

Cadastral Template 2003

(Based on the PCGIAP-Cadastral Template 2003)

Thailand

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I. Country Report

A. Country Context

Geographical Context

Thailand is situated in South East Asia surrounding by countries namely Myanmar in the West, Lao People's Democratic Republic in the North and North East, Cambodia in the East and Malaysia in the South. Thailand consists of 77 provinces with the total land area about 513,120 square kilometres (320.70 million rai) and has population around 65.12 million of which 10.62 million reside in the Capital, Bangkok and peripheral provinces. The number of title deeds and other land right certificates are 35.74 million parcels covering the area of 205,328 square kilometres (128.33 million rai) over Thailand.

Historical Context

Prior to the reign of King Chulalongkorn all land in Thailand belonged to the King. With his long vision, aspiration, and intention to establish security of land tenure for Thai people in order to solve land dispute problems and secure right in land with equity, therefore, King Chulalongkorn established Temporary Land Registry Office at Saphakan Ratchaprayun which situated in Bang Pa In Royal Palace, Phra Nakorn Si Ayutthaya Province on 20 September B.E. 2444 (1901). The Temporary Land Registry Office was responsible for registering land right document in Muang Krungkao District. Afterwards, he established Department of Land Registry under Ministry of Agriculture on 17 February B.E. 2444 (1901). Department's name as well as ministry where it was under has been changed several time, until B.E. 2484 (1941), Department's name was lastly changed to "Department of Lands" under Ministry of Interior since then. Various law and regulations were prescribed thereafter to regulate right in private land. Acts were consolidated into the Land Code in 1954 which provided the legal framework for the land administration procedures implemented by the Department of Lands.

Current Political and Administrative Structures

Thailand is a parliamentary democracy with a constitutional monarchy. After the country went through a peaceful transformation in 1932, sovereign power came to belong to the Thai people, with the King as the Head of State who is above partisan politics and discharges his role in accordance with the country's Constitution. The administration of the country is carried out by the prime minister – elected through an open vote by members of the House of Representatives and the cabinet that the prime minister forms.

Over the past decades, there has been a remarkable continuity in policy direction, providing a predictable framework for investors and businessmen. Successive Thai governments have always been committed to certain fundamental policy principles: friendly relations with all its neighbours and a responsible and constructive foreign policy, an open-market economy, hospitality toward foreign investors and tourists, sound macro-economic policies with fiscal and monetary prudence and the improvement of the country's infrastructure to increase competitiveness and achieve sustainable development.

Despite periods of political turbulence, Thailand's political history reflects the country's unwavering commitment toward becoming a full-fledged, multi-party democracy, with accountability, transparency, good governance, as well as respect for human rights and the rule of law being among its main guiding principles. The Thai people and civil society organizations are increasingly taking part in political activities, enjoying the rights and freedoms guaranteed by the Constitution.

Until 22 May 2014 the politics of Thailand were conducted within the framework of a constitutional monarchy, whereby the Prime Minister is the head of government and a hereditary monarch is head of state. The judiciary is independent of the executive and the legislative branches. From then on the country was ruled by a succession of military leaders installed after coups d'état. However the basic structure of government has remained the same. The Government of Thailand is made up of three branches: the executive, the legislative, and the judiciary. All branches of the government are located within Bangkok, the capital city of Thailand.

Thailand is the second largest economy in Southeast Asia with Gross Domestic Product (GDP) around USD 396 billion and has traditional agrarian economy with rice as its main product and also free-market economy. Thailand is a key player in the Association of Southeast Asian Nation (ASEAN), enjoying its strategic location that provides easy access to a larger market of approximately 636 million people, which is expected to gain more strength under the motto of “one vision, one identity, one community” when the ASEAN vision of One Community materializes in 2015.

Historical Outline of Cadastre

In the past, Thailand has tied the horizontal coordinate since the reign of King Chulalongkorn (King Rama V) by using coordinate from the enlargement of triangulation network from the Mount Kaneanper in India then pass Myanmar into Thailand and the evolution of cadastral method in Thailand has begun since then, from triangulation traverse first order to traverse first order, thereafter, surveying from Doppler Satellite Positioning or in the other name Transit System. At present Thailand uses Navigation Satellite Timing and Ranging Global Positioning System: GPS. It is the system that using data from the satellite orbit and center of the world as reference. The horizontal coordinate has related to datum, the developments of datum in Thailand are as follows:

1. Rajchaburi Datum

Since India has determined the origin system of ellipsoid Everest 1830 at Mount Kaneanper and enlarged the triangulation traverse first order throughout the region pass Myanmar to the border of Thailand at Khao Laung, Rajchaburi Province; it has been ratified since year 1899. Later in year 1907 Thai Mapping Department, in that era, conducted triangulation network first order to connected the control mark at Khao Laung and conducted line datum Rajchaburi including Azimuth astronomy from Mount Ngeam to Mount Ngu in order to use as the first station of the enlargement of triangulation network throughout the country.

2. Indian Datum 1916

In year 1916, US Army Map Service has assigned US Coast and Geodetic Survey to calculate and rectify the new triangulation network in India and Myanmar by using previous data and new data from the astronomy surveying and additional line datum. This led to the change of origin coordinate at Mount Kaneanper, therefore, the coordinate at Khao Laung had changed accordingly. The result of the aforementioned rectify was called Indian Datum 1916.

3. Indian Datum 1954

In year 1954, Thai Government cooperated with the United States of America in the Project of Producing Topographic Map in the scale of 1: 50,000 from aerial photography for increasing density of triangulation and reliability of the Geodesy coordinate of Thailand. Therefore, US Army Map Service had rectified all enlargement of triangulation network by using 10 triangulation marks at the borders of Thai-Myanmar as a control point network. It deemed that it does not have any error to those control points as they were the coordinates received from Indian Datum 1916. The result of the aforementioned rectify was called Indian Datum 1954.

4. South Asia Datum

In year 1957, the 11th International Ordinary Meeting of Geodesy Association at Toronto, Canada had set up the committee in order to rectify the triangulation network in South Asia Region which comprised of Pakistan, India, Myanmar, Malaysia, and Thailand to use the same Geodesy coordinate. The result of this rectify has been completed in year

1963 and named South Asia Datum. However, no country in this region has used this rectified coordinate in mapping affairs.

5. Indian Datum 1975

In year 1975, Defense Mapping Agency Hydrographic Topographic Center: DMAHTC has rectified and shifted the origin of Datum at Mount Kleanper in India to Khao Sa Kea Kraug, Uthaitani Province. This rectification used the technique of surveying from 9 stations of Doppler satellite which their relative locations were more accurate than the relative location from triangulation network. The control point of triangulation network comprises of 426 stations of triangulation mark. The result of this rectify has been named Indian Datum 1975 and the datum had been used as horizontal reference in foundation map L7017.

6. WGS 84 (World Geodetic System 1984) Datum

This Datum could possibly be international datum system due to the fact that it has been used as global reference datum which been developed by Ministry of defense of the United State of America by using the World Gravity Data perform with the survey information from Doppler satellite which has many stations cover all over the world. This Datum could be benefit in the development of outer space operation especially satellite positioning system. This Datum uses world center point as the origin point which similar to Geocentric Reference System (GRS) and has the same physical description as the ITRS (International Terrestrial Reference System). Also, the world center point and Datum origin point are the center point of GPS satellite's orbit. At present, the WGS 84 Datum is accepted as the datum with accurate detail and high reliability (The deviation of world center position is approximately +/-1 meter). Thailand has used this datum as horizontal reference to create the new map called L7018.

Apart from horizontal datum, there are other methods of surveying in order to receive the horizontal coordination which can be classified as follows:

- 1. Surveying by expanding Triangulation Network** is the method to find the coordinate by using the angle of each mark in the network to calculate the coordinate. The marks of Triangulation Network are often established in the high land so they can be seen remotely. There are 2 types of Triangulation Network's Mark i.e. (1) Big Triangle Mark (Deviation +/-1.7") and (2) La Plas Mark (deviation +/-0.5"). In 1984, there were 362 Mark stations in total.
- 2. Surveying by making Traverse First Order** is to survey the angle and similar distance with the Triangulation Network. It will not perform as a network but will perform as a circle that circulate to meet its own and find the distance by using the Electronic Distance Measurement (EDM) to disperse the deviation value to each mark in the circle. The method to find this horizontal coordinate is to establish more mark from the triangulation network. There were 154 mark stations from 1976 to 1986.

3. **Surveying by Doppler Satellite** is the method to set a position between satellite receivers and center point of satellite's orbit (center of the world) which it had surveyed in 1971 to 1979 approximately. It was the first time of surveying to receive horizontal coordinate by satellite which is the cooperation of Thailand and United State. There was the establishment of new marks and was a survey on original mark of triangulation network for the main propose of improving Indian datum 1954 along with WGS 72 and then became Indian datum 1975 and there were 19 stations in total. However, there was surveying to expand the network continuously until 1990 and the total amount of the station were 120 stations.
4. **Surveying by Satellite GPS** is the method to set a position between satellite receivers and center point of satellite's orbit (center of the world) as same as Doppler. The survey stated in 1990 by using original marks and also establishing new marks. The information service available on Indian datum 1975 and WGS 84. This method of surveying is used to improve information of datum.

B. Institutional Framework

Government Organizations

Thai Government by the National Committee on Geo-information serves to define the policy and directed the operations of the overall geospatial. The committee also defines policy in the development of national spatial data infrastructure, and the policy framework and structure standards sets of geospatial information infrastructure, i.e. Fundamental Geographic Data Set (FGDS), and networking (clearinghouse/portal) in the country. The National Committee on Geo-information defines FGDS to 13 layers with its responsible agencies following this:

1. Admin Boundary - Department of Provincial Administration
2. Transportation - Ministry of Transport
3. Hydrology - Department of Water Resources
4. Urban and Town - Department of Public Works and Town & Country Planning
5. Forest - Ministry of Natural Resources and Environment
6. Land use - Land Development Department
7. Aerial Photos - Royal Thai Survey Department
8. Satellite images - Geo-Informatics and Space Technology Development Agency
9. National mapping ground control point - Royal Thai Survey Department
10. DEM - Royal Thai Survey Department
11. Topographic map - Royal Thai Survey Department
12. Cadastral map –Department of Lands
13. Naval hydrographic - Hydrographic Department

There is no specific survey board in Thailand; surveying is recognised under the Council of Engineers but is at present officially unregulated. That is, survey engineering comes under the 'regulated' Civil Engineering discipline. There are plans in the future for surveying, among other

16 other engineering sub-disciplines, to be revised as a regulated profession within the Council. The Council of Engineers is the central regulatory body for professional engineering services in Thailand.

According to the Engineer Act, B.E. 2542, the Council of Engineers has the following power and duty

- (1) to issue license to applicants for the Regulated Engineering Profession;
- (2) to suspend or revoke the license;
- (3) to certify the degree, diploma or certificate required for practicing the Regulated Engineering Profession;
- (4) to certify knowledge and experience of a person practicing the Regulated Engineering Profession;
- (5) to propose to the Minister the addition or the removal of fields in the Regulated Engineering Professions;
- (6) to issue the regulations of the Council of Engineers concerning
 - (a) determination of prohibited characteristics of an ordinary member who is not being a person of unsound mind, a seriously handicapped person or being afflicted with a disease specified in the regulations of the Council of Engineers;
 - (b) admission of Members, the rates of registration fees, membership fees and other fees from a Member or a non-Member;
 - (c) appointment and election of the Council Board Members under the election of Council Board Members;
 - (d) the issuance of license, the term, the suspension and the revocation of the same, and the certification of knowledge and experience in the practice of Regulated Engineering Professions;
 - (e) the qualifications, terms and the termination of office of the inspectors shall be as specified in the regulations of the Council of Engineers;
 - (f) the regulations relating to the application for license in any level of engineering profession and the qualifications of such applicants under classifying in this Act;
 - (g) the qualifications and the prohibited characteristics of the applicants for the license under the regulations of Council of Engineers;
 - (h) the code of ethics of the engineering profession and violation of the code in such a manner that disgraces the engineering profession;
 - (i) the standard in the practice of the Regulated Engineering Profession;
 - (j) the meetings of the general assembly of the Council of Engineers;
 - (k) any other matters specified in this Act

Private Sector Involvement

Each year there are approximately 400,000 cases for boundary and cadastral survey with approximately 90% of these undertaken directly by government. The Private Land Survey Practitioner Act B.E. 2535 (1992) allows for private sector to undertake these jobs, but only approximately 6,000 cases are undertaken by the private sector. There are 1,238 private

surveyors who have a license to undertake this work, issued by the Department of Land, however the majority of these are likely to only have a diploma level qualification. Only Thai nationals (over 20 years of age) or Thai juridical persons are allowed under the Act to be licensed (or, similarly, foreign equity/shareholders less than 50%). Another aspect of the law is that it only allows private surveyors to undertake the field work and calculation, not the drafting of plans, due to the authority and mandate of the government.

The Private Surveyor Board Office provides contractor of cadastral survey for the land ownership. The land owner can show the surveying contract to the officer at provincial land office or branch/district land office for cadastral surveying by their requirement according to the regulation of private surveyor board on the operational control of private surveyor, the private surveyor board office B.E. 2535.

There are many private companies in Thailand – meeting participants estimated 100 companies, some working only in the (engineering) surveying sector, others also in wider disciplines. Many work as consultancies to government, but also privately. The majority of their work was reported as highway design and construction, but also in the planning sector and GIS. LiDAR is also growing in use in Thailand and is propagated by the private sector. No license is yet required for using UAVs, but these are also not yet popular (although GISTA are using). An example was given of ESRI Thailand, which is a large company with a majority of Thai staff, but some international staff. ESRI Thailand concentrates on GIS but does undertake some small scale survey and mapping work. They employ some 20 survey engineers. It was reported that there are more than 100,000 private surveyors in Thailand, but these do less than 10% of cadastral work.

Professional Organization or Association

At present for a person to be recognised as a professional surveyor he/she should be a member of the Council of Engineers – however, until surveying is promoted to be its own discipline under the Council, this is not a strict requirement, just an expectation.

Cadastral surveying, as with many other jurisdictions, requires a specific licence from government and is particularly undertaken within government. Hydrography is predominantly undertaken by military, however there is a growing private sector and this is at present unregulated. Engineering surveying is at present not regulated but is expected to be in the future. Geospatial is not completely considered a discipline in its own right. Surveying activities are typically open to Thai nationals only, particularly within the cadastral sector.

There are quite a few professional associations that are related to surveying and mapping e.g.

- The Engineering Institute of Thailand
- The Surveying and Mapping Association of Thailand
- The Association of Consulting Engineers
- The Association of Surveyors
- The Remote Sensing and GIS Association of Thailand
- The Association of Geographers

- The Cartography Association

It is not a compulsory that a professional has to be a member of a professional association. The number of members differs from tens of thousands to couple of hundreds. It is a requirement that associations register (with the rules and regulations) with the official authority. Some associations are members of the international associations. Survey technicians are able to be adjunct members of the Council of Engineers, but must have 7 years' experience and are limited to specific areas of surveying. There is considered to be a strong demand for surveying services, however the participants do not believe they sell themselves effectively as a profession. Membership of the Council of Engineers provides a high profile, but without that surveying is considered to have a lower profile.

The Association of Surveyors has member around 2,891 persons. The objectives of this association are as follows:

- To be a centre for promoting friendship relation and occupation among member of the association.
- To promote research and education in the field of science in the survey in order to provide members with expertise in the academic standards and plans.
- To disseminate knowledge and information regarding to surveying.
- To help each other among members.
- To promote health, sports, entertainment and recreation among members.
- To promote public charity and cooperate with the government in the assembly.
- To support other public affairs which not relate to political affairs.

Licensing

The Council of Engineers has three categories of Members: (1) ordinary, (2) extraordinary and (3) honorary. Whilst it is a requirement of the act that ordinary members are of Thai nationality, among other items, Thailand is supporting the ASEAN MRA process for Engineering and has established an Assessment Statement for ASEAN Chartered Professional Engineers. Under this process, the Council of Engineers may approve Thai citizen applications for ASEAN Chartered Professional Engineer (ACPE) status, and may also approve foreign ACPEs to be registered in Thailand as Registered Foreign Professional Engineers (RFPEs). RFPEs are permitted to work in Thailand in collaboration with designated Professional Engineers and are not eligible to work in independent practice in the country.

Members are further classified according to four levels for the purposes of licencing (ie: practice): (1) adjunct engineer (2) associate engineer (3) professional engineer and (4) senior professional engineer. A license applicant must be an ordinary or extraordinary member of the Council of Engineers. A juristic person must have its principal business office located in Thailand and the majority of partners/directors must be themselves licensed. It was noted that whilst the most experienced engineers were expected to be the senior professional engineer status, many experienced individuals choose to remain at the associate level as they do not feel

the need to progress. In part this is due to the current classification of survey engineering under civil engineering, in that some specialties (e.g developing a large scale GIS for a municipal council) cannot be claimed as activities under engineering.

The progression for registration and licensing proceeds as follows: after graduation from a qualifying degree-level course, applicants may sit an exam to apply for associate-level membership. Following three years of experience, professional level may be applied for, requiring an interview and proof of relevant experience. Senior Professional status can be attained after a further five years' experience.

The Council's Board may revoke memberships as a form of sanction.

Under the ASEAN MRA process for Engineering, the Council of Engineers is supporting the establishment of the ASEAN Chartered Professional Engineer. An example Assessment Statement is available at: <http://www.coe.or.th/coe-2/engDiv/download/AS-Thailand.pdf> .

The board does not have strict regulatory powers to review or develop regulations or directives, but may be consulted to do so. Again, in surveying this power is not yet as strong as it could be if surveying was recognized as a discipline in its own right. Similarly, the Council of Engineers has a role in accrediting courses but not yet for surveying. In the past the Council of Engineers recognized the educational program based on subjects studied rather than degree. In this context students had to register as civil engineers and study specific courses to qualify as surveyors. New laws will enable Council of Engineers to accredit the degree, which may make it difficult for some universities unless survey engineering degrees are also reviewed and revised.

There is presently no separate registration of survey engineering companies, but companies may be recognized as juristic persons by law and licensed in this regard. This may or may not continue under changes to the recognition of surveying within the Council.

There is no issuance of work licensing for surveyor that working at the Department of Lands but for private surveyors, they must qualify under Section 19 of the Private Surveyors Act B.E. 2535. Qualifications and backgrounds are as follows:

1. Have a minimum high school vocational or graduated in the program related to survey and mapping according to the private surveyor board certification and also experienced in the field of surveying and mapping not less than two years, or
2. Have a minimum high school vocational or graduated in the program related to survey and mapping according to the private surveyor board certification and also passed the training courses as defined by the private surveyor board, or
3. Hold a surveyor position at Department of Land for not less than five years.
4. The applicant under clause 1 and clause 2 must pass knowledge examination by the private surveyor board.

5. The applicants must provide a certificate of conduct at least two people who have been private surveyor for not less than five years or government officer (level 6 up) to certify that the candidates are not as incompetent or lacking in morality.

Education

There are three universities that provide a major in surveying engineering at the degree level in Thailand:

1. Chulalongkorn University (Faculty of Engineering) – approx. 25 graduates per year
2. Kasetsart University (Faculty of Engineering) – approx. 35 graduates per year
3. Chulachomkiao Royal Military Academy – approx. 10 graduates per year

The Royal Thai Naval Academy also provides a hydrographic surveying degree, but only has 2 graduates every year. The Academy class is new, and the Port Authority Harbour Department has been invited to join.

There are very few polytechnic courses available, as several have been upgraded to degree program. For those that exist, there are two levels of diploma, the first requires two years following secondary school (First Diploma) and the second is a Higher Diploma, equivalent to two years of a university degree.

Given the sub-discipline status of surveying under civil engineering, there is scope for individuals working in survey and mapping without a first degree in surveying to have background experience evaluated. Similarly, those civil and environmental engineers working in surveying with significant experience can be evaluated and recognised as registered surveyors.

As part of the process of re-evaluating the discipline of surveying under the Council of Engineers, the survey degree program will be re-evaluated. A first draft of courses has been made, but still requires work and input.

In general it is considered that there are not enough surveying graduates to meet the demand of the profession. However, very few graduates go to work in government, given the low budget and hence low availability for jobs. Many graduates end up working in the private sector, particularly in oil and gas.

C. Cadastral System

Purpose of Cadastral System

Cadastral System is defined the limit of land parcel based on laws, rights, and title deed registration for the parcel or property. Thailand, Department of Lands (DOL) has completely upgraded the cadastral system on Land Tilting Project for 20 years. A new series of 1: 4000 cadastral mapping were produced base on rectified photomap. The procedures for title deed survey are on new technology which is online process. After the system had developed on Land Tilting Project for new tenure system which cadastral base maps were created by Universal Traverse Mercator projection on Indian datum and new technology had started implement.

Currently, the system is on digital era the official or license surveyor can work online via internet. The cadastral survey system has been transformed to digital model as database.

Types of Cadastral Systems

There is only one comprehensive cadastral system, a title registration system, covering the whole territory of Thailand. Department of Lands (DOL) is involved in cadastral system i.e. providing the technical aspects, surveys, mapping and the registration, transfers etc.

Cadastral Concept

Thailand modern cadastre is based on registration of title. The main unit in the cadastral system of Thailand is cadastral parcel about 128.33 million rai, are divided into 35.74 million parcels.

The cadastral systems in Thailand are operated by Department of Lands (DOL). Land parcels are surveyed in the field while the land ownership titles are recorded in Department of Lands (DOL). Two different types of real properties can be registered as land parcel and condominium. All types of real properties have a unique identity number and are registered separately. Department of Lands (DOL) uniquely identifies each parcel corresponding to the title. The Cadastral System in Thailand is organized as follows:

- The cadastral map shows all land parcels graphically.
- Legal survey measurements are the method to precisely identify all new parcel boundaries determined by cadastral surveys such as subdivision, etc.
- Titles deed identifies the legal rights based on the cadastral identification.

A land parcel is defined as a piece of land limited by its boundaries and presented in a cadastral map. Every parcel has its unique number within so called “cadastral unit”. Land parcels are surveyed in the field then survey plans will be submitted to Department of Lands (DOL) for checking in accordance with Survey Regulations and Conditions of the Town Planning. Only when a survey plan is approved as surveyed, leases will be registered accordingly.

Content of Cadastral System

The cadastre is, parcel based and update land information system, managed by Department of Lands (DOL). The cadastral system consists of the following:

- a. Record of ownership (land books and condominiums registers) managed by Land Registration Section. Textual component, which includes all land parcels and identify right of the owner, restrictions, and responsibilities, ownership, special rights, mortgages, area of land parcel, history of the parcel, and etc. The record of ownership is fully computerized.
- b. Cadastral maps, survey document and geodetic information files corresponding to the registered title with unique identifiers, managed by Cadastral Survey Section.

D. Cadastral Mapping

Cadastral Map

The Civil and Commercial Code (1932) has been dealing in private land under the Land Code (1954) that contains the main legal provisions covering tenure and administration of land. Under

this code, the Department of Lands (DOL) is responsible for all cadastral surveys including subdivision, maintaining land registration, and issuance land title document. Private land can be divided into the following categories (Angus-Leppan and Williamson):

- Land held by title deed (NS4) which based on a full survey and adjudication.
- Land held by certificates of utilization which in some circumstance the claim certificates, some without any document, though the occupiers may have a legal claim to the land.

Title deed and certificate of utilization are two main documents which are negotiable and can be registered. All transfers and dealing of land titles are recorded in the provincial land office of each province. There are various indexes and records supporting the registration system to actual title documents as follows:

- a. Ownership index show the proprietor of land titles or certificate in the province or district listed alphabetically.
- b. Survey files show all survey and subdivision information of each parcel.
- c. Series of official cadastral plans covering the province or district.
- d. Dealing file of each parcel consolidates all dealing documents from initial adjudication onwards in chronological order.

For mapping, DOL has been carried out cadastral surveying and mapping of land titles based on the scale of 1:4000 that showed graphical parcel in meters and also boundaries, cornerstones, and land information. It was generated from the scale of 1:50,000 topographic map under Royal Thai Survey Department (RTSD), called L7017 series. A 1:50,000 map covered 15X15 minus (about 27x27 km.) which equal to 169 sheets on 1:4,000 scale. On 1:50,000 map, the grid lines are 1,000 meters apart in both rectangular axis and shows UTM coordinate on India datum with two zones, 47 and 48, of each grid line in the ten thousandth and a thousandth meter unit (the tenth and a kilometer unit) in bold capital number. Therefore, in 1:4000 map sheet 2,000 meters distance on ground is equal to four rectangular grids in a 1:50,000 map sheet.

The land tenure system in Thailand concerns the usage and possession of land in order to retain ownership or legal interest. The physical boundaries of parcel are generally defined by the legal boundaries follow by the general boundary approach which based on aerial photography. There are two categories of cadastral system for land title (NS4) as follows:

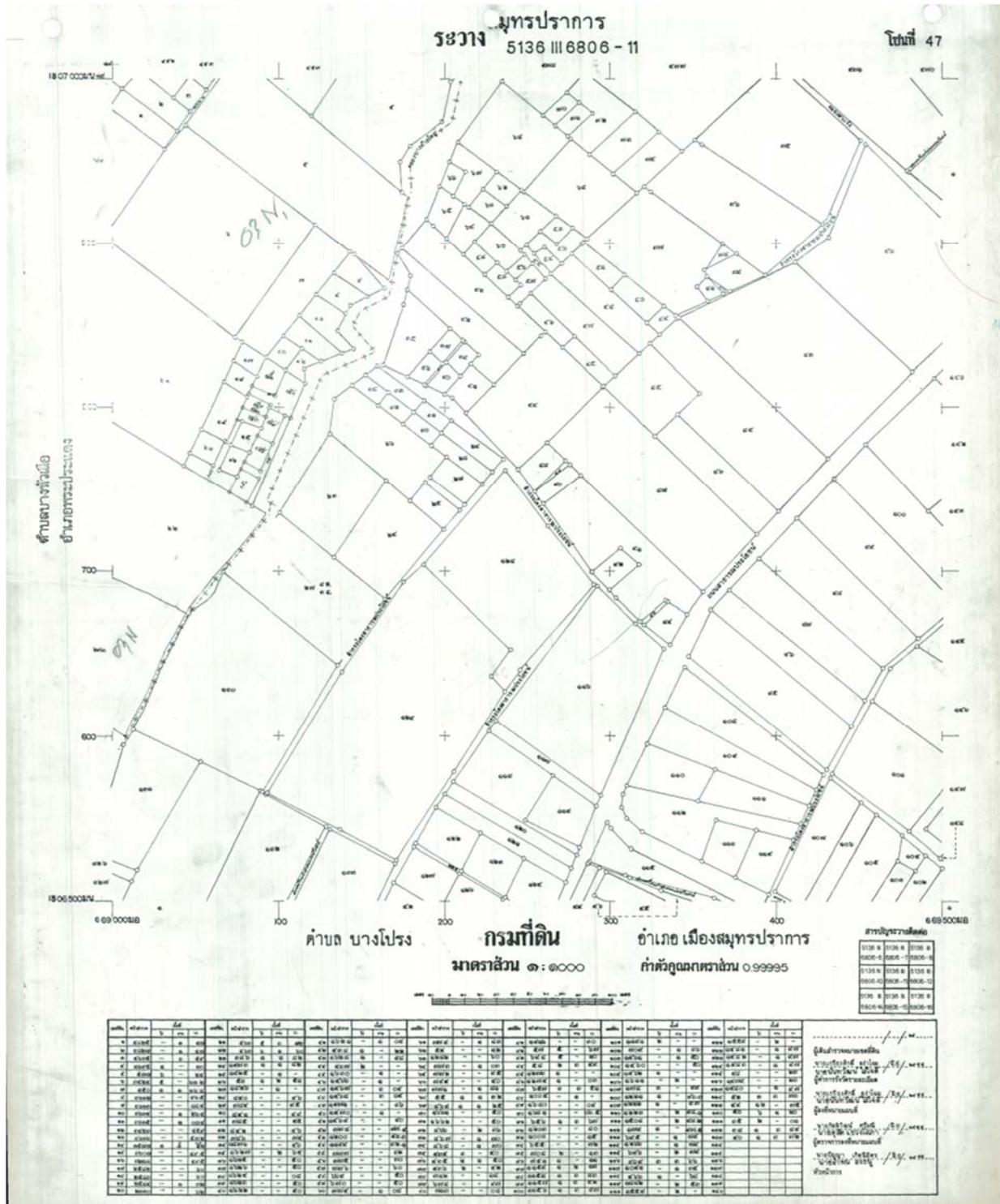
For the first class in urban area, most of individual survey job is for subdivision. These systematic surveys are usually carried out in the area where sufficient cadastral control can be provided. The first class survey is as follows:

- a. Boundaries are adjudicated. The adjudication documents have to be signed by all adjacent owners and numbered concrete blocks are placed at each corner.
- b. All boundaries corners are surveyed by radiation from the control traverse using theodolite and chain.
- c. All calculation is checked at the field. The final calculation is done in the head office in Bangkok where the cadastral map is plotted by computer.

d. The final plan is checked at the field. Certificated of title will be prepared and issued by temporary field office set up for the systematic survey.

The second class surveys are based on rectified photomap 1:4000 in rural area and based on traverse and tape survey 1:1000 in village and urban area.

Example of a Cadastral Map



At present digital or analogue cadastral maps (land registry map) are the basic information to establish different database for supporting the development and the environmental interests. The land registry map, according to law, is compulsory to use for spatial, town planning, building regulations, and basis map for public utility companies. For local governments, municipalities land registry map is basic layer for managing their activities. Extracts of land registry map (cadastral map) are widely used by the public for different purpose.

E. Reform Issues

Cadastral Issues

For over 3 decades landowners have required better services from Department of Lands such as issuance of land title deed, land boundaries surveying, and registration of land rights and juristic acts. The high demand for these services in many areas leads to a considerable improvement in our work to the proper directions, both in the use of computer and providing information to land owners. Therefore, the Department of Lands have introduced computer system in order to assist service delivery at several land offices.

In Thailand, there are three main problems that need to be solved very soon as follows:

1. Convert data from hardcopy into digital form.
2. Planning to solve the problem of overlapping boundaries of state lands.
3. Online Registration system.

Current Initiatives

For increasing efficient in services delivery, Department of Lands has implemented "The National Land Information and Mapping Centre Project" for effectiveness, convenient, rapid, economize, transparent and reasonable service delivery in registration of rights and juristic acts on land and immovable property. This is a crucial mean for promoting investment on land to stimulate the holistic development of the country which contributes to the increasing of customer's satisfaction. The objective of the project is to be the central integrated organization of the utilization of land and mapping information between government agencies in accordance with the government policies. The database of land parcels of the whole country, which was originally stored or kept as the paper document in various forms of text, cadastral map (spatial) and image data for more than a century, will be stored in computerized database, which will be continuously updated automatically and deliver geographic information system to all users. The system can be connected and exchanged information between internal departments and external agencies at any time via the internet. This project will contribute to governmental policy formulation and management of land; it will also help to reform land and building tax for local governments.

Government will have a tool for country's development and directions for economic competitiveness towards e-government programme. This project requires collaboration among government agencies. The DOL have recognized that our land information is fundamental and vital to all sectors of government and private. Moreover, land information should be kept up to

date, in order to deliver efficient and effective e-services to the people because land resource is one of the main basic factors which is critical to the survival of humanity and food security.

The project is divided by Thai region area into two phases. The first phase has implemented during 2014-2015 covers the North and the North-East of Thailand, while the second phase covering the Central and the South part is in progress and will be completed in 2016.

References

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II. Questionnaire

1. Cadastral Principles

Deed or title registration

- 1.1 Is your cadastral system based on deeds registration or on title registration?
 - deeds registration
 - title registration
 - other:

Registration of land ownership

- 1.2 By law, is registration of land ownership compulsory or optional?
 - compulsory
 - optional
 - other:
- 1.3 If felt necessary, please, comment on the actual practice and the legal consequences.

Approach for the establishment of the cadastral records

- 1.4 Are landowners required to register their properties systematically during the initial establishment of the cadastre or is registration sporadic, i.e. triggered only by specific actions (such as for example sale)?
 - systematic
 - sporadic
 - both
 - all properties are already registered
 - other:

2. Cadastral Statistics

Population

2.1 What is the **population** of your country? 65.12 million

2.2 Please, estimate the **population distribution** between urban and rural areas.

urban: ...34.2...	%
rural: ...65.8...	%
total: ...100...	%

Number and distribution of land parcels

2.3 Please, estimate the approximate **total number of the smallest uniquely identified land units**, often called "land parcels" in your country, including urban and rural areas? 35.74 million parcels

The total number would include all freehold and state owned land, regardless of registered, non-registered or informal holding.

2.4 What is the approximate **total number of registered strata or condominium units**? This number would be in addition to the number of land parcels indicated in 2.3? 699,995unit

- 2.5 For **URBAN areas**, please, estimate the **distribution between the smallest uniquely identified land units, often called "land parcels"** (i) that are legally registered and surveyed, (ii) that are legally occupied but not registered or surveyed, and (iii) that are informally occupied without any legal title (this may include illegal occupation or squatting).

If the estimation is too difficult or complex using land parcels, you may base your estimation alternatively on the number of people occupying these forms of land parcels.

legally registered and surveyed:	...100... %
legally occupied, but not registered or surveyed:	...0... %
informally occupied without legal title:	...0... %
<hr/>	
total:	...100... %

- 2.6 For **RURAL areas**, please, estimate the **distribution between the smallest uniquely identified land units, often called "land parcels"** (i) that are legally registered and surveyed, (ii) that are legally occupied but not registered or surveyed, and (iii) that are informally occupied without any legal title (this may include illegal occupation or squatting).

If the estimation is too difficult or complex using land parcels, you may base your estimation alternatively on the number of people occupying these forms of land parcels.

legally registered and surveyed:	...94... %
legally occupied, but not registered or surveyed:	...3... %
informally occupied without legal title:	...3... %
<hr/>	
total:	...100... %

Number of professionals

Please estimate the total number of *academic professionals* that are active within the cadastral system and the proportion of the time that they actually commit for cadastral matters (as opposed to work outside of the cadastral system) ?

- 2.7 Total number of **professional land surveyors**, such as licensed surveyors active within the cadastral system:
- 2.8 Proportion of the time that these land surveyors commit for cadastral matters:
- 2.9 Total number of **lawyers/solicitors** or equivalent active within the cadastral system or land market:
- 2.10 Proportion of time that these lawyers/solicitors commit for cadastral matters or land market:

3,770
100%

4,742
100%

Remarks and Comments

Please, identify the best aspect of this questionnaire?

-

Please, suggest the area in the questionnaire that could be improved?

-