DWELLING ENVIRONMENTS: A COMPARATIVE ANALYSIS,
LAHORE, PAKISTAN

BY

PARVEZ L. QURESHI

Bachelor of Architecture, University of Engineering and Technology, Lahore
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Signature of Author...........................................

Department of Architecture, May, 1979

Certified by..................................................

Horacio Caminos, Professor of Architecture
Thesis Supervisor

Accepted by..........................................

Julian Beinart, Professor of Architecture
Chairman, Departmental Committee for Graduate Students

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ABSTRACT

This study presents a comparison of different typical low-income
housing systems in the city of Lahore, Pakistan.
It provides data to formulate, evaluate and implement housing
policies especially in the physical planning aspects.

Thesis Supervisor........................
Horacio caminos
Professor of Architecture
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COVER PHOTOGRAPH:
An oblique aerial view of a squatter settlement at Lahore.

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Pakistan is no exception to the Third World phenomenon of rapid urbanization and the ensuing environmental chaos. The urban issues of the country emerged right from its birth, with a large influx of immigrants coming from India at the time of partition in 1947. Over the last thirty years, the urban problems have assumed unmanageable proportions.

Many of the larger cities in the country are growing at the rate of five to eight percent annually. This growth has resulted in the creation of a multitude of socio-economic and physical problems. The housing and urban conditions in all these cities have been consistently deteriorating due to their rapid and unchecked growth during the last several decades. In this whole process, the low and very low income groups constituting a great majority of the urban population are adversely affected. They are socially and economically insecure; their basic needs of food, shelter, medical care, and education have not been fulfilled.

The private sector is the major contributor in providing housing in Pakistan, however its supply is restricted primarily to the middle and high income groups. The public sector, with its limited resources and lack of overall fiscal policy, has not been able to resolve the critical issues of providing housing to low income groups. The essential weakness in the government's approach is its piece-meal solution to immediate needs and problems rather than approaching the fundamental issues and understanding the long range implications. The consequence of an absence of a national policy for housing and urban develop-
ment is reflected in the haphazard, unplanned, deteriorating physical environments in a majority of the urban areas. With scarce resources and increasing population, physical planning has a critical role to play.

The study focuses on the housing situation in the city of Lahore, which is the second largest city in the country, with a population of approximately three million people. A large section of this population lives in environments which are in deteriorating physical conditions; their dwellings are semi-permanent and lack basic utilities and amenities. Nearly a half of the city's population belongs to the low income groups. Due to their limited financial resources, shelter is a secondary priority for a majority of them.

The study concentrates on the analyses of the existing dwelling environments in Lahore. A classification of present housing systems is outlined, with the aim of investigating existing patterns and conditions of different settlements; to relate and compare basic issues concerning land utilization and efficiency of settlement patterns; and to recognize, define and evaluate the limitations/potentials and evolution of these systems in terms of their physical structure.

In this connection, several representative localities in the city were selected for investigation and evaluation. The selected areas focus on the very low to middle income housing systems. The cases are representative of the overall dwelling environments in Lahore which have been identified as traditional, squatter, and public/institutional housing systems.

The cases are analysed at four scales: the locality, selected segment of the locality, a selected block of the segment and a typical dwelling unit. The dwelling systems emphasize the relationship between the efficiency of settlements and physical layouts through a comparative analysis/evaluation of land utilization, population densities, circulation efficiencies, and utility infrastructure and community facilities.

The data is derived from field surveys carried out by the author from 1975 to 1978. Included are interviews and reports from public and private agencies.

The study is intended to serve as a reference and to provide a tentative set of guidelines for those involved in planning of residential developments and formulation of housing policies. It is intended to provide a framework for the analysis and evaluation of existing and proposed low income housing developments.
PAKISTAN
NATIONAL CONTEXT

1. PRIMARY INFORMATION

Country: Islamic Republic of Pakistan
Capital: Islamabad
Population: 72,000,000 (1976)
Population growth: 24 % urban, 76 % rural
Area: 796,095 sq. km.
Languages: Urdu, Baluchi, English, Punjabi, Sindhi & Pushtu
Currency: Rupee (9.8 Rupees = US $ 1, 1979)
Per Capita Income: Rs 1200 (1976)
Religion: 98 % Muslim, 2 % Hindu, Christian & Parsi
Government: Parliamentary Democracy
Major Cities: (1978)
Karachi 4.2 million
Lahore 3.3 million
Peshawar 1.1 million
Hyderabad 1.1 million
Faisalabad 1.2 million
Rawalpindi/Islamabad .3 million

2. GEOGRAPHY

Pakistan, situated between 24° and 37° North latitudes, extends from the Arabian Sea to 1600 kilometers northward across the Thal Desert to the eastern plains of the Hindu Kush and the foothills of the Himalayan Mountains. It is bounded on the east by India and west by Iran and Afghanistan. The disputed state of Jammu and Kashmir lies on the northeast tip of the country. There are four Provinces in Pakistan - Punjab, Sind, Northwest Frontier and Baluchistan - plus several centrally administered tribal areas located in the Northwest Frontier Province. The major rivers in Pakistan are the Indus and its four tributaries; the Ravi, Chenab, Sutlej, and Jhelum. The areas drained by these rivers are very fertile and intensively cultivated.

The climate varies from hot and dry near the coast to cool in the north eastern region. Essentially three seasons are recognized; summer, winter, and monsoon. The summer is hot and dry from March to July and winter is cool from November to February. The monsoon is a rainy season from July to September. On the plains the temperatures are seldom below freezing but often go as high as 110° F during the summer months. Annual rainfall averages less than 25 cm.

3. PEOPLE

The ethnic and linguistic structure of Pakistan reflects the interplay between the nations unique history of religious nationalism and the ethnic pattern of its indigenous population. Founded as a homeland of the subcontinent's Muslims, Pakistan has been committed to Urdu as the official language. This language has been associated with Muslim government and learning since Mughal times but is not indigenous to the territory of Pakistan. The official language is native to approximately 8 % of the people who are predominantly Urdu speaking migrants from various territories now in North India. Pakistan's indigenous population includes four major geographically compact linguistic groups essentially based according to the provinces in the country. About 63 % of the population speaks Punjabi, 12 % Sindhi, and about 16 % speak Pushtu, Baluchi and Brohi. English is an associate language and is widely used.
4. HISTORY

The forces which generated the concept of Pakistan as an independent nation for the large Muslim population of the subcontinent grew directly from developments in British India in the first half of the twentieth century. Indirectly, however, they go back hundreds of years.

Muslim sailors reached the coast of Sind early in the seventh century and Muslims made a temporary conquest of the area in the eighth century. Between the eleventh and eighteenth centuries, successive Afghan and Turkish invaders gradually spread their authority across most of northern India, reaching as far east as Bengal. Large numbers of Indians were converted to Islam during this period of Muslim rule.

By the last half of the eighteenth century, Great Britain began to assume control of India and after 1857 it controlled directly or indirectly the entire Indian subcontinent. Muslim and Hindu leaders began to agitate for an effective voice in Indian affairs. The Indian National Congress was organized in 1885, the first Indian forum which petitioned the U.K. for a greater degree of home rule. There were few Muslims in the Congress and to present their position more effectively, a number of Muslim leaders formed the All India Muslim League in 1906 and adopted the goal of self-government for India. However, the Congress and the League were unable to agree on a formula for the protection of Muslim religious and economic rights and representation in an independent Indian government. Mounting tensions between the two religious groups resulted in a series of bitter communal disturbances. The idea of Pakistan as a separate Muslim nation to be created by a partition of India developed in 1930 and by 1940 the Muslim League led by Mohammed Ali Jinnah officially endorsed the goal of establishing Pakistan as a homeland for the Muslims of the subcontinent. In June 1947, the British government declared that it would grant full Dominion status for two successor states - India and Pakistan. Pakistan was to consist of the contiguous Muslim majority areas of British India. Bengal and Punjab were to be partitioned resulting in a bifurcated Pakistan east and west separated by the breadth of India, a distance of more than a thousand air miles. The partition was accompanied by communal rioting with losses of tens of thousands of lives as migration of some six million Muslims from India to Pakistan took place and a like number of Hindus and Sikhs to India.

Soon after the partition, Pakistan underwent a series of political upheavals. In 1947, with the death of Jinnah in 1948 and assassination of his political successor Prime Minister Liaquat Ali Khan in 1951, political instability brought frequent partisan realignments and cabinet changes resulting in gradual economic deterioration. In 1958, Martial Law was declared by General Ayub Khan and the country was brought under the rule of the military. The following decade was of relative peace and stability. Again in 1969, Martial Law was imposed after substantial political unrest and agitation. The Martial Law authorities under General Yahya Khan stated their intent to restore constitutional rule when internal political conditions stabilized. Elections were finally held in December 1970, but the two major parties who won majority seats in parliament (the Awami League under Sheikh Mujibur-Rehman in East Pakistan and the People's Party under Zulfikar Ali Bhutto in West Pakistan) were unable to come to an agreement on the division of powers. East Pakistan was maintained. Later, they too had been under represented in the central government and denied their share of government revenues. The Pakistan military intervened and banned the Awami League, arrested the leadership charging them with treason. In response, the Awami League proclaimed the Independence of East Pakistan in the name of Bangla Desh and established a government in exile in India. An insurmountable fighting force called the Mukti-Bahini (Liberation Force) was formed to fight the Pakistani Army. By late fall 1971 the Mukti-Bahini, supported by India but operating throughout East Pakistan were regularly harassing the Pakistan Army, by now composed exclusively of soldiers from the West and viewed as an army of occupation. India - Pakistan tensions mounted until full scale fighting broke out on both the East and West Pakistan borders in early December 1971. The Pakistani Army in East Pakistan was rapidly overwhelmed by the combined forces of India and Bangla Desh and subsequently cease fire was agreed upon to terminate the hostilities. Thus in late December 1971, Pakistan as conceived at the time of partition was dismembered into two countries, Pakistan and Bangla Desh.

President Yahya Khan stepped down from the leadership after this debacle and was replaced by Zulfikar Ali Bhutto who took over the country as President. Bhutto's government moved decisively on many broad fronts to restore confidence in the nation's leadership. Sweeping programs of nationalization were instituted along with the return of the constitutional order to the earlier form of parliamentary government. Bhutto's government lasted until 1977, when he was replaced by General Zia-ul-Haq.

5. GOVERNMENT

Pakistan is a democratic republic with a parliamentary form of government. A permanent constitution was established on August 14, 1973 which provides for a President as a ceremonial chief of state, elected by the Senate and the National Assembly. The head of the government, however, is a Prime Minister elected by the National Assembly. The National Assembly comprises of 200 members elected by universal adult suffrage plus 10 seats reserved for women, having a term of five years unless dissolved sooner. The Senate consists of 63 members indirectly elected for four years by the Provincial Assemblies and tribal councils with half the members up for re-election every two years. The Senate is not subject to dissolution. The constitution permits a vote of no-confidence by a majority of the Assembly, provided that the name of a successor is included in the no-confidence motion. Two liases - federal and concurrent - specify jurisdiction on legislative subjects, and all residual powers are vested in the Province. Provincial Governors are appointed by the President on the advice of the Prime Minister but act on the advice of the Chief Ministers who head the Provincial Ministries. The Judiciary is a single, integrated, hierarchical system, with the Supreme Court at the top, the High Courts at the Provincial level and lower courts at the district and local levels. The justices of the High Courts are appointed by the President.
Pakistan bears the usual burdens of a developing country - low per capita income (about US $ 120 in 1976); large and growing population; rigid, highly stratified traditional society; minimal level of literacy and other needed skills; an archaic educational system, predominantly agricultural economy of vast, absentee-owned estates or small farms primitively cultivated, inadequate infrastructure and a difficult balance of payments problem. In spite of these difficulties, the country does have adequate resources to develop a viable economy. It has the largest irrigation system in the world, fed by the Indus River. The river system also powers a number of large hydroelectric stations. Natural gas is also being exploited. However, the backbone of the economy is its arable land which, under intensive farming practices, is expected to make the nation self-sufficient in foodgrains within the next few years. Agriculture accounts for almost 45% of the gross domestic product (GDP), and industry for 20 to 25 percent. Agriculture absorbs about 50 to 60 percent of the working force, while industry absorbs about 15 percent. Through the construction of large irrigation facilities and active land reclamation projects, food grain and cotton production is now carried out in large areas of land which were previously arid and barren. Rice production in 1976 was estimated to be about 2.5 million metric tons, while wheat production was about 8 million metric tons. This production record was attributable largely to increased use of high-yield seeds and fertilizer. Rice and cotton production have doubled in the past decade.

The nations known minerals are limited and include small amounts of petroleum (supplying 12 percent of local needs) and poor quality coal and iron ore. Natural gas is used as fuel for power stations and as a basic raw material for many fertilizer plants. There was little organized industry in Pakistan at the time of independence in 1947. In the late 1950's and 1960's a rapid expansion of light industry took place. New plants were established, generally based on local raw materials, primarily in the fields of textiles and fertilizers. Presently, industrial production accounts for about 15 percent of GDP and is increasing. Surplus labour results in high rates of unemployment and under-employment. Emigration of labour to western and Arab countries produces remittances which have become a primary source of foreign exchange. Pakistan exports about 40 percent primary products, and 60 percent manufactures and semi-manufactures. Cotton and cotton products account for about 50 percent of the exports. Major markets for Pakistani goods are the Far East, Middle East and the European Economic Community (EEC). Imports are primarily raw materials for consumer and capital goods. Major sources are the countries of the EEC, North America; and the Middle East.

The relationship of the public sector to the economy is divided between the central government and the provinces as prescribed in the constitution. Government revenues and expenditures are collected and disbursed at three levels: central, provincial and local. The greater part of the taxing power is concentrated in the central government.

Education is primarily the responsibility of individual provinces, with some specific powers and responsibilities reserved for the Central Government. This accounts for the lack of uniformity in the country's educational system. The predominant pattern of education comprises of ten years of primary and elementary education followed by two years of 'higher secondary' education, and two to four years of university education is adopted in most of the provinces. Urdu is the media of instruction at elementary and secondary level. Regional languages and English are also a part of the curriculum. However, English is the media of instruction at the university level.

A number of measures have been adopted by the Central and provincial governments to encourage education to adults and women. Vocational and training programs have been introduced to lower the currently unsatisfactory high ratio of liberal arts graduates to technically trained personnel.
LAHORE, PAKISTAN

URBAN CONTEXT

1. PRIMARY INFORMATION:

Lahore, the second largest city in Pakistan is situated about 1300 km north of Karachi in the central part of the country. The city is located about 225 meters above sea level on 32° north latitude and 74° west longitude. It is connected to other parts of the country by extensive railway, highway and air route networks. Physical features which define the boundaries of the city is the river Ravi which flows from north east - south west direction in relation to the city. Other than this the city is situated on almost flat land.

The city is characterized by its hot dry climate; summer temperatures go as high as 44°C, with hot winds and occasional sand storms. The four coldest months (Nov.-Feb.) are mild with temperatures reaching 7°C. Monsoons occur during June to September and result in average rainfall of 90 mm.

2. HISTORY:

Lahore is a city located where the historic al route from the Khyber Pass to Delhi crosses the River Ravi. The strategic location of the city which led to its foundation is also the reason for its continued growth and importance as a regional trade, military and administrative center. The early history of Lahore, its exact date of founding and place of origin are obscure and controversial. Archeological evidence indicates that Lahore emerged as a settlement between the first and the seventh centuries A.D. It developed into an important market for grain, a center for manufacture of wooden and metal handicrafts. Lahore entered its Muslim period in 1092 A.D. when it was captured by Mahmud of Ghazni. Under the Ghurian rule it regained its importance both as a military stronghold and as a capital city for the whole region. Due to its strategic location, it was an important military objective. As a result, the history of Lahore is one of alternating periods of devastation, decay and magnificence. However, it was under the Mogul Empire (1525-1747) that Lahore reached its glory. The Moguls consolidated, fortified and enlarged the city they inherited. They covered vast areas with richly designed architecture comprising of mosques, tombs, palaces and gardens. The wall around the city was constructed by Emperor Akbar in 1594-98. Emperor Shah Jahan had the Shalimar Gardens built and in the mid 1600's Emperor Aurangzib supervised the construction of the Badshahi Mosque. The sikhs eventually gained control over the area and ruled it for over a hundred years, after which came the British. Over the remains of the Mogul and Sikh empires, the British (1846-1947) built their extensive establishment of military cantonments and administrative centers.

After independence (1947) the city suffered its major crisis with a large influx of migrants from India and a significant increase in the population of the city. This taxed the services and infrastructure of the city to its maximum. Lahore became the provincial capital of the Punjab. Over the last thirty years, it has become a center of commerce, education, industry and administration.

PHOTOGRAPH:

(Opposite Page) Shalimar Bagh in the Walled City, a prominent commercial area of Lahore; it is the focal point of number of adjoining markets.
3. ECONOMY:
Lahore is a major commercial, industrial, administrative and educational center of the country. The commercial and industrial activity are the economic backbone of the city. Lahore, being the capital of the Province of Punjab, is the second most important commercial center of the country. It has all types and patterns of commercial activity - from major, district, local, and specialized shopping centers to wholesale, retail and mixed markets. The evolution and growth of these centers and markets have primarily contributed to the rapid expansion of the city. Most shopping centers and business activities located within the Walled City and in adjacent locations tend towards specialization while shopping centers in newly developed areas are more heterogeneous, in character. According to estimates, there are over 10,000 industrial units in Lahore, ranging from one man workshops to large industrial concerns employing more than a thousand people. The small scale manufacturing industry is scattered throughout the city especially in the older localities and in major roads and main bazaars of the central areas. Large scale industries, however, follow a well defined pattern. They are concentrated in a linear pattern on both sides of the roads leading to Wagah, Kasur, Pattoki Sheikhpura, and Gujranwala. In the older parts of the city, particularly around Badami Bagh, there are a few medium sized industries. Lahore as the administrative center of the province contains large areas at various locations which are owned by government and semi-government organizations. The shortage of office accommodation and housing for administrative personnel has necessitated the acquisition of numerous privately owned buildings which are also widely distributed in the city. It is estimated that about 30 percent of the labor force in Lahore is employed by the government, 30 percent in industry and the rest in trade, commerce, construction, etc.

4. GOVERNMENT
The Lahore Municipal Corporation (LMC) is headed by a Chairman - who is appointed by the provincial government. The executive power of the municipality vests in the Chairman who is responsible for prescribing duties of various establishments and supervision of their work. The municipality administers and executes functions relating to taxation and finance, engineering works, transportation, health and education. A separate and somewhat parallel organization known as the Lahore Development Authority (LDA) exists whose functions comprise of formulation and execution of major developmental works of the city in the spheres of planning, transportation, housing, water...
supply and sewage networks.
The LDA is headed by a Director General who is responsible directly to the Provincial Government. It has within its framework various agencies which deal with a variety of aspects concerning the development of the city. One of these is the Water and Sanitation Authority which is essentially responsible for the planning and execution of water supply and sewage networks for the city.

Another autonomous organization known as the Cantonment Board also exists in the city which is responsible for the administration of Cantonment (military) areas. The Cantonment Board is controlled directly by the Ministry of Defence and is outside the purview of the Provincial Government. The Board is responsible for planning, sub-division, community facilities and services of the areas under its jurisdiction.

5. DEMOGRAPHY
The population of Lahore Municipal Area was 2,148,000 according to the 1971 census. This population represents an increase of over 55% in the last decade. Approximately, 52% of the existing population was born outside the city. 44% of the population is female. The population can be divided into the following age groups: 42% below 14 years, 53% between 15 - 59 years, and 5% above 60 years.

6. SOCIO-CULTURAL
Like most cities in Pakistan, Lahore has people from diversified ethnic origins, socio-cultural backgrounds and occupations. The social system is one in which traditional values, institutions and patterns coexist with those arising from economic development and social change. But equality of participation in the overall socio-economic development has been partially successful. In spite of the fact that there are limited cultural differences amongst the overall population of the city - three characteristic class lines can be distinguished. The upper class - large storekeepers, landlords, industrialists - hold the highest political positions. The middle class - small emergent and heterogeneous - occupies mid-level professional, commercial and bureaucratic positions. In the lower class - economic and cultural variations are more predominant than in other groups. It is composed of a variety of people: recent migrants, urban dwellers living in slums or illegal settlements. They reap few benefits from economic development and expansion which virtually excludes them.

Expression of living patterns of various groups is frequently found in their dwelling environments through uses of areas and spaces of varying characters: verandahs, central courtyards, front and back yards, quality of the dwellings, number of rooms, usage of roofs, etc.
abandoned its course and has never since returned to it. After the British took over, the city expanded towards the south and the east where a large military and administrative establishment was built. Areas like the cantonment, Civil Lines, the Secretariat along with large areas for the railways were developed. In order to control the changing course of the river and to protect the city from flooding, numerous dykes and bunds were constructed and the river which used to have several branches, was contained in one channel. The first few years after independence did not see much development in Lahore. By the mid 1950's several development schemes were initiated and implemented. However, it was not until the early 60's that effort towards making an overall Master Plan was made. Under the plan, the city’s undeveloped land was subdivided, circulation and infrastructure networks developed. Zoning regulations, municipal building by-laws, and other ordinances controlling the urban growth formulated, but all these have not been successfully implemented or enforced. As a result, the city has grown haphazardly with a concentration of commercial and business in the centre and industries in small pockets all over the city.

By the mid 1950’s, a large influx of mainly destitute refugees came to the city. Due to a high demand for housing, squatting became prevalent on open land of the city. The problem was further exacerbated by the process of urbanization which has taken place over the last thirty years. The settlements developed as rural pockets in the urban area with physical environments resembling the villages. These illegal settlements lack basic services. The quality of housing, material and technology used for construction depends on the age of the settlement. Newer settlements have small dwellings made from assorted salvage materials. The dwellings are often made of scraps of wood, pieces of gunny sack, cardboard, straw, or sticks, supplemented by mud and stone and roofed with straw and mud. The houses frequently are located in areas subject to flooding and are often destroyed during heavy rains. The dwellings in the older settlements are consolidated using mud or brick walls and clay tiles or galvanized iron roofs. They are spacious having one or two rooms and a verandah in the front. In general, the settlements have substandard living conditions with high population densities.

The squatters, as illegal occupants of the public and private land they occupy, live in constant threat of evacuation and demolition by the municipality. However, the development authority in recent policies has undertaken a de-facto recognition of squatter settlements and are in the process of legalizing them to a certain extent. In this connection, certain essential utilities like water supply, sewerage and electricity is being provided to them in the process of upgrading these areas. Many pilot projects have been initiated where this policy is being currently implemented. As a result of this, many squatters have started improving their physical environments by consolidating and improving their dwellings.

The analysis of the existing situation indicates that the public sector involvement has been very marginal. The city lacks realistic urban development and housing policies. The development efforts are on a very small scale, scattered and only in response to immediate needs and requirements. The type of housing options and the size of individual projects have varied according to the needs and economic constraints of the past years.
Due to lack of storm drainage and sewage, water collects in large cess pools in the majority of the squatter settlements.

Typical interior of a dwelling in the squatter settlements. Majority of the structures are made out of mud walls with thatched roofs. Most activities take place outside the dwelling in open spaces, while the rooms are primarily used for storage purposes.

SOURCES

Topography and Circulation: (approximate) Master Plan for Greater Lahore, 1973
Land Use Pattern: (approximate) 1820
Income Pattern: (approximate) 1820
Density Pattern: (approximate) 1820
Growth Pattern: (approximate) 1820
Climate: (approximate) 1820
Photographers: Author and Mr. Shahid Majeed
CASE STUDIES

The following section contains case studies describing selected low income dwelling environments within the Lahore Metropolitan Area. The three case studies were selected on the basis of income groups, housing type, 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 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 meters by 400 meters is taken from each locality.

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

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

The case studies are arranged by locality as indicated in the following:

1. WALLED CITY
   An old traditional development located in the city center. Predominantly houses low income people although some middle and high income groups are also prevalent. The Walled City itself contains approximately ten percent of the total population of the city. However, the housing system in the Walled City is representative of about forty percent of Lahore's population.
   PHOTOGRAPH: (OPPOSITE PAGE)
   (Bottom Left) A residential alley in the Mori Gate area of the Walled City.

2. FAZALIA COLONY
   A spontaneous squatter settlement located in the inner ring of the city. There are over one hundred similar settlements located in small pockets scattered over the city. They primarily house very low income people and are representative of about thirty percent of the total population of the city.
   PHOTOGRAPH: (OPPOSITE PAGE)
   (Bottom Right) A dwelling unit at Fazalia Colony.

3. KOT LAKHPAT
   A public housing development located on the periphery of the city. Although intended for lower income groups, this development presently houses lower middle to middle income groups. It is the only housing system that contemplates the provision of instantly developed "packages" including utilities/services, dwelling units, and community services. Similar projects have also been executed in the inner ring of the city. This housing system represents about three percent of the total population of the city.
   PHOTOGRAPH: (OPPOSITE PAGE)
   (Top) A residential street in Block 'B' of Lahore Township Scheme at Kot Lakhpat.
LOCATION: The Walled City of Lahore is generally oval in shape and covers an area of approximately 245 Hectares. At present, it forms the northeastern extension of the city center. The locality is defined by a circular road. Within the circular road, on the northern peripheries are located the Badshahi Mosque and the Lahore Fort. The Ravi River flows about 2 km. northwest of this area. The city railway station is on the east and the city bus terminal on the north of the locality.

ORIGINS: The origin of the Walled City is directly linked with the origins of Lahore. The locality was one of the oldest parts of the city. Archaeologists suggest that probably the first settlement was founded between the first and seventh centuries A.D. where the fort is located today.

PHOTOGRAPHS:
MORE GATE, WALLED CITY, LAHORE;
(Top) An oblique aerial view of the residential area. Notice the building conditions and the quality of the housing stock.
(Bottom) Main street into the Mori Gate area.
However, it was during the Moghul Empire (1525-1747) that the maximum development of this area took place. The wall around the city was constructed by Emperor Akbar in 1594-98. In the 1660's the Badshahi Mosque was built by Emperor Aurangzeb. A subsequent moat was added outside the wall by the Sikhs in the early 1700's. Access into the city was through twelve gates which linked the area to other parts of Lahore. The wall was partially demolished by the British and the moat converted into a public garden. Today the wall is almost completely non-existent and only six of the original gates remain. The garden has been replaced by a broad, major thoroughfare lined with commercial activity.

The layout of the Walled City is a classic example of a spontaneous unplanned development. The street system within the residential areas appear haphazardly and reflect an evolutionary, spontaneous growth. Exceptions of this are two areas where some form of "urban renewal" was practiced. One of these is the area known as Shahalmi Bazar, a former Hindu area, which was totally destroyed at the time of partition. The boundaries of the redeveloped areas are apparent on the adjacent plan, since the street pattern is totally different from the rest of the city. The bazar itself is a wide road, providing the only access for heavy trucks and buses to the center of the city. The other redevelopment project is smaller and more modest in scale, but equally out of character from its environment. This is the Pakistan Cloth Market, built for the purpose of providing accommodation for wholesale textile merchants. It is situated on an area, blocking completely, what was once a major street from Sheranwala Gate to the city center.
LAND USE: The Walled City contains a multitude of diversified activities and has now reached a saturation point with mixed land use of residential and commercial areas. It is a major marketing center - not only for Lahore, but also for a great part of northeast Pakistan. Wholesale and retail markets for cloth, shoes, utensils, jewelry, foodgrains, plastics and many other items are grouped together throughout the locality. Virtually all its major circulation routes are lined with retail shopping.
In a traditional sense, the Walled City is also a major industrial area. In its bazaars and residential streets, there exists a wide variety of small workshops; shoemakers, tailors, printers, machinists, jewelers, manufacturers of plastic items etc. The old Moghul Fort and the adjoining Badshahi Mosque lie on the northern side of the city. These along with many other Moghul monuments and various bazaars make the area a major tourist attraction. There are over 200 mosques dispersed over the whole area. Adjacent to the Badshahi Mosque is a large hospital complex and Lahore's red light district. There is a total absence of open areas or parks within the city itself.

CIRCULATION: The city is surrounded by a major vehicular artery known as the Circular Road. Spaces outside the gates of the city act as transportation interchanges. Goods are unloaded from trucks onto horse, bullock, or push carts and then carried into the interior of the city. The traffic varies enormously in speed and volume. It includes pedestrians, bicycles, hand pulled carts, horse carts, motorcycles, auto rickshaws, cars, buses and stray animals. Vehicular traffic is virtually non-existent inside the city mainly due to its narrow streets. The exceptions to this are the areas of Shahani Bazar, the Fort Road area, and the Pakistan Cloth Market area. Streets in the residential areas are relatively quiet, dark, cool, winding and twisting and often ending in cul-de-sacs.
LOCALITY CONSTRUCTION TYPES

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shack</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mud/Wattle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masonry Wood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 UTILITIES AND SERVICES

- Water Supply
- Sanitary Sewerage
- Storm Drainage
- Electricity
- Gas
- Refuse Collection
- Public Transportation
- Paved Roads, Walkways
- Telephone
- Street Lighting

LOCALITY COMMUNITY FACILITIES

- Police
- Fire Protection
- Health
- Schools, Playgrounds
- Recreation, Open Spaces

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

Quality of information: Approximate

SELECTED BLOCK

LOCALITY SEGMENT PLAN

1:2500
CASE STUDY: WALLEd CITY

LAND UTILIZATION DIAGRAMS

PERCENTAGES

Streets/Walkways 13
Playgrounds 3
Cluster Courts 2
Dwellings/Lots 82

DENSITY

1210 Persons/Hectare
20 Persons

CIRCULATION EFFICIENCY

Meters/Hectare 283

POPULATION AND INCOME: It is estimated that about 10% of Lahore's population lives in the Walled City, which amounts to approximately 300,000 people. This population consists mainly of working class people, relatively poor and poorly educated. In the past, upper middle and high income extended families lived in the locality. Many of them have moved to the suburbs by either selling or renting their property. A majority of the present occupants are connected to the surrounding commercial areas. There is a great degree of cohesion and interaction amongst the populace. Average annual household income is around US$500.00 (Rs. 5000). There are also, according to some estimates, over 5000 cows and water buffaloes which populate the area, providing the locality with its milk and other dairy products.

LOCALITY SEGMENT/BLOCK: Public utilities are essentially inadequate in the Walled City. Water mains follow major and secondary streets, but the smaller residential alleys are supplied by means of bundles of pipes lying on the surface of the pavement. The original open drains are still used but are inadequate for the population they now serve.

The lots are narrow and the houses have common walls to avoid heating by direct sun exposure. As protection against the hot dry climate 3 to 5 story houses shade narrow streets. A central courtyard is situated in most of the houses which provide a source of light and ventilation.

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES

<table>
<thead>
<tr>
<th>Total</th>
<th>Area</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lots</td>
<td>52</td>
<td>.6</td>
</tr>
<tr>
<td>Dwelling Units</td>
<td>104</td>
<td>.6</td>
</tr>
<tr>
<td>People</td>
<td>728</td>
<td>.6</td>
</tr>
</tbody>
</table>

AREAS

<table>
<thead>
<tr>
<th>Hectares</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>.08</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>.02</td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>.49</td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>.01</td>
</tr>
<tr>
<td>TOTAL</td>
<td>.60</td>
</tr>
</tbody>
</table>

NETWORK EFFICIENCY

Network length (streets, walkways) = 283

LOTS

Average area, dimensions = 100 sq m
CASE STUDY SOURCES

Plan (approximate) Prof. Samuel Noe
Field Survey 1976-1977-1978
Land Use Plan (approximate) IBID
Circulation Plan (approximate) IBID
Block Plan (approximate) IBID
Segment Plan (accurate) Field Survey 1977-1978
Typical Dwelling (approximate) IBID
Physical Data (approximate) IBID
Other Information: Field Survey 1976-1977-1978
Prof. Samuel Noe

KEY
S Storage
R Room (multi-use)
K Kitchen/Cooking Area
T Toilet/Bathroom

TYPICAL DWELLING
PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT
- type: HOUSE
- area (sq m): 364
- tenure: LEGAL OWNERSHIP
- LAND/LOT
  - utilisation: PRIVATE
  - area (sq m): 210
  - tenure: LEGAL OWNERSHIP

DWELLING
- location: CITY CENTER
- type: RON HOUSE
- number of floors: 3
- utilisation: SINGLE
  - physical state: FAIR

DWELLING DEVELOPMENT
- mode: INCREMENTAL
- developer: PRIVATE
- builder: ARTISAN
- construction type: MASONRY, WOOD
- year of construction: 1905

MATERIALS
- foundation: BRICK
- floors: BRICK
- walls: BRICK
- roof: REINFORCED BRICKWORK

DWELLING FACILITIES
- wc: 1
- shower: 2
- kitchen: 3
- rooms: 16
- other: INTERNAL COURTYARD

SOCIO-ECONOMIC DATA
(related to user)

GENERAL: SOCIAL
- user's ethnic origin: PUNJABI
- place of birth: LAHORE
- education level: SECONDARY SCHOOL

NUMBER OF USERS
- extended family
- married: 14
- single: 3
- children: 33
- total: 52

MIGRATION PATTERN
- number of moves: NONE
- rural - urban: -
- urban - rural: -
- why came to urban area: -

GENERAL: ECONOMIC
- user's income group: LOW
- employment: TAILOR
- distance to work: 2 Kms
- mode of travel: WALK/BICYCLE

COSTS
- dwelling unit: -
- land - market value: -

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

PHOTOGRAPHS:
MORI GATE, WALLED CITY, LAHORE,
(Left) Main commercial street in Mori Gate Area.
(Right) Residential street/alley; notice the bundles of water supply pipes on the surface of the pavement.
FAZALIA COLONY
Lahore
SQUATTER SETTLEMENT
POPULAR, VERY LOW/LOW INCOME

LOCATION: The squatter settlement at Fazalia Colony is located between Ferozepur Road and Shah Jamal Colony. The settlement encompasses an area of approximately 8 hectares. Most of this area is hidden behind large houses; the main access into this area is primarily from Ferozepur Road which is a major link between the city center and the suburbs. The Bari Doab Canal runs about half a kilometer on the eastern periphery of this settlement.

PHOTOGRAPHS:
FAZALIA COLONY, LAHORE:
(Top) An oblique aerial view of a part of the settlement. Note the beds (charpai's) on the roofs of various dwellings. The roofs are used for sleeping during the summer.
(Bottom right and left) Due to lack of a sewage disposal system, water collects into large cess pools creating unhygienic conditions for the residents.
ORIGIN: This settlement is the result of the prevalent housing shortage within the city. The land on which this settlement is located was a depression in relation to adjacent areas and due to lack of storm drainage in the locality, collected rain water which turned into a pond during monsoon seasons. Most of the squatters initially came as displaced people from other parts of the city in mid 1960's. It began as a relatively small community but expanded at a very high pace and now encompasses not only this area but also undeveloped areas in adjacent locations. The area on which squatters are presently living is private property but the land owners have been unable to evict them.

LAYOUT: The locality is bounded on the western side by large residences of the upper income category of people from Lahore. On the eastern and southern peripheries of the settlement are located large cess pools which have restricted the growth of the settlement in those directions. The settlement has grown over the years without any controls in a more or less spontaneous manner. Essentially, the layout represents an arbitrary pattern of land subdivision although there is some evidence of square/rectangular blocks.

LAND USE: The locality is primarily a high density residential area with very little commercial activity. The commercial activity comprises of small vegetable, fruit and grocery stores. There are also a few tailors and shoemakers in the area. There is a total absence of open areas where children can play. Recreational activity takes place in the streets and alleys of the locality. The settlement lacks the basic essential utilities and services. There is a communal water supply and no sewerage. Most of the waste is dumped into large cess pools distributed over various locations. The cess pools generate foul odour and result in unhygienic conditions for the residents. The Lahore Development Authority in recent policies has undertaken a de facto recognition of this settlement and are in the process of legalizing its existence. Under the "Kathchi Abadi Upgrading Scheme", this area has been earmarked for development and upgrading. In this connection certain essential utilities, like water supply and sewerage are being proposed at the communal level. There are no supporting educational or community/social services in the area.

CIRCULATION: Primary approaches into the locality are from Ferozepur Road which provides the main access to the city center. The city bus service connects this area to other parts of Lahore. There is no through traffic inside the settlement. Only the main street is wide enough for vehicles but it is rarely used. None of the streets are paved. Excluding the main approaches, the streets are narrow and winding, and can only accommodate pedestrian traffic.

POPULATION & INCOME: It is estimated that approximately 5000 people live in this particular settlement. It is relatively a small settlement compared to many others within the city. The squatters belong to the low and very low income category of the city's population. Their average annual income is approximately US$350.00 (Rs. 3500). A large percentage of the male population works on daily wages as labour with a variety of small contractors. A few have more permanent jobs in industries while others are self employed. Women are mostly employed by high income families in the surrounding areas as domestic help.
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

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.
Quality of information: Approximate
The area contains a high population density. The utilities/services are provided at the community level, but are inadequate for the population they serve. The dwellings are generally shacks (jhuggies) made of mud walls with assorted salvage materials, and sometimes with brick walls reinforced by wood and thatch. They enclose a small area serving mainly as a storage space. Most of the activities take place outside in partly covered and open spaces.
DWELLING ENVIRONMENTS: LAHORE

PHYSICAL DATA
(treated to dwellings and land)

DWELLING UNIT
- type: SHANTY
- area (sq m): 29
- tenure: EXTRA LEGAL

LAND/LOT
- utilization: PRIVATE
- area (sq m): 50
- tenure: EXTRA LEGAL

DWELLING
- location: INNER RING
- type: ROOM/SEMI-DETACHED
- number of floors: ONE
- utilization: SINGLE
- physical state: POOR

DWELLING DEVELOPMENT
- zone: INCREMENTAL
- developer: POPULAR
- builder: SELF HELP
- construction type: SHACK
- year of construction: POOR

MATERIALS
- foundation: COMPACTED EARTH
- walls: MUD
- roof: WOOD, MUD

DWELLING FACILITIES
- wc: 1
- shower: NONE
- kitchen: OPEN AREA
- rooms: 3
- other: DRY PLATFORM

SOCIO-ECONOMIC DATA
(treated to user)

GENERAL: SOCIAL
- user’s ethnic origin: PUNJABI
- place of birth: GUJRANWALA
- education level: NONE

NUMBER OF USERS
- married: 2
- single: 1
- children: 4
- total: 7

MIGRATION PATTERN
- number of moves: 2
- rural - urban: 1960
- urban - rural: 1969
- why came to urban area: EMPLOYMENT

GENERAL: ECONOMIC
- user’s income group: VERY LOW
- employment: LABOUR
- distance to work: 4 KMS
- mode of travel: WALK/BUS

COSTS
- dwelling unit: -
- land - market value: -

DWELLING UNIT PAYMENTS
- financing: SELF FINANCE
- % income for rent/mortgage: -
PHOTOGRAPHS:
FAZALIA COLONY, LAHORE:
(Left) A residential alley; sewage runs through open drains in the middle of the alley.
(Right) Typical dwelling in the settlement.

CASE STUDY SOURCES
Plan: (approximate) Lahore Development Land Use Plan Authority; Field Survey 1977-1978
Circulation Plan: (approximate) Field Survey 1977-1978
Segment Plan: (approximate) 1972
Block Plan: (approximate) 1972
Typical Dwelling: (accurate) IBID
Physical Data: (approximate) IBID
Other Information: Field Survey 1976-1977-1978
LOCATION: The Lahore Township Scheme at Kot Lakhpat is located approximately ten kilometers from the city center on the southern periphery of the overall city of Lahore. The whole township area is over one thousand hectares. Only "Block B" of this township, where a major public housing project was developed, is the area for this case study. This block of the township encompasses an area of approximately two hundred hectares. Located due north of the area is Model Town, an old suburb of the city. The Kot Lakhpat Railway Station is located due east, about two kilometers from the locality. Major accesses to the development are either from Model Town or from Ferozpur Road which runs on the eastern side of this area.

PHOTOGRAPHS:
KOT LAKHPAT, LAHORE: (Top) An oblique aerial view of the main commercial street in "Block B" of the Kot Lakhpat Township scheme. All the structures on the right of the picture are encroachments. (Bottom) Commercial street in the same area. Notice the width of the street in relation to the number of automobiles.
ORIGINS: The whole project was initially conceived in the early 1960's as a complete township comprising of residential, commercial, institutional and industrial areas. Adjacent to the project site was a large industrial area - one of the largest concentrations of industrial activity in Lahore. The scope and purpose of the township included:
- resettlement of a large number of squatters being displaced from the central parts of the city
- to provide residential accommodation to the lower echelons of government/semi-government employees
- to provide housing for some of the industrial workers being employed in adjacent areas.
It was the first large scale, low income public housing project in Lahore. It was initiated and executed by the Housing and Physical Planning Cell of the Government of Punjab. The project was to be implemented in phases and only a portion of the project has been implemented so far. This kind of a development has been the most important government response to the housing shortage of the city. It focuses on the provision of finished houses for low income groups.

LAYOUT: The site has no major contours and is relatively flat. The layout followed is gridiron; a pattern with limited attention to land utilization. The design criteria and norms generally adopted for this project suggest a very low density development. The design is based on auto oriented streets even though there are limited cars, a western commercial center instead of public markets and corner shops. The lot size is the basic dimension for the intervals between public circulation networks: either vehicular or pedestrian. Since the lots are relatively small, this dimension is determined by the size of two lots back to back, which increases the length and area of public circulation. All these conditions indicate excessive waste of land and an increase of maintenance costs.
LAND USE: The locality is predominantly a low density residential area. There are provisions of stores and service shops within the project itself, however, their locations are inappropriate and questionable. As a result, commercial activities have grown along intersections of major roads. Most people use their front rooms as a store, service shop or a restaurant. Small shops for daily purchases have developed on the more frequented corners. There has also been a substantial amount of encroachment for commercial activity on public land along major circulation routes. Encroachers have erected semi-permanent structures and use these as stores and retail shops dealing with a variety of items. There is no industrial activity in this area although there are a variety of small workshops within the residential streets. These workshops comprise of blacksmiths, tailors, shoemakers, a few machinists, manufacturers of bangles etc. There are no community facilities, although a few schools have been built. However, community facilities are proposed on open spaces scattered throughout the site. High percentage of public areas in this development have resulted in high capital investment and subsequent maintenance costs for streets, public green areas, playgrounds and walkways. The percentage of semi-public areas is also negligible. There are no clear definitions of the utilization of open spaces in the locality. As a consequence, a large portion of the land remains unutilized or under utilized. Better land subdivision with specific designated uses would have diminished the percentage of public land.

KEY
S School
Ch Church
P Police
PO Post Office
M Mosque
M Market
C Cemetery
Bus

LOCALITY LAND USE PATTERN
CIRCULATION: Public transportation connects the locality with the city. A bus terminal is located on the south west side of the locality. The bus route to the city is either through Model Town or via Ferozepur Road which runs on the eastern part of the development. It is also possible to take a train from the Kot Lakhpat Railway Station to the main city railway terminal. Within the locality itself, all streets are open to both vehicular and pedestrian traffic. The streets vary in width from six meters in residential streets to twenty meters on main circulation routes. All streets are paved although none have any foot paths or walkways.

POPULATION AND INCOME: The project was initially meant for low income people. However, the cost of individual lots/dwellings was beyond the economic capacity of the low income sector of the urban population. As a result, the people presently living in this area are middle income groups with approximate income ranges between Rs 500 to 800 (US $ 50 - 80) per month. The estimated population of this locality is about twenty five thousand people.
LOCALITY CONSTRUCTION TYPES

<table>
<thead>
<tr>
<th>Construction Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shack</td>
<td>0</td>
</tr>
<tr>
<td>Mud/Wattle</td>
<td>0</td>
</tr>
<tr>
<td>Masonry Wood</td>
<td>0</td>
</tr>
<tr>
<td>Masonry Concrete</td>
<td>0</td>
</tr>
<tr>
<td>Concrete</td>
<td>0</td>
</tr>
</tbody>
</table>

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

Quality of information:

LOCALITY UTILITIES AND SERVICES

- WATER SUPPLY
- SANITARY SEWERAGE
- STORM DRAINAGE
- ELECTRICITY
- GAS
- REFUSE COLLECTION
- PUBLIC TRANSPORTATION
- PAVED ROADS, WALKWAYS
- TELEPHONE
- STREET LIGHTING

LOCALITY COMMUNITY FACILITIES

- POLICE
- FIRE PROTECTION
- HEALTH
- SCHOOLS, PLAYGROUNDS
- RECREATION, OPEN SPACES

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: MORE, LIMITED, ADEQUATE.

Quality of information: Approximate
LOCALITY SEGMENT/BLOCK: The area has a low population density. All dwellings have utilities and services. The original plan of the dwellings comprised of one room with a verandah and toilet facilities. Over the years, the individual households have added additional rooms, as and when the need arose. A two meter strip of land in front of the lots also belongs to the individual residents. According to zoning and building regulations, the residents are not allowed to erect any structures on this area; it is meant to act as a green strip. Over time, the residents have started to encroach on this land by initially building a small wall and then ultimately converting it to a room which is either rented or used as the part of the dwelling.

**LOCALITY BLOCK LAND UTILIZATION DATA**

<table>
<thead>
<tr>
<th>AREAS</th>
<th>Total Number</th>
<th>Area Hectares</th>
<th>Density N/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC (streets, walkways, open spaces)</td>
<td>22</td>
<td>.3</td>
<td>73</td>
</tr>
<tr>
<td>SEMI-PUBLIC (open spaces, schools, community centers)</td>
<td>.02</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>PRIVATE (dwellings, shops, factories, lots)</td>
<td>.21</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>SEMI-PRIVATE (cluster courts)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>.33</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**NETWORK EFFICIENCY**

Network length (streets, walkways) = 135
Areas served (total area) = .33

**OTHER**

LLOTS = 400 m/ha
Average area, dimensions = 100 sq.m.
DWELLING ENVIRONMENTS: LAHORE

PHYSICAL DATA
(related to dwelling and land)

DWELLING UNIT
- type: HOUSE
- area (sq m): 32
- tenure: LEGAL OWNERSHIP

LAND/LOT
- utilization: PRIVATE
- area (sq m): 188
- tenure: LEGAL OWNERSHIP

DWELLING
- location: ROW HOUSE
- number of floors: ONE
- utilization: SINGLE
- physical state: GOOD

DWELLING DEVELOPMENT
- mode: INSTANT
- developer: PUBLIC
- builder: LARGE CONTRACT
- construction type: MASONRY, CONCRETE
- year of construction: 1966

MATERIALS
- foundation: BRICK
- floors: CEMENT PLASTER
- walls: BRICK
- roof: CONCRETE

DWELLING FACILITIES
- wc: 1
- shower: 1
- kitchen: 1
- rooms: 2
- other: VERANDAH

Socio-Economic Data
(related to user)

GENERAL: SOCIAL
- user's ethnic origin: PUNJABI
- place of birth: GUJRAT
- education level: EIGHTH CLASS

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

MIGRATION PATTERN
- number of moves: 2
- rural - urban: 1960
- urban - urban: 1970
- urban - rural: -
- why came to urban area: EMPLOYMENT

GENERAL: ECONOMIC
- user's income group: LOW
- employment: PEON
- distance to work: 10 Kms
- mode of travel: BUS

COSTS
- dwelling unit: -
- land - market value: -

DWELLING UNIT PAYMENTS
- financing: SELF FINANCED
- rent/mortgage: -
- % income for rent/mortgage: -
PHOTOGRAPHS:
KOT LAKHPAT, LAHORE
(Top) Residential street is in the process of being converted into a commercial street.
(Bottom) View of residential street in this area. Notice the initial stages of encroachment.

CASE STUDY SOURCES

Land Use Plan: (approximate) Field Survey 1976-1977-1978
Circulation Plan: (approximate) IBID
Segment Plan: (approximate) IBID
Block Plan: (accurate) IBID
Typical Dwelling: (accurate) IBID
Physical Data: (approximate) IBID
Photographs: The Author and Mr Shahid Majid 1977-1978
Other Information: Field Survey 1976-1977-1978
Existing dwelling systems are the most valuable reference and source of information for formulating urban land policies and housing programs. Dwelling environments provide a guide to basic questions of land use (for what?), distributions (for whom?), and subdivision (how?). They also raise more specific issues concerning population, incomes, densities, and efficiency of land utilization as well as cultural and social values.

Each of the three case studies described on the following pages represents a basic dwelling type of the low income urban environments of Lahore. A comparative overview of the dwelling systems is presented in the Evaluations, analysing each case from a different perspective. The following sections are included in the Evaluations.


PHYSICAL DATA MATRIX: a comprehensive summary of the data with a matrix.

TIME/PROCESS PERSPECTIVE: a chart relating the case studies to their originating models.
LAND UTILIZATION:
PATTERNS, PERCENTAGES,
DENSITIES, CIRCULATION

The cases are arranged in a chronological order of
development. The comparison shows a trend towards
reduction in private areas and excessive circulation
areas. The criteria used in the evaluation of
efficiency of physical layouts in the survey are:

PATTERNS
Lot configurations, blocks and circulation
patterns are primary indicators in deter-
mining infrastructure network lengths. For
example, when certain layouts have excessive
network lengths or are very complicated,
this results in higher costs per person for
the overall development.

PERCENTAGES
Proportion of public and private areas are
indicators in determining maintenance, re-
sponsibility, user control and functional
efficiency of a layout. For example, a large
percentage of land for circulation results
in high costs of installation per person and
extensive maintenance for the public sector,
indicating an inefficient layout.

DENSITY
The number of persons per hectare relates to
both the number of lots and the types
of dwellings per hectare. This determines the
intensity of land use; low densities reflect
higher development costs per person.

CIRCULATION EFFICIENCY
A relation between public circulation lengths
and the area served indicates the network
efficiency; a high ratio reflects a less
efficient network in terms of direct capital
investment and future maintenance costs.
1 WALLED CITY
Traditional housing
Private, Low income
Low percentage of land for streets; high percentage for lots. High population density; deteriorating standard of services due to layout pattern.

2 FAZALIA COLONY
Squatter settlement
Popular, Very low/low income
High density; low percentage of dwelling area; extra-legality of land/lot tenure the issue.

3 KOT LAKHPAT
Public Housing Scheme
Middle income
Very high percentage of land for streets; low density; poor layout with undefined responsibilities results in excessive public land.
The physical data of three case studies of dwelling environments plus information and data from two other localities in Lahore are summarized in the physical data matrix with the following comments. The physical data matrix permits: a) a comprehensive view of the spectrum of low income dwelling types, and b) a comparison and determination of trends and patterns.

The population figures represent those living within the municipality boundary and correspond to the inhabitants of similar dwelling systems in the city. The population per category are tentative estimates, and are indicated here only to provide an approximate reference.

### Physical Data Matrix

<table>
<thead>
<tr>
<th>Category</th>
<th>Population Per Category</th>
<th># of Total Population</th>
<th>Locality Case Studies</th>
<th>User</th>
<th>Dwelling Unit</th>
<th>Dwelling</th>
<th>Utilities and Services</th>
<th>Community Facilities</th>
<th>Land Utilization</th>
<th>Circulation Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,100,000</td>
<td>40</td>
<td>WALLED CITY (Traditional)</td>
<td>6.5</td>
<td>Low House 100 Owner/Rental</td>
<td>City Center Row 3 Poor</td>
<td>A A L A L A A A A</td>
<td>A A L L L A A</td>
<td>14 2 81</td>
<td>283 1200</td>
</tr>
<tr>
<td>B</td>
<td>1,000,000</td>
<td>30</td>
<td>FAZALIA COLONY (Squatter)</td>
<td>6.8</td>
<td>Very Low Shack 50 Extra-Legal</td>
<td>Inner Ring Row 1 Poor</td>
<td>L N N L N N A N N</td>
<td>L N L L E</td>
<td>12 - - 85</td>
<td>333 570</td>
</tr>
<tr>
<td>C</td>
<td>100,000</td>
<td>3</td>
<td>KOT LAKHPAT (Public)</td>
<td>5.5</td>
<td>Middle House 100 Owner/Rental</td>
<td>Outer Ring Row 1 Fair</td>
<td>A A A A A L L L A</td>
<td>L L L L A</td>
<td>30 7 - 63</td>
<td>400 410</td>
</tr>
<tr>
<td>D</td>
<td>500,000</td>
<td>15</td>
<td>GUJJARPURA (Traditional)</td>
<td>6.8</td>
<td>Low/Middle House 45 Owner/Rental</td>
<td>Inner Ring Row 2 Fair</td>
<td>A L N A L A L A</td>
<td>L L L L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>60,000</td>
<td>2</td>
<td>RIVAZ GARDENS (Public)</td>
<td>4.8</td>
<td>Middle/High Apart 60 Owner/Rental</td>
<td>Inner Ring Apart 4 Good</td>
<td>A A A A A A A A</td>
<td>A A A L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>300,000</td>
<td>10</td>
<td>OTHERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>3,000,000</td>
<td></td>
<td>TOTAL POPULATION OF LAHORE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key**
- **A**: Adequate or normal
- **L**: Limited or occasional
- **N**: No provision at all
- **Cat./Income**: Category and Income
- **Dwelling Type**: Dwelling Type
- **Developer**: Developer

### The Physical Data Matrix Illustrates
- The approximate availability of community facilities, utilities and services in the five case studies. These levels are indicated as follows:
- **A**: Adequate or normal
- **L**: Limited or occasional
- **N**: No provision at all

### Population Figures
- The population figures represent those living within the municipality boundary and correspond to the inhabitants of similar dwelling systems in the city. The population per category are tentative estimates, and are indicated here only to provide an approximate reference.

### The Population Figures Correspond To
- The population figures represent those living within the municipality boundary and correspond to the inhabitants of similar dwelling systems in the city. The population per category are tentative estimates, and are indicated here only to provide an approximate reference.

### The Three Case Studies Plus Data From Two Other Localities
- The three case studies plus data from two other localities of the city have been grouped in five categories, identifying different income groups, housing systems and selected physical characteristics. The five categories are represented in the following manner:

#### Category A Includes Low and Middle Income Groups Living in the Traditional Dwelling System
- Represents approximately 40% of the total population.
the city's population. Categories B and D include very low and low income groups and represent approximately 50% of the urban population. Category C and E includes moderately low, middle and high income groups representing 5% of the population.

(5) USER: Family Size: The average family size is taken as an indicator in the analysis of housing quality

(6) DWELLING UNIT: Type: A pattern is defined in terms of income groups; shanty and room: very low and low income, apartment and house: moderately low, middle and high income.

(6) DWELLING UNIT: Area: It is observed to be a function of household income. In low income groups the dwelling usually consists of one room. Middle and high income dwellings are larger having two or more rooms, a kitchen, and a bathroom. The dwelling unit area ranges from 15 sq.m. in squatter to 100 sq.m. in public housing projects.

(6) DWELLING UNIT: Tenure: Three situations are found among very low and low income groups: a) extralegal ownership/rental; generally a characteristic of fresh migrants in the existing pockets of squatter settlements within the city, b) legal rental c) legal ownership; both of which require payment in the form of rent to the government or a private party. In moderately low, middle and high income groups, legal rental and legal ownership are the general norm.

(7) DWELLING: Location: The city center is occupied by moderately low and middle income groups. Very low and low income groups are located mostly in squatter settlements in pockets within the high income residential areas of the city.

(7) DWELLING: Type: Detached shanties are found among very low income squatter settlements. The traditional housing is mostly in the walled city and also some in adjacent localities. Public housing projects represent row/grouped dwelling types accommodating middle income groups.

(7) DWELLING: Number of Floors: Most of the dwellings in very low income groups are single story structures. In low income groups, as in the case of the walled city, 3 to 5 story walk-ups are also prevalent. Public housing developments have 3 to 4 story walk-ups generally for middle/high income groups.

(7) DWELLING: Physical State: The pattern is usually as follows: "bad state" is a visible feature of very low and low income groups in squatter settlements and in the old city. No investment is put into the dwelling since housing is a secondary priority for the tenant/owner. "Fair state" is found in public housing projects in the city; and good physical state is typical of middle and high income dwellings.

(8) UTILITIES: Water: Almost the entire city is connected to the water supply network. Water is pumped through numerous tube well stations located in various parts of the city. The supply is limited: therefore, the provision is restricted to 2-3 hours in the morning and for the same period in the evenings. Most of the middle and high income dwellings have overhead water tanks. However, in low income settlements with common water tape, restricted supply is common. As present, water is supplied without any charges, except for some lump sum charged in some areas of the city.

(8) UTILITIES: Sewage Disposal: A major part of the city is connected to a sewage disposal network. It was installed and extended through piecemeal efforts and is generally overloaded. Break-downs due to choking and backing are very frequent. Most of the middle and high income dwelling systems are connected to the network. Low and very low income settlements are generally devoid of such facilities.

(8) UTILITIES: Storm Drainage: Storm drainage is found to be very inadequate. Flooding of low lying areas during monsoons and other rainy seasons is very common and frequent.

(8) UTILITIES: Electricity: It is generally adequate in the city, however, the installation process is long and tedious.

(8) UTILITIES: Gas: Gas service network exists in most parts of the city. It is relatively cheap and is used predominantly as fuel for cooking. However, this service does not exist in most parts of the walled city or in any of the squatter settlements. Dry cow dung, wood and coal are the most common substitutes.

(8) UTILITIES: Refuse Collection: Most of the waste produced in residential areas is organic. There are limited numbers of containers provided for refuse collection by the city. As a result, waste is dumped along road sides to be picked up by municipality trucks.

(8) UTILITIES: Public Transportation: Bus services are operated by the Urban Transport Corporation of the province and connects the entire urban area. It is adequate but expensive for low income people.

(8) UTILITIES: Telephone: Its supply is so scarce that even high income groups acquire it with difficulty.

(9) COMMUNITY FACILITIES: Fire Protection: Fires are less frequent and, therefore, the fire stations are located at greater distances from each other.

(9) COMMUNITY FACILITIES: Health: Public and private facilities are generally available in the entire city. Private clinics outnumber public clinics, however, these are beyond the economic reach of the low income groups.

(9) COMMUNITY FACILITIES: Schools/Playgrounds: Public and private schools are scattered throughout the urban area. Most schools do not have adequate playgrounds.

(9) COMMUNITY FACILITIES: Recreation: Cinemas are the major form of recreation. There are no community centers and very few clubs. Open spaces are prevalent in most areas except in the walled city. These areas generally remain undeveloped and maintained until finally being invaded by squatters.

(10) LAND UTILIZATION: The data from the case studies indicates that in traditional and squatter areas, there is a higher percentage of residential areas as compared to public housing developments.

(11) CIRCULATION EFFICIENCY: The analysis of the case studies indicates that in the traditional and squatter areas there is greater circulation efficiency resulting in greater utilization of land in relation to public housing developments.

(12) DENSITIES: Higher densities generally indicate low income groups living in shanties/rooms/row houses and low densities indicate high income groups living in apartments and houses. The walled city has the highest density. It should be noted that in the case studies, due to unavailability of information, the densities are not always precisely computed but rather approximately estimated.
The case studies and information regarding housing models from other areas cover the range from very low to middle income groups. They are representative of dwelling types which originated, have developed, and are evolving in different ways.

In this evaluation, the dwelling types are arranged horizontally according to their income levels, and related vertically to their past, present and future conditions, in order to see them in a broader time/perspective. The chart presents the observation of users, densities and trends as they change over time.

**SECTION PLAN**

**DWELLING SYSTEM**

<table>
<thead>
<tr>
<th>Dwelling type</th>
<th>Lot configuration</th>
<th>Dwelling layout</th>
<th>Location</th>
<th>Block layout</th>
<th>Land utilization</th>
<th>Origin</th>
<th>Localities</th>
<th>Urban population served</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INDIVIDUAL SHANTIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irregular/narrow lots</td>
<td>Single/multiple</td>
<td>Low/medium</td>
<td>Center</td>
<td>Compact</td>
<td>Acceptable</td>
<td>Rural</td>
<td>Fazalia colony, Ravi Road, Basti Saidan Shah.</td>
<td>20 %</td>
</tr>
<tr>
<td>Very low</td>
<td>Single/multiple</td>
<td>Low/medium</td>
<td>Continuing</td>
<td>Low/medium</td>
<td>Acceptable</td>
<td>Yes</td>
<td>Unskilled newcomers; no capacity to pay for better dwellings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Model</td>
</tr>
</tbody>
</table>

**SQUATTER SETTLEMENTS**

<table>
<thead>
<tr>
<th>Dwelling type</th>
<th>Lot configuration</th>
<th>Dwelling layout</th>
<th>Location</th>
<th>Block layout</th>
<th>Land utilization</th>
<th>Origin</th>
<th>Localities</th>
<th>Urban population served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irregular/narrow lots</td>
<td>Single/multiple</td>
<td>Low/medium</td>
<td>Center</td>
<td>Compact</td>
<td>Acceptable</td>
<td>Rural</td>
<td>Fazalia colony, Ravi Road, Basti Saidan Shah.</td>
<td>20 %</td>
</tr>
<tr>
<td>Very low</td>
<td>Single/multiple</td>
<td>Low/medium</td>
<td>Continuing</td>
<td>Low/medium</td>
<td>Acceptable</td>
<td>Yes</td>
<td>Unskilled newcomers; no capacity to pay for better dwellings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Model</td>
</tr>
</tbody>
</table>

**ROW HOUSES**

<table>
<thead>
<tr>
<th>Dwelling type</th>
<th>Lot configuration</th>
<th>Dwelling layout</th>
<th>Location</th>
<th>Block layout</th>
<th>Land utilization</th>
<th>Origin</th>
<th>Localities</th>
<th>Urban population served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small narrow</td>
<td>Single/multiple</td>
<td>Low</td>
<td>Center</td>
<td>Compact</td>
<td>Acceptable</td>
<td>Rural</td>
<td>Kot Lakhpat, Iqbal Town</td>
<td>3 %</td>
</tr>
<tr>
<td>Of houses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Model</td>
</tr>
</tbody>
</table>

**COMMENTS**

- Employment facilities generated, land/housing supply improved, and exercise greater control over unoccupied land.
- Employment facilities generated, land/housing supply improved, and exercise greater control over unoccupied land.
- Employment facilities generated, land/housing supply improved, and exercise greater control over unoccupied land.
- Employment facilities generated, land/housing supply improved, and exercise greater control over unoccupied land.
- Employment facilities generated, land/housing supply improved, and exercise greater control over unoccupied land.
- Employment facilities generated, land/housing supply improved, and exercise greater control over unoccupied land.
ROW / TRADITIONAL HOUSES

Big square
3-5
Central courtyard with rooms around it.
Center (deteriorated areas).
Spontaneous irregular
Acceptable
Universal
M all City, Gowlamandi, Brandreth Road Area, Hadi Road Area.
40 %
Middle
Single/multiple
Medium
Continuing
Low
Single/multiple
High
Continuing
Very low/low
Single/multiple
High
Saturated
Yes
Poor inhabitants with cultural affiliations; no other options.

WALK-UP APARTMENTS

Large squares/rectangular
4
Compact multi-use rooms with adjacent covered verandah.
Center, inner ring, periphery; developments in small pockets.
Gridiron
Bad
Western
Rivaz Gardens, Iqbal Town, Garden Town, Baghbanpura
2 %
Low/middle
Single/multiple
Low/medium
Continuing
Middle
Single/multiple
Medium
Continuing
Middle/high
Single/multiple
Medium
Continuing
High
Single
Medium
Continuing
Yes
Middle and high income people.

Semidetached row houses

Narrow rectangular
1-2
Multi-use rooms with front and back yards, also a side alley.
Center, inner ring, periphery (relatively new developments).
Gridiron
Acceptable
Universal
Iqbal Town, Iqstha
15 %
Middle
Single/multiple
Low/medium
Continuing
Middle/high
Single/multiple
Medium
Continuing
High
Single
Medium
Continuing
Yes
Middle and high income people.

A revised model should avoid present tendency to encourage urban sprawl, and include traditional values in dwelling design.
CRITICAL ISSUES

The foregoing study, encompassing a wide range of existing dwelling environments in Lahore, provides factual data and information in a comparative format. Different dwelling types used by various income groups are observed to have a variety of problems and different levels of services. It also indicates that over sixty percent of the city's population live in substandard dwelling units of poor physical state. The urgency of the dwelling needs of this large section of the population demands a substantial program of improvements. With limited resources of the public sector, it has become necessary to optimize its utilization to promote greater social equity.

Various issues emerge from the analysis/evaluation of the dwelling systems, and although their nature may be similar, the causes and solutions vary substantially. Identification of these issues becomes crucial for future policies concerning the upgrading/development of residential areas of the city. They also provide guidelines for better control and optimizing the public sector involvement with respect to the planning process and financial investment.

In this connection, an attempt has been made to identify certain critical issues in the existing dwelling systems and to suggest possible options for their solutions. The options are only illustrative of the factors that need attention of the concerned authorities in order to formulate a comprehensive framework for housing. They are indicated in the following:

TRADITIONAL AREAS
Dwelling unit type: House
Developer: Private

The study indicates that a substantial percent of the dwelling units in this housing system (over 50% in the Walled City itself) have questionable/unclear tenure. Due to the consequent insecurity of occupancy, caused by the ambiguity in tenureship, the individual residents are not willing/do not desire to invest their savings and resources in improving their dwellings. It is also probably due to this factor that the localities are physically deteriorating. In this connection, it is suggested that either through a summary judicial set-up or otherwise, a system needs to be devised through which questions regarding tenureship may be resolved.

The study also indicates insufficient utilities in this housing system. This is a result of problems posed by the physical layout of these areas, which were implemented long before the present service lines were installed. The problems are essentially engineering issues which need careful assessment and evaluation. Furthermore, the numerous narrow streets make it difficult for vehicular traffic and add to the congestion.

For a population of this economic level with very little buying power, mutual dependency is the answer to many problems and, therefore, a cohesive cluster or a group of houses becomes a very important issue in upgrading or redevelopment. Clusters promoting the social/communal interactions are more desirable and should be a major determining factor in any future layout design.
The study indicates that a substantial part of the city's population comprises of very low income groups. To obtain housing facilities on a legal tenure of land/lot at the market level is beyond their economic capabilities. Apart from the cost, the supply of dwelling units cannot cope with the demand, leaving no other options but to squat on undeveloped pieces of public/private land.

A prominent feature of these settlements is the lack or inadequacy of utilities/services. Traditionally, the public authorities have taken minimal action in this direction due to complications arising out of provision of services without any legal title to the land. Usually, this has resulted in the demolition of these settlements, partially or completely, often with no avail as the squatters return and rebuild their dwellings after a short duration. However, in the recent past, the government has formulated a policy of de-facto recognition and legalization of many of these settlements and are in process of upgrading these areas. This policy has been an appropriate move, however, there are other issues which need to be investigated. Issues of levels of utilities and infrastructure; community facilities, in terms of schools and health facilities; employment; financing; implementation; and community participation need to be resolved.

Basic to all other optional solutions is the recognition of the enormous potential that the squatter settlements have in providing a solution to housing.

The layout followed for this type of a development is an auto oriented design, when less than one percent of the residents own cars. This implies excessive capital investment and maintenance costs.

Unbalanced distribution of public/semipublic and private/semiprivate areas is a characteristic of this system. Large tracts of land which are meant to be open areas, the development and maintenance of which is public responsibility, remain undeveloped or poorly maintained for a variety of reasons. If possible, elimination of these areas at the planning stage is desirable. Existence of such areas within a residential development, if not maintained, promotes squatting and encroachment.

Finally, it is suggested that the administration should restrict its activities to providing site and services projects and limit its involvement in building complete dwelling units.
It is inevitable that Lahore will continue to grow in the immediate future. According to estimates, at the current rate of growth, the population will double within the next fifteen years. It is expected that about fifty percent of that population will not be able to reach the formal housing market. The housing gap will continue into the foreseeable future and thus new slums and shanty settlements will continue to be created to meet the requirements of the low income people.

This rapid urbanization will have disastrous implications on all facets of life, unless remedial actions are not undertaken immediately.

It must be recognized that in the past, the government's policies have proven to be highly inefficient and have had limited impact. Results of the government's attempts to eliminate squatter settlements and provide alternate accommodation have been disappointing both qualitatively and quantitatively. Their public works approach to larger urban issues has had a negative effect in relation to controlling land sub-division, land distribution, appropriate directions of growth, and improving the housing conditions of the majority of the population.

Although government policies have had limited success, a reorientation of their efforts and attitudes is required in controlling the formidable housing problems existing in the city. Housing must be considered as a part of the overall process of urban development and the government's emphasis should be directed towards the improvement of the low income people. Participation of the private sector should be promoted and the public sector involvement towards implementation of large scale projects must continue. However, the institutionalized, instant, public projects approach must change. Immediate action should be taken in the provision of infrastructure and community services over which the administration has direct control and responsibility. The provision of dwellings by the popular sector must be encouraged and supported by the government.

A characteristic implication of this study is that the existing situation prevalent in the dwellings systems must be accepted as a starting point for any reasonable program of action and improvement. The existing dwelling systems have certain negative and positive elements which the authorities need to recognize. The policies and actions, subsequently should be geared towards exploiting these potentials. Basic to all other options is the fact that existing dwelling environments provide the framework for planning and executing future developments.
GLOSSARY

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

- SECOND DEFINITION: definitions from technical dictionaries, or reference manuals.
- THIRD DEFINITION: definitions from the Urban Systems Study Group (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. Accuracy of definitions is indicated in parenthesis. (See also: REFERENCES).

ACCESSORIES. The pedestrian/vehicle 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)...not 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 tax assessed by local governments is not always or even usually the market value, but only a valuation for purposes of assessment.

ALIENATION DISTURBANCE. The act or process of destroying the rest, tranquility, or settled state of (the site) by the presence of airplane facilities, vibration, hazards, etc. (Merriam-Webster, 1971)

AIRPORT ZONING RESTRICTIONS. The regulation of the height or type of structures in the path of moving airport aircraft. (U.S.D.P.)

ALTERNATING CURRENT (A.C.) (an electric current) that reverses its direction of flow at regular intervals (U.S.D.P.)

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. (U.S.D.P.)

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

APPRAISERS. The main routes external to the site (pedestrian/vehicle) 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. (Hayes, 1971)

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

BASIN. Earth or other material used to replace material removed during construction, such as in culverts, sewers, and trenches and building backfill excavations and retaining walls or between an old structure and a new lining. (Defina, 1972)

BARRIER. (a boundary) as a topographic feature or a boundary made of a magnetic field, or of chemical transformation. (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 surface base and the base course to increase bond between base and surface course. (Defina, 1971)

BITUMINOUS. A coating of or containing bitumins; as: any asphalt or tarlike materials. (Merriam-Webster, 1971)

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

BOUNDARY. Any (line or area) that fixes or delimits. (Merriam-Webster, 1971)

BUILDING CODE. "A body of 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, qualification, and maintenance of buildings and structures within the city, and any equipment specifically regulated there (A.R.B.O.C., 1967)

BUILDING DRAIN. Lowest horizontal piping of the drainage system receiving discharge from all building plumbing or firefighting equipment. It is connected to the building sewer. (STC 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. (STC 45-7, 1953)

CEMETARY. 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 the liquid into the surrounding soil. (Merriam-Webster, 1971)

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

CLAY. A lusterless colloidal substance, plastic when moist (crystalline grains less than 0.0002 in diameter). (U.S.D.P.)

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

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

COLELCTION SYSTEM. The system of pipes in a sewage network, including lines, manholes, valleys, mainlines, laterals, mains. (U.S.D.P.)

COMBINED SEWER. A sewers that carries both storm and sanitary waste. (Merriam-Webster, 1971)

COMBINED SWAGE. The arrangements of elements that make up a system, such as an electric current, another periodic process. (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.)

COURT. See: ALTERNATING CURRENT, DIRECT CURRENT. (Merriam-Webster, 1971)

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

CUMULUS. A barrier preventing the flow of water: a barrier built across a watercourse and keep back flowing water. (Merriam-Webster, 1971)

CUMULUS ACCELERATION (TAX). A tax incentive based on a property's value: 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 system, such as an electric current, another periodic process. 2) The process of selecting the means and controlling the elements, steps, and procedures for producing what will adequately satisfy some need. (Merriam-Webster, 1971)

DEVELOPMENT. Gradual advance or growth through processes encompassing the building of large quantities of facilities, services, community, etc. (U.S.D.P.)

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

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

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. (Merriam-Webster, 1971)

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 dwellings units: (U.S.D.P.)

DWELLING BUILDING. Four groups are considered: SELF-RENTAL UNIT. The dwelling unit is directly built by the user or occupant; ABREZAR DISTRICT. Where the dwelling unit is totally built by a skilled craftman hired by the user or occupant; PROFESSIONAL DISTRICT. Where the dwelling unit is totally built by a skilled craftman hired by the user, occupant, or developer; SMALL CONTRACTOR DISTRICT. Where the dwelling unit is built by a small organization, on a take or pay basis, by the user, occupant, or developer; "small" contractor is defined by the scale of operations, financially and materially; the scale being limited by the construction of single dwelling units or single complexes; LARG CONTRACTOR DISTRICT. 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 reflecting the scale of operations, competition and larger size of operations accompanying the building of large quantities of similar units, or a simplify larger complex. (U.S.D.P.)

DWELLING DENSITY. The number of dwellings, dwelling units, people or families per unit hectare. (U.S.D.P.)

DWELLING DEVELOPER. Three sectors are considered in the supply of dwellings: POPULAR SECTOR, the marginal sector limited or eliminated by a marginal or social, political, administrative, legal, technical institutions involved in the provision of dwellings. The housing process (promotion, financing, construction, operations) carried out by the popular sector specifically for 'self use' and sometimes for profit. (PUBLIC-
FLOW METER. A device to measure flow of water.

PLUG TANK TOILET. Toilet with storage tank of water under pressure.

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 illumination on a surface at a distance of one foot from a uniform point source of light of one candle and equal to one lumen per square foot. (U.S.D.P.)

FIRES. Casseous emissions that are usually odorous or sometimes odorous. (Merriam-Webster, 1971)

GAS. A system for supplying natural gas, manufactured gas, or liquefied petroleum gas to the site and individual user. (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 discontinuities in the grid blocks some lots have indirect access to public streets. (U.S.D.P.)

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

GRIDIRON BLOCKS. 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 subject to influence by governmental action through all or some of the following regulations: Master Planning 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 60°F. (DePina, 1972)

HIGH-RISE. Dwelling units grouped in five or more stories. (U.S.D.P.)

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

HYDRAULICS. That branch of science or engineering dealing with water or other fluid 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 the use or enjoyment of property. (Merriam-Webster, 1971)

INCREMENT. A special tax on the increased value of land, which is due to the labor of the owner, but rather to natural causes such as the changing of the soil, the addition of gravel or sand, new use made of the land, etc. (U.S.D.P.)

INFRASTRUCTURE. The underlaying foundation or basic framework of transportation network, storm drainage, water network, sewage system, electrical network;
...gas network; telephone network; public transportation; police and fire protection; refuse collection, health schools, playgrounds, parks, open spaces. (U.S.D.P.)

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

INTERIOR CIRCULATION NETWORK (SITE PLANNING). The physical relationship systems to and from the site. It should be designed based upon the exterior circulation/accesses and land development requirements. (1971)

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

KILOWATT (kw). (1000 watts) a convenient measure of large wattage. Kilowatt hours (kwh) measure the total quantity of energy consumed in a given time. (Merriam-Webster, 1971)

LAMPOULE. A vertical pipe or shaft leading from the surface of the ground to a sewer, for admitting light for purposes of inspection. (1971)

LAND COST. Price of 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 (with the understanding that ownership of the land may run as long as 99 years). (U.S.D.P.)

LAND-MARKET VALUE. Refers to: 1) the present monetary value of the land; 2) the present taxes value of the land; or 3) the present commercial market value of the land. (1971)

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 building or holding of 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 (public parks, walkways, open spaces): user -approved/unlimited; physical controls -minimum; responsibility -public sector. PRIVATE (private parks, playgrounds, schools): user -limited group of people; physical controls -partial or complete; responsibility -private sector and user. PRIVY (dwellings, lots): user -owner or tenant or second owner -limited. INDIAN -PRIVATE (cluster courts): user -group of owners and/or tenants; physical controls -partial or complete; responsibility -user. (1972)

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

LAND UTILIZATION: RESPONSIBILITY. The quality/state of being morally/legally responsible for the use and maintenance of the land by the owners/users. (1972)

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

LATRINE. A receptacle (as in 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 cell) containing such a receptacle. (Merriam-Webster, 1971)

LAYOUT. The plan or design or arrangement of something. LAYOUT differs from layout. (Merriam-Webster, 1971)

LEVELS OF SERVICES. Two levels are considered: MINIMUM, are admissible or possible levels below the standards; STANDARD, are set up and established by authority, custom of general consent, as a standard. (Merriam-Webster, 1971)

LUMINAIRE. In highway lighting, a complete lighting system which is owned and operated by the government containing within it or in connection with it. (Merriam-Webster, 1971)

LOW. 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 eourt (owned in common). (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.)

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

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

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

LUMINAIRE. In highway lighting, a complete lighting system which is owned and operated by the government containing within it or in connection with it. (Merriam-Webster, 1971)

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

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

occupied by a railroad, the land used by a public utility, or rights-of-way may be shared (as streets; pedestrian walkways and railroads, etc.) (Merriam-Webster, 1971; U.S.D.P.)

RAPIDWAY (HIGHWAY). A portion of the highway included between the outside lines of gutter or side ditches, including all appurtenant structures, shoulders, and appurtenances necessary to proper drainage, protection, and use. (Defina, 1972)

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

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

ROW-ROOF RATIO. The percentage (ratio) of the building area that is not reduced by eavestrough, depression storage, surface wetting, and percolation. (Merriam-Webster, 1971)

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

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

SEMI-DETACHED DWELLING. "Two dwelling units sharing a common wall (duplex)." (Merriam-Webster, 1971)

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. (NRTC ST 45-7, 1953)

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

SEWERAGE. The entire system of sewers. (U.S.D.P.)

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

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

SEWERAGE SYSTEM. A 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.)

SIZZ. 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 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 new housing. (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 and fuel are: (a) smoke (from fires); (b) smog (from engines); and (c) fume (from industrial operations). (Merriam-Webster, 1971)

SOIL BUILDING. The arrangement of soil particles in various aggregations differing in size, shape, stability, and 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 for possible limitations and restrictions/hazards for early planning considerations. (U.S.D.P.)

STACK. The vertical pipe in a dwelling of the soil, waste, and vent systems. (Merriam-Webster, 1971)

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

STANDPIPE. A pipe riser with tap used as a source of water for domestic purposes. (Merriam-Webster, 1971)

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

STREET LIGHTING. Illumination to improve vision at night for security and for the extension of activities. (Merriam-Webster, 1971)

SUBDIVISION REGULATIONS. Regulations governing the development of raw land for residential or other purposes. (Merriam-Webster, 1971)

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

SUBMAIN or BRANCH SEWER. A collector pipe receiving sewage from one or more sewers. (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.)

SUGGEST. The right to profit from a parcel of land or control of a parcel of land without becoming the owner or discontinuing the 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.)

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

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

VIEW. A view or property not covered by the terms that are revealed to the eyes 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 the pipe discharge from water closets. (U.S.D.P.)

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

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

WATERSHED. The catchment area or drainage basin from which water is ultimately drawn. (Merriam-Webster, 1971)

WASTE. (I) any material of a fluid or solid form that is not useful to the user. (U.S.D.P.)

WATER TRAP. A trap using water as a seal to prevent gases and odors being discharged through fixtures. (NRTC ST 45-7, 1953)

WATERFRONT. Means of conveyance of passengers or goods from one place (the site) to another place (parts of other urban context). (NRTC ST 45-7, 1953)

WEBSTER, 1971. A dictionary or reference work containing information on words, their origins, and usage. (Merriam-Webster, 1971)

WEBER, 1971. A dictionary or reference work containing information on words, their origins, and usage. (Merriam-Webster, 1971)

WEDGES. The whole system of reservoirs, channels, ditches, etc. (U.S.D.P.)

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

WETZEL, Waiss (me) 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. 746 = Hp. (NRTC ST 45-7, 1953)

XERISCAPE. The desertification of a city by ordination into 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.)

XEROGRAPHY. The availability of new housing. (Merriam-Webster, 1971)
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QUALITY OF INFORMATION
The quality of information given in drawings, charts and descriptions has been qualified in the following manner:

Approximate: when deducted from different and/or not completely reliable sources.

Accurate: when taken from reliable or actual sources.

Tentative: when based upon rough estimations of limited sources.

QUALITY OF SERVICES, FACILITIES AND UTILITIES

None: 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 to a locality.

METRIC SYSTEM EQUIVALENTS

Linear Measures
1 centimeter = 0.3937 inches
1 meter = 100 centimeters = 39.38 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 10.764 square feet
1 hectare = 19,000 sq.metres = 2.4711 acres
1 square foot = 0.0929 square meters
1 acre = 0.4047 hectares

DOLLAR EQUIVALENTS

All income, cost and rent/mortgage data have been expressed in terms of the U.S. equivalent. 1 US Dollar = 9.90 Rupees (May 1979)