

MUNICIPAL & RURAL AFFAIRS,
Ministry of 1978

Southern Region Project Study
Master Plan report - Nimas

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DEPUTY MINISTRY FOR TOWN PLANNING AFFAIRS
MINISTRY OF MUNICIPAL AND RURAL AFFAIRS
KINGDOM OF SAUDI ARABIA

SOUTHERN REGION PROJECT STUDY

MASTER PLAN REPORT

VILLAGE CLUSTER NIMAS

1978

KENZO TANGE & URTEC



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PREFACE

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Our participation in the project was initiated in May, 1974. Since that time, under the guidance of the Ministry and with close collaboration between our offices in Tokyo and Aden, we have done our utmost to carry forward our task.

This report presents the final results of our study for the preparation of master plans for the five main cities and a village cluster in the Southern Region. The series of six reports of which this is a part represents the work of the third phase of the third stage of the Southern Region Project Study as specified in the Agreement.

The development plans contained in this report have been based on the Existing Conditions Report, the Initial Appraisal Report, the Alternative Strategies Report, and the Preliminary Master Plan Report, all of which have been previously submitted to the Ministry of Municipal and Rural Affairs. The development plans have been formulated in line with the major objectives, policies and priorities adopted by the Ministry.

The development plans cover the anticipated growth of the five major cities and the village cluster, proposed land uses, infrastructure planning, and outline programs of development, land acquisition, improvement, and zoning regulations.

We therefore submit these reports as the final Master Plans of the main cities and village cluster in the Southern Region.

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H.R.H. Prince Khalid Ibn Faisal Ibn Abdul Aziz
The Governor of Asir Province

H.E. Omar Abdullah Kadi
The Deputy Minister for Town Planning

H.E. Dr. Abdelhak Mohamed Ibrahim
The U.N. Chief Advisor--Regional and National Physical Planning Project

H.E. Mohamed Hassan Hakeem
Director General of the General Department of Following-Up Consultants

H.E. Abdul Aziz Mohamed Abu Rifaah
Director General of Municipal and Rural Affairs--Southern Region

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The Assistant Director General of Municipal and Rural Affairs--
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MEMORANDUM

In the process of the review of the report, it was noted that the data presented in the report are not in accordance with the information available to the Department of the Interior. It is recommended that the report be revised to reflect the correct information.

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In the process of the preparation of the report, the following information was obtained from the various departments of the Government and the various agencies of the Executive Branch. It is noted that the information obtained from the various departments and agencies is not always in the form of a report and is often in the form of a letter or a memorandum. It is also noted that the information obtained from the various departments and agencies is often in the form of a letter or a memorandum and is not always in the form of a report.

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Southern Region

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I. introduction

1-1 SCOPE OF REPORT

The series of six reports of which this is a part presents the Master Plan for the five major cities and a village cluster in the Southern Region. The report reviews all the significant information on the existing conditions, presents future projections, and a physical Master Plan which outlines the development of the cities and the village cluster for the twenty-year planning period from 1975 to 1995. The report also contains a development strategy for the phasing of the plan, recommendations for an implementation program.

1-2 PLANNING PROCESS

1-2-1 DEFINITION OF MASTER PLAN STUDY

While the agreement between the Government and the Consultant requires that the Consultant create a village cluster master plan for an area of not more than 4 square kilometers (which for the Nimas Village Cluster covers village group "B" as shown in figure 1-3-3), the Consultant has felt that in order to accomplish this task in a comprehensive and meaningful way, a somewhat wider area should be studied. For this reason, the Consultant has conducted a general study which covers the Nimas Village Cluster (which contains the Nimas Village Group) and the Nimas Emirate. The results of this broader study are presented in this report along with the master planning of the Nimas Village group itself.

1-2-2 RELATIONSHIP OF THE FINAL MASTER PLAN TO PREVIOUS REPORTS

During the course of the Southern Region Project Study, a series of five separate reports has been previously submitted for each of the five major cities of the Southern Region "Initial Appraisal of Existing Conditions" and "Immediate Action" identify areas requiring immediate attention while "Existing Conditions" and "Alternative Strategies" focus on broader issues confronting the cities and on various alternative approaches toward meeting long range planning objectives. The "Preliminary Master Plan draws from all four previous reports and presents a program for the development of the city over the twenty year planning period. The "Final Master Plan" represents a refinement of the "Preliminary Master Plan" based upon comments and reactions of the Ministry and its advisors.

In the case of the Village Cluster a set of two separate reports has been previously submitted as required by the Ministry. "Alternative Strategies" deals with identifying the relevant

aspects of the existing conditions and proposing various alternative approaches toward meeting long range planning objectives. This report has dealt with issues on an Emirate wide basis. The "Preliminary Master Plan" draws from this previous report and generally narrows the focus to present a program for village cluster development. The Final Master Plan while focussing on the Nimas Village Cluster perspective in order to deal with important broader issues. For example, tourism and service facilities which have a service radius beyond the area shown in the Final Master Plan are included in order to relate the Nimas Village Group to its larger context.

As the studies for the Village Cluster have been developed, the focus and definition have progressed so that the scope of each report is somewhat different. This is a natural result of both the narrowing focus described above and the continuing feedback process between the Consultant and the Deputy Ministry of Municipal and Rural Affairs and its Consultant U.N. experts.

Whenever this changing scope has resulted in modifications, these have been identified and this Final Master Plan represents the final judgement of the Consultant.

1-2-3 ELEMENT BY ELEMENT ANALYSIS

The various considerations affecting physical development have been classified into various "Planning Elements." Each planning element is a collection of highly interrelated topics which can be investigated in great detail and in relative independence of other elements. Taken together, however, the elements encompass an exhaustive list of issues involved in the formation of development plans. The element by element study makes possible a clear identification of trends, needs, and problems which must be addressed by the master plan.

1-2-4 COORDINATION OF PLANNING ELEMENTS

There is, at the same time, a systematic coordination of Planning Elements through the recommended Schematic Master Plan, developed in Alternative Strategies reports, and through the establishment of a "community structure," derived from Planning Standards presented in the appendix of this report. The schematic master plan contains the basic strategy for the growth of the city or village cluster, the recommended directions for the change in population, the functional distribution of land use, infrastructure development, and policies toward the nomadic population. The community structure, on the other hand, identifies a hierarchy of population groupings in order to pro-

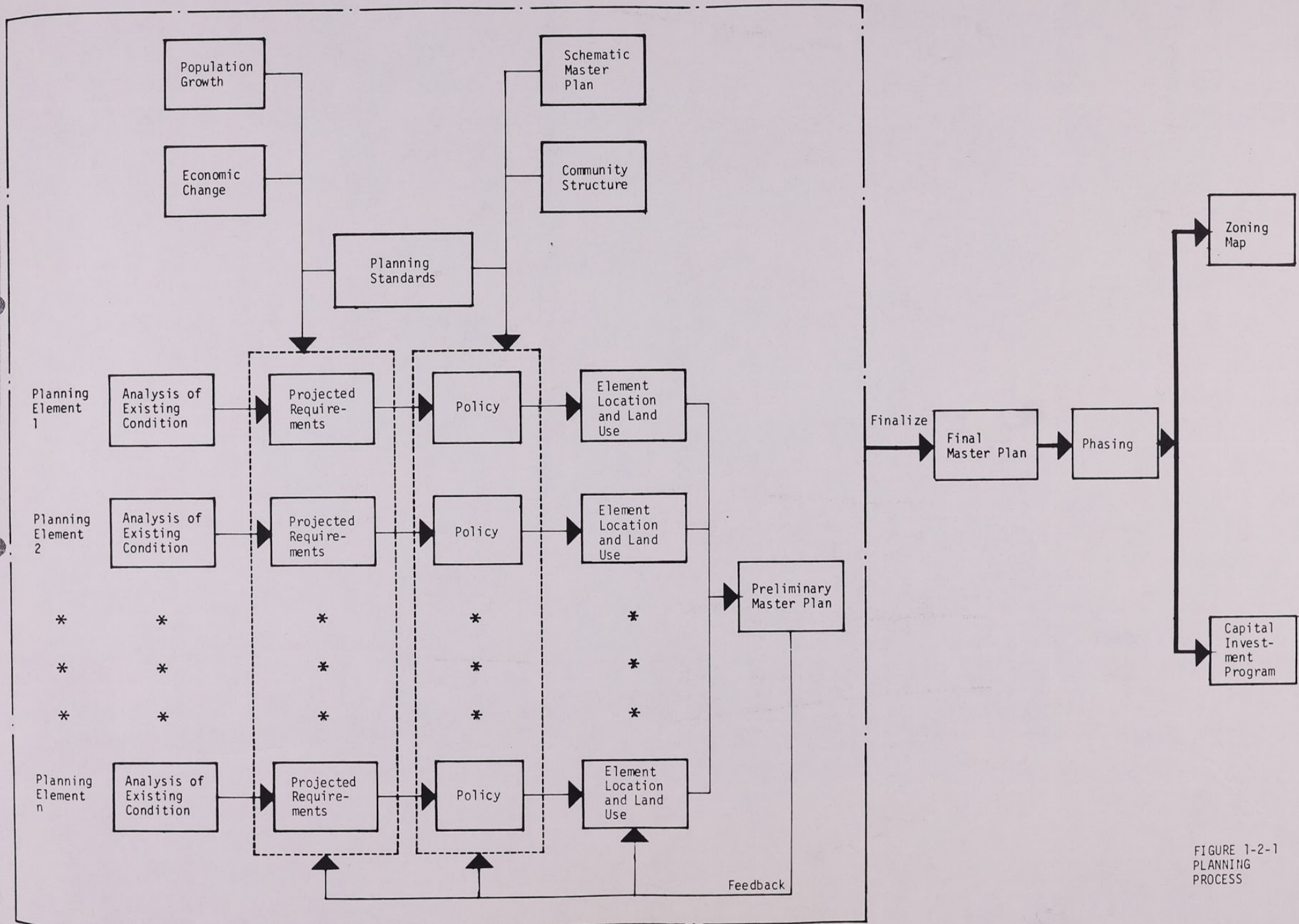


FIGURE 1-2-1
PLANNING
PROCESS

perly distribute urban or village services and to help establish identifiable communities.

1-2-5 FLOW OF INFORMATION

For each Planning Element, first, the existing conditions are reviewed. Next, the projections of populations developed in Chapter 3 and economic projections developed in Chapter 4 are applied to in the context of the Planning Standards. As a result, future requirements or projections for a particular Planning Element may be obtained. Third, a policy which will determine land use for the element is developed by considering the schematic master plan, the community structure, and the Planning Standards. The application of policy principles results in the element land use plan. Site considerations and local issues are discussed at this stage. The recommended overall development plan, or the Master Plan, is generated from the simultaneous consideration of all the individual element land use plans. Phasing, zoning and legal framework.

Planning Element

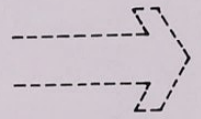
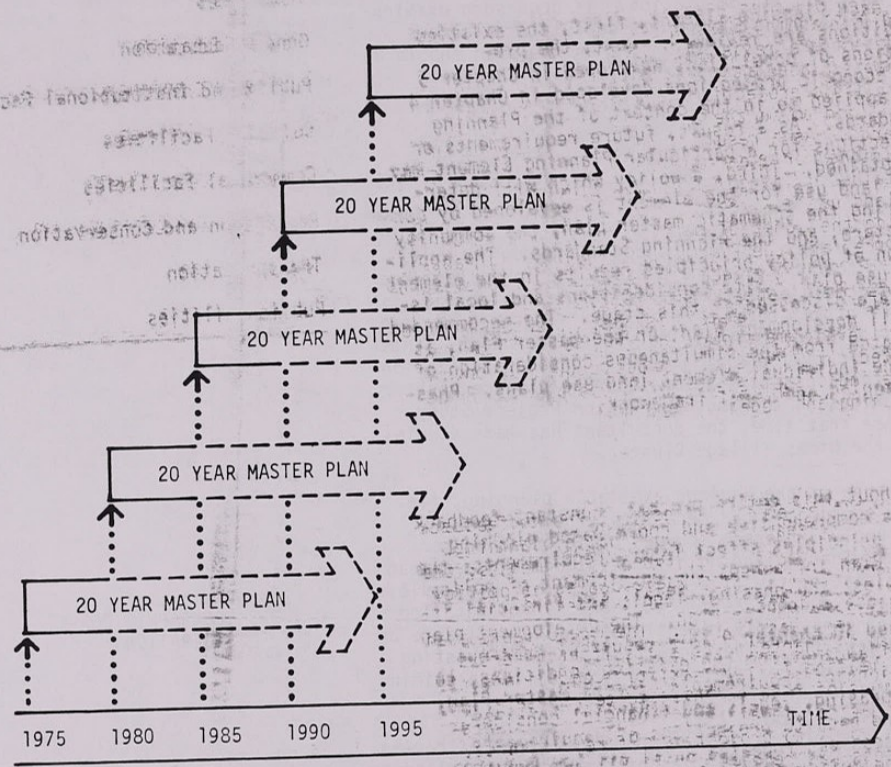
- Housing
- Industries
- General Education
- Public and Institutional Facilities
- Cultural Facilities
- Commercial Facilities
- Recreation and Conservation
- Transportation
- Public Utilities

1-2-6 FEEDBACK

Throughout this entire process, constant feedback assures comprehensive and coordinated planning. Policy principles affect future requirements; the Master Plan influences the development of policy principles; and phasing, legal, and financial issues alter the Master Plan. The development plan discussed in Chapter 9 is a result of numerous studies leading from the existing conditions, to projections of requirements, to the Master Plan, and to phasing, legal, and financial considerations and back to projections of requirements. The process was repeated until all the requirements and policy principles could be satisfied in a consistent and comprehensive Master Plan.

1-2-7 FUTURE FEEDBACK

It must be very strongly emphasized that this master plan (as should be the case with any master plan) must be implemented in a way which allows a substantial amount of modification in the future should conditions change in unforeseen ways or should future planners feel that compelling reasons exist to alter certain aspects of the plan. Such adaptability is especially important when very rapid development is expected as is the case with every major area of Saudi Arabia.



Project horizon for each master planning term

FIGURE 1-2-2
 DIAGRAM OF
 MASTER PLAN
 OVER TIME

While it is desirable that continuous monitoring of the progress of the plan take place, it is especially important that examination and identification of possible modification be undertaken by the Ministry and its internal and consultant planners at the beginning of implementation and at every five year interval as identified in the section on implementation. If upon such examination the Ministry and its consultant planners agree upon modifications, then the plan should be adapted to accommodate these modifications.

1-3 PLANNING OF VILLAGE CLUSTER

1-3-1 PROJECT HISTORY

The Southern Region Project was begun in 1974. From that time to the present the consultant has undertaken extensive study of the region and its five major cities - Abha, Khamis Mushayt, Najran, Jizan and Bishah. In May 1977, the Deputy Ministry for Town Planning Affairs gave authorization to the consultant to include the village cluster of Nimas in the Southern Region Project Study. Since that time, the consultant has made studies of the Nimas Village Cluster.

Because of the limited available planning time, the consultant has necessarily relied upon slightly different sources of information for preliminary planning of the village cluster than for that of the five major cities. For example, because current aerial photography and detailed mapping have only recently been made available by the Ministry. The consultant has used existing maps from other sources for some of the preliminary planning work.

Significant and relevant data have been extracted from existing available information and applied to the Nimas Village Cluster. Such an approach is felt to be consistent with the philosophical goal of treating the planning of a specific village cluster as a generic or prototypical model for application to other village clusters. The recommendation by the consultant that the village cluster of Nimas be selected for inclusion in the study was made with this intent in mind, and with the knowledge that Nimas is not anomalous in any substantial way and that its characteristics are consistent with those already known and extensively studied for the surrounding region.

The recent availability of more detailed aerial photography and mapping as well as substantial additional field observation and survey have

1-3-2 METHODOLOGY

enabled the consultant to complete examination of and planning for the Nimas Village Cluster at a level consistent with the goals of the project.

The area of the Nimas Village Cluster dealt with in the preliminary master plan is reduced from that which was studied in the Alternative Strategies Report. The reason for this has to do with planning methodology.

As is the case with many major villages, the village of Nimas provides services to a wider area than its own boundaries. Education, health care, governmental administration, and trade are among the functions which an urban area may offer to communities and settlements many kilometers removed. It was necessary to study the area surrounding Nimas in order to ascertain more accurately what these functions are, where they are carried out, and what additional needs existed.

The facilities by which such functions are handled, however, are located almost entirely within the central part of Nimas. The study showed that for the most part, residents of the outlying communities came into Nimas to engage in commercial activities, seek medical care, and make use of other opportunities. Hence the planning for these functions could be limited to a smaller geographical area, which is reflected in the smaller area incorporated in the master plan.

1-3-3 GEOGRAPHIC CONSIDERATIONS

In the course of the study of Nimas and vicinity, it has been necessary to establish standards for determining gradations in population density, intensity of land use, levels of governmental jurisdiction, and so on. An overwhelming majority of the population lives on land which is basically rural: 878,400 people, or 84% of the 1,049,500 residents of the Southern Region, live outside the five major cities. The mean population density is quite low. It has thus been necessary to pay attention to careful establishment of standards and definitions.

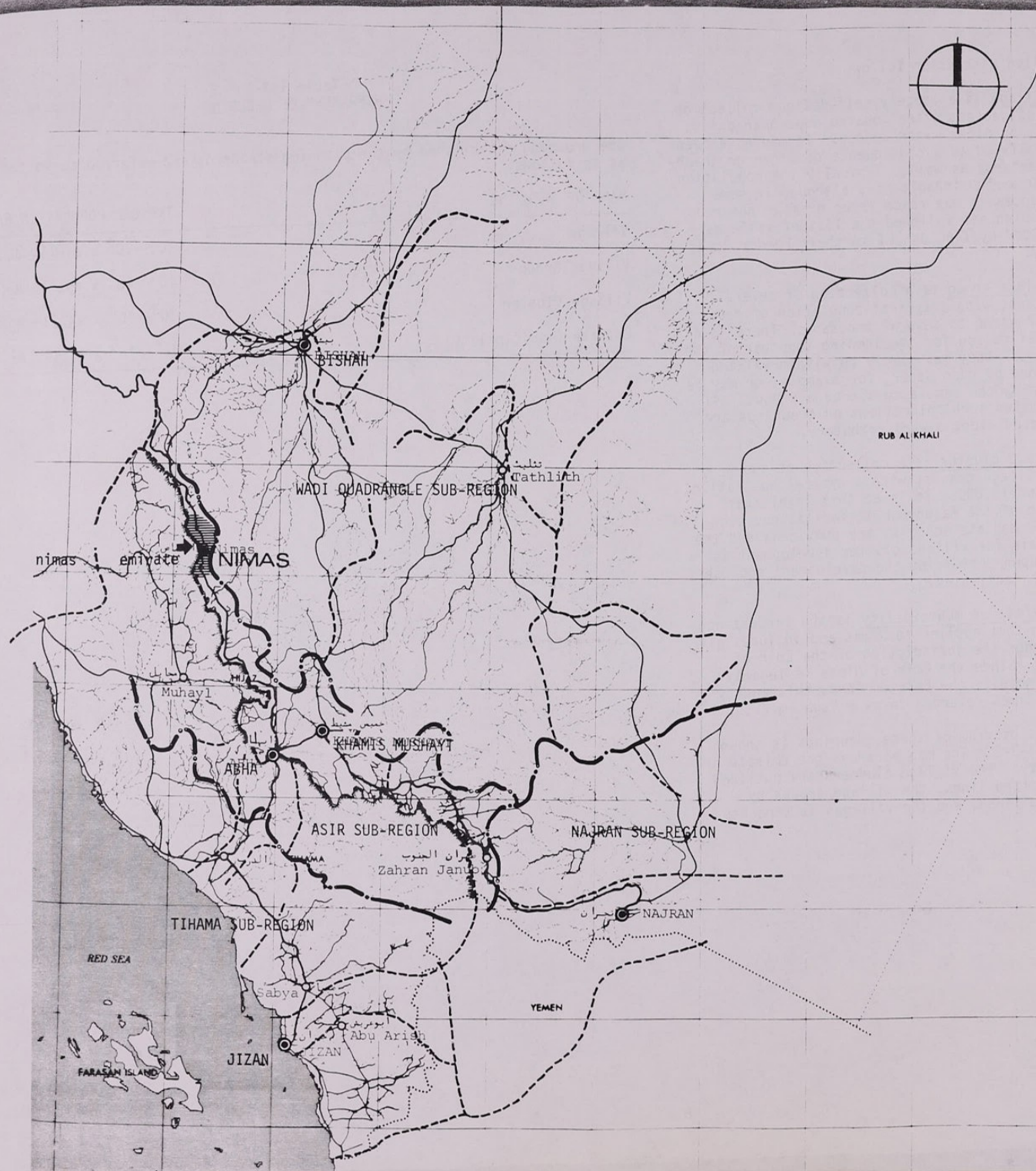
Definitions. Four basic levels of jurisdiction have been established. They are in accord with existing natural and governmental conditions, and will serve to implement the recommendations of the plan as well. They are as follows, in ascending order of magnitude:

1. Village
2. Village Group
3. Village Cluster
4. Emirate or Municipality

FIGURE 1-3-1
REGIONAL
LOCATION

scale 1:2,000,000

NOTE:
Initial Appraisal of Existing
Conditions, fig. 2-1, Environ-
mental Situation.
nimas emirate



--- sub-region
..... wadi basin

A detailed discussion follows.

1. A village is a largely self-defined collection of residences, often located around an oasis, well, or other water source. It may have been established as a consequence of other geographic features as well. Typically the population is 50 to 100 inhabitants, although in some instances it may reach three or four hundred. This plan has followed the list of villages provided by ITALCONSULT in their Feeder Roads Study.
2. A village group is a collection of several villages, with a typical population of from one thousand to several thousand. There is a logical reason for the lumping together of the villages--they may simply be within walking distance of each other, for example, or may be served by the same access road off Route 54. Very often such collections or groupings are clustered along a wadi tributary.
3. A village cluster is a collection of two or more village groups, with a typical population of about 10,000. It is at this level that certain of the major public facilities, such as intermediate schools, are provided; and the rationale for village cluster development is based upon optimizing the development and use of such facilities.
4. The Emirate or municipality is the largest conception that applies to Nimas and includes all area under the jurisdiction of the Emir of Nimas. (Since the Emir of Nimas is legally subordinate to the Emir of Abha, this entity is sometimes referred to as a "sub-emirate.")

A schematic diagram of these groupings is shown in Figure 1-3-2. The map portrays the Emirate or municipality. The village clusters are outlined by heavy dotted lines, the village groups by light solid lines, and the villages as separate entities.

Table 1-3-1
HIERARCHY OF GROUPING

The grouping established by the planning standards and referred to in the text is as follows:

NAME OF GROUPING	TYPICAL POPULATION RANGE
Village	$10^1 \sim 10^2 \times a_1$ ($1 \leq a_1 < 10$)
Village Group	$10^2 \sim 10^3 \times a_2$ ($1 \leq a_2 < 10$)
Village Cluster	$10^3 \sim 10^4 \times a_3$ ($1 \leq a_3 < 10$)
Emirate (Municipality)	$10^4 \sim 10^5 \times a_4$ ($1 \leq a_4 < 10$)

text

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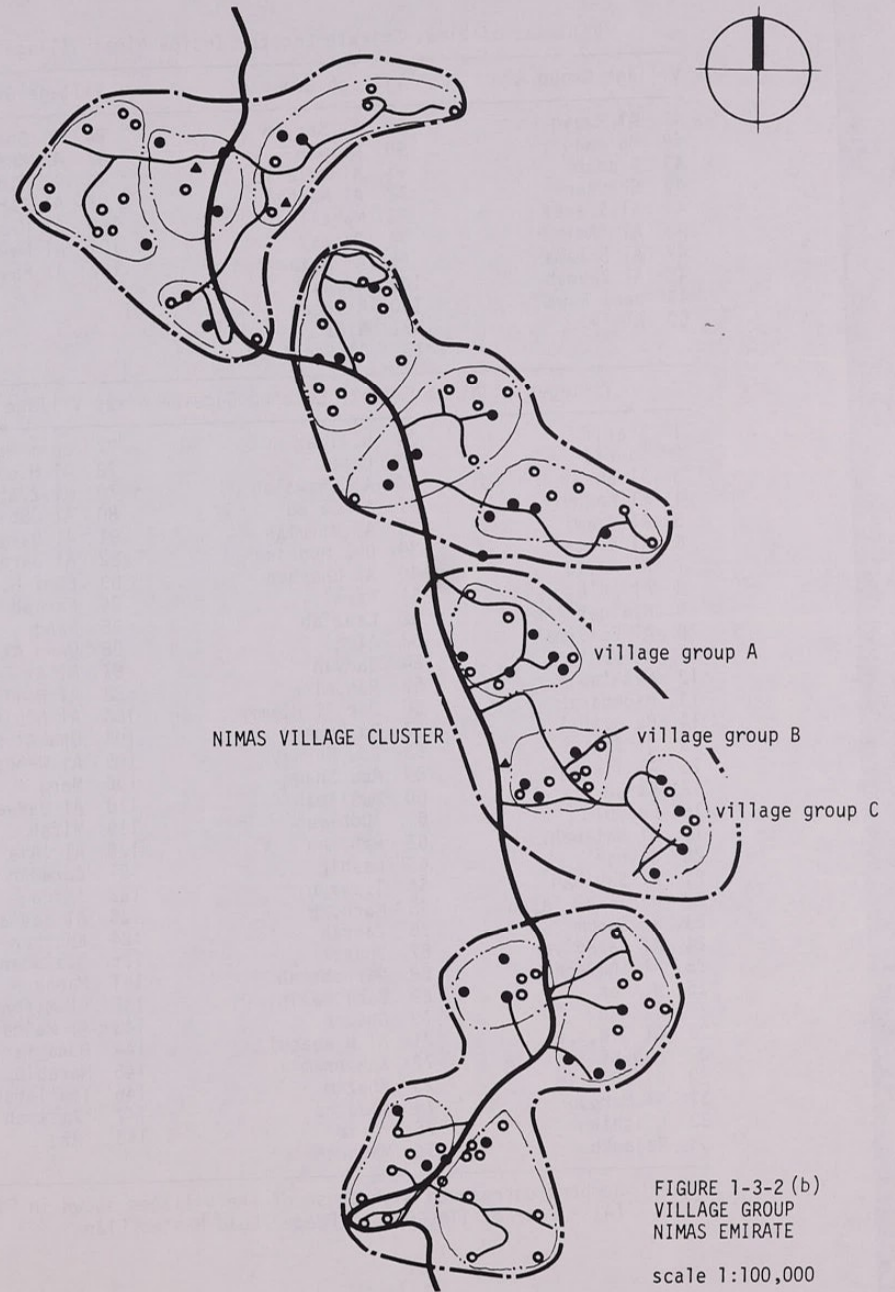


Table 1-3-2
VILLAGES OF NIMAS EMIRATE AND VILLAGE CLUSTER

Villages of Nimas Emirate Located Inside Nimas Village Cluster: *

Village Group A	Village Group B	Village Group C
41 Al Rzayq	89 Al Shaykh	96 Al Shanduf
42 Ma'awad	90 Bazwah	97 Al Khanfus
43 H.adab	91 Al Mala'ib	98 Al Jid'a
44 Shaukan	92 Al Maghzi	99 Al Barqan
45 Al T.araf	93 Manzil	100 Al H.asan
46 Al 'Amir	94 Jahway	101 Al Hayah
47 Al Salamah	95 Al H.abaybah	102 Al Fuways
48 Al Zaynab	149 Nimas	
49 Bani Rawk	150 H.arqah	
50 Al 'Ali	151 Nih.	
	152 Al Badal	

Villages of Nimas Emirate Located Outside Nimas Village Cluster

1 S.arif	34 H.ilqah	77 Bani Mashmur
2 Sadrid	35 Qaym	78 Al H.usayn
3 Al Sukut	36 Al Ghawalah	79 Al Z.abiyah
4 Al Maqbul	37 Al Sa'ad	80 Al Jabir
5 Al Z.awi	38 Al Hilalah	81 Al Dayy
6 Al H.atar	39 Dha Mudhir	82 Al Jaradah
7 Al Walid	40 Al Ghayhab	83 Bani H.ilsil
8 Al Ka'b	51 Fara'	84 Far'ah
9 H.alqat 'Aksah	52 Lanz'ab	85 Mahd
10 Al Fat.imah	53 'Irq	86 Qarn Al Thabit
11 Al Kra'	54 Qaryah	87 Al At Tays
12 Lash'ab	55 Rah.al	88 Al H.illah
13 Maghdarah	56 Dar Al H.amra	103 Al Nibih
14 Bu H.ibal	57 Bu Qubays	104 Dha Al H.alah
15 Qif'ah	58 Abu Qarnayn	105 Al Wahdah
16 Al T.ariq	59 Abu Shawq	106 Marw
17 Farsh	60 Muslimah	118 Al Qaryah
18 Fad.ul	61 'Udhiyah	119 Mifah
19 Al Malawah.	62 Rah.mah	120 Al 'Ala
20 Daynah	63 Nashir	121 Buradah
21 Al Sah'ban	64 T.uwayr	122 'Afra
22 Hada1 Al 'Ajab	65 Marh.ab	123 Al Yas'ad
23 Al Surum	66 Zahrah	124 Kharban
24 Al Sa'Adiyah	67 Sharaf	125 S.a'aban
25 Al Shaykhah	68 Qarnabshah	141 Mabna
26 H.Afah	69 Bani Malih.	142 Al Mishni
27 Badwah	70 Ghuran	143 Al Ma'ma'
28 Al Qah.t.an	71 Al H.abashi	144 Qunayfar
29 Lah.bi	72 Khashram	145 Marabid
30 Al Sult.an	73 Khazim	146 Tha'labah
31 Al Marsuq	74 Khad.ra	147 'Amasyah
32 H.ashish	75 'Azib	148 'Arq
33 Rajamah	76 Madanah	

*Note: Numbers correspond with those of the villages shown in Figure 1-3-2 (A). Source: ITALCONSULT Feeder Road Master Plan

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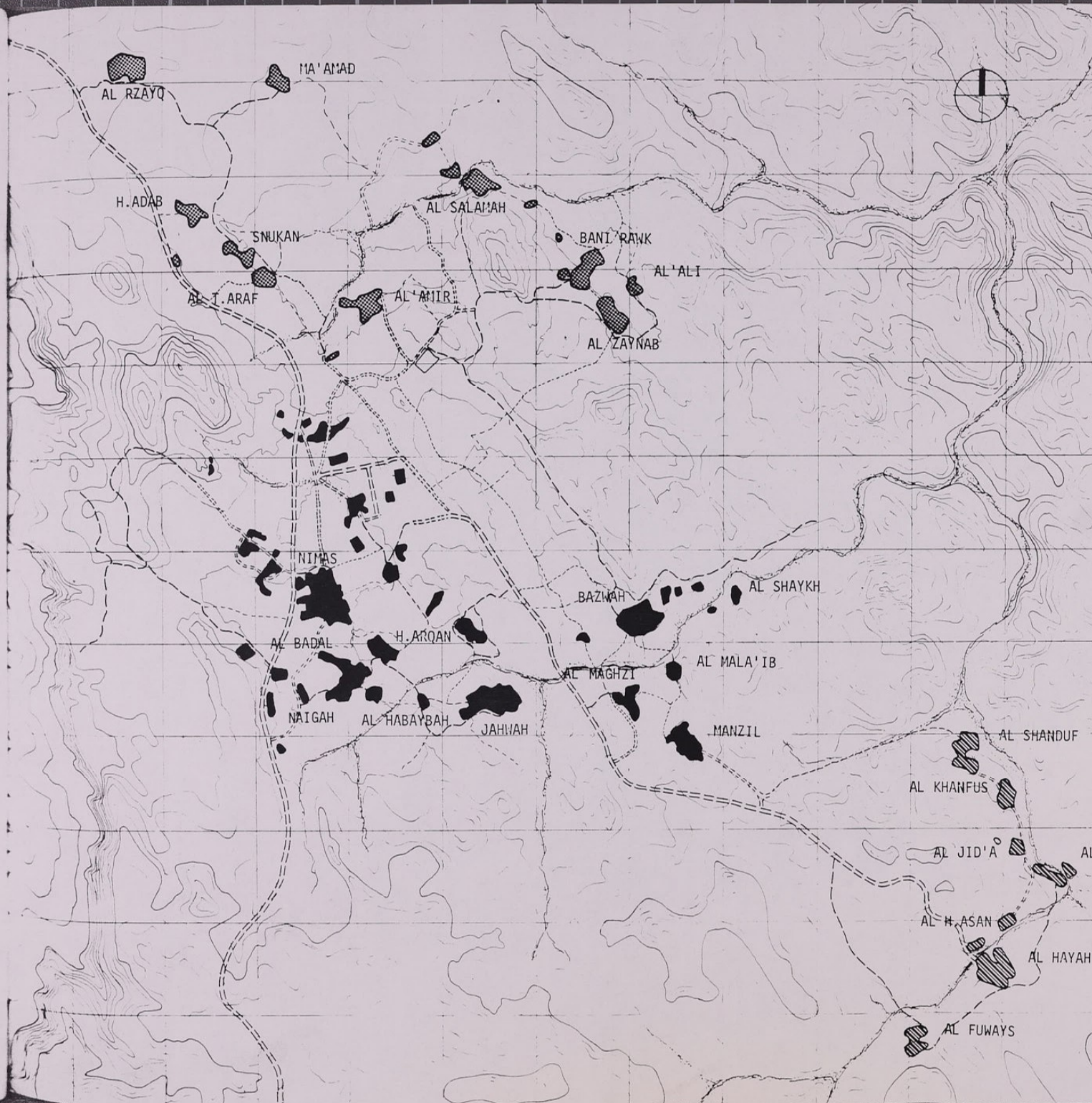





FIGURE 1-3-3
NIMAS VILLAGE
CLUSTER AND
VILLAGE GROUPS

scale 1:20,000

-  village group A
-  village group B
-  village group C

2. existing conditions and planning objectives

2-1 REGIONAL POLICIES
AND THE VILLAGE
CLUSTER

The traditional independence and self-reliance of the tribes in the Southern Region (as of those in all parts of Saudi Arabia) has traditionally resulted in a relatively small amount of commercial or social interaction with other regions. The difficulty of transportation and the distance from the larger metropolitan areas have in the past contributed to an isolation of the rural areas of the Southern Region. Recent development efforts including great advancements in primary communication and transportation have done much to alleviate this problem. Accordingly there is increased interest on the part of the rural public for improvements in public facilities and services as well as in commerce. This interest is shown by the Governments which also seeks an improvement in administrative facilities to serve the rural areas. For these reasons as well as its favorable location, it is expected that new public, commercial, and government facilities will be located in or near the Village of Nimas. While such development will bring about a general increase in the size and importance of Nimas, it must be emphasized that in order to satisfy the general development goals of the Government, it will be necessary to increase agricultural production and to generally improve rural functions by providing such facilities as modern markets and distribution facilities for rural produce and health, education, and welfare facilities for the surrounding rural population. In these ways, the greatest potential for economic activity and development within the regional context may be realized.

In recent years the great increase in general development brought about by expansion of oil-related development in other parts of the Kingdom has for a variety of reasons resulted in substantial out-migration from the Southern Region--both the cities and the rural areas. The out-migrants have for the most part been young men between the ages of 15 and 35 years. In general this age group represents one of the most energetic and productive segments of the labor force. Such out-migration therefore represents a serious problem especially in the rural areas of the Southern Region. Such areas have the greatest capacity for agricultural development and production of any area in the Kingdom. If the national goal of decreasing the gap between agricultural self-sufficiency and actual production is to be achieved, then it will be in large part because of the maximization of the agricultural output of the rural areas of the Southern Region.

Part of the problem is purely economic. A worker may well obtain four or five times the salary by

working in the oil fields of the Eastern Region as is possible by working as a farmer in the Southern Region. But there are other less tangible advantages in the way of opportunities for advancement, for education of oneself and one's family, health care, for entertainment, and for many other urban amenities.

It is clear then that regional policies must in general be directed toward increased productivity in the rural areas which is in part dependent on reversing the out-migration of young men, which is in turn dependent on improving economic, social, and cultural opportunities. As an important yet typical village cluster and group, Nimas represents one location in which such improvements must be made.

2-2 MAIN FUNCTIONS OF
THE VILLAGE CLUSTER

2-2-1 TRADITIONAL
FUNCTION

Agriculture is the predominant economic activity of the area comprising the Nimas Emirate and consequently of the Nimas Village Cluster and Nimas village group as well. This is of course a result of the excellent climatic conditions--mild temperatures and relatively large rainfall--as well as the absence of any other kinds of major economic activity. Because of this strong agrarian tradition, the skills and interests of the people are directed largely toward agriculture and associated economic activity.







2-2-2 RECENT CHANGES

Recently however, two interrelated changes have had a major impact and have begun to transform the area. One is the substantial improvement of the transportation network, especially the construction of Route 54 and the rapid development of motorized transportation. Another is the increasing urbanization of the Region. A profound change has thus been wrought on the social and economic life of the people in rural areas like those surrounding Nimas. Migration to the urban area offers them an opportunity to make more money and to enjoy advantages unavailable in the rural areas. But if this process goes too far, it will reduce the workforce needed to maintain and develop the agricultural sector.

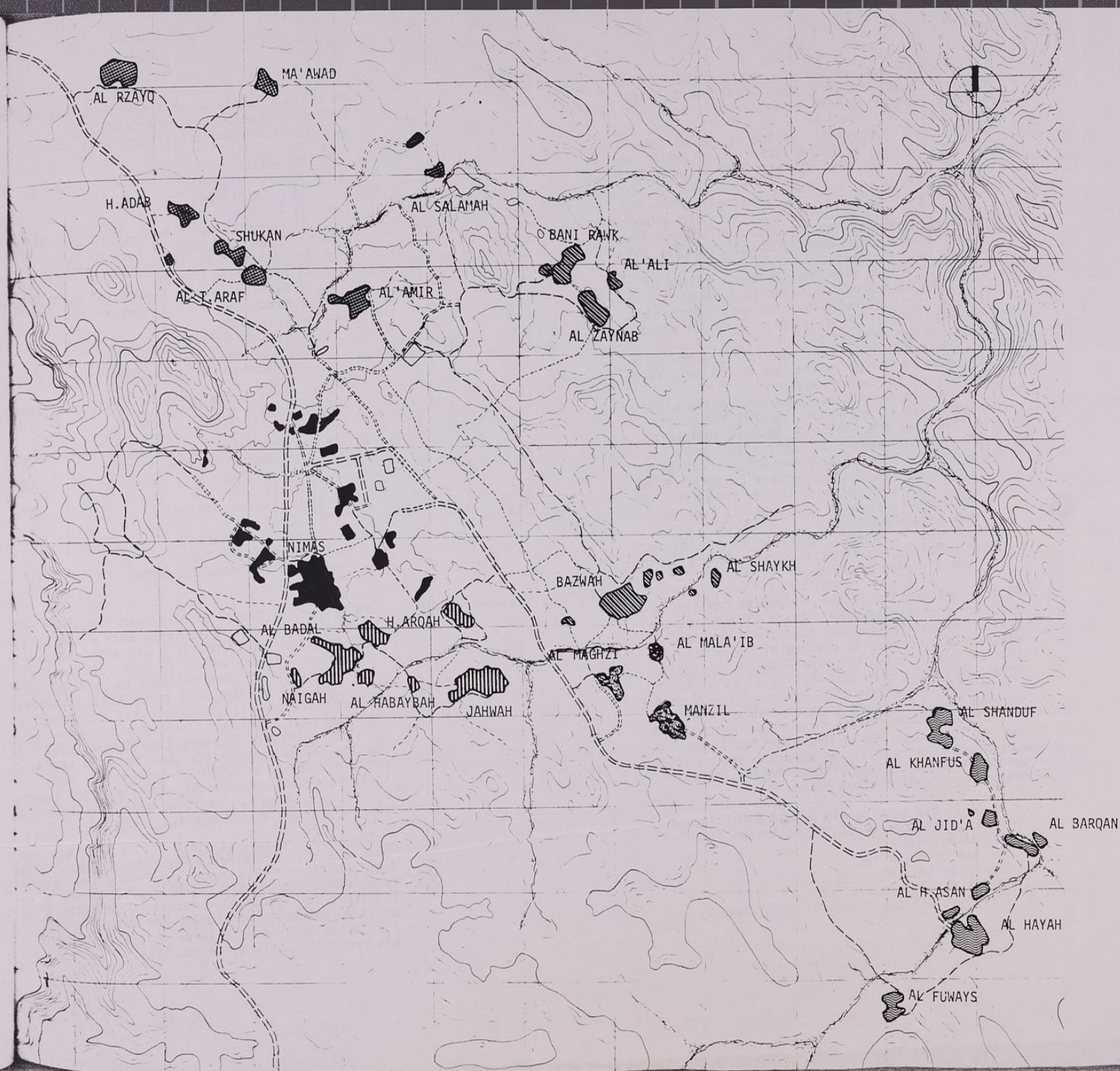
Thus, one of the functions of the development of Nimas must be to provide rural dwellers with some of the advantages of urban life without necessitating their actual migration to the city. Care-

FIGURE 2-3-1
HISTORIC
DISTRIBUTION
OF TRIBES

scale 1:20,000

-  mainly Bani Jubair,
Bani Bakir and others
-  Bani Jubair
-  Bani Qusair
-  Amishah
-  Bani Bakir
-  Kra Shuhum

SOURCE: URTEC Field Survey



ful attention must be paid to the selection of such facilities and services. This must be done in a way that takes best advantage of present conditions.

1. The existing physical facilities, as well as the residents' skills and abilities, should be used in the way that optimizes their production potential.
2. Further, it should be realized that increasing demand for agricultural products in the growing urban sectors and the improved transportation network offer great possibilities for the expansion of markets.
3. It is in accord with the Kingdom's policy of reducing dependence on imported food to increase agricultural output as much as possible, particularly of those types of food for which the greatest need exists.
4. A policy of steady improvement in the region's standard of living is the one most likely to be beneficial to the inhabitants.
5. It is necessary and possible to provide many urban types of opportunities that the people in this area are beginning to seek in accord with the improvement of their livelihood. In the 500+ Km between Taif and Abha, there is no regional center of commerce and culture. Similarly, there is no major center from which administration and other governmental functions can be provided.
6. Therefore, it appears desirable to develop such a commercial, governmental, and cultural center in the vicinity of Nimas.

Another possibility is the development of the region for domestic tourism. Exact figures are unavailable, but it is clear that there has been a substantial increase in the use of and demand for tourist facilities within the Kingdom. Attention should be paid to the possibility of constructing a national park within the region. Since such development would require a considerable amount of time, consideration of it should be undertaken as soon as feasible. Among the other facilities required would be hotels, restaurants, and related accommodations along the transportation routes south from the area along Mecca.

In summary, the area in and around Nimas should function as the center of the following hierarchical divisions:

1. The nearby rural region
2. The Nimas Emirate
3. The Nimas Village Cluster
4. The Nimas Village Group (Village Group B)

At various levels of this hierarchy the following functions should be incorporated.

1. Agriculture and associated functions:
 - a. Production
 - b. Marketing
 - 1) Distribution
 - 2) Cold Storage
 - 3) Transportation
 - 4) Preparation of Agricultural Machines and Other Materials
 - c. Processing Function
 - 1) Processing Plants
 - 2) Association for Commercial Agriculture
 - d. Research and Training Center
 - e. Nomad Center
 - 1) Auction Market
 - 2) Procurement Center
 - 3) Slaughter House and Cold Storage Facilities
 - 4) Guidance Center for Occupational Change
 - 5) Nomad's Bank.
 - 6) Etc.
2. Central functions for the nearby rural region:
 - a. Governmental Functions
 - 1) Administration
 - 2) Education
 - 3) Health and Welfare
 - 4) Etc.
 - b. Commercial Functions
 - c. Cultural Activities
3. Tourist functions and a National Park

2-3 HISTORICAL GROWTH

The historical growth of Nimas and the other villages of the area is associated both with the social structure of tribal life and with the physical features of the area. In most substantive ways the growth of such villages parallels that of cities such as Abha in an early stage of development. These villages originated as basically agrarian wadi settlements and were organized according to tribal structure (see Figure 2-3-1). The low population density that the land could sustain produced an ethic of separation, and, thus, as tribal encampments slowly assumed a permanent form, they tended to be widely distributed along the edges of the wadis.

A noteworthy feature of these settlements was the lack of public buildings other than mosques. Most public affairs were carried out during the weekly market day. Hence, the assembly of the area inhabitants for exchange of goods and services also provided the best opportunity for carrying out public and governmental functions, a custom which has prevailed until quite recently.

With the great increase of modern development, the historical growth pattern is likely to undergo dramatic changes. As can be seen in Figure 2-4-1, Route 54 is a central physical feature which will likely have a profound impact on future growth as will the natural features of the area as explained in the following section.

The structure of the surrounding farmlands has been influenced by natural condition, characteristics of local property ownership, and the demands for non-agricultural land use. These often conflicting conditions have resulted in a variety of problems. One is a somewhat disorderly and uncoordinated pattern of urban growth. Another is the inability of existing forms to expand to a size which would be more efficient in order to improve their production and employment potential. The resolution of this conflict between the need for non-agricultural land use and the desire for increased agricultural production will be a major factor in determining future growth of the population centers in and around Nimas. In general, it may be stated that non-agricultural land use should be directed toward vacant land, land which is unsuitable for farming and the less desirable agricultural land.

2-4 NATURAL FEATURES AND STRUCTURE OF THE VILLAGE CLUSTER

2-4-1 LOCATION AND TOPOGRAPHY

The Emirate of Nimas is located between 19°-0' and 19°-30' north latitude and between 42°-5' and 42°-10' east longitude in the southwestern part of the Kingdom of Saudi Arabia. It is at the eastern edge of the Asir Mountain Range and is bounded on the west by the steep and rough slope of the escarpment which descends to the Tihama plane and the Red Sea about 100 km to the west. The average altitude is about 2400 m above sea level with steep rocky hills reaching up to about 2500 m (see Figure 2-4-1). The land is generally rough and uneven although the village of Nimas itself is located on a small plain about 2 km from the escarpment (see Table 2-4-1).

2-4-2 CLIMATE

Except for brief periods at the beginning of summer and the beginning of autumn when dry winds blow from the east, the prevailing wind is from the west and southwest. Air laden with moisture from the Red Sea rises rapidly up the steep slope of the escarpment resulting in relatively heavy precipitation in the areas at the top edge of the escarpment (over 400 mm/yr in the areas around Nimas). Thus along with the mild temperatures (annual mean of about 15°C) and moderate humidity (annual mean of about 60%) result in excellent agricultural potential.

2-4-3 GEOLOGY

The geology of the area is described generally in the Regional Existing Conditions report [1]:

The oldest rocks capping out in the area are the Older Gneisses forming the principal western Arabian Shield. Above the gneisses, the Precambrian Hali Schists are distributed extensively in the western slopes of the Asir Mountains and crop out sparsely on the eastern slopes of the upland plateau. The Baish Greenstone stretches out approximately parallel to the Asir watershed. It includes pillow lavas, minor slates, phyllites and conglomerates. After the Baish Greenstone was laid down, a phase of metamorphism and intense folding followed. Then came a deposition represented by the Halaban Andesites.

Intrusions of the Calc-Alkaline Granite of the Precambrian era are marked widely but sparsely on the upland plateau. After this phase the new surface was peneplained and successive formations arose consisting of breccias, arkose, green lavas, conglomerates, sandstones and schists. All metamorphosed and were laid down over almost the whole area. In the eastern and southeastern margins of the upland plateau, there is a succession of cross-bedded sandstones containing thin lenses of grit, conglomerates, and erratic boulders belonging to Wajid Sandstone.

This formation lies in nonconformity on a surface which had previously been peneplained.

Drainage of the western slopes of the Asir Mountains is mainly controlled by a series of faults, since the major valleys almost lie along the most marked structural lines, which run parallel to the Red Sea Rift or at right angles to it. The southernmost area of the Asir Mountains near the Yemen border is slightly different geologically from the other area. Here, the mountains are often flat-topped, consisting of basalt and sandstone formations, which lie in nonconformity on Precambrian Basement Rocks, tilted slightly eastward.






Alluvial deposits are widespread throughout the area, although they are limited to the valley sides in the Asir Mountain range. On the upland plateau of the eastern slopes of the mountain range, considerable proportions of alluvial deposits extend into the channels and watercourses, and consist of fairly coarse to finer sands, gravels and pebbles. Both fine and loose sands derived from the disintegration of the crystalline rocks on higher foothills through the watercourses are deposited extensively in the alluvial plains along the long channels of Wadi Bisha, Tathlith and other major wadis, as well as Wadi Najran.

The alluvial deposits referred to here are found extensively in the valleys and on the valley side in the areas around Nimas. Much of this alluvium is the basis for the rich agricultural potential of the area. The soils of the Southern Region have been categorized in six functional classifications according to their potential agricultural land use capabilities:

For the purpose of determining land use in the Nimas area only the first two classes are specified while the remaining four are combined as areas less suitable for agricultural purposes (See Figure 2-7-1). Class I and II land is for the most part located in and along the valleys or wadis which run more or less perpendicular to the line of the escarpment.

FIGURE 2-4-1
NATURAL FEATURES
NIMAS
VILLAGE CLUSTER

scale 1:20,000

-  class I agricultural land*
 -  class II agricultural land*
 -  large exposed boulders
 -  moderate out-cropping
 -  vacant or non-used land
- * see FIGURE 2-7-1



2-4-4 NATURAL FEATURES AND VILLAGE LOCATION

The villages of the Nimas Village Cluster are located along the edges of these wadis and are most numerous in the areas close to the escarpment where erosion from runoff is less resulting in more suitable areas for development. This strip of land is also the location for the recently constructed national Route 54.

Toward the east away from the escarpment, the precipitation and humidity are substantially less and agricultural potential is consequently reduced. Primarily for this reason it seems likely that future development is likely to take the form of more intense use of existing development rather than extensive expansion into new presently unused areas.

2-5 POPULATION AND EMPLOYMENT

2-5-1 CURRENT POPULATION

Historically, population has been distributed in tribal villages along the Wadis (see Figure 2-3-1) although recently because of national policy, this strict tribal structure is beginning to disappear. The total population of the Nimas Emirate is shown in Table 2-5-1. It can be seen that 83% of the total is settled, and for the most part, this settled population is living in the villages.

Current population and household distribution among the three village groups of the Nimas Village Cluster are shown in Table 2-5-2. As this table shows, almost 50% of the entire population is located in Village Group B which centers around the village of Nimas itself. Except for the Village of Nimas which has a population of 1650, the villages of this cluster have a population of between 50 and 450. It should be noted that these population figures differ somewhat from those given in Table 3-1-7d of the Existing Conditions Report for the Southern Region [3]. This is primarily due to the fact that in the interviews which were the basis for the earlier figures, no precise boundaries were given for the villages, which resulted in some double counting. Since that time, the survey methods have been improved and the figures given here are more accurate.

2-5-2 NATURAL RATES OF CHANGE

The population rates of change are based upon regional data for nomadic and rural population as reported in the Regional Existing Conditions Report. The natural rates of change are shown in Table 2-5-3.

Table 2-4-1
SUMMARIZED CLASSIFICATION OF REGION SOILS

Class	Description of soil and land use capability
I	Land well-suited for irrigation all crops and orchards
II	Land moderately well-suited for irrigation almost all crops with the exception of slightly saline areas where apples and pears cannot be grown. Gravel areas are suitable only for grapes and peaches.
III & IIIa	Land fairly well-suited for irrigation limited use for orchards
IV	Land less suited for irrigation suitable for shallow rooted vegetable or forage crops
V	Land requiring special irrigation management suitable for barley or sugarbeet drainage and lowering of groundwater table requires excess water for leaching
VI	Non-irrigable lands suitable for sparse grazing only

[2]

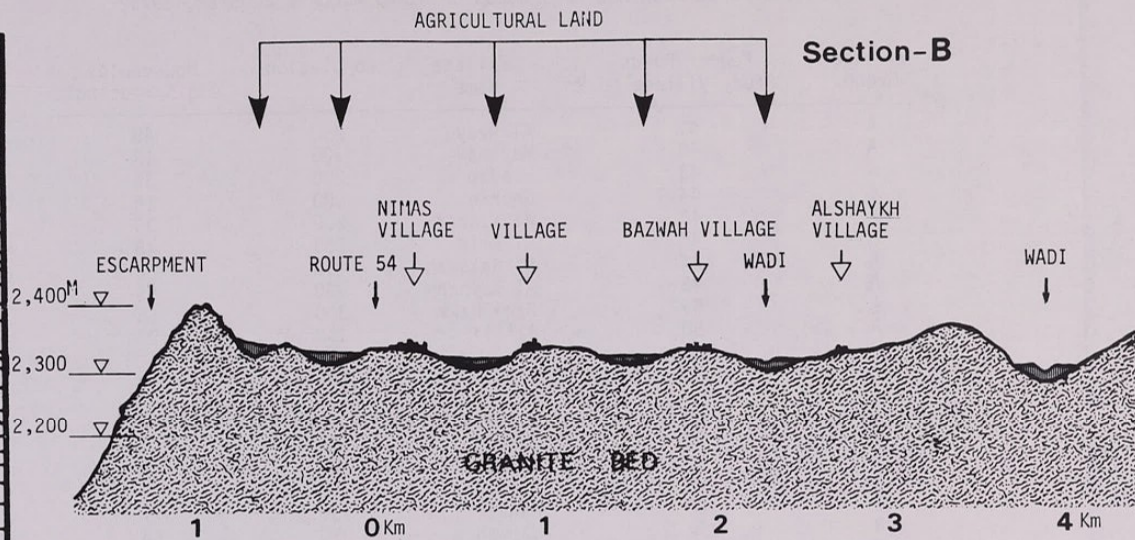
Table 2-5-1
EXISTING POPULATION OF THE EMIRATE (MUNICIPALITY) OF NIMAS

	Settled	Nomadic	Total
1975a	20,100	4,100	24,200

Notes:

a. Existing Population data obtained from the 1974 National Census. See Kenzo Tange & URTEC; Southern Regional Final Physical Plan, Table 9-1-4. The figures have been rounded to the nearest hundred.

NIMAS VILLAGE CLUSTER AERIAL VIEW



Section-A

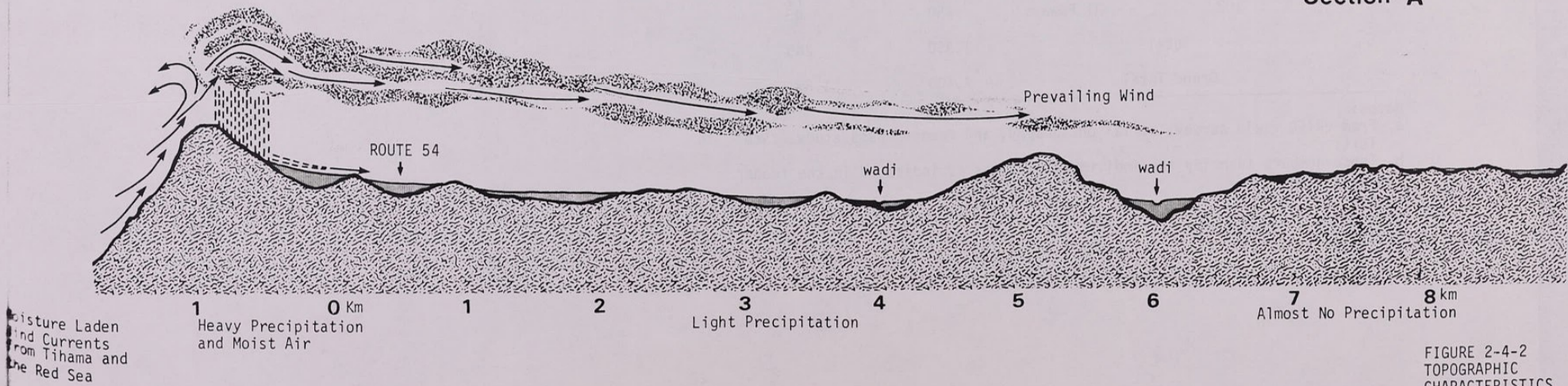


FIGURE 2-4-2
TOPOGRAPHIC
CHARACTERISTICS
AND CLIMATE

Table 2-5-2
EXISTING POPULATION AND HOUSEHOLDS OF NIMAS VILLAGE CLUSTER, 1975^a

Village Group	Feeder Roads Study Village No. ^b	Village Name	Population	Households @ 5.5/household
A	41	Al Rzayq	250	45
A	42	Ma'awad	100	18
A	43	H.adab	200	36
A	44	Snukan	100	18
A	45	Al T.araf	200	36
A	45	Al'Amir	250	45
A	46	Al Salamah	450	82
A	48	Al Zaynab	300	55
A	49	Bani Rawk	300	55
A	50	Al'Ali	150	27
A		Total	2,300	418
B	89	Al Shaykh	50	9
B	90	Bazwah	350	64
B	91	Al Mala'ib	100	18
B	92	Al Maghzi	150	27
B	93	Manzil	150	27
B	94	Jahwah	350	64
B	95	Al H.abaybah	100	10
B	149	Nimas	1,650	300
B	150	H.arqah	200	36
B	151	Naigah	100	18
B	152	Al Badal	250	45
B		Total	3,450	626
C	96	Al Shanduf	300	55
C	97	Al Khanfus	50	9
C	98	Al Jid'a	250	45
C	99	Al Barqan	50	9
C	100	Al H.asan	50	9
C	101	Al Hayah	400	73
C	102	Al Fuways	250	45
C		Total	1,350	245
		Grand Total	7,100	1,291

Notes:

- From URTEC field survey, aerial photography, and feeder roads study. See Text.
- These numbers identify the individual villages as indicated in the feeder roads study.

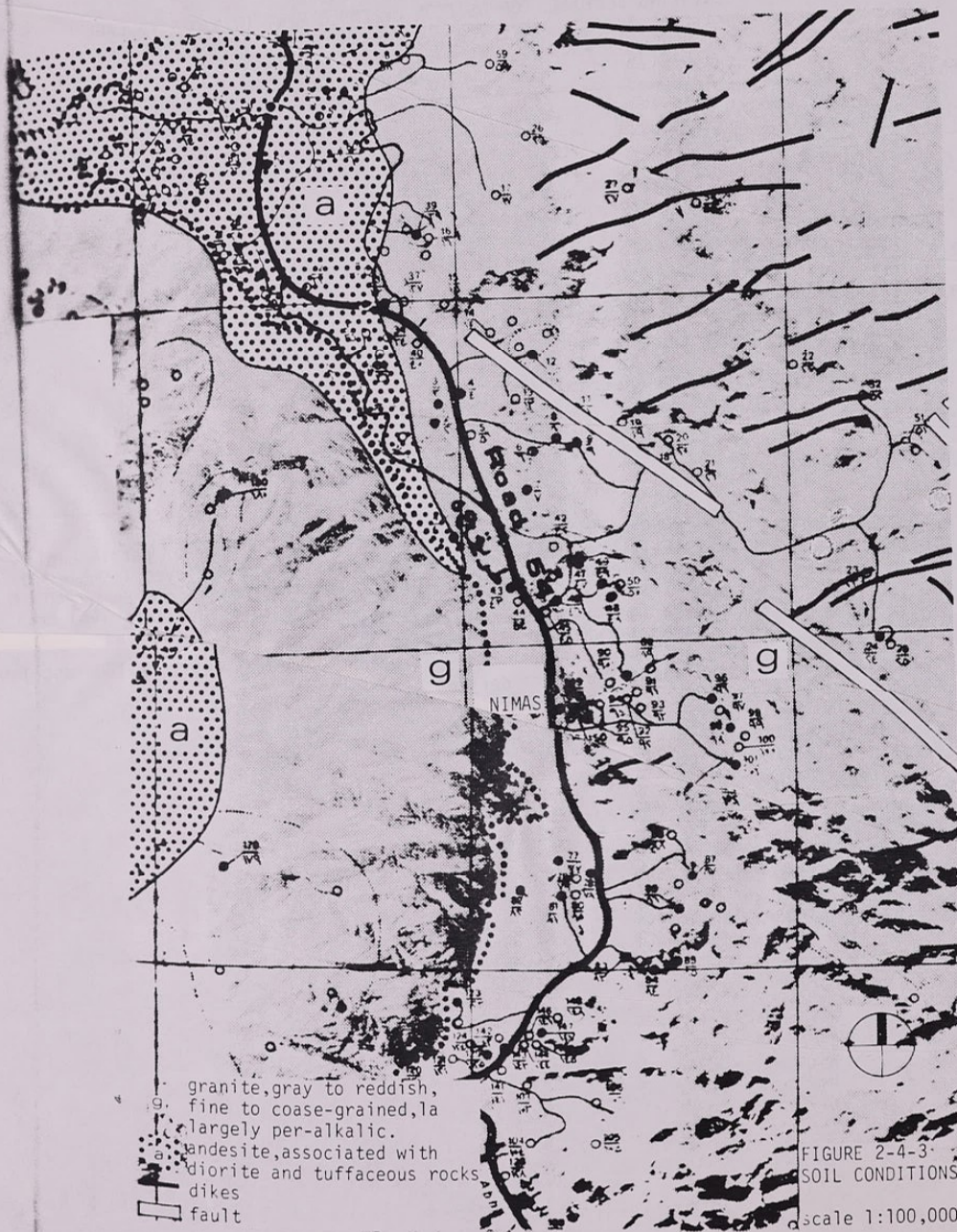
Table 2-5-3
ESTIMATED BIRTH AND DEATH RATE

	Annual Rate per Thousand Persons		
	Birth Rate	Death Rate	Natural Increase
Nomadic	42	34	8
Rural	42	20	22

Note: The methodology for determining these rates is given in: Kenzo Tange & URTEC, Southern Region Project Study, Southern Region, Existing Conditions, Vol. 1, Section 3-1-5.

Table 2-5-4
NATION-WIDE POPULATION TRENDS

	1962-63 Share	1969-70 Share
Urban	24	33
Rural	55	50
Nomadic	21	17



Source: Geologic Map of The Nimas Quadrangle, 1966 by James Mytton
 Ministry of Petroleum and Mineral Resources

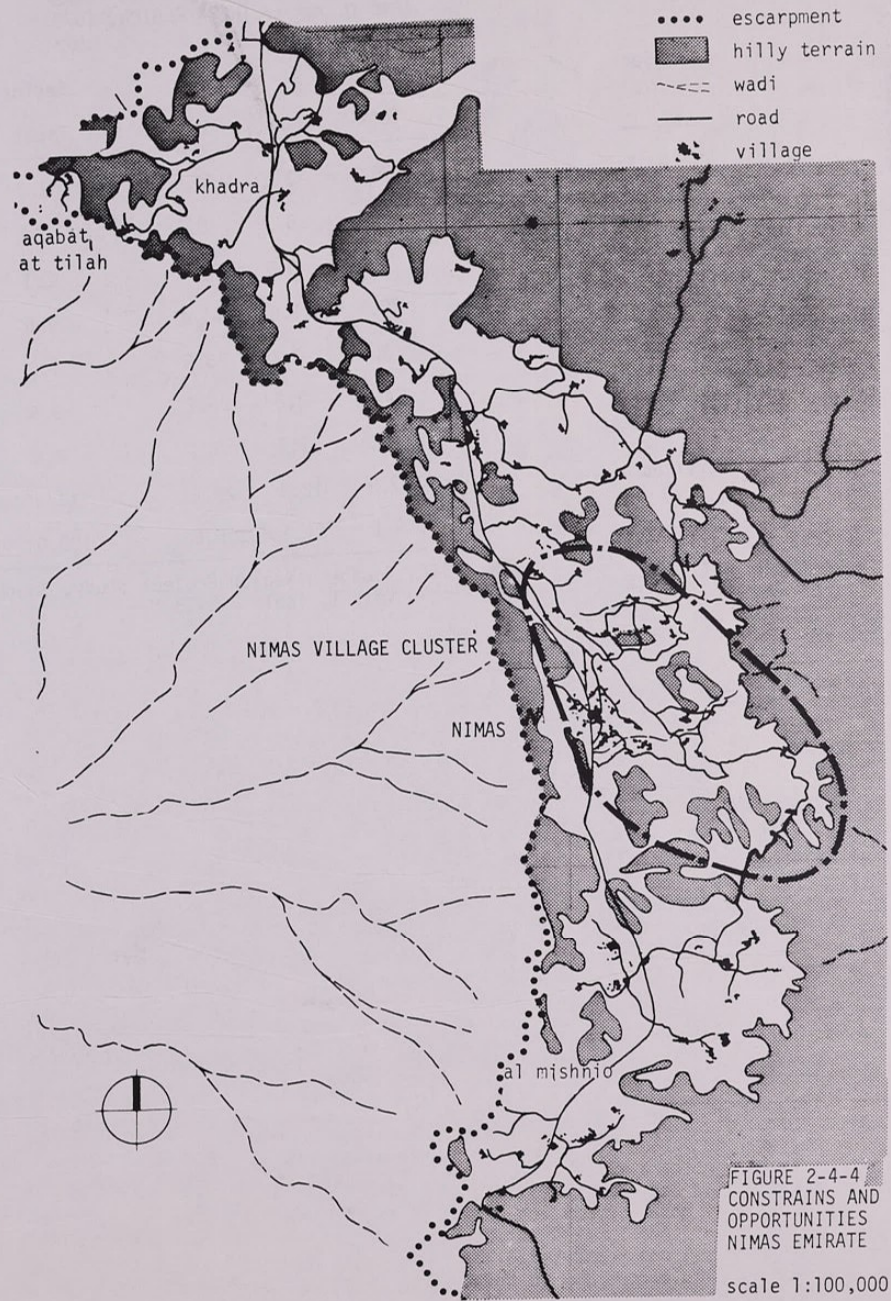


Table 2-5-5
 URBAN AND RURAL
 COMPOSITION OF EMPLOYMENT IN THE SOUTHERN REGION, 1975

Sector	1,000 Persons			Sectoral Share in %		
	Total	Urban	Rural	Total	Urban	Rural
Agriculture	196.1	1.2	194.9	63.7	5.4	68.0
Mining and	0.6	0.3	0.3	0.2	1.3	0.1
Manufacturing	6.6	0.6	6.0	2.1	2.6	2.1
Construction	20.3	1.9	18.4	6.6	8.9	6.4
Public Utilities	3.7	0.2	3.5	1.2	1.1	1.2
Trade	29.4	3.2	26.2	9.5	15.1	9.1
Transportation	8.9	1.2	7.7	2.9	5.8	2.7
Services	42.9	12.8	29.6	13.8	59.8	10.3
	308.0	21.4	286.6	100.0	100.0	100.0

Source: K...
 E...

IRTEC, Southern Region Project Study, Southern Region
 Reports, Vol. 1, Table 3-2-13

Table 2-5-6
 EXISTING SECTORAL COMPOSITION OF EMPLOYMENT IN NIMAS VILLAGE

Sector	Adjusted No. of Workers ^a
Agriculture and Rangeland ^b	930
Manufacturing and Construction	70
Commercial and Trade	70
Service and Transportation	10
Educational	150
Government	130
Total	1360

Notes:

- a. These figures are somewhat less than the actual number of people employed in each activity. This is because many people are employed in more than one job. For example, a farmer might supplement his income by working for the government. An attempt has been made here to adjust the actual employment figures so that only primary occupations are counted. This avoids double counting which would diminish the value of the figures.
- b. 780 agricultural workers derived from Table 4-1-3 plus 150 rangeland workers.

Rural population in this instance refers to those people living in villages such as those which comprise the Nimas Village Cluster. The estimates of natural rates of change of the population are consistent with the indicated average growth rates for the Nimas Emirate of between 1.9% and 2.6% per year as given in section 3-1-4 of this report. This overall growth rate includes migration rates which are discussed in detail in the Regional reports [4].

2-5-3 MIGRATION

In general, the Nimas area in spite of its relatively good agricultural resources has experienced migrational phenomena similar to the rest of the Region. These are characterized by out-migration from unsettled areas to rural and urban population centers and out-migration from rural population centers to urban centers both inside and outside the country.

Although it has many components, such migration is primarily the result of economic factors. It has been estimated that in the seven years between 1962-63 and 1969-70 the Urban population share increased dramatically while the rural and nomadic shares fell (see Table 2-5-4) [5].

This movement has been attributed to several factors including marriage, military service, schooling, and reasons directly related to employment. In order to produce a well-balanced rural society, it will become increasingly necessary to provide better education, jobs, and cultural facilities in rural areas such as the Nimas Village Cluster in order to hold the young portion of the population which currently finds leaving more attractive than staying.

2-5-4 EMPLOYMENT

It has been estimated that about 19.1% of the population of the Nimas area is working (see Table 4-2-1). In Nimas as for any rural area, this figure is somewhat misleading since in family farming of the sort found here, every able member of the family usually takes part in the work of the farm.

It can be seen by comparing the sectoral composition of urban and rural employment that rural employment is dominated by agricultural activity while urban is dominated by services (see Table 2-5-5). Agriculture accounts for 68% of rural employment; services, 10.3%; trade, 9.1%; construction, 6.4%; all other sectors are below 3%.

These figures refer to the rural average for the Southern Region. The figures for Nimas are quite

similar with only minor variations due to local conditions (see Table 2-5-6).

Although it is expected that as development advances, other sectors will be strengthened, nonetheless agriculture will remain an important economic activity as modern farming methods are brought into use, and any plan for the area must take this fact into account.

2-6 HOUSING

2-6-1 TYPOLOGICAL ASPECT

The URTEC survey has identified three basic housing types in the Nimas area (see Figure 2-6-1)

TYPE	DESCRIPTION
A	Collective court houses
B	Detached farm houses
C	Modern, non-indigenous houses

In the Nimas area as with other areas in the relatively fertile area along the Asir escarpment, housing traditionally took forms suitable to an agricultural life. Whether collective clusters associated with families or tribes or detached single family houses, most traditional houses here were associated in one way or another with farming. Construction was primarily of stone, the most abundant naturally occurring building material in the area. The high level of craft of the traditional stone workers is immediately apparent upon examination of these magnificently constructed buildings. Recently, however, this traditional housing form has been disappearing and is being replaced by concrete block houses of the sort now found throughout the Southern Region. Although it would be desirable to retain some of the traditional houses and building methods, it is expected that the more modern dwellings of concrete construction will become more and more prevalent.

2-6-2 DISTRIBUTION OF RESIDENTIAL AREAS

Residential areas are distributed in a way which corresponds to the traditional tribal structure of the villages of the Nimas Village Cluster (see Figure 2-6-2). These areas are scattered along the line of the new Route 54 and to a distance of about 3 km. to the East of the line. These clusters are distributed among the fertile farmlands which are worked by the people of the villages.

2-6-3 ENVIRONMENTAL
EFFECTS

Unlike some of the cities where traditional housing clusters are all but abandoned and are rapidly deteriorating, in the Nimas area traditional houses are, for the most part, lived in and adequately maintained. On the other hand, as with traditional urban houses, the sanitary condition of Nimas houses is generally poor. Septic tanks are rare and sewage is more often simply allowed to drain into the land creating dangerous health conditions, especially in areas of multiple dwellings.

As development in the area progresses and the population increases, more people will choose to move to modern houses with modern facilities and there will undoubtedly be the same tendency to abandon traditional housing as exists in the cities. Insofar as possible such abandonment should be discouraged. The traditional stone houses are of excellent construction and add greatly to the character of the area. Such houses should be modernized whenever possible rather than abandoned or destroyed. Furthermore, traditional stone building methods should be encouraged in new construction and taught in vocational schools. Such an approach is preferable to permitting the complete replacement of beautiful distinctive stone houses by the sort of characterless concrete block houses which are appearing everywhere in the region. Because of the abundance of excellent building stone, the Nimas area, as well as the rest of the Asir highlands, presents an excellent opportunity for the preservation of traditional stone construction.

2-7 AGRICULTURE AND
WATER RESOURCES

2-7-1 CURRENT AGRICULTURAL
AREA

As has been mentioned previously, agriculture is currently the most important economic activity in the Nimas area, employing almost 70% of the working population (See Table 2-5-6). Currently the agricultural land of the Nimas Emirate is located in a zone about 25 km long and 5 km wide stretching along the line of the escarpment. Of this total of 12,500 ha, the Nimas Agricultural census taken in 1974 indicated that about 3000 ha was being used for agricultural purposes. In 1977 the URTEC field survey as well as analysis of aerial photographs indicate that about 5000 ha is being used for agricultural purposes. This difference can be accounted for partly by the gradual but steady improvement in

production techniques but is undoubtedly due primarily to annual differences in the amount of rainfall since this is the single greatest factor in determining the amount of cultivated land. A devastating drought was experienced in the late 1960's (1380's) and early 1970's (1390's), and recovery was not yet complete in 1974. In the intervening years, however, rainfall has come back to normal resulting in a great increase in the amount of agricultural land compared with that of the early 1970's.

Applying to this 5000 ha figure, the average ratio of irrigated land to total agricultural land in the Asir sub-region (26.4%) it can be seen that of this total, about 1300 ha are irrigated lands while about 3700 ha are used for dry farming.

The agricultural land of the villages of the Nimas Village Cluster is about 953 ha of which about 715 ha are irrigated. This proportion of irrigated land is completely different from that of the Nimas Emirate as a whole, partly because use of irrigation is more advanced around the village of Nimas itself and partly as a result of the complex water-rights structure which will be discussed later.

The distribution of this agricultural land among the village groups of the Nimas Village Cluster is shown in Table 2-7-1 and Figure 2-7-1.

The total cultivated land at present amounts to 953 ha which is estimated to be about 100 ha under the total potential available arable land within the bounds of the Nimas Village Cluster.

As mentioned in Section 2-4-3, the soil in the Southern Region has been classified in seven groups according to its agricultural potential. The arable land of the Nimas Village Cluster fall almost wholly within group I—land moderately well suited for irrigation and capable of supporting all crops and orchards; and group II—land moderately well suited for irrigation and capable of supporting almost all crops (See Figure 2-7-1). These two classifications occur in almost the same proportion as do irrigated and dry farming lands, indicating that irrigation in the area of the Nimas Village Cluster is being relatively efficiently carried out.

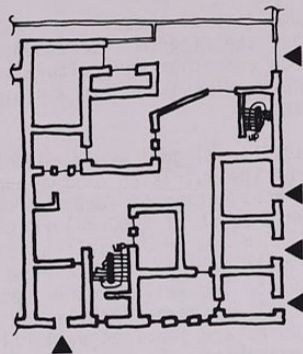
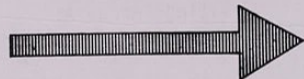
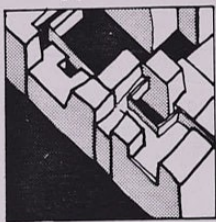
The current five-year national development plan lists the objectives for national agricultural policy as follows:

- a. To raise the per capita income and improve the standard of living of the inhabitants of

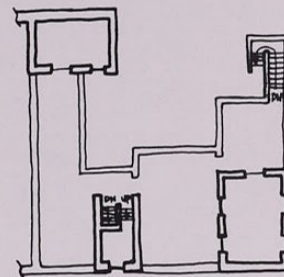
past

present

Type - A

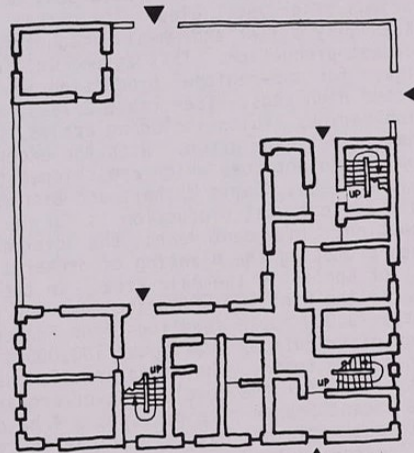
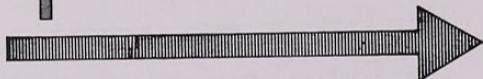
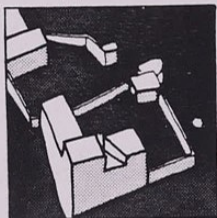


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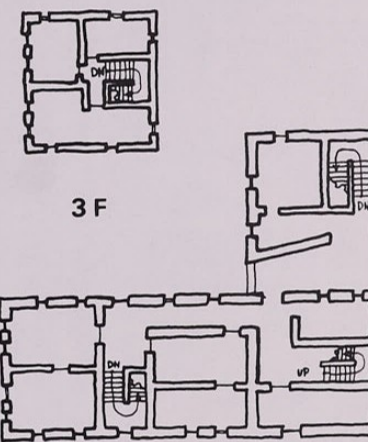


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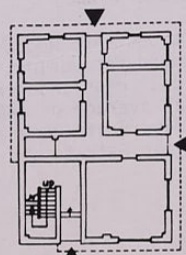
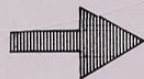
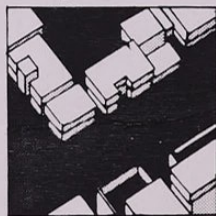
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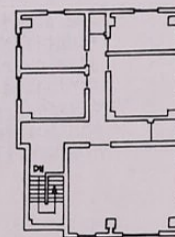
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Type - C



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2F

FIGURE 2-6-1 (a)
TRANSITION OF
HOUSING TYPES

FIGURE 2-6-1 (b)
TYPICAL PLAN
BY HOUSING TYPE
scale 1:250

- the Kingdom's rural areas.
- b. To minimize the Kingdom's dependence on imported food and other agricultural products.
 - c. To release surplus labor for employment in other areas.

A possible additional goal would be to improve the quality of the nutrition of the people. The present mean consumption of foodstuffs in the Kingdom amounts to about 2000 calories per day, a figure which is low in comparison to that typical for Western nations. Protein is supplied largely by mutton (as well as other meat and chicken) and pulses (beans lentils and edible seeds). Vitamins are supplied primarily by fruits and vegetables, the consumption of which is about 50% of that of Western countries.

2-7-2 AGRICULTURAL PRODUCTION

Crops currently grown in the Nimas area include wheat, sorghum, tomatoes, potatoes, onions and various other vegetables. The cereal grains, especially millet and wheat, account for the largest production. This agrees well with figure for sub-regional production in the dissected highlands. (See Table 2-7-2). In addition various fruits including apples, peaches and apricots are grown. With the exception of apples and potatoes which are shipped to Jeddah, Riyadh, Abha, Khamis Mushayt and Bishah, most of this agricultural production is for local consumption. In recent years, the Government has been promoting the planting of orchards, primarily of apples in the Asir area. In the past 5 years, the Ministry of Agriculture has distributed 70,000 apple seedlings from France and will soon distribute an additional 100,000 apple seedlings from Spain. The Nimas area is one of the best areas for the development of orchards and the recent Shapan plan proposes a 4 ha orchard with automatic and natural irrigation systems to be located on land owned by the Ministry of Agriculture to the south of the intermediate school.

Table 2-7-3 indicates the productivity and 1975 domestic price of some of the crops which have proven at least moderately suitable for cultivation in the Nimas area, or which offer possibilities for future development.

The physical plan for the Southern Region has identified the worker demand for various physiographic areas of the region. Highland farming of irrigated land required an average of 140 man-days/ha/yr. [6]. These figure are generally applicable to both the Nimas Emirate and the Nimas Village Cluster.

Table 2-7-1
DISTRIBUTION OF CULTIVATED LAND
NIMAS VILLAGE CLUSTER

	1975 ^a
Village Group A:	
Existing Irrigation	232
Improved Irrigation	-
Dry Farming	77
Total	309
Village Group B:	
Existing Irrigation	352
Improved Irrigation	-
Dry Farming	113
Total	465
Village Group C:	
Existing Irrigation	131
Improved Irrigation	-
Dry Farming	48
Total	179
Village Cluster Total:	
Existing Irrigation	715
Improved Irrigation	-
Dry Farming	238
Total	953

Notes:

- a. Existing distribution of cultivated lands estimated from field survey, aerial photography, and Southern Region, Existing Conditions, Vol. I.

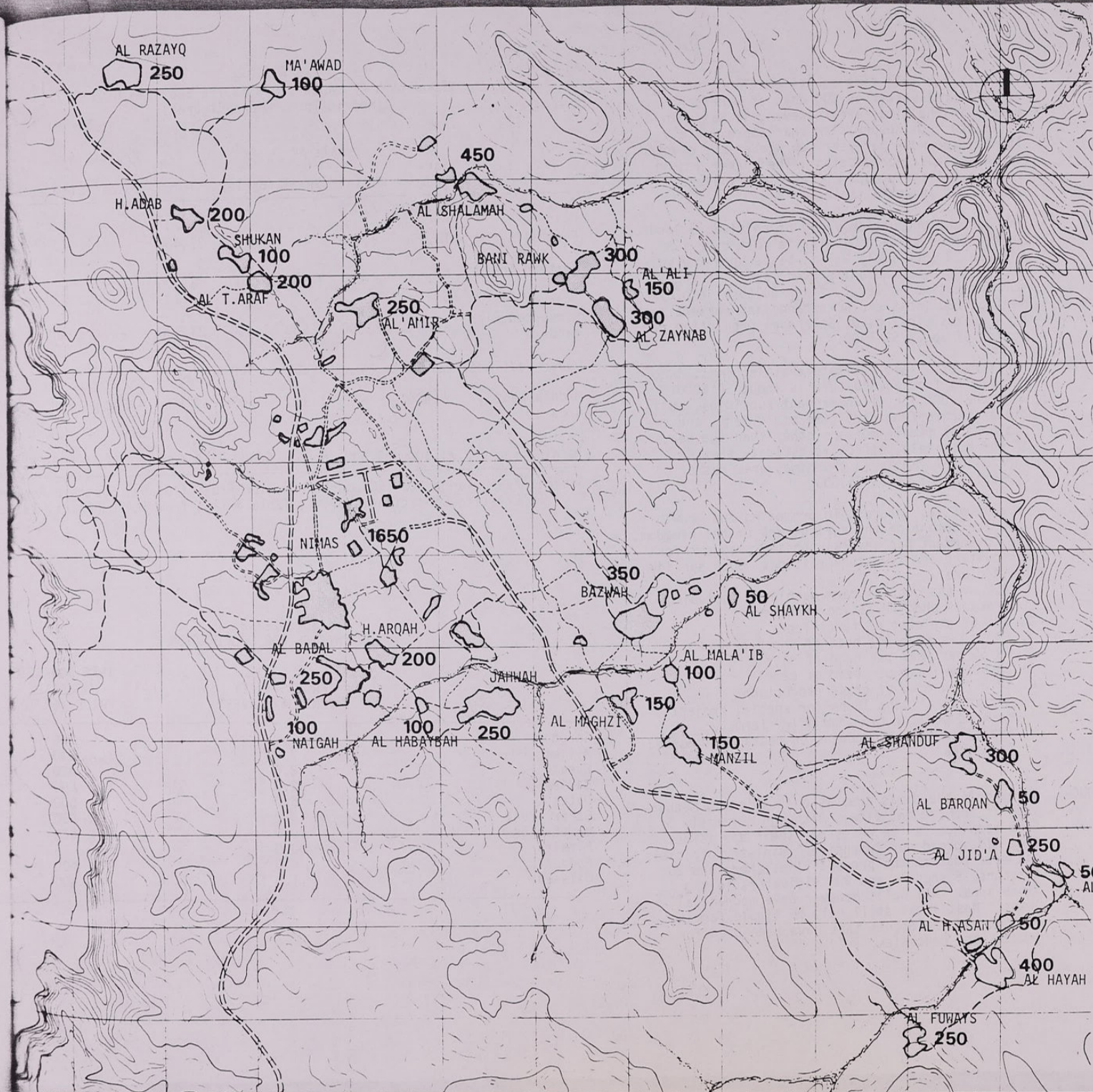



FIGURE 2-6-2
EXISTING
RESIDENTIAL
AREA AND
POPULATION
DISTRIBUTION

scale 1:20,000

 residential area
100 population

SOURCE: URTEC Field Survey,
Table 2-5-2
Existing Population
of Nimas Village Cluster,
1975.

The expected full time equivalent labor of an agricultural worker is 200 days of work per year. In the Nimas area however, it has been estimated from observation that approximately 150 days of work per year per worker are devoted to agricultural production. The worker demand for the village groups of the Nimas Village Cluster is shown in table 2-7-4.

The current production value of cultivated land in the Nimas Village Cluster is just over 1.5 million SR (See Table 2-7-4) based upon the values of improved and unimproved land. At the current estimated level of agricultural employment of 780 (this excludes rangeland workers such as shepards) this gives an annual production per worker of about SR 1960.

Ministry officials estimate that in Nimas, income per family from agriculture is about SR 8000. With the addition of Government subsidies, additional income from part time employment, and employment of family members other than the head of the household, officials estimate that an agricultural family in the Nimas area has a typical income of SR 25,000

Because of its interest in promoting the growth and development of the agriculture of the kingdom, the Government has several subsidy programs for agriculture and livestock raising. Such subsidies include:

1. 45% of the cost of farm machinery including tractors and irrigation machinery
2. 50% of the cost of fertilizer
3. SR 30 per year per head of sheep or goats
4. SR 50 per year per head of cattle
5. SR 60 per year per head of camel
6. SR 0.25 per kg of grain production
7. Agricultural bank loans for special projects such as poultry farms or dairy farms.
8. Subsidies for transportation costs of imported livestock

Farming in the Nimas area is only slightly mechanized at the present time. Although a variety of farm machines can be observed, their use is neither widespread nor intensive. Ministry officials estimate that at the present time, there are 20 tractors, 5 shovels and 30 cultivators in the Nimas area. All wells however have mechanical pumps. Most areas still rely on simple farming methods and implements that have been used for decades and centuries.

2-7-3 AGRICULTURAL PRODUCTION METHODS

Table 2-7-2
PRODUCTION OF MAJOR CROPS IN THE SOUTHERN REGION
(Metric Tons, Round Figures)

	Sor- ghum	Cereals			Total	Fruits		Vege- table
		Millet	Wheat	Barley		Dates	Others	
Coastal Plain	43,000	7,000	-	-	50,000	-	-	-
Foothills	19,000	8,400	-	-	27,400	-	-	-
Western Scarp Slope	3,000	500	1,500	3,000	8,000	-	-	-
Dissected High-lands	3,500	18,000	500	1,500	23,500	-	600	1,500
Upper Wadi Area	2,700	-	4,500	500	7,700	-	200	900
Middle Wadi Area	400	-	1,900	500	2,800	9,500	700	3,700
Total	71,600	33,900	8,400	5,500	119,400	9,500	1,500	6,100



Source: Kenzo Tange & URTEC Southern Region Project Study, Southern Region, Existing Conditions, Vol. 1, Table 4-1-5; from ILACO Report, 1973.

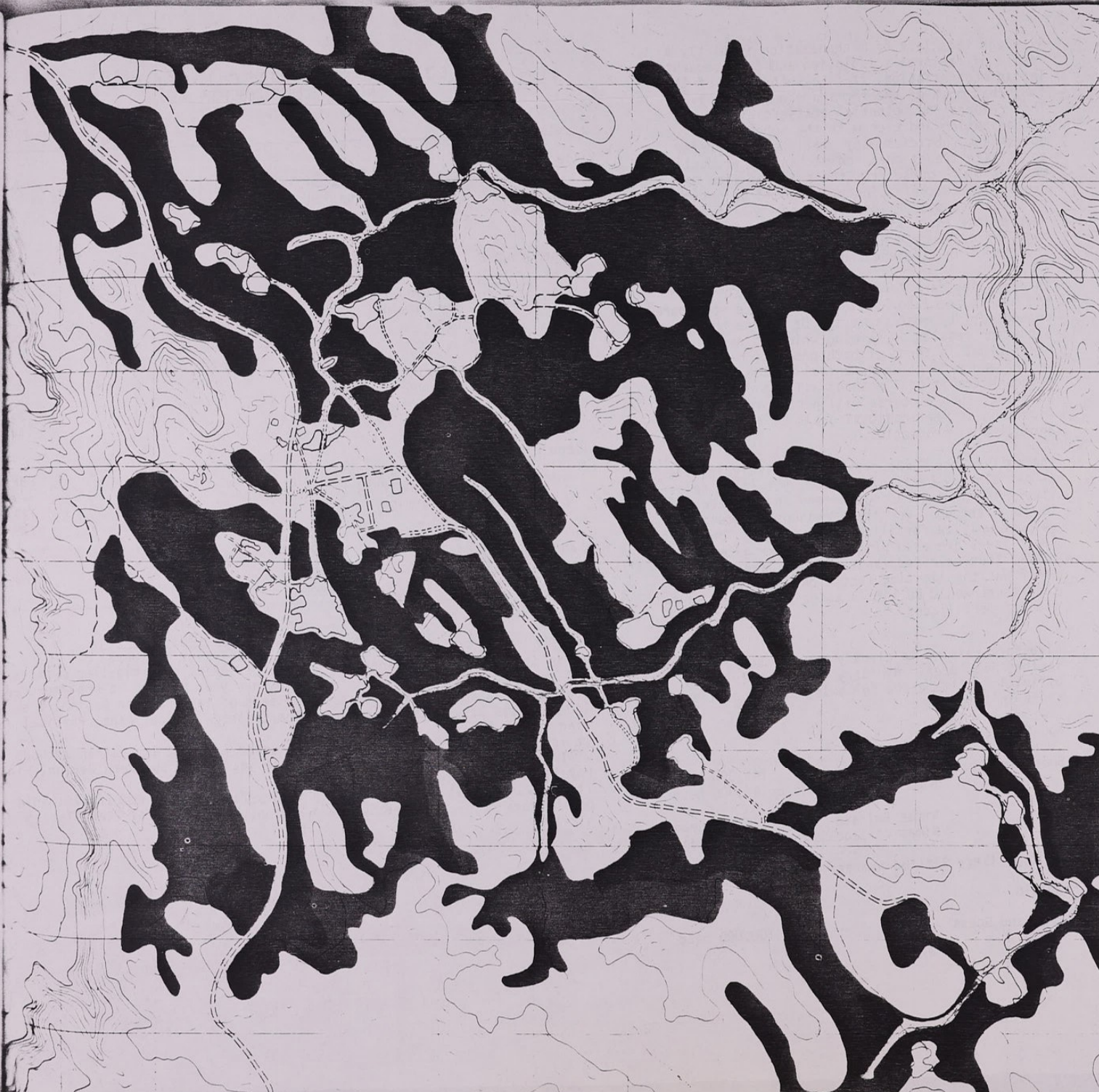
Table 2-7-3
OPPORTUNITIES FOR CULTIVATION

	PRODUCTIVITY (TONS/HA/HARVEST)	1975 DOMESTIC WHOLESALE PRICE (SR/TON)
Sorghum	2.0	750
Millet	2.0	500
Wheat	2.0	850
Barley	2.0	600
Dates	5.0	600
Other Fruit	10.0	650
Vegetables	10.0	350
Alfalfa	80.0	35
Fodder	4.0	500
Oilseeds	1.0	800

FIGURE 2-7-1
EXISTING
ARABLE LAND

scale 1:20,000

-  class I agricultural Land*
-  class II agricultural land**



* -they expand in a bottom of water basin with convenient access from wadi and/or irrigation wells, are mostly irrigated land and partially dry farming with irrigable potentials.

** -they are on relatively moderate hills, mostly terraced land and cultivated lots are generally small comparing to class I, and they are used for water harvesting as well as dry farming.

-areas locating relatively far from village have potentials of dry farming and irrigation by technology up to date.

Although this lack of mechanization is partly a result of the area's isolation and a consequent lag in modernization, it is also because of the fact that most of the farms are quite small. This reduces the potential cost-efficiency of mechanization and even with the substantial government subsidies many small farmers prefer to utilize traditional non-mechanized production methods. Of course from the point of view of production cost-efficiency, it would be desirable to create consolidations of these small farms. However the acquisition costs for land are very high and discourage either private or government investment in farmland consolidation.

In any case, farm labor is relatively plentiful and mechanized labor saving devices are considered unnecessary by most farmers. Of course this situation results in farming which is relatively inefficient in terms of both production value per worker and production potential of the land. Although traditional methods will be difficult to supplant, such a course will become increasingly important to meet national goals of increased agricultural production.

The soil in the Nimas area is relatively fertile as has already been pointed out, yet it is relatively low in organic matter and in some areas is low in nitrogen. For these reasons, it tends to respond well to fertilizers. Currently, chemical fertilizers are used primarily on irrigated land rather than rain-fed land. It has been felt that water was the limiting factor on such land so that there would be little to gain from the addition of fertilizers.

2-7-4 LIVESTOCK RAISING

Livestock raising is already a major activity in the Nimas area. Ministry of Agriculture officials estimate the following number of livestock in this area:

Non Nomadic

Sheep and Goats	Nimas Emirate	145,000 head
	Nimas Village Cluster	45,000 head
Cattle	Nimas Emirate	6,000 head
	Nimas Village Cluster	2,500 head

Poultry (Very limited numbers at this time)

Nomadic

Sheep and Goats	100,000 head
-----------------	--------------

Table 2-7-4
EXISTING WORKER DEMAND OF CULTIVATED LAND,
NIMAS VILLAGE CLUSTER^a

	1975
Village Group A:	
Existing Irrigation ^b	217
Improved Irrigation ^c	-
Dry Farming ^d	36
Total	253
Village Group B:	
Existing Irrigation	329
Improved Irrigation	-
Dry Farming	53
Total	382
Village Group C:	
Existing Irrigation	122
Improved Irrigation	-
Dry Farming	22
Total	144
Village Cluster Total:	
Existing Irrigation	668
Improved Irrigation	-
Dry Farming	111
Total	779
Average Man-Days of Work	
Per Agricultural Worker	150
Per Year	

Notes:

- (Worker Demand) = (Cultivated Land Area) x $\frac{\text{Man-Days Required}}{\text{Average Man-Days}}$
- It is assumed that the land cultivated under existing irrigation methods will require the same number of man-days per year devoted to non-improved irrigation lands in the dissected highlands of the Southern Region, i.e. 140 man-days per hectare per year. See Southern Region, Final Physical Plan, Table 5-2-13.
- It is assumed that the land cultivated under improved irrigation methods will require 210 man-days per hectare per year. See Southern Region, Final Physical Plan, Table 5-2-13a.
- It is assumed that the land devoted to dry-farming will require 70 man-days per hectare per year. See Southern Region, Final Physical Plan, Table 5-2-14.

At the present time, livestock is kept mostly in small herds or flocks and large scale breeding and production have not yet been developed here. Although sheep and goats do quite well in this area, cattle tend to be rather small and their production subject to wide variation. This is partly because sheep and goats are able to obtain adequate forage for themselves from the sparse and rocky rangeland, while cattle have a much more difficult time of this.

At the present time, sheep, goats and cattle are produced primarily for domestic and local consumption of both milk and meat. In addition, cattle are used as work animals.

The Government has instituted several programs aimed at increasing both the quantity and quality of livestock production. To promote poultry farming, the Government will provide a 100% subsidy for machinery and a 50% subsidy for nutritional substances. In addition credits may be obtained for construction of necessary buildings and plans and technical guidance are available. Chickens for such poultry farms will be provided from large private farms already established in the area of Taif.

Although at the present time, there are no poultry farm operations in Nimas, there has already been one application to the Government for technical and financial assistance for such a facility. Because local conditions are quite favorable for poultry production, it is expected that this first farm will be very successful. If this is the case, many additional applications for assistance will undoubtedly be made.

Another government program intended to improve the quality of local cattle is the distribution of Frisian bulls from Denmark and Holland for the purpose of cross breeding with local cattle. Such programs have already proven successful in improving both beef and dairy production in even hotter climates such as Egypt and Iraq. Twenty of these bulls will be distributed in Asir this year and three will soon be sent to Nimas.

In order to facilitate local meat production, a new slaughter house is currently under construction at Al Zahara, about 8 km toward Abha from Nimas.

An additional innovative government program is the introduction of apiculture to the Asir highlands. Because of the relatively abundant vegetation and moderate climate of this area, it is

anticipated that beekeeping can become quite successful. The Ministry of Agriculture in Abha currently has in storage 50 modern bee-hives which will soon be delivered to Nimas for a pilot project. As with other such programs, it is expected that once the initial project has been proven to be successful, many farmers will request assistance in setting up bee-keeping operations.

Based upon estimates of projections of increased livestock production in the dissected highlands, it has been calculated that with maximum increase in production methods including improved genetic characteristics, improved nutrition additives and improved veterinary health care livestock production in the Nimas area could be increased by from 2 to 2.5 times by weight during the next twenty years.[7] This would mean an effective increase in the livestock carrying capacity of the land brought about by methods other than land improvement itself.

2-7-5 WATER RESOURCE COMPONENTS

Nimas is fortunate in having a mean annual rainfall of about 500 mm, which provides sufficient water for many agricultural uses. While desalination is already a source of water in some parts of the Kingdom, Nimas' distance from the coast and elevation make this impractical. Thus it will rely upon the following:

- a. Rainfall. Obviously the rain that falls on crops is directly used by them with no need for human intervention.
- b. Runoff. The amount of water which flows into the Wadi basins and becomes available for use depends upon how much is lost by percolation into the soil and evaporation into the air. If the soil becomes sufficiently saturated, it will allow more water to flow across its surface than when dry. In fact, when rainfall exceeds a certain volume and intensity, flooding may occur. The most effective means of capturing runoff is by damming the Wadi beds at appropriate points, a technique that can be undertaken at a low level of technology with indigenous labor and materials. Attention must be paid to the tendency toward flooding, and the drainage or catchment area should not be so large as to entrap so much water that dams might be damaged or destroyed.
- c. Aquifers. The difficulty here is that the aquifers in the areas of greatest need tend to be shallow, which decreases their ability to hold water and increases evaporation. The only assistance that can be provided is the construction of small dams and channels in appropriate areas to maximize the recharge

effect of rainfall and runoff. In a few instances it might prove worthwhile to pump water in from other sources (such as dammed basins) to recharge aquifers.

d. Water harvesting. This is a means of increasing the amount of water available from runoff and storing it. The two major methods of accomplishing this are:

- (1) Setting up temporary ground cover in the form of plastic films, sheet metal or similar impervious material. This is a quick and convenient method but subject to several hazards: wind and weather damage to the cover, deterioration over a fairly short time, leakage of water, and so on.
- (2) A more effective and only slightly more expensive method is a permanent catchment facility. A relatively smooth, cleared surface is prepared and then treated or covered with an impervious material, such as bituminous pavement. It would not need to be thick or strong since it would not be subject to traffic and could be expected to last indefinitely. It would also be less likely to leak. Besides obtaining water for storage tanks, water harvesting would be an effective means of recharging aquifers.

2-7-6 WATER RESOURCE POTENTIAL

The water catchment area for the lands of the Nimas Village Cluster is about 5000 ha. With an annual rainfall of 500 mm per year, this means that about 25 million cubic meters of water fall per year. At an annual runoff of 20%, this gives a potential of 5,000,000 m³/year which is approximately 8% of the total of Wadi Bishah's upstream runoff and 4% of the total runoff of Wadi Bishah I (the portion of Wadi Bishah west of the city of Bishah).

Based on the estimated ratios of aquifer, effective rainfall and return flow to the total runoff volume can be computed that the Nimas Village Cluster has additional effective water availability of about 7,500,000 m³/year. With the annual runoff this gives a total water resource potential of 12,500,000 m³/year (See Table 2-7-5).

It has been estimated that for maximum production of highland farming approximately 16,000 m³/yr/ha of water is needed.[3] With an efficiency factor of 1.3, a gross water supply of about 20,000 m³/yr/ha is required. It can be seen that based on an agricultural area of about 1000 ha for the Nimas Village Cluster, a total yearly water availability of 20,000,000 m³/yr is necessary for maximum efficiency. This is greater than the

Table 2-7-5
Water Resource Potential
Nimas Village Cluster
(m³/yr)

Water Catchment Area = 5000 ha

Source	Volume (m ³ /yr)
Annual Rainfall 500 mm x 5,000 ha	25,000,000
Annual Runoff 20% (a) x 25,000,000 m ³ /yr.	5,000,000
Aquifer 20% x 5,000,000 m ³ /yr	1,000,000
Effective Rainfall 1000 ha x 500 mm/yr.	5,000,000
Return Flow (5,000,000 + 1,000,000) x 25%	1,500,000
Total Water 3 + 4 + 5 + 6	12,500,000

Note: a. Runoff coefficient is substantially higher than the average of Wadi Bishah. [9] This is because the area of the Nimas Village Cluster is at the uppermost point of the Asir highlands and each of the slopes which affect runoff is such that maximum runoff is expected. Runoff is increased by steep slopes with little ground cover, slow evaporation because of high humidity and lack of excessive seepage because of shallow bedrock. Each of these conditions is present in the area of the Nimas Village Cluster.[10]

amount available based on the Nimas water catchment area alone (5000 ha; 12,500,000 m³/yr). This means that either water must be made available from other sources (such as downstream catchment areas) or production efficiency must be less than maximum.

In the past 5 years, the Government and its consultants have investigated 106 potential dam sites in Asir area and another 30 will be examined this year. The dams which are being considered in these cases are relatively small, some on the order of 4 meters in height. In the area around Nimas, three such dams are planned at this time:

1. Nahiyan dam near Al Fuways
2. Saraba dam on Wadi Saraba in Baraba Bani Baker
3. Saroom dam on Wadi Saroom near Al Ben Raya

Small dams such as these which are in close proximity to the users are quite beneficial to the realization of useful water resources and are also fairly easy to build compared with larger dams requiring greater technology. Such dams have several purposes including:

1. Water Conservation
2. Feeding of downstream wells
3. Establishment of an agricultural water reserve for direct application to farmland in time of need.

2-7-7 AGRICULTURAL WATER USE In the Nimas area both irrigated and rainfed farming is practiced. Terraced farming is highly developed here - a practice which enables rainfed farming in areas which would otherwise be barren. To supplement the scanty rainfall, rain which falls on uncultivated slopes is collected and diverted to prevent seepage. This water is allowed to descend from terrace to terrace to supply the growing crops. It has been estimated that in this area it is necessary to have an additional catchment area of approximately half the area under cultivation to produce best results with rainfed farming[9].

Water rights are bound to the land and therefore land ownership. The rights to wadi floodwater are traditionally held, and land which has been brought into cultivation since the original water rights were distributed has only a secondary right. Consequently most such land in the Nimas area is non-irrigated and corresponds to Class II soil areas.

At the present time, there are about 150 wells in the Nimas Village Cluster. These wells are usually from 10 to 20 meters deep and their water is used both for domestic and agricultural use.

2-7-8 NON-AGRICULTURAL WATER USE

The current supply of domestic water is almost entirely from wells which are scattered throughout the area (see Figure 2-7-1). Although it is extremely difficult to accurately determine existing levels of non-agricultural water use, it is estimated that consumption is about 50 litres per day per person. Such a level of consumption is considered low by standards of developed areas and the realization of the maximum available water potential (see Section 2-7-6) will undoubtedly cause this consumption to be raised in the future.

2-8 INDUSTRY AND COMMERCE

2-8-1 INDUSTRY

Although the Nimas Village Cluster serves as a regional industrial and commercial center, there is as yet no unified and coordinated structure for activity of this nature. Both industrial and commercial establishments are small and scattered throughout the village cluster (see figure 2-8-1)

Industrial establishments are exclusively small scale manufacturing (such as of cement blocks), metal working and stoneworking. At the present time, there are around ten such establishments which are located primarily in the vicinity of route 54 and close to the village of Nimas.

2-8-2 COMMERCE

Excluding light industry and manufacturing establishments, there are currently around 50 permanent commercial establishments in the Nimas Village Cluster. The URTEC field survey identified about 35 shops dealing in foodstuffs, clothes, hardware etc; 4 coffee houses (qahwah); 3 auto repair shops; 3 benzine stations; and several other type of shops including a fresh meat shop, a lamp repair shop, a stationery shop and a photo studio.

In addition to these permanent shops, there is a suq in the village of Nimas where farmers and merchants from the surrounding areas may set up stalls to sell their produce and wares. Although the number of such stalls varies, there are around 50 on the Tuesday market day.

At the present time, over two thirds of the commercial establishments in the Nimas Village Cluster are located in and around the village of Nimas itself.

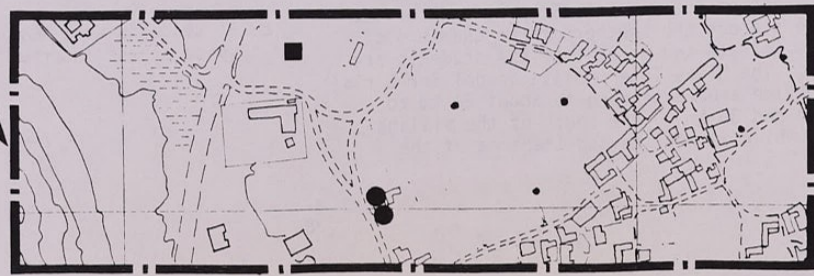
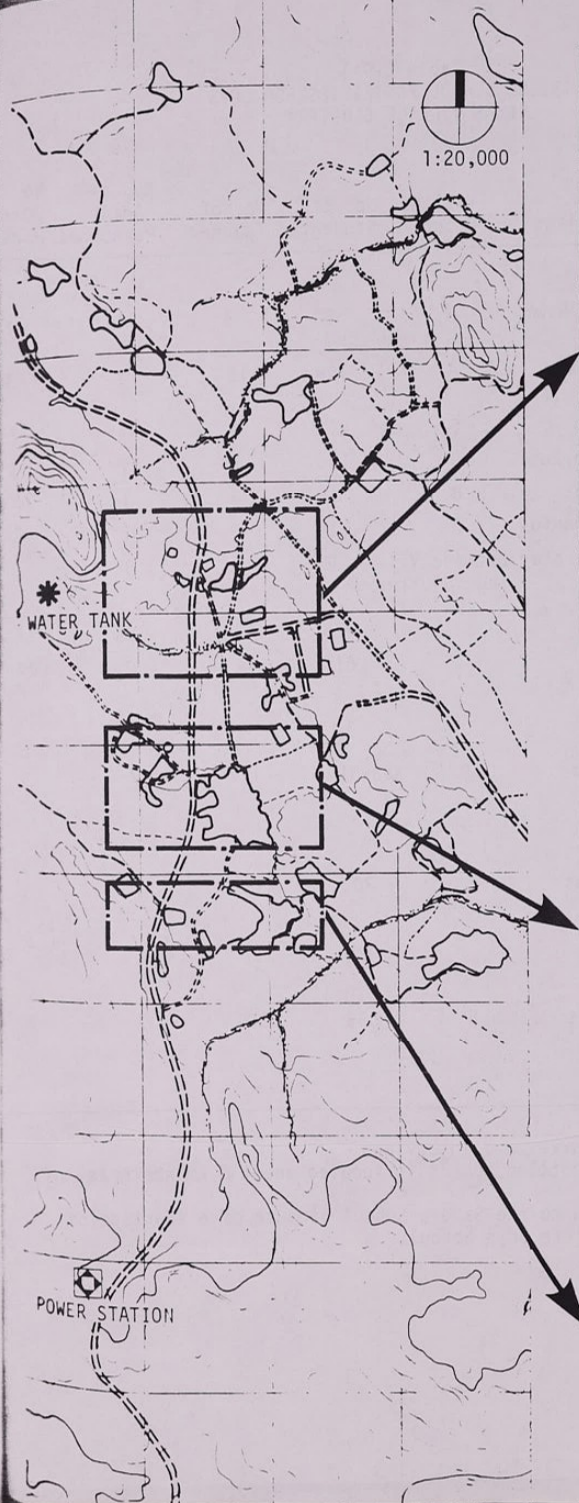


FIGURE 2-8-1
EXISTING
DISTRIBUTION
OF COMMERCIAL
AND INDUSTRIAL
ACTIVITY

scale 1:5,000

- general retail shop group or buildings (foodstuffs, clothing, hardware, stationery, etc.)
- service shops (benzine shop, bakery, barber, photo studio, repairing shop, qafwah)
- * manufacturing (cement block, metal work, stone work)
- open market place

SOURCE: URTEC Field Survey

PHOTOGRAPHED BY: [unreadable]
 DRAWN BY: [unreadable]

2-9-1 GENERAL EDUCATION

A directorate of Education was upgraded to the ministerial level in 1954. The budget of this ministry has been increased considerably in recent years and this has benefited the general educational level in all parts of the Kingdom. At present the adult literacy rate is fairly low but over 90% of the children attend at least elementary school, so that a dramatic increase in literacy rate and educational level will be achieved with the coming generation.

It has always been and continues to be difficult to provide comprehensive educational services to Nomads and those in remote rural areas, but because of the high priority given to education by the government even these areas are receiving far greater attention than in the past. In rural population centers such as the Nimas Village Cluster, education has made great advances in the past 10 years and is rapidly approaching parity with the urban centers of the Kingdom.

The Nimas Village Cluster currently has a total of 12 educational institutions (plus the Badiya Bani Backle school at Al Fara'a which is outside the Nimas Village Cluster yet serves the Nimas program for settling Nomads) as shown in Tables 2-9-1 and 2-9-2.

The boys elementary schools (grades 1-6) have an enrollment of 776 which is equal to about 10.9% of the total service population. Interviews with school authorities have indicated that for elementary boys there is effectively 100% enrollment. If it is assumed that the male-female population is approximately equal for this age group, then the girls elementary enrollment of 420 students amounts to about 54% of potential. Such figures are quite good and it is expected that as development continues, the girls enrollment at the elementary level will approach 100%.

At the intermediate levels, (grades 7-9) the schools in the Nimas Village Cluster serve an area which extends outside the Cluster. In the case of the Boys Intermediate School, the service area covers about the southern three quarters of the Nimas Emirate and a total of 294 students are enrolled. The Nimas Intermediate School for Girls has a service area extending to about 30 km to the north and 30 km to the south of the village of Nimas which is well beyond the area of the

Table 2-9-1
EXISTING SCHOOL FACILITIES FOR BOYS
NIMAS VILLAGE CLUSTER^a

Type & Name	Village	Village Group	No. of Students	No. of Teachers	No. of Admin. Personnel	No. of Other Workers
Boys Elementary						
1. Abdul Allah bin Masoud	Bani Rawk	A	50	3	1	1
2. Mohammed Abdul Wahab	Shukan	A	158	10	2	3
3. Saudi	Nimas	B	212	9	2	2
4. Al-Khalidiah	Al Harkuh	B	150	8	1	3
5. Bani-Qusair	Bazwa	B	85	7	1	2
6. Nahiyah	Al-Khanfus	C	121	6	1	3
7. Badiya Bani Backle	Al-Fara'a	Outside Village Cluster ^b	35	1	1	0
Totals 1-6			776	43	8	14
Totals 1-7			811	44	9	14
Boys Intermediate						
1. Boys Intermediate School	Nimas	B	263+31 ^c	17	7	3
Boys Secondary						
1. Nimas Secondary School	Nimas	B	200	16	7	3
Boys Teachers' Training						
1. Teachers Training Institute for Boys at Al-Nimas	Nimas	B	355	30	7	2

Notes:

- Source: URTEC field survey and interviews
- This school for semi-settled nomads is located about 8 km northeast of Nimas.
- 31 students were moved to the Saudia School because of a shortage of space at the Intermediate Boys School.

FIGURE 2-9-1
 EXISTING
 EDUCATIONAL
 FACILITIES AND
 SERVICE AREA
 OF BOYS
 ELEMENTARY
 SCHOOLS

scale 1:20,000

- boys elementary school
- service area of boys elementary school
- ◻ boys intermediate school
- ◻ boys secondary school and adult night school
- ◻ boys teacher training
- girls elementary school
- ◻ girls intermediate school
- ◻ girls secondary school
- ◻ girls teacher training

SOURCE: URTEC Field Survey

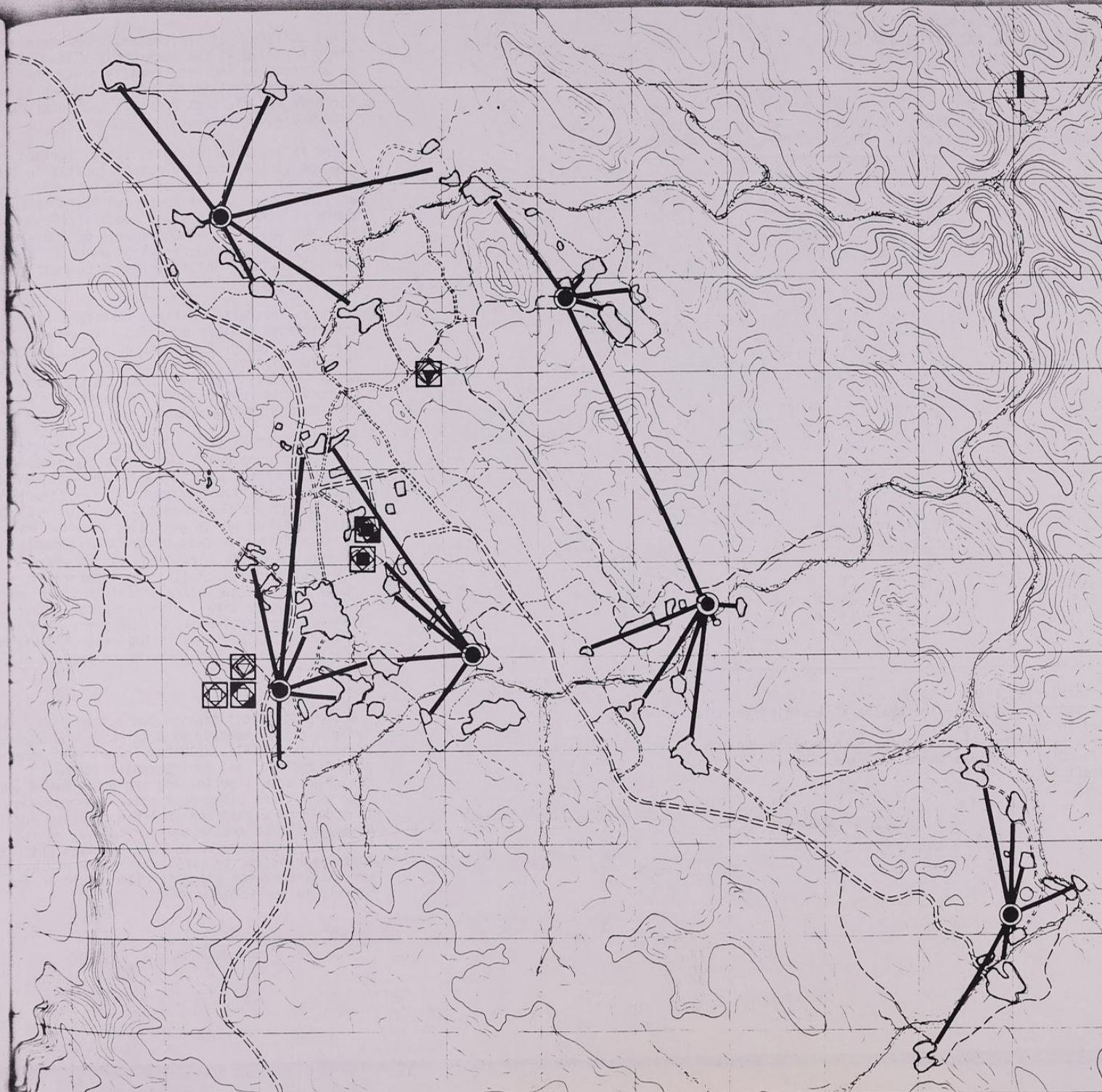


Table 2-9-2
EXISTING SCHOOL FACILITIES FOR GIRLS
NIMAS VILLAGE CLUSTER^a

Type & Name	Village	Village Group	No. of Students	No. of Teachers	No. of Admin. Personell	No. of Other Workers
Girls Elementary						
1. The First Elementary School for Girls in Nimas	Nimas ^b	B	350	16	4	6
2. Nahyan Girls School	Al Khanfus	C	70	6	1	2
Totals			420	22	5	8
Girls Intermediate						
1. Nimas Intermediate School for Girls	Nimas ^b	B	100	14 ^c	1 ^c	5 ^c
Girls Secondary & Girls Teachers' Training						
1. Secondary Teachers' Training Institute for Girls	Nimas ^b	B	31	c	c	c

Notes:

- Source: URTEC field survey and interviews
- The elementary, intermediate and secondary teachers' training schools in Nimas are all located in the same building.
- The Nimas Intermediate School for Girls and the Secondary Teachers' Training Institute for Girls in Nimas share the same teaching, administrative and other staff.

Nimas Emirate. At the present time there are 100 girls enrolled at the intermediate level but this is expected to increase rapidly since the goal of the government is to achieve 100% enrollment for boys and girls at both the elementary and intermediate levels.

There is one boys secondary school (grades 10-12) and one girls secondary school located in the Village of Nimas, each of which serves an area at least 30 km to the north and 30 km to the south of Nimas. The Nimas Secondary School for boys currently has an enrollment of 200 students and the girls secondary school which is also a teacher training institute has a current enrollment of 31 students.

The boys Teachers' Training Institute located in the Village of Nimas provides a three year course for the training of elementary school teachers. This school has an enrollment of 355 Saudi students in 17 classes. In terms of the number of classes this represents an increase of almost 100% in the past two years.

The distribution of existing school facilities is shown in figure 2-9-1 along with the general service area of the boys elementary schools which helps to clarify the existing social structure of the villages of the Nimas Village cluster. This existing distribution generally provides walking distance access to most of the boys schools. On the other hand for girls' education, there exist only 2 elementary schools, one intermediate school and one secondary school in the Nimas Village cluster area. With exception of Nahyan girls elementary school, all of these schools are located in one building to the west of Route 54, pedestrian access for girls is inadequate at present time.

The physical facilities of the schools vary widely in quality, however many or most of the schools of the Nimas Village cluster do not meet acceptable structural and environmental standards. Many have poor lighting and are overcrowded and lack sufficient playground space. Nonetheless it should be emphasized that the existing local buildings which are leased for several of the schools are of a scale and construction which is quite appropriate to rural elementary education, and when renovated and modernized could be preferable to new schools.

FIGURE 2-9-2
EXISTING
DISTRIBUTION OF
SERVICE FACILITIES

scale 1:20,000

SOURCE: URTEC Field Survey

- governmental & public facil.
- 1 emirate office
- 2 municipality
- 3 religious office
- 4 sharia court
- 5 pass port office
- 6 educational office
- 7 post, telegram & telephone off.
- 8 social welfare office
- 9 police office
- 10 criminal investigation & jail
- 11 agriculture & water office
- 12 agriculture bank
- 13 municipality guest house
- 14 dispensary
- 15 fire station
- 16 water resevoir & supply office
- * mosque



2-9-2 HEALTH CARE FACILITIES

At the present time, there is only one health care facility located in Nimas—a dispensary which serves both the Village Cluster and the surrounding rural population. (See Figure 2-9-2) There is no hospital and patients requiring any but the simplest of treatments must be sent to Jeddah or Abha. Plans are currently being made to construct a hospital of from 50 to 100 beds in Nimas just to the north of the new government facilities area.

2-9-3 MOSQUES

Mosques represent significant centers of both religious and social life in the Village Cluster, and there is at least one mosque in each of the villages (see figure 2-9-2). Although some of these mosques are in need of rehabilitation and repair, they are situated in excellent locations to serve the population of the villages

2-9-4 PUBLIC ADMINISTRATION FACILITIES

The government is currently implementing a plan to provide a consolidated government center in the Nimas Village Cluster. This plan has been prepared in conjunction with the existing TPO plan prepared in 1972 by the TPO in Jeddah. It covers an area of approximately 13 ha in the north-eastern section of the Village of Nimas. Offices currently existing in this area are the office of the Emir, the offices of the Municipality and the jail and office for Criminal Investigation (See Figure 2-9-2).

Most of the other public administration facilities are clustered in and around the old section of the Village of Nimas. Such offices include the Court, the Passport Office, the Education Office, the Communication Office Etc. It is expected that many of these functions as well as additional ones will be consolidated in the new government center in the future.

2-9-5 SOCIAL AND CULTURAL CENTERS

Mosques which could be said to function as social or cultural facilities in addition to or in conjunction with their primary functions, the only facility or facilities devoted specifically to social interaction is the sports club.

2-10 RECREATION AND CONSERVATION

There is currently only a single sports club facility for recreation in the entire Nimas Village Cluster. Other than in conjunction with the schools, there is no organized program for either recreation itself or the development of recreational facilities.

The same can be said for conservation. Although there are many areas along the escarpment and rich agricultural areas which should be permanently protected from development, and many examples of historic indigenous buildings which should be saved from ultimate demolition, there is currently no organized program for conservation of these valuable natural and man-made resources.

2-11 PHYSICAL STRUCTURE

2-11-1 SPATIAL ASPECTS OF THE VILLAGE CLUSTER

The Nimas Village Cluster is located at the eastern edge of the Asir Mountain Range at the edge of the great escarpment which descends to the planes of the Red Sea to the west. As has been mentioned previously, the land around Nimas is generally rough and uneven though the small plateau on which the village cluster is located and the valleys between rocky hills are quite suitable for agriculture.

The present pattern of development consists of several small villages and associated agricultural areas scattered around the concentration of the Village of Nimas itself. (refer to figure 1-3-3) The historical development of this pattern is a result of the interaction between natural features (topography, location of agricultural land, etc.) and the traditional structure of tribal settlement which dictated a certain separation between individual villages.

In recent times, this historical pattern of growth has been affected by various aspects of the recent rapid modernization of the kingdom. This is perhaps most apparent in the recent construction of Route 54 which is now a modern highway connecting Abha, the capital of the Southern Region with Taif, Mecca and Jeddah. Naturally this modern transportation route has tended to affect the traditional pattern of development, and in recent times additional new development has occurred along this road. While properly planned and executed development along this road is not necessarily undesirable, it should be noted that much of the prime agricultural land of the area lies along Route 54. Thus some moderation of this recent trend may be necessary. In addition recent development has been rather disorganized in spite of the existence of the 1972 TPO plan.

2-11-2 BUILDING TYPES AND USES

Until quite recently most of the construction in the Nimas area was of the traditional stone type common to the villages of the Asir escarpment region. Stone is the most abundant naturally occurring building material in this area, and the traditional building methods create very attractive structures. Of course recently, reinforced concrete and concrete block construction have become much more common.

The traditional stone buildings have been put to almost every possible use. Not only do they serve as dwellings but as commercial and light industrial establishments as well. Concrete and concrete block construction has been generally used for public buildings in recent times and is becoming increasingly popular for private dwellings.

2-11-3 ARCHITECTURAL AND AESTHETIC CONSIDERATIONS

The traditional buildings and construction methods described above are strong and durable as well as aesthetically pleasing. Traditional construction using the abundant local granite reflect the regional character and way of life.

This is not the case with many of the recent concrete buildings. Such buildings, in addition to being relatively expensive because of the need to import the raw materials, give the impression of being out of character with the natural and man made environment of the area.

Traditional local construction techniques with adaptation are quite suitable to modern buildings and uses, and it would seem to be desirable to develop methods of applying these techniques to projects which would otherwise be constructed with concrete. This would seem especially true of housing projects and government buildings.

2-12 INFRASTRUCTURE

2-12-1 TRANSPORTATION

Even quite recently, there were no roads in the area of the Nimas Village Cluster which could be travelled by other than 4-wheel drive vehicles. This meant that in terms of transportation, the area was relatively isolated from the rest of the kingdom. This has all changed in the past few years with the construction of Route 54. This is a modern highway from Abha to Taif with design speeds in excess of 50 km/hr. The existence of this road has led to a marked improvement in the standard of living of the Villages of the Nimas Village cluster. Construction materials, fuel,

foodstuffs and other consumer products are now much more readily available to the villagers than prior to the construction of Route 54. In addition to the gradual improvement of agricultural production in the area is greatly facilitated by this road since it provides easy access to agricultural raw materials such as fertilizer, to present and planned processing facilities and to markets in the larger urban areas to the north and south.

Aside from Route 54 and a short road to the southeast of Nimas leading to Al Hayah and the Villages of Village Group C (refer to Figure 1-3-3) there is very little paved road surface in the Nimas Village Cluster (See Figure 2-12-1).

The URTEC Traffic Survey was conducted at several points in and around the Village of Nimas in December 1977 (See Figure 2-12-1). The results of this traffic count are shown in Tables 2-12-1(a) and 2-12-1(b) as well as Figures 2-12-2(a) and 2-12-2(b). During the same period a parking survey was conducted, the results of which are shown in Table 2-12-2.

An analysis of this data must touch on several major aspects:

1. Volume
2. Composition
3. Hierarchy
4. Parking

It can be seen from examining the data on traffic volume that except for a couple of locations, the daily traffic volume peaks at the 7-8 AM period. This represents the expected peak at the start of the business and school day. At counting points 5 and 8, the peak occurs somewhat later in the day. This is because the traffic at these locations is either constantly light as at point 5 or is travelling to or from points outside the village cluster at point 8. The other counting points all have a high percentage of intra-village traffic which accounts for the greatest part of the total traffic volume. It is this intra-village traffic (that is traffic between the villages of the Nimas Village Cluster or within Nimas itself) which exhibits the early morning peak pattern which is quite common in all areas of the Southern Region.

Another interesting observation which can be made concerning the traffic volume in the Nimas Village Cluster is that at no point is it even greater than 165 vehicles per hour (this peak occurs at counting point 4 between the hours of 7 and 8 AM). This means that even the lowest level of public roadway V₆, Local Access Road

(See Table A-2-9(a) in the Appendix)-which is called for in the planning standards would be more than sufficient to handle the highest volume currently generated in the Nimas Village Cluster. Of course, there are reasons other than absolute volume for determining road sizing and hierarchy, especially as population and traffic increase over the 20 year planning period, yet this gives some indication that relatively small rights of way will be required based on volume alone.

It can be seen from Table 2-12-1(b) and Figure 2-12-2(d) that pick-up trucks are the predominant type of vehicle here. This is a characteristic shared by all of the areas of the Southern Region. Passenger cars account for the next highest volume followed by trucks (larger than pick-up trucks) jeep-type vehicles, motorcycles and buses.

The field survey traffic count also identified the largest hierarchical division of traffic in the Nimas Village Cluster-that between local traffic and through traffic. It can be seen from Figure 2-12-2(c) that overall through traffic accounts for 1/3 of the total volume. Furthermore, it was learned that 2/3 of all large truck traffic is through traffic rather than local. This indicates that the volume and type of through traffic is of a character such that it would be desirable to separate it from local traffic. This could be done by several different forms of bypass-horizontal or vertical and will be discussed more fully in later chapters dealing with traffic policy for the future.

Parking was examined at five locations around the Village of Nimas. These locations are shown on the map in Figure 2-12-1 and described in Table 2-12-2. It can be seen that the largest parking requirement occurs near the new sq building between the hours of 10 and 11 in the morning. Even at this peak, the total is relatively small. The highest hourly total of all the parking survey points at the time of the survey was 133 and before 9AM and after 12 noon the total was markedly lower. These results have similar implications to those of the volume studies; namely that compared to the larger urban areas of the Southern Region, relatively little space is required for parking. This is a positive sign since it indicates that with proper traffic design it should be relatively easy to achieve a desirable separation between vehicular and pedestrian traffic, a subject which will be discussed more extensively later.

Table 2-12-1 (a)
TRAFFIC VOLUME COUNT, DEC. 1977









TRAFFIC COUNT LOCAL- TION	DIREC- TION	TRAFFIC VOLUME (NO. CARS PER HOUR)										11 HOUR TOTAL	
		6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4		4-5
1	NORTH	31	132	65	69	86	72	68	48	67	108	101	847
	SOUTH	46	55	50	53	85	67	105	108	65	83	97	814
2	EAST	14	40	12	23	40	31	29	20	5	16	18	248
	WEST	20	95	29	21	34	35	22	24	36	39	25	380
3	EAST	11	64	8	0	4	10	27	26	5	10	7	172
	WEST	14	71	10	4	4	13	24	6	17	24	24	211
4	EAST	35	165	144	95	84	78	108	110	94	93	73	1079
	WEST	13	75	104	103	98	120	132	96	52	63	80	936
5	EAST	12	22	32	33	23	18	26	37	23	23	37	286
	WEST	2	29	40	37	32	34	53	62	33	24	24	370
6	NORTH	27	160	118	69	56	48	64	90	91	93	140	956
	SOUTH	40	148	115	86	86	92	88	76	84	108	114	1037
7	EAST	18	50	77	88	77	56	39	27	47	86	88	653
	WEST	14	36	60	106	117	68	91	75	50	67	54	738
8	EAST	32	68	67	102	120	124	131	116	103	105	84	1052
	WEST	55	88	108	123	113	107	121	98	108	144	177	1242

Table 2-12-1 (b)
TRAFFIC VOLUME COUNT, DEC. 1977

TRAFFIC COUNT LOCAL- TION	DIREC- TION	TRAFFIC TYPES OF VEHICLE (% TO TOTAL VEHICLES)					
		PASSENGER CARS	PICKUP	TRUCKS	BUS	MORTORCYCLE	JEEP
1	NORTH	16	43	22	0	9	10
	SOUTH	14	43	29	1	2	11
2	EAST	27	38	11	2	7	15
	WEST	24	50	7	0	6	13
3	EAST	25	54	5	0	5	11
	WEST	36	36	5	2	0	21
4	EAST	17	51	8	1	11	12
	WEST	15	61	6	0	7	11
5	EAST	27	42	14	0	5	12
	WEST	24	44	11	0	3	18
6	NORTH	22	37	22	1	3	15
	SOUTH	21	44	14	1	8	12
7	EAST	17	54	8	1	5	15
	WEST	13	56	10	0	8	13
8	EAST	19	52	15	0	8	9
	WEST	15	48	22	0	3	12
OVERALL		21	48	13	1	5	12

FIGURE 2-12-1
EXISTING
ROAD
CONDITIONS
AND TRAFFIC
SURVEY POINTS

scale 1:20,000

-  asphalted
-  temporarily asphalted
-  newly graded to be asphalted
-  non-asphalted road
-  truck and dirt road
-  footpath
-  traffic survey point
reference No. in Table 2-12-1(a)
-  parking survey area
reference No. in Table 2-12-2

SOURCE: URTEC Field Survey
and aerial photo

UNIVERSITY OF TEXAS AT AUSTIN
DEPARTMENT OF TRANSPORTATION ENGINEERING



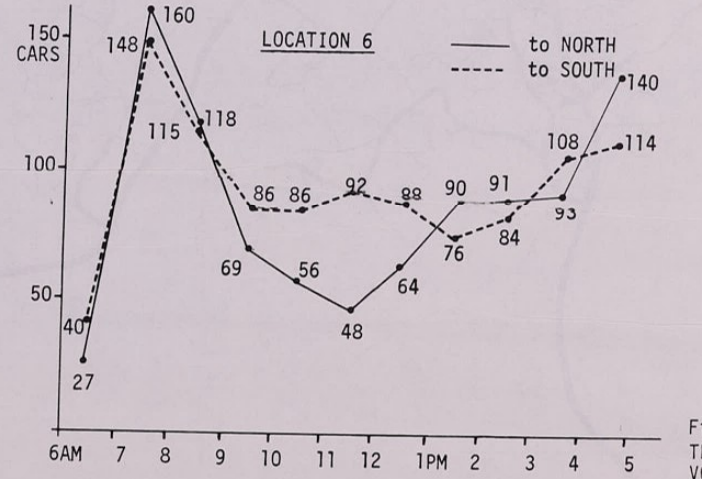
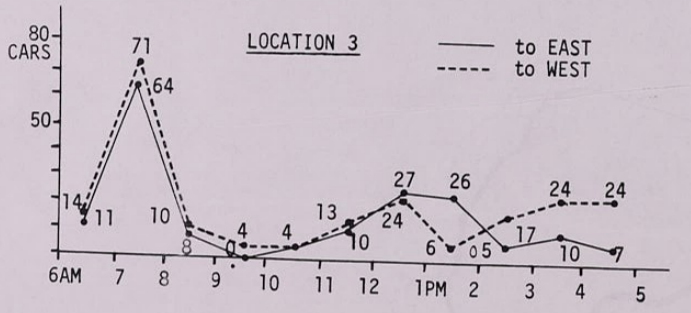
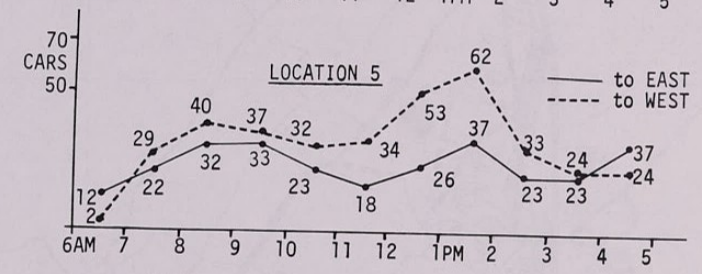
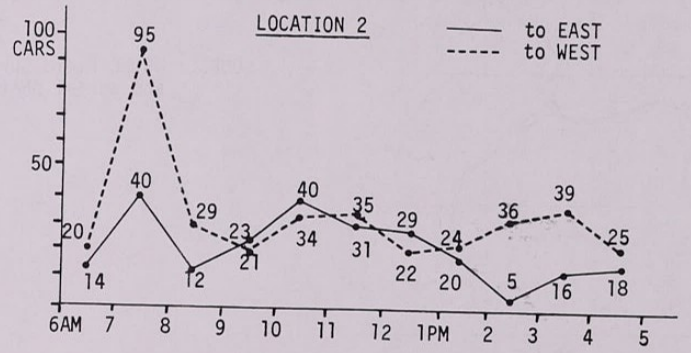
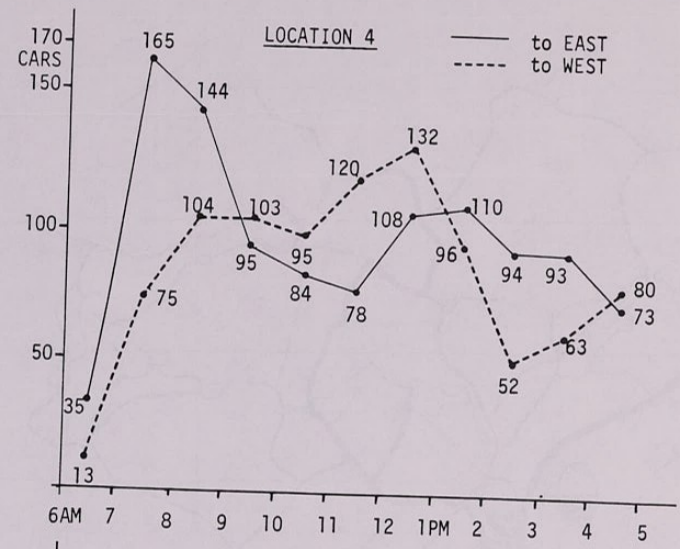
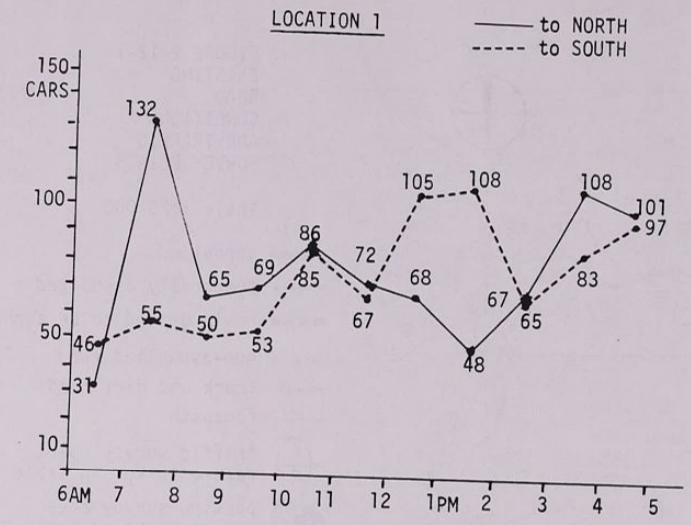


Figure 2-12-2(a)
TRAFFIC
VOLUME
COUNT.
DEC., 1977

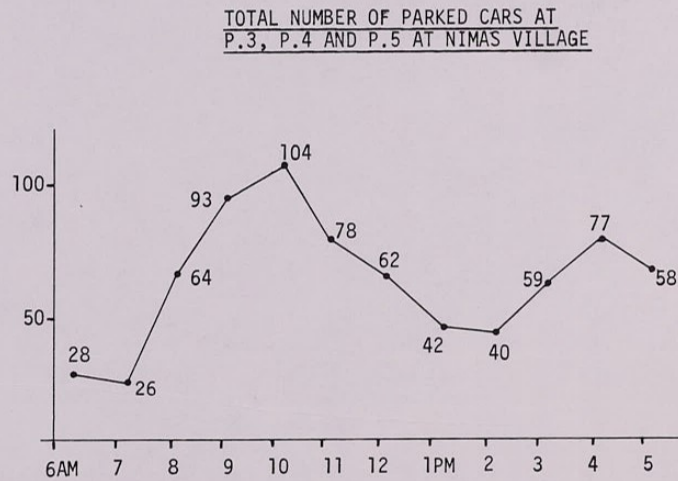
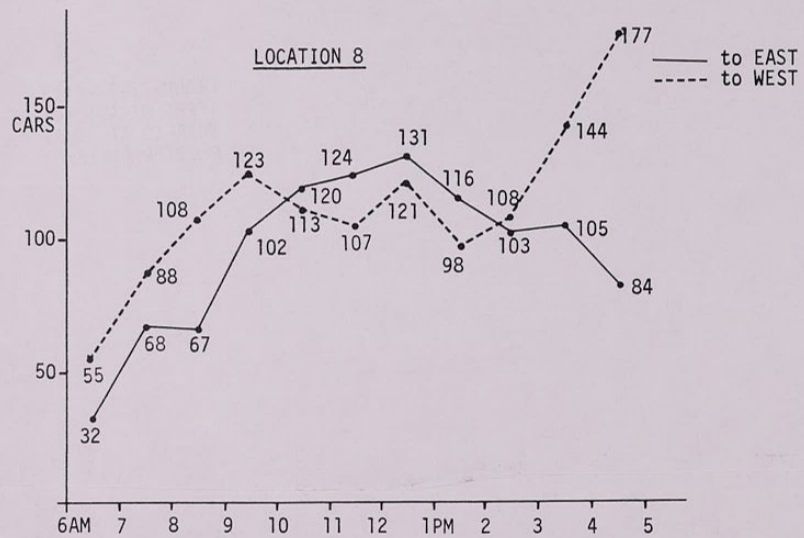
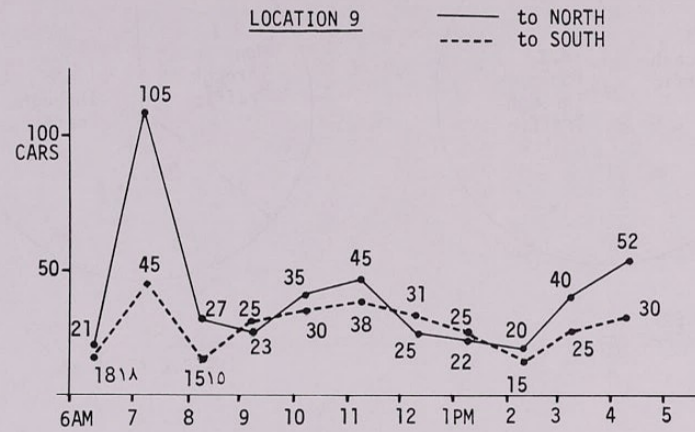
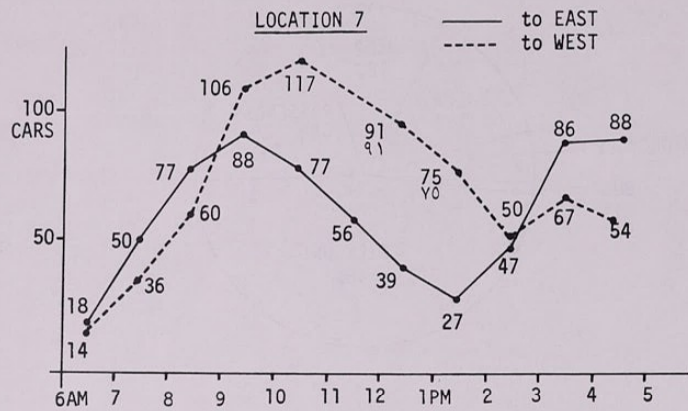
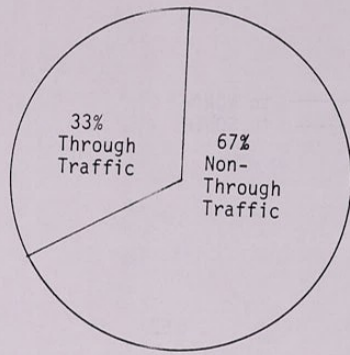
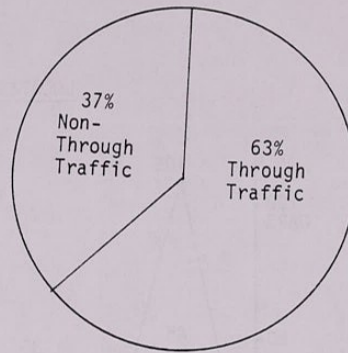


Figure 2-12-2 (b)
TRAFFIC
VOLUME
COUNT,
DEC., 1977

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BERKELEY - CALIF. 947 20



OVERALL
TRAFFIC AT RT 54



TRUCK
TRAFFIC AT RT 54

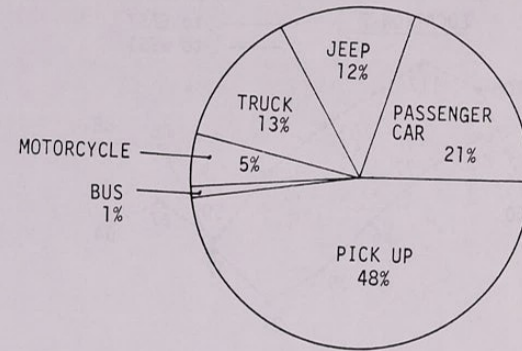


FIGURE 2-12-2(d)
TYPES OF AUTOMOBILE
TRAFFIC AT NIMAS VILLAGE
CLUSTER (1977)

FIGURE 2-12-2(c)
THROUGH TRAFFIC
RT 54 AT NIMAS VILLAGE CLUSTER (1977)

Table 2-12-2
PARKING STUDY, DEC. 1977

TIME	NUMBER OF PARKED CARS AT NIMAS VILLAGE					TOTAL P3,P4,P5	TOTAL
	P.1	P.2	P.3	P.4	P.5		
6:20 AM	4	6	25	0	3	28	38
7:20	5	4	22	0	4	26	45
8:20	12	8	46	15	3	64	84
9:20	20	7	55	28	10	93	120
10:20	21	8	59	33	12	104	133
11:20	22	7	38	30	10	78	107
12:20 PM	17	3	37	18	7	62	82
1:20	7	2	30	6	6	42	51
2:20	3	1	26	12	2	40	44
3:20	5	3	34	23	2	59	67
4:20	6	4	38	33	6	77	87
5:20	5	1	28	26	4	58	64

- NOTE: P.1 : Street parking and parking directly off the road (no fence) between RT 54 and Mosque (includes 3-4 parking spaces for blacksmith along the road).
- P.2 : Street parking and parking directly off the road (no fence) between Mosque and new Suq building.
- P.3 : Parking around the new Suq building including parking spaces for police cars (5 wrecked cars, 3 police cars, 1 tow car, 1 construction crane).
- P.4 : Parking in the old Suq section.
- P.5 : Parking directly off from the intersection of RT 54 and road to Suq (including parking spaces in front of auto-repairshop at the corner of RT 54 and Suq road).

2-12-2 PUBLIC UTILITIES

Public utilities in the Nimas Village Cluster are somewhat more limited than in the urban areas of the Southern Region. This is due primarily to the isolation of the Village Cluster until the construction of Route 54. Though they are still very inadequate, the public utilities of the Village Cluster are being improved. (See Figure 2-12-3)

At this time, there is a single primary electrical generating station with a capacity of 190 kw. A second larger plant is currently nearing comple-

tion south of Nimas and it is expected that this new plant will serve users within a radius of about 15 km from Nimas. In addition there are many small private generators serving one or two households each.

Heat energy is generally supplied by butane, however, the burning of wood and kerosene is still quite popular. Petroleum fuels including gasoline, butane, kerosene etc. must all be transported by truck from the refineries of the eastern provinces. At the present time, there are no practical plans for supplying this area by pipeline.

The water supply system in the Nimas area is as yet relatively limited in scope. A reservoir tank supplied by well water is located to the northwest of the Village of Nimas between Route 54 and the escarpment. This supplies limited amounts of water to most of the village of Village Group B. (refer to Figures 1-3-3 and 2-12-3) The villages of Group A and Group C still depend on un-piped water from private wells brought to individual users by tank trucks. The distribution of water from the main reservoir tank is by a series of pipelines which follow the primary roads. At the present time, water is untreated and may be the source of much of the chronic disease in the area.


As with other small village clusters in the Southern Region, there is currently no sanitary sewage system in the Nimas Village Cluster. As in other rural areas, waste is handled by the natural filtration of the soil or by private septic tanks. In rural areas where population concentrations are small, such facilities may be adequate but as population concentrations increase, such systems rapidly become inadequate. The ability of the earth and of small septic tanks to handle large amounts of waste is limited and insufficient treatment of sewage can lead to contamination of the water supply and severe health problems.


At the present time, solid refuse is dumped in several locations scattered throughout the municipality of Nimas. The municipality owns two trucks which collect this garbage on a regular basis and hauls it to a central disposal area located between Route 54 and the escarpment to the west of the Village of Nimas. This central dumping location is quite close to the largest population concentrations and is situated on land which is quite suitable for recreational development.

There is currently no stormwater drainage system in the Nimas area, and as long as development remains limited in scale, this does not present a serious problem. However as development increases and more of the land surface in concentrated areas is paved or otherwise covered, the potential for water damage increases. This is especially true in an area such as this with a relatively high annual rainfall (around 500mm) which is often concentrated in a few large storms.


FIGURE 2-12-3
EXISTING
ELECTRIC AND
WATER SUPPLY


scale 1: 20,000

 power station
(under construction)

 electricity line
(under extension)

SOURCE: URTEC Field Survey

 water tank (completed)

 village and new housings
within planned area of
water supply (
presently partially supplied)

* SOURCE: interview at the
department for
agriculture and water
resources, Nimas

In 1972 the Jemma branch of the Town Planning Office prepared a master plan for the Village of Nimas and some nearby villages (Al Badal, H. Argah, Al Habaybah, Naiyah). The T.P.O. plan (Figure 2-13-1) has attempted to integrate old existing clusters of dwellings (villages) with new planned neighborhoods and planned government facilities.

An evaluation of this T.P.O. plan must examine its compatibility with existing conditions and its effect on various aspects of the physical structure of the Village Cluster. Among the items which should be carefully examined are:

1. Compatibility of the planned road network with existing development.
2. Location of planned population concentrations with regard to both physical and economic characteristics of the Village Cluster
3. Compatibility of the planned land use with both existing land use and optimum land use
4. Compatibility of the proposed plan with topographic conditions

Figure 2-13-2 indicates areas of the T.P.O. plan which the consultant feels create certain problems with regard to the points mentioned above.

It can clearly be seen that there are several places in the villages of Nimas, Al Badal and H. Argah where the implementation of the T.P.O. road Network would require substantial acquisition and demolition of existing buildings. In addition in a general sense, the road networks shown in the T.P.O. plan are quite dense in relation to the amount of land that they serve--that is in the new development areas, the ratio of roads to total land use is unnecessarily high. Furthermore, the development pattern established by this plan, creates a series of closed development areas which are not susceptible to expansion or modification which may become necessary as time passes and problems are discovered.

The new development to the south of the Village of Nimas around Al Badal, Naiyah and H. Argah would place a fairly large concentration of population in what has always been a predominantly agricultural setting. This means that the population here would be too great to be supported by the surrounding agricultural production and would have to travel outside the immediate area for other employment.

It can further be seen from Figure 2-13-2 that substantial amounts of prime (Class I) agricultural land would be converted to residential development, there diminishing the production of one of the strongest sectors of the Nimas economy. While it is difficult to say exactly how much agricultural land would be lost by this conversion because of the possibility of development along new access roads even where no development was planned, it can be seen that in the planned areas alone between 75 and 100 ha of the best agricultural land would be lost to development.

In addition, it can be seen that the rectilinear pattern of the new development areas has been planned without sufficient regard to topographic conditions.

For these reasons, the consultant feels that though certain elements of the 1972 T.P.O. plan are meritorious and may be kept (for example the location of the new Government Center and hospital) the general scheme must be carefully re-examined and thoughtfully replanned.

Table 2-13-1
TPO PROJECTED AREA CALCULATION
(AREA DISTRIBUTION SHOWN IN THE TPO PLAN)

DISTRICT NUMBER	DISTRICT AREA(ha)	CIRCU- LATION UP(ha)	BUILT- UP(ha)	BUILT-UP AREA								
				SCHOOL	COM- MERCE	HOS- TAL	CEM- E- TERY	OTH- ERS	RESI- DEN- TIAL	RESI- DENTIAL NEW EXIST- ING		
(1)	15.9	4.0	11.9	0.5	-	2.6	0.6	-	8.2	6.8	1.4	
(2)	4.3	1.8	2.5	-	-	-	-	0.1	2.7	2.2	0.5	
(3)	13.3	4.0	9.3	-	-	-	-	0.3	9.0	8.2	0.8	
(4)	11.5	1.6*	9.9	-	-	-	-	3.0**	6.9	1.4	5.5	
(5)	14.7	3.4	11.3	-	-	-	0.5	0.7	10.1	3.4	6.7	
(6)	3.8	1.2	2.6	0.5	0.3	-	-	-	1.8	1.8	-	
SUB TOTAL		63.5	16.0	47.5	1.0	0.3	2.6	1.1	4.1	38.7	23.8	14.9
(7)	13.3											
(8)	4.3											
TOTAL		81.1										

NOTE: * Excluding Route 54
** Including commercial use

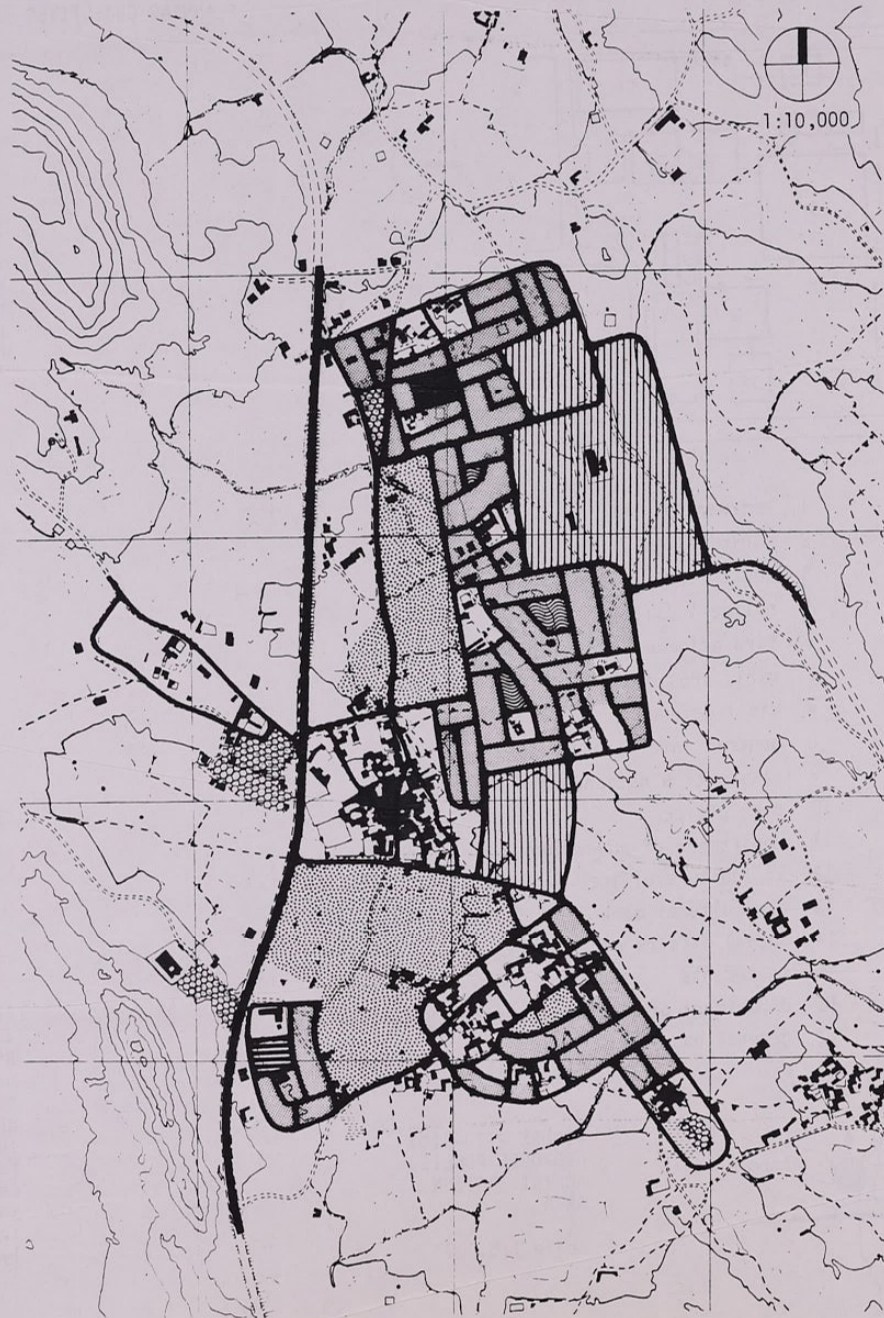
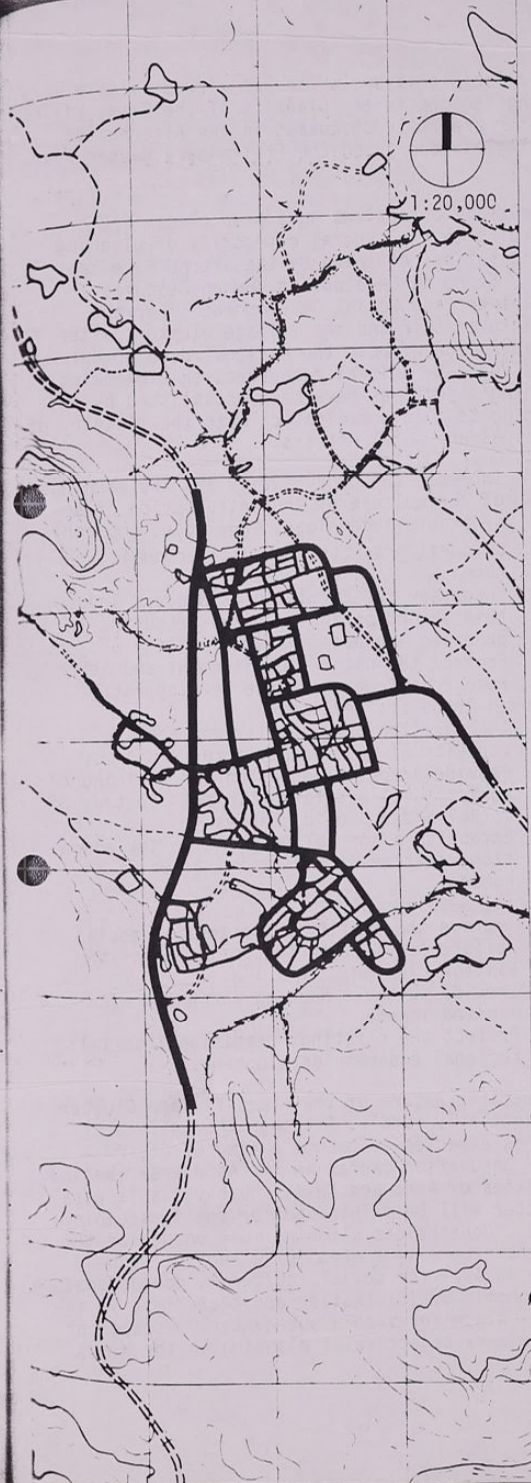
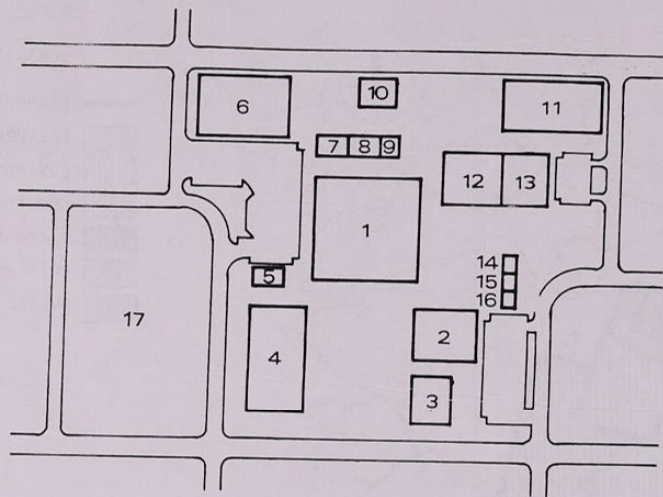


FIGURE 2-13-1(a)
T.P.O. PLAN 1972

scale 1:10,000

- planned road
- ▨ residential development
- ▤ governmental
- ▧ cemetery
- elementary school, boys
- ▩ cultivated land
- public use



- 1 emirate
- 2 municipality
- 3 court
- 4 police & jails
- 5 fire brigade
- 6 girls presidency
- 7 civil defence
- 8 general intelligence
- 9 passports & nationality
- 10 post office
- 11 department of education
- 12 agriculture office
- 13 agricultural bank
- 14 social affairs office
- 15 endowments
- 16 department of welfare
- 17 general hospital

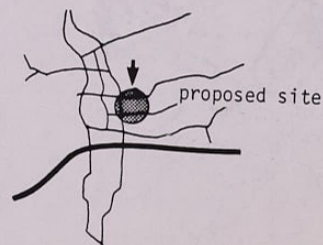


FIGURE 2-13-1(b)
PROPOSED PUBLIC
ADMINISTRATION
AREA

scale 1:5,000

2-14 PRINCIPLE ISSUES AND
PLANNING OBJECTIVES

The principle issues which are viewed as determining factors in the planning of the Nimas Village Cluster are fully discussed in the Alternative Strategies report and the Preliminary Master Plan report.








The overall objectives have been classified according to the general categories of planning considerations employed by the Second Five-Year Plan: Economic Development, Human Resource Development and Social Development. For the Province of Asir and the village cluster, after consideration of both the national development goals and sub-regional resources, the following planning objectives have been established by the planning team in consultation with the Ministry of Municipal and Rural Affairs:

1. Economic Development
 - a. Increase the productivity and the earnings of agriculture by the introduction of appropriate technology, knowledge, and agricultural products with high economic return
 - b. Encourage the formation of process industries based on agricultural products, in order to increase the availability of jobs.
 - c. Protect the natural environment and other resources from excessive development.
2. Human Resources Development
 - a. Increase the productivity and earning capacity of individual workers.
 - b. Provide adequate education and training of agricultural population in anticipation of social and economic changes.
 - c. Establish a special program for the education, settlement and assimilation of nomads.
3. Social Development
 - a. Improve the quality and extent of social welfare services to the residents of the village cluster.
 - b. Provide suitable housing for those with limited income.
 - c. Protect the existing, traditional social regional economic development.

The specific nature of the Nimas Village Cluster is essentially rural. Although the Emirate of Nimas is expected to become a kind of "third-order" population center in the Asir area (behind the cities of Abha and Khamis Mushayt) this rural character will be maintained for the foreseeable future. Nonetheless planning must recognize the fact that there is a need for a regional sub-center in Asir for social, cultural, educational and economic administration and that Nimas is the logical place for such a sub-center. Consequently a primary objective of planning in the Nimas

FIGURE 2-13-2
EVALUATION OF
T.P.O. PLAN

scale 1:10,000

-  existing intensively used class I agricultural land
-  main roads in T.P.O. Plan
-  minor roads in T.P.O. Plan
-  completed or commenced main road construction according to T.P.O. Plan
-  spot where existing buildings would be demolished or damaged by new road constructions
-  eaten up agricultural lands by other land use
-  damaged agricultural land where road construction would cause difficulties in maintaining and sustaining



Village Cluster is to reconcile its basic rural and agricultural character with the need for it to serve as a population and administrative sub-center for Asir.

Agriculture itself is a central issue in the planning of the Nimas area for here as elsewhere in Saudi Arabia agriculture is not simply a means to an end, but a way of life. Agricultural life in Nimas and the entire Asir highland area is especially important to the agricultural economy of the Kingdom since next to Tihana this is the most productive area of the country. Therefore a second primary objective of master planning for the Nimas Village Cluster is to optimize agricultural production. Such a goal would of course have many aspect including:

1. The establishment of agricultural communities either specific as in the case of Nimas or prototypical as in the case of outlying villages.
2. Promotion of independence and self sufficiency of farmers and livestock producers.
3. The development of an agricultural infrastructure including the production, processing and transportation to markets of agricultural produce and livestock.
4. The utilization of modern and efficient tools and machinery as well as up-to-date production techniques.
5. Government support of these objectives.

A third principle objective of planning is to improve the general quality of life of the residents of the Nimas Village Cluster including improvements in housing, infrastructures, economic opportunities and social and cultural activities. At the same time, it is highly desirable to maintain the aesthetic character and charm of the village cluster. This can be done to a large extent simply by maintaining traditional stone construction techniques.

Of course there are many detailed issues and objectives which must be addressed in the master plan of Nimas and these will be fully discussed in the following chapters

2-15 SCHEMATIC MASTER PLAN CONCEPT

2-15-1 DEVELOPMENT OF THE MASTER PLAN

The development process of the master plan for the Nimas Village Cluster has been somewhat different than that of the master plans for the five urban areas of the Southern Region. As mentioned in Chapter 1, aerial photography and detailed mapping have only relatively recently become available. Therefore, the Alternative Strategies report for Nimas concentrated on identifying the issues and objectives for planning and developing three schematic alternatives. The Preliminary Master Plan report further developed the selected schematic master plan alternative in such a way that basic principles were identified and applied to the available base data. This was done in such a way that a great deal of flexibility was maintained in order that adaptation to detailed conditions could be successfully accomplished once detailed data and mapping became available.

In the period between the completion of the Preliminary Master Plan and the start of the Final Master Plan, aerial photography and detailed mapping of the Nimas Village Cluster was completed.

This Final Master Plan represents the adaptation and application of the principles and schematic planning of the Preliminary Master Plan to the actual physical and topographic conditions revealed by the detailed mapping. For this reason the superficial appearance of this plan appears to be somewhat different from that of the preliminary plan. However a careful examination will reveal that the basic principles remain constant and that the flexibility built into the Preliminary Master Plan has been successful in enabling these principles to be adapted to actual existing physical conditions.

2-15-2 ELEMENTS OF THE PLAN

The schematic master plan represents an effort to relate several of the broad planning functions, both physical and functional, to each other. Among the elements to be inter-related are the following:

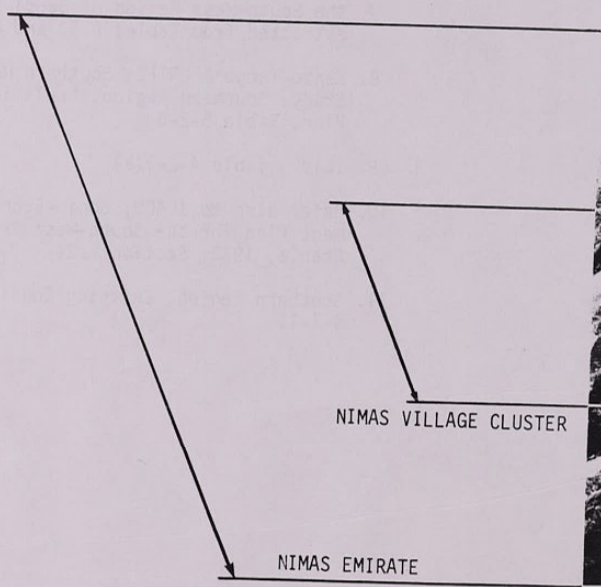
1. Roads. Roads in the vicinity of Nimas play a number of roles, either presently or in the future:
 - a. Long-range inter-city and inter-regional transportation.
 - b. Local transportation, including movement of farm equipment.

Chapter 2 Notes:

- c. Scenic views for tourist traffic.
 - d. Boundaries, property lines, and definitions of other topographic features.
 - e. Directors of physical and economic development.
2. Economic functions. It is desirable that certain types of economic functions be related directly to each other in a manner which has been referred to as "pairing". Examples of pairing include national or regional recreational facilities with local community centers, or of tourist centers with areas to be conserved. The advantages include the following:
- a. Efficiency, in that many parcels of land or other physical items can be shared.
 - b. Cost-effectiveness
 - c. A symbiotic, or mutually reinforcing, relationship of functions.
 - d. Assistance in meeting broader objectives.
 - e. Direction and containment of uses that have a potential for damaging the physical or social environment. (A single, well-contained large development is less dangerous than several smaller ones distributed in an unplanned fashion.)
3. Experimentation with new systems and techniques. Nimas provides an opportunity for dealing with many of the issues which have been impediments to a fully modern system of agricultural planning and implementation. The following are examples, and would require Government intervention in several respects including financial subsidies, legal reform, and "legitimization" of new approaches:
- a. Experiments in breeding higher qualities of livestock, more productive varieties of seed, and so on.
 - b. Mechanization, probably with some variety of Governmental financial support or subsidy.
 - c. Reform of property-holding so that larger more congruent, more accessible farms may be established.
 - d. Reform of water rights and access.
 - e. Development of new large-scale water resource systems.

1. Kenzo Tange & URTEC, Southern Region Project Study, Southern Region, Existing conditions, Vol. 1, Section 2-3-2.
2. *Ibid.*, Section 4-1-1.
3. *Ibid.*, Section 3-1-7, Table 3-1-7^d.
4. See *Ibid.*, Section 3-1-6; and Kenzo Tange & URTEC Southern Region Project Study, Preliminary Physical Plan, Southern Region, Section 9-3.
5. Southern Region, Existing Conditions, Section 3-1-2.
6. Kenzo Tange & URTEC, Southern Region Project Study, Southern Region, Preliminary Physical Plan, Tables 5-2-13 and 5-2-14.
7. ILACO, Socio Economic Development Plan for the South-West Region of Saudi Arabia, 1973, extracted from Tables 2.13 and 2.14, up dated.
8. Kenzo Tange & URTEC, Southern Region Project Study, Southern Region, Preliminary Physical Plan, Table 5-2-6
9. *Ibid.*, Table 4-2-1(a)
10. Refer also to ILACO, Socio-Economic Development Plan for the South-West Region of Saudi Arabia, 1973, Section 2.2.
11. Southern Region, Existing Conditions, Section 4-1-1.

THE EMIRATE



NIMAS VILLAGE CLUSTER

NIMAS EMIRATE



3. population and housing policy

3-1 POPULATION PROJECTION

3-1-1 HIERARCHY OF VILLAGE ORGANIZATION

In discussing Nimas, it is necessary to differentiate among the Nimas Village Group (Village Group B from Table 1-3-2), the Nimas Village Cluster, and the Emirate of Nimas. The Nimas Village Group is a group of villages immediately surrounding the village of Nimas and is located in an area of approximately 6 km². The Village Cluster is the next level in the hierarchy of village organization and is located in an area of approximately 4 km by 7 km. The Emirate or the municipality of Nimas is an area under the jurisdiction of the Emir of Nimas; it contains some 24,200 residents and is spread out along about 25 km of Route 54. For a more complete description of the hierarchy of village organization, see Sec. 1-2-3.

3-1-2 EXISTING POPULATION AND SOURCES OF DATA

The 1974 National Census identified the population of the Emirate of Nimas to be 24,200, classified into 20,100 settled population (about 83% of total) and 4,100 unsettled or nomadic population (about 17% of total). The population of the Nimas Village Cluster has been estimated by the planning team through a field survey and interview of village chiefs, through data obtained from an aerial photograph of the Nimas area prepared for the Ministry, and from a Feeder Roads Study compiled by Italconsult for the Ministry of Communication. The resulting figures are presented in Table 3-1-1. Thus, in 1975, there were 7,100 settled population in the Nimas Village Cluster.

3-1-3 ASSUMPTION FOR PROJECTION

For the purposes of this report, it has been assumed

1. That the population of Nimas Emirate will grow in proportion to the overall population of the Southern Region.
2. That the population of the Nimas Village Cluster will grow in proportion to the overall settled (i.e. rural plus urban) population of the Southern Region; and
3. That the population increases of the Village Cluster will be distributed among its three village groups according to the availability of potential residential land and to an assumed demand for housing within each village group.

The first two assumptions are justified by the fact that the area around Nimas is in many ways representative of the Southern Region as a whole. The choice of Nimas as a particular village cluster to be studied was expressly made with this fact in mind [1].

Table 3-1-1
POPULATION PROJECTIONS FOR THE EMIRATE (MUNICIPALITY) OF NIMAS

	1975 ^a	1980	1985	1995
Settled				
High ^b	-	23,500	27,600	38,800
Low ^b	-	23,000	26,200	33,400
Planning ^d	20,100	23,250	26,900	36,100
Nomadic				
High ^c	-	3,100	2,300	1,300
Low ^c	-	3,400	2,800	2,000
Planning ^d	4,100	3,250	2,550	1,650
Total				
High	-	26,600	29,900	40,100
Low	-	26,400	29,000	35,400
Planning ^d	24,200	26,500	29,450	37,750

Notes:

- a. Existing population data obtained from 1974 National Census. See Southern Region, Final Physical Plan, Table 9-1-5. The figures have been rounded to the nearest hundred.
- b. It is assumed that the settled population will grow in proportion to the settled population of the Southern Region as a whole. See Southern Region, Final Physical Plan, Secs. 9-2 and 9-3.
- c. It is assumed that the nomadic population will decline in proportion to the nomadic population of the Southern Region as a whole. See Southern Region, Final Physical Plan, Secs. 9-2 and 9-3.
- d. Arithmetic mean of high and low populations.

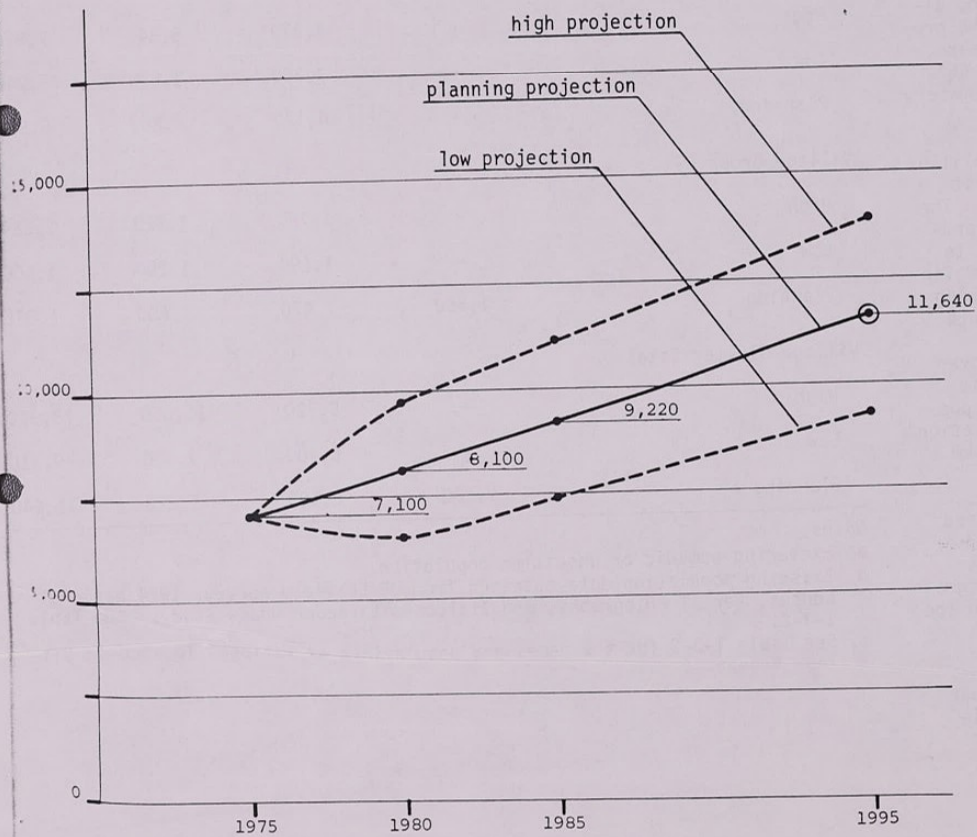
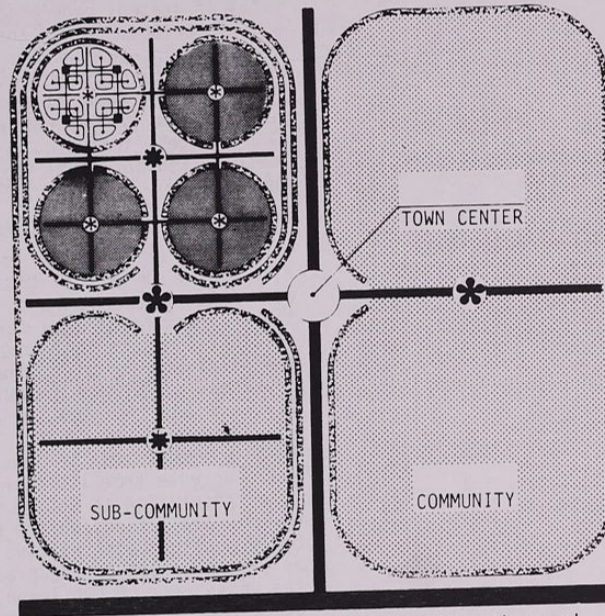


FIGURE 3-1-1
PROJECTED
GROWTH OF
POPULATION



NOTE: This general diagram may be used for both urban and village grouping. For village use, the following equivalents apply:

sub-neighborhood = village
 neighborhood = village group
 sub-community = village cluster
 community = emirate

- inter regional and regional highway
- major arterial
- minor arterial
- collector
- distributor
- local access road
- residential unit group center
- sub-neighborhood center
- neighborhood center
- sub-community center
- community center
- residential unit group
- neighborhood
- buffer zone

FIGURE 3-1-2
COMMUNITY
STRUCTURE
DIAGRAM

3-1-4 PROJECTIONS

The population projections of the Nimas Village Cluster parallel those of only the settled population of the Southern Region, since the estimates of present population do not include the nomadic tribes. As in the case of regional population changes, however, there is an implicit assumption that the nomads will settle in rural areas such as Nimas at a substantial rate each year. For a full discussion of regional population changes, including nomadic settlement, see Southern Region, Final Physical Plan, Secs. 9-2 and 4-3.

Considered as the larger body, the present population of the Emirate of Nimas places it on a par with Abha, Khamis Mushayt, Jizan, and Najran, although the central area is much smaller. The projections indicate that in the next twenty years, the Nimas Emirate will grow between 46% and 66%, representing average growth rates of approximately 1.9% and 2.6% per year.

In this twenty-year period, the settled population will increase from its current level of 83% of total population to 96% of total population. The nomadic population, on the other hand, will probably decline both relatively and absolutely to as little as 32% of the present level, reflecting the rapid rate of settlement which is now taking place and is expected to continue in the future.

In 1975, the Asir sub-region contained just over 403,000 persons. By 1995, it is expected that this will have grown to at least 598,000 and possibly as much as 685,000. Most of this population is distributed in a linear pattern within 50 km either side of the escarpment.

The projected rates of growth for both Nimas and the sub-region are less than might be expected with the high fertility and birth rates. This is due largely to a fairly high rate of out-migration. These phenomena have several effects on the composition of the population. The high birth rate, for example, means that there is a large sector of the population under ten years of age. The number of indigenous males in the 15-35 year old group is much smaller than would be anticipated, however, since they are the sector most likely to migrate. Similarly, the non-Saudis (mostly male and from Yemen) in the population are concentrated in the 30-39 age group.

Table 3-1-2
POPULATION PROJECTIONS FOR NIMAS VILLAGE CLUSTER^a

	1975 ^b	1980	1985	1995
Village Group A ^c				
High	-	3,030	3,300	3,870
Low	-	1,990	2,220	2,570
Planning	2,300	2,510	2,760	3,220
Village Group B ^c				
High	-	4,930	5,840	7,870
Low	-	3,300	3,880	5,240
Planning	3,450	4,120	4,860	6,500
Village Group C ^c				
High	-	1,760	1,920	2,230
Low	-	1,190	1,280	1,500
Planning	1,350	1,470	1,600	1,870
Village Cluster Total				
High	-	9,720	11,060	13,970
Low	-	6,480	7,380	9,310
Planning	7,100	8,100	9,220	11,640

Notes:

- Excluding nomadic or unsettled population.
- Existing population data obtained from URTEC field survey, 1974 National Census, Aerial Photography, and Italconsult Feeder Roads Study. See Table 1-3-2.
- See Table 1-3-2 for the names and populations of villages located in Village Groups.

3-2 HOUSING NEEDS

3-2-1 EXISTING HOUSING CLUSTER

The great majority of housing types in the Village Cluster are of a traditional style, and thus there is not a wide variety. The traditional agricultural house, which predominates, is two or three stories in height, including space on the lower floors for storing of implements and supplies and housing of livestock. Often there will be several houses built close to one another, with some type of connecting passageway. Several families may live together in one house.

The mud style of construction that exists in the other parts of the Kingdom is little used in this area. This is due partly to the availability of granite and the fairly heavy rainfall which makes mud construction impractical.

Recently, there has been some reinforced concrete construction of housing, but this is undesirable from both economic and aesthetic standpoints. In many less-developed regions of the world, the first step in so-called modernization has been the destruction of many facilities of a traditional style and replacing them with what is believed to be a contemporary style. This is an erroneous approach. There are many traditional buildings which, with little or no repair or updating, could be made to serve very well. The expense would be much less, and the aesthetic appeal much more, than replacing them with new buildings.

3-2-2 HOUSING TYPES AND NET RESIDENTIAL AREA

In the present report, the Net Residential Area has been defined to include the fence-to-fence (or property line-to-property line) residential site plus the narrow foot paths between adjacent sites. The Net Residential Area does not include any streets or roads for automobile circulation or any area for community service facilities, such as schools and mosques.

For planning purposes, two types of housing have been identified: Agricultural and non-agricultural. The principal difference between the two is the difference in the Net Residential Areas. It is expected that additional housing for agricultural families will require the same site areas as the existing rural housing. Housing for the families of non-agricultural workers, on the other hand, will resemble housing in urban areas and require smaller site areas.

The average Net Residential Area of the existing agricultural housing has been estimated to be 470 m² per household. This estimate has been derived from a sampling of five villages in which the numbers of households and Net Residential Areas were identified (Table 3-2-1).

The average Net Residential Area of the non-agricultural housing to be constructed is assumed to be 300 m² per household. This reflects the fact that although the Government normally subdivides new residential land into 400 m² plots, past experience indicates that frequently there is more than one family on one lot.

Table 3-2-1
NET RESIDENTIAL AREAS IN FIVE VILLAGES

Name of Village	No. of Households ^a	Total Net Residential Area ^b (ha)
Jahwah	64	3.0
Al H.abaybah	10	0.5
Al H.arqah	36	1.7
Al Bada1	45	2.1
Bazwah	64	3.0
Total	219	10.3

Notes:

a. From Table 2-5-2

b. From Aerial Photography

3-2-3 PROJECTED HOUSING NEEDS

Projections of future housing requirements have been derived from projections of population divided by average household size. It is expected, as in the case of the major cities of the Southern Region, that the average household size in the Nimas Village Cluster will decrease as the average household income rises and general urbanization proceeds. Specifically, it is assumed that the average household size will decrease at the rate of 0.2 persons per household per five years. The resulting projections are tabulated in Table 3-2-2.

Table 3-2-2
PROJECTED HOUSING NEEDS FOR NIMAS VILLAGE CLUSTER
(Number of Dwelling Units)

	1975 ^b	1980	1985	1995		1975 ^b	1980	1985	1995
<u>Village Group A</u>					<u>Village Group C</u>				
<u>Agricultural^c</u>					<u>Agricultural</u>				
High	-	550	590	680	High	-	320	340	420
Low	-	360	400	450	Low	-	210	230	280
Planning	418	450	490	570	Planning	245	270	290	350
<u>Non-Agricultural^c</u>					<u>Non-Agricultural</u>				
High	-	20	60	140	High	-	10	40	60
Low	-	20	40	100	Low	-	10	20	40
Planning	-	20	50	120	Planning	-	10	30	50
<u>Total</u>					<u>Total</u>				
High	-	570	650	820	High	-	330	380	480
Low	-	380	440	550	Low	-	220	250	320
Planning	418	470	540	690	Planning	245	280	320	400
<u>Village Group B^d</u>					<u>Village Cluster Total</u>				
<u>Agricultural</u>					<u>Agricultural</u>				
High	-	650	670	700	High	-	1,520	1,600	1,800
Low	-	440	450	460	Low	-	1,010	1,080	1,190
Planning	536	550	560	580	Planning	1,199	1,270	1,340	1,500
<u>Non-Agricultural</u>					<u>Non-Agricultural</u>				
High	-	280	470	970	High	-	310	570	1,170
Low	-	180	310	650	Low	-	210	370	790
Planning	92	230	390	810	Planning	92	260	470	980
<u>Total</u>					<u>Total</u>				
High	-	930	1,140	1,670	High	-	1,830	2,170	2,970
Low	-	620	760	1,110	Low	-	1,220	1,450	1,980
Planning	628	780	950	1,390	Planning	1,291	1,530	1,810	2,480
					<u>Household Site (pers./H.H.)^e</u>				
					5.5 5.3 5.1 4.7				

Notes:

- Computed by applying the household size to population projections of Table 3-1-2.
- Existing housing data obtained from URTEC field survey (reported in memorandum to Department of Town Planning, Abha, April 1976) and aerial photography.
- See text for definitions of agricultural and non-agricultural housing.
- Village Group B is the Nimas Village Group.
- Household size is assumed to decrease from the current 5.5 persons per household at the rate of 0.2 persons per household per five years.

As the importance of Nimas' role as an administrative center continues, housing needs will increase. This is due to both direct consequences--the housing needs of administrators, educators, health professionals, and other such people who will come to the community--and also to indirect results--the increase in commercial and service industry activities that are likely to be associated with the administrative functions. It is estimated that the demand will be for an increase of at least 2.2% per year over the next twenty years and possibly as high as 4.3%. The latter figure would be somewhat in excess of the maximum projected population growth rate of 2.6% per year, for several reasons:

1. A smaller net family size due to out-migration and other causes.
2. An increase in the number of people living in non-family environments, such as teachers or administrators temporarily living in Nimas.

Table 3-2-3
PROJECTED NET RESIDENTIAL LAND USE AREA REQUIREMENTS
(Planning Projections Only; in HA)

	1975 ^a	1980	1985	1995
Village Group A				
Agricultural ^b	19.6	21.2	23.0	26.8
Non-Agricultural ^c	-	0.6	1.5	3.6
Village Group B ^d				
Agricultural	25.2	25.8	26.3	27.3
Non-Agricultural ^e	4.3	8.5	13.3	25.9
Total	29.5	34.3	39.6	53.2
Village Group C				
Agricultural	11.5	12.7	13.6	16.4
Non-Agricultural	-	0.3	0.9	1.5
Total	11.5	13.0	14.5	17.9
Total				
Agricultural	56.3	59.7	62.9	70.5
Non-Agricultural ^e	4.3	9.4	15.7	31.0
Total	60.6	69.1	78.6	101.5

Notes:

- a. Existing net residential land areas have been estimated from the aerial photo.
- b. Net land requirement for all new agricultural housing is assumed to be 170 m² per household.
- c. Net land requirement for all new non-agricultural housing is assumed to be 300 m² per household.
- d. Village group B is the Nimas Village Group.
- e. It is assumed that the non-agricultural housing located in Village Group B will retain their present average lot size of 470 m² per household.

3-3 HOUSING POLICY

3-3-1 GENERAL

Housing has been heavily affected by the growth and development that has occurred in Nimas thus far. There has been a trend in the central area toward housing for persons involved in administrative and commercial activities and away from farming. There has been replacement of traditional housing by modern styles that are aesthetically in conflict with the traditional forms. There has been a shift in residential patterns from a multiple or extended family facility to one housing only the nuclear family increasing the need for housing units. The mean household size in urbanized areas is likely to be smaller than that typical for rural areas, and thus a larger number of housing units per population is called for in the central area of Nimas, where urban activities are expected.

3-3-2 POLICY AREAS

In short, housing policy must deal with five inter-related areas: The transition from agricultural to urban uses, the transition from multi-family to single-family units, the degree of government involvement, replacement of antiquated housing, and density.

1. The agricultural-urban transition is a normal and expected element of development. Policy in this area must be used to ensure proper land use, protection of existing agricultural uses, and otherwise promote orderly development, but does not need to affect the transition itself as long as it remains within the area designated for urban development.
2. The multiple-family to single-family shift is similarly a natural and expected phenomenon, while multiple-family residences have some utility in agricultural or rural areas, it is preferable in urban areas to maintain the integrity of the family unit.
3. The government should undertake, by planning, zoning, and similar steps, to control growth and promote orderly development. However, it should generally not involve itself in the actual provision of housing except where the private market fails or where there are other purposes to be served.
4. A minimum standard of housing should be established and enforced, and substandard housing should therefore be replaced or improved. The policy should be directed toward the highest possible degree of re-use of existing facilities and of new construction that is essentially the same style as that existing. This

should provide the most economical, effective, and aesthetically compatible form (See Sec. 3.3-4 below).

5. Density and land use are discussed in the following section.

3-3-3 REHABILITATION AND CONSERVATION POLICY

Within an overall framework of housing policy for the Village Cluster, it is essential that a policy for rehabilitation and conservation of existing housing be established. The following are some of the reasons for the importance of a rehabilitation policy:

1. There is a need for immediate improvement in fire safety, sanitation, and traffic circulation in the existing residential areas.
2. Current programs of construction and public improvement have already resulted in demolition of a number of fine, traditional structures. Without a proper conservation program, there will be an indiscriminate and unnecessary replacement of traditional with modern structures.
3. Excessive demolition of existing structures and replacement with modern buildings may result in a loss of historical continuity and local identity. Such a loss may substantially diminish the attractiveness of the Nimas area as a tourism and resort center.

The main outline of the rehabilitation and conservation policy should include:

1. Provision of parking at the periphery of the cluster with an interconnected network of pedestrian circulation.
2. Hierarchical system of access for fire fighting
3. A network of utility and infrastructure served from the periphery.

Figure 3-3-1, represents a portion of the current plan prepared by the Deputy Ministry. The plan if implemented, will involve a substantial replacement of existing, traditional structures. It is proposed that there be a more careful consideration for rehabilitation and conservation. Figure 3-3-1, represents an alternative plan, taking into consideration the policy outlined above.

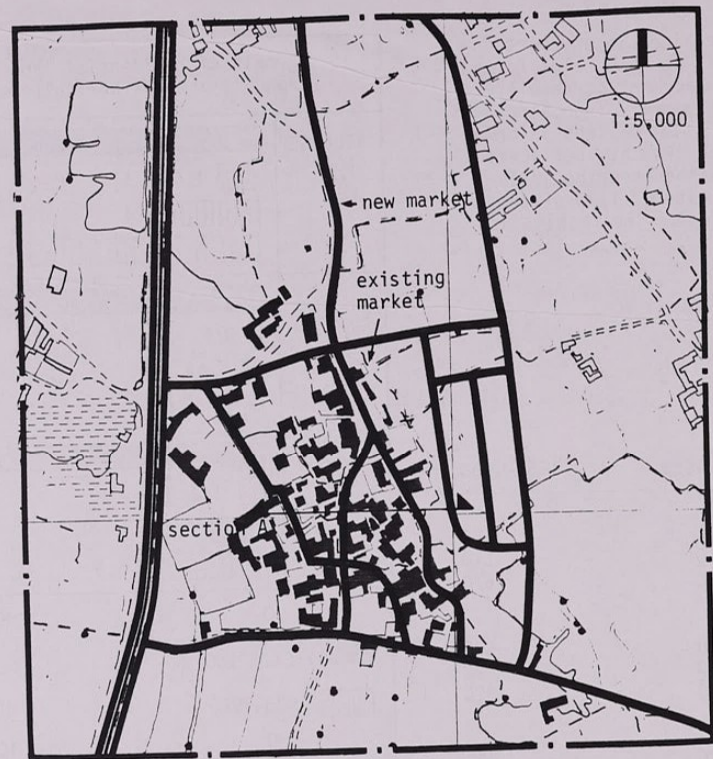
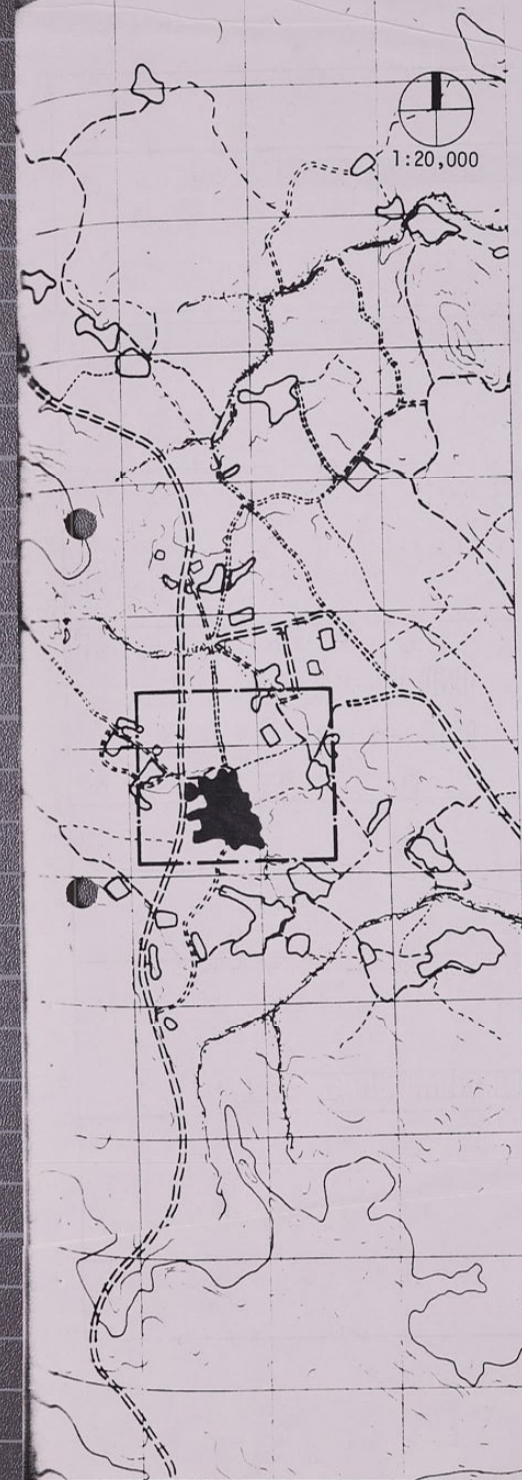
3-4 HOUSING LAND USE POLICY

3-4-1 MAJOR ISSUES

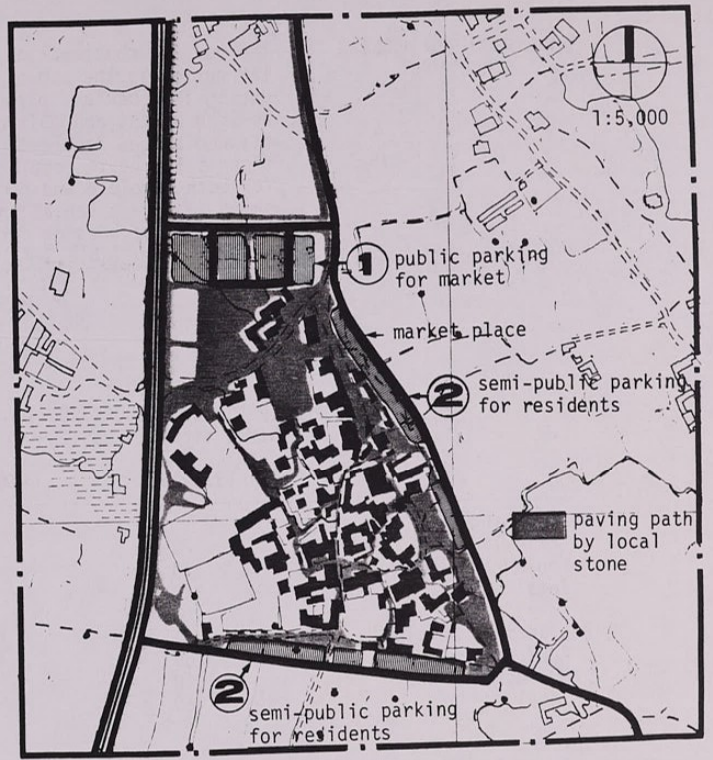
The orderly and planned use of the land for residential and other purposes is a critical element in the development of Nimas, up to the present time, the form of housing development has been largely in accord with traditional agricultural patterns but as the administrative and commercial functions increase their roles and as additional growth occurs, it will be necessary to plan more comprehensively.

It has been noted that housing demand will increase rapidly from the present level of about 1,300 units to as many as 3,000 in 1995. The issues that must be taken into account in establishing an orderly system of housing land use are size, density, use, and location.

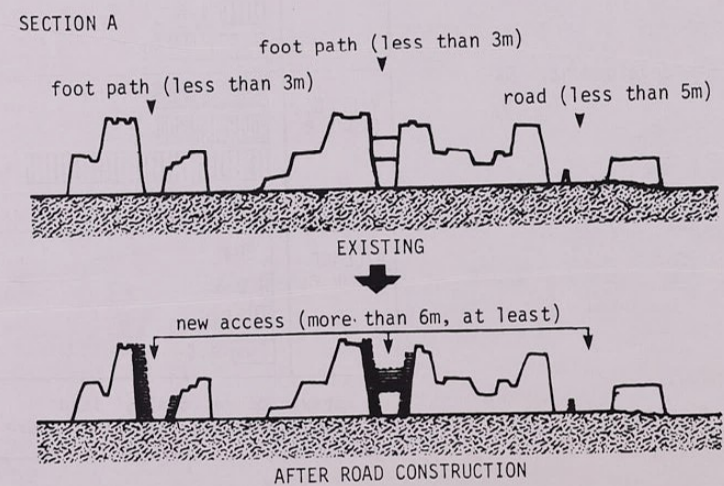
1. Size. The mean size of rural housing units is about 180 m² in gross floor area. (See examples of existing housing types in Figure 2-6-1. However, this includes much space used for animals and storage of food and implements. It also contains an average of 7.0 residents while the mean family size is 5.5 persons, which means that more than one family often lives in the same housing unit. In light of this, it would be possible to reduce the average size of a single-family dwelling unit in the urban area in comparison with those in the rural areas, without reducing the per person space available or creating an uncomfortable living environment.
2. Density. Conservation and efficient use of land in the central parts of Nimas are important to maximize use of available land and provide the most convenient manner of living and working. It is therefore the policy to increase density to a level of 200-250 m²/unit by zoning controls and to ensure that future development is in accord with this standard.
3. Use. Residences have traditionally been used for a variety of purposes in addition to housing, such as small shops or the keeping of animals, but it may be necessary to restrict uses in the future. If higher densities are developed, for example, it would be unsanitary for animals to be kept.
4. Location. The location of housing is determined by a variety of factors such as existing housing locations or proximity to markets or fields. Because of the high priority which has been given to agricultural production, it is the policy to discourage farmland from being changed into residential land.



ROAD PLAN OF EXISTING PROPOSAL



RECOMMENDATION



▨ building demolition

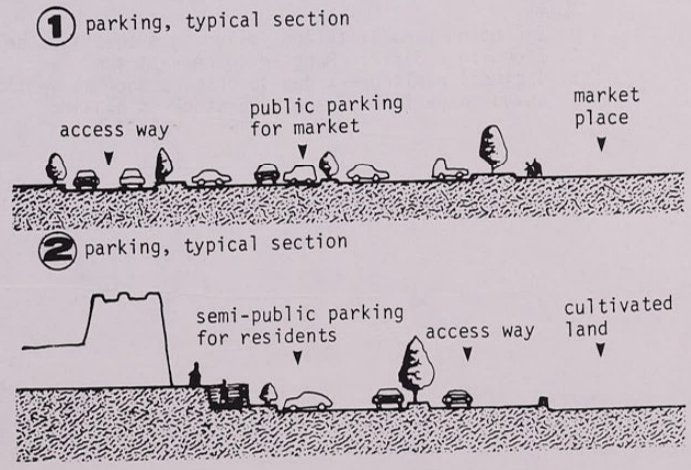


FIGURE 3-3-1
REHABILITATION AND
CONSERVATION OF
OLD HOUSING QUATER,
NIMAS VILLAGE

3-4-2 REQUIRED HOUSING CONSTRUCTION

The housing construction required in any particular period is the sum of (1) new households formed during that period, (2) replacement of obsolete housing units, and (3) replacement of housing demolished by new development. New household formation is linked to population growth. Replacement for both obsolete and demolished housing is assumed to take place at the rate of 1/40 of the 1975 stock of housing per year. The results are summarized in Table 3-4-1.

Table 3-4-1
REQUIRED HOUSING CONSTRUCTION
NIMAS VILLAGE CLUSTER^a

	1975-1980	1980-1985	1985-1995
New Housing^b			
Agricultural	70	70	160
Non-Agricultural	170	210	510
Total	240	280	670
Replacement Housing^c			
Agricultural	150	150	300
Non-Agricultural	10	10	20
Total	160	160	320
Total			
Agricultural	220	220	460
Non-Agricultural	180	220	530
Total	400	440	990

Notes:

- Excluding rehabilitation; planning projections only.
- From Table 3-2-2. Rounded to nearest ten.
- Includes replacement due to obsolescence as well as new development. Assumed to be 1/40 of the 1975 stock of housing.

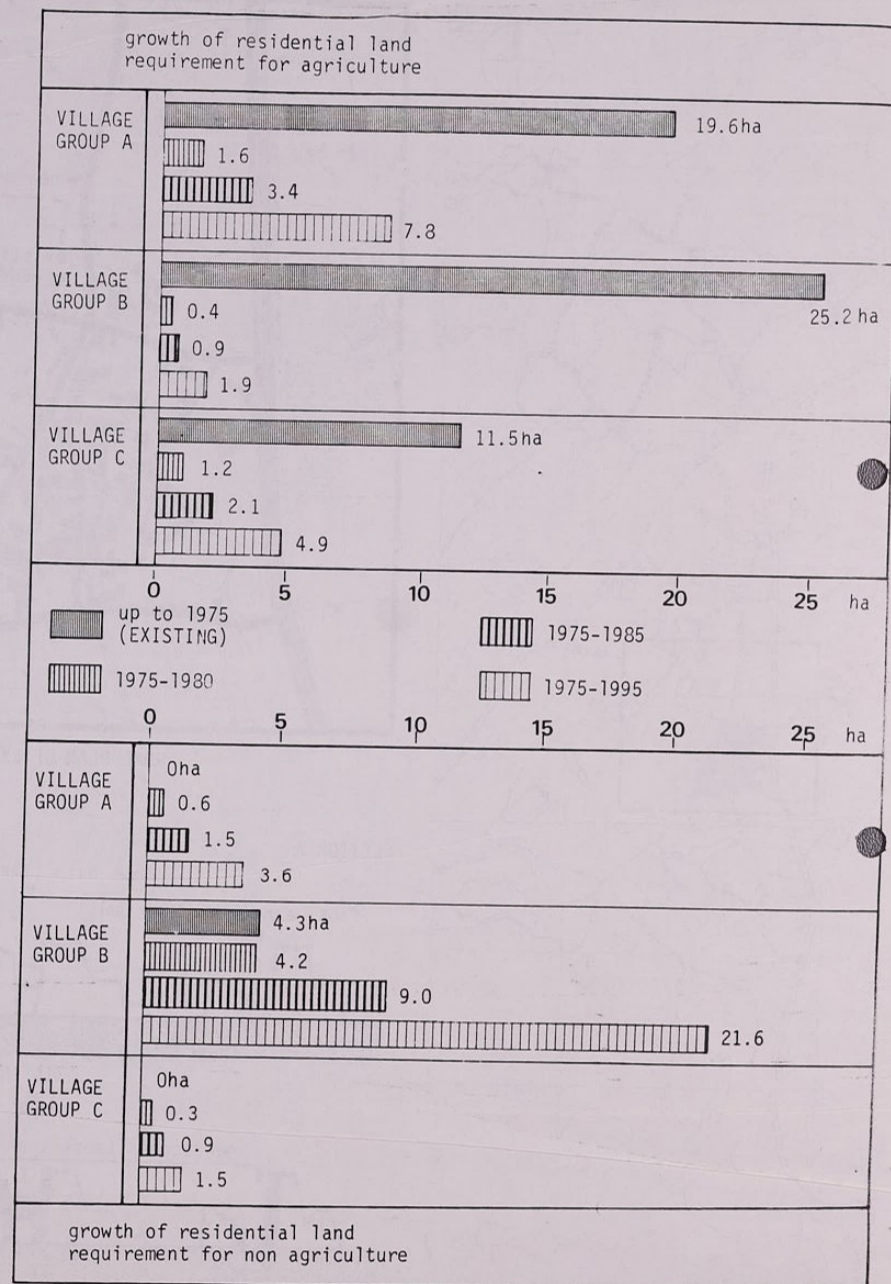







FIGURE 3-4-1
GROWTH OF
RESIDENTIAL AREA

scale 1:20,000

-  class I agricultural
land to be conserved
for agriculture
-  class II agricultural
land possible to
develop agriculture
or others
-  large exposed boulders
-  moderate out-cropping
possible to develop
case by case
-  vacant or non-used land
possible development
land to be given
first priority

3-5 POPULATION AND HOUSING
POLICY FOR NOMADS

The 1974 National Census identified a nomadic population of 4,100 in the Nimas Emirate. This amounts to about 17% of the total population in this area. It is an assumption of the population projections of the Region as well as of the Nimas Emirate and Nimas Village Cluster that nomads will settle in rural areas such as Nimas at a substantial rate each year (see the Southern Region Final Physical Plan Sections 9-2 and 4-3). As mentioned earlier, it is expected that the nomadic population may decline to as little as 32% of its present level over the 20 year planning period. Such a decline will be due to a rapid rate of settlement as nomads attempt to improve their economic potential. The economic returns of nomadic stock raising are at best marginal, and as the general economic level of the Kingdom's population rises in response to the Government's vast investments in the country, nomads will probably become increasingly able to accept a change in their lifestyle in order to share in the benefits of this economic development.

As others have pointed out, such settled nomads will most probably have to seek employment outside the agricultural sector.[1] Consequently, settled nomads will have a basically non agrarian lifestyle. (This is discussed more fully in Section 4-6.)

Housing for settled nomads must take account of both their cultural tradition and their future employment prospects. For this reason it is recommended that a special settlement be established which will enable the recently settled nomads to maintain some of their traditional lifestyle yet will introduce them to modern culture. Such a settlement should be in a rural area somewhat separated from larger concentrations of population yet close enough to such population centers to enable the settled nomads to find suitable employment and to gradually become assimilated in the culture of settled areas.

Nomadic settlement areas should have utilities and basic infrastructures but should not be physically overstructured. Though rights of way must be defined, only major roadways should be built in such developments. Flexibility in housing type should be allowed with areas for temporary dwellings (such as tents) as well as permanent ones. Utility connections - electric, telephone, water and sewage should ultimately be made available to all dwellings whether temporary or permanent.

The Government has already begun to implement such a development at Al Farah, a village about 8 km northeast of Nimas. At this location, a new school, the Badiya Bani Backle School has been opened to serve the nomads and a planned Al Farah housing project has been approved by TPO. This project will have about 800 house sites available to Nomads who wish to settle there. The location of this project is an area of flat rich land with a wadi stream to assure water availability and is close enough to Nimas to assure easy and quick travel.

Chapter 3 Notes.

1. ILACO, Socio Economic Development Plan for the Southern Region of Saudi Arabia, 1973, Section 2.5.3.



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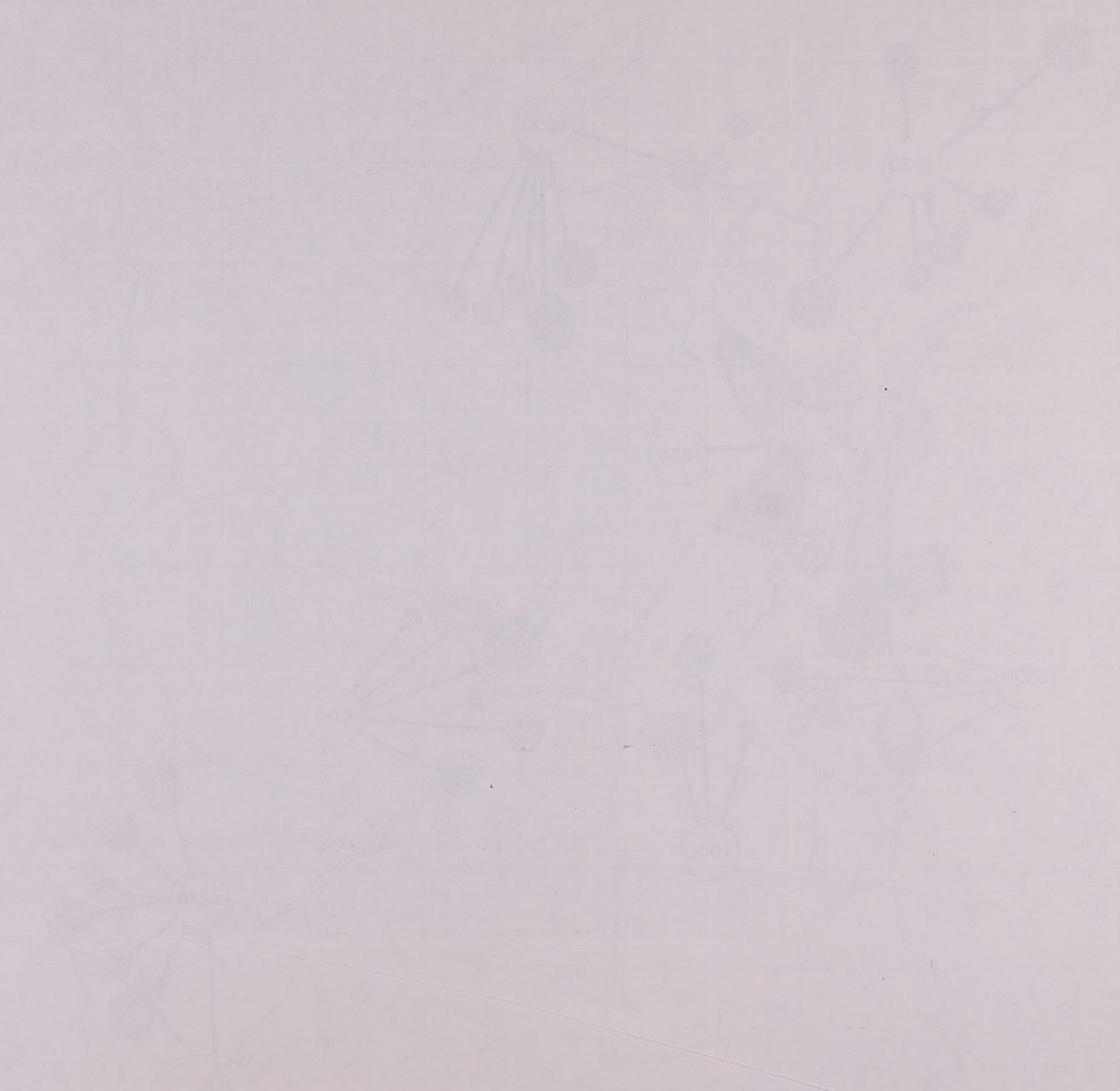
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4. employment and policy for employment center

4-1 AGRICULTURE AND AGRICULTURAL EMPLOYMENT

4-1-1 CULTIVATED LAND OF NIMAS EMIRATE

Based on an aerial photograph supplied by the Ministry, on field survey and analysis by the consultant, and on information from previous studies by ILACO and others, it has been estimated that the extent of the Nimas Emirate containing arable land measures approximately 25 km by 5 km, or 12,500 ha. This area may be considered as the agricultural zone of Nimas Emirate. It is also the principal area of settlement and the area of investigation for the present study. It should be noted, however, that the traditional, political jurisdiction of the Emir of Nimas is spread across an area much larger than the agricultural zone, including much uncultivated land east of the agricultural zone.

Within this agricultural zone, it has been estimated that approximately 40%, or 5,000 ha is currently under cultivation. Since the agricultural zone is very similar to other highland areas of the Asir Sub-Region [1], various characteristics of the Nimas area may be inferred from data included in the series of reports on the Southern Region.

Thus, we know that the percent shares of irrigated and dry farming (non-irrigated or rain-fed) lands are approximately 26.4% and 73.6% [2]. In the Nimas Emirate, this implies that approximately 1,300 ha of cultivated land is devoted to existing irrigation farming, while some 3,700 ha is devoted to dry farming.

For the projected distribution of cultivated land, the following assumptions have been made:

1. All of the existing irrigation land is assumed to be converted to improved irrigation land at the same proportion as projected for the Asir Sub-Region [3].
2. There is a limited conversion of some of the dry farming lands to improved irrigation lands such that the proportion of total irrigation land (existing plus improved) to dry farming land will increase from 26.4/73.6 1975 to 40/60 in 1995.
3. Through a land reclamation program, it is assumed that the existing stock of total cultivated land will be increased by 10% by 1995.

The resulting projections are summarized in Table 4-1-1.

4-1-2 AGRICULTURAL EMPLOYMENT IN NIMAS EMIRATE

The Physical plan for the Southern Region has identified the worker demand of various types of land in the region. In the highlands, such as the area around Nimas, existing irrigation lands require an average of 140 man-days/ha/yr; and, in the future with maximum improvement, 210 man-days/ha/yr [4].

The expected full time equivalent labor of an agricultural worker is 200 days of work per year. In the Nimas area, however, it has been estimated from observation that approximately 150 days of work per year are devoted to agricultural production. It is also expected that the economic development of the Nimas Emirate will result in a diversification of income sources, resulting in a reduction in the full time equivalent labor expended on agricultural work. For the employment projection, it is assumed that the average full time equivalent labor will decrease from 150 days per worker per year in 1975 to 110 days in 1995.

4-1-3 CULTIVATED LAND OF NIMAS VILLAGE CLUSTER

There are 953 hectares of cultivated land in the Nimas Village Cluster, of which some 75%, or 715 ha, of land is devoted to irrigation and 25%, or 233 ha, is devoted to dry farming (see Figure 2-7-1). There are also potentially arable lands in the vicinity of Village Groups A and C. As in the case of the Nimas Emirate as a whole, it is suggested that a program for new agricultural land be implemented in the Nimas Village Cluster. Subtracting the agricultural land which would be converted to urban uses in Village Group C, it is estimated that the total stock of cultivated land increase by 105 ha, or approximately 10%, from 1975 to 1995.

The projected distribution of agricultural land, presented in Table 4-1-2, is based on the following assumptions:

1. As in the case of Nimas Emirate, all of the existing irrigation land is assumed to be converted to improved irrigation land at the same proportion as projected for the Asir Sub-Region [6].
2. While, locally, some dry farming areas must be converted to urban uses, it is assumed that the total stock of land devoted to dry farming will remain constant during the planning period.
3. As noted above, the total stock of cultivated land will increase by 105 ha during the planning period and will be devoted principally to improved irrigation farming.

Table 4-1-1
DISTRIBUTION OF CULTIVATED LAND
NIMAS EMIRATE (HA)

	1975a	1980	1985	1995
Existing Irrigation ^b	1,300	800	300	-
Improved Irrigation	-	800	1,700	2,700
Dry Farming ^c	3,700	3,500	3,200	2,800
Total ^d	5,000	5,100	5,200	5,500

Notes:

- Existing cultivated land is estimated to be approximately 40% of the 25 km X 5 km area, from field observation and aerial photography. It is assumed that 26.4% of cultivated land is irrigated and 73.6% is devoted to dry farming, in conformity with the estimated averages for Asir Sub-Region. See Southern Region, Final Physical Plan Table 5-2-9.
- The amount of existing irrigation land is assumed to decrease in the same proportion as projected for the Asir Sub-Region. See Southern Region, Final Physical Plan, Table 5-2-8 (a).
- It is assumed that the ratio of irrigate to dry farming lands will change from 26.4/73.6 in 1975 to 40/60 in 1995. See text.
- It is estimated that the total amount of cultivated land in the Nimas Emirate may be increased by 10% between 1975 and 1995. It is assumed that the new agricultural land plus those converted from existing areas will be cultivated according to improved irrigation.

Table 4-1-2
DISTRIBUTION OF CULTIVATED LAND
NIMAS VILLAGE CLUSTER (HA)

	1975 ^a	1980	1985	1995
Village Group A				
Existing Irrigation ^b	232	139	59	-
Improved Irrigation ^b	-	115	203	297
Dry Farming ^c	77	79	81	83
Total	309	333	343	380
Village Group B				
Existing Irrigation	352	211	88	-
Improved Irrigation	-	144	255	344
Dry Farming	113	110	106	101
Total ^d	465	465	449	445
Village Group C				
Existing Irrigation	131	79	32	-
Improved Irrigation	-	67	122	179
Dry Farming	48	49	51	54
Total	179	195	205	233
Village Cluster Total				
Existing Irrigation	715	429	179	-
Improved Irrigation	-	326	580	820
Dry Farming	238	238	238	238
Total	953	993	997	1,058

Notes:

- Existing distribution of cultivated lands estimated from field survey, aerial photography, and Southern Region, Existing Conditions, Vol. 1.
- The amount of existing irrigation land is assumed to decrease in the same proportion as projected for the Asir Sub-Region. See Southern Region, Final Physical Plan, Table 5-2-8 (a).
- It is assumed that the total amount of land devoted to dry farming will remain relatively constant.
- Due to construction of roads, residential development, and public services, some agricultural land (Class II) in Village Group B (Nimas Village Group) is converted to urban use.

4-1-4 AGRICULTURAL EMPLOYMENT IN NIMAS VILLAGE CLUSTER

The same assumptions concerning the worker demand by type of agricultural land and the expected amount of work devoted to agriculture are made as in the case of Nimas Emirate. The resulting projections of agricultural employment are tabulated in Table 4-1-3.

The mean production values of cultivated land are SR 1,800/ha for existing irrigation land, SR4,500 for improved irrigation, and SR 1,000 for dry farming [5]. For projected production value per worker, it is necessary to correct for the decreasing number of man-days devoted to agricultural work per worker. (See Table 4-1-4).

4-2 COMPOSITION OF EMPLOYMENT SECTORS AND PROJECTIONS

4-2-1 APPRAISAL OF EXISTING EMPLOYMENT

Both Nimas Emirate and Nimas Village Cluster are predominantly based on agricultural production. 63% of the employment in the Emirate is engaged in agriculture, and, in Nimas Village Cluster, where secondary and tertiary economic sectors serve the Emirate-wide population, 57% of the workers are engaged in agriculture. In Nimas Village Cluster, the most significant non-agricultural functions are associated with government at both the national and emirate levels. The remainder are involved in small-scale commercial activities.

4-2-2 PROJECTION OF EMPLOYMENT

Expected changes in agricultural employment in the Emirate and the Village Cluster have been discussed in Secs. 4-1-2 and 4-1-4. To recapitulate, total agricultural employment will increase due to the improvement of existing methods of irrigation and cultivation and to the decrease in the average amount of work per worker per year expended for agriculture.

Generally, the labor force participation rate for both the Emirate and the Village Cluster is expected to increase gradually over time. The Second Development Plan (1395-1400) has estimated that the growth of the male labor force will be 7.4% over the five-year period and that the growth of the female labor force will be

Table 4-1-3
WORKER DEMAND OF CULTIVATED LAND
NIMAS VILLAGE CLUSTER^a

	1975	1980	1985	1995
Village Group A				
Existing Irrigation ^b	217	139	64	-
Improved Irrigation ^c	-	172	328	567
Dry Farming ^d	36	40	44	53
Total	253	351	436	620
Village Group B				
Existing Irrigation	329	211	95	-
Improved Irrigation	-	216	412	657
Dry Farming	53	55	57	64
Total	382	482	564	721
Village Group C				
Existing Irrigation	122	79	34	-
Improved Irrigation	-	101	197	342
Dry Farming	22	24	27	34
Total	144	204	258	376
Village Cluster Total				
Existing Irrigation	668	429	193	-
Improved Irrigation	-	489	937	1,566
Dry Farming	111	119	128	151
Total	779	1,037	1,258	1,717
Average Man-Days of Work Per Agricultural Worker Per Year ^e	150	140	130	110

Notes:

- Derived from Table 4-1-1.

$$(\text{Worker Demand}) = (\text{Cultivated Land Area}) \times \frac{(\text{Man-days Required})}{(\text{Average Man-Days})}$$
- It is assumed that the land cultivated under existing irrigation methods will require the same number of man-days per year devoted to non-improved irrigation lands in the dissected highlands of the Southern Region, i. e. 140 man-days per hectare per year. See Southern Region, Final Physical Plan, Table 5-2-11 (a)
- It is assumed that the land cultivated under improved irrigation methods will require 210 man-days per hectare per year. See Southern Region, Final Physical Plan, Table 5-2-11 (a).
- It is assumed that the land devoted to dry-farming will require 70 man-days per hectare per year. See Southern Region, Final Physical Plan, Table 5-2-12.
- It is expected that, as the economy of Nimas Village Cluster develops, the full man-day equivalent of work devoted to farming per agricultural worker will decrease, paralleling the increased diversification of income sources, due, for example, to tourism.

Table 4-1-4
 PRODUCTION VALUE OF CULTIVATED LAND
 NIMAS VILLAGE CLUSTERS^a
 (SR)

	1975	1980	1985	1995
Existing Irrigation				
Total	1,287,000	772,200	322,200	-
Per Worker	1,930	1,800	1,670	-
Per Full-Time Worker ^b	2,570	2,570	2,570	-
Improved Irrigation				
Total	-	1,467,000	2,610,000	3,690,000
Per Worker	-	3,000	2,790	2,360
Per Full-Time Worker	-	4,290	4,290	4,290
Dry Farming				
Total	238,000	238,000	238,000	238,000
Per Worker	2,140	2,000	1,860	1,580
Per Full-Time Worker	2,850	2,860	2,860	2,870
Total				
Total	1,525,000	2,477,200	3,170,200	3,928,000
Per Worker	1,960	2,390	2,520	2,290
Per Full-Time Worker	2,610	3,410	3,880	4,160

Notes:

- a. Derived from Tables 4-1-1 and 4-1-2. Production value per hectare is assumed to be SR 1,800/ha for existing irrigation land, SR 4,500/ha for improved irrigation land, and SR 1,000/ha for dry farming land. See Southern Region, Final Physical Plan, Tables 5-2-13 and 5-2-14.
- b. A full time worker is assumed to work an average of 200 days per year.

4-2-3 POLICY FOR EMPLOYMENT DEVELOPMENT

21.6% over the same period. Considering the regional factors as well as employment beyond the initial five-year period, it has been estimated that the participation rate will increase by 2 percentage points every five years.

At the same time, new economic activities will be generated from an increased role of the local and the national governments and from a development of secondary and tertiary sectors such as food processing, distribution, and services. In short in Nimas Village Cluster, the predominantly agricultural economy will experience both expansion and diversification of its activities. The Village Cluster, and especially its central area, Village Group B, will become increasingly urbanized.

Thus, the sectoral composition of the non-agricultural employment in the Village Cluster is expected to become similar to the composition of the non-agricultural employment in the five major cities of the Southern Region. For planning purposes, it has been assumed that the share of secondary, commercial (including private tertiary), and government sectors in 1995 will be approximately equal to the weighted average of the shares for the five cities. During the intervening years between 1975 and 1995, the sectoral shares have been proportionally interpolated (See Table 4-2-1).

Three major points must be borne in mind in developing the policy for employment development.

1. It is important that training facilities be developed to prepare the residents of Nimas for the new employment opportunities that are likely to develop. For example, domestic tourism is going to become a major commercial activity in the future, and thus a major provider of jobs. This is a function with which people are presently unacquainted and a training program should be developed to accommodate them.
2. Another major new function will be commercial activities associated with agriculture. Food processing, marketing, and other elements of agro-industry are likely to undergo a major expansion. As in the case of domestic tourism, agro-industry will provide many new employment opportunities for those who are prepared to take advantage of them; hence, training programs are needed.
3. Finally, it is important that agricultural production be maintained. It is normal and likely that the productivity of the individual worker will go up however, there is a danger

that outmigration and the higher wages that are available in the oilfields will cause a decline in the agricultural workforce if steps are not taken to prevent this. These steps should include raising agricultural wages to a level similar to those available elsewhere in the country (at present, they may be one-fourth the level available in the oil-producing areas).

Table 4-2-1
PROJECTIONS OF EMPLOYMENT
NIMAS EMIRATE

	1975	1980	1985	1995
Planning Population	24,200	26,500	29,500	37,800
Participation Rate (%) ^a	19.1	21.1	23.1	27.1
Total Employment	4,600	5,600	6,800	10,200
Agricultural ^b	2,900 ^c	3,800	4,700	7,000
Existing Irrigation	1,200	800	300	-
Improved Irrigation	-	1,200	2,700	5,200
Dry Farming	1,700	1,800	1,700	1,800
Non Agricultural	900	1,100	1,500	2,800
Nomadic ^d	900	700	600	400

Notes:

- Existing participation rate is estimated from the average of the five major cities in the Southern Region. See Southern Region, Existing Conditions, Vol. I, Table 3-2-4b. It is assumed that the participation rate will increase 2 percentage points every five years.
- Agricultural employment is derived from Table 4-1-1, with the same assumptions as those indicated in notes of Table 4-1-3.
- Note that the estimated share of agricultural employment, $3,100/4,600 = 67\%$ generally conforms with the estimated share of agricultural employment of 63.7% for the entire Southern Region. See Southern Region, Existing Conditions, Vol. I, Table 3-2-3.
- These projections are obtained by applying the participation rate to the appropriate population projections from Table 3-1-2.

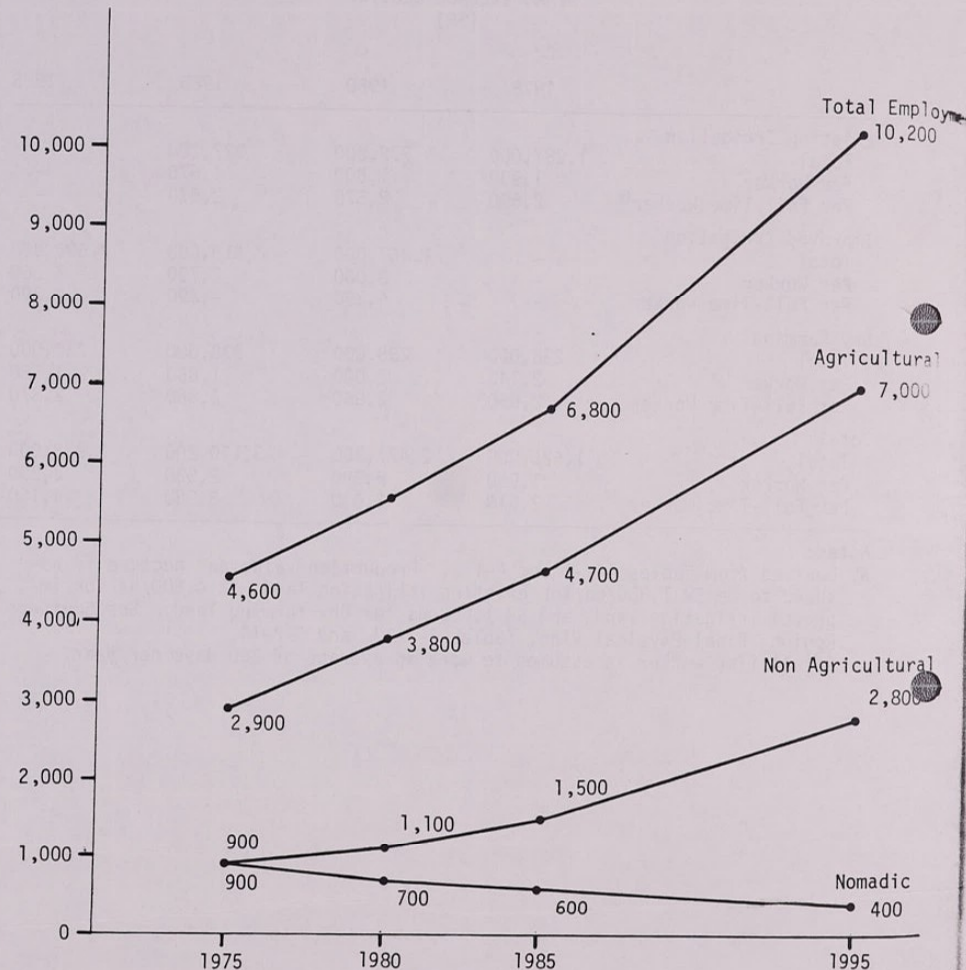


FIGURE 4-2-1
PROJECTED
GROWTH OF
EMPLOYMENT BY
SECTORS

Table 4-2-2
PROJECTED CHANGES IN SECTORAL COMPOSITION
OF NON-AGRICULTURAL EMPLOYMENT, NIMAS VILLAGE CLUSTER (%)

	1975 ^a	1980 ^b	1985 ^b	1995 ^c
Secondary Sector ^d	4.7	8.4	12.2	19.7
Commercial Sector ^e	20.9	25.4	29.8	38.6
Government Sector ^f	74.4	66.2	58.0	41.7
Total	100.0	100.0	100.0	100.0

Notes:

- From field survey and interviews.
- Interpolated proportionally from 1975 and 1995 figures.
- Estimated from weighted average of the five major cities. See five major cities, Final Master Plan, Table 4-1-1.
- Includes manufacturing and construction.
- Includes all tertiary sector activities excluding government employees.
- Includes school teachers and all government employees.

Table 4-2-3
PROJECTIONS OF EMPLOYMENT
NIMAS VILLAGE CLUSTER

	1975 ^a	1980	1985	1995
Planning Population	7,100	8,100	9,200	11,600
Participation Rate (%) ^b	19.1	21.1	23.1	27.1
Total Employment	1,360	1,710	2,130	3,150
Agricultural ^c	780	1,040	1,260	1,720
Non-Agricultural ^d	430	530	740	1,320
Secondary Sector	70	50	90	260
Commercial Sector ^e	80	130	220	510
Government Sector ^f	280	350	430	550
Rangeland	150	140	130	110

Notes:

- Existing employment data obtained from field survey and interviews.
- See note 'a' Table 4-2-1.
- From Table 4-1-3.
- See Table 4-2-2 for projected changes in the sectoral composition of non-agricultural employment.
- Including all private tertiary sector.
- Including teachers.

4-3 DISTRIBUTION OF
EMPLOYMENT CENTERS

At present, there is little employment outside the agricultural sector. Less than 15% of the workforce is in non-agricultural pursuits, either in governmental administration or in scattered, small-scale industrial or commercial activities.

The projections for the future call for growth in five major sectors of the employment:

- High-intensity administrative and commercial activities. These will be located mostly in Nimas Village Group.
- Agro-business activities. This sector consists of the formal and informal activities associated with agriculture—marketing, trading, sale of seed and fertilizer, and so on, and is also centrally located.
- Tourist and recreation activities. This consists both of facilities oriented toward national tourism, such as restaurants, hotels, automobile camps and service centers, and the national park along the escarpment; and of the larger locally-oriented recreational facilities, such as sports fields. These will be generally located to the west of Nimas in the vicinity of the escarpment.
- Education. Facilities, ranging from elementary through technical school level, will be located in Nimas. It is also likely that research, educational extension, and similar types of programs will be included.
- High intensity farms. These will generally be small but efficiently cultivated plots of land, scattered throughout the village.

The agro-business and high-intensity farms will be the greatest employers of the existing workforce. The tourism-oriented activities will begin small and gradually increase. At least initially, the teachers and researchers will likely be brought into Nimas from elsewhere in the Kingdom, as will be some of the administrators associated with the national government.

4-4 INCOME DISTRIBUTION

At present, the wages of workers in Nimas and other areas of the Southern Region are low. Merely sixty percent of the population earns less than SR 500/month and only about ten percent earns as much as SR 1000/month. The average wage is about SR 600/month, but this is a deceptively high figure since about fifty percent of the entire payroll comes to the small portion of the workforce that is employed either in the government or construction work. As a rule, urban workers in the Southern Region make about twice what rural or agricultural workers earn, and urban workers in other parts of the Kingdom (particularly the oil fields of the Eastern Region) make about twice the wages of their counterparts in the Southern Region. The income distribution policy thus needs to address a wage differential that varies internally within the Southern Region by two hundred or more percent, and nationally by four hundred or more percent.

It appears that the need is for a policy that will address two areas:

1. Promotion of industrial and commercial development in Nimas and the Southern Region. This is desirable because the wages available in such activities are generally higher than those found in agriculture and because of the likelihood of secondary economic activities developing from initial investment.
2. Support to agriculture. In all likelihood, it will be necessary to provide sizable financial support to agriculture. This will serve several objectives:
 - a. Stabilization of population and discouragement of large-scale movement.
 - b. Promotion of Nomad settling
 - c. Increase in agricultural output and promotion of national food self-sufficiency.
 - d. Promotion of the type of development which is likely to produce the greatest long-term benefits for the Kingdom.

4-5 POLICY FOR INDUSTRIAL LOCATION

At present, there is practically nothing in the way of true industrial activity in the vicinity of Nimas. There are a few activities concerned with low-level processing of agricultural products, and a few facilities for the making of cement block, doors, and other construction items; these are all small-scale, however, and employ no more than two or three persons.

Future industrial development will be very much associated with agriculture. Drying, processing, and packaging of fruits, vegetables, meat, and

animal feed will likely be the primary function of the projected industrial activities. The policy for location of industries should be based upon the following:

1. Maximization of efficiency of location with regard to transportation of raw and finished products, communication, association with similar functions, convenience of workers and patrons, and so on.
2. Maximization of the use of infrastructure, such as water supply, electric lines, and waste disposal facilities.
3. Minimizing the impact upon other uses, particularly residential and farming areas. In particular, the Southwest wind, which is relatively constant in the Nimas area, should be taken into consideration to avoid adverse environmental effects.
4. Compatibility and support to related commercial activities in order to provide the greatest support to the local and national economic and commercial needs.
5. Adherence to the land use policies with regard to location, size of plot, and intensity of use, as expressed in the plan.

4-6 EMPLOYMENT POLICY FOR NOMADS

Unsettled nomads have traditionally supported themselves by livestock raising, moving from place to place as the seasons change in search of greener pastures and water. As economic development moves rapidly ahead such nomadic stock raising becomes less and less economically viable. Consequently it is expected that during the coming years many nomads will choose to settle in rural population centers such as Nimas in order to improve their economic condition.

As mentioned earlier such settled nomads will probably have to seek employment outside the agricultural sector. This is because the opportunities for settled farming are quite limited. Water resources are of course limited and future water resource development is allocated for improvement of existing farmlands and for other non-agricultural purposes. Farmland in the Nimas Village Cluster is expected to increase in area by only 11% over the next 20 years (See Section 4-1-3) For this reason, rainfed cropping will be the only alternative agricultural activity available to settled nomads who have given up stock raising. The economic prospects of rainfed cropping are little better than nomadic livestock raising so it is assumed that settled nomads will leave the agricultural sector to seek employment elsewhere.

As has been mentioned previously, the present economy of the Nimas Village Cluster is predominantly agricultural. Development of secondary and tertiary sectors are expected to increase, however, as new economic activities are generated by increased public and private investment. It is in these new areas that settled nomads must find employment. In order to facilitate the transition from agrarian to non-agrarian employment training programs should be established to enable nomads to develop the skills they will need to find productive employment outside the agricultural sector. Educational facilities of this sort are discussed in Section 5-12.

5. policy for service and cultural facilities

5-1 ELEMENTARY EDUCATION

5-1-1 APPRAISAL OF EXISTING CONDITIONS

A full discussion of the existing elementary schools in the Village Cluster is included in Sec. 2-9. Some of the major observations are summarized below:

1. Enrollment. Currently, 100% of the boys in the ages 6 through 11 are enrolled in elementary schools, and 45% of the girls in the same age bracket are enrolled.
2. Distribution of facilities. The existing distribution of boys schools generally provides an intimate, walking-distance access to most of the boys in the Village Cluster. Access to some of the schools, such as the Nahiyan School, should be improved. For example, there is an underpath at Route 54, which is used by students from the western part of the Village Cluster. There are currently an insufficient number of girls schools to allow pedestrian access to all the girls in the appropriate school age bracket.
3. Facilities. Many of the existing schools in the Village Cluster do not meet acceptable, structural and environmental standards. Major areas of deficiency are inadequate lighting and lack of space. There is a shortage of playgrounds, and many schools are too small to house the entire range of first to sixth grades.

It should be emphasized, however, that the local buildings which are presently leased to the Ministry of Education by and large utilize excellent building materials and have scales appropriate to rural, elementary education. Local characteristics and needs are particularly well reflected in the leased buildings. If the Village Cluster is to maintain its present philosophy of providing 'mini-schools' within walking distance to rural children, the current practice of leasing the existing, local structures is to be preferred to construction of massive buildings according to the Ministry of Education specifications, which are intended primarily for schools in large, urban areas such as Abha.

5-1-2 PROJECTED ENROLLMENT

The Appendix presents a method for computing the number of school age children for a given total population. For the planning period, it is assumed that 100% of the school age children, both boys and girls, will be enrolled in elementary schools. 9.5% of the total population is assumed to be in the elementary school ages, 6 through

11, for boys, and 9.5% for girls. The current enrollment in boys elementary schools, however, is 776, or 10.9% of the total population. There are primarily two reasons for relying on the lower estimate of the ratio of school age population to total population:

1. There is currently some retardation, and there are elementary school children behind the normal upper age limit of 11. It is expected that, in the future, the distribution of students by grade levels will more closely approximate their distribution by age.
2. Similar to the major rural centers such as Bishah and Najran, it is expected that there is currently high migration of working age people out of the Emirate, resulting in a layer fraction of those at the bottom of the population pyramid than would be expected in the future.

The resulting projections of future enrollment are presented in Table 5-1-1.

5-1-3 GOALS, PROGRAM, AND POLICY FOR ELEMENTARY EDUCATION

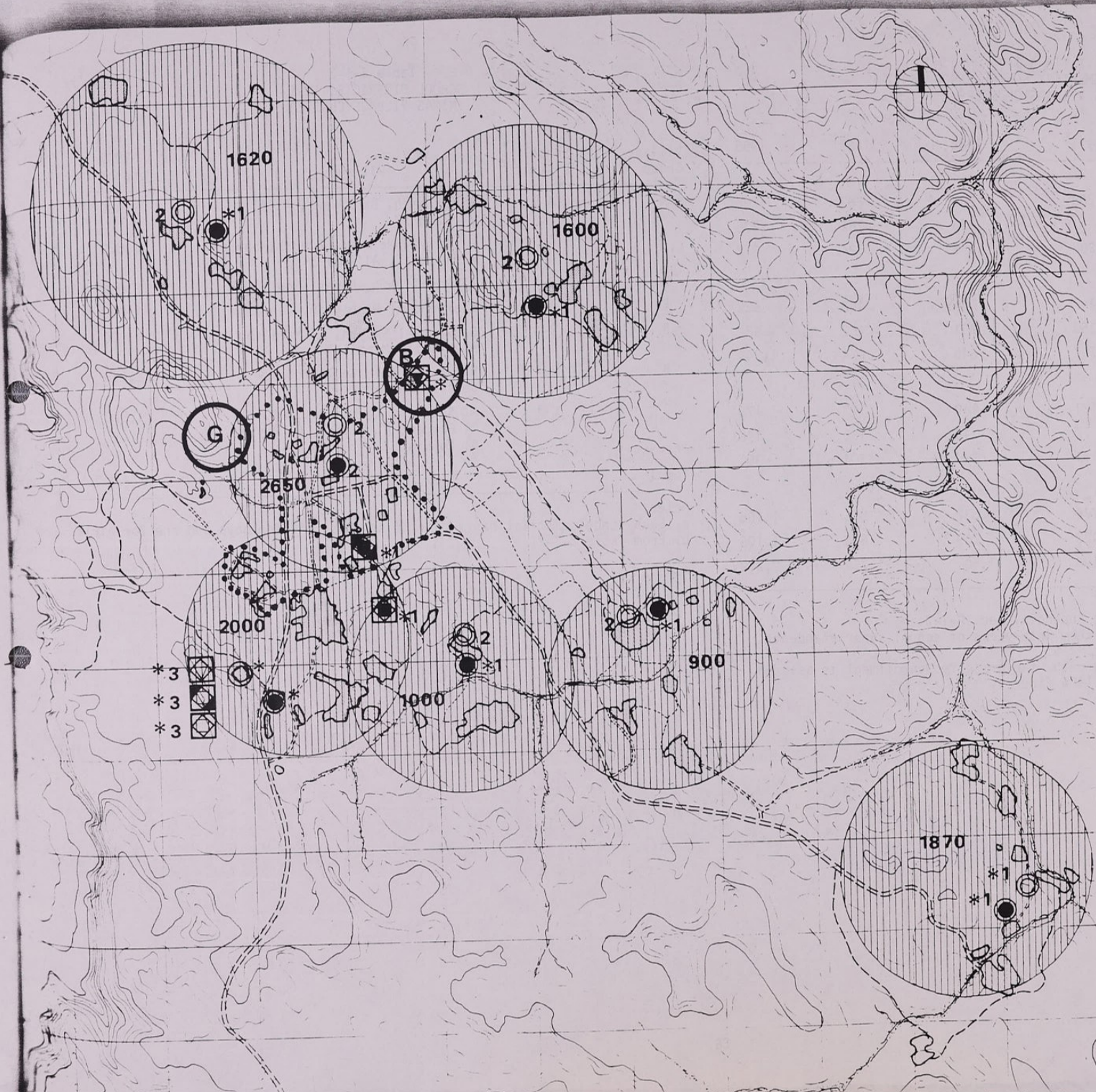
Because of the extremely low, overall density, it is proposed that the present practice of providing 'mini-schools,' smaller in scale than specified in the current standards of the Ministry of Education and more accessible to a widely separated population, should be the principal unit of elementary education. As indicated in Sec. 5-1-1, such 'mini-schools' may be provided by leasing existing structures in appropriate locations, rather than by constructing entirely new buildings. It is often necessary, however, to up-grade the existing structures to conform with standards indicated in the Appendix of this report as well as to general Ministry standards which govern the interior environment of school buildings (including lighting and furnishing).

The following goals are suggested for inclusion in a general policy for the Nimas Village Cluster elementary education:

1. Enrollment. It is proposed that there be a 100% enrollment of both boys and girls by 1980 and thereafter. The projected number of students in 1995 will be 1,100 boys and 1,100 girls.
2. Distribution of schools. In order to accommodate the expected population of 1995 within acceptable walking radii, it is proposed that there be 2 pairs (boys/girls) of schools in Village Group A, 4 pairs in Village Group B, and 1 pair in Village Group C. There will thus be 7 boys elementary schools and 7 girls elementary schools in the Village Cluster (See Table 5-1-2).

FIGURE 5-1
EDUCATIONAL
FACILITY
DISTRIBUTION
IN 1995

scale 1:20,000



- * existing school
- 1 presently leased building, improved and/or moved
- 2 KTU proposed school symbols are not necessarily exact school sites
- 3 presently shared use recommended to be separated
- ⊙ presently vacant or non-built-up land with better accessibility to emirate and village cluster-wide service
- recommendable locations for intermediate, secondary, teacher training schools and agricultural uses, serving emirate and village cluster-wide population
- B for boys
- G for girls
- boys elementary school
- girls elementary school
- ◼ boys intermediate school
- ◼ girls intermediate school
- ◼ boys secondary school
- ◼ girls secondary school
- ◼ boys teacher training
- ◼ girls teacher training
- ⊙ elementary school service district
- 100 served population see FIGURE 3-4-2

Table 5-1-1
PROJECTED ELEMENTARY SCHOOL ENROLLMENT
NIMAS VILLAGE CLUSTER^a

	1975 ^b	1980	1985	1995
Village Group A				
Boys	208	238	262	306
Girls	-	238	262	306
Total	208	476	524	612
Village Group B				
Boys	447	454 ^c	462	622
Girls	350	391	462	622
Total	797	845	924	1,244
Village Group C				
Boys	121	140	152	178
Girls	70	140	152	178
Total	191	280	304	356
Village Cluster Total				
Boys	776	832	876	1,106
Girls	420	769	876	1,106
Total	1,196	1,601	1,752	2,212

Notes:

- Derived from Table 3-1-2. See Appendix, Sec. A-1-3.
- Existing enrollment, obtained from interviews of school superintendents, Nimas Village Cluster, See Sec. 2-9.
- For transition to stabilized growth, the projected enrollment is assumed to be the average of 1975 and 1985 figures.

Table 5-1-2
SCHOOL DISTRICTS, 1995
NIMAS VILLAGE CLUSTER

Village Group	School District ^a	Villages	1995 Population ^b
A	A-1	Al Salamah, Bani Rawk, Al'Ali, Al Zaynab	1,600
A	A-2	Al Rzayq, Ma'awad, H.adab, Shukan, Al T. araf, Al'Amir	1,620
B	B-1	Al Bada1, Nih, Nimas (South)	2,000
B	B-2	H.arqah, Al H.abaybah, Jahwah	1,000
B	B-3	Bazwah, Al Shaykh, Al Mala'ib, Al Maghzi, Manzil	900
B	B-4	Nimas (North), including new development areas	2,650
C	C-1	Al Shanduf, Al Khanfus, AlJid'a, Al Barqan, Al H.asan, Al Hayah, Al Fuways	1,870
Total			11,640

Notes:

- Each school district has a pair of schools, one for boys and one for girls.
- From Table 3-1-2.

Table 5-1-3
PROGRAM AND LAND REQUIREMENTS FOR
ELEMENTARY SCHOOLS IN NIMAS VILLAGE CLUSTER, 1995

School District	School ^a	Enrollment ^b	Land Requirement (ha)		
			Building & Courts	Play-ground ^d	Total
A-1	Boys	152	0.22	0.30	0.52
A-1	Girls	152	0.22	0.23	0.45
A-2	Boys	154	0.22	0.31	0.53
A-2	Girls	154	0.22	0.23	0.45
B-1	Boys	190	0.27	0.38	0.65
B-1	Girls	190	0.27	0.29	0.56
B-2	Boys	95	0.15	0.19	0.34
B-2	Girls	95	0.15	0.14	0.29
B-3	Boys	85	0.14	0.17	0.31
B-3	Girls	85	0.14	0.13	0.27
B-4	Boys	252	0.34	0.50	0.84
B-4	Girls	252	0.34	0.38	0.72
C-1	Boys	178	0.25	0.36	0.61
C-1	Girls	178	0.25	0.27	0.52
Total	14 Schools	2,212	3.18	3.88	7.06

Notes:

- See Table 5-1-4 for relationship with existing schools.
- 9.5% of total population is assumed to be enrolled in boys elementary schools; 9.5% for girls. See Appendix, Planning Standards, Sec. A-1-3.
- 400 m² plus 12m²/student. See Sec. A-2-1-2. These figures do not include playgrounds.
- 20 m²/elementary boy student and 15 m²/elementary girl student. See Sec. A-2-2-4.

Table 5-1-4
REMARKS ON PROGRAM FOR ELEMENTARY SCHOOLS
NIMAS VILLAGE CLUSTER

School District	School	Remark
A-1	Boys	Existing Bani-Rawk School to be expanded and improved.
A-1	Girls	To be constructed.
A-2	Boys	Existing Mohamed Abdul Wahab School to be expanded and improved.
A-2	Girls	To be constructed.
B-1	Boys	Existing Saudia School to be maintained. Because of new construction and improvement of schools in the surrounding areas, fewer enrollment is expected in this school in 1995 than in 1975.
B-1	Girls	A new school to be constructed east of Route 54. Existing girls elementary school should be converted to an intermediate or a secondary school.
B-2	Boys	Existing Al-Khalidiah School to be improved. Because of the proposed construction of a boys elementary school in district B-4, where students now attend Al Khalidiah School, the enrollment at this school will be reduced during the next twenty years.
B-2	Girls	To be constructed.
B-3	Boys	Existing Bani Qusheer School to be improved.
B-3	Girls	To be constructed.
B-4	Boys	To be constructed in order to serve the population projected for settlement in this area.
B-4	Girls	To be constructed.
C-1	Boys	Existing Nahiyah School to be improved.
C-1	Girls	Existing school to be replaced by a new school to be constructed 200 m northwest of the present location.

3. Physical Education. In all schools, physical education programs should be improved, and appropriate facilities provided.
4. Safe Commuting. There should be safe and easy access in all school districts. Within each district, access to school should be integrated with the overall pedestrian network.

Based on the forgoing considerations and on the existing distribution of facilities, it is proposed that the Nimas Village Cluster be sub-divided into 7 school districts, as indicated in Table 5-1-2. These districts generally conform with the service areas of existing schools, while providing for expected increases in population by 1995. Each district should have a pair of schools, one for boys and one for girls, and each school should be equipped with its own playground.

Applying the standards indicated in the Appendix, the estimates for land area requirements have been derived in Table 5-1-3. It should be noted that the enrollments vary among the various schools in order to provide acceptable walking distances as well as to avoid conflict with the existing schools.

Of the 14 schools projected for 1995, 8 schools must be constructed during the planning period, while 6 of the existing schools will be modified and maintained. A detailed discussion is presented in Table 5-1-4.

5-2 INTERMEDIATE AND SECONDARY SCHOOLS

5-2-1 APPRAISAL OF EXISTING CONDITIONS

Enrollment:

1. Boys Intermediate. The boys intermediate school students come from all over the Nimas Emirate. Currently, there are 263 students enrolled in the intermediate school building, 31 students at Saudia School, and approximately 90 students (3 classes) at the new Alcsir Intermediate School-- totaling approximately 380 students. Since there are $24,200 \times 3.75\% = 900$ boys of intermediate school age, the current enrollment may be estimated to be $380/900 = 40\%$.
2. Girls Intermediate. There are at present 100 students enrolled in the girls intermediate school. The students come from a service area wider than the Emirate. As in the case of boys, there are $24,200 \times 3.75\% = 900$ girls of intermediate school age, which implies an enrollment rate of less than 10%.

3. Boys Secondary. There are 200 students enrolled in the present Nimas secondary school. The students come from a service area greater than the Emirate. Since there are an estimated $24,200 \times 3.75\% = 900$ boys of secondary school age in Nimas Emirate alone, the current enrollment is less than 20%.
4. Girls Secondary. At present, 31 girls attend the girls secondary school, but they are all enrolled in a teacher training program. There are no students in general, secondary education.

Location of facilities:

1. Boys Intermediate. Present location is adequate for future expansion. Although the wide spread distribution of population makes it necessary for many students to arrive by bus or car, there is currently an inadequate vehicular access to the school especially from the major highway of Route 54. The present location is nevertheless desirable for two reasons:
 - a. The location is central yet not identified with any one village.
 - b. The site is on an elevated land surrounded by non-agricultural land.
2. Girls Intermediate. Although the existing school is located west of the regional highway Route 54, there is no major access difficulty, since the large service area makes it necessary for most students to rely on vehicular transportation. In the future, however, girls intermediate schools will primarily serve the local population, and the present access system must be reconsidered--that is, an underpath or an overpath must be provided.
3. Boys Secondary. The existing secondary school has an inadequate access. The access road is not wide enough, and there is a lack of parking spaces. It is recommended that a new school be constructed at a location which is accessible from Route 54 (hence from the Emirate-wide service population) and which can easily accommodate expansion as well as a large playfield.
4. Girls Secondary. Currently, the girls intermediate and secondary schools are housed in a single building. This arrangement is adequate for the time being, since there are relatively a small number of students enrolled. It is proposed, however, that a new girls secondary school be constructed prior to 1995, when the enrollment of the intermediate school will be approximately 700, and that of the secondary school, approximately 350 (See Sec. 5-2-3).

Facilities:

1. Boys Intermediate. By 1995, the composition of the current enrollment of 263 Emirate-wide students will be replaced by a 100% enrollment of 437 students from only the Nimas Village Cluster (See Table 5-2-1). Thus the existing building must be expanded or a new building constructed. The playfield is not large enough to adequately serve the existing enrollment and should be expanded. If a new building is to be constructed, it is proposed that the existing structure should be maintained and converted for use as a secondary or a teacher training school.
2. Boys Secondary. The existing facility is inadequate in size as well as quality, and a new facility is required. In case a new intermediate school is to be built, the existing intermediate school may be converted to a secondary school. The present playfield is inadequate. A new location with sufficient land area should be found.
3. Girls Intermediate and Secondary. The existing structure may continue to be used as a combined intermediate and secondary school until the enrollment becomes large enough to justify separate schools. As indicated in Sec. 5-1-2, the elementary school should be relocated east of Route 54. The existing building is large enough to accommodate either an intermediate or a secondary school in 1995. Thus a new building must be built by 1995.

5-2-2 GOALS, PROGRAM AND POLICY FOR INTERMEDIATE AND SECONDARY SCHOOLS

The target rates of enrollment assumed for this report are 100% for boys and girls intermediate schools, 50% for boys secondary school, and 25% for girls secondary school. There should be a pair (boys and girls) of intermediate schools in all the Village Clusters in the Nimas Emirate, eliminating the need for transporting intermediate school students from one Village Cluster to another. The service area of the secondary schools, however, will continue to be the entire Emirate.

The share of population 10 to 19 years old is assumed to vary between 2 and 3% per age [1]. The total share of intermediate school children, including boys and girls, is therefore between 6 and 9% of total population, or an average of 7.5%. Assuming equal numbers of boys and girls, the share of boys or girls intermediate school children is 3.75%. Similarly, the share of boys or girls secondary school children is also 3.75%.

The specific assumptions used to devise the program and land requirements in 1995 are summarized below:

1. Boys Intermediate.
 - a. Service Area. The service area is limited to the Nimas Village Cluster, with an estimated population of 11,640 in 1995. Service radius is approximately 4 km (10 minutes by bus). If properly located, more than 50% of the students will be living within a walking distance to school (i.e., within 2 km or 30 minutes walking).
 - b. Enrollment. It is assumed that 100% of the age group is enrolled; that is, 3.75% of the total population is enrolled. Given the estimated Village Cluster population of 11,640, enrollment in 1995 is projected to be 440.
 - c. Land Area Requirement. $20 \text{ m}^2/\text{student}$ is recommended for the building and its immediate surrounding area. $20 \text{ m}^2/\text{student} \times 440 \text{ students} = 0.9 \text{ ha}$ is required for the Nimas Village Cluster boys intermediate school in 1995. In addition, a playfield must be added to this area.
 - d. Playfield Area. $30 \text{ m}^2/\text{student}$ is recommended, resulting in $30 \text{ m}^2/\text{student} \times 440 \text{ students} = 1.3 \text{ ha}$ of playfield. If the boys intermediate school is located in the vicinity of a secondary school or other higher or special educational facilities, the playfield area may be shared by the adjacent schools and the standards modified (See program for Boys Educational Center).
2. Girls Intermediate. Items 'a' through 'c' above may be applied also to girls intermediate education. For girls playfield, however, $20 \text{ m}^2/\text{student}$ is recommended, resulting in $20 \text{ m}^2/\text{student} \times 440 \text{ students} = 0.9 \text{ ha}$ of playfield. If the girls intermediate school is located in the vicinity of a girls secondary or higher or special educational facility, then the playfield requirement may be reduced. (See Girls Educational Center program).
3. Boys Secondary.
 - a. Service Area. The service area of the boys secondary school is the entire Nimas Emirate, which will have a population of 37,800 by 1995. Thus, although the school is located in the Nimas Village Cluster, it will serve a population located outside the Village Cluster. Service radius will be approximately 13 km, or 20 to 30 minutes distance by bus.
 - b. Enrollment. It is estimated that, by 1995, 50% of the age group will be enrolled and, therefore, 15% to 2.25% (say 1.88%) of the total population will be enrolled in

- the school (See Appendix Planning Standards). Since the total population in the service area is 37,800, the enrollment will be 710 ($37,800 \times 0.0188$, the enrollment will be 710 ($37,800 \times 0.0188 = 710$).
- c. Land Area Requirement. $25 \text{ m}^2/\text{student} \times 710 \text{ students} = 1.8 \text{ ha}$. Area for playfield is needed in addition to this. (See Appendix, Planning Standards).
- d. Playfield. $50 \text{ m}^2/\text{student}$ is recommended. If the secondary school is located close to an intermediate school or higher special educational facilities, standards may be reduced. (See Boys Educational Center Program.)

4. Girls Secondary.

- a. Service Area. Nimas Emirate with estimated 1995 population of 37,800. Although the school will be located in the Nimas Village Cluster, it will serve a population beyond this geographical area. The entire emirate will be served by one school. The service radius, therefore, will be about 13 km, or 20 to 30 minutes distance by bus.
- b. Enrollment. It is estimated that by 1995, 25% of the girls in the age group will attend the secondary school. Therefore, 0.75% to 1.125% (say 0.94% average) of the total population will be enrolled in the school (See Planning Standard in Appendix
- c. Land area requirement. $25 \text{ m}^2/\text{student} \times 360 \text{ students} = 0.9 \text{ ha}$. Area for playfield is not included in this 0.9 ha.
- d. Playfield. $40 \text{ m}^2/\text{student}$ is recommended. If combined with an intermediate school or a higher or special educational facility, the area standard may be reduced. (see Girls Educational Center program.)

5-3 HIGHER AND SPECIAL EDUCATIONAL FACILITIES

5-3-1 APPRAISAL OF EXISTING CONDITIONS

Enrollment:

- Boys Teacher Training Institute. There are at present 355 students in 13 classes, with a history of rapid growth in recent years. It is estimated that there will be 17 classes in 1978.
- Girls Teacher Training Institute. 31 students are now enrolled in teacher training programs

Table 5-2-1
PROJECTED INTERMEDIATE AND SECONDARY
SCHOOL ENROLLMENT, NIMAS VILLAGE CLUSTER

	1975 ^a	1980	1985	1995
Boys Intermediate ^b	294 ^e	300	350	440
Girls Intermediate ^b	100	180 ^g	270 ^g	440
Boys Secondary ^c	200	330 ^g	460 ^g	710
Girls Secondary ^d	-f	90 ^g	180 ^g	360

Notes:

- Existing enrollments obtained from interviews of school superintendents.
- Projections are based on 100% enrollment, 3.75% share of intermediate school age children out of projected total population, and serving only the Nimas Village Cluster.
- Projections are based on 50% enrollment, 3.75% share of secondary school age children out of projected total population, and a service area encompassing the entire Nimas Emirate.
- Same as note 'c' above, but assuming 25% enrollment.
- Includes 263 students at the new intermediate school and 31 students at Saudia School, but does not include the new intermediate school at Aksir. (See Sec. 5-2-2).
- Since the students currently enrolled in girls secondary school are pursuing teacher training programs, it is assumed that there are presently no general secondary school students.
- Transitional periods assume proportional interpolations of existing enrollment and projected enrollment in 1995.

Table 5-2-2
PROGRAM AND LAND REQUIREMENTS FOR
INTERMEDIATE AND SECONDARY SCHOOLS, NIMAS VILLAGE CLUSTER, 1995^a

School	1995 Enrollment	Land Requirement (ha)		
		Building and Courts	Play- field	Total
Boys Intermediate	440	0.9	1.3	2.2
Girls Intermediate	440	0.9	0.9	1.8
Boys Secondary	710	1.8	3.6	5.4
Girls Secondary	360	0.9	1.4	2.3

Note:
a. See text. Sec. 5-2-2 for assumptions.

at the Nimas secondary school. If the goal is to be achieved, there must be a rapid expansion of the teacher training program.

3. Others. There is presently no technical school in Nimas. There are, however, adult education programs administered at the boys intermediate and secondary schools. 34 students are currently enrolled at the boys secondary school adult school.

Distribution of Facilities. It is assumed that there will be one boys and one girls teacher training institutes in 1995. During the initial transitional phase, the current programs will have a wider service area than the Nimas Emirate itself.

1. Boys Teacher Training Institute. The existing institute does not have sufficient space for access, expansion, or an appropriate playfield. It is proposed that there be a new teacher training institute to be located at a new Boys Educational Center.
2. Girls Teacher Training Institute. The location of the existing secondary school is adequate in terms of access and expansion.

Building and facilities for the boys teacher training institute. The existing structure suffers from lack of space as well as light. There is no room for teachers or special rooms for various activities. It is therefore recommended that the school be moved to a more spacious site with improved access, and a new building should be built according to specifications by the Ministry of Education

5-3-2 PROJECTED ENROLLMENT

Teacher Training Institutes. The current student/teacher ratios in the Nimas elementary schools are 18.0 students/teacher for boys and 19.0 students/teacher for girls, a reflection of the strong commitment to elementary education in the Emirate. As both the school age population and the enrollment rates increase, however, a student/teacher ratio of 20 is appropriate for future projection. Therefore, for a projected boys elementary school enrollment of 3,600 students across the entire Emirate, $3,600/20 = 180$ elementary school teachers will be required, and similarly for girls (see Table 5-3-1). It is recommended that the teacher training institutes be equipped to provide all of these teachers locally. It is further assumed that of the graduating class from an institute, approximately one-third will elect to remain and teach in the elementary schools of the Emirate and that the average stay of a new teacher is three years. The 1995 re-

quired enrollment for boys teachers training institute is $180 \times 3 \times 3 \times 3 = 540$ students. Similarly, the required enrollment for girls is also 540 students.

Technical Schools. It is assumed that some 10% of the secondary school age boys will attend a technical school and 5% of the girls. The expected enrollments in 1995 are therefore $37,800 \times 3.75\% \times 10\% = 140$ students (boys) and $37,800 \times 3.75\% \times 5\% = 70$ students (girls).

5-3-3 GOALS, PROGRAM AND POLICY FOR HIGHER AND SPECIAL EDUCATION

Enrollment:

1. Teacher Training Institutes. In the long run, there should be a sufficient number of teachers trained in Nimas to staff all the elementary schools of the Nimas Emirate.
2. Boys and Girls Technical Schools. Of particular concern to Nimas is the development of technical schools concentrating on agriculture and agro-industry.

Distribution of schools. In order to take advantage of shared facilities, playfields, and appropriate access, it is proposed that there be Boys and Girls Educational Centers. Such a center will incorporate the intermediate, the secondary, as well as the higher and special schools. Specific programs are indicated in Tables 5-3-3 and 5-3-4.

The following is a summary of locational policies for an Educational Center:

1. The site should have ample non-agricultural land, relatively flat and free from large boulders.
2. The site should not be located too close to existing agricultural villages.
3. The site should be easily accessible both for pedestrian commuters in the Village Cluster and for vehicle commuters in the Nimas Emirate.
4. The site should be near an existing school in order to facilitate development and transition.

In order to avoid excessive noise and interference between schools in an Educational Center, it is suggested that clear separations be made between two different facilities. The benefits of establishing an organized community of schools, however, will exceed any potentially negative impacts.

5-3-4 AGRICULTURAL RESEARCH

Although there is not sufficient population in the Nimas Emirate to justify an independent agricultural college, the natural advantages of the Asir Highlands should be intensively studied by a research station with experimental farms. Such a

Table 5-3-1
1995 PROJECTED NUMBERS OF STUDENTS AND TEACHERS IN
ELEMENTARY SCHOOLS LOCATED IN NIMAS EMIRATE

	Enrollment	Number of Teachers
Boys Elementary Schools	3,610 ^a	180 ^b
Girls " "	3,610 ^a	180 ^b

Notes:

- a. The projected population of the Nimas Emirate in 1995 is 37,800; the ratio of boys or girls elementary school students to total population is 9.5% (see Planning Standards). $37,800 \times 9.5\% = 3,600$.
- b. At present there are 43 teachers for 776 students in Nimas Village Cluster. (i.e. 18.0 student/teacher). $3610/20=180$.
- c. At present, there are 22 teachers for 420 students in schools in Nimas Village Cluster. (School in Nimas Village and Nahiyah School), i.e. 19 students/teachers. 20 students/teacher is assumed for 1995 girls elementary schools.

Table 5-3-2
PROGRAM AND LAND REQUIREMENTS FOR HIGHER
AND SPECIAL EDUCATIONAL FACILITIES, NIMAS VILLAGE CLUSTER, 1995

School ^a	1995 Enrollment	Land Requirement (ha)		
		Building & Courts ^b	Play-field ^c	Total
Boys Teacher Training Institute	540 ^d	1.6	1.6	3.2
Girls Teacher Training Institute	540 ^d	1.6	1.1	2.7
Boys Technical School	140 ^e	0.4 ^g	-	0.4
Girls Technical School	70 ^f	0.2 ^g	-	0.2

Notes:

- The service area for all these schools is the Nimas Emirate, with a projected 1995 population of 37,800.
- Ministry of Education Standards recommend 100 m X 100 m = 1.0 ha. 30 m²/student is recommended by the Consultant. 540 students X 30 m²/student = 1.6 ha.
- These land areas are recommended with the assumption that the teacher training institutes will be located in the appropriate Educational Centers (see Tables 5-3-3 and 5-3-4). If the institutes are to be built separately, the following standards are recommended: 30 m²/student for boys and 20 m²/student for girls.
- See text for the assumptions underlying the projected institute enrollment.
- 20% of boys in the age group 15, 16, and 17 are assumed to be enrolled.
- 10% of girls in the age group 15, 16, and 17 are assumed to be enrolled.
- 30 m²/student is assumed. Ministry of Education standards recommend a minimum of 5,600 m². It is felt that for the girls technical school, 2000 m² will suffice, especially if the school is to be located in the proposed Educational Center.

Table 5-3-3
PROGRAM FOR BOYS EDUCATIONAL CENTER

School	1995 Enrollment	Land Requirement (ha)			
		Building & Courts	Play-field ^a	Shared Playfield ^b	Other Common Areas ^c
Boys Intermediate School	440	0.9	0.7		
Boys Secondary School	710	1.8	1.8	1.65	1.65
Boys Teacher Training Institute	540	1.6	0.8		
Boys Technical School	140	0.4	-		
Sub-Total	1,830	4.7	3.3	1.65	1.65
Grand Total	1,830			11.3	

Notes:

- 50% of the playfield requirements of an individual school are assumed for exclusive use by the school.
- 25% of the playfield requirements are pooled together to create playfields for use by all the schools.
- The remaining 25% of the playfield requirements are assumed for buffers, landscaping, and other common areas not used as playfields.

Table 5-3-4
PROGRAM FOR GIRLS EDUCATIONAL CENTER

School	1995 Enrollment	Land Requirement (ha)			
		Building & Courts	Play-field ^a	Shared Playfield ^b	Other Common Areas ^c
Girls Intermediate School	440	0.9	0.45		
Girls Secondary School	360	0.9	0.7		
Girls Teacher Training Institute	540	1.6	0.55	0.85	0.85
Girls Technical School	70	0.2	-		
Sub-Total	1,410	3.6	1.7	0.85	0.85
Grand Total	1,410		7.0		

Notes:

- 50% of the playfield requirements of an individual school are assumed for exclusive use by the school.
- 25% of the playfield requirements are pooled together to create playfields for use by all the schools.
- The remaining 25% of the playfield requirements are assumed for buffers, landscaping, and other common areas not used as playfields.

research station may be established as a branch of a university at Abha or Jeddah and as local center for agricultural instruction. Technical schools and adult education programs should incorporate classes in improved knowledge and techniques in agriculture.

5-4 NURSERIES AND KINDERGARTENS

5-4-1 APPRAISAL OF EXISTING CONDITIONS

Currently there are no facilities specifically devoted to care of children below the elementary school age. However, the social significance of the mosque, the well-developed network of pedestrian circulation, the intimate scale of village buildings, and the traditional commitment to education in Nimas all present an ideal setting for the establishment of an organized network of nurseries and kindergartens.

5-4-2 GOALS, PROGRAM, AND POLICY

There are several reasons for considering the establishment of pre-elementary school care facilities:

- It may be assumed that the current high birth rates in the rural areas of the Southern Region will remain relatively constant during the planning period. At the same time, improved nutrition and delivery of medical care will significantly decrease infant mortality as well as death rates in general.
- Evolving social customs will induce more women to seek active work outside the home, creating a need for public care of young children.
- Adjustment to a rapid pace of modernization which is now taking place in the Kingdom will necessitate a comprehensive educational program, and infant care is a vital component of training and socialization.

In order to provide an appropriate program for nurseries and kindergartens, the Planning Standards include a recommendation for enrollment of between 25% and 50% of ages 3,4, and 5. Since 9 to 12% of the total population belong to this age group, the projected enrollment will be from 2.25 to 6% of the total population [2]. For planning purposes, the mean of 4.125% will be assumed.

The recommended size of service population is approximately 500, and the recommended enrollment per school is approximately 20 children. The suggested service radius is 600 meters. The new development area in the western section of the

Table 5-4-1
1995 PROGRAM FOR NURSERIES AND KINDERGARTENS
NIMAS VILLAGE CLUSTER

Village Group	1995 Population	1995 Enrollment ^a	Recommended Number of Facilities ^b	Total Land Requirement ^c
A	3,220	130	6	1.3
B	6,550	270	10	2.1
C	1,870	80	3	0.6
Total	11,640	480	19	4.0

Notes:

- 4.125% of total population is assumed to be enrolled. See Text.
- The number of facilities is derived from a service population of 500, service radius of 600 meters, and recommended enrollment of around 20 children. The enrollment sizes of facilities in Village Group B are somewhat larger due to a higher residential density.
- For building site area, 5 m²/child is recommended. In addition, a playlot of 1,000 m² to 3,000 m² per facility (mean of 2,000 m²/facility) adjacent to the facility is recommended.

Village of Nimas will be more densely populated than other agricultural villages. Hence the area defined by the suggested service radius will include a greater population than the normal agricultural village, and a fewer number of facilities will be required.

The projections based on the above program are summarized in Table 5-4-1, and the suggested distribution of facilities and service areas are indicated in Figure 5-1

5-5 HEALTH CARE FACILITIES

5-5-1 APPRAISAL OF EXISTING CONDITION

Health care in Nimas is handled by a small dispensary located north of the new extension road to government facilities. There is at present no hospital, and patients requiring more than routine treatment are sent to Jeddah or Abha. Plans have been made, however, to construct a general hospital containing 50 to 100 beds and located immediately north of the new government facilities area.

5-5-2 GENERAL GOALS FOR DELIVERY OF HEALTH CARE

It is recommended that future health care needs be met by a four-level system of health care facilities, to be distributed according to the hierarchy of village organization:

Service Area	Facility
Village Group or Sub-Group	Pharmacy
Village Cluster	Diagnosis and Treatment Facility
Emirate	General and Special Hospitals

In addition, it is recommended that a mobile health care unit may be associated with the general hospital and staffed by a physician or paramedical personnel. Such a unit should be the primary instrument of emergency health care in the remote areas of the Emirate.

5-5-3 PROGRAM AND POLICY

For the Nimas Village Cluster, it is recommended that a pharmacy be established in each elementary school district. This is to insure that minimum health supplies and information will be available within walking distance of all the villages. The diagnosis and treatment center may be associated with the proposed general hospital and may substitute as the hospital's out-patient clinic.

Table 5-5-1
PROJECTED HEALTH CARE FACILITIES AND AREA REQUIREMENTS
NIMAS VILLAGE CLUSTER

Facility	1975		1980		1985		1995	
	No. of Land	Facilities (ha)	No. of Land	Facilities (ha)	No. of Land	Facilities (ha)	No. of Land	Facilities (ha)
Pharmacy ^a	1	0.1	3	0.3	3	0.3	3	0.3
Diagnosis and Treatment Center ^b	-	-	1	0.2	1	0.3	1	0.3
General Hospital ^c	-	-	1	3.0	1	3.0	1	3.0
Special Hospital and Nursing Home ^d	-	-			1	3.6	1	4.5

Notes:

- There should be one pharmacy for each school district by 1995. Land area requirement is 0.1 ha per facility.
- There should be a Village Cluster diagnosis and treatment center associated with the proposed general hospital land area requirement is 0.3m²/inhabitant.
- A general hospital was originally planned to be located immediately north of the new public administration area. Although the proposed site area of 3.0 ha is larger than the minimum recommended area of 2.0 ha, it is assumed that the new site will be the same size.
- Land area requirement is estimated to be 1.0 m²/inhabitant for a mental or a long-term hospital and 0.2 m²/inhabitant for a nursing home. Although the projected Emirate population is used for computational purposes, the actual service area is greater than the Emirate. See Appendix, Sec. A-2-5-4, and text.

5-6 MOSQUES AND CEMETERIES

Mosques play a significant role in the life of the Village Cluster. There is at least one mosque in every village, and the frequent gathering of the villagers for religious activities makes it the natural focal point of the village life.

Two types of mosques will be required in the Village Cluster:

- Mosques to serve the villages and village groups, and
- A Jami'a mosque for the Village Cluster as a whole.

The existing mosques in the villages are located at proper walking distances from the service population, and apart from rehabilitation, no new mosques are required. On the other hand, although at present a recently constructed mosque north of the old village of Nimas serves the entire Village Cluster, it is recommended that a larger Jami'a mosque be constructed near the central area as proposed in this report. The required land area for such a mosque is between 0.6 ha and 0.8 ha.

Cemeteries have traditionally not required land use planning, but this will change as urban development causes more intense use of the land. There are now six cemeteries in the Nimas Village Cluster totaling approximately 3 ha. By 1995, an additional 2 to 3 ha are likely to be needed, based on population projections.

5-7 HISTORICAL CONSERVATION

Nimas has many fine sturdy buildings and houses built of traditional stone construction. It is desirable that they be maintained, since:






- They represent a significant aspect of traditional life in the Southern Region.
- They have been well developed over time to meet needs according to climate and use.
- Rehabilitation and upgrading of old buildings is less expensive than tearing them down and building new ones.
- They can be built of locally available materials with labor, while "Western" style buildings require important materials and different skills.

Among the actions that can be taken to protect and conserve this architectural heritage are:

- Establishing a system of incentives through tax subsidies to encourage maintenance and upgrading of existing buildings.

FIGURE 5-2
 POTENTIAL CENTER
 FOR ADMINISTRATIVE,
 SOCIAL AND
 COMMUNITY
 ACTIVITIES

scale 1:20,000

-  access for emirate-wide social and community services
-  access for village cluster-wide social and community services
-  available land for future development located in the center of population distribution and administrative control
-  potential land for future development-moderate development potentials
-  recommendable area including administrative social and community center
- 1** presently proposed area including emirate and village cluster-wide service, see FIGURE 2-13
- 2** area for village cluster-wide service (suggested for general hospital)
- 3** area with emirate and village cluster-wide convenient traffic access (suggested "community" center)

2. Establish a policy by the government to rehabilitate existing buildings and re-use them whenever possible, rather than construct new buildings.
3. Establish a system of zoning and land use regulations which will protect and preserve such buildings.
4. Establishing a comprehensive plan to rehabilitate and re-use the existing housing clusters. For a more complete discussion of rehabilitation and conservation policy, see Sec. 3-4.

5-8 PUBLIC ADMINISTRATION FACILITIES

The Ministry is currently implementing a plan to create an integrated center for governmental buildings in the Nimas Village Cluster. Some of the major facilities included in the center are new offices for the Emir and the Municipality and branch offices of various Ministries based in Rigadh. Also planned for construction are community services such as police and fire station, civil defense, post office, et.

The gross site area of the new center for government facilities is approximately 13 ha, including parking areas. This is more than adequate for major public administration facilities required in the foreseeable future.

The road plan as presently conceived, however, presents a severe grade problem at the northeast corner of the site. It is therefore recommended that the road at the eastern boundary of the site be re-aligned to conform more closely to the natural terrain (See Figure 2-13-2). Such a re-alignment will necessitate a reconsideration of the locations for the Girls Presidency, the post office, and potentially the group of three buildings intended for occupation by civil defense, general intelligence, and passports and nationality.

5-9 COMMERCIAL FACILITIES

5-9-1 APPRAISAL OF EXISTING CONDITIONS

At present there are more than 60 permanent shops in the Nimas Village Cluster, providing foodstuff, clothes, hardware, and other daily necessities. Approximately 30 temporary stalls are opened at the Nimas Suq, or market, on Tuesdays. There are also some 20 wholesalers in the Nimas area.

5-9-2 PROJECTED INCREASE IN COMMERCIAL FACILITIES

Most of the commercial activities are located around the suq adjacent to the Village of Nimas. The others are scattered on either side of Route 54 (See Figure 2-8-1).

- For planning purposes, three different types of commercial activities are identified:
1. Village group shopping area, incorporating food and dry goods stores, to serve the population of the village group.
 2. Village cluster shopping area, incorporating shops which rely on a larger market than the village group and providing such items as shoes, clothing, and books.
 3. Emirate or sub-regional shopping area, to serve the population within the Emirate.

Standards have been derived in the Appendix to estimate the land area requirements from projected growths in population. The estimates are summarized in Table 5-9-1.

5-9-3 POLICY FOR COMMERCIAL FACILITIES

Among the objectives to be met for the planning of commercial development are:













1. maximizing the efficiency of commercial exchanges;
2. maximizing the efficiency of transportation of goods into and from the suq, and the convenience of the consumer;
3. protecting adjacent neighborhoods from intrusion of commercial activities;
4. establishing a hierarchical system of commercial facilities for convenience and efficiency.

Since the overall density of the Village Cluster is approximately 2 persons per hectare (pph) in 1975 and 4 pph in 1995, it is not possible to create a shopping facility within walking distance of every house. As an acceptable compromise, it is proposed that there be a small-scale, village group shopping area in Village Groups A and C, while the village group, the village cluster, and the Emirate shopping areas be combined to form a central commercial zone in Village Group B.

The central commercial zone would be directed to the full range of trade or service areas from the village to the Emirate and must be accessible both by neighboring pedestrians as well as by vehicles. Furthermore, in order to maintain the historical continuity of the existing suq, the central commercial area should be established as an extension of the suq.

FIGURE 5-3
 POTENTIAL CENTER
 FOR COMMERCIAL
 AND INDUSTRIAL
 ACTIVITY

scale 1:20,000

-  regional commodity flow
-  local product flow
-  daily shopping flow
-  existing commercial center
-  population centers supporting commercial activity
-  potential center of emirate and village cluster-wide commercial activity
-  potential center of village group-wide commercial activity
-  existing power plant
-  existing garbage disposal area for locational potentials refer to FIGURE 6-1
-  existing slaughter house is located approx. 4km south of Nimas Village (out of this map)
-  prevailing wind direction
-  potential land for agro-industry complex (including slaughter house)

MADRAN - SAUDI ARABIA



It is therefore recommended that the mix of vacant land and small farms immediately north of the suq and east of Route 54 be reserved for up to 2.8 ha of commercial use, with the completion of Route 54, since gasoline stands and shops have been established along the highway. Although such developments result naturally from high economic potential of increased access, it is recommended that future commercial developments directly fronting Route 54 be controlled in order to avoid an excessive dispersion of economic activities along the highway. In the vicinity of the Nimas Village Cluster, some of the land fronting the highway should be restrained from further construction of commercial facilities.

5-10 CENTERS FOR SOCIAL AND CULTURAL ACTIVITIES

5-10-1 PROGRAM FOR SOCIAL AND CULTURAL CENTERS

There are currently no public buildings specifically for non-religious social interactions, as in the case of health and commercial facilities, there should be a hierarchy of social and cultural centers, serving, at the smallest scale, Village Groups A and C, and, at the largest scale, Village Group B and wider service areas. The three levels of social centers are:

1. Village Group Social Center, containing offices for a village group association, responsible for the supervision and coordination of village group activities.
2. Village Cluster Community Center, for activities involving the village cluster population—meetings, ceremonies, adult education, among others—and for the offices of a community association.
3. Emirate Cultural Center, including a museum and auditorium for use by the population of the entire Emirate.

The detailed program for each center must evolve out of each social unit of village organization. For general land use planning, suggested area requirements are tabulated in Table 5-10-1.

5-10-2 LOCATIONAL POLICY

For optimum utilization of land and facilities, the village group and cluster's social and cultural activities should be located adjacent to a park and in relative proximity to a school.

Table 5-9-1
PROJECTED COMMERCIAL AREA REQUIREMENTS (HA)

Village Group	1975 ^a	1980	1985	1995
Village Group A				
Village Group Shopping Area ^b	-	0.8	0.8	1.0
Village Group B				
Village Group Shopping Area ^b	-	1.2	1.5	2.0
Village Cluster Shopping Area ^c	-	0.3	0.3	0.4
Emirate Shopping Area ^d	0.5	2.0	2.2	2.3
Village Group C				
Village Group Shopping Area ^b	-	0.4	0.5	0.6
Total	0.5	4.7	5.3	6.8

Notes:

- a. Currently, there is one suq in the Village of Nimas and a number of small shops located generally along Route 54. See Sec. 2-7.
- b. Land requirement is between 2 to 4 m²/inhabitant. There should be one shopping area for each school district, i.e. 7 such shopping areas should be established by 1995. See Appendix A-2-6-1.
- c. Land requirement of between 0.5 m² to 1.0 m²/inhabitant, including parking, is recommended. See Appendix, A-2-6-2.
- d. Land requirement of between 0.5 m² to 1.0 m²/inhabitant, including parking, is recommended. See Appendix, A-2-6-3.

In such a location, the site area requirements may be reduced, and the frequency of use increased, due to potential interaction of activities. The Emirate Cultural Center, on the otherhand, should be located in proximity to major public and commercial activities.

Table 5-10-1
PROJECTED LAND AREA REQUIREMENTS FOR
SOCIAL AND CULTURAL CENTERS

	1975	1980	1985	1995
Village Group A				
Village Group Social Center ^a	-	0.3	0.3	0.3
Village Group B				
Village Group Social Center ^a	-	0.5	0.5	0.5
Village Cluster Community Center ^b	-	0.6	0.6	0.6
Emirate Cultural Center ^c	-	1.9	1.9	1.9
Village Cluster C				
Village Group Social Center ^a	-	0.2	0.2	0.2
Total	-	3.5	3.5	3.5

Notes:

- Land requirement is between 0.2 ha and 0.5 ha (see Appendix, Sec. A-2-4-1). For a medium village group such as Village Group A, 0.3 ha is recommended. For a large village group such as Village Group B, 0.5 ha is recommended. For Village Group C, 0.2 ha is recommended.
- Land requirement is between 0.2 ha and 1.0 ha. 0.6 ha is recommended as an average. The Village Group B Social Center and the Village Cluster Social Center should be combined into one structure.
- Land requirement is 0.5 m²/inhabitant. For the 1995 projected Emirate population of 37,800, the recommended site area is 1.9 ha. It is assumed that a land of this size will be reserved by 1980.

5-11 EMIRATE SUB-CENTER

As described in the Alternative Strategies report, it is proposed that the Nimas Village Cluster be considered as the primary political, economic, and social center of the Nimas Emirate. However, since the Emirate spans an area extending more than 25 km along Route 54, and since there is already a moderate concentration of villages in the northern area of the Emirate, it has been recommended that a sub-center for the Emirate be established at Khadra.

5-12 SERVICE AND CULTURAL FACILITIES FOR NOMADS

As mentioned previously, 17% of the population of the Nimas Emirate are currently nomadic. The goal of the Government and an assumption of this plan is that many of these nomads will settle over the next 20 years. This trend toward settlement will be primarily a result of the desire for economic self-improvement. In order to facilitate this settlement it is necessary to provide three basic elements of life:

- Adequate housing (discussed in Section 3-5)
- Employment opportunities (discussed in Section 4-6)
- Service and Cultural facilities

Of the entire range of service and cultural facilities, two-primary education and health care facilities-must be specially considered for nomads.

Primary education is a crucial aspect of any nomadic settlement program. It is at this level that the basic skills for the transition from a nomadic lifestyle to a settled one must be taught.

The Badiya Bani Backle School for boys has been just recently opened at Al Farah. Its purpose is to provide elementary education for the children of Nomads. Currently such children live in nearby tents with their parents (or sometimes without their parents) and attend the school at times when it is in session. In the future as the Al Farah settlement program is further developed, a girls' school should be

added so that girls can be educated without having to travel to schools in other villages.

Beyond the level of primary education, it is expected that nomadic children will become assimilated into the general settled culture so that special educational facilities at the intermediate and secondary levels will not be needed.

Although no special separate facilities would be necessary, it is recommended that the secondary schools or technical training schools provide programs in technical skills and retraining for adult nomads who wish to obtain the skills necessary to find employment outside the agricultural sector.

The Government currently has plans to provide health care clinic facilities in the area of Al Farah to care for settled Nomads in this area. Such a program is sufficient for those nomads who choose to settle, but as was mentioned previously (Section 5-5-2) serious consideration should be given to establishment of a mobile health care unit not only to provide care for remote settlements of the Nimas Emirate but also to provide care for nomads who are not settled in nomadic settlement areas.

These two areas - primary education and health care - are essential services which must be provided to the Nomads of the Nimas Emirate.

In addition, since it is expected that the number of people leading a nomadic existence will continually decline over the next 20 years, it is recommended that a program of historical-cultural preservation and education be established in association with the Emirate Cultural Center (See Section 5-10-1) to ensure that the cultural history of the nomads be preserved.

6. policy for recreation and conservation

6-1 RECREATIONAL FACILITIES

6-1-1 APPRAISAL OF EXISTING FACILITIES

Currently, in the Nimas Village Cluster there are no organized, publicly supported areas for sports and recreation. Need for playgrounds is especially acute in the relatively built-up villages of the cluster and in the central area classified as Village Group B.

6-1-2 GENERAL POLICY FOR RECREATIONAL FACILITIES

It is recommended that a policy for recreational areas be established which includes the following elements:

1. Hierarchy of recreational areas. There should be a variety of recreational areas to meet the needs of the different segments of the Village Cluster population:
 - a. Tot-lots, for children of ages 2 to 5.
 - b. Nursery-Kindergarten playlot, for children of ages 3 to 5.
 - c. Village group park, for general recreation.
 - d. Playground, for elementary school athletics.
 - e. Village cluster park, for passive recreation.
 - f. Playfield, level I, for intermediate school athletics.
 - g. Playfield, level II, for secondary school athletics.
 - h. Emirate park, for general recreation and conservation.
2. Connected green spaces. The various playgrounds, playfields, and parks should form a connected network of green spaces.
3. Integration with pedestrian network. The connected green spaces should form an integral part of the overall network of pedestrian paths and rural roads.

For further discussion of planning standards of recreational land uses, see Appendix, Sec. A-2-2.

6-1-3 PROGRAM FOR TOT-LOTS

Main Function

Exterior play area is provided for infants, 2 to 5 years old, accompanied by supervising adults. The tot-lot also provides a place for socializing by parents.

Service Area and Population

Between 12% and 16% of total population is assumed to be in the 2 to 5 year old age group,

Locational Policy

with an average of 14%. In terms of site area, 500 m²/tot-lot is recommended.

Tot-lots should be located at the centers of a residential unit group with population of 100. It must be accessible on foot, but the actual location to be determined only by a detailed planning of each village.

6-1-4 PROGRAM FOR NURSERY-KINDERGARTEN PLAYLOT

Main Function

This facility provides an exterior play area for 3 to 5 year old children enrolled in nursery-kindergartens. The facility may also be used by lower-grade elementary school children during off-school hours and by infants in the surrounding area accompanied by supervising adults.

Service Area and Population

The primary service population are the children enrolled in the nearby nursery-kindergarten, typically 4.1% of the total population in the service area. The service area should contain approximately 500 people. A site area of 2,000 m²/lot is recommended.

Locational Policy

The play-lot should be located adjacent to or within the site for nursery-kindergarten. The facility should be connected to the pedestrian network and should not be directly exposed to automobile traffic.

6-1-5 PROGRAM FOR VILLAGE GROUP PARK

Main Function

This is an area for general recreation. The park is also intended to preserve the natural environment in a residential area and to connect the various small scale pedestrian activities within the village group.

Service Area and Population







Service population is the population of the village group, generally several thousand residents. One park is recommended for each village group. Recommended site area is 5 m²/inhabitant.

Locational Policy

Village group park should be located near the center of the village group to be served and along the pedestrian path which connects the various sub-areas (e.g., school districts) of the village group. It is recommended that the village group park not be an isolated, compact facility but a linear connector linking the

VIEW FROM A



-  grass, forest and rocky area
-  suitable land for large park space (moderate out-cropping hills)
-  existing sport field
-  regional and emirate-wide approach to Nimas
-  available land for development along arterial
-  population centers supplying labor for tourist activities

ARABIAN PENINSULA

FIGURE 6-1-1
APPRAISAL FOR
TOURISM AND
RECREATIONAL
ACTIVITY

scale 1:20,000

small-scale pedestrian activities such as totlots, playlots, nursery-kindergartens, elementary schools, and playgrounds. The network of existing foot-paths in the village group can form the major element of the village group park.

6-1-6 PROGRAM FOR PLAYGROUND

Main Function

This facility is intended for active play and athletic programs for children enrolled in the elementary school. During the off-school hours, other residents of the school district should have access to the facility.

Service Area and Population

The primary service population is the number of elementary school students enrolled. One playground is proposed for each boys or girls elementary school. The recommended areas are 20 m²/student for boys and 15 m²/student for girls. For a detailed tabulation of estimated enrollment and land requirement in each school district, see Table 5-1-3.

Locational Policy

The playground should be designed as an integral part of an elementary school or be located in convenient proximity to a school. The site should be connected to the school and the residential areas of the school district by pedestrian paths without crossing any major automobile traffic. It is recommended that the adult residents of the school district be allowed access to the playground and some support facilities during off-school hours.

6-1-7 PROGRAM FOR VILLAGE CLUSTER PARK

Main Function

This facility is intended for occasional passive recreation. It is not anticipated that every resident in the service area will use the facility on a daily basis. The park should be integrated with cultural and religious facilities and should be planned as a linear connector of village cluster or municipal center facilities located in the village cluster.

Service Area and Population

The service population is the population of the entire village cluster, projected to be 11,640 in 1995. At the recommended land area of 4 m²/inhabitant, the park will require some 4.7 ha.

Locational Policy

The park should be designed as an integrated, linear connector of built-up areas in the

Village Cluster. It forms the basic pedestrian network linking the Village Cluster and Municipal functions. Where the park comes in contact with an active central area, the park design should reflect the quality of an urban park, with extensive pavement and landscaping concentrated in a limited area.

6-1-8 PROGRAM FOR PLAYFIELD, LEVEL I

Main Function

This facility is intended for programmed athletic activities for a boys or a girls intermediate school. The grounds may also be used during off-school hours for practice and field games by the Village Cluster residents' sports club or team.

Service Area and Population

A pair of playfields, level I, is recommended for the pair of intermediate schools. The primary service population is the boys and girls intermediate school children; the secondary service population is the population of the Village Cluster

Locational Policy

The fields should be located close to the geographic center of the Village Cluster and in close proximity to the intermediate schools. Parking spaces should be provided for the adult users (10 to 20 spaces). For sports requiring relatively small spaces, such as tennis and basketball, game courts should be provided in standard dimensions. For sports requiring relatively large spaces, such as field and track, less than standard dimensions may be provided. Land requirements are 30 m²/student for boys and 20 m²/student for girls.

Playfield for boys must be separated from playfield for girls, due to local custom and regulation. Playfield, level I, for boys, however, may be combined with Playfield, level II, for boys, or be located adjacent to one another, if an intermediate school for boys and a secondary school for boys are located in close proximity to each other. Similar arrangements may be made for girls. In such cases, shared use of a combined field is possible and recommended, provided that a program of staggered use can be arranged.

6-1-9 PROGRAM FOR PLAY-FIELD, LEVEL II

Main Function This facility is intended for programmed athletic activities for a boys or a girls secondary school, or for a higher or special education. During off-school hours, the field may be used for practice or competition games by the Emirate sports clubs or teams.

Service Area and Population A pair of playfields is recommended for the pair of boys and girls secondary schools. The primary service population is the secondary school enrollment, which has been estimated to be 1.88% of total population for boys and 0.94% for girls. The secondary service population is the general community of the Emirate, including various sports clubs or teams.

Playfields with smaller land requirements are recommended for the pair of boys and girls teacher training institutes. The boys secondary school playfield, however, should be considered as the primary playfield for the Emirate.

Locational Policy The playfields, level II, should be located close to the geographic center of the Emirate and in close proximity to the secondary schools. Parking spaces should be provided for the adult users. Full-size, official dimensions for courts, track and field should be provided, together with simple outdoor seating. Official size swimming pool may also be provided.

As in the case of Playfield, Level I, the boys and girls facilities must be separated, but the different facilities for boys intermediate and secondary schools may be combined for greater efficiency; similarly for girls.

Table 6-1-1
PROGRAM AND LAND REQUIREMENTS FOR VILLAGE GROUP
RECREATIONAL FACILITIES, NIMAS VILLAGE CLUSTER, 1995

	Village Cluster A	Village Cluster B	Village Cluster C	Total
Planning Population	3,220	6,550	1,870	11,640
Tot-Lots				
Service Population	451	917	262	1,630
No. of Facilities	30	60	20	110
Total Area (ha)	1.5	3.0	1.0	5.5
Nursery-Kindergarten Playlot				
Service Population	133	271	77	481
No. of Facilities	6	10	3	19
Total Area (ha)	1.2	2.0	0.6	3.8
Village Group Park				
Service Population	3,220	6,550	1,870	11,640
No. of Facilities	1	1	1	3
Total Area (ha)	1.6	3.3	0.9	5.8
Playground (Boys)				
Service Population	306	622	178	1,106
No. of Facilities	2	4	1	7
Total Area (ha)	0.6	1.2	0.4	2.2
Playground (Girls)				
Service Population	306	622	178	1,106
No. of Facilities	2	4	1	7
Total Area (ha)	0.5	0.9	0.3	1.7
Total Area (ha)	5.4	10.4	3.2	19.0

6-1-10 PROGRAM FOR EMIRATE PARK

Main Function A relatively large park is recommended to accommodate weekend family recreation, and could include both passive and active recreation areas. Such a park could be an integral part of an Emirate cultural and religious center. If possible, historical districts and architecture could be included within both the physical and conceptual framework of this park.

Service Area and Population The service population of this park is the entire population of the Emirate, projected to be about 38,000 in 1995. An area of 4m² per inhabitant is recommended which would result in a park of 15.2 ha. Of course if suitable land were available, an even larger park could be considered.

Locational Policy The major portion of this park should be located within the area of the Nimas Village Cluster. It is recommended that it be located near the edge of the escarpment both because of the spectacular views (see Figure 6-1-1) and because at the escarpment edge valuable agricultural land can be avoided (see Figure 6-1-2).

6-1-11 NATIONAL PARK

Although specifics of a national park for this location are difficult without clear national objectives in this area, it can generally be said that some of the most beautiful scenery in the Kingdom is located along the Asir escarpment in the Southern Region which also enjoys the most temperate climate and rainfall in the country. The location of a national park somewhere along the edge of the escarpment would be a desirable long range objective of planning.

6-2 TOURISM

As a third order population center, the Nimas Village Cluster is one of the most prominent concentration of population along the Asir highlands between Abha and Taif, and with special development priorities targeted for this area will become even more important in future years. Already a suitable location for at least limited domestic tourism, this fact makes the Nimas Village Cluster even more appropriate for tourism development. As facilities become available, the Nimas area will become a stopping-off spot for travellers between Abha and Taif. Hotels and recreation facilities may appropriately be promoted for this reason.

Tourism development in Nimas must of course be examined from the point of view of larger coor-

Table 6-1-2
PROGRAM AND LAND REQUIREMENTS FOR VILLAGE CLUSTER AND EMIRATE RECREATIONAL FACILITIES, NIMAS VILLAGE CLUSTER, 1995

	1995 Service Population	Total Area (ha)
Village Cluster Park	11,640	4.7
Playfield, Level I (Boys)	437	1.3
Playfield, Level I (Girls)	437	0.9
Playfield, Level II (Boys)	714	3.6
Secondary School	540	1.6
Teacher Training Institute		
Playfield, Level II (Girls)	357	1.4
Secondary School	540	1.1
Teacher Training Institute		
Emirate Park	37,800	15.2
Total Area (ha)	-	29.8
Grand Total of All Recreational Facilities		48.8

VIEW FROM B



FIGURE 6-1-2
PARK AND
OPEN SPACE
NETWORK

scale 1:20,000

- 
-  class I agriculture land
 -  class II agriculture land
 -  grass, forest and rocky area
 -  existing main pedestrian network
 -  existing play field or educational facilities
 -  potential land for future development and surrounded by productive and natural green spaces presently where green is shortage
 -  proposed open space of school see: FIGURE 5-1-1
 -  proposed park see: FIGURE 6-1-1
 -  area where intensive development would be presented see: FIGURE 2-13-1
FIGURE 3-4-2
FIGURE 5-5-1
FIGURE 5-7-1
FIGURE 6-1-1
 -  recommendable open space network as green mall

PROPOSED - 1980

minated regional development of tourism. Already the city of Abha has been designated a potential location for tourism development and ambitious plans are going forward to locate a tourist development at Al Sawdah along the escarpment to the north of Abha.

In terms of comprehensive planning, it would seem to be best to limit substantial direct involvement in tourism development in the Nimas area until tourism in the area of Abha has been firmly established. At such time however, the Nimas area is eminently suitable for development of local tourism. In the meantime, much can be done to facilitate preparation for tourism development. The establishment of basic infrastructure systems, of an appropriate roadway network and of a comprehensive park and recreation plan such as has been recommended in this chapter will suitably

- a. the way for future development of expanded tourism activities. A program for the development of local tourism would include the following:
 - 1. Good and convenient transportation facilities, including air, bus, and auto transportation to Nimas as well as transportation within the Nimas area.
2. Development of potential attractions in a way that can easily accommodate tourists. Such attractions may include:
 - a. Sites of particular beauty such as scenic overlooks or forests.
 - b. Sites of geological interest.
 - c. Sites of historical interest.
 - d. Sites that demonstrate a particular area of Saudi Arabian life or culture.
3. General accommodations for travelers, such as:
 - a. Gasoline stations.
 - b. Repair and service facilities.
 - c. Convenience and comfort facilities.
 - d. Inexpensive restaurants, hotels, auto camps, and related accommodations.
4. Special facilities specifically oriented toward tourism and recreation, such as:
 - a. Hotels, motels, and resorts in the immediate area of tourist attractions.
 - b. Special recreational facilities such as swimming pools and sports arenas.
 - c. Special convenience or luxury features such as taxis and personal service.
5. Development of large-scale facilities such as a large park along the escarpment.
6. Development of a workforce with tourism-oriented skills.
7. Promotion and advertisement of tourism opportunities in the Southern Region via media in other parts of the Kingdom.

6-3 OPEN SPACE CONSERVATION

A program for the conservation of open space becomes a necessity when an area such as the Nimas Village Cluster begins to undergo rapid development. It can often be seen that lack of planning for such open space conservation can greatly diminish the environmental quality of areas with any amounts of population concentration.

Conservation plays many roles and may include many elements. For example:

1. Natural features
 - a. Wilderness and undeveloped land.
 - b. Land which is particularly sensitive or fragile.
 - c. Land for recreation.
 - d. Land reserved for special future uses.
 - e. Land to be kept undeveloped within urban areas such as parks and open space.
2. Man-made features
 - a. Sites of historical or archeological interest.
 - b. Sites which demonstrate distinctive features of culture or living style.
 - c. Land which is left undeveloped or underdeveloped to act as a buffer or protection to adjacent land.
 - d. Land which serves a special function, such as being allowed to lie fallow to "rest" from growing crops, prevent erosion, or increased run-off.

In the traditional agricultural system of land use, there has been a degree of selectivity. In the selection of sites for cultivation for example, the areas that were the most flat, or most fertile, or best provided with water were chosen and the rest left alone. In urban development, however, a much higher degree of intensity is expected.

It is also necessary to practice conservation to assist meeting other goals such as efficient water use and cultivation.

The policy for conservation should, at a minimum address the following:

1. Protection of environmentally sensitive land to avoid destruction or damage.
2. Maintenance of a balance in rural areas between lands under cultivation and those allowed to lie fallow.
3. Maintenance of a balance in urban areas to provide a minimal amount of park land and open space.
4. Awareness of the impact on the environment and ecological balance of major construction and land use projects.
5. Preservation and appropriate re-use of housing

and other man-made facilities built in a traditional style.

6-4 HISTORICAL CON-
SERVATION

Nimas has many fine sturdy buildings and houses built of traditional stone construction. It is desirable that they be maintained, since:

1. They represent a significant aspect of traditional life in the Southern Region.
2. They have been well developed over time to meet needs according to climate and use.
3. Rehabilitation and upgrading of old buildings is less expensive than tearing them down and building new ones.
4. They can be built of locally available materials with labor, while "Western" style buildings require imported materials and different skills.

Among the actions that can be taken to protect and conserve this architectural heritage are:

1. Establishing a system of incentives through subsidies to encourage maintenance and upgrading of existing buildings.
2. Establish a policy by the government to rehabilitate existing buildings and re-use them whenever possible, rather than construct new buildings.
3. Establish a system of zoning and land use regulations which will protect and preserve such buildings.
4. Establishing a comprehensive plan to rehabilitate and re-use the existing housing clusters. For a more complete discussion of rehabilitation and conservation policy, see Sec. 3-4.

1950

...

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7. policy for primary communication and transport

7-1 GENERAL

7-1-1 LOCATION

Of all the population center being studied by this consultant in the Southern Region, the village cluster is one of the two smallest with a total planned 1995 population of approximately 37,000 people. Located some 130 kilometers north of Abha along Highway 54, the region's main transport lifeline, this area can be expected to play an important role in the development of the Southern Region. Like Najran and Bishah, the village's main function is agricultural by nature; climate, soil and water availability all being favorable. Administrative functions, however, depend totally on Abha. Midway between Abha and Bishah, the village cluster may develop as a distribution center supplying commodities entering from Jizan and Jeddah to the many surrounding villages.

7-1-2 VILLAGE DEVELOPMENT

Expansion of the villages has been parallel to, but extending eastward from, Highway 54. Urban development between the present time and 1995 will spread throughout the area, but will be most significant in the new city center with the establishment of regional and agricultural centers. Trade, government offices and high density residences will dominate the central development while agriculture, light commercial activity and medium density residences will dominate development of other sectors. Educational facilities are projected to expand quite substantially. The village cluster has a potential to develop, relative to its present situation, faster than most other urban areas in the Southern Region. For this reason, the need for planning a safe and efficient transportation system is essential to insure the success of overall development expansion.

7-2 LAND USE/TRANSPORTATION STUDY

7-2-1 OBJECTIVES

The principal objectives of this study are:

1. To satisfy the long term travel demands of the village cluster through the establishment of an effective transportation system, and
2. To provide a practical basis for the phasing of construction relative to the expanding needs of the village cluster.

7-2-2 TRANSPORTATION PROCEDURE

The transportation planning procedure is based on the extension of present travel habits relative to known trends in national prosperity and vehicle ownership to project and predict future travel demands. Existing travel characteristics for the village cluster were derived from the analysis of data obtained from home interviews and roadside traffic surveys carried out in 1975 and basic information on land use, population and employment obtained from planning surveys. Based on the available data described above, the predicted total number of trips generated and attracted to each traffic zone of the village cluster is distributed and assigned to the road network. Thus, future highway requirements are determined and future demands for parking and terminal facilities are derived.

7-2-3 TRAFFIC PLANNING METHODOLOGY

Although a very detailed account of the traffic survey methodology would take far too much space to be presented here, a detailed and comprehensive survey was conducted which is outlined below.

1. Information gathering - the following classes of data were collected:
 - A. Socio Economic Survey. This information was gathered as a comprehensive sample survey and provided valuable background material applicable to both qualitative and quantitative interfacing with actual traffic data gathered in specific traffic surveys. In the course of the URTEC survey conducted by this consultant certain numbers of the population of the village cluster were interviewed in their homes, and were asked questions such as how many and what type of vehicles were owned or used by them, and for what purposes.
 - B. Manual Traffic Volume Counts. These data are of various types. Straightforward volume counts conducted at locations identified in the Existing Conditions report (Chap. 2). Such counts were conducted at strategic locations within the village cluster to determine both basic volume and turning movements of intra-city traffic, and were conducted at arterial highways leading from the village cluster to determine inter-city traffic movements. On the basis of these manual counts an accurate idea of straight line volume turning movements, intra- and inter-city volumes for the existing situation was determined (see Figs. 2-12-2 (a) and 2-12-2 (b)).
 - C. Manual Mode Counts. These counts were done independently of the survey, to establish

FIGURE 7-1-1
EVALUATION OF
ROAD CONDITIONS
AND POTENTIALS OF
INTENSIVELY
DEVELOPED LAND

scale 1:20,000

- existing road with enough width for vehicle flow
- most desirable main roads of existing T.P.O. project
- ① newly established road fitting topographic condition
- ② improvement of existing road
- ③ expansion in width of existing footpath
- existing road not having enough width for smooth vehicle flow
- - - - existing dirt road with difficulty of two way vehicle flow
- - - - existing footpath
- ▒ vacant or non-built-up lands at junctions of main roads having best development potential
- ▤ vacant or non-used lands with moderate out-croppings having moderate development potential



an accurate idea of actual mode use on the toads and to act as a general check of proportional information gathered in the household survey.

- D. Bypass or through Traffic Surveys. During field traffic counts, the ratio of through and non-through traffic was determined (see Fig. 2-12-2).
- E. Origin Destination Survey. Comprehensive origin-destination surveys were conducted by traffic engineering consultants to determine both locational and purpose parameters for trips. To show a complete set of locational origin-destination elements here would be overly complicated for the general level of this report. However, Nimas was divided into seven districts for planning puposes. Population, traffic generators and traffic routes were determined within and between these districts so that desire lines for 1995 traffic could be established.

The trips were distributed using the gravity method and trasportation planning techniques. This method uses distance as an inverse function of trip volume. Distance is stated in terms of travel time which is raised to exponential power to account for its restraining effect. The model can be stated as follows:

$$T_{ij} = \frac{T_i S_j / D_{ij}^n}{(S_x / D_{ix}^n)}$$

Where S_j = "attraction" factor at j

S_x = "attration" factor at any zone x .

D_{ij} = distance or travel time from i to j

D_{ix} = distance or travel time from i to any zone x .

n = friction exponent or restraining influence.

The "attraction" factor may be expressed in any meaningful way. For example, the logical measure of attraction for work trips would be the number of jobs in the zone.

When the number of trips between pairs of zones have been calculated they were assigned to routes of the appropriate transportation network using minimum friction path method. Resistance to travel was measured in units of time.

A computer evaluation based on iterative procedures was conducted with certain established parameters held constant. Based upon this iterative computer program, the traffic volume assignment was made (see Fig. 7-2-1). For Nimas (and the process was essentially the same for the other cities in this study) existing land use and future land use based upon this plan were known. Vehicle occupancy and type were determined by traffic field surveys, and future occupancy and composition were assumed based on established trends and conventional guidelines. From these data and assumptions, a modal split was established (for conservative planning due to the extreme uncertainty of the rapidly developing situation, the pedestrian mode was puposely excluded here), trips per person and trips per zone were established and consequently persons per vehicle. Once the programatic development of a satisfactory figure for trips per person was achieved, this number was held constant and applied to all future years (a standard procedure). From this information and the planned road network, a modal split assignment was made, road capacities determined and road widths were established. For further information regarding existing traffic and the initial traffic surveys, refer to the Existing Conditions detailed in Chap. 2 of this report (section 2-12-1).

7-2-4 LAND USE/ TRANSPORTATION STUDY - SUMMARY OF CHANGING DEMANDS

A primary objective is to ensure high standards in the developing areas throughout the village cluster in the course of creating an efficient transportation system. A policy therefore is founded on three important considerations:

1. To establish an integrated land/use transportation plan.
2. To establish an attractive public transportation system.
3. To establish an efficient commodity distribution network.

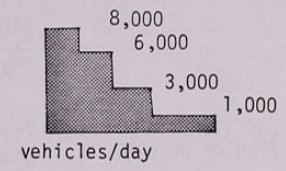
Table 7-2-1
SUMMARY OF TRANSPORTATION DATA

Planning Parameters	1975	1995
*Population	7,100	11,640
Jobs	1,322	2,600
Households	1,290	2,390
**Vehicle Ownership (per thousand persons)	58.4	204.7

*Planning Figures
**Regional Average

FIGURE 7-2-1
1995 TRAFFIC
VOLUMES

scale 1:20,000



This is a cluster of agricultural villages centered around a few main traffic generators, namely the Regional and Agricultural Centers, the school or educational zones, the commercial district and the Regional Recreational Park. Another generator, but of secondary importance, is the residential sector located two kilometers southeast of the center urban area.

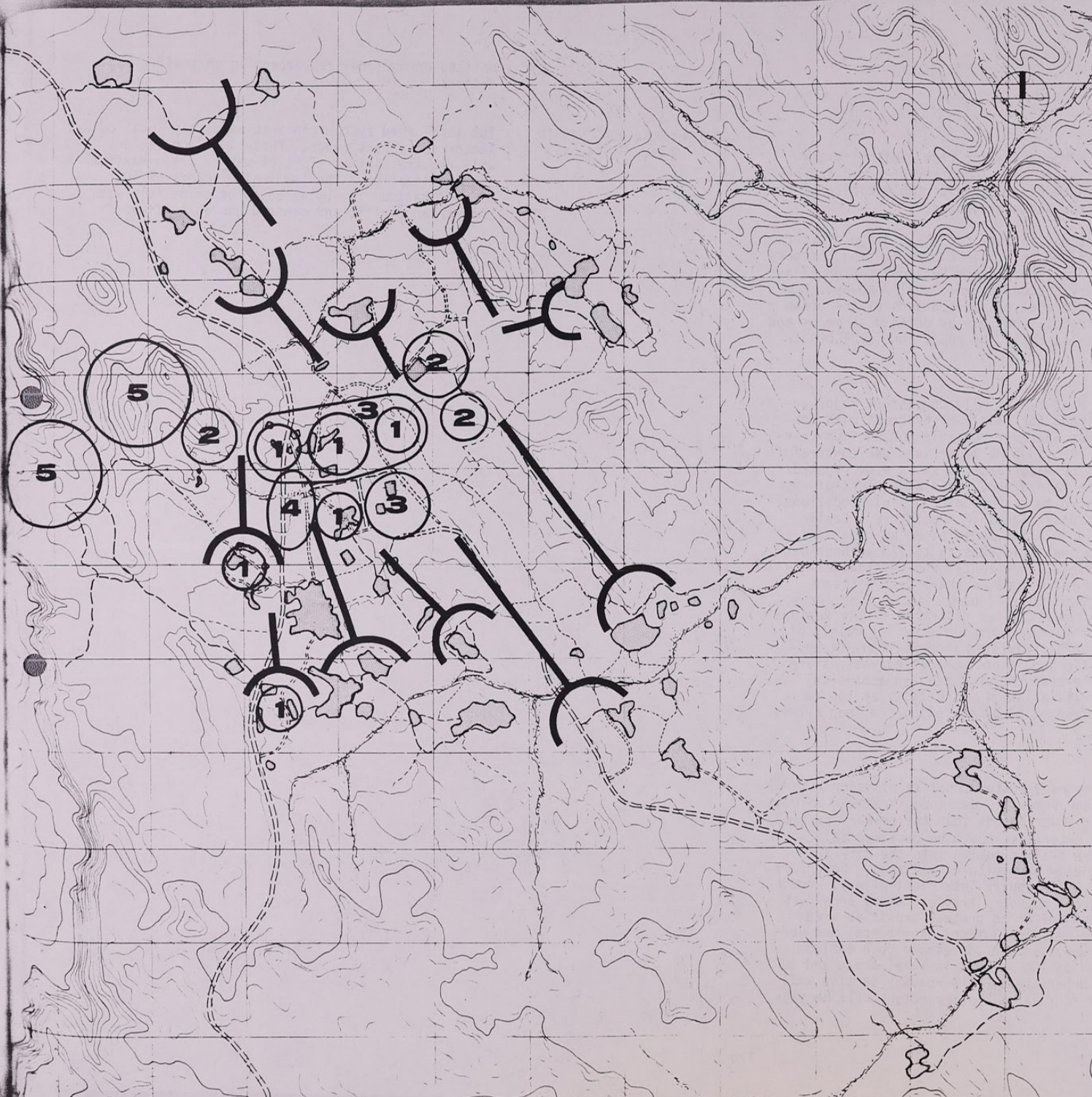
7-2-5 LOCATION AND DESCRIPTION OF GENERATORS



The primary importance as a node of attractivity is the proposed Regional Center located in the center of the village cluster. This center will cover an area of approximately 20 hectares, containing a community and civic center, a community and regional shopping center, an administration center, a health treatment center and all related parking facilities. Major new residential development is planned for the crescent shaped area of non-agricultural land between village groups A and B to the northeast of the center as the proposed boys educational center and to the west as the girls educational center and the large park.

Combining all of this planning data with, the fact that Highway 54 carrying heavy private and commercial through traffic directly by the control area, results in a moderate traffic flow in the vicinity of the central district.

FIGURE 7-2-2
LOCATION OF
FUTURE TRAFFIC
GENERATORS

scale 1: 20,000



-  access between future central area and village
-  major element of traffic generator
- 1** residential development
see: Section 2-13 and 3-4
- 2** educational complex development
see: Section 5-1
- 3** governmental, social and community facility development
see: Section 2-13 and 5-5
- 4** major commercial development
see: Section 5-7
- 5** tourism and major recreational development
see: Section 6-1

7-3 PRINCIPAL ROAD NETWORK

7-3-1 ROADWAY CLASSIFICATIONS AND DESIGN CRITERIA

Achievement of good traffic flow continuity depends upon the proper integration of urban and rural roadway networks throughout the vicinity of the village cluster and the country.

The urban roadway network for the village cluster will maintain the principle classification categories already described in the Regional Master Plan, namely primary, secondary and local roadways. However, the functional classifications of the urban system for the villages can be defined as major and minor arterials, collector roads and local or access roads.

7-3-2 PRIMARY ROAD SYSTEM (V1, V2)

The primary road system will consist of major arterials designed for fairly high speeds with controlled access wherever possible and maximum travel comfort. Provided no major land use constraints exist along the major arterials, a wide right-of-way should be maintained. This wide right-of-way can be utilized to accommodate possible additional traffic or transit lanes in the future. Design speeds should be established at 80 km/hour maximum in urban areas, increasing to 120 km/hour outside urban areas. Horizontal and vertical alignments should correspond to these design speeds. The roadway section will be of two or four lanes. Unlike the primary system described in the Regional plan, this primary system will consist mainly of signalized or unsignalized intersections depending on traffic conditions. Grade separations are preferred wherever the physical and economical conditions will allow it, especially at the two crossings of Route 54 by the elongated loop artery.

7-3-3 SECONDARY ROAD SYSTEM (V2, V3)

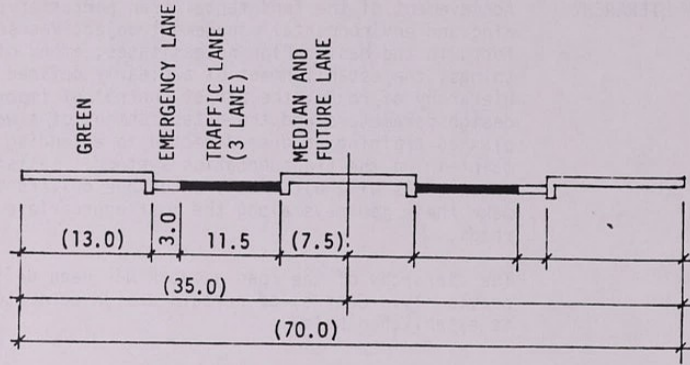
The secondary road system consists of major arterials and minor arterials designed for lower volumes and equal or lower speeds than the primary system. These minor arterials should be designed to accommodate the traffic coming into the city from many surrounding agricultural villages. Secondary road system will require less right-of-way; enough to accommodate necessary traffic lanes, shoulders and a minimum buffer to protect sensitive areas from air and noise pollution. Horizontal and vertical alignments should correspond to a maximum design speed of 100 km/hour in rural areas and 80 km/hour in urban areas. The roadway section will have two or four lanes. Intersections will be sig-

nalized or unsignalized depending on traffic conditions.

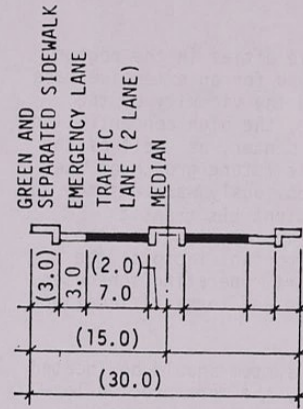
7-3-4 LOCAL ROAD SYSTEM (V4, V5, V6, V7)

The local road system consists of mostly local collector and access roads. These local collectors will require minimum right-of-way to allow maximum land utilization. The low design speeds of 60 km/hour maximum is suggested to be compatible with pedestrian traffic and other urban activities.

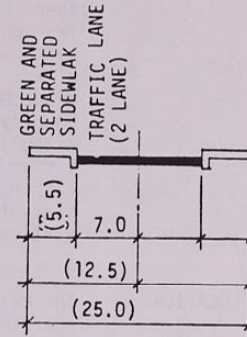
V₁ EXAMPLE
(REGIONAL HIGHWAY)
6 LANE



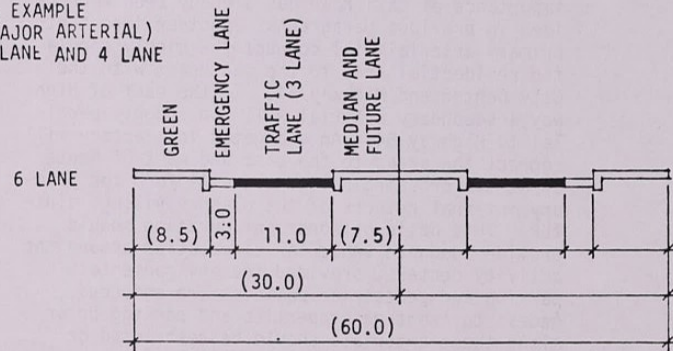
V₃ EXAMPLE
(ARTERIAL)
4 LANE



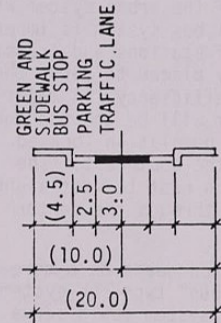
V₄ EXAMPLE
(COLLECTOR)
4 LANE



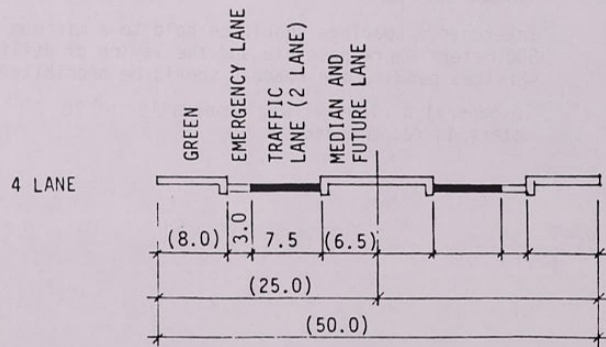
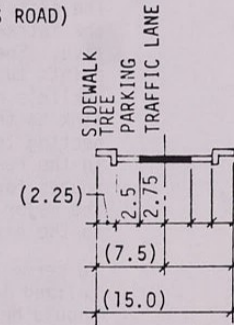
V₂ EXAMPLE
(MAJOR ARTERIAL)
6 LANE AND 4 LANE



V₅ EXAMPLE
(DISTRIBUTOR)
2 LANE



V₆ EXAMPLE
(LOCAL ACCESS ROAD)
2 LANE



NOTE: () Dimensions can vary depending on the local condition and detail design, sometimes median strip and green zone can even be eliminated where elimination is justified by the detail planning.

FIGURE 7-3-1
ROAD SECTIONS BY
CLASSIFICATION
(EXAMPLE)

7-4 PUBLIC TRANSPORTATION

7-4-1 URBAN BUS TRANSIT SYSTEM

Relative to the other five cities in the region, there will be little demand for an extensive mass transportation network in the vicinity of the village cluster. However, the high concentration of activities around the center, as well as the expected by unpredictable future growth of the country and the region, obviously warrants the establishment of an efficient bus transit system. Success of this system hinges on the combination of several important factors; the size of bus, riding comfort, operating schedules, station and transfer points and terminal location.

7-4-2 SYSTEM LOCATION

The main terminal of the system should be located near the Center. However, the more precise location of the terminal should be established after a more detailed study is conducted to enhance and improve people and commodity movement and to provide the fluent access to and from Highway 54. The efficient integration of the urban system with the intra-regional long haul bus system is imperative. Specific locations of stations and transfer points must be strategically placed to serve the public's need with maximum efficiency. A major link to this proposed system will be the one connecting the Center with the population located in the residential area to the southeast. The routes for this link will run east to west along the major arterials passing through the center to the east of Route 54.

To serve public transportation needs on a more localized level, a "courtesy bus" type sub-system should be considered. This system could serve the individual residential areas on a regularly scheduled basis.

7-4-3 OTHER MODES

Due to the size and configuration of the village cluster and the relatively small population growth predictions, when compared to the rest of the region, a more sophisticated mode of public transit (i.e. at grade or above grade rapid transit systems) would not be warranted until well beyond our 20-year planning period. However, the realization that it will eventually be necessary should be a major consideration in the planning of the overall transportation system. Therefore, provision for a "public transit corridor" within the right-of-way should be made along all of the principal inter and intra-regional highway arterials. This realization should also be considered for the location of terminals to achieve "flexible mode interchange".

7-5 TRAFFIC CONTROL POLICY

7-5-1 ROADWAY HIERARCHY

Achievement of the fundamental transportation planning and environmental management objectives set forth in the Master Plan necessitates, among other things, the establishment of a clearly defined hierarchy of roads; the strict control of important design parameters and the establishment of a well planned training program directed to extending and maintaining the transportation systems. Satisfying these goals will ultimately encourage drivers to make their journeys along the most appropriate roads.

The hierarchy of the road network has been defined previously. Control of certain design parameters is established below.

7-5-2 PRIMARY AND SECONDARY SYSTEM








The main primary arterial for the village cluster is Highway 54, which runs north to South. The importance of this road has already been emphasized in previous paragraphs. Another important primary arterial will connect the highly populated residential area to the southeast with the City Center and Highway 54. To the east of Highway a secondary arterial will run roughly parallel to Highway 54. An elongated loop artery will connect the areas to the east and west of Route 54 at two crossing points and will form the primary internal network of the planned village cluster. This basic network configuration should provide adequate vehicular circulation around the activity centers, provided the environmental, parking and pedestrian policies are enforced. Access to frontage properties and parking on or along these arterials should be restricted or prohibited respectively. As previously discussed, such as the activity centers already discussed, certain vehicles such as motorcycles, donkey carts, etc. should be prohibited.

Interchange spacings should be held to a minimum of 500 meters where possible and the laying of utility services beneath the roadway should be prohibited.

In general a right-of-way reservation of 70 meters is recommended.

FIGURE 7-3-1
DIAGRAMATIC
NETWORK OF
RECOMMENDED
MAIN ROADWAY

scale 1:20,000

-  class I agricultural land
 -  class II agricultural land
 -  large exposed boulders
 -  moderate out-cropping
 -  vacant or non-used land
 -  recommended diagramatic main roadway
 -  main roadway right of way
- compare this with FIGURES
2-12-1, 7-1-1 to define the
need for new construction
and/or improvement



7-5-3 COLLECTORS

The function of the collector roads is to provide a link between the primary roads and the local residential, industrial, business, agricultural and commercial areas. As redevelopment takes place, an increasing degree of restrictions should be placed on frontage access and street parking where warranted.

In the village cluster, the major collectors will connect between residential areas and the main arterials.

Secondary and minor collectors connect the residential areas with the secondary arterials and ultimately with the activity centers. These roads should facilitate the safe and free movement of traffic within the districts they serve.

For these collector roads, junction spacings should be at a minimum of 200 meters where possible. The junctions should be controlled by the traffic signals or signs depending on traffic conditions and utilities should not be placed beneath the roadway, but adjacent to right-of-way.

7-5-4 LOCAL AND ACCESS ROADS

These roads will provide a link between smaller access roads and the collector system. By design these roads should attract only local traffic for immediate access to residences, shops or offices and should discourage through traffic. Appropriate restrictions should be set with regard to access and street parking to meet particular needs.

7-5-5 GRADE SEPARATED INTERCHANGES

Grade separated interchanges not only increase capacity and safety, but reduce congestion, shorten travel time and efficiently transfer traffic from one roadway to another. In Nimas there are two intersections of major concern where the estimated future traffic volumes warrant the smooth directional transfer of flow. These are the locations where the two major "internal" village cluster arterials cross Route 54. The number of such crossings was purposely reduced to avoid traffic conflict as much as possible, and grade separated interchanges both for pedestrians and automobiles would be entirely consistent with this policy. Refer to Fig. A-2-9 (d) in the Appendix, planning Standards for various examples of both at-grade and grade separated interchanges.

7-5-6 SAFETY CONSIDERATIONS

To ensure the safe and efficient use of the proposed road system, careful consideration must be given to specific design parameters such as turning movements, visibility requirements and pedestrian movements for each roadway type. Restricting the number of junctions along major roads will increase safety by decreasing possible vehicles and pedestrian conflicts. Where junctions exist, the use of traffic and pedestrian signals is an effective method of traffic control and is strongly recommended.

Mandatory speed limits, strictly enforced by traffic police, is by far the most effective means of safety control.

Perhaps the most important factor in the planning of a safe efficient and environmentally compatible transportation system is the establishment of an adequate training program for the maintenance and operation of the existing or planned transportation systems.

7-5-7 PEDESTRIAN MOVEMENT

The use of pedestrian crossings, both signalized and unsignalized, or grade separation crossings are essential in the segregation of pedestrian and vehicular activities, especially at the two major crossings of Route 54. Restriction of vehicle penetration within the central area, or "pedestrianization" of main shopping streets, not only increases safety but improves the environment as well.

It would be quite impractical to recommend the precise locations of pedestrian crossings that may be needed in the future. The selection of such locations should be based on up-to-date surveys of pedestrian movements within the city and detailed studies of short term developments which might make alternative crossing points more attractive. Pedestrian routes which cross primary roads must be given careful attention, and the construction of pedestrian bridges or subways must be given detailed consideration.

7-6 CAR PARKING POLICY

7-6-1 GENERAL

Increased prosperity will increase vehicle ownership quite substantially by 1995, resulting in increased pressures to control the use of road space and increased conflicts between moving and stationary vehicles. Concentration of commercial and business activities in the city centers will, consequently, be of major concern. Therefore, the main car parking policy for the village cluster must attempt to provide a reasonable balance between the capacities of the car parks and the road system planned for the central area.

7-6-2 PARKING DEMANDS

To accommodate the dominant types of trips made by vehicle users, two categories of parking demands exist, namely long and short term parking. Long term parking is attributed to workers employed in the City Center. These long term facilities can be located on peripheral sites providing reasonable access to the work center with walking distances less than 400 or 500 meters. Short term parking attributed to shopping and business trips comprises the major portion of the parking space demands. This trend can be expected to continue indicating that priority should be given to accommodating these demands conveniently within or close to the central business district. General locational policies, however, for both types of facility demands must consider specific proposals for access from the primary feeder road system and, most importantly, the competing demands for land in the central business area.

Additional general policies for parking planning, design and location are as follows:

1. Off street parking should be encouraged wherever possible, especially at busy intersections.
2. All parking facilities should have painted parking stall lines. See Fig. A-2-9 (f) for appropriate dimensioning for such stalls.
3. On-grade parking facilities should utilize landscaped islands to subdivide large paved areas.
4. Whenever large scale development of any kind is planned (such as a civic center, central Suq, etc.) parking should be included as an integral part.
5. Public parking areas should be created at all main commercial centers. These should be off-street facilities, planned in such a way as to avoid congestion at street intersections.
6. Although each parking facility, whether independent or associated with a major develop-

ment, should be individually examined and planned according to the specific needs of each development, the following guidelines may be used for an initial determination of number of parking spaces.

A. Housing	- 1 space per household.
B. Office	- 1 space per 30 m ² floor area.
C. Commercial	- 1-4 spaces per 40 m ² sales area (see the planning Standards section).
D. Industrial	- 1 space per 5 employees.
E. Hotel	- 1 space per guest room.
F. Entertainment	- 1 space per 10 seats.
G. Hospital	- 1 space per bed.

Parking data (see section 2-12-1) indicate that in Nimas as elsewhere in the Southern Region continuous parking for more than two hours is rare. This implies a need to satisfy short term parking demand.

The Central area as planned, can be expected to generate some 22,000 personal trips or approximately 11,000 to 13,000 private vehicles. The agricultural center can be expected to generate some 17,000 personal trips of 8,000 to 10,000 vehicular trips. Provisions then should be made to meet these 1995 demands through a policy of progressive development from surface to multi-story car parks.

7-6-3 VEHICULAR PENETRATION

Another consideration in the establishment of a good car parking policy is vehicular penetration within the Commercial Center. A policy restricting vehicular traffic to commercial vehicles delivering goods and private vehicles associated with families residing in the center would provide a safe environment for shopping and business activities.

Where commercial areas exist directly along major roads vehicular penetration and access should be established to reduce possible congestion. Parking should be provided at the rear of such commercial areas, and community access should be from this side as well. Frontage parking should be limited and strictly controlled. Loading and unloading should not occur directly from the street, but at loading areas at the sides or back of commercial establishments. Such frontage control is especially important at major intersections where undesirable congestion would otherwise certainly occur.

7-7 ENVIRONMENTAL MANAGEMENT POLICY

7-7-1 THE FACTORS AND IMPACT

Design of any transportation links or terminals should be done concurrently with environmental impact assessments to minimize adverse consequences to surrounding areas. In addition to the usual factors taken into consideration such as right-of-way acquisition, type of construction and traffic volumes it is necessary to evaluate the impact on air quality, noise levels and aesthetics of the facility.

Since noise and air quality are the most critical items in an environmental assessment, an effective Environmental Policy and National Standards must be established and enforced. As an example, the United States Environmental Standards are shown below in Table 7-7-1.

After these standards are established, design parameters such as number of lanes, median widths, shoulder widths, maximum grades and roadway curvatures and design speed limits should be reviewed and modified if necessary. Governmental and administrative policies can be set as to the allowable automobile pollutant emissions to be accepted. Land use or urban activity must be controlled in the vicinity of any transportation facility.

7-7-2 METHODS AND CONTROL

The vicinity of the village cluster is presently fortunate to have a clear, clean and quiet environment. It will be the responsibility of the Administrators and Planners not to permit conditions to deteriorate, but to improve them instead.

In populated areas such as the village clusters along Road 54 of the primary system, vegetative, earth or man-made barriers can be used aesthetically to control objectionable noises produced by traffic. Many materials and techniques are available for the construction of these noise barriers and at a relatively low cost. The right-of-way at intersections where congestion tends to build up should be ample in size and access should be partially or fully controlled to provide a separation between traffic flow and surrounding developments which could result in reduction of noise and air pollution.

Grade separated interchanges not only increases capacity and safety, but reduces congestion, shortens travel time and efficiently transfers traffic from one roadway to another. Two locations of major concern, where grade separations may be con-

sidered, are the major intersection of Road 54 and the "internal" arteries. It is estimated that by 1995 traffic volumes will be such that grade separations may be warranted at these location.

Aesthetics should always be kept in mind when choosing the final design of grade separations, roadway intersections or traffic control devices in general. Landscaping and provision of wide open right-of-ways contribute greatly to safe and comfortable transportation.

7-7-3 POLICY SUMMARY

Therefore, the environmental management policy must extend to the design of various interacting facilities other than just the road types and their junctions. Careful consideration must also go into the location and design of car parking areas, pedestrian routes, general traffic control devices and most importantly an attractive public transportation system with adequate terminal and transfer facilities.

7-8 PHASING AND COST OF RECOMMENDED IMPROVEMENTS - INVESTMENT NEEDS FOR 5, 10 AND 20 YEARS

Recommended construction of the road network must be related to the growth estimates prepared for the village cluster. In order to ensure adequate widths of right-of-ways for the future transportation corridors, it recommended that right-of-ways be established and purchased as soon as possible. The early purchase of right-of-ways will minimize costs and also will establish minimum building setbacks for future developments.

It is estimated that approximately 10 km of a four-lane roadway and 30 km of a two-lane roadway have to be built by the year 1995 to establish a basic road network. The total construction cost of the proposed improvements is estimated to be 39 million S.R. Since the bulk of this construction should be completed in the first 10 years, it is recommended that 33% or 13 million S.R. be expended in the first 5 years, another 33% in the next 5 years, and the remaining 33% in the final 20 years of the planning period.

All costs cited are estimated in order of magnitude costs based on hypothetical road alignments and an average cost per kilometer based on 1977 costs, excluding cost of right-of-way.

Table 7-7-1
 1977 UNITED STATES FEDERAL EXHAUST EMISSION
 STANDARDS AND CONTROL LEVELS

Type of Vehicle	Emissions Expressed in Grams per Kilometer		
	HC	CO	NO _x
Light-duty Gasoline Passenger Car	0.94	9.4	1.25
Light-duty Diesel Passenger Car	0.94	9.4	1.25
Light-duty Gasoline Truck	1.25	12.5	1.9
Light-duty Diesel Truck	1.25	12.5	1.9

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8. policy for public utilities

8-1 ELECTRICITY

8-1-1 EXISTING AND PLANNED SERVICES

At the present time there is a single small electric generating plant capable of producing 190 kw. A larger plant is currently under construction and nearing completion. There are also existing long range plans to establish a regional Asir power net which could supply power to all of the Asir villages in addition to Abha and Khamis Mushayt. This Asir power net would in turn be a part of the planned nationwide electric supply network.

8-1-2 ESTIMATED DEMAND BY VILLAGE GROUP

Required potential domestic electric power is assumed to be about 0.3 kw per person by 1995. This is significantly higher than current supply or demand, but can be justified by expected increases in domestic use as electric lighting and appliances become more widely used over the course of the next 20 years.

In addition, non domestic uses including industry, commerce, hospitals, schools and other similar uses, are estimated to consume an amount of electric power equal to an additional 0.2 kw per person. The total rate of 0.5 kw per person would mean that 1995 generating capacity for the Nimas Village Cluster must be about 5,820 kw. Table 8-1-1 indicates the projected 1995 demand for electric power and other public utilities.

8-1-3 PROPOSED SERVICES

Electric power is one public utility which is relatively easily distributed in rural areas. For this reason it is recommended and expected that electric power be distributed to all population concentrations and new areas of population and other development anticipated by this plan. (See Figure 8-1)

The present site of the new generating plant currently under construction is acceptable since it is far enough south of the population centers to avoid wind borne pollution problems. Unless engineering considerations dictate otherwise, expansion of this facility to meet future demand is recommended.

8-2 WATER

8-2-1 EXISTING WATER SUPPLY

The present water supply system consists of several wells and a small reservoir tank on Shuhn Mountain. In this system water is distributed by pipes laid along the major roadways at the rate of about 710³/day. There are about 150 wells in the area of the Nimas Village Cluster. These wells are usually from 10 to 20 meters deep and supply water for both domestic and agricultural use.

8-2-2 ESTIMATED DEMAND BY VILLAGE GROUP

Based on a standard of 150 litres per person per day for domestic consumption, the Village Cluster must supply 1,740 M³/day by 1995 for domestic consumption. It is anticipated that non-domestic, non-agricultural demand will amount to 450 M³/day by 1995. This means that by 1995 the water system of the Nimas Village Cluster must supply a total of 2,190 M³/day in addition to agricultural demand. This demand by Village Group is shown in Table 8-1-1. It should be pointed out that as was mentioned in Section 2-7-6 agricultural demand for maximum production efficiency will be just over 20,000,000 M³/yr for the cultivated lands of the Nimas Village Cluster. Adding this to the domestic demand results in a total 1995 water requirement of about 21,000,000 M³/yr. As shown in Table 2-7-5 total potential supply of the 5000 ha Nimas water catchment area is 12,500,000 M³/yr.

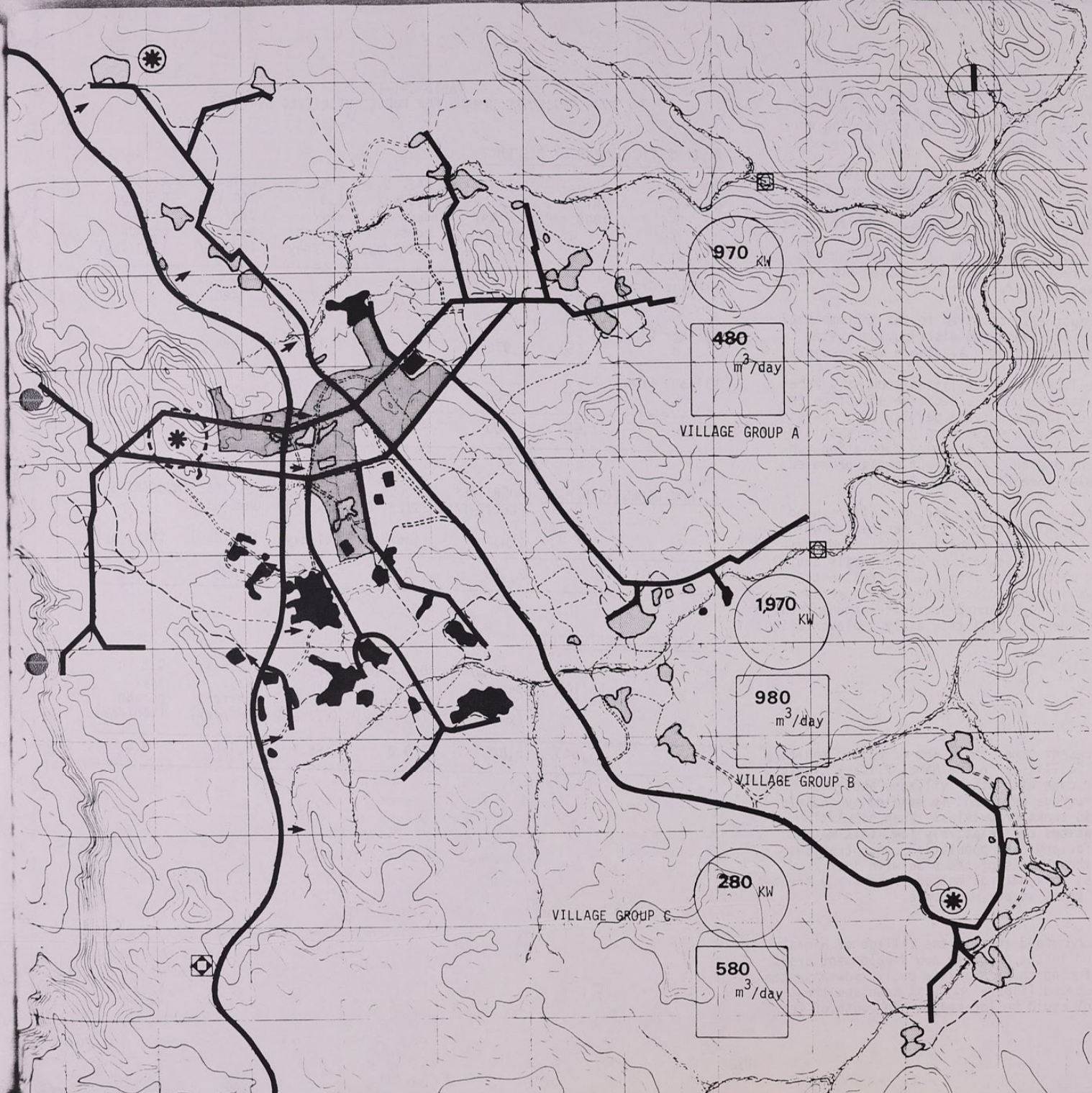
This means that in order to support the projected 1995 population assumed in this plan and to achieve maximum agricultural production, additional water supplies amounting to 68% of the potential of the Nimas water catchment area must be found.












Although there are many ways to accomplish this (and none are easy), the most feasible seems to be to tap sources downstream from the Nimas Village Cluster and transport the water back to Nimas. This method is one which essentially increases the water catchment area, and is similar to the proposal for the city of Abha. Feasibility of such a proposal should be determined by extensive and detailed engineering studies.

If such an increase is found to be unfeasible, then some adjustment of both agricultural production and population will occur. In order to achieve a "conservative" plan which allows for the reasonable maximum potential growth, it is an assumption of this study that the increased water

FIGURE 8-1
ELECTRICITY
AND WATER

scale 1:20,000



-  power station functioning as sub-station of regional-wide electricity project presently under construction
-  main junctions of electric feeder on trunk line see: FIGURE 2-12-2
-  water tank
-  proposed water tank
-  dug well area for water resources of public supply presently used
-  recommendable water reservoirs, for their locations refer to Section 8-1
-  diagrammatic roadway in 1995 to be utilized for network of main distributor of public utilities
-  presently proposed water supply villages by T.P.O.
-  expanded water supplied villages and residential area by 1995
-  water domestic demand by village group in 1995 (m³/day)
-  electricity domestic demand by village group in 1995 (kw)

demand can be met. The consultant feels that such an assumption allows the greatest possibility for future flexibility due to changing or unforeseen conditions.

8-2-3 PROPOSED SERVICES

The ability to meet the projected demand for water will depend largely on the development of optimal water gathering methods. High priority should be given to technical planning of such methods and implementation of a comprehensive system to realize the goal of tapping the maximum available water.

Priority must also be given to the implementation of a water treatment and distribution system utilizing the presently available water supply.

Since the location of utilities such as a water supply system can have a decisive effect on the location of future private development, it is recommended that a water supply network be limited to those areas of existing population concentrations and new development areas proposed in this plan (See Figure 8-1).

Water supply for industry and agriculture need not meet the high standards of sanitation which are essential in the domestic supply, and these uses may be supplied both by ground wells and by recycling waste water from sewage treatment. Such recycling should be planned in close conjunction with any planned sewage treatment facilities in order to facilitate early implementation.

8-3 SEWERAGE

8-3-1 EXISTING SERVICE

At the present time, there are no public sanitary sewerage facilities in the Nimas Village Cluster. As is the case with other villages and rural areas, sewerage treatment is handled by individual septic tanks or privies. When population concentrations are relatively low, this method is satisfactory. As population concentrations rise in those areas of the plan with increased densities, this natural method of sewerage treatment may prove to be inadequate.

8-3-2 PROPOSED SERVICES

It is recommended that in the Village of Nimas itself and in the proposed new development areas just to the north of Nimas, a public sewer system be implemented. (Figure 8-2) A sewerage treatment plant could be located to the south of the

Table 8-1-1
1995 PROJECTED DEMAND FOR PUBLIC UTILITIES SERVICES

A. DOMESTIC DEMAND BY DISTRICT

PLANNING DISTRICT	POPULATION 1995	ELECTRICITY 0.3 kw/person (kw)	GAS 0.5 kg/day/person (ton/day)	FUEL 2.3 l/day/person (kl/day)	WATER 150 l/day/person (m ³ /day)	REFUSE 0.5 kg/day/person (ton/day)
Village Group A	3,220	970	1.6	7.4	480	1.6
Village Group B	6,550	1,970	3.3	15.1	980	3.3
Village Group C	1,870	560	0.9	4.3	280	0.9
TOTAL	11,640	3,500	5.8	26.8	1,740	5.8

B. NON-DOMESTIC DEMAND (HOSPITALS, SCHOOLS, UTILITIES FACILITIES, INDUSTRIES, PUBLIC FACILITIES, BUSINESS AND COMMERCIALS)

(kw)	(ton/day)	(kl/day)	(m ³ /day)	(ton/day)
2,320	3.5	18.6	450	3.5

C. VILLAGE CLUSTER TOTAL

POPULATION 1995	0.5 kw/person (kw)	0.8 kg/day/person (ton/day)	3.9 l/day/person (kl/day)	18.8 l/day/person (m ³ /day)	0.8 kg/day/person (ton/day)
11,640	5,820	9.3	45.4	2,190	9.3

FIGURE 8-2
SEWAGE AND
DRAINAGE

scale 1:20,000

- watershed
- ▲ peak
- Y wadi
- diagramatic main road network see: FIGURE 7-3-1
- ← road down inclination
- ▨ area served by public sewer system
- system expansion recommended wherever feasible



Village Cluster near the proposed new garbage facility where prevailing winds would blow any noxious substances well to the south of population concentrations, or at an appropriate location somewhere to the west of the Village Cluster where fumes would be blown to the west over generally unpopulated areas.

It is recommended that the sewer system be limited to those areas shown on the plan for two reasons. First, in less densely populated areas natural methods will continue to be satisfactory; and second, as mentioned before, the location of such utility services can have a large impact on the location of private development. People will tend to locate where more extensive public services are available. In this way, the Government can indirectly but strongly influence the location of future development.

8-4 STORMWATER DRAINAGE

8-4-1 EXISTING SERVICES

There is no drainage system in the Nimas Village Cluster at the present time. As long as there was little paving or other impervious ground cover, drainage was not a problem. As more and more new roads and parking lots are constructed, however, drainage can become a significant problem.

8-4-2 PROPOSED SERVICES

Because rainfall is relatively high in the area of the Nimas Village Cluster, a drainage system should be planned in conjunction with the planning of future roads. This is necessary to prevent flooding and ponding on streets and to reduce costly erosion. In the Nimas Village Cluster, such a system could be quite simple, with nothing more than outlets and diversion ditches at low points in roads and parking lots. Should it prove feasible, however, a more complicated system which would collect valuable runoff water could be utilized.

The first of these is the fact that the land use policy is not a static one. It is a dynamic process which evolves over time in response to changing circumstances. The second is the fact that the land use policy is not a purely technical one. It is a political process which involves the interests of different groups in society. The third is the fact that the land use policy is not a purely national one. It is a regional process which involves the interests of different regions in the country.

The fourth is the fact that the land use policy is not a purely economic one. It is a social process which involves the interests of different social groups in society. The fifth is the fact that the land use policy is not a purely environmental one. It is a cultural process which involves the interests of different cultural groups in society.

The sixth is the fact that the land use policy is not a purely legal one. It is a moral process which involves the interests of different moral groups in society. The seventh is the fact that the land use policy is not a purely historical one. It is a future-oriented process which involves the interests of different future-oriented groups in society.

The eighth is the fact that the land use policy is not a purely scientific one. It is a human process which involves the interests of different human groups in society. The ninth is the fact that the land use policy is not a purely philosophical one. It is a practical process which involves the interests of different practical groups in society.

The tenth is the fact that the land use policy is not a purely theoretical one. It is an applied process which involves the interests of different applied groups in society. The eleventh is the fact that the land use policy is not a purely abstract one. It is a concrete process which involves the interests of different concrete groups in society.

The twelfth is the fact that the land use policy is not a purely idealistic one. It is a realistic process which involves the interests of different realistic groups in society. The thirteenth is the fact that the land use policy is not a purely utopian one. It is a pragmatic process which involves the interests of different pragmatic groups in society.

The fourteenth is the fact that the land use policy is not a purely visionary one. It is a practical process which involves the interests of different practical groups in society. The fifteenth is the fact that the land use policy is not a purely idealistic one. It is a realistic process which involves the interests of different realistic groups in society.

The sixteenth is the fact that the land use policy is not a purely theoretical one. It is an applied process which involves the interests of different applied groups in society. The seventeenth is the fact that the land use policy is not a purely abstract one. It is a concrete process which involves the interests of different concrete groups in society.

The eighteenth is the fact that the land use policy is not a purely idealistic one. It is a realistic process which involves the interests of different realistic groups in society. The nineteenth is the fact that the land use policy is not a purely utopian one. It is a pragmatic process which involves the interests of different pragmatic groups in society.

9. land use policy

9-1-1 APPRAISAL OF EXISTING LAND USE

Although in the past there has not been extensive implementation of land use planning for the Nimas Village Cluster, it would be inaccurate to suggest that the development of the land has occurred in a totally disorganized fashion. On the contrary, the use of land in this area has occurred in a very logical and orderly fashion. It has been previously discussed that the distribution of agricultural and residential uses has occurred in such a way that the best land is usually left for growing crops while built up areas occur on less desirable land. This along with the tribal social structure has been the fundamental basis for land use in the past.

Because of its good climate and relatively fertile soil, the Nimas Village Cluster has always relied on agriculture as its primary economic sector. Agricultural land use has been predominant in the past and will undoubtedly continue to be so in the future. The flat lower land along the wadi courses is generally excellent (class 1 or class II-See Section 2-9-3), and its value as agricultural land has served to keep other kinds of development on less desirable land.

Although the areas along the wadi courses generally represent the best agricultural land, downstream wadi courses are presently not used to their full capability because of their relatively steep slopes and their inconvenient access.

In general agricultural land use is limited primarily by water availability. Upstream areas (that is areas near the wadi headwaters between about 1km and 5km from the escarpment edge) can be farmed both by irrigation and by rainfed farming, for it is in this area that most precipitation occurs. Beyond this area to about 8km from the escarpment potential for irrigated farming exists if wadi and underground water resources can be fully tapped. Currently however, the total amount of agricultural land use varies greatly from year to year in direct relation to the annual rainfall.

Existing residential land use is of two basic types-agricultural villages and individual farm houses. Because of the value of agricultural land such residential use has wisely been limited primarily to areas unsuitable or less desirable for agriculture. Villages are distributed in a scattered pattern on moderately high areas with rocky

soil (although this is not always the case) in the middle of agricultural areas (refer to Figure 2-7-1). No great national expansion of these scattered residential areas is expected because of the balance which must be maintained between agricultural land and the population it supports.

On the other hand as the population grows, new economic activity develops and public facilities such as schools and government offices are built and there is developmental pressure created which results in more and more land being built up. This has already occurred to a limited extent along the recently built Route 54. It is essential that land use policy attempts to confine such new development to land unsuitable to agriculture. This consideration will become increasingly important as population continues to rise and commercial and institutional development expands.

Such policy in addition to being directed to the conservation of agricultural land must also deal with problems of uncontrolled strip development along Route 54 (which is already beginning to occur) and congestion in existing central villages and commercial areas (especially the Village of Nimas and its central suq) which could become critical if development is allowed to occur in an uncontrolled manner. This is especially true as the automobile continues to become more and more the dominant form of non-pedestrian transportation.

The TPO plan described in Section 2-13 represents a land use plan which is at odds with some of these basic principles. It violates the historical and natural pattern of development by taking large areas of prime agriculture land for residential and other built-up forms of development. In addition, it shows little regard for the existing villages. New roads cut directly through old sections of the villages creating a need for substantial acquisition and demolition and doing little to alleviate probable congestion in these areas. Concern for topography is lacking in that land use plan, and some roads will be difficult to build and use for this reason.

The area to the west of Route 54 between this road and the escarpment presents special problems to development in the Nimas Village Cluster. The routing of highway 54 was quite well done, showing great sensitivity to the issue of agricultural conservation. This road runs quite close to the escarpment and thereby avoids most of the prime agricultural land. At the same time, it provides convenient access to the villages it serves.

Another general area of the Nimas Village Cluster which is presently underutilized in terms of land use is the eastern region where only very small scale agriculture takes place. This is due primarily to the lesser amounts of precipitation and the steepness of the wadi bands as mentioned previously, but with improved irrigation, grading and terracing and the construction of access roads, these areas might possibly be able to support small agricultural settlements.

Table 9-2-1 represents existing and projected land use by area for the Nimas Village Cluster. The 1975 figures represent the results of the recent detailed aerial photography and mapping completed since the submission of the Preliminary Master Plan. It should be noted that the 1975 figures represent existing use without regard to planning standards while the 1995 projection is based on the planning standards given in the appendix applied to the projected population. The projections for 1980 and 1985 are based on reasonable expectations of development phasing directed toward meeting the 1995 objectives.

9-1-2 PROJECTED GENERAL LAND USE

Land use in 1995 will remain predominantly agricultural. It is very important that all class I agricultural land and the best of class II land be conserved and improved. This means that flat low lying land near the wadis will remain agricultural. It is expected that with improved irrigation and water harvesting as well as improved general farming methods, there will be a small increase in the cultivated land of the Nimas Village Cluster from about 953 ha to about 1058 ha in 1995. Of course this increase of about 11% will be subject to yearly variations in rainfall which, as has been mentioned before, is the single most important factor in determining the amount of cultivated land in the period between 1975 and 1995. The planning population of the Nimas Village Cluster will grow by about 64% from 7,100 to 11,640. This of course means that with the expected decrease in household size from about 5.5 to 4.7, the number of households will have to double (see Table 3-2-2 and Chapter 3 in general). Residential land use then must be greatly increased. The expected increase in area totals about 41 ha over the 20 year planning period (see Table 9-2-1).

New residential areas must be developed on relatively flat unused land in the village centers and on higher areas with moderate rock out-croppings which have no agricultural value.

Within the Nimas Village Cluster itself, Route 54 does in fact bisect some prime agricultural land. Just across from the old Village of Nimas a fairly large agricultural area lies to the west of Route 54. For the most part, however, the land of the Nimas Village Cluster to the west of Route 54 is classified as areas of moderate or extensive rock outcropping.

This presents both problems and opportunities for development. On the one hand as it exists now, the highway presents a kind of barrier which might divide development on the west side from development on the east. To some extent this has already become a problem since the main girls schools are located in a building on the west side of Route 54. This presents somewhat of an access problem for girls who travel to school on foot. However a drainage culvert located just south of the Village of Nimas serves as a pedestrian underpass which somewhat alleviates this problem and suggests that the solution to developing the west side of Route 54 in a way which is integral with east side development is to provide some form of vertical separation between pedestrian and local vehicular traffic and traffic on Route 54. Because agricultural and grazing land is located on the west side of Route 54, it can be anticipated that some conflict might arise between traffic on Route 54 and farm implements and livestock crossing from one side to the other. Here again a vertically separated crossing could be the solution.

In spite of the problems associated with development west of Route 54, the opportunities such development presents are several. Simply because of the fact that agricultural land in this area is limited indicates that built-up uses could be successfully developed here without disturbing such land.

Development along the west side of Route 54 would also take full advantage of the access to regional transportation networks which the presence of the highway provides. Such access could prove valuable to agricultural, commercial/industrial, institutional and recreational development.

The development of recreational facilities including a large park on the west side of Route 54 would represent an excellent use of land in this area since it would utilize otherwise undesirable land and would take advantage of the spectacular views to the west over the escarpment (refer to Figure 6-1-1). Such development could also support potential tourist activity.

Both because of the expected population increase and because of the steady rise in the standard of living, institutional and commercial areas will increase substantially over the 20 year planning period. By area, institutional use (including education, religion, health care, administration and public service) will increase from the present 5.5 ha to about 37.8 ha in 1995. The largest increases here are in the area of education and administration and result from the rapidly increasing standard of education and the expected increase in government offices as the secondary administrative function of Nimas becomes more important.

Recreational land use too is projected to greatly increase, primarily because today there is so little land which is exclusively designated as recreational. The increase from 0.9 ha to 46.7 ha is distributed among all recreational uses with the largest absolute increase resulting from the creation of a large Emirate Park. Playgrounds and playfields which are associated with the schools show an increase over the 20 year planning period proportional to the growth of education.

The land use area projections shown in Table 9-2-1 are based on the following factors:

1. 1975 land use is based on the latest aerial photography, mapping and field surveys.
2. 1995 land use is based upon the application of the planning standards (given in the appendix to this report) to the projected planning population.
3. The projections for intermediate years 1980 and 1985 are intermediate between 1975 and 1995 and are based on historical trends, policy recommendations given in this report, and realistic views regarding expectation and capabilities for short range development. The phasing of the master plan will be discussed further in Section 9-3.

9-1-3 LAND USE AND LOCATION POLICY

Land use and location policies for the Nimas Village Cluster must address themselves to seven general areas:

1. Agricultural land use
2. New development and built-up land use
3. Land use related to old village quarters
4. Land use along Route 54
5. Land use west of Route 54
6. Land use issues related to transportation and utilities infrastructures
7. Recreation and conservation land use
8. Land use on the outskirts and periphery

The major policy recommendations for these land use categories are outlined below.

1. Agricultural land use.

In a sense policies for agricultural land use will have the greatest impact on the future development of the Nimas Village Cluster even though actual area and location of agricultural use will change relatively little over the 20 year planning period. This is because of the great importance which must be placed on conservation of prime agricultural land in order to preserve the traditional economic base of the area. The consequence of nearly total conservation of agricultural land is of course that built-up development must occur only on non-agricultural land or on the fringe edge of class II agricultural land. Such a policy severely restricts the location of concentrations of built-up development, yet it is a policy the importance of which cannot be overemphasized.

Policy for the increase of agricultural land use should be directed at two areas. Firstly, wherever possible existing class II agricultural land should be upgraded to class I. This can be done by improved irrigation and fertilization, but as mentioned previously will be somewhat dependent on yearly rainfall. Secondly wherever possible, due to potentially improved irrigation and grading or terracing of slopes, downstream wadi areas on the eastern edge of the village cluster area should be developed for agricultural uses. One of the most promising areas to investigate for such agricultural development is the downstream area of Wadi Shaban at the eastern edge of Village Group A (the northern most of the three village groups forming the Nimas Village Cluster.)

2. New development and built-up land use.

New non-agricultural development should occur only on non agricultural land or on the fringe areas of Class II agricultural land when this cannot be avoided. An examination of agricultural land use (see Figure 2-4-1) reveals that there is a relatively large crescent shaped area of land located between Village Group A and B to the north of the Village of Nimas which extends between two low peaks and which is unsuitable for cultivation.

This area seems most suitable for development of built-up uses such as residential, institutional and commercial. It is a large enough area to accommodate the development which must occur by 1995 yet is compact enough to enable

an efficient development layout. This area extends to both sides of Route 54 thereby providing good potential access to this important transportation route. Because of the suitability of this area for development and because of its proximity to the existing population concentration of the Village of Nimas, development of residential areas and the new government administration center have already begun there. It is recommended that policy for development of built-up land uses limit such uses (with the exception of agricultural houses and small settlements) to this area.

3. Land use related to old village quarters. It is recommended as a matter of policy that land use in old village quarters remain essentially as it is. In outlying villages, a successful balance between functional land use and societal needs has been developed over many years. Since these small villages will retain an essentially agricultural orientation, little functional land use will be necessary.

However, it is recommended that land use policy assure that each of these villages contain a certain group of service amenities including a park, small scale commercial facilities and designated parking space. This amenities package will assure that, combined with the other functions already present in each of these villages (such as mosques) many of the day to day needs of the inhabitants will be met without the necessity of traveling to the larger population center.

As with the smaller outlying villages, the land use at the old village of Nimas will remain essentially as it is except that the suq just to the north of the village will be expanded to the north to link the old village with the new development area (refer to Figure 3-3-1 for an idea of how this concept will affect the old Village of Nimas.)

4. Land use along Route 54. Development directly along Route 54 should occur as a natural sequence to the historic pattern of land use. Along much of its length as it passes through the Nimas Village Cluster, Route 54 is bordered by prime class I agricultural land. It is of course essential that this use be conserved.

In addition to agriculture land use residential and various types of commercial and use exist along Route 54. It seems to be an inevitable consequence of the building of any major road through a city or village that so-called "strip" development begins to occur in an uncontrolled way along such a road. Linear development along a major transportation route is not in itself an undesirable thing, however such development must be strongly controlled if possible to prevent traffic congestion problems, aesthetic deterioration and, in the case of Nimas destruction of agricultural land.

For this reason, it is recommended that auto-oriented commercial facilities be permitted in a controlled zone along Route 54 separated from it by a buffer to limit access and to create a better visual impression. Such a commercial zone could be created as a connecting link between the suq of the old Village of Nimas and the new development area to the north as mentioned previously.

5. Land Use west of Route 54. Existing agricultural and rangeland use should be maintained to the maximum extent possible in areas west of Route 54 in the Nimas Village Cluster. Built up uses in this area should be limited to relatively flat areas designated as having moderate rock outcroppings and which are therefore unsuitable for agricultural purposes.

The use of the west side of Route 54 for built-up land uses is important in order to make maximum utilization of the limited amounts of non-agricultural land for these functions. In order to create a strong connection between development to the east of Route 54 and development to the west, it is important as a matter of policy that some key function of the village cluster be located in or expanded to this area in order to encourage development. The development of the girls education center and the creation of a Emirate park to the west of Route 54 are two such functions which can serve to accomplish this purpose.

It should perhaps be pointed out here that the solid waste disposal or dumping which is presently located along the escarpment west of Route 54 should be relocated to a more suitable location where it will cause less air pollution and not be a hinderance to development of tourism facilities in this area.

6. Land use relating to transportation and utilities infrastructural.
Land use policy has certain implications to the development of infrastructure systems which must be considered.

Locational land use policies can influence the potential for difficulty with the traffic and transportation system. If possible it would be best to develop a land use pattern which would minimize the interaction of local traffic with traffic on Route 54. Of course, basic decisions relating to transportation planning itself can strongly influence this interaction (for example the vertical separation of Route 54 from the major local arteries and pedestrian network which was discussed earlier), but by avoiding stringing out major traffic generators along Route 54, the number of major intersection crossings can be greatly reduced.

Another aspect of land use related to the traffic system is the use of buffers to reduce the negative impact of traffic on other land uses and pedestrian. In its simplest form, such a buffer can take the form of nothing more than trees and other planting along the edge of a sidewalk, but can be more elaborate and consist of an actual strip of land along the roadway which is nicely landscaped and provides a clean separation from automobile traffic and other land uses. As a matter of policy it is recommended that wherever possible such buffers be developed along the roadways in the Nimas Village Cluster and especially in the new development area established in this plan and along Route 54 as it passes through the Village of Nimas and the new development areas. In the matter of traffic buffers, the Nimas area is more fortunate than other areas because it is relatively easy to grow the vegetation needed to create very pleasant green zones along the streets. In fact because of the extent of agricultural activity, there are many existing cultivated areas which with proper detailed planning could be utilized both as active agricultural areas and as very pleasant green buffers.

Land use intensity can also be an important factor in influencing the success of the traffic network. This is one of the reasons that the location of new development in a single, consolidated area is recommended. By locating functions such as commercial, institutional and governmental as well as new residential areas in one relatively

compact development zone, the traffic network serving and connecting these functions can be developed with maximum efficiency.

Similar benefits for efficiency accrue to other infrastructure systems when land use intensity is well planned. By creating new development in a relatively compact way with a clear structure and organization of the various functions, the development of utility systems-water, electricity, sewage etc. can be accomplished with maximum efficiency. For this reason as well as others presented earlier, it is recommended that as a matter of policy, new development in the Nimas Village Cluster be limited to the vacant, non-agricultural zone between Village Groups A and B in order to create optimum land use intensity.

7. Recreation and conservation land use.
As seen previously, total land used for recreation will be greatly increased by 1995. This is due to the fact that there is presently so little land used for recreational purposes. Not only will the increase in recreation land use benefit the everyday social lives of the residents of the Nimas Village Cluster, but it will also greatly improve the potential for development of tourism as a viable function. Because of this dual function of recreational land, location policy for recreation land use has two basic parameters:
- A. Land intended for use as recreation primarily for residents of the Village Cluster or any of its subdivisions should be located near its intended users at each level. For example, the playgrounds (see Appendix-Planning Standards A-2-2-4) should be located adjacent to or very near the elementary schools which they serve, the level 1 playfields should be situated in close proximity to the intermediate schools, etc.
 - B. Land intended primarily for use as recreation for a larger population and as part of potential tourism development should for the most part be located along the escarpment with connections to a connector network which bridges Route 54 and integrates such recreational land into the overall planned structure of the Village Cluster.
8. Land Use on the outskirts and periphery.
Land use policies and controls for the outskirts and periphery of the Nimas Village Cluster do not have the same urgency as such policies would have in large cities. Because the Nimas area is rural and agricultural and because the settled population is relatively

small, there will be relatively little development pressure outside of the central areas of planned new development. Nonetheless it should be emphasized that in order to control potential deleterious development on the outskirts of the Village Cluster two policy considerations should be strictly applied to these areas.

- A. Agricultural land should be strictly conserved everywhere including peripheral areas.
- B. Undesirable and unsightly development along Route 54 at the outskirts of the village cluster should be strictly controlled.

9-2 MASTER PLAN

9-2-1 MASTER PLAN CONCEPT AND BASIC ORGANIZATION

The master plan presented here represents a comprehensive basic guideline for land use and development implementation. As such it represents the basic intent of the planners and the requirements of the Ministry and other government agencies and personnel. The information given in this report incorporates a number of planning and implementation tools which are intended for use by subsequent planners to facilitate the process of development implementation. Among these tools are the following:

1. Policy Statements.
Policy statements for future development have been derived from considerations developed in the Alternative Strategies Report and the Preliminary Master Plan. They have been presented in this report in detailed discussions in preceding chapters relating to specific elements of the master plan and are reviewed later in this chapter.
2. Land Use Plan.
The land use plan (or Master Plan-Figure 9-2-1) is a graphic representation of specific recommendations for application of the policy statement to the actual geographic and topographic conditions of the Nimas Village Cluster in a suitably structured manner.
3. Phasing Plan.
The phasing plan represents the timing sequence for future development during the 20 year planning period. This sequence is important in order to assure that as the population grows and other developmental changes occur, adequate facilities of every sort are provided in proper proportion to this growth and change.

4. Action Area Delineation
The delineation of proposed action areas is presented in order to communicate to those charged with implementation, the planners' priorities for areas of the master plan requiring immediate implementation.
5. Zoning Ordinance
The zoning ordinance is presented as a recommendation for a tool to control development in a way consistent with recommended or permissible land use as represented in this master plan.
6. Statement of administrative policy recommendations and control guidelines.
Chapter 10 is devoted to a discussion of suggestions and recommendations for a methodology by which this master plan and its component policies may be carried out by the controlling government agencies.

As was discussed in Chapter 1 (Section 1-2-7) relating to planning methodology and implementation, these tools must be used in such a way that a substantial amount of future modification is allowed. This approach is considered absolutely essential in the implementation of a long range master plan such as this because conditions will undoubtedly change in ways which cannot be predicted at this time. Consequently flexibility and adaptability are absolutely essential elements in both planning and implementation if this (or any) long range physical master plan is to be successful.

Periodic examination and revision by the planners of the Southern Region branch of the TPO will assure that changing conditions and modifications of policy will be accommodated in a manner consistent with the intent of this master plan.

Previous chapters in this report have discussed in detail recommendations for policy. Several of these policy recommendations have a direct affect on the physical characteristics of the master plan presented in this chapter. Among these key policies are the following:

1. There should be maximum conservation of prime agricultural land with some increase due to improved water harvesting and irrigation. Incursion of new built-up development on existing agricultural lands should be avoided.
2. There should be conservation and improvement of agricultural villages at sizes to produce a proper labor-land balance.

3. Educational institutions should be distributed properly according to the standards presented in the Appendix. Consolidation of areas devoted to secondary and other higher education for both boys education and girls education should take place.
4. Government offices should be consolidated in the planned government center.
5. Main commercial areas should be consolidated and integrated with existing Nimas sq. This commercial center should be used as a connector between the old Village of Nimas and the new development area.
6. New built-up development should be located in non-agricultural moderately hilly and rocky areas between Village Groups A and B.
7. A green pedestrian network should be an underlying structure of facility distribution. This green network can function as an element of the Village Cluster park.
8. There should be a hierarchical distribution of facilities and roads in order to promote convenience, good access, group privacy for residents and the development of buffers to separate incompatible land uses.
9. Route 54 should be minimized as a barrier to integration of development on its east and west sides by creating a vertical separation between it and major local arteries and pedestrian ways.
10. There should be convenient and direct access to facilities with a service area larger than the Village Cluster for users coming from outside this area.
11. Land use should be planned in such a way that promotes development of efficient infrastructure systems, especially in areas of new built-up development which will have a higher land use intensity than existing areas of development.

These key policies as well as others presented in earlier chapters must be organized in such a way that a physical structure for future development may be synthesized. It is this synthesis of form which has resulted in the master plan presented here. The underlying physical organization of the plan is based on a number of physical structure elements including the following (refer to Figure 9-2-1)

1. Hilltop Connector

This element - an east - west spine - forms the basic skeletal structure of the new development area between Village Groups A and B. It connects the low lying hills at either end of the rocky crescent shaped non-agricultural area mentioned earlier. It is formed by two paral-

lel arterial roadways along which major facilities of the village cluster are located. This spine crosses Route 54 and although a vertical separation here is recommended, it is connected to this important regional artery to provide a proper hierarchical relationship between regional and local roadways and to provide easy access between these two levels.

This hilltop connector spine contains a linear green space at its center which functions as an element of the Village Cluster Park and connects the facilities located along the spine. With a southward reaching branch, this linear green space provides a pedestrian connection between all three village groups of the Nimas Village Cluster.

2. Northwest-Southeast Village Connector roads. The traditional and natural direction of village development has been from northwest to southeast along a line roughly paralleling the escarpment. There are several existing transportation tracks in this direction which connect small villages. This master plan upgrades these to local arteries and incorporates them as crossing elements in the hilltop connector spine. In this way, villages and population located along the traditional routes of movement are provided integral links to the new development area. These roads provide good opportunity for the development of new residential areas with direct and convenient access to the facilities located along the hilltop connector spine.
3. Cul-de-sac loops for agricultural villages. Because many of the smaller villages of the Nimas Village Cluster are in somewhat isolated locations, their connection to the main transportation network is by means of cul-de-sac access routes. The use of cul-de-sacs in these situations enables the smaller villages to have convenient modern roadway connection to the larger population center without the risk of disruption which might occur if a through-street network were constructed. An added advantage is that the use of cul-de-sacs in these cases would save substantial amounts of costly acquisition and construction, and would conserve agricultural land which would be lost if a through-street network were constructed connecting these villages.
4. Pedestrian Footpath Network. In any area where development results in rapid expansion of the roadway network and greatly increased use of the automobile, it is felt to be essential that some kind of comprehensive pedestrian foot path network is maintained. This will insure that pedestrians are neither

FIGURE 9-2-1(a)
1995 PROPOSED
MASTER PLAN

scale 1:20,000

FIGURE 9-2-1 (b)
1995 PROPOSED
MASTER PLAN
NIMAS CENTRAL AREA

scale 1:10,000

elementary school and playground for boys	EB
elementary school and playground for girls	EG
intermediate school and playfield-level 1 for boys	IB
intermediate school and playfield-level 1 for girls	IG
secondary school and playfield-level 2 for boys	SB
secondary school and playfield-level 2 for girls	SG
teachers' school for boys	TB
teachers' school for girls	TG
technical school for boys	VB
technical school for girls	VG
colleges	U
special college	SU
"village group" park	VP
"village cluster" park or small city park	CP
city park or "emirate" park	P
mosque	SM
jami'a mosque	JM
eid mosque	M
village group center	VC
village cluster community center	CC
municipal center (emirate cultural center)	C
pharmacy	PH
village cluster diagnosis and treatment center	DT
general hospital	H
special hospitals and nursing home	SH
village group shopping center	VS
village cluster shopping center	CS
sub-regional shopping center	S
fire station	FS
post offices	PO
police station	PS
government offices	G

- *1
- *2
- *3

NOTES:












- *1 Existing facilities.
- *2 Facilities proposed and approved by the Military of Municipal and Rural Affairs as of April 1978.
- *3 Facilities newly proposed by the Master Plan in addition to those identified in *1 and *2.

Facilities are distributed according to the community structure established in accordance with Planning Standards. Facilities for neighborhoods, sub-communities, communities, and the city have been shown, but these for residential unit groups have been included as part of the general service requirements of the residential neighborhoods, hence are not shown in this plan. For further details concerning the service population, function, area, and other requirements for various facilities, see Appendix, Planning Standards.

governmental and civic center	1
general hospital	2
boys educational center	3
girls educational center	4
agricultural processing	5

NOTES:

1. For a detailed discussion of zoning classification and requirements, see Southern Region, Final Physical Plan, Sec. 13-3, Legislation and Regulations.
2. Principal land use is the predominant land use activity associated with each zoning classification. See Summary of Permitted uses for classes of detailed land uses permitted for each zoning classification.
3. Non-agricultural conservation includes recreation, scenic, and, in Jizan, coastal conservation area.
4. Restricted development area is land unsuitable for development due to unfavorable topographic or geological conditions, land reserved for traffic and industrial buffer areas or land specially reserved for future use.



Zoning Classification	Principal Land Use	
A1	Class I agricultural land	
A2	Class II agricultural land	
A3	Agricultural residential	
R1	Low density residential	
B	Business and commercial	
M	Industrial and warehousing	
P1	Government and civic	
P2	Institutional	
Special District Classification	Principal Land Use	
S1	Recreational	
S2	Non-agricultural conservation	
S4	Restricted Development	

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FIGURE 9-2-1(a)
1995 PROPOSED MASTER
PLAN, NIMAS VILLAGE
CLUSTER

scale 1:20,000

-  large exposed boulders
-  moderate out-cropping *1

*1 partially existing lands are
converted to development lands

For further details of developed lands,
refer to Chapter 3,4,5,6,7, and 8
and especially for the Central area,
refer to Fig.9-2-1(b).



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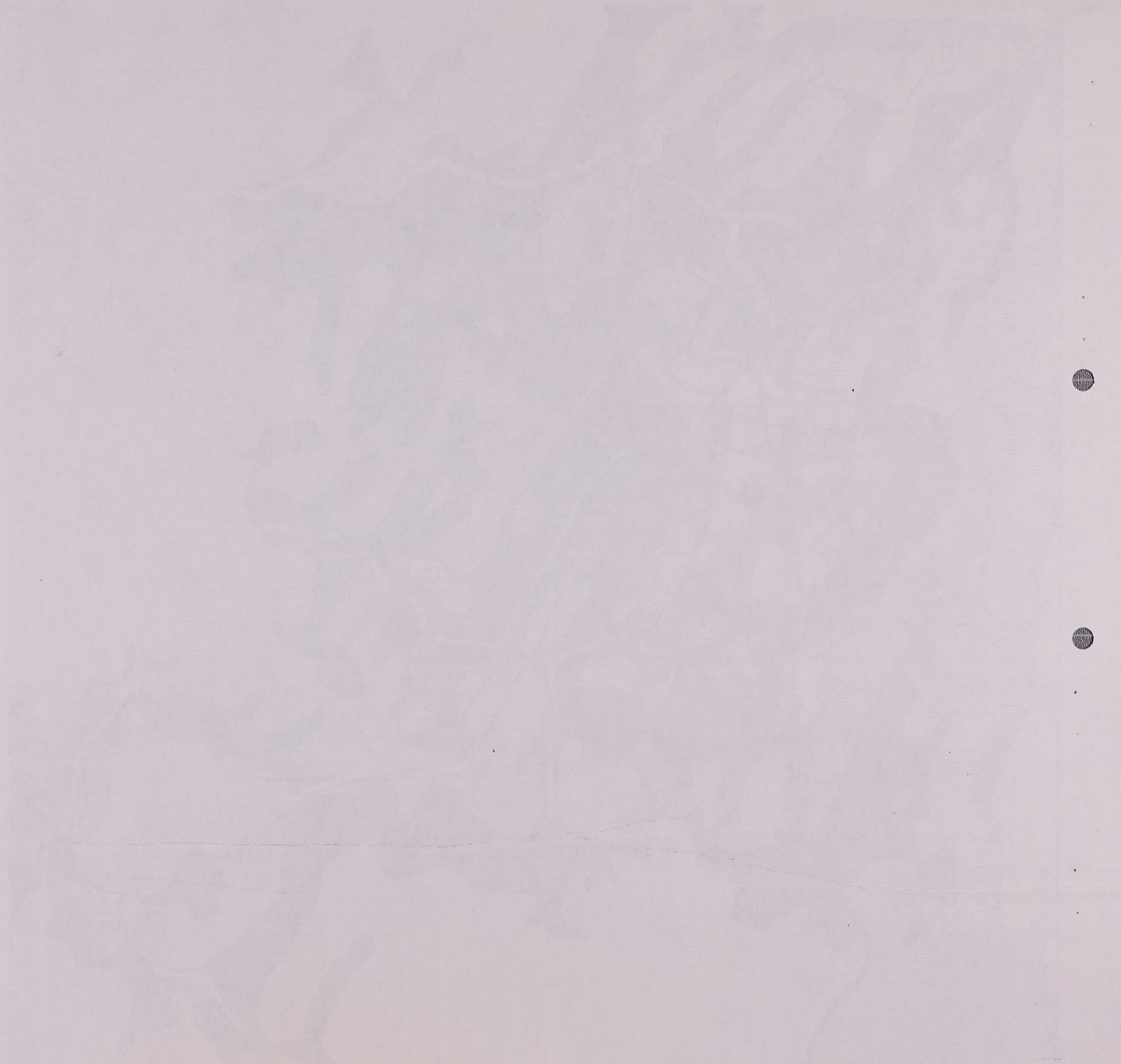
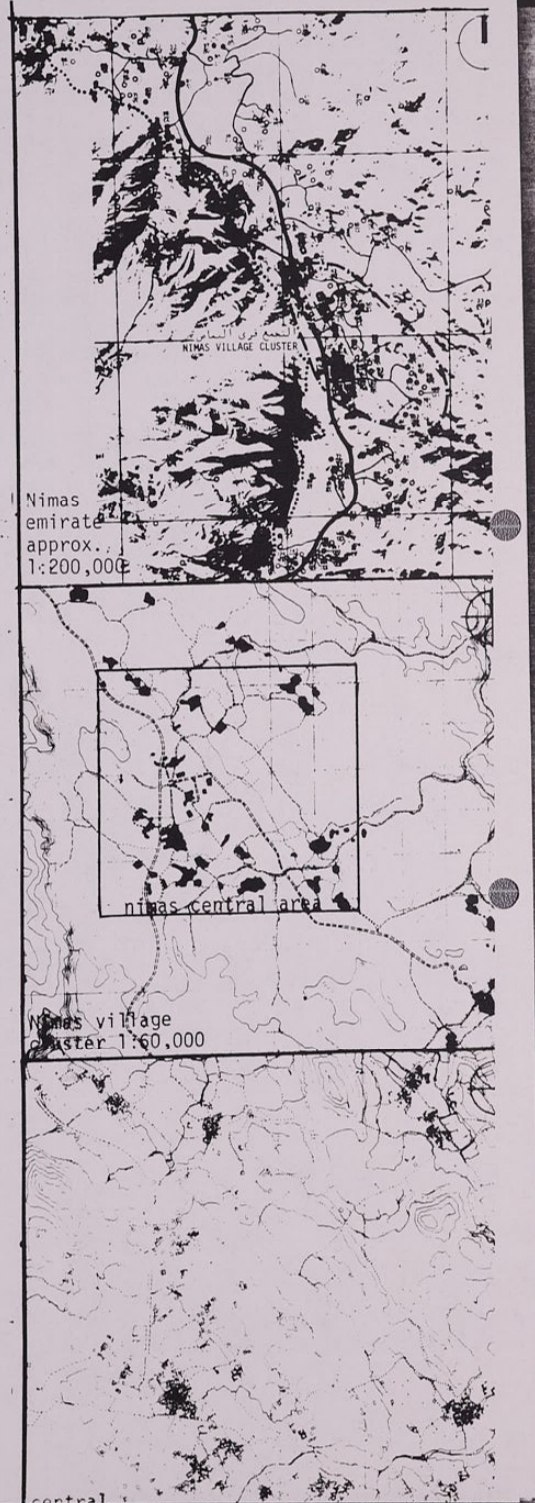




FIGURE 9-2-1(b)
1995 PROPOSED
MASTER PLAN
NIMAS CENTRAL
AREA



نيماتى قىلىسى
NIMAS VILLAGE CLUSTER

Nimas
emirate
approx.
1:200,000

nimas central area

Nimas village
cluster 1:60,000

Central



inconvenienced nor endangered by automobile traffic, a particular concern in rural areas such as Nimas where pedestrians are often forced to share the roads with auto and truck traffic.

In the Nimas Village Cluster, existing agricultural footpaths can be improved, extended and integrated into the overall structure of planned development in such a way that smaller scale facilities are located along them.

5. Commercial Area Integration.

Because this master plan shifts the center of activity slightly to the north of the existing Village of Nimas, it is felt to be important that a strong physical/functional connection exist between the old village and the new development in order to integrate the old village into the overall structure and thus maintain its historic importance.

This is done by modernizing and improving the existing sq or the north end of the village and extending a linear commercial area from there to the heart of the new development. Since shopping is an important and everyday activity, such a connection will provide a crucial and enduring link between the old and the new areas. In this way, the old Village of Nimas with its historic tradition will become one of the most important elements in the new plan without losing its own valuable identity, character and aesthetic quality. These would be greatly endangered if it were to be surrounded by new development and altered by the construction of new roads through the village.

6. Separation of Functions.

Because major areas of land use such as educational centers, government centers, commercial centers generate their own particular kind of activity, and function in ways which could affect adjacent functions such as residential areas, this plan creates several distinct land use areas each devoted primarily to a particular type of function. This approach in efficiencies of concentration and will, with proper detailed design reduce the possibility of negative impact to adjacent uses.

At the same time it is felt that such functions must not be separated from the vitalizing influence of the residential areas. For this reason, such centers of functions are distributed along the hilltop connector spine along with areas of residential development. In this way an active vitality may be maintained even at times when some functions are not in operation.

7. Limited Major Intersections

It is felt that in a situation such as this where areas of population and facilities distribution occur on both sides of a major highway, it is best to minimize the number of intersections between local roads and the highway. For this reason, there are only two major local arteries which cross Route 54 and these are recommended to be vertically separated from the highway (either by depressing Route 54 in this area or by raising these two local roads). In this way a proper hierarchy of roads and intersections is established so that local traffic and regional traffic do not come into conflict with each other.

These major elements of physical structure are crucial to the master plan presented here and represent a physical synthesis of policy recommendations presented in this report.

9-2-2 LAND USE PLAN

As mentioned previously, the land use plan shown in Figure 9-2-1 represents a graphic representation of specific recommendations for application of the policy statements to the actual geographic and topographic conditions of the Nimas Village Cluster. It shows the basic thematic structure of the master plan for future development and indicates general areas of intended land use.

The land use plan consists of several categories of use which are general enough to include all intended functions, yet are able to provide a clear distinction between areas of markedly different use. These land use categories represent either typical, primary or most important use in the sub areas which they delineate.

Since many, many specific functions may be included in each category, detailed specifications for use are not considered important or useful at this level of planning, and the following general definitions of land use categories are given in order to provide guidelines for interpretation of the plan by future planners and implementors.

Land Use Categories:

1. Residential

Residential areas are those whose primary function is to provide space for housing and small scale facilities directly related to the occupants of that housing (e.g. small scale convenience stores). Detailed discussions of residential facilities and their locational relationships to the residential areas which they

serve are given in the Appendix-Planning Standards.

2. Business and Commercial.
This category is used to designate major areas intended for private business and commercial enterprises. Areas of small convenience scale commercial are not designated thus, but are included in the residential or other designations.
3. Institutional.
The institutional designation delineates major areas of use by public institutions (excluding government) such as schools, other educational facilities, hospitals and other health facilities.
4. Government and Civic
This designation indicates use by government offices at every level of government-national, regional, Emirate and municipal - as well as courts, police, military etc. Also included are civic facilities meant for public use such as meeting places and auditoriums.
5. Industrial
Included in this designation are both private industrial uses such as factories, manufacturing plants and processing plants and public utility plants such as electric generating plants, sewage treatment plants and water works
6. Recreational
Recreational land use includes parks and large scale playfields (small playfields and playgrounds are included as integral parts of residential or institutional land use) and non-agricultural conservation lands intended for public use.
7. Agriculture
This land use is divided into two categories - Class I and Class II agricultural land. The definitions of these sub-categories are given in Section 2-4-3 of this report.
8. Geological and Topographic Features.
In the Nimas area this category is composed of two sub-categories which are considered important for planning purposes. Areas of large exposed boulders are unsuitable for agricultural use and either unsuitable or very difficult for built-up uses. Areas of moderate outcropping of rocks are unsuitable for agriculture, but suitable with preparation for built-up uses. It is these moderate outcropping areas which will be used for most of the future built-up development in the Nimas Village Cluster.
9. Vacant Land
This category includes all land not covered by one of the other categories and is unused in this Master Plan.

In the Master Plan for the Nimas Village Cluster presented here, agricultural land accounts for by far the largest use (excluding unsuitable and unused land) which reinforces its traditional economic base. The hilltop connector spine discussed earlier creates a skeletal structure for built-up land development in an area which avoids destruction or conversion of any valuable agricultural land.

This Hilltop Connector is an east west linear spine located just to the north of the Village of Nimas between Village Groups A and B. The primary area of commercial land use stretches from the old suq at the north end of the Village of Nimas to the heart of the new development zone where the two primary local arterial roads cross Route 54.

At the west end of the spine near the edge of the escarpment on the west side of Route 54 is the proposed Girls education center including intermediate, secondary and teachers training schools which serve the population of the entire village cluster and other areas of the Emirate. It should again be pointed out that because of the location of this educational facility, a good traffic-free pedestrian connection must be developed to link this area with the areas of the Village Cluster east of Route 54. This location for the Girls' Education Center is considered ideal because it provides very easy access to all the residents of the Nimas Village Cluster as well as to those coming from other sections of the Emirate or Region to attend the educational facilities located here. In addition it is located at the edge of the proposed Emirate Park at the edge of the escarpment providing a pleasant environment and more privacy than would exist at other possible locations.

Also located in this western area is the water works which will expand from its present size but remain in essentially the same location.

Between the Girls Education Center and Route 54 is a proposed new residential area just across the highway from a new commercial area at the north end of the linear commercial district. To the east of this commercial district are an agricultural area and another new residential development area. Just to the east of this residential and the new government center which is already under construction. Although the location of these two areas is very slightly shifted, it is essentially the same as that of the 1972 TPO plan (compare the location of the hospital and government center in this master plan with that of the TPO master plan shown in Figure 2-13-1).

Beyond the planned hospital and government center, the hilltop connector spine turns to the north east where another new residential area is proposed. At the eastern-most end of the new development zone is the proposed Boys Education Center and an area for light industry.

Like the proposed Girls Education Center, the Boys Education Center includes intermediate, secondary, and teachers training schools which serve the population of the entire Village Cluster as well as other areas of the Emirate. Also included in the Boys Education Center is a proposed agricultural center with experimental farms for research and training. This is considered a good location for such a facility both because in general it is at the center of a productive agricultural zone and specifically because this location is adjacent to areas of every soil condition of the Nimas Village Cluster thus facilitating research on types of soil other than Class I agricultural land - a valuable asset for agricultural research in a region with large amounts of poor quality agricultural land.

The area designated for light industry will include such uses as light manufacturing and agricultural processing plants. Although this type of industry will cause few pollution problems, the location of this industrial area at the north east of the populated areas of the Village Cluster will result in most of the pollution which is created to be blown away from most of the population areas due to the prevailing southwest wind.

It should be pointed out that at this level of planning, exact boundaries for land use districts are neither necessary nor recommended. For this reason, the land use plan presented here should be viewed as a structural guideline for future planning and implementation. For this reason it is expected that there will be some deviation in location and boundaries as this plan is implemented over the 20 year planning period.

On the other hand, once this basic structure has been accepted, as the guideline for future growth, zoning ordinances should be drawn up which can be used to enforce the specific manifestations of the land use policies presented in this report.

The relationship this land use plan to a zoning plan indicating permissible use should perhaps be discussed here. This land use plan presents a map showing major categories of intended use. As such it represents the intentions of the planners and the agencies such as the Ministries and the TPO from which the planners received input and

guidance. No responsible planner can expect or assume that the detailed intentions of a large, long-range master plan such as this will be carried out in every respect. Some flexibility and adaptability must be allowed.

A zoning plan provides a certain measure of such flexibility and adaptability, for a zoning plan indicates land use areas not by what is intended by the planners, but by what is permissible to the planners and the controlling government authorities.

Thus, for example, although the land use plan may designate an area as "residential", the zoning plan for the same area may permit not only residential uses but small scale commercial and business uses. In addition the zoning plan would indicate detailed characteristics of permissible housing such as density or height restrictions.

As another example where the land use plan designates commercial development, the zoning plan for the same area might permit not only commercial but educational, government offices or health care facilities. Of course these are only examples and specific zoning regulations must be indicated for all areas, but they illustrate the purpose of the land use master plan presented here and its relation to the zoning plan.

9-3 PHASING

9-3-1 PHASE I, 1975-1980

The phasing plan represents a sequential ordering of priorities for development over the 20 year planning period. Obviously it is unnecessary to complete all aspects of the plan immediately, since many aspects are dependent upon population which will grow only gradually over the planning period. On the other hand, some elements of the plan must be completed proportionately faster than the growth of the population because the need is immediate. The distribution and phasing of projected land use is shown in Table 9-2-1 for a three phase development. The major characteristics of phase I of development are as follows:

In general during the first phase (1975-1980) there should be an initial appraisal of necessary measures to be taken in order to achieve implementation of the master plan. Certain areas and projects should be identified and designated for immediate action (see Section 9-4), identification and acquisition planning for future land require-

Table 9-2-1
PHASING AND PROJECTED LAND USE,
NIMAS VILLAGE CLUSTER AREA (ha)^a

		1975 EXISTING LAND USE		1980		1985		1995					
RESIDENTIAL	VILLAGE TYPE	56.3	60.6	59.7	69.1	82.9	78.6	70.5	101.5				
	URBAN TYPE	4.3		9.4		15.7		31.0					
EDUCATIONAL ^b	NURSERY-KINDERGARTEN	0	3.1	9.2	0.1	8.5	42.1	0.1	14.1	66.1	0.2	25.5	99.7
	BOYS ELEMENTARY	1.1			1.8			2.5			3.8		
	BOYS INTERMEDIATE	0.9			1.3			1.6			2.2		
	BOYS SECONDARY	0.4			2.0			3.6			7.0		
	BOYS HIGHER EDUCATION	0.1			0.5			1.0			2.0		
	GIRLS ELEMENTARY	0.6			1.1			1.8			3.3		
	GIRLS INTERMEDIATE				0.4			0.9			1.8		
	GIRLS SECONDARY				0.9			1.7			3.4		
	GIRLS HIGHER EDUCATION				0.4			3.4			1.8		
RECREATIONAL	TOT-LOT	0	0		2.8	9.8		4.2	18.1		5.5	32.3	
	PLAY-LOT	0			0.9			1.8			3.8		
	VILLAGE GROUP PARK	0			1.5			2.9			5.8		
	VILLAGE CLUSTER PARK	0			1.2			2.4			4.7		
	EMIRATE PARK	0			3.4			6.8			12.5		
RELIGIOUS AND CEMETERY	MOSQUE	0.3	3.3		0.6	4.2		1.1	6.0		1.1	7.3	
	JAMIA MOSQUE	0			0			0.7			0.7		
	CEMETERY	3.0			3.6			4.2			5.5		
SOCIAL- CULTURAL	VILLAGE GROUP CENTER	0	0		0.5	1.7		1.0	2.9		1.0	3.5	
	VILLAGE CLUSTER CENTER	0			0.3			0.5			0.6		
	EMIRATE CENTER	0			0.9			1.4			1.0		
HEALTH FACILITIES	PHARMACY	0.1	0.1		0.1	3.5		0.2	7.0		0.3	8.1	
	VILLAGE CLUSTER TREATMENT	0			0.1			0.2			0.3		
	GENERAL HOSPITAL	0			3.1			3.0			3.0		
	SPACIAL HOSPITAL	0			0			3.6			4.5		
COMMERCIAL	VILLAGE GROUP SHOPPING	0	0.5		2.4	4.7		2.8	5.3		3.6	6.8	
	VILLAGE CLUSTER SHOPPING	0			0.3			0.3			0.4		
	SUB-REGION COMMERCIAL	0.5			2.0			2.2			2.8		
ADMINISTRAT- ION AND PUBLIC SERVICE	GOVERNMENT OFFICES	2.0	2.2		9.0	9.2		12.5	12.7		16.0	16.2	
	FIRE STATION	0.2			0.2			0.2			0.2		
STREET	ARTERIAL/COLLECTOR (v3/v4)	27.0		34.0	30.0		45.0	36.0		59.0	36.0	75.0	
	DISTRIBUTOR-LOCAL ROAD (v5)	7.0			15.0			23.0			39.0		
AGRICULTURAL	IRRIGATED	715.0		953.0	255.0		993.0	795.0		1033.0	820.0	060.0	
	DRY FARMING	238.0			238.0			238.0			240.0		
TOTAL LAND USE				1056.8			1149.2			1236.7		1336.2	
UNUSED & VACANT LAND				1855.2			1762.8			1675.3		1575.8	

NOTES:

- a. For a detailed explanation of each component, see the policy chapters related to those components. Also see section 11-2 for phasing. The total land area of the Nimas Village Cluster is defined in this plan as comprising an area of about 5.2 km by 5.6 km or about 2912 ha.
- b. For boys and girls elementary, intermediate and secondary schools, the appropriate playgrounds and playfields are included in the educational land areas. For further details see the appropriate sections of chapters 5 and 6.

ments should be undertaken, and certain necessary projects involving infrastructure implementation should be started.

During Phase I, land use and density zoning should be put into effect, and designation of agricultural-historic and natural conservation areas should be completed by the end of Phase I. Areas to be designated as parks. (at every level - see Appendix; Planning Standards) should be determined and set aside.

By 1980, the population of the Nimas Village Cluster will have reached almost 12,000 with over half living in Village Group B. At this point there should be at least one boys and one girls elementary school in Village Groups A and B with the children from Village Group C sharing the facilities of Village Group B. Village Group B will contain a boys intermediate and girls intermediate and a boys secondary and girls secondary school at existing locations. Detailed planning should be underway for the Boys Education Center and the Girls Education Center to which the intermediate and secondary education functions will be moved.

In conjunction with the phased school completion, there will be one Sub-Village Group Center (equivalent to the Neighborhood Centers in the Cities) for each elementary school pair (boy-girl). Although in 1980, the Village Cluster will have a population of about 8,100 which is sufficient to justify the existence of a Village Cluster Center for meetings, adult education, entertainment etc. which are of concern to the whole Village Cluster. It should be pointed out that some of the functions of the Sub-Village Group Center and the Village Cluster Center are appropriately provided by the mosques, and it is recommended that the development of these social/cultural/entertainment centers be carried out in close conjunction with the mosques at appropriate levels.

Comprehensive detailed plans for the new development area between Village Groups A and B as well as the commercial zone connection to the old Village of Nimas should be completed during Phase I, and implementation of some of the central areas begun.

The comprehensive and detailed planning for basic infrastructure systems including roads, water sewer and electric lines should be completed during Phase I, and implementation of arterial and collector level roads as well as distributor level roads in the central area should be underway.

The establishment of programs for conservation, both natural and historic, should be accomplished in Phase I and educational programs to support conservation should be started in the schools.

9-3-2 PHASE II, 1980-1985

During the second phase (1980-1985) implementation utility infrastructure systems should be well underway for all areas identified in Chapter 8. The road network for the new development zone should be completed along with roads connecting this new development to outlying villages.

New housing districts should be developed at a rate sufficient to keep pace with the rising population, decreasing household size and replacement of obsolescent housing. By the end of Phase II, housing in the denser areas must double in land area from present level to about 9.4 ha. These denser residential areas will all occur in the new development zone.

By the end of Phase II, there should be an additional boy-girls pair of elementary schools should be built in Village Group C. This means that by 1985 there will be a total of 4 pairs of elementary schools in the Nimas Village Cluster. Implementation of basic facilities at the boys educational Center and the Girls Educational Center should be complete. This includes boys and girls intermediate schools and boys and girls secondary schools as well as teacher training facilities. The facilities at the two Education Centers should be implemented in such a way that modular expansion may be carried out over the final 10 years of the planning period to keep pace with the increasing population.

As mentioned before, the number of Sub-Village Group Centers should equal the number of elementary school pairs so by 1985 there should be four of these facilities in the Nimas Village Cluster. The Village Group Center established in Phase I should be expanded and improved and made capable of modular expansion over the final 10 years of the planning period so that its size can keep pace with projected population growth.

During Phase II, full implementation of the proposed Government Center and the new hospital should be completed. Manufacturing and industries should be consolidated in the industrial land use zone. Action area projects identified during Phase I should be completed during Phase II.

During this phase the park areas set aside in Phase I should be improved by the implementation of pathways, picnic areas and public sanitary facilities.

9-3-4 PHASE III, 1985-1995

Phase III encompasses the final 10 years of the planning period of this 20 year master plan. If development up to this point has proceeded smoothly without significant time delays, much of the Government's basic capital improvements (and this investment) will already be complete by the start of Phase III. Beyond this point, most capital investment should come from the private sector. Government programs during this phase will be primarily aimed at completing already begun in earlier phases. The roadway network, sewer, water and electric lines, the new government center, the new hospital and the two Educational Centers should already be substantially complete or should be completed (except for future planned modular expansion) in the first half of Phase III.

By the end of Phase III, the population of the Nimas Village Cluster will reach about 11,600, making it almost the size of a small city. By this time all of the planned new residential areas will have reached their capacity at the planned densities and increases and improvements in agricultural village residential areas will have been completed.

At the end of Phase III, there will be seven elementary school districts - 2 in Village Group A, 4 in Village Group B and 1 in Village Group C - each with a boys and a girls elementary school. The Boys Education Center on the eastern end of the new development zone and the Girls Educational Center at the western end of this zone will be complete at this time.

There will be seven Sub-Village Group Centers to correspond with the elementary school districts, and the Village Cluster Center will be completed and functioning as the social and cultural center of the Village Cluster.

9-4 PROPOSED ACTION AREAS

A number of elements of this plan must be given high priority for immediate detailed planning and implementation. Among these are:

1. Improvement of the old Village of Nimas and the development of a basic structure by which the old sq may be expanded to the north to form a new central commercial zone.
2. Land use zoning density zoning and land acquisition planning and implementation.

3. Infrastructure development in the old Village of Nimas and in the new development zone.
4. Improvement of water harvesting and irrigation and consequent improvement of agricultural lands
5. Establishment of parks and conservation districts to both improve the quality of life of the Village Cluster residents and to prepare for potential development of a domestic tourism industry.
6. Establishment of the basic physical structure (e.g. roads) in the new development area.

These elements are each part of the early phases of the development plan, but it is felt that they deserve particular attention in order to quickly establish the course of future development.

10. master plan

10-1 TOWN PLANNING LEGISLATION AND ADMINISTRATION

10-1-1 EXISTING LEGISLATION AND ADMINISTRATION

The main responsibility for urban and regional planning lies with the Deputy Ministry for Town Planning Affairs. The office for the Southern Region is the Department of Town Planning in Abha, which coordinates regional planning activities. However, the responsibility of the Abha office is somewhat attenuated and it cannot plan new facilities without the approval of the Deputy Ministry of Riyadh. It is believed that the responsibilities and decision makings of the department of town planning in Abha should be increased, that is to enable the department to avoid delays and to meet the local need and requirements of the Southern Region.

Just recently since the Preliminary Master Plan was completed, the authority of the Department of Town Planning in Abha has been modified somewhat so that this office has more control over Ministry projects which are done in the Southern Region. This shifting of responsibility is viewed by the consultant as a most wise and desirable policy.

10-1-2 PROPOSED MANAGEMENT FRAMEWORK

The proposed management framework must overcome existing problems in the administrative and legislative spheres by achieving a proper balance between centralization and decentralization.

It is suggested first that the Master Plan be read into existing law to eliminate some of these problems. Second, it is proposed that the planning process be decentralized by making the Deputy Ministry in Riyadh responsible only for long-range planning. Offices on the local, regional and municipal levels should then be allowed to interpret and execute the Plan without further consulting Riyadh. The delegation of authority should make the process more efficient, more responsive to local needs, and less cumbersome. Third, a comprehensive management framework requires enacting a general zoning act, tailoring each city's Master Plan to it and thereby creating a zoning map for each city.

Fourth, the Deputy Ministry for Town Planning should have an annual budget, with only very general guidelines given as to the allocation of funds and the specifics left to the municipal office in question. Presently, there must be an item-by-item approval from Riyadh to the point where if a new fence is built in Khamis Mushayt, it cannot be done without prior approval from the Deputy Ministry. Clearly the Deputy Ministry must still continue to have some control over the trade-off of funds from sector to sector.

Finally, there should be a review system by which consultants doing work for the ministry make continual presentations to the TPO on the progress of work and the TPO responds with continual feedback. There should be an annual review procedure by which the Ministry in Riyadh, the TPO in Abha and the contracting consultants may apprise each other of the progress of work, problems encountered and projected schedules and priorities.

10-2 DEVELOPMENT AND IMPLEMENTATION PROGRAM

10-2-1 PRIORITIES AND PHASING

Development priorities can be indicated by the phasing of investment and the share of public investment in the total investment requirements. The following general rule is assumed in preparing a public investment schedule: that the standards of facilities in all sectors will be raised by 1985. Furthermore, public investment will by that time be attempting to achieve two objectives simultaneously: raising the standards of existing facilities and providing additional facilities to an increased population. Therefore, public investment seeks to provide a growing population with adequate facilities, while replacing old stock.

There will be a large volume of public investment in the near future. This should be done in accordance with the following guides:

1. The phasing should be done so that maximum speed and efficiency are accomplished, with minimum disruption.
2. Construction of new facilities should be done in a way that favors the broadest level of development as possible and does not favor a particular area except as directed by the plan.
3. Public investment should be done in a way that encourages appropriate private investment.

The extent of Government investment with the total required capital investment program in the Nimas Village Cluster is tentatively estimated as follows:

1. Housing
 - a. Site Development 100%
 - b. Housing Construction 30%
2. Educational Facilities (lease, purchase and construction) 100%
3. Recreation Facilities 80%
4. Social and Religious Facilities 100%
5. Health and Welfare Facilities 100%
6. Commercial Facilities 10%
7. Public Facilities 100%
8. Public Utilities 100%
9. Industrial Facilities 20%
10. Transportation Facilities 100%

Although in many cases 100% Government investment is assumed, it is recognized that in several of these areas, private investment is permitted and at least tacitly encouraged. Therefore depending on the stimulation of private enterprise, the percentage of Government investment in some sectors may be reduced from the assumed 100%.

New parts of the Village Cluster will be developed over time as indicated in the various phases. Investment should in general correspond to overall phasing, with high priority given to the city center and its associated action area, then to completion of plans within the ring road and finally to areas outside the ring road which will only be fully developed in the final phase. Although this general pattern of investment should be followed, it must be recognized that even at early stages, investment problems for later stages (such as land acquisition) may require immediate action. For this reason there may not be a direct relation between actual development priority and phasing and the associated investment.

10-2-2 CAPITAL INVESTMENT PROGRAM

Because of the immediate necessity for infrastructure development as well as the need to quickly purchase land to cover long range plan proposals (the latter need resulting from inordinately difficult and costly land acquisition problems), Government investment should be heaviest during the first two phases. As an estimate it might be assumed that percentages of the total 20 year Government investment program will be split among the three phases at a ratio of 40%, 30%, 30%.

10-3 ZONING REGULATIONS AND ADMINISTRATIVE MEASURES

The purpose of zoning regulations is to safeguard the health, safety and welfare of the community as well as to insure that land is available for the purposes designated in the Plan. With growth and development, legal issues will arise regarding land use. If these are decided on a case-by-case basis, development will be slow and regulatory measures may be undermined.

Zoning is essentially a legal instrument for the implementation of land use aspects of the Master Plan. A zoning ordinance divides the land area within the municipal boundaries into zones; designates the classes of industry, trade, commerce, business, residence, and other purposes for which structures are to be used in each district; and imposes varying standards of development such as setbacks, height, bulk, and other requirements for buildings and other structures to be constructed, rehabilitated, altered, or repaired.

Zoning regulations should be ratified as legal documents and administered by the Building Departments in various municipalities, assisted as necessary by the police and the Shariah courts. Applicants for building permits would have to submit the necessary documentation, including plans and specifications to the Building Department and no permit would be granted for work not in conformity to standards.

In Nimas, the following districts should be established:

1. Agriculture
 - a. High-Intensity (Class I land)
 - b. General Cultivation (Class II land)
 - c. Rangeland
2. Residential
 - a. Medium Density (generally non-agricultural)
 - b. Low Density
3. Business and Commercial
4. Industrial (including Manufacturing and Processing, as well as power plants, sewage treatment plants etc.)
5. Public Use
 - a. Administrative
 - b. Religious
 - c. Health
 - d. Others as necessary
6. Special Use
 - a. Conservation
 - b. Recreation
 - c. Water Harvesting Areas
 - d. Flood Prone Areas
 - e. Others as necessary

It should be pointed out that because of the problems related to land acquisition costs and compensation to landowners for restricted land use, the zoning associated with this master plan should be officially established as soon and as expeditiously as possible. The Ministry and the TPO must also seek methods by which this zoning may be enforced. Since this involves complex questions of law, such methods will have to be worked out in collaboration with all Ministries and other agencies which have jurisdiction over matters of law. Because of the complex and special legal considerations involved, a detailed discussion of this matter here would be inappropriate and is beyond the scope of the consultant's responsibility.

appendix

A-0 INTRODUCTION

Planning standards and community facility design criteria are studied and summarized in this chapter. They are given here as a set of guidelines for facility planning and community grouping strategy. Obviously planning standards should vary from one locality to another reflecting different local needs and conditions. Standards should also vary from one state to the next in the development process reflecting the different constraints of each stage of development. Meanwhile standards applicable to relatively wide ranges of situations are also needed before a locally specific set of standards is created. The general standards are needed to determine or reflect policies for the region or areas covering more than one village cluster. The study here was intended to create a set of standards with ranges wide enough to reflect many of the village clusters' situations yet narrow enough to function as a guideline for the relatively detailed planning. The standards provide recommended rigid target figures as well as their acceptable ranges providing strong guidelines whenever needed, as well as flexibility to adapt to local conditions. The standards are based on our understanding of the planning area and our general knowledge and philosophy gained through experience in other projects.

The standards for most items (such as service radius, population served and required land) depend on residential density and overall population size. In the first section of this appendix, the characteristics of population and its density are summarized for the village cluster for both existing and future situations, providing the basic background reasons for the range of standards and the population grouping described in the later sections. In the second section, planning standards are described for each type of facility. They contain, as mentioned above, the recommended target numbers and their acceptable ranges.

A-1 DEMOGRAPHIC AND DENSITY FRAME FOR STANDARDS

A-1-1 OVERALL POPULATION SIZE

Table A-1-1 shows population of Nimas Emirate, Nimas Village cluster and Nimas Village group and villages in it in 1975 and 1995. Thus, the standards are to be applied not to a large city nor to a completely isolated small rural village. The standards here should cover mainly the population group scale of order of 10^3 (in this

study we refer to this scale as a village group or a village cluster) and the scale of population of order 10^4 (we refer to this scale as the Emirate). The population group scale normally called "Region" (population of order of 10^5) should also be discussed, but the former two scales should be given more emphasis. Sub-groupings of the village group scale (i.e., village and residential unit group) are also discussed.

A-1-2 POPULATION DENSITY

Table A-1-2 summarizes the 1975 and 1995 population densities for Nimas Emirate. The table indicates that density is low in overall Emirate and village cluster areas in 1975 and, therefore, in the next twenty years "in-fill" type of development is natural and recommended rather than "sprawl" type of development. On the other hand, some of the built up village area or village centers are already congested due to the limited area available for residential use rather than for agricultural use. In these areas, the possibility for future in-fill is quite small, and a limited increase of the population is recommended as well as expected in these traditional village areas. The planning standards should reflect these facts.

A-1-3 SCHOOL AGE GROUP DISTRIBUTION

Table A-1-3 shows the per cent share per age of children in the total population. The numbers are based on the results of surveys and studies of comparable situations. From this table it is apparent that there are 3 to 4 children per age per 100 population for the age group 0 to 9, and there are 2 to 3 children per age per 100 population for the age group 10 to 19.

Presently larger numbers of children exist in Nimas than in normal urban areas. In the future, this deviation may be reduced by regaining working age populations back to these areas. Table A-1-3 indicates the range of the population of children taken into consideration in the determination of the standards.

Analysis of the existing distribution of the numbers of boys and girls indicates that boys and girls number basically the same for each age group, and the standards do not need to differentiate between the two, although the ratio of school enrollment may differ between the sexes.

Based on the Table A-1-3, Nursery-Kindergarten enrollment may be estimated by the following method:
If Nursery-Kindergarten (ages 3 to 5) enrollment is 25 or 50% of the total population of that age

Table A-1-1
NIMAS POPULATION 1975 AND 1995^a

	1975	1995	Increase
Villages in Nimas Village Group ^b			
Smallest Village (Al Shaykh)	50	100±	Variable
Largest Village (Nimas)	1,650	3,000	Variable
Nimas Village Group ^c	3,450	6,550	90%
Nimas Village Cluster ^d	7,100	11,640	64%
Nimas Emirate ^e	24,200	37,750	56%

Notes:

- a. Planning Projections.
- b. Village Group B. See Table 3-1-1.
- c. Village Group B. See Table 3-1-3
- d. See Table 3-1-3.
- e. See Table 3-1-2.

Table A-1-2
POPULATION DENSITY 1975 AND 1995 (PPH)

	Approximate Area (ha)	Density (pph)	
		1975	1995
Villages in Nimas Village Group ^a			
Smallest Village (Al Shaykh) ^b	1	50	50
Largest Village (Nimas) ^c	150	11	20
Nimas Village Group ^d	600	6	11
Nimas Village Cluster ^e	3,000	2	4
Nimas Emirate ^f	13,000	2	3

Notes:

- a. Village Group B. See Table 3-1-1.
- b. Approximately 70m x 130m.
- c. Approximately 1 km x 1.5 km.
- d. Village Group B. Approximately 2 km x 3 km.
- e. Approximately 7 km x 4 km.
- f. Approximately 25 km x 5 km.

group, the enrollment may be calculated to be between 2.25% and 6.0% of the total population as shown below:

Table A-1-3
APPLICABLE RANGE OF POPULATION OF CHILDREN FOR PLANNING STANDARDS

Age Group	Number of Children Per 100 Population
0 to 9	3 to 4 Children/age
10 to 19	2 to 3 Children/age

	25% Enrollment	50% Enrollment
3% per age x 3 ages = 9%	9% x 25% = 2.25%	9% x 50% = 4.5%
4% per age x 3 ages = 12%	12% x 25% = 3.0%	12% x 50% = 6.0%

Also based on Table A-1-3, Elementary School enrollment may be derived as following: Elementary School age group is 6 through 11 and the enrollment rate should be very close to 100% for both boys and girls. Therefore 16% to 22% of the total population may be estimated for elementary school enrollment (total of boys and girls) as shown in the following calculation:

$$3\%/age \times 4 \text{ ages (6,7,8 and 9)} + 2\%/age \times 2 \text{ ages (10,11)} = 16\%$$

$$4\%/age \times 4 \text{ ages (6,7,8 and 9)} + 3\%/age \times 2 \text{ ages (10,11)} = 22\%$$

Intermediate School age group is 12 through 14, and close to 100% of the age group population should be enrolled. Intermediate School enrollment thus is estimated to be somewhere between 6% and 9% (total of boys and girls) of the total population:

$$2\%/age \times 3 \text{ ages (12,13 and 14)} = 6\%$$

$$3\%/age \times 3 \text{ ages (12, 13 and 14)} = 9\%$$

For secondard schools, enrollment in 1995 is assumed to be around 50% (boys), 25% (girls) and averages 37.5% (boys and girls) of the age group population (15,16 and 17). Secondard school enrollment is expected to be between 2.25% and 3.30% of the total population:

$$2\%/age \times 3 \text{ ages (15,16 and 17)} \times 37.5\% = 2.25\%$$

$$3\%/age \times 3 \text{ ages (15,16 and 17)} \times 37.5\% = 3.38\%$$

A-1-4 SUMMARY OF DEMOGRAPHIC AND DENSITY FRAMEWORKS

The key elements to be taken into consideration of planning standards, which have been discussed individually, are analyzed as a whole. Table A-1-4 shows potential population grouping on the left hand side, density and enrollment ranges across the top, and the combined implications in terms of land area requirements for each population group, service radii, and school enrollments.

The table indicates, for example, that a population of 10^3 ^a (i.e., an a-multiple of population group 10^3) provides a normally acceptable range of elementary school enrollment per school when the value of a is between 1 and 3, and the resulting elementary school enrollment (160a to 220a) is 160 to 660. In this case the service area (100a to 20a) is 300 ha to 20 ha, and its radius from the center to the edge is 977m to 252m (for densities between 10pph and 50 pph) which is equivalent to 15 to 4 minute walking distance. If one elementary school (if boys' and girls' schools are counted separately, then two schools) is located in this territory then both the number of enrollment per school and the distance to the school are acceptable to the standards recommended. (For lower density case like 5pph, the introduction of the school bus may be recommended, especially for girl students.)

The table also indicates, for another example, that a population of 10^4 ^b (i.e., a b-multiple of population group 10^4) provides a normally acceptable range of intermediate school students per school when the value of b is between 1 and 2, and the resulting intermediate school enrollment (600b to 900b) is 600 to 1800. In this case the service area (2000b) is 2,000 ha to 4,000 ha, and its service radius is 2523m to 1128m (for the density of 5pph is assumed. If one set of boys' and girls' intermediate schools is located in this territory then both the number of enrollment per school and the distance to the school with busing (less than 10 minute busing distance with a speed of 30km/h) are within the acceptable range of the standards recommended.

The table also shows that a population of 10^4 ^c (i.e., a c-multiple of population group 10^4) provides a normally acceptable range of secondary school enrollment per school when the value

Table A-1-4
SUMMARY OF POPULATION GROUP, DENSITY, AND ENROLLMENT

Population Group Range	Density Range				Range of Enrollment							
	5pph		10pph		Nursery Kindergarten	Elementary School	Intermediate School		Secondary School			
	5pph	10pph	50pph	100pph			2.25%	6.0%	16.0%	22.0%	6.0%	9.0%
50	10 ^a (173) ^b	5 (126)	1 (56)	0.5 (40)	1 ^c	3	8	11	3	5	1	2
100	20 (252)	10 (178)	2 (80)	1 (56)	2	6	16	22	6	9	2	3
500	100 (564)	50 (399)	10 (178)	5 (126)	12	30	80	110	30	45	11	17
1000	200 (798)	100 (564)	20 (399)	10 (178)	23	60	160	220	60	90	123	34
5000	1000 (1784)	500 (1262)	100 (564)	50 (397)	115	300	800	1100	300	450	112	169
10000	2000 (2523)	1000 (1784)	200 (798)	100 (564)	230	600	1600	2200	600	900	225	338
50000	10000 (5642)	5000 (3989)	1000 (1784)	500 (1262)	1150	3000	8000	11000	3000	4500	1125	1690

Notes:

- Land area for group population in Hectarea
- Service radius in meters
- School enrollment

Table A-1-5
SUMMARY TABLE OF POPULATION GROUPING

Name of Grouping	Population Range	Approximate Order of Population
Residential Unit Group ^a	less than 100	10
Village ^b	100 - 1,000	10 ²
Village Group	1,000 - 5,000	10 ³
Village Cluster	5,000 - 15,000	10 ⁴
Emirate	greater than 15,000	10 ⁴

Notes:

- Some population groups, such as Al Shaykh, with less than 100 people, are called "villages" for the purposes of this report. They should, however, be considered as belonging to residential unit groups.
- The Village of Nimas is exceptionally large, with a population of 1,650. For planning purposes, it is useful to consider the old section of Nimas separately from the new development area west of the old section.

of c is between 2 to 4, and the resulting enrollment (225c to 338c) is 450 to 1352. In this case, the service area (2000c) is 4000 ha to 8000 ha and the service radius is 3560m to 5046m (for the density which is equivalent to 7 to 10 minute busing distance. if one set of boys' and girls' secondary school is located in this territory then both the number of enrollment per school and the distance to the school are acceptable to the standards recommended.

From these findings, the following observations may be made for the densities and population characteristics of the Mimas village cluster:

1. Elementary School oriented territory includes a population of 1,000 to 3,000 (2 000 represents the range as typical).
2. Intermediate School oriented territory includes a population of 10,000 to 20,000 (15,000 represents the range as typical).
3. Secondary School oriented territory includes a population of 20,000 to 40,000 (30,000 represents the range as typical).

Obviously the standards recommended are not so restrictive as to exclude possibilities other than those listed above. However, the range definition is justifiable not only because of the acceptability of the key standard elements normally used by the consultant for the rural planning, but also because of the convenience in establishing a hierarchical order of population grouping. As mentioned in A-1-1 of this section, the grouping of population with order of 10^3 is called "village" or "village group" and the grouping of population with order of 10^4 is the scale of the Emirate population. The elementary school oriented territory defined above corresponds to "village" to "village group" scale and the secondary school oriented territories correspond to a Emirate scale grouping. Taking these hierarchical, structural character of the grouping into consideration, the following pattern and names are used:

A "Residential Unit Group", as the smallest grouping, provides at its center a tot-lot and seating areas for the approximately 10 to 100 residents who live in the vicinity. The service radius and scale are so small and intimate that these shared outdoor spaces are conceived almost as extensions of living room activities.

A "Village" provides nursery-kindergarten and other facilities whose immediate accessibility from the residential area and whose sense of spatial intimacy is crucial. This territory

basically corresponds to the traditional cluster of farmhouses to form a village within 5 ha area.

The following sections assume these basic grouping ideas as guidelines. The ideas in this section, in turn, were influenced by a study of each set of standards summarized in the next section.

A-2 PLANNING STANDARDS FOR EACH FACILITY

A-2-1 PLANNING STANDARDS FOR EDUCATIONAL FACILITIES

A-2-1-1 NURSERY KINDERGARTEN

Age of Children:	3 through 5
Enrollment:	25% to 50% of age group population is enrolled. 9% to 12% of the total population is in this age group. Therefore, 2.25% to 6% of the total population is enrolled.
Population Served:	Approximately 500 with an acceptable range of 100 to 1,000.
Size of Facility:	20 pupils/school with an acceptable range of 15 to 80.
Radius of Area Served:	Maximum 200m (3 minute walking distance) is recommended. 600m (10 minute walking distance) is also acceptable if density is less than 50 pupils. Beyond this range, the busing is needed.
Sub-Unit:	20 pupils/class (3 year old); 25 pupils/class (4 year old); 30 pupils/class (5 year old). 1 nurse and 1 assistant for each class are recommended.
Land Area Requirement:	5m ² /pupil is recommended (3m ² to 7m ² /pupil is acceptable) for building area and service area. For play area (see next section, "Nursery-Kindergarten Playlot".)
Floor Area:	3m ² /pupil is recommended (2m ² to 4m ² /pupil is accepted).

Location: It shall be closely located to the center of gravity of residential group of "village" scale and away from major traffic. Play lot is either a part of or closely located to it.

Other Requirement: 3 and 4 year old children could be separated from the 5 year old children if there is room. (Although ages are close, there is a substantial difference of activity between the two groups.) Mixed for boys and girls.

A-2-1-2 ELEMENTARY SCHOOL FOR BOYS

Age of Children: 6 through 11 (16% or 22% of total population)

Enrollment: Close to 100% of age group population is enrolled. 8% to 11% of the total population is enrolled (boys' school). Ministry of Education Standards (M. E. Standards) indicates that 10% of the total population is equal to the expected enrollment for boys' elementary school.

Population Served: One to a few thousands (say 2,000 as typical) is recommended. 750 to 5,000 is acceptable. (Even a further deviation may be acceptable with good planning reasons.)

Size of Facility: 200 enrollment (boys only)/school is recommended. 100 to 550 is acceptable. (M.E. Standards indicate 450 pupils/school = 30 pupils/classroom x 15 classrooms for urban areas.)

Radius of Area Served: Maximum of 300m (i.e. 5 minute walking distance.) 1000 (15 minute) is also acceptable. Although, if density is less than 50 pph, and a school bus system is developed, then further expansion of the radius is also acceptable. (Maximum 10 minute busing distance is recommended), the "walking" to the school is highly recommended.

Sub-Unit: 30 pupils/class is recommended. 20 - 40 pupil/class is also acceptable. (M.E. Standards indicate 30 pupils/class and 15 classes/school for urban situations.)

Land Area Requirement: $4.5m^2$ /student, i.e. $900m^2$ /200 student is recommended. $3m^2$ to $6m^2$ /student is also acceptable depending on the degree of programs for non-classroom facilities such as library, special purpose rooms and indoor athletic play facilities.

Location: It should be situated in the center of grouping Level of "Village group" (If the village group covers larger area—like village group A or B—

then more than one school may be needed to enable "walking" to the school). It should be accessible by footpath from residential areas not interrupted by major auto traffic, even by the distributor roads whenever possible. It should be separated from the girls' school.

Other Requirement: Playground should be a part of or close to the school. Play area of the school should be fenced from the street whenever major auto traffic is expected in the street.

A-2-1-3 ELEMENTARY SCHOOL FOR GIRLS

Age of population, population served, radius of area served and sub-units are the same as boys' schools. Locational requirements are similar to those of boys' elementary school. Site area for girls' elementary school often slightly smaller at present and the rate of enrollment is also smaller than the rate for boys. The consultant, however, hesitates to recommend any smaller or lesser standards to girls' schools than boys' schools because of the urgent and strong necessity for girls' education in the kingdom.

A-2-1-4 INTERMEDIATE SCHOOL FOR BOYS

Age of Student: 12 through 14 (3.0 to 4.5% of total population; boys only).

Enrollment: Close to 100% of age group population is enrolled, therefore 3.0% to 4.5% of the total population is enrolled (boys). Although M.E. Standards indicate that 5% of the total population is to be enrolled for boys intermediate schools.

Population Served: 10,000 is recommended. 5,000 to 20,000 is also accepted. (Even wider range is accepted if good planning reasons exist.)

Size of Facility: 450 enrollment per school (boys) is recommended. 300 to 900 enrollment per school is also acceptable. (M. E. Standards indicate 30 students/class x 15 classes/school = 450 student/school.)

Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended. Larger radius is also accepted if density is less than 50 pph. In this case 10 minutes busing distance (approximately 5km should be considered maximum).

Sub-Unit: 25 to 30 students/class or homeroom (M. E. Standards recommend 30 students/classroom and 15 classrooms/school.)

Land Area Requirement: $20m^2$ /student is recommended for the building and ground area. ($20m^2$ /student x 450 students = 0.9 ha) plus playfield which is either inside of the school site or closely located to it. (See "Standards for Playfield" - Level 1.) Minimum width of site is 80m with an acceptable building layout plan. (M. E. Standards recommend 100m x 100m but not less than 80m x 95m.)

Floor Area Requirement: $6.5m^2$ /student, i.e. $3000m^2$ /450 students, is recommended. $5m^2$ /student to $8m^2$ /student is also acceptable depending on the degree of non-classroom facility (library, indoor sports) programs.

Location: It should be situated in the center of major "village cluster". It should be accessible either by footpath, lanes (V₇), alleys (V₆), local access street (V₅) or distributor road (V₄) with sidewalks (See definition of V₇ through V₄ in the "On-Road Standards" section.) It should be separated from girls' school.

Other Requirements: Playfield - Level 1 should be a part of or close to the school; it shall be used for intermediate school curriculum and also by the neighboring population for weekend and off-working-hour sports activities.

A-2-1-5 INTERMEDIATE SCHOOL FOR GIRLS

Age of population, population served, radius of area served, and sub-unit standards are the same as intermediate school for boys. Although the standards for girls' school are inferior at the moment, it is recommended that 100% enrollment up to intermediate school be mandatory not only for boys but also for girls. From this view point the standards for girls' school should be basically identical.

A-2-1-6 SECONDARY SCHOOL FOR BOYS

Age of Student: 15 through 17 (3 to 4.5% of total population; boys only).

Enrollment Assumptions: 37.5% of the age group served is assumed to be enrolled (boys enrollment is assumed 50%, girls' enrollment is assumed 25%). Therefore, 1.50 to 2.25% of total population is assumed to be enrolled for boys' secondary schools. (M.E. Standards estimate that 2.5% of total population

is enrolled for boys' secondary schools.)

Population Served: 30,000 is recommended. 20,000 to 40,000 is also acceptable. (Even wider range is acceptable if good reasons exist.)

Size of Facility: 600 enrollment per school (300 to 900) is recommended within the enrollment assumptions described above. (M. E. Standards indicate 30 students/classroom x 18 classrooms/school = 480 students/school.)

Radius of Area Served: Maximum 1600m (25 minute walking distance) is recommended if the overall density is higher than 50pph. Larger radius is also acceptable if density is less than 50 pph. In the case of Nimaas 15km (20 minutes busing distance) should be considered maximum).

Sub-Unit: 25 to 30 student/class (M. E. Standards recommend 30 students/class and 18 classes/school.)

Land Area Requirement: $25m^2$ /student is recommended for building and ground area ($25m^2$ /student x 600 student = 1.5 ha). In addition to the building and ground area, the playfield should be provided next to or close to the school. (See "Standards for Playfield" - Level 2.) Minimum width of site is 95m, but it could be less than that if acceptable building layout plans are provided. (M. E. Standards recommend 100m x 100m but not less than 95m x 110m.)

Floor Area Requirement: $7m^2$ /student, i.e. $4200m^2$ /600 students is recommended. $6m^2$ /student to $8m^2$ /student is also acceptable depending on the degree of provision of non-classroom facility (such as indoor athletic facilities) programs.

Location: It should be situated in the center of "Emirate" level grouping. It should be accessible by either footpath, lanes (V₇), alleys (V₆), local access street (V₅), distributor road (V₄) or minor collector road (V₃). It should not be directly accessible from the residential area through arterial road (V₁). (See section on "Road Standards" for the definition of V₇ through V₁.) It should be separated from secondary schools for girls.

Other Requirements: Playfield - Level 2 should be a part of or close to the school. It shall be used by secondary school curriculum and also by the neighboring population for weekend and off-working hour sports activities.

A-2-1-7 SECONDARY SCHOOL FOR GIRLS

Age of population, population served, radius of area served and sub-unit standards are the same as those of secondary school for boys. Enrollment assumptions should be lower than the case for boys. The enrollment of girl students should in the future go higher and eventually as high as the boys. For the present planning purposes, it is assumed that 25% of the girls' will be enrolled in the secondary school in 1995 (instead of 50% for boys). 25% of age group means 0.75% to 1.13% of the total population is enrolled in a girls' secondary school.

Floor Area Requirement:

8m²/student (M. E. Standards require 100m x 110m for building area).

Location:

Directly accessible to the town center or accessible from an arterial road (V₂) leading to the town center.

A-2-1-8 TEACHERS' SCHOOL

Age of Student: Varies (but after the intermediate school)

Enrollment and Size of Facility: M. E. Standards recommend 30 students/class x 24 classrooms/school = 720 students/school.

Population Served/ Radius of Area: One Teachers' School for each city or region with population over 20,000.

Sub-Unit: 25 to 30 students/class.

Land Area Requirement: 30m²/student

Floor Area Requirement: 8m²/student (M.E. Standards require 100m x 100m for building area).

Location: Directly accessible from the town center or from an arterial road leading to the town center.

Other Requirement: When college is established, the Teachers' School can be absorbed into it. Athletic field should be easily accessible.

A-2-1-10 TECHNICAL SCHOOL FOR GIRLS INCLUDING SEWING LEARNING PROGRAM

Age of Student: Varies but over 15.

Population Served/Radius of Area Served: One female technical school for each city with population of 20,000 or more.

Land Area Requirement: 1 ha recommended. Minimum 80m x 70m.

Floor Area Requirement: 7m²/student.

Location: Accessible from the city center or from an arterial road leading to the center.

A-2-1-9 TECHNICAL SCHOOL

Age of Student: Varies but over 15.

Enrollment and Size of Facility: M. E. Standards recommend 30 students/class x 24 classes/school = 720 students/school.

Population Served/ Radius of Area Served: One technical school for each city or region with population of 20,000 or more.

Sub-Units: 25 to 30 students/class.

Land Area Requirement: 30m²/student

A-2-1-11 COLLEGES

Age of Student: 18 to 21 or 18 to 19.

Population Served: The first college at Abha by 1980. By 1995, Jizan, Khamis Mushayt and Najran will also have one college each. A college can be justified in Nimas but not necessarily by 1995.

Size of Facility: Average size of 1,000 students.

Land Area Requirement: 100m²/student to 50m²/student.

Floor Area Requirement: 15m²/student excluding dormitory facilities. (If dormitory is needed then 25m²/dormitory resident is additionally needed.)

Location: Accessible from the city center through arterial road. Locate as closely as possible to the city's central cultural area so that cultural-educational facility of the college is shared by the community.

A-2-1-12 SPECIAL COLLEGE

Age of Student: 18 to 21 or 18 to 19.

Population Served: The first special college (for medicine, agriculture and engineering) at Abha by 1995 serving the regional population. The special agricultural college can be in Nimas.

Size of Facility: Average size of 600.

Land Area Requirement: 100m²/student excluding dormitory facilities.

Location: Located on regional arterial road or major arterial road connecting to and situated close to the city center.

A-2-2 PLANNING STANDARDS FOR RECREATIONAL AND ATHLETIC FACILITIES

A-2-2-1 TOT-LOT

Main Population: Pre-school children 2 years old to 5 years old and their supervising adults (mothers).

Main Function: Infants' exterior play, supervising adults' seating, conversation, and evening stroll.

Size of Population Served: Approximately 100. 12 to 16% of the total population is in ages 2 through 5.

Radius of Area Served: Maximum 120m (2 minute walking distance) is recommended. If density is less than 50 pph, 300 m (5 minute walking distance) is acceptable provided pedestrian network exist to connect a tot-lot to the residential unit.

Land Area Requirement: 500m²/lot is recommended. 300m² to 1000m²/lot is also acceptable.

Location: Situated in the center of each residential group unit (as defined in A-1-4) directly accessible from each unit without crossing any street or preferably even group parking spaces or access lane. It should be bordered by residential units or pedestrian activities but not by parking or streets.

Other Requirement: Infant play area and seating area should be arranged in such a way as to enable adult surveillance over the infants at play. Enough

planting and shaded area should be provided. Play area should be visible from as many dwelling units as possible for the adults in house to survey their children at play in the tot-lot. Connected to the nearest nursery-kindergarten playlot by footpath through narrow but well controlled exit point.

A-2-2-2 NURSERY-KINDERGARTEN PLAYLOT

Main Population Served: 3 to 5 year old children enrolled in nursery-kindergarten. It also serves surrounding infants, accompanied by adults, and lower grade elementary school children during off-school hours.

Main Function: For nursery-kindergarten outdoor play or for organized group play for pre-school children.

Size of Population Served: Hundreds to 1,000 inhabitants. 2.25% to 6% of the total population is enrolled in the nursery-kindergarten (See "Standards for Nursery-Kindergarten" in the previous section).

Radius of Area Served: Maximum 200m (3 minute walking distance) is recommended. 600m (10 minute walking distance) is also acceptable if density is less than 50 pph.

Land Area Requirement: 2000m² is recommended. 1000m² to 3000m² is also acceptable.

Location: Situated in the center of "Village". (See "Nursery-Kindergarten Standards".)

Other Requirement: Integral part of kindergarten design. Footpath connection to surrounding small scale tot-lots should be provided. Should not be bordered by major traffic. If bordered by any auto traffic, fences should be provided. Play pool for children may be included.

A-2-2-3 "VILLAGE GROUP"

Population Served: All inhabitants in the "Village Group", all age groups.

Main Function: General recreation. Preservation of natural environment in the "Village group". Common garden for its residents.

Size of Population Served: 3,750, say 4,00, is recommended. 2,500 to 5,000 is accepted. In lower density situation even small number is acceptable if good planning reasons exist.

Radius of Area Served: Maximum 300m (i.e. 5 minute walking distance) is recommended. 600m (10 minute) is also acceptable. If density is less than 50 pph and access path to the park is designed over a long distance and properly separated from auto traffic, then radius may be extended.

Land Area Requirement: $5m^2$ /inhabitant is recommended; $2m^2$ to $10m^2$ /inhabitant is also acceptable.

Location: Situated in the center of "Village Group". Should not be surrounded or bordered by major traffic (street classification of "collector road" or higher).

Other Requirement: Connected to major "village group" level facilities (such as elementary school, village group shopping, small mosque, etc.) by footpath without crossing major traffic. Park itself could be stretched along such a path to create a linear park along which facilities can be clustered. Trees, green areas, seating areas with benches and paved paths should be provided. Recreational adult swimming pool with ancillary facilities may be provided.

A-2-2-4 PLAYGROUND

Main Population Served: Primarily elementary school children at school time. Secondly other inhabitants at off-school-hours and weekends.

Main Function: Active play and game for elementary school athletic programs.

Size of Population Served: One to a few thousand, per two (boys and girls) playgrounds is recommended. 750 to 5,000 is acceptable. 400 children (200 to 1,100 in range) per 2 playgrounds are expected, of which half are boys.

Radius of Area Served: Maximum of 300m (i.e. 5 minute walking distance) is recommended. 1000m (15 minute walking distance) is also acceptable. When density is less than 50 pph, longer service radius is acceptable if safe and pleasant access to the playground is provided or bus connection is provided.

Land Area Requirement: $20m^2$ /elementary school student is recommended. $10m^2$ to $30m^2$ /elem. school student is acceptable.

Location: Situated in convenient proximity to both boys' and girls' elementary schools.

Other Requirement: Designed as an integral part of an elementary school. Connected to the elementary school and residential zone on footpath crossing no major traffic. Off-school time usage by the adult population is recommended and elementary school utilities such as water-drinking and toilet should be available for those adults. Enough pavement space should be provided for medium size sports activities such as basketball, tennis, etc. Childrens' pool, fenced and equipped with locker room and shower can be provided as a part of the playground program or a part of school program.

A-2-2-5 "VILLAGE CLUSTER" PARK OR SMALL CITY PARK

Population Served: All residents of the "Village Cluster" whose population range is approximately 10,000.

Main Function: Passive recreation on a weekly to monthly participation basis (not daily use) to be integrated with cultural, religious facilities. It also functions as a linear connector of "Village Cluster" level facilities.

Size of Population Served: 10,000 is recommended. 5,000 to 20,000 or even wider range is acceptable, depending on the size and character of Village cluster.

Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended. When density is less than 50 pph, longer service radius may be acceptable is the park penetrates into the residential zones as a linear park to provide safe and pleasant footpath to the center of the park.

Land Area Requirement: $4m^2$ /inhabitant is recommended. $2m^2$ to $6m^2$ /inhabitant is acceptable.

Location: Situated in the center of a "Village Cluster" whose population range is 5,000 to 20,000. It should be located in the area connecting smaller open spaces to create a park-open pace spine along which the "Village Cluster" center is located.

Other Requirement: Fruit trees or agricultural land use could be used as a part of park function since a part of the function is as visual relief or visual buffer between two adjacent village groups. Where village cluster park comes in contact with commercial (or shopping) area, the park design should reflect an "urban park" where extensive pavement and landscaping are concentrated in a limited area.

A-2-2-6 PLAYFIELD -
LEVEL 1

Main Population Served: Primarily for intermediate school students at school hour; secondarily, for other inhabitants in the area at off-school-hours or weekends.

Main Function: For athletic curriculum activities of intermediate schools (boys and girls). Practice field for residents' sports club or sports team activity.

Size of Population Served: 10,000 is recommended. 5,000 to 20,000 is acceptable. 600 to 1800 intermediate school enrollment (boys plus girls) is assumed in the service area.

Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended. When density is less than 50 pph, longer radius is acceptable if bus service is provided the areas beyond the recommended walking distance.

Land Area Requirement: $30m^2$ /intermediate school student is recommended. $20m^2$ to $40m^2$ /student is accepted.

Location: Situated at the center of a "Village Cluster", whose population range is 5,000 to 20,000, and in close proximity to both boys' and girls' intermediate schools.

Other Requirement: Parking space should be provided for the adult field users (10 to 20 spaces). Official pavement sizes for game courts should be provided for sports requiring smaller spaces, such as tennis and basketball, but not necessarily full size official dimensions for the field and track. When shared by boys' school, girls' school and off-school time adult usage, time sharing program should be prearranged; subdividing the area into two sections by fences or locational separation is also acceptable. Swimming pool(s) can be provided with shower rooms and locker rooms. Time sharing with playfield - level 2 is also possible. Intermediate boy students shares combined field of level 1 and level 2 with the secondary school boy students and male adults is more practical and easy than the time sharing between the different sexes.

A-2-2-7 PLAYFIELD -
LEVEL 2

Main Population Served: Primarily for secondary school students at school hour; secondarily for the other residents in the "Emirate" off-school-hours or weekends.

Main Function: For athletic curriculum activity of secondary schools (boys and girls). Practice and competition or game for the community sports teams and clubs.

Size of Population Served: 30,000 is recommended. 20,000 to 40,000 is acceptable.

Radius of Area Served: Maximum 1000 m (15 minute walking distance) is recommended; 1600 m (20 minute) is also acceptable. When density is less than 50 pph, longer service radius may be acceptable if bus system and pleasant pedestrian path are provided to cover the service area and if ample parking space is provided.

Land Area Requirement: $50m^2$ /secondary school student. $40m^2$ to $60m^2$ /student is also acceptable. Minimum land area is 2ha/playfield.

Location: Situated at the center of a "Emirate" whose population range is 20,000 to 40,000 and in close proximity to secondary schools.

Other Requirement: Parking space should be provided for the adult field users and game spectators. Full size official dimensions for courts, track and fields. Simplified spectator seating area, either by stands or by banking should be provided. Where shared by the intermediate school and off-school time adults, usage can be organized through a time sharing program; subdividing the area into two sections by fences or locational separation is also acceptable. Swimming pool with full official size can be provided with full ancillary activities (indoor and outdoor).

A-2-2-8 CITY PARK OR
"EMIRATE" PARK

Population Served: All residents and non-resident workers of central area or an municipality.

Main Function: Weekend family recreation for residents. Lunch time recreation for central area workers. Park as an integral part of Emirate's cultural and religious center.

Size of Population Served: 20,000 or more. If the population is smaller a "Village Cluster park" functions as a small scale "city park".

Radius of Area Served: Entire city, or municipality (in case of Nimas, Nimas Emirate). Radius varies.

Land Area Requirement: $4m^2$ /inhabitant is recommended. $2m^2$ to $6m^2$ /inhabitant is acceptable.

Location: Situated at the center of city with main cultural, community, and educational functions clustered around it.

Other Requirement: Historical district and architecture are to be integrated into the network of this park. The park is conceived as a combination of a central park and its extended network to which the lower hierarchical park network is connected. Arena (enabling indoor sports, exhibition, theater, musical festival and other multi-purpose uses) can be integrated in the city park site.

A-2-3 PLANNING STANDARDS FOR RELIGIOUS FACILITIES

A-2-3-1 MOSQUE

Population Served: 75% to 100% of the adult male in the age group 15 and above (i.e. approximately 20% to 25% of the total population potentially attends one of the mosques in the city.

Size of Population Served: One mosque for every elementary school district (potential attendance about 500 persons) is recommended. Even smaller population is acceptable if enough population is not available in the reasonably short service radius (such as 15 minutes walking distance.)

Radius of Area Served: Maximum 300m (i.e. 5 minute walking distance) is recommended. 1000m (15 minute walking distance) is also acceptable. If density is less than 50 pph even larger radii may be acceptable provided that parking spaces and automobile access are available.

Land Area Requirement: 0.2 to 0.3 ha/mosque.

Floor Area Requirement: $1.2m^2$ /person.

Location: Situated at the center of a "Village Group" or village group sub areas with population of approximately one to a few thousands.

Other Requirement: Elementary school and village group cultural facilities should be closely linked to the mosque to foster an integration of religious and educational functions.

A-2-3-2 JAMI'A MOSQUE

Population Served: 10% of the inhabitants of the service area.

Size of Population Served: One Jami'a Mosque for approximately ten thousand inhabitants (i.e. approximately 1000 prayers) is recommended. 10,000 to 20,000 inhabitant range is also accepted (i.e. 1000 to 2000 prayers).

Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended. Larger radius may be acceptable if density is less than 50 pph and parking spaces and auto access are provided. In this case standards should be provided on a case by case basis.

Land Area Requirement: 0.6 to 0.8ha/mosque.

Floor Area Requirement: $1.2m^2$ /prayer (i.e. 1200 to 2400 m^2 /mosque) is recommended.

Location: Situated at the center of a "Village Cluster" with a population of 5,000 to 20,000.

Other Requirement: Intermediate schools should be close to the mosque in order to foster an integration of religious and educational functions.

A-2-3-3 EID MOSQUE

Population Served: 1 to 2% of the population in the served area; 20 to 25% of the total population should be included for the determination of land area.

Size of Population Served: One for every 100,000 to 300,000 population. Therefore none of the cities in the southern region (including Nimas municipality) can justify an Eid Mosque due to a lack of population. Abha and Khamis Mushayt's combined population in 1995 is estimated to be 151,000 and will together require one Eid Mosque.

Radius of Area Served: Not specified.

Land Area Requirement: $0.6m^2$ /prayer, i.e. 1.2 ha to 3.6ha/unit is recommended.

Other Requirement: The mosque is a fenced open area; it is provided with a guard room and a storage.

A-2-4 PLANNING STANDARDS
FOR CENTERS FOR SO-
CIAL AND CULTURAL
ACTIVITIES

A-2-4-1 VILLAGE GROUP

Size of Population Served:	One to a few thousand is recommended. Elementary school district can be used as a service area of the village group center.
Main Function:	General social interactions (meetings, movies, elementary school PTA, games). Offices for a village group association to program activities, maintenance, and utilization of village group parks and facilities. Supervision and coordination of lower scale activity and facilities such as play-lots and tot-lots inside of the village group territory. Adult education associated with elementary school facilities and small mosque activities (including a village group library if feasible).
Radius of Area Served:	Maximum 300m (i.e. 5 minute walking distance) is recommended. 600m (10 minute) is also acceptable if the density is too low to keep all residents in this radius, the parking spaces for these residents should be provided.
Land Area:	0.1 to 0.5ha/center. If the center abutts a park and the park is directly accessible from the center, less than 0.1 ha is acceptable.
Floor Area Requirement:	$0.05m^2$ /inhabitants is recommended. 0.03 to $0.1m^2$ /inhabitant is also acceptable.
Location:	Situated at the center of a "Village Group" whose populations in in the range of one to a few thousands. Close to the village group park, small mosque, playground, and village group shopping area. If the village group is large in area and population, more than one center is provided in one village group.
Other Requirement:	Courtyards and other small scale exterior spaces for seating and visual relief should be provided. Footpath access from surrounding residential area without crossing any major traffic.

A-2-4-2 VILLAGE CLUSTER
COMMUNITY CENTER

Size of Population Served:	10,000 is recommended. 5,000 to 20,000 is acceptable; even wider range is acceptable if good reasons exist.
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Main Function:	General social interactions for residents in the "Village Cluster" (meetings, adult education, social ceremonies, entertainment, cultural activity programs, PTA for intermediate and secondary schools). Offices for a community association to program activities for maintenance and utilization of community parks, community facilities, intermediate and high school facilities and playfields.
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Radius of Area Served:	Maximum 1200m (20 minute walking distance) is recommended. Even larger radius is accepted if density is less than 50 pph, depending on the situation.
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Land Area Requirement:	0.2 to 1.0ha/center is recommended. If the center abuts a village cluster park and direct access to it is available, less than 0.2 ha is also acceptable. In any case 0.1 ha is the minimum.
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Floor Area Requirement:	$0.01m^2$ /inhabitant (i.e. $50m^2$ to $200m^2$) is recommended. $0.005m^2$ to $0.02m^2$ /inhabitant is also acceptable.
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Location:	Situated at the center of a "Village Cluster" whose population range is 5,000 to 20,000. Close to the village cluster park, village cluster shopping center, Jami'a Mosque, intermediate school community museum, library, youth center (these could be a part of the village cluster community center) and playfield, Level 1.
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A-2-4-3 MUNICIPAL CENTER
(EMIRATE CULTURAL
CENTER)

Size of Population Served:	One center for every municipality.
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Main Function:	Cultural and social center for the city. Art gallery, exhibition hall, small arena, museum and auditorium can be included.
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Radius of Area Served:	Entire municipality (Emirate) and its vicinity. Radius varies.
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Land Area Requirement:	$0.5m^2$ /inhabitant (i.e. 3ha/60,000 inhabitants) or more. If the Municipal Center is designed as an integral part of other central activities such as commercial areas, the land area requirement can be reduced to $0.25m^2$ /inhabitant.
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Floor Area Requirement:	$0.05m^2$ /inhabitant (i.e. $300m^2$ /60,000 inhabitants) is recommended, including art gallery, exhibition hall, arena-auditorium (these facilities can be put in one structure or in
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separate buildings) and other general and multi-purpose rooms.

- Location: Situated at the center of major municipality. Closely located to the administration-commercial center and park system.
- Other Requirement: Pedestrian zone should be clearly defined, eliminating auto traffic and providing in the city a pedestrian island of which the Municipal Center is a core. Downtown historical artifacts should be preserved and maintained as a part of a Municipal Center-park complex.
- Other Requirement: Additional standards for potential components of municipal center:
a. Library: One for each 30,000 inhabitants (20,000 to 40,000). Land area $0.1m^2$ /inhabitant if library is in an independent building and not a part of a complex building. Floor area is $0.01m^2$ /inhabitant.
b. Community museum: Standard is identical to that of library with the exception of museums located in a renovated old structure. In such a case, standards should be created on a case by case basis.

A-2-5 PLANNING STANDARDS FOR HEALTH FACILITIES

A-2-5-1 PHARMACY

- Size of Population Served: One general practitioner and/or pharmacy for every population size of one to a few thousand.
- Main Function: Outdoor treatment, diagnosis, and general treatment. Providing hospital information to the residents. Providing patient information to the community clinic and higher level hospitals.
- Radius of Area Served: Maximum 300m (i.e. 5 minutes walking distance) is recommended. 600m (10 minute) is also acceptable.
- Land Area Requirement: 0.1ha/unit approximately.
- Floor Area Requirement: $0.05m^2$ /inhabitant or more.
- Location: Situated at the center of a "Village Group" or a sub-area of the village group whose population size is in the range of one to a few thousands. Access by footpath without crossing major traffic.

A-2-5-2 VILLAGE CLUSTER DIAGNOSIS AND TREATMENT CENTER

- Size of Population Served: One for 10,000 (5,000 to 20,000) inhabitants.
- Main Function: Public health centers for general treatment and diagnosis.
- Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended. Larger radius may be acceptable when density is less than 50 pph.
- Land Area Requirement: $0.3m^2$ /inhabitant (i.e. 0.3ha to 0.6ha/center) is recommended.
- Floor Area Requirement: $0.01m^2$ /inhabitant (i.e. 50 to 200/center) is recommended.
- Location: Situated at the center of a "Village Cluster" with a population of 5,000 to 20,000.

A-2-5-3 GENERAL HOSPITAL

- Size of Population Served: One for each municipality (Emirate) with a population over 30,000.
- Main Function: General hospital for normal treatment clinics, diagnosis and treatment, long term care, public health, nursing units, and emergency.
- Radius of Area Served: Varies. The hospital serves not only the city population but also the surrounding suburban population.
- Land Area Requirement: $0.5m^2$ to $1.0m^2$ /inhabitant is recommended (i.e. 2.5 ha to 5ha/hospital for a city with 50,000 inhabitants for example).
- Floor Area Requirement: 3 to 4 beds/1,000 inhabitants is recommended. 20 to $40m^2$ /bed is recommended. (i.e. $3000m^2$ to $8000m^2$ /hospital for a city with 50,000 inhabitants.)
- Location: Close to the center of the municipality yet easily accessible from the main arterial and regional road for easy emergency access and easy access for the suburban population. Psychological, visual, and accoustical relief should be secured by not locating in the middle of the built-up areas.

A-2-5-4 SPECIAL HOSPITALS
AND NURSING HOME

Size of Population Served: One mental hospital for each 50,000 inhabitants or more. One special long term hospital for each 50,000 inhabitants or more. One nursing home for each 50,000 inhabitants or more.

Land Area Requirement: 0.1ha/1000 inhabitants for mental hospital or long term hospital. 0.02ha/1000 inhabitants for nursing home.

Floor Area Requirement: 5 beds/1000 inhabitants, and 20m² to 45m²/bed (mental hospital). 3 beds/1000 inhabitants, and 20m² to 45m²/bed (special long term hospital), 1 to 2 beds/1000 inhabitants, and 20m² to 45m²/bed (nursing home).

A-2-6 PLANNING STANDARDS
FOR COMMERCIAL
FACILITIES

A-2-6-1 VILLAGE GROUP
SHOPPING CENTER

Size of Population Served: One to a few thousands

Main Functions: Small food market, bakery, etc.

Radius of Area Served: Maximum of 300m (i.e. 5 minute walking distance) is recommended. 600m (10 minute) is also acceptable. If density is less than 50 pph, a larger radius may be acceptable depending on the situation. In this case auto access and parking area is needed.

Land Area Requirement: 2 to 4m²/inhabitant i.e. 0.4 ha to 0.8 ha/2000 inhabitants.

Floor Area Requirement (Sales Area): 0.25 to 0.5m²/inhabitant (i.e. 500m² to 1000m²/2,000 inhabitants) is recommended.

Location: Situated at the center of the village group or grouping of villages with population size of one to several thousand.

Other Requirement: If a shopping center for a higher hierarchical group order exists in the vicinity, the village group shopping center is incorporated into the larger shopping center. A portion of the village group shopping center could be substituted by the corner stores in the area. 1:1 parking (i.e. parking area : sales area = 1:1)

is recommended. Less than 1:1 is acceptable if density is more than 50 pph.

A-2-6-2 VILLAGE CLUSTER
SHOPPING CENTER

Size of Population Served: 10,000 inhabitants, more or less (5,000 to 20,000).

Main Function: Basic retail service to the "Village Cluster" population. Shops whose financial viability requires larger population than village group population are located in this shopping center (such as florist, shoe shops, giftshops, candy, lingerie, book stores, toys, childrens' wear, radio and/or TV repairs, etc.). "Second Floor Office" could be included.

Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended. Larger radius is also acceptable if density is less than 50 pph and ample parking space is provided.

Land Area Requirement: 0.5m² to 1.0m²/inhabitant is recommended.

Floor Area Requirement (Sales Area): 0.1m² to 0.2m²/inhabitant

Location: Situated at the center of village cluster with population size of approximately 10,000 or along the arterial road connecting village cluster center to municipal center. Close to or integrated with village cluster community center, park and other facilities.

Other Requirement: When a regional shopping center or a large shopping center is in the vicinity, the village cluster shopping center may be incorporated into the larger shopping center. 2:1 parking (i.e. parking area : sales area = 2:1). Less than 2:1 is acceptable if density is more than 50 pph.

A-2-6-3 SUB-REGIONAL
SHOPPING CENTER

Size of Population Served: Approximately 100,000 inhabitants.

Main Function: Shopping center to serve the regional and sub-regional population. This could also be located along a major arterial extending from the municipal center. It will provide, in addition to the stores normally found in the smaller

shopping centers, fashion goods, furniture, household equipment, women's apparel, etc.

Table A-2-1
SALES AREA PER CAPITA^a

Radius of Area Served

Municipality and its neighboring communities. Regional population beyond city and its surroundings also uses on a less frequent basis.

Land Area Requirement:

0.5 m² to 1.0 m²/inhabitant (i.e. 5 ha to 10 ha/100,000 inhabitants) is recommended.

Floor Area Requirement (Sales Area):

0.1 m² to 0.2 m²/inhabitant (i.e. 10,000 m² to 20,000 m²/100,000 inhabitants) is recommended.

Table A-2-1 indicates per capita sales areas for different sizes of the population (including village group, village cluster and sub-regional shopping centers).

Location:

Situated in the central area of major municipalities or along the regional arterials leading to the major municipal centers.

Other Requirement:

4:1 parking is recommended. 2:1 is also acceptable if located in the middle of crowded central area.

Population	Sales Area (m ² /person)	Total Sales Area (m ² /person)
less than 5,000	0.25 - 0.5	0.25 - 0.5
5,000 - 10,000	[0.25 - 0.5] plus [0.1 - 0.2]	0.35 - 0.7
greater than 10,000	[0.25 - 0.5] plus 0.1 - 0.2 plus [0.1 - 0.2]	0.45 - 0.9

Note:

a. Building area is approximately 1.5 times the total sales area.

A-2-7 PLANNING STANDARDS FOR PUBLIC BUILDINGS

A-2-7-1 FIRE STATION

Population Served: One for each village cluster of population of 20,000 to 40,000 inhabitants.

Radius of Area Served:

In a high value district:
a. Maximum 1.5 km for engine companies.
b. Maximum 2.0 km for ladder companies.
In a normal residential district:
a. Maximum 3.0 km for engine companies.
b. Maximum 5.0 km for ladder companies.
In a high density residential district:
a. Maximum 2.5 km for engine companies.
b. Maximum 3.5 km for ladder companies.

Land Area Requirement:

Approximately 10 m²/1000 inhabitants is recommended, with a minimum of 0.2 ha per station.

Floor Area Requirement:

3 m²/1000 inhabitants is recommended, with a minimum of 100 m² per station.

Location: In residential district, station should be located to the center. Additional stations should be near extensive industrial or business districts and near districts where there is a high life hazard. An intersection of roads is a preferred station location.

Other Requirement: Water supply system with adequate pressure should be developed. Reserve capacity: 5-day reserve with maximum daily rate.

A-2-7-2 POST OFFICES

Population Served: One main post office for each municipality. One branch post office for each village cluster with a population range of ten thousand.

Radius of Area Served: Maximum 1200m (20 minute walking distance) is recommended for branch office. Larger radius is also acceptable if density is less than 50 pph.

Land Area Requirement: 0.2 ha to 0.4ha/post office.

Floor Area Requirement: $2m^2/1000$ (i.e. $60m^2/30,000$ city). Main post office should be located at municipal center. Branch post office should be located at the center of village cluster with population range of ten thousand. It can be located inside of the "village cluster center" building.

A-2-7-3 POLICE STATION

Population Served: One for each municipality with population over 20,000.

Radius of Area Served: 10,000ha/district (20 km x 5 km, for example) or more at a density of 5 pph or less. At lower densities, service radius may be extended. Mobile unit is needed in any case.

Land Area Requirement: 0.2 to 0.4ha/district station.

Floor Area Requirement: $2m^2/1000$ inhabitants (i.e. $100m^2/50,000$ inhabitants).

Location: Situated in the center of town with comparable distances to different parts of its service population. Corner site is preferred for the convenience of the mobile unit.

A 2-7-4 GOVERNMENT OFFICES

Population Served: One for each municipality. The percentage of government employment to total population is in a range from 6% to 14% (at present the average of the 5 major cities in Southern Regional is approximately 10%) of which it is assumed 3% to 7% (half) are in administrative sectors (excluding teachers, police, firemen, etc., who have normal place of work rather than offices), i.e. 2,500 to 3,750 are located in the administrative offices (for the case of a 50,000 city).

Floor Area Requirement: Assuming 80% gross efficiency and proper use of net areas, there should be $10m^2/employee$ (i.e., $25,000m^2$ to $75,000m^2$ for city of 50,000). If FAR = 2, then land area is approximately 2.5 ha.

Location: Situated and concentrated in the center of town.

A-2-8 PLANNING STANDARDS FOR ROAD AND STREET NETWORK

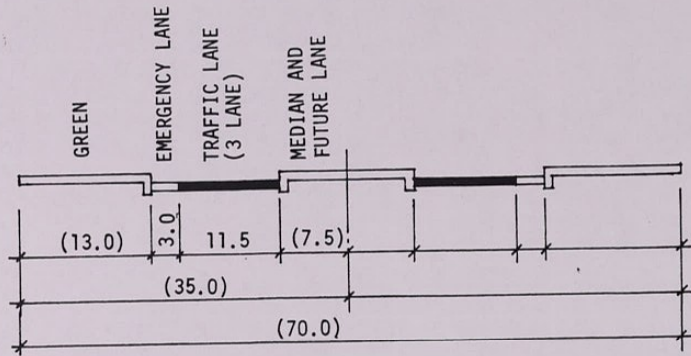
Table A-2-9(a) shows the classification and standards for roads and streets. Clear recognition of the hierarchical order of the street network system is crucial to achieve group privacy in an automobile oriented society. The street network hierarchy should be integrated into the hierarchical order of facility distribution and territorial sequence to maximize the access convenience yet to minimize the potential hazard and nuisance caused by auto traffic in the residential area.

Figure A-2-9(b) indicates typical sections for each type of road classified in Table A-2-9(a).

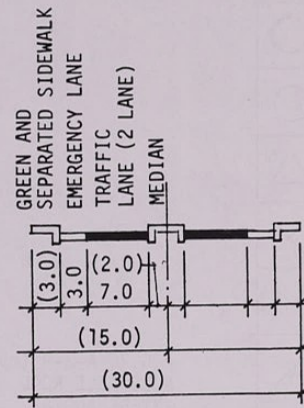
Table A-2-9(a)
CHARACTERISTICS AND HIERARCHY OF ROADS AND STREETS (RECOMMENDATION ONLY)

SYSTEM CLASSIFICATION	PRIMARY ROAD SYSTEM		SECONDARY ROAD SYSTEM				LOCAL ROAD SYSTEM	
	V ₁ REGIONAL HIGHWAY	V ₂ MAJOR ARTERIAL	V ₃ ARTERIAL	V ₄ COLLECTOR	V ₅ DISTRIBUTOR	V ₆ LOCAL ACCESS ROAD	V ₇ SERVICE ROAD	
FUNCTIONAL CLASSIFICATION	LONG TRIPS: NATIONAL AND REGIONAL TRIP	MEDIUM TRIPS: INTER-SETTLEMENT TRAVEL	MEDIUM TRIPS: INTER TO INTRA-SETTLEMENT TRAVEL	MEDIUM TO SHORT TRIPS: INTRA-SETTLEMENT TRAVEL	SHORT TRIPS: INTRA-SETTLEMENT TRAVEL ONLY	VERY SHORT TRIPS: INTRA-SETTLEMENT TRAVEL ONLY	SERVICE ACCESS TO PROPERTIES	
ACCESS CONTROL	FULL CONTROL	CONTROL	PARTIAL	PARTIAL	NONE	NONE	NONE	
DESIGN SPEED (km/h)	120	100-80	90-80	80-70	60-50	50	30	
OPERATING SPEED (km/h)	100-80	80-70	70-60	60-50	50-30	50-30	30-20	
MAXIMUM GRADE: UP (%) DOWN (%)	6 7	7 8	7 8	7 8	8	10	12	
MINIMUM HORIZONTAL RADIUS OF CURVATURE (m)	500	300	250	200	150	75	30	
HOURLY CAPACITY/LAND (VEHICLE/HOUR)	1500-800	1000-800	900-700	900-600	600-300	400-200	-	
RIGHT OF WAY (m)	70	50	30	25	20	15	5	
LANE WIDTH (m)	3.75 MINIMUM	3.75	3.5	3.5	3.0	2.75	2.5	
DIVIDED FLOW	ALWAYS	USUALLY	FREQUENTLY	SOMETIMES	NOT USUALLY	NEVER	-	
PARKING	PROHIBITED	PROHIBITED	PROHIBITED	INTERIM ONLY	PERMITTED OR INTERIM	PERMITTED	PROHIBITED	
RELATED ELEMENTS	EMERGENCY LANES (SHOULDER), NO SIDEWALKS, NO SMALL MOTORCYCLES	EMERGENCY LANES, NO SIDEWALK, NO BICYCLE	EMERGENCY LANES NO SIDEWALK USUALLY, SEPARATED SIDEWALK MAY BE ALLOWED, NO BICYCLE	SIDEWALKS SEPARATED FROM PAVEMENT USUALLY	SIDEWALKS	SIDEWALKS	OPTIONAL	
INTERSECTION TYPE	GRADE SEPARATED ALWAYS	GRADE SEPARATED IN GENERAL	GRADE SEPARATION OPTIONAL	SIGNALIZED	SIGNALIZED OR STOP SIGNS	STOP SIGN OR UNCONTROLLED	STOP SIGN OR UNCONTROLLED	
DISTANCE BETWEEN INTERSECTIONS (m)	1,000 MINIMUM	400 MINIMUM	250 MINIMUM	200 MINIMUM	200 MINIMUM WHEN POSSIBLE	-	-	
NORMAL NUMBER OF LANES	6-4 USUALLY	4 MINIMUM	4-2	4-2	2	2	1 or 2	

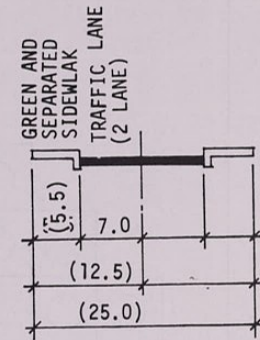
V₁ EXAMPLE
(REGIONAL HIGHWAY)
6 LANE



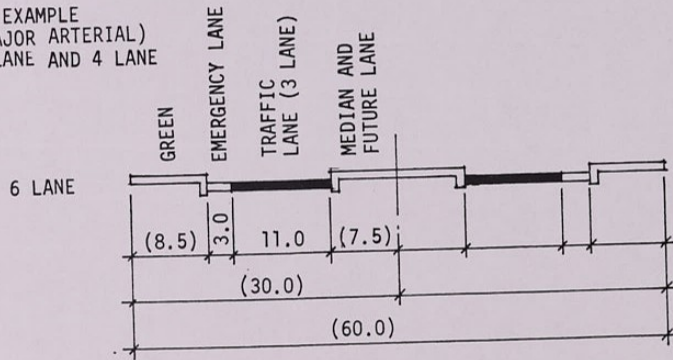
V₃ EXAMPLE
(ARTERIAL)
4 LANE



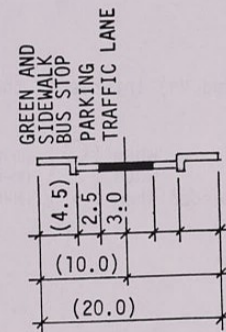
V₄ EXAMPLE
(COLLECTOR)
4 LANE



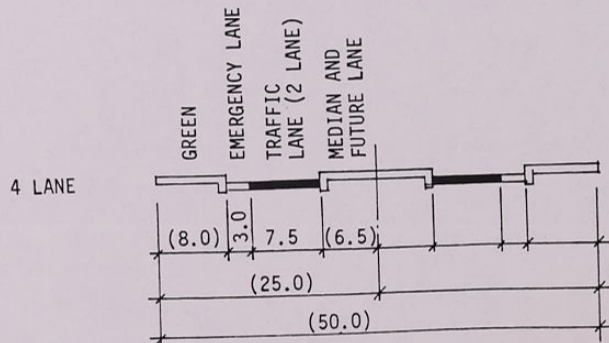
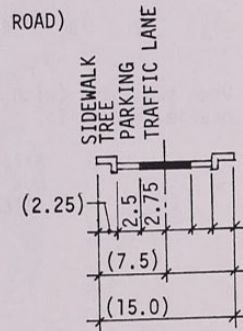
V₂ EXAMPLE
(MAJOR ARTERIAL)
6 LANE AND 4 LANE



V₅ EXAMPLE
(DISTRIBUTOR)
2 LANE



V₆ EXAMPLE
(LOCAL ACCESS ROAD)
2 LANE



NOTE: () Dimensions can vary depending on the local condition and detail design, sometimes median strip and green zone can even be eliminated where elimination is justified by the detail planning.

FIGURE A-2-9 (b)
ROAD SECTIONS BY
CLASSIFICATION
(EXAMPLE)

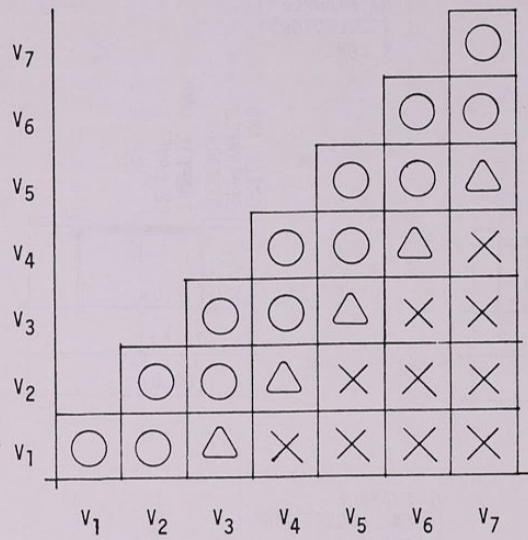
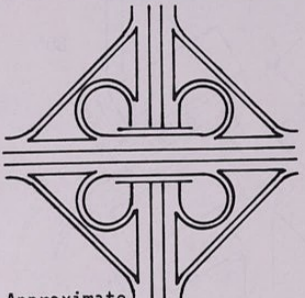
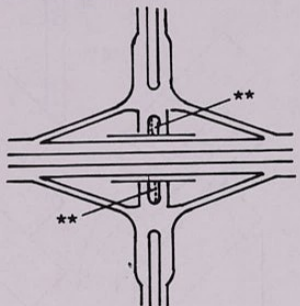
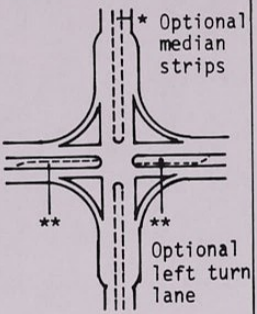
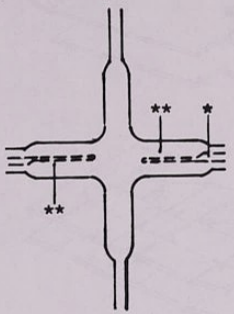
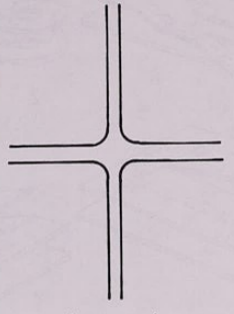
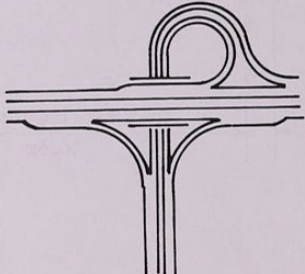
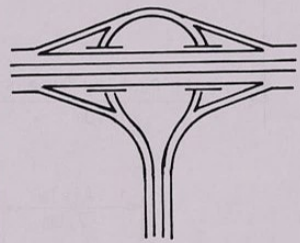
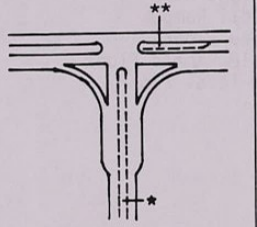
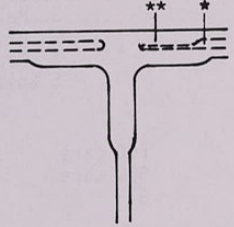
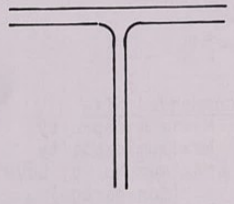


FIGURE A-2-9 (c)
ALLOWABLE ROAD
INTERCHANGES

NOTE: When two roads (with classification V_m and V_n) intersect, then interchange (V_m/V_n) is:

Allowed when (○) $|m-n| = 0$ or 1
 Not allowed when (△) $|m-n| = 3$
 Allowed but not recommended when (X) $|m-n| = 2$

	Cloverleaf	Diamond	Channelized	Flaired	Common
Four leg Cross intersection	 <p>Approximate scale: 200-400 M</p>	 <p>100-200 M</p>	 <p>* Optional median strips ** Optional left turn lane 50-100 M</p>	 <p>** * 50-100 M</p>	 <p>50 M More or less</p>
Three leg "Tee" intersection			 <p>** * 50-100 M</p>	 <p>** * 50-100 M</p>	
Basic characteristics of intersection	Vertical separation Flow separation Ramps Speed control	Vertical separation Flow control Ramps Speed control Signal/sign control	Flow control Traffic channels Signal control	Flow control Traffic channels Signal/sign control	Sign control or Uncontrolled
Types of roads intersecting	V_1 / V_1 (V_1 intersecting V_1) V_1 / V_2 V_2 / V_2 V_2 / V_3	V_2 / V_2 V_2 / V_3 V_3 / V_3 V_3 / V_4	V_3 / V_3 V_3 / V_4 V_4 / V_4 V_4 / V_5	V_4 / V_4 V_4 / V_5 V_5 / V_5 V_5 / V_6	V_5 / V_5 V_5 / V_6 V_6 / V_6 V_6 / V_7

Note:
Intersections shown above are "examples" only.
Actual design should be based on detailed analysis
of each case in each location.

* Median strips may be eliminated, then
roadway width can be decreased accordingly

** Left turn lane may be provided
for safer turn (optional)

FIGURE A-2-9(d)
INTERSECTION
EXAMPLES

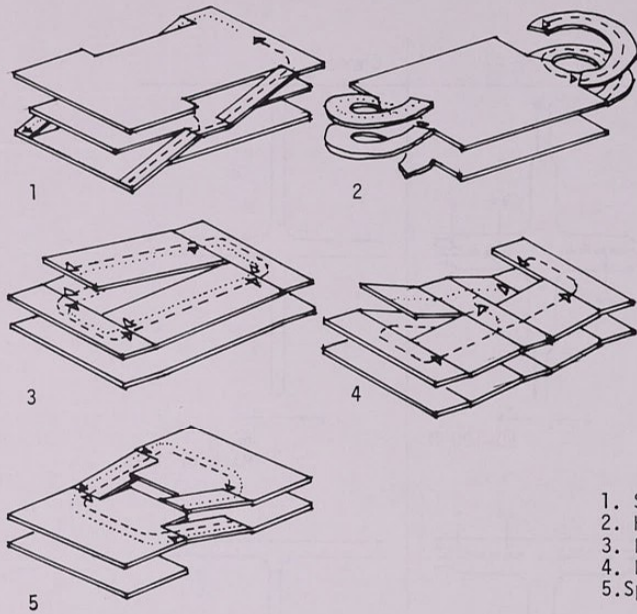


FIGURE A-2-9 (e)
STRUCTURE PARKING
(EXAMPLES)

1. Straight Ramp
2. Helical Ramp
3. Ramped Floor
4. Double Ramped Floor
5. Split-level Floor

Recommended Size

Minimum capacity	200 cars
Maximum capacity	500 cars
Maximum No. of Levels (for garage)	6

Unit Parking Dimensions

45° one-way	14.5 to 16.5 m.
60° one-way	17.0 to 19.0 m.
90° two-way	18.5 to 19.5 m.

Entrance and Exit

Number	At least one with multiple lanes, minimum 15 m from street intersection.
Width of lanes	3.5 m for one-way
Radius of Curb (inside)	Minimum 3.5 m.

Ramps and Driveways

Slope	15 per cent maximum.
Width	
Straight	Minimum 3.0 m.
Curved, inside lane	Minimum 3.5 m.
Curved, outside lane	Minimum 3.0 m.
Curvature	4 m. diameter to inside.

Parking Stalls

Length	5.5 m.
Width	2.5 m.

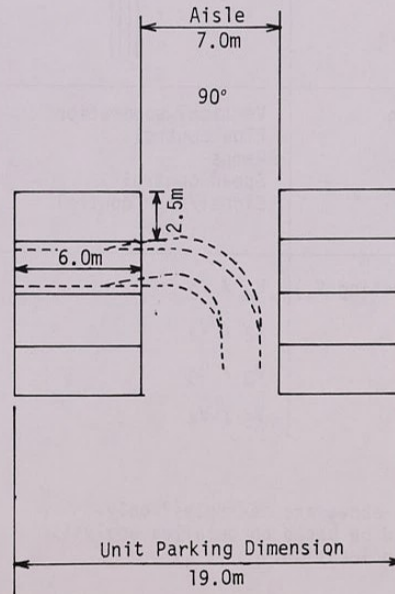
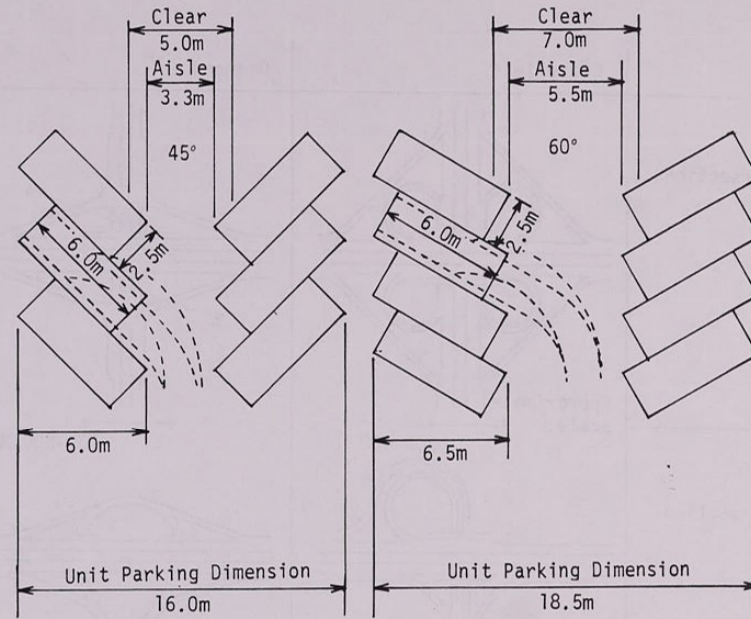
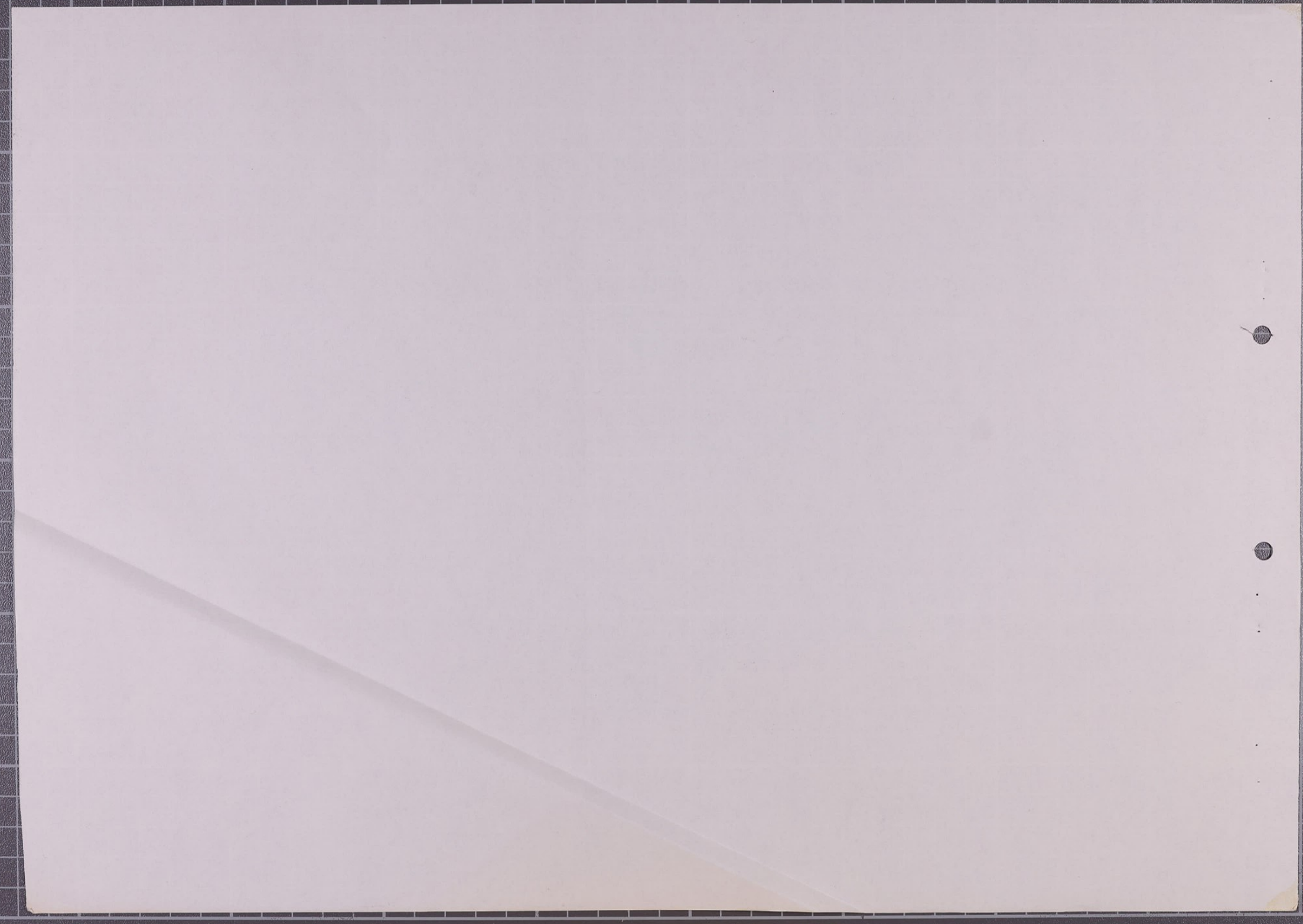


FIGURE A-2-9-(f)
UNIT PARKING
DIMENSION (EXAMPLES)







Oxford

If 2-1/4" tabs specify AC182-115

If 3-3/4" tabs specify AC182-113

And state tab color and Position(s) desired

If 4" tabs all right end specify AC182-215
and tab color desired.



MADE IN U. S. A.

