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SPECIAL ENGINEER INTELLIGENCE STUDY NO. 3

TIBET

DECLASS REVIEW by NIMA/DOD

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DATE: 3 APRIL 1961

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CONTENTS

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ILLUSTRATIONS

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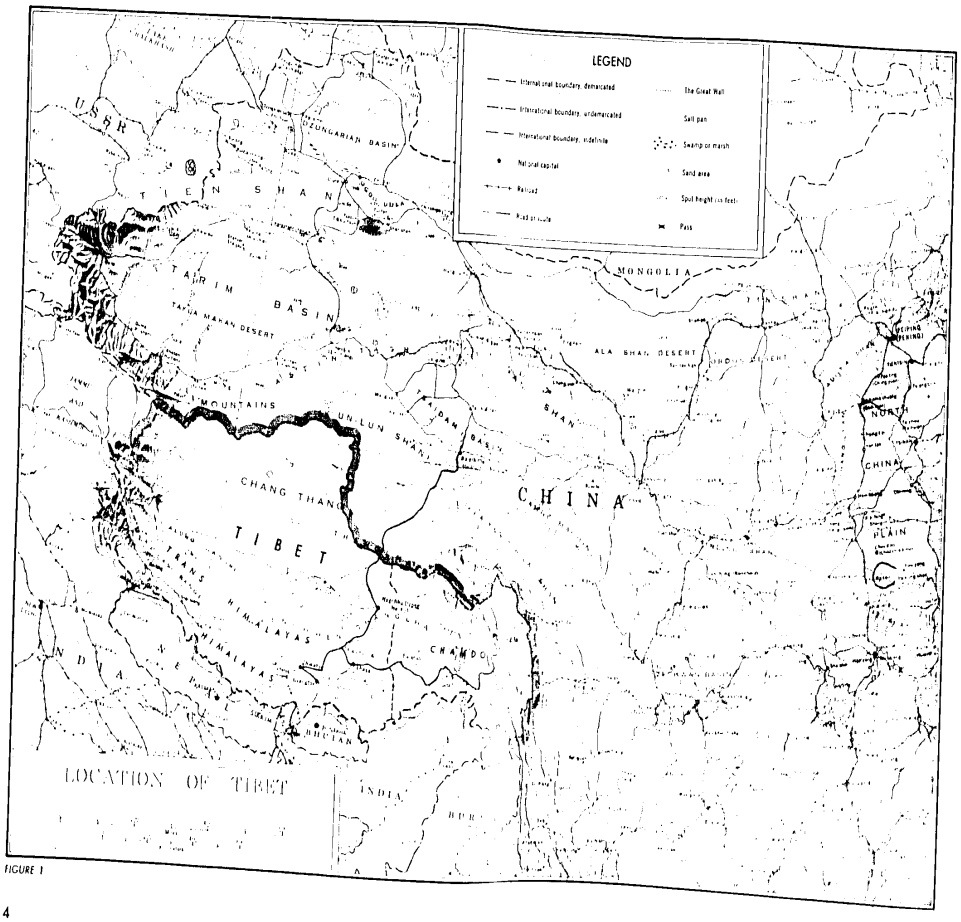

FIGURE 1

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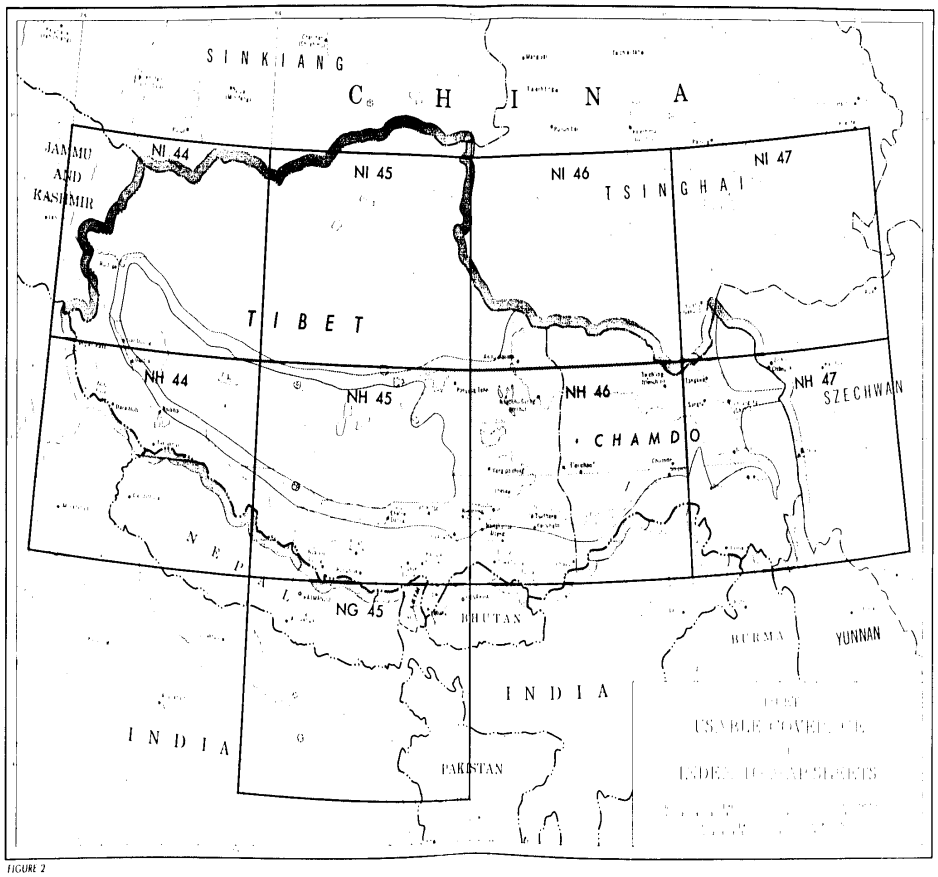

FIGURE 2

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INTRODUCTION

Tibet,* a forward area of Chinese Communism, is one of the most remote and medieval places in the world. Under the influence of the Communists, however, Tibet is beginning to awaken. Since Red China occupied Tibet in 1950, reforms have taken place that are changing the way of life for Tibetans and bringing them into closer contact with the outside world. The success of Communism in Tibet will provide a base for its spread to adjoining countries.

A. PURPOSE OF REPORT

Inaccessibility to Tibet has restricted knowledge of the country to information furnished by a few explorers and traders. Since the Communist invasion, efforts to obtain information have become even more restricted.

The presence of Communists in Tibet has made good intelligence mandatory and has prompted production of this study, the prime purpose of which is to provide current intelligence on all of Tibet. A second purpose is to show the amount of change effected by the Chinese in their first 10 years of occupation. In this report, no attempt has been made to describe physical features of Tibet by means of photography.

B. SOURCE OF INFORMATION

This study was derived primarily from TALENT photography. All TALENT Missions flown over Tibet prior to [ ] have been interpreted and utilized herein. They consist of the following missions that were flown on the dates indicated:

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[ ] 25X1

Although good collateral intelligence of Tibet is meager and for the most part outdated, it has been used to fill in the gaps in the TALENT coverage and to aid in describing installations covered by TALENT photography.

C. SCOPE OF REPORT

This study consists of two major sections: the body of the report and three annexes. The body of the report, consisting of map sheets and brief descriptions, shows the location of all installations and activities. The three annexes present detailed descriptions as follows:

Annex A, Installations.

Annex B, Urban Areas.

Annex C, Transportation.

An index at the end of the report provides a cross-reference to each installation or activity.

Photographic coverage designated usable in this report is restricted to that in which the ground detail is not obscured by clouds, or distorted beyond recognition by obliqueness of photography. In addition, configuration of the terrain may have masked some features.

Gaps in information are indicated on the map sheets by a boundary line which shows the limits of usable photographic coverage.

D. METHODS OF PRESENTATION

All intelligence has been described in as much detail as possible consistent with the summary concept of this report. Installation and roads have been plotted and alined as correctly as possible on existing maps: A.M.S. series 1301. These maps are presented east to west, and from top to bottom as shown in figure 2.

All items are shown by symbol. Most features have been assigned a number which refers to the accompanying textual description, but some features have been shown on the map by symbol only and not described. The color of each symbol indicates the source of the information. Road data derived from TALENT are shown in red, those from collateral sources are shown in black. All other data are the reverse; i.e., all items except roads shown in black are from TALENT, those in red are from collateral. Sources of information are also given for both collateral and TALENT-derived intelligence in the textual description. Missions and frames of TALENT-derived intelligence are given at the end of each description. [ ] 25X1

* As used in this report, Tibet includes Chamdo Province (formerly part of Sikang Province).

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Brief explanations of the treatment accorded each category of information are listed below:

1. Installations have been separated into military, nonmilitary, airfields, and way stations for symbolization. Military, nonmilitary, and airfields are located and briefly described in the "Description and Location of Installations and Activities"; on the maps, reference to the appropriate annex is given with all except the most minor installations; the appropriate annex contains a photograph and drawing with a detailed description. If an installation is located in an urban area, it is described in Annex B, Urban Areas; otherwise, it is depicted in Annex A or Annex C, as appropriate. Identification of these installations as military or nonmilitary is extremely difficult. The nonmilitary installations appear in the same type layout as the military, and many of them are located in military areas.

Only installations that have been established by collateral intelligence have been referred to by name. No attempt has been made to name an installation because of its proximity to a populated place. These are referred to simply by their common name such as "military installation" or "agricultural center."

Way stations appear at varying distances along the roads, frequently at bridges. Collateral sources indicate that some of the bridges are guarded by the Chinese Communist Army. Therefore, the way stations may also provide quarters for bridge guards and for bridge and road maintenance crews. Their primary purpose, however, is to provide rest and refueling facilities for the long, difficult motor marches of the truck convoys. The way stations consist of a wall-enclosed area containing one to five buildings situated by the side of the road. A typical way station is shown in figure C-6a. Since all of them are very similar, they are only symbolized and plotted on the map sheets.

2. Roads are depicted in eight classes according to surface characteristics and trafficability; alinement only is given for tracks and trails.

3. No evidence of railroads was found in Tibet, and it is probable that none exist. Collateral sources indicate, however, that one is planned from Lan-chou to Lhasa. It will no doubt follow the route of the Ka-erh-mu - Lhasa road.

4. Road bridges over 100 feet long were located and have been described in detail. Bridges less than 100 feet were counted and entered with the road description in the Transportation Annex; these have not been located, however, except where situated in the urban areas. No information was collected on bridges located on tracks and trails.

5. Liquid storage facilities are sparse and, when located, were described within the respective installation. The most important liquid storage facilities are located at the Lhasa Airfield and in the Lhasa urban area. It is reported that POL facilities often consist of drums under tent cover, which explains the small amount discovered to some degree. Although not located, it is assumed that some POL facilities are at all installations and way stations.

6. Two powerplants were located in the vicinity of Lhasa and are discussed with the Lhasa urban area.

7. Radio stations, when located, were described within their respective installations. This is probably the major means of communication between the widely separated Chinese installations.

8. Populated places are shown by symbol. Four important ones (Lhasa, Zhikatse, Nagchu Dzong, and Ch'ang-tu) have been treated separately as urban areas. All others having 10 or more buildings have been plotted on the individual map sheets.

E. GEOGRAPHY OF TIBET

Located between 28 and 36 degrees north latitude -- a position similar to that of the state of Texas -- Tibet is a mountainous, landlocked region almost twice the size of Texas, with a population of approximately 1 million. Roughly oval in shape, Tibet has a maximum east - west extent of about 1,160 miles and a maximum north - south dimension of about 610 miles.

1. Landforms, drainage, and vegetation. The highest political entity in the world, much of Tibet exceeds 15,000 feet. The formidable Himalayas trend east - west across southern Tibet; peaks in this range average about 20,000 feet and slopes are extremely steep. The world's highest peak (Mt. Everest, 29,200 feet) is on the Tibet - Nepal border.

Immediately north of the Himalayas a deep, narrow trough having a general elevation of about 12,000 feet trends east - west for more than 1,000 miles. The Indus, Sutlej, and Brahmaputra Rivers all head in the western part of this trough. The Indus flows northwestward into Jammu and Kashmir, the Sutlej southwestward into India, and the Brahmaputra eastward for many miles before flowing through the Himalayas southward into India. The eastern section of the Brahmaputra valley in Tibet widens to as much as 5 miles in places and is the only significant area of farm land in Tibet. This valley also contains most of the population of the country.

Rising from this trough on the north are several ranges, which together are referred to as the Trans-Himalaya. Though these ranges do not have peaks as high as many of those in the Himalayas, passes are generally higher. Vegetation on both the Trans-Himalayas and Himalayas consists of evergreen shrubs and grass on the more protected slopes.

North of the Trans-Himalayan Range is a vast plateau consisting of basins and ranges similar in many respects to the basin-and-range topography of Utah, Nevada, and Idaho. Elevations of the mountains on the Tibetan plateau are generally about 16,000 feet. The plateau, an area of interior drainage with many salt lakes, is almost uninhabited and is one of the bleakest regions in the world. Some of the lakes are deep and perennial, but others exist only during the summer as a result of snowmelt and limited rainfall. Borax and other salts are common in the lakes. Vegetation is extremely sparse, chiefly short grass. Soils of the basins are stony.

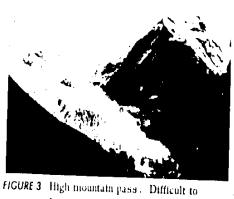

FIGURE 3 High mountain pass. Difficult to traverse.

FIGURE 4 Gentle mountain pass, with typical shrubery.

The Chamdo, or eastern, portion of Tibet consists of extremely rugged, steep hills and mountains that are difficult to traverse; this region receives more moisture and consequently has more vegetation than other parts of the country. Three major streams that drain the eastern part of this area are separated by high, unbroken ridges that trend generally northwest - southeast. The southward-flowing upper Yangtze River (Chin-sha) forms the eastern boundary of Tibet. Both the Mekong and Salween Rivers flow southeastward through Chamdo into Yunnan Province, and thence into other countries of southeast Asia. Even in their upper courses, all these streams are swift, turbulent, and difficult or impossible to ford.

Large fir trees, the only significant source of timber in all of Tibet, grow in the valleys and on lower slopes in Chamdo because of more rainfall and a somewhat warmer climate. Grass is common on the higher slopes.

2. Climate. Tibet's climate is extreme because of the high elevations. Winter temperatures remain below freezing and summers are cool, even in the desert plateau. During the summer months, frost occurs most nights except in valleys in the south. Precipitation is received primarily during the southwest monsoon season (May through September). Though the Himalayan ridges catch most of the precipitation, some does reach the Trans-Himalayas; in this southern part of the country, 10 to 20 inches of precipitation fall annually. In the mountainous plateau region, however, little moisture is received (less than 7 inches annually), and arid conditions exist. The southeastern part of the Chamdo region receives more than 20 inches of precipitation annually, primarily during the summer months.

3. International borders and approaches. Tibet's western and southern boundaries are significant as a periphery of Communism. At present Red China is at odds with all of Tibet's neighbors on the west and south because of boundary disputes. On the west, Tibet borders Jammu and Kashmir; overland access is severely restricted by the nearly continuous high mountain wall. Only one road crosses the western boundary; it enters Tibet 70 miles north of Rudog. Several tracks also cross the western border.

Southern boundaries are with India, Nepal, Sikkim, Bhutan, and Burma. Approaches to passes on the southern boundary are less steep on the Tibetan side than on the Indian side, favoring military attack from Tibet; approaches to passes from the south are usable only by pack animals or men on foot. The only road that crosses the southern boundary extends from Darjeeling, India, through Sikkim to Gyangtse, Tibet. This road is not motorable for a 20-mile stretch at the Sikkim - Tibet border. Both this road and the one into western Tibet are closed in winter and are subject to landslides in summer. Autumn is the best season for travel along all land approaches to Tibet.

Northern and eastern Tibetan boundaries are with Communist China. Two major roads link Communist China with Tibet. These roads are two- to three-lane with all-weather* gravel surfaces. One of them originates at Ka-erh-mu in Tsinghai Province and extends to Lhasa. The other originates

* An all-weather road, as used in this study, refers to one with an improved gravel- or crushed rock surface. Gravel or crushed rock has been applied only to the most vulnerable places, and traffic may be halted occasionally for a day or so at a time. Heavy use during adverse weather conditions may lead to complete collapse of the road.

at Ch'eng-tu in Szechwan Province, passes through Ch'eng-tu, a major urban area in Chamdo, and then on to Lhasa.

Air approaches from all directions are highly unfavorable because of the extreme elevations, cloudiness, turbulence, and strong winds. The only airfield of importance in Tibet is located 50 miles north of Lhasa along the Lhasa - Ka-erh-mu road.

4. Urban areas and internal routes. The urban areas and internal routes of Tibet are presented in detail in Annex B (Urban Areas) and Annex C (Transportation) of this photo interpretation report. (S)

5. Water supply. Military operations in Tibet would be greatly hampered by a lack of fresh surface water in much of the area, particularly during the winter months and in the extensive mountainous plateau, where interior drainage prevails and annual rainfall is negligible. In the south and east, water in streams is muddy in summer and is contaminated near populated places.

6. Construction materials. Granite, sand, gravel, sandstone, and limestone are abundant in most of Tibet. Timber suitable for construction is available in quantity only in valleys and on lower slopes in the Chamdo region of the country. (S)

SUMMARY

All TALENT photography and available collateral information has been utilized in this study to present an up-to-date intelligence study of the manmade features of Tibet.

Isolated by high mountains and cursed with rugged, barren terrain and harsh climate, Tibet fostered the growth of Buddhist Lamaism to the extent that Lama philosophy of life became more important than material accomplishment. The abrupt change introduced by the Chinese Communists since their invasion in 1950 is of great significance.

In an effort to integrate Tibet into China, the Chinese have endeavored to construct a transportation system, provide electric power, improve the agricultural production, develop the natural resources, and control the native populace. The extent to which these goals have been accomplished is presented in this report.

DESCRIPTION AND LOCATION OF INSTALLATIONS AND ACTIVITIES

25X1

SEIS 3

NI-44

ITEM	DESCRIPTION
1	Rudog Airfield:
	Collateral source: [redacted]
	[redacted] Weekly Review of Current Intelligence, for period ending 2 August 1960, reports an airfield at Rudog.
2	Gar Dzong military installation:
	Heavily fortified garrison, storage; enclosed area with 50 buildings and 4 stick masts.
	See Annex A, figure A-3.

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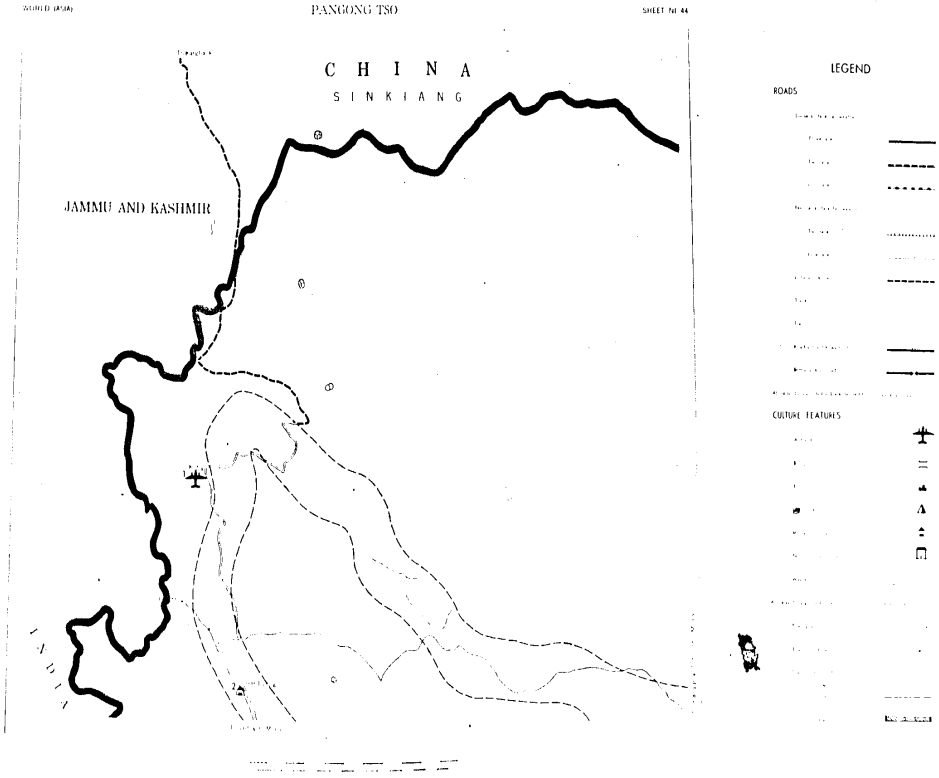
SEIS 3



13

SEIS 3

25X1

NI-46

ITEM	DESCRIPTION
1	Military Installation: Storage; 3 areas, 2 enclosed; 26 buildings. See Annex A, figure A-4.
2	Bridge: 150 feet long, [redacted] wide; wooden deck; water gap 140 feet.
3	Bridge: 300 feet long, [redacted] wooden deck, 6 equal spans; water gap 50 feet.

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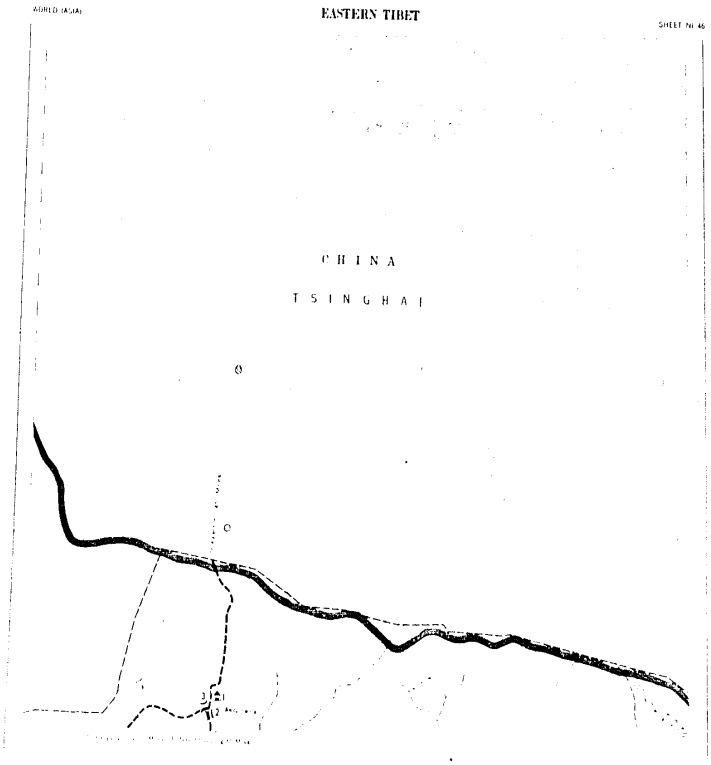

17

TOP SECRET [redacted]

25X1

NI-47

ITEM	DESCRIPTION
1	Ford: 140 feet long.
2	Ford: 70 feet long.
3	Ford: 110 feet long.
4	Ford: 80 feet long.
5	Bridge: 670 feet long, wooden deck; water gap 420 feet.
6	Ford: 400 feet long.

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TOP SECRET [redacted]

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SEIS 3

WORLD (ASIA) SOURCES OF HUANG HO SHEET NO 47

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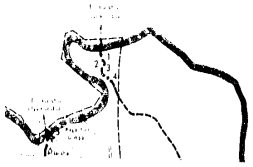
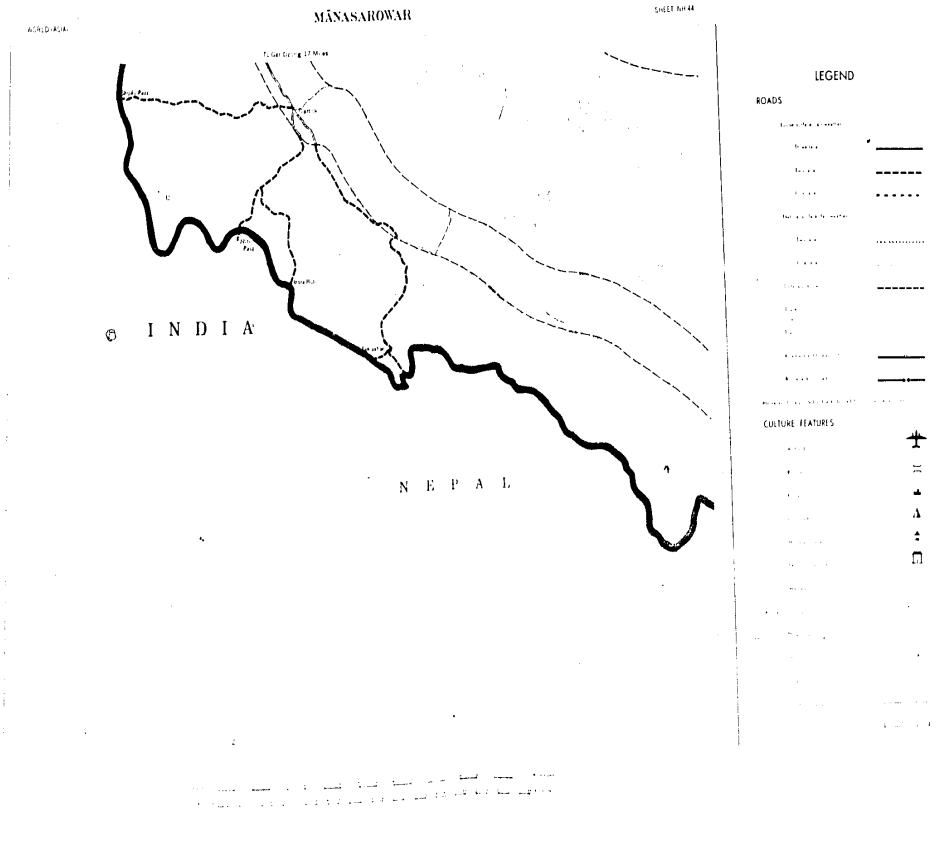


LEGEND

ROADS

CULTURE FEATURES



SEIS 3

NH-45

ITEM	DESCRIPTION
1	Quarters and supply area for borax processing plant: 103 buildings and 4 tents. See Annex A, figure A-5.
2	Borax plant: Processing, storage, powerplant; 108 buildings. See Annex A, figure A-6.
3	Bottleneck: Bridge out; water gap 10 feet.
4	Bottleneck: Bridge out; water gap 15 feet.
5	Bottleneck: Bridge out; water gap 30 feet.
6	Military installation: Garrison and storage; 4 areas, 2 enclosed, 41 buildings. See Annex A, figure A-7.
7	Bridge: 270 feet long, wooden deck; water gap 235 feet.
8	Ford: 600 feet long.
9	Bridge: 180 feet long, 6 spans, 4 at 25 feet, 2 at 40 feet; water gap 135 feet.
10	Agricultural center: 6 buildings containing 20,000 square feet of floor space, and 5 animal shelters, each 165 feet x 40 feet. Situated in a large, extensively cultivated area.
11	Bridge: 320 feet long, wooden deck; water gap 300 feet.
12	Ferry: 2-ponton section; additional ponton sections line riverbank, indicating that this is a floating bridge when stream velocity permits; approaches consist of a 30-foot pier and 125-foot pier, 20 feet wide; distance between piers is 150 feet; water gap 305 feet; 3 buildings 15 feet x 25 feet, and 7 tents 10 feet x 15 feet, support this facility.
13	Military installation: Enclosed area; 200 soldiers; radio station nearby.
14	Tingri Dzong Airfield: Rock and stone surface, 3,000 feet minimum length; area is a level open plain.
15	Military installation: Under construction; 2,000 soldiers; supply tunnel.

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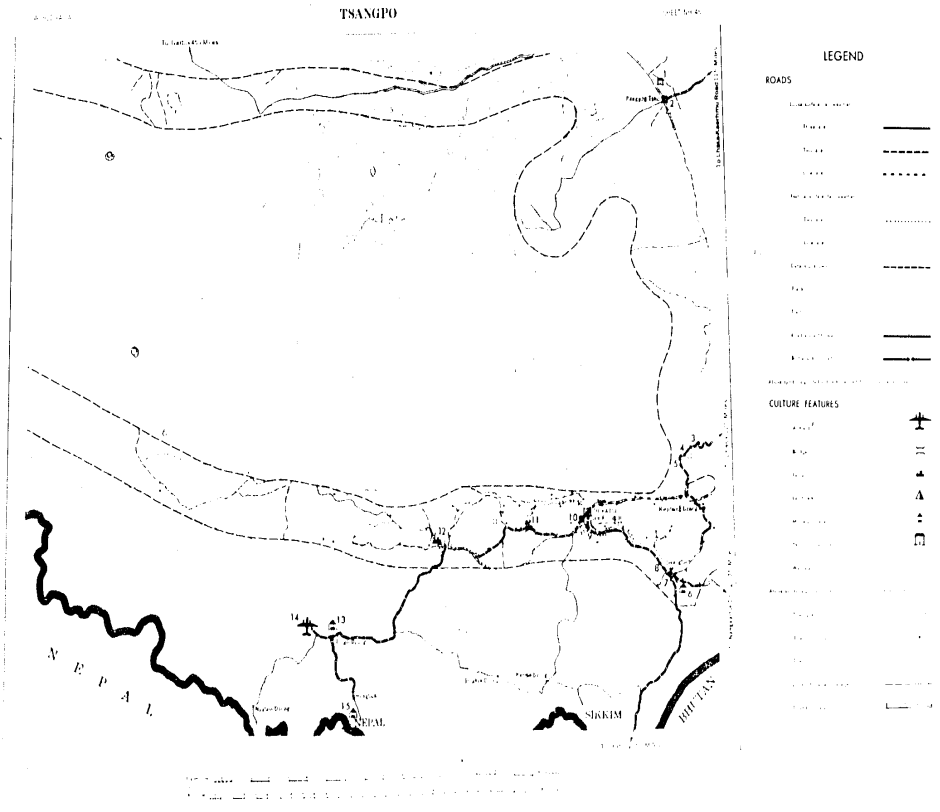
SEIS 3



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SEIS 3

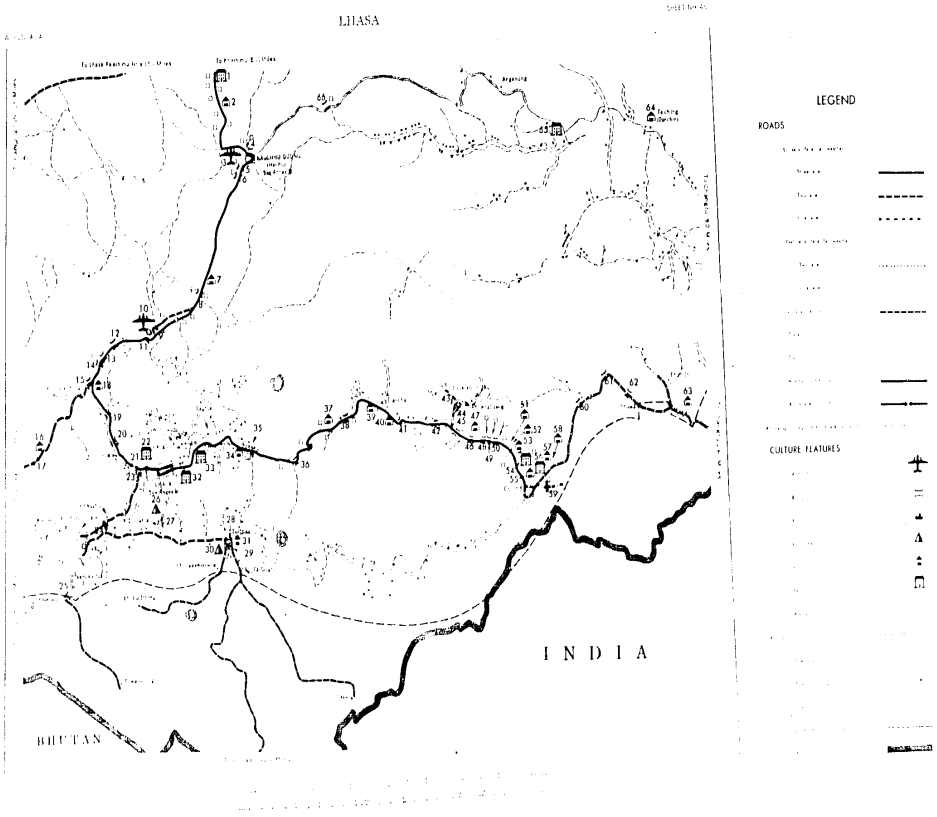
NH-46

ITEM	DESCRIPTION
1	Road construction camp: 7 quonset buildings, 25 feet x 25 feet, and 20 tents, 10 feet x 10 feet.
2	Military installation: Garrison; rest, maintenance, and refueling station; enclosed area with 10 quonsets and 3 barracks buildings. See Annex A, figure A-8.
3	Nagchhu Dzong Airfield: Natural surface runway, oriented WSW/ENE, length 14,000 feet, width 350 feet. Runway in poor condition; no visible activity. Possibly abandoned. See Annex A, figure A-9a.
4	Bridge: 135 feet long, 16 feet wide; wooden deck; water gap 100 feet.
5	Bridge: 230 feet long, [redacted] wooden deck; water gap 215 feet.
6	Bridge: 220 feet long, 10 feet wide; wooden deck; 6 spans, 4 at 30 feet and 2 at 50 feet (1 30-foot span missing); water gap 200 feet.
7	Military installation: Garrison and storage; enclosed area with 6 buildings and 6 tents. See Annex A, figure A-10.
8	Bridge: 330 feet long, 10 feet wide; wooden deck; 3 spans, 2 at 85 feet and 1 at 160 feet; water gap 310 feet.
9	Bridge: 115 feet long, 10 feet wide; wooden deck; water gap 110 feet.
10	Lhasa Airfield: Rock aggregate surface, bound by clay; two runways, one ENE/WSW 15,500 feet x 125 feet, and one NE/SW, 9,700 feet x 190 feet; administration building, 35 barracks, aircraft maintenance buildings, storage and radio facilities. See Annex A, figure A-12.
11	Bridge: 100 feet long, 10 feet wide; wooden deck; water gap 80 feet.
12	Bridge: 250 feet long, 10 feet wide; wooden deck; 9 spans, 1 at 50 feet, 1 at 40 feet, 1 at 45 feet, 1 at 30 feet, 1 at 25 feet, 2 at 20 feet, and 2 at 15 feet; water g[redacted]
13	Bridge: 110 feet long, [redacted] wooden deck; wate[redacted] feet.
14	Bridge: 110 feet long, [redacted] wooden deck; water gap 110 feet.
15	Bridge: 575 feet long, [redacted] wooden deck; 5 spans, 1 at 155 feet, 1 at 140 feet, 1 at 135 feet, 1 at 75 feet, and 1 at 70 feet; water gap 530 feet.
16	Military installation: Garrison; rest, maintenance, and refueling station; enclosed area with 6 buildings. See Annex A, figure A-13.
17	Bottleneck: bridge out; water gap 50 feet.
18	Military installation: Garrison; rest, maintenance, and refueling station; enclosed area with 19 buildings; liquid storage tanks in area. See Annex A, figure A-14.
19	Bridge: 115 feet long, 10 feet wide; wooden deck; water gap 65 feet.
20	Bridge: 140 feet long, 20 feet wide; concrete deck; water gap 100 feet.
21	Bottleneck: Road only [redacted] possibly be[redacted]dable.
22	Road construc[redacted]: 18 buildings, 15 feet by 20 feet.
23	Bridge: 150 feet long, [redacted] wooden d[redacted] gap 70 feet.
24	Ferry: Constructed of 3 sections of floating bridge equipment, probably a floating bridge when velocity of water permits; water gap 200 feet. See Annex C, figure C-5a.
25	Bridge: Approximately 140 feet long; [redacted]
26	Landmark: Separated star-shaped wall, 300 feet in diameter; probably depicts Communist star.
27	Bridge: 100 feet long; [redacted] wooden deck, 2 spans at 40 feet each, water gap 90 feet.

ITEM	DESCRIPTION
28	Bottleneck: Bridge out; water gap 350 feet.
29	Bridge: 140 feet long, water gap 120 feet.
30	Landmark: this Tibetan phrase is spelled out across a mountain top; it means "Oh, to the jewel in the lotus blossoms" and is a frequently repeated Tibetan prayer.
31	Military installation: Garrison and storage; enclosed area with 12 buildings. See Annex A, figure A-15.
32	Agricultural center: Enclosed area with 8 buildings and irrigation ditches. See Annex A, figure A-16.
33	Brick and tile works: 32 primitive earth kilns, clay pits, and 45 buildings. See Annex A, figure A-17.
34	Military installation: Garrison; rest, maintenance, and refueling station; 2 enclosed areas with 19 buildings. See Annex A, figure A-18.
35	Bridge: 120 feet long, wooden deck; 5 spans, 3 at 30 feet, 2 at 15 feet; water gap 100 feet.
36	Bridge: 150 feet long, 10 feet wide; wooden deck; 5 spans at 30 feet; water gap 130 feet.
37	Military installation: Garrison; rest, maintenance and refueling station; enclosed area with 6 buildings. See Annex A, figure A-19. source:
38	Bridge: 105 feet long, 10 feet wide; wooden deck; 3 spans at 35 feet, with stone crib piers; water gap 100 feet.
39	Military installation: Garrison and storage area; 2 enclosed areas with 12 buildings. See Annex A, figure A-20.
40	Military installation: Garrison; rest, maintenance, and refueling station; enclosed area with 10 buildings. See Annex A, figure A-21. source:
41	Bridge: 220 feet long, 20 feet wide; steel through truss with wooden deck; two spans at 110 feet; water gap 140 feet.
42	Bridge: 105 feet long, 20 feet wide; wooden deck; water gap 100 feet.
43	Bridge: 160 feet long, 10 feet wide; wooden deck; water gap 100 feet.
44	Bridge: 260 feet long, 10 feet wide; wooden deck; 8 spans at 35 feet; water gap 150 feet.
45	Bridge: 520 feet long, 20 feet wide; 2 steel through truss spans at 120 feet each, and 8 wooden deck spans at 35 feet each, 3 piers of which rest on the island in middle of the stream; 500-foot water gap across 2 separate streams, with water gaps of 220 feet and 150 feet each.
46	Bridge: 110 feet long, 20 feet wide; wooden deck; water gap 110 feet.
47	Military installation: Garrison; rest, maintenance, and refueling station; 2 enclosed areas with 13 buildings. See Annex A, figure A-22.
48	Bridge: 100 feet long, 20 feet wide; wooden deck; 3 spans, 2 at 35 feet and 1 at 30 feet; water gap 100 feet.
49	Bridge: 200 feet long, 20 feet wide; wooden deck; 4 spans at 50 feet; water gap 175 feet.
50	Bridge: 120 feet long, 20 feet wide; wooden deck; water gap 100 feet.
51	Military installation: Garrison and storage area with 23 buildings. See Annex A, figure A-23.
52	Military installation: Storage area with 20 buildings. See Annex A, figure A-24.

SEIS 3

ITEM	DESCRIPTION
54	Military installation: Garrison, vehicle maintenance, and storage; 2 areas with 41 buildings. See Annex A, figure A-25.
54	Road construction camp: 2 buildings, 50 feet by 20 feet, and 14 tents, 10 feet by 10 feet, on north side of road; 20 tents, 10 feet by 10 feet, on south side of road.
55	Military installation: Garrison and storage; 2 enclosed areas with 24 buildings.
	See Annex A, figure A-26.
56	Civil encampment: Contains government offices and a hospital.
57	Military camp: Estimated 600 Chinese soldiers.
58	Military camp: Petroleum dump; estimated 100 Chinese.
59	Ferry: Water gap 700 feet.
60	Bridge: 200 feet long, 10 feet wide; wooden deck; water gap 160 feet.
61	Bridge: 250 feet long, 10 feet wide; wooden deck; water gap 175 feet.
62	Bridge: 125 feet long, wooden deck; water gap 85 feet.
63	Military and civil administration installation: Garrison and storage; 9 enclosed areas with 337 buildings located on both sides of Tsangpo River. See Annex A, figure A-27.
64	Military installation area: Garrison; enclosed areas with 11 buildings. See Annex A, figure A-28.
65	Road camp: 23 buildings, 20 feet x 30 feet; 70 tents, 15 feet x 15 feet.
66	Bridge: 350 feet long, water gap 160 feet.



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NH-47

ITEM	DESCRIPTION
1	Bridge: 175 feet long, wooden deck, 7 spans; water gap 135 feet.
2	Quarry: Approximately 15 sheds.
3	Agricultural center: 17 buildings and 10 Tibetan-type buildings.
4	Bridge: 210 feet long, 15 feet wide; wooden deck, 3 spans, 1 at 90 feet and 2 at 60 feet; water gap 150 feet.
5	Military installation: Possible maintenance station and storage; enclosed area with 14 buildings and 4 POL tanks. See Annex A, figure A-29.
6	Military installation: Probable ammunition storage area, 14 buildings and 17 bunkers. See Annex A, figure A-30.
7	Bridge: 100 feet long, 10 feet wide; wooden deck; water gap 80 feet.
8	Bottleneck: Bridge under construction; water gap 125 feet.
9	Bridge: 100 feet long, wooden deck; water gap 85 feet.
10	Bottleneck: Ford across braided stream; water gap 2,500 feet.
11	Probable bridge: Clouds obscure area at point where road crosses river; water gap a short distance upstream is 190 feet.
12	Bridge: [redacted] long, water gap 140 feet.
13	Ning-Ching (Markham) military installation: Garrison; storage.
14	Yen-Ching (Yakalo) military installation: Garrison.

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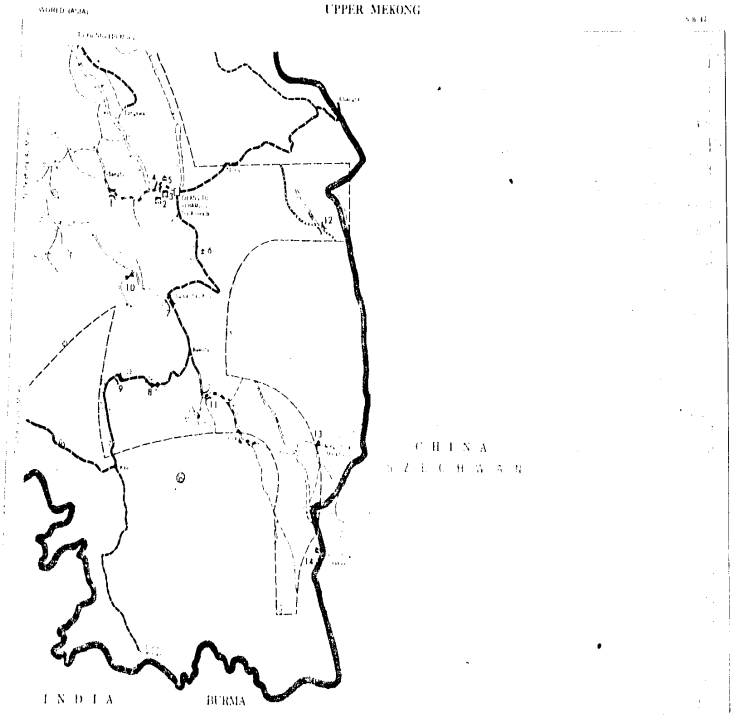
SEIS 3

UPPER MEKONG



LEGEND

ROADS

CULTURE FEATURES

25X1

SEIS 3

NG-45

ITEM	DESCRIPTION
1 & 2	Military installations: 2 large military camps reported established at Nien Lung; area restricted to Chinese.

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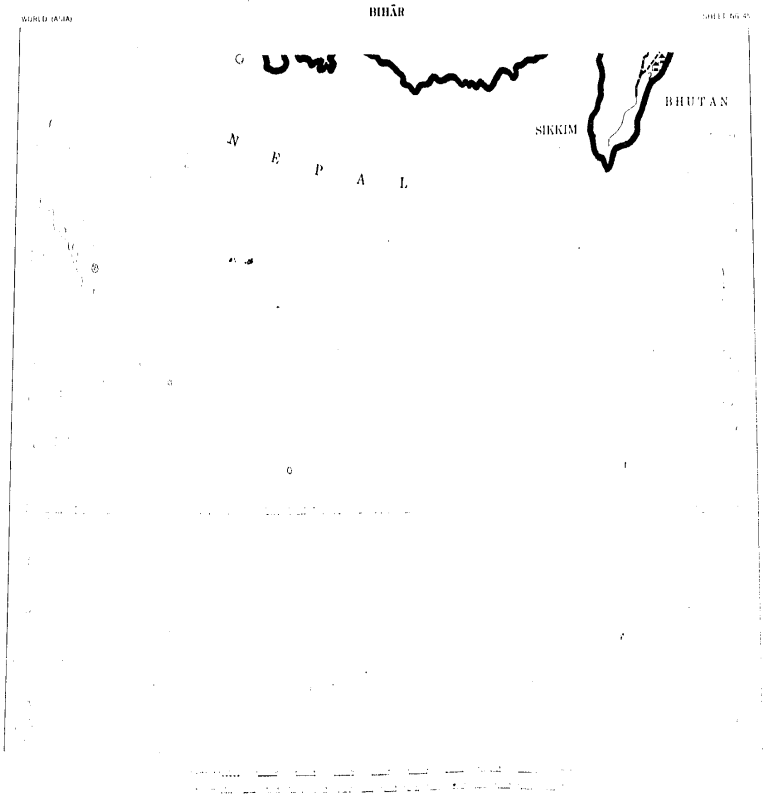

31

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ANNEX A

INSTALLATIONS

25X1

INSTALLATIONS

I. INTRODUCTION

Military and nonmilitary installations, except those located within urban areas, are of primary interest in this Annex. The similarities in appearance of both types increased the difficulty of identifying the activity of each installation. It is believed that all installations have been found and described.

II. DISCUSSION

The 27 installations discussed in this Annex are those located outside the urban areas; 21 of these are interpreted to be military, 2 are airfields, 1 is an agricultural center, 1 a borax processing plant, 1 a supporting installation for the borax processing plant, and 1 a brick and tile works.

The primary function of the military installations is to garrison the area and guard the road network from dissident elements. Many installations are located along the major roads, and it appears that they carry on supporting functions of 1) augmenting the transportation facilities by furnishing minor maintenance, and 2) refueling motor convoys.

Many installations provide storage facilities for both the military activities and the civilian economy.

Of the two airfields discussed herein, only Lhasa Airfield is operational. It is used to provide transportation to priority passengers and supply items to and from other areas of China.

FIGURE A-1 Geological survey group.

The brick and tile works and the borax processing plant included within this Annex are the only industries discovered outside the major urban areas of Tibet. This probably indicates a trend of the future: the Chinese may be expected to locate and exploit the mineral resources of Tibet, and light industries will spring up at these sites.

An agricultural center located near Lhasa also is included in this Annex. Three other agricultural centers were located: a large one in Lhasa (discussed in the Urban Area Annex) and two smaller ones -- one near Zhikatse and the other near Ch'ang-tu. These centers were established by the Chinese in an effort to increase the production of the limited farm land so that it will not only support the present population but also the Chinese who are expected to make a great influx. Productive farm land is restricted to the river valleys, which seldom exceed 5 miles in width. The Chinese are attempting to increase production by the development of new and better plants, and by irrigation and the opening of new land. Ground water is probably available beneath the farm land and is possibly the key to year-round water sufficiency.

FIGURE A-2 Irrigated farm land in river valley.

III. SUMMARY

This Annex discusses the installations that are located outside the urban areas. Most of them are military and were established by the Chinese with the goal of controlling the country.

The others foretell the future development of Tibet. Now that the Chinese have developed a road net, more rapid advances can be expected in the exploitation of natural resources and the increasing of farm output.

ILLEGIB

FIGURE A-5 (Item 1, NH45)

Quarters and supply area for borax processing plant; 2 areas -- A and B.

Area A: Enclosure with 7 storage buildings inside and 1 outside the enclosure. Building sizes in feet are:

a. 1 at 175 x 25.

b. 2 at 85 x 25.

c. 1 at 65 x 35.

d. 4 at 60 x 30.

Area B: Consists of 95 buildings and 4 tents, mostly quarters, dispersed along road. Building sizes in feet are:

a. 30 at 60 x 30.

b. 65 at 30 x 15.

c. 4 tents at 15 x 15.

25X1

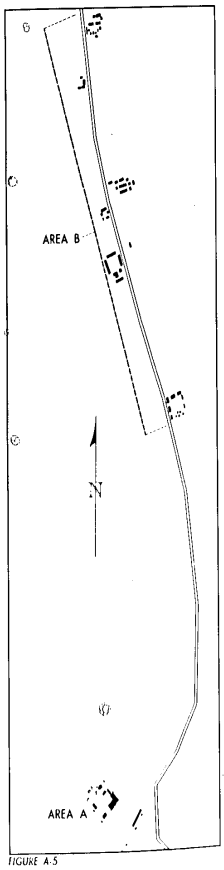

FIGURE A-5

FIGURE A-5a

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SEIS 3

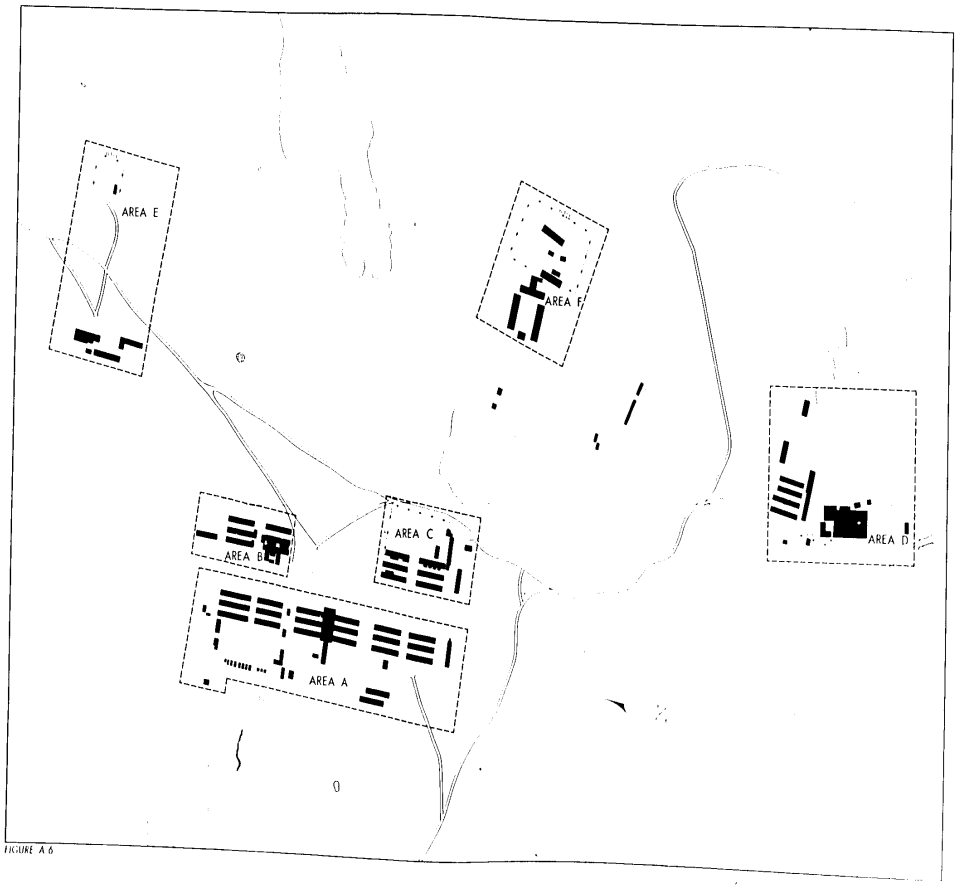

FIGURE A 6

FIGURE A-6 (Item 2, NH45)

Borax processing plant: 6 areas -- A through F.

Area A: Processing and storage; 45 buildings with functions and sizes in feet as follows:

Administration: 1 at 150 x 30.

Processing:

a. 1 at 165 x 85.

b. 1 at 135 x 20.

Barracks: 2 at 165 x 25.

Storage: 18 at 165 x 35.

Miscellaneous support building:

a. 1 at 80 x 30.

b. 1 at 70 x 20.

c. 1 at 65 x 30.

d. 2 at 50 x 35.

e. 3 at 50 x 20.

f. 2 at 40 x 25.

g. 1 at 35 x 35.

h. 11 at 25 x 15.

Area B: Storage; 17 buildings with functions and sizes in feet as follows:

Storage:

a. 6 at 165 x 35.

b. 1 at 150 x 35.

Miscellaneous: 10 at 65 x 20.

Area C: Motor park and barracks; 11 buildings with functions and sizes in feet as follows:

Barracks: 8 at 165 x 35.

Miscellaneous: 3 at 50 x 35.

Area D: Processing and storage; 21 buildings with functions and sizes in feet as follows:

Processing: 1 at 300 x 75 with 4 wings 85 x 50.

Storage:

a. 1 at 265 x 40.

b. 2 at 185 x 35.

c. 2 at 150 x 35.

Miscellaneous support buildings:

a. 1 at 135 x 40.

b. 1 at 85 x 35 with wing 85 x 35.

c. 1 at 85 x 40.

d. 1 at 70 x 35.

e. 11 at 35 x 25.

Area E: Support area with 5 buildings; sizes in feet are:

a. 1 at 160 x 70.

b. 2 at 150 x 35.

c. 1 at 65 x 35.

d. 1 at 50 x 35.

Area F: Administration and vehicle maintenance area; 9 buildings with functions and sizes in feet as follows:

Administration:

a. 1 at 200 x 75.

b. 1 at 170 x 40 with 2 end wings, 65 x 35, and 40 x 15.

c. 1 at 50 x 40.

FIGURE A-6a

Vehicle maintenance:

a. 1 at 170 x 40.

b. 1 at 100 x 35.

c. 1 at 50 x 40.

Storage: 1 at 200 x 75.

25X1

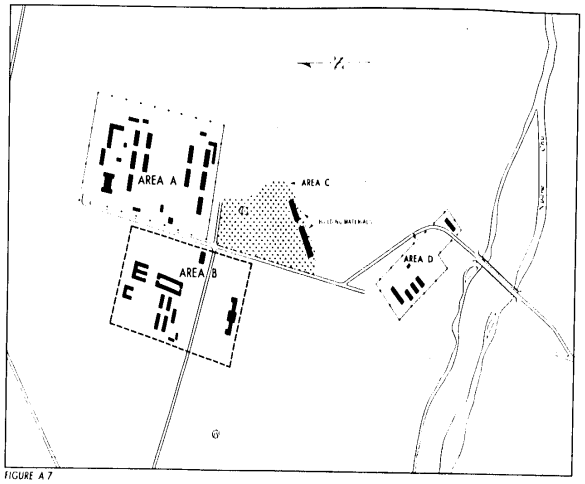

FIGURE A-7

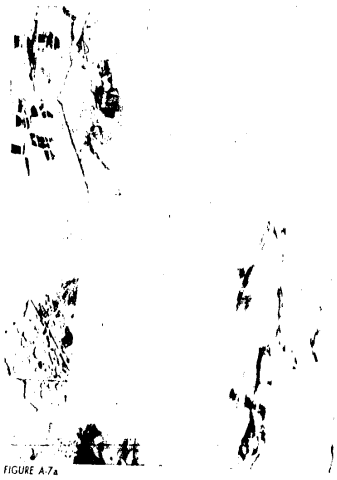

FIGURE A-7a

FIGURE A-7 (Item 6, NM45)

Military installation: Garrison and storage;

4 areas — A through D.

Area A: Enclosed; 4 administration buildings, 10 barracks, and 9 miscellaneous buildings; their sizes in feet are:

Administration:

a. 1 at 135 x 80 with 4 wings 20 x 20.

b. 1 at 110 x 25 with wing 75 x 45.

c. 1 at 105 x 25 with wing 70 x 45.

Barracks: 10 at 90 x 40.

Miscellaneous:

a. 1 at 80 x 15 with 2 wings 40 x 15.

b. 1 at 75 x 20.

c. 1 at 45 x 15.

d. 3 at 40 x 20.

e. 1 at 30 x 30.

f. 1 at 30 x 20.

g. 1 at 30 x 15.

Area B: Consists of 5 administration buildings, 5 barracks and 3 miscellaneous buildings; their sizes in feet are:

Administration:

a. 2 at 250 x 25 with 2 wings 25 x 15.

b. 1 at 130 x 25 with 3 wings 120 x 25.

c. 1 at 70 x 70 with 2 end wings 100 x 30 each end wing has a lateral wing 30 x 30.

d. 1 at 80 x 15 with 2 wings 45 x 15.

Barracks: 5 at 105 x 30.

Miscellaneous:

a. 1 at 105 x 30.

b. 1 at 75 x 15.

c. 1 at 40 x 20.

Area C: An open storage area.

Area D: Enclosed; has 6 storage buildings; their sizes in feet are:

a. 2 at 135 x 30.

b. 3 at 90 x 30.

c. 1 at 25 x 10.

25X1

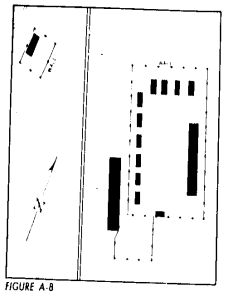

FIGURE A-8

FIGURE A-8a

FIGURE A-8 (Item 2, NH46)

Military installation: Garrison; rest, maintenance, and refueling station; 13 buildings; their sizes in feet are:

a. 2 at 130 x 35.

b. 1 at 75 x 25.

c. 11 at 55 x 25.

FIGURE A-9a

FIGURE A-9 (Item 3, NH46)

Nagchu Dzong Airfield: Natural surface runway oriented WSW-ENE; length [illegible] feet, width 450 feet; runway in poor condition; no visible activity, possibly abandoned.

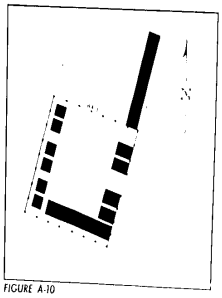

FIGURE A-10

FIGURE A-10a

FIGURE A-10 (Item 7, NH46)

Military installation: Garrison and storage; enclosed area with 6 buildings and 6 tents.

Building sizes in feet are:

a. 2 at 145 x 30.

b. 4 at 55 x 30.

c. 6 tents at 20 x 20.

FIGURE A-12 (Item 10, NH46)

Lhasa Airfield: Consists of two runways, only one of which is operational; it is 9,700 feet long, 190 feet wide. The second runway is under construction and is to be 15,500 feet long, 125 feet wide. Runways are constructed of rock aggregate bound by gumbo-clay. One Crate aircraft is located on the runway. Parking apron is a hard-surfaced pad 2,260 feet x 200 feet; it is connected to the operational runway by a taxiway that is 1,600 feet long and varies from 65 to 145 feet in width. Three Crate aircraft are on the parking apron. Electronic facilities include both short-wave and long-range communications. A rhombic antenna system is used with the short wave. It is directed towards Lan-chou and Peiping. Direction-finding equipment, including both inner and outer marker beacons, are located northwest of the operational runway. One marker beacon is located southwest of the runway. POL storage is provided by 17 horizontal tanks. Supporting facilities of the airfield consist of 11 areas (A through K) with 71 buildings.

Area A: Administrative and storage area; 1 administrative and 3 storage buildings with dimensions in feet as follows:

Administrative: 1 at 65 x 35 with wing 45 x 20.

Storage:

a. 1 at 65 x 30 with wing 30 x 15.

b. 1 at 60 x 25.

c. 1 at 30 x 15.

Area B: Aircraft maintenance area; 3 maintenance buildings and 5 storage buildings.

Sizes of buildings in feet are:

Maintenance:

a. 1 at 145 x 30.

b. 1 at 90 x 40.

c. 1 at 60 x 45.

Storage:

a. 1 at 50 x 35.

b. 1 at 40 x 35.

c. 3 at 25 x 15.

Area C: Barracks; enclosed area with 35 buildings that have dimensions in feet as follows:

a. 1 at 225 x 35.

b. 12 at 170 x 35.

c. 11 at 155 x 35.

d. 4 at 120 x 35.

e. 4 at 100 x 35.

f. 3 at 75 x 35.

Area D: POL storage; enclosed area with 4 guard towers, 2 storage buildings, and 17 horizontal storage tanks. Building sizes in feet are:

a. 1 at 125 x 25.

b. 1 at 90 x 30.

Storage tank sizes are:

a. 1 at 100 x 20, 15 feet high.

b. 16 at 55 x 20, 15 feet high.

Area E: Storage area; enclosed; 4 guard towers and 4 storage buildings with dimensions in feet as follows:

a. 1 at 140 x 25.

b. 1 at 115 x 25.

c. 1 at 105 x 25.

d. 1 at 70 x 25.

Area F: Communications center; enclosed area with 7 buildings and 26 radio masts. Three radio systems are present -- a horizontal long-range broadcast system, a long-wave radio broadcast resonator system, and a directional high frequency system. Building sizes in feet are:

a. 1 at 50 x 30.

b. 1 at 50 x 20.

c. 1 at 30 x 20.

d. 3 at 30 x 15.

e. 1 at 15 x 15.

Area G: Directional finding station; 2 radio antennae, 4 buildings, 1 towerlike building 20 feet x 20 feet and 2 stories high. Sizes of remaining buildings in feet are:

a. 2 at 40 x 20.

b. 1 at 20 x 20.

Area H: Inner marker beacon; in line with and 3,650 feet from operational runway. Enclosed area with 2 support buildings 30 feet x 15 feet.

Area I: Outer marker beacon; in line with and 12,000 feet from operational runway. Enclosed area with 4 support buildings that have dimensions in feet as follows:

a. 1 at 45 x 20.

b. 3 at 30 x 15.

Area J: Support area; enclosed with 1 building 50 feet x 15 feet.

Area K: Outer marker beacon; in line with and 12,000 feet from operational runway. Enclosed area with 2 support buildings 30 feet x 15 feet.

25X1

25X1

25X1

SEIS 3

FIGURE A-11

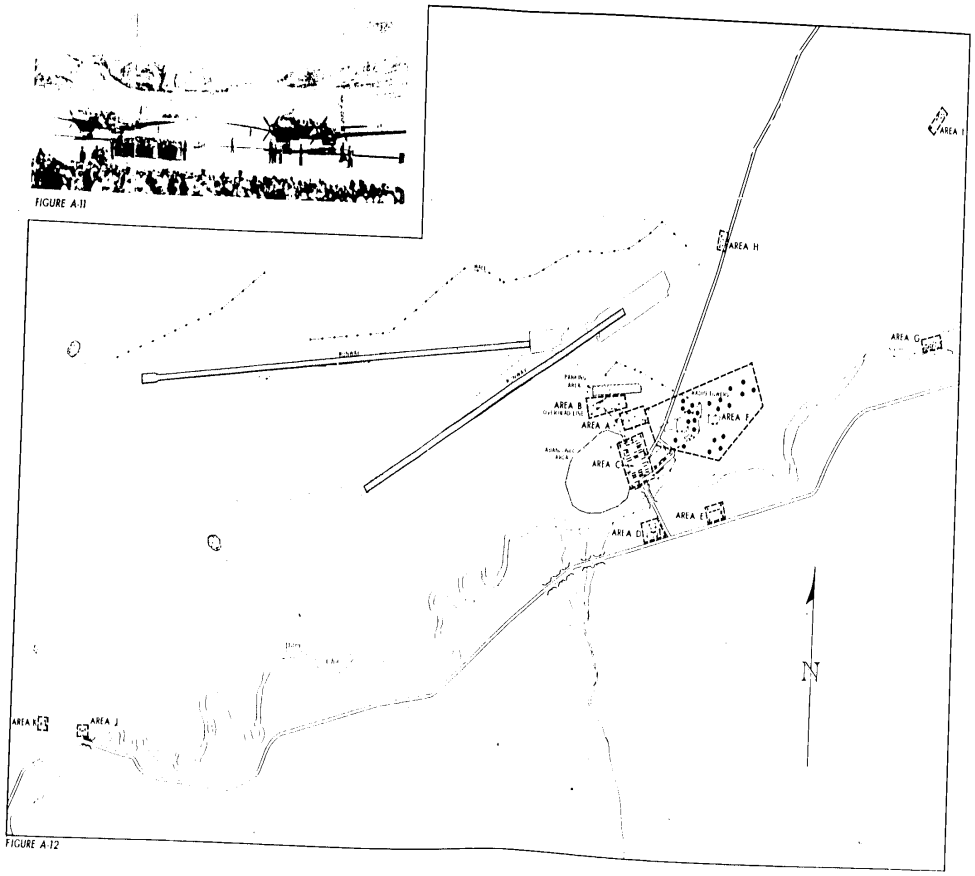

FIGURE A-12

25X1

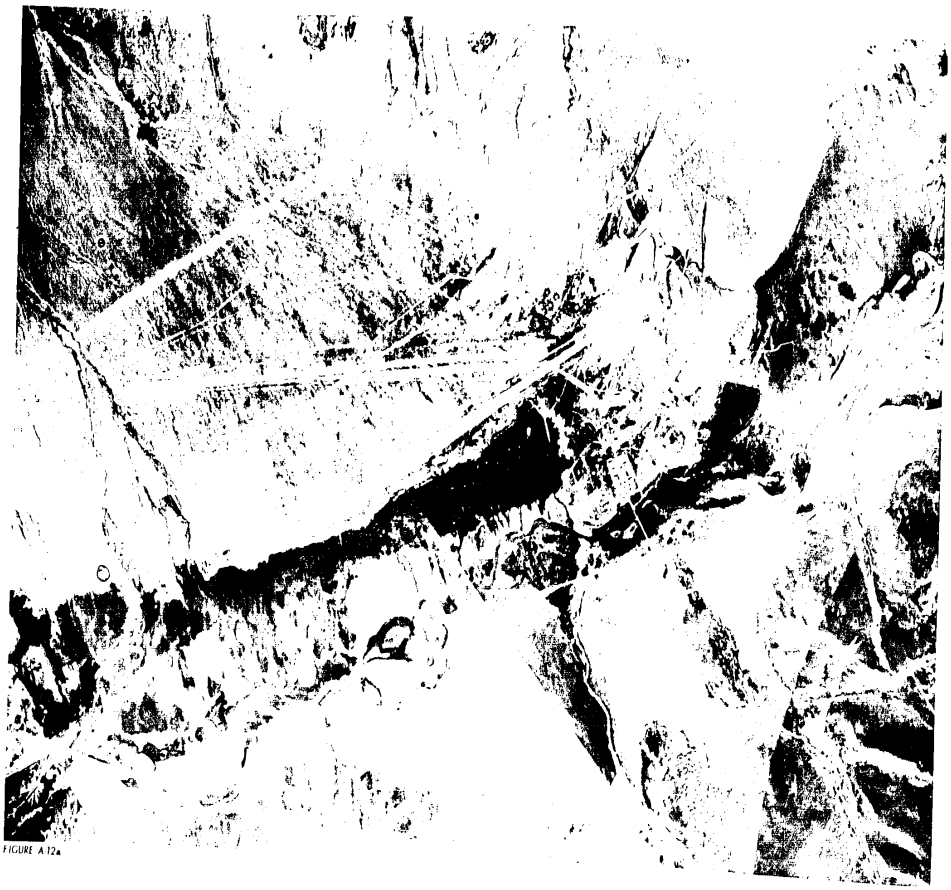

FIGURE A-12a

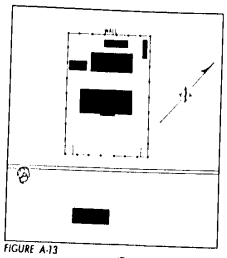

FIGURE A-13

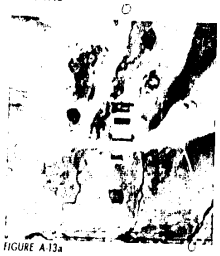

FIGURE A-13a

FIGURE A-13 (Item 16, NH46)

Military installation: Garrison; rest, maintenance, and refueling station; enclosed area with 6 buildings that have dimensions in feet as follows:

a. 1 at 150 x 50.
b. 1 at 120 x 40.
c. 1 at 100 x 35.
d. 1 at 70 x 15.
e. 1 at 50 x 20.
f. 1 at 40 x 15.

[redacted]

25X1

FIGURE A-14 (Item 18, NH46)

Military installation: Garrison; rest, maintenance and refueling station; enclosed area with 19 buildings and 4 liquid storage tanks 20 feet in diameter. Building sizes in feet are:

a. 1 at 140 x 20.
b. 1 at 120 x 30.
c. 2 at 120 x 20.
d. 1 at 100 x 35.
e. 1 at 90 x 35.
f. 1 at 90 x 20.
g. 2 at 80 x 20.
h. 2 at 70 x 20.
i. 1 at 65 x 20.
j. 2 at 60 x 25.
k. 2 at 45 x 20.
l. 1 at 45 x 15.
m. 1 at 35 x 20.
n. 1 at 30 x 20.

[redacted]

25X1

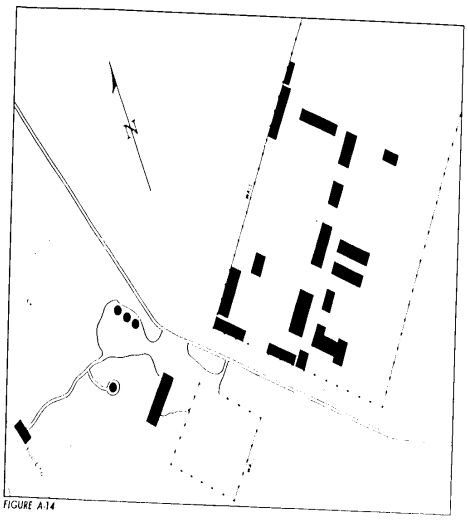

FIGURE A-14

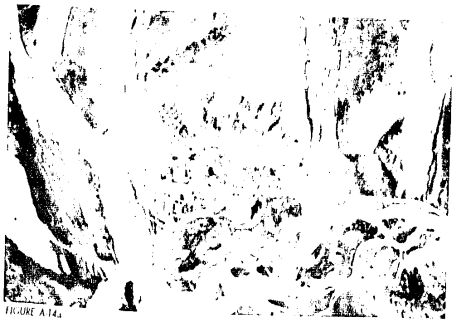

FIGURE A-14a

SEIS 3

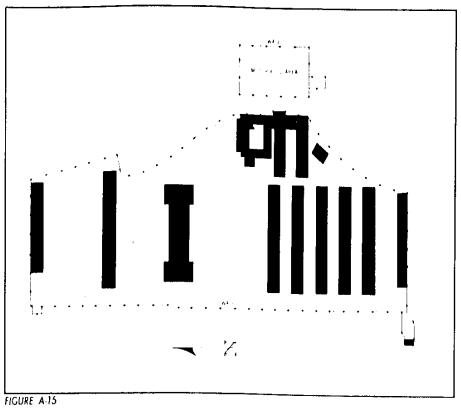

FIGURE A-15

FIGURE A-15 (Item 41, NH46)

Military installation: Garrison and storage; enclosed area with 2 administration buildings, 5 barracks, 3 storage and 2 miscellaneous buildings. Sizes of buildings in feet are:

Administration:

a. 1 irregular in shape; outside dimensions 200 x 140.

b. 1 at 140 x 55, 2-story, with 2 end wings 70 x 40.

Barracks: 5 at 250 x 55.

Storage:

a. 1 at 250 x 55.

b. 2 at 200 x 80.

Miscellaneous: 2 at 80 x 55.

25X1

FIGURE A-15a

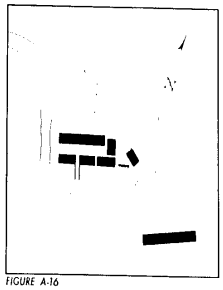

FIGURE A-16

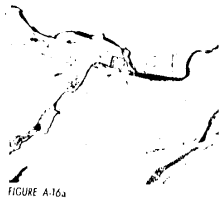

FIGURE A-16a

FIGURE A-16 (Item 42, NH46)

Agriculture center: Enclosed area with 8 buildings and irrigation ditches. Building sizes in feet are:

a. 1 at 130 x 20.

b. 1 at 135 x 20.

c. 3 at 90 x 20.

d. 2 at 45 x 20.

e. 1 at 45 x 40.

25X1

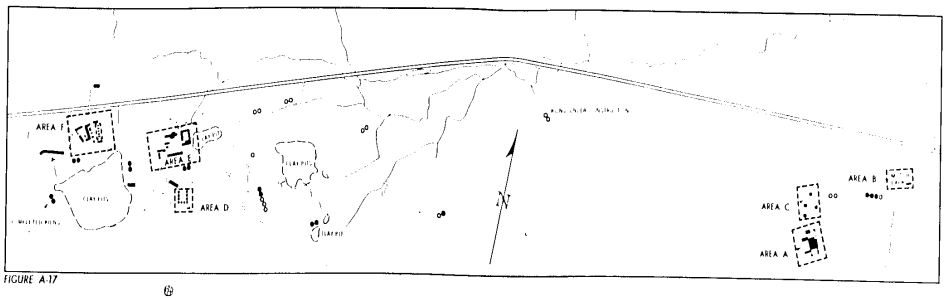

FIGURE A-17

FIGURE A-17 (Item 33, NH4o)

Brick and tile works: Contains 32 primitive earth kilns, clay pits, barracks, administration, and processing buildings. Buildings are located principally in 6 areas -- A through F.

Area A: Contains 2 buildings. Sizes in feet are:

a. 1 with 2 parallel wings 100 x [redacted] and 100 x 10 connected by 2 lateral wings 70 x 20.

b. 1 at 60 x 20.

Area B: Motor park with 1 maintenance building 80 feet x 20 feet.

Area C: Contains 4 buildings 20 feet x 15 feet and 9 feats 15 feet x 15 feet.

Area D: Contains 10 barracks 40 feet x 20 feet.

Area E: Contains 10 buildings. Sizes in feet are:

a. 2 at 135 x 20.

b. 2 at 100 x 20.

c. 1 at 90 x 10.

d. 1 at 80 x 20.

e. 3 at 55 x 20.

f. 1 at 30 x 20.

Area F: Contains 13 buildings. Sizes in feet are:

a. 1 at 100 x 30 with 1 wing 70 x 15.

b. 3 at 70 x 20.

c. 1 at 50 x 20.

d. 2 at 30 x 20.

e. 6 at 20 x 10.

Other buildings outside the 6 areas are:

a. 1 at 230 x 15.

b. 2 at 135 x 20.

c. 1 at 70 x 30.

d. 1 at 35 x 20.

[redacted]

25X1

FIGURE A-17a

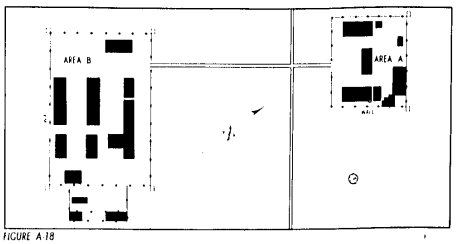

FIGURE A-18

FIGURE A-18a

FIGURE A-18 (Item 34, NH6)

Military installation: Garrison; rest, maintenance, and refueling station; 2 enclosed areas with 16 buildings. Sizes of buildings in feet are:

Area A:

a. 2 at 100 x 35.
b. 2 at 70 x 40.
c. 1 at 40 x 30.
d. 1 at 25 x 15 with 2 end wings 30 x 15 and 15 x 10.
e. 2 at 20 x 15.

Area B:

a. 1 at 170 x 45 with wing 55 x 35.
b. 2 at 115 x 40.
c. 1 at 95 x 30.
d. 1 at 75 x 20.
e. 4 at 60 x 45.
f. 1 at 55 x 15.
g. 1 at 50 x 20.
h. 1 at 45 x 15.

25X1

25X1

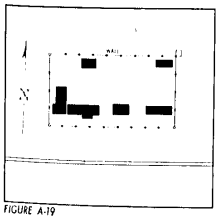

FIGURE A-19

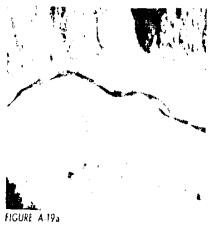

FIGURE A-19a

FIGURE A-19 (Item 37, NH4b)

Military installation: Garrison; rest, maintenance, and refueling station, enclosed area has 9 buildings; their sizes in feet are:

a. 1 at 100 x 20 with wing 30 x 10.
b. 1 at 75 x 20.
c. 1 at 65 x 30 with wing 20 x 10.
d. 1 at 60 x 15.
e. 1 at 55 x 20.
f. 1 at 30 x 10.

Reported as containing a radio.

[redacted] Collateral source.

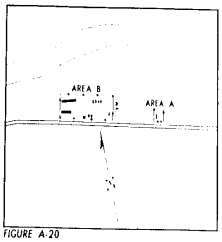

FIGURE A-20

FIGURE A-20a

FIGURE A-20 (Item 39, NH4c)

Military installation: Garrison and storage; 2 enclosed areas (A and B) have 12 buildings. Sizes of buildings in feet are:

Area A: 1 at 20 x 10.

Area B:

a. 1 at 100 x 15.
b. 1 at 60 x 10.
c. 2 at 25 x 15.
d. 2 at 20 x 20.
e. 5 at 15 x 10.

25X1

25X1

25X1

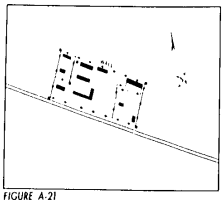

FIGURE A-21

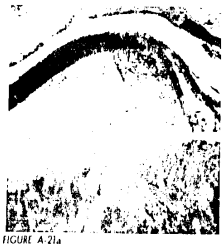

FIGURE A-21a

FIGURE A-21 (Item 40, NH46)

Military installation: Garrison; rest, maintenance, and refueling station; enclosed area with 10 buildings; their sizes in feet are:

a. 1 at 140 x 20 with wing 40 x 30.
b. 1 at 110 x 30.
c. 2 at 100 x 20.
d. 1 at 70 x 15.
e. 2 at 60 x 20.
f. 3 at 40 x 20.

Reported as containing a radio.

25X1

25X1

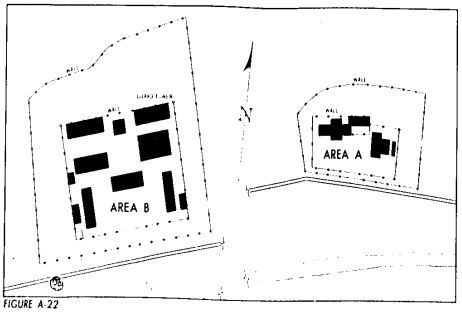

FIGURE A-22

FIGURE A-22a

FIGURE A-22 (Item 47, NH46)

Military installation: Garrison; rest, maintenance, and refueling station; 2 enclosed areas (A and b) have 13 buildings. Sizes of buildings in feet are:

Area A:

a. 1 at 100 x 25 with 2 wings 30 x 10.
b. 1 at 60 x 20.
c. 1 at 55 x 55.
d. 1 at 35 x 10.

Area B:

a. 3 at 105 x 35.
b. 2 at 90 x 40.
c. 3 at 90 x 20.
d. 1 at 35 x 30.

25X1

25X1

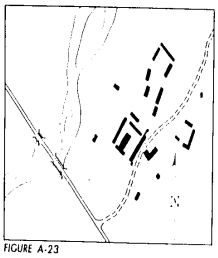

FIGURE A-23

FIGURE A-23a

FIGURE A-23 (Item 51, NH46)

Military installation: Garrison and storage area with 23 buildings; wall to enclose area is under construction. Building sizes in feet are:

a. 2 at 190 x 25.
b. 1 at 130 x 25 with wing 45 x 20.
c. 1 at 120 x 25.
d. 1 at 110 x 50.
e. 8 at 90 x 25.
f. 10 at 40 x 25.

25X1

25X1

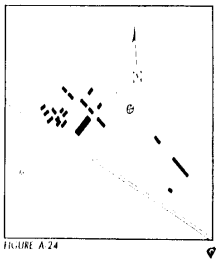

FIGURE A-24

FIGURE A-24a

FIGURE A-24 (Item 52, NH46)

Military installation: Storage, 20 buildings, facilities in feet are:

a. 1 at 210 x 25.

b. 1 at 185 x 30.

c. 1 at 140 x 25.

d. 2 at 75 x 65.

e. 4 at 60 x 25.

f. 10 at 45 x 25.

g. 1 at 25 x 25.

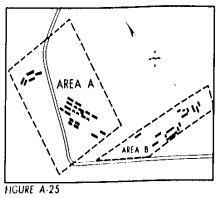

FIGURE A-25

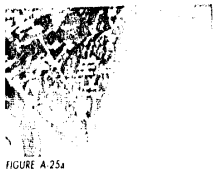

FIGURE A-25a

FIGURE A-25 (Item 53, NH46)

Military installation: Garrison, vehicle maintenance, and storage; 2 areas (A and B) with 41 buildings.

Area A: 27 barracks. Building sizes in feet are:

a. 6 at 60 x 20 with two wings 20 x 10.

b. 21 at 60 x 20.

Area B: Vehicle maintenance and storage area with 15 buildings that have dimensions in feet as follows:

a. 1 at 250 x 20

b. 1 at 110 x 20

c. 6 at 50 x 15

d. 7 at 40 x 20

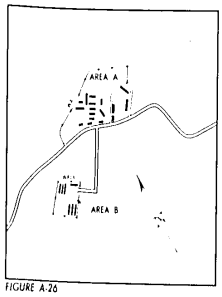

FIGURE A-26

FIGURE A-26a

FIGURE A-26 (Item 55, NH46)

Military installation: Garrison and storage; 2 enclosed areas (A and B) with 24 buildings.

Area A: Storage; area with 17 buildings; their sizes in feet are:

a. 7 at 75 x 20.

b. 10 at 40 x 15.

Area B: 7 at 85 feet x 20 feet.

FIGURE A-27 (Item 63, NH46)

Military and civil administration installation: Garrison and storage; 9 enclosed areas (A through I) with 337 buildings. Areas A through E are reported to be military, areas F through I, civilian.

Area A: Administration area with possible hospital; contains 20 buildings that have dimensions in feet as follows:

a. 1 with 2 parallel wings, 220 x 70 and 135 x 40, connected by 2 corridors with 6 lateral wings 135 x 40 off the corridors.

b. 1 at 185 x 60.

c. 1 at 160 x 45.

d. 2 at 130 x 40.

e. 4 at 115 x 35.

f. 7 at 85 x 30.

g. 4 at 65 x 25.

Area B: Storage area with 13 buildings that have dimensions in feet as follows:

a. 6 at 120 x 35.

b. 4 at 100 x 35.

c. 1 at 80 x 35.

Area C: Barracks area with 67 buildings that have dimensions in feet as follows:

a. 3 at 130 x 30.

b. 31 at 100 x 20.

c. 13 at 90 x 25.

d. 20 at 70 x 20.

Area D: Barracks area with 76 buildings that have dimensions in feet as follows:

a. 21 at 150 x 35.

b. 5 at 140 x 110.

c. 1 at 140 x 40.

d. 26 at 110 x 30.

e. 1 at 110 x 35.

f. 1 at 100 x 35.

g. 19 at 65 x 30.

h. 2 at 50 x 30.

Area E: Storage area with 4 buildings 70 x 25.

Area F: Quarters; 24 buildings with dimensions in feet as follows:

a. 2 at 170 x 30.

b. 1 at 150 x 30.

c. 6 at 100 x 40.

d. 6 at 90 x 40.

e. 3 at 65 x 30.

f. 6 at 50 x 30.

Area G: Quarters and administrative area; 19 buildings with dimensions in feet as follows:

a. 1 at 130 x 50.

b. 2 at 115 x 30.

c. 4 at 95 x 30.

d. 10 at 70 x 30.

e. 2 at 45 x 20.

Area H: Quarters and administrative area; 52 buildings with dimensions in feet as follows:

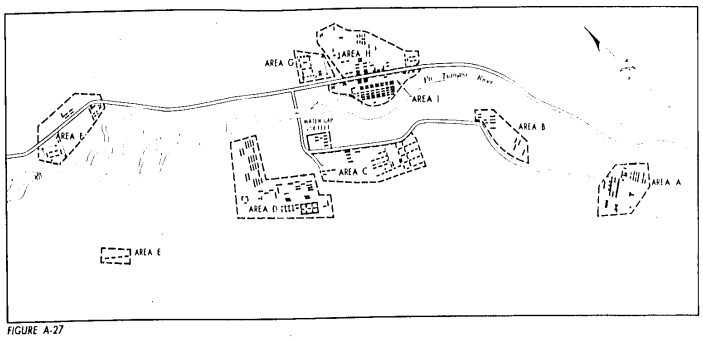

FIGURE A-27

FIGURE A-27a

a. 1 with 2 wings, 135 x 45 and 95 x 30, connected by a lateral wing, 40 x 30.

b. 15 at 105 x 30.

c. 18 at 75 x 25.

d. 16 at 60 x 25.

e. 2 at 45 x 20.

Area I: Quarters and administrative area reported to contain commercial shops; 62 buildings in area. Building sizes in feet are:

a. 51 at 100 x 30.

b. 1 at 85 x 20.

c. 1 at 70 x 35.

d. 4 at 50 x 30.

e. 2 at 50 x 20.

f. 1 at 45 x 45.

g. 2 at 20 x 20.

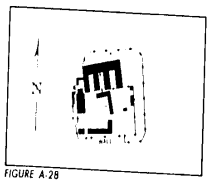

FIGURE A-28

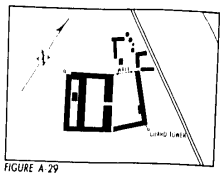

FIGURE A-29

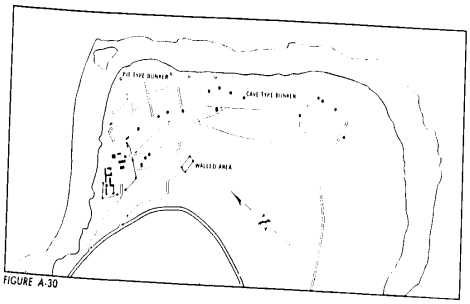

FIGURE A-30

FIGURE A-28a

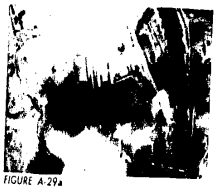

FIGURE A-29a

FIGURE A-30a

FIGURE A-28 (Item 64, NH46)

Military installation: Garrison with 11 buildings; possible antennae outside the area.

Building sizes in feet are:

a. 1 at 420 x 35 with 4 wings 140 x 35.
b. 1 at 265 x 35 with wing 45 x 35.
c. 1 at 170 x 30 with wing 125 x 35.
d. 1 at 140 x 65 with wing 50 x 20.
e. 1 at 80 x 35.
f. 1 at 60 x 30.
g. 1 at 60 x 20 with wing 45 x 20.
h. 1 at 50 x 20 with wing 20 x 20.
i. 1 at 30 x 20.
j. 2 at 20 x 20.

FIGURE A-29 (Item 5, NH47)

Military installation: Maintenance station and storage; enclosed area with 14 buildings and 4 POL tanks. Building sizes in feet are:

a. 1 at 300 x 55.
b. 2 at 300 x 25.
c. 1 at 240 x 20.
d. 2 at 200 x 20.
e. 2 at 150 x 40.
f. 3 at 75 x 20.
g. 1 at 75 x 20 with wing 60 x 20.
h. 2 at 25 x 25.

POL tank sizes are:

a. 3 at 20-foot diameter
b. 1 at 10-foot diameter

FIGURE A-30 (Item 6, NH47)

Military installation: Possible ammunition storage area with 14 buildings, 17 pit-type bunkers, and 4 cave-type bunkers. Building sizes in feet are:

a. 1 at 175 x 15.
b. 1 at 110 x 15.
c. 1 at 100 x 25.
d. 1 at 90 x 15 with wing 25 x 15.
e. 1 at 70 x 15 with wing 25 x 15.
f. 1 at 70 x 25.
g. 1 at 65 x 20.
h. 1 at 50 x 15.
i. 1 at 40 x 25.
j. 4 at 30 x 20.

ANNEX B

URBAN AREAS

URBAN AREAS

I. INTRODUCTION

The major urban areas of Tibet have little more than local significance. They are the focal and control points for the transportation network and also for the Red Chinese military units that occupy the country. Three urban areas form the nucleus of Tibet's major strategic area: Lhasa, Zhikatse, and Gyangtse. Ch'ang-tu and Nagchhu Dzong are other urban areas of importance. All of these urban areas lack municipal water supplies, sewage disposal systems, and most other utilities and services. Other towns in Tibet are chiefly small trade or farm settlements.

The urban areas of Lhasa, Zhikatse, Ch'ang-tu, and Nagchhu Dzong are covered by photography and are included in this Annex. Gyangtse, the other principal urban area, was not photographed.

Great expansion has occurred in Lhasa, Zhikatse, and Ch'ang-tu. New military installations and transportation facilities have accounted for most of the expansion. New industries are just now being planned and constructed.

The town of Gartok, which prior to the Chinese occupation was an active trading center and caravan stop in western Tibet, was covered by photography and found to contain only about 50 small Tibetan-type buildings. A military garrison is located at Gar Dzong, which may now be the center of activity in western Tibet.

Control of Tibet could be effected by controlling the urban areas of Lhasa, Zhikatse, and Gyangtse; this could be accomplished by neutralizing the few highly vulnerable routes of supply and by controlling the air.

II. DISCUSSION

A. LHASA

Lhasa is the largest and most important city in Tibet. For centuries its chief importance was as the religious capital of Lama Buddhism. It is now the major administrative, supply, and transportation center, and has become a key military base and headquarters for the Chinese in Tibet. Lhasa is also the hub of the Szechwan - Tibet road and the Tsinghai - Tibet road via the newly constructed bridge over the Kyi River.

The present population of Lhasa is approximately 60,000, with about 20,000 each attributed to the inner city, the Tibetans in the outer area (including the monasteries), and the occupying Chinese.

Lhasa is situated in the Kyi River valley about 40 miles northeast of the point where the Kyi flows into the Brahmaputra River. Lying at an elevation of slightly more than 12,000 feet, the Kyi valley at Lhasa is reasonably level and is about 6 miles wide. Steep, barren hills rise from 6,000 to 8,000 feet above the valley floor. The river floods widely and is broken into a number of branches; it occupies approximately a mile-wide strip along the southern rim of the valley.

The center of the original walled area of Lhasa is located approximately 1 mile north of

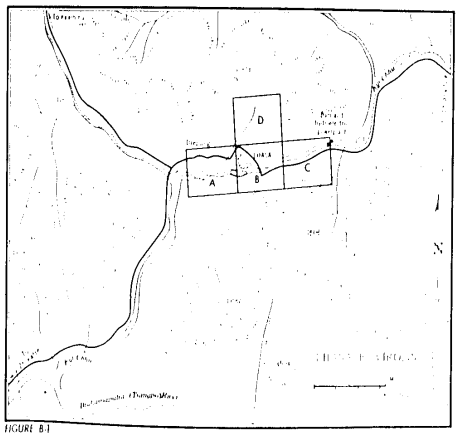

FIGURE B-1

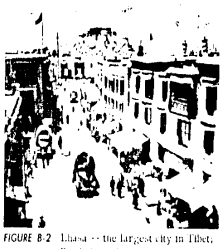

FIGURE B-2 Lhasa -- the largest city in Tibet; Potala is in the background.

FIGURE B-3 The steel bridge in Lhasa.

the river. The present city is surrounded by gardens, groves, open spaces, and marshes; a narrow zone of these cultivated fields and woods continues along the banks of the kyi for some distance above and below the city. This pleasant strip of green is soon replaced by rocky sands along the remainder of the valley.

Most of the city is built on clay, silt, and sand no more than 5 feet thick, with hard massive limestone, slate, schist, gneiss and quartzite exposed at or near the surface.

Lhasa has a surprisingly mild climate. The mean daily maximum temperature in June, the warmest month, is 75° F., the mean daily minimum, 50° F., mean daily maximum in January, the coldest month, is 43° F., the mean daily minimum, 20° F.

Annual precipitation averages about 20 inches, with over 90 percent falling between May and September. Most of the rain is in the form of downpours that drain away rapidly; the remainder of the year, arid conditions exist.

The most important buildings in the town are the Potala and the Jokang. The Potala is the official residence of the Dalai Lama; the Jokang, the holiest temple in Tibet, contains fabulous treasures. Important religious buildings such as the Potala are often located on the highest terrain overlooking the urban area and thus would make excellent observation posts.

Many of the Tibetan houses are of clay and sun-dried brick, with some of the larger ones, such as the Yutkok House, of stone and brick. Reinforced concrete is being used in some of the recent construction by the Chinese.

Lhasa Airfield is located 50 miles north of Lhasa along the Tsinghai - Tibet highway.

The Chinese have constructed two hydroelectric powerplants in the vicinity of Lhasa -- one rated at 7,500 kw, the other much smaller. Several small thermal powerplants have been reported but are not located.

Lhasa is said to have a telephone exchange, but it was not observed. Large barracks and supply areas of various sizes are located in and around Lhasa. They appear to provide adequate facilities for the reported 20,000 troops in the city.

About 800,000 square feet of general military covered storage was observed throughout all of the Lhasa military installations. There is also 45,000 square feet of covered grain storage, 6,000 square feet of ammunition storage, and 375,000 gallons of POL storage. No other covered storage was observed.

Reports indicate that the Chinese are going to push the development of various industries in Lhasa. Only a few small industries were observed, but several unidentified areas under construction may be small factories.

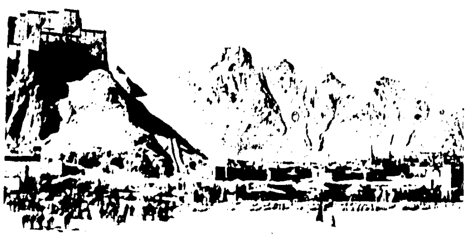

FIGURE B-4 Zhikatse -- the second largest city in Tibet.

FIGURE B-5 Ch'ang-tu -- the third largest city in Tibet.

B. ZHIKATSE

Zhikatse, along with Gyangtse, is an important junction for traffic between Tibet and India and Nepal. Like Lhasa, military installations account for the expansion in the city. Powerplants have been reported but were not observed in the area.

A military headquarters is reported to be located in Zhikatse to control troop units stationed along the border areas.

C. CH'ANG-TU

Ch'ang-tu is the administrative center of eastern Tibet. It is located on the Szechwan-Tibet Road and is the main supply point between Tibet and western China. Like other urban areas of Tibet, its expansion is a result of the construction of military and transportation facilities.

D. NAGCHHU DZONG (HEIHO)

Nagchhu Dzong lies on the Tsinghai-Tibet Road in the northeastern part of Tibet. It has experienced slight growth, with military installations accounting for the expansion. Nagchhu Dzong also lies on the proposed route of the

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SEIS 3

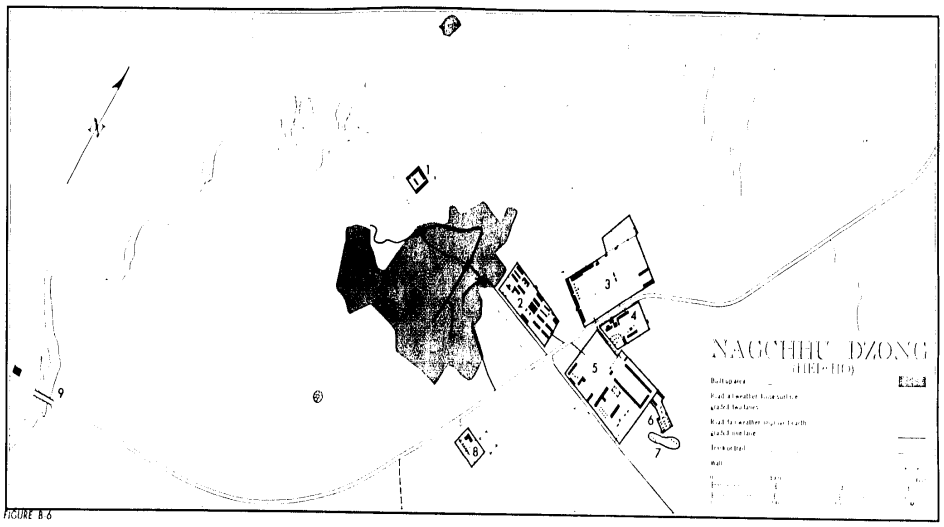


FIGURE B.6

NAGCHHU DZONG (HEHO)

ITEM	DESCRIPTION
1	Unidentified installation: Enclosed area with 5 buildings. Building sizes in feet are: a. 1 at 160 x 20. b. 2 at 150 x 25. c. 1 at 120 x 25. d. 1 at 35 x 25.
25X1	
2	Military installation: Garrison, enclosed area with 3 guard towers, 1 administration building, 15 barracks, and 9 miscellaneous buildings. Building sizes in feet are: a. 15 at 145 x 40. b. 1 at 120 x 20 with wings, 65 x 20. c. 1 at 113 x 33 with 4 lateral wings (25 x 10) d. 1 at 120 x 25. e. 1 at 90 x 20 with wing, 35 x 20.
f.	2 at 65 x 30.
g.	4 at 40 x 15.
3	Military installation: Storage, enclosed area with 6 guard towers, open storage, and 21 buildings. Building sizes in feet are: a. 7 at 160 x 40. b. 2 at 40 x 25. c. 12 at 30 x 25.
25X1	
4	Military headquarters: Enclosed area with 25X1 tower, 2 administration buildings, and 18 miscellaneous buildings. Building sizes in feet are: a. 1 at 235 x 35 with wing, 70 x 30 b. 1 at 150 x 40 with wing, 35 x 30 c. 1 at 120 x 30 d. 1 at 90 x 35 e. 1 at 70 x 40

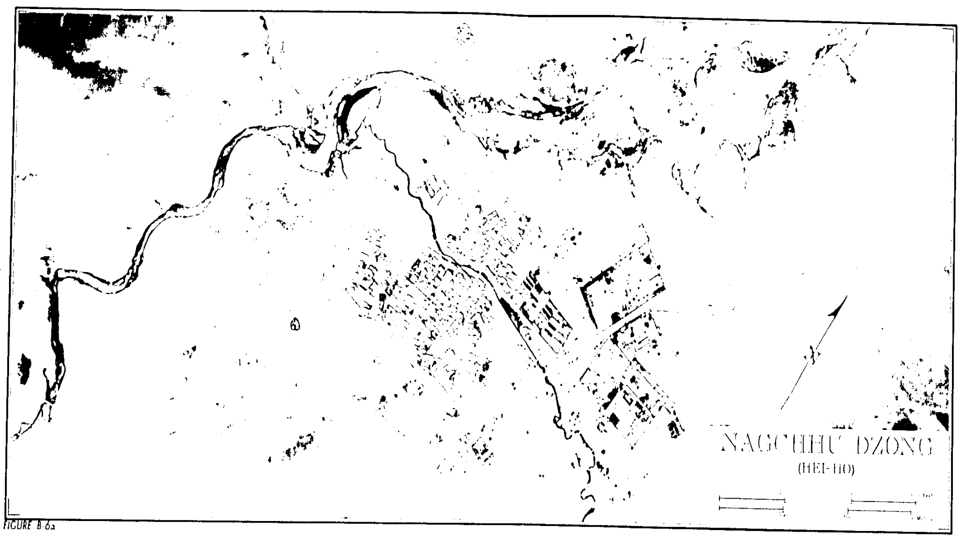


FIGURE B-6a

ITEM — DESCRIPTION

f. 1 at 45 x 35.

g. 14 at 30 x 25.

[redacted] 25X1

5 Military installation: Storage, enclosed area with 1 administration building, 20 barracks, 20 possible buried storage bunkers 20 x 15, 14 storage buildings, and extensive open storage. Building sizes in feet are:

a. 1 at 310 x 45 with lateral wing 60 x 45.

b. 1 at 535 x 25.

c. 1 at 515 x 35.

d. 2 at 185 x 30.

e. 1 at 175 x 35.

f. 1 at 115 x 30 with wing 25 x 45.

g. 2 at 90 x 30.

h. 3 at 55 x 55.

i. 25 x 35 x 25.

[redacted] 25X1

6 Military installation: Garrison and communications center; enclosed area with 16 barracks. Two antennae and 5 poles outside the area. Building sizes in feet are:

a. 2 at 110 x 25.

b. 16 at 35 x 25.

25X1 [redacted]

7 POL storage: 2 wire enclosures with 6 [redacted] 25X1

[redacted] 25X1

8 Military installation: Motor pool and maintenance; enclosed area with 2 guard towers and 5 maintenance buildings. Building sizes in feet are.

a. 1 at 110 x 50 with wing 30 x 35.

b. 4 at 55 x 25.

[redacted] 25X1

9 Bridge, 140 feet long, [redacted] wooden deck, water gap 140 feet.

[redacted] 25X1

25X1

CH'ANG-TU

ITEM	DESCRIPTION
1	Ammunition storage: 3 enclosed areas; 4 guard towers, 11 ammunition storage buildings, 3 barracks, and 7 miscellaneous buildings. Sizes in feet are:
	a. 1 at 185 x 45.
	b. 1 at 105 x 30.
	c. 6 at 95 x 60.
	d. 1 at 90 x 20 with 2 lateral wings 50 x 20 and 65 x 20.
	e. 1 at 70 x 60.
	f. 1 at 60 x 45.
	g. 1 at 50 x 45.
	h. 4 at 50 x 30.
	i. 5 at 30 x 15.
2	Foot and animal bridge: 390 feet long 15 feet wide; wooden deck; 4 span; water gap 200 feet.
3	Bridge: 315 feet long; 30 feet wide; wooden deck; water gap 200 feet.
4	Military installation: Motor pool and maintenance station; enclosed area with 6 maintenance buildings and 19 miscellaneous buildings. Sizes in feet are:
	a. 2 at 160 x 50.
	b. 2 at 120 x 30.
	c. 2 at 95 x 30.
	d. 19 at 30 x 20.
5	Military and civil installation: Storage, administration, and quarters; area contains 14 family quarters, 7 barracks, 5 administration buildings, and 74 storage buildings. Sizes in feet are:
	Family quarters: 14 at 55 x 20 with wing 20 x 20.
	Barracks:
	a. 2 at 220 x 50.
	b. 1 at 160 x 50.
	c. 1 at 150 x 75.
	d. 3 at 150 x 50.
	Administration:
	a. 2 at 200 x 35 with 6 lateral wings 20 x 20.
	b. 1 at 150 x 35 with wing 35 x 15.
	c. 1 at 110 x 25 with 6 wings 10 x 10.
	d. 1 at 60 x 45 with 2 wings 20 x 20.
	Storage:
	a. 1 at 300 x 60.
	b. 1 at 200 x 50.
	c. 10 at 190 x 50.
	d. 1 at 190 x 20.
	e. 1 at 185 x 30.
	f. 1 at 155 x 70.
	g. 1 at 155 x 30 with wing 100 x 45.
	h. 8 at 160 x 30.
	i. 6 at 155 x 20.
	j. 1 with wing at 110 x 30 and 1 wing at 90 x 30 connected by a lateral wing 15 x 15.
	k. 7 at 105 x 45.
	l. 2 at 100 x 35.
	m. 5 at 95 x 45.
	n. 1 at 100 x 15 with 3 lateral wings 60 x 45, 20 x 20, 20 x 20.
	o. 1 at 90 x 50 with wing 30 x 20.
	p. 7 at 90 x 20.
	q. 3 at 80 x 50.
	r. 4 at 70 x 45.
	s. 1 at 60 x 20 with wing 30 x 20.
	t. 12 at 45 x 30.
6	Military installation: Storage, enclosed area with 3 buildings. Building sizes in feet are:
	a. 1 at 205 x 50.
	b. 1 at 130 x 45 with wing 45 x 20.
	c. 1 at 130 x 45.
7	Storage area: Under construction; 8 buildings. Building sizes in feet are:
	a. 1 at 160 x 50.
	b. 2 at 125 x 45.
	c. 2 at 110 x 20.
	d. 2 at 100 x 30.
	e. 1 at 70 x 30.
8	Military headquarters: 5 administration buildings, 4 barracks, 4 storage buildings, and 6 miscellaneous buildings. Building sizes in feet are:
	Administration:
	a. 1 with 6 connecting wings, 5 at 220 x 45, 2 at 75 x 35 and 1 at 90 x 45.
	b. 1 at 110 x 70 with 2 wings 15 x 30.
	c. 1 wing at 110 x 35 and 1 wing 65 x 30 connected by lateral wing 20 x 20.
	d. 1 with 2 wings 45 x 35 connected by 1 wing 45 x 35.
	e. 1 wing at 110 x 35 and 1 wing 75 x 35 connected by lateral wing 25 x 25.
	Barracks: 4 at 130 x 45.

25X1

SEIS 3

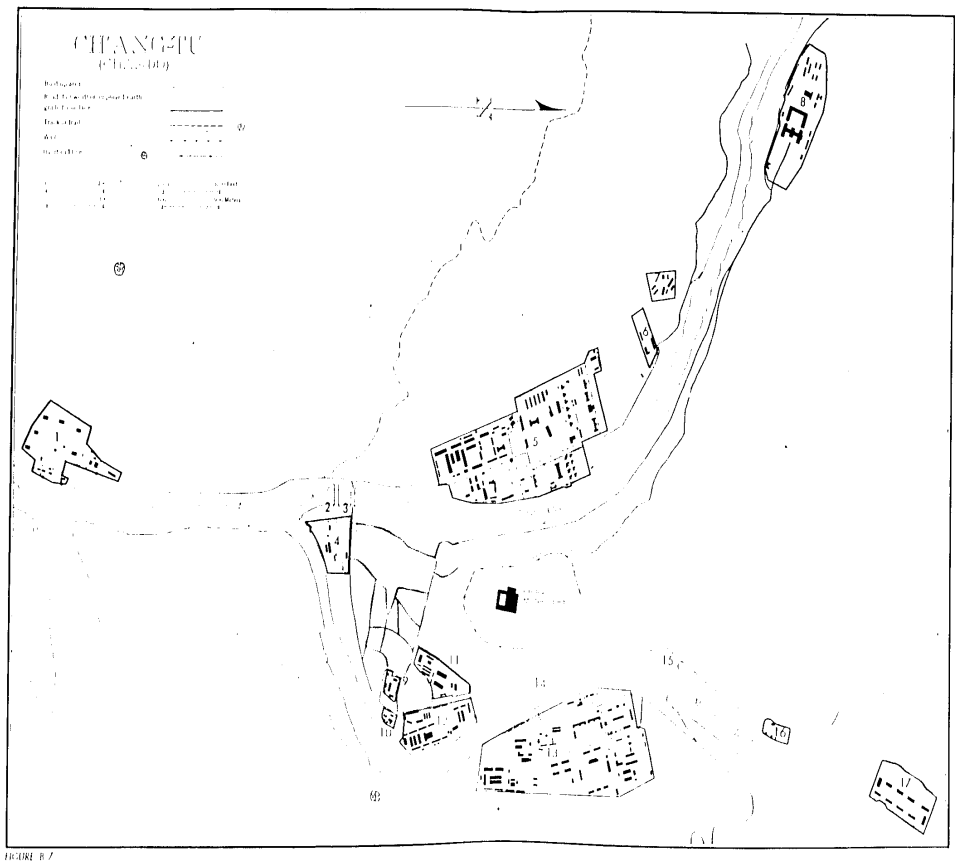


FIGURE B 7

ITEM DESCRIPTION

Storage: 4 at 150 x 35. 25X1

Miscellaneous:

a. 2 at 160 x 40.

b. 1 at 110 x 35.

c. 3 at 55 x 25.

25X1 [redacted].

9 Military installation: Garrison; enclosed area with 3 barracks and 3 miscellaneous buildings. Sizes in feet are:

Barracks:

a. 1 at 150 x 50.

b. 2 at 80 x 35.

Miscellaneous:

a. 2 at 70 x 30.

b. 1 at 45 x 20. 25X1

25X1 [redacted]

10 Administrative area: 2 administration buildings, 3 miscellaneous buildings. Building sizes in feet are:

Administrative:

a. 1 at 65 x 20 with 2 lateral wings 7 x 15.

b. 1 at 100 x 35 with wing 45 x 45.

Miscellaneous:

a. 1 at 95 x 35.

b. 1 at 60 x 30.

c. 1 at 50 x 20.

ITEM DESCRIPTION

[redacted]

11 Civil installation: Administrative area, possible school or hospital with 2 buildings and 12 supporting buildings. Building sizes in feet are: 25X1

Main buildings: 2 at 165 x 60.

Supporting buildings:

a. 4 at 175 x 30.

b. 1 at 115 x 50.

c. 1 at 95 x 45.

d. 3 at 70 x 30.

e. 1 at 60 x 30 with wing 30 x 20.

f. 1 at 45 x 30.

g. 1 at 30 x 20.

[redacted].

12 Military installation: Garrison; enclosed area with 1 administration building, 8 storage buildings, and 24 barracks. Sizes in feet are:

Administration: 1 at 145 x 65 with 2 wings 15 x 35.

Storage:

a. 1 at 145 x 60.

b. 1 at 130 x 50.

c. 6 at 50 x 30.

Barracks:

a. 16 at 155 x 35.

ITEM DESCRIPTION

b. 3 at 145 x 45.

c. 2 at 100 x 45.

d. 3 at 90 x 35.

[redacted].

13 Military installation: Garrison and storage; enclosed area with 4 administration, 8 barracks, and 70 storage buildings. (Photo coverage incomplete.) Building sizes in feet are:

Administration:

a. 2 at 270 x 45 with 3 lateral wings, 1 at 30 x 20 and 2 at 20 x 15.

b. 1 at 175 x 60 with end wing 30 x 35.

c. 1 at 225 x 50.

Barracks:

a. 1 at 180 x 40.

b. 2 at 150 x 35.

c. 5 at 110 x 35.

Storage:

a. 2 at 235 x 60.

b. 3 at 180 x 60.

c. 2 at 170 x 45.

d. 10 at 160 x 35.

e. 1 at 140 x 35.

f. 4 at 125 x 50.

g. 3 at 115 x 20.

h. 1 at 110 x 35 with wing 50 x 35.

ITEM DESCRIPTION

i. 2 at 110 x 30.

j. 2 at 95 x 50.

k. 8 at 95 x 30.

l. 7 at 65 x 40.

m. 7 at 60 x 45.

n. 14 at 50 x 30.

o. 4 at 35 x 20.

[redacted] 25X1

14 Bridge: 390 feet long, 30 feet wide; wooden deck; 5 spans, 1 at 110 feet and 7 at 40 feet; water gap 180 feet.

[redacted]

15 Animal and foot bridge: 320 feet long, 15 feet w25X1en deck; 3 spans, 1 at 140 feet and 2 at 90 feet; crib piers; water gap 260 feet.

[redacted].

16 Military installation: Garrison; 4 buildings and 10 tents (15 feet x 15 feet). Building sizes in feet are:

a. 2 at 75 x 20.

b. 1 at 65 x 30.

c. 1 at 45 x 35.

M-6050E 1b701., 1b751.

17 Military installation: Storage; enclosed area with 10 buildings (144 feet x 65 feet).

[redacted].

25X1

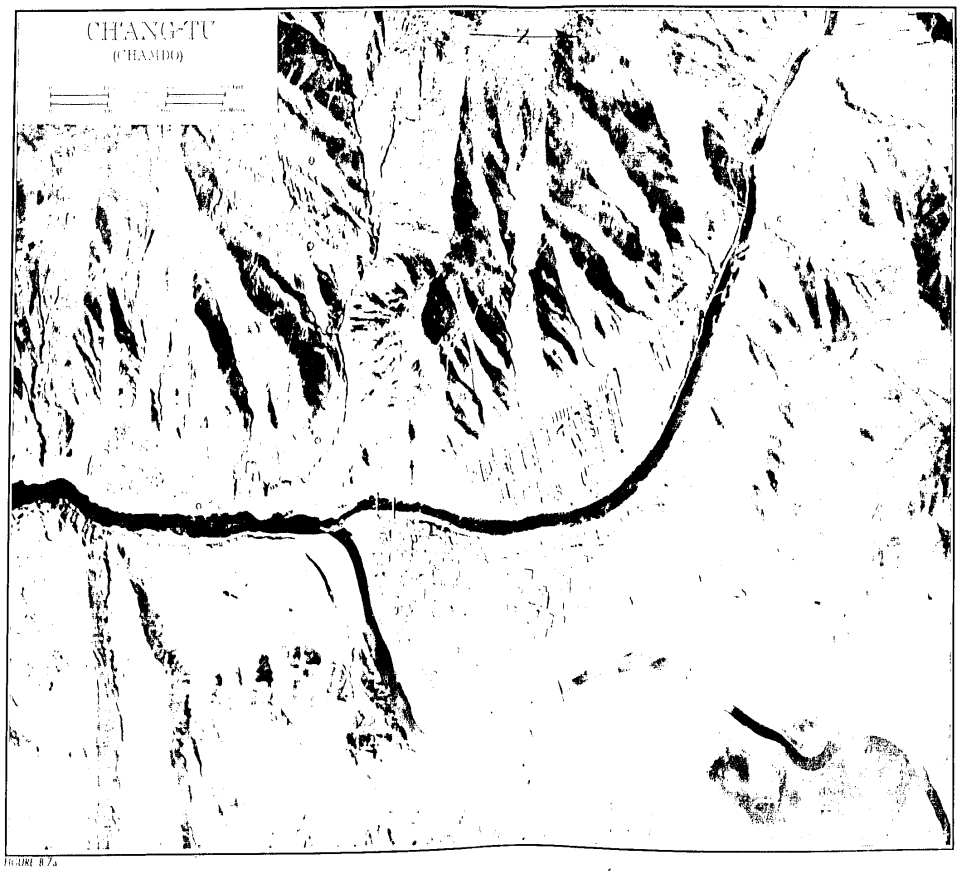


FIGURE 8 7a

25X1

ZHIKATSE

ITEM	DESCRIPTION
1	Military installation: Enclosed area with 7 Tibetan-type buildings; reported as Chinese Military Camp. Building sizes in feet are: a. 1 at 240 x 25 with wings 135 x 25 and 170 x 30. b. 1 at 200 x 25 with wing 90 x 25. c. 1 at 360 x 25. d. 1 at 135 x 30. e. 2 at 55 x 25. f. 1 at 30 x 25.
	25X1 [redacted] source: [redacted]
2	Panchen Lama's Palace: Enclosed area with 14 buildings. Sizes in feet are: a. 1 with 2 main wings 290 x 25 connected by 3 lateral wings; 2 at 140 x 30 and 1 at 140 x 50. b. 1 with 2 main wings 260 x 25 connected by 3 lateral wings 90 x 25. c. 1 at 245 x 35 with 3 wings 140 x 15, 130 x 70, and 100 x 65. d. 1 with 2 wings 260 x 20 connected by 3 lateral wings; two at 90 x 20 and 1 at 90 x 35.
	25X1
	e. 1 at 225 x 35 with wing 165 x 60. f. 1 with 2 main wings; 1 at 160 x 25 and 1 at 160 x 10 connected by 2 laterally connecting wings 40 x 10. g. 2 at 180 x 35. h. 2 at 180 x 15. i. 1 at 120 x 95. j. 1 at 115 x 50. k. 1 at 70 x 35. l. 1 at 60 x 60.
	25X1 [redacted]
3	[redacted]
4	Storage area: 9 buildings. Building sizes in feet are: a. 1 at 485 x 80. b. 1 at 260 x 25.

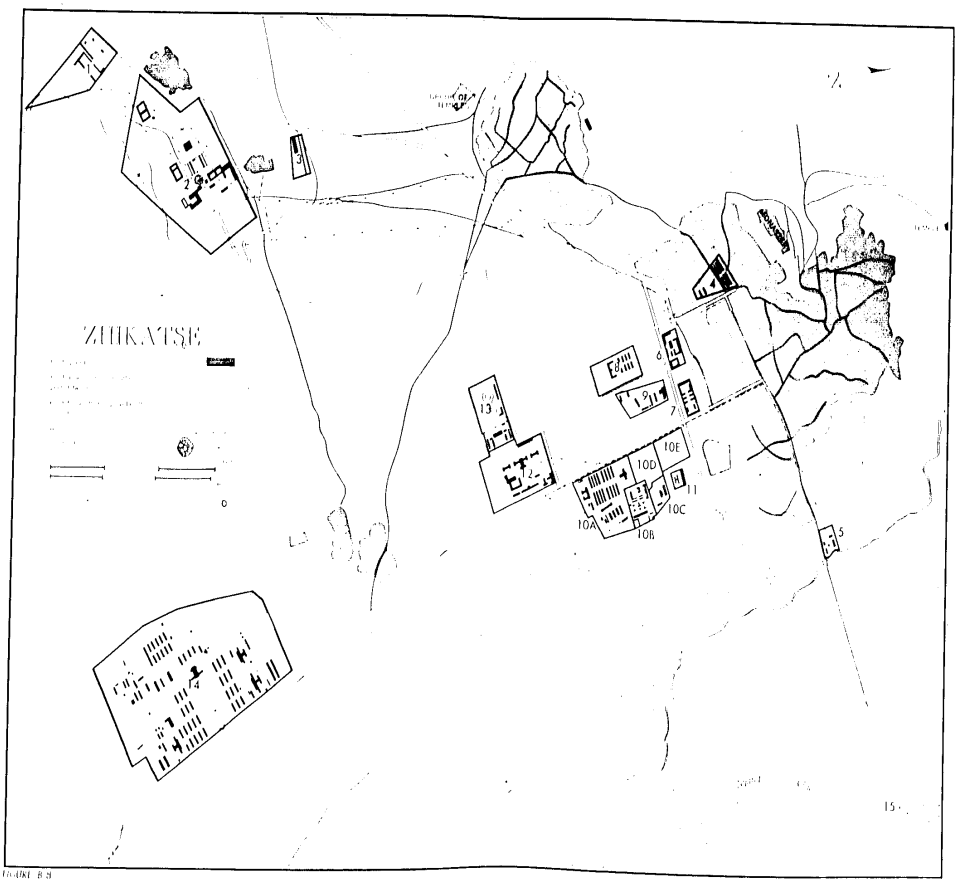
ITEM	DESCRIPTION
	c. 5 at 220 x 20. d. 2 at 145 x 35.
	[redacted]
5	Possible communications center: Enclosed area with 4 guard towers, 5 buildings, and 1 antenna. Building sizes in feet are: a. 1 at 130 x 35. b. 2 at 90 x 30. c. 2 at 65 x 40.
	[redacted]
6	Possible civil installation: Enclosed area with 6 buildings. Building sizes in feet are: a. 1 with 2 main wings 170 x 25 connected by 2 lateral wings 100 x 25. b. 1 at 165 x 25. c. 1 with 2 main wings 110 x 25 connected by 1 lateral wing 200 x 25 and 1 link connecting lateral wing 90 x 25. d. 1 at 145 x 25 with 1 wing 125 x 25. e. 1 at 140 x 65. f. 1 at 90 x 25.

ITEM	DESCRIPTION
	25X1 [redacted]
7	Possible civil installation: Enclosed area with 9 buildings. Building sizes in feet are: a. 1 at 195 x 25. b. 2 at 125 x 25 with wing 60 x 25. c. 2 at 80 x 45. d. 4 at 60 x 25.
	25X1 [redacted]
8	Military installation: Storage; enclosed area with 1 administration building 260 x 40 with lateral wings 60 x 40, 70 x 80, and 60 x 25; 6 warehouses 115 x 35; and 2 barracks 75 x [redacted]
	25X1 [redacted]
9	Unidentified area: Under construction; 6 buildings. Building sizes in feet are: a. 1 at 190 x 60 with wing 70 x 60. b. 2 at 175 x 30. c. 1 at 155 x 40. d. 1 at 130 x 30. e. 1 at 115 x 40. f. 1 at 70 x 25. g. 1 at 45 x 45.
	25X1 [redacted]

25X1

25X1

SEIS 3



25X1

ITEM	DESCRIPTION
10	Military installation: Storage; enclosed area subdivided into 5 sections. Area "A" contains 1 administration building 200 x 55 with 2 T-shaped wings, stem 70 x 35 and top 55 x 35; 22 storage buildings 195 x 30, and 10 miscellaneous buildings with sizes in feet as follows: a. 1 at 170 x 45. b. 1 at 180 x 80 with 2 wings 70 x 45. c. 6 at 35 x 35. d. 2 at 65 x 45. Area "B" contains 1 administration building 280 x 50 with 2 wings 50 x 50; 3 storage tanks 25 feet in diameter, and 10 storage buildings. Building sizes in feet are: a. 4 at 50 x 20 with wing 25 x 20. b. 1 at 55 x 25 with wing 65 x 20. c. 1 at 300 x 55. d. 4 at 110 x 20. Area "C" contains 3 Tibetan-type buildings possibly used for barracks. Building sizes in feet are: a. 1 at 100 x 70 with 2 lateral wings 90 x 15; 2 lateral wings are connected by 1 wing 30 x 15, forming a courtyard 80 x 35. b. 1 at 90 x 45. c. 1 at 70 x 45. Areas D & E are under construction.
[redacted] 25X1	
11	Enclosed area: 4 Tibetan-style buildings, possibly used as barracks. Building sizes in feet are: a. 1 at 125 x 25, with 2 wings 170 x 25 and 25 x 25. b. 1 at 225 x 15. c. 1 at 50 x 20. d. 1 at 35 x 15.
[redacted] 25X1	
12	Military administrative headquarters: Enclosed area with 12 buildings. Building sizes in feet are: a. 1 at 175 x 70 with 1 wing 20 x 25 and 1 wing 70 x 25 connected to wing 205 x 25 connected to another wing 85 x 25. b. T-shaped building with 2 T-shaped wings; main stem 120 x 55 with top 100 x 35; wing stems 70 x 35 with top 70 x 35.
13	Military installation: Storage and maintenance; 2 enclosed areas with 10 buildings. Building sizes in feet are: a. 1 at 190 x 60. b. 1 at 240 x 50. c. 1 at 85 x 35 with wing 85 x 35. d. 2 at 150 x 30. e. 2 at 110 x 30. f. 2 at 70 x 30. g. 1 at 60 x 25.
[redacted]	
14	Military installation: Garrison; enclosed area with 4 administration buildings, 47 barracks, and 25 miscellaneous buildings. Building sizes in feet are: a. 1 at 160 x 80, with 4 lateral wings 65 x 25. b. 3 at 160 x 55 with 2 end wings 70 x 25 and 1 T-shaped wing; stem 55 x 55; top 125 x 30. c. 1 at 345 x 30. d. 3 at 325 x 45. e. 2 at 210 x 40. f. 1 at 185 x 40. g. 25X1 x 65. h. 47 at 155 x 30. i. 2 at 145 x 30. j. 1 at 115 x 35. k. 2 at 95 x 35. l. 1 at 85 x 55. m. 1 at 60 x 15. n. 6 at 50 x 35. o. 1 at 35 x 25. p. 2 stables 175 x 45.
[redacted] 25X1	
15	Bri[redacted]0 feet long, 18 feet wide; wooden deck, water gap 550 feet.
[redacted]	

SEIS 3

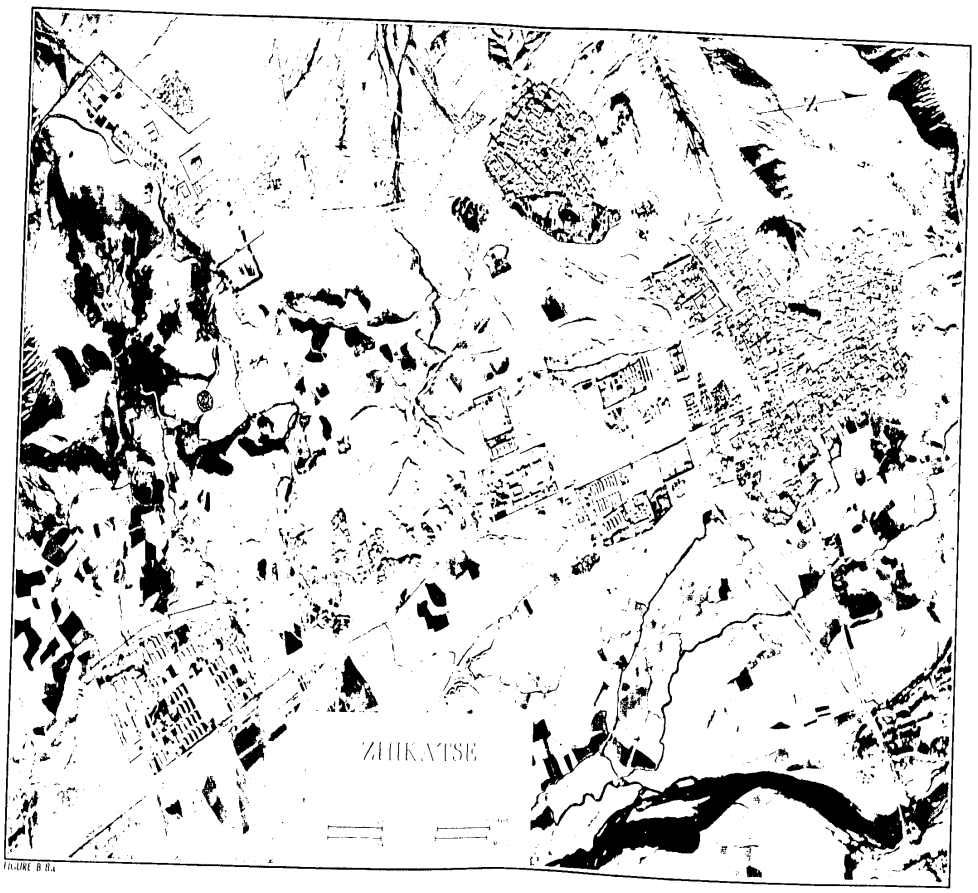


FIGURE B 8a

25X1

LHASA

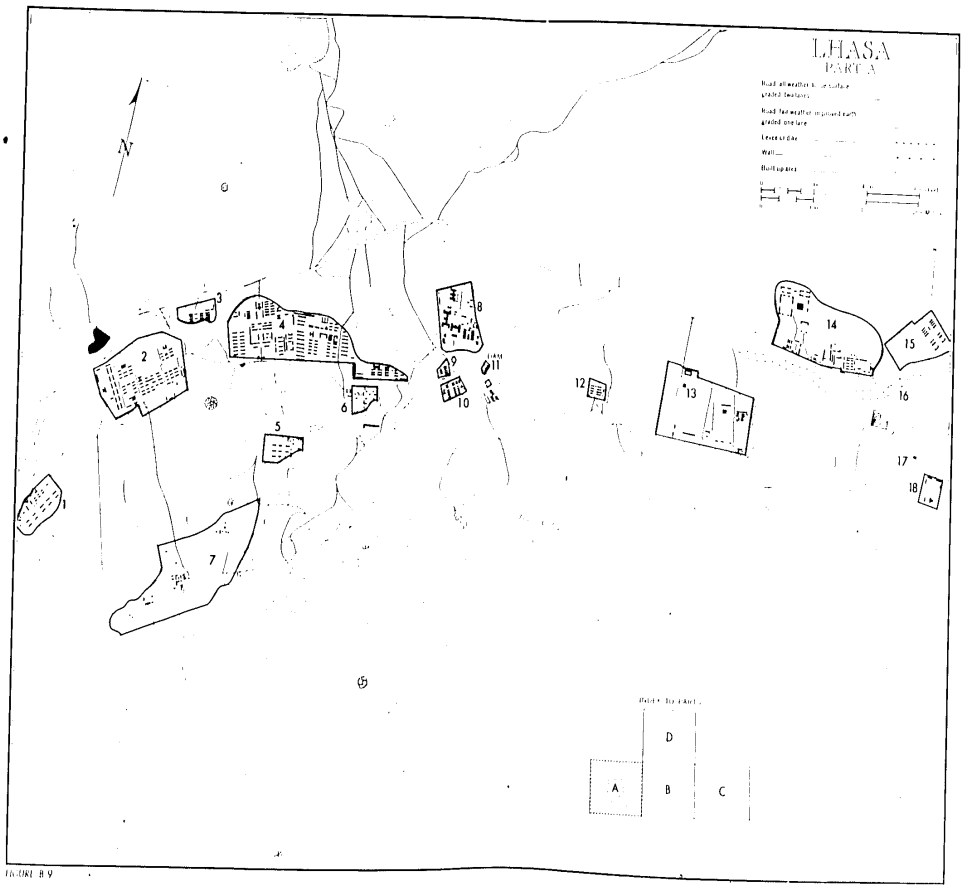
ITEM	DESCRIPTION
1	Military installation: Barracks and storage; enclosed area with 6 guard towers, 10 barracks, 10 storage buildings, 1 administration building, and 10 miscellaneous buildings. Building sizes in feet are: Barracks: 10 at 115 x 35. Storage: 10 at 145 x 45. Administration: 1 at 85 x 35 with wing 60 x 45. Miscellaneous: a. 2 at 60 x 35. b. 2 at 65 x 30. c. 1 at 50 x 20. d. 1 at 45 x 30. e. 4 at 45 x 30.
[redacted]	
2	Military installation: Barracks, enclosed area with 3 administration buildings, 72 barracks, and 11 miscellaneous buildings. Building sizes in feet are: Administration: a. 1 at 140 x 60 with 2 lateral wings 80 x 60. b. 1 at 160 x 50 with lateral wing 50 x 45, and 2 at 85 x 30. c. 1 wing at 160 x 45 and 1 wing at 70 x 45 connected by a lateral wing 35 x 45.
	Barracks: a. 18 at 170 x 30. b. 54 at 130 x 35.
	Miscellaneous: a. 12 at 70 x 35. b. 1 at 45 x 30.
[redacted]	
3	Military installation: Storage; enclosed area with 3 guard towers, 15 storage buildings, and 1 administration building. Building sizes in feet are: Administration: 1 at 115 x 35 with wing 35 x 35. Storage: a. 8 at 140 x 35. b. 5 at 170 x 35. c. 1 at 85 x 45. d. 1 at 85 x 35.
[redacted]	
4	Military installation: Barracks, storage, and vehicle maintenance; enclosed area with 34 barracks, 38 storage, 2 vehicle maintenance, 4 administration, and 85 miscellaneous buildings. Dimensions of buildings in feet are: Administration:

ITEM	DESCRIPTION
	a. 1 at 300 x 30 with 2 wings 95 x 35. b. 1 at 165 x 45 with 3 wings 30 x 35. c. 1 at 145 x 35 with 2 wings 20 x 50. d. 1 with 2 wings at 100 x 60 connected by a lateral wing 60 x 60.
	Barracks: a. 24 at 165 x 35. b. 16 at 145 x 45.
	Storage: a. 1 at 900 x 45. b. 1 at 500 x 45 with wing 350 x 35. c. 26 at 300 x 35. d. 10 at 200 x 45.
	Vehicle maintenance: 2 at 210 x 70.
	Miscellaneous: a. 5 at 245 x 35. b. 29 at 150 x 20. c. 4 at 170 x 45. d. 9 at 145 x 45. e. 3 at 140 x 45. f. 17 at 100 x 45. g. 16 at 50 x 20.
[redacted]	
5	Military installation: Storage; enclosed area with 5 guard towers, 9 storage and 11 miscellaneous buildings. Dimensions of buildings in feet are: Storage buildings: 9 at 145 x 35.

ITEM	DESCRIPTION
	Miscellaneous: a. 3 at 95 x 35. b. 8 at 50 x 30.
[redacted]	
6	Unidentified installation: Enclosed area with 19 buildings inside enclosure and 5 buildings outside. Building sizes in feet are: a. 1 at 150 x 35. b. 2 at 120 x 30. c. 4 at 115 x 50. d. 5 at 95 x 30. e. 6 at 70 x 35. f. 2 at 50 x 45. g. 4 at 35 x 20.
[redacted]	
7	Agricultural area: Under construction, 35 buildings with sizes in feet as follows: a. 1 at 145 x 50 with wing 40 x 40 b. 14 at 115 x 35. c. 6 at 70 x 20. d. 1 at 70 x 35 with wing 45 x 30. e. 9 at 60 x 30. f. 1 at 45 x 35. g. 4 at 30 x 20.
[redacted]	
8	Chinese military hospital: Enclosed

25X1

SEIS 3



25X1

ITEM	DESCRIPTION
	area with 3 hospital buildings, 13 barracks, and 29 miscellaneous buildings. Dimensions of buildings in feet are: Hospital:
	a. 1 with 2 wings at 270 x 55 connected by a lateral wing 285 x 55; each main wing has 2 lateral wings 35 x 50; connecting wing also has a lateral wing 95 x 55.
	b. 1 with 3 parallel wings, 2 at 200 x 55 and 1 at 135 x 55, connected by lateral wings 85 x 55 and 50 x 20.
	c. 1 at 220 x 50 with 2 lateral wings 50 x 30 and 1 end wing 180 x 50.
	Barracks: 13 at 115 x 30.
	Miscellaneous:
	a. 2 at 200 x 5[illegible].
	b. 2 at 165 x 35.
	c. 5 at 120 x 30.
	d. 1 at 115 x 50.
	e. 1 at 115 x 30.
	f. 6 at 85 x 35.
	g. 12 at 65 x 35.
25X1 [redacted]	
9	Military area: Barracks; 10 quonset buildings 145 feet x 30 feet.
25X1 [redacted]	
10	Military installation: Barracks; enclosed area with 2 administration buildings and 22 barracks. Building sizes in feet are: Administration:
	a. 1 at 100 x 35 with wing 55 x 35.
	b. 1 at 110 x 30 with 2 wings 85 x 30.
	Barracks: 22 at 85 x 35.
[redacted] 25X1	
11	Dam 135 feet x 20 feet and possible hydroelectric powerplant.
[redacted] 25X1	
12	Military installation: Storage; enclosed areas with 9 storage and 4 miscellaneous buildings. Dimensions of buildings in feet are:
	Storage: 9 at 140 x 30.
	Miscellaneous:
	a. 1 at 65 x 30.
	b. 2 at 55 x 30.
	c. 1 at 55 x 20.
[redacted] 25X1	
13	Norbu Lingka Monastery: Area contains 11 major buildings with dimensions in feet as follows:
	a. 1 rectangular building with inner court, 2 sides 320 x 45 and 2 sides 300 x 45.
	b. 1 at 300 x 55.
	c. 1 at 360 x 35.
	d. 1 at 270 x 70.
	e. 1 at 215 x 100.
	f. 2 at 215 x 55.
	g. 1 at 200 x 70.
	h. 1 at 145 x 70.
	i. 1 at 140 x 85.
	j. 1 at 140 x 35.
[redacted]	
14	Chinese Central Lhasa Transportation Headquarters: Area under construction; contains 1 administration building, 5 vehicle maintenance buildings, 24 barracks, and 29 miscellaneous buildings. Dimensions of buildings in feet are: Administration: 1 at 250 x 45.
	Maintenance:
	a. 4 at 320 x 30.
	b. 1 at 250 x 165
	Barracks:
	a. 4 at 160 x 30 with wing 35 x 30.
	b. 10 at 140 x 35.
	c. 10 at 120 x 35.
	Miscellaneous:
	a. 1 at 330 x 30 with 2 wings 35 x 5.
	b. 4 at 250 x 30 with wing 30 x 30.
	c. 5 at 230 x 35.
	d. 1 at 170 x 55.
	e. 1 with 1 wing 120 x 50 and 1 wing at 55 x 45 connected by a lateral wing 35 x 20.
	f. 6 at 120 x 35.
	g. 1 at 85 x 30 with 2 wings 15 x 20.
	h. 10 at 45 x 30.
[redacted] 25X1	
15	Lhasa Chinese Middle School: Enclosed area with 15 buildings that have dimensions in feet as follows:
25X1	
	a. 2 at 165 x 30 with 2 wings 55 x 30.
	b. 12 at 115 x 35.
	c. 1 at 100 x 55.
[redacted] 25X1	
16	Bridge: 185 feet long, 20 feet wide; concrete deck, one span; water gap 150 feet
[redacted] 25X1	
17	Ammunition storage area: Enclosed area with 1 building, 85 x 70.
[redacted] 25X1	
18	Lhasa quarters of the Panchen Lama
[redacted] 25X1	
19	Potala
[redacted] 25X1	
20	Preparatory Committee of Tibetan Autonomous Government Building: 400 feet x 55 feet
[redacted] 25X1	

25X1

ITEM	DESCRIPTION
21	Auditorium: 180 feet x 85 feet.
25X1	[redacted]
22	Capital building: 250 feet x 55 feet.
25X1	[redacted]
23	Lumber mill: Area consists of 11 buildings with sizes in feet as follows: a. 1 rectangular building with inner court; 2 sides 120 x 35 and 2 sides at 35 x 20. b. 6 at 165 x 45. c. 1 at 160 x 50. d. 1 at 115 x 35. e. 1 at 55 x 30. f. 1 at 30 x 30.
25X1	[redacted]
24	Chinese civilian hospital: Enclosed area with 1 hospital building, 1 administration building, 6 barracks, and 7 miscellaneous buildings. Sizes in feet are: Hospital: 1 at 360 x 55 with 2 wings 85 x 45. Administration: 1 at 70 x 20 with 2 wings 20 x 15. Barracks: 6 at 145 x 50. Miscellaneous: a. 1 at 150 x 50. b. 3 at 145 x 35. c. 1 at 120 x 55 with wing 45 x 30.

ITEM	DESCRIPTION
	d. 1 at 65 x 65. e. 1 at 50 x 35.
	[redacted] 25X1
25	Chinese military headquarters: 1 rectangular building with inner court; 2 sides 165 feet x 115 feet and 170 feet x 45 feet connected by two sides 100 feet x 45 feet.
	[redacted] 25X1
26	Yuthok House: 355 feet x 55 feet.
	[redacted] 25X1
27	Chinese officials quarters: 8 multi-story buildings; sizes in feet are: a. 3 at 315 x 30. b. 2 at 180 x 45 with wing 70 x 45. c. 3 at 160 x 30.
	[redacted] 25X1
28	Military installation: Tibetan Fort (Gyantse); enclosed area with 1 administration building, 4 barracks, and 10 miscellaneous buildings. Dimensions of buildings in feet are: Administration: 1 at 230 x 50. Barracks: 4 at 150 x 40. Miscellaneous: a. 1 at 350 x 30. b. 1 at 160 x 50. c. 2 at 120 x 30.

ITEM	DESCRIPTION
	d. 2 at 250 x 20. e. 2 at 70 x 25. f. 2 at 85 x 20.
	[redacted]
29	Ma-K'ang Sha-pa military installation: Garrison and supply; enclosed area with 2 administration buildings, 51 barracks, 22 storage buildings, 16 quarters, 4 maintenance buildings, and 29 miscellaneous buildings. Dimensions of buildings in feet are: Administration: a. 1 at 260 x 55. b. 1 at 230 x 100 with 4 lateral wings 100 x 30; each lateral wing has an end wing 30 x 30. Barracks: a. 1 at 245 x 35 with 2 wings 35 x 20. b. 1 at 215 x 35 with 2 wings 35 x 15. c. 22 at 180 x 35. d. 1 at 170 x 35 with 2 wings 55 x 30. e. 1 at 165 x 55 with wing 85 x 55. f. 16 at 150 x 30. g. 4 at 145 x 35. h. 1 at 145 x 30 with wing 35 x 35. i. 1 at 115 x 50. j. 1 at 145 x 35 and 1 at 110 x 35, connected by a lateral wing;

ITEM	DESCRIPTION
	20 x 30. k. 1 at 110 x 35. Storage: 25X1 at 270 x 65 with 2 wings 110 x 65. b. 1 at 230 x 35. c. 1 at 200 x 45. d. 1 at 160 x 35 with 2 lateral end wings 70 x 35; each lateral wing has an end wing 35 x 30. e. 1 rectangular building with inner court; 2 sides 160 x 20 and 2 at 35 x 20; 1 lateral wing at 135 x 30. f. 1 with 2 wings at 65 x 30, connected by a lateral wing 135 x 50. g. 3 at 130 x 45. h. 13 at 110 x 30. Quarters: a. 1 at 45 x 30 with 2 wings 65 x 30. b. 6 with wings at 70 x 30, connected by a lateral wing 70 x 30. c. 7 with 2 wings at 55 x 35 connected by a lateral wing 55 x 50. Maintenance: a. 1 at 345 x 30. b. 1 at 140 x 30. c. 1 at 110 x 30. d. 1 at 65 x 30. Miscellaneous:

25X1

25X1

ITEM	DESCRIPTION
	a. 1 at 260 x 35.
	b. 1 at 245 x 70 with 2 wings 70 x 70.
	c. 1 at 215 x 55.
	d. 1 at 185 x 35.
	e. 1 with 2 wings at 145 x 55 connected by a lateral wing 55 x 20.
	f. 1 at 140 x 35 with 2 wings 55 x 30.
	g. 1 at 135 x 30 with 2 end wings 120 x 30; each end wing has a lateral wing 30 x 20.
	h. 4 at 130 x 30 with 2 wings 20 x 20.
	i. 1 with 1 wing at 115 x 45 and 1 wing at 85 x 30 connected by a lateral wing 45 x 20.
	j. 1 at 110 x 35, with 1 wing at 85 x 35 and 1 at 20 x 20.
	k. 2 at 110 x 20.
	l. 1 at 100 x 50.
	m. 2 with 2 wings at 55 x 20 connected by a lateral wing 85 x 30.
	n. 1 at 85 x 35.
	o. 2 at 70 x 55.
	p. 3 at 70 x 30.
	q. 1 at 55 x 30.

25X1

30 Tibet Foreign Bureau: Enclosed area with 16 buildings. Dimensions of buildings in feet are:

25X1

ITEM	DESCRIPTION
	a. 1 at 210 x 50.
	b. 6 at 200 x 30.
	c. 2 at 190 x 70.
	d. 1 at 100 x 50.
	e. 5 at 80 x 30.
	f. 1 at 50 x 35.

25X1

31 Chinese Weather Observatory: Enclosed area with 9 buildings. Dimensions of buildings in feet are:

25X1

	a. 1 at 185 x 50.
	b. 1 at 115 x 85.
	c. 4 at 85 x 30.
	d. 1 at 55 x 35.
	e. 1 at 55 x 20.
	f. 1 at 35 x 20.

25X1

32 Police Barracks: Enclosed area with 13 buildings. Dimensions of buildings in feet are:

25X1

	a. 6 at 135 x 30.
	b. 1 at 110 x 30, with 2 wings 55 x 30.
	c. 1 at 100 x 30.
	d. 1 at 90 x 55.
	e. 1 at 80 x 20.
	f. 1 at 55 x 30.
	g. 2 at 35 x 20.

25X1

ITEM	DESCRIPTION
33	Ra-Mo-Che Monastery.

25X1

34 Tibetan hospital: 1 rectangular building with inner court; 2 sides 235 feet x 30 feet and 235 feet x 25 feet, connected by 2 wings 100 feet x 25 feet and 100 feet x 40 feet.

25X1

35 Post office: 3 buildings 130 feet x 30 feet.

25X1

36 Theater: 135 feet x 60 feet.

25X1

37 Chinese quarters: Area contains 8 buildings. Dimensions of buildings in feet are:

	a. 1 at 140 x 35.
	b. 2 at 130 x 30.
	c. 3 at 85 x 35.
	d. 1 at 65 x 45.
	e. 1 at 55 x 15.

25X1

38 Chinese Meteorological Station: Area contains 10 buildings with dimensions in feet as follows:

	a. 1 at 165 x 30.
	b. 2 at 130 x 30.
	c. 1 at 100 x 35.

ITEM	DESCRIPTION
	d. 2 at 50 x 30.

25X1

39 Gyu-To Academy.

25X1

40 Me-Ru Monastery.

25X1

41 Chinese officers quarters and grain warehouses: Enclosed area with 2 officers quarters, 9 storage, and 10 miscellaneous buildings. Sizes in feet are:

Quarters:

	a. 1 with 2 wings at 70 x 20, connected by a lateral wing 60 x 45.
	b. 1 with 2 wings at 55 x 35, connected by a lateral wing 165 x 35.

Storage:

	a. 1 at 155 x 70.
	b. 1 at 115 x 55.
	c. 6 at 95 x 35.
	d. 1 at 90 x 35 with wing 70 x 45.

Miscellaneous:

	a. 1 at 140 x 30.
	b. 3 at 110 x 30.
	c. 1 at 70 x 30.
	d. 3 at 45 x 20.

25X1

42 Chinese administrative offices: Area contains 35 buildings with dimensions

25X1

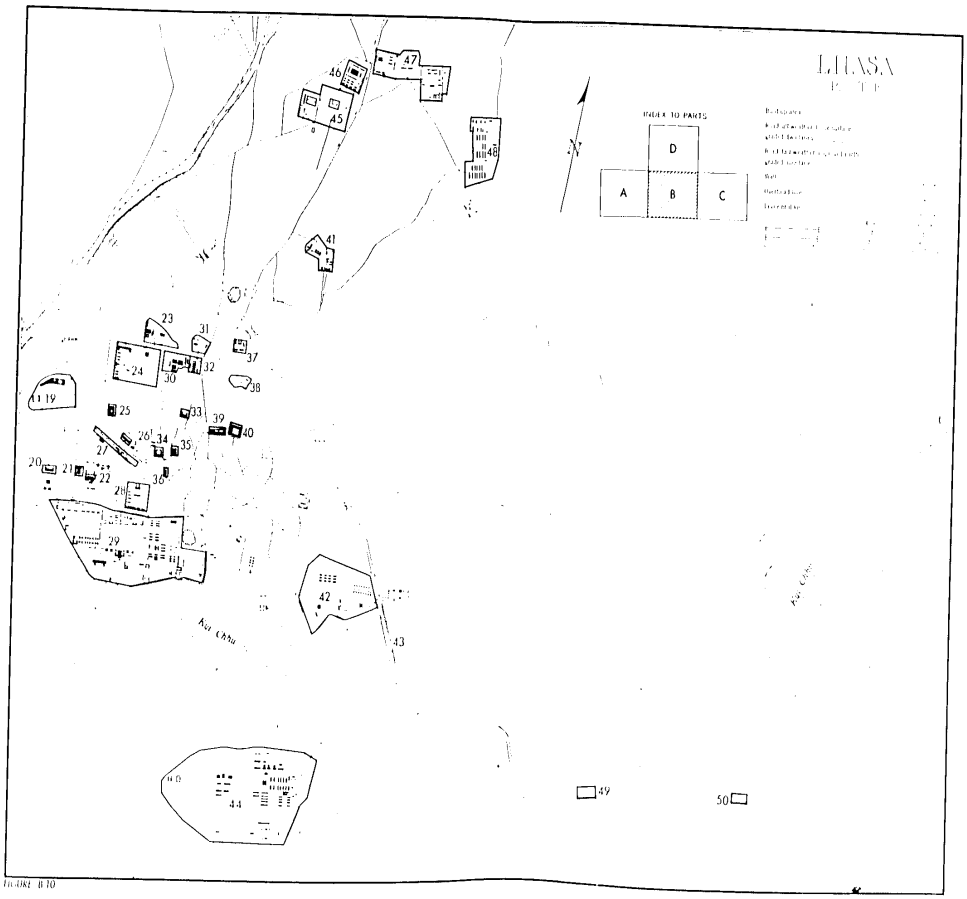


FIGURE II-10

ITEM	DESCRIPTION
	in feet as follows:
	a. 18 at 130 x 15 with 2 wings 20 x 15.
	b. 12 at 130 x 35.
	c. 1 at 225 x 30.
	d. 4 at 70 x 30.
[redacted]	
43	Bridge: 2000 feet long, 20 feet wide; 33 spans; 9 at 115 feet, 24 at 40 feet; water gap 500 feet.
[redacted]	
44	Military installation (Thip Military Compound): Garrison and storage; enclosed area with 3 headquarters buildings, 4 administration buildings, 22 barracks, 14 storage, and 30 miscellaneous buildings. Dimensions of buildings in feet are:
	Headquarters:
	a. 1 at 100 x 50.
	b. 2 at 65 x 35.
	Administration: 4 with 1 wing at 110 x 35 and 1 wing at 85 x 35, connected by a lateral wing 35 x 20.
	Barracks: 22 at 145 x 35.
	Storage: 14 at 230 x 35.
	Miscellaneous:
	a. 1 at 500 x 45.
	b. 2 at 230 x 35.
	c. 1 at 185 x 35 with wing 35 x 35.
	d. 1 at 165 x 85 with 3 wings 30 x 30.
	e. 3 at 165 x 35.
	f. 7 at 145 x 35.
	g. 2 at 130 x 70.
	h. 1 at 100 x 50.
	i. 2 at 70 x 20.
	j. 3 at 65 x 35.
	k. 7 at 50 x 50.
[redacted]	
45	Tibetan Fort (mint): Enclosed area with 16 buildings. Dimensions of buildings in feet are:
	a. 1 rectangular building with inner court; 2 sides 420 x 30 and 2 at 215 x 20.
	b. 2 at 395 x 20.
	c. 1 rectangular building with inner court; 2 sides 360 x 30 and 2 at 270 x 30.
	d. 1 at 300 x 20.
	e. 1 at 290 x 45.
	f. 1 at 185 x 35 with 2 wings 70 x 20.
	g. 1 at 180 x 20 with wing 70 x 20.
	h. 1 at 140 x 20.
	i. 1 at 110 x 30.
	j. 1 at 80 x 50.
	k. 3 at 70 x 30.
	l. 1 at 35 x 35.
	m. 1 at 35 x 20.
[redacted]	
46	Military installation: Garrison and storage; enclosed area with 2 administration buildings, 9 barracks, 9 storage, and 7 miscellaneous buildings. Dimensions of buildings in feet are:
	Administration:
	a. 1 at 115 x 65.
	b. 1 at 115 x 45.
	Barracks: 9 at 115 x 45.
	Storage:
	a. 1 at 240 x 120.
	b. 1 at 380 x 45.
	c. 1 at 330 x 50.
	d. 1 at 315 x 30.
	e. 1 at 200 x 45.
	f. 1 at 170 x 50.
	g. 1 at 120 x 20.
	h. 2 at 115 x 45.
	Miscellaneous:
	a. 3 at 70 x 30.
	b. 2 at 50 x 30.
	c. 2 at 50 x 20.
[redacted]	
47	Military installation: Vehicle maintenance and storage; enclosed area with 1 administration building, 2 vehicle maintenance buildings, 7 storage buildings, 4 barracks, and 24 miscellaneous buildings. Storage buildings reported to contain grain and produce. Building sizes in feet are:
	Administration: 1 at 160 x 50.
	Vehicle maintenance:
	a. 1 at 215 x 45.
	b. 1 at 185 x 65.
	Storage:
	a. 3 at 160 x 50.
	b. 3 at 145 x 35.
	c. 1 at 120 x 55.
	Barracks: 4 at 110 x 30.
	Miscellaneous:
	a. 1 at 170 x 30 with 2 wings 95 x 20.
	b. 1 at 145 x 30.
	c. 1 at 130 x 45.
	d. 4 at 110 x 30.
	e. 1 at 80 x 45.
	f. 1 at 65 x 20 with wing 50 x 30.
	g. 3 at 55 x 35.
	h. 6 at 45 x 20.
	i. 6 at 35 x 30.
[redacted]	
48	Military installation: Storage; enclosed area with 29 storage buildings and 16

25X1

SEIS 3

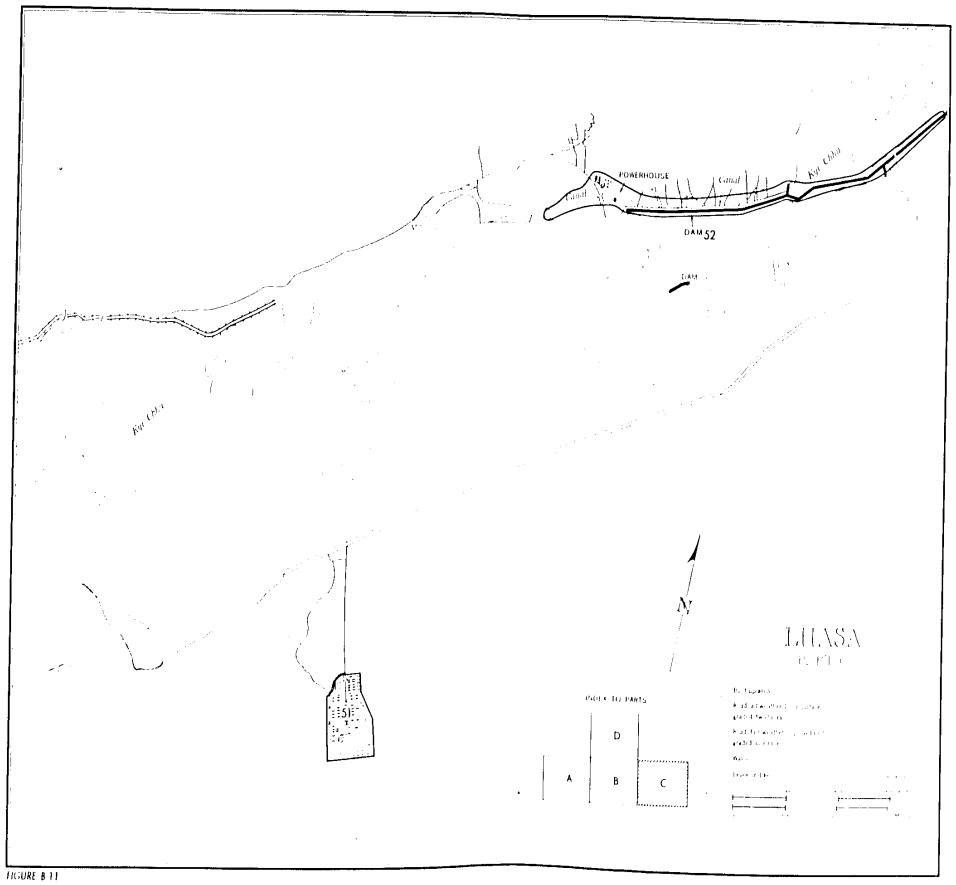


FIGURE B 11

25X1

SEIS 3

ITEM	DESCRIPTION
	miscellaneous buildings. Dimensions of buildings in feet are: Storage: a. 24 at 145 x 45. b. 5 at 85 x 35. Miscellaneous: a. 3 at 85 x 35. b. 15 at 50 x 30.
49	POL Storage: Enclosed area with 22 horizontal storage tanks 15 feet in diameter. Area appears to be under construction.
50	
51	Military installation: Garrison and storage; enclosed area with 1 administration building, 24 barracks, 15 storage buildings, and 39 miscellaneous buildings. Sizes in feet are: Administration: 1 at 215 x 30 and 1 at 60 x 20 connected by a lateral wing 100 x 70. Barracks: 24 at 145 x 35. Storage: 15 at 145 x 30. Miscellaneous:

ITEM	DESCRIPTION
	a. 1 at 150 x 50. b. 8 at 115 x 25. c. 30 at 55 x 30.
52	Nachin hydroelectric powerplant: Earth dam 13,000 feet long. Eastern half of dam forms a reservoir; western half protects eastern canal from floods. Eastern canal leads from the reservoir to the powerplant and is 5,600 feet long, 60 feet wide. Western canal, 2,200 feet long and 110 feet wide, returns the water from the powerhouse to the river. Collateral sources state that the rated capacity is 7,500 kilowatts. Powerhouse and 18 other buildings in area, plus numerous tents and sheds. Building sizes in feet are: Powerhouse: 1 at 115 x 45. Miscellaneous: a. 4 at 125 x 30. b. 13 at 80 x 30. c. 1 with 2 wings 80 x 30 connected by a lateral wing 30 x 15.
53	Unidentified installation: 4 buildings 100 feet x 30 feet under construction.

ITEM	DESCRIPTION
54	
55	
56	

ITEM	DESCRIPTION
57	Hydroelectric powerplant: Regulating dam 115 feet x 20 feet located 1 nautical mile north of powerplant; canal from dam to penstocks serving plant. Powerplant is within an enclosed area with 6 additional buildings. Dimensions of buildings in feet are: Powerplant: 100 x 55, with wing 30 x 35. Supporting buildings: a. 2 at 85 x 35. b. 2 at 80 x 55. c. 1 at 50 x 20. d. 1 at 20 x 15.
58	Probably quarters for construction workers. Enclosed area with 16 buildings that have dimensions in feet as follows: a. 2 at 170 x 30. b. 1 at 140 x 20. c. 3 at 105 x 30. d. 2 at 80 x 35. e. 2 at 65 x 30. f. 4 at 50 x 20. g. 2 at 35 x 30.

25X1

SEIS 3

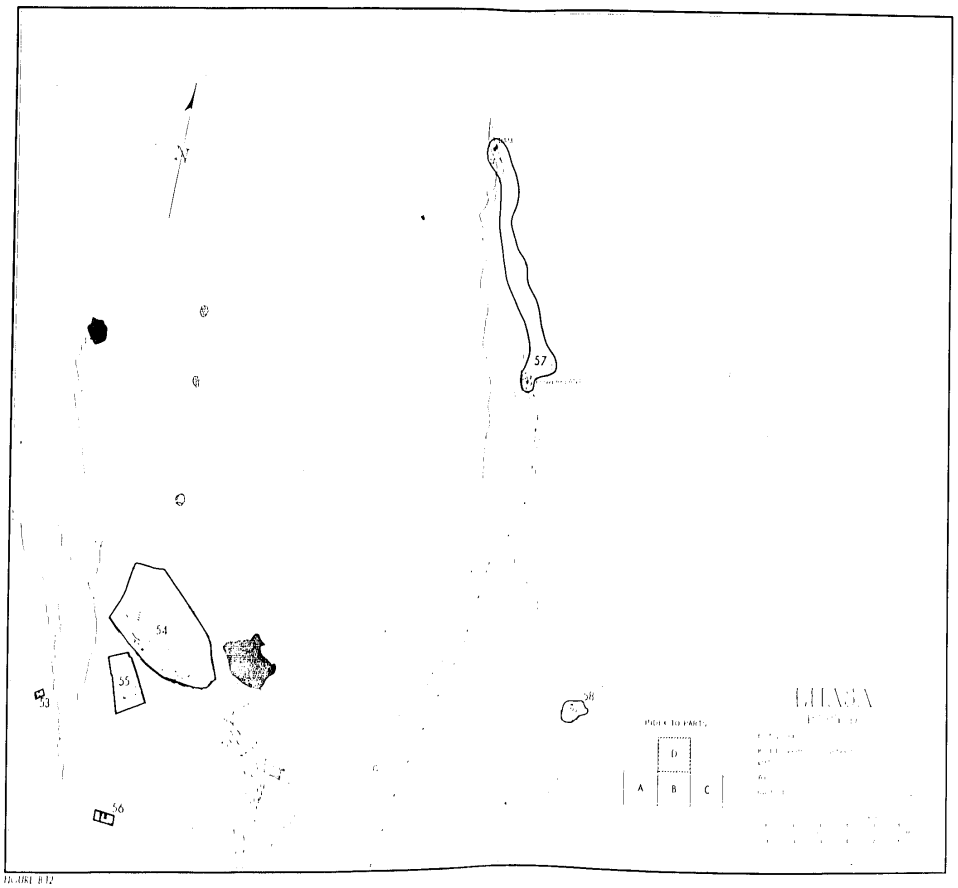


FIGURE B 12

25X1

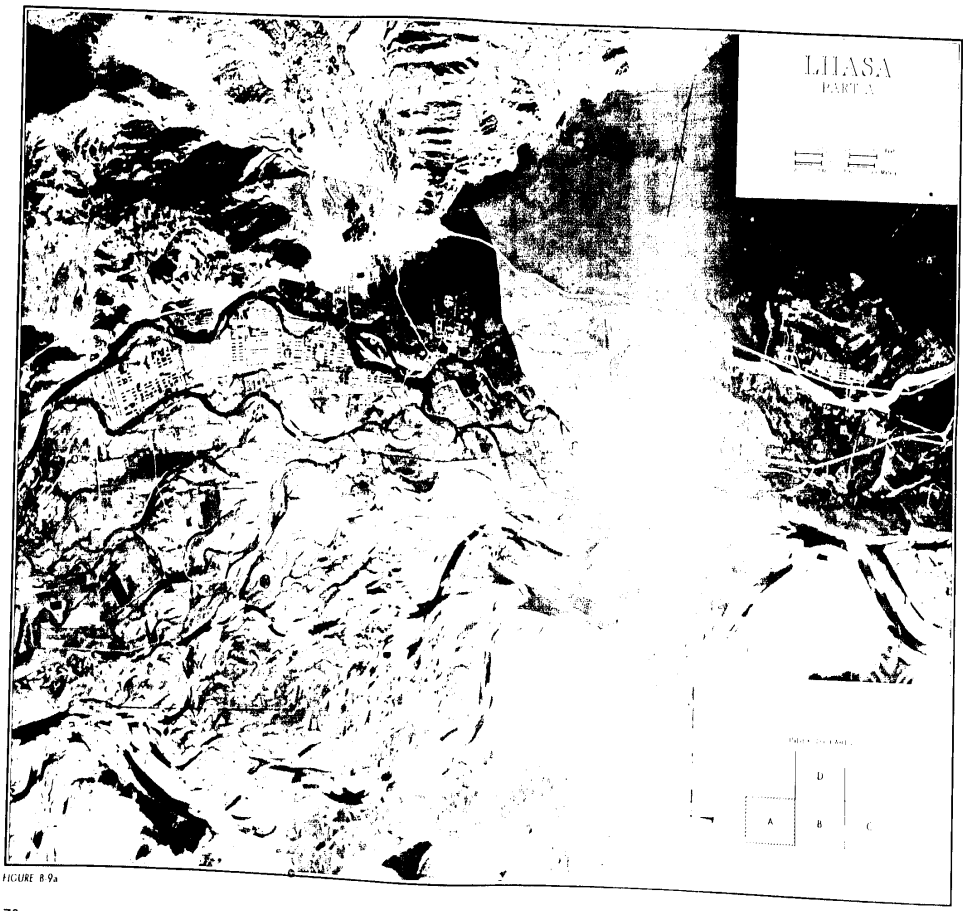


FIGURE 8.9a

SEIS 3

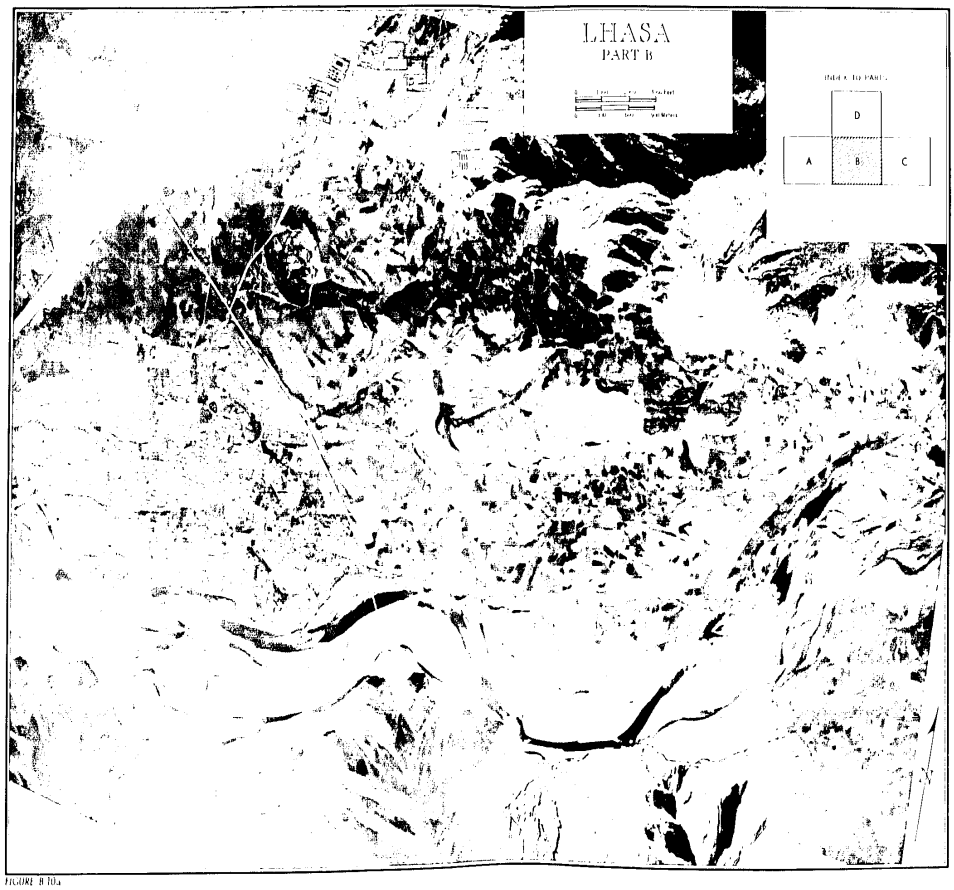


FIGURE B TO 3

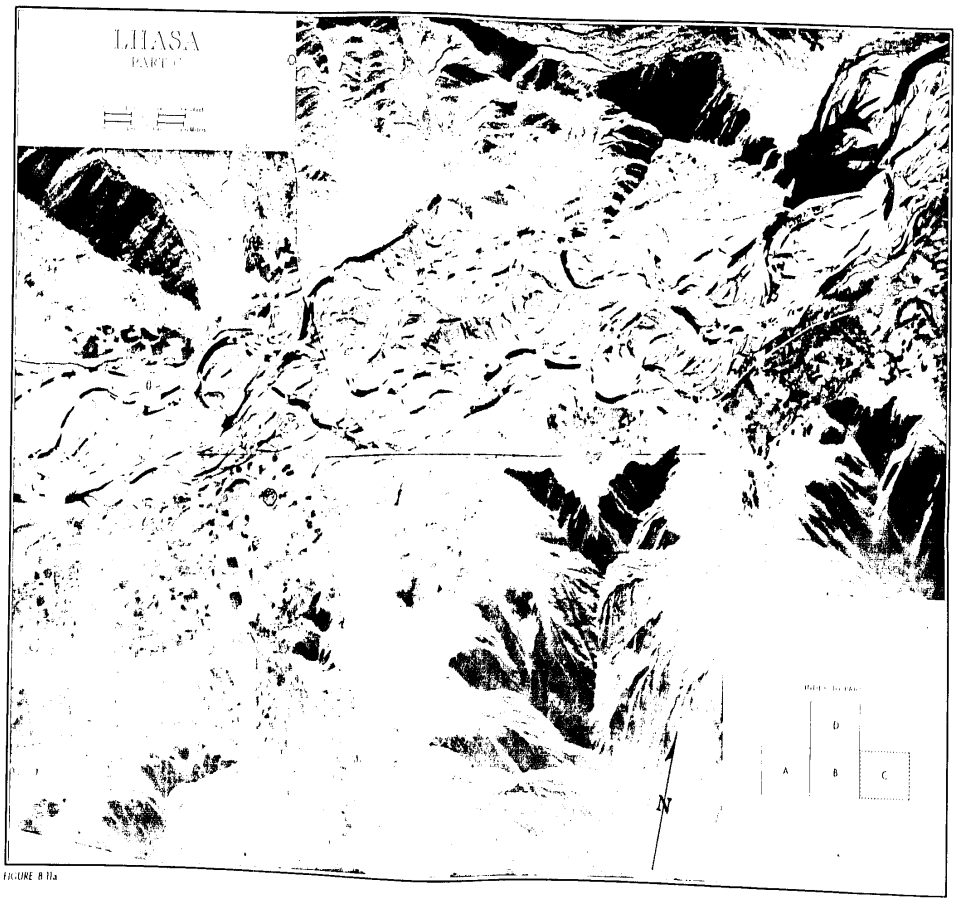


FIGURE B IIa

SEIS 3

FIGURE B124

ANNEX C

TRANSPORTATION

I. INTRODUCTION

The transportation network of Tibet is limited to roads and a few airfields, both of which are vital to the expanding economy of the country. An analysis of the different types of roads, bridges, ferry crossings, way stations, and airfields, with some examples, are presented under Section II, Discussion.

Roads, which are few in number, form the backbone of transportation in Tibet. Airfields are utilized primarily to bring in supplies and personnel when lack of time precludes their conveyance by motor convoy. There are no railroads, and no appreciable navigation on the inland waterways.

TALENT missions over Tibet were flown at different times of the year, and although some of the roads were covered by snow, all of them have been classified.

II. DISCUSSION

A. ROADS

1. Introduction. When the Chinese entered Tibet, travel was restricted to foot and animal transport because use of the wheel, a symbol of Buddist prayer, was considered a desecration by the Tibetans: there was no need for roads -- only caravan trails.

As the Chinese Army advanced into Tibet, it was necessary for them to construct supply roads, which at present are the most important of the manmade features in Tibet. These roads afford access to all critical areas of the country, their construction has demonstrated the advanced Chinese culture, and the organization of labor groups for their construction has established Chinese control of much of the Tibetan populace.

The motorable routes built by the Chinese into Tibet have only a limited capability for supporting sustained military traffic. They are limited by low-weight-capacity bridges and culverts, and could be neutralized easily in time of military conflict. The sparse, low-capacity road net, plus the general lack of strategically located airfields, would require an invasion force to place considerable dependence on airborne support for transportation of troops and equipment.

2. Status of road construction. One of the most important goals of the Chinese has been the construction of a supporting road net. Two main routes to China, the Lhasa - Ka-erh-mu and the Lhasa - Ch'eng-tu roads, now have been constructed. These routes, together with smaller feeder roads, are being continually improved, and collateral sources indicate that many access roads are being driven toward the southern boundary of Tibet to consolidate the Chinese position there.

The completed roads and those under construction or planned will provide the country with a network of roads connecting major Tibetan urban areas with China and with areas along the southern boundary of Tibet. The latter roads will also support Chinese claims to disputed territories along the southern Tibetan border. Although many of the roads are negotiable by jeep only, they are under progressive improvement.

Two thousand nine hundred fifty (2,950) miles of roads and tracks consisting of the following types were observed in Tibet:

a. 800 miles of all-weather, 3-lane roads;

b. 1,150 miles of all-weather, 2-lane roads;

c. 100 miles of all-weather, 1-lane roads;

d. 100 miles of fair-weather, 2-lane roads;

e. 650 miles of fair-weather, 1-lane roads;

f. 450 miles of tracks.

Collateral sources report many additional roads constructed in Tibet outside the TALENT-covered area; 2,100 miles of these undarived roads have been plotted.

Roads designated as all-weather have been

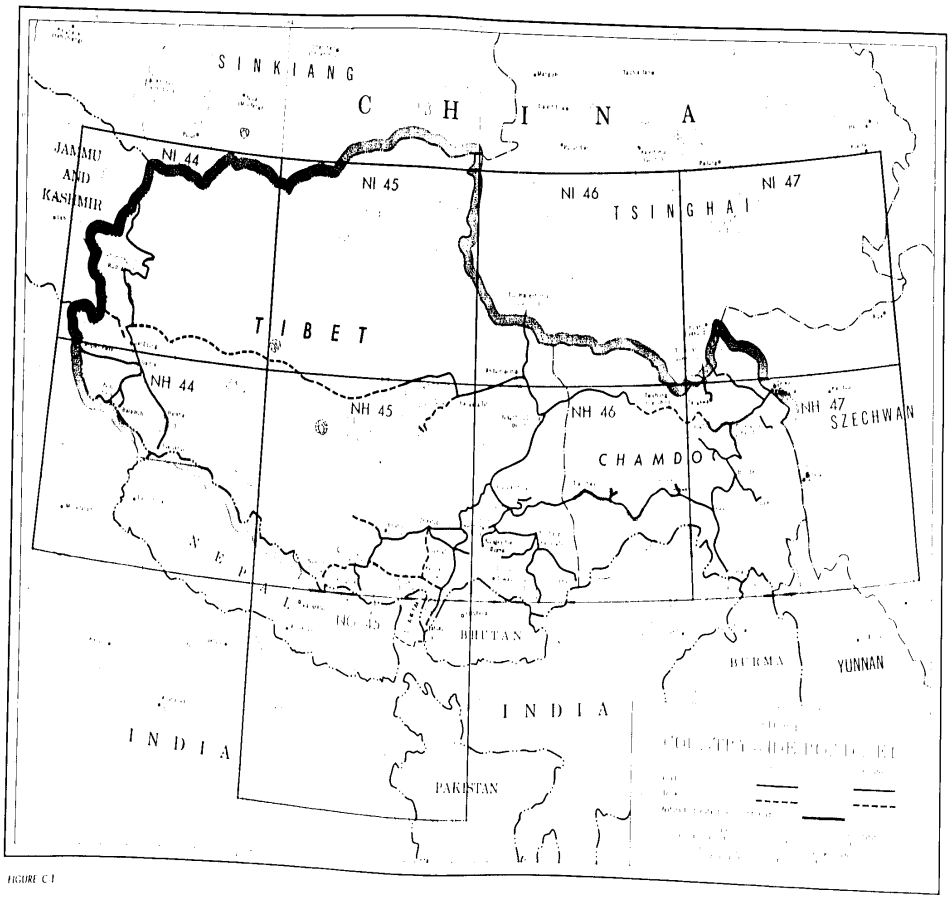


FIGURE C-1

improved with a gravel- or crushed-rock surface, and most bridges and culverts have been completed. Gravel or crushed rock has been applied only to the most vulnerable places. During long wet periods, even roads with this base begin to fail. Natural-surface roads cannot be utilized during wet weather.

3. Construction procedure. The Chinese converted existing trails into jeepable tracks by leveling the earth and by clearing away rocks and boulders; subsequently, these trails were widened into one-lane earth roads, trafficable by trucks. Roads are now being realined to correct excessive curves, are being graded, and given a gravel- or crushed-rock surface to effect all-weather travel. Maximum use is made of land labor and locally available material.

Stream crossings are initially made by fords and ferries; these are gradually replaced with bridges.

4. Maintenance and repair. Roads and bridges have been subjected to flooding conditions because of expedient construction. Several instances of washes across the road, as well as several bridge washouts, were noted. Little evidence of landslides on the roads was noticed, and it is believed that landslides are not a significant problem. In the more rugged southern area which was not photographed, landslides and subsidence occur more frequently.

Major maintenance problems appear to be the failure of the roads because of heavy traffic on a poor subgrade. Repair teams are probably dispersed along the major routes and utilized for permanent routine maintenance -- chiefly manual labor with some mechanical grading. A piece of heavy equipment that may have been a motorized grader was noticed on the Lhasa - Ch'ang-tu road.

5. Bridges and culverts. Bridge and culvert construction is an extremely important aspect of road construction in Tibet. Ferries and fords are utilized initially, but construction of bridges and culverts is necessary before the road can be used during all types of weather. Numerous bridge washouts were observed, an indication that many of the bridges were hastily and incorrectly constructed.

All concrete and steel is transported into Tibet at present, restricting construction of bridges to the sparse timber resources. Figure C-1 shows the areas near existing roads where trees are of sufficient stature and quantity for use in construction and repair of bridges and culverts. Bridges normally have wooden decks supported by rock cribbers masonry rock

FIGURE C-3 Virgin forest in Chamdo Province.

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FIGURE C-2a Realinement of a roadbed.

The importance with which the Chinese regard the bridges is reflected in the fact that they are reportedly kept under armed guard. The guards also are used to keep the bridges in a good state of maintenance.

Forty-four bridges over 100 feet long were located on the map sheets and are discussed specifically. Bridges and culverts less than 100 feet long have been counted on the sections of road where detail is sufficient for accuracy; these are reported in figure C-4.

b. Tunnels. The roads cling to the mountainside in many places, and tunnels could have been used advantageously; none were observed on the TALENT photography, however, and none have been reported in collateral sources. It is doubtful that any exist.

c. Fords. Fords are commonly utilized in the initial stages of road construction and are later replaced with bridges and culverts. They are most numerous on fair-weather roads, and those observed have been indicated on the individual map sheets. Stream widths and depths may vary greatly during the day because of thaw at mid-day. Fords may therefore be passable only a part of the day.

OBSERVED BRIDGES LESS THAN 100 FEET LONG

ROADS	SECTION	NUMBER OF BRIDGES
Lhasa to Ka-erh-mu	Lhasa to Yang-pa-ching.	80
	Yang-pa-ching to Nagchhu Dzong.	100
	Nagchhu Dzong to An-tu-mai-ma.	50
	An-tu-mai-ma to Northern Boundary.	50
Lhasa to Ch'ang-tu	Lhasa to Showa.	500
	Rau to Bonda.	75
	Bonda to Ch'ang-tu.	175
Bonda to Uya		30
Ch'ang-tu to Sangto		45
Tsethang to Yarlungto		50
Chimdin to Tsethang		225
Lhasa to Chimdin		35
Zhikatse to Rinpung Dzong		150
Zhikatse to Lhatse Dzong		275
Zhikatse to Gyangtse		120

FIGURE C-4

d. Ferries. Ferries are employed at unfordable stream crossings until bridges can be erected. Three important ferries were located on the Brahmaputra. They have been described individually in the body of the report and are indicated on the map sheets. These ferries appear to be components of floating bridge equipment. Extra equipment stored at each ferry site indicates that the ferries are converted to floating bridges during optimum periods. Each site is at a wide river crossing on an all-weather, 2- or 3-lane road.

FIGURE C-5a Ferry site

9. Way stations. Way stations are situated throughout Tibet to support the transportation system; these have been located on the individual map sheets. Way stations consist of rock-walled enclosures that contain one to five buildings and are located adjacent to the road.

Facilities include lodging for personnel, minor maintenance supplies and equipment, and POL for vehicles. Radio communication is available at many of the stations. In addition,

FIGURE C-6a Way station.

road-maintenance and bridge-guard units are probably located at many of these stations.

B. AIRFIELDS

Two airfields were observed in Tibet: the Lhasa Airfield and one at Nagchhu Dzong; others have been reported by collateral sources but only two of them are deemed probable -- one at Tingri Dzong and one at Rudog. These are plotted but no other information is available.

Air traffic is limited to small aircraft in Tibet because of the high elevation. Lhasa Airfield, the most important in the country, is the focal point of air traffic with China. It has only one operational runway, but another is under construction. The operational runway is 9,700 feet in length, equivalent to 4,000 feet at sea level.

The Nagchhu Dzong Airfield has an earth runway with no facilities. Airfields at Rudog and Tingri Dzong are probably being used to support the road construction and military garrisons within their respective areas.

C. RAILROADS

A railroad from Lan-chou to Lhasa has been proposed. It is reported that the route has been surveyed and will follow the Lhasa - Ka-erh-mu road, but no construction activity was observed on the photography. Construction of this railroad would greatly increase the supply capability of the Chinese in Tibet and would aid tremendously in economic development of the country.

D. WATERWAYS

The only navigable waterways in Tibet are the Brahmaputra, the Indus, and the Kyi, a tributary of the Brahmaputra. Navigation is restricted to small, shallow-draft native craft (coracles) because the rivers are only 2 feet deep in places. Operation of the boats is probably for short distances only. The Chinese boast of a successful inland waterway test-run by barge over the Brahmaputra and Kyi from Tsethang to Lhasa, indicating possible limited use of water transportation in the future. Construction of canals through the shallow places in the Brahmaputra and Kyi would make inland waterway transportation available to much of the population of Tibet. No extensive development of waterway transport is anticipated for Tibet in the near future, however.

III. SUMMARY

Road construction, which has had a high priority since the Chinese occupied Tibet, is expected to continue as a first-priority project. To impose the will of the Chinese Communists over the Tibetan people and also to develop the

[redacted]

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LOCATION	PAGE	ITEM
MISCELLANEOUS		
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Quarters and Supply Area for Borax Plant (31 48N 89 36E)	22	1
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NH-46		
Agricultural Center (29 41N 91 21E)	25	32
	46	A-16
Civil Encampment (29 33N 94 30E)	26	56
Landmark (29 24N 91 12E)	24	26
Landmark (29 11N 91 44E)	25	30
NH-47		
Agricultural Center (31 09N 97 09E)	28	3
CH'ANG-TU (31 10N 97 14E)		
Administrative Area	62	10
Civil Installation	62	11
NAGCHHU DZONG (31 30N 92 00E)		
[redacted] 25X1	51	1
LHASA (29 39N 91 06E)		
Agricultural Area	68	7
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Theater	72	36
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LOCATION	PAGE	ITEM
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ZHIKATSE (29 15N 88 53E)		
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Possible Civil Installation	64	6
Possible Civil Installation	64	7
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[redacted] 25X1	64	3
	64	9

25X1

25X1