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PLANNING OF UTILITIES, SERVICES AND COMMUNITY FACILITIES 'X' CANTONMENT

A DISSERTATION

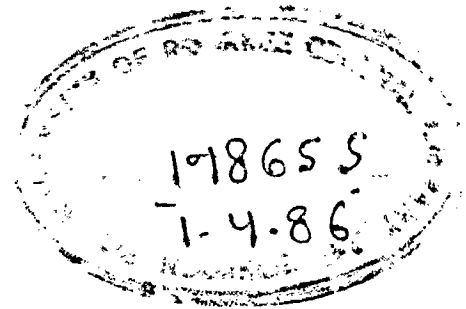
submitted in partial fulfilment of the
requirements for the award of the degree

of

MASTER OF URBAN AND RURAL PLANNING

By

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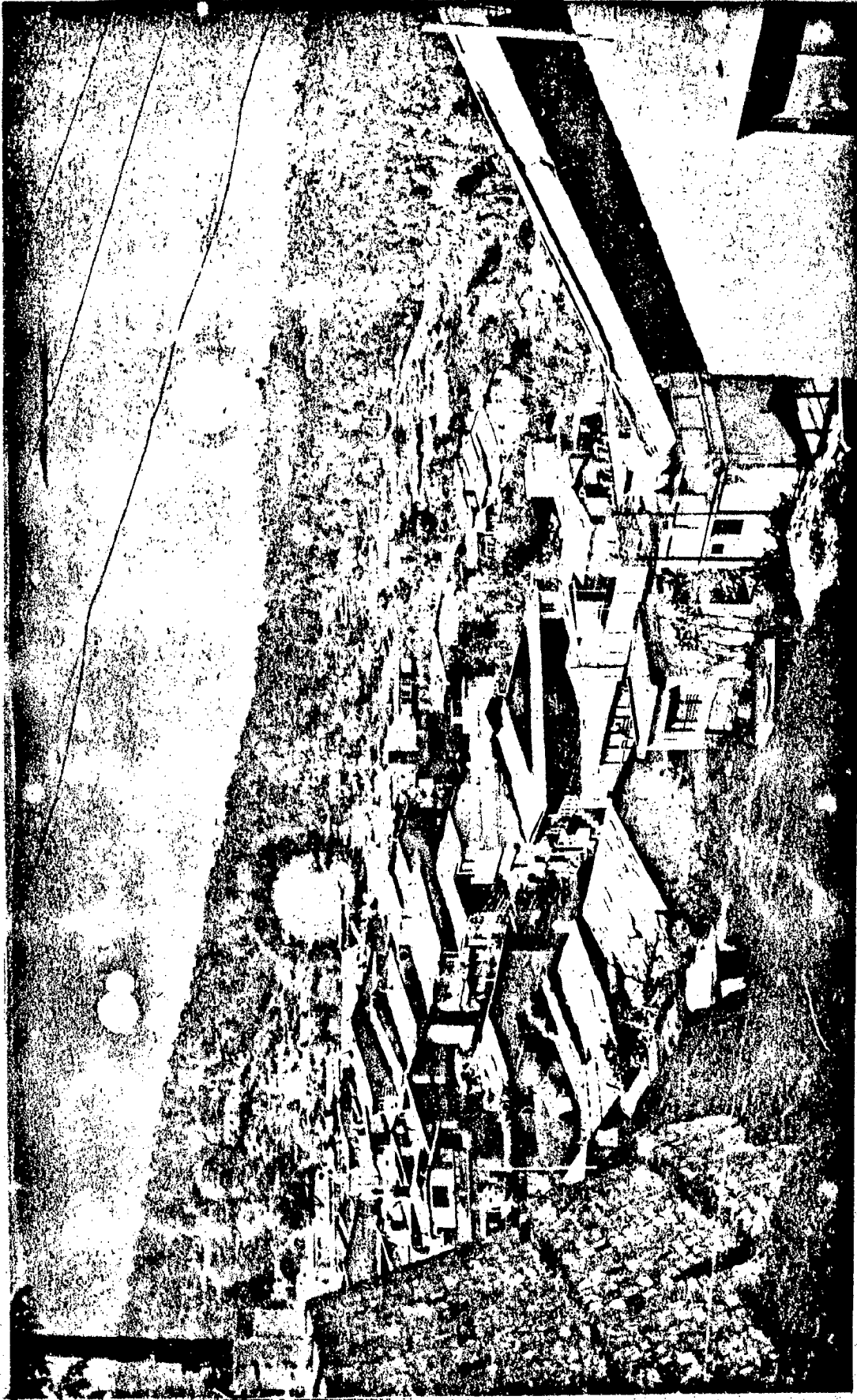
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PHOTOGRAPH, 1. DENSELY DEVELOPED CIVIL AREA — CONGESTEDNESS

'A Cantonment is [essentially] a town or a city planned with a military bias, for a defence establishment. While it must provide for the defence personnel all the essential concepts of an urban city, yet at the same time it must ensure and provide facilities for [their] efficient training'.¹

So the amenities and facilities of the army area must be fulfilled with the prime requirement for the provision of efficient training. The facilities of civilian population which is 60.74% of the total population was being maintained by the Cantonment Board.

¹ Engineer Technical information No.16 'Manual on planning of Cantonment', Published by E in C's Branch, Army Headquarters, P.I.

CHAPTER-2

IDENTIFICATION, SCOPE AND OBJECTIVES OF THE STUDY

2.1 IDENTIFICATION OF THE PROBLEM

The unimaginable growth of the existing four Metropolitan cities of Delhi, Madras, Bombay and Calcutta, had prompted the Government of India to develop medium and small towns having a population of about 20,000. In addition, my zeal for the study of a Cantonment in a hilly terrain encouraged me to choose the present X-Cantonment for my thesis research.

In general no feed back studies are made for such towns, to know the facilities provided by Cantonment Boards under the guidelines of the army authorities to civilians, who are helping the authorities directly or indirectly. The accessible range of the town, its population, area and data has given me encouragement, to study and know the interlinkages and influences which the Cantonment exerts on the development of the civilian areas and how in return these areas respond to their own needs and the needs of the resident army personnel and their dependents.

2.2 SCOPE, OBJECTIVES AND LIMITATIONS OF THE STUDY

The selected cantonment is situated in a hilly terrain and is catering to a variety of needs of the surrounding areas as a service town. Since, it is basically a Cantonment, it has rigid rules and regulations of development and planning. The scope of the work is to bring out the deficiencies of the following areas while studying the existing conditions.

1. Study of the existing natural drainage system as per topographical nature of the area and its relation with the overall development, isolating any adverse affects of development on the natural ecology.
2. Critical evaluation of existing water resources, supply conditions, system of distribution and its further development.
3. Study of refuse and sewage disposal system, impact of climatic conditions and problems evolved.
4. The partial study of Electric power and communication system in this area.
5. Critical analysis of the commercial and public services e.g., banks, post offices, police stations etc. their problems and distribution as per the dispersion of the population.
6. Critical analysis of educational and medical institutions with reference to its impact on the region, as the town is Tehsil Head Quarters.
7. The physical dispersion of the Community facilities in relation to the population distribution.

CHAPTER-3

MANAGEMENT AND FINANCING

3.1 INSTITUTIONAL SET-UP OF THE CANTONMENT BOARDS

Cantonments are classified into three types:

- i) Class I Cantonments are those in which civil population exceeds Ten thousand.
- ii) Class II Cantonments are those in which the civil population exceeds Two thousand five hundred, but does not exceed ten thousand.
- iii) Class III cantonments are those in which the civil population does not exceed Two thousand five hundred.

The X-Cantonment is a class II Cantonment and is in the process of being upgraded to class I. The administrative authority of the area is the Cantonment Board. It consists of 6 elected members, 3 Ex-Officio members and three nominated members. The present civil population is 11049 (1981 Census). The matter for upgradation is under active consideration.

Similar to the Municipalities, the Cantonment Board also has Duties and Discretionary functions like maintenance of streets, supply of potable water, provision of Sanitary facilities, maintenance of public parks, and buildings, etc.

3.2 ROLE OF THE CANTONMENT BOARD

By knowing the function of the cantonment Board for the provision of utilities, services and community facilities, we would know its role in providing the amenities to the civil population.

To make reasonable provisions within the cantonment, the Cantonment Board's Duties and discretionary functions are as follows²,

3.2.1 Public Utilities

- a) Lighting streets and other places.
- b) Watering streets and other public places.
- c) Cleaning streets and other public places, and drains, abating nuisance and removing noxious vegetation.
- d) Providing or arranging for a sufficient supply of pure wholesome water.
- e) Establishing and maintaining a farm or other place for disposal of sewage.
- f) Constructing, establishing, or maintaining public parks, offices, washing places, drinking fountains, tanks, wells, and other works of public utility.

3.2.2 Community Facilities

- a) Construction, Altering, maintaining streets, culverts, markets, slaughter-houses, latrines, privies, urinals, drains, drainage, etc.
- b) Establishing and maintaining or supporting public Hospitals and Dispensaries and providing public medical relief.

² Misra R.N. "The Cantonment Act 1984" (Act No.21924)
(As Amended by Act No.15 of 1983 dated 28.8.83) pp.51-53.

- c) Establishing and maintaining Primary Schools.
- d) Establishment of remunerative projects.

3.2.3 Public Services

- a) Provision of Security.
- b) Rendering assistance in extinguishing fires, and protecting life, and property when fires occur.
- c) Laying of new roads etc.

3.3 INCOME AND EXPENDITURE OF CANTONMENT

Management and Financing play an important role in the efficient functioning and operation of any and all community facilities, Public utilities and services. The study of income-expenditure of various years and money spent for the provision of various facilities, reflects the existing situation of Cantonment.

Income and expenditure with reference to actual income, incurred from the collection of taxes, etc., is given in the Table (1). In the Fig.1, the curve of total income is showing sharp increase from 1981. Where as the curves plotted with the income from personal sources and expenditure, these are relatively gentle. The closeness of the curves of total income and expenditure upto 1981 indicates, that these are within limits. When the curves of the total income, (including Central Aids) and actual income are observed, there is much variation from year to year. There is a sharp increase in total income curve and mild increase in the actual income curve. This reveals

TABLE-I INCOME AND EXPENDITURE AT GLANCE

YEAR	1975-76	1976-77	1979-80	1980-81	1982-83	1983-84	1984-85
	Rs. ps.	Rs. ps.	Rs. ps.	Rs. ps.	Rs. ps.	Rs. ps.	Rs. ps.
ACTUAL INCOME	19,48,410.00	20,59,072.00	25,43,961.00	25,51,042.00	42,26,389.00	47,41,311.00	61,80,276.00
EXPEN-DITURE	17,88,767.00	17,91,983.00	23,92,374.00	23,12,162.00	38,93,513.00	43,89,033.00	45,66,547.00
INCOME FROM TAXES ETC.	13,20,014.00	18,05,479.00	22,18,181.00	23,60,449.00	23,80,775.00	30,02,753.00	32,20,876.00

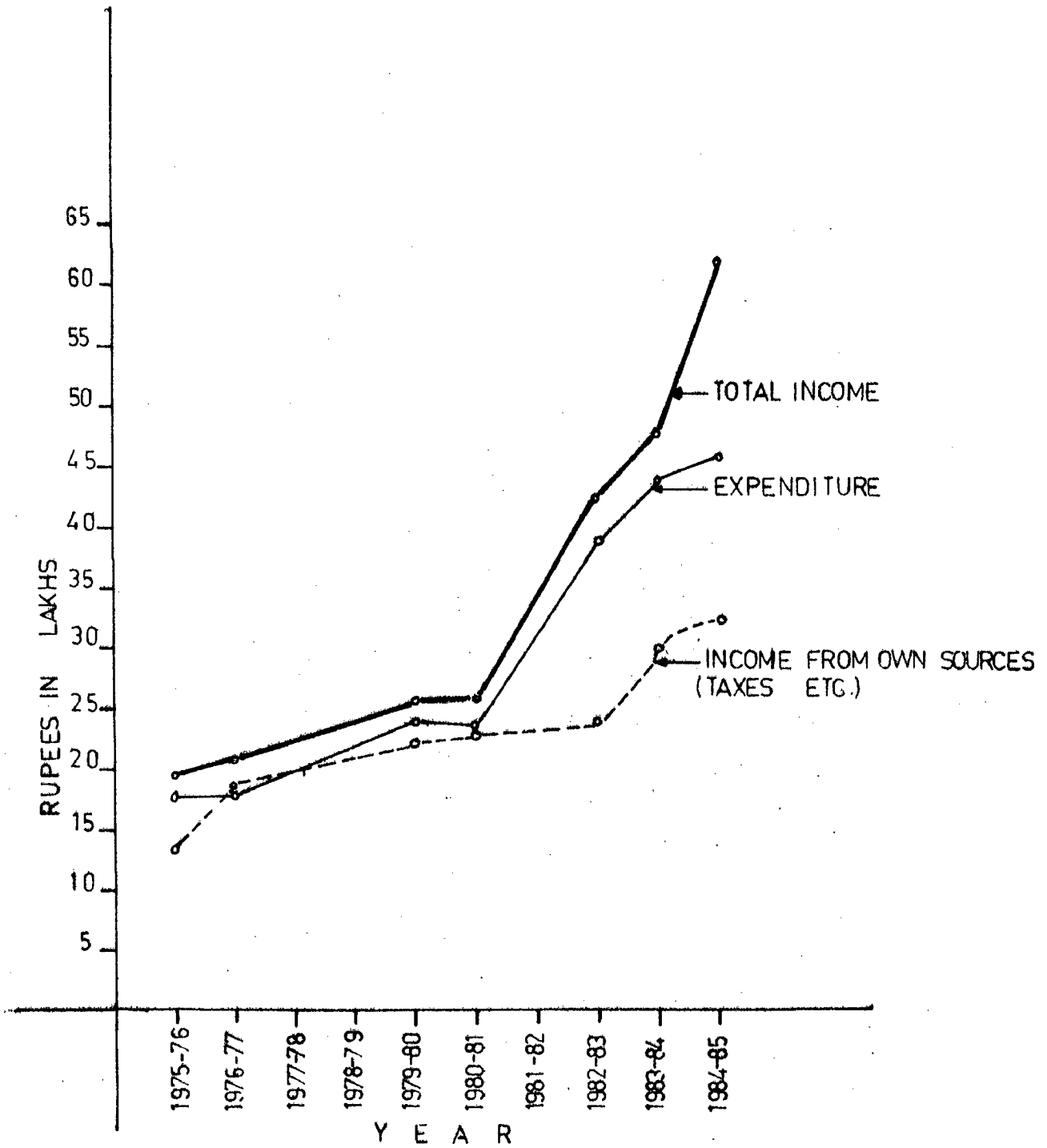


FIG.1. INCOME-EXPENDITURE OF CANTT. BOARD

that the Cantonment Board is unable to tap revenue from its own sources, even though taxation is higher with reference to other neighbouring municipalities. As shown in Appendix-4, the house tax and water tax collected by the Cantonment Board is 10% where as in the neighbouring municipality it is $5\frac{1}{2}\%$ and 6% respectively.

From the Appendices (1) and (2) we come to know that major importance was given to the utilities, specially the constructions of water reservoirs. For example in 1985-86 Rs.43.75 lacs are likely to spend only on the improvement of basic facilities like water supply, number of conservancy vehicles, construction of public latrines and street lighting. This is 95.75% of the present total expenditure of Rs.45,66,547/-. That means in the coming years, major expenditure is going to be on utilities. In addition to all of these, the 8.33% of the expenditure is utilised for maintainance of different amenities as shown in Appendix-(3), which indicates the prominence given to the development of amenities.

CHAPTER-4

POPULATION DISTRIBUTION AND ITS RELATION TO UTILITIES,
SERVICES AND COMMUNITY FACILITIES4.1 INTRODUCTION

For planning and assessing the adequacy or inadequacy of utilities, services and community facilities it is imperative to know about the inhabitants for whom these are meant. Therefore, a concerted study of the characteristic of the population and its dispersion in the settlement follows hereunder.

4.2 CURRENT DISTRIBUTION4.2.1 Total Population

The most important factor in the planning of a city or a town is the magnitude, character and composition of the population. According to 1981 census the total population of the cantonment was 18190. The growth of the population in various decades is shown in the Table (2).

The percentage increase of population is more fluctuative upto 1961 and thereafter it became almost constant and was about 30%. But when the average of the percentage increase throughout the decades from 1921 to 1981 was calculated it came 32%. This indicates that the future percentage increase can be taken at 30.74% on an average, considering only last two decades.

TABLE: 2 DECADAL POPULATION GROWTH OF CANTONMENT

Year	Population	Population growth	% Increase
1921	3632	-	-
1931	3772	140	3.85
1941	4894	1122	29.75
1951	8937	4043	82.61
1961	10,642	1705	19.08
1971	13,917	3275	30.77
1981	18,190	4273	30.70

As it is a cantonment the population can be divided into two parts, namely Civil and Military. The civil population is 60.74% of the total population. The total area of the cantonment is 1725 hectares and thus has a gross population density of 10.54 person per hectare. Major portion of the town is covered with forest and unbuidable steep slopes. Therefore, development is concentrated on limited amenable slopes as shown in the Map (1). Here the maximum density of population is 161 persons per hectare as per ward wise distribution. In the ward number five the population density of 5.4 persons per hectare is the lowest because major portion is covered with unbuidable land.

As per 1971 census 85.38 percent of the population consisted of Hindus and second and third positions were occupied by Muslims and sikhs with 9.29 and 2.6 percent respectively and rest 2.7% are others, as shown in the Table (3).

MAP NO. 1

PLANNING OF UTILITIES, SERVICES
AND COMMUNITY FACILITIES -
X CANTONMENT

POPULATION DISTRIBUTION

WARD	AREA	POPULATION	DENSITY
1	8-8	1461	166-3
2	182-0	3772	19-2
3	280	2159	76-9
4	23-1	1952	84-5
5	1118-5	6033	5-4
6	263-7	2873	8-1

POPULATION DISTRIBUTION

(i) AREA IN HECTARES
(ii) DENSITIES IN PERSONS/HECTARE

SCALE
0 500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
9500
10000

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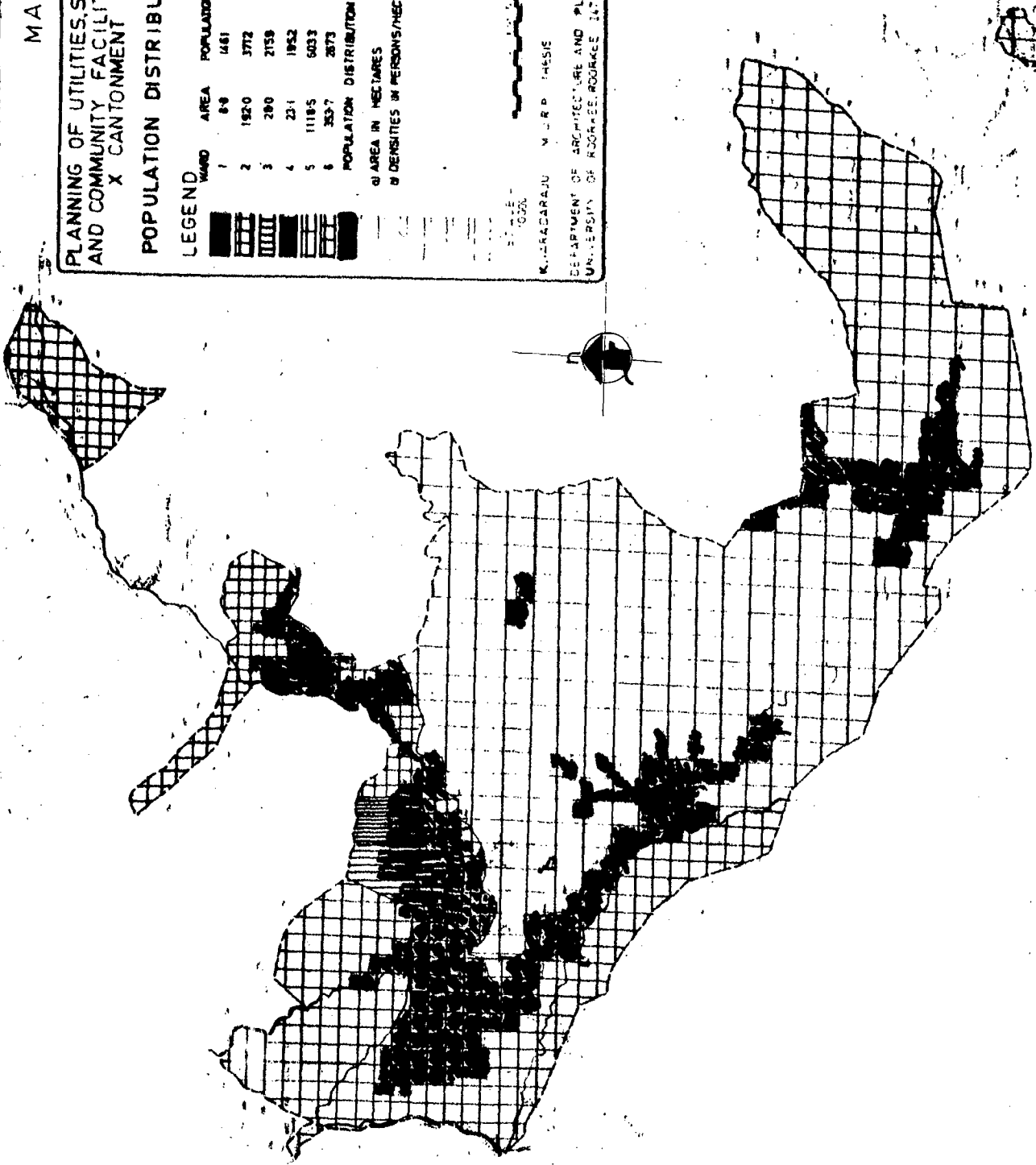


TABLE : 3 RELIGION WISE BREAKUP OF POPULATION IN PERCENTAGE
OF CANTONMENT (1971 Census)

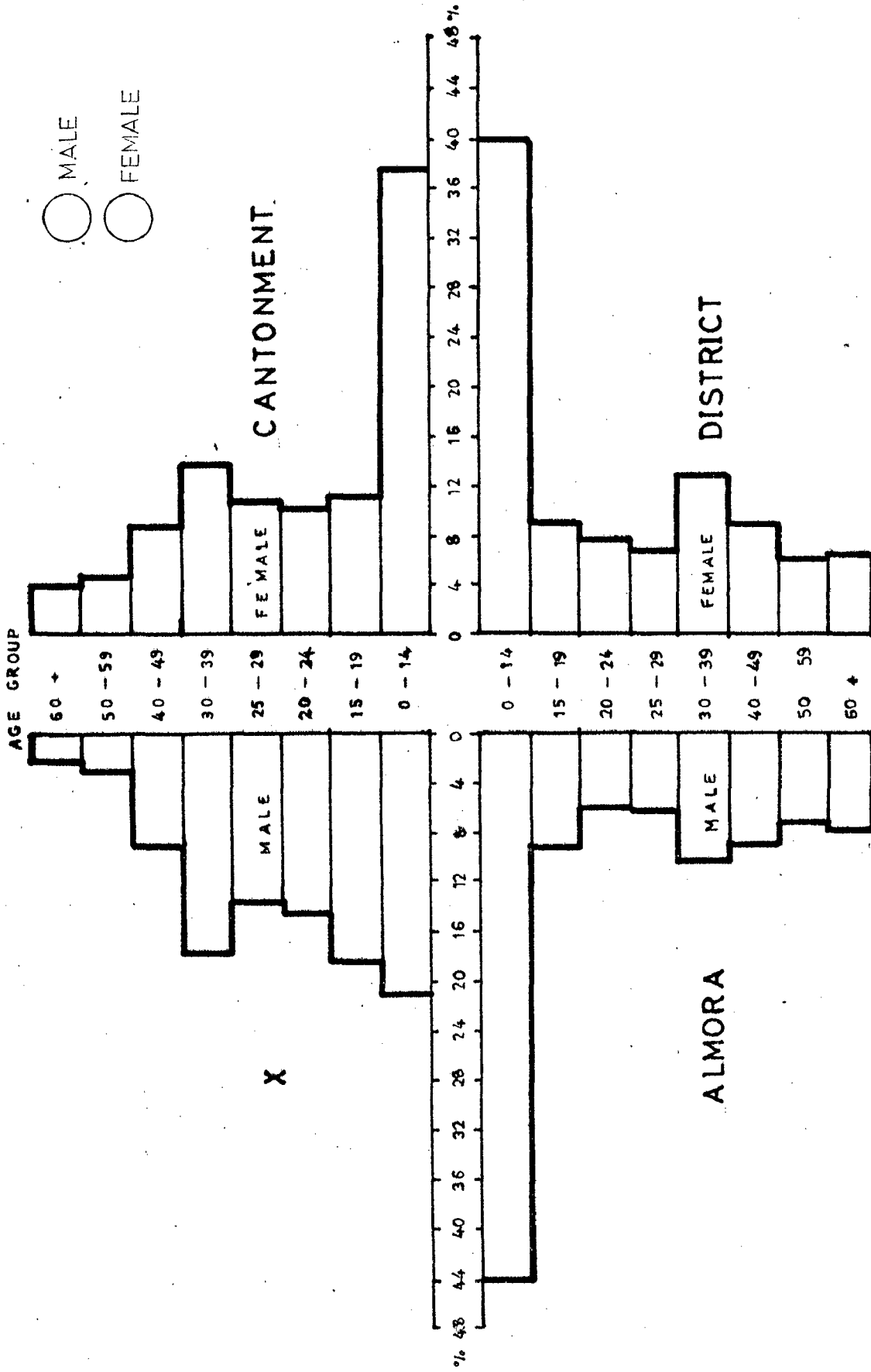
S.No.	Religion	Percentage to total population
1.	Hindus	85.38
2.	Muslims	9.29
3.	Sikhs	2.6
4.	Christians	2.57
5.	Jains	0.115
6.	Buddhishi	0.043

4.2.2 Population differentiated into subgroups to suit particular function

4.2.2.1 Age-sex ratio

The study of age-sex ratio is very important for the provision of medical, educational, and other like facilities. To find out the needs of different age groups, it is important to study the age structure of the population. The cantonment possess 473 and 489 females per thousand males as per 1971 and 1981 census respectively. In the same period number of males to thousand females are more than 1000 in its Tehsil and sistrict. The age-sex pyraonid was shown in the fig. (2) with reference to the total district. The school going children of age-group 0-15 years constitute 26.33% of the total population and 70% are in the age-group 16-60 years doing service.

FIG.2.AGE-SEX RATIO 1971



SOURCE DISTRICT CENSUS HANDBOOK ALMORA DISTRICT 1971

4.2.2.2 Litracy

A literate person is considered to be one who can read and write though he may not have recieved any formal school education. The study of the litracy ratio of various years gives an idea for the assessment of necessity and requirements for the provision of educational institutions. Table (4) and fig. (3) give the litracy rate of the cantonment with reference to it's District and Tehsil.

TABLE : 4 LITRACY RATES FOR ALMORA DISTRICT, X-TEHSIL
ALMORA U.A. AND X- CANTONMENT 1971-1981.

Sl. No.	Name of place	Litracy 1971			Litracy 1981		
		Total	Male	Feamale	Total	Male	Fema
1.	Almora district	28.08	45.89	11.53	37.76	56.66	20.77
2.	X-Tehsil	26.65	44.08	11.42	39.66	60.70	20.98
3.	X-Cantt	66.32	76.23	45.39	76.47	85.27	58.28
4.	Almora UA	72.11	79.47	61.31	78.33	84.13	70.78

As shown in the table (4) the litracy rate of the moles increased from 76.23% to 85.25% during 1971 and 1981 and 45.39% to 58.28% in females, unlike other areas of the district. This shows the tendency of increasing pressure for the provision of additional educational institutions.

4.2.2.3 Economic status

The study of the economic status of the town is necessary to see as to whether the facilities provided by

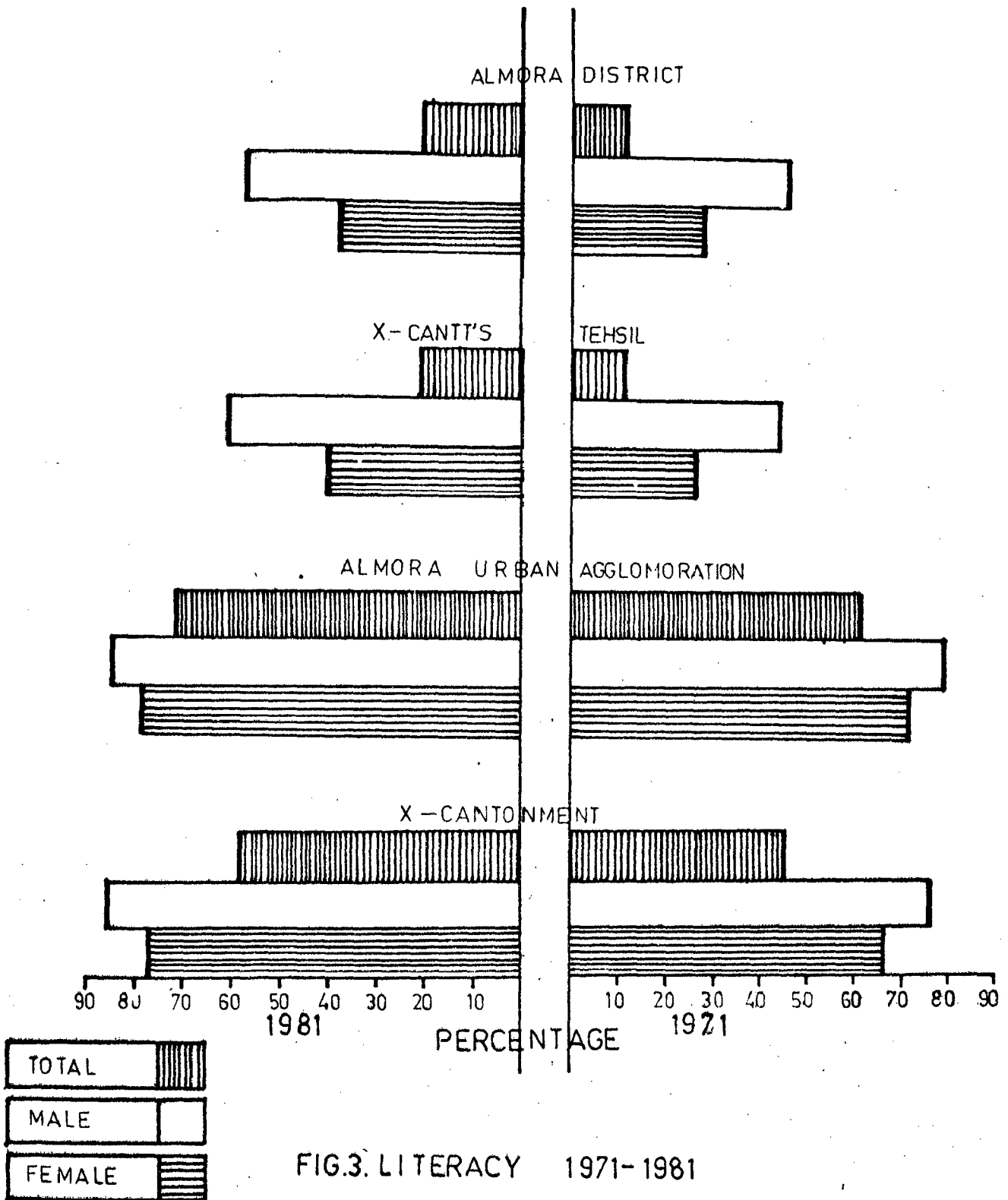


FIG.3. LITERACY 1971-1981

the authorities were affordable by the population. The occupational structure, in table (5) reveals that more than 90% of the population, is engaged in service and others. While the occupation of the primary and secondary sectors of the contonment is very less virtually negligible while in its Tehsil and district Almora population is primarity dependent on the primary sector as is shown in Fig. (4) and Appendix (5). The results of the house hold survey revealed that, a household's average monthly income is Rs. 1024.18 amongst civil population and Rs. 927.22 amongst Army. For the whole town the average works out to Rs.982.82 per household.

TABLE 5 : COMPARATIVE STATEMENT OF OCCUPATIONAL STRUCTURE

Sl. No.	Name of place	Primary Secondary sector		Service and Non workers others			
		1971	1981	1971	1981	1971	1981
1.	X cantt	7.47	6.21	92.53	93.80	116.61	126.67
2.	X Tehsil	87.42	79.21	12.58	20.79	141.03	190.96
3.	Almora UA	12.42	8.01	87.59	91.99	244.68	230.83
4.	Almora District	87.05	76.37	12.95	23.63	157.44	217.37

Note Total workers taken 100

4.2.2.4 Floating population

Upto now we have discussed regarding the general population trend only. Another factor which must be considered is that of floating population, the population coming

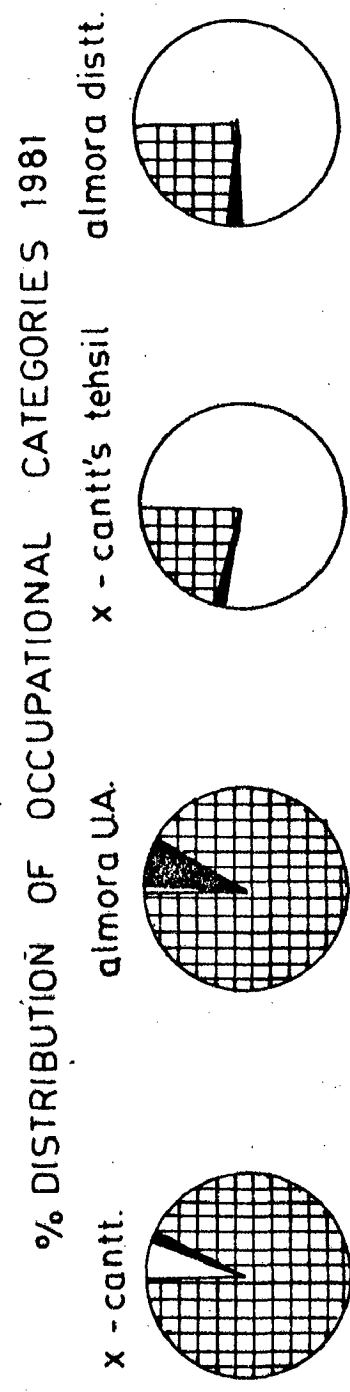
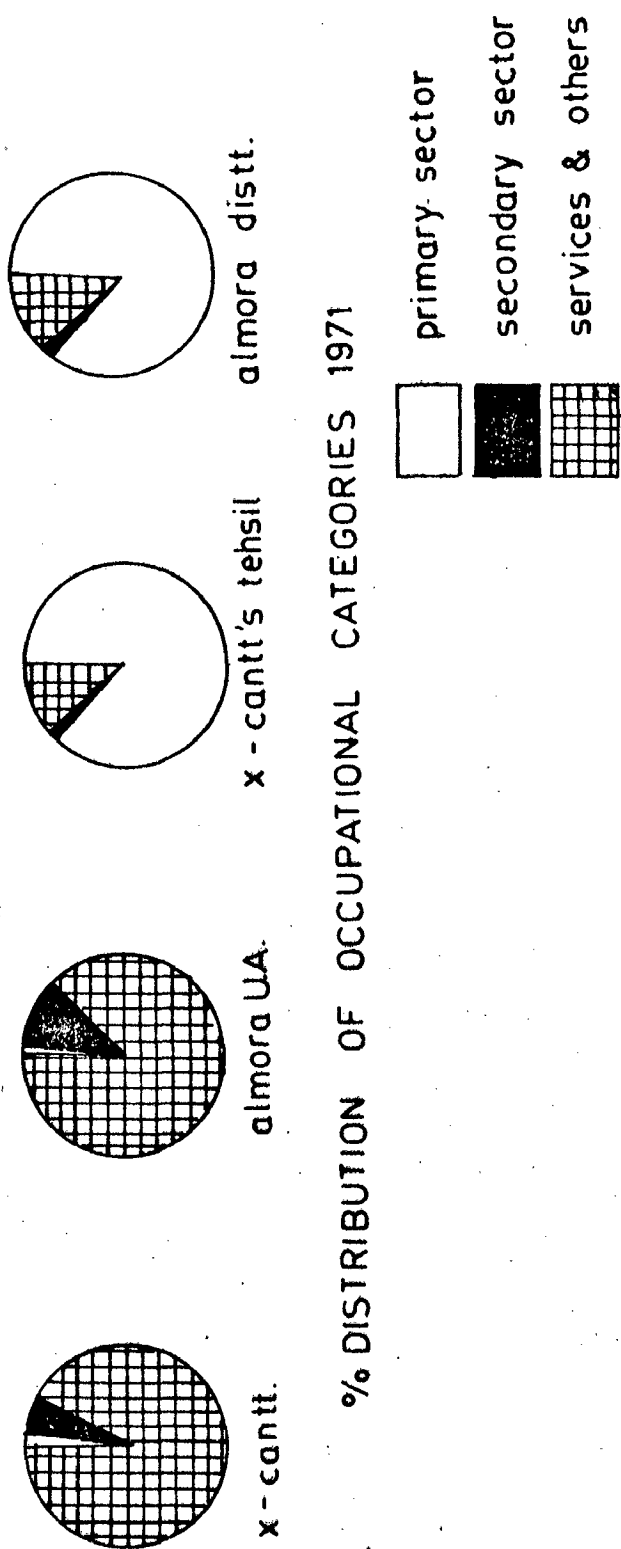


FIG.4.

source : district census hand book 1971 & 1981.

to the town as visitors, tourists, or those coming for shopping or merely passing through and spending a small time in the town. Appendix (6) gives the population passing through cantonment in various months. In 1984 the floating population varied from 477 persons/day to 1400 persons/day i.e. 3% to 8% of the population is adding to the original population in lean and peak months respectively. Further the Fig.(5) shows clearly that the peak months in which the cantonment has provide facilities.

4.3 POPULATION PROJECTION

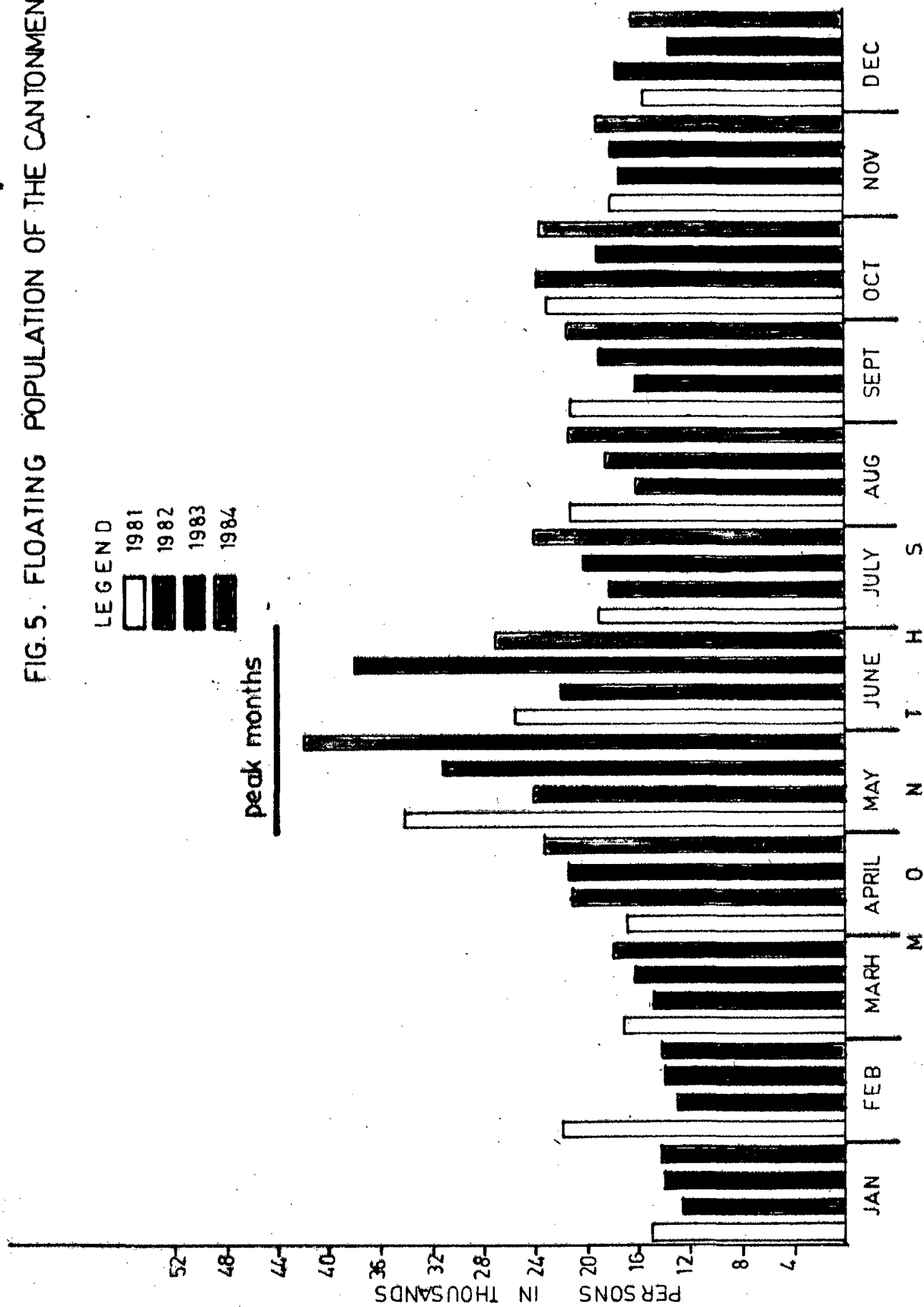
4.3.1 Total Population

For the population projection there are three popular methods. All of them are tried and the results are as follows:

1. By using Arithmetic mean method population in the year 2001 works out to 25738.
2. By using Geometrical Increase method it works out to 31085.
3. And by using Graphical method it works out to 31000 (As shown in Fig.6).
4. Number projected by the cantonment authorities is 31005.

In this above three projected values (1) is very low and different from that of other values. The population projected by geometrical and graphical methods are more or less same and is very close to the one estimated by the authorities. As No.2,3 and 4 are close to each other, the average value of those three was considered. Therefore,

FIG. 5. FLOATING POPULATION OF THE CANTONMENT



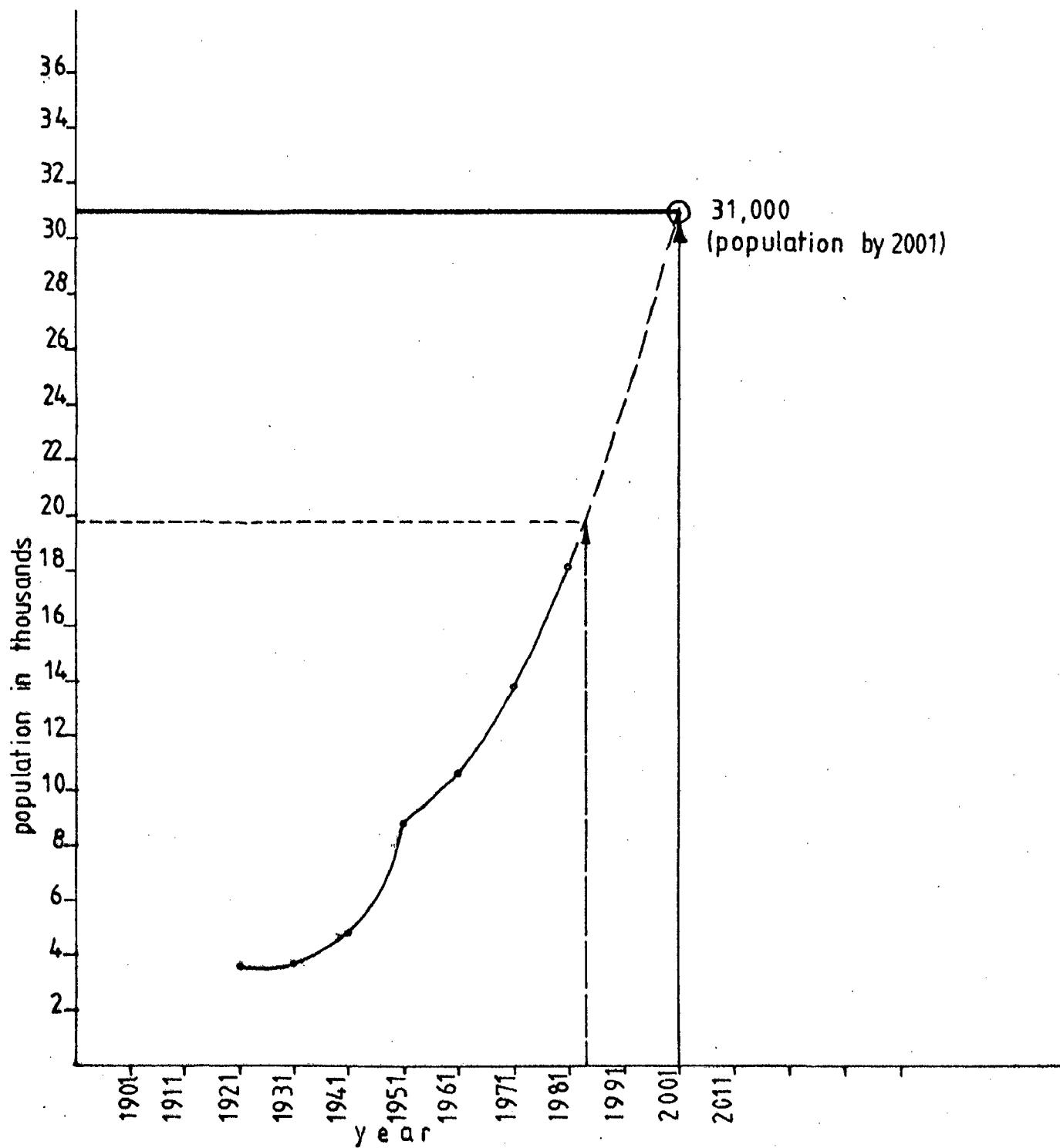


FIG.6. POPULATION PROJECTION FOR 2001

the population of the cantonment, by 2001 AD is taken to be

$$\frac{31085+31000+31105}{3} = 31063.3 \text{ persons Say } 31000 \text{ persons.}$$

4.3.2 Classification of the population

The cantonment population can be classified mainly into two groups, namely, Army population and Civil population. For some amenities, we are concerned only with the civil population. As shown in the table (6) the civil population is 63.73% and 60.7% in 1971 and 1981 respectively. On an average 62.235% total are civil population so the civil population in the cantonment works out to 19292 for the year 2001.

TABLE : 6 CLASSIFICATION OF CANTONMENT POPULATION.

Year	Total population	Civil population	Percentage
1971	13917	8869	63.73
1981	18190	11049	60.79
* 2001	31000	19292	62.235**

NOTE

* Predicted population

** Average of percentages of previous two decades.

CHAPTER-5

PUBLIC UTILITIES

5.1 INTRODUCTION

Public utilities have direct impact on the public health and welfare of the inhabitants. In India, the most of the services are governed either by the Central, State or Local Governments. In this chapter I am dealing with Water Supply, Sanitation, Power Supply and Communication Systems. I am also discussing topography and natural drainage pattern, as this is important in dealing with sanitation and for the provision of various facilities.

5.2 DRAINAGE AND ITS RELAVANCE TO UTILITIES

In the process of selecting the site, development or redevelopment of any settlement, studying natural drainage pattern of area is important, Specially in the planning of sanitation, the study of topography, geologic structure of the area is essential. As the cantonment is in a hilly region, there are moderate to steep slopes. There is very less flat area for development and maintenance of the drainage as they follow natural pattern. Factors that determine drainage requirements include Land use, size of area to be drained, types of soil, vegetation cover, and intensity and duration of rainfall.

5.2.1 Underlying rocks and soil

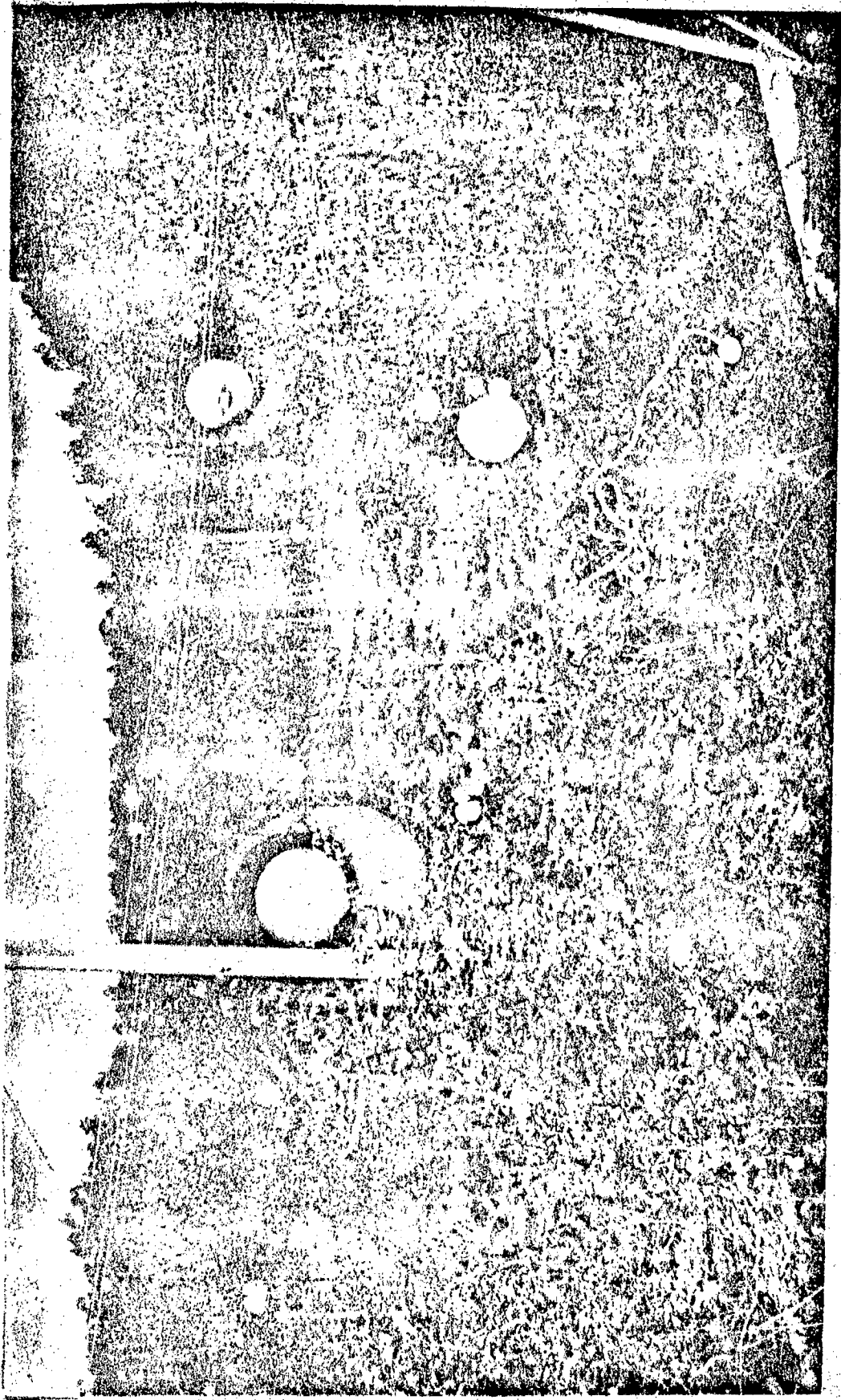
The underlying rocks of cantonment, are mainly schist with mica almost always conspicuous . Bands of quartzite are found among the schists, Both schists and gneiss are good building stone, the former is easily workable and the latter which is of strongly granite type makes handsome building stone.

The hills are cut for the construction of roads. Thus photo No.3, taken at such point is, exposing the existing state type of rock structure underlying.

5.2.2 Existing natural drainage system

As shown in the contour map (2), the highest altitude, of the town at Chaubattia area, is 2116 m (MSL) and the lowest 1585 m (MSL). The south-west of the town is having steep slopes. So there is not much development. There is civil development on the north, where there is a moderate slope. Thus the storm water collected in the residential areas follow the slopes and finally merge with the natural streams. Very few patches have gentle slope, where the parade grounds are carved out for training the army.

As far as slopes are concerned no classification is universally applicable. WilliamM.Marsh says that there are four slope inclination categories:












PHOTOGRAPH . 2. HIGH-TENSION POWERLINES PASSING THROUGH CANTONMENT FOREST AREA



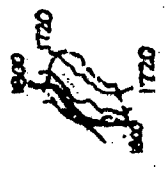
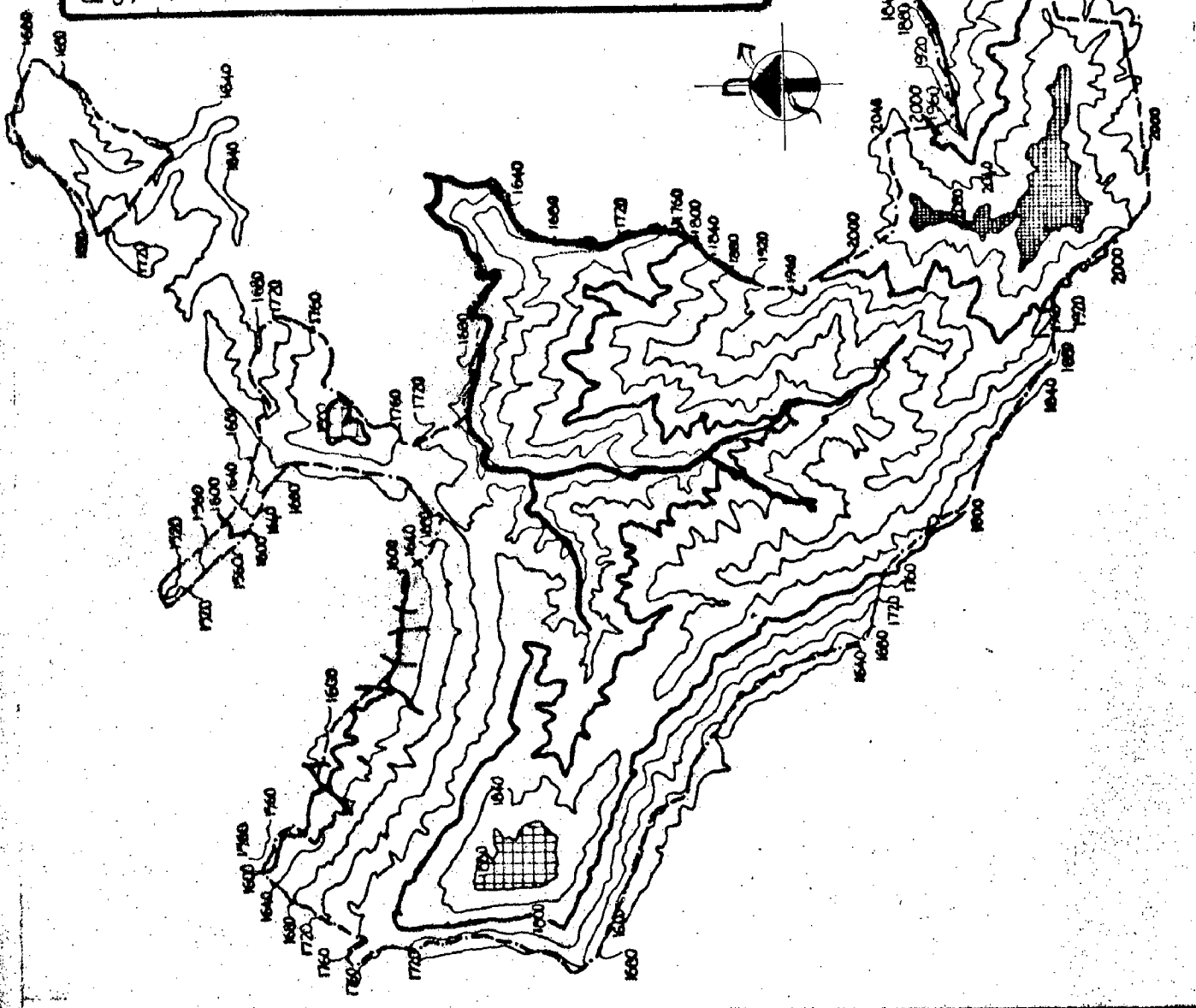
PHOTOGRAPH. 3. CUT-OUT FOR ROAD CONSTRUCTION, EXPOSING
LAYERS OF SCHISTOSE

MAP NO 2

PLANNING OF UTILITIES
SERVICES AND COMMUNITY
FACILITIES X CANTONMENT
CONTOUR MAP
LEGEND

-  HIGHEST PEAK 2000 m (M.S.L)
-  MEDIUM 1 1800 m (M.S.L)
-  LOW 1800m (MSL)
-  40m INTERVAL CONTOUR
-  100m INTERVAL CONTOUR
-  RIVER / NALLAH
-  BOUNDARY LINE
-  HIGHEST CONTOUR 2000 m
-  LOWEST CONTOUR 1520 m

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PLANNING U O R ROORKEE 247 867(U.P.)



- 1) Very steep ($0 > 25^\circ$). If disturbed by construction processes or forest removal, wide spread failure is highly probable.
- 2) Steep ($15^\circ - 25^\circ$) if plant cover is removed, the slope is highly susceptible to erosion and gully formation.
- 3) Moderate ($5^\circ - 15^\circ$) will support residential and agricultural land uses, however if misused, it is definitely susceptible to serious erosion.
- 4) Gentle ($< 5^\circ$) for the terrain, this slope will sustain the most intensive use and with least managements.³

5.2.3 Protection and Conservation

Regarding protection and conservation of the area, the authorities must be very conservant of the development as the cantonment is in a hilly region. More than 70% of the cantonment area is covered with the forest. These forests are well protected by the army authorities as they are essential for army training. No land slide was reported in the cantonment area for the last 50 years.

5.3 WATER SUPPLY

Water is an essential commodity for the survival of living beings. The traditional tendency, that drinking

³William Mersh M., 1978 Environmental Analysis for land use and site planniry, McGraw Hill Book Company. Flint pp66-68.

water is a gift of nature and must be supplied free of cost, has changed, particularly in urban centres due to the fast growth of urbanisation. Drinking water has become scarce, contaminated and nonpotable causing health hazards. Thus, the intervention of the public authorities has become inevitable, so as to make necessary investment, for accumulation of potable water from various available sources and distribution to the public.

5.3.1 Current Status of the Water Supply

5.3.1.1 Sources

- a) Gagas river
- b) Springs at Nagpani
- c) Bhalukhud dam
- d) Kalu Gadhera river
- e) Mint and X-Springs

In this area there is no water available in bulk from one source. For example Kalu Gadhera dam, as shown in the Photograph (4), has a small reservoir.

5.3.1.2 Treatment

The Cantonment has treatment plants at Nagpani water works, and at Kalugadhera. In both the places treatment is done by chlorination, sedimentation and filtration.

5.3.2 Collection and Distribution System

Water has to be collected from the various sources in order to meet the demand. As shown in the map (3) reservoirs



PHOTOGRAPH.4. KALUGADHERA DAM — ONE OF THE SOURCE OF WATER SUPPLY

MAP NO.3

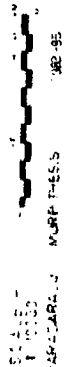
PLANNING OF UTILITIES SERVICES AND COMMUNITY FACILITIES — X CANTONMENT

WATER SUPPLY FACILITIES (WATER SUPPLY SYSTEM)

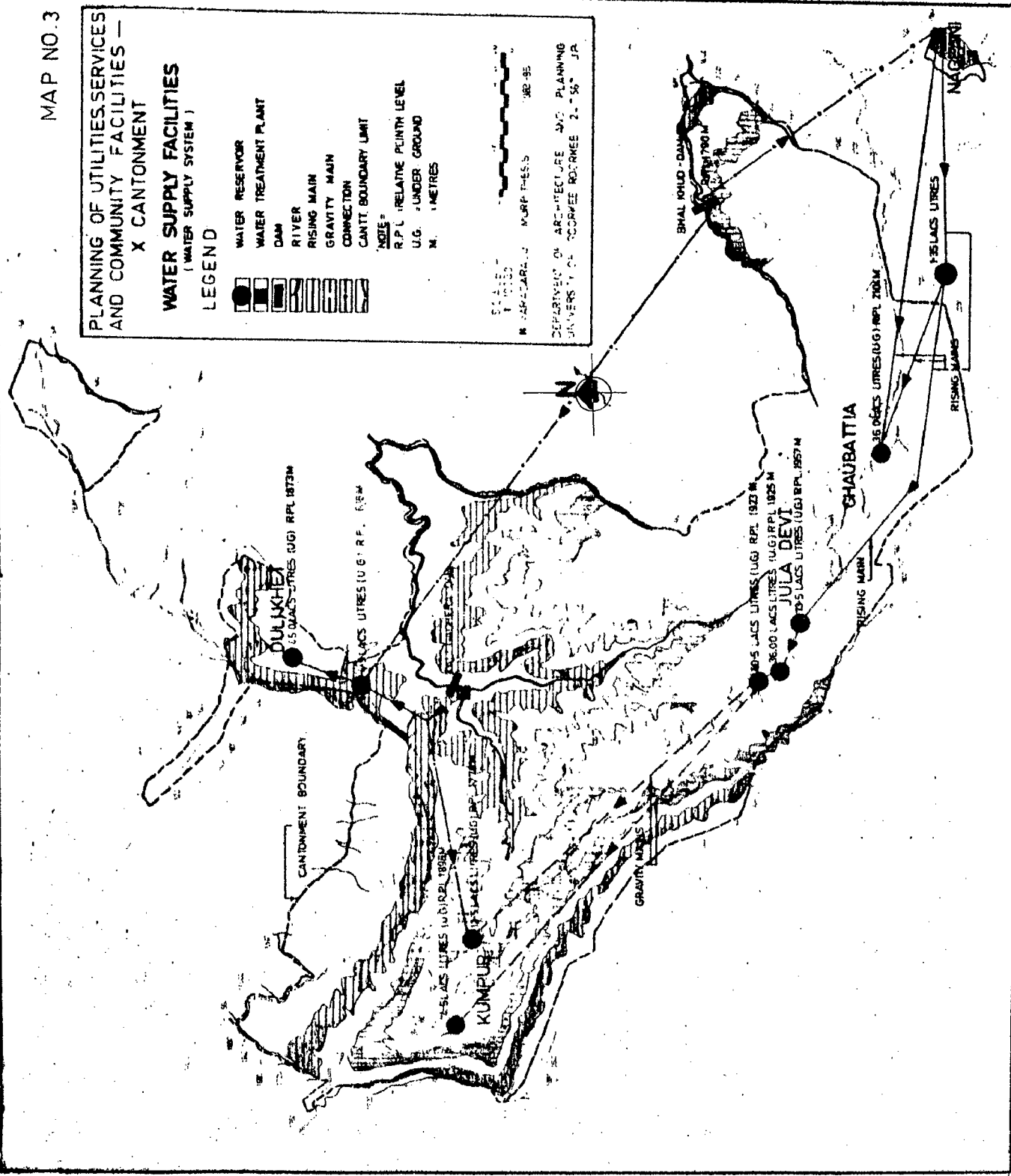
LEGEND

- WATER RESERVOIR
- WATER TREATMENT PLANT
- DAM
- RIVER
- RISING MAIN
- GRAVITY MAIN
- CONNECTION
- CAN'TT. BOUNDARY LIMIT

NOTE —
 R.P.L. - RELATIVE PINTNTH LEVEL
 U.G. - UNDER GROUND
 M. - METRES







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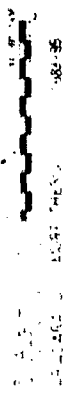


MAP NO. 4

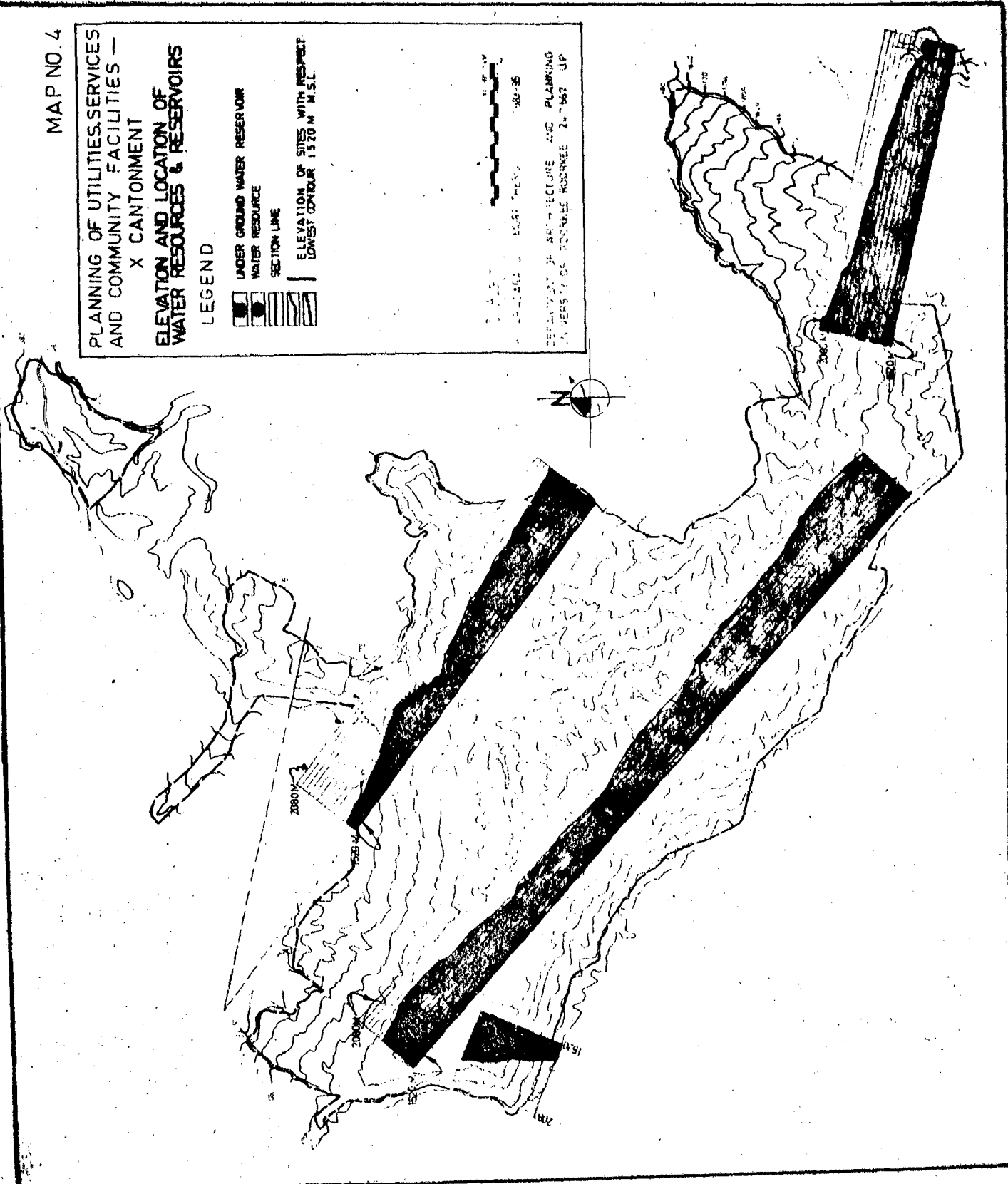
PLANNING OF UTILITIES, SERVICES
AND COMMUNITY FACILITIES —
X CANTONMENT
ELEVATION AND LOCATION OF
WATER RESOURCES & RESERVOIRS

LEGEND

-  UNDER GROUND WATER RESERVOIR
-  WATER RESOURCE
-  SECTION LINE
-  ELEVATION OF SITES WITH RESERVOIR
LOWEST CONTOUR 1570 M. M.S.L.



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were constructed in varying capacities at various levels.

From Nagpani water works, water is supplied to Chaubattia and to major reservoirs at Jula devi temple with rising mains as shown in the map (3). The reservoirs at various places in the populated lower areas, are fed by the major reservoirs situated at Jula devi Temple, by gravity mains. Then the water is supplied to consumers. Similarly, Dulikhet and Bazar areas reservoirs are fed by Gagas river and Kalu Gadhera river.

5.3.3 Demand and Supply

As given in the Table (7) the total bulk demand of water, to the needs of the public is 6.45 lakh gallons per day. But only 4.45 Lakhs gallons per day is available i.e. there is deficiency of 2 Lac gallons per day.

Table 7 WATER CONSUMPTION AND AVAILABILITY FOR CANTT AREA

S. No.	STATION	FUTURE REQUIREMENT AS PER KLP	PRESENT REQUIREMENT LGPD	AVAILABILITY LGPD	DEFICIENCY	
					PRESENT LGPD	KLP LGPD
1.	X-Cantonment	9.856 LGPD	6.45	KALUGADHERA -0.70	2.00	5.45
				BHALUDAM -1.25		
				UP JALNIGAM -2.50		
TOTAL		-	-	4.45		

Note: LGPD - Lakh gallons per day

KLP - Key location plan

SOURCE: CANTONMENT ANNUAL REPORT

In order to compare with standards of per capita demand, the conditions of this town is entirely different because of its altitude and climate. In general the per capita demand advocated by the various organisations are as follows.

- a) Manual of water supply and treatment (II ed.). Published by Ministry of Works and Housing 1976, prescribes that per capita demand for population, 10,000 to 50,000 is 100 to 125 litres/head/day.
- b) The ISI (Times of India, Sunday August 11, 1985) has fixed the minimum water supply requirement is 200 litres per head per day.
- c) Further the same publication as described above at (a) prescribes the minimum supply should be 70 litres per head per day.

In addition to all of these standards, U.P. Jalnigam (hills) prescribed the standard to be 150 litres per person per day, for hills.

In 1976-77, the per capita supply of water was 31.5 litres. At present as shown in the table no.8 the per capita supply was 59.66 litres. There is good increase in the per capita supply. But this supply is still inadequate. It requires to be augmented to 150 litres/head per day as per standard prescribed by U.P. Jalnigam (Hills).

Thus the total water required for 2001 AD is as follows.

- a) Total water consumption is $31,000 \times 150 =$
46.5 lakh litres per day.
- b) For army population $11,708 \times 150 = 17.56$ lakh
litres per day.
- c) For civil population 28.938 lakh litres per day.

The present existing reservoirs could take the quantity required even in the year 2001. But there is only the problem of the source of water.

Table 8 DETAILS OF WATER SUPPLY OF CIVIL AREA

S. No.	YEAR	SUPPLY LITRES/DAY	PER CAPITA SUPPLY LITRES/DAY
1.	1976-77	2,95,245	31.5
2.	1977-78	4,00,896	40.5
3.	1978-79	N. A.	N. A.
4.	1979-80	N. A.	N. A.
5.	1980-81	5,40,000	48.87
6.	1981-82	6,79,185	63
7.	1982-83	N. A.	N. A.
8.	1983-84	6,07,500	49.5
9.	1984-85	6,52,500	59.66

SOURCE: ANNUAL REPORT OF CANTONMENT

5.4 SANITATION

Increase in the population and density, increases the quantity of refuse. Therefore some system should be adopted for

the disposal of refuse, sewage and sullage. The Cantonment is on a hilly terrain. So it has the easy convenience for the disposal of storm water, care however needs to be taken to ensure that there is no erosion of top soil. Its varying levels makes the storm water, to follow the natural pattern of drainage. Therefore, special care need to be taken only for removal of sullage and sewage.

5.4.1 Refuse Disposal

The refuse is disposed at about 3 Km. away from the town in the trenching ground. The area of the trenching ground is about an acre. The refuse consists only of domestic waste. The refuse is transported by trucks and disposed in the trenching grounds.

5.4.1.1 The Constituents

As there is no industrial development, the refuse is mostly of domestic origin. Refuse consists of garbage, street sweep and trade refuse.

5.4.1.2 Collection - Transportation - Disposal

Refuse of the civilian areas is removed partly by tractor, traylor, trucks and partly manually in some areas and disposed in the trenching ground. The land area needed for trenching depends on the amount of refuse generated in the service area, the depth to which the refuse is to be placed and the operation period of the site.

The refuse of municipal areas generally averages from 1.59 kg. to 2.5 kg. per head per day. Thus a site should be provided from 10-20 acre feet (an acre-foot is one acre filled to the depth of one foot) each year per 10000 population.

In addition, the area needed can be estimated only after getting the clear picture of the site where the refuse has to be disposed, the geometries of disposal and topography of the area.

5.4.2 Night-Soil Disposal

5.4.2.1 Existing Status

In the cantonment the night soil is disposed off in the following manner.

- a) Septic Tanks and Soakpits and
- b) Incineration

Army area is having soakpit and septic tank facilities. But in most of the civil areas, human conservancy system is prevalent and night-soil is disposed off by incineration.

But for about 6 months the Cantt. board started disposing the Night-soil along with refuse in the trenching ground. Due to low temperatures, there is no bacterial action, even after 6 months. So they have stopped trenching and again switched over to incinerators.

The incinerators were spread all over the cantonment. But the incinerators existing in the civil areas are abandoned

as shown in the photograph (5). The new incinerators were built, away from the residential areas.

5.4.2.2 Collection - Transportation - Disposal

Night-soil is disposed off by burning in incinerators along with refuse. Night-soil in civil areas is collected by the scavengers from the respective premises to the place of final disposal. But in bungalow areas the same is brought by scavengers employed by bungalow owners to the incinerators and thereafter same is burnt in the incinerators by Cantonment Board staff.

5.4.3 Sullage Collection and Disposal

The Cantonment is not having the sewerage facilities as discussed earlier. The sullage and Night-soil are disposed separately. At present as shown in the photograph (6) only open drains take the sullage and storm water through slopes. The existing drains and nallahs are flushed and cleaned partly by spring water and partly by people employed by the Cantonment Board.

At present due to less population it is not economical to introduce the sewerage facilities, as the sewage disposed by the present population doesn't exert the required velocity for the each flow of solids suspended in the sewage. The blockage may occur creating unhygienic conditions or else more water shall be required to flush the sewers. But there is a great demand to introduce the same.



PHOTOGRAPH 5. ABANDONED INCINERATORS IN THE DENSELY POPULATED CIVIL AREAS



PHOTOGRAPH. 6. DRAINAGE IN HILL AREAS - AN EXAMPI

5.4.4 Sanitary Facilities for 2001 AD

5.4.4.1 Refuse Disposal

At present there is only one trenching ground at Upat as shown in the map. But as per the zonal map of the MES, the same area is demarcated for J.C.O's residential area. Hence the change of position of the trenching ground is necessary.

In order to meet the future demand, two trenching grounds are necessary. One at Chaubattia and the other at about 3 km. East of Dulikhet. As shown in the map (13), the proposed positions are in leeward direction and down hill side, of the peaks of the respective areas. In these two trenching grounds incinerators should also be installed for the incineration of refuse in the rainy season, so as the refuse may not be washed away, and pollute the nearby water sources.

5.4.4.2 Drainage Facilities

The Cantonment has to provide drainage facilities for 31000 population by 2001 AD. As we are entering into the 21st century the provision of these facilities in the town is necessary.

As the town was located on the ridges of the mountain, the storm water should be disposed in the natural streams. But as far as domestic sewage is concerned we must introduce sewerage system. The following reasons has to be considered while providing so.

- a) The population was dispersed as per the availability of the buildable area, with large distances inbetween.
- b) Administrative of civil and military authorities are separate. So these two authorities have to work together to have these facilities.
- c) The civil population growth is considerable to introduce the sewerage system and likely to become 19292 persons by 2001. But they are dispersed in different areas as per land allotted in the zonal plan.

Thus one autonomous body should be formed in order to provide the sewerage facilities or adequate understanding and co-operation between MES and Cantonment Board is necessary. So the integrated development scheme for the provision of sewerage facilities considering the whole cantonment should be designed.

As there are no rivers with adequate quantity of water, for the self purification, sewage treatment plant should be installed.

In this regard, I propose to install the sewage treatment plant somewhere in the down hill side of the densely populated Sadar bazar (Map No.13). Further the sewage after being treated travels about 2 Km before merging with Gagas river and finally becomes harmless.

5.5 POWER SUPPLY

Electricity provides a very convenient form of power for lighting. It is an important utility in the present society. For the prediction of the future needs of the power, it is necessary to study the load requirements of the area, where the power is to be supplied. This depends on the nature of the area, the population, density, standard of living industrial development and the cost of power.

For the sake of calculation, loads are divided into a) residential or domestic load, (b) Commercial load, (c) Industrial load, (d) Government load and (e) Municipal load. At special occasions, irrigation, mining, traction, distribution licences and special industries also come into the picture.

5.5.1 Source

The electricity is supplied by U.P.S.E.B. which receives from various sources, feeds the Cantonment Board, through district head quarters. In addition to this main source, the town is fed from other sources like Bowali, Tarikhet in case of failure of supply. The sub-station in the town steps down the 33 kv to 11 kv and then to 440V/230V to feed the neighbouring villages of the region, along with Cantonment.

5.5.2 Distribution System

The Fig.(7), the flow diagram, describes the general system of power supply to the consumer starting from the generation point.

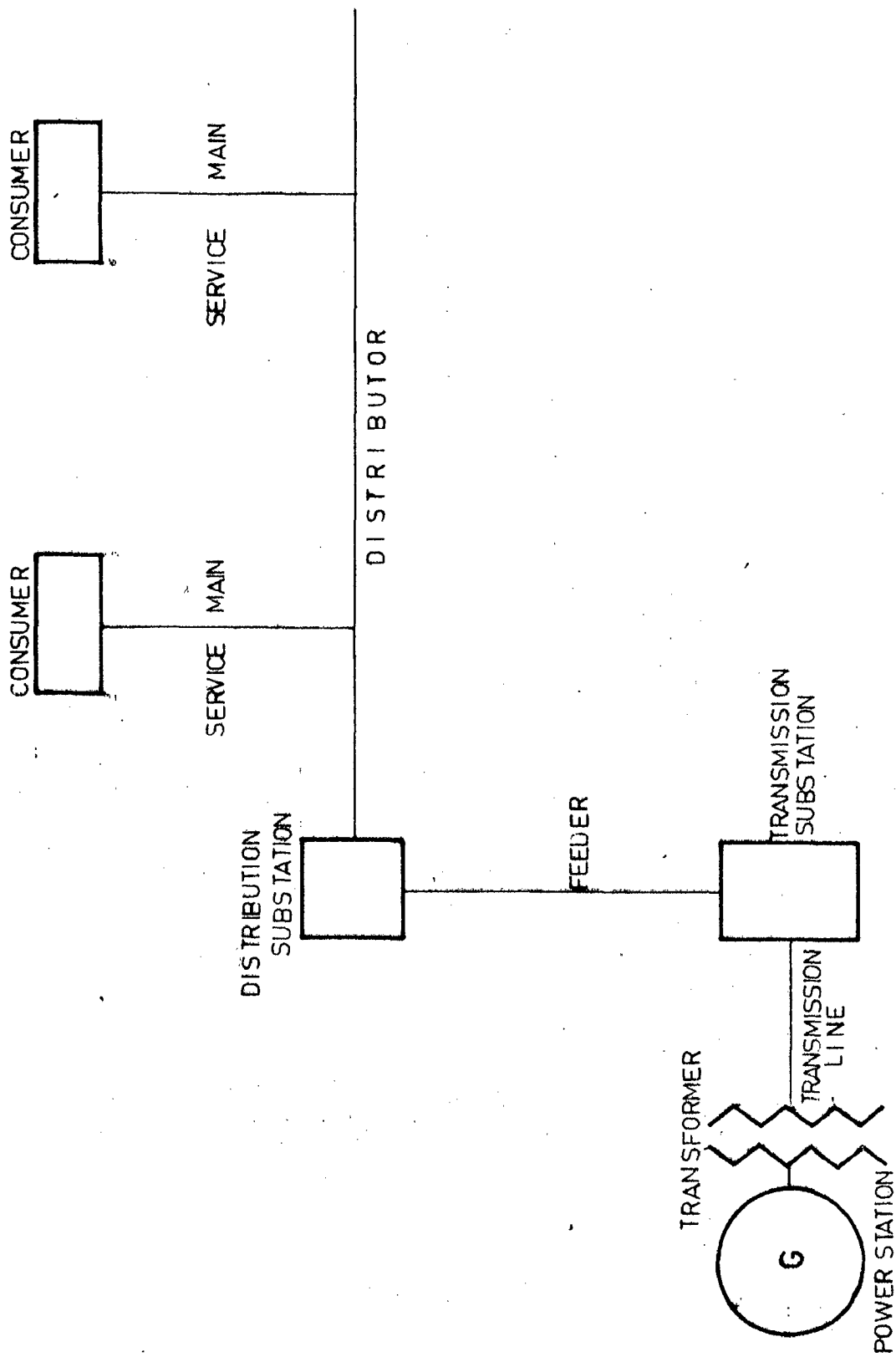


FIG.7. MAIN PARTS OF A POWER SYSTEM

5.5.2.1 The Characteristics of the Route

Usually the low voltage lines are run along the streets and highways where ever possible, in order to reach the consumer more easily. The high voltage transmission lines are more often run across the country through private land or forest area in order to obtain shortest possible route. In the mountain region, as shown in the photograph (2) the valleys may often be crossed by single spans of more than a kilometre length.

5.5.2.2 The Clearances

The vertical and horizontal clearances must be considered for the conductors strictly. The clearances of power lines for the different voltage are different."The vertical clearance above the ground and for the various structures differs as per the voltage of the power line for e.g., no conductor of an overhead line including service line, erected across a street shall at any part thereof be at a height less than

- a) For low and medium voltage lines 5.80 m
- b) For high voltage lines 6.10 m⁴

5.5.2.3 Types of Distribution - Existing System

In the distribution of electrical energy, many systems are used. They are radial distribution, Network distribution loop distribution, ring main and duplicate service. Each of

⁴ The Indian Electricity Rules 1956.

the system has its advantages, disadvantages and limitations, for e.g. the network distribution system is widely used in heavy populated urban centres and this system is not applicable in small towns.

The Cantonment has one 33 kv substation. This substation was fed from different sources as explained in 5.5.1. and distributes to consumers in radial pattern as shown in the fig. (8). The substation steps down 33 kv to 11 kv and further to 440 V/230 V and feeds cantonment and nearby villages of the region.

There are proposals (from UPSEB) for conversion of this radial system to ring main to improve its efficiency of supply and to maintain required voltage through out the town.

As per the data available the electrical connections are as follows:

A)	Total No. of Connections	932 (upto June 1985)
	(excluding industrial connections)	
a)	Residential connections	887
b)	Commercial connections	45
c)	Domestic consumers on waiting list	9
B)	Industrial Connections	10 HP 13
		105HP 1
		200HP 1

(Source : N.E. Cantt. Substation)

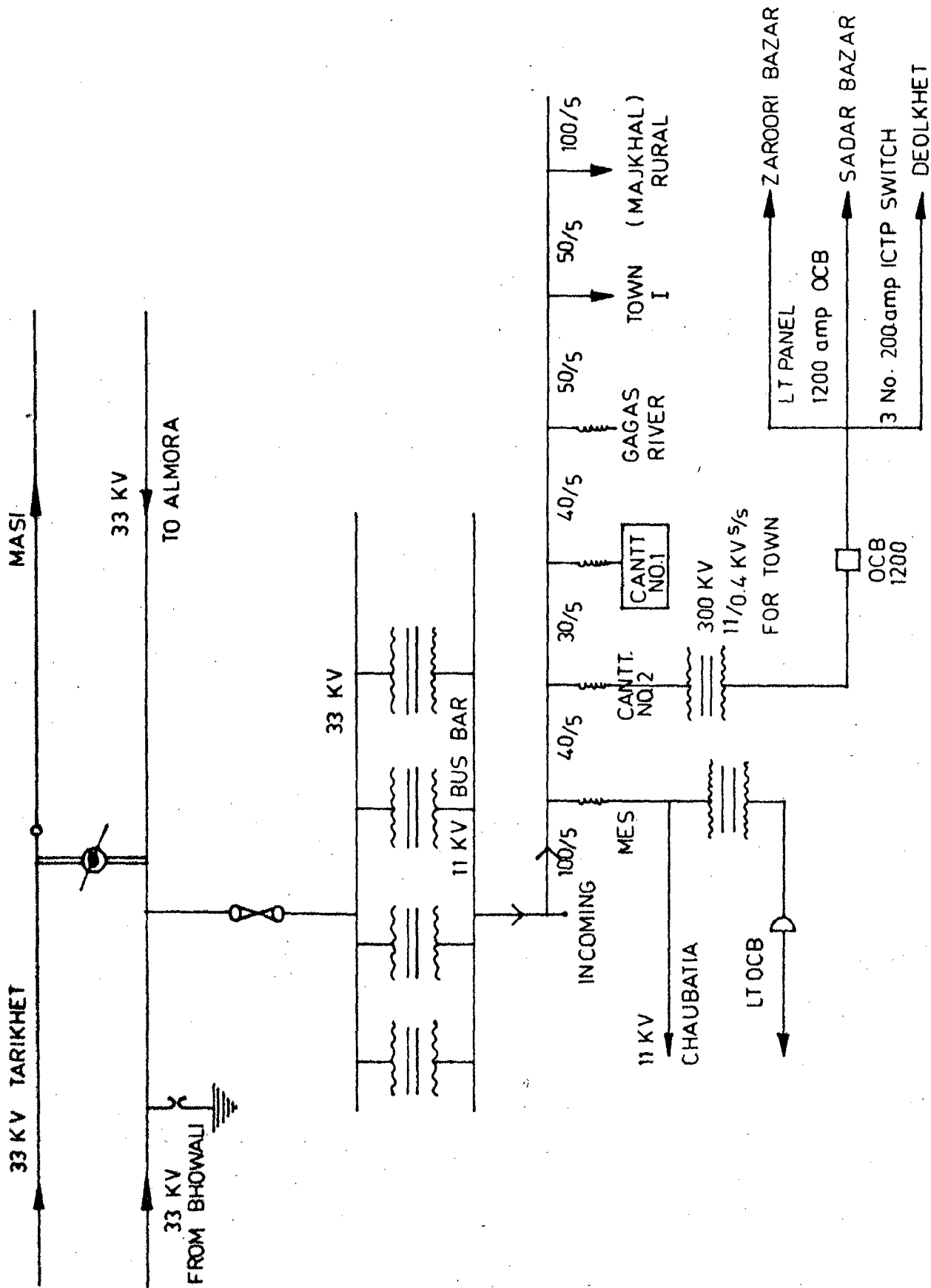


FIG. 8. ELECTRIC POWER SUPPLY FLOW DIAGRAM OF 'X'-CANTONMENT

SOURCE: J.E. U.P.S.E.B X-CANTONMENT.

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5.5.3. Demand and supply :-

Electricity is among the most important requirements for urban development. Not has it become a necessity in every home, but it provides power for industry and provides lights and signals required for urban transportation. As it has such an importance, its demand increases day to day. The planner must be much aware of its increasing demand. He must give proper prediction for the future needs.

As per the survey results, Appendix (6) 75.94 percent of the population are enjoying the electric power facility available. The waiting list for new electrical connections is only 9, where total domestic connections are 887, so there is a distribution of connections gives an average on the basis of 3 families per connection. There is not much increase in the number of street lamps since one and half decades as per table (9).

So taking all the arguments into consideration, the load requirement is calculated and given in chapter 8. The table (10) gives the monthly power consumption in units in April and June of 1985.

TABLE 9 STREET LIGHT DISTRIBUTION IN TOWN

S. No.	Description	1969	1976	1977	1980	1981	1982	1984	1985
1	Bulbs	NA	212	217 (56.65)	100 (31.25)	200 (54.95)	100 (38.46)	100 (31.25)	100 (31.15)
2	2'-0" Tubes	NA	160 (42.33)	160 (41.78)	31	81 (22.25)	31	31	31
3	4'-0" Tubes	NA			167 (52.19)	61	107 (41.15)	167 (52.19)	167 (52.02)
4	Mercury Lamps	NA	6	6	18	18	18	18	19
5	Sodium Vapour Lamps	NA	-	-	4	4	4	4	4
6	Total	234	378	383	320	364	260	320	321

Note : Percentage of total is given in brackets

SOURCE : CANTT. BOARD.

TABLE 10 CONSUMPTION OF ELECTRICITY

S.No.	Description	Consumption in Units	
		April 1985	June 1985
1	Town I	1583	1731
2	Town II	3357	3328
3	MES	148560	129230
4	Gangas River	5145	5152
5	Total consumption by Cantonment	158645	139441
6	Supply to Villages	17145	174809
7	Total	330060	314250
8	% of Town Consumption	48.07	44.37

SOURCE : J.E. UPSEB - Cantonment

5.5.4 POWER SUPPLY : FOR 2001 AD

At present the Cantonment is having one step-down substation. It is supplying power to cantonment and nearby villages. At present the load fluctuation is 0.573 - 0.658 M.V.A. from summer to winter months. As per the discussion with the J.E. revealed that the substation can take the present load.

In the year 2001 A.D. it has to take 1.000 M.V.A. load. So the transformers should be installed in the phased manner as per the requirement and finally in the year 2001 A.D., it must be in a position to take 1.000 MV.A. load.

- | | | |
|----------------------------------------------------------|---|-----------------|
| a) Existing load | - | 0.573 MVA |
| b) proposed load by
2001 A.D. | | |
| i) Existing load | - | 0.573 MVA |
| ii) 50% addition
for the normal
population growth. | - | 0.286 MVA |
| iii) Winter to
Summer fluctu-
ation is 10-15% | - | 0.128 MVA (15%) |
-

Proposed load by 2001 AD - 0.987 MVA

Say 1.000 MVA.

5.6 COMMUNICATION SYSTEM

5.6.1 Post and Telegraph Office

The post and telegraph office has become an important utility. This department has become one of the well known and poor man's communication agency for long distances. So the distribution of this institution should be well placed, to serve the public to its maximum. In the Rural and less populated areas, immaterial of distance, minimum one post office must be there for population upto 2000. One post office can efficiently serve upto a radius of 1.61 Km as per the access standards of COPP.

5.6.1.1 Existing status

There are three post offices in the cantonment, as shown in the Map (4). One of them is situated at Mall road and the other is in Sadar Bazar area. One post office having only MO, Saving Bank, Stamp selling and Registered letters provisions is situated in the Chaubattia area. At present these post offices are covering the entire population and no complaints were received during house hold survey. It is thus adequate and is likely to remain so till the year 2001.

5.6.2 Telecommunication

Telephone and telegraph utilities provide important communication links which are essential in the present world. The position of the exchange and maximum distance it can serve per exchange is a matter of concern to planners.

5.6.2.1 Existing Facilities

This cantonment is having three manually operated Telephone exchanges. One of them is main exchange serving the whole population of the town and region. Other two are P.B.X. exchange.







The capacity of the main telephone exchange is 200 lines, where only 190 connections are given. In the remaining ten lines, six are put in reserve, as per rules, 3 percent of the lines should be kept in reserve for emergency. The remaining 4 lines are in open. The other details of the exchanges is given in table No.11.

PLANNING OF UTILITIES SERVICES AND COMMUNITY FACILITIES -

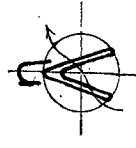
X CANTONMENT

COMMUNICATION SYSTEM.

LEGEND

-  POST OFFICE (P.O.)
-  TELEPHONE EXCHANGE (T.E.)
-  P.B.X.
-  EFFECTIVE AREA P.O.
-  EFFECTIVE AREA T.E.
-  CANTT. BOUNDARY

NOTE:
P.B.X. : PRIVATE BRANCH EXCHANGE



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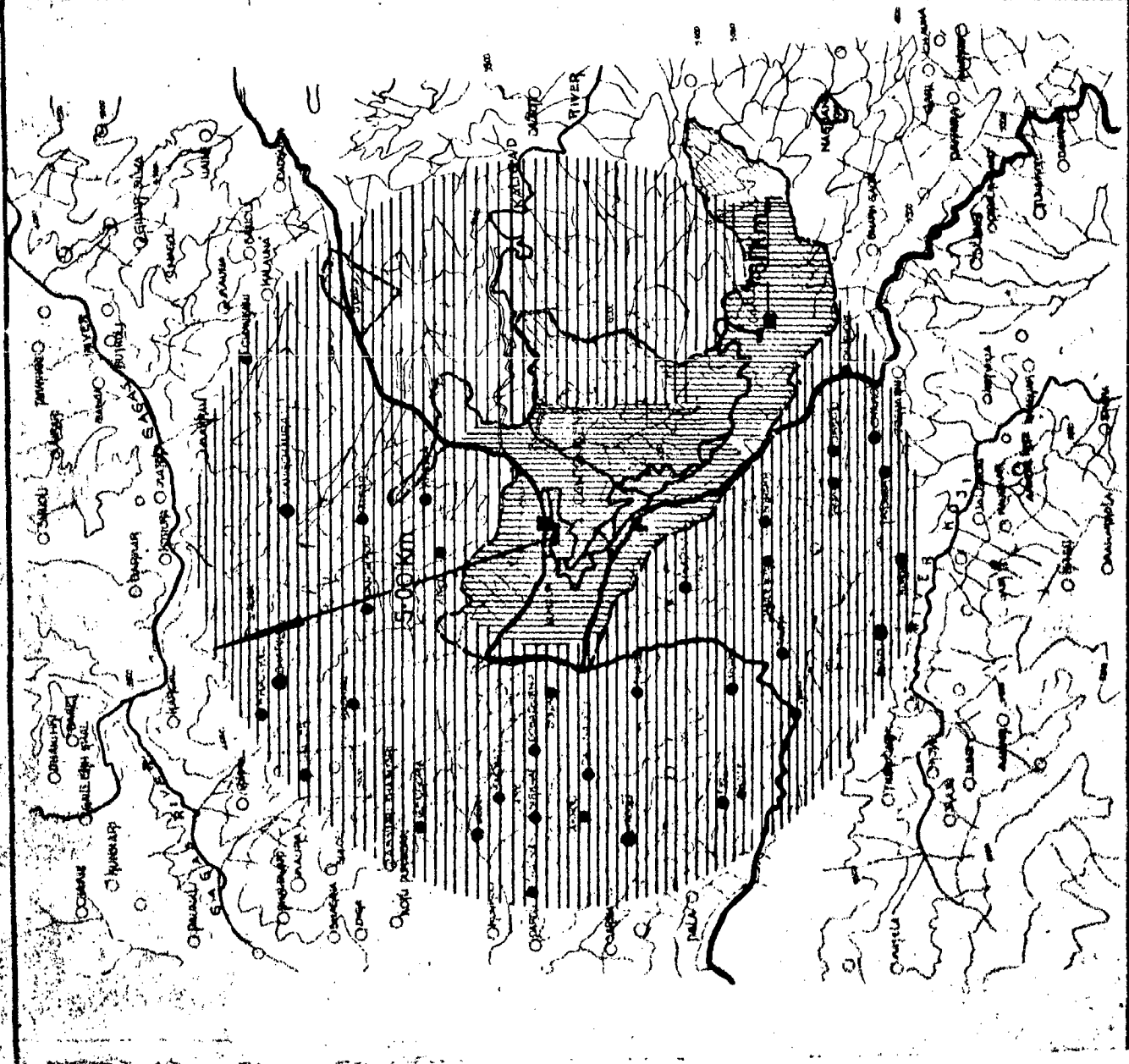


Table 11 STATEMENT SHOWING DETAILS OF TELEPHONE EXCHANGE FACILITIES

Type of Exchange	No. of lines	Working/ connected	Remaining
General (Civil lines)	200	190	10

5.6.2.2 Problems and Prospects

The existing General exchange is situated in the congested area of the Civil lines which has adequate parking facilities. There is very little scope of development. Acquiring additional area has become difficult, because of defence strategies.

The oral interview, with the exchange authorities revealed that in general, the exchange can serve upto 5 km radius as shown in the map (4). This coverage is fulfilling our requirement. The only development that should be done is, increasing the capacity of the exchange. There are proposals for converting this exchange into autoexchange in collaboration with France.

CHAPTER-6

COMMUNITY FACILITIES

6.1 INTRODUCTION

Community facilities are the physical facilities essential for satisfactory urban living. They include the provision of educational institutions, medical relief, commercial development, recreational facilities and transportational facilities. Location, number and distribution of these facilities in a planned manner, in order to put them in easy reach of the community, is necessary. In the X-cantonment, these facilities are adequate in some respects and deficit in others. The following part gives the existing conditions of these in the said cantonment.

6.2 EDUCATIONAL FACILITIES

The increasing emphasis on the basic education, together with the rather drastic physical changes in the urban settlements, makes the problem of location of schooling facilities, difficult. In the location of various types of institutions, the factors like population distribution, population concentration, regional impact and maximum distance that the institution can serve, plays an important role.

6.2.1 Types of Educational Institutions

In the 'X' cantonment there are 19 educational institutions serving the various educational needs of the population. They are broadly classified as follows.

a) Nursery schools	4 Nos.
b) Primary schools	8 Nos.
c) Higher Secondary schools	5 Nos.
d) Degree Colleges	1 No.
e) Technical/Vocational school	1 No.

As far as the management is concerned, the educational institutions are having the following categories of management.

- a) Central Government run Kendriya Vidyalaya for the benefit of the army population,
- b) State Government institutions, managed by the rules and regulations of the State Government's Education Ministry,
- c) Cantonment Board owned institutions, specially provided for the civilian population of the cantonment,
- d) Institutions run by private organisations,
- e) Degree College run by the State Government.

6.2.2 Current Status

As shown in the map (No.6), most of the educational institutions were located in the densely populated civil areas.

There are four nursery schools. Three of them are in sadar bazar and one at Chaubattia. Nursery level educational facilities fall short of requirement in several respects.

The primary schools are distributed throughout the cantonment, with seven schools in the Kumpur, Sedar Bazar areas and one at Chaubattia. At present the number of schools at

MAP NO. 6

PLANNING OF UTILITIES, SERVICES AND COMMUNITY FACILITIES - X CANTONMENT

EDUCATIONAL FACILITIES.

LEGEND

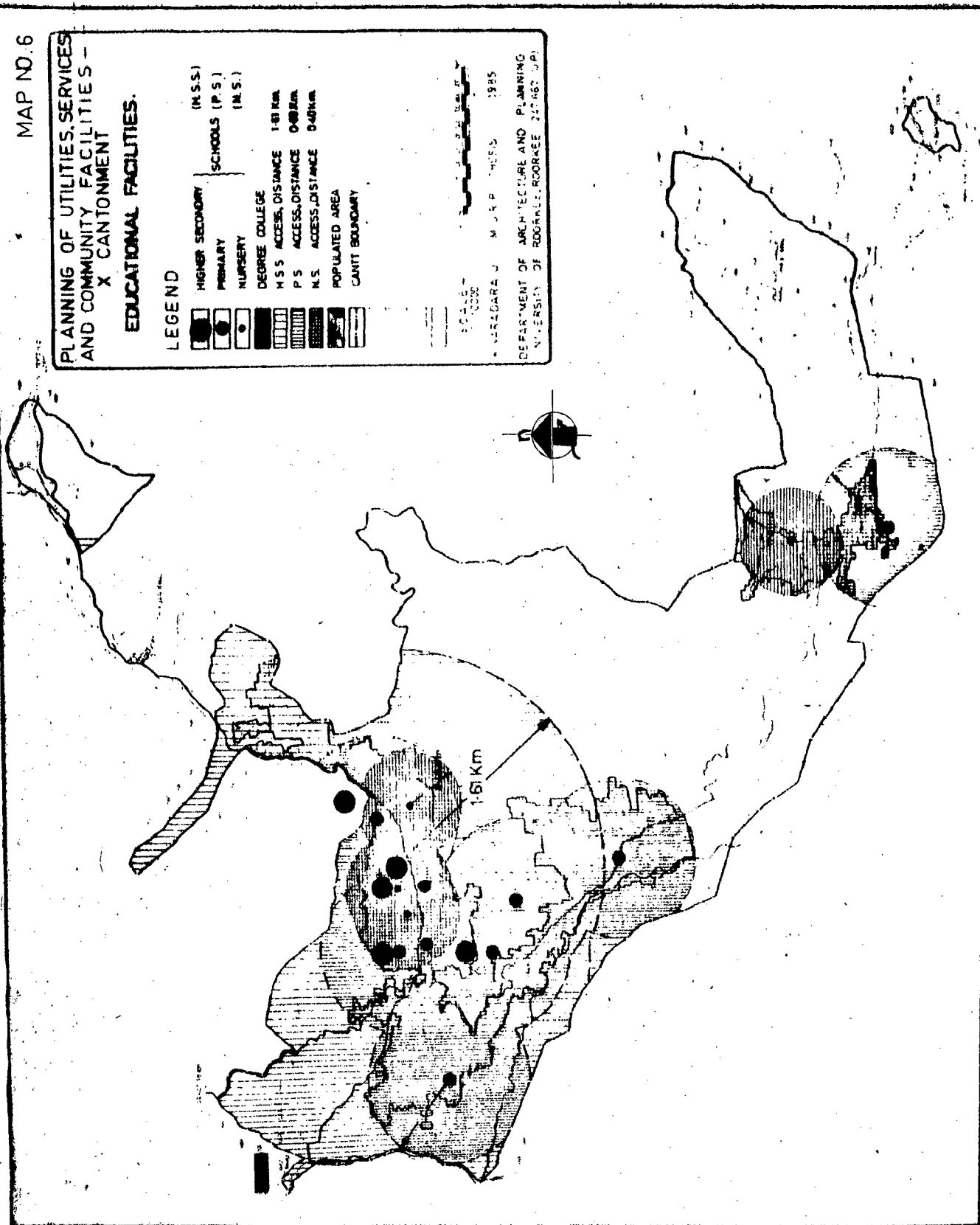
- HIGHER SECONDARY (H.S.S.)
- PRIMARY SCHOOLS (P.S.)
- NURSERY (N.S.)
- DEGREE COLLEGE
- M.S. ACCESS, DISTANCE 1-81 Km
- P.S. ACCESS, DISTANCE 0-81 Km
- N.S. ACCESS, DISTANCE 0-40 Km
- POPULATED AREA
- CANTT BOUNDARY



SCALE 1:5000

VIJAYAPURAM MAP NO. 6 1985

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primary level are adequate with 230 students per school where TCPO standards advocate 450-500 students per school.

There are five higher secondary schools and all of them are clustered in Sadar Bazar and Lower Mall areas. As per standards each school can have 700-750 students. At present there are 695 students per school. Hence the cantonment has adequate number of Higher Secondary Schools. However, as far as the spatial distribution is concerned, Chaubattia area is neglected. Possibly one of the schools can be shifted to Jula Devi Temple area or a new school could be set-up there.

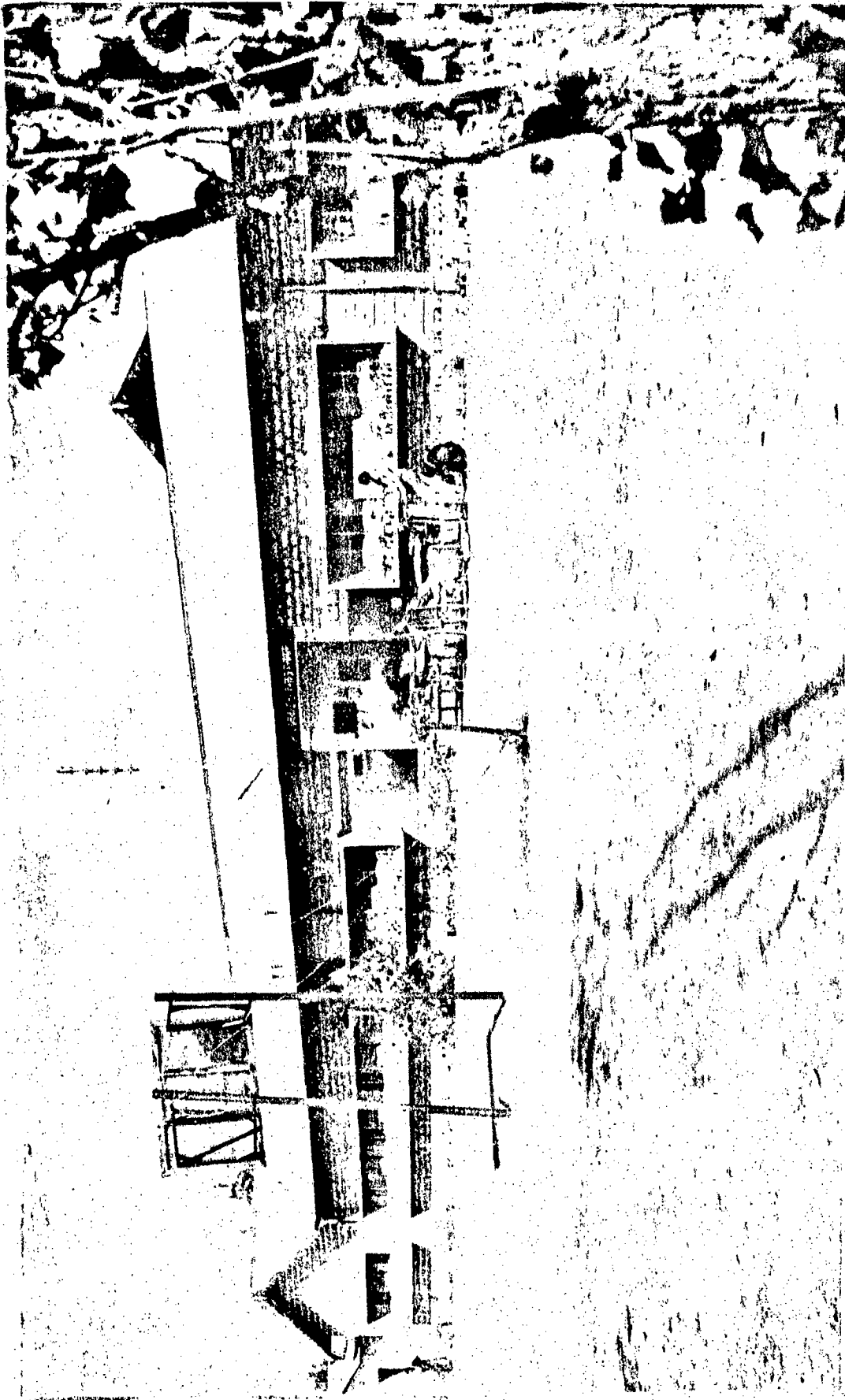
There is one academic college in the Chilianola area, outside the cantonment boundary as shown in the map No.6. This college is serving the whole region along with the cantonment.

Table 12 STATEMENT SHOWING THE EXISTING EDUCATIONAL FACILITIES

S. No.	INSTITUTION	TCPO STANDARDS	EXISTING	ADEQUACY
1.	Nursery schools	1/1250-1500 population 75-90 seats/ School	1/4547 population 115 seats/ School	Inadequate
2.	Primary Schools	1/4000 pop. 450-500 seats/ School	1/2275 pop. 230 seats/ School	Adequate
3.	Higher Secondary Schools	1/5000-6000 population 700-750 seats/ School	1/3638 pop 695 Seats/ School	Adequate
4.	Academic College	1/40000 pop. (B.P.E. Standards)	1	Adequate
5.	Technical/Vocational School	1 - 2 as reqd.	1	Adequate



PHOTOGRAPH. 7. THE PLAYFIELD OF A NURSERY SCHOOL — CHAUBATTIA



PHOTOGRAPH.8. WELL MAINTAINED PLAY GROUND OF HIGH-SCHOOL (GIRLS)

6.2.3 Regional Impact

This cantonment is a major urban settlement in it's Tehsil. Students from the surrounding villages of the region ply to the cantonment for the higher education. Out of a total number of 6143 students attending the educational institutions, 1204 (nearly 20%) are from rural areas. So, in providing the educational facilities, 20% addition was counted to cater to the demand of the rural areas.

6.2.4 Educational Facilities for 2001 AD

The existing educational institutions are not only catering to the population of the town, but also the sub-region.

It was explained earlier in 6.2.3, that 20% of school attending children were from rural areas. So the 20% of the strength required as per standards to the projected population is added, for estimating number of educational institutions required by 2001 AD.

6.2.4.1 Nursery Schools

There are four nursery schools, one at Chaubattia and others in Sadar Bazar which are inadequate. In all 20 schools are required by 2001 AD, which should be evenly distributed amidst the residential areas.

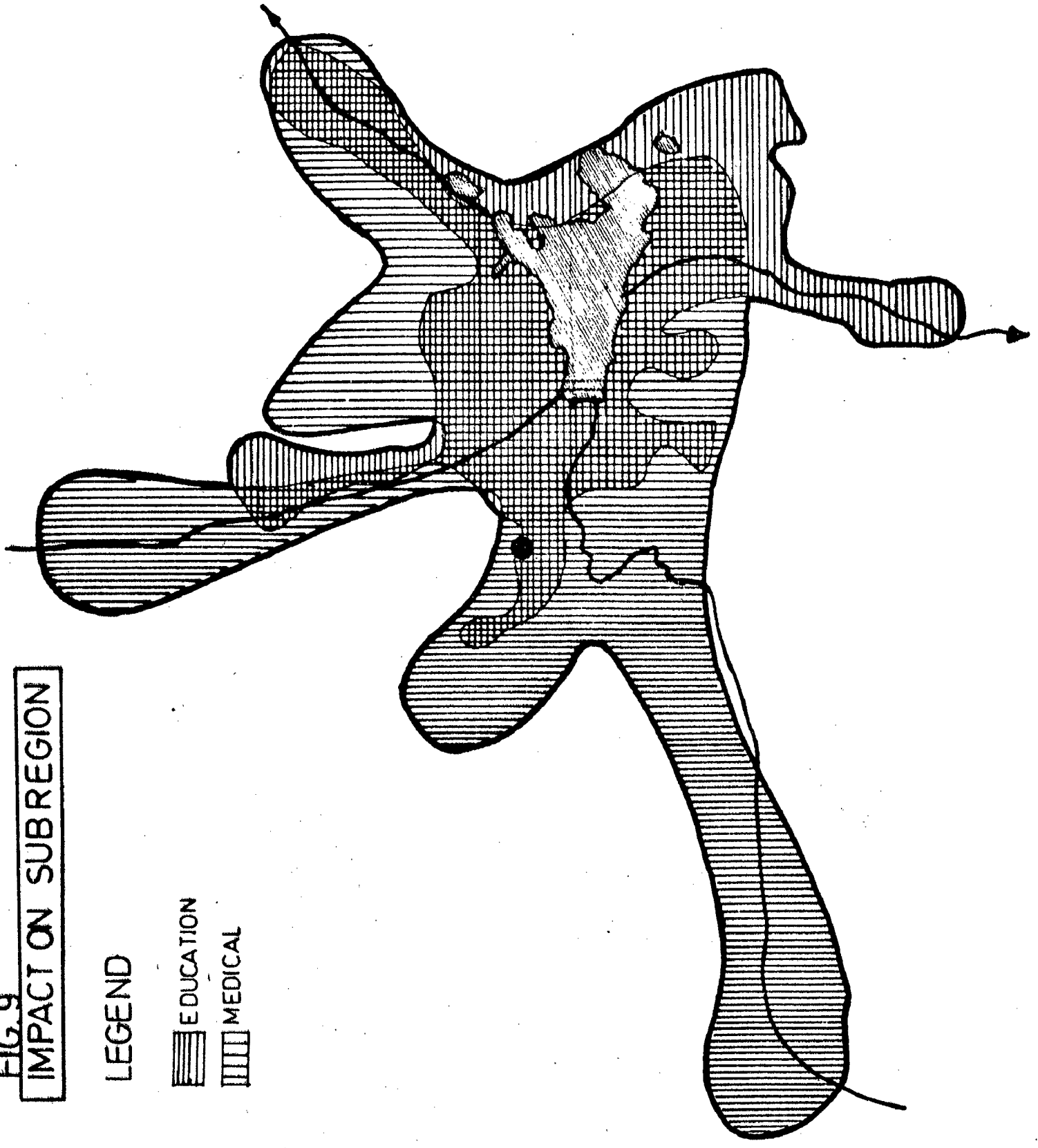
6.2.4.2 Primary Schools

There are eight primary schools which are adequate to meet the future demand by 2001 AD. But as far as the spatial

FIG. 9
IMPACT ON SUBREGION

LEGEND

- EDUCATION
- MEDICAL



MAP NO. 7

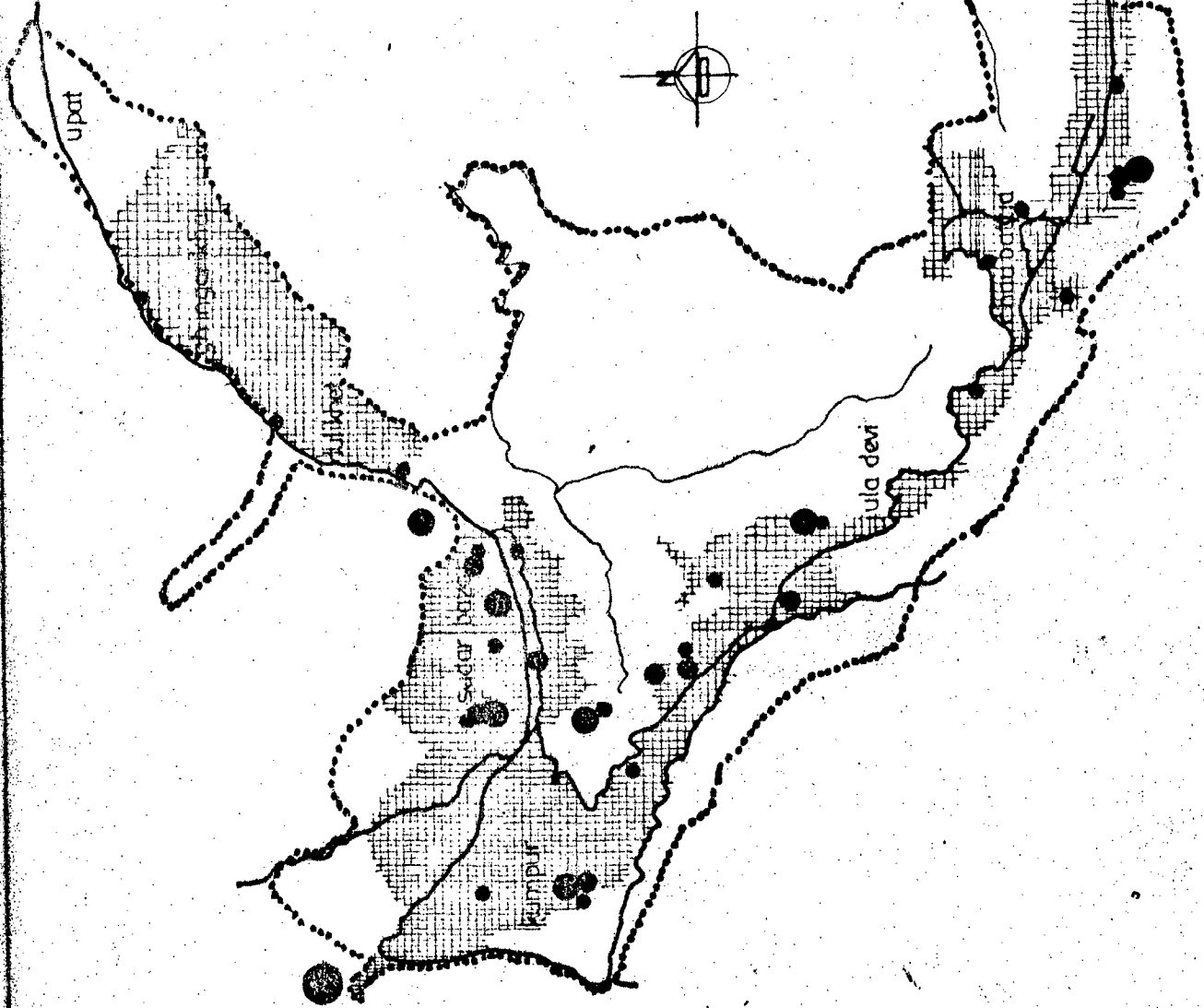
PLANNING OF UTILITIES, SERVICES
AND COMMUNITY FACILITIES
'X' CANTONMENT

EDUCATIONAL FACILITIES
FOR 2001AD.

LEGEND

- NURSERY SCHOOLS
- PRIMARY SCHOOLS
- HIGHER SECONDARY
- DEGREE COLLEGE
- CANTONMENT BOUNDARY

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distribution of these schools is considered it is strongly felt that Saraswati Madhyama Vidyalaya must be shifted to Jula devi temple area, where the future expansion is going to take place, as indicated in the zonal plan.

6.2.4.3 Higher Secondary Schools

There are five higher secondary schools at present. Due to impact of the sub-region and the population growth another two higher secondary schools are necessary. So I propose to upgrade the primary schools at Kumpur and Chaubattia to higher secondary level. Further it is recommended that the X-cantonment Inter College must be shifted to the civil areas at Jula devi temple to facilitate the easy access to the people of Chaubattia and to meet their needs.

6.2.4.4 Degree College

There is one degree college serving the cantonment and its sub-region. As per Bureau of Public Enterprises Standards. One college can serve a population of 40,000. The population limit for the college is higher than my projected population of 31,000. Thus the college can cater to the needs of the population upto the year 2001 AD.

The table 13 gives the details of the existing and proposed educational institutions; question of location has already been dealtwith.

Table 13 PROPOSED EDUCATIONAL FACILITIES

S. No.	Institution	TCPO Standards	Existing	Total Required By 2001	Additional Facility By 2001	Coverage
1.	Nursery Schools	1/1250-1500 population 75-90 Seats/School	4	20	16	Only Cantonment
2.	Primary Schools	1/4000 pop. 450-500 Seats/School	8	8	-	Only Cantonment and boarder villages
3.	Higher Secondary Schools	1/5000-6000 population 700-750 Seats/School	5	7	2	Region and the Cantonment.
4.	Academic College	1/40000 population (B.P.E. Standards)	1	1	-	The Cantonment and the Region.
5.	Technical/Vocational School	1-2 as required	1	1	-	The Cantonment and the Region.

NOTE: For Higher Secondary schools, 20% of the strength required as per standards is added to meet the rural population.

6.3 MEDICAL FACILITIES

6.3.1 Types of Medical Institutions

In the Cantonment there are two types of medical institutions; Military and Civil. The Army controlled military hospital is confined to the Army population only. The civil population is secured by the Cantonment Board run civil hospital.

6.3.1.1 Civil Hospital

There was only one civil hospital with 50 beds. It was located near the UPSRTC Bus station, giving an easy access to the patients of the region. Cantonment and its sub-region when compared with the COPP standards (3 beds/1000 population) only 35 beds were required. Hence the existing facilities were considered to be adequate.

6.3.1.2 Dispensaries

The cantonment has two dispensaries. One was run as OPD from the civil hospital itself and the other at the cantonment stockyard. As per the TCPO-standards (one dispensary/20000 population) only one dispensary was required. But as far as the distribution is concerned, Chaubattia area was not covered as shown in the map (8). So the shifting of the dispensary of cantonment stockyard to the civil area, near Jula devi temple is recommended.

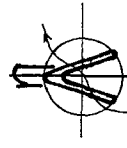
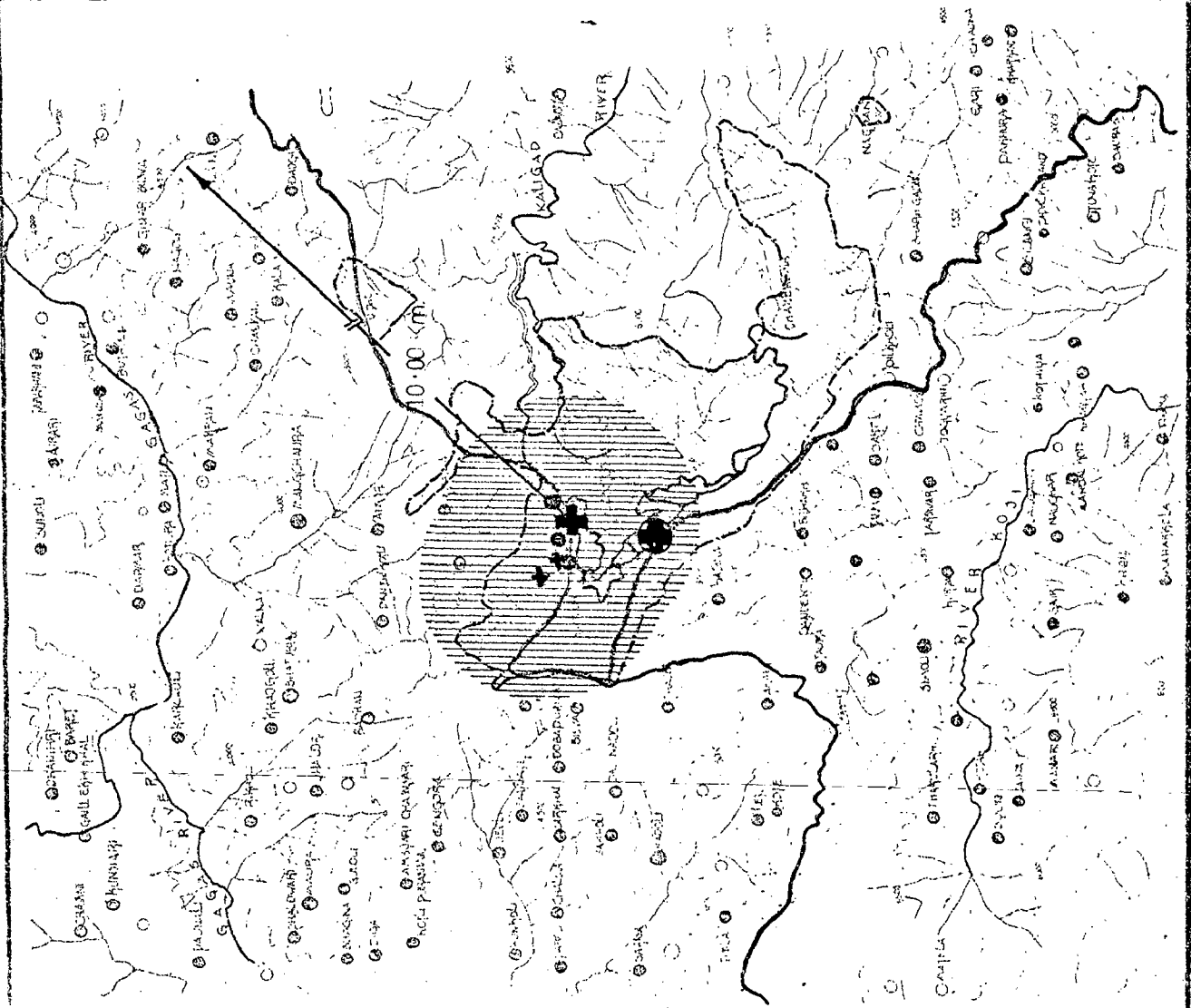
PLANNING OF UTILITIES SERVICES
AND COMMUNITY FACILITIES --

X CANTONMENT

MEDICAL FACILITIES

LEGEND

- ⊕ CANTT. BOARD HOSPITAL
- MILITARY HOSPITAL
- ⬇ SPECIALISED HOSPITAL
- ⬆ DISPENSARY (H.C.)
- PRIVATE CLINICS
- CANTT. BOUNDARY



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6.3.1.3 Clinics

At present there are three clinics without beds. These three clinics were located in Sadar Bazar. I.C.P.O. standards prescribe one clinic for 12000 population. Thus the present number is adequate.

6.3.1.4 Specialised Hospital

The town has one specialised eye-hospital with 25 beds. It is located near the Bus-station. As per standards 11 beds would have sufficed. Therefore 25 beded eye hospital is considered adequate and would meet the needs of the inhabitants even in the year 2001 of the cantonment.

6.3.2 Regional Impact

The cantonment is the only urban center within its Tehsil. So the population of its sub-region depends on the cantonment for the medical facilities. The discussion with the hospital authorities revealed that, the people from about 10 km radius come to the cantonment for seeking medical aid. Thus, the medical facilities were planned considering the population of the cantonment and its sub-region.

6.3.3 The Future Demand

a) At present there are 50 beds in the civil hospital.

Two wards of 32 beds are under construction. In addition to this, another 13 beds are required by 2001 AD.

- b) In the specialised hospital, 13 beds should be added by 2001 AD.

Table 14 PROPOSAL OF MEDICAL FACILITIES

S. No.	Institution	Norms	Existing	Total Nos. of Beds/ H.C.required	Additional facility
1.	Civil Hospital	2.5 Bed/ 1000 pop- ulation (COPP)	50 beds	95 beds	45 beds
2.	Specialised Hospital (eye-hospital)	1 Bed/1000 population (TCPO)	25 beds	38 beds	13 beds
3.	Cantonment Board dispen- sary	1/20000 population (TCPO)	2 dispen- saries	2 dispen- saries	-
4.	Clinics	1/12000 population (TCPO)	3 clinics	3 clinics	-

The details of the calculations for providing medical facilities for the sub-region are given below:

- i) The total population of the villages of the region (upto 10 Km radius) = 25209 (19 1)
- ii) The projected population of the region, taking Tehsil's growth rate 14.41% into consideration = 37752 (2001)
- iii) 50% of the village are having Pucca roads, so the probability of attendance = 50%

iv) The net population of the region depending on the cantonment 37752 x 50%	= 18876
v) The proposed population of the cantonment (civil)	= 19292

Total population = 38168	

Thus, in the calculation of the total requirement of medical facilities regarding civil and specialised hospital, the above population of 38168 persons was considered.

6.4 COMMERCIAL DEVELOPMENT

Similar to the other cantonments, Sadar bazar is the chief shopping and entertainment place. It has shops of all types, cinemas, restaurants and other social amenities. So it forms the hub of the town.

6.4.1 Hierarchy of the Shopping Areas

As it is a small town, it has only two types of shopping areas.

- a) Town center and
 - b) Local shopping
- a) Town Center

The Sadar bazar area is the main shopping center of the town and the sub-region. It also serves as a local shopping area for the civil population in it's locality.

b) Local Shopping

It has three local shopping areas, at various locations, called regimental bazars. They are located at Kumpur, Chaubattia and Upper Mall.

6.4.2 Analytical Review

6.4.2.1 Uniqueness in the Cantonments - Hill Areas

In general, army provides, essential items to their employees at subsidised rates through army canteens. So, only a small shopping center exists in the cantonments to cater to the needs of the civil population.

In the hill region, the roads follow the contours forcing the shopping areas to develop in linear pattern. Presently in the cantonment there are 432 shops developed as the town center, stretching for a Kilometer in a linear fashion.

6.4.2.2 Location and Access

As shown in the map no.(10), the convenient shopping areas are within accessible range of 1.61 Km. The Sadar Bazar, town center, is located on the main road connecting the cantonment to its sub-region and Chaubattia. So it is easily approachable by all residents of the cantonment.

6.4.2.3 Review of the current status of Sadar Bazar a Town Center










Number of shops required are generally taken with reference to the population of the settlement. A recent survey of the consumer habits undertaken by the town and country planning organisation, covering, part of the middle income group residential areas in Delhi, has brought out the inadequacies of shopping facilities consequent to the norm of 6 to 7 shops per thousand population and has suggested a norm of

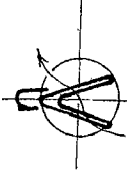
PLANNING OF UTILITIES SERVICES
AND COMMUNITY FACILITIES -

X CANTONMENT

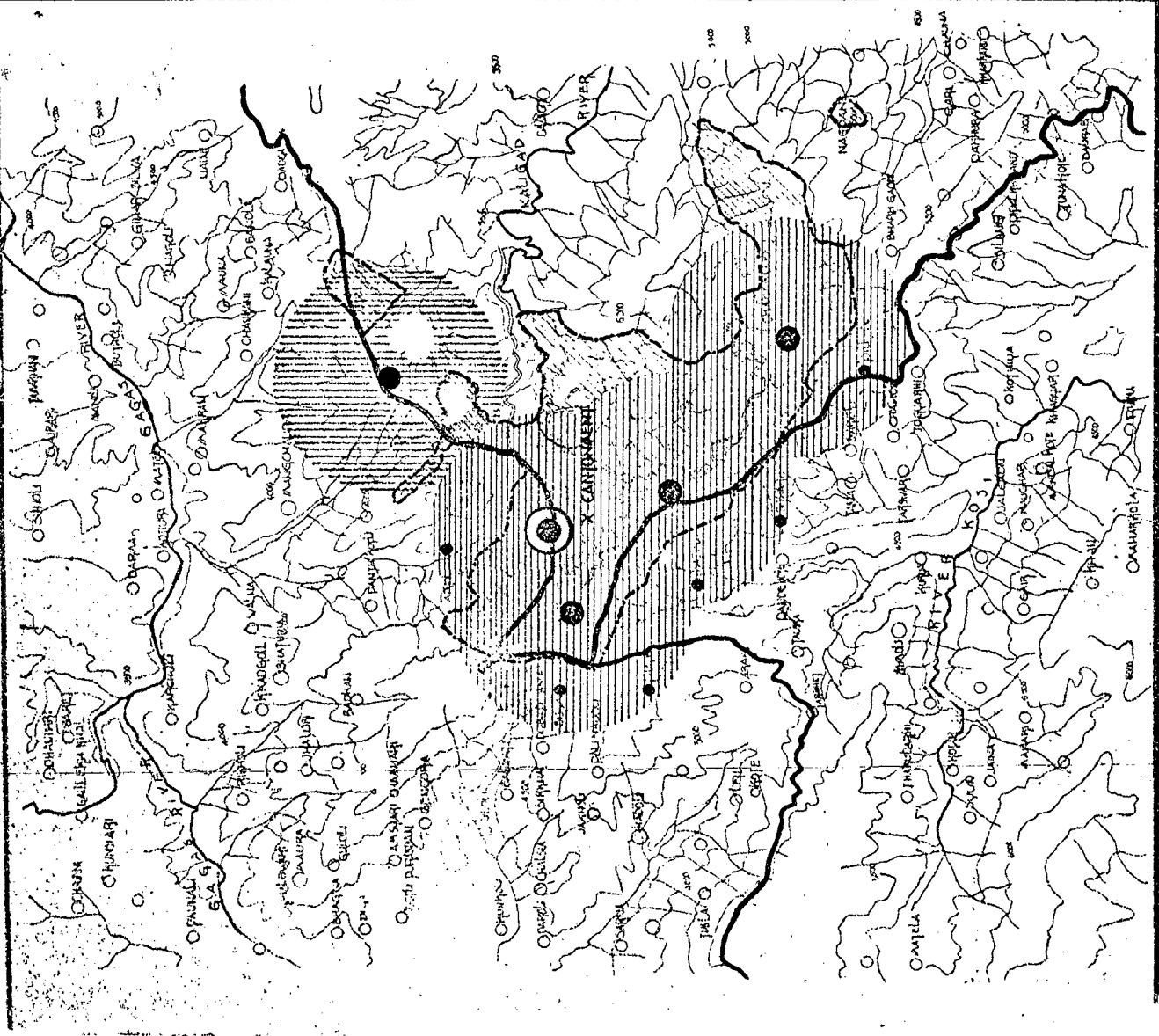
COMMERCIAL FACILITIES.

LEGEND

-  TOWN-CUM-REGIONAL SHOPPING CENTER
-  CONVENIENT SHOPPING
-  REGIONAL CONNECTING-ROAD
-  VILLAGE UNDER ACTIVE AREA OF LOCAL CONVENIENT SHOPPING
-  NO SHOPPING FACILITY
-  ACTIVE AREA OF CONVENIENT SHOPPING
-  CANTT. BOUNDARY LIMIT
-  PROPOSED LOCAL SHOPPING
-  ACTIVE AREA OF PROPOSED LOCAL SHOPPING



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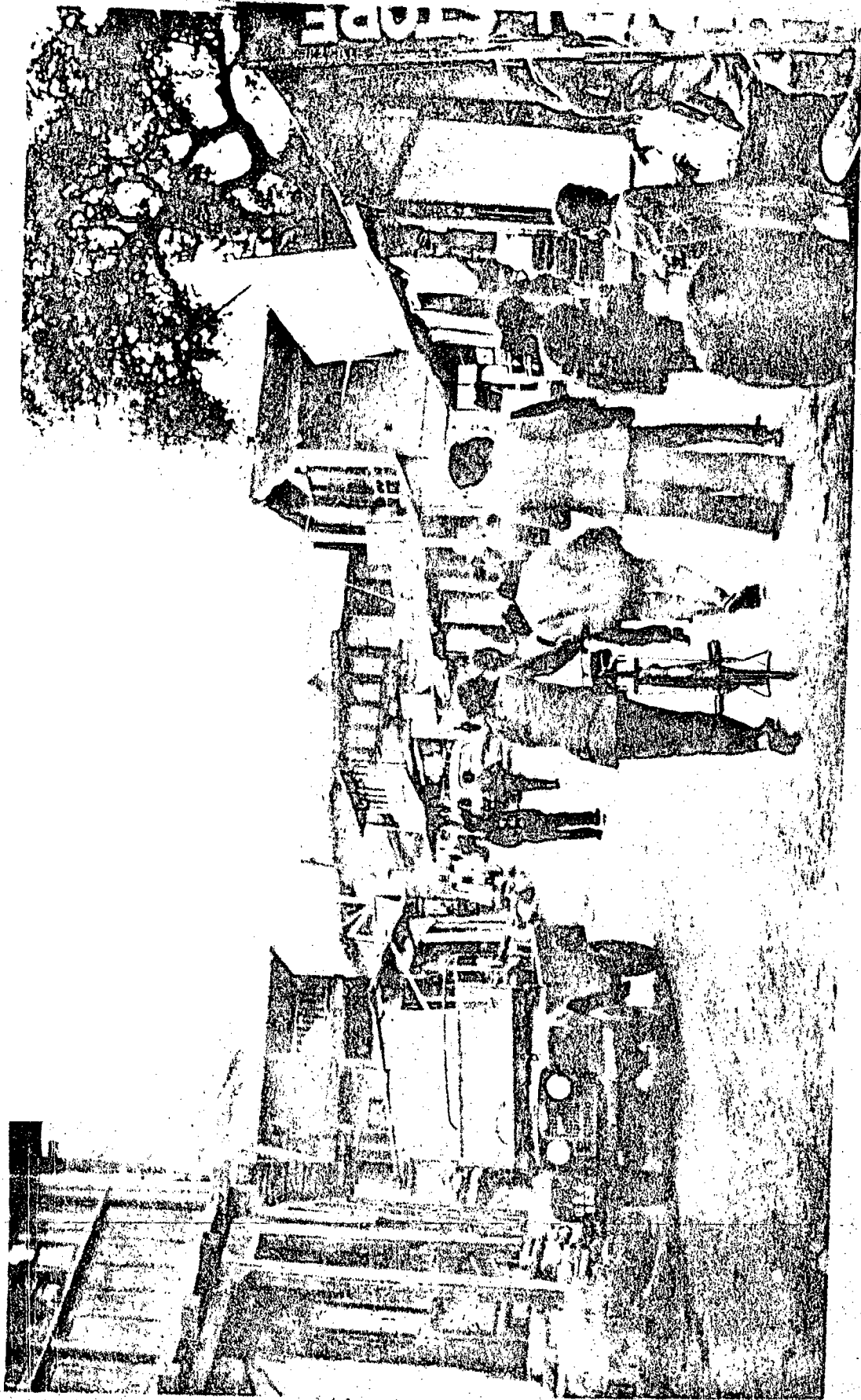


6 to 7 shops per thousand population and has suggested a norm of 17 shops per 1000 population of all types, besides provision of space for hawkers and mobile shops. So as per survey results

Table 15 SHOPPING FACILITIES IN X-CANTT.

A. GOODS	Number of shops		
	1971	1981	1984
1. Tea Stalls	70	91	92
2. General Stores	31	45	46
3. Restaurants and Hotels	24	36	37
4. Vegetable and fruit shop	30	41	36
5. Provision stores	49	37	36
6. Cloth merchant	27	24	22
7. Sweet-meat shop	29	22	22
8. Chemists and Druggists	16	18	19
9. Foot-Wears	15	14	14
10. Whole-sale dealers	19	13	14
11. Fancy articles	22	13	14
12. Meat Shop	9	6	6
13. Watch shop	5	4	5
14. Bakery	5	4	4
15. Photostudio	3	3	3
B. SERVICES			
1. Tailoring	30	27	28
2. Barber shop	15	10	13
3. Gold smith	13	11	10
4. Black smith	5	5	7
5. Dhobi	11	8	4
6. Carpenter	3	4	2
7. Others	30	37	59
8. TOTAL	461	473	493

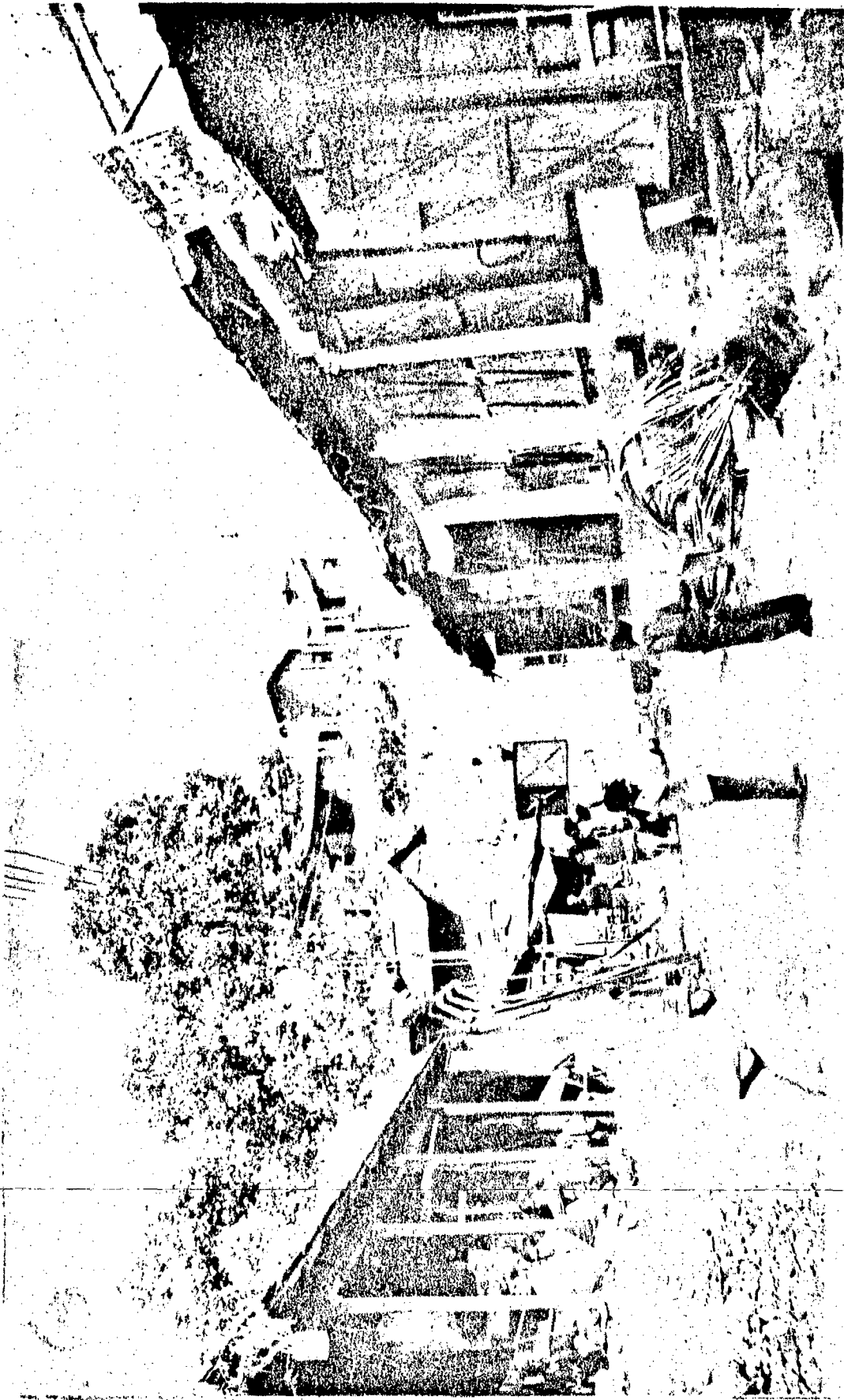
SOURCE: CANTT BOARD



PHOTOGRAPH.9. TOWN CENTER SADAR BAZAAR - A REGIONAL SHOPPING AREA



PHOTOGRAPH.10. TOWN CENTER - PAVEMENTSHOP ON THE CRUCIAL HAIRPIN BENDROAD.



PHOTOGRAPH.11. A TYPICAL LOCAL SHOPPING AREA - CHAUBATTIA

given in the appendix (8). There are 432 shops in sadar bazar area. This comes to an average of 22 shops per thousand population. But 'The Manual of Cantonment Planning' has prescribed 30 shops for 3000 population. Thus the present number is more than adequate.

When the whole town is considered, the number of shops increased from 461 in 1971 to 473 in 1981 and 493 in 1984 (Table 12) the increase is not very remarkable and appears to be in consonance with the increase in population.

6.4.3 Commercial Development for 2001 AD

With reference to the analysis as shown in the map (9) the part of Dulikhet area is not coming into the active zone of Sadar Bazar area. In addition, as per the zonal plan, the area inbetween Dulikhet and Upat is being developed, for army officers residences. Thus a local shopping center is necessary which will serve the people of Rai-Estate and the new development.

The following table gives the details of the commercial development.

As per the table (15), there are 493 shops in the cantonment and the requirement is 354 shops. As it is serving as a sub-regional shopping center, the number cannot be decreased. As far as spatial distribution is concerned, a new local shopping area should be developed at Ghingarkhal.

Table 16 THE STATEMENT SHOWING EXISTING AND PROPOSED NUMBER OF SHOPS AT VARIOUS SHOPPING AREAS.

S. No. of Shops	Existing No.	Norm	Adequacy	Total No. of Shops required by 2001
A. TOWN CENTER (SADAR BAZAR)				
	432	10 Shops/ 1000 population	Adequate	310
B. LOCAL SHOPPING				
1.	Mall road 17 shops	3 Shops/ 1000 population (TCPO)	Adequate	17
2.	Chaubattia 9 shops	3 Shops/ 1000 population (TCPO)	Adequate	9
3.	Kumpur 9 shops	3 Shops/ 1000 pop. (TCPO)	Adequate	9
4.	Ghingarikhal	3 Shops/ 1000 pop. (TCPO)	Inadequate	9
	TOTAL	-	-	354

6.5 RECREATIONAL FACILITIES

6.5.1 Existing Status

There are five parade grounds in the cantonment. These are maintained and used by the army. The land used for parks is very less and only patches of land as shown in the photograph (12) are developed. As shown in the Table (17),



PHOTOGRAPH.12. PARKS ON THE ROADSIDE PATCHES OF LAND - A FACE LIFT

28-483 acres of land is covered by parks and play grounds. As per the standards for plains (4 acres per thousand population, T.C.P.O. standards) 72-76 acres are necessary. But the deficiency of the open areas was not felt for the following reasons:

- a) having less population
- b) 70% of the cantonment is covered with forests,
- c) cold climate

There are two cinema houses and three recreation clubs existing in the cantonment. There is a U.P. State Government's fruit garden near Chaubattia outside the cantonment limit, which is the only picnic spot. Table no.17 below gives the existing facilities and that are required for 2001 AD.

Table 17 EXISTING STATUS OF RECREATION FACILITIES

S. No.	Item	Existing	Norm	Required for 2001
1.	Parks and play grounds	28.483 Acres	4 Acres/1000 population	Restricted due to nonavailability of flat areas
2.	Auditoriums	-	One/20000 population (COPP)	1
3.	Cinema halls	2	1/35000-40000	-
4.	Recreation clubs	3	1/20000-30000	-

6.5.2 Problems and prospects for 2001

The factors effecting the recreational facilities are:

- a) Population growth,
- b) Physical distribution of the population,
- c) Economic status of the population,
- d) Topography,
- e) Natural resources like water bodies and skiing grounds availability etc.,
- f) Transportation facilities,
- g) Legal restrictions,
- h) Tourists Traffic
- i) Climate

Thus in the development of recreational facilities in the hill areas, it is better to encourage the sports and games that favours the topography and climate conditions, rather than imposing pre-concieved games suited to plains. So the present 5 parade grounds should be put in optimum use, thus giving the civil population, specially students an opportunity and encouragement . The hill sports like mountaineering, skating, rope climbing, gliding should be encouraged. So they should be trained in such fields, where the topography and climate helps a lot.

6.6 TRANSPORTATION FACILITIES

6.6.1 Existing Status

Development of any settlement urban or rural depends on the efficient transportation. Some accomodate the evergrowing number of movement within the urban area; others accomodate movement of persons and commodities to and from the area. As the cantonment is a small town there was no problem of internal movement and it has direct transportation facilities to Delhi, Nainital, Barielly etc.

There are two types of public transportation organisations,

- a) State owned UPSRTC
- b) Private service under the control of Kumaon motor operators union limited (KMOU).

UPSRTC has 54 buses in the cantonment depot. Under long routes, the buses were run upto Delhi, Moradabad and Barielly. On the hills routes buses were run upto Pithoragarh, Julaghat and Almora. But the KMOU Ltd was limited only to the hill region and Kumaon division.






These two transportation authorities run, one bus each to Chaubattia, at half an hour frequency, located little away from the main town.

It has also taxi service which connects various places like Chaubattia, Dulikhet, Dwarhat etc. The range of taxi services operating is from ten to twenty five Kilometers.

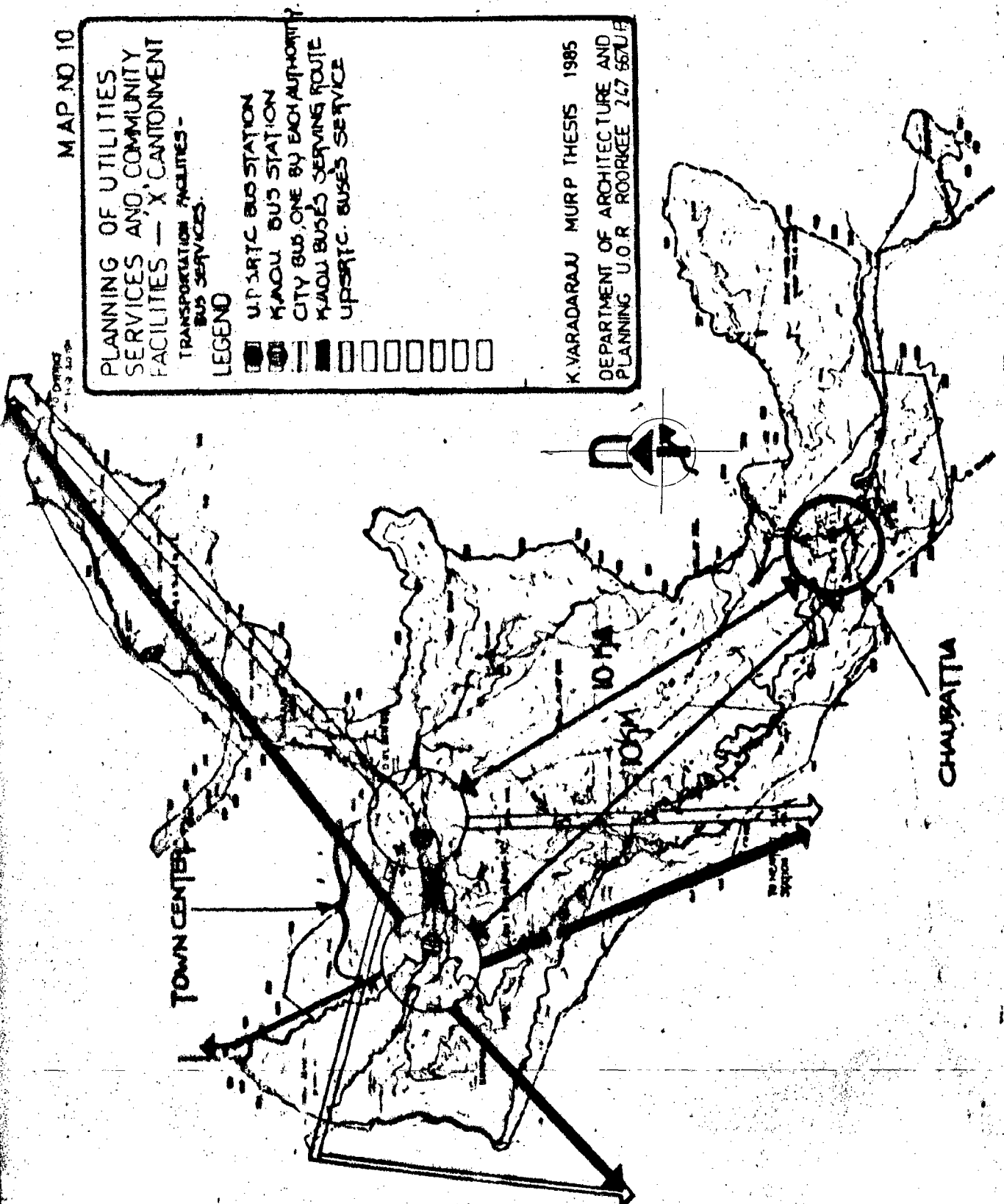
MAP NO 10

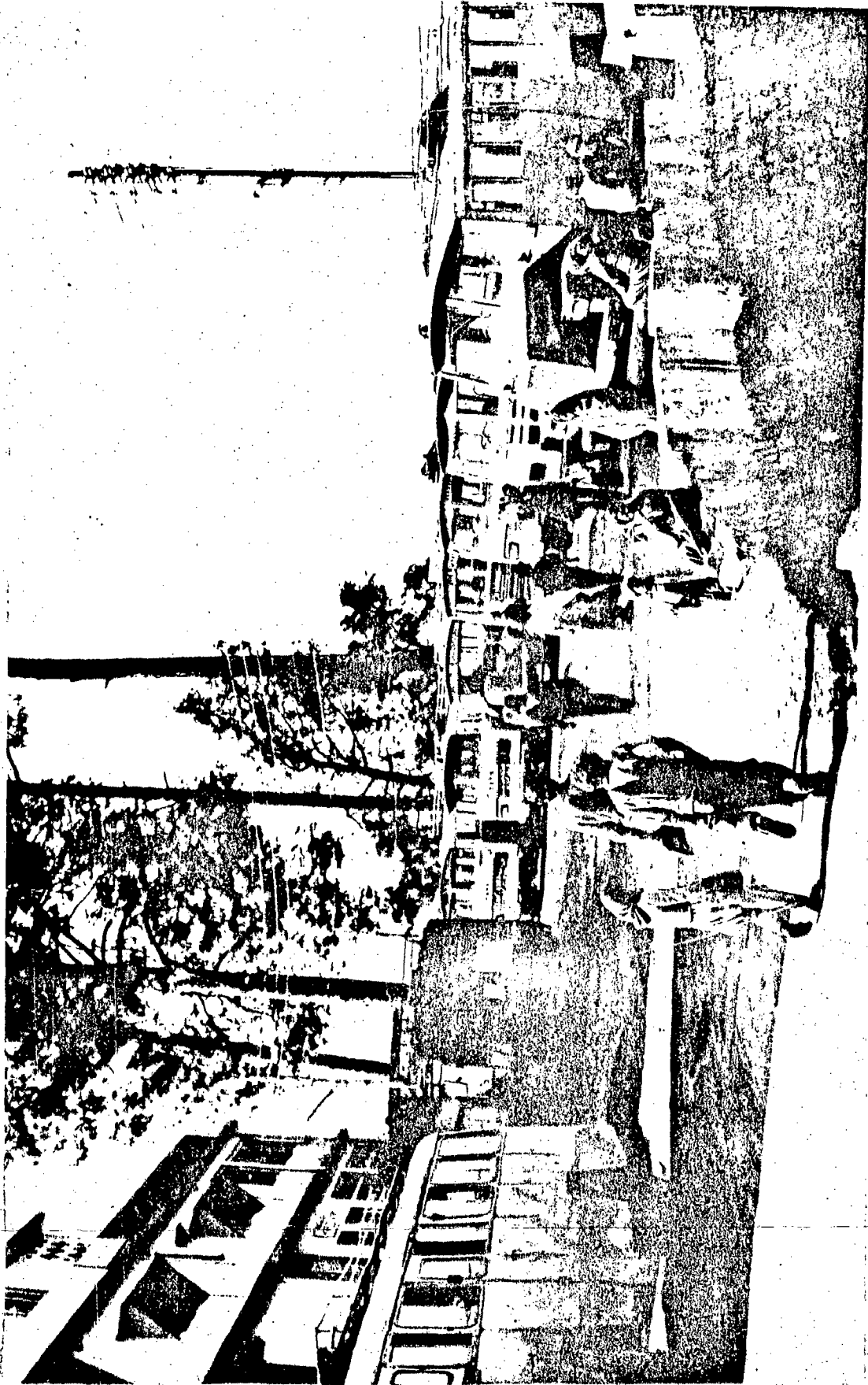
PLANNING OF UTILITIES
SERVICES AND COMMUNITY
FACILITIES — X, CANTONMENT
TRANSPORTATION FACILITIES -
BUS SERVICES.

LEGEND

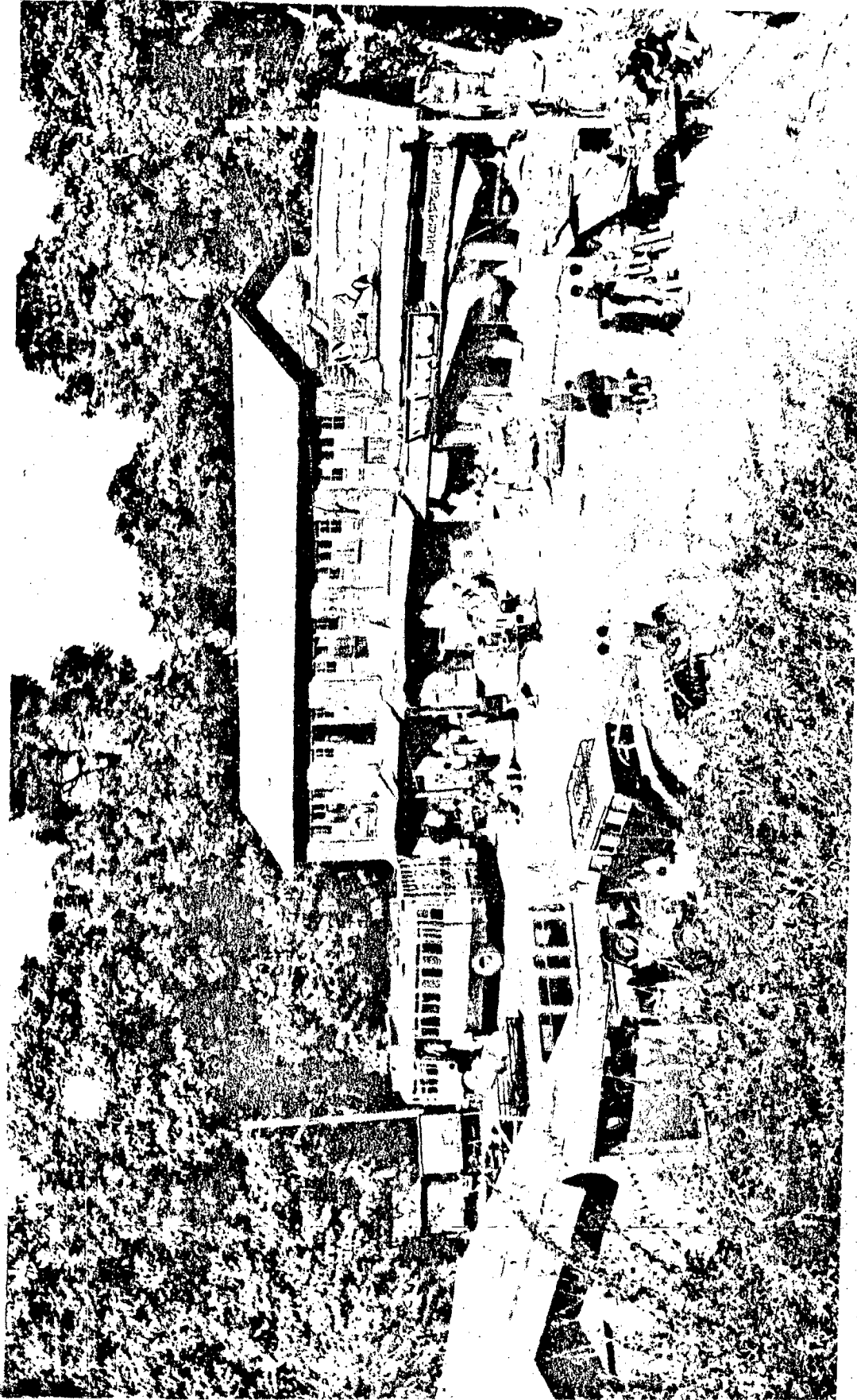
-  U.P.S.R.T.C. BUS STATION
-  K.A.O.U. BUS STATION
-  CITY BUS, ONE BY EACH AUTHORITY
-  K.A.O.U. BUSES SERVING ROUTE
-  U.P.S.R.T.C. BUSES SERVICE

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PLANNING U.O.R. ROORKEE 247 667U.F.





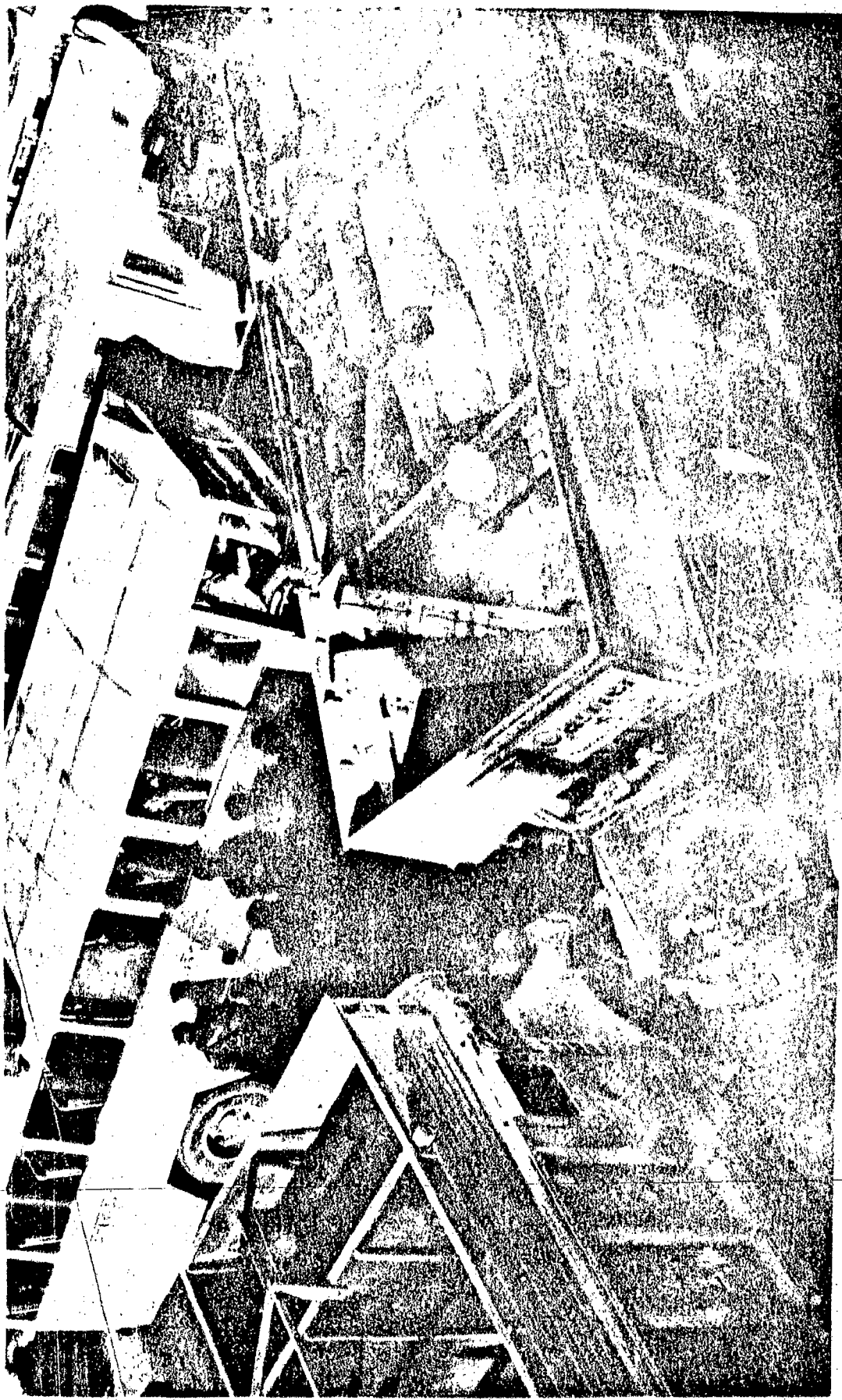
PHOTOGRAPH. 13. BUS STATION - BUSES PARKED ON THE ROAD, WHERE EARTH WAS RETAINED



PHOTOGRAPH . 14. THE CONDITION OF THE PRIVATE BUS STATION



PHOTOGRAPH. 15. THE FLAT OPENSACE ADJACENT TO THE ROAD CONNECTING
THE REGIONAL SETTLEMENTS



PHOTOGRAPH 16. BUSES PARKED AT THE TURNING POINT NEAR BUS STATION.
— TRAFFIC JAM — CAUSE : WRONG LOCATION OF THE BUS STATION

6.6.2 Transportation facilities for 2001

In general there is no problem of parking. But this problem is arising only in the case of UPSRTC buses near the R.T.C. bus-station. As shown in the photograph (16) frequent traffic jams occur. So in order to overcome this problem, I propose that a new common bus-station, near the KMOU bus-station on the open area shown in the photograph (15). It convenes the passengers to get into the private and R.T.C. buses from the same place. The workshop will be in the original place.

CHAPTER-7
PUBLIC SERVICES

7.1 INTRODUCTION

Public services are those services which are offered for the welfare of the community without charging the public directly. For example, roads, Police stations, Fire stations, banks, libraries are some of such facilities.

7.2 ROADS

7.2.1 Hierarchy

The roads are primary services required for the improvement of transportation facilities. In the contonment, there are three types of roads.

- a) P.W.D. roads : These roads are laid and maintained by P.W.D. These roads connect the contonment, with the rest of the sub-region.
- b) Contonment Board Roads : These roads are maintained by the contonment Board. These are limited to the civil areas only.
- c) MES Roads : These roads are laid and maintained by MES. These are laid in the active areas only.

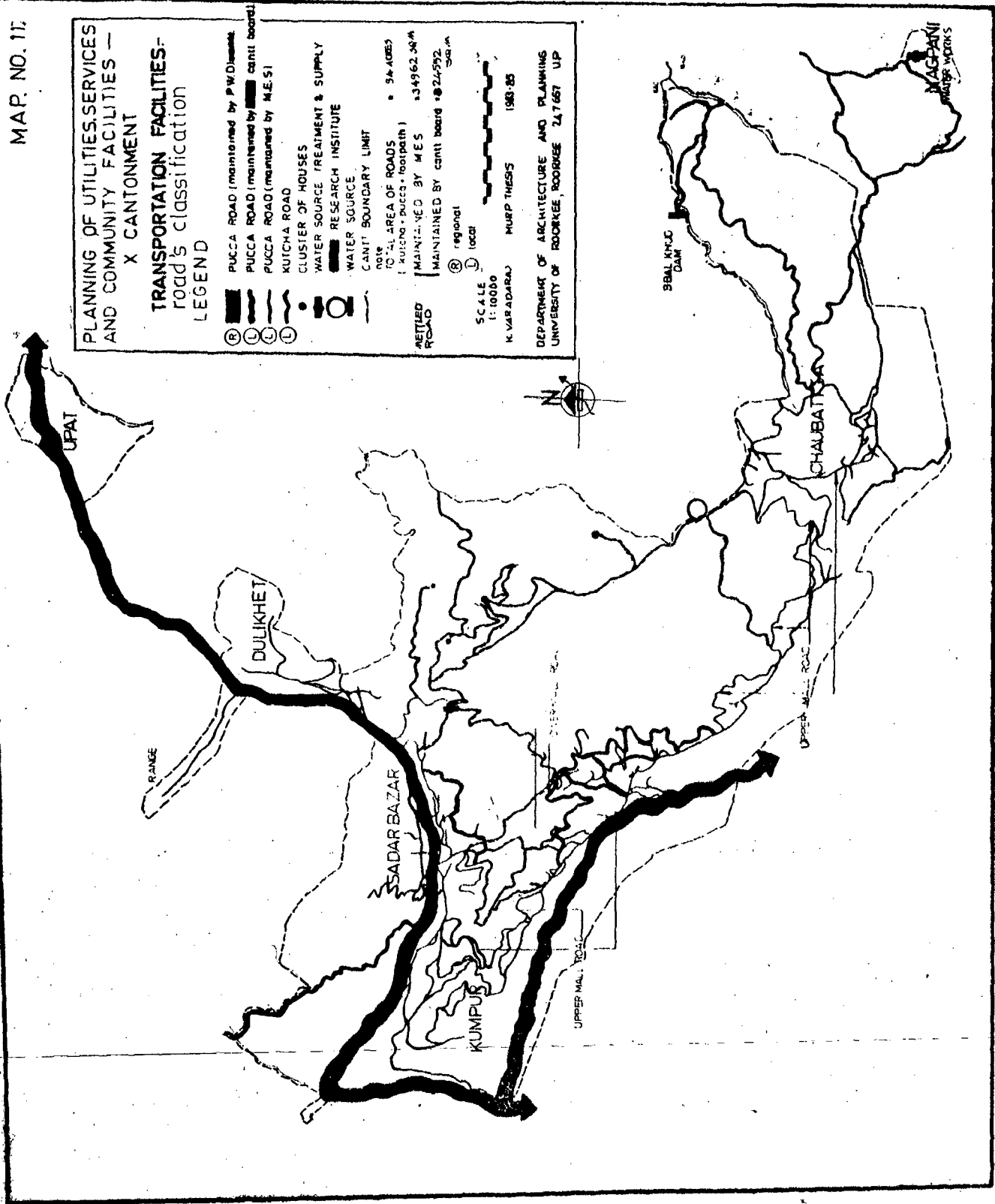
7.2.2 Environmental Impact in the mountain road construction

In general, the most part of the mountain sides are covered with light to moderate growth of timber. The most elemental part of the construction of the ghat road is

MAP. NO. 11

PLANNING OF UTILITIES, SERVICES AND COMMUNITY FACILITIES — X CANTONMENT
TRANSPORTATION FACILITIES-
 road's classification
 LEGEND

(R) P.U.C.A. ROAD (maintained by P.W. Division)
 (C) P.U.C.A. ROAD (maintained by cantt board)
 (L) P.U.C.A. ROAD (maintained by M.E.S.)
 (K) KUTCHA ROAD
 CLUSTER OF HOUSES
 WATER SOURCE TREATMENT & SUPPLY
 RESEARCH INSTITUTE
 WATER SOURCE
 CANTT BOUNDARY LIMIT
 NOTE
 TO 74. AREA OF ROADS = 54 ACRES
 (KUTCHA + P.U.C.A. + FOOTPATH)
 MAINTAINED BY M.E.S. = 3349.62 SQ.M
 MAINTAINED BY cantt board = 24592 SQ.M
 (R) regional
 (L) local
 SCALE 1:10000
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simply tearing up the surface of the hill as shown in the figure (10). This creates problems like destabilisation and erosion of soil, caused by the exposure of slopes and vegetation destruction. Due to these cuts and fills the natural streams are encroached, and hence diversion of the stream water, which finally becomes problematic, causing soil erosion and land slides. The tribals and wild life are the most disturbed, due to occupation of their territory.

7.2.3 Existing status and future needs

The cantonment, Board is maintaining 8.184 Km of metalled road and 11.146 Km of unmetalled road. In the cantonment 94 acres of land is under roads including Kutcha and pucca roads, foot paths. It has good network of roads which is 7.62% of the gross developed area, including civil and military areas.

The development takes place only by the side for about 1/4 Km adjacent to the main roads in the hill region. Thus there is no much need for the future and the existing roads are adequate, only development of few residential streets and footpath are necessary.

7.3 SECURITY

7.3.1 Police Stations

The cantonment has one police station and three police out posts. The police station is situated in the sadar bazar area. It covers approximately 14 Km radius.

The police out posts are located only in the civil areas of the town. These are distributed at Kumpur Chaubattia and Mall road one at each place. From 1980-1984, the maximum number of incidence of crime was 49 as shown in the table (18). In the zonal plan no remarkable development was suggested for the civil areas. Compared to other towns incidence of crime here is low, thus no additional outpost, required.

Table 18 INCIDENCE OF CRIME

S.No.	Type of Crime	Year				
		1980	1981	1982	1983	1984
1.	Decoity	1	2	1	-	1
2.	Looting	-	1	-	2	1
3.	Murdor	-	2	-	-	2
4.	Riots	-	1	3	-	2
5.	Pickpocket	8	9	12	1	1
6.	Theft	9	6	10	10	6
7.	Accidents	-	3	3	3	3
8.	406/409/420 P.C.	3	4	3	2	7
TOTAL		36	44	49	28	35

—SOURCE: S.H.O. X-CANTONMENT

7.3.2 Fire Station

Fire station service is one of the important facility. The town has one fire-station as shown in table (19). In ordinary conditions one fire station can serve upto 5 Km distance radius. So the existing fire station fulfils the civilians necessity.

FIG 10 HILLS-CUT FOR THE CONSTRUCTION OF HILL-ROADS



Table 19 DETAILS OF FIRE FIGHTING ARRANGEMENTS

Year	Machinery			Staff			Expenditure	
	Jeep	Fire engine	Water tanks	Fire officer	Fire Driver	man	Extg.	Reqd.
1976-77	1	1 (mounted on jeep)	200 gals	1	10 (part time)	1	5986.62	18500.00
1977-78	-do-		-do-	-do-	-do-	-do-	8111.00	-
1980-81	-do-		-do-	-do-	-do-	-do-	13834.00	-
1981-82	-do-		-do-	-do-	-do-	-do-	10626.00	-

SOURCE: CANTT BOARD

7.4 MISCELLANEOUS FACILITIES7.4.1 Banks

Under the branch licensing policy, R.B.I. recommends spreading out of the banking services to remote unbanked centres. Previously it was thought that bank is only a place of business for monetary exchange, limited to rich. But now, banks have become one of the important money exchangers for all. Thus the RBI has reduced the population norm of 10,000 per office to 5000 per bank in metropolitan and certain selected urban centres.

At present there are six banks in cantonment 'X' as given below.

1. State Bank of India
2. Punjab National Bank
3. Zilla Co-operative Bank

4. Gramin Bank
5. Durga Saha Mohan Saha Bank
6. Nainital Bank

The above distribution of banks shows the availability of Banks for different sections of the people. When number of banks are taken on the population basis, only four banks are required, thus there is no additional requirement.

7.4.2 Libraries

Library and the community inter act with each other. The modern library is a living force in the community where it functions. It has potentiality to determine the shape and quality of its community. Therefore, it ought to be moulded to serve cater to the needs of that community.

In the cantonment there are two libraries. One at Sadar Bazar, which is maintained by the Cantt Board and the other at Recreation club, maintained by club authorities. As per the instruction of S.R. Ranganathan and Neelamegham, in their Five tier integrated public library system a library per 25000 population is necessary. So the existing libraries adequately service the present population.

MAP NO. 12

PLANNING OF UTILITIES, SERVICES AND COMMUNITY FACILITIES - X CANTONMENT

LAND USE CLASSIFICATION

LEGEND

- ACTIVE MILITARY AREA
- CIVIL AREA
- COMMERCIAL
- WATER BODY
- ROADS
- OPEN SPACES
- FOREST

SCALE 1:10000

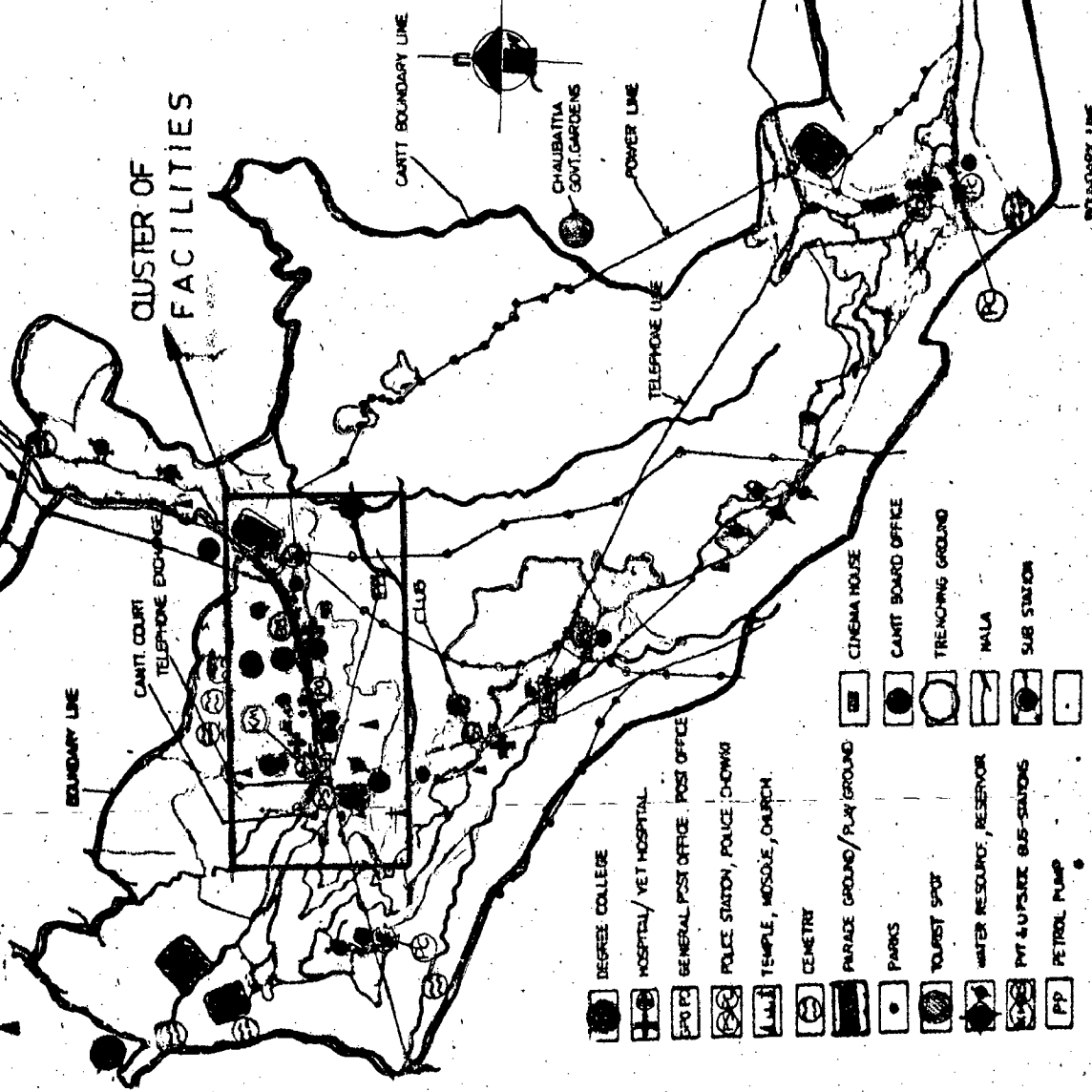
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COMMUNITY FACILITIES 1/4 LAND USE

LEGEND

- NURSERY SCHOOL
- PRIMARY SCHOOL
- HIGHER SECONDARY SCHOOL
- BOUNDARY LINE
- TELEPHONE LINE
- POWER LINE



- DEGREE COLLEGE
- HOSPITAL/VET HOSPITAL
- GENERAL POST OFFICE, POST OFFICE
- POLICE STATION, POLICE CHOWKI
- TEMPLE, MOSQUE, CHURCH
- CENETRY
- PARADE GROUND/PLAY GROUND
- PARKS
- TOURIST SPOT
- WATER RESERVOIR, RESERVOIR
- PVT SUPPLIES BUS-STANDS
- PETROL PUMP
- BOUNDARY LINE
- TELEPHONE LINE
- POWER LINE
- CINEMA HOUSE
- CANTT BOARD OFFICE
- TRENCHING GROUND
- MALA
- SUB STATION

MAP NO. 13

PLANNING OF UTILITIES
SERVICES AND COMMUNITY
FACILITIES X CANTONMENT
PROPOSED BROAD LANDUSE
(based on Zonal plan of Cantt)

LEGEND

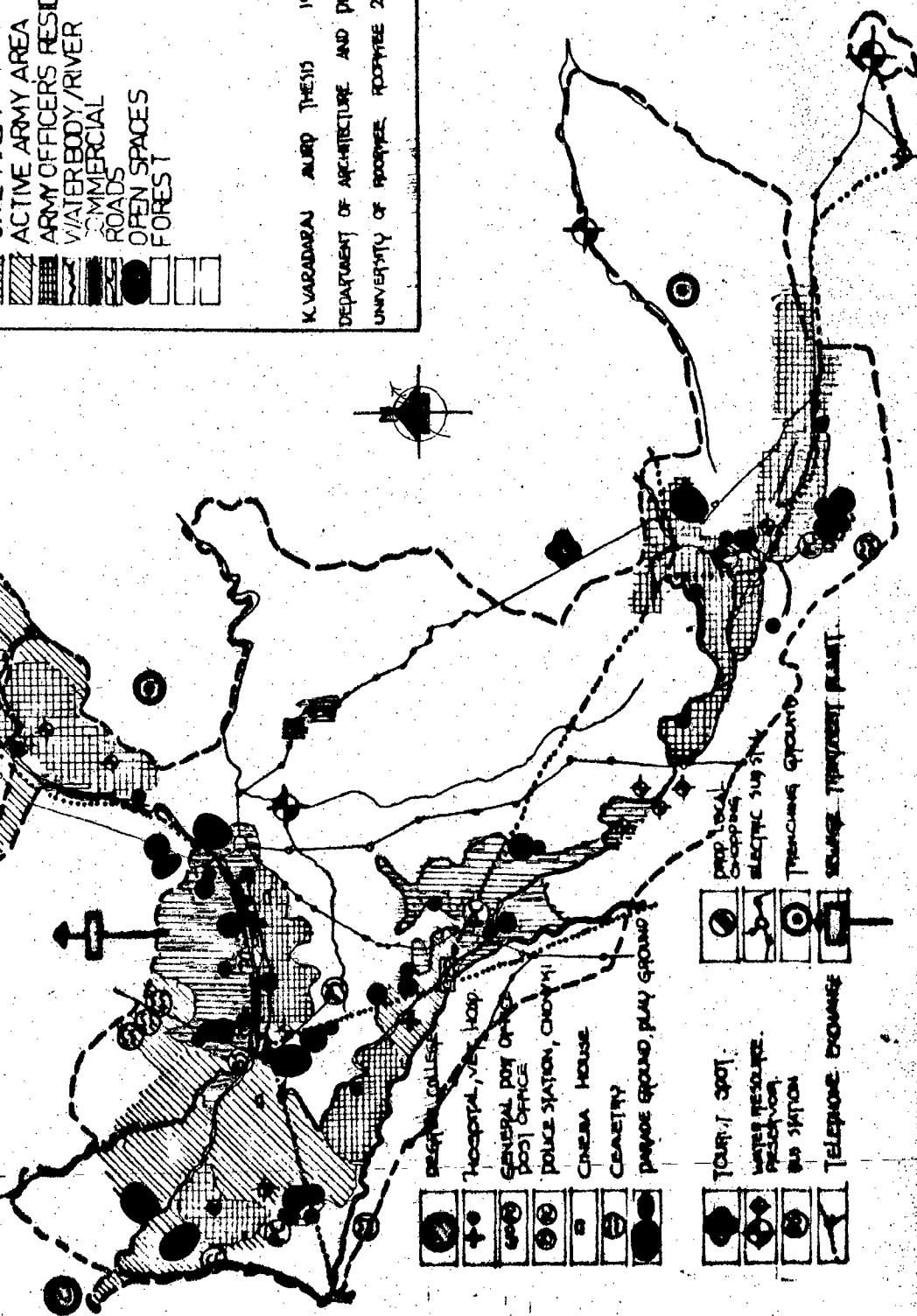
- CIVIL AREA
- ACTIVE ARMY AREA
- ARMY OFFICERS RESIDENTIAL
- WATER BODY/RIVER
- COMMERCIAL
- ROADS
- OPEN SPACES
- FOREST

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UNIVERSITY OF ROOFTOP, ROOFTOP 20667(UP)

COMMUNITY FACILITIES FOR 2001

Legend

- HIGHER SCHOOL
- PRIMARY SCHOOL
- H.S. SCHOOL
- BOUNDARY LINE
- PROPOSED LAND FOR FUTURE EXP.
- WATER BODY
- OPEN SPACES



- HOSPITAL, VET. HOSP.
- GENERAL POST OFFICE
- POLICE STATION, CHOWKI
- CINEMA HOUSE
- CEMETERY
- PARADE GROUND, PLAY GROUND
- TOURIST SPOT
- WATER RESOURCE
- BUS STATION
- TELEPHONE EXCHANGE
- HIGHER SCHOOL
- PRIMARY SCHOOL
- H.S. SCHOOL
- BOUNDARY LINE
- PROPOSED LAND FOR FUTURE EXP.
- WATER BODY
- OPEN SPACES
- COLLEGE
- HOSPITAL, VET. HOSP.
- GENERAL POST OFFICE
- POLICE STATION, CHOWKI
- CINEMA HOUSE
- CEMETERY
- PARADE GROUND, PLAY GROUND
- TOURIST SPOT
- WATER RESOURCE
- BUS STATION
- TELEPHONE EXCHANGE
- HIGHER SCHOOL
- PRIMARY SCHOOL
- H.S. SCHOOL
- BOUNDARY LINE
- PROPOSED LAND FOR FUTURE EXP.
- WATER BODY
- OPEN SPACES
- COLLEGE
- HOSPITAL, VET. HOSP.
- GENERAL POST OFFICE
- POLICE STATION, CHOWKI
- CINEMA HOUSE
- CEMETERY
- PARADE GROUND, PLAY GROUND
- TOURIST SPOT
- WATER RESOURCE
- BUS STATION
- TELEPHONE EXCHANGE
- HIGHER SCHOOL
- PRIMARY SCHOOL
- H.S. SCHOOL
- BOUNDARY LINE
- PROPOSED LAND FOR FUTURE EXP.
- WATER BODY
- OPEN SPACES
- COLLEGE
- HOSPITAL, VET. HOSP.
- GENERAL POST OFFICE
- POLICE STATION, CHOWKI
- CINEMA HOUSE
- CEMETERY
- PARADE GROUND, PLAY GROUND
- TOURIST SPOT
- WATER RESOURCE
- BUS STATION
- TELEPHONE EXCHANGE

CHAPTER-8

RECOMMENDATION AND CONCLUSION

8.1 RECOMMENDATIONS

- a) Like present Cantonment, where the cantonment becomes a service center of the sub-region, development of that region should be considered simultaneously and integrated with the development of the urban centre.
- b) In the hill regions, similar to the present cantonment, where the water is tapped from various sources, the settlements in the down-hill region suffer from water scarcity. Thus the development of water supply should be considered, in conjunction with the needs and requirements of water of the surrounding settlements specially in down down-hill areas.
- c) Development of the shopping or other structures should not be permitted on the down-hill side of the road, as it disturbs the scenic beauty of the snow clad mountains and also makes the road more congested.
- d) In the hill areas, uniform distribution of population is not possible, due to its topography. Thus the distribution of the educational institutions at the specified areas must be well planned.

In my present study the educational institutions revealed, that the major number of institutions were located in the densely populated Sadar bazar area. Some of these do not have

proper access and are not located in consonance with the needs of the people. Thus making it incumbent to shift them to new locations.

- e) The local industries which needs to be given boost are the cottage industries pertaining to woollen cloth, shawls, beekeeping, manufacture of bamboo mats and furniture etc. However it is proposed that heavy emphasis laid on importing synthetic wool from the plains for this purpose to safegaurd denusion of soil cover due to over grazing by sheep.

To provide economic boost to the civilian population in such cantonments and to divert their attention to the surrounding selected settlements, industries which have very low input-output bulk ratio such as electronic industries which however may require buildingup talent and may be possible due to high litracy levels obtaining, must be established at those settlements.

- f) While there is a need to connect surrounding villages with the cantonment and the main thoroughfares to have a two-way movement of goods and services flowing from these settlements to the larger urban locations and market places and vice-versa, it is necessary that a caution must be exercised to ensure that the ecology of the area is not disturbed unduly. Falling of goods and services, therefore may be considered by building some experimental gravity ropeways in the selected locations.

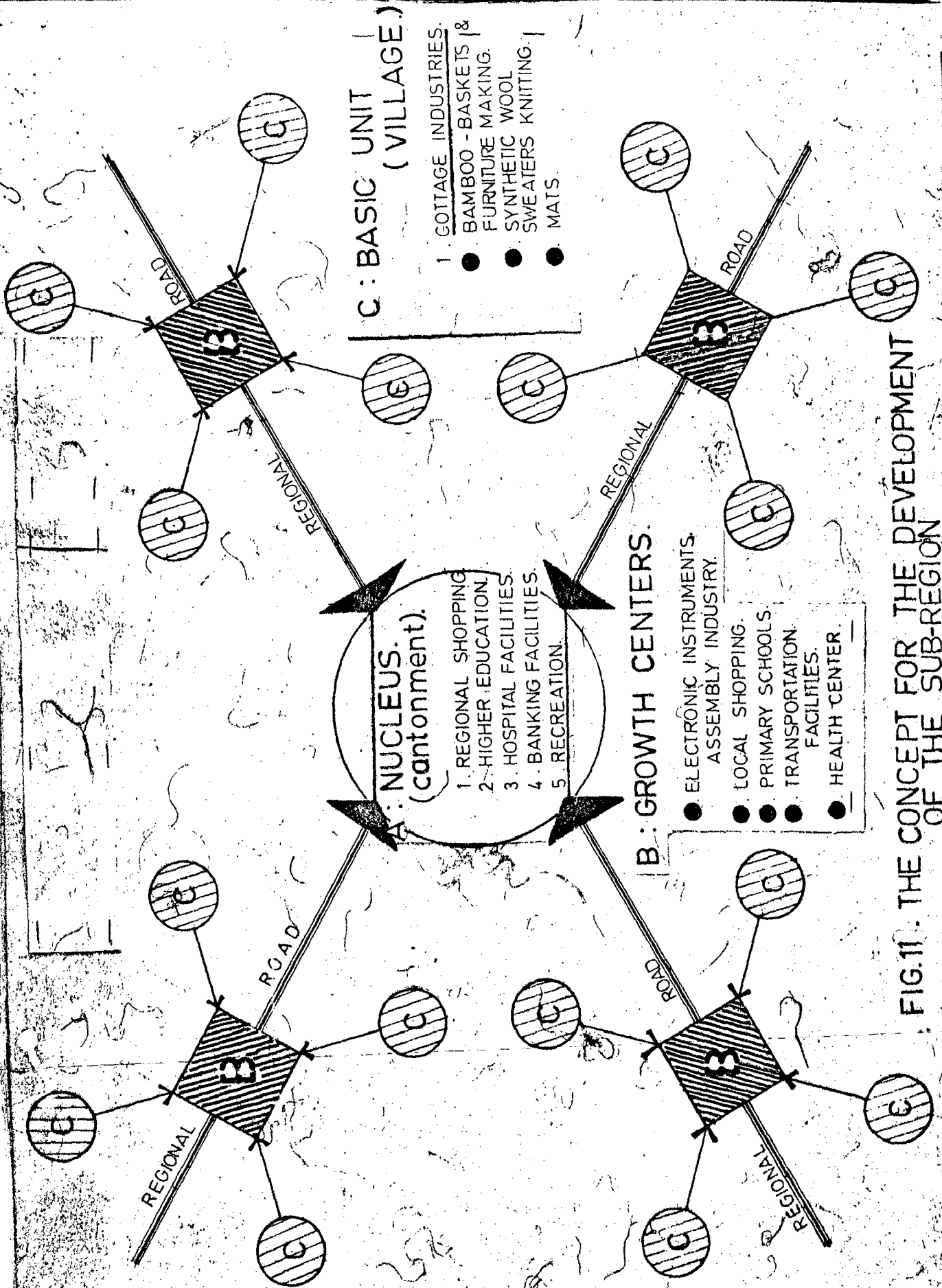


FIG.11. THE CONCEPT FOR THE DEVELOPMENT OF THE SUB-REGION

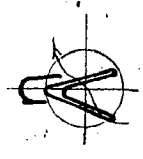
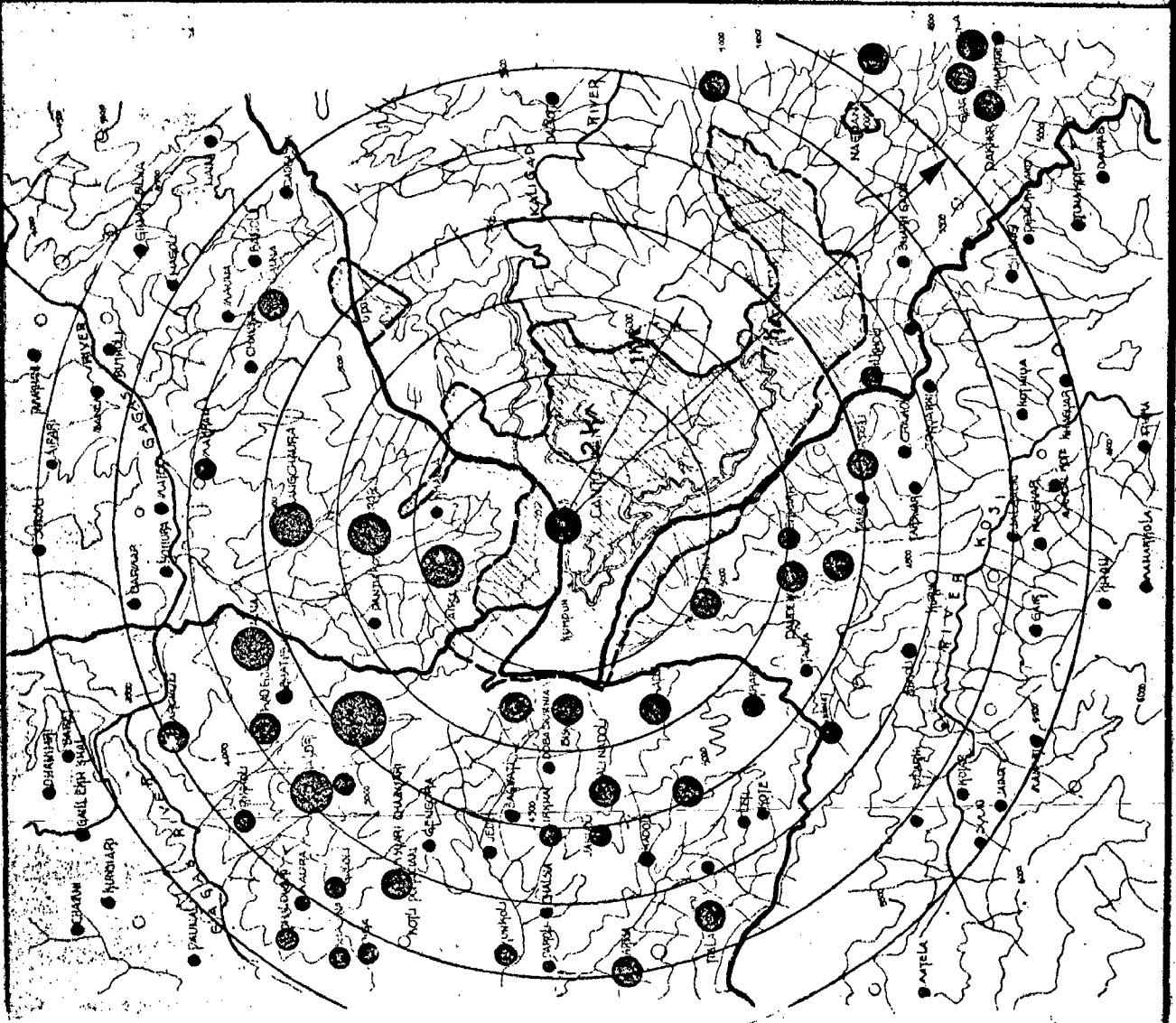
MAP NO.14

PLANNING OF UTILITIES SERVICES
AND COMMUNITY FACILITIES -
X CANTONMENT

SETTLEMENTS PATTERN

LEGEND

●	0 - 100
●	101 - 200
●	201 - 500
●	500 - 1000
●	1000 - 1500
—	ROADS



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- g) For effective servicing of the settlements within the surrounding region, settlements which have potential for growth and which are central to few settlements in their surroundings, should be identified for instituting the minimum facilities like primary schools, small shopping centres, dispensaries and small scale electronic industries as explained above at (f).

This idea has been schematically illustrated in Fig.(11). Limitations of time and resources had restrained me from making actual proposals in this respect. The brief idea of the settlement pattern is illustrated in Map No.(14) with reference to population.

- h) Because of scarcity of land required for play grounds it may be worth considering to encourage indoor and other sports which provide opportunities for full measure of physical exercise for different groups, that do not require a large chunks of levelled grounds. Emphasis could be made on indoor sports and gymns.

i) Play Grounds

Play grounds are a scarce commodity in the hill settlements. Thus the existing grounds should be used optimally.

Further, trenching grounds should be well maintained, properly developed and designed so that they may be used as the play-grounds in the later days, when they are abandoned after reaching certain stage.

- j) Tourist traffic should be discouraged by encouraging the construction of the cottages and lodges in the nearby major selected settlements and by increasing the toll and other taxes.
- k) To rationalise the amount of tourist traffic that can be amicably accommodated in the region- without jeopardising environmental and ecological grace of the area, concerted studies should be undertaken to assess the carrying capacity of the whole area and its parts, for effective implementation of taxation and other measures to control the inflow of tourists.

8.2 CONCLUSION

- 1) The Cantonment being the only urban centre of the Tehsil, it is acting as important and attractive hub for the numerous rural settlements falling in the orbit of its influence. In the present study it has been revealed that the people commute daily to this urban centre from as far as 10 Km. for variety of services. Because of high level of amenities, facilities and economic opportunities available in the town many people from the distant villages have tendency to migrate and settle in this urban centre permanently. This is not a healthy trend and can prove disastrous for both the cantonment and the region surrounding it. Therefore, to stall this trend it is imperative, that the regional development should be taken up simultaneously along with the development

of the cantonment, preferably the former should precede the later.

- 2) Although water supply and sanitary facilities constitute perennial problem in all our urban settlements they are of echoes of special concern in the hill towns because of their sensitive and delicate environmental disposition and ecological balance. The present cantonment while adequate in terms of several other facilities, does have a problem of raising per capita consumption of water and disposal of human and other waste, because of its altitude for which concerted scientific studies are required which would provide solution for digestion of waste without polluting the environment.
- 3) We are entering into the 21st Century and electric power supply is supposed to be an essential utility for the comfortable living of the human being. The cantonment has electricity with 75.94% of the population enjoying the same. But in the cantonment's subregion, only two settlements out of 117 settlements are having electricity supply (1971 census). Thus the electric power supply facilities should be given more weightage in its development.
- 4) In the present competitive world, the efficient services of the educational institutions are in much need, along with the growing literacy rate. In the present urban

world, specially in the hill areas, much care should be taken in the spatial distribution, so that they may not increase pressure on the services and further deteriorate the conditions of densely populated areas.

- 5) The commercial centres become, core areas for the urban development, intensifying the population concentration and further attracting people by offering services. So specially in the hill areas due to the development on **both the** sides of the roads, which obstructs the vision of scenic beauty of it's surrounding areas. So special studies of the commercial development in the hill region are necessary in order to overcome such obligations.
 - 6) In the hill areas, in addition to the ordinary traffic problems which are to be studied for the provision of smooth transportation facilities, the travel of vertical distances are also should be the matter of concern. Thus in this connection it is imperative, to follow the contours in laying the roads increasing the horizontal distances inbetween, which disturbs the natural echoe system by it's construction. Thus the potentials of the settlements of surrounding sub-region ~~should be studied, in order to provide rapid transportation system facilities with modern technology like cable cars, rope ways etc.~~
-

APPENDIX-1

DETAILS OF WORKS CARRIED OUT DURING THE YEAR 1983-84 and
1984-85

Sl. No.	Item	1983-84		1984-85	
		PRIORITY	EXP.	PRIORITY	EXP.
1.	Improvement of water supply Extg: 1,05,000 Gals from MES day own supply 40,000 gal/day	I	Rs.20 lacs	I	Rs.40 lacs
2.	Conservancy Vehicles 2 trucks 1 tractor trailer	II	Rs. 1 lac	II	-
3.	Sanitation	III	Rs.3.5 lacs drain improvement Rs. 15 lacs Laying of Sewage line I phase --	II	Rs.4 lacs
4.	Provision of tubes and electric lights extension	IV	Rs.1.5 lacs		
5.	Re-surfacing of roads	V	Rs.2 lacs	III	Change from Kutchha to pucca Rs. 2 lacs
6.	Construction of Harijan Qtrs.	VI	Rs. 2 lacs	II	Rs. 2.6 lacs (I phase) 45 Nos.
7.	Provision of Sewerage system		-	III	Rs. 40 lacs (I phase)
8.	Renovation of Buffalo lines	VII	Rs. 2 lacs		
9.	Afforestation	VIII	Rs. 1 lacs		
10.	Purchase of fire engine, construction of water tanks in the main localities.	IX	Rs. 5 lacs		

SOURCE: CANTT BOARD ANNUAL REPORT

APPENDIX - 2

LINE PLANS SHOWING YEAR WISE DETAILS TO BE UNDERTAKEN DURING 7th 5 YEAR PLAN 1985-90

Sl. No.	CIVIC AMENITIES AVAILABLE AT PRESENT	AMENITIES AVAILABLE IN NEIGHBOURING MUNICIPALITIES NAINITAL	DEFICIENCY	PROJECT PRIORITY	DETAILS OF PROPOSED PROJECTS ALONGWITH ITS ESTIMATED COST TO BE UNDERTAKEN	NECESSITY OF THE PROJECT
				1985-86 1986-87 1987-88 1988-89 1989-90		
I.	WATER SUPPLY 1. In bulk MES 1,05,000 gal/day 2. Cantt. Board's Supply 40000 gal/day	Supplied by Jalnigam	2 lac gal	I	From Jalnigam Rs. 40 lacs II phase replacing old dist. line 4 lacs replacing old dist. line 4 lacs Replac- ing mint ing old dist. line 4 lacs Res. const. 40000 gal Kumpur 10 lacs	2 lac gallons pumped from river Gargas/ Chaukani to Ghingarikhhal Estate 5 lacs
II.	TOURIST COTTAGE	Residential accommodation in Municipal board	5 tourist cottages	VII	- 3 Cottages 1.8 lacs 2 Cottages 1.5 lacs	To construct 5 cottages for tourists

Contd...

Contd. --

III. CONSER VENCY VEHICLES 2 Trucks, 1 Tractor	One Truck and Night soil tanker	II	night soil tank Rs25,000	Cons- vency vehicles 1.21 lacs	Rs.20000	-	-	Composting and trench- ing ground Ghingarikhel
IV. PUBLIC Latrines 58, Nos.	Flush type 143 to be conver- ted	II	1 lac I phase	1.5 lacs II	1.01 lacs III	1.05 lacs IV	2 lacs V	58 latrines 350 seats
V. STREET LIGHT- ING E. Bulbs 100 Nos. Tubes-21-20w- 31Nos., Tubes 41- 40w-167Nos. Mercury Vapour Lamps 18 Nos, Sodium Vapour 4 Total=320	-	-	2.5	1.25	-	-	-	-

SOURCE: CANTI BOARD PROPOSED DRAF

APPENDIX -3

EXPENDITURE ON UTILITIES AND SERVICES
(ANNUAL ADMINISTRATION REPORT 1984-85)

a) <u>Building:</u>	
Cantt fund Buildings/Stalls maintained and repaired	Rs.26,921.00
b) <u>Roads:</u>	
Maintained and repaired	Rs.1,16,677.00
c) <u>Drainage:</u>	
Amount spent	Rs. 47,771.00
d) <u>Water Supply:</u>	Rs.1,09,320.00
e) <u>Stores</u>	Rs. 81,437.00
f) <u>Miscellaneous</u>	Rs. 970.00
	<hr/>
Total Expenditure	Rs.3,83,096.00
	<hr/>

SOURCE: CANTT BOARD ANNUAL REPORT

APPENDIX-4

TAX COLLECTION OF CANTT BOARD-NEIGHBOURING MUNICIPALITY

Sl. No.	Tax	X-CANTT BOARD	NEIGHBOURING MUNICIPALITY
1.	House Tax	10% of annual letting value of the building	5 $\frac{1}{2}$ % of annual letting value
2.	Water Tax	10% of annual letting value of the Building	6% of annual letting value
3.	Scavenging tax	Min.Rs.4.00 per annum Max.Rs.120.00 per annum	Rs.18.00 per annum on latrines Rs.9.00 per annum for public latrines
4.	Profession Tax	Min.Rs.0.62 per annum Max.Rs.62-50 per annum	Not available
5.	Dog Tax	Rs.2.00 per dog/annum Rs.3.00 per 2 or more dogs	Rs.1.00 per dog/annum
6.	Cycle Tax	Rs. 3.00/annum	-
7.	Toll Tax		
	a) Motor Car	Rs.2.00 per car +Rs.2.00 per passenger	a) Rs.2.00 per seat
	b) Trucks and Buses	Rs. 10.00 per vehicle +Rs.1.00 per occupied seat +Transit fees Rs.2.00	b)i) Trucks Rs.12.00 each ii) Passenger buses Rs.15.00 each iii) Taxies Rs.5.00 each iv) Transit fees Rs.2.00 per vehicle
	c) Annual Toll pass for residents of town	Rs.15.00 each	Toll pass Rs.20.00 per annum per passenger

SOURCE: CANTT BOARD ANNUAL REPORT

APPENDIX-5

RESULTS OF HOUSEHOLD SURVEY AT A GLANCE, CANTONMENT

Sl. No.	Description of Item	Sample size				
		Civil population 122	Army population 90	For the whole Town (3+4) House- holds 212(5.79%)		
1	2	3	4	5		
1.	No. and percentage of migrant households	54 (44.3)	59 (65.56)	113 (53.5)		
2.	Duration of Migration (Percentage of households)					
	a) 0 - 5 years	38.89%	88.14%	64.60		
	b) 6 - 10 years	14.81%	0.0%	7.08		
	c) More than 10 years	46.30%	11.86%	28.32		
3.	Average number of members/household	5.9	3.7	4.97		
4.	a) Average number of males/household	3.20	2.0	2.7		
	b) Average number of females/household	2.70	1.7	2.27		
5.	Average number of increasing members/household	1.42	1.08	1.28		
6.	Average household monthly income	Rs.1024.18	Rs.927.22	Rs.982.82		
7.	a) Percentage of households living in 'kutcha houses'	22.4	29.85	25.1		
	b) Percentage of households living in 'Pucca houses'	77.6	70.15	74.9		
8.	Average number of habitable rooms	2.52	1.89	2.25		
9.	Percentage of households living in single habitable room	30.33	38.9	33.97		
10.	Percentage of households having bath room	54.55	52.22	53.56		
11.	Percentage of households having W.C.	45.45	50.00	47.39		

contd..2

	2	3	4	5
12. Percentage of households having electricity connection		77.05	74.44	75.94
13. a) Percentage of households having private tap connection		67.21	0.00	38.68
b) Percentage of households having common tap		18.85	83.33	46.22
c) Percentage of households depending on other sources		13.94	16.67	15.10
14. Percentage of households having proper waste disposal system (septic tank)		37.19	36.67	36.97
15. Percentage of households using various types of fuels for cooking:				
a) L.P.G.		38.84	11.22	27.11
b) Kerosene		26.45	26.67	26.54
c) Fire wood		49.58	53.33	51.17
d) Coal/wood charcoal		23.14	20.00	21.80
16. a) Percentage of households owning bicycles		8.26	5.56	07.10
b) Percentage of households owning scooter/Motor-cycle		13.22	3.33	09.00
c) Percentage of households owning car		2.48	00.00	01.42
d) Percentage of households not having any vehicle		76.86	91.11	82.90
17. Particulars on Use of Various Facilities				
I Educational Facilities				
a) Average distance travelled by household for education		2.6 Km	2.8 Km	2.69 Km
b) Percentage of households using various modes of transport				
i) Own vehicle		2.5	0.0	01.42
ii) Bus service		20.0	0.0	11.32
iii) Walking		77.5	100.0	87.26

:3:

	1	2	3	4	5
17. II. Medical Facilities					
a) Average distance travelled by household for medical facilities			2.5 Km	2.9 Km	2.67 Km
b) Percentage of household using various modes of transport					
i) Own vehicle			6.6	00.0	3.80
ii) Bus service			19.0	1.15	11.42
iii) Walking			74.48	98.85	84.78
III. Shopping Facilities					
a) Average distance travelled by household for shopping facilities			1.7 Km	2.8 Km	2.2 Km
b) Percentage of household using various modes of transport					
i) Own vehicle			2.94	1.14	2.15
ii) Bus service			2.94	0.00	1.69
iii) Walking			94.12	98.86	96.13
IV. Recreational Facilities					
a) Average distance travelled by household for Recreational Facility			1.25 Km.	2.75 Km.	1.88 Km.
b) Percentage of Household using various modes of transport					
i) Own vehicle			2.48	1.14	1.91
ii) Bus service			1.65	0.00	0.95
iii) Walking			95.87	98.86	97.14

APPENDIX-6

NUMBER OF PERSONS VISITING/PASSING THROUGH CANTT.

Sl. No.	Month	Year			
		1981	1982	1983	1984
1	January	15,103	12,804	14,303	14,526
2	February	22,008	13,005	14,014	14,319
3	March	17,208	15,023	16,223	18,032
4	April	17,031	21,026	21,534	23,344
5	May	34,020	24,059	31,023	42,045
6	June	25,509	23,025	38,022	27,726
7	July	19,204	18,000	20,010	24,028
8	August	21,507	17,980	22,105	19,024
9	September	21,025	16,008	18,508	21,223
10	October	23,011	21,542	19,425	23,466
11	November	18,006	17,338	18,015	19,220
12	December	15,311	17,655	13,514	16,224
13	Total	2,48,943	2,17,465	2,46,696	2,63,177

SOURCE: a) TOLL TAX OFFICE
b) TOLL TAX NUMBER

APPENDIX-7A

STUDENTS COMING FROM LOCAL AND NEARBY VILLAGES

Code No.	Locality	Students	Teaching Staff	N.T. Staff
1	Airora	100	1	
2	Airoli	15		
3	Badhan	3		
4	Kharkhet	50		
5	Guloli	30		
6	Khairani	20		
7	Panth Kotli	45		
8	Talla Biswa and Malla Biswa	150		
9	Singoli	10		
10	Drugs factory	10		
11	Pandekote	15	1	
12	Khaniya	175	3	
13	Mangchora	47	1	
14	Thapala	10		
15	Kapina	5		
16	Irha	24		
17	Uparari	15		
18	Pilkholi	60	1	3
19	Jainoli	30	1	
20	Sarka	15		

contd...2

21	Tana	10		
22	Jarekhote	15		
23	Tarikhet	20		
24	Chilayanala	120	13	
25	Mijholi	30		
26	Chaukani	20		
27	Makron	30		
28	Kotilya	30	1	
29	Chamoli	-	-	2
30	Chapar Range	15		
31	Sauni	-	2	
32	Junoli	15	1	
33	Dwarhat	40		
34	Local (X-Cantt)	4989	220	95
35	Urban (X-Cantt)	4989	220	95
36	Rural (S.No.1 to 33)	1204	25	7
37	Total Strength	6143	245	102
Percentage of Rural to total strength		20%	10%	7%

SOURCE: FIELD SURVEY

APPENDIX-7B

EDUCATIONAL INSTITUTIONS AND THEIR STRENGTH - X CANTT

S.No.	Name of the educational Institution	Total Strength		
		Students	Teaching Staff	Non-Teaching Staff
N.S.1	Reena Nursery School	152	6	1
N.S.2	Tiny Tot Nursery School, Zaroori Bazar	116	5	3
N.S.3	Balnketan School, Zaroori Bazar	134	5	2
N.S.4	Garuda Convent, Chaubattia	52	3	2
PS.1	Canossa Convent School	266	8	2
PS.2	Urdu medium school, Sadar Bazar	54	3	1
PS.3	Cantt. Primary School, Kumpur	88	4	1
PS.4	Cantt Primary School, Sharna Gardens	611	15	1
PS.5	Cantt Primary School, Upper Mall Road	163	4	1
PS.6	Saraswati Madhyama Vidyalaya Sadar Bazar	196	8	3
PS.7	Cantt Primary Patashala, Chaubattia	159	4	2
PS.8	Army school, X-Cantonment	303	14	4
H.SS.1	Cantt Junior High School, Sadar Bazar	363	9	4
H.SS.2	National Inter College	962	28	16
H.SS.3	Govt. Girls Inter College	988	40	19
H.SS.4	X-Cantonment Inter College	459	22	12
H.SS.5	Kendriya Vidyalaya	699	39	8
C.1	Govt. PG.College Chilianola	378	28	20
T.1	Technical Cadre	-	-	-
T	Total	6143	245	102

SOURCE: FIELD SURVEY

APPENDIX-8

DETAILS OF SHOPS - TYPES AND AREAWISE

S.No.	SHOP TYPE	PUCCA	KUTCHA	MOBILE	PAVEMENT	TOTAL
A: <u>SADAR BAZAAR AREA</u>						
1.	General Stores	60	10	-	-	70
2.	Tea Stalls	29	18	-	-	47
3.	Hotels	44	-	-	-	44
4.	Pan Shops	2	37	-	-	39
5.	Cloth stores	23	9	-	-	32
6.	Vegetable Seller	17	7	-	-	24
7.	Shoes	9	13	-	-	21
8.	Tailors	14	6	-	-	20
9.	Fruits	4	5	2	-	11
10.	Watch Repair	7	1	-	-	8
11.	Barber	8	-	-	-	8
12.	Laundries	6	1	-	-	7
13.	Medical Stores	6	-	-	-	6
14.	Woollen Garments	4	-	-	2	6
15.	Jewellery	6	-	-	-	6
16.	Confectionary	4	1	-	-	5
17.	Electricals/Electronics	5	-	-	-	5
18.	Hardware	5	-	-	-	5
19.	Fancy Stores	4	-	-	-	4
20.	Stationary	4	-	-	-	4
21.	Radio repairs	4	-	-	-	4
22.	Groundnut Seller	-	-	4	-	4
23.	Film Studios	3	-	-	-	3

contd..2

24. Tyres	3	-	-	-	3
25. Stove repairers	2	1	-	-	3
26. Clinics	3	-	-	-	3
27. Steel Works	2	-	-	-	2
28. Petrol Pumps	2	-	-	-	2
29. Rajais and Cotton pillows	1	-	-	1	2
30. Frame work of posters/ Calenders (Glazier)	1	-	-	-	1
31. Motor parts	1	-	-	-	1
32. Mechanic	1	-	-	-	1
33. Eggs	1	-	-	-	1
34. Fertilizer	1	-	-	-	1
35. Soaps	1	-	-	-	1
36. Knife finishing	1	-	-	-	1
37. Name Board Artist	1	-	-	-	1
38. Pathological Lab.	1	-	-	-	1
39. Lime Seller	1	-	-	-	1
40. Wine Merchants	1	-	-	-	1
41. Tobacco	1	-	-	-	1
42. Waste paper	-	1	-	-	1
43. Steel Utensils	1	-	-	-	1
44. Tea leaves	1	-	-	-	1
45. Crockery	1	-	-	-	1
46. Sports Goods	1	-	-	-	1
47. Bangles	1	-	-	-	1
48. Meat Shop	4	2	-	-	6
49. Black Smith	7	-	-	-	7
50. Carpenter	2	-	-	-	2

contd...3

B: MALL ROAD

1. General Stores	3	-	-	-	3
2. Sweets shop	2	-	-	-	2
3. Confectionary	2	-	-	-	2
4. Vegetable shops	2	-	-	-	2
5. Restaurants	2	-	-	-	2
6. Tea-shops	2	-	-	-	2
7. FP shop	1	-	-	-	1
8. Tailor	3	-	-	-	3

C: CHAUBATTIA

1. General shops	1	-	-	-	1
2. Confectionary	1	-	-	-	1
3. Tea shops	1	-	-	-	1
4. Milk Selling	1	-	-	-	1
5. Cloth Merchant	1	-	-	-	1
6. Cotton Weaver	1	-	-	-	1
7. Hardware	1	-	-	-	1
8. Tailor	2	-	-	-	2

D: GANIADEO

1. Provision Store	3	-	-	-	3
2. Tea-Stall Restaurant	18	-	-	-	18
3. Cobbler	-	-	-	1	1
4. Pan Shop	-	3	-	-	3

E: JULA DEVI TEMPLE

1. Tea Shop	1	-	-	-	1
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contd...4

F: REGIMENTAL BAZAR KUMPUR

1. General shops	2	-	-	-	2
2. Confectionary	1	-	-	-	1
3. Tea Shop	-	2	-	-	2
4. Pan Shop	-	2	-	-	2
5. Tailor	-	1	-	-	1

SOURCE: PHYSICAL SURVEY

APPENDIX-9

STATEMENT SHOWING DETAILS OF ESSENTIAL FACILITIES AVAILABLE FOR 10 Km RADIUS OF THE REGION OF CANTONMENT

Distance in No. of Villages	Total population	Density persons/acre	Educational facilities	Medical facilities	Percentage of communication by pucca roads	Post and Telegraph Office
2	1170	1.86	JBS-1	-	80%	-
3	3945	2.28	JBS-2 SBS-1 JBS-12	-	100%	2
4	8763	1.51		Health Center	26.66	1
5	1535	2.2	JBS-1	-	66.66	1
6	3526	1.31	JBS-2	-	92.0%	-
7	1309	1.1	JBS-4	-	66.66%	-
8	1741	1.57	JBS-1	H.C-1 F.C-1	66.66%	-
9	1163	1.1	JBS-1 HSS-1	-	100%	1
10	2057	0.77	JBS-2	-	70%	-

SOURCE: TOWN VILLAGE DIRECTORY 1971

APPENDIX-11

PROVISION OF SHOPPING CENTRES AT
NEW MILITARY STATIONS

It is recommended that for 20,000 population, we should provide shops of the following types:-

1. Aerated Water	1
2. Barber	2
3. Book/Stationary	2
4. C r/Scooter repair and service	2
5. Cloth	2
6. Chemist and druggist	2
7. Cycle	2
8. Dry cleaner	1
9. Fuel including gas	2
10. Furniture	1
11. Grocery	2
12. Hardware	1
13. Instrument repairs	1
14. Meat and Poultry	2
15. Milk dairy/bakery	2
16. Photographer	1
17. Restaurant	2
18. Radio electricals	2
19. Shoes	2
20. Tailors	2
21. Vegetables/fruits	3

NOTE: Size of shops = 5 m x 8 m.

SOURCE: ARMY HQ LETTER DATED 9 MAR 71.

APPENDIX-12

CITIZENS' OPINION ON LIFE AND MERITS OF CANTONMENT

I. Opinion on Life in Town	Residents of Civil Area		Residents of Army Area	
	Total No. of Responding Households	121	Total No. of Responding Households	87
	No. of Respondents Ranking of opinion	3	No. of Respondents Ranking (% within brackets) of opinion	5
	2	3	4	5
1. Life is Satisfactory	69 (57%)	I	53 (61%)	I
2. Life is Good	29 (24%)	II	8 (9.2%)	III
3. Life is Unsatisfactory	10 (8.3%)	III	15 (17.2%)	II
4. Life is Excellent	7 (5.8%)	IV	4 (4.6%)	V
5. Life is Bad	6 (4.9%)	V	7 (8.0%)	IV
	Total No. of Responding Households	100	Total No. of Responding Households	18
II. Merits of the Town	No. of Respondents Ranking (Percentage same as number)	Ranking	No. of Respondents Ranking (Percentage same as number)	Ranking
1. Healthy, Congenial and Cool Climate	56	I	13	I
2. Peaceful, Quiet Place	32	II	7	II
3. Good Scenery/Natural Beauty	15	III	6	III
4. Native place	10	IV	-	-
5. Safe and Secure Town	9	V	-	-
6. Communal Harmony and Co-operation among people	8	VI	-	-
7. Offers Employment Opportunities	6	VII	-	-

CITIZENS' OPINION ON LIFE AND MERITS OF CANTONMENT

	1	2	3	4	5
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III. Opinion on Whether the town is Comfortable to Live In.

1. Yes		107		58	
2. No		13		32	

SOURCE : FIELD SURVEY

PROBLEMS OF RESIDENTS OF CIVIL AREA
(Total No. of Responding Households = 85)

Sl. No.	Description of Problem	Percentage of Households Responded	Problem Ranking
1.	Inadequate Housing Facilities	32.9	I
2.	Lack of Toilet Facility in Residence	32.9	I
3.	Inadequate Water Supply	25.9	II
4.	Inadequate Local Transport Facilities	10.6	III
5.	High Cost of Living	10.6	III
6.	Lack of Employment opportunities	9.4	IV
7.	Inadequate Medical Facilities	9.4	IV
8.	Very Cold Winter	9.4	IV
9.	Restriction on Development/Construction	5.9	V
10.	Problem of Fuel Supply	5.9	V
11.	Inadequate Recreational Facilities	4.7	VI
12.	Long Distance between Residence and Facilities	3.5	VII
13.	Unsatisfactory Electricity Supply	2.4	VIII
14.	Inadequate Educational Facility	1.2	IX
15.	Fear of Wild Life	1.2	IX

SOURCE : FIELD SURVEY

APPENDIX - 12 B

PROBLEMS OF RESIDENTS OF ARMY AREA
(Total No. of Responding Households = 47)

Sl. No.	Description of Problem	Percentage of Households Responded	Problem Ranking
1.	Inadequate Housing Facilities	27.7	I
2.	Lack of Toilet Facility in Residence	27.7	I
3.	Very Cold Winter	23.4	II
4.	Inadequate Water Supply	12.8	III
5.	Inadequate Local Transport Facilities	12.8	III
6.	High Cost of Living	10.6	IV
7.	Inadequate Educational Facilities	6.4	V
8.	Inadequate Medical Facilities	4.3	VI
9.	Long Distance between Residence and Facilities	4.3	VI
10.	Problem of Fuel Supply	2.1	VII

SOURCE : FIELD SURVEY

ACCESS STANDARDS FOR COMMUNITY FACILITIES

Sl. No.	Item	Suggested walking distance
1.	School	
	Nursery	1/4 mile (0.40 K.M.)
	Primary	1/4 to 3/8 mile (0.40 to 0.60 K.M.)
	Secondary	1/2 to 1 mile (0.54 to 1.61 K.M.)
2.	Recreation	
	Tot lot	1/8 mile (0.20 K.M.)
	Children Park	1/4 to 1/3 mile (0.40 to 0.54 K.M.)
	Adults' Play ground	1/2 to 1 mile (0.80 to 1.61 K.M.)
	Adults Park	1/2 to 1 mile (0.80 to 1.61 K.M.)
3.	Groceries and local Shopping	1/4 to 1/2 mile (0.40 to 0.80 K.M.)
4.	Health Centre	1/2 to 1 mile (0.80 to 1.61 K.M.)
5.	Post Office	1/2 to 1 mile (0.80 to 1.61 K.M.)
6.	Institutional	1 mile (1.61 K.M.)
7.	Service Shopping	1 mile (1.61 K.M.)

SOURCE : CORP REPORT

ISI code for water supply

By A Staff Reporter

NEW DELHI, August 10: The Indian Standards Institute has fixed the minimum water supply requirement for residential use at 200 litres per head daily.

According to the ISI code, where there is a full-flushing system about 45 litres per head daily is required for flushing and 155 litres for other domestic purposes.

The need for stipulating minimum requirements is intended to prevent waste, misuse and undue consumption of water as conservation of water has become an urgent necessity in view of its increasing demand and storage.

The ISI code covers general requirements and regulations for water supply, plumbing connected to public water supply, licensing of plumbers, distribution of water within the premises, storage, water fittings and appliances, inspection and maintenance. The code does not cover requirements of water supply for fire-fighting purposes.

Meanwhile, between January 1 and June 30 this year, the ISI cancelled 343 licences to use ISI mark granted to manufacturers under its certification marks scheme. This was done because of unsatisfactory performance, lack of licencees' interest, stoppage of production or marking and change in management, it was stated.

SOURCE:

"TIMES OF INDIA" SUNDAY 11TH AUGUST, 1987.

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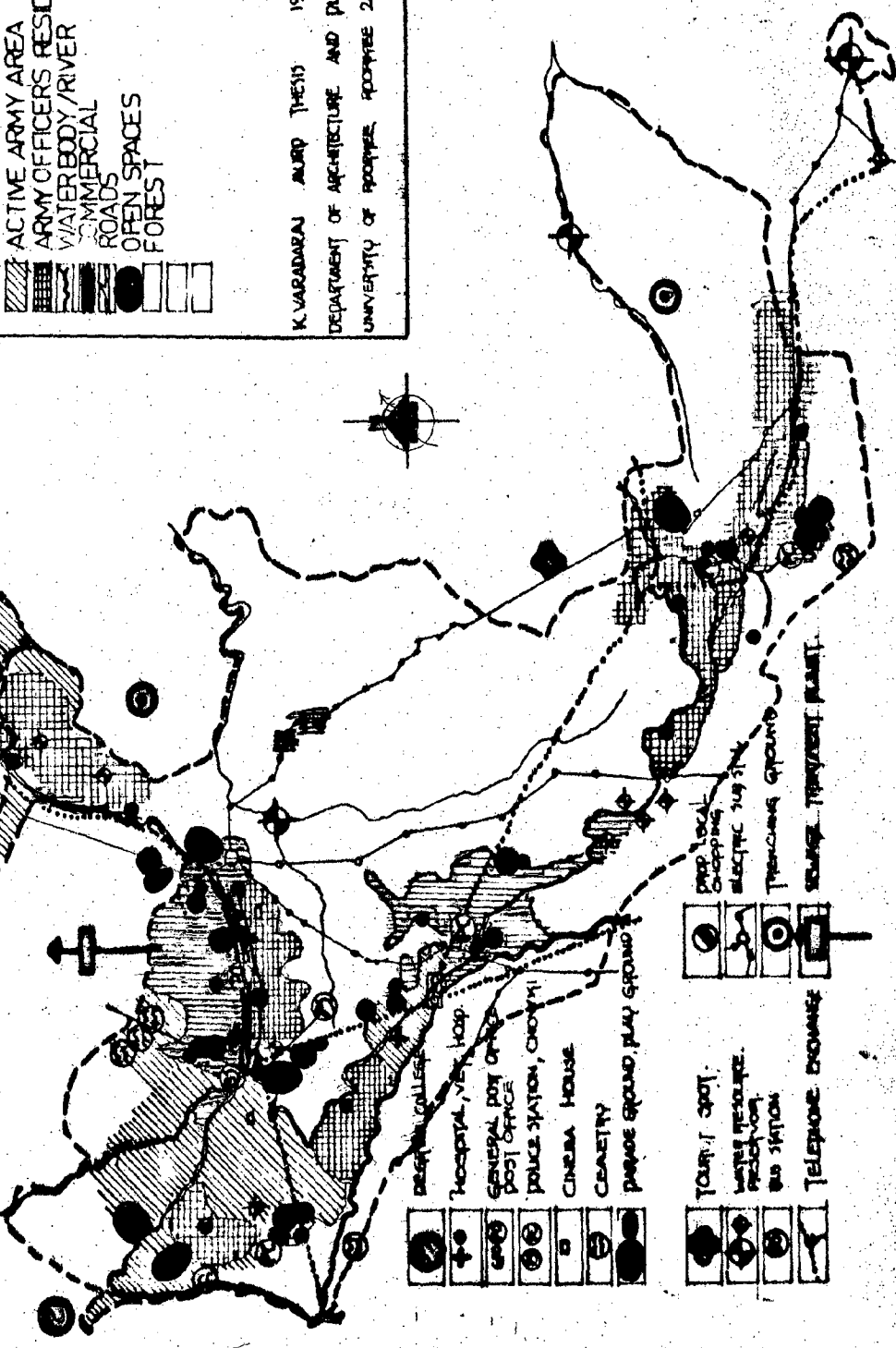
PLANNING OF UTILITIES
SERVICES AND COMMUNITY
FACILITIES X CANTONMENT
PROPOSED BROAD LANDUSE
(based on Zonal plan of Cantt)

- LEGEND**
- CIVIL AREA
 - ACTIVE ARMY AREA
 - ARMY OFFICERS RESIDENTIAL
 - WATERBODY/RIVER
 - COMMERCIAL
 - ROADS
 - OPEN SPACES
 - FOREST

K. VARADARAJ MAUR THESIS 1987.
DEPARTMENT OF ARCHITECTURE AND PLANNING
UNIVERSITY OF MADRAS, MADRAS 205667 (UP)

COMMUNITY FACILITIES FOR 2001

- Legend**
- secondary school
 - primary school
 - H.S. school
 - boundary line
 - proposed land for future exp.
 - the power



- DISTRICT COLLEGE
- HOSPITAL, VET. HOSP.
- GENERAL POST OFFICE
- POLICE OFFICE
- POLICE STATION, CHOWKI
- CINEMA HOUSE
- CANTINE
- PLAY GROUND, PLAY GROUND

- TOURIST SPOT
- WATER RESERVE
- TELEPHONE
- BUS STATION
- TELEPHONE EXCHANGE
- PROP. LOCAL SUPPLYING
- ELECTRIC SUPPLY
- TRANSMISSION GROUND
- STATION TRANSMISSION PLANT

proper access and are not located in consonance with the needs of the people. Thus making it incumbent to shift them to new locations.

- e) The local industries which needs to be given boost are the cottage industries pertaining to woollen cloth, shawls, beekeeping, manufacture of bamboo mats and furniture etc. However it is proposed that heavy emphasis laid on importing synthetic wool from the plains for this purpose to safeguard denusion of soil cover due to over grazing by sheep.

To provide economic boost to the civilian population in such cantonments and to divert their attention to the surrounding selected settlements, industries which have very low input-output bulk ratio such as electronic industries which however may require building up talent and may be possible due to high literacy levels obtaining, must be established at those settlements.

- f) While there is a need to connect surrounding villages with the cantonment and the main thoroughfares to have a two-way movement of goods and services flowing from these settlements to the larger urban locations and market places and vice-versa, it is necessary that a caution must be exercised to ensure that the ecology of the area is not disturbed unduly. Falling of goods and services, therefore may be considered by building some experimental gravity ropeways in the selected locations.

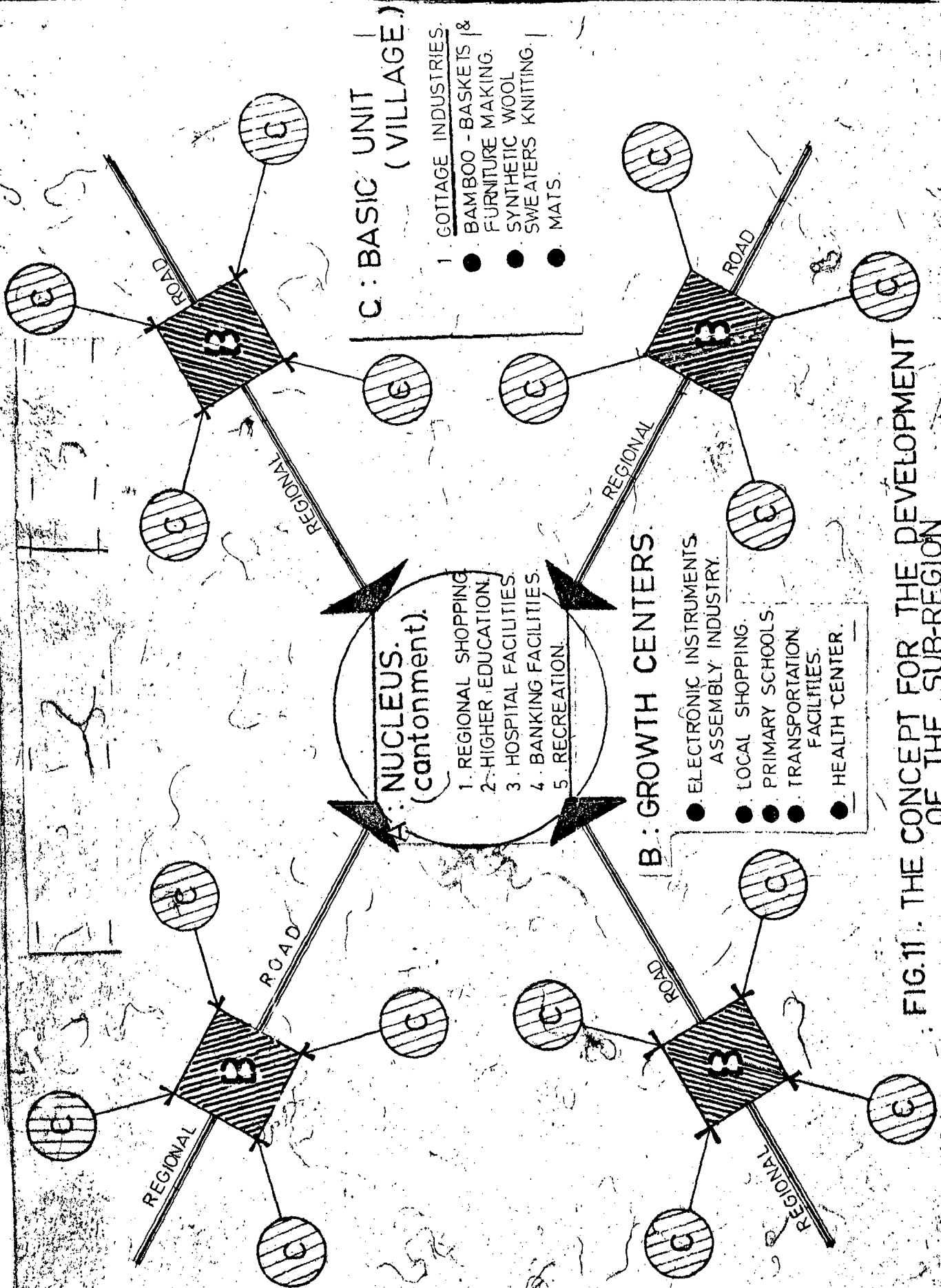


FIG.11. THE CONCEPT FOR THE DEVELOPMENT OF THE SUB-REGION

MAP NO.14

PLANNING OF UTILITIES SERVICES
AND COMMUNITY FACILITIES --

X CANTONMENT

SETTLEMENTS PATTERN

LEGEND

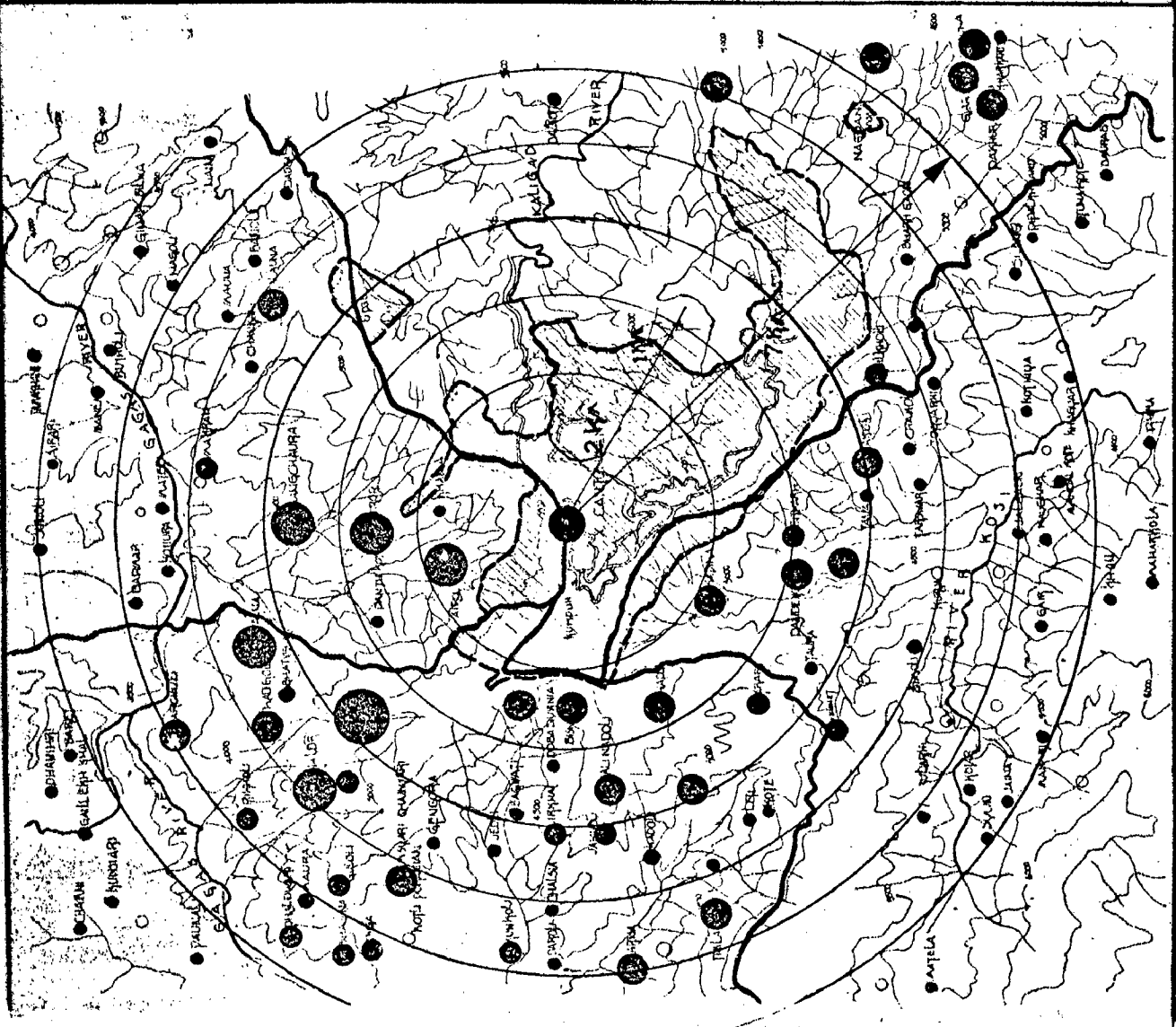
SIZE OF SETTLEMENTS IN
TERMS OF POPULATION.

●	0 - 100
●	101 - 200
●	201 - 500
●	500 - 1000
●	1000 - 1500
—	ROADS



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- g) For effective servicing of the settlements within the surrounding region, settlements which have potential for growth and which are central to few settlements in their surroundings, should be identified for instituting the minimum facilities like primary schools, small shopping centres, dispensaries and small scale electronic industries as explained above at (f).

This idea has been schematically illustrated in Fig.(11). Limitations of time and resources had restrained me from making actual proposals in this respect. The brief idea of the settlement pattern is illustrated in Map No.(14) with reference to population.

- h) Because of scarcity of land required for play grounds it may be worth considering to encourage indoor and other sports which provide opportunities for full measure of physical exercise for different groups, that do not require a large chunks of levelled grounds. Emphasis could be made on indoor sports and gyms.

i) Play Grounds

Play grounds are a scarce commodity in the hill settlements. Thus the existing grounds should be used optimally.

Further, trenching grounds should be well maintained, properly developed and designed so that they may be used as the play-grounds in the later days, when they are abandoned after reaching certain stage.