付　表

表１　工業立地におけるバンサパン地域の優位点

1	Deep Sea Port of Prachuap Port	- Prachuap Port is the deepest port in Thailand which allows accommodation of the gigantic vessels with bulk cargo and suitable for the heavy and chemical industries which require amount of cargo transportation.
2	Virgin Area with Lower Land Price	- Vast industrial land will be available by the lower price for the investors.
3	Directed and Supported by the Governmental Development Policy and Strategy	- Bang Saphan area will gradually be developed in accordance with the integrated regional plan of Western Seaboard Development Plan and Bang Saphan Industrial Development Plan formulated by the cooperation of Japanese technical assistance. - Infrastructure such as water supply, electric supply, road network, etc. will be developed by the official initiative.
4	Free Trade Zone Concept	- Free trade zone concept will be applied in the Bang Saphan industrial area in order to accelerate the promotion of investment. Enterprises could enjoy free production and trading activity with tax exemption and reduction including the VAT exemption.
5	Presence of Giant Iron/Steel Industry	- An Integrated industrial complex will be developed in the Bang Saphan area where the Sahaviriya group has developed the giant iron/steel factories and a new industrial estate has being developed. The downstream industry and supporting industry as well as relevant industries will be recommended to be establish in the industrial complex.
6	Linkage with Eastern Seaboard and Myanmar and Andaman Sea	- Easy access to other industrial regions in Thailand and abroad from Bang Saphan area will be accomplished by the marine and road transportation. Liner service including Ro/Ro ship is already begun to Eastern Seaboard from Bang Saphan area.

表2　バンサパン工業団地における立地期待業種

1	2	3	4	JSIC	TSIC	Japanese Industry
				Manufacture of Food Group		
○				1211	311	Meat Products
○				1212	311	Dairy Products
○				1219	311	Miscellaneous Livestock Products
○	◎			1222	31141	Canned seafood and seaweed
○				1229	31149	Miscellaneous seafood products
○			△	1242	31132	Soy sauce "syoyu" and edible amino acids
	◎			1253	31211	Glucose, starch syrup and high-fructose corn syrup
	◎			1263	31169	Wheat flour milling
○	◎			1281	312	Vegetable oil and fats
	◎			1283	312	Edible oil and fats
○				1293	31173	Noodle, macaroni and spaghetti
○	◎			2021	35120	Compound fertilizers
				Manufacture of Textile Group		
		●		1421	32113	Spinning mills and cotton
		●		1431	32119	Twisting yarns, except bulky yarns
		●		1441	32115	Fabric mills,woven cotton and spun ravon
				Manufacture of Petroleum and Coal(C1 Chemicals) Group		
○		●		2011	35400	Nitrogenous and phosphatic fertilizers
○	◎	●		2012	35120	Compound fertilizers
○		●		2023	35210	Inorganic pigments
○	◎	●		2024	35111	Compressed and liquefied gases
○	◎	●	△	2031	35111	Basic petrochemicals, including derivatives produced from an integrated process
○	◎	●	△	2032	35111	Alphabetic intermediates, including alphabetic solvent
○	◎	●		2033	35111	Methane derivatives
○	◎	●		2034	35299	Fermentation industry
	◎	●	△	2061	35220	Medical material preparations
○	◎	●		2121	35299	Lubricating oils
○		●		2122	35299	Greases
		●		2311	35510	Tire and tubes for automobiles
		●		2333	35591	Mechanical rubber products
		●		2393	35591	Rubber sheets
				Manufacture of Wooden and Furniture Group		
○		●		1617	33112	Flooring mills
○		●		1619	33111	Sawing and planning mills,n.e.c.
○	◎	●		1624	33113	Particle board
		●	△	1711	33201	Wooden furniture, except Japanese
				Manufacture of paper and pulp group		
○	◎	●		1821	34111	Paper
○	◎	●		1822	34111	Paperboard
○		●		1832	34120	Corrugated paper
○		●		1841	34190	Office paper products

1	2	3	4	JSIC	TSIC	Japanese Industry
				Steel processing industry group		
○	◎		△	2644	371	Steel pipes and tubes
○				2646	371	Cold finished steel bars
○	◎		△	2648	371	Wire drawing
○				2653	371	Coated steel pipes
○				2654	371	Coated steel wire
○	◎		△	2661	371	Iron casting, except cast iron pipes and malleable iron castings
○			△	2662	371	Malleable iron castings
○	◎		△	2663	371	Steel castings
○			△	2664	371	Secondary forgings
○	◎		△	2692	371	Iron and steel shearing and slitting
○			△	2693	371	Iron and steel scrap preparation for smelting
○			△	2694	371	Cast iron pipe
○	◎		△	2841	371	Fabricated construction-use metal products
○				2842	371	Fabricated architectural metal products,except structural hardware
○	◎		△	2843	371	Fabricated plate work and sheet metal work
				Ceramics industry group		
○	◎			2512	36200	Processed flat glass
○	◎			2514	36200	Glass containers
○				2551	36910	Fire blicks
○	◎			2559	36999	Miscellaneous clay refractories
○	◎			2561	36999	Carbonaceous electrodes
				Processing and Assembly Industrial group		
○	◎	●		2911	38299	Boilers
○	◎	●		2912	38240	Steam engines, turbines and water wheels
○		●	△	2971	38240	Pumps and pumping equipment
○	◎	●		2972	38292	Air compressors, gas compressors and blowers
○	◎	●		2974	38240	Coveyers and conveying equipment
○		●		2977	38240	Oil hydraulic equipment
○	◎	●		2978	38240	Chemical machinery and its equipment
○	◎	●	△	2979	38299	Miscellaneous general industry machinery and equipment
		●		2981	38250	Office machines
		●		2982	38250	Miscellaneous office,service industry and household machines
○		●		2983	38292	Refrigerators and air conditioning apparatus
○		●		3011	38240	Generators, motors and other rotating electrical machinery
○		●		3012	38240	Power and distribution transformers, except electronic appliances transformers
		●	△	3021	38330	Household electric appliances
		●		3042	38320	Radio communication equipment
		●		3091	38392	Storage batteries
		●		3112	Shipbuilding	Motor vehicle bodies and trailers
		●	△	3113	Shipbuilding	Motor vehicle parts and accessories
				Shipbuilding and repairs		
○	◎			3141	38411	Steel shipbuilding and repairing
○	◎			3142	38419	Hull blocks

Note;

○ Regional resources based industrial category

◎ Port-oriented industrial category

● Policy-oriented industrial category

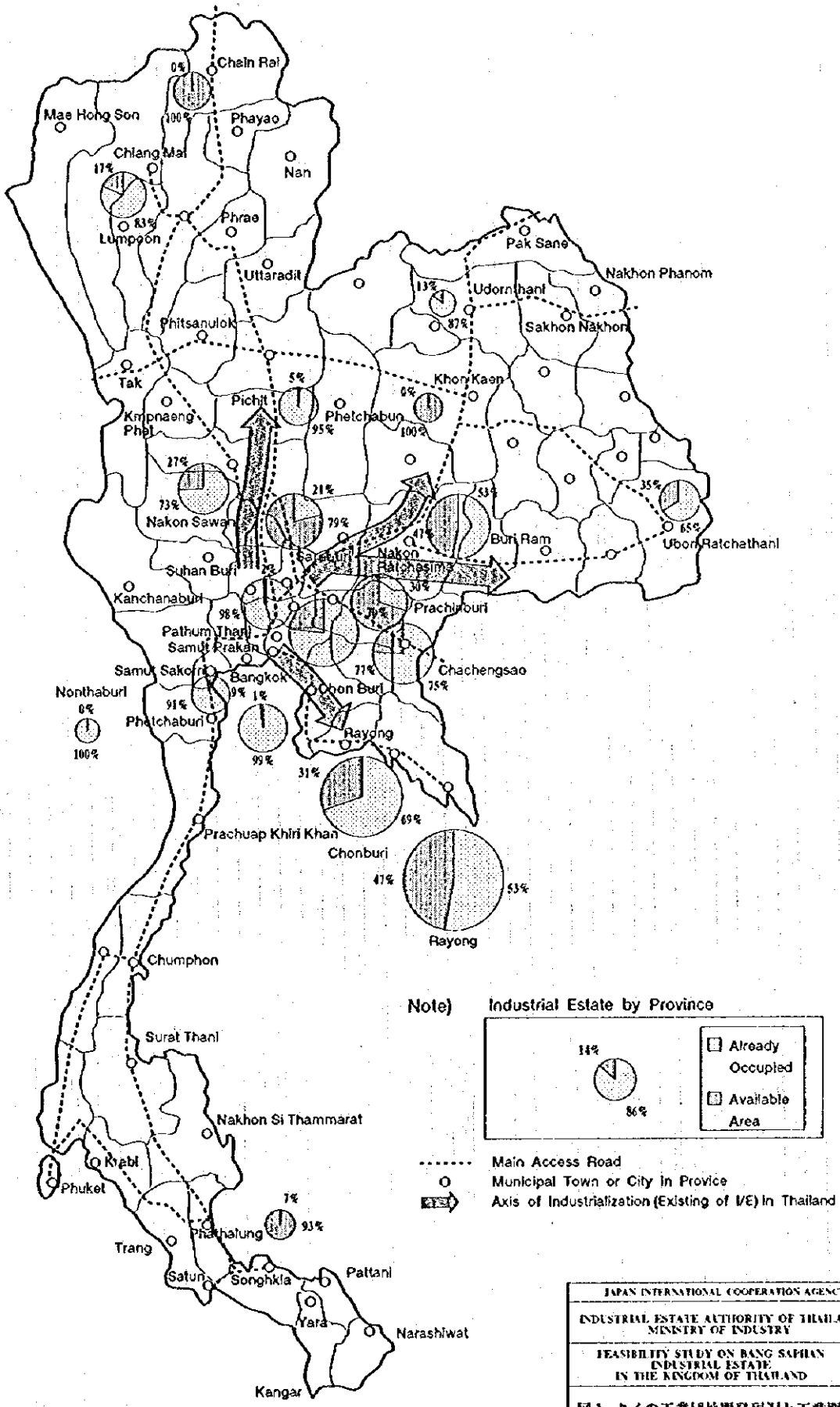
△ Industrial category selected from result of demand survey

表3　関連インフラ施設の整備／管理主体

	F/S	E/S	Construction	Maintenance /Operation	Remarks
1 Water Supply System					
1) Reservoir(Tha Sae)	RID	RID	RID	RID	
2) Reservoir(Bang Saphan River)	RID	RID	RID	RID	
3) Pipeline(Tha Sae~Bang Saphan)	IEAT/PWA	IEAT/PWA	IEAT/WW	IEAT/WW	
4) Pipeline(Bang Saphan Reservoir ~ Bang Saphan)	IEAT/PWA	IEAT/PWA	IEAT/WW	IEAT/WW	
5) Purification Plant	-	IE Co.	IE Co.	IE Co.	
6) Distribution Facility	-	IE Co.	IE Co.	IE Co.	
2 Port					
1) Jetty for Ore/Coal	PP Co.	PP Co.	PP Co.	PP Co.	
2) General Cargo Berth	PP Co.	PP Co.	PP Co.	PP Co.	Governmental assistance is recommendable for the construction.
3) Back Support Area (Container Deposit, General Cargo Warehouse, etc.)	PP Co.	PP Co.	PP Co.	PP Co.	
3 Road					
1) Access Road to IE (R4 ~ IE)	DOH	DOH	DOH	DOH	
2) Access Road to Port (IE~Port)	DOH	DOH	DOH	DOH	
3) Road inside IE	IE Co.	IE Co.	IE Co.	IE Co.	
4) Community Road in Bang Saphan Town (R. 3169)	-	DOH (1996)	DOH (1997~1998)	DOH	will be improved by 1998
5) Community Road in Bang Saphan Town (Provincial Road)	-	PKK Province	PKK Province	PKK Province	
4 Electric Supply					
1) IPP	Private	Private	Private	Private	
2) 500 kV transmission line	EGAT	EGAT	EGAT	EGAT	
3) Expansion of Bang Saphan SS	EGAT	EGAT	EGAT	EGAT	
4) Development of New SS	EGAT	EGAT	EGAT	EGAT	
5) 115 kV TL (BS SS ~ IE)	PEA	PEA	PEA	PEA	
6) 115 kV TL (New SS ~ IE)	PEA	PEA	PEA	PEA	
7) SS in IE	PEA	PEA	PEA	PEA	
8) Distribution line in IE	IE Co.	IE Co.	IE Co.	IE Co.	
5 Telecommunication					
1) Switching station in IE	TOT	TOT	TOT	TOT	
2) Optical cable from SS of IE to Bang Saphan SS	TOT	TOT	TOT	TOT	
3) Distribution line in IE	IE Co.	IE Co.	IE Co.	IE Co.	
6 Solid Waste Disposal					
1) Hazardous Waste Disposal	MOI/Private	MOI/Private	MOI/Private	Private	
2) Incinerator for General Waste	IE Co.	IE Co.	IE Co.	IE Co.	

RID : Royal Irrigation Department
PWA : Provincial Waterworks Authority
WW : Western Water Resources Development and Management Co., Ltd.
IE Co. : Industrial Estate Company (Assumption)
DOH : Department of Highway
PKK : Prachuap Khiri Khan
PPCo. : Prachuap Port Company
EGAT : Electricity Generating Authority of Thailand
PEA : Provincial Electricity Authority
MOI : Ministry of Industry
TOT : Telephone Organization of Thailand

付　　图



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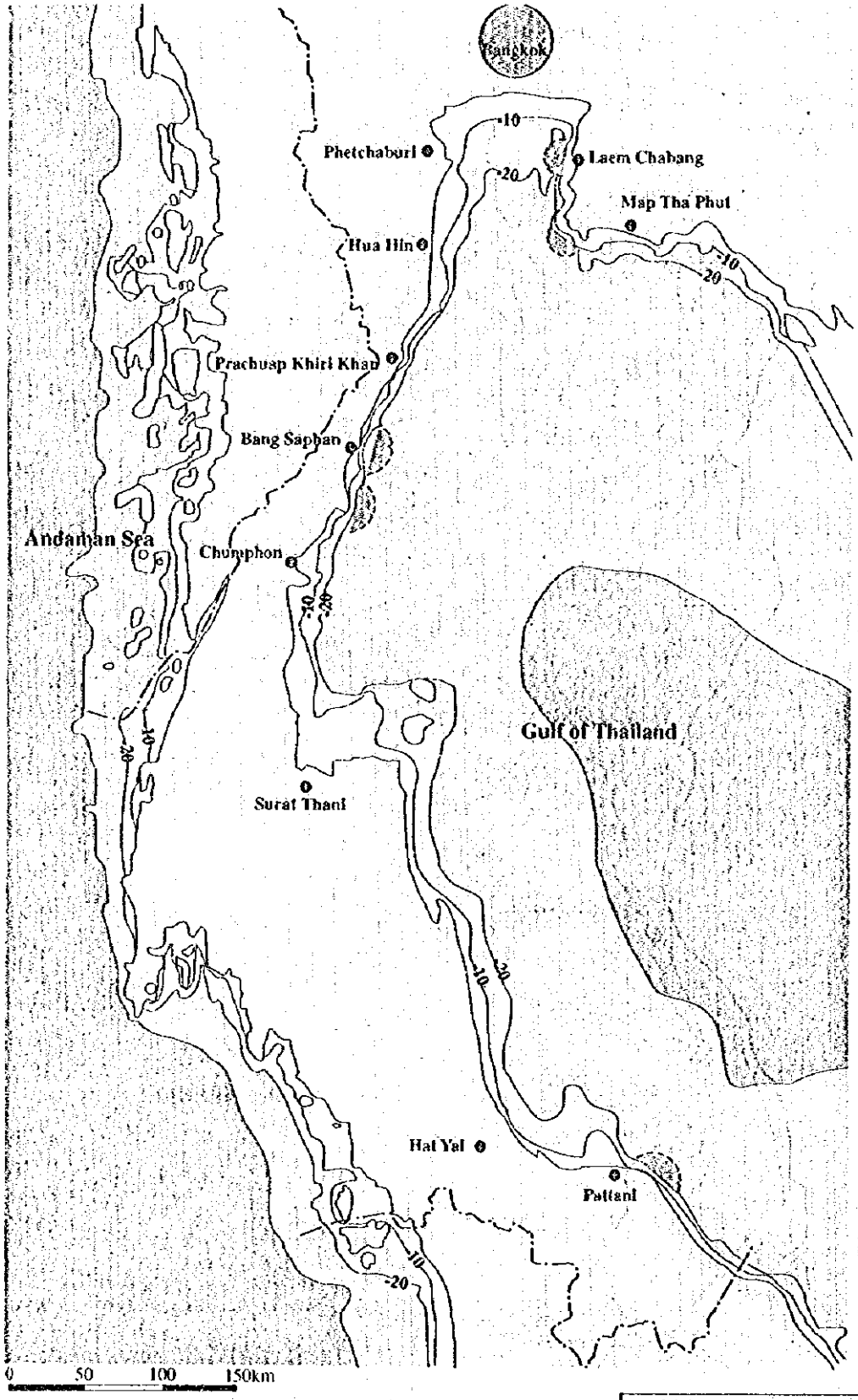
INDUSTRIAL ESTATE AUTHORITY OF THAILAND
MINISTRY OF INDUSTRY

FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図1 タイの工業団地開発現況と工業開発軸

NIPPON KOEI CO., LTD
JAPAN INDUSTRIAL LOCATION CENTER



- -10 – minus 10m from Mean Sea Level
- -20 – minus 20m from Mean Sea Level
- most suitable for Deep Sea Port

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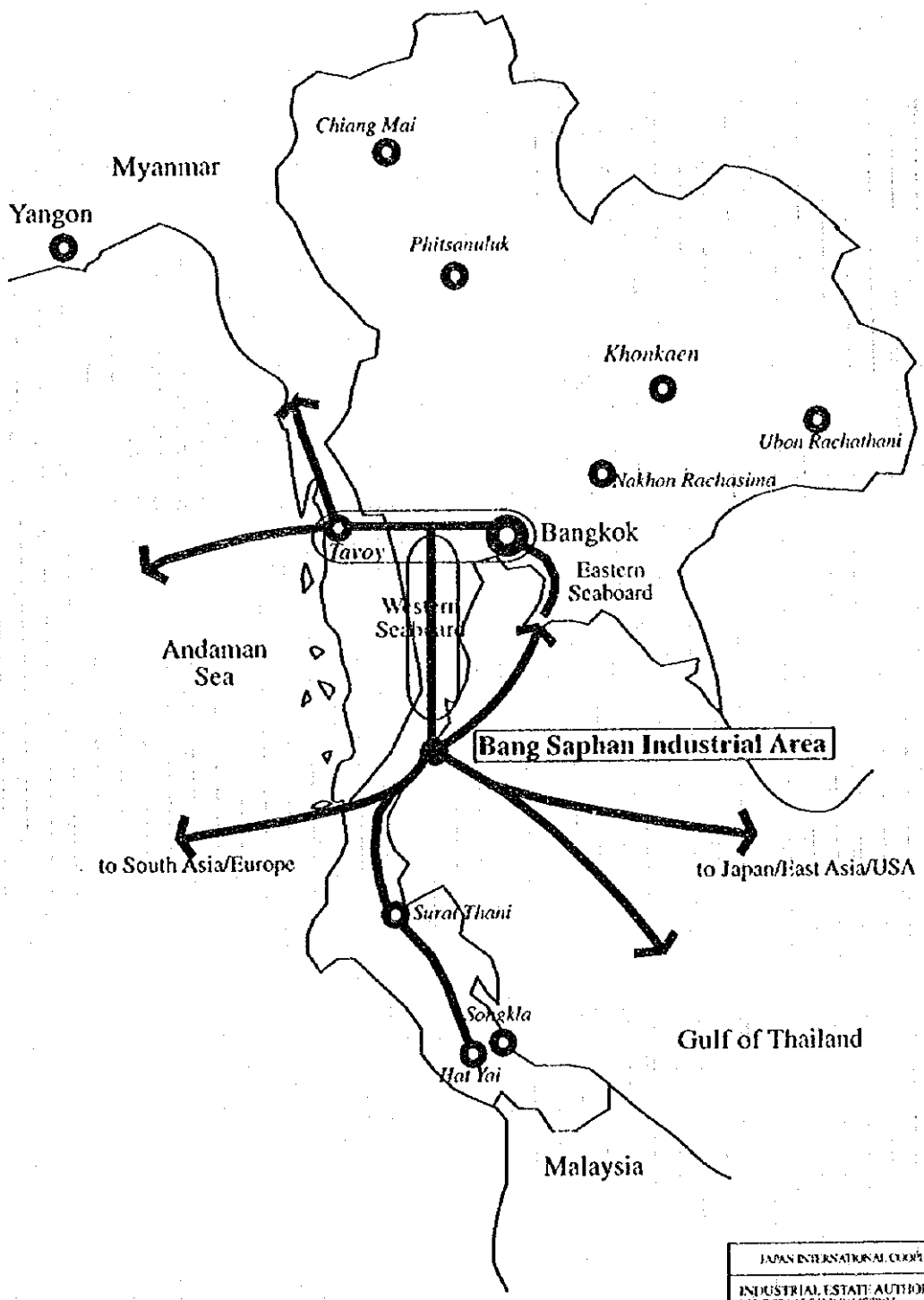
MINISTRY OF INDUSTRY

FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図2 海底の地形と大水深港湾の適地

NIPPON KOEI CO., LTD
JAPAN INDUSTRIAL LOCATION CENTER



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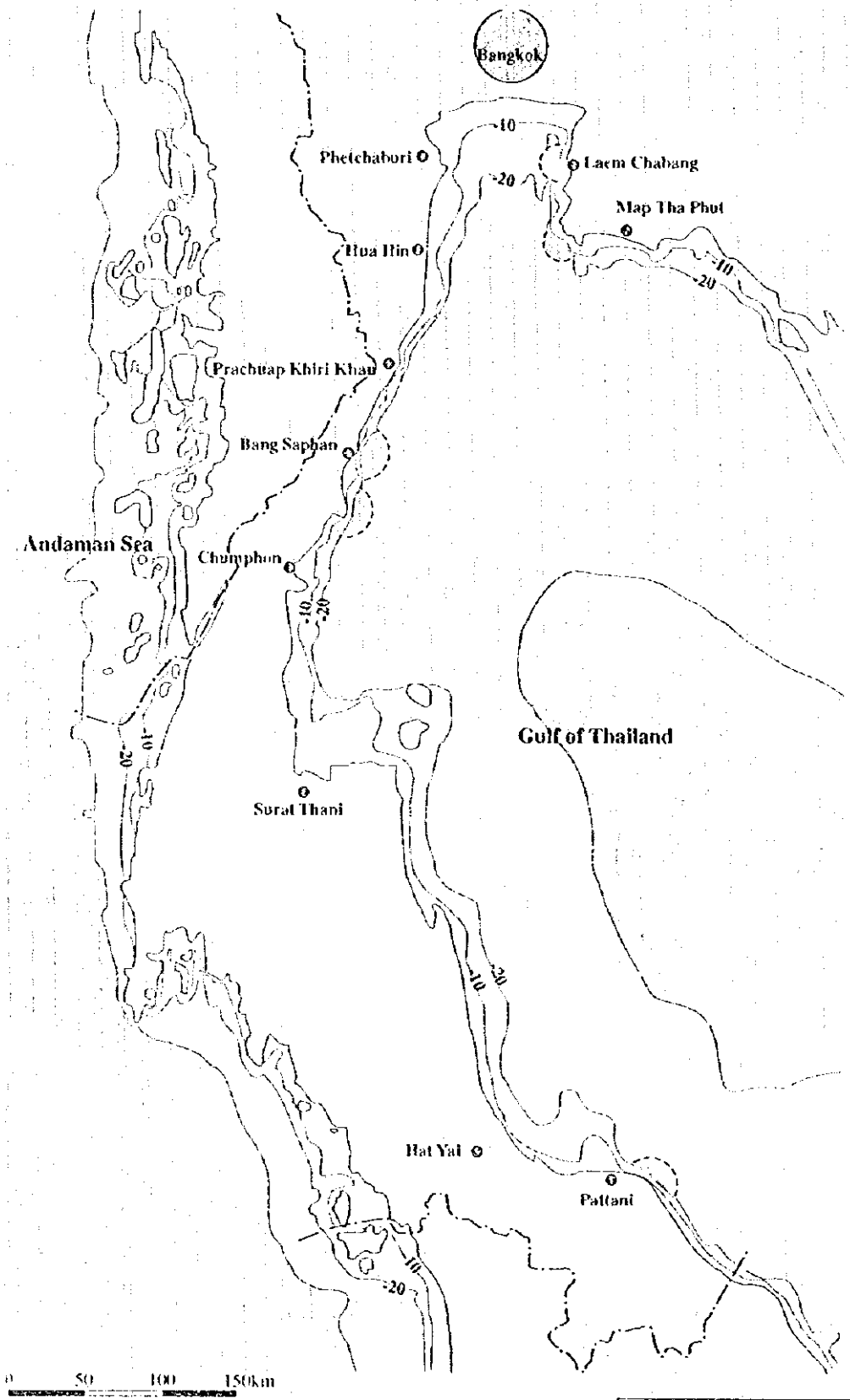
MINISTRY OF INDUSTRY

FEASIBILITY STUDY ON BANG SAPHAN
INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND

図3
バンサパン地域から首都圏、東部臨海、海外へのリンケージ

NIPPON KOEI CO., LTD
JAPAN INDUSTRIAL LOCATION CENTER



-10 minus 10m from Mean Sea Level

-20 minus 20m from Mean Sea Level

most suitable for Deep Sea Port

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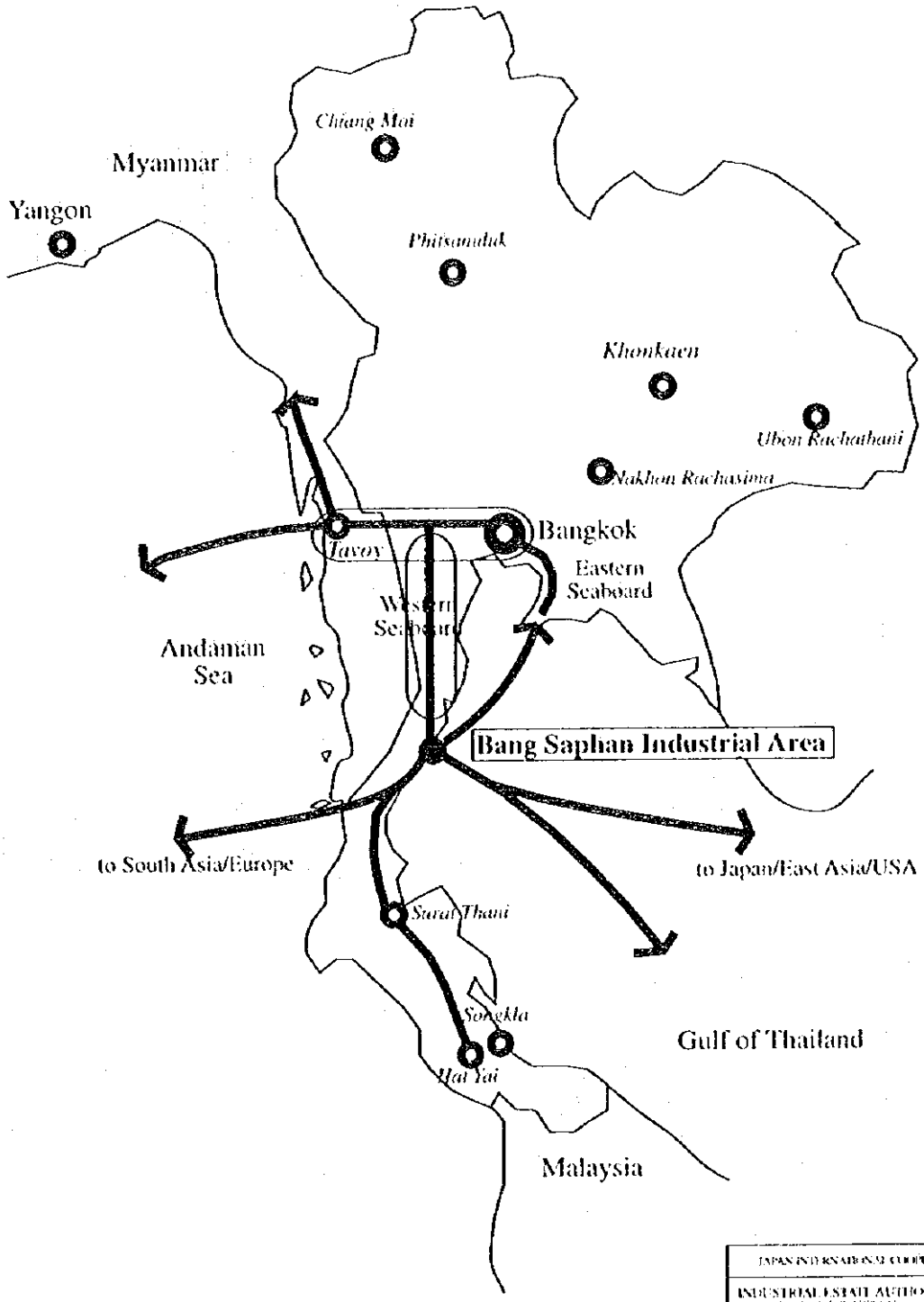
図2 海底の地形と大木深港湾の適地

NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER



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FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図3
バンサパン地域から首都圏、東部臨海、海外へのリンケージ

NIPPON KOEI CO., LTD.
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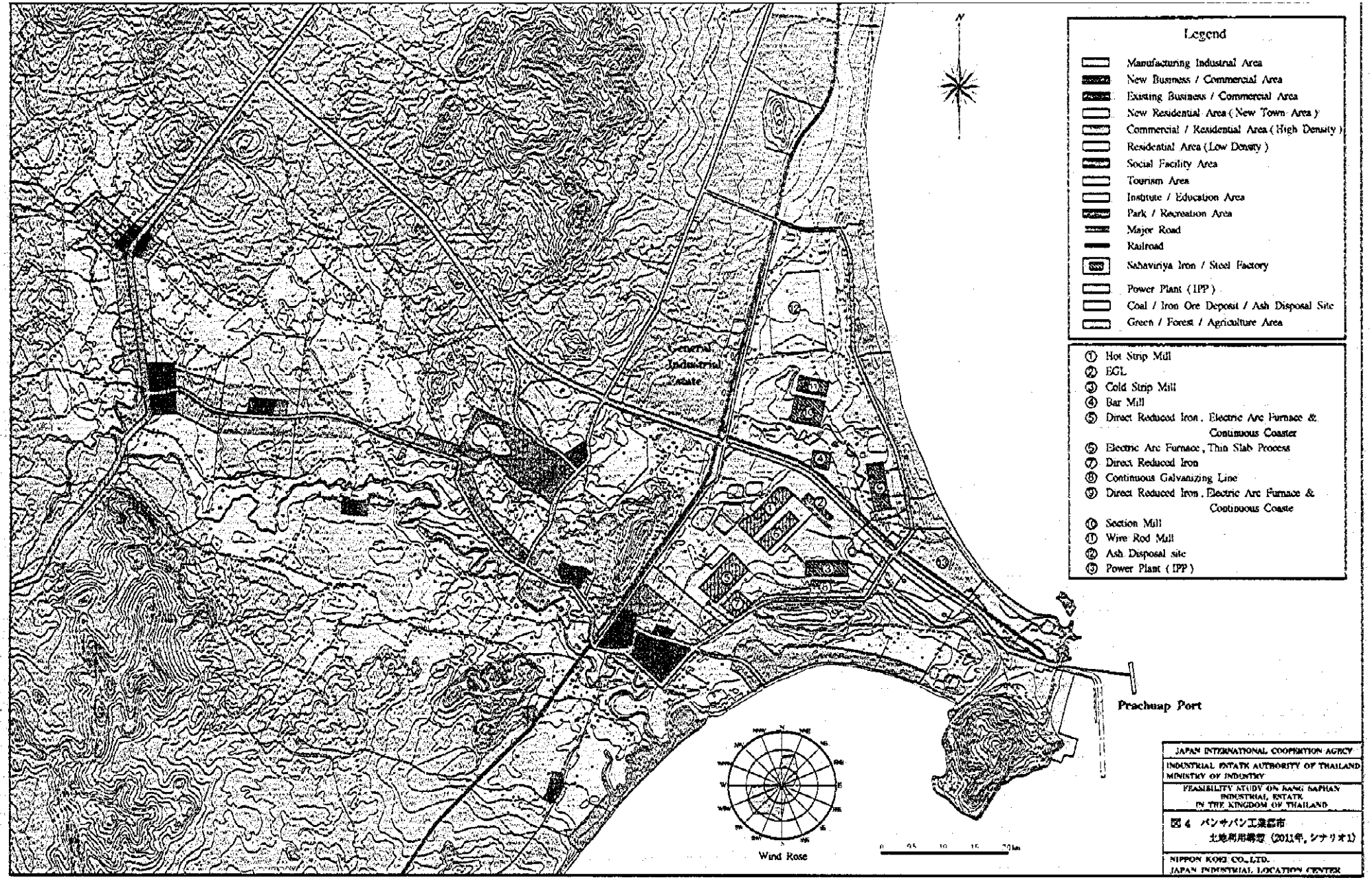
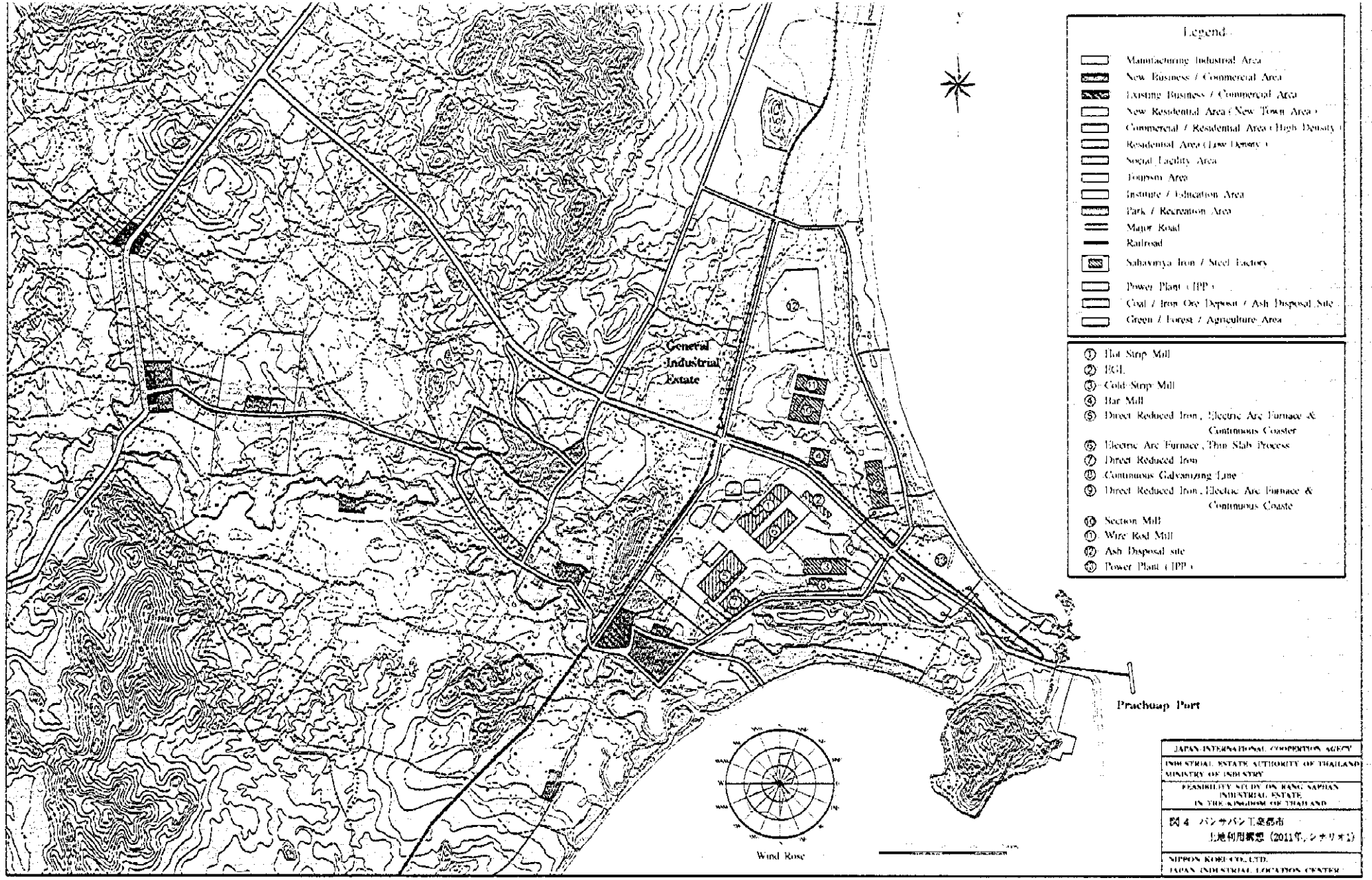

Legend
Manufacturing Industrial Area
New Business / Commercial Area
Existing Business / Commercial Area
New Residential Area (New Town Area)
Commercial / Residential Area (High Density)
Residential Area (Low Density)
Social Facility Area
Tourism Area
Institute / Education Area
Park / Recreation Area
Major Road
Railroad
Sahaviriya Iron / Steel Factory
Power Plant (IPP)
Coal / Iron Ore Deposit / Ash Disposal Site
Green / Forest / Agriculture Area
① Hot Strip Mill
② EGL
③ Cold Strip Mill
④ Bar Mill
⑤ Direct Reduced Iron, Electric Arc Furnace & Continuous Coaster
⑥ Electric Arc Furnace, Thin Slab Process
⑦ Direct Reduced Iron
⑧ Continuous Galvanizing Line
⑨ Direct Reduced Iron, Electric Arc Furnace & Continuous Coaste
⑩ Section Mill
⑪ Wire Rod Mill
⑫ Ash Disposal site
⑬ Power Plant (IPP)
Prachuap Port
Wind Rose
JAPAN INTERNATIONAL COOPERATION AGENCY
INDUSTRIAL ESTATE AUTHORITY OF THAILAND
MINISTRY OF INDUSTRY
FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND
図 4 バンサパン工業都市
土地利用構想 (2011年, シナリオ1)
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER


Legend
Manufacturing Industrial Area
New Business / Commercial Area
Existing Business / Commercial Area
New Residential Area (New Town Area)
Commercial / Residential Area (High Density)
Residential Area (Low Density)
Social Facility Area
Tourism Area
Institute / Education Area
Park / Recreation Area
Major Road
Railroad
Sahavanya Iron / Steel Factory
Power Plant (IPP)
Coal / Iron Ore Deposit / Ash Disposal Site
Green / Forest / Agriculture Area
① Hot Strip Mill
② HGI
③ Cold Strip Mill
④ Bar Mill
⑤ Direct Reduced Iron, Electric Arc Furnace & Continuous Coaster
⑥ Electric Arc Furnace, Thin Slab Process
⑦ Direct Reduced Iron
⑧ Continuous Galvanizing Line
⑨ Direct Reduced Iron, Electric Arc Furnace & Continuous Coaste
⑩ Section Mill
⑪ Wire Rod Mill
⑫ Ash Disposal site
⑬ Power Plant (IPP)
General Industrial Estate
Prachuap Port
Wind Rose
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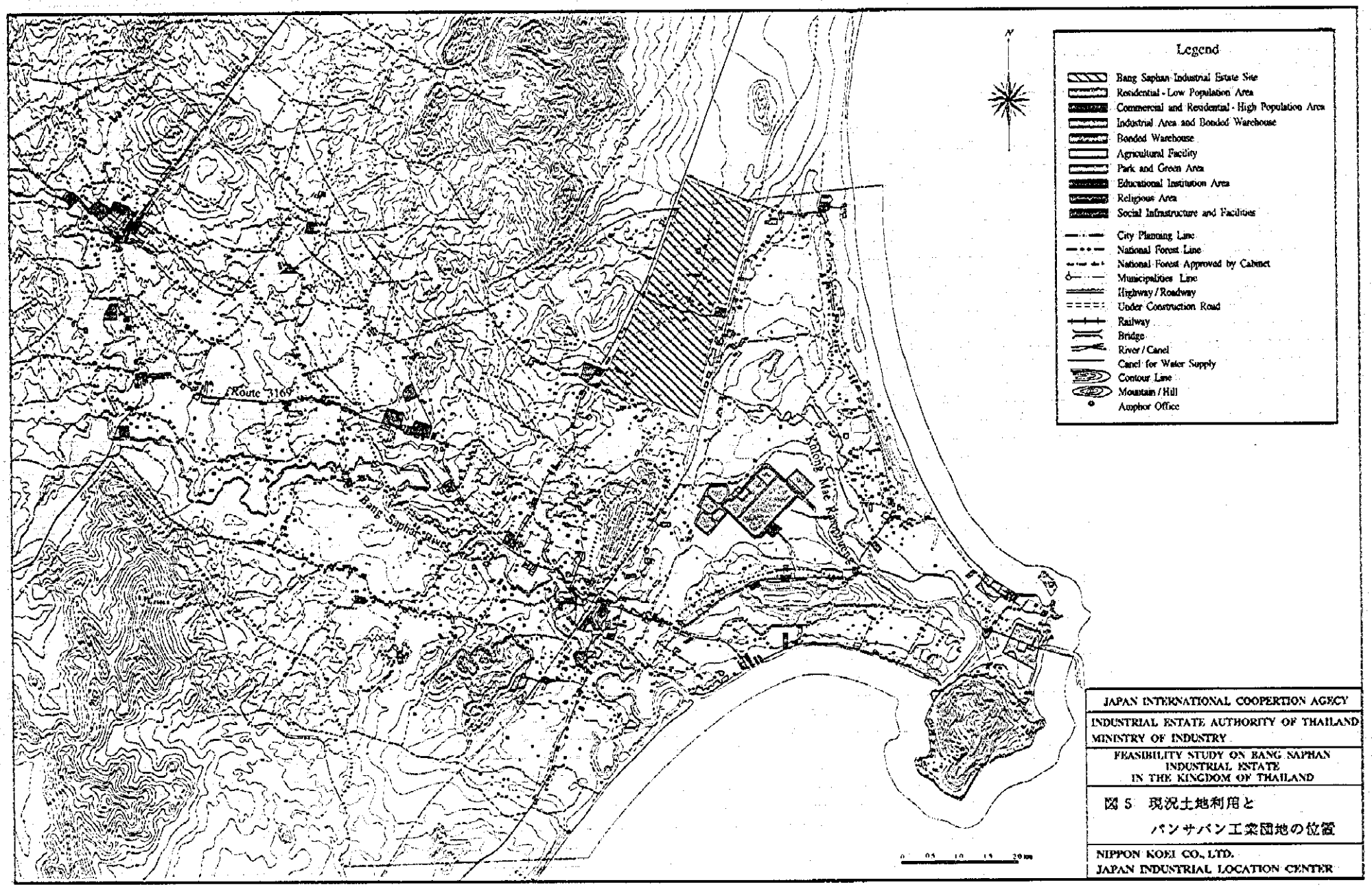
INDUSTRIAL ESTATE AUTHORITY OF THAILAND
MINISTRY OF INDUSTRY
FEASIBILITY STUDY ON RANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND
図 4 バンサパン工業都市
土地利用構想（2011年，シナリオ1）
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER



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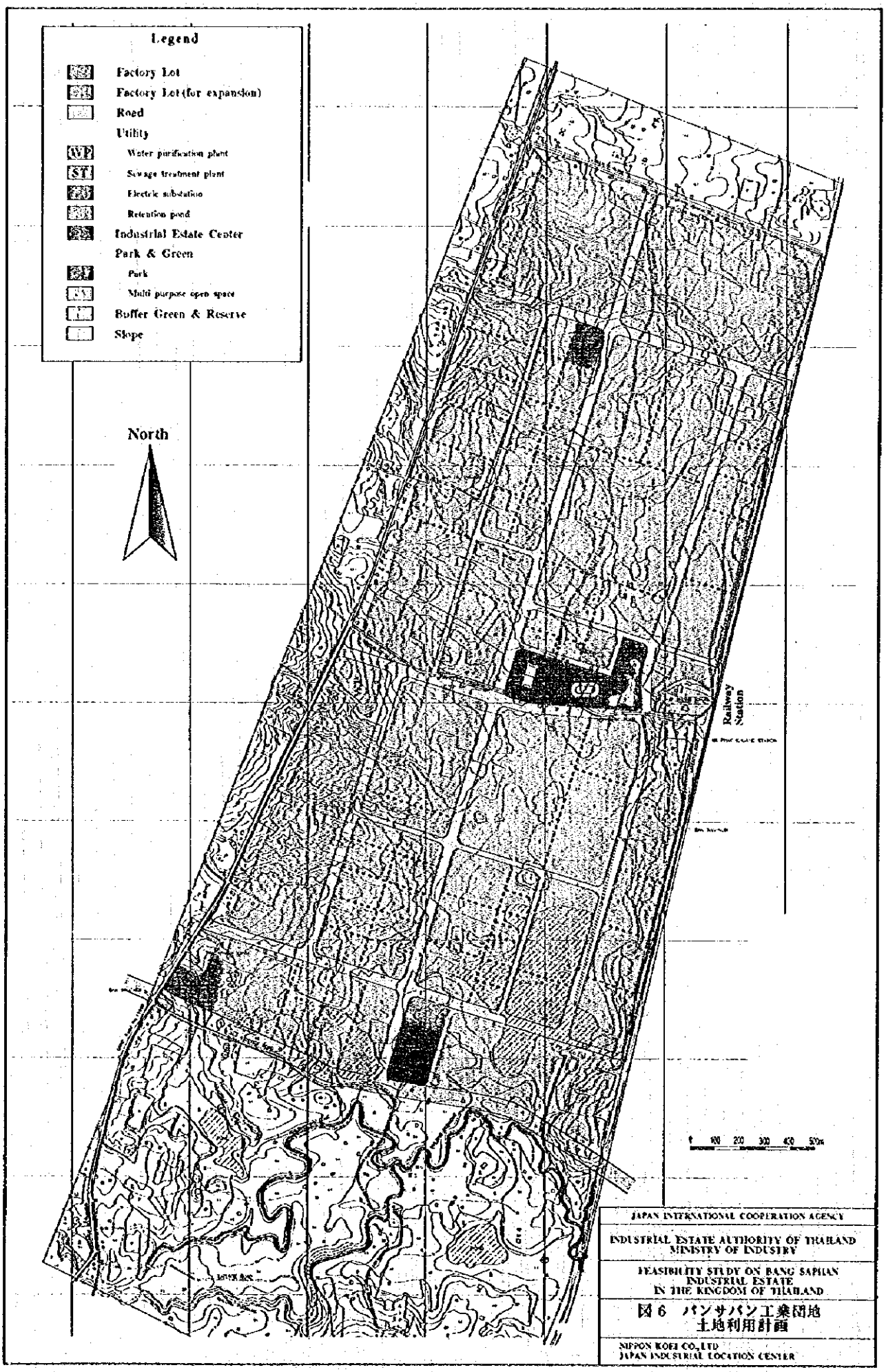
FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図 5 現況土地利用と
バンサパン工業団地の位置

NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER


Legend
Factory Lot
Factory Lot(for expansion)
Road
Utility
WP
Water purification plant
ST
Sewage treatment plant
Electric substation
Retention pond
Industrial Estate Center
Park & Green
Park
Multi purpose open space
Buffer Green & Reserve
Slope
North
Railway Station
0 100 200 300 400 500m
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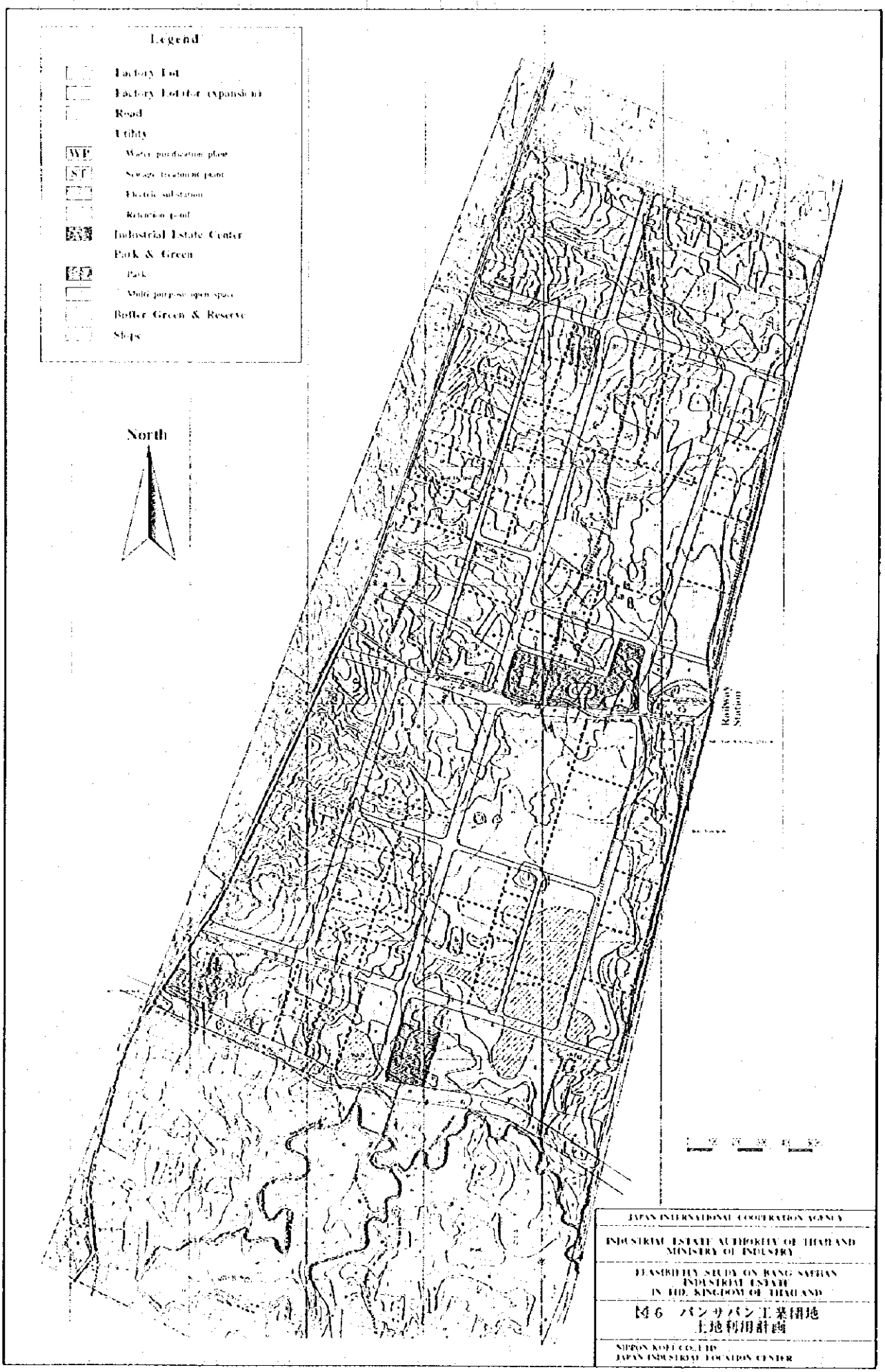
MINISTRY OF INDUSTRY
FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND
図6 バンサパン工業団地
土地利用計画
NIPPON KOEI CO., LTD
JAPAN INDUSTRIAL LOCATION CENTER


Legend
Factory Lot
Factory Lot(for expansion)
Road
Utility
WP
Water purification plant
ST
Sewage treatment plant
Electric substation
Retention pond
Industrial Estate Center
Park & Green
Park
Multi purpose open space
Buffer Green & Reserve
Ships
North
Railway Station
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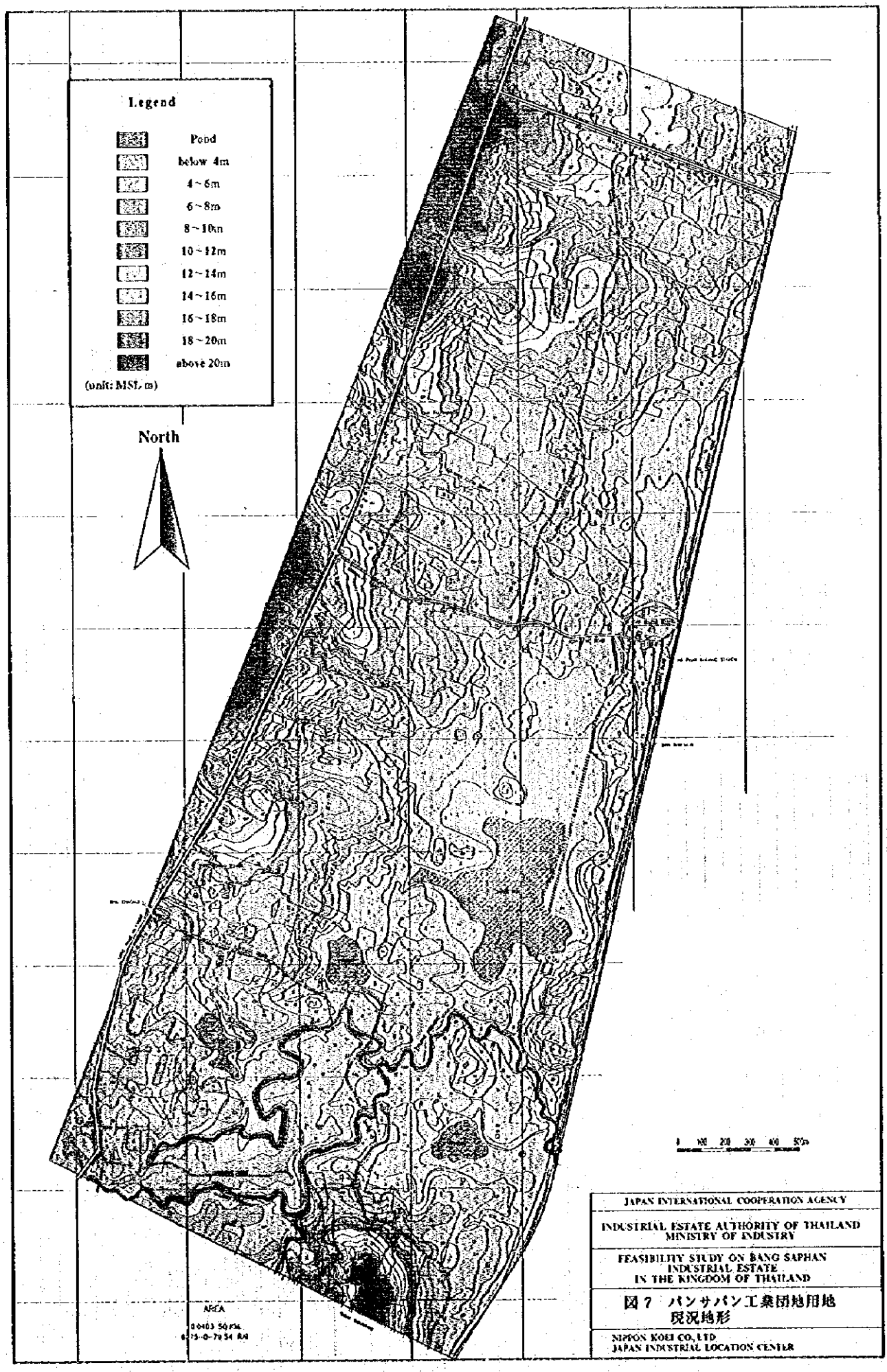
MINISTRY OF INDUSTRY
FEASIBILITY STUDY ON BANG SAPHAN
INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
図6 バンサパン工業団地
土地利用計画
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER


Legend
Pond
below 4m
4~6m
6~8m
8~10m
10~12m
12~14m
14~16m
16~18m
18~20m
above 20m
(unit: MSL m)
North
0 100 200 300 400 500m
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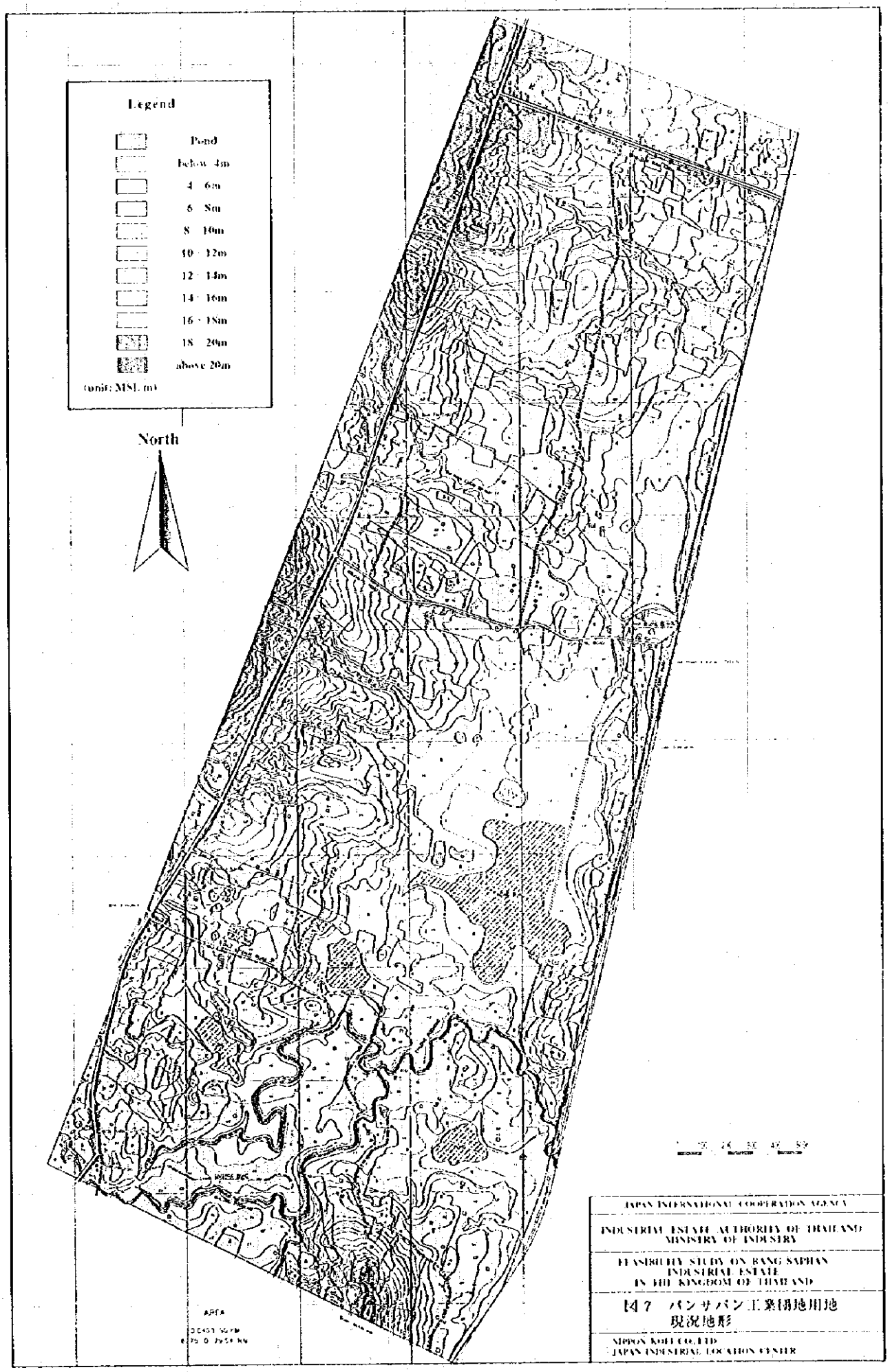
FEASIBILITY STUDY ON BANG SAPHAN
INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
図 7 バンサパン工業団地用地
現況地形
NIPPON KOEI CO., LTD
JAPAN INDUSTRIAL LOCATION CENTER


Legend
Pond
Below 4m
4 - 6m
6 - 8m
8 - 10m
10 - 12m
12 - 14m
14 - 16m
16 - 18m
18 - 20m
above 20m
(unit: MSL m)
North
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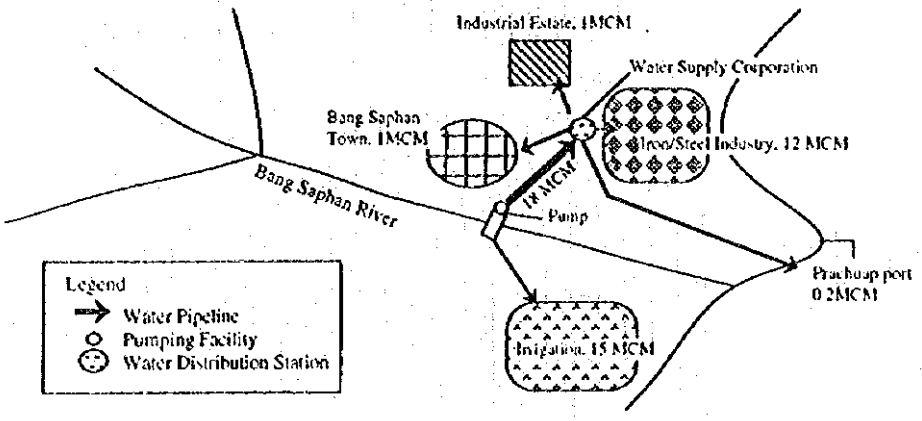
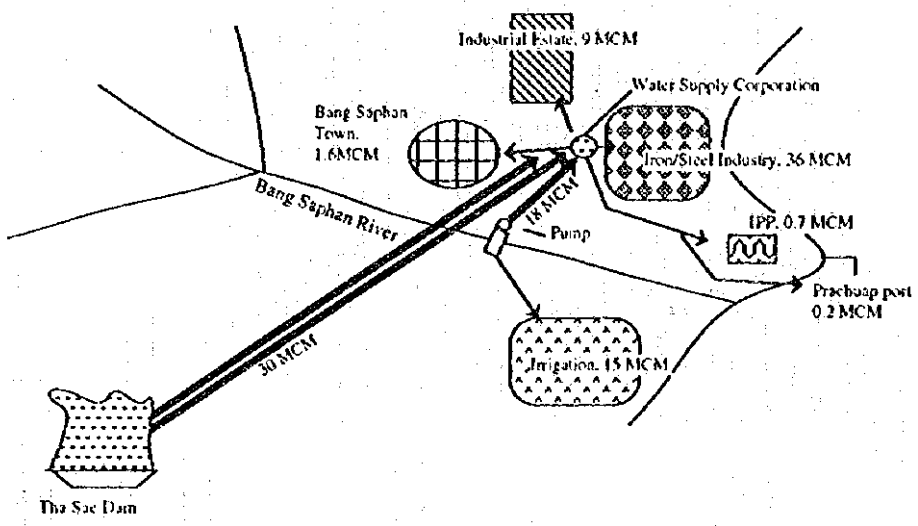
FEASIBILITY STUDY ON BANG SAPHAN
INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
図7 バンサパン工業団地用地
現況地形
NIPPON KOEI CO.,LTD.
JAPAN INDUSTRIAL LOCATION CENTER



in 2001

From Bang Saphan River : 33 MCM
Pump 18 MCM
Irrigation 15 MCM

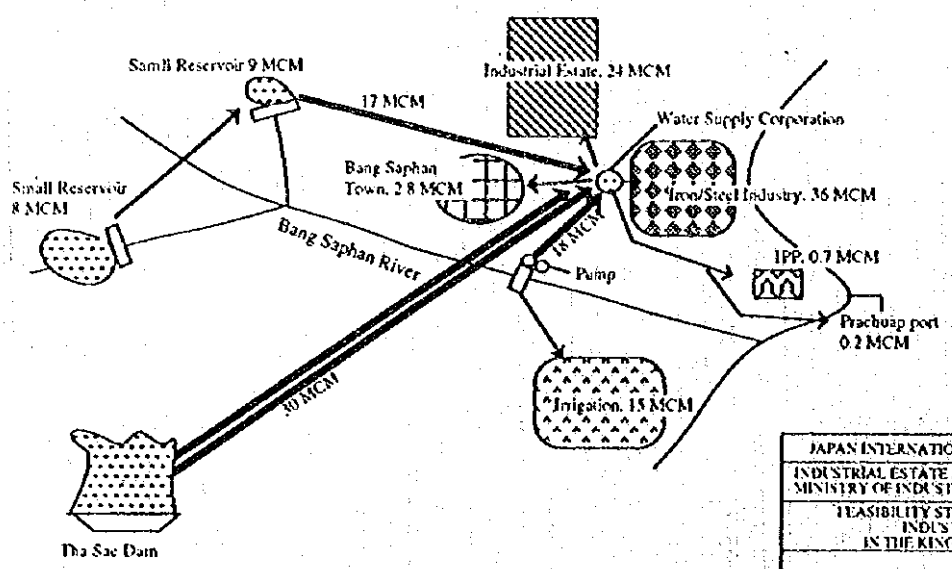
Demand : 30 MCM
Iron industry : 12 MCM
IE : 1 MCM
Domestic use : 1 MCM
Irrigation : 15 MCM
Others : 0.2 MCM
Total : 30 MCM



in 2006

From Bang Saphan River : 33 MCM
Pump 18 MCM
Irrigation 15 MCM
From Tha Sae Dam : 30 MCM
Total : 63 MCM

Demand : 63 MCM
Iron industry : 36 MCM
IE : 9 MCM
Domestic use : 2 MCM
Irrigation : 15 MCM
Others : 1 MCM
Total : 63 MCM



in 2011

From Bang Saphan River : 50 MCM
Pump 18 MCM
Dam 17 MCM
Irrigation 15 MCM
From Tha Sae Dam : 30 MCM
Total : 80 MCM

Demand : 77 MCM
Iron industry : 36 MCM
IE : 22 MCM
Domestic use : 3 MCM
Irrigation : 15 MCM
Others : 1 MCM
Total : 77 MCM

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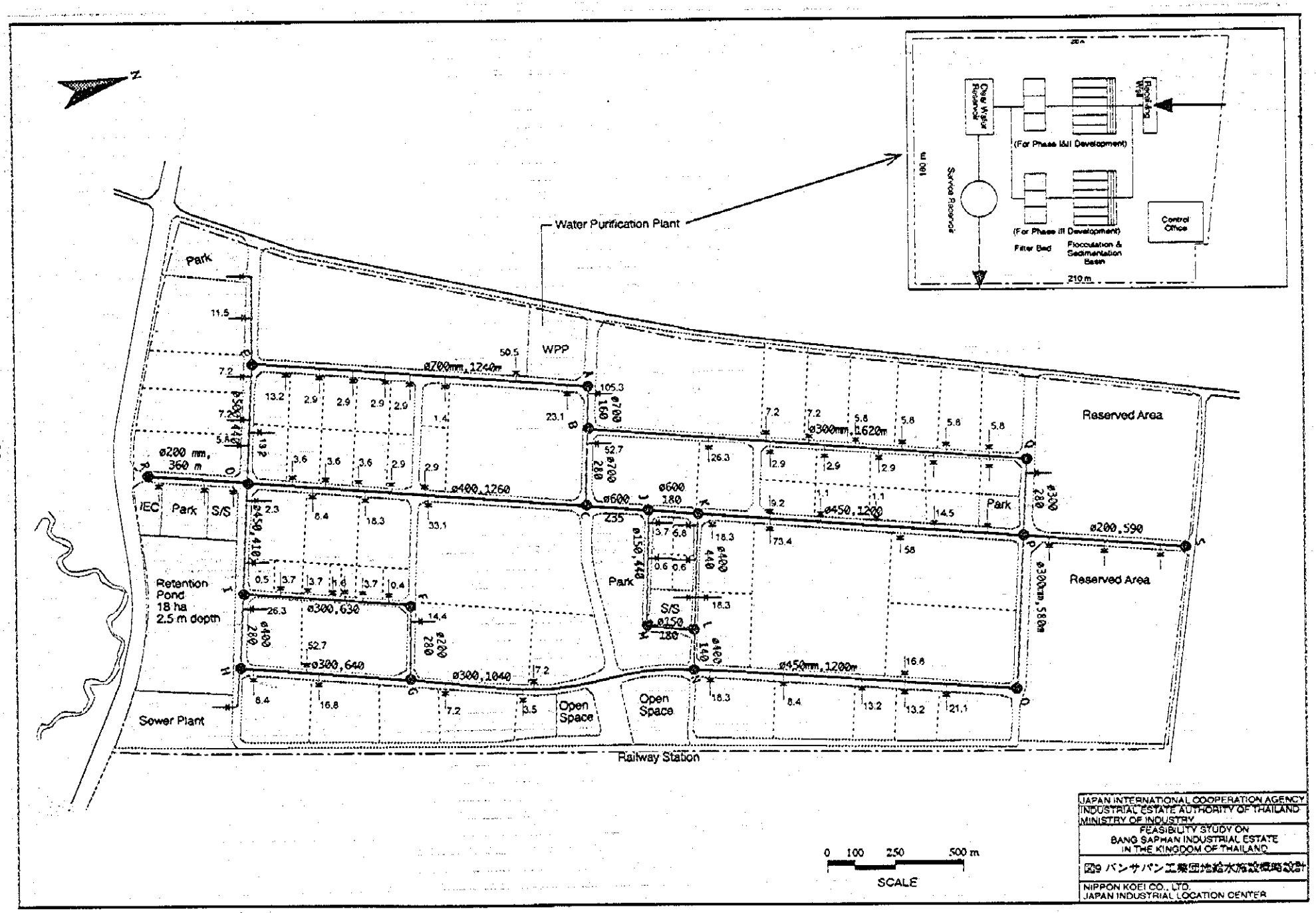
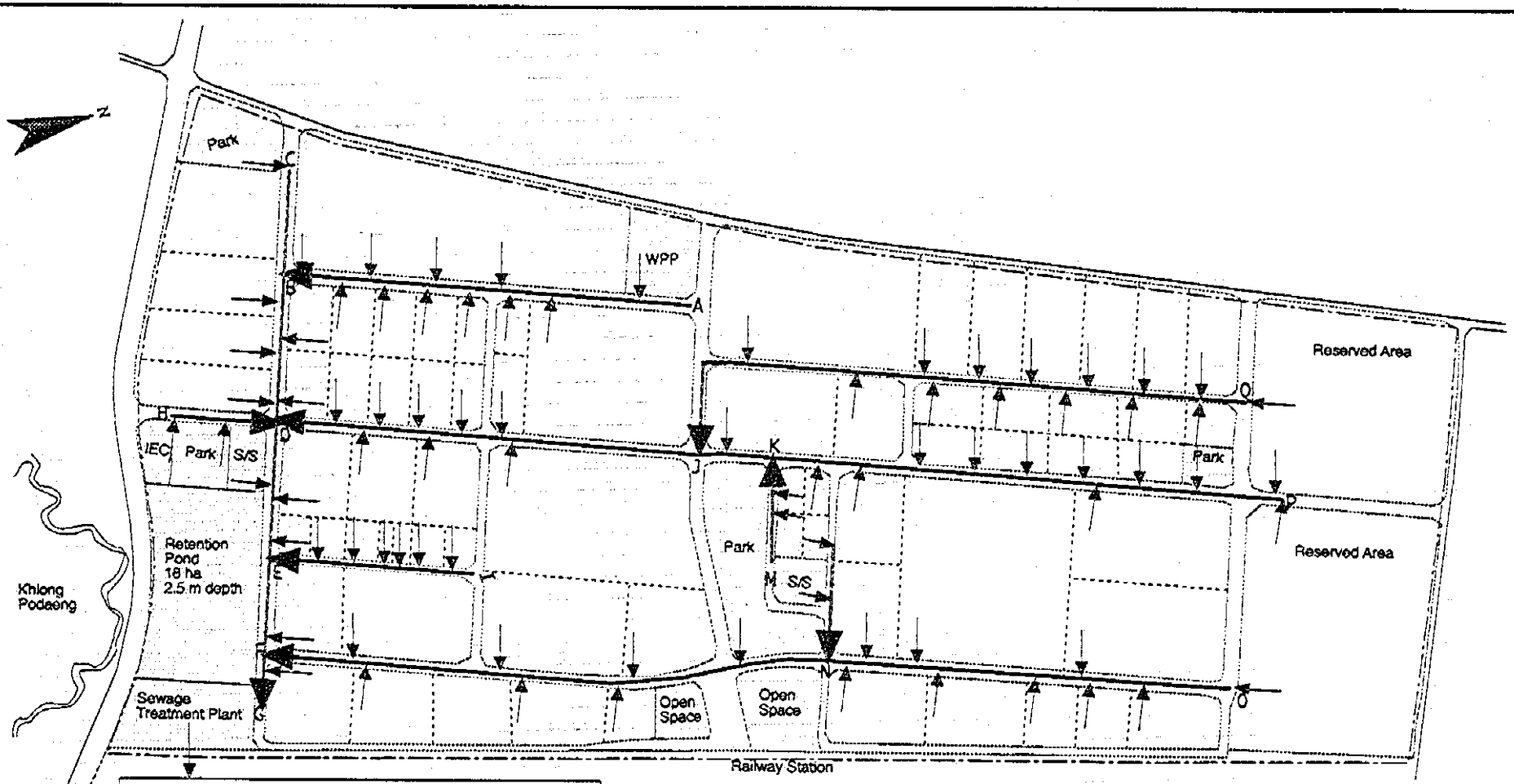
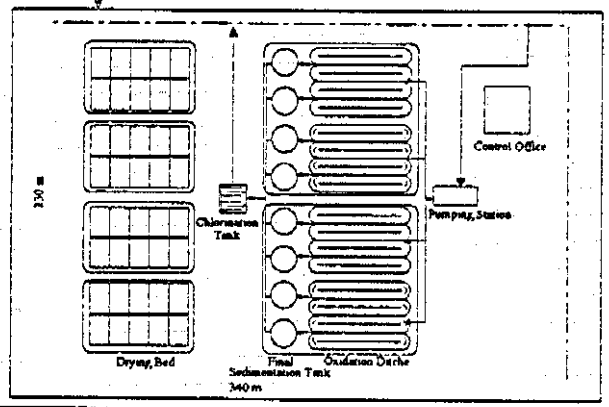
MINISTRY OF INDUSTRY
FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図8 バンサパン地区への給水計画

NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER


Water Purification Plant
WPP
Park
Reserved Area
Retention Pond
18 ha
2.5 m depth
Sewer Plant
Railway Station
Open Space
S/S
IEC
Z35
ø200mm, 1240m
ø300mm, 1620m
ø200 mm, 360 m
ø400, 1260
ø450, 1200
ø200, 590
ø300mm, 580m
ø300, 630
ø300, 640
ø300, 1040
ø450mm, 1200m
(For Phase I&II Development)
(For Phase III Development)
Filter Bed
Flocculation & Sedimentation Basin
Control Office
Service Reservoir
210 m
0 100 250 500 m
SCALE
JAPAN INTERNATIONAL COOPERATION AGENCY
INDUSTRIAL ESTATE AUTHORITY OF THAILAND
MINISTRY OF INDUSTRY
FEASIBILITY STUDY ON
BANG SAPHAN INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER





Pipe No.	Length (m)	Diameter (mm)
A-B	1,240	300
C-B	250	300
B-D	440	300
D-E	450	600
E-F	280	600
F-G	100	800
H-D	360	300
O-J	1,900	300
P-J	1,650	300
J-D	1,260	600
O-N	1,200	300
N-F	1,680	500
I-E	630	300
L-N	350	300
M-K	300	300

0 100 250 500 m
SCALE

JAPAN INTERNATIONAL COOPERATION AGENCY
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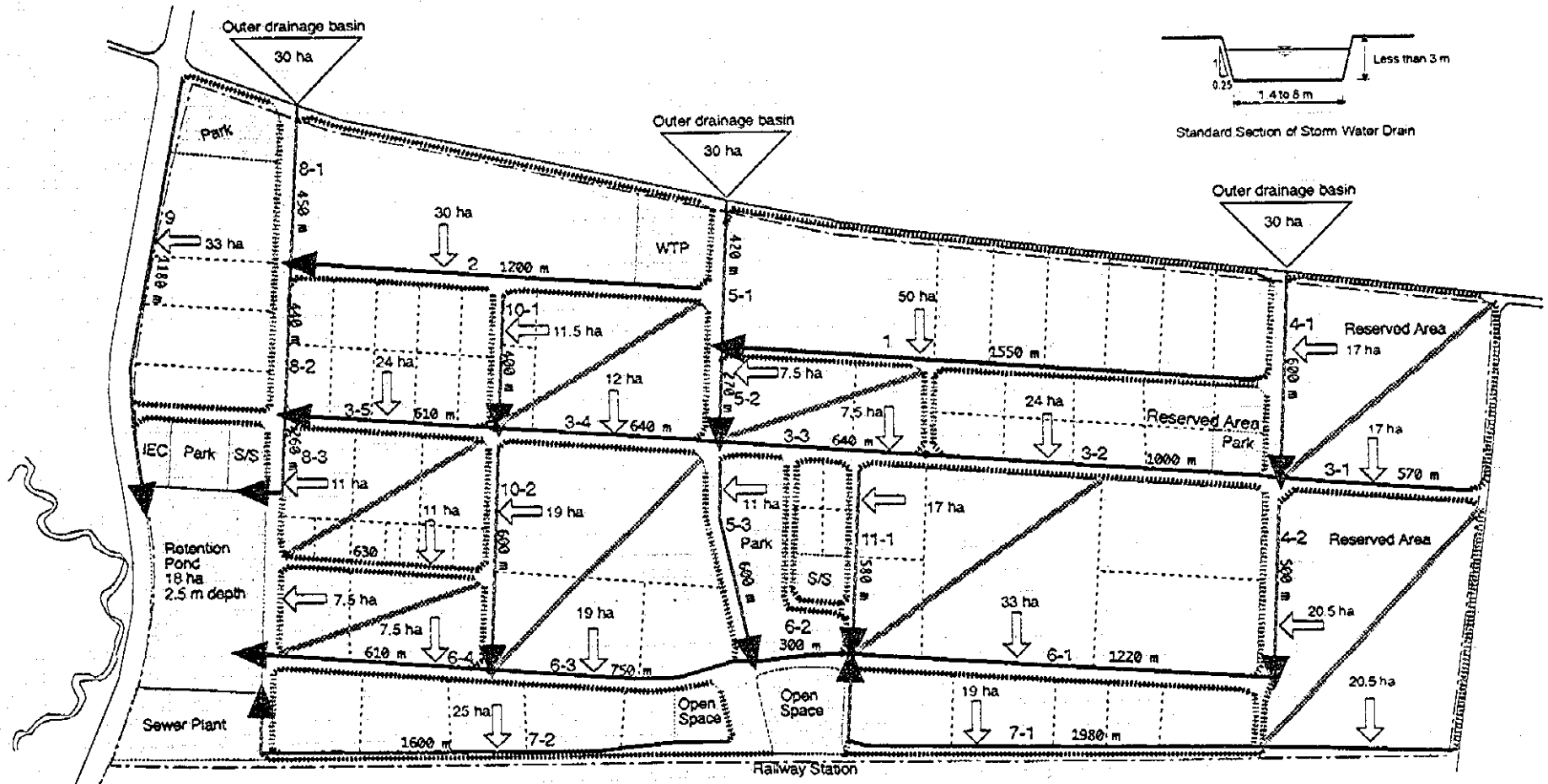
BANG SAPHAN INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
図10 バンサパン工業団地
汚水処理施設配置図
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER


N
Outer drainage basin
30 ha
Outer drainage basin
30 ha
Outer drainage basin
30 ha
Less than 3 m
1
0.25
1.4 to 8 m
Standard Section of Storm Water Drain
Park
8-1
450 m
9
33 ha
1180 m
30 ha
2
1200 m
WTP
420 m
5-1
50 ha
1
1550 m
4-1
Reserved Area
17 ha
10-1
11.5 ha
8-2
24 ha
400 m
12 ha
7.5 ha
5-2
3-5
610 m
3-4
640 m
3-3
640 m
7.5 ha
24 ha
Reserved Area
Park
3-2
1000 m
17 ha
3-1
570 m
IEC
Park
S/S
8-3
11 ha
10-2
19 ha
11 ha
5-3
Park
17 ha
11-1
4-2
Reserved Area
Retention
Pond
18 ha
2.5 m depth
630
600 m
S/S
500 m
7.5 ha
7.5 ha
610 m
6-4
19 ha
6-3
750 m
6-2
300 m
33 ha
6-1
1220 m
20.5 ha
20.5 ha
Sewer Plant
25 ha
1600 m
7-2
Open
Space
Open
Space
19 ha
7-1
1980 m
Railway Station
LEGEND
Road Side Ditch
Storm Water Drainage Canal and Flow Direction
Direction of Inland Rain Water
Boundary of Drainage Area
0 100 250 500 m
SCALE
JAPAN INTERNATIONAL COOPERATION AGENCY
INDUSTRIAL ESTATE AUTHORITY OF THAILAND
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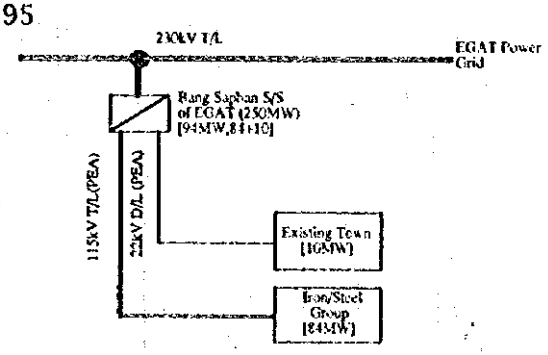
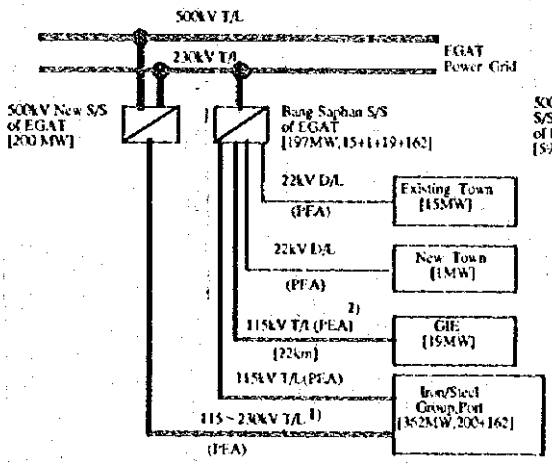
BANG SAPHAN INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
図11 バンサパン工業団地
雨水排水処理施設概略図
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER

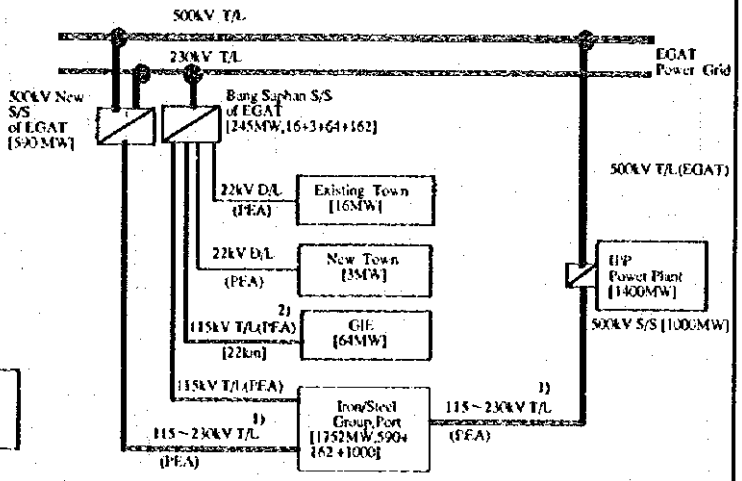
in 1995



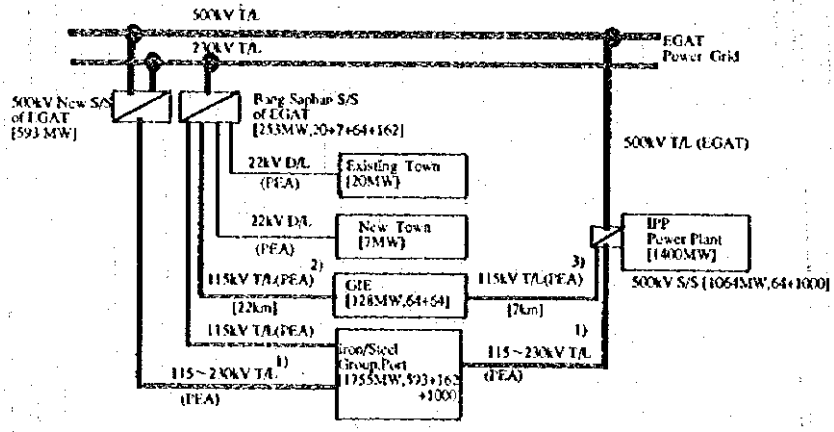
End of 2001



in 2006



in 2011



Remarks 1) : Transmission voltage will depend on electricity demand of each consumer.

2) : To be constructed by the end of 2000.

3) : To be constructed by the end of 2007.

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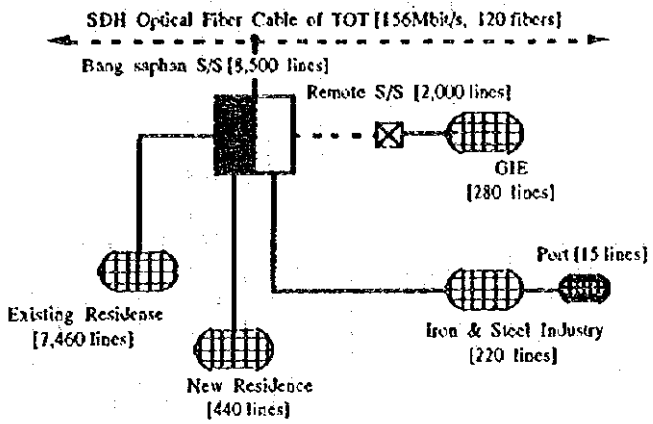
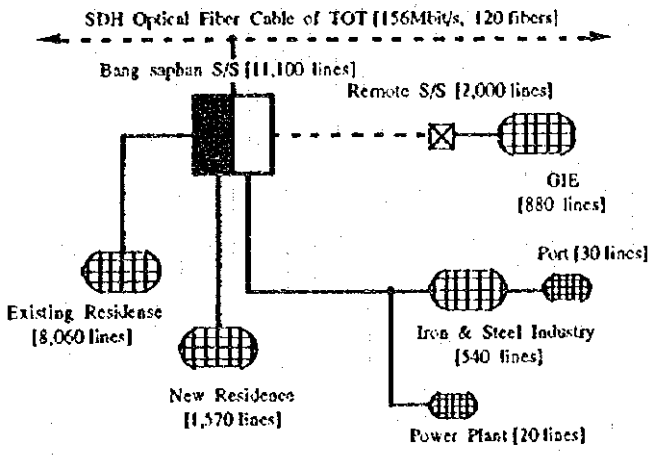
図12 バンサパン工業都市全体の配電計画
NIPPON KOEI CO.,LTD JAPAN INDUSTRIAL LOCATION CENTER

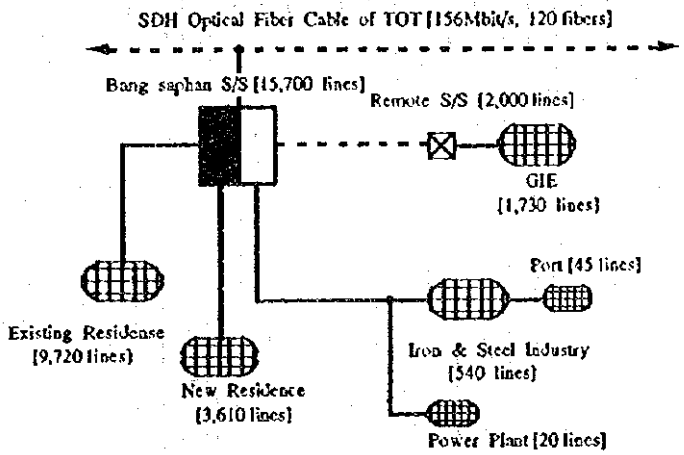
in 2001



in 2006



in 2011



Legend

- Switching station to be expanded
- Remote Switching station to be constructed
- Distribution line to be constructed and/or to be expanded
- Optical fiber cable
- Distribution grid line to be constructed and/or to be expanded

JAPAN INTERNATIONAL COOPERATION AGENCY
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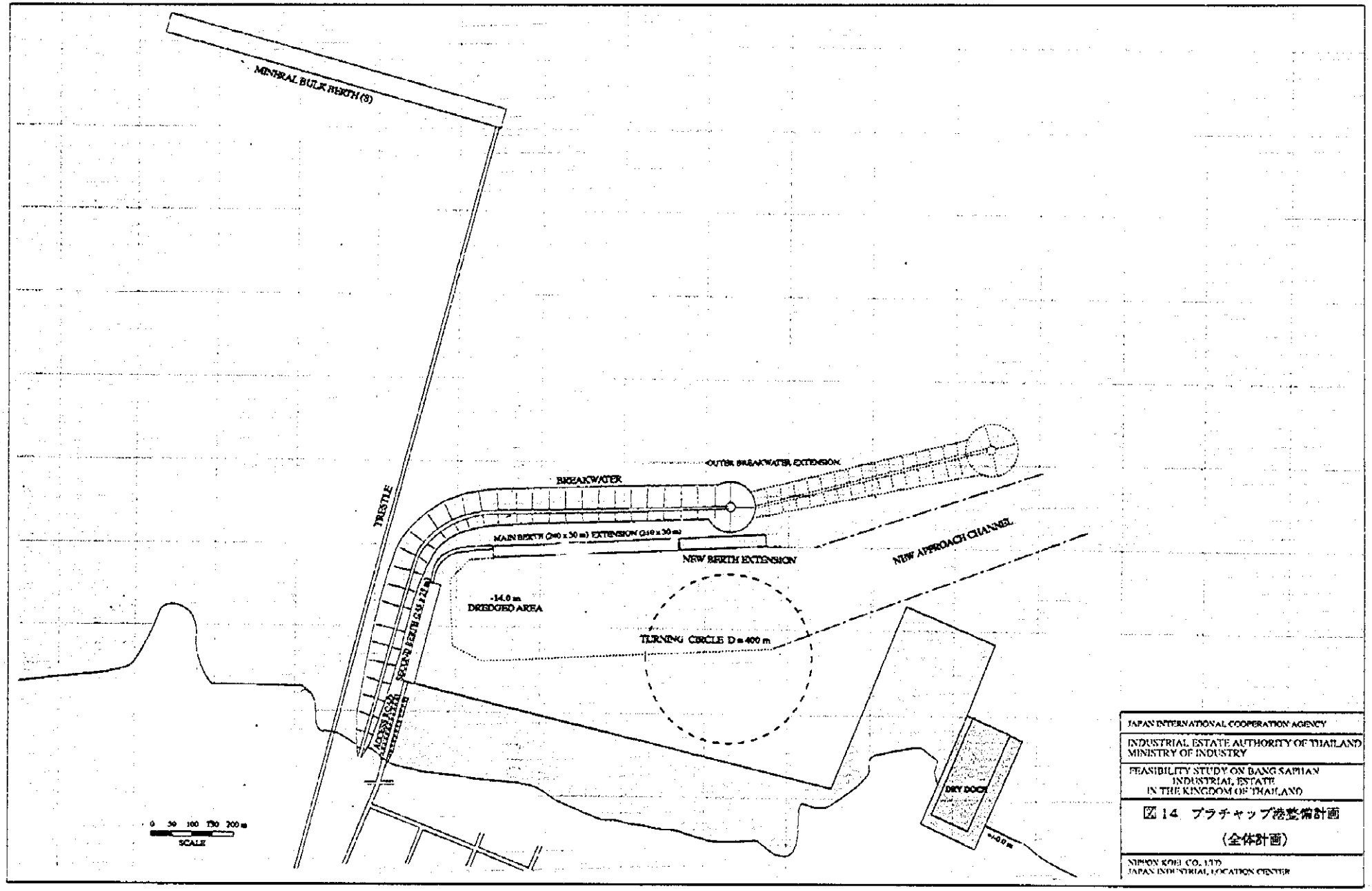
FEASIBILITY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図 13 バンサパン工業都市全体の通信施設計画

NIPPON KOEI CO. LTD
JAPAN INDUSTRIAL LOCATION CENTER


MINERAL BULK BERTH (S)
TRESTLE
BREAKWATER
OUTER BREAKWATER EXTENSION
MAIN BERTH (260 x 30 m) EXTENSION (210 x 30 m)
NEW BERTH EXTENSION
NEW APPROACH CHANNEL
-14.0 m
DREDGED AREA
TURNING CIRCLE D = 400 m
SECOND BERTH (50 x 12 m)
ACCESS ROAD
DRY DOCK
0 50 100 150 200 m
SCALE
JAPAN INTERNATIONAL COOPERATION AGENCY
INDUSTRIAL ESTATE AUTHORITY OF THAILAND
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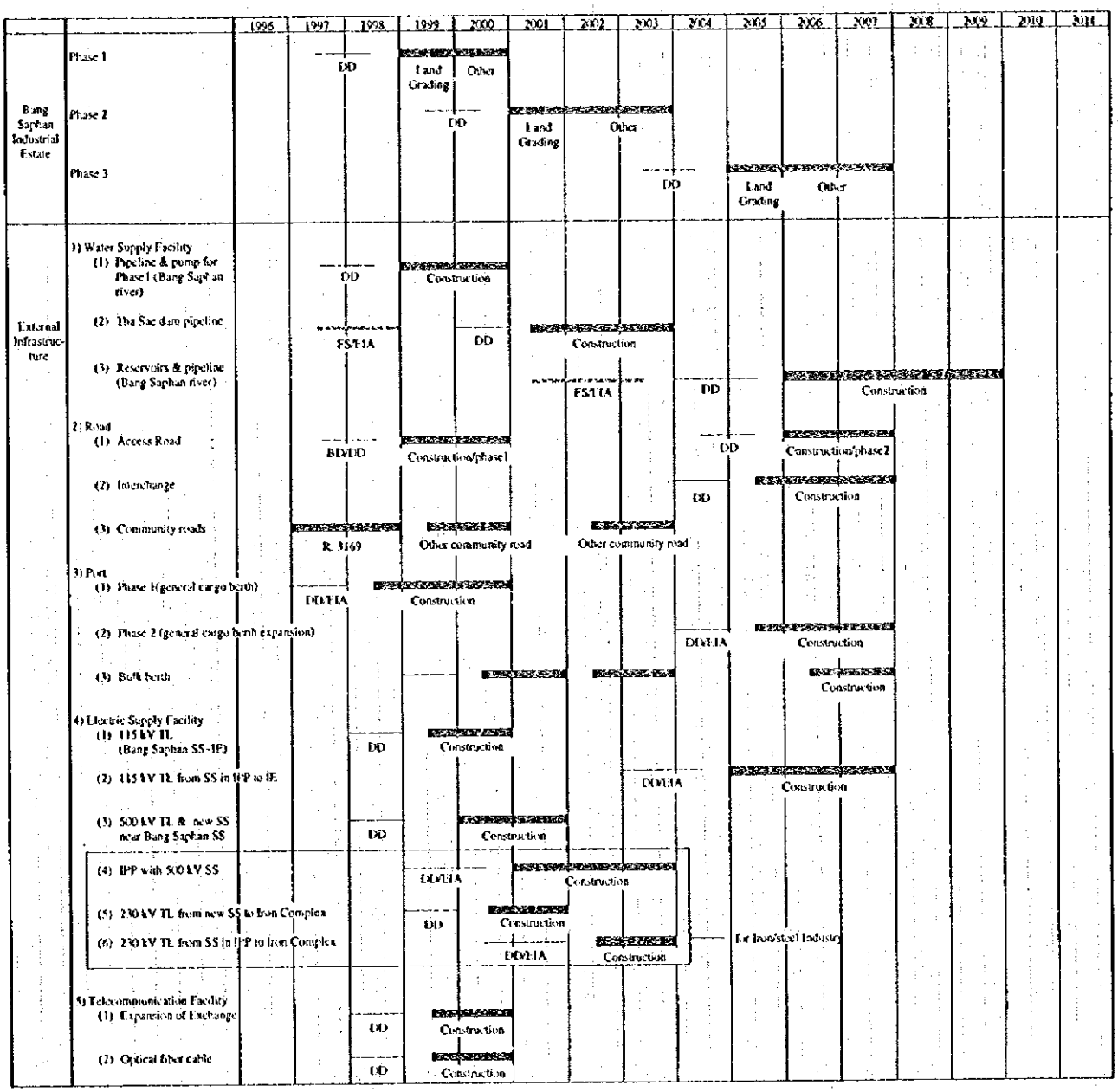
FEASIBILITY STUDY ON BANG SAPHAN
INDUSTRIAL ESTATE
IN THE KINGDOM OF THAILAND
図 14 プラチャップ港整備計画
(全体計画)
NIPPON KOEI CO., LTD.
JAPAN INDUSTRIAL LOCATION CENTER



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INDUSTRIAL ESTATE AUTHORITY OF THAILAND
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TF ASIBO FY STUDY ON BANG SAPHAN INDUSTRIAL ESTATE IN THE KINGDOM OF THAILAND

図15 開発スケジュール

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JICA