

URBAN DWELLING ENVIRONMENTS: JEDDAH, SAUDI ARABIA

by

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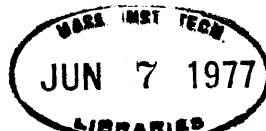
June, 1977

Signature of Author
Department of Architecture, May 6, 1977

Certified by
Horacio Caminos, Professor of Architecture, Thesis Supervisor

Accepted by
Chairman, Department Committee

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Submitted to the Department of Architecture
on May, 1977 in partial fulfillment of the requirements
for the Degree of Master of Architecture in Advanced Studies

ABSTRACT

This study intends to identify, analyze, and evaluate the existing housing situation in terms of systems, patterns, dwelling environments, and income of the inhabitants in Jeddah City, Saudi Arabia. This report is the result of studies based on a field survey carried out by the author in the summer 1976, as well as other information provided by government authorities and private sources. The case study analysis is based on a methodology developed in the Urban Settlement Design Program at M.I.T., under the guidance of Professor Horacio Caminos.

The development of the proposed model is based on four selected existing situations, representing different housing conditions in the Jeddah Urban Area. The model focuses on the physical layout/land subdivision according to the traditional structure of the urban areas, and incorporates the social and cultural values of the region. The intent is to provide more efficiency in terms of infrastructure, cost, and functional viability in development in terms of administration, maintenance, etc.

The study is intended to:

Provide a reference for understanding and evaluating the existing housing conditions and the urban environment.

Provide guidelines for the identification of dwelling systems within an urban area.

Provide a reference to orient decision-makers in optimizing the allocation of financial resources in housing, housing improvement, and urban development.

Thesis Supervisor: Horacio Caminos, Professor of Architecture.

URBAN DWELLING ENVIRONMENTS: JEDDAH, SAUDI ARABIA

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(2)

PREFACE

This study intends to identify, analyze, and evaluate the existing housing situation in terms of systems, patterns, dwelling environments, and income of the inhabitants in Jeddah City, Saudi Arabia. This report is the result of studies based on field survey carried out by the author in the summer 1976, as well as other information provided by government authorities and private sources. The case study analysis included the physical and socio-economical aspects of selected urban dwelling environments in Jeddah City. The methodology of this study was developed in the Urban Settlement Design Program, M.I.T., under the guidance of Professor Horacio Caminos.

The support, guidance, and advice of Professor Horacio Caminos is gratefully acknowledged. I wish also to express my great appreciation of the personal advice and assistance of Mr. Reinhard Goethert, and members of the class of 1975-1977 and 1976-1978 for their comments and assistance. I would like to acknowledge Riyadh University for financing this research, the Saudi Arabian Educational Mission for their kind cooperation, and the Town Planning Office, the Ministry of Public Affairs and Housing, the Ministry of Petroleum and U.S.G.S. for their assistance. I would particularly like to acknowledge my family and my brother Yahya for their moral support. I am further indebted to every one who directly or indirectly contributed to this work during the field survey in Jeddah in the summer of 1976 and during the two years of study while at M.I.T.

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CONTENTS

INTRODUCTION 5

URBAN CONTEXT: 6

CASE STUDIES 11

1. Al-Sabeel 12

2. Old City 22

3. Al-Saheifah 32

4. Al-Medina Road 42

SUMMARY 53

Dwelling Time/process pererspective 54

Physical Data Summary 56

Community Facilities, Utilities/Services Summary. . 57

Land Utilization, Patterns, Percentages, Densities 59

PROPOSED MODEL 60

Background 60'

The Model, Model Goals 62

Planning Policies 63

Basic Data 64

Proposed Land Use/Circulation 68

Block Subdivision 70

Housing Options 72

GLOSSARY 78

EXPLANATORY NOTES/BIBLOGRAPHY 82

(4)

INTRODUCTION

The city of Jeddah is currently experiencing a rapid rate of urbanization following the recent high economic growth. The process of rapid urbanization is resulting in an acute shortage of housing, community facilities, services, and public utilities. People in large numbers are migrating to the city from rural areas as well as from the nearby countries in search of better income opportunities. Thus, the city is passing through a period of painful transition in the evolution of a human settlement pattern. With the introduction of modern technology, Jeddah's urban area is developing on the same pattern as in advanced countries without much consideration to the local cultural and physical characteristics. This adopted pattern has had also a wide impact on the people's living conditions which is reflected in community life as well as in emerging housing standards. The acute shortage of housing which Jeddah faces is not only due to the high immigration and the inadequacy of public services, but also due to the lack of adequate planning controls, uncoordinated administrative structure, lack of necessary data and information for the purpose of designing a spatial plan, and the excessively high cost of land especially in and around the built-up areas. Speculation is rampant with land left unbuilt for a long period of time. Speculation in vacant land has also made it difficult for public housing to be built in an orderly fashion, and private housing is being built in a scattered uncontrolled pattern with no relation to urban development plans. In the case of low income sectors, which represent 46% of the population in Jeddah, they do not have access to a piece of land and consequently they do not benefit from the government subsidized housing program. The housing situation is growing worse every year because the housing supply has not been able to keep pace with the demand. During the years 1970-75 approximately 75,000 urban

dwelling units were constructed compared with the need for new houses and replacement of 154,000. The present housing market in Jeddah is beyond the income capacity of most of the people even with government subsidies.

The study attempts to provide a reference for understanding and coping with the housing problems in Jeddah. It attempts to provide a base for decisions by documenting typical existing dwelling situations/ environments from all income sectors. The focus is on the low income groups who bear the greatest burden in regard to shortages, inadequate services, and limited municipal resources. A project is developed to provide a model for further new developments in Jeddah. The development of the proposed model is based on four selected existing situations, representing different housing conditions in the Jeddah Urban Area. The model focuses on the physical layout/land subdivision according to the traditional structure of the urban areas, and incorporates the social and cultural values of the region. The intent is to provide more efficiency in terms of infrastructure, cost, and functional liability to the development in administration, maintenance, etc.

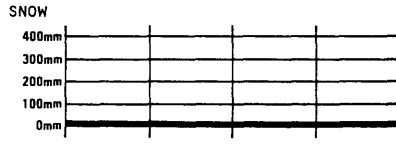
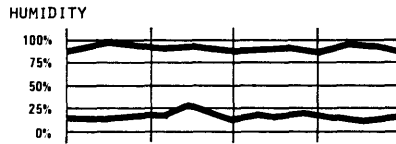
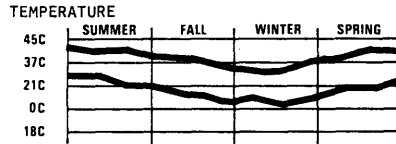
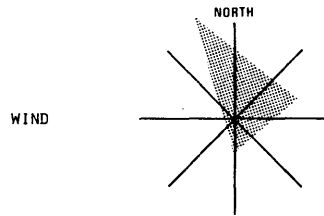
The study is intended to:

- Provide a reference for understanding and evaluating the existing housing conditions and the urban environment.
- Provide guidelines for the identification of dwelling systems within an urban area.
- Provide a reference to orient decision-makers in optimizing the allocation of financial resources in housing improvement, and urban development.

URBAN CONTEXT

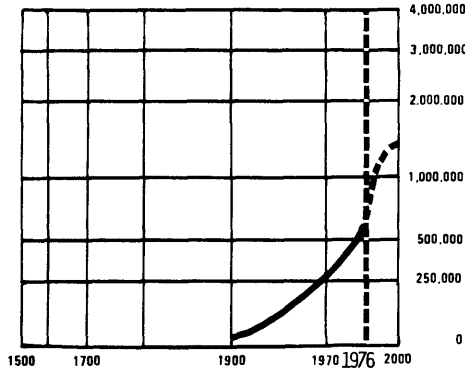
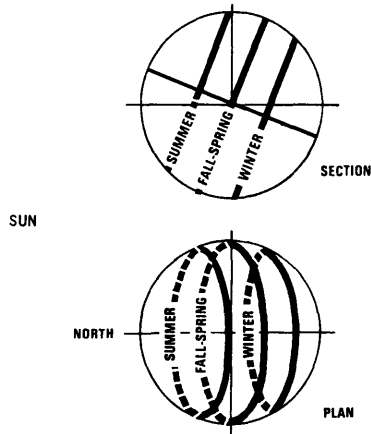
JEDDAH, SAUDI ARABIA

JEDDAH 21° 29' NORTH

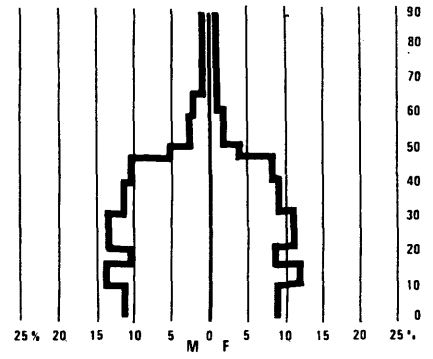


1. PRIMARY INFORMATION: Jeddah city, one of the largest cities in the country, is situated on a narrow coastal plain (Tihama plain) in the western region of Saudi Arabia, bounded on the east by the Al-Sarawat mountain range and on the west by the Red Sea. It is the main commercial and distribution center and also the gateway to the Holy City, Mecca. The population was 560,000 in 1976. It is located at latitude 21°29' North, longitude 39°12' East. The city is on a flat plain. The climate, remarkable for its heat and humidity, rises during the summer to 42°C but during the winters it is relatively mild. Rainfall is erratic between October and April with an average rainfall of 12 mm. The average relative humidity ranges between 75%-80%.

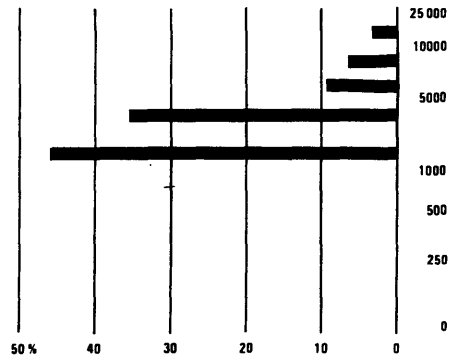
2. HISTORY: The origin of Jeddah dates from pre-Islamic time but the foundation of its future prominence was laid by the Caliph Uthman in the year 26 A.H/646 A.D. As the initial focus of the Islamic religion and of a great empire, Jeddah derived huge wealth from the wars of conquest due to its strategic location on the Red Sea and its gateway to the Holy City. Many decades later Jeddah was the point of interest of Mumluk-Sultan of Egypt who had been concerned with the protection of the Holy City and the control of the Red Sea ports.



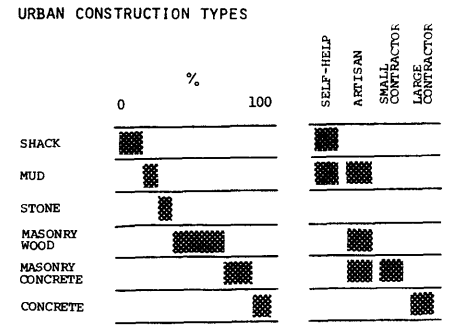
URBAN POPULATION GROWTH
horizontal: dates vertical: population
Source: Robert Matthew, JEDDAH Existing Conditions



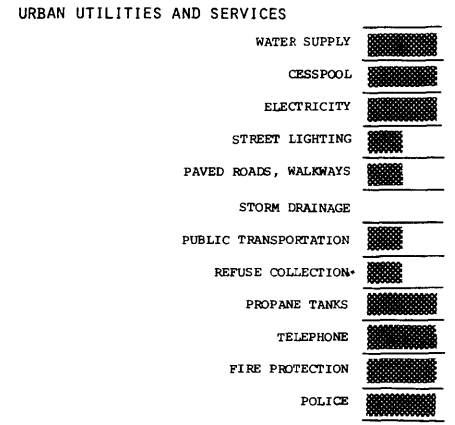
URBAN POPULATION DISTRIBUTION
horizontal: percentages vertical: ages
males: M females: F
Source: Robert Matthew, JEDDAH Existing Conditions



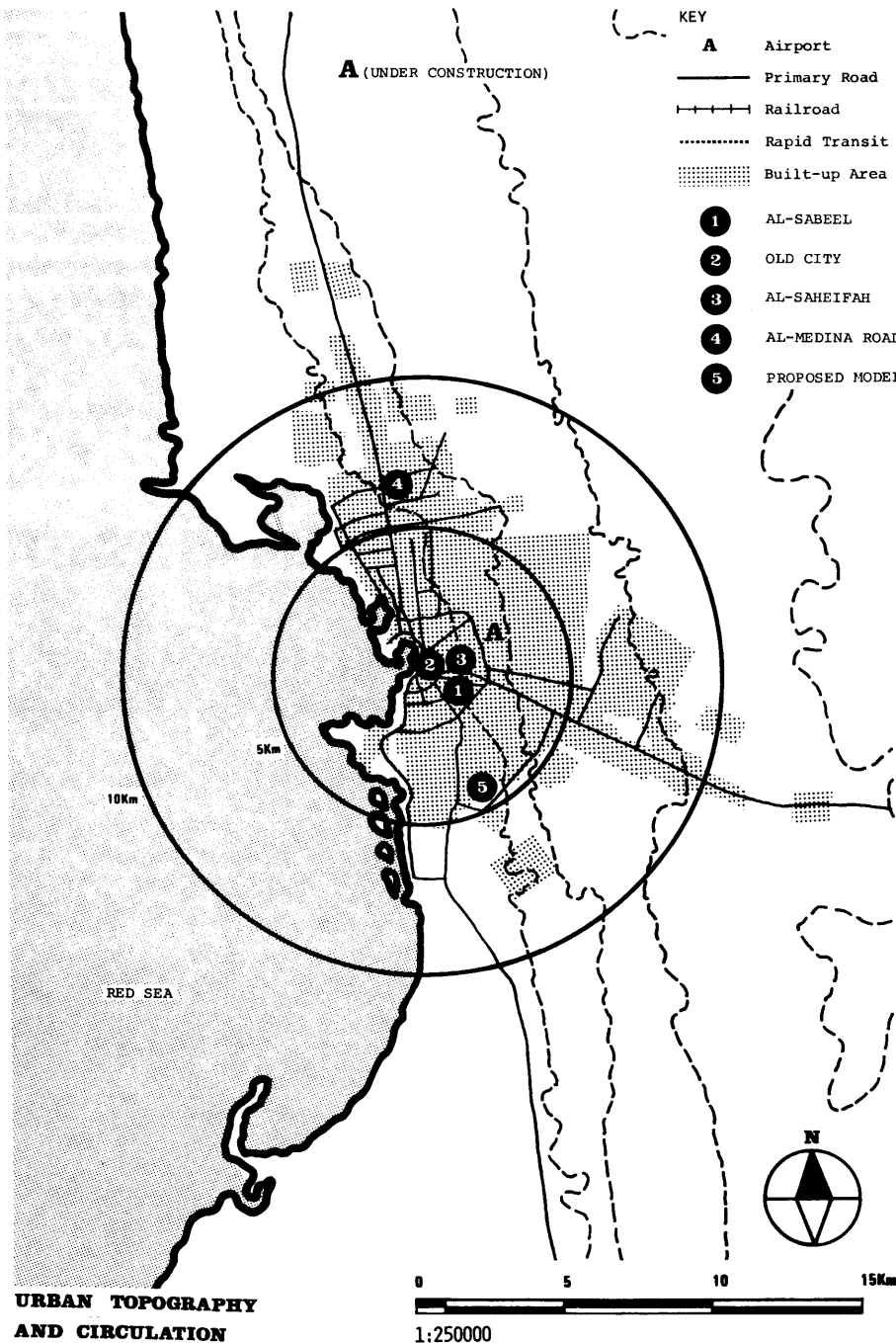
URBAN ANNUAL INCOME DISTRIBUTION
horizontal: percentages vertical: dollars
Source: Robert Matthew, JEDDAH Existing Conditions



The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.
Quality of information: Approximate



URBAN COMMUNITY FACILITIES
The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.
Quality of information: approximate



URBAN TOPOGRAPHY AND CIRCULATION

1:250000

- KEY**
- A** Airport
 - Primary Road
 - +—+— Railroad
 - Rapid Transit
 - ▒ Built-up Area
 - ① AL-SABEEL
 - ② OLD CITY
 - ③ AL-SAHEIFAH
 - ④ AL-MEDINA ROAD
 - ⑤ PROPOSED MODEL

In 912 A.H/1506 A.D. Husayn Al-Kurdi, the governor of Jeddah, gave an order to build a strong fort around Jeddah to protect the city from the Portuguese. In AD 1517 Jeddah fell under the administration of the Turks who stationed the "Wali" (administrative head) in the city. After the occupation of the Hejaz area by the Egyptian forces of Mohammed Ali in 1813, Jeddah became much more closely tied to Egypt. These ties were further strengthened after the assassination of the British and French Consuls in 1858 by the Turks and a bombardment by the British fleet. The Turks then occupied Jeddah and increased the garrison very considerably adding to the growth of the city. However, it was the opening of the Suez Canal in 1869 which stimulated the growth of Jeddah to the point where it became the greatest trading center on the Red Sea.

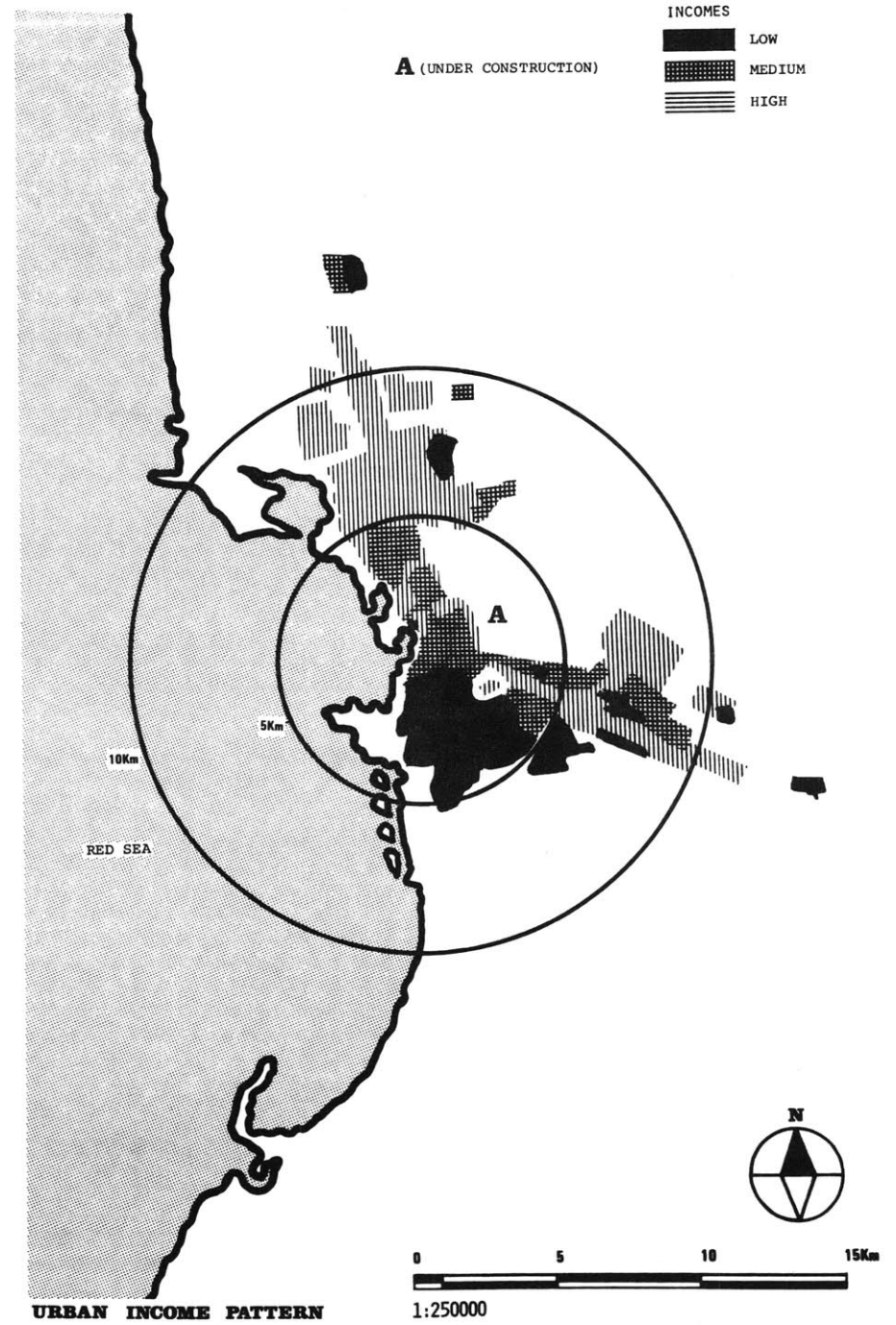
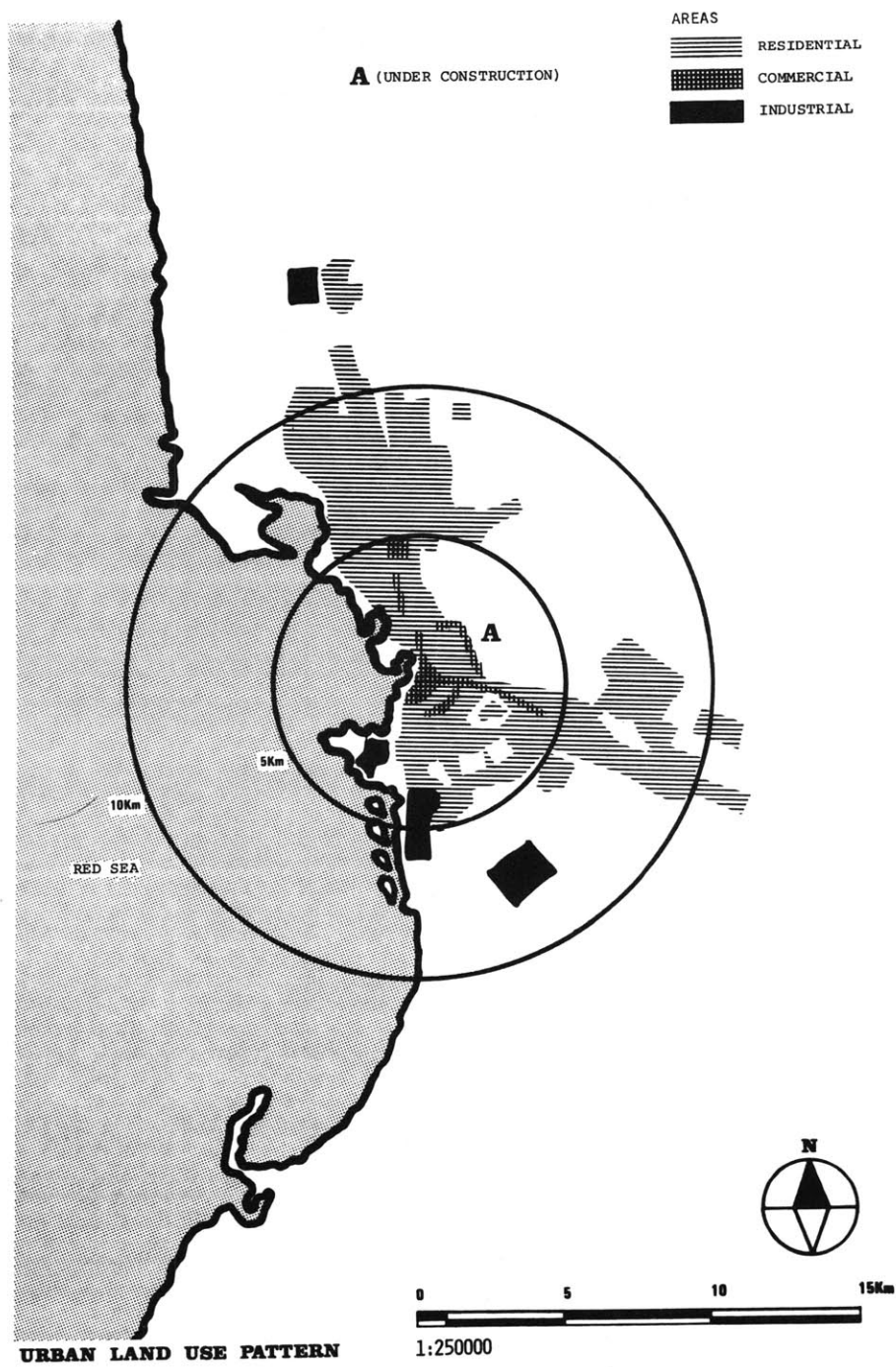
The recent history of Jeddah started in 1925 when King Abdulaziz Ibn Saud took over. Since then the trading tradition which was long established has further flourished and the city has expanded with this considerable increase.

3. ECONOMY: For a long time Jeddah has maintained its economic structure as commercial, distribution and service center. The city has grown to dominate the economic life of the entire region. It also remains the predominant transit point for the "Hadj" (Pilgrimage) movement. It has further benefited by the rise in trade and commerce associated with the oil wealth of the country. The city is an extremely important market for local produce, drawing its supplies of fresh fruits and vegetables from the surrounding areas. Its impact on land use patterns is demonstrated in the commercial farming patterns in the valleys which lie favorably placed around the city. The urban economy is predominantly a service one and the highest level of services is found here, particularly in the financial, commercial, and distribution sectors. A substantial majority of all bank offices in the Western Region of Saudi Arabia are in the city. Also, the port gives easy access to imported raw materials and the city provides both a large workforce and a large local market. 76% of all employment recorded in the manufacturing sector of the Western Region cities is located in Jeddah. Since most of the capital intensive industries such as petrol refining

and steel milling are also in Jeddah, the proportions for output and capital investment are both high.

4. GOVERNMENT: The Municipality of Jeddah is responsible for the administration of the city's facilities and infrastructure jointly with the national Ministry of the Interior. The town planning office and the recently established national Ministry of Housing and Public Works are concerned with public housing projects for Jeddah and its metropolitan area. Judicial matters and the implementation of rules and regulations according to Islamic law are handled by a judge who is appointed by the King and the Ministry of Justice.

5. DEMOGRAPHY: With an estimated population of 560,000 in 1976, Jeddah is the largest of the Western Region's six cities. It also appears to have grown far more rapidly over the past 28 years (that is, in the oil period) than any of the other cities. From an approximate estimate the 1948 population was around 50,000, giving a total increase of 510,000 and an average percentage growth of around 9%, compared to the annual growth rate of the country of 3% (1974-est). With birth rates as high as those found in the other cities of the Western Region, the increase is due to immigration. In Jeddah 88% of the heads of households were born outside Jeddah, and about 60% of those born outside Jeddah were also born outside Saudi Arabia. This concentration of immigrants is due to its location as the port of entry for the great majority of foreigners and the rate at which new jobs have been provided by its rapidly growing economy. The high proportion of foreign immigrants has a great influence on the city's overall demographic structure. Jeddah's population contains a rather high proportion of males, 54%. Since male foreign immigrants outnumber females, the average household size is low, since non-Saudi households are much smaller than Saudi households. The overall activity rate is high for the same reason - because there are fewer dependents for each worker in the immigrant population. The structure is heavily biased towards young people with 46% under age 15 and only 2% aged 65 or over; and 52% between 15-65 of age.





6. **SOCIO-CULTURAL:** Jeddah's inhabitants are ethnically Arabs, with some admixture of non-Arab adherents of Islam, of which most immigrated as pilgrims, and reside in the Hijaz area. Many Arabs from other Arab states are employed in Jeddah. Most of the citizens are Muslims, and Islam places a high value on the individual's privacy. Traditional houses in Jeddah clearly take into account this aspect. Family structure is very strong and the extended family still exists in Jeddah, especially in the old parts of Jeddah. The social hierarchy goes from unskilled laborers to industrial workers, from small salesmen to very sophisticated traders, and also from very simple government employees to high ranking professionals. All of these groups are diffused throughout Jeddah but still are distinguished into different social classes in certain areas. 46% of households have incomes less than \$300 per month; 36% receive between \$300-500, and the rest receive more than \$500.

7. **SOCIO-ECONOMIC:** The lowest income group in the city is concentrated in the southern part where the industrial zone is located and where most of the immigrants from the southern part of the Arabian peninsula and Africa are also concentrated. The moderately low income and middle income are in the South-Western sector at the outer ring of the city. To the north of the city and along Mecca Road (South-West), there are the middle, and upper middle income sectors where they mostly work in trades, service employment, and in the government. The northern part of the city is predominantly high income residents whose source of income is trade, companies and government employees.

8. **HOUSING:** Most of the dwellings in Jeddah fall into the row house category. However, apartments, villas, traditional houses, and shanties are also common in Jeddah. The overall space standards are worse in Jeddah than in the other urban areas, mainly because of overcrowding in the large shanty areas. The proportion of households living with more than two persons per room (42%) is one third higher in Jeddah than in the other urban areas. The basic feature of Jeddah's socio-geographical structure emerges if one separates the broad wedge of development to the south of the central business district,

starting with the high density in the inner localities and moving out to the south where the shanty districts exist. In this southern sector of the city nearly a third of the dwellings are shanties, 92% of Jeddah's shanties are concentrated here and most of the rest are low-income cluster houses. Elsewhere to the north and east of the central business district are apartments, villas, traditional houses, and row houses. Shanties and low income dwellings do exist here, but they usually appear in smaller enclaves.

URBAN CONTEXT SOURCES

Urban Topography and Circulation : (accurate) MAPS. Town Planning Office, Jeddah.
Urban Land Use Pattern : (approximate) IBID.
Urban Income Pattern : (approximate) IBID.
Urban Growth Pattern : (approximate) IBID.
Climate : (accurate) Robbert Mathew, Jeddah Existing Conditions.
Photographs : Field Survey, Y. Fadan, 1976.
General Information : Robbert Mathew, Jeddah Existing Conditions; Field Surveys, Y. Fadan, 1976.



CASE STUDIES

The following section contains case studies describing selected low/middle/high income dwelling environments situations within the Jeddah urban area at the present time. The four case studies were selected on the basis of income groups, housing systems, location, and the percentage of population that each system houses. The case studies are represented at four levels.

LOCALITY: A locality is defined as a relatively self-contained urban area. It is generally confined within physical boundaries.

LOCALITY SEGMENT: All localities differ in size and shape; for purposes of comparison, a segment of 400 x 400 meters has been taken from each locality.

LOCALITY BLOCK: Within each locality segment a typical residential block is selected in order to compare land utilization (patterns, percentages, and densities).

DWELLING UNIT: A self-contained unit for an individual, a family, or a group in each locality segment.

1. AL-SABEEL

INCOME GROUP

Low

FAMILY COMPOSITION

Single

DWELLING UNIT

Row house

NO. OF FLOORS

1-2

POPULATION DENSITY

Medium

DEVELOPER

Popular

DEVELOPMENT

Progressive

2. OLD CITY

Middle

Single/Extended

Traditional house

2-5

High

Private

Progressive

3. AL-SAHEIFAH

Middle

Single

Apartment

2-5

Medium

Private

Progressive

4. AL-MEDINA ROAD

High

Single

Detached house

1-2

Low

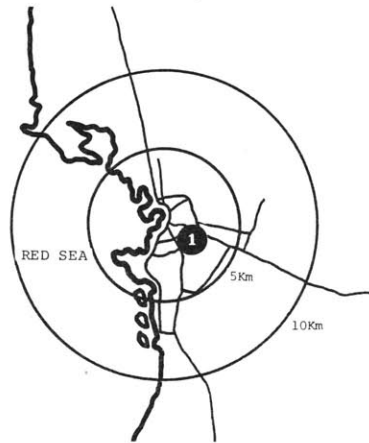
Private/public

Instant



1 AL-SABEEL Jeddah

PRIVATE, LOW INCOME
ROW HOUSES

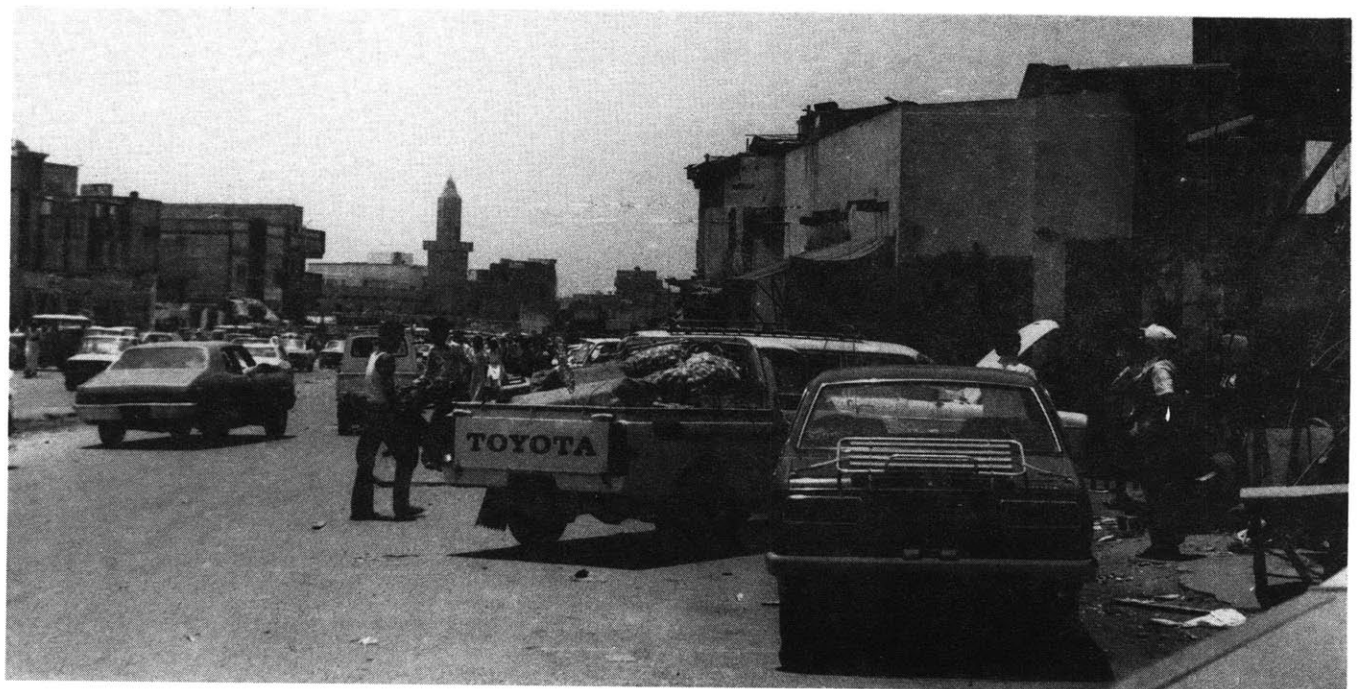
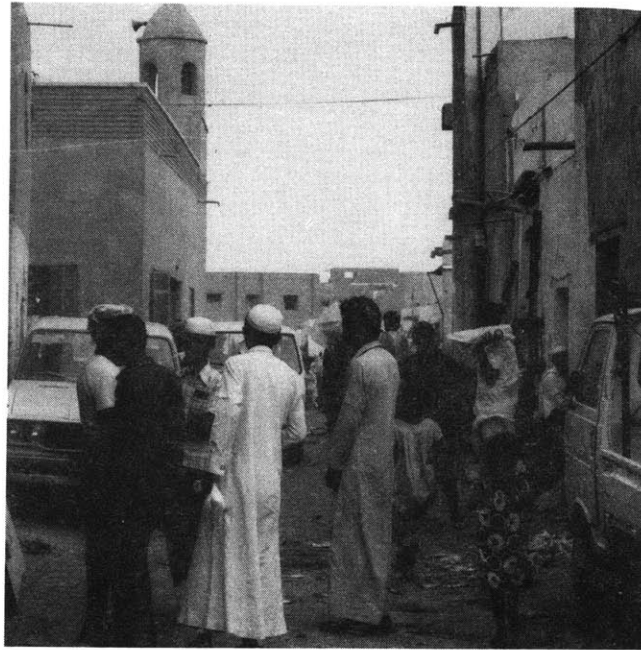


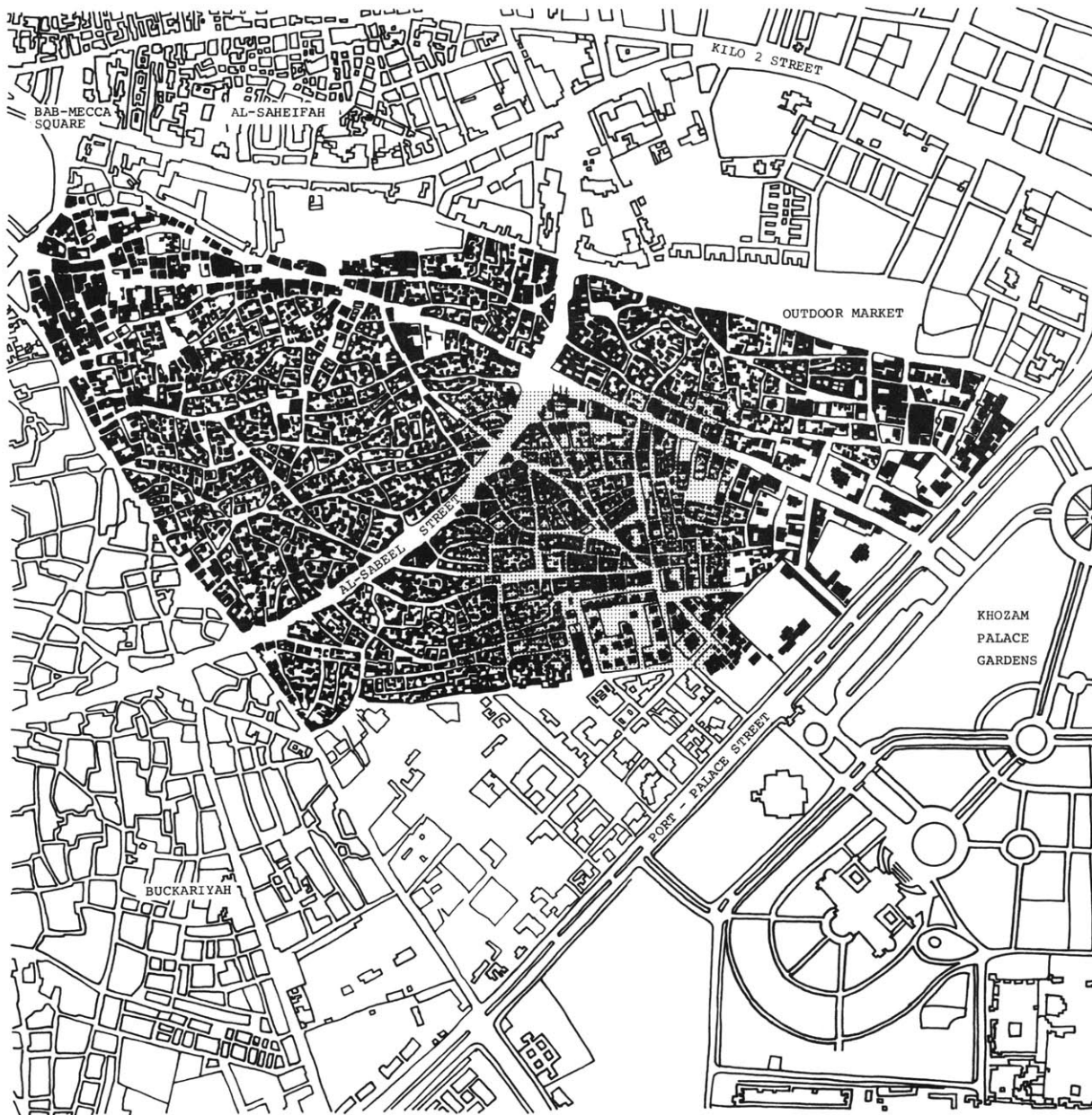
LOCATION: It is located immediately to the southeast of the old city, bounded by the inner and outer ring roads.

DEVELOPMENT: The development of the area occurred gradually by the people who came from the south of Arabia. They settled here because of the access to the old city and to be near a free water supply, from which came the locality's name ("free water"). Most of the houses were originally shanties; over time people legalized their land ownerships by building on their properties. Because of this, the locality developed an irregular shape with narrow streets. The inhabitants are working in different job activities: from government employees to small traders, from company employees to manual laborers, and from small salesmen to taxi drivers.

AL-SABEEL, Jeddah. (top left) The interior unpaved narrow street has no sidewalk and is dominated by pedestrians. Car owners park their cars immediately in front of their houses or in the nearest open spaces. (top right) The photograph shows an overview of the locality. The house entrance can be seen opening directly to the street. Use of the water tanks on the roof. Telephone lines can be seen strung across the street.

(bottom) Al-Sabeel Street is the most crowded street in the locality. Commercial, small industrial, car repair shops, etc. are found on the both sides of the street. No parking lots provided and the street become congested from stopped cars.





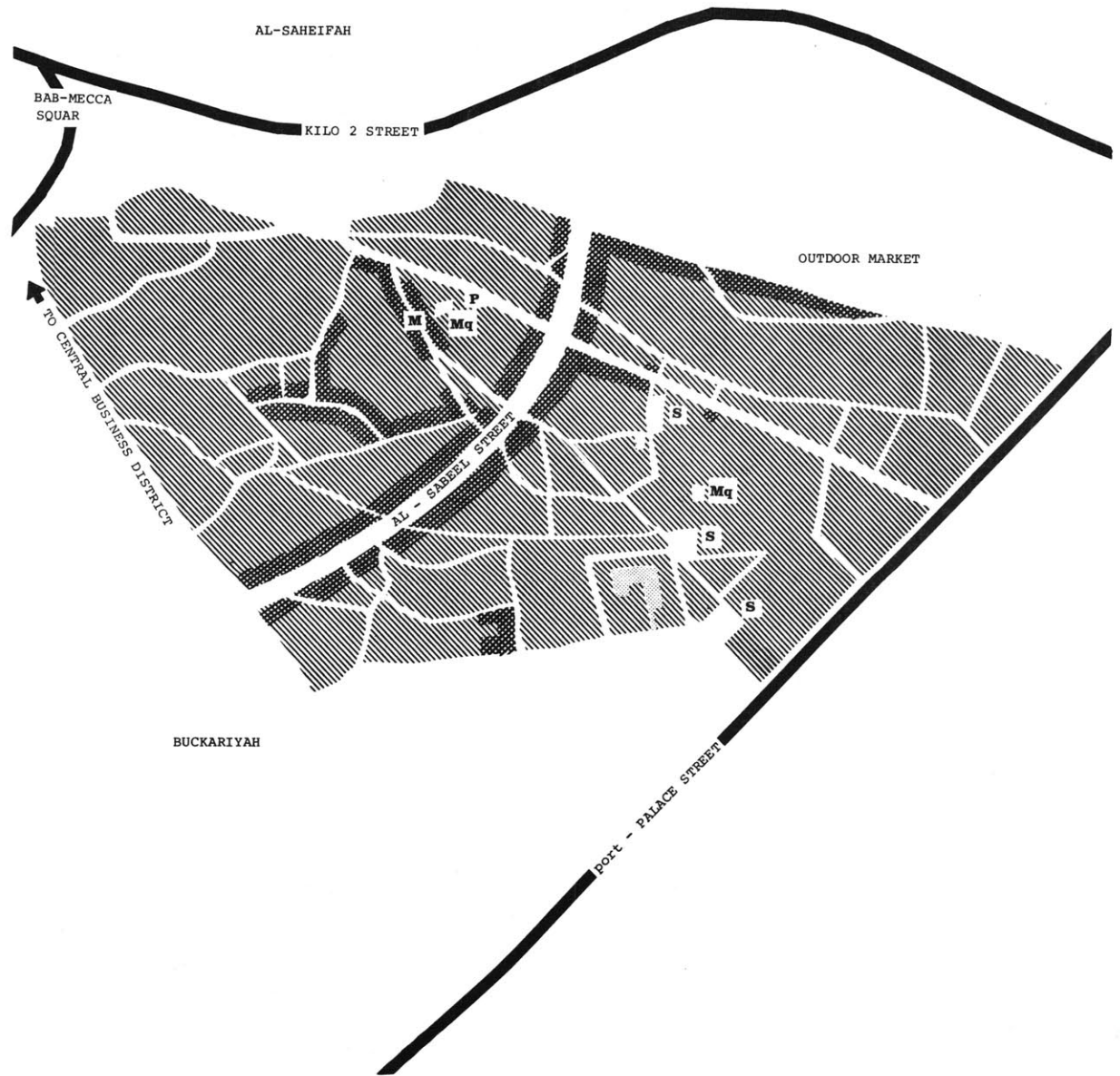
LAYOUT: The development by accretion gave the locality its irregular shape. Streets are narrow and of various widths. There are very few open areas and playgrounds provided within the locality. The school areas provide the only playgrounds within the locality.

LOCALITY PLAN



 SELECTED
 SEGMENT

LAND USE: The locality was mainly developed for residential use. Commercial and light industry are concentrated along Al-Sabeel Street. Two main market places are located in the locality: Suqe Al-Sabeel (Al-Sabeel market) located in the middle part, and the main outdoor market of the city located on the northeast. One of the main recreation areas of the city (Khozame Palace Gardens) is located to the east of the locality. Mosques, schools, and other institutional facilities are scattered throughout the site.

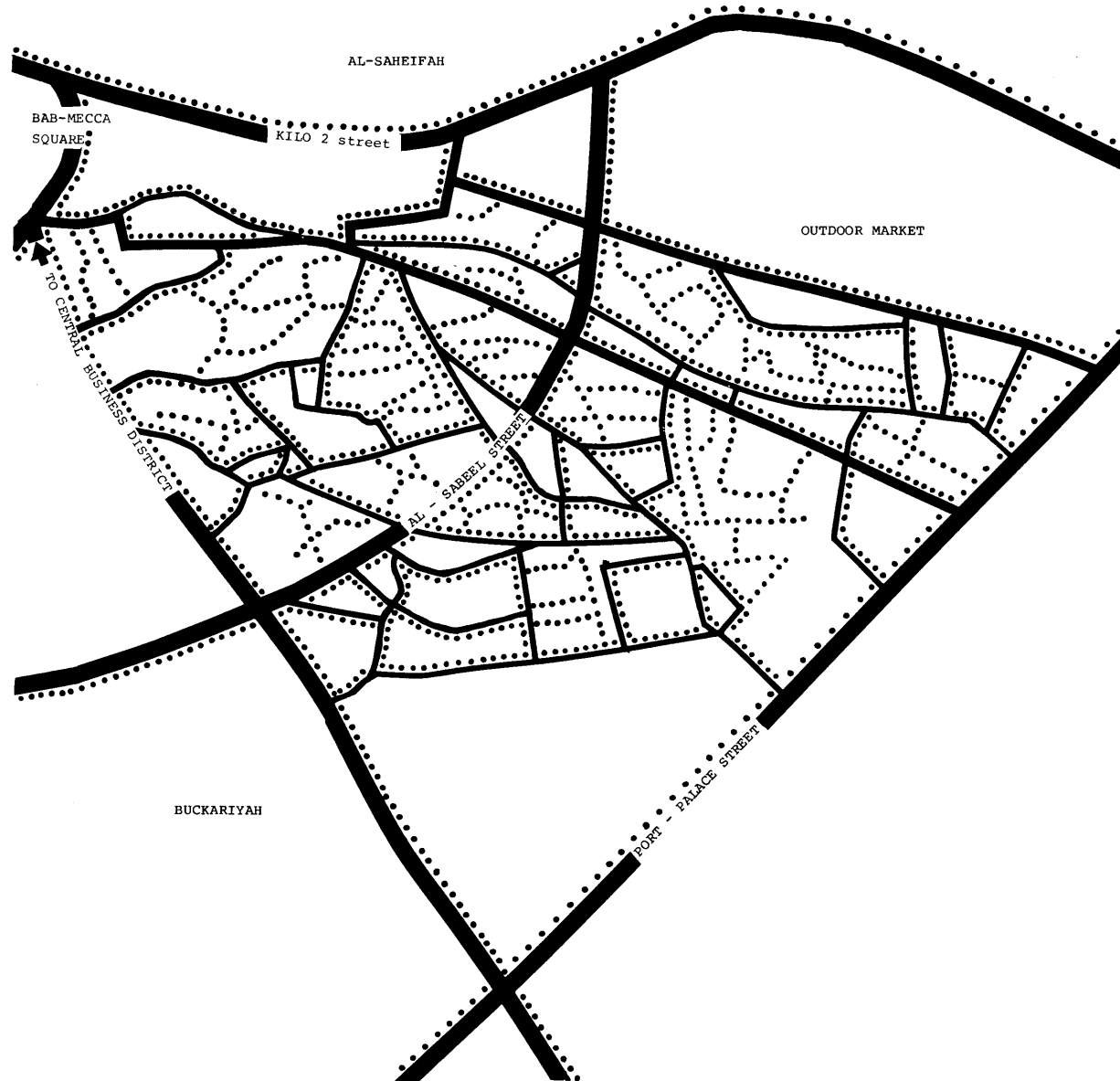


- AREAS
- RESIDENTIAL
 - COMMERCIAL
 - INDUSTRIAL
 - OPEN SPACES

- KEY
- Pk Parking
 - P Police
 - F Fire Department
 - S School
 - Mq Mosque
 - R Recreation
 - L Library
 - U University
 - H Health
 - PO Post Office
 - SS Social Services
 - M Market
 - C Cemetery
 - Bus
 - Rapid Transit

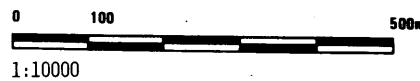
LOCALITY LAND USE PATTERN





CIRCULATION: Al-Sabeel Street and Bash-Shar Ben Burd Street are the only paved streets in this locality. Al-Sabeel is the most important and crowded street in the locality where most commercial activities, light industry, and car repair shops are located. No street lights are provided yet, and the narrow interior streets are lighted by kerosene lanterns from the municipality and by incandescent electric lights, provided by the inhabitants in front of their doors. The narrow interior streets are dusty with no maintenance or garbage collection control; no parking lots are provided, and cars park wherever they can.

LOCALITY CIRCULATION PATTERN



— VEHICULAR
 PEDESTRIAN

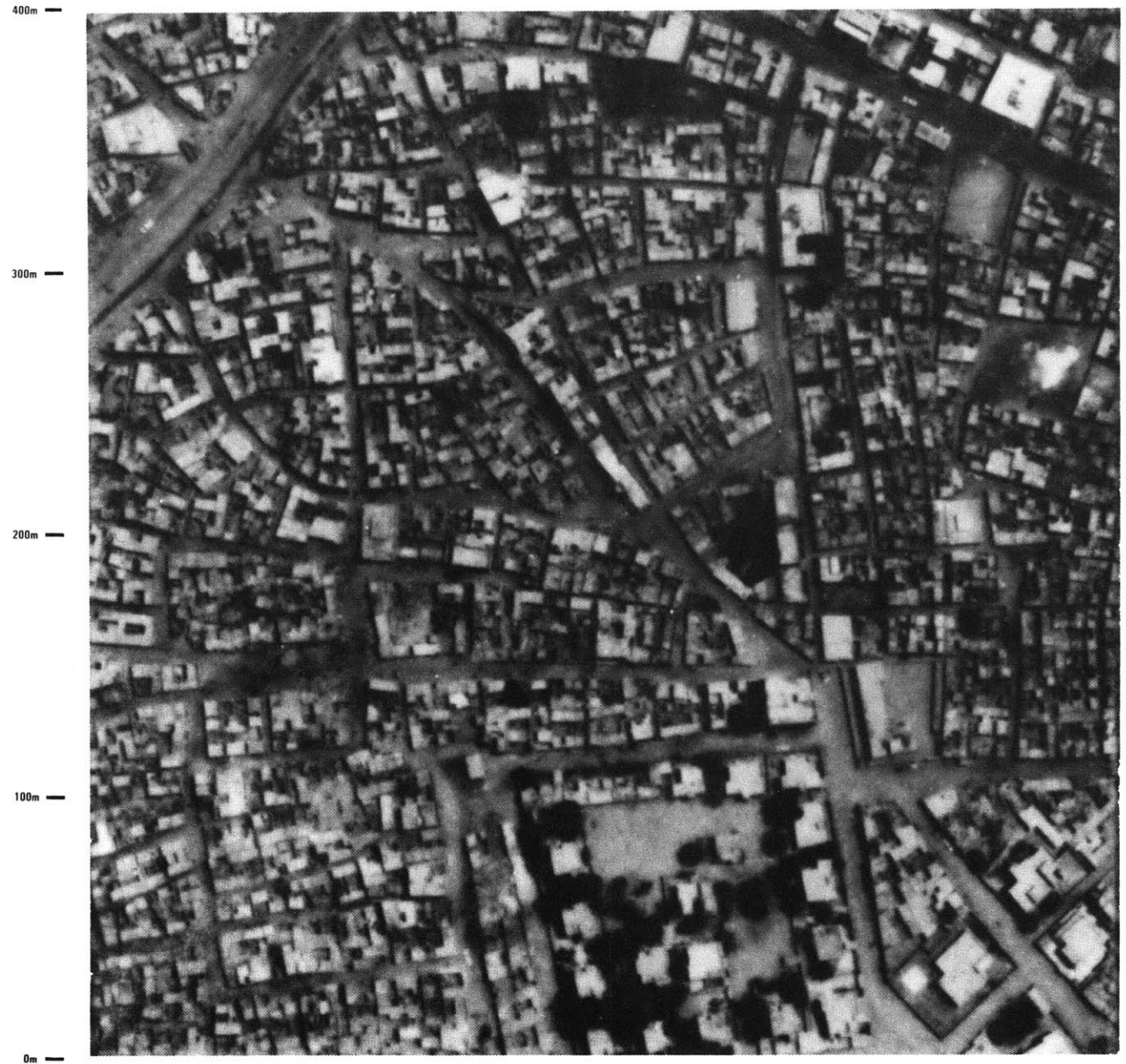
LOCALITY SEGMENT LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	542	16.0	34
DWELLING UNITS	542	16.0	34
PEOPLE	1900	16.0	118

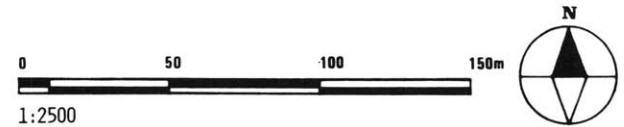
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	5.8	36
SEMI-PUBLIC (open spaces, schools, community centers)	0.3	2
PRIVATE (dwellings, shops, factories, lots)	9.8	61
SEMI-PRIVATE (cluster courts)	0.1	1
TOTAL	16.0	100

NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 485 \text{ m/Ha}$$
$$\text{AVERAGE LOT AREA} = 295 \text{ m}^2$$

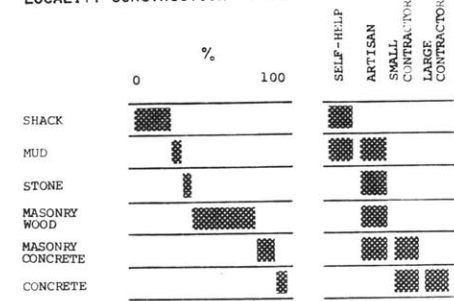


LOCALITY SEGMENT AIR PHOTOGRAPH





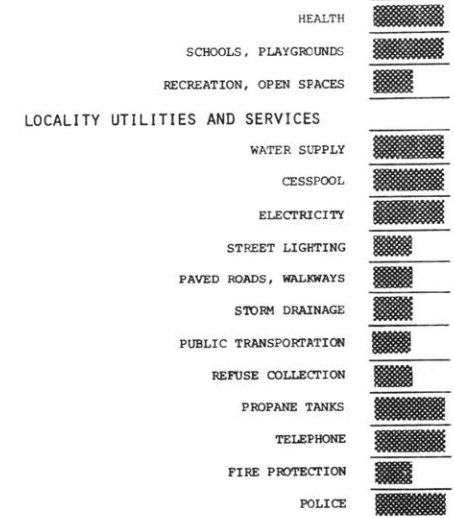
LOCALITY CONSTRUCTION TYPES



The chart shows (1) approximate percentage of each construction type within the total number of dwellings; and (2) building group that generally produces each type.

Quality of information: Approximate

LOCALITY COMMUNITY FACILITIES



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Approximate

LOCALITY SEGMENT PLAN



█ SELECTED BLOCK

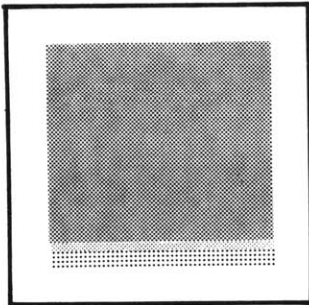
LAND UTILIZATION DIAGRAMS



PATTERN

- Public: streets/walkways
- Semi-Public: playgrounds
- Semi-Private: cluster courts
- Private: lots
- dwellings

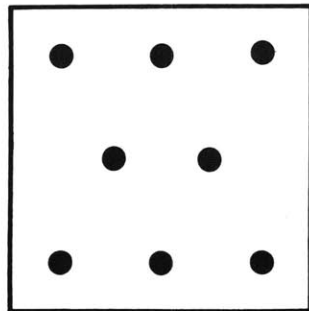
1 Hectare



PERCENTAGES

Streets/walkways	36%
Playgrounds	2%
Cluster Courts	1%
Dwellings/Lots	61%

1 Hectare



DENSITY Persons/Hectare 158

● 20 Persons



SELECTED BLOCK



1:2500



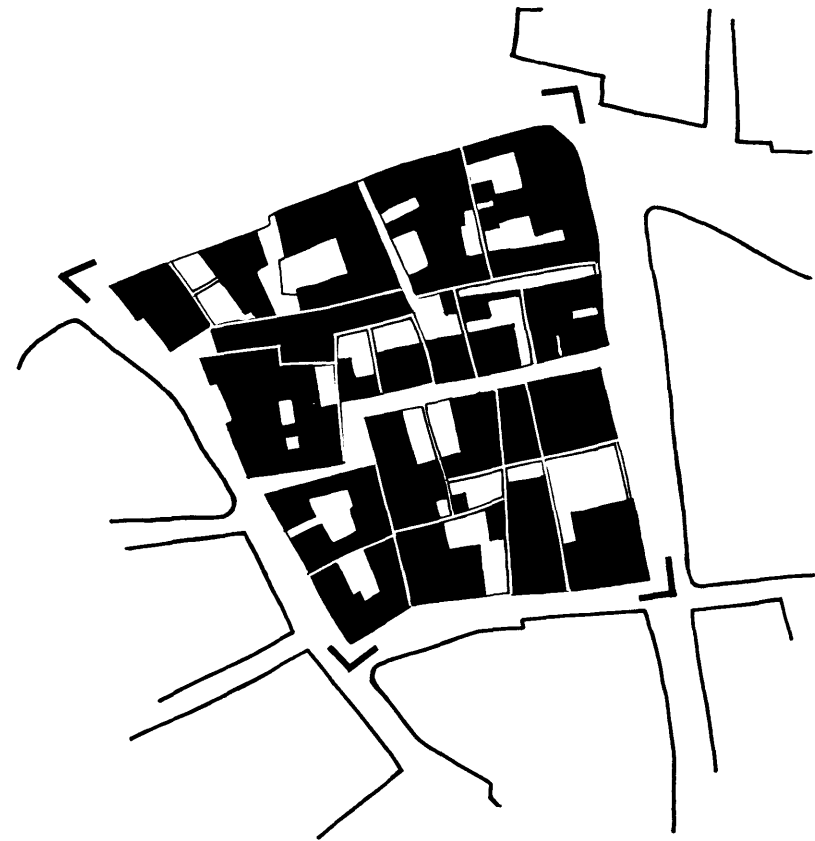
LOCALITY SEGMENT PLAN

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	26	0.34	76
DWELLING UNITS	26	0.34	76
PEOPLE	78	0.34	229

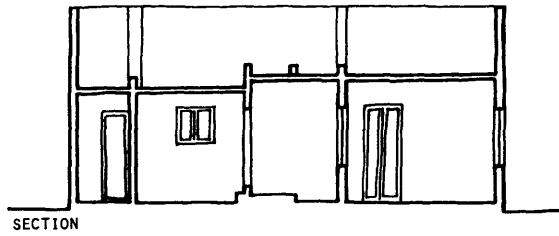
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.06	18
SEMI-PUBLIC (open spaces, schools, community centers)	-	-
PRIVATE (dwellings, shops, factories, lots)	0.28	82
SEMI-PRIVATE (cluster courts)	-	-
TOTAL	0.34	100

NETWORK EFFICIENCY
 $R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 647 \text{ m/Ha}$
 AVERAGE LOT AREA = 132 m²

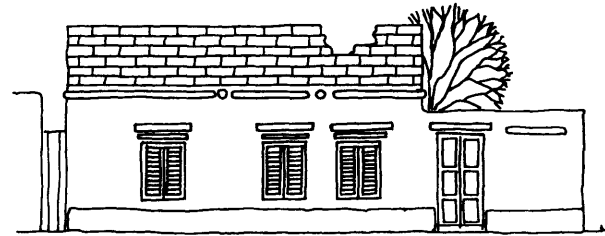


1:1000

LOCALITY BLOCK PLAN



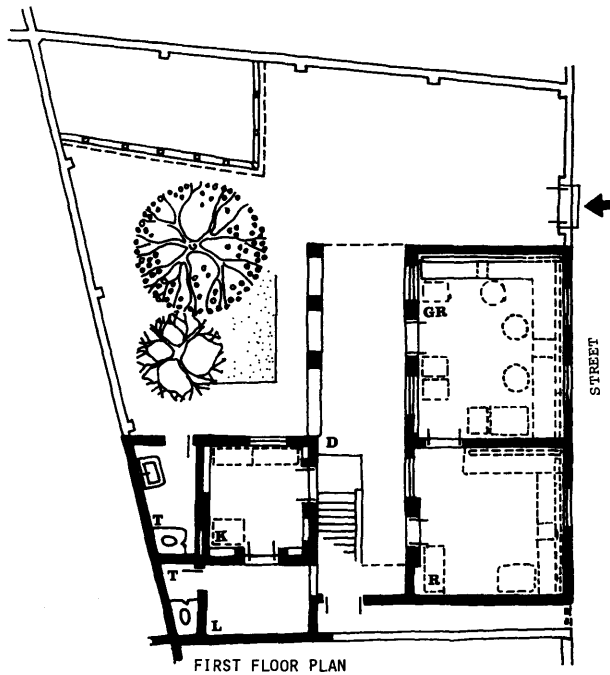
SECTION



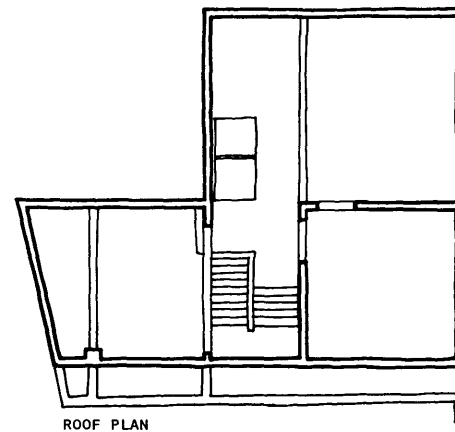
ELEVATION

KEY

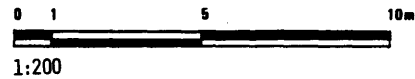
- LR Living Room
- D Dining/Eating Area
- BR Bedroom
- K Kitchen/Cooking Area
- T Toilet/Bathroom
- L Latrine
- C Closet
- S Storage
- R Room (multi-use)
- GR Guest Room

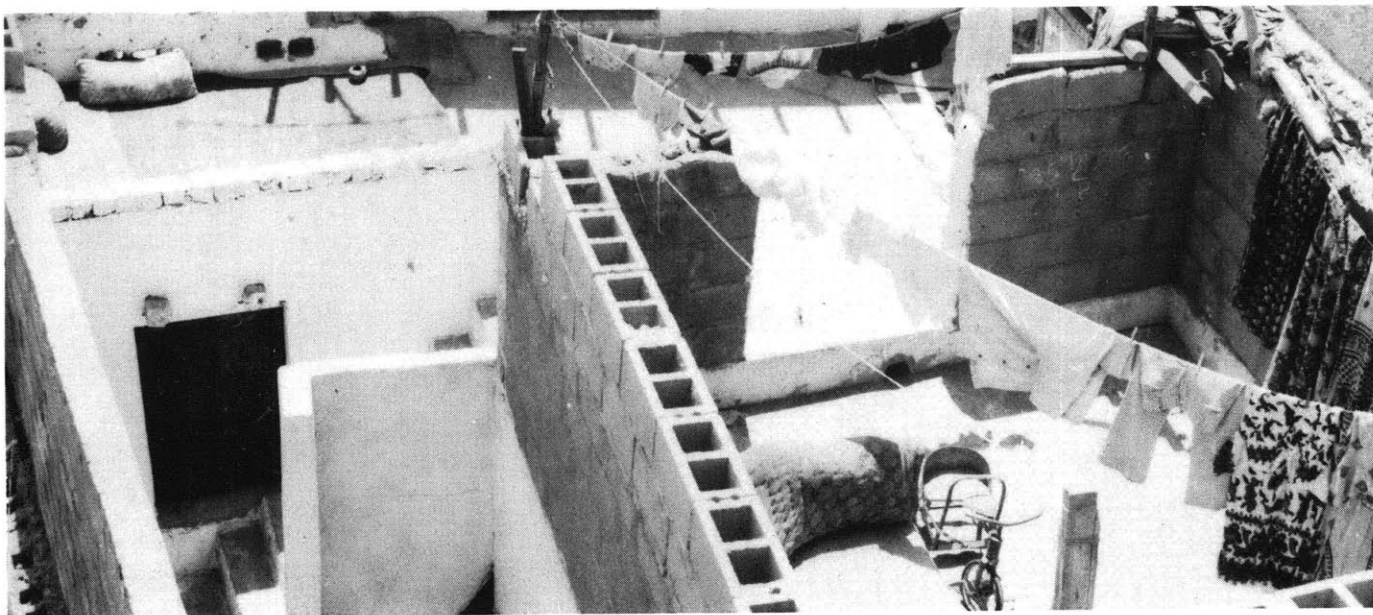


FIRST FLOOR PLAN



ROOF PLAN





PHYSICAL DATA

(related to dwelling and land)

DWELLING UNIT
 type: House
 area (sq m):
 tenure: Legal ownership

LAND/LOT:
 utilization: Private
 area (sq m):
 tenure: Legal ownership

DWELLING
 location: Inner ring
 type: Row house
 number of floors: 1
 utilization: Single family
 physical state: Fair

DWELLING DEVELOPMENT
 mode: Incremental
 developer: Private
 builder: Artisan
 construction type: Masonry/wood
 year of construction: 1949

MATERIALS
 foundation: Stone
 floors: Concrete
 walls: Cement block
 roof: Concrete

DWELLING FACILITIES
 wc: 2
 shower: 2
 kitchen: 1
 rooms: 2
 other: Court

SOCIO-ECONOMIC DATA

(related to user)

GENERAL: SOCIAL
 user's ethnic origin: Saudi
 place of birth: Yemen
 education level: -

NUMBER OF USERS
 married: 2
 single: -
 children: 1
 total: 3

MIGRATION PATTERN
 number of moves: 2
 rural - urban: 1
 urban - urban: 1
 urban - rural: -
 why come to urban area: Relatives/work

GENERAL: ECONOMIC
 user's income group: Self-employed
 employment: -
 distance to work: -
 mode of travel: -

COSTS
 dwelling unit: -
 land - market value: -

DWELLING UNIT PAYMENTS
 financing: Self-financing
 rent/mortgage: -
 % income for rent/mortgage: -

AL-SABEEL, Jeddah. (top left) This area is used for eating, sleeping, resting, and many other activities. It is open to the inner courtyard. Note the cushion and the television.

(top right) The roof is the most useful place in the house, several functions occur in this area. Sleeping area during the summer, drying washed clothes, storing unused things, etc.

CASE STUDY SOURCES

Locality Plan: (accurate) MAPS. Town Planning Office, Jeddah. AERIAL PHOTOGRAPHS, United States Geology Survey.

Locality Land Use Pattern: (approximate) IBID.

Locality Circulation Pattern: (approximate) IBID.

Segment Plan: (approximate) IBID.

Segment Land Utilization: (accurate) IBID.

Block Plan: (approximate) IBID.

Typical Dwelling: (approximate) Field Surveys, Y. Fadan, 1976.

Physical Data: (approximate) IBID.

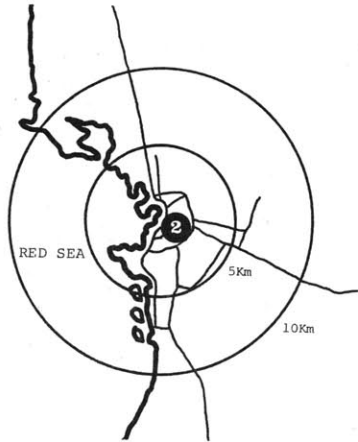
Socio-Economic Data: (approximate) IBID.

Photograph: Y. Fadan, 1976.

General Information: Field Surveys, 1976.

2 OLD CITY Jeddah

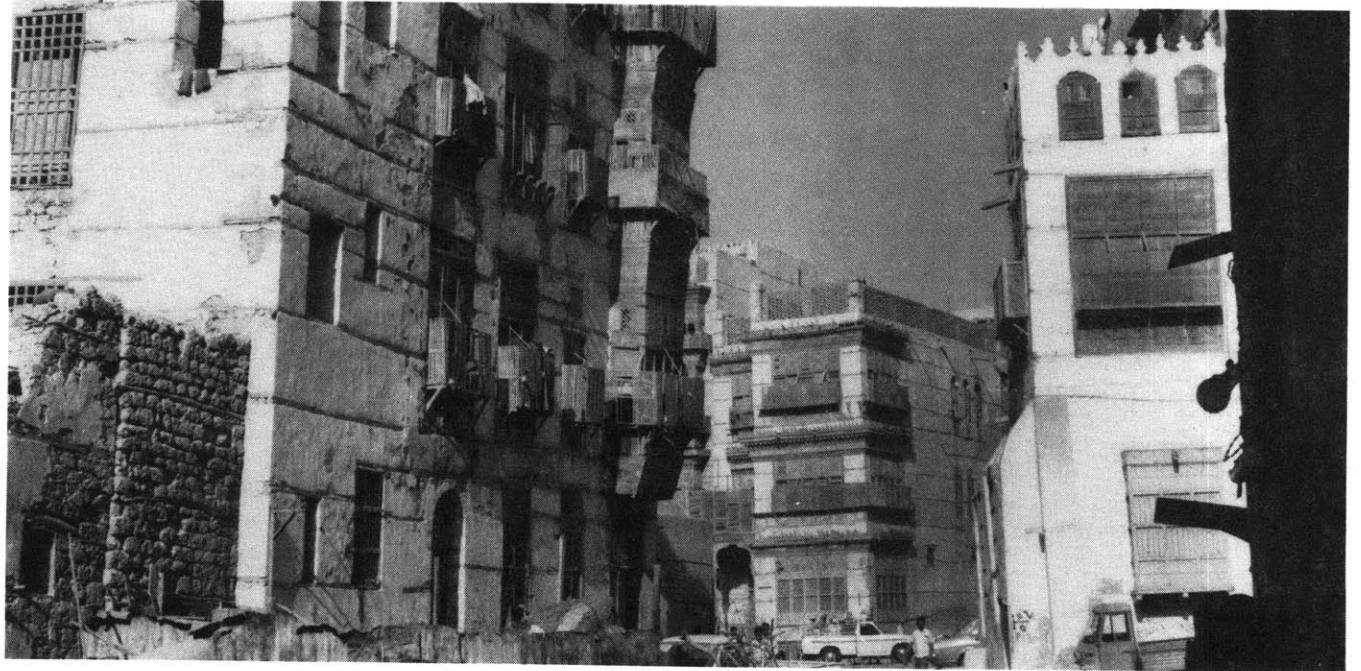
PRIVATE/RENTAL,MIDDLE/UPPER MIDDLE
INCOME,TRADITIONAL HOUSES/APARTMENTS



LOCATION: It is located in the central part of the city, bounded by the inner ring from the north, east and south; and by the sea from the west.





DEVELOPMENT: The development of the area took place on a raised mound of the ancient settlements. Most of Jeddah's traditional houses are being demolished and replaced with "modern" high rise buildings. The streets are also being widened which destroys the traditional houses. The origin of most of this locality's inhabitants dates back to the Ottoman time. These people are predominantly from the middle and upper middle income sector, but a small group of low income people exist in this locality where most of them are manual workers and small salesmen.

Old City, Jeddah: (top left) Shops, drying clothes, ironing activities are expanding into the street. Many of the windows are protected by a hand crafted wooden lattice work to provide privacy for the residents but still to allow cooling breezes to pass through. (top right) The narrow streets and the traditional houses are the main feature of the Old City. This was the result of protection requirements and the limited availability of land and also to facilitate pedestrian movement. Cars still manage to penetrate the locality (bottom) Small open spaces are provided for the gathering of the neighbors. The traditional construction with wooden reinforcement can be seen in the dwelling on the left.





LAND USE: Because of its location in the city center, mixed land uses of residential and commercial areas predominate. The main central business district of the city is located to the west of this locality, on King Abdulaziz Street. The nearest recreational area is Bab-Jaded Square which is located to the north of the locality. Mosques are scattered throughout the locality. The main boys' school complex in this area is Al-Flah schools; other schools are found in various sections of the locality.

AREAS

-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  OPEN SPACES

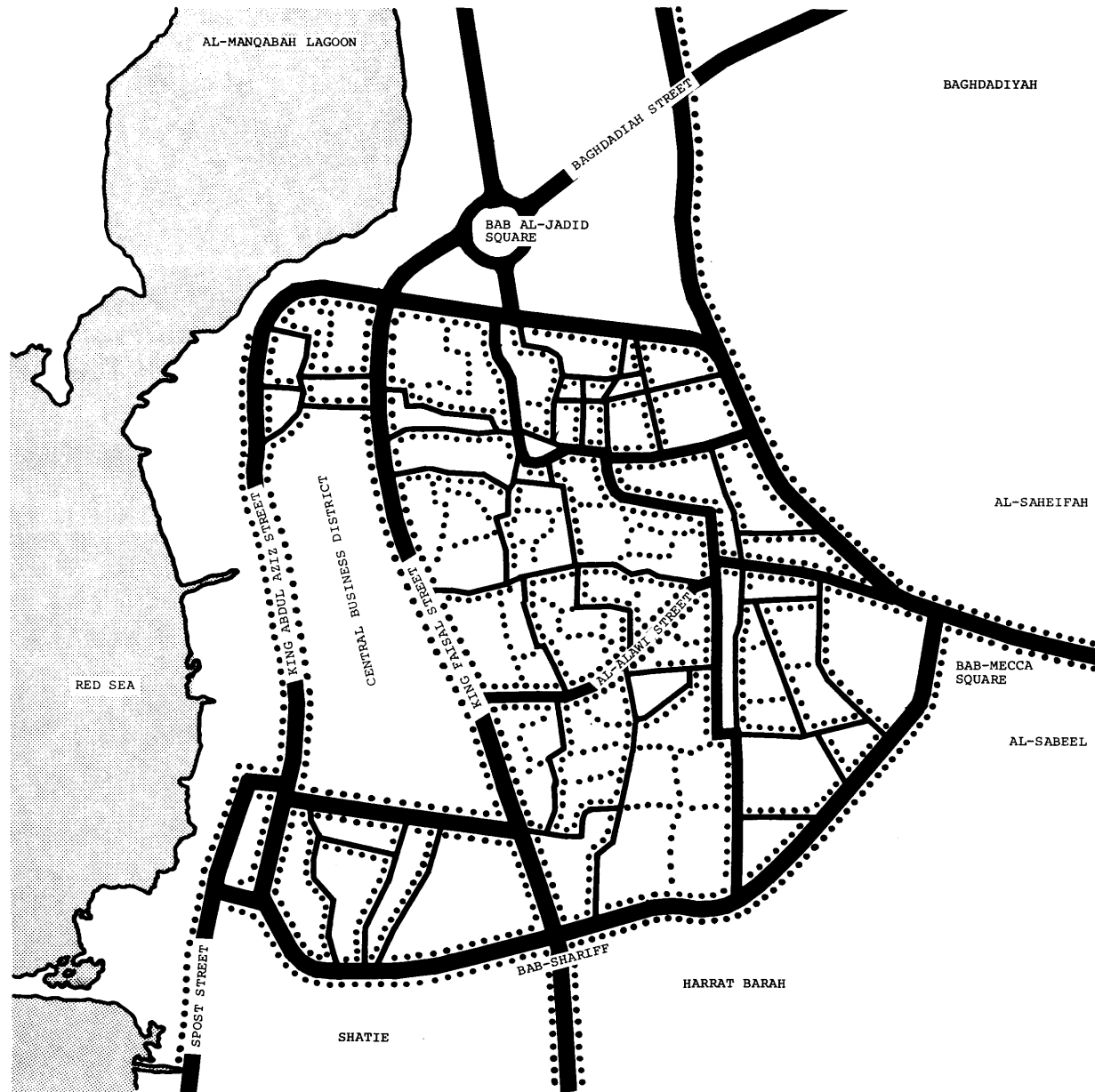
KEY

- Pk** Parking
- P** Police
- F** Fire Department
- S** School
- Mq** Mosque
- R** Recreation
- L** Library
- U** University
- H** Health
- PO** Post Office
- SS** Social Services
- M** Market
- C** Cemetery
-  Bus
-  Rapid Transit



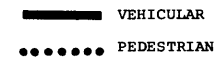
LOCALITY LAND USE PATTERN





CIRCULATION: Only the main streets are paved. Street lights are only provided along the main streets. The narrow interior streets are lighted by kerosene lanterns from the municipality and by fluorescent and incandescent electric lights, provided by the inhabitants in front of their doors. Prking lots are provided only along the main streets and in the central business district.

LOCALITY CIRCULATION PATTERN



LOCALITY SEGMENT LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	368	16	23
DWELLING UNITS	368	16	23
PEOPLE	7264	16	454

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	6.72	42
SEMI-PUBLIC (open spaces, schools, community centers)	0.32	2
PRIVATE (dwellings, shops, factories, lots)	8.64	54
SEMI-PRIVATE (cluster courts)	0.32	2
TOTAL	16	100

NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 421 \text{ m/Ha}$$

$$\text{AVERAGE LOT AREA} = 434 \text{ m}^2$$

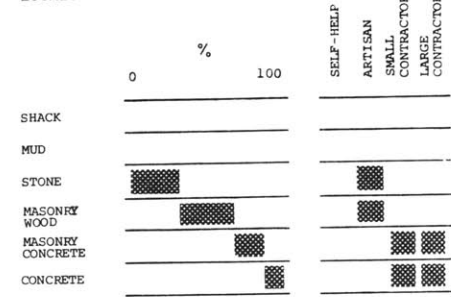


LOCALITY SEGMENT AIR PHOTOGRAPH





LOCALITY CONSTRUCTION TYPES



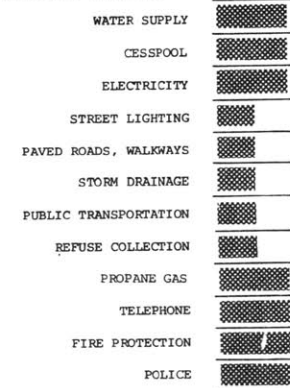
The chart shows (1) approximate percentage of each construction type within the total number of dwellings; and (2) building group that generally produces each type.

Quality of information: Accurate

LOCALITY COMMUNITY FACILITIES



LOCALITY UTILITIES AND SERVICES



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Approximate

LOCALITY SEGMENT PLAN



[Pattern] SELECTED BLOCK

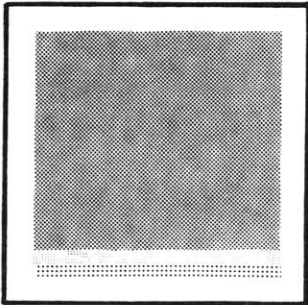
SEGMENT LAND UTILIZATION DIAGRAMS



PATTERN

- Public: streets/walkways
- Semi-Public: playgrounds
- Semi-Private: cluster courts
- Private: lots
- dwellings

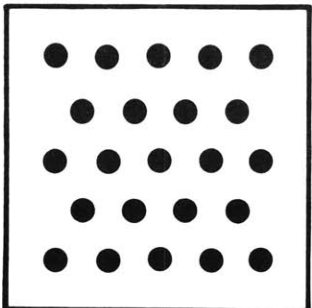
1 Hectare



PERCENTAGES

Streets/walkways	42%
Playgrounds	2%
Cluster Courts	2%
Dwellings/Lots	54%

1 Hectare



DENSITY Persons/Hectare 454

● 20 Persons



SELECTED BLOCK

LOCALITY SEGMENT LAND UTILIZATION



1:2500





LOCALITY BLOCK LAND UTILIZATION DATA

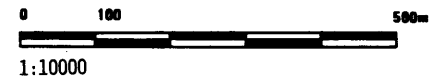
DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	9	0.4	23
DWELLING UNITS	9	0.4	23
PEOPLE	184	0.4	460

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.16	39
SEMI-PUBLIC (open spaces, schools, community centers)	-	-
PRIVATE (dwellings, shops, factories, lots)	0.2	51
SEMI-PRIVATE (cluster courts)	0.04	10
TOTAL	0.4	100

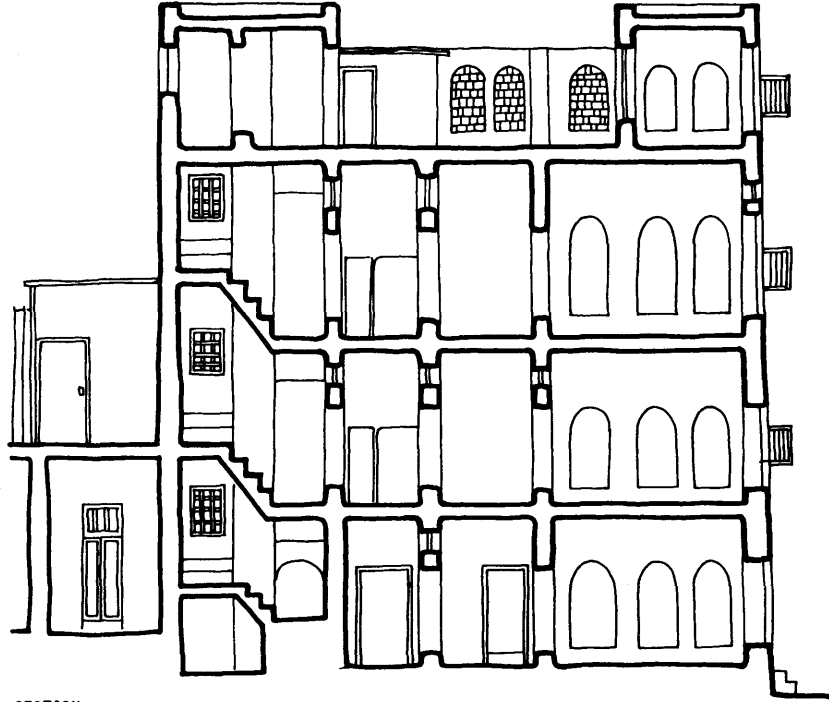
NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 500 \text{ m/Ha}$$

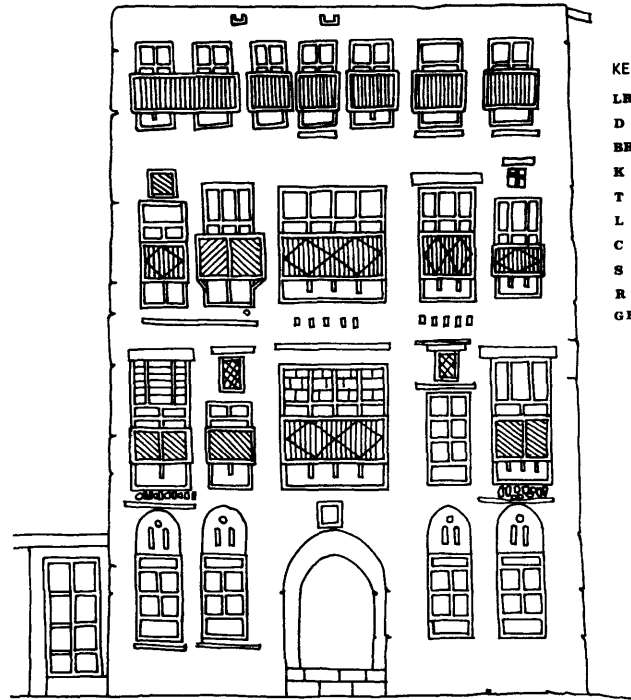
$$\text{AVERAGE LOT AREA} = 444 \text{ m}^2$$



LOCALITY BLOCK PLAN



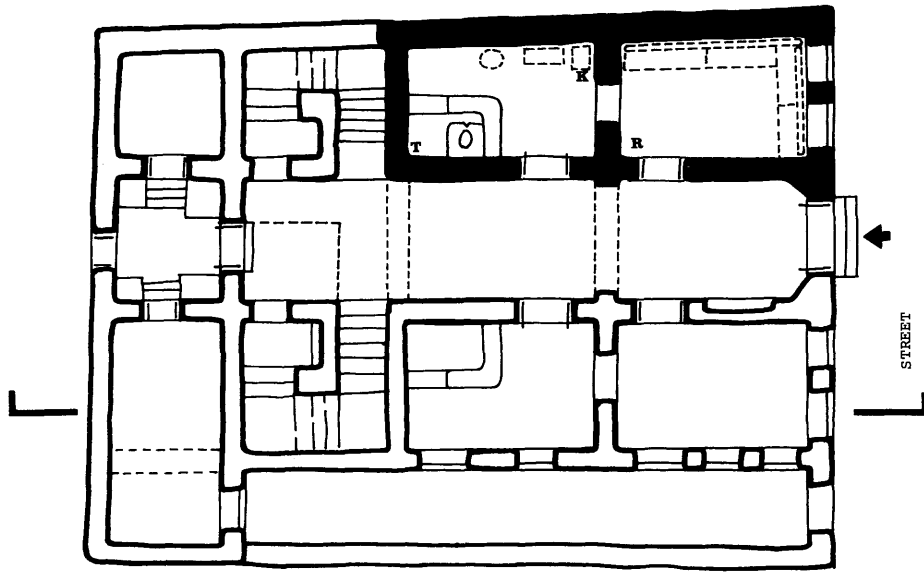
SECTION



ELEVATION

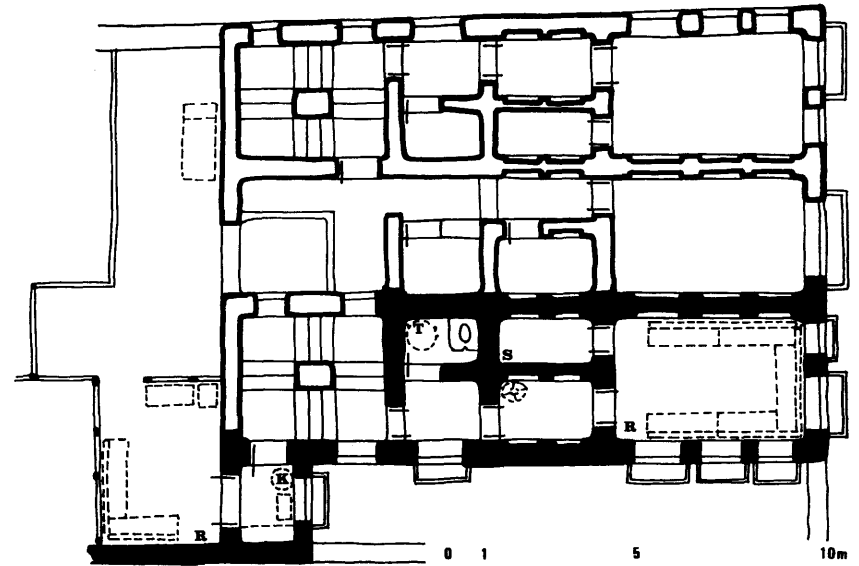
KEY

- LR Living Room
- D Dining/Eating Area
- BR Bedroom
- K Kitchen/Cooking Area
- T Toilet/Bathroom
- L Latrine
- C Closet
- S Storage
- R Room (multi-use)
- GR Guest Room

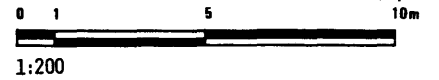


FIRST FLOOR PLAN

TYPICAL DWELLING



SECOND FLOOR PLAN





PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT
 type: House (traditional)
 area (sq m):
 tenure: Legal ownership

LAND/LOT:
 utilization: Private
 area (sq m):
 tenure: Legal ownership

DWELLING
 location: City center
 type: Traditional
 number of floors: 4
 utilization: Multi-family
 physical state: Good

DWELLING DEVELOPMENT
 mode: Incremental
 developer: Private
 builder: Artisan
 construction type: Stone
 year of construction: 1920

MATERIALS
 foundation: Stone
 floors: Concrete
 walls: Stone
 roof: Wood/concrete

DWELLING FACILITIES
 wc: 6
 shower: -
 kitchen: 4
 rooms: 12
 other: Court/storage

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
 user's ethnic origin: Saudi
 place of birth: Jeddah
 education level: Intermediate

NUMBER OF USERS
 married: 2
 single: 6
 children: 2
 total: 10

MIGRATION PATTERN
 number of moves: 1
 rural - urban: -
 urban - urban: 1
 urban - rural: -
 why come to urban area: Employment

GENERAL: ECONOMIC
 user's income group: Middle
 employment: Government employee
 distance to work: 3 Km
 mode of travel: Public transportation

COSTS
 dwelling unit: -
 land - market value: -

DWELLING UNIT PAYMENTS
 financing: Self-financing
 rent/mortgage: -
 % income for rent/mortgage: -

Old City, Jeddah: (from right to left) The photographs show the "modern" technology adapted to the traditional way of life. The elaborate hand carved wood-work on the wide windows are in contrast to the electrical service connection installed beside the main entrance. A refrigerator in the family room replaces the traditional way of food storage. The propane container replaces charcoal as a cooking fuel.

CASE STUDY SOURCES

Locality Plan: (accurate) MAPS. Town Planning Office, Jeddah. AERIAL PHOTOGRAPHS, United States Geology Survey.

Locality Land Use Pattern: (approximate) IBID.

Locality Circulation Pattern: (approximate) IBID.

Segment Plan: (accurate) IBID.

Segment Land Utilization: (approximate) IBID.

Block Plan: (accurate) IBID.

Typical Dwelling: (approximate) Field Surveys, Y. Fadan, 1976.

Physical Data: (approximate) IBID.

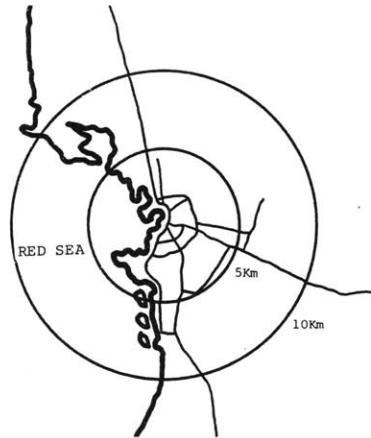
Socio-Economic Data: (approximate) IBID.

Photograph: Y. Fadan, 1976.

General Information: Field Surveys, 1976.

3 AL-SAHEIFAH Jeddah

PRIVATE/RENTAL, MIDDLE/UPPER MIDDLE
INCOME ROW HOUSES/APARTMENTS



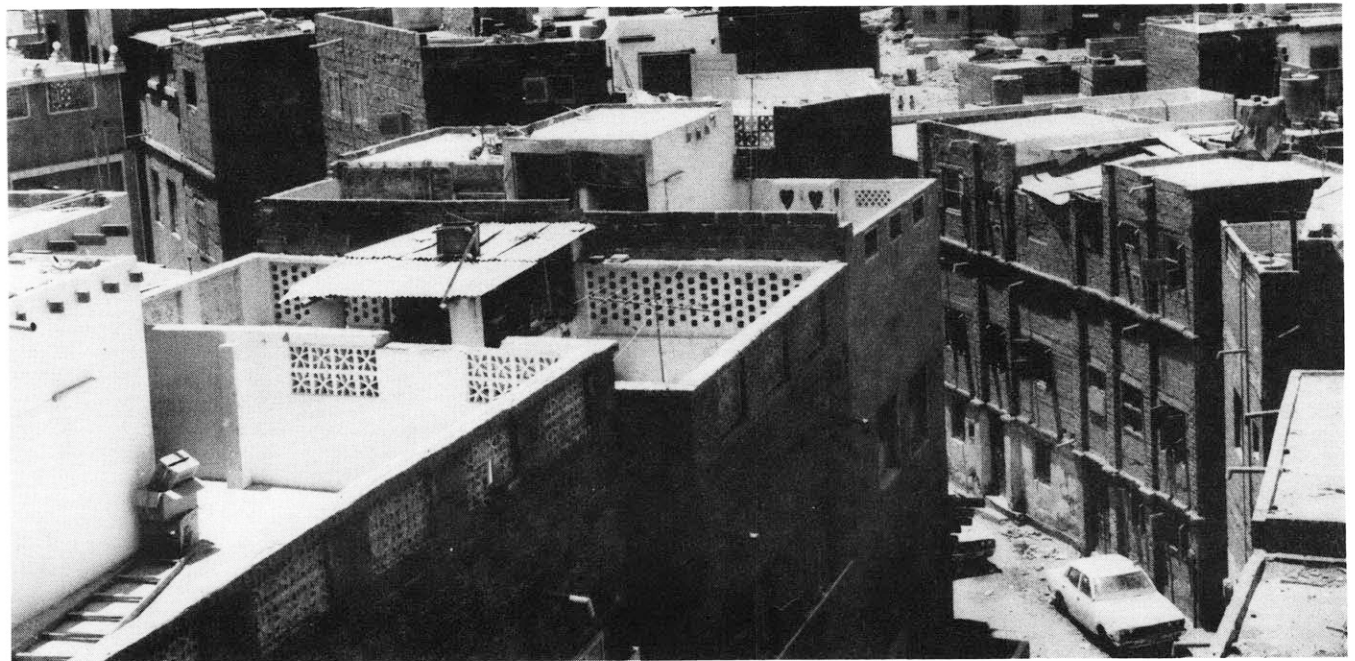
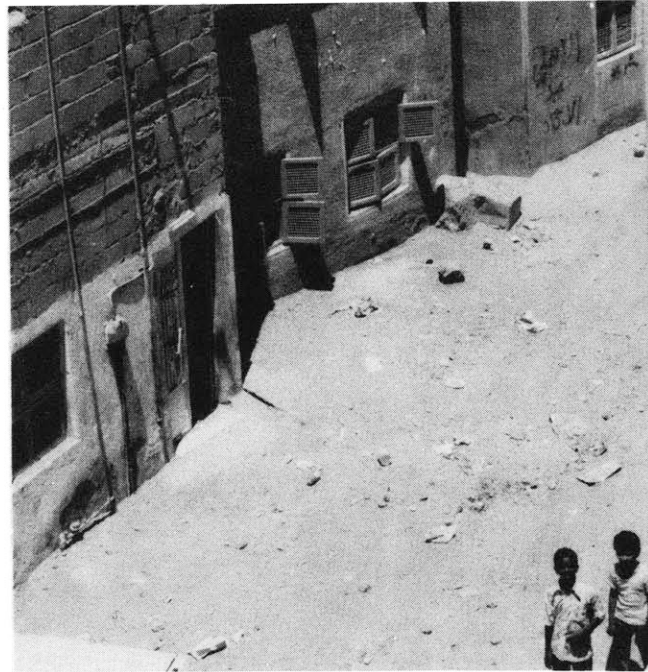
LOCATION: It is located between the inner and outer ring roads on the east side of the old city.

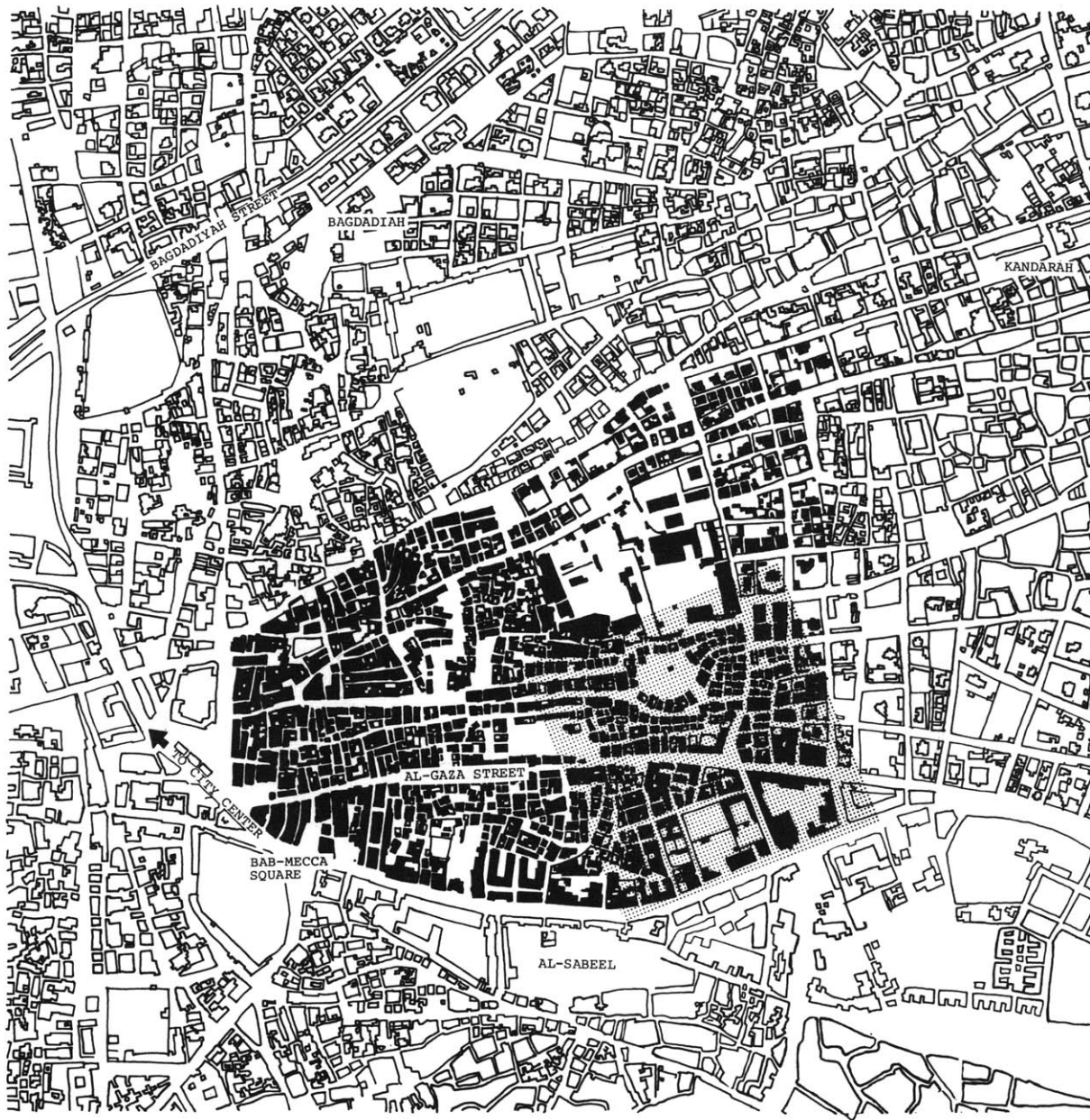
DEVELOPMENT: The development of this area occurred shortly after the demolition of the fortified wall of the old city. Most of the dwellings are 2-5 stories, extended gradually due to the need of the inhabitants for rental purposes. The inhabitants are predominantly from the south of Arabia and Syria. Mostly they are traders, salesmen, and mechanics.

AL-SAHEIFAH, Jeddah. (top left) Most of the houses in this locality have electricity and water connections from the city networks. The residents provide fluorescent lamps above their entrance doors for street lighting.

(top right) Most of the interior streets are not paved. No parking is provided, and car owners park their cars in front of their houses.

(bottom) Walk-up apartments predominate. Roof areas are shared by the tenants. Down-spouts direct rain and wash water immediately to the street below.





LAYOUT: The area is developed by accretion. The lots are varied in size. Most of the houses were originally row houses and expanded slowly into walk-up apartments. New apartments took the place of the old houses with the open spaces and block layouts defined by each row of apartments.

LOCALITY PLAN

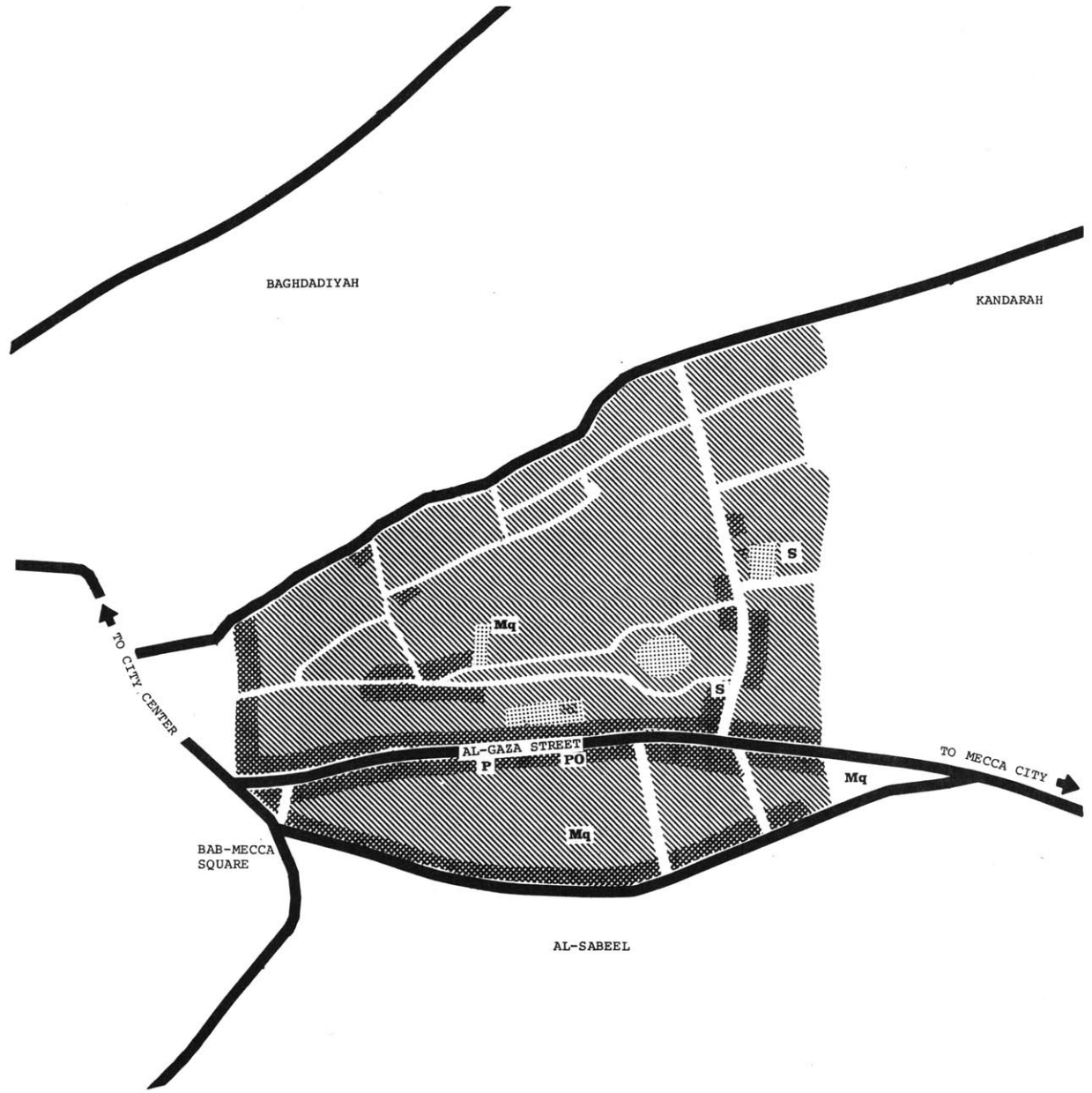


SELECTED SEGMENT

LAND USE: The locality is predominantly residential; however, commerce and light industry are taking place along Al-Gaza Street. Two large land users in the locality are the Ben Laden Company (roads, construction, contractor) and Ka'Ky Kola Company (soft drink company). No open spaces or playgrounds are provided in this locality. Several mosques, schools, and other institutional facilities are found throughout the site.

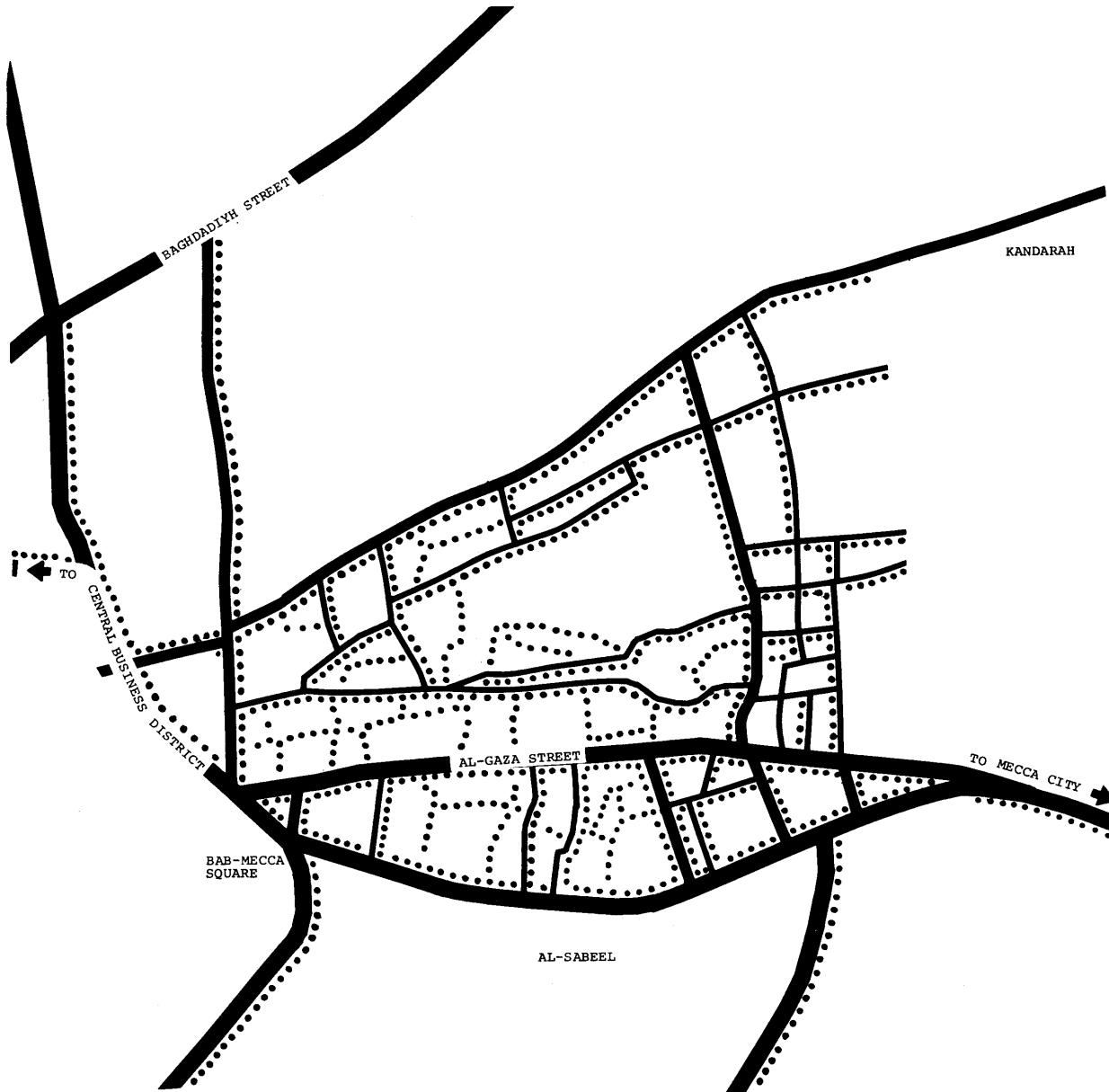
- AREAS
- RESIDENTIAL
 - COMMERCIAL
 - INDUSTRIAL
 - OPEN SPACES

- KEY
- Pk Parking
 - P Police
 - F Fire Department
 - S School
 - Mq Mosque
 - R Recreation
 - L Library
 - U University
 - H Health
 - PO Post Office
 - SS Social Services
 - M Market
 - C Cemetery
 - Bus
 - Rapid Transit



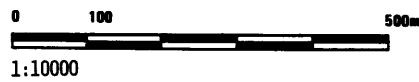
LOCALITY LAND USE PATTERN





CIRCULATION: Al-Gaza Street is the most crowded street in the locality where most commercial activities and light industry occur. Vehicular, pedestrian movements are very heavy in this street. Most primary streets and the narrow interior streets are unpaved and no sidewalk provided. Street lights are provided only along Al-Gaza Street; other streets are lighted by fluorescent and incandescent bulbs provided by the inhabitants along the streets.

LOCALITY CIRCULATION PATTERN



- VEHICULAR
-** PEDESTRIAN

LOCALITY SEGMENT LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	492	16	31
DWELLING UNITS	968	16	61
PEOPLE	2464	16	154

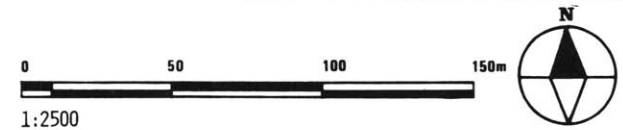
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	6.4	40
SEMI-PUBLIC (open spaces, schools, community centers)	0.16	1
PRIVATE (dwellings, shops, factories, lots)	9.44	59
SEMI-PRIVATE (cluster courts)	-	-
TOTAL	16	100

NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 423 \text{ m/Ha}$$
$$\text{AVERAGE LOT AREA} = 325 \text{ m}^2$$



LOCALITY SEGMENT AIR PHOTOGRAPH

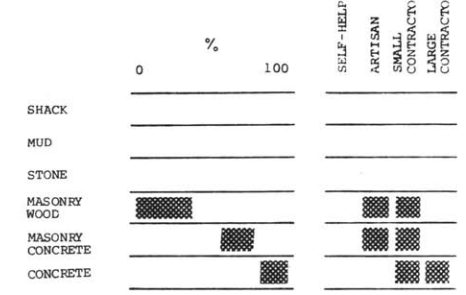




LOCALITY SEGMENT PLAN



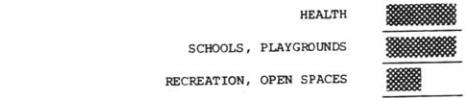
LOCALITY CONSTRUCTION TYPES



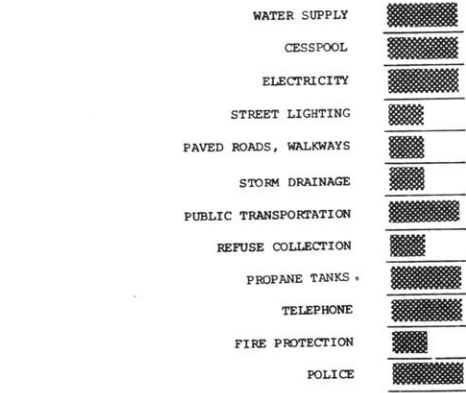
The chart shows (1) approximate percentage of each construction type within the total number of dwellings; and (2) building group that generally produces each type.

Quality of information: Accurate

LOCALITY COMMUNITY FACILITIES



LOCALITY UTILITIES AND SERVICES

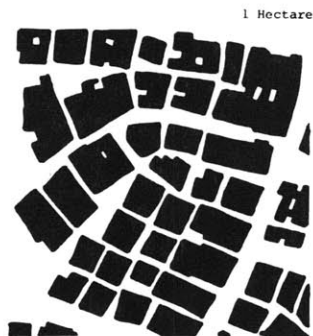


The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Approximate



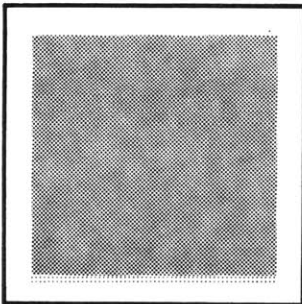
SEGMENT LAND UTILIZATION DIAGRAMS



PATTERN

- Public: streets/walkways
- Semi-Public: playgrounds
- Semi-Private: cluster courts
- Private: lots
- dwellings

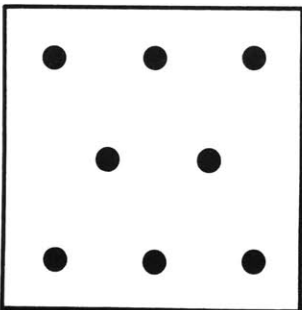
1 Hectare



PERCENTAGES

Streets/walkways	40%
Playgrounds	1%
Cluster Courts	-%
Dwellings/Lots	59%

1 Hectare



DENSITY Persons/Hectare 154

● 20 Persons



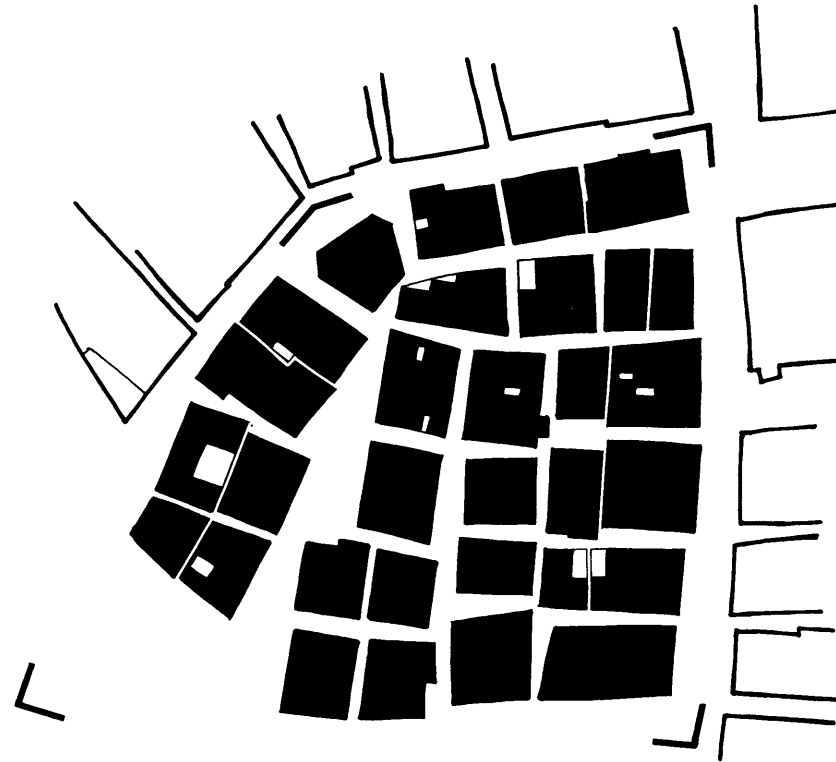
SELECTED BLOCK



1:2500



LOCALITY SEGMENT LAND UTILIZATION



LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	31	0.5	62
DWELLING UNITS	56	0.5	112
PEOPLE	230	0.5	460

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.2	40
SEMI-PUBLIC (open spaces, schools, community centers)	-	-
PRIVATE (dwellings, shops, factories, lots)	0.3	60
SEMI-PRIVATE (cluster courts)	-	-
TOTAL	0.5	100

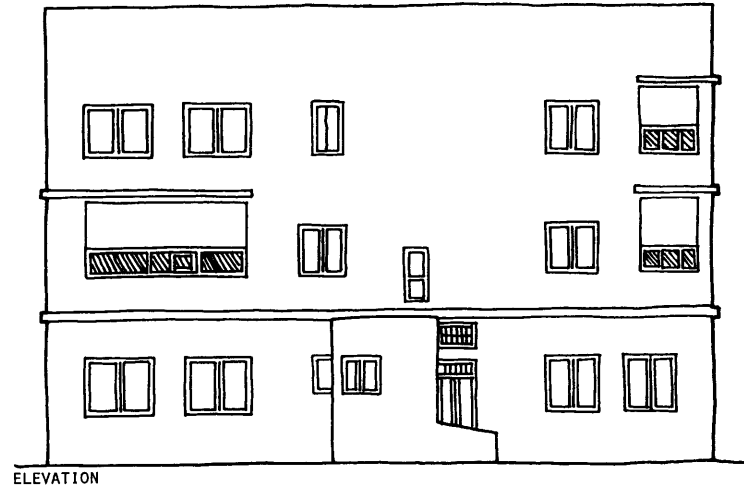
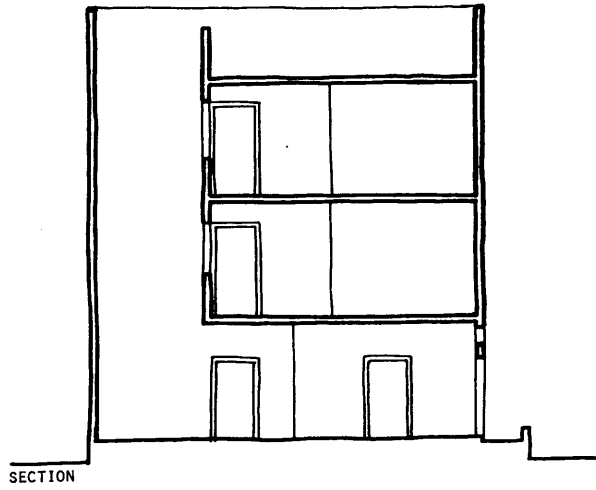
NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 600 \text{ m/Ha}$$

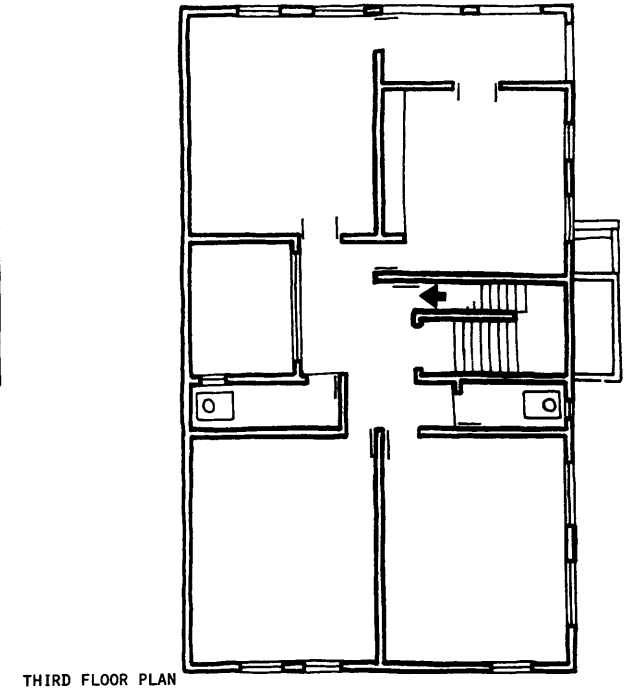
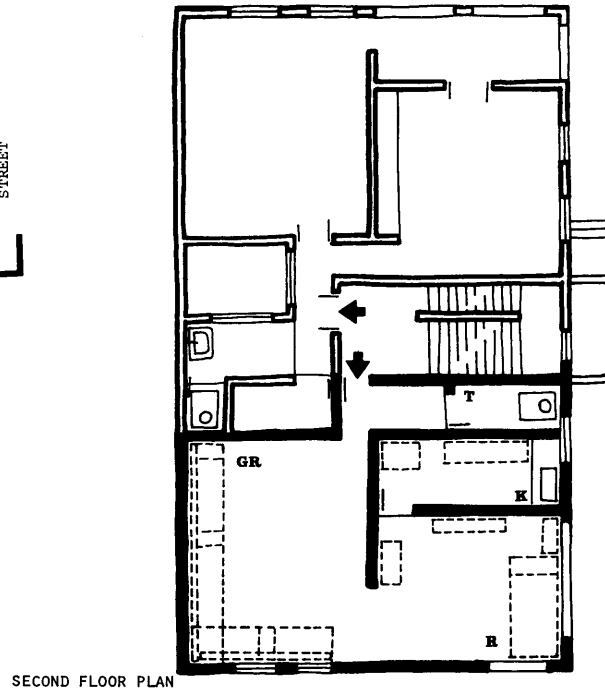
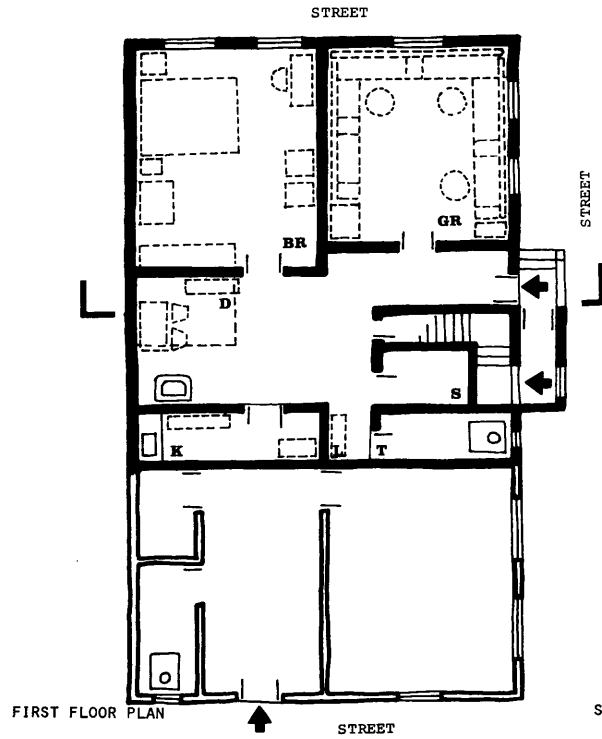
$$\text{AVERAGE LOT AREA} = 161 \text{ m}^2$$

LOCALITY BLOCK PLAN

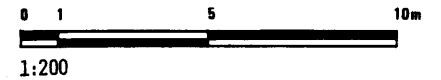


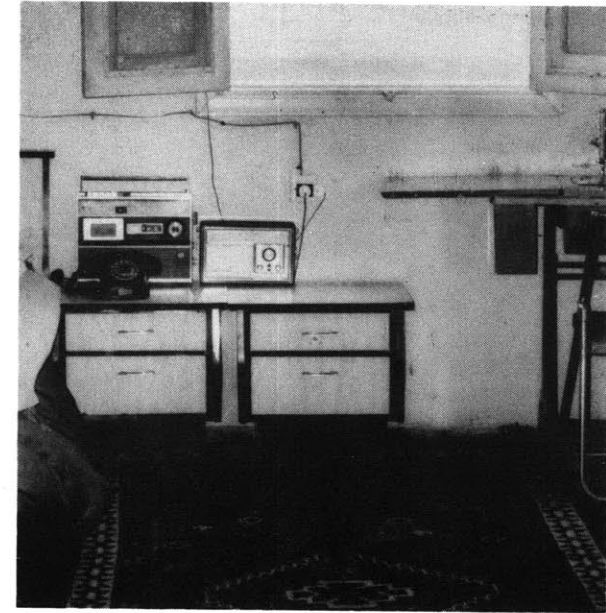


- KEY**
- LR** Living Room
 - D** Dining/Eating Area
 - BR** Bedroom
 - K** Kitchen/Cooking Area
 - T** Toilet/Bathroom
 - L** Latrine
 - C** Closet
 - S** Storage
 - R** Room (multi-use)
 - GR** Guest Room



TYPICAL DWELLING





PHYSICAL DATA (related to dwelling and land)

DWELLING UNIT
 type: Apartment
 area (sq m):
 tenure: Legal ownership

LAND/LOT
 utilization: Private
 area (sq m):
 tenure: Legal ownership

DWELLING
 location: Inner ring
 type: Apartment
 number of floors: 3
 utilization: Single family
 physical state: Good

DWELLING DEVELOPMENT
 mode: Incremental
 developer: Private
 builder: Artisan
 construction type: Cement brick
 year of construction: 1950

MATERIALS
 foundation: Reinforced concrete
 floors: Reinforced concrete
 walls: Cement brick
 roof: Mosaic tiles

DWELLING FACILITIES
 wc: 1
 shower: 1
 kitchen: 1
 rooms: 4
 other: -

SOCIO-ECONOMIC DATA (related to user)

GENERAL: SOCIAL
 user's ethnic origin: Saudi
 place of birth: Hadhramawt
 education level: Intermediate

NUMBER OF USERS
 married: 2
 single: 3
 children: -
 total: 5

MIGRATION PATTERN
 number of moves: 1
 rural - urban: 1
 urban - urban: -
 urban - rural: -
 why come to urban area: Employment

GENERAL: ECONOMIC
 user's income group: Middle
 employment: Electric Company
 distance to work: 4 Km
 mode of travel: Public transportation

COSTS
 dwelling unit: -
 land - market value: -

DWELLING UNIT PAYMENTS
 financing: Self-financing
 rent/mortgage: -
 % income for rent/mortgage: -

AL-SAHEIFAH, Jeddah. (left) The main elements of the cooking area in the typical house is a stove and sink.

(middle) This multi-use room is used as a living room, sleeping area and eating space.

(right) Aside from the main function of the bedrooms, it can be used for other activities during the day. The room is very neat and well kept.

CASE STUDY SOURCES

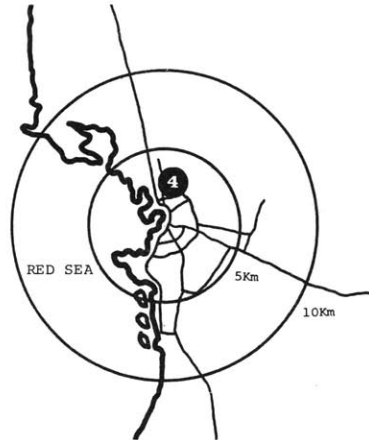
Locality Plan: (accurate) MAPS. Town Planning Office, Jeddah. AERIAL PHOTOGRAPHS, United States Geology Survey.

Locality Land Use
 Pattern: (approximate) IBID
 Locality Circulation
 Pattern: (approximate) IBID.
 Segment Plan: (accurate) IBID.
 Segment Land Utilization: (approximate) IBID.
 Block Plan: (accurate) IBID.
 Typical Dwelling: (approximate) Field Surveys, Y. Fadan, 1976.

Physical Data: (approximate) IBID.
 Socio-Economic Data: (approximate) IBID.
 Photograph: Y. Fadan, 1976.
 General Information: Field Surveys, 1976.

4 AL-MEDINA ROAD Jeddah

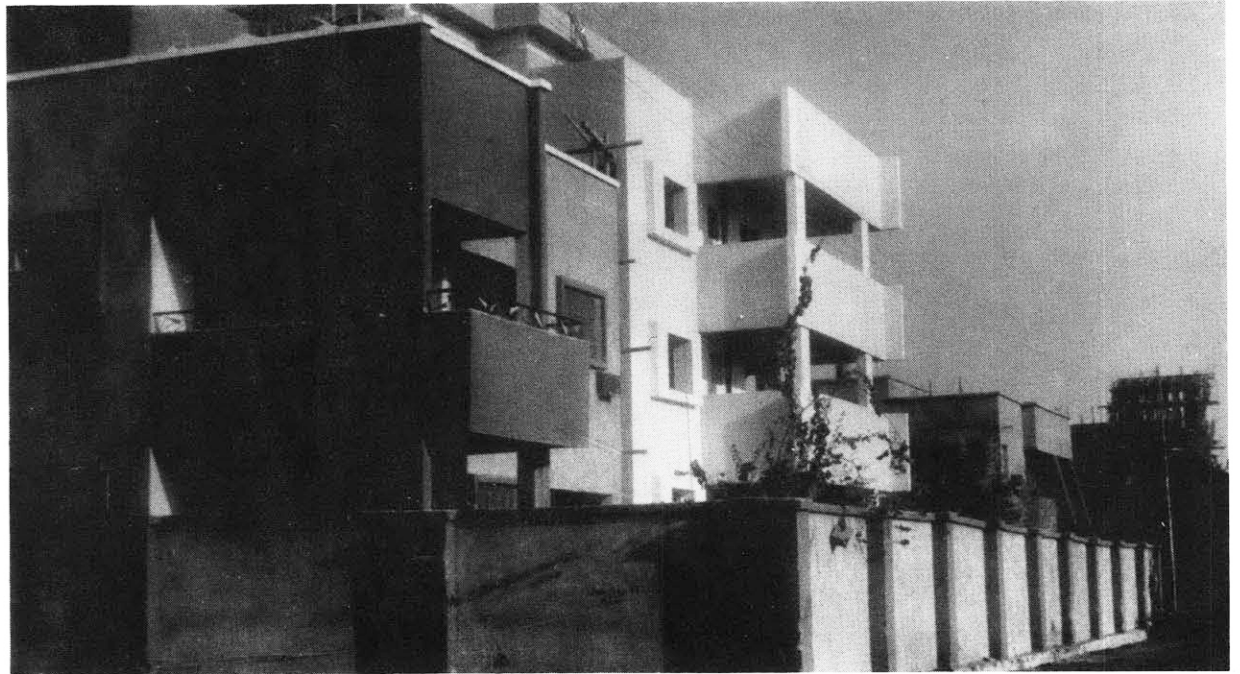
PRIVATE/PUBLIC, UPPER MIDDLE/HIGH INCOME
VILLAS/APARTMENTS

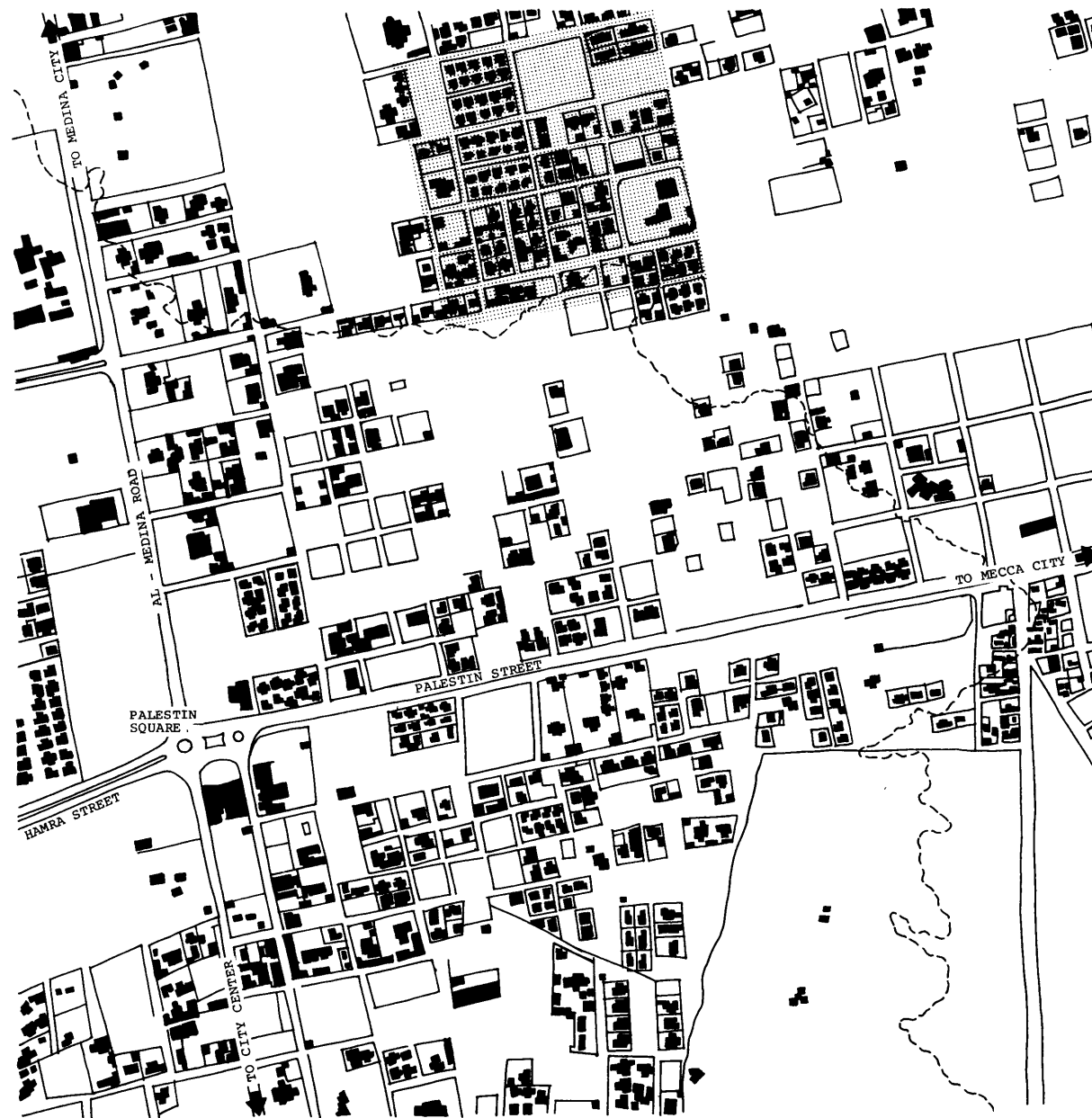


LOCATION: This locality is located 7 kilometers north of the central part of the city, along the Medina Road.

DEVELOPMENT: The development of this area started in the last twenty years. It contains scattered villas built by the very rich. Much recent development is being made; and many housing projects, public and private, are taking place in this part of the city. The inhabitants are predominantly upper middle and high income; working for the government, for companies and as businessmen and professionals.


AL-MEDINA ROAD. (top) The western style buildings have open balconies which make them unusable, and the high wall surrounding the dwelling attempts to provide privacy for the family. The dwellings are slowly being expanded with additional floors. (bottom) Cars are left in the streets if the lot is too small to allow parking. The perforated block screen is the modern substitute for the wooden one.









LOCALITY PLAN

LAYOUT: The locality was developed in a grid pattern by private developers. No clear boundaries define the area. The locality experiences an instant development to the north. The lot size varies from one hectare to 350m². Most of the open spaces are private lots on which no construction has taken place.



 SELECTED SEGMENT

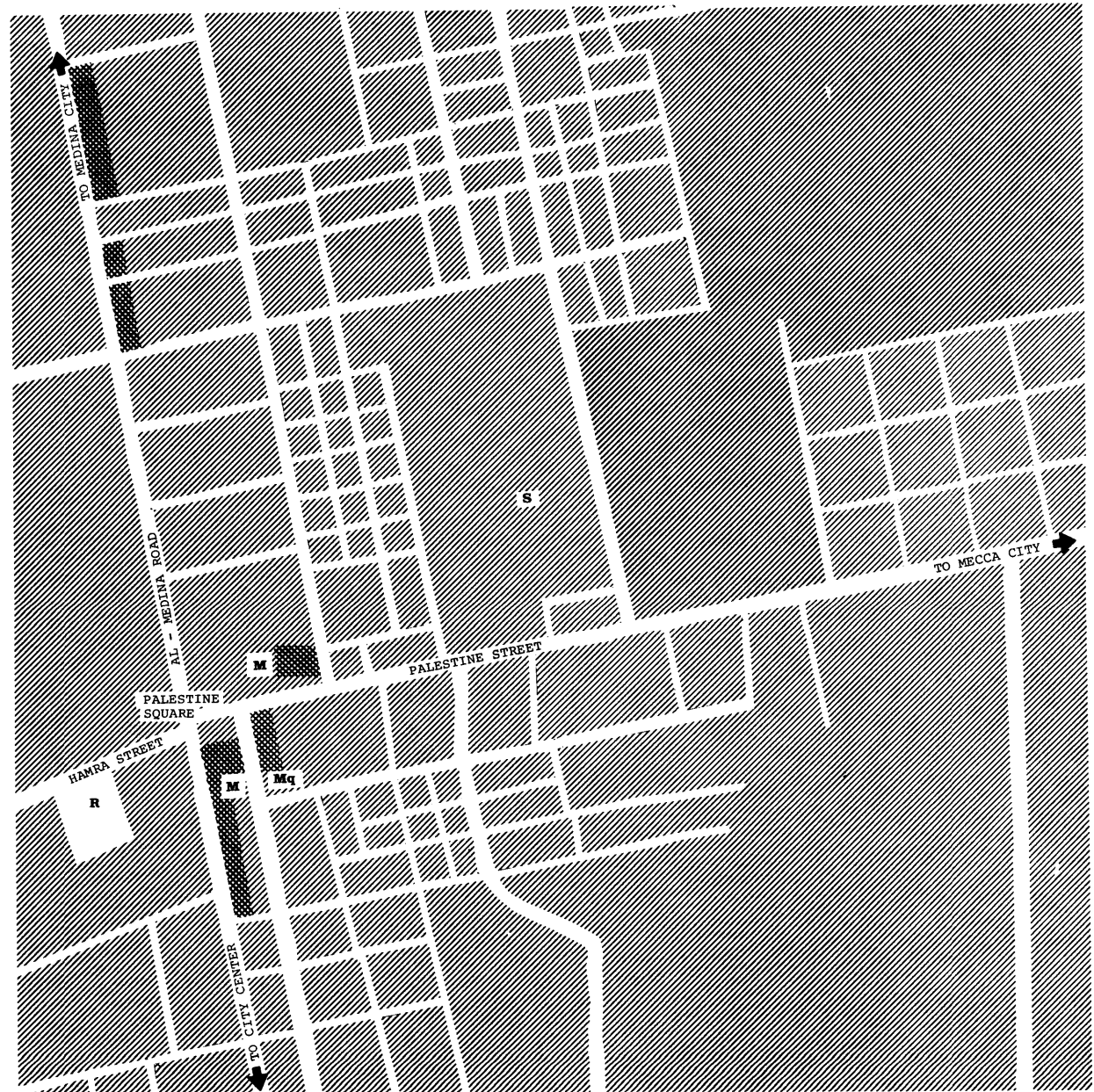
LAND USE: The locality is predominantly residential with commercial areas, gas stations, and car repair shops located along Medina Road. The nearest recreational area to the locality is the new Al-Hamrah Palace Corneich (beach area); also the new Athletic Stadium located to the north of the locality. There is an insufficient number of mosques, schools, and institutional facilities.

AREAS

-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  OPEN SPACES

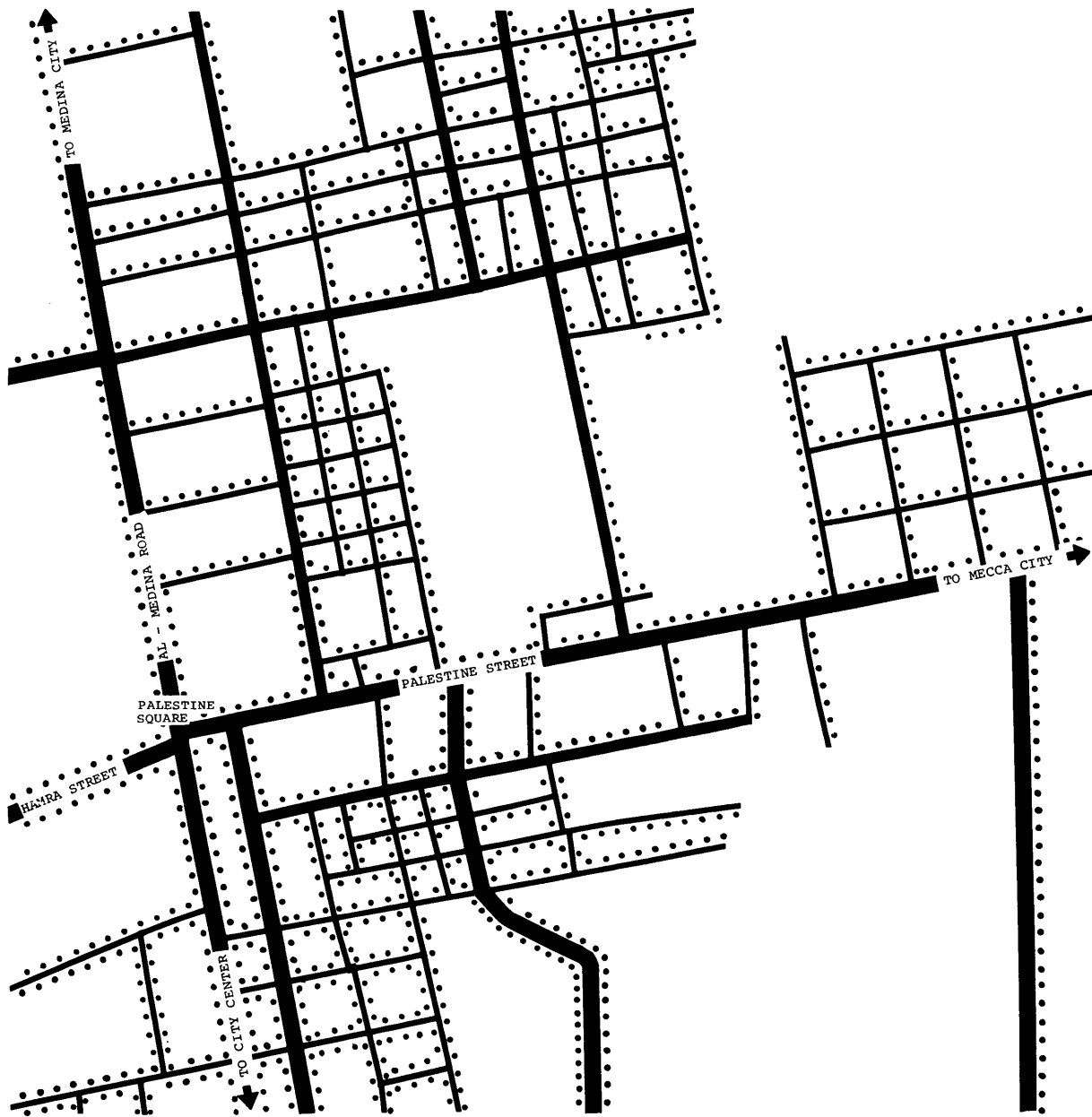
KEY

- Pk Parking
- P Police
- F Fire Department
- S School
- Mq Mosque
- R Recreation
- L Library
- U University
- H Health
- PO Post Office
- SS Social Services
- M Market
- C Cemetery
-  Bus
-  Rapid Transit



LOCALITY LAND USE PATTERN





CIRCULATION: Al-Medina Road, which connects the locality with the city center, and Palestine Street are the most important streets in this locality. Almost all of the secondary streets connect into these streets. Few traffic lights are provided on the intersections. Pedestrian movement is very light. No public transportation is provided yet and the majority of people have private cars.

LOCALITY CIRCULATION PATTERN



- VEHICULAR
- PEDESTRIAN

LOCALITY SEGMENT LAND UTILIZATION DATA

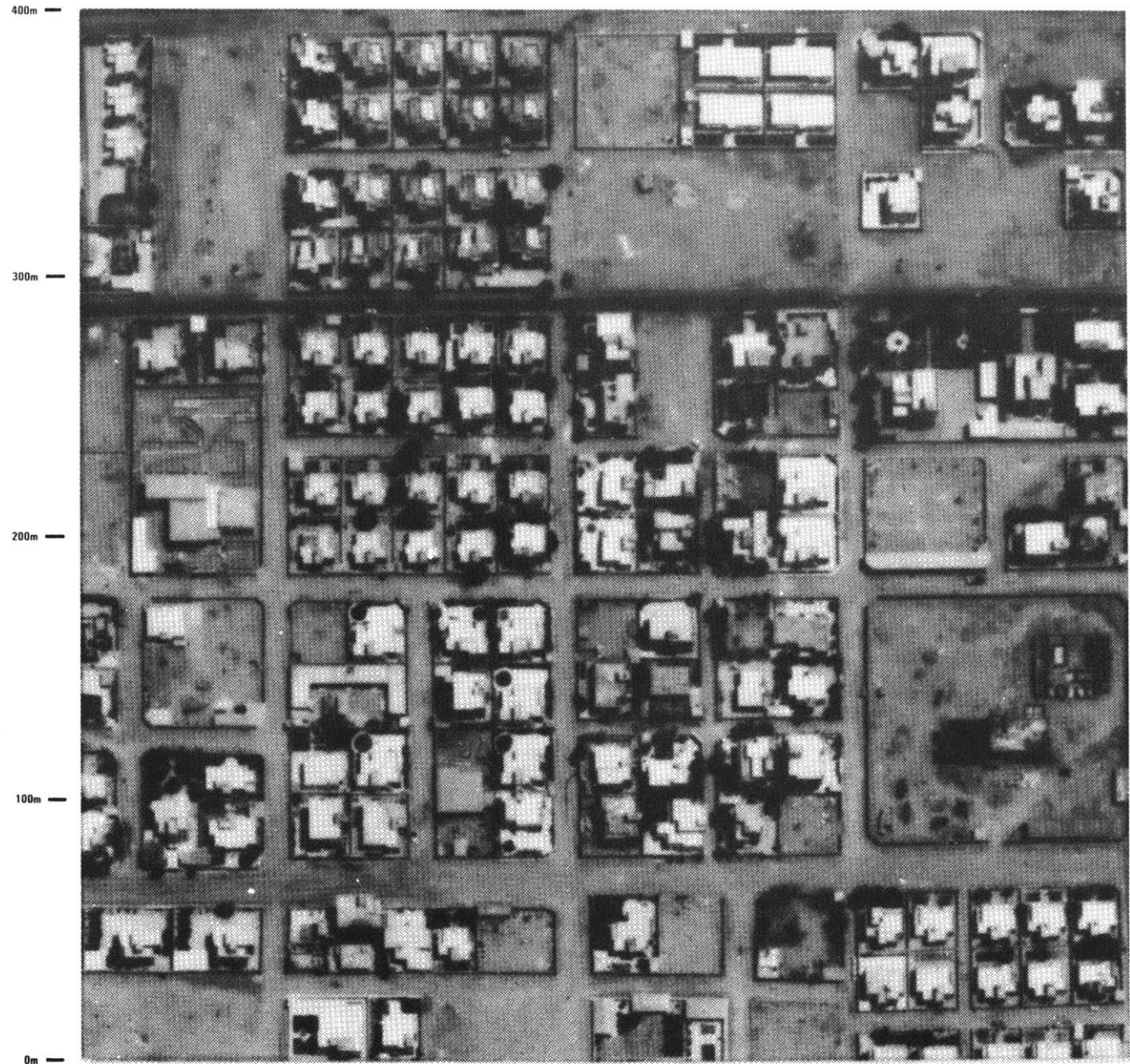
DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	147	15.0	9.8
DWELLING UNITS	147	15.0	9.8
PEOPLE	560	15.0	37

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	3.7	23
SEMI-PUBLIC (open spaces, schools, community centers)	-	-
PRIVATE (dwellings, shops, factories, lots)	12.3	77
SEMI-PRIVATE (cluster courts)	-	-
TOTAL	16	100

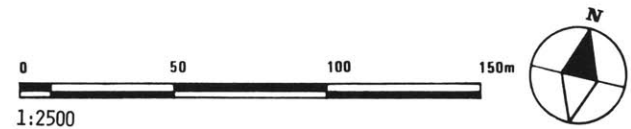
NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 281 \text{ m/Ha}$$

$$\text{AVERAGE LOT AREA} = 1240 \text{ m}^2$$



LOCALITY SEGMENT AIR PHOTOGRAPH



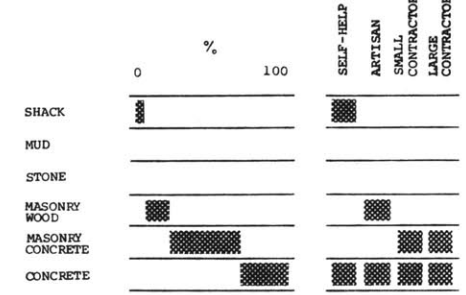


LOCALITY SEGMENT PLAN

1:2500



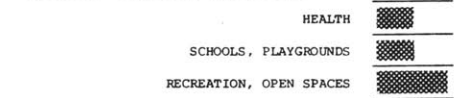
LOCALITY CONSTRUCTION TYPES



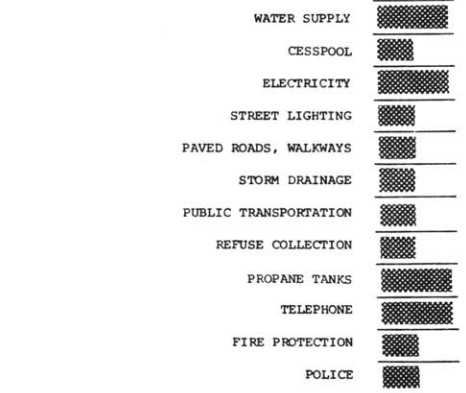
The chart shows (1) approximate percentage of each construction type within the total number of dwellings; and (2) building group that generally produces each type.

Quality of information: Accurate

LOCALITY COMMUNITY FACILITIES



LOCALITY UTILITIES AND SERVICES

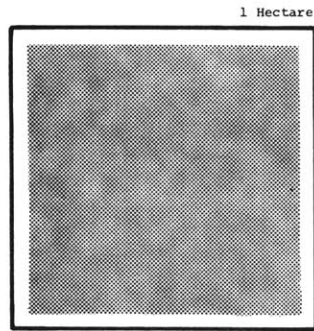
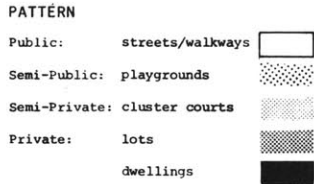
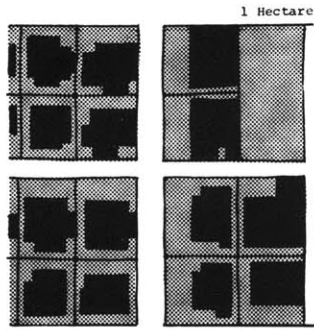


The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Approximate

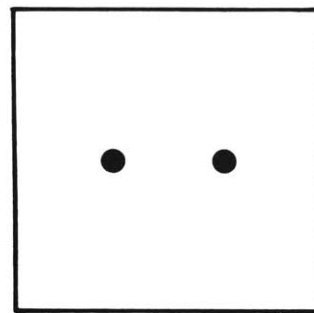
██████████ SELECTED BLOCK

SEGMENT LAND UTILIZATION DIAGRAMS



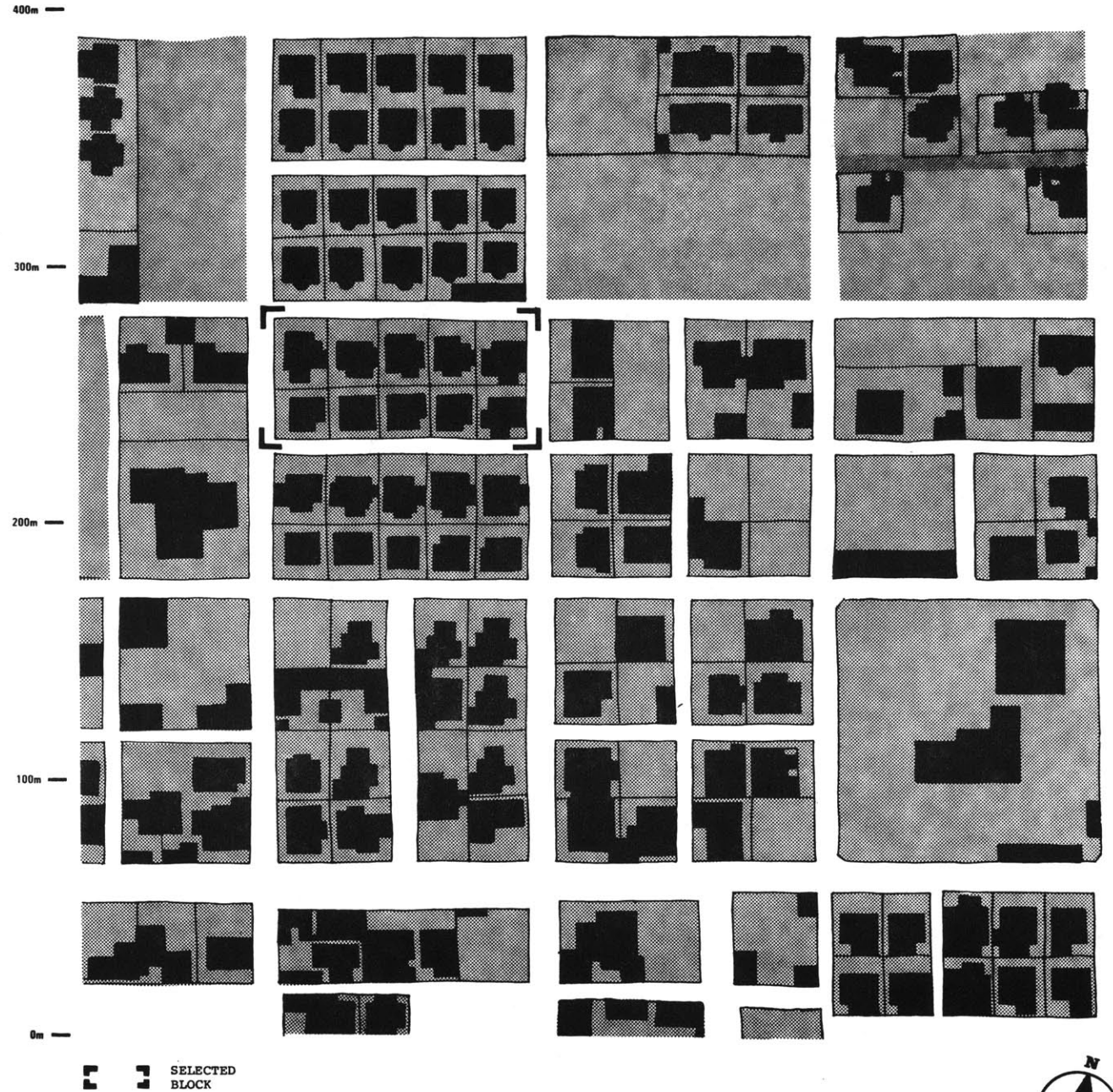
PERCENTAGES

Streets/walkways	23%
Playgrounds	-%
Cluster Courts	-%
Dwellings/Lots	77%

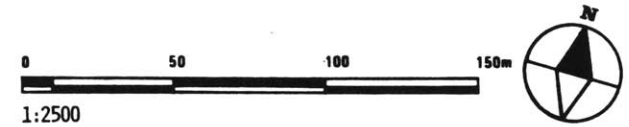


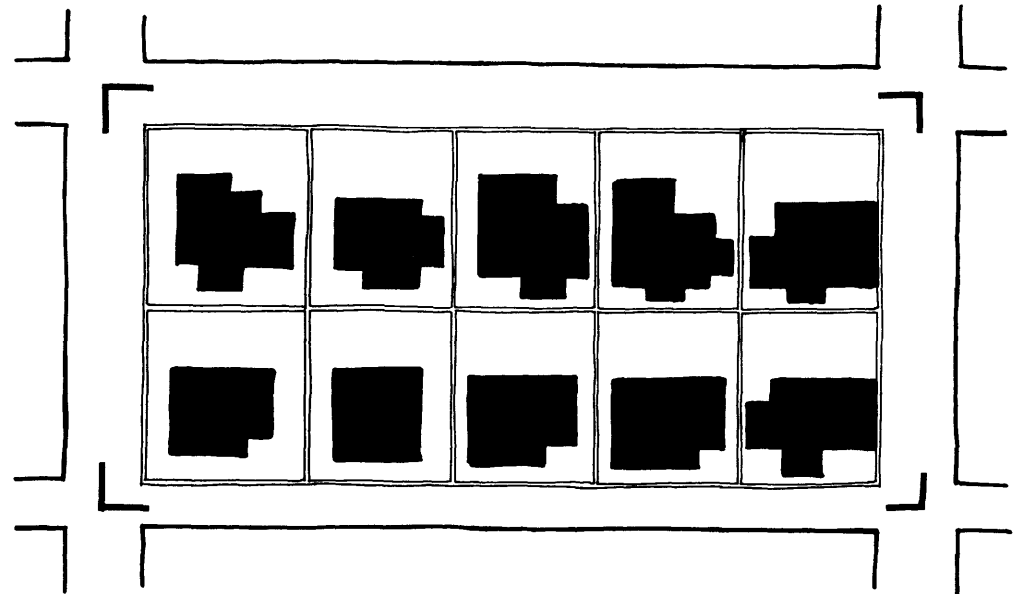
DENSITY Persons/Hectare 37

● 20 Persons



LOCALITY CIRCULATION PATTERN





LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	10	0.6	17
DWELLING UNITS	10	0.6	17
PEOPLE	42	0.6	70

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	0.14	28
SEMI-PUBLIC (open spaces, schools, community centers)	-	-
PRIVATE (dwellings, shops, factories, lots)	0.46	72
SEMI-PRIVATE (cluster courts)	-	-
TOTAL	0.6	100

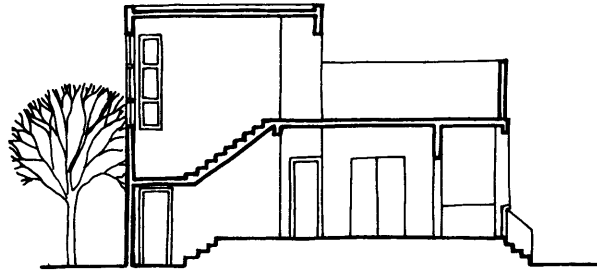
NETWORK EFFICIENCY

$$R = \frac{\text{network length(circulation)}}{\text{areas served(circulation, lots)}} = 500 \text{ m/Ha}$$

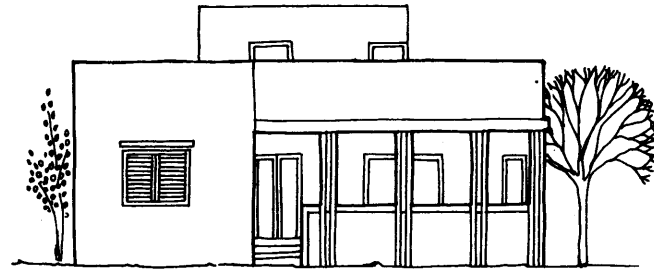
$$\text{AVERAGE LOT AREA} = 600 \text{ m}^2$$

LOCALITY BLOCK PLAN

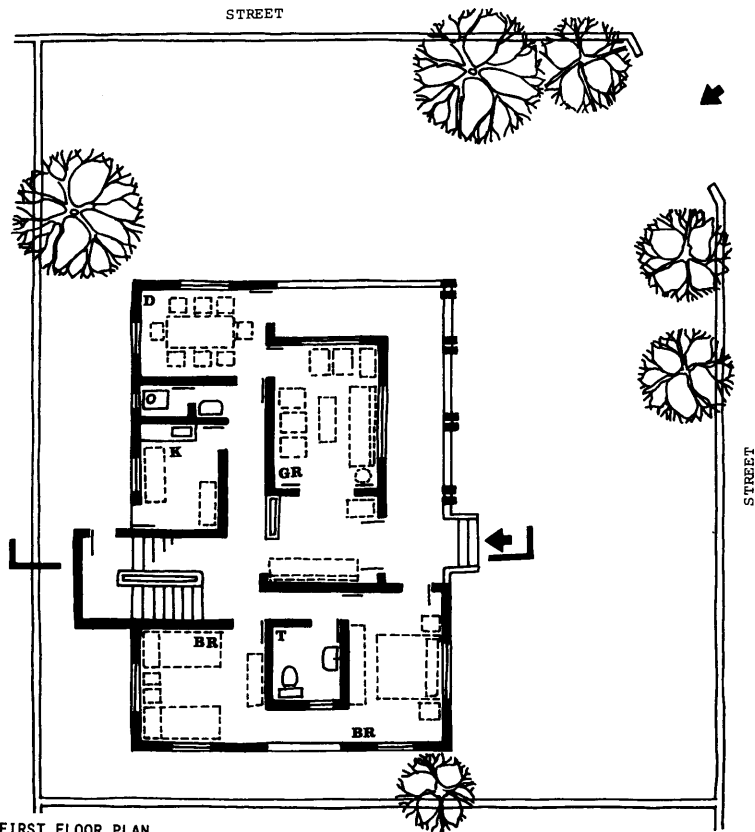




SECTION



ELEVATION

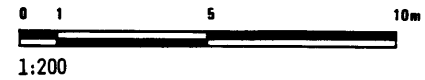


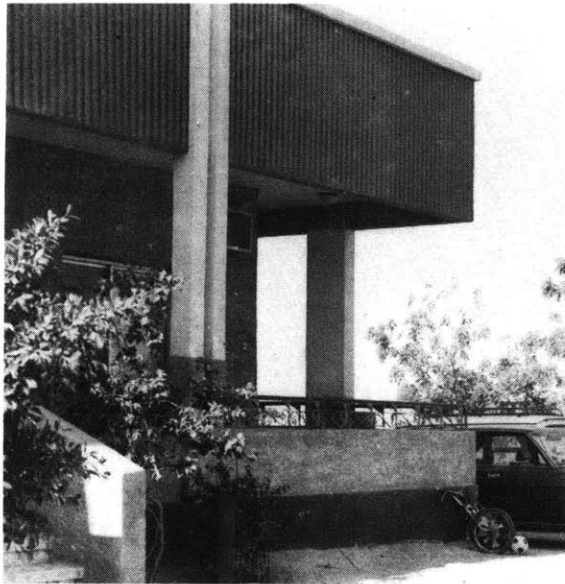
FIRST FLOOR PLAN

KEY

- LR Living Room
- D Dining/Eating Area
- BR Bedroom
- K Kitchen/Cooking Area
- T Toilet/Bathroom
- L Latrine
- C Closet
- S Storage
- R Room (multi-use)
- GR Guest Room

TYPICAL DWELLING





SOCIO-ECONOMIC DATA (related to user)

DWELLING UNIT
 type: Detached house
 area (sq m):
 tenure: Legal ownership

LAND/LOT
 utilization: Private
 area (sq m):
 tenure: Legal ownership

DWELLING
 location: Outer ring
 type: detached house
 number of floors: 1
 utilization: Single family
 physical state: Good

DWELLING DEVELOPMENT
 mode: Instant
 developer: Public
 builder: Small contractor
 construction type: Masonry/concrete
 year of construction: 1969

MATERIALS
 foundation: Reinforced concrete
 floors: Concrete
 walls: Cement brick
 roof: Mosaic tiles

DWELLING FACILITIES
 wc: 2
 shower: 2
 kitchen: 1
 rooms: 4
 other: Roof/storage

PHYSICAL DATA (related to dwelling and land)

GENERAL: SOCIAL
 user's ethnic origin: Saudi
 place of birth: Mecca
 education level: Secondary school

NUMBER OF USERS
 married: 2
 single: 4
 children: -
 total: 6

MIGRATION PATTERN
 number of moves: 1
 rural-- urban: -
 urban - urban: 1
 urban - rural: -
 why came to urban area: Employment

GENERAL: ECONOMIC
 user's income group: High
 employment: Government employee
 distance to work: 7 Km
 mode of travel: Private car

COSTS
 dwelling unit: \$25,000
 land - market value: \$50,000

DWELLING UNIT PAYMENTS
 financing: Public
 rent/mortgage: -
 % income for rent/mortgage: -

AL MEDINA ROAD. (left) The view from the inside of a lot. The building is located in the center of the lot creating sideyards which have little relationship to family needs.

(middle) The pitched roof is perhaps more appropriate for areas with a high rainfall.

(right) The large glass openings and the thinner walls make the use of an air conditioner mandatory. The open balcony does not provide the privacy required in the traditional family life style.

CASE STUDY SOURCES

Locality Plan: (accurate) MAPS. Town Planning Office, Jeddah. AERIAL PHOTOGRAPHS, United States Geology Survey.

Locality Land Use
 Pattern: (approximate) IBID.
 Locality Circulation
 Pattern: (approximate) IBID.
 Segment Plan: (accurate) IBID.
 Segment Land Utilization: (approximate) IBID.
 Block Plan: (accurate) IBID.
 Typical Dwelling: (approximate) Field Surveys, Y. Fadan, 1976.

Physical Data: (approximate) IBID.
 Socio-Economic Data: (approximate) IBID.
 Photograph: Y. Fadan, 1976.
 General Information: Field Surveys, 1976.



SUMMARY

For the reason of comparison between the previous case studies of the existing dwelling environments of Jeddah, a summary of the following aspects will be shown in the following pages.

DWELLINGS TIME/PROCESS PERSPECTIVE

Model relating the case studies to their originating models.

PHYSICAL DATA SUMMARY

A comprehensive table of the data with comments.

COMMUNITY FACILITIES, SERVICES SUMMARY

A data of the availability of facilities.

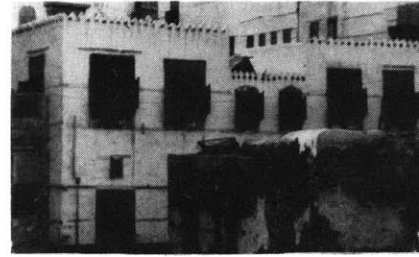
LAND UTILIZATION

Patterns, percentages, densities, a graphic comparison of land utilization.

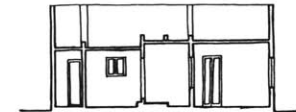
DWELLINGS TIME/PROCESS PERSPECTIVE

The following six dwelling types are representative of Jeddah's existing situations which illustrate different cases of land utilization. The six dwelling types in the chart attempt to relate them to their originating types and to see them in a broader time/process perspective. Shanties and tenements types were not included in the previous case studies. The shanties are a temporary situation which are actually a transition to row houses once the occupants feel secure of their land ownership. Tenement cases exist only in the Old City. This type usually contains a group of rooms around the inner court with their own services given to single old women who are dependent on public welfare for free accommodation or on very low rents.

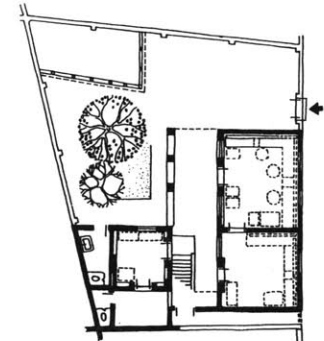
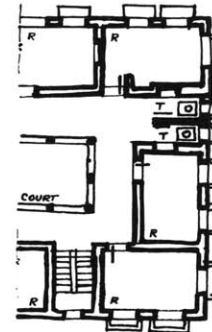
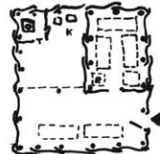
The use of this summary is to give a reference source and guidelines in formulating urban land policies and housing programmes to clarify the basic questions of land use, land distribution, land subdivision. It is also a guide in determining the different types of people, densities, income, and efficient land utilization.



SECTION



PLAN



SHANTY

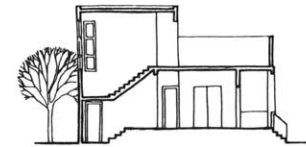
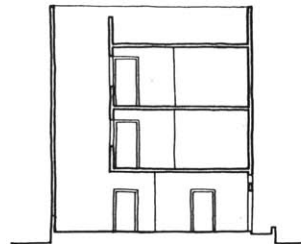
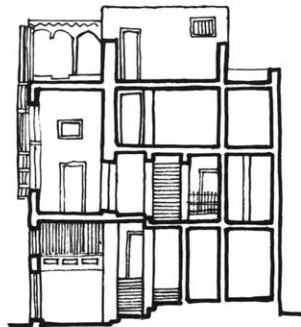
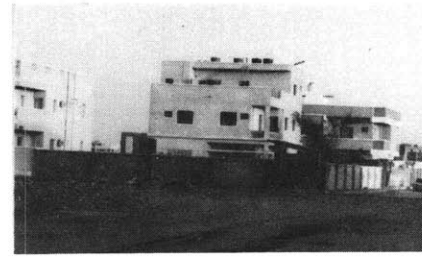
PAST	CHARACTERISTIC	Group of shanties scattered on privately owned lands.
	LAND ISSUES	INTERNATIONAL MODEL, Permits very low income group.
	USERS	Very low income group.
PRESENT	PRESENT MODEL	Model imported to Jeddah in the 20 th century by immigrants from south of Arabia and Africa.
	USERS	Very low income group.
	CASE STUDY	Not included.
FUTURE	FUTURE MODEL	It will develop into row house
	TRENDS	The model is a temporary situation, either developing the land after legalizing it or removal.
	COMMENTS	Illegal model for urban areas; lack of land ownership and security; accessible to very low income group; very high density; inefficient land utilization; does not provide protection from climate, and danger of fire.

TENEMENT ROOM

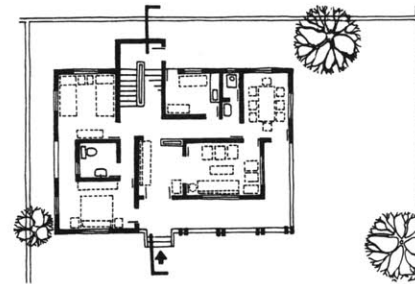
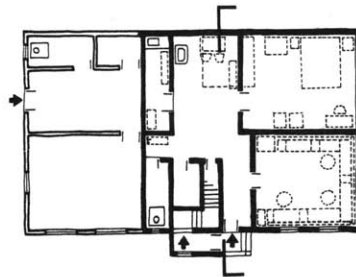
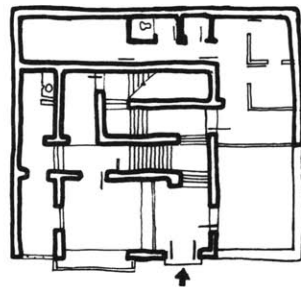
CHARACTERISTIC	A group of rooms surround inner court. each group of rooms having their own facilities.
LAND ISSUES	INTERNATIONAL MODEL; Permits medium density, in case of Jeddah, the model known as "Robatt" used by older people.
USERS	Very low income group.
PRESENT MODEL	Model was developed in Jeddah in the 19 th century.
USERS	Low income group.
CASE STUDY	Old City.
FUTURE MODEL	Disappearing.
TRENDS	Disappearing, very few cases left in the Old City.
COMMENTS	The model should be encouraged to maintain its function as shelter for older low income people; it permits medium density, efficient land utilization.

ROW HOUSE

CHARACTERISTIC	Row house, appeared in different lot sizes, and shapes. Irregular layout, streets follow the shape of the houses.
LAND ISSUES	INTERNATIONAL MODEL, Permits medium/high densities.
USERS	Very low income group.
PRESENT MODEL	60% of the model is the development of the shanty house.
USERS	Low income group.
CASE STUDY	Al-Sabeel.
FUTURE MODEL	Continuing.
TRENDS	No change expected from the present condition, some improvement required.
COMMENTS	Some improvement required for Arabic culture; accessible to low/moderately low income groups; permits high density, efficient land utilization, and maximum private responsibility.



SECTION



PLAN

TRADITIONAL

Traditional house, with different lot sizes and shapes, the houses are 2-5 stories high.

ARABIC CULTURE, Permits middle/high densities.

Middle income group.

All the existing units were built in the past, and the construction of this type no longer exists.

Middle income group.

Old City.

Decreasing in use.

The settlement is rapidly being replaced by modern high rise buildings.

Consistent with Arabic culture; accessible to middle income group; permits medium/high densities; efficient land utilization; maximum privacy and private responsibility; good climate protection.

APARTMENT

Group of several apartments per floor with multiple stories.

INTERNATIONAL MODEL; Permits middle/high densities.

Model was imported to Jeddah in the 20th century.

Middle income group.

Al-Saheifah.

Continuing.

Changes expected in building materials, construction, and technology.

Inconsistent with Arabic culture, very high speculation with rents, very high investment in construction and utilities; permits very high density; inefficient land utilization, minimum privacy and private responsibility.

DETACHED HOUSE

Detached houses in grid layout pattern, grouped back to back within a rectangular block.

WESTERN CULTURE, Permits low/medium densities, accessible to upper middle and high income group.

High income group.

Model was imported to Jeddah in the 20th century.

High income group.

Al-Medina Road

No change expected.

Because of high land value, lot size reduction expected (previously one hectare, now 350 m² average).

Inconsistent with Arabic Culture; accessible to middle/high income groups; permits low/middle densities, inefficient land utilization, maximization of private responsibility; minimum of privacy and good climate protection.

CHARACTERISTIC

LAND ISSUES

USERS

PRESENT MODEL

USERS

CASE STUDY

FUTURE MODEL

TRENDS

COMMENTS

PAST
PRESENT
FUTURE

PHYSICAL DATA SUMMARY

1 Category	2 Population Per Category	3 % of Total Population	4 LOCALITIES	USER		DWELLING UNIT				LAND/LOT		DWELLING					DWELLING DEVELOPMENT					
				5 Income	6 Type	7 Area	8 Tenure	9 Rent/Mort.	10 Utilization	11 Area	12 Tenure	13 Location	14 Type	15 No. Floors	16 Utilization	17 Phy. State	18 Mode	19 Developer	20 Builder	21 Construction Type	22 Date	23 Den.
				very Low	Shanty Room	50 m ² or less	Legal Rental	20% or less of income	Public	m ²	Extralegal; rental	City Center	Detached	1	Bad	Incremental	Popular public	Self-Help	Shack	1928	158	1
				Low	Apartment	51 - 100 m	Legal ownership	21% or more of income	Semi-Public		Extralegal; ownership	Inner Ring	Semi-detached	2	Fair	Instant	Private	Artist	Mud and Wattle	—	454	2
				Moderately Low	House	101 m or more			Private		Legal; rental	Periphery	Row/Grouped	3	Good	Popular private	Small Contractor	Wood	1946	154	3	
				Middle							Legal; ownership		Walk-up				Large Contractor	Masonry/Wood	1959	37	4	
				High								High-rise						Concrete				
A	257600	46	1. AL-SABEEL							175												
			2. OLD CITY							220												
B	201600	36	3. AL-SAEIFAH							170												
C	100800	18	4. AL-MEDINA ROAD							500												
	560,000	100	TOTAL POPULATION																			

The table above is a summary of the physical data of the 4 cases surveyed in Jeddah. Descriptive text follows below.

PHYSICAL DATA SUMMARY

(1) CATEGORY: (2) POPULATION PER CATEGORY: Number of people; (3) PERCENT OF TOTAL POPULATION: (4) NAME OF LOCALITY. The four case studies have been grouped in three categories, identifying different income groups, housing systems and selected physical characteristics. The three categories shown were identified as follows:

CATEGORY/INCOME	PATTERN	DWELLING
A. Low/M.Low	Accretion	Row House
B. Middle/Upper Middle	Old Middle New	Traditional Apartment
C. Upper Middle/ High	New	Detached

Category A includes the low, moderately low income groups, which represents the majority of the population (46%). Category B includes middle/upper middle income groups 36%. Category C includes the upper middle and high income groups and represents 18%.

(5) USER INCOME GROUP: The income level is the basic indicator with the expected pattern: The higher the income, the higher is the level of the indicator. The process of housing for the low income groups is a matter of survival whereas in the higher income group, it is a service or commodity.

(6) DWELLING UNIT TYPE: In the four case studies the percentage of shanties and rooms is very low. Low/moderately low income groups live in row houses between the inner and the outer ring roads. Middle income groups live in apartments within the city center or along the main streets. Most high income groups live in detached houses to the north and east of the city.

(7) DWELLING UNIT AREA: In the case of Al-Sabeel locality, there is a small percentage of v.low income who live in shanties whose areas in this case are lower than

50m². Low and moderately low income groups live in row houses having areas ranging from 51m² to more than 100m². Middle income groups live in traditional houses having areas of more than 100m². Middle income groups live in apartments having areas of 50m² - 100m². High income groups live in detached houses of more than 100m².

(8) DWELLING UNIT TENURE: The low/moderately low, and middle/high income groups have legal ownership of their house. Middle income and high income also live in legal rental apartments and detached houses.

(9) DWELLING UNIT-PERCENT INCOME FOR RENT AND MORTGAGE: At the present time the percentage for rent is higher than 21% of income, but the percent for mortgage is less than 20% of the total household income.

(10) LAND/LOT UTILIZATION: From the case

studies it is very clear that wherever the lot boundary has been defined, the land utilization remains private among all income groups. In the case of the old city, where groups of houses are gathered around an open space, the utilization of the space is semi-private.

(11) LAND/LOT AREA: In the case of Al-Sabeel locality it is clear that the lots do not have regular shapes and at the same time do not have fixed areas. Many lot areas in this locality range between 100m² - 250m². In the old city, most of the land/lot areas are more than 100m². In the case of Al-Medina Road locality the average area of land/lot is 500m²; however, many cases in this locality have lot areas of up to one hectare.

(12) LAND/LOT TENURE: Legal rental and illegal ownership can be found in Al-

COMMUNITY FACILITIES, UTILITIES/SERVICES SUMMARY

Category	Population per Category	% of Total Population	LOCALITIES	COMMUNITY FACILITIES							UTILITIES AND SERVICES							Locality
				Police	Fire Protection	Recreation	Health	Schools, Playgrounds	Refuse Collection	Cesspool	Water	Storm Drainage	Electricity	Propane tanks	Telephone	Public Transportation	Paved Roads, Walkways	
A	257600	46	1. AL-SABEEL	■	■	■	■	■	■	■	■	■	■	■	■	■	■	1
B	201600	36	2. OLD CITY	■	■	■	■	■	■	■	■	■	■	■	■	■	■	2
			3. AL-SAHEIFAH	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C	100800	18	4. AL-MEDINA ROAD	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
560,000 100			TOTAL POPULATION															

The table above is a summary of the data on community facilities and utilities and facilities of the 4 cases in Jeddah. Descriptive text follows on the next page.

No provision at all.
 Limited or occasional.
 Adequate or normal.

Sabeel locality. Legal ownership and legal rental are predominant in the rest of the cases.

(13) DWELLING LOCATION: From the case studies it is found that the city center is occupied by middle income groups. Within the inner and outer ring roads and to the south are low/moderately low income groups. To the north of the city and along Mecca Road are high income groups.

(14) DWELLING TYPES: The Old City is characterized by traditional houses where multi-family houses are found. Walk-up apartments and high-rise buildings also exist there. Al-Sabeel, the locality of predominately low income groups, is characterized by its popular row houses. Upper middle and high income groups occupy apartments and detached houses.

(15) DWELLING FLOORS: Most of the dwellings in Al-Sabeel locality are 1-2 floors. In the Old City the traditional houses range between 2-5, and apartment buildings range up to 35 floors. In Al-Saheifah locality the range is from 2-6 floors. Al-Medina Road locality has 1-2 floors.

(16) DWELLING UTILIZATION: Single occupancy is found in row houses and detached houses (Al-Sabeel, Al-Medina Road). Multi-dwelling occupancy is in the Old City and Al-Saheifah.

(17) DWELLING PHYSICAL STATE: Fair physical state is found in low/moderately low and some middle income groups (Al-Sabeel) because of poor maintenance. Good physical state is found in high income as well as middle income groups.

(18) DWELLING DEVELOPMENT MODE: Incremental mode is used by low/moderately low in-

come and middle income groups such as Al-Sabeel, Old City, and Al-Saheifah. Instant mode is used for high income groups and public housing projects.

(19) DWELLING DEVELOPER: The popular developer is generally found in the lower income sector (Al-Sabeel). The public sector is concerned with housing projects for low and middle income groups. The private sector is involved in land subdivision and develops their houses on an individual basis.

(20) DWELLING BUILDER: Most of the low income groups build their houses with the assistance of artisans. Artisans are employed widely for row houses and traditional houses. Middle/high income hire small contractors for constructing their individual houses. Generally large contractors are hired by the public sector for low/middle

income housing projects.

(21) DWELLING CONSTRUCTION TYPES: Masonry/wood construction is widely used in low income group as in Al-Sabeel. Limestone walls with wooden beams covered with earth are commonly used in traditional houses. Masonry concrete is widely used by middle/high income groups.

(22) DWELLING DEVELOPMENT-YEAR OF CONSTRUCTION: The oldest case study is the traditional development (Old City); it was constructed on top of the ancient settlements. The newest case study was developed not more than 20 years ago (Al-Medina Road).

(23) DWELLING DEVELOPMENT DENSITY: From the previous case studies it is clear that the very dense locality is the Old City and the lowest populated locality is Al-Medina Road of 37p/Ha.

The following comments summarize the Community facilities, Utilities/services data, of the four case studies existing in Jeddah City. (see chart on the previous page)

COMMUNITY FACILITIES

Police: Generally, the City has a good security system, with each locality having it's own police station. In the case of Al-Medina Road, the locality shares the police services with the nearby locality.

Fire protection: Since fires are not frequent throughout the City, the fire stations scattered in several parts of the City are adequate.

Health: Old City and Al-Saheifah localities have good health facilities. Most of the public and private hospitals and clinics are found here, Al-Medina Road and Al-Sabeel have only limited health facilities.

Recreation areas: Most of the recreation areas of the city are located outside the

residential areas, unadequate recreation areas are found within the localities.

Schools/playgrounds: Primary/intermediate schools are provided in most of the localities except Al-Medina road where the inhabitants share the educational facilities with the nearby localities. Playgrounds are very limited in most of the cases, the only playground areas provided are within the school sites.

UTILITIES AND SERVICES

Refuse collection: At the present time the city faces a manpower shortage which has a strong effect on the collection. Very limited refuse containers are provided. Waste is dumped along the roadside or in an open areas where it is then picked up by Municipality trucks.

Sewage disposal: No sewage network is provided yet. However, each building currently has an individual cesspool.

Water: Most of the localities have an ade-

quate public water supply, either by direct house connection to the distribution network or by water trucks, donkey-carts, or by local public standpipes. In the case of Al-Medina locality almost 60% of houses are supplied by water trucks.

Storm drainage: There is no storm drainage network in the City. Al-Saheifah and Al-Sabeel localities have flooding problems during the rainy season.

Electricity: The City has an adequate electrical system. In the case of Al-Medina Road, some houses have their own electricity supplied by a privately operated generator. Illegal connections can be found in the Al-Sabeel locality.

Propane Tanks: Propane gas is the main form of fuel, received and used in tanks.

Telephone: Telephone service is available to all parts of the City. In the case of Al-Sabeel locality, about 70% of the houses have

no telephone service.

Public transportation: Taxies are available anywhere in the City. Buses are available only on the main streets.

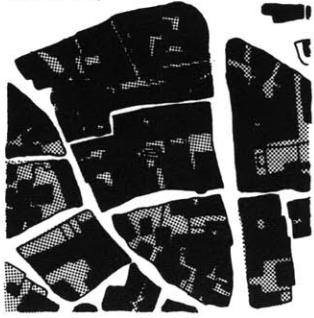
Paved roads, walkways: The existing paved roads have poor maintenance. Walkways are only provided on the main, important streets.

Streets lighting: Street lights are provided on the main streets. Interior narrow streets are lighted by kerosene lanterns provided by the Municipality and by flourescent and incan-electric lights, provided by the inhabitants on the front door of their houses.

LAND UTILIZATION: PATTERNS, PERCENTAGES, DENSITIES

1 AL-SABEEL

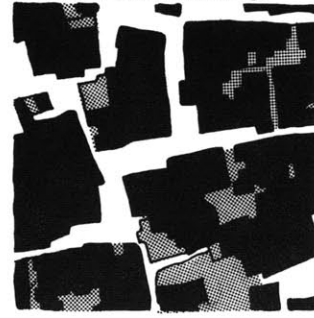
POPULAR, LOW INCOME, ROW HOUSES.
Medium percentage of land for streets/
walkways and narrow streets; acceptable
percentage of land for dwellings/lots,
low percentage of land for semi-public
and semi-private areas. Medium popula-
tion density.



PATTERN

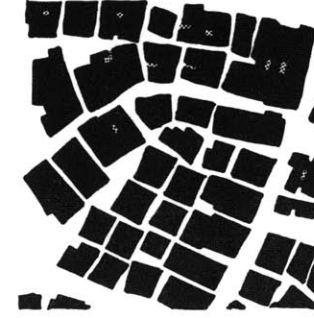
2 OLD CITY

PRIVATE, MIDDLE/UPPER MIDDLE INCOME,
TRADITIONAL HOUSES.
High percentage of streets/walkways and
narrow streets; medium percentage of
land for dwellings/lots, very low per-
centage of semi-public and cluster
courts, high population density.



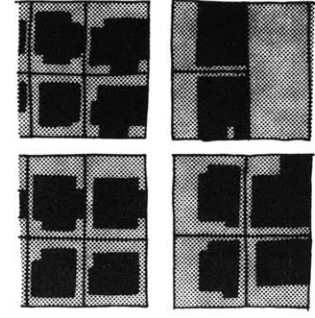
3 AL-SAHEIFAH

PRIVATE, MIDDLE INCOME, APARTMENTS.
High percentage of land for streets/
walkways; medium percentage of land for
dwellings/lots, very low percentage of
semi-public areas, medium population
density.

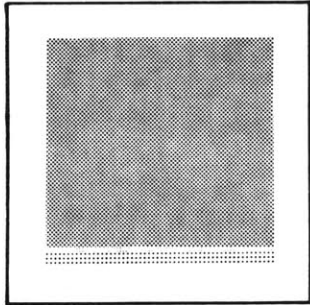


4 AL-MEDINA ROAD

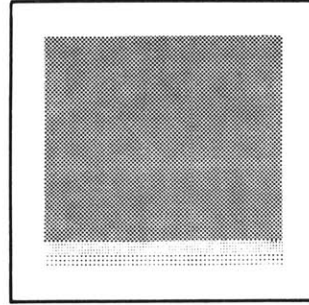
PRIVATE/PUBLIC, UPPER MIDDLE AND HIGH
INCOME, VILLAS.
Acceptable percentage of land for walk-
ways; high percentage of land for dwe-
lings/lots, very low density.



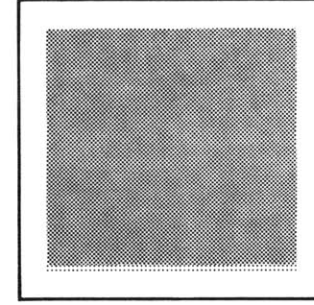
1 Hectare



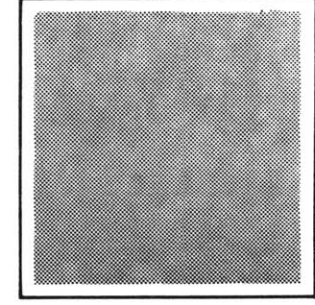
PERCENTAGES	
Streets/walkways	36%
Playgrounds	2%
Cluster Courts	1%
Dwellings/lots	61%



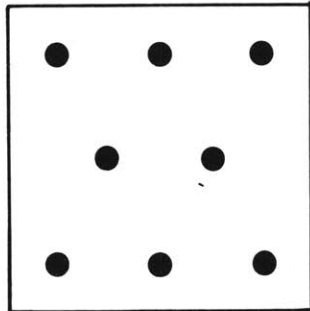
Streets/walkways	42%
Playgrounds	2%
Cluster Courts	2%
Dwellings/lots	54%



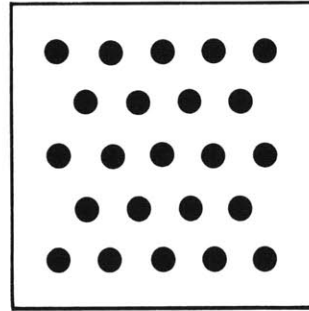
Streets/walkways	40%
Playgrounds	1%
Cluster Courts	-
Dwellings/lots	59%



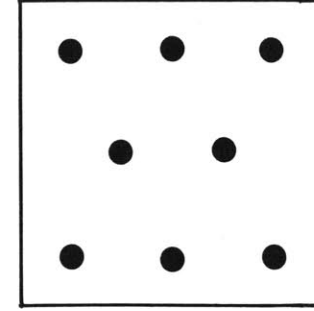
Streets/walkways	23%
Playgrounds	-
Cluster Courts	-
Dwellings/lots	77%



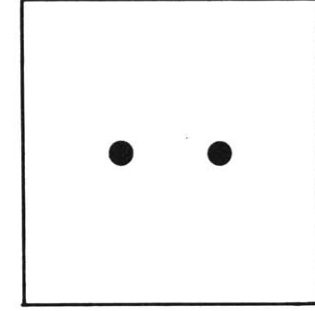
DENSITY Persons/Hectare 158



454 P/Ha



154 P/Ha



37 P/Ha

PROPOSED MODEL

BACKGROUND

The introduction and previous four case studies provide an overview and a reference of the housing situation in Jeddah. It is clear that an acute shortage of housing exists. This shortage is aggravated because of the following conditions particular to Jeddah.

- Labor shortage
- Insufficient production of local building materials
- Inadequate port capacity for delivery of materials
- Un-coordinated administration structure
- Lack of adequate planning controls
- Lack of necessary data and information

The labor shortage is one of the most serious problems which the nation faces. Due to the national development and industrialization plans, the government has opened its doors to foreign laborers from the nearby countries to work in the kingdom. Also, the government plans to import another 500,000 foreign workers before 1980. Even with the government's awareness of the housing shortage, and rules which require foreign companies and contractors to supply their own laborers and also to build camps or to bring with them prefabricated houses, the shortage is still acute. The plan introduced other factors which made the demand for shelter far greater than the supply, as most of the immigrant workers came individually without any control or organization; not to mention their accompanying families who required schools, and other public facilities, and increased daily consumption and traffic congestion.

Production of building materials is insufficient. Demand cannot be met; therefore, much material is imported. However, the port congestion is

another major problem in Jeddah. Delays have occurred for up to three months. In 1976 some 160 ships, more than 50 of them carrying cement and other construction materials, were waiting in the port. They ran up demurrage charges of as much as \$5,000 a day. This additional surcharge on shipping costs will, of course, be passed along to the consumer, which will further increase the high cost of construction materials.

Because of inadequate planning controls and the ignoring of the rules of Shariaa (Islamic Law) especially with regard to ownerships, acquisition and compensation of land, and freedom of private investment in urban areas, the land values have increased within a short time to more than 800 percent. The high land prices and many other limitations face the low income sector which prevents them from benefiting from the government housing subsidized program. The programs established a Real Estate Development Fund to be utilized for construction of real estate projects for private or commercial use, for individuals or for private firms. The individual house loan amounts to 70% of the construction cost, is interest free, and is to be repaid over a 25 year period.

The necessary updating of data is rare; no machinery exists to do this at any level. Within the town planning office for example there is limited collection of data or monitoring, implementation, or control of the planning process. The planning data, which has been collected already, has become outdated. Moreover, the rapid population growth makes any attempt at data collection soon obsolete. This has created serious difficulties for reviewing and adjusting the master plans as well as preparing de-

tailed plans for implementation of projects. It is necessary to continuously update the basic planning data and store it in a manner that is readily available to all those concerned with the planning and development of urban and rural settlements. Fortunately, the Ministry of Municipal and Rural Affairs has initiated action to establish a data bank within the Deputy Ministry of Town Planning to serve as municipal and rural information center.

THE MODEL

The previous discussion has presented a broad outline of the existing condition and the problems that are influencing the growth pattern and housing development in Jeddah. Any attempt in improving the situation and increasing the housing supply goes parallel with the rapid development of the city. The previously mentioned problems must be considered. Minimizing the dependence on foreign laborers will reduce the housing needs. Increasing the capacity of the local building material factories will reduce the costs, time, and also reduce demand for imported materials, and consequently relieve the bottleneck in the ports. Coordination between Jeddah's authorities will save a lot of the duplication of works; it is more economical in costs, laborers, and time to develop the infrastructure following a reasonable sequence. A proposal that follows will introduce a land subdivision model in the context of the overall difference in housing supply and demand. The model aims to focus especially on the physical layout and land subdivision to propose an alternative method of residential development stressing low income housing. The characteristic of the model will concentrate on the following aspects.

INFRASTRUCTURE: Provision of an efficient layout that minimizes public sector costs in implementation, maintenance, and operation of services and provides maximum amenity to the user.

LAND SUBDIVISION: Provision of cluster ownership with maintenance and operation.

HOUSING: Provision of dwellings and lots that can be easily expanded or modified to permit flexibility in their use, to absorb growth of the family needs, and to minimize the initial investment cost by the user and the public sector.

MODEL GOALS

PREMISE: This project assumes that the government will acquire the land and redistribute the lots to the low/moderately low income groups for ownership. The development of the site will be under the supervision of the Real Estate Fund, Jeddah's municipality, and the Town Planning Office to prevent land speculation and adherence of the proposed land use plan.

A project will be developed as a reference source for the provision of dwellings and land for low and middle income groups which incorporate modern technology within the existing socio-economic and cultural context.

The development of the project will be the result of a previous analysis of basic housing systems, types of residential areas, and dwelling environments in Jeddah. The case studies and evaluation done previously provide a basis for the understanding of critical land development, physical planning elements, and pose problems as how to deal adequately with the housing needs for low income families. They also define the relationships of home to the work place as low income groups tend to be non-car owning and thus less mobile.

70% of the project will accommodate low income groups and 30% for middle and high income groups to provide social integration between the residents.

It is intended to provide a well balanced community with shops, schools, mosque, institutional facilities, and complete public utilities. Employment opportunities will be provided in the nearby industrial areas.

The project includes community services and the following options:

Diversity of choice in land tenure.

Diversity of choice in housing programs.

Diversity of funding between public and private.

PLANNING POLICIES

PRIMARY USE: The primary use of the site will be residential. Residential use implies that the necessary supporting land uses will be included:

- . Schools
- . Mosques
- . Playgrounds
- . Commercial facilities
- . Institutional facilities.

INTENSITY OF LAND USE: The site is planned for a net density of 300 to 600 persons/Hectares. Average household 5 to 6 persons.

TARGET INCOME GROUPS: All income groups will be included in the site. The income groups who will need special programs are the low and lower middle income groups whose income is below 600 S.R./month; they constitute 46.4% of households.

TENURE: Every household will have land ownership. Public subsidies will be used to make house ownership possible for at least 75% of the households. Householders will be counseled in their obligations and rights under tenure agreements prior to occupancy of houses constructed or improved with government assistance.

HOUSING FINANCE: Single houses as well as groups of houses will be financed in part from direct loans made by the Real Estate Fund and in part by funds channelled through the Real Estate Fund to private institutions engaged in financing housing. Institutional buildings and infrastructure will be built with government funding and supervision.

DEVELOPMENT: The site will be developed in two stages; 1) Instant development of site, infrastruc-

ture and construction of expandable houses. Land subdivision in order to control the land from being squatted; 2) Incremental long range development which will be equally public and private development.

CIRCULATION: The interior streets will be joined to existing peripheral streets.

UTILITIES: They will primarily be in streets and public land. The utilities (water, sewer, electricity, storm drainage) should be interconnected into the city network as they are implemented.

HOUSING OPTIONS: From the previous case studies of Jeddah, the following housing options are the most applicable for the low, moderately low, and middle income sectors.

- . Houses for single families
- . Houses for extended families
- . Walk-up apartments
- . Mixed use dwellings (Residential/Commercial).

BASIC DATA

LOCATION: The site is approximately 5 km south of the Jeddah city center. It is located between low/moderately low income residential areas and an industrial zone.

BOUNDARIES:

To the north - Residential area and radio/TV station

To the east - Open land

To the south - Industrial zone and isolation hospital

To the west - Gholeal and Karantina localities.

AREA: The available area for development is 98 hectares. Future expansion is to the east of the site.

APPROACHES/ACCESS: The approaches to the site are through the Al-Mahjar Road, Al-Fahd Road, and the New Road which was recently constructed to connect the city center with the industrial estate. Those roads will become of major importance when the nearby industrial zone reaches its full capacity.

EXISTING STRUCTURE: (See air photograph, opposite page.) The site is bounded by two localities (Gholeal, Karantina), which are inhabited by low income groups. Unconsolidated dwellings, shanties are predominant in those localities. Few dwellings, shanties are shown within the chosen site. It is assumed that these houses will be replaced by the proposed lots and housing options according to the family size and their income. Other structures in the site are, vacant lands surrounded by walls, used for storing new cars, wood, cement, and other building materials. Since the site is zoned as a residential area, it is assumed that these warehouses should be moved to the industrial area.





THE SITE, Jeddah. (left) The aerial photograph shows the existing condition and the physical boundaries of the site.

(opposite page, top) The new road passing through the adjacent residential area of the site connects the site to the city center and to an industrial estate.

(bottom) The same street but further down into the existing residential area. There is no sidewalks, street lighting, and planting areas.

TRANSPORTATION: Public bus services is provided to the site from the city center along the Al-Mahjar Road. Taxi services are available along the Al-Mahjar, Al-Fahd, and the New roads.

EMPLOYMENT: The nearby Industrial Estate, Steel Rolling Mill and the Refinery are providing major job opportunities.

TOPOGRAPHY/NATURAL FEATURES: The site is flat and with no unusual features.

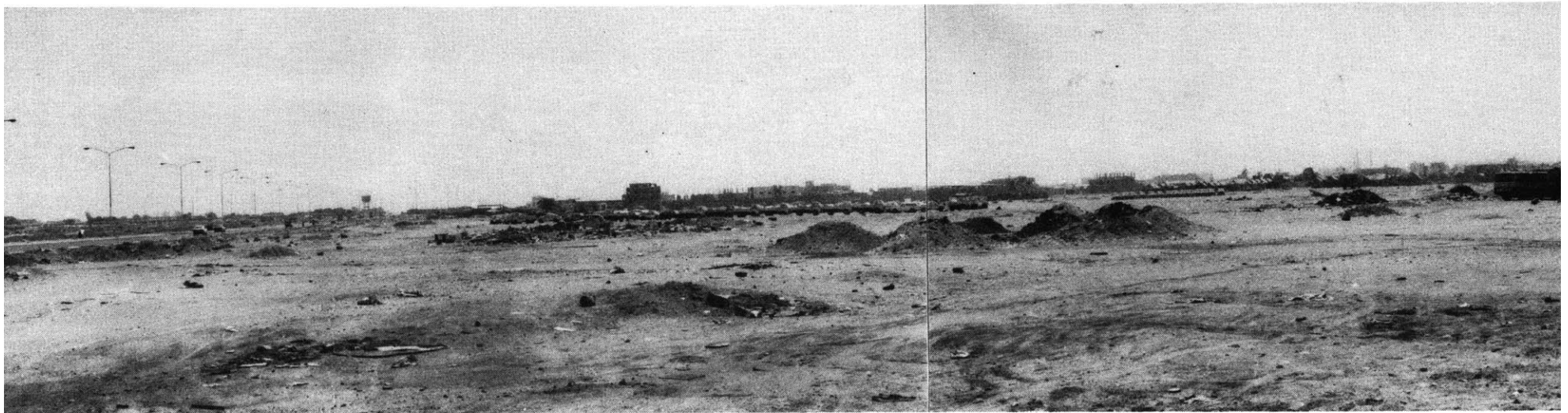
SOIL CONDITION: The soil is acceptable for construction.

INFRASTRUCTURE/COMMUNITY FACILITIES/CIRCULATION: Al-Mahjar Road, Al-Fahd Road, and the New road will be the major circulation routes connecting the site to

the city center. The circulation network inside the area will provide a basic framework for the development of the site. Pedestrians and vehicles will be mixed in the public streets, but pedestrians will dominate over vehicles. The traffic and frequency and speed will be controlled by the width and layout of the streets.

UTILITIES: Water and electricity lines will be connected to the existing system along Al-Mahjar Road. Main lines for sewage and storm drainage are planned along Al-Mahjar and Al-Fahd Roads.

OWNERSHIP: The land, when developed, will be purchased by the government. The policy of this is to redistribute the proposed lots to the low/moderately low income groups with an acceptable price, and also to control the land speculation. All semi-



private spaces will be owned in condominium. Schools, mosques, and other institutional facilities will be controlled by each respective government ministry.

OTHER FACTORS: According to the site location, the following factors have to be considered.

- . FIRE
- . SMOKE AND ODOR

FIRE: Fire protection and regulations will be controlled by the fire department.

SMOKE AND ODORS: Although the location is near to industrial areas, smoke and odors will not be a nuisance because the wind blows constantly from the north and northwest, and drives the smoke and odor away from the site.

The Site (below): The area is bordered by dwelling to the back. The flat site may be developed immediately with only minimal site work.



PROPOSED LAND USE/CIRCULATION

The site will accommodate 30,000 persons (net density 600 p/Ha) at the saturation stage. The site development will be integrated to the existing residential area by connecting the proposed circulation network to the existing one; and by producing the required public facilities (schools, mosques, commercial areas, and recreation areas) for both the proposed site and for the existing community.

The proposed land use plan shows residential/commercial areas: The residential areas are distributed evenly over the site, the high density of population is concentrated on the main streets where the land value is high. The commercial areas are located along the main commercial streets running from the northeast to the southeast, and from the northwest to the southeast.

SEMI-PRIVATE AREAS: They are the areas owned in condominium. It is assumed that each dwelling has access to this semi-private area. In the cases of walk-up apartments or mixed use dwellings, the access to the semi-private area will be through the backyards.

PUBLIC/SEMI-PUBLIC AREAS: Public areas are for circulation. They are discussed in the following section. Four semi-public areas are equally distributed in the site. The areas are proposed to serve the new community as well as the existing adjacent residential area. Mosques are located within the semi-public areas, on the main streets for easy accessibility. An existing boys school located in the west part of the site has been considered in the proposed land use plan. Two new schools (girls & boys) are proposed to serve the community.

RESERVED OPEN SPACE: A 50 meter strip along the Al-Mahjar, Al-Fahd, and the new roads (constructed in 1976) are reserved for government use and for expected future expansion of the roads.

The proposed circulation plan was developed according to the existing pattern, it provides an even distribution path throughout the site, and connects the proposed community to the existing community. The circulation plan provides the utility spine throughout the site. The development of the plan is based upon the following goals:

- . Integration of the proposed network with the existing one, and at the same time with the city center through the major streets.
- . Minimization of infrastructure investment for the public sector.
- . Provision of open spaces along the major roads as a buffer zone and to allow for future expansion of those roads.

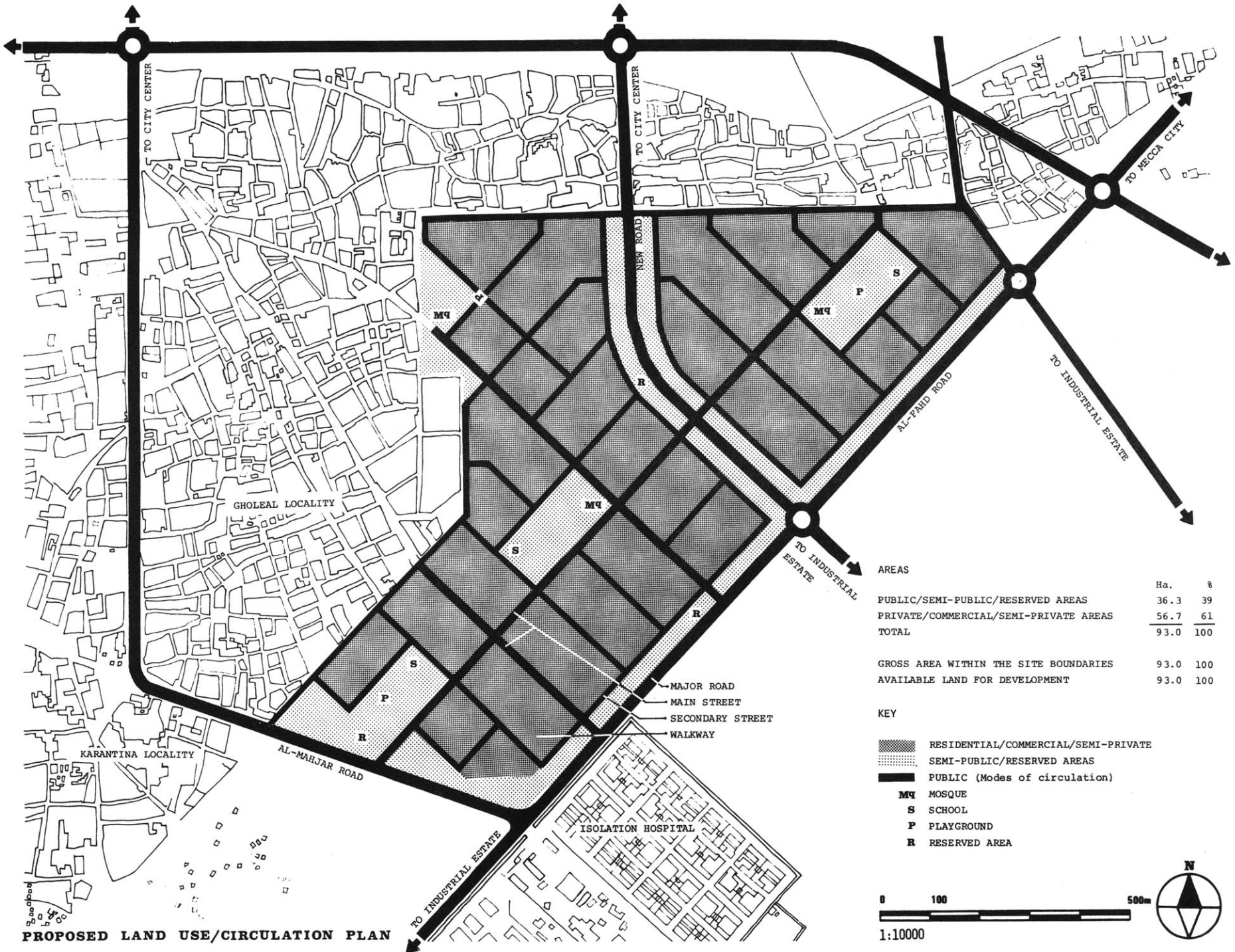
The following circulation modes are considered in the plan.

MAJOR ROADS: Al-Mahar Road, Al-Fahd Road, and the new road which runs through the site, are the major roads which connect the site to the city center and to the work areas. The roads are mainly used by vehicles.

MAIN STREETS: The Main streets are connecting the interior circulation to the major roads, also connecting the proposed site to the immediate neighborhood. They are used by vehicles and pedestrians, also they will have the main commercial activities.

SECONDARY STREETS: They connect each cluster to the main streets. Pedestrians dominate over vehicles.

WALKWAYS: For pedestrian use only; they allow access to parks, market, schools, mosques, and other sections of an urban unit.



AREAS	Ha.	%
PUBLIC/SEMI-PUBLIC/RESERVED AREAS	36.3	39
PRIVATE/COMMERCIAL/SEMI-PRIVATE AREAS	56.7	61
TOTAL	93.0	100

GROSS AREA WITHIN THE SITE BOUNDARIES	93.0	100
AVAILABLE LAND FOR DEVELOPMENT	93.0	100

- KEY
- RESIDENTIAL/COMMERCIAL/SEMI-PRIVATE
 - SEMI-PUBLIC/RESERVED AREAS
 - PUBLIC (Modes of circulation)
 - MOSQUE
 - SCHOOL
 - PLAYGROUND
 - RESERVED AREA



PROPOSED LAND USE/CIRCULATION PLAN

BLOCK SUBDIVISION

It is recognized that the majority of houses in Jeddah are row houses (single family houses) which house 51% of the population, and apartments which house 15.7% of the population and the rest 5.3% are traditional houses and detached villas. For the Arabic and Islamic culture, privacy is a very important factor in the family and the house must be self-sufficient in service. Shared services (bath, shower, kitchen) do not appear in the Jeddah housing systems. Even in Jeddah's traditional house with extended families, every married member has his own private facilities.

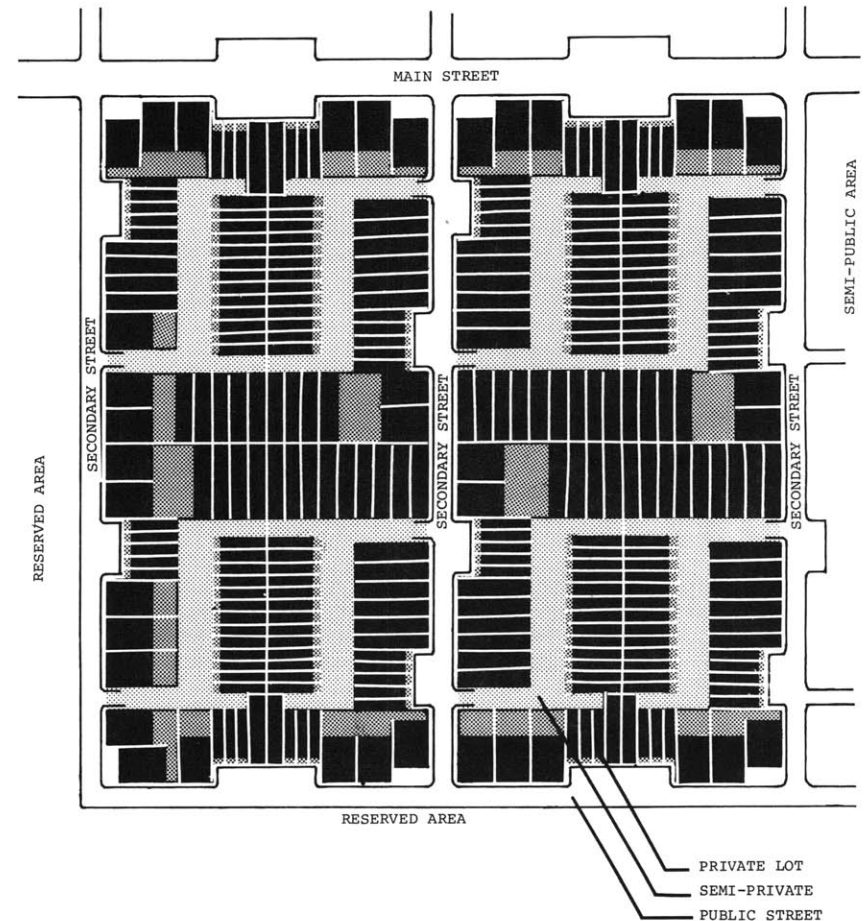
As seen in the small open spaces and narrow streets in old city, semi-private open spaces surrounded by a group of single family houses (cluster) is recommended. The advantage of this is to minimize the public responsibility and to maximize the private responsibility, and also to create a space for social gatherings for neighbors. The hierarchy of land subdivision is as follows:

- . Block
- . Cluster
- . Dwelling Units

BLOCK: It is a portion of land surrounded by public circulation. The proposed block has an average area of one hectare and each block contains one or more lot clusters.

CLUSTER: It is a group of dwellings (including lots) gathered around a semi-private court.

DWELLING UNITS (INCLUDING LOTS): It appears in four housing options on the following pages.

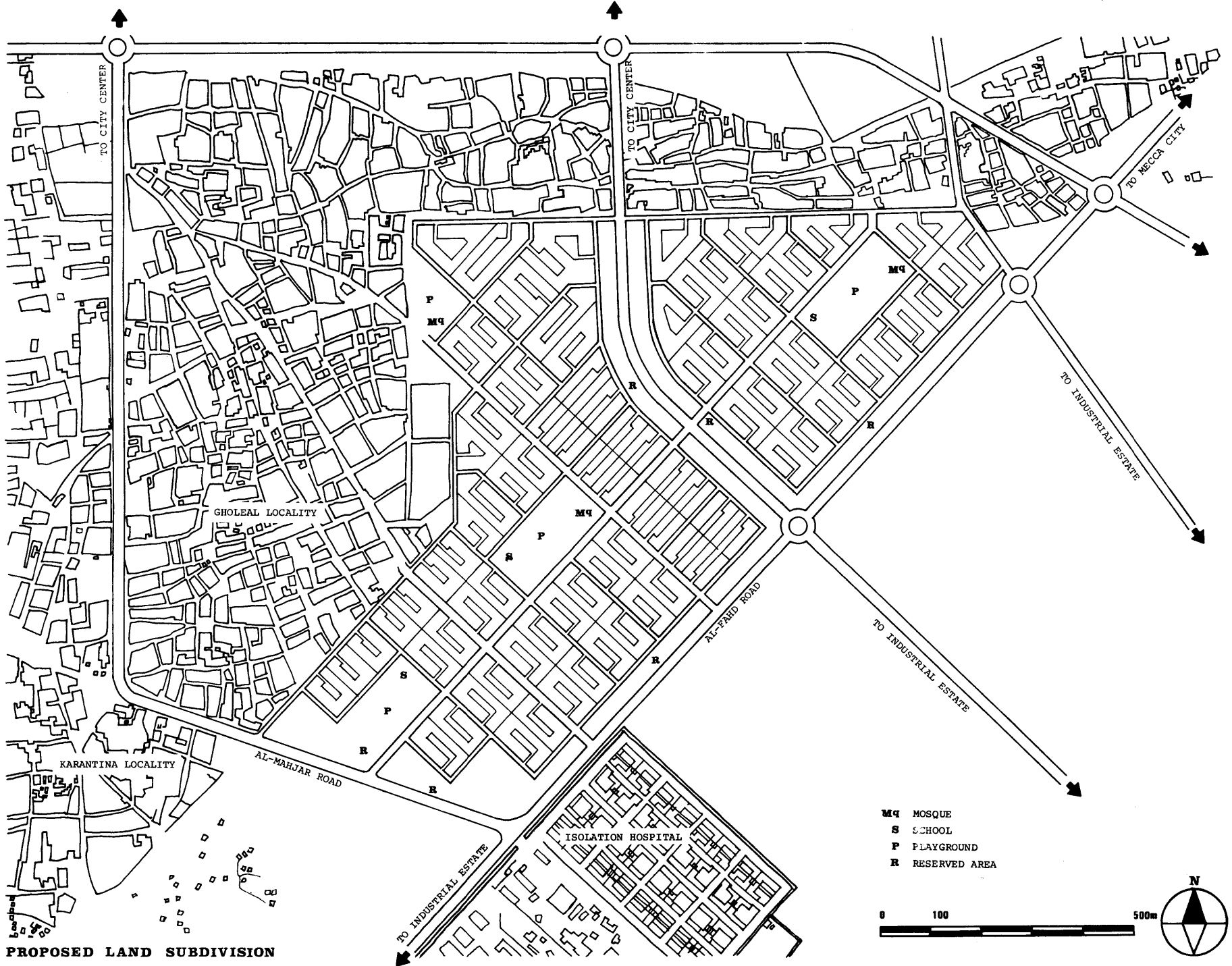


URBAN AREA



1:2500





PROPOSED LAND SUBDIVISION

HOUSING OPTIONS

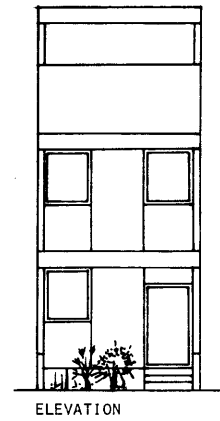
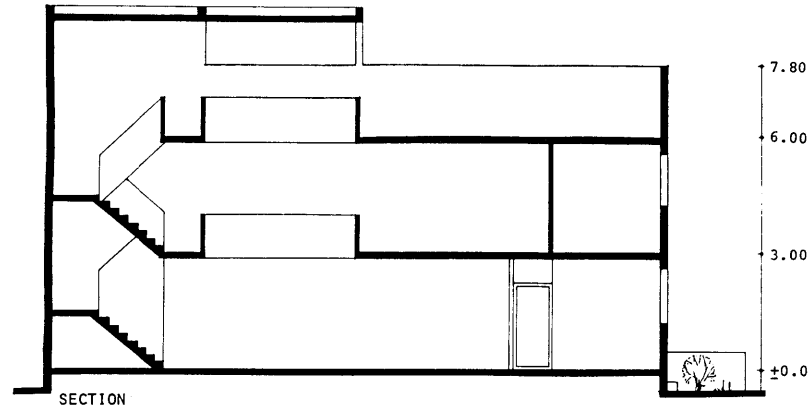
1. SINGLE FAMILY HOUSES (SMALL LOTS): The dwelling units will be grouped in lot clusters. The units will be developed by the Real Estate Fund, and will be offered to the users for ownership and rent. The unit includes the lot with one room minimum, kitchen, toilet, and services (water, electricity, sewage). The unit has one floor with expansion into the second floor and also a roof extension for sleeping during the summer.
2. EXTENDED FAMILY HOUSE: The dwelling units will be grouped in lot clusters, each unit has 2 floors with 2 rooms minimum, kitchen, toilet, and services (water, electricity, sewage). The second floor will be available for use of the extended family or for renting to another family. Users may expand the house up to four stories (including the roof) all within the lot and without changing the lot cluster configuration. Units will be funded by the Real Estate Fund, and will be accessible to the users for ownership and renting.
3. WALK-UP APARTMENT: The four-story walk-ups include in each floor a minimum of 2 apartments; each apartment has 2 rooms minimum, a toilet and kitchen. The walk-up apartments are located on the main streets. It is offered to the users for private ownership and the units can be rented individually.
4. MIXED-USE BUILDING (residential and commercial): The units are a combination of walk-up and large lot units which allow commercial use in the ground floor and residential use in the upper floors. These units are developed along the main commercial streets. It is offered for ownership, rental, long lease, and the units will be developed either by the Real Estate Fund or by private developers.

ALTERNATIVE HOUSING OPTIONS

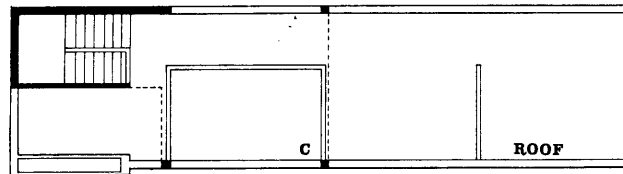
		1	2	3	4
PROPOSED NO. OF	1 DWELLINGS	40%	30%	15%	15%
	2 PEOPLE (thousands)	12,000	9,000	4,500	4,500
INCOME GROUP/TENURE OPTION	3 MIDDLE/UPPER MIDDLE	OWNERSHIP/ RENTAL	OWNERSHIP/ RENTAL	OWNERSHIP/ RENTAL	OWNERSHIP/ RENTAL/LEASE
	4 LOW	OWNERSHIP/ RENTAL	OWNERSHIP/ RENTAL	OWNERSHIP/ RENTAL	OWNERSHIP/ RENTAL/LEASE
SIZE (m ²)	5 LOT	72	144	188	188
	6 DWELLING (build up)	64	144	180	180
INFRASTRUCTURE PROVIDED	7 WATER	ON SITE	ON SITE	ON SITE	ON SITE
	8 SEWAGE	ON SITE	ON SITE	ON SITE	ON SITE
	9 ELECTRICITY	ON SITE	ON SITE	ON SITE	ON SITE
	10 ACCESS	TO SITE	TO SITE	TO SITE	TO SITE
EXPANSION	11 VERTICAL	YES	YES	-	-
	12 HORIZONTAL	YES	YES	-	-
COST	LAND				
	DWELLING				
	INFRASTRUCTURE				
	13 TOTAL				DATA NOT AVAILABLE
	14 RENTAL				
	15 MORTGAGE				
DEVELOPMENT	16 LOAN				
	17 FINANCED BY				
	18 DEVELOPED BY		REAL ESTATE FUND/PRIVATE		
	19 MANAGED BY				

1 SINGLE FAMILY HOUSE

Dwelling area for 2 floors and roof: 196m².
 Dwelling area for basic shell, 1 floor and roof: 134m².
 This dwelling is intended for the low income.

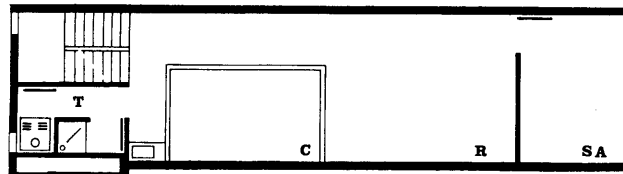


ROOF PLAN: 62m²
 The roof is an important element in the dwelling. It may be used for sleeping during the summer months.



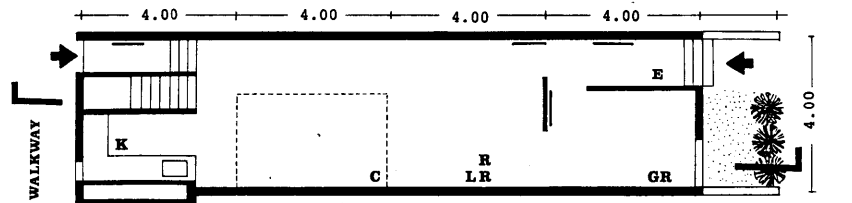
ROOF PLAN

SECOND FLOOR PLAN: 62m².
 The plan indicates the final stage already expanded into a multi-purpose room and a sleeping area. This floor is optional in the initial stage depending on income, etc. The toilet is provided with the initial shell.



SECOND FLOOR PLAN

FIRST FLOOR PLAN: 72m².
 The ground floor is the basic unit with two rooms, kitchen (and toilet on the second floor). It may be expanded into the upper floor in later stages by the owner. A Guest Room is initially planned, according to custom.



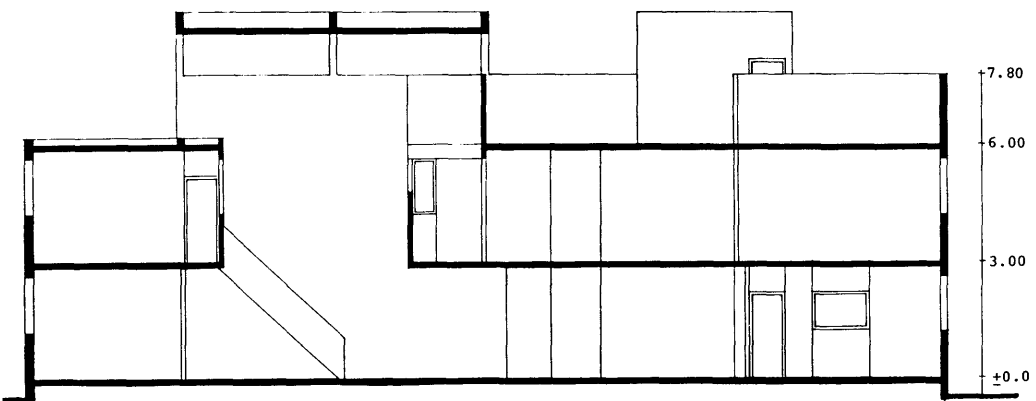
FIRST FLOOR PLAN

- E ENTRANCE
- GR GUEST ROOM
- LR LIVING AREA
- SA SLEEPING AREA
- R MULTI-USE AREA
- C SEMI-OPEN COURT
- K KITCHEN/COOKING AREA
- T TOILET/BATH/WASH AREA
- S STORAGE

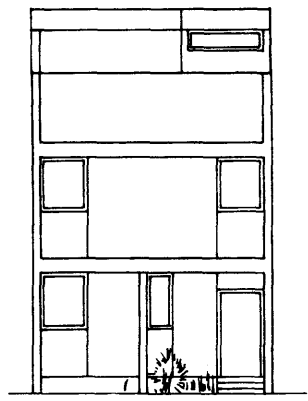


2 EXTENDED FAMILY HOUSE

Dwelling area for 2 floors (2 separate units: 120m², 144m²) and roof: 384m².
 Dwelling may be expanded with one additional floor for rental purposes.

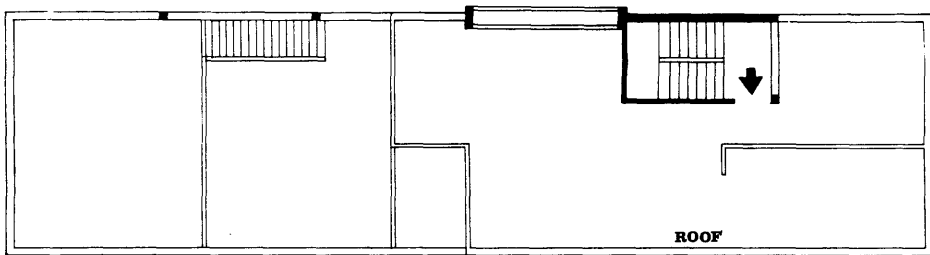


SECTION



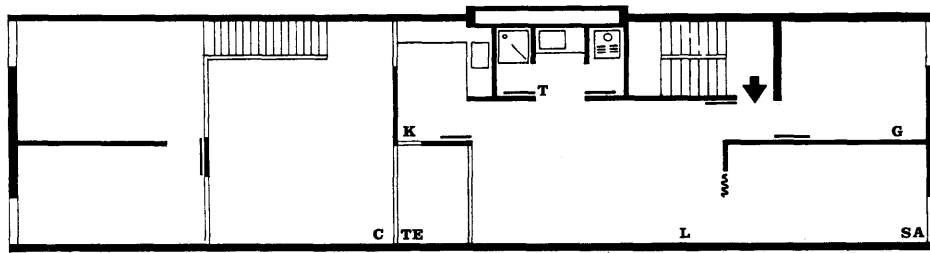
ELEVATION

ROOF PLAN: 120m²
 The roof may be used for sleeping during the summer. The roof may be expanded into two separate rooms.



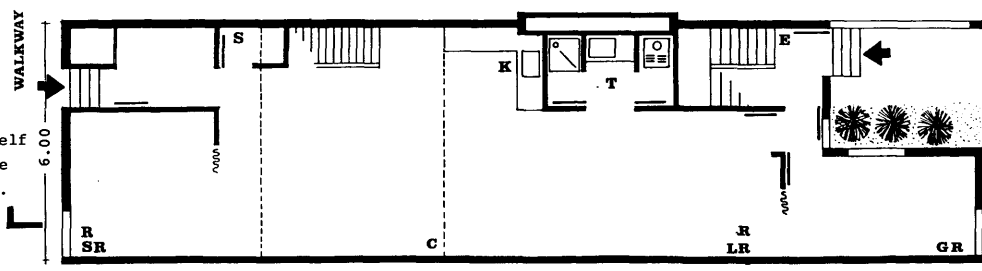
ROOF PLAN

SECOND FLOOR PLAN: 120m²
 The second floor is an independent unit. It may be used for an extended family together with the first floor or for rental purposes. The stairs in the rear allow independent access should an additional room be added on the roof. A Guest Room is also provided.



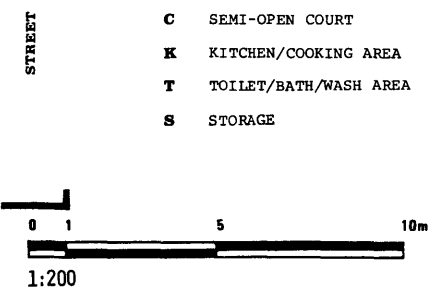
SECOND FLOOR PLAN

FIRST FLOOR PLAN: 144m²
 The ground floor is a complete unit in itself which may be independent or joined with the second floor in extended family situations. The street entrance is arranged to allow independent access to the second floor. A Guest Room is provided also.



FIRST FLOOR PLAN

- E ENTRANCE
- GR GUEST ROOM
- LR LIVING AREA
- LR SLEEPING AREA
- R MULTI-USE AREA
- C SEMI-OPEN COURT
- K KITCHEN/COOKING AREA
- T TOILET/BATH/WASH AREA
- S STORAGE



3 WALK-UP APARTMENT

**4 MIXED-USE BUILDING
(RESIDENTIAL & COMMERCIAL)**

Dwelling area options:

1-2 sleeping areas ... 67.50m²

1-2 sleeping areas ... 71.25m²

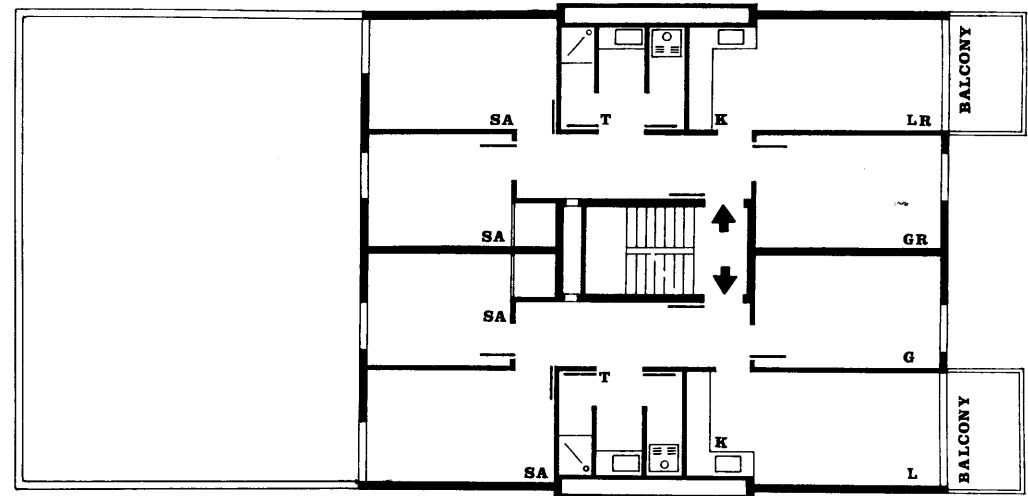
1-2 sleeping areas ... 85.00m²

2-3 sleeping areas ... 97.00m²

The various options will be offered according to income, family size, etc.

TYPICAL UPPER FLOOR PLAN:

Several area variations are available. These are two apartments per floor. Both apartments may be rented together for extended families.



TYPICAL PLAN (APARTMENT & MIXED USE BUILDING)

FIRST FLOOR PLAN APARTMENT:

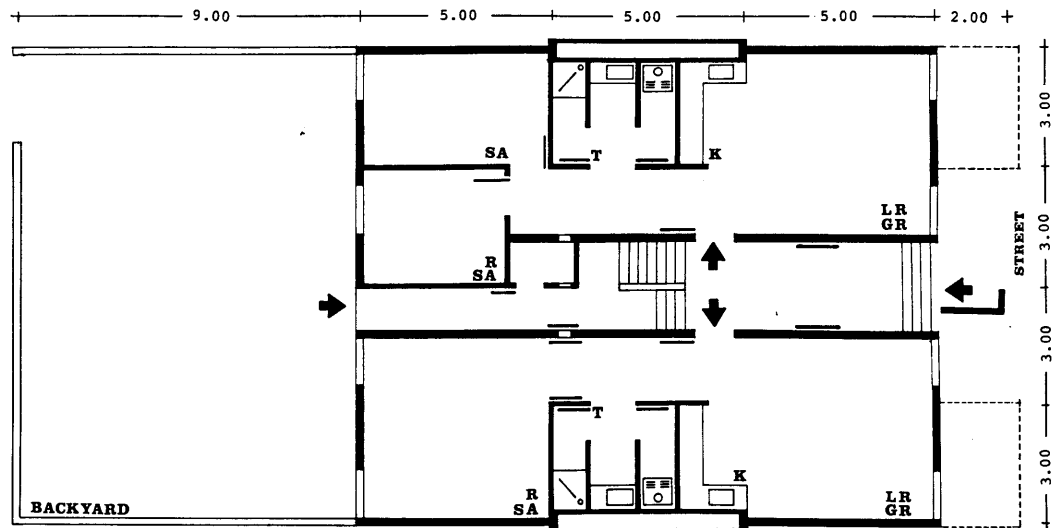
Several area variations are available. The courtyard will be shared by the tenants of the apartment. The courtyard has access to the semi-private cluster for a greater potential of social interaction of different income groups.

FIRST FLOOR PLAN-MIXED USE BUILDING: (opposite page)

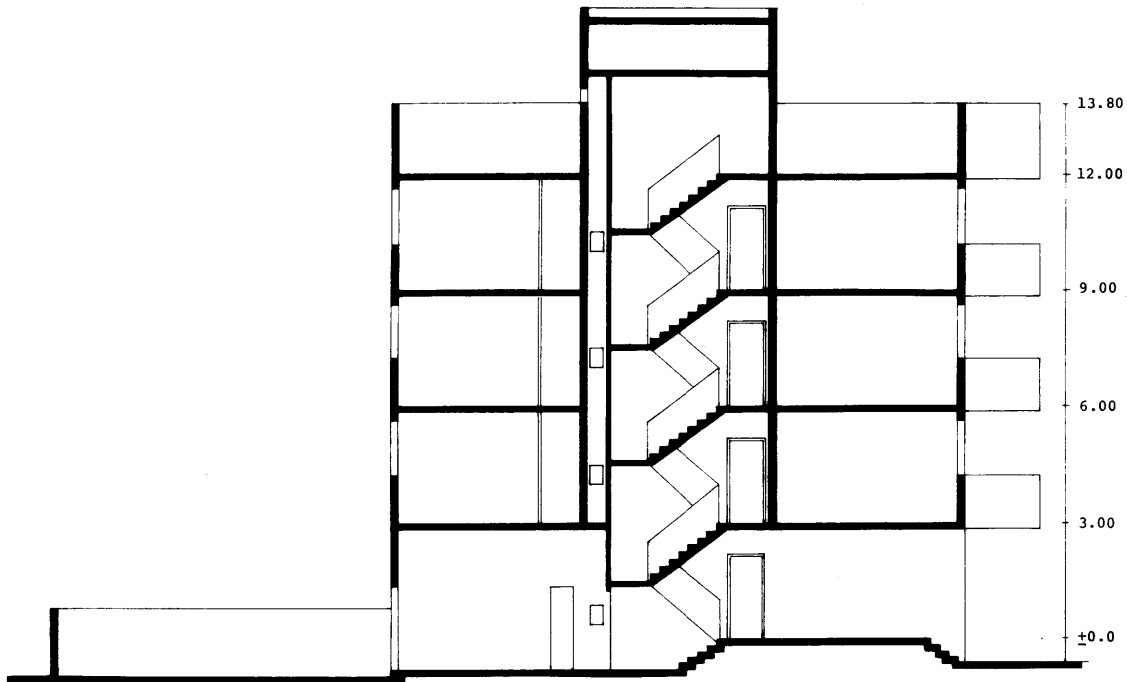
The ground floor may be used for shops, offices, small artisan workshops, etc. If needed, the courtyard may be used for expansion of the shops.

SECTION: (opposite page)

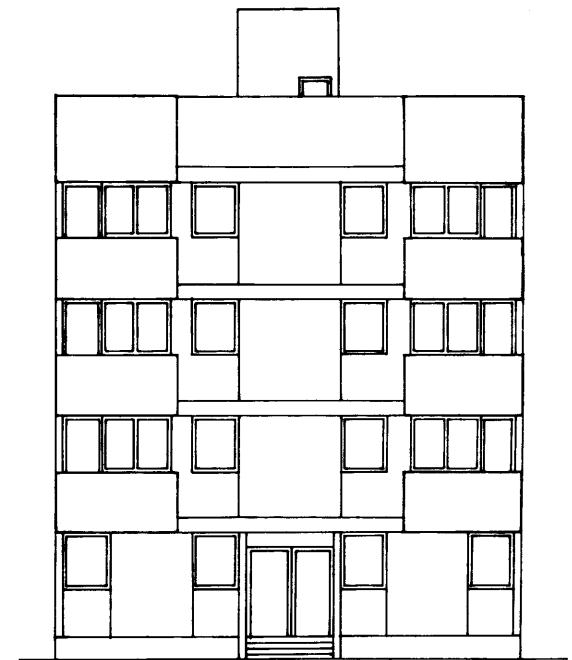
The apartment will be constructed complete. No additional floors can be added, either in the interior or by expansion on the roof. However, partitions may be altered for flexibility in room layout.



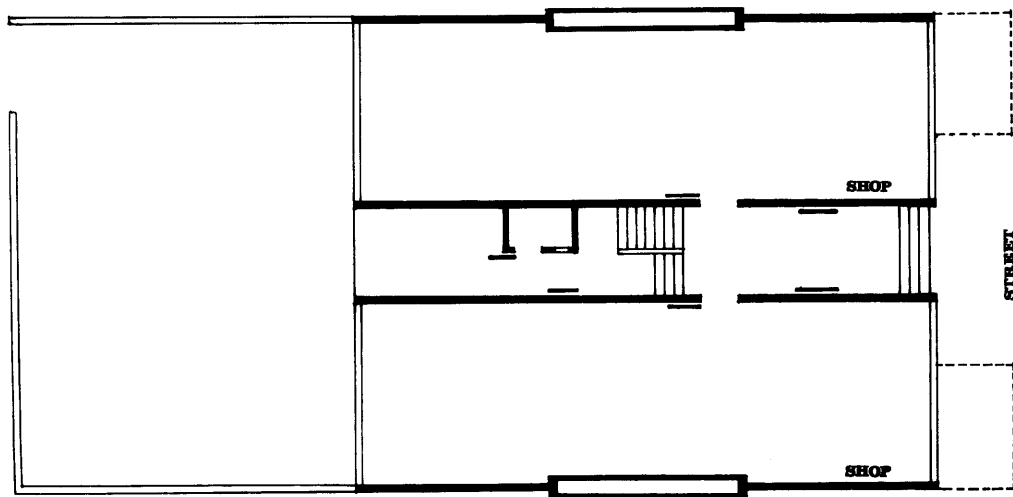
FIRST FLOOR PLAN (APARTMENT)



SECTION

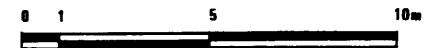


ELEVATION



FIRST FLOOR PLAN (MIXED USE BUILDING)

- E** ENTRANCE
- GR** GUEST ROOM
- LR** LIVING AREA
- SA** SLEEPIN AREA
- R** MULTI-USE AREA
- C** SEMI-OPEN COURT
- K** KITCHEN/COOKING AREA
- T** TOILET/BATH /WASH AREA
- S** STORAGE



1:200

GLOSSARY

The criteria for the preparation of the definitions have been as follows:

-FIRST PREFERENCE: definitions from "Webster's Third New International Dictionary", Merriam-Webster, 1971.

-SECOND PREFERENCE: definitions from technical dictionaries, text books, or reference manuals.

-THIRD PREFERENCE: definitions from the Urban Settlement Design Program (U.S.D.P.) Files. They are used when existing sources were not quite appropriate/satisfactory.

Words included for specificity and to focus on a particular context are indicated in parenthesis.

Sources of definitions are indicated in parenthesis. (See also: REFERENCES).

ACCESSES. The pedestrian/vehicular linkages from/to the site to/from existing or planned approaches (urban streets, limited access highways, public transportation systems, and other systems such as: waterways, airlines, etc.) (U.S.D.P.)

ACTUAL LAND COST. "(The cost of land is)...set solely by the level of demand. The price of land is not a function of any cost conditions; it is set by the users themselves in competition." (Turner, 1971)

AD VALOREM (TAX). A tax based on a property's value; the value taxed by local governments is not always or even usually the market value, but only a valuation for tax purposes. (U.S.D.P.)

AIRPORT DISTURBANCE. The act or process of destroying the rest, tranquility, or settled state of (the site by the annoyance of airport noise, vibration, hazards, etc.) (Merriam-Webster, 1971)

AIRPORT ZONING RESTRICTIONS. The regulation of the height or type of structures in the path of moving aircraft. (Abrams, 1971)

ALTERNATING CURRENT (A.C.) (an electric) current that reverses its direction of flow at regular intervals. (ROTC ST 45-7, 1953)

AMENITY. Something that conduces to physical or material comfort or convenience, or which contributes satisfaction rather than money income to its owner. (Merriam-Webster, 1971)

AMPERES. Amperes (amp) are a measure of the rate of flow of electricity. It is somewhat comparable to the rate of flow of water (quantity/time). A steady current produced by one volt applied across a resistance of one ohm. (ROTC ST 45-7, 1953)

APPRAISAL. An estimate and opinion of value, especially by one fitted to judge. (Merriam-Webster, 1971)

APPROACHES. The main routes external to the site (pedestrian/vehicular) by which the site can be reached from other parts of the urban context. (U.S.D.P.)

ASSESSED VALUE. A valuation placed upon property by a public officer or board as a basis for taxation. (Keyes, 1971)

ASSESSMENT. The valuation of property for the purpose of levying a tax or the amount of the tax levied. (Keyes, 1971)

BACKFILL. Earth or other material used to replace material removed during construction, such as in culvert, sewer, and pipeline trenches and behind bridge abutments and retaining walls or between an old structure and a new lining. (DePina, 1972)

BARRIER. (A boundary) as a topographic feature or a physical or psychological quality that tends to separate or restrict the free movement (to and from the site). (Merriam-Webster, 1971)

BETTERMENT (TAX). A tax on the increment in value accruing to an owner because of development and improvement work carried out by local authorities. (U.S.D.P.)

BINDER COURSE. A transitional layer of bituminous paving between the crushed stone base and the surface course (to increase bond between base and surface course). (DePina, 1972)

BITUMINOUS. A coating of or containing bitumin; as asphalt or tar. (DePina, 1972)

BLOCK. A block is a portion of land bounded and served by lines of public streets. (U.S.D.P.)

BOUNDARY. Something (a line or area) that fixes or indicates a limit or extent (of the site). (Merriam-Webster, 1971)

BUILDING CODE. "A body of legislative regulations or by-laws that provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within the city, and certain equipment specifically regulated therein." (BOCA, 1967)

BUILDING DRAIN. Lowest horizontal piping of the building drainage system receiving discharge from soil, waste, and other drainage pipes. It is connected to the building sewer. (ROTC ST 45-7, 1953)

BUILDING MAIN. Water-supply pipe and fittings from the water main or other source of supply to the first branch of the water-distribution system of a building. (ROTC ST 45-7, 1953)

CESS POOL. An underground catch basin that is used where there is no sewer and into which household sewage or other liquid waste is drained to permit leaching of the liquid into the surrounding soil. (Merriam-Webster, 1971)

CIRCULATION. System(s) of movement/passage of people, goods from place to place; streets, walkways, parking areas. (U.S.D.P.)

CLAY. A lusterless colloidal substance, plastic when moist (crystalline grains less than 0.002mm in diameter). (U.S.D.P.)

CLEANOUT. A plug or similar fitting to permit access to traps or sewer lines. Cleanouts are usually used at turns and other points of collection. (ROTC ST 45-7, 1953)

CLIMATE. The average condition of the weather at a particular place over a period of years as exhibited by temperature, wind, precipitation, sun energy, humidity, etc. (Merriam-Webster, 1971)

COLLECTION SYSTEM. The system of pipes in a sewage network, comprised of house service, collection lines, manholes, laterals, mains. (U.S.D.P.)

COMBINED SEWER. A sewer that carries both storm water and sanitary or industrial wastes. (DePina, 1972)

COMMUNITY. The people living in a particular place or region and usually linked by common interests: the

region itself; any population cluster. (U.S.D.P.)

COMMUNITY FACILITIES/SERVICES. Facilities/services used in common by a number of people. It may include: schools, health, recreation, police, fire, public transportation, community center, etc. (U.S.D.P.)

COMMUNITY RECREATION FACILITIES. Facilities for activities voluntarily undertaken for pleasure, fun, relaxation, exercise, self-expression, or release from boredom, worry, or tension. (U.S.D.P.)

COMPONENT. A constituent part of the utility network. (U.S.D.P.)

CONDOMINIUM. Condominium is a system of direct ownership of a single unit in a multi-unit whole. The individual owns the unit in much the same manner as if it were a single family dwelling: he holds direct legal title to the unit and a proportionate interest in the common land and areas. Two types of condominiums are recognized: *HORIZONTAL*: detached, semi-detached, row/grouped dwelling types; *VERTICAL*: walk-up, high-use dwelling types. (U.S.D.P.)

CONDUCTORS. Materials which allow current to flow such as aluminum, copper, iron. (ROTC ST 45-7, 1953)

CONDUIT. A pipe or other opening, buried or above ground, for conveying hydraulic traffic, pipelines, cables, or other utilities. (DePina, 1972)

CONSERVATION EASEMENT. An easement acquired by the public and designed to open privately owned lands for recreational purposes or to restrict the use of private land in order to preserve open space and protect certain natural resources. (U.S.D.P.)

CONURBATION. Area of large urban communities where towns, etc. have spread and became joined beyond their administrative boundaries. (A.S. Hornby, A.P. Cowie, J. Windsor Lewis, 1975)

CONURBATION. An aggregation or continuous network of urban communities. (Merriam-Webster, 1963)

CORPORATION COCK/CORPORATION STOP. A water or gas cock by means of which utility-company employees connect or disconnect service lines to a consumer. (Merriam-Webster, 1971)

COSTS OF URBANIZATION. Include the following: *CAPITAL*: cost of land and infrastructure; *OPERATING*: cost of administration, maintenance, etc.; *DIRECT*: include capital and operating costs; *INDIRECT*: include environmental and personal effects. (U.S.D.P.)

CURRENT (See: ALTERNATING CURRENT, DIRECT CURRENT). An electric current is a movement of positive or negative electric particles (as electrons) accompanied by such observable effects as the production of heat, of a magnetic field, or of chemical transformation. (Merriam-Webster, 1971)

CYCLE. One complete performance of a vibration, electric oscillation, current alternation, or other periodic process. (Merriam-Webster, 1971)

DAM. A barrier preventing the flow of water; a barrier built across a water course to confine and keep back flowing water. (Merriam-Webster, 1971)

DEPRECIATION ACCELERATION (TAX). A tax incentive designed to encourage new construction by allowing a faster write-off during the early life of a building. (U.S.D.P.)

DESIGN. 1) The arrangement of elements that make up a work of art, a machine or other man-made object. 2) The process of selecting the means and contriving the elements, steps, and procedures for producing what will adequately satisfy some need. (Merriam-Webster, 1971)

DETACHED DWELLING. Individual dwelling unit, separated from others. (U.S.D.P.)

DEVELOPMENT. Gradual advance or growth through progressive changes; a developed tract of land (U.S.D.P.)

DEVELOPMENT SIZE. There are two general ranges of size: *LARGE*: may be independent communities requiring their own utilities, services, and community facilities; *SMALL*: generally are part of an adjacent urbanization and can use its supporting utilities, services, and community facilities. (U.S.D.P.)

DIRECT CURRENT (D.C.) (An electric current that) flows continuously in one direction. (ROTC ST 45-7, 1953)

DISCHARGE (Q). Flow from a culvert, sewer, channel, etc. (DePina, 1972)

DISTANCE. The degree or amount of separation between two points (the site and each other element of the urban context) measured along the shortest path adjoining them (paths of travel). (Merriam-Webster, 1971)

DISTRIBUTION (STATION). The part of an electric supply system between bulk power sources (as generating stations or transformation station tapped from transmission lines) and the consumers' service switches. (Merriam-Webster, 1971)

DISTURBED SOIL. Soils that have been disturbed by artificial process, such as excavation, transportation, and compaction in fill. (U.S.D.P.)

DRAINAGE. Interception and removal of ground water or surface water, by artificial or natural means. (De Pina, 1972)

DUST/DIRT. Fine dry pulverized particles of earth, grit, refuse, waste, litter, etc. (Merriam-Webster, 1971)

DWELLING. The general, global designation of a building/shelter in which people live. A dwelling contains one or more dwelling units! (U.S.D.P.)

DWELLING BUILDER. Four groups are considered: *SELF-HELP BUILT*: where the dwelling unit is directly built by the user or occupant; *ARTISAN BUILT*: where the dwelling unit is totally or partially built by a skilled craftsman hired by the user or occupant; payments can be monetary or an exchange of services; *SMALL CONTRACTOR BUILT*: where the dwelling unit is totally built by a small organization hired by the user, occupant, or developer; 'small' contractor is defined by the scale of operations, financially and materially; the scale being limited to the construction of single dwelling units or single complexes; *LARGE CONTRACTOR BUILT*: where the dwelling unit is totally built by a large organization hired by a developer; 'large' contractor is defined by the scale of operations, financially and materially; the scale reflects a more comprehensive and larger size of operations encompassing the building of large quantities of similar units, or a singularly large complex. (U.S.D.P.)

DWELLING DENSITY. The number of dwellings, dwelling units, people or families per unit hectare. Gross density is the density of an overall area (ex. including lots, streets). Net density is the density of selected, discrete portions of an area (ex. including only lots). (U.S.D.P.)

DWELLING DEVELOPER. Three sectors are considered in the supply of dwellings: *POPULAR SECTOR*: the marginal sector with limited or no access to the formal financial, administrative, legal, technical institutions involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Popular Sector generally for 'self use' and sometimes for profit. *PUBLIC SEC-*

TOR: the government or non-profit organizations involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Public Sector for service (non-profit or subsidized housing). **PRIVATE SECTOR:** the individuals, groups or societies, who have access to the formal financial, administrative, legal, technical institutions in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Private Sector for profit. (U.S.D.P.)

DWELLING DEVELOPMENT MODE. Two modes are considered: **PROGRESSIVE:** the construction of the dwelling and the development of the local infrastructure to modern standards by stages, often starting with provisional structures and underdeveloped land. This essentially traditional procedure is generally practiced by squatters with de facto security of tenure and an adequate building site. **INSTANT:** the formal development procedure in which all structures and services are completed before occupation. (U.S.D.P.)

DWELLING FLOORS. The following numbers are considered: **ONE:** single story; generally associated with detached, semi-detached and row/group dwelling types. **TWO:** double story; generally associated with detached, semi-detached and row/group dwelling types. **THREE OR MORE:** generally associated with walk-up and high-rise dwelling types. (U.S.D.P.)

DWELLING GROUP. The context of the dwelling in its immediate surroundings. (U.S.D.P.)

DWELLING/LAND SYSTEM. A distinct dwelling environment/housing situation characterized by its users as well as by its physical environment. (U.S.D.P.)

DWELLING LOCATION. Three sectors are considered in single or multi-center urban areas. Sectors are identified by position as well as by the density of buildings as follows: **CENTER:** the area recognized as the business center of the city, generally the most densely built-up sector; **INNER RING:** the area located between the city center and the urban periphery, generally a densely built-up sector; **PERIPHERY:** the area located between the inner ring and the rural areas, generally a scatteredly built-up sector. (U.S.D.P.)

DWELLING PHYSICAL STATE. A qualitative evaluation of the physical condition of the dwelling types: room, apartment, house; the shanty unit is not evaluated. **BAD:** generally poor state of structural stability, weather protection, and maintenance. **FAIR:** generally acceptable state of structural stability, weather protection, and maintenance with some deviation. **GOOD:** generally acceptable state of structural stability, weather protection, and maintenance without deviation. (U.S.D.P.)

DWELLING TYPE. The physical arrangement of the dwelling unit: **DETACHED:** individual dwelling unit, separated from others. **SEMI-DETACHED:** two dwelling units sharing a common wall (duplex). **ROW/GROUPED:** dwelling units grouped together linearly or in clusters. **WALK-UP:** dwelling units grouped in two to five stories with stairs for vertical circulation. **HIGH-RISE:** dwelling units grouped in five or more stories with stairs and lifts for vertical circulation. (U.S.D.P.)

DWELLING UNIT. A self-contained unit in a dwelling for an individual, a family, or a group. (U.S.D.P.)

DWELLING UNIT AREA. The dwelling unit area (m²) is the built-up, covered area of a dwelling unit. (U.S.D.P.)

DWELLING UNIT COST. The initial amount of money paid for the dwelling unit or the present monetary equivalent for replacing the dwelling unit. (U.S.D.P.)

DWELLING UNIT TYPE. Four types of dwelling units are considered: **ROOM:** A SINGLE SPACE usually bounded by

partitions and specifically used for living; for example, a living room, a dining room, a bedroom, but not a bath/toilet, kitchen, laundry, or storage room. **SEVERAL ROOM UNITS** are contained in a building/shelter and share the use of the parcel of land on which they are built (open spaces) as well as common facilities (circulation, toilets, kitchens). **APARTMENT:** A MULTIPLE SPACE (room/set of rooms with bath, kitchen, etc.) **SEVERAL APARTMENT UNITS** are contained in a building and share the use of the parcel of land on which they are built (open spaces) as well as some common facilities (circulation). **HOUSE:** A MULTIPLE SPACE (room/set of rooms with or without bath, kitchen, etc.) **ONE HOUSE UNIT** is contained in a building/shelter and has the private use of the parcel of land on which it is built (open spaces) as well as the facilities available. **SHANTY:** A SINGLE OR MULTIPLE SPACE (small, crudely built). **ONE SHANTY UNIT** is contained in a shelter and shares with other shanties the use of the parcel of land on which they are built (open spaces). (U.S.D.P.)

DWELLING UTILIZATION. The utilization indicates the type of use with respect to the number of inhabitants/families. **SINGLE:** an individual or family inhabiting a dwelling. **MULTIPLE:** a group of individuals or families inhabiting a dwelling. (U.S.D.P.)

EASEMENT. Servitude: a right in respect of an object (as land owned by one person) in virtue of which the object (land) is subject to a specified use or enjoyment by another person or for the benefit of another thing. (Merriam-Webster, 1971)

EFFICIENCY. Capacity to produce desired results with a minimum expenditure of energy, time, money or materials. (Merriam-Webster, 1971)

EFFLUENT. Outflow or discharge from a sewer or sewage treatment equipment. (DePina, 1972)

ELECTRIC FEEDER. That part of the electric distribution system between the transformer and the service drop or drops. (HUD, Mobile Court Guide, 1970)

ELECTRIC SERVICE DROP. That part of the electric distribution system from a feeder to the user's service equipment serving one or more lots. (HUD, Mobile Court Guide, 1970)

ELECTRIC TRANSFORMER. A device which changes the magnitude of alternating voltages and currents; generally from distribution voltages to user voltages; a distribution component that converts power to usable voltage. (TM 5 765 US Army, 1970; U.S.D.P.)

ELECTRICAL CIRCUIT. A closed, complete electrical path with various connected loads. Circuits may either be 'parallel' (voltage constant for all connected loads) or 'series' (voltage divided among connected loads). Parallel circuits are fixtures wired independent of each other, which are used in nearly all building wiring. (U.S.D.P.; ROTC ST 45-7, 1953)

ELECTRICAL FREQUENCY. The number of times an alternating electric current changes direction in a given period of time. Measured in cycles per second: hertz. (ROTC ST 45-7, 1953)

ELECTRIC GROUND. The electrical connection with the earth or other ground. (Merriam-Webster, 1971)

ELECTRICAL NETWORK COMPONENTS. It is composed of the following: **GENERATION:** produces electricity; **TRANSMISSION:** transports energy to user groups; **DISTRIBUTION STATION:** divides power among main user groups; **SUBSTATION:** manipulates power into useful energy levels for consumption; **DISTRIBUTION NETWORKS:** provides electric service to user. (U.S.D.P.)

ELECTRIC PHASE. May be either a single-phase circuit (for small electrical devices) or a three-phase circuit (for heavy equipment, large electrical devices). In single-phase only one current is flowing through

the circuit with the voltage dropping to zero twice in each cycle. In three-phase currents flow through the circuit with the power never dropping to zero. (U.S.D.P.)

ELECTRICAL POWER. The source or means of supplying energy for use; measured in watts. (U.S.D.P.)

ELECTRICAL WIRING SYSTEMS. May either be single-phase or three-phase. **SINGLE-PHASE:** 2 hot wires with 1 neutral wire; **THREE-PHASE:** 3 hot wires with 1 neutral wire. (ROTC ST 45-7, 1953)

ELECTRICITY. Electrification: the process (network) for supplying (the site) with electric power. (Merriam-Webster, 1971)

EMBANKMENT (or FILL). A bank of earth, rock, or other material constructed above the natural ground surface. (DePina, 1972)

EROSION. The general process whereby materials of the earth's crust are worn away and removed by natural agencies including weathering, solution, corrosion, and transportation; (specific) land destruction and simultaneous removal of particles (as of soil) by running water, waves and currents, moving ice, or wind. (Merriam-Webster, 1971)

EXCRETA. Waste matter eliminated from the body. (U.S.D.P.)

EXISTING STRUCTURE. Something constructed or built (on the site). (U.S.D.P.)

EXPLORATORY BORING. Initial subsurface investigations (borings) are done on a grid superimposed on the areas of interest and on areas indicated as limited/restricted/hazard in the initial survey. (U.S.D.P.)

EXTERIOR CIRCULATION/ACCESSES (SITE PLANNING). The existing and proposed circulation system/accesses outside but affecting the site. These include limited access highways as well as meshing access to the surrounding area. Exterior circulation/accesses are generally given conditions. (U.S.D.P.)

FAUCET (also TAP). A fixture for drawing liquid from a pipe, cask, or other vessel. (Merriam-Webster, 1971)

FINANCING. The process of raising or providing funds. **SELF FINANCED:** provided by own funds; **PRIVATE/PUBLIC FINANCED:** provided by loan; **PUBLIC SUBSIDIZED:** provided by grant or aid. (U.S.D.P.)

FIRE/EXPLOSION HAZARDS. Danger: the state of being exposed to harm; liable to injury, pain, or loss from fire/explosion (at or near the site). (Merriam-Webster, 1971)

FIRE FLOW. The quantity (in time) of water available for fire-protection purposes in excess of that required for other purposes. (Merriam-Webster, 1971)

FIRE HYDRANT. A water tap to which fire hoses are connected in order to smother fires. (U.S.D.P.)

FIRE PROTECTION. Measures and practices for preventing or reducing injury and loss of life or property by fire. (Merriam-Webster, 1971)

FLEXIBLE PAVEMENT. A pavement structure which maintains intimate contact with and distributes loads to the subgrade and depends upon aggregate interlock, particle friction, and cohesion for stability. (DePina, 1972)

FLOODING. A rising and overflowing of a body of water that covers land not usually under water. (U.S.D.P.)

FLOODWAY FRINGE. The floodplain area landward of the natural floodway which would be inundated by low velocity flood waters. (U.S.D.P.)

FLOW METER. A device to measure flow of water. (U.S.D.P.)

FLUSH TANK TOILET. Toilet with storage tank of water used for flushing bowl. (U.S.D.P.)

FLUSH VALVE TOILET. Toilet with self-closing valve which supplies water directly from pipe. It requires adequate pressure for proper functioning. (U.S.D.P.)

FOOT CANDLE. A unit of illuminance on a surface that is everywhere one foot from a uniform point source of light of one candle and equal to one lumen per square foot. (Merriam-Webster, 1971)

FUMES. Gaseous emissions that are usually odorous and sometimes noxious. (Merriam-Webster, 1971)

GAS. A system for supplying natural gas, manufactured gas, or liquefied petroleum gas to the site and individual users. (U.S.D.P.)

GRADE. Profile of the center of a roadway, or the invert of a culvert or sewer. (DePina, 1972)

GRID BLOCKS. The block determined by a convenient public circulation and not by dimensions of lots. In grid blocks some lots have indirect access to public streets. (U.S.D.P.)

GRIDIRON BLOCKS. The blocks determined by the dimensions of the lots. In gridiron blocks all the lots have direct access to public streets. (U.S.D.P.)

GRID LAYOUTS. The urban layouts with grid blocks. (U.S.D.P.)

GRIDIRON LAYOUTS. The urban layouts with gridiron blocks. (U.S.D.P.)

GOVERNMENT/MUNICIPAL REGULATIONS. In urban areas, the development of the physical environment is a process usually controlled by a government/municipality through all or some of the following regulations: Master Plan, Zoning Ordinance, Subdivision Regulations, Building Code. (U.S.D.P.)

HEAD. (Static) The height of water above any plane or point of reference. Head in feet = (lb/sq. in. x 144)/(Density in lb/cu. ft.) For water at 68°F. (DePina, 1972)

HIGH-RISE. Dwelling units grouped in five or more stories with stairs and lifts for vertical circulation. (U.S.D.P.)

HOT WIRE. Wire carrying voltage between itself and a ground. (ROTC ST 45-7, 1953)

HYDRAULICS. That branch of science or engineering that deals with water or other fluid in motion. (DePina, 1972)

ILLEGAL. That which is contrary to or violating a rule or regulation or something having the force of law. (Merriam-Webster, 1971)

INCOME. The amount (measured in money) of gains from capital or labor. The amount of such gain received by a family per year may be used as an indicator of income groups. (U.S.D.P.)

INCOME GROUPS. A group of people or families within the same range of incomes. (U.S.D.P.)

INCREMENT (TAX). A special tax on the increased value of land, which is due to no labor/expenditure by the owner, but rather to natural causes such as the increase of population, general progress of society, etc. (U.S.D.P.)

INFRASTRUCTURE. The underlying foundation or basic framework for utilities and services: streets; sewage, water network; storm drainage, electrical network;

(80) URBAN DWELLING ENVIRONMENTS

gas network; telephone network, public transportation; police and fire protection; refuse collection, health, schools, playgrounds, parks, open spaces. (U.S.D.P.)

INSULATOR. A material or body that is a poor conductor of electricity, heat, or sound. (Merriam-Webster, 1971)

INTERIOR CIRCULATION NETWORK (SITE PLANNING). The pedestrian/vehicular circulation system inside the site. It should be designed based upon the exterior circulation/accesses and land development requirements. (U.S.D.P.)

INTERVAL. A space of time (or distance) between the recurrences of similar conditions or states. (Merriam-Webster, 1971)

KILOWATT (kw). (1000 watts) A convenient manner of expressing large wattages. Kilowatt hours (kwh) measure the total quantity of energy consumed in a given time. One kwh represents the use of an average of 1 kilowatt of electrical energy for a period of 1 hour. (ROTC ST 45-7, 1953)

LAMPHOLE. A vertical pipe or shaft leading from the surface of the ground to a sewer, for admitting light for purposes of inspection. (U.S.D.P.)

LAND COST. Price: the amount of money given or set as the amount to be given as a consideration for the sale of a specific thing (the site). (Merriam-Webster, 1971)

LAND DEVELOPMENT COSTS. The costs of making raw land ready for development through the provision of utilities, services, accesses, etc. (U.S.D.P.)

LAND LEASE. The renting of land for a term of years for an agreed sum; leases of land may run as long as 99 years. (U.S.D.P.)

LAND-MARKET VALUE. Refers to: 1) the present monetary equivalent to replace the land; 2) the present tax based value of the land; or 3) the present commercial market value of the land. (U.S.D.P.)

LAND OWNERSHIP. The exclusive right of control and possession of a parcel of land. (U.S.D.P.)

LAND SUBDIVISION. The division of the land in blocks, lots and laying out streets. (U.S.D.P.)

LAND TENANCY. The temporary holding or mode of holding a parcel of land of another. (U.S.D.P.)

LAND UTILIZATION. A qualification of the land around a dwelling in relation to user, physical controls and responsibility. PUBLIC (streets, walkways, open spaces): user -anyone/unlimited; physical controls -minimum; responsibility -public sector. SEMIPUBLIC (open spaces, playgrounds, schools): user -limited group of people; physical controls -partial or complete; responsibility -public sector and user. PRIVATE (dwellings, lots): user -owner or tenant or squatter; physical controls -complete; responsibility -user. SEMI-PRIVATE (cluster courts): user -group of owners and/or tenants; physical controls -partial or complete; responsibility -user. (U.S.D.P.)

LAND UTILIZATION: PHYSICAL CONTROLS. The physical/legal means or methods of directing, regulating, and coordinating the use and maintenance of land by the owners/users. (U.S.D.P.)

LAND UTILIZATION: RESPONSIBILITY. The quality/state of being morally/legally responsible for the use and maintenance of land by the owners/users. (U.S.D.P.)

LATERAL SEWER. A collector pipe receiving sewage from building connection only. (U.S.D.P.)

LATRINE. A receptacle (as a pit in the earth or a water closet) for use in defecation and urination, or

a room (as in a barracks or hospital) or enclosure (as in a camp) containing such a receptacle. (Merriam-Webster, 1971)

LAYOUT. The plan or design or arrangement of something that is laid out. (Merriam-Webster, 1971)

LEVELS OF SERVICES. Two levels are considered: MINIMUM, are admissible or possible levels below the standard; STANDARD, are levels set up and established by authority, custom of general consent, as a model, example or rule for the measure of quantity, weight extent, value or quality. (U.S.D.P.)

LIFT PUMP. A collection system component that forces sewage to a higher elevation to avoid deep pipe networks. (U.S.D.P.)

LOCALITY. A relatively self-contained residential area/community/neighborhood/settlement within an urban area which may contain one or more dwelling/land systems. (U.S.D.P.)

LOCALITY SEGMENT. A 400m x 400m area taken from and representing the residential character and layout of a locality. (U.S.D.P.)

LOCATION. Situation: the way in which something (the site) is placed in relation to its surroundings (the urban context). (Merriam-Webster, 1971)

LOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

LOT CLUSTER. A group of lots (owned individually) around a semipublic common court (owned in condominium). (U.S.D.P.)

LOT COVERAGE. The ratio of building area to the total lot area. (U.S.D.P.)

LOT PROPORTION. The ratio of lot width to lot depth. (U.S.D.P.)

LUMINAIRE. In highway lighting, a complete lighting device consisting of a light source, plus a globe, reflector, refractor, housing and such support as is integral with the housing. (DePina, 1972)

MANHOLE. An access hole sized for a man to enter, particularly in sewer and storm drainage pipe systems for cleaning, maintenance and inspection. (U.S.D.P.)

MATRIX (OF BASIC REFERENCE MODELS). A set of models of urban layouts arranged in rows and columns. (U.S.D.P.)

MASTER PLAN. A comprehensive, long range plan intended to guide the growth and development of a city, town or region, expressing official contemplations on the course its transportation, housing and community facilities should take, and making proposals for industrial settlement, commerce, population distribution and other aspects of growth and development. (Abrams, 1972).

MEDIAN BARRIER. A double-faced guard rail in the median or island dividing two adjacent roadways. (DePina, 1972)

MESHING BOUNDARIES. Characterized by continuing, homogeneous land uses or topography, expressed as: LINES: property lines, political or municipal divisions, main streets, etc.; AREAS: similar residential uses, compatible uses (as parks with residential). (U.S.D.P.)

MICROCLIMATE. The local climate of a given site or habitat varying in size from a tiny crevice to a large land area, but being usually characterized by considerable uniformity of climate. (Merriam-Webster, 1971)

MODE OF TRAVEL. Manner of moving from one place (the

site) to another (other parts of the urban context). (U.S.D.P.)

MODEL (OF URBAN LAYOUT). A representation of an urban residential area illustrating circulation, land utilization, land subdivision, and utility network of a specific layout and lot. (U.S.D.P.)

MUTUAL OWNERSHIP. Private land ownership shared by two or more persons and their heir under mutual agreement. (U.S.D.P.)

NATURAL FEATURES. Prominent objects in or produced by nature. (U.S.D.P.)

NATURAL UNDISTURBED SOIL. Soils that have not been disturbed by artificial process. Although natural, they depend greatly on local conditions, environment, and past geological history of the formations. (U.S.D.P.)

NEIGHBORHOOD. A section lived in by neighbors and having distinguishing characteristics. (U.S.D.P.)

NETWORK EFFICIENCY (LAYOUT EFFICIENCY). The ratio of the length of the network to the area(s) contained within; or tangent to it. (U.S.D.P.)

NEUTRAL WIRE. Wire carrying no voltage between itself and a ground. (ROTC ST 45-7, 1953)

NOISE. Any sound (affecting the site) that is undesired (such as that produced by: traffic, airports, industry, etc.) (Merriam-Webster, 1971)

ODOR. A quality of something that affects the sense of smell. (Merriam-Webster, 1971)

OHMS (electrical). The unit of resistance to the flow electricity. The higher the number of ohms, the greater the resistance. When resistance is constant, amperage (and wattage) are in direct proportion to voltage. Resistance varies inversely with the cross-sectional area of the wire. Ohms = volts/amperes. $R = E/I$. The practical mks unit of electrical resistance that is equal to the resistance of a circuit in which a potential difference of one volt produces a current of one ampere or to the resistance in which one watt of power is dissipated when one ampere flows through it and that is taken as standard in the U.S. (U.S.D.P.; ROTC ST 45-7, 1953; Merriam-Webster, 1971)

OPTIMIZE/OPTIMIZE. To bring to a peak of economic efficiency, specially by the use of precise analytical methods. (Merriam-Webster, 1971)

ORGANIC SOILS. Soils composed mostly of plant material. (U.S.D.P.)

OXIDATION POND (LAGOON). A method of sewage treatment using action of bacteria and algae to digest/decompose wastes. (U.S.D.P.)

PERCENT RENT/MORTGAGE. The fraction of income allocated for dwelling rental or dwelling mortgage payments; expressed as a percentage of total family income. (U.S.D.P.)

PIT PRIVY/LATRINE. A simple hole in the ground, usually hand dug, covered with slab and protective superstructure; for disposal of human excreta. (U.S.D.P.)

PLANNING. The establishment of goals, policies, and procedures for a social or economic unit, i.e. city. (U.S.D.P.)

PLOT/LOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

POLICE PROTECTION. Police force: a body of trained men and women entrusted by a government with the maintenance of public peace and order, enforcement of laws, prevention and detection of crime. (Merriam-

Webster, 1971)

POPULATION DENSITY. It is the ratio between the population of a given area and the area. It is expressed in people per hectare. It can be: GROSS DENSITY: includes any kind of land utilization, residential, circulation, public facilities, etc. NET DENSITY: includes only the residential land and does not include land for other uses. (U.S.D.P.)

POSITION. The point or area in space actually occupied by a physical object (the site). (Merriam-Webster, 1971)

PRIMER. A small introductory book on a specific subject. (U.S.D.P.)

PRIVATE LAND OWNERSHIP. The absolute tenure of land to a person and his heirs without restriction of time. (U.S.D.P.)

PRIVY. A small, often detached building having a bench with one or more round or oval holes through which the user may defecate or urinate (as into a pit or tub) and ordinarily lacking any means of automatic discharge of the matter deposited. (Merriam-Webster, 1971)

PROJECT. A plan undertaken; a specific plan or design. (U.S.D.P.)

PUBLIC CIRCULATION. The circulation network which is owned, controlled, and maintained by public agencies and is accessible to all members of a community. (U.S.D.P.)

PUBLIC FACILITIES. Facilities such as schools, playgrounds, parks, other facilities accessible to all members of a community which are owned, controlled, and maintained by public agencies. (U.S.D.P.)

PUBLIC SERVICES AND COMMUNITY FACILITIES. Includes: public transportation, police protection, fire protection, refuse collection, health, schools, and playgrounds, recreation and open spaces, other community facilities, business, commercial, small industries, markets. (U.S.D.P.)

PUBLIC SYSTEM (general). A system which is owned and operated by a local governmental authority or by an established public utility company which is controlled and regulated by a governmental authority. (HUD/AID, Minimum Standards, 1966)

PUBLIC UTILITIES. Includes: water supply, sanitary sewerage, storm drainage, electricity, street lighting, telephone, circulation networks. (U.S.D.P.)

PUMP. A device or machine that raises, transfers, or compresses fluids or that attenuates gases especially by suction or pressure or both. (Merriam-Webster, 1971)

REFUSE COLLECTION. The service for collection and disposal of all the solid wastes from a community. (U.S.D.P.)

RESERVOIR. Large-scale storage of water; also functions to control fluctuations in supply and pressure. (U.S.D.P.)

RESIDENTIAL AREA. An area containing the basic needs/requirements for daily life activities: housing, education, recreation, shopping, work. (U.S.D.P.)

RESISTANCE. The opposition to electrical flow. (Resistance increases as the length of wires is increased and decreases as the cross-sectional area of wires is increased). (ROTC ST 45-7, 1953)

RIGHT-OF-WAY. A legal right of passage over another person's ground (land), the area or way over which a right-of-way exists such as: a path or thoroughfare which one may lawfully use, the strip of land devoted to or over which is built a public road, the land

occupied by a railroad, the land used by a public utility. Rights-of-way may be shared (as streets; pedestrians and automobiles) or exclusive (as rapid transit routes; subways, railroads, etc.) (Merriam-Webster, 1971; U.S.D.P.)

ROADWAY (HIGHWAY). Portion of the highway included between the outside lines of gutter or side ditches, including all slopes, ditches, channels, and appurtenances necessary to proper drainage, protection, and use. (DePina, 1972)

ROW/GROUPED HOUSING. Dwelling units grouped together linearly or in clusters. (U.S.D.P.)

RUNOFF. That part of precipitation carried off from the area upon which it falls. (DePina, 1972)

RUNOFF-RAINFALL RATIO. The percentage (ratio) of stormwater runoff that is not reduced by evaporation, depression storage, surface wetting, and percolation; with increased rainfall duration, runoff-rainfall ratios rise increasing runoff flow. (U.S.D.P.)

SAND. Loose, distinguishable grains of quartz/feldspar, mica (ranging from 2mm to 0.02mm in diameter). (U.S.D.P.)

SANITARY SEWERAGE. The system of artificial usually subterranean conduits to carry off sewage composed of: *excreta*: waste matter eliminated from the human body; *domestic wastes*: used water from a home/community containing 0.1% total solids; and some *industrial wastes*, but not water from ground, surface, or storm. (U.S.D.P.)

SEMI-DETACHED DWELLING. Two dwelling units sharing a common wall (duplex). (U.S.D.P.)

SEPTIC TANK. A tank in which the organic solid matter of continuously flowing sewage is deposited and retained until it has been disintegrated by anaerobic bacteria. (Merriam-Webster, 1971)

SERIES CIRCUIT. Fixtures connected in a circuit by a single wire. When one fixture is out, the circuit is broken. Fixtures with different amperages cannot be used efficiently in the same circuit. (ROTC ST 45-7, 1953)

SETTLEMENT. Occupation by settlers to establish a residence or colony. (U.S.D.P.)

SEWAGE. The effluent in a sewer network. (U.S.D.P.)

SEWER. The conduit in a subterranean network used to carry off water and waste matter. (U.S.D.P.)

SEWER BUILDING CONNECTION. The pipe connecting the dwelling with the sewer network. (U.S.D.P.)

SEWERAGE. Sewerage system: the system of sewers in a city, town or locality. (Merriam-Webster, 1971)

SHAPE. Form/configuration of the site surface as defined by its perimeter/boundaries. (U.S.D.P.)

SHOPPING. (Facilities for) searching for, inspecting, or buying available goods or services. (U.S.D.P.)

SILT. Loose, unconsolidated sedimentary rock particles (ranging from 0.02mm to 0.002mm in diameter). (U.S.D.P.)

SITE. Land (that could be) made suitable for building purposes by dividing into lots, laying out streets and providing facilities. (Merriam-Webster, 1971)

SITE AREAS. Two types are considered: *GROSS AREA*: includes the whole site or the bounded piece of ground. *USABLE AREA*: includes only the portion of the site that can be fully utilized for buildings, streets, playgrounds, recreation facilities, gardens, or other structures. (U.S.D.P.)

SITE AND SERVICES. The subdivision of urban land and the provision of services for residential use and complementary commercial use. Site and services projects are aimed to improve the housing conditions for the low income groups of the population by providing: a) *SITE*: the access to a piece of land where people can build their own dwellings; b) *SERVICES*: the opportunity of access to employment, utilities, services and community facilities, financing and communications. (U.S.D.P.)

SIZE. Physical magnitude or extent (of the site), relative or proportionate dimensions (of the site). (Merriam-Webster, 1971)

SLOPE. Degree or extent of deviation (of the land surface) from the horizontal. (Merriam-Webster, 1971)

SMOKE. The gaseous products of burning carbonaceous materials made visible by the presence of carbon particles. (Merriam-Webster, 1971)

SOIL. Soil structure: the arrangement of soil particles in various aggregates differing in shape, size, stability, and degree of adhesion to one another. (Merriam-Webster, 1971)

SOIL INVESTIGATION. It is the process to find the soil structure and other characteristics. It may include the following stages: initial soil survey, exploratory boring, construction boring. (U.S.D.P.)

SOIL PIPE. The pipe in a dwelling which carries the pipe discharge from water closets. (U.S.D.P.)

SOIL SURVEY (INITIAL). An on-site examination of surface soil conditions and reference to a GENERAL SOIL MAP. It is used to reveal obvious limitations/restrictions/hazards for early planning consideration. (U.S.D.P.)

STACK. The vertical pipe in a dwelling of the soil-, waste-, or vent-pipe systems. (ROTC ST 45-7, 1953)

STANDARD. 1) Something that is established by authority, custom or general consent as a model or example to be followed. 2) Something that is set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality. (Merriam-Webster, 1971)

STANDPIPE. A pipe riser with tap used as a source of water for domestic purposes. (HUD/AID, Minimum Standards, 1966)

STORM DRAINAGE. Storm sewer: a sewer (system) designed to carry water wastes except sewage (exclusively storm water, surface runoff, or street wash). (Merriam-Webster, 1971)

STREET LIGHTING. Illumination to improve vision at night for security and for the extension of activities. (U.S.D.P.)

SUBDIVISION REGULATIONS. Regulations governing the development of raw land for residential or other purposes. (Abrams, 1972)

SUBGRADE. The layer of natural soil or fill (compacted soil) upon which the pavement structure including curbs is constructed. (DePina, 1972)

SUBMAIN or BRANCH SEWER. A collector pipe receiving sewage from lateral sewer only. (U.S.D.P.)

SUBSISTENCE INCOME. The minimum amount of money required for the purchase of food and fuel for an average family to survive. (U.S.D.P.)

SULLAGE. Drainage or refuse especially from a house, farmyard, or street. (Merriam-Webster, 1971)

TAP (also FAUCET). A fixture for drawing a liquid from a pipe, cask, or other vessel. (Merriam-Webster, 1971)

TAX EXEMPTION. A grant by a government of immunity from taxes; (a ten-year tax exemption on new housing in New York stimulated new construction in the 1920's; to ease its housing shortage, Turkey granted a ten-year tax exemption on new buildings). (Abrams, 1966)

TAX INCENTIVE. Favorable tax treatment to induce the beneficiary to do something he would not otherwise be likely to do. (U.S.D.P.)

TAX STRUCTURE - TAXATION. The method by which a nation (state, municipality) implements decisions to transfer resources from the private sector to the public sector. (U.S.D.P.)

TELEPHONE. An electrical voice communication network interconnecting all subscribing individuals and transmitting over wires. (U.S.D.P.)

TENURE. Two situations of tenure of the dwelling units and/or the lot/land are considered: *LEGAL*: having formal status derived from law; *EXTRALEGAL*: not regulated or sanctioned by law. Four types of tenure are considered: *RENTAL*: where the users pay a fee (daily, weekly, monthly) for the use of the dwelling unit and/or the lot/land; *LEASE*: where the users pay a fee for long-term use (generally for a year) for a dwelling unit and/or the lot/land from the owner (an individual, a public agency, or a private organization); *OWNERSHIP*: where the users hold in freehold the dwelling unit and/or the lot/land which the unit occupies; *EMPLOYER-PROVIDED*: where the users are provided a dwelling unit by an employer in exchange for services, i.e. domestic live-in servant. (U.S.D.P.)

TITLE. The instrument (as a deed) that constitutes a legally just cause of exclusive possession (of land, dwellings, or both). (Merriam-Webster, 1971)

TOILET. A fixture for defecation and urination, esp. water closet. (7th Collegiate Webster, 1963)

TOPOGRAPHY. The configuration of a (land) surface including its relief and the position of its natural and man-made features. (Merriam-Webster, 1971)

TRANSPORTATION. Means of conveyance or travel from one place (the site) to another (other parts of the urban context). (Merriam-Webster, 1971)

TRAP. A fitting that provides a water seal to prevent sewer gases and odors being discharged through fixtures. (ROTC ST 45-7, 1953)

TREATMENT WORKS. Filtration plant, reservoirs, and all other construction required for the treatment of a water supply. (ROTC ST 45-7, 1953)

UNIT. A determinate quantity adopted as a standard of measurement for other quantities of the same kind. (Merriam-Webster, 1971)

URBAN TRANSPORTATION. Means of conveyance of passengers or goods from one place to another along ways, routes of circulation in a metropolitan context. (U.S.D.P.)

URBANIZATION. The quality or state of being or becoming urbanized; to cause to take on urban characteristics. (U.S.D.P.)

USE TAX. The tax on land aimed primarily at enforcing its use or improvement. (U.S.D.P.)

USER INCOME GROUPS. Based upon the subsistence (minimum wage) income per year, five income groups are distinguished: *VERY LOW* (below subsistence level): the income group with no household income available for housing, services, or transportation; *LOW* (1 x subsistence level): the income group that can afford no or very limited subsidized housing; *MODERATE* (3 x subsistence level): the income group that can afford limited housing and rent only with government assistance; *HIGH* (5 x subsistence level): the income

group that can afford housing without subsidy, by cash purchase, through mortgage payments, or by rent; *VERY HIGH* (10 x subsistence level): the income group that represents the most economically mobile sector of the population. (U.S.D.P.)

USUFRUCT. The right to profit from a parcel of land or control of a parcel of land without becoming the owner or formal leasee; legal possession by decree without charge. (U.S.D.P.)

UTILITIES. Include: water supply, sanitary sewerage, storm drainage, electricity, street lighting, gas, telephone. (U.S.D.P.)

UTILITY/SERVICE. The organization and/or infrastructure for meeting the general need (as for water supply, wastewater removal, electricity, etc.) in the public interest. (U.S.D.P.)

VALVE. A water supply distribution component which interrupts the supply for maintenance purposes. (U.S.D.P.)

VENT. A pipe opening to the atmosphere, which provides ventilation for a drainage system and prevents trap siphonage or back pressure. (ROTC ST 45-7, 1953)

VIBRATION. A quivering or trembling motion (such as that produced by: heavy traffic, industry, aircraft, etc. (Merriam-Webster, 1971)

VIEWS. That which is revealed to the vision or can be seen (from the site). (Merriam-Webster, 1971)

WALK-UP. Dwelling units grouped in two to five stories with stairs for vertical circulation. (U.S.D.P.)

WASTE PIPE. A pipe (in a dwelling) which carries water from wash basins, sinks, and similar fixtures. (ROTC ST 45-7, 1953)

WATER SUPPLY. Source, means, or process of supplying water, (as for a community) usually involving reservoirs, pipelines, and often the watershed from which the water is ultimately drawn. (Merriam-Webster, 1971)

WATERSHED. The catchment area or drainage basin from which the waters of a stream or stream system are drawn. (Merriam-Webster, 1971)

WATERWORKS. The whole system of reservoirs, channels, mains, and pumping and purifying equipment by which a water supply is obtained and distributed to consumers. (Merriam-Webster, 1971)

WATT. Watts (w) measure the power of the flow of energy through a circuit. Wattage is the product of volts times amperes. Both watts and horsepower denote the rate of work being done. 746w = 1hp. (ROTC ST 45-7, 1953)

ZONING ORDINANCE. The demarcation of a city by ordinance into zones (areas/districts) and the establishment of regulations to govern the use of land and the location, bulk, height, shape, use, population density, and coverage of structures within each zone. (U.S.D.P.)

REFERENCES

METRIC SYSTEM EQUIVALENTS

Linear Measures

1 centimeter	=0.3937 inches
1 meter	=100 centimeters =39.37 inches or 3.28 feet
1 kilometer =1,000 meters	=3,280.83 feet or 0.62137 miles
1 inch	=2.54 centimeters
1 foot	=0.3048 meters
1 mile	=1.60935 kilometers

Square Measures

1 square meter	=1,550 square inches or 10.7639 square feet
1 hectare =10,000 sq meters	=2.4711 acres
1 square foot	=0.0929 square meters
1 acre	=0.4087 hectares

DOLLAR EQUIVALENTS

All income, cost, and rent/mortgage data have been expressed in terms of the U.S. equivalent;
1 U.S. dollar = 3.5 Saudi Riyals.

QUALITY OF INFORMATION

The quality of information given in the drawings have been qualified in the following manner:

- Tentative: when based upon rough estimations of limited sources.
- Approximate: when deducted from different and/or completely reliable sources.
- Accurate: when taken from reliable or actual sources.

QUALITY OF SERVICES, FACILITIES AND UTILITIES

- Non: when the existence of services, facilities and utilities are unavailable to a locality.
- Limited: when the existence of services, facilities and utilities are available to a locality in a limited manner due to proximity.
- Adequate: when the existence of services, facilities and utilities are available in/to a locality.

EXPLANATORY NOTES

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