name and other details please refer to table 4.1.

2.3 Topography: TDI CITY is flat area. With an average highest level of 3000 mm of Yamuna danger level at Agra.

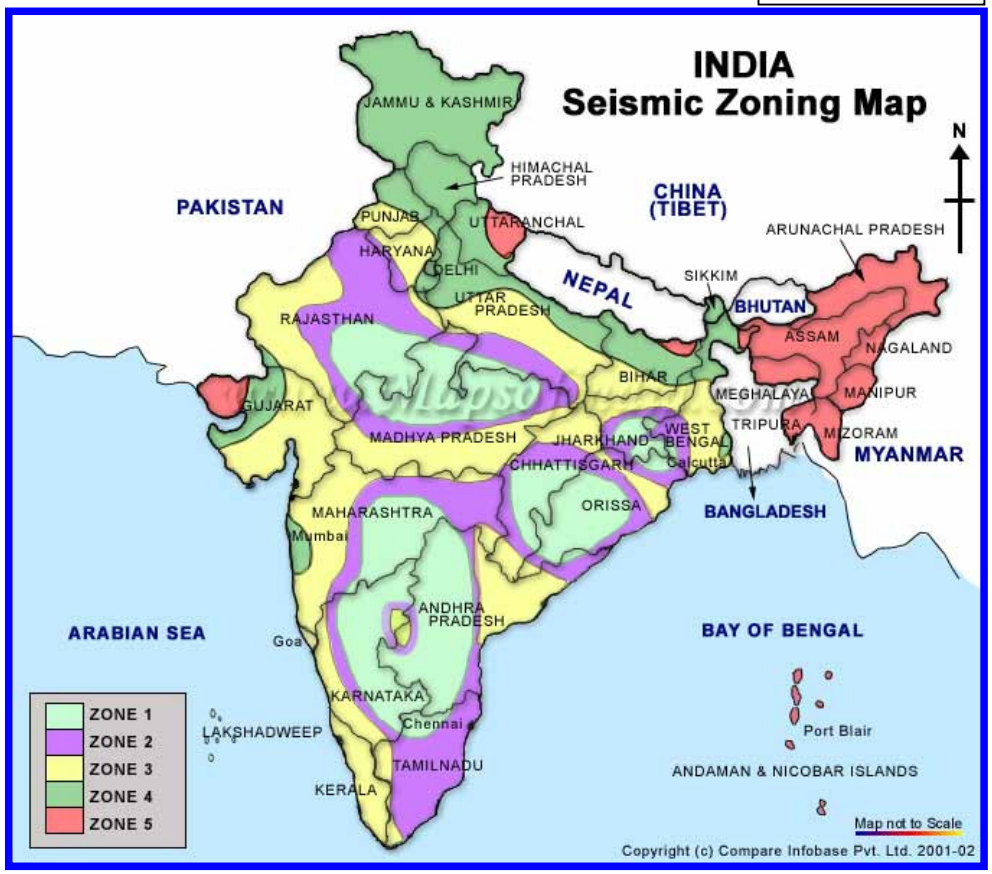
2.4 Drainage: Natural drainage of acquired land is towards the natural depression in adjourning Garm Sabha land, which is used for cremation of villagers.

2.5 Vegetation: As per the test conducted by M/s. S.G.S. Pvt. Ltd. list of flora and fauna are found is attached in **enclosure A 6 .**

2.6 Soil: As per the test conducted by M/s. S.G.S. Pvt. Ltd., the findings of soil conditions of Proposed Township are attached as enclosure of this report.

2.7 Seismic descriptions: Agra is situated in seismic zone 3 and it does not fall under the Fault line.

MAP 2.1



2.8 Existing Land Use: In master plan 2000-2021 it is decided as residential area.

2.9 Places of tourist: historic and archaeological building near to the proposed site is TAJ. The distance between TAJ & the proposed site and is nearly 15 Km.

2.10 Natural resources: At present there is no mining activity. River Yamuna Flows at the boundary of 7 Km Area.

2.11 ECOLOGY

2.11.1 Flora

The structure and composition of flora at any geographic location is the reflection of prevailing climatology and physiographic conditions. This area is characterized by the driest of the air, except in the monsoon season, a hot summer and a cold winter. The physiographic study of the area shows that it is sedimentary consolidated Alluvium to laterite.

TREE AND SHRUB SPECIES IN THE STUDY AREA

TABLE 2.1

	Botanical Name	Common Name	Local Name
1	Acacia Arabica	Gum tree	Babul
2	Azadirachta indica	Margsa tree	Neem
3	Ziziphu mammularia	Plum	Jhar-beri
4	Phoenix sylvestris	Date	Khajur
5	Ficus bengalansis	Bargad	Bargad
6	Ficus religiosa	Pipal	Pipal
7	Dalbergia sissoo	Shisham	Shisham
8	Prosopis juliflora	Kikar	Kikar
9	Albizia lebbeck	Siris	Siris
10	Tamarindus Indica	Imli	Imli

The plants are cultivated in the study area for economic benefits, mainly fruits, fiber, ornamental, medicinal values etc. Many such trees are found in fields, road side and even backyards of houses. The important trees grown for economic benefits are listed in **Table. 2.1**

CULTIVATED AND PROPAGATED PLANTS IN THE STUDY AREA

TABLE 2.2

Sl. No.	Botanical Name	Common Name	Local Name
1	Mangifera indica	Mango	Aam
2	Psidium guajava	Guava	Amrud
3	Syzygium jambolana	Black berry	Jamun

4	Citrus species	Lemon	Nimbu
5	Aegle marmelos	Wood apple	Bel
6	Carica papaya	Papaya	Papita
7	Musa paradisiacal	Banana	Kela
8	Eucalyptus hybrid	Eucalyptus	Eucalyptus

2.11.2 Vegetation :

Vegetation pattern was studied in study area. Natural vegetation is governed by climatic conditions of the region. In the study area natural vegetation is dominated by shrubs or grasses of different types.

Vegetation density at most places is low except at a few places having Acacia sp. And *Prosopis juliflora*. Other plants that were observed include *Azadirachta indica, Cassia sp., Adatoda basica, Calotropis sp.*, various grasses like *Cynodon* and *aquatic macrophytes* such as *Eichornia sp*.

2.11.3 Grasses

Grasses are normally found in sandy soils. Sacchrum spontanoum is found in low lying area. Typha olephatina is found in moist and water shed areas, other grasses which were observed are Cynodon dactylon, Sporobolis marginatus, Dactylocteium acgyptium, Cyperus sp. Grasses were observed to grow in vast stretches on uncultivated lands, along road side and along the sides of canals.

2.11.4 Reverie forests

Vegetation along the banks of river Yamuna consisted predominantly of Acacia Leucophloea, Salvadora aleoids, Crythrina subrosa, Prosopis cineraria and Acacia Arabica.

2.11.5 Reserve forests

Natural forests are absent in the study area. At Baipur approximately 36.7 ha of land is reserve forests. This patch of land was dominated by Prosopis juliflora. It has a good fuel value and is not grazed by herbivores animals due to their thorny nature.

A few species of birds, insects and butterflies were observed in this forest. Monkeys were also observed. About 20 to 30 ha of land in the study area is under village forest and orchards.

2.11.6 Soorsarovar Bird Sanctuary

The sanctuary which is located at approx 35 KM from TDI proposed site was set up in 1991 covers an area of 4030 sq. km and is under Agra Forest Division. It offers an ideal home for a large number of aquatic birds both resident and migratory. A lot of

migratory birds visit the Soorsarovar lake during winter. Cranes, purple herons and little egrets were observed around the lake. A good number of parrots and little doves were also observed on trees around Neelgai, monkeys, wild cats, wild boar have also been reported from this region.

2.11.7 Social forestry

Natural vegetation in this region has almost been destroyed due to overgrazing by cattles and reckless cutting of trees. Having fields , now been devoid of any vegetation for long , the soil in the area has very low fertility. In such areas species of Acacia and Prosopis have been planted predominantly. Besides these Neem, Pongamia pinnata, Holeoptea integrifolia, Dalbergia sisoo. Albizzia procera, Delonix regia, Polyantha longifolia have also been planted. Out of these growths of Prosopic juliflora has been found to be successful. Dalbergia, Albizzia, Azadirachta indica have been suggested by various researches as indicator species. The plantations have been done by the sides of cannels and roads. Majority of road side plantations include trees with canopy such as mango, neem, arjun, sheesham.

2.11.8 Green belt development

Massive forestation operations have been undertaken by forest department of Uttar Pradesh. One major initiative in this direction was development of green belt. The plantation under this activity were carried out not only around the near TDI but at several other locations viz. Refinery township, Taj Reserve Forest, Raunkta Reserve Forest, nearby villages :, Territorial army area Agra, NCC Camp Keetham. About 35 ha of land together from Raunki Reserve Forest and Taj Reserve Forest have been covered under green belt development and about 1 lac trees been planted on this land so far.

2.11.9 Aquatic vegetation

Aquatic vegetation was absent in Yamuna river. Agra canal and temporary water ponds at numerous places in study region showed sporadic presence of aquatic vegetation. Eichornia crasipes was found in almost all water bodies. At places Lemna sp., Hydrilla and Ceratophyllum were also observed. In ponds at Eco-park of Mathura refinery, patches of Spirodela sp. And Lemna sp., Hydrilla sp., Ceratophyllum sp. And Vallisnaria sp. Were observed.

2.12 Phyto-sociological study

2.12.1 To understand the attribute of communities, a phyto-sociological study of vegetation was conducted on the basis of vegetation component and their importance for project. An attempt has been made to study only for tree flora because herbaceous

flora was not identifiable during the study period (June month). Perennial grasses grow in clumps and tussocks.

At each selected site, random vegetation sampling was done with the help of 10 m x 10 m quadrate size. Presence and absence of species, number of individual species and basal area of each plant species in each quadrate was recorded. Frequencies and densities were calculated following Curtis and Mc. Intosh (1951) method. Species diversity index was estimated using Shannon-Weiner index (1963).

Shanon Weiner diversity Index was calculated by following formula :

$H = \Sigma Pi \log Pi$

Where : H = Shanon Weiner diversity index

Pi = ni/N, where ni is number or biomass or IVI of individual species and N is the total number of biomass or IVI of all individuals.

In the present study IVI (Importance Value Index) has been taken into consideration for evaluation of diversity index. IVI gives total performance of individual species at particular site. IVI is the total of relative frequency (RF), relative density (RD) and relative dominance (RDO). Since IVI includes many of the attributes at a time, therefore consideration of IVI was preferred on number for evaluation of Shannon-Weiner diversity index. This diversity index includes both richness of spices and apportionment of species at any particular site. Higher the value of Index, more is the stability at any particular site. Higher the value of index, more is the stability of that community. Thus Shannon-Weiner diversity index is an indication of goodness of community.

Phyto sociological study of tree layer vegetation was conducted at three sites close to the mines and plants. The parameters such as frequency, density, abundance, relative frequency, relative density, relative dominance and IVI were evaluated for each sampling study. Shanon-weiner diversity index was also calculated for each studies stand. A detailed analytical study for three sites are given in **Table 2.3** and **2.4. & 2.5**

CHARACTERISTICS OF TREE LAYER VEGETATION AT SITE

TABLE 2.3

Name of Species	F	D	AB		RD	RDO	IVI
Prosopis juliflora	60	1.7	2.83		35.42	25.36	90.78
Albizzia lebbeck	20	0.4	2.00		8.33	5.97	24.30
Azadirachta indica	10	0.1	1.00		2.08	1.48	8.57
Cordia myxa	10	0.1	1.00		2.08	4.53	11.61

Psidium guajava	20	0.9	4.50		18.75	7.49	36.24
Syzygium cumini	20	0.5	2.50		10.42	4.15	24.57
Dalbergia sisoo	20	0.4	2.00		8.33	13.29	31.63
Ficus glomerata	10	0.1	1.00		2.08	5.88	12.97
Ficus religiosa	20	0.2	1.00		4.17	18.54	32.71
Eucalptus hybrid	10	0.4	4.00		8.33	13.29	26.63

CHARACTERISTICS OF TREE LAYER VEGETATION AT MIYAPUR

TABLE 2.4

Name of Species	F	D	AB	RF	RD	RDO	IVI
Prosopis juliflora	20	0.4	2.00	10.00	8.89	11.58	30.47
Pavelta indica	40	1.3	3.25	20.00	28.89	21.30	70.19
Azadirachta indica	70	1.7	2.43	35.00	37.78	27.85	100.63
Acacia Arabica	30	0.7	2.33	15.00	15.56	15.69	46.25
Ficus religiosa	20	0.2	1.00	10.00	4.44	17.78	32.22
Dalbergia sisoo	10	0.1	1.00	5.00	2.22	2.90	10.12
Eucalyptus hybrid	10	0.1	1.00	5.00	2.22	2.90	10.12

CHARACTERISTICS OF TREE LAYER VEGETATION AT BAURAULI AHIR

TABLE 2.5

Name of Species	F	D	AB	RF	RD	RDO	IVI
Azadirachta indica	40	0.8	2.00	18.18	18.60	18.52	55.31
Eucalyptus hybrid	40	1.1	2.75	18.18	25.58	32.39	76.16
Ficus religiosa	30	0.3	1.00	13.64	6.98	15.71	36.32
Pongamia pinnata	30	0.4	1.33	13.64	9.30	2.35	25.29
Prosopis juliflora	40	1.0	2.50	18.18	23.26	17.92	59.36
Dalbergia sisoo	10	0.1	1.00	4.55	2.33	1.32	8.19
Acacia Senegal	10	0.3	3.00	4.55	6.98	3.93	15.46
Ficus cordifolia	10	0.1	1.00	4.55	2.33	5.24	12.11
Moringa oleifera	10	0.2	2.00	4.55	4.65	2.62	11.81

Diversity Index = 0.86

Note :

F - Frequency D - Density

AB - Abundance RF - Relative Frequency

RD - Relative Density RDO - Relative Dominance

IVI - Importance Value Index

Vegetation within the study area resembling every where, so that only three sampling stations were sufficient to understand the attributes of communities.

2.12.2 Fauna

The studies on native animal species and other fauna species diversity, dominance were carried out. Classified information about native species collected from the forest department **has been presented.**

2.12.3 Avi fauna

Checklist of birds was prepared based on visual observations. Birds commonly observed included Cattle Egret (Bubulcus ibis), Parrots (Pisttacula krameri), House swift (Apus affinis), Common pegion (Columba livia) common mynah (Acridothoros tustos) and Poackocks (Pavovistatus sp.). Peacock is an endemic bird species of this region and was frequently observed in the study area. A large number of resident and migratory birds species have been reported inside the Eco-park of Mathura refinery (**nearly 35 Km form study area)**, in a species have been reported inside the Eco-park of Mathura refinery in a survey conducted by **Bombay Natural History Society during Feb. 99.** A list of birds species as per this report is presented in **enclosure A 7) .** Breasted Pond heron (ardeola grazeri), flamingo (Phanenicopterus roses), grey heron (ardeola cineaea) were observed in vicinity of water bodies. A large number of birds were also observed in refinery township. The diversity and distribution of avifauna in the study area are indicative of insignificant impact due to refinery activity.

2.12.4 Fisheries

Information on fisheries were obtained from fisheries department, Agra district. Fish species that are cultured in ponds in study area are Catla catla, Labeo rohita, Common carp, Grass carp and Silver carp. In Agra development block 38.21 ha of land is under pisciculture.

2.12.5 Domestic animals

Animal husbandry plays an important role in rural economy and its contribution for the economic up lift of rural area is now as well recognized as that of agriculture. Domestic animals like cow, buffaloes, goat, donkey, dogs, camels and mules are found.

3.1 Water Environment

At a distance of 10 meter from bore well developed for the water supply, a test bore was created and water table level observed, was, at 65 ft from the Road level on 25th June 2005.. After test Expected yield for the well developed at the site is 6000 Lt. / hr. (after measuring the cone of depression.)

Quality of water (biological, chemical, physical),

In order to assess the water quality, water samples were collected from bore well created for water supply. Sample collected and analyzed for pH, chlorides, fluorides, nitrates, sulphates, hardness, T.D.S. and total solids as per as per IS 2488 (Part 1, 2, 3 and 4). (Results of analysis are given in **enclosure** and summarized in Table 3.1.)

3.2 SUMMARISED WATER ANALYSIS RESULT OF THE STUDY AREA

TABLE 3.1

. No.	Parameters	Results	Drinking water standard (IS : 10500)	
			Desirable limits	Permissible limit
1	Iron (mg/l)	<0.1	0.3	1.0
2	TDS (mg/l)	1300.00	500	2000
3	pH	7.5	6.5-8.5	No relaxation
4	Calcium (mg/l)	38.4	75	200
5	Fluoride (mg/l)	1.4	1.0	1.5
6	Chloride (mg/l)	119.5	250	1000
7	Sulphate (mg/l)	40.3	200	400
8	T. hardness (mg/l)	394.0	300	600

The ground water test results shows that the TDS, Fluoride and Total hardness are higher than the desirable limits of IS : 10500 standards of CPCB for drinking water. Water is confirming to all parameter of the IS: 10500:1991 for drinking water.

3.3 **Surface water**, There is no water body in or in vicinity of proposed site except the river Yamuna. Keetham lake is situated nearly 35 Km from the proposed site.

3.4 **Drainage patterns**: Map of area indicates that runoff from the area is collected by natural drains and collected water is disposed in to the River Yamuna. **As per the map attached Map 2.2**

3.5 Soil quality

Top soil samples were collected from Proposed site.

The colour of the soil is brown. The soil of the study area is sandy loam. The soil cover of the study area is almost uniform. Conductivity of the soil samples is 0.060 micro-mhos/cm, as per classification of sandy loam water holding capacity is 43% by mass.

3.6 Cropping pattern

Rapid increase in population and prospects of industrialization is putting great pressure on land area for agricultural production with the population continuously rising and almost all cultivable land already put under plough. The only way to increase agricultural production can be through more intensive use of land under cultivation. Crop yield is 12-13 quintal per acre and the major crops are wheat and bajara.

Rabi is the main crop of this area which consists of wheat, mustard, gram, vegetables and fodders while kharif crop includes millets, paddy, vegetables, fruits, fodders and pulses.

3.7 Energy: Data on production and consumption patterns of coal, firewood, oil, gas, electricity and non-conventional energy resources is not available, as it has no human habitat in side of proposed site and data for surrounding are not available. **Thus consumption pattern of unconventional energy sources could not be established**. Estimated Electrical power requirement of proposed area as per UPSEB prevalent norms is

PHASE I = 8000 KVA

PHASE II = 5000 KVA

PHASE III = 5000 KVA

4. SOCIO-ECONOMIC ENVIRONMENT

Socio-economic study of an area gives an opportunity to assess the socio-economic conditions and living standards of that area and it also helps in predicting the impact of the proposed infrastructure development on the economic conditions of the study area. The socio-economic study of an area will also reflect an overall assessment of the likely socio-economic changes in the area as a result of the setting up of the proposed terminal. Details of the studies are described in the following paragraphs

4.1 Demographic details

There are 49 villages in the buffer zone. For the demographic details please see the below tables:

DISTRICT AND TALUK WISE POPULATION IN THE STUDY AREA

TABLE 4.1

SL.NO	VILLAGE	MALE	FEMALE	TOTAL	PRIMARY SCHOOL	JUNIOR HIGH SCHOOL	INTER COLLEGE
1	BIJMANI	1030	823	1853	PS		
2	TORA	1106	904	2010	PS		
3	KALAL KHERIA	1493	1325	2818	PS		
4	KOTLI KI BAGI	650	540	1190	PS		
5	MIYAPUR	504	490	996	PS		
6	NAGLA ARHAR BASAI	667	535	1202	PS		
7	KAHRAI	1153	1012	2165	PS		
8	MALAHLA	1080	826	1906	PS		
9	JHARPURA	770	600	1370	PS		
10	GAHRI BINDRABAN	820	540	1360	PS		
11	JANRA	371	308	679	PS		
12	TARAKPUR	560	330	890	PS		
13	PAWAOLI	774	665	1439	PS		
14	ISLAMPUR	673	529	1202	PS		
15	NAUBARI	699	580	1279	PS		
16	SHYAMO	4378	3824	8202	PS	J.H	INTER COLLEGE

17	BAMROLI KATARA	4941	4339	9280	PS	J.H	
18	BUDHARA	1240	1120	2360	PS		
19	BIRAMNAGAR	504	492	996	PS		
20	AKBARPUR	324	260	584	PS		
21	LODHAI	1098	916	2014	PS		
22	GUTLA	997	765	1762	PS		
23	GANGARUA	2007	1747	3754	PS		
24	DEVORI KI GHARI	1423	1253	2676	PS		
25	BAROLI AHIR	2207	1937	4144	PS	J.H.	
26	SEMRI	3057	2558	5615	PS		
27	BAGDA	2582	2171	4753	PS		
28	LAKAWALI	1473	1225	2698	PS		
29	KAULAKHA	2840	2370	5220	PS		
30	CHAMROLI	2226	1957	4183	PS		
31	RAJPUR	1710	1544	3254	PS		
32	KUAKHERA	2472	2180	4652	PS		
33	GARHI CHANDI	304	264	568	PS		
34	MAHUKHERA	2057	1790	3847	PS		
35	IKTARA	846	708	1554	PS		
36	NAGLA SHABLA	805	655	1408	PS		
37	SHARBAT PUR	459	382	841	PS		
38	MADRA	1860	1700	3560	PS		
39	ISHWARI KA NANGLA	624	458	1082	PS		
40	GARI SAMPTTI	1306	980	2286	PS		
41	NAGLA NAKTA	508	328	836	PS		
42	RAHANKALA	3070	3516	5586	PS		
43	TALFI LA NANGA	654	456	1110	PS	J.H	
44	KARBANA	2495	2044	4539	PS		
45	REMJA KA NAGLA	635	478	1113	PS		

46	ATTAL	718	536	1254	PS		
47	NAGLA NATHU	437	342	779	PS		
48	BAJEHRA	528	489	1017	PS		
49	KADHERU KA NAGALA	1156	1027	2183	PS		

BANK'S DETAILS AS UNDER

TABLE 4.2

SL.NO.	VILLAGE	BANK'S NAME
1	BAROULI AHEER	CANARA BANK, JAMUNA GRAMIN BANK
2	HIGOT KHERIA	JAMUNA GRAMIN BANK
3	KALAL KHERIA	JAMUNA GRAMIN BANK
4	BAMRAULI KATARA	JAMUNA GRAMIN BANK
5	SHYAMO	JAMUNA GRAMIN BANK

4.2 DETAILS OF POST OFFICES

There are 8 post office in the area. The name of post offices are as under

1. Baraouli Aheer
2. Gutila
3. Shyamo
4. Semri
5. Bamraouli Katara
6. Burahana
7. Kalal Kheria
8. Dhandupura

4.3 HEALTH CENTRE

1 Primary health centre – Bamrauli Aheer

2. New Primary Health Centre, Shyamo

The total population of the villages, in the study area is 146122 over an area of about 360 sq. km hence having a density of 406 persons per sq. km. Break-up of the population with male and female are given in **enclosure A 4 .** The same has been summaries here in **Table 4.3 .**

The employment pattern and break-up of the main workers, SC & ST and list of amenities available in the villages of study area are given in **enclosure A 4** and summarized in **Table 4.3 .**

4.4 DEMOGRAPHIC DETALS OF BUFFER ZONE

TABLE 4.3

Occupation	Population	Percentage
Main workers	40116	27.45
Marginal workers	2088	1.43
Non workers	103918	71.12
Total	**146122**	**100.00**
		Break-up of main workers
Cultivators	18551	46.24
Agriculture labors	7139	17.80
House hold industry	647	1.61
Other workers	13779	34.45
Total	**40116**	**100.00**
		Other details
Literate	50795	34.76
SC	40367	27.63
ST	19	0.01
Total SC & ST	**40386**	**27.64**

The employment patter, break-up of the main workers and SC and ST are depicted by pie graph in **Fig. 3.6, 3.7 and 3.8** respectively. From the situation of employment pattern it is found that :

1. Over 71.12% of the total population is non-workers.
2. Over 46.24% of the main workers are engaged in cultivators followed by about 34.35% of the other workers.
3. Household industries feed meager 1.61% of the main workers population.

Apart from the above, the abundance of buffaloes and cows indicates that there is a trend of life stock rearing in the buffer zone. The main activity in the study area is agriculture. Majority of people do not have a vibrant agricultural economy and they have taken agriculture as a source of livelihood rather than as a profitable commercial venture. Irrigation in the study area is mostly done by pumping set (bore well) with sprinkling method.

4.5 Schedule Cast and Schedule Tribe

There is not tribal population in the study area. Schedule Casts are 27.63% on the basis of socio-economic survey, it has been found that Schedule Castes are also distributed in various categories of professions rather than their traditional one.

4.6 Literacy level and educational facilities

The over all literacy level in the buffer zone in 34.76%.In villages like Baraouli Ahir , Lakawali & Bamraouli katara, Shyamo has better literacy level.

4.7 Amenities

The core zone is vacant lying barren land but the buffer zone villages are well equipped with almost all types of facilities viz. Educational, medical, drinking water electricity, communication etc. The details of these are given in **enclosure A 4.**

5. Details of TDI CITY

5.1 Please see MAP IN PLATE for Key map showing the location of the TDI City at Agra

5.2 Area of the TDI CITY . 421932.00 sq meter

5.3 Population (Dwelling units). 1150 approx. (1058 plots including group housing)

5.4 Township density:

(a) gross density 1150X7=8050 persons in all three phases

(b) net density 191 person / hectare

Land use map of the proposed town giving the break up of area and percentages under different land use types

TABLE 5.1

Area Statement	**3rd Phase**	**2nd Phase**	**1st Phase**	**Total (Sq. Mtr)**	**%**
Total Area Of Land	156815.00	102980.00	162137.00	421932.00	
Green Area	1286.50			1286.50	
Road Widening 45 m wide 24 m wide 18 m wide	 1065.00 10724.00	 22350.00	 15086.00	39225.00	
Area Left for gages widening	5842.50			5842.50	
Net Area Of the Land	137897.00	90630.00	147051.00	375578.00	100
Area Under Residential Plot	76648.16	49616.76	82451.70	208716.62	55.572
Area Under Nursing Home & Dispensary	1755.00		1492.75	3247.75	0.865
Area Under Park & Jalashya	20685.54	13640.47	22168.88	56494.89	15.042
Area Under Roads	31225.55	21951.02	29077.11	82253.68	21.90
Area Under Con. Shop/ Office/ Group Housing	6894.00	4148.50	6986.00	18028.50	4.80

Area Under nursery school	620.00	1242.00	820.00	2682.00	0.714
Area Under Dhalao Ghar	68.75	31.25	56.25	156.25	0.042
Area Under primary School			3998.31	3998.31	1.064
No. of Plots	400	251	408	1058	
Jalashya	5055.00	4855.50	7481.50	17392.00	

TABLE 5.2

Land Use	**Area**
Total land area	421932.00 m^2
Total area allocated for plots	208716.62 m^2
Total area allocated for parks/ Jalashya	56494.89 m^2
Total area allocated for roads	39225.00 m^2
Total area allocated for solid waste management	156.25 m^2
Total area allocated for shops/offices	18028.50 m^2
Total area allocated for nursery school	2682.00 m^2
Total area allocated for Dispensary	3247.75 m^2
Total area allocated for Primary School	3998.31 m^2

Proposed City is aiming for middle income group of Society and upcoming young professionals.

5.5 Details of facilities provided in the TDI CITY

	Educational:	**No.**	**Area**
a.	Nursery school	3	2682.00 m^2
b.	Primary school	1	3998.31 m^2
c.	Higher secondary school	None	
d.	College	None	
e.	Technical/Vocational Training Institutes	None	
	Health	No.	Areas
a.	Dispensaries	2	3247.75 m^2

b.	Health Clinics	None		
c.	Nursing Homes (No. of beds)	None		
	Parks, Playgrounds:	**No.**		**Area (m^2)**
a.	Park	9		22168.88
b.	Cluster Open spaces			As per ADA norms
c.	Neighborhood open spaces.			As per ADA norms
d.	Sector open spaces			As per ADA norms
e.	Open spaces at town level			15.07 %
	Commercial		**No of shops**	**Area**
a.	Convenient shops			18028.50
b.	Shopping Centers			Sq. mt.
c.	Central Business District			
	Other facilities			
a.	Post Office			
b.	Bank		As per A.D.A. norms	
c.	Telephone Booth			
d.	Milk Booth			
e.	Police Station			
	Infrastructural Facilities:			
	Transport			
a.	Mode of travel from residence to work place: Own Vehicle, Hired Transport			
b.	Mode of travel to surrounding areas :Own Vehicle, Hired Transport			
c.	Mode of travel within the town: Own Vehicle			
	Water Supply:			
a.	Source of water supply and quantities to be drawn.			
(i)	Phase -1 300 KL			
(ii)	Phase-2 200 KL			
(iii)	Phase-3 300 KL			

5.6 Drinking water supply Source of water supply is Ground water; Pumped water will be stored in overhead tank and after disinfection by Sodium hypochlorite solution, will be distributed to the stakeholders.

5.7 Type of treatment proposed,. Sedimentation and disinfection by Sodium hypochlorite solution

5.8 Supply Continuous supply will be made to the stakeholders.

5.9 Storage facility Overhead Tanks of 300 KL/ 200 KL / 300 KL are created (no. of OHT are 3).

5.10 Details of Distribution System

Distribution system is designed to assured water supply to the farthest distribution point. It is proposed to build **Grid – iron method** of layout for supply main line and branch line as per dead-end type of layout, with a minimum assured pressure head of 5 m of water column.

5.11 Sewage

5.11.1 Mode of collection of Domestic effluent

It is proposed to have **subsurface sewage drains** design to meet followings

TABLE 5.3

S. No.	parameter	value to be attain
1	Minimum Velocity of sewage	0.72-0.75
2	Design to attain At least half full condition at least once in a day.	gn flow should 2.4-2.6 times to the actual flow
3	Peak hour	6-10 AM and 7-8.30 PM
4	Maximum travel times for sewage to reach S.T.P.	Should not more than 4 - 5 hrs.
5	Rain water	Should not enter into the system.
6	Capacity	1200 Lt per house per day (with projection for 10 Yrs.)

5.11.2 Mode of treatment

It is proposed to carry wastewater to the U.A.S.B reactor / trickling filter based aeration pond based polishing treatment system with combined handling capacity of 1100 KLD. Treated water will be used for irrigation purpose and leftover will be

disposed though the soaking filed to be developed in the park area.(For details see enclosed drawing in enclosure A 17),

5.12 Disposal of Municipal Solid Waste generated at the residential complex.

It is proposed to built collection site for Municipal Solid waste Called as Dalav Ghar (Marked as DG in the layout)

Area requirements for Collection Points

Expected generation of waste in each house is 2.5 Kg per day

@ 0.3-0.5 Kg per day per capita

Thus for1150 houses will generate Total wt of 2875 Kg/ day

For the convenience of public TDI provides total 16 Dalav Ghar of **approx**. **10 Sq. mt each.**

From this collection point Nagar Nigam Disposal trucks will lift the garbage and send it to Municipal land fill area..

Estimated quantity of type of solid waste is 2.5 Kg/ house per day i.e.1150X2.5=2875 Kg/ day of domestic in nature. A general estimation is that out of it 60 % is bio degradable, 10% is plastic material & remaining 30% is un segregated, non decomposable material containing mostly dust etc.

5.13 Mode of collection & Disposal of segregated waste

Colored coded bins will be provided at the door step of resident and segregation techniques will be imparted to occupiers . Bio degradable & segregated material will be composted at site provided in layout. Segregated plastic material will be sent to scrape dealers of the Agra Town. Metal recyclable metal part of waste will be sold to scrape dealers as above.

6 Phase wise development of the New Town

Since project is proposed to be developed in three phase, the developer has layout the following phases for completion of project.

6.1 Marking of level – 6 weeks

6.2 Construction of overhead tank – 16 weeks phase–I,
35 week phase-II
105 week Phase-III

6.3 Developing of services – 30 weeks

6.4 Developing & completion of roads – 30 weeks

6.5 Developing & completion of Sewage treatment Plant 52 weeks

6.6 Total Time for the completion of services for the project will be 52 weeks

6.7 Total time for the construction of Dwelling unit 160 weeks

6.8 Density of developed occupiers will be 7x1150=8050 persons in all three phases

6.9 Expected density after 5 years of completion will be 2040 in all phases.

6.10 Periphery of project is enclosed by local different land owners thus it is not possible to predict the further development in neighborhood.

6.11 There is no buffer zone planned or proposed.

6.12 It is expected that near by neighborhood will be having commercial activity related to construction material supply and gradually settling as daily needs supplier, thus creating venue for new employment.

6.13 Change in resources in water use pattern is as follows:-

Rainwater runoff is higher and the area is with in the en-Catchment basin of Yamuna , therefore large quantity of rainwater reaches to river and can be consider as not utilized in proposed area. But after completing the project, net rainwater will be utilized in the proposed area. **(please see the water balance in enclosure A3**)

6.14 **Crops & Pattern**: - Till two years back area was used for cultivation, thus after construction there will be negative impact on food crops pattern but simultaneously plantation suggested the area will over power this impact on ecology

6.15 **Input on energy resource**

Since dwelling units are aimed for middle income group, **electricity consumption** in project side will be 18000KVA and requirement of **fuel for cooking** will be required under which is expected to be 14.5x1150X1.5= 25012.5 Kg of LPG per Month.

7. Environmental Characteristics of New Town

7.1 Phase wise development of the New Town

Since project is proposed to be developed in three phase, the developer has layout the following phases for completion of project.

TABLE 6.1

Marking of level	6 weeks
Construction of overhead tank –	16 weeks phase-1 35 weeks Phase-2 105 weeks Phase-3
Developing of services –	30 weeks
Developing & completion of reads –	30 weeks
Developing & completion of Sewage treatment Plant	52 weeks
Total Time for the completion of services for the project will be	52 weeks
Total time for the construction of Dwelling unit	160 weeks
Density of developed occupiers will be	7x1150=8050 persons

Periphery of project is enclosed by local different land owners thus it is not possible to predict the further development in neighborhood . **But as per Master plan 2021 of Agra Surrounding will be moderate density residential area**. There is no buffer zone is planned or proposed. It is expected that near by neighborhood will have commercial activity related to construction material supply and gradually settling as daily needs supplier, thus creating venue for new employment.

7.2 Change in resources in water use pattern is as follows:-

Till a year back, ground water was main source of water requirement for irrigation. Rain water was primary source to recharge the ground water. But during the construction water will be used as building raw material. After the completion of the project water will be used for domestic purposes and wastewater, after treatment, will used to meet out the irrigation needs of landscaping.

7.3 Crops & Pattern: - Till two years back area was used for cultivating, thus after construction there will be negative impact on food crops pattern but simultaneously plantation suggested in the area will over power reduction in carbon offset in this region.

7.4 Input on energy resource

Since dwelling units are aimed for middle income group, electricity consumption in project side will be 18000 KVA and requirement of fuel for cooking will be required under which is expected to be 14.5x1150X12.5= 25012.5 Kg of LPG per month

7.5 Proposed institutional set up : - The TDI City will be run by the developer till it is handed over to the NNA. Day to day services will be taken by one society created by the resident of the proposed new town.

7.6 Management of the town – The developers of the project has enough funds to run the services till it is handing over and the remaining amount will be transferred to the society of resident for further use and improvement.

7.7 Name of the authority and functions. :

All public health services will be taken care by Agra Nagar Nigam.

All day to day services i.e. security; park maintains etc. will be taken care by society name of which will be decided by the occupier of the project.

7.8 Socio-cultural aspects: - Before some time, the land was used for cultivation and at present it is barren land. The project population in the proposed site will be 1150x5=5750 person on completion of project.

Projected population after 2 years of completion of project will be = 2040 person

Age ratio	40%	above 40 years
	60%	below 40 years

Sex ratio …….. as an average Ratio in Agra district .It will over around male: female = 52:48

As the project is targeted for population working middle class it is expected to have 5 person / dwelling or 1150 families.

Since the project is on ownership basis and dwelling units are designed for one family, thus no. of family will be about 1150. After 2 yrs of completion, we can expect increase in no. of family to 20% extra as few of owner can create more living space by further construction in there premises.

8. ENVIRONMENTAL ASPECT OF DIFFERENT PARTS OF THE 'TDI CITY'

At present, in our national policy" housing " is thrust area and housing loans are easily available, middle income group has large disbursement at its disposal. Thus whole project will be occupied at the time of handling over.

In nutshell we can summaries the project in following table:-

8.1 Residential;-

TABLE 8.1

S. No.	Parameter	Remarks
1.	Type of developments	Low rise/ middle income housing
2.	pulation of township in 2021	8050 person in all 3 phases
3.	Density	1150X7=8050
4.	Plot size	From 150 to 500 sq. mt.
5.	F.A.R	1.5
6.	Site coverage	56.07%
7.	Development Controls	In phase manner

8.2 Commercial:

TABLE 8.2

S. No.	Parameter	
1.	Building material supply	30% of resident
2.	Construction Labour	10% of resident
3.	Daily need stores	95% of resident
4.	Transport Local	40% of resident

Recreational:

TABLE 8.3

S. No.	Parameter	
1.	Area of % of open space	15.07%
2.	Cinema hall	NIL
3.	Swimming pool	Nil
4.	Water based recreation	2 fountain
5.	Play Ground	Parks as shown in the layout

8.3 Utility:

TABLE 8.4

1.	Supply of electricity	To all dwelling units 1150
2.	Water Supply	- do -
3.	Proposed two tier water supply system	Drinking water For irrigation (treated waste water on path way)
	Quantity of water supply Treatment detail are attached in enclosure	145 Lt./day/capita for drinking and general purposes 1000 KLD/ for irrigation.
	Sewage / Drainage wastewater	Proposed town will have centralized water treatment system of all waste water
	Rain water	Rain water will be collected by surface drains and are proposed to harvest in nearest park as suggested in plan attached in **enclo- A 3**

8.4 Quality of effluent before disposal:-(Expected)

TABLE 8.5

Physical	**Parameter**	**Value**
	BOD	250 mg/l
	TSS	150 Mg/l
	PH	6.5-8
	Oil & Gear	10 Mg/l
Chemical	detergent	5 Mg/l
	Alkalinity	200 Mg/l

8.5 Method of disposal:

Treatment by anaerobic/ aerobic combination of sewage treatment based ion UASB reactor & polishing pond. The Details of disposal and calculation are attached in **enclosure A 1 .**

8.6 Storm water drainage

It is proposed to have segregated drainage system for storm water. All drains along side of road will lead to nearest park where it is proposed to harvest the rain fall. Harvesting structure are designed in such a way that all surplus water will move toward to nearest water body. For detailed calculation please refer to enclosure A 1.

8.7 Rain water Harvesting

Rain water collected from en-Catchment area will be diverted to nearest park or recharging zone through storm water drainage system For detailed scheme and calculation **refer to enclosure A1**

8.8 Mode of transport :

To reach the town ship, resident will use public as well as private transport. All the handling units are well connected by either link road or zonal plan road.

Road has minimum of 10ft. of walkway and 3 meter of metal road.

All the occupier of dowelling units will use their own planning but out side guest / visitors will use dedicated parking as proposed in layout.

8.9 Landscape:-

Residential – developers has no plan to develop any tree or plantation inside the dwelling units however it is proposed to plant 12000 trees outside the dwelling unit. The natural types of plant are suggested are as follows:-

8.10 PLANT SPECIES RECOMMENDED FOR PLANTATION

TABLE 8.6

Sl. No.	Scientific name	English name	Hindi name
1.	Azadirachta indica	Margosa	Neem
2.	Albizzia lebbek	Lebbeck tree (Kokko)	Safed siris
3.	Salvadora persica	Mustard tree	Jhal, kharjal
4.	Casuarina equisetifolia	Casuarina	Jangli Jhau
5.	Hibiscus rosa sinensis	China rose	Gulhut
6.	Thevetia neriifolia	Yellow oleander	Pili kaner
7.	Bougenvilia buttiana	Bougenvlia	Bogenvilia
8.	Mangifera indica	Mango	Aam
9.	Caesalpinia pulcherrima	Peacock flower	Gulmohar
10.	Pongamia glabra	Pongam	Karanja
11.	Eucalyptus hybrid	Eucalyptus	Eucalyptus
12.	Acacia auriculiformis	Australian wattle	
13.	Polyalthia longifolia	Ashok	Asok
14.	Terminalia arjuna		Arjuna
15.	Casuarina equisetifolia	Casuarina	Jhan
16.	Melia azedarach	Persian lilac	Bakain
17.	Nauclea cadamba	Kadamba	Kadam
18.	Morus alba	White mulberry	Shehtoot

Any other local shady trees of evergreen type will also be planted. Preference will be given to local varieties of trees. The above species are recommended based on plantation carried out around by railways and other inhabitants.

9. Other information

Following treatment will be made available to construction Labour during construction phase:-

a. Common Latrine.

b. Assure Safe Drinking water supply

c. Sewage disposal and treatment by temp. septic tank and soak pit created on site

d. Temporary shelter for each family of construction Labour.

e. All temporary shelter will be remove from the site as the work is complete and are cleaned by the construction Labour.

f. As it is clear that service population is coming from nearest neighborhood village of Lakawali, Baraouli Ahir, Shayamo etc. thus developers have not created and provide any shelters for the same.

As all the proposed population health services will be maintained by the NN Agra and NN Agra has its own tariff plan for the same and it changes time to time to meet the inflation.

Sewage plant will be operated and maintained by the local resident society an expected expenditure is attached in enclosure A16

Appraisal done by
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Enclosure-A1

A. Design philosophy of wastewater treatment and disposal at "TDI CITY, Agra "

A1.1 The proposed complex is a residential complex. It will generate the waste water mostly consists of, Fat tissues, human and animal waste, kitchen waste and other biodegradable products.

A1.2 During the process of washing, few quantity of caustic also passes with the wastewater, causing high alkalinity but this is for very short time and in less quantity.

A1.3 Since the layout is spread in nearly 126 Acres and it is segregated piece of land, it is proposed to have segregated treatment system, thus reducing the cost of sewage transportation system and preservation of national recourses.

A1.4 It is proposed to have waste water treatment system as follows

Phase 1 one UASB reactor , Trickling filter based Aerobic zone and one polishing pond. Followed by disinfection and disposal system.

Phase 2 one UASB reactor , Trickling filter based Aerobic zone and polishing pond Followed by disinfection and disposal system

Phase 3 Two UASB reactor , two Trickling filter based Aerobic zone and one polishing pond Followed by disinfection and disposal system

A1.5 Analysis of wastewater from different sample collected

Wastewater is collected at various locations in the wastewater treatment area, prior to any treatment except for the screening or settling of coarse solids. Screens and primary settling tanks are usually situated at the inlet of wastewater and it is difficult to collect the sample before that point, table 1 shows the strength of raw water varies, but variation seems to be independent of plant capacity: smaller population do not produce stronger or weaker wastewater.

TABLE A.1

Parameter (mg/l)	1	2	3	4	5	6
B.O.D. Total	250	235	195	220	260	230
Suspended Solids	957	736	1348	877	2397	1431
.ph	6.7	7.2	6.5	4.9	7.0	6.5
$CaCO_3$	333	333	333	83	1014	250

Wastewater sample should always collected in morning or early afternoon and did not include water from afternoon washing. The raw water collected was probably

stronger than 24 hrs composite samples, which would include wash water. Table ii present the range of values as well as the coefficient of variation for different parameter tested in raw water samples. For most parameter the variation was under 20%.

A 1.6 Parameter for System design

1.	Water quality	Sewage
2.	Colour	Colloidal Solution, mud and suspended solids
3.	T.S.S.	450 Mg/l
4.	Oil and grease	Nil
5.	B.O.D	250 mg/l
6.	Peak out flow	1200 KL day

7. Output water should comply the norms for discharge for irrigation..
8. Plants have to handle of 250 KL. wastewater discharge /day
9. With prime concentration on economy in removal of organic mass from the effluent.
10. Water should meet the requirement of U.P.P.C. Board .

A1.6 PROPOSED SOLUTION

Wastewater with these characteristics contains highly decomposable material, thus we can choose both the following method for water treatment.

Process of anaerobic and aerobic decomposition (See annexure for suggested the scheme.)

The wastewater generated and collected is proposed to be collected after screening, removing the oil and grease, in equalization tank, which has HRT of 6 hrs to minimize the shock loading in the upcoming treatment system.

Ahead of equalization tank it is proposed to have Primary sedimentation tank at this stage, 20% of BOD will be removed thus BOD after this stage would be

250X 0.8 = **200 mg/l**

Equalization tank is proposed to be followed by up-flow anaerobic sludge blanket reactor to complete the reduction. Proposed UASB has HRT of 10 Hrs, its efficiency at influent water temp. of 20-35 degree C is 90% thus

Effluent BOD 200 X .1 =**20 mg/l**

The detailed process is as follows:

Grit remover Oil and grease remover

We are going to use air floatation type oil and grease remover system with skimming arm,

A1.7 Equalization tank

After removing the grit and oil and grease water will be passed through the anaerobic zone created in equalization tank to equalize the water so that there is minimization of B.O.D. shock loading. Refer to Drawing 2

A1.8 U.A.S.B. reactor

It is main reactor for digesting the biodegradable soluble/ settle ale solids. It has proprietary distribution system, sludge zone, gas – liquid- solid separation and gas collection chamber. U.A.S.B. unit is capable of reducing B.O.D. load to 90% at HRT 10 hrs. Refer to Drawing 1

A1.9 Polishing ponds

Water with BOD less than to 20 mg/l will be sent to polishing pond with HRT 2 days, here we will use Aquatic plants to bring down the BOD to less than 20 mg/L.
Since Polishing ponds are used for landscaping and will be provide as per the site, but as per the calculations we require a minimum plan area of 1800 Sq m. with 1.5 meter deep polishing pond.

A1.10 Sand filter

Low volume high capacity multi grade sand filter with capacity to treat 20 KL/hr will be installed before sending water to disinfection system. It will remove suspended particles from the treated water. In turn will ensure that water will meet M.O.E.F requirements of safe disposal of wastewater.

A1.11 Disinfection System

Since water is intends to be used for the irrigation it is suggested to disinfect the water with Sodium Hypochlorite and maintain 0.2 PPM of free Chlorine in the treated wastewater.

A1.12 Disposal of treated water

The treated water will be used for the irrigation purposes.
Since the quantity of water is nearly 1200 KLD per day. It is proposed to divide the total quantity in following sub section.
Water is proposed to be used for sprinkle in the park area which is nearly 56494.89 sq m. out of which 5600.00 sq m will have artificial wetland. Thus as per the requirement for Grass in Hot and Humid climate like Agra it is 3-3.25 Lt/ Sq. m or it requires.
50000 X 3.25 = 162500 Lts. Or 160 KLD will be requirement for maintains of Lawn etc.

A1.13

Evapo-transpiration system will be used for consumption of treated wastewater. Nearly 12000 trees will cover all the path ways of residential complex, and boundary of park,. Thus achieving ratio of approximately 12 trees per dwelling unit , making greenest residential complex, surpassing local norms.

A1.13.1

Water requirement for maintains of 12000 trees will be nearly

12000 X 150 = 1800000 Lt. Per day or 1800 KLD, which is higher than the water generation of proposes layout.

A1.14.2

Soaking Trench is proposed to be created at the periphery of the park with an average width of 10 M and approximate surface area of 15000 Sq M. (detailed drawing is attached). Since sandy Loom has Percolation rate of 50 mm/ hr. during most of the time.

It will help in management of wastewater during the rains and preserving the ground water resource.

Taking percolation rate of loamy sand is 25 mm/ 36 min during **rainy days**,

it can disperse Q =**204 Lt./ Sq m /day**

or =204/$(36)^{1/2}$

or =204/6 or 34 Lt / sq m /day

or =34X5000

or =170 KL per day

Soaking capacity loading rate 170 Lt. / Sq. M / day for 15000 Sq. M

15000 X 170 = 2550000 or 2550 KLD.

This is almost 2.2 times of daily generation of wastewater from residential complex; hence there is no chance of choking of soaking trench Thus during the peak of rains system is self sustainable does not additional pumping. of treated wastewater.

A1.15 Parameter / Factor selected for calculation of treatment plant

Total flow rate / cell	Q	=	200 KLD
Sedimentation velocity of settable solids	Vs	=	0.5 m/h
Safety factor	Fs	=	0.4
Height of media	H	=	0.75 m
Settling are provided by tubes at 55^{o}		=	13 sq m/ cum
Maximum up flow velocity in reactor	Vmax	=	1.0 m/hr
Minimum velocity		=	0.8 m/hr

Loading rate	Lr	=	18 cum per hr
HRT for UASB		=	10 hr
HRT for Equalization tank		=	6-7 hr
Grit chamber		=	10 –15 min.

A1.16 Dimensioning of reactor

Plan area of UASB		=	Lr / Vmax
		=	18 sq. m
Volume per hr	Vhr	=	18 cu m / hr
Radius of reactor	R^2	=	[Vhr / (3.14 X Vmax)]
		=	[18 / (3.14 X 1)] m
	R	=	**2.3 m**
Height of water column		=	Lr X HRT / area of reactor
		=	18 X 10 / 31.5
		=	**10 m**

A1.17 Calculation for Media specification

Dimensioning the tube settler			
Area required	As	=	Lr /(Vs.Fs)
	As	=	18 / /0.5X0.4
		=	90 sqm
Volume of tube settler		=	90 / 13
		=	6.9
Surface area of settler		=	V /H
		=	156.25 / 0.75
		=	**9.2 sqm**
Provided area for media		**=**	**3 X 3 m**
Overall media loading rate		**=**	**18/9 or 2.0 cum/sqm/hr**
Calculation for equalization tank			
Plan area of Equalization tank		=	Lr / Vmax
		=	18 sq. m
Volume per hr	Vhr	=	18 cu m / hr
Radius of tank	R	=	[Vhr / (3.14 X Vmax)]
		=	[18 / (3.14 X 1)] m
		=	**2.3 m**

Height of water column = Lr X HRT / area of reactor

= 18 X 6 / 18

= **6 m**

A 1.18 Expected production of biogas

Since production of biogas is dependent of nature of bio waste and we have no previous data to calculate the possible production. Considering the data collected from the field

Generation of biogas from sewage = BOD X loading rate per day (in MLD) X .5 cum Meter per day at NTP

Thus the expected biogas generation = 250 X 1.1 X 0.5

= 1375 cum per day

This gas can be used for cooking or street lighting without any scrubbing and is equivalent to 1 cylinders of LPG in terms of energy equivalence.

A1.19 Expected value of treated water quality

TABLE A1.2

Wastewater Characteristics	Units	Influent	Target Effluent	Effluent
Biochemical Oxygen Demand (BOD)	mg/L	219	<10	
Total Suspended Solids (TSS)	mg/L	174	<10	
Total Nitrogen	mg/L	23	<10	
Total Kjeldahl Nitrogen	mg/L	23	5	
Ammonia	mg/L	14.0	1	
Total Phosphorous	mg/L	4.8	3	
Fecal Coli form	col/100ml	9,380,833	<2,000	

Enclosure-A 2

A2.1 Arrangement for self-sustaining finance of the project

Every unit holder has to pay 5000.00 upfront as security to the Co-Operative Society of residents.

Thus a reserve of 5000.00 X 1150 = Rs. 57,50,000 .00 will remain with the co-operative at all times

He / She is also liable to pay Rs. 250.00 per month as maintains charges.

Thus a total of Rs. 1150 X 250 = Rs. 2,87,500.00 per month.

Thus no financial crunch is expected for maintains of the treatment plant.

A2.2 Disposal of Municipal Solid Waste generated at the residential complex.

It is proposed to built collection site for Municipal Solid waste Called as Dalav Ghar (Marked as DG in the layout)

Area requirements for Collection Points

Expected generation of waste in each house is 2.5 Kg per day

@ 0.3-0.5 Kg per day per capita

Thus 1150 houses will generate Total wt of 1150 * 2.5 = 2785 Kg/ day or say 1 MT per day.

For the convenience of public we have total no. 10 of Dalav Ghar .

From this collection point Nagar Nigam Disposal trucks will lift the garbage and send it to Municipal land fill area..

A2.3 Power Generation at Site

It is expected that no Generator set will be used at site, if used; it will have all the necessary equipment for pollution control as required by MOEF guidelines.

Enclosure-A3

A3.1 WATER BALANCE STATEMENT

Annual rain fall @ Agra 750 mm per year.

Total Area of project TDI CITY

Maximum harvestable water 268000 KL per year. (A)

Extraction of ground water 1150*7*145 = 1167250 per day

426046.25 KL per year. (B)

Recharge by reuse of treated wastewater

426046.25* 65% = 276930.0625 KL per year (C)

Loss of groundwater by evapo-transpiration etc

149116.1875 KL (D)

thus net balance of water is = A-D

= 118883.82 KL YEAR

above project has positive balance of natural water resource

Enclosure-A 4

TABLE A.4.1

S.No.	Item	Units	Duration	Value
1	**GEOGRAPHICAL AREA**	**SQUARE KM**	**2000**	**4027**
2	**POPULATION**			
	MALE	**IN THOUSAND**	**1991**	**1501.93**
	FEMALE	**IN THOUSAND**	**1991**	**1249.09**
	TOTAL	**IN THOUSAND**	**1991**	**2751.02**
	RURAL	**IN THOUSAND**	**1991**	**1639.94**
	URBAN	**IN THOUSAND**	**1991**	**1111.09**
	SCHEDULE CASTE	**IN THOUSAND**	**1991**	**638.33**
	SCHEDULE TRIBES	**IN THOUSAND**	**1991**	**0.27**
3	**NUMBER OF LITERATES**			
	TOTAL	**IN THOUSAND**	**1991**	**1059.67**
	MALE	**IN THOUSAND**	**1991**	**757.38**
	FEMALE	**IN THOUSAND**	**1991**	**302.29**
4	**NUMBER OF TEHSILS**	**NUMBER**	**2000**	**6**
5	**BLOCKS**	**NUMBER**	**2000**	**15**
6	**NYAYA PANCHAYAT**	**NUMBER**	**2000**	**114**
7	**GRAM SABHA**	**NUMBER**	**2000**	**636**
8	**NUMBER OF VILLAGES**			
	NUMBER OF HABITATED VILLAGE	**NUMBER**	**1991**	**904**
	NUMBER OF INHABITATED VILLAGE	**NUMBER**	**1991**	**36**
	FOREST GRAM	**NUMBER**	**1991**	**0**
	TOTAL	**NUMBER**	**1991**	**940**
9	**TOWN & TOWN GROUPS**	**NUMBER**	**1991**	**15**
10	**MUNICIPAL CORPORATION**	**NUMBER**	**2000**	**1**
11	**NAGAR PALIKA PARISHAD**	**NUMBER**	**2000**	**5**
12	**CANTONMENT AREA**	**NUMBER**	**2000**	**1**

13	**NAGAR PANCHAYAT**	**NUMBER**	**2000**	**7**
14	**CENSUS TOWN**	**NUMBER**	**1991**	**1**
15	**POLICE STATION**			
	RURAL	**NUMBER**	**2000**	**25**
	URBAN	**NUMBER**	**2000**	**16**
16	**BUS STATION/BUS STOP**	**NUMBER**	**2000**	**144**
17	**RAILWAY STATION/HALT**	**NUMBER**	**2000**	**29**
18	**LENGTH OF RAILWAY LINE**			
	BROAD GAUGE	**KILOMETERS**	**1998-99**	**196**
	NARROW GAUGE	**KILOMETERS**	**1998-99**	**35**
19	**POST OFFICE**			
	URBAN	**NUMBER**	**2000**	**98**
	RURAL	**NUMBER**	**2000**	**253**
20	**TELEGRAM OFFICE**	**NUMBER**	**2000**	**23**
21	**TELEPHONE CONNECTIONS**	**NUMBER**	**1998-99**	**73511**
22	**COMMERCIAL BRANCHES**			
	NATIONALIZED BANKS	**NUMBER**	**1998-99**	**172**
	OTHERS	**NUMBER**	**1998-99**	**5**
23	**RURAL BANK BRANCHES**	**NUMBER**	**1998-99**	**43**
24	**CO-OPERATIVE BANK BRANCHES**	**NUMBER**	**1998-99**	**16**
25	**CO-OPERATIVE AGRICULTURE AND VILLAGE DEVELOPMENT BANCHES**	**NUMBER**	**1998-99**	**8**
26	**FAIR PRICE SHOP**			
	RURAL	**NUMBER**	**1998-99**	**804**
	URBAN	**NUMBER**	**1998-99**	**473**
27	**BIO-GAS PROJECT**	**NUMBER**	**1998-99**	**3471**
28	**COLD STORAGE**	**NUMBER**	**1998-99**	**67**
29	**AGRICULTURE**			
	NET SOWN AREA	**HECTARE**	**1997-98**	**288**
	NET IRRIGATED AREA	**HECTARE**	**1997-98**	**219**
	GROSS IRRIGATED AREA	**HECTARE**	**1997-98**	**237**
30	**AGRICULTURE PRODUCTION**			
	FOOD GRAINS	**HECTARE METRIC T**	**1997-98**	**602**
	CANE	**HECTARE METRIC T**	**1997-98**	**22**
	TILHAN	**HECTARE METRIC T**	**1997-98**	**59**
	POTATO	**HECTARE**	**1997-98**	**397**

		METRIC T		
31	**CLIMATE**			
	GENERAL RAINFALL	**MM**	**1998-99**	**751**
	ACTUAL RAINFALL	**MM**	**1998-99**	**820**
	MAXIMUM TEMPERATURE	**°C**	**1998-99**	**-**
	MINIMUM TEMPERATURE	**°C**	**1998-99**	**-**
32	**IRRIGATION**			
	LENGTH OF CANAL	**KILOMETER**	**1997-98**	**614**
	GOVERNMENT TUBEWELL	**NUMBER**	**1997-98**	**396**
	PRIVATE TUBEWELLS & PUMP SETS	**NUMBER**	**1997-98**	**63192**
33	**ANIMAL HUSBANDRY**			
	TOTAL ANIMAL HUSBANDRY	**NUMBER**	**1993**	**948075**
	VETENARY HOSPITAL	**NUMBER**	**1998-99**	**29**
	ANIMAL HUSBANDRY SERVICE CENTRE	**NUMBER**	**1998-99**	**36**
	ARTIFICIAL BREEDING CENTRE	**NUMBER**	**1998-99**	**24**
	ARTIFICIAL BREEDING SUB-CENTRE	**NUMBER**	**1998-99**	**43**
34	**CO-OPERATIVE**			
	PRIMARY COOPERATIVE AGRICULTURAL LOAN SOCIETIES	**NUMBER**	**1997-98**	**103**
	MEMBERS OF SOCIETIES	**THOUSAND**	**1997-98**	**299**
35	**INDUSTRY**			
	NUMBER OF RUNNING FACTORIES REGD. UNDER THE INDUSTRIAL ACT 1948	**NUMBER**	**1998-99**	**289**
	SMALL INDUSTRIES	**NUMBER**	**1998-99**	**6981**
	WORKERS	**NUMBER**	**1998-99**	**44336**
36	**EDUCATION**			
	PRIMARY SCHOOLS	**NUMBER**	**1998-99**	**1748**
	JUNIOR SCHOOLS	**NUMBER**	**1998-99**	**383**
	HIGHER SECONDARY SCHOOLS	**NUMBER**	**1998-99**	**198**
	DEGREE COLLEGES	**NUMBER**	**1998-99**	**10**
	UNIVERSITY	**NUMBER**	**1998-99**	**2**

	INDUSTRIAL TRAINING INSTITUTE	**NUMBER**	**1998-99**	**2**
	POLYTECHNICS	**NUMBER**	**1998-99**	**2**
	ENGINEERING COLLEGE	**NUMBER**	**1998-99**	**2**
37	**PUBLIC HEALTH**			
	HOSPITALS			
	ALLOPATHIC	**NUMBER**	**1998-99**	**45**
	AYURVEDIC	**NUMBER**	**1998-99**	**25**
	HOMEOPATHIC	**NUMBER**	**1998-99**	**8**
	UNANI	**NUMBER**	**1998-99**	**1**
	PRIMARY HEALTH CENTRE	**NUMBER**	**1998-99**	**56**
	FAMILY & MOTHER INFANT CENTRE	**NUMBER**	**1998-99**	**34**
	FAMILY & MOTHER-INFANT SUB-CENTRE	**NUMBER**	**1998-99**	**310**
	SPECIAL HOSPITALS			
	TUBERCULOSIS	**NUMBER**	**1998-99**	**1**
	LEPROSY	**NUMBER**	**1998-99**	**1**
	COMMUNICABLE DISEASES	**NUMBER**	**1998-99**	**1**
38	**LENGTH OF CONNECTED ROADS**	**KILOMETER**	**1997-98**	**2585**
	TOTAL LENGTH OF ROAD CONSTRUCTED BY PWD	**KILOMETER**	**1997-98**	**1826**
39	**ELECTRICITY**			
	TOTAL ELECTRIFIED VILLAGE	**NUMBER**	**1998-99**	**769**
	TOTAL ELECTRIFIED CITIES	**NUMBER**	**1998-99**	**15**
	ELECTRIFIED SCHEDULE CASTE LOCALITIES	**NUMBER**	**1998-98**	**443**
40	**THE AREAS AVAILED WITH WATER SUPPLY AFTER INSTALLING TAPS/ HANDPUMPS OF INDIAN MARK-2**			
	VILLAGES	**NUMBER**	**1998-99**	**904**
	CITY	**NUMBER**	**1998-99**	**15**
	TOTAL NUMBER OF LACKING VILLAGES	**NUMBER**	**1998-99**	**0**
41	**ENTERTAINMENT**			
	CINEMA HALLS	**NUMBER**	**1998-99**	**42**
	TOTAL NUMBER OF SEATS IN HALLS	**NUMBER**	**1998-99**	**33513**

Source: ZSP-1999, Agra

Enclosure -A 5

List of Plant Species under Green-belt Development

TABLE A.5.1

1.	Peltophorum ferrugineum	20.	Lawsomia alba
2.	Delonix regia coronaria	21.	Tabenaemontana
3.	Cassia siamea	22.	Double chandni
4.	Callistemon lancelatus	23.	Techoma stans
5.	Gmelina arborae	24.	Hamella patens
6.	Polyalthia pendula	25.	Cassia glanca
7.	Polyathia longifolia	26.	Ixora coccenia
8.	Cassia fistula	27.	Thevetia nerifolia
9.	Terminalia arjuna	28.	Bougeinvillae Sp.
10.	Grevillea robusta	29.	Thuja compacta
11.	Alibizzia lebbek	30.	Nyctanthus arbortristis
12.	Eucalyptus hybrid	31.	Jasminum pubescens
13.	Casurina equisetifolia	32.	Jasminum sambac
14.	Acacia auriculaeformis	33.	Putranjiva roxburghi
15.	Melia azedarach	34.	Muraya exotica
16.	Alastonia scholaris	35.	Cestrum alba
17.	Nauclea cadamba (N. Orentails)	36.	Cestrum nocturnum
18.	Hibiscus rosasinenel	37.	Tabebula rosea

Enclosure A-6

LIST OF FAUNA WITHIN THE STUDY AREA

TABLE A.6.1

ZOOLOGICAL NAME	COMMON NAME	LOCAL NAME
MAMMALS		
Presbytis entellus	Langoor	Hanuman monkey
Felis chaus	Jungle cat	Junglee billi
Lutra perspicillata	Otter	Und
Mellivora indica	Indian ratel	Bijju
Canis aureus	Jackal	Geedad
Canis lupus	Wolf	Bhedia
Vulpes bengalensis	Indian fox	Lomdi
Hyaena hyaena	Striped hyaena	Lakaadbaggha
Herpestec edwrdsi	Mangoose	Nevla
Gazella gazelle	Indian gazalla	Chinkara
Tetracerus quadricornis	Fourhorned antelope	Chowsingha
Axis axis	Spotted deer	Cheetal
Cervus unicolor	Sambar	Sambhar
Sus scrofa	Indian wild boar	Junglee suar
Camelus dromedaries	Camel	Oont
Lepus nigricolis	Hare	Khargosh
Corcidora murira	Musk shrew	Chuchandaer birds
Pterocles exustus	Common sand grouse	Bhat teetar
Tophozous melamopogon	Bearded sheath tailed bat	Chamgadar
Funambulus sps.	Palm squirrel	Gilhari
AVI-FAUNA		
Columba livia	Blue rock pigeon	Kabutar
Streptopelia chinensis	Spotted dove	Parakeeva
Streptopelia risoria	Indian ring dove	Phachta
Capella gallinago	Common tail snipe	Chatta
Egretta gazetta	Little egret	Kanchia bagula
Bubulcus ibis	Cattle egret	Surkhia
Ardea cinera	Grey heron	Bagula

Ciconia episcopus	White necked stork	Luglug
Gyps bengalensis	Bengal vulture	Gidhh
Caprimulgus indicus	Night jar	Chapka
Tockus birostris	Grey horn bill	Dhanesh
Picoides nanus	Golden backed dinopium wood peaker, Pygmy wodpeaker	Katphoda
Pavo cristatus	Peacock	Mor
REPTILES		
Ptyas mucosus	Common rat snake	Dhaman
Colotes versicolor	Common garden lizard	Girgit
Riopa punetata	Snake skink	
Lissemys punetata	Flap shell turtle	Kachua
Fchis carinatus	Saw scalled viper	Afai
Bungarus caeruleus	Common Indian carait	Karait
Naja naja	Indian Kobra	Nag

Enclosure-A 7

Birds recorded in Polishing Ponds at ECO Park

TABLE A.7.1

S. No.	Species	Scientific Name	Status
1.	Dabshick	*Tachybabtus ruficollis*	R
2.	Little Cormorant	*Phalacrocoras niger*	R
3.	Indian Shag	*Phalacrocorx carbo*	R
4.	Large Cormorant	*Phalacrocorx carbo*	R
5.	Darter	*Anhinga rufa*	R
6.	Grey Heron	*Ardea cinerea*	R
7.	Pond Heron	*Ardeola grayii*	R
8.	Purple Heron	*Ardea purpurea*	R
9.	Cattle Egret	*Bubulcus ibis*	R
10.	Little Green Heron	*Ardeola striatus*	R
11.	Large Egret	*Ardea alba*	R
12.	Smaller Egret	*Egretta intermedia*	R
13.	Little Egret	*Egretta garzetta*	R
14.	Night Heron	*Nycticorax nyticorax*	R
15.	Painted Stork	*Mycteria leucocephala*	R
16.	White Ibis	*Threskiornis aethiopica*	R
17.	Barheaded Goose	*Anser indicus*	M
18.	Lesser Whistling Teal	*Dendrocygna javanica*	R
19.	Pintail	*Anas acuta*	M
20.	Mallard	*Anas platyrhynchos*	M
21.	Common Teal	*Anas creeca*	M
22.	Spotbill	*Anas poechilorhyncha*	R
23.	Gadwall	*Anas strepera*	M
24.	Wigeon	*Anas penelope*	M
25.	Garganey	*Anas querquedula*	M
26.	Redcrested Pochard	*Anas clypeata*	M
27.	Tufted Duck	*Netta rufina*	M
28.	Whiteeyed pochard	*Aythya fuligula*	M
29.	Comb Duck	*Aythya nyroca*	M
30.	Crested Honey Buzzard	*Sarkidiornis melanotos*	M

31.	Black kite	*Pernis ptilorhynchus*	R
32.	Shikra	*Milvus migrans*	R
33.	Londbilled Vultureq	*Accipiter badius*	R
34.	Whilebacked Vulture	*Gyps indicus*	R
35.	Egyptian Vulture	*Gyps bengalensis*	R
36.	Marsh Harrier	*Neophron percnopterus*	R
37.	Lagger Falcon	*Circus aeruginosus*	M
38.	Whilebreasted Waterhen	*Falco jugger*	R
39.	Infian Moorhen	*Amaurornis phoenicurus*	R
40.	Purple Moorhen	*Gallinula chloropus*	R
41.	Coot	*Poryphyrio porphyrio*	R
42.	Redwattled Lapwing	*Fulica atra*	M
43.	Common Sandpiper	*Vanellus indicus*	R
44.	Green Sandpiper	*Tringa hypoleucos*	M
45.	Yellowlegged Green Pigeon	*Tringa ochropus*	M
46.	Blue Rock Pigeon	*Treron phoenicoptera*	R
47.	Ring Dove	*Columba livia*	R
48.	Little Brown Dove	*Streptopelia decaotcto*	R
49.	Roseringed parakeet	*Streptopelia senegalensis*	R
50.	Crow Pheasant	*Psittacula krameri*	R
51.	Common Indian Night Jar	*Centrpus sinensis*	R
52.	Longtailed Night Jar	*Caprimulgus asiaticus*	R
53.	Spotted Owlet	*Caprimulgus macrurus*	R
54.	House Swift	*Athene brama*	R
55.	Whitebreasted Kingfisher	*Apus affinis*	R
56.	Small Blue Kingfisher	*Halcyon Symrnensis*	R
57.	Green Bee-eater	*Alcedo atthis*	R
58.	Blue jay	*Merops orientalis*	R
59.	Hopooe	*Coracias benghalensis*	R
60.	Grey Hoenbill	*Upupa epops*	R
61.	Wiretailed Swallow	*Tockus birostris*	R
62.	Striated Swallow	*Hirundo smithii*	R
63.	Common Swallow	*Hirundo dauricaq*	R
64.	Black Drongo	*Hirunda rustica*	M

65.	Brahminy Myna	*Dicrurus adsimilis*	R
66.	Pied Myna	*Sturnus pagodarum*	R
67.	House Crow	*Sturnus contra*	R
69.	Jungle Crow	*Corvus splendens*	R
70.	Redvented Bulbul	*Coryus macrorhynchos*	R
71.	Whitecheeked Bulbul	*Pycnonotus cafer*	R
72.	Jungle Babbler	*Pycnonotus leucogenys*	R
73.	Large Grey Babbler	*Turdoides striatus*	R
74.	Redbreasted Flycateches	*Turdoides malcolmi*	R
75.	Greyheaded Flycatches	*Muscicapa Parva*	M
76.	Great Reed Warbler	*Culicicapa ceylonensis*	R
77.	Lesser Whitethroat	*Acrocephalus stentoreus*	M
78.	Chiff Chaff	*Sylvia curruca*	M
79.	Yellobrowed Lead Warbler	*Phylloscopus collybita*	M
80.	Blue Throat	*Phylloscopus inornatus*	M
81.	Magpia Robin	*Erithacus svecicus*	M
82.	Black redstart	*Copsychus saularis*	R
83.	Indian Robin	*Phoenicurus ochruros*	M
84.	Grey Wagtail	*Saxicoloides fulicata*	R
85.	Yellow Wagtail	*Motacilla cinerea*	M
86.	White Wagtail	*Motacilla Flava*	M
87.	White Wagtail	*Motacilla alba personata*	M
88.	Pied Wagtail	*Motacilla alba dukhunensis*	M
89.	Yellowwheaded Wagtail	*Motocilla maderaspatensis*	M
90.	Purple Sunbird	*Motacilla citreola*	M
91.	White-eye	*Nectarinia asiatica*	R
92.	House Sparrow	*Zosterops palpebrosa*	R
93.	Spotted Munia	*Passer domesticus*	R
94.	Spotted Munia	*Lonchura punctulata*	R
95.	Whitethrated munia	*Lonchura punctulata*	R
96.		*Lonchura malabarica*	R

Enclosure A 8

AMBIENT AIR QUALITY STANDARD IN RESPECT OF NOISE

TABLE A.8.1

Area Code	Category of Area	Limits in dB (A) Leq	
		Day time	Night time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence zone	50	40

Note :-

1. Date time is reckoned in between 6 AM, and 9 PM.
2. Night time is reckoned in between 9 PM, and 6 AM.
3. Silence zone is defined as areas up to 100 meters around such premises as hospitals, educational institutions and courts. The Silence zones are to be declared by the Competent Authority. Use of vehicular horns, loudspeakers and bursting of crackers shall be banned in these zones.
4. Mixed categories of areas should be declared as one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.

Source : EPA Notification G.S.R. 1063 (E), dt. 16th December, 1989.

Enclosure- A 9

DAMAGE RISK CRITERIA FOR HEARING LOSS
OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA)

TABLE A.9.1

MAXIMUM ALLOWABLE DURATION PER DAY, h	NOISE LEVEL Dba (SLOW RESPONSE)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

Enclosure-A10

INDIAN STANDARDS FOR INLAND SURFACE WATERS SUBJECT TO POLLUTION

TABLE A.10.1

Characteristics	Tolerance limits for inland surface waters, IS : 2296-1963		
	For raw waters used for public water supply & bathing ghats	For fish culture	For irrigation
BOD, 5 days, 20^0C, mg/l	3	-	-
Dissolved oxygen, % saturation	40	20	-
pH	6.0-9.0	6.0-9.0	-
Total dissolved solids, mg/l (inorganic)	-	-	2100
Phenolic compounds, mg/l (as C-H-OH)	0	-	-
Cyanides, mg/l (as CN)	0.01	-	-
Fluorides, mg/l (as F)	1.5	-	-
Arsenic, mg/l (as As)	0.2	-	-
Chromium, mg/l (as Cr)	-.05	-	-
Selenium, mg/l (as Se)	0.05	-	-
Chlorides, mg/l (as Cl)	600	-	600
Free CO2 mg/l	-	6	-
Ammonical nitrogen mg/l (as N)	-	1.2	-
Boron, mg/l (as B)	-	-	-
Sulphates, mg/l (as SO_4)	-	-	2
Electrical conductance, at 250^0C	-	$100x10^{-6}$ mhos	$3000x10^{-4}$ mhos
% Sodium	-	-	60
Coli form organisma (monthly average MPN 100 ml)	-	-	-
Radioactive materials			
Alpha emitters, p.c./ml	10^{-9}	10^{-9}	10^{-9}
Beta emitter, p.c./ml	10^{-8}	10^{-8}	10^{-8}

Enclosure-A 11

INDIAN STANDARDS FOR INLAND SURFACE WATERS SUBJECT TO POLLUTION

TABLE A.11.1

Sl. No.	Parameters	Standards			
		Indian surface water	Public sewers	Land for irrigation	Marine coastal area
1	2	3	4	5	6
1	Colour odour	See note (1)	-	See note (1)	See note (1)
2	Suspended solids, mg/l max.	100	600	200	a) for process waste water – 100 b) For cooling water effluent 10% above total suspended matter of influent
3	Particle size of suspended solids	Shall pass 850 micron IS sieve	-		a) Floatable solids, max. 3 mm. b) Settle able solid, max. 850 microns.
4.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
5.	Temperature max. ^{0}C	Shall not exceed 5 ^{0}C above the receiving	-	-	Shall not exceed 5 ^{0}C above the receiving temperature.

		temperature			
6.	Oil and grease, mg/l, max.	10	20	10	20
7.	Total residula chlorine mg/l max.	1	-	-	1
8.	Ammoniacal nitrogen (as N) mg/l max.	50	50	-	50
9.	Total kjedahl nitrogen (as N) mg/l max.	100	-	-	100
10.	Free ammonia (as NH_3) mg/l max.	5	-	-	5
11.	Biochemical oxygen demand (5 days at 20 ^{0}C) mg/l max.	30	35	100	100
12.	Chemical oxygen demand mg/l max.	250	-	-	250
13.	Arsenic (as As) mg/l max.	0.2	0.2	0.2	0.2
14.	Mercury (as Hg) mg/l, max.	0.01	0.01	-	0.01
15.	Lead (as Pb) mg/l, max.	0.1	1	-	2
16.	Cadmium (as Cd) mg/l, max.	2	1	-	2
17.	Hexavalent chromium (as Cr^{+8}) mg/l, max.	0.1	2	-	2
18.	Total Chromium (as Cr) mg/l, max.	2	2	-	2

19.	Copper (as Cu), mg/l	3	3	-	3
20.	Zink (as Zn) mg/l, max.	5	15	-	15
21.	Selenium (as Se) mg/l, max.	0.05	0.05	-	0.05
22.	Nickel (as Ni) mg/l, max.	3	5	-	5
23.	Cyanide (as Cn) mg/l, max.	0.2	2	0.2	0.2
24.	Fluoride (as F) mg/l, max.	2	15	-	15
25.	Dissolved Phosphates (as P) mg/l, max.	5	-	-	-
26.	Sulphide (as S) mg/l, max.	2	-	-	5
27.	Pesticides	Absent	Absent	Absent	Absent
28.	Phenolic compounds (as C_6H_5OOH) mg/l, max.	1	5	-	5
29.	Radioactive materials a) Alpha emitters, C/m max.	10^7	10^7	10^8	10^7
	b) Beta emitters uc/mi max.	10^6	10^6	10^7	10^6
30.	Bio-assay test	90% of survival of fish after 96 hourse in 100% effluent	90% of survival of fish after 96 hourse in 100% effluent	90% of survival of fish after 96 hourse in 100% effluent	90% of survival of fish after 96 hourse in 100% effluent

31.	Manganese (as Mn), mg/l	2	2	-	2
32.	Iron (as Fe), mg/l	3	3	-	3
33.	Vanadium (as Mn), mg/l	0.2	0.2	-	0.2
34.	Nitrate nitrogen, mg/l	10	-	-	20

Enclosure-A 12

WATER QUALITY CRITERIA FOR DRINKING WATER

(IS 10500 : 1991)

TABLE A.12.1

Sl. No.	Substance of Characteristic	Requirement (Desirable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods off test (Ref. to IS)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Essential Characteristics						
i)	Colour, Hazen units, Max.	5	Above 5, consumer acceptance decreases	25	3025 (Part 4) : 1983	Extended to 25 only if toxic substances are no suspected in absence of alternate sources
ii)	Odour	Unobjectionable	-	-	3025 (Part) 5 : 1983	a) Test cold and when heated b) Test at several dilutions
iii)	Taste	Agreeable	-	-	3025 (Part 7) : 1984	Test to be conducted only after safety has been established
iv)	Turbidity NTU, Max.	5	Above 5, consumer acceptance	10	3025 (Part 10) :	-

			decreases		1984	
v)	pH value	6.5 to 8.5	Beyond this range the water will affect the mucous membrane and/or water supply system.	No relaxation	3025 (Part 11) : 1984	-
vi)	Total hardness (as $CaCO_3$) mg/l, Max.	300	Encrustation in water supply structure and adverse effects on domestic use	600	3025 (Part 21) : 1983	-
vii)	Iron (as Fe) mg/l, max	0.3	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria	1.0	32 of 3025 : 1964	-
viii)	Chlorides (as Cl) mg/l, max	250	Beyond this limit, taste, corrosion and palatability are affected	1000	3025 (Part 32) : 1988	-
ix)	Residual free chlorine mg/l, Min.	0.2	-	-	33025 (Part 26) : 1986	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is

						required, it should be Min. 0.5 mg/l.
Desirable Characteristics						
x)	Dissolved solids mg/l, Max.	500	Beyond this palatability decreases and May cause gastro intestinal irritation	2000	3024 (Part 16) : 1984	-
xi)	Calcium (as Ca) mg/l, Max.	75	Encrustation in water supply structure and adverse effects on domestic use	200	3025 (Part 40) : 1991	-
xii)	Copper (as Cu) mg/l, Max.	0.05	Astringent taste, discoloration and corrosion pipes, fitting and utensils will be caused beyond this	1.5	36 of 3025 : 1964	-
xiii)	Manganese (as Mn) mg/l, Max.	0.1	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures	0.3	35 of 3025 : 1964	-
xiv)	Sulphate (as SO_4) me/l, Max	200	Beyond this causes gastro intestinal irritation when magnesium or sodium are present	400 (see col 7)	3025 (Part 24) : 1986	May be extended up to 400 provide (as Mg) does not exceed 30
xv)	Nitrate (as NO_3)	45	Beyond this methaemoglobi-nemia takes place	100	3025 (Part 34) : 1988	-

	mg/l, Max.					
xvi)	Fluoride (as F) mg/l, Max	1.0	Fluoride may be kept as low as possible. High fluoride may cause fluorosis	1.5	23 of 3025 : 1964	-
Xvii)	Phenolic compounds (as C_6H_5OH) mg/l, max	0.001	Beyond this, it may cause objectionable taste and odour	0.002	54 of 3025 : 1964	-
xviii)	Mercury (as Cd), mg/l, Max.	0.001	Beyond this, the water becomes toxic	No relaxation	(see Note) Mercuryion analyzer	To be tested when pollution is suspected
xix)	Cadmium (as Se), mg/l, max	0.01	Beyond this, the water becomes toxic	No relaxation	(see note)	To be tested when pollution is suspected
xx)	Selenium (as Cd), mg/l, max	0.01	Beyond this, the water becomes toxic	No relaxation	28 of 3025 : 1964	To be tested when pollution is suspected
xxi)	Arsenic (as As), mg/l, max	0.05	Beyond this, the water becomes toxic	No relaxation	3025 (Part 37) : 1988	To be tested when pollution is suspected
xxii)	Cyanide (as	0.05	Beyond this, the water becomes	No relaxation	3025 (Part 27) :	To be tested when pollution

	CN), mg/l, Max		toxic		1986	is suspected.
xxiii)	Lead (as Pb), mg/l, Max	0.05	Beyond this, the water becomes toxic	No relaxation	(see note)	To be tested when pollution / plumbo-solvency is suspected
xxiv)	Zinc (as Zn), mg/l, Max	5	Beyond this limit it can cause stringent taste and an opalescence water	15	39 of 3025 : 1964	To be tested when pollution is suspected.
xxv)	Anionic detergents (as MBAS), mg/l, Max	0.2	Beyond this limit it can cause a light froth in water	1.0	Methylene-blue extraction method	To be tested when pollution is suspected.
xxvi)	Chromium (as Cr^{6+}), mg/l, Max	0.05	May be carcino-genic above this limit	No relaxation	38 of 3025 : 1964	To be tested when pollution is suspected.
xxvii)	Polynuclear aromatic hydrocarbons (as PAH), g/l, Max.	-	May be carcinogenic	-	-	-
xxviii)	Mineral oil mg/l, Max	0.01	Beyond this limit undesirable taste and odour after chlorination take	0.03	Gas chromato-graphic method	To be tested when pollution is suspected

			place.			
xxix)	Pesticides mg/l, max	Absent	Toxic	0.001	-	-
xxx)	Radioactive materials :				58 of 3025 : 1964	
	a) Alpha emitters Bq/l, Max	-	-	0.1	-	-
	b) Beta emitters pci/l, Max	-	-	1	-	-
xxxi)	Alkalinity mg/l, Max	200	Beyond this limit taste becomes unpleasant	600	13 of 3025 : 1964	-
xxxii)	Aluminium (as Al), mg/l, Max	0.03	Cumulative effect is reported to cause dementia	0.2	31 of 3025 : 1964	-
xxxiii)	Boron, mg/l, Max	1	-	5	29 of 3025 : 1964	-

Note : Atomic absorption spectrophotometer method may be used.

Enclosure A 13

ENVIRONMENT AND FORESTS

CENTRAL POLLUTION CONTRAL BOARD

National Ambient Air Quality Standards, Notification, 11th April, 1994

TABLE A.13.1

Pollutant	Time weighted average	Concentration in Ambient Air			Method of measurement
		Industrial Area	Residental rural and other areas	Sensitive area	
Sulphur dioxide (SO_2)	Annual average	80 ug/m^3	60 ug/m^3	15 ug/m^3	1 Improved West & Gaeke method 2 Ultraviolet fluorescence
	24 Hours	120 ug/m^3	80 ug/m^3	30 ug/m^3	
Oxide of nitrogen as NO_2	Annual average	80 ug/m^3	60 ug/m^3	15 ug/m^3	1 Jacob & Hochheiser modified (Na-Arsenite method) 2 Gas phase chemiluminescence
	24 Hours	120 ug/m^3	80 ug/m^3	30 ug/m^3	
Suspended Particulate Matter (SPM)	Annual average	360 ug/m^3	140 ug/m^3	70 ug/m^3	High Volume sampling average (average flow rate not less than 1.1 m^3/minute)
	24 Hours	500 ug/m^3	200 ug/m^3	100 ug/m^3	
Respirable Particulate Matter (size less than 10 um) RPM	Annual average	120 ug/m^3	60 ug/m^3	50 ug/m^3	Respirable Particulate Matter, sampler
	24 Hours	150 ug/m^3	100 ug/m^3	75 ug/m^3	
Lead (Pb)	Annual averag	1.0 ug/m^3	0.75 ug/m^3	0.50 ug/m^3	ASS Methods after sampling using, EPM 2000 of

	e				equivalent filter paper
	24 Hours	1.5 ug/m^3	1.00 ug/m^3	0.75 ug/m^3	
Carbon mono-oxide (CO)	1 Hour	10.0 mg/m^3	4.0 mg/m^3	2.0 mg/m^3	Non dispersive infrared spectroscopy
	1 Hours	10.0 mg/m^3	4.0 mg/m^3	2.0 mg/m^3	

- Annual Arithmetic mean of minimum 1`04 measurements in a year taken twice a week 24 hourly at uniform interval.
- 24 hourly/8 hourly values should be met 98% of the time in a year. However 2% of the time, it may exceed but not on two consecutive days.

Note :-

1 National Ambient Air Quality Standard, The levels of the air quality necessary with an adequate margin of safety, to protect the public health, vegetation and property.

2 Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.

3 The State Government/ State Board shall notify the sensitive and other areas in the respective states within a period of six months from the date of notification of National Ambient Air Quality Standards.

Enclosure A 14

Parameter and process selected for

Calculation for expected water consumption at tenements

TABLE A.14.1

S. No.	Classification	Requirements
1	Tenements having common conveniences	900 Lt./ net per W.C. seat
2	Residential premises other than tenements	270 lt. net per one W.C. seat and 170 Lt. for additional seat in the same flat.
3	Factories, Workshops etc.	900 Lt. / W.C. seat
4	Public Assembly hall Etc.	900 Lt./ W.C. Seat 35-0 Lt / urinal
5	Domestic Storage (a) Premises occupied as tenements with Common Convenience (b) Premises occupied as flat etc.	500 Lt. per tenements 800 Lt. per tenements
6	The above storage may be provided, provided it is not less than storage calculated on the number of fitting as below Taps. Showers Bath Tubs	 70 Lt. each 135 Lt. each 200 Lt. each

Enclosure A 15

Estimated Cost of proposed plant

Based on anaerobic - aerobic degradation of organic biomass as per Schematic diagram drawings, attached in A17

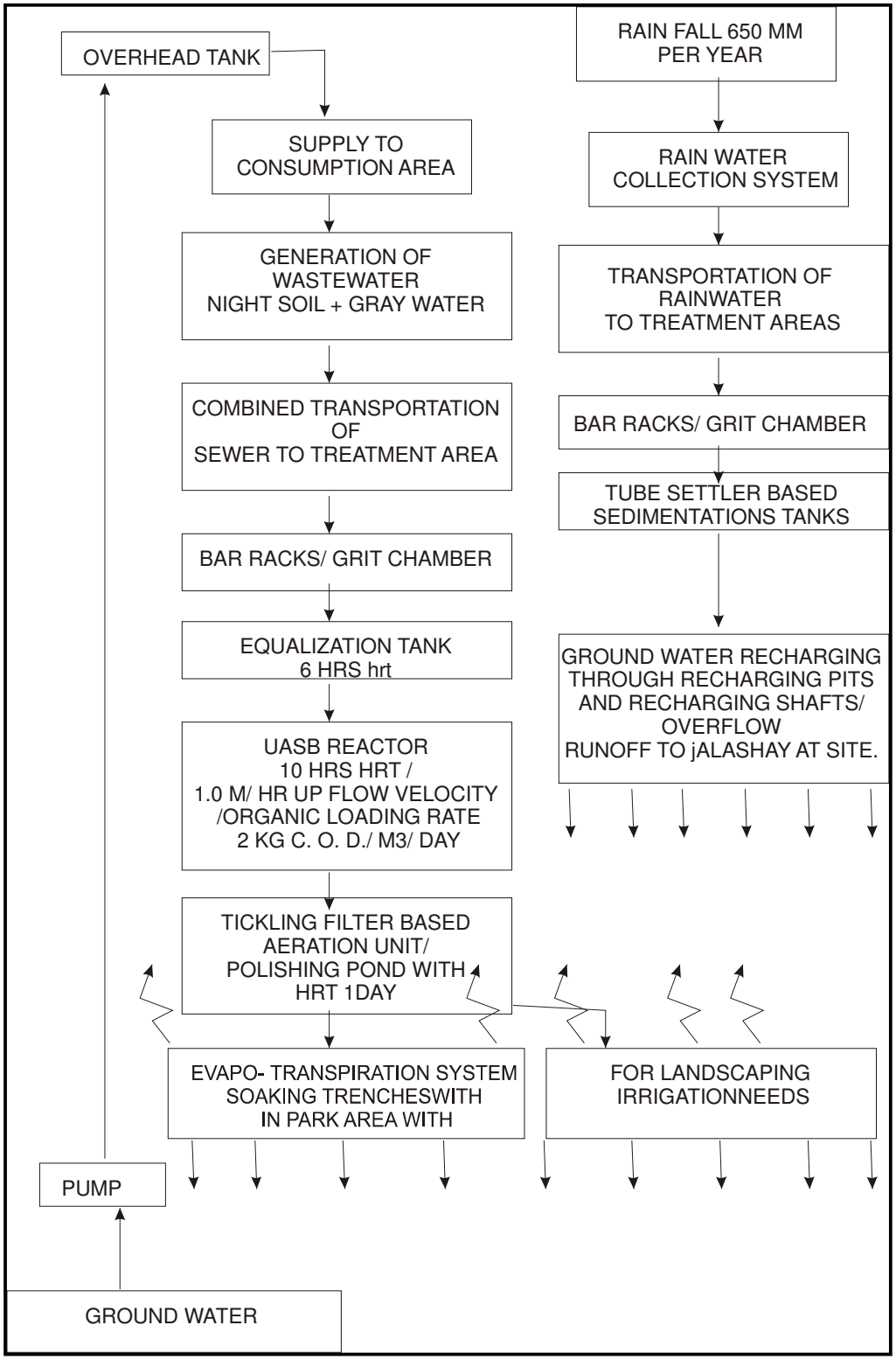
PLANTCOMPONENTS		No.	COMPONENT TOTAL IN Rs.
U.A.S.B. reactor	6000000.00	1	6000000.00
Chlorine and EM Dozer,	120000.00	1	120000.00
Grit Remover	30000.00	2	60000.00
Motor Pumps	200000.00	2	400000.00
Pipelines	15000.00		15000.00
Valves	45000.00		45000.00
Plumbing and fittings	54000.00		54000.00
Equalization 300 KL HRT 6 hrs	1800000.00	1	1800000.00
Polishing Pond 800 KL HRT 2days @ RS 500 /KL as per the site	400000.00		400000.00
Labor for Plant erection and commissioning			52000.00
Miscs.			200000.00
Total expected value of plant			**9146000.00**

Enclosure A 16

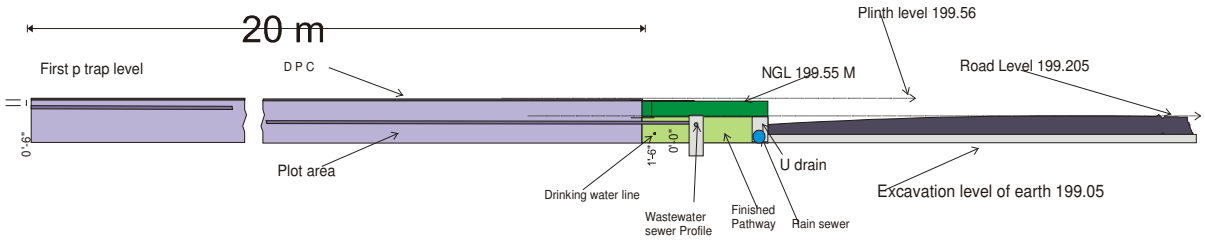
Expected Running cost of wastewater treatment

Cost of maintenance staff	4 @ 4000.00 p.m.	16000.00
Cost of electricity		125000.00
Cost of supervisory staff	2 @ 6000.00 p.m.	12000.00
Cost of Chemicals etc.		30000.00
Mics.		10000.00
Total Cost		**1,93,000.00 p.m**.

Enclosure A 17



Schematics of treatment



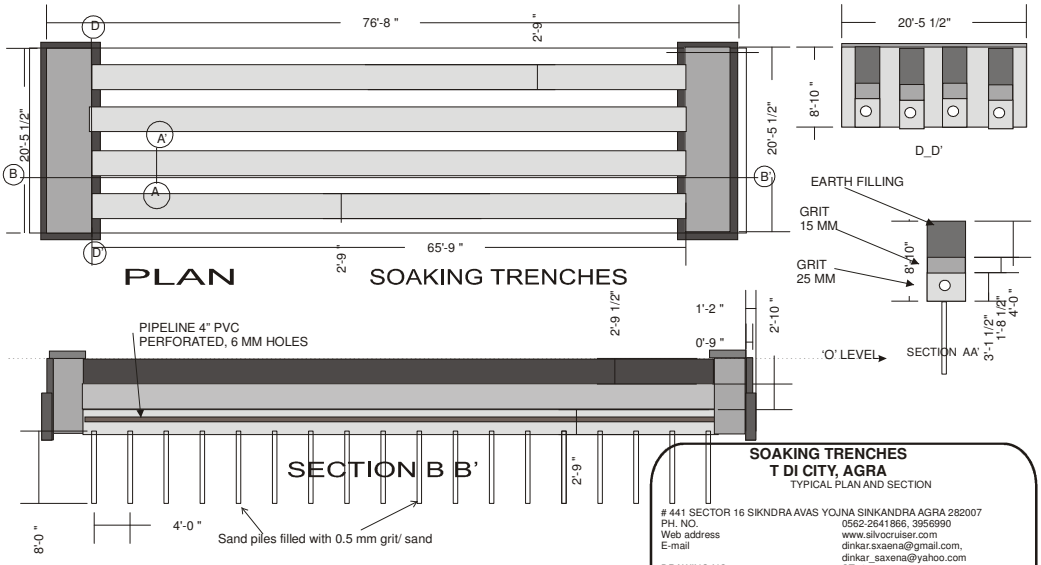
Sectional details and & Proposed levels of Road & drain system

PREPARED BY : PROJECT MANAGEMENT CONSORTIUM

# 441 SECTOR 16 SIKNDRA AVAS YOJNA SINKANDRA AGRA 282007	
PH. NO.	0562-2641866, 3956990
Web address	www.silvocruiser.com
E-mail	dinkar.sxaena@gmail.com, dinkar_saxena@yahoo.com
DRAWING NO.	TDI RC-1
TITLE:	levels
DATE:	15/02/06
SCALE :	NTS
OWNER :	TDICITY
ARCHITECTS/ ENGG.	

All the levels as per the survey Sheets provided by the Client.

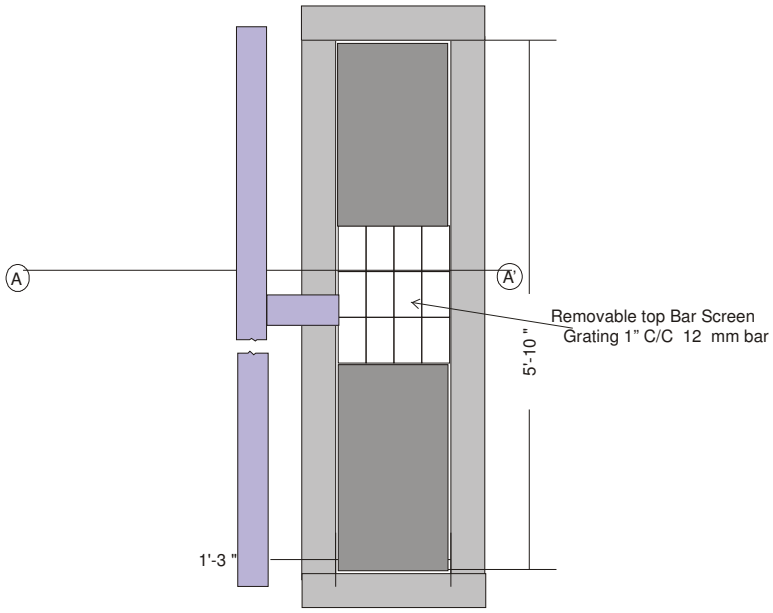
Structural details are only for guideline purposes
Customer is advised to have revised structural details from structural Engineer based on site conditions.

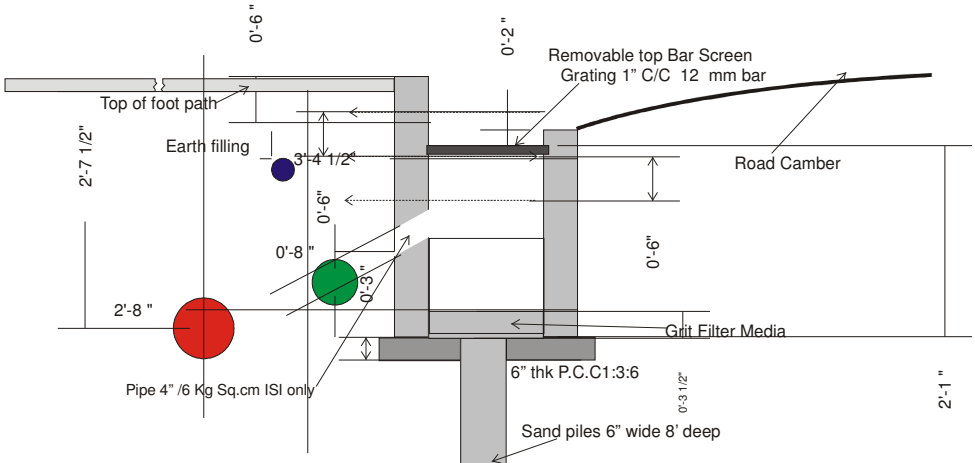


SOAKING TRENCHES
T DI CITY, AGRA
TYPICAL PLAN AND SECTION

# 441 SECTOR 16 SIKNDRA AVAS YOJNA SINKANDRA AGRA 282007	
PH. NO.	0562-2641866, 3956990
Web address	www.silvocruiser.com
E-mail	dinkar.sxaena@gmail.com, dinkar_saxena@yahoo.com
DRAWING NO.	ST -1
TITLE:	SOAKING TRENCH
DATE:	10/11/05
SCALE :	
OWNER :	TDI CITY
ARCHITECTS/ ENGG.	
Design flow	35M^3 per day
Surface Loading rate	0.3 m^3/m^2/Day
Sedimentation velocity of settle able solid	------

Structural details are only for guideline purposes
Customer is advised to have revised structural details from structural Engineer based on site conditions.





Section of Rain drain Manhole
Section A-A’

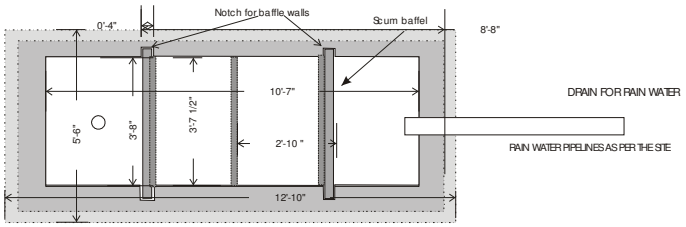
PREPARED BY :

DASS RASAYANIC SERVICES

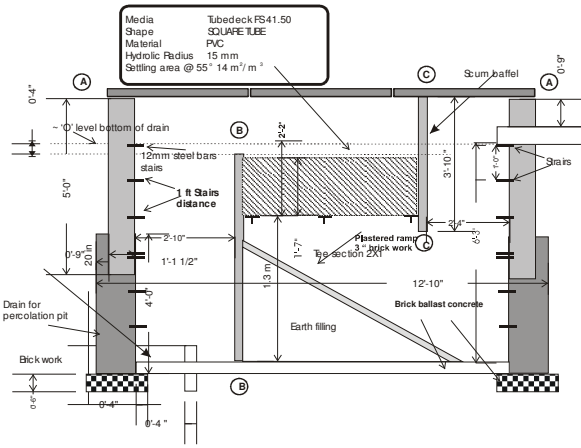
441 SECTOR 16 SIKNDRA AVAS YOJNA SINKANDRA AGRA 282007

PH. NO.	0562-2641866, 2620218
Web address	www.silvocruiser.com
E-mail	dinkar.saxena@gmail.com
	dinkar_saxena@yahoo.com
DRAWING NO.	5
TITLE:	profile of Rain drain manhole
Project	TDI CITY
DATE:	27/05/06
SCALE :	NTS
OWNER :	RIDGE VIEW DEVELOPERS P LTD.
ARCHITECTS:	
velocity of water flow	.0.7~0.8 m/sec.

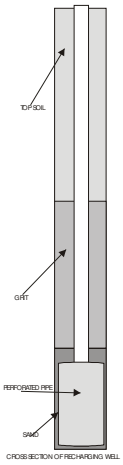
For Engineering details please refer to see attached calculations
All Structural details are suggestive in nature and are need to have revision by Structural Engineers .



PLAN OF SEDIMENTATION TANK



CROSS SECTION OF SEDIMENTATION TANK



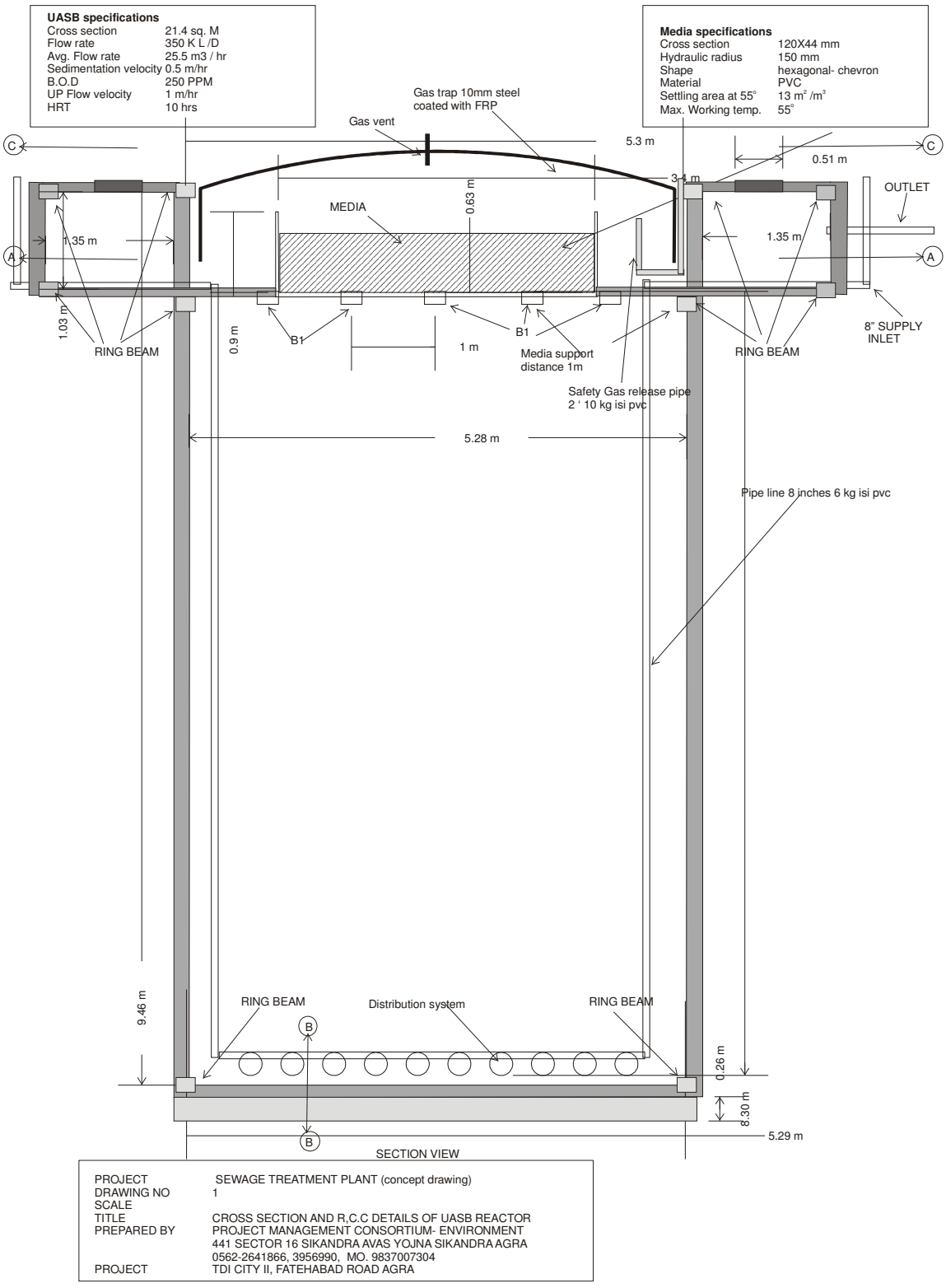
RAIN WATER HARVESTING FOR
TDI CITY, AGRA

PREPARED BY : DASS RASAYANIC SERVICES

441 SECTOR 16 SIKNDRA AVAS YOJNA SINKANDRA AGRA 282007

PH. NO.	0562-2641866, 2620218
Web address	www.silvocruiser.com
E-mail	dinkar_saxena@yahoo.com
DRAWING NO.	6
TITLE:	layout of SEDIMENTATION TANK
DATE:	30/05/0.6
	RIDGE VIEW DEVELOPERS P LTD.
Design flow	30 M^3 per hrs
Surface Loading rate	9.5 $m^3/m^2/hr$
Sedimentation velocity of settle able solid	1.0 m/hr

For Engineering details please refer to see attached calculations
All Structural details are suggestive in nature and are need to have revision by Structural Engineers .


UASB specifications
Cross section 21.4 sq. M
Flow rate 350 K L /D
Avg. Flow rate 25.5 m3 / hr
Sedimentation velocity 0.5 m/hr
B.O.D 250 PPM
UP Flow velocity 1 m/hr
HRT 10 hrs
Media specifications
Cross section 120X44 mm
Hydraulic radius 150 mm
Shape hexagonal- chevron
Material PVC
Settling area at 55° 13 m² /m³
Max. Working temp. 55°
Gas trap 10mm steel coated with FRP
Gas vent
5.3 m
0.51 m
3.4 m
OUTLET
MEDIA
0.63 m
1.35 m
1.35 m
1.03 m
RING BEAM
0.9 m
B1
1 m
B1
Media support distance 1m
RING BEAM
8" SUPPLY INLET
Safety Gas release pipe 2 ‘ 10 kg isi pvc
5.28 m
Pipe line 8 inches 6 kg isi pvc
9.46 m
RING BEAM
Distribution system
RING BEAM
0.26 m
8.30 m
5.29 m
SECTION VIEW
PROJECT SEWAGE TREATMENT PLANT (concept drawing)
DRAWING NO 1
SCALE
TITLE CROSS SECTION AND R,C.C DETAILS OF UASB REACTOR
PREPARED BY PROJECT MANAGEMENT CONSORTIUM- ENVIRONMENT
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PROJECT TDI CITY II, FATEHABAD ROAD AGRA