

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF INDUSTRY

INDIA

**THE FEASIBILITY STUDY
ON
THE INDUSTRIAL MODEL TOWN
IN
INDIA**

**FINAL REPORT
SUMMARY**

JUNE 1995

YACHIYO ENGINEERING CO., LTD.

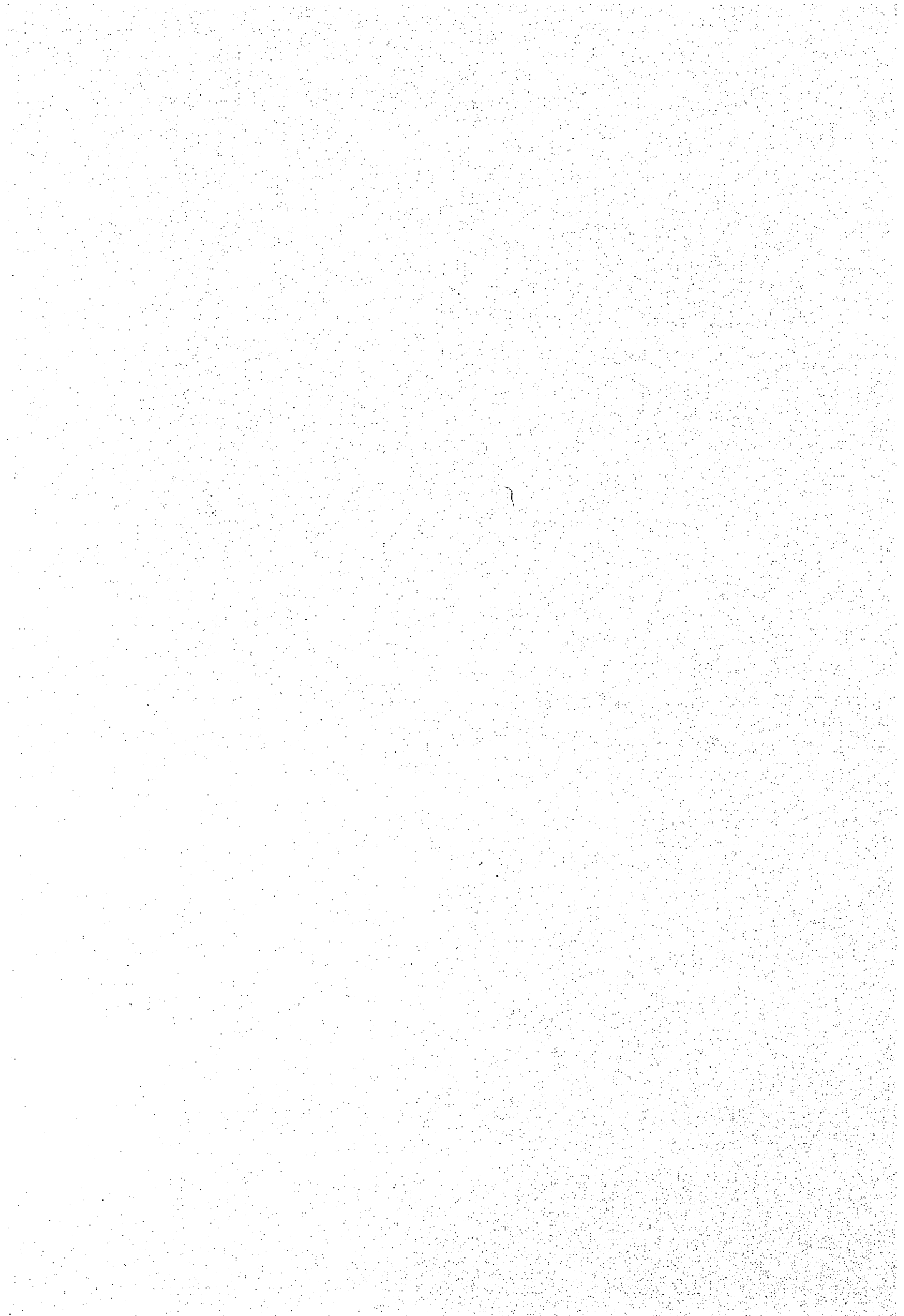
in Association with

TECHNO CONSULTANTS, INC.

MPI

JR

95-136



JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF INDUSTRY

INDIA

**THE FEASIBILITY STUDY
ON
THE INDUSTRIAL MODEL TOWN
IN
INDIA**

JICA LIBRARY



1119834181

FINAL REPORT

SUMMARY

277 29

JUNE 1995

YACHIYO ENGINEERING CO., LTD.

in Association with

TECHNO CONSULTANTS, INC.

国際協力事業団

27729

Table of Contents

Chapter 1	Objective and Scope of Study	1-1
1.1	Background of Study	1-1
1.2	Objective of Study	1-2
1.3	Results of the Study	1-4
1.3.1	Compilation of the Report	1-4
1.3.2	Conclusions of the Study	1-4
Chapter 2	Current Situation of Indian Economy and Industrial Policy	2-1
2.1	Macro Economic Situation	2-1
2.2	Current Situation of Industrial Policy	2-1
2.2.1	Recent Changes in Industrial Policy	2-1
2.3	Trends in Foreign Investment and Main Issues	2-2
Chapter 3	Investment Climate In and Around Haryana State	3-1
3.1	Characteristics of Industrial Location	3-1
3.2	Locational Characteristics of the IMT	3-2
3.2.1	Investment Climate	3-2
3.2.2	Industrial Policy	3-3
Chapter 4	Social Climate In and Around the Candidate Site at Gurgaon	4-1
4.1	Population and Development Plan	4-1
4.2	Facilities Necessary in the IMT	4-3
4.2.1	Position of Gurgaon	4-3
4.2.2	Necessity for construction of Facilities	4-3
Chapter 5	Present Condition of Infrastructure In and Around the Candidate Site at Gurgaon	5-1
5.1	IMT Site and its Characteristics	5-1
5.2	Traffic and Transportation	5-1
5.2.1	Access to IMT Site	5-1
5.3	Water Supply	5-3
5.3.1	Potable Water Supply Plan	5-3
5.4	Sewage Treatment	5-4
5.4.1	Present Condition of Sewage Treatment	5-4
5.4.2	Sewage Treatment Plan	5-4
5.5	Electric Power Supply	5-5
5.5.1	Future Plan	5-5
5.5.2	Main Issues	5-5

5.6	Telecommunication	5-6
5.6.1	Future Plan	5-6
5.6.2	Issues and Constraints	5-6
Chapter 6	Investment Demand Survey	6-1
6.1	Investment Demand Survey : Methodology	6-1
6.2	Summary of the Potential Demand of Investment	6-2
6.3	Screening for Potential Investment Demand	6-4
Chapter 7	Conceptual Development of the IMT	7-1
7.1	Basic Concept for the Development of IMT	7-1
7.2	Selection of Suitable Industries for IMT	7-1
7.2.1	Scale of Development	7-3
7.3	Planning of Housing and Urban Facilities	7-5
7.3.1	Type of Housing and Urban Facilities	7-5
7.4	Development Methodology of IMT	7-10
7.4.1	Characteristics of the IMT Project	7-10
7.4.2	Primary Evaluation : Formulation of Alternative Scenarios	7-11
7.4.3	Secondary Evaluation : Evaluation of Alternative Scenarios	7-14
7.4.4	Tertiary Evaluation : Evaluation from Demand Side	7-15
Chapter 8	Conceptual Design of the IMT	8-1
8.1	Land Use	8-1
8.1.1	Zoning Concept	8-1
8.1.2	Land Usage and Layout of Facilities	8-1
8.1.3	Site Preparation Plan	8-3
8.2	Roads and Traffic Planning	8-4
8.2.1	Traffic Generated by the IMT	8-4
8.2.2	Access to the IMT from NH - 8	8-4
8.2.3	IMT Road Layout	8-4
8.2.4	Provisions for Public Transport	8-8
8.3	Water Supply	8-8
8.3.1	Design Philosophy of Water Supply System	8-8
8.3.2	Basic Design Data of Water Supply Facilities	8-9
8.4	Sewage Treatment	8-9
8.4.1	Waste Water Treatment Facilities for IMT	8-9
8.4.2	Conceptual Design of Stormwater Drainage System	8-10
8.5	Electric Power Supply	8-11
8.5.1	Basic Concept of Power Supply System for the IMT	8-11
8.5.2	Captive Power Generation Plant (IMT Power Plant)	8-12
8.6	Telecommunication	8-15
8.6.1	Estimate of Telecommunication Lines	8-15
8.6.2	Basic Concept of Telecommunication Facilities for the IMT	8-16
8.6.3	Required Function of Telecommunication Facilities	8-16

8.7	Underground Utilities Duct	8-17
8.7.1	Design Condition of Underground Utilities Duct	8-17
8.8	Industrial Solid Waste and Pollution Control	8-18
8.8.1	Solid Waste Disposal	8-18
8.8.2	Waste Water Control	8-18
8.8.3	Air Pollution Control	8-18
Chapter 9	Operation and Management of IMT	9-1
9.1	Concept of Operation and Management Planning for the IMT	9-1
9.2	The Operation and Management Organisation	9-1
9.2.1	Possibility of Operation and Management Agency	9-1
9.2.2	Operational Planning for the IMTPC	9-2
9.3	Structure of the Operation and Management	9-4
9.3.1	Scope of Work	9-4
9.3.2	The Figure of the Operation and Management Organization	9-4
9.3.3	The IMTPC Implementation Plan	9-6
Chapter 10	Cost Estimation and Implementation Schedule	10-1
10.1	Cost Estimate	10-1
10.2	Implementation Schedule	10-1
Chapter 11	Economic and Financial Evaluation	11-1
11.1	Financial Evaluation	11-1
11.2	Economic Evaluation	11-5
Chapter 12	Social Environment Assessment	12-1
12.1	Land Acquisition	12-1
12.2	Water Rights	12-1
12.3	Employment Related Problems	12-1
12.4	Commuting	12-1
12.5	Slums	12-2
12.6	Environmental Protection	12-2
12.6.1	Aravalli Range (Natural Preservation)	12-2
12.6.2	Sultanpur Bird Sanctuary	12-2
12.6.3	Environmental Impact Assessment	12-2
Chapter 13	Conclusions and Recommendations	13-1
13.1	Conclusion	13-1
13.2	Recommendations	13-1
13.2.1	Requirements during Project Preparation Stage	13-1
13.2.2	Requirements for Project Commencement	13-3

1. The first part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

2. The second part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

3. The third part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

4. The fourth part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

5. The fifth part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

6. The sixth part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

7. The seventh part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

8. The eighth part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862. It is a very important document, as it contains the President's message to the Congress, and is a very important document, as it contains the President's message to the Congress.

Chapter 1 Objective and Scope of Study

1.1 Background of Study

- (1) The Government of India has actively promoted economic liberalization through the enactment in 1991 of new economic policies. Urgent considerations since that time have been given to a shift from the country's present conservative industry to an internationally more competitive industry.

The government's programmes are proving effective and have encouraged further efforts toward economic and industrial growth. However, foreign investment in the form of joint ventures and other capitalization projects requires that the country's present investment climate be improved to meet the future demands of industrial growth.

The country's industrial technology level must be upgraded, competitiveness restored, and outdated manufacturing equipment must be replaced with highly efficient and economical equipment. Also, to strengthen foreign investment, further the introduction of new technology, and promote the growth of domestic industries, the Government of India must continue to pursue economic liberalization policy efforts.

- (2) During the 18th India and Japan Study Committee Meeting, hosted by India in March 1989, the Japanese members recommended that establishing industrial zones that meet international standards would encourage foreign investment in the country. In August 1991, the Government of India responded positively and requested through proper diplomatic channels that the Government of Japan assist the country with a development study of an Industrial Model Town (IMT).
- (3) In response to this request by the Government of India, the Japan International Cooperation Agency (JICA) conducted a project identification study in October 1991, followed by a project formation study in March 1992. Accordingly, India's Ministry of Industry, Department of Industrial Development (DID) and JICA agreed upon the *Scope-of-Work* for the Master Plan Study on August 7, 1992.
- (4) As per the above mentioned *Scope-of-Work*, the Master Plan Study was carried out to recommend the most appropriate site among the four candidate sites for the establishment of the IMT, and to prepare an IMT Conceptual Plan for the recommended site. The four candidate sites were Gurgaon and Noida (both near Delhi) and Bidadi and Sathnur (both near Bangalore). The Master Plan Study commenced in October 1992 and was completed in December 1993.
- (5) As a result of the Master Plan Study, Gurgaon was recommended as the most appropriate site for the establishment of an IMT. Thereafter, the *Scope-of-Work* for the present Feasibility Study were signed in February 21, 1994. This Feasibility Study is being carried out as per the *Scope-of-Work*.

1.2 Objective of Study

The main objective of this study is to establish an Industrial Model Town (IMT) of international standards near Gurgaon city in Haryana state, in order to attract foreign investment and technology and upgrade the competitiveness of Indian companies and increase employment opportunities through collaboration and technology transfers from foreign companies. The present study will formulate the conceptual design for the IMT and examine the economic and financial feasibility of establishing such an IMT.

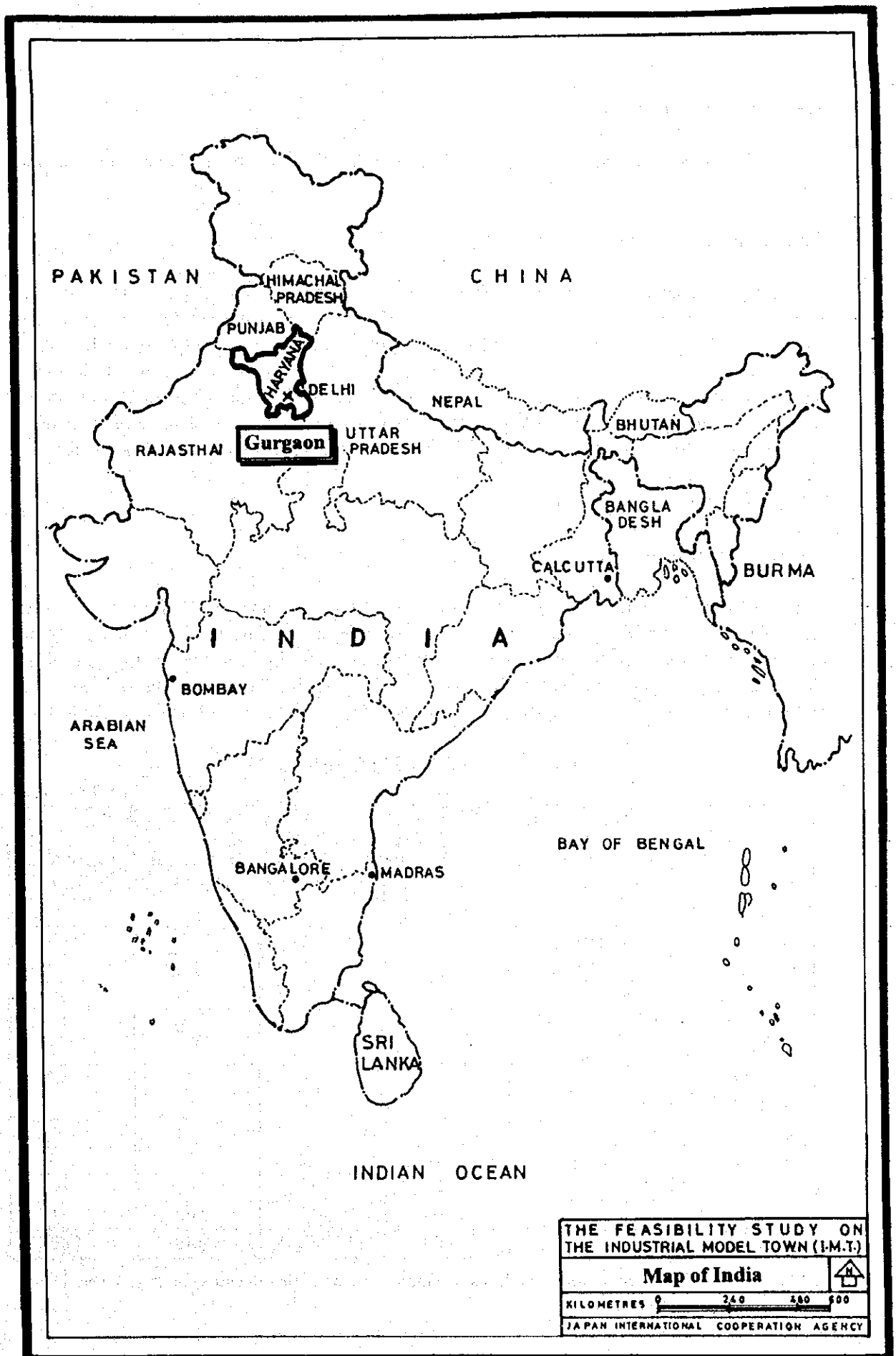


Fig 1.1: Map of India Showing the Location of the Candidate Site (Gurgaon)

1.3 Results of the Study

The final results of the study are described in the Final Report. This is the summary of that report.

1.3.1 Compilation of the Report

This report consists of 13 chapters, which are broadly divided into 2 parts. The first part consists of Chapter 1 to Chapter 6, and describes the review of the Master Plan Study and Chapter 7 describes the results of the basic concept for the development of the IMT, which forms the basis for the conceptual design for the IMT. The second part consist of Chapter 8 and onwards, and describe the conceptual design for the IMT. Although a conceptual design for the IMT was prepared in the Master Plan Study, some modifications have been made in this Feasibility Study based on a re-analysis of the development conditions for the IMT.

1.3.2 Conclusions of the Study

(1) Scale of Development

In this Feasibility Study (F/S), the land-use plan of the IMT and the IMT facilities which were planned in the Master Plan Study (M/P) were reviewed. The results of this study are quite similar to those of the Master Plan Study. The area required for the development of the IMT is 600 ha of which 400 ha will be used for industrial purpose and 200 ha for residential and urban purposes. The comparative land-use for M/P and F/S is shown below in Table 1.1.

Table 1.1 : Land Use Plan for the IMT

(in hectares)

	(M/P)		(F/S)	
	Industrial Zone	Residential Zone	Industrial Zone	Residential Zone
Industrial area	288		267	
Housing area Low density		28		20
Medium density		30		39
High density		42	14	39
(Total)		(100)	(14)	(98)
School area				7
Center area	10	30		37
Recreation area		8		
Traffic facility area			1	1
Utility area	10	7	10	4
Park / Green belt	28	23	47	22
Road space	64	32	62	31
(Total)	400	200	400	200

Note : * In the F/S, the community facilities (Community center, Health care center etc.) were also included in the Center area.

(a) Final Results of Investment Demand Survey

From the Investment Demand Survey except India, it is estimated that 329 ha will be required for the 99 potential industries in the IMT, as shown below.

	Surveyed Countries	Other Countries	Total
Number of Potential Companies	52	47	99
Potential Area Required (ha)	173	156	329

Note 1 : Japan, USA, UK, Germany and Singapore

Note 2 : Manufacturing industry only

(b) Recommended Scale of the IMT

Based on the results mentioned above and the analysis of suitable industries for the IMT, the scale of the industrial zone including the non-manufacturing sector is recommended as follows :

	Manufacturing	Non-Manufacturing	Total
Number of Potential Companies	64	48	112
Potential Area Required (ha)	220	47	267

(2) Effects of Development

The following development effects will be derived from the implementation of the IMT project.

(a) Economic Analysis

Economic Internal Rate of Return (EIRR)	29.6%
Added Value of Increased Industrial Production	Rs. 28,360 million/year
Increase in Employment Opportunity	29,890 people will be employed. This is equivalent to 1.3 times of the number of factory workers of Gurgaon (22,847) or 10% of that of Haryana State. Overall payment of wages will be Rs. 2.773 million per year
Effect on the Regional Economy	Development cost of the IMT; Rs. 18.08 billion Construction cost of factories; Rs. 21.06 billion Total investment amount is equivalent to 25% of the GDP of the Haryana State.

(b) Financial Analysis

The calculated Return on Investment (ROI) at the price of US\$ 50/m² is as follows :

	Sales Completion	
	10 Years	5 Years
ROI (before tax)	8.0%	12.8%
ROI (after tax)	4.6%	7.4%

(3) Development Methodology

The IMT facilities consist of profitable and non-profitable facilities. For each type of IMT facility, the implementing agency, the funding source and the method of investment recovery is shown in Table 1.2

Table 1.2 : Development Methodology for the IMT facilities

Component	Estimated Cost (Rs. Million)	Implementation Agency			Financing Source (Rs. Million)				Cost Recovery
		State Govt.	Third Sector	Private Sector	State Govt. (A)	Indian Private (B)	Foreign Official (C)	Foreign Private (D)	
1. Land Acquisition	1,500	○ (A)			1,500				Land Sales
2. Basic Infrastructure	1,867		○ (D)					1,867	Land Sales
3. National Highway No. 8	269	○ (C)					269		Land Sales
4. Power Supply	4,113	○ (C)					4,113		Service Charge
5. Telecommunications	221	○ (C)					221		Service Charge
6. Water Supply	747	○ (C)					747		Service Charge + Subsidy
7. Sewage Treatment	585	○ (C)					585		Service Charge + Subsidy
8. Solid Waste Management	63		○ (C)				63		Service Charge
9. Housing Facilities									
High Density (4F) 5,000 rooms	790	○ (C)					790		Rental Fee
Housing for EWS 1,000 rooms									
High Density (10F) 6,000 rooms	6,339			○ (B)		6,339			Sales
Middle Density 1,500 rooms									
10. Town Facility									
Promotion Center	448		○ (C)				448		Land Sales
Public Facility (Town Center, etc)	647	○ (C)					647		Service Charge (partially)
Commercial Facility (Shopping Center etc)	2,167			○ (B)		2,167			Sales
Sub-Total and Total	19,756	8,872	2,378	8,506	1,500	8,506	7,883	1,867	

Chapter 2 Current Situation of Indian Economy and Industrial Policy

2.1 Macro Economic Situation

The Indian economy has successfully recovered from the crisis of 1991 when the foreign currency reserves had fallen to about US \$1 billion, inflation soared to an annual rate of 17% and the overall economic growth had declined to 1.1%. The economic reforms started during 1991-92 has helped restore the foreign currency reserves to US \$6.4 billion, brought down the rate of inflation to 7% and the economic growth to 4% in 1992-93.

As per the Economic Survey 1993-94, the Government of India will continue the economic reforms and further (a) introduce policy reforms for transforming the structure and competitiveness of the economy, (b) accelerate the growth of labor-intensive industries for employment generation and, (c) pursue the fiscal reforms to achieve better macro-economic stability and balance-of-payments position.

2.2 Current Situation of Industrial Policy

In this report, the changes and modifications made in the industrial policy after the NIP-91 are discussed as a supplementary to the Master Plan Study for providing the latest information and outline of the industrial policy.

2.2.1 Recent Changes in the Industrial Policy

(1) New Industrial Policy "NIP-91"

The New Industrial Policy (NIP-91) introduced in June 1991 was a major shift from the previous industrial policy with reference to the following five main points.

(a) Industrial Licensing Policy

- Six areas (Refer to Appendix-II, Annex I) where security and strategic concerns predominate will continue to be reserved for the public sector.
- For all industries, except 15 industries (Refer to Appendix-II, Annex II), licensing was abolished.

(b) Foreign Investments

- Automatic approval for foreign equity participation up to 51% is granted in high priority industries (Refer to Appendix-II, Annex III).
- The Foreign Investment Promotion Board (FIPB), a specifically empowered Board has been set up in the office of the Prime Minister to speed up the approval process.

(c) Foreign Technology Agreement

- Automatic permission for payment of royalty will be given for foreign technology agreements in high priority industries.

(d) Public Sector

- Six industries related to security and strategic concerns (Refer to Appendix-II, Annex I) will be operated in the public sector.

(e) The Monopolies and Restrictive Trade Practices (MRTP) Act

- The MRTP Act was amended to remove the threshold limits of assets in respect of MRTP companies and dominant undertakings.
- Functions for the fair trade practices commission were consolidated.

(2) Outline of Recent Changes in the Industrial Policy

The changes made in the industrial policy after the NIP-91 are listed below in the chronological order.

- March 1992 Foreign Exchange Regulation Act (announced by Finance Minister)
- March 1992 New EXIM Policy (announced by Minister of Commerce)
- June 1992 Abolition of Dividend Remittance Regulation (Press Note No. 10)
- January 1993 Foreign Exchange Regulation Act (announced by President of India)
- March 1993 Foreign Exchange Regulation Act (announced by Finance Minister)
- March 1993 Modification in Tax System (announced by Finance Minister)
- March 1993 New National Mineral Policy (Ministry of Industry, Press Note No. 3)
- April 1993 Controlled Investment Goods (announced by Investment Special Committee)
- August 1993 Procedure for Opening of Liaison Office (RBI, Circular No. 24)
- February 1994 Modification in Taxation System (announced by Finance Minister)
- March 1994 Modifications in EXIM Policy (announced by Minister of Commerce)
- March 1994 Liberalisation of Exchange Control Norms (RBI [ECD] Circular No.4)
- April 1994 Abolition of PMP (Ministry of Industry, Press Note No. 1)
- May 1994 EPZ's in Private/Joint Sector Permitted (Press Note No. 42)
- May 1994 New Telecom Policy, 1994

2.3 Main Issues in Foreign Investment

During the discussion with the Japanese companies based in India, it was found that the number of companies gathering information regarding investment opportunities in India is increasing and the number of companies interested in investing in India is also increasing. The policy and regulations regarding foreign investment in India is also improving.

Some of the companies pointed out the following impediments for investment in India.

(1) Lack of attractive investment incentives

For projects targeted at the domestic market, the incentives are not attractive as compared to some other countries.

(2) Complicated approval system

For the implementation of projects, the project submission and approval system is complicated at the Central and State government levels. Single Window Service and simplified procedures are necessary.

(3) Regulation for raising financial resources

If a company has a loan from other countries with guarantee of parent company, a loan will be approved only for payment in foreign currency, not in local currency. A Company must obtain a loan from governmental financial institutions, which have a higher rate of interest than other countries. This makes the project unprofitable.

(4) Inflexibility of financial system

The Opening of a bank account in foreign currency is approved only for settlement of account for import of capital goods. It should be used for settlement of accounts such as license and engineering fees. Also, the terms of banking account do not match the implementation schedule of the project.

(5) High tax rates and duties

The corporate and import tax duties are very high and should be reduced.

(6) Restrictions on industrial approvals

- Requirement of industrial licenses for 15 types of industries
- Restrictions for 34 high-priority industries
- Non-liberalization of royalty for foreign technical cooperation

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

100-100000-100000

Chapter 3 Investment Climate In and Around Haryana State

3.1 Characteristics of Industrial Location

There were a total of 5,422 industries in the Haryana State out of which the maximum number of industries were located in Faridabad District (1,605 industries), followed by Yamunanagar District at 836 industries. The Gurgaon District came at seventh position with 309 industries and accounted for about 5.7% of the total number of industries in the Haryana State.

The Gurgaon District has the following features when observed from Type of Industry perspective.

- Among the industries in the manufacturing sector, 50 industries were engaged in non-metallic mineral products followed by 35 industries in wood & wood products, 34 in metal products & parts and 30 in machinery & machine tools.
- Among the industries in the manufacturing sector, in terms of share, textiles products accounted for 13.4%, rubber, plastic & petroleum products for 12%, transport equipment & parts for 14.2 % and other manufactured goods for 12.8%.
- In the non-manufacturing sector, Gurgaon was the only district to have a water works and supply industry.

The following characteristics can be observed for the Gurgaon District related to the volume of industrial production in Haryana by District and Type of Industry.

- Among all the Districts in the Haryana State, Gurgaon District has the largest share in automobiles (100%), followed by steel tubes (72%) and powerloom weaving (59%).
- The Gurgaon District has a production of about 6300 ton of cement and 270,000 sq. m of handloom weaving.

The following characteristics can be observed for the Gurgaon District related to the number of employed workers in Haryana by District and Type of Industry.

- The number of employed workers in Gurgaon District is about 23,000 which is about 7.2% of the total number of employed workers in Haryana State.
- The industries employing more than 1000 workers are cotton textile, textile products, rubber, plastic & petroleum products, chemical & chemical products non-metallic mineral products, metal products and parts, machinery and machine tools and other manufacturing industries.

3.2 Locational Characteristics of the IMT

In the Master Plan Study critical comparison was conducted on the primary industrial policy factors which attract foreign investment such as the investment climate and the position of the state government in receiving industries.

The results of the review of Gurgaon in Haryana State in this study which was conducted from the same viewpoint are as follows.

3.2.1 Investment Climate

(1) The position of Haryana State

Although being one of the smaller states in India from the point of view of area and population, economically, it has a high growth rate, per capita income and other economic figures are considerably higher than the average for India. Furthermore, it borders the capital Delhi and thus has access to a large labor supply, consumer market and an international airport, giving it a favorable position.

(2) Concentration of industries

Compared to other states in India, Haryana state is relatively advanced in transportation related engineering industries with car, motorbike, bicycle and truck producing industries.

The proposed site for IMT, Gurgaon is currently not particularly advanced within Haryana State, however, as it has a concentration of automobile makers such as Suzuki-Maruti and it is close to Delhi it has a bright future in industrial advancement.

Also, recently Sony of Japan has decided to locate a facility with 100% foreign equity investment in the suburbs of Gurgaon.

Therefore, as industries locating in IMT will be able to strengthen ties with automobile, general machinery, electric and electronic industries, IMT is in an advantaged position.

(3) Industrial estate development

Industrial Development is carried out by the Haryana State Industrial Development Corporation (HSIDC) which has developed many industrial estates in major cities despite its small size.

However, from an international perspective the existing facilities are somewhat lacking, thus the development of IMT is desired.

(4) Research and development organizations

Industries entering IMT will be able to make use of the existing Industrial Research

and Development Facilities in Gurgaon.

Many foreign companies in the suburbs of Gurgaon require graduation from the Industrial Training Institute (ITI) as a condition for employment, and thus the number of students desiring entry to the institute is large. However, its facilities and materials are limited and therefore it is desirable for industries entering IMT to guarantee their own occupational training facilities.

3.2.2 Industrial Policy

(1) Incentives

It is the policy not to provide special incentives on top of the various incentives which the Haryana State Government already provides.

However, the proposed IMT site will be given zone "B" status incentives.

(2) Single window service

The Haryana State Government is providing "Single Window Service" to accelerate and simplify paperwork for industries.

Improved service is necessary for attracting industries to IMT. A facility to conduct industrial promotion activities, approval procedures, and provide production assistance is required within IMT.

Chapter 4 Social Climate In and Around the Candidate Site at Gurgaon

4.1 Population and Development Plan

Gurgaon is located in the southern part of the Haryana State. It is located in the south-west direction from New Delhi at a distance of 45 km from the center of New Delhi. Gurgaon is one of the satellite towns of New Delhi and is well within commuting distance from New Delhi.

The site for the IMT is located along the National Highway No.8, near the village of Manesar in Gurgaon District (refer Fig 4.1). The land of the IMT site and the surrounding area is mainly agricultural, and there are 8 villages in the surroundings of the IMT site.

(1) Delhi

The planned development of Delhi is shown in the Regional Development Plan of the Delhi Metropolitan Area from the "Regional Plan 2001--National Capital Region", published by the National Capital Region Planning Board, December 1988.

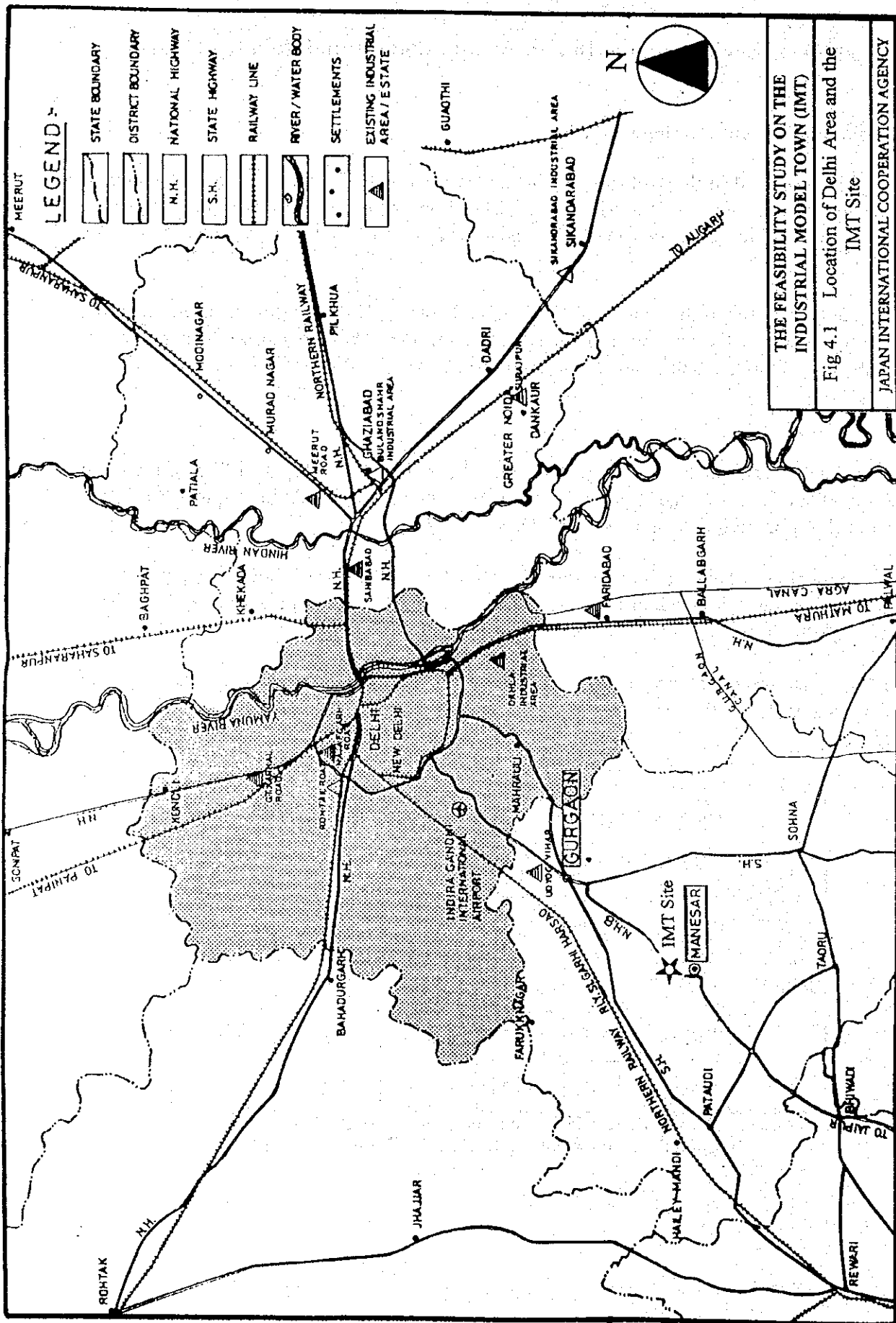
The population of Delhi is projected to be 12,900,000 in 2001 according to this plan which was based on the population in 1981. The estimated growth of the population is 3.6% per year from 1991 to 2001.

The predicted growth of the population is 3.89% per year in the urban area, but the growth in the rural area is -1.99%; therefore the population will become more concentrated in the urban area.

Table 4.1 : Present and Future Population in Delhi

	Population (thousand persons)			Growth per year(%)	
	1981	1991	2001	1981-1991	1981-2001
Delhi U.T Urban	5,770	8,810	12,900	4.32	3.89
Rural	450	440	360	-0.22	-1.99
Total	6,220	9,250	13,260	4.05	3.67

Source : Regional Plan 2001 - National Capital Region, National Capital Region Planning Board, Dec.1988



(2) Gurgaon

The development plan of Gurgaon is included in the Regional Development Plan of the Delhi Metropolitan Area from the "Regional Plan 2001--National Capital Region", published by the National Capital Region Planning Board, December 1988.

The population of Gurgaon is projected to be 700,000 in 2001 according to this plan which was based on the population in 1981. The predicted growth of the population was 10.2% per year from 1981 to 2001; therefore the population in 1991 would be 266,000 as per the plan, but the actual growth of the population was 3.0% per year from 1981-1991. At current growth rates the population will be 183,000 in 2001, which is much less than the population as per the plan, and it will not reach 700,000 until 2045 at the present trend.

However a large scale residential town is being constructed in Gurgaon, and the number of residents in the new town will be over 400,000 persons; therefore it is supposed that the population plan, 700,000 persons, will be attained after completion of the new town development in the early 21st century.

Table 4.2 : Present and Future Population in Gurgaon

	(Population)			(Growth per year)	
	1981	1991	2001	1981-1991	1981-2001
Gurgaon	100,877	135,884	700,000	3.0%	10.2%

Source: Regional Plan 2001 - National Capital Region, National Capital Region Planning Board, Dec. 1988

4.2 Facilities Necessary in the IMT

IMT is not just an industrial estate, but it is an industrial town which includes housing and commercial facilities necessary to support urban life. As a result, for foreign industries, the housing facilities are also important besides the industrial facilities.

Discussions were held during the Master Plan study regarding the facilities necessary in IMT considering the current conditions in Gurgaon and the surrounding regions, and the outlook for the future.

4.2.1 Position of Gurgaon

The regional development plan for the National Capital Region (NCR) which includes the proposed IMT site in Gurgaon has the year 2001 as its target year. This plan calls for

controlling the growth of Delhi and shifting the growth to surrounding cities. Gurgaon being located in the outskirts of the Delhi Megalopolis is therefore, systematically expected to achieve an appropriate and healthy level of growth.

4.2.2 Necessity for Construction of Facilities

Large scale development including residential areas has already started in the suburbs of Gurgaon, however, the facilities necessary to guarantee a world class living suburban environment for IMT were considered and the results are as follows.

(1) Housing

There is a ready supply of housing from the large scale residential developments, including those by private developers, taking place in the outskirts of Gurgaon, and there is no need to build all the necessary housing units within the IMT compounds.

(2) Commercial Facilities

In Gurgaon there are very few commercial facilities that can be used by foreigners. Therefore it is necessary to provide these facilities in the IMT.

(3) Medical Facilities

The large size general hospital in Delhi can be used. However, a simple medical center for common treatments is needed.

(4) Educational Facilities

There are many schools in Gurgaon, however, considering the population of the IMT, it will be necessary to provide facilities at the elementary and junior high school level.

(5) Urban Amenities

There are no five star hotels as of present, however, there are hotels which can be used by foreigners. Also as there are existing plans for hotel development, there is no need to plan to develop new hotels or resorts. A sports facility which can be used by foreigners is necessary.

(6) Other public facilities

Post offices, fire stations and police stations needed to support a community must be built within the IMT.

Chapter 5 Present Condition of Infrastructure In And Around the Candidate Site at Gurgaon

5.1 IMT Site and its Characteristics

(1) IMT site

The proposed site is located near the village Manesar in Gurgaon district of Haryana state, at a distance of 45 km from New Delhi (Connaught Place) along the National Highway 8 (NH 8). The IMT site falls within the administrative boundaries of the Gurgaon Tehsil of the Gurgaon District. A Tehsil is an administrative sub-division of a District. The population of Manesar is 5,649 as per the 1991 population census. The IMT site and its surrounding area is shown in Fig 5.1. The detailed layout of the site is same as that mentioned in the Master Plan Study, however, based on practical consideration, minor modifications have been made in the layout of the site. The topography of the site is fairly flat and the site is presently being used for agriculture.

(2) Climate

The Manesar area receives an annual rainfall of 625 mm. The mean humidity varies from 47% in May to 83% in December. The temperature of the area varies from a minimum of 4 degree Celsius in January to a maximum of 45 degree Celsius in June. The prevailing wind direction in the area is from the north-west to the south-east. The mean wind velocity varies from 2.7 kmph in December to 7 kmph in May.

(3) Soil Condition of IMT site

The site lies in the midst of the Aravali Hills and the area is flat agricultural land with wheat and mustard as the main crops. The sub-soil strata predominantly consists of non-plastic yellowish silt or silty sand of medium compressibility, with traces of *Kankar* (a variety of gravel) at different levels. The safe bearing capacity at a depth of about 1.0 m is in the range of about 10.00 ton per sq. mtr.

5.2 Traffic and Transportation

The establishment of the IMT will inevitably generate additional traffic (both passenger & goods) on the road network around the IMT. In order to plan for the smooth flow of this additional traffic in the future, the present condition of the traffic around the IMT was studied. Section 5.2.1 describes the presently available modes of travel to the IMT and the village Manesar which is located adjacent to the IMT.

5.2.1 Access to IMT site

(1) Access to IMT site by road

The proposed site of IMT is well connected by road network and the National Highway 8 (NH 8) passes through this site. About 80% of the IMT site is located on the right side of the

NH 8 (while going from Delhi towards Jaipur) and the remaining 20% is located on the left side of the NH 8. The NH 8 connects New Delhi to Bombay via Jaipur. The IMT site is about 50 min drive from the center of New Delhi and about 35 min from the Indira Gandhi International Airport, which is also located close to the NH 8.

5.3 Water Supply

The industrial development in Gurgaon is expected to increase rapidly in the future which will lead to a rapid increase in population. The population of Gurgaon is projected to be more than 1 million by the year 2001. In order to cope with the high water demand due to the increase in the population and industrial activity in the future, the water supply network should be developed as early as possible.

5.3.1 Potable Water Supply Plan

Water supply to the IMT shall be incorporated in the water supply plan of the Gurgaon district because the IMT is expected to be constructed from the latter part of 1990's to the year 2000.

The water supply plan for the year 2010, was confirmed at the Haryana P.W.D. (Haryana Public Works Department), which is responsible for planning of water supply in the Gurgaon district.

Based on this schedule, the water purification plant at second phase will be constructed by 1998 and if it is planned that water is supplied to the IMT by this plant, requirement of water by the IMT is about 40,000 m³ per day, which is about 50 % of the plant design capacity of 90,000 m³ per day.

According to the water supply plan, at the year 2001 when construction of the IMT will be well under way, availability of industrial water is expected to be 100,000 m³ per day, which would allow for constructing another industrial area equivalent to the IMT. At this stage, a water purification plant at third phase, will be completed and total availability of water will be 315,000 m³ per day. Total water supply rate is larger than the design capacity of the three water purification plants by 45,000 m³ per day, which is equivalent to the water supply rate to the IMT.

According to the planning by the Haryana P.W.D., a water purification plant which is exclusively used for the IMT, is to be constructed and it is planned that water is to be supplied from the plant at the second phase only at the beginning of the construction phase of the IMT.

However, it is advisable to make a water supply planning, in which water supply to the IMT is included, considering construction of water purification plants, all of which have same capacity of 90,000 m³ per day, so that specifications and drawings for the plant completed at the first stage, will be made use of, to shorten construction term and maintenance of equipment will become easier due to applying same equipment for all plants. During the visit to India this time, it was confirmed to the Haryana P.W.D. that further increase in capacity of water purification is planned besides the three plants above if shortage of water supply is anticipated.

In conclusion, the water supply to the IMT is assumed to be secured when the plants are constructed as planned by the Haryana P.W.D..

5.4 Sewage Treatment

At present, almost all waste water is discharged into the drains without any treatment thus leaving the water to the self-purification of nature. However, it is urgent to provide the waste water treatment facilities in Gurgaon in order to cope with the industrialization and rapid increase in population in the future.

5.4.1 Present Conditions of Sewage Treatment

A sewage treatment plant having a capacity of 68,000 m³ per day is now under construction at Gurgaon and will be completed by 1995.

The conventional activated sludge process can be applied for waste water treatment so that the concentration of contaminants can be lowered than those specified in the Japanese Uniformity Standard, though the indexes of water contamination such as BOD, COD and SS are higher in waste water in Gurgaon than those of waste water from living quarters in Japan.

In the Indian standard of effluents from industries, allowable limit of BOD is only specified among BOD, COD and SS whereas the criteria of BOD, COD and SS are specified respectively in the Japanese Uniformity Standard. The Japanese Uniformity Standard gives the maximum allowable limits of contaminants in Japan, which should at least be applied to the standard for the IMT, considering industrial development in India in the future.(Refer to Table 8.4.1). The waste water treatment plant now under construction at Gurgaon, stated above, has also applied the conventional activated sludge method for treatment.

5.4.2 Sewage Treatment Plan

The sewage treatment capacity is forecasted to about 60 % of water supply capacity when ratio of sewage treatment capacity to water supply capacity is checked each year. Separated system is to be applied for collecting waste water in this area, so capacity of the waste water treatment facilities can be greatly reduced, comparing to a capacity when combined system is applied.

Industrial effluents having a lower concentration of BOD, COD and SS can be discharged into the drains without being sent to the waste water treatment plant. The new waste water treatment facility to be established in Gurgaon will adopt the split flow treatment system, treatment capacity of which can be reduced, compared with the combined system.

The waste water treatment facilities for the IMT are planned to treat about 55 % of total amount of waste water in the IMT. The IMT is not an industrial estate but a model town, where the residential area for the workers and the commercial and public utilities are also provided, and in a sense, the IMT projects industrialized Gurgaon in future.

5.5 Electric Power Supply

5.5.1 Future Plan

Considering the importance of the Gurgaon Industrial Complex, improvement plans to increase generating capacity were made to ensure abundant uninterrupted power to this belt. The 400 kV Samaypur Substation, will be connected to the Faridabad Gas-based Thermal Power Station, which is to be constructed by the National Thermal Power Corporation. The Faridabad power station will have 400 MW capacity and the construction of the station is expected to be completed in 1996. GAIL is implementing the project to extend the gas supply trunk line for the purpose of supplying natural gas to this power plant via a 36 inch pipeline. The project is expected to be completed by 1996 too.

As a future project, Haryana is to take up a thermal power station at Palwal which is likely to be completed by the turn of the century. With the commissioning of this thermal power station, the power available in this area will further increase.

5.5.2 Main Issues

In the Master Plan Study, the scheme for power supply to the IMT was based on the assumption that that 70% of power demand will be covered by the power supply from the Haryana State Electricity Board (HSEB) and remaining 30% will be covered by the captive power plant.

However, after the review of the power conditions around Gurgaon in this study, it was considered appropriate to have a complete and reliable power supply to the IMT through an isolated power supply system or a captive power plant.

(a) Balance between power supply and power demand

Although the Gurgaon district has been designated as a priority area for the power supply, however considering the power balance in Haryana state for the year 1994-95, the demand for power was 11,745 Gwh and the supply was only 91% of the demand at 10,640 Gwh. This gap between demand and supply could affect the power supply to the Gurgaon district.

(Source : "Current Energy Scene in India" June 1994, Center for Monitoring Indian Economy Pvt. Ltd.)

In addition, since the balance between demand and supply of power in future is not very clear, it is supposed by people in general that lack of electric power will occur in future in these areas where further industrialisation is expected.

(b) Stability of power supply

The results of the questionnaire survey carried out during the Master Plan Study also indicate that power interruption occurs frequently, i.e., 3 or 4 times per day, especially during the summer months, though the conditions in the Gurgaon area are rather good when compared to other parts of India.

(c) Comparison with other industrial estates

Almost all industries of large and medium size which are located around the Delhi area have a captive power plant as countermeasure for the frequent power interruption.

In NOIDA where large scale industrial development is taking place, had earlier planned to buy electric power from existing sources. However, because of frequent power interruptions, NOIDA is recently planning to construct a gas turbine based power plant. The IMT is being planned to have a higher or at least equal level of infrastructure compared to existing industrial estates.

(d) Participation of private sectors

The private sector has been recently permitted to participate in the power projects, and the private companies has shown keen interest for the IMT project.

(e) Utilization of natural gas

The planned captive power plant for the IMT will be gas turbine based power plant for which natural gas will be used as fuel.

The supply of natural gas is managed by Gas Authority of India Limited (GAIL), a public corporation and at present it is supplied from Bombay to the suburban areas of Delhi by a gas pipeline. The supply of natural gas is available in Haryana and the factory of Maruti Udyog Limited located in Gurgaon has its own power plant driven by natural gas fired turbine with a capacity of 20MW.

5.6 Telecommunication

5.6.1 Future Plan

(1) Status of Nearest Manesar Exchange

A 512 line will be proposed in year 1994 - 1995. 1024 port will be installed in year 1997 - 1998.

(2) Telecom Facility in Gurgaon District

The demand for telephones in Gurgaon is about 16,000 as of this date. The department is planning to expand the capacity of more 5,000 lines during 1994-1995 in addition to the existing digital exchanger which has 13,000 lines capacity in Gurgaon Main Exchange.

(3) Access to Data Transmission Network

Access to Packet Switching service on the I-NET of the Department of Telecom and Gateway Packet Switching System of the Videsh Sanchar Nigam Ltd. (VSNL) and the Remote Area Business Message Network (RABMN), can be provided from any location.

5.6.2 Issues and Constraints

Telecommunication lines in IMT should be directly connected to the exchange in the Gurgaon Main Exchange, so that high reliability can be maintained on the line, considering the fact that advanced digital exchanging system is already installed in the Main Exchange and is connected with Delhi and Bombay by optical fiber main links.

Chapter 6 Investment Demand Survey

An investment demand survey was conducted to identify Indian and overseas potential investors and to identify the possibility of investment in the Industrial Model Town (IMT) in India using the statistical data, the results of questionnaire and interview survey. Also, this survey gathered possible future investment plans in the likelihood that investors would be interested in a project in India or such as the IMT, and identified the conditions required by the investors.

6.1 Investment Demand Survey : Methodology

(1) Investment Demand Survey: Countries Sampled

The investment demand survey essentially sampled target populations from India, Japan, the United States, the United Kingdom, Germany and Singapore, because each country is a prominent investor in India and has myriad levels of experience in foreign investment, technology transfer agreements, and the availability of hard currency. Specifically, a summary of each country surveyed will follow below.

(2) Methodology

The investment demand survey of the six countries were accomplished in three phases. The first Phase consisted of shortened questionnaire forms selected from the detailed questions used in the second-Phase questionnaire survey. The third Phase survey was interviews.

The objectives of the first Phase survey were to obtain the maximum number of replies, to increase the size of the sample population to ensure objective results, and to ensure improved response rate for the second Phase survey.

After examining the response of the first Phase, enterprises which showed rather positive opinions regarding investments in India were selected as a purposeful sample for the second Phase survey. The detailed opinions by companies on investing in India were to be obtained at the second Phase survey.

Furthermore as the third Phase survey, interviews were held to the certain selected companies to obtain more detailed opinion not included in the questionnaire surveys.

6.2 Summary of the Potential Demand of Investment

(1) Potential Investors to the IMT

Table 6.1 summarizes the results of the 1st, 2nd and 3rd Phase surveys, mainly concerning to the potential investors interested in the IMT.

Table 6.1 : Potential Investors to the IMT

	(Number of Companies)							
	Japan	U.S.	U.K.	Germany	Singapore	S-Total	India	Total
1st Phase Survey (Questionnaire Survey)								
Mailed	4,772	4,399	2,917	5,042	1,448	18,578	4,339	22,917
Reply	825	396	242	97	48	1,608	460	2,068
IMT								
Very Interested	1	5	7	5	2	20	106	126
Interested	46	116	53	23	18	256	193	449
Total	47	121	60	28	20	276	299	575
(% in Reply)	(5.7%)	(30.6%)	(24.8%)	(28.9%)	(41.7%)	(17.2%)	(65.0%)	(27.8%)
2nd Phase Survey (Questionnaire Survey)								
Mailed	816	1,000	1,027	991	1,006	4,840	1,026	5,866
Reply	109	38	54	60	21	282	43	325
IMT								
Very Interested	1	2	1	3	0	7	9	16
Interested	10	5	6	5	2	28	14	42
Total	11	7	7	8	2	35	23	58
(% in Reply)	(10.1%)	(18.4%)	(13.0%)	(13.3%)	(10.0%)	(12.4%)	(53.5%)	(17.8%)
3rd Phase Survey (Questionnaire Survey)								
No. of Interviews	43	35	50	29	26	183	33	216
A: (Average %)	39	33	19	39	53	34	-	
B: (Average %)	14	12	9	24	15	14	Depends on J/V	

Note A: Possibility of Investment in India

B: Possibility of Investment in IMT

(2) Summary of the Interviews

The common opinion to the IMT among the companies in the respective target countries can be summarized as below.

- (a) Companies with plans to invest around the Delhi area are hoping for immediate completion of the IMT in light of their timing for investment, as the IMT is an other option.

Companies with stronger interests in the IMT mention the timing of investment as within 1-3 yrs.

- (b) Gurgaon has the advantage of being close to the airport and to the large consumption area but is located unfavorably away from sea ports. It is therefore expected to establish an adequate traffic system such as roads and railways so as to facilitate access to sea ports.

- (c) It is essential for the IMT to provide stable supply of electricity, water and communication facilities.

- (d) The price appraisal of the IMT, however, totally depends on its level of industrial infrastructure.

As the price level of the real estate of industrial zones is a key factor to make decisions for the selection of site, the land price of the IMT is desired to be competitive with the price of neighboring industrial estates.

- (e) In order to attract foreign investors to the IMT, it is necessary to not only promote the attractiveness of India but also to identify the IMT from other industrial estates in India.

- (f) India's new economic policies are not known by many companies, and much effort is necessary in promotion of advertisement activities.

- (g) Drastic policies and investment promotion organization to invite foreign firms and foreign investments are desired to make future potential demand realistic.

(3) Potential Investment Demand of others besides the 5 Surveyed Countries

The number of companies of the five countries and that of others in the Delhi area in 1993 were similar at 211 and 215 respectively, as described in Table 6.2, and the average in India from 1991 to 1993 shown in Table 6.3 is also at the ratio of 1 : 1.

The potential demand of investment in the IMT from other countries besides the 5 surveyed countries, i.e., Japan, the U.S., the U.K., Germany and Singapore, has been assumed to be similar to that of the 5 countries.

Table 6.2 : Foreign Investment Approvals in the Area of Delhi and the Neighboring 4 states in 1993

(Number of Companies)			
	Financial	Technical	Total
Japan, U.S.A., U.K., Germany, Singapore	113	98	211
Others	143	72	215
Total	256	170	426

Source: Based on the data from IIC

Table 6.3 : Foreign Investment Approvals

(Number of Companies)				
	Total 1974 to 1993	Total 1984 to 1993	Total 1991 to 1993	1993
U.K.	2,079 (15.2%)	1,315 (13.5%)	492 (12.5%)	172 (11.7%)
U.S.A.	2,803 (20.5%)	1,985 (20.4%)	807 (20.5%)	298 (20.2%)
Germany	2,455 (18.0%)	1,637 (16.8%)	529 (13.4%)	174 (11.8%)
Japan	1,134 (8.3%)	844 (8.7%)	271 (6.9%)	92 (6.2%)
Singapore	N.A.	N.A.	94 (2.4%)	41 (2.8%)
Others	5,172 (38.0%)	3,936 (40.6%)	1,752 (44.3%)	699 (47.3%)
Total	13,643	9,717	3,945	1,476

Source: Based on the data from JETRO New Dehli

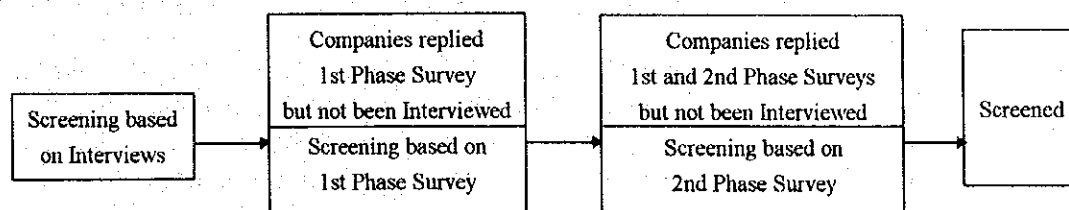
The investment approvals of Japan in 1993 as described in Table 6.3 was 92 which was 6.2% of total approvals.

6.3 Screening for Potential Investment Demand

Screening is conducted on companies with possibility of investments by questionnaire and interview response. The investment possibilities have been classified in 5 ranks, and among them, A to D are listed in Table 6.4. In addition, the area required by investors are calculated.

(1) Screening for potential investors

The screening was carried out based on the following procedure, and the results are summarized in Table 6.4.



**Table 6.4 Potential Investors in IMT
(Japan, United States, United Kingdom, Germany, Singapore)**

SIC Code	Short Title	Rank				
		A	B	C	D	Total (number of company)
20	FOOD & KINDRED PRODUCTS	2	6	4	3	15
21	TOBACCO PRODUCTS	0	0	0	0	0
22	TEXTILE MILL PRODUCTS	0	10	4	13	27
23	APPAREL & OTHER TEXTILE PRODUCTS	0	3	2	6	11
24	LUMBER & WOOD PRODUCTS	0	0	3	3	6
25	FURNITURE & FIXTURES	0	1	4	2	7
26	PAPER & ALLIED PRODUCTS	1	2	1	4	8
27	PRINTING & PUBLISHING	0	0	1	2	3
28	CHEMICALS & ALLIED PRODUCTS	3	10	7	6	26
29	PETROLEUM & COAL PRODUCTS	0	3	0	0	3
30	RUBBER & MISC. PLASTICS PRODUCTS	1	4	6	6	17
31	LEATHER & LEATHER PRODUCTS	2	2	2	5	11
32	STONE, CLAY, & GLASS PRODUCTS	1	1	4	7	13
33	PRIMARY METAL INDUSTRIES	1	2	8	5	16
34	FABRICATED METAL PRODUCTS	0	11	6	13	30
35	INDUSTRIAL MACHINERY & EQUIPMENT	2	10	15	14	41
36	ELECTRONIC & OTHER ELECTRIC EQUIPMENT	6	15	15	7	43
37	TRANSPORTATION EQUIPMENT	2	1	4	3	10
38	INSTRUMENT & RELATED PRODUCTS	2	5	7	3	17
39	MISCELL. MANUFACT. INDUSTRIES	2	4	1	4	11
Total		25	90	94	106	315
Probability of investment		A (60%) B (25%) C (10%) D (5%)				
Number of Potential Companies		15	23	9	5	52
Potential Area Required (ha)		68.6	62.5	30.3	11.6	173.1

Note: The details are shown in Table 6-3-8 of Chapter 6 of the main report.

(2) Results of Potential Investment Demand Study

(a) Assumptions in estimation of investment demand

- 1) The infrastructure of the IMT is to meet the international level to be distinguished from other industrial estates.
- 2) The price of the IMT is to be competitive with those of the other industrial estates near the Delhi area.
- 3) Many companies responded as investments in the IMT or India would be within 1 - 3 years which does not match with the construction schedule of the IMT. However, similar results will be obtained if surveyed during the construction period assuming the trend in investment demand does not change significantly due to the steady increase of foreign collaboration approvals during last 20 years.
- 4) Many companies in India are towards joint venture formation and/or technical collaborations with foreign industries, for only 5% responded as not interested during the 1st Phase survey where the sample size is larger. The potential investment demand of companies in India is assumed to be included in that of foreign companies to avoid double-accounting.
- 5) The potential investment demand of other countries besides the surveyed Japan, U.S., U.K., Germany and Singapore is assumed to be similar as mentioned in (4) of 6.3.1 in the main report.
- 6) The unit area requirement for each industry surveyed in Japan is used to estimate the necessary area, and a small adjustment is made by using the unit area in Table 7.2.4 shown in Chapter 7 of the main report as well as in questionnaires and interviews.
- 7) The potential investment demand is classified into five ranks of possibilities based on the results of interviews and the 1st and 2nd Phase surveys. The possibilities of investing in the IMT of ranks A, B, C, and D are 60%, 25%, 10%, and 5%, respectively based on the information from interviews, and the rest is no possibilities.

(b) Potential Investment Demand

The demand of investment by companies in Japan, U.S., U.K., Germany and Singapore is estimated at 52 companies which will require 173 hectares of industrial area, and that of other countries is 47 companies with 156 hectares. The total demand will be 99 companies and 329 hectares of plant area.

The estimated investment demand from 52 companies in the 5 countries represents 0.5% of 9,717 approved collaborations with foreign firms in India during the 10 years from 1984 to 1993, and 3.5% of 1,476 approvals during the year of 1993. The total investment demand from 99 companies represents 1.0% of the past 10 years and 6.7% in 1993.

Chapter 7 Conceptual Development of IMT

7.1 Basic Concept for the Development of IMT

The IMT development follows the basic concept of the Master Plan Study and also incorporates the results of this feasibility study and the Investment Demand Survey explained in the previous chapter. The development concept for the IMT is described as follows.

1. The site for the IMT is the same as that mentioned in the Master Plan Study.
2. In terms of land-use, the total area will be divided into industrial zone and urban zone.
3. High-growth industries such as electronics, etc., will be the main target industries for the IMT. Also, supporting industries for these high-growth industries mainly in the manufacturing and distribution activities will be targeted.
4. The industries which are conducive to the characteristics of the IMT site such as availability of raw materials, marketability of products in the National Capital Region, transportation, potential for inducing industrial growth etc., will be considered when selecting the industries for the IMT. Also, full consideration shall be given to intentions of the potential industries (as described in the previous chapter on Investment Demand Survey) and local demands of the Haryana State.
5. Large to medium scale industries including multinational and foreign companies will be the target industries for the IMT. Small scale local industries will not be considered for the IMT.
6. Industries such as coastal industries which require large amount of water and electricity per industrial unit will not be eligible for entrance to IMT.
7. The basic facilities and services required by the potential industries in the IMT, for manufacturing, transportation and usage of their products, will be located within the IMT after taking into consideration the facilities and services available in the surrounding area.
8. Basic infrastructure such as main roads, water supply etc. will be developed in the first stage of development. Further facilities will be developed in a phased manner according to the actual requirements and the growth in the number of industries in the IMT.

Also, the type of potential industries and their scale as described in the Master Plan Study will be reviewed.

7.2 Selection of Suitable Industries for IMT

The selection of suitable industries for the IMT will be based on the overall evaluation of the results of (i) analysis of suitability of industries and, (ii) Investment Demand Survey, as shown in Fig 7.1. Since there are numerous types of industries, the candidate industries for the IMT are first short-listed. From these candidate industries, industries suitable for the IMT are selected as follows.

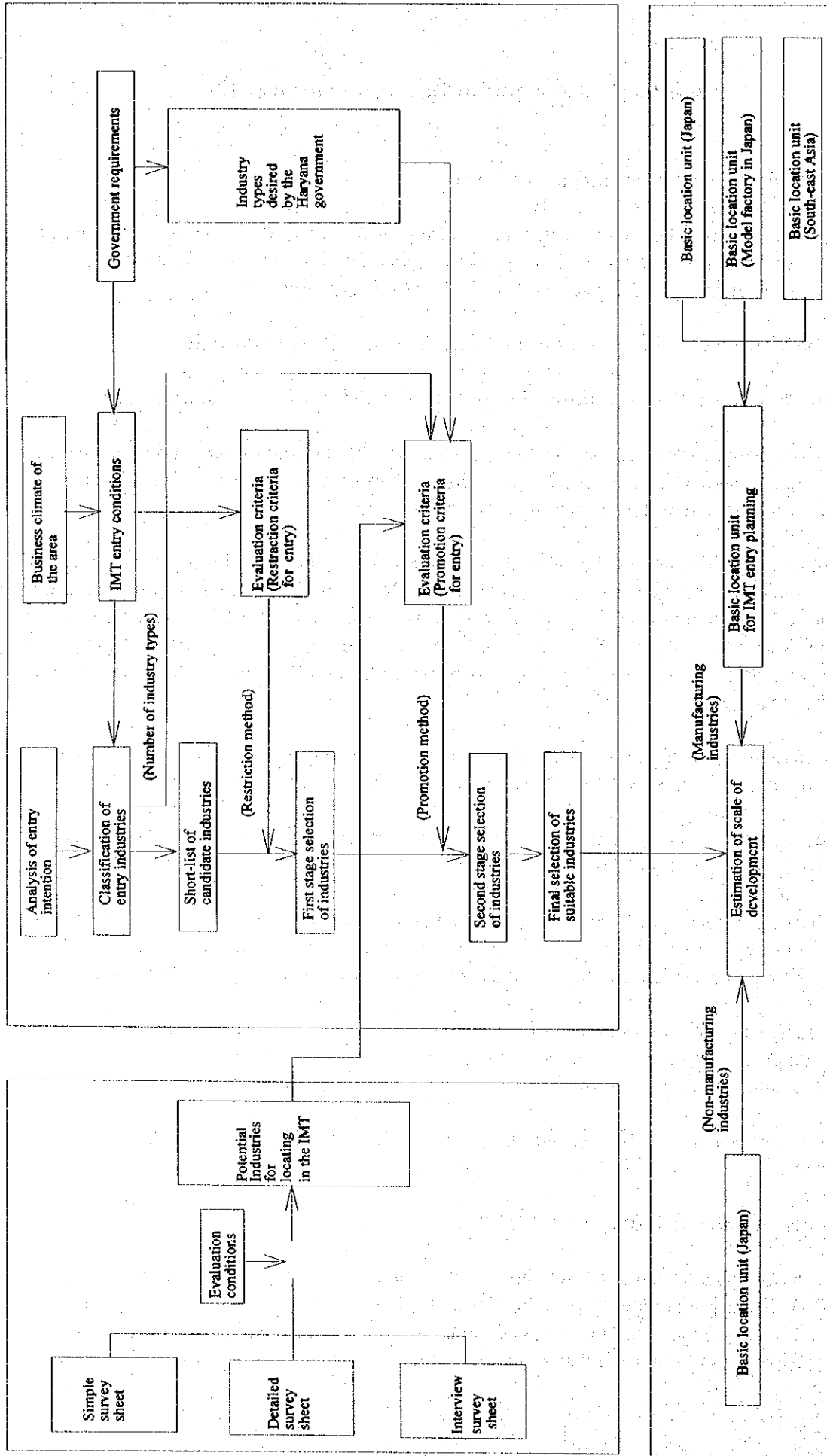
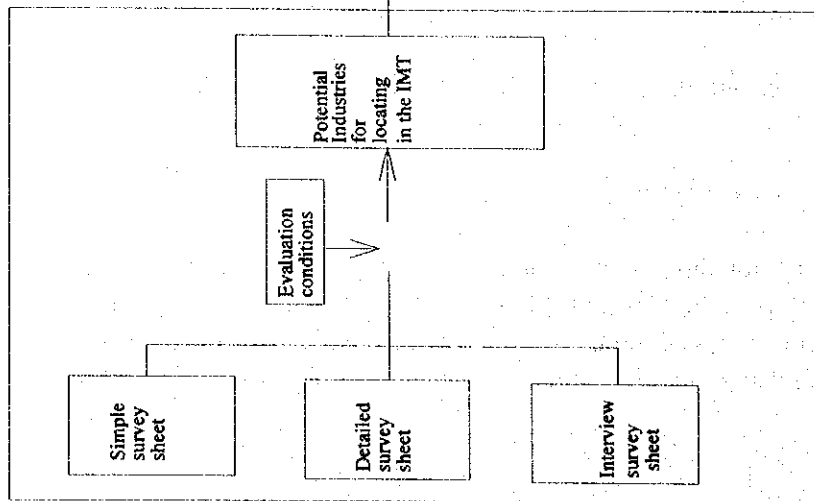


Fig. 7.1 : Flow chart for selection of suitable industries for the IMT and scale of development

7.2.1 Scale of Development

In this section, the total scale of development of the IMT is estimated in order to allocate the selected industries in the IMT. The items to be estimated are the infrastructural requirements such as total area, water supply, electric power, inflow and outflow freight volume, number of employees and fuel requirements. These items are necessary to determine the scale of the development of IMT which will be necessary for allocating the selected industries in the IMT. These industries were selected from the candidate industries by the three-stage evaluation method.

The basic requirements for the above items (such as area, electric power, water supply etc.) per industrial unit (termed here as basic location unit) will depend on various factors such as the characteristics of the IMT site, available and planned infrastructure facilities in and around the IMT and the management strategy of the industries in the IMT.

Since this feasibility study refers to the planning stage of the IMT, the basic location unit was determined by adapting the available data from existing industrial estates as follows.

- (1) For large scale and core industries, the internationally used basic location unit will be applied for IMT.
- (2) For other type of industries, the basic location unit, as used in Japan and South Asian countries will be applied.

The total requirements for the IMT, and thus the scale of the development of the IMT is shown in Table 7.2. As shown in the Table 7.2, the number of industries is 112, the area required is 267 hectares, water supply at 32,870 cubic meter per day, electricity at 77,320 kW, inflow freight volume at about 2.23 million tonnes per year and the outflow freight volume at about 2.24 million tonnes per year, number of employees at 28,890 and the fuel at 516,810 million kcal per year.

In the Master Plan Study, the area for industrial-use was estimated at about 288 hectares, and after including roads, green belt and other public facilities, the total industrial area in the IMT was about 400 hectares.

From the results of the Investment Demand Survey as described in Chapter 6, the total area for industrial-use was estimated to be around 329 hectares. Since this area is greater than 267 hectares as estimated in this study, the area for public facilities will be reduced by 30 to 40 % so that the total industrial area in the IMT can be adjusted to 400 hectares.

Table 7.1 : Summary of the Total Scale of the IMT

Selected Industries for the IMT	Number of In- dustries	Total Area (ha)	Water Supply (m ³ /day)	Electric Power Supply (kw)	Cargo Volume (10 ³ tons/year)		Number of Employees (persons)	Fuel Consump- tion (10 ⁶ kcal)
					Inflow	Outflow		
Food, Beverage	5	17	3,570	3,430	85.5	112.5	790	65,450
Textile, Apparel	5	11	920	3,930	14	14	1,960	9,760
Lumber, Furniture	1	4	220	700	20	18	260	4,070
Paper	4	7	1,820	2,100	83	69	520	23,840
Publishing, Print.	2	2	700	400	86	102	1,710	4,660
Chemical	3	13	1,770	5,000	92	69	530	56,490
Petroleum	1	2	130	2,000	68	64	60	11,110
Plastic	4	15	2,600	4,600	108	98	620	52,780
Rubber	3	5	1,480	3,000	11	9.5	1,030	11,890
Leather	3	2	60	350	2	2	360	860
Ceramic	2	5	840	4,200	53	41	250	77,090
Iron, Steel	3	14	650	3,600	13	10	340	48,260
Non-ferrous Metals	2	9	1,100	3,500	16	14.5	750	14,290
Fabricated Metal	5	15	1,680	5,300	39	33.5	1,280	15,190
General machinery	6	22	1,810	6,640	32	27	1,890	11,160
Electrical mach.	8	34	7,300	13,400	34	32	8,430	24,620
Transportation eq.	2	30	2,630	5,400	23	21	3,200	62,070
Precision instrum.	5	13	900	3,250	6	6	1,870	10,310
Manufacturing total	64	220	30,180	70,800	785.5	743	25,850	503,860
Warehouse estate	10	25	300	1,000	480	500	1,000	4,630
Energy distribut.	2	10	100	2,000	880	900	200	1,850
Cleaning factory	2	2	1,400	770	10	12	100	3,700
Mart place	20	4	360	1,000	70	80	1,000	740
Car repair factory	4	4	160	960	3	3	240	740
Soft ware park	10	2	430	790	2	2	500	1,290
Non-Manufacturing tot.	48	47	2,690	6,520	1,445	1,497	3,040	12,950
Grand-Total	112	267	32,870	77,320	2,230.5	2,240	28,890	516,810

7.3 Planning of Housing and Urban Facilities

7.3.1 Type of Housing and Urban Facilities

(1) Housing Facilities

The housing facilities are planned for both the employees of the industries located in the IMT as well as persons engaged in commercial and service activities in the IMT. The housing is divided into 3 types, high density housing, medium density housing and low density housing. These facilities are planned for both the single employees and employees with families. Separate facilities are planned for executives, middle & senior level employees, junior employees and servants.

(a) High Density Housing

In the high density housing area, two type of housing facilities are planned; one for the junior employees and the other for servants. There are two types of housing facilities for the junior employees, housing for single employees and housing for employees with families. Housing for families is planned as per the standards used in the high density areas of the new housing estates being constructed in Gurgaon.

(b) Medium Density Housing

In the medium density housing area, housing facilities are planned for middle & senior-level employees, supervisors and foremen.

(c) Low Density Housing

In the low density housing area, housing facilities (including club and guest houses) are planned for the executives of large and multinational companies having companies/ factories in the IMT. The land required for these facilities will be sold to these companies and the facilities will be constructed by the companies themselves.

Table 7.2 : Type of Housing Facilities in IMT

1. High Density Housing	
Junior Employees	Two types of housing facilities for junior employees - single type / family type
Servants	Housing facilities for servants
2. Medium Density Housing	Housing facilities for middle & senior level employees, supervisors and foremen
3. Low Density Housing	Housing facilities (including club and guest houses) for the executives of large and multinational companies

(2) Urban and Business-Related Facilities

The urban and business-related facilities which are planned in the IMT, can be broadly grouped into three categories; urban facilities for the IMT, business support facilities for the promotion of business and industries, and office facilities for companies as mentioned below.

Urban Facilities

1. Town Center
2. Community Center
3. Health Care Center
4. Shopping Center
5. Restaurant Building
6. Shopping Mall
7. School
8. Police and Fire Station

Business Support Facilities

1. Promotion Center
2. Training Center
3. Seminar House

Office Facilities

1. Office Building

(a) Urban Facilities

(i) Town Center

The Town Center will provide facilities such as post office, bank and public and governmental agencies including the single-window services of Haryana and Central government.

(ii) Community Center

The Community Center will provide several type of facilities for the residents of IMT such as cultural facilities, facilities of interchange, communication and meeting places, clinic etc.

(iii) Health Care Center

The Health Care Center will provide medical and sports facilities for health care of the residents in IMT.

(iv) Shopping Center

Shopping Center is planned as the main commercial facility in the IMT. General household items and daily use materials and foods (including imported items for foreign residents) will be sold in this shopping center.

(v) Restaurant Building

This building is planned to contain high class restaurants and bars which will serve both Indian and continental foods.

(vi) Shopping Mall

The Shopping Mall is planned for shops and small stores, fast food restaurants, amusement facilities and others.

(vii) School

This school is provided for the children of the residents in IMT and will be planned as an international school to attract multinational companies to the IMT.

(viii) Police and Fire Station

A police and fire station are planned in the IMT for the safety and security of the IMT residents and work force.

(b) Business Support Facilities

(i) Promotion Center

The Promotion Center will be the core facility to promote the industrial activity in the IMT. The promotional functions were also mentioned in the Master Plan Study and are as follows.

1. Investment Promotion
2. Management Services
3. Technical Service Assistance
4. Manpower Development
5. Information Services Coordination
6. Civil and Public Coordination Services

Since the Training Center and the Seminar House will have the manpower development function, the Promotion Center has the remaining 5 functions i.e. investment promotion, management services, technical service assistance, information services coordination, civil and public coordination services.

(ii) Training Center

The Training Center will provide high-level manpower required by the industries in the IMT. The industries in the IMT will have the priority to employ the persons who complete the training course of the center.

(iii) Seminar House

The Seminar House is provided for the industries in the IMT to hold meetings, give training to employees and interact with research organizations and other companies.

(c) Office Facilities

Office facilities will be provided for the software and electronics industry, administrative departments of companies that have factories in the IMT and to support the commercial and service functions in the IMT.

Table 7.3 : Sizes of Housing and Urban Facilities (ha)

Type of Housing and Urban Facilities		Total floor area (ha)	Total built-up area (ha)	Total ground area (ha)
Housing	High density Single	10.0	3.0	12.5
	Family	60.0	6.0	36.0
	(Total)	70.0	9.0	48.5
	Medium density	18.8	6.5	39.0
	Low density	-		20.0
	Servants	3.6	1.0	4.0
	(Total)	92.4	16.5	111.5
Urban Facilities	1. Town Center	2.0	0.5	2.0
	2. Community Center	0.4	0.3	3.0
	3. Health Care Center	0.6	0.5	5.0
	4. Shopping Center	2.8	1.4	5.0
	5. Restaurant Build.	0.7	0.4	1.6
	6. Shopping Mall	4.8	2.4	7.2
	7. School	1.8	1.0	7.0
	8. Police Stn., Fire Stn.	0.2	0.1	0.6
	(Total)	13.3	6.6	31.4
Business Support Facilities	1. Promotion Center	2.0	0.5	2.0
	2. Training Center	0.9	0.3	3.0
	3. Seminar House	0.6	0.2	2.0
	(Total)	3.5	1.0	7.0
Office Buildings		6.8	1.2	4.8
Traffic	1. Bus Terminal			(0.1)
	2. Heliport			1.1
	(Total)			1.1
Utility				13.3
(Total)				169.1

7.4 Development Methodology for the IMT

The successful implementation of the IMT project would require the involvement of different types of implementing agencies and the coordination of these agencies with the funding agencies. In this section, alternative scenarios for the development of the IMT are examined and are discussed as follows.

7.4.1 Characteristics of the IMT Project

The IMT will consist of various kinds of infrastructure and urban facilities, some of which could be expected to be self-sustainable or even profitable. However, in total these infrastructure and urban facilities would require a huge investment. Therefore it is considered necessary to study the existing implementing agencies which are normally responsible for developing infrastructure and urban facilities, and to formulate an efficient development methodology for the IMT. Accordingly, the possibilities available for developing each of the facilities in the IMT are studied from two perspectives, the "Potential Implementing Agencies" and the "Potential Funding Agencies".

(1) IMT facilities

The IMT facilities can be broadly grouped into two types, the infrastructure facilities and the urban facilities (Refer Fig. 7.2). Infrastructure facilities consist of roads, water supply, electric supply, etc. and urban facilities consist of housing, shopping center, promotion center etc. Some of the infrastructure facilities are located within the IMT and others outside the IMT because of the necessary connection to the existing infrastructure in the surrounding area. In addition, some infrastructure facilities can be expected to provide a return on their investment through the sale of land or service charges from users. The urban facilities consists of public facilities (with little or no return on investment) such as servant housing, town center, community center, etc., and commercial facilities (with return on investment) such as offices, restaurants, shopping center etc.

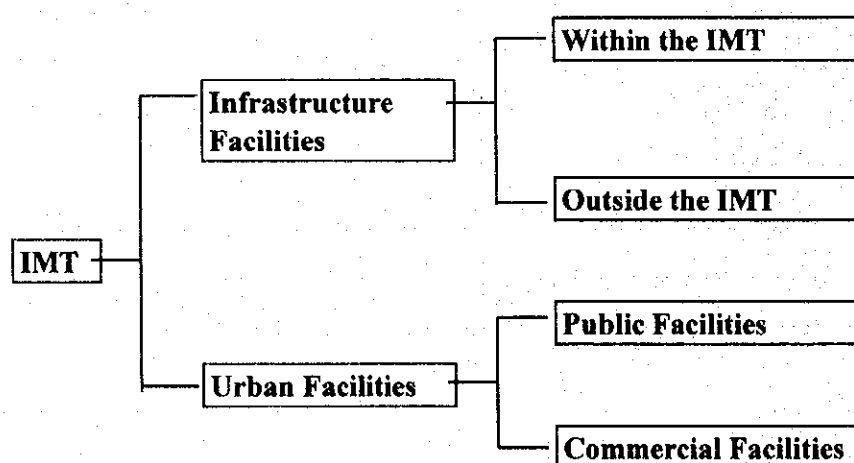


Fig 7.2 : Grouping of IMT Facilities

(2) Evaluation Method

Various factors such as type and nature of the IMT facilities, prospects of return on investment, the existing implementing agencies and possibility of establishing new implementing agencies, availability of financial resources etc. need to be taken into consideration for formulating an appropriate development methodology for the IMT. Based on the above mentioned factors, several alternative scenarios were formulated for the development of the IMT. A three-step evaluation method is used for formulating and evaluating the alternative scenarios for the development of the IMT.

(a) Primary evaluation : Formulation of alternative scenarios

In the primary evaluation, each IMT facility (both, infrastructure and urban facilities) is evaluated using two criteria; the prospect for return on investment and possible implementing agencies. Based on the results of the primary evaluation, alternative scenarios for development of the IMT are formulated.

(b) Secondary evaluation : Evaluation of alternative scenarios

In the secondary evaluation, the alternative scenarios which were formulated in the primary evaluation are further examined for their advantages and disadvantages. The availability of financial resources is also considered in the examination of the alternative scenarios.

(c) Tertiary Evaluation : Evaluation from the demand side

The subject of the primary and secondary evaluation is studying the development methodology from the view point of implementing agency of each facility of IMT. However, in the tertiary evaluation, implementing agency is studied from the view point of demand from foreign investors.

7.4.2 Primary Evaluation : Formulation of alternative scenarios

In the primary evaluation , the infrastructure and urban facilities have been classified as follows.

- Group "A" -- Development by public sector
- Group "B" -- Development by public, private or third sector
- Group "C" -- Development by private sector

As per the above grouping, the characteristic of Group A is that the infrastructure facilities are outside the IMT and the urban facilities are mainly public facilities with no possibility of return on the investment. Urban facilities of Group C are expected to make profit and private sector can positively develop these facilities. However, the facilities of Group B could be developed by any development method. Therefore by adding and combining typical development methods of Group B facilities with Group A and Group C facilities, a range of alternative development scenarios can be formulated. As a result, six typical cases for development are formulated.

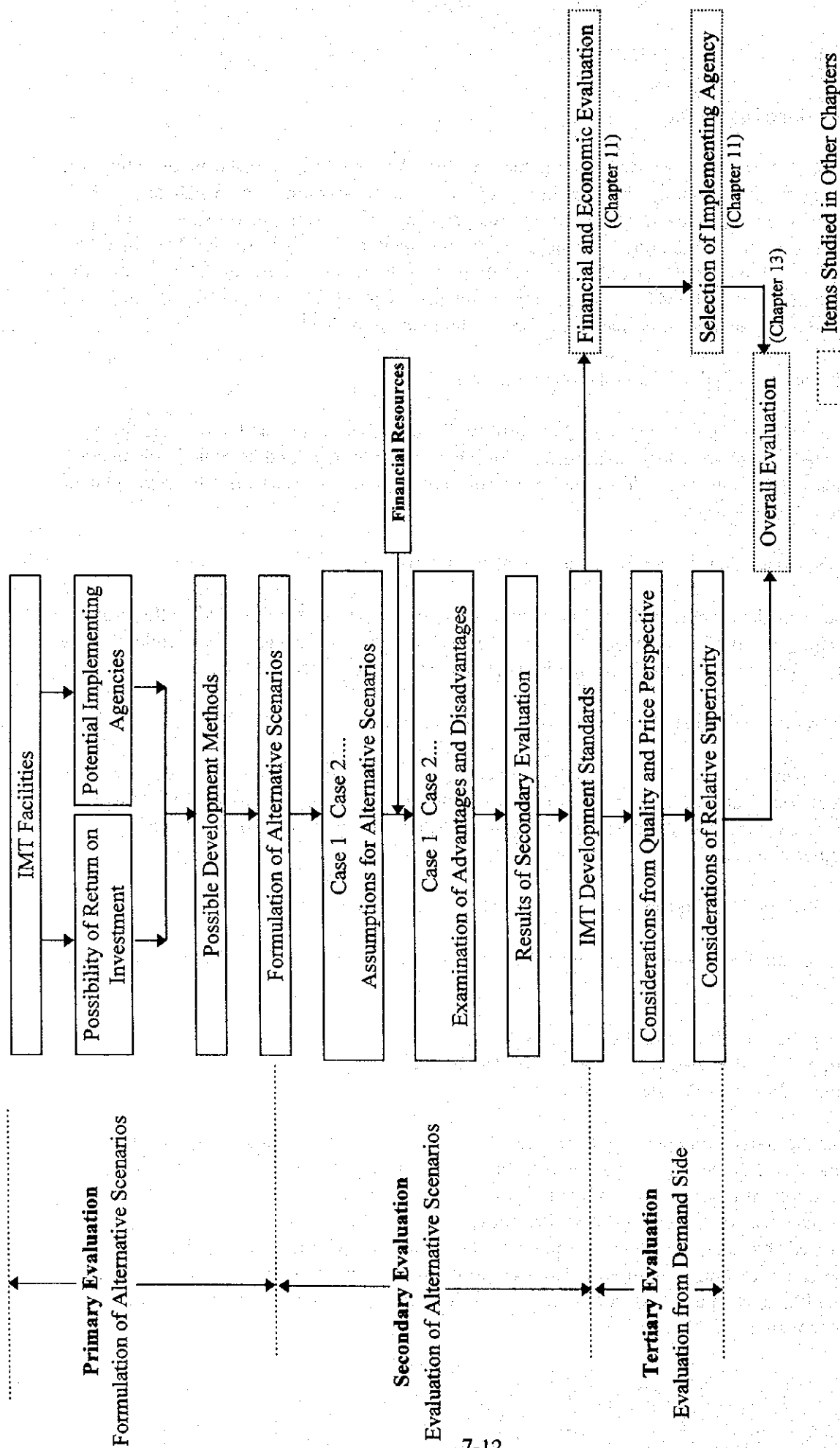


Fig 7.3 : Evaluation Method for Formulation and Evaluation of Alternative Scenarios

For Case 1 to Case 3, development of site preparation and infrastructure will be mainly done by the public sector whereas for Case 4 to case 6, this development will be mainly done by the private sector.

Land acquisition should be carried out by the state government so it is added to Group A. The Groups and Cases are summarised in the following Table.

		Development Scenario					
IMT Facilities		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Group A	Land Acquisition	Haryana State					
	Infrastructure Facilities outside the IMT ⁽¹⁾	Haryana State					
	Part ⁽²⁾ of Urban & Housing Facilities						
Group B	Site preparation and other Infrastructure ⁽³⁾						
	Promotion Center	Haryana State	Third Sector		Private Sector		
	Solid Waste Collection						
	Power Plant	Haryana State		Third Sector	Haryana State	Third Sector	Private Sector
	Housing	Haryana State			Private Sector		
Group C	Shopping Center and others ⁽⁴⁾	Private Sector					

Note

- (1) Flyover on NH No. 8, Water Treatment and Supply to IMT, Discharge of Storm Water and Sewage, Fuel Pipeline to IMT, Telecommunication Facilities, Solid Waste Disposal
- (2) Servant Housing, Town Center, Community Center, Schools, Police and Fire Station, Training Center, Seminar House
- (3) Roads in IMT, Parks and Green Belt, Water Pumping & Distribution Facilities, Collection of Storm Water, Sewage Treatment Facilities, Solid Waste Collection
- (4) Shopping Center, Restaurant Building, Shopping Mall, Health Care Center, Office Building

7.4.3 Secondary Evaluation : Evaluation of alternative scenarios

(1) Methodology for Secondary Evaluation

The six alternative scenarios (Cases 1 to 6) which were formulated in the primary evaluation, are further examined for their advantages and disadvantages as follows.

Establishment of the IMT would require "land acquisition", followed by "Establishment of an implementing agency", "Construction" and "Operation". However, the implementation must be supported by firm financial resources. Furthermore, good borrowing conditions will be favorable for implementation of the IMT. Therefore, the secondary evaluation is studied from viewpoint of impact on business activity and investment cost subject to borrowing conditions. Evaluation items for each of the six Cases are set as follows.

Impact on business activity

- a) Would it be possible for each development scenario to establish the required implementing agency(s) in accordance with the development schedule? -- preparation of establishment
- b) Would the development scenario affect the options available for financing (funding) the IMT? -- financial considerations
- c) How would each development scenario be likely to affect the ability to successfully promote the IMT and attract companies to invest? -- business activities
- d) What effect would the development scenario have on the ability to achieve a uniform and international level of development within the IMT? Development of all components of the IMT should be to uniform high standards in terms of architecture, materials, etc. -- harmonization/uniformity.

Impact on investment cost

- e) Are any of the six development scenarios likely to provide access to more favourable borrowing conditions? -- borrowing conditions
- f) Does the type of business entity (public or private) provide any opportunity or possibility of reducing the investment cost? -- characteristics of business entity
- g) Do any of the six scenarios provide the opportunity or possibility of an earlier recovery of investment cost? -- cost recovery

(2) Results of Secondary Evaluation

The secondary evaluation has examined the relative advantages using Case 1 as the base case. However, because this project comprises a variety of aspects, it is difficult to draw conclusions regarding the superiority or inferiority of one case relative to others. Notwithstanding such difficulties, the conclusions of the comparative evaluation of the different cases are expressed in general terms below.

Case 1 contemplates the state government itself using public funds borrowed from foreign sources to develop the project in the same manner it has heretofore carried out such projects. However, interest on the borrowed funds may result in relatively expensive development costs. Nonetheless, the state government acting as developer would enable

public facilities to be developed together with the industrial park.

In Cases 2 and 3 most development would be carried out by the third sector which would also include private foreign companies. Because this approach would allow the utilization of low-cost private funds from foreign sources, it has advantages with respect to development costs.

In Cases 4 through 6 most development would be carried out by private developers. Whereas this approach would result in advantageous development costs due to the low-interest private financing that could be obtained from abroad, it raises questions regarding integrated development due to its inability to provide for public facilities and infrastructure outside of IMT.

With respect to the implementing agency for this project : (1) It is desirable for the state government to be the main implementing agency in order to ensure that development is integrated with the public facilities in Group A. (2) Due to favorable borrowing conditions, development by private companies from abroad is assumed to be the most advantageous approach in terms of development costs. Development-cost savings can also be anticipated from the efficient execution of the project, including such aspects as the activities to attract foreign companies to locate in the IMT.

7.4.4 Tertiary Evaluation : Evaluation from the Demand Side

Because the nature of the project is such that it is affected to a great extent by factors on the demand side, we will conduct from the perspective of product quality and price an evaluation that considers investment-related aspects, particularly the conditions for seeking foreign investment.

(1) IMT's Development Standards

IMT's role and development standards were confirmed by the Master Plan Study.

(a) Background of the IMT Project

At the 18th joint meeting of the Japan India Research Committee, held in India in March 1989, the establishment of industrial parks with infrastructure that meets international standards was proposed by the Japanese delegation as a strategy to stimulate foreign investment.

(b) IMT's Objectives

Pursuant to the findings of the Master Plan Study, the objectives of IMT were formulated as (1) promoting the expansion of domestic industry (i.e. strengthening and fostering industries to respond to domestic demand) as a measure to invigorate the Indian economy; and (2) promoting the development of local industries to provide an impetus for foreign investment and technology transfer.

(c) Standards for the Development of Infrastructure

Because a country's infrastructure standards (which ensure quality) are a major factor for investors considering investing in a country, it was decided to develop IMT's infrastructure in conformance with international standards as an enticement for both foreign and domestic firms to locate within IMT. Consequently, the question of whether a high-quality industrial park with infrastructure that conforms to international standards can be offered at a price that can compete with the industrial parks in the environs of Delhi and in other Asian countries becomes a major issue. Expressed differently, it is a question of whether it is possible to create an industrial park that can secure a relative advantage in terms of both quality and price.

(2) Considering Matters From the Perspective of Quality and Price

We will examine from the perspective of foreign investors IMT's relative advantage in terms of the quality and price that IMT is seeking to realize. In addition to a stable supply of power, water and other utilities and services to the companies located within IMT, the product quality (the standards by which infrastructure and services are established) that will be demanded of IMT by companies also includes (1) development integrated with public facilities and infrastructure outside of IMT, (2) provision of various business support services to the occupant companies, and (3) cost performance deriving from operating efficiency.

With respect to price, sales prices will be inexpensive by virtue of the advantageous combination of the characteristics of the configuration of the implementing agency that develops the project and financing conditions.

Table 7.4 shows the various combinations of implementing agency and financing sources. However, due to the state government's policy of aiming to bring this project to fruition through the utilization of as much capital from abroad as possible, we will limit this comparison to scenarios in which the financing is obtained from abroad. We will also take into consideration the fact that due to circumstances in India, interest rates on public funds borrowed from abroad through India's central government are higher than those on funds borrowed from private foreign financial institutions. As shown in Table 7.4, pairing the different variables results in six scenarios, which are numbered one through six.

Table 7.4 : Combinations of Implementing Agencies and Sources of Funds

Source of funds	Implementing Agency		
	State Government	Third Sector	Private Sector
Public funds from abroad	①	②	③
Private funds from abroad	④	⑤	⑥

Of these scenarios, the ones whose financing conditions give rise to an advantage in terms of pricing are the ones in the bottom row, which are premised upon the borrowing of private funds from abroad. Hence, we will hereupon comparatively examine scenarios ④, ⑤, and ⑥ with respect to product quality.

Scenario ④, in which the state government is paired as the developer with private funds from abroad, has advantages that derive from the state government being the implementing agency : development that is integrated with both infrastructure outside of IMT and public facilities will be able to be realized; and a variety of business support services will be able to be provided to the occupant companies. However, this scenario has drawbacks in terms of cost performance related to operating efficiency.

Scenario ⑥, in which a private-sector developer is paired with private funds from abroad, has advantages in terms of cost performance deriving from the operating efficiency that would result the developer being a private implementing agency. However, this scenario has drawbacks in terms of its ability both to integrate development with infrastructure outside of IMT and public facilities, and to provide various business support services to occupant companies.

Due to the fact that the developer in scenario ⑤, a pairing of a public/private joint venture as developer with private funds from abroad, is a joint venture between the state government and private companies from abroad, we can say that this approach is able to capitalize upon the advantages of scenarios ④ and ⑥ while compensating for their drawbacks. The results of the above evaluation are organized in the table below.

Table 7.5 : Results of the Evaluation Conducted from the Perspective of Product Quality

Product-quality evaluation criteria	State Government	Third Sector	Private Sector
Development integrated with infrastructure outside of IMT and public facilities	○	○	□
Provision of various business support services to occupant companies	○	○	□
Cost performance deriving from operating efficiency	□	○	○

Note : ○: Can be expected; □: Difficult to realize/cannot be expected

(3) Consideration of Relative Superiority

Based on the results of the secondary evaluation, development by a private-sector developer tended to be rated as superior to the other alternatives due to cost considerations deriving from the potential to obtain low-interest financing and efficiency considerations related to such aspects of the project as activities to attract companies to locate in the industrial park. However, the results of the tertiary evaluation indicate that from the perspective of product quality, participation by the state government is desirable. We will now examine the relative advantages of scenario ⑤, in which a public/private joint venture would develop the project using private financing obtained from abroad.

By adopting the approach of developing the project through a public/private joint venture, it is possible to maintain the following relative advantages:

- If HSIDC participates, it will be easy to ensure unity of the project, because the state government would develop the related Group-A infrastructure outside of IMT and a portion of the urban facilities.
- Because HSIDC can acquire land at below-market prices, it will also be possible to keep subdivision prices low.
- Private companies from abroad participating in the joint venture will contribute their know-how to the project, thus enabling the pursuit of project efficiency.
- Due to the experience and capabilities of the private companies from abroad participating in the project, both the establishment of infrastructure conforming to international standards and the vigorous progress of activities to attract companies to locate in IMT can be anticipated.
- HSIDC's previous development experience can also be fully utilized in this project.

That is to say, with respect to Group-B's site preparation and infrastructure development, the option-formation development scenario of either Case 2 or 3 would be adopted. By so doing, it will be possible for the state government to utilize the financial and technological capabilities of private companies from abroad to the maximum extent possible.

Chapter 8 Conceptual Design of the IMT

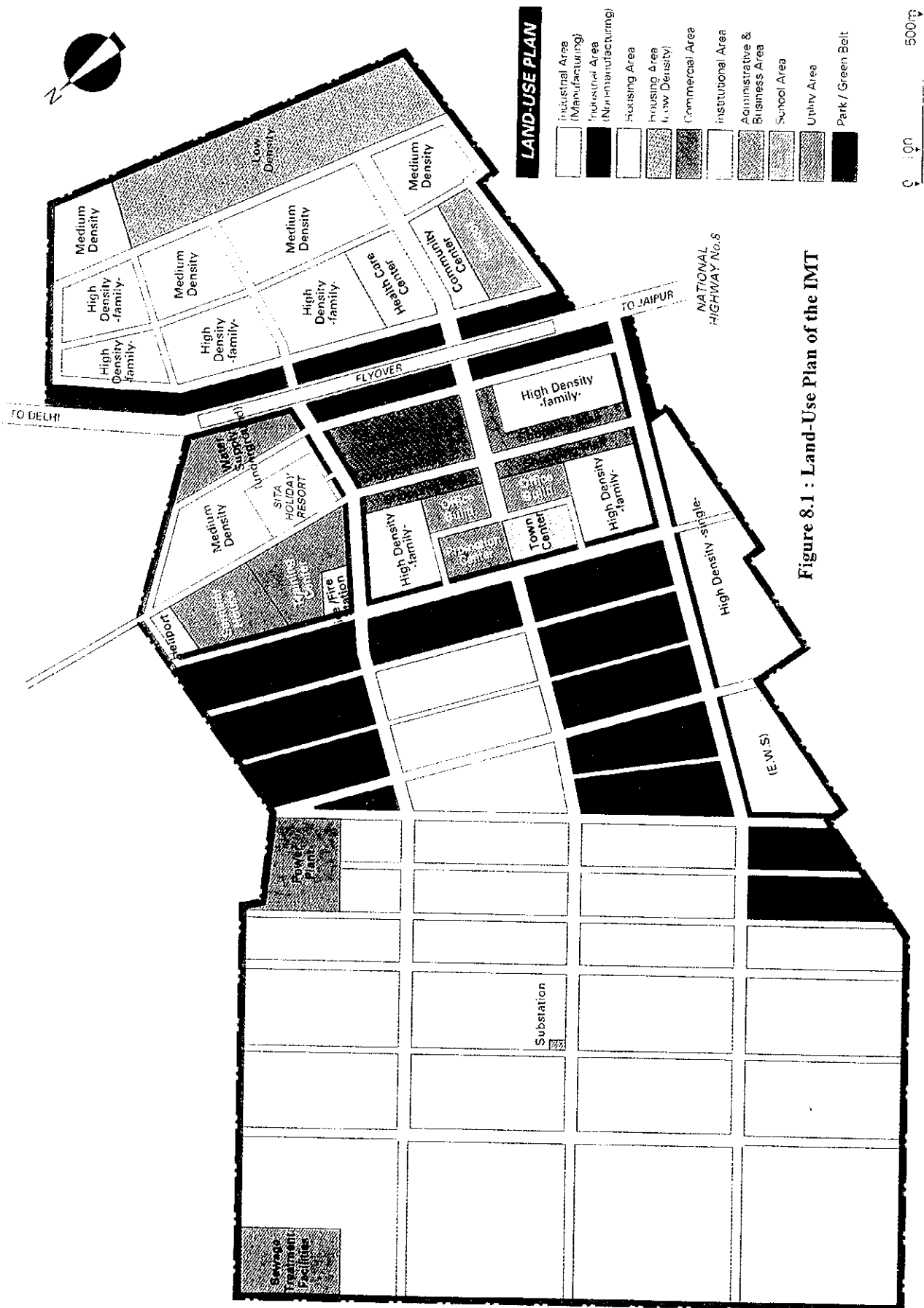
8.1 Land Use

8.1.1 Zoning Concept

- The IMT is made up of an industrial zone and urban zone. The total area is 600 ha, of which 400 ha is used for the industrial zone and 200 ha for the urban zone. National Highway 8 (NH-8) will run through the IMT, with 100 ha of the IMT on the east side and 500 ha on the west side of NH-8.
- Based on the above, the zoning of the IMT will be as follows for the reasons given below: 400 ha in the western side will be secured as the industrial zone, and 100 ha to the west of NH-8 and 100 ha to the east of NH-8 will be used as the urban zone.
 - 1 The industrial zone and urban zone will be clearly divided.
 - 2 The industrial zone will be a continuous zone.
 - 3 Considerations will be made so that the industrial zone can be expanded in the future.

8.1.2 Land Usage and Layout of Facilities

The layout of facilities is considered based on the above philosophy and the results of Chapter 7. The proposed land use is shown in Figure 8.1.



8.1.3 Site Preparation Plan

Site preparation is analyzed using the layout plan of the IMT.

(1) Matters to be considered for site preparation

Following items should be considered for site preparation plan (level establishment).

- Balance of cut and fill
- Attention to stormwater drainage
- Connection to NH - 8

(a) Balance of cut and fill

Balance of cut and fill shall reflect the soil volume of not only bulk cut and fill but also surplus soils caused by excavation of underground utilities duct, drainage system, etc., and embankment for bunds along the site boundaries.

(b) Stormwater drainage

The natural ground surface at the site has a gentle slope from the south-east to the north-west. Therefore, the site shall be graded with slopes to allow gravity flow in all of the drainage system within the site and also on the discharge route from the retention pond. The site grading levels shall also be planned to avoid inundation from outside stormwater.

(c) Connection to NH - 8

The site grading levels shall be schemed considering the road connections with National Highway (NH - 8).

(2) Standard profile of site grading

(a) Site grading level establishment

Housing, commercial and industrial lot levels are planned to be higher than surrounding road level by at least 300 mm.

(b) Embankment (Bund, Mound) plan

(i) Outer Bund

Bund and open drain will be provided along the site boundaries to cut off the view from outside, to obstruct the inflow of external rainwater and to restrict the trespass of strangers and animals (cows, etc.).

(ii) Inner mound

The inner mound around community center, etc., will be provided for the purpose of landscaping, privacy, etc.

8.2 Roads and Traffic Planning

National Highway NH-8 is on one of the 9 major transport corridors out of Delhi. It passes through the IMT site and will be the main transportation link for access to the IMT for residents and workers, and also for the flow of goods into and out of the IMT. It is therefore extremely important to the viability of the IMT that NH-8 is maintained in good condition and that appropriate improvements are carried out as the volume of traffic increases. It is equally important that adequate vehicular access is provided between the IMT and NH-8, while maintaining at the same time sufficient capacity for through traffic on NH-8. These aspects have been considered in detail as described below.

8.2.1 Traffic Generated by the IMT

In order to recommend traffic access between the IMT and NH-8, the amount of traffic generated by the IMT has been estimated. No data was available on traffic generation and attraction rates for developments in India similar to the proposed IMT. Trip generation and attraction of the IMT have therefore been estimated from first principles according to the number of workers, the number of residents, the area of commercial and service facilities, and the tonnage of material to be trucked into and out of the site.

8.2.2 Access to the IMT from NH-8

Concept layouts for each of the three junctions on NH-8 have been developed taking into consideration the road plan of the IMT and the traffic volumes estimated above for the year 2010. Proposed details of the three junctions are shown in Figure 8.2.

8.2.3 IMT Road Layout

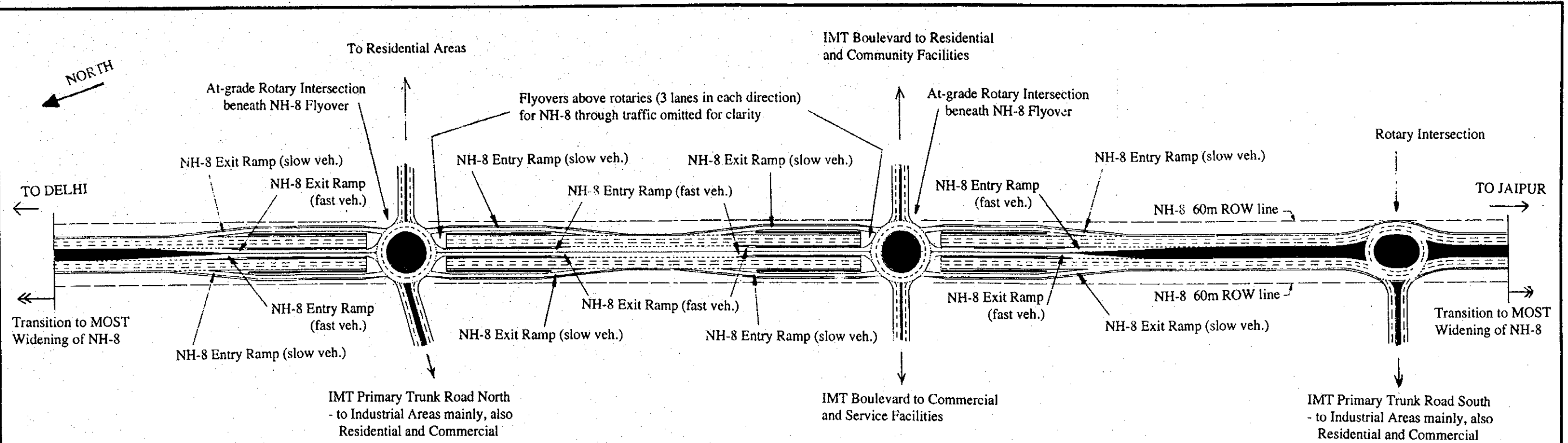
The proposed road layout for the IMT is shown in Figure 8.3. The layout is based on the concept described in Chapter 8.1. There are five classes of roads shown in the Road Plan and typical cross-sections for each class of road are shown in Figure 8.4. The proposals have been developed taking into consideration the function and hierarchy of each type of road, the expected traffic volumes, and expected usage by cyclists and pedestrians.

The road carrying the heaviest volume of traffic is the main U-shaped primary trunk road (ROW width = 38m) which will carry most traffic entering and leaving the industrial area of the IMT. This road connects at each end to the National Highway NH-8 and a divided carriageway with a 5m wide median is proposed. The median will improve the safety for vehicles and pedestrians, and is also wide enough to allow right turn lanes to be constructed clear of the through lanes.

Footpaths and cycle paths have also been proposed as shown on the typical cross-sections to encourage walking and cycling as safe and convenient modes of transport within the IMT.

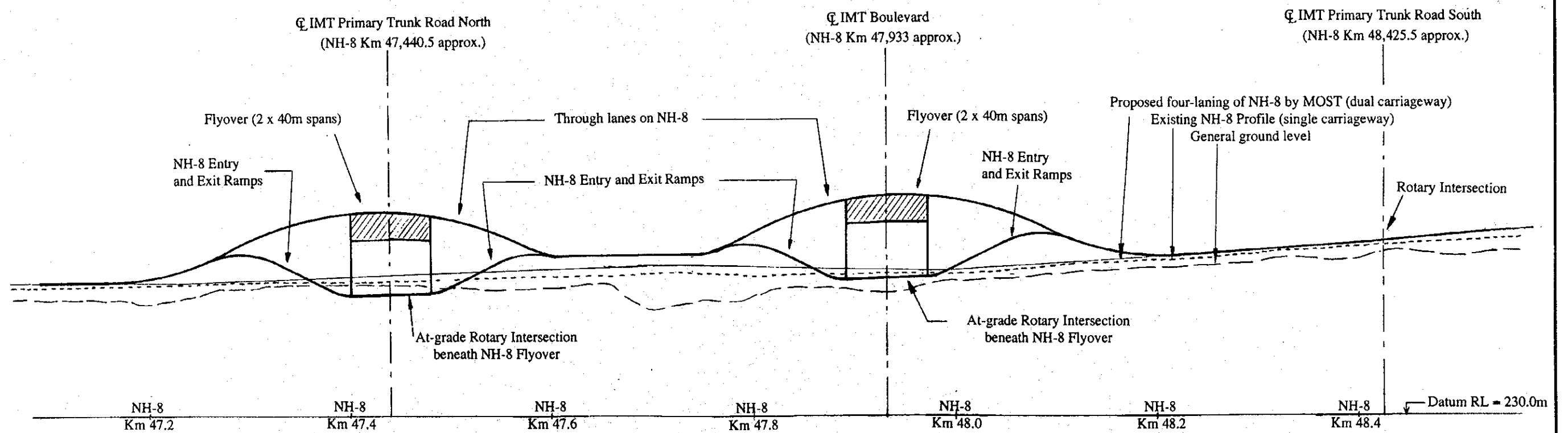
Preliminary calculations show that the internal intersections within the IMT will have sufficient capacity without traffic signals. Priority control will apply, with the major (wider) road having priority in each case.





Plan of NH-8 showing IMT Access Junctions

Scale = 1:4,000



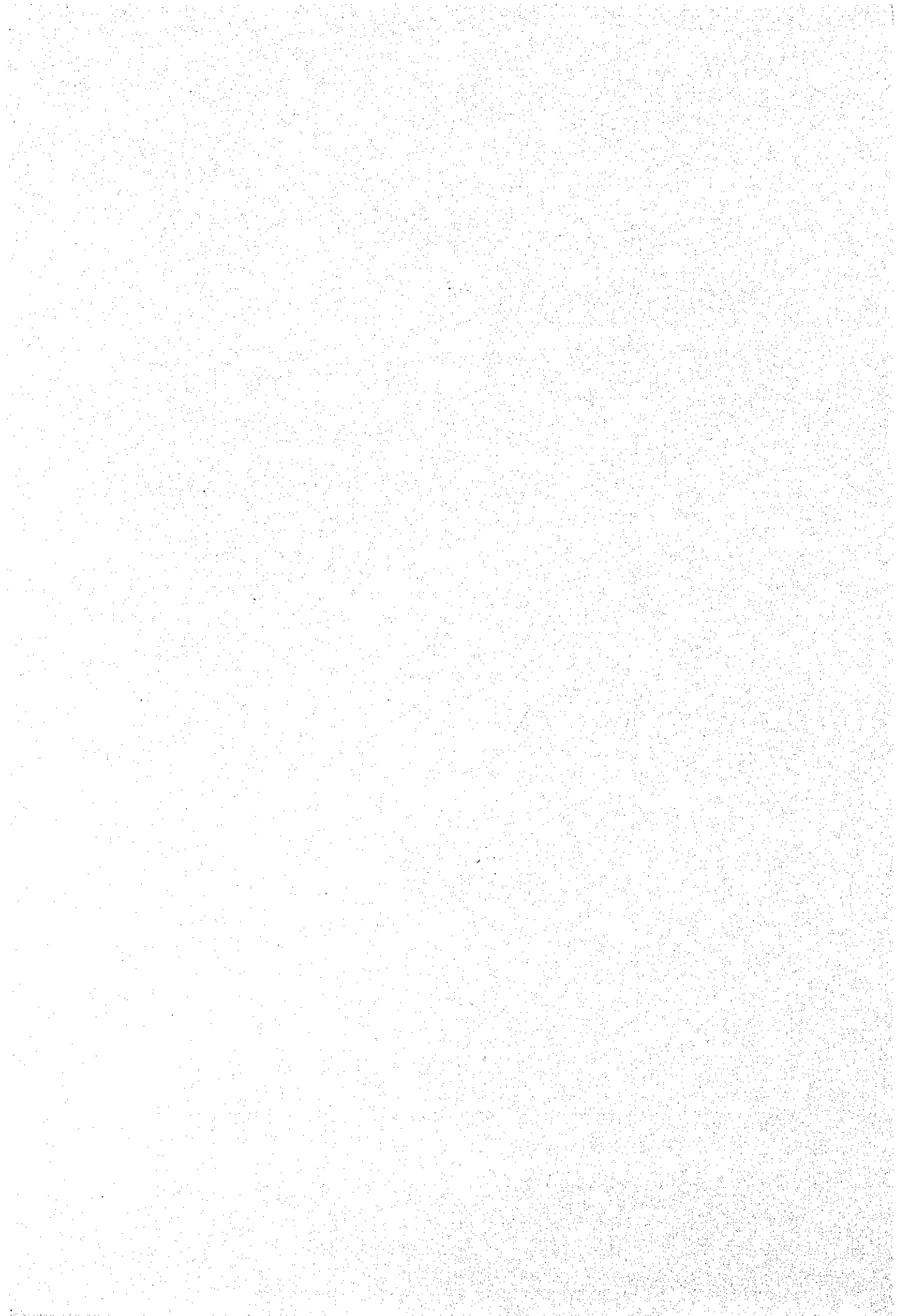
Profile of NH-8 Through IMT Access Junctions

Horizontal Scale = 1:4,000, Vertical Scale = 1:400

THE FEASIBILITY STUDY ON THE
INDUSTRIAL MODEL TOWN IN INDIA (IMT)

Figure 8.2 - Layout of IMT Access Junctions

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



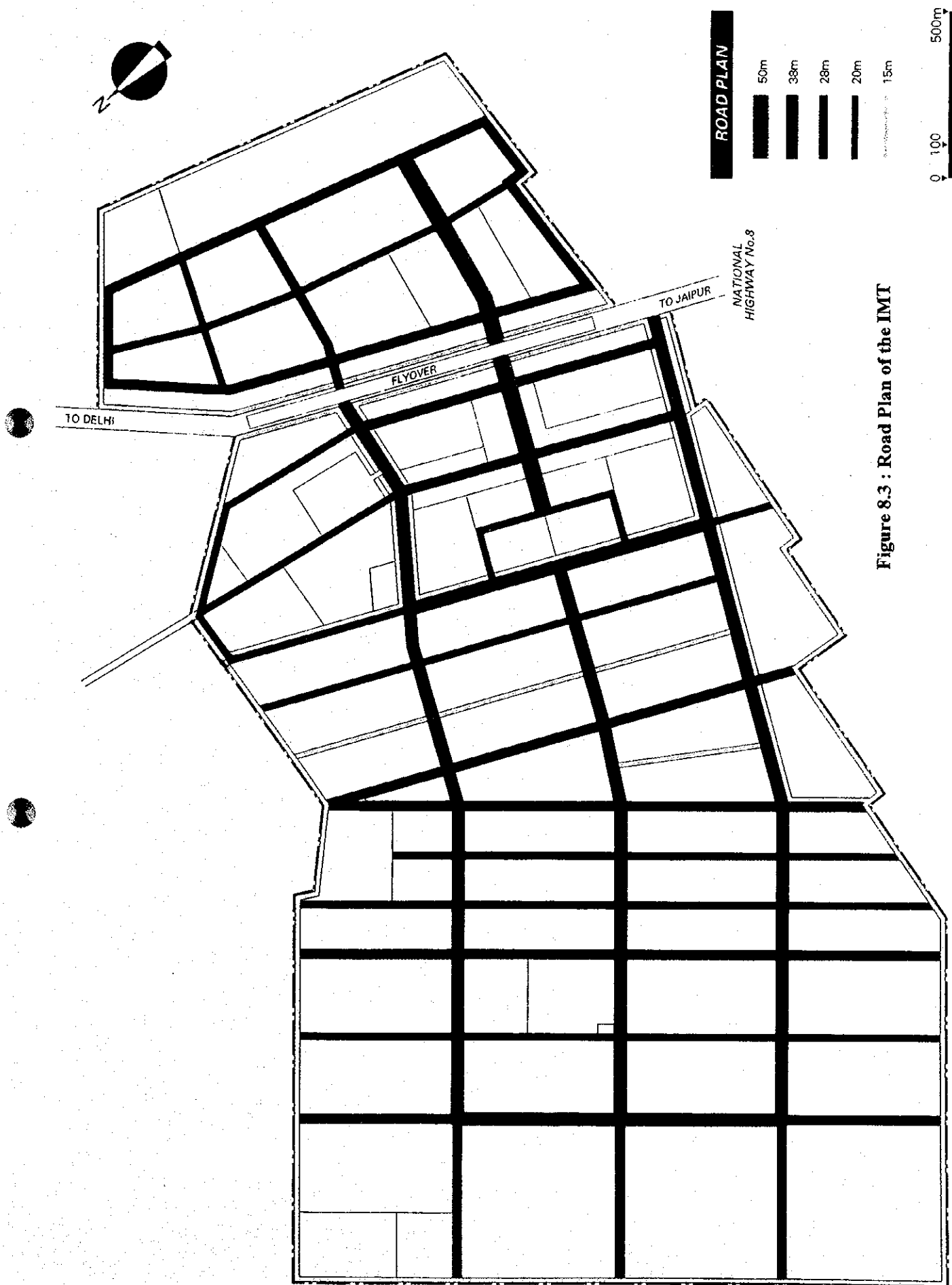
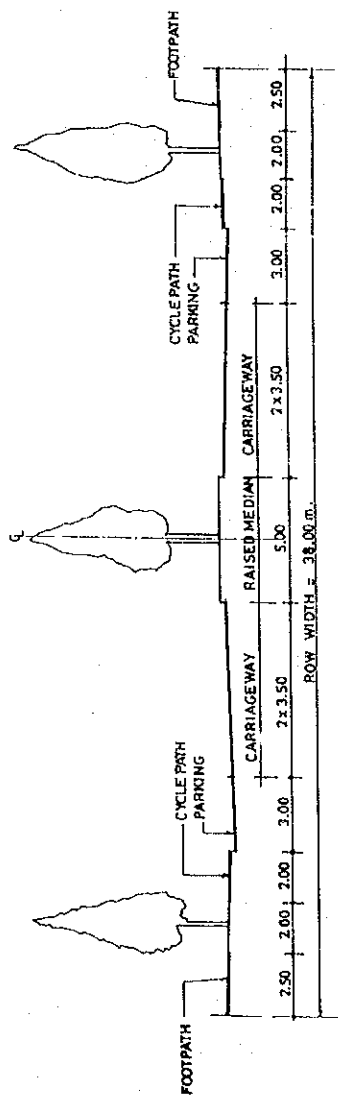
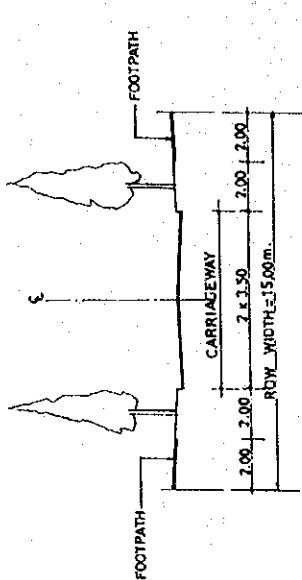


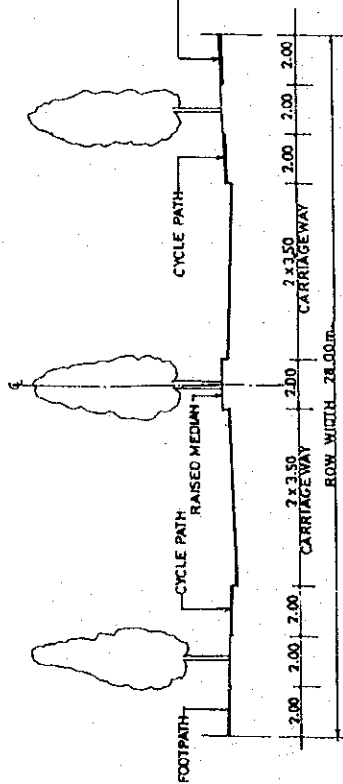
Figure 8.3 : Road Plan of the IMT



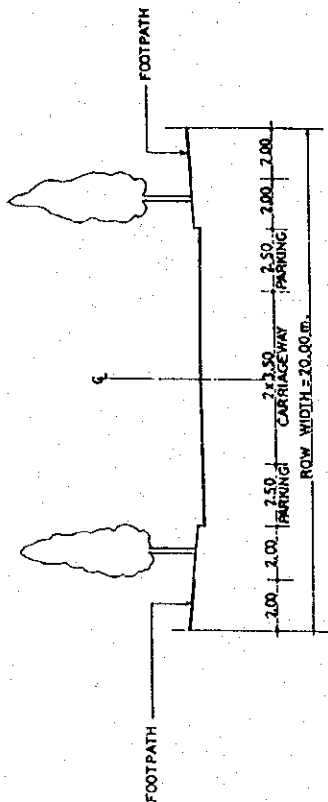
CLASS-1 ROAD



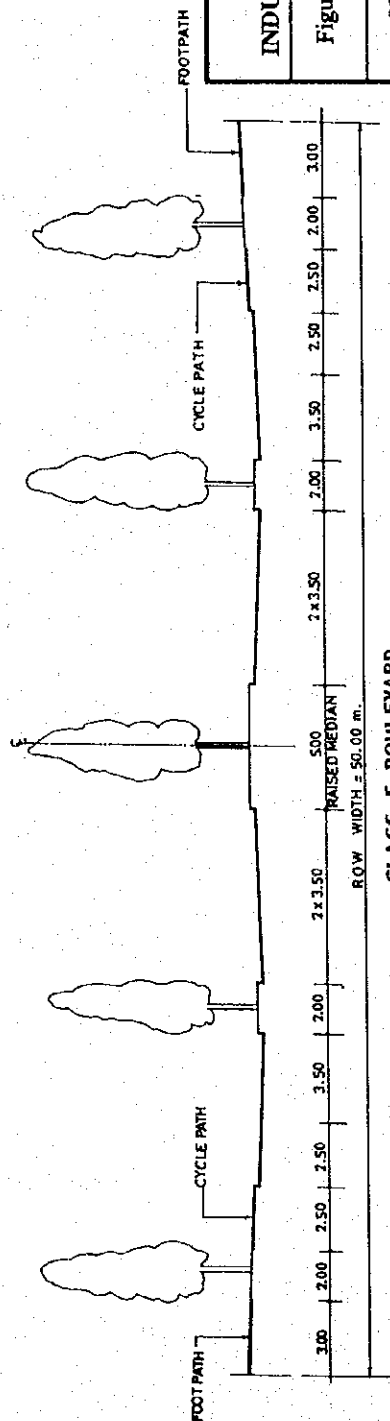
CLASS-4 ROAD



CLASS-2 ROAD



CLASS-3 ROAD



CLASS-5 BOULEVARD

THE FEASIBILITY STUDY ON THE INDUSTRIAL MODEL TOWN IN INDIA (IMT)

Figure 8.4 : IMT Roads - Typical Cross-Sections

SCALE 0m 1 2 3 4 5 6 7 8 9 10m

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

8.2.4 Provisions for Public Transport

The main form of public transport providing access to and from the IMT site will be buses which will access the site from national highway NH-8. For public transport within the IMT site, a system of smaller buses circulating within the IMT is proposed. A bus transfer station is proposed at a central location in the commercial area and all buses travelling to/from the IMT site will discharge/collect passengers at this transfer station. Passengers will transfer at the bus station to/from smaller buses which will circulate at frequent intervals within the various zones of the IMT.

During the meeting held with the Steering Committee on 26 August 1994 it was noted that the Ministry of Railways has a proposal for the development of a mass rapid transit system between Delhi and Manesar. No details of this proposal are known and no specific allowance has been made for a mass transit system in developing the layout of the IMT. Further information is requested if some provision for a future mass transit system should be incorporated in the IMT layout.

8.3 Water Supply

The conceptual design of the water supply system in the IMT is described as follows:

8.3.1 Design Philosophy of Water Supply System

(1) Utilization of potable water for industrial water

The IMT is a model town, for which in some cases, it is advisable to apply standards of the developed countries. The standard of industrial water for Japan is one of such standards that would be applicable for the IMT.

(2) Water consumption

With development of this district, it is expected that they will have a rapid increase in population and industrial development. Water supply to the district of Gurgaon has been planned to cover the demand by these developments. The water purification facilities are to be constructed in three phases, and a purification capacity of 90,000 m³/Day (Daily mean water consumption) will be added in each phase.

The water purification plant of 90,000 m³/Day, which will be constructed at the 2nd phase, will supply water to the IMT at a rate of about 40,000 m³/Day (Daily mean water consumption).

(3) Water supply system

The presently planned reservoir capacity is justified reasonably, which consists of two basins of 175,000 m³ each, which is equivalent to the reservoir capacity based on four day's purification capacity of 90,000 m³/Day (Daily mean water consumption).