

2.3 Existing Conditions in The Study Area

2.3.1 Natural Settings

(1) Fauna and Flora

Currently, almost all of the Study Area is affected by human activities and therefore primary natural conditions, such as primary forests or natural rivers, are not observed. However, more diversified fauna and flora are found in the Study area than in the central Bangkok Metropolitan Administration area. The Study Area has several environments that function as habitats for fauna and flora such as paddy fields, groves, canals and fish ponds.

1) *Terrestrial Environmental Conditions*

A large part of the Study Area is occupied by agricultural land such as paddy fields. Such agricultural land is affected by human activities, however the area also functions as feeding fields for birds such as herons, storks, and egrets. Spotted groves are shrubs which are a major type of vegetation in the Study Area. The characteristics of the vegetation are secondary groves that grow after the cutting of the primary forest, or shrubs growing in flooded areas. The dominant species in the groves are *Combretum Quadrangulare* Kurz, *Bumusa flexuosa* munro, *Ficus benhamina* Linn and *Erythina fusca* Lour.

Most of the trees in the groves are about 10 to 20 meters in height, and serve as shelter and feeding areas for bird species, especially those nesting on the trees.

In the environmental impact assessment for the Survarhumi International Airport Project, a field survey was undertaken to record bird species in and around the airport project site. The dominant and common species recorded in the study are shown below. Of these, two species, *Streptopelia chinensis* and *Corvus macrohynchos*, are designated as threatened species by the IUCN Threatened Red List.

Table 2.12: List of Threatened Species from the IUCN

Scientific Name	Common Name	Scientific Name	Common Name
<i>Phalacrocorax niger</i>	Little Cormorant	<i>Dicururus macrocercus</i>	Black Dragon
<i>Bublcus ibis</i>	Cattle Egret	<i>Corvus macrohynchos</i>	Large-Billed Crow
<i>Nycticofrax nycticofrax</i>	Night heron	<i>Orthotomus sutorius</i>	Long Tailed Tailor
<i>Vallunes indicus</i>	Red-wattled lapwing	<i>Copsychus saularis</i>	Lippie robin
<i>Cloumbia livia</i>	Rock pigeon	<i>Rhipidura javanica</i>	Pied Forestial Flycatcher
<i>Streptopelia chinensis</i>	Spotted-Necked Dove	<i>Acridotheres tristis</i>	Common Myna
<i>Coracias Benghalensis</i>	Black-Bulled Roller	<i>Passer montanus</i>	Tree Sparrow
<i>Pycnonotus blanford</i>	Blanford's Bulbul	<i>Lonchura punctulata</i>	Spotted Munia

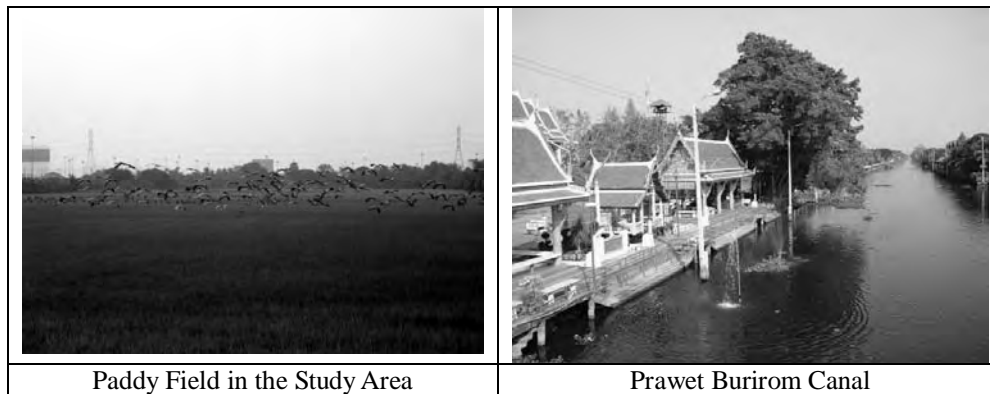
Note : Marked species are designated as threatened species by IUCN Threatened Red List.
Source : Environmental Impact Assessment Report for Suvarnabumi International Airport

2) *Condition of the Aquatic Environment*

As mentioned above, there are no natural large rivers in the Study Area. Therefore, fish ponds and canals, such as the Prawet Burirom Canal, are the main aquatic environments in the Study Area. The dominant species are carp (*Puntius gonionotus*),

catfish (*Claris macrocephalus*), eel (*Mastacembelus maculates*) and perch (*Anabas testudineus*).

The water quality in the canals is basically adaptable for the above types of fish from trophic viewpoint. The color of water in the canals is generally green, which means that algae grows and eutrophic conditions exist. The Biochemical Oxygen Demand (BOD) of the Prawet Burirom Canal ranges between 10 mg/L and 15 mg/L based on a recent field survey conducted by the BMA. These values are slightly better than in small canals in the city center area, where the color of the water is black or gray. In the field reconnaissance, no strong odor was detected.



2.3.2 Socio-Economic Characteristics

(1) Local Administration at Village Level within the BMA

1) Local Villages

Within the BMA, there exist three levels of local administration. These are districts (khet), sub-districts (khwaeng), and villages (muban) or registered communities (chumchon). However, the BMA Governor announced an administrative order in September 2004 stating that five local positions (sub-district head (kamnan), village head (puyaibaan), assistant to village head, sub-district doctor and sub-district inspector), would be revoked. In the order, the above officials were given a grace period of one year and were all dismissed by the end of September 2005. The situation now observed at village level is that a village head remains in some villages but not in others. Administratively, the villages without a village head are now under a district. However, the name and boundary of these villages are still used for reference purposes.

2) Registered Local Community

Aside from villages, registered communities also exist at the village level within the BMA. The registered communities are provided with administrative and financial support from the BMA. The households in the villages without a village head have been recommended by the BMA to either join the existing registered communities nearby or form their own registered community. Otherwise, the individual households in the villages without a village head are directly under the administration of the respective district.

(2) Local Communities in the Study Area

1) *Existing Villages and Registered Communities in the Study Area*

In the Study area, there are 11 villages and 11 registered communities located within the three districts of Lat Krabang, Saphan Sung and Prawet. The registered communities in the Study area are all established within village boundaries. The existing villages and registered communities in the Study area are listed in the following table.

Table 2.13: List of Villages and Registered Communities in the Study Area

	Village / Registered Community	Sub-District	District
Villages	Muban 1	Klong Song Ton Noon	Lat Krabang
	Muban 2	Klong Song Ton Noon	Lat Krabang
	Muban 5	Klong Song Ton Noon	Lat Krabang
	Muban 5	Klong Sam Prawet	Lat Krabang
	Muban 5	Lat Krabang	Lat Krabang
	Muban 6	Lat Krabang	Lat Krabang
	Muban 7	Lat Krabang	Lat Krabang
	Muban 14	Saphan Sung	Saphan Sung
	Muban 17	Saphan Sung	Saphan Sung
	Muban 1	Prawet	Prawet
	Muban 2	Prawet	Prawet
Registered Communities	Lan Boon Village Community	Lat Krabang	Lat Krabang
	Lang Wat Lan Boon Community	Lat Krabang	Lat Krabang
	Somnook Community	Lat Krabang	Lat Krabang
	Soi Thammanoon Community	Lat Krabang	Lat Krabang
	Wat Sangkha Ra Cha Community	Klong Song Ton Noon	Lat Krabang
	Therd Sasana Community	Klong Song Ton Noon	Lat Krabang
	Jitra Community	Klong Song Ton Noon	Lat Krabang
	Rom Khlong Nung Community	Klong Song Ton Noon	Lat Krabang
	Khlong Nung Community	Klong Song Ton Noon	Lat Krabang
	Saphan Sung Mu 14 Pattana Community	Saphan Sung	Saphan Sung
	Klong Maechan Community	Saphan Sung	Saphan Sung

Source: Community Development Sub-Division of Lat Krabang, Saphan Sung and Prawet Districts

The location of the villages and registered communities in the Study area is shown in the following Figure.



Figure 2.12: Location of Villages and Registered Communities in the Study Area

The general characteristics of each community are summarized below.

2) *General Characteristics of Local Communities in the Study Area*

The major characteristics of local communities in the Study area were derived from an interview survey of 350 households randomly selected within the Study area.

It is noted that the total number of family members in the sampled households was 1,364, of which 57.8% were independent family members and 42.2% were dependent family members.

Number of Family Members – The average number of family members in each household is 3.9, which is a little higher than the Bangkok average of 3.6.

Age Group Composition - The average age of the family members is 32. The majority of family members (29.3%) are between the ages of 31 and 45. The share of elders older than 61 is 9.0%.

Composition of Religions - The majority of households are of Buddhist religion (96.3%). There are also Muslim households (2.9%) and Christian households in the Study area. It is noted that a large number of the Muslim households are located in two registered communities in the Saphan Sung District in the Study area (Saphan Sung Mu 14 Phattana Community: 66.1%, and Khlong Mae Chan Community: 90.0%).

Educational Attainment - The majority of family members graduated from primary school (38.6%), followed by vocational school (14.7%), junior high school (14.1%), university or higher (12.1%) and senior high school (10.8%).

Length of Stay in the Study Area - The majority of households have lived in the Study area for 10 years or less (53.4%), followed by 11-21 years (19.4%) and 21-30 years (9.1%). The share of the households that have lived in the Study area for more than 51 years is 6.9%. It is noted that most of the households are found to have a blood relationship, which implies strong social ties among the households.

Occupation - The majority of independent household members are employed as office workers (47.8%), followed by retail sellers (29.2%), restaurant and food related workers (4.3%), self-employed workers (4.2%), farmers (3.7%) and wage-workers (2.8%).

Household Income - The majority of households were found to have a monthly income of 10,000 to 25,000 Baht (34.4%). According to the average household income (NHA standard), 28.5% of the households are in the low-income group. A further 15.6% of the households are below or close to the household poverty line set by the NESDB. It is noted that the above figures are based on 288 households that responded the question on household income.

Workplace - The place of work for the majority of households is the Lat Krabang District (79.1%). Including the households working in the vicinity of Lat Krabang (3.4%), the share of households working in and around the vicinity of Lat Krabang is 82.5%. The share of households working in the inner city of Bangkok is only 5.1%.

House Ownership and Land Tenure – The majority of the households own their house (70.3%), while the share of the households renting their house is 23.1%. The majority of the households own their land (62.9%), while the share of the households renting their land is 27.4%. It is noted that these figures imply that approximately 60% of the household could own both their house and land.

Membership of Local Associations – Only a small number of households (14.0%) were found to be members of a local association. The majority of these households are members of a saving association (22.4%), followed by associations in career development (14.3%), sports (14.3%), senior citizens (12.2%) and community development (10.2%).

(3) Population

In the Lat Krabang Sub-Center Area, there are currently 70 villages as listed below, with a total population of about 30,000.

Table 2.14: Population and Households in the Study Area

District (Khet)	Sub-districts (Khwaeng)	No. Village (Mu)	Population			No. House holds	HH. Size (persons /HH.)	Remarks - Registered communities are in the village
			Male	Female	Total			
Lat Krabang 1/	Khlung Song Ton Noon	1	891	959	1,850	438	4.22	Khlung 1 (438 hh.)
		2	694	706	1,400	259	5.41	Jitra (105 hh.)
	Lat Krabang	5	1,377	1,460	2,837	706	4.02	Rom Khlao 1 (137 hh.)
		5	2,654	2,834	5,488	2,059	2.67	Wat Sang Kha Ra Cha (100 hh.) Therd Sasana (104 hh.)
		6	1,070	1,209	2,279	722	3.16	Lan Boon Village (135 hh.) Somnook Village (69 hh.)
		7	2,215	2,333	4,548	1,324	3.44	Behind Wat Lan Boon (240 hh.) Soi Thammanoon (105 hh.)
	Khlung Sam Prawet	5	2,540	2,660	5,200	3,539	1.47	- None
Saphan Sung 2/	Saphan Sung	14	537	523	1,060	187	5.67	Saphan Sung Mu 14 Phattana
		17	118	135	253	124	2.04	Khlung Maechan
Prawet 2/	Prawet	1 *	1,140	1,332	2,472	1,233	2.00	- None
		2 *	1,622	1,664	3,286	1,136	2.89	- None
Total			14,858	15,815	30,673	11,727	2.62	

Remark: * Muban 1 and 2 of Prawet District included the out side the study area because of the Muban boundaries.

Source : 1/ Lat Kabang District, September 2004.

2/ Saphan Sung District and Prawet District, October 2004.

Source: JICA Study Team estimates based on data provided by BMA.

(4) Economic and Industrial Activities

As listed in the following table, the major types of industrial activities in the Study Area are car maintenance, hardware makers and gas stations. There are approximately 90 industries in total, of which the Lat Krabang district incorporates 60%.

Table 2.15: List of Existing Industries in the Study Area

Company	Type	No.of Labour
Klong Song Ton Noon Sub-district		
1 Lamhom's mart	Packaged Food	-
2 Match & Fresh	Canning food production	-
3 Mitphum Co., Ltd	Metal Container Making	7
4 Motorwaytry Co.,Ltd	Motor maintainence	3
5 Phumanirat drugstore	Drugstore	-
6 Pradit Compressor	Electric maintainence	-
7 Rain Mart Co., Ltd	Painting	180
8 Rain Mart Co., Ltd	Seamstress	120
9 Sricharoen's platic	Plastic draner	10
10 Tawatchai's commerce	Collecting for unused material	3
11 Taweechai Construct	Concrete product	-
12 Wo.Rungruang Karnchang	Wood's product	3
Total	12	326
Klong Sam Prawet Sub-district		
1 Amorn Sao Khem Co.,Ltd	Sawwing	-
2 Berlin Farmatical Industry Co.,Ltd	Drug Industry	168
3 Best Print Garment Co.,Ltd	Garment	-
4 Best Toy Co., Ltd	Garment, Aecessories make up	49
5 Chin Chai Hao Industry	Laundry by machine	490
6 Eastern China Wear Co., Ltd	Pottery	572
7 JGLO International Co., Ltd	Garment	130
8 Lapat	Barber	-
9 LXS Co., Ltd	Garment	64
10 National Furniture limited partnership	Aecessories make up	48
11 OGC Inter Trad Co., Ltd	Platic make up	-
12 R Ka Kong Kao	Collecting for unused material	-
13 Rom klao Ob-mai	Wood Dry	29
14 Siam Cpac Block Co., Ltd	Cement Factory	85
15 Sikari Pitroliem Co., Ltd	Mashine maintenance ,Gas Station	20
16 SRP Platic Co., Ltd	Rubber Make up	-
17 Star Holding Co., Ltd	Car Care, Gas Station	6
18 Thai agree pack Coj., Ltd	Packaged Food	38
19 Thai Inter Life Co., Ltd	Animal food	-
20 Thai Media Indutry Co.,Ltd	Plastic make up	387
21 Tho Nam Sakol Co.,Ltd	Pipe Distribution	121
Total	21	2207

*The Study on Implementation of the BMA Subcenters Program
in the Kingdom of Thailand (Case of Lat Krabang)
Final Report*

Lat Krabang Sub-district			
1	Aim Product Co., Ltd	Accessory make up	1
2	Air Product Co., Ltd	Painting	-
3	Alta Co., Ltd	Garment	967
4	Areeya Ka Mai & Construct	Sawwing	2
5	Ari Kar Mai limited partnership	Cement Collection	2
6	Big Garage	Painting	-
7	Chanakarn part of motor	Engine maintainence	-
8	Charoen Kao Thai limited partnership	Sawwing	-
9	chingnamchai (2002) Co., Ltd	Damage Things Collecting	-
10	Dafter Co., Ltd	Accessory make up	-
11	Doung Charoen Gas shop	Gas shop	3
12	Good Text Garment Factory Co., Ltd	Garment	51
13	Goodtext Garment Factory	Garment	51
14	Hlaung Thong Dee Co., Ltd	Car care	-
15	Hlaung Thong Dee Co., Ltd	Car care	-
16	Hlaung Thong Dee Co., Ltd	Car care	-
17	Hlaung Thong Dee Co., Ltd	Gas Station	-
18	Hnamdee	Wearing	264
19	Huai Chai Gas Shop	Gas shop	2
20	Isuzu Central Motor	Car Maintainence	180
21	Jong pattana karn chang	Painting	9
22	KG Trading & Service Co., Ltd	Gas Station, Car care	-
23	Kitso Co., Ltd	Accessory make up	30
24	Kitso Co., Ltd	Painting	-
25	Lee Bangkok Garage 2000	Painting	4
26	Moblie Oil Co., Ltd	Car care	-
27	Namkrai Kami Co., Ltd	Garment	372
28	Nattapan Prattana	Car care	17
29	Nontapan Prattana limited Partnership	Gas Station	-
30	NV yangyon	Engine maintainence	-
31	On-Nut Karn Tor Limited Partnership	Wearing	10
32	Pairot Karn Tor	Wearing	10
33	Peampul Karmai	Cement Collection	6
34	Perm Pattanakit Limited Partnership	Cement make up	4
35	Permpul animal husbandry clinic	Animal food	-
36	Permsinpaisan Industry	Metal make up	-
37	Phra Kanong Break 3	Material Fixed	-
38	Pluamprasert commerce	Car's Maintainence	5
39	Plusiri industry contrete Co., Ltd	Hand Material Making	4
40	Saha Stainless Steel Co.,Ltd	Metal Container making	-
41	SCL Furniture Limited Partnership	Accessory make up	-
42	Seksan Commerce	Tow Hoo Making	-
43	Siam Pat Kol Co., Ltd	Hand make	-
44	Sin Kam Chang	Metal Works	-
45	Sin Service	Motorcicle maintainence	2
46	Sing Tor Namchai Factory	Garment	1102
47	Sopon Yontrakit	Engine maintainence	3
48	Srichai Prug Kanr Chang Co., Ltd	Accessory make up	4
49	Sricharoen	Accessory make up	-
50	Suwijack Garment	Garment	-
51	Tawikit Commerce	Cement Collecting	2
52	To Ta Oil (PTT) Co.,Ltd	Gas Station	-
53	TPI Oil Co., Ltd	Car care, Gas Station	17
54	TPI Oil Co., Ltd	Cement Collecting	-
55	Unichan Co., Ltd	Drug Factory	403
56	VR Waler Co., Ltd	Gas Station	31
57	Wong Paiboon Kolakarn	Car Maintainence	1
58	yong Kit Wong Kob Factory	Accessory make up	4
59	Yontrapan Car Care	Part Auto-Part together	-
Total		59	3563

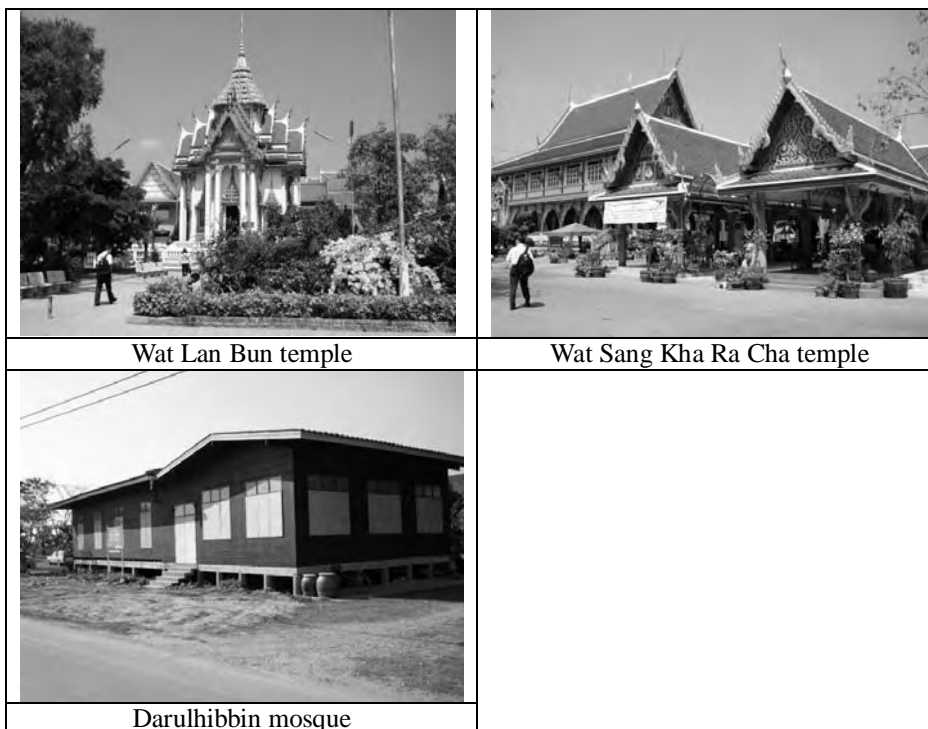
(5) Religious Assets

1) *Buddhist Temples*

In the Study Area, three Buddhist temples are located along the Prawet Burirom Canal. Of these, the Wat Lan Bun Temple and the Wat Sangkha Racha Temple are key assets for the surrounding local communities. Several registered communities have been built around both temples.

Wat Lan Bun Temple was established in 1875. The main repair work was carried out in 1974. The temple has received rewards on two occasions (in 1994 and 2000) for being a well-maintained temple. The temple houses a monk school, established in 1932, which continues educational activities through relationships with local schools such as Wat Lan Boon School and Deang Pao School. Along the Prawet Burirom Canal, there is an open library for local people, and a feeding place for catfish preserved under the temples' care under the Buddhism mercy policy.

Wat Sangkha Racha Temple was constructed in 1904. The temple also has a monk school to educate Buddhist people. Wat Khun Mae Chan Temple was constructed in 1929. There are no registered communities in the vicinity of this temple.



2) *Islamic Mosque*

In the Klong Son Ton Noon sub-district, there is a mosque named Darulhibbin. In the areas around the mosque, the ratio of Islamic people is higher than in the southern or eastern part of the Study Area. The mosque has an educational and meeting room for local residents.



Figure 2.13: Location of Religious Places

(6) Cultural Assets

Prewet Burirom Canal

The Prewet Burirom Canal was excavated in 1878 by order of the King Rama V. The length of the Prawet Burirom Canal is approximately 11.5 km from Khlong Pra Kanong to Bang Pakong in Chachoengsao Province. The canal has had a close relationship with the development of the Lat Krabang District. It is one of the historical assets in the Lat Krabang District.

When built, the main objective of the canal was to transport rice which was the most important export for Thailand at the time. Another objective of the canal was to supply irrigation water to new reclaimed paddy fields in order to increase rice production. In those days, settlement of the Lat Krabang District had extended along the canals because the canal system was a main transportation network in Bangkok before the road network was established. In the middle of the 1880s, more than 1,000 households were located along both sides of the Prawet Burirom Canal and its sub-canal network as this was a base for paddy field reclamation in the Lat Krabang area.

Nowadays, the Lat Krabang District has several trunk road networks to connect the district area to the Bangkok city center, however the Prawet Burirom Canal is still utilized for water transportation. At Talad Hua Takhe near the Lat Krabang district office, a small floating market (Hua Takhe market) has regularly been held for local residents. In front of the Wat Lan Bun Temple, the canal has provided a place of amenity value for people to commune with the water environment. The Prawet Burirom Canal still retains a relationship with local residents even in the existing conditions.

2.3.3 Land Use and Building Use

(1) Existing Land uses in the Study Area

The Study Area is approximately 1,945 ha in size and is divided into two major portions by the Bangkok-Chonburi motorway. The major land uses are agriculture and vacant land including road facilities, at 20.5% and 26.1% of the total area respectively. The second major use, at 12.8% of the total area, is for residential purposes. The land for reservoirs and swamps, which excludes fish ponds, occupies 11.3% of the total land area and is the third major land use. There is only a minor proportion of commercial land in the area.

Table 2.16: Area by Land Use Categories

Existing Land Use	Area(ha)	%
Residential Area		
Residential	257.2	13.23%
Commercial Area		
Commercial	17.7	0.91%
Mixed Use	11.3	0.58%
Industrial Area		
Industrial	72.3	3.72%
Warehouse	27.1	1.39%
Public Area		
Public Facilities	8.9	0.46%
Educational Institutions	3.8	0.20%
Recreational Facilities	0.1	0.00%
Agricultural Area		
Agriculture	459.0	23.60%
Fishery	40.4	2.08%
Others		
Religious Places	5.8	0.30%
Forest/Grass Land	70.0	3.60%
Reservoir	146.0	7.51%
Swamp	68.8	3.53%
Unused land	756.4	38.89%
Total	1,945	100.00%

Source: Department of Land Readjustment and GIS calculation

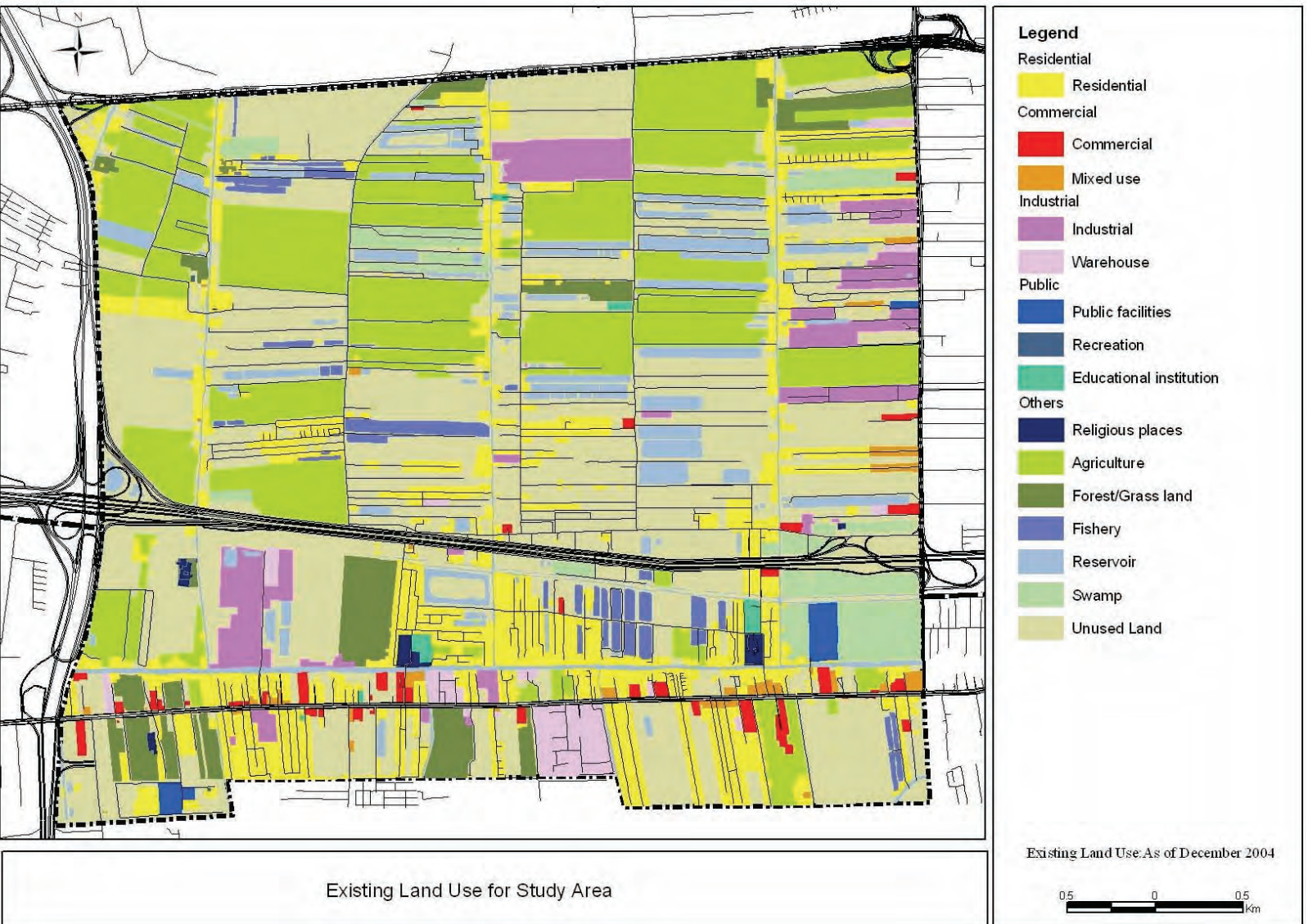


Figure 2.14: Existing Land Uses in the Study Area

(2) Building use in the Study Area

The following table shows the existing number of building units by building type in the Study Area. The total number of buildings in the Study Area is 7,143 units. At 62% of the total buildings or 4,431 units, single houses or buildings are the major building type. The second major type is townhouses at 16.2% or 1,158 units. Commercial buildings account for less than 5% of the total, or 333 units.

Table 2.17: Number of units by Building type in the Study Area

Building Type	No.of units	%
Single housing/Building	4,431	62.0%
Detached house	49	0.7%
Town house	1,158	16.2%
Commercial building	333	4.7%
Half timber building	375	5.2%
Unregistered buidling(Apartment)	408	5.7%
Others	389	5.4%
Total	7,143	100.0%

Source: City Planning Department, BMA

With regard to existing building uses, residential use accounts for almost 60% of the total and is made up of general housing, government official housing, and housing for temporary workers. The second major use is 'mixed use' at 6.4% of the total, in which the mixed use of residential and services occupies the majority at 90% of the total. In the category of industrial use, warehousing accounts for 60% of the total compared to 38% for factories. Public use for transportation or utilities, schools and public institutions is less than 0.6% of the total.

Table 2.18: Number of buildings by Existing Building Use in the Study Area

Building Use	No. of Units	%
Residential		67.2%
General housing	4,718	
Housing for government officials	29	
Temporary housing for workers	50	
Commercial		3.3%
Offices	63	
Market Places	6	
Gas station	23	
Other service building	138	
Night club, café, and massage places	2	
Other commercial building	6	
Industry		3.3%
Factory	89	
Warehouse	142	
Other industrial building	3	
Mixed use		6.4%
Mixed use of residential and office	18	
Mixed use of residential and service	420	
Commercial and industrial	1	
Residential and industrial	17	
Transport/Utility		0.1%
Railway station	1	
Telephone line station	2	
Electric office and substation	3	
School		0.3%
Nursery school	2	
Elementary school	6	
Nursery and elementary school	3	
Elementary and high school	4	
Secondary school	1	
Other institutional building	2	
Religious places		1.7%
Temple	119	
Mosul	1	
Shrine	1	
Crimination	2	
Other religious places	1	
Public		0.2%
Other governmental institution	13	
Public health center	1	
Others		17.6%
Gymnasium	6	
Recreational building	55	
Nursery	2	
Livestock farm	31	
Others	1,162	
Total	7,143	100.0%

Source: City Planning Department, BMA

As shown in the following table, 90% of the total buildings are lower than two stories, and 0.6% of the total buildings are higher than five stories. Residential buildings such as single houses, detached houses, and town houses are two stories at the highest. The types of buildings with four stories and higher are apartments or half timber buildings.

Table 2.19: Number of stories by building type

Building Type	Number of stories							Total
	1	2	3	4	5	6	9	
Single housing/Building	2,430	1,944	29	22	4	2		4,431
Detached house	6	43						49
Town house	20	1,098	40					1,158
Commercial building	280	53						333
Half timber building	6	26	240	88	15			375
Unregistered buidling(Apartment)	135	158	50	44	20		1	408
Others	319	69	1					389
Total	3,196	3,391	360	154	39	2	1	7,143

Source: City Planning Department, BMA

The most common type of building material is concrete at 52% of the total or 3,717 units and the second most common type is wood at 24% of the total or 1,743 units. Thirty percent of single houses and half of the commercial buildings are built from wood.

Table 2.20: Type of material by building type

Building Type	Type of material				Total
	Concrete	Wood	Concrete&Wood	Others	
Single housing/Building	1,568	1,413	807	643	4,431
Detached house	44	5			49
Town house	1,156		2		1,158
Commercial building	172	153	3	5	333
Half timber building	366	7	2		375
Unregistered buidling(Apartment)	299	49	29	31	408
Others	112	116	3	158	389
Total	3,717	1,743	846	837	7,143

Source: City Planning Department, BMA

2.3.4 Transportation Facilities

(1) Roads

1) Existing Condition

There are two motorways in the project area; the Outer Bangkok Ring Road (OBRR) and the Bangkok to Chonburi Highway (BCH). The two motorways are access controlled toll roads and belong to the Department of Highways (DOH). Currently, the only access to the project area from the motorways is via the Rom Klao Interchange on the BCH and the Onnut Interchange on the OBRR.

With regard to trunk roads, there are three truck roads in the project area. Rom Klao Road runs from north to south along the eastern boundary of the project area. The road provides local access from the project area to the BCH and connects to Minburi in the north and the second Bangkok International Airport in the south.

Onnut Road runs from east to west in the south of the project area. The road provides local access to the OBRR, Lat Krabang town to the east and Suan Luang / Phra Khanong to the west.

Chao Khun Thahan Road runs eastwards from the north of the project area and links the project area with the Inland Container Depot, Track Terminal and Lat Krabang Industrial Estate in the east.

Frontage roads beside the two motorways (OBRR and BCH) are also available for local access.

2) *Future Improvement Plan*

The following improvement plans are identified for the relevant highways.

- i) **Widening of the Bangkok- Chonburi Highway (BCH)**
Widening of the BCH into eight-lanes (four-lanes per direction) from Sri Nakarin Road (B.P.) to the SBIA Junction has already been completed by the DOH.
- ii) **Widening of the Outer Bangkok Ring Road (OBRR)**
Widening of the OBRR (eastern portion) into eight-lanes (four-lanes per direction) from Bang Plee to Thanya Buri is scheduled to be implemented in the FY2005 budget of the DOH and is due for completion by 2007.
- iii) **Construction of the Southern Outer Bangkok Ring Road (S-OBRR)**
The S-OBRR is the final element of the whole OBRR system linking the OBRR-Eastern portion and the OBRR-Western portion and passing over the Chao Phraya River. If the S-OBRR is completed, the project area will have direct motorway access to the west side of the Chao Phraya River (Tonburi side).
Construction of the project road commenced in 2005 and will be completed in 2007.
- iv) **Widening of Rom Klao Road**
The widening of Rom Klao Road to four-lanes is under construction by the DOH and will be completed in September 2005.
- v) **Related SBIA access**
 - From BCH to SBIA(Access B): Completed
 - From Rom Klao Road/Wat Kigkeo Road to SBIA (Access A & E): Under construction and will be completed in February 2006
- vi) **Construction of Krung Thep Kritha – Rom Klao Road**
The section between the Rom Klao Road intersection and the OBRR is under construction by the BMA. The section between the OBRR and the Krung Thep Kritha Road intersection, including a bridge passing over the OBRR, will be implemented in the next three years.



Figure 2.15: Major Road Network in and around the Study Area

(2) Railway Sector

There is an existing SRT line passing across the project area from east to west on the south side of the Bangkok-Chonburi Motorway. Three tracks have been provided on this section however the tracks are not yet electrified. There is only one railway station within the project area; Wat Lanboon station, which is located at the center of the southern part of the area. There are two stations adjacent to the project area; Lat Krabang station is located on the east side, and Ban Tap Chang station is on the west side.

Wat Lanboon station is currently out of service. Therefore, Lat Krabang is the nearest station servicing the area. Five inbound trains bound for Bangkok stop during the morning peak hours (6 am to 10 am), and three outbound trains bound for Chachoengsao. In the evening peak hours (4 pm to 8 pm), there are five trains to Chachengsao and three trains to Bangkok.

The Airport Rail Link, which is now under construction, will connect the center of Bangkok and the new international airport (SBIA) by rail. There will be two kinds of trains; SA Express will connect SBIA and Bangkok CAT (Makkasan/Asoke) directly, and SA City Line will connect SBIA and Phaya Thai with six intermediate stations, namely Lat Krabang, Ban Tap Chang, Hua Mak, Ramkhamhaeng, Makkasan/Asoke, and Ratchaprarop.

There will not be a station within the project area. The planned ARL Lat Krabang station is located on the north side of the existing SRT Lat Krabang station.



Figure 2.16: Model of Lat Krabang Station

2.3.5 Environmental Pollution and Public Nuisance

(1) Air Pollution

Although several factories exist, the main source of air pollution in the study area is gas emissions from automobiles as in the city center of the BMA. The air quality along trunk roads such as On Nut Road is substantially worse than in other areas.

Due to the lack of fixed air pollution monitoring stations, there is limited reference data for air quality monitoring. Recently, in the EIA study for the Suvarnabhumi International Airport Project, one of the survey points in an air quality survey was at the Lat Krabang District Office, which is along On Nut Road. The average values of monitored TSP, carbon monoxide, and nitrogen dioxide are shown in the table below together with monitoring data from fixed air quality monitoring stations in the city center of the BMA area. All of the monitoring results at the Lat Krabang District Office were within the Thai air quality standard values. Comparing monitored results at the Lat Krabang Office with those in the city center area, the average carbon monoxide and nitrogen readings were lower. This suggests that the air quality

in the Study Area is generally better than that in the city center. The average values of TSP were the same level when compared between the two sites. It is considered that one of the reasons for this tendency is that the ratio of paved areas in the Lat Krabang District is less than that in the city center. Generally, it can be said that the air quality in the Lat Krabang District is better than in the city center. It is noted, however, that the available air quality monitoring data is limited in this area as mentioned before. It is necessary to monitor the air quality along trunk roads relating to the Study Area to examine the impact of automobile gas emissions under existing conditions.

Table 2.21: Air Quality Monitoring Results (2002)

Parameter	Unit	Range	Average	Air Quality Standard	
				Thai	Japanese
Total suspended particle (TSP) 24 hours average	mg/m ³	0.09-0.12	0.10	0.33	-
Carbon monoxide 1 hours average	ppm	0.58-0.79	0.85	9	20
Nitrogen dioxide 1 hour average	ppb	11-20	23.9	170	-

Note : In each parameter, the above range and average values are the results monitored at more than 50 m from the roadside. Below values are the results monitored at the roadside.

The Japanese standard value for nitrogen dioxide is set only for 24 hour average, which is 60 ppb.

Source : Bangkok State of Environment (2003)

(2) Water Quality

The recent results from monitoring the biochemical oxygen demand (BOD) in the Prawet Burirom Canal are shown in the table below. According to the results, the monitored values ranged from 2.8 to 14 mg/L. Approximately 90% of the water samples analyzed have a BOD of less than 10 mg/L. The level of BOD is suitable for daily amenities without observing offensive odors. Regarding organic pollution, it is considered that the water quality in the Prawet Burirom Canal in the Study Area is better than in other canals located in the city center of the BMA area.

However, there are several pieces of missing information that are required to determine the safety of the water with respect to water quality. Regular monitoring of heavy metals and pesticides has not yet been implemented and there are insufficient recent analytical results for coliforms. Considering that local people have expressed their concerns on water quality in the canals in the Study Area in a series of stakeholder meetings in this study, it is recommended that a water quality survey is implemented at not only Prawet Burirom Canal but also other tributary canals in the Study Area.

It should be noted that there is no modern wastewater treatment system in the Study Area. Consequently, if no wastewater treatment plan is implemented, the canal water quality in the Study Area may decline in the future, despite an increase in population in the eastern part of the BMA area.

Table 2.22: Monitoring Results of BOD in the Prawet Burirom Canal (mg/L)

Parameter	2002					2003						Water Quality Standard	
	Apr	May	Jun	Jul	Sep	Jan	Feb	Mar	Jun	Jul	Sep	Thai	Japanese
Wat Lan Boon	3.5	4.5	4.8	4.8	4.8	-	11	14	-	-	-	4	10
Lat Krabang District Office	-	6.3	3.9	8.7	4.2	4.5	2.7	5.7	5.2	2.8	2.8		

Note : Thai water quality standard value in the table is designated as “fairly clean wastewater (Class 4 water)” that can be used for domestic purposes after a special treatment process.

Japanese water quality standard value in the table is designated as the limiting value for daily amenity value without any complaints such as odor.

Source : Lat Krabang District Office

2.3.6 Flood Protection and Drainage

(1) Land Elevation

Most of the study area can be characterized as undeveloped land such as agricultural land, unused land and forests which have an original land level of between 0.4 and 0.8 m MSL. In developed areas such as residential, commercial, and industrial areas, the ground level has been raised approximately 1.0 m to 1.5 m above the original ground level.

The subsoil in the Bangkok area consists mainly of soft clay layers to a depth of 10 m to 15 m. Stiff clay continues to depth of 15 m to 30 m and is underlain by a sequence of sand and clay layers. Over time, the process of consolidation, which is the natural process of soft clay together with the over-pumping of groundwater, has caused land subsidence across most of the Bangkok area.

(2) Land Subsidence

In the Suvarnabhumi Aerotropolis Development Plan land subsidence rates have been reported for the whole Bangkok area for the year 2000. The land subsidence rate is approximately 3 cm per year. The long term average land subsidence rate is recorded as 0.7 cm per year between 1933 and 1987. The rate has increased recently due to the growth in urbanization and the increase in ground water consumption.

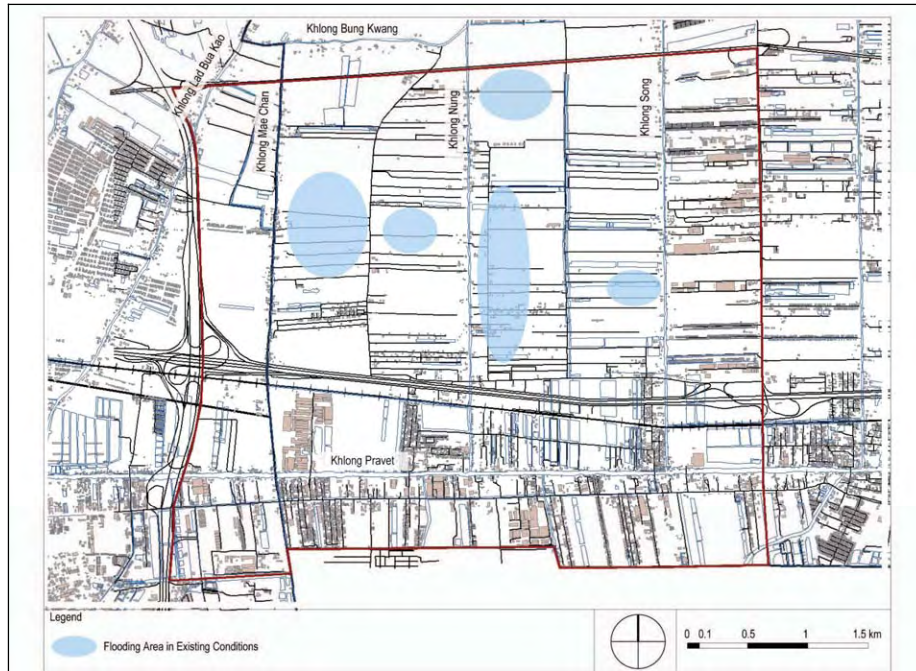
In the master plan for infrastructure development and the preliminary design of flood protection and drainage systems for the eastern suburban area in 1996, the annual land subsidence is reported at 2 cm/year for the areas along the King’s dike. Therefore an average annual land subsidence rate of 2 cm/year is used in this study. This assumes that the rate will reduce due to the expansion of the piped water supply system in the BMA in the future.

(3) Drainage Conditions and Flood Problems

There are three main *khlongs* which flow in a north to south direction in and around the study area. These are named *khlong* Mae Chan, *khlong* Nung, and *khlong* Song. These *khlongs* merge into *khlong* Pravet which flows in an east to west direction in the south of the study area. *Khlong* Pravet discharges into *khlong* Prakanong. Finally, the water in *khlong*

Prakanong is pumped into the Chao Praya River at the Prakanong gate station which is located 13.5 km away from the study area.

Due to the remote location of the gate station, the water level in *khlong* Pravet in the study area normally increases to a high level during heavy rainfall. This high water level in the *khlong*, together with the relatively low and flat topographical conditions, causes regular flooding in the study area during the rainy season. According to the Lat Krabang district office of the BMA, the flooding continues for three to four months in the undeveloped areas and in places where there is not a proper drainage system, such as in Phattana Chonnabot 2.

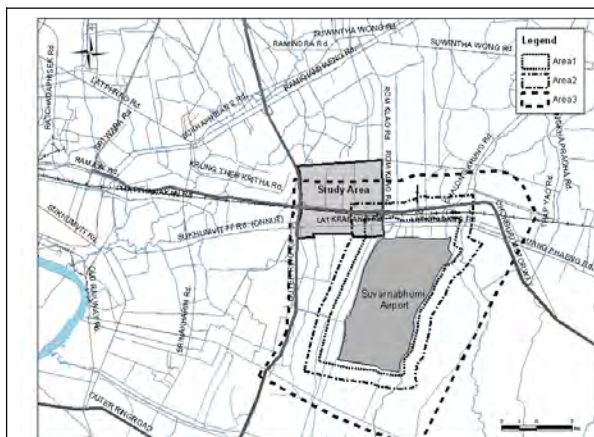


Source: Lat Krabang District Office, BMA

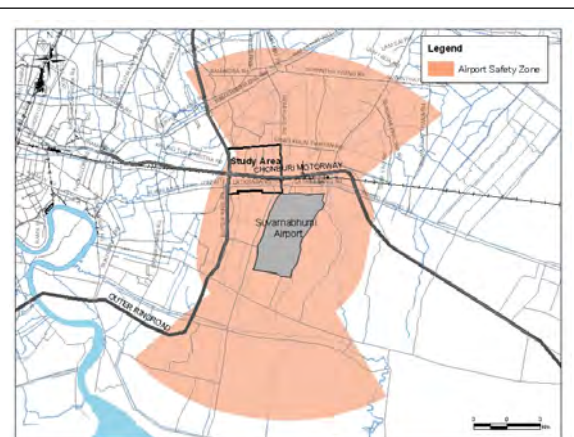
Figure 2.17: Flooding Area in the Study Area in Existing Conditions

2.3.7 Existing Regulatory Framework

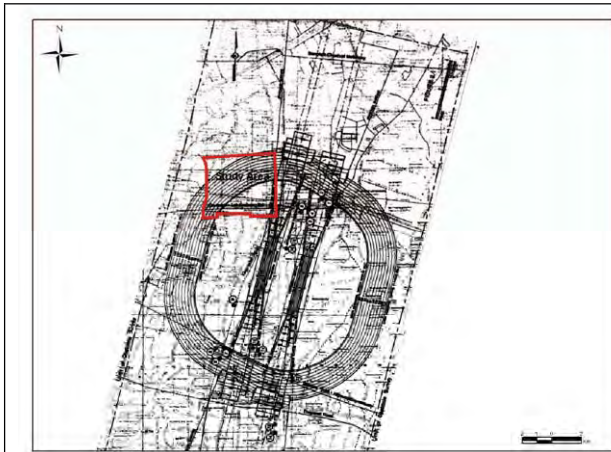
The existing regulations, which concern the Study Area, are summarized in the following section and are shown in the maps below.



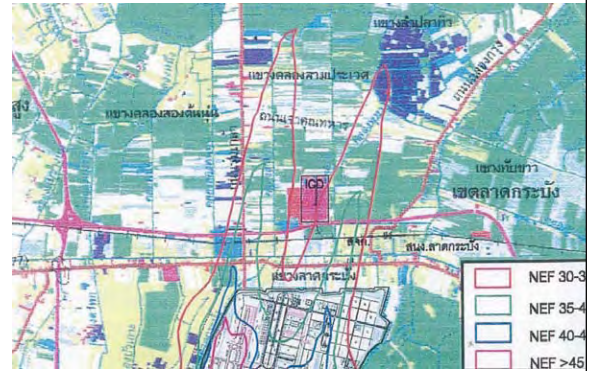
Map1: Area Regulated by the Building Code
Source: Ministry of Interior



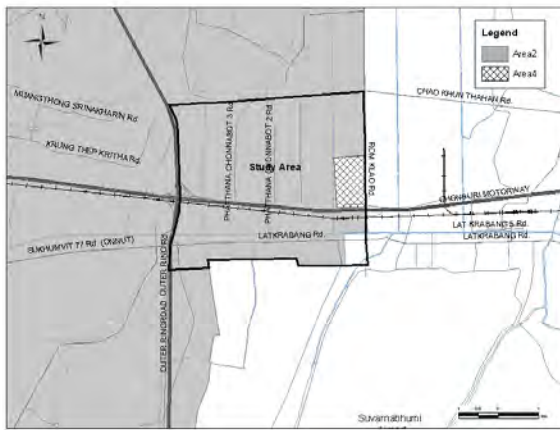
Map2: Area Regulated by the New Airport Development
Source: Ministry of Transport and Communications



Map3: Aviation Safety Zone for the New Airport
Source: Environmental Assessment Report by TEAM



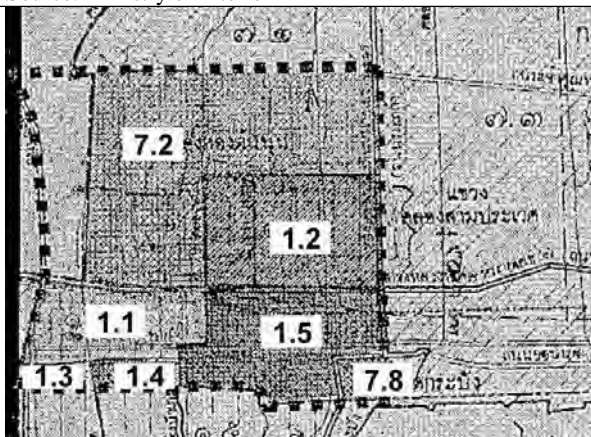
Map4: Impact Area for Noise in connection with the new airport
Source: Environmental Assessment Report by TEAM



Map5: Area Regulated by Ministerial Regulation on Building Construction
Source: Ministry of Interior



Map6: Area Regulated by the BMA by Law
Source: BMA by Law



Map7: Draft Ministerial Regulation on building construction
Source: DPT

Figure 2.18: Regulations around the Study Area

(1) Regulation and Conditions for Areas Surrounding the New Airport

According to Act 13 of the Building Code 1979 and Acts 29, 31, 35, 48, and 50 of the Constitution of the Kingdom of Thailand that the Minister of Interior announced by the suggestion of the Director of Civil Work and Urban Planning, the areas surrounding the Suvarnabhumi airport are regulated to control the construction of specific types of buildings and the modification of building types (Refer Map1). The Study Area is classified into three areas in accordance with the notice of the MOI. Area 1 is the area of which the north boundary is adjacent to On-Nut Road and the west boundary is parallel with Kingkaew Road, and is located in the south-east corner of the Study Area. Area 2 is the area of which the north boundary is adjacent to the line that runs parallel with the Chonburi Motorway at 700 meters in distance and the west boundary is adjacent to the line that runs parallel with Area 1 at 700 meters in distance. Area 3 is the area of which the north boundary is adjacent to the line that runs parallel with Chonburi Motorway at 1,500 meters in distance and the west boundary is adjacent to the line that runs parallel with the outer ring road at 300 meters in distance, and covers two thirds of the southern part of the Study Area.

The types of buildings that are prohibited to be constructed in each area are shown in the table below.

Table 2.23: Prohibited types of buildings in each area

	Type of Buildings	Area 1	Area 2	Area 3
1	Row House	○		
2	Market that already allowed by public health	○		
3	Theaters that follow the Building Code	○	○	
4	Hotels that follow the Act of Law	○		
5	Service areas that follow the Act of Service	○		
6	Crematorium that follow the Act of cemetery control and	○	○	
7	Garage and maintenances	○		
8	Places that feed animals as it's total area exceed 20 sq.m.	○	○	○
9	Any building is higher than 12 meter	○		
10	Storage areas that have total areas exceed 200 sq.m.	○	○	○
11	Buildings that have total areas of all floors under the same roof or different buildings exceed 1,000 sq.m.	○	○	
12	The factory that have the machine power in total more than 5 horse powers or equivalent	○	○	○
13	Oil storage areas that need to ask for the allowance from the authority except the petrol station	○	○	
14	Liquid Petrol Gas storage and refilled areas	○	○	○
15	Advertisement board or cutout that is higher than 12 meter	○		
16	Commercial building	○	○	○
17	Building that is higher than 18 meter		○	
18	Advertisement board or cutout that is higher than 18 meter		○	
19	Building that is higher than 32 meter			○

Another regulation for the area surrounding the new airport relates to the notification from the Ministry of Transport and Communications which was announced on 28th September 1992. By virtue of Article 58 of the Aviation Act B.E. 2497, the areas are regulated as an airport safety zone (Refer Map2). Almost the entire Study Area falls within the airport safety zone except for the northern corner of the Study Area.

According to the International Civil Aviation Organization (ICAO) standard, the new airports aviation safety zone has been classified into eight categories as shown on map 3. The south-east corner of the study area is covered by the inner horizontal surface zone which allows a construction height of up to 45 meters. The outer ring of the inner horizontal surface allows a building height from 45 meters up to 145 meters in accordance with the reduction ratio of 1:20.

The area surrounding the airport is likely to be affected by noise in relation to the new airport. Map 4 shows the impact area based on the scenario that 100 million passengers use the airport annually. The effect of the aircraft noise is estimated to be limited in the south-east corner to a level of NEF 30-40 as indicated on the map. From an environmental viewpoint, a noise level of NEF 30-40 is acceptable for commercial, outdoor theater, recreational or residential uses with some conditions. The construction of hotels and offices in an area with this noise level requires the addition of noise control features in the building design.

(2) Areas where Building Construction is Prohibited by the Ministry of Interior

The announcement “Prohibited areas for construction, modification or change of use of certain types of buildings”, as announced by the Ministry of Interior (MOI), regulates certain parts of the BMA territory by prohibiting the construction, modification, and change of use of certain types of buildings. As shown on map 5, the Study Area has two regulated areas which relate to this regulation; Area 2-1 covering the most of the Study Area, Area 4-6 situated on the north side of Chonburi Motorway, the area which is parallel to Chonburi Motorway at 1250 meters, the west side of Rom Klao Road, and the area which is parallel to Rom Klao Road at 800 meters.

Under the announcement, the construction of supermarkets, such as discount stores, with a total area of between 300 and 2,000 square meters is prohibited in Area 2-1. In Area 4-6 the construction of supermarkets with a total area of more than 4,000 square meters is prohibited.

(3) The BMA Bylaw

As shown on map 6, the BMA Bylaw, which was announced on 25th May 1992, designates areas where it is prohibited to construct, modify or transform certain types of buildings located in the regulated area. The Study Area has two regulated areas which are subject to the legal code; on the western side of Rom Klao Road in 15 meters, and on both sides of Sukhumvit Road 77(On-Nut Road) in 15 meters.

The following regulation is registered.

- Nobody shall be allowed to construct any kind of town houses, commercial buildings, large buildings, entertainment buildings, hotels, department stores, warehouses, industrial factories or any other modified buildings to be located in the regulated area
- Buildings constructed before or after the law enforcement shall not be allowed to modify except that the use of the buildings shall violate the legal code number 3.

(4) Draft Ministerial Regulation by the DPT

Map 7 indicates the ministerial regulation on building construction prepared by the DPT, which is under consideration for enactment within this year. Under the draft of regulation, the study area is classified into seven areas and the allowable building height is specified for each area as follows.

Table 2.24: Permitted Building Height in each area

	Area	Permitted Building Height
1	Area 1.1	> 18 meter
2	Area 1.2	>12 meter
3	Area 1.3	>23 meter
4	Area 1.4	>23 meter
5	Area 1.5	>23 meter
6	Area 7.2	>9 meter
7	Area 7.8	>9 meter

The following map describes all the regulated areas in terms of development in the Study Area.

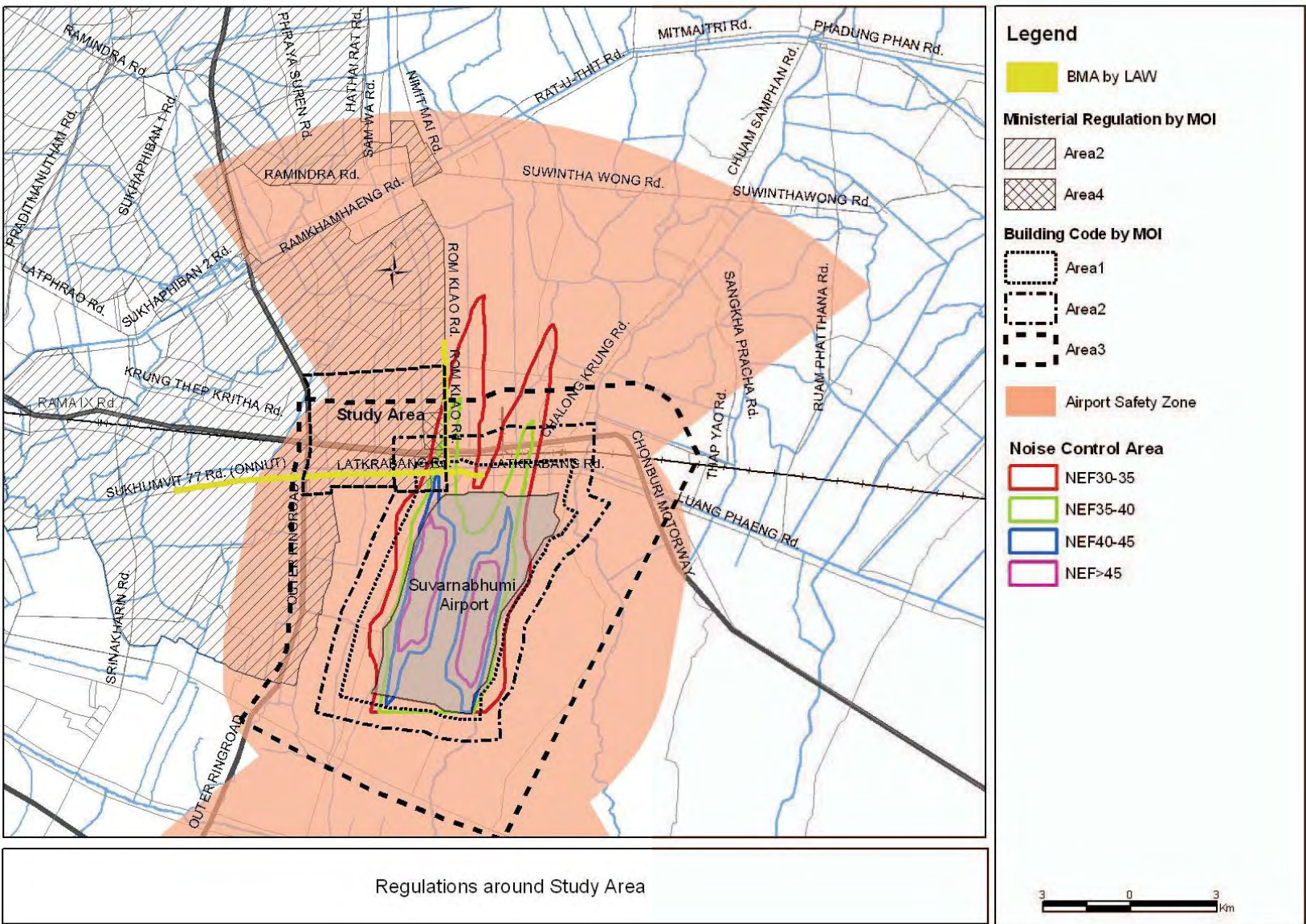


Figure 2.19: Existing Regulations Concerning the Study Area

CHAPTER 3: DIRECTION OF THE LATKRABANG SUB-CENTER DEVELOPMENT

3.1 Background to the Development Planning

3.1.1 Context of the International and National Policies

(1) Free Trade and Open Market

The international policy for trade and industry is moving towards the free trade of goods and services. There is a steady movement towards a free trade zone within the ASEAN nations, denoted as the ASEAN Free Trade Area, or AFTA, which is calling for a significant lowering of import tariffs at the international borders of the member countries. There is also the movement of bilateral free trade agreements, notably the one initiated by Japan with a few of the emerging economies in Southeast Asia, including Thailand.

It is widely discussed amongst academics and practitioners alike that the policy framework towards free trade and open markets will accelerate regional and international integration of manufacturing modes. Under increasing international and regional competition for survival, all countries need to have industries with high domestic added-value to find their own *niches* in the world economy.

In order to survive in the competitive open market, the key word for success is said to be human resources to support and advocate an up-market shift for Thai industries in their respective fields, by creating more value through higher quality.

(2) Need for Value Creation

The Thai Government has launched various promotional activities for their industries to encourage higher added-value or value creation. Some of the prominent industries targeted in Thailand, as declared by the Government and respective agencies, and their slogans include the following¹.

The essence of higher added-value or value creation resides in shifting from relatively low added-value assembling and production of parts and components categories towards upstream functions such as research and development (R&D) and designing, or downstream to marketing and branding².

¹ Following MOI-VDF Joint Mission on Industrial Policy Formulation of Thailand, March 2005, with amendments.

² Mai The Cuong, et al. "Trade-Industry Linkage in the Thai Automobile Industry and its application to Viet Nam, June 2005.

Table 3.1: Major Strategies for the Up-Market Transition of Thai Industries and Slogans

Industry	Master Plan, and Slogan	Major Strategies
Automobile	Thai Automotive Master Plan 2002 - 2006 : Detroit of Asia	Creating a predictable environment for business Information center Engineer development Enhancing the competitiveness Automotive research and development center Export promotion center for auto parts
Information Technology (IT)	IT 2010 : Towards the Knowledge Based Economy	Equitable access for the public ICT knowledge enhancement ICT research and development ICT industry development
Fashion	Bangkok World Fashion City project	Develop human resources for Thai fashion industry Transition from “cut, make & trim” to higher-added-value production Synergy of textile and apparel industry with no broken links in supply chain
Tourism	Tourism Capital of Asia	Tourism promotion under “Amazing Thailand” Promotions to attract up-market visitors Niche market tourism such as MICE (Meetings, incentives, conventions and exhibitions)

The Thai automobile industry, for example, is said to be in the category of assembly and production of parts and components (Category C and D), while the industry is striving towards the upstream (Category A; R&D and Category B; designing) and downstream (Category E; marketing and Category F; branding) categories.

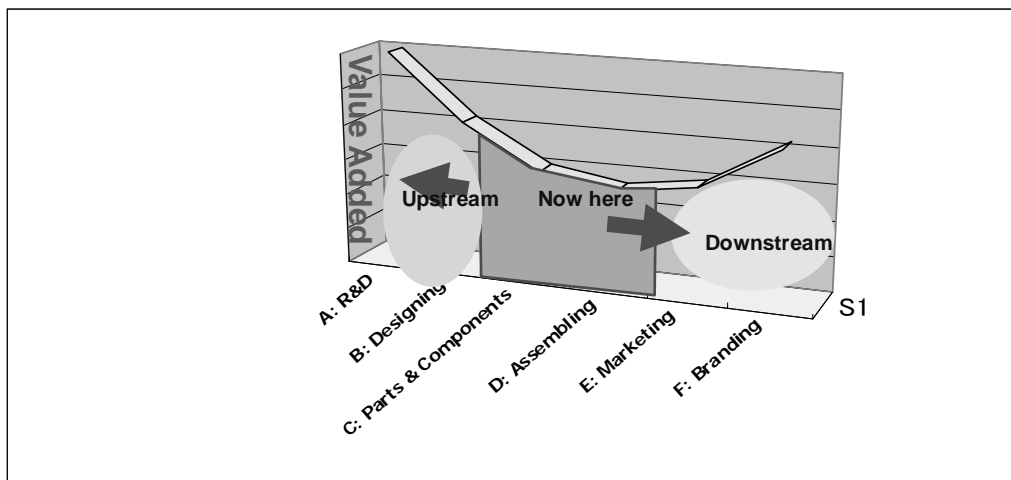


Figure 3.1: Value Creation of Thai Industries by Upstream and Downstream Expansion

3.1.2 Policy Context for the New International Airport Development

(1) Regional Development around Suvarnabhumi Airport

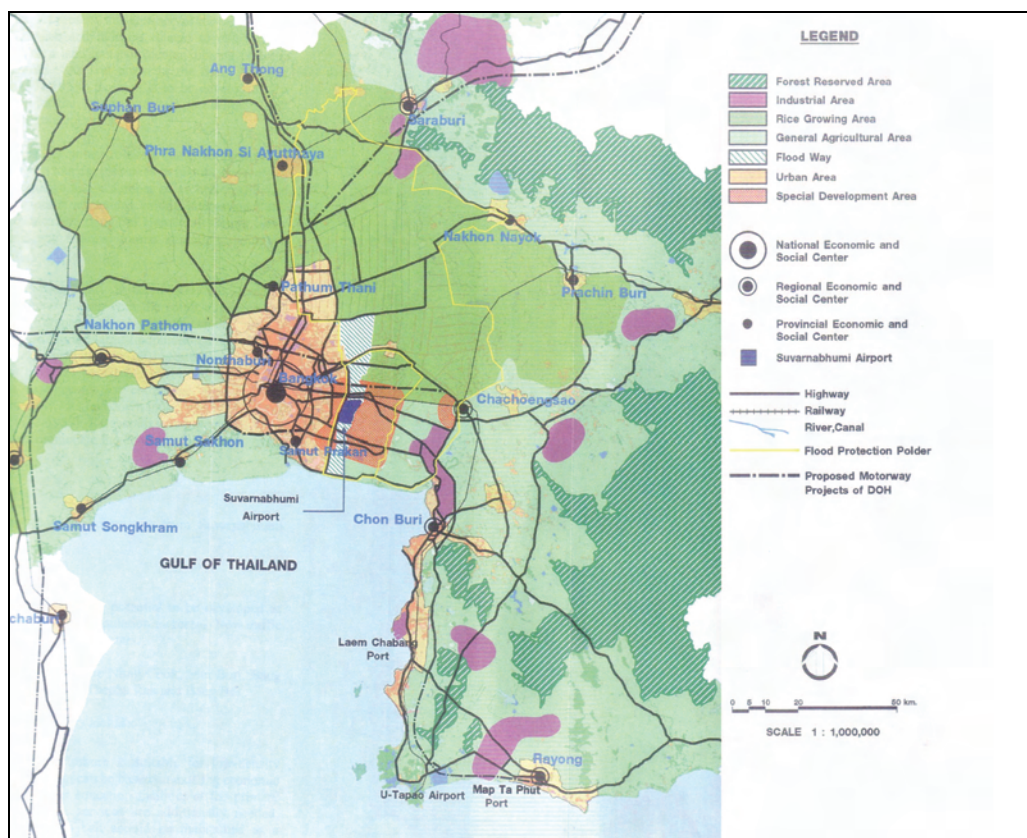
In the regional development planning for the area including the Lat Krabang Study area, two important planning efforts have been made by the Thai government, as follows.

1) *Suvarnabhumi Aerotropolis Development Plan by the NESDB*

The Suvarnabhumi Aerotropolis Development Plan was prepared by the National Economic and Social Development Board (NESDB) for the development of a new airport, Suvarnabhumi Airport, over the next three decades until 2035. The airport is

to be located in the southeast of the Study Area. The plan consists of details of land use, transportation, flood control, water supply, wastewater and solid waste management, and utilities. The Land Use Plan is developed with the concept of maximizing land utilization with consideration to the preservation of the natural environment.

As shown on the following Macro Land Use Plan of the Suvarnabhumi Aerotropolis, six land use development categories are proposed for the target year of 2035. These are Agricultural Land, Flood-way, Forest Conservation Land Use, Urban Land, Industrial Land, and Special Development Land. In the plan, the Bangkok Metropolitan Region (BMR) is proposed to be Urban Land in the form of a national economic and social center. The development objectives of the BMR focus on its role as an economic, tourism, industrial, and telecommunications center as well as an air transportation hub. The Study Area for the sub-centers program is categorized as Special Development Land that should be promoted for orderly new development to prevent urban sprawl. The area is targeted to accommodate airport related activities, a new employment center, business district, trade center, offices, recreational area, and a residential area for the future workers and residents.

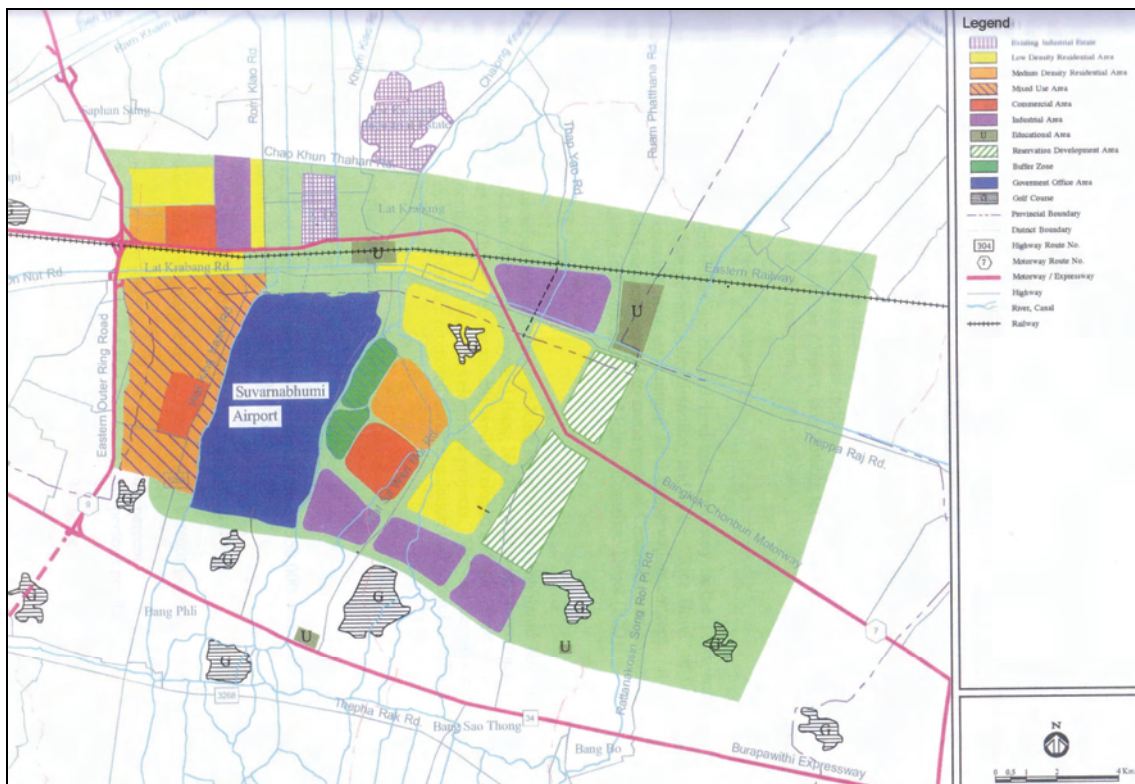


Source: Suvarnabhumi Aerotropolis Development Plan

Figure 3.2: Macro Land Use Plan of Suvarnabhumi Airport 2035

In the report, the Master Plan Area is the area up to 30 kilometers from Suvarnabhumi Airport. According to the land use plan for the Master Plan Area shown on the following map, the Study Area is categorized as a land use control area with four types of proposed land uses including industrial, low density residential, medium density residential, and commercial. The major land use in the area is industrial which is on the west side of Rom Klao Road, and

low density residential which is in the northern half of the Study Area. The commercial area is located in the center of the Study Area on the northern side of the Bangkok-Chonburi Motorway.



Source: Suvarnabhumi Aerotropolis Development Plan

Figure 3.3: Land Use in the Master Plan Area around Suvarnabhumi Airport in the Year 2035

2) Regional Development Plan of the DPT around the Suvarnabhumi Airport

Upon the instruction by the Bureau of the Suvarnabhumi Airport Development, NESDB, the Department of Public Works and Town and Country Planning (DPT) of the MOI initiated the regional development plan for the area around the new airport. The DPT formulated the draft final report in January 2006 and continues to receive public comments on the report.

Originally, the objectives of the two regional development plans by the NESDB and the DPT were defined by the study area and the depth of the required outputs. The Suvarnabhumi Aerotropolis Development Plan by the NESDB formulated the regional development policy within a radius of 30 km from the new airport, while the DPT aimed to formulate the physical plan for the 800 km² area which extends over two administrative areas around the new airport, including the BMA and Samut Prakan.

As the DPT's study focused on physical planning, analysis was conducted on physical aspects, which resulted in an output that contradicted the NESDB's plan. The committee for the DPT's development plan decided to adopt the draft land use plan as shown on the next page, even though there were contradictions with the NESDB's plan. Adoption of this land use plan will be examined.

With regard to the Lat Krabang sub-center, the DPT's study area includes the whole sub-center area. The land use categories for the study area are mid-density residential

over most of the northern area, commercial in the northern area along Rom Klao Road and the motorway, high-density residential in the southern area, and open spaces in the south-east corner of the study area. There are also regulations regarding building use and size of buildings and lots by land use categories as shown in the following table. Those land uses and regulations are inconsistent with the BMA's revised comprehensive plan Update No.2 which will be described in the following section. Some adjustments are needed to the DPT's plan and the BMA's plan in relation to the Lat Krabang sub-center.

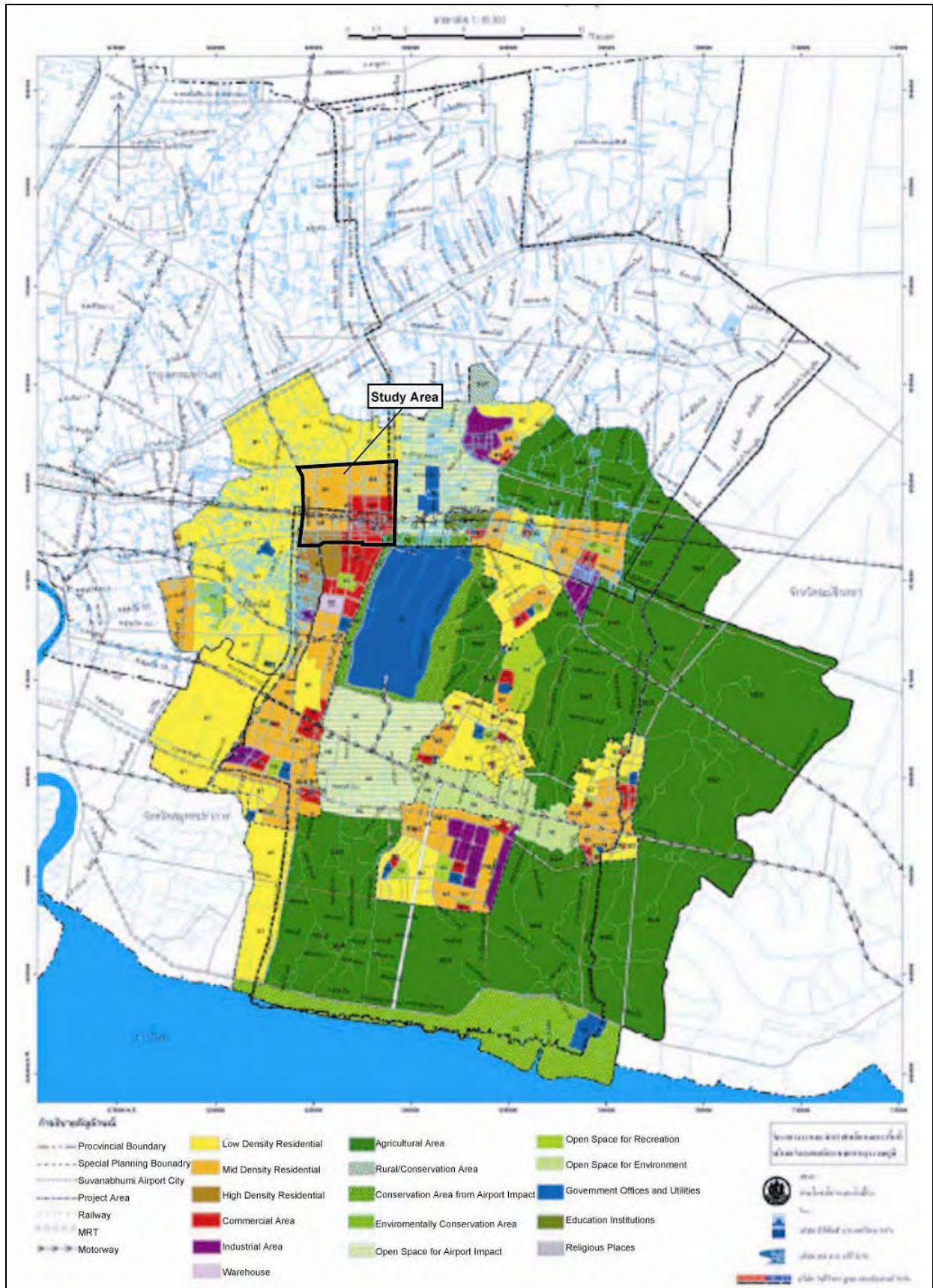


Figure 3.4: Draft Final Land Use Plan by the DPT

Table 3.2: Draft Final Building Regulations by Land Use Category for the Study Area

Activities	Medium density Residential			High density Residential		Commercial			Open space; protection from aircraft impact
	3	4	5	6	7	1	2	3	
Single house	○	○	○	○	○	○	○	○	○
Twin/duplex house	○	○	○	○	○	○	○	○	○
Rowhouse/shop house	○	○	○	○	○	○	○	○	X
High densed house	○	○	○	○	○	○	○	○	X
Large size building	○	○	P2	○	○	○	○	○	X
Highrise building	P2	X	X	○	○	○	X	○	X
Building in super large size	P3	P3	X	○	○	○	X	○	X
Commercial rowhouse shophouse	○	○	○	○	○	○	○	○	X
Commercial > 100 m2	○	○	○	○	○	○	○	○	X
Commercial > 200 m2	○	○	○	○	○	○	○	○	X
Commercial >300 m2	○	○	○	○	○	○	○	○	X
Commercial in large building size	○	○	○	○	○	○	○	○	X
Commercial in highrise building	P3	P3	X	P3	P3	○	○	○	X
Commercial in special large building type	X	X	X	P3	X	P3	P3	X	X
Office building >100 m2	○	○	○	○	○	○	○	○	X
Office building >300 m2	P2	P2	X	○	○	○	○	○	X
Office building in large size	X	X	X	○	○	○	○	X	X
Office building in highrise	X	X	X	○	X	X	○	X	X
Office building in special large size	X	X	X	P3	X	P3	P3	X	X
Hotel	○	○	○	○	○	○	○	○	X
Theater	P2	P2	X	P2	X	○	○	○	X
Entertainment	X	X	X	○	○	○	X	X	X
Market	○	○	○	○	○	○	○	○	X
Convention hall	P3	P3	P3	P3	P3	P3	P3	X	X
Amusement park	P3	P3	P3	P3	P3	P3	P3	X	X
Warehouse/store	P2	P2	P2	P2	P2	P2	P2	P2	X
Second-hand product wholesale	X	X	X	X	X	X	X	X	X
Second-hand mashine trade	P2	P2	P2	X	X	X		X	X
Gas station	P2	P2	P2	P2	P2	P2	P2	P2	X
Gas storage	P2	P2	P2	P2	P2	P2	P2	P2	X
Sign board/Commercial/Advertisement	—	—	—	—	—	—	—	—	X
Community service industry	○	○	○	○	○	○	○	○	○
Service industry	○	○	○	○	○	○	○	○	○
Packaging industry	X	X	X	X	X	○	○	○	X
Agricultural industry	X	X	X	X	X	X	X	○	○
Light industry	X	X	X	X	X	X	X	X	X
Hevey industry	X	X	X	X	X	X	X	X	X
Solid waste treatment	X	X	X	X	X	X	X	X	X
Harzadous waste treatment	X	X	X	X	X	X	X	X	X
Farming for trade	X	X	X	X	X	X	X	X	X
Agricultural storage	X	X	X	X	X	X	X	X	X
Fish pond	X	X	X	X	X	X	X	X	○
Slughterhouse	X	X	X	X	X	X	X	X	X
Graveyard/Cementary	X	X	X	X	X	X	X	X	X
Health center	○	○	○	○	○	○	○	○	X
Educational institute	○	○	○	○	○	○	○	○	X
Retirement home	○	○	○	○	○	X	X	X	X
Child care center	○	○	○	○	○	X	X	X	X
FAR	4	3	3	6	6	6	6	6	0.5
BCR	70	70	60	70	70	80	80	70	25
Front building setback(m)	—	—	—	—	—	—	—	—	2
Side building setback (m)	—	—	—	—	—	—	—	—	2
Rear building setback (m)	—	—	—	—	—	—	—	—	2
Min.lot size	—	—	—	—	—	—	—	—	—
Watershed	—	—	—	—	—	—	—	—	—
Height (m)	—	—	—	—	—	—	—	—	12
Setabck in front of building < (m)	—	—	—	—	—	—	—	—	20
Hight of basement without walls setup (m)	—	—	—	—	—	—	—	—	—
Hight of landfilling	—	—	P5	—	P5	—	—	P5	—

○ =approved

x=no approved

- =no controlled, follow the existing regulation

p1=10 m. right of way or over

p2=16 m. right of way or over

p3=30 m. right of way or over

p4=>50% of lot size be covered up with soil

p5=>50% of lot size be covered up with soil

p6=no less than 20%of the site should watershed with connect.public canal