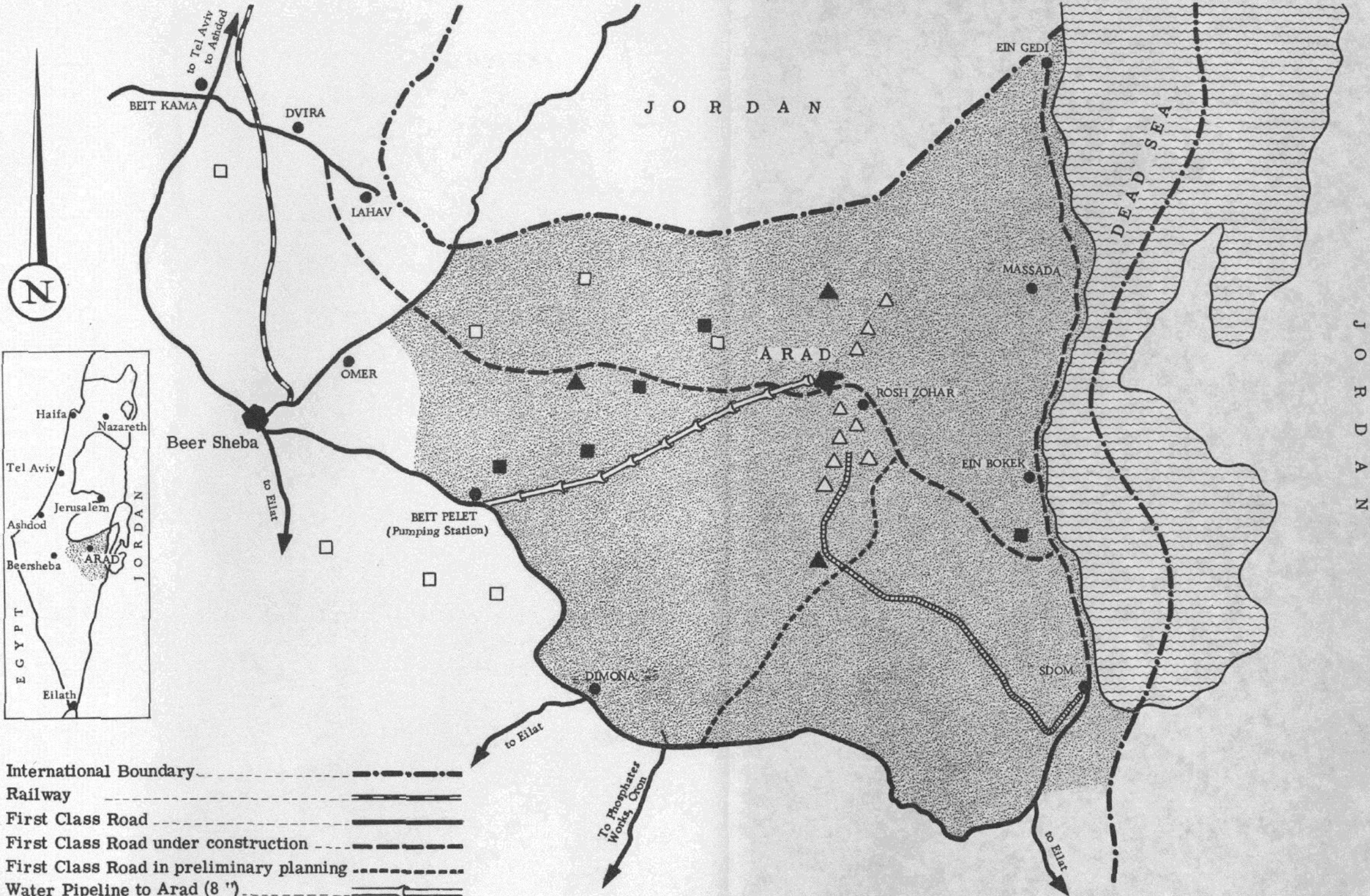




**STATE OF ISRAEL**  
**MINISTRY OF HOUSING**

**ARAD**  
**DEVELOPMENT PROJECT**





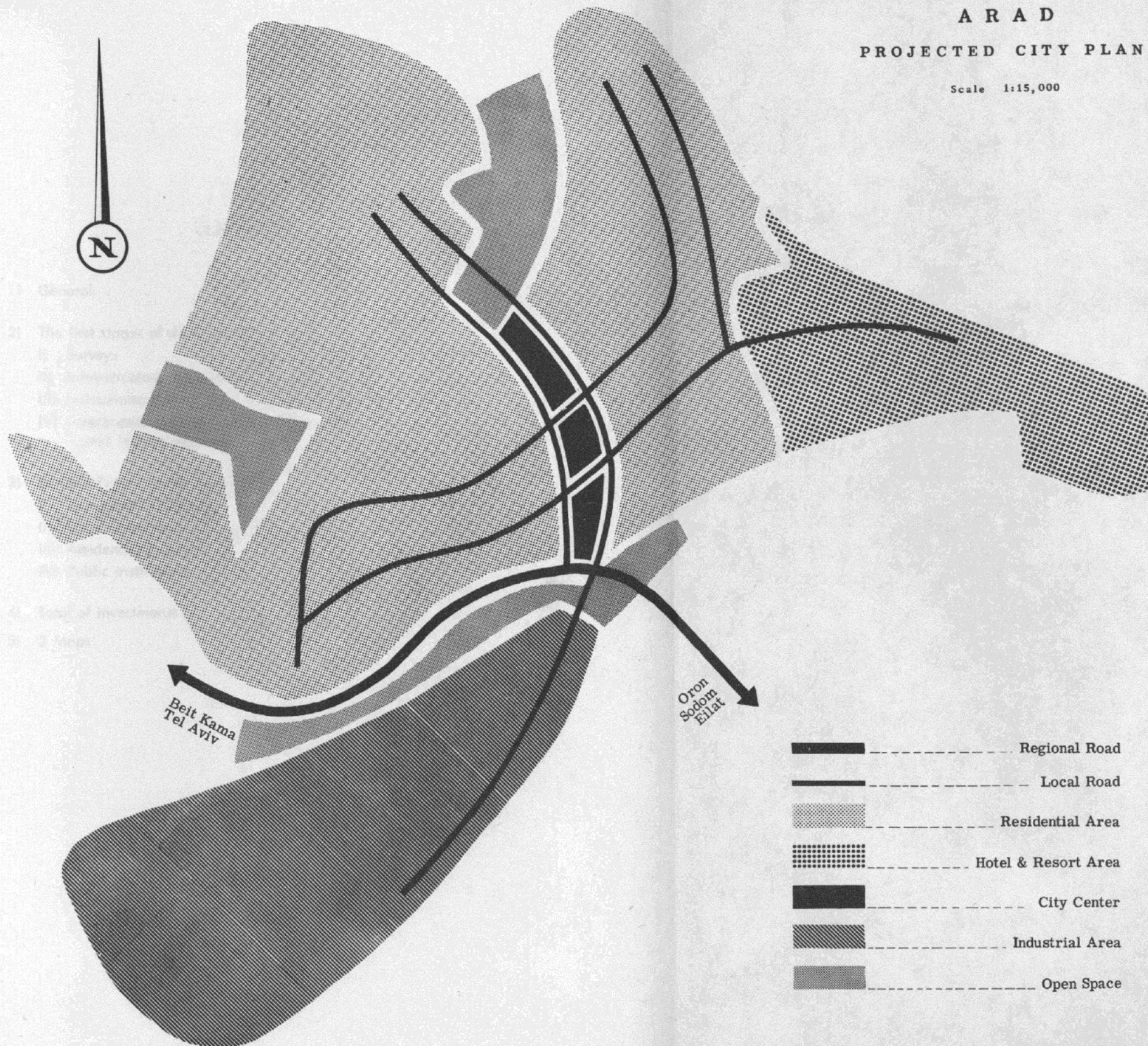
## ARAD DEVELOPMENT PROJECT








### GENERAL PLANNING



# A R A D PROJECTED CITY PLAN

Scale 1:15,000



-  Regional Road
-  Local Road
-  Residential Area
-  Hotel & Resort Area
-  City Center
-  Industrial Area
-  Open Space



## CONTENTS

	Page
1) General . . . . .	3
2) The first stages of development of Arad	
I) Surveys . . . . .	5
II) Infra-structure development . . . . .	6
III) Industrialization . . . . .	7
IV) Investments in infra-structure development and industrialization . . . . .	9
3) Settling People in the Town	
I) Demographic figures . . . . .	10
II) Basic investment . . . . .	10
III) Residential Building . . . . .	11
IV) Public institutions . . . . .	12
4) Total of investments . . . . .	15
5) 2 Maps	

## GENERAL

As part of the Government of Israel's plans for developing and settling the Negev, the southern section of the country, a beginning has been made on establishing the town of Arad.

Arad is situated in the north-eastern part of the Negev. The site of the new town is a point about 15 kilometres west of the Dead Sea, at a height of approximately 600 metres above sea level (i.e. about 1,000 metres above the level of the Dead Sea), in the centre of the region bearing the same name, Arad.

The creation of this new town must be seen against the wider background of the development of the Negev and its riches, the development of industries based on the raw materials to be found there, and the establishment and settlement of new towns. This task of turning the desert into a populated area with all its potentialities exploited is in fact a pioneering undertaking of the first magnitude, which demands a supreme effort, both financial and organisational. It is intended that the first stage be carried out over a period of ten years. This first stage comprises the following basic points : —

A. Ten towns will be established in the Negev expanses. Early on, each town will have 10,000 inhabitants, but in the course of development they will take some 50,000 inhabitants each. In this desert environment, the only development that comes into question is urban development, and a town of less than 10,000 population cannot possibly provide public and economic services on an adequate scale or a satisfactory cultural life

B. The economic basis will be industry. The aim is simultaneous and inter-connected development of heavy and light industry, but since it will perforce take a considerable time to create heavy industries exploiting the natural resources of the area, the main stress at the beginning will be on light industries, which can be established speedily and thereby provide an immediate source of livelihood for the first settlers. An additional advantage of light industries is that they are not influenced to any great extent by the locality and the distances involved. Parallel with this, plans will be made for heavy industries, the establishment of which during the further stages of development will provide a livelihood for more and more settlers at the same time as they exploit the natural resources of each area.

C. The beginnings of heavy industry already exist in the region, and during the first stages of development the expansion of these industries will provide additional sources of livelihood. This is also true of the projects for expanding the Dead Sea enterprises, which will provide extra sources of employment for the inhabitants of Arad.

D. Possibilities of agricultural expansion in this part of the country due to the present scarcity of water availability are limited. As part of the over-all programme it is planned to grow agaves, but these possibilities concern mostly other areas and the suitability of the Arad district for the cultivation of these products has still to be surveyed.



E. Another potential source of employment is tourism, and Arad and its environs come particularly into question here because of their proximity to the Dead Sea. A short while ago medicinal springs were discovered there, and the mild winter climate and the impressive scenery of the region offer an excellent basis for development in this sphere.

The ten-year programme for developing this southern section of the country can be divided into three main parts : —

- I. Infrastructure development of the whole region.
- II. Industrial development and expansion to provide economic foundations.
- III. Construction of the towns.

I. **Infrastructure development** of the region includes :

- a) Supplying water for domestic, industrial and agricultural use, which involves prospecting for new water resources, developing them and setting up a system of distribution.
- b) Supplying electricity, which involves both manufacturing the electricity and distributing it.
- c) Developing communications — building roads, extending the railways, expanding port facilities.

II. **Industrial development** and expansion includes :

- a) Basic industries and heavy industries :
  - Development of natural gas deposits, providing a system of regulation and distribution ;
  - exploitation of the gas deposits for the creation of chemical and petrochemical industries ;
  - expansion of the chemical industries based on the Dead Sea mineral deposits such as bromium, potashium, magnesium, chlorium ;
  - expansion of the existing chemical fertilisers industry based on phosphates, potash and nitrates ;
  - production of chemicals, other than chemical fertilisers, having an admixture of phosphates ;
  - expansion of the Timna copper works.
- b) Light industries using materials found locally, such as gypsum, kaolin, flint, bentonite, quartz sand, marble.
- c) Industries such as those processing diamonds and semiprecious stones ; ceramics, glass, textiles, metal work.
- d) Growing agaves, working it up into sisal, utilising it industrially.
- e) Tourism : providing hotels, developing medicinal springs, preserving and embellishing historical sites, etc.

## The First Stages of Development of Arad

### I Survey

The over-all project is to be carried out in successive stages. The first stage, the creation of four towns of 10,000 inhabitants each, is to take the next three to four years. The first stage covers the execution of some projects, which have already been got under way and others which can be started immediately.

The first of these towns is Arad, the foundation of which has already been laid. The town is being set up, as already stated above, west of the Dead Sea, near the Zohar and Kidod gasfields.

A variety of preliminary researches have already been carried out :

a) Hydrological survey : the site is in the arid region of the country, and the annual rainfall does not exceed 100 to 250 mm. The purpose of the survey was to examine by means of a series of deep borings whether it is possible to find water, at not too deep levels, in quantities sufficient to meet the needs of the population, of industry, and even perhaps of agriculture.

b) Geological survey : The purpose was to discover what quantities of primary materials are to be found in the area, materials such as marble, phosphates, white cement sand, other building materials, china clays and the like. The only survey completed to date has established that there is marble to be quarried in the immediate neighbourhood of the town, in not very extensive quantities but of good enough ornamental quality, black, red and brown, to justify industrial utilisation for tiles and mosaics, and production of marble both for export and for the internal market. The result of surveys being made of other materials will be known in the next few months and together will serve as data for estimating the possibilities of establishing a variety of industries.

c) Climatological survey : The results obtained from the meteorological station at the site of the town are encouraging. On the average, temperatures are similar to those of Jerusalem, that is to say they are not at all extreme or difficult, and prevailing winds are from the west and north-west. Additional meteorological stations are to be set up in the area in the near future.

d) Soil survey : A hundred dunams of agaves have been planted experimentally this year, to test the soil and means of preparing it for growing this plant, which needs no water. It is used for rope-making and has a variety of by-products. The experiment would appear to have been successful, and the plants took root without trouble. The area planted will accordingly be doubled in the coming year, and an experiment will also be made in planting trees.

A population of 10,000 will need some 3,000 dwelling units, besides a variety of institutions like kindergartens, schools, hospitals, clinics, municipal offices, commercial centres, workshops, religious and cultural institutions, etc.



This building programme naturally demands municipal provision of water, sewerage, electricity, roads, sidewalks, etc.

The demographic structure of the town will be discussed in greater detail below.

The planning of the town in all its aspects is being carried out by a team of experts representing all the interests connected with the establishment of the town, such as the Ministries of Finance, Housing, Commerce and Industry, Labour, Interior, Development, Agriculture, the Army and the Jewish Agency. Alongside them work the architects, engineers and administrative personnel. An advance camp has been set up in the area, providing the planning team with 40 Office rooms as well as a hostel for 150 people with a dining room and a club.

During the first stages of planning and execution, this camp will serve both planners and executants.

## II Infrastructure Development

Since the town is part of a wider programme, it must do its share of infrastructure development, which is not only being planned for all the ten towns as a whole but will be carried out from the beginning as a whole.

In the first stage, scheduled to take three to four years, infrastructure development of Arad, charged to Arad itself, will need about \$ 11,9 million, under the following heads : —

a) **Water supply** : The quantities of water needed will be —

for a population of 10.000 — 600,000 cubic meters per annum.

for industry 2500,000 cubic metres per annum.

The supply of drinking water for the population will come from borings in the Beersheba area, piped to the town. The first stage has been the laying of an 8" pipe, which has already reached Arad. It is intended to supply water for industry from borings in the vicinity ; drilling has already begun, but if water is not found in sufficient quantity, water for industrial purposes will also have to be supplied from the Beersheba area.

The investment needed is on the scale of \$ 2,150,000.

b) **Communications** : The construction has already begun of 65 kilometres of road to provide access to Arad from the north and Beersheba, and from Arad to the Dead Sea. This road has been built in part through the most difficult mountainous terrain, and the outlay is estimated at some \$ 85,000 for every kilometre. To complete this road will therefore cost about \$ 5,250,000. Construction of the road has begun from both ends, and up to now a dirt road has been completed over a stretch of about 15 kilometres.

3) **Electricity** : In the first stage, the provision of electricity for both domestic and industrial consumption, and the extension of the regional power line to the



municipal distributor requires an investment of about \$ 2,500,000. It should be pointed out that this figure has been reached on a somewhat theoretical basis, as part of the total sum required for the over-all supply of electricity in the first stages of creating those of the ten towns that come into question. This will be a high-tension line connected at Dimona, extended to the Potash Works on the Dead Sea and thence connected up with the town of Arad.

It is possible that in the first stage of construction, electricity will be supplied from generators, the motor power of which will come from the gasfields near the town.

d) **Tourism** : In this section of our memorandum we shall only recall the need to create suitably attractive conditions, mainly as regards transport and services. Since the cost of building a hotel of international standard is included in outlay under the heading of construction, it can therefore be assumed that under the heading of infrastructure it is enough to earmark the sum of \$ 2,000,000, from which will also have to be financed amenities at historic sites in the environs like Ein Gedi and Massada, development of the medicinal springs at Ein Bokek, etc.

Negotiations are already in hand for the erection of a 40-room hotel. Construction will begin next year, with the intention of increasing its capacity as time goes on.

## **II Industrialisation.**

The first stages of industrialisation for which so far detailed plans have only partly been worked out and should therefore be considered flexible will include :

- 1) a chemical industry based on the gas found in the area ;
- 2) light industries processing diamonds and semi-precious stones, and allied industries ;
- 3) a marble industry ;
- 4) building materials ;
- 5) knitted fashion goods ;
- 6) Workshops.

### **1) Chemical industry :**

The gas found at Zohar and Kidod, natural gas the quantity of which is estimated as equivalent to 2 million tons of petroleum oil a year, opens up possibilities of setting up a chemical combine : the gas is 98% methane, the rest being ethane. The gas will be utilized in successive stages.

Stress should also be laid on the geographical proximity of the gasfields to the phosphate deposits at Oron — they will be no more than 30 to 40 kilometres apart when the road Dimona — Oron is completed. The distance when the road is completed will be no more than 25 kilometres from the Dead Sea installations for potash and other chemical products. This proximity makes it possible to produce compound

fertilisers. The enterprise will employ about 600 workers ; the necessary investment in the first stage sums to about \$ 33 millions.

## **2) Diamond-processing :**

(a) At present the **diamond-cutting and polishing** industry in the country employs about 6,000 persons. In the course of the next three years this number will increase to 8,000 workers, part of them in the southern part of the country. Undertakings planned for Arad will include some six or seven workshops, employing about 400 workers, and requiring an investment of about \$ 300,000. While only large and medium-sized stones have been processed in the country up till now, it is now planned to work small stones as well. There is also an idea of setting up a vocational school in the town, which will train diamond-cutters and attract workers in this field from other parts of the country.

(b) **Machine tools and work tools.** Technological development involves the increasing use of precision tools and instruments. An enterprise is planned for Arad to supplement existing enterprises in Israel, and supply machine-tools for the spinning industry, as well as precision tools for cutting and working diamonds, tools for polishing, drills, etc. This enterprise, in which about \$ 550,000 will be invested, will employ 60 workers.

(c) Processing **semi-precious stones.** The mechanical working of these stones is a relatively simple process, needing only experienced workers. It is planned to set up a branch for this in the trade school. The idea is to establish five or six undertakings, each to employ about 30 workers. The investment needed to create these 200 work-places is roughly \$ 550,000. The products will meet technical needs in the branches of electronics, precision instruments and jewellery.

(d) **Goldsmith and jewellers.** This undertaking, to employ 100 workers at an investment of about \$ 100,000 will produce jewellery, religious objects, souvenirs, objects d'art, etc.

## **3) Marble :**

(a) **Quarrying.** Red, black and brown marble is found in the immediate vicinity of Arad in quantities such that it is economically feasible to start quarrying. The idea is that some 150 workers will be employed, the necessary investment being about \$ 1,100,000.

(b) **Marble processing :** Marble blocks and slabs produced by the quarry will have to be polished and worked up. Moreover, marble dust can be utilised in mosaic form for floor- and wall-tiles, decorative products and objects d'art. An undertaking is planned for these purposes, to employ some 100 workers, and requiring an investment of about \$ 400,000.

## **4) Building Materials :**

It is intended to start producing building blocks, tiles, white cement, and sewerage items. For all of these branches, the discussions that are taking place have already reached an advanced stage. It is assumed that these undertakings



will together employ about 200 workers, requiring an investment of about — \$ 4,000,000.

**5) Knitted fashion goods :**

Negotiations for setting up a branch of this industry in the area are also under way and have reached an advanced stage. It will employ 250 workers, and the investment required is estimated at \$ 2,000,000.

**6) Workshops :**

The town will need some 50 to 60 small workshops : locksmiths, carpenters, painters, tailors, watchmakers, bakers, shoemakers, electricians, plumbers, etc. The investment needed is estimated at about \$ 350,000, and the number of people who will find employment in this way at 200.

Thus in the first stages of the town's development, investment in industrial undertakings and workshops will amount to about 42,350,000 and will provide work-places for about 2,260 workers.

**IV Investments in Infrastructure Development and Industrialisation**

The over-all investment in both infrastructure development and industrialisation in the first years of the programme will then add up as follows : —

**I. Infrastructure development**

1) Water supply	\$ 2,150,000	
2) Communications	\$ 5,250,000	
3) Electricity	\$ 2,500,000	
4) Tourism	\$ 2,000,000	
	<hr/>	
Total		\$ 11,900,000

**II. Industrialisation**

1) Chemical industry	\$ 33,000,000	
2) Diamond-processing :		
(a) Diamond-cutting	\$ 300,000	
(b) Machine-tools	\$ 550,000	
(c) Semi precious stones	\$ 550,000	
(d) Goldsmiths	\$ 100,000	
3) Marble :		
(a) Quarrying	\$ 1,100,000	
(b) Processing	\$ 400,000	
4) Building Materials	\$ 4,000,000	
5) Knitted fashion goods	\$ 2,000,000	
6) Workshops	\$ 350,000	
	<hr/>	
Total		\$ 42,350,000
Over-all Total		<hr/> <hr/> \$ 54,250,000

## Settling People in the Town — The Necessary Building Construction

### I Demographic Figures

There is reason to believe that the demographic structure of Arad will be different from the average in the country. This springs from the fact that the place is far from any big urban concentration, and will certainly attract young people by the employment it offers. From this it would follow that the percentage of young couples will reach about 20, as against the average in the country of 17.8%, and single persons will represent 8% as against the average of 10.8%. Accordingly the dominant age-group will be that from 20—49, which will constitute 60% of the total population as against 40% in the country as a whole. The family unit will comprise an average of 3,5 persons in comparison with the national figure of 3.8 persons.

This difference in the make-up of the population not only determines what institutions are needed, mainly educational ones, but also means that the active labour force will reach 36 to 40% as against the national average of 33%. At the start, this labour force will be employed mainly on construction work, but the percentage of building workers will gradually decrease and that of industrial workers will increase.

The provision of dwellings demands investments under three main, interdependent heads :

- A. Basic investments in developing the town.
- B. Residential building.
- C. Public institutions.

### II Basic Investments

Under this head comes :

- 1. Town and district planning :
  - I General planning
  - II Surveying and topography
  - III Climatic research
  - IV Hydrological research
  - V Geological and soil research
  - VI Geographical research

Estimated total cost	\$ 900,000
2. Regional Highways and road links	\$ 1,100,000
3. Water supply system : pipes, reservoir, pumping station	\$ 600,000
4. Central sewerage system, water purification plants	\$ 460,000
5. General development and preliminary outlay (on the assumption that the local costs of development are included in the unit cost)	\$ 900,000
6. Electricity connection	\$ 300,000
7. Reserves	\$ 300,000
Total	<u>\$ 4,560,000</u>



### III Residential Building

The 10,000 inhabitants that will settle in Arad in the first stage will comprise some 3,000 households, and hence it will be necessary to build this number of apartments within a period of three to four years, in accordance with the town's demographic structure. These apartments will be classified according to standards of building and according to size, and they will naturally, as a consequence, differ in price. On the basis of prices at the beginning of 1961, apartments will be classified according to size and building standards and price, as follows:

No. of Apartments	Size	Standard	Unit Price	Average Price	Total
1)					
250 apartments for single persons			\$ 2,800	\$ 2,800	\$ 700,000
2)					
220 small apartments	(42/55	a	\$ 4,450		
220 " "	sq. metres)	b	\$ 5,115		
110 " "		c	\$ 5,550		
<u>550</u> " "				\$ 5,000	\$ 2,750,000
3)					
440 medium-sized	(60/70	a	\$ 6,100		
450 " "	sq. metres)	b	\$ 6,780		
180 " "		c	\$ 7,060		
<u>1070</u>				\$ 6,550	\$ 7,008,500
4)					
440 big apartments	(70/80	a	\$ 7,780		
230 " "	sq. metres)	b	\$ 8,450		
260 " "		c	\$ 8,720		
<u>930</u>				\$ 8,200	\$ 7,626,000
5)					
200 luxury apartments	(80/100			\$ 11,115	\$ 2,223,000
	sq. metres)				
Total cost of residential building in first stage :					<u>\$ 20,307,500</u>

As already stated, the above prices are based on the level of building costs at the beginning of 1961. They do not include the price of the land, but only the price of actual building and costs of local development.

The differing standards of the apartments indicate various types of tenants : 'a' standard is mainly intended for unskilled workers, 'b' standard for skilled workers. 'c' standard apartments will be for managerial and administrative personnel, university graduates, experts, etc.

It is assumed that about 30% of tenants will buy their apartments, while the other 70% will rent them. People buying their apartments will pay 50% of the price from their own resources, and finance for the apartments for letting will have to be mobilised by the Government. Schematically, the financial picture is therefore as follows :

		Participation of :	
		Government	Occupant
A) Flats for sale :			
30% of \$ 20.307.000.—	= \$ 6.092.100	\$ 3.046.000	\$ 3.046.000
B) Flats for rent :			
70% of \$ 20.307.000.—	= \$ 14.214.900	\$ 14.215.000	—
Total	<u>\$ 20.307.000</u>	<u>\$ 17.261.000</u>	<u>\$ 3.046.000</u>

The Government contribution towards financing the purchase of apartments will be in the form of mortgage loans, repayable in 20 to 25 years, bearing about seven percent interest, but of this interest about one and a half per cent goes to the bank which is responsible to the government for these moneys, and this commission covers the bank's liability, its collection charges, general expenses, etc.

Rents for rented apartments differ according to the social position of the tenant. They range from a "social" rent of 2 to 3% of the value of the apartments to 12% of its value, which is already an economic rent permitting amortisation of the investment.

#### IV Public Institutions

No town can exist without a whole gamut of public institution, certainly no town in a desert environment just beginning to be developed. The necessary institutions that have been planned, and the investment needed for the buildings alone (still according to the level of costs at the beginning of 1961) are as follows :

##### 1) Administration

a) Local Council	\$ 44,500	
b) Municipal buildings	27,800	
c) Government and other public offices	166,600	
d) Post office	33,500	
e) Police	27,800	
f) Fire Brigade and ambulance	22,500	
g) Labour Exchange	20,000	
		\$ 345,000



<b>2) Education</b>		
a) 2 day nurseries for 150 children (babies and toddlers)	166,600	
b) 12 kindergarten classes (children aged 3+4)	133,500	
c) 12 compulsory kindergarten classes (children aged 5)	133,500	
d) 72 primary school classes	1,000,000	
e) 8 secondary school classes	180,000	
f) 3 youth centres	84,000	
g) 3 neighbourhood centres for adults	67,000	
h) Town cultural centre	84,000	
i) Cinema	250,000	
	<hr/>	\$ 2,100,000
<b>3) Religion</b>		
a) 1 central synagogue	55,000	
b) 2 neighbourhood synagogues	44,500	
c) offices of the rabbinate	14,000	
d) cemetery	11,000	
e) ritual baths	8,500	
	<hr/>	\$ 135,000
<b>4) Health</b>		
a) 2 neighbourhood clinics	110,000	
b) 1 central clinic	110,000	
c) 3 mother and child care centres	50,000	
d) hospital (100 beds for a population of 10,000 souls, in the context of 300 beds for 50,000 souls)	550,000	
	<hr/>	\$ 820,000
<b>5) Sports, amenities</b>		
a) Football ground	27,800	
b) Basketball ground	8,500	
c) Gymnastics hall	33,500	
d) Swimming pool	84,000	
e) Playgrounds and gardens	55,000	
f) Public park	55,000	
	<hr/>	\$ 265,000
<b>6) Business premises</b>		
120 shops, of which 30 dispersed in neighbour- hoods, 20 in the centre, 70, incl. 2 banks, in the central shopping centre		\$ 750,000
Hotel		\$ 225,000
		<hr/>
Total :		<u>\$ 4,640,000</u>

As regards the above list of buildings, it should be noted that : —

1. The cost in each instance is the cost of building only, and does not include any of the necessary equipment or installations.
2. Educational needs were worked out accorded to the following key :
  - a) Kindergarten for two years : 50% intake of children in this age group 3 and 4 : On the reckoning of 29.6 children for every 1,000 of the population. One arrives at 296 children ; this gives 12 classes, allowing 24 children to a class.
  - b) Compulsory kindergarten: children aged 5 : On the reckoning of 29.6 children for every 1,000 of the population, one arrives at 296 children ; allowing 24 children to a class, this gives 12 classes.
  - c) Primary school for 8years : On the reckoning of 180 pupils for every 1,000 of the population, one arrives at 1,800 pupils ; allowing 25 pupils to a class, this gives 72 classes.
  - d) Secondary school : On the reckoning of 18 pupils for every 1,000 of the population, one arrives at 180 pupils ; allowing 22 pupils to a class, this gives 8 classes.
3. Business premises were estimated at 1.5 sq. meters to every family, giving 4,500 sq. metres.



## TOTAL OF INVESTMENTS

Settling people in the town and the necessary building construction in the first stage will therefore demand the following investments :

A. Basic investments in developing the town	\$ 4,560,000	
B. Residential building	\$ 20,307,500	
C. Public institutions	<u>\$ 4,640,000</u>	\$ 29,507,000
while the rest of the investments needed for infrastructure development and industrialisation, as detailed above, are :		
I. Infrastructure development	\$ 11,900,000	
II. Industrialisation	<u>\$ 42,350,000</u>	\$ 54,250,000
Grand Total		<u><u>\$ 83,757,000</u></u>

All calculations are on the basis of a rate of 1.80 Israel Pounds to every U.S. dollar. Building costs are based on the level at the beginning of 1961. The stage of development described in this memorandum, the surveys completed, etc., are of September 1961.