Chapter 7
Feasibility Study on Industrial Area

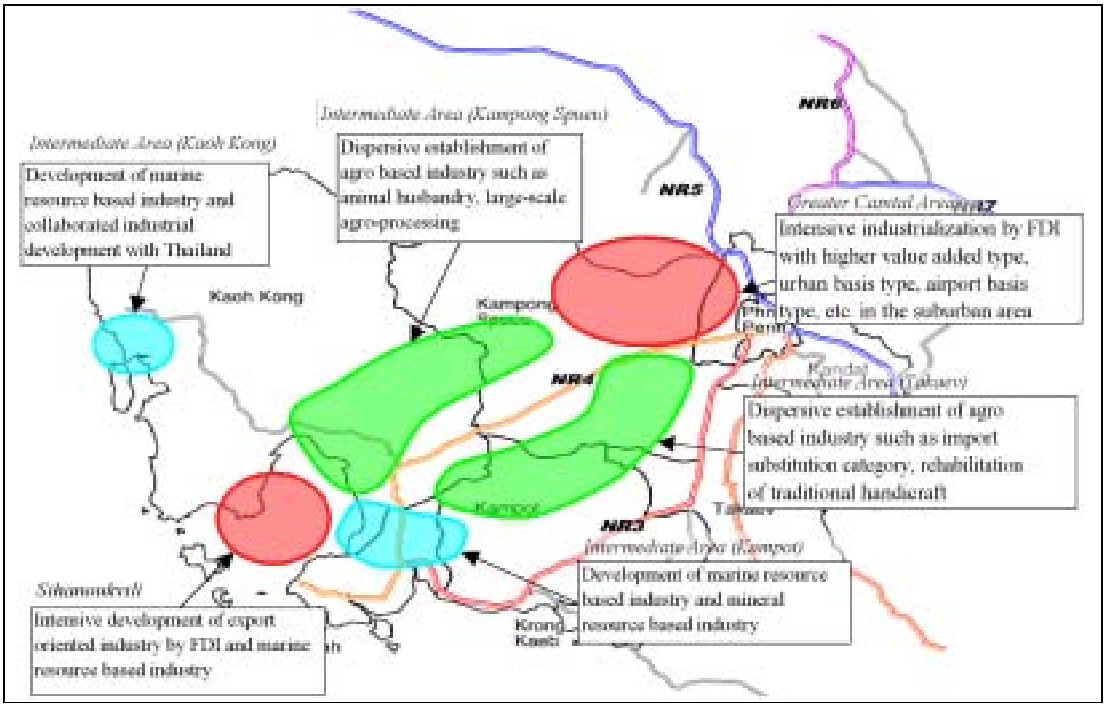
CHAPTER 7 FEASIBILITY STUDY OF INDUSTRIAL AREAS

7.1 DEVELOPMENT PLAN OF INDUSTRIAL AREAS IN STUDY AREA

7.1.1 Distribution Plan of Industrial Areas in the Study Area

This Section discusses the basic concepts for the development of industrial areas in the Phnom Penh-Sihanoukville Growth Corridor area.

In accordance with the strategy for secondary industry presented in **Section 5.4.2** and summarized in the conceptual figure below, two industrial cores are proposed for development in Phnom Penh and Sihanoukville. The core in Sihanoukville will mostly accommodate export processing oriented industries and marine resource based industries, while the other in the suburbs of Phnom Penh will house higher value-added industries pertinent to air transport and urban supply.



Source: JST

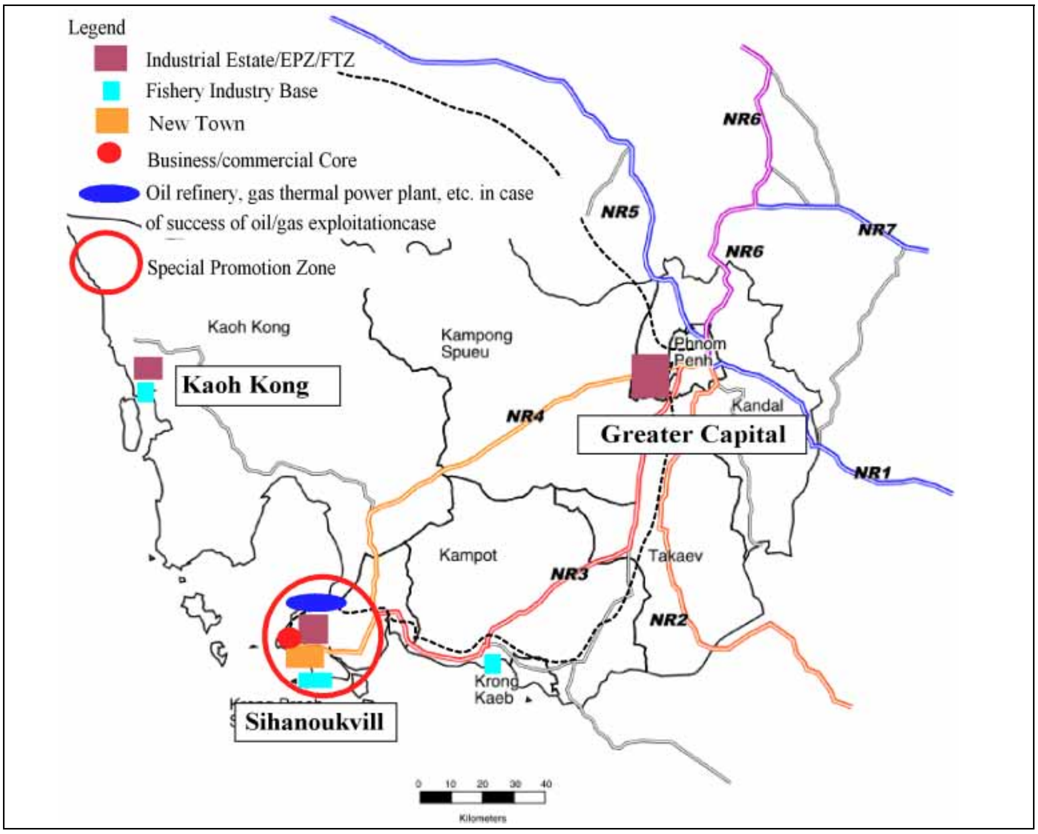
Figure 7.1-1 Summarized Concept of Industrial Area Development by Region

The Kaoh Kong EPZ, which had been planned under the joint development study with Cambodia and Thailand on the western boarder area in Kaoh Kong Province, will be a typical border area EPZ. This project will be coordinated with the proposed projects of PNP-SNV Growth Corridor.

Although the possibility of success appears high for the oil/gas exploitation in Siam Bay, development of an oil refinery is treated as provisional in this Study due to the uncertainty.

The industrial development utilizing the marine resources in the intermediate area is a tactical target. For this, the project for developing a fishery industry base with fishery processing estates is taken into consideration in the intermediate area.

The concept for the distribution of industrial areas in the Growth Corridor area is schematically illustrated in **Figure 7.1-2**.



Source: JST

Figure 7.1-2 Schematic Distribution Concept of Industrial Areas in the Study Area

7.1.2 Demand Projection of Industrial Development in the Study Area

(1) Projection of Industrial Land Demand

The area necessary for industrial land use was projected based on the planning framework discussed in Section 5.2 for the number employed by category of industry projected with an assumed unit number of employees per industrial land area. Two alternative scenarios were considered; a high growth case with intensive industrial development and a low growth case with stagnant garment industry as shown in **Figure 7.1-3**. For the former alternative, the present growth trend is assumed to continue, whilst for the latter demand for the garment/apparel industry is assumed to be constant. As a result approximately 2,500 ha for the high growth alternative and 2,100 ha for the low growth alternative were deemed to be necessary in 2015 in the Study Area.

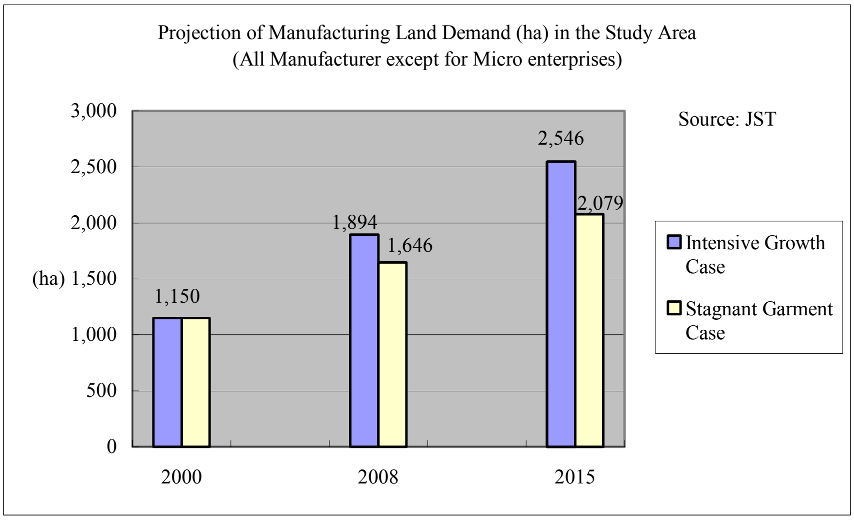


Figure 7.1-3 Projected Alternatives of Manufacturing Land Demand in the Study Area (cumulative increment)

Figure 7.1-4 shows the results of regional industrial area demand of the high growth alternative. The demand for the greater capital area (Phnom Penh and Kandal) will be the largest with 1,900 ha or the three quarters of the total demand. A demand for 370 ha or one fifth for the total demand is projected for the Sihanoukville area.

In the greater capital area, the garment industry will remain as a major industry, while new industries including the food industry with the marine food industry, metal and machinery and light industry such as sports products in Sihanoukville and agro-industry in the intermediate area will increase as shown in **Figure 7.1-5**. Details are explained in the **Figures 7.1-6** and **7**.

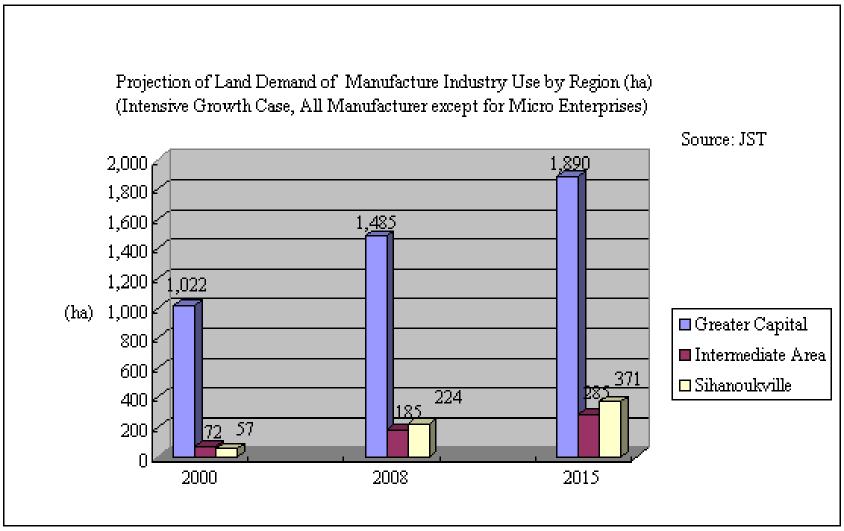
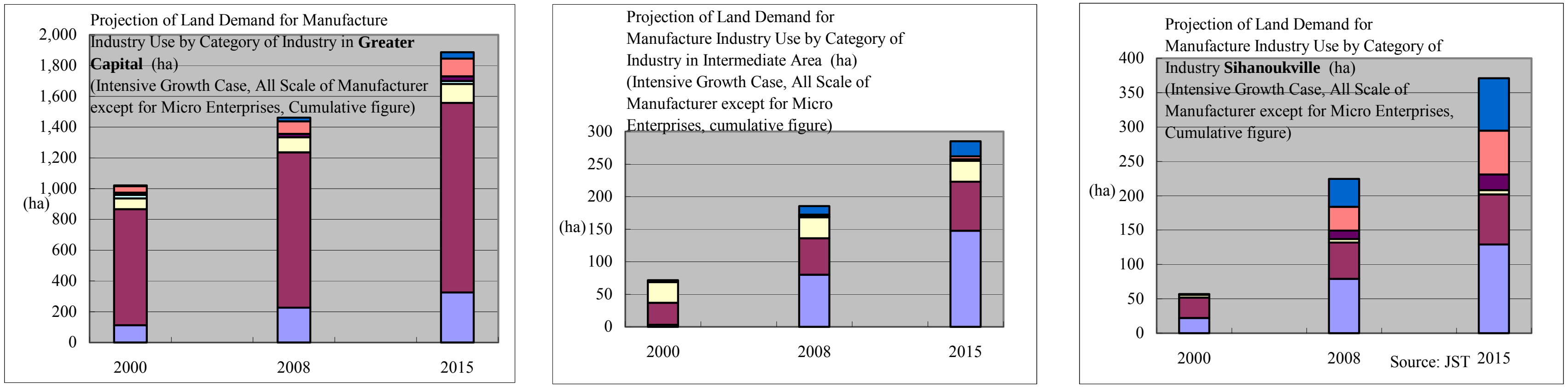


Figure 7.1-4 Projected Alternatives of Manufacturing Land Demand by Region Intensive Growth

Intensive Growth Case



Stagnant Garment Case

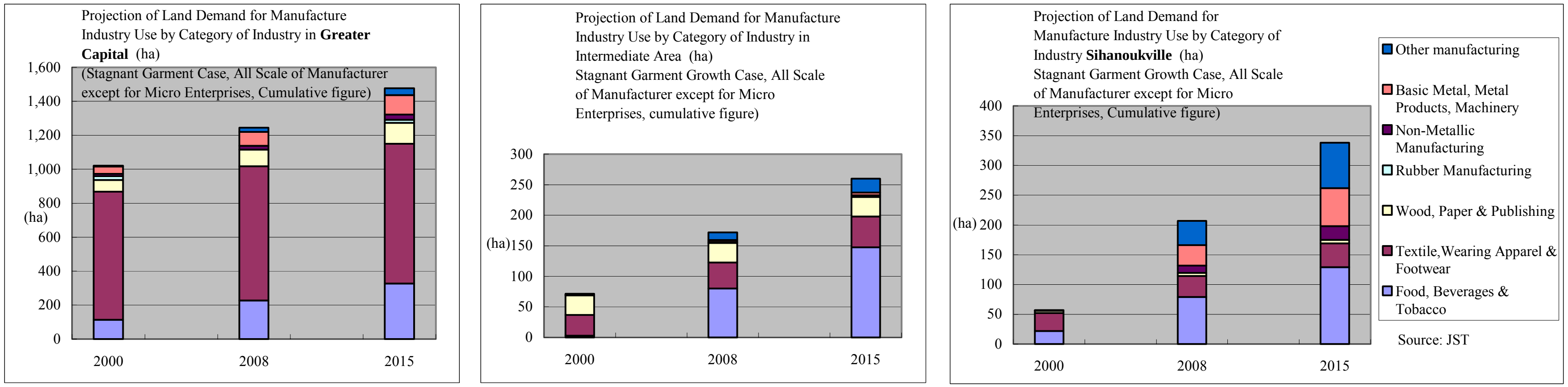


Figure 7.1-5 Projection of Land Demand for Manufacture Industry by Category of Industry and Region

Employment at Workplace 2015-Intensive growth (persons)

	Study Area	Greater Capital	Intermediate Area	Sihanouk Ville
Manufacturing total	504.7	359.2	88.6	56.9
Food, Beverages & Tobacco	122.4	65.3	44.2	12.9
Textile,Wearing Apparel & Footwear	292.5	247.7	30.3	14.6
Textile,Wearing Apparel & Footwear (	240.1	225.5	0.8	13.7
Textile,Wearing Apparel & Footwear (	52.4	22.1	29.4	0.9
Wood, Paper & Publishing	8.0	6.1	1.6	0.3
Rubber Manufacturing	2.5	2.1	0.1	0.3
Non-Metallic Manufacturing	10.9	5.1	2.5	3.3
Basic Metal, Metal Products, Machinery	24.2	12.8	2.3	9.1
Other manufacturing	44.1	20.0	7.7	16.4

unit land area per employee by category of industry

Manufacturing Land Area in 2015 -All Enterprises- Intensive Growth (ha)

	Study Area	Greater Capital	Intermediate Area	Sihanouk Ville
Manufacturing	3,357	2,347	566	444
Food, Beverages & Tobacco	1,077	653	295	129
Textile,Wearing Apparel & Footwear	1,462	1,238	151	73
Wood, Paper & Publishing	161	123	32	6
Rubber Manufacturing	25	21	1	3
Non-Metallic Manufacturing	97	51	13	33
Basic Metal, Metal Products, Machinery	242	128	23	91
Other manufacturing	293	133	51	109

Percentage of micro factory by category of industry

Large/Medium/Small Manufacturing Land Area in 2015 - Intensive Growth (ha)

	Study Area	Greater Capital	Intermediate Area	Sihanouk Ville
Manufacturing	2,546	1,890	285	371
Food, Beverages & Tobacco	603	327	148	129
Textile,Wearing Apparel & Footwear	1,380	1,232	76	73
Wood, Paper & Publishing	161	123	32	6
Rubber Manufacturing	23	23	0	0
Non-Metallic Manufacturing	56	31	3	23
Basic Metal, Metal Products, Machinery	184	115	5	64
Other manufacturing	139	40	23	76

Source: JST estimate

Figure 7.1-6 Projection Method of Manufacturing Land Demand (Intensive Case)

Employment at Workplace 2015-Stagnant Garment Growth (persons)

	Study Area	Greater Capital	Intermediate Area	Sihanouk Ville
Manufacturing total	405.7	276.8	78.5	50.3
Food, Beverages & Tobacco	122.4	65.3	44.2	12.9
Textile,Wearing Apparel & Footwear	193.5	165.3	20.2	8.0
Textile,Wearing Apparel & Footwear (	158.5	150.5	0.6	7.4
Textile,Wearing Apparel & Footwear (	35.0	14.8	19.6	0.6
Wood, Paper & Publishing	8.0	6.1	1.6	0.3
Rubber Manufacturing	2.5	2.1	0.1	0.3
Non-Metallic Manufacturing	10.9	5.1	2.5	3.3
Basic Metal, Metal Products, Machinery	24.2	12.8	2.3	9.1
Other manufacturing	44.1	20.0	7.7	16.4

unit land area per employee by category of industry

Manufacturing Land Area 2015 - Stagnant Garment Growth (ha)

	Study Area	Greater Capital	Intermediate Area	Sihanouk Ville
Manufacturing	2,863	1,936	516	411
Food, Beverages & Tobacco	1,077	653	295	129
Textile,Wearing Apparel & Footwear	968	827	101	40
Wood, Paper & Publishing	161	123	32	6
Rubber Manufacturing	25	21	1	3
Non-Metallic Manufacturing	97	51	13	33
Basic Metal, Metal Products, Machinery	242	128	23	91
Other manufacturing	293	133	51	109

Percentage of micro factory by category of industry

Large/Medium/Small Manufacturing Land Area 2015 - Stagnant Garment Growth (ha)

	Study Area	Greater Capital	Intermediate Area	Sihanouk Ville
Manufacturing	2,079	1,481	260	338
Food, Beverages & Tobacco	603	327	148	129
Textile,Wearing Apparel & Footwear	913	823	51	40
Wood, Paper & Publishing	161	123	32	6
Rubber Manufacturing	23	23	0	0
Non-Metallic Manufacturing	56	31	3	23
Basic Metal, Metal Products, Machinery	184	115	5	64
Other manufacturing	139	40	23	76

Source: JST estimate

Figure 7.1-7 Projection Method of Manufacturing Land Demand (Stagnant Garment Case)

(2) Development Demand of the Industrial Areas

The demand for the development of industrial area is estimated on the basis of the increment of required industrial land use, which covers the necessary land development for large/medium/small manufacturers excluding micro manufacturers, which are normally self-employed and would not require industrial estates.

The result of the estimate is shown below.

Table 7.1-1 Increase of Demand for Land in the Industrial Area (Large/Medium/Small Manufacturer except for Micro Enterprises)

(unit: ha)

Category of Industry	2008			2015		
	Greater Capital	Intermediate Area	Sihanoukville	Greater Capital	Intermediate Area	Sihanoukville
Intensive Growth Case	463	114	168	868	214	314
Stagnant Garment Case	245	101	150	459	189	281

Source: JST

Assuming that 80 % of the increase in demand for land in the industrial area will be for the establishment of industrial areas both in the Greater Capital and Sihanoukville and 50 % in the intermediate area, the necessary area for development of the industrial area by two alternative scenarios can be estimated as shown below.[1]

Table 7.1-2 Projection of Development Demand of Industrial area (Intensive Growth Case)

(unit: ha)

Item	2000-2008			2000-2015		
	Greater Capital	Intermediate Area	Sihanoukville	Greater Capital	Intermediate Area	Sihanoukville
Industrial Estate (EPZ/FTZ/GIE)	347	70	**130**	695	131	259
Area of Individual Factory	116	44	38	174	83	55
Total	463	114	168	869	214	314

Note: GIE (General Industrial Estate), EPZ(Export Processing Zone), FTZ(Free Trade Zone)
Source: JST

[1] One third of the food industry is assumed to become established in the fishery processing estate in the Sihanoukville and intermediate area.

Table 7.1-3 Projection of Development Demand of Industrial area (Stagnant Garment Case)

(unit: ha)

Item	2000-2008			2000-2015		
	Greater Capital	Intermediate Area	Sihanoukville	Greater Capital	Intermediate Area	Sihanoukville
Industrial Estate (EPZ/FTZ/GIE)	184	63	**117**	367	118	232
Area of Individual Factory	61	38	33	92	69	49
Total	245	101	150	459	187	281

Note: GIE (General Industrial Estate), EPZ(Export Processing Zone), FTZ(Free Trade Zone)
Source: JST

In the greater capital area, the demand for an industrial estate is projected to be approximately 180 ha to 350 ha in 2008 and 370 ha to 700 ha in 2015, whilst that of Sihanoukville is expected to be 120 ha to 130 ha in 2008 and 230 ha to 260 ha in 2015. In the intermediate area, the demand will be approximately 60 ha in 2008 and 120 ha in 2015. That includes estates for export processing and the fishery processing. The distribution of the industrial area demand is schematically illustrated in **Figure 7.1-8**.

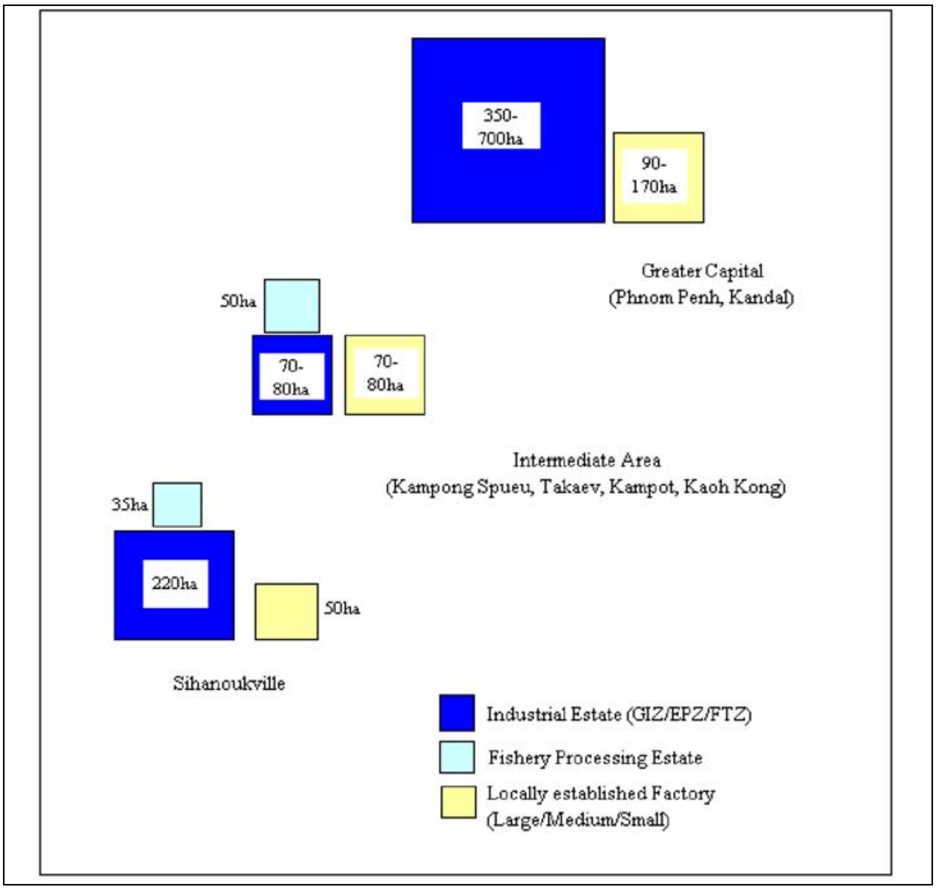


Figure 7.1-8 Projection of Industrial area Development Demand by Region in 2015

(3) Results of Questionnaire Survey

The Study Team conducted an extensive questionnaire survey concerning the investment interest in Sihanoukville on the sample of manufacturers in the relevant countries in Asia. In all 8,758 manufacturing enterprises were selected on the basis of a manufacturer directory of potential industry categories. In all, 634 enterprises responded to the questionnaire of a response rate of 7.2 % . Thailand showed highest response rate, while Taiwan and Korea showed the lowest rates as shown below. (Refer to **Annex A.I.2** for details)

Table 7.1-4 Number of Surveyed Enterprises and Response Rate

Country/Region	Num of enterprises questioned		Num of Respondent	Response rate	
	Originally planned	Actual		vs original	vs actual
1 China	500	1,000	110	22.0%	11.0%
2 Hong Kong	500	706	104	20.8%	14.7%
3 Korea	500	2,460	105	21.0%	4.3%
4 Malaysia	500	727	73	14.6%	10.0%
5 Taiwan	500	3,305	101	20.2%	3.1%
6 Thailand	500	379	96	19.2%	25.3%
7 Thailand (Japanese)		181	45		24.9%
Total	3,000	8,758	634	21.1%	7.2%

Source: Result of questionnaire survey in the neighboring countries, JST

1) Prospective Manufacturers:

Of the 634 enterprises that responded, 14 enterprises showed a “keen interest” in investment in a Sihanoukville industrial area and an additional 52 enterprises indicated “possible” for investment. Enterprises of Korea, Thailand and Malaysia showed a relatively strong interest, while those of China, Hong Kong and Taiwan indicated lesser interest in Sihanoukville.

Table 7.1-5 Interest and Possible Investors by Country/Region
-Results of Investment Questionnaire Survey-

Country/Region	Num of enterprises questioned		Num of Respondent	Number of Prospective Investors		
	Originally planned	Actual		Interest	Possible	Total
1 China	500	1,000	110	1	1	2
2 Hong Kong	500	706	104	1	4	5
3 Korea	500	2,460	105	6	7	13
4 Malaysia	500	727	73	2	28	30
5 Taiwan	500	3,305	101	1	4	5
6 Thailand	500	379	96	2	6	8
7 Thailand (Japanese Enterprise)		181	45	1	2	3
Total	3,000	8,758	634	14	52	66

Source: Result of questionnaire survey in the neighboring countries, JST

As for the categories of industry, the indicated interests are high for food, apparel, electric machinery/supplies, paper products, chemical products and pottery/ earthen-ware, as shown below.

Table 7.1-6 Interested and Possible Investors by Category of Industry
-Results of Investment Questionnaire Survey-

No	The category of Industry	Interest	Possible	Total
1	Food manufacture	3	8	11
2	Textiles	2	4	6
3	Wearing apparel except footwear	0	7	7
4	Footwears except vulcanized or molded rubber or plastic footwear	0	0	0
5	Furniture and fixture	0	2	2
6	Pulp, paper, paperboard, and other paper product	2	5	7
7	Drugs and medicines	1	3	4
8	Soap and cleaning preparations, perfumes, cosmetics and other toilet	1	5	6
9	Rubber products	1	3	4
10	Pottery, china and earth ware	2	4	6
11	Electrical machinery, apparatus, appliance and electric supplies	1	7	8
12	Jewellery and related articles	0	1	1
13	Sporting and athletic goods	1	0	1
14	Manufacturing industries not elsewhere classified	0	3	3
	Total	14	52	66

Source: Result of questionnaire survey in the neighboring countries, JST

2) FDI Demand Projection

Based on the questionnaire survey results, the overall potential FDI investment demand of all manufacturers in Cambodia, utilizing the sampling rate by category of industry and country/region, was projected provisionally as below. According to this estimation, approximately 140 FDI firms, with 50 positive and 90 possible, may invest in Cambodia in the short term. Assuming an average1 ha plot area per factory, the total demand for industrial area in Sihanoukville is roughly estimated at 140 ha for the short-term. This estimation roughly coincides with the development projection demand of 120 ha to 130 ha in 2008 discussed in item (2) above.

It should be noted that the above discussion pertains to the potential demand, rather than the actual, and it would require a great effort to verify the potential demand. The above discussion only confirms that there is potential to fill the estimated demand for industrial development in a rough calculation.

Table 7.1-7 Projection of Overall FDI Investment Demand of all Manufacturers in Sihanoukville

Country/Region	Num of sample	Number of prospective investors			Num. of enterprises by directory/1	Projection based on sample ratio		
		Interest	Possible	Total		Interest	Possible	Total
1 China	1,000	1	1	2	3,347	2	1	3
2 Hong Kong	706	1	4	5	n.a. /2	2	11	13
3 Korea	2,460	6	7	13	15,645	42	35	77
4 Malaysia	727	2	28	30	797	2	26	28
5 Taiwan	3,305	1	4	5	8,375	2	5	7
6 Thailand	379	2	6	8	420	2	7	9
7 Thailand (Japanese)	181	1	2	3	253	1	5	6
Total	8,758	14	52	66	28,837	53	90	143

Note
/1 Resource: Manufacturer directory of respective country.
/2 Applied China's rate
Source: JST

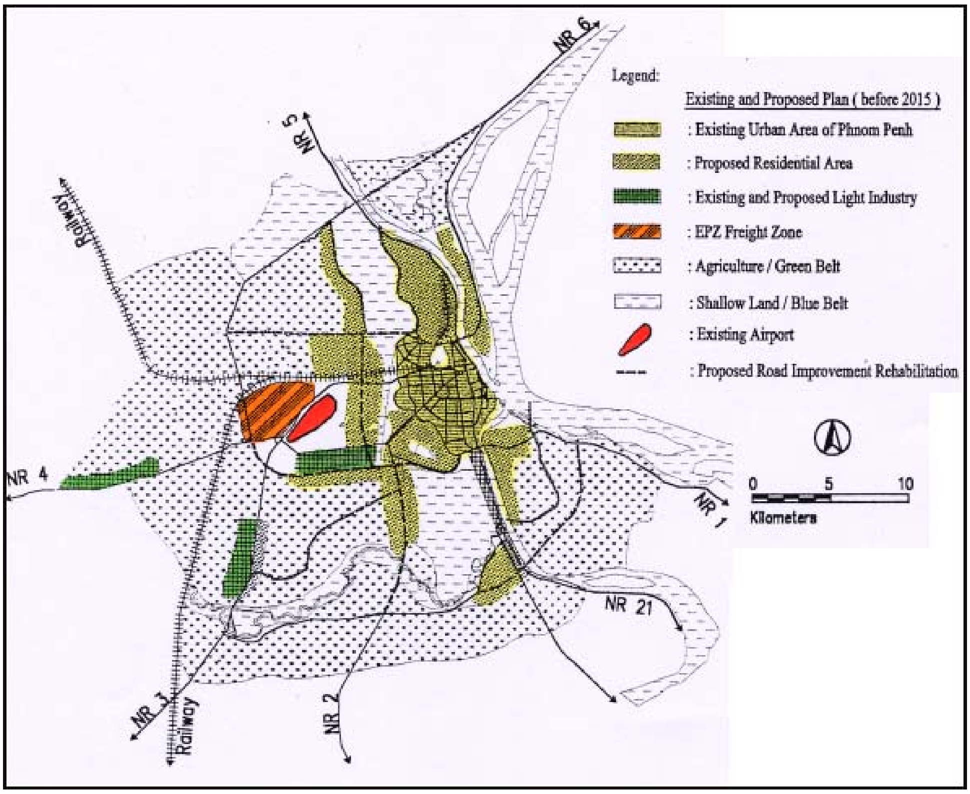
Detailed projection by category of industry and country origin is shown in **Appendix G.2**.

7.1.3 Selection of Candidate Sites for the Industrial Area

(1) Greater Capital Area

A land use plan of Phnom Penh Municipality[2] located a new industrial area in the vicinity of the present international airport in the western suburb of Phnom Penh as shown in **Figure 7.1-9** has been formulated to promote the airport-related industries. The existing factories in the already built-up area in the central city are also presumed to relocate to this new industrial land. Vast vacant lands opposite of and on the southern sides of the international airport and along routes 4 and 3 are considered suitable for future industrial expansion.

Following this land use plan, the Study Team selected candidate sites for the analyses of the potential industrial areas in the suburbs of Phnom Penh.



Source: The Study on the Transportation Master Plan of the Phnom Penh Metropolitan Area in the Kingdom of Cambodia, JICA

Original Source: Bureau for Urban Affairs of Phnom Penh Municipality, BAU/MPP

Figure 7.1-9 Land Use Plan and Industrial Development Area, Phnom Penh in 2015

(2) Sihanoukville Area

Though there is no approved land use plan for Sihanoukville Municipality, it is generally believed that residential and business/commercial land use will expand to the eastern part of the present central city. The northern part, along the Route 4 is mostly forest and agricultural land presently, and is recommended for preservation

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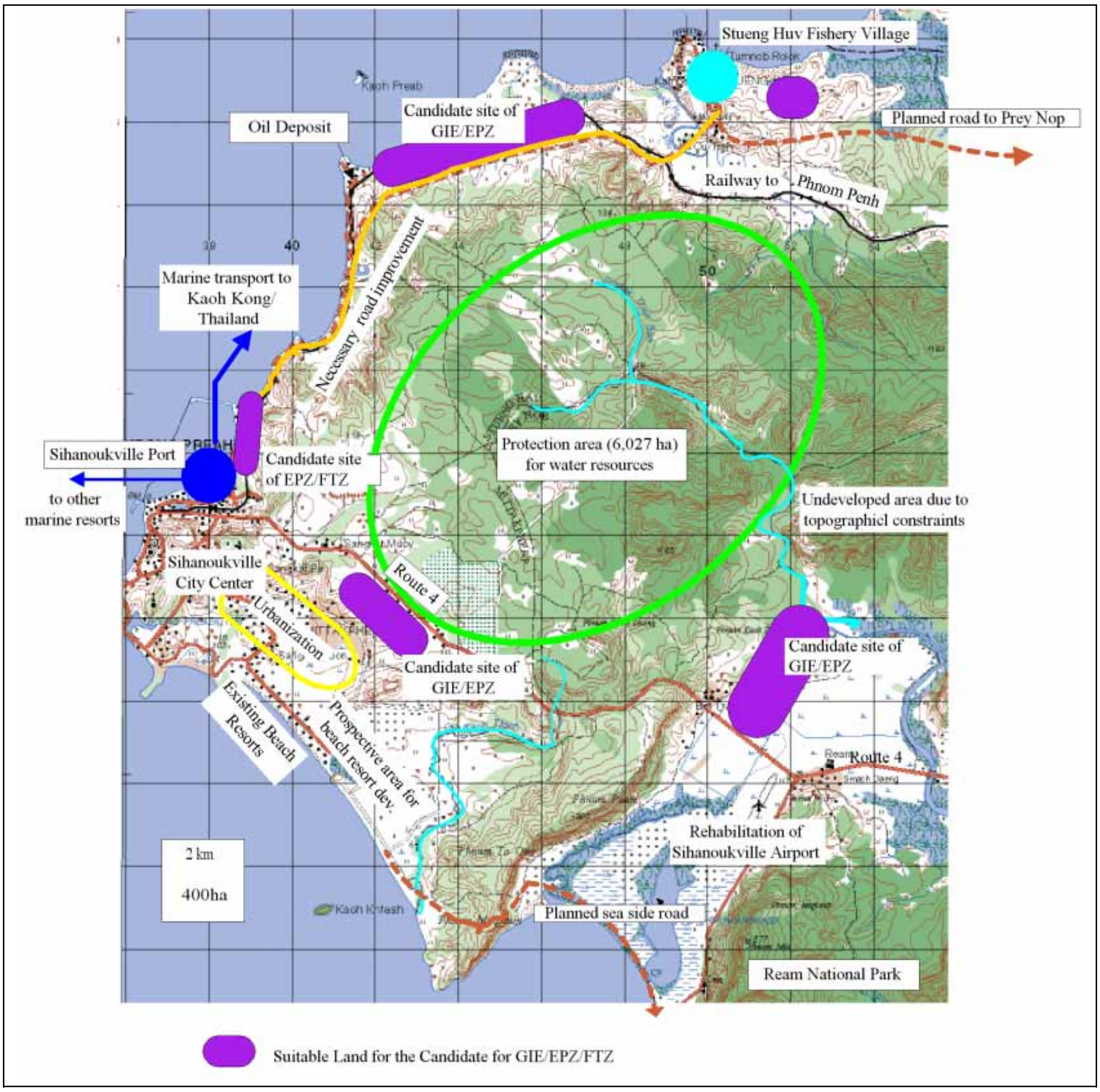
[2] This master plan formulated in a JICA study has not been officially approved by the Government, but is still the only master plan available presently.

by DANIDA[3] as a water resources area for future growth of the city and tourism with the Kbal Chay waterfall. In this context, potential land for the industrial area development in Sihanoukville will partly be restricted.



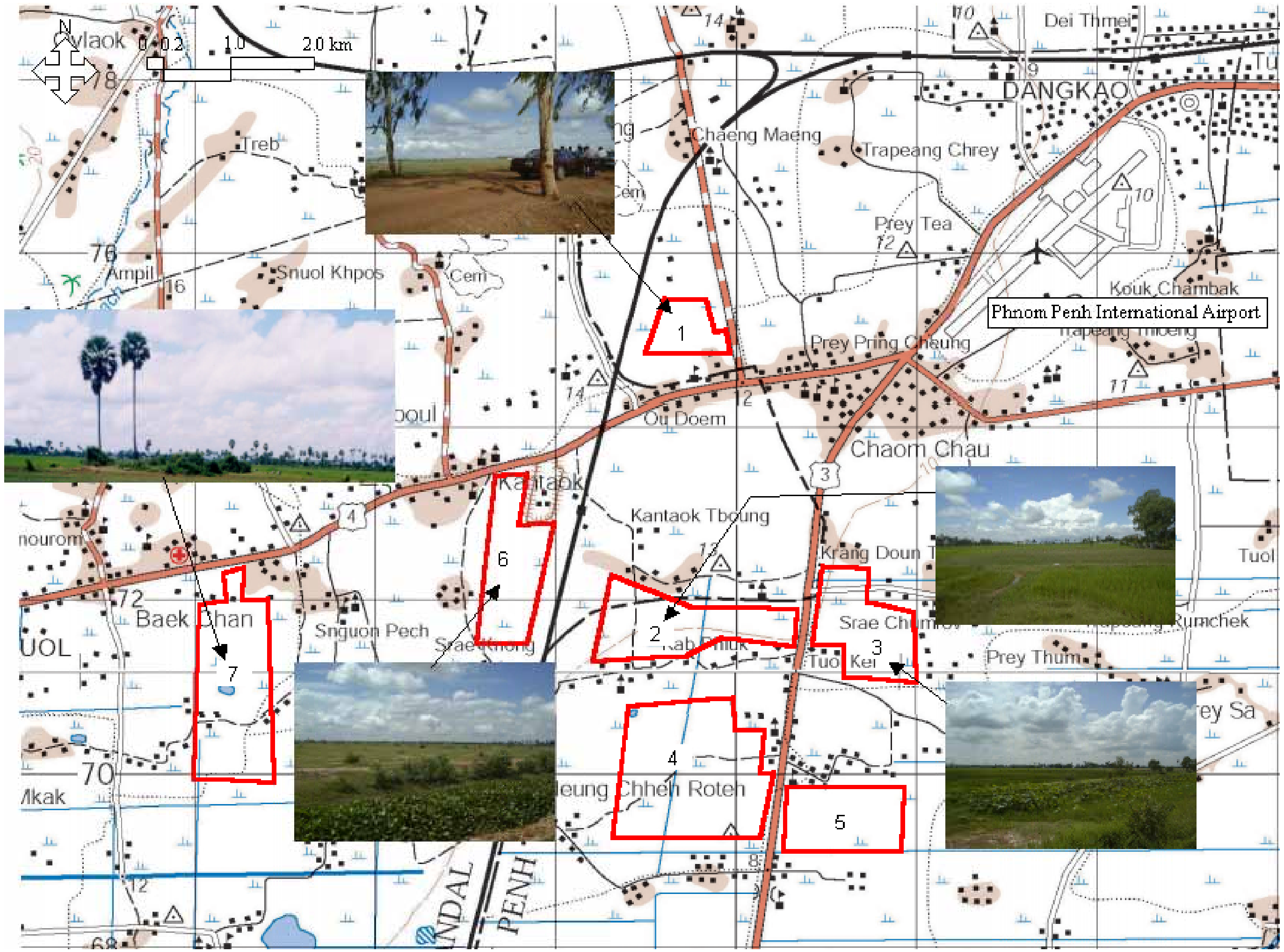
Source: JST

Figure 7.1-10 Future Land Use Concept of Sihanoukville and Suitable Land for Development of Industrial area/EPZ/FTZ

As shown in **Figure 7.1-10,** the candidate sites for industrial development are an unused parcel behind the Sihanoukville Port, an agricultural plateau along Route 4, barren land in the northern coast, and agricultural land in the vicinity of the Sihanoukville airport.

The Study Team selected 7 candidate sites as shown in **Figure 7.1-11** and **7.1-12** as the result of a preliminary field survey in the areas in Phnom Penh and Sihanoukville, and carried out a comprehensive investigation through the data/information in documents and field surveys under collaboration with the working group members.

[3] Project for Prek Toek Sap Forest Management & Water Conservation Area, from August 2002 till 2005



The Study on Regional Development of The Phnom Penh - Sihanoukville Growth Corridor in The Kingdom of Cambodia	Figure 7.1-11 Candidate Sites in and around Phnom Penh
Japan International Cooperation Agency (JICA)	