

PRE-FEASIBILITY REPORT

1.0 INTRODUCTION

HSIIDC is the nodal agency of State Govt. of Haryana to develop industries in the industrial estates. This will help generate employment and revenue for the state.

Industrial Model Township (IMT) is located at Tehsil: Kharkhoda, District Sonapat, Haryana and is bounded by the KMP expressway in north, SH-18 in the east, and government purchased land in the south and west direction. The Site is about 18 km from Sonapat City, 35 km from Indira Gandhi International Airport, and 9 km from Narela Railway Station.

The infrastructure such as road, drainage network, water supply and power linkage will be developed by HSIIDC.

Land is acquired as per the provision of section 4 and 6 of the Land Acquisition Act, 1984. R & R will be implemented in accordance with State Govt. Policy.

Since the total area of project measures 3271.26 Acre (1323.86 Hectare), it falls under Category A, Schedule 7 (c) of the EIA Notification, 2006 and amendments. Hence, The Environment Clearance is being sought from Ministry of Environment, Forests & Climate Change (MoEFCC).

Salient features of the project are given in Table 1 below:

Table 1: Salient Features of Industrial Model Township, Kharkhoda, Sonapat, Haryana

S. No.	Project - Parameters	Details
1.	Project Name	Industrial Model Township, Kharkhoda, Sonapat, Haryana
	Connectivity	Nearest Town: Kharkhoda, 6 km Nearest City: Sonapat, 18 km District Headquarters: Sonapat Nearest Railway Station: Narela, 9 km Nearest Airport: Indira Gandhi International Airport 35 km. The site has good connectivity by road. KMP Expressway & SH-18 are adjacent to the project site.

	Project category as per EIA Notification, 2006 and amendments		Category: A, item 7 (c) of the schedule
2.	Land (Acre)	Total area	3271.26 Acre (1323.86 Hectare)
3.	Population	Industrial Zone	50,000 persons
		Residential Zone (Residents)	2,30,000 persons
		Commercial Zone	60,575 persons
		Recreational, Utility & Other Areas <i>i.e.</i> Schools, Post Office, Parks, Etc.	3,25,455 persons
		Total	6,66,030 persons
4.	Water (KLD)	Source	Western Yamuna Canal
		Total Demand	94,000
		Fresh Water Demand	48,000
		Treated water available for re-circulation/re-use	46,000
5.	CETP/STP (KLD)	Capacity	60,000
		Treated effluent available	46,000
		Area provided for CETP/STP	22.30 Acre
6.	Power (MW)	Source	State Electricity Board
		Demand	500
7.	Solid waste (T/day)	Household waste	115
		Food Waste	20
		Bio-Medical waste	5
		Industrial waste	100
		Total	240
8.	Green area	581.90 Hectare	

The upcoming industries in the proposed IMT project will obtain a separate Environment Clearance from MoEF&CC or SEIAA, Haryana as applicable. Consent to Establish and Consent to Operate will be obtained from Haryana State Pollution Control Board.

2.0 INTRODUCTION

2.1 About HSIIDC

In the pursuit of prosperity in Haryana, pioneering role has been played by the Haryana State Industrial and Infrastructure Development Corporation Limited (HSIIDC). One of the leading

contributors to the well-being and progress of the state, HSIIDC has been instrumental in bringing about a major change in the people of Haryana over the years. The pioneering zeal of HSIIDC has facilitated the transformations of Haryana from a primarily agrarian society to one of the most highly industrialized states of modern India.

HSIIDC was setup in 1967 for promoting medium and large-scale industries so as to ensure balanced regional development of Haryana by acting as an Institutional Entrepreneur and a financial institution. HSIIDC serves as the single most important platform for providing services in the following areas:

- HSIIDC is nodal agency of Government of Haryana to develop industries at the industrial estates after necessary infrastructure developments such as road & drainage network, water supply and power linkage for the industrial estate.
- Providing financial assistance in terms of terms loans, equipment, finance/ leasing and working capital.
- Infrastructural development in the state of Haryana.
- Performing agency functions on behalf of the state Government.
- Performing agency functions for entrepreneurs and established industries for enhancement of capacity/modernization.
- Success entrepreneurs will take separate linkage as per the requirement of industry and environment clearance.

HSIIDC is a Public Limited Company wholly owned by the Government of Haryana, set up as a catalyst for promoting and accelerating the pace of industrialization in the State. The corporation provides a wide spectrum of financial services under one roof – the concept being “Total Financial Support” for its clientele. Being an intrinsically customer – oriented organization, HSIIDC has often gone beyond in helping to shape to the destiny and vision of thousands of entrepreneurs. It has generally taken on the role of a trusted friends and guide, providing crucial support and most important of all, created an environment where nascent projects are able to attain their function and become vibrant industries.

2.2 Brief Description of the nature of project

HSIIDC proposes an Industrial Estate at Kharkhoda, Sonapat, Haryana. The proposed project is to:

- Build a four-in-one industrial system, including industry, IT and tourism, becoming a crucial pivot of localization of home appliances, expanded manufacturing of NCR auto parts and agricultural-oriented development of Haryana.
- Lead India's extension of medical instruments industrial from production to the field of research and development, building the first tourism industry base in south Asia integrating functions of health care, business and leisure, cultural tourism of India
- Develop a new-generation South Asia and international markets-oriented cultural tourism industry represented by leisure, experience and vacation.
- Build top-class community, providing diversified selection of residence and allocating world's leading life and leisure services.

The proposed IMT will have Industrial zone, commercial and residential area, public utility facilities, parks, etc. There will be provision of adequate power, water supply, roads, sewerage, and effluents disposal system with treatment, storm water disposal and solid waste management to enable enterprises to function in a state of the art environment.

Industries of varying capacity will be setup on industrial plots planned within the Industrial Estate. The type of Industries would be Food & Beverage, Metal Products, General Metal Textiles, Chemical & Chemical Products, Automobile, Rubber & Plastics Products, Non-Metallic Materials, Machinery & Equipment, etc.

The individual industry will obtain a separate Environmental Clearance from MoEFCC/SEIAA, Haryana as applicable in accordance with the EIA notification, 2006 and amendments.

The detailed area statement is provided in table below:

Table 2: Detailed Area Statement

SR. NO.	AREA STATEMENT	IN ACRES
1	TOTAL AREA (INCLUDING GOVT. LAND MEASURING 59.90 AC. WHICH NEEDS TO BE TRANSFERRED IN FAVOUR OF HSIIDC)	3366.23
2	AREA RELEASED U/S-48	87.21
3	NET PLANNED AREA INCLUDING R & R Plots & Land pooling	3271.26
4	AREA UNDER INDUSTRIAL PLOTS	957.93
5	AREA UNDER TOURISM ZONE	142.52
6	AREA UNDER COMMERCIAL ZONE	149.58
7	AREA RESERVED FOR RESIDENTIAL HOUSING	811.77
8	AREA UNDER UTILITY SERVICES, PUBLIC LANDESCAPED AREA, GREEN BELT, OPEN SPACES, ROADS, INSTUTION, PUBLIC FACILITIES & ORBITAL RAIL CORRIDOR ETC.	1209.46

Figure 1: Function based zoning of the Industrial Estate

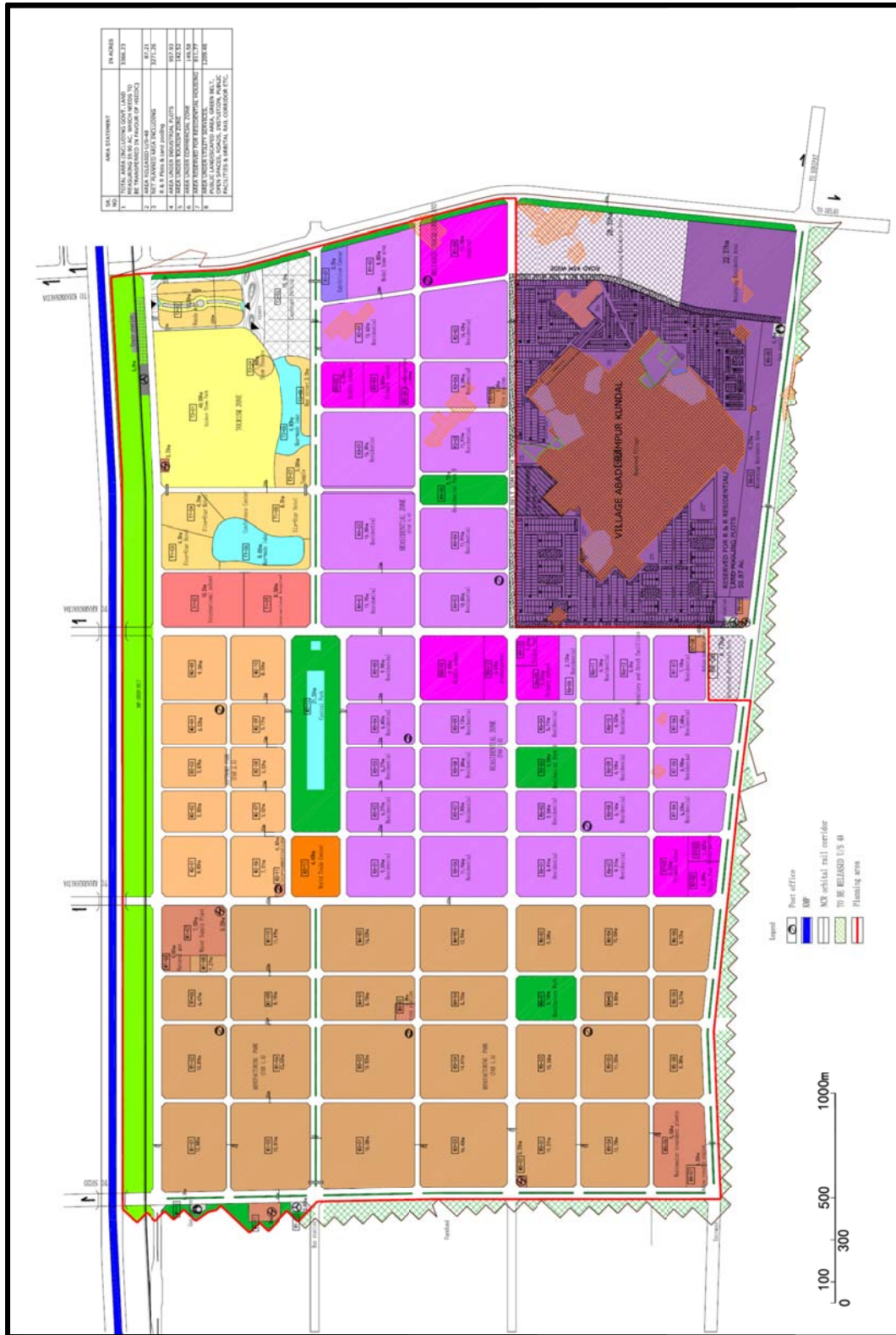


Table 3: Land Development Intensity Glossary (Proposal)

Land Plot Type		Proposed FAR
N3、 Residential		3.0
M、 Industrial		--
Wherein	M1、 Manufacturing Park	1.5
	M2、 IT Park	2.5
T、 Tourism Zone(Theme Park、 Gourmet street, Show Theatre, Car Park, Man-made Lake, Public Square)		0.5
N2、 Commercial		--
Wherein	B1、 Mall	2.5
	B2、 Resort Hotel Zone	1.0
	B3、 World Trade Center (Tower A、 Tower B)	3.0
	B4、 Bar Street	0.75
C、 Public Facilities		--
Wherein	Education facilities	1.0
	Medical facilities	1.0-1.5
	Community service facilities	1.0

The site layout is attached as Annexure - II.

2.3 Need for the project

While US and China dominate the world GDP pie, India is the fastest growing economy with a GDP growth of 7.6% expected in 2016. In 2014, reforms were put on the fast lane by the government, which aggressively invested a lot to facilitate trade and attract foreign investment.

- **Favorable Demographics:** The country's Population grew to 1.2 billion in 2011 from 1.02 billion in 2001. Among the total population, the proportion of population under the age of 35 is about 60%, educated population is about 73% (Literacy Rate) and town population is about 30% (377 million).
- **Sustained Economic Growth:** GDP grew from USD 834 billion in 2005 to USD 2.04 trillion in 2014. India is the fastest growing economy in the world with an expected growth of 7.6% in 2016.
- **Declining Fiscal Deficit:** Fiscal deficit has been at a three-year low (7.5% CAGR improvement since 2013), well within the government's target.

- Established Hubs: Delhi NCR, Mumbai, Bangalore, Chennai, Pune and Hyderabad are the leading hubs for both manufacturing and service sectors, especially the IT/ITeS industry.
- The Infrastructure Push: Recent budget allocated INR 2210 billion for infrastructure development; 10,000 km of national highways will be built in FY 2017.

Overall growth rate of the manufacturing industry is amongst the highest in the world, but contribution to GDP is low and has shown a downward trend in recent years. From 1999 to 2009, growth rate of Indian manufacturing industry was 6.8%, among the highest in the world; but contribution to GDP was just 15%. Manufacturing's high contribution to employment and low contribution to economy have led to serious deviation between employment and capacity. There is a big space for optimization of structure in the Indian manufacturing industry.

Major sources for driving growth in NCR include government bodies, BFSI sector, IT/ITeS sector, automobile sector, grain production, IT/ back office, agriculture, minerals, textile, etc.

Haryana is one of the most prominent and fastest growing states across India. GDP grew by approx. 8% in the last decade (above National average). It contributes to approx. 3.2% of India's GDP as of 2013.

Sound industrial development: Industrial activity has accounted for approx. 29% of the state's GDP in the last 5 years.

Haryana's development is integrated into the largest economic and industrial policy strategies which include DMIC (Delhi Mumbai Industrial Corridor) and Tourism Development, etc.

Solid economic basis and accelerated industrial structure transformation and upgrading. Haryana's per capita income ranked No. 2 among all the states of India. In the period 1966-2011, the tertiary sector developed fast, while the secondary sector developed at a steady pace.

Sonapat, located closely to the border of Haryana and NCT, is the sixth largest district in the State of Haryana in terms of population. Government plans for regional industry transformation and upgrading: Haryana presently has 69 industrial enterprises with an export volume of INR 11.7887 billion (from 2010 to 2011). Its major export products include rice, stainless steel products, paper products, electrical goods and auto parts.

Approx. 90% of the primary sector workforce in the region continues to remain engaged in agricultural activities such as cultivating/agricultural laboring. However, this trend is envisaged to change with State government looking to position the region as a knowledge center to encourage industrial activities.

Sonapat is one of the cities with highest per capita GDP (Rank 4th) in the Haryana sub-region. The city has quickly emerged as a hub for construction and household industrial activities, thus propelling per capita GDP.

The development of fourth-generation Industrial Model Township, Kharkhoda, Sonapat, Haryana shall meet the requirements of DMIC, national industrial corridor and NCR. Use of to build an important industrial park in DMIC, resource endowment in Haryana shall be fully utilized, so as to achieve the building of important industrial parks of DMIC, balanced development of the capital area and attract talents and capital to Haryana.

The industrial system approach to the industrial park will enable the manufacturing, IT, and tourism sectors to become a large synergized industrial cluster. This new industrial new city will provide large commercial centers, large theme parks, high-end hotels, international hospitals, international schools, green residential communities and a complete set of service facilities, thus creating a top quality livable new town.

Contribution of an Industrial Estate to the Economic and Industrial Development:

- a) To promote more rapid industrialization of the country
- b) To increase national and local employment
- c) To attract private investment both national and foreign
- d) To promote the development of small and medium industries

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

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

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

3.0 PROJECT DESCRIPTION

HSIIDC is the nodal agency for development of industrial infrastructure in the state of Haryana and has successfully developed a number of Industrial Model Township & Industrial Estates like Bawal, Rohtak, Roz ka Meo, etc.

The proposed project will consist of Industrial, Commercial and Residential zone along with Municipal Utility services, Public facilities and Parks. The individual industries will seek separate environment clearance for the respective plots that will be allotted to them.

3.1 Types of industries

Based on quantitative and qualitative analysis of the existing industrial strengths of Haryana and Sonapat region and evaluation of local/regional industrial sectors with development potentials, some particular industries are selected for the project. These are industries with good market performance, such as:

- Food & Beverage,
- Metal Products,
- General Metal Textiles,

- Chemical & Chemical Products,
- Automobile,
- Rubber & Plastics Products,
- Non-Metallic Materials,
- Machinery & Equipment, etc.

An industrial chain will be established based on result of preliminary selection of industries, taking into account the current development and future market demand, in conjunction with development basis of IMTs and relevant industries around Delhi, with the principle of dislocation competition and factor endowment.

Table 4: Selection of Industry Segments

Industry Category	Industry Segment	Industry Basis	Industry Chain Demand	Consumption Market Demand	Nearby Raw Materials Market
Metal Products	Manufacture of doors, windows and structural metal products	√	√	-	-
Textile & Garment	Spinning, weaving and finishing of textiles	√	√	-	√
	Manufacture of wearing apparel, except fur apparel	√	-	√	-
	Manufacture of knitted and crocheted apparel	√	-	√	-
Electrical Equipment	Manufacture of electric lighting equipment	-	√	-	-
	Manufacture of domestic appliances	-	-	√	-
Automobile Manufacturing	Manufacture of motor vehicles	√	-	√	-
	Manufacture of bodies (coachwork) for motor vehicles	√	√	-	-
	Manufacture of parts and accessories for motor vehicles	√	√	√	-
Food & Beverage	Processing and preserving of meat	√	-	√	√
	Processing and preserving of fruit and vegetables	√	-	√	√
	Manufacture of vegetable and animal oils and fats	√	-	√	√
	Manufacture of dairy products	√	-	√	√
	Manufacture of grain mill products, starches and starch	√	-	√	√

	products				
	Manufacture of beverages	√	-	√	√
Bio-pharmaceutical	Manufacture of medicinal substances used in the manufacture of Pharmaceuticals	√	√	√	-
	Manufacture of pharmaceutical preparations	√	-	√	-
	Manufacture of medical impregnated wadding, gauze, bandages, dressings, surgical gut string etc.	√	-	√	-

3.2 Location

Industrial Model Township (IMT) –is located at Tehsil: Kharkhoda, District: Sonapat, Haryana and is bounded by the KMP expressway in north, SH-18 in the east, and government purchased land in the south and west direction. The Site is about 18 km from Sonapat City, 35 km from Indira Gandhi International Airport, and 9 km from Narela Railway Station.

The geographical co-ordinates of project site are:

28°51'17.74"N, 76°56'42.20"E

28°48'33.40"N, 76°55'57.16"E

28°50'3.51"N, 76°58'11.65"E

28°49'38.39"N, 76°54'42.17"E

Google earth image showing project site & surroundings within 500 m and SoI toposheet depicting 2, 5 & 10 km radius around the project site are enclosed as Annexure - III (a) & (b).

3.3 Site Selection

Site selection is an important criterion for development of any project. As this is an Industrial Estate project, identification of suitable site is based on various considerations such as:

- Physical Infrastructure
- Environment consideration (land use, air pollution, water pollution sensitivities)
- Socio economic consideration

Physical infrastructure: In Haryana land use plan, the area where the site is located is defined as urbanization development area. Development and construction of the site are consistent with the positioning in this land use plan, which also defines the possibility of development and construction of periphery areas. The west of the site is planned as an agriculture area unavailable for development and construction. Both the east and the south of the site are planned for urbanization development where development and construction will be allowed, providing sufficient room for the site's future development.

In Kharkhoda Development Plan (2008-2021), the direction for city development is southward; areas for living and production are located to the north and south of KMP Expressway and railway, respectively; and the site is located right in the latter area. In this way, the development positioning of new industrial city in site is accurate and conforms to Kharkhoda Development Plan (2008-2021).

Periphery environment is favorable. Traffic and municipal condition are good which can satisfy the local planning requirements. Positioning of the industrial park is accurate and feasible. Terrain is flat. Remising price is low, and so is transformation cost. The value of the land has great potential. Overall, it is very favorable for project construction and realization of planned positioning.

3.4 Water Requirement

Total water requirement for the proposed IMT, Kharkhoda project will be 94 MLD out of which fresh water demand will be 48 MLD. The source of water will be Western Yamuna Canal. Detailed calculations for water demand, waste water and water balance are given in the following tables:

Table 5: Water Demand Calculation

WATER DEMAND CALCULATIONS & CAPACITY OF TREATMENT PLANTS								
S. No.	Block name	Plot area (Acre)	Area (Hectare)	BUILT UP AREA (SQM)	Population	Unit	Water Requirement	Total Water Requirement (LPD)
I. DOMESTIC WATER DEMAND (FOR TOTAL AREA INDUSTRIAL , RESIDENCIAL & COMMERCIAL)								
1	INDUSTRIAL AREA	1100.4	445.6801	4456801		Per Hectare	45000	20055606
2	RESIDENTIAL AREA	811.8	328.7635	3287635	230000	Per Person	150	34500000
3	COMMERCIAL AREA	149.6	60.57487	605748.7	60575	Per Person	45	2725869.162
4	RECREATIONAL, UTILITY & OTHER AREAS i.e. SCHOOLS, POST OFFICE, PARKS, ETC.	482.2	195.2732	1952732	325455	Per Person	15	4881829.5
5	Road & open spaces	727.4	294.5849					
	Total	3271.3	1323.85					62163305
	Add 15 % for misc & continegencies							9324496
	Grand Total							71,487,800
	Say in Cum/day)							71,490
II. HORTICULTURAL WATER DEMAND								
1	Green Area =581.9 Acres @ 20,000 ltr./acres							11,638,000
	Say (in Cu.m. per day)							11640
III. HVAC/Industrial WATER DEMAND								
1	Hvac/Industrial water demand							10,283
	Say (in Cu.m. per day)							10283
	TOTAL WATER REQUIREMENTS FOR ALL PURPOSES Cum/day)							93,413
	SAY (in MLD)							94

Table 6: Waste Water and Water Balance Calculation

WATER BALANCING DIAGRAM		
A.	TOTAL WATER DEMAND	FOR TOTAL MASTERPLAN (in KLD)
1)	DOMESTIC WATER DEMAND	71,490
(i)	Total Potable Water Demand	47,660
(ii)	Total Flushing Water Demand	23,830
	Total Domestic Water Demand	71,490
2)	Total Horticulture Water Demand	11,640
3)	HVAC water demand	10,283
	Grand Total of Water Demands for all Purposes	93,413
B.	Total Available Treated Effluent for Recycling	(In m³/Day)
1)	Total Sewerage / Industrial Waste Generated to STP (Total Domestic Demand × 0.8)	57,192
2)	Total Treated Effluent Water Available from CETP for Recycling (80%)	45,753
	Total of Available Water for Re-use (Say)	45,753
C.	Total Utilized Treated Effluent	(In m³/Day)
1)	Total Amount Re-used for Flushing Water Purposes	23,830
2)	Total Amount Re-used for Horticulture Purposes	11,640
5)	Balance treated water available for HVAC / other industrial use	10,283
6)	Discharge from the site	NIL
7)	Recommended Capacity of CETP	57,192
	Say capacity of CETP in MLD	60
8)	Net Fresh Water Requirement (Domestic)	47,660
	Fresh Water Requirement (in MLD)	Approx. 48

The raw water collected in the storage tanks will be transferred to Water Treatment Plant before supply. Treatment process will involve following steps:

- Clarification
- Filtration
- Disinfection

Approx. 57.19 MLD of waste water generated will be treated from the project which will be treated in an onsite CETP of 60 MLD capacity. Treated effluent 46 MLD will be reused for flushing, horticulture, etc.

3.5 Common Effluent Treatment Plant

To treat the industrial effluent, a Common Effluent Treatment Plant (60 MLD) is proposed to be constructed within the industrial estate in an area measuring 22.30 Acre.

Treatment Technology

The methods for treatment of effluent range from physico-chemical to biological as explained below:

Physico- Chemical:

- I) Screen & grit removal
- II) Sedimentation
- III) Sludge Thickeners
- IV) Vacuum Filters
- V) Centrifuges

Biological:

Anaerobic

- a) Contact beds
- b) UASB
- c) Sludge Digesters
- d) Anaerobic Ponds

Aerobic

- a) Attached

- i) Moving bed bio reactor
- ii) Plasma treatment

b) Suspended

- i) Activated Sludge
- ii) Extended Aeration
- iii) Aerated Lagoons
- iv) Waste Stabilization Ponds (WSP)

Evaluation of Treatment Processes:

The following alternatives of sewage treatment have been considered for evaluation of performance characteristics, land requirement, energy input, equipment requirement and operational characteristics.

1. Membrane Biological Reactor
2. FAB/MBBR technology
3. Sequential Batch Reactor (SBR)
4. Extended Aeration

The advantages and disadvantages of various processes are as under:-

a) Membrane Biological Reactor

Advantages:

- Less area requirement; it is about 0.33 to 0.5 times the space required for a conventional system.
- Low operating cost.
- No dependence on sludge recirculation
- Excess sludge production is very low and it is fully digested
- Operating power consumption cost is 0.3 kWh /cum for filtration.
- More efficient in removing total Coliform; to the order of ~ 99.999 %.
- Drinking water quality is achieved
- Option available for removal of N and P

Disadvantages:

- High initial capital investment.
- Periodical cleaning of membranes with chemicals to prevent clogging

of membranes. Membranes also require replacement every 4-5 years.

b) Moving Bed Bio film Reactor (MBBR)

Advantages:

- Sensitivity to small power breakdowns is low
- Sludge re-circulation not needed and the system is self sustaining.
- Very small area around 1/10th of conventional system is required.
- Low power consumption
- Higher degree of treatment.
- High degree of coliform removal
- Less chlorine dosing required.

Disadvantages:

- Installation cost is slightly higher

c) Sequential Batch Reactor (SBR)

Advantages:

- Over all footprint area is less.
- Fully automatic system makes it very easy for operation & maintenance.
- Variable loads can be treated in batches.
- No synthetic media is required for treatment.
- No recommissioning is required once its stabilised.
- Effective BOD removal along with Nitrogen and phosphorus removal due to nitrification –
- Denitrification process accuring within the system.

Disadvantages:

- Installation cost is higher
- Skilled manpower is required to run the plant.

d) Extended Aeration

Advantages:

- High degree of treatment-Efficiency 95 to 98% BOD removal

- The excess sludge does not require separate digestion and can be directly dried on beds.
- Excess sludge production is minimal.

Disadvantages:

- Low organic loading
- Long aeration time
- Higher power consumption
- Less F/M ratio

Table 7: Techno-economic comparison of the sewage treatment alternatives

S. No.	Item/Parameter	Extended Aeration	MBR	MBBR	SBR
1	Overall HRT (Whole System)	12 - 14 hrs	8 hrs	4-6 hrs	8 hrs
2	Out let BOD mg/l	<50	< 5	<30	<30
3	Out let COD mg/l	80 - 90	< 10	<100	<70
4	TSS Removal, %	85 - 90	< 1	<100	<70
5	Faecal coliform Removal, log unit	Up to 3<4	Up to 6 < 7	Up to 2<4	Up to 5<6
6	Average Area required (m ² /mld)	1600	760	1100	850
7	Capital Cost, Rs. Lacs per MLD	140	400	190	250
8	Total Annual O & M Cost, Rs. Lacs per MLD	50.4	48.2	41.9	40
9	Life cycle cost for 15 yrs, Rs. in Lakhs	612.6	835.6	568.3	602.62
10	Energy efficiency rate	1.95	2.8	2.5	-----

With respect to the quality of treatment achieved, MBBR is most efficient technology. Extended aeration with tertiary treatment gives acceptable quality for prescribed reuse. SBR is a technology that is developed for batch wise treatment i.e. where flow is largely varied. The cost of Extended aeration is lowest followed by MBBR but Extended Aeration requires more area as compared to the MBBR. Hence, MBBR technology is proposed for CETP.

CETP capacity

CETP of 60 MLD will be constructed which will be based on Moving Bed Biofilm Reactor technology.

In MBBR process, a non-clogging biofilm reactor with special grade plastic media having density close to that of water is used. This plastic media has more surface area and biofilm grows on these media, which move along with the water in the reactor. This movement within the reactor is generated by providing aeration with the help of diffuser placed at the bottom of aerobic reactor. The thin biofilm on the elements enables the bacteria to act upon the biodegradable matter in sewage and reduce BOD/COD content in the presence of oxygen present in air. Area requirement for this process is 1/10 of space required for conventional sewage treatment plant. Power requirements are low. This can take shock load and can withstand variation in characteristics of sewage.

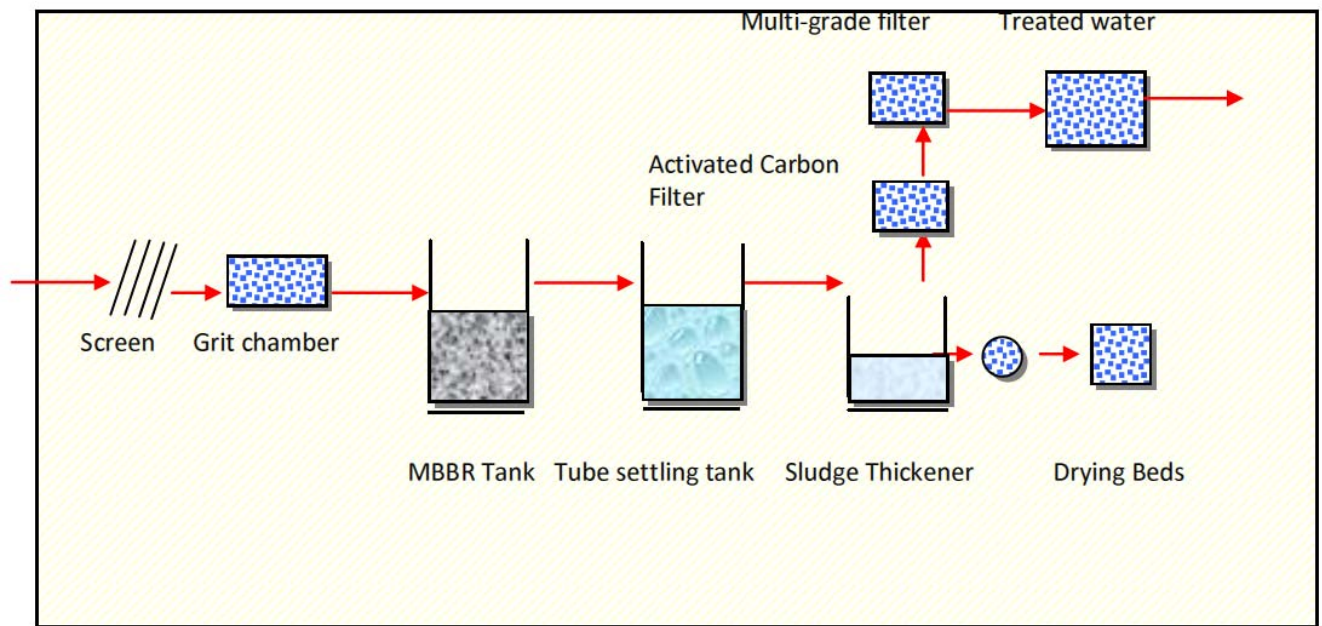


Figure 2: CETP Scheme

3.6 Electricity Requirement

The estimated electricity requirement for the project is 500 MW which will be supplied by State Electricity Board.

The new city contains numerous buildings with high requirements for power supply reliability such as international hospitals, international schools, high-end hotels, large-scale amusement centers. Therefore, for the reliable power supply of Industrial Model Township, Kharkhoda, two circuit of 220kV power supply line from two different 400KV substation of Indian State Grid shall be adopted as normal power source, Furthermore, another 132kV line shall be as an accident backup power supply. And the technical measures of gridding network, multi-link power supply and distribution automation are utilized to meet the requirements of power supply reliability.

In the first stage, 220 kV substation (2x240 MVA), two of 132 kV substation (2x63 MVA) will be put into operation. In the second stage, another two 132 kV substation (2x63 MVA) will be built. In the third stage, all substations will reach final capacity.

11kV switching stations are gradually constructed along with load increasing.

3.7 Waste Generation

During construction phase, approx. 400 ton/day of construction waste will be generated which will be used for filling purpose at site and surplus will be disposed off through local agency. During operation phase, following types of waste will be generated:

Household waste: Assuming 0.50 kg/person of household waste produced every day, then the waste generation from the project will be about 115 ton/day from the residential zone.

Food waste: Food waste is expected to be of the tune of 20 ton/day.

Industrial waste: Industrial waste will be under fully classified collection. Classification of industrial waste would be coordinated with urban household waste so as to realize unified disposal.

Industrial wastes are planned to be classified into recyclable, non-recyclable and toxic and harmful waste. It is estimated that approx. 100 ton/day of industrial waste will be generated from the industrial zone.

Medical waste: Approx. 5 ton / day of medical waste will be generated from the project.

Total solid waste generation during operation phase will be approx. 240 ton/day.

3.7.1 Management of Solid Waste

Scientific and systematic storage of waste at source will be done by providing a suitable system of storage of waste at source and educating the people.

- Promote holding waste in bags and classified collection with fixed time and places, wastes transport will combine indirect transport by transfer stations with direct transport.
- Streets sweeping and drain cleaning will be done on regular basis. The solid waste generated in the IMT shall be collected and removed by sanitary workers of the local Public Health Division.
- Design scale and operational capability of the collection station must meet requirements for “daily clearing for daily production” of domestic garbage in the service area. The collection station adopting sorting collection shall meet simple sorting and storage requirements according to the collection frequency of the sorted rubbish.

(1) Waste collection service radius will be within 0.4 km, not exceeding 1 km at maximum.

(2) The small motor vehicle will be adopted for collection and the service radius will not exceed 2 km at maximum.

- To build 18 wastes collection stations, each covering an area of 80 m²
- To build 2 transfer station with total designed scale of 200 ton / day.
- The total planned land area of the transfer station is 16,000 m² (Equipped with the sanitation parking lot, vehicle cleaning station and basic-level sanitation management institution) and the distance between the transfer station and surrounding buildings cannot be less than 10m, and the width of green belt no less than 5m. The transfer station will satisfy the demand for wastes collection and parking of transfer vehicles.
- **Treatment/Disposal of Waste:** The waste shall be segregated at site and waste that will be reused and sent for recycling. Manure from compost will be used for enriching and renewing the vast green spaces. Remaining inert waste shall be transported to local solid waste-dumping site.

Approx. 17.84 Acre of land is proposed for solid waste disposal.

4.0 Land Form, Land-ownership

The land is being purchased by HSIIDC, Govt. of Haryana.

Farmland dominates the landuse in area, covering approx. 1,323.86 hectare; villages cover an area of about 34.7 hectares; factories cover an area of about 8.6 hectare; schools cover an area of about 2.7 hectares; river systems cover an area of about 22.2 hectare; woods cover an area of about 11.3 hectares; roads cover an area of about 6.8 hectare.

Existing river systems mainly consist of irrigation canals and ponds; the seasonal change in water levels is considerably large. As a farmland ecosystem, the site is mainly covered by cultivated land, with a few bushes on the west side. There are no animals or plants in need of protection.

Table 8: Land Ownership Details

S. No.	Name of village	Area as per award/possession with HSIIDC			Date of notification u/s -4	Date of notification u/s -6	Award no. & dated
		A	K	M			
1	Barona,	72	1	4	01-04-2010	04-04-2011	44/13-03-2013
2	Pahladpur,	59	6	17	01-04-2010 24-12-2013	04-04-2011 17-12-2014	45/13-03-2013 16/30-09-2016
3	Nizampur Khurd,	265	7	17	01-04-2010 24-12-2013	04-04-2011 17-12-2014	46/20-03-2013 15/30-09-2016
4	Gopalpur,	464	4	1	01-04-2010 24-12-2013	04-04-2011 17-12-2014	47/25-03-2013 17/30-09-2016
5	Rampur,	851	6	6	01-04-2010 24-12-2013	04-04-2011 17-12-2014	49/28-03-2013 9/30-09-2016
6	Kundal,	821	1	17	01-04-2010 24-12-2013	04-04-2011 17-12-2014	50/01-04-2013 10/30-09-2016
7	Sohti,	494	1	12	01-04-2010 24-12-2013	04-04-2011 17-12-2014	51/02-04-2013 13/30-09-2016
8	Pipli,	100	7	16	01-04-2010 24-12-2013	04-04-2011 17-12-2014	52/03-04-2013 11/30-09-2016
9	Saidpur,	85	3	2	01-04-2010 24-12-2013	04-04-2011 17-12-2014	53/03-04-2013 12/30-09-2016

10	Firojpur Bangar,	5	0	18	01-04-2010 24-12-2013	04-04-2011 17-12-2014	54/03-04-2013 14/30-09-2016
11							

5.0 Transportation Facilities

The KMP Expressway is under construction to the north of the site, which is planned to be a two-way six-lane expressway around Delhi. Two entrances and exits will be set up in the vicinity of the site. A railway around Delhi in parallel with KMP, and a railway station near the site will also be built. At present, No. 18 State Highway, a two-lane highway runs through the eastern side of the site, being an important road connecting to Delhi.

- Parking facilities: It is planned to arrange 4 parking lots, which includes one service hub transfer parking lot, two living area parking lots and one parking lot within the tourism industrial park area.
- Bus station: Three bus stations are arranged in the plan, which are located at the west side and south side of the industrial new city, and the rail station.
- Oil filling station and CNG filling station: It is planned to arrange 2 oil filling stations in total.
- Helipad: 2 helipads, to be mainly used for emergencies and regional high-end traffic travel service, are set on the roof of the international hospital.

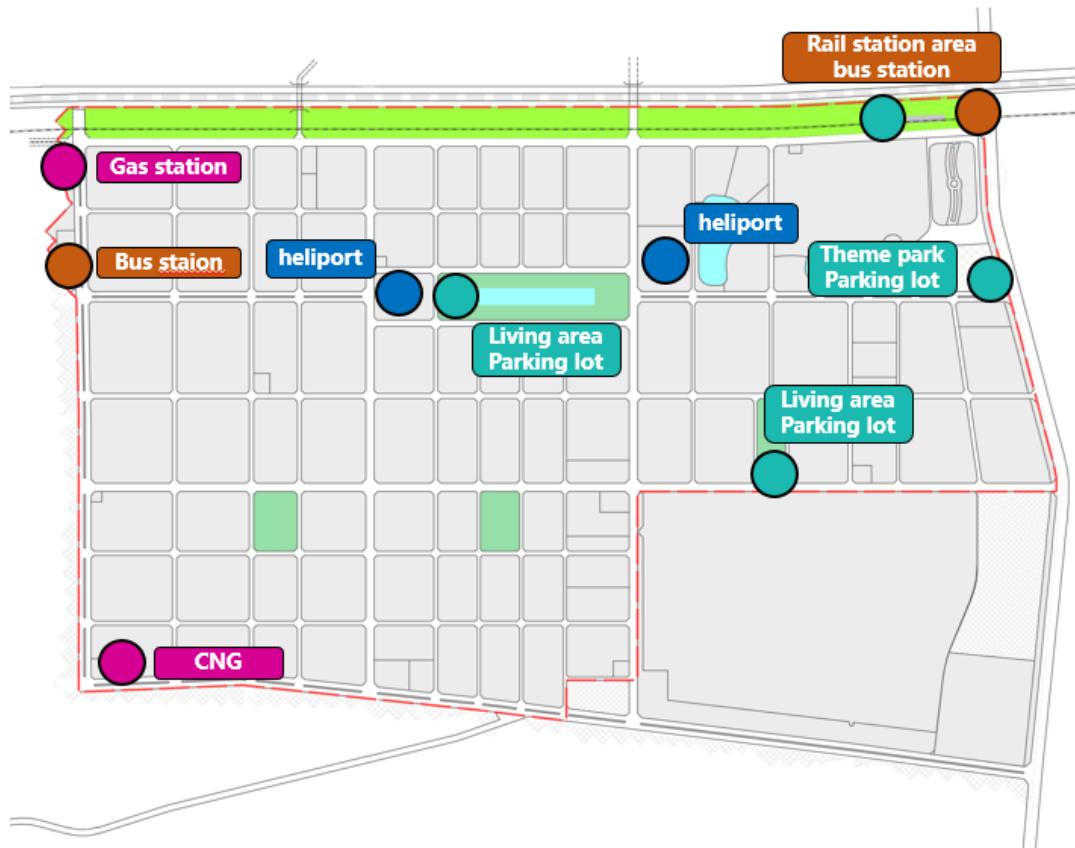


Figure 3: Public Transportation Plan

5.1 Parking Facilities

The total area of the land for public parking lots of the city is about 0.8 to 1.0m² for each person in the urban area, including 80% to 90% of the land for parking lot for motor vehicles and 10% to 20% of the land for parking lot for bicycles. Therefore, the area of public parking lots for motor vehicles in the Industrial Model Township, Kharkhoda is about 115,200m². Considering rigidity (20%-25%) and semi-rigidity (25%-30%) of parking demands, and flexible parking facilities (45-50%), this plan is only to consider and plan for car parks that are rigid and semi-rigid, which is around 57600 m² (includes on road and off road parking facilities). Of the total parking space available, parking space for residents of the new industrial city is 48960 m². This plan recommends building 3 parking lots, which is to be distributed as follows: one is located in the regional train station, one in the eastern side of the residential area and the left one in the western side of the residential area. The average

size of each parking lot is approximately 16000 m². On road parking spaces can be set up along feeder roads and roads with limited traffic.

5.2 Bus Station Facilities

For the planned fleet size of urban buses and trams, a standard car for every 1200 to 1500 people shall be realized in the medium and small cities. The floor area of the standard car is about 120 m², and the total area of the public transport station facilities is 14400m². It is suggested that 3 bus stations be arranged, which shall be located at the rail station, west side of the park and south side of the park. The average area of each bus station is around 5000m², totaling 1.5 ha.

5.3 Oil Filling Station Facilities

The service space of the urban public oil filling station shall be 0.9 to 1. 2km. The area of the industrial new city shall be about 11.72 square kilometers. Therefore, about 2 to 5 public oil filling stations shall be arranged. It is planned to arrange 2 oil filling stations with an average area of about 3000 m² per filling station, totaling 0.6 ha.

Table 9: Schedule of Traffic Facilities for Industrial Model Township, Kharkhoda, Sonapat, Haryana

Traffic facility type	Serial No.	Area (m²)	Remarks
Parking lot	1	16000	To provide approximately 533 underground parking spaces, to be combined with the rail station transfer.
	2	16000	To provide approximately 533 underground parking spaces, providing service for parking in the living area.
	3	16000	To provide approximately 533 underground parking spaces, providing service for parking in the living area.
	4	150000	To provide approximately 4348 parking spaces, aboveground, providing service for parking in the tourism industrial park area

Bus station	1	56000	Service for the new industrial city
	2	4500	Service for the new industrial city
	3	4500	Service for the new industrial city
Oil Filling Station	1	3000	Oil filling station, providing service for vehicles from the industrial new city
	4	3000	Oil filling station, providing service for vehicles from the industrial new city
Total	12	177700	

6.0 PLANNING

6.1 Planning Concept

Vigorously develop new manufacturing industry and modern service industry, reflecting constructive integration of the city space for manufacturing, life and ecology, build international integrated industrial new city based upon concepts of wisdom, ecology and culture.

Merge of industries and the city: Construct a modern industrial park with multi-function, including manufacturing industry, IT industry and the tourism industry. It upgrades modern service industries such as commerce, traveling and entertainment. It aims to promote urbanization through building a high quality new area that is both good for living, traveling and doing business.

Culture guidance: It protects and inherits local cultures and way of life, with inclusiveness and a respect to differences. It advocates a modern life style, promotes the merge of traditional and modern cultures, facilitates the modernization of infrastructures and improves vitality, prosperity and stableness for the city.

Ecological Friendliness: It adheres to the principle of giving priority to the ecology and advocates a mode that causes low ecological shock. It protects the environment through using lands and resources in an efficient way, decreasing power use, strengthening the management of waste and adopting green technologies and materials.

Smart efficiency: It matches the space of the city to its different functions, improves its carrying capacity and operational efficiency, applies innovative technics of smart development and convenient life, and forms a smart new town.

7.0 POPULATION

The total population of the project is estimated to be 6,66,030 persons which include residents, staff & visitors. The population break-up is as given below:

Population of Industrial zone = 50,000 persons

Residential population = 2,30,000 persons

Commercial Zone = 60,575 persons

Utility Zone = 3,25,455 persons

Total population = 6,66,030 persons

8.0 REHABILITATION & RESETTLEMENT (R & R) PLAN

Area reserved for R & R measures 469.97 Acre. Details are given in the table below:

Table 10: R&R Area Details

SR. NO.	AREA STATEMENT FOR R&R AREA	IN ACRES
1	TOTAL AREA	469.97
2	AREA TO BE PLANNED LATER	10.00
3	NET PLANNED AREA	459.97
4	AREA UNDER COMMERCIAL POCKETS	32.83
5	AREA UNDER R&R PLOTS	110.63
6	AREA UNDER R&R RESIDENTIAL & LAND POOLING PLOTS/ HOUSING	95.38
7	AREA UNDER UTILITY	1.27
8	AREA RESERVED FOR INSTITUTIONAL USE	31.86
9	AREA UNDER 132KVA SUB STATION	4.07
10	AREA RESERVED FOR SCHOOL	6.27
11	AREA RESERVED FOR COMMUNITY CENTRE	1.25
12	AREA UNDER CRECHE	0.86
13	AREA UNDER ESI HOSPITAL	1.34
14	AREA UNDER GREEN BELTS, OPEN SPACES & ROADS ETC.	174.21

DETAIL OF R&R RESIDENTIAL PLOTS			
S.no.	SIZE (METERS)	AREA (IN SQM.)	NO'S
1	15x30	450	569
2	13.5x26	350	154
3	12x25	300	145
4	10x20	200	190
5	9x16.5	150	102
6	7.5x12	90	134
TOTAL			1294

Govt., of Haryana has formulated a policy for rehabilitation and resettlement of land owners – land acquisition oustees. The silent features of the R & R policy are as under:

I. Annuity:

- i) The land owners will be paid annuity for 33 years over and above the usual land compensation. The amount of annuity will be Rs. 21,000/- per acre per annum.

- ii) Annuity of Rs. 21,000/- will be increased by a fixed sum of Rs. 750/- every year.
- iii) In respect of land acquired in terms of land acquisition policy for settling up of Special Economic Zone/Technology cities, Technology Parks in addition to rehabilitation and resettlement package notified by Industries and commerce Department vide No.49/48/2006-41BL dated 4th May, 2006, a sum of Rs. 42,000/- per acre annual will be paid for a period of 33 years by private developers and this annuity will be increased by Rs. 1,500/- every year.
- iv) The policy by paying annuity will be applicable to all cases of land acquisition by Govt., except land acquired for defense purpose.

Allotment of residential plots in cases where a self-occupied residential house is acquired for unavoidable reasons:

- i) Recognizing the sensitivity involved in acquisition of built-up residential houses/ structures for unavoidable reasons, the Government has decided to accord the highest priority to the resettlement of this category of persons. In the first instance, all efforts will be made by the acquiring departments to leave out the residential structures existing in the form of clusters from acquisition except where it becomes absolutely unavoidable either due to its stand-alone character or its location being within the Right of Way of infrastructure projects such as roads, canals, railway line etc.;
- ii) Accordingly, it has been decided that wherever any self-occupied residential structure/ house has to be acquired for unavoidable reasons in the process of acquisition of land by the Government for any purpose, such owners of built-up residential structures would be offered assured allotment of residential plots as per the following scale:

Scale of residential plots in cases where an existing self-occupied house/ residential structure is acquired	
Size of residential house acquired	Size of residential plot to be allotted
150sq.yd.	90 sqm
150 to 200 sq.yd.	150 sqm
Above 200 and up to 250 sq. yards	200 sqm
Above 250 and up to 300 sq. yards	250 sqm
Above 300 and up to 400 sq. yards	300 sqm
Above 400 and up to 500 sq. yards	350 sqm
Above 500 sq. yards	450 sqm

Categories of Land Acquisition Cases:

It has been observed that the Government acquires land for various infrastructure projects, which could be broadly clubbed under the following two categories:

- i) Projects where the urban/ industrial/ agriculture marketing infrastructure is developed in the form of large clusters by the state agencies i.e. the HUDA, the HSIIDC, and the HSAMB, for which comparatively large mass of land is acquired for development of planned infrastructure;
- ii) Projects where the land is either acquired in smaller pockets (e.g. water works and STPs of the Public Health Engineering Departments or the Power Sub-stations set-up by the power utilities) or where the land is acquired in a linear/ strip form for construction of roads and canals etc.

Whereas it has been found feasible to grant certain benefits in respect of the cluster development projects, the same has not been found feasible in the second category cases.

Benefits for the affected persons whose land is acquired for HUDA, HSIIDC and the HSAMB:

Recognising that the Government is expected to address the concerns of all sections of landowners to the extent possible, it has been decided to follow a two-pronged strategy in this behalf. Accordingly, it has been decided to grant the following benefits to the landowners whose land is acquired for HUDA, HSIIDC, and the HSAMB:

- i) Reservation and allotment of residential plots for the land-oustees, and
- ii) Provision for allotment of commercial booth-sites/ industrial plots to the landowner in whose case 75% or more of his land in a revenue estate, subject to a minimum of one acre, is acquired.

Allotment of 'oustees-category' residential plots in cases of land acquisition for development of infrastructure HUDA, HSIIDC, and the HSAMB.

- i) Where the land is acquired for development of planned urban infrastructure by HUDA, or development of planned industrial infrastructure by the HSIIDC, or marketing infrastructure

by the HSAMB, developed residential plots will be reserved for assured allotment to the land oustees as per the following scale:

Allotment of in cases where only land is acquired (Oustee Quota Plots)	
Land/area acquired	Size of residential plot to be allotted
100 to 500 sq.yd.	90 sq. mtrs
501 to 1000 sq.yd.	150 sq. mtrs
1001 sq. yd. to ½ acre	200 sq. mtrs
Above ½ acre to ¾ acre	300 sq. mtrs
Above ¾ acre to 1 acre	350 sq. mtrs
One acre and above	450 sq. mtrs

ii) The rates of residential plots reserved for allotment to the land oustees, in both the above categories, as per the scale prescribed, would be 20% lesser than the nodal price applicable for the general public at the time of first floatation in the case of HUDA and HSIIDC, in all other cases the rates of plots would be determined by the acquiring departments/ organisations based on the actual costs taking into account (a) the cost of acquisition of land, (b) costs incurred on provision of minimum amenities/ services, and (c) loading of the areas under roads/ streets/ services and utilities on to the plotted area;

iii) Each of the co-sharers, depending upon his share in the land acquired as per the entries in the revenue records at the time of issue of Section 4 Notification, would be entitled to the allotment of a plot under the 'oustee category'. The co-sharers would be limited to the persons mentioned in the revenue records on the date of Section 4 Notification. Wherever any such landowner/ co-sharer dies during the intervening period of Section 4 Notification and the Award, the natural successors will be treated as one single unit;

iv) As regards the co-sharers, it may be clarified that the entitlement for size of the plot would be determined based on the share of each of the co-sharers as on the date of Section 4 Notification. Further, under no circumstances, the total land under the plots allotted to the co-sharers put together would exceed 50% of the total acquired land of such co-sharers. An illustrative list of the entitlements is enclosed with this policy as Appendix-2.

v) In cases where the land of a landowner is acquired in phases, and he becomes entitled to a bigger size of the plot due to subsequent acquisition, he would be entitled to additional area as per his revised entitlement. In such cases, either (a) the plot allotted as per the original

entitlement may be upgraded as per his entitlement, or (b) in case he has already utilised/ transferred the earlier allotted plot, he may be allotted an additional plot as per his entitlement on account of the net additional area.

vi) In case a landowner or co-sharer avails of a plot under para (5), he will not be entitled to a second plot in the 'oustees category' under para 8. Such a person, however, will have the option to either apply for allotment of a plot under para 5 or para 8 of this Policy. The landowner interested in availing this benefit would be required to submit his application in the prescribed Application Form -5.

vii) No litigation should be pending in respect of the acquired land, except a reference under Section 18 of the Act, in order to be eligible for allotment of an 'oustees category' plot under the Scheme.

viii) The acquiring department/ development agency will earmark a separate chunk of land, preferably close to the village in close vicinity of the Toshi Abadi, for carving out 'oustees category plots' for the landowners as stated under para 5(vi) above.

The allotment of 'Oustee Category' Plots will precede the allotment of 'General Category' plots.

Allotment of Commercial/ Industrial Sites:

i) Where 75% of the land-holding of a landowner/co-sharer in a revenue estate, measuring one acre or above, is acquired by the Government for HUDA, HSIIDC, and the HSAMB, thereby substantially impacting his means of sustenance, developed commercial/ industrial sites would be reserved and allotted to such land oustees as per the following criterion:

ii) The allotment of commercial sites/ industrial plots would be made to each cosharer provided his share in the acquired land is one acre or more, otherwise all the co-sharers will be allotted a site(s) as per entitlement. In case the total acquired land of all the co-sharers put together is less than one acre, they would not be entitled to this facility. Illustrations given in Appendix-2 may be referred for any clarity;

1	Commercial Sites measuring 3 mtr x 4 mtr (12 sq. mtrs)	To be allotted by HUDA/ HSIIDC/ HSAMB at the Reserve Price, which will be no more than 3 times of the price of residential plot in that area/ sector.
2	Industrial Plot measuring 450 sq mtrs. in the case of HSIIDC	A landowner oustee eligible under this category will have the option in the case of HSIIDC to opt for the Commercial site or an industrial plot. The rate for the Industrial Plot will be 20% lesser than the rate determined for the general public at the time of first floatation.

iii) The commercial/ industrial sites would be reserved and allotted in addition to the residential plots for the land-oustees in these categories. The affected landowner would be required to submit his application in the prescribed Application Form-6.

9.0 PROJECT COST ESTIMATES

Total project cost is anticipated to be INR 4000 Crore that includes the land and development cost.

- Land cost = INR 1700 Crore
- Development cost = INR 2300 Crore

10.0 ANALYSIS OF PROPOSAL

The available empirical material allows the followings broad conclusions to be drawn on the impact of Industrial Estate on industrial, urban and regional development plans:

- In our country, it has been observed that only a small proportion of the industrial enterprises and of the labour force operates in industrial estates, and consequently any improvements effected by estates are per se limited.
- For industrial estate to make significant contribution to industrial development they must be supported by financial, training and incentive policies.

- Industrial estate play an essential part in urban and regional developments, provided the estates are successful in other aspects, and can be of great help in reducing the environmental impact of industry.
- Industrial estates can be very effective in providing accommodation for relocated establishments.
- Industrial Estate has success in attracting industry to semi-urban and rural areas.
- Industrial estates can help industrial entrepreneurs to make considerable savings on financial resources, but estate do not by themselves result in more efficient use of capital and labour.

11.0 PROJECT BENEFITS

The project will create direct and indirect employment opportunities and boost economic development of the State.

- Employment generation potential of the IMT at Kharkhoda: The direct employment population of each industry is calculated based on the employment density and land area. According to statistics of India's statistical authority concerning direct employment and total employment population engaged in relevant industries (Principal Characteristics by Major Industry Group in ASI 2012-13), the proportion of indirect employment of relevant industries can be calculated, and the indirect employment population can be calculated accordingly. Finally, the total employment population is calculated as about 1,00,000 to 1,50,000 persons.

**Table 11: Proportion of Employment Population in Industrial Model Township,
Kharkhoda, Sonapat, Haryana**

INDUSTRY TYPE	TOTAL EMPLOYMENT POPULATION (PERSONS)
Automobile Industry	20,000~26,000
Food products and beverages	14,000~20,000
Fabricated metal products (Automobile and household appliance amenity)	8000~11,000
Textiles and wearing apparel	22,000~35,000

Smart Household Appliance (Electrical equipment)	9000~16,000
medical instruments	9000~15,000
IT industry	18,000~27,000

- Economic scale of Industrial Model Township, Kharkhoda, Sonapat, Haryana: Based on India's total investment on relevant industries and total employment population, the labor productivity of each industry is calculated, and annual GDP growth after construction of each industry in the park can be calculated as well. After completion of Industrial Model Township, Kharkhoda, annual gross industrial output value will be USD 5.0-8.0 billion (current value in 2015) and average revenue of industrial land will be about USD 1.5-2.5 billion/km².

Table 12: Output Value of Industrial Model Township, Kharkhoda, Sonapat, Haryana

INDUSTRY	LABOR PRODUCTIVITY (INR Lakh/person)	INDUSTRY TOTAL OUTPUT VALUE (INR Lakh)	INDUSTRY TOTAL OUTPUT VALUE (100 million US dollars)
Automobile Industry	9.26	3,40,000~5,00,000	5~8
Food products and beverages	5.75	5,00,000~13,00,000	7~19
Fabricated metal products (Automobile and household appliance amenity)	4.78	1,50,000~3,00,000	2~4
Textiles and wearing apparel	3.31	3,30,000~8,00,000	5~12
Smart Household Appliance (Electrical equipment)	8.05	3,00,000~6,00,000	5~8
medical instruments	11.54	2,60,000~6,00,000	4~9
IT Industry (IT/ITeS)	7.11	4,00,000~7,50,000	6~11