PROFILE OF

FAIREY SURVEYS LIMITED

1979

Fairey Surveys

FAIREY SURVEYS LIMITED MAIDENHEAD BERKSHIRE ENGLAND

Telephone: (0628) 21371 — *Telex:* 847352 Airmap G — *Cables:* Airimap Maidenhead

Fairey Surveys

INFORMATION SHEET

FAIREY SURVEYS LIMITED

Services & Consulting Services Available:

Aerial Photography
Airborne Geophysics

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Geodetic & Cadastral Surveys
Precision Surveys

***

Photogrammetric Mapping
Orthophotography

***

Volumetric & Design Studies
Digital Ground Models

***

Cartography
Reprographics

***

Photo Geology
Geophysics Data Analysis

***

Photo-Interpretation
Land Use Surveys

***

Resources Survey
Environmental Monitoring

***

Thermal Infra-Red Linescan
Pollution Studies

***

Remote Sensing Consultancy
Heat Loss Surveys

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Traffic Surveys
Highway Engineering Consultancy

***

Irrigation Consultancy
Surveys of Construction Sites & Materials

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Terrain Evaluation Studies
Terrain Modelling

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Fairey Surveys Ltd., Reform Road, Maidenhead, Berkshire SL6 8BU, England.
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INFORMATION SHEET

Fairey Surveys Limited is the direct successor of The Air Survey Company which was formed in 1923 to carry out the aerial survey of the Irrawaddy Delta for the Forestry Department in Burma.

In 1929 The Air Survey Company became a subsidiary of The Fairey Aviation Company and with greatly increased resources, its activities spread to include surveys in India, Africa, Egypt and the Middle East. After the Second World War, the Company was reorganised and modernised and today, although The Air Survey Company of India still exists as an associate, the parent company, Fairey Surveys Limited, operates from Maidenhead, England. It uses air, ground and marine methods involving aerial cameras and a wide range of other airborne remote-sensing systems. These are carried in modern aircrafts, owned by Fairey and operated world-wide by Fairey Surveys' experienced aircrew. Ground and hydrographic surveys are made by professionally qualified surveyors using up-to-date instrumentation. Information is collected on the shape, size and ownership of the land; its geological form and mineral content; its soils, hydrology, vegetation and irrigation potential, and all man-made features such as towns, communications, harbours, industrial and agricultural patterns.

In addition to providing processed aerial photography and photogrammetrically produced line maps, data interpretation and analysis are carried out on the imagery. The various remote sensing systems - satellite, radar, thermal infra-red and airborne multispectral scanner imagery as well as the more conventional black and white, colour and colour infra-red aerial photography are used either singly or in combination to suit the particular problem. The fields of interest covered include rural and urban land use, water resources, environmental pollution, agricultural, forestry and rangeland management, fishery resources, integrated natural resources inventories and rural development.

Maps have been used traditionally for the presentation of such information, frequently supplemented by interpretative reports. Fairey Surveys' staff of skilled photogrammetrists, cartographers and other experts has earned a substantial reputation for the quality and accuracy of their work. The in-house computer controlled digital systems provide accurate data for civil engineers and planners while the Company's scientific consultants concerned for objective interpretation, are of international standing.

Fairey Surveys' established techniques have frequently been applied in the development of agricultural projects in many parts of the World. The areas selected for development are mapped at various scales to provide the essential base for detailed planning. In addition, networks of bench marks and triangulation stations are established in the development areas to control the engineering and building works.

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EQUIPMENT OWNED BY COMPANY

The aircraft owned and operated by FSL available for undertaking overseas projects consists of:

1 Beechcraft Queenair B.80

1 DC3 with 1830-90c engine

1 Britten-Norman Islander BN-2A

All these aircraft are equipped with Fairey side sights especially developed by Fairey Surveys Limited for flying block photography. FSL also own the following cameras which would be available for overseas photography.

1 RC10 with S.W.W. lens

2 RC8

NF 2B Nov sight
PAV2 Remote control Camera Mount

1 RC9

4 RC5A

Other auxilliary equipment includes

Marconi Doppler

Zeiss Statoscope

APR

The survey equipment owned by FSL and available for overseas projects consists of:-

(i) Theodolites

Kern DEM 3	11
Zeiss 010	1

(ii) Levels

Zeiss N.2	2	Wild NAKO	3
Zeiss N.025	1	NAK1	4
C.T.S. 300	4	NAK2	2
Watts Autoset	4	Kern GKOAC	1
Wild NA2	3	Zeiss Koni 007	3

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(iii) Tachyometer

Wild RDS	2

(iv) E.D.M.

Tellurometer 101	6	AGA Geodimeter 6BL1	1
		AGA Geodimeter 6	1
		AGA Model 14	1
		Wild DI 10	1
		Wild DL3	1
		Hewlett Packard 3800B	1
		Cubitape DM60	1
		Mekometer	1

(v) Electronic Calculators

Sumlock Scientist 2		Hewlett Packard HP25	4
		Texas SI52II	3

plus tripods, staffs, tapes, radios, reflectors, etc. suitable for all degrees of accuracy.

Equipment owned by FSL and installed in their Laboratories at Maidenhead.

Photogrammetric Plotting

Zeiss Stereoplanigraph C.8	1
Wild Autograph A8	6
Wild Avograph B8	2
Zeiss (Jena) Stereometrograph 'D'	1
Zeiss (Jena) Stereometrograph 'E'	1
Zeiss (Jena) Topocart	1

Auxilliary Equipment

Wild EK5A with electric typewriter and SE15 tape punch	1
Wild EK8 with electric typewriter and Facit tape punch	1
Wild EK22 with electric typewriter and Facit tape punch	1
Zeiss (Jena) Orthophot	1
Zeiss (Jena) Orograph	1
Wild P.U.G. 4	1

Compilation & Drawing

Haag Strait Co-ordinatograph	1
C.A. Rost Plan Variograph	1
Mirror Stereoscope	3
Glass Grids	2
Monotype - Photo lettering	1
Berthold Diatype Photo lettering	1
Varityper -letter composing machine	1

(b) Equipment

Hunter Penrose Littlejohn Newspeed 24 copy camera (25" x 21")	1
Lee Smith copy camera (40" x 20")	1
Kodak 242 Supermatic Automatic Film Processor	1
Dupont Cromalin proofer	1
F11 BIORCIO Whirler (65" x 50")	1
F11 BIORCIO P/M Exposure Frame (65" x 50")	1
Collier Exposure Frame (52" x 40")	1
Mailander proving press (56" x 42")	1
Lee-Smith Loftline Printing Unit (144" x 48")	1
Contact Printing Frames (24"x30") (30"x40") (50"x60")	3
Film Densitometer	1
Roth Weber Diazo Copier 48" wide	1

Photographic

Wild E4 Rectifying Enlarger	1	
Saltzmann Rectifying Enlarger	1	
Veribrom Processor for Bromide Print	1	
Milligan Electronic Printers	2	FOR PHOTO BROMIDE PAPER
Cintel Electronic Printers	2	
Contact Printing Frame 50" x 60"	1	

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FAIREY SURVEYS LIMITED

COUNTRIES IN WHICH WORK HAS BEEN CARRIED OUT

ARGENTINE/CHILE
AUSTRALIA
BAHAMAS
BAHRAIN
BANGLADESH
BARBADOS
BORNEO
BOTSWANA
BRITISH HONDURAS
BRUNEI
BURMA
CAMEROON
CYPRUS
ECUADOR
FIJI
GAMBIA
GHANA
GUYANA
INDIA
IRAN
IRAQ
JAMAICA
JORDAN
KENYA
KUWAIT
LIBYA
MALAWI
MOROCCO
NEPAL
NIGERIA
OMAN
PAKISTAN
SAUDI ARABIA
SICILY
SIERRA LEONE
SINGAPORE
SPAIN
SPANISH SAHARA
SRI LANKA
SUDAN
SYRIA
TANZANIA
THAILAND
TOGO
UGANDA
UNITED ARAB EMIRATES
WEST INDIA ISLANDS
YEMEN ARAB REPUBLIC
PEOPLES' DEMOCRATIC REPUBLIC OF YEMEN
ZAMBIA
ZANZIBAR.

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LIST OF SOME OF THE MAJOR PROJECTS
UNDERTAKEN DURING RECENT YEARS

LOCATION	PROJECTS	VALUE (U.S. $)
Tanzania	Photography at 1/40,000 and medium scale mapping of river valley area for irrigation - 39,000 sq.km	$ 200,000
Botswana	Photography at 1/40,000 scale - 40,000 sq.kms	$ 25,000
Malawi	Annual photographic and mapping projects including 40,000 sq.km photography - 1/40,000 scale, 1962	$ 24,000
Uganda	1/40,000 air photography - 34,000 sq.kms	$ 50,000
Nigeria	Small and large scale photography and mapping including 800 km precise levelling Sokoto River project	$ 24,000
Sierra Leone	Air photography and large scale mapping	$ 75,000
Jamaica	Large scale mapping of towns and urban areas for town planning purposes	$ 100,000
Guyana	Small scale air photography, three seasons 1959/61	$ 75,000
Burma	1/50,000 and 1/20,000 photography of over 520,000 sq.km	$ 600,000
Pakistan	8,300 sq. km - 1/7920 scale photography and mapping East Pakistan Water and Power Development Authority	$ 600,000
Iran	1/2000 scale mapping - 430 km of road - Zenjan to Marand	$ 72,000
U.A.R.	1/10,000 scale air photography for crop classification	$ 30.000
Libyan Arab Republic	Ground Control and 1/10,000 mapping 1,400 sq.km Wadi Maganian Area	$ 32,000
Jordan	City photography at 1/10,000 and 1/25,000 respectively	$ 10,000

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LOCATION	PROJECTS	VALUE
Kuwait	20,700 sq.km at 1/50,000 photography and mosaics	$ 48,000
Cyprus	Large scale photography of whole island - 10,000 sq.km	$ 46,000
Trucial Coast	Miscellaneous photography at 1/10,000 - 1/25,000 including 9,000 sq.km	$ 36,000
Saudi Arabia	Photography, ground control and large scale mapping of 32 towns for town planning purposes	$ 600,000
Saudi Arabia	A.P.R. Grid covering 200,000 sq.km and photography of road alignments	$ 120,000
Botswana	Photography of 1,000 sq.km and 550 line km at 1/10,000 scale	$ 42,000
Ghana	Photography of 13,000 sq.km at 1/30,000 and 1/40,000 scale	$ 43,000
Zambia	Photography at 1/40,000 scale 47,000 sq.km	$ 82,000
Togo F.A.O.	For F.A.O. Aerial photography and mosaics at 1/20,000 of 9,500 sq.km	$ 12,000
Kariba Dam	Photography at 1/40,000, 1/20,000 and 1/12,000 medium and large scale mapping for Kariba Project - 31,000 sq.km	$ 150,000
Argentina/Chile	Boundary Survey, aerial photography airborne profile recording and mapping - area 7,300 sq.km	$ 60,000
Caribbean	Photography at 1/25,000 and 1/12,500 scales covering eight islands	$ 60,000
Malawi	Colour aerial photography 50,000 sq.km at 1/40,000 scale	$ 82,000
Iran	Photography at various scales of five areas including islands in Arabian Gulf	$ 6,000
Libyan Arab	Aerial Photography, screened enlargements, ground control and mapping - 7 main towns and villages	$ 240,000

LOCATION	PROJECTS	VALUE
Sweden	Offshore Aeromagnetic Survey 10,000 line km flying and recording. compilation and drawing	$ 45,000
United Kingdom	Large scale photography, ground control and large scale mapping	$ 350,000
Zambia	Photography, small scale and large scale black and white infra-red, colour, false colour and multi-spectral	$ 150,000
United Kingdom	Large scale photography, ground control and plan production for various authorities for town planning, highway construction, railways, power transmission lines etc.	$ 240,000
Bahamas	Air photography, medium and large scale mapping for development of islands	$ 150,000
Caribbean	Aerial photography panchromatic and infra-red, 1/25,000, 1/10,000 and 1/5,000 scales	$ 70,000
Zambia	Photography and mapping of Nchanga Mines area 324 sheets at 1/1,000 scale	$ 180,000
Saudi Arabia	Photography, ground control and mapping for 1/50,000 Orthophoto mapping of 18,000 sq.kms.	$ 180,000
West Caribbean & British Honduras	Photography 1/40,000, 1/20,000 and 1/10,000 scales, panchromatic and colour	$ 70,000
Singapore	Photography and mapping at 1/2,500 scale of Singapore - 300 sheets	$ 150,000
Trucial States Dubai	Mapping 1/1,000 and 1/2,000 scale 250 sq.kms	$ 90,000
United Kingdom	Large scale photography, ground control and large scale mapping for C.E.G.B., N.C.B., R.C.U., and various County & Local Authorities	$ 280,000
Lesser Antilles & British Honduras	Photography 1/40,000, 1/20,000 and 1/10,000 scales	$ 150,000

LOCATION	PROJECTS	VALUE
Libya	1/5,000 scale Road Survey 13,000 sq.km	$ 650,000
United Arab Emirates	Wall Maps and Tourist Maps for the Government of Abu Dhabi	$ 30,000
United Kingdom	3-dimensional models of British Isles	$ 85,000
Libya	Photography at various scales, ground control and mapping of 12,000 sq.kms at scale 1/2,000	$ 750,000
Saudi Arabia	Aerial photography and mosaics at various scales totalling 182,000 sq.kms	$ 150,000
Nigeria	Aerial photography for land use studies and mosaics of townships	$ 150,000
Gambia	Aerial photography, 4,000 sq.miles	$ 45,000
Brunei	Photography and mapping at scale 1/12,500 - 490 sq.kms	$ 40,000
Saudi Arabia	Miscellaneous mapping contracts	$ 60,000
Kenya	1/50,000 fairdrawing covering 780 sq.kms	$ 21,000
Cyprus	Town mapping of major towns at 1/7,500 scale	$ 62,500
Saudi Arabia	Aerial photography and mapping of five towns in Northern Region plus 7,500 sq.kms at 1/40,000	$ 130,000
Ghana	Aerial photography as part of the British Technical Aid programme	$ 80,000
Chad	Lake Chad Basin photography - 45,000 sq.kms as part of British Technical Aid programme	$ 100,000
Zaire	Ground surveys of airfields	$ 20,000
Saudi Arabia	Photography covering 1,400 sq.kms at 1/30,000 and mapping of 100 sq.kms in Eastern Region	$ 500,000
Saudi Arabia	Road Map for Ministry of Communications	$ 15,000

LOCATION	PROJECTS	VALUE
Burma/United Nations	Supervision, ground control and mapping at 1/2,000, 1/10,000 and 1/25,000 scales Sittang River Valley	$ 200,000
Portugal	Offshore Aeromagnetic Survey 17,500 line km flying and recording, compilation, fair-drawing and interpretation	$ 100,000
Saudi Arabia	Photography, Ground Control, Mapping and Revision of four Regional Planning areas	$ 750,000
Saudi Arabia	S.W.A. Photography at 1/80,000 of 175,000 sq.kms	$ 160,000
Libya	Photography, ground control and mapping of 13,000 sq.kms for route planning	$ 375,000
Saudi Arabia	Air triangulation and block adjustment of three project areas totalling 500,000 sq.kms	$ 125,000
North Yemen	Aerial photography of parts of Tihama Plain 4,329 sq.kms	$ 23,000
Honduras	Mapping and soil maps of Comayagua Valley for a proposed irrigation project	$ 10,000
Saudi Arabia	Photography, ground control and mapping of Central Region Cities at various scales	$ 185,000
Zambia	Photography and mapping at various scales totalling 40,000 sq.kms at 1/38,000	$ 52,000
Nepal	Aerial photography for Forestry Department, 15,522 and 12,758 sq. miles	$ 300,000
Cyprus	1/50,000 mapping of entire island (9,250 sq.kms)	$ 175,000
Belize	Aerial photography on behalf of the Directorate of Overseas Surveys	$ 82,000
Uganda	1/2,500 scale mapping of Janja area	$ 13,000

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LOCATION	PROJECTS	VALUE
Saudi Arabia	Aerial photography and mapping of Southern Region	$ 500,000
Oman	Road Surveys	$ 50,000
Saudi Arabia	Survey and Mapping of Jeddah-Corniche	$ 300,000
Kuwait	Town Mapping	$ 20,000
Saudi Arabia	Survey and mapping of Irrigation Project	$ 100,000
Nigeria	Survey and mapping of Northern Nigeria together with urban land use mapping	$ 1,700,000
Bahrain	Offshore and onshore survey and mapping for water resources and urban planning	$ 1,200,000
United Kingdom	National Land Use Survey by photo-interpretation of England and Wales	$ 150,000
Libya	Ground survey of Benghazi establishing a system of plan points and bench marks to cover 100 sq.kms.	$ 1,000.000
Saudi Arabia	Production of 1:50,000 mapping of the South Shammar region, an area of 110,000 sq.kms. Part of the National Topographical map series.	$ 1,230,000

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Examples of work completed by Fairey Surveys in the United Kingdom during the last two years.

	CLIENT	PROJECT
1976/77	Berkshire County Council	Photographic County Cover.
	Midland Road Construction Unit	M42. Castle Donnington
	National Smokeless Fuels	Stockpile Volume Survey
	London Transport Executive	Survey for Underground Railway
	Somerset County Council	Orthophoto Maps - N Sedgemoor & Dimmer
1978	Institute of Geological Sciences	Orthophoto Map at 1/1250 Glen Iug
	South Hams District Council	Ivybridge, Dartmouth and Kingsbridge
	Ballackolish, Scotland	Volume survey of slate quarry
	Nottinghamshire County Council	Photographic County Cover (in progress
	National Coal Board	Aerial photography, Margam, S. Wales
	Sir Wm. Halcrow & Partners	1:250 Mapping of Lee Valley
	Howard Humphries	S.Pembrokeshire Coast - Infrared Line Scan
	Scottish Development Department	Aerial photography in colour and Infra red false colour
	Highlands, Islands Development Board	" " " " " "
	Redpath Dorman Long/British Rail	Precision Survey of Lyne Underbridge
	Central Electricity Generating Board	Infra red linescan of Hinkley Point Power Station
	Wimpey Laboratories	Aerial survey to determine flow direction of effluent.
	Scottish Development Department	Glen Luce By-Pass - Mapping at 1:2500
	Property Agencies Agency	Broughton Moor: 12500 Mapping
	G H Hill	Carsington Reservoir - Mapping 1:500
	T B Bennett & Son	Three dimensional terrain model Reading.

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	CLIENT	PROJECT
	London Transport Executive	River Line: Mapping at 1:500
	Eastern Road Construction Unit	Link road between M1 and A1. 1:2500 mapping
	Rhondda Borough Council	Mapping at 1:500 of Reclamation Site
1978/79	Ministry of Agriculture, Fisheries and Food.	Infra red False Colour - Dartmoor
	Consolidated Goldfields Limited	Gairloch - Mapping at 1:1000
	Midland Road Construction Unit	Mapping of A564 Blythe Bridge to Uttoxeter
	Kent County Council	Thameside Industrial Route - Mapping at 1:500
	Redland Purle Limited.	Mapping of sites at Denham and West Drayton.

Fairey Surveys

INFORMATION SHEET: ENVIRONMENT AND RESOURCES CONSULTANCY

THE COMPANY : For more than 50 years FAIREY SURVEYS LIMITED has been surveying and mapping land and surrounding water areas throughout the world. The increasing need to monitor natural resources, particularly in developing countries, has led FAIREY SURVEYS to establish the ENVIRONMENT AND RESOURCES CONSULTANCY section which, through the expertise of its own highly qualified personnel, together with the specialist services of associated consultants and the facilities of FAIREY SURVEYS, is able to plan and implement such surveys, including all aspects of preliminary project formulation, feasibility studies, data collection, interpretation analysis and presentation and subsequent project development implementation and management.

SERVICES PROVIDED: The ENVIRONMENT AND RESOURCES CONSULTANCY section of FAIREY SURVEYS specializes in the following fields :-

natural resources inventories
integrated rural development
rural land use
urban land use
regional planning
engineering surveys
water resources
environmental impact assessment
energy conservation surveys
consultancy/training assignments

Data interpretation and analysis are carried out by the staff of the ENVIRONMENT AND RESOURCES CONSULTANCY section with specializations in remote sensing data extraction from aerial photography, Landsat, radar, thermal infra-red linescan, multispectral imagery and other image types.

Besides the services and activities briefly outlined above, the ENVIRONMENT AND RESOURCES CONSULTANCY section has acted as consultants to the United Nations, F.A.O., the European Space Agency and N.A.S.A., to advise on interpretation procedures from orbital and other remote sensing imagery, and are registered internationally with many organisations including :

United Nations
F.A.O.
Ministry of Overseas Development (UK)
Plan and Budget Organization (Iran)
African Development Bank
Asian Development Bank
Inter-American Development Bank
World Bank (I.B.R.D.).
Commission of the European Communities.

FAIREY SURVEYS are part of the International Group for Environmental Studies (I.G.E.S.), a grouping of European Companies involved in all aspects of remote sensing, and therefore, able to tackle the most complex projects with the combined resources and expertise of the I.G.E.S. members.

The Company works closely with several specialist consulting agencies, academic institutes and research organizations to further its resources and to increase the scope of the services so that the ENVIRONMENT AND RESOURCES CONSULTANCY section can provide complete packages to a client in the field of natural resources surveys and rural development programmes.

THE APPROACH : The professional service supplied by the ENVIRONMENT AND RESOURCES CONSULTANCY gives clients not simply its skills and resources, but confidence in areas where advice and information are needed. This has been achieved by the staff's ability to determine these needs through obtaining an understanding of the client's requirements in depth. An entirely objective and open-minded basis is used to ensure that the right service or methodology is offered to the client in terms of both consultants' professional expertise and a full range of available services. The approach employed by the ENVIRONMENT AND RESOURCES CONSULTANCY section is therefore, very flexible, and only after this initial procedure has been fulfilled are the services co-ordinated to meet the specific requirements of each individual assignment.

TRAINING : The highly qualified staff of the ENVIRONMENT AND RESOURCES CONSULTANCY are able to provide both short and long-term courses on remote sensing applications to natural resources survey and development, in addition to on-the-job training.

Several teaching sets have been prepared to assist with such training. Many books and articles on remote sensing covering numerous aspects of integrated natural resources inventories and development programmes have been published by the staff in internationally recognized journals, further illustrating the wealth of expertise available to clients.

THE FACILITIES: The facilities available to the ENVIRONMENT AND RESOURCES CONSULTANCY section include the entire resources of FAIREY SURVEYS. These include a fleet of fully equipped aircraft with survey cameras for panchromatic, black and white infra-red, colour and colour infra-red photography, together with a multispectral camera installation and thermal infra-red linescan equipment.

At the Company's Head Office in Maidenhead there are all the necessary support facilities to initiate, organise, co-ordinate, implement and manage even the largest projects. These facilities include :

comprehensive photographic processing laboratories
thematic and topographic mapping
LANDSAT and aerial photography mosaicing
photo-interpretation and remote remote sensing laboratories
flying
flight trials
geophysical surveys
field survey
research and instrumentation
technical library
photogrammetric mapping

EQUIPMENT : As well as all the necessary data collection, interpretation and

analysis equipment existing in the laboratories, FAIREY SURVEYS are maintaining their position as one of the world's more experienced and professional surveying companies by the development of new equipment. For remote sensing applications a low-cost multispectral additive colour viewer, designed for analysis and comparing data arrays from LANDSAT, SKYLAB and aerial multi-spectral imagery, has been manufactured and is already in use in many government departments and research institutes around the world. Also, an inexpensive stereoviewer designed and produced by FAIREY SURVEYS is employed at many educational establishments.

COUNTRIES WORKED IN :

Africa	: Botswana, Chad, Gambia, Ghana, Kenya, Malawi, Nigeria, Sierra Leone, Tanzania, Togo, Uganda, Zaire, Zambia.
Asia	: Australia, Brunei, Burma, China, India, Japan, Malaysia, Nepal, Pakistan, The Philippines, Singapore.
Europe	: Cyprus, Eire, Norway, Portugal, Sweden, United Kingdom.
Middle East	: Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Libya, North Yemen, Oman, Saudi Arabia, Syria, U.A.E.
South and Central America	: Argentina, Bahamas, Chile, Honduras, Jamaica.

PROJECTS : The following are a small selection of the projects carried out during recent years and serve to illustrate the type of services provided to clients by FAIREY SURVEYS.

A national land use survey of the developed areas of England and Wales, for the UK Government's Department of the Environment. This involved detailed air photo-interpretation and land use mapping by experienced urban photo-interpreters.

Urban land use and planning in Libya, Saudi Arabia, Bahrain, Kuwait, Iran and Nigeria.

Survey and mapping of northern Nigeria.

Forest survey in Nepal.

Survey and mapping of irrigation project in Saudi Arabia.

Soil and irrigation project in Honduras.

Engineering materials survey and road alignment in Libya.

Traffic analysis in Saudi Arabia, England and Scotland.

Onshore and offshore survey and mapping for water resources and planning for State of Bahrain.

Location and monitoring of coastal and offshore fresh water springs and other discharges along the South Wales coastline using thermal infra-red imagery and colour photography.

Monitoring the dispersal patterns of thermal plumes from coastal power stations in the United Kingdom.

Environmental monitoring studies in Scotland.

Airborne energy conservation surveys to locate heat loss from buildings throughout the United Kingdom.

Multispectral photographic studies in Zambia, Australia, United Kingdom and Saudi Arabia.

Establishment of the National Cartographic Centre in Iran with responsibility for advice on the purchase of equipment and training of key personnel, the layout of laboratories and offices and the technical organization of the Centre.

Consultancy lecture tours of Syria, Qatar, Saudi Arabia, Algeria, The Peoples' Republic of China, Pakistan, The Philippines and United Kingdom.

For further information, contact :

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SERVICES PROVIDED BY THE ENGINEERING SURVEY SECTION

The Environment and Resources Consultancy Division of Fairey Surveys recognizes that the continuous demand for new roads in countries of the developing world has emphasised the increasing need to improve the accuracy and speed of engineering surveys. Several useful aids have been developed in recent years, including remote sensing systems carried aboard both aircraft and satellites. These produce photographs and images at a wide range of scales that can be used to appraise ground conditions for road planning purposes. A variety of information on the various factors affecting the cost of alternative alignments and types of construction may now be most efficiently obtained by deploying these new remote sensing methods in conjunction with established terrain evaluation procedures. In this way the evaluation of ground conditions at one site can be broadened and extended to other sites by classifying the terrain into distinct, easily mapped units which have practical engineering significance.

These techniques have important applications especially in remote situations in overseas countries where background information on ground conditions is often sparse. Design engineers who are able to apply indirect reconnaissance survey methods have improved opportunities of recognizing the range of available ground options at an early stage in the planning process. This is vitally important if the location of the final alignment of a road is to represent the most advantageous route with respect to the terrain. Similarly, the application of these methods can do much to ensure that the costly effort put into the site investigation of the final road alignment is not misplaced.

For more than 50 years Fairey Surveys Limited has been undertaking traditional aerial photography, surveying and mapping for highway engineering projects. The increasing need to make use of recent technological developments in remote sensing and terrain evaluation methods has led Fairey Surveys to establish a section within the Environment and Resources Consultancy Division which, through the expertise of its own experienced and highly qualified personnel and the facilities of Fairey Surveys, is able to provide a very specialised service for all aspects of engineering surveys.

Areas of interest covered by the services of the Engineering Survey Section of the Environment and Resources Consultancy Division include :-

- Acquisition, Processing and Interpretation of all forms of remotely sensed data for engineering projects.
- Terrain evaluation studies for all aspects of regional and national transport planning.

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- Engineering terrain evaluation investigations for highway and other major construction projects - location, design, construction and maintenance.

- The provision of technical and general background information for tender documents and the reconnaissance and feasibility stages of engineering projects in developing countries.

- The location, inventory, specification and recommended use of indigenous engineering materials for national, regional and individual project surveys in developing countries.

- Geomorphological studies in geotechnical appraisals of terrain - mapping for detailed site investigation; studies of slope stability, weathering, erosion, hydrology, etc.

- The acquisition and interpretation of low cost, purpose flown, specialised, non-photogrammetric aerial photography - these surveys are recommended for the detailed information required at the final design stage of a highway project and are particularly appropriate for road construction in difficult and inaccessible terrain.

The facilities available to the Engineering Survey Section include the entire survey and mapping resources of Fairey Surveys. These include a fleet of fully equipped aircraft and a wide range of remote sensing data acquisition and processing systems. At the Company's Head Office in Maidenhead, there are all the necessary support facilities to initiate, organise, co-ordinate, implement and manage even the largest projects. These facilities include :-

Photo-interpretation and remote sensing laboratories	Comprehensive photographic processing laboratories
Thematic and Topographic mapping	Flying
Field Survey	Flight Trials
Photogrammetric Mapping	Research and instrumentation
LANDSAT and aerial photography mosaicing	Technical Library

The Company works closely with several specialist consulting agencies, academic institutes and research organisations, to further its resources and to increase the scope of services, so that the Engineering

Survey Section can provide complete packages to a client in the field of transport planning and highway engineering surveys for regional and national development programmes.

For further information, contact :

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TRAFFIC SURVEYS

In order to evaluate the capacities and improvements required of existing street and road networks, there is an increasing awareness of the need to undertake traffic surveys, most of which form an important basis for the planning of new highways.

Aerial survey methods and special analytical techniques have been developed by the Environment and Resources Consultancy Division of Fairey Surveys to provide information on pertinent traffic parameters, such as composition, flow, density, routing, average speed and spacing, travelling times between selected points, signal control systems and vehicle classification based on type, weight or size criteria.

Flying at suitable altitudes fixed wing aircraft or helicopters have provided data on a variety of traffic studies. These include

- Evaluation of regional traffic patterns
- Analysis of traffic patterns for major arteries between centres of population and within urban areas
- Analysis of traffic patterns on motorways and at tunnel entrances and exits, bridge crossings and major airports
- Sequential and repetitive coverage of traffic problem areas and sites of specific interest, e.g. roundabouts, major junctions and intersections
- Parking studies
- Origin and destination surveys
- Various studies for the planning of town and rural areas
- Investigations of traffic congestion in relation to the routing and efficient operation of public transport in major cities of the developing world
- Studies of the effects of traffic on the environment.

Methods of data collection depend on the traffic parameters to be evaluated and the analytical techniques employed. Time lapse photography, for example, can be acquired by repeatedly flying over a test area, hovering above fixed points or following a number of vehicles through the road network. The accuracies obtained by these methods as compared to ground surveys have been very high.

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The main advantages of aerial photography for traffic studies include :- the provision of a permanent record that can be re-examined at any time; synoptic coverage of traffic in large areas, at a uniform point in time, which under normal prevailing circumstances would be impossible by other methods; a comprehensive ability to study the behaviour of individual vehicles as well as their mutual interaction; more reliable and objective results due to studies being undertaken without physical or psychological interference; the ability to determine very accurate measurements on speed, distance and other traffic parameters.

The Environment and Resources Consultancy Division evaluate the particular needs in consultation with the client and thereby plan the optimum flight details and sensor package most suitable for the site and individual requirements of the project. In this way, problems such as, for example, low sun angle and the frequency of haze and smoke over large urban areas may be overcome by careful preliminary planning.

Detailed traffic studies are carried out using skilled interpreters and sophisticated image analysis equipment. A variety of statistical sampling techniques and data presentation methods have been developed by Fairey Surveys. These techniques have proved to be particularly useful in the evaluation and display of sequential traffic studies.

The following projects are representative of the type of surveys which have been undertaken by the Company.

- Several surveys of the industrial city of Glasgow (Scotland), carried out at different times of the year, have involved the acquisition and interpretation of large scale aerial photographs during peak periods of traffic movement in order to study the effectiveness of area traffic control systems.

- Repetitive large scale colour aerial photography has been taken at two hourly intervals over a five day period in a study involving a detailed analysis of the number, location, density and type of vehicles in the Holy areas of Mecca and Medina, Saudi Arabia. These investigations enabled vehicle movement patterns to be evaluated for traffic planning during the annual Hajj.

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- A town planning study to acquire vehicle parking statistics and assess the availability of parking space in the coastal resort of Weston-super-Mare involved the analysis of sequential aerial photography flown at half-hour intervals throughout a typical day in the holiday period. In addition to providing much useful traffic data, the photography revealed sites experiencing the heaviest parking concentrations and those areas where additional facilities were required. The photography also enabled planners to record the periods of time for which individual cars were parked.

- Large scale colour aerial photography acquired over Dartmoor formed the basis for a study of access, parking and vehicle movements in relation to the planning and management of recreational activities within the National Park.

The Company works closely with several specialist consulting agencies, academic institutes and research organisations, to further its resources and to increase the scope of services, so that the Engineering Survey Section can provide complete packages to a client in the field of integrated surveys for transport planning and traffic engineering.

For further information, contact :

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WATER RESOURCES SURVEYS

The aim of a water resources survey is to provide specific and detailed information on the nature and amounts of all surface, sub-surface and offshore fresh water, to enable the implementation of relevant water management plans.

The Environment and Resources Consultancy of Fairey Surveys is able to carry out the inventory part of such projects to enable the objectives of an improved water management programme to be achieved.

Several stages are involved :

- the identification, location and evaluation of all water resources,
- the production of detailed drainage network maps by photo-interpretation and field checking,
- the production of surface geological maps using existing aerial photography and available satellite imagery,
- the detection of offshore freshwater springs using thermal infra-red line scanning techniques,
- the determination of possible seasonal effects and assessment of environmental problems such as over-use of water,
- the production of a report, with maps and recommendations for the implementation of a sound water management programme based on up-to-date, complete and reliable data on the region's water resources.

In addition to the obvious benefits which would result from any extra water supplies located, such a survey would provide the basis for numerous subsidiary benefits, including :-

- the formulation of sound policies and programmes of water resources use and management,
- the drafting and evaluation of national and regional plans,
- the expansion of agriculture,
- the data would be useful for all subsequent engineering/ construction projects,
- the training of personnel in remote sensing techniques.

All these activities would employ the information produced by the water resources survey.

THE ENVIRONMENT AND RESOURCES CONSULTANCY employ a methodology involving two concepts :-

1. The Multi-purpose Data Base Concept - whereby one type of collected data is used to meet multiple objectives simultaneously, for example :-

   LANDSAT satellite data are used to assist in geological mapping, especially structural aspects, to determine principal aquifers and structural controls of groundwater and aid in the location of offshore freshwater springs by examination of fracture zones which form leakage routes from onshore water bearing strata.

   AERIAL PHOTOGRAPHY is used for detailed drainage network analysis, surface geological mapping, detecting linears and seepage areas, in addition to overall project planning and implementation.

2. The Multi-stage sampling Concept - in which each data collection technique assembles data of a unique and, also, complimentary character. Therefore, when all information has been compiled, integrated and analysed a complete picture of water resources in the study area can be obtained.

Once specific water resources have been located and assessed, follow-on development programmes are usually carried out to utilize the resources in the optimum manner. Such programmes include :-

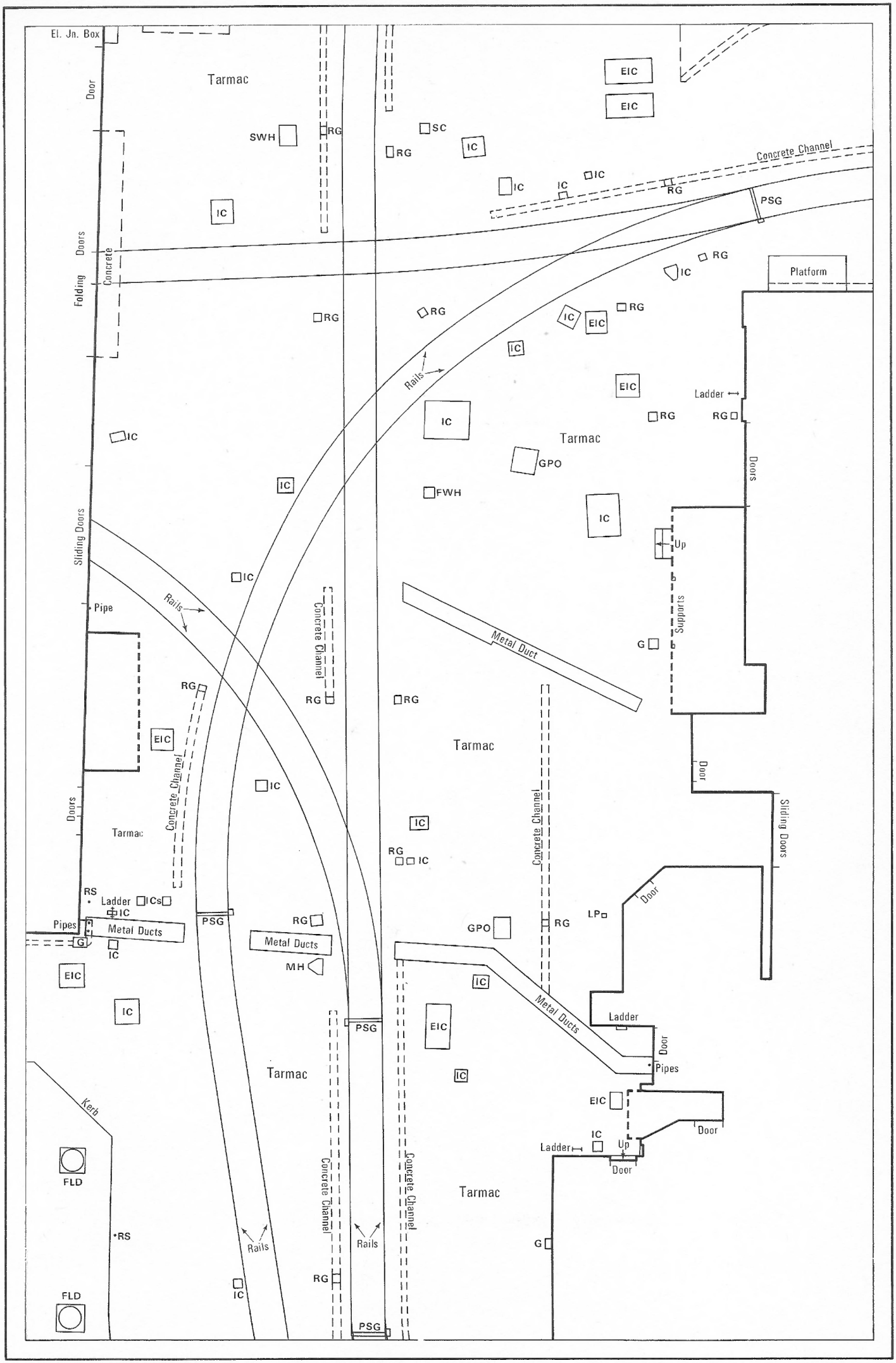
- geophysical surveys to provide more detailed subsurface information
- planning and implementation of associated engineering structures
- land use surveys and evaluation studies in the light of increased water supplies.

THE ENVIRONMENT AND RESOURCES CONSULTANCY is able to implement any or all of these water resources development programmes. Together with its associates, it can provide the expertise and resources, combined with a comprehensive approach, so essential to integrated economic development.

FAIREY SURVEYS

SAMPLE MAP SHEETS

VARIOUS SCALES



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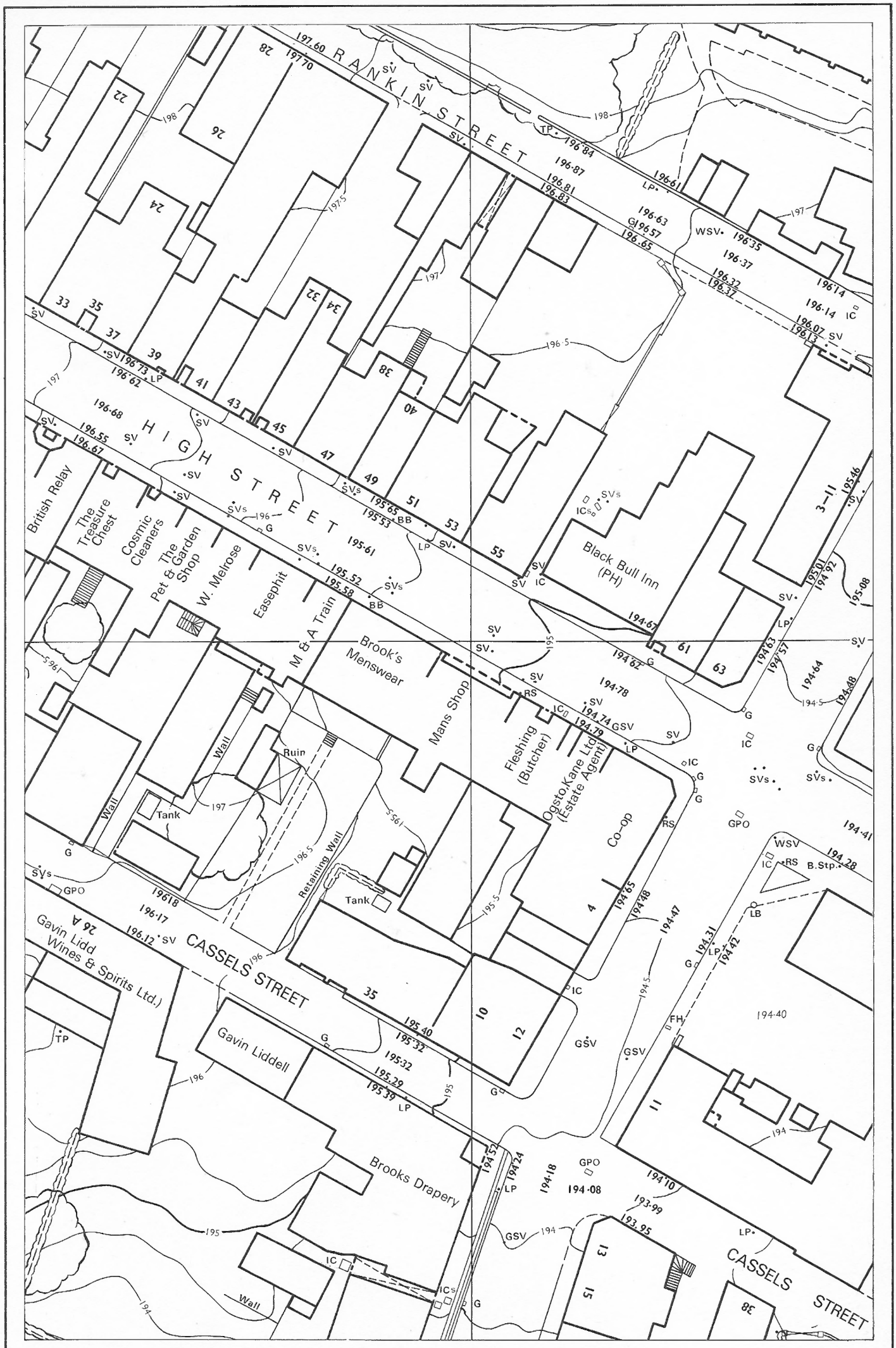

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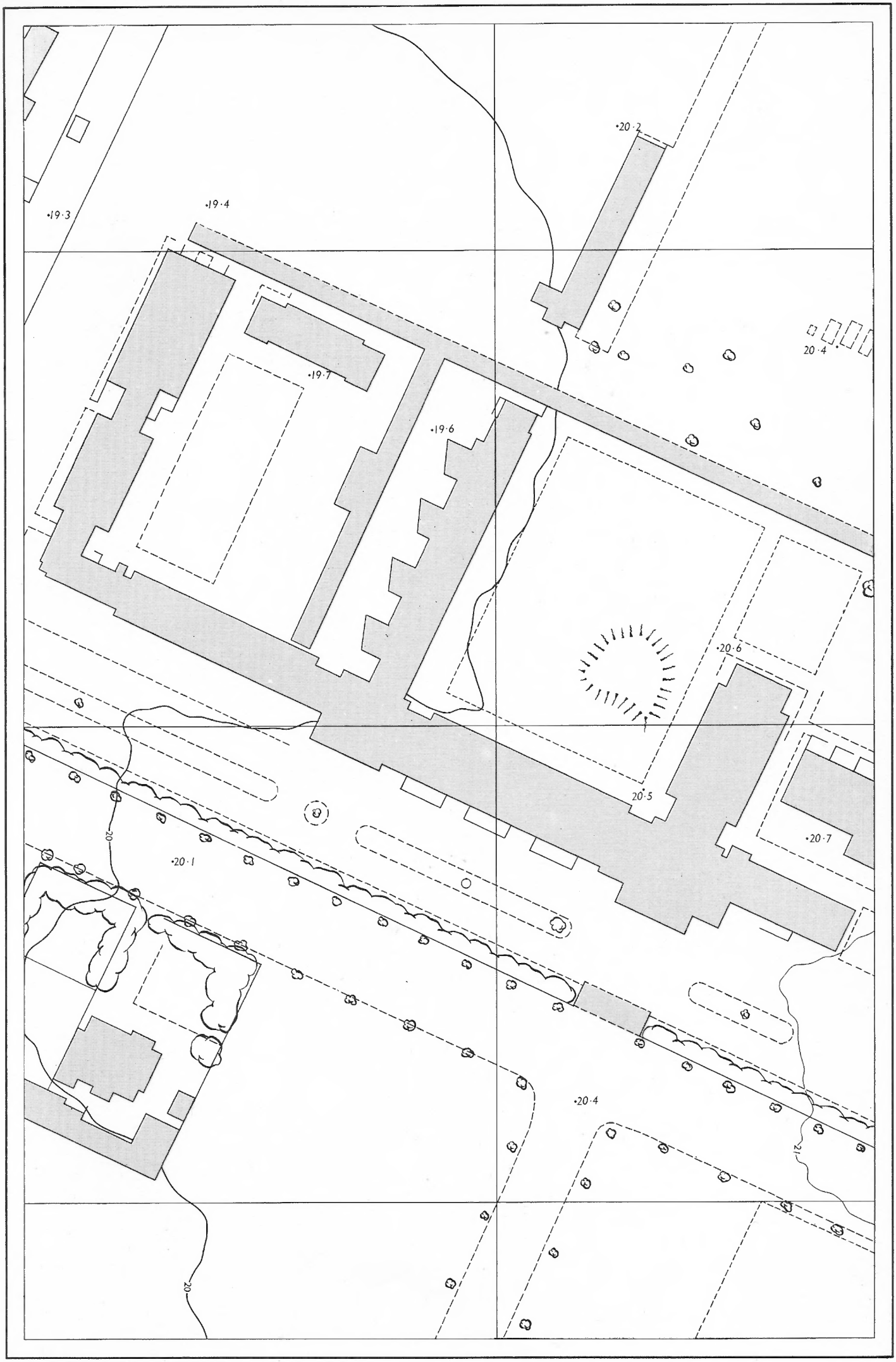

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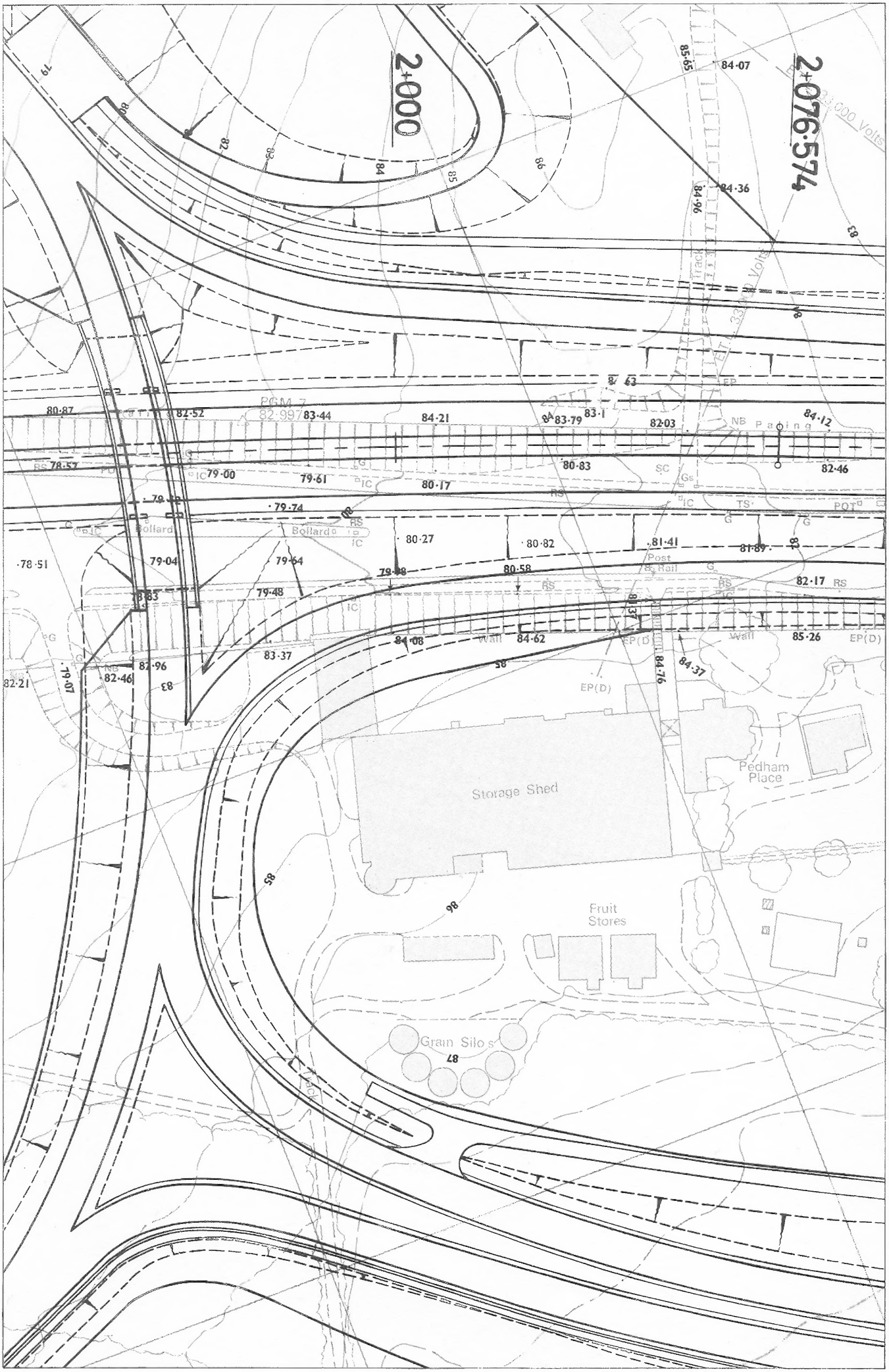

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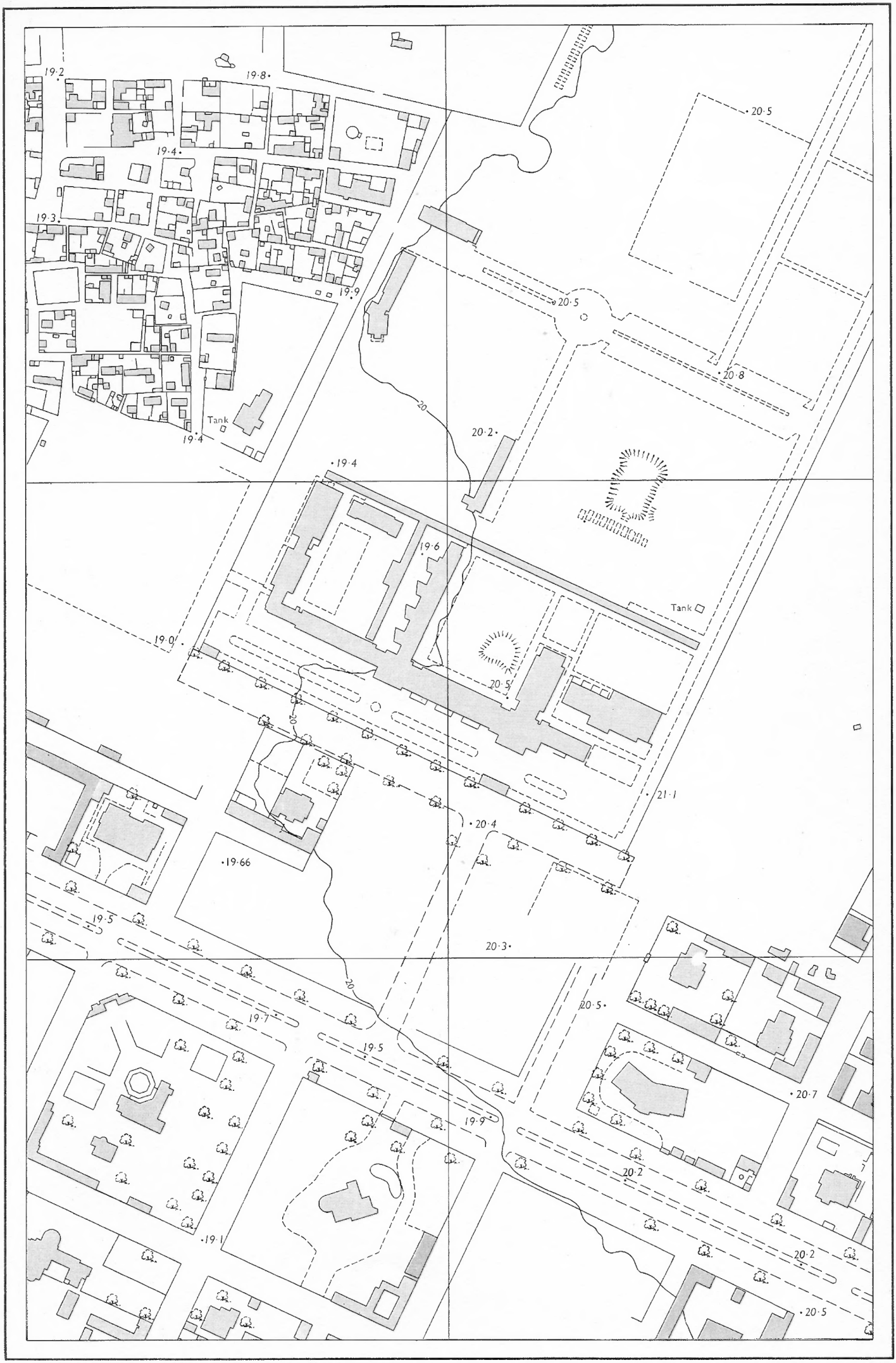

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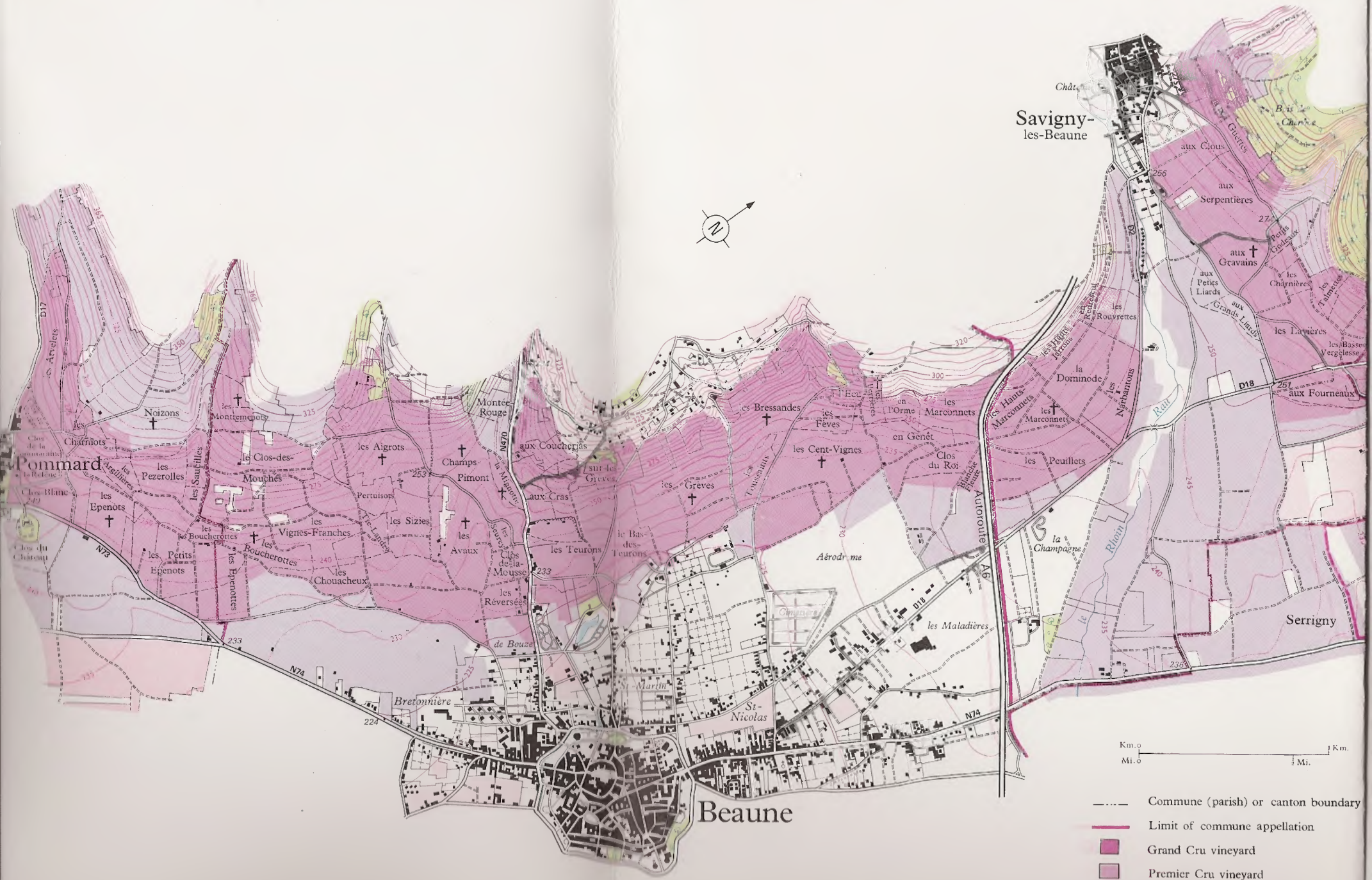
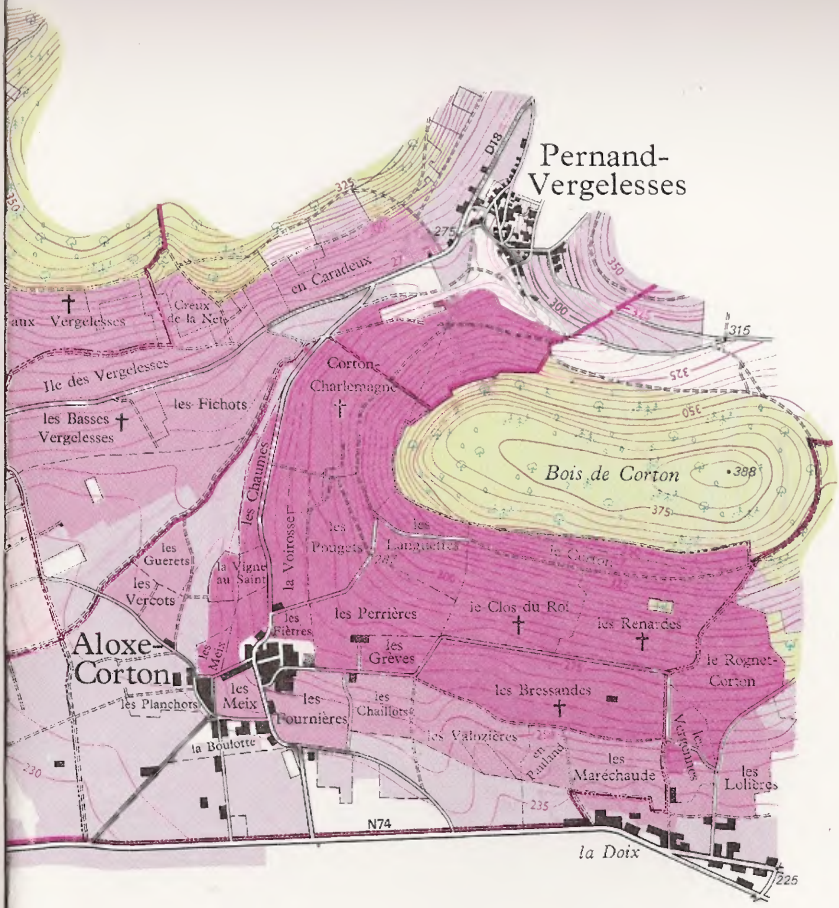


A plate from THE WORLD ATLAS OF WINE by Hugh Johnson
Published by Mitchell Beazley Limited, London.



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