

CHAPTER 4 GEOGRAPHIC INFORMATION SYSTEM – DESCRIPTION AND BASIC OPERATION

Many of the data used to make the final map products have been converted to digital data and stored as computer files. These computer files are uniformly formatted to conform to standard PC Arc/Info Geographic Information System (hereafter referred to as "GIS") format, to be used primarily in a PC Arc/Info GIS computer system. This chapter describes and summarizes the GIS system and operation, and how to use the digital data in the Arc/Info GIS system.

4.1 GIS System Description

A GIS system is a combination of computer hardware and software, which is capable of storing, analyzing, and manipulating geographically referenced data. It can perform analyses and allow queries based on spatially related data, and allows different data files to be linked together for advanced analyses. The components of the GIS system are described in further detail below.

4.1.1 Computer Hardware

The computer system used for the GIS is an IBM compatible personal computer (PC) containing the latest technology. In order to meet the needs of processing large volumes of GIS data, the selected model exceeds the minimum requirements of Arc/Info GIS software. It contains sufficient RAM memory and hard disk storage to allow efficient GIS processing. In addition, a high-resolution colour monitor is included to display the complex GIS data and maps. It is also possible to connect a variety of peripheral hardware to this computer through the serial and parallel ports, and through optional adapter ports.

4.1.2 Peripheral Hardware

In addition to the main computer there are several possible optional peripherals which might or could be connected to and used with the GIS computer. Typically, a printer, plotter, and digitizer are desirable. Other possible peripherals might include a scanner and a second monitor.

4.1.2.1 Printer

The printer is a high-resolution colour printer that can use paper of at least A4 size, and more likely A3 size. It is fully compatible with the computer and GIS software. It should be used to create page sized colour maps and figures as well as general text and tables. For larger size maps, a plotter or special printer should be used.

4.1.2.2 Plotter

Plotters come in a variety of sizes, from A4 to A0, and other capabilities such as formats and ink types. Since the colour printer will handle most of the

page-sized maps and figures, the plotter should be used for larger maps and figures. There are many options for plotters and they should be considered carefully. The plotter can use different types of media for plotting, from paper to Mylar plastic, each with a specific purpose. Most plotting will use A0 size paper, either in cut sheets or from a roll. The plotter uses the latest inkjet technology and can print a full range of colors, producing beautiful maps and posters, but care must be taken to provide proper maintenance.

4.1.2.3 Digitizer

The digitizer is used to convert data from paper maps to digital files and is one of the primary sources of GIS data. Digitizers come in a variety of sizes, ranging from A4 to A0, and the cursor usually has either 4 or 16 buttons, the latter being preferred. The larger A0 size is particularly useful since it allows large maps to be digitized at once, without dividing the map into tiles, or sections. The digitizer is a precision device which allows very small and detailed features to be digitized. Care should be taken to digitize carefully using standard digitizing techniques to avoid introducing unnecessary errors in the digital data.

4.1.2.4 Scanner

The scanner is also very useful to convert data from paper maps to digital files and are available in various sizes from A4 to A0. However, scanned data usually requires processing to extract the desired information and reject the undesirable information before it can be used for GIS. Therefore, consideration must be given to the complexity of the features on the map. A simple map can be scanned and processed fairly easily whereas a more complex one will require considerable time to process. In the case of a more complex map, it might be better to use a digitizer.

4.1.2.5 Second Monitor

The second monitor is very useful to allow graphics on one and text on the other. This way, the entire screen can be used on a high resolution colour monitor to display the graphics, and the text window can be displayed and used on the other monitor, which does not need to be a high resolution colour monitor. This is particularly useful for GIS and CAD processing where a high level of detail is being displayed. Arc/Info GIS software supports the use of dual monitors.

4.1.3 GIS Software

As mentioned previously, the PC version of Arc/Info GIS software is used for GIS processing and analysis. This is a state-of-the-art, highly sophisticated and complex GIS. Arc/info provides the tools to perform many powerful analyses of spatial and geographic data as well as data entry, editing, manipulation, management, display, and output of final results.

4.1.4 Other Software

In addition to the Arc/Info GIS software, the computer includes other basic and utility software.

a) Windows 95

The main operating system for the computer is currently Windows 95. It is a windows based system which uses the mouse to navigate through the directory structures, start and run programs and application software, and efficiently manage data files. The Arc/Info GIS software takes advantage of the Windows 95 system to provide an easy to use windows interface to Arc/Info.

b) Microsoft Office

In addition to the main operating system, the Office suite of applications is included as a standard feature on the computer. It includes Word, a sophisticated word processing program, Excel, a powerful spreadsheet program, PowerPoint, a program to create presentations, and a few other utilities, depending on the current version installed.

c) Other Utilities

Typically, there are other utility programs included with the computer. These provide tools for managing the computer, personal convenience, and sometimes entertainment programs. For more information about these programs and tools, the owner manual should be consulted.

4.2 Operation of PC Arc/Info GIS

The operation of Arc/Info GIS is somewhat complex and usually requires formal training and practice before it can be used effectively. However, it is possible to learn how to do one or two simple GIS tasks and be productive within a day or two. This section provides an overview of the operation of Arc/Info GIS, starting with an introduction to the concepts, definitions, and terminology. For a more detailed explanation of any aspect of operation, the readers' attention is directed to the various Arc/Info manuals.

It is assumed that the user of the computer is familiar with the basic operation of the computer and Windows 95 system. This will be necessary for learning how to use and operate Arc/Info GIS software.

4.2.1 Concepts, Definitions, and Terminology

4.2.1.1 Maps and GIS

A map consists of many different geographic features that can be classified as points (wells, spot elevations), lines (roads, streams), and areas (lakes, forests).

These features contain spatial (locations) and descriptive (names) information. GIS is the digital version of the information on a map. These features are usually grouped into layers to represent a common theme such as roads or land use. While the map is simply a display of several layers of geographic data, the GIS can enter, edit, manipulate, and analyze these data as well as create maps of the results in any combination with other layers and at any scale.

4.2.1.2 Coverages

A coverage is a digital map layer or theme. Just as a map has several layers of data, a GIS database contains many coverages. The coverage is usually a homogeneous class of thematic data, such as roads or forests, and usually contains spatial and descriptive data for these features. Spatial data is used to describe locations and shapes of features, and descriptive data provides information about the features, such as names and statistics. All coverage data are stored as a combination of primary and secondary features.

4.2.1.3 Primary and Secondary Feature Classes

In the GIS environment geographic features are stored as points, lines, and polygons, which are primary feature classes. However, a polygon is actually a combination of lines, defining a closed area, and a label point to identify the polygon. Lines, which are called arcs, can be described by endpoints, vertices, and the right/left side relationship. Points generally describe a single point, but in the case of a label point for a polygon, it also contains information with relation to adjoining polygons.

Secondary feature classes include ties, which are registration or control points, extent and boundary coordinates for the coverage area, and user supplied annotations to describe features in the display mode.

The primary and secondary features are created automatically and generally are not edited. This is a form of internal database management from which we can extract valuable spatial information and perform spatial analyses.

4.2.1.4 Spatial Relationships

Spatial relationships are based on relationship of various features to each other and can be used to describe exact and approximate questions and answers. Typical examples of this would be relative proximity to a feature, interpolated values, or shortest/longest path.

4.2.1.5 Topology

This term describes the desired condition of the spatial data. If the data has been digitized then the spatial data exists, but the relationships don't. To establish the spatial relationships that are necessary for analyses, topology must be created.

Topology, which is based on points, arcs, and polygons, will establish this spatial relationship.

4.2.2 Starting Arc/Info GIS

In the Windows 95 desktop there will be several desktop icons for Arc/Info and the various modules. Starting Arc/Info is a simple matter of clicking the icon for the desired program. If any advanced options or start up parameters have been specified, they will initiate automatically during the start up sequence. If there is a problem, the user should consult the Arc/Info manuals or a qualified computer technician.

4.2.3 GIS Data Input

GIS data can be acquired in many ways and from many sources ranging from commercial GIS data to in-house creation of GIS digital data. Some of the more common sources and methods are outlined below.

4.2.3.1 Digitized

GIS data can be digitized directly from a map using a digitizing tablet or board. Since data are not always available, this is probably the most common method for creating GIS data. However, maps contain many different features and feature types and must be carefully prepared prior to digitizing. Digitized data will contain errors that need to be identified and corrected. The digitized data will need to have topology so that it can be used for GIS analysis. Additionally, various attributes are typically added to create a robust GIS data set.

4.2.3.2 Scanned

Scanning is another technique for automated data input but this method is limited by the complexity of the source map. Therefore, it is necessary to prepare the maps to identify the desired features and mask the undesirable features. The scanned data will then require an additional layer of processing to extract and edit the desired features, making the data suitable processing into GIS data. As with digitized data, these data will require topology and attributes before they can effectively be used as GIS data.

4.2.3.3 Direct

This method uses the computer keyboard to enter individual coordinates either interactively or as a file. It can be quite time consuming and is better suited for small tasks such as updates and maintenance. Once the data has been entered, it will need additional processing to build topology and add attributes.

4.2.3.4 Private Sources

There are many other sources that will be labeled as private sources. These

include data in GIS format that is shared from other departments and companies, as well as data in other formats which can be imported or converted to Arc/Info GIS format. Since the sources and formats vary considerably, the amount and type of processing will be on a case by case basis, depending on the source, format, and extent of the data.

4.2.3.5 Commercial Sources

As GIS technology and methods have spread throughout the world, commercial GIS data products have become more commonly available. These are usually regional or global in scale and can be used for projects at those scales or as basemap data that can be combined with project data. Care must be taken to ensure that the data is in the correct format and has the correct geographic parameters to be used with other regional or local GIS data sets.

4.2.4 Identifying and Correcting GIS Data Errors

In order to ensure the integrity of the GIS data, it must be checked for errors and those errors must be corrected. Errors can occur in many forms such as missing or extra data, inaccurate locations or coordinates, and incorrect GIS data relationships and topology. Arc/Info GIS provides several options and methods detecting, identifying, and correcting these errors. All newly acquired GIS data, regardless of the source, will need to be checked and all errors resolved before any analyses can be performed. If it is not, the potential errors will be passed on to the results, making the results unreliable.

Identifying and correcting errors is usually considered part of the data input process, whether the source is digitizing or commercial, and is usually carried out by a trained GIS technician.

4.2.5 Attribute data

Attributes are data that are directly related to the features. As an example, consider a coverage of wells, which is are point features and have coordinates to mark their location. Additional attribute data might include a file of recorded water levels, geologic descriptions, or construction details. Each attribute is directly related to the individual wells by location. This allows processing and analyses based on attribute information related to location, a very powerful analytical tool in GIS.

Commercial and privately obtained GIS data typically have some limited attributes. GIS data created in-house (i.e. digitized) will need to have attributes added. In either case, it may be desirable to add and expand the attributes to make a more powerful GIS data set. Creating attribute files must be carefully planned and once established they must be checked for errors and those errors will need to be resolved, a task for the GIS technician and database manager.

4.2.6 Data Management

As the GIS database becomes larger and more complex, so does the task of managing the data. There are considerations that are common to all data, but as the complexity and size increases, additional considerations must be made. A data manager should have a basic understanding of cartography and database systems.

4.2.6.1 Coordinate Systems

With all GIS data, consideration must be given to the coordinate system for the data. As with maps, GIS features must contain real-world coordinates that allow them to be related to each other by absolute position. However, it is also known that there are many different coordinate systems used to describe the position of a feature. The choice of coordinate system for the data usually depends on many factors such as latitude of the data, scale of the data, and the extent of the data. Therefore, it is important to know the correct or appropriate coordinate system for the GIS data and ensure that all of the GIS data layers are using the same system.

4.2.6.2 Multi-Coverage Organization

As the vertical and horizontal structures of the GIS database expand, special consideration must be given to the organization of these data. Vertical structure refers to thematic layers in the GIS database and horizontal structure refers to spatial partitions, or tiles, within an aerial extensive thematic layer.

Since each layer represents a feature type or theme, careful consideration needs to be given to names to easily identify the feature type. In addition, attribute files associated with a particular thematic layer should also have names that not only identify the thematic layer, but also the contents of the attribute file.

When the extent of the thematic layer covers several map sheets, then the GIS database sometimes is also divided into tiles that correspond to the map sheets to make update and maintenance more efficient. The decision to use tiles depends on several factors related to not only the density and complexity of the data, but also the computer memory and computing capacity. Larger data sets require more processing space and computing performance but may be easier and more efficient to analyze as large data sets, provided the computer resources are adequate.

4.2.7 Plotting GIS Data and Results

When using GIS data it is always desirable to look at the data, examine intermediate results, and present final results and interpretations. Arc/Info GIS provides the tools to accomplish all of these tasks either on the computer monitor or printed on paper.

Generally, the computer monitor is rather limited in size and more suited for simple displays of the GIS data and intermediate, or working results. This is a quick and effective way to interactively browse the GIS data. It is also the most common method to examine intermediate results during an analysis with several steps. It may be necessary to reprocess the analytical step to refine the initial parameters and interactive display on the monitor allows a quick and efficient decision to be made.

There are several reasons for printing a paper copy of the GIS data. It is sometimes desirable to have a paper record of the basic GIS data as an inventory for planning, update, and maintenance. Intermediate results can be printed to allow closer scrutiny before going on to the next step. Final results are almost always printed as this is the preferred method for presenting and interpreting the results of a GIS analysis. Printed maps require more planning than the interactive display on a computer monitor. It will be necessary to determine the focus and purpose of the map and who the audience will be. It will also be necessary to determine certain factors such as size, scale, and media. All printed maps need to contain cartographic information, therefore the balance of the map and GIS elements will need to be determined in a balanced design layout. There may also be a need for additional files to specify symbols and legend explanations. Generally, a printed map will require some thought, planning, and preparation before it can be made and printed.

4.3 Using Digital Data

Digital data can be used for a variety of purposes but most always for displays and analyses. Many software applications will do these things, each with a different focus or intended result, whether it is geographic analysis or an interactive 3D flythrough. Arc/Info GIS is a very powerful software tool for geographic analysis using spatial relationships and related attribute data.

4.3.1 Geographic Analysis

The purpose of geographic analysis is to study real-world processes by developing and applying models using spatial data and attributes. This type of analysis helps to identify trends and patterns in the geographic data, making new information and results available. Arc/Info GIS provides tools which can be combined in many ways to develop specific models and analytical methods. These models and methodologies can be used to determine options and solutions that would otherwise be difficult to determine.

The process of geographic analysis follows a basic procedure, outlined below.

- In order to design and assemble the correct GIS tools for the analytical model it is necessary to establish the objectives and criteria for the analysis.
- After preparation of the GIS data, spatial operations will be performed in a sequence determined to produce the desired results.
- After preparation of the data for tabular analysis, tabular and statistical analyses can be performed.

- The results of the analyses must be evaluated and interpreted to check the validity of the methods.
- Depending on the evaluation and interpretation, it may be necessary to adjust the analytical method and re-analyze the GIS data.

These steps form an iterative procedure that define a GIS model and allow refinement of the method, leading to reliable and accurate results.

4.3.2 Spatial Operations

Spatial operations are the main tools for performing GIS analyses. The fundamental types of spatial operations are:

- Topological map overlay
- Buffer generation
- Feature extraction
- Feature merging
- Relational database operations

New map features can be created by overlaying features from two map layers. Features for each layer are intersected to create new output features, and attributes of each input feature are combined from the two layers to describe each new output feature. Topological overlay can be used for a number of different objectives including coverage updating, feature extraction, merging adjacent coverages, and merging feature attributes.

Another very important class of spatial operation concerns the determination of spatial proximity or nearness of various geographic features. This is known as buffer generation. It is a GIS method to create buffer zones around spatial features for the purpose of identifying areas and features that fall within the buffer zone. These resultant buffer zones can subsequently be used for additional analysis in conjunction with other spatial operations.

Another important spatial operation is feature extraction and merging. Feature extraction and merging is the process of identifying a subset of coverage features to be saved and then eliminating the unselected features to create a new output coverage. This can be done by either clipping out a desired portion of a coverage or by identifying and selecting specific features to be saved or eliminated.

4.3.3 Tabular and Statistical Analysis

In most cases, GIS analysis and interpretation require a compilation of the tabular data to assist with the overall analytical method. It is also quite common to include compiled tabular data in the final presentation or report. In some cases, it is desirable to compile statistical data based on the tabular data. Arc/Info GIS provides the tools to create simple tabular reports which can be included on maps or in reports. There is also a complete set of basic statistical tools to perform basic and moderately sophisticated statistical analyses. The results can be readily included on a map or in a report.

ANNEX

List of Results

1. Aerial photographs	
(1) 1:20,000 black and white negative films	1 set
(2) 1:5,000 colour negative films	1 set
(3) 1:20,000 black and white positive films	1 set
(4) 1:20,000 black and white contact prints	2 sets
(5) 1:5,000 colour contact prints	2 sets
2. Ground survey results	
(1) List of ground control points	3 sets
(2) Descriptions of ground control points	3 sets
(3) Descriptions of control points/bench marks	3 sets
(4) Index map of GPS observations	3 sets
(5) Leveling route map	3 sets
(6) Accuracy control tables	3 sets
3. Aerial triangulation	
(1) Aerial triangulation results and implementation chart	3 sets
(2) Tables of control point residual errors and tie point discrepancy	3 sets
(3) Accuracy control tables	3 sets
4. Topographic map at a scale of 1:10,000	
(1) Draft map (monochrome mylar)	1 set
(2) Duplicated draft (monochrome mylar)	4 sets
(3) Blueprint map	6 sets
5. Topographic map at a scale of 1:5,000	
(1) Draft map (monochrome mylar)	1 set
(2) Duplicated draft (monochrome mylar)	4 sets
(3) Blueprint map	6 sets
6. Digital data	
(1) CD-ROM of topographic maps (each containing both 1:10,000 and 1:5,000-scale maps)	10 sets

English/Khmer annotation list

Results of control points and descriptions of control points/bench marks

Scope of work

Minutes of meeting

ENGLISH/KHMER ANNOTATION LIST

English	Khmer
LEGEND	សញ្ញាសំគាល់
Land Form (Black)	សណ្ឋានដី (ពណ៌ខ្មៅ)
Control Point (1997)	បណ្តោលប្រថវិកាពេល (១៩៩៧)
Control Point (1994)	បណ្តោលប្រថវិកាពេល (១៩៩៤)
Bench Mark (1994)	តម្រូវសំគាល់កំពស់ (១៩៩៤)
Spot Height (Level)	ចំណុចកំពស់ (កំណត់ដោយម៉ាស៊ីននិរ្ត្រ)
Spot Height (Photogrammetry)	ចំណុចកំពស់ (ហោស្រោយតាមរូបថត)
Contour Line	ខ្សែរយៈកំពស់
Depression	ខ្សែរយៈកំពស់បាក់ស្រុតចុះ
Weir	ទំនប់ទឹក
Culvert	លូទឹក
Cliff	ច្រាំងខោត
Embankment	ទំនប់ ឬ ផ្លូវខ្ពស់
Water (Blue)	ទឹក (ពណ៌ខៀវ)
Flow direction	ទិសចរន្តទឹកហូរ
Swamp / Marsh	ទំនាបបឹង
Water channel	ប្រឡាយទឹក
Lake / Pond	បឹង ព្រៃពាំង
Road (Brown)	ផ្លូវ (ពណ៌ត្នោត)

៥៧

Revetment	ច្រាំងបង្កប់
Water gate	ទ្វារទឹក
Road (Double line)	ផ្លូវដែលមានទទឹង 5m ឡើងទៅ (ខ្សែពីរ)
Road (Single line)	ផ្លូវដែលមានទទឹង 2.5m (ខ្សែមួយ)
Unclear road	ផ្លូវលំ
Bridge	ស្ពាន
Trail	ផ្លូវដើរ
Vegetation (Green)	រុក្ខជាតិ (ពណ៌បៃតង)
Bamboo	ឫស្សី
Cultivated field	ដីដាំដុះ
Vegetation boundary	ព្រំប្រទល់រុក្ខជាតិដុះ
Forest	ព្រៃ
Shrub	ព្រៃឈ្មោះ
Waste land	ដីស្ងួតទឹក
Architecture (red)	ស្ថាបត្យកម្ម (ពណ៌ក្រហម)
Wall	កំពែង
School	សាលាស្រុះ
House	ផ្ទះ
Temple and Monument	វត្ត និង វិមាន

៥៧

Annotation (Purple)	ចំណាត់ថ្នាក់(ពណ៌ស្វាយ)
Pr. (Prasat) - Temple	ប្រាសាទ
Tr. (Trapeang) - Pond	ព្រៃព័ទ្ធ
Ph. (Phum) - Village	ភូមិ

ការបញ្ជូនទិន្នន័យស្របច្រកដែលបានប្រើប្រាស់នៅលើផែនទីនេះត្រូវបានអនុម័តដោយ
 ផ្នែកការពារឆ្នាំ ។ ចំពោះការសង្កេតឃើញ សូមមេត្តាផ្ញើសេចក្តីជូនដំណឹងទៅភ្នាក់ងារសាមញ្ញ
 ការសាងសង់ លេខ 4 ផ្លូវលេខ 65 សង្កាត់ ស្រែក ភ្នំពេញ កម្ពុជា ។
 ទូរស័ព្ទ 855-23 430138 ។

SYSTEM TRANSLATION USED ON THIS MAP IS NOT OFFICIALLY

APPROVED .

ANY COMMENTS, PLEASE SEND TO THE GEOGRAPHIC DEPARTMENT .

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Annotation (Khmer - English)
Scale 1: 10,000 Sheet N°

N° A
Feb/18, 1998

N°	X	Y	Khmer	English
A1-1			ប្រាសាទ ភ្នំពេញ	Pr. Phnum Rung
A1-2			ប្រាសាទ ល្វែស	Pr. Roluos
A1-3			បារាយណ៍ ខាងលិច	Western Baray
A2-1			ប្រាសាទ ព្រៃ	Pr. Prey
A2-2			ប្រាសាទ បន្ទាយធំ	Pr. Banteay Thum
A2-3			ប្រាសាទ ជ្រុង	Pr. Chrung
A2-4			ប្រាសាទ ព្រៃ	Pr. Prey
A2-5			ប្រាសាទ ទន្លេស្ងួត	Pr. Tonle Snguot
A2-6			ប្រាសាទ ជ្រុង	Pr. Chrung
A2-7			ប្រាសាទ គូប	Pr. Toub
A2-8			ប្រាសាទ គូប	Pr. Toub
A3-1			បារាយណ៍ ខាងកើត	Eastern Baray
A3-2			ប្រាសាទ មេបុណ្យខាងកើត	Pr. East Mebon
A4-1			ប្រាសាទ ភ្នំពេញ	Pr. Phnum Bouk
A4-2			ប្រាសាទ លាក់ខាង	Pr. Leak Neang
A4-3			បារាយណ៍ ខាងកើត	Eastern Baray

៥២

A5-1			ប្រាសាទ កាសបូរ	Pr. Kas Hou
A5-2			ប្រាសាទ ត្រពាំងធ្មៅ	Pr. Trapeang Lpov
A5-3			ប្រាសាទ តាណី	Pr. Ta Norei
A5-4			ប្រាសាទ រំពេច	Pr. Prey Khmeng
A5-5			បារាយណ៍ ខាងលិច	Western Baray
A5-6			ប្រាសាទ មេបុណ្យខាងលិច	Pr. West Mebon
A6-1			ប្រាសាទ ចាក	Pr. Chak
A6-2			ប្រាសាទ តាប្រហ្មកិល	Pr. Ta Prom Kel
A6-3			ប្រាសាទ បាយក្រៀម	Pr. Bay K'aek
A6-4			ប្រាសាទ ប្រៀមក្រុង	Pr. Baksei Chamkrong
A6-5			ប្រាសាទ ជ្រុង	Pr. Chrung
A6-6			ប្រាសាទ ជ្រុង	Pr. Chrung
A6-7			ប្រាសាទ ខ្លោច	Pr. Khmaoch
A6-8			ប្រាសាទ បី	Pr. Bei
A6-9			ប្រាសាទ ភ្នំបាខែង	Pr. Phnum Bakhaeng
A7-1			ប្រាសាទ រំពេចប្រាសាទ	Pr. Prey Prasat
A7-2			ប្រាសាទ កំណប់	Pr. Kannab
A7-3			ប្រាសាទ រំពេចប្រាសាទ	Pr. Prey Prasat
A9-1			ប្រាសាទ ដួងសោ	Pr. Doun Sao

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A9-2		ប្រាសាទ គោកតាឡី	Pr. Kouk Tale
A9-3		ប្រាសាទ គោកប្រាសាទ	Pr. Kouk Prasat
A9-4		ប្រាសាទ បុព្វតាត្រាវ	Pr. Prey Ta Trav
A9-5		ប្រាសាទ ករណ្តាលដុំ	Pr. Kandaol Dom
A9-6		ត្រពាំង បឹង	Tr. Boeng
A9-7		ប្រាសាទ តាព្រហ្ម	Pr. Ta Prom
A10-1		ប្រាសាទ ស្រងំ	Pr. Srangae
A11-1		ប្រាសាទ គោកត្នក	Pr. Kouk Tulok
A11-2		ប្រាសាទ ទឹមឆ្នៃ	Pr. Toueng Tingai
A11-3		ប្រាសាទ ស្វាយប្រាម	Pr. Svay Pream
A11-4		ប្រាសាទ គោកដូង	Pr. Kouk Doung

N°	X	Y	Khmer	Romanized
1			អូ តាអិ	Ou Ta E
2			ព្រះវាំង វ៉ែ	Tr. Run
3			ព្រះសាម ចាន់	Pr. Bapuon
4			ព្រះសាម ព្រះវង	Pr. Preah Piliu
5			ព្រះវាំង ស្វាយ	Tr. Svay
6			ព្រះវាំង លង្វែ	Tr. Leang Dai
7			ផ្លូវលេខ ១០៤	Road Number 105
8			ព្រះសាម ព្រះបុរេវេរ	Pr. Kraol Kou
9			ព្រះសាម ឆាន់វង់	Pr. Neakpou
10			ស្ទឹង អូរ្យោបាយ	Sueng Siem Reap
11			ព្រះសាម ឆាន់	Pr. Ta Ney
12			ព្រះសាម ឆាន់ខ្ពង់	Pr. Thommeanon
13			ព្រះសាម ចោលយចេវា	Pr. Chausay Tevoda
14			ព្រះសាម ឆាន់វេ	Pr. Takaev
15			ព្រះសាម ចាន់វង់	Pr. Bayon
16			ព្រះសាម ព្រះវង់	Pr. Preah Khan
17			ព្រះសាម ស្ទឹងព្រៃ	Pr. Suor Pral
18			ព្រះសាម បង្កាយព្រៃ	Pr. Banteay Prey
19			អង្គរ ធំ	Angkor Thum
20				
21				

N°	X	Y	Khmer	Romanized
1			ផ្លូវលេខ ២០៤	Road Number 205
2			អូ កាណ្ឌាល	Ou Kandaol
3			ព្រះសាម ព្រះវង	Pr. Trapeang Run
4			អូ តាស៊ីវ	Ou Ta Siv
5			អូ តាអូ	Ou Ta Ou
6			ព្រះសាម គោកពោធិ៍	Pr. Kouk Pou
7			ព្រះសាម រូង	Pr. Phum Rung
8			អូ ខ្ពក	Ou Khlok
9			អូ ខ្ពក	Ou Khlok
10			បារាយណ៍ ខាងលិច	Western Baray
11				
12				

Annotation (Khmer-English) N° A4
 Scale 1: 10,000 Sheet N° 4 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			អូ តាស៊ីវ	Ou Ta Siev
2			ភ្នំ បូក	Phnum Bouk
3			ស្ទឹង រត្ន	Sueng Ratuos
4			ផ្លូវ លៀន	Loley Road
5				
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Annotation (Khmer-English) N° A3
 Scale 1: 10,000 Sheet N° 3 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ស្ទឹង រត្ន	Sueng Siem Reap
2			ផ្លូវលេខ ១០៥	Road Number 105
3			បារាយណ៍ ខាតិក	Eastern Baray
4			អូ ខ្នារ	Ou Khnar
5			ផ្លូវលេខ ៨១០	Road Number 810
6			ប្រាសាទ បុរាណ	Pr. Banteay Samrae
7			ប្រាសាទ តាសាម	Pr. Ta Saom
8				
9				

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Annotation (Khmer-English) N° A0
 Scale 1: 10,000 Sheet N° 0 Feb/0, 1998

N°	X	Y	Khmer	Romanized
1			ប្រាសាទ អង្គរ	T. Angkor Thum
2			ផ្លូវលេខ ៦៦	Road Number 66
3			ភ្នំ បាខាង	Phnum Bakhaeng
4			អង្គរវត្ត	Angkor Wat
5			ស្ទឹង អូរស្រប	Sieng Siem Reap
6			ប្រាសាទ ព្រៃប្រាសាទ	Pr. Ta Prom
7			ផ្លូវលេខ ៦៦	Road Number 66
8			ប្រាសាទ បុរាណ	Pr. Banceay Kdei
9			បុរាណវត្ថុ បាខាង	Western Bary
10			អង្គរ ធំ	Angkor Thum
11			ប្រាសាទ ក្រវាង	Pr. Kravann
12				
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Annotation (Khmer-English) N° A5
 Scale 1: 10,000 Sheet N° 5 Feb/0, 1998

N°	X	Y	Khmer	Romanized
1			ផ្លូវជាតិលេខ ៦	National Road N. 6
2				
3			ផ្លូវលេខ ៨១៣	Road Number 813
4			អាកាសយានដ្ឋានអូរស្រប	Siem Reap Airport
5			បឹង ស្រង់	Boeng Sraung
6			ប្រាសាទ អាយ	Pr. Ak Yum
7			ប្រាសាទ ប្រៃ	Pr. Prey
8				
9				

55

Annotation (Khmer-English) N° A8
 Scale 1: 10,000 Sheet N° 8 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ផ្លូវជាតិលេខ ៦៦	Batchum Road Number 66
2			ស្ទឹង រលួស	Stueng Roluos
3			ក្រាំង បឹង	Tr. Boeng
4			អូរ ស្ទឹង	Ou Stueng Touch
5			អូរ តាបេត	Ou Ta Bet
6			ត្រាំង ខ្លែ	Tr. Khvaen
7			សាលារៀន បង្កំ	Salakhum Ballang
8			ប្រាសាទ ចេតិយវិហារ	Pr. Chau Srei Vibol
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Annotation (Khmer-English) N° A7
 Scale 1: 10,000 Sheet N° 7 Feb/6 1998

N°	X	Y	Khmer	Romanized
1			ប្រាសាទ វិហារ	Pr. Prae Rub
2			ផ្លូវលេខ ៦៦១	Road Number 661
3			ស្រះប្រាសាទ	Srah Strang
4			ប្រាសាទ ចាតុជ	Pr. Bat Chum
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Annotation (Khmer-English) N° A10
 Scale 1: 10,000 Sheet N° 10 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1				
2			ស្រះបាណ្ឌវ	National Road N. 6
3			ប្រាសាទ បាណ្ឌវ	Pr. Bakong
4			ស្ថាប័ន	Stueng Reiuos
5				
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Annotation (Khmer-English) N° A9
 Scale 1: 10,000 Sheet N° 9 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ស្រះបាណ្ឌវ	National Road N. 6
2			ប្រាសាទ ប្រាសាទ	Pr. Prean Kou
3			ប្រាសាទ បាណ្ឌវ	Pr. Bakong
4			ប្រាសាទ ល្វែង	Pr. Loley
5			ប្រាសាទ បាណ្ឌវ	Ou Spean Daek
6				
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Annotation (Khmer-English) N° A12
 Scale 1:10,000 Sheet N°12 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ស្ទឹង រត្នបុរ	Stueng Roltuos
2				
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Annotation (Khmer-English) N° A11
 Scale 1:10,000 Sheet N°11 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ប្រាសាទ ព្រៃក្រវាត់	Pr. Trapeang Phong
2			ប្រាសាទ ប្រៃសណីយ៍	Pr. Prey Mont
3				
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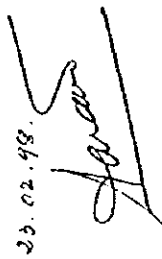
Annotation (Khmer-English) N° B2
 Scale 1: 10,000 Sheet N°2 Feb/5, 1998

N°	X	Y	Khmer	Romanized
1			ភូមិ ព្រះគោ	Ph. Preah Kou
2			ភូមិ ជ្រុង	Ph. Phlong
3			ភូមិ ជួនឯង	Ph. Doun Ov
4			ភូមិ សំរោង	Ph. Samraong
5			ភូមិ លាងដៃ	Ph. Leang Dai
6			ភូមិ អង្ករក្រៅ	Ph. Angkor Krau
7			ភូមិ គោកឃ្លាង	Ph. Kouk Beung
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Annotation (Khmer-English) N° B1
 Scale 1: 10,000 Sheet N°1 Feb/4, 1998

N°	X	Y	Khmer	Romanized
1			ភូមិ ជួនដំរី	Ph. Doun Kaev
2			ភូមិ គោកឃ្លាង	Ph. Kouk Pnov
3			ភូមិ រំពាល	Ph. Rohal
4			ភូមិ គោកជ្រូក	Ph. Tnaot Chrum
5			ភូមិ លៀក	Ph. Lbaeuk
6			ភូមិ គោកកោង	Ph. Kouk Pou
7			ភូមិ គោកស្រី	Ph. Ta Sae
8			ភូមិ ជ្រុង	Ph. Phnum Rung
9			ភូមិ ពាង	Ph. Peam
10			ភូមិ ព្រៃលាងចាវ	Ph. Prasat Char
11			ភូមិ គោកត្នោត	Ph. Kouk Tnaot
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Annotation (Khmer-English) N° B3
 Scale 1: 10,000 Sheet N° 3 Feb/5, 1998

N°	X	Y	Khmer	Romanized
1			ភូមិ តាកុស	Ph. Ta Kos
2			ភូមិ វាលបន្ទាយ	Ph. Thnal Bandaoy
3			ភូមិ វាលស្រែង	Ph. Thnal Totueng
4			ភូមិ អូរស្រង	Ph. Ou Totueng
5			ភូមិ ព្រះពោធិ៍	Ph. Preah Dak
6			ភូមិ តាសៀវ	Ph. Ta Siev
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Annotation (Khmer-English) N° B4
 Scale 1: 10,000 Sheet N° 4 Feb/5, 1998

N°	X	Y	Khmer	Romanized
1			ភូមិ ថ្លាក	Ph. Thlok
2			ភូមិ តាសៀវ	Ph. Ta Siev
3			ភូមិ ស្រែចង្ការ	Ph. Srae Changhout
4			ភូមិ រុន	Ph. Run
5			ភូមិ ជ័រ	Ph. Chey
6			ភូមិ តាអ៊ក	Ph. Ta Aek
7			ភូមិ ត្បាញ	Ph. Tmat Pong
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N°	X	Y	Khmer	Romanized
1			ភូមិ បឹងខ្នារ	Ph. Boeng Khnar
2			ភូមិ ប្រៃសែន	Ph. Prey Kmeng
3			ភូមិ រលួស	Ph. Koluos
4			ភូមិ ប្រៃសែន	Ph. Prey Thlok
5			ភូមិ ជ្រលង	Ph. Chroloeng
6			ភូមិ ត្រពែង	Ph. Trameang
7			ភូមិ ស្វាយ	Ph. Svay
8			ភូមិ ប្រម្រុយ	Ph. Pralay
9			ភូមិ ខ្នារ	Ph. Khnat
10			ភូមិ គោកស្នួល	Ph. Kouk Snuol
11			ភូមិ ប្រៃសែន	Ph. Preack Thmei
12			ភូមិ បឹងស្រី	Ph. Tuek Vil
13			ភូមិ ប្រៃ	Ph. Chrey
14			ភូមិ សាលា	Ph. Sandan
15			ភូមិ បន្ទាយរលើ	Ph. Banteay Chheu
16			ភូមិ ប្រៃ	Ph. Prey
17			ភូមិ គោកដូង	Ph. Kouk Doung
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N°	X	Y	Khmer	Romanized
1			ភូមិ បារាយណ៍	Ph. Baray
2			ភូមិ គោកតាចាន	Ph. Kouk Ta Chan
3			ភូមិ ត្រពាំងល្បែ	Ph. Trapeang Lpov
4			ភូមិ ខ្នារ	Ph. Khvien
5			ភូមិ ស៊ីស៊ីត	Ph. Serei Lech
6			ភូមិ ស៊ីស៊ីត	Ph. Serei Kaeut
7			ភូមិ ត្រពាំងស្នួល	Ph. Trapeang Seh
8			ភូមិ វាល	Ph. Veal
9			ភូមិ ភ្នំពេញ	Ph. Ksen Tboung
10			ភូមិ បណ្ណាល័យ ៣	Ph. Mondol Bei
11			ភូមិ ត្រពាំង	Ph. Treang
12			ភូមិ ជ្រលង	Ph. Thnal
13			ភូមិ អង្គរវត្ត	Ph. Akphivod
14			ភូមិ រលួស	Ph. Rohal
15				

N°	X	Y	Khmer	Romanized
1			ភូមិ តាអែក	Ph. Ta Aek
2			ភូមិ បងកាង	Ph. Bang Kaong
3			ភូមិ ត្រាច	Ph. Trach
4			ភូមិ ព្រំកូដ	Ph. Prum Kod
5			ភូមិ ស្រែស្រែង	Ph. Sna Saung-reau
6				
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N°	X	Y	Khmer	Romanized
1				
2			ភូមិ ស្រែស្រែង	Ph. Srah Srang Tboung
3			ភូមិ ក្រវាង	Ph. Kravan
4			ភូមិ អាកស្វាយ	Ph. Arak Svay
5			ភូមិ អង្គាញ	Ph. Anhchay
6			ភូមិ ត្រាបេង	Ph. Trapeang Thlok
7			ភូមិ ត្រាច	Ph. Trach Chrum
8			ភូមិ អំបិល	Ph. Ampil
9			ភូមិ បុស្រំ	Ph. Bos Thum
10			ភូមិ គោកចាន់	Ph. Kouk Chan
11			ភូមិ គីរីម៉ោន	Ph. Kiri Meanon
12			ភូមិ តាប៉ាង	Ph. Ta Pang
13			ភូមិ ត្រាបេង	Ph. Trapeang Run
14			ភូមិ ស្រែស្រែង	Ph. Srah Srang Cheung
15				
16				

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N°	X	Y	Khmer	Romanized
1			ភូមិ ក្រែប៊ុយ	Ph. Prey Kuy
2			ភូមិ ក្រែប	Ph. Chrey
3			ភូមិ ស្វាយធំ	Ph. Svay Thum
4			ភូមិ គោកត្នោត	Ph. Kouk Tnaot
5			ភូមិ ល្អិត	Ph. L'ak
6			ភូមិ ត្រាង	Ph. Trang
7			ភូមិ ស្ពានក្រែក	Ph. Speau K'ack
8			ភូមិ មូរ	Ph. Ou
9			ភូមិ ខ្ពស់ក្រែក	Ph. Ovlaok
10			ភូមិ ប្រាសាទបាគង	Ph. Prasat Bakong
11			ភូមិ ប្រាសាទរុន	Ph. Trapeang Run
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N°	X	Y	Khmer	Romanized
1			ភូមិ សំរោង	Ph. Loley Thmei
2			ភូមិ សំរោង	Ph. Loley
3			ភូមិ ត្បូងគ្រប់	Ph. Thnal Trang
4			ភូមិ ស្ទឹង	Ph. Stueng
5			ភូមិ រលួសស្ទឹង	Ph. Roluos Lech
6			ភូមិ រលួសកែវ	Ph. Roluos Kaeui
7			ភូមិ គោកត្រាង	Ph. Kouk Trach
8				
9				

៥៨

N°	X	Y	Khmer	Romanized
1			ភូមិ ចំប៉ា	Ph. Chambak
2			ភូមិ មហេញ	Ph. Momeanh
3			ភូមិ រលួសរំបិច	Ph. Roluos Lech
4			ភូមិ តាប្រាក់	Ph. Ta Prak
5			ភូមិ កញ្ជា	Ph. Kanhchor
6			ភូមិ រលួសរំកិល	Ph. Roluos Kaeul
7				
8				

៤/

N°	X	Y	Khmer	Romanized
1			ភូមិ បុស្សត្រីភ្នំ	Ph. Bos Kralanh
2			ភូមិ គោកព្រុក	Ph. Kouk Thlok
3			ភូមិ ឃុំរមាត	Ph. Khun Mouk
4			ភូមិ ត្រពាំងរំបិច	Ph. Trapeang Tuem
5			ភូមិ ជ្រួស	Ph. Chres
6			ភូមិ ក្បួនរៀក	Ph. Speau K' aek
7			ភូមិ ទួរ	Ph. Ou
8			ភូមិ គោកស្រុក	Ph. Kouk Srok
9				
10				

៤៥

N°	X	Y	Khmer	Romanized
1			ឧប ច្បង	Tumnup Barung
2			បារាយណ៍ ខាងកើត	Eastern Baray
3			ប្រាសាទ ក្រោលមេស	Pr. Kraol Romeas
4			ស្ទឹង សៀមរាប	Srueng Siem Reap
5			អង្គរ ធំ	Angkor Thum
6				
7				

8/1

N°	X	Y	Khmer	Romanized
1			អង្គរ ធំ	Angkor Thum
2			ប្រាសាទ ព្រះព្រហ្មវិហារ	Pr. Preah Poitley
3			បារមី ឆ្នេរស្ទឹង	Lean Seach Kumlong
4			បារមី ជល់ដី	Lean Chol Damrei
5			ព្រះព្រហ្មវិហារ	Preah Reach Veang
6			ប្រាសាទ ភិមានភាពស	Pr. Phumean Akas
7			ប្រាសាទ ព្រះភិទ្ធ	Pr. Preah Pithu
8			ប្រាសាទ ប្រាង្គជើង	Pr. Khleang Cheung
9			ប្រាសាទ ប្រាង្គត្បូង	Pr. Khleang Tboung
10			ប្រាសាទ សុគ្រឹត្រ	Pr. Suor Prat
11			ប្រាសាទ ក្រោលមេស	Pr. Kraol Romeas
12			បារាយណ៍ ខាងលិច	Western Baray
13			ត្រពាំង កំសាន្ត	Tr. Kamsan
14			ប្រាសាទ ប្រិយ	Pr. Prey
15			ត្រពាំង ប្រិយ	Tr. Prey
16			ផ្លូវលេខ ៦៦	Road Number 66
17				
18				

8/1

Annotation (Khmer-English) N° D4
 Scale 1: 5,000 Sheet N° 4 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ប្រាសាទ វិហារ	Pr. Ter
2			បារាយណ៍ ខាងកើត	Eastern Saray
3				
4				
5				

៥/

Annotation (Khmer-English) N° D3
 Scale 1: 5,000 Sheet N° 3 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			ប្រាសាទ គាសោរ	Pr. Ta Saom
2			បារាយណ៍ ខាងកើត	Eastern Baray
3				
4				

៥/

Annotation (Khmer-English) N° D6
 Scale 1: 5,000 Sheet N° 6 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			អង្គរ ធំ	Angkor Thum
2			ស្ទឹង ស៊ីម រឿង	Stueng Siem Reap
3			ផ្លូវលេខ ៦៦	Road Number 66
4				
5				
6				

៧

Annotation (Khmer-English) N° D5
 Scale 1: 5,000 Sheet N° 5 Feb/6, 1998

N°	X	Y	Khmer	Romanized
1			បារាយណ៍ ខាងលិច	Western Baray
2			ប្រាសាទ បុរីច្រក	Pr. Baksei Cham Krong
3			អង្គរវត្ត	Angkor Wat
4				
5				
6				

៧

Annotation (Khmer-English) N° D7
 Scale 1: 5,000 Sheet N° 7 Feb/6,1998

N°	X	Y	Khmer	Romanized
1			ស្រះស្រង	Srah Srang
2			ព្រំបាល បាត់ដំបង	Pr. Banchum
3			ព្រំបាល លាតាំង	Pr. Leak Neang
4			ព្រំបាល ត្បូងឃ្មុំ	Tr. Khmaoch
5			ព្រំបាល កោះកុង	Tr. Taiev
6			ព្រំបាល ឃ្មុំ	Tr. Phong
7				
8				
9				

84

Annotation (Khmer-English) N° D8
 Scale 1: 5,000 Sheet N° 8 Feb/6,1998

N°	X	Y	Khmer	Romanized
1			ផ្លូវលេខ ៦៦១	Road Number 661
2				
3				
4				

85

Annotation (Khmer-English) N° D 9
 Scale 1: 5,000 Sheet N° 10 Feb/6, 1998

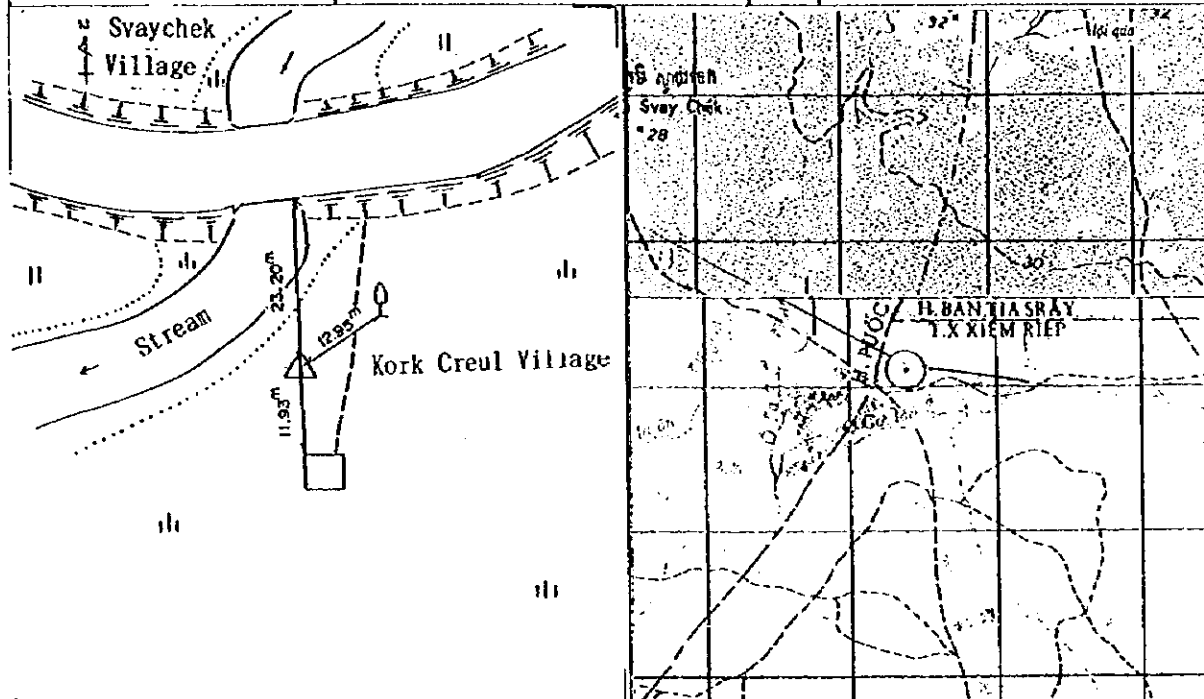
NO	X	Y	Khmer	Romanized
1			ប្រាសាទ កណ្តាល	Pr. Kandal
2			ប្រាសាទ ខ្សាច់	Pr. Ou K'ack
3			ប្រាសាទ ខ្សាច់	Pr. Ovlaok

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These correlation is authorized by Mr. Huong Savang,
 the Director of the Geographic Department
 on 23rd February, 1998.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO . 1	11. Feb. 1 9 9 7	Concrete Peg
LATITUDE	N 13° 29' 37" .92208 ✓	N m 1,492,049.805 ✓
LONGITUDE	E 103° 50' 13" .21456 ✓	E m 374,129.413 ✓
GRIDAZIMUTHOF MERIDIAN	0° 16' 17" .079 ✓	H m 25.348 ✓



NOTE

This point is 7.5km for north:
east of West-Baray center.
Along the road it is middle to
Ph Tabek from Ph. Phlong



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 2	10. Feb. 1997	Concrete Peg
LATITUDE	N 13° 29' 40" .55725 ✓	N m 1,492,161.695 ✓
LONGITUDE	E 103° 46' 41" .47458 ✓	E m 367,763.268 ✓
GRIDAZIMUTHOF MERIDIAN	0° 17' 06" .562 ✓	H m 18.827 ✓

NOTE

.....
 This point is 7.5km for
 north-east of West-Baray
 center.

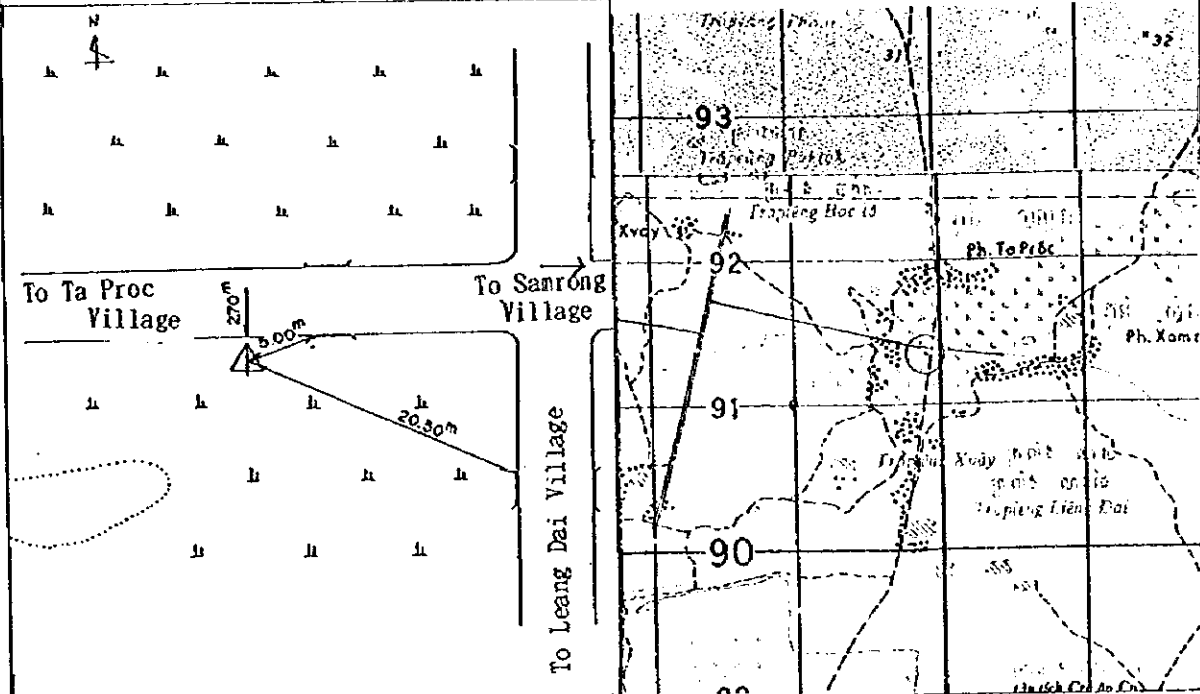
.....
 Along the road , it is middle to
 Ph. Don Kep from Ph. Kouk
 kok.

.....

※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 3	11. Feb. 1997	Concrete Peg
LATITUDE	N 13° 29' 19" .39132 ✓	N m 1,491,455.729 ✓
LONGITUDE	E 103° 53' 10" .54524 ✓	E m 379,458.677 ✓
GRIDAZIMUTHOF MERIDIAN	0° 15' 35" .335 ✓	H m 29.894 ✓

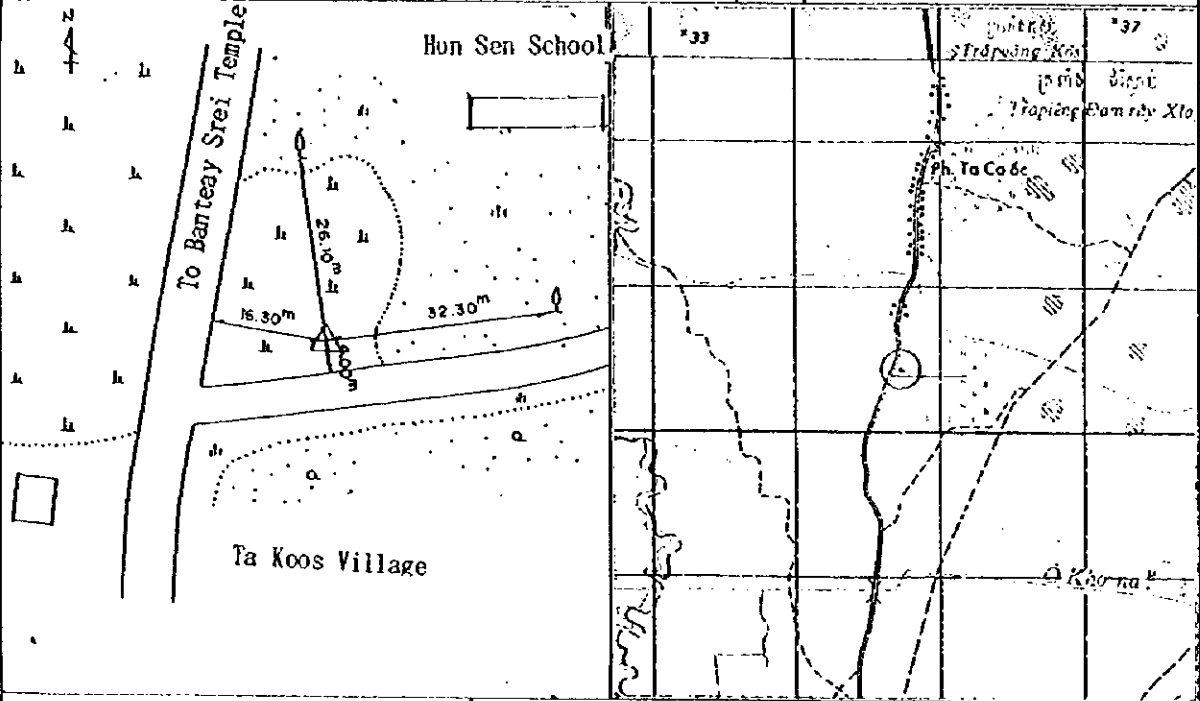



NOTE
 This point is 6km for north-east of Bayon temple
 Along the road, it is near Xam rong village.



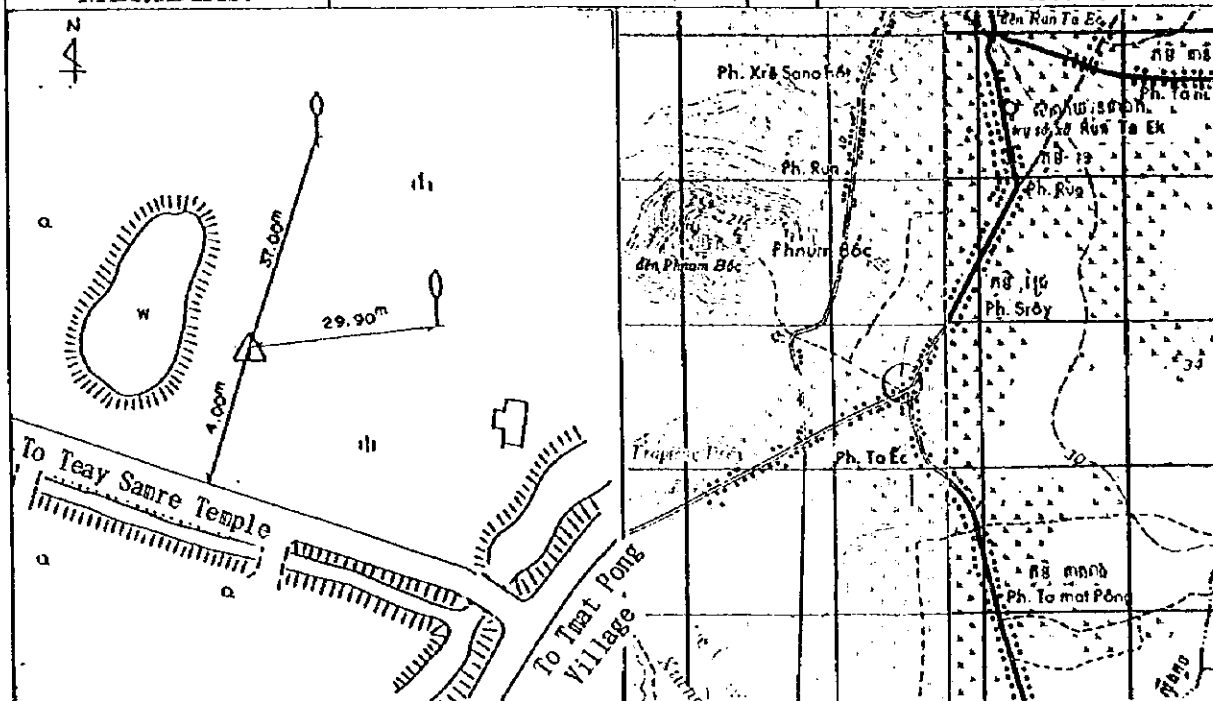
※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

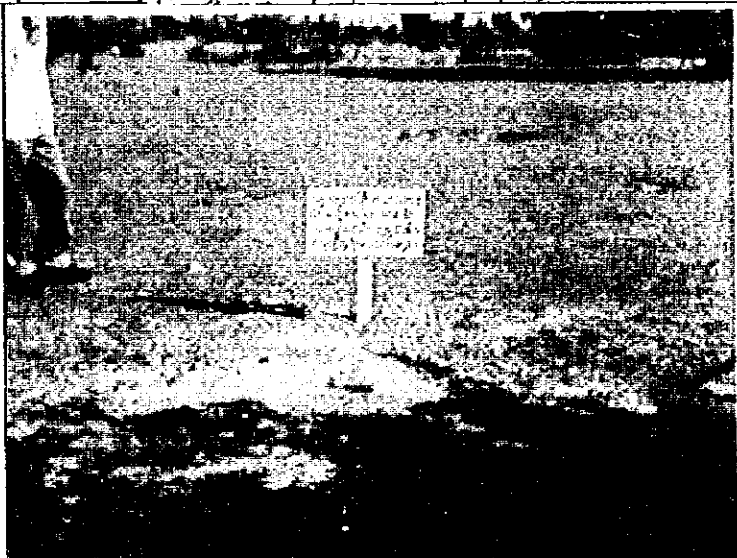
STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 4	10. Feb. 1997	Concrete Peg
LATITUDE	N 13° 28' 55" .32638 ✓	N m 1,490,690.723 ✓
LONGITUDE	E 103° 56' 23" .13762 ✓	E m 385,246.243 ✓
GRIDAZIMUTH OF MERIDIAN	0° 14' 49" .963 ✓	H m 31.606 ✓
		
<p>NOTE</p> <p>This point is 3km for north-east of East-Baray center.</p> <p>Along the road, it is middle to Ban Teay Srey from Pradac village</p>		
<p>※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.</p>		

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO.5	11. Feb. 1 9 9 7	Concrete Peg
LATITUDE	N 13° 27' 23" .95712 ✓	N m 1,487,859.085 ✓
LONGITUDE	E 103° 59' 36" .32896 ✓	E m 391,043.592 ✓
GRIDAZIMUTH OF MERIDIAN	0° 14' 03" .347 ✓	H m 29.518 ✓



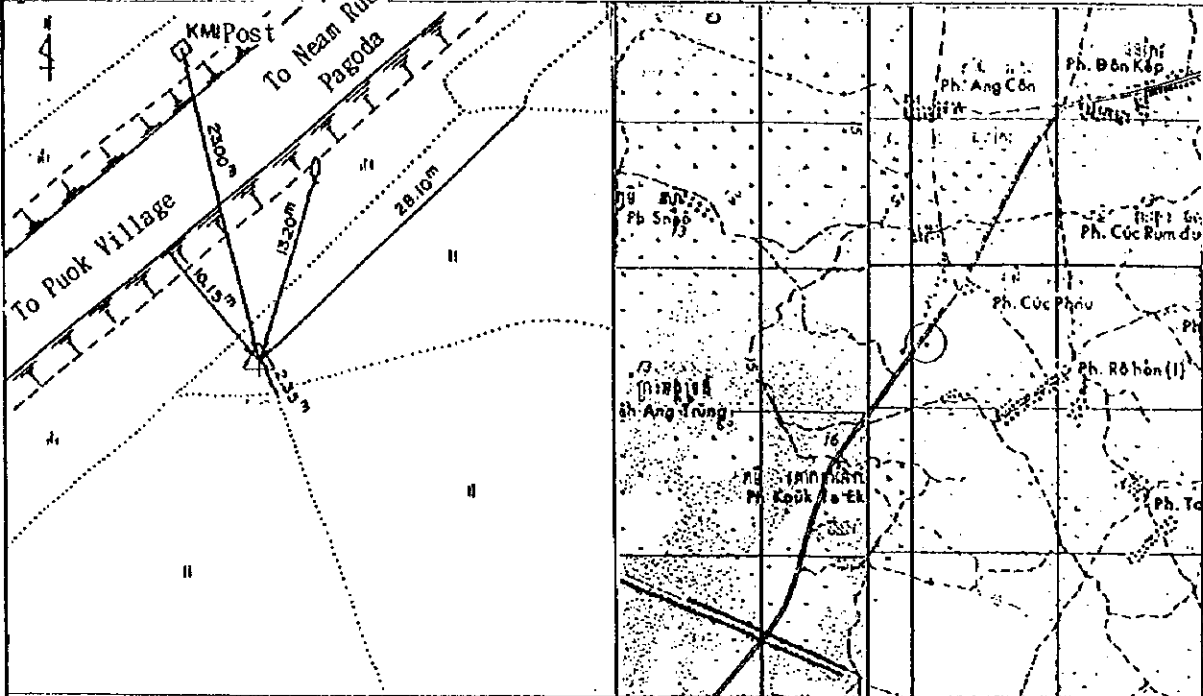
NOTE
 This point is 1.5km for south-east of Bok Mountain.
 It is located in crossing road of Ta Ek village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 6	11 Feb. 1997	Concrete Peg
LATITUDE	N 13° 28' 17" .54022 ✓	N m 1,489,627.069 ✓
LONGITUDE	E 103° 44' 54" .73844 ✓	E m 364,540.921 ✓
GRIDAZIMUTH OF MERIDIAN	0° 17' 29" .717 ✓	H m 15.963 ✓



NOTE

This point is 7km for North:
West of West-Baray.....

Along the road, it is near
Rohal village.....

.....

.....

.....

.....

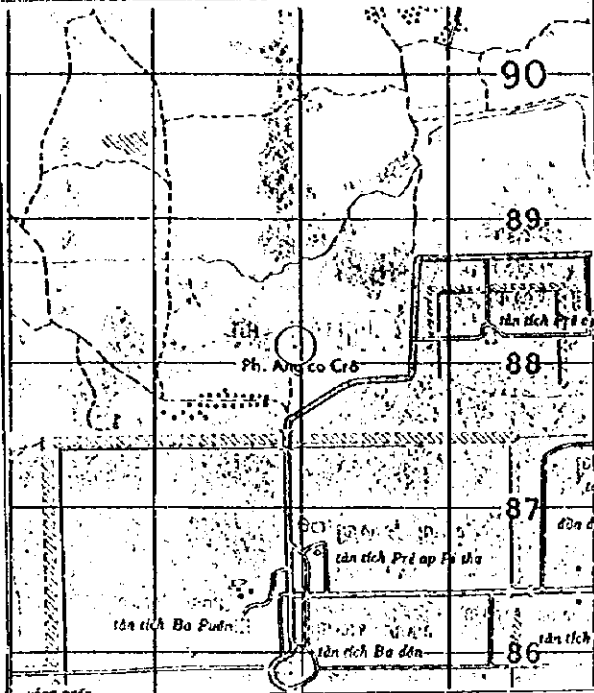
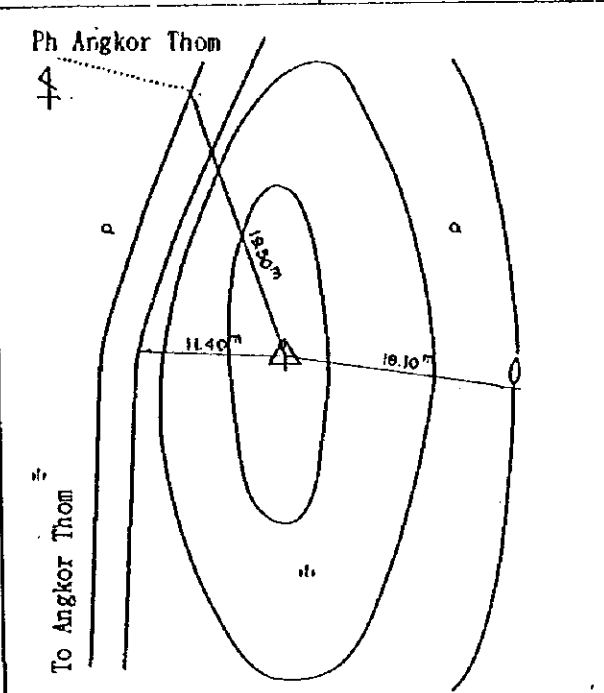
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*THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 7	11. Feb. 1997	Concrete Peg
LATITUDE	N 13° 27' 39" .10560 ✓	N m 1,488,387.833 ✓
LONGITUDE	E 103° 51' 33" .57031 ✓	E m 376,528.559 ✓
GRID AZIMUTH OF MERIDIAN	0° 15' 56" .021 ✓	H m 27.105 ✓



NOTE

This point is 2km for North of Bayon temple.

Along the road it is near Angkor Krao village.

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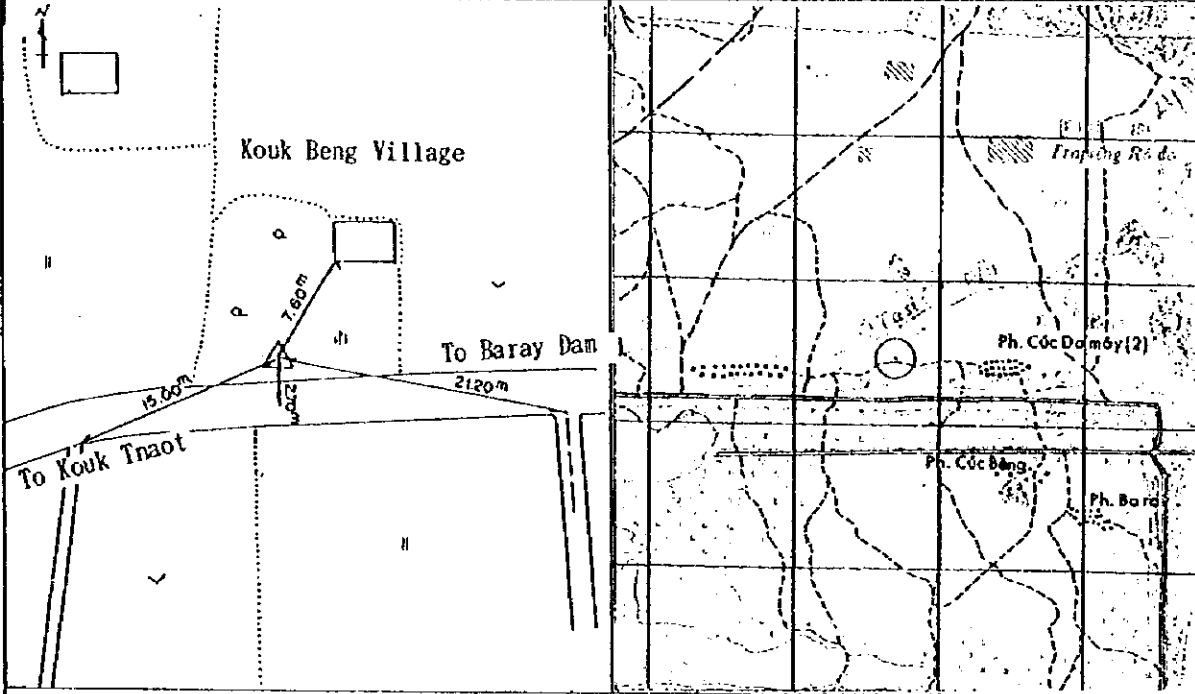

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.....



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

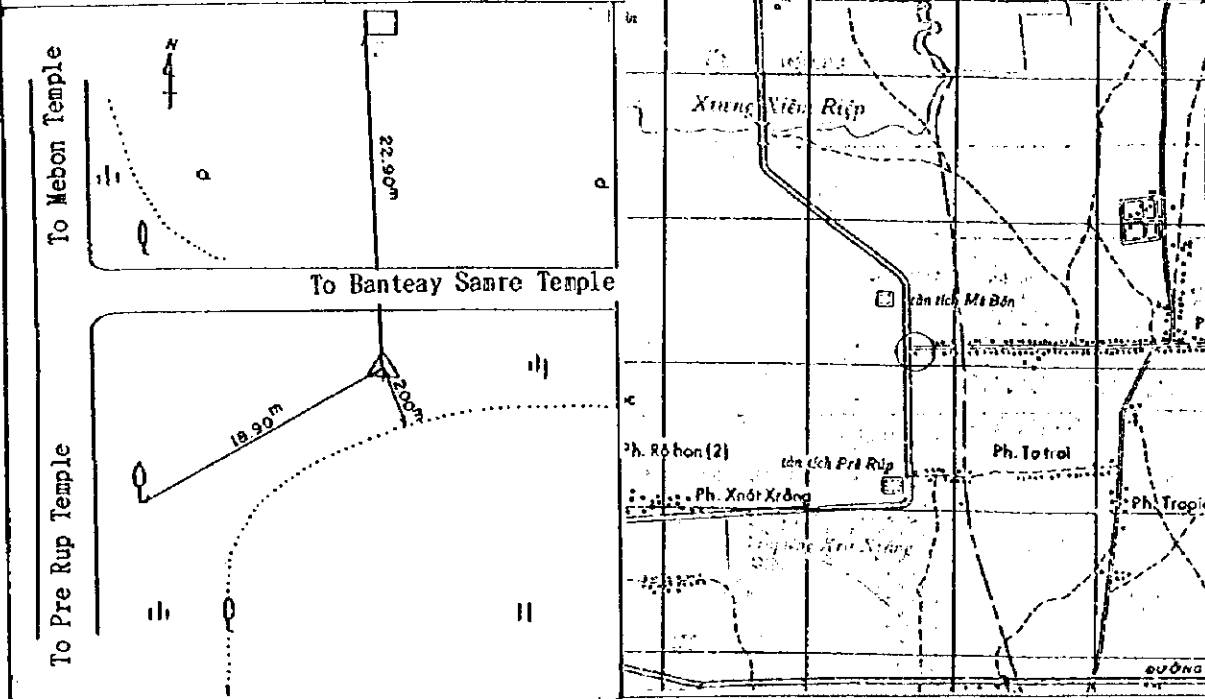
DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 8	11. Feb. 1997	Concrete Peg
LATITUDE	N 13° 26' 46" .00436 ✓	N m 1,486,777.033 ✓
LONGITUDE	E 103° 49' 07" .27313 ✓	E m 372,121.343 ✓
GRIDAZIMUTHOF MERIDIAN	0° 16' 29" .025 ✓	H m 19.708 ✓
		
<p>NOTE</p> <p>This point is near the West-Baray, it is situated in the North of West - Baray.</p> <p>Along the road, it is located in Kouk Beng village.</p>		

※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 9	12. Feb. 1997	Concrete Peg
LATITUDE	N 13° 26' 36" .36848 ✓	N m 1,486,429.885 ✓
LONGITUDE	E 103° 55' 17" .72644 ✓	E m 383,260.742 ✓
GRIDAZIMUTH OF MERIDIAN	0° 15' 02" .674 ✓	H m 25.901 ✓



NOTE

This point is 1km for north of Pre Rup temple and 300m for south of Mebon temple and it is located in the corner of road toward Mebon and Bantey-Sam Re temple and it is situated in Pradac village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

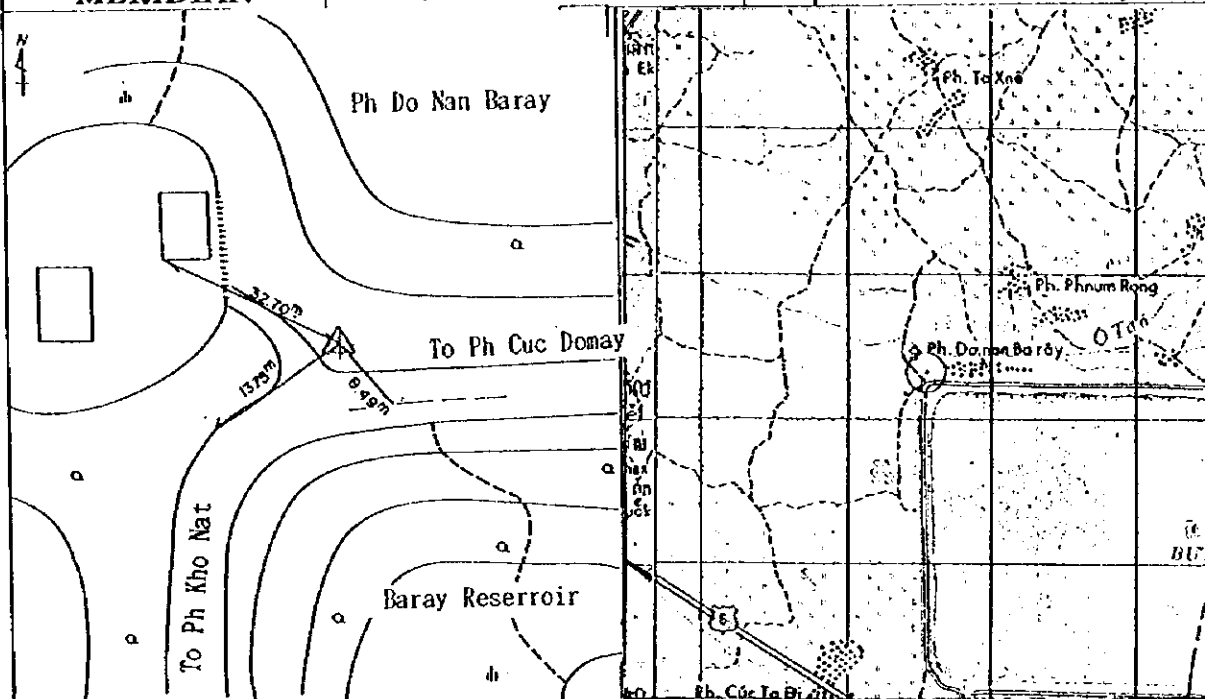
DESCRIPTION OF POINT(BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 10	10. Feb. 1997	Concrete Peg
LATITUDE	N 13° 26' 41" .12634 ✓	N m 1,486,558.710 ✓
LONGITUDE	E 103° 57' 31" .91789 ✓	E m 387,296.878 ✓
GRIDAZIMUTH OF MERIDIAN	0° 14' 31" .551 ✓	H m 26.132 ✓
<p>NOTE</p> <p>This point is 200m for north of Banteay Samre temple and situated in the corner of entry road to Banteay SamRe temple and along the road toward Bok Mountain.</p> <p>It is located in Ototeoung village.</p>		

※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 11	12.Feb. 1 9 9 7	Concrete Peg
LATITUDE	N 13° 26' 38" .69549✓	N m 1,486,581.769✓
LONGITUDE	E 103° 45' 48" .67435✓	E m 366,147.575✓
GRIDAZIMUTHOF MERIDIAN	0° 17' 15" .072✓	H m 25.368✓



NOTE

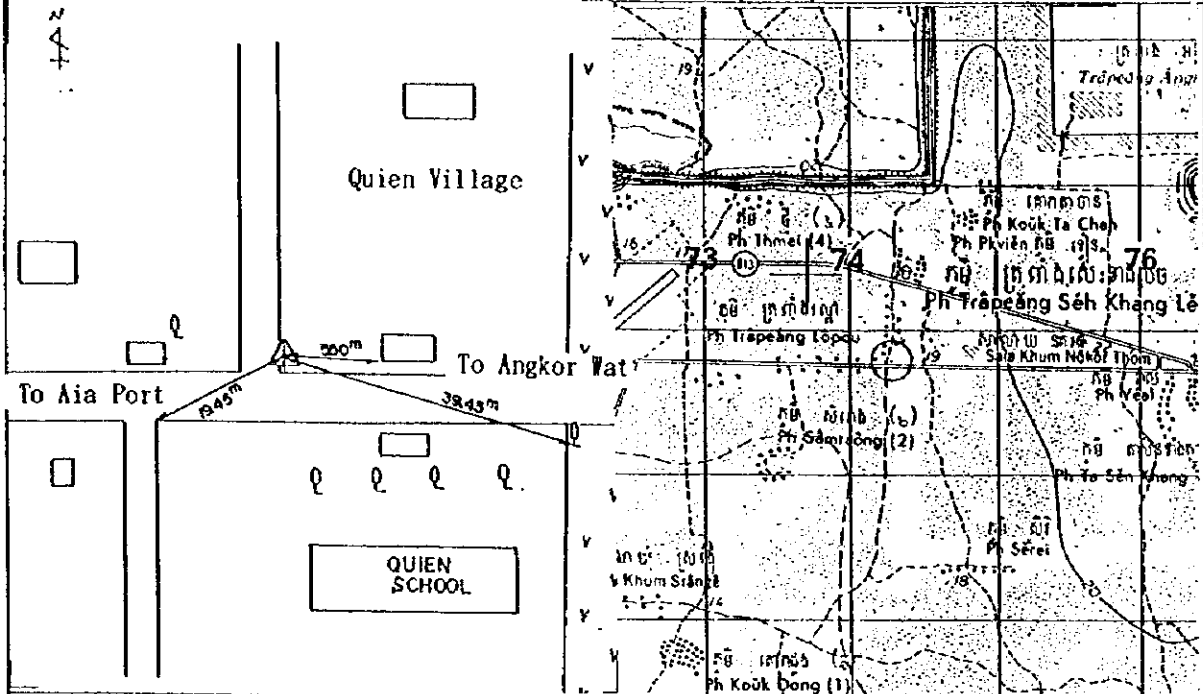
This point is situated in the north-west corner of West-Baray and it is located in Kork Thmei village



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 12	10.Feb.1997	Concrete Peg
LATITUDE	N 13° 24' 46" .41240 ✓	m 1,483,094.386 ✓
LONGITUDE	E 103° 50' 04" .29753 ✓	m 373,818.907 ✓
GRIDAZIMUTHOF MERIDIAN	0° 16' 13" .393 ✓	m 19.334 ✓



NOTE

This point is 2.8km for West of Angkor wat.

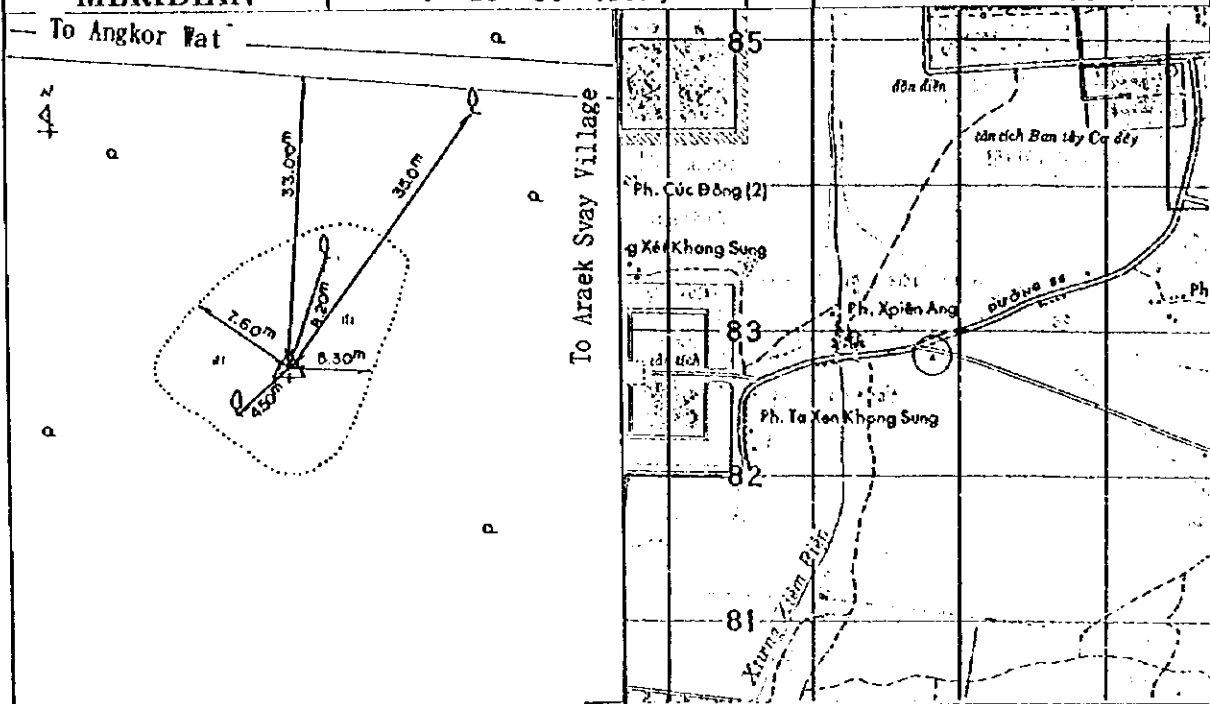
Along the road from the western gateway of Angkor Wat toward the air port and it is located in Quien village.....



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

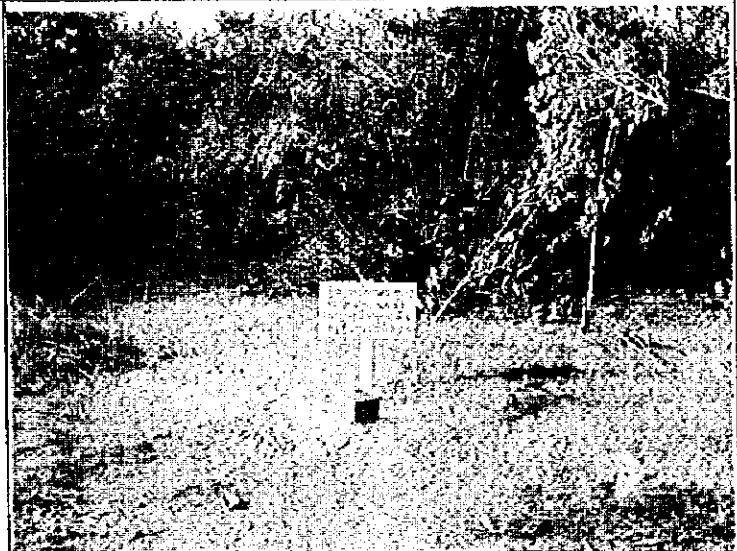
DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 13	10.Feb. 1 9 9 7	Concrete Peg
LATITUDE	N 13° 24' 49" .73111 ✓	m 1,483,170.833 ✓
LONGITUDE	E 103° 53' 08" .10943 ✓	m 379,347.947 ✓
GRIDAZIMUTHOF MERIDIAN	0° 15' 30" .801 ✓	m 21.031 ✓



NOTE

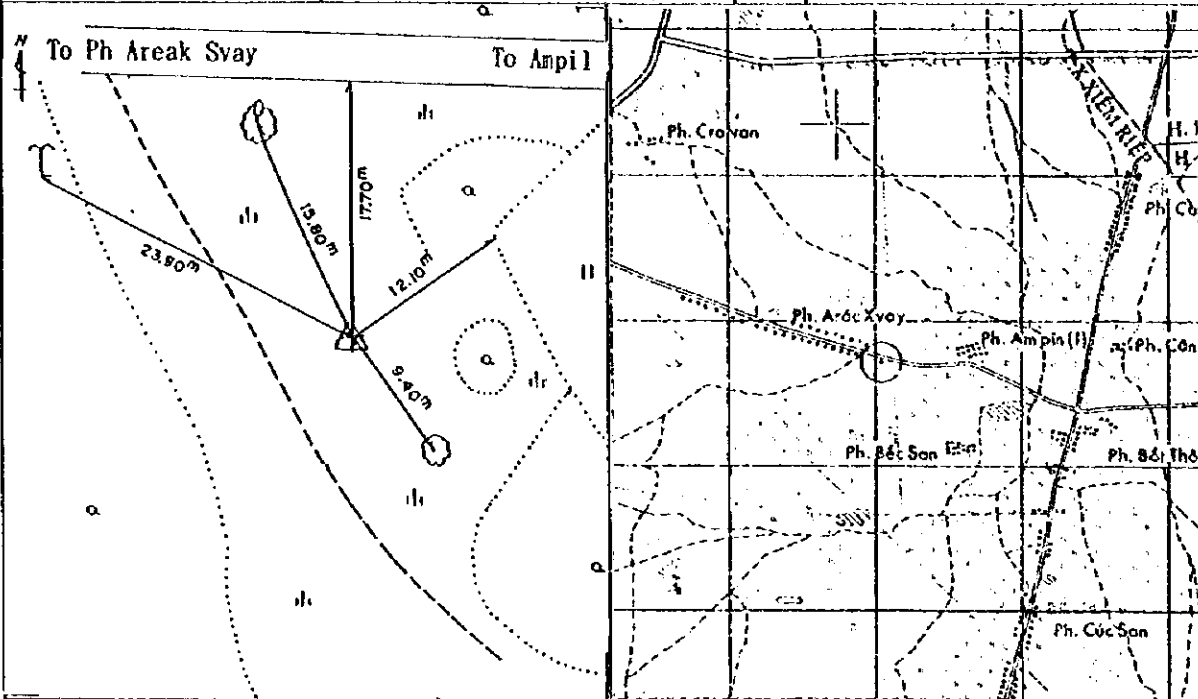
This point is 1.5km for the East of Angkor Wat and it is located in the corner of road from Eastern gateway of Angkor Wat and the road toward the east of Angkor Wat and it is also situated in the East of Angkor Wat village.....



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 14	10. Feb. 1997	Concrete Peg
LATITUDE	N 13° 24' 12" .19789 ✓	m 1,482,001.916 ✓
LONGITUDE	E 103° 55' 05" .76716 ✓	m 382,881.674 ✓
GRIDAZIMUTH OF MERIDIAN	0° 15' 02" .808 ✓	m 19.736 ✓



NOTE

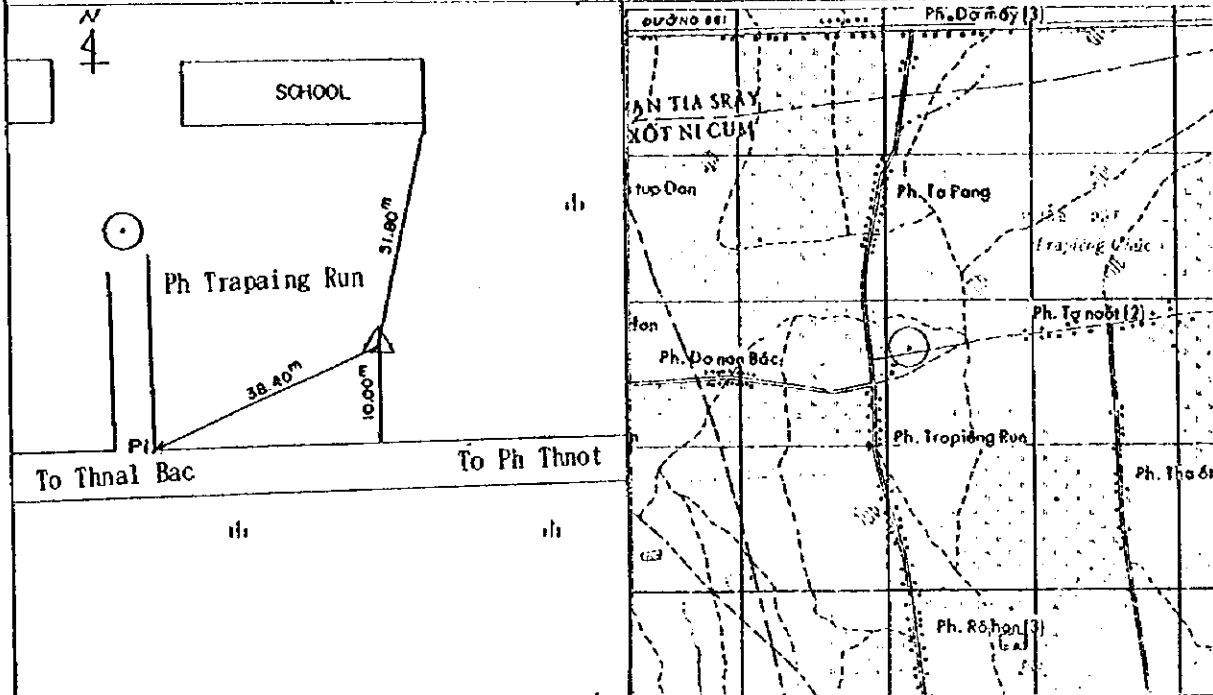
This point is 5km for East of Angkor Wat.
 Along the road, it is situated in Areak Svay village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 15	11. Feb. 1997	Concrete Peg
LATITUDE	N 13° 24' 13" .38262 ✓	N m 1,482,020.861 ✓
LONGITUDE	E 103° 57' 20" .69138 ✓	E m 386,940.060 ✓
GRID AZIMUTH OF MERIDIAN	0° 14' 31" .542 ✓	H m 21.228 ✓



NOTE

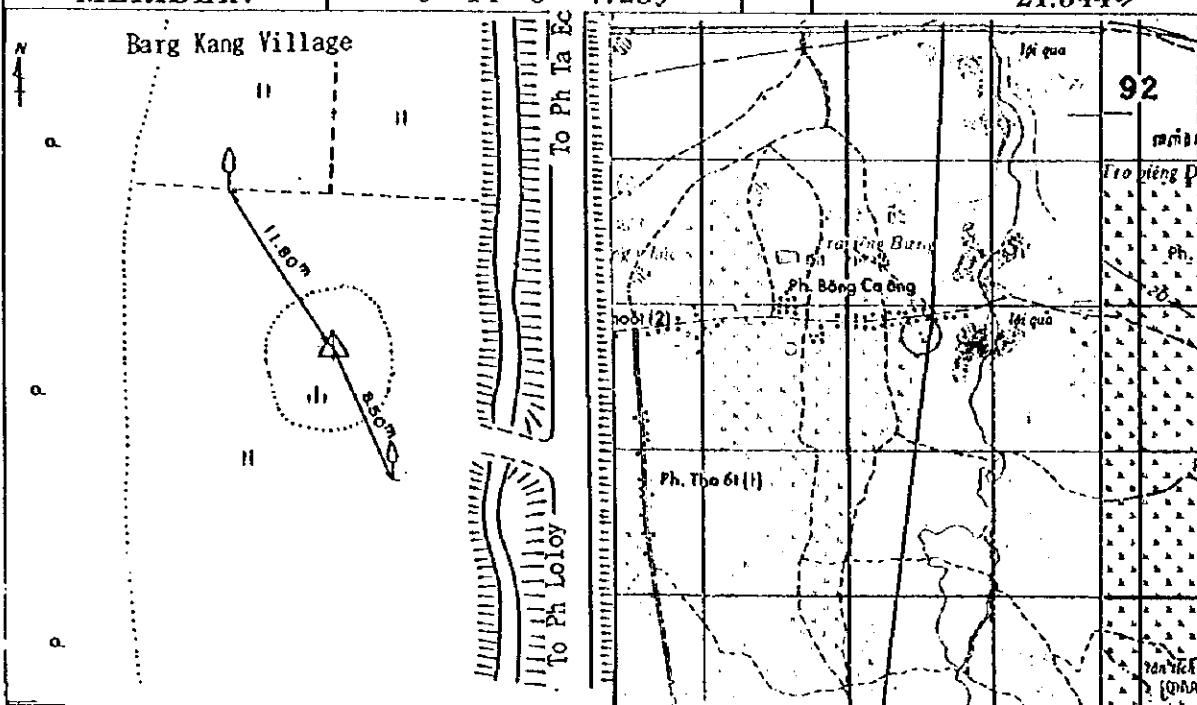
This point is 9.5km for East of Angkor Wat.
 Along the road, it is situated in Ta Pang village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 16	11. Feb. 1997	Concrete Peg
LATITUDE	N 13° 24' 17" .67229 ✓	N m 1,482,138.146 ✓
LONGITUDE	E 103° 59' 16" .64595 ✓	E m 390,428.225 ✓
GRIDAZIMUTH OF MERIDIAN	0° 14' 0" .728 ✓	H m 21.544 ✓



NOTE

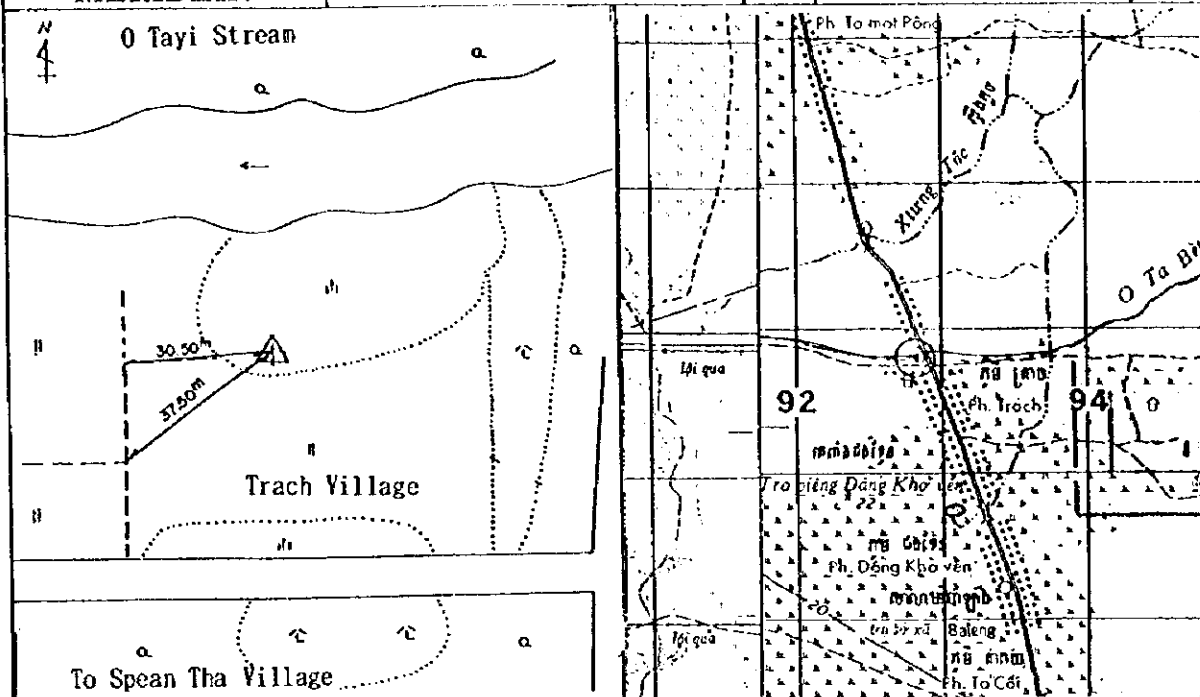
This point is 7km north of National road No.6. Along the road toward Bok Mountain, it is situated in Bang Kang village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 17	12. Feb. 1997	Concrete Peg
LATITUDE	N 13° 25' 22" .35179 ✓	N m 1,484,117.394 ✓
LONGITUDE	E 104° 00' 21" .64707 ✓	E m 392,391.272 ✓
GRID AZIMUTH OF MERIDIAN	0° 13' 50" .746 ✓	H m 24.594 ✓



NOTE

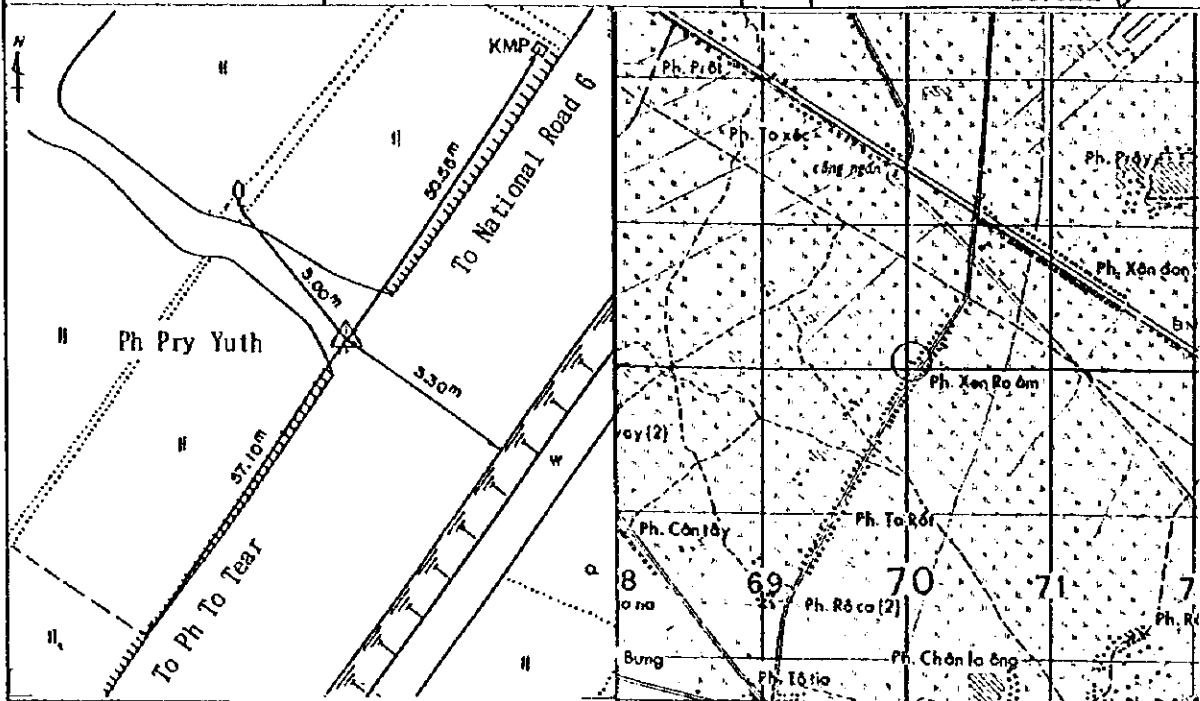
This point is 5km for south-east of Bok Mountain and for west of Trach Pagoda.
 Along the road, it is situated in Trach village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 18	10.Feb. 1 9 9 7	Concrete Peg
LATITUDE	N 13° 23' 22" .48819 ✓	N m 1,480,535.034 ✓
LONGITUDE	E 103° 47' 50" .75614 ✓	E m 369,789.731 ✓
GRIDAZIMUTH OF MERIDIAN	0° 16' 42" .669 ✓	H m 13.422 ✓



NOTE

This point is 5km for south of West-Baray center.
 Along the road, it is situated in Prayut village.



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

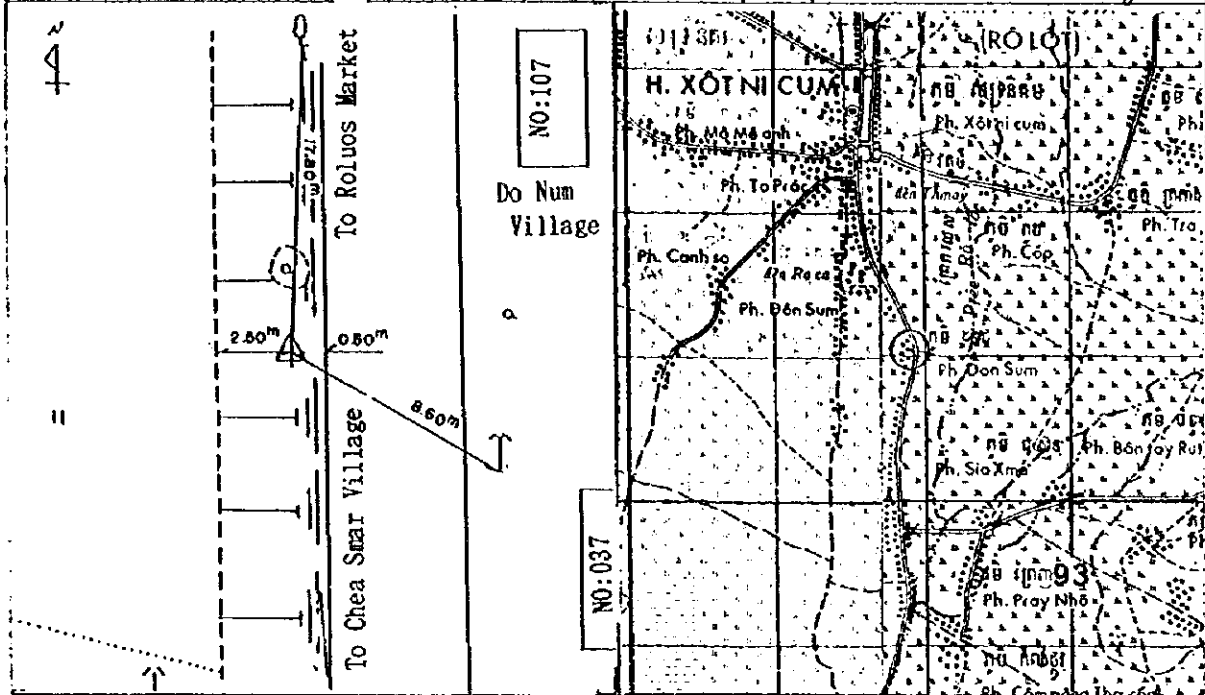
DESCRIPTION OF POINT (BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 19	10.Feb. 1 9 9 7	Concrete Peg
LATITUDE	N 13° 22' 02" .55371 ✓	N m 1,477,978.915 ✓
LONGITUDE	E 104° 00' 21" .50838 ✓	E m 392,362.427 ✓
GRIDAZIMUTH OF MERIDIAN	0° 13' 47" .406 ✓	H m 16.484 ✓
<p>NOTE</p> <p>This point is 6km for north-east of Bakorng temple.</p> <p>Along the road, it is situated in Ta Phok village.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>		

※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT(BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 20	12. Feb. 1997	Concrete Peg
LATITUDE	N 13° 18' 27" .28379 ✓	N m 1,471,368.450 ✓
LONGITUDE	E 103° 59' 53" .72908 ✓	E m 391,500.099 ✓
GRIDAZIMUTH OF MERIDIAN	0° 13' 50" .168 ✓	H m 10.635 ✓



NOTE
 This point is 5km for south-east of Bakorng temple
 Along the road, it is situated in Do Noum village



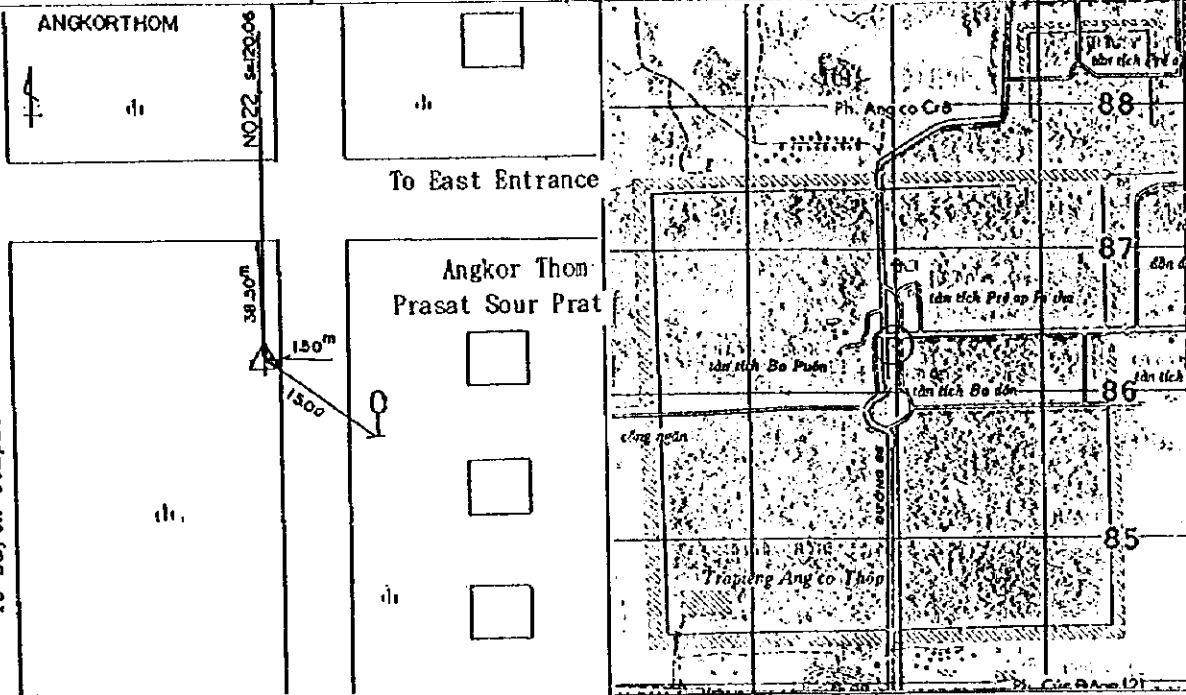
※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT (BASE POINT)

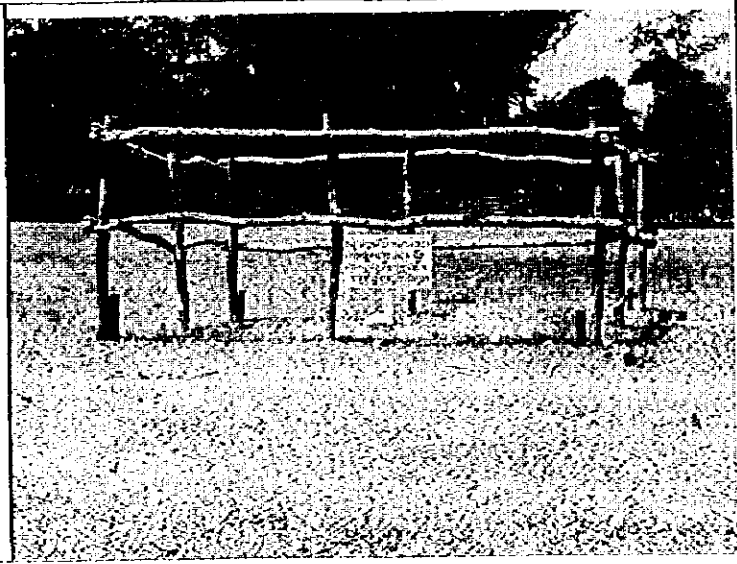
STATION NAME	ESTABLISHED DATE		KIND OF BASE POINT
NO. 21	13. Feb. 1997		Concrete Peg
LATITUDE	N 13° 26' 43" .85108 ✓	N	m 1,486,689.805 ✓
LONGITUDE	E 103° 51' 35" .97708 ✓	E	m 376,593.074 ✓
GRIDAZIMUTH OF MERIDIAN	0° 15' 54" .391 ✓	H	m 23.377 ✓

To Prakan Temple

To Bayon Temple



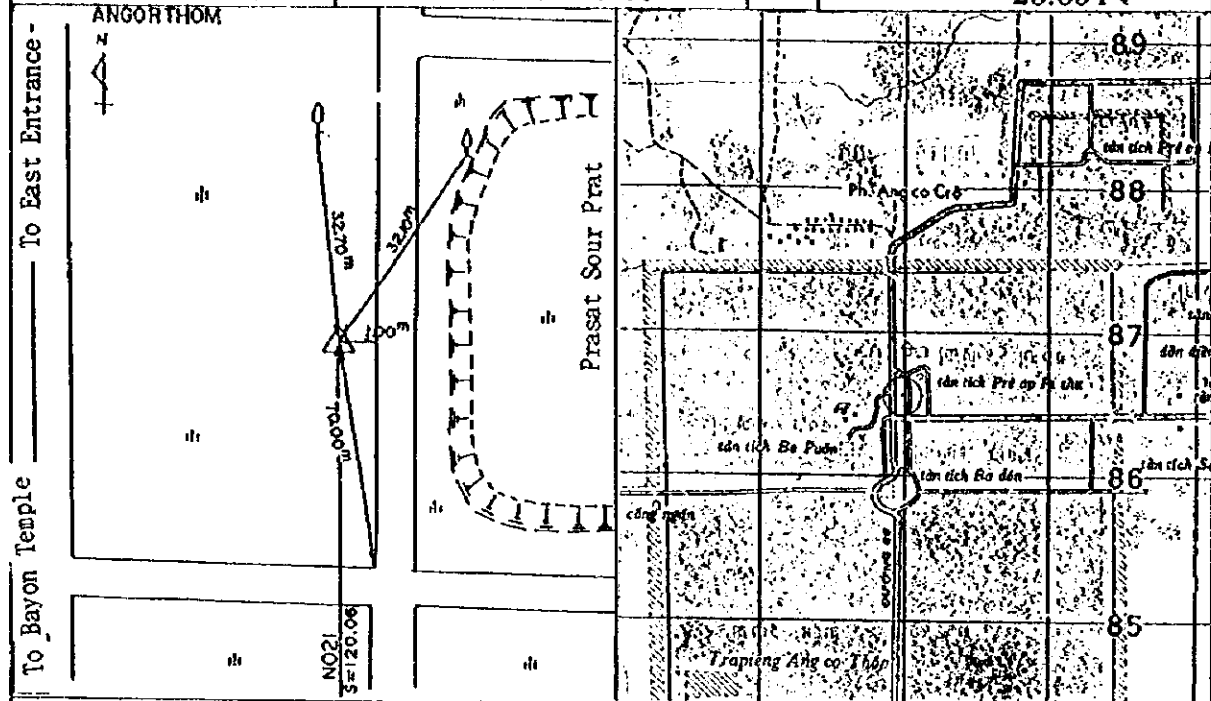
NOTE
 This point is Located in Angkor Thom area it is in front of Prasat Sour Proat.....



※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

DESCRIPTION OF POINT(BASE POINT)

STATION NAME	ESTABLISHED DATE	KIND OF BASE POINT
NO. 22	13. Feb. 1997	Concrete Peg
LATITUDE	N 13° 26' 47" .75750 ✓	N m 1,486,809.837 ✓
LONGITUDE	E 103° 51' 35" .92227 ✓	E m 376,591.981 ✓
GRIDAZIMUTH OF MERIDIAN	0° 15' 54" .480 ✓	H m 23.654 ✓



NOTE

This point is located in Angkor Thom area, it is in front of Prasat Sour Prati.



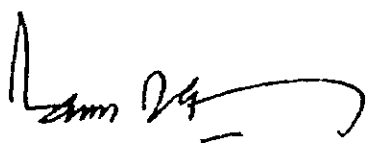
※THIS RESULT IS BASED ON FRANCE IGN(1994) CALCULATION RESULT.

THE
MINUTES OF MEETING
FOR
THE TOPOGRAPHIC MAPPING
OF THE ANGKOR ARCHAEOLOGICAL AREA
IN THE SIEM REAP REGION
OF
THE KINGDOM OF CAMBODIA

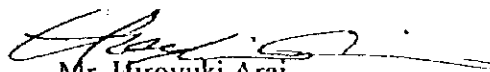
Phnom Penh, Cambodia

May 25th, 1998

May 25th, 1998



H.E. Mr. Vann Molyvann
Senior Minister for
Culture and Fine Arts,
Territorial Management,
Urban Planning and Construction
Vice-President of the Board of Administration
APSARA Authority



Mr. Hiroyuki Arai
Resident Representative
Japan International Cooperation
Agency Cambodia Office

The Japan International Cooperation Agency (hereafter referred to as "JICA") and the Authority for the Protection of the Site and Management of the Region of Angkor (hereafter referred to as "APSARA") held a meeting concerning the "Topographic Mapping of the Angkor Archaeological Area in the Siem Reap Region of the Kingdom of Cambodia", on the 25th day of May, 1998, from 10:00 a.m. to 10:30 a.m., at the APSARA Authority's office. The members who attended the meeting are listed in Appendixe-1.

The conclusions of the discussions are as follows.

•

1. JICA handed over the following final results:

To the APSARA Authority:

- | | |
|---|--------|
| - Contact prints of the aerial photographs (Color and B/W) | 1 set |
| - Results of the ground control point survey (Original and copy) | 1 set |
| - Results of the aerial triangulation (Original and copy) | 1 set |
| - 1/10,000 and 1/5,000 scale duplicate topographic maps | 2 sets |
| - 1/10,000 and 1/5,000 scale blue-line copies of topographic maps | 3 sets |
| - 1/10,000 and 1/5,000 digital data on CD-ROM | 5 sets |

To the Geographic Department:

- | | |
|---|--------|
| - Positive films of the aerial photographs (B/W) | 1 set |
| - Contact prints of the aerial photographs (Color and B/W) | 1 set |
| - Results of the ground control point survey (Original and copy) | 2 sets |
| - Results of the aerial triangulation (Original and copy) | 2 sets |
| - 1/10,000 and 1/5,000 scale original topographic maps | 1 set |
| - 1/10,000 and 1/5,000 scale duplicate topographic maps | 2 sets |
| - 1/10,000 and 1/5,000 scale blue-line copies of topographic maps | 3 sets |
| - 1/10,000 and 1/5,000 digital data on CD-ROM | 5 sets |

2. JICA agreed that the Cambodian side make copies of the CD-ROM, and distribute them to the public, on the following conditions:

(1) They will be distributed to non-profit organizations contributing to the development of the Cambodia's social economy and for the conservation of the Angkor archaeological area.

(2) The Cambodian side takes measures to prevent the illegal publication of the CD-ROM.

3. Negatives of aerial photographs shall be kept by JICA in Tokyo until the Cambodian side prepares equipment and an appropriate storage facility. During this period, the Japanese side shall reproduce paper prints when requested by APSARA or

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the Geographic Department through the JICA Cambodia Office under the following procedures.

(1) The user that requests prints of aerial photographs shall submit a copy of the order to either APSARA or the Geographic Department.

(2) APSARA or the Geographic Department shall convey the order to JICA Cambodian Office.

(3) All expenses including shipping and transportation shall be borne by the requestee and paid to the Infrastructure Development Institute-Japan.

4. The Cambodian side agreed that JICA can reproduce paper prints for research and internal use from negatives of aerial photographs.

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LIST OF ATTENDANTS

Cambodian Side:

H.E. Mr. Vann Molyvann
Ms. Eng Sun Kérya
Mr. Seung Kong
Mr. Ang Chouléan
Mr. Ouk Sun Heng
Mr. Moeung Sim
Mr. Yin Sovath
Mr. Huong Savang
Mr. Ith Sotha
Department

Senior Minister
Advisor to H.E. Mr Vann Molyvann
Deputy Director General APSARA
Advisor to H.E. Mr. Vann Molyvann
Coordinator Administration APSARA
Director of Accounting Department APSARA
Assistant in charge of environment APSARA
Director of Geographic Department
Chief of Technical Office Geographic

Japanese Side:

- JICA
Mr. Shinichi Masuda

JICA Cambodia Office

- Study Team
Mr. Yoshitake Egawa
Mr. Isao Ikeshima

Leader of the Study Team
Deputy Leader of the Study Team

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THE
MINUTES OF MEETING
FOR
THE TOPOGRAPHIC MAPPING
OF THE ANGKOR ARCHAEOLOGICAL AREA
IN THE SIEM REAP REGION
OF
THE KINGDOM OF CAMBODIA

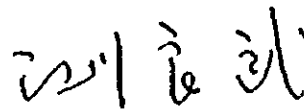
Phnom Penh, Cambodia

May 25th, 1998



H.E. Mr. Vann Molyvann
Senior Minister for
Culture and Fine Arts,
Territorial Management, Urban Planning
and Construction
Vice-President of the Board of Administration
APSARA Authority

May 25th, 1998



Mr. Yoshitake Egawa
Leader of the Study Team
Japan International Cooperation
Agency

The Japanese Study Team (hereafter referred to as "the Team") for the "Topographic Mapping of the Angkor Archaeological Area in the Siem Reap Region of the Kingdom of Cambodia" and the Authority for the Protection of the Site and Management of the Region of Angkor (hereafter referred to as "APSARA" held a meeting on the 25th day of May, 1998, from 10:00 a.m. to 10:30 a.m., at the APSARA Authority's office. The members who attended the meeting are listed in Appendix-1.

The conclusions of the discussions are as follows.

1. The Team requested the Cambodian side to send the comment on the Draft Final Report to the JICA office by end of June, 1998.
2. The Team requested that the Final Report to be prepared by the Study will be open to the public on request, and the Cambodian side agreed to the request.
3. APSARA requested the transfer of the following equipment of the JICA Study Team:

To APSARA:

- one computer: 32 Mbytes RAM, 2Gbytes Hard Disk, monitor
- one license of PC Arc/Info software
- one CD-ROM drive
- one UPS (stabiliser for computer)
- one colour printer (A3 size)
- one photocopier (A0 size)
- one digitising table
- one mirror stereoscope
- one map storage cabinets
- two 4WD vehicles.

To the Geographic Department:

- one computer
- one license of PC Arc/Info software
- one digitizing table
- one high accuracy Autolevel
- one mono-frequency GPS receiver
- one 2-frequency GPS receiver
- one mirror stereoscope
- two Total Stations
- one 4WD vehicle.

- The Team promised to convey the requests to the JICA Headquarters.

- JICA will transfer the results to APSARA.

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LIST OF ATTENDANTS

Cambodian Side:

H.E. Mr. Vann Molyvann	Senior Minister
Ms. Eng Sun Kérya	Advisor to H.E. Mr Vann Molyvann
Mr. Seung Kong	Deputy Director General APSARA
Mr. Ang Chouléan	Advisor to H.E. Mr. Vann Molyvann
Mr. Ouk Sun Heng	Coordinator Administration APSARA
Mr. Moeung Sim	Director of Accounting Department APSARA
Mr. Yin Sovath	Assistant in charge of environment APSARA
Mr. Huong Savang	Director of Geographic Department
Mr. Ith Sotha	Chief of Technical Office Geographic Department

Japanese Side:

- JICA	
Mr. Shinichi Masuda	JICA Cambodia Office
- Study Team	
Mr. Yoshitake Egawa	Leader of the Study Team
Mr. Isao Ikeshima	Deputy Leader of the Study Team

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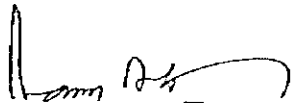
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SCOPE OF WORK
ON
TOPOGRAPHIC MAPPING
FOR
ANGKOR ARCHAEOLOGICAL AREA
IN
SIEM REAP REGION
OF
THE KINGDOM OF CAMBODIA

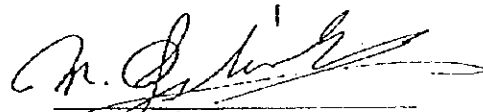
AGREED UPON BETWEEN

SUPREME COUNCIL OF NATIONAL CULTURE
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Phnom Penh, Cambodia
September 26, 1996



H.E. Mr. Vann MOLYVANN
State Minister



Mr. Masao ISHIHARA
Leader
Preparatory Study Team
Japan International
Cooperation Agency

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I. INTRODUCTION

In response to the request of the Royal Government of Cambodia, the Government of Japan has decided to conduct "Topographic Mapping for Angkor Archaeological Area in Siem Reap Region in the Kingdom of Cambodia (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation program of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of the Kingdom of Cambodia

Authority for the Protection of the Site and Management of the Region of Angkor (hereinafter referred to as "A.P.S.A.R.A.") shall act as counterpart agency to the Japanese Study Team (hereinafter referred to as "the Study Team") and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study and Geographic Department, Cabinet of Council of Ministers (hereinafter referred to as "Geographic Dept.") shall support the Study Team technically for the implementation of the Study.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The Objectives of the Study are to prepare topographic maps covering archaeological sites and surrounding area for supporting restoration and conservation programs of Angkor archaeological monuments and infrastructure development plan surrounding Angkor archaeological sites.

III. STUDY AREA

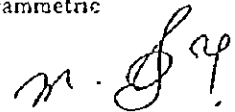
The topographic mapping shall cover mainly northern and eastern suburbs of Siem Reap City of Siem Reap Province. The location of topographic mapping area is shown in APPENDIX-1. The area to be covered by topographic maps shall be as follows:

1) 1:10,000 scale topographic mapping	430 km ²
2) 1:5,000 scale topographic mapping	100 km ²

IV. SCOPE OF THE STUDY

In order to carry out the topographic mapping, the Study Team should station in the region and collect necessary data and information, carry out the ground control survey in the Kingdom of Cambodia. Office works such as aerial triangulation and photogrammetric

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mapping shall be executed in Japan.

The scope of the Study is itemized below:

1) Aerial photography

1:20,000 new Black and White (hereinafter referred to as "B/W") aerial photos covering study area shall be taken for photogrammetric mapping. Furthermore, 1:5,000 scale color aerial photos covering 1:5,000 scale topographic mapping area shall be taken for the use of future archaeological conservation planning and photo interpretation.

2) Monumentation, pre-marking and pricking

Before starting aerial photography, concrete monuments and pre-marks shall be established on the necessary ground control points for aerial triangulation. The location of the existing control points necessary for aerial triangulation shall be pricked on the enlarged aerial photos.

3) Leveling

The elevation of ground control points shall be decided by direct leveling. The leveling shall be started at and ended on the existing ground control points which were established by IGN France International in 1994.

4) Differential GPS

Ground control survey with Differential Global Positioning System (hereinafter referred to as "DGPS") to decide horizontal coordinates of ground control points shall be carried out at the monumented points. Reference points for DGPS shall be the existing GPS stations established by IGN France International in 1994.

5) Field identification and field completion

Field identification and field completion to identify natural and artificial terrain features which are difficult or impossible to interpret on the aerial photographs shall be carried out in the study area.

6) Aerial triangulation

Analytical aerial triangulation to establish photo control points shall be carried out for the photogrammetric mapping.

7) Photogrammetric mapping

Photogrammetric mapping shall be carried out to prepare 1:10,000 scale topographic maps with 10 m contour intervals and 1:5,000 scale topographic maps with 5 m contour

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intervals.

V. STUDY SCHEDULE

The Study shall be carried out in accordance with the attached tentative study schedule shown in APPENDIX-2. The schedule, including reports submission date stated in the next clause (VI), is tentative and subject to be modified when both parties agree upon and any necessity that arises during the course of the Study.

VI. REPORTS AND FINAL PRODUCTS

JICA shall prepare and submit the following reports in English and final products of topographic mapping works to the Royal Government of Cambodia

1. Plan of operation

10 copies

At the time of starting of the Study

2. Final report

10 copies

At the end of the Study

3. Final products of topographic mapping

- | | |
|---|--------|
| (1) Negative film of aerial photos (Color and B/W) | 1 set |
| (2) Positive film of aerial photos (B/W) | 1 set |
| (3) Contact prints of aerial photos (Color and B/W) | 2 sets |
| (4) Results of ground control point survey | 3 sets |
| (Original 1 set and copy 2 sets) | |
| (5) Result of aerial triangulation | 3 sets |
| (6) 1:10,000 scale topographic maps | |
| - Original topographic maps | 1 set |
| - Duplicate original topographic maps | 4 sets |
| - Blue copy of topographic maps | 6 sets |
| - Digital topographic data | 1 set |
| (7) 1:5,000 scale topographic maps | |
| - Original topographic maps | 1 set |
| - Duplicate original topographic maps | 4 sets |
| - Blue copy of topographic maps | 6 sets |
| - Digital topographic data | 1 set |

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VII. UNDERTAKING OF THE ROYAL GOVERNMENT OF CAMBODIA.

1. To facilitate smooth conduct of the Study, the Royal Government of Cambodia shall take the following necessary measures:

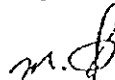
- (1) to secure the safety of the Study Team;
- (2) to permit the members of the Study Team to enter, leave and sojourn in the Kingdom of Cambodia for the duration of their assignment therein and exempt them from alien registration requirements and consular fees;
- (3) to exempt the members of the Study Team, from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into and out of the Kingdom of Cambodia for the conduct of the Study;
- (4) to exempt the members of the Study Team from income taxes and charges of any kind imposed on or in connection with any emoluments or allowance paid to the members of the Study Team for their services in connection with implementation of the Study;
- (5) to provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced into the Kingdom of Cambodia from Japan in connection with the implementation of the Study.
- (6) to secure permission for entry into private properties and restricted areas for the implementation of the Study;
- (7) to secure permission for the Study Team to take all data and documents including topographic maps and aerial photos related to the Study out of the Kingdom of Cambodia;
- (8) to secure necessary permission for aerial photography by foreign registered aircraft for the implementation of the Study;
- (9) to provide entry pass to Angkor archaeological site for the Study Team in connection with the implementation of the Study; and
- (10) to provide the medical services as needed. Its expenses will be chargeable on the members of the Study Team.

2. The Royal Government of Cambodia shall bear claims, if any arises, against the members of the Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study Team.

3. A.P.S.A.R.A. shall act as a counterpart agency to the Study Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study and Geographic Dept. shall support the Study Team technically for the implementation of the Study.

4. A.P.S.A.R.A. and Geographic Dept. shall, at its own expense, provide the Study

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Team with the following, in connection with other organization concerned:

- (1) available data and information related to the Study;
- (2) Counterpart personnel;
- (3) Suitable office space with necessary equipment in Siem Reap; and
- (4) credentials or identification cards.

VIII. UNDERTAKING OF JICA

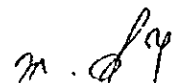
For the implementation of the Study, JICA shall take the following measures:

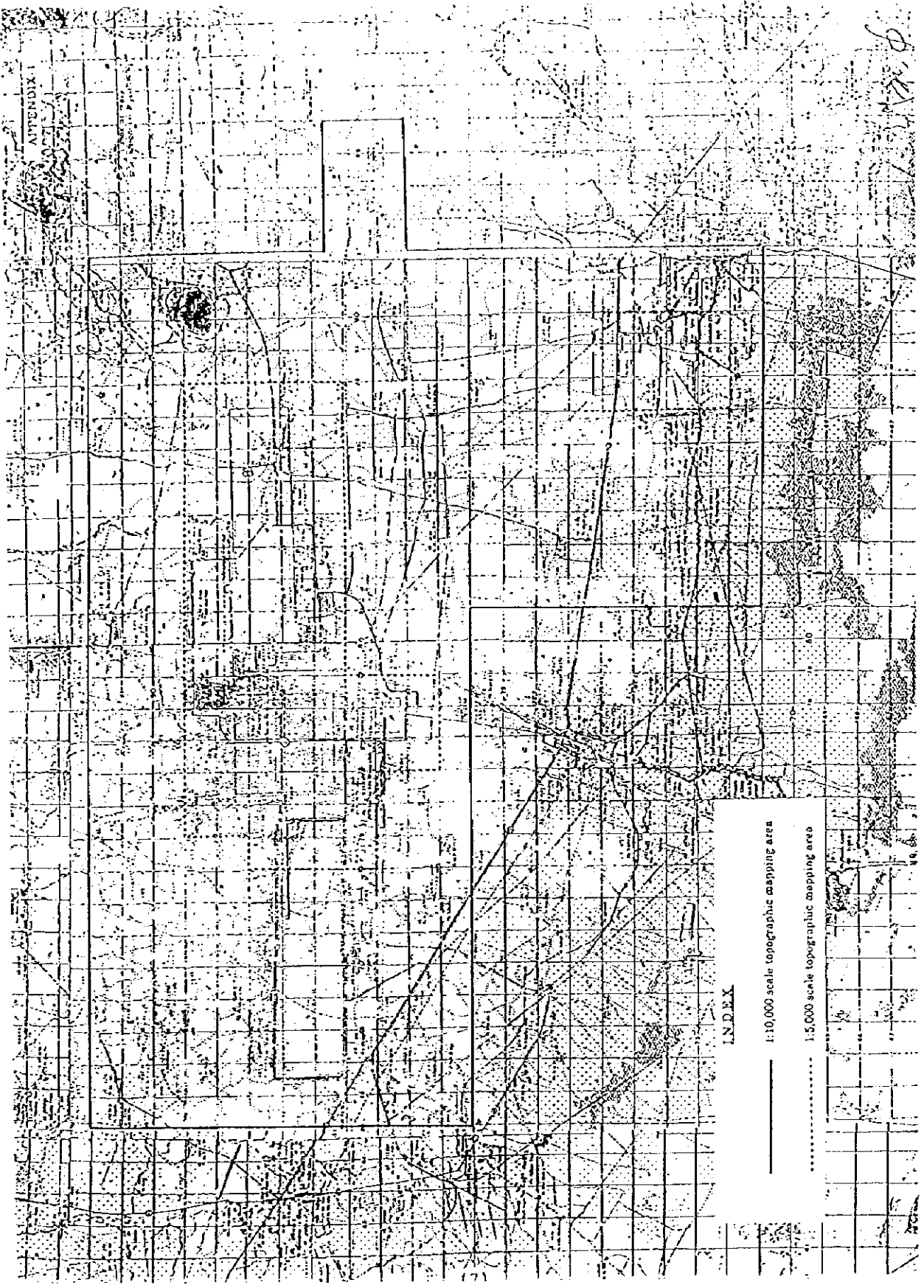
- (1) to dispatch, at its own expense, the Study Team to the Kingdom of Cambodia; and
- (2) to pursue technology transfer to the Cambodian counterpart personnel in the course of the Study.

IX. CONSULTATION

A.P.S.A.R.A. and JICA shall consult with each other in respect of any matters that may arise from or in connection with the Study.

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TENTATIVE SCHEDULE OF THE STUDY

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Work in Cambodia														
Work in Japan														
Report and Final Products	<p>• P/O • F/R, F/P</p>													

Abbreviation P/O : Plan of Operation
 F/R : Final Report
 F/P : Final Products of Topographic Mapping

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