Ismailia Demonstration Projects
Volume 3 Technical

Clifford Culpin and Parters
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Preface

The format of the Ismailia Demonstration Projects final report is as follows:

Volume 1: Proposals. This volume provides an overview to the study, describes the plans and present proposals.

Volume 2: Technical. This volume provides technical background on the subjects of population and social studies, land, building and housing.

Volume 3: Technical. This volume provides technical background on the subjects of environment, social facilities and recreation, commerce, industry, centres, transportation and roads, utilities, costing, ability to pay and finance, institutional options and legal context.

The technical volumes provide the supporting information, such as survey results, on which the proposals are based and describe the development of the proposals.

The text is supported, wherever possible with small scale figures. In addition, three portfolios (A,A* and B) of large scale plans are provided. These are necessary only for detailed examination of the proposals.

Index

List of Tables

List of Figures

1

Environment

1
Enviroment

1.1 This section deals with the physical basis of the proposals, and the means by which this information was collected. The mapping which was carried out is described, with emphasis on the 'intermediate level' surveys which were used to supplement the formal methods when a greater area than could be formally surveyed was required, but only a lower level of accuracy needed. Soil information of two types was collected. Structural information was obtained from the parallel 'Ismailia Geotechnic Study', while the potential for landscaping was assessed by carrying out a special survey of soil quality. The surveys of land use and condition of buildings formed an important basis for the proposals for improvement of existing areas. They were carried out at two levels of detail; the first covered the whole of the existing areas of El Hekr and Abu Atwa, and the second, more detailed, concentrated on the 'Detailed Improvement Areas'. A short section describes the relevant climatic factors operating in Ismailia, and the final sub-section considers the main concepts of landscaping relative to the physical background, and to implementation and maintenance.

LAND SURVEY

SURVEY AND MAPPING METHODS

1.2 A number of methods have been employed in order to obtain appropriate standards of detail and accuracy of survey information for each of the three Project Areas. These are outlined below.

i) Use of Existing Maps and Survey Information

1.3 The extent and nature of this varied between the three areas. In El Hekr, a 1:2500 scale map (1975) and 1:500 City Plans (1961 and 1962) were available though the map and plans were of limited use because of recent development. For Abu Atwa, no large scale or up to date mapping existed at all. Sixty percent of the Nifisha industrial site was surveyed in 1976 and mapped at 1:1000, though this survey was not tied into the Survey

of Egypt grid. All three areas are covered by the Survey of Egypt (1942) 1:25000 scale map, and aerial photography of poor definition at scale 1:10000 (1965). These were, however, considerably out of date and although further aerial surveys were flown in 1977 for the entire city, no photographs were available for use by the Consultants in time to be utilised. The existing mapping was therefore deficient in both coverage and reliability.

ii) Full Ground Survey

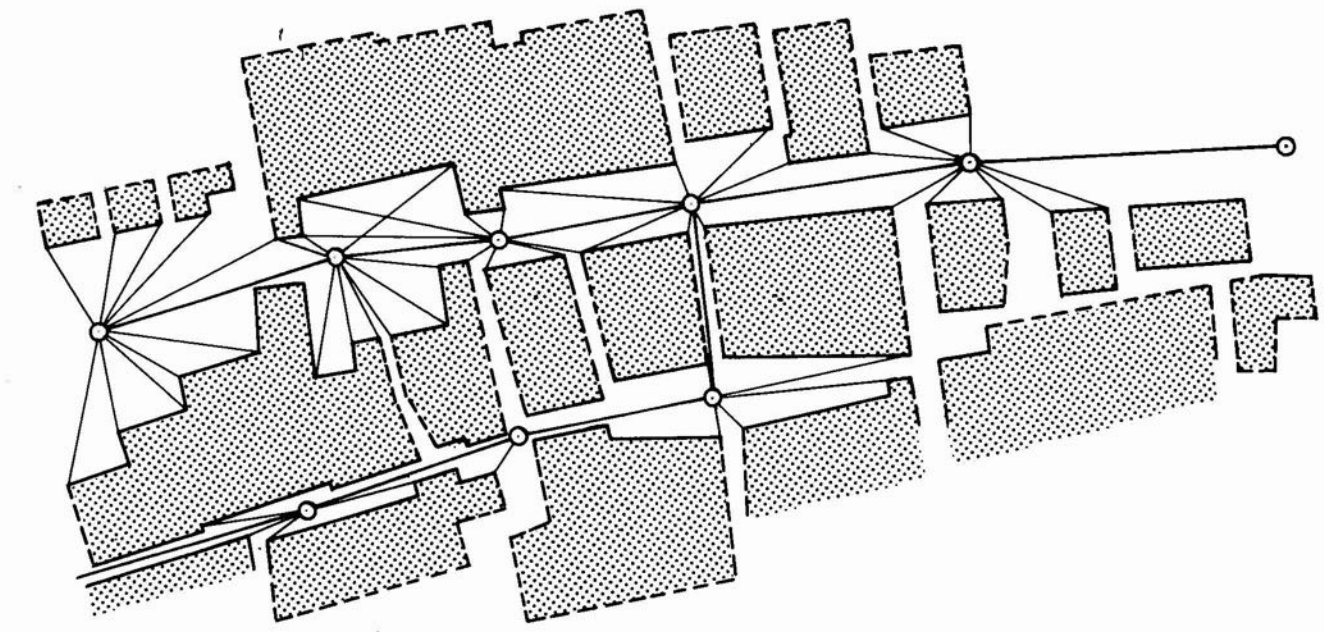
1.4 This work was carried out by the Executive Agency for Reconstruction in the Canal Zone Administration of Reconstruction Surveys and Studies. Conventional ground survey methods were used in which a network of co-ordinated points was established by Primary and Secondary traversing to a relative accuracy not less than 1:20000*. From these points, detail and levels were surveyed by electronic and stadia tacheometry, together with level grid and tape methods. In built-up areas, the survey located in detail all building plots by block and, in areas of sporadic development, distinguished between individual buildings and plot areas marked on the ground by low walls. The full ground surveys were plotted at a scale of 1:1000 and contoured at 0.5m intervals.

*Full specification for this survey is given in Ismailia Demonstration Projects Status Report

iii) The 'Intermediate Level' Survey

1.5 This method employed a mixture of techniques to provide mapping for areas where a lower level of accuracy and detail were sufficient. A framework was established by running a traverse along the main local streets of a given area and locating plan detail points (ie., corners of buildings, electricity poles, etc.) by tacheometric survey as indicated in Figure 1.1.

This survey framework was plotted at 1:1000 scale and transposed to scale 1:2500 and then used as the base for a sketched plan, the remaining detail of which was completed by members of the field team by pacing, or by tape measurement according to the level of accuracy required. This permitted a very rapid survey which was



AGRICULTURE

EXISTING DEVELOPMENT

AREA OF 1:1000 SURVEY

LINES OF ADDITIONAL LEVELLING

El Hekr · Ground survey areas

1·2

accurate where required, in the main streets, where levels and building limits were precise.

iv) Sketch Mapping

This consisted of visual checks in the field to plot buildings, roads, planting and other features where survey information was out of date or none was available. It also served as a valuable check upon the full ground survey. Mapping was generally at scale 1:2500.

APPLICATION

1.7 The methods used in each of the three areas varied according to the quality of existing mapping and the likely requirements of Project proposals. The approach adopted in each area was as follows:

i) El Hekr

1.8 The total Study Area included 395 hectares as shown in Figure 1.2. The existing survey covered only the more developed southern area; this was largely out of date but, locally, provided the basis for sketch mapping. The recent settlement in the north and west was not covered by mapping or aerial photography.

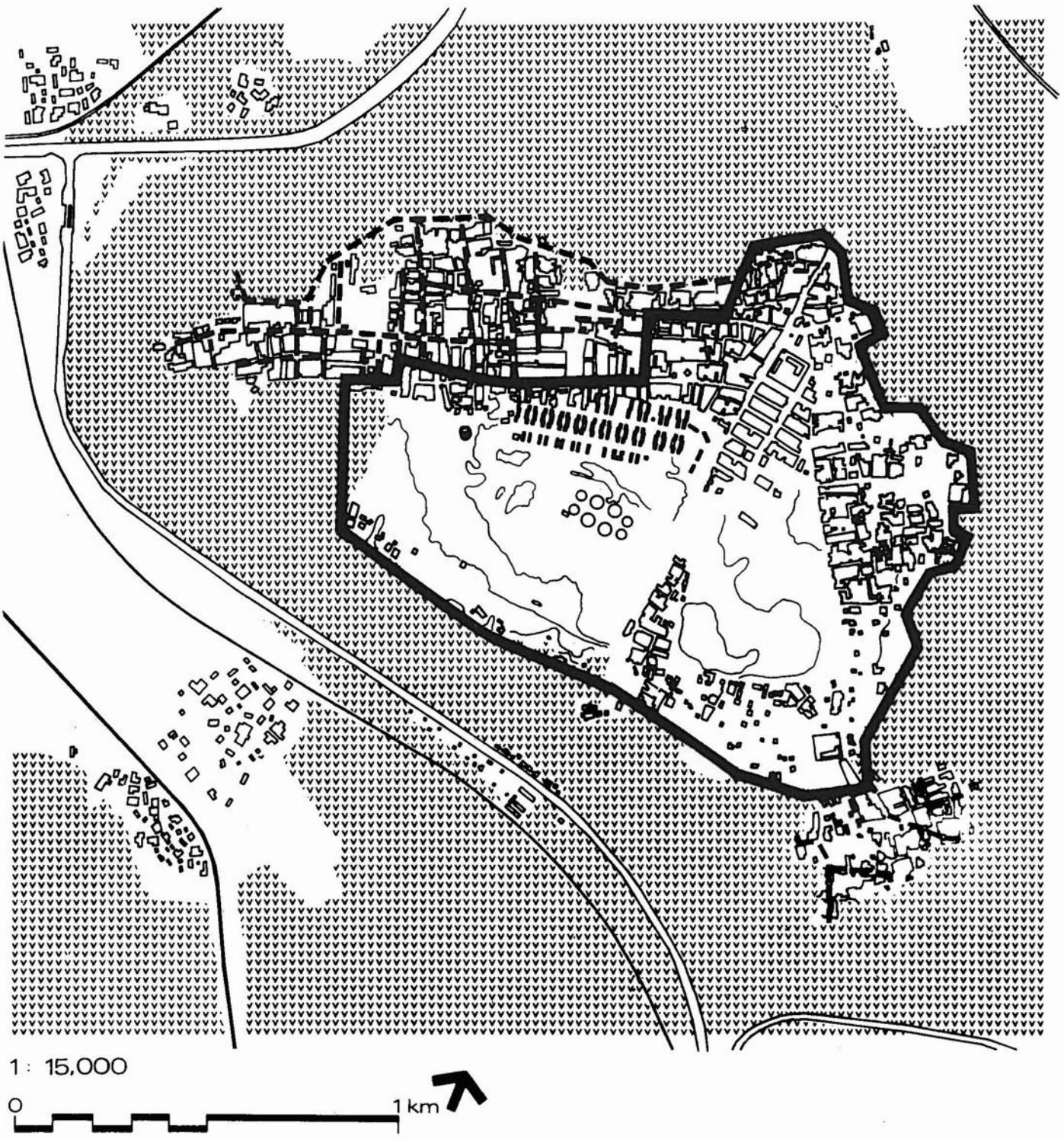
1.9 A full ground survey was therefore made of the 210 hectares in these latter areas and in the section of the existing development selected for detailed improvement. The area involved was surveyed using 35 traverse points established with a relative accuracy greater than 1:20000. Two Survey of Egypt co-ordinated points numbers 3 and 4, were used to locate the site in this grid.

1.10 Outside the area of full ground survey, additional level traverses were carried out to give some level coverage of the study area outside the fully surveyed area. The existing plans were verified in selected areas and detailed checks were made of those where specific action was envisaged or important features were observed. The methods used in each part of the area are shown in Figure 1.2.

ii) Abu Atwa

1.11 The Study Area covered 315 hectares. No up to date mapping existed for any part of this and a full ground survey was therefore undertaken for those locations in which it was considered development was likely. This survey covered 110 hectares of land and included the central and southern areas of Abu Atwa as well as open land south of Abu Shehata selected for new development. The detailed improvement area was also included. A total of 47 traverse points were established with a relative accuracy greater than 1:20000. Three Survey of Egypt co-ordinated points, numbers 14, 706 and 73, were used to locate the site on this grid.

1.12 The area covered by this full survey excluded all the agricultural land surrounding Abu Atwa, as well as the sewage works, a small military site and a refuse tip, which were treated as special areas. Access to some of



RAILWAY

CANAL

EXISTING DEVELOPMENT

AREA OF 1:1000 SURVEY

LINES OF ADDITIONAL LEVELLING

Abu Atwa · Ground survey areas

1·3

the special areas became possible during the course of field work, however, and the relevant areas were subsequently included in the full survey.

1.13 In addition to this work, the 'intermediate level' survey method was applied to extensive parts of the Study Area. A number of local east-west roads were accurately surveyed and the blocks in between sketched in by members of the field team. The same approach was then applied in El Sahara. In each case, full survey details were plotted at scale 1:1000 and also transposed to 1:2500 base. As in El Hekr additional level traverses were carried out to give some level coverage over most of the Study Area. The methods used in each part of the area are shown in Figure 1.3.

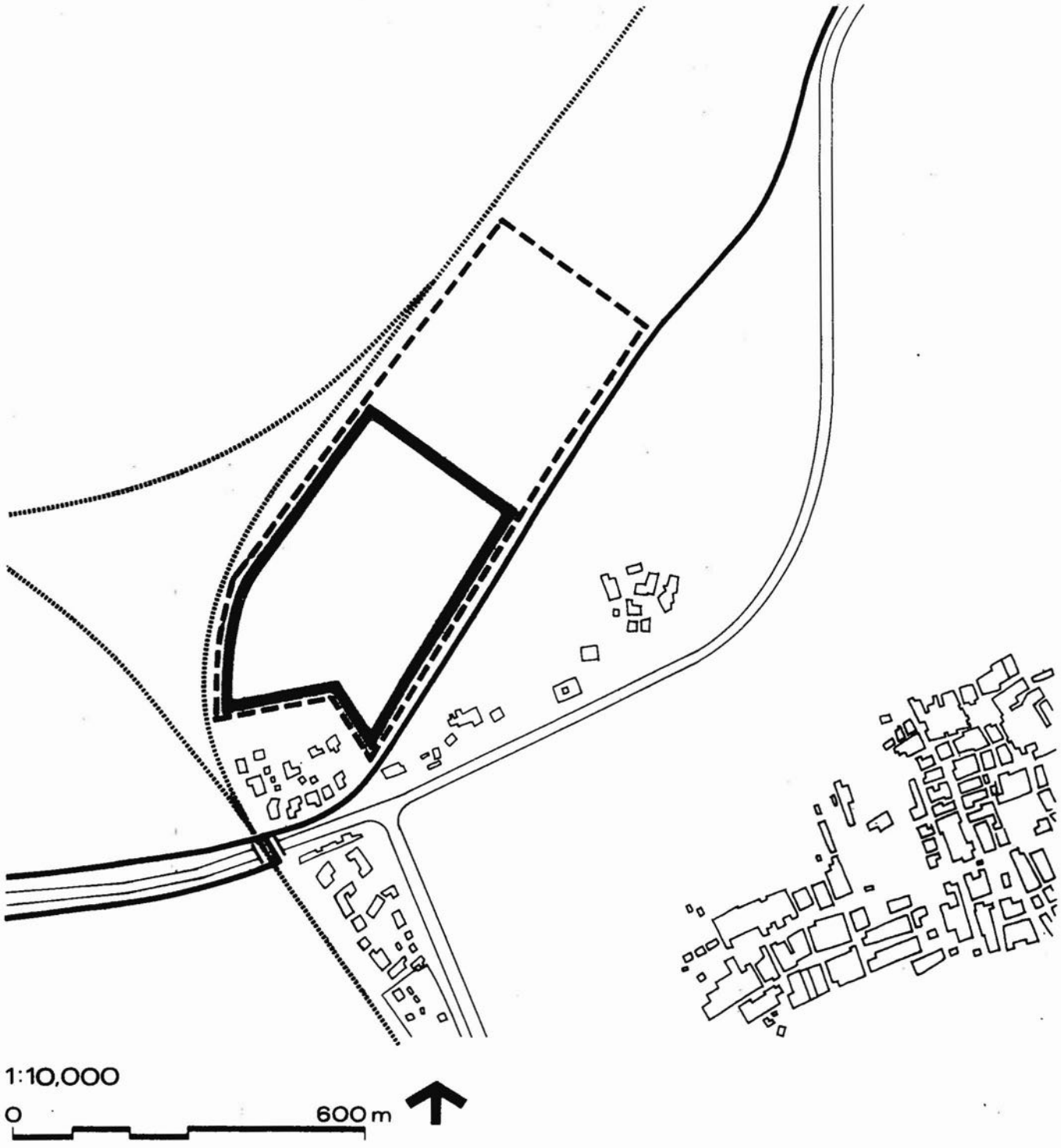
iii) Nifisha Industrial Site

1.14 The Study Area covers 40 hectares, 60% of which was surveyed and levelled in 1976 on a 20m level grid; the plot of this survey shows only a few features and has no grid which can be related to the Survey of Egypt. Substantial land filling has taken place since the survey, changing levels, particularly in the western part of the site. The survey does not show features such as the main road and several low-level walls; however, the wall may have been built after the survey. For these reasons, a full land survey was proposed for the entire site, and permission requested from the military authorities. This was not, however forthcoming, and a limited updating survey to 1:1000 scale has been carried out on the western part of the site, away from the military area. This survey comprised levels at 30m intervals and identification of principal features. A traverse line was made from Nifisha bridge to link the site to a known point, but the survey has not, to date, been linked to the Survey of Egypt grid. The survey coverage is shown in Figure 1.4.

Comments

1.15 Control traverse closures for both El Hekr and Abu Atwa were generally good, (1:20000 to 1:50000) and all points were plotted accurately and checked. The connections to the Survey of Egypt were less reliable and descriptions of points have been difficult to obtain. The minimum number of points were therefore used and no checks were possible. Traverse points, especially those on the tops of buildings, were not well located in either area. All levels were related to the Survey of Egypt.

1.16 In view of the resources required to undertake full ground surveys, the Consultants placed considerable emphasis upon the 'intermediate level' survey method. This was found to provide an accurate framework of details in a given area within a short time and using simple survey methods. Especially if combined with the use of aerial photographs, it could provide a reliable, quick and inexpensive method of obtaining survey information and the Consultants recommend that it be considered for wider application. Unfortunately, aerial



AREA OF 1:1000 SURVEY
EXTENT OF STUDY AREA
CAIRO - ISMAILIA ROAD
RAILWAY
SWEETWATER CANAL

Nifisha light industrial area · Ground survey 1.4

photographs were made available to the Consultants too late in the study to allow them to be used.

SETTING OUT

INTRODUCTION

1.17 One of the first steps towards implementation of the proposals will be to set out plots in the Phase 1 areas and to ensure that sites set aside for community facilities can be safeguarded against encroaching development.

1.18 For the new areas the setting out information is provided by defining coordinated points which allow the intersection points of street rights-of-way to be established. These points, given on the setting out drawings* are expressed in the terms of the Survey of Egypt grid. The setting out drawings also give the dimensions of rights-of-way and,where necessary, additional information in the form of off sets and bearings from coordinated points. The information presented on the setting out drawings is thus sufficient to define the property lines defining the boundary of each block.

*See Portfolio A Drawings Nos. 11A,B, and C and Portfolio B Drawing No. 30.

LAYOUT

1.19 The plot layouts are based on a grid of streets except where topography, or other factors, have imposed irregularities. This greatly simplifies setting out. Plot dimensions are not given specifically on the 1:1000 scale drawings of the new areas but because plot sizes are based on 3 metre modules,dimensions can be scaled off the drawings with sufficient accuracy for setting out.

METHOD

1.20 The control points used in the full ground survey can be used in establishing on site a sufficient number of the intersection points from which block and plot setting out can proceed. This part of the setting operation should be carried out by accurate survey; once this framework is established theodolite and tape can be used to set out each block.

Plot Setting Out

1.21 The block corners can easily be located once rights-of-way intersections have been established. A theodolite and tape can then be used to define the plot corners in each block. The theodolite would be set up at one end of the front, and then back, of plot boundary lines. Then using the theodolite to keep the correct line, plot widths would be taped off along the boundary line. Taped plot setting out should be checked by measurement of diagonals.

1.22 It is necessary to locate blocks with reasonable accuracy because the layout design has taken account of existing development. An accumulation of errors could easily mean that existing buildings could be in a new right-of-way, or that new roads will mismatch existing

rights-of-way. However it can also be expected that existing buildings have not been accurately located (or there has been subsequent development) when the full ground survey was done. For this reason some local adjustment to the plot layouts may at times be necessary.

Local Grids

1.23 It is suggested that a local setting out grid be established where this is convenient. Most of the new area in El Hekr is a regular street grid and a setting out grid parallel to the streets would simplify the survey work. The El Hekr drawings key gives coordinates on the base line which are used to locate the street grid.

1.24 The enforced irregularities in the Abu Atwa layouts mean that a local setting out grid based on the street grid cannot be used. The Nifisha setting out information is entirely based on a local grid, because the survey tied to the Survey of Egypt is not yet available.

SOIL SURVEY

1.25 Two surveys have been undertaken in the Study Areas. First, studies of soils have been undertaken to evaluate their ability to support vegetation.* Secondly, the Geotechnical Investigation** has surveyed ground conditions principally to evaluate engineering problems and possibilities. A summary of these is made here, but for full discussion reference should be made to the Study Report.

*Ismailia Demonstration Projects Working Paper No. 3 'Soil Quality Survey'.

**Geotechnical Investigation for the Ismailia Master Plan, MOHR/ODM Draft Final Report

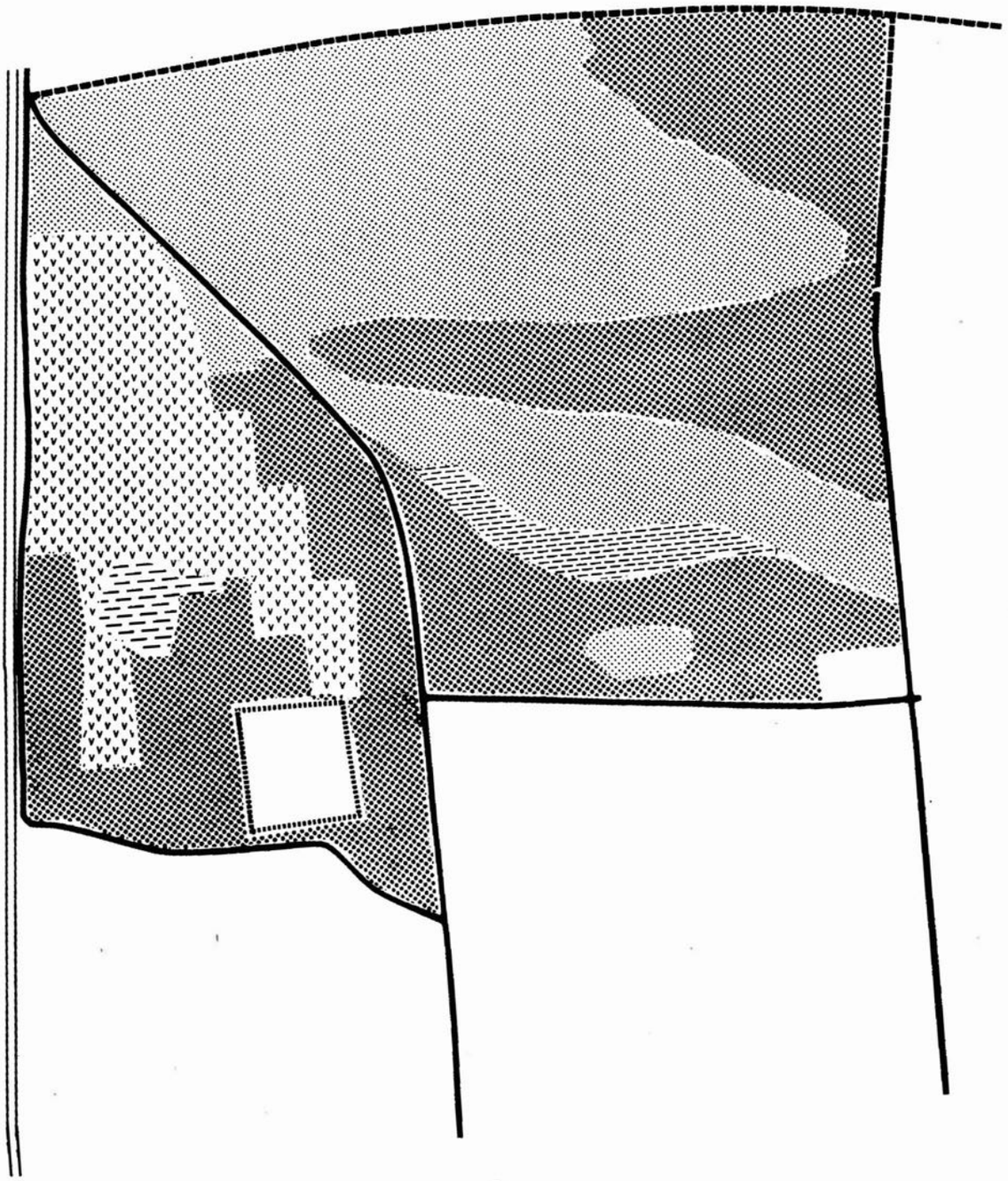
1.26 The Geotechnical Studies of the Project Areas were based on a series of borehole, trial pit and Mackintosh Probe tests. The soil survey was based on a series of profiles which were developed to represent different soils in the Project Area.

1.27 Principally, the surveys show that in Abu Atwa there are no geotechnical problems, but in both El Hekr and Nifisha problems for development exist. Descriptions of each area are set out below, followed by a description of the problems where these exist.

EL HEKR

Geology

1.28 The surface geology of the El Hekr Study Area is shown in Figure 1.5. The site is underlain by Pleistocene sands and gravels, containing lenses of overconsolidated clay, generally between 1m and 3m thick. These lenses are often used as sources for building materials. The Pleistocene deposits are overlain by windblown sands of variable thickness. Although most of El Hekr has at least a thin cover of windblown sands, in places foundations will be placed on the underlying Pleistocene deposits. The distinction is significant and is discussed below. The extent of the deposits are shown on Figure 1.5.



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Source: Geotechnical Investigation for the Ismailia Master Plan MOHR/ODM draft final report

IRRIGATED AGRICULTURAL AREA

APPROXIMATE EXTENT OF HIGH WATERTABLE AND SAND FILLED CHANNEL

WINDBLOWN SAND: SINGLE SIZE SUBROUNDED SAND

CEMENTED SANDS AND GRAVELS

MARSH

TIPPED RUBBISH FILL

1·5

El Hekr·Geological survey

1.29 There is a former drainage channel running from west to east through El Hekr. This is filled with windblown sands to a depth of at least 3 metres and on its southern side, where the surface topography is lower, the water table is generally within 1m of ground surface over the area shown in Figure 1.5. The groundwater table is also within 1m of ground surface in the west and south west of El Hekr, adjacent to the Port Said Sweetwater Canal. Apart from these areas the water table appears to be between 2m and 5m below ground surface in the central part of El Hekr, becoming deeper as the topography rises to the north.

1.30 In conclusion, the principal development problem in the area will be the excavation of windblown sands below the water table for pipe laying and foundations. This problem will be greatest in the central part of El Hekr where the windblown sands are thickest and the ground water table is at, or close to, the ground surface. The latter problem also applies in the south western corner of the area.

Implications for Building

1.31 On the Pleistocene sands and gravels no significant problems are foreseen in the construction and performance of foundations. On Pleistocene clays footings of 1 metre square at 1 metre depth are suitable for bearing pressures of 2 Kgf/cm^2. In windblown sand areas foundations placed at a depth of 0.5m may be designed for bearing pressures of about 1 Kgf/cm^2 depending on the geometry of the foundations.

1.32 Excavations in dry Pleistocene deposits will present no problem and the sides of the excavation should be stable at steep angles. However, excavations in dry windblown sands will have to be supported full face unless the side slopes can be battered back to angles of about 30^o without causing damage to adjacent buildings. Excavations below the water table will be difficult and dewatering will be required, probably requiring a well pointing system.

1.33 The water table over most of El Hekr is at present sufficiently far below ground level for chemical attack on concrete not to cause a problem. Chemical attack on concrete placed above the water table will be small, provided dense, well compacted concrete is used. The Geotechnical Report sets out specifications. Chemical attack will need to be dealt with in areas of high water table. This will be encountered in the southern part of the channel through the middle of El Hekr, where foundation concrete should be designed accordingly.

1.34 Some drifting sand will occur in the northern part of El Hekr causing a build-up of sand. It is considered that the problem is minor and can be dealt with by maintenance. With a high density of structures the overall problem will be reduced.

Implications for Landscaping

1.35 The morphological and chemical studies of the soil samples taken from El Hekr reveal limited soluble salts and a relatively low amount of bicarbonate. Sodium comprises less than half of the soluble cations. Generally the soils are of moderate potential for planting, and would support a restricted range of vegetation. In the north of El Hekr,due to the relative increase in gravels and to the west due to their alkaline nature, the soils are less conducive to vegetation and hardy species are required.
(Planting is discussed more fully in the following section 'Landscaping'.)

ABU ATWA

Geology

1.36 Abu Atwa is an island of Pleistocene deposits in the centre of a wadi, rising about 10m above the wadi floor. These Pleistocene deposits are principally sands and gravels and although no clays were encountered, it is possible that they may exist. The sands and gravels are variably cemented, the west side of the Project Area being generally less than the east. (See Figure 1.6).

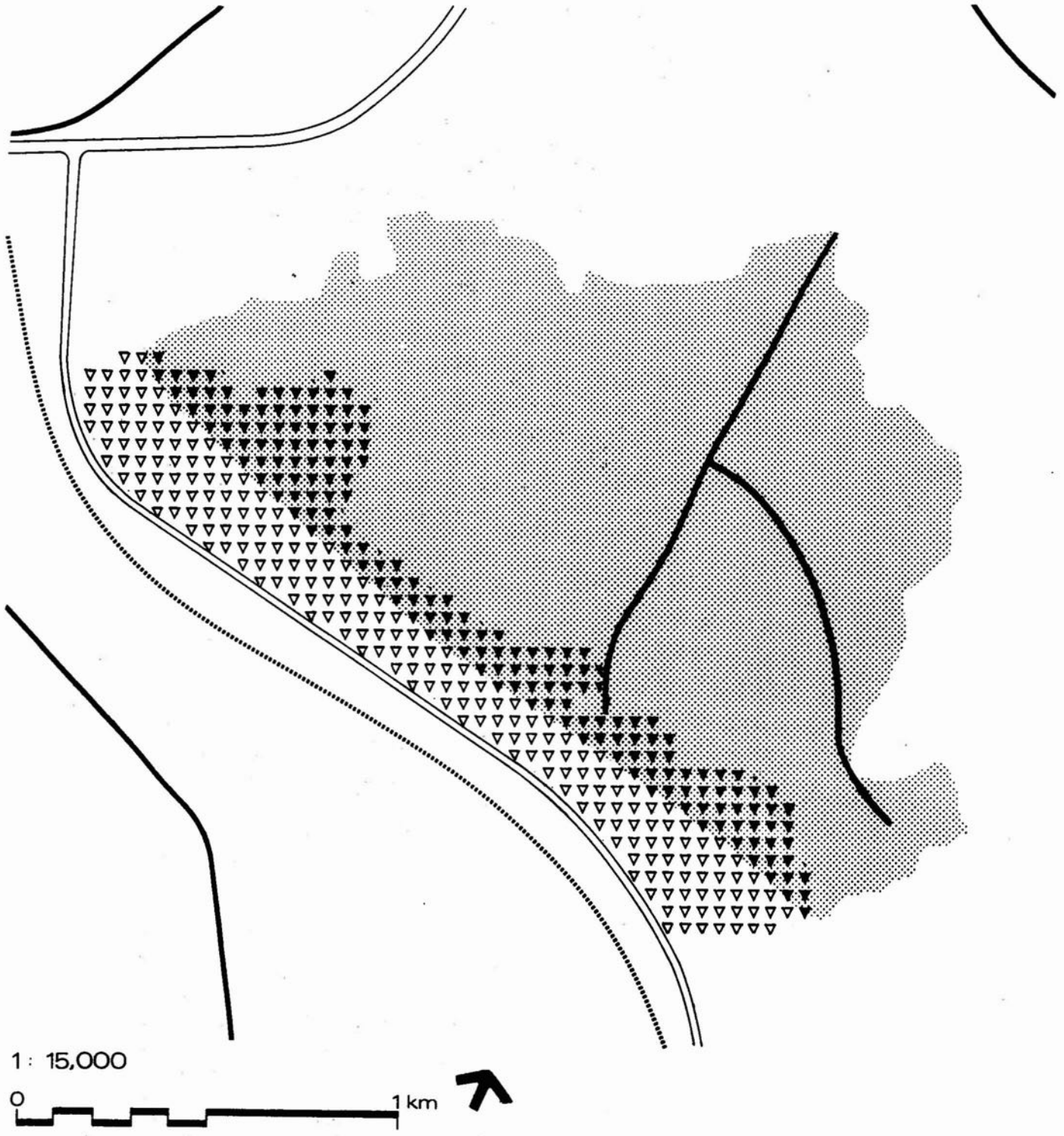
Implications for Building

1.37 No significant foundation problems are anticipated in the Pleistocene deposits for the types of structures proposed. Allowable bearing pressures will be about 3 Kgf/cm^2 (sufficient for multi-storey buildings), the actual pressure depending on the degree of cementing, the geometry of the footing and the allowable settlement.

1.38 Since all foundations will be above the water table no problems of sulphate attack are anticipated unless the groundwater table rises locally. No problems are anticipated during construction. The sides of excavations through well cemented materials will stand unsupported vertically, but excavation by hand through these materials will be slow. The slopes of excavations through less well cemented materials will have to have a 45^0 or 60^0 batter, but excavation through these materials will be easier. The high salt content within the upper layers of the Pleistocene deposit makes these materials potentially unsuitable for re-use as aggregate without extensive washing. However, the less well cemented sands and gravels occurring on the west side of Abu Atwa may be used, although some washing is likely to be necessary.

Implications for Landscaping

1.39 Soils in the Abu Atwa area are poor, with moderate to high salt content. They are suitable for planting of species with tolerance to saline conditions.



Source: Geotechnical Investigation for the Ismailia Master Plan
MOHR/ODM draft final report

ROAD

RAILWAY

CANAL

IRRIGATED AREA

PLEISTOCENE DEPOSITS

Abu Atwa · Geological survey

NIFISHA LIGHT INDUSTRIAL AREA

Geology

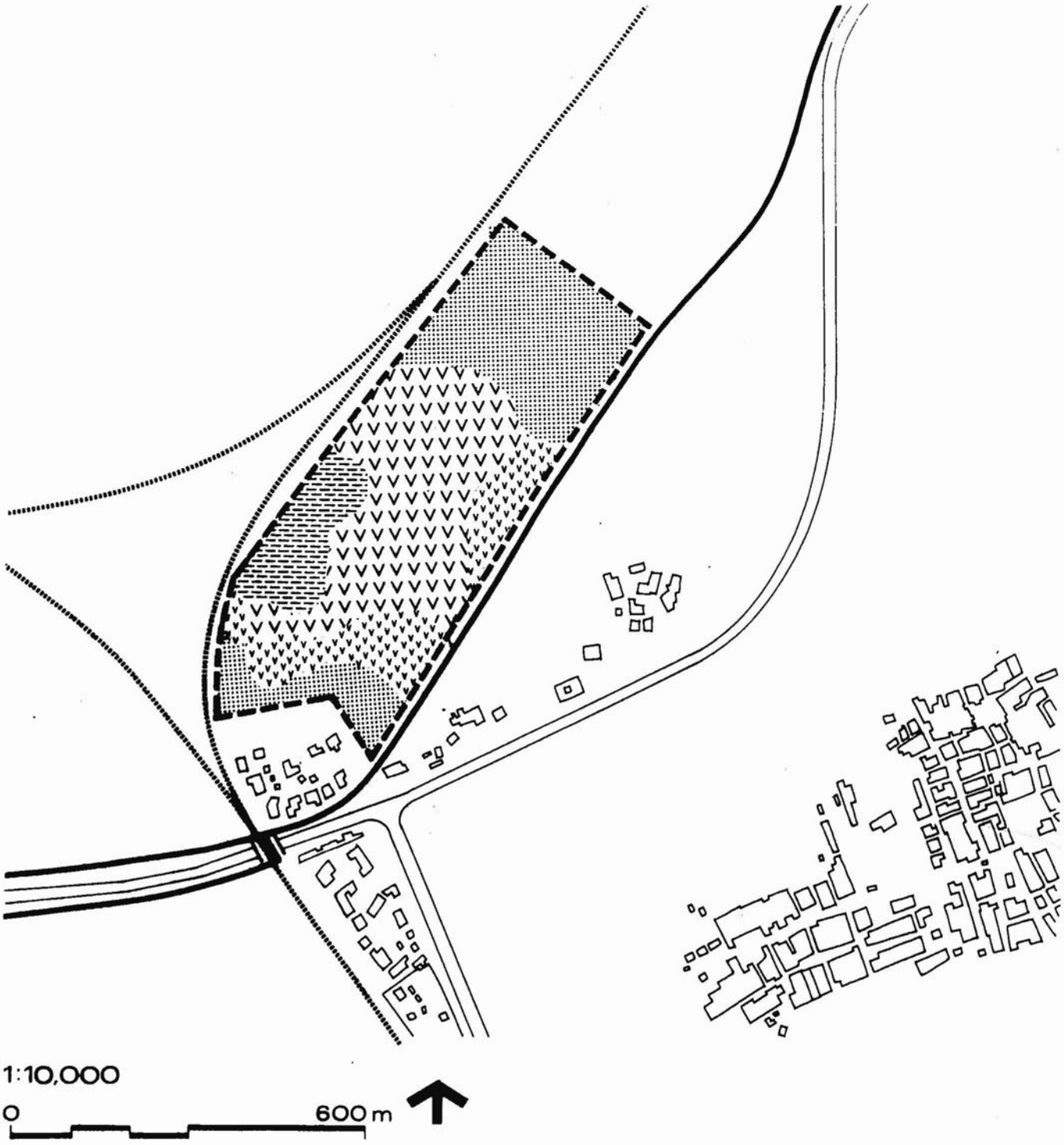
1.40 The Nifisha area is underlain by Pleistocene deposits covered in part by a thin layer of windblown sands. The southern part of the area has been filled using windblown sand to raise the ground level above the zone of capillary rise (0.5m - 0.6m above the ground water table). Over part of the area a salt crust is forming above standing water. In this very saline environment vegetation is scarcely supported and in this central area even palm trees have died.

1.41 The boreholes indicated an artesian pressure at a depth of about 8m below ground level so that there is an upward flow of water beneath the site. The dead palm trees and salt crust forming at the present time may indicate a recent rise in the water table. This may result either from a general rise in water table associated with the water level in the Sweetwater Canal, or more locally from a blocked drainage system. (See Figure 1.7)

Implications for Building

1.42 The very high water table and chemically aggressive composition of the groundwater provide the main engineering problems. The combined difficulties of constructing footings below the water table with an artesian pressure at depth, and providing sufficient protection of the concrete to sulphate attack, probably rule out the practicability of constructing footings from the existing ground level in this central area of the site. This situation has acted as a major constraint on proposals for the light industrial estate, see Volume 3, Section 4.

1.43 The conclusion of the Geotechnical Investigation is that compacted fill over the whole site is necessary. The fill is recommended to be at sufficient depth that foundations can be placed above the level of its groundwater and zone of capillary rise. Not only would the foundation problem be eased but also the difficulties of installing services. An allowable bearing pressure of 3 Kgf/cm^2 for a conventional pad footing, approximately 1 metre square at a depth of 1 metre exists at the moment. If fill is provided, it will have to be properly compacted to ensure that it is capable of carrying the proposed loads. To provide this standard, up to 3 metres of properly compacted fill would be required which is very expensive. Alternative solutions would be to have a lower fill level and provide extra concrete in the foundations for wastage, or to use only low cost buildings with very shallow footings.



Source: Geotechnical Investigation for the Ismailia Master Plan
MOHR/ODM draft final report

PLEISTOCENE DEPOSITS
AGRICULTURAL AREA
RECLAIMED LAND
HIGH WATERTABLE

Nifisha light industrial area

1·7

Implications for Landscaping

1.44 The high salt content of the soils limits their potential for landscaping. In the higher parts and where fill is provided, trees and shrubs with a high salt tolerance should be used.

LAND USE

The Surveys

1.45 Block by block field surveys of land use were conducted within, and where significant, peripheral to the Study Areas. Records were made of all land uses at a broad level of generalisation,(for example, whether residential, industrial or agricultural use) and at a detailed level, (for example, individual shops, cafes, workshops, schools and mosques.)

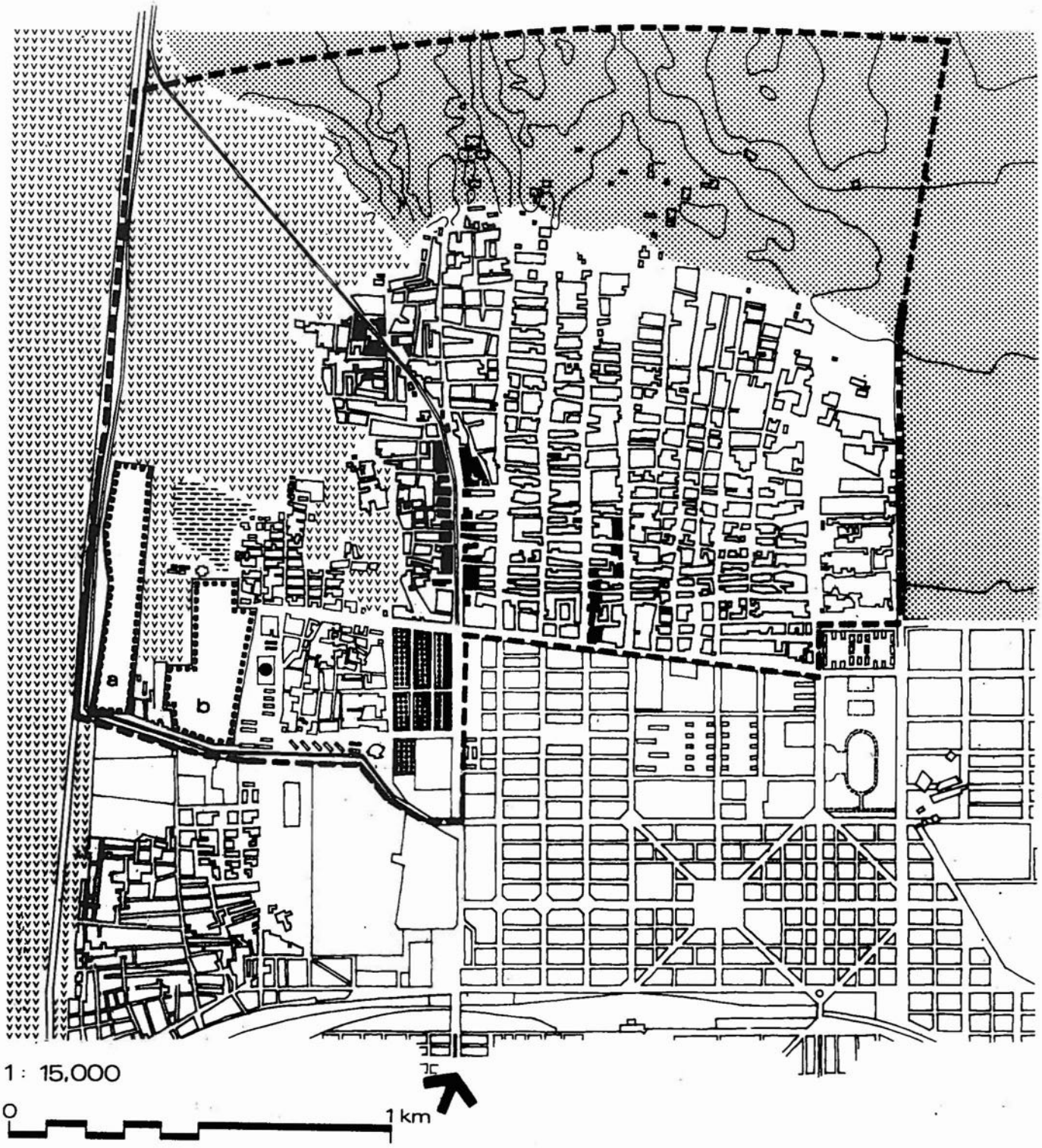
1.46 The findings of the surveys have been mapped and appear as Figures 1.8 and 1.9.*

*See also large scale figures and portfolios

El Hekr

1.47 Figure 1.8 shows the principal distribution of land uses in the Study Area.

1.48 The western quarter of the Study Area is predominantly agricultural being essentially low lying ground, irrigated from the adjacent Sweetwater Canal. This area is thus not suitable for urban development. Equally, the south west corner of the Study Area is occupied by the Suez Canal Authority Nursery and an Agricultural College, in addition to housing. This section of the study area has been excluded from the Project Area, for which detailed proposals are being made, for technical and administrative reasons.



SHOPPING/COMMERCE AREA
URBAN/RESIDENTIAL AREA
INDUSTRIAL AREA
DESERT WITH SPORADIC DEVELOPMENTS
AGRICULTURAL LAND
MARSH
SECONDARY SCHOOL
a SCA NURSERY
b AGRICULTURAL COLLEGE

El Hekr · Existing land use

1·8

1.49 An estimated 58.4% of the Project Area is built up, and of the remainder in the north and north east, 20% is completely unbuilt and 21.6% contains scattered buildings at very low density. Of the built up area 56% is in predominantly residential use, containing within it shop and workshop uses. These are concentrated along principal streets and in particular Talaatini and Tanta Streets, and further shops are scattered more or less evenly throughout the residential areas. Larger industrial or commercial uses are few in number. The area south west of the junction of Talaatini and El Bahri Streets just outside of the Project Area, contains a bus repair garage, government workshops and store. The only significant premises within the Project Area are the bread factory, a timber yard and grain store in the commercial area concentrated along Talaatini Street.

1.50 General circulation takes up 43.5% of the built up area and this land is more than will be needed for circulation. The availability of a proportion of this land for open space and social facilities use underlies the improvement proposals. Public facilities take up 0.5% of the built up area, and comprise mosques, a church and a small school.

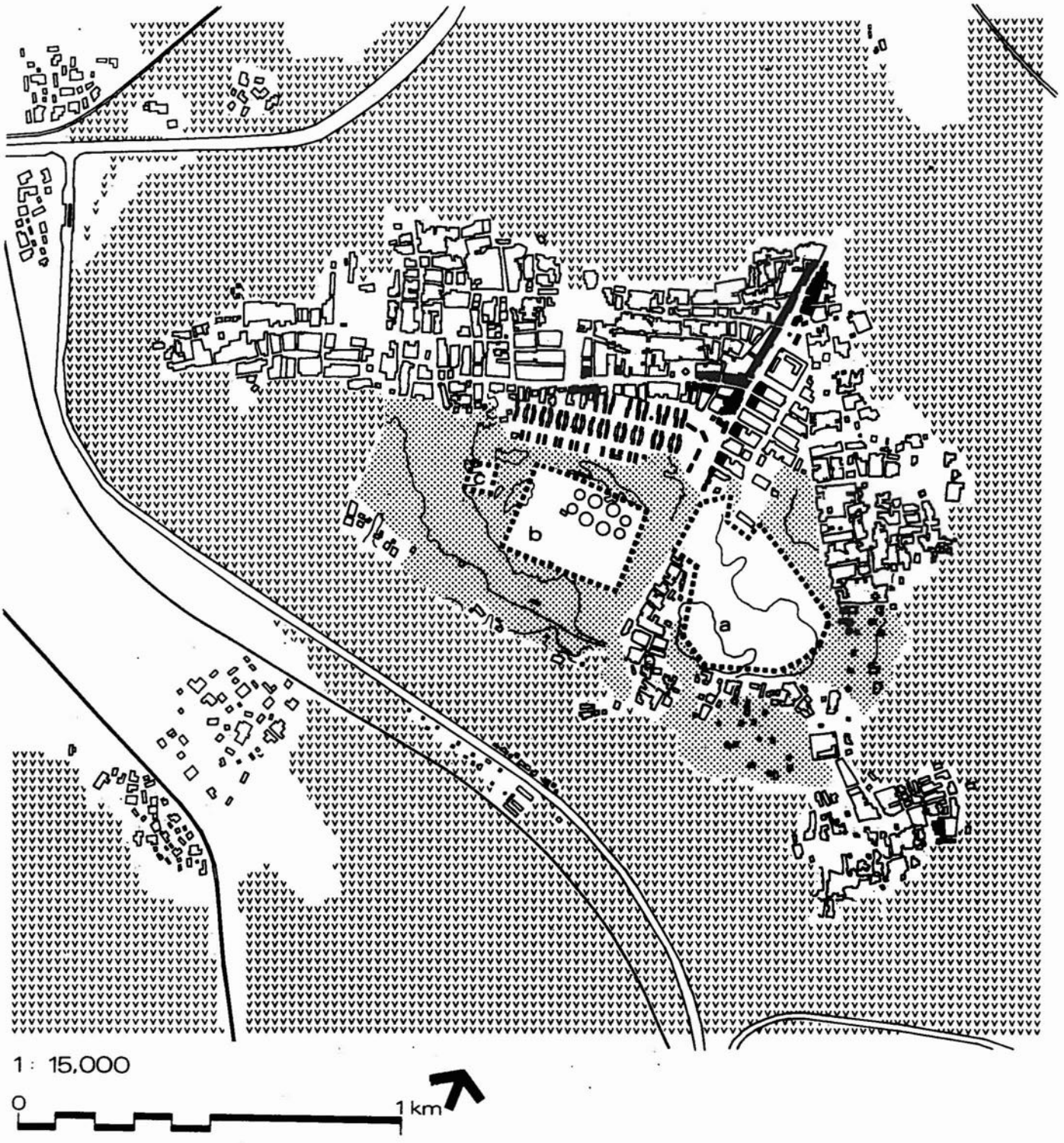
Abu Atwa

1.51 Figure 1.9 shows the principal distribution of land uses in the Study Area. The area is located on raised ground and is surrounded by intensively cultivated agricultural land. It contains three well established settlements; Abu Atwa itself, Abu Shehata to the west and El Sahara to the south. It is estimated that 54.3% of the area is in residential use. This proportion includes shops and workshops which are concentrated along the existing main street with a limited number located along secondary streets throughout the area. The street which connects the Abu Atwa centre with Abu Shehata accommodates a Friday market.

1.52 To the east of the existing main street, residential development is in the form of a north-south ribbon bounded on one side by the cemetery and on the other by intensive agricultural land extending south as far as the village of El Sahara. Residential development along the southern boundary of the cemetery is at very low density and is bounded to the south by further agricultural use.

1.53 The residential use to the west of the main street runs principally along a central east-west street from Abu Atwa main street towards Nifisha, and is bounded to the north by agricultural land and to the south by the sewerage works, military area, and vacant developable land.

1.54 Large industrial/commercial uses are limited to two warehouses at the junction of Abu Atwa main street and the street leading from El Sahara. One of these warehouses is currently under construction. Major roads take 9% of the land area, and in addition, general



COMMERCIAL/INDUSTRIAL AREA

URBAN/RESIDENTIAL AREA

DESERT WITH SPORADIC DEVELOPMENTS

AGRICULTURAL LAND

a CEMETERY

b SEWERAGE WORKS

c MILITARY AREA

Abu Atwa · Existing land use

1·9

circulation is estimated to take 29% of the built up area.

1.55 Open space, excluding the vacant developable land, takes approximately 6% of the built up area, and principal open spaces are a formal football pitch in Abu Shehata, vacant land opposite the cemetery on the eastern side of the Abu Atwa to El Sahara street, and land adjacent to the El Sahara Primary School. There is, in addition, an area containing borrow pits in Abu Shehata of some potential use, and in the period of plan preparation a small park has been laid out south of the sewerage works and is associated with a war memorial on the eastern side of the main street. Public facilities, taking an estimated 1.8% of land, are principally in the Abu Atwa centre, consisting of a primary school and health centre, and a primary school in El Sahara.

BUILDING MATERIALS AND CONDITION

THE SURVEYS

1.56 Assessments of building condition are based on three surveys. First, the block by block survey, which was also used to identify land use, was used to record materials and structural condition. In this survey detailed identification was limited to exceptionally good and exceptionally poor buildings, and a general assessment of structural condition was made. Second, information was collected in the household scanning surveys, and finally the most rigorous surveys were conducted in the Detailed Improvement Areas. The information collected included materials used, state of repair, the costs and kinds of repairs, improvements and extensions being undertaken. This kind of building-orientated information was collected and analysed in conjunction with social and economic information, and detailed information on utilities provision and use.

1.57 The Terms of Reference requirement for 100% survey of certain physical information was waived in view of the comprehensive nature of the sample information being collected. Additionally, a further detailed survey of building exteriors was undertaken to verify and extend the earlier block by block survey. Case studies also included assessments of building condition. Details of the survey methodologies are to be found in Volume 2, Section 1.

1.58 The following information sets out the principal points concerning building condition. Further information is contained in Volume 3, Section 7 Utilities, Volume 2, Section 3 Informal building and Volume 2, Section 4 Housing.

El Hekr (see Figure 1.10)

1.59 In El Hekr as a whole, traditional materials and methods are prevalent, with 75% of all buildings in the area being of mud or mud brick and sand cement. 25% of buildings have red brick as a material (20% using it as the exclusive material and 5% using mixed modern and traditional materials).

TRADITIONAL MATERIALS
MIXED TRADITIONAL & MODERN MATERIALS
MODERN MATERIALS
EXISTING DEVELOPMENT OUTSIDE STUDY AREA

El Hekr · Building materials

1·10

Table 1.1
BUILDING CONDITION CATEGORIES & CHARACTERISTICS

Very Good:

Well constructed, straight vertical walls. No cracks in masonry or external plaster or 'render'. Roof of sound construction (irrespective of material). Door and window lintels of sound construction, windows and doors rectangular and of good, (probably factory made) quality - obvious good state of repair.

Good:

Contains many of the items listed above but not all, or not to the same extent.

Average:

Structurally sound and weatherproof. Walls and roof in reasonable state of repair.

Poor:

Walls out of true, or bulging visibly. Cracked masonry, external plaster. Crude joists, lintels to roof, doors and windows (ie., timber of doubtful strength or standard of installation). Badly fitting doors and windows. Generally poor state of repair.

Very Poor:

Any building which is in an obvious state of structural collapse, walls broken or falling down, roof holed or broken. Probably no longer occupied as part of the basic building use.

Buildings of modern materials are predominantly in the south west of the Project Area. There are scattered examples of modern materials throughout the rest of the area. Buildings of mixed modern and traditional materials are located on the outer fringe of the area containing predominantly modern materials, indicating a geographical northward and eastward progression of development. In the east of the Project Area, and to the north, traditional materials predominate.

Only 2% of dwellings were recorded as being in very poor condition (see classification of types of building condition, Table 1.1).

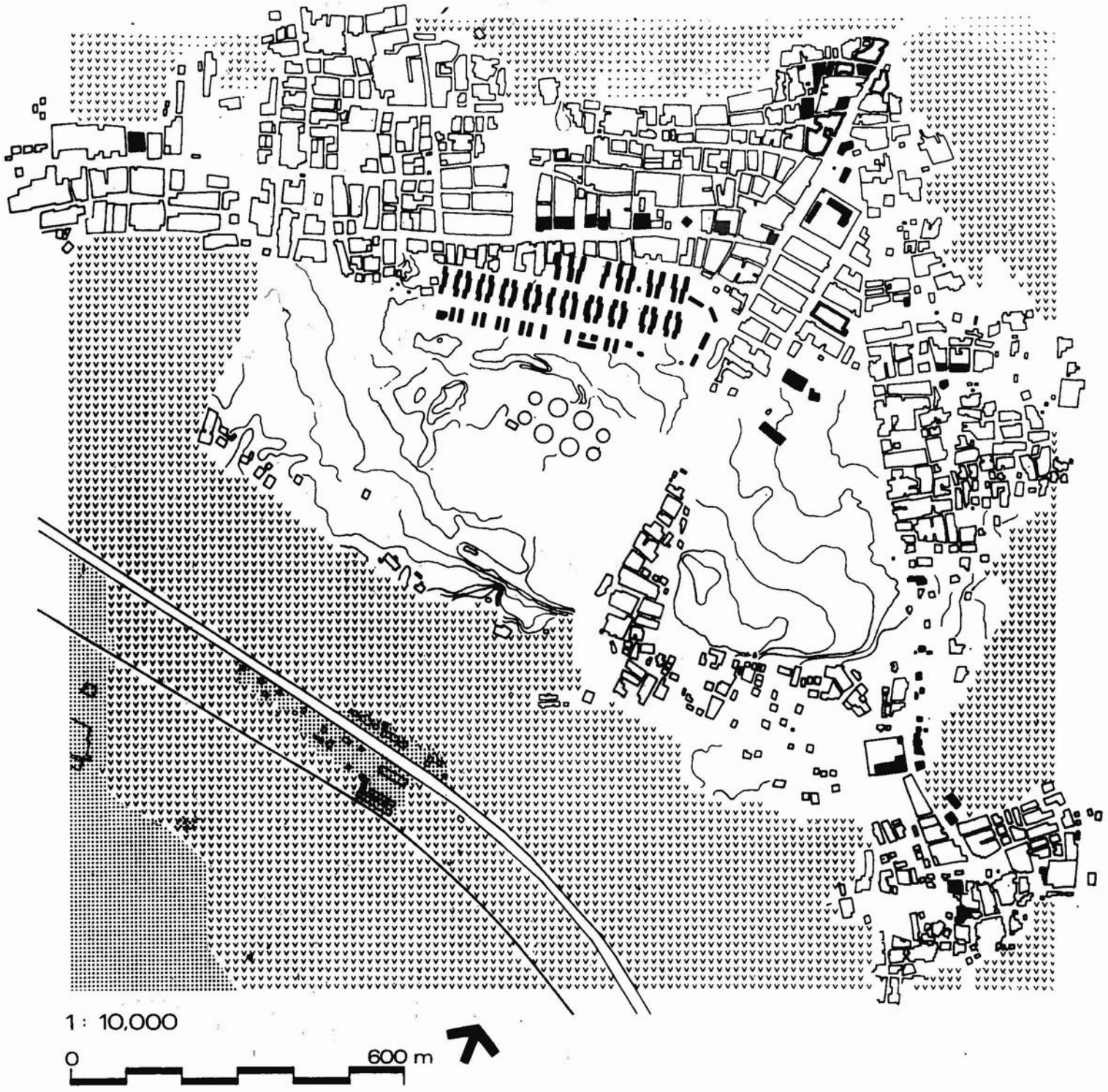
The buildings in poor condition tend to be in the area where traditional materials are giving way to mixed or modern materials, but poor quality buildings are also found in the north west of the built up area. In the former case it would seem that this is because these are in older areas and the occupants have not so far been able to change to modern materials, whilst in the latter case, it is probably due to the lack of time available for consolidation. Buildings of exceptionally good condition are predominantly in the south of the area and in modern materials, but there are a number of examples in the central and northern areas of excellent traditional buildings.

Multi-storey buildings of modern materials are predominantly in the south of the area.

Abu Atwa (See Figure 1.11) (1 64)

Traditional materials and methods are even more prevalent than in El Hekr with 90% of all buildings in the area being of mud or mud brick and sand cement. 10% of buildings in the area have red brick as the exclusive material. The limited number of red brick buildings are predominantly in central Abu Atwa in the vicinity of the main street and along the secondary street which leads to Abu Shehata. A number of examples of red brick buildings of very high standard are also located along the road leading to El Sahara, and many of these are currently

New construction in Abu Atwa using brick and concrete.



TRADITIONAL MATERIALS

MIXED TRADITIONAL & MODERN MATERIALS

MODERN MATERIALS

EXISTING DEVELOPMENT OUTSIDE STUDY AREA

Abu Atwa · Building materials

1·11

being extended, in two cases to aimaras. Mixed material dwellings are also found in the central area. Buildings of very poor condition are principally in the eastern area between the cemetery and agricultural land, a limited number centrally and a limited number at the northern extreme of the Project Area and on the eastern side of the main street. A few are also found in El Sahara, but, in total, no more than 2% of dwellings are in this condition. North of the sewerage works and military area is a development of EGYCO prefabricated housing units for emergency use, which, though erected recently, are generally unsatisfactory.

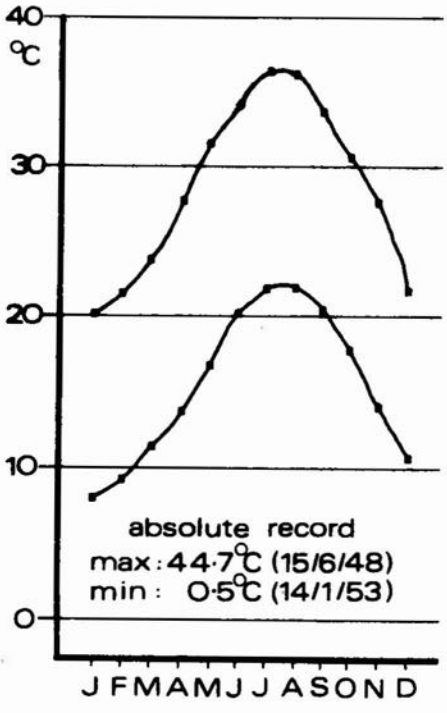
1.65 Buildings of exceptional quality are less common than in El Hekr, and are spread throughout the area. Apart from the aimaras being built near El Sahara, and a limited number of multi-storey buildings in the central area, development is entirely single storey.

IMPLICATIONS

1.66 The results of the land use and building condition surveys are used in two ways. First, in order to understand how the areas have developed and are developing physically, and second, to identify where demolition should take place when land is required for improvement of facilities or infrastructure.

1.67 The understanding of the process of development of an area is vital if proposals for improvement are to function effectively. For example, it is logical to plan a neighbourhood centre where commercial activity is already taking place, when this fits within the overall plan. By this means the chance of success is much higher than if a purely theoretical approach is followed.

The building condition survey allows 'hard' and 'soft' areas to be identified. A 'hard' area is one where buildings are of generally good condition, and demolition for road widening or other purposes is wasteful and expensive in terms of compensation. 'Soft' areas of poor building condition provide opportunities for improvement. The building condition plans were thus an important tool in the detailed planning of the existing areas of El Hekr and Abu Atwa.

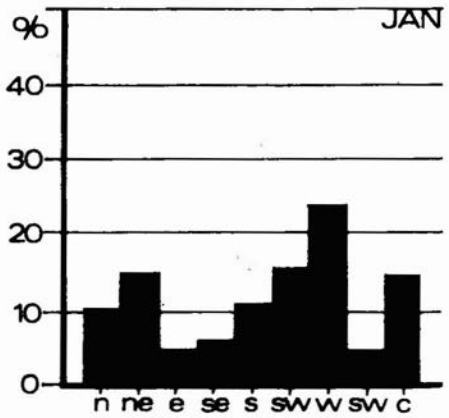


MEAN ANNUAL TEMPERATURE 1·12

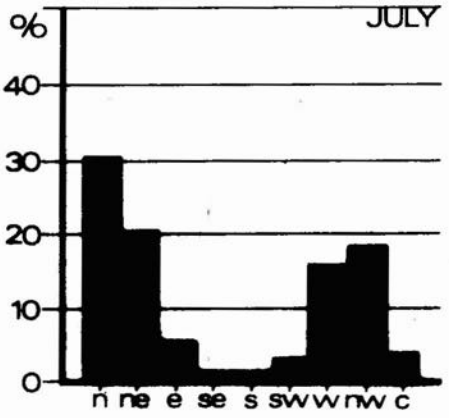
CLIMATE

An examination of climatic factors in Ismailia is relevant to the Demonstration Projects in order to ensure that either the favourable aspects of the local climate can be taken advantage of, or the effects of unfavourable aspects can be minimised by appropriate design. The important aspects of the climate are first described, and then the effects of these on project design are analysed.

DESCRIPTION OF CLIMATE



1.13



% WIND DIRECTION 1.14

*United Nations Centre for Housing, Building and Planning 'Climate and House Design'

The official description of the climate of Ismailia is 'dry, hot desert'. Rainfall is very low (29.4mm/year) and summer temperatures are high (July mean max 36°C). Climatic statistics, as normally presented, however, mean very little, and it is important to consider which aspects are relevant. Basically there are two important aspects. The first relates to human comfort levels, whether people are likely, at any particular time of year, to feel hot, cold or comfortable, and, on that basis, how buildings and their layouts should be designed to minimise the effects of the extremes. The second aspect relates to engineering design, particularly whether design must take account of surface run-off of rain. The relevance of the different elements is described below:-

Temperature and relative humidity (Figure 1.12)

These elements are described together, as combined they give a measure of 'thermal stress', or when the body would feel uncomfortable without air movement. 'Mahoney Tables'* are a method devised to estimate months when thermal stress is likely, and whether this is due to hot or cold conditions. The Mahoney Table for Ismailia is shown in Table 1.2.

This shows that during the day, temperatures are uncomfortably hot between May and October, and that night temperatures are uncomfortably cold between December and April. Day temperatures are cold between December and February. There is thus not a simple situation where design must be purely for hot conditions. The design implications of these figures are that buildings should have walls and roofs of a high thermal capacity, that is they should be thick. Traditional materials, such as mud brick, in fact, are well adapted to these conditions.

Wind

Ventilation is very important, as air movement in hot conditions greatly increases comfort levels. Ideally, ventilation should be controllable. It is desirable,

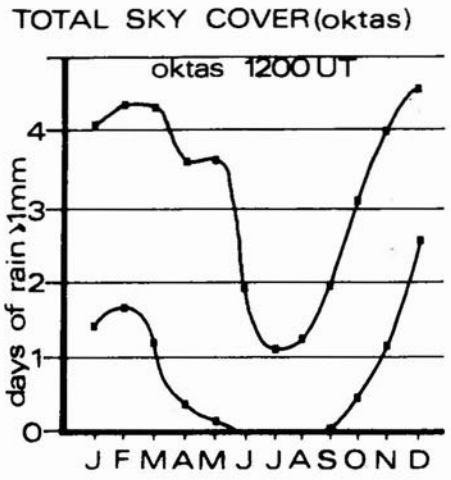
1.72

Table 1.2
ISMAILIA MAHONEY TABLE

	Month J	F	M	A	M	J	J	A	S	O	N	D
Monthly mean max.	20.4	21.5	24.0	27.2	32.0	34.8	36.3	36.2	34.0	30.8	26.6	21.5
Day comfort: upper	29	29	29	31	31	31	29	29	29	29	29	29
lower	23	23	23	25	25	25	23	23	23	23	23	23
Monthly mean min.	8.2	9.4	11.0	13.2	17.2	20.2	22.2	22.6	20.8	17.8	13.7	10.0
Night comfort: upper	23	23	23	24	24	24	23	23	23	23	23	23
lower	17	17	17	17	17	17	17	17	17	17	17	17
Thermal stress: day*	C	C	O	O	H	H	H	H	H	H	O	C
night*	C	C	C	C	O	O	O	O	O	O	O	C

* C=Cold; H=Hot; O=Comfortable.

for instance that air in a courtyard can be 'stored' as in the morning it provides a reservoir of cool air. Later in the day, this may become hot, and then air movement is desirable. Thus the possession of a courtyard is important, as is orientation to enable prevailing winds in summer to be utilised. The prevailing wind directions in January and July are shown in Figures 1.13 and 1.14. Those in July are most critical, and these are mainly from the sector from the north west to the north east. The exception to this is the Khamseen wind which is a strong, hot, dust carrying wind which blows from the south within a period of fifty days in Spring.



NUMBER OF DAYS OF RAIN (≥1mm) 1·15

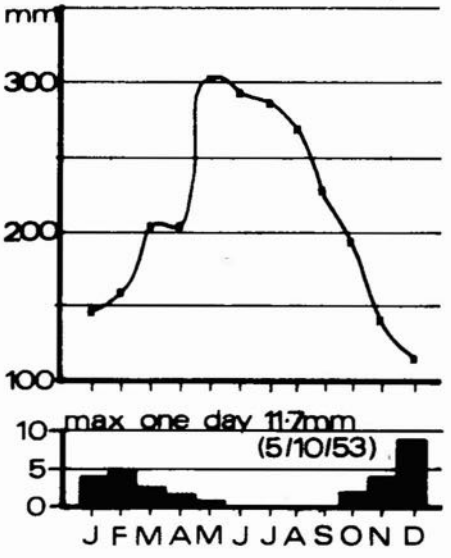
Rain

Rainfall is very light, as Figure 1.15 shows. The highest average number of days per month with more than 1mm of rain is December, with 2.6 days. It is thus not an important design determinant, except that it allows much cheaper roofing materials to be used. In engineering terms, only minor precautions have to be made to deal with surface water drainage, as a small amount of surface flooding is acceptable on one or two days a year. In addition, the evaporation rate is always considerably higher than the rainfall, see Fig. 1.16. This means that surface water will quickly dry up. On the other hand, it means that for any landscaping to be established, a form of irrigation must be used until plant roots can reach the water table.

Microclimate

1.74

Microclimate is the climate in any particular place, at any particular time. It is thus what really affects individuals, and is to a certain extent controllable. In buildings this is by means of orientation, shade, ventilation and wall thickness. In streets and open areas it is by means of shade and ventilation.



RAINFALL 1·16

1.76

INFLUENCE ON BUILDING DESIGN

It is not proposed to construct buildings as part of the Demonstration Projects, but it is important that the plot sizes provided allow the occupiers to build in such a way that climatic factors can be taken into account. As mentioned above, traditional housing has evolved designs which work very well climatically, with thick walls and courtyards. It is proposed that these aspects be encouraged in the new developments, by at least ensuring that plots are of sufficient size to allow courtyard construction, and that suggested layouts are possible with courtyards, adequate ventilation and traditional construction.

INFLUENCE ON LAYOUT

Orientation of streets should relate to the direction of the sun, to reduce excessive insolation, and openings in the building should, where possible, be able to take advantage of the northerly winds. Layouts are influenced by many other considerations, but where possible these factors are taken into account.

LANDSCAPING

INTRODUCTION

1.77 Landscaping is too often regarded as an inessential extra becoming one of the first victims of pressures to economise. The use of planting is, however, an extremely cost effective method of improving the environment. It is especially important in low cost housing, being a cheap and easy method of counteracting the necessary plain and utilitarian nature of the built environment, bringing both physical and social benefits to the inhabitants as well as providing an important additional food source.

Physical Aspects

1.78 Vegetation is useful in combating noise and air pollution in urban environments. While in such areas

The landscaping in Ismailia boulevard

foliage has little measurable oxygenating effect, it is possible to detect the freshness of air over vegetation, always emphasised by a slightly lower temperature. In addition, trees serve to break the force of strong winds capable of lifting sand. This is important in the projects, as it will be some time before all streets are likely to be paved. One of the most obvious physical benefits of planting is the shade afforded for all outdoor activities. The tree-lined boulevard providing shade for pedestrians is an established feature of Ismailia. Shade is also useful in car parking and children's play areas as well as for areas devoted to domestic work and outdoor relaxation.

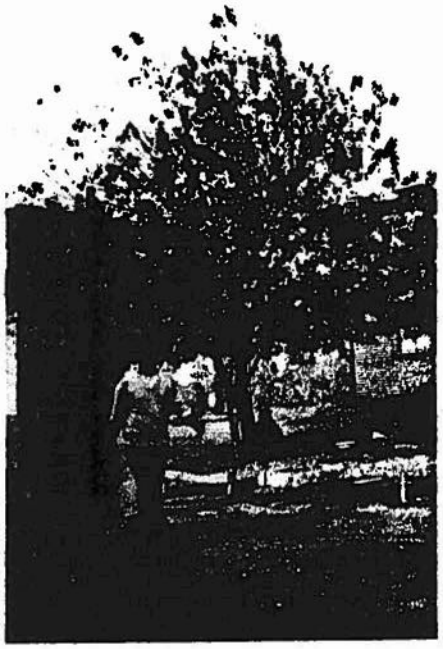
Social Aspects

1.79 The more intangible benefits of landscaping are, however, probably even more important than the purely physical aspects. Planting may provide contrast and visual relief.

to an otherwise barren and hard environment, and is an important design tool in the organization of space. Many pressing social problems can be attributed to failure of the relationship between individual and community. Gardens form the boundary between individual domestic privacy and the areas of communal activity, and thus have especial importance.

1.80 As urban areas are perpetually changing it is most important to ensure compatibility between what is being done now and what has been done in the past or will be done in the future. Unless the landscape implications of design proposals are fully understood and realistically tackled, there is a risk of visual and physical disorder. Lack of an appropriate system of land husbandry could result in large areas of uncared-for space used or misused by everybody and with no clearly defined responsibilities for up-keep.

EXISTING SITUATION IN EL HEKR



Planting in a front garden in El Hekr

There is a pronounced difference in landscaping between the old and the more recent parts of El Hekr. In the old area, although there are not a great number of trees, those that there are have been bought, planted and cared for by the settlers themselves without technical assistance. Palm is the most common type of tree planted, mainly because it is cheap, easy to obtain, not difficult to maintain and can withstand moderate salinity. Many householders also carry out the planting of small gardens that vary from 0.80m to 7m depth at the front of their plots. It is common to see the front gardens planted with ornamental flowers, shrubs, climber plants, vegetables and herbs.

In the more recent part of El Hekr planting is more limited for various reasons, one being insecurity of land tenure, another being that the new settlers have more pressing needs such as the building of permanent houses. It is probable, however, that planting will follow as the new areas mature.

EXISTING SITUATION IN ABU ATWA

1.83 It is noticeable that Abu Atwa possesses far fewer planted front gardens and far less tree planting in the streets than the more urban area of El Hekr. There is a small number of mature trees near the existing centre. In the past the preference in Abu Atwa has been for large internal courtyards which, in addition to planting, were also used for animals and numerous domestic activities. However, as the area has developed, and ceased to be a purely rural village, this arrangement has, of necessity, begun to give way to a more urban pattern. Internal courtyards have become smaller and many of the activities previously carried out in them brought into the streets. Front garden planting, where it does exist, is generally found in the denser areas and as time proceeds it seems probable that this will become the more typical pattern. However, the surrounding areas are intensively cultivated (e.g. cauliflowers, peanuts, tomatoes, as well as orchards).

1.84 The surveys carried out in the Study Areas showed that local people would like the opportunity to participate in the landscaping around their homes in addition to individual planting in private plots. This would be strongly supported by the Consultants.

PROPOSALS

1.85 Ismailia is justly regarded as one of the most attractive cities in Egypt. This is in no small measure due to the standard of landscaping and landscape maintenance that is evident in several areas of the city. The challenge, therefore, is not so much how to improve on existing practice as how to extend an already high standard of landscaping into the lower income Project Areas, without unduly straining the demand on scarce resources.

1.86 The Master Plan landscape policy guidelines include the following:

1. Conservation of the existing city landscape.
2. Improvement of those sections which have suffered deterioration and establishment of measures to avoid pollution damage.
3. Continuous expert advice and maintenance.
4. Implementation of new landscape in barren areas of the city.
5. Establishment of a varied and adequate stock of trees and shrubs to ensure constant replacement and expansion, in character with the existing city landscape.
6. Formation of a community action programme to encourage involvement of the people in the enhancement of the city.
7. Continuous Government monitoring.
8. Adequate provision of water.

While many of the recommendations appear to have been implemented or are in the process of implementation in other parts of the city, recommendation number 6 would seem to have particular relevance to the two areas at present under consideration.

Planting in a front garden

Front Gardens

Open space within the curtilage of a property must be a minimum requirement of any house, whether in the form of a front garden or internal court. Not only is it necessary to make provision for day-light, ventilation and future expansion but also for the numerous domestic activities which are traditionally carried out in open courtyards in Egypt.

One of the general proposals for improvement areas has been to rationalise the use of public land, bringing more of it under the control of local residents. An important factor in this discussion was the desirability of keeping public costs of landscaping to a minimum while providing the inhabitants with an opportunity to grow their own plants and giving them a personal interest in the up-keep of the environment.

The Consultants propose for new development subdivisions, a front garden, varying from 1.5m depth in clusters and local streets to 2.0m depth which has been allocated to

all sites facing distributor roads. One of the main purposes of this provision is to provide a defined area for the planting which, in the existing development is very often seen encroaching on public right of ways. These planted areas also form a buffer zone between the dwellings and the noise and dirt of the streets. The land will remain in public ownership and cannot be built on.

Semi-private Open Space

1.90 Areas of communal responsibility, where activities such as children's play, adult relaxation and domestic tasks are carried out, are provided for within the clusters. It is proposed that the cost of implementation and maintenance of these areas be shared between the residents of each block and that this responsibility should be a condition of plot purchase.

Public Spaces

1.91 Public areas include spaces partly or wholly devoted to 'kick-abouts', 'passive' recreation and car parking; these appear to be the most difficult areas to keep properly maintained. There is no tradition of communal care of these types of spaces and the capacity of the responsible public agencies is presently insufficient to maintain them. Thus it has been proposed (see Volume1, Section 8) that the Project Agencies themselves budget funds for tree planting and maintenance. At the same time, the Project Agencies will involve local residents in these maintenance activities.

1.92 Entirely under public maintenance is the landscaping of the community centres and sub-centres and the verges of major roads. To the extent that the responsible public agency (in this case, the City Council) cannot service these areas, the Project Agencies will provide nominal funds to allow at least minimal treatment.

Queen's Palm

Guidelines for Landscape Development

The Consultants recommend the following landscape development guidelines to be used by the authority:

1. Any proposed or existing levels or features of the sites should be considered as design limitations. Surface geology maps and site samples show the nature of surface material, subsoil and any drainage problems.
2. Physical and chemical analysis of topsoil must be considered, especially characteristics such as pH and nutrient status, before planting specifications are made.
3. Design must be for low maintenance and low cost.
4. 10mm of water coverage daily is recommended for the areas.
5. Minimum recommended topsoil depth after light consolidation: shrub areas 40cm; tree pits 60cm; grass banks 7.5 to 10cm.
6. It is proposed that seedlings be made available at nominal cost to encourage the inhabitants to increase the amount of planting in communal spaces and private land. It is envisaged that plot owners and those responsible for communal areas would be able to buy these seedlings (and acquire the necessary technical

Table 1.3
TREES SELECTED FOR LANDSCAPE PROPOSALS.

Common Name	Medium loam soil	Light clayey soil	Light sandy soil	Moderate salinity	Moderate water need	Big water need	Rapid growth	Slow growth	Evergreen	Flowering	Fruit bearing	Pollution resistant	Little/no maintenance	Regular maintenance	Tall (more than 8m)	Medium (4m to 8m)	Small (less than 4m)	Dense foliage (shady)	Botanical Name
Date Palm			●	●	●			●	●		●	●	●		●				Phoenix dactylifera
Canary Palm		●	●	●	●			●	●			●	●		●				Phoenix Canariensis
Washington Palm	●	●	●		●			●	●			●	●		●				Pritchardia filifera
Chinese Palm	●				●			●	●			●	●			●			Livistona Chinens
Eucalyptus		●			●			●	●	●		●	●		●				Eucalyptus canaldulensis
Dwarf Banyan		●			●		●					●	●			●	●	●	Ficus Nitida
Banyan Tree		●			●		●					●	●		●			●	Ficus Bengalensis
Indian Walnut		●			●			●			●	●	●		●			●	Albizzia Lebbek
Mango	●	●			●			●	●		●	●		●	●			●	Mangifera indica
Cypress		●				●		●	●			●	●		●	●			Temarix articulata Apaylla
Tamarisk		●	●		●			●	●	●		●	●		●	●			Tamarix gallica
Barbados Pride		●		●	●					●		●	●			●	●	●	Poinciana pulcherima
Casuarina	●	●			●			●		●		●	●			●	●	●	Casuarina equisetifolia
Jointwood	●	●	●		●			●		●		●	●			●	●	●	Cassia nodosa
Golden Shower	●	●	●		●			●		●		●	●			●	●	●	Cassia fistula
Jacaranda	●	●			●			●		●		●	●			●	●	●	Jacaranda acutifolia
	●	●	●	●	●		●					●	●			●		●	Morus sativus
Egyptian Pine	●	●		●	●			●	●			●	●		●	●		●	Pinus Ægyptus

Date Palm

information) from the Project Agencies. The Agencies would 'ration' the distribution of these seedlings and discourage waste. (See Volume 1, Section 8.)

The following list shows examples of types of trees available in Ismailia recommended by the Consultants.

1. Medium and small trees are recommended for most front garden situations, eg., Dwarf Banyan, Indian Walnut, etc. It should be noted, however, that Dwarf Banyan is not recommended for Abu Atwa, as it is unsuitable adjacent to citrus production because of the types of insects which it harbours.

2. Larger trees for the distributor roads are recommended (eg., Date Palm, Queen's Palm, Spotted Gum, Red Gum, Blue Gum, Cuban Royal Palm, etc.) The Date Palm (or Phoenix Dactylifera) is a tall feather palm. The trunk may reach over 30m in height; it produces offsets which can be transplanted. Date Palms are intimately connected with the Egyptian landscape. It is one of the most useful trees and nearly every part of it is utilised for different purposes.

3. Shrubs help to form basic background in front gardens and public open spaces. They can be either fast growing (eg., Bougainvillaea, Egyptian Privet, etc.) or slow growing (eg., Jasmin, Lautassa, etc.) Climbers are invaluable in small spaces like the front gardens. There are two types: self-clinging and non-clinging ramblers and twiners which require support from wires, trellises and pergolas. Table 1.3 shows the different types of trees and shrubs recommended and their characteristics.

Dwarf Banyan

Typical square for passive recreation

2

Social Services / Recreation

2
Social Services / Recreation

2.1 This section describes the demand for education, health, social, public safety and recreational services and facilities. The description is in terms first of population and second of the existing level of service provision. The services which are proposed to meet the identified demand are set out, including the standards at which they are to be provided.

2.2 It is important to note that whilst the demand for schools can be specified, for social facilities like mosques, recreational areas, youth and sports centres, it is much more difficult to quantify demand. Standards are based on those in the Master Plan, but these have been applied flexibly and the main purpose has been to ensure that sufficient land is set aside or made available for a range of uses. The various authorities and other interested parties, including the local communities, will establish preferences as time goes on.

2.3 The Master Plan recommendations on standards apply to new areas. However, limited land availability in the existing areas has meant that some modifications have been necessary. The proposed locations of the facilities discussed in this section are shown in Volume 1,Secs. 4 and 6.

EDUCATION

POPULATION

2.4 The estimated existing age structures of El Hekr and Abu Atwa appear in Volume 2, Section 1. In order to provide a basis for the planning of schools, the age structures have been re-aggregated to show proportions of primary school children (6-12), preparatory school children (13-15) and secondary school children (16-18).

2.5 Consideration has been given to the proposed raising of the school leaving age, which is due to take place

within the next few years, and which would raise the age limit of compulsory education to 15 years. Tables 2.1 and 2.2 give the total estimated number of children in the Project Areas.

*Suez Canal Regional Report, Volume 3, MOHR 1976

Estimates of enrolment rates* for primary and preparatory schools, verified by the local Department of Education, suggest that even for the current compulsory school age group, 100% enrolment is far from being achieved. It is estimated that in 1980/81, 74% of eligible children will have enrolled in primary schools, and 50% in preparatory schools.

Table 2.1
ESTIMATED SCHOOL AGE POPULATIONS - EL HEKR

Year	6-12	13-15
1977	5500	2400
1980-5	8600	3700
2000	14000	6000

In 1990 the estimated percentages are 85% and 70% respectively and in the year 2000, 100% and 90% respectively. It is not expected that the new legislation will have an immediate effect, but it has been the aim to provide for the total number eligible to allow for and facilitate improving enrolment rates. In secondary schools a very much lower enrolment rate than for primary or preparatory schools is experienced with a current estimate of 31% and estimates of 38% and 60% for 1980/81 and 2000 respectively.

Table 2.2
ESTIMATED SCHOOL AGE POPULATIONS - ABU ATWA

Year	6-12	13-15
1977	3500	1300
1980	3600	1700
1990	5300	2300
2000	5775	2700

EXISTING PROVISION

EL HEKR

Primary

El Hekr is outstanding in its lack of schools. Within the area there is currently one school, a primary of 12 classes, which operates one shift (due to a stipulation of the landlord, the building being privately owned).

2.9 Schools in the adjacent Arashia provide places for El Hekr children, but it is estimated that at the most 30%-40% of eligible El Hekr children have school places.

*See Volume 1, Section 4 for provision at full development.

Programme*

2.10 A 12 class primary school is programmed for construction 1978/9.

Preparatory

2.11 There are no preparatory schools in the area, although one 12 class school is under construction. It is estimated that schools in Arashia currently provide places for 25% of the eligible children from El Hekr.

Programme

2.12 An agricultural secondary school in Arashia is to be converted to a 23 class preparatory school serving El Hekr during 1978/9.

Secondary

2.13 There are no secondary schools in the Project Area, although provision exists in Arashia.

ABU ATWA

Primary

2.14 There are two primary schools in Abu Atwa, one of 21 classes (double shift, 2048 pupils) and one of 10 classes (double shift 749 pupils). Considering the average enrolment rate, these schools are considered by the Ministry of Education to be only just providing for demand.

*See Volume 1, Section 6 for provision at full development.

Programme*

2.15 There are no primary schools in the current programme.

Preparatory

2.16 There are no local preparatories in the Project Area, and children travel some distance, mostly to Nifisha This long journey to school is reported to militate against girls going on to preparatory school because of parents objection to the distance.

Programme

2.17 A preparatory school is currently programmed for construction during 1978/9.

Secondary

2.18 There is no provision locally, the nearest being in Ismailia.

STANDARDS

2.19 Having established the level of demand, standards were established in order to develop the proposals. The following factors have been taken into account in developing standards.

Double Shifts

2.20 The lack of accommodation has resulted in double shifts being used fairly commonly although it is not used by all schools. The view taken by the local Department of Education office is that the planned provision for the Project Areas should accommodate all children by single shift use of buildings. This also allows a safety margin for population increase beyond the year 2000.

2.21 The Department has accepted the Consultant's view, however, that in existing areas single shift schools to accommodate demand beyond 2000 would be at too great a cost to the community in terms of house demolition and double shifts may be required beyond that date.

Enrolment Rate

2.22 It is understood that the enrolment rate for primary school children has not yet returned to pre-war levels, although this is not the case for preparatory and secondary schools; (with the full publication of the 1976 Census this can be monitored). Enrolment rates should not be affected by the lack of school places

however, and the aim has been to provide sufficient accommodation for every eligible child.

Class size

2.23 Currently, class sizes are very high, with 45-50 children per class in primary schools, and 40-42 in preparatory schools. The local Department of Education is working towards achieving standards of 40 children per class in primary schools, 36 children per class in preparatories. These are above those recommended in the Master Plan, and whilst the former have been accepted as the upper limit of the standards to be achieved, the Master Plan recommended standards of 33 children per primary class and 30 children per preparatory class have been the principal aim.

PROPOSED PROVISION

2.24 Given these background considerations, 15 primary schools in El Hekr and 4 new primary schools in Abu Atwa have been planned, each to form the nucleus of a neighbourhood centre, serving some 4000-7000 people (see Figures 1.3 and 1.4 Volume 2, Section 1). Each school has been sited to avoid where possible the need for pupils to cross principal routes. In new areas sites are adjacent to open space to provide opportunities for expansion. The standard of provision of land reservation of 1 hectare per primary school is achieved in all new neighbourhoods. This allows considerable development flexibility within the site. In existing areas land shortage has meant that in the denser parts of El Hekr in particular, smaller schools with little or no expansion potential have been necessary. Three schools in El Hekr are planned at the northern limit of their neighbourhoods, where open land is available beyond the presently built up area.

2.25 In seven other El Hekr neighbourhoods, the schools have only minimal amounts of open space to accommodate children during breaks, and it is recommended that playing fields are provided in two specified locations on the closest available land outside the Project Area. In the cases of the sites of four schools in existing El Hekr, a limited amount of demolition will be necessary to provide adequate sites. Average size of all primary schools is 24 classes.

2.26 Two preparatory schools are planned in Abu Atwa. In El Hekr one new preparatory school is planned in addition to one currently being built, one converted from an agricultural secondary school and another located outside the Project Area. A guideline of 1.5 hectares site area has been the target for preparatory schools in both areas. The average size of preparatory schools to serve both areas is 36 classes. A secondary school site of 2.5 hectares has been planned in El Hekr to accommodate a school of 30 classes. No secondary school is proposed within the Abu Atwa area, though it is recommended that one be located on open land immediately to the north of the Project Area.

HEALTH

POPULATION

2.27 The proportions of pre-school children and the elderly

Table 2.3
ESTIMATE OF 0-4 AND 65+ AGE GROUPS - EL HEKR

Year	0-4	65+
1977	4700	950
1980-1985	6300	1450
2000	9800	2100

Table 2.4
ESTIMATE OF 0-4 AND 65+ AGE GROUPS - ABU ATWA

Year	0-4	65+
1977	2590	500
1980	3290	700
1990	4300	900
2000	4850	1050

are important particularly when considering provision for basic health care, and estimates of these proportions are set out in Tables 2.3 and 2.4. The principal health care problems are with the youngest age groups (0-4), with relatively high infant mortality rates; the principal causes of infant mortality being gastro-intestinal diseases and diarrhoea.

EXISTING PROVISION

The evaluation of existing provision must consider all of the factors which militate against the health of the communities, and it is stressed that it is lack of treated water, poor sanitation and inadequate solid waste disposal which creates conditions for the incidence of gastro-intestinal diseases, diarrhoea and dysentry. These are discussed in Volume 3, Section 7.

The provision of improved sanitary and refuse disposal facilities, and in particular the provision of piped water, is to be considered in parallel with the provision of health centres and polyclinics. Full details of existing and proposed utilities provision appear in Volume 3, Section 7.

2.30 In terms of local health services provision, Abu Atwa is better served than El Hekr, with a health centre situated close to the central primary school. There is, however, local criticism because of its hours of operation (see case studies), capacity and range of services. In El Hekr there is no local provision, although there is access to the public hospital in Arashia.

STANDARDS

2.31 A national objective of health services provision is to implement a programme of building polyclinics to provide specialist and diagnostic out-patient services, thus relieving pressure on hospital beds, to be followed by the building of health centres supplementary to the polyclinics. Principally, the function of the centres is to provide local public health and preventative services and to maintain the registers of births and deaths.

2.32 This proposed pattern of health services is reflected in the proposals for the Project Areas, using standards recommended in the Master Plan. Proposals have been made in full consultation with the local Ministry of Health.

Polyclinics

2.33 A polyclinic is planned for both Project Areas each serving a population of 100,000. Thus the polyclinic proposed for Abu Atwa will serve neighbouring villages, in addition to the Project Area.

2.34 In El Hekr the polyclinic is planned to be sited in the main centre and in Abu Atwa the polyclinic is planned as a new development of the existing health centre. Both polyclinics would provide general practitioner clinics, gynaecological, orthopaedic, neurological, ophthalmic,

ear, nose and throat, dermatological and psychiatric consulting rooms, dental surgeries, laboratories, pharmacies and administrative facilities. The polyclinic in Abu Atwa may also include a limited number of beds. The buildings are planned to have direct access to a paved road and space for ambulances on site has been made available. The site areas allowed for the polyclinics are 4500m^2 and 2875m^2: respectively.

2.35 The polyclinics, particularly that in El Hekr, are intended to be implemented in the first stage of the development of the community centres.

Health Centres

2.36 The principal function of the health centres is the provision of accommodation for several general practitioner services, minor casualty service, mother and child health advice, school health and administration. The centres are proposed in particular to promote preventative medicine.

2.37 The relevant recommended national standard is one health centre per 50,000-70,000 population, but the recommendation made here is for one health centre for 25,000-30,000 population, in the plan period, but approaching the recommended 50,000 as consolidation continues.

2.38 This relatively generous level of provision should be seen in relation to the development of the local services recommended in the Suez Canal Regional Plan. These local services, including mother and child care advice, need not depend, initially, on the provision of purpose-built accommodation of a high construction standard, and it is not proposed that health centres be provided until the later stages of the development of the areas. In the meantime other facilities and existing buildings could serve as the basis of local preventive work. It is interesting to note that in Abu Atwa it is reported that a number of residents already permit clinics to operate from their houses, and this is a valuable service at times such as mass immunisation. Similarly, it is generally agreed that family planning clinics are viewed with less scepticism if not held in a health centre.

2.39 Land has been reserved for health centres in both Project Areas; the sites are shown in Volume 1, Sections 4 and 6

SOCIAL SERVICES

POPULATION

2.40 There are various demands for the services of the Ministry of Social Affairs. Neither Project Area has adequate provision of the general support services provided by the Department; this is particularly serious in view of the limited extent of community self-help in the areas. Again, the dispensing of welfare payments and pensions function is important as the numbers of elderly are increasing and very low incomes are a feature of both Project Areas. At the other age extreme, kindergartens

are organised by the Department and demand in both areas is very high. Finally, low school attendance and under-employment are also features of the areas and the Department of Social Affairs administers services which have the potential to offer constructive support.

EXISTING PROVISION

2.41 Existing provision is very limited. El Hekr is served by a small social unit in Arashia which has a kindergarten and office and which is capable of serving only a small proportion of El Hekr. Abu Atwa has no social unit in the area. A large unit in Duba'iya, 6 kilometres away, is intended to serve Abu Atwa but the distance is too great for it to be effective.

STANDARDS

2.42 Two standards of social unit are recommended to serve urban populations; a principal unit serving about 100,000 people and small units serving 25,000-30,000 people. These standards are the product of considerable discussion with the Department of Social Affairs, and represent a development of standards shown in the Master Plan.

2.43 The principal social units are based on a scheme built in 1973 at Abu Suweir, near Ismailia, which is regarded as a success by its staff and users and forms a model for future development. The activities catered for in the principal unit will be mainly pensions distribution, kindergarten, industrial training classes for women and young people (including the provision of training workshops), adult illiteracy classes, library and a hall for meetings and performances. (The hall at Abu Suweir is used principally for wedding receptions.) The Abu Suweir unit also includes a family planning 'clinic', and accommodation is provided for the leader and assistant leader in two flats on the first floor. The principal units are proposed to be sited in the community centres and occupy sites of 2120m^2 in El Hekr and 2500m^2 in Abu Atwa.

2.44 The small social units provide a more limited range of services, principally the administration of welfare payments and a kindergarten, although the Department would like to see training workshops at this level. The small units are planned to be located in the sub-centres, and as with health centres, the existence of their services should not depend on the provision of an expensive purpose-built building, but could use existing buildings or make use of other planned facilities until populations have increased to justify their provision, assuming that the principal units have been provided at a very early stage. Land reserved for ultimate provision, however, is 500m^2 for each small unit.

2.45 The level of provision proposed is high, but is considered to be justified in view of the problems of the areas and the lack of formal or informal support services. It is anticipated that the latter may strengthen as the rehabilitation programme is implemented, depending as it does

on considerable community involvement.

MOSQUES

2.46 There are currently approximately 10 mosques in El Hekr. In Abu Atwa there are 7 mosques including a recently expanded one in the central area.

2.47 Discussions with the Waqf have led to the recommendation that a new main mosque should be provided in the community centre of El Hekr, on a site which is large enough ($7000m^2$ - the central square) for open air worship, and is a building which is flexible enough to accommodate a number of different activities. Each new neighbourhood is planned to contain a small mosque ($400m^2$).

2.48 It is expected that the provision of all but the principal mosque planned for the El Hekr community centre will be the result of joint local community and Waqf funding.

GOVERNMENT OFFICES

2.49 It is proposed that a number a small offices are provided in each community centre. In El Hekr community centre the most important of these will be the Project Implementing Agency Office, which should be provided at the very earliest possible opportunity.

2.50 Also planned to be included in both El Hekr and Abu Atwa are banks and post offices. The total site area planned for these offices is $200m^2$.

FIRE AND POLICE

2.51 Both the Fire and Police service are currently looking for sites in Abu Atwa and El Hekr. Both community centres are planned to contain adjoining fire and police stations, as the police control the fire service. Ultimate fire station provision will be increased incrementally to a three appliance 'standard'. Similarly the police station will increase in size and function as the population increases. The site areas in each community centre planned to accommodate this expansion are $750m^2$ and $756m^2$ respectively in both El Hekr and Abu Atwa.

RECREATION

POPULATION

2.52 The Master Plan recommendations of open space standards have been taken as the basis of open space provision. However, consideration has been given to the demand for recreation provision in qualitative as well as quantitative terms, and in addition to the Master Plan standards, the case studies have been used to gauge the kind of demand which exists for recreational facilities.

EXISTING PROVISION

<u>El Hekr</u>

2.53 There are no formal play spaces in the whole of El Hekr.

Typical east-west street in El Hekr, used for sitting out

Most streets are used for games of various kinds, in particular football which is played by both men and boys. The east-west streets, being virtually traffic free, are used for sitting out and for younger children's play. Where temporary play equipment has been installed it has been intensively used. The city stadium in adjacent Arashia is used for major football matches but is also used by local people, principally for basketball.

Abu Atwa

Abu Atwa has more scope for football games. There is a formal football pitch associated with the primary school in El Sahara, a formal pitch with club-house at Abu Shehata, and a piece of land near to the cemetery is also used for football at present.

Secondary streets are used for sitting out by adults and as play areas by younger children. A park, associated with the war memorial, has recently been opened and is available for local use. There is much evidence in both areas of tree planting by residents to create spaces and shade in quieter streets.

STANDARDS

2.56

The Master Plan guidelines for standards of recreational provision include streets which have been made safe for children's play. Including this type of space, the standard of local provision of 1 hectare per 1000 population has been aimed at. The space is allocated as in the Master Plan, (a) 0.2 hectare per 1000 population provided in the form of squares and small parks and (b) 0.2 hectare per 1000 population provided in recreational strips adjacent to roads and agricultural areas. These spaces were designed in the Master Plan to provide for local 'passive' recreation. Local 'active' recreation demand is to be met by the provision of 0.2 hectare per 1000 population using safe-streets and communal spaces, the remaining 0.4 hectare being provided in the form of kick-about areas.

The cafe is a general meeting place

For formal 'active' recreation, land has been planned in the community centres for use by sports clubs and youth clubs (providing equipped sports facilities). It is anticipated that sports clubs and youth centres will, in time, be set up in association with the recreational land being made generally available at the neighbourhood and sub-centre level, as well as in the main centres where land is made specifically available.

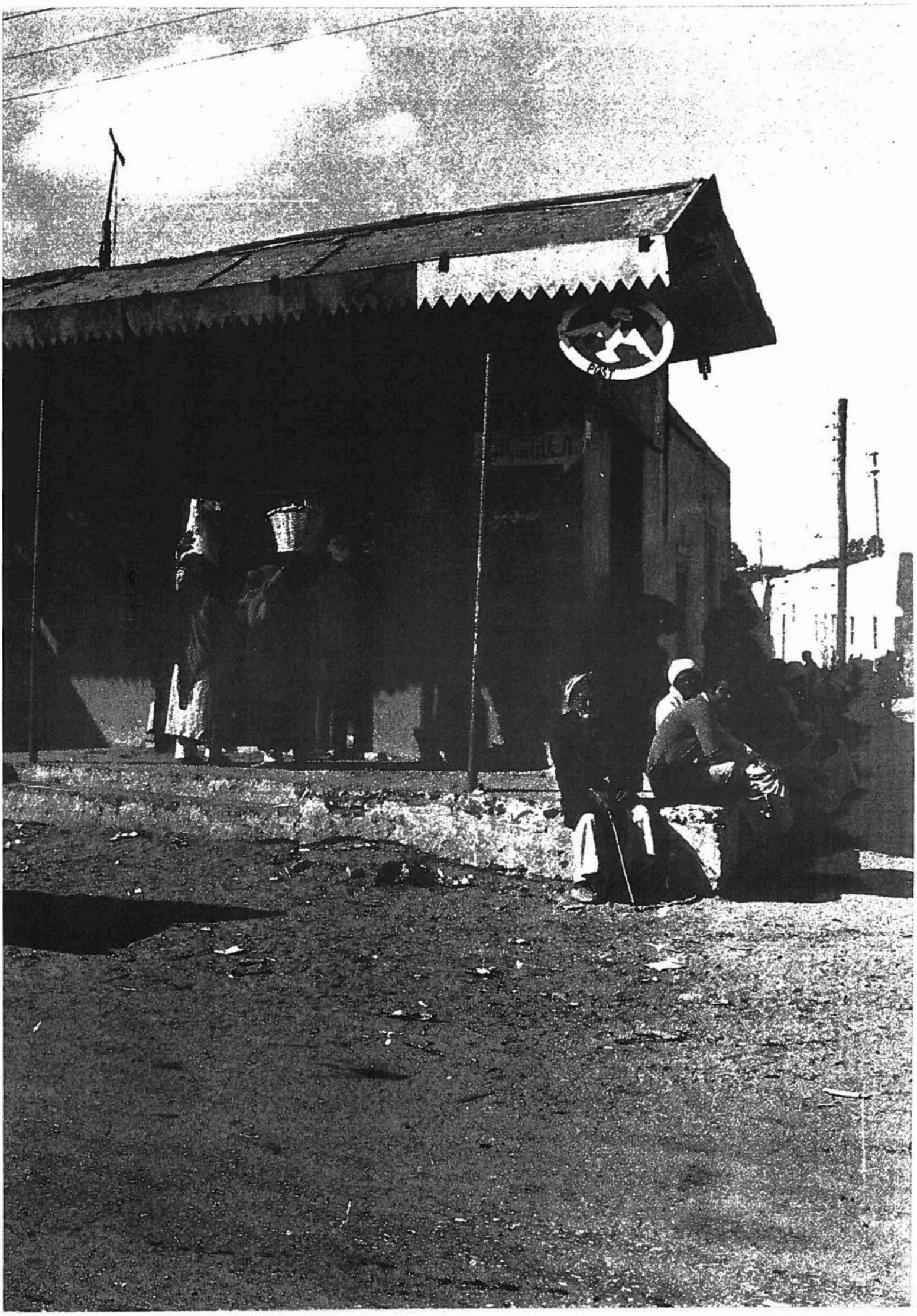
For commercially-provided recreation, land has been planned for provision of a cinema or similar use in each centre and the plots with commercial potential in each centre at each level could be used for cafes and coffee shops.

Finally the social units in the two main centres are planned to be equipped with a theatre/hall for general public use. Also, multi-use of school buildings and open space has been assumed throughout.

2.60 The standards used as a guideline have been adhered to in the new areas. However, in existing areas, levels of provision vary from neighbourhood to neighbourhood and have been constrained by land availability and the policy of minimal demolition. For example, in El Hekr the pattern of land available in the existing areas has led to the provision of public recreation and 'kick-about' areas in the form of a central spine of public open spaces in all but one neighbourhood. This is a function of the basic planning concept of using parts of every second existing north-south street, which have been converted in their remaining sections into predominantly local access roads.

3

Commerce



3
Commerce

OVERVIEW

3.1 This section deals with the background analyses which have been carried out to support proposals for expected commercial activities in El Hekr and Abu Atwa. First, the existing situation on a city-wide scale is briefly described, then this is compared with the level and nature of commercial activities in El Hekr and Abu Atwa. Next, future expected commerce in both El Hekr and Abu Atwa is investigated with reference to planned site development, and finally a discussion is presented on ways of charging for commercial potential.

3.2 The Consultants' approach towards commerce is to treat it as one means of stimulating the local economies of the Study Areas and of increasing employment opportunities; the reader should be aware that there are other subjects which also have an economic stimulation component, specifically industry (Volume 3, Section 4) and administration/implementation (Volume 1, Section 8).

EXISTING SITUATION: CITY-WIDE CONTEXT

DEFINITION OF SECTOR

3.3 By 'commercial' is meant all population-serving establishments, both those offering personal services and those engaged in retail activities. Personal consumption services; cafes, restaurants, laundries, barbers, etc. are part of this sector, as are the retailing sub-sectors; food, general, and specialised non-food. Excluded from the purely commercial sector, as defined here, are 'petty manufacturing and repair establishments', specifically furniture, metalworking, tailoring, etc. and those establishments concerned with the distribution and repair of transport and investment goods, such as garages, autoparts stores and bicycle shops. By this definition, establishments which deal in the distribution and/or manufacture of building supplies are excluded. These excluded establishments have some element of manufacturing or play a role in industrial activities

and are considered separately in the Industry section (Volume 3, Section 4).

SIZE AND COMPOSITION OF COMMERCIAL SECTOR

3.4 The City Council of Ismailia had 1560 commercial establishments registered in December 1975 as well as over 200 workshops. While no information on the composition or activity of these units is recorded, a commercial survey was carried out in central Ismailia (all of Ismailia excluding the settlements of Nifisha, Abu Atwa and El Hekr) in March 1975*. For shops that were open this gives a breakdown of types of establishment and an estimate of associated full-time employment.

*Ismailia Master Plan, 1st Status Report, June 1975

Table 3.1
COMMERCIAL ESTABLISHMENTS; ISMAILIA 1975

Type of Establishment	Number	(%)	Full-time workers	%
Personal consumption services (Restaurants, cafes, barbers, laundries, etc.)	280	38.1	980	49.5
Food retailing (groceries, fruit and veg. outlets, butchers, etc.)	160	(21.8)	320	(16.2)
General retailing (small general stores)	135	(18.3)	200	(10.1)
Specialised non-food retailing (hard-ware, clothes and fabrics, shoes and leather, department stores, pharmacies, etc.)	160	(21.8)	480	(24.2)
TOTAL	735	(100.0)	1980	(100.0)

Also enumerated were 390 stalls and carts engaged in retail trade, and a total of 400 shop fronts were permanently closed. In addition, a number of repair and productive establishments were counted, but these are treated elsewhere.

DESCRIPTION OF COMMERCIAL ACTIVITY

3.5 Commercial activity in Ismailia is governed by market forces, both as to the general level of activity and the location of its elements. The participants are the individual merchants whose decision to enter the market is based on perceptions of demand and possible competition. To start an establishment requires very little capital; this can vary from LE100 for a stall or small shop to several thousand pounds for a large store. (Paid-up capital as recorded by the Chamber of Commerce generally ranges from LE200 to LE600). A license is required from the City Council for all establishments (including stalls and carts), but this is easily obtained. Thus to enter the commercial sector is not difficult,

Kiosk "complex" in El Hekr

the main constraint being the availability of a shop to rent (although a stall or push-cart is always an open alternative). Rentals are controlled by the Government, and usually range from LE1.5 to LE5.00 per month for the simple 3m by 5m module. Of course, on prime locations key money is required, and this can be in excess of LE1000.

3.6 In general the retail mark-up rate is around 20%, although this varies considerably depending on the type of products sold. Thus, it is possible to postulate that minimum turnover for a shop or stall would be between LE100 and LE150 per month, giving the proprietor a monthly income of around LE25; (see discussion of household incomes, Volume 3, Section 9.) Of course this relates to the very small enterprise, and turnover in larger establishments can be many times higher. It is possible to give a rough estimation of the average turnover of establishments in Ismailia by comparing income and expenditure data from the Household Budget Survey for Urban Areas (1975) with the total number of establishments*. Taking the median urban expenditure range of LE300-350 per year per household (and assuming that this applies to Ismailia), one can postulate that the following items are obtained through commercial establishments;

*Central Agency for Public Mobilisation and Statistics, Household Budget Survey 1974-75, Cairo 1976

Table 3.2
% HOUSEHOLD EXPENDITURE: ISMAILIA

Item	%age of total expenditures
Food and beverages	57.4
Clothing	11.7
Furniture and equipment (½)	0.4
Home Products (½)	0.8
Miscellaneous (2/3)	5.6
TOTAL	75.9

Thus an average of LE247 can be considered spent per

household annually in the commercial sector, and assuming that the 1975 population of Ismailia spent 80% of this amount in Ismailia (the remainder in Cairo and elsewhere), there would be a total amount of LE5.7 million spent per year (28,000 households x 247 x 0.8). Taking the total number of commercial establishments at 735 (and assuming that the 390 stalls and carts each had a turnover of LE125 per month) the average turnover per shop in Ismailia would be LE6940, or LE580 per month. Assuming an average 20% mark-up, average revenues would be LE106 per month.

3.7 What this indicates is that the size and returns of commercial establishments varies considerably, from a very low turnover of LE100 per month to the average of LE580, and, for the largest establishments, several times higher. These larger establishments are found exclusively where there is a great mix of size and type of commerce in the central areas of town; the main commercial centres of Talaatini and Sultan Hussein Streets contain 45% of all Ismailia's shops and 60% of all stalls, and as indicated by land prices, commercial potential in this central business district is considered very large (see Volume 2, Section 2).

3.8 It should be noted that the commercial system in Ismailia is characterised by a great degree of dynamic flexibility. Commercial services can promptly expand and adapt in response to demand, both to changing spatial arrangements and to changing consumer preferences. The basic shop unit can take on almost any commercial or workshop function; an establishment can be altered from a general store to a restaurant, barber shop, metal workshop, etc. with little additional investment. Expansion of a unit is accomplished by taking over the adjacent module, or alternatively, by extension into fronting space. Stalls, kiosks, and pushcarts provide additional flexibility, bringing commercial services to areas otherwise deficient.

Multi-shop aimara in El Hekr

EXISTING SITUATION: EL HEKR

3.9 Commercial activity in El Hekr as defined in paragraph 3.3 above, has been included in the Study Area survey, and locations of commercial establishments are shown in Figure 1.8. Commercial establishments in El Hekr have been enumerated as in Table 3.3. When compared

Table 3.3
COMMERCIAL ESTABLISHMENTS IN EL HEKR 1977

Type of Establishment	Number	%
Personal comsumption services	28	16
Exclusive food retailing	7	4
Variety retailing	133	76
Specialised non-food retailing	8	4
Sub Total	176	100
Stalls	42	
TOTAL	218	

with a similar classification for the city as a whole (Table 3.1 above), it can be seen that there is a much greater proportion of stalls and variety retailing, and an almost complete absence of specialised non-food and exclusive food retailing shops. Personal consumption services establishments are almost all restaurants, laundries, and barbers. All establishments are small when compared to the typical city shops, with very few employing more than one person full-time. In general it can be said that commerce in El Hekr is characterised by low levels of investment, low turnover, a low order of specialisation, and predominantly serves only the local neighbourhoods.

3.10 This situation can be expected given the low incomes of the inhabitants, but it is also affected by the location of a much better developed commercial system in close relation to the area, specifically in Arashia and, extending along Talaatini Street, an agglomeration of many of Ismailia's city-serving commercial establishments. This is particularly true of the central market, which helps to explain the absence of exclusive food retailing establishments in El Hekr itself.

3.11 To estimate the degree to which purchasing power in El Hekr is actually spent in the area, the following rough calculations were made. First, it was assumed that shops in El Hekr are either 'main' or 'subsidiary' shops, ie., that some shops only provide supplemental income to a household. 'Main' shops would provide monthly incomes of LE30 and 'subsidiary' shops LE15. It was estimated that 66% of all establishments were 'main' shops, and that the rest plus all stalls were 'subsidiary'. Thus total monthly income would be LE4900 (57 + 42 = 99 x 15, and 114 x 30), and assuming profit at 20% of gross turnover, monthly turnover would be LE24,500 or LE294,000 per year). This was then compared to likely total expenditures of the El Hekr population, assuming that all expenditures in El Hekr shops were made by residents. The Household Budget Survey was

Cafe in Abu Atwa

used as above, but the expenditure group LE250-300/year was chosen since its midpoint coincided with the estimated median income in El Hekr (see Volume 3, Section 9).

Table 3.4
EXPENDITURE PATTERN IN EL HEKR 1977

Item	%age of total expenditures
Food and beverages	57.9
Clothing and fabrics	10.5
Furniture and equipt. (½)	0.4
Home products (½)	0.9
Miscellaneous (2/3)	4.9
TOTAL	74.6

3.12 This gives an estimate of 74.6% of total expenditures in the commercial sector. Thus, taking the population of El Hekr at 6070 households (SW corner excluded), the total purchasing power would be LE1,270,000 (275 x 0.75 x 6070). This, finally, gives the figure of 23% of El Hekr household expenditures in the commercial sector actually being spent in El Hekr itself; and 77% of this purchasing power is being spent outside the area. Of course this is only the roughest of indications, but it shows that there is a considerable amount of purchasing power in El Hekr, which, if directed back into the area, could support a much greater degree of commercial activity.

EXISTING SITUATION: ABU ATWA

3.13 In Abu Atwa commercial activity, as defined above, has been included in the Study Area survey. Locations of commercial premises in Abu Atwa are shown in Figure 1.9. Commercial establishments in Abu Atwa have been enumerated in Table 3.5.

Table 3.5
COMMERCIAL ESTABLISHMENTS IN ABU ATWA

Type of Establishment	Number	%
Personal consumption services	9	13.1
Exclusive food retailing	17	24.6
Variety retailing	27	39.1
Specialised non-food retailing	16	23.2
Sub Total	69	100.0
Stalls	10	
TOTAL	79	

3.14 As found in El Hekr, these figures indicate that commerce in Abu Atwa is of a much lower order and scale than Ismailia city proper (compared to Table 3.1). Compared to the number of shops in El Hekr, Abu Atwa has, proportional to the estimated existing population, slightly fewer shops. This may at least be partially explained by the very popular Friday market in Abu Shehata (and to a lesser extent the weekly market in nearby Nifisha) and also to the high proportion of households (over 50%) with non-cash incomes. The case studies indicate, in addition, that weekly shopping visits tend to be made to central Ismailia, where prices are low enough to offset the transport costs of 6 piastres return by bus and 20 piastres return by taxi.

3.15 The distribution of the types of shops in the area does reflect a greater degree of commercial autonomy than exists in El Hekr. There is a much higher proportion of exclusive food retailers than in El Hekr, which is influenced by the Talaatini Street markets, and the proportion in Abu Atwa exceeds that of Ismailia. The proportion of specialised non-food retailing is also higher than in El Hekr and closely resembles the proportion for Ismailia; personal consumption is low however. As in El Hekr all establishments are small, when compared to the typical city shops, and it can be said that Abu Atwa is characterised by low levels of investment, low turnover, and predominantly serves the local area. The distribution of types of commerce in Abu Atwa reflects greater commercial autonomy, but the numbers of shops do not. Even taking into account the Friday market, and non-cash incomes, the calculation undertaken to determine purchasing power which is actually spent in the area shows a dependence, almost equal to that of El Hekr, on commerce outside of the area.

3.16 Following the general procedure adopted in El Hekr, it was estimated that in Abu Atwa 75% of all establishments were 'main' shops and 25%, plus all stalls, were 'subsidiary'. To allow for the estimated 35 stalls in the Abu Shehata market the total provision was increased to 45. Total monthly income on these assumptions would then be LE2,490 (17 + 45 = 62 x 15, and 52 x 30).

3.17 Assuming profits @ 20% of gross turnover, monthly turnover would be LE12,450 or LE149,400 per year. This was compared to the likely total expenditures of the Abu

Typical extension of local shop into the pedestrian space.

Atwa population, assuming that all expenditures in Abu Atwa shops were made by residents. The Household Budget Survey was used as in El Hekr, and an estimate of 74.6% of total expenditures in the commercial sector was assumed. Taking the estimated number of households in the area at 2850, the total purchasing power was estimated to be LE587,812. This finally gives the figure of 25.4% of Abu Atwa expenditure in the commercial sector actually being spent in Abu Atwa itself, 74.6% of the purchasing power being spent outside the area. The indication is that, as in El Hekr, there is a considerable local purchasing power which if directed into the area could support a higher level of commercial activity.

FUTURE COMMERCIAL ACTIVITY AND SITE DEVELOPMENT

3.18 Future commercial activity in Abu Atwa and El Hekr must, to some extent, be planned for. Although, as pointed out in Volume 1, a basic policy of allowing commercial (and workshop) activity on both existing and new residential plots has been adopted, a certain control and encouragement of the sector is desirable (1) to increase the size and sophistication of commercial services in both El Hekr and Abu Atwa, (2) to encourage the agglomeration (thus range, variety and convenience) of commercial activity at central locations and (3) to recoup, for general improvements, at least a portion of the rise in land values attributable to major commercial potential. Thus, in both El Hekr and Abu Atwa, the future community development plans call for the creation (El Hekr) or strengthening (Abu Atwa) of multi-service community centres whose attractions for social and commercial services, shopping, public transport and entertainment are mutually self-reinforcing. The strategy for commercial activities is, while allowing the establishment of shops at any location, to reserve a certain amount of prime space at the community centres for future sale or lease. In this way these sites would be developed only when the commercial potential has risen to attract entrepreneurial investment and be sold at 'market' or

near 'market' cost so that the increase of land value would accrue to the developing agency. The first plots would be sold at concessionary rates to attract initial development, and with a flexible array of sizes and locations, differing scales and types of commercial establishments could be accommodated (see Volume 3, Section 5).

3.19 The main problem of estimation is to ascertain how much space to reserve for these commercial plots. The main danger is that too much space is reserved, although if too little is made available speculative profits will accrue to normal settlers and commercial development may not concentrate at the desired range of space to be reserved in the community centres.

3.20 Estimation for El Hekr was as follows. The standard 3m x 5m shop (15m2) was assumed to have a monthly turnover of LE150 (constant 1977 prices). The purchasing power of El Hekr residents at full development was assumed to be 75% of total household expenditures, or LE208 per household. (Although average household income in El Hekr is likely to rise significantly by the year 2000, so would prices and commercial turnovers, thus all factors were kept constant). With a total of 15,000 households expected by the year 2000 there would be a total annual purchasing power in the commercial sector of LE3,100,000. Assuming that the existing shops continue to absorb LE294,000 of this (see preceding section), there would be a balance of LE2,800,000 that would be spent either at new establishments in the area or outside the area. The implications of space needs can be seen under different assumptions of the proportions of this amount that would be spent in the area, as Table 3.6 shows. Obviously, in

Table 3.6
IMPLICATIONS OF PROPORTIONS OF LOCAL EXPENDITURE EL HEKR

Proportion of commercial expenditures spent in El Hekr	New commercial space @ 15m2 per LE150 monthly turnover	
	m2	No. of 'main' shop units
23% (present ratio)	5360	357
40%	9350	623
60%	14000	933
80%	18650	1243

an area with a future population of nearly 100,000 inhabitants, one can expect a higher proportion to be spent in El Hekr than the present 23%. Once the area is serviced and given a central focus one can anticipate, and in fact encourage, a much greater number of exclusive food retail and some higher order, specialised non-food retail shops, and an increased number of personal service establishments such as cafes and restaurants. Since food and beverages are such a large proportion of total household expenditures (57.9%), if the amounts spent on food and beverages in El Hekr were to be between 50%-65% of the household's total, then this increase alone would raise the propor-

tion of commercial expenditures spent in El Hekr from 23% to between 42% and 52%. Allowing for a modest increase of proportions spent in El Hekr on clothing, home furnishings, and miscellaneous, one can postulate that between 50% and 65% of commercial expenditures would be spent in El Hekr, which translates into between 11,650 and 15,150 m2 of new commercial space, or between 776 and 1010 new 'main' shop units.

3.21 Of course this range is only indicative, and in fact expresses as much the magnitude of desirable increase of commercial expenditures as any estimate of likely trends. This indicative range has been used in planning commercial space needs, but as is discussed below, ample flexibility in the type and character of future sites is designed into the programme of execution so as to enable significant modifications based on future trends.

3.22 It remains to estimate how much of expected future commercial space in El Hekr should be reserved in the community centre. Smaller 'subsidiary' shops will be built throughout the area, and stalls and carts will also claim a share of commercial expenditures. Taking the same proportion of subsidiary shops and stalls/carts to the total as presently found in El Hekr and assuming as before, that these establishments have half the turnover of 'main' shop units, total space needs in the community centre would be reduced by 1090 m2 ($99 \times \frac{8930}{6070} = 145$ new 'subsidiary' units, each with LE75 turnover, or LE10875 per month total, which translates into 1087 m2 of 'main' shop space). This reduces the range to between 10,560 and 14,060 m^2. but this must be further reduced because there will be some 'main' shop units built on settlers' plots at strategic locations such as at corners, along main thoroughfares, and on the fringes of the commercial/community centre itself. There is no way to estimate the extent of this development, but it seems reasonable to hope for a concentration of 60% of all 'main' shop units in the centre itself, and thus the working range of commercial space reserved needed in the community centre becomes from 6340 m2 to 8440m2. This translates into between 420 and 560 'main' shop units of 15m2.

3.23 In the actual plan of the community centre in El Hekr (see Volume 1. Section 4) 3810 m2 have been reserved for three sizes of shops, all of which are multiples of the 3 x 5 m unit. Depending on demand at the time of sale, these plots can be easily aggregated or disaggregated and second floors may be built. Besides this reserve for purely commercial establishments, there are reserves for other activities which either have some commercial element or could, depending on future demand, be partially converted to shop spaces. These are:

i) Workshops (including outside workspace) = 3087m2

ii) 'Concession' plots, larger plots for future sale to private institutions, public services, or large commercial establishments = 3549m2

iii) A central market for stalls and carts = 390m2

Thus there is ample oportunity to expand the amount of land in commercial use in the centre upwards from 3810 m2, and so to accommodate a greater concentration than even the upper range of these calculations allow for. Only after the centre is established and begins to develop its commercial attraction can the administrating agency begin to decide the mix of uses and the prices at which plots will be sold.

3.24 In Abu Atwa the situation is quite different, and it is not necessary to go through the same exercise as has been carried out above for El Hekr. This is because in Abu Atwa the existing commercial centre is being reinforced and expanded into a multi-service node for the whole community. There is little empty land which can be reserved for future commercial plots, and the amount available must be shared between new community services, open space, workshops, and commercial establishments. Thus the amount of land designated for commercial reserve (and shown in Volume 1, Section 6) has been affected primarily by design constraints and intuitive perceptions of what locations are likely to have the best commercial potential.

3.25 The bulk of new commercial activity will occur on plots already occupied by inhabitants, who will convert their frontages to shops as commercial demand increases. The magnitude of the total commercial space in the community/commercial centre at full development may be roughly estimated using the same assumptions as have been applied to El Hekr above. This exercise gives a range of between 5208 and 6770 m2, of which 1245 m2 is now under commercial or workshop use. Assuming that some of this activity will go onto reserved plots of 1900 m2, this leaves between 2060 and 3620 m2 (or between 137 and 241 'main' shop units) that can be expected to be developed on existing plots in the community centre, particularly along the by-pass arterial and between the by-pass and the existing main street. On the assumption that 15m2 of shop space equals 3m of frontage, this gives a total of between 207 and 394 linear metres of commercial frontage to be created on existing plots in the community centre. Although only indicative, these ranges have been used in calculations of supplementary charges to be assessed on certain plots in Abu Atwa to reflect commercial potential (see Volume 3, Section 9).

CHARGING AND COMMERCIAL POTENTIAL

3.26 In Abu Atwa and El Hekr land reserved for commercial plots will be sold by the executing agency progressively over time, at 'market' rates, though initially an incentive below 'market' rate will be applied in El Hekr. As a guideline, this base rate should be above LE3/m2 in El Hekr and above LE7/m2 in Abu Atwa (see Volume 2, Section 2 for discussion of existing and expected land values in the Study Areas). Actual charges will depend on market conditions and decisions to be made by the executing agency.

3.27 It is intended that a nominal charge be put on certain existing and new settlers' plots to reflect their

commercial potential. This charge would be added to the general land purchase rates and would thus be paid for over the amortisation period (see Volume 1, Section 8 and Volume 3, Section 9). How much to charge is problematical, since if it is too high it will put an excessive burden on certain existing households (especially in Abu Atwa) and will scare off prospective new settlers from plots with commercial potential (especially in El Hekr). On the other hand, if it is too low the project will miss recouping a significant amount of income. Unfortunately this supplemental rate must be decided before plots are sold or existing plots are assessed; thus the rate, however arbitrary, must be fixed.

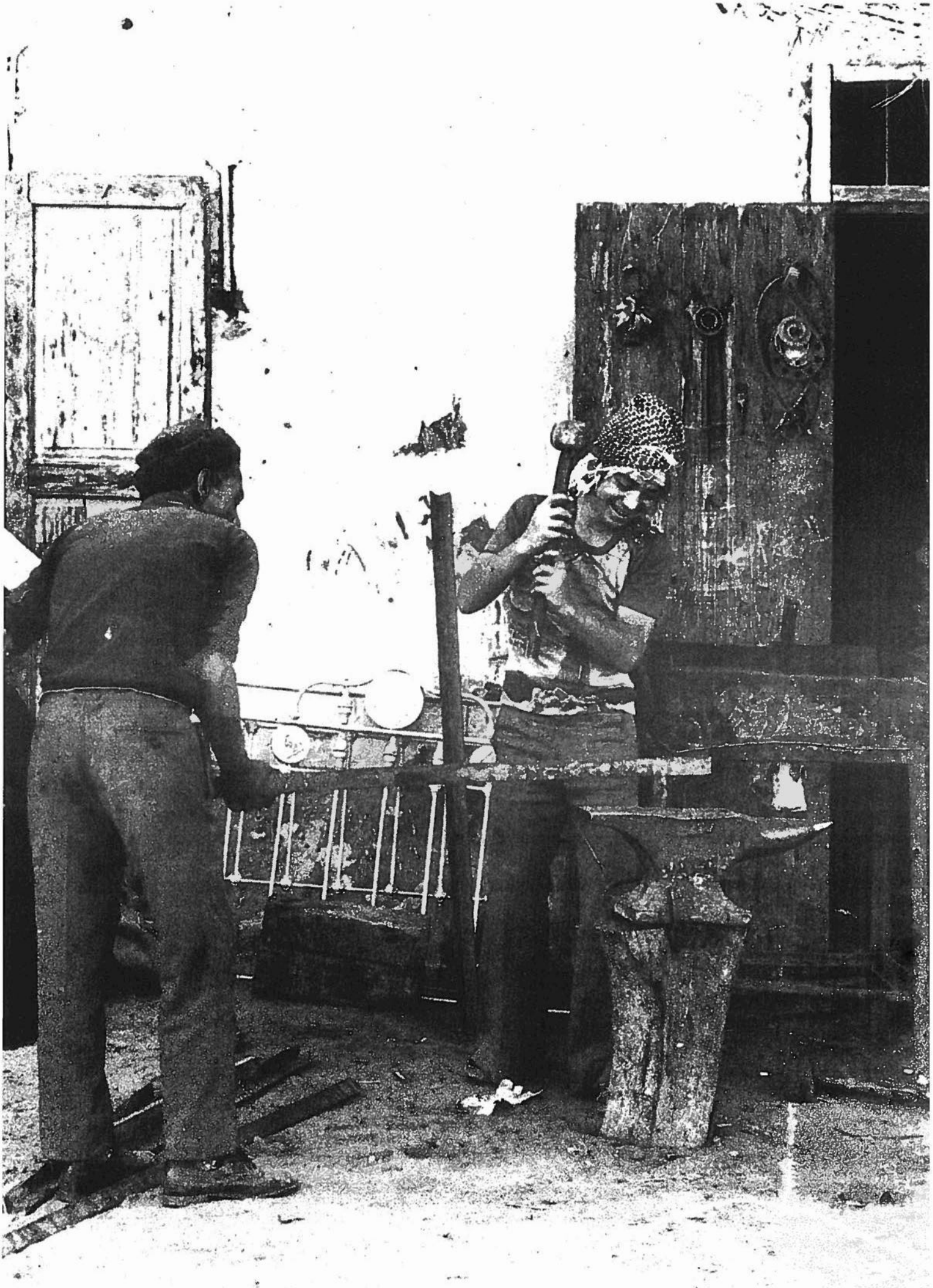
3.28 In El Hekr Class B plots, ie., those fronting on wider roads, are to be charged a higher effective rate than Class A plots. Thus to a certain degree commercial potential is accounted for, since very little or no commerce will be expected in the semi-public spaces and lanes. However, this is completely arbitrary, and a Class C has been introduced to designate those Class B plots which have a definite commercial advantage due to location. In principle, some plots on 20 m roads, plots on strategic corners, and plots abutting the community centre would be considered Class C. Class C plots have been indicated in the First Phase of new development in El Hekr and also in the Detailed Improvement Area of El Hekr. This demarcation has been made by judgement, but total number of plots has been limited to each neighbourhood's proportionate share of 'main' shop space which has been assumed to locate outside the community centre.

3.29 What linear frontage rate to be charged can only be arbitrary. As a guideline, it should not increase the total charge for a plot by more than 50% of the Class B rate for a similar plot, and at a minimum should not be less than an additional LE1.5 per year per plot; (for 20 years at 7% this represents LE16 which, when applied to the standard 6m frontage, gives a per linear metre rate of LE2.67). Using, for example, this minimum linear metre rate, wider plots (9m) would be assessed LE23.9 and corner plots of 9 x 12 m would be assessed LE56.5, as long as this amount did not exceed a 50% increase over the Class B rate.

3.30 A similar approach for Abu Atwa has been proposed. New areas of Phase One would virtually all be either Class A or Class B since the location of Phase One gives it little commercial potential. In the community centre, however, the same linear rate would be added to the existing settlers plot purchase rate for all plots within the designated commercial centre; demarcation of these plot frontages would be constrained however to total no more than the 400m of commercial frontage expected in the centre.

4

Industry



4
Industry

INDUSTRY – ISMAILIA CONTEXT

OVERVIEW

4.1 Ismailia city remains a predominantly service industry centre with a relatively small manufacturing capacity. While it is forecast that the manufacturing sector will slowly increase as a proportion of total basic and non basic employment, service industry will remain the dominant employer in the city. At present, it is estimated that 10% of employed population is in the manufacturing sector, of which perhaps only 40% are in the formal manufacturing sector, the remainder being in small-scale private sector enterprises. Service industry in Ismailia has been and remains dominated by the requirements of the Suez Canal Authority, and there is an associated emphasis on transport related industries in the local economy. With the re-opening of the railway and the resumption of other public transport services, employment in this sector is now likely to be about double the national average, as was in fact the case pre-1967.

4.2 The significant change in the manufacturing sector, as noted in the IMPS, is the growth of investment in larger, formal manufacturing enterprises in the private sector. Previously, there were a few public sector factories in Ismailia, namely Canaltron, Telemisr, a milk processing plant, a mineral water bottling plant (Sico) and the Canal associated companies, Timsah Ship Building Company and Canal Harbour Works Company. In the last two years however, a number of private sector companies have expressed interest in investment in Ismailia. Already established are the Arab Aluminium company, the Larsen Nielsen company, producing pre-fabricated housing units, and Arab Contractors Company, manufacturing barges and associated marine equipment. Other possible investments include a tractor manufacturing plant (Deutz) and a citrus fruit processing plant.

4.3 The majority of employment classified as manufacturing in Ismailia, as in Egypt generally, is in small-scale

factories/workshops, characterised by small work forces (generally less than 15) and low capitalisation. In many instances the distinction in the enterprise's output between basic (exporting) and non-basic (local population serving) activities is blurred. For the purposes of the present Demonstration Projects study, a more useful breakdown of small scale industry is (a) workshop manufacture with a particular emphasis on metal working and carpentry / furniture manufacture, and (b) distribution and repair of investment/transport goods, such as automotive parts distribution, building materials, etc..

DEVELOPMENT POLICIES

4.4 The IMPS made the following recommendations regarding industrial development policies for the city:

a) The city should reinforce its role as a service orientated employment area. Only when there has been a major investment in the Ismailia region, ie., significant reclamation and new agricultural schemes, coupled with an overall growth of the regional economy, will there be major diversification of the city's economy.

b) Given the limited natural resource base in the Ismailia region and the relatively highly skilled work force, the city should actively encourage investment by 'higher order' manufacturing, administrative and service functions. In particular the city should capitalise on its tradition of female participation in the workforce. While major export oriented industries are likely to be established at Port Said and Suez free zones, Ismailia may be favoured for light, high value exports with less dependence on nearby cargo port facilities. The progressive improvement of Delta-Canal Zone and Canal Zone-Sinai transport will reinforce Ismailia's nodal position in the region. Nevertheless, producers serving the domestic market may prefer to locate nearer that markets centre of gravity, eg., at Helwan, Alexandria and Sadat City.

c) The considerable natural and man-made attractions of the Ismailia environment can be promoted to attract service industries which might ordinarily seek office accommodation in Cairo or regional capitals elsewhere in Egypt. These considerations are likely to be particularly attractive to private foreign concerns seeking to provide the best available living and working conditions to expatriate staff.

d) The most likely types of manufacturing industries to locate in the Ismailia area will be:

i) Industries with a high proportion of value added by labour.
ii) Light industry with low pollution risks which will not jeopardise other activities in the area, for example tourism and agriculture.
iii) Industries with high value export - orientated outputs which necessitate relatively little capital investment.
iv) Industries serving the domestic market with low value outputs.

e) In all, long term industrial development will proceed in both the public and small scale private sector. Large scale industries will tend to develop in three particular types of activity; those extending the existing transport orientated industries, those supporting the reconstruction and development of the Canal Zone and those based on accelerated agricultural production in the Ismailia region. The small scale industrial sector will expand as the Ismailia economy expands and diversifies and in response to the trend towards economic liberalisation, which should allow smaller enterprises access to foreign exchange resources, currently a major constraint on production.

4.5 Details of manufacturing and service industry development policies and forecasts of basic industrial employment are included in IMPS Volume 5, 'Manufacturing and Basic Service Industry'.

SCALE OF MANUFACTURING ACTIVITIES

4.6 Manufacturing activity in Ismailia city can be classified as follows:

a) Larger scale establishments employing 100+ workers, on individual sites, utilising extensive purpose built factory space and large storage areas, and dependent on uninterrupted supplies of electricity, water and raw materials.

b) Smaller scale establishments employing between 10 and 50 people, located close to or within residential areas, sometimes in purpose built premises, and generating important localised employment opportunities throughout Ismailia.

c) Workshops and very small scale craft industries employing up to 9 full time workers, usually owner-operated with the assistance of relatives/friends, and located in residential or commercial areas because of their local market and commercial orientation.

4.7 The role of industrial infrastructure in helping the expansion of the manufacturing and service industry sector is extensively discussed in IMPS Volume 5, 'Manufacturing and Basic Service Industry'. In summary, it is clear that a shortage of suitably located and serviced sites is a significant constraint on Egyptian manufacturing industry. Such shortages are common to all scales of industrial development, but with different emphases. The infrastructure requirements for each scale of establishment used in determining the size and layout of industrial zones in the IMPS are summarised in Table 4.1.

Table 4.1
INFRASTRUCTURAL REQUIREMENTS BY SCALE OF ESTABLISHMENT

Requirements	Large scale	Medium/ small scale	Very small scale/ workshops
Utilities:			
Public water supply	Always	Always	Limited
Public sewerage	Always	Always	Limited
Electricity	Always	Always	Always
Telecommunications	Always	Always	Limited
Other Factors:			
Public factory space	Limited	Limited	Usual
Access to transport networks	Always	Usual	Usual
Proximity to market	Limited	Usual	Always

Source: IMPS, Volume 5.

4.8 The hierarchy of manufacturing industry zones proposed in IMPS is as follows:

Type	Location
1. Industrial areas for large scale industries located on the periphery of Ismailia close to regional/national transport facilities.	West Ring Road Suez Road South West
2. Industrial estates of developed land, close to residential areas and suitable for smaller scale establishments. For these estates the desirability of proximity of employment opportunities to general urban areas is balanced against the inconvenience and environmental cost caused by the industrial activity.	Nifisha Sheik Zeid City
3. Commercial and trading areas with provision for very small scale establishments, craftsmen and artisans in association with trading and in conjunction with newly developed housing areas or local centres.	El Hekr Abu Atwa Sheik Zeid City etc.

COMMERCIAL/TRADING AREAS (WORKSHOPS)

4.9 Paragraphs 4.1-4.8 above form the necessary background to proposals for workshops in residential areas and an initial light industry area as given in the Demonstration Projects terms of reference. This section presents the analysis of commercial/trading areas in residential areas corresponding to industrial zone type 3 above, as applied to the El Hekr and Abu Atwa Project Areas. The aim is to arrive at a strategy for the future provision and encouragement of these activities. It is emphasised that the characteristics of workshop activity in El Hekr

and Abu Atwa are not necessarily common to all such zones in Ismailia. Nevertheless the planning assumptions shown below would be applicable in general to similar workshop areas.

DESCRIPTION OF WORKSHOP ACTIVITIES IN EL HEKR AND ABU ATWA

4.10 From the land use surveys the following classification of workshop establishments has been constructed:

Table 4.2
CLASSIFICATION OF WORKSHOP ESTABLISHMENTS: EL HEKR AND ABU ATWA

Type of Establishment	El Hekr	Abu Atwa
Woodworking	3	5
Tailors	5	3
Metalworking	2	3
Auto repair	2	2
Tyre repair	2	1
Bicycle repair	2	1
Rug making	2	1
Pottery making	-	2
Cobblers	1	2
Distribution of building materials	4	2
Other	12	3
Totals	35	28

4.11 As can be seen by the types of establishments, workshops in both areas produce, repair,or distribute items destined almost exclusively for local (neighbourhood) consumption. Manufactured products from these establishments are much less sophisticated than those produced from similar shops in Ismailia proper. Most establishments average only two to four workers (only one workshop, a carpentry shop in Abu Atwa, employed more than 7 workers), and the level of capitalisation is in general very low. It is significant to note that the majority of establishments have a retail as well as a productive/repair function, and for this reason most workshops are found along-side commercial establishments in the well established commercial zones of El Hekr and Abu Atwa. It is also worth noting that all of these establishments, with the exception of tailors, cobblers, and rug makers, carry on a significant part of their activities in uncovered spaces fronting the shops. Finally, it should be noted that the total number of workshops in El Hekr would be higher were there not a well developed workshop zone in the adjacent neighbourhood of Arashia.

FUTURE WORKSHOP ACTIVITY AND SPACE NEEDS IN EL HEKR AND ABU ATWA

4.12 It is extremely difficult to make any realistic estimate of future workshop activities in the Project Areas. Using a simple population ratio one could expect roughly 100 new units in El Hekr and 60 new units in Abu Atwa at full development, but this disregards the changing

composition and size of establishments, and in any event does not reflect agglomeration and size economies nor the objective of creating a higher level of locally based employment. Because of these problems, the estimates of future activity are arbitrary, as shown below.

4.13 Assuming, for the moment, that new units based on population ratios will represent the minimum limit of new activity, the question of how much space this represents can be roughly estimated; first, 'space' is here defined to include both covered and uncovered work areas; secondly, using an overall average space per worker of 15m2*, the following hypothetical (or desirable) size distribution for future workshops is derived.

*The Manager of the Ismailia Cooperatives Association gives standards of 33m2 per worker for furniture workshops, 14m2 per worker for cobblers, and 12m2 per worker for tailors. Observation in the Study Area indicates that these standards are quite high.

Table 4.3
FUTURE SPACE PROVISION FOR WORKSHOPS

No. of workers including employer in workshop	Proportion of whole (%)	Total space per worker (m^2)	Total space per workshop (m^2)
1	20	20	20
2	25	15	30
3-5	40	15	45-75
6-10	12	15	90-150
11-20	3	15	165-300

It can be estimated that at a minimum there will be a need for 5560m2 of new workshop space in El Hekr and 3340m2 in Abu Atwa.

4.14 Using this minimum as a base, it can be postulated that the desirable space devoted to workshops should be some multiple of this. In El Hekr this multiple was arbitrarily taken to be 1.75, (because of its larger size) and for Abu Atwa 1.5. Of course these values cannot be absolute, but as will be seen below they are simply used as boundary guidelines.

AGGLOMERATION OF WORKSHOPS IN COMMUNITY/COMMERCIAL CENTRES

4.15 It is a very common trend for workshops to be located together with commercial establishments and with each other. As part of the site development strategies for El Hekr and Abu Atwa the attraction power of the community centre is to be magnified by the agglomeration of community facilities, commercial establishments, and workshops. (See Volume 3, Section 5). Yet at the same time it is a basic policy of the Demonstration Projects to allow workshop activities (of a non-nuisance nature) to be established on residential plots, as it is well known that small businesses function better, other factors being equal, if the proprietor lives close by or on the same plot. Thus the question to be answered is, of total expected workshop activity, how much should be located at the community centres and what in terms of space requirements does this imply? Many workshops will be located on residential plots at strategic locations, either along main roads or around the community centre,

some will be dispersed throughout the area, and some new workshop activity will be taken up by the expansion of existing establishments. Thus it would be risky to allow for too much of a reserve at the community centres, and it has been assumed that only 40% of new workshop space should be reserved at the community centres; for El Hekr this represents 3900m2 and for Abu Atwa 1340m2.

4.16 As with retail space at the community centres, (see Volume 3, Section 3) it is proposed that flexible workshop plot modules be reserved for future sale at market or near-market prices. In the design of the community centres, the workshop plots are based on modules of (6x18m) and (9x18m) which can be easily aggregated or subdivided depending on demand. Each of these plots represents both covered and uncovered space, and it will be generally required that at least 50% of the plot be left unbuilt (except for tailoring, cobblering, appliance repair and rug-making establishments, which will, in any event, be small units). Not only is there flexibility in the reserved workshop space, but the administering agency has the option, depending on future demand, to increase the total area for workshops by converting other parcels, designated in the plan as large-lot concessions, into small clusters of additional workshop plots which could be related to manufacturing and handicrafts training and cooperative programmes. Thus, in general, it is felt that the flexibility in design is sufficient to meet a variety of future demand situations.

INDUSTRIAL ESTATES

4.17 This sub-section analyses the role of smaller scale industrial estates corresponding to industrial zone Type 2 above.

ROLE OF INDUSTRIAL ESTATES

4.18 As already noted, the majority of private sector industrial establishments in Ismailia, as in Egypt, employ fewer than 50 workers, and a majority of these fewer than 15. The IMPS considered that the Nifisha zone should be designed for this category of medium to small firms which can operate at a sufficient level of output and turnover to justify the occupation of small factory units with full services. The majority of firms coming to Nifisha will originate elsewhere in Ismailia and are likely to employ no more than 10-15 staff. Such firms will be at a stage of development where they need and can afford the advantages of organised services, etc., which can be provided on a light industrial estate. Other firms may originate outside Ismailia and will be perhaps larger. Consequently, the Consultants consider that the bulk of accommodation at Nifisha should be geared to the lower end of the market in terms of size of firm, and this is reflected in the balance of small and medium sized factories in the design. Such enterprises may be drawn from transport, metal fabrication, construction materials, electrical and electronic, clothing and footwear, paper products and a variety of other engineering sectors. This size of industrial enterprise is capable of flexibility and

modification by virtue of its size and position in markets; adequacy of factory space, suitability of location, availability of utilities and communications can all influence productivity substantially. This is in addition to problems of raw materials supplies, marketing and distribution, availability of finance and credit and administrative difficulties encountered by the private sector.

4.19 To overcome many of these difficulties, industrial estate organisations have been used in many developed and developing countries as one means of implementing urban planning policies while catering for the optimum requirements of individual enterprises located in the estate. The IMPS noted that the chief advantage of such estates is that by grouping small industries, considerable economies of scale are achieved in services, including factory space, more effective assistance in technical and administrative matters can be given, and efficiencies can be brought about by specialisation and improved position in markets. Industrial estates of the scale being proposed at Nifisha require good transport and communications, an economic arrangement of utilities, and if possible additional services such as worker transport, maintenance facilities, central administration, telecommunication facilities, parking, expansion areas, etc.. If possible, the estate should be run by a special industrial development/promotion unit which can react quickly and positively to matters affecting firms located there (see Volume 1, Section 8).

4.20 It is concluded that in the long term the Nifisha area can be developed as a light industrial estate, with the provision of full serviced sites, the possible provision of some advance factory space, and the adoption of the form of organisation referred to in the Suez Canal Industrial Plan (Third Progress Report). Thus the estate will be designed to provide 'nursery' services for small establishments on a rental basis and possibly some advance factory units, as well as sites for sale to incoming firms able to operate as fully independent entities. The nursery services will include central workshop facilities and allied services such as classrooms, a technical library and centralised communications services, eg., telex. The present Consultants fully support the proposal in the Regional Industrial Plan that the estate would be suitable for the activities of producer cooperatives, (a number of cooperative societies already exist in Ismailia).

DEVELOPMENT STRATEGIES FOR NIFISHA INDUSTRIAL AREA

4.21 The preferred form of development at Nifisha must take into account:

a) The balance to be struck between the options as described in the IDP Status Report, namely (i) the provision of fully serviced factory units as described in the IMPS, (ii) serviced plots with no buildings, (iii) subdivision only.

b) The progress since the IMPS and in the next 5-10 years, in achieving the expansion of manufacturing

employment in Ismailia as a whole, and thus the likely take-up of industrial sites at Nifisha and elsewhere in the city.

c) The acquisition of 13.5 feddans of the site by the Ismailia Transport Company, and existing options on a further 1.5 feddans within the site.

d) The confirmation by the geotechnic Consultants that a substantial volume of fill will be required over most of the site to permit reasonable construction standards for utilities and superstructures.

e) Further work undertaken during the Demonstration Projects on the land market in Ismailia, and the ability to pay for serviced land at Nifisha by small industrial establishments.

f) The phasing of offsite utilities investment (see IMPS Volume 5, Chapter 9).

4.22 It has been concluded that it is premature to recommend the immediate complete development of the Nifisha zone as a fully-serviced industrial estate, because it is not clear at present that the market for industrial enterprises wishing to locate at Nifisha is such as to justify the necessary high costs of ground filling, (see Volume 1, Section 7). Depending on how the development of Ismailia follows the broad lines of direction shown in the IMPS, and in particular when there are decisions on the future of the Al Galaa camp, the proposed new central area and the timing of major residential development north west of the central area, then it will be easier to predict the increased value of land at Nifisha which could make industrial development attractive and mainly self-financing. It is recommended therefore, that the proposed Governorate Industrial Development Unit should monitor the market for sites and/or factory units, and make its own judgements as to when, and in what form, the first and subsequent phases of estate development should proceed. The role of the Unit in this respect is shown in Volume 1, Section 8, and the Consultants' views on the question of factory rentals and sale of serviced land are shown in paragraphs 4.37-4.38.

4.23 While the Consultants are not able to recommend an immediate start to the full scale development of the Nifisha site, it is emphasised that the Demonstration Projects should by definition include a substantial proportion of policy and design recommendations relevant to other areas of the city. This being so, the following sections illustrate the infrastructure standards adopted for both a full scale estate and an initial phase, and the implications of the investment required on ability to pay by potential users.

INFRASTRUCTURE STANDARDS AND COSTS

4.24 The following description of the Nifisha Industrial Estate summarises the principles shown in the IMPS Volume 5, updated by work undertaken in the Demonstration Projects. It also takes into account various infrastructure recommendations made in the Suez Canal Regional

Industrial Plan (Third Progress Report).

STANDARDS

4.25 The following standards of infrastructure provision have been used in the preparation of the Nifisha Industrial Estate plan (see Volume 1, Section 7).

Table 4.4
STANDARDS OF INFRASTRUCTURE FOR INDUSTRIAL ESTATE

Type of Infrastructure Provision	Standard	Comments
1. Employment/ factory space ratios	1 employee/ 10m2	Likely to be wide variations in labour intensity, but standard represents safis- factory average.
2. Optimum plot ratios of factory space to total plot area	1:1.5	Non-factory space includes uncovered workspace, storage, hard standing and provision for expansion.
3. Roads	13m right of way. 7m carriageway. 10cm on 25cm base. 3m + hard shoulders.	
4. Utilities:		
a. Electricity	146 Kva/ha	No extraordinary consumers of electricity assumed on estate.
b. Water - Industrial usage	270 litres/ day/worker	
Water - Employees	40 litres/ day/worker	
c. Sewage	80-100% of water consumption volumes	Will vary depending on type of factory process, recycling etc.. Particularly harmful effluents assumed treated by factory before discharge.
5. Factory units	Basic units of 72m2 and 120m2 with provision for separate units to be combined	For detailed description of design standards, see Volume 1, Section 7.

4.26 In addition to factory plots and associated public areas, a central administration area is proposed. This area could provide the administration offices of the Industrial Development Office as well as the central 'nursery' services for the use of firms on the estate (see paragraph 4.20).

Administration Offices; Office space sufficient for 5 staff/advisors and 3 classrooms	300m2
Workshop Buildings Including Machinery; including workshop equipment appropriate for the initial phase	1000m2

4.27 Provision is made for a bus terminal area for bus transport to and from the estate, connecting with the central area and elsewhere. Security measures, including policing and fire protection, will be the responsibility of the implementing agency.

INFRASTRUCTURE COSTS RELATED TO ABILITY TO PAY

METHODOLOGY

4.28 As concluded in the IMPS (Volume 5), a full economic feasibility study, based on an examination of the true economic resource costs and benefits arising from investment in industrial estates is not warranted. The principle of cost recovery has been calculated, based largely on commercial considerations. Since the costs calculated are on-site costs only, the objective of the industrial estate management and utilities organisations should be to recover full costs. In fact, it could be argued that part or all of the offsite costs should be recovered from the wider community, since there are community benefits arising from the estate, e.g. diversification of local economy.

4.29 The methodology used, therefore, is to examine notional revenues arising from the sale or lease of serviced plots in the Nifisha estate in terms of the on-site costs of creating these assets. The return on investment is then calculated. The administrative costs of running the estate are not calculated - it is fair to assume that these fall within the central budget of the Ismailia Governorate. Similarly, factory operation/maintenance costs will be borne by individual enterprises.

INFRASTRUCTURE COSTS

4.30 The full development costs of the Nifisha Light Industrial Area are presented in Volume 1, Section 7. Total infrastructure costs are reproduced here and related to the net revenue generating area, as shown in Table 4.5. (N.B.: Infrastructure here is defined as all on-site investments which must be recouped through plot sale or lease).

4.31 The resulting cost per net m2 of LE18.7 is extremely high, due primarily to the cost of fill which must be calculated over the whole site (gross area). It should be noted that, if the cost of land acquisition and land

preparation (fill) are excluded, the resulting cost of revenue-generating land falls dramatically to LE4.7 per m2 net.

Table 4.5
NIFISHA INDUSTRIAL AREA - FULL DEVELOPMENT; ESTIMATED CAPITAL COST BREAKDOWN

	Total cost LE	Gross LE/m2	Net LE/m2	Size %
Land	117,527	0.721	1.357	7.244
Upfilling	1,109,848	6.735	12.673	67.671
Paved Areas	125,000	0.767	1.443	7.705
Unpaved Areas	7,500	0.046	0.087	0.462
Water supply	61,712	0.379	0.712	3.804
Sewerage	83,740	0.514	0.967	5.162
Electricity supply	40,000	0.245	0.462	2.466
Street lighting	15,000	0.092	0.173	0.925
Telephones	15,000	0.092	0.173	0.925
Landscape	5,000	0.030	0.058	0.308
Community facilities	35,000	0.215	0.404	2.157
Boundary wall	19,000	0.117	0.219	1.171
Totals	1.622,327	9.953	18.728	100.000

ABILITY TO PAY

4.32 The question of ability to pay for sites in the estates is difficult to answer, as there is virtually no market for serviced industrial land in Ismailia on which to base calculations of comparative market values. The only comparisons that can be made are with the general urban land market in Ismailia. The analysis presented in Volume 2, Section 2 shows that in 1977 empty serviced plots located 1 to 1.5 km. from the city centre had market values of LE7-12m2. The Nifisha Light Industrial Area is 4 km. from the centre and since there are no serviced land parcels on the market of equivalent distance, one can only assume that if serviced land at Nifisha were put on the market now it could not command a price higher than LE5-7m2. (Moreover, it cannot be assumed that this price could be asked for industrial use).

4.33 Another approach is to look at prices of serviced and unserviced industrial land in Cairo and other centres, on the assumption that small foot-loose industrial concerns will be assessing land costs as part of their locational decisions. Industrial land near Cairo Airport is presently being sold for LE8-12m2, but these sites are not strictly comparable since (1) they are primarily large lots (1 feddan and more) and (2) they are 'unserviced' but close to road, water and electrical lines. This kind of industrial land is found in Ismailia at the Ring Road Industrial Estate, and at present the Governorate of Ismailia sells this land for LE0.45/m2.

4.34 It is not necessary to go deeper into this market analysis, since under even the most optimistic assumptions, current demand for land (whether industrial or general purpose) could not support the prices that would have to be charged. Even if it is assumed that land fill could be carried out at half the estimated cost, the resulting price of LE12.4/m^2 would still be excessive, whether prospective buyers (or lessees) come from Ismailia or from outside the region.

4.35 This leads to the question of whether it would be possible to develop a part of the Nifisha site (requiring less fill), at lower levels of infrastructure provision to reduce costs and thus make the land price competitive. This has been investigated, and plans for a Phase 1 development have been developed and included in Volume 1, Section 7. An analysis of costs shows that revenue-generating land could be sold at LE15/m^2 to provide an acceptable return on investment. This price is still high when present market forces are considered and it is doubtful whether enough of the kinds of establishments (small and medium size manufacturing enterprises) which are desired could be attracted.

4.36 These considerations apply to the present, i.e. on the assumption that development would proceed in 1978. Although an analysis of future market conditions is not possible, trends in the Ismailia land market, as well as general expansion of industrial activities in the Canal Zone and Egypt as a whole, point to the possibility of delaying development of Nifisha until demand for serviced industrial land rises to a point which covers all costs. Excepting unforeseen circumstances, it is difficult to anticipate this situation occurring before 1982-3.

4.37 One further market test was carried out. This was to investigate the possibility of building small factory units and leasing them to firms which could not amass the capital necessary for construction of their own units. The 'demand' for such units is extremely variable in Ismailia, ranging from annual rents of LE1.5 per m^2 to more than LE5.00 per m^2. This variation reflects the age of the lease which in each case is set by the City Council. Recently, small key money payments have been demanded for workshop space, indicating that these rents do not completely reflect current demand, and that perhaps as much as LE6-7 could be levied. On the supply side, it has been estimated that it costs LE55 per net m^2 of built factory space, and to this must be added the cost of serviced land which, at Nifisha, translates into a cost of LE44 per m^2 of buildable space; (this is because, on average, factory units will have 42% plot coverage).

4.38 Total costs for built factory space would be LE99/m^2, which, when allowing 10% for operating overheads, requires annual rents of LE10.4/m^2. (Costs amortised for 20 years at 7% per annum.) Thus these calculations show that, while the renting of factory units is not presently feasible in terms of market demand, the gap between supply costs and market demand is not nearly as great as that found for serviced land. The implication

is that built factory units will, in the future, become one form of development of Nifisha which should be carefully considered along with the land development programme. For this reason proposals for Phase 1 of Nifisha (see Volume 1, Section 7) include the possibility of the developing authority building small factory units for rent.

5

Centres

5
Centres

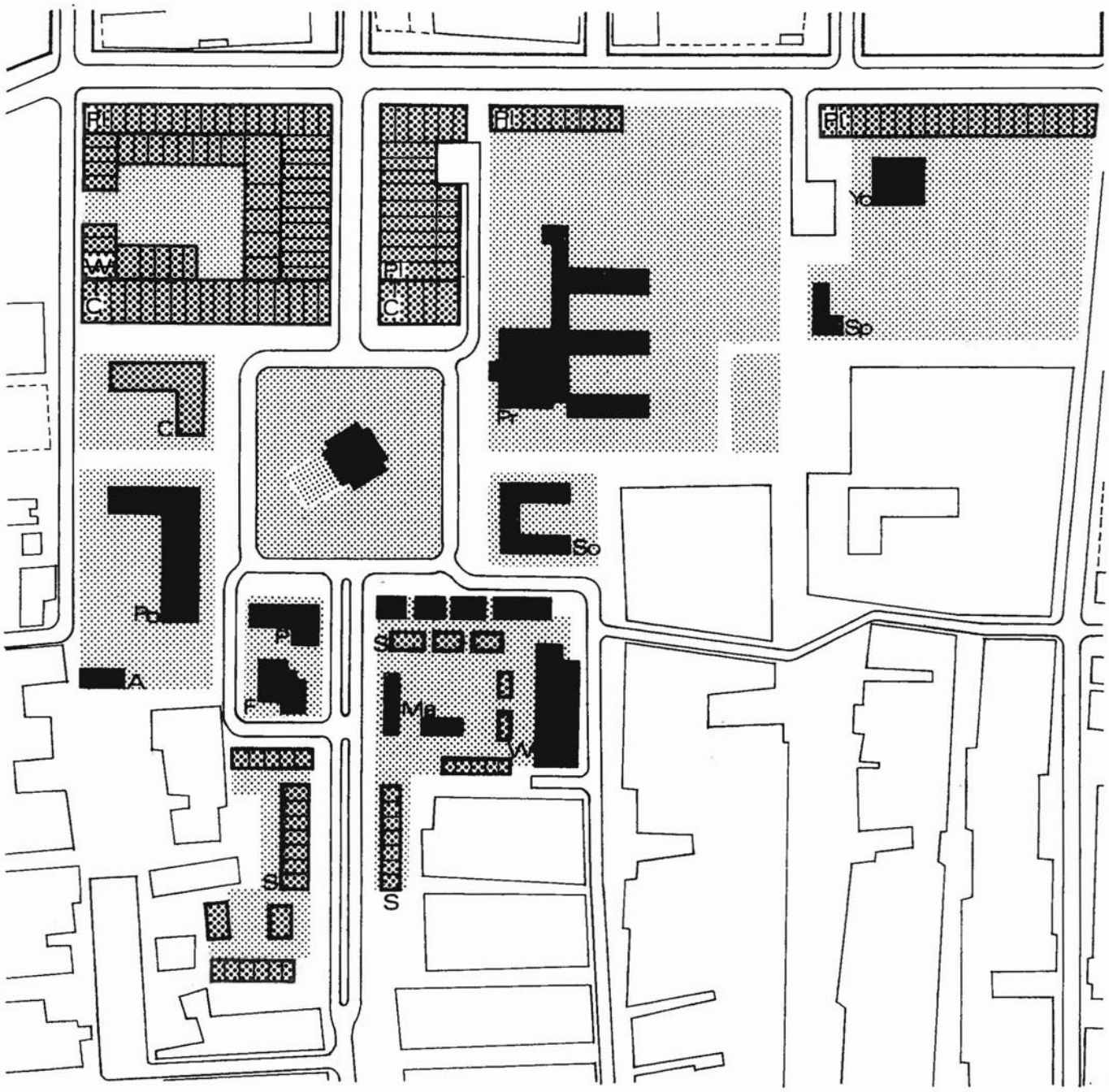
5.1 This section describes the proposals for the centres and sets out the concept of hierarchy which relates main centres, sub centres, and neighbourhood centres. The spatial organisation of the two main centres is described in detail and the principle criteria effecting the buildings and services provided are listed. Schedules summarise the provision in the various types of centre and the phasing of development is also discussed.

5.2 The importance of these centre provisions cannot be overstressed. The communities in El Hekr and Abu Atwa are rapidly expanding and already there is an urgent need for schools, health centres and other social services. It is also necessary to ensure that trading activity is guided into a more compact form in order to attract a wider variety of commerce, and so that the centres at various levels can be developed to their full potential. This urgency is of particular relevance to the main centres but also applies at the local level.

5.3 The phasing of the centres is described later and will, of course, follow the demands of local need and the availability of finance. Development may extend over a long period and it is essential therefore to plan ahead and to establish the main land requirements, as set out in the schedules, as soon as possible so that space will be available, future demands can be met and the success of the centres may be assured.

THE HIERARCHY

5.4 The hierarchy of the various levels of service centre has been based upon an analysis of user and provider thresholds in the education, health, social and public safety services. Information was obtained from the social surveys and in consultation with local service providers and other authorities. The basis for the standards of provision are those recommended in the Master Plan. The hierarchy principle is proposed as a guideline and it is recognised that land availability



1 : 2,500

0 150m

OPEN SPACE WITHIN SITE

M MOSQUE

P POLICE STATION

F FIRE STATION

A AMBULANCE STATION

Po POLYCLINIC

So SOCIAL CENTRE

Pr PREPARATORY SCHOOL

Sp SPORTS CENTRE

Yo YOUTH CENTRE

Ma MARKET

S SHOPS

C CONCESSION SITES

W WORKSHOPS

Pl PLOTS

Community Centre · El Hekr

5·1

may prove a problem in existing areas. Flexibility, therefore, is an essential element of these proposals and provided that the general principles are maintained, plans may be modified as required by circumstances.

5.5 The minimum threshold at which local services are provided is the neighbourhood based on a primary school catchment area, with a population of between 4000-7000. Next is the sub centre, with a population of 22,000-30,000 (or 4-6 neighbourhoods) and finally the community centres which provide higher order services for up to 100,000 people (2-3 sub centres).

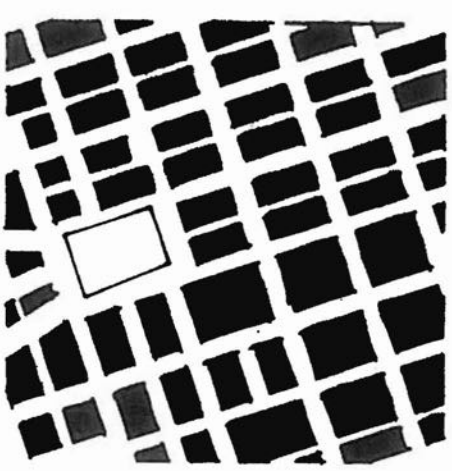
5.6 As stated above there is a need for the structure to be established promptly, particularly because several service providers (education, fire and police in particular) have capital projects currently in their programmes, and their proper siting is an essential component of the planned development of the areas.

5.7 An attempt has been made at each level to design compact groups of facilities which are economic in terms of both land and costs, but which at the same time optimise social service provision and satisfy perceived demand. In the new areas this general objective can be achieved, but in existing areas the objective of minimising demolition has resulted in the necessity of reducing space standards, and some buildings have had to be sited in sub-optimal locations.

5.8 The problem of limited land availability in the existing areas has been minimised by multi-use of land and buildings. Vertical expansion is another means of obtaining more intensive use.

GENERAL DESCRIPTIONS

5.9 The following description applies primarily to the main centres of El Hekr and Abu Atwa, but similar principles and criteria apply to the sub centres and neighbourhood centres at the appropriate levels of provision. Proposals for El Hekr are shown in Figure 5.1 and for Abu Atwa in Figure 5.2.



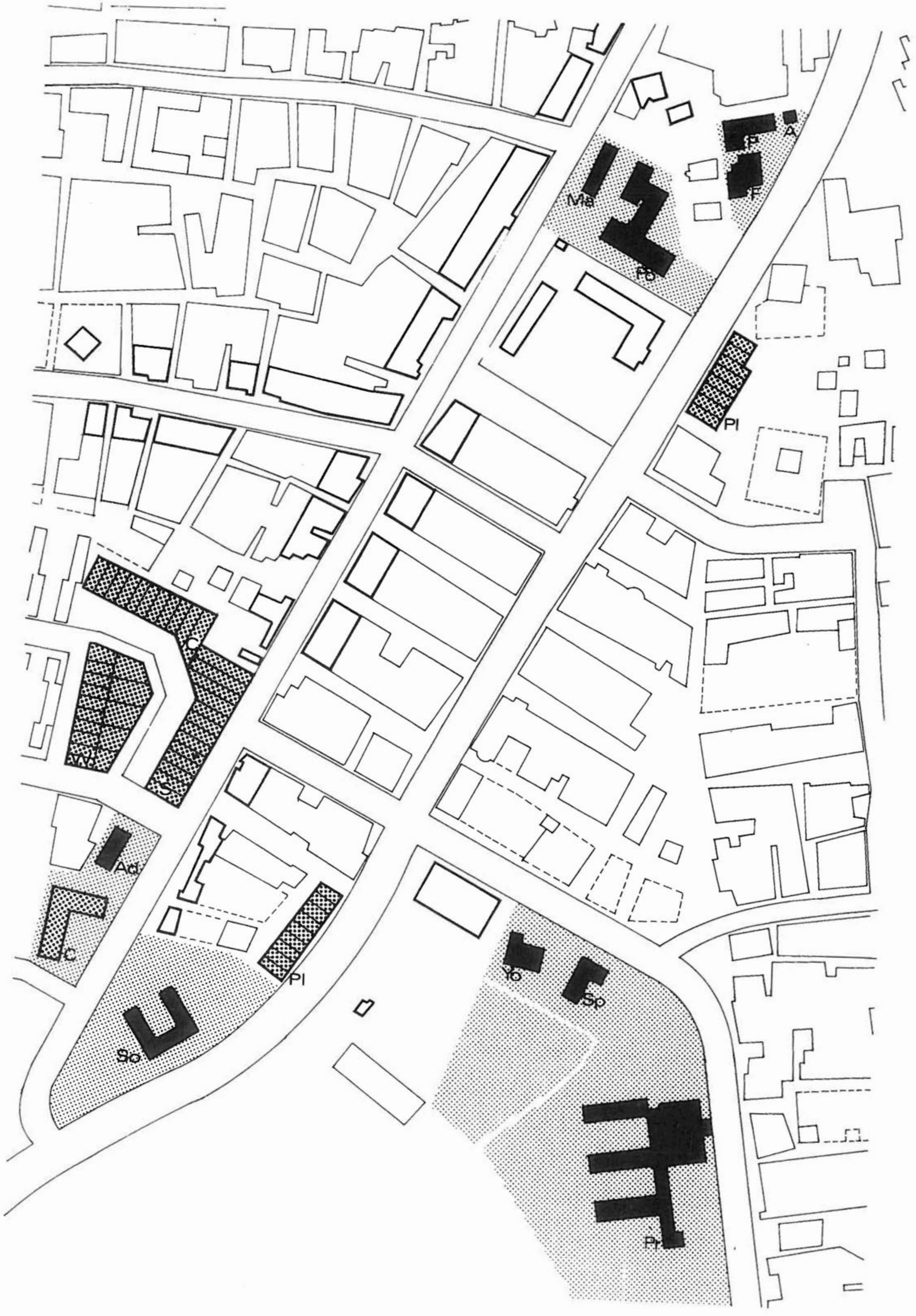
Abhasa 1: 500

COMMUNITY CENTRES

El Hekr

The centre in El Hekr is designed in recognition of Ismailia as an example of the synthesis of the Arab Traditional Urban Form and French Town Planning of the 19th Century with its accent on open squares and tree lined avenues.

In Abhasa, the former 'Arab Quarter' of Ismailia, for instance, the narrow streets not only give shade but also provide an opportunity for many complementary activities to take place in close proximity, thus stimulating trade and commerce which takes place both within buildings and in the open. The streets, in places, become continuous market places.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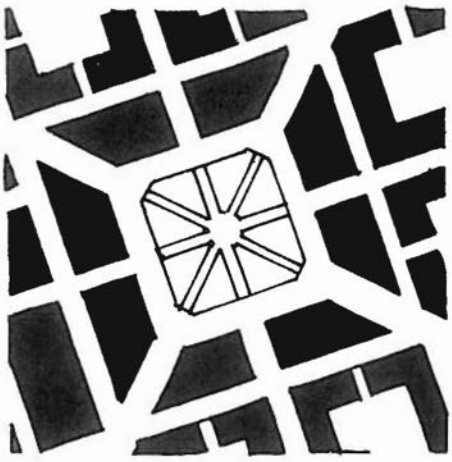


Gomhouria Square 1:500

The open park-like squares on the other hand, which are over 100 metres across and have rectangular and diagonal pedestrian circulations, have provided opportunities for larger scale landscaping giving shade for recreation or sitting about. The two forms come together in the centre of the city and it is the juxtaposition of narrow streets and open squares which gives an element of surprise and which provides an essential aspect to a pleasant environment and interesting townscape.

Although the square, as a form of civic design, is normally associated with high buildings of strong architectural quality, this is not essential as illustrated for example, by Gomhouria Square in Ismailia. Provided that the square is sufficiently large and well landscaped, it can be surrounded by buildings of many different sizes, not necessarily upon a street building line. The square is sometimes the site of the principal mosque which can then be seen as the main focal element.

5.14

The civic square together with an intensive market, shopping and workshop area forms the basis of the design for El Hekr Community Centre.

Abu Atwa Centre 1:500

Abu Atwa

The considerations described above are appropriate to the centre of El Hekr where proposals can be made within new development and the land is largely vacant, but the situation in Abu Atwa is quite different. In Abu Atwa a more traditional form has been maintained, rectangular patterns are present, but not obvious within the central area and the planning of new multi-storey geometric forms would be alien in this setting. It has been necessary here to examine local scale and the relationships between existing buildings, and to try to ensure that new buildings will fit into the existing pattern and improve the surroundings for recreation and commerce. The space between buildings is just as important as the buildings themselves.

1 : 2,500

0 150m

OPEN AREA WITHIN SITE

A AMBULANCE STATION

P POLICE STATION

F FIRE STATION

Ma MARKET

Po POLYCLINIC

Ad ADMIN CENTRE

So SOCIAL CENTRE

Yo YOUTH CENTRE

Sp SPORTS CENTRE

Pr PREPARATORY SCHOOL

W WORKSHOPS

S SHOPS

C CONCESSION SITES

Pl PLOTS

EXISTING SOCIAL FACILITIES & SHOPS

Community Centre · Abu Atwa 5·2

5.16 Existing trees are of particular importance and by careful design they will still form a principal feature of the centre. The buildings along the proposed new road are also deliberately placed to break up formal building lines and to create space for landscaping.

5.17 The centre is proposed to be a consolidation of the existing central area, but with some further facilities provided on available locations to the south. These two principal areas will, in time, become a single centre when the shops between them become more established.

THE CONTENT AND PLANNING OF THE COMMUNITY CENTRES

5.18 The principal buildings being proposed for the main community centres are divided in to the following categories:

Group One - Shops
Market
Workshops

Group Two - Police Station
Fire Station
Ambulance Station
Polyclinic
Social Unit
Cinema (or similar)
Mosque
Bank/Post Office/Cooperative shop

Group Three- Preparatory School
Primary School (to serve immediate neighbourhood)
Youth Centre
Sports Club

In addition, recreational open space, play areas, car-parking, bus stops, taxi rank, space for bicycles and public conveniences are proposed.

5.19 These facilities are listed in the schedule at the end of this section, together with an indication of building area and approximate total land requirement. Land take will vary with land availability and is not necessarily the minimum for the building type.

5.20 For the purpose of the proposals, examples of similar buildings at present in use or planned in the vicinity have been obtained. Space schedules and costs are based on these examples, but requirements will change in the future and designs will be amended or improved with experience, so that it is not expected or proposed that these buildings will take the precise form, or even occupy the precise land areas as have been indicated. In some cases additional space has been provided to allow for anticipated change, and there is some space provision for flexibility. Land areas, therefore, should not be regarded as rigid, but should be adjusted in the light of experience as development proceeds.

household annually in the commercial sector, and assuming that the 1975 population of Ismailia spent 80% of this amount in Ismailia (the remainder in Cairo and elsewhere), there would be a total amount of LE5.7 million spent per year (28,000 households x 247 x 0.8). Taking the total number of commercial establishments at 735 (and assuming that the 390 stalls and carts each had a turnover of LE125 per month) the average turnover per shop in Ismailia would be LE6940, or LE580 per month. Assuming an average 20% mark-up, average revenues would be LE106 per month.

3.7 What this indicates is that the size and returns of commercial establishments varies considerably, from a very low turnover of LE100 per month to the average of LE580, and, for the largest establishments, several times higher. These larger establishments are found exclusively where there is a great mix of size and type of commerce in the central areas of town; the main commercial centres of Talaatini and Sultan Hussein Streets contain 45% of all Ismailia's shops and 60% of all stalls, and as indicated by land prices, commercial potential in this central business district is considered very large (see Volume 2, Section 2).

3.8 It should be noted that the commercial system in Ismailia is characterised by a great degree of dynamic flexibility. Commercial services can promptly expand and adapt in response to demand, both to changing spatial arrangements and to changing consumer preferences. The basic shop unit can take on almost any commercial or workshop function; an establishment can be altered from a general store to a restaurant, barber shop, metal workshop, etc. with little additional investment. Expansion of a unit is accomplished by taking over the adjacent module, or alternatively, by extension into fronting space. Stalls, kiosks, and pushcarts provide additional flexibility, bringing commercial services to areas otherwise deficient.

Multi-shop aimara in El Hekr

EXISTING SITUATION: EL HEKR

3.9 Commercial activity in El Hekr as defined in paragraph 3.3 above, has been included in the Study Area survey, and locations of commercial establishments are shown in Figure 1.8. Commercial establishments in El Hekr have been enumerated as in Table 3.3. When compared

Table 3.3
COMMERCIAL ESTABLISHMENTS IN EL HEKR 1977

Type of Establishment	Number	%
Personal comsumption services	28	16
Exclusive food retailing	7	4
Variety retailing	133	76
Specialised non-food retailing	8	4
Sub Total	176	100
Stalls	42	
TOTAL	218	

with a similar classification for the city as a whole (Table 3.1 above), it can be seen that there is a much greater proportion of stalls and variety retailing, and an almost complete absence of specialised non-food and exclusive food retailing shops. Personal consumption services establishments are almost all restaurants, laundries, and barbers. All establishments are small when compared to the typical city shops, with very few employing more than one person full-time. In general it can be said that commerce in El Hekr is characterised by low levels of investment, low turnover, a low order of specialisation, and predominantly serves only the local neighbourhoods.

3.10 This situation can be expected given the low incomes of the inhabitants, but it is also affected by the location of a much better developed commercial system in close relation to the area, specifically in Arashia and, extending along Talaatini Street, an agglomeration of many of Ismailia's city-serving commercial establishments. This is particularly true of the central market, which helps to explain the absence of exclusive food retailing establishments in El Hekr itself.

3.11 To estimate the degree to which purchasing power in El Hekr is actually spent in the area, the following rough calculations were made. First, it was assumed that shops in El Hekr are either 'main' or 'subsidiary' shops, ie., that some shops only provide supplemental income to a household. 'Main' shops would provide monthly incomes of LE30 and 'subsidiary' shops LE15. It was estimated that 66% of all establishments were 'main' shops, and that the rest plus all stalls were 'subsidiary'. Thus total monthly income would be LE4900 (57 + 42 = 99 x 15, and 114 x 30), and assuming profit at 20% of gross turnover, monthly turnover would be LE24,500 or LE294,000 per year). This was then compared to likely total expenditures of the El Hekr population, assuming that all expenditures in El Hekr shops were made by residents. The Household Budget Survey was

Cafe in Abu Atwa

used as above, but the expenditure group LE250-300/year was chosen since its midpoint coincided with the estimated median income in El Hekr (see Volume 3, Section 9).

Table 3.4
EXPENDITURE PATTERN IN EL HEKR 1977

Item	%age of total expenditures
Food and beverages	57.9
Clothing and fabrics	10.5
Furniture and equipt. (½)	0.4
Home products (½)	0.9
Miscellaneous (2/3)	4.9
TOTAL	74.6

3.12 This gives an estimate of 74.6% of total expenditures in the commercial sector. Thus, taking the population of El Hekr at 6070 households (SW corner excluded), the total purchasing power would be LE1,270,000 (275 x 0.75 x 6070). This, finally, gives the figure of 23% of El Hekr household expenditures in the commercial sector actually being spent in El Hekr itself; and 77% of this purchasing power is being spent outside the area. Of course this is only the roughest of indications, but it shows that there is a considerable amount of purchasing power in El Hekr, which, if directed back into the area, could support a much greater degree of commercial activity.

EXISTING SITUATION: ABU ATWA

3.13 In Abu Atwa commercial activity, as defined above, has been included in the Study Area survey. Locations of commercial premises in Abu Atwa are shown in Figure 1.9. Commercial establishments in Abu Atwa have been enumerated in Table 3.5.

Table 3.5
COMMERCIAL ESTABLISHMENTS IN ABU ATWA

Type of Establishment	Number	%
Personal consumption services	9	13.1
Exclusive food retailing	17	24.6
Variety retailing	27	39.1
Specialised non-food retailing	16	23.2
Sub Total	69	100.0
Stalls	10	
TOTAL	79	

3.14 As found in El Hekr, these figures indicate that commerce in Abu Atwa is of a much lower order and scale than Ismailia city proper (compared to Table 3.1). Compared to the number of shops in El Hekr, Abu Atwa has, proportional to the estimated existing population, slightly fewer shops. This may at least be partially explained by the very popular Friday market in Abu Shehata (and to a lesser extent the weekly market in nearby Nifisha) and also to the high proportion of households (over 50%) with non-cash incomes. The case studies indicate, in addition, that weekly shopping visits tend to be made to central Ismailia, where prices are low enough to offset the transport costs of 6 piastres return by bus and 20 piastres return by taxi.

3.15 The distribution of the types of shops in the area does reflect a greater degree of commercial autonomy than exists in El Hekr. There is a much higher proportion of exclusive food retailers than in El Hekr, which is influenced by the Talaatini Street markets, and the proportion in Abu Atwa exceeds that of Ismailia. The proportion of specialised non-food retailing is also higher than in El Hekr and closely resembles the proportion for Ismailia; personal consumption is low however. As in El Hekr all establishments are small, when compared to the typical city shops, and it can be said that Abu Atwa is characterised by low levels of investment, low turnover, and predominantly serves the local area. The distribution of types of commerce in Abu Atwa reflects greater commercial autonomy, but the numbers of shops do not. Even taking into account the Friday market, and non-cash incomes, the calculation undertaken to determine purchasing power which is actually spent in the area shows a dependence, almost equal to that of El Hekr, on commerce outside of the area.

3.16 Following the general procedure adopted in El Hekr, it was estimated that in Abu Atwa 75% of all establishments were 'main' shops and 25%, plus all stalls, were 'subsidiary'. To allow for the estimated 35 stalls in the Abu Shehata market the total provision was increased to 45. Total monthly income on these assumptions would then be LE2,490 (17 + 45 = 62 x 15, and 52 x 30).

3.17 Assuming profits @ 20% of gross turnover, monthly turnover would be LE12,450 or LE149,400 per year. This was compared to the likely total expenditures of the Abu

Typical extension of local shop into the pedestrian space.

Atwa population, assuming that all expenditures in Abu Atwa shops were made by residents. The Household Budget Survey was used as in El Hekr, and an estimate of 74.6% of total expenditures in the commercial sector was assumed. Taking the estimated number of households in the area at 2850, the total purchasing power was estimated to be LE587,812. This finally gives the figure of 25.4% of Abu Atwa expenditure in the commercial sector actually being spent in Abu Atwa itself, 74.6% of the purchasing power being spent outside the area. The indication is that, as in El Hekr, there is a considerable local purchasing power which if directed into the area could support a higher level of commercial activity.

FUTURE COMMERCIAL ACTIVITY AND SITE DEVELOPMENT

3.18 Future commercial activity in Abu Atwa and El Hekr must, to some extent, be planned for. Although, as pointed out in Volume 1, a basic policy of allowing commercial (and workshop) activity on both existing and new residential plots has been adopted, a certain control and encouragement of the sector is desirable (1) to increase the size and sophistication of commercial services in both El Hekr and Abu Atwa, (2) to encourage the agglomeration (thus range, variety and convenience) of commercial activity at central locations and (3) to recoup, for general improvements, at least a portion of the rise in land values attributable to major commercial potential. Thus, in both El Hekr and Abu Atwa, the future community development plans call for the creation (El Hekr) or strengthening (Abu Atwa) of multi-service community centres whose attractions for social and commercial services, shopping, public transport and entertainment are mutually self-reinforcing. The strategy for commercial activities is, while allowing the establishment of shops at any location, to reserve a certain amount of prime space at the community centres for future sale or lease. In this way these sites would be developed only when the commercial potential has risen to attract entrepreneurial investment and be sold at 'market' or

near 'market' cost so that the increase of land value would accrue to the developing agency. The first plots would be sold at concessionary rates to attract initial development, and with a flexible array of sizes and locations, differing scales and types of commercial establishments could be accommodated (see Volume 3, Section 5).

3.19 The main problem of estimation is to ascertain how much space to reserve for these commercial plots. The main danger is that too much space is reserved, although if too little is made available speculative profits will accrue to normal settlers and commercial development may not concentrate at the desired range of space to be reserved in the community centres.

3.20 Estimation for El Hekr was as follows. The standard 3m x 5m shop (15m2) was assumed to have a monthly turnover of LE150 (constant 1977 prices). The purchasing power of El Hekr residents at full development was assumed to be 75% of total household expenditures, or LE208 per household. (Although average household income in El Hekr is likely to rise significantly by the year 2000, so would prices and commercial turnovers, thus all factors were kept constant). With a total of 15,000 households expected by the year 2000 there would be a total annual purchasing power in the commercial sector of LE3,100,000. Assuming that the existing shops continue to absorb LE294,000 of this (see preceding section), there would be a balance of LE2,800,000 that would be spent either at new establishments in the area or outside the area. The implications of space needs can be seen under different assumptions of the proportions of this amount that would be spent in the area, as Table 3.6 shows. Obviously, in

Table 3.6
IMPLICATIONS OF PROPORTIONS OF LOCAL EXPENDITURE EL HEKR

Proportion of commercial expenditures spent in El Hekr	New commercial space @ 15m2 per LE150 monthly turnover	
	m2	No. of 'main' shop units
23% (present ratio)	5360	357
40%	9350	623
60%	14000	933
80%	18650	1243

an area with a future population of nearly 100,000 inhabitants, one can expect a higher proportion to be spent in El Hekr than the present 23%. Once the area is serviced and given a central focus one can anticipate, and in fact encourage, a much greater number of exclusive food retail and some higher order, specialised non-food retail shops, and an increased number of personal service establishments such as cafes and restaurants. Since food and beverages are such a large proportion of total household expenditures (57.9%), if the amounts spent on food and beverages in El Hekr were to be between 50%-65% of the household's total, then this increase alone would raise the propor-

tion of commercial expenditures spent in El Hekr from 23% to between 42% and 52%. Allowing for a modest increase of proportions spent in El Hekr on clothing, home furnishings, and miscellaneous, one can postulate that between 50% and 65% of commercial expenditures would be spent in El Hekr, which translates into between 11,650 and 15,150 m2 of new commercial space, or between 776 and 1010 new 'main' shop units.

3.21 Of course this range is only indicative, and in fact expresses as much the magnitude of desirable increase of commercial expenditures as any estimate of likely trends. This indicative range has been used in planning commercial space needs, but as is discussed below, ample flexibility in the type and character of future sites is designed into the programme of execution so as to enable significant modifications based on future trends.

3.22 It remains to estimate how much of expected future commercial space in El Hekr should be reserved in the community centre. Smaller 'subsidiary' shops will be built throughout the area, and stalls and carts will also claim a share of commercial expenditures. Taking the same proportion of subsidiary shops and stalls/carts to the total as presently found in El Hekr and assuming as before, that these establishments have half the turnover of 'main' shop units, total space needs in the community centre would be reduced by 1090 m2 ($99 \times \frac{8930}{6070} = 145$ new 'subsidiary' units, each with LE75 turnover, or LE10875 per month total, which translates into 1087 m2 of 'main' shop space). This reduces the range to between 10,560 and 14,060 m^2. but this must be further reduced because there will be some 'main' shop units built on settlers' plots at strategic locations such as at corners, along main thoroughfares, and on the fringes of the commercial/community centre itself. There is no way to estimate the extent of this development, but it seems reasonable to hope for a concentration of 60% of all 'main' shop units in the centre itself, and thus the working range of commercial space reserved needed in the community centre becomes from 6340 m2 to 8440m2. This translates into between 420 and 560 'main' shop units of 15m2.

3.23 In the actual plan of the community centre in El Hekr (see Volume 1. Section 4) 3810 m2 have been reserved for three sizes of shops, all of which are multiples of the 3 x 5 m unit. Depending on demand at the time of sale, these plots can be easily aggregated or disaggregated and second floors may be built. Besides this reserve for purely commercial establishments, there are reserves for other activities which either have some commercial element or could, depending on future demand, be partially converted to shop spaces. These are:

i) Workshops (including outside workspace) = 3087m2

ii) 'Concession' plots, larger plots for future sale to private institutions, public services, or large commercial establishments = 3549m2

iii) A central market for stalls and carts = 390m2

Thus there is ample oportunity to expand the amount of land in commercial use in the centre upwards from 3810 m2, and so to accommodate a greater concentration than even the upper range of these calculations allow for. Only after the centre is established and begins to develop its commercial attraction can the administrating agency begin to decide the mix of uses and the prices at which plots will be sold.

3.24 In Abu Atwa the situation is quite different, and it is not necessary to go through the same exercise as has been carried out above for El Hekr. This is because in Abu Atwa the existing commercial centre is being reinforced and expanded into a multi-service node for the whole community. There is little empty land which can be reserved for future commercial plots, and the amount available must be shared between new community services, open space, workshops, and commercial establishments. Thus the amount of land designated for commercial reserve (and shown in Volume 1, Section 6) has been affected primarily by design constraints and intuitive perceptions of what locations are likely to have the best commercial potential.

3.25 The bulk of new commercial activity will occur on plots already occupied by inhabitants, who will convert their frontages to shops as commercial demand increases. The magnitude of the total commercial space in the community/commercial centre at full development may be roughly estimated using the same assumptions as have been applied to El Hekr above. This exercise gives a range of between 5208 and 6770 m2, of which 1245 m2 is now under commercial or workshop use. Assuming that some of this activity will go onto reserved plots of 1900 m2, this leaves between 2060 and 3620 m2 (or between 137 and 241 'main' shop units) that can be expected to be developed on existing plots in the community centre, particularly along the by-pass arterial and between the by-pass and the existing main street. On the assumption that 15m2 of shop space equals 3m of frontage, this gives a total of between 207 and 394 linear metres of commercial frontage to be created on existing plots in the community centre. Although only indicative, these ranges have been used in calculations of supplementary charges to be assessed on certain plots in Abu Atwa to reflect commercial potential (see Volume 3, Section 9).

CHARGING AND COMMERCIAL POTENTIAL

3.26 In Abu Atwa and El Hekr land reserved for commercial plots will be sold by the executing agency progressively over time, at 'market' rates, though initially an incentive below 'market' rate will be applied in El Hekr. As a guideline, this base rate should be above LE3/m2 in El Hekr and above LE7/m2 in Abu Atwa (see Volume 2, Section 2 for discussion of existing and expected land values in the Study Areas). Actual charges will depend on market conditions and decisions to be made by the executing agency.

3.27 It is intended that a nominal charge be put on certain existing and new settlers' plots to reflect their

commercial potential. This charge would be added to the general land purchase rates and would thus be paid for over the amortisation period (see Volume 1, Section 8 and Volume 3, Section 9). How much to charge is problematical, since if it is too high it will put an excessive burden on certain existing households (especially in Abu Atwa) and will scare off prospective new settlers from plots with commercial potential (especially in El Hekr). On the other hand, if it is too low the project will miss recouping a significant amount of income. Unfortunately this supplemental rate must be decided before plots are sold or existing plots are assessed; thus the rate, however arbitrary, must be fixed.

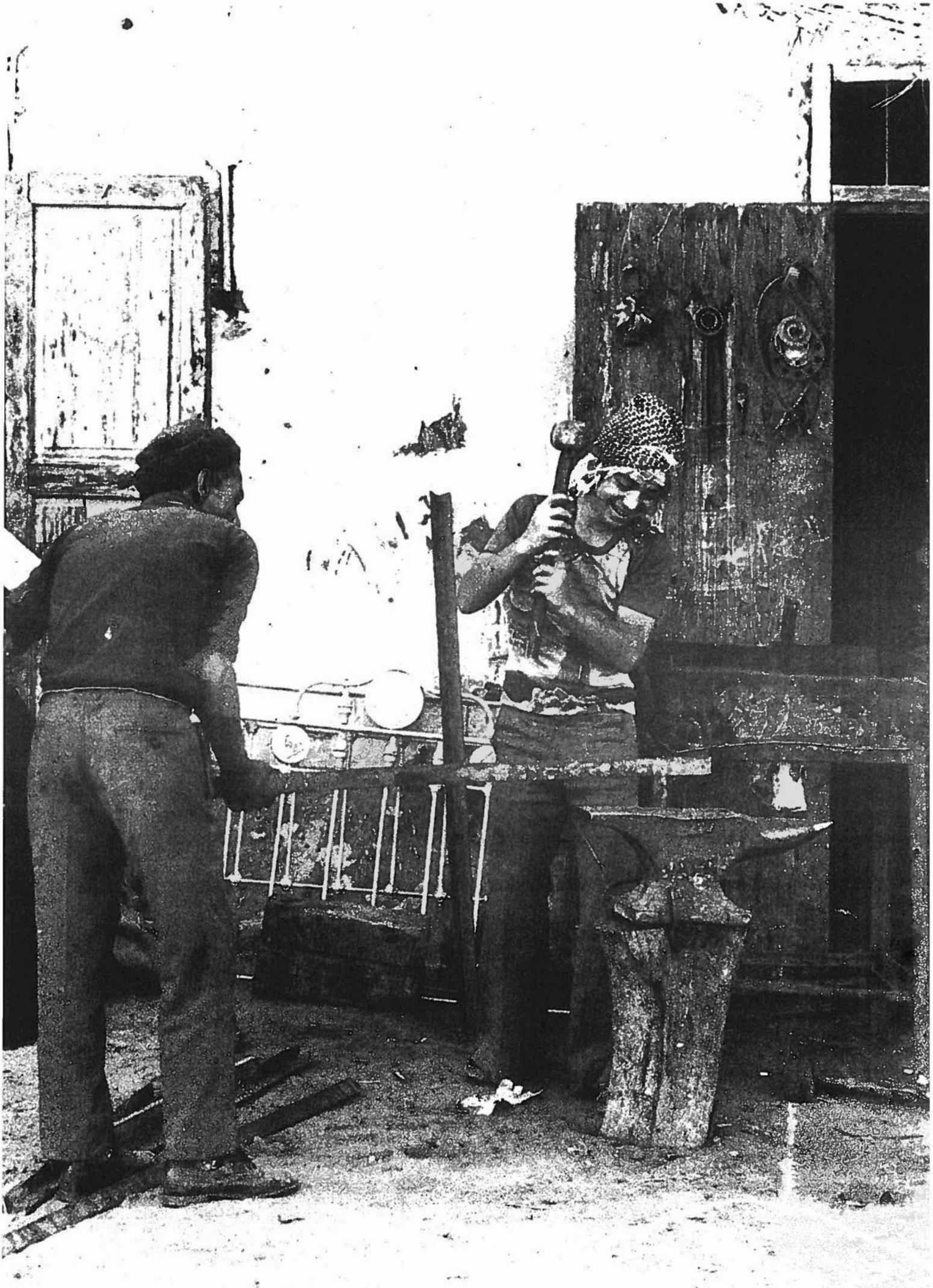
3.28 In El Hekr Class B plots, ie., those fronting on wider roads, are to be charged a higher effective rate than Class A plots. Thus to a certain degree commercial potential is accounted for, since very little or no commerce will be expected in the semi-public spaces and lanes. However, this is completely arbitrary, and a Class C has been introduced to designate those Class B plots which have a definite commercial advantage due to location. In principle, some plots on 20 m roads, plots on strategic corners, and plots abutting the community centre would be considered Class C. Class C plots have been indicated in the First Phase of new development in El Hekr and also in the Detailed Improvement Area of El Hekr. This demarcation has been made by judgement, but total number of plots has been limited to each neighbourhood's proportionate share of 'main' shop space which has been assumed to locate outside the community centre.

3.29 What linear frontage rate to be charged can only be arbitrary. As a guideline, it should not increase the total charge for a plot by more than 50% of the Class B rate for a similar plot, and at a minimum should not be less than an additional LE1.5 per year per plot; (for 20 years at 7% this represents LE16 which, when applied to the standard 6m frontage, gives a per linear metre rate of LE2.67). Using, for example, this minimum linear metre rate, wider plots (9m) would be assessed LE23.9 and corner plots of 9 x 12 m would be assessed LE56.5, as long as this amount did not exceed a 50% increase over the Class B rate.

3.30 A similar approach for Abu Atwa has been proposed. New areas of Phase One would virtually all be either Class A or Class B since the location of Phase One gives it little commercial potential. In the community centre, however, the same linear rate would be added to the existing settlers plot purchase rate for all plots within the designated commercial centre; demarcation of these plot frontages would be constrained however to total no more than the 400m of commercial frontage expected in the centre.

4

Industry



4
Industry

INDUSTRY – ISMAILIA CONTEXT

OVERVIEW

4.1 Ismailia city remains a predominantly service industry centre with a relatively small manufacturing capacity. While it is forecast that the manufacturing sector will slowly increase as a proportion of total basic and non basic employment, service industry will remain the dominant employer in the city. At present, it is estimated that 10% of employed population is in the manufacturing sector, of which perhaps only 40% are in the formal manufacturing sector, the remainder being in small-scale private sector enterprises. Service industry in Ismailia has been and remains dominated by the requirements of the Suez Canal Authority, and there is an associated emphasis on transport related industries in the local economy. With the re-opening of the railway and the resumption of other public transport services, employment in this sector is now likely to be about double the national average, as was in fact the case pre-1967.

4.2 The significant change in the manufacturing sector, as noted in the IMPS, is the growth of investment in larger, formal manufacturing enterprises in the private sector. Previously, there were a few public sector factories in Ismailia, namely Canaltron, Telemisr, a milk processing plant, a mineral water bottling plant (Sico) and the Canal associated companies, Timsah Ship Building Company and Canal Harbour Works Company. In the last two years however, a number of private sector companies have expressed interest in investment in Ismailia. Already established are the Arab Aluminium company, the Larsen Nielsen company, producing pre-fabricated housing units, and Arab Contractors Company, manufacturing barges and associated marine equipment. Other possible investments include a tractor manufacturing plant (Deutz) and a citrus fruit processing plant.

4.3 The majority of employment classified as manufacturing in Ismailia, as in Egypt generally, is in small-scale

factories/workshops, characterised by small work forces (generally less than 15) and low capitalisation. In many instances the distinction in the enterprise's output between basic (exporting) and non-basic (local population serving) activities is blurred. For the purposes of the present Demonstration Projects study, a more useful breakdown of small scale industry is (a) workshop manufacture with a particular emphasis on metal working and carpentry / furniture manufacture, and (b) distribution and repair of investment/transport goods, such as automotive parts distribution, building materials, etc..

DEVELOPMENT POLICIES

4.4 The IMPS made the following recommendations regarding industrial development policies for the city:

a) The city should reinforce its role as a service orientated employment area. Only when there has been a major investment in the Ismailia region, ie., significant reclamation and new agricultural schemes, coupled with an overall growth of the regional economy, will there be major diversification of the city's economy.

b) Given the limited natural resource base in the Ismailia region and the relatively highly skilled work force, the city should actively encourage investment by 'higher order' manufacturing, administrative and service functions. In particular the city should capitalise on its tradition of female participation in the workforce. While major export oriented industries are likely to be established at Port Said and Suez free zones, Ismailia may be favoured for light, high value exports with less dependence on nearby cargo port facilities. The progressive improvement of Delta-Canal Zone and Canal Zone-Sinai transport will reinforce Ismailia's nodal position in the region. Nevertheless, producers serving the domestic market may prefer to locate nearer that markets centre of gravity, eg., at Helwan, Alexandria and Sadat City.

c) The considerable natural and man-made attractions of the Ismailia environment can be promoted to attract service industries which might ordinarily seek office accommodation in Cairo or regional capitals elsewhere in Egypt. These considerations are likely to be particularly attractive to private foreign concerns seeking to provide the best available living and working conditions to expatriate staff.

d) The most likely types of manufacturing industries to locate in the Ismailia area will be:

i) Industries with a high proportion of value added by labour.
ii) Light industry with low pollution risks which will not jeopardise other activities in the area, for example tourism and agriculture.
iii) Industries with high value export - orientated outputs which necessitate relatively little capital investment.
iv) Industries serving the domestic market with low value outputs.

e) In all, long term industrial development will proceed in both the public and small scale private sector. Large scale industries will tend to develop in three particular types of activity; those extending the existing transport orientated industries, those supporting the reconstruction and development of the Canal Zone and those based on accelerated agricultural production in the Ismailia region. The small scale industrial sector will expand as the Ismailia economy expands and diversifies and in response to the trend towards economic liberalisation, which should allow smaller enterprises access to foreign exchange resources, currently a major constraint on production.

4.5 Details of manufacturing and service industry development policies and forecasts of basic industrial employment are included in IMPS Volume 5, 'Manufacturing and Basic Service Industry'.

SCALE OF MANUFACTURING ACTIVITIES

4.6 Manufacturing activity in Ismailia city can be classified as follows:

a) Larger scale establishments employing 100+ workers, on individual sites, utilising extensive purpose built factory space and large storage areas, and dependent on uninterrupted supplies of electricity, water and raw materials.

b) Smaller scale establishments employing between 10 and 50 people, located close to or within residential areas, sometimes in purpose built premises, and generating important localised employment opportunities throughout Ismailia.

c) Workshops and very small scale craft industries employing up to 9 full time workers, usually owner-operated with the assistance of relatives/friends, and located in residential or commercial areas because of their local market and commercial orientation.

4.7 The role of industrial infrastructure in helping the expansion of the manufacturing and service industry sector is extensively discussed in IMPS Volume 5, 'Manufacturing and Basic Service Industry'. In summary, it is clear that a shortage of suitably located and serviced sites is a significant constraint on Egyptian manufacturing industry. Such shortages are common to all scales of industrial development, but with different emphases. The infrastructure requirements for each scale of establishment used in determining the size and layout of industrial zones in the IMPS are summarised in Table 4.1.

Table 4.1
INFRASTRUCTURAL REQUIREMENTS BY SCALE OF ESTABLISHMENT

Requirements	Large scale	Medium/ small scale	Very small scale/ workshops
Utilities:			
Public water supply	Always	Always	Limited
Public sewerage	Always	Always	Limited
Electricity	Always	Always	Always
Telecommunications	Always	Always	Limited
Other Factors:			
Public factory space	Limited	Limited	Usual
Access to transport networks	Always	Usual	Usual
Proximity to market	Limited	Usual	Always

Source: IMPS, Volume 5.

4.8 The hierarchy of manufacturing industry zones proposed in IMPS is as follows:

Type	Location
1. Industrial areas for large scale industries located on the periphery of Ismailia close to regional/national transport facilities.	West Ring Road Suez Road South West
2. Industrial estates of developed land, close to residential areas and suitable for smaller scale establishments. For these estates the desirability of proximity of employment opportunities to general urban areas is balanced against the inconvenience and environmental cost caused by the industrial activity.	Nifisha Sheik Zeid City
3. Commercial and trading areas with provision for very small scale establishments, craftsmen and artisans in association with trading and in conjunction with newly developed housing areas or local centres.	El Hekr Abu Atwa Sheik Zeid City etc.

COMMERCIAL/TRADING AREAS (WORKSHOPS)

4.9 Paragraphs 4.1-4.8 above form the necessary background to proposals for workshops in residential areas and an initial light industry area as given in the Demonstration Projects terms of reference. This section presents the analysis of commercial/trading areas in residential areas corresponding to industrial zone type 3 above, as applied to the El Hekr and Abu Atwa Project Areas. The aim is to arrive at a strategy for the future provision and encouragement of these activities. It is emphasised that the characteristics of workshop activity in El Hekr

and Abu Atwa are not necessarily common to all such zones in Ismailia. Nevertheless the planning assumptions shown below would be applicable in general to similar workshop areas.

DESCRIPTION OF WORKSHOP ACTIVITIES IN EL HEKR AND ABU ATWA

4.10 From the land use surveys the following classification of workshop establishments has been constructed:

Table 4.2
CLASSIFICATION OF WORKSHOP ESTABLISHMENTS: EL HEKR AND ABU ATWA

Type of Establishment	El Hekr	Abu Atwa
Woodworking	3	5
Tailors	5	3
Metalworking	2	3
Auto repair	2	2
Tyre repair	2	1
Bicycle repair	2	1
Rug making	2	1
Pottery making	-	2
Cobblers	1	2
Distribution of building materials	4	2
Other	12	3
Totals	35	28

4.11 As can be seen by the types of establishments, workshops in both areas produce, repair,or distribute items destined almost exclusively for local (neighbourhood) consumption. Manufactured products from these establishments are much less sophisticated than those produced from similar shops in Ismailia proper. Most establishments average only two to four workers (only one workshop, a carpentry shop in Abu Atwa, employed more than 7 workers), and the level of capitalisation is in general very low. It is significant to note that the majority of establishments have a retail as well as a productive/repair function, and for this reason most workshops are found along-side commercial establishments in the well established commercial zones of El Hekr and Abu Atwa. It is also worth noting that all of these establishments, with the exception of tailors, cobblers, and rug makers, carry on a significant part of their activities in uncovered spaces fronting the shops. Finally, it should be noted that the total number of workshops in El Hekr would be higher were there not a well developed workshop zone in the adjacent neighbourhood of Arashia.

FUTURE WORKSHOP ACTIVITY AND SPACE NEEDS IN EL HEKR AND ABU ATWA

4.12 It is extremely difficult to make any realistic estimate of future workshop activities in the Project Areas. Using a simple population ratio one could expect roughly 100 new units in El Hekr and 60 new units in Abu Atwa at full development, but this disregards the changing

composition and size of establishments, and in any event does not reflect agglomeration and size economies nor the objective of creating a higher level of locally based employment. Because of these problems, the estimates of future activity are arbitrary, as shown below.

4.13 Assuming, for the moment, that new units based on population ratios will represent the minimum limit of new activity, the question of how much space this represents can be roughly estimated; first, 'space' is here defined to include both covered and uncovered work areas; secondly, using an overall average space per worker of 15m2*, the following hypothetical (or desirable) size distribution for future workshops is derived.

*The Manager of the Ismailia Cooperatives Association gives standards of 33m2 per worker for furniture workshops, 14m2 per worker for cobblers, and 12m2 per worker for tailors. Observation in the Study Area indicates that these standards are quite high.

Table 4.3
FUTURE SPACE PROVISION FOR WORKSHOPS

No. of workers including employer in workshop	Proportion of whole (%)	Total space per worker (m^2)	Total space per workshop (m^2)
1	20	20	20
2	25	15	30
3-5	40	15	45-75
6-10	12	15	90-150
11-20	3	15	165-300

It can be estimated that at a minimum there will be a need for 5560m2 of new workshop space in El Hekr and 3340m2 in Abu Atwa.

4.14 Using this minimum as a base, it can be postulated that the desirable space devoted to workshops should be some multiple of this. In El Hekr this multiple was arbitrarily taken to be 1.75, (because of its larger size) and for Abu Atwa 1.5. Of course these values cannot be absolute, but as will be seen below they are simply used as boundary guidelines.

AGGLOMERATION OF WORKSHOPS IN COMMUNITY/COMMERCIAL CENTRES

4.15 It is a very common trend for workshops to be located together with commercial establishments and with each other. As part of the site development strategies for El Hekr and Abu Atwa the attraction power of the community centre is to be magnified by the agglomeration of community facilities, commercial establishments, and workshops. (See Volume 3, Section 5). Yet at the same time it is a basic policy of the Demonstration Projects to allow workshop activities (of a non-nuisance nature) to be established on residential plots, as it is well known that small businesses function better, other factors being equal, if the proprietor lives close by or on the same plot. Thus the question to be answered is, of total expected workshop activity, how much should be located at the community centres and what in terms of space requirements does this imply? Many workshops will be located on residential plots at strategic locations, either along main roads or around the community centre,

some will be dispersed throughout the area, and some new workshop activity will be taken up by the expansion of existing establishments. Thus it would be risky to allow for too much of a reserve at the community centres, and it has been assumed that only 40% of new workshop space should be reserved at the community centres; for El Hekr this represents 3900m2 and for Abu Atwa 1340m2.

4.16 As with retail space at the community centres, (see Volume 3, Section 3) it is proposed that flexible workshop plot modules be reserved for future sale at market or near-market prices. In the design of the community centres, the workshop plots are based on modules of (6x18m) and (9x18m) which can be easily aggregated or subdivided depending on demand. Each of these plots represents both covered and uncovered space, and it will be generally required that at least 50% of the plot be left unbuilt (except for tailoring, cobblering, appliance repair and rug-making establishments, which will, in any event, be small units). Not only is there flexibility in the reserved workshop space, but the administering agency has the option, depending on future demand, to increase the total area for workshops by converting other parcels, designated in the plan as large-lot concessions, into small clusters of additional workshop plots which could be related to manufacturing and handicrafts training and cooperative programmes. Thus, in general, it is felt that the flexibility in design is sufficient to meet a variety of future demand situations.

INDUSTRIAL ESTATES

4.17 This sub-section analyses the role of smaller scale industrial estates corresponding to industrial zone Type 2 above.

ROLE OF INDUSTRIAL ESTATES

4.18 As already noted, the majority of private sector industrial establishments in Ismailia, as in Egypt, employ fewer than 50 workers, and a majority of these fewer than 15. The IMPS considered that the Nifisha zone should be designed for this category of medium to small firms which can operate at a sufficient level of output and turnover to justify the occupation of small factory units with full services. The majority of firms coming to Nifisha will originate elsewhere in Ismailia and are likely to employ no more than 10-15 staff. Such firms will be at a stage of development where they need and can afford the advantages of organised services, etc., which can be provided on a light industrial estate. Other firms may originate outside Ismailia and will be perhaps larger. Consequently, the Consultants consider that the bulk of accommodation at Nifisha should be geared to the lower end of the market in terms of size of firm, and this is reflected in the balance of small and medium sized factories in the design. Such enterprises may be drawn from transport, metal fabrication, construction materials, electrical and electronic, clothing and footwear, paper products and a variety of other engineering sectors. This size of industrial enterprise is capable of flexibility and

modification by virtue of its size and position in markets; adequacy of factory space, suitability of location, availability of utilities and communications can all influence productivity substantially. This is in addition to problems of raw materials supplies, marketing and distribution, availability of finance and credit and administrative difficulties encountered by the private sector.

4.19 To overcome many of these difficulties, industrial estate organisations have been used in many developed and developing countries as one means of implementing urban planning policies while catering for the optimum requirements of individual enterprises located in the estate. The IMPS noted that the chief advantage of such estates is that by grouping small industries, considerable economies of scale are achieved in services, including factory space, more effective assistance in technical and administrative matters can be given, and efficiencies can be brought about by specialisation and improved position in markets. Industrial estates of the scale being proposed at Nifisha require good transport and communications, an economic arrangement of utilities, and if possible additional services such as worker transport, maintenance facilities, central administration, telecommunication facilities, parking, expansion areas, etc.. If possible, the estate should be run by a special industrial development/promotion unit which can react quickly and positively to matters affecting firms located there (see Volume 1, Section 8).

4.20 It is concluded that in the long term the Nifisha area can be developed as a light industrial estate, with the provision of full serviced sites, the possible provision of some advance factory space, and the adoption of the form of organisation referred to in the Suez Canal Industrial Plan (Third Progress Report). Thus the estate will be designed to provide 'nursery' services for small establishments on a rental basis and possibly some advance factory units, as well as sites for sale to incoming firms able to operate as fully independent entities. The nursery services will include central workshop facilities and allied services such as classrooms, a technical library and centralised communications services, eg., telex. The present Consultants fully support the proposal in the Regional Industrial Plan that the estate would be suitable for the activities of producer cooperatives, (a number of cooperative societies already exist in Ismailia).

DEVELOPMENT STRATEGIES FOR NIFISHA INDUSTRIAL AREA

4.21 The preferred form of development at Nifisha must take into account:

a) The balance to be struck between the options as described in the IDP Status Report, namely (i) the provision of fully serviced factory units as described in the IMPS, (ii) serviced plots with no buildings, (iii) subdivision only.

b) The progress since the IMPS and in the next 5-10 years, in achieving the expansion of manufacturing

employment in Ismailia as a whole, and thus the likely take-up of industrial sites at Nifisha and elsewhere in the city.

c) The acquisition of 13.5 feddans of the site by the Ismailia Transport Company, and existing options on a further 1.5 feddans within the site.

d) The confirmation by the geotechnic Consultants that a substantial volume of fill will be required over most of the site to permit reasonable construction standards for utilities and superstructures.

e) Further work undertaken during the Demonstration Projects on the land market in Ismailia, and the ability to pay for serviced land at Nifisha by small industrial establishments.

f) The phasing of offsite utilities investment (see IMPS Volume 5, Chapter 9).

4.22 It has been concluded that it is premature to recommend the immediate complete development of the Nifisha zone as a fully-serviced industrial estate, because it is not clear at present that the market for industrial enterprises wishing to locate at Nifisha is such as to justify the necessary high costs of ground filling, (see Volume 1, Section 7). Depending on how the development of Ismailia follows the broad lines of direction shown in the IMPS, and in particular when there are decisions on the future of the Al Galaa camp, the proposed new central area and the timing of major residential development north west of the central area, then it will be easier to predict the increased value of land at Nifisha which could make industrial development attractive and mainly self-financing. It is recommended therefore, that the proposed Governorate Industrial Development Unit should monitor the market for sites and/or factory units, and make its own judgements as to when, and in what form, the first and subsequent phases of estate development should proceed. The role of the Unit in this respect is shown in Volume 1, Section 8, and the Consultants' views on the question of factory rentals and sale of serviced land are shown in paragraphs 4.37-4.38.

4.23 While the Consultants are not able to recommend an immediate start to the full scale development of the Nifisha site, it is emphasised that the Demonstration Projects should by definition include a substantial proportion of policy and design recommendations relevant to other areas of the city. This being so, the following sections illustrate the infrastructure standards adopted for both a full scale estate and an initial phase, and the implications of the investment required on ability to pay by potential users.

INFRASTRUCTURE STANDARDS AND COSTS

4.24 The following description of the Nifisha Industrial Estate summarises the principles shown in the IMPS Volume 5, updated by work undertaken in the Demonstration Projects. It also takes into account various infrastructure recommendations made in the Suez Canal Regional

Industrial Plan (Third Progress Report).

STANDARDS

4.25 The following standards of infrastructure provision have been used in the preparation of the Nifisha Industrial Estate plan (see Volume 1, Section 7).

Table 4.4
STANDARDS OF INFRASTRUCTURE FOR INDUSTRIAL ESTATE

Type of Infrastructure Provision	Standard	Comments
1. Employment/ factory space ratios	1 employee/ 10m2	Likely to be wide variations in labour intensity, but standard represents safis- factory average.
2. Optimum plot ratios of factory space to total plot area	1:1.5	Non-factory space includes uncovered workspace, storage, hard standing and provision for expansion.
3. Roads	13m right of way. 7m carriageway. 10cm on 25cm base. 3m + hard shoulders.	
4. Utilities:		
a. Electricity	146 Kva/ha	No extraordinary consumers of electricity assumed on estate.
b. Water - Industrial usage	270 litres/ day/worker	
Water - Employees	40 litres/ day/worker	
c. Sewage	80-100% of water consumption volumes	Will vary depending on type of factory process, recycling etc.. Particularly harmful effluents assumed treated by factory before discharge.
5. Factory units	Basic units of 72m2 and 120m2 with provision for separate units to be combined	For detailed description of design standards, see Volume 1, Section 7.

4.26 In addition to factory plots and associated public areas, a central administration area is proposed. This area could provide the administration offices of the Industrial Development Office as well as the central 'nursery' services for the use of firms on the estate (see paragraph 4.20).

Administration Offices; Office space sufficient for 5 staff/advisors and 3 classrooms	300m2
Workshop Buildings Including Machinery; including workshop equipment appropriate for the initial phase	1000m2

4.27 Provision is made for a bus terminal area for bus transport to and from the estate, connecting with the central area and elsewhere. Security measures, including policing and fire protection, will be the responsibility of the implementing agency.

INFRASTRUCTURE COSTS RELATED TO ABILITY TO PAY

METHODOLOGY

4.28 As concluded in the IMPS (Volume 5), a full economic feasibility study, based on an examination of the true economic resource costs and benefits arising from investment in industrial estates is not warranted. The principle of cost recovery has been calculated, based largely on commercial considerations. Since the costs calculated are on-site costs only, the objective of the industrial estate management and utilities organisations should be to recover full costs. In fact, it could be argued that part or all of the offsite costs should be recovered from the wider community, since there are community benefits arising from the estate, e.g. diversification of local economy.

4.29 The methodology used, therefore, is to examine notional revenues arising from the sale or lease of serviced plots in the Nifisha estate in terms of the on-site costs of creating these assets. The return on investment is then calculated. The administrative costs of running the estate are not calculated - it is fair to assume that these fall within the central budget of the Ismailia Governorate. Similarly, factory operation/maintenance costs will be borne by individual enterprises.

INFRASTRUCTURE COSTS

4.30 The full development costs of the Nifisha Light Industrial Area are presented in Volume 1, Section 7. Total infrastructure costs are reproduced here and related to the net revenue generating area, as shown in Table 4.5. (N.B.: Infrastructure here is defined as all on-site investments which must be recouped through plot sale or lease).

4.31 The resulting cost per net m2 of LE18.7 is extremely high, due primarily to the cost of fill which must be calculated over the whole site (gross area). It should be noted that, if the cost of land acquisition and land

preparation (fill) are excluded, the resulting cost of revenue-generating land falls dramatically to LE4.7 per m2 net.

Table 4.5
NIFISHA INDUSTRIAL AREA - FULL DEVELOPMENT; ESTIMATED CAPITAL COST BREAKDOWN

	Total cost LE	Gross LE/m2	Net LE/m2	Size %
Land	117,527	0.721	1.357	7.244
Upfilling	1,109,848	6.735	12.673	67.671
Paved Areas	125,000	0.767	1.443	7.705
Unpaved Areas	7,500	0.046	0.087	0.462
Water supply	61,712	0.379	0.712	3.804
Sewerage	83,740	0.514	0.967	5.162
Electricity supply	40,000	0.245	0.462	2.466
Street lighting	15,000	0.092	0.173	0.925
Telephones	15,000	0.092	0.173	0.925
Landscape	5,000	0.030	0.058	0.308
Community facilities	35,000	0.215	0.404	2.157
Boundary wall	19,000	0.117	0.219	1.171
Totals	1.622,327	9.953	18.728	100.000

ABILITY TO PAY

4.32 The question of ability to pay for sites in the estates is difficult to answer, as there is virtually no market for serviced industrial land in Ismailia on which to base calculations of comparative market values. The only comparisons that can be made are with the general urban land market in Ismailia. The analysis presented in Volume 2, Section 2 shows that in 1977 empty serviced plots located 1 to 1.5 km. from the city centre had market values of LE7-12m2. The Nifisha Light Industrial Area is 4 km. from the centre and since there are no serviced land parcels on the market of equivalent distance, one can only assume that if serviced land at Nifisha were put on the market now it could not command a price higher than LE5-7m2. (Moreover, it cannot be assumed that this price could be asked for industrial use).

4.33 Another approach is to look at prices of serviced and unserviced industrial land in Cairo and other centres, on the assumption that small foot-loose industrial concerns will be assessing land costs as part of their locational decisions. Industrial land near Cairo Airport is presently being sold for LE8-12m2, but these sites are not strictly comparable since (1) they are primarily large lots (1 feddan and more) and (2) they are 'unserviced' but close to road, water and electrical lines. This kind of industrial land is found in Ismailia at the Ring Road Industrial Estate, and at present the Governorate of Ismailia sells this land for LE0.45/m2.

4.34 It is not necessary to go deeper into this market analysis, since under even the most optimistic assumptions, current demand for land (whether industrial or general purpose) could not support the prices that would have to be charged. Even if it is assumed that land fill could be carried out at half the estimated cost, the resulting price of LE12.4/m^2 would still be excessive, whether prospective buyers (or lessees) come from Ismailia or from outside the region.

4.35 This leads to the question of whether it would be possible to develop a part of the Nifisha site (requiring less fill), at lower levels of infrastructure provision to reduce costs and thus make the land price competitive. This has been investigated, and plans for a Phase 1 development have been developed and included in Volume 1, Section 7. An analysis of costs shows that revenue-generating land could be sold at LE15/m^2 to provide an acceptable return on investment. This price is still high when present market forces are considered and it is doubtful whether enough of the kinds of establishments (small and medium size manufacturing enterprises) which are desired could be attracted.

4.36 These considerations apply to the present, i.e. on the assumption that development would proceed in 1978. Although an analysis of future market conditions is not possible, trends in the Ismailia land market, as well as general expansion of industrial activities in the Canal Zone and Egypt as a whole, point to the possibility of delaying development of Nifisha until demand for serviced industrial land rises to a point which covers all costs. Excepting unforeseen circumstances, it is difficult to anticipate this situation occurring before 1982-3.

4.37 One further market test was carried out. This was to investigate the possibility of building small factory units and leasing them to firms which could not amass the capital necessary for construction of their own units. The 'demand' for such units is extremely variable in Ismailia, ranging from annual rents of LE1.5 per m^2 to more than LE5.00 per m^2. This variation reflects the age of the lease which in each case is set by the City Council. Recently, small key money payments have been demanded for workshop space, indicating that these rents do not completely reflect current demand, and that perhaps as much as LE6-7 could be levied. On the supply side, it has been estimated that it costs LE55 per net m^2 of built factory space, and to this must be added the cost of serviced land which, at Nifisha, translates into a cost of LE44 per m^2 of buildable space; (this is because, on average, factory units will have 42% plot coverage).

4.38 Total costs for built factory space would be LE99/m^2, which, when allowing 10% for operating overheads, requires annual rents of LE10.4/m^2. (Costs amortised for 20 years at 7% per annum.) Thus these calculations show that, while the renting of factory units is not presently feasible in terms of market demand, the gap between supply costs and market demand is not nearly as great as that found for serviced land. The implication

is that built factory units will, in the future, become one form of development of Nifisha which should be carefully considered along with the land development programme. For this reason proposals for Phase 1 of Nifisha (see Volume 1, Section 7) include the possibility of the developing authority building small factory units for rent.

5

Centres

5
Centres

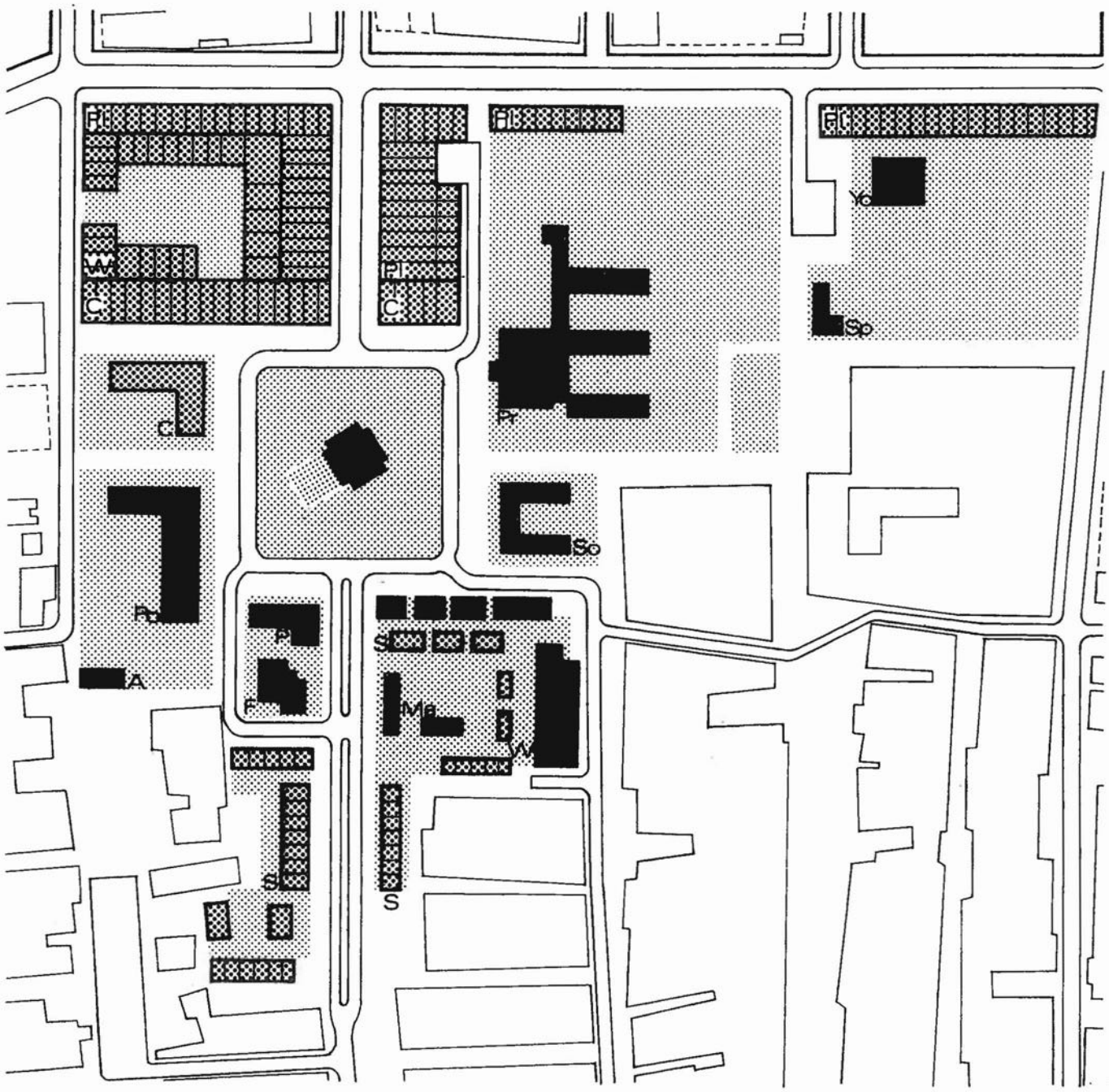
5.1 This section describes the proposals for the centres and sets out the concept of hierarchy which relates main centres, sub centres, and neighbourhood centres. The spatial organisation of the two main centres is described in detail and the principle criteria effecting the buildings and services provided are listed. Schedules summarise the provision in the various types of centre and the phasing of development is also discussed.

5.2 The importance of these centre provisions cannot be overstressed. The communities in El Hekr and Abu Atwa are rapidly expanding and already there is an urgent need for schools, health centres and other social services. It is also necessary to ensure that trading activity is guided into a more compact form in order to attract a wider variety of commerce, and so that the centres at various levels can be developed to their full potential. This urgency is of particular relevance to the main centres but also applies at the local level.

5.3 The phasing of the centres is described later and will, of course, follow the demands of local need and the availability of finance. Development may extend over a long period and it is essential therefore to plan ahead and to establish the main land requirements, as set out in the schedules, as soon as possible so that space will be available, future demands can be met and the success of the centres may be assured.

THE HIERARCHY

5.4 The hierarchy of the various levels of service centre has been based upon an analysis of user and provider thresholds in the education, health, social and public safety services. Information was obtained from the social surveys and in consultation with local service providers and other authorities. The basis for the standards of provision are those recommended in the Master Plan. The hierarchy principle is proposed as a guideline and it is recognised that land availability



1 : 2,500

0 150m

OPEN SPACE WITHIN SITE

M MOSQUE

P POLICE STATION

F FIRE STATION

A AMBULANCE STATION

Po POLYCLINIC

So SOCIAL CENTRE

Pr PREPARATORY SCHOOL

Sp SPORTS CENTRE

Yo YOUTH CENTRE

Ma MARKET

S SHOPS

C CONCESSION SITES

W WORKSHOPS

Pl PLOTS

Community Centre · El Hekr

5·1

may prove a problem in existing areas. Flexibility, therefore, is an essential element of these proposals and provided that the general principles are maintained, plans may be modified as required by circumstances.

5.5 The minimum threshold at which local services are provided is the neighbourhood based on a primary school catchment area, with a population of between 4000-7000. Next is the sub centre, with a population of 22,000-30,000 (or 4-6 neighbourhoods) and finally the community centres which provide higher order services for up to 100,000 people (2-3 sub centres).

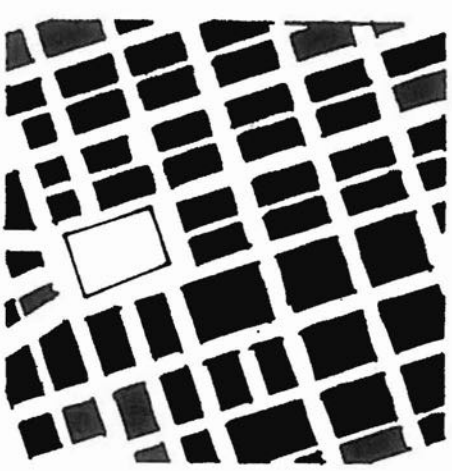
5.6 As stated above there is a need for the structure to be established promptly, particularly because several service providers (education, fire and police in particular) have capital projects currently in their programmes, and their proper siting is an essential component of the planned development of the areas.

5.7 An attempt has been made at each level to design compact groups of facilities which are economic in terms of both land and costs, but which at the same time optimise social service provision and satisfy perceived demand. In the new areas this general objective can be achieved, but in existing areas the objective of minimising demolition has resulted in the necessity of reducing space standards, and some buildings have had to be sited in sub-optimal locations.

5.8 The problem of limited land availability in the existing areas has been minimised by multi-use of land and buildings. Vertical expansion is another means of obtaining more intensive use.

GENERAL DESCRIPTIONS

5.9 The following description applies primarily to the main centres of El Hekr and Abu Atwa, but similar principles and criteria apply to the sub centres and neighbourhood centres at the appropriate levels of provision. Proposals for El Hekr are shown in Figure 5.1 and for Abu Atwa in Figure 5.2.



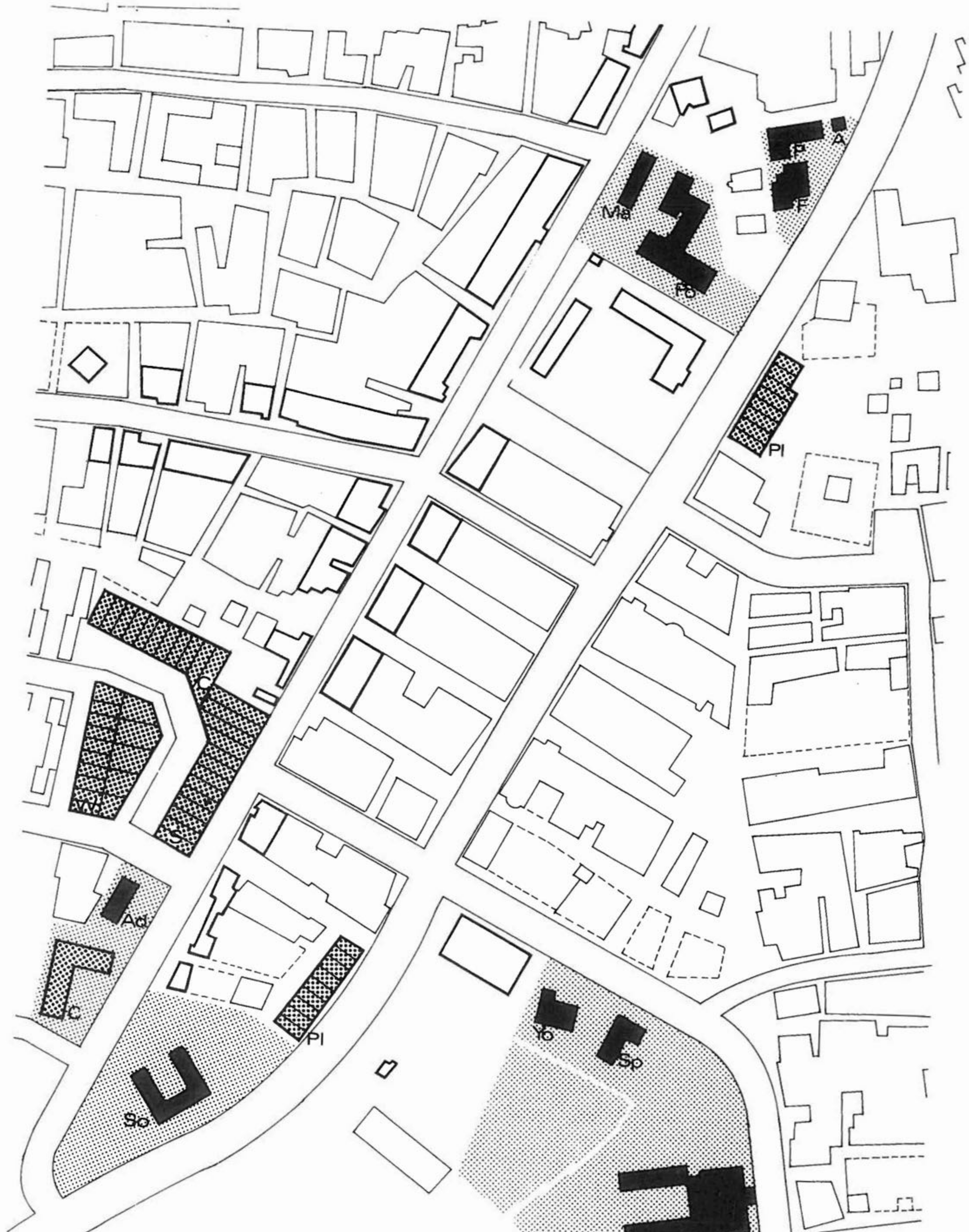
Abhasa 1: 500

COMMUNITY CENTRES

El Hekr

The centre in El Hekr is designed in recognition of Ismailia as an example of the synthesis of the Arab Traditional Urban Form and French Town Planning of the 19th Century with its accent on open squares and tree lined avenues.

In Abhasa, the former 'Arab Quarter' of Ismailia, for instance, the narrow streets not only give shade but also provide an opportunity for many complementary activities to take place in close proximity, thus stimulating trade and commerce which takes place both within buildings and in the open. The streets, in places, become continuous market places.



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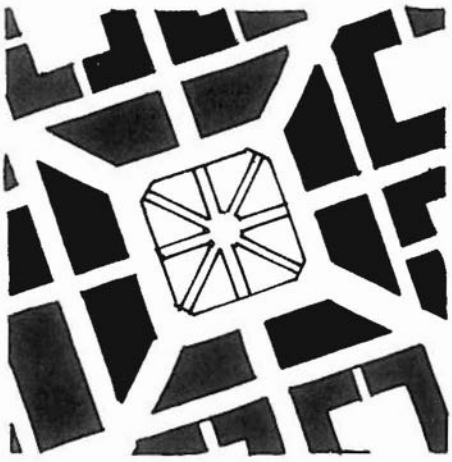


Gomhouria Square 1:500

The open park-like squares on the other hand, which are over 100 metres across and have rectangular and diagonal pedestrian circulations, have provided opportunities for larger scale landscaping giving shade for recreation or sitting about. The two forms come together in the centre of the city and it is the juxtaposition of narrow streets and open squares which gives an element of surprise and which provides an essential aspect to a pleasant environment and interesting townscape.

Although the square, as a form of civic design, is normally associated with high buildings of strong architectural quality, this is not essential as illustrated for example, by Gomhouria Square in Ismailia. Provided that the square is sufficiently large and well landscaped, it can be surrounded by buildings of many different sizes, not necessarily upon a street building line. The square is sometimes the site of the principal mosque which can then be seen as the main focal element.

5.14

The civic square together with an intensive market, shopping and workshop area forms the basis of the design for El Hekr Community Centre.

Abu Atwa Centre 1:500

Abu Atwa

The considerations described above are appropriate to the centre of El Hekr where proposals can be made within new development and the land is largely vacant, but the situation in Abu Atwa is quite different. In Abu Atwa a more traditional form has been maintained, rectangular patterns are present, but not obvious within the central area and the planning of new multi-storey geometric forms would be alien in this setting. It has been necessary here to examine local scale and the relationships between existing buildings, and to try to ensure that new buildings will fit into the existing pattern and improve the surroundings for recreation and commerce. The space between buildings is just as important as the buildings themselves.

1 : 2,500

0 150m

OPEN AREA WITHIN SITE

A AMBULANCE STATION

P POLICE STATION

F FIRE STATION

Ma MARKET

Po POLYCLINIC

Ad ADMIN CENTRE

So SOCIAL CENTRE

Yo YOUTH CENTRE

Sp SPORTS CENTRE

Pr PREPARATORY SCHOOL

W WORKSHOPS

S SHOPS

C CONCESSION SITES

Pl PLOTS

EXISTING SOCIAL FACILITIES & SHOPS

Community Centre · Abu Atwa 5·2

5.16 Existing trees are of particular importance and by careful design they will still form a principal feature of the centre. The buildings along the proposed new road are also deliberately placed to break up formal building lines and to create space for landscaping.

5.17 The centre is proposed to be a consolidation of the existing central area, but with some further facilities provided on available locations to the south. These two principal areas will, in time, become a single centre when the shops between them become more established.

THE CONTENT AND PLANNING OF THE COMMUNITY CENTRES

5.18 The principal buildings being proposed for the main community centres are divided in to the following categories:

Group One - Shops
Market
Workshops

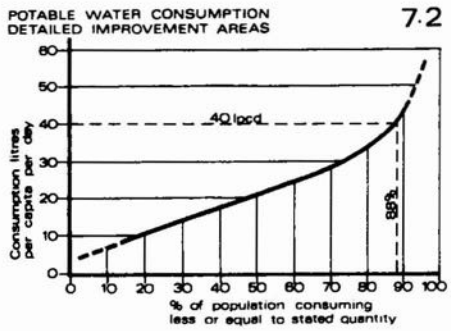
Group Two - Police Station
Fire Station
Ambulance Station
Polyclinic
Social Unit
Cinema (or similar)
Mosque
Bank/Post Office/Cooperative shop

Group Three- Preparatory School
Primary School (to serve immediate neighbourhood)
Youth Centre
Sports Club

In addition, recreational open space, play areas, car-parking, bus stops, taxi rank, space for bicycles and public conveniences are proposed.

5.19 These facilities are listed in the schedule at the end of this section, together with an indication of building area and approximate total land requirement. Land take will vary with land availability and is not necessarily the minimum for the building type.

5.20 For the purpose of the proposals, examples of similar buildings at present in use or planned in the vicinity have been obtained. Space schedules and costs are based on these examples, but requirements will change in the future and designs will be amended or improved with experience, so that it is not expected or proposed that these buildings will take the precise form, or even occupy the precise land areas as have been indicated. In some cases additional space has been provided to allow for anticipated change, and there is some space provision for flexibility. Land areas, therefore, should not be regarded as rigid, but should be adjusted in the light of experience as development proceeds.



7.2

*Abu Atwa existing utilities

installed internal plumbing systems linked to high level storage tanks.

Information has been obtained by survey on per capita consumption of potable water and is shown in Figure 7.2. Dwelling-standpipe distances in the survey range from a few metres up to 400 metres.

Abu Atwa

The existing distribution network and work in implementation is shown in Figure 7.3*. Construction of a new feeder main from the treatment plantis nearly complete and limited extensions to the network are underway. The feeder main will have an eventual capacity of 4000m3 per day (200 lpcd for existing population); present supply to the area is 1000-1500m3 per day (50-75 lpcd for existing population). Residual pressures at the furthest standpipes are approximately 6m.

7.15 In other respects the area is similar to El Hekr (see paragraphs 7.10-7.13) although fewer handpumps have been installed due to the (generally) greater depth of groundwater. Samples of groundwater have been analysed and five out of ten classified as non-potable; as in El Hekr they contained excessive amounts of nitrites, nitrates and bacteria.

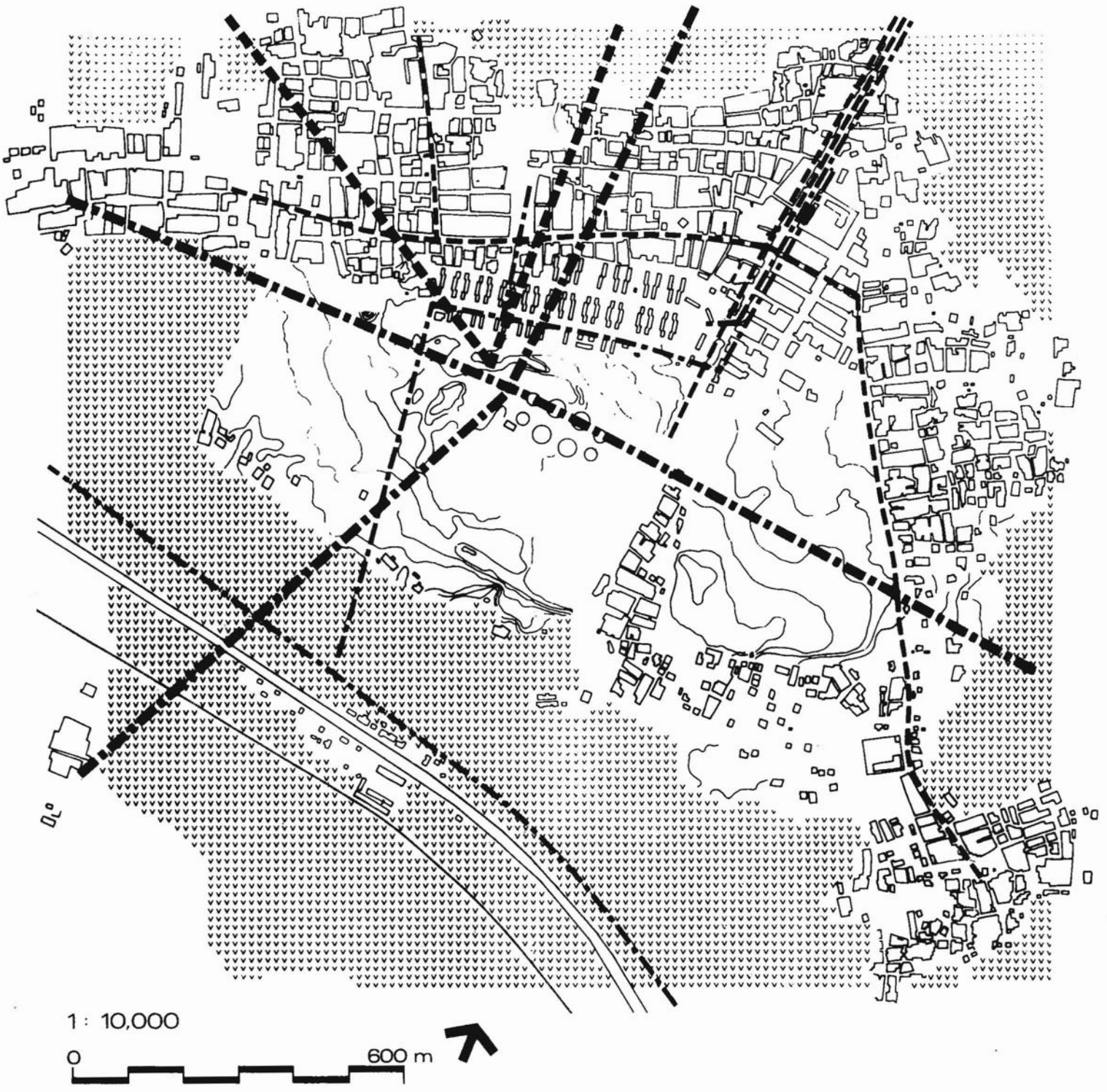
Nifisha Light Industrial Area

7.16 There are no water distribution systems on site or in the vicinity of the site except for a self contained system for the Army Camp to the east. A 250mm. diameter pipeline from Abu Suweir terminates in the vicinity of the site. This was constructed by GOWS, and originally to be supplied by potable water from the Army treatment plant. Laying of a 400mm diameter main to link the Abu Suweir pipeline to the SCA treatment plant (a distance of approximately 1.5km.) has recently commenced and should be completed in June 1978. SCA has agreed to allocate 4000m3 per day to Abu Suweir.

WASTE WATER: EXISTING SITUATION

ORGANISATIONS AND GENERAL BACKGROUND

7.17 The General Organisation for Sewerage and Sanitary Drainage (GOSSD) is responsible for the planning, design and construction of water-borne wastewater facilities. Maintenance and operation of the system, together with the design and construction of building connections, is the responsibility of the City Council. Local needs and demands are identified by the City Council who are advised on the technicalities by GOSSD; basic policies are formulated by national Government. There are no user charges other than those paid to the City Council for house connection; all other financing is from national Government funds. All connections have to be approved and there are heavy penalties for illegal connections. GOSSD use their own specifications for materials and workmanship; national standards for sewer pipes are published by the Egyptian Organisation



WATERMAIN OR CURRENT WATERMAIN PROJECT

11 KV CABLE/LINE

MASTER PLAN PROPOSED WATERMAIN

MASTER PLAN PROPOSED 11 KV LINE

See Portfolio B Figure 24 for additional details

Abu Atwa · Existing utilities and Master Plan proposals 7·3

for Standardisation. Construction is by public and private contractors, the latter being restricted to contracts less than LE100,000. Selective tendering procedures are employed and prices from the private sector are often significantly less than the public sector.

El Hekr

7.18

*El Hekr existing utilities. See also Protfolio A Drawing Nos. 7, 8 and 9 for details.

Details of the existing sewerage system are shown in Figure 7.1*. Most of the area is unsewered and in some areas there are extensive pools of wastewater and/or groundwater in the streets. This is particularly noticeable in the south-west sector where it is due to ineffective drainage of fully serviced public housing blocks and a high watertable. The network on site and to the south of the site is in a critical condition because of undersized pipes, damaged pipes and manholes, blockages and excessive infiltration of groundwater, sand and silt. Capacity is inadequate for present discharges and there is no spare capacity in the new network in the east. Sewage from the public housing in the south-west sector was originally discharged into septic tanks leading to soakaways, but now is discharged into the sewer system. The septic tanks however, remain; access covers are missing and the tanks are used to dispose of refuse. In some instances connections to the waterborne network have been made on the downstream side of the tanks. Sewage from certain areas outside the project site is discharged into the on-site system in the south-west.

7.19

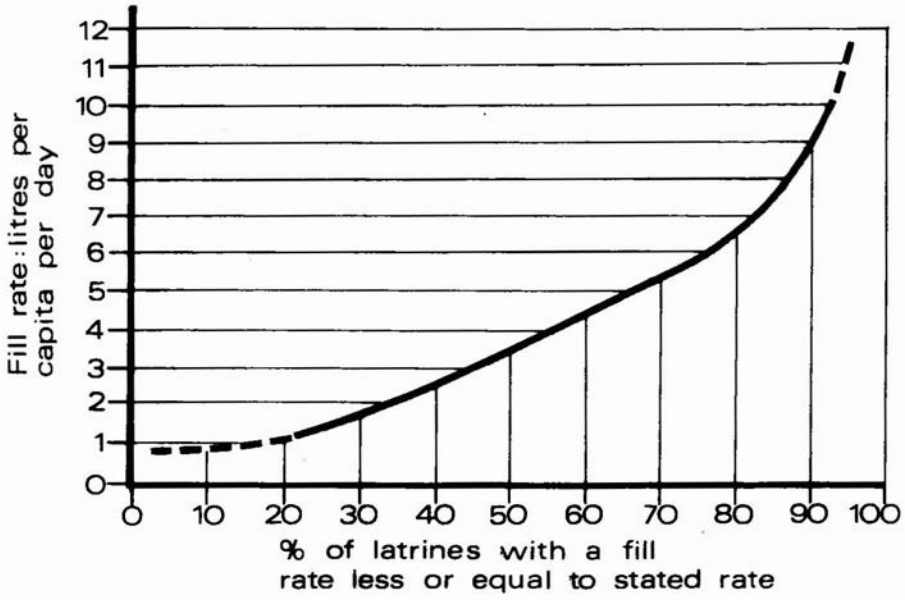
Some remedial work is in hand but GOSSD and the City Council have stated that sewage from the project site should not be discharged into the present network, and have suggested that they would be interested in diverting some of the existing flows into the project sewerage system. The remedial work has been hindered by groundwater in the excavations, and well points have been employed adjacent to Port Said Pumping Station.

7.20

Most dwellings have a modified form of pit latrine for excreta disposal, consisting of a rectangular hole close to the building in the yard or the street. The floor is left uncovered and the walls are in dry brick or stone lining to allow some seepage. The roof consists of a reinforced concrete slab. A squatting plate (without waterseal and located inside the dwelling) is connected to the pit by a short length of pipe. Some pits are made watertight eg., where groundwater is intercepted. Possibly 15% of latrines are located on the street or accessway frontage; the remainder being in a courtyard/passageway etc.. Dwellings without latrines use very low cost solution such as oil drums. The City Council will empty a pit on request by suction tanker but, due to difficulties of vehicular access, manual methods of emptying are often employed and the sludge used for agricultural purposes. The Council charge 18 piastres per cu. m. for emptying latrines inside the city boundary and 36 piastres per cu.m. outside the boundary. It is understood that an emptying service is provided by private contractors and that their rates are somewhat

PIT LATRINE FILL RATES:
DETAILED IMPROVEMENT AREAS

7.4



dearer than the Council rates. From the social survey information was obtained on the time for pits to fill and the rate of fill is illustrated in Figure 7.4. Pits generally fill in 3 to 6 months. Approximately 40% of the households complain of problems with their latrine, including flooding, odours, insects and rate of fill. According to local opinion the emptying process is a 'messy' operation and one of the principal disadvantages of the system. Sullage is usually thrown onto the ground or discharged into the latrine. A fine is incurred if a householder allows sewage to overflow into the street.

7.21 There are no provisions for surface water drainage. A groundwater, or 'cover' drain has been installed by the Ministry of Irrigation to lower the watertable and alleviate flooding in Arashia. Due to financial and contractual difficulties only the main line has so far been constructed and this is in a poor condition, having been damaged by other sewer works. Some of the proposed locations of lateral connections conflict with recent building development. Much silting has occurred and refuse is thrown into the open manholes. Even so, it is understood that the drain has lowered the watertable by up to 0.4m. in certain areas. The contractor engaged on the sewer remedial works during 1977 discharged water and sewage into the cover drain. The sewage was pumped up a disused groundwater rising main from the Port Said pumping station, and in the longer term the City Council intend to reserve this main for emergency use. Prior to discharge into the drain the sewage was passed through a settling tank (built by GOSSD) in order to effect primary sedimentation. The tank is in a poor condition and has not been emptied since it came into operation two years ago.

Abu Atwa

7.22 Details of the existing sewerage system are shown in Figure 7.3*. The site is unsewered except for the recent Egyco housing development and trunk sewers associated with the sewage works. The Egyco sewers

*Abu Atwa existing utilities. See also Portfolio B Drawing Nos. 26, 27 and 28 for details.

form a self-contained system draining to a small pumping station in the centre of the development; from here sewage is pumped into the sewage works. There is no spare capacity in the system. Two sewage rising mains enter the project site from the north and deliver city sewage to the sewage works. A gravity sewer (450mm. diameter vitrified clay) conveys final effluent from the works to a point adjacent to the south-east corner of the project site where it outfalls to El Mahsama Drain. A recently constructed asbestos-cement sewer parallels this gravity sewer and will become operational when additional outfall capacity is required. The City Council have experienced difficulty with the sewer line since the effluent is highly valued by local farmers as irrigation water with 'built in' fertiliser; consequently manholes are broken into and the effluent diverted over adjacent land. The comments regarding on-plot disposal in El Hekr apply also to Abu Atwa. There are no provisions for surface water drainage.

Nifisha Light Industrial Area

7.23 The site and surrounding area are unsewered except for a self-contained waterborne system in the Army Camp. Existing nearby development is served by on plot disposal.

WATER AND WASTE WATER: HEALTH ASPECTS AND STANDARDS OF SERVICE

7.24 Human health in many developing countries is poor and it has long been recognised that there is a positive correlation between socio-economic status and ill health. In Egypt, 20-25% of the population die before the age of 5 and gastro-enteritis accounts for possibly over 50% of infant and young child deaths*. Recent statistics on infant and young child mortality for Ismailia are given in Volume 3, Section 2. These statistics illustrate the widespread occurence of enteric diseases and other diseases which for the most part are related (directly or indirectly) to low standards of public hygiene. A crucial part of any programme to improve public hygiene includes the provision of adequate quantities of good quality water together with the safe disposal of wastewater.

*Source: Suez Canal Regional Plan 1976

7.25 In most developing countries mean daily per capita consumption varies over a wide range, from a few litres in low income rural areas to around 300 litres in high income households with multi-tap installations. When water has to be carried into the house from public standpipes consumers will use the amount they perceive as being their minimum requirement, probably (in urban peripheries) within the range 10-50 lpcd (for measured consumption in the project sites see Figure 7.2). In these circumstances there is a considerable risk of polluting the water prior to consumption; furthermore the cost of water to the consumer is high in terms of time and energy expended on collection, and also in terms of morbidity and mortality due to the use of insufficient quantities for washing. Excreta are dealt with by non-waterborne methods such as the pit latrine and the small volumes of sullage produced are usually thrown on the

ground or discharged into surface water drains; (for further discussion of basic systems of water and wastewater see paragraphs 7.31-7.38 and 7.46-7.53). It is generally recognised that the benefits (especially those related to water-borne diseases) resulting from the installation of a single tap and possibly shower in each dwelling are significantly greater than the benefits resulting from the introduction of public standpipes into a locality. Primarily this is because the consumer will use considerably more water and the chances of polluting the water prior to consumption are much less. At this stage consumption will increase to perhaps 40-100 lpcd and disposal of sullage will require careful consideration - the actual method of disposal is likely to influence the amount of water consumed. As living standards rise and multi-tap plumbing is installed, water consumption will increase to perhaps 150-300 lpcd, the actual figure being related to socio-economic status. The additional health and social benefits which accrue will, however, be relatively small compared with the initial benefits which accrued from the installation of the single tap and shower. Waterborne sewerage will normally be required to deal with the large volumes of wastewater produced.

7.26 The Suez Canal Regional Plan, in summarising the health policies for the region, places priority on the following two policies:

1. Environmental engineering (the provision of clean water and of sewage and refuse disposal) must be adequate for and keep pace with the growing population.

2. In new urban areas, water provision should be such that all householders can install a single interior tap.

The Consultants fully endorse these policies. Furthermore it is considered that with regard to infrastructure provision the installation of a single tap in each dwelling should be second only in priority to the provision of access to the plot. The opportunity to obtain the water connection should be made available either when the dwelling is occupied or as soon as possible after occupation. Communal standpipes should be provided for those who are unable to obtain their own connection.

COMMUNAL FACILITIES

7.27 World wide experience has shown that communal sanitary facilities are, almost without exception, subject to misuse, vandalism and lack of proper maintenance. The well established local tradition of on-plot sewage disposal would in any case result in the under utilisation of communal facilities. Such facilities are not therefore recommended for use in Ismailia.

POLICIES, STANDARDS & DESIGN CRITERIA

7.28 General (ie., non-site specific) policies, standards and design criteria for water supply and wastewater disposal

are considered in the following sections. No distinctions are made in these sections between areas for new development and areas for improvement - such distinction as may be necessary will be made in the sections dealing with proposals for specific sites. Existing practice/standards have been examined to see if any changes are warranted which might have a significant effect on schematic design and preliminary costing. Accordingly, acceptance of existing practice/standards does not mean that at final design stage detailed changes would not be recommended.

POTABLE WATER DISTRIBUTION: EXISTING STANDARDS AND DESIGN CRITERIA

7.29 Existing standards and design criteria used in potable water distribution systems are as follows:

System: Generally a closed grid fed via pumping or gravity mains arranged as ring mains. Building connections fed from 100/150/200mm service mains. Mains located in carriageway.

Design Period: Through to the year 2000.

Consumption: 150-200 lpcd in year 2000 including losses. The higher figure is used in higher income areas and also to allow for some commercial/light industrial use. Consumption from standpipes not known. Consumption in commercial/industrial areas assessed separately.

System Capacity: Maximum day demand = 2.0 x average day demand. Trunk mains sized to pass maximum day demand at velocity 1.0m/s. Distribution mains sized on peak hour demand. Peak hour demand = 1.5 x maximum day demand. Fire demand assumed to be covered by peak hour capacity and storage.

Pipe Sizes and Velocities: Minimum service mains 100mm diameter. Velocity range 0.6-1.5m/s.

Pressure: Where possible 20-25m residual pressure in service mains for 4-5 storey construction.

Fire Hydrants: Underground and spaced at 150m. intervals.

Building Connections: Consumer services are metered, usually one meter per apartment building. SCA do not install/maintain internal plumbing.

Construction Details: Mains of 400mm. diameter or smaller are generally locally made asbestos-cement with flexible (Viking Johnson or Simplex) joints. For larger sizes ductile iron is preferred. Pipes laid direct on trimmed trench formation. Bends, tees etc., in cast iron. Minimum cover to pipe 0.9m. Building connections consist of 5m. of lead service pipe connected to the service mains and then (usually) galvanised steel pipe into the building. A public standpipe unit consists of 2-4 bibtaps fixed in a rendered brick wall with a lockable meter box on the central feed pipe.

POTABLE WATER DISTRIBUTION: PROPOSED STANDARDS & DESIGN CRITERIA*

7.30

*Further studies on these aspects will be undertaken by the Ismailia Water, Waste Water and Sewage Study which will prepare detailed design proposals.

*See also letter ref 0/777/FD/EE/1135 dated 4/4/78 to the Advisory Committee for Reconstruction for further details.

Proposed standards and design criteria for potable water distribution systems are as follows:

System: A closed grid of service mains reinforced at intervals by larger diameter pipes and fed, via secondary/primary ringmains, from a distribution reservoir. Mains to be located in R.O.W..

Design Period: Through to year 2000 for service and feeder mains. Consideration to be given to designing trunk mains for a shorter period and supplementing at a later date.

Consumption: Related to income level as follows:-

Low income	(50% of year 2000 population)	- 150 lpcd
Med. "	(40% " " " ")	- 200 lpcd
High "	(10% " " " ")	- 250 lpcd

Mean consumption, 180 lpcd including losses and fire fighting requirements. This figure will also allow for schools, shops, home, industry etc., within residential areas. An additional allowance of 16 lpcd is proposed for irrigation of landscaped areas. Industrial consumption to be assessed separately. For discussion of water consumption from standpipes and single tap installations see paragraphs 7.31-7.38.

System Capacity: Maximum day demand = 1.5 x average day demand. Peak hour = 2.5 x average hour. Fire demand covered by peak hour demand and storage reservoir.

Pipe Sizes and Velocities: As existing standards. Consideration should be given at detail design stage to using 50mm or 75mm diameter pipes in streets with a small number of dwellings.

Pressure: As existing standards.

Fire Hydrants: As existing standards.

Building Connections and Construction Details: As existing standards.

POTABLE WATER DISTRIBUTION: FURTHER CONSIDERATIONS

7.31

Three distinct levels of service are envisaged as follows:

1. Public standpipes.
2. Individual connection to single interior tap/shower.
3. Multi-tap installations.

The use of groundwater is not recommended because of the dangers of water pollution; also investment in handpumps works against the policy of installing individual connection. Provided standpipes are easily accessible there should be no demand for handpumps. In existing areas consumers should be warned of the possible dangers from polluted groundwater.

Public Standpipes

7.32 The distribution mains feeding standpipes will eventually form part of the full distribution network. This initial mains network will be capable of supplying some individual building connections, but a careful check on pressures and capacities should be made in order to avoid 'drying up' the standpipe supplies. The present policy of metering standpipes should be continued in order to monitor per capita consumption; such information will be useful in determining future policies and also assist in detecting waste.

7.33 A design consumption of 30 lpcd (including losses) is recommended. For sizing distribution mains however, a minimum design consumption of 80 lpcd is proposed where feasible in view of the policy regarding early installation of individual house connections. No special fire fighting allowance is considered necessary although underground hydrants should be installed at 150m. intervals. Residual pressure should be sufficient to give at least 5m head over each standpipe and interior tap.

7.34 To establish the optimum spacing of standpipes the maximum number of people who could adequately be served from one standpipe unit was considered. A single tap discharging 15 litres per minute over an 8 hour period would be adequate for 40 households (each with 6 persons consuming 30 lpcd). At development densities of 400 persons per hectare a 4 tap standpipe would be adequate for an area of 2.4 hectares. On this basis standpipes would be required at 150 metre intervals throughout the site. This spacing will ensure that most dwellings are within 2 minutes walk of a standpipe; consequently there will be little or no demand for the distribution of water by donkey drawn tankers.

7.35 In order to minimise misuse and vandalism of standpipes the following policies should be considered at detail design stage:

i) The use of self-closing taps to control the flow of water.
ii) The use of 'proprietary' standpipe units instead of wall and taps.
iii) The use of standpipe guards who would be persons living near to the standpipe and paid a wage of, say, LE20/month (equivalent to 2 piastres/consumer) to maintain a permanent watch on the standpipe.

These methods either singly or in combination would save the cost of installing and maintaining seepage pits, which in many cases tend to become ineffective after a short while due to the impermeable ground conditions.

Individual Connection to Single Tap/Shower

7.36 Consumption will be constrained by the capacity of the wastewater facilities. The Consultants considered first the consumption in a dwelling with limited drainage facilities; excreta are dealt with by a pit latrine and sullage is thrown on the ground with perhaps a small

quantity discharged into the latrine. Consumption figures are given in Table 7.1.

Table 7.1
POSSIBLE CONSUMPTION OF POTABLE WATER (LPCD) FOR A DWELLING WITH SINGLE TAP, SHOWER AND PIT LATRINE

Shower	15
Pit latrine	12
Laundry	8
Washing dishes	5
Hand and face wash	15
Drinking)	4
Cooking) Consumed	4
Cleaning)	5
TOTAL	68

Notes:

Wastewater quantities to pit latrine	12
Sullage	45
Design consumption (including losses)	80

No allowance has been made for garden use. Sullage would be used for garden watering or thrown on the ground in the absence of waterborne sewerage. In order to reduce costs, metering at this level of service is not recommended; (for further discussion of the drainage aspects, see paragraphs 7.51-7.53).

7.37 Once waterborne sewerage is installed, the amount of water consumed increases significantly due to the use of flush cistern and increases for other uses. Meters would be installed at this stage. Figures are given in Table 7.2.

Table 7.2
POSSIBLE CONSUMPTION OF POTABLE WATER (LPCD) FOR A DWELLING WITH SINGLE TAP, SHOWER AND FLUSH W.C. TO WATERBORNE SEWERAGE

Shower	20
W.C.	50
Laundry	10
Washing dishes	5
Hand and face wash	15
Drinking)	4
Cooking)	4
Cleaning) Consumed	5
Garden Use)	15
TOTAL	128

Notes:

Wastewater quantities	100
Design consumption including losses	150

Dwellings could be paired for the connection to the service mains in order to reduce costs and the number of trenches in roads. The distribution network would generally be designed in accordance with the standards and criteria set out in paragraph 7.29, unless the following modifications gave operational and/or cost benefits:

1. Design consumption of 80 or 150 lpcd as appropriate.

2. Residual pressures of 12-15m; (this where dwellings would not exceed 2 storeys).

Multi-Tap Installations

7.38 The full development stage. Design standards etc., are discussed in paragraph 7.30.

IRRIGATION WATER

7.39 The IMP recommended the extension of the existing raw water network to allow watering of new green areas within the city. The Consultants consider that, whilst this maybe a viable proposition in the long term on a city wide scale, the use of potable water from the distribution mains is a more suitable proposition for the project sites. The reasons for this conclusion are:-

1. There is a significant surplus capacity of potable water at the treatment plant for some years to come, and so the marginal cost of extra water for irrigation is likely to be small.

2. Two networks of piped water, in an area having utilities upgraded and extended over a period of time, is impractical; apart from the dangers of cross-connection, the risk of accidental damage to the network is significantly increased.

SEWERAGE: EXISTING STANDARDS AND DESIGN CRITERIA

7.40 Existing standards and design criteria used in sewerage systems are as follows:

System: Combined foul and surface water. Surface water run-off reaches sewers via road gullys. Sewers generally laid in streets.

Design Period: Through to year 2000.

Discharge Volumes: 200-250 litres per head per day depending on income levels.

System Capacity: Peak flow = 2 x average daily flow. Sewers designed to flow half full at peak flow; additional capacity caters for infiltration and surface water.

Pipe Sizes and Gradients: Gradients chosen to give minimum velocity of 0.75m/s, but a higher figure is usually aimed for. Minimum pipe diameters are 125mm. for house connections and 175mm. for street sewers. Minimum house connection and rider sewer gradients; 1 in 100. Typical gradients on 175mm. diameter and 225mm diameter sewers are 1 in 150 and 1 in 200 respectively.

Cover: Minimum cover generally 1.2m.

Manholes: Located at all changes of gradient, direction, junctions etc.. Maximum spacings of 30m (for 175 - 255mm diameter); 45m (300 - 450mm diameter); 60m (450mm. diameter).

Inspection Chambers: Located at foot of all soil stacks. May be connected in series, (rider sewers) to minimise connections under carriageway (particularly for deep sewers). Maximum spacings 30m.

Ventilition: Through 75mm. diameter vent columns on each building.

Small Pumping Stations/Rising Mains: Daily inflow assumed to arrive over a 16 hour period and each pump is sized to discharge this flow rate. Wet well capacity is related to the number of starts per hour. A duty pump alternates to equalise wear. One pump is kept on stand-by. Acceptable velocities in rising main lie between 0.8 and 2.5m/s. Surface level motors with pumps in dry well. Circular reinforced concrete substructure. Imported centrifugal pumps commonly used.

Construction Details: Pipes (less than 1.0m. diameter) are locally manufactured vitrified clay pipes laid with rigid joints on concrete bed and haunch. Where cover is shallow or deep full surround is used. Excavation is usually by hand. Groundwater dealt with by pumps or wellpoints. Manholes formed of in situ mass concrete. Inspection chambers may be brick, or concrete.

SEWERAGE: PROPOSED STANDARDS AND DESIGN CRITERIA*

7.41

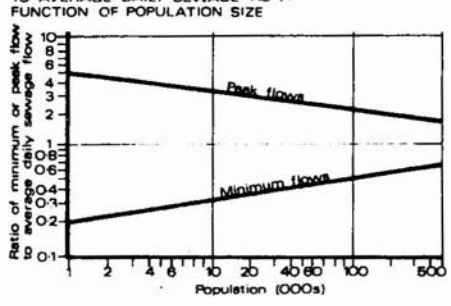
Proposed standards and design criteria for sewerage systems are as follows:

*Further studies on these aspects will be undertaken by the Ismailia Water, Waste Water and Sewage Study which will prepare detailed design proposals. See also letter ref 0/777/FD/EL/1135 dated 4/4/78 to the Advisory Committee for Reconstruction for further details.

System: Maximum rainfall recorded in one day during the period 1946-1956 was 11.7mm. Yearly average is 38mm. Consequently, a separate storm water drainage system cannot be justified. As the sites develop, run-off from large impermeable areas can be directed into catchment basins, (for example, low lying landscaped areas) and allowed to soakaway or evaporate. Where site constraints such as topography or high watertable prevent this, the stormwater can be intercepted by road gullies and discharged into the sewer system. Sewers generally to be located in public or semi-public spaces in order to maximise on-plot building flexibility and ensure easy access for construction and maintenance. In existing areas, however, the laying of private sewers along the backs of properties to reduce capital costs should be considered.

Design Period: Through to year 2000.

RATIO OF MINIMUM OR PEAK FLOW TO AVERAGE DAILY SEWAGE AS A FUNCTION OF POPULATION SIZE 7.5



Domestic Discharge Volumes: 80% of water supply volumes i.e. 146 lpcd. It is assumed that 20% of the water will be consumed or used for garden watering. Commercial/ industrial discharges assessed separately.

Flow Rates: These are related to size of population. Ratios of minimum and peak flows to average daily flows are given in Figure 7.5. Where appropriate, an allowance has been made for infiltration.

Pipe sizes and Gradients: Gradients are generally chosen to give minimum velocities of 0.9m/s at peak flow and 0.6m/s at minimum flow. Proposed minimum pipe diameters

are 100mm for house connections and 150mm for sewers. It is considered that the marginal reduction in pipe diameter coupled with steeper gradients (see below) will overall give better hydraulic performance than is achieved at present, and hence reduce maintenance problems. Pipe size is increased to 225mm diameter where more than 50 dwellings are connected. Where small groups of dwellings are served (ie. on upstream branches of the system) the following minimum gradients are proposed to give improved hydraulic characteristics.

No. of Dwellings	Pipe dia. (mm)	Minimum Gradient
1 - 2 (house	100	1 in 40
3 - 10 connection)	150	1 in 60
11 - 20	150	1 in 100
21 - 50	150	1 in 125
> 50	225	1 in 165

Cover: As existing standards.

Manholes: Maximum spacing are as follows:- 40m (150 - 225mm diameter); 55m (300 - 450mm diameter); 70m (500 - 600mm diameter). Rodding eyes to be used at the head of each run. (For further discussion see paragraph 7.43).

Inspection Chambers: As existing standards.

Ventilation: As existing standards.

Pumping Stations: Submersible centrifugal pumps. Wet installation (in order to minimise construction costs). Detention period in wet well to be limited to 15-20 minutes to minimise septicity. Preferably constant speed squirrel-cage motor.

Construction Details: It is considered that the following significant benefits would be derived from the use of flexibly jointed sewer pipes*.

*Building Research Establishment Digest 130-UK

1. A drastic reduction in the amount of infiltration which presently enters the system.
2. A minimum of skill is needed and jointing is more rapid and reliable.
3. A test may be applied immediately after laying the run of pipes.
4. Rectification of faults is relatively quick and easy.
5. Because of the speed of laying, the time the trench has to be kept open is reduced to a minimum with a possible saving in pumping and strutting.
6. The flexibility of the joints reduces the risk of breakage of the pipeline through movements due to settlement of the soil or of structures to which the pipeline is connected.
7. Joints less susceptible to attack by aggressive ground conditions.

Overall, a higher standard of construction can be achieved and capital and maintenance costs reduced. The additional cost of the pipes would be to some extent offset by savings in concrete bedding; (pipes

could be laid on granular bedding and in some circumstances sand or the prepared trench bottom, as in fact is the practice with water pipes). The overall reduction in maintenance problems would enable the present strict criteria for manhole spacings to be relaxed with confidence, and significant cost benefits would be achieved. The Consultants are aware that the above recommendations require further study and action at national level but are confident that flexibly jointed pipes will be increasingly used in Egypt if substantial investments are to be made in new sewerage systems. Accordingly, the allowance for infiltration is based on the assumption that some parts of the system will have flexible joints. Generally, however, cost estimates are based on existing GOSSD specifications for rigid pipelines.

Manholes: Further Considerations

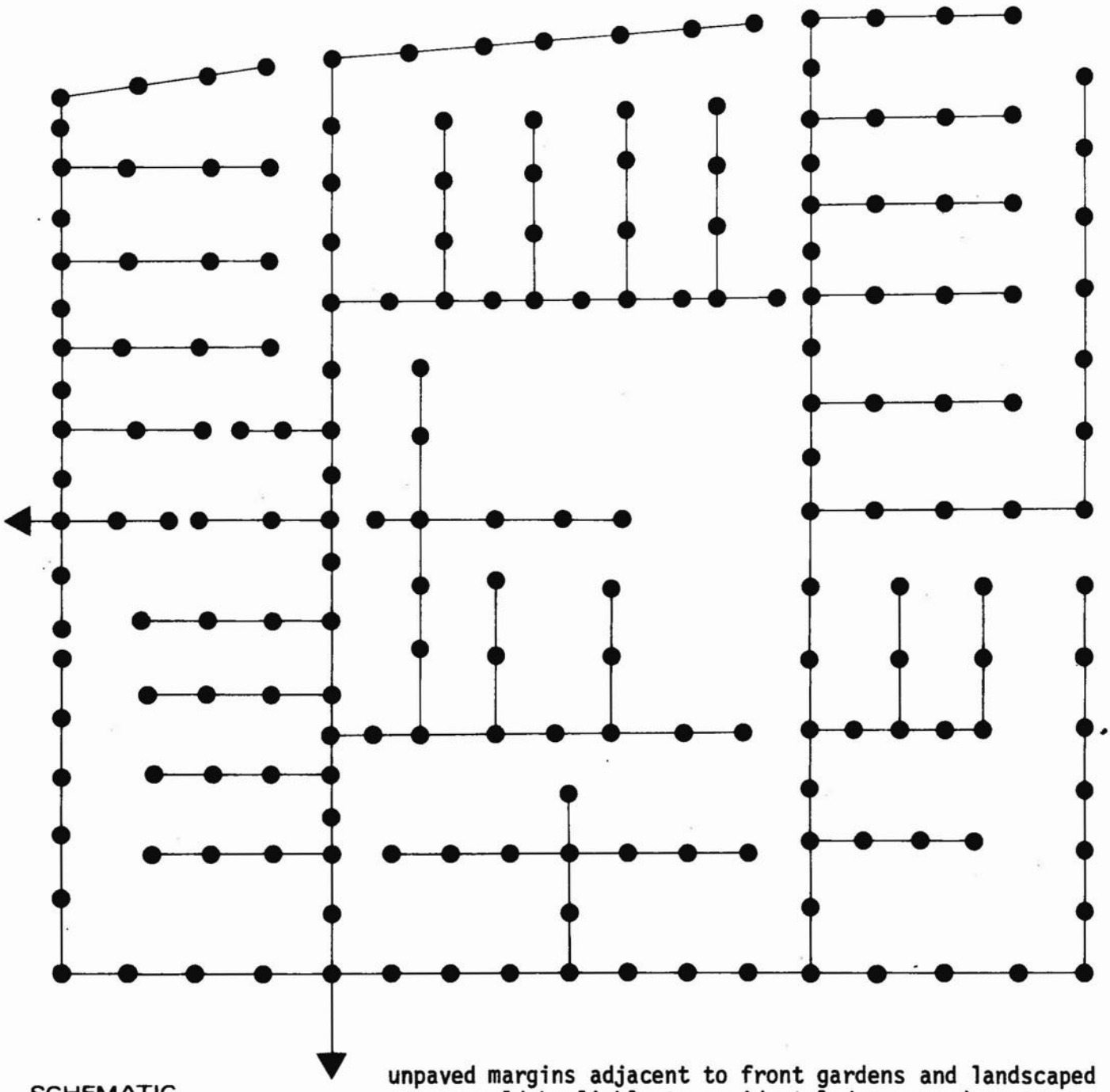
7.42 Access to sewers is necessary for several purposes, the most important being maintenance and clearance of blockages. The present close spacings specified by GOSSD are in response to the apparently high incidence of blockages brought about by poor construction and misuse of the system (for example household refuse being thrown down inspection chambers). In Ismailia the problem is further aggravated by the large amounts of sand and silt infiltrating the sewers, and in addition the present velocity/gradient criteria for house connections and small sewers.

7.43 The Consultants have already proposed the use of steeper gradients and discussed the use of flexible joints to reduce infiltration and increase construction quality. Provision of adequate solid waste disposal facilities should also reduce the misuse of the system. It is considered that some relaxation of the present spacing criteria is warranted and proposals are given in paragraph 7.41.

7.44 To illustrate the cost savings thus achieved, existing and proposed spacing criteria were applied to a typical neighbourhood sewerage system serving 1078 dwellings (see Figures 7.6 and 7.7) and the cost saving is LE10,142, or 11% of the street sewer system. If, additionally, rodding eyes are used at the head of each run a further saving of LE6634 or 10% is achieved. The potential saving for the whole of El Hekr (neighbourhood sewers only) is thus in the order of LE140000. It should be noted that the average spacing of access points in scheme 2 is 33.4 metres.

Connections

7.45 GOSSD stipulate that connections between house/building drains and sewers shall be made only at manholes. Applying this policy to the new residential areas (with relatively narrow plot frontages and street widths) would result in, at one extreme, long lengths of rider sewers on each side of the central street sewer and at the other extreme, manholes at 12m spacings (assuming one inspection chamber serves 2 dwellings). Both these systems would have disadvantages. Rider sewers, being relatively shallow, and located (in many instances) in



SCHEMATIC
NEIGHBOURHOOD SYSTEM

Notes

MANHOLE SPACING
30M. MAXIMUM

TOTAL NUMBER 199

AVERAGE SPACING
26.7M.

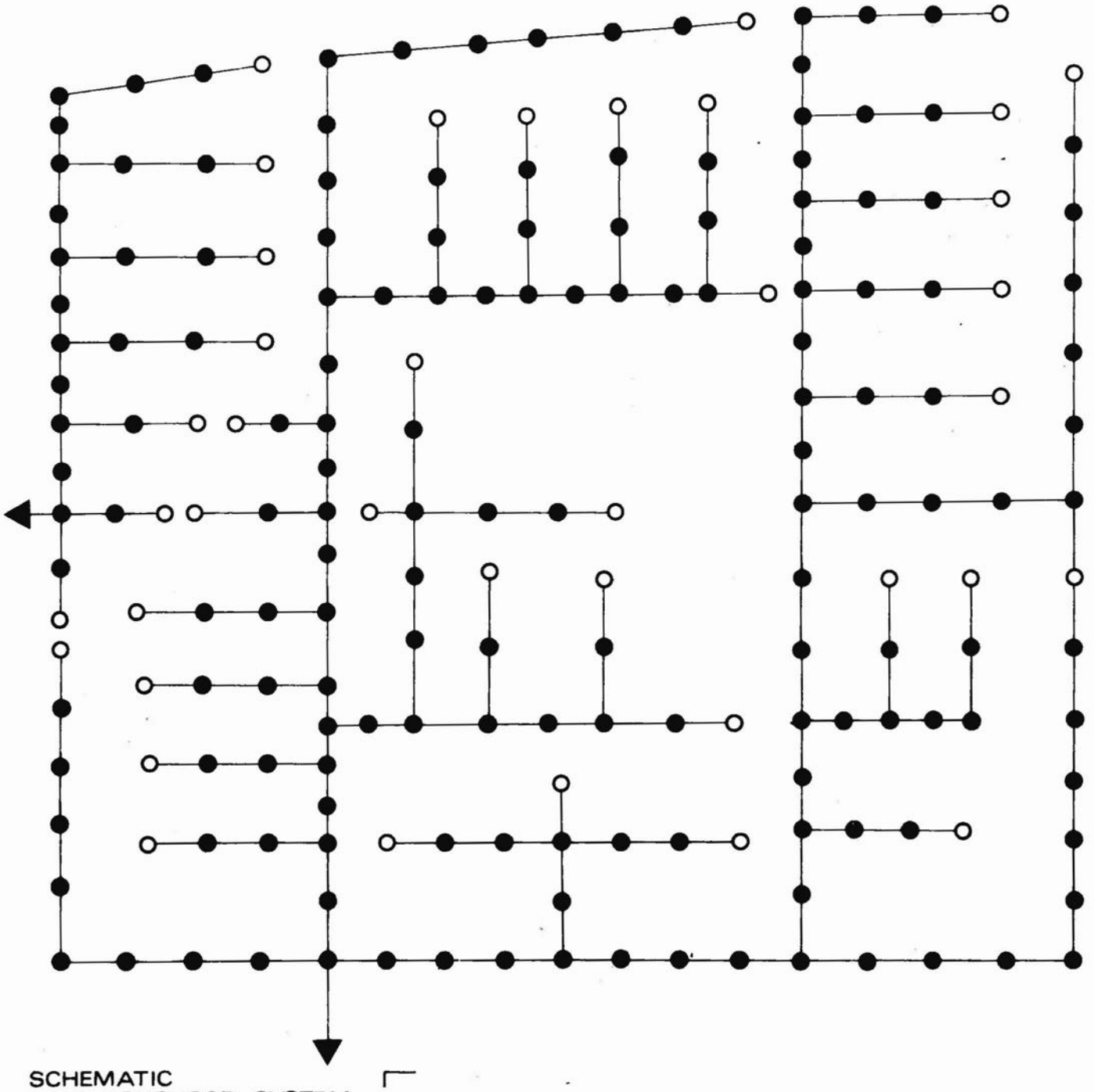
● MANHOLE POSITION

unpaved margins adjacent to front gardens and landscaped areas would be liable to accidental damage and root penetration; furthermore the flexibility necessary to allow optional hook-ups to the street sewer would be reduced and the placement of other services restricted. Manholes at 12 metre spacings would be expensive.

It is considered that, with the general modifications to the sewer system proposed elsewhere, it would be feasible to allow connections via saddles or Y-junctions, provided the distance to the inspection chamber is not excessive. In practice it is likely that a combination of the above methods would be achieved. For budgeting purposes approximately 75% of connections are assumed to be made (either direct or via rider sewers) at manholes whilst 25% connect via saddles or Y-junctions.

WASTEWATER DISPOSAL: BASIC SYSTEMS

7·6 The possibility of using basic wastewater systems (including the existing system described in paragraph



SCHEMATIC
NEIGHBOURHOOD SYSTEM

Notes

MANHOLE SPACING
40M. MAXIMUM

RODDING EYES AT
HEAD OF EACH TURN

TOTAL NUMBER
ACCESS POINTS 159

AVERAGE SPACING
33.4M.

○ RODDING EYE

● MANHOLE POSITION

7.20) as a short or medium term alternative to a fully developed waterbourne network has been considered and the Consultants findings are given below:

In evaluating such systems the following criteria were considered.

1. Surface soil and surface water should not be contaminated.
2. Wastes must be collected, stored, transported without endangering health.
3. Odours and unsightly conditions must be minimised.
4. System must be compatible with local habits.
5. System must not require skills not normally found among its users.
6. Installation and running costs should be compatible with general income of users.
7. System must be compatible with the eventual installation of waterborne collection.

7.48 A factor to be borne in mind at this stage is the nature of the soils; in many areas these have poor seepage characteristics, except for the occasional deeper pockets of windblown sands in low groundwater areas which are a feature of the northern part of El Hekr.

7.49 The following systems have been considered:

1. Bucket Latrine: Excreta is deposited in a bucket which is removed for emptying daily or several times per week. Cheap in initial cost, expensive to operate and maintain efficiently. Significant health hazards; collection procedure is unpleasant. Sullage (and sometimes urine) requires separate provision. Widely acknowledged to be an undesirable method of sanitation.

2. Pit Latrine: The basic solution for sanitation in rural areas of developing countries. Excreta is deposited in a hole in the ground covered with a squatting plate. Liquids seep off into the ground and the solids accumulate and decompose. When pit fills a new one is built nearby or is emptied periodically. Cheap. Minimum distance between pit and house should be about 7m. Success depends on subsoil conditions - in soft ground walls may collapse, in impermeable ground useful life is reduced. Variations include the borehole latrine, the leaching cesspool and the waterseal latrine. The latter uses a modified squatting plate with shallow waterseal. Sullage requires separate provision.

3. Compost Privy: Similar to pit latrine except that garbage, paper, animal and vegetable waste are thrown into the pit. After at least six months the contents are reduced, by a mixture of aerobic and anaerobic processes, to a stable compost which can be dug out and used as fertiliser; handling of the raw excreta is thus eliminated. This method is more suited to rural areas but even there it is a rather complicated process and requires supervision by health and agricultural officials. Entrance of water into the pit must be avoided.

4. Vault and Suction Tanker: Basically a large scale version of the bucket latrine. A watertight, vented vault or tank, possibly in conjunction with a waterseal toilet of low water consumption (approximately two litres per flush). The tank is emptied regularly under vacuum by suction tanker which then discharges into the city sewerage system. Sullage generally requires separate provision. This overcomes most of the disadvantages of the bucket latrine but running costs may still be significant. It is flexible in that suction tankers can be reused in other areas once the area is sewered.

5. Aqua Privy: Watertight tank filled with water in which excreta is deposited through a chute above the tank. Excreta undergoes anaerobic decomposition and digested sludge is removed at intervals. Liquid is disposed of via a soakage pit or a filter trench. The initial costs are high although operating costs are low; daily operation and maintenance are necessary Effluent pollutes the soil. The system requires permeable sub-

soil and large plots. Sullage is usually excluded to minimise problems with soakaway. A permanent type of installation. Requires about 8 lpcd of water for efficient working.

6. Septic Tank: A large version of the aqua privy which will deal with all waste water from a dwelling or group of dwellings. The chute is replaced by a w.c.. Because of its high initial cost, and the extensive areas needed for effluent disposal, its use in dense urban areas is generally impractical except in certain cases such as public buildings with large areas of open space.

7.50 For the reasons noted above, the bucket latrine, compost privy, aqua privy and septic tank are not considered suitable for use in the new residential areas. In view of the proposed density of development and the nature of the soils, the pit latrine also has problems. Construction of a watertight vault would be expensive; the use of a suction tanker has several advantages, as also would the utilisation of existing local expertise in whatever system is proposed. It is therefore concluded that the most suitable basic wastewater system would be the system already operating in the sites, but with modifications:-

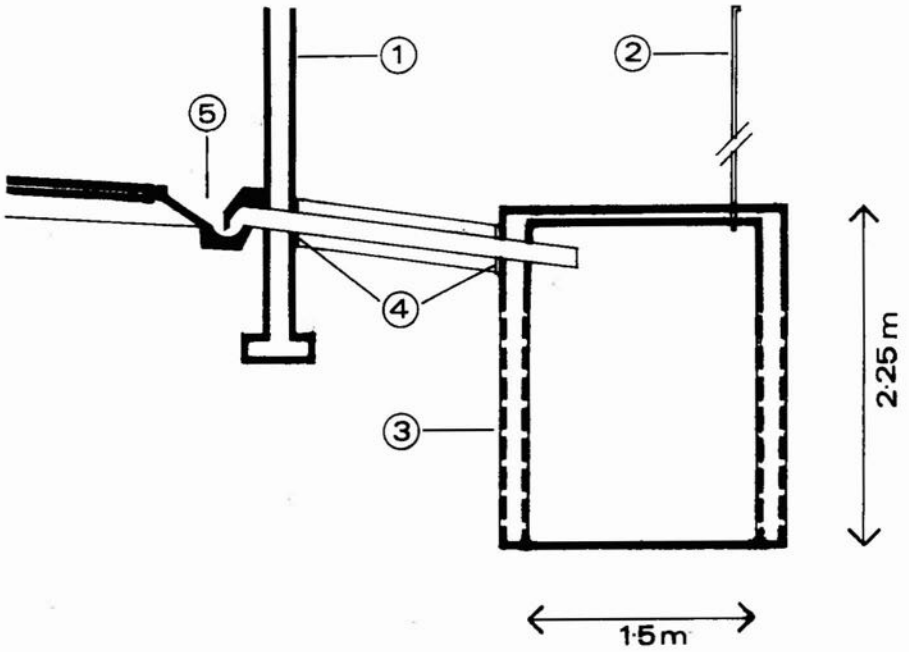
1. Pit (see Figure 7.8) to be readily accessible by suction tanker. The bathroom and kitchen should be on the street side of the plot in the optimum position for waterborne sewerage and to facilitate ventilation. Pits (or their materials) could be used as inspection chambers when sewerage is installed.
2. A regular emptying service must be provided by the City Council.
3. Size, location, construction details and timing of construction to be controlled.
4. Squatting plate to have a low volume waterseal trap to protect dwelling against odours and prevent insect nuisance.
5. Connecting pipe to be kept as short as possible and have steep gradient (say 1 in 20) to minimise blockages.
6. Pit to be vented.

In order to reduce the cost of the pit, and also provide an element of seepage, a floor will not be provided and the lower sections of the wall should be dry jointed.

Pit Latrines: Further considerations

7.51 From Figure 7.5 it can be seen that 85% of latrines fill at a rate of 8 lpcd or less. Hence a volume of 4.35m3 would ensure that most pits took at least 3 months to fill (assuming 6 persons per pit). On the basis of present charges for outlying areas (LE0.36/m3), the annual emptying charge for the latrine in the above example would be LE6.30. Most households would pay less than this, some perhaps as little as LE1.70 per annum. Details of the proposed pit latrine are shown in Figure 7.8.

7.52 Assuming that one suction tanker empties 10 pits per



① DWELLING WALL
② VENT PIPE
③ DRY JOINTED WALL*
④ FLEXIBLE JOINT
⑤ SQUAT PLATE WITH SHALLOW S-TRAP

*Where soil conditions permit

SCHEMATIC ARRANGEMENT PROPOSED PIT LATRINE 7·8

day, and also that each latrine fills at the rate of 8 lpcd, one tanker would be adequate for 750 dwellings. The emptying charge should be related to the total cost of servicing the latrines. At final design stage, in situ seepage tests should be carried out and monitoring of the fill rates of the first phase pits is also recommended, with the objective of reducing the size of pit required.

Sullage

7.53 The pit will not accept significant amounts of sullage without the fill rate becoming excessive. Until installation of waterborne sewerage, alternative methods of dealing with sullage will have to be employed. In the existing areas sullage is thrown on the ground where it evaporates or soaks away. It is also used for garden irrigation. Generally this method of disposal is satisfactory in a hot, arid climate provided there is sufficient open ground and the quantity of sullage is not excessive. This method will therefore be acceptable where the only source of water is from public standpipes. Provided certain safeguards are observed it can also be used where dwellings have a single interior tap and shower. Clearly the main advantage of this policy is that the provision of a sewerage network can be delayed until a later stage. Additionally, the re-use of water reduces the demand on the potable water supply.

7.54 An area of 6m2 would cater for approximately 45 litres of sullage from one person (ie., 7.5 litres/m2) and so for a 6 person household 36m2 of open ground would be required. This area should be mostly on-plot although front garden areas and local landscape areas could also be used (until the R.O.W. is paved the street margins could also be used).

7.55 Since misuse of the system or accidental breakages could result in flooding of the dwelling, pit latrine or locality the following safeguards are envisaged:-

1. Statutory reservation of on-plot open space for sullage; (the objective being to effectively limit the density of development in any neighbourhood until sewerage is provided).
2. Provision of emergency overflow into the street and shower pipe or channel connected to open space.
3. Maintenance and emergency repair service for internal plumbing.
4. Easily accessible stop tap inside the dwelling.

In the first instance the system should be tried on an experimental basis, and water consumption and any problems monitored. Particular care will be necessary in areas with a high water table.

SOLID WASTE

7.56 The Governorate, (through the City Council) are responsible for refuse collection within the city boundary. The collection service is run by a private contractor on a three year contract awarded by the Council to the highest bidder. Householders pay a nominal monthly charge to the contractor who collects the refuse by donkey cart; after re-cyclable materials have been extracted the residue is burnt at the city dump some twelve kilometres south of Nifisha. The former city dump in the centre of Abu Atwa has been redeveloped into a landscaped area. The service does not extend to El Hekr and Abu Atwa except along the limited lengths of transitable road; instead refuse is either re-cycled, burnt, buried in the locality, or simply thrown into the street. In some areas piles of refuse form a potential health hazard and an eysore. Whilst the situation varies from street to street, the general impression is that solid waste is not, at the moment, a very serious problem. However, this situation will change as land use intensifies and standards of living rise.

7.57 It is felt that the present system of charging, albeit a nominal amount, is likely to lead to a less than satisfactory standard of service since low income households will still be tempted to throw the refuse in the street. This can be observed at present in the more established parts of the city where a general atmosphere of untidiness prevails.

7.58 The Consultants therefore propose that the feasibility of a free daily household refuse collection should be investigated. The system would be initiated in the project sites under the close supervision of the City Council and operated in parallel with a street cleaning service. Donkey carts are the most suitable vehicles, being economical, labour intensive and highly manoevrable. For efficient operation, the collection service must operate at city scale.

7.59 At some point it will probably be necessary to transfer refuse from the donkey carts to a lorry for the long haul out to the city dump. Again, this is a matter for city wide investigation, as is the question of location of the transfer depots. However, tentative locations have been identified within the project sites on the basis of one depot per 25,000 population.

ELECTRICITY: EXISTING SYSTEM

ORGANISATIONS AND GENERAL BACKGROUND

There is a high priority for electricity in existing areas

The Ismailia Section of the Suez Canal Organisation for Electricity (SCE) is responsible for the planning, design, construction, maintenance and operation of electricity networks, including street lighting. The Governorate identify and advise on local needs; basic policies are formulated by the Ministry of Electricity operating through the Egyptian Electricity Authority. The SCE obtains revenue from user charges (tariffs and connection charges) - individual supplies are metered. Building connections must be approved by SCE who install the meter and the service line. Internal wiring is the consumer's responsibility. Illegal connections are made to the distribution lines, but in view of the situation since the war the SCE do not take legal action (although empowered to do so), but prefer to charge the consumer a flat rate based on the number of electrical appliances on the premises.

El Hekr

*El Hekr existing utilities. See also Portfolio A Drawing No. 9 for details.

Primary distribution is by an 11 KV underground cable (see Figure 7.1*) to six transformers (200 or 250 KVA) in or adjacent to the project site. Secondary distribution lines radiate from each transformer, the standard overhead circuit being 380/220 V, 3 phase, 4 wire, 50 Hz with a fifth wire for street lighting. Street lamps are attached to the distribution poles which are either wood or steel. The secondary network extends to most of the site and house connections average three per pole. A 3 KV underground network (mainly south of the site) is being phased out at present. An 11 KV overhead line crosses the north-east sector of the site. Built approximately eighteen months ago, the line is an exclusive feed to industry some 30 kilometres outside the city.

Abu Atwa

7.62

*Abu Atwa existing utilities. See also Portfolio B Drawing No. 28 for details.

The main primary distribution to the site (see Figure 7.3*) is from an 11 KV o/h line on the southern and western perimeter of the site. This serves two no. 250 KVA transformers from which the secondary lines are distributed. An 11 KV underground cable enters the site from the north. This forms part of the self contained circuit for sewage pumping stations and the sewage works, and also serves a small secondary distribution network in the east of the area.

7.63

The low voltage network, covering approximately 60% of the existing development, is currently being extended and new lines of street lighting installed. Details of cables etc., are similar to those in El Hekr.

Nifisha Light Industrial Area

7.64

An 11 KV o/h line runs alongside the Ismailia Sweetwater Canal a short distance to the south of the site. The main road fronting the site has a street lighting system and the adjacent development to the west has a secondary

distribution network.

STANDARDS AND DESIGN CRITERIA

7.65 The proposed standards and design criteria described below are generally similar to those used at present. There are no national design standards as such but various British, American and German standards and codes of practice are used for reference.

Demand

7.66 Anticipated year 2000 demand is estimated on the basis of 21.4 KVA per hectare for residential areas and 7 KVA per hectare in commercial and educational areas. In the Nifisha light industrial area a figure of 146 KVA per hectare has been used. Particularly heavy loads on the system, for example, pumping stations, are assessed separately.

Distribution System

7.67 The primary distribution network will consist of underground 11 KV feeders linking into the existing city network at the site boundaries via overhead or underground lines, as the case may be. Inside each site the 11 KV cable will connect to a series of distribution transformers (located in kiosks) where the supply will be reduced to 380/220 volts for secondary distribution. Transformers will normally be rated within the range 100-300 KVA.

7.68 The secondary distribution will be 380/220 volts, 3 phase, 4 wire, 50 Hz supply. Underground cables or insulated overhead lines will be used. The low voltage network will radiate from each transformer and the lengths of the branches will be adjusted as necessary to keep voltage drop within acceptable limits.

Street Lighting

7.69 A good street lighting system is essential to the security and general convenience of residents in any area. The level of illumination must relate to the nature of the street and the immediate surroundings. For budgeting purposes, columns are assumed to be spaced at 35m. intervals throughout. The street lights will be supplied directly from the low voltage network where this is underground; otherwise they will be fed from a separate circuit linking in to the transformer kiosks.

Connections

7.70 Domestic connections will consist of single phase 2 wire taps between the street service and the meter installation. Internal wiring will remain the responsibility of each householder. Connections to premises with larger loads will be either single phase 3 wire 380/220 volt service or 380 volt 3 phase service.

Level of Service

7.71 Consideration has been given to the installation of

street lighting prior to the installation of domestic supplies as a means of reducing capital investment in the early years of the development. It is considered, however, that this is an impractical proposition. Experience of existing areas showns there is high priority for individual connections, and installation of a self-contained street lighting system is often closely followed by a multitude of illicit hook-ups. This has the obvious disadvantages of low standard of connection and loss of revenue to the electricity authority. Hence the opportunity to install individual connections should be available at the same time as the construction of the street lighting system.

Staging

7.72 In view of the nature of the residential areas, secondary distribution on overhead lines is preferable to underground cables, at least in the early years of the development. Apart from the lower installation and maintenance costs associated with overhead lines, they are better suited to the nature of the proposed development in that they form less of a constraint to the future upgrading and extension of other utilities and streetworks. The visual impact of the cables can be reduced by using braided cables, insulated in plastic and attached to building facades.

TELEPHONES: EXISTING SYSTEM

ORGANISATIONS AND GENERAL BACKGROUND

7.73 The Ministry of Transport and Communications is responsible for the regional telephone system. The system is generally in a poor condition and there is a long waiting list for telephone facilities. The Ministry has formulated plans for substantial improvements within the regional centre for the Canal Zone and Sinai.

El Hekr

7.74 There is a short length of overhead line within the Project Area. This is located on Sharia Talaatini; a small number of subscribers are served by the line.

Abu Atwa

7.75 A recently installed underground cable (100-150 lines) serves the area. Connections to subscribers are made from this cable via overhead lines. As in El Hekr the number of telephones is small.

Nifisha Light Industrial Area

7.76 The main trunk lines (subscriber and co-axial) from the city pass along the perimeters of the site. The lines are underground along the main road; alongside the railway, on the northern perimeter of the site, the lines are overhead and underground.

7.77 The Ismailia Master Plan made specific proposals for improving and extending the telephone service. It assumed that higher income housing will require 8-12 lines per 100 inhabitants with lower income housing needing 3-5 lines per 100 inhabitants. Forecast requirements for non-domestic services eg., industry were also described. The Consultants feel that these proposals are adequate goals in the long term. Within the project sites consideration must be given, in the short term, to the provision of an essential minimum level of service based on a priority allocation system. Within residential areas, first priority would be for the installation of public telephones in cafes and shops to provide a connection within say 500m of every dwelling, together with individual lines for police, doctors, etc. Thereafter, individual lines would be installed on the basis of demand, with priority being given to commercial enterprises.

UTILITIES: TARIFFS AND CONNECTIONS CHARGES

7.78 The following tariffs and connection charges apply to utilities.

WATER:

1. Domestic rate - 18 milliemes/m3.
   Government buildings - 6 milliemes/m3.
   Public standpipes - free, but Governorate billed for 'excessive' usage.
   Fire Hydrants - 15-50 milliemes/m3 (Governorate pays).
   Irrigation water (non-potable) 10 milliemes/m3
2. Standing charge (domestic) - LE0.13 per month.
3. Connection charge; varies according to diameter and length. For 12mm. diameter x 5m., cost = LE52 plus LE13 for insurance. Price includes meter and stop-cock.

SEWERAGE:

1. No user charges.
2. Connection charges assessed on merit.

ELECTRICITY:

1. Domestic rate - 23.4 milliemes/Kwh (first 45 Kwh)
   15 milliemes/Kwh thereafter.
2. Connection charge; varies according to distance:
   To street line, generally LE20-25; the price includes the installation of a meter.

8

Costing

8
Costing

SOURCE OF COSTS

8.1 The purpose of this section is to describe the methods adopted for costing the Demonstration Projects. Costings for Project Areas are presented after the detailed proposals for each area.

8.2 Cost estimates for the Demonstration Projects have been based on a number of sources. These include:

Public Sector Contractors
Private Sector Contractors
Labour Teams in the Informal Sector
Government and Governorate Departments
Public Authorities
Local Manufacturers and Suppliers

8.3 Market prices have been used; those prices which the various contractors charged to their clients in Ismailia as at November 1977. Cost estimates are prepared on the same time and location basis as the sections in this report on incomes and affordability.

8.4 Costings given in this report are all inclusive; that is, they include all direct costs of labour, materials, equipment, on-cost and profit. They do not, however, include design or supervision costs. In the case of community facilities appropriate allowances have been made for the provision of capital furniture and equipment. Costs have generally been calculated by applying unit rates to measured quantities or areas, a sample list of these unit rates is given at the end of this section.

8.5 Unit rates differ depending on the contracting method adopted for the various works. General assumptions have been made based on the Consultants knowledge of the construction industry, which do not make these differences in rates significant. These assumptions are based on the understanding that the various contractors are mainly confined to one type of work; ie., public sector construction companies will undertake large and medium

scale public utilities; private sector construction companies will undertake most formal housing such as Aimaras and most community facilities; labour teams will be involved in both initial and incremental development of 'self help' housing.

UTILITIES COSTS

8.6 A major part of the costing effort has been concentrated on the economics of utilities provision. Initially costing exercises were carried out on theoretical housing layouts and indicative costs per plot and per hectare for these were established. These layouts were prepared for a variety of plot sizes and the costs derived, assisted in the determination of optimum plot sizes from a utilities points of view. At a later stage, these theoretical costs were compared with actual designed layouts in the Project Areas to ensure that the proposed layouts were reasonably efficient.

8.7 Contractor-built housing and community facilities have generally been costed on a square metre basis. Gross areas for each building type have been measured from drawings or calculated from schedules of space provision then unit rates have been applied to these areas.

COST LEVELS

8.8 The costings presented in this report are intended to indicate the level of expenditure required to implement the Demonstration Projects. Costs can increase sharply mainly dependant on the supply of, or demand for, the basic inputs of construction, materials and labour. This is a national as well as a local problem; a major development programme in another part of Egypt can affect Ismailia directly by drawing off already scarce resources.

8.9 To some extent the local resources for 'self help' housing are an exception to the above. This is due to their essentially local nature; Ismailia is unlikely to be in the position of an exporter of mud or palm, though labour may well be attracted elsewhere by better work opportunities or higher wages. Development of local material resources so as to produce, for example, fired mud bricks should be considered, but at a local low technology level, otherwise the market factors described previously may encourage export.

UNIT RATES

8.10 Table 8.1 shows unit rates and is an abbreviated list of those used in the costing of the Demonstration Projects. They are given here not only as useful background information but also to assist in future updating of project costs.

8.11 No allowance has been made in these unit rates for additional costs due to bad ground conditions such as close boarding in the case of loose soil, pumping in the presence of ground water, or excavation in rock. Due allowances have, however, been made in the costings accompanying the detailed proposals for each area.

8.12 The unit rates listed 1-65 are based on local formal material and labour costs assuming current levels of availability. Rates are all inclusive as described previously and individual items are priced at the level appropriate to the type of contractor most likely to carry out that work item.

8.13 Unit rates for informal materials vary greatly in Ismailia dependant largely on the location of construction as transport costs are by far the largest single cost factor.

Table 8.1
UNIT RATES

Item No.	Brief Description	Unit	Rate/LE
	General Construction Works:		
1	Bulk excavation in good ground backfill and removal of surplus	m3	1.50
2	Ordinary concrete	m3	17.50
3	Reinforced concrete complete with formwork and reinforcement	m3	65.00
4	Red brickwork	m3	20.00
5	Red brickwork 12 cm. thick	m2	3.50
	Sewerage:		
	Trench excavation in good ground backfill and removal of surplus; glazed clay pipes with mortar joints on a concrete base		
6	100 mm. diameter pipe, trench average 1.00 m. deep (with concrete surround)	m	5.5
7	100 mm. diameter pipe, trench average 1.50 m. deep (with concrete surround)	m	6.5
8	150 mm. diameter pipe, trench average 1.00 m. deep (with concrete surround)	m	7.70
9	150 mm. diameter pipe, trench average 1.50 m. deep (with concrete surround)	m	8.20
10	150 mm. diameter pipe, trench average 2.00 m. deep	m	7.53
11	225 mm. diameter pipe, trench average 1.50 m. deep	m	12.36

Item No.	Brief Description	Unit	Rate/LE
12	225 mm. diameter pipe, trench average 2.50 m. deep	m	12.30
13	225 mm. diameter pipe, trench average 3.50 m. deep	m	15.70
14	375 mm. diameter pipe, trench average, 2.5 m. deep	m	22.00
15	375 mm. diameter pipe, trench average 3.5 m. deep	m	25.60
16	375 mm. diameter pipe, trench average 4.5 m. deep	m	31.30
17	450 mm. diameter pipe, trench average 3.5 m. deep	m	32.20
18	500 mm. diameter pipe, trench average 2.5 m. deep	m	34.30
19	600 mm. diameter pipe, trench average 3.0 m. deep	m	43.00
20	600 mm. diameter pipe, trench average 4.0 m. deep	m	49.00
21	600 mm. diameter pipe, trench average 5.0 m. deep	m	59.00
22	Dewatering trenches by well-pointing	m3	5.00
	Manhole excavation in good ground, backfill and removal of surplus; Egyptian standard concrete manholes complete with benching, step irons and manhole covers.		
23	Manhole 1.0 m. deep	each	120.00
24	Manhole 2.0 m. deep	each	230.00
25	Manhole 3.0 m. deep	each	400.00
26	Manhole 4.0 m. deep	each	630.00
27	Manhole 5.0 m. deep	each	900.00
	Water Supply:		
	Trench excavation in good ground to give 0.9 m.minimum cover, backfill and removal of surplus; asbestos cement pipes with cast iron joints and rubber inserts.		
28	100 mm. diameter pipe	m	7.00

Item No.	Brief Description	Unit	Rate/LE
29	150 mm. diameter pipe	m	9.10
30	200 mm. diameter pipe	m	12.50
31	250 mm. diameter pipe	m	15.00
32	300 mm. diameter pipe	m	20.00
33	400 mm. diameter pipe	m	35.00
34	500 mm. diameter pipe	m	52.00
35	600 mm. diameter pipe	m	73.00
	Extra over asbestos cement pipes for case iron fittings		
36	90^{o} bend on 100 mm. diameter pipe	each	14.00
37	90^{o} bend on 150 mm. diameter pipe	each	32.00
38	90^{o} bend on 300 mm. diameter pipe	each	135.00
39	90^{o} bend on 400 mm. diameter pipe	each	255.00
40	90^{o} bend on 600 mm. diameter pipe	each	620.00
41	150 mm. - 100 mm. diameter reducer	each	12.00
42	200 mm. - 150 mm. diameter reducer	each	29.00
43	400 mm. - 350 mm. diameter reducer	each	130.00
44	100 mm. diameter tee with 100 mm. diameter branch	each	16.00
45	150 mm. diameter tee with 100 mm. diameter branch	each	30.00
46	300 mm. diameter tee with 100 mm. diameter branch	each	75.00
47	300 mm. diameter tee with 150 mm. diameter branch	each	90.00
48	500 mm. diameter tee with 300 mm. diameter branch	each	475.00
	Electricity Supply:		
49	11 Kv overhead electricity distribution lines	m	8.00

Item No.	Brief Description	Unit	Rate/LE
50	11 Kv underground electricity distribution lines	m	15.00
51	380/220 V. overhead electricity distribution lines	m	4.00
52	380/220 V. underground electricity distribution lines	m	7.00
53	11 - 0.4 Kv./1000 Kw. capacity pad mounted transformer	each	9000.00
	Roadworks:		
54	Hardcore base course 15 cm. thick	m2	1.50
55	Asphalt prime coat	m2	0.17
56	Double bitumen surface treatment	m2	0.60
57	Asphalt binder course 5 cm. thick	m2	1.95
58	Asphalt wearing course 5 cm. thick	m2	2.20
	Total Construction Costs:		
59	Low cost housing	m2	40.00
60	Medium cost housing	m2	65.00
61	Higher cost housing	m2	80.00 and over
62	Educational Facilities	m2	70.00
63	Medical Facilities	m2	85.00
64	Social Facilities	m2	70.00
65	Religious Buildings	m2	110.00 average
	Local Materials:		
66	Building mud	m3	1.00
67	Reed mats	m2	0.10
68	Palm joists	m	0.50
	Total Informal Costs:		
69	Housing	m2	10.00 average

9

Ability to Pay & Financing

9
Ability to Pay & Financing

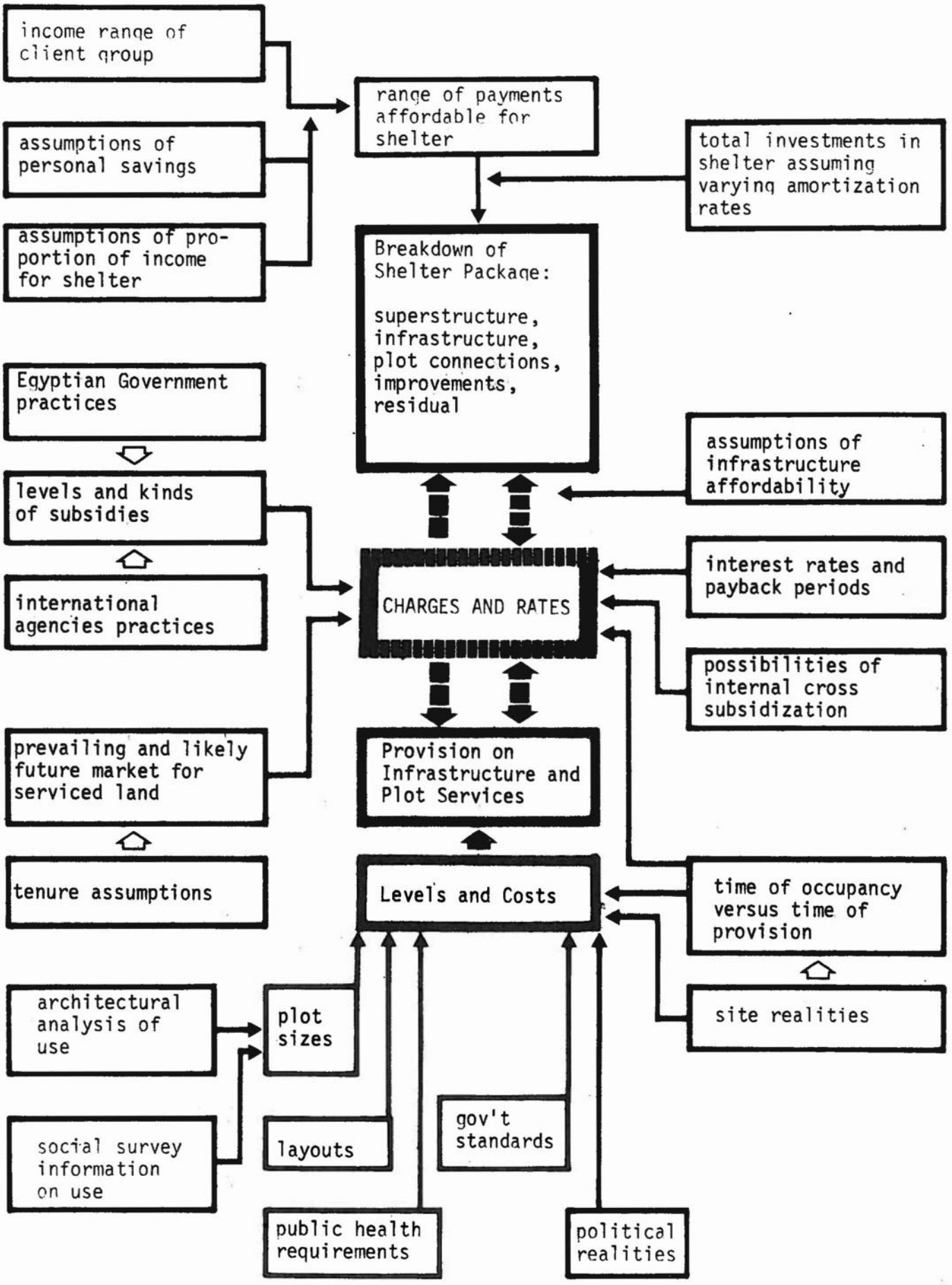
OVERVIEW

9.1 In this section the various factors affecting decisions of fundamental importance to the realisation of the Abu Atwa and El Hekr Demonstration Projects are presented. The basic objectives and policies of the projects, as described in Volume 1, have been subjected to an ongoing analysis by the Consultants throughout the study period, and this section presents both a summary of this process and the resulting conclusions as to ability to pay, charging and finance for the Projects.

9.2 The analysis as set out below is arranged in logical sequence, starting with the subject of client ability to pay for the "shelter package", which is then compared to costs of different levels of housing and infrastructure, resulting in an array of choices of provision and charges to the client. Practical issues and the subsidy question are then introduced, and finally the preferred charging strategy is presented along with the basic project financing profile. It should be noted, however, that the actual process involves the simultaneous consideration of a wide range of factors and assumptions; in fact an iterative process has been carried out with repeated testing of the effects of one factor on the whole and vice versa. An idea of the complexity of the problem can been seen in the schematic diagram shown in Figure 9.1, which shows the interdependency of factors and, in summary form, the decision routines.

THE TARGET POPULATION: HOUSEHOLD INCOMES

9.3 As is indicated in the policy proposals of Volume 1, the El Hekr and Abu Atwa projects are designed for a population (both existing and new) which exhibits the same income characteristics as those of the existing inhabitants of the Study Areas. At 1977 prices, this target population has been estimated to conform to the household income distribution shown in Table 9.1.



Decisions on provision and charging

9.1

Table 9.1
TARGET POPULATION HOUSEHOLD INCOME DISTRIBUTION (1977)
EL HEKR/ABU ATWA

Monthly Income (LE)	Annual Income (LE)	% of households in income group	Cumulative % of households
15	180	14	14
15-25	180-300	39	53
25-40	300-480	30	83
40-70	480-840	16	99
70+	840+	1	100

Median household income: 290 LE/year.

9.4 This distribution has been constructed from an average of the income characteristics as reported in the Scanning Surveys of El Hekr and Abu Atwa and the household incomes as reported in the Detailed Improvement Areas social survey. Thus this standardised distribution reflects a summing of observed characteristics in both Abu Atwa and El Hekr. Absolute differences in income between the two areas were found to be small enough to be statistically insignificant, and it was felt that by averaging all distributions, a smoother, more universally applicable profile could be obtained. (See Volume 2, Section 1 for detailed results of these surveys.)

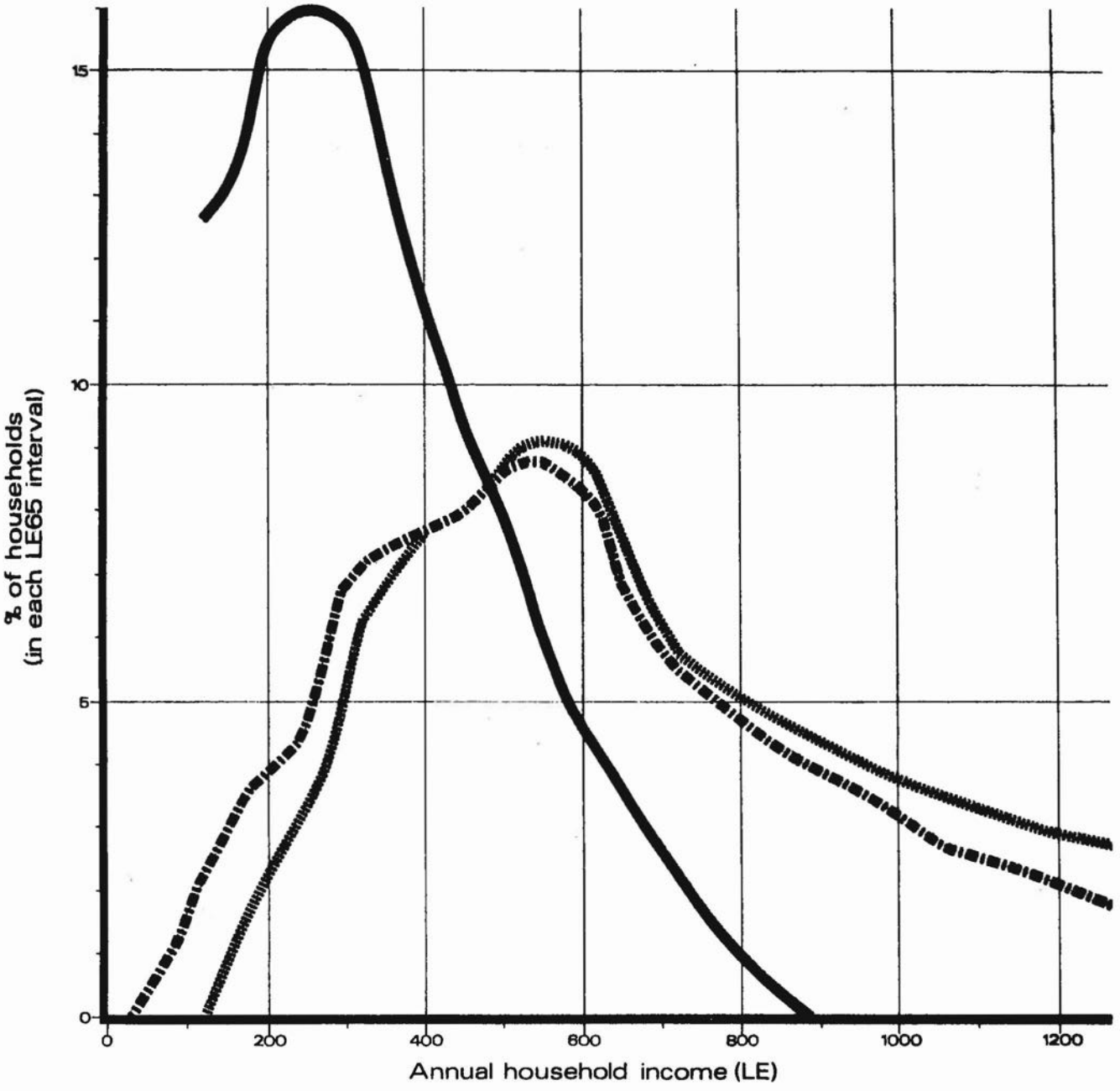
9.5 A comparison of this household income distribution with the equivalent distribution for the national urban population shows dramatically thatthe Ismailia Demonstration Projects client populations have a very low set of incomes. A comparison of these two distributions is set out below, but before pointing out the differences, the assumptions used in constructing the national tables must be explained:

*CAPMAS, 1974-75, Cairo December 1976, No.0819/AA/76

(a) The base distribution used was the Family Budget Sample Survey of Urban Households*. Although this reports expenditures and ignores savings, at the same time there is probably under-reporting of expenditures of the lowest-income households (irregular and multiple-job wage earners). Certainly a number of qualifications and assumptions could be considered in detail to argue for or against the realism of these distributions as an expression of household income, but the Consultants are of the opinion that they are the best available.

(b) As a parallel exercise the same distribution was used after omitting 1 and 2 person households, thus correcting for skewdness of the lowest income brackets and producing a distribution which, in terms of household sizes, is more in line with the target populations of the Study Areas.

(c) To adjust these national distributions to 1977 prices, an across-the-board increase of 30% on all income brackets was used, on the assumption that incomes kept pace with inflation (consumer price index) during the end 1974 - mid 1977 period. This



ISMAILIA TARGET POPULATION

NATIONAL URBAN (ALL HOUSEHOLDS)

NATIONAL URBAN (HOUSEHOLDS OF 3 OR MORE PERSONS)

Household income distribution (1977)

increased median income from LE490/year to LE625/year for all households, and from LE505/year to LE655/year for households of three and more persons.

Table 9.2
ESTIMATED 1977 NATIONAL INCOME DISTRIBUTION FOR URBAN HOUSEHOLDS

Annual Income Ranges (LE)	All Households % in each range	All Households cumulative %	Households of 3+ % in each range	Households of 3+ cumulative %
<0-180	8.0	8.0	1.1	1.1
180-300	5.0	13.0	7.0	8.1
300-480	19.0	32.0	18.8	26.9
480-650	21.1	53.1	22.3	49.2
650-830	13.1	66.2	14.0	63.2
830-1040	15.1	81.3	16.3	79.5
1040+	18.7	100.0	20.5	100.0
Median Household Income:	625 LE/year		655 LE/year	

From Tables 9.1 and 9.2 the most striking observation is the concentration of the Ismailia target households in the lowest third of the national urban distribution. The lowest group, below LE180/year, represents 14% of the target households but only 1% of national households of 3+ persons (8% of all national households). A full 70% of the target households lie within brackets LE180-480/year which contain only 24-26% of national households. Also, there are virtually no target households (less than 1%) in ranges above the national 63-66 percentile. Figure 9.2 demonstrates this in graphic terms and emphasizes that, besides being much lower, the target distribution is much more concentrated (ie., of smaller variance).

9.7 The incomes of this target population have been assumed to remain constant, in real terms, over the next fifteen years. This means that incomes are expected to rise at the same rates as inflation. A case could be made for increasing real income to reflect national GDP/capita growth rates, but this would require the assumption that these increases are being enjoyed equally throughout all range of incomes, and particularly that the poorest third is receiving its share. There is far too little data to accept this assumption, and it was felt that the safest position, especially for analyses of ability to pay for housing, is one of constant real income.

THE TARGET POPULATION AND THE THEORETICAL ABILITY TO PAY FOR SHELTER

9.8 It is standard practice to assume that a certain constant proportion of a household's annual income is available for 'shelter', ie., all expenditures on housing. This proportion is expected to be higher for higher income brackets as the available surplus over and above the basic necessities of food and clothing increases, and is normally expected to range from 15%

to 25%. The Sample Family Budget Survey for Urban Egypt shows a total expenditure on housing which varies from 11% to 21%, the percentage decreasing as income levels increase. This can be partly explained by the distorting effects of rent control, and there is considerable evidence that actual payments for new housing in Urban Egypt, when key money etc. is included, may be higher than 30% of income for lower income families. Evidence from the case studies in the Study Areas shows that some low-income renters are paying out over 25% of their incomes for rent (excluding any key money payments). In effect, there is nothing fixed about this standard proportion; it seems, in Egypt, to depend more on the difficulty of finding housing and the availability of other income sources such as personal savings and converted capital assets, than upon any constant proportion of annual income. As will be discussed below, a household's 'propensity to spend on housing' seems, at least in the Study Areas, to be tied to opportunities of building incrementally, perceptions of future security and secondary income, and other factors which have little to do with current income.

9.9 Nonetheless, a calculation of ability to pay for housing as a percentage of income has been applied to the household income distribution of the target population, and results are shown, for three different percentages - 15%, 20% and 25% - in Table 9.3. The last column shows the total amount that could be supported (assuming a loan was available) by annual payments for new housing. To make the analysis of the following paragraphs less complicated it is assumed that 20% of income is devoted to housing by all households.

9.10 It should be apparent that a distinction must be made between existing and new settlers; the former already are occupying shelter and, if owner-occupiers, are only devoting their proportion of income for 'shelter' to improvements, utility connections to plots and secure land tenure. The new settlers, however, must also pay for or build a superstructure. In both cases the important question is the amount of income (or that fraction of the proportion devoted to 'shelter') that will be available for infrastructure and plot connections.

ABILITY TO PAY FOR INFRASTRUCTURE

9.11 There are no 'standard' proportions of income that households are expected to pay for the infrastructure portion of the housing package*. In the present study differing assumptions for existing and new settlers have been used as follows:

*The definition of infrastructure used here is: All utilities and road networks including plot connections plus landscaping. 'Infrastructure' does not include any on-plot investments except pit latrinies or a service core.

EXISTING SETTLERS

9.12 Existing settlers in the Study Areas chosen as case studies have expressed a high priority for piped water, water-borne sewerage, and paved roads, but this gives no indication of how much they would actually be willing to pay for these services. If it is assumed that a maximum of 65% of their 'shelter' proportion of income could be available for the provision of infrastructure

Table 9.3
HOUSEHOLD ABILITY TO PAY FOR SHELTER UNDER VARYING ASSUMPTIONS (1977 LE)

Annual Income Ranges: Limits & Midpoints	% Income for shelter	Monthly (LE)	Annual (LE)	Total Available assuming amortisation at 7% over 20 years
150	15	1.9	22.5	238
	20	2.5	30.0	318
	25	3.1	37.5	397
180	15	2.3	27.0	286
	20	3.0	36.0	381
	25	3.8	45.0	476
240	15	3.0	36.0	381
	20	4.0	48.0	508
	25	5.0	60.0	635
300	15	3.8	45.0	476
	20	5.0	60.0	635
	25	6.3	75.0	794
390	15	4.8	57.8	609
	20	6.4	77.0	815
	25	8.0	96.3	1020
480	15	5.9	70.5	747
	20	7.8	94.0	995
	25	9.8	117.5	1244
660	15	8.3	99.0	1049
	20	11.0	132.0	1398
	25	13.8	165.0	1805
840	15	10.4	124.5	1318
	20	13.8	166.0	1758
	25	17.3	207.5	2197

and the rest for housing improvements, then the following amounts would be available for infrastructure:

20th percentile household	LE273
Median household	LE400
80th percentile household	LE624

9.13 How much in the way of infrastructure services these amounts could support is examined below, but it should be mentioned here that 65% of the housing proportion of income (or 13% of income) is not an unreasonable amount for a household with an existing property to spend on infrastructure, based on the experiences of neighbourhood improvement projects in other countries. To put this proportion in perspective, the residual available for housing improvements would be LE150 for the 20th percentile household, and this could finance the construction of roughly 22m2 or 2 rooms of low standard 'informal' housing. The same residual for the 80th percentile household would be LE335, which would finance the construction of roughly 18m2 of good quality 'informal' housing or 1.5 rooms. (Costs of informal construction are discussed in Volume 2, Section 3).

NEW SETTLERS

9.14 For new settlers it must be assumed that a first priority call on available finance is the construction of an acceptable shelter. At a minimum, this would mean two rooms of the cheapest informal construction which would cost roughly LE140. To this should be added the opportunity to build another room (LE70) or to use this amount for future improvements. Since higher income households will want higher quality superstructures, it is assumed that households of median income and above could devote a maximum of 50% of the housing proportion of income to infrastructure (or 10% of income). Under these assumptions the following amounts would be available for infrastructure:

20th percentile household	LE210
Median household	LE310
80th percentile household	LE480

9.15 These figures give a rough indication of the magnitude of funds new and existing settlers might be able to mobilize or be charged for infrastructure. The types and levels of infrastructure provision which could be wholly financed by residents, given the above available funds, are shown in subsequent sections. However it must be emphasized that the issue is not straightforward: first, any infrastructure package includes land under secure tenure, and this represents a good which should be 'costed', especially if in the future settlers can sell this good at market rates. Secondly, the use of an arbitrary 20% of income as the proportion affordable for housing, while the most 'reasonable' choice, has little predictive value. As mentioned above, there is frequently a large if non-quantifiable gap between ability and 'willingness' to pay for housing. Thirdly, there is nothing magical about amortising payments for housing at 7% for 20 years. If, for example, no loan is available, then it must be assumed that initial superstructures are built either completely incrementally (eg., 4m2 per year !) or that some outside funds are available. Again, if there is a loan and it is more favourable, say 3% for 30 years, then the amounts available for both infrastructure and superstructure double.

PROVISION OF INFRASTRUCTURE: TOTAL COST OPTIONS

9.16 In this sub-section the costs of elements of infrastructure, expressed on a per plot basis, are compared with the above estimates of ability to pay for infrastructure to show the options of different levels of provision. The infrastructure costs, as shown in Tables 9.5 and 9.7 below, are based on estimates of average plot shares of the costs of neighbourhood modules for new and existing areas of El Hekr. Thus they vary slightly from plot costs derived from calculations of total project costs (shown in Volume 1, Section 4 & 6), but are sufficiently accurate for this exercise of testing ability to pay.

OPTIONS FOR EXISTING SETTLERS

9.17 Costs of elements of infrastructure provision to existing

Table 9.4
EXISTING PLOT SIZES IN STUDY AREAS

Plot Size	Distribution %
0-50	4
50-100	31
100-150	32
150-200	13
200-250	8
250-300	4
300+	1

Source: El Hekr Detailed Improvement Area Survey 1977

settlers are calculated as follows. First, costs are expressed on a per plot basis, even though it is known that some plots contain more than one household (in El Hekr 15% of existing plots have two or more households). Thus average household affordability is somewhat underestimated, but the reality is that most households will be faced with full plot charges. For the same reason the effect of increasing multiple occupancy in the future has been ignored. Secondly, it has been necessary to distinguish between elements of provision which would be charged on a flat per plot basis (such as connections) and those which would be assessed on a plot area (m2) basis (such as circulation and utilities networks). This is important since existing plots range in size, as shown in Table 9.4.

Obviously what a household could afford depends on the plot size, and to reflect this, three plot sizes representing the median, 25th and 75th percentiles have been used. The results of the costing exercise are shown in Table 9.5, setting six hypothetical levels of infrastructure provision against the per plot costs for these three plot sizes.

9.19 The data shown in Table 9.5 is set against the target household income distribution and, under the assumptions described above for existing settlers, against household affordability for infrastructure. This gives a range of the percentages of the target households which could afford a particular level of provision, as shown in Table 9.6.

9.20 As can be seen from Table 9.6 there is full ability to pay for Levels I and II, an average 87% for Level III, and a considerable fall in the percentage as the more expensive levels of provision are achieved. This situation is that experienced by new settlers, ie., that the costs of water-borne sewerage and water to individual plots represent a burden that only a minority of the households can afford. This gap between Levels III and IV is so significant that it remains valid even under altered assumptions of the % of income spent on infrastructure. It should be noted that Level IV equals Level II plus water and sewerage provision and if one were to add the road elements of Level III coverage would be even lower, averaging only 23% of households. Also, when one considers that a household with water and sewerage must spend considerable funds on plumbing and fixtures there is an additional burden on household finances which is not reflected here.

9.21 Another important conclusion to be gained from this exercise is the 'ability to pay' for roads. Infrastructure Levels I and II, which all households could afford, are provided with Stage I roads, ie., local roads gravelled and access roads with earth/gravel. Infrastructure Level III, which 87% of households could afford, includes paved local streets, and access roads gravelled. Also, district streets are fully paved and finished. This means that a high standard of roads is easily within the affordability of most existing residents. However, a high standard of roads has lower

Table 9.5
LEVELS OF INFRASTRUCTURE PROVISION FOR EXISTING SETTLERS: TOTAL COST OPTIONS

Level of Infrastructure Provision	Costs per Plot (1977 LE) 83m2 plot	123m2 plot	176m2 plot
Level I			
- administration, markers, compensation, registration	15	23	33
- pit latrines (capitalized running costs)	24	24	24
- standpipes	14	21	30
- stage I local roads	19	28	40
TOTAL	72	96	127
Level II			
- Level I	72	96	127
plus:			
electricity	53	53	53
- landscaping	3	5	7
TOTAL	128	154	187
Level III			
- Level II plus:	128	154	187
- stage I district streets	18	27	38
- stage II local roads	44	65	93
TOTAL	190	246	318
Level IV			
- Level II (less pit latrines) plus:	104	130	163
- reticulated water network (excl. standpipe provision)	50	74	106
- water connections	65	65	65
- reticulated sewerage network	100	149	213
- sewerage connections	104	104	104
TOTAL	423	522	651
Level V			
- Level IV plus:	423	522	651
- stage I district streets	18	27	39
- stage II roads	44	65	93
TOTAL	485	614	783
Level VI			
- Level V plus:	485	614	783
- trunk sewers	36	54	77
- trunk water mains	36	54	77
- paved access roads	34	51	73
TOTAL	591	773	1010

Table 9.6
EXISTING HOUSEHOLDS ABILITY TO PAY FOR DIFFERENT LEVELS OF INFRASTRUCTURE

Level of Infrastructure Provision (see Table 9.4)	Percentage of Households affording each level		
	83m2 plot	123m2 plot	176m2 plot
Level I	100	100	100
Level II	100	100	100
Level III	100	87	69
Level IV	48	33	17
Level V	38	23	13
Level VI	24	14	5

priority than water and sewerage according to the results of the case study interviews, and there is the practical problem that paved roads should not be put in before water and sewerage lines. This is discussed further below.

OPTIONS FOR NEW SETTLERS

9.22 The costs of elements of infrastructure provision to new settlers are calculated as follows: First, as with existing settlers, it is assumed that there is only one household per plot. Secondly, a distinction has been made between elements of provision which would be charged on a flat per plot basis (such as connections), and those which would be assessed as part of the cost of plot acquisition charge (such as circulation and utilities networks). New settlers are faced with a choice of six different basic plot configurations which include five different plot sizes ranging from 72m2 to 162m2, with an average plot size of 108m2. The question is, on what basis should these different sized plots be assessed as a share of the total network costs? In Volume 2, Section 4 it is shown that, on a theoretical basis, cost variations where land costs are low, are small as one moves from the smallest plots upward, as long as frontage lengths are constant (ie., from 6x12 m2 to 6 x 18 m2). If this method of assessment were used here, there would therefore be practically no advantage in testing affordability for the smaller plots, as they would cost almost the same as the average 108m2 plot. Thus in Table 9.7, which shows costs of levels of provision for three plot sizes (72m2, 108m2 and 135m2), network costs are apportioned in direct relation to the plot size. As a result there is a significant variation in costs attributable to the smaller plots; therefore Table 9.7 provides a guideline for relating actual plot acquisition charges to client affordability, as is discussed in the following sub-sections.

9.23 By relating the target household income distribution and affordability assumptions described above for new settlers against household affordability for infrastructure, a range of the percentages of target households which could afford a particular level of provision is derived. The results are shown in Table 9.8. As can be seen from this table,

Table 9.7
LEVELS OF INFRASTRUCTURE FOR NEW SETTLERS: TOTAL COST OPTIONS

Level of Infrastructure Provision	Costs per Plot (1977 LE) 72m2 plot	108m2 plot	135m2 plot
Level I			
- administration,markers,compensation,registration	17	25	31
- pit latrines (incl. capitali ed running costs)	105	105	105
- standpipes	14	21	26
- stage I local roads	17	26	32
TOTAL	153	177	194
Level II			
- Level I	153	177	194
plus:			
- electricity	53	53	53
- landscaping	3	5	6
TOTAL	209	235	253
Level III			
- Level II plus:	209	235	253
- paved district streets	11	16	20
- stage II local roads	27	41	51
TOTAL	247	292	324
Level IV			
- Level II (less pit latrines)+:	104	130	148
- reticulated water network*	34	50	62
- water connections	65	65	65
- reticulated sewerage network	53	79	79
- sewerage connections	95	95	95
TOTAL	351	419	469
Level V			
- Level IV plus:	351	419	469
- paved district streets	11	16	20
- stage II local roads	27	41	51
TOTAL	389	476	540
Level VI			
- Level V plus:	389	476	540
- trunk sewers	36	54	68
- trunk water mains	36	54	67
- paved access roads	41	61	76
TOTAL	502	645	751
Level VII			
- Level VI plus:	502	645	751
- service core	163	163	163
TOTAL	665	808	914

*(excl. standpipe provision)

Table 9.8
NEW HOUSEHOLDS ABILITY TO PAY FOR DIFFERENT LEVELS OF INFRASTRUCTURE

Level of Infrastructure Provision (see Table 9.6)	Percentage of Households affording each level		
	72m2 plot	108m2 plot	135m2 plot
Level I	96	93	87
Level II	87	81	78
Level III	79	72	66
Level IV	41	30	23
Level V	35	21	15
Level VI	17	11	6
Level VII	10	4	1

the degree of affordability for levels of provision is not as good as that found for existing settlers (Table 9.6), which is as expected given that new settlers are faced with the greater initial superstructure burden. Even so the general pattern is the same, with an acceptable degree of coverage (79% for the smallest plots) at Level III provision, but a large drop (to 41% for the smallest plots and to 30% for the average, 108m2 plot) at the Level IV provision. As in the case of existing settlers, it is concluded that the costs of water-borne sewerage and water to individual plots represent a burden that very few of the new households could afford. Also, this shows that a fairly high standard of roads (as represented by Level III) could be afforded.

9.24 **AFFORDABILITY QUALIFICATIONS**

The above analysis gives, in broad terms, an indication of the levels of provision of infrastructure that the target population is likely to be able to afford, given assumptions of a minimum superstructure requirement. These results must be qualified by the following observations:

(1) The percentages of coverage as expressed in Tables 9.6 and 9.8 are by no means inviolate, even assuming no external or internal subsidization (subsidies are treated below). Actual ability to pay will depend to a large extent upon the charging arrangements and the choices available to the participating household. Thus, for example, either an existing or a new household might be able to support as much as 50% higher charges than indicated in this section if he could select a longer payback period.

(2) The time element is an important qualification. To the extent that items of infrastructure are to be charged through plot sale with equal instalment repayment, then any increases in real household income will mean more money available for superstructure investment. Even if real income is constant but rises, in money terms, at the same rate as inflation, then the proportion of income being paid for infrastructure will decline relative to

the total, meaning a greater proportion of the 'shelter' affordability total available for superstructure.

(3) The possibility of secondary income generated from investments in superstructure (ie., the renting out of rooms or sub-units, a very common practice in the Study Areas) means that there may be a rise in income (and thus ability to pay for housing) which is itself associated with the superstructure building process. In other words although one household is being charged for infrastructure initially, in fact this cost will be shared by more than one household at full plot development (assumed for planning purposes to be 1.5 households per plot).

(4) Since the opportunity cost and values of all plots will rise over time, a household will have a future capital asset which may be used to borrow against. Although it is not at all certain that households will actually be able to take advantage of this fact (ie., that there will be any informal financial mechanism to enable it), it is a factor which may increase the amounts invested in superstructure. Certainly, to the extent that superstructure is considered a pure investment, there will be the possibility of a level of construction much beyond that needed to satisfy 'housing' demand.

(5) Given a basic project objective of maximum production of suitable housing, it is important that maximum amounts of money are available for superstructure. Points (1), (2) and (3) above indicate that there will be, over time, a greater amount than could be expected based only on affordability analysis. This 'surplus' could actually be even greater, perhaps double for some households, when personal savings, liquidation of capital (largely agricultural land holdings), and family transfers are included. Of course this bears no relation to 'income' strictly speaking, but it is an extremely important factor when considering the total 'superstructure' that might be built. The case studies provided considerable evidence to support this.

9.25 In summary, the above qualifications indicate that there will very likely be more resources available for both infrastructure and superstructure than the analysis of affordability suggests. This situation is particularly true in relation to superstructure as indicated in the points above; in effect therefore, most households will be able to afford far more than the minimum superstructure costs used in the calculations. Consequently, a household could devote more of total income to pay for infrastructure than assumed, and thus one could expect a higher percentage of household coverage for any particular level of infrastructure provision. It is, unfortunately, not possible to estimate this greater coverage; one can only assume that the coverage percentage is more likely to vary upward rather than downward.

THE RELATIONSHIP OF INFRASTRUCTURE PROVISION TO CHARGING

9.26 Inseparable from the subject of levels of infrastructure provision and affordability is a consideration of ways of actually recouping infrastructure costs. Whereas theoretically elements could either all be charged together in a single rate for plot acquisition or be separated out and each charged directly for the service or use by the appropriate authority, in practice a mix of the two approaches is most common. At this point the realities of current Egyptian practices, and even more important, the real constraints of the site characteristics must be considered. In this sub-section crucial practical issues concerning charging are discussed and indications of the best approaches are given. These issues are brought together below as part of the basic charging strategy.

CURRENT CHARGING PRACTICES

9.27 The following list gives a summary view of prevalent charging methods for infrastructure and services improvements in existing deficient areas:

Facility/Service	Existing Means of Recovering Costs
a) Water at public taps.	None.
b) Installation and supply of piped water to dwelling.	No charge for network; full recovery for connection from mains; consumption rates recover only a portion of operating costs.
c) Water-borne sewerage.	No charge for network (except through betterment levies) full recovery for connection cost; no recovery for operating costs.
d) Installation and sup ply of electricity and street lighting.	Near full recovery for connection consumption, and network through connection charge and rates.
e) Improved roads, midans and sidewalks.	None, except through legal process (betterment taxes).
f) Tree planting and maintenance.	None.
g) Street cleaning.	None.
h) Garbage collection.	Full recovery through private contractors.
i) Emptying of pit latrines	Full recovery through private contractors except for inaccessible plots.
j) Registration and rationalisation of plot tenure.	None.

9.28 For new areas there are additional costs; plot marking and levelling, and plot assignment (administrative), none

of which can be recovered except through a plot acquisition charge. The provision of all infrastructure facilities for new plots could be charged at the time of plot acquisition, but as will be seen in the following paragraphs this is problematic given the situation in the Study Areas even if the target population could afford full provision.

9.29 Egyptian charging practices for infrastructure (particularly water and sewerage) are currently undergoing review and it is expected that in the future tariffs and rates will be altered to better reflect actual system costs. The possible effects of these reforms on the Demonstration Projects are discussed below.

CHARGING AND THE TIME ELEMENT

9.30 A basic objective of the Demonstration Projects for El Hekr and Abu Atwa which underlies all of the Consultants' proposals is that the projects get underway as soon as possible (see Volume 1). Also, it is preferable, if at all possible, that charging for an element of infrastructure should not preceed its provision. Whereas some time lag would not be unreasonable, if there is a gap of several years client confidence would be undermined and inflation would eat into the allocations to such an extent that sufficient funds may not be available. This brings up a very practical problem with regard to the provision of water-borne sewerage in El Hekr and the provision of piped water to both El Hekr and Abu Atwa: the city trunk capacities are insufficient and major capital works would be required which would take a minimum of three years, assuming no delays in funding, design, and administration. Thus even if settlers could support payments for water and sewerage as part of a plot purchase rate, they would be paying for the service for years before its realisation. (For a discussion of some practical utilities constraints, see Volume 3, Section 7).

9.31 Administrative realities demand that, as far as possible, recouping of infrastructure costs be done through a single, simple rate associated with plot acquisition. Separate charges not directly associated with benefits should be avoided as they would require a severly increased administrative strain and default would be common. Although such a system of assessment in the future through benefit rates, while common in the West, has no precedent in Egypt; what is common in Egypt (and is being used more and more) is the acquisition of secure tenure to a plot through simple amortised purchase. Thus in the Study Areas it is proposed that settlers on new plots will be 'buying' plots at prices which will be amortised over a number of years, and a similar charging method will be applied to existing households so they may obtain title (see Volume 1, Section 8 and Volume 3, Section 10). These charging programmes will begin with the opening of the Projects, thus the 'actual'price' for a plot must be known and announced prior to commencement of the programme. While it is possible to put an escalation clause in contract agreements, it would be better to avoid this if at all possible for obvious reasons.

CHARGING FOR MAJOR WORKS

9.32

The Consultants have been given guidelines as to the share of network costs which should be attributed to individual plots*. This allows a convenient breakdown of costs for sewerage and water into:

*Letter No. 699-77, dated 15 November 77, from the Advisory Committee for Reconstruction

(1) connection charges

(2) neighbourhood networks (the reticulation network)

(3) on-site trunk lines

(4) off-site trunk lines and capacity improvements.

9.33

In a similar fashion road costs can be broken down, and in the costing of levels of provision given in Tables 9.5 and 9.7 above, these distinctions have been maintained**. The guidelines specify that only costs (1) and (2) above should be attributed to plots, with the inference that (3) and (4) should be borne as part of the city-wide network, which presumably is to be financed from general city or Governorate revenues. This approach is logical, as many of the benefits of off-site infrastructure will accrue to the wider community. However, such a division of costs does not ensure, in a practical sense, that these major works will actually be provided. Local networks of sewerage and water are useless without major trunk works, and there is the danger that a programme for recouping local system costs would fail because there are no funds for the major works. Fortunately, the same is not exactly true for roads, although the usefulness of local roads is diminished if the district and arterial roads linking the local system to the city are not built. The electrical system is not affected by this problem since connection charges and tariffs are meant to recover system costs.

**In these tables the costs of on-site trunk lines for sewerage and water are introduced at Level VI, and the cost for 'District Roads' (re presenting the same definition) in Level III.

9.34

This practical problem of the funding of major works has influenced the Consultants' strategy for charging, as is pointed out below. It is derived from a concern for the early and successful implementation of the El Hekr and Abu Atwa projects, as is stated in Volume 1, Section 2.

CHARGING FOR COMMUNITY FACILITIES

9.35

In the strategy proposed by the Consultants the capital and running costs of schools, health centres, police, etc. are not charged to the inhabitants. They are assumed to be financed out of the budgets of the relevant Government organisations as is the current practice in all urban development in Egypt. In the project areas the implementing agency only provides the land necessary for these facilities free of charge.

9.36

But what of the infrastructure services which these facilities use? It is general practice for the agency constructing the facility to pay for connections and for the municipal authorities to provide water, sewerage, and road extensions if the facility is located away from existing lines. Thus the costs of these networks attributable to the facility should be calculated and this has been done on an area basis (see Table 9.10

below). Yet for the same reasons as expressed above for major works, the Consultants are concerned that if the municipal authorities do not contribute this share either (1) the particular infrastructure system cannot be built because of insufficient funds, (2) the facility is not built because the necessary infrastructure is not available, or (3) the facility is built but unused because it is unserviced. Thus in the charging and project finance proposals the Consultants have considered the possibility of having to finance these infrastructure shares from the revenues of the implementing agency.

SUBSIDIES

9.37 The question of subsidies, both external and internal, has been present throughout the Consultants' analysis of affordability and provision, but has not been discussed until now so that a clear exposition of the possibilities for self-financed projects could be presented. As shown above, in the absence of subsidies, only about 23% of existing and 21% of new target households could reasonably afford full infrastructure provision. This sub-section attempts to define, given the Egyptian context and the practical realities of the Project Areas the role of subsidies and the best form such subsidies should take.

HOUSING & INFRASTRUCTURE SUBSIDIES IN EGYPT

9.38 Given the present situation in Egypt, a very strong argument can be made for demanding a very large subsidy for any housing infrastructure programme in the Project Areas. In new public housing projects, as represented by Sheik Zeid City which stands less than one kilometre from El Hekr, the effective subsidy on rents is at least 85%*, exclusive of infrastructure costs. Rent control and occupancy rights imply subsidies in the private housing sector, as does the absence of property taxes. Moreover the terms for currently available loans for cooperative and other housing projects are such as to imply as much as 50% subsidies over market rates for borrowing. Since land is usually provided free or nearly free for public, cooperative and employee housing, there is an additional subsidy involved.

*See Ismailia Demonstration Projects Status Report, August 1977.

9.39 The presence of a subsidy is also prevalent in infrastructure provision. Whereas the subdivision law (No. 52 of 1940) requires that costs of sewerage, water and roads be borne by the developer, and by inference the inhabitants, in practice this has only been applied to a small fraction of urban development in Egypt (and not at all in Ismailia). In the formal building sector it is rare that any but plot connections are charged to plot owners and in the informal sector whole sections of Egyptian cities are created deficient in infrastructure, with the Government responsible for all networks. Such is the case in the Project Areas where the existing low standards of water supply and roads have been provided free. More importantly, a tradition has formed wherein the inhabitants expect the Government to continue to provide infrastructure free of charge.

9.40 This 'expected subsidy' situation for infrastructure is largely due to the Government's financing of improvements through non-recoverable allocations in the general annual budget. Because there are so many deficient infrastructure services, funds are 'rationed' by sector and administrative unit, and once spent, are written off. On this basis, it may be asked what should be the equity (per capita) share of the infrastructure budget attributable to the target population. Examination of preliminary estimates of the Ismailia Governorate 5-year budget (1978-82) gives some indication; it appears that a household should be able to claim LE100 for roads and LE275 for utilities*. This amount, if actually allocated and directed to the Study Areas, would finance most infrastructure needs, but it is wishful thinking to assume that this will happen even if 5-year plan estimates are actually allocated to the annual Governorate budget.

*Assumptions as follows: For roads, 80% of budget for Ismailia City, with 60% of households already provided for; for utilities, 60% fir Ismailia City with 60% of households already provided for.

9.41 This prevailing subsidy situation in Egypt is all the more ironic when it is remembered (see above) that the target population represents the poorest 35% of urban Egypt, yet these people stand the least chance of benefiting from the various existing forms of housing and infrastructure subsidies. At present there is a trend in thinking, at the national and even local levels, towards less subsidisation and the establishment of projects which pay for themselves, at least partially. Certainly international advice is strongly oriented in this direction. However, such recommendations do not help change peoples attitudes which are based on precedent and a real sense of 'fairness', ie., 'if they didn't pay, why should we?'.

APPROPRIATE FORMS OF SUBSIDY FOR THE STUDY AREAS

9.42 To finance full provision of infrastructure in the Study Areas, above the amount which the target population can be expected to pay, there are a multitude of subsidy mechanisms that could be proposed. However, any such proposals must respect the following practical constraints:

(1) Most importantly, no subsidy system should be proposed which, if the subsidy is not forthcoming, means that the project as a whole fails even its most limited objectives. This means that the ongoing financial viability of the project should be independent of assumed subsidies. The Consultants feel this is crucial.

(2) Any subsidy should be easy to administer and budget; ie., it should not involve complicated accounting or administrative routines which make it difficult to separate out what is and what is not subsidised. International experience in sites and services projects suggests that, all else being equal, a subsidy is better directed to a once-and-for-all capital outlay that is separately accountable. Subsidies over time, such as subsidised interest rates or user charges, run the risk of financial failure or inferior services unless the source of this subsidy is assured. In Egypt, with many elements of housing and infra-

structure finance undergoing reconsideration, future uncertainty must be considered.

(3) While it is very desirable to relate levels of subsidies to the benefiting household's income, the achievement of this goal should neither prejudice project administration by overburdening it with complicated means tests and policing, nor should such a goal restrict the individual household's freedom of choice. For example, a family should be free to purchase a more expensive or cheaper plot than its income level would indicate, as long as its payment obligations are clearly understood.

9.43 These three practical constraints have heavily influenced the Consultants' proposals concerning appropriate subsidies. The proposals are outlined in paragraphs 9.52 - 9.70 below. However, before proceeding it is necessary to discuss the subject of internal cross-subsidization.

INTERNAL CROSS-SUBSIDIZATION

9.44 Two different forms of internal cross-subsidy are possible in the study areas. The first, termed 'market cross-subsidization', aims at gaining income for the project by the future sale of certain plots within the project area at market prices. Such income would then be used to finance identified infrastructure elements. The second, termed 'settler cross-subsidization', aims at a fractional subsidy of the cheapest settlers' plots through slightly higher rates for bigger or better serviced plots. Both of these types of cross-subsidy are attractive forms of subsidy since they require no dependence on outside funding.

Market cross-subsidization

9.45 With rising land prices in Ismailia (see Volume 2, Section 2) there is an opportunity to realize significant 'profits' in the project areas (particularly El Hekr) by reserving choice sites for future sale. This is a recognition that the project areas will move steadily into the orbit of the general city land market. How much land to reserve for this purpose has been decided more on the basis of site constraints and perceptions of location attractiveness than on a calculation of needed profit*, (see discussion of El Hekr and Abu Atwa site development, Volume 1). Such an exercise is extremely difficult since the future cost of land, while it can be assumed to fall within a certain range, cannot be predicted at all accurately. The amount of revenue generated from these sites could be quite significant; Table 9.9 shows, for El Hekr, the net amount that might be available and, for illustration, what this could finance in terms of full system infrastructure in El Hekr.

*The amount specifically reserved for commercial activities has been estimated from calculation of retail space need: See Volume 3, Section 3.

Settler cross-subsidization

9.46 In the proposed layouts for new areas, plots can be separated into two classes; Class A are those on semi-public ways, and Class B are those fronting on streets with widths greater than 10m. The actual infrastructure costs at full development attributable to these plots

Table 9.9
REVENUE POSSIBILITIES FROM THE FUTURE SALE OF CONCESSION PLOTS IN EL HEKR

Concession Area (m2)	42200	42200	42200
Assumed sale price (LE/m2)	10	20	30
Total revenue (LE)	422000	840000	1266000
Net revenue (allowing 7LE/m2 for infrastructure)	127000	548000	970000
% of El Hekr sewerage network (incl. on-site mains but excl. connections) -or-	9%	39%	70%
% of El Hekr water network (incl. on-site mains but excluding connections)	12%	50%	88%

depend on the assumed percentages of road and utilities network costs which are assigned to one class or the other. In setting these percentage shares, there is the opportunity to decrease the Class A percentage at the expense of Class B, thus 'subsidizing' slightly the former plots, on the assumption that they, being cheaper, smaller, and less desirable, will be more likely chosen by poorer families. The same can be done for existing settlers, but here there is the problem that poorer households do not necessarily live only in the smaller lanes (Class A) or in the smaller plots, nor are all households fronting the major streets (Class B) necessarily relatively well-off.

9.47 A similar kind of cross-subsidization is implied by charging on a straight m2 basis. Smaller plots are thus cheaper than would be expected by charging the true plot share of infrastructure costs, and conversely, larger plots are more expensive.

Other forms of subsidy

9.48 In the proposals for charging and project operation there are minor implied and direct subsidies which it is important to identify here:

(1) The Consultants propose that basic land costs are not charged to participants or to the implementing agency. This policy implies a subsidy from the Government, for there is certainly an opportunity cost for at least the empty land in El Hekr and Abu Atwa. As has been estimated in Volume 2, Section 2, such Government land in Ismailia presently has a base value of LE0.40/m2, which would mean a total value for El Hekr (excluding space for community facilities) of LE280000.

(2) As pointed out in Volume 3, Section 10, the arrangements for seconding administrative staff to the projects imply a subsidy from local Government offices, estimated to be LE9000 annually for El Hekr.

(3) To the extent that settlers will be able to obtain building materials at official prices, there is direct

subsidy to these settlers (if it is assumed that official prices do not reflect market values). See Volume 2, Section 3.

(4) If building loans are made available to settlers, there is an implied subsidy if the loan terms do not reflect prevailing commercial interest rates, including service charges and risk.

(5) A subsidy is implied to the extent that infrastructure provision is financed by loans offered at rates less than the opportunity cost of capital.

PROPOSED CHARGING STRATEGY: PLOT PURCHASE RATE

ROLE OF PLOT PURCHASE RATE

9.49 The charging strategy proposed by the Consultants has been formulated from consideration of all the issues discussed in the earlier parts of this section. It has also been formulated in relation to the role and functions of the implementing agency (see Volume 1, Section 8 and Volume 2 Section 10). Thus before explaining the main points of the charging strategy a summary of the financial role of the implementing agency is in order.

9.50 An implementing agency (called the Project Agency) is to be set up in both Abu Atwa and El Hekr, with control over all lands within its designated boundaries, which includes both existing and new settlements. Each Agency will be financially independent of local government budgets; ie., each will be a self-financing concern. The Agencies' revenues will come from instalment payments for plot purchase (both new and existing settlers), and with this revenue it will finance infrastructure improvements and also various community services. In financing infrastructure improvements it will obtain loans; supplemental income will be available in future years from the sale of certain residential and commercial plots on the open market.

9.51 In effect, the Project Agency will be undertaking infrastructure improvements over time, to the best of its financial capabilities. How much of total infrastructure the Agency can finance will depend on how much it charges for plot acquisition, but it will also depend on future factors which cannot be quantified at present. Thus one of the essential features of the Project Agency will be its ability over time to take decisions, and to quickly invest its own revenues in infrastructure.

9.52 Both new and existing settlers will be required to 'purchase' plots through instalment payments, which when capitalised at 7% is equal to the 'price' of the plot. This price, or rate, has been calculated as follows: From the above analysis of ability to pay it is evident that infrastructure elements related approximately to Level III of provision (for both new and existing settlers) are the most that settler households can afford. The implications of this situation are fundamental: that the costs of water-borne sewerage and full water supply (which must be provided together) are not to be charged, and that in effect only a 'minimal' level of infrastructure can be supported, ie., marked

and surveyed plots, water from standpipes, electricity to each plot, landscaping, and a good but variable standard of roads. The total costs of these elements on a project-wide basis were investigated in detail to see what actual plot purchase rate would need to be charged. These results were then re-tested against client affordability, and the process was repeated to arrive at a practical infrastructure programme which could be supported by revenues from plot purchases. In this process, considerable attention was paid to the real problems of staged infrastructure provision as implied by this strategy.

DERIVATION OF PLOT PURCHASE RATE

9.53 To make this analysis (or process) clearly understood the method of deriving the rate to be used for the El Hekr Demonstration Project is presented as an illustration:

9.54 (1) First, the total capital costs of the minimal infrastructure programme were worked out, element by element, as shown in Table 9.10. Running costs were capitalised, and care was taken to include all costs which the Project Agency would be likely to meet, assuming that no elements would be financed by external sources. For example, the costs of levelling and landscaping all public open areas are included, as are main (district) roads, even though these are properly the responsibility of the City Council.

Table 9.10
CAPITAL COSTS OF MINIMUM INFRASTRUCTURE PROGRAMME: EL HEKR
(Equivalent to Level II, all costs LE 1977)

Item	Total Cost	Share of Total Cost Attributed To:-			
		Existing Settlers	New Settlers	Concession Plots	Community Facilities
1) Administration (incl. capitalised running costs)	94900	55990	34165	4745	-
2) Compensation	26550	14660	8560	1330	2000
3) Markers (including surveying)	38850	2100	32110	3940	700
4) Levelling	18400	13060	4780	560	-
5) Standpipes	202165	110000	69000	7500	15665
6) Stage I local roads	246810	150500	81310	5000	10000
7) Stage I district roads	200290	106370	64905	9015	20000
8) Landscaping	45000	26550	16200	2250	-
TOTAL	872965	479230	311030	34340	48365
Share percentage	100%	54.9%	35.6%	3.9%	5.5%
Adjusted share percentage	100%	62.7%	37.3%	-	-

9.55 (2) These capital costs were broken down into the shares that should be attributed to (a) existing settlers, (b) new settlers, (c) concession areas, and (d) community facilities. This breakdown was made on either a net surface area or plot basis, depending on the nature of the capital element. (see Table 9.10).

9.56 (3) The total cost of these elements represents the minimum capital responsibility of the Agency, and this total was related to the total revenue-generating surface area of El Hekr, and a base cost per square metre was derived (keeping the distinction between existing and new plots), as shown in Table 9.11. It should be noted that in this table these costs are all assigned to settler plots, even though a share should go to concession areas and community facilities. This implies that settlers are paying for costs of infrastructure elements which are not their proper responsibility (approximately 10% of total costs). Also, it should be noted from Table 9.11, item 5, that the total revenue-generating area has been increased by 21.1 hectares for existing plots. This is because of the street rationalisation programme in existing areas creates an additional 21.1 hectares of useable space, and this additional revenue-generating areas has been apportioned equally to new and existing plots.

9.57 (4) The 'minimum' plot purchase rate per m2 (from item 7, Table 9.11) was set against the range of plot sizes to give, for new and existing households, an indication of the percentage coverage based on the ability to pay assumptions described above. Particular attention was paid to the poorer households, and in estimating their ability to pay the following factors were considered:

(a) For existing settlers: Each household was assumed to commit 7% of its annual income for superstructure improvements and 13% for infrastructure and other 'shelter' goods (same assumption as used in paragraphs 9.12-9.15 above). Out of this 13% each household must pay for electricity connections, rates and the running costs of pit latrines, with the remainder available for the plot purchase charge. In calculating the burden of the plot purchase charge it was assumed that the poorest households do not live on plots greater than 140m2; those few who do live on larger plots can opt to reduce their plot size or, if they wish, pay the higher rates associated with large plots. Finally, it is assumed that the poorest households will select the most advantageous payback terms, ie., the 30 year payback.

(b) For new settlers: Each household was assumed to commit LE210 minimum for superstructure (as above in paragraphs 9.12-9.15); they must also pay for electrical connections and rates, and also build a pit latrine according to Agency specifications. After these commitments, the residual of 20% of annual income is available to meet the plot purchase charge. It is assumed that the poorest new settlers will select the smallest (cheapest) plots, and also that they will opt for the most advantageous payback terms, ie., 30 years.

Table 9.11
EL HEKR: DERIVATION OF THE PLOT PURCHASE RATE

	Attr'ble to existing settlers	Attr'ble to new settlers	Total
1) Capital costs of 'minimum' provision (from Table 9.10)	547631	325334	872965
2) 15% contingency	82144	48800	130945
3) TOTAL	629800	374100	1003900
4) Base revenue area (m2)	771500	365700	1137200
5) Additional revenue area (m2)(see text)	21100	-	211000
6) TOTAL (4+5)	982500	365700	1348200
7)'Minimum' plot purchase rate (3÷6)	0.641 LE/m2	1.023 LE/m2	0.745 LE/m2
Cost of additional infrastructure:			
8) street lighting	79570	50970	130440
9) stage 2 roads (including 50% write off cost of stage 1 roads)	433600	182500	616100
10) 15% contingency	65040	35020	100060
11) ADJUSTED TOTAL (3+8+9+10)	1208000	642600	1850600
12) ADJUSTED PLOT PURCHASE RATE (11÷6)	1.230 LE/m2	1.757 LE/m2	1.373 LE/m2

(all costs in 1977 LE)

9.58 (5) These calculations showed that the minimum plot rate could be afforded by all existing households and roughly 85% of new households. This raises the question, by how much could the base plot rate be raised and still be afforded by a reasonable majority of households? It is very important that the Project Agency be able to cover more responsibilities than those implied by the minimum rate. (The 15% contingency included in Table 9.11 is only meant to cover inflation.) Thus an iterative process was carried out, adding different capital elements to the minimum programme, and then testing the impact on affordability. It was finally necessary to establish a limit (or target) for the percentage of households which could afford the programme. As has been pointed out repeatedly in this section, the affordability percentages are only indicative in the broadest sense. Thus the percentage points cannot be considered firm, and it was agreed that 90% coverage for existing households was acceptable, since this for all practical purposes meant full coverage. For new settlers (who have choice, but also have a greater superstructure burden), it was decided that 75% coverage would be acceptable. New target households in the 25% that are not covered could participate if they have any non-income sources of funds, but there would be some, say 10-15% of the total households, who could not. These households, being extremely poor, would probably not be in any position to finance self-built housing.

9.59 (6) Using the calculations and assumptions described in the preceeding paragraph, the base plot purchase rate was adjusted upward. The additional revenue obtained is shown in Table 9.11. Also shown, for illustration, are infrastructure items which this additional amount could finance. For reasons explained below it may not be possible (or, in the case of street lighting, necessary) to commit this extra revenue to these items. In effect, this additional revenue could be used for a variety of important purposes.

9.60 (7) The revenues to be expected from charging certain settler plots with commercial potential are not included in this analysis of establishing the base plot purchase rate. (See Volume 3, Section 3, for a description of the proposed charging scheme) This is because the revenues obtained are so small that they would not appreciably affect the affordability argument. They have been included, however, in the project financial profiles given in Table 9.12 below. They have been calculated as follows: Class B plots in new areas are assessed a surcharge on the plot purchase rate of LE0.25/m2. These plots, located on streets of at least 10.5m width, represent 48% of all new plots, thus the capitalised revenue gained is LE43880. Class C plots (a small number of plots in prime commercial locations) are to be assessed a surcharge on the plot purchase rate of LE8/linear m. of street frontage. In new areas of El Hekr there are estimated to be 5000m of chargeable linear frontage, plus extra revenues of LE40000, and in existing areas an estimated linear frontage of 6000m2 giving total capitalised revenues of LE171900 for El Hekr from both Class B and Class C plots.

9.61 Before moving on to the issue of project finance, a general observation is in order. The adjusted plot purchase rate for existing settlers is LE 1.23/m2 and for new settlers LE 1.76/m2 (from Table 9.11). These prices per square metre are very 'cheap' when compared to prevailing land prices in Ismailia, as shown in the description of the land market found in Volume 2, Section 2. Furthermore, these prices per m2 translate into annual payments of LE 0.11/m2 and LE 0.16/m2 respectively, and these rates are reasonable when one considers that present inhabitants are supposed to pay annual hekr rents of LE 0.03/m2 to LE 0.05/m2. This hekr rent gives no benefits to the inhabitants, not even secure tenure, so the higher rates of the improvement programme should be acceptable to the inhabitants if they are fully aware of the multiple benefits gained.

9.62 A further general point should be made: the plot purchase rate represents only a fraction of the settler household's total 'shelter' commitment; for the poorest new households it amounts to 20% of the amount for shelter (or only 4% of income), and is progressively a smaller percentage of income as one moves up the income scale. This means that at least 80% of what a new settler is assumed to spend on housing depends on his own priorities and decisions. Given this large degree of freedom of choice, the Consultants feel confident that all target households who wish to acquire plots will be able to do so.

PROFILE OF PROJECT FINANCE

9.63 The above calculations allow a first estimate of the operating budgets of the Project Agencies, particularly for the crucial first years. The resulting financial profiles can be used as a final test of the basic charging rate. As previously, El Hekr has been used here for illustrative purposes.

9.64 During Phase 1 of the El Hekr Project, the minimum infrastructure elements (Table 9.10) are to be installed for all existing plots as well as some 970 new plots, (Neighbourhood 13). At present it is not possible to say exactly what the annual financial position of the Project Agency will be, even for the first year; certain factors can only be fixed (or decided upon) after the project gets under way, for the following reasons:

(1) Total annual revenues are not fixed, even assuming no arrears in repayments; since both new and existing settlers can choose different payback periods, actual revenues can only be known after the registration programme is complete. For the calculations presented here it is assumed that, on average, the 20 year payback option is chosen. It is quite possible that most settlers will pick shorter periods in order to gain freehold title sooner, in which case the financial position (operating budget) of the Project Agency will be improved.

(2) The specific terms of any infrastructure loans to be obtained by the Project Agency are unknown at present. For the present, it is assumed that these loans will be offered at 7% for 20 yrs with a 10% equity requirement; this is the best estimate possible,consistent with guidelines from The Advisory Committee, but it should be realised that more advantageous terms would increase the capital investment possibilities, and the Project Agency, as a Government body, should make every effort to obtain such terms.

(3) The cost of infrastructure items will inevitably vary from estimates given here; inflation will be a real problem, implying that investment in infrastructure should take place as soon as possible. On the other hand the Project Agency will be further investigating the cheapest and most acceptable solutions for infrastructure items such as standpipes and road surface treatment, as has been suggested in Volume 3, Section 7, and there could be significant savings.

(4) There is a possibility (which should be actively encouraged) that one or more of the local organisations will supply or fund some elements of infrastructure during the early years of the Project. For example, the Suez Canal Authority could provide standpipes, or the City Council could provide roads and municipal services. Any such contributions would naturally affect the Project Agency's role in Phase 1.

9.65 Given these diverse factors, it should be clear that the Project Agency, will have to carefully manage its capital programme and relate it to operating expenses. Any operating surplus will become an important aid in this management process.

9.66 Taking these factors into account, the Consultants have been able to derive a model of the simplified 5-year annual financial profile; this is given in Table 9.12. The main features of this profile are as follows:

(1) Large revenues accruing in the first year are due to registration fees imposed on settlers (LE5 for existing plots and LE10 for new plots) and to the obligation on settlers to pay one year's instalment in advance.

(2) It has been assumed, for illustrative purposes, that a second group of new plots (667 plots of Neighbourhood 14) is sold at the start of Year Four, and that these plots are serviced in Year Three from a loan taken out at midyear.

(3) Large infrastructure loans are raised by the middle of Year One, covering the minimum infrastructure programme as set out in Table 9.10. The money obtained from these loans (some LE720000) allows the immediate servicing of all existing plots and the new plots of Neighbourhood 13. (It is assumed that actual costs of this servicing equal the value of the loan; in reality this cannot be expected.)

Table 9.12
EL HEKR PROJECT AGENCY: SIMPLIFIED FIVE YEAR CASH FLOW STATEMENT

Year	1	2	3	4	5
1) Working Capital at start of year	100000	20000	20000	20000	20000
2) Revenues					
Existing Settlers					
- fees	27500	-	-	-	-
- year advance on plot purchase rate	108840	-	-	-	-
- installments on plot purchase rate (assuming to start mid yr)	54420	108840	108840	108840	108840
New Settlers					
- fees	9640	-	-	6770	-
- year advance on plot purchase rate	20505	-	-	13440	-
- installments on plot purchase rate	10250	20505	20505	33944	33944
Sale of concession plots	-	-	-	-	2000
TOTAL REVENUES	231155	129345	129345	162994	144784
3) Expenses					
- administration	7150	7150	7150	7150	7150
- other current	2500	2500	2500	2500	2500
infrastructure loans (starting mid year)					
- equity	71866	-	5880	-	-
- repayment	30525		63553	66053	66053
- project office complex	30000	-	-	-	-
- servicing concession plots	-	-	-	1600	-
- repayment of loan on initial working capital	7000	-	-	-	-
TOTAL EXPENSES	149041	70703	79089	77303	75703
4) Balance	82114	58642	50256	85691	69081
5) Accumulated Surplus	62114	120756	171012	250703	325785

(4) An initial working capital of LE100000 is assumed which is paid back, with interest, at the end of year one.

(5) A nominal number of concession plots are assumed to be serviced in year four and sold in year five.

9.67 At the end of year one a balance of LE82114 is obtained, of which LE20000 is reserved for year two as working capital. The remainder is termed the Accumulated Surplus. As can be seen from Table 9.12, in future years this Accumulated Surplus increases steadily as there is a constant surplus of revenues over expenses. This surplus arises because, while revenues are based on plot purchase rates of LE1.23/m2 and LE1.76/m2, expenses are mostly dervied from the minimum infrastructure programme which is valued at LE0.70/m2 and LE0.83/m2. This Accumulated Surplus gives the Project Agency the opportunity to finance further infrastructure investments: thus in year two it could take out and support over time an additional loan with a maximum value of LE678000 (paying 10% equity) which could be used for a variety of purposes. For example, the loan could be used to cover the following items:

- Installation of full street lighting in the event that the Electricity Board is unwilling to undertake this (cost LE130000).

- Advance servicing of all remaining new plots (cost LE215600).

- Construction of high standard road and sidewalks over the whole site, representing 60% of the full costs of Stage 2 local roads.

Alternatively, the loan could be used for other purposes, such as the endowment of a building loan programme, the installation of piped water to individual plots on an experimental basis (as suggested in Volume 3, Section 7), or the subsidization of pit latrine emptying services. In conclusion, it is important to emphasise that the Accumulated Surplus, when capitalised, gives the Project Agency very significant financial leverage for its improvement programmes;see Vol.1 for explanation of use of Surplus.

9.68 While the Accumulated Surplus could be set aside for the future installation of mains water and sewerage, it would only be sufficient to meet a part of such investment costs; significant subsidies would still be required. This situation is discussed in detail in the following section.

FUTURE FINANCING AND THE QUESTION OF SUBSIDIES

9.69 As shown above, the plot purchase rates only cover a minimum level of infrastructure provision. They do not cover any of the costs of the water-borne sewerage system and only a fraction of the costs of water to each plot. In addition, some of the higher level road provision is not covered. These items are assumed to

be financed, at least partially, by external subsidies. The arguments for such an approach are found throughout the earlier parts of this section and will not be repeated. Here the implications of this strategy are explored.

FUTURE WATER & SEWERAGE FINANCING

9.70 Estimated total costs for the full water and sewerage system in El Hekr are given in Table 9.13. (It should be noted that these totals exclude off-site capacity improvements which are part of the city network.) The Project Agency will constantly pursue all possibilities to obtain outside financing for these elements, but the ability of inhabitants to pay for a proportion has been tested. Using the same affordability assumptions stated above it was found that 63% of existing households and 55% of new households could reasonably afford to pay for water and sewerage connections, assuming instalment financing were available. The 55% of new households able to afford water and sewerage have already had to construct pit latrines; if sewerage were installed before plot acquisition (or at least could be guaranteed to be provided within, say, one year after acquisition), then the proportion able to afford it increases to about 65%. (The implications of this fact on future phasing alternatives are set out below.)

9.71 These percentages imply that in general, plot owners will be able to support the costs of connections for both water and sewerage; they will have to pay for connection charges under prevailing charging practices. The remaining costs of sewerage and water - the reticulation and trunk systems - would still need financing, and, in this, the Project Agency could use its financial leverage to propose a sharing arrangement with outside funding sources. The Agency's available funds in the future are difficult to estimate, but could amount to a maximum of LE1500000 (LE800000 from the sale of concession plots plus LE700000 from the Accumulated Surplus shown in Table 9.12). Thus the Agency could offer to meet roughly between 30 and 55% of the future system costs of water and sewerage, depending on the effects of inflation, and also future market values of concession plots and the possibility of communal labour contributions.

Table 9.13
ESTIMATED 1977 COSTS OF FULL WATER & SEWERAGE PROVISION - EL HEKR

Infrastructure	Water	Sewerage	Total
Connections	573105	884865	1457970
Reticulation Network*	612234	1109287	1721521
On-site trunk lines	370000**	510000	880000
TOTAL	1555339	2504152	4059491

*also termed 'local mains' ie., the proportion of system costs attributable to plots as clarified in the Advisory Committee on Reconstruction's letter of November 15, 1977, no. 699-77.

**excluding system costs of standpipes.

FUTURE ROAD FINANCING

9.72 Although households could be charged for Stage 2 road provision as part of the plot purchase rate (see Table 9.11 above), the problem is that this Stage involves paving many streets that would have to be dug up in order to lay sewerage and water pipes. Thus Stage 2 roads could not be put down immediately, and the greater the delay in water and sewerage installation, the more road funds would be consumed by inflation. In effect this higher standard of roads is tied to sewerage and water provision, and the Project Agency will have to weigh the alternatives as they present themselves. If full financing for water and sewerage networks is obtained, the supplementary funds of the Agency could be fully used to finance a very high standard to streets and pedestrian ways. But if it must devote this 'bargaining capital' completely to obtaining water and sewerage then the financing of these higher standard streets will have to come from its normal source, ie., the City Council.

EXTRA COSTS OF THE STRATEGY OF STAGED PROVISION

9.73 The Consultants are well aware that, by planning for staged future provision of water, sewerage, and roads, certain cost elements of earlier stages must be written off. These have been calculated for El Hekr to be, on a plot basis:

	existing settler plot	new settler plot
Water-borne sewerage; (the pit latrine is written off)	-	LE105.00
Piped water; (a small portion of the standpipe system is written off)	LE0.90	LE 0.90
Stage 2 roads; (a portion of Stage 1 road investment is lost)	LE14.00	LE 12.00

These extra costs cannot be avoided for Phase 1, which includes all existing settlers and 1000 new settler plots. But for future new plot phases, the implications are clear, as is seen below.

Decision point: Future phases

9.74 As soon as Phase 1 new plots are taken up, the Project Agency must decide whether to carry on with the next phases under the same minimal infrastructure provision and the same charging arrangements as used in the first phase, or whether to try a different approach. If at this time sewerage and water mains have been installed in neighbouring areas, the possibility of provision of sewerage and water prior to plot acquisition (or within a year of acquisition) becomes very attractive, as write-off costs are avoided. The actual decision will depend on the financing opportunities, (ie., the situation regarding subsidies and the funds of the Project Agency) for these water and sewerage investments since this will determine the charging burden on the new households. As shown

above, if new settlers are required only to pay connection costs then the situation becomes quite reasonable. However, in a situation where there is ample demand for plots in the next phase and no sewerage and water can be provided immediately, then the Agency policy will be to open up the new area for settlement with minimal provision.

10

Institutional Options

10
Institutional Options

10.1 In this section a background discussion is presented which covers (1) the institutional options considered for administration of the Demonstration Projects, including ramifications of cost and flexibility, and (2) the present and possible future sources of financing for housing and infrastructure, the opportunities for inhabitants of the Study Areas to benefit from these sources, and ways in which the implementing agency may encourage this process.

OPTIONS FOR MANAGING THE PROJECTS

10.2 Given the nature of the projects in El Hekr and Abu Atwa and the present national and local administrative context, there are actually few real management options. One possibility would be to assume that a national level sites and services administration undertakes the running and financing of the projects, such as is the system in many developing countries. There are many obvious advantages to this approach, but unfortunately no such structure exists, nor is there presently a national level body which could be easily modified to undertake, supervise or even encourage projects of the type proposed in Ismailia. The Consultants are aware of current studies under way at the Ministry of Housing and Reconstruction which are investigating alternative housing solutions for low income Egyptians, and are proposing pilot sites and services projects at different locations. Yet the lead time before realisation of these projects under the most optimistic assumptions is too long, and to assume that the Ismailia projects could wait to be assimilated in such a national programme might condemn them to failure. Of course, once established, the Ismailia projects could easily be associated with the 'Low Income Housing Development Unit' which is understood to be proposed at the national level.

10.3 Another option, one which has ample precedent in Egypt, would be to design the projects after the land development company model, such as the Maadi, Helwan and Nasr City companies. As such, project management would take

on the form of a financially independent land developer and subdivider as specified in Law 52 of 1940. Besides the practical problem that such agencies only provide new plots and have no legal capacity to deal with neighbourhood improvements in deficient areas, their record to date shows that development under their administration only provides for middle and upper-income families. Furthermore, they must have firm freehold title to the land being developed, and the statutes governing their operations require such an administrative load that, even if aimed at poorer clients, the resulting land and administrative costs would probably end up excluding even the better-off low income families. Finally, although public sector companies, such entities would by nature seek profits and it is difficult to see how they could be restrained; Government control might be fully applied, but such control as presently legislated does not ensure that development will benefit lower income segments. (In fact, it usually forces the exclusion of these groups).

10.4 Thus, based on their familiarity with local government in Ismailia, the Consultants have evolved administrative proposals which aim at making full use of the advantages of local control (inherent understanding of the problems of the sites, their inhabitants, and the city's development needs) and the advantages of the powers of local government, particularly those specified in Law 52 of 1975. Under this, and prior legislation, it is specified that the Governorate has the responsibility for improvements in the public benefit and for the housing of its inhabitants. Furthermore, the Governorate has the power to establish executive bodies of the form required for the Project Agencies, and is the ultimate authority among all local bodies. Thus the form of administration proposed has been directly linked to the Governorate. The Consultants are under no illusions either that such an arrangement is ideal or that local administration runs with an efficiency which makes the proposals self-evident and easily absorbed. The very concept of the Demonstration Projects is innovative and so is the proposed administration, but it is felt that the design of the proposed Project Agencies strike a balance between project independence of action and strong relations with local government.

OPTIONS IN THE SIZE AND CAPACITY OF THE PROJECT ADMINISTRATION

10.5 The Consultants, in evolving administration proposals, have had constantly to respect one overall constraint; that the larger the scope of activities and services, the larger the staffing needs and the greater the likelihood of bureaucratic entanglements, with the result that administration would assume a greater and greater share of the total budget. It is not uncommon in some sites and services and neighbourhood improvement projects that administration consumes from 20 to 40% of revenues, with the result that little ever reverts back to the supposed beneficiaries. If a project undertakes large scale investments (eg. house-building and full utilities), then its administration can be large without it absorbing an inordinant share of the budget; but if, as is the case of the Ismailia Demonstration Projects, the project is

aiming at lower-scale investments for truly low-income clients, then administration becomes a very important cost, one that, if large, produces the ridiculous situation of the poor (already disadvantaged visavis subsidies and loans) having to support a fat and complacent administration.

10.6 With this in mind the Consultants have designed an administrative structure which is 'lean'; that is, its staffing and organisation is oriented towards the most important business of land development and neighbourhood improvement with a simple, practical capacity for encouraging home-building; (see Implementation Proposals, Volume 1, Section 8). Wherever possible administrative routines and work loads have been simplified so that paper work and confusion (either on the part of the clients or the staff) is kept to a minimum. For example, the proposed registration programme of existing settlers plots is designed to involve the inhabitants themselves in the demarcation and registration process to minimise the need for the Project Agency to survey and arbitrate boundary disputes.

10.7 The cost of staffing can be quite significant, even in Egypt. One advantage of the Project Agencies being Government bodies is that they can to a large extent be staffed by seconded personnel, where the base salary and payments for social security, pensions etc., continue to be paid by the secondment source, with the Agency obliged to pay only the incentive salary. In discussions with local officials, agreement in principle has been reached that all but the managerial level employees would be seconded from local offices. Under this arrangement the Project Agency would provide the incentive pay (normally 50% of base salary) for seconded personnel and directly pay the salaries of the project managers and office heads. This means that, for these crucial positions, the Agencies can recruit highly qualified personnel. The costs of staffing under these arrangements are shown in Table 10.1. These staffing costs represent, for El Hekr, 4 % of revenues at full development; (assuming that existing and new settlers all choose the 20 year payback arrangement and that there are no payment defaults). Other recurrent administrative expenses such as office supplies, office utilities, and transport would increase the administrative expenses to the following proportions of annual revenue:

El Hekr	
Phase I	7.11%
Full Development	5.5 %
Abu Atwa	
Phase I	9.5 %
Full Development	7.6 %

These are only estimates; it is very likely that, as the projects mature (and as experience is gained in administration) the staffing needs will fall off. However, there may be expanded services in the future which would require more staff.

Table 10.1
ESTIMATED ANNUAL STAFFING COSTS

Staff	Project Agency	
	El Hekr	Abu Atwa
Key Managerial:		
Number	3	2
Total salary and benefits @ LE100 per month	3600	2400
Professional:		
Number	6	4
Base salary @ LE300 per year	1800	1200
Professional increment @ LE11 per month	792	528
Benefits @ 30% of base salary	540	360
Incentive pay @ 50% of base	900	600
Clerical/Secretarial:		
Number	13	9
Base salary @ LE230 per year	2990	2070
Benefits @ 30% of base salary	897	621
Incentive pay @ 50% base	1495	1035
Support:		
Number	6	5
Base salary @ LE210 per year	1260	1050
Benefits @ 30% of base salary	378	315
Incentive pay @ 50% of base	630	525
Total Annual Payroll	15282	10704
Project Agency Share	6625	4560
Secondment Source Share	8657	6144

10.8 Of course, in assuming that most staff will have their base salaries and benefits paid by sources other than the Project Agencies, there is an implied subsidy to the projects. This is felt to be a justified position to take, however, when it is considered that many of the functions of the Project Agencies are those which should be the responsibility of local government bodies - land control, registration, local planning, and the provision of utilities, roads, and upgrading. In fact, there is a very good case to argue that all administrative expenses should be paid by local government.

OPTIONS FOR HOME-BUILDING LOANS

10.9 A review of current housing loan and assistance programmes in Egypt shows that there are almost no opportunities for individual home builders to secure long term loans, and that what programmes do exist only benefit the middle and upper income groups (see "Housing Finance in Egypt", MHR/USAID, August 1977). Lending institutions like the Credit Foncier and commercial banks totally ignore the poorer home builders in the informal sector who, if they can find any financing, must pay what are effectively exorbitant rates for short periods from local contractors. Only the General Authority of Housing and Building Co-operatives distributes soft loans (at 3% interest over 30 years) to members of cooperative organisations and sometimes to individuals (through the Governorates) for 'economic' housing. These activities are expected to increase as the GAHBC's operating capital is augumented through deposits from the general budget and the newly formed National Housing Fund, although it is likely that interest charged will increase to near market rates. The inhabitants of the Project Areas could benefit greatly if they could qualify for these loans, but the requirement of freehold title and proper documentation through the building regulation routines makes qualification presently impossible. In any event, these loans can only be used for the 'purchase' of a complete unit and have no relevance to the incremental building systems prevalent in the Study Areas.

10.10 Given the present situation, there is little hope that inhabitants of El Hekr and Abu Atwa can expect any financial assistance from 'outside'. The only chance is that GAHBC lending requirements will be relaxed in the future, or that the GAHBC could accept the Project Agencies themselves as guarantor and administrator of loans. One task of the Project Agencies would be precisely this, to try to obtain for new and existing settlers GAHBC loans on the strength of (1) the delayed freehold tenure status of plots and (2) the guarantee of 'proper' construction of the units to be built. Certainly there is a case to be made for such an approach, including the disbursement of small loans for incremental building on an experimental basis in the Project Areas.

OPTIONS FOR LOAN FINANCING OF INFRASTRUCTURE PROVISION

10.11 In the financial profiles of the Project Agencies presented in Volume 1, Section 8, there is an assumed 'commercial' financing for the earliest infrastructure investments. The Project Agency is in a strong position

to obtain such loans, since it can offer as guarantees:

1) The future repayment profile (revenue statements) of the Agency.
2) The unoccupied plots which are reserved for future sale on the open market.

Such loans could come from the local Ismailia Banks, in particular the newly established Canal Development Bank. However, there is no reason why the Project Agency should not try to obtain softer conditions from the GAHBC; this agency has, to date, not dealt with infrastructure financing, but it should be possible to obtain at least partial financing through the representation of the Governorate. The Governorate does receive annual allotments from the GAHBC for distribution, and it could allocate a part to the Project Agencies.

11

Legal Context

11
Legal Context

OVERVIEW

11.1 This section first presents a discussion of the legal factors affecting the Demonstration Projects by focussing on (1) the tenure issue, (2) those laws which, depending on their interpretation, might cause problems in establishing the Demonstration Projects, and (3) the main laws which will be the basis of establishing and running the Projects. Finally, a short discussion is presented on possible areas of legal reform needed to better cope with the types of urban development found in the Study Areas.

THE TENURE ISSUE

11.2 The vast majority of occupied land in El Hekr and Abu Atwa is considered to be under the hekr leasehold system; that is, it is owned by the State and rented by occupiers. The laws governing this condition are found in the Civil Code, Book Three (primarily articles 870 to 984 and 999 to 1014), but a reading of these laws shows that there is considerable confusion in terms of strict interpretation. For example, whereas Article 874 states that a cultivator or builder on empty State land becomes owner forthwith upon possession, even without permission of the State, this stipulation is contradicted by Article 968, which sets a period of fifteen years of continuous possession as a condition of ownership. Further, Article 974 states that ownership by acquisitive prescription (possession) can be suspended if any cause for suspension exists. Furthermore, the set of articles dealing with hekr rights (999 to 1014), (among which are loss of claim for non-payment of rents, a maximum of 60 years applicability of a claim, and stipulations that rents reflect market values) are stated to apply only to waqf properties after the date of issuing this law (presumed to be 1948). Thus recourse to the Civil Code does not clarify the rights of existing inhabitants. However, as stated in Article 1 of the Civil Code, in the absence of a provision of a law that is applicable, the Court will decide according first to custom. 'Custom', in Ismailia at least, is defined by

the operations of the Amlak Department (muslaha al amlak al miri) and the regulations they follow as part of the General Organisation for Land Reclamation. For areas inside the City Council boundaries similar control is excercised over 'hekr' lands by the Housing Directorate. Thus the Consultants have based their understanding of tenure rights on the operations of these bodies and, as far as proposals are concerned, have first ascertained the reactions of the heads of these organisations.

11.3 Basically, in the Study Areas, existing inhabitants are to be offered delayed freehold title to their plots upon payments over a certain period. Actual title will be delivered at the end of the period, and for the duration of the period they have the status of lessee of their plots. This arrangement has been provisionally agreed upon by the responsible officials. The only complication is that not all claims by existing inhabitants in the Study Areas have the same force. Those with long standing occupation, formalised by registration and payment of hekr rents, have the strongest claim. Those of varying lengths of occupation without formal registration have less claim, and recent settlers (post-war) have the least. (For a discussion of the tenure status of land in the Study Areas, see Volume 2, Section 2). The Consultants have adopted the policy that all occupiers, whatever the length of occupation, should have their claims respected unless removal is necessary for street widening, or public facilities. The only occupiers' plots which are not respected are those who have built on empty land in the last year in contravention of the Governor's Administrative Order 402. Occupiers must be compensated for buildings that are removed and these occupiers have priority in the selection of new plots. To reflect the greater claims of long-term, registered occupiers, these households are to be given a credit against their payments equal to three times the value of hekr rents paid to date.

11.4 Before proposing the delayed freehold system for existing and new settlers, the Consultants considered the advantages and disadvantages of all possible forms of tenure that could be offered. The choice varied from immediate freehold, delayed freehold to leasehold of different terms. The main issues and considerations which affected the choice are as follows:

SECURITY OF TENURE

11.5 To give maximum incentive to settlers to invest in and upgrade housing, secure tenure, ie., inalienable freehold, is preferred. Leasehold runs the risk of being construed, in the eyes of the inhabitants, as a loss of future control of their plots and, most importantly, the loss of the future right of sale at market values.

CONTROL OF DEVELOPMENT

11.6 In theory, leasehold gives the Government maximum control over development. However, since the Study Areas are to be planned communities there is little need for future 'control', at least in the sense of expropriation. If by 'control' is meant control of building activities, it is

actually pure freehold land which, through existing building regulations and building permits, is under the strictest control. Certainly, however, leasehold tenure has the advantage of the possibility of higher rents in the future to either finance improvements or to recoup benefits due to general urban development.

POLITICAL TRENDS

11.7 Presently in Egypt freehold title is becoming a more and more common aspect of housing and land development; it is now the main strategy in public housing units and in new cities development. Thus any proposals recommending a leasehold system would run counter to this trend and would need a range of legal and institutional controls which are not now in existence.

SPECULATION ON THE LAND

11.8 As the main goal of the projects is the rapid creation and expansion of suitable housing for low-income families, it is important that land speculation and under-building is discouraged. As shown in Volume 2, Section 2, there exists a vigorous freehold land market in Ismailia and, equally as strong, a 'shadow' and unofficial land market for hekr leasehold land. Thus outright freehold without controls would give the settler full rights to enter the market rather than to simply build, and leasehold would only reinforce the existing 'shadow' market. Delayed freehold, with conditions of contract as proposed in Volume 1, will keep plots off the freehold market over the delay period, and will also discourage plot exchange on the informal market.

ENSURING PAYMENT

11.9 Of all the tenure choices, delayed freehold gives the greatest incentive to the settler's compliance with payment conditions over time. Without strict, costly, and onerous controls and supervision, payment default under either immediate freehold or leasehold is likely to be common.

POSSIBLE LEGAL PROBLEMS

11.10 In the establishment and running of the Demonstration Projects the following legal points may, depending on interpretation, be problematical:

CONFORMITY WITH SUBDIVISION LAWS

11.11 Since in El Hekr and Abu Atwa certain new streets are proposed with widths less than ten metres, this is in contravention of Article 4 of Law 52 of 1940. However, this limit can be reduced through the issue of an executive regulation (Ministerial Decree in this case), as is suggested by the Advisory Committee for Reconstruction's letter of December 13, 1977 and as is provided for in Article 2 of Law 29 of 1966. It is worth mentioning in this regard that recent Government projects have disregarded this provision of the law; many of the streets in the 'workers' district of Sheikh Zaid City, a project of the MHR, are less than 6 metres in width.

11.12 Another provision of the subdivision law requires that at least one-third of the total area be allocated for roads, squares, gardens, parks, and other open spaces of a similar nature (Article 5). In the new areas of El Hekr and Abu Atwa less than this third is provided strictly for this kind of open space, but when open spaces associated with schools and other public facilities are included 'open space' exceeds one third. Thus the projects are in compliance with the law if this looser interpretation is applied.

11.13 Another condition of the subdivision law states that buildings may not occupy more than 60% of the parcel (60% plot coverage), whereas in the Demonstration Projects as much as 80% is allowed on some plots. As with street widths, by executive authority (Ministerial Decree) this 60% limit may be increased, and such a decree should be issued (See Volume 1,Section 8).It is in fact extremely common to find 'legal' buildings in subdivided areas of Egyptian cities with plot coverage approaching 100%.

CONFORMITY WITH THE BUILDING REGULATIONS

11.14 The building regulations (Law 106 of 1976 and, until modified, Decree 169 of 1962) apply in part to the individuals who will be building on new or existing plots in the Study Area. Law 106 of 1976 specifies the coverage of the regulations and the legal routines, and in doing so requires all construction exceeding LE 5000 in value (or repair exceeding LE 5000 in one year) to obtain permission (valid for one year) from the Housing Committee as a pre-requisite for a building permit. All construction or modification of buildings, whatever the cost, must be preceded by obtaining the building permit from the administrative committee responsible (Article 4), and permits are not given for buildings which do not conform with the general and technical specifications as set out in Decree 169 of 1962. Nor are they given without proof of freehold title to the land, nor without technical documentation and fees.

11.15 In effect, all existing construction in El Hekr and Abu Atwa is illegal, and new construction will by definition be illegal, unless delayed freehold is accepted as sufficient title to the land. As discussed in Volume 2, Section 4, 'Housing', the kinds of building processes in the Study Areas cannot conform with these restricting and formalised legal routines,and the inhabitants cannot hope to afford to follow all the requirements. What they can follow, with little difficulty, are simple specifications and guidelines for construction. In the implementation proposals in Volume 1 these are presented as conditions of plot acquisition. Of course, any inhabitant wishing to obtain a building permit is free to do so, thereby qualifying for building materials at official prices.

11.16 The specifications and guidelines for construction given as part of the conditions of contract (Volume 1, Section 8) are meant to achieve roughly the same goal as the regulations of Decree 169 of 1962; they are in the spirit of the law. Lighting,ventilation, limiting overcrowding, public health and safety are considered, but

simply stated in ways that are easy for the inhabitant or local contractor to follow. To these stipulations are to be added technical advice from Project engineers and the availability of model diagrams, thus further encouraging desired building processes.

BRIEF OF LAWS SERVING AS A BASIS FOR THE DEMONSTRATION PROJECTS

ESTABLISHING THE PROJECTS IN ABU ATWA AND EL HEKR

11.17 The establishment of the Projects, as set out in Volume 1, Section 8, will be based on executive orders published by the Governor with approval of the Governorate Local Council. A reading of the duties and responsibilities of the Governor and Local Council as specified by Law 52 of 1975 shows that these projects, which deal with public benefit and local development, and particularly with public utilities and local services, are the appropriate concern of the Local Council and Governor (Articles 8 and 9, and particularly Article 13, points 2, 3, 4, 5, 8, 9 and 12, and Article 14, points 4 and 5). The only uncertainty is the lack of a specific power to create an entity which is self financing; however, Article 37 and Article 38, points 2 and 3, allow the establishment by the Local Council of an account for local services and development for the purposes of increasing the level of performance of the local public services, and for the completion of projects for which Governorate funds are insufficient. It may, following discussions with the appropriate officials, be necessary to request a Ministerial Order from the Minister of Local Administration to allow an independent self-financing capacity.

ILLEGAL SUBDIVISIONS (LAW 29 OF 1966)

11.18 The Project Areas of Abu Atwa and El Hekr are illegal subdivisions as defined by this law, and Article 3 provides for the authority in charge of planning (the Governorate) to provide deficient public services and to collect the costs of providing for these services from the landowners or occupants by administrative procedure. As above, the use of this provision may require a decree of the Minister of Housing and Reconstruction.

11.19 It is worth noting that similar provisions for the introduction of utilities and roads to deficient areas exist under Law 259 of 1956, with costs apportioned to benefactors according to their plots' surface area (Article 3).

BETTERMENT TAX (LAW 222 OF 1955)

11.20 This law could be used to charge beneficiaries for improvements, but only for sewerage, drainage and roads, and to use revenues to finance these improvements. The main problems are the tremendous administrative load necessary to assess payments, as such payments are to be based on 50% of the increased value of properties (within specified distances from the improvement) resulting from the improvement, and thus require

evaluation of property values and their expected increases, on a plot by plot basis. The Law itself is not clear on how payments actually finance the development; it is only stated that collection of charges forms one of the financial resources of the City Council and thus seems to be aimed at recouping costs of works already completed. Since at present parts of the Study Areas are outside the City Council boundaries (though expected to be revised in the future), it is not clear that the City Council could undertake these assessments, even if it had the administrative capacity to do so.

11.21 This betterment tax could best be used in the future as a mechanism to force payments for improvements from plots owners who do not agree to pay through a voluntary system, as would probably be used for sewerage provision. Thus instead of a general application of the betterment tax, the use of it as a 'negative incentive' in certain cases is felt to be preferable.

EXPROPRIATION (LAWS 577 OF 1954 AND 27 OF 1956)

11.22 Expropriation procedures and compensation for real property in the Study Areas are relatively straightforward, according to Law 577 of 1954. As above, however, property owners should if possible be encouraged to cooperate voluntarily. The expropriation power should only be used as a 'negative incentive', since the administrative routines and necessary legal steps are burdensome.

11.23 It is worth noting that Law 27 of 1956, which provides for expropriation for planning purposes in residential areas, contains a section dealing with the sale of excess lands resulting from the planning process (Articles 19 to 21). The stipulations for sale of this land, the recovery of improvement costs, and the priorities of owners of nearby expropriated property in the purchase of these plots, are all basically in agreement with the proposals concerning these issues found in Volume 1, Section 8.

ESTABLISHING AND OPERATING INDUSTRIAL AREAS

11.24 Law 28 of 1949 provides for the designation of industrial zones in and around cities, and specifies that expropriation under Law 577 of 1954 can be used to acquire the necessary lands. The designation of a zone can be made by Governor's order after approval of the Local Council, (Law 52 of 1975) and this order can also specify the range and types of industrial establishments to be located in the zone. As such, the existing laws are sufficient for the establishment of the Nifisha Light Industrial Area.

11.25 Restrictions on noxious use and industrial effluent are provided for in Law 453 of 1954, and these provisions are adhered to in the design and operating guidelines of the Nifisha Project.

11.26 There is no specific legislation which defines the self-financing ability of an industrial project; it is understood that, normally, investments in roads and utilities

for an industrial area would come from the Governorate's general budget or, in the case of projects sponsored by the Ministry of Industries, from the funds of this Ministry. However, it should be possible to set up an independent account for the Nifisha area within the Governorate; whether or not this will require a Decree of the Minister of Local Government is not at present known.

THE DRAFT PLANNING LAW

11.27 The draft planning law, if ratified, will be a welcome aid to the operation of the Demonstration Projects since it:

- Gives legal status to Master Plans.
- Allows the designation of specific areas for sub-division in the public interest by public agencies (Article 8).
- Formalises the responsibilities of the Local Councils, the MHR, the Governorate and Municipal Councils with regard to urban development projects.
- Explicitly defines the methods for the establishment of industrial areas (Articles 23 to 29)

Even so, the promulgation of this law is not a pre-requisite for the establishment of the Demonstration Projects in Ismailia, as should be evident from the above discussions.

INDICATIONS OF THE NEED FOR LEGAL REFORM

11.28 In the study of the needs and problems of development in the Study Areas, the Consultants have become aware of certain legal areas which are in need of re-definition and reform. Any such changes would require a serious study of all legal ramifications and thus demands an effort far beyond the scope of the Demonstration Projects. Yet the kinds of development observed in El Hekr and Abu Atwa are representative of a very popular phenomenon in urban Egypt, one which must be controlled and, moreover, encouraged as one approach to the solution of the housing problem.

11.29 The following are areas to be investigated:

1) New legislation is needed to define and control development on empty Government land. The Articles of the Civil Code, visavis rights or possession, must be recognised to allow more Government control and to clarify the claims process.

2) Linked to (1) above should be new legislation which aims specifically at providing improvements to infra-structure for existing settlers on Government land, with a clear mechanism for charging for improvements within an overall policy of neighbourhood and housing improvement for low-income families. The conceptual bases for such legislation already exist in spirit (Laws 222 of 1955, 29 of 1966, and 27 of 1956), but a clear statement is needed of tenure rights along with a realisation that most occupiers are low income families.

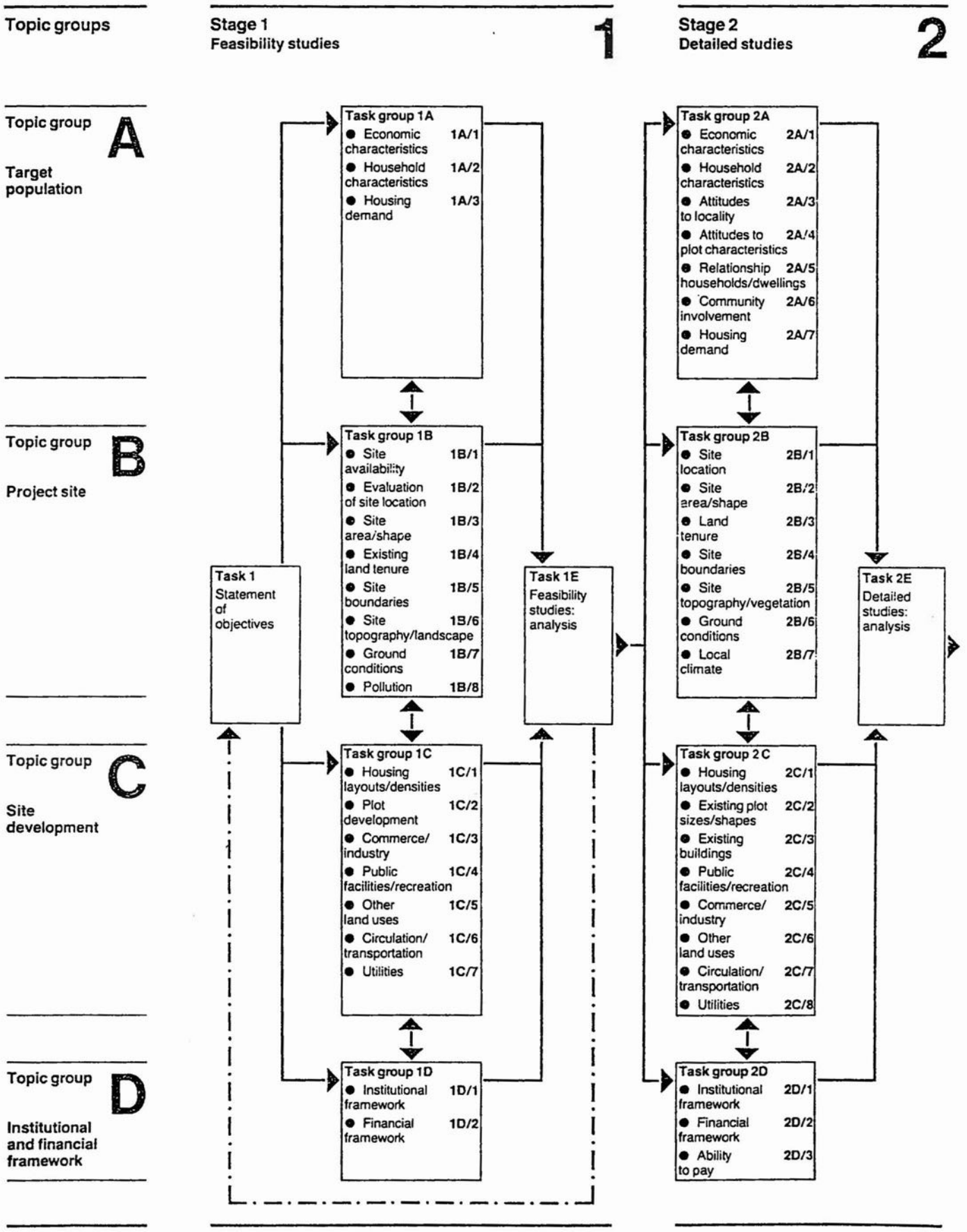
3) In new areas where sites and services projects for

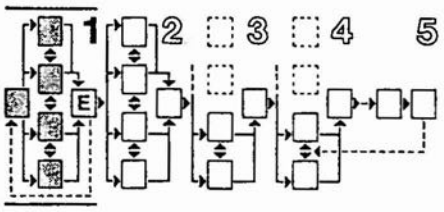
low income families are possible, new legislation is needed which sets out the designation process and administrative responsibilities, which allows modified standards of subdivision (Law 52 of 1940), modified and simplified building regulations, specialised building loan and building materials supply programmes for incremental building, and concrete tenure arrangements. Also, project financing mechanisms should be specified and linked to local administrative responsibilities.

11.30 Whereas the above suggestions may seem to imply a radical reform of existing legal structures, it in fact would be limited to specific development areas, with the existing laws still applying to 'normal' urban development, ie., planned areas of cities under freehold ownership and new middle and upper income developments of the Maadi and Nasr City type. The fundamental policy behind such legal reform would be a recognition of the need to encourage the informal building sector as the best solution to the housing problem for low income families. Certainly the precedent has been set by recent legislation such as Law 107 of 1976 and, particularly, Law 49 of 1977, in that the Government has recognised that legislation which directly stimulates the provision of low-cost housing is needed. Such legislation would, in fact, allow the minimum levels of control necessary for public health and well-being to be excercised in a sector which at present operates outside the legal system.

Manual framework

The framework shown here is the key to the organisation of material in the Manual. It is based on the work sequence likely to be undertaken in project preparation, but is, of necessity, a simplification. Not all Tasks and Task groups shown in one column will be carried out at exactly the same time, but there should be the maximum of co-ordination between those working on different Tasks. It is vital that co-ordination occurs during analysis, selection and implementation.





Task 1E

Feasibility studies: analysis

How can the analysis of project sites and proposals be made? In view of the range of points described in the previous Tasks, there can be no simple answer and methods should be related to local experience and resources. Wherever possible, however, expensive methods such as computer modelling should be avoided, since the decision on feasibility can only be as accurate as the information on which it is based and that will generally be provisional and incomplete.

Of possible methods, the tabulation of information against a checklist provides a simple and useful way of:

- Making sure that all the relevant points are covered.
- Forming a basis for comparing information from different sites, where a choice is being made.

A checklist has to resolve the problem of *rating* each point, that is, how will it achieve project objectives. Some points are also more important than others, and that in turn raises the problem of *ranking* them in order of importance.

In using the checklist, a simple five point rating system can be used. One method is as follows:

++ Indicates that a point is very favourable to a project.
+ Indicates that a point is favourable.
+ – Indicates that a point would not create any particular problems.
– Indicates that a point would create some difficulty.
– – Indicates that a point would make the success of a project very difficult to achieve.

The checklist cannot attempt any ranking of the various points, since the relative importance of each will vary with local conditions. Reducing the list of points to the minimum will, however, make comparison easier.

For clarity, the checklist should follow the Task sequence in the text as closely as possible. Where there is any doubt concerning the rating of any particular point, reference can be made to the appropriate part of the text.

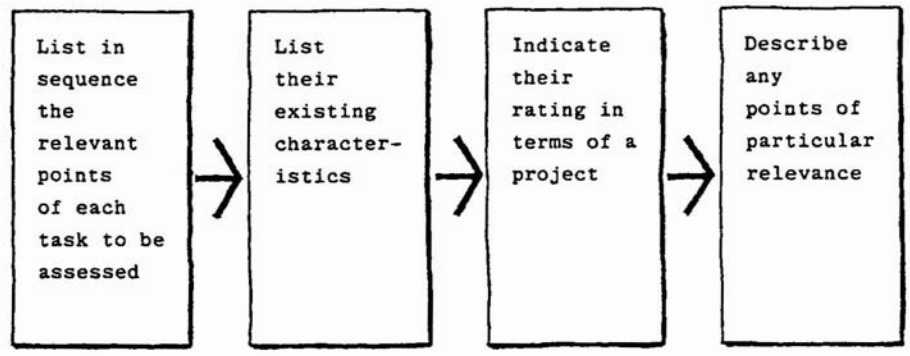


Figure 11
Preparation of feasibility study checklist

The checklist can be organised as shown in Figures 11 and 12.

This anaylsis is, of course, only a pre-liminary one. *The rating of each Task will indicate the degree to which a project is likely to succeed. The possibility of the target population being able to afford project costs is probably the most critical test.*

If the analysis shows the most important elements favourable and a minimum of unfavourable assessments, it would suggest that the project site and proposals being considered are feasible. Where there are more than one site or set of proposals, the analysis will indicate the combination most likely to produce a successful project. These can then be submitted for approval to the authorities. Once this is obtained, work can begin on the Tasks described in Stage 2.

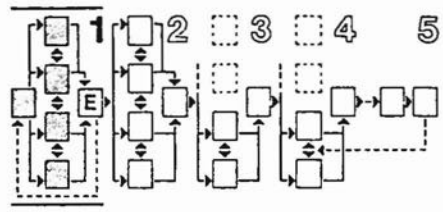
If the analysis shows that, on balance, the project site or proposals are *not* suitable, it will be necessary to establish the reasons. In most cases, one or both of the following may be responsible:

- The site is unsuitable. This may be because the land cost is too high, the amount of work needed on it may be too expensive, or there may be a large number of tenants living on it, making upgrading more difficult. If this is the case, it is likely that another site will need to be selected, unless a subsidy is available.
- The proposals are not suitable. This may well be because they cost more than the target population can afford to pay or do not reflect adequately its housing needs. If this is the case, proposals should be modified until they *are* suitable. The same exercise of relating them to the project site and the resources of the target population will then need to be repeated.

If subsequent reviews suggest that the project may become feasible, it can be submitted for approval to the authorities. Should the analysis show that despite modifications, it is still unlikely to be feasible, it should be abandoned and an alternative site or set of proposals chosen. The only possible exception could be if the cause is excessive costs due to abnormal local factors, such as flood prevention requirements, high land acquisition costs or landfill. In such cases it may be considered appropriate to subsidise the project sufficiently to offset the extra costs (any larger subsidy would, of course, reduce the funds available for other projects). The analysis should enable a preliminary estimate to be made of the subsidy that may be required and an indication that this is available will be essential before approval can be given for the project to proceed.

Figure 12 (*right*)
Checklist for analysing project feasibility and /or selecting sites

Example of sheet used in selection of El Hekr site, Ismailia



NUMBER	CRITERIA	++	+	+−	−	−−	COMMENTS	REFERENCE TO MANUAL TASKS
1	Sufficient size of area	●					Sufficient area for Demonstration Project both new and upgrading, its future stages, necessary relocations and services, population of existing area 20 000	1B/3
2	Local concentration of diverse employment (including low skill)			●			Some in older section of El Hekr more in adjacent Arashia and bazaar area 1 km (15 minutes walk) away	1B/2
3	Proximity to main concentration of diverse employment in the city (including low skill)	●						1B/2
4	Proximity to specialized employment centre			●			Limited, more in adjacent area (5 to 10 minutes walk) or in main bazaar	1B/2
5	Local subsistence shopping			●			0.8 to 1.5 km away (depending on section of El Hekr)	1B/2
6	Proximity to main bazaar of the city		●					1B/2
7	Food purchase from local farmers					●	Practised on limited scale at present	1B/2
8	Possibility of own subsistence farming and animals		●				Most rapidly improving area of the city (Arashia) immediately adjacent	1B/1
9	Proximity to other low income residential areas		●				No constraints. Some relocations may be needed for improved site, layout, services and facilities	1B/5
10	Compatibility with present land uses in the area		●				Insufficient information	1B/1
11	Compatibility with committed land uses in the area			●			Control of urbanisation of El Hekr essential to prevent invasion of future University land	1B/1
12	Compatibility with present surrounding land uses		●				Insufficient information	1B/5
13	Compatibility with committed surrounding land uses		●				Positive mix already existing will be enhanced by new site programme	1B/1
14	Possibility of fine grain social stratification of the section of the city		●				Area of strongest urbanisation pressure in Ismailia	1B/5
15	Agreement with general present growth trend of the city	●					No constraints	1B/1
16	Possibility of continuing directly from present growth	●					Upgrading and new sites programme essential to prevent growth inconsistent with Master Plan	1B/1
17	Agreement with Master Plan		●				Very rapid rate	1B/1
18	Intensity of new construction in the area or adjacent		●				see number 9	1B/5
19	Rate of improvement in the area or adjacent		●				Limited at present, demand evident	1B/5
20	Existing community centre in the area or adjacent		●				Limited at present, demand evident	1B/1
21	Potential of local employment		●					1C/3
22	Off-site (trunk) infrastructure (existing or relative cost of new)			●			Adjacent area fully serviced. Electricity and standpipes within El Hekr	1C/7
23	Public transport (existing or relative cost of new)			●			Main bus terminal about 1 km away - buses to all directions. Demand for service in the area	1C/6
24	Other services (existing or relative cost of new)			●				1B/2
25	Facilities (existing or relative cost of new)			●				1B/2 1C/6
26	Land ownership and tenure		●				Government ownership of open desert land. Hekr leasehold in built-up area	1B/1 1B/4
27	Natural and topographical features		●				Sand desert stabilizes when settled, dry	1B/7
28	Environmental factors		●				Relatively elevated, well ventilated. Generally healthy, dusty on edges on windy days	1B/8
29	Other relevant site constraints and advantages		●				Low density and adjacent sparsely settled land permit new services, relocation and expansion	1B/5
30	Opportunity cost of land			●			Low. Area of proposed new sites being squatted over at present. Will be completely and chaotically settled if no action is taken	1B/4
31	Impact on economic viability (families)		●				Good location in respect to employment and subsistence shopping supports economic potential of families	1A/1
32	Impact on economic viability (project economy)		●				Present rate of construction and improvement in the area assures project viability	1B/2 1C/3
33	Political acceptability		●				No very sensitive decisions (eradication, expropriation, etc.) necessary	1B/1
34	Visibility			●			Largest spontaneous urbanisation in the city. Its control as main step to orderly urban growth	1B/2
35	Demonstration value (typicality of situation)	●					Upgrading of new spontaneous urban area, and guiding urbanisation of open fringe land	1B/2
36	Potential for generating improvement in other areas			●				General
37	Benefits for areas and population beyond the project			●			Services and facilities for new area and first stage of upgrading will benefit entire present population	General
38	Housing tenure (users)		●				Majority owner-builders on Hekr land. Rental demand small but will increase soon	1B/4
39	Housing tenure (owners)		●				Own houses on Hekr land	1B/4
40	Physical improvability of structures		●				Likely to follow improvement process demonstrated in Arashia and oldest section of El Hekr	1C/1
41	Need of property line changes to improve the area			●			Some limited adjustments needed	1C/1
42	Capacity to pay		●				Insufficient information	1A/1 1D/2
43	Willingness to contribute		●				Demonstrated by investments in response to installation of main electricity lines	1A/3

APPLY TO UPGRADING AREA ONLY

++ very supportive/very positive/very easy + supportive/positive/easy +− no problem − some problem/negative/difficult −− big problem/very negative/very difficult