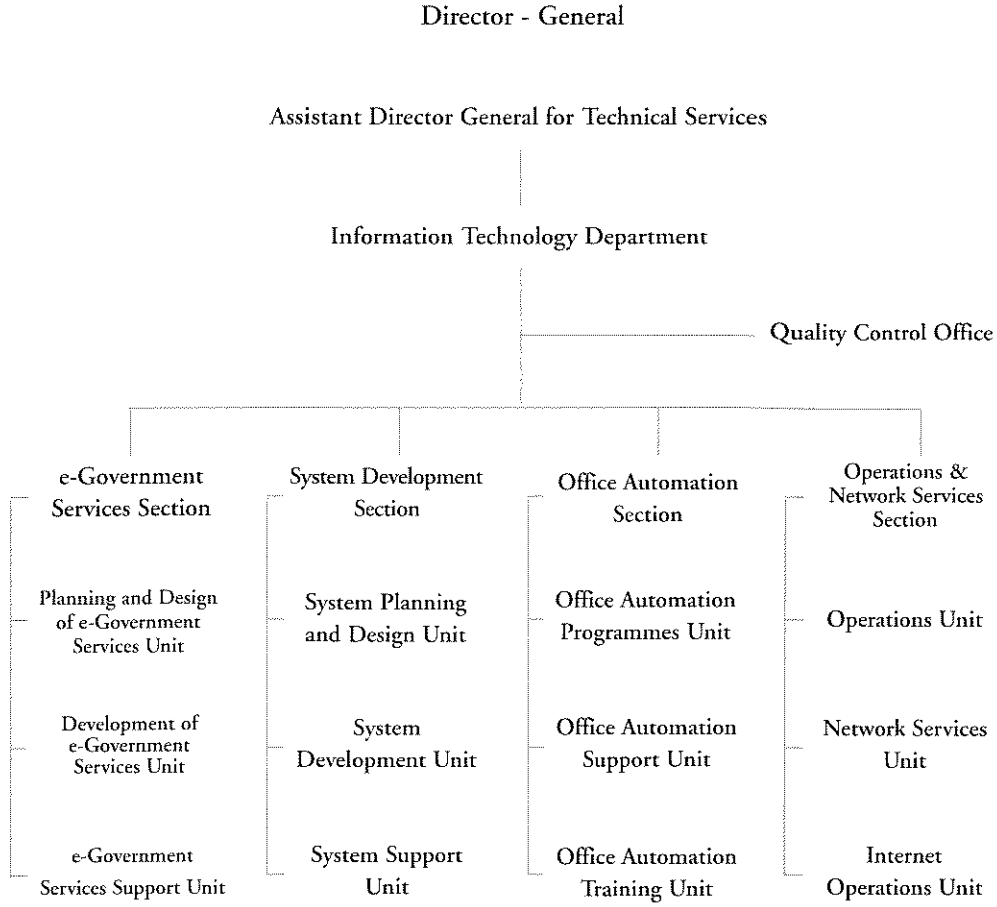
In 2002, the name of the Information Technology Department was changed, as shown in Chart No. 4.

Chart No. 4. Organisation Chart for the Information Technology Department in 2002



Information Technology Department

The Information Technology Department is responsible for suggesting and implementing policies, laws, regulations and procedures relating to information technology and systems within the Municipality, including information processing services, and for the provision of equipment, programmes and the necessary communication networks for employees. It is also charged with the provision of the necessary system support for the end-users to ensure effective benefit of the systems. Its various Sections have the following duties.

e-Government Services Section

This Section is responsible for the supervision, modernisation, monitoring and support of all computer systems relating to e-Government, whether bought externally or developed internally,

and for the preparation and determination of technical criteria and specifications relating to the development of e-Government systems, databases, programming languages and for their implementation in the Information Technology Department.

It also studies existing e-Government systems, specifies ways in which technical specifications for system upgrades are to be developed and prepares tender specifications.

System Development Section

This Section has the task of suggesting long, medium and short term development plans for the information technology systems in the Municipality and of preparing and specifying technical criteria and specifications relating to the development of systems, databases and programming languages and then has the responsibility of implementing them in the Information Systems Department.

It also carries out cost efficiency studies on systems required by other units in the Municipality and provides technical assistance and training on existing systems and on those which are to be introduced.

Office Automation Section

This Section specifies the need for office automation programmes, carries out studies on their cost effectiveness and makes the relevant recommendations. It also prepares tender invitations with the appropriate technical specifications, contacts suppliers and evaluates quotations received, in co-ordination with other relevant organisational units.

It then supervises training of all computer end-users on the use of various office programmes, internet browsers and e-mail and provides guidance on data protection.

Operations and Network Service Section

This Section operates and maintains the internal and external computer network, lines and communication links, suggests and then implements procedures and special systems relating to the safety and confidentiality of the information network, databases, information storage, back-up systems and the Computer Connections Unit. It also installs and maintains terminals, printers and communications equipment.

Progress between 1995 and 2000

Substantial progress continued to be made by the Department during this period, one notable achievement being the tackling of the Y2K (new Millennium) issue without any adverse effects on the Municipality's operations.

Another important focus of attention was on the implementation of the Municipality's policy on Emiratisation.

On 10th December 1995, the guidelines for Emiratisation were drawn up and adopted, with the recognition that they posed a considerable challenge. One key feature of the guidelines were that people with low to intermediate educational qualifications, below University or College level, should be identified and trained internally, then being distributed among the various units

of the Municipality, so as to reduce the need for support from the Information Technology Centre itself.

It was recognised that there would need to be a creative approach to the task of implementing the Emiratisation and Replacement policy and that available expertise in training should be used, while the replacement of highly-qualified expatriates with members of this internally-trained group of Emiratis was recognised as a way of reducing costs.

Initially, therefore, an experimental programme of such training was initiated. This involved theoretical training on computers, PC programmes and the principles of computer networks, coupled with continuous attention to the need to maintain a high level of morale, through such means as the issuing of Certificates of Appreciation on a monthly basis.

The trainees were also encouraged to take part in technical support operations performed by the Department, so as to gain practical experience, and were encouraged gradually to take on administrative and technical responsibilities, such as those of being team leaders or project leaders required to make reports on the progress of various projects.

Table No. 3. Emirati employees, 1992 – 2002

Year	1995	1996	1997	1998	1999	2000	2001	2002
Number of Emiratis	23	25	29	35	45	54	65	71

The Storage, Movement and Distribution of Information

Archives now require large capacities in comparison to other programmes while many archives lack organisation. This meant that the Department was obliged to re-examine the strategy of creating smaller archives as well as to review data safety procedures with regards to fire hazards, theft and damage. The decision was taken to introduce the concept of the "paperless office", with a number of steps being taken to improve storage, movement and distribution of data. These included the introduction of the following.

Optical Archiving System

A special team was formed to evaluate this concept, to study end-user requirements and to evaluate systems available in local and foreign markets. It was found that there were numerous benefits, including the distribution of documents by e-mail, quicker document retrieval and the reduction of the space needed for storage of paper files. Data could also be more easily protected against threats of damage, loss and the infiltration of extraneous information.

In 1995, the WATER MARK archiving system, a miniature system for daily photocopying of documents and their electronic storage, was selected and approved for use in the Historic Buildings, Contracts and Purchasing, Public Relations, Information Technology and Personnel Departments, while the PLEXUS programme, for large applications, was introduced for the Personnel, Buildings, Administrative Affairs, Legal Affairs and Administrative Development Departments.

It was subsequently found that there were a number of problems with the WATER MARK

system, including insufficient support from the supplier, and in 1999, this was replaced by the DOCUWARE system, which was installed in the Information Technology, Department, the Contracts and Purchasing Department, the Public Relations Section, the General Projects Department, the Historic Buildings Department, the Quality Administration Section, the Roads Department, the Finance Department, the General Maintenance Department, the Dubai Central Laboratory Department, the Markets and Abattoirs Department, the Public Transport Department, the Internal Audit Department and the Public Relations and Organisations Department.

In line with a strategy of centralising the holding of information, the archives of several departments were combined and were unified on one server in the IT Department, which simplifies the provision of support to these systems by the Electronic Archiving Committee.

e-mail System

After testing in the Information Technology Department in 1994, e-mail was gradually extended, from 1995 onwards, to all departments and sections in the main building and to some branch offices, while all end-users were provided with training.

e-mail has proved to be an extremely valuable tool. It has helped secretaries to organise the time of their Managers, through maintaining an electronic diary, while messages can be sent direct to the person concerned. Any letters received by telefax can now be distributed electronically while communications between employees and their managers have been enhanced. Problems arising from oral communications have been removed while the distribution of copies to multiple recipients is now simply a matter of pressing a button.

Internet System

The beginnings of the Internet System were in April 1998, when, following a study by the Internet Committee, a number of dedicated lines were provided to various units of the Municipality.

A Dubai Municipality website was also prepared, with the data being available both inside and externally. The website has several sections. One, for example, offers general information about the work and scope of duties of the various Departments and Sections of the Municipality. Others include a section on general projects, a section of announcements and events, on which various advertisements dealing with, for example, job opportunities, contracts, bids and conferences, are included, while the Laws and Municipal Ordinances section includes the text of legislation and Municipal Ordinances relating to public health issues, environment, building licences and project contracts.

Table No. 6. e-mail and Internet users, 1996 – 2002

Year	1996	1997	1998	1999	2000	2001	2002
e-mail end-users	341	589	943	1,170	1,674	1,865	2,186
Internet end-users	-	50	78	121	242	381	582

A section on Public Services and Utilities provides information on parks, museums, public libraries and the like while there is also a dedicated Dubai Award section, with information on the Dubai International Award for Best Practices to improve the Living Environment.

Administrative Follow-Up System

This system follows up on all documents issued and received by the Municipality, by organising the system for internal and external correspondence. It allows employees to receive information in a timely manner, rather than having to search manually, and also eases movement through the system, reducing the number of forms required.

The follow-up system also registers all correspondence and keeps track of movement so as to avoid any delays in the carrying out of instructions. Confidentiality can be maintained by specifying end-users.

System installation went hand-in-hand with the training of users so that the simplification of procedures was well-established and outdated routines were removed, thus saving both time and effort.

The Internet has also made it easier to link employees through the e-mail system while connection speeds have been increased by around sixty per cent, thus helping in the transmission and back-up of information. The appropriate anti-virus programmes have also been installed, and are regularly updated.

A Programme Bank System was also introduced, involving the storage of programmes needed by end-users on a central computer and the distribution of programmes via the Internet, thus removing the need to send employees to install new programmes. Besides the advantages gained in terms of distribution, this also helped to guard against illegal copying of programmes.

Automated Attendance Monitoring System

In 1995, an automated attendance monitoring system was introduced, to monitor the attendance of Municipality employees and workers. This has simplified the process of preparing reports and statistical data and has also helped Department and Section heads, as well as the Personnel Department, to monitor attendance. It includes two separate sections, one for issuing cards and the other to monitor attendance itself, and to print out all related documents.

Implementing the Principle of Decentralisation

In 2000, a decentralised system covering the procedures of the Personnel Department was introduced throughout the Municipality, this handling holidays, work certificates, reports of attendance sheets, procedures for returning from leave and for overtime working and a general enquiry system. The objectives included a speeding up of procedures, a reduction in the large amount of paperwork that was formerly required, improvement of performance and a reduction of pressure on the employees of the Personnel Department.

The system also simplifies maintenance requirements, since amendments required can now be in-put by end-users, and has helped to disseminate understanding of the concept of comprehensive quality.

As part of its improvement of the services offered to citizens and other residents and as part of the implementation of the e-Government project, the Department introduced 25 separate

Internet-based services between 1999 and 2002. These dealt with revenue collection, the issue of No Objection Certificates, the provision of public transport maps and timetables, a system for offering suggestions, an electronic services guide, a guide to the services of the Buildings and Housing Department, a parking violations system, a library services system and a traffic enquiry system.

Other Internet services dealt with test results from the Dubai Central Laboratory, health certificates from Food Control, the Veterinary Clinic and other veterinary certificates, information from the Central Laboratory on engineering materials, calibration, bricks, foodstuffs, and sand, data on building landmarks, company registration, certificates of import and re-export, hazardous waste, employment, general location maps and enquiries relating to inspection results and violations.

Automated Telephone Enquiry System (IVR)

This system automatically replies to telephone calls made by the public. By calling the Municipality on the dedicated number, 090-40111, callers can be guided through the available options, which include one to indicate the current status of an application and one whereby callers can opt to receive responses by telefax.

This system has meant that there are far fewer visitors to the main Municipality building, thus reducing pressure on employees and permitting them to perform their tasks more effectively.

It also makes it easier for customers to check the process of their applications, while they can also ask to receive, by telefax, details of the relevant laws and procedures.

The system can be extended, as required, throughout the Municipality.

Other systems introduced through the Automated Telephone Enquiry System include automatic replies for the Financial, Parking Violations, Personnel, Contracts and Purchasing , Building and Housing, Roads and Planning and Survey systems.

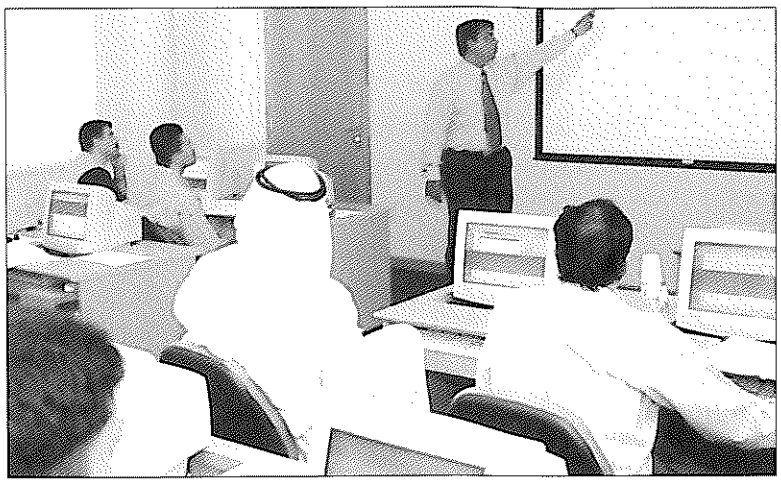
Table No. 7. Number of requests input into the Support Magic programme, 1999 - 2002

Years	1999	2000	2001	2002
Completed Requests	8,748	12,717	16,289	18,481
Requests being processed	19	282	699	949
Total	8,767	12,999	16,988	19,430

Internet Team

In 1999, a special team was established to handle the Municipality's links with the World-Wide Web, this being tasked with the provision of e-mail links to the web and with the authorisation of end-users within the Municipality. It also administers the website and is responsible for providing protection against dangers that may arise from Internet usage, as well as administering and maintaining the Internet servers and monitoring Internet usage.

This team has successfully protected the website against attack, through the use of a security system known as SFIRE WALL, which was completed during the first quarter of 1999. This had additional security features to the previous system, which was replaced.



Training employees on the use of the Internet

Training

The Department carried out a detailed study of requirements for PC and office automation equipment training in 1996, while there is, of course, a continual need for further training, not least because of the increasing dependence of employees on computers to perform their daily tasks.

Information Systems

The process of continually evaluating the Municipality's IT resources made it clear that by the end of 1999, there would be a need for these to be updated. A plan was formulated, in association with specialist IT companies, to develop the programmes using the Client Server technology and ACCESS and VISUAL BASIC languages on a Microsoft SQL server database and an ORACLE database, so as to avoid any problems that might occur in association with the arrival of the new millennium – the Y2K issue.

45 projects were undertaken, with completion rate reaching 90 per cent, partly because some ran for more than a year and partly because of the desire to rely primarily on internally-available resources, in particular on Emirati staff, as part of the process of training them to take on more responsibilities.

Table 12 shows those projects and systems on which work was completed, up to 2002.

Table No. 8. Number of employees trained in the Information Technology Department, 1995 – 2002

Year	1995	1996	1997	1998	1999	2000	1002	2002
Number of Trainees	210	704	336	424	473	427	835	806

With the growing number of trainees, and the upgrading of their skills, new computer servers were required.

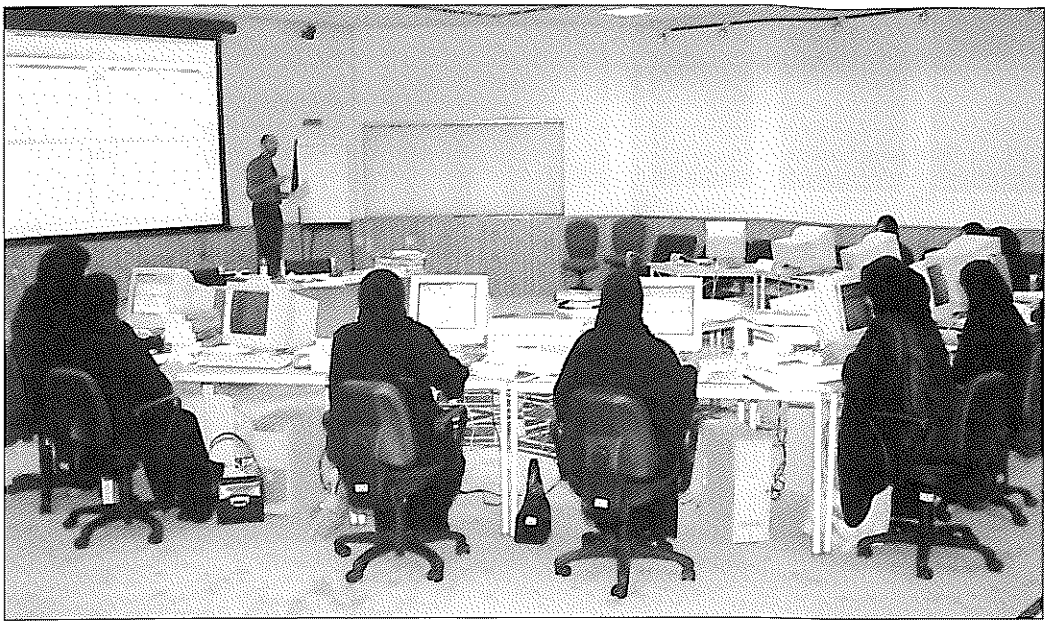
Table No. 9. Number of computer servers, 1996 – 2002

Year	1996	1997	1998	1999	2000	2001	2002
Computer Servers	15	25	64	31	28	30	53
Storage Capacity (GB)	50	110	190	500	1732	2500	3000
Memory (GB)	1.02	4	7	12	21	25	46

Another result of the increasing number of trained personnel was the identification of a need for more Internet access locations.

Table No. 10. Number of Internet access locations, 1998 – 2002

Year	1998	1999	2000	2001	2002
Number of Locations	7	34	64	87	91
Internet Locations Percentage	10%	49%	91%	95%	93%
Percentage of back-up capacity	33%	56%	69%	50%	100%



The number of computers has increased as more people have been trained

With the increase in the number of Internet access points and in trained personnel, it became apparent that there was not only a need for more computers but also for an expanded training programme, to help continue the expansion of the computer network. Table No. 11 shows the expansion in the amount of equipment, from 1996 – 2002.

Table No. 11. Number of computers in use, 1996 – 2002

Year	1996	1997	1998	1999	2000	2001	2002
Number of Computers	374	1,035	1,250	1,390	1,799	2,299	2,731
Number of Printers	138	462	599	941	1,099	1,213	1,413
Number of Scanners	0	20	36	66	85	121	201

Table No. 12. Projects completed up to 2002

No	Name of System	Department concerned	Implementation
1	Purchasing System	Contracts and Purchasing	Internal
2	Stores System	Contracts and Purchasing	Internal
3	Personnel, Payroll, Services and Training Systems	Personnel	Internal
4	End-Users support system (SUPPORT MAGIC)	Information Technology	External
5	Food Inspection System	Health	External
6	General Maintenance System	Transportation	External
7	Administrative Follow-Up System	All Departments	Internal
8	Dubai Central Laboratory Department System – Engineering Materials	Dubai Central Laboratory	Internal
9	Instruction System for Public Transport Users	Transportation Section	External
10	Veterinary Clinic System	Health	External
11	Audit system, ACL	Administrative Develop. & Quality	External
12	Government Housing System	Buildings and Housing	Internal
13	Project Payments System	Contracts and Purchasing	Internal
14	Graveyard System	Health	Internal
15	Project Contracts System	Contracts and Purchasing	Internal
16	Contracts and Tenders System	Contracts and Purchasing	Internal
17	No Objection Certificates System for the Drainage System	Drainage	External
18	Follow-Up and Maintenance of Personal Computers System	Information Technology	Internal
19	Monitoring of Traffic Violations System	Roads	Internal
20	Locations Licencing System	Roads	Internal
21	Building Violations System	Buildings and Housing	Internal
22	Properties System	Markets and Abattoirs	Internal
23	Financial System	Finance	External
24	Industrial Land System	Planning and Survey	External
25	Abattoirs System	Markets and Abattoirs	External
26	Road Maintenance System	Roads	External
27	Public Clinic System	Health	External

No	Name of System	Department concerned	Implementation
28	Pest Control System	Health	External
29	Abra System	Transportation	Internal
30	Transportation System	Transportation	External
31	Car Park System	Transportation	External
32	Environment Protection System	Environment	External
33	Compensations System	Finance	External
34	Parking Violations System (Internet)	Roads (and the public)	External
35	Local Fee Collection System	Finance (and the public)	External
36	Internet Building Services System	Buildings and Housing (and the public)	External
37	Information Technology Department Procedures System (relating to Projects Department)	Information Technology	External
38	e-Government Services (First Phase)	All Departments (& the public)	External
39	Pavements System	Roads	External
40	System Administration of computer programmes and systems issued (First Phase)	Information Technology	Internal
41	Land Registration System	Planning and Survey	Internal
42	Building Licences System	Buildings and Housing	External
43	Food Laboratory System	Dubai Central Laboratory	External
44	Calibration System for Measuring Equipment	Dubai Central Laboratory	External
45	Borehole Databank System	Dubai Central Laboratory	External
46	Car Park Ticket Sales System	Finance	Internal
47	Garage Purchasing System	Transportation	Internal
48	Archiving Scanner System (DocuWave)	All Departments	External
49	Maintenance System – Al-Aweer Station	Drainage	External
50	Inspection System	Environment	Internal
51	Assisting Archiving System (Optical Archiving System 2000)	Planning and Survey	Internal
52	PLEXUS Archiving System	Planning and Survey, Personnel and Buildings and Housing	External
53	Decentralised Personnel System	All Departments	Internal
54	Children's City website	Public Parks (& the public)	External

Developments between 1998 – 2002

During the period from 1998 to 2002, the IT system underwent a major upgrade, this being due, in part, to the fact that many employees were working in locations outside the main Municipality building. It was also necessary for there to be a more efficient system of communications between different departments and sections as part of the process of transferring to the new e-Government procedures.

As part of this process, the entire network was replaced, at a cost of two million UAE dirhams, with the latest network technology being installed, under the terms of an agreement with HNCR, the supplier.

The internal network was re-designed to permit data to be distributed rapidly, using switches designed by the firm NORTEL, while high-speed fibre optic cables, with a speed of 1 GB per second, became the core of the system.

A Network Operations Centre was also established, to supervise most of the technology services in the Municipality, while designs similar to those in the main building were prepared for all of the external locations. Servers in remote locations were linked to a centralised backup system which gathers the data from external locations and saves it in the magnetic tape library, which has a capacity of between 100 and 200 GB. A CISCO router was introduced to link the various networks and to provide emergency branch lines.

As far as the Y2K issue was concerned, an emergency plan was drawn up covering all of the Municipality's systems, under which all available technical resources were mobilised. This involved extensive overtime, with people on occasion working as late as midnight, while all holiday leave and the system by which people were authorised to leave their work during office hours were suspended.

As a result of the work carried out under the plan, around nine new ORACLE systems were introduced, all COBOL systems were replaced by Microsoft systems and 800 individual computers and 30 servers were inspected to ensure that they were Y2K-compliant. The Department also collaborated with other units of the Municipality in liaison with manufacturers to seek assurances that their equipment would not be affected by the Y2K problem. As a result of all of this effort, the Municipality was not affected in any way.

In 2000, in accordance with the directives and vision of His Highness General Sheikh Mohammed bin Rashid Al Maktoum, then Crown Prince of Dubai and UAE Defence Minister, with regards to the e-Government project, a special committee was formed, headed by the Assistant Director General for Environment and Public Health Affairs.

Information Systems

The following table illustrates the information systems used in Dubai Municipality

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
1	Parking Fines System	Roads	2000		Used to input and follow up on par ing violations affiliated to t Municipality. It is linked to the inte net, permitting individuals and cor panies to search for parking viol tions recorded.
2	Pavement System	Finance	2002		Used to monitor pavements ar includes engineering data for streets.
3	Road Corridor	Roads	2000		Includes the input and issue of stre permits for cafe and restaurant ou door seating.
4	Road Maintenance	Roads	1999		Used to register and follow up c road maintenance work (project dat clients, maintenance requests, eng neers, materials...etc.)
5	Inspection and Service Coordination	Roads	1999		Used to input and follow up c requests for road construction worl and the issue of No Objectio Certificates.
6	Traffic Faults System	Roads	2000		Used in the Traffic Systems Contr Centre, part of the Roac Department, to count the number c times in which the network lines ar detached from the traffic lights, an to specify the reasons for malfun tion, whether due to external autho ities such as Etisalat or for intern reasons, such as being due to maint nance work. This is done throug extraction of reports and data relatin to malfunctions.
7	Smart Stream	Finance	1999		Financial Administration System, fc input and regulation of the chart c accounts, General Ledger, supplier accounts, budget accounts...etc.
8	Finance Report System	Finance	2001		Used to extract financial reports fron the financial system.
9	Local Fees Collection	Finance	Phase (1) 2000 Phase (2) 2002		Used to collect local fees owed by var ious parties.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
10	Abattoir	Markets and Abattoirs	1999		Used to organise all the abattoirís procedures, including slaughter, dissection, refrigeration and distribution of cattle to companies and individuals.
11	Real Estate	Markets and Abattoirs	1998		Administers real estate/ rent in respect of the Municipalityís real estate.
12	Land Registration	Planning and Survey	1990		Used to register and follow up on land in Dubai, registration of land ownership and change of ownership, according to purchase, sale, transfer or granting of land.
13	Industrial Land	Planning and Survey	1999		Used to register and follow up on industrial land in Dubai, registration of purchase requests and planning of distribution.
14	Plexus	Planning and Survey Personnel Affairs Building and Housing Legal Affairs	1993		Archives and saves documents electronically.
15	Land Management System	Planning and Survey	2002		Registers private and public land distribution and organises all matters relating to their ownership.
16	Advertisement Contracts System	Advertisement Section	2002		Used to follow up on the award of advertising contracts and issue of payment vouchers and reports on late contracts.
17	Advertisement Permits Search System	Advertisement Section	2002		Used to check bridges and vehicles to enquire about permits and to check the list of the names of private buildings registered at the Advertisement Section to avoid the duplication of names.
18	Building Fines/ Supervision	Building and Housing	1996		Used for supervision of construction, input of records of violations and specification of fines.
19	Building Fines/ Supervision	Building and Housing	1996		Used for building inspection, input of records of violations and specification of fines.
20	Fines/ Remote Building	Building and Housing	1999		Used for inspection and supervision of rural areas, input of records of violations and specification of fines.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
21	Government Housing	Building and Housing	1997		Administers the work of tl Government Housing Section, inclu ing the granting to Emiratis of lar and the provision of maintenance wo and financial assistance.
22	Building Permits	Building and Housing	1990		Used for the issuing of building permits
23	Food Laboratory	Dubai Central Laboratory	2000		Receives food samples and perforn tests on the samples. Results are sei to the Food Monitoring Section
24	Calibration Laboratory Equipment	Dubai Central Laboratory	1999		Records and calculates the calibratic date for equipment and saves a information on equipment.
25	Borehole Databank	Dubai Central Laboratory	2000		Registers information on excavatio and soils in respect of characteristi such as layers and thickness.
26	LIMS (Laboratory Information Management System)	Dubai Central Laboratory	1998		Manages operations relating to tes ing, examination, costs and paymer of materials.
27	Warehouses	Contracts & Purchasing Transportation Administrative Development Quality Information Technology Markets & Abattoirs Administrative Affairs	1999		Includes procedures for input an dispense of items from warehous and follow up of stock and stocktal ing and all operations relating t warehouses. This system is linked t other systems
28	Projects & Payments	Contracts and Purchasing Roads Sewage and Irrigation General Projects Maintenance	1999		Handles registration and organisa tion of contract data, project phase amounts due at each phase, registra tion of payments to contractors an consultants. The system includes register with details of all contracto and consultants registered at th Municipality.
29	Tenders and Contracts	Contracts and Purchasing	2000		Handles registration and organisa tion of contracts and tenders data an is linked to project contracts.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
30	Purchasing	Contracts and Purchasing – used in each administration	1999		Organises procedures relating to purchasing and internal and external purchase requisitions.
31	Fixed Assets System	Contracts and Purchasing Administrative Affairs	2001		This system registers and follows up fixed assets as well as calculating their depreciated values.
32	Personnel & Payroll System	Personnel Affairs	1999		Organises personnel affairs and calculates all matters relating to employee salaries and services such as air tickets, leave, work certificates and overtime payments.
33	Recruitment	Personnel Affairs Legal Affairs	1996		Organises procedures relating to employment and vacancies in the Personnel Affairs Department.
34	Training	Personnel Affairs	2000		Follows up on employee training and training courses.
35	Employees Evaluation	Personnel Affairs	1999		Follows up on employees evaluation.
36	Attendance	Personnel Affairs	1999		Follows up on employees attendance.
37	Employees contracts	Personnel Affairs	2000		Follows up on employee contracts.
38	Veterinary Clinic System	Health	2000		The Veterinary Information Administration System deals with all cases handled by the Veterinary Section, part of the Public Health Administration of Dubai Municipality, through maintenance, treatment and administration of information relating to animals imported through Dubai's various ports. It also includes the processing of detailed veterinary treatment records, animal death registrations, animal vaccinations, health certificates, veterinary tests and results in addition to the inspection records and health quarantine records.
39	Food Inspection	Health	1996		Allows food inspectors to inspect food types and, through laptop computers, to view the daily inspection table, to register inspection results and to follow upon the results and print reports.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
40	Public Health Clinic	Health	1999		Administers the public clinic proc dures within Dubai Municipality.
41	Pest Control System	Health	1999		Administers health, registers and f lows up on pest control procedures
42	Cemetery System	Health	2000		Used to register data relating deaths where bodies are transport in, to and from the Emirate of Dub Extracts the required reports and st tistics and registers incoming a outgoing movement of vehicl belonging to the cemetery and hosp tals which are used to transport bo ies and consumables.
43	Abra Control	Public Transport	1999		Registers all the data relating to abra their owners and passengers ar issues an Abra Operation Certificat Registers all the approved procedur within the Abra Section, includir violations, fees due for abras, registr tion of collection receipts, issue abra maintenance permits and regi tration of accidents involving abras i the Creek.
44	Transit Control System (TRACS)	Public Transport	2000		Public Transport Revenue System passenger tickets are issued inside th bus from a ticket machine. At the en of the day, the machine's key is hanc ed over to the Operations Supervisc in the Garage. The Supervisor emp ties all the keys in a machine linked t a computer with the TRACS prc gram. In the morning, the accountan extracts the necessary reports from th system to check against the revenue received from the drivers. There is a additional reports system affiliated t the system.
45	Public Transport ñ Transport Operations	Public Transport	2001		Registers the daily movement of bu operations beginning with the Ru Out Control which is prepared accord ing to the list of drivers and timetable which is updated when required by th Planning and Marketing Centre. Als deals with other tables such as the dri vers' schedules,, bus malfunctions buses stationed in the garage and th

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
					period of malfunction, changes of buses and period taken for changeover as well as extracting daily reports.
46	Public Transport ñ Penalty	Public Transport	2001		Used to input violations and complaints made against public transport drivers and specifies a date for investigation and the date drivers are to be informed about the investigation and when it is to be held. The Bus Operations Officer views the lists on the relevant day and follows up the investigation with the driver and administers the appropriate penalty. Then the Administrative and Financial Services Section types the table and places in the driver's file pertaining to Personnel Affairs. The same applies to internal procedures.
47	Public Transport DM Parking	Public Transport	2001		Registers the details of every employee who receives a Municipality Vehicle for which Municipality parking is allocated after working hours. The security guard in charge of the car park sends a list of all the cars present. The list of cars is checked against those registered to identify any violation of the rules and saves data received from various departments in the master database.
48	Bus Passes – Public Transport	Public Transport	1999		This system is available in the main bus stations. It registers passenger applications and renewal of monthly bus tickets which are valid from the date of issue –a file is saved for each applicant and statistical reports are extracted, such as reports pertaining to the number of participants in a certain area and informs participants upon renewal of tickets.
49	Public Transport – Overtime	Public Transport	1999		Calculates the number of overtime hours for each Supervisor according to his work schedule at the bus stations.
50	Public Transport –Economic - NOC	Public Transport	2001		This system registers the No Objection Certificates issued to the Department of Economy relating to a customer allowing him to establish

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
					activities in the field of transport tion which are not in conflict wit the activities of the Public Transpo system.
51	Public Transport –Internal Transport	Public Transport	2001		Inputs the number of drivers accor ing to routes and buses specified fc internal transport in addition t extracting daily reports and a stat ment of daily movement.
52	Public Transport –Stores System	Public Transport	2001		Processing items received in an issued from the store of the Transpor Department (Administrative an Financial Services Section) to extrac the stocktaking report.
53	Public Transport –Bus Station Control	Public Transport	2002		Registers the arrival time of buses i the main bus stations. It is to b installed in all of the stations an linked to the garage database. Al types of reports can be extracted fron this system.
54	Public Transport –Pathfinder System	Public Transport	2002		Used to enquire about public trans port routes, register missing proper ties left in public transport vehicle and for registering suggestions an complaints.
55	Public Transport –Keepers' Time Table	Public Transport	2002		Used to allocate keepers to stations The keepers are posted to the station on a monthly basis, and are rotated while keeping in mind their weekl holiday.
56	Maintenance System –MAXIMO	Transportation General Maintenance Sewage and Irrigation	1999 2002 2000		Follows up on regular maintenance for all machinery according to an annual schedule. The system works by inputting all data relating to unscheduled maintenance such as spare parts and hours of work spent on maintaining the system. This system is linked to the stores system.
57	Re-order System Transportation	Transportation	2001		This system automatically follows up on orders for spare parts for vehicles according to international storage formulas and standards as well as initiating purchase orders, these being automatically input.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
58	Preventative Maintenance System Transportation	Transportation	2001		This system formulates preventative maintenance plans for official vehicles, based on a study of the mileage, whereby maintenance messages are sent to the Municipality's departments and sections. A work ticket is raised for each vehicle.
59	DM Vehicles Information Transportation	Transportation	2003		This system is used to enquire about official vehicles data separately in respect of maintenance costs, preventative maintenance appointments and when vehicle maintenance work is completed in the workshop.
60	PC follow up and maintenance	Information Technology	2000		This system registers and follows up on all requests involving computers and their accessories, follows up on maintenance operations required for equipment received from other departments and follows up on the issue of sequential numbers used within the system to issue various administrative and statistical reports for reviewing work completed by the technicians.
61	Environment and Protection Safety	Environment	1999		Administers all work relating to violations of environment regulations and all matters concerning food factories and textile, leather and timber workshops and factories. All complaints and violations are in-put into this system.
62	ACL System	Internal Audit Section	1999		This system is used by the auditors to extract reports for review and audit purposes.
63	Rent Committee System	Municipal Council	2002		This system is specifically designed for the Municipal Council, to organise and follow up on all matters relating to rents.
64	Follow–up System	All Offices within the Municipality	2001		This system registers and organises incoming and outgoing documents and archives them electronically.
65	Docuware	All Offices within the Municipality	2000		This system archives and documents all papers and documents.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
66	Web-based Personnel	All Offices within the Municipality	2002		This is an internet enquiry syste relating to personnel procedu (leave, salaries, air tickets, evaluatio overtime...etc.) Through this system, the vario departments are able to issue certi cates dealing with work, leave, a returning from leave without refe ring to Personnel Affairs, therel reducing the time and the paperwo relating to these procedures.
67	Health Certificates Service on the net (part of E-Government Services)	Health	2002		These services include the following: Food Monitoring, including - Health Certificate for the export foodstuffs - Health Certificate for the export foodstuffs to GCC countries - Certificate on absence of radioactivit - Special requests to approve healt cards - Requests to destroy food stuffs The Clinic, including: - Request for Certificate of Goo Health - Request for Health Card The Veterinary Clinic, including: - Certificate for the import of animal and veterinary materials - Certificate for the export of animal and veterinary materials - Health Certificates for animals
68	Site Plans Service on the net (part of E-Government Services)	Planning and Survey	2002		This includes the following: Requests for new housing land Requests to renew a map and nev requests for the granting of land o grant or renewal of map –private
69	Hazardous Waste Service on the net (part of E-Government Services)	Environment	2002		This includes the following: No Objection Certificates to obtair information No Objection Certificates for th design phase No Objection Certificates for th implementation phase Other No Objection Certificates Renewal of No Objection Certificates Clearance Certificate

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
70	DCL Services on the net (part of E-Government Services)	Central Laboratory	2001		This includes the following: Engineering materials, including: - Request to issue Engineering Materials Certificate Bricks, including: - Request to issue Brick Certificate Sand, including: - Request to issue Sand Certificate Foodstuffs, including: - Requests for food stuff testing Calibration, including: - Request to calibrate equipment
71	One Stop Inspection Results and Fines Service on the net (part of E-Government Services)	Building and Housing Central Laboratory Environment Finance General Maintenance Markets and Abattoirs Health Horticulture & Public Parks Roads Advertisement Section Service Coordination Office	2002		Including the following services: Enquiry about inspection results Enquiry about violations Enquiry about outstanding unpaid violations.
72	Recruitment Service on the net (part of E-Government Services)	Personnel Affairs	2002		Includes applications for employment
73	Online Statistical Information Service on the net (part of E-Government Services)	Census Centre	2002		Includes the display of existing statistical reports and requests for new statistical reports
74	Revenues Service on the net (part of E-Government Services)	Finance Roads	2001		Includes Monthly revenues from fees paid by hotels, furnished apartments, supply companies. Monthly revenues from fees paid by cinemas Monthly revenues from fees paid by private shops Monthly revenues from fees relating to accidents.

No.	Name of the System	Beneficiary Administration(s)	Date of Implementation		Description of the system
75	Parking Fine Enquiry Service on the net (part of E-Government Services)	2000	Roads		Enquiries about car parking fines.
76	Directory of Services Service on the net (part of E-Government Services)	2001	All Offices within the Municipality		Includes the display of general info mation relating to the Municipality services.
77	Geographical Information system (GIS) Service on the net (part of E-Government Services)	2000	Geographical Information Centre		Includes Search for maps within the Emira of Dubai Search for addresses Search for utilities/services
78	Dubai Public Library Service on the net (within E-Gov part of E-Government)	2000	Administrative Affairs		Includes the facility to search by titl subject and author
79	Fuel System	1998	Administrative Affairs		This monitors the fuel consumptio of Municipal vehicles.
80	Horizon System	1999	Administrative Affairs		This is used to input and follow u on indexing, borrowing, membe ships and registration procedures.
81	Food Control System	1998	Health		This is used to monitor and to follow u on all shipments entering Duba through the various ports of entr through the registration of detailed dat relating to each shipment, food sample data and any follow up on laborator tests undertaken to determine whethe import of goods is to be permitted.
82	Daily Follow-Up System	2001	Public Transport Department		This programme is used to inpu appointments and daily matters relat ing to the Departmentís Manager The inputting is carried out by th secretary, with follow up being undertaken by the Departmen Manager.
83	Evaluation System Drivers	1999	Public Transport Department		Drivers are evaluated every six months and the best 20 drivers are chosen and rewarded with prizes according to the performance criteria chosen. These include conduct, absences, sick leave and number of accidents, a statement and graph being extracted to show results.

The Municipality and e-government

The Municipality began its transition towards the process of e-Government many years ago, setting out to prepare and to plan for the transition, without feeling the need to make any formal announcement. The process was initiated by the Information Technology Department, which sought to make use of the emerging Internet to benefit Municipality customers by making various services accessible by electronic means.

One of the earliest steps was introduced in November 1999, and involved a simplification of the procedure for collecting revenues from hotels, furnished apartments and cinemas.

This was followed by January 2000 by the launching of the Municipality's website while in January 2001 an electronic book and magazine search facility was introduced in the Public Libraries. This was followed by the inauguration of an electronic method for searching for statistical data, in June 2001, and by the implementation of the Geographical Information System GIS, for the Geographic Systems Centre in July 2001.

In 2002, four more electronic services, with eight separate subsidiary services, were introduced, covering Building Landmarks, the Classification of Land Use, Sewage and Irrigation Services and, being launched for the public for the first time, the GIS system..

The Information Technology Department also worked to establish the necessary infrastructure within the Municipality for e-Government. Over 2,000 computers were installed, each equipped with an e-mail facility, training courses were run for employees on basic computer skills, and the electronic network was extended to link the Main Office to a total of 87 different locations, including external units affiliated with the Municipality. Over 50 separate systems were developed to support the work of various Municipality units, to help them carry out their work and to provide services to customers.

The Dubai e-Government project was formally launched in April 2000 by HH General Sheikh Mohammed bin Rashid Al-Maktoum, then Dubai Crown Prince and UAE Minister of Defence, followed by the issue of Administrative Directive No. 104 for 2000 on 22nd April 2000. This set up a special committee, headed by the Municipality's Assistant Director-General for Environment and Public Health Affairs, to follow up the implementation of the e-Government project. This committee was given the task of laying down a comprehensive vision and strategy for the implementation of e-Government within the Municipality, and of then implementing it.

A firm of international consultants was appointed to draw up a vision and strategy with realistic and tangible objectives for the near and longer-term future. This was to be done through interviewing the people in charge of each of the Municipality's organisational units, so as to identify their responsibilities and the services they provide and to assess the extent to which they had assimilated and implemented the basis and concepts of e-government. As an initial step, around 150 separate services provided by the Municipality were identified, including internal services such as personnel affairs and legal services.

A second stage of classification involved the distribution of a questionnaire to specify the services under the criteria of "specifying the benefits of electronically transforming services according to their importance to the Municipality and customers." At this stage 40 services were identified which could be provided through the Internet.

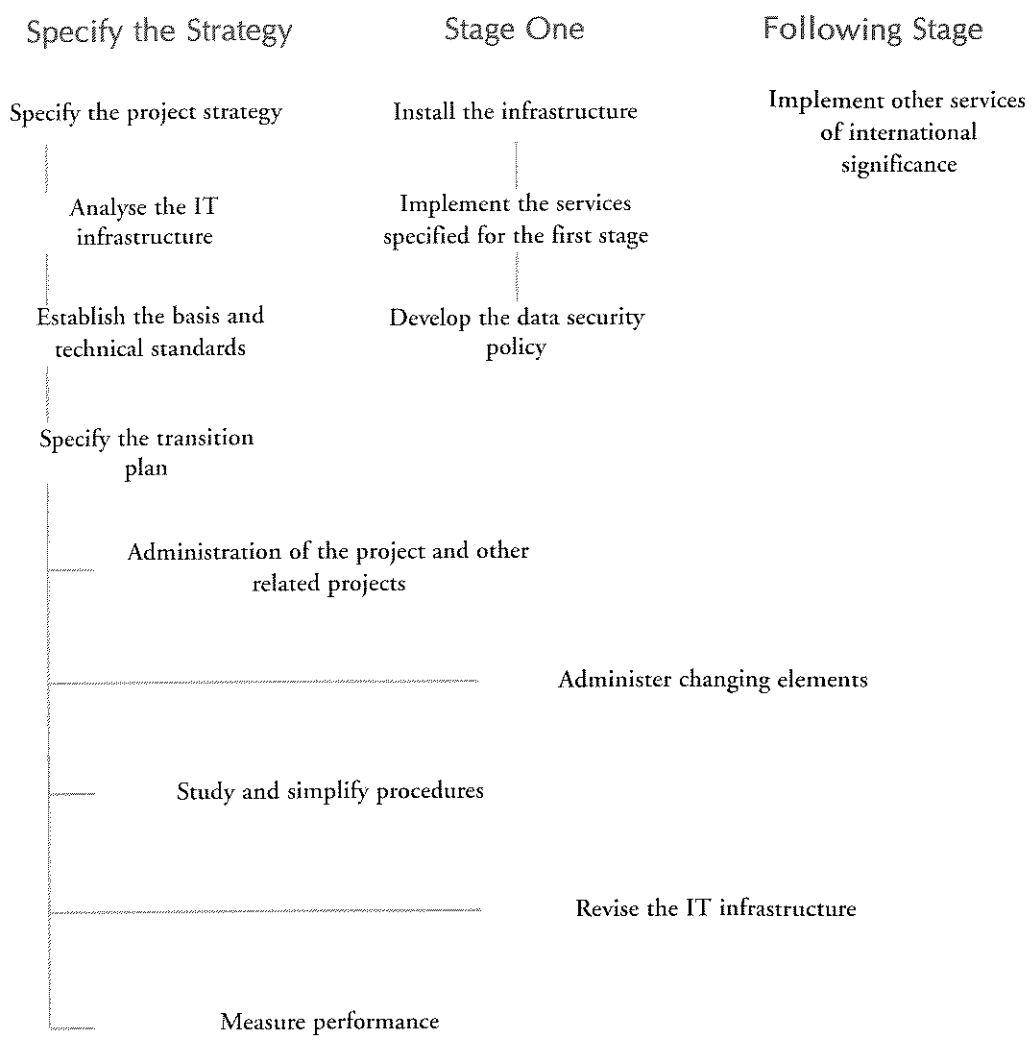
A third phase of classification then took place, to compare the scope of service with the degree of difficulty in introducing it. A total of 12 major services were then identified as being of high

priority in terms on introducing an Internet capability, as part of the first phase of implementing e-Government within the Municipality.

This was followed by a study of the existing Information Technology infrastructure and an analysis of the extent to which the Municipality was ready to introduce and operate electronic services, including a comparison of programmes, equipment and various technical standards used internationally in an Internet environment.

A number of seminars were then organised to raise the level of awareness among employees about the objectives of e-Government and their effect on customers and employees, followed by the preparation of a plan to implement the project, in several stages.

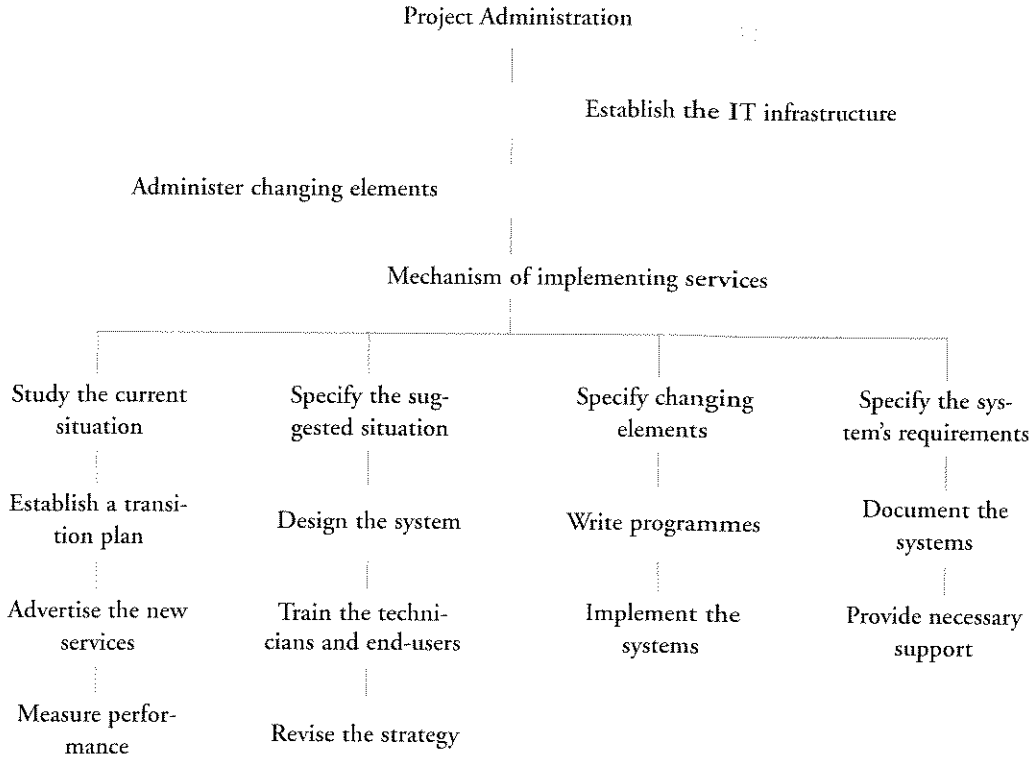
Comprehensive plan to implement the e-Government project within Dubai Municipality



Implement the First Stage Services (12 Main Services)

The first stage of introducing e-Government, which commenced in June 2001 and concluded in May 2002, started with the installation and testing of the necessary electronic infrastructure. Several main services were then introduced, in accordance with decisions taken during the Strategy Specification phase.

The Methodology of implementing the First Phase Services in the Project



The Municipality's e-Government committee then set up several sub-committees and work teams, one for each service, to work with the project consultants on implementing the services. Each sub-committee and work team included a Head, drawn from the membership of the e-Government committee, and representatives drawn from the organisational unit or units concerned. The number of members ranged between 5 to 20, depending of the nature of the service and on the number of units involved.

This was followed by the holding of seminars about e-Government and data security concepts as well as technical seminars for employees of the IT Department, and by the organisation of training courses for Municipality employees and customers on how to use and to benefit from the electronic services. In all, over 50 seminars and courses were held, attended by around 1,050 people.

In order to inform the public about the impending introduction of e-Government services, a number of press conferences were held, while advertising campaigns were undertaken to inform customers and to encourage them to use the new services.
The data security policy was also drawn up and was implemented.

The first phases of the Municipality's e-Government programme to be introduced are explained below, along with some basic information about the scope of the systems and the extent of work involved in preparing them.

List of Services	Number of contributing departments	Average number of participating employees	Number of sub-systems	Links with internal systems
Electronic Services Guide	22	30	1	-
No Objection Certificates	11	35	1	-
Dubai Central Laboratory test results	3	20	2	1
Dubai Central Laboratory Certificates	4	25	3	1
Health Certificates	4	20	3	1
Enquiries on inspection results	12	50	1	3
Inquiries on violations	12	50	1	3
Employment	2	10	1	1
Municipality news	22	30	1	-
Statistical data	2	5	1	-
Administration of hazardous waste	2	5	1	-
Location maps	3	10	1	1
Registering customers	2	10	1	1
Collection of revenue fees	1	20	8	-
Suggestions system	22	50	1	-
Public Transport maps & timetables service	1	3	1	-
Building and Housing Department services	1	21	18	-
Car park violations	1	3	1	1
Public Library services	1	40	1	-
Traffic movement services	1	2	1	-
Geographical Information services (e-guide)	1	8	1	-
Building Landmarks	1	6	3	2
Classification of land uses	1	3	1	1
Sewage and irrigation services	1	5	4	1
Geographical Information Systems (GIS)	1	4	3	-

The Municipality website (www.dm.gov.ae)

The Information Technology Department set up a work team with over ten members to administer the project and to follow up on its technical implementation. The first phase involved the introduction of 12 main services, with a total of 55 subsidiary services. In 2002, other services were added, with the total number of services being explained in the following table.

There are currently around 3,400 customers, from various firms and bodies, who are registered with the Municipality's e-Government services, while at the end of 2002, around 655 employees of the Municipality had been registered to provide electronic services.

The first phase of the e-Government project, including the study, design and development of electronic services and the installation of the necessary technical infrastructure, cost around 15.5 million UAE dirhams.

The next phases of the project

In the second phase, it is planned to introduce a new Internet service, to provide services through a variety of channels, such as mobile and land telephones and to link the electronic services with the Municipality's internal systems, so as to achieve a greater degree of electronic communication between the customer and Municipality employees.

New internal systems will be developed by the Information Technology Department to support the electronic services and to integrate the Municipality's internal procedures, while a comprehensive programme of training courses will be carried out to improvement education on the Internet and to raise the awareness of both customers and employees about the electronic services available and ways of using them.

Other plans include further promotion of the Municipality's website and services and the introduction of electronic payment systems to simplify procedures for customers.

Geographic
Information
Systems Centre

Geographic Information Systems are very important for any institutions because of the way in which they can provide data and analysis for the use of decision-makers. This applies, of course, to any city government, such as the Dubai Municipality, which has established a local system covering the whole of the Emirate.

What is Geographic Information?

Geographic information includes all types of information related to specific locations, such as naturally-occurring features like flora, mountains and beaches and man-made structures, like buildings and roads and sewage networks. Information like land Units, legislation, building laws and so on can also be included in the broader definition of such information.

Background to the Dubai Geographic Information System, DUGIS

At the beginning of 1990, the Survey Section of Dubai Municipality began to plan for the implementation of the Geographic Information Systems, GIS, project. Over a ten year period, those involved in the project have been able to secure recognition of both an internal and an external role for the use of GIS, internally with regards to all Municipality units and externally with regards to consultants and contractors.

As interest in GIS developed and it became more extensively used by the Municipality's various Departments and Sections, it became apparent that there was a need for a special organisational structure to be set up to ensure effective co-ordination. The Geographic Information Systems Centre was established by Dubai Municipality in February 2001.

Development of GIS in the Municipality

The first phase of work in setting up the GIS system involved identifying the sources of data and then collecting the data, first within the Survey Section and then throughout the Municipality. This was then followed by the drawing up of the Organisation Chart and implementing the introduction of GIS.

Phase One: Specifying the sources and data gathering, 1990 – 1997

During this stage, a central computer system was established, linked to the GIS model, and the necessary equipment was obtained to permit the assigned team to obtain the necessary data to construct the nucleus of an accurate database.

The study of the basic requirements and the testing of programmes and equipment was completed in 1990 and a successful pilot project was carried out in 1991-1992. A network of accurate and uniform survey control points was established, using the highly-precise WGS84 datum, and then, between 1992 and 1995, planning documents and topographical plans covering Dubai's urban and rural areas were collected, digitised and entered into the database.

Aerial photography was carried out in 1992 and satellite photography was obtained in 1993, with the survey work being completed by the end of 1994.

During 1996 and 1997, the Land Information System was prepared. This involved allocating to each plot of land a unique number, PID, which was then linked on the database to information such as the area of the plot, the owner's name, the date on which it was granted to him, land use, geographical co-ordinates and so on.

In 1997, the available maps of locations in Dubai, showing over 45,000 individual plots, were scanned and included.

Only limited resources were available during this stage, but excellent use was made of locally-available personnel who were provided with training to equip them to manage the system when it became operational. Consultants with experience of GIS were recruited to provide assistance and training

The collection of data took a considerable amount of time, and it was, therefore, possible to undertake various other tasks in parallel, including the development of the applications for the system.

One need was for the completion of a structure whereby applications made to the Survey Section for information from the GIS could be handled in an automated way. The team prepared a flexible system which allocates tasks and forwards applications to the relevant parties in a sequential and effective manner. Each employee was allocated responsibility for handling clearly-defined parts of applications, in accordance with their own specialist skills or information.

Today, applications for the issuing of location and planning maps or of building landmark certificates and certificates of completion are all handled by computer with a unique identification key for each.

The system also provides a simple and effective electronic record of all applications received by the Section and of the process of procedures, from receipt to completion. It also allows managerial staff to produce reports that help in the preparation of detailed future planning. All of this also makes it easier for staff to take informed and appropriate decisions.

A second task undertaken in parallel with the data-collection process was that of completing the issuing of land location and impact maps, this being completed by the end of 1993. A special programme was designed to permit the production of these maps, in A4 size, from the system, making use of the allocated PID numbers. This not only enhanced the accuracy and quality of the mapping, but also made it possible to increase the output of maps, from two or three a day, when they were manually produced, to between 15 and 20 a day.

In 1997, a system for issuing Certificates of Completion and Landmark Certificates automatically was also completed, saving time and effort and improving accuracy, this being followed by the introduction of a system for issuing No Objection Certificates.

Also in 1997, a Parcel Enquiry Programme was introduced for handling requests for land data. This included a facility for viewing the location map, placing the piece of land concerned in context to other parcels of land in the same planning area and for printing out of data.

Phase Two: Expansion of the system in the Municipality's Departments and Sections, 1998 – 2000

During this phase, the concept of a dedicated GIS was circulated to most of the Departments and Sections of the Municipality. At the same time, end-users were trained and a special team was created to administer and to develop the system.

Among the work carried out during this phase was the following:

1- Aerial Photography

Aerial photography of the whole of Dubai Emirate was carried out in 1998, to obtain a com-

plete set of accurate and up-to-date images. This helped the Municipality's programme to improve the services being offered with relation to, for example, survey and planning services, sewerage, property planning and so on.

2 - In-putting of Data

Data on the right-of-way centrelines was digitised and in-put during 1998 as part of planning for the development of a programme for producing maps that included street numbers and names. Zoning data and data on the sewage and irrigation networks were in-put during 1999, this being made available to the various users in the Municipality as well as to the computer application which produces location maps.

Digitisation of the centrelines from the aerial photography and from various road projects was also completed with the results being in-put between 1998 and 2000. Over the same period the GIS team also in-put the land address system, linking building numbers to street and area numbers, so that this could also be used in various applications.

3 - Archiving

Work began in 1999 on auditing and organising the land files, according to the unique PID Number and according to the planning area numbers. The files were then moved to the new archive system.

Parallel with the above, the design and development of various applications also continued. In 2000, for example, an application was developed for the production of location maps, including zoning data and street names, at an A3 size, while a Geographic Information Enquiry System was also developed, which included the land data and zoning data, roads, the address system and the sewage and irrigation network as well as aerial photographs.

Phase Three: Development of the Organisation Chart and establishment of the Geographic Information Systems, GIS, Centre

In 1992, a general strategy, in accordance with Administrative Order No, 281, was drawn up, outlining the ways of obtaining benefit from the Geographic Information System.

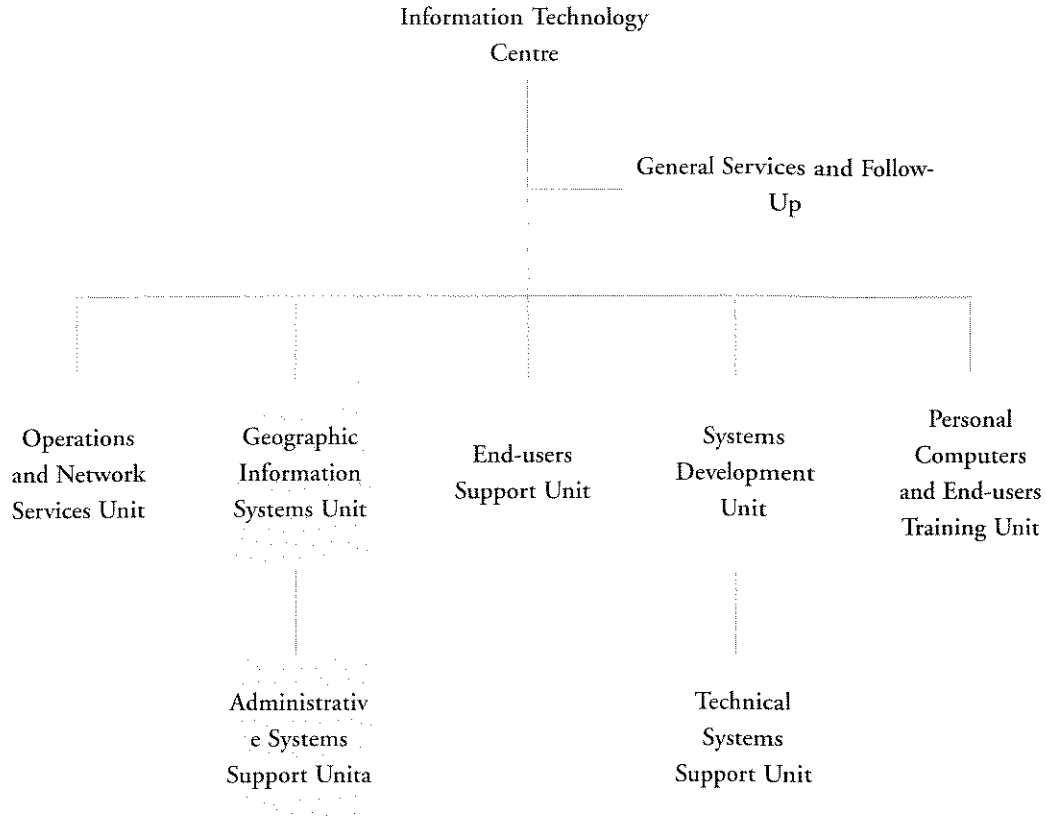
In line with this, between 1993 and 2000, work on the GIS was handled by the Planning and Survey Department which was responsible for collecting the data and establishing an initial structure for the system, and by the Information Technology Department, which handled the necessary technical matters. The project as a whole was overseen by various committees, with these having changes in their membership, as appropriate. New posts were also established.

The Higher Committee for GIS Policy was formed in accordance with Administrative Directive No. 249, issued on 3rd July 1993, this being charged with keeping up to date with latest international developments and uses of GIS.

The Executive Committee, formed by Administrative Directive No, 250, had a membership of engineers from various departments and was responsible for keeping an eye on progress while Administrative Directive No. 251 set up a work team to investigate various needs.

In 1994, some of the decisions of the Executive Committee and the Higher Committee were amended, while a post for a GIS Consultant was created within the Administrative

Chart No. 1. Organisation Chart for the Information Technology Centre in 1995



Development Office, this unit also being given the responsibility for overseeing project administration.

In 1995, the Geographic Information Systems Unit was established as part of the Information Technology Centre, as shown in Chart No. 1. During the same year, the Higher Committee was re-structured by Administrative Directive No. 1094 to ensure that the GIS project continued to make progress, with the Director-General becoming the head of the committee while Administrative Directive No. 268, issued on 5th April 1995, increased the membership of the Executive Committee.

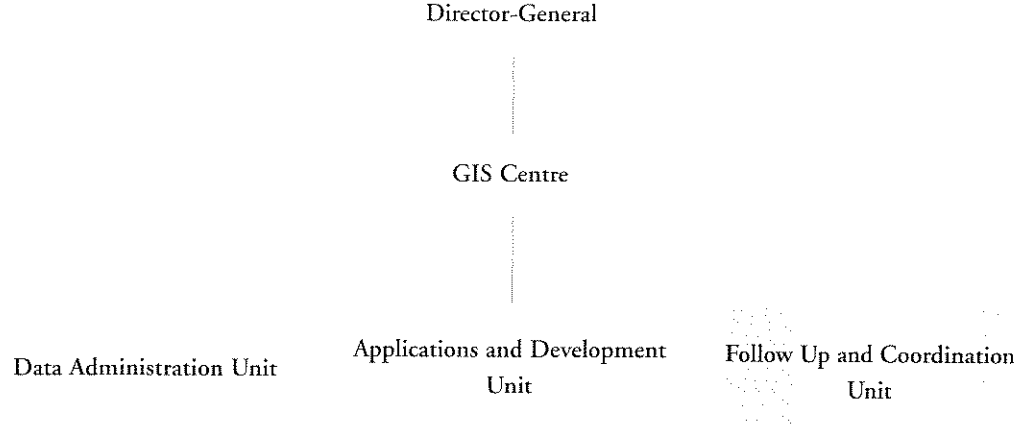
On 26th July 1997, H.H. Sheikh Hamdan bin Rashid Al-Maktoum issued an order to designate the Survey Section in Dubai Municipality as the source of Geographical Survey information.

Establishment of the GIS Centre

The great variety of work as well as the increasing interest in GIS from within the Municipality and demand from other government offices for data made it clear that there was a need to revise

the organisational structure and define criteria for collaboration and co-ordination. Accordingly in 2001, Organisational Directive No. 5 was issued to establish the GIS Centre. This was affiliated directly to the office of the Director-General, as shown in Chart No. 2.

Chart No. 2. Organisation Chart for the GIS Centre, 2001



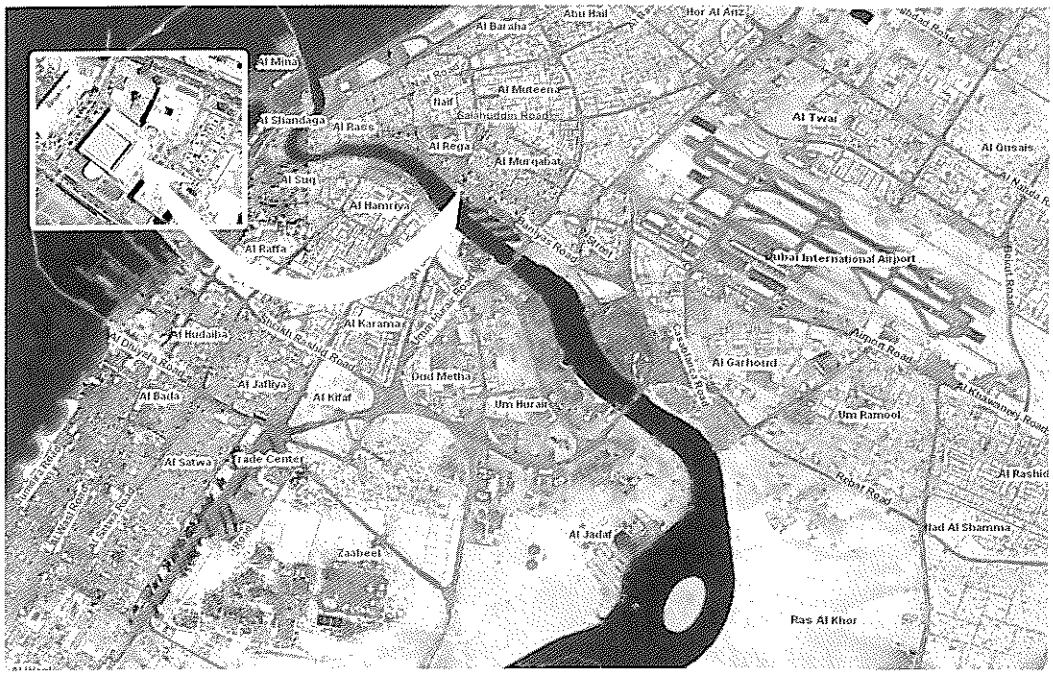
In the same year, the late H.H. Sheikh Maktoum bin Rashid Al-Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, issued Law No. 6 for 2001 approving the Centre as the only official source of geographical information for the Emirate.

The objectives of the GIS Centre

The GIS Centre was established to provide the requirements of all end-users in the Emirate, including both public and private bodies, in respect of geographical data, programmes, technical support, facilitation and training. Its objectives included the specifying of standards and of initial data sources, definition of the responsibilities relating to the identification of and collection of data and the creation of the required infrastructure, including the central computers and a network to link the various Government bodies.

It was also given the tasks of developing the necessary applications for maintaining and uplifting data, providing aerial photography and satellite images for government end-users, promoting the GIS concept and providing technical support and working to establish links with other Government departments and organisations.

To achieve these objectives, the GIS Committee was established, with members from both Government and private bodies, while H.H. Sheikh Maktoum bin Rashid Al-Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, issued Law No. 6 for 2001 on the setting up of the GIS Centre in the Municipality. This decree stated that it was to co-ordinate the establishment of a framework with common criteria that would facilitate the integration of all geographical information on the Emirate.



Benefiting from the Geographic Information Systems (GIS) to specify locations

Achievements of the GIS Centre, 2001 – 2002

Among projects undertaken by the Centre in 2001 and 2002 was a linking of all data from the Paving and Maintenance unit of the Roads Department with the geographical data to simplify the process of following up on road maintenance, linking of information on locations to existing statistical data, and, in 2002, preparation of data on bus routes, to provide users with details of routes and timetables as well as ways of identifying the best choice of route or routes to reach a specific location.

Also completed in 2002 was a project to link the names of commercial establishments with their location, specifying building number, street number and area name, as well as analysis of the data to permit the distribution of various types of commercial establishment to be plotted.

Another project in the same year, the GIS Pilot Project, brought together all geographical data held by the Municipality, the Dubai Electricity and Water Authority and Etisalat within a GIS framework, this not only permitting standards and applicable criteria to be laid down but also problems to be identified and solved.

The Municipality's achievements in the field of GIS

Between 1992 and 1997, all paper maps, planning data, sewage and irrigation data and right-of-way centreline data were digitised, while in 1994 the survey programme was completed with data being uploaded automatically

In 1996, a DLTM system was developed to permit investigation of the accuracy of location data while information criteria and a Data Dictionary were developed for use in field surveys, aerial photography and public service projects.

In 2001, the Dubai Electronic Guide was completed and launched.

Linking and integration of the system with other databases in the Municipality, like those dealing with the sewage network, the address system for the Emirate, census data and the location of advertising billboards, was also completed and integrated applications were developed to facilitate the delivery of information.

In consequence, the Municipality was able to provide various types of information to a wide range of government and private sector bodies.

Cost of Geographic Information Systems

Dubai Municipality began work on establishing its Geographic Information System in 1988, as explained above. To date, the cost of this project has been as shown below:

Customers of the Geographic Information Systems Centre

Authorities/ Establishments producing data, work team and system end-users.

No.	Description	Total Cost (Dirhams)
1	Collection of required data for the system	10,460,600
2	Equipment required, such as appliances and accessories	7,000,000
3	Programmes used	1,113,550
4	Employees working on the system	7,500,000
5	Total Cost	26,074,150

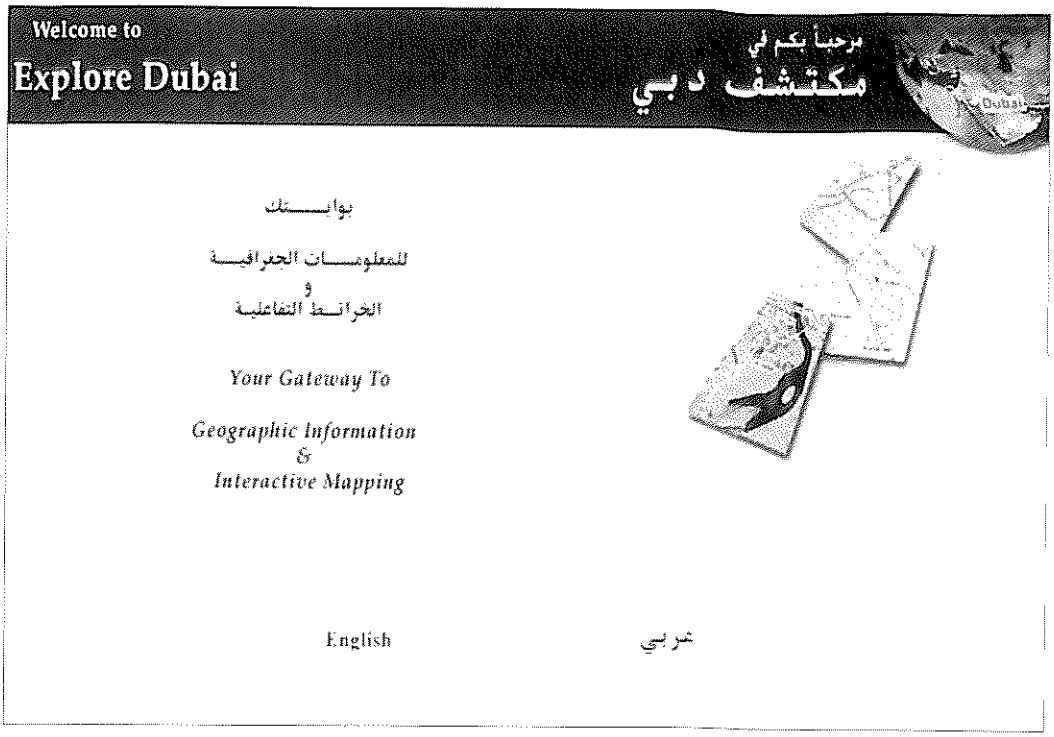
Conclusion

Geographic Information Systems are not only tools to prepare maps and plans and papers to various scales and using different projection systems, they are also tools which permit geographical data to be analysed. The databases themselves do not include detailed maps, but they do contain data which can be displayed and analysed in order to prepare those maps required for a specific purpose. The main feature of Geographic Information Systems is their ability to investigate the relationship between locations through various types of maps.

For this to be achieved, of course, it is essential that the geographical data is integrated and unified in accordance with a well-planned system, so that the data analysis can be of the greatest possible value. This requires the implementation of unified standard criteria, automated links between the parties producing and using the data, information end-users and the community at large about the resources available through the Geographic Information System and, finally, the automated exchange of data, linking end-users, whether in government departments or in the private sector, so that all data can be viewed or updated.

This, in turn, means that better services can be offered to citizens and other residents as well as to visitors.

Dubai Electronic Guide Project



The Geographical Information and Interactive Mapping Site "Explore Dubai"

In 2001, the Municipality announced its "Dubai Electronic Guide." This provides a way of looking for and selecting the various services available in Dubai through the Municipality's website. The facility was later developed to become "Explor Dubai", which was given its own website, www.exploredubai.ae, as well as being accessible through the Municipality website.

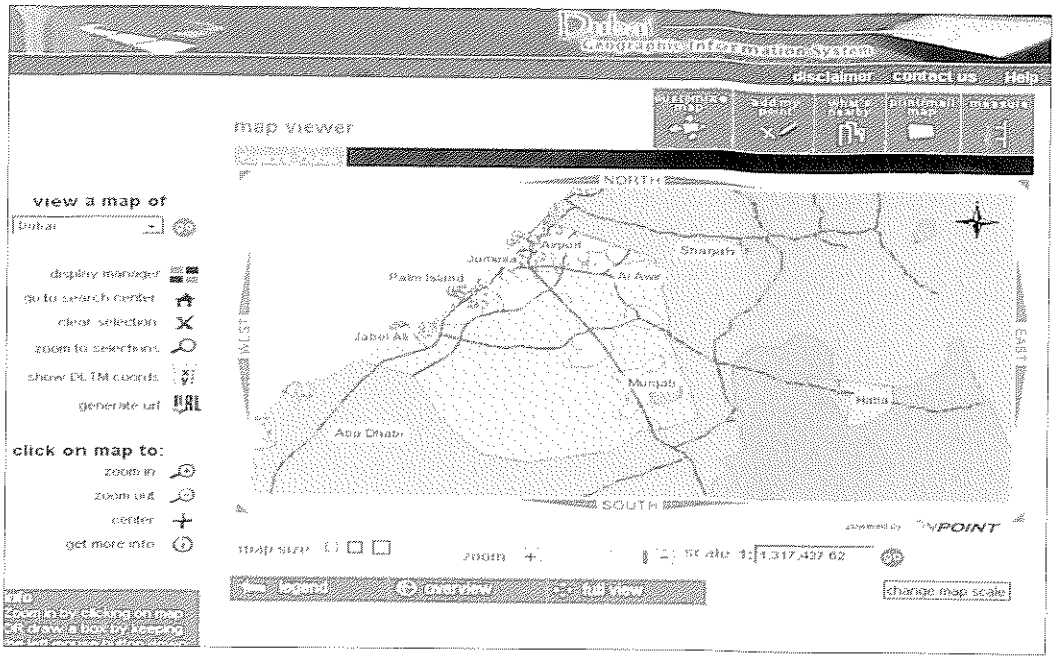
www.exploredubai.ae is the first official source for accurate and detailed geographical information about Dubai and also serves as a guide for visitors, using the approved address system for the whole of the Emirate.

The website includes a map that pinpoints the locations of all of Dubai's main attractions, including hotels, public utilities, commercial centres and restaurants. It also makes it easy for visitors to the site to obtain information and statistics relating to hotels, to make hotel bookings on-line, through links to the web pages of the hotels themselves, and to look at the facilities near each hotel.

The website also gives details on the location of various areas and on the major projects currently under construction as well as giving data for property owners in both English and Arabic.

Any hotel, company or other organisation can also provide a link on its own website to www.exploredubai.ae making it easy for intending visitors to check their location.

Geographic Information
System DUGIS
www.dugis.ae



Internet site for Dubai's Geographic Information System, DUGIS

In 2002, the Internet-based Geographic Information System "DUGIS" was approved for use in the Emirate of Dubai. The website www.dugis.ae provides Internet users with access to the system, and permits them to view, to analyse and to print geographical data about the Emirate.

The system was designed to meet the needs and the levels of expertise of various types of user, such as planners, engineers, inspectors and administrators, with each being given limited access, according to these needs.

www.dugis.ae links the databases of the Land and Properties Office and the Real Estate Office, and also offers access, according to the level of registration, to view and analyse data from the Civil Defence, Dubai Police, the Economic Development Department, the Civil Aviation Department, the Land and Property Office, the Dubai Electricity and Water Authority, the Dubai Free Zone Authority for Ports and Customs, Etisalat and Emaar.

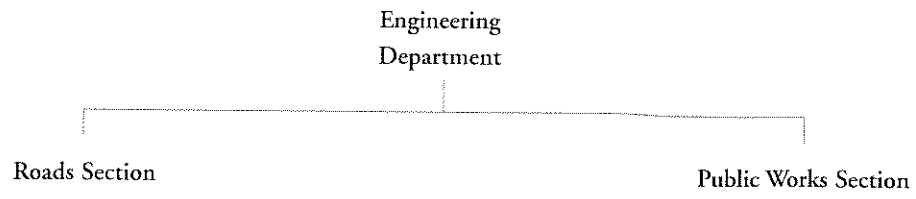
The Internet application of DUGIS, www.dugis.ae, also includes tools to analyse types and patterns of geographical data such as geodesic data, land data and other service data.

Thus Internet users can view data on land ownership held at the Land and Property Office, and then look at geographical data provided through interactive mapping. They can also enquire about and analyse any other type of geographical data such as data on land, building laws and legislation or on vital utilities such as drainage and sewerage networks. The mapping can then be printed or sent by e-mail to recipients.

General Maintenance Department

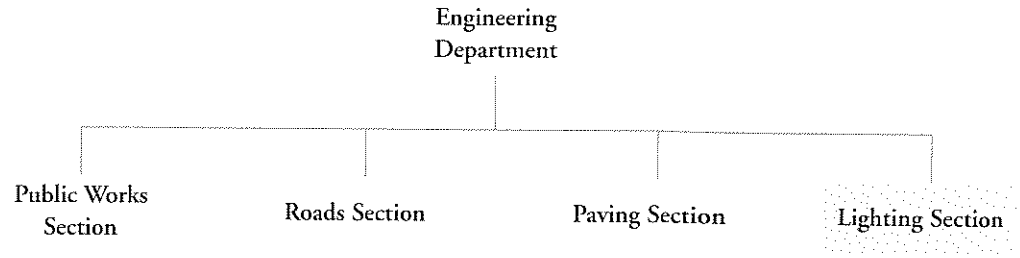
The origins of the General Maintenance Department of Dubai Municipality can be traced back to the establishment of the Public Works Section and Roads Section as part of the Engineering Department in the early 1960s. Maintenance was then carried out by small teams of workers divided into two groups which were affiliated to the Engineering Department. This continued until 1972, as shown in Chart No. 1.

Chart No. 1. Organisation Chart for the Maintenance Section, 1964 – 1972



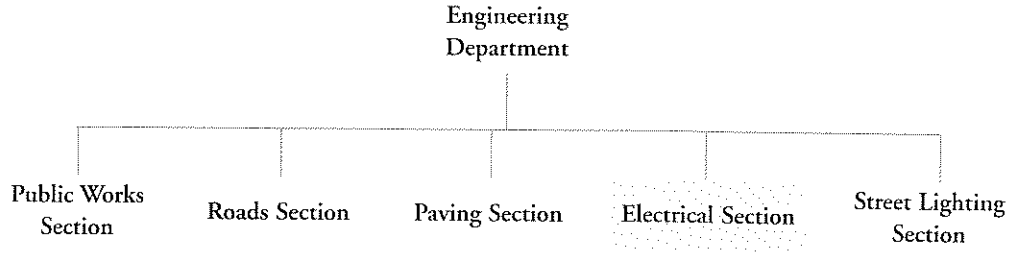
In 1972, the Lighting Section was created, as shown in Chart No. 2, this also having some duties related to maintenance.

Chart No. 2. Organisation Chart for the Maintenance Section, 1972 – 1978



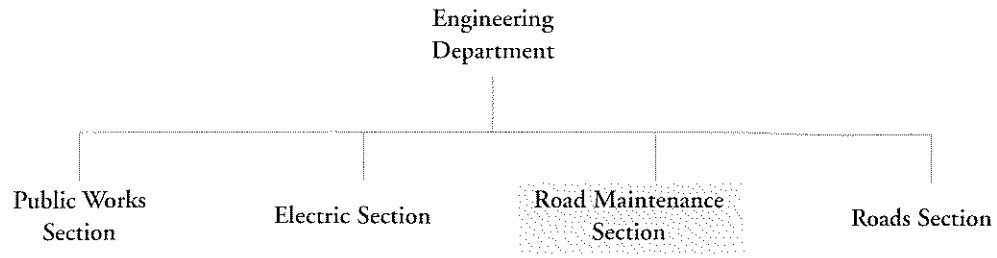
It became clear as a result of the rapid growth taking place that there was a need to separate Road Lighting from other electrical work. This was done in 1978, through the establishing of separate sections for electrical work and for street lighting, as illustrated in Chart No. 3. Mechanical maintenance was an important part of the work of the Electrical Section.

Chart No. 3. Organisation Chart for the Maintenance Section, 1978 – 1980



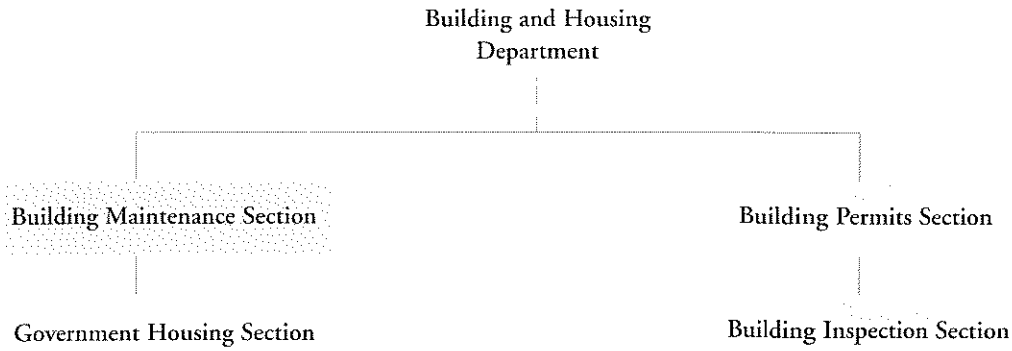
At the beginning of the 1980s, there was an increasing amount of work being undertaken by the Municipality on the construction of roads, tunnels, bridges and various utilities, and there was, therefore, a need for a greater capability in terms of maintenance. This led to the establishment of the Road Maintenance Section, as shown in Chart No. 4.

Chart No. 4. Organisation Chart for the Maintenance Section, 1980 – 1988



The continuing development of Dubai meant that the Municipality's physical assets were growing quickly, with a consequent increase in the need for an effective in-house maintenance programme and capacity. In 1988, therefore, it was decided to establish the Building and Housing Department, as shown in Chart No. 5. This Department had a special section for building maintenance, including both civil engineering and electrical work.

Chart No. 5. Organisation Chart for the Maintenance Section, 1988 – 1992

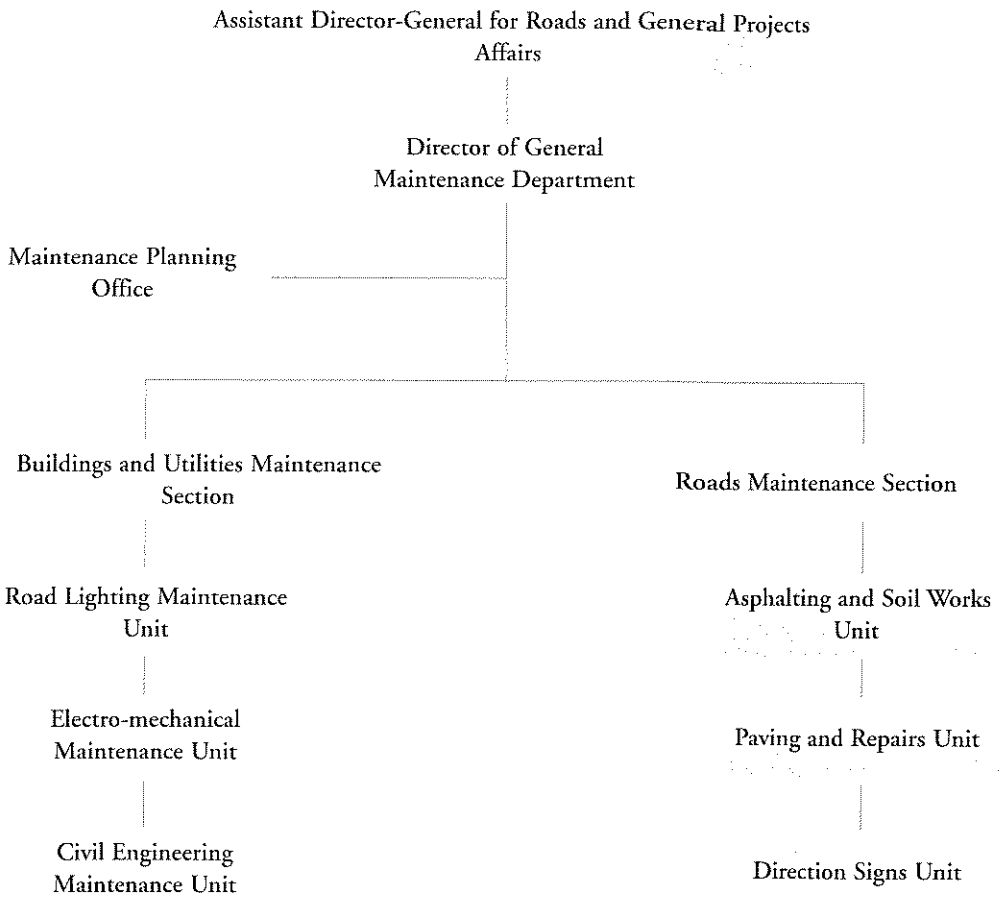


The next major change in the administrative structure took place in 1992, when the names of several units were changed and two new departments were created, the Roads Department and the General Projects and Maintenance Department. The maintenance of roads was made part of the responsibility of the Roads Department, while the maintenance of buildings and other establishments was given to the General Projects and Maintenance Department. This allocation of responsibilities continued until 1998, with the Roads Department having four Sections, dealing with Roads Maintenance, Road Lighting, Road Construction and Road Planning, and the General Projects and Maintenance Department having two sections, for Building Maintenance and for Projects.

Establishment of the General Maintenance Department

The General Maintenance Department was created on 15th July 1998, under the terms of Directive No. 185 for 1998, as part of planning to provide the Municipality with the appropriate structure to deal with the rapid growth of the city. In particular, it had become apparent that there was a need for a dedicated maintenance department. The Organisation Chart for the Municipality was changed accordingly, as shown in Chart No. 6.

Chart No. 6. Organisation Chart for the General Maintenance Department, 1998



One early task was the introduction of a computerised management system in the new Department. This included features to permit the efficient administration and organisation of regular maintenance work and repair for all buildings and other structures owned by the Municipality, such as traffic signs, electricity poles and pylons, vehicles and other equipment.

The introduction of this system increased the Department's productivity and also helped to lengthen the life expectancy of depreciated and fixed assets, thus saving both time and money.

It also made it easier to ensure that the right spare parts were available and helped to improve operational performance as a whole, while it also became easier to monitor the performance of companies carrying out maintenance work once the Municipality had begun to out-source this work.

Duties and responsibilities of the General Maintenance Department and its sections

The out-sourcing of work was gradually introduced from 1999 onwards, in response to the increase in the number of establishments owned by the Municipality and because of the expansion of the road network, resulting in more lighting, signs, pavements and so on. All maintenance work is now out-sourced, and is supervised by the General Maintenance Department. The most important aspects are as follows:

Carrying out maintenance, modernisation and the necessary repairs to the property under the Municipality's control. This includes buildings, public parks and related utilities and the roads network, as well as bridges, tunnels, road lighting, pavements, pedestrian bridges, directional signs, other traffic signs and other installations which are the responsibility of the Municipality.

Reducing the amount of corrective maintenance work, to strike the appropriate balance in the preventative maintenance programme.

The Department also takes part in the work of the committees responsible for the hand-over of Municipality projects, once they are completed, and monitors the implementation of Municipality regulations in all matters relating to maintenance.

It lays down the short-term and long-term plans for its work, reviews plans put forward by other administrative units and then ensures that they are carried out and also prepares, presents and implements its own annual budget, in co-ordination with the other relevant units of the Municipality. Another administrative task is the reviewing of monthly, quarterly and annual reports from various administrative units and making the recommendations required to deal with any problems.

In terms of the maintenance work itself, the Department prepares and revises annual maintenance contracts and monitors the quality of the work being carried out, on these and on planned maintenance programmes, in coordination with the Maintenance Planning Office and the units concerned. These contracts deal, in particular, with buildings, utilities and street lighting.

It also draws up and ensures the implementation of preventative maintenance and repair programmes and carries out internal auditing of its work.

In terms of work related to the hand-over of new projects and projects still under guarantee, the Department prepares the necessary No Objection certificates and archives all completed plans. The No Objection certificates include those dealing with road maintenance and street lighting.

Since it is the responsibility of the Department to oversee all maintenance, it is, of course, necessary for it to carry out routine inspections to determine maintenance needs for roads, pedestrian walkways, road signs, bridges and tunnels. Another task is the repair and replacement of defective or old traffic signs and the installation of new ones, as well as maintenance, repair and replacement of safety barriers of various kinds, both on roads and for pedestrians, as well as carrying out improvements at road intersections to improve the flow of traffic.

It also receives and handles requests from the public as well as from other bodies for back-filling or the levelling of roads.

More generally, the Department is also responsible for making suggestions and for carrying out policies and regulations and Municipal directives related to the maintenance of buildings, road lighting and associated equipment.

In general terms, the Department, finally, is responsible for monitoring the work carried out by contractors on roads and for imposing any fines that may be necessary as a result of violations of Municipality Ordinances as well as for implementing all of the Municipality's polices and rules related to preventative maintenance and repair of roads and associated utilities and of pavements.

The policy of out-sourcing maintenance work that began in 1999 meant that the Department was obliged to terminate the services of its manual labourers, while there was also a reduction in the total number of technical positions. The following tables shows the changes in the employment structure of the Department between 1996 and 2002.

Maintenance of street lighting

The out-sourcing programme also meant that the Department no longer had to maintain its own stocks of equipment, and a number of items were disposed of, being surplus to requirements, as shown in this table.

Fixed Assets of the General Maintenance Department, 1998 – 2002

Building and Utility Maintenance Section

Year	1998	1999	2000	2001	2002
Number of Buildings	494	509	527	539	544
Road Lighting (km.)	808	1,007	1,206	1,314	1,400

Road Maintenance Section

Length of Roads Network (Lane/km)	1998	1999	2000	2001	2002
	5,265	5,420	6,362	6,902	9,100

Year / Department/ Section	1996	1997	1998	1999	2000	2001	2002
Department and Planning Office	0	0	4	5	8	9	11
Road Maintenance Section	215	216	208	124	62	62	63
Building and Utility Maintenance Section	157	152	213	58	62	62	62
Total	372	368	425	187	132	133	136

Items of equipment held by the Department, 1998 – 2002

Years / Section	1998	1999	2000	2001	2002
Road Maintenance Section	88	40	40	35	37
Building and Utilities Maintenance Section	49	37	41	41	45
Total	137	77	81	76	82

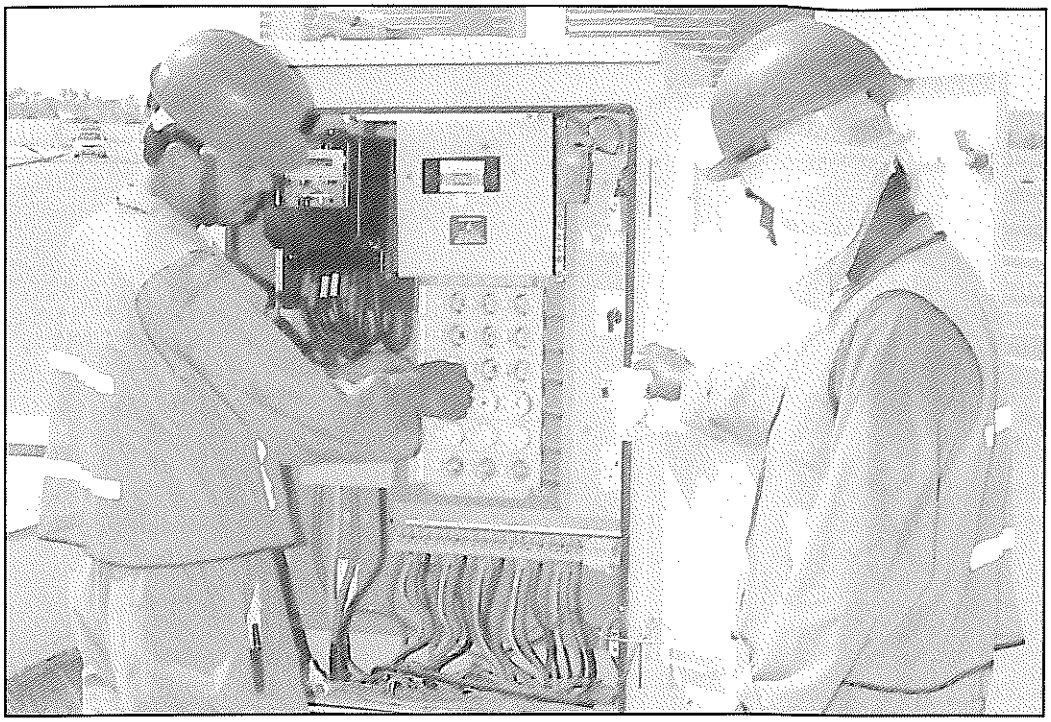
Maintenance of Al-Maktoum Bridge

The out-sourcing programme had immediate cost benefits, as shown in the following table.

Comparison of costs prior to and after out-sourcing

Building and Utilities Maintenance Section

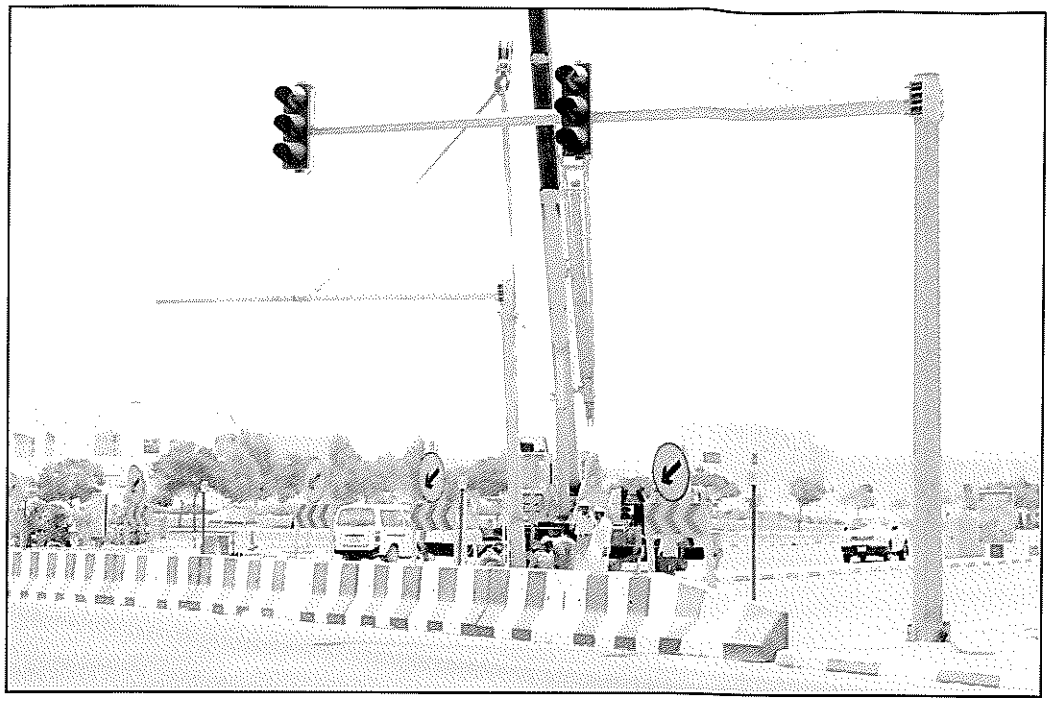
Maintenance Contracts	Cost of Work prior to out-sourcing	Value of maintenance contracts after out- sourcing	Saving (Dirhams)
Maintenance of the Municipality's housing stock	3,631,000	1,900,000	+1,731,000
Annual maintenance contract for plumbing, carpentry, painting and building work.	3,900,000	1,980,000	+1,920,000
Annual maintenance contract for electrical systems	2,150,000	850,000	+1,300,000
Maintenance contract for air-conditioning and other equipment	1,119,000	900,000	+219,000
Maintenance contract for fountains	533,000	550,000	-17,000
Annual maintenance contract for road lighting	3,800,000	3,700,000	+100,000
TOTAL	15,133,000	9,880,000	+5,253,000



Maintenance of Electrical Systems

Road Maintenance Section

Maintenance Work	Cost of Work prior to out-sourcing	Value of maintenance contracts after out - sourcing	Saving (Dirhams)
Maintenance of pavements and fixtures	3,950,000	3,160,000	+790,000
Painting road lanes	2,150,000	0	+2,150,000
Maintenance of asphalt pavements	3,100,000	5,750,000	-2,650,000
Maintenance of road signs and signals	2,100,000	3,539,770	-1,439,770
Soil works and maintenance of unpaved roads	3,600,000	5,866,000	-2,266,000
Cleaning road signs	500,000	0	+500,000
TOTAL	15,400,000	18,315,770	-2,915,770



Maintenance of traffic lights

Building and Utilities Maintenance Section

Total expenditure, by Chapter, 1998 – 2001, in dirhams

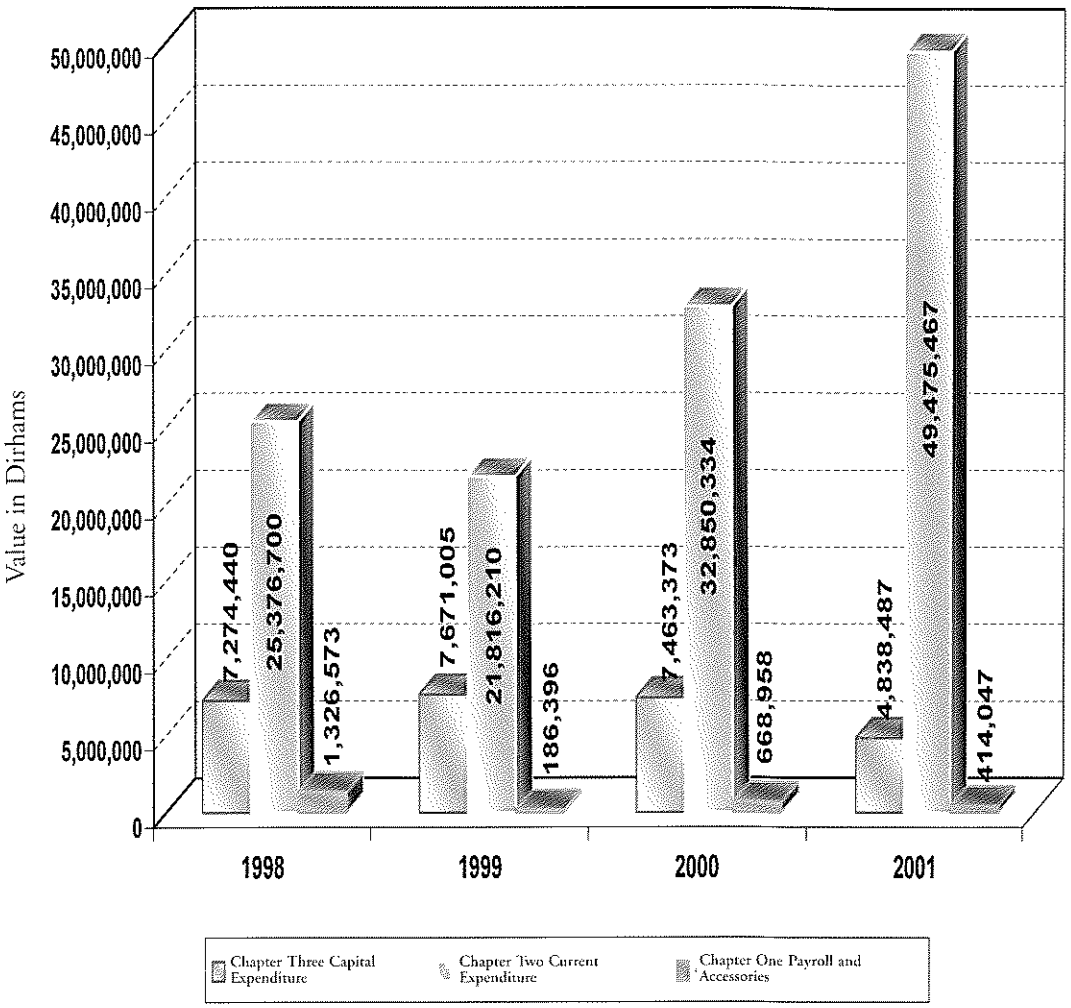
Item	Chapter One Payroll and Accessories	Chapter Two Current Expenditure	Capital Expenditure	Total expenditure for Building and Utilities Maintenance Section
1998	7,274,440	25,376,700	1,326,573	33,977,714
1999	7,671,005	21,816,210	186,396	29,673,611
2000	7,463,373	32,850,334	668,958	40,982,665
2001	4,838,487	49,475,467	414,047	54,728,000

The net increase in costs relating to road maintenance following the out-sourcing programme was due to a variety of factors. In 1997, for example, asphalting work covered an area of 78,000 square metres, while in 2002, it had risen to 240,000 sq. metres. There was also a sharp increase in the size of the road network, from 4,828 km./lanes in 1997 to 9,100 km./lanes in 2002.

Better quality services were also provided in response to public demand, such as, for example, the provision of temporary gravel roads, rather than rolled tracks, across sabkha.

It should also be noted that the out-sourced contract for road signs and traffic signals also covered the cleaning of signs and the painting of lines dividing the lanes of roads, this latter previously having been accounted for as a separate item.

Expenditure by the Building and Utilities Maintenance Section, by Chapter, 1998 – 2001



Expenditure

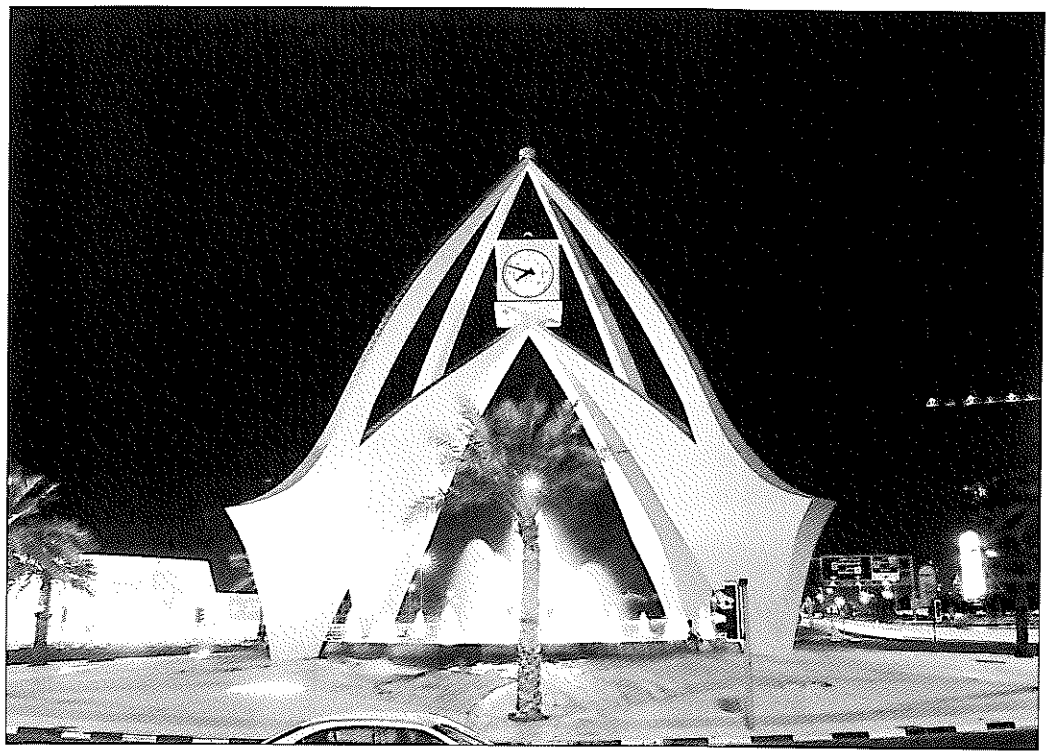
In order to plan ahead for its work, the Department carried out a careful examination of the actual expenditure within its various sections, using this to estimate future spending. Details are shown in the tables that follow.

The large increase in current expenditure in the Section during 2000 was due primarily to the fact that several major annual contracts were awarded in 1999, with payments for these being made in the financial year 2000. These including a contract for building maintenance, with a value of 7,113,204 dirhams, a contract for maintenance of garden fountains, with a value of 1,433,742 dirhams, an air-conditioning contract worth 433,652 dirhams and a general garden maintenance contract worth 350,000 dirhams.

Other contracts having a significant impact on expenditure during the year included additional maintenance work on schools, costing 12,901.900 dirhams, and the carrying out of several projects not originally included in the planned budget, which accounted for a total of expenditure of 3,911,069. These included the maintenance and development of the Deira fish market, improvements to kitchens in accommodation camps for labourers and maintenance on six buildings received by the Municipality as a result of the closing down of the Jumeirah camp.

A subsidy of 429,069 dirhams was also paid to various clubs and societies.

The increase in current expenditure in the Road Maintenance Section in 2000 was due to a number of factors.

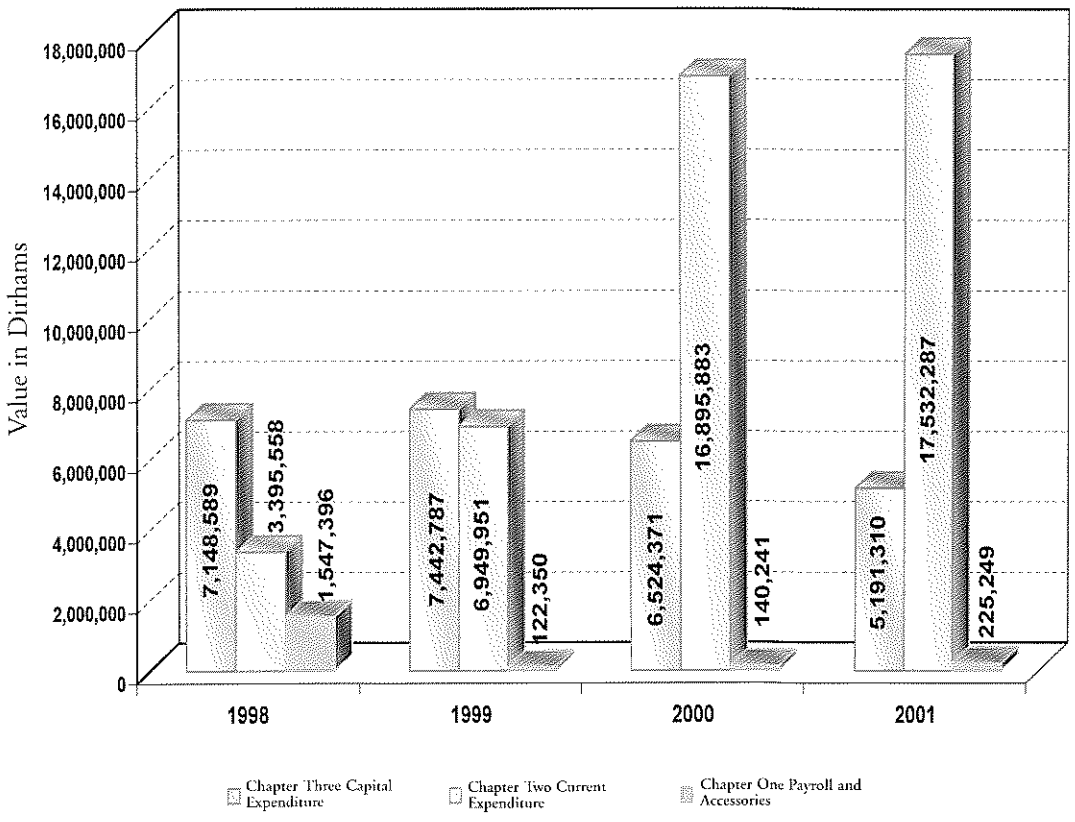


Maintenance of Fountains

Total expenditure, by Chapter, 1998 – 2001, in dirhams

Item	Chapter One Payroll and Accessories	Chapter Two Current Expenditure	Capital Expenditure	Total expenditure for Road Maintenance Section
1998	7,148,589	3,395,558	1,547,396	12,091,543
1999	7,442,787	6,949,951	122,350	14,515,088
2000	6,524,371	16,895,883	140,241	23,560,495
2001	5,191,310	17,532,287	225,249	22,948,846

Expenditure by the Road Maintenance Section, by Chapter, 1998 – 2001



Road Maintenance

The use of asphalt rose to 74,986 sq. metres, costing 2,984,000 dirhams, as well as a further 20,721 sq. metres used to fill in cracks and to repair roads, while the Section also took over various duties formerly carried out by the Roads Department. These included the repair of high-level traffic lights, the erection of large signboards, the cleaning of signs and road-painting. This cost a total of 3,193,000 dirhams. Work carried out for other Departments, but charged to the budget of the General Maintenance Department, cost 432,000 dirhams while items to the value of 1,275,000 purchased in 1999 were not paid for until 2000.

There were also payments of end-of-service benefits for manual labourers whose employment with the Department came to an end as a result of the introduction of the out-sourcing programme. These payments amounted to 1,988,000 dirhams.

Establishment and Development of the Markets & Abattoirs Department

The first market established by the Municipality was the fruit and vegetable market at Sabkha, in Deira, which opened in 1964. A number of other markets were set up at the beginning of the 1970s, as described below.

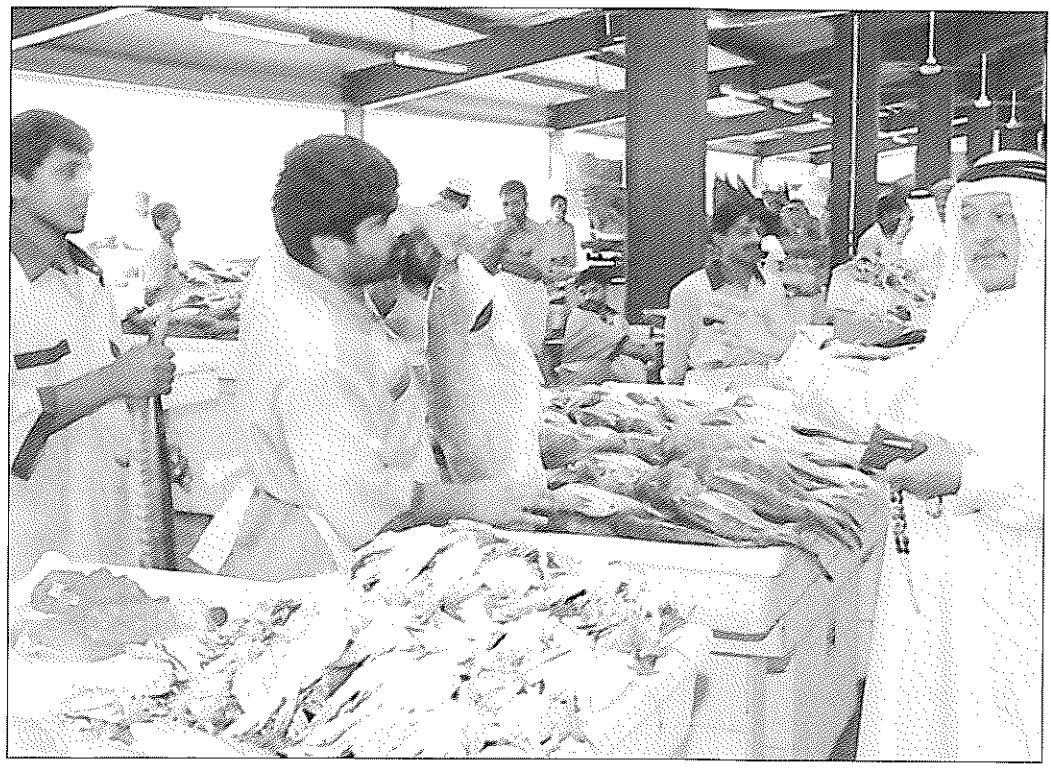
Al-Sanadeeq Market (now Nayif Market)

Established in 1970 in the Nayif area in Deira, it had around 50 stalls for selling fabrics and clothing, with others selling charcoal and tobacco, and was one of the most active markets at the time.

It was replaced in 1988 by the Nayif Market, which took its name from the nearby Burj Nayif (Nayif Tower). This rapidly became one of the busiest markets in the city, with a total of 182 shops, selling clothes, perfumes, accessories and various types of fabrics.

Deira Fish Market

This market was established in 1971 in the Al-Raís area of Deira, with fifty stalls selling fish, meat, fruit and vegetables and with a number of vendors selling from displays laid out on the ground. In 1987, it moved to newly-built premises nearby which included stalls for selling fish, fruit and vegetables and spaces for small carts from which fruit and vegetables were also sold. Besides this, there were a number of shops, selling meat, vegetables and other foodstuffs, tables displaying local produce, including dates, and other displays of fodder and other locally-made goods. This market has been renovated several times.



Fish Market

Bur Dubai Fish Market

This market opened in 1970 in the Al-Ghabibia area in Bur Dubai, inside a large enclosure where fifty shops had been constructed for the sale of fresh meat, fruit and vegetables. A number of vendors also displayed their goods on the ground, while there was a small abattoir for cattle nearby. In 1976, the number of shops was increased to 60.

Another group of 16 shops for the sale of fruit and vegetables was built nearby in 1969, this being known as the Al-Ghabibia Market. It lasted until 1990.

In 1992, the fish market was closed, with traders from both markets moving to the Al-Shindagha Market, also in Bur Dubai.

Cattle Market

The origins of today's cattle market go back to the 1960s and beyond. At the beginning of the 1960s, there were two cattle markets, one in the Al-Ra's area, known as Al-Arsa Market, and another in the Sabkha area. In 1963, these were closed and a new market selling cattle, sheep and fodder was established in the Nayif area. In 1968, the market moved again, to a new site on the location of today's Al-Shabab Club, and then it moved once more, in 1971, to a location adjacent to Hamriyyah Port.

The market was moved to its present location, in Al-Qusais, in 1995, this move being made for ease of movement of the livestock from the market to the nearby abattoir.

Al-Shindagha Market

Wholesale Vegetable Market in Hamriyyah

During the 1980s, the Emirate of Dubai grew rapidly, with a consequent growth in the population. Foreseeing this development, it was recognised that a large wholesale fruit and vegetable market was required, and a site was chosen at Hamriyyah. It was supervised by the Health Section of the Municipality, which monitored the quality of goods sold. The market, which still operates in the same location today, was administered by four Municipality employees.

Local Markets

A number of local markets were also established in residential areas. In 1985, for example, the Al-Rashidiya Central Market was opened in Al-Rashidiya area, with 46 shops selling a variety of clothes, perfumes, accessories and fruit and vegetables, as well as a number of tailor's shops.

In 1986, the Hamriyyah Central Market opened. This had 72 shops.

It was initially supervised by the Municipality's Health Section, but, later the same year, it was handed over to the Administrative Affairs Section, under the direct supervision of the head of the Section. At the end of 1986, there were seven Municipality employees involved in managing markets, four of them in the Administrative Affairs Section and three in the Health Section.

In 1988, the responsibility for supervision of the markets was transferred to the Commercial Licence Section under the direct supervision of the Head of Section, with one more employee being added.

In 1989, Administrative Directive No. 208 amended the Organisation Chart of the Section so that it became the Commercial Registration and Licence Department. The Markets Section was established as a separate administrative unit and was given the responsibility of managing the seven main markets that then existed.

1– The Hamriyyah Wholesale Fruit and Vegetable Market, opened in 1980.

2– The Al-Rashidiya Central Market, opened in 1985.

3– The Hamriyyah Central Market, opened in 1986.

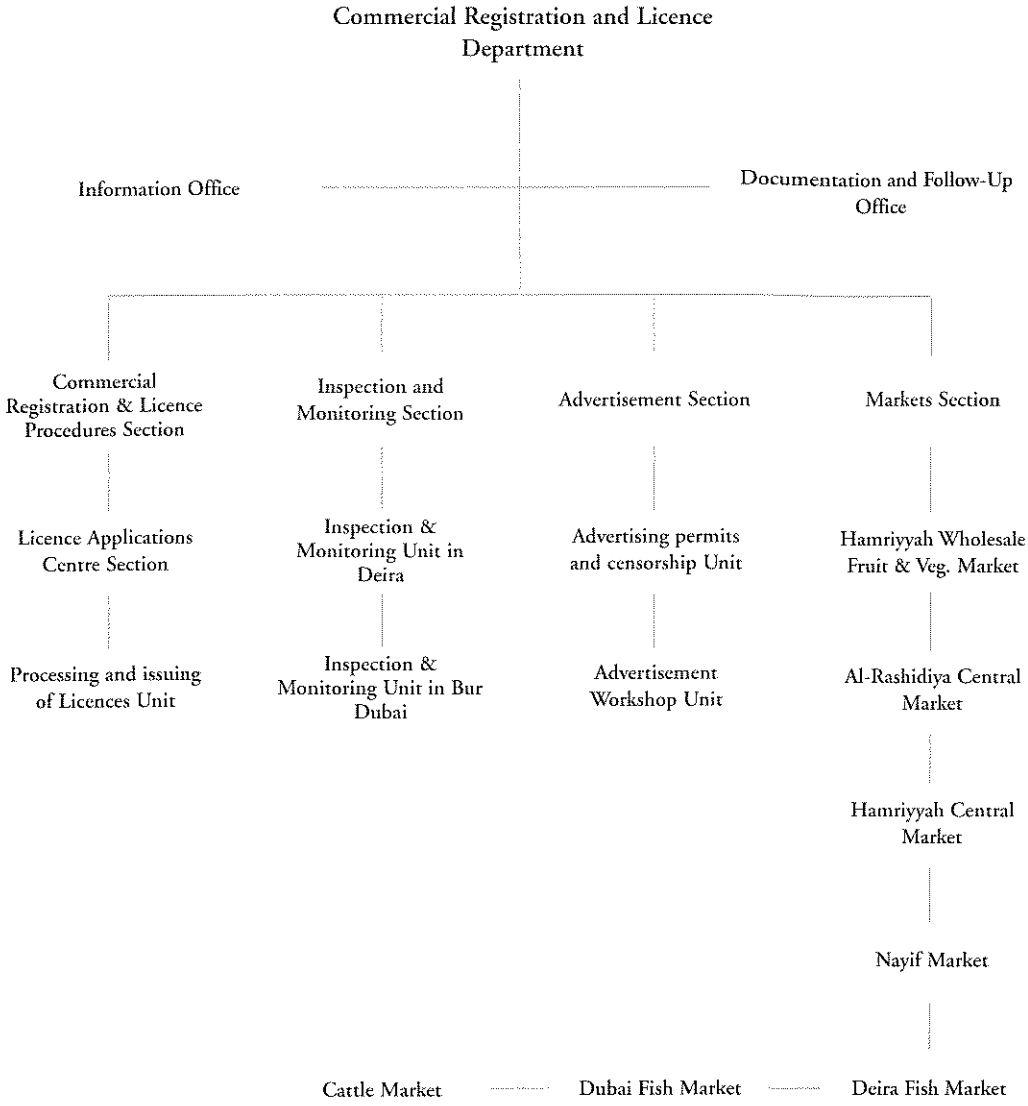
4– Nayif Market, opened in 1988.

5– The Deira Fish Market, opened in 1971.

6– The Bur Dubai Fish Market, opened in 1970.

7– The Cattle Market, opened in 1963.

Chart No. 1. Organisation Chart for the Commercial Registration and Licence Department in 1989



In 1989, the job description for the Markets Section was drawn up, with a total of twenty employees. This remained in operation until 1993 when, in accordance with Administrative Directive No. 206, the Markets Section was removed from the Commercial Registration Department to become part of the Administrative Affairs Department, as shown in Chart No. 2. At the same time, the Commercial Registration and Licence Department was transferred from the Municipality to the Economic Development Department.

Chart No. 2. Organisation Chart for the Administrative Affairs Department in 1993

As per the Administrative Order No. 22 issued in 1998 approving the organizational structure and modified job descriptions, subsequent to the issuance of the Local Order No. 107 of 1997, the Markets Section will supervise the following markets.

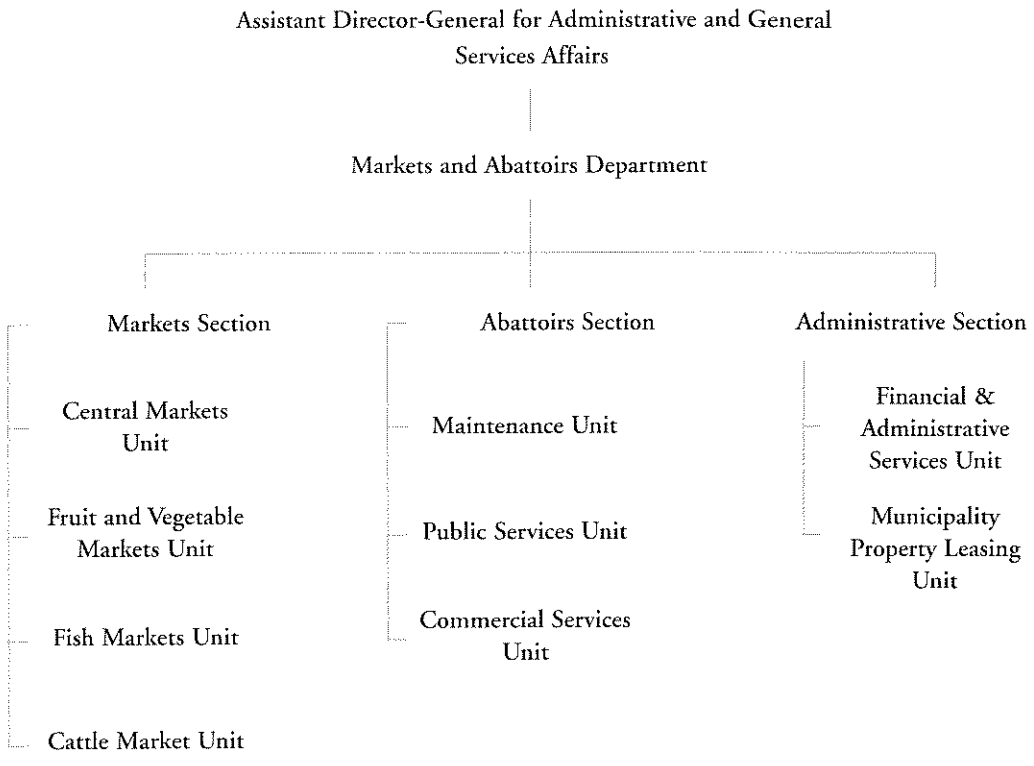
1– The Hamriyyah Wholesale Fruit and Vegetable Market.
2– The Hamriyyah Central Market.
3– The Al-Rashidiya Central Market.
4– Nayif Market.
5– Deira Fish Market.
6– Al-Shindagha Market.
7– The Cattle Market.
8– The Abattoirs.
9– A new market at Nad al-Sheba.
10– The market in Hatta.

In October 1998, Administrative Directive No. 291 was issued to establish the Markets and Abattoirs Department and to update the duties and responsibilities of the Markets Section.

The new Department had four Units, the Central Markets Unit, the Fruit and Vegetables Markets Unit, the Fish Markets Unit and the Cattle Market Unit, as shown in Chart No. 3.

Fruit and Vegetable Market

Chart No. 3. Organisation Chart for the Markets and Abattoirs Department in 1998



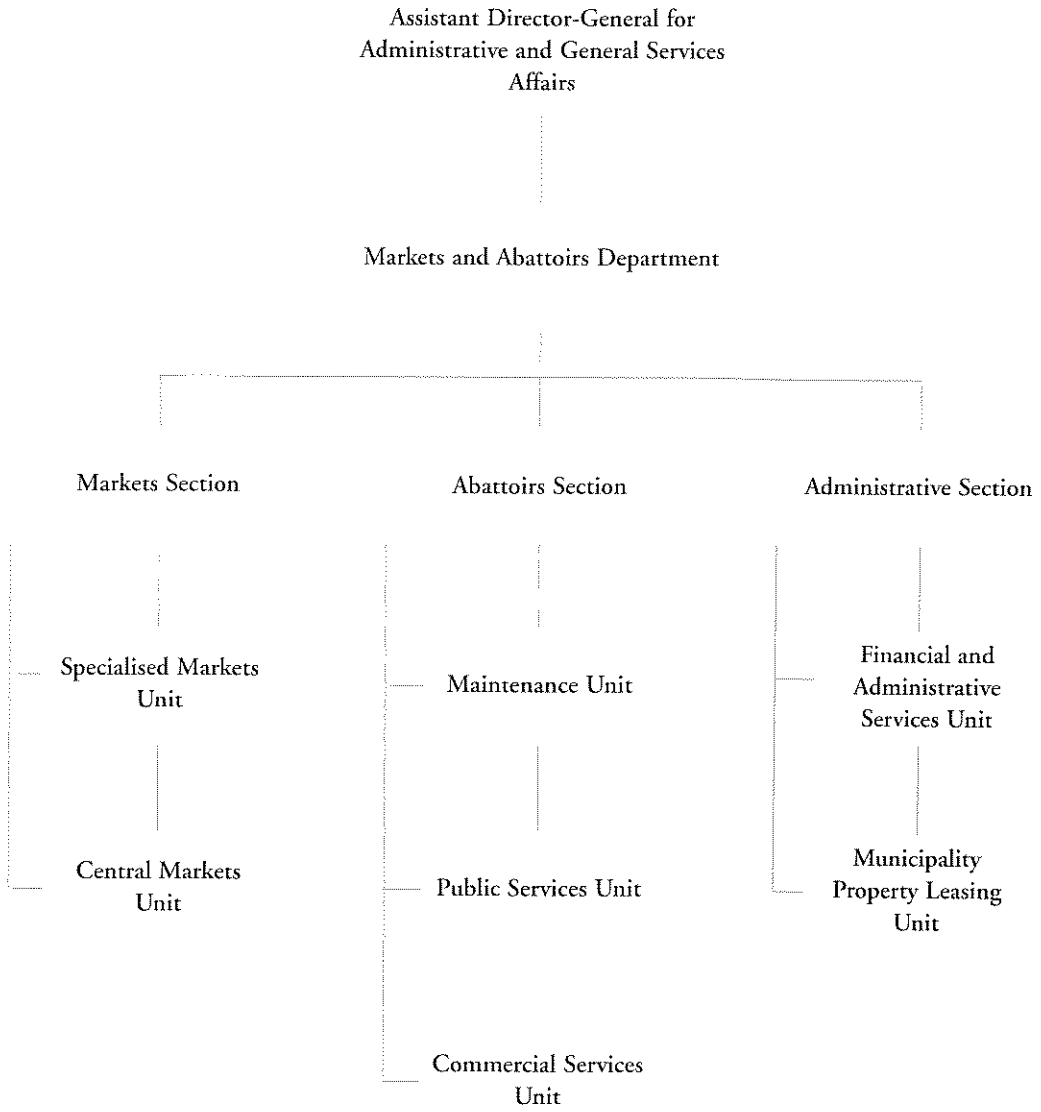
In 1999, Administrative Directive No. 280 amended the organisation chart for the Markets Section within the Markets and Abattoirs Department to create two separate Units,

1- The Specialised Markets Unit

2- The Central Markets Unit

as shown in Chart No. 4.

Chart No 4. Organisation Chart for the Market and Abattoir Department in 1999



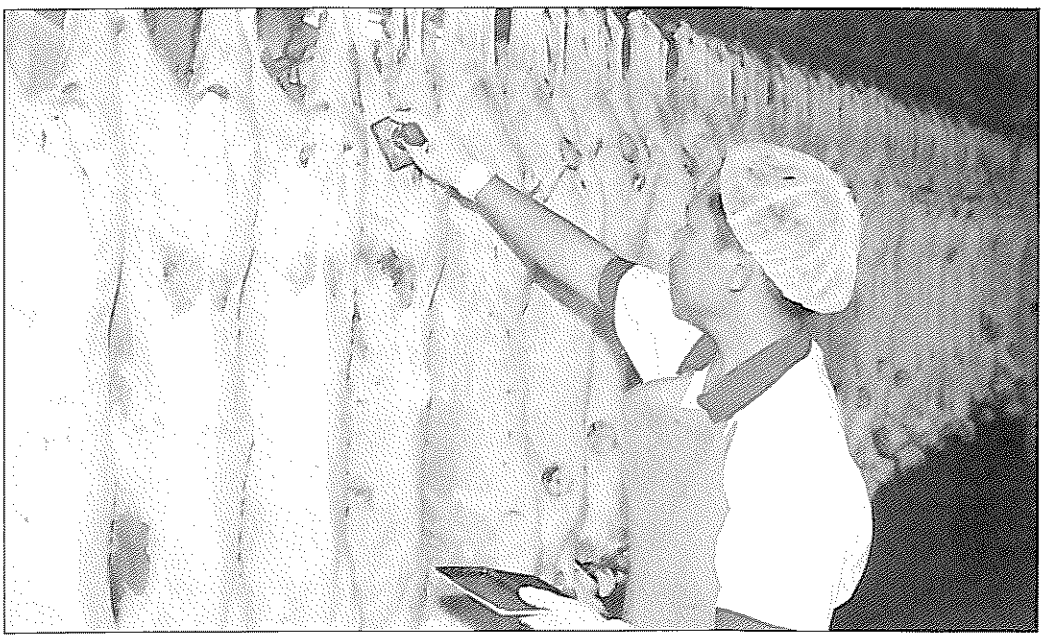
Duties and responsibilities of the Markets and Abattoirs Department and its sections

The Department and its various sections and Units are responsible for the supervision, monitoring, inspection and development of all of the Municipality's markets and abattoirs and for ensuring that they are run in accordance with the agreed plans and adhere to Municipality rules and regulations. This task includes the function of ensuring that the appropriate health and safety procedures are followed. All of this work is down in accordance with the policies and procedures laid down by the Municipality's Director-General.

Health and safety, both for market workers and for the public, are a key task. In the abattoirs, this is of particular importance and the Department has the role here of proposing and implementing the appropriate methods for receiving and slaughtering of livestock, and for the preparation, preparation and storage of meat, as well as its delivery to customers. Both normal and cold stores are provided. Qualified veterinarians are present to ensure that animals, both alive and following slaughter, are free of disease and fit for human consumption. They oversee the cutting up of the carcasses and the delivery of these, along with skins and offal, to the owners of the animals and are also responsible for ensuring that all slaughtering is undertaken in accordance with the precepts of Islamic Sharia law and for supervising the disposal of animal waste.

The Municipality abattoirs are provided with the latest equipment to ensure that they operate both economically and in accordance with international standards.

The Department is also responsible for leasing market properties and for collecting rents and other fees and for the keeping of detailed financial records on revenue, expenditure, purchasing, stores and the payment of casual labourers. Each merchant or operator is checked to see that they have the necessary permits and licences or rent agreement. Where appropriate, the Department



Operations inside the abattoir

also works with the Dubai Economic Development Department on inspection campaigns to check that those running shops in markets have the right permits. Tenants are extensively briefed on all relevant regulations, while prompt action is taken against any violations of the Municipality's rules as well as other legislation.

Wherever necessary, the Department works with the relevant units of the Municipality responsible for maintenance, planning, health and environment, to ensure that the buildings, vehicles and other equipment are properly maintained and that the relevant rules and regulations are implemented.

To ensure that the markets and abattoirs operate effectively, the Department also promotes them through exhibitions, advertising campaigns and other activities designed to attract more business.

Recently-built markets administered by the Municipality

The second-hand car hypermarket

In order to make the buying and selling of second-hand cars in Dubai more efficient, the Municipality decided to establish a dedicated market for this purpose. A site was chosen at Ra's al-Khor in 1998, and the necessary facilities were built, costing 55 million dirhams. Construction work ended in June 2001, though the market itself had opened for business the previous year, with 130 showrooms, two auction yards and 2,231 car-parking spaces.

The market also has an area for testing vehicles, an office for registering sale and purchase, a bank to provide finance facilities and a cafeteria. Work on improving roads around the market and the street-lighting in the market was under way at the time this book was being written.

Second-hand car hypermarket

Al-Warsen Fruit and Vegetable Market

This large market is close to the junction between the highway to Al-Aweer and the Emirates Highway and covers an area of one million square metres. Selection of the site was finalised in 2001, and construction work, costing 153 million dirhams, was completed in 2003. Easy to reach, yet outside the city, it has helped to reduce the number of heavy trucks entering Dubai.

The market has an administration block and associated service facilities, as well as seven buildings with 284 wholesale shops. There are also four buildings for the retail trade, with a further 150 shops, selling fruit and vegetables, meat and fish. Associated with these are special areas for the wholesale and retail trade, truck loading and unloading bays and vehicle repair workshops.

There are also 18 cold stores, 24 packing warehouses, a refuse depot and a wide range of other offices and facilities, including a supermarket, cafeterias, a mosque, a Civil Defence station, a police station, a bank, a post office and a petrol station. A motel offers accommodation for drivers coming from far away, while there is also an accommodation block for manual workers.

Jum'a Market (Friday Market)

At the beginning of 2001, a weekly 'Friday Market' was opened in the Hamriyyah Central Market car-park. It has space for 445 market stalls, which sell a wide range of goods, excluding food items. Anyone wishing to trade in the market may do so provided that they inform the Market Section of the type of goods to be sold and obtain approval. No commercial licences are required, and no fees are payable to the Municipality.

Friday Market

Table No. 1. Shops in the various markets, 1990 – 2002

Market / Number of shops	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000*	2001	2002
Hamriyyah Fruit & Vegetable Market	171	194	225	245	285	236	308	316	316	322	389	169	169
Al-Rashidiya Central Market	43	43	43	43	43	43	43	43	43	45	46	46	47
Hamriyyah Central Market	68	68	68	68	72	72	72	72	72	72	72	72	72
Nayif Market	181	181	181	181	181	181	181	182	182	183	183	183	192
Deira Fish Market	317	319	321	321	321	321	321	411	421	421	421	421	1196
Al-Shindagha Market	136	136	127	329	329	329	329	329	329	329	329	152	157
Cattle Market	311	311	311	311	311	146	223	223	223	223	223	223	223
Nad El Sheba Market	-	-	-	-	-	-	-	-	53	53	120	168	169
Car Hypermarket	-	-	-	-	-	-	-	-	-	130	130	130	139

* The increase in number of shops is due to the addition of privately-owned shops

Table No. 2. Total revenue and expenditure for the Market Section, 1991 – 2002

Year	Total Expenditure	Total Revenue	Revenue as a percentage of expenditure
1991	2,072,813	8,389,554	405%
1992	2,349,936	5,962,377	254%
1993	2,566,263	6,291,520	245%
1994	2,673,765	7,580,082	283%
1995	2,988,266	8,689,949	291%
1996	4,573,733	11,652,627	255%
1997	3,664,555	10,445,276	285%
1998	4,224,694	10,884,137	258%
1999	3,883,277	11,340,900	292%
2000	4,378,580	15,060,377	344%
2001	6,224,717	15,272,151	245%
2002	5,559,088	40,974,551	737%
Total	45,159,687	152,543,501	338%

Revenue as a percentage of expenditure, 1991 – 2002

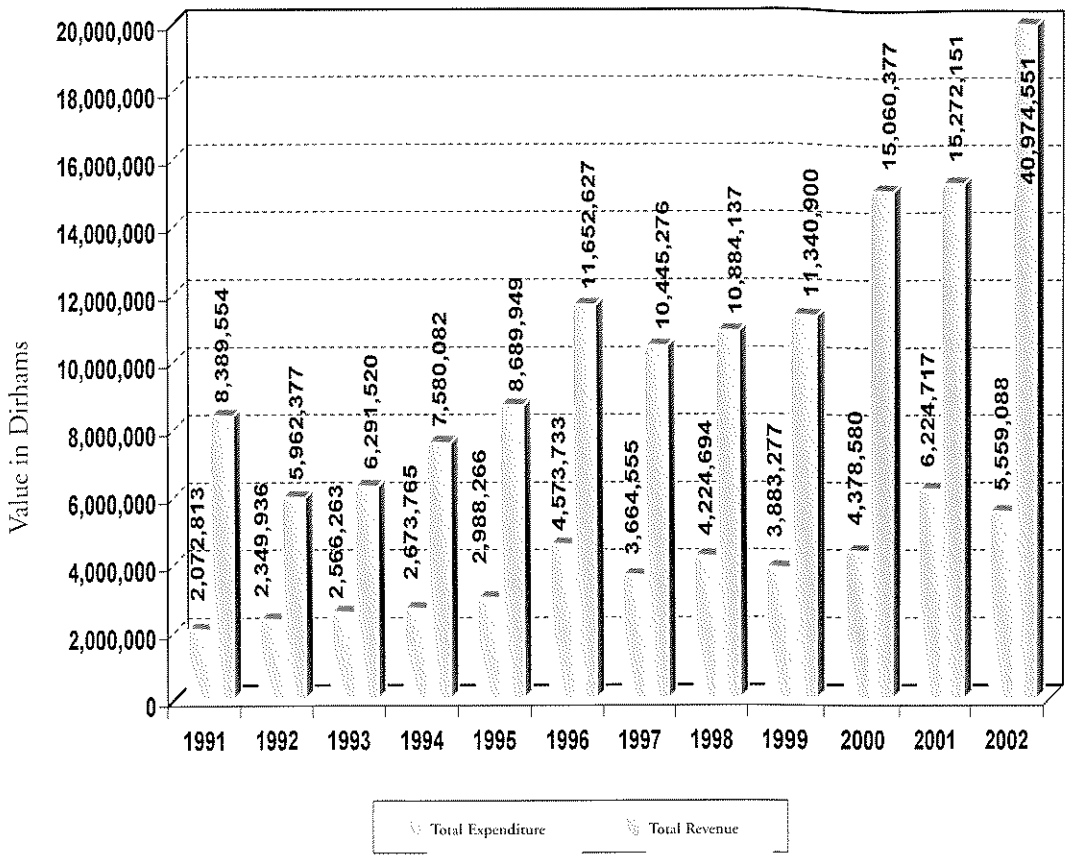
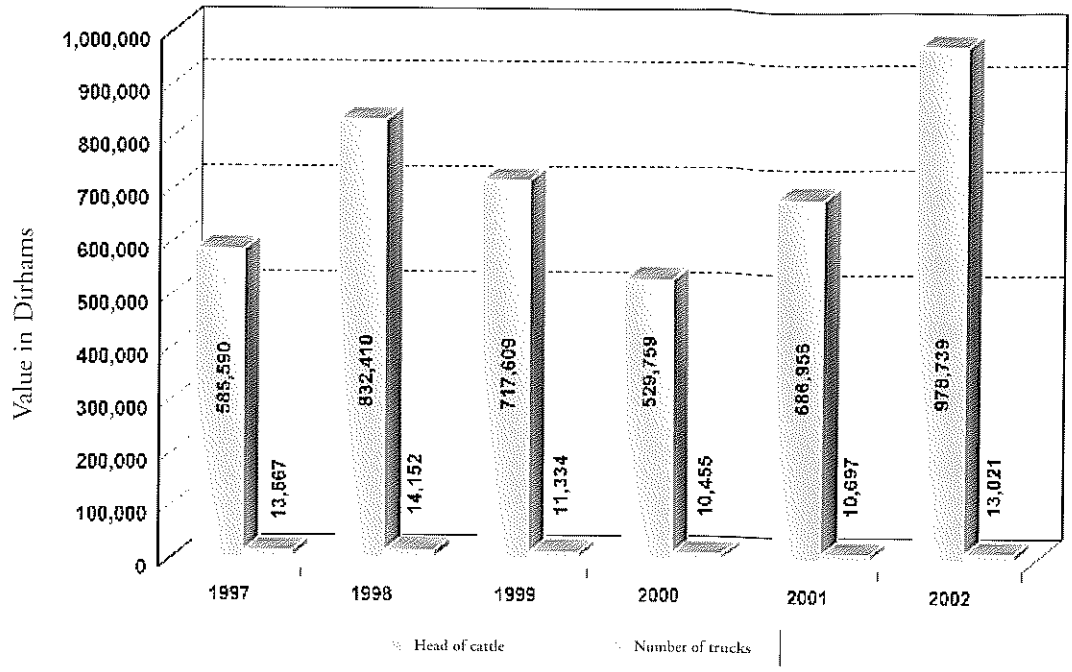


Table No. 3. Total number of refrigerated truck and cattle deliveries to the Hamriyyah Fruit and Vegetable Market and the Cattle Market, 1997 – 2002

Item	1997	1998	1999	2000	2001	2002
Head of Cattle	585,590	832,410	717,609	529,759	686,956	978,739
Number of refrigerated trucks	13,567	14,152	11,334	10,455	10,697	13,021

Total number of refrigerated truck and cattle deliveries to the Hamriyyah Fruit and Vegetable Market and the Cattle Market, 1997 - 2002



Refrigerated truck deliveries to the Hamriyyah Fruit and Vegetable Market and to the Cattle Market, by origin, in 2002

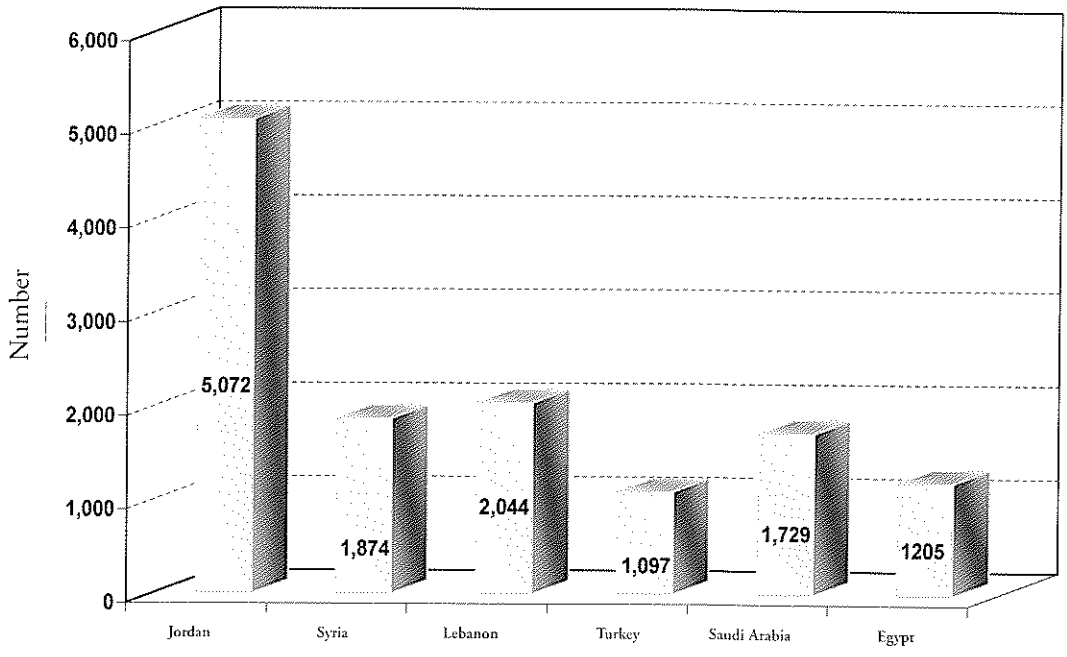
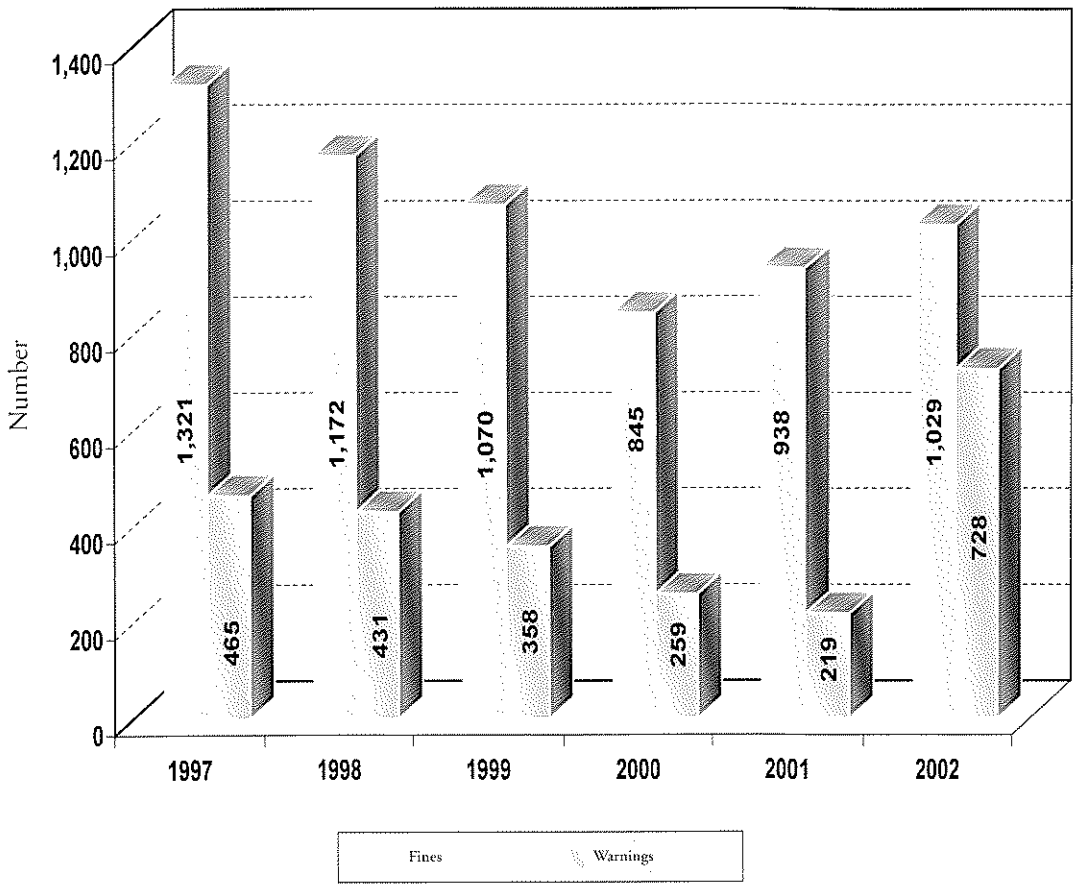


Table No. 4. Number of offences in the markets, 1997 – 2002, by type of penalty

Item	1997	1998	1999	2000	2001	2002
Fines	1,321	1,172	1,070	845	938	1,029
Warnings	465	431	358	259	219	728
Total	1,786	1,603	1,428	1,104	1,157	1,757

Number of offences in the markets, 1997 – 2002, by type of penalty



Development Phases of the Abattoirs

The origins of today's abattoirs in Dubai can be traced back to 1957, when a small one was built behind the present Nayif Centre, consisting only of a cement floor building with wooden rails on which the carcases were hung. It had no running water, and water supplies were brought from elsewhere.

In 1961, in order to safeguard the health of the public, Municipal Ordinance No. 6 was issued to prohibit the slaughter or sale of meat, or the sale of cattle and offal anywhere other than in the locations specified by the Municipality. The original abattoir was closed down and two new ones were opened, one in Bur Deira, as part of the Fish Market, and the other in Dubai, at the Bur Dubai Market. Both were very simple, meeting only very basic public health needs. The butchers in both were self-employed. These two abattoirs continued to operate until 1989.

During the 1980s, however, the process of monitoring abattoirs to ensure that they meant public health requirements got properly under way, and planning began for new abattoirs. Conditions laid down for the operation of these included safeguards for the health of the consumer, such as the provision of veterinary care to examine the livestock and the meat, to ensure that they were disease-free, and the introduction of a healthy and sterile environment for the slaughter of the animals.

The first of the new abattoirs, the Dubai Abattoir, was built at Al Qusais. The United Nations Development Programme was asked to provide the services of a consultant, who made an initial study of the needs, and an international company specialising in abattoir design and construction was then appointed.

Work on constructing the new abattoir began in March 1987, this being completed in 1988 at a cost of 28.6 million dirhams.

In 1989, work at the old abattoirs in Bur Dubai and Bur Deira ceased, and the new Dubai abattoir was opened. Administrative Decree No. 201 laid down that it should have a capacity of 1,200 head of sheep and goats and 65 head of cattle and camels. 85 qualified staff were appointed, and the abattoir was placed under the control of the Municipality's Public Health Department.

In 1989, a fertiliser plant, costing 3.5 million dirhams, was set up in association with the abattoir, with a daily production capacity of 1.5 tons of output, equivalent to 547 tons a year, suitable for use on the land or for animal fodder. 500 litres a day of oils, or 182,000 litres annually, were also produced, suitable for use in various types of manufacturing, this being sold to commercial companies.

The continuing increase in the consumption of meat, as a result of population growth, meant that the Al Qusais abattoir could not meet demand, and in 1990, work on the building of a new Bur Dubai abattoir began.

Costing 6 million dirhams, this opened in 1992, with a daily throughput capacity of 600 head of sheep and goats and 20 head of cattle and camels. In the same year, an annexe to the Al Qusais abattoir also opened, for use by the public. Called the Public Abattoir, and costing 5.5 million dirhams, it had a daily capacity of 600 head of sheep and goats and 20 head of cattle and camels.

In 1993, Administrative Directive No 294 for 1993 laid down the organisation of the Dubai Abattoir, which was divided into two Units, the Public Services Unit and the Commercial Services Unit. It remained part of the Public Health Department.

In 1995, Administrative Directive No. 313 for 1995 spelt out the administrative structure of

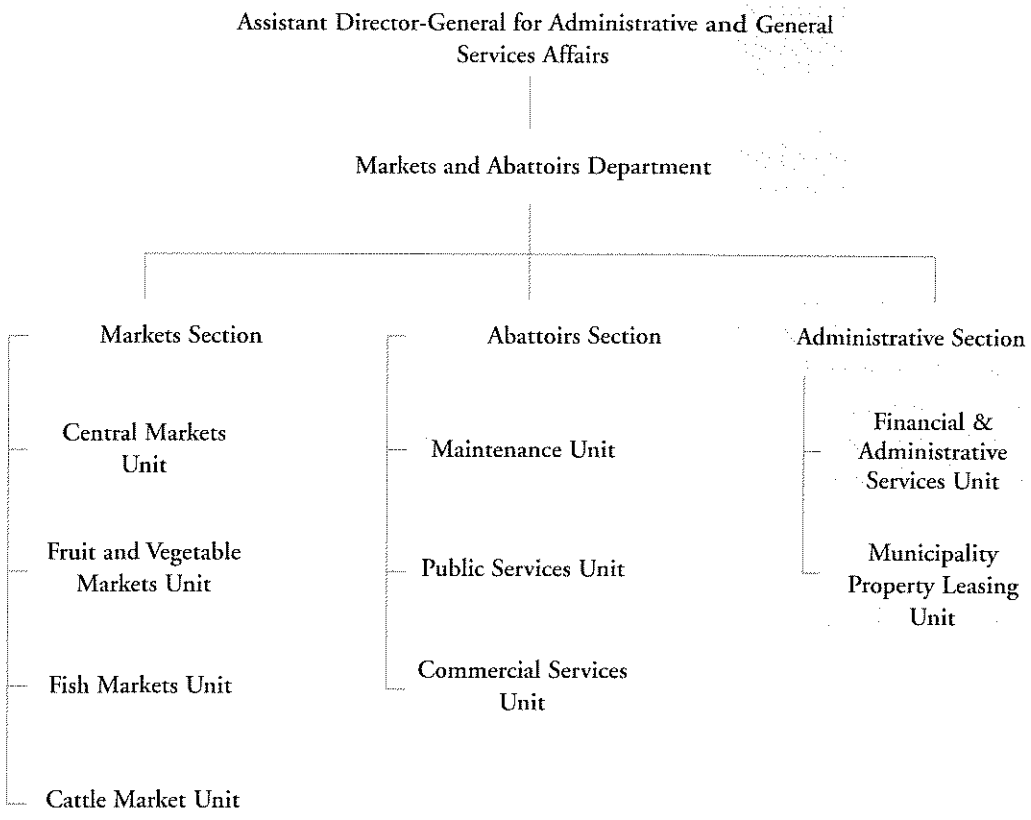
and duties of the Dubai Abattoir at Al Qusais, which was placed under the supervision of the Assistant Director-General for Environment and Public Health Affairs. In this directive, it was specified that Municipality abattoirs should be operated using the latest equipment and in accordance with the appropriate health requirements. The necessary measures to dispose of the remains of carcases were prescribed as well as the requirement that a high degree of cleanliness should be maintained at all times. It also laid down details of the fees to be charged and how these were to be collected, and provided for collaboration with the Public Relations Section and other appropriate sections on the preparation of advertising and publicity material.

Until 1998, the abattoirs were part of the Environment and Public Health Department, with an Abattoir Maintenance Unit, an Abattoir Operations Unit and an Accounting and Administrative Services Unit.

In March 1998, a new abattoir with a capacity of 100 head of sheep and goats and 20 head of cattle opened in the town of Hatta, to meet the needs of Hatta and nearby villages.

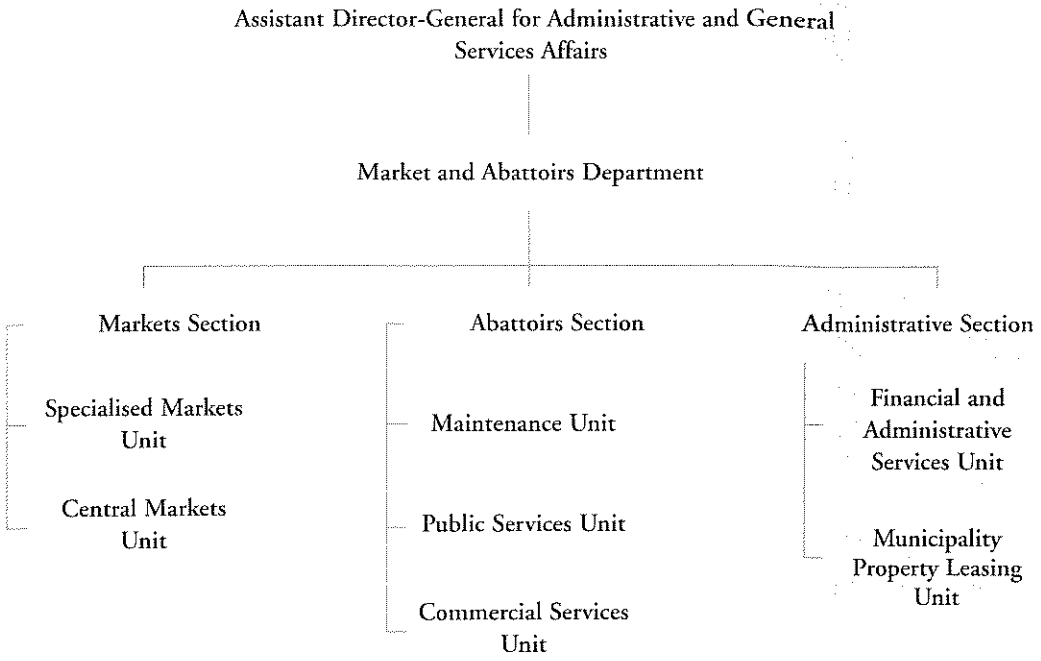
In 1998, Administrative Directive No. 291 created the Markets and Abattoirs Department, into which the Markets and Abattoirs Sections were merged, as shown in Chart No. 5.

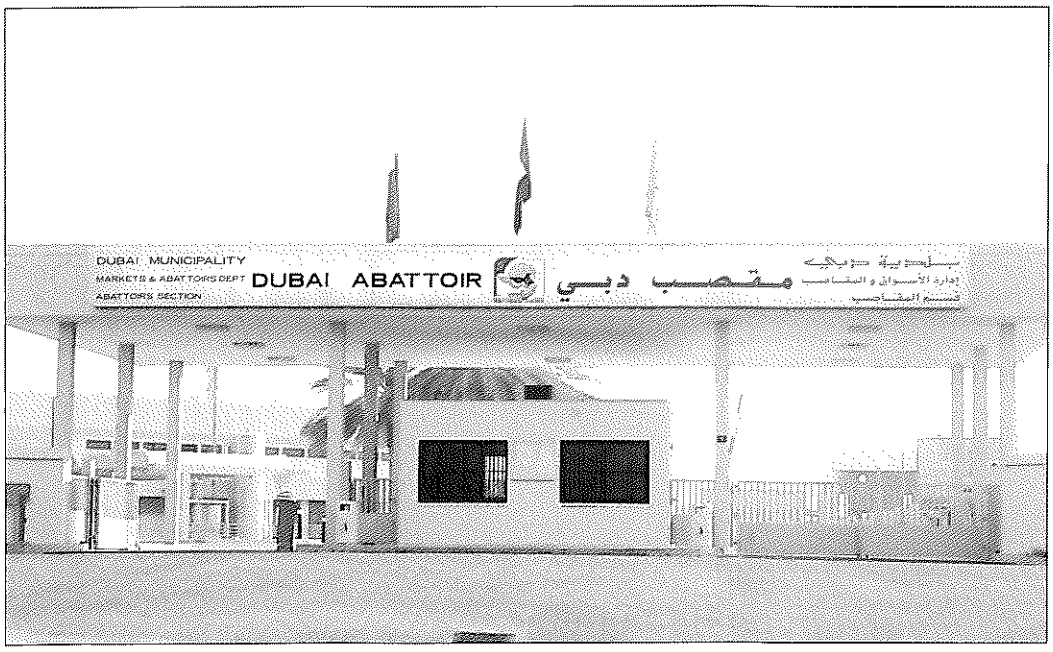
Chart No. 5. Organisation Chart for the Markets and Abattoirs Department in 1998



In 1999, Administrative Directive No. 280 was issued amending the organisation chart, as shown in Chart No. 6.

Chart No. 6. Organisation Chart for the Market and Abattoir Department in 1999



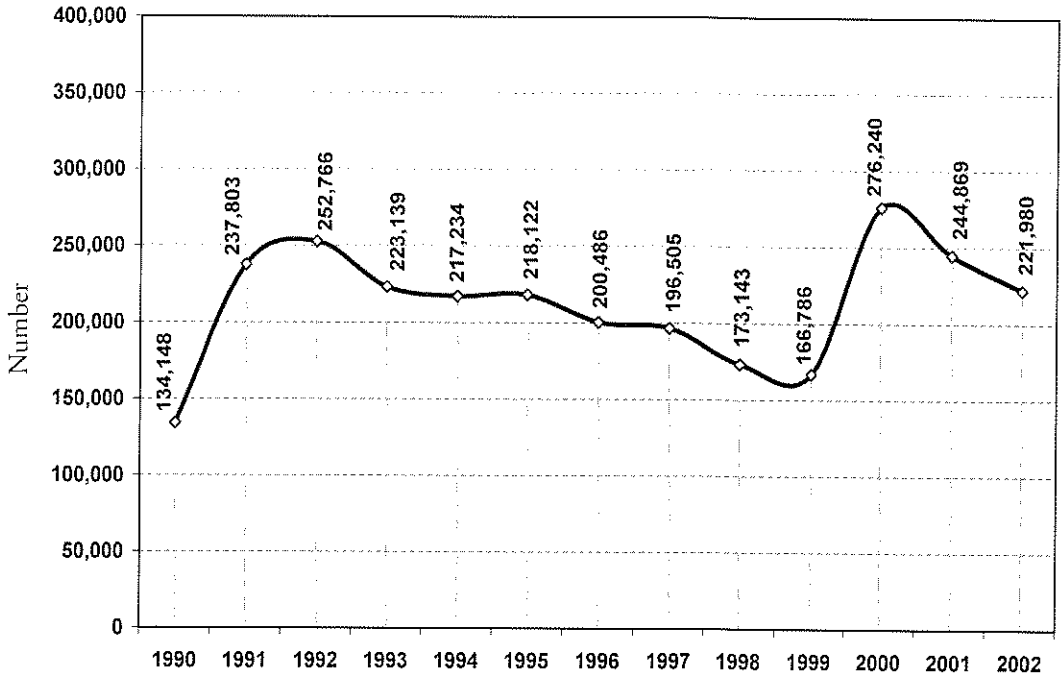


The Dubai Abattoir at Al-Qusais

Animals slaughtered in Dubai's abattoirs according to type, 1990 – 2002 during 1990 – 2002

Item \ Year	Sheep	Goat	Cattle	Camel	Total
1990	79,799	51,953	2,077	319	134,148
1991	146,139	88,111	2,810	743	237,803
1992	132,004	119,237	1,023	502	252,766
1993	137,225	81,827	3,361	726	223,139
1994	142,966	69,563	3,804	901	217,234
1995	102,476	110,982	3,663	1,001	218,122
1996	93,742	102,218	3,722	804	200,486
1997	84,555	105,784	5,133	1,033	196,505
1998	63,947	102,911	5,500	785	173,143
1999	51,857	108,402	5,717	810	166,786
2000	159,676	107,927	7,585	1,052	276,240
2001	145,599	93,093	5,430	747	244,869
2002	112,845	98,778	9,462	895	221,980

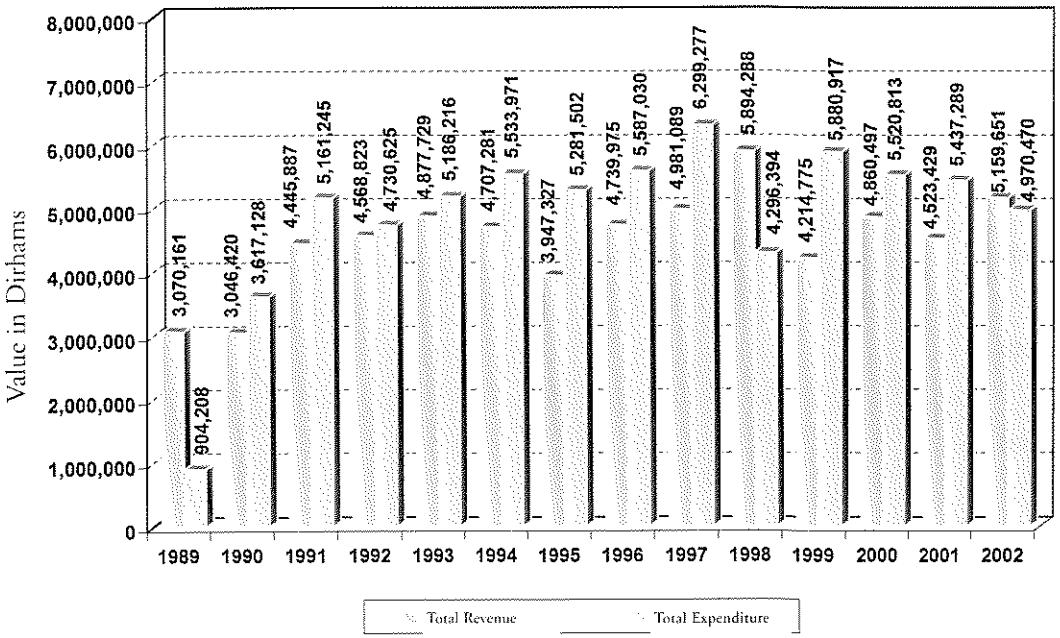
Animals slaughtered in Dubai's abattoirs, 1990 – 2002



Revenue and expenditure of the Abattoir Section, 1989 – 2002, in dirhams

Year / Item	Total Expenditure	Total Revenue	Revenue as a percentage of expenditure
1989	3,070,161	904,208	29%
1990	3,046,420	3,617,128	119%
1991	4,445,887	5,161,245	116%
1992	4,568,823	4,730,625	104%
1993	4,877,729	5,186,216	106%
1994	4,707,281	5,533,971	118%
1995	3,947,327	5,281,502	134%
1996	4,739,975	5,587,030	118%
1997	4,981,089	6,299,276.55	126%
1998	5,894,287.81	4,296,393.96	73%
1999	4,214,774.97	5,880,917.34	140%
2000	4,860,496.91	5,520,813.35	114%
2001	4,523,428.98	5,437,289.30	120%
2002	5,159,650.69	4,970,469.77	96%
Total	63,037,311.36	68,407,085.27	108.52%

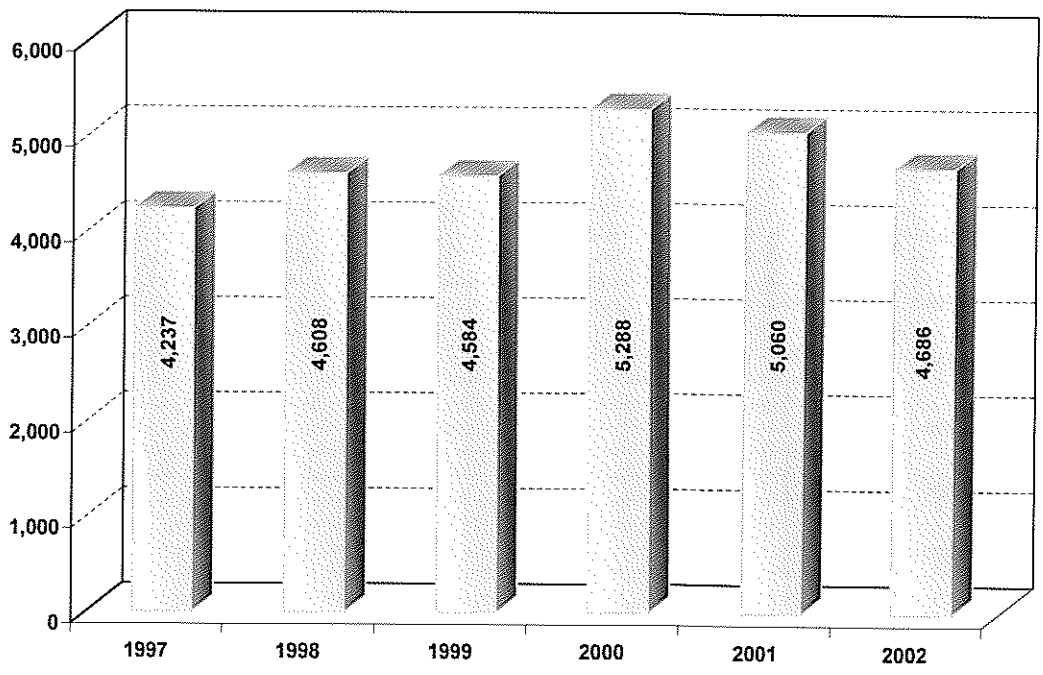
Revenue as a percentage of expenditure in the Abattoir Section, 1989 – 2002



Since 1997, Dubai's abattoirs have relied on the HACCP (Hazard Analysis and Critical Control Points) system to monitor cleanliness. This involves the taking of regular samples from animal enclosures, workers, equipment, surfaces, walls, ceilings, water, carcases and meat to check for pollution. in order to monitor the degree of pollution. In 1999 the latest system for the monitoring of pollution was introduced with the installation of a tool which monitors and corrects pollution in less than 10 minutes.

Source of sample	Number of samples tested for pollution					
	1997	1998	1999	2000	2001	2002
Meat and carcases	1,232	1,073	1,103	1,124	948	963
Equipment and tools	784	987	918	1,206	1,299	898
Level surfaces	1,137	1,510	1,435	1,809	1,640	1,507
Workers	655	721	800	891	971	1,081
Water	266	253	270	191	189	163
Retained carcases	85	7	26	57	6	26
Leftovers/ entrails	78	66	32	10	7	48
Total	4,237	4,608	4,584	5,288	5,060	4,686

Samples tested, 1997 – 2002



Dubai Central
Laboratory
Department

One of the main tasks of the Municipality from the time it was established has been the taking of measures to protect the health of citizens and other residents of Dubai, as well as their interests as consumers.

In 1975, the Food Laboratory was set up, to carry out basic tests on foodstuffs for public consumption. As illustrated in Chart No. 1, it was then part of the Public Health Section.

Chart No. 1. Organisation Chart for the Food Laboratory in 1975

Municipality Director

Public Health Section

Clinic and Medical Services Unit

Food Laboratory

As the development of Dubai continued to gather pace, a number of other laboratories were established, such as, in 1979, the Material Testing Laboratory, which was placed directly under the Municipality's Director, as shown in Chart No. 2.

Chart No. 2. Organisation Chart for the Material Testing Laboratory in 1979

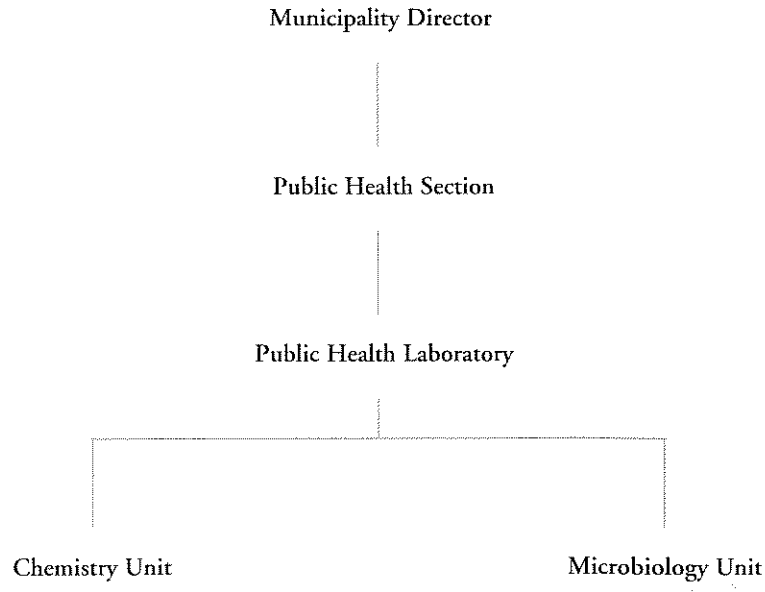
Municipality Director

Material Testing Laboratory

When first set up, this had only four employees, and dealt primarily with the testing of concrete blocks, as well as limited tests on rocks and stone, this continuing until the end of the 1980s.

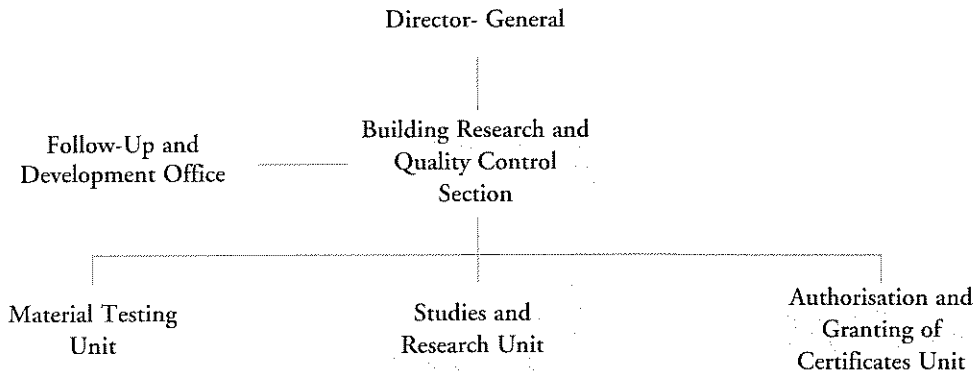
In 1984, the name of the Food Laboratory was changed to the Public Health Laboratory, with two separate Units being created, as shown in Chart No. 3.

Chart No. 3. Organisation Chart for the Public Health Laboratory in 1984



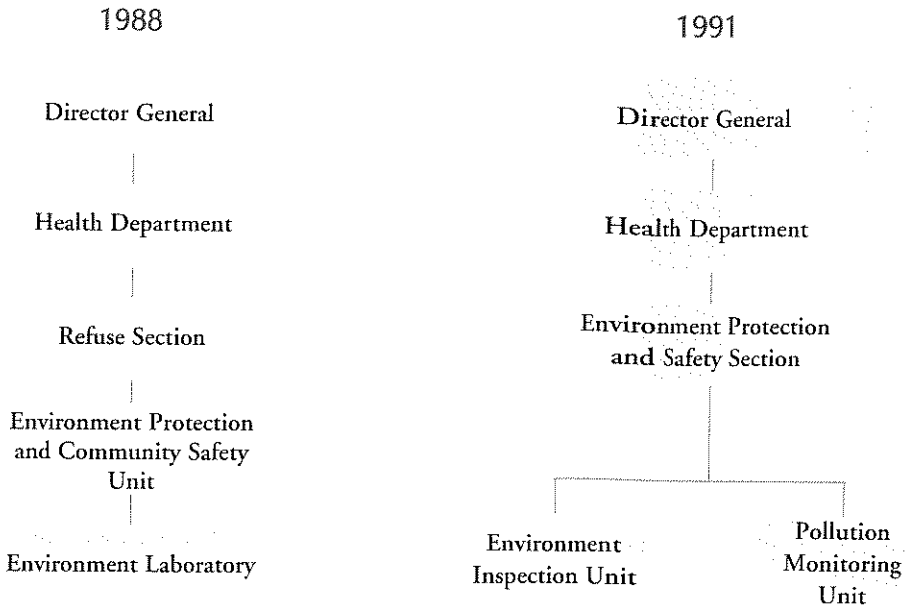
In 1987, the Material Testing Laboratory was renamed the Building Research and Quality Control Section, under the terms of Administrative Directive No. 208, as shown in Chart No. 4.

Chart No. 4. Organisation Chart for the Building Research and Quality Control Section in 1987



In 1988, the Environment Laboratory was established, as part of the Environment Protection and Community Safety Unit, itself part of the Public Health Department. Once the Environment Protection Section was set up in 1991, it was transferred to this Section, as shown in Chart No. 5.

Chart No. 5. Organisation Chart for the Environment Laboratory, 1988 – 1991

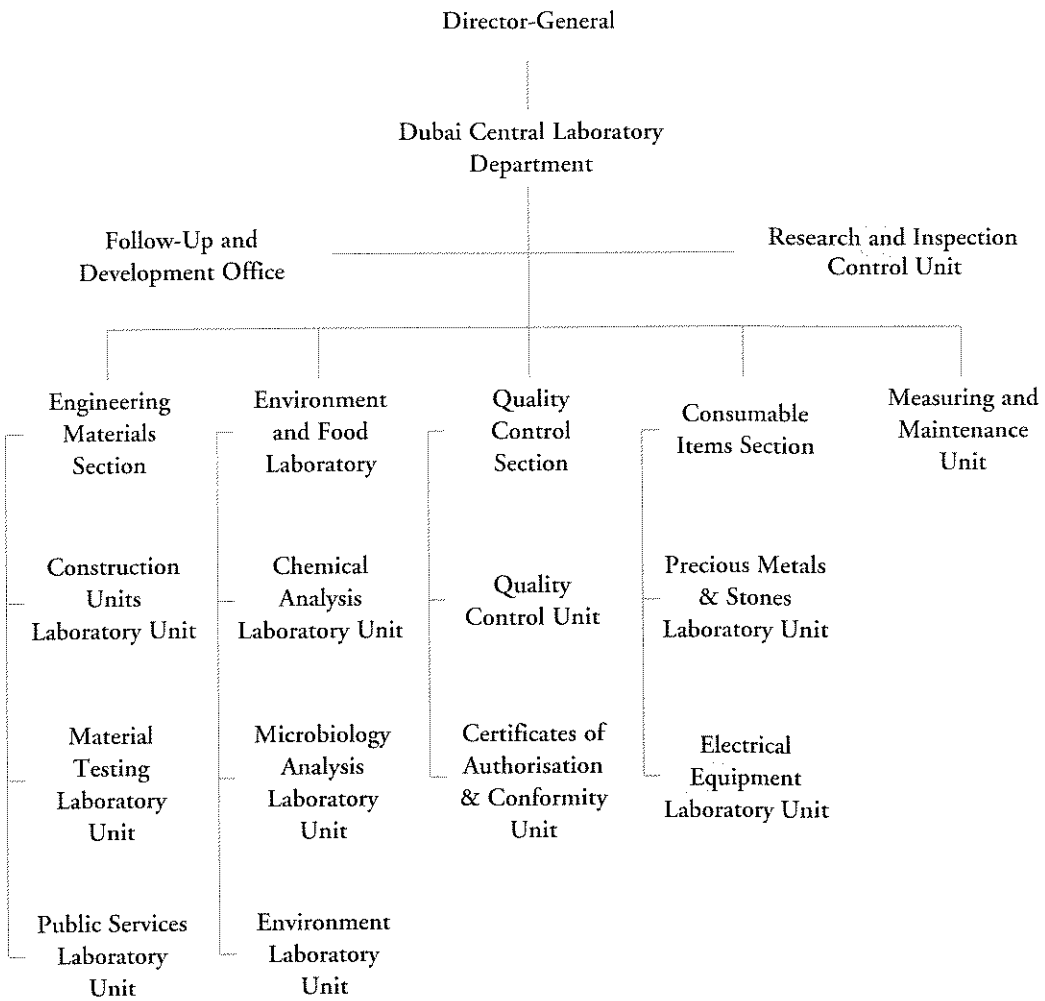


Inside the Laboratory

In 1997, the Dubai Central Laboratory Department was established in the Al-Karama area (Umm Hurair). This included all of the Municipality's laboratories, those mentioned above as well as the Precious Metals and Stones Laboratory, the Electrical Equipment Laboratory and others. The objective of this move was to improve performance and to enhance consumer protection as well as contributing in a positive way to the national economy and to facilitate the import and export of goods within the framework of the country becoming a member of the World Trade Organisation, WTO.

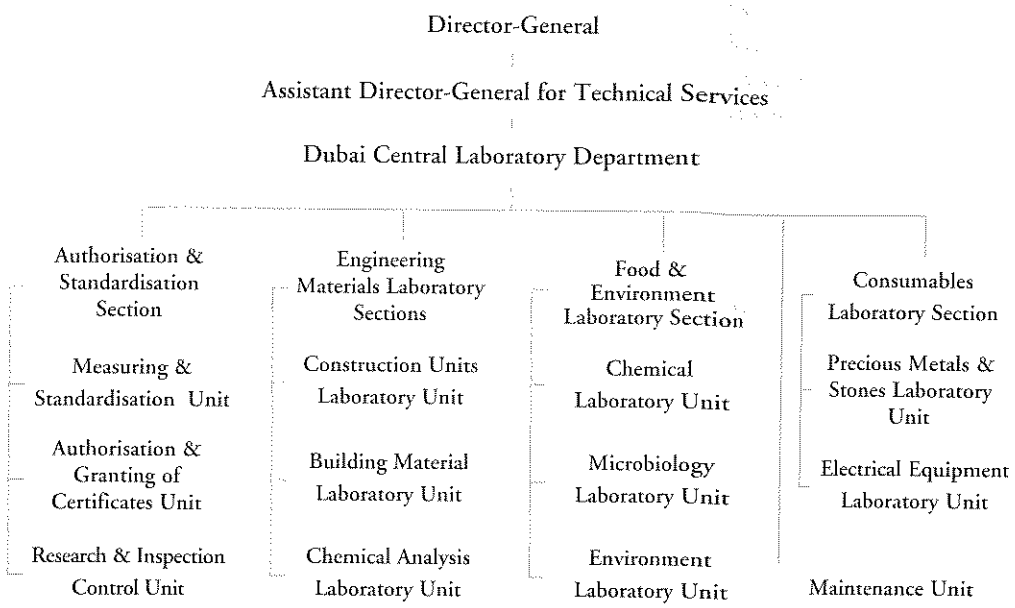
In the same year, Administrative Directive No. 800, issued on 9th June 1997, laid down the organisational structure for the Laboratory, as explained in Chart No. 6.

Chart No. 6. Organisation Chart for the Dubai Central Laboratory Department in 1997



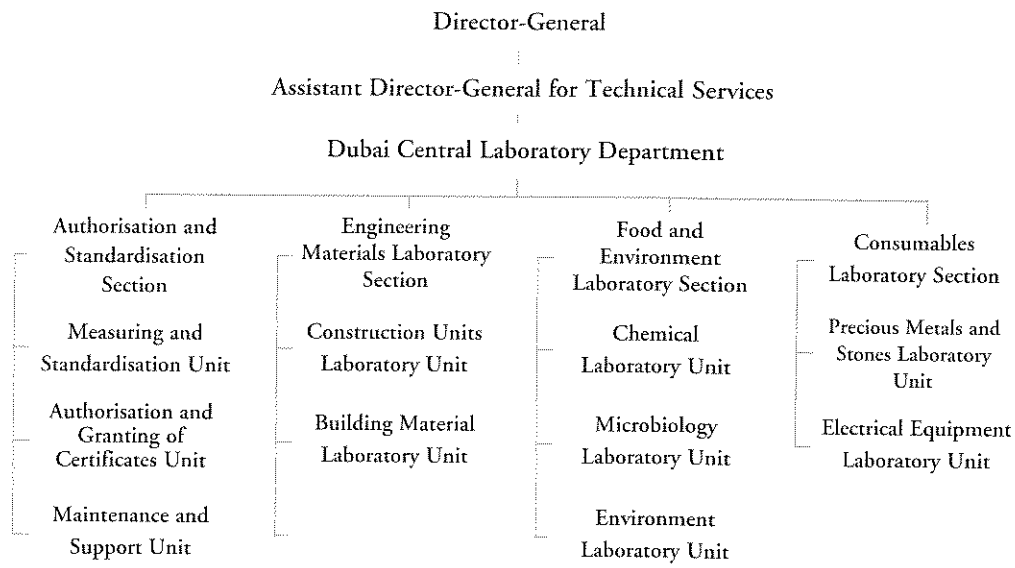
In 1999, the organisation chart for the Department was amended, as shown in Chart No. 7.

Chart No. 7. Organisation Chart for Dubai Central Laboratory Department in 1999



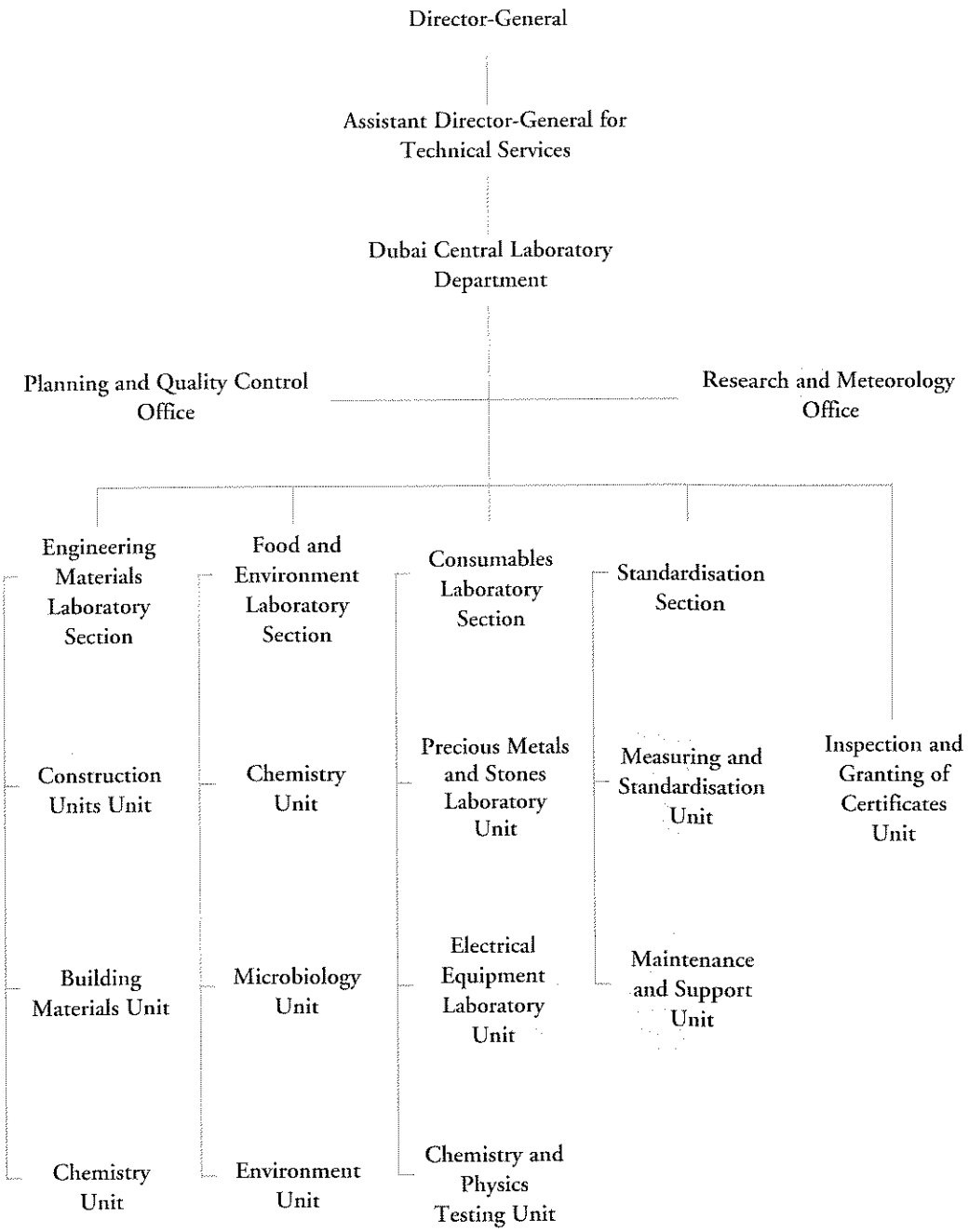
In 2000, the organisation chart for the Department was once again amended, under the terms of Administrative Directive No. 45 for the year, as shown in Chart No. 8, while on 25th March 2000 the vision, mission and objectives of the Department were specified in a manual issued as part of the quality implementation programme.

Chart No. 8. Organisation Chart for Dubai Central Laboratory Department in 2000



In July 2002, the organisation chart was once again amended, as shown in Chart No. 9.

Chart No. 9. Organisation Chart for Dubai Central Laboratory Department in 2002



The main duties and responsibilities of Dubai Central Laboratory Department

The main duties of the Dubai Central Laboratory are to ensure that the appropriate tests and research are carried out with regards to standardisation, the use of weights, meteorological information and other topics. It is responsible for the issuing of certificates guaranteeing authenticity and conformity with standards and the unification of all standards and descriptions used for engineering materials, environmental matters, foodstuffs, and other goods, such as precious stones, precious metals and household electrical and electronic goods. This work is carried out by following sections, as described below.

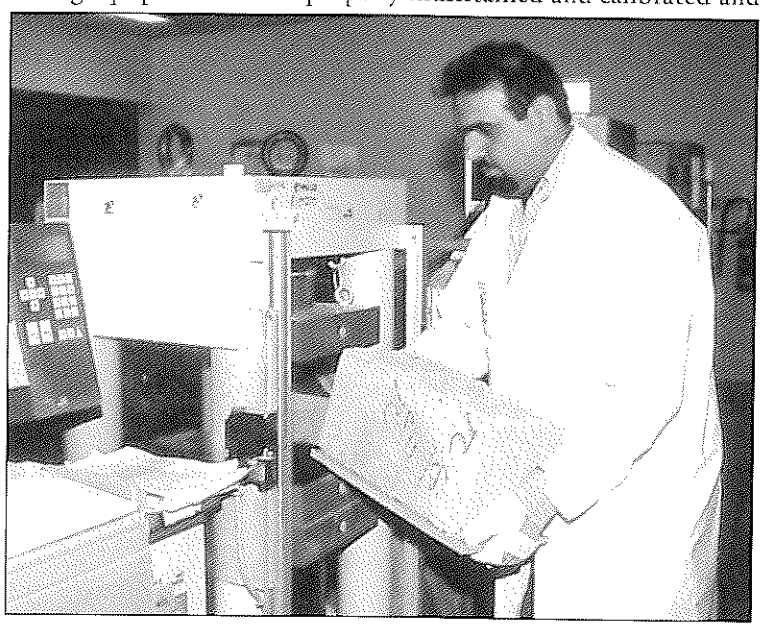
Authorisation and Standardisation Section

This Section provides quality control services for the laboratories engaged in the testing and analysis of building material, food stuffs, environmental products and consumables and carries out research on the building industry with relation to the development of techniques, rules on standardisation, regulations and descriptions. It also provides measuring services (gauging), using approved measuring techniques, for all the equipment of the Central Laboratory Department as well as for other government and private bodies.

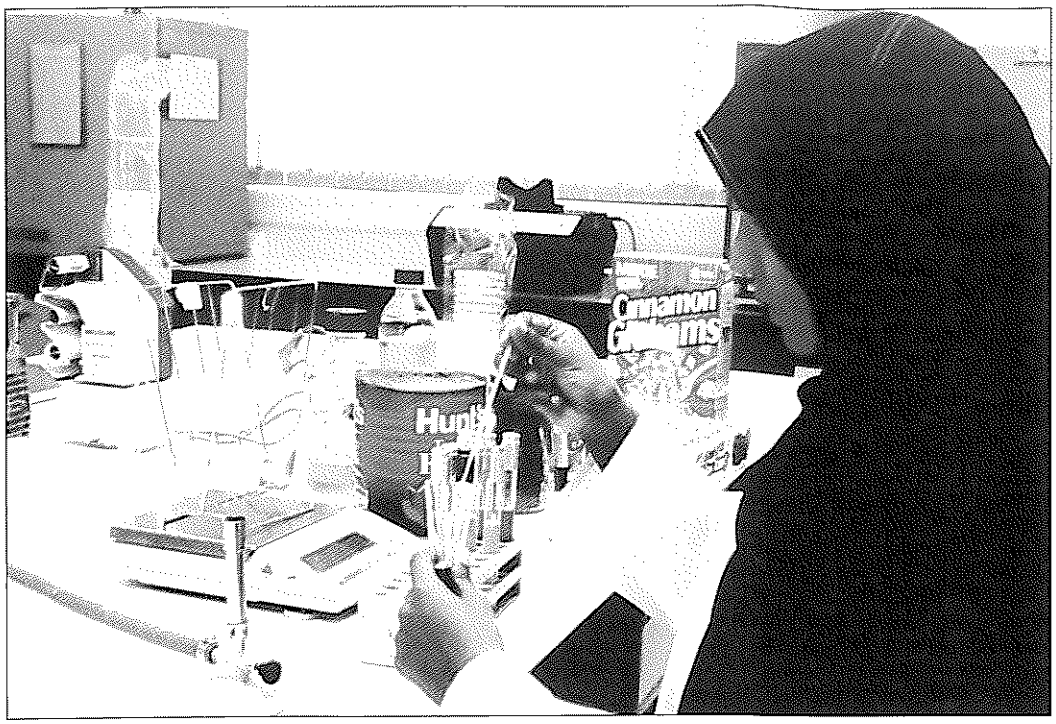
Engineering Material Laboratory Section

This Section offers physical, mechanical, chemical and petrographic testing on various items used for construction to federal and local government bodies and to the private sector, in order to ensure that materials meet the required specifications. It also ensures that all of the testing and measuring equipment used is properly maintained and calibrated and undertakes research on engineering materials and other items used in construction, collecting the necessary data and preparing reports.

Other tasks include the study and revision of all specifications related to Municipality projects and making the appropriate recommendations, in particular with regards to the suitable scales to be used.



Measuring the endurance of a building block in the Engineering Material Laboratory



Testing foodstuffs

Food and Environment Laboratory Section

This Section carries out microbiological, chemical and physical analysis on samples of food stuffs and drinking water according to request, including testing for levels of radioactivity. It also conducts specialised tests samples of agricultural and animal products to identify the presence of traces of pesticides, growth hormones and fungal toxins.

Other work includes the carrying out of laboratory tests on foodstuffs to determine their composition and to identify whether they have been accurately described, so as to provide consumers with satisfactory guarantees. It also carries out laboratory tests on food and environmental samples received from other Municipalities in the country, if requested to do so.

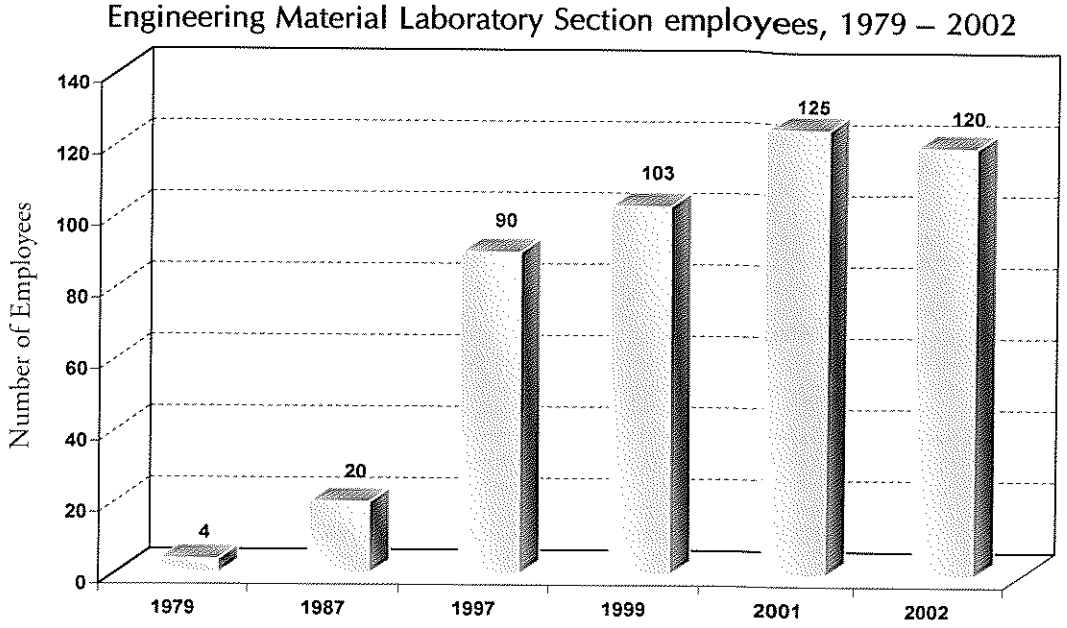
Consumables Laboratory Section

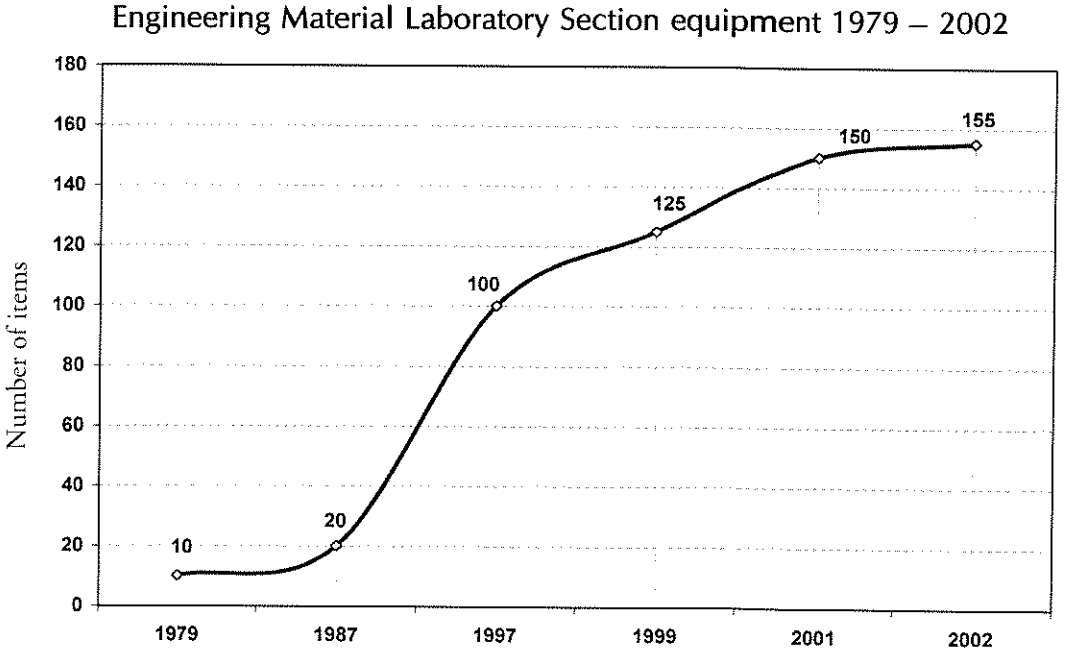
The Section tests precious stones and precious metals manufactured in or imported into Dubai, and, where appropriate, puts on hallmarks. It also carries out laboratory tests on household electrical and electronic equipment and tools which are sold or made in the Emirates to ensure they are safe for use and carries out other tests prior to the issuing of quality certificates.

Development of the Sections of the Dubai Central Laboratory

Engineering Material Laboratory Section

Since this Section was first established in 1979, it has grown rapidly, both in terms of the number of employees and in terms of the amount of equipment being used. These graph shows the growth between 1979 and 2002.

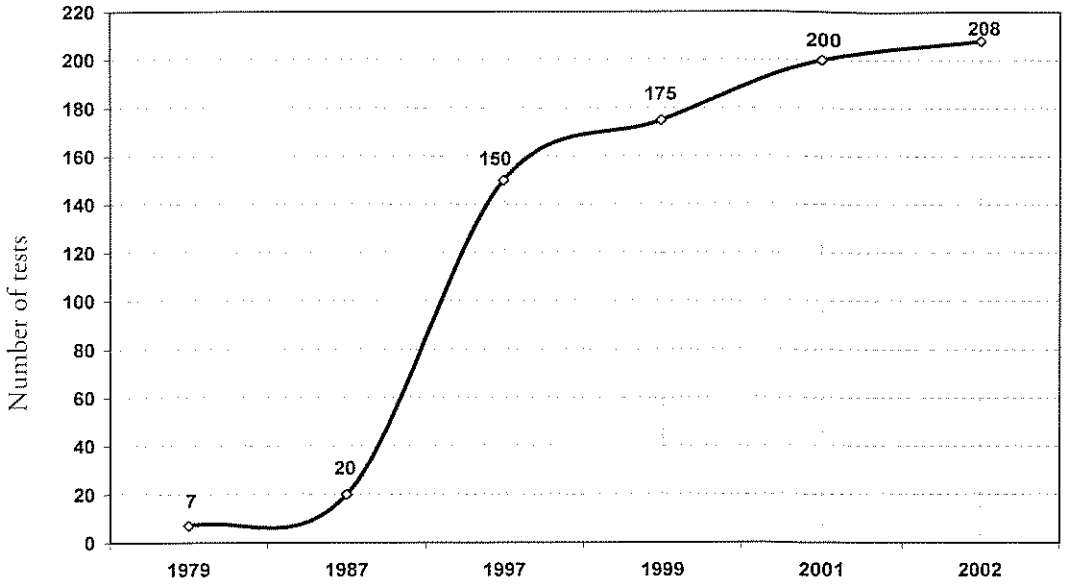




Following the establishment of the Dubai Central Laboratory Department in 1997, it was decided to increase the number of services and test facilities for building materials that were offered by the Building Research and Quality Control Section.

The Section has three Units, the Building Material Laboratory Unit, the Chemical Laboratory Unit and the Construction Units Laboratory Unit, with 120 employees at the time this book was compiled. These carry out a variety of physical, chemical, mechanical and petrographic tests.

Tests conducted by the Engineering Material Laboratory Section, 1979 – 2002



Building Material Laboratory Unit

This Unit has several laboratories carrying out physical and mechanical tests on building materials using standard international measuring techniques. Both the number of tests and the quality of them have increased substantially since 1979.

Chemistry Laboratory Unit

Chemical tests on building materials began with simple facilities, but these have been much improved. The laboratories are now equipped with the latest equipment, capable of carrying out detailed tests on a variety of construction and manufacturing materials. These include cement tests, engine oil tests and others such as microscopic petrographic tests.

Construction Units Laboratory Unit

This Unit provides physical and mechanical testing services for Municipality projects, for the private sector and for federal and local Government bodies, in accordance with the latest international standards. In 2001, new equipment was purchased for tests of reinforced concrete, and for tests of concrete structures to see whether they meet specifications as well as for tests on heat insulation.

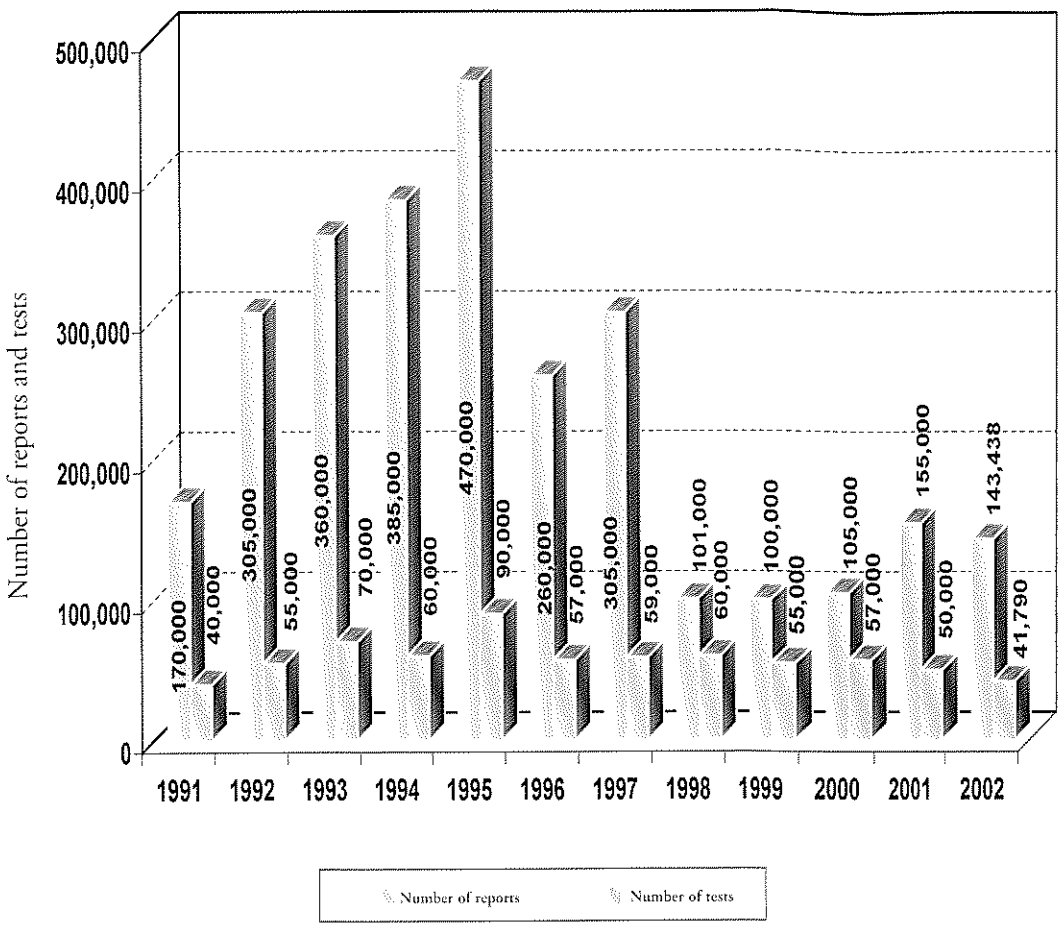
The following table summarises the development of tests and other resources in the Engineering Material Laboratory Section.

Tests and other resources available in the Engineering Resources Section, 1979 – 2002

Year	Number of employees	Number of tests			Items of equipment
		Physical	Mechanical	Chemical	
1979	4	2	3	2	10
1987	20	8	8	4	20
1997	90	60	50	40	100
1999	103	70	60	45	125
2001	125	80	70	50	150
2002	120	84	72	52	155

The Engineering Material Laboratory Section

This Section implements quality control programmes on construction materials used in Municipality projects. This has helped significantly in improving standards for roads, bridges and buildings. The following graph shows the way in which the Section's work developed between 1991 and 2002.



Development Studies

The rapid development of Dubai's construction industry has involved much greater use of pre-cast units for tower construction. Originally, however, there was no authority responsible for the testing of such units. The Central Laboratory therefore set up a hard-ground testing area in its research centre and purchased the equipment necessary to allow it to carry out tests on pre-cast units.

Another recent development has been the purchasing by the Engineering Material Laboratory Section of equipment to test the plastic and concrete pipes used in irrigation and sewage projects. Previously, these had only been tested by the manufacturers and not by an independent third-party laboratory.

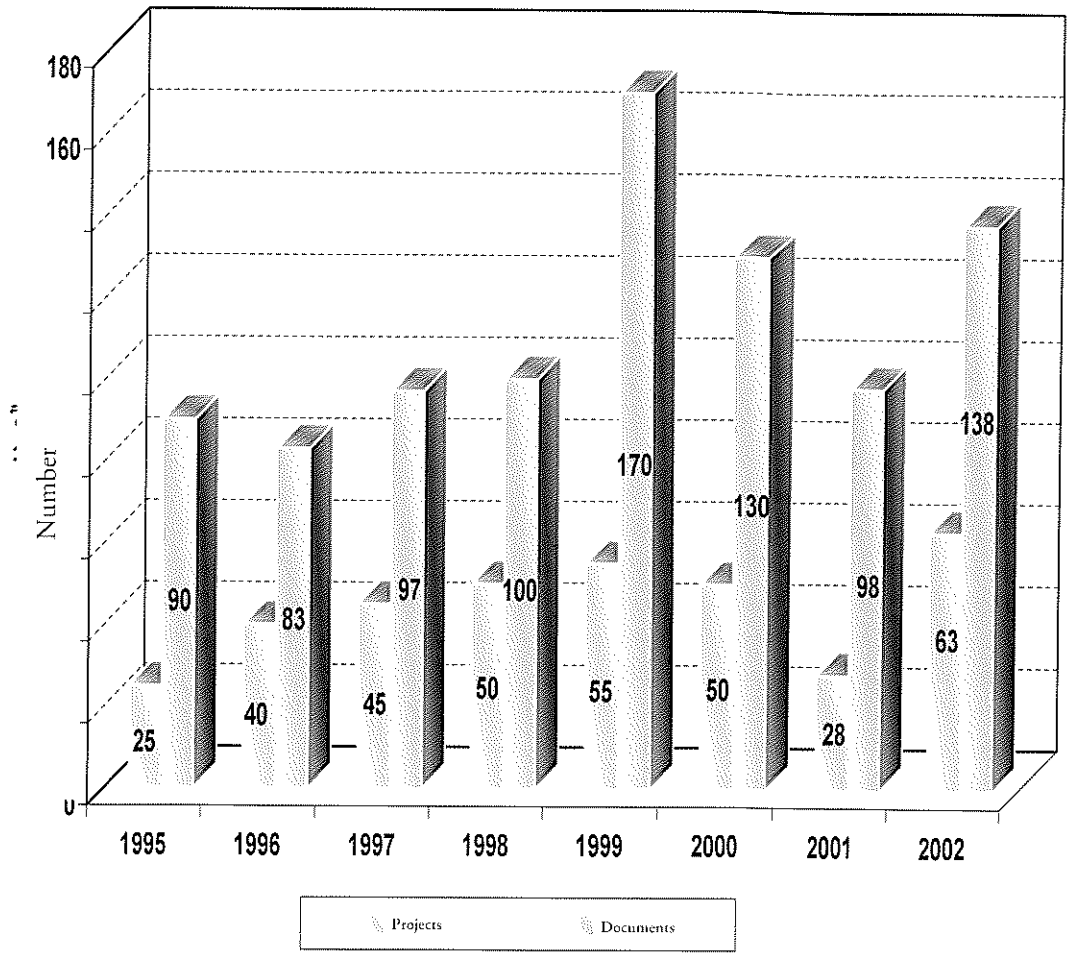
The recent introduction, in 2003, of building heat insulation regulations also meant that laboratory testing equipment for this purpose needed to be purchased. Tests began in mid-

2001, and, overall, the introduction of the new regulations has contributed to a reduction of electricity consumption in the buildings concerned by a factor of around 40%.

Another project has been a study to investigate the optimal composition of asphalt mixes, to determine the mix that can best cope with the combination of heavy loads and high temperatures on Dubai's roads. This is being carried out by the Engineering Materials Laboratory in co-ordination with the Roads Department and a firm of external consultants, and is expected to reduce the need for roads maintenance.

The Engineering Material Laboratory Section has also carried out an audit and review of tender documentation and of studies prior to hand-over of projects. The following graph illustrates the development of this activity.

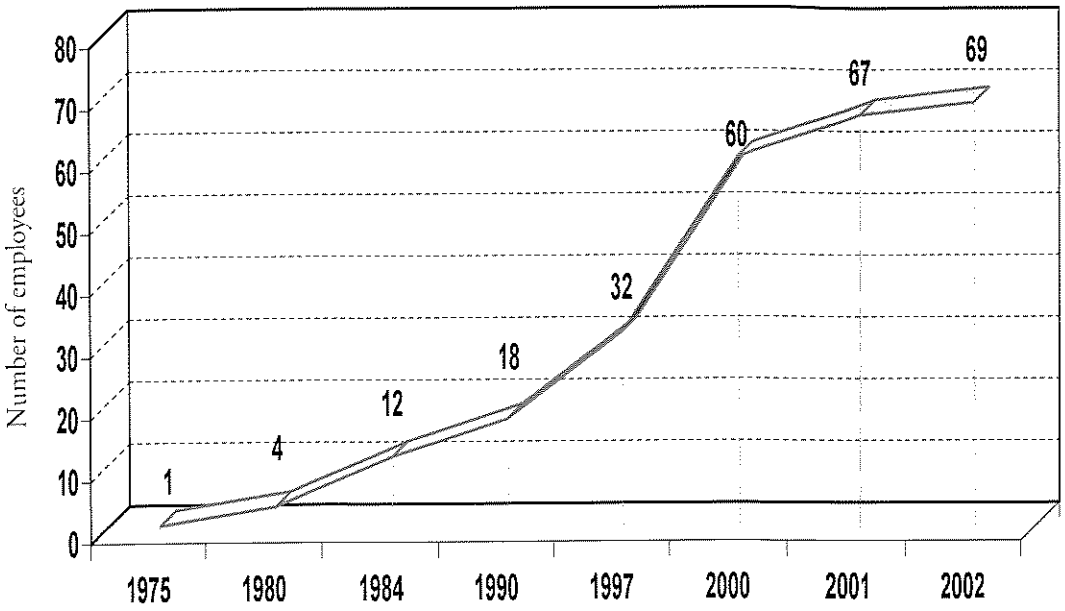
Studies of documents and projects prior to hand-over, 1995 – 2002



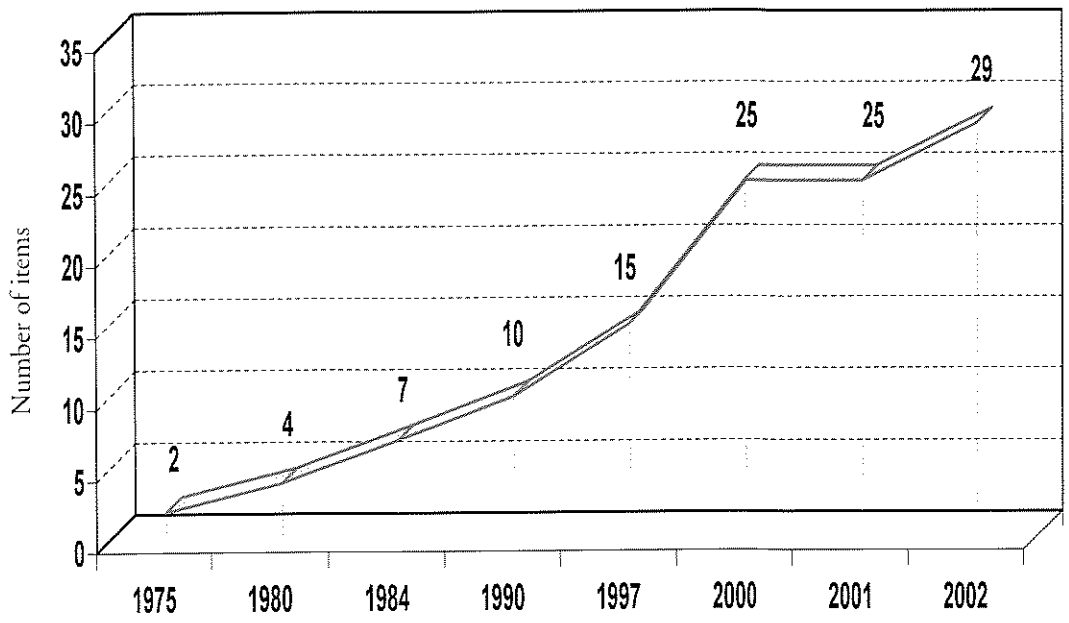
Food and Environment Laboratory Section

The Food and Environment Laboratory Section has expanded greatly since it was set up in 1975. Graphs 1 and 2 show the changes in personnel and equipment between 1975 and 2002.

Graph No. 2. Employess in the Food and Environment Laboratory Section, 1975 – 2002



Graph No. 2. Equipment in the Food and Environment Laboratory Section, 1975 – 2002



In 1991, the Environment Unit was upgraded to become a Section, known as the Protection of Environment and Safety Section, with two Units:

1– The Environment Inspection Unit

2– The Pollution Monitoring Unit.

Both were provided in 1992 with the equipment necessary to permit them to conduct their work in a timely and effective way.

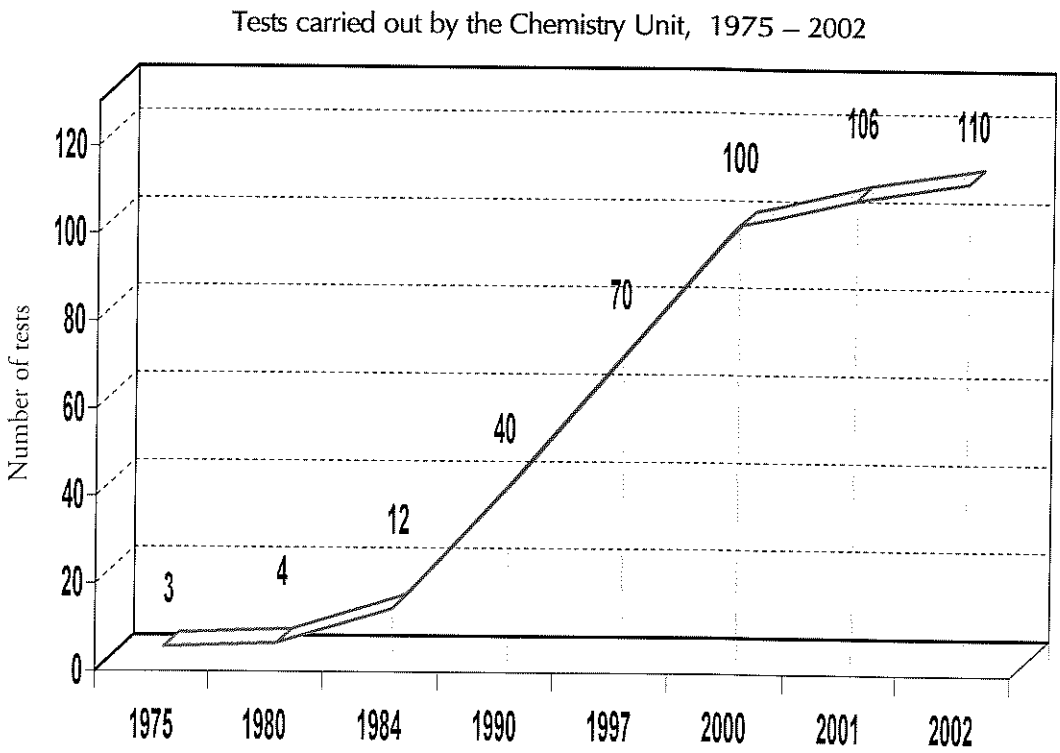
In 1995, the Food and Environment Laboratory moved to new offices in Al-Ittihad Square, the first UAE national chemist joining in the same year.

Another Emirati became the head of the laboratory in 1996.

In 1997, the Food and Environment Laboratory became one of the Units of the Municipality Food Section, which was renamed the Food and Environment Laboratory Section.

Chemistry Unit

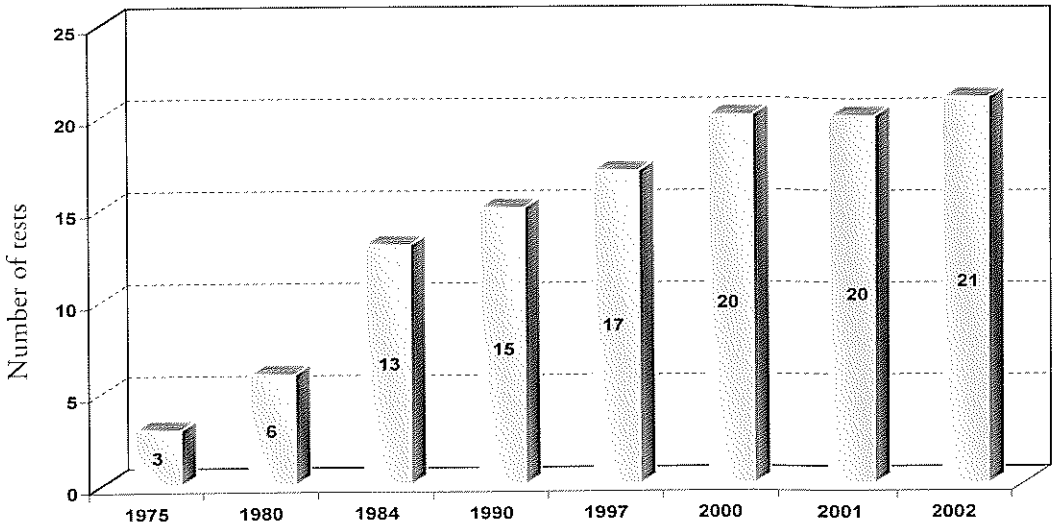
The development of this Unit since 1975 is shown in the following graph.



Biology Unit

This Unit has been able to increase the quality of its testing through the purchase of newer and more accurate equipment, as shown by this graph.

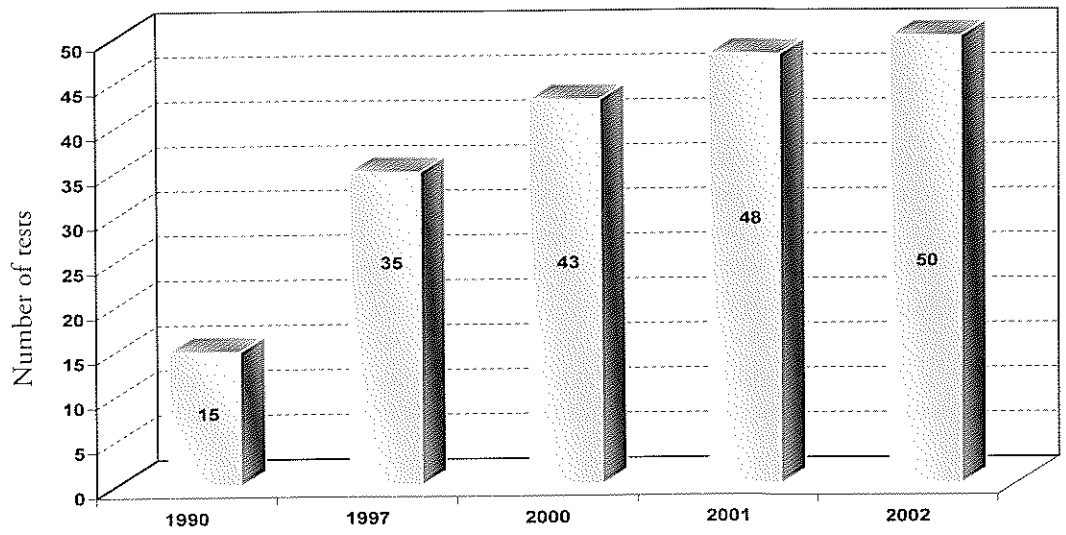
Tests carried out by the Biology Unit, 1975 – 2002



Environment Unit

Since 1988, the importance of environmental testing has become of much greater significance, because of the growing attention being paid to environmental issues at a local, regional and international level. The following graph shows the tests carried out between 1990 and 2002.

Tests carried out by the Environment Unit, 1990 – 2002



Development of Services and Resources

The following table summarises the development of tests and resources, both human and in terms of equipment, in the Food and Environment Laboratory Section.

Tests and resources in the Food and Environment Laboratory Section, 1975 – 2002

Year	Number of employees	Number of tests			Number of equip-ment	Number of samples per month
		Chemical	Microbiological	Environ mental		
1975	1	3	3	-	2	200
1980	4	4	6	-	4	250-300
1984	12	12	13	-	7	500
1990	18	40	15	15	10	1,000
1997	32	70	17	35	15	1,200-1,300
2000	60	100	20	43	25	1,230
2001	67	106	20	48	25	1,350
2002	69	110	21	50	29	1,110

Authorisation and Standardisation Section

This Section was established in 1987, and includes:

- The Authorisation and Granting of Certificates Unit
- The Maintenance and Support Unit
- The Measuring and Standardisation Unit.

Following the establishment of the Building Research and Quality Control Section, the Authorisation and Granting of Certificates Unit was created to implement the Municipality objective of improving the quality of items being produced in Dubai. It began its work in 1991, following the issuing of Municipality Ordinance No. 44 for that year, relating to standard specifications for concrete blocks.

Initially it had three employees, working under the supervision of the Follow-Up and Development Office, then part of the Building Studies and Quality Control Section.

In 1992, the implementation of Administrative Directive No. 143/1991 provided for

the monitoring of the quality of the fine gravels used in cement mixes.

At the beginning of 1994, and in accordance with Municipality Ordinance No. 52 for 1990 on the licencing of private laboratories in Dubai, the Unit was given responsibility for supervision of such private laboratories, and more employees were recruited.

In 1998, the Unit introduced inspection of shops selling gold items, to ensure that they adhered to Federal Law No. 9 for 1993 on the hallmarking of precious metals.

In 2001, another inspection system was introduced, for shops selling engine oils, to ensure that they implemented Dubai Municipality Directive No. 36 for 2001 and rules of standard specifications laid down by UAE Standard No. 635 for 1996.

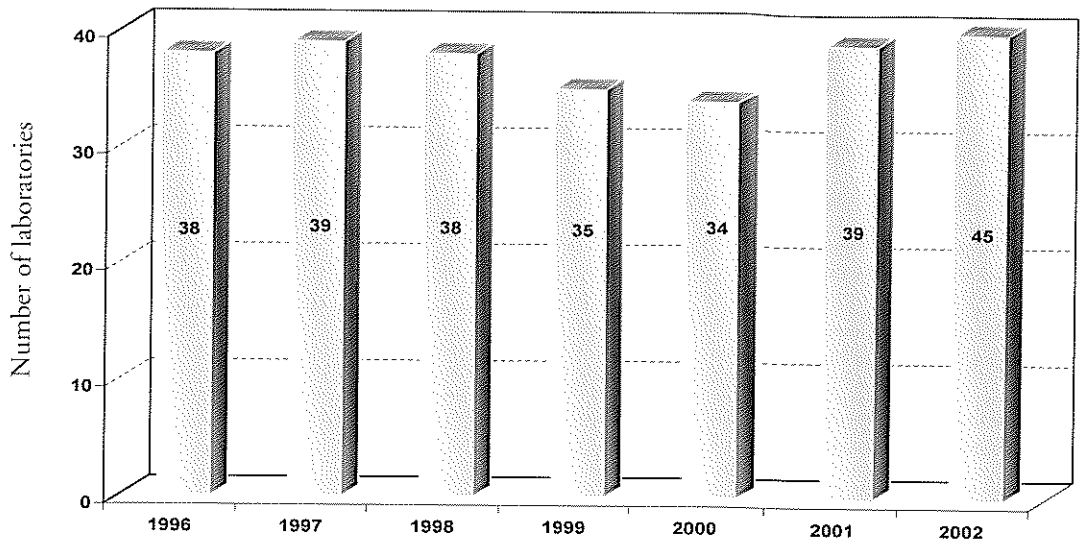
Certificates of Conformity and the number of products concerned, 1996 – 2002

No	Accomplishments/ Activities	1996	1997	1998	1999	2000	2001	2002
1	Number of registered concrete block factories within the Emirate of Dubai	21	22	20	21	22	21	22
2	Number of registered concrete block factories outside the Emirate of Dubai	-	3	3	3	3	3	3
3	Number of Certificates of Conformity issued for concrete blocks	11,194	12,953	15,890	18,433	18,216	20,250	18,743
4	Number of Certificates of Non-conformity issued for concrete blocks	390	598	602	588	447	635	919
5	Actual quantity of concrete blocks represented by the number of Certificates of Conformity issued	108,436,776	124,498,531	154,729,476	179,824,255	178,642,226	198,441,166	183,639,185
6	Actual quantity of concrete blocks represented by the number of Certificates of Non-conformity issued	3,821,725	5,636,392	5,907,404	5,718,602	4,410,408	6,200,902	8,919,032
7	Number of companies/factories for ready-made concrete and central mixing units registered at the Section and operating in the Emirate of Dubai.	19	19	18	23	28	31	29
8	Number of companies/factories for ready-mix concrete registered with the Section and operating outside the Emirate of Dubai.	3	3	3	5	5	6	4
9	Number of Certificates of Conformity issued to companies/factories for ready-mix concrete and central mixing units	210	185	220	252	369	512	642
10	Number of Certificates of Non conformity issued to companies/factories for ready-mix concrete and central mixing units	17	18	19	25	13	13	22

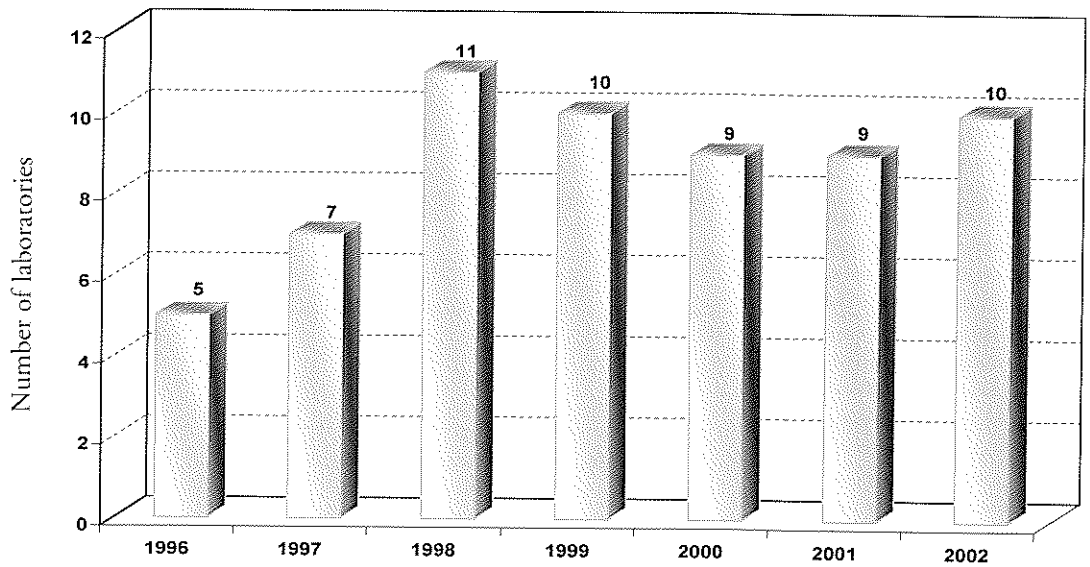
Authorising Private Laboratories

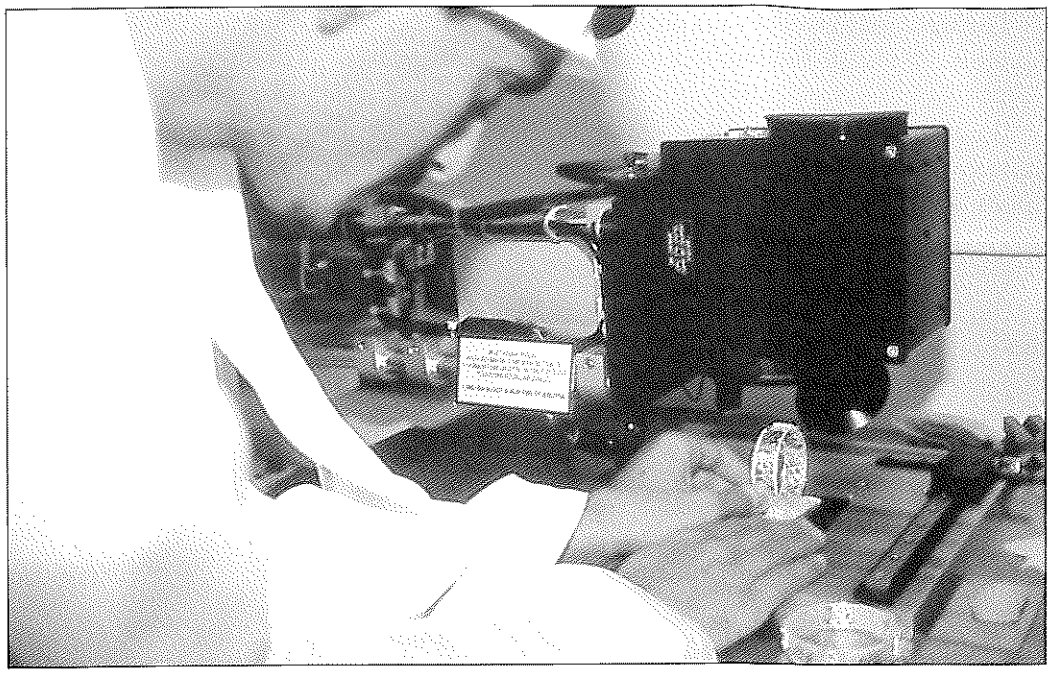
In order to encourage the private sector, and to avoid competition with it, the Central Laboratory Department has authorised a number of privately-owned laboratories to offer certain services, within the framework of carefully-defined specifications. Details are given in the following graphs.

Registered laboratories, 1996 – 2002



Approved laboratories, 1996 – 2002





Testing precious metals

Consumables Laboratory Section

This Laboratory was established to undertake work relating to inspection and quality control of precious stones and precious metals, in particular gold, since the size of Dubai's gold trade means that all consumers, whether UAE citizens, expatriate residents or visitors, as well as the merchants, require protection against possible commercial fraud.

In order to achieve this, a special laboratory was established to test gold, while, at the time this book was prepared, the final touches were being made to plans for testing electrical goods and children's toys.

Work on plans for the Consumables Laboratory Section began on 1997, shortly after the establishment of the Central Laboratory Department, with the purchase of the necessary equipment to set up the Precious Stones and Precious Metals Laboratory. The Unit was officially established in 1998 to implement plans by the Department to implement Federal Law No. 9 for 1993 on the regulation of trade in previous stones and precious metals, the necessary personnel then being recruited and the necessary equipment being purchased.

The Precious Stones and Valuable Metals Unit has three units:

- The Sample Management Unit.
- The Precious Metals Laboratory Unit.
- The Precious Stones Laboratory Unit.

Testing of gold jewellery and other gold items began in 1998, followed by silver and platinum goods in 1999 while hallmarking of gold, silver and platinum items also began in 1999.

The Section has an X-ray machine for the initial testing of the purity of precious metals, an Inductively-Coupled Plasma machine for the testing of platinum jewellery and other platinum goods, as well as precious metals of 99.99 per cent purity, a potentiometer for measuring silver and a laser machine for the hallmarking of jewellery and other goods made of precious metals.

The following graph shows the number of tests and certificates relating to precious metals samples between 1991 and 2002.

Central Laboratory Revenues, 1988 – 2002

Expenditure by the Central Laboratory was higher than revenues throughout the period from 1988 to 2002, though the two were nearly equal in 1994. The excess of expenditure over revenue grew at a result of the purchase of modern equipment as well as the introduction of new

Tests on precious metals samples, 1991 – 2002