

I

(Information)

COMMISSION

**Publication of main points of decisions to grant financial assistance under Regulation
(EC) No 1164/94 establishing a Cohesion Fund**

(98/C 153/01)

LIST OF PROJECTS

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PROJECT No: 97/11/15/001

1. **Name:** Network of centres for marine traffic control and control of marine pollution.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestario
Ministerio de Economía y Hacienda
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General de la Marina Mercante
- 3.2. **Address:** C/Ruiz Alarcón, 1
28071 Madrid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Andalusia, Cantabria, Galicia, Ceuta, Murcia, Basque Country and Canary Islands
5. **Description:**
- This group of projects is part of the Spanish system of marine traffic centres located along the Spanish coast which, together with those already financed by the Cohesion Fund in 1993 and 1995, complete the national plan for special services to save human lives at sea and for the control of marine pollution.
- The measures are located in Santander, Vigo, Huelva, Cadiz, Ceuta and Cartagena.
- Santander**
- The following project is planned:
- Electronic equipment for the Local Rescue Coordination Centre of Santander.
- The Local Rescue Coordination Centre of Santander will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20–30 miles).
- Detailed description of the equipment:
- (a) Centre:
- Control and presentation
 - VHF radiogoniometer
 - VHF communications for SMM and SMT
 - MW communications
 - Communications recorder
 - Weather station
 - Link with the remote station
 - Computer system
 - Auxiliary power supply systems
- (b) Remote station at Loredó:
- X-band radar
 - Link with the centre
 - Burglar and fire alarm
 - Auxiliary power supply systems
 - VHF radiogoniometer
 - Partial VHF communications for SMM
- Vigo**
- The following project is planned:
- Electronic equipment for the Local Rescue Coordination Centre of Vigo.
- The Centre will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20–30 miles).
- Detailed description of the equipment:
- (a) Centre:
- Control and presentation
 - VHF radiogoniometer
 - VHF communications for SMM and SMT
 - MW communications
 - Communications recorder
 - Weather station
 - Link with the remote station
 - Computer system
 - Auxiliary power supply systems

(b) Remote station at Muelle de Bouza:

- X-band radar
- Link with the centre
- Burglar and fire alarm
- Auxiliary power supply systems
- VHF radiogoniometer
- Partial VHF communications for SMM

Huelva

The following project is planned:

Electronic equipment for the Local Rescue Coordination Centre of Huelva.

The centre will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20–30 miles).

Detailed description of the equipment:

(a) Centre:

- Control and presentation
- VHF radiogoniometer
- VHF communications for SMM and SMT
- MW communications
- Communications recorder
- Weather station
- Link with the remote station
- Computer system
- Auxiliary power supply systems

Cadiz

The following projects are planned:

1. Refurbishing of the building housing the harbourmaster's office and the Local Rescue Coordination Centre (CLCSM) in Cadiz.
2. Electronic equipment for the Local Rescue Coordination Centre of Cadiz.

The Local Rescue Coordination Centre of Cadiz will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20–30 miles).

Detailed description of the equipment:

(a) Centre:

- Control and presentation
- VHF radiogoniometer

- VHF communications for SMM and SMT
- MW communications
- Communications recorder
- Weather station
- Link with the remote station
- Computer system
- Auxiliary power supply systems

(b) Remote station at El Dique de San Felipe:

- X-band radar
- Link with the centre
- Burglar and fire alarm
- Auxiliary power supply systems
- VHF radiogoniometer
- Partial VHF communications for SMM

Ceuta

The Ceuta harbourmaster's office is temporarily housed in 300 m² premises on the upper passageway of the Ceuta Marine Station belonging to the Ceuta Port Authority. The premises are located in the normal transit area for passengers embarking on vessels and the relocation of the harbourmaster's office is therefore urgently required.

The following project is planned:

Construction of a building to house the harbourmaster's office and the Local Rescue Coordination Centre (CLCSM) in Ceuta.

Cartagena

The following project is planned:

Electronic equipment for the Local Rescue Coordination Centre of Cartagena.

The Centre will provide radar, radiogoniometric and communications cover on VHF for vessels approaching the port. There will also be communications cover in the A1 zone (20–30 miles).

Detailed description of the equipment:

(a) Centre:

- Control and presentation
- VHF radiogoniometer
- VHF communications for SMM and SMT
- MW communications
- Communications recorder
- Weather station

- Link with the remote station
 - Computer system
 - Auxiliary power supply systems
- (b) Remote station at El Borracho:
- X-band radar
 - Link with the centre
 - Burglar and fire alarm
 - Auxiliary power supply systems
 - VHF radiogoniometer
 - Partial VHF communications for SMM

Technical conditions for the acquisition of four vessels for rescue and salvage of persons and goods at sea and control of marine pollution.

These vessels are designed for the rescue and salvage of persons and goods at sea and for the control of marine pollution in all waters for which Spain has such responsibilities. They must be able to sail in all weathers.

The vessels must be unsinkable and have positive stability from an angle of heel of over 90°. Their self-righting capacity will be one of the assessment criteria.

The rescue area is to be as near the waterline as possible in order to facilitate lifting persons, life rafts, lifeboats, etc. from the water.

The vessels are to include marine pollution control equipment suitable for use and transport on this type of vessel.

Pollution control equipment:

1. Dynamic V-form collection barriers
2. Coastal barriers
3. Port and estuary barriers
4. Large capacity overflow skimmers
5. Oleophilic fibre skimmers
6. Flatboats for the transport of waste materials
7. Means of transport

6. **Objectives:**

The control centres are being set up to achieve the required fluidity and safety for traffic in the ports of Santander, Vigo, Huelva, Cadiz, Ceuta and Cartagena, their anchorages and adjacent coastal waters, in compliance with both international and Community regulations. The centres should be integratable with the control systems being set up to the same end in neighbouring states.

Together, the Marine Traffic Control Centres and the Local Rescue Coordination and Control of Marine Pollution Centres will:

- act as Marine Traffic Control Centres to supervise and control traffic passing through their assigned geographical area, using the necessary technical equipment to monitor such traffic and issue all forms of messages to shipping;
- act in their area of responsibility as Local Rescue Coordination Centres to direct operations and coordinate search and rescue facilities integrated into the national organisation;
- act as regional centres to coordinate the control of marine pollution, assuming responsibility for the full availability of the various surface or air units used to combat pollution in incidents arising.

The national plan for special services to save human lives at sea lays down specific tasks for the Network of Marine Traffic Control Centres:

- Surveillance and prevention of accidents at sea
- Surveillance and control of marine traffic
- Control and combating of pollution
- Control of marine activities and port emergencies
- Broadcast of warnings to shipping
- Provision of support and information to the maritime administration

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	1.1.1996	1.6.1997
Main work	1.10.1996	1.12.1998
Operational phase	1.1.1999	

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis is not applicable because the Rescue Coordination and Pollution Control Centres are a public service the main aim of which is to save human lives and protect the environment.

The social benefits arising from this type of project are in any case justified considering that in previous years an annual average of 3 000 operations were carried out, including rescues,

marine safety activities, prevention and control of pollution, as well as other incidents, responding to requests for aid, alarm signals, etc.

SANTANDER: In 1995 a total of 1 371 ships put in at port. 4 702 000 tonnes of goods were handled. The fishing fleet is estimated at 72 vessels.

VIGO: A total of 1 813 ships put in at Vigo during 1995. 3 700 000 tonnes of goods were handled.

HUELVA: Huelva is among the ports with the largest number of ships loading/unloading and

handling hazardous goods (9 346 000 tonnes of hazardous goods, 62 % of the total).

CÁDIZ: The port of Cádiz receives an annual average of 1 800 ships/year. 5 000 000 tonnes of goods were handled in 1995.

CEUTA: Traffic is intense in the port of Ceuta (9 000 ships in 1996).

CARTAGENA: The port of Cartagena received 1 015 merchant ships in 1995 (75 % of traffic involving hazardous goods). There was also considerable Spanish Navy activity, estimated at 2 500 ship movements a year.

9. Cost and assistance:

(i) Group of projects

(in ECU)

	Total cost	Expenditure prior to eligibility date	Eligible costs
Buildings and construction	1 579 219	—	1 579 219
Equipment and machinery	4 449 435	232 980	4 216 455
Vessels	1 242 960	—	1 242 960
Pollution equipment	1 399 080	—	1 399 080
Taxes	1 387 071	37 229	1 349 842
Total	10 057 765	270 209	9 787 556

(ii) Breakdown by project

(in ECU)

	Buildings	Equipment	Rescue vessels	Pollution equipment	Total cost
Bilbao			360 278		360 278
Santander		1 014 783			1 014 783
La Coruña				810 626	810 626
Vigo		1 140 881	360 278		1 501 159
Huelva		720 556			720 556
Cadiz	1 014 783	1 140 881			2 155 664
Algeciras				810 626	810 626
Ceuta	816 630				816 630
Tenerife			360 278		360 278
Cartagena		1 140 881	360 278		1 501 159
Totals	1 831 413	5 157 982	1 441 112	1 621 252	10 051 759

(iii) Assistance:

Total cost:	ECU 10 051 759
Eligible cost (after 17 June 1997):	ECU 9 787 556
Rate of assistance:	85 %
Cohesion Fund grant:	ECU 8 319 423

ANNEX

FINANCING PLAN

Project No: 97/11/15/001

(in ECU)

Year	Total cost ⁽¹⁾ 1=2+11	Public expenditure									Private sector		Communi-ty loans 13
		Total public expenditure		Cohesion Fund		National authorities				Other 10	11	%	
		2=4+6+10	3=2/1	4	5=4/2	Total 6=8+9	7=6/2	Central govern-ment 8	9				
1997	4 023 106	4 023 106	100	3 419 640	85	603 466	15	603 466					
1998	5 764 450	5 764 450	100	4 899 783	85	864 667	15	864 667					
Total	9 787 556	9 787 556	100	8 319 423	85	1 468 133	15	1 468 133					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/025-1

1. **Name:**

Reconditioning and degassing of sanitary landfill containing municipal solid waste (MSW) at Logroño.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Planificación

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** F.E.M.P.

3.2. **Address:** C/ del Nuncio nº8

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Rioja

5. **Description:**

The project consists in carrying out the works and installing the equipment required for the proper operation of the landfill and for extracting gasses therefrom. The works to be undertaken are as follows:

General services (over an area of 3 000 m²), including:

- automation and control of weighing of MSW;
- construction of maintenance building, office and laboratory;
- collection, sanitation and drainage facilities;
- electrical installation;
- paving and planning of access roads (1 200 m²).

Landfill site proper:

- waterproofing (25 000 m²);
- drainage of runoff (1 100 m);
- leachate collection (350 m);
- conditioning of landfill area (70 000 m²).

Leachate treatment site (5 000 m²):

- conditioning process and paving (2 500 m²);
- installation of treatment tanks (1 500 m²);
- dosage of reagents;
- building to house toilets (20 m²).

Degassing of landfill:

- infrastructure required for degassing process (covering 2 500 m in length);
- automatic system for biogas extraction;
- flare for burning biogas;
- electrical generator;
- transformer and power supply plant;
- automatic instrumentation and regulation system for degassing process.

6. **Objectives:**

The project aims to improve the environmental conditions under which the landfill operates, in particular by preventing water and soil contamination by leachates and air pollution due to the uncontrolled release of biogas.

The works envisaged will permit the treatment of 40 000 tonnes of refuse per year and will benefit 150 000 inhabitants.

The recovered biogas will also generate 3 920 000 kWh per year.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project		31.1.1995
Main works	1.7.1996	31.12.1998
Construction of works	1.1.1999	

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis focusing on social aspects and covering a period of 15 years has been carried out, taking into account the following economic flows:

- negative flows (economic costs), including initial investments and maintenance and operating costs;
- positive flows (economic benefits), including reduced soil and water pollution as a result of landfill as also receipts generated by the sale of electrical energy produced from biogas.

The project's internal rate of return is 8,63 %.

With a discount rate of 8 % (consumption rate of interest), the net updated value is 100 million pesetas.

9. *Environmental impact analysis:*

The project meets the objectives of Article 130R of the Treaty establishing the European Community with regard to preserving, protecting and improving the quality of the environment and protecting human health.

It fits in directly with Community policy on the environment given that it arises from the implementation of European Union directives on the environment, particularly Directive 75/442/EEC (as amended by Directive 91/156/EEC) on the management of urban solid waste and that it is

consistent with the fifth programme (new strategy for the environment and for sustainable development) on matters concerning waste management, urban environmental pollution and shrinkage of natural resources.

Lastly, the strategy pursued in this series of projects meets the objectives laid down in the Community Regulation on the Cohesion Fund and the guidelines of the Green Paper on the urban environment.

10. *Cost and assistance:*

Total cost: ECU 1 563 537

Eligible cost (after 2 April 1996): ECU 1 563 537

Rate of assistance: 80 %

Cohesion Fund grant: ECU 1 250 830

ANNEX

FINANCING PLAN

Project No: 96/11/61/025-1

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	%	Central govern-ment				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	390 885	390 885	100	312 708	80	78 177	20		78 177				
1997	781 772	781 772	100	625 418	80	156 354	20		156 354				
1998	390 880	390 880	100	312 704	80	78 176	20		78 176				
Total	1 563 537	1 563 537	100	1 250 830	80	312 707	20		312 707				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/025-2

1. **Name:**

Selective pneumatic transport of municipal waste in Amézola (Bilbao)

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Planificación

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** F.E.M.P.

3.2. **Address:** C/ del Nuncio, 8

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Basque Country

5. **Description:**

The project deals with the installation of a pneumatic network for the transport of refuse in an area covered by the special renovation plan of Amézola.

The conventional refuse collection system gives rise to environmental and health problems which are extremely difficult to deal with, and the pneumatic refuse transport system is a valid alternative which solves most of the problems inherent in the transport and storage of waste generated by large towns.

Briefly, the system requires the installation of a network of pipes running underground on publicly-owned land. The pipes connect residential and other establishments to a collection station where the refuse is compacted and stored. The system is devised to permit the selective collection of the various constituents of waste so as to facilitate their recycling.

The installation is equipped with an automatic control system which runs and monitors the operations required for the collection of municipal solid waste. Transport of waste is by compressed air, which is released into the atmosphere after appropriate treatment.

The main system components are as follows:

Collection station made up of the following units:

- control chamber;
- compaction area;
- turbo-extractor chamber;

- chamber for pneumatic separation of waste;
- filtering chamber;
- processing plant;
- storage area;
- toilets.

The above units are fitted out with the following equipment:

- 110 kW turboextractors;
- waste pneumatic separators;
- compactors;
- air cleaners;
- compressed air facilities;
- control, valve, panel etc. devices.

Steel carbon pipelines with a 500 mm diameter in different thicknesses, welded and with outer anti-corrosion protection, including elbow pipes, laterals and trenches; the total length of the network is 1 988 m.

The project does not cover the pipelines within the plots which will be installed and connected to the general network by private promoters.

6. **Objectives:**

The primary purpose of the project is the installation of an infrastructure for the collection and transport of municipal waste which improves management practices in terms of the environment. The aim is also to encourage selective collection, the sorting of waste at its source as well as optimisation of transport, valorisation and recycling.

The infrastructure in question will serve 10 590 inhabitants and have a capacity to treat 4 000 tonnes of refuse per year.

7. **Work schedule:**

Category of work	Commencement	Completion
Main works	1.8.1996	31.12.1997
Commissioning	1.1.1998	

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis focusing on social aspects and covering a period of 15 years has been carried out on the basis of the following economic flows:

- negative flows (economic costs), including initial investments and maintenance and operating costs;
- positive flows (economic benefits), including receipts generated by the sale of products and byproducts, savings on waste management costs through the provision of recycling options, savings in raw materials, natural resources and energy through recycling and private generation and lastly improved environmental conditions at the collection stage of urban solid waste.

The project's internal rate of return is 14,97%.

With a discount rate of 8% (consumption rate of interest), the net updated value is 120 million pesetas.

A sensitivity analysis to assess the risks and uncertainties linked to the projects should running costs increase and receipts from the sale of products and byproducts fall shows that profitability would remain at an acceptable level (consumption rate of interest of 8%).

9. *Environmental impact analysis:*

The projects on the management of urban solid waste meet the objectives of Article 130R of the

Treaty establishing the European Community in terms of preserving, protecting and improving the quality of the environment and protecting human health.

They are in line with Community policy on the environment given that they emanate from European Union environmental Directives, particularly Directive 75/442/EEC (as amended by Directive 91/156/EEC) on the management of municipal solid waste and that they comply with the guidelines on waste management, urban environmental pollution and depletion of natural resources laid down in the Fifth Programme (new strategy for the environment and for sustainable development). The projects will also contribute to the achievement of the objectives laid down in the Regulation establishing a Cohesion Fund and the Green Paper on the urban environment.

10. *Cost and assistance:*

Total cost: ECU 1 821 935

Eligible cost (after 2 April 1996): ECU 1 821 935

Rate of assistance: 80%

Cohesion Fund grant: ECU 1 457 548

ANNEX

FINANCING PLAN

Project No: 96/11/61/025-2

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other				
			%		%	Total	%	Central govern-ment				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	607 310	607 310	100	485 848	80	121 462	20		121 462				
1997	1 214 625	1 214 625	100	971 700	80	242 925	20		242 925				
Total	1 821 935	1 821 935	100	1 457 548	80	364 387	20		364 387				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/030-3

1. **Name:** Biological treatment
Integral waste-water disposal system in Madrid: work at Valdebebas, Rejas and Viveros de la Villa water treatment plants.
— one aeration tank
— one circular secondary sedimentation tank
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Planificación (MEH)
— one primary gravity thickener
— one biological flotation thickener
— one anaerobic digester
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
— one belt filter for dewatering sludge
— one hopper for the storage of dewatered sludge
3. **Body responsible for implementation:**
- 3.1. **Name:** Ayuntamiento de Madrid
(b) *Sludge-treatment system*
- 3.2. **Address:** Barceló, 6
28004 Madrid
(c) *Gas system*
— one floating cylindrical gas-holder
— one high-pressure gas-storage tank
— one electricity generation unit
4. **Location:**
- 4.1. **Member State:** Spain
2. **Extension of the Rejas waste-water treatment plant**
- 4.2. **Region:** Madrid
The capacity of the water treatment system will be extended from its present level of 0,6 m³/s to 1,8 m³/s.
5. **Description:**
The extension comprises the following operational facilities:
— one solids-removal channel with coarse grid and self-cleaning screen
— one aerated sand and grease removal channel
— one primary sedimentation tank
— one biological reactor
— two secondary sedimentation tanks
— three sludge recirculation units
- Ten projects forming part of the series of measures contained in the Second Integral Waste-Water Treatment Plan for Madrid. Five relate to work in waste-water treatment plants, and five to work on the sewage network (collector sewers and improvements to overflows).
1. **Extension of the Valdebebas waste-water treatment plant**
3. **Improvement and extension of the Viveros de la Villa waste-water treatment plant**
- Extending the treatment capacity of the Valdebebas waste-water treatment plant to a total of 600 litres per second. This will involve extending all lines to enable them to treat an average flow of 200 l/s of waste water.
The purpose of the work is to adapt the station to an average treatment capacity of 2,2 m³/s.
- It is planned to increase the treatment capacity of the waste-water treatment plant as follows:
The project comprises the following measures:
— extension of the aeration capacity of biological treatment:
turbo pump air compressor in the building at present housing the blowers;
— extension and improvement of the fine bubble aeration system in the flocculation tank;
— extension of secondary sedimentation facilities: construction of a new secondary sedimentation tank of the same size as those already in service in the plant;
- (a) *Water-treatment system*
- Pre-treatment
— one solids-removal channel with coarse and fine automatic grids
— one sand and grease removal facility
- Primary sedimentation
— one rectangular primary sedimentation unit with movable bridge

- emptying, uncoupling and demolishing the biogas storage cylinder:

this equipment must be dismantled to leave room for the new sedimentation tank. It will be moved to a new site near the entrance to the plant;

- installation of a spiral heat exchanger;

- increasing sludge-screening capacity:

installation of a rotating screen with a mesh size of 6 mm.

4. Tertiary treatment for nutrient elimination and filtering in the Viveros de la Villa water treatment plant

This project consists in a tertiary treatment system for waste water, with an average flow of 2,2 m³/s, to reduce nutrients (nitrogen and phosphorus) in effluent and to filter effluent through a granular medium so as to improve the quality of water leaving the plant.

This involves:

- (a) 27 500 m³ reactor for anaerobic-anoxic biological treatment.

Installation of a new reactor comprising 10 channels, the first three in the anaerobic zone and the other seven in the anoxic zone.

- (b) Connection channels to bring water leaving the primary sedimentation tanks into the anaerobic and anoxic zones, and recirculation channels for water leaving the aerated tanks at the entrance to the anoxic zone.

- (c) Extension of the aeration capacity of existing biological treatment tanks.

Adequate and guaranteed nitrification in the present biological reactor can be assured only by changing and extending the air supply system, to double its capacity.

- (d) Tertiary filtration through a granular medium to improve effluent quality.

The filtration system plan provides for four filtration units.

5. Improvement of environmental conditions at the Viveros de la Villa waste-water treatment plant

This is the second phase of the project 'Extending the existing odour control system in the Viveros de la Villa waste-water treatment plant'. Cohesion Fund assistance was approved for the first phase in 1995.

The present phase involves covering engineering structures of the present biological treatment flocculation tank and installing extraction equipment for air treatment and the corresponding network of extraction pipes. The main components of the project are as follows:

- inflatable plastic covering for the engineering structures of the flocculation tanks;

- system of air compressors and input pipes for injecting air under pressure into the flexible supports of the covering (2 Ud);

- emergency controls for compressors, using diesel or biogas powered generators;

- network of air extraction pipes composed of galvanised steel tubes;

- air extraction and treatment facilities;

- construction of a building to house air extraction and treatment equipment for pressurised air inflation of the cover.

6. Somontes collector sewer

The collector sewer will be 1 900 m long, of which 1 800 m will be underground and the rest in a trench. The flow through this collector sewer will be about 30 m³/s. The overflow will be equipped with a movable grid to prevent rainborne pollution from entering the collector sewer and the Manzanares River.

7. Rosas collector sewer and ancillary work

The total length is 4 150 metres, underground; inclines vary from one segment to another, depending on the terrain, from 1,5 % at the beginning to 0,5 % at the end.

The planned flow is 12 m³/s.

The collector sewer will be linked to the Rejas water treatment plant.

8. Valdebebas collector sewer II and ancillary work

The collector will measure 4 100 m, and will be laid in a trench except for the last 700 m, placed on piers because of depressions in the landscape. Inclines will vary considerably as a function of the terrain, from approximately 1 % at the beginning to 2 % at the end.

The total planned flow is 72,1 m³/s.

The collector sewer will be linked to the Valdebebas water treatment plant.

9. Valdebebas-Rejas collector sewer

5 900 m collector sewer laid in a trench between the Valdebebas and Rejas water treatment plants.

This collector sewer runs from Valdebebas, in the headrace supplying the Valdebebas collector sewer.

As both plants are at approximately the same altitude, the water will be pumped.

10. Improvement of overflows in the waste-water disposal system

The project to improve overflows in the waste-water disposal system is defined on the basis of the present situation. Madrid's network of drains consists entirely of combined sewers (carrying a mixture of waste water and rainwater); at certain points in the network, where there is a suitable intercepting channel, overflows or diversion canals have been built to channel some of the flow to that channel, with a view in particular to reducing the section of the collector sewer downstream.

The overall dilution in the overflows existing at present in the Madrid sewage network is about 5:1.

The purpose of this project is to increase the dissolution of discharges into intercepting channels of the Madrid sewage system, so as to achieve a dilution of 7:1.

6. Objectives:

Aims vary from project to project.

1. Extension of the Valdebebas waste-water treatment plant

To absorb the increased flow and pollution load due to an increase in the population in the catchment area of the plant.

Assuming that the sewage system must deal with 350 l/day per head of population, the plant will have to treat an extra 370 l/s, in addition to the present volume of 220 l/s, i.e. a total of 590 l/s. Consequently, treatment capacity must be increased to 600 l/s, which means extending existing facilities by capacity to treat an additional 200 l/s.

2. Extension of the Rejas waste-water treatment plant

The main aim is to adapt the capacity of the water-treatment plant to the present average flow of 1,215 m³/s, which is 8 % more than the average flow of 1,125 m³/s that the plant was designed to cope with.

Consequently, to deal with the present excess flow and the increase expected in future (17%), it is planned to build a unit of 0,57 m³/s, the same as the two already installed.

3. Improvement and extension of the Viveros de la Villa waste-water treatment plant

- To increase the waste-water treatment capacity by 0,6 m³/s, bringing the average flow up to 2,2 m³/s.
- To increase the population served by the plant by the equivalent of 286 000, bringing it up to 1 000 000.
- To increase the flexibility of present treatment, to adapt it to wide variations in flow and pollution load.

4. Tertiary treatment for nutrient elimination and filtering in the Viveros de la Villa water treatment plant

- To improve the quality of the effluent from the Viveros de la Villa waste-water treatment plant, which forms an important part of the Manzanares river as it flows through the urban centre of Madrid, by means of tertiary filtration.
- To reduce nutrients (nitrogen and phosphorus) in the waste water treated.

5. Environmental improvements at the Viveros de la Villa waste-water treatment plant

- To improve the environment around the plants by reducing noise and odours.
- To achieve maximum efficiency from the existing odour-treatment equipment and installations.

6. Somontes collector sewer

- To reduce the load on the sewage system, protecting the Manzanares river from rainborne pollution.
- To prevent, by means of movable grids, the discharge of rainborne pollution into the river.

- A population of 60 791 will benefit from this measure.

7. Rosas collector sewer and ancillary work

The work will benefit 20 000 inhabitants. The quantity of waste water transported will be increased to 6 275 664 m³ per year and the quantity of rainwater to 12 m³/s.

8. Valdebebas collector sewer II and ancillary work

Transportation of 19 968 595 m³ of waste water per year and of 72,1 m³/s of rainwater. To serve 104 722 inhabitants.

9. Valdebebas-Rejas collector sewer

To link the Valdebebas and Rejas water treatment plants by a pressurised conduit with reversible pumping, so that, in case of operational problems in one of the plants, flows may be transferred to the other. The flow transfer capacity is 1,3 m³/s.

10. Improvement of overflows in the sewage system

- To reduce the pollution load in the intercepting channels by increasing the dilution of discharges.
- To eliminate most of the rainborne pollution in the reduced flows, by installing movable grids. This work is to be carried out at eight points of discharge into public channels.

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.10.1996	31.12.1999

8. Assessment of costs and socio-economic advantages:

A cost-benefit analysis has been carried out for the group of project over a period of 25 years. The costs comprise the investments and the running and maintenance costs.

The projects will bring environmental and social benefits:

- Reduction of damage to public water resources: the benefit is calculated on the basis of an evaluation of the pollution load of discharges expressed in pollution units (PU). The price of 1 PU in 1996 is ESP 1 000 000 with a 3 % annual increase.

- Sewage tax: this covers the running and maintenance costs and 20 % of the initial investment in infrastructure.

- Reduction of odours: this is calculated on the basis of the usufruct price applied to dwellings.

As it is difficult to evaluate accurately the environmental benefits of Project 14: Somontes collector sewer, and Project 20: Improvement of overflows in the waste-water disposal system, no conventional cost-benefit analysis could be carried out. Instead, a concise description of present problems of rainborne pollution has been made, specifying how far the two projects contribute to solving them in the Madrid local authority area. The volume of investment for these two projects accounts for 4,6 % of total investment for the set of projects.

The internal rate of return of the group of projects varies between 7,7 % and 28 %.

9. Environmental impact analysis:

The projects to extend waste-water treatment plants to achieve the Community's environmental objectives by increasing their treatment capacity up to the level needed to cope with the new needs arising from the urban development of Madrid.

The improvement and extension of the waste-water treatment plants will help achieve Community environmental objectives by improving the operation of those installations currently causing problems and increasing treatment capacity to meet forecast future demand, thus improving effluent quality.

The collector sewers will be an addition to the Madrid waste-water disposal system and will enable it to cope with future urban developments.

The group of projects fulfils, in particular, the provisions of Directive 91/271/EEC concerning urban waste-water treatment.

10. Cost and assistance:

Total cost: ECU 42 830 375

Eligible cost
(after 2 April 1996): ECU 42 830 375

Rate of assistance: 80 %

Cohesion Fund grant: ECU 34 264 300

Breakdown of the aid:

1. Extension of the Valdebebas waste-water treatment plant 3 133 425

2. Extension of the Rejas waste-water treatment plant	5 518 894	6. Somontes collector sewer	2 562 261
3. Improvement and extension of the Viveros de la Villa waste-water treatment plant	2 981 539	7. Rosas collector sewer and ancillary work	3 163 293
4. Tertiary treatment for nutrient elimination and filtering in the Viveros de la Villa water treatment plant	5 659 943	8. Valdebebas collector sewer II and ancillary work	6 177 339
5. Improving environmental conditions at the Viveros waste-water treatment plant	1 029 293	9. Valdebebas-Rejas collector sewer	2 908 452
		10. Improvement of overflows in the sewage system	1 129 861
		Total	34 264 300

ANNEX

FINANCING PLAN

Project No: 96/11/61/030-3

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities			Other				
			%		%	Total	%	Central government				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	2 422 063	2 422 063	100	1 937 650	80	484 413	20		484 413				
1997	10 466 736	10 466 736	100	8 373 389	80	2 093 347	20		2 093 347				
1998	17 852 305	17 852 305	100	14 281 844	80	3 570 461	20		3 570 461				
1999	12 089 271	12 089 271	100	9 671 417	80	2 417 854	20		2 417 854				
Total	42 830 375	42 830 375	100	34 264 300	80	8 566 075	20		8 566 075				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/040

1. **Name:** Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Duero.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda
- 2.2. **Address:** Pº de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal
- Address:** Gran Vía de S. Francisco, 4
28005 Madrid
- 3.2. **Name:** Consejería del Medio Ambiente y Ordenación del Territorio
Dirección General del Medio Natural
Comunidad Autónoma de Castilla y León
- Address:** C/Muro, 6
Valladolid 47004
- 3.3. **Name:** Consejería de Agricultura, Ganadería y Montes
Dirección General de Montes y Medio Ambiente Natural
Comunidad Autónoma de Galicia
- Address:** C/San Lázaro s/n
15703 Santiago de Compostela,
La Coruña
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Galicia and Castile-Leon
5. **Description:**
- The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the Duero by damaging three extremely important natural resources: vegetation, soil and water.
- Specifically, the measures in this first category involve:
- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
 - afforestation with species suited to the environment,
 - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
 - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.
- The second category of measures concerns the regeneration of woodlands damaged by fire. Specifically, the measures in this second category are biological measures designed to encourage natural regeneration and establish protective plant cover in areas devastated by fire: They comprise:
- reafforestation and regeneration of fire-damaged areas;
 - forestry work in existing stands to prevent forest fires.
- It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.
6. **Objectives:**
- The main objectives of the project are as follows:
- to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;

- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by both water and wind and to assist the biological recovery of damaged areas;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
- to regulate the water cycle: to protect and improve the quality of water resources, to minimise the danger and frequency of floods and protect hydraulic infrastructures;
- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.1.1996	31.12.1997

8. *Assessment of costs and socio-economic advantages:*

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

- reduced risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

An economic analysis was carried out for the other operations planned in the Duero catchment area.

The analysis shows a cost/benefit ratio of 0,16, a net discounted value of ESP 1,809 billion applying a discount rate of 7%, and an internal rate of return of 9,28%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. *Environmental impact analysis:*

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a

basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. *Cost and assistance:*

Total cost:	ECU 4 921 172
Eligible cost (after 12 April 1996):	ECU 4 921 172
Rate of assistance:	85 %
Cohesion Fund grant:	ECU 4 182 997

ANNEX

FINANCING PLAN

Project No: 96/11/61/040

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities				Other	Private sector	
		Total public expenditure	%	Cohesion Fund	%	Total	%	Central government	Other	Other			
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	2 003 230	2 003 230	100	1 702 746	85	300 484	15						
1997	1 625 802	1 625 802	100	1 381 932	85	243 870	15						
1998	1 292 140	1 292 140	100	1 098 319	85	193 821	15						
Total	4 921 172	4 921 172	100	4 182 997	85	738 175	15						

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/043

1. **Name:** Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the northern catchment area.
- Address:** Calle Gutierrez Solana s/n
39071 Santander
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (MEH)
- Address:** Calle San Lázaro s/n
15771 Santiago de Compostela (La Coruña)
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal (MMA)
- Address:** Gran Vía de S. Francisco, 4
28005 Madrid
- 3.2. **Name:** Consejería de Agricultura
Dirección Regional de Montes y Medio Natural
Comunidad Autónoma de Asturias
- Address:** Calle Coronal Aranda s/n
33071 Oviedo Asturias
- 3.3. **Name:** Consejería del Medio Ambiente y Ordenación del Territorio
Dirección General del Medio Natural
Junta de Castilla y León
Comunidad Autónoma
- Address:** C/Muro, 9
47004 Valladolid
- 3.4. **Name:** Departamento de Agricultura, Ganadería y Producción Rural
Servicio de Montes
Diputación Foral de Navarra
- Address:** C. Tudela, 20
31002 Pamplona (Navarre)
- 3.5. **Name:** Consejería de Agricultura
Ganadería y Pesca
Dirección General de Montes y Conservación de Naturaleza
Comunidad Autónoma de Cantabria
- 3.6. **Name:** Consejería de Agricultura, Ganadería y Montes
Dirección General de Montes y Medio Ambiente Natural
Comunidad Autónoma de Galicia
- Address:** Calle San Lázaro s/n
15771 Santiago de Compostela (La Coruña)
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Asturias, Cantabria, Castile-Leon, Navarre and Galicia
5. **Description:**
- The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the northern catchment area by damaging three extremely important natural resources: vegetation, soil and water.
- Specifically, the measures in this first category involve:
- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
 - afforestation with species suited to the environment;
 - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
 - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.
- The second category of measures concerns the regeneration of woodlands damaged by fire.
- It involves biological measures to encourage natural regeneration and create protective plant cover. It includes:

- reafforestation and assistance for the regeneration of fire-damaged areas;
- stepping up forestry work in existing stands to prevent forest fires.

A surveillance system will be set up to monitor the processes linked to erosion and hydrological developments.

6. Objectives:

General aims:

The general purpose of the projects is:

- to ensure continuity of basic natural processes and sustainable protection of the environment, in particular through conservation of water, soil and genetic resources;
- to achieve balance between the nutrition supply to soils and plants on the one hand, and their absorption capacity on the other, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat;
- to ensure that forest areas can fulfil their functions.

More specifically, the objectives are:

- to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;
- to attenuate the destructive effects of flooding on riverbanks;
- to encourage the deposit of much of the sediment generated by erosion;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
- to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
- to improve rural structures and help establish or maintain the population in depressed areas

or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems;

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are to be pursued through integrated operations for each basic geographical unit, defined as a catchment area, and for the country as a whole. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.1.1996	31.12.1998

8. Assessment of costs and socio-economic advantages:

The profitability of hydrological and forest restoration must be sought in its long-term social benefits. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

Despite this, the following costs and benefits have been calculated using the reference values and shadow prices usually taken for this type of project.

The following benefits were considered:

- reduction in the risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

Measures and operations in the autonomous communities of Asturias, Castile-Leon, Cantabria, Galicia and Navarre were analysed together.

Setting these benefits against investment costs results in an internal rate of return of 10,33 %, sufficient to ensure that the projects are viable in socio-economic and environmental terms.

The analyses were based on the assumption the effects would last 50 years.

All the returns and benefits are indirect, since there are no plans to exploit forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. *Environmental impact analysis:*

(a) All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

(b) Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

(c) In accordance with Article 3(5) of Regulation (EEC) No 2158/92 on protection of the Community's forests against fire, the forestry measures provided for in this project will comply with the Spanish forest-fire protection plan approved by the Commission on 7 February 1994.

(d) Reafforested areas will be monitored for three years following planting, to determine whether any species have disappeared and how many seedlings have been lost. Replanting will be carried out accordingly.

10. *Cost and assistance:*

Total cost: ECU 12 914 283

Eligible cost
(after 12 April 1996): ECU 12 914 283

Rate of assistance: 80 %

Cohesion Fund grant: ECU 10 331 426

ANNEX

FINANCING PLAN

Project No: 96/11/61/043

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities				Other			
			%		%	Total	%	Central government	Other				
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	2 893 932	2 893 932	100	2 315 146	80	578 786	20						
1997	7 316 312	7 316 312	100	5 853 050	80	1 463 262	20						
1998	2 704 039	2 704 039	100	2 163 231	80	540 808	20						
Total	12 914 283	12 914 283	100	10 331 426	80	2 582 857	20						

(¹) Total eligible cost of project.

PROJECT No: 96/11/61/044

1. **Name:**
Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Ebro.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria, Ministerio de Economía y Hacienda
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal
- Address:** Gran Vía de S. Francisco, 4
28005 Madrid
- 3.2. **Name:** Consejería de Agricultura y Medio Ambiente
Dirección General de Medio Ambiente
Comunidad Autónoma de Aragón
- Address:** P. de María Agustín, 36
Edif. Pignatelli
50004 Zaragoza, Aragón
- 3.3. **Name:** Consejería del Medio Ambiente y Ordenación del Territorio
Dirección General del Medio Natural
Junta de Castilla y León
(Comunidad Autónoma)
- Address:** C/Muro, 9
47004 Valladolid
- 3.4. **Name:** Departamento de Agricultura, Ganadería y Producción Rural
Servicio de Montes
Diputación Foral de Navarra
- Address:** C. Tudela, 20
31002 Pamplona, Navarra
- 3.5. **Name:** Consejería del Desarrollo Autónomo Administraciones Públicas y Medio Ambiente
Secretaría General para el Medio Ambiente
Comunidad Autónoma de la Rioja
- Address:** C. Portales, 71
26071 Logroño, La Rioja
- 3.6. **Name:** Departamento de Agricultura Ganadería y Pesca
Subdirección General de Conservación de la Naturaleza
Generalitat de Cataluña
- Address:** Gran Vía de las Corts Catalanas, 612-614
08007 Barcelona, Cataluña
- 3.7. **Name:** Consejería de Medio Ambiente
Dirección General de recursos Forestales
Generalitat de Valencia
- Address:** Arquitecto Alfaro, 39
46011 Valencia
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Autonomous communities of Aragon, Castile-Leon, Catalonia, Navarre, Rioja and Valencia.
5. **Description:**
- The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the Ebro catchment area by damaging three extremely important natural resources: vegetation, soil and water.
- Specifically, the measures in the first category involve:
- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
 - afforestation with species suited to the environment,
 - forestry work to preserve and improve existing stands in order to maintain the

balance between soil protection and the progression of vegetation;

- improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.

The second category of measures concerns the regeneration of woodlands damaged by fire.

It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:

- reforestation and assistance for the regeneration of fire-damaged areas;
- forestry work in existing stands to prevent forest fires;

It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.

6. Objectives:

The main objectives of the project are as follows:

- to ensure continuity of basic natural processes and sustainable protection of the environment, in particular through conservation of water, soil and genetic resources;
- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by wind and water, and restore the biological capacity of degraded areas;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO² in the air
- to regulate the water cycle: to protect and improve the quality of water resources,

minimise the danger and frequency of floods and protect hydraulic infrastructure;

- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

The secondary objectives are:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are to be pursued through integrated operations for each basic geographical unit, defined as a catchment area, and for the country as a whole. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.1.1996	31.12.1998

8. Assessment of costs and socio-economic advantages:

The profitability of hydrological and forest restoration must be sought in its long-term social benefits. The intangible benefits of reforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and shadow prices normally established for projects of this type.

The following benefits were considered:

- reduction in the risks of flooding,
- reduced loss of forest soil,
- less silting of dams,
- improved woodlands and less desertification,
- improved water quality,
- increased general welfare.

A joint economic analysis was carried out for the operations planned in Aragon, Castile-Leon, Catalonia, Rioja, Navarre and Valencia.

Comparison of the benefits mentioned with investment costs results in an internal rate of return of 7,57%, proof that the projects are viable in socio-economic and environmental terms.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

(b) Planting will be carried out either on land which has, in the last 50 years, been covered by more or less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

(c) In accordance with Article 3(5) of Regulation (EEC) No 2158/92 on protection of the Community's forests against fire, the forestry measures provided for in this project will comply with the Spanish forest-fire protection plan approved by the Commission on 7 February 1994.

(d) Reafforested areas will be monitored for three years following planting, to determine whether any species have disappeared and how many seedlings have been lost. Replanting will be carried out accordingly.

9. *Environmental impact analysis:*

(a) All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

10. *Cost and assistance:*

Total cost: ECU 26 001 236

Eligible cost
(after 12 April 1996): ECU 26 001 236

Rate of assistance: 85 %

Cohesion Fund grant: ECU 22 101 050

ANNEX

FINANCING PLAN

Project No: 96/11/61/044

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure										Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities				Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government	8				9	
1=2+11													12=11/1	13
1996	2 329 038	2 329 038	100	1 979 682	85	349 356	15							
1997	16 931 612	16 931 612	100	14 391 870	85	2 539 742	15							
1998	6 740 586	6 740 586	100	5 729 498	85	1 011 088	15							
Total	26 001 236	26 001 236	100	22 101 050	85	3 900 186	15							

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/047

1. **Name:** Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the eastern Júcar.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda
- 2.2. **Address:** Pº de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal
- Address:** Gran Vía de S. Francisco, 4
28005 Madrid
- 3.2. **Name:** Consejería de Agricultura y Medio Ambiente
Dirección General de Medio Ambiente
Comunidad Autónoma de Aragón
- Address:** P. de María Agustín, 36, Edif. Pignatelli
50004 Zaragoza, Aragón
- 3.3. **Name:** Consejería de Agricultura y Medio Ambiente
Dirección General del Medio Ambiente Natural
Junta de Castilla la Mancha
- Address:** C/Matías Moreno, 4
45002 Toledo
- 3.4. **Name:** Consejería de Medio Ambiente
Dirección General de recursos Forestales
Generalitat de Valencia
- Address:** Arquitecto Alfaro, 39
46011 Valencia
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Autonomous communities of Aragon, Castile-La Mancha and Valencia
5. **Description:**
- The project consists of a number of measures carried out in woodlands. The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the eastern Júcar by damaging three extremely important natural resources: vegetation, soil and water.
- Specifically, the measures in this first category involve:
- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
 - afforestation with species suited to the environment,
 - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
 - stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.
- The second category of measures concerns the regeneration of woodlands damaged by fire. It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:
- reforestation and assistance for the regeneration of fire-damaged areas;
 - forestry work in existing stands to prevent forest fires;
- It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.

6. *Objectives:*

The main objectives of the project are as follows:

- to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;
- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
- to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these projects are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.1.1996	31.12.1997

8. *Assessment of costs and socio-economic advantages:*

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

- reduction in the risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

A joint economic analysis was carried out for the projects in the eastern Júcar.

It shows a cost-benefit ratio of 0,23, a present discounted value of ESP 2,377 billion with a discount rate of 7%, and an internal rate of return of 7,06%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. *Environmental impact analysis:*

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or

less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. *Cost and assistance:*

Total cost: ECU 14 939 626

Eligible cost
(after 12 April 1996): ECU 14 939 626

Rate of assistance: 85 %

Cohesion Fund grant: ECU 12 698 682

ANNEX

FINANCING PLAN

Project No: 96/11/61/047

(in ECU)

Year	Total cost ⁽¹⁾ 1=2+11	Public expenditure									Private sector		Communi-ty loans 13	
		Total public expenditure			Cohesion Fund		National authorities				Other 10	11		12=11/1
		2=4+6+10	% 3=2/1	4	% 5=4/2	Total 6=8+9	% 7=6/2	Central government 8	Other 9					
1996	3 380 310	3 380 310	100	2 873 264	85	507 046	15							
1997	8 232 417	8 232 417	100	6 997 554	85	1 234 863	15							
1998	3 326 899	3 326 899	100	2 827 864	85	499 035	15							
Total	14 939 626	14 939 626	100	12 698 682	85	2 240 944	15							

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/048

1. **Name:** Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Tagus.
- Address:** C/Princesa, 3
28008 Madrid
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal
- Address:** Gran Vía de S. Francisco, 4
28005 Madrid
- 3.2. **Name:** Consejería de Agricultura y Medio Ambiente
Dirección General del Medio Ambiente Natural
Junta de Castilla la Mancha
- Address:** C/Pintor Matías Moreno, 4
45002 Toledo
- 3.3. **Name:** Consejería de Agricultura y Comercio
Dirección General de Estructuras Agrarias
Comunidad Autónoma de Extremadura
- Address:** C/Adriano, 4
Mérida
Badajoz
- 3.4. **Name:** Consejería del Medio Ambiente y Ordenación del Territorio
Dirección General del Medio Ambiente Natural
- Address:** C/Muro, 9
47004 Valladolid
- 3.5. **Name:** Consejería de Cooperación
Agencia del Medio Ambiente
Comunidad Autónoma de Madrid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Madrid, Castile-La Mancha, Castile-León and Extremadura
5. **Description:**
- The project consists of a number of measures carried out in woodlands.
- The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the Tagus by damaging three extremely important natural resources: vegetation, soil and water.
- Specifically, the measures in this first category involve:
- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
 - afforestation with species suited to the environment,
 - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
 - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.
- The second category of measures concerns the regeneration of woodlands damaged by fire. It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:
- reforestation and assistance for the regeneration of fire-damaged areas;
 - forestry work in existing stands to prevent forest fires.
- It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.

6. *Objectives:*

The main objectives of the project are as follows:

- to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;
- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
- to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems.

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.1.1996	31.12.1997

8. *Assessment of costs and socio-economic advantages:*

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

- reduction in the risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

A joint economic analysis was carried out for the projects in the Tagus catchment area.

It shows a cost-benefit ratio of 0,17, a present discounted value of ESP 2,945 billion with a discount rate of 7%, and an internal rate of return of 8,94%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. *Environmental impact analysis:*

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or

less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. *Cost and assistance:*

Total cost: ECU 17 729 655

Eligible cost
(after 12 April 1996): ECU 17 729 655

Rate of assistance: 85 %

Cohesion Fund grant: ECU 15 070 207

ANNEX

FINANCING PLAN

Project No: 96/11/61/048

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities				Other	Private sector	
		Total public expenditure	%		Cohesion Fund	%	Total	%	Central government	Other			
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	1 264 764	1 264 764	100	1 075 049	85	189 715	15						
1997	11 308 782	11 308 782	100	9 612 465	85	1 696 317	15						
1998	5 156 109	5 156 109	100	4 382 693	85	773 416	15						
Total	17 729 655	17 729 655	100	15 070 207	85	2 659 448	15						

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/61/049

1. **Name:**
Afforestation and complementary work to control erosion and desertification; regeneration of ecosystems damaged by fire in the catchment area of the Guadiana.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General para la Conservación de la Naturaleza
Ministerio del Medio Ambiente
Subdirección General de Control de la Erosión y Desarrollo Forestal
- Address:** Gran Vía de S. Francisco, 4
28005 Madrid
- 3.2. **Name:** Consejería de Medio Ambiente
Dirección General de Planificación y Participación
Comunidad Autónoma de Andalucía
- Address:** Avda. de Eritaña, 2
Seville
- 3.3. **Name:** Consejería de Agricultura y Medio Ambiente
Dirección General del Medio Ambiente Natural
Junta de Castilla la Mancha
- Address:** C/Pintor Matías Moreno, 4
45002 Toledo
- 3.4. **Name:** Consejería de Agricultura y Comercio
Dirección General de Estructuras Agrarias
Comunidad Autónoma de Extremadura
- Address:** C/Adriano, 4
Mérida
Badajoz
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Andalusia, Extremadura and Castile-La Mancha
5. **Description:**
- The project consists of a number of measures carried out in woodlands.
- The measures fall into two main categories, the first being measures to halt erosion and desertification, which directly affect the natural environment of the catchment area of the Guadiana by damaging three extremely important natural resources: vegetation, soil and water.
- Specifically, the measures in this first category involve:
- biological measures to improve plant cover, thereby providing adequate protection for the soil by means of:
 - afforestation with species suited to the environment,
 - forestry work to preserve and improve existing stands in order to maintain the balance between soil protection and the progression of vegetation;
 - improvements to infrastructure: stabilisation of slopes and river beds in order to prevent recurring flooding by means of small-scale individual hydrotechnical operations.
- The second category of measures concerns the regeneration of woodlands damaged by fire. It involves biological measures to encourage natural regeneration of areas destroyed by fire and create protective plant cover. It includes:
- reafforestation and assistance for the regeneration of fire-damaged areas;
 - forestry work in existing stands to prevent forest fires;
- It also includes surveillance of processes linked to hydrological dynamics and erosion, by establishing a system of monitoring.

6. *Objectives:*

The main objectives of the project are as follows:

- to maintain basic natural resources and to protect the environment so as to achieve sustainable conservation, in particular conservation of water, soil and genetic resources;
- to achieve balance between the nutrition supply to soils and plants, and their absorption capacity, and to regenerate ecosystems damaged by forest fire;
- to manage the rural environment in such a way as to safeguard biodiversity and the natural habitat, and to minimise natural risk;
- to ensure that forest areas can fulfil their functions.

In more detail, the objectives are:

- to halt and control erosion caused by wind and water, and to restore the biological capacity of degraded areas;
- to prevent and control fire and regenerate the areas destroyed by fire;
- to increase and improve plant cover, encouraging biodiversity, so that it can provide sufficient stability and biopedological protection to the soil as well as absorbing most of the CO₂ in the air;
- to regulate the water cycle: to protect and improve the quality of water resources, minimise the danger and frequency of floods and protect hydraulic infrastructure;
- to improve rural structures and help establish or maintain the population in depressed areas or where there is a danger of abandonment, by ensuring a balanced environment in a manner compatible with the conservation of the natural ecosystems;

Secondary objectives:

The projects should also produce other effects, such as creating and protecting biodiversity or increasing the aesthetic or recreational value of woodland.

All these objectives are sought through integrated operations, with each catchment area acting as a geographical unit for action. The ultimate objective is to set up a strategy for protecting nature from a desertification process aggravated by soil erosion, forest fires and the chronic drought affecting Spanish forests.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.1.1996	31.12.1997

8. *Assessment of costs and socio-economic advantages:*

The viability of this type of watercourse and forest restoration work depends on the long-term benefits to society. The intangible benefits of reafforestation, silvicultural and hydrological corrections (impact on air, water, soil, ecosystems, etc.) are difficult to measure in monetary terms.

However, costs and returns have been calculated on the basis of reference values and threshold prices normally established for projects of this type.

The following benefits were considered:

- reduction in the risks of flooding;
- reduced loss of forest soil;
- less silting of dams;
- improved woodlands and less desertification;
- improved water quality;
- increased general welfare.

A joint economic analysis was carried out for the projects in the Guadiana catchment area.

It shows a cost-benefit ratio of 0,20, a present discounted value of ESP 1,555 billion with a discount rate of 7%, and an internal rate of return of 7,59%.

It is estimated that the effects of the project will last for 50 years.

All the benefits are indirect, since there will be no exploitation of forestry resources over the next 50 years.

Calculations do not take account of land values, or of the cost of maintenance work, plantations and other planned measures.

No significant revenue is generated by this group of projects.

A number of effects were too difficult to evaluate, including the reduction of the greenhouse effect and the improvement of the landscape.

9. *Environmental impact analysis:*

All the measures included in these projects are designed to restore and preserve the protective plant cover. Their general purpose is to protect resources: soil, water and the water cycle as a basic environmental process. Their impact on the environment is therefore invariably beneficial, since none of the measures use methods or introduce species which will alter the natural balance of the environment in question.

Planting will be carried out either on land which has, in the last 50 years, been covered by more or

less the same species which will now be planted or on land where there is no serious danger of a transformation harmful to the ecology.

10. *Cost and assistance:*

Total cost: ECU 10 794 657

Eligible cost
(after 24 April 1996): ECU 10 794 657

Rate of assistance: 85 %

Cohesion Fund grant: ECU 9 175 458

ANNEX

FINANCING PLAN

Project No: 96/11/61/049

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities				Other	Other	
		Total public expenditure	%		Cohesion Fund	%	Total	%	Central government	Other			
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	3 895 304	3 895 304	100	3 311 008	85	584 296	15						
1997	4 503 978	4 503 978	100	3 828 381	85	675 597	15						
1998	2 395 375	2 395 375	100	2 036 069	85	359 306	15						
Total	10 794 657	10 794 657	100	9 175 458	85	1 619 199	15						

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/001

1. **Name:** Especials S.A.', the State-owned company responsible for construction of the plant and are not part of the subsidised project.
- Treatment plant for incinerable hazardous waste (processing unit).
- The processing unit to be subsidised includes the following:
2. **Body responsible for the application:**
- 2.1. **Name:** Direcció General de Análisis y Planificació Presupuestaria
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Generalitat de Catalunya
Departament de Medi Ambient
Junta de Residus
Empresa pública Planta
d'Incineració de Residus Especials,
SA
- 3.2. **Address:** Provença 204-208
08036 Barcelona
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Regions:** Catalonia; province; Tarragona;
municipality: Constantí
5. **Description:**
- The project concerns an incineration plant for special waste situated in the industrial park of Constantí in the area of Camp de Tarragona.
- The plant has a nominal capacity of 36 800 t/year and was designed for a real treatment capacity of 30 000 tonnes per year in a multi-purpose rotary oven with a heat recovery system for electricity generation.
- The plant is located on land owned by the 'Junta de Residus' and consists chiefly of the installations for the actual incineration process. The land and certain of the buildings and installations (furnished offices and laboratories, fully equipped workshop, electricity substation with plant, fire protection system, roads and service areas; water collection systems) belonging to 'Junta de Residus' have been transferred under an agreement for use and occupation to the 'Planta d'Incineració de Residus
6. **Objectives:**
- Primary aims:*
- (a) To improve the management of special waste generated in the area, which is currently transported to France, with the attendant risks and costs. The planned plant will be able to process 30 000 t/year which, according to the estimates of incinerable waste made for Catalonia's special waste management programme, covers the treatment of 33 % of incinerable waste produced in Catalonia according to the abovementioned plan. Forecasts for the production of incinerable hazardous waste for 1996 and 2000 are 60 000 t/year (33 % reduction) and 45 000 t/year (50 % reduction), respectively.
- (b) To reduce emissions into the atmosphere, since the technology used meets very stringent requirements with regard to emission limits.

Secondary aims include:

- (a) Making optimal use of the energy contained in the waste. To achieve this a comparative study was made of the different technologies available for the incineration of special waste with energy recovery, capable of processing not only solid waste, but also liquids and gunk, i.e. a multi-purpose system. The most suitable technology actually generates more than twice the amount of electricity consumed by the plant.
- (b) Minimising water consumption. Technically, this project uses a wet method for treating gases, which means it will produce waste water. However, it is planned to reuse all such water and to discharge none into the public sewage system. A water treatment system is planned to optimise water consumption and to recycle it through the process.
- (c) Reducing the transport of hazardous incinerable waste, since there are no other such plants in the area.
- (d) Providing a model showing how this type of clean technology can be used, with a view to the creation of similar plants elsewhere in Spain.
- (e) Giving the plant an educational role, with permanent conference rooms, guided tours, exhibitions, etc.

7. *Work schedule:*

Category of work	Commencement	Completion
Initial phase (preparation of the area, etc.)	1.1.1995	31.1.1997
Processing area	11.10.1996	11.11.1998

8. *Assessment of costs and socio-economic advantages:*

The cost benefit analysis runs from the date of the first investments until 2013 and assumes an active life of 15 years. The plant is expected to be fully operational at the beginning of 1999 and already able to process 30 000 tonnes per year.

The main costs taken into account were the investment costs, the running costs and the social costs linked to its environmental impact. The chief benefits taken into account were revenue from the rates charged, energy savings from the electricity

generated, savings in resources which would have been required to transport waste to some more distant incinerator and the social benefits of terminating the environmental impact of the current waste management arrangements. On the basis of the estimates made, at a discount rate of 6%, the project has a present discounted value of PTA 12 309 million and an IRR of 18,33%, figures which are acceptable in socio-economic terms.

Existence of this infrastructure for the treatment of special waste will also have an economic spin-off for the region, improving its competitiveness, and establishing Tarragona's image and reputation as a highly suitable place for chemical and petrochemical plants.

9. *Environmental impact analysis:*

The construction of this incinerator for hazardous waste in Catalonia has very clear aims. Firstly it complies with the objectives of the Fifth Community Programme and secondly it will blaze a trail for the safe elimination of hazardous waste throughout Spain, demonstrating the uses of clean technologies of this kind.

The project has therefore been designed to comply with the requirements of Directive 94/67/EC on the incineration of hazardous waste. Indeed, it goes further by including measures to reduce nitrogen oxides and a system for total recycling of the water used during the gas scrubbing process.

The technical design of the plant is based on the best available technology (BAT) not entailing excessive costs, as defined in Council Directive 84/360/EEC on the combating of air pollution.

In addition, the project meets the basic criteria of proximity and adequacy laid down in the Special Waste Management Programme for Catalonia. Being located in Constantí means that it is sufficiently isolated from other sites which emit pollution in the area, so that the plant's own emissions can be monitored much more specifically and directly with a view to ensuring that the requirements are met.

An environmental impact assessment has been made in accordance with Directive 85/337/EEC, and the corresponding favourable declaration has been issued, which includes an environmental monitoring programme to be supervised by the environmental department of the regional government.

10. Cost and assistance:		Cost taken as basis for calculating aid (net revenue deducted):	ECU 39 893 338
Total cost (processing unit):	ECU 73 589 423	Rate of assistance:	80 %
Eligible cost (after 24 March 1997):	ECU 66 234 997	Cohesion Fund grant:	ECU 31 914 670

ANNEX

FINANCING PLAN

Project No: 97/11/61/001

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communit- nity loans		
		Total public expenditure			Cohesion Fund		National authorities				Other	11		12=11/1	13
		2=4+6+10	3=2/1	%	4	5=4/2	6=8+9	7=6/2	%	8					
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13			
1997	28 241 598	17 009 914	60,23	13 607 931	80	3 401 983	20	3 401 983			11 231 684	39,77			
1998	34 680 442	20 888 030	60,23	16 710 424	80	4 177 606	20	4 177 606			13 792 412	39,77			
1999	3 312 957	1 995 394	60,23	1 596 315	80	399 079	20	399 079			1 317 563	39,77			
Total	66 234 997	39 893 338	60,23	31 914 670	80	7 978 668	20	7 978 668			26 341 659	39,77			

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/002

1. **Name:**

Treatment of urban waste water in the Ebro river basin (Navarre).

2. **Body responsible for the application:**2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria2.2. **Address:** Paseo de la Castellana, 162
28046 Madrid3. **Body responsible for implementation:**3.1. **Name:** Gobierno de Navarra
Dpto. de Administración Local
(Nilsa)3.2. **Address:** Blas de la Serra, 1
Edificio Fuente Príncipe II4. **Location:**4.1. **Member State:** Spain

- 4.2. *Region:* Navarre
Municipalities: Tudela, Cárcar,
Andosilla and San Adrián

5. *Description:*

A group of three projects: two for collector sewers and one for a waste-water treatment plant.

The first project concerns the collector sewer to collect waste water from the urban settlement of Tudela, which is currently being discharged directly into the Ebro river, and convey it to the location of the treatment plant to be constructed. The second project involves construction of the treatment plant itself. Treatment will comprise a two-stage percolating filter with primary, secondary and final sedimentation, complying with the treatment standards set out in Directive 91/271/EEC.

The third project concerns a collector sewer to collect waste water from Cárcar, Andosilla and San Adrián, which is currently discharged without any treatment, and convey it to the location of the treatment plant to be constructed. This treatment plant will comprise a two-stage percolating filter with the necessary primary, secondary and final settling basins, and is the subject of a separate project to be financed under the master sanitation plan for the rivers of Navarre.

5.1. **Tudela collector**

The project can be split into four different types of work in different terrains: work to be carried out under the cover of the Queiles river, connecting in Mediavilla, laying the pipeline to the waste-water treatment plant and constructing the pump station:

- (a) Queiles collector sewer:
- total length: 509 m
 - diameter: 268 m of 1 000 mm; 241 m of 600 mm
 - number of manholes: 21
 - the project includes a proportional part of the installation of service lines.
- (b) Connecting in Mediavilla:
- total length: 114 m
 - diameter: 500 mm
 - Vortex type spillway: 1 unit.

- (c) Pipeline to the treatment plant:
- total length: 1 936 m
 - diameter: 1 000 mm
- (d) Pump station (civil works)

5.2. **Tudela waste-water treatment plant**

The project consists of seven specific units:

- (a) Preliminary treatment and pumping of untreated sewage:
- Screen for gross solids: 2 units
- (b) Primary sedimentation:
- Number of units: 2
 - Type: circular
 - Diameter: 25 m
 - Reduction of organic load: 25 % of BOD₅
- (c) Biological filters, Stage 1:
- Number of units: 3
 - Type: circular
 - Diameter: 30 m
 - Reduction of organic load: 89 % of BOD₅.
- (d) Secondary sedimentation:
- Number of units: 2
 - Type: circular
 - Diameter: 25 m
- (e) Biological treatment, Stage 2:
- Number of units: 2
 - Type: circular
 - Diameter: 20 m
 - Reduction of organic load: 35 % of BOD₅
- (f) Final sedimentation:
- Number of units: 2
 - Type: circular
 - Diameter: 25 m
- (g) Sludge handling:
- Thickeners: 2 units
 - Type: circular
 - Inner diameter: 8 m.

5.3. **Collector for Cárcar-Andosilla and San Adrián**

The project consists of the main collector sewer, secondary lines and a range of single elements, described below:

- (a) Collector sewer:
- total length: 8 970 m of PVC pipeline
 - diameter: 3 933 m of 315 mm; 331,5 m of 400 mm; 4 706 mm of 500 mm
- (b) Secondary lines:
- total length: 328,5 m of PVC pipeline
 - diameter: 61,5 m of 400 mm; 223,0 m of 315 mm; 44,0 m of 160 mm
- (c) Manholes: 138 units
- (d) Single sections
- bridge crossing
 - two irrigation canal crossings
 - crossing for the San Adrián dam
 - spillway for San Adrián canal
 - road modification
 - crossing for the San Adrián mill canal
 - crossing for highway in San Adrián
 - crossing for Ega river in Andosilla

Project No: 97/11/61/002	Total
Present population (inhabitants)	30 781
Present population equivalent (p.e.)	42 064
Design population equivalent	46 922
Total average BOD ₅ on entry (mg/l)	300
Total average BOD ₅ on exit (mg/l)	25
Total average SS on entry (mg/l)	250
Total average SS on exit (mg/l)	35
Average daily volume of water (m ³ /day)	9 331
Industrial waste	27%

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	10.5.1995	20.9.1996
Purchase of land	1.6.1997	30.6.1997
Main work	1.10.1997	31.12.1999
Commissioning	1.1.2000	

8. *Assessment of costs and socio-economic advantages:*

A cost-benefit analysis has been carried out on the following basis:

- utility value = 25 years
- net book value = 0
- discount = 6%

The following were put on the positive side of the equation:

- sanitation tax
- financial estimate of the environmental benefit of reducing the pollution load of discharge
- revenue from re-use of treated water

The following were put on the negative side:

- initial investment
- operating and maintenance costs

6. *Objectives:*

The measures included in this set of projects are part of the general strategy being followed to solve the problem of serious loss of river-water quality in the sanitation plan for the rivers of Navarre, approved by the regional government. This plan is coordinated with the national plan for the disposal and treatment of urban waste water and with Directive 91/271/EEC.

The measures in this project constitute the next step in improving the quality of the Ebro river in Navarre, following completion of the waste-water treatment projects for Pamplona. These measures will solve a serious environmental and public health problem, given that the inlet of the Canal Imperial, which carries water to supply the city of Zaragoza, is situated a few kilometres downstream from Tudela.

Specifically, the main technical parameters regarding the population served and the water quality to be obtained from the Tudela treatment plant are as follows:

The results are:

IRR : 6,54 %

9. *Environmental impact analysis:*

1. The project will improve water quality by providing sewer systems and treatment facilities to municipalities which currently have none, thereby allowing water to be re-used for ecological purposes. The project will therefore contribute to achieving the objectives of Article 130R of the EC Treaty and the fifth Community programme of policy and action in relation to the environment and sustainable development.

The project also complies with Directive 91/271/EEC and the measures provided for in it are both preventive (avoiding the possibility of environmental problems downstream from Tudela which might even affect human health) and palliative (reducing the pollution load

of discharge downstream of the treatment plant).

2. The planned sewers must be connected to a treatment plant before they are put into service.

3. Sludge from the planned treatment plant intended for use in agriculture must comply with Directive 86/278/EEC. Remaining sludge must be treated, depending on its composition, in accordance with the Community Directives on the treatment of waste.

10. *Cost and assistance:*

Total cost: ECU 9 612 496

Eligible cost (after 2 April 1996): ECU 9 612 496

Rate of assistance: 80 %

Cohesion Fund grant: ECU 7 689 997

ANNEX

FINANCING PLAN

Project No: 97/11/61/002

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other				
			%		%	Total		Central government				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	584 614	584 614	100	467 691	80	116 923	20		116 923				
1998	3 458 858	3 458 858	100	2 767 087	80	691 771	20		691 771				
1999	5 569 024	5 569 024	100	4 455 219	80	1 113 805	20		1 113 805				
Total	9 612 496	9 612 496	100	7 689 997	80	1 922 499	20		1 922 499				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/004

1. **Name:** Integral waste-water disposal and treatment in nature reserves and protected areas of the Autonomous Community of Extremadura.
- Submerged pumps for raising water from one of the areas.
 - Collector, 1 100 m long by 400 mm diameter, to connect the system to the waste-water treatment plant.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria MEH
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Medio Ambiente, Urbanismo y Turismo
- 3.2. **Address:** Santa Eulalia, 30
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Autonomous Community of Extremadura
5. **Description:**
- This group of 17 projects involves the work necessary to provide waste-water treatment for towns in the catchment basins of the Monfragüe, Cornalvo, la Garganta de los Infiernos and los Barruecos Nature Reserves. The work involves construction of collector systems and waste-water treatment plants.
- The proposed installations will include secondary treatment facilities to ensure that effluent meets the required standards.
- 5.1. **Monfragüe Nature Reserve**
- The Reserve, with a total area of 17 852 ha, is bordered by the River Tagus and the River Tiétar. The following work is to be carried out in the towns lying in the catchment areas of the Reserve:
- Waste-water disposal and treatment in Malpartida de Plasencia*
- Collectors:
- Collectors, 1 400 m long by 400 mm diameter and 900 m long by 300 mm diameter, for the collection of waste water from parts of the town not yet connected to the sewer system.
- Waste-water disposal and treatment in Toril and Villarreal de San Carlos*
- Collectors:
- Collector, 1 500 m long by 300 mm diameter, to connect the existing sewer system to the treatment plant.
- Waste-water treatment plants:
- General by-pass of the plant.
 - Solids removal using a manual screen.
 - Sand-trap/oil separator.
 - Sedimentation tank/digester.
 - Biological treatment using a compact percolating filter.
 - Secondary sedimentation.
 - Disinfection of effluent before final discharge.
 - Pumping of sludge to sedimentation tank/digester.
 - Dewatering of sludge in drying beds.

Waste-water disposal and treatment in Serrejón, Jaraicejo, Torrejón el Rubio, Casas de Millán y Mirabel

Collectors in Serrejón:

- Extension of the collector from discharge point 1 (north-west) with 800 m of 400 mm diameter piping.
- Extension of the collector from discharge point 2 (north-east) to the junction with discharge point 1 at the site of the new treatment plant with 1 500 m of 400 mm diameter piping.

Collectors in Jaraicejo:

- Extension of the collector from discharge point 1 to the junction with discharge point 2 with 600 m of 300 mm diameter piping.
- Extension of the pipe carrying the combined discharges to discharge point 3 at the site of the new treatment plant with 500 m of 400 mm diameter piping.

Collectors in Torrejón el Rubio:

- Renovation of the existing 600 mm diameter collector and correction of its alignment over 1 750 m.

Collectors in Casas de Millán:

- Connecting the two existing discharge points by means of a 400 m long 400 mm diameter collector.
- Extension of the collector carrying the combined discharges to the site of the new treatment plant with 400 m of 500 mm diameter piping.

Collectors in Mirabel:

- Renovation of the existing 500 mm diameter collector over 1 500 m.

Treatment plants:

- General by-pass of the treatment plant.
- Solids removal using an automatic screen and a manual screen in the by-pass.
- Sand-trap/oil separator.
- Biological treatment with nitrification/denitrification by prolonged aeration.
- Elimination of phosphorous by chemical precipitation.
- Secondary sedimentation.
- Disinfection of effluent before final discharge.
- Recirculation of sludge by pumping.
- Pumping out of sludge.
- Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in Casas de Miravete

Collectors:

- Extension of the collector from discharge point 1 with 150 m of 300 mm diameter piping.
- Extension of the collector from discharge point 2 to the junction with the extension of the collector from discharge point 1 at the site of the new treatment plant with 250 m of 300 mm diameter piping.

Waste-water treatment plant:

- Solids removal using an automatic screen and a manual screen in the by-pass.
- Sand-trap/oil separator.
- Biological treatment.
- Secondary sedimentation.
- Disinfection of effluent before final discharge.
- Recirculation of sludge by pumping.
- Pumping out of sludge.
- Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in Serradilla

Collectors:

- Extension of the collector from discharge point 1 to the collector to discharge point 2 with 750 m of 400 mm diameter piping.
- Extension of the collector carrying the combined discharge to discharge point 3 and piping to the site of new treatment plant.

Waste-water treatment plant:

- Distributor at the junction of the old and new collectors to transport waste water to the treatment plant.
- General by-pass of the treatment plant.
- Initial solids removal using an automatic screen.
- Sand-trap.
- Flow meter.
- Sedimentation tank/sludge digester.
- Biological treatment using a bacteria bed.
- Secondary sedimentation using a sedimentation tank with a scraper to remove scum and floating solids.
- Disinfection of effluent before final discharge.

- Pumping of sludge to sedimentation tank/digestor.
- Dewatering of digested sludge using a belt filter press.

5.2. Cornalvo Nature Reserve

The Reserve has an approximate area of 10 740 hectares. The following work is to be carried out in the towns lying in the catchment areas of the Reserve:

Waste-water disposal and treatment in Mirandilla

Collectors:

- Construction of a spillway and laying 1 500 m of 400 mm diameter collector.

Waste-water treatment plant:

- General by-pass of the treatment plant.
- Initial solids removal using an automatic screen.
- Sand-trap/oil separator.
- Flow meter.
- Sedimentation tank/sludge digestor.
- Biological treatment using a bacteria bed.
- Secondary sedimentation using a sedimentation tank with a scraper to collect scum and other floating material.
- Disinfection of effluent before final discharge.
- Pumping of sludge to sedimentation tank/digestor.
- Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in San Pedro de Mérida, Trujillanos and Torrefresneda

Collectors in San Pedro de Mérida:

- Laying 1 300 m of 400 mm diameter collector.

Collector sewers in Trujillanos:

- Extension of the existing 400 mm diameter collector by 1 500 m to the site of the new treatment plant.

Collectors in Torrefresneda:

- Construction of a spillway and laying 1 700 m of 300 mm diameter collector.

Waste-water treatment plants:

- General by-pass of the treatment plant.
- Solids removal using an automatic screen and a manual screen in the by-pass.
- Sand-trap/oil separator.
- Biological treatment with nitrification/denitrification by prolonged aeration.
- Elimination of phosphorous by chemical precipitation.
- Secondary sedimentation.
- Disinfection of effluent before final discharge.
- Recirculation of sludge by pumping.
- Pumping out of sludge.
- Dewatering of digested sludge in drying beds.

Waste-water disposal and treatment in Aljucén

Collectors:

- Laying 1 500 m of 300 mm diameter collector.

Waste-water treatment plant:

- Solids removal using an automatic screen and a manual screen in the by-pass.
- Sand-trap/oil separator.
- Biological treatment.
- Secondary sedimentation.
- Disinfection of effluent before final discharge.
- Recirculation of sludge by pumping.
- Pumping out of sludge.
- Dewatering of digested sludge in drying beds.

5.3. La Garganta de los Infiernos Nature Reserve

The Reserve lies in the comarca of Valle de Jerte on the border between the Communities of Extremadura and Castile-Leon. The following work is to be carried out in the towns lying in the catchment area of the Reserve:

Waste-water disposal and treatment in Jerte

Collectors:

- Laying 1 600 m of 400 mm diameter collector to transport part of the waste water to the new treatment plant.

Waste-water treatment plant:

- General by-pass of the treatment plant.
- Initial solids removal using automatic screens.
- Sand-trap/oil separator.
- Flow meter.
- Sedimentation tank/sludge digester.
- Biological treatment using a bacteria bed.
- Secondary sedimentation using a sedimentation tank with a scraper to collect scum and other floating material.
- Disinfection of effluent before final discharge.
- Pumping of sludge to sedimentation tank/digester.
- Dewatering of digested sludge in drying beds.

5.4. Los Barruecos Nature Reserve

Lying to the south of the town of Malpartida de Cáceres, the Reserve is a site of geological, geomorphological, faunistic and cultural importance.

The following work is to be carried out in the town located in the catchment area of the Reserve:

Waste-water disposal and treatment in Malpartida de Cáceres

Collectors:

- Laying of four sections of 500 mm diameter collector to transport waste water from the town to the new treatment plant.

Waste-water treatment plant:

- Inlet structure with spillway.
- Initial solids removal using a screen.
- Pumps to lift waste water.
- Solids removal.
- Sand-trap/oil separator.
- Sedimentation tank/sludge digester.
- Biological treatment using activated sludge.
- Secondary sedimentation.
- Recirculation of biological sludge.
- Pumping of excess sludge to the sedimentation tank/digester.
- Dewatering of sludge using a belt filter press.

6. Objectives:

The principal objective is to provide the towns neighbouring the Montfragüe, Cornalvo, la Garganta de los Infiernos and los Barruecos Nature Reserves with collector systems and waste-water treatment plants in order to prevent the discharge of untreated waste from damaging water quality in the watercourses which form the basis of the ecosystems of the Reserves.

The objective can be quantified in terms of the populations of the towns discharging waste water into the watercourses flowing through the Reserves.

Nature reserve	Population equivalent	Flow (m ³ /day)
Monfragüe	13 100	3 275
Cornalvo	5 010	1 253
La Garganta de los Infiernos	2 060	514
Los Barruecos	5 660	1 416

The technical details of the group of projects are as follows:

	Entry	Exit
BOD (in mg/l)	Between 116 and 350	25
SS (in mg/l)	Between 126 and 378	35
Dry matter (sludge)		20%

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project	January 1997	May 1997
Purchase of land		May 1997
Main work	April 1997	December 1998

8. Assessment of costs and socio-economic advantages:

The economic analysis was based on a period of 20 years, considered as the working life of the treatment plants.

It was based on the following parameters:

- cost of the project: initial investment and operating and maintenance costs,
- benefits:
 - revenue generated by a municipal tax, equal to the operating and maintenance costs,

- exploitation of the environmental benefits deriving from improved water quality,
- environmental benefits linked to the increase in the number of visitors to the area, based on estimated expenditure per visitor.

The results were as follows:

Project	Internal rate of return (%)	Cost-benefit
Monfragüe	7,3	0,58
Cornalvo	7,1	0,59
Garganta de los Infiernos	9,3	0,52
Los Barruecos	7,0	0,62

9. *Environmental impact analysis:*

This project will provide adequate waste-water treatment for number of towns which currently lack it, reducing the pollution discharged into the rivers in the area and considerably improving water quality.

The projects are part of the work required to comply with Directive 91/271/EEC on the treatment of urban waste water.

10. *Cost and assistance:*

Total cost: ECU 11 247 558

Eligible cost (after 23 April 1997): ECU 11 247 558

Rate of assistance: 80 %

Cohesion Fund grant: ECU 8 998 046

Breakdown of costs by Reserve:

Monfragüe ECU 6 140 100

Cornalvo ECU 2 665 840

La Garganta de los Infiernos ECU 853 276

Los Barruecos ECU 1 588 342

Total: ECU 11 247 558

ANNEX

FINANCING PLAN

Project No: 97/11/61/004

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8				9	
1997	5 322 920	5 322 920	100	4 258 336	80	1 064 584	20		1 064 584				
1998	5 924 638	5 924 638	100	4 739 710	80	1 184 928	20		1 184 928				
Total	11 247 558	11 247 558	100	8 998 046	80	2 249 512	20		2 249 512				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/005

1. **Name:** Province, to treat sludge from urban waste-water treatment plants to permit its use in agriculture.
- Plants for composting sludge from waste-water treatment plant in the Autonomous Community of Extremadura.
- The system selected for both plants is composting in closed tunnels, since this requires only very compact plants, with totally closed treatment areas, which blend into the landscape without any visual impact and without causing odour problems.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General Análisis y Programación Presupuestaria MEH
- 2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid
- The Monroy composting plant will have a capacity of 22 220 tonnes of sludge per year from the Cáceres, Plasencia, Navalmoral de la Mata, Coria and Trujillo waste-water treatment plants.
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Medio Ambiente, Urbanismo y Turismo
- 3.2. **Address:** Santa Eulalia, 30
- The Montijo composting plant will have a capacity of 46 300 tonnes of sludge per year from the Badajoz, Almendralejo, Don Benito-Villanueva de la Serena, Mérida, Montijo and Villafranca de los Barros waste-water treatment plants.
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Autonomous Community of Extremadura
5. **Description:**
- The project involves the construction of two composting plants, one in Montijo, Badajoz Province, and one in Monroy, Cáceres
6. **Objectives:**
- The plants will treat sludge from waste-water treatment plants to permit its use in agriculture, since there is a shortage of organic material in Extremadura for intensively farmed land.
- The detailed objectives of the projects are as follows:

Montijo composting plant

Waste-water treatment plant	Population concerned (Population equivalent)	Sludge production (tonnes/year)	Compost production (tonnes/year)
Badajoz	210 000	20 965	5 240
Almendralejo	49 700	4 240	1 060
Don Benito-Villanueva	72 240	7 215	1 800
Mérida	85 000	7 250	1 820
Montijo	32 500	2 930	730
Villafranca de los Barros	41 000	3 700	925
Total	490 440	46 300	11 575

Monroy composting plant

Waste-water treatment plant	Population concerned (Population equivalent)	Sludge production (tonnes/year)	Compost production (tonnes/year)
Plasencia	58 500	4 991	1 250
Cáceres	120 000	11 980	3 000
Navalmoral de la Mata	24 960	2 250	560
Trujillo	12 600	1 259	310
Coria	19 300	1 740	435
Total	235 360	22 220	5 555

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.1.1997	1.4.1997
Purchase of land		1.4.1997
Main work	1.5.1997	1.11.1998

8. *Assessment of costs and socio-economic advantages:*

The economic analysis was based on a period of 20 years, considered to be the working life of the plants.

It was based on the following parameters:

- cost of the project: initial investment and operating and maintenance costs,
- benefits, including the direct benefits from the sale of compost and the indirect benefits from the reduction in social costs (reduction of water, soil and atmospheric pollution).

To these must be added to socio-economic benefits deriving from the increase in the productive capacity of agricultural land resulting from the application of the compost produced.

The internal rate of return for the Montijo plant is 15,6% and for the Monroy plant 8,1%.

9. *Environmental impact analysis:*

The projects will help reduce disposal by controlled tipping of sludge produced during the treatment of waste water and permit its use in agriculture under satisfactory conditions following stabilisation.

The project is a preventive measure since its aim is to ensure the satisfactory management and use in agriculture of sludge and prevent actions harmful to the environment.

Treatment of the sludge will meet the requirements of Directive 86/278/EEC on the use of sewage sludge in agriculture.

10. *Cost and assistance:*

Total cost: ECU 11 595 590

Eligible cost
(after 23 April 1997): ECU 11 595 590

Rate of assistance: 80 %

Cohesion Fund grant: ECU 9 276 472

Breakdown of costs:

1. Montijo plant ECU 6 797 053

2. Monroy plant ECU 4 798 537

Total: ECU 11 595 590

ANNEX

FINANCING PLAN

Project No: 97/11/61/005

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans	
		Total public expenditure			Cohesion Fund		National authorities			Other		%		
		2=4+6+10	3=2/1	%	4	5=4/2	6=8+9	7=6/2	8					9
1997	3 506 062	3 506 062	100	2 804 850	80	701 212	20		701 212					
1998	8 089 528	8 089 528	100	6 471 622	80	1 617 906	20		1 617 906					
Total	11 595 590	11 595 590	100	9 276 472	80	2 319 118	20		2 319 118					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/006

1. **Name:** as a leisure and amenity area for the town of Logroño.
Plan for the environmental reclamation of the stretch of the river Ebro running through Logroño.
2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General Análisis y Programación Presupuestaria
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
 - 3.1. **Name:** Ayuntamiento de Logroño
 - 3.2. **Address:** Avda. de la paz, 11
26071 Logroño
4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Rioja
5. **Description:**

The project consists of a number of measures to reclaim the banks of the river Ebro for use

These measures form part of an environmental reclamation plan for the Ebro area, costing more than ESP 10 000 million. This application is for aid of almost ESP 382 million to improve sewerage and water-treatment facilities, develop the green spaces along the river banks, construct a footpath along the left (northern) bank, develop the Parque del Ebro on the right bank, improve the footbridge over the river and restore the original appearance and route of the river by dismantling the walls of several disused swimming pools obstructing the river bed and a redundant weir.

Most of the measures concern the left bank where, in addition to the reclamation of the green areas, effluent will no longer be discharged directly into the river but will be diverted into a new sewer and pumped across one of the existing bridges to the main sewer on the right bank.

Also on the left bank, it is planned to construct a new footpath to connect two areas formerly very close to the river (La Playa and the Pozo de Cubillas). Along this footpath a permanent cultural centre for environmental observation and experimentation, the Casa de las Ciencias y el Medio Natural, will shortly be created.

On the right bank, measures include the surfacing of several footpaths in the Parque del Ebro.

A redundant weir will be demolished and the walls of disused swimming pools in the river bed dismantled. As a result of this, the northern bank will have to be reinforced and permanent boundaries established for the southern bank to protect the woods from flooding.

As the parks on the two banks are linked by an existing footbridge, the project includes entries for maintenance work and development (repair of a damaged support column, treatment of joints and supports, resurfacing, etc.).

It is also planned to lay piping along one bridge to supply drinking water to the urban areas on the northern bank and the newly-created green spaces.

The measures as a whole comprise the following:

- collector sewer: 1 535 m
- footpaths: 1 800 m
- developed green areas: 73 500 m²

6. Objectives:

The main objective is to restore as a leisure and amenity area for the town a number of sites close to the river and footpaths that are currently in a serious state of disrepair.

At the same time, the environmental state of the river is to be upgraded by discontinuing the direct discharge of effluent into the river from urban areas on the left bank and conveying it to the treatment plant now under construction.

The quantified objectives are:

Number	Description
126 000	Inhabitants affected
350 000 m ³	Water currently treated per year
900 000 m ³	Water to be treated per year in future
73 500 m ²	Green areas restored

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project	1.11.1996	31.7.1997
Main work	1.2.1998	31.12.1999

8. Assessment of costs and socio-economic advantages:

- (a) A cost-benefit analysis has been carried out on the following basis:
- investments for a working life of 25 years,
 - operating and maintenance costs at ESP 11 million/year, i.e. 2,83 % of the initial investment,
 - assessment of the environmental benefits: improved water quality, public health, river bed,
 - evaluation of public interest: restoration of recreational areas.

- (b) The internal rate of return (IRR) is 15 %.

The net present value of all the projects included in the application is ESP 382 million (1997).

- (c) Creation of jobs:

- during implementation: direct: 20; indirect: 40 (21 months),
- during operation: direct: 4; indirect: 1.

9. Environmental impact analysis:

- (a) The projects are consistent with the following objectives, set out in Article 130R of the EC Treaty:

- preserving, protecting and upgrading the quality of the environment,
- contribution to the protection of public health,
- ensuring the rational use of natural resources.

- (b) The projects as a whole are in keeping with the following objectives of the Fifth Community action programme:

- the sustainable management of natural resources through the reduction of water pollution,
- proper management of water resources,
- enhancing the quality of urban environment,
- improving public health and safety.

- (c) The project concerns the piping and collection of urban waste water as provided for in Directive 91/271/EEC on the treatment

of urban waste water and the Spanish laws incorporating the Directive into national law. The proposed measure is for the environmental rehabilitation of a seriously run-down section of the river bank, the construction of a footpath and the discontinuance of the direct discharge of effluent into the river in order to reduce pollution levels and improve water quality significantly.

10. <i>Cost and assistance:</i>	
Total cost:	ECU 2 292 234
Eligible cost (after 24 April 1997):	ECU 2 292 234
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 1 833 787

ANNEX

FINANCING PLAN

Project No: 97/11/61/006

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other	11	%	
		2=4+6+10	%	4	%	6=8+9	%	Central government	Other				
1=2+11	3=2/1	5=4/2	7=6/2							8	9	10	12=11/1
1997	36 028	36 028	100	28 823	80	7 207	20		7 207				
1998	1 128 103	1 128 103	100	902 482	80	225 620	20		225 620				
1999	1 128 103	1 128 103	100	902 482	80	225 620	20		225 620				
Total	2 292 234	2 292 234	100	1 833 787	80	458 447	20		458 447				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/007

1. **Name:**

Improvement of the drainage system of the Vitoria-Gasteiz solid municipal waste tip and regulation of river flows.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Ayuntamiento de Vitoria Gasteiz

3.2. **Address:** C/Dato, 11
Vitoria

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Basque Country

5. **Description:**

The project is to be implemented under the Vitoria-Gasteiz Sewage System Hydrological Control and Environmental Improvement Plan, drawn up in order to solve the problems currently affecting the city's waste-water collection and treatment system. The principal aim is to prevent, as far as possible, massive flows of water from rivers and streams into the collector.

The Plan consists of the 'Project to divert the flow of the Rivers Santo Tomás and Errekaleor', which received aid from the Cohesion Fund in 1996, and the 'Project for the improvement of the drainage system of the Vitoria-Gasteiz solid municipal waste tip and regulation of river flows into the sewage system' now being presented. The principal aim of this second project is to solve the problems caused by the waters of the Rivers Zapardiel, Batán, Ali and Esquivel entering the city's sewage system and to improve the drainage system of the Vitoria-Gasteiz waste tip located in the basin of the River Zapardiel.

The solution chosen consists in digging a large collector canal 9 422 m long running approximately southeast-northwest from the upper end of the solid urban waste tip to collect flows

from the Rivers Zapardiel, Batán, Ali and Esquivel and carry them to the River Zadorra downstream from the Asteguieta bridge. The construction of two small detention reservoirs on route will permit the regulation of floods and thus permit the reduction of the size of the channel along subsequent sections. These will be provided by two earth dams (total volume 235 000 m³). The work will be completed with a series of landscaping and environmental measures over an area of 150 000 m² to create a green corridor linking the Montes de Vitoria and the banks of the River Zadorra.

The technical details of the planned works are as follows:

1. *River Zapardiel diversion channel (1st section)*

The waters of the River Zapardiel are to be diverted from the upper end of the tip by means of an earth dam. A channel will be dug around the tip (width at the base of 1,5 m, height 1,2 m and 45° walls).

2. *Gardélegui detention reservoir*

It is planned to construct a 22 m high earth dam with a 125 m long crest. The reservoir will have a capacity of 500 000 m³.

3. *River Zapardiel diversion channel (2nd section)*

A channel will be dug from the Gardélegui reservoir (width at the base of 0,8 m, height 1 m and 45° walls).

4. *River Batán diversion channel*

This channel will have two standard sections: an open section and a reinforced concrete underground section.

5. *Berrosteguieta detention reservoir*

A 20 m high rubble dam with 34/1 V sides. The outflow system will consist of a lateral flow spillway and an undersluice (600 m diameter pipe).

6. *River Ali diversion channel*

Water released from the Berrosteguieta reservoir will be carried to the River Esquivel by a 1 050 m long channel.

7. *River Esquível diversion channel*

The channel will carry water from the River Esquível and the Berrosteguita reservoir to the Torroguico Stream. The channel will be 25 m wide and have a total length of 800 m.

8. *Channelling of the Torroguico Stream*

This is to cope with flows from the River Esquível. The section will be increased over 2 300 m, maintaining the longitudinal profile and one of the banks.

9. *Torroguico Stream diversion channel*

This will be a 300 m long underground channel in reinforced concrete with internal dimensions of 4,20 m wide and 2,5 m high.

10. *Environmental works (see above)*6. **Objectives:**

The project has the following objectives:

- To minimise the volume of water from the Rivers Zapardiel, Batán, Ali and Esquível basins currently entering the sewage system.
- To regulate the resulting flows so as to minimise surges along the new channels and reduce the peak flow into the River Zadorra.
- To permit the expansion of the existing Vitoria-Gasteiz solid urban waste tip and prevent runoff from its catchment area entering the leachate-collection system.
- To create a green corridor along the southwestern boundary of the city, connecting the Zabalgana and Armentia periurban parks with the Montes de Vitoria and the banks of the Zadorra.

The diversion of the Rivers Zapardiel, Batán, Ali and Esquível will immediately reduce the volume of water being treated by the waste-water treatment plant, thus increasing its efficiency and reducing the uncontrolled discharge of waste water into the River Zadorra caused by overloading of the sewage system. This will considerably reduce the risk of flooding in the city.

7. **Work schedule:**

Category of work	Commencement	Completion
Construction	1.7.1998	31.12.1999

8. **Assessment of costs and socio-economic advantages:**

- (a) A cost/benefit analysis was carried out on the basis of the following assumptions:
- working life of investments: 25 years,
 - operating and maintenance costs: 6%,
 - environmental improvements: improved urban environment, reduced risk of flooding, reduced risk of pollution by leachates, reduced levels of pollution in the River Zadorra.
- (b) Number of inhabitants benefiting: 209 704.
- (c) Internal rate of return (IRR): 25%; net present value (NPV): ESP 2 291 019 million at a discount rate of 6%; cost/benefit ratio: 2,83.

9. **Environmental impact analysis:**

(a) General assessment:

- The project is covered by Article 130R of the Treaty establishing the European Community.
- The project addresses the issues and goals set out in the Fifth Community Programme of Policy and Action in relation to the Environment and Sustainable Development, which states 'For the purposes of improving the quality of life and as a condition for achieving sustainable development, it is essential to secure sufficient water of adequate quality throughout the Community without upsetting the natural equilibrium of the environment'.

The project fulfils the following aims laid down in the Programme:

- integrated pollution control and prevention of discharges,
- improved urban environment,
- improved public health and safety.
- The project aims to solve the problems of the control and collection of urban waste water in accordance with the guidelines laid down in Directive 91/271/EEC

concerning urban waste-water treatment. It complies with the objectives and lines of action laid down in the recently adopted National Waste Water Disposal and Treatment Plan (Resolution of 28 April 1995, BOE 113 of 12 May 1995), which is, in turn, based on criteria laid down in Directive 91/271/EEC.

from the upper Zapardiel basin crossing the tipping area, thus preventing the overload of the leachate collector and the possible pollution of the subterranean aquifer.

- Landscaping of an area of 150 000 m² to create a green corridor linking the Montes de Vitoria and the banks of the Zadorra.

(b) Specific assessment:

- The purpose of the project is solve the problem of flooding by regulating the Rivers Zadorra and Batán by means of detention reservoirs.
- Improvements to the drainage system at the Vitoria-Gasteiz solid urban waste tip are intended to prevent surface runoff

10. *Cost and assistance:*

Total cost:	ECU 4 326 230
Eligible cost (after 24 April 1997):	ECU 4 326 230
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 3 460 984

ANNEX

FINANCING PLAN

Project No: 97/11/61/007

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	60 177	60 177	100	48 142	80	12 035	20		12 035				
1998	1 632 638	1 632 638	100	1 306 110	80	326 528	20		326 528				
1999	2 633 415	2 633 415	100	2 106 732	80	526 683	20		526 683				
Total	4 326 230	4 326 230	100	3 460 984	80	865 246	20		865 246				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/012

1. **Name:**

Phase II of the integral waste-water disposal and treatment system for the Bay of Santander: pumping station and underwater outfall.

southern part of Santander will be pumped to the northern part of the city for treatment through three conduits 1 000 mm in diameter and 1 336 m long.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

2. Conveyance from the main pumping station: force and gravity mains from Cazoña to the San Román waste-water treatment plant. The construction of the first section will entail creating a tunnel 3,20 m in diameter and 878 m long; the second section will consist of piping 1,5 m in diameter and 1 286 m long buried in a trench; the last section will consist of a double conduit 1 200 mm in diameter.

3. **Body responsible for implementation:**

3.1. **Name:** Consejería de Medio Ambiente y Ordenación del Territorio del Gobierno de Cantabria

3.2. **Address:** Pº de Pereda, 16

3. Underwater outfall: an underground section 500 m long and a 2 200 m underwater section fitted with three diffusers 250 m, 150 m and 200 m long respectively.

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Cantabria

4.3. **Municipalities:** Astillero, Camargo and Santander

The first phase consists simply of collecting effluent at the place where the pumping station is to be constructed in the second phase. The second phase is therefore of critical importance to the project, since without it totally untreated waste water would be discharged at sea in one continuous flow, worsening the situation by raising the concentration of polluting load. In the second phase, the waste water will be pumped to the future treatment plant in the northern part of Santander.

5. **Description:**

The integral waste-water disposal and treatment system for the Bay of Santander will consist of the following:

- effluent treatment and disposal in the southern section of the city of Santander and the Camargo-Astillero area and the pumping of waste water to the main pumping station;
- the pumping of all waste water in the southern section of the city of Santander and the Camargo-Astillero and Santa Cruz de Bezana areas and from the existing El Sardinero pumping station, currently conveyed to the San Román waste-water treatment plant;
- the laying of an underwater outfall for disposal at sea of the treated waste water.

The work is being undertaken in several phases:

Phase I: collection of effluent from the Camargo-Astillero area and the southern part of Santander,

Phase II: main pumping station and underwater outfall,

Phase III: waste-water disposal and treatment plant for Santa Cruz de Bezana.

The work schedule for Phase II is as follows:

1. Main pumping station: waste water collected from the Camargo and Astillero areas and the

6. **Objectives:**

The integral waste-water disposal and treatment system for the Bay of Santander is in line with the Spanish Government's national plan for waste-water treatment (1995—2000), which is aimed principally at:

- expanding waste-water collection and treatment facilities in compliance with Directive 91/271/EEC;
- reducing pollution levels in order to meet bathing water quality standards.

The project aims to provide the area in question with water treatment facilities that will help reduce waste water discharges which are contaminating the bay and, secondly, to bring the polluting load of the remaining discharge within the maximum levels set by law.

The package of measures comprising Phases I, II and III will benefit a fixed future population of 216 611 representing a population equivalent of some 359 513.

7. *Work schedule:*

Category of work	Commencement	Completion
Purchase of land	1.10.1997	31.10.1997
Main work	1.12.1997	31.12.1999
Commissioning	1.1.2000	

8. *Assessment of costs and socio-economic advantages:*

A cost-benefit analysis has been carried out on the following basis:

- useful life of the waste-water treatment plant: 20 years
- net book value: 0
- discount rate: 6%.

The following were put on the positive side of the equation:

- water charges
- financial estimate of the environmental benefit of reducing the pollution in the discharged water

The following were put on the negative side:

- the initial investment
- operating and maintenance costs.

The results are:

- an IRR of 59,4%.

However, other benefits which are difficult to quantify were not taken into account, such as an

increase in the local population's welfare and standard of living by improving health and environmental conditions and the development of rural tourism and fisheries, which are important in the region.

9. *Environmental impact analysis:*

The project is intended to improve water quality by providing sewers and water treatment facilities in municipalities which currently have none. The project is a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community action programme on the environment and sustainable development. The project complies also with the obligations set out in Directive 91/271/EEC, and the measures provided for in it are both preventive (avoiding the possibility of environmental problems in the bay which might even affect human health) and palliative (reducing the contaminant loads of waste-water to be discharged from the outfall once the treatment plant has been built).

10. *Cost and assistance:*

Total cost:	ECU 28 537 098
Eligible cost (after 29 April 1997):	ECU 28 537 098
Rate of assistance:	80%
Cohesion Fund grant:	ECU 22 829 678

ANNEX

FINANCING PLAN

Project No: 97/11/61/012

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	8				9	
1997	2 487 233	2 487 233	100	1 989 786	80	497 447	20		497 447				
1998	11 847 402	11 847 402	100	9 477 922	80	2 369 480	20		2 369 480				
1999	14 202 463	14 202 463	100	11 361 970	80	2 840 493	20		2 840 493				
Total	28 537 098	28 537 098	100	22 829 678	80	5 707 420	20		5 707 420				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/013

1. **Name:** Waste-water disposal for Bajo Nalón, Asturias. and Forcinas de Arriba, Peñaullán, Bances, Los Cabos, Somado and Valle de Arango, all of which belong to the municipality of Pravia.
2. **Body responsible for the application:** The project involves providing:
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
— 32 332 m of pipeline ranging in diameter from 150 mm to 1 000 mm,
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
— 843 manholes,
— two spillways,
— one lifting station with three 30 kW pumps.
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Fomento del Principado de Asturias
- 3.2. **Address:** C/Coronel Aranda 2
33005 Oviedo
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Asturias
5. **Description:**
- This operation comprises several projects (collector sewer systems for Muros de Nalón, Pravia and Soto del Barco; collector and interceptor sewer to serve all these urban centres and a waste-water treatment plant) to improve water quality at the mouth River Nalón.
- 5.1. **Muros de Nalón system**
- New sewers to supplement the existing ones for the urban areas of Muros de Nalón and San Esteban de Pravia.
- The project involves providing:
- 30 332 m of pipeline ranging in diameter from 150 mm to 1 000 mm,
 - 608 manholes,
 - four spillways,
 - three lifting stations with a total of seven pumps (two of 41 kW, three of 75 kW and two of 9,4 kW).
- 5.2. **Pravia system**
- New sewers to supplement the existing ones for the urban areas of Agones, Cañedo, Forcinas
- 5.3. **Soto del Barco system**
- New sewers for San Juan de la Arena, El Castillo, Soto del Barco and Riberas in the municipality of Soto del Barco.
- The project involves providing:
- 38 095 m of pipeline ranging in diameter from 80 mm to 1 000 mm,
 - 802 manholes,
 - five spillways,
 - three lifting stations with a total of three 17,5 kW and five 12,5 kW pumps.
- 5.4. **Bajo Nalón interceptor sewer**
- Construction of a main interceptor sewer with three branches, two on the left bank of the River Nalón and one on the right bank, to collect waste water from the sewer systems serving Cañedo, Forcinas, Agones, Bances, Peñaullán, Los Cabos, Somado, Muros de Nalón, San Esteban de Pravia, San Juan de la Arena, El Castillo, Soto del Barco and Riberas.
- The main characteristics are as follows:
- 22 703 m of pipeline ranging in diameter from 100 mm to 1 200 mm,
 - 61 manholes,
 - five lifting stations with a total of 26 pumps of between 4,2 kW and 130 kW,
 - 94 piping clamps.
- Bajo Nalón waste-water treatment plant*
- Construction of a waste-water treatment plant to treat urban waste water from the Pravia, Muros de Nalón and Soto del Barco municipalities. The plant is intended to serve a population of 20 800

inhabitants equivalent, based on urban planning data, with an average daily through-flow of 6 500 m³.

The main features of the plant are as follows:

- Inflow unit:
installation of a spillway and later two pits for primary screening of coarse solids through grilles with 100 mm openings.
- Screening channels:
two screens for coarse and fine solids with openings of 30 mm and 40 mm respectively.
- Lifting system:
untreated water will be raised using Archimedes' screws.
- Raised storage tank:
the lifting system will discharge into a storage tank fitted with a spillway.
- Grit removal and separation of floating solids:
installation of two longitudinal aerated desanders, with grease removal.
- Grit removal:
abrasion-resistant pumps are planned.
- Biological treatment:
two lines for treatment by prolonged aeration with carousel-type water flow.
- Sludge dewatering:
to be carried out mechanically.
- Sludge dewatering by belt filter presses:
- chemical stabilisation of dewatered sludge.

6. Objectives:

The planned measures comply with the Law of the Principality of the Asturias on the supply of water and waste-water treatment, which comes under the national plan for waste-water treatment. The main aim is to extend sewerage and waste-water treatment facilities to comply with the guidelines set by Directive 91/271/EEC.

The aim is to improve water quality in the final 14 km of the River Nalón and complete the sewerage and waste-water treatment facilities available upstream in this catchment area under the programme for the development of central Asturias.

The main parameters regarding the population served and the water quality to be obtained are as follows:

Bajo Nalón waste-water treatment plant:

Project No: 97/11/61/013	Total
Present population (inhabitants)	15 444
Present population equivalent (p.e.)	19 887
Design population	16 153
Design population equivalent (p.e.)	20 800
Total average BOD ₅ on entry (mg/l)	250
Total average BOD ₅ on exit (mg/l)	< 12
Total average SS on entry (mg/l)	300
Total average SS on exit (mg/l)	< 15
Average daily volume (m ³ /day)	6 500
Industrial waste	18 %

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project		31.3.1997
Purchase of land	1.5.1997	30.9.1997
Main work	1.10.1997	31.12.1999
Commissioning	1.4.2000	

8. Assessment of costs and socio-economic advantages:

A cost-benefit analysis has been carried out on the following basis:

- utility value of the infrastructure = 25 years,
- net book value = 0,
- discount rate = 6%.

The following were put on the positive side of the equation:

- sanitation tax,
- financial estimate of the environmental benefit of reducing the pollution load of discharge,
- benefits from recreational use,
- improved public health,
- revenue from re-use of treated water.

The following were put on the negative side:

- initial investment,
- operating and maintenance costs.

The results are:

- IRR: 15,25 %,
- PDV: ESP 7 410 million.

A sensitivity analysis was made, varying the parameters used to calculate those benefits which are more subjective to quantify (recreational use, public health). This analysis results in an IRR above 3 % even in the worst case (benefits reduced by 75 %).

Community programme of policy and action in relation to the environment and sustainable development.

The project also complies with Directive 91/271/EEC and the measures provided for in it are both preventive (avoiding the possibility of environmental problems downstream of the cities concerned, which might even affect human health) and palliative (reducing the pollution load of discharge downstream of the treatment plant concerned).

2. The planned sewers must be connected to a treatment plant before they are put into service.

10. *Cost and assistance:*

9. *Environmental impact analysis:*

1. The project will improve water quality by providing sewer systems and treatment facilities to municipalities which currently have none, thereby allowing water to be re-used for ecological purposes. The project will therefore contribute to achieving the objectives of Article 130R of the EC Treaty and the Fifth

Total cost: ECU 34 845 299

Eligible cost
(after 29 April 1997): ECU 34 845 299

Rate of assistance: 80 %

Cohesion Fund grant: ECU 27 876 239

ANNEX

FINANCING PLAN

Project No: 97/11/61/013

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other			
				%		%	Total		Central government				
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	6 007 810	6 007 810	100	4 806 248	80	1 201 562	20		1 201 562				
1998	11 414 840	11 414 840	100	9 131 872	80	2 282 968	20		2 282 968				
1999	17 422 649	17 422 649	100	13 938 119	80	3 484 530	20		3 484 530				
Total	34 845 299	34 845 299	100	27 876 239	80	6 969 060	20		6 969 060				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/014

1. **Name:**

Biological treatment of effluent from 30 urban areas in the following river basins: Besós (4), Ebro (2), Francolí (1), Garona (4), Llobregat (6), Riera de la Bisbal (1), Rieres del Maresme (3), Rieres Meridionals (2), Segre (3), Ter (3) and Tordera (1).

2. **Body responsible for the application:**

2.1. **Name:** Direcció General de Anàlisi y Programació Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Junta de Sanejament

3.2. **Address:** Direcció Provença 204-208
08036 Barcelona

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Catalonia

5. **Description:**

Various waste-water disposal systems consisting of treatment plants and collector networks.

The water-treatment systems of the plants will conform to the following standard model: removal of coarse solids, removal of fine solids, desanding/degreasing, flow measurement, mixing and flocculation, primary sedimentation, biological reaction, secondary sedimentation, recirculation of sludge and chlorination.

The sludge-treatment systems of the plants will conform to the following standard model: primary-sludge extraction, primary-sludge thickening, mixing, digestion, storage of digested sludge, dewatering and storage of dewatered sludge.

In detail:

1. **Caldes de Montbuí**

Extension of the existing treatment plant:

- (i) water treatment: bypass of the biological treatment unit, biological reactor, secondary sedimentation, recirculation of sludge;

- (ii) sludge treatment: thickening of activated sludge, conditioning, dewatering in a belt filter press, storage and disposal of sludge.

2. **La Llagosta**

Extension of the existing treatment plant:

- (i) water treatment: biological reactors, clarification, disinfection;
- (ii) sludge treatment: thickening of activated sludge by flotation, mixed-sludge reservoir, anaerobic digestors, storage of mixed digested sludge, dewatering, storage and disposal of sludge.

3. **Montornés del Vallés**

Extension of the existing treatment plant.
Construction of:

- (i) secondary treatment unit: pre-aeration tank, three biological reactors, three secondary sedimentation basins;
- (ii) sludge treatment: thickening by flotation, anaerobic digestion, dewatering in centrifuges, storage of digested sludge.

4. **Sabadell – Riu Ripoll**

Construction of a waste-water treatment plant on the standard model.

5. **Flix**

Construction of a waste-water treatment plant on the standard model.

Laying collectors:

Collectors	Diameter (mm)	Length (m)	Material
Main	600	17	glass fibre
Main	400	711	reinforced concrete
Main	250	911	polyethylene
Main	500	443	reinforced concrete
Main	315	832	polyethylene

Collectors	Diameter (mm)	Length (m)	Material
Main	300	262	glass fibre
Main	600	23	reinforced concrete
Branch	400	599	reinforced concrete
Branch	110	617	polyethylene

6. Móra la Nova — Móra d'Ebre

Construction of a waste-water treatment plant on the standard model.

Laying collectors:

Collectors	Diameter (mm)	Length (m)	Material
PS1 — PS2 — PS3	400-630	830	HD polyethylene, PVC
PF3 — PS4	400-630	138	HD polyethylene, PVC
PS4 — WWTP	450-630	655	ductile steel-PVC
Parallel to the CN-420 road	400		PVC
Discharge into the River Ebro	10		HD polyethylene

7. Valls

Construction of a waste-water treatment plant on the standard model, with phosphate removal.

8. Bossost

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

Collectors	Diameter (mm)	Length (m)	Material
Interceptor 1	400	539	concrete
Interceptor 2	900	175	concrete

9. Escunhau

Construction of a waste-water treatment plant on the standard model, with percolating filters.

Collectors:

Collectors	Diameter (mm)	Length (m)	Material
Escunhau	400	364	PVC
Casarilh	400	776	PVC

10. Les

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

Collectors:

Collectors	Diameter (mm)	Length (m)	Material
Collector	400	633	PVC

11. Vielha e Mijaran

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

Collectors:

Diameter (mm)	Length (m)
180	223
300	373
400	1 266
600-800	3 350

12. Castellbell i el Vilar

Drafting the specifications and project for the waste-water treatment plant.

13. Gelida

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biodiscs and secondary sedimentation.

14. Els Hostalets de Pierola

Construction of a waste-water treatment plant on the standard model.

15. Moia

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biodiscs and secondary sedimentation.

Collectors:

Diameter (mm)	Length (m)
200	499
400	2 788
500	1 548

16. El Pont de Vilomara

Construction of a waste-water treatment plant on the standard model.

Collectors:

Diameter (mm)	Length (m)
—	862
160	127
400	360

17. Terrassa

Extension of the existing treatment plant:

- (i) water treatment: biological treatment using activated sludge, secondary sedimentation and chlorination;
- (ii) sludge treatment: thickening of excess activated sludge, storage of mixed sludge, anaerobic digestion, mechanical dewatering.

18. El Vendrell

Construction of a waste-water treatment plant on the standard model.

Three pumping stations.

Collectors:

Description	Diameter (mm)	Length (m)
Collectors	400-600	—
Pressure	350-500	3 600
Pressure	400-600	3 500
Pressure	400-600	1 880

19. Arenys de Mar

Construction of a waste-water treatment plant on the standard model.

Alterations to a pumping station.

Collectors:

Description	Diameter (mm)	Length (m)
Collectors	500	460
Pressure	250-400	606

20. Sant Andreu de Llavaneres

Construction of a waste-water treatment plant on the standard model.

21. Sant Pol de Mar

Construction of a waste-water treatment plant on the standard model.

Alterations to the existing pumping unit on the marine outfall. Pressure pipes, 250–350 mm in diameter, 1 650 m long.

22. Alcanar (les Cases)

Construction of a waste-water treatment plant on the standard model. Removal of phosphates and disinfection of effluent before discharge into the sea.

Pressure piping: 250, 280 and 315 mm diameter, 2 203 m long.

Collectors: 400 and 500 mm diameter, 1 125 m long.

Four pumping stations.

23. L'Ametlla de Mar

Construction of a waste-water treatment plant on the standard model.

Asbestos-cement pressure piping, 300 mm diameter, 1 300 m long.

Asbestos-cement piping from the treatment plant to the marine outfall, 250 mm diameter, 1 065 m long.

24. La Masella

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

25. La Molina

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

26. Supermolina

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

27. Les Planes d'Hòstoles

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

28. Riudellots de la Selva

Construction of a waste-water treatment plant on the standard model.

29. Vilobí d'Onyar

Construction of a waste-water treatment plant on the standard model.

30. Santa Maria de Palautordera

Construction of a waste-water treatment plant on the standard model. Secondary treatment using biological filters.

Collectors: 125–600 mm diameter, 3 990 m long.

6. Objectives:

Various waste-water treatment systems.

System	Current population		Design		Influent ⁽¹⁾ (BOD mg/l)	Effluent (BOD mg/l)	Influent ⁽¹⁾ (SS mg/l)	Effluent (SS mg/l)	Volume water (m ³ /d)	% Industrial
	Inhabitants	Population equivalent	Inhabitants	Population equivalent						
Caldes de Montbui				35 600	357	25	318	35	6 000	17
La Llagosta				232 917	313	25	60	35	43 000	16
Montornès del Vallès				196 333	357	25	60	35	31 000	19
Sabadell — Riu Ripoll				275 000	500	25	500	35	30 000	13
Flix				12 928	417	25	350	35	1 949	1
Móra la Nova — Móra d'Ebre				16 971	313	25	233	35	3 182	1
Valls				33 720	278	25	300	30	7 200	14
Bossost				2 090	132	25	159	35	943	7
Escunhau				499	132	25	159	35	225	0
Les				2 494	132	25	159	35	1 125	6
Vielha e Mijaran				10 260	132	25	159	35	4 560	2
Castellbell i el Vilar				27 840	313	25	350	35	5 568	11

System	Current population		Design		Influent ⁽¹⁾ (BOD mg/l)	Effluent (BOD mg/l)	Influent ⁽¹⁾ (SS mg/l)	Effluent (SS mg/l)	Volume water (m ³ /d)	% Industrial
	Inhabitants	Population equivalent	Inhabitants	Population equivalent						
Gelida				7 200	313	25	313	25	1 440	7
Els Hostalets de Pierola				4 958	357	25	375	30	850	4
Moià				9 158	313	25	417	25	1 650	12
El Pont de Vilomara				7 083	500	25	318	35	850	5
Terrassa				375 000	357	25	292	35	60 000	12
El Vendrell				140 000	417	25	292	35	21 000	1
Arenys de Mar				50 050	417	25	292	35	7 700	16
Sant Andreu de Llavaneres				28 213	227	25	250	35	7 360	1
Sant Pol de Mar				17 600	250	25	269	35	4 224	3
Alcanar (les Cases)				6 799	250	25	233	35	1 569	2
L'Ametlla de Mar				9 285	417	25	700	35	1 238	2
La Masella				1 500	147	25	175	35	600	0
La Molina				901	104	25	121	35	515	0
Supermolina				1 500	147	25	175	35	600	0
Les Planes d'Hòstoles				6 771	333	30	375	30	1 250	3
Riudellots de la Selva				8 732	313	25	313	25	1 612	11
Vilobí d'Onyar				3 095	313	25	313	25	619	7
Santa Maria de Palautordera				10 089	278	25	188	30	2 242	6

⁽¹⁾ BOD and SS values for influent are estimated on the basis of efficiency and values for effluent.

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.1.1997	31.12.1998

— environmental benefits: preservation, protection and improvement of the coastal environment, preservation of the quality of non-polluted waters, reduction of water pollution and decontamination of polluted waters.

8. Assessment of costs and socio-economic advantages:

(a) a cost/benefit analysis was carried out on the following assumptions:

- working life of investments: 20 years
- operating and maintenance costs

(b) Jobs created during the:

- construction stage: (21 months): direct: 980 jobs; indirect: 1 770 jobs
- operating stage: direct: 100 jobs; indirect: 50 jobs

(c) The internal rate of return is 14,13 %, the net present value (at 7 %) ESP 12 368,72 million and the cost/benefit ratio 1,2.

9. *Environmental impact analysis:*

The project aims to fulfil, inter alia, the following objectives laid down in Article 130R(1) of the EC Treaty:

- the preservation, protection and improvement of the environment,
- the protection of public health.

The project addresses the following issues covered by the Fifth Community Programme of Policy and Action in relation to the Environment and Sustainable Development:

- management of water resources,
- coastal areas.

The project will preserve, protect and improve the environment of coastal areas subject to heavy pressure from mass tourism and property development. The use of water for bathing means that appropriate hygiene standards must be maintained.

It is also important to end the pollution of surface and ground fresh water, bringing the quality of water which is now polluted up to drinking-water standard.

Treated effluent will meet the requirements of Directive 91/271/EEC.

The project will contribute to the implementation of Community Directive 91/271/EEC concerning urban waste-water treatment and Community Directive 76/160/EEC concerning the quality of bathing water.

The projects are included in the Catalonia Waste-Water Treatment Plan and the Economic and Financial Plan of the Junta de Saneamiento (Sanitation Committee) and comply with Directive 91/271/EEC.

10. *Cost and assistance:*

Total cost:	ECU 83 589 903
Eligible cost (after 30 April 1997):	ECU 83 589 903
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 66 871 922

ANNEX

FINANCING PLAN

Project No: 97/11/61/014

(in ECU)

Year	Total cost ⁽¹⁾ 1=2+11	Public expenditure									Private sector		Communi-ty loans 13
		Total public expenditure		Cohesion Fund		National authorities			Other 10	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total 6=8+9	% 7=6/2	8				9	
1997	53 909 647	53 909 647	100	43 127 718	80	10 781 929	20		10 781 929				
1998	29 680 256	29 680 256	100	23 744 204	80	5 936 052	20		5 936 052				
Total	83 589 903	83 589 903	100	66 871 922	80	16 717 981	20		16 717 981				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/015

1. **Name:** Integral management of solid municipal waste in the Community of Madrid.
- tractor unit,
 - semi-trailer,
 - container loading equipment.
2. **Body responsible for the application:** Hazardous waste will be sent as soon as possible for suitable treatment.
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
- (b) An information campaign aimed at the general public and at gaining support for the Regional Management Plan among those responsible for its application at municipal level.
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Medio Ambiente y Desarrollo Regional (GEDESMA)
- 3.2. **Address:** C/Princesa nº 3
28008 Madrid
- The campaign will use the following means and materials: leaflets, posters, articles in newspapers and in local and national magazines, radio announcements, television programmes, television advertisements, videos, educational material, stickers, placards, badges, balloons, letters.
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Madrid
5. **Description:**
- The group of projects is to be implemented under the 1997–99 Solid Municipal Waste Management Plan for the Madrid region and consists of four principal projects:
- 5.1. **Sorting at source and selective collection**
- (a) The purchase and supply to residents' associations and local authorities of the following equipment:
- containers for glass (1 050 units),
 - container for sacks for packaging (21 000 units),
 - sacks for packaging (678 million sacks) and dustbins (1 000 units),
 - containers for hazardous waste:
 - for pharmaceutical products: 3 200 units,
 - for batteries: 1 200 units,
 - vehicles to deal with the extra work involved in collection with sorting at source (10 units) comprising the following:
- 5.2. **Sorting plants**
- It is planned to establish sorting plants in the municipalities of Pinto, Nueva Rendija and Colmenar Viejo to carry out through sorting of waste to facilitate greater reuse, using automatic sorting where possible.
- The plants will separate the following types of waste for sale on the recycling market:
- ferrous metals,
 - non-ferrous metals,
 - aluminium,
 - plastics,
 - tetrapacks,
 - glass,
 - paper and board.
- The plants will be built on land adjacent to the existing waste tips so as to keep the costs of transporting waste both to and from the plant to a minimum.

5.3. *Closing, sealing and degassing the La Rendija waste tip*

The Rendija waste tip in the municipality of Mejorada del Campo, subject to health monitoring, has recently reached the end of its working life and must be closed. This must be done in accordance with a number of technical criteria:

- sealing by covering with insulating material to prevent rainwater percolating through; the covering will comprise the following: layer of vegetation, layer of topsoil, layer of sand for drainage, barrier layer of clay, base layer,
- degassing using biogas collection and treatment systems, with or without electricity generation,

- inspecting and monitoring the tip after sealing as long as it is active (gas emissions, treatment of leachate, repairing of cracks, etc.).

The final reclamation of the La Rendija waste tip will require the following essential work:

- earth works and laying the different layers necessary to ensure effective sealing of the tip,
- installation of piping for rainwater and run-off water,
- installation of wells, piping and equipment for degassing,
- laying topsoil and replanting the whole of the surface with indigenous plants.

6. *Objectives:*

The measures are intended to achieve a number of objectives for the recovery of raw materials from solid municipal waste generated in the Madrid region with a consequent reduction in the amount of waste for disposal.

The objectives are as follows:

- paper and board: 45 % by 2000 (80 000 tonnes/year)
- glass: 35 % by 2000 (44 000 tonnes/year)
- metals: 15 % by 2000 (5 250 tonnes/year)
- plastics: 10 % in 2000 (11 000 tonnes/year)
- tetrapacks: 15 % in 2000 (1 500 tonnes/year)
- other: recovery of other raw materials in waste is expected to increase gradually as public awareness grows.

Furthermore, the amount of waste which is now disposed of by controlled tipping will be reduced, thus extending the working life of tips subject to health monitoring in the Madrid region.

Quantification of objectives by project

SORTING AT SOURCE AND SELECTIVE COLLECTION

Activity	Number of inhabitants benefitting	Tonnes/year of waste collected and/or treated	Number of containers
Purchase of containers for sacks for packaging	2 094 000	198 250	21 023
Purchase of vehicles for sorting at source	2 094 000	62 200	—
Purchase of containers for the selective collection of glass	755 000	22 000	1 050

Activity	Number of inhabitants benefitting	Tonnes/year of waste collected and/or treated	Number of containers
Purchase and distribution of sacks for packaging and bins	2 094 000	198 250	600 000
Purchase of containers for hazardous waste (pharmaceutical products)	2 094 000	n.a.	3 200
Purchase of containers for hazardous waste (batteries)	2 094 000	214	1 200
Public awareness campaigns	2 094 000	—	—

SORTING PLANTS

Activity	Number of inhabitants benefitting	Tonnes/year of waste collected and/or treated	Number of containers
Construction of the Pinto sorting plant	1 433 000	98 250	
Construction of the Nueva Rendija sorting plant	397 000	50 000	
Construction of the Colmenar Viejo sorting plant	264 000	50 000	

CONTROLLED TIPS

Activity	Number of inhabitants benefitting	Tonnes/year of waste collected and/or treated	Number of containers
Sealing, degassing and landscaping	397 000		

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.1.1997	1.7.1997
Main work	1.7.1997	31.12.1999

- income from the recovery of glass;
- income from the recovery of scrap iron;
- income from the recovery of plastic;
- savings from the reduction in the amount of waste produced.

8. *Assessment of costs and socio-economic advantages:*

The internal rate of return is 7,1%. A cost-benefit analysis was carried out on the following assumptions:

- working life of the group of projects and objectives achieved: estimated at eight years based on the average working life of the investments;
- cost of the investments;
- income from the recovery of paper and board;

Operating costs were not included in the cost-benefit analysis since these will be covered by the income from the sale of recyclable materials. The operating accounts of the sorting plants are therefore balanced.

9. *Environmental impact analysis:*

The environmental objectives of the Plan include the prudent and rational utilisation of natural resources referred to in Article 130R of the EC Treaty by increasing the reutilisation and recycling

of raw materials. Along with the energy savings which will be achieved, this will also help preserve, protect and improve the quality of the environment, also referred to in the Article concerned.

The project involves both palliative and preventive measures in that it is intended to rectify environmentally negative situations, such as the indiscriminate consumption of resources and raw materials and the management of solid municipal waste based on tipping, in accordance with current Community and national policies, and that one of the basic objectives of the Plan is the reduction of the amount of waste created. Making people aware of the cost of solid municipal waste management is very important so as to encourage them to buy products whose packaging uses fewer raw materials which then create waste for treatment.

The project is in accordance with Directives 91/156/EEC, 91/689/EEC and 94/62/EEC and the acts transposing them into national law such as the Law on Packaging, the Basic Law on Waste and the Law on Packaging and Packaging Waste and take account of Law 42/75 on Municipal waste, as amended by Royal Decree 1136/86 on the Collection and Treatment of Solid Municipal Waste and the Law on Packaging and Packaging Waste, and it therefore fully complies with Community environmental rules.

10. *Cost and assistance:*

Total cost:	ECU 21 555 340
Eligible cost (after 6 May 1997):	ECU 21 555 340

Rate of assistance:	80 %
Cohesion Fund grant:	ECU 17 244 272

Breakdown of total cost (in ECU):

Construction of the Pinto sorting plant	3 910 375
Construction of the Nueva Rendija sorting plant	2 178 465
Construction of the Colmenar Viejo sorting plant	2 142 258
Sealing, degassing and landscaping of tips	298 105
Purchase of containers for sacks for packaging	2 205 021
Purchase of vehicles for sorting at source	1 086 215
Purchase of containers for the selective collection of glass	380 175
Purchase and distribution of sacks for packaging and bins	2 871 229
Purchase of containers for hazardous waste (pharmaceutical products)	72 414
Purchase of containers for hazardous waste (batteries)	72 414
Public awareness campaigns	6 338 669
Total	21 555 340

ANNEX

FINANCING PLAN

Project No: 97/11/61/015

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1=2+11													
1997	6 226 542	6 226 542	100	4 981 234	80	1 245 308	20		1 245 308				
1998	9 101 646	9 101 646	100	7 281 316	80	1 820 330	20		1 820 330				
1999	6 227 152	6 227 152	100	4 981 722	80	1 245 430	20		1 245 430				
Total	21 555 340	21 555 340	100	17 244 272	80	4 311 068	20		4 311 068				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/016

1. Name:

Waste-water treatment plants for Alcañiz, Barbastro, Calatayud and Ejea de los Caballeros.

2. Body responsible for the application:

2.1. Name: Dirección General de Análisis y Programación Presupuestaria M.E.H.

2.2. Address: Paseo de la Castellana, 162
28071 Madrid

3. Body responsible for implementation:

3.1. Name: Dirección General del Agua
Diputación General de Aragón

3.2. Address: Pº Mª Agustín, 36
50071 Zaragoza

4. Location:

4.1. Member State: Spain

4.2. Region: Aragón

5. Description:

Group of four projects involving the construction of collectors and waste-water treatment plants. All the plants will provide secondary treatment, using biodiscs in the Barbastro plant and activated sludge systems in the other plants.

Nutrient reduction is planned for the Alcañiz plant, which will be discharging in a sensitive area.

5.1. Waste-water disposal and treatment for Alcañiz

Collector leading to the plant, 500 mm in diameter, 550 m long.

Biological waste-water treatment plant with a conventional activated sludge system.

Water treatment:

- spillway and general by-pass
- tank for coarse materials
- lifting of untreated water using four submersible pumps
- fine screening with two independent screens
- desander and de-greaser with aeration
- primary settling tank, one unit 15 m in diameter
- biological reaction line
- secondary settling tank 19 m in diameter
- chlorination tank.

Sludge treatment:

- recirculation of secondary sludge using pumps
- transportation of primary sludge using pumps
- aerobic digestion
- thickening of digested sludge
- dewatering of digested sludge using two belt filter presses.

Physico-chemical treatment is included.

5.2. Waste-water disposal and treatment for Barbastro

315 mm diameter collector over a length of 141 m, and 800 mm diameter collector to the treatment plant located some 1 000 m downstream.

The planned treatment plant will use the biodisc process.

Water treatment:

- pumping unit to lift water using three submerged pumps
- screen to remove coarse solids
- automatic revolving screen to remove fine solids
- twin sand-trap with grease removal
- two primary settling tanks of 16 m diameter
- six biodisc modules for biological treatment

- two secondary settling two tanks of 18 m diameter
- chlorination.

Sludge treatment:

- recirculation of secondary sludge, using pumps
- pumping of primary sludge
- thickening of primary sludge by gravity
- anaerobic digestion in two digestors
- dewatering of sludge using belt filter press.

5.3. Waste-water disposal and treatment for Calatayud

1 400 m long collector made of concrete pipe 80 cm in diameter. Includes spillways on both banks of the Jalón river and a syphon drainage crossing to carry the flow from the left-bank collector.

The planned treatment plant will involve conventional biological treatment of activated sludge at half load and will include physico-chemical treatment prior to primary settling.

Water treatment:

- inlet structure
- tank for coarse materials
- lifting of untreated water
- general by-pass
- automatic screens for removal of fine solids
- twin sand-traps with grease removal and aeration
- two primary settling tanks of 18 m diameter
- two biological reactors aerated by turbine
- two secondary settling tanks of 25 m diameter.

Sludge treatment:

- pumping, recirculation and removal of sludge
- aerobic digestion in two tanks
- thickening of digested sludge
- dewatering of sludge using three belt filter presses.

5.4. Waste-water disposal and treatment for Ejea de los Caballeros

1 000 mm diameter collector to the inlet structure. A second collector, with a diameter of 800 mm, leading from the Valdecerrín industrial estate to the inlet structure.

The planned treatment plant will involve conventional biological treatment of activated sludge at half load.

Water treatment:

- spillway and general by-pass
- lifting of untreated water
- two automatic screens to remove fine solids

- twin sand-traps with grease removal and aeration
- two primary settling tanks of 27 m diameter
- biological reactor
- four secondary settling tanks of 27 m diameter.

Sludge treatment:

- pumping, recirculation and removal of sludge
- two units for preliminary dewatering of primary sludge
- aerobic digestion
- dewatering of sludge by means of preliminary dewatering and belt filter presses

6. Objectives:

The design capacities and quality objectives of treatment are:

	Alcañiz	Barbastro	Calatayud	Ejea de los Caballeros
Average daily through-flow	62,5 l/s	100 l/s	115,7 l/s	187,7 l/s
Peak flow	125 l/s	211 l/s	199 l/s	469 l/s
Inhabitants equivalent	19 800	20 000	48 330	62 150
Organic load (BOD ₅):				
— on entry	220 mg/l	139 mg/l	290 mg/l	230 mg/l
— on exit	25 mg/l	20 mg/l	25 mg/l	15 mg/l
Suspended solids:				
— on entry	280 mg/l	100 mg/l	300 mg/l	120 mg/l
— on exit	25 mg/l	30 mg/l	35 mg/l	15 mg/l

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.6.1997	30.11.1999

- Investment and operating costs.

— Benefits:

8. Assessment of costs and socio-economic advantages:

The economic analysis was made for a working life of 25 years using the following factors:

- availability of better quality water for re-use, evaluated in terms of possible savings in water treatment by municipalities down-stream of the treatment plants;

- environmental benefits from reduced pollution, evaluated on the basis of the difference in the pollution load of discharged water with and without the treatment plant.

The profitability indicators are:

Project	Cost/benefit ratio	Internal rate of return
Alcañiz	1,07	7,60 %
Barbastro	1,18	9,19 %
Calatayud	1,13	8,82 %
Ejea de los Caballeros	1,20	10,37 %

9. *Environmental impact analysis:*

The projects will contribute to preventing contamination of aquatic environments and improve the water quality of the Guadalope, Vero, Jalón and Arba rivers.

The projects are included in the waste-water disposal and treatment plan of the Autonomous Community of Aragon, which is coordinated with

the national plan designed to achieve compliance with Directive 91/271/EEC.

The collectors must be connected to the treatment plants before they are put into use.

10. *Cost and assistance:*

Total cost: ECU 17 709 504

Eligible cost (after 6 May 1997): ECU 17 300 895

Rate of assistance: 80 %

Cohesion Fund grant: ECU 13 840 716

Breakdown of the cost (in ECU):

1. Alcañiz	2 326 897
2. Barbastro	2 954 437
3. Calatayud	5 856 497
4. Ejea de los Caballeros	6 163 064
Total	17 300 895

ANNEX

FINANCING PLAN

Project No: 97/11/61/016

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	12=11/1		
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8				9	
1=2+11												13	
1997	1 562 031	1 562 031	100	1 249 625	80	312 406	20		312 406				
1998	11 727 245	11 727 245	100	9 381 796	80	2 345 449	20		2 345 449				
1999	4 011 619	4 011 619	100	3 209 295	80	802 324	20		802 324				
Total	17 300 895	17 300 895	100	13 840 716	80	3 460 179	20		3 460 179				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/017

1. **Name:** Waste-water treatment plants for Binéfar, Calamocha, Cariñena, Fraga and Tarazona.
 - discharge into the Faleva collector, which flows from the irrigable area into the Arroyo de la Vell, which in turn empties into the river Cinca.

2. **Body responsible for the application:** Sludge treatment:
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria M.E.H.
 - recirculation of secondary sludge, using pumps
 - pumping of primary sludge and removal of excess sludge
 - 2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid
 - thickening
 - anaerobic digestion
 - dewatering of sludge using a belt filter press.

3. **Body responsible for implementation:**
 - 3.1. **Name:** Dirección General del Agua Diputación General de Aragón
 - 3.2. **Address:** Pº Mª Agustín, 36 50071 Zaragoza

4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Aragon

5. **Description:**

Set of five projects involving the construction of collectors and waste-water treatment plants. All the plants will provide secondary treatment, using biodiscs in the Fraga plant, activated sludge systems in the Binéfar and Cariñena plants and protracted aeration in the Tarazona plant.

 - 5.1. **Waste-water treatment for Binéfar**

Biological waste-water treatment plant with a conventional biological system using activated sludge.

Water treatment:

 - pumping unit to lift water using five submersible pumps
 - automatic screens to remove coarse and fine solids
 - twin sand-trap with grease removal and aeration
 - two primary settling tanks of 19 m diameter
 - two biological reactors
 - two secondary settling tanks of 21 m diameter
 - chlorination tank
 - 5.2. **Waste-water disposal and treatment for Calamocha**

600 mm diameter collector over a length of 620 m.

The planned treatment plant will use a fixed-support biological process with forced aeration and sludge washing.

Water treatment:

 - lifting of untreated water using two submerged pumps
 - screen with removable rungs at distance of 1 mm
 - twin sand-trap with grease removal
 - primary settling tank with a useful diameter of 18,3 m
 - six aerated biological filters in two sets of three rows
 - 175 m³ tank for treated water to be used for washing filters before discharge into the Jiloca river
 - pumps and compressors for washing filters
 - storage and washing water and recirculation to the primary settling tank.

Sludge treatment:

 - pumping of sludge from the primary settling tank
 - addition of lime to stabilise the sludge
 - thickening by gravity
 - dewatering using a band filter press.

5.3. Waste-water treatment for Cariñena

The planned treatment plant will involve conventional biological treatment using activated sludge at half load and will include physico-chemical treatment prior to primary settling. The project will make partial use of existing civil works on the site for a treatment plant that was never finished.

Water treatment:

- spillway at entrance
- pumping unit
- two fine-screening channels
- twin sand-trap with grease removal
- homogenisation tank
- physico-chemical treatment
- primary settling tank 10,6 m in diameter
- two existing biological reactors
- existing secondary settling tank
- final discharge into the Frasno river.

Sludge treatment:

- pumping, recirculation and removal of sludge
- thickening of biological sludge
- aerobic digestion in two existing tanks
- thickening of digested and primary sludge
- dewatering on belt filter press.

5.4. Waste-water disposal and treatment for Fraga

Collector for the left bank, made up of two sections of 595 m and 362 m respectively, which meet at a pumping unit before crossing the Cinca river to join the system on the right bank of the river.

Collector 180 m long from the current discharge point of the right bank to the treatment plan, including a pumping unit.

The planned treatment plant will be use biofilm processes, more particularly biodiscs.

Water treatment:

- screen to remove coarse solids
- automatic revolving screen to remove fine solids

- twin sand-trap
- two primary settling tanks with a useful diameter of 12 m
- four biodiscs modules for biological treatment
- secondary settling tank with a useful diameter of 20 m
- chlorination
- discharge into the Cinca river.

Sludge treatment:

- pumping of sludge from the primary settling tank
- pumping of mixed sludge from the primary settling tank
- thickening of mixed sludge by gravity
- anaerobic digestion
- dewatering using belt filter press.

5.5. Waste-water disposal and treatment for Tarazona

Two segments of collector, 1 330 m and 375 m long respectively, from the current discharge points to the treatment plant.

The planned treatment plant will involve biological treatment using activated sludge at low load or protracted aeration. Sludge is not further stabilised because the treatment process itself provides adequate stability.

Water treatment:

- inlet structure and general bypass
- lifting of untreated water
- automatic screen for the removal of fine solids
- sand-trap with grease removal
- by — pass for the biological reactor and distribution chamber
- biological reactor made up of two oxidation channels
- discharge into the Queiles river.

Sludge treatment:

- pumping to remove excess sludge
- thickening in a gravity unit
- sludge tank
- dewatering using a belt filter press.

6. **Objectives:**

The design capacities and quality objectives of treatment are:

	Binéfar	Calamocha	Cariñena	Fraga	Tarazona
Average daily through-flow	142 l/s	78 l/s	19 l/s	59 l/s	47 l/s
Peak flow	230 l/s	139 l/s	37 l/s	81 l/s	118 l/s
Inhabitants equivalent	27 000	26 500	11 600	11 300	18 400
Organic load (BOD ₅)					
— on entry	132 mg/l	236 mg/l	435 mg/l	132 mg/l	270 mg/l
— on exit	25 mg/l	25 mg/l	25 mg/l	15 mg/l	20 mg/l
Suspended solids					
— on entry	127 mg/l	183 mg/l	400 mg/l	124 mg/l	170 mg/l
— on exit	35 mg/l	30 mg/l	30 mg/l	20 mg/l	30 mg/l

7. **Work schedule:**

Category of work	Commencement	Completion
Main work	1.11.1997	31.12.1999

8. **Assessment of costs and socio-economic advantages:**

The economic analysis was made for a working life of 25 years using the following factors:

- Investment and operating costs.
- Benefits:
 - availability of better quality water for re-use, evaluated in terms of possible savings in water treatment by municipalities down-stream of the treatment plants;
 - environmental benefits from reduced pollution, evaluated on the basis of the difference in the pollution load of discharged water with and without the treatment plant.

The profitability indicators are:

Project	Cost/benefit ratio	IRR (%)
Binéfar	1,39	14,95 %
Calamocha	1,35	13,25 %
Cariñena	0,83	0,68 %
Fraga	1,00	6,05 %
Tarazona	1,16	9,48 %

9. **Environmental impact analysis:**

The projects will contribute to preventing contamination of aquatic environments and improve the water quality of the La Faleva, Jiloca, Frasnó, Cinca and Queiles rivers.

The projects are included in the waste-water disposal and treatment plan of the Autonomous Community of Aragon, which is coordinated with the national plan designed to achieve compliance with Directive 91/271/EEC.

The collectors must be connected to the treatment plants before they are put into use.

10. **Cost and assistance:**

Total cost:	ECU 12 273 151
Eligible cost (after 6 May 1997):	ECU 11 986 470
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 9 589 176

Breakdown of cost (in ECU):

Binéfar	2 548 333
Calamocha	2 689 540
Cariñena	2 374 245
Fraga	2 221 730
Tarazona	2 152 622
Total	11 986 470

ANNEX

FINANCING PLAN

Project No: 97/11/61/017

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1=2+11													
1997	300 391	300 391	100	240 312	80	60 079	20		60 079				
1998	10 033 042	10 033 042	100	8 026 434	80	2 006 608	20		2 006 608				
1999	1 653 037	1 653 037	100	1 322 430	80	330 607	20		330 607				
Total	11 986 470	11 986 470	100	9 589 176	80	2 397 294	20		2 397 294				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/018

1. *Name:*

Waste-water collection system for Murcia.

2. *Body responsible for the application:*

2.1. *Name:* Dirección General de Análisis y Programación Presupuestaria M.E.H.

2.2. *Address:* Paseo de la Castellana, 162
28071 Madrid

3. *Body responsible for implementation:*

3.1. *Name:* C.A. Región de Murcia
Consejería Medio Ambiente,
Agricultura y Agua

3.2. *Address:* Plaza Santoña
Murcia

4. *Location:*

4.1. *Member State:* Spain

4.2. *Region:* Murcia

5. *Description:*

The project concerns an integrated system of collector sewers to collect all the urban waste water of the city of Murcia and its built-up environs and convey it to the treatment plant.

The project can be split into different sections with different characteristics, as follows:

Phase 1

Central collector: concerns most of the sewer system of the city centre, running from north to south. Reinforced concrete pipe is planned, with a no-load full cross-section conveyance capacity of 12 m³/s, over a length of 2 040 m. The inside diameter will be 3 m. Special installation is planned, mostly involving sinking or tunnels.

A series of inlets, connections and spillways are planned, all in reinforced concrete. Specifically, an inlet well (10 m × 10 m × 5 m), the 'Azarbe Mayor' spillway (spillway with stationary lip, 70 m long with an evacuation capacity of 13 m³/s >), a connecting channel (12,7 × 0,91 m

rectangular cross-section with a capacity of 25 m³/s, 90 m long) and a storm basin and spillway (5 m × 0,85 m cross-section, 90 m long, with a stationary-lip weir) to connect to the section of pipeline (12 m³/s) also acting as a spillway for excess flow (up to 13 m³/s).

Phase 2

Connection of the city's main collectors along the route, including the Antalayas collector (single reinforced concrete box connection) and the S. Felix collector connection, which includes a new variation in the route (length 1 000 m; reinforced concrete pipeline with a diameter of 1,9 m).

Phase 3

The Segura river left bank collector running along the left bank of the river to the treatment plant (total length: 4 770 m; reinforced concrete pipeline with a diameter of 2,1–2,2 m depending on the section). Includes intake (capacity: 7–8 m³/s sewage diluted to 5/1).

Phase 4

The Segura river right bank collector mainly conveys the waste-water of the city and suburbs. The collector is 1 350 m long, with a diameter of 2 m and a flow of 5 m³/s (sewage diluted to 5/1). The river crossing is a double pipeline with a diameter of 1,0 m over a length of 80 m.

Phase 5

The Azarbe Mayor and eastern zone collector mainly collects the waste water from the north-western suburbs. It is 4 870 m long, with diameters ranging from 0,60–1,0 m. Two pump stations (Castillas and Llano de Brujas) are positioned along the route. There will also be an emergency spillway for the pumping stations (Casillas-Azarbe Mayor spillway, 600 m long with a diameter of 0,90 m) and a spillway for overflow diluted rainwater (Azarbe Mayor-Azarbe Merancho connection, reinforced concrete channel, 300 m long with a cross-section of 6 m²). This connection will also act as a safety by-pass and additional emergency overflow for the entire sewage system of the northern part of the city.

The project also includes all the necessary ancillary works, repositioning, environmental rehabilitation,

etc., as well as the automatic computer and general control systems for the entire sewer complex.

This application also covers the technical assistance needed to programme and prepare the construction plans and for the control, security, engineering and general financial and technical monitoring of the work.

6. Objectives:

The objective of the project is to install a sewer system to collect and convey urban waste water from the city of Murcia and its surroundings for treatment at the treatment plant.

The project will prevent discharge pollution, safeguard the quality of water in the Segura river, enable waste water to be re-used, improve the standard of living in the city, both through the benefits of urban sewers and by improving the river environment in the city and settlements downstream, improve public health and comply with Directive 91/271/EEC.

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.1.1998	31.12.1999

8. Assessment of costs and socio-economic advantages:

- (a) A cost-benefit analysis has been carried out on the following basis:
- investments for a working life of 20 years
 - running and maintenance costs; ESP 20/m³ treated,
 - charge for supply and treatment of water (to cover the operating and maintenance costs of the sewer systems and treatment plants),
 - assessment of environmental benefits: improved water quality, increased water resources thanks to re-use.
- (b) 330 000 inhabitants will benefit from the project.
- (c) The internal rate of return (IRR) is 17,44 %. The net value added is ESP 8 428 million at 1998 prices, at a discount rate of 6 %.

(d) Creation of jobs:

- during construction (24 months): direct: 200; indirect: 200.
- during operation: direct: 20; indirect: 20.

contributes to the following of the Programme's objectives:

- integrated pollution control and prevention of waste,
- improvement of public health and safety.

The project aims at controlling and collecting urban waste water in the context of Directive 91/271/EEC on the treatment of waste water.

9. *Environmental impact analysis:*

The project is consistent with the objectives of Article 130R of the EC Treaty and with the Fifth environment Community Programme of Policy and Action in relation to the Environment and Sustainable Development, which stipulates that 'for the purposes of improving the quality of life and as a condition for achieving sustainable development, it is essential to secure sufficient water of adequate quality throughout the Community without upsetting the natural equilibrium of the environment'. The project

10. *Cost and assistance:*

Total cost:	ECU 23 959 843
Eligible cost (after 6 May 1997):	ECU 23 959 843
Rate of assistance:	80 %
Cohesion grant:	ECU 19 167 874

ANNEX

FINANCING PLAN

Project No: 97/11/61/018

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	Central government	Other					
1=2+11				6=8+9	7=6/2	8	9	10	12=11/1	13			
1997	479 197	479 197	100	383 358	80	95 839	20		95 839				
1998	6 708 756	6 708 756	100	5 367 004	80	1 341 752	20		1 341 752				
1999	16 771 890	16 771 890	100	13 417 512	80	3 354 378	20		3 354 378				
Total	23 959 843	23 959 843	100	19 167 874	80	4 791 969	20		4 791 969				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/019

1. **Name:**

Arga General Plan.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Ayuntamiento de Pamplona
Gerencia de Urbanismo

3.2. **Address:** Plaza Consistorial s/n
31001 Pamplona

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Navarre

5. **Description:**

A global measure is planned for the river and its environs within the Pamplona city area aimed at conserving and restoring its natural values and integrating it in so far as possible into the urban structure of the city. The measure will cover both banks of the river for 11 km.

Of the 11 prepared projects, one is to be implemented by the City Council with its own funds (Parque del Vergel, for which tenders are currently being considered) and another is a medium-term project (pedestrian walkway over the Arga at Errotazar); the remaining nine have been regrouped as eight projects for the purposes of application for Cohesion Fund assistance.

These latter eight projects aim to cover an overall area of about 1 000 000 m² (with compulsory purchase of 89 291 m² of land which has come to be owned privately), with an area of 530 000 m² directly affected by the measures. The projects will take in 19 780 metres of riverbank, including the planting of 6 726 trees and work on 9 115 metres of paths.

1. **Project for environmental restoration for the Magdalena river area**

This project covers areas directly and indirectly bordering the river: on the left bank from the city boundaries to the Ripa de Medialuna, and on the right bank from Lagun Artea, again on the city boundaries, to the la Chantrea bridge, taking in a total of about 140 000 m² (60 000 m² on the left bank, 80 000 m² on the right).

The following measures are planned:

- General cleaning operation of all riverbanks, with the removal of refuse, tree-trunks and flood flotsam, as well as selective felling and grubbing, and ground clearance. Subsequent planting will be aimed at combating minor erosion and will tend to replace the existing poplars with riverbank species of shrubs.
- Ground clearance allowing the reopening of the old path running along the left bank and under the bridge at Beloso Bajo.
- General cleaning operation, removal of fallen trees and selective felling on the Beloso-Medialuna embankment and on the flat area below it, with subsequent planting aimed at restoring the natural wooded area.
- Opening to the public of the landing stage of the Amaya sports complex, with creation of proper access points.
- Building of a footbridge across the river, allowing the connection of the lower stretches of the Magdalena river area with the embankment walk at la Cuesta de Beloso, which will also receive attention.
- Substitution of a dry stone revetment with an imitation stone concrete wall in the Lagun Artea area, in order to avoid narrowing this stretch of river and thus also solving drainage problems in the Iturriapurria river area.
- Building of a flat dike path, involving partial shifting of the existing revetment towards the adjoining vegetable plots and using it as a foundation; the path is then to be continued by reconstructing the existing path leading over a small rise.
- Creation of a park (20 000 m²) in the Playa de Magdalena area, with trees, lawns and some park furniture.
- Removal of existing vegetable plots near the Magdalena bridge and the creation of a park area (13 500 m²), with reconstructive work on the banks, planting of open shrubbery and some park furniture.

2. *Project for environmental restoration and general work on the area around the Caparrosso mill*

This project involves restoration and new general work on the area directly bordering on the river along the left bank from the Ripa de la Medialuna to the la Chantrea bridge, covering a total area of 50 000 m².

Privately-owned riverside lands are to be returned to public use (compulsory purchase of 2 939 m²), paths opened up and banks made more accessible in a river area at present in a very poor condition, both environmentally and in regard to public use. The entire riverbank (840 m) will be replanted, and the existing footbridge ('las pasarelas') renovated.

The project includes the restoration of the medieval Caparrosso mill, at present in a state of semi-ruin, together with its weir, branch stream and other accompanying structures, leaving it ready for use as the future Arga River Environmental Education Centre.

The following measures are also planned:

- General cleaning operation, removal of fallen trees and selective felling on the Medialuna embankment, with subsequent planting of riverbank shrub species.
- Complete restoration of the Caparrosso mill building (706,75 m²) and its immediate environs, including repair of the sluice, with dredging, cleaning and restoration of the branch stream, etc. The complex will be readied for use, except for interior fittings, as the Arga River Environmental Education Centre.
- Development of the area surrounding the Caparrosso mill, with pedestrian access, sowing of lawns, tree planting and park furniture.
- Shallow dredging of the river bed under the mill wheel, with general cleaning of the river banks, removal of refuse, fallen trunks and flood flotsam, as well as selective ground clearance between the weir and 'las pasarelas'.
- Demolition of the existing semi-ruined footbridge ('las pasarelas'), and construction of a new safer footbridge, better designed for resistance to flooding.
- Conservation of the present poplar grove between the mill and the la Magdalena bridge, with levelling of a small rise, a general cleaning operation, removal of refuse and flood flotsam, selective felling and subsequent planting of riverbank species.

- General felling of the acacia grove between the la Magdalena and la Chantrea bridges, after general cleaning of the riverbanks and subsequent planting of herbaceous and native species.

3. *Project for work on banks and footbridge in the Aranzadi river area*

The project covers environmental restoration and general work on all riverbanks between the la Chantrea bridge and the San Pedro weir, including the construction of a new footbridge for connection with Aranzadi. The measures will affect 34 000 m²: 24 000 m² on the right bank and 10 000 m² on the left.

The following measures are planned:

- General cleaning operation, removal of fallen trees and selective felling and ground clearance covering the whole the embankment, as well as subsequent replanting with native riverside trees and shrubs.
- Shallow dredging of the Ciganda mill island and creation of semi-permanent access points to the river for future cleaning operations.
- Recovery for public use of a riverside plot belonging to the Ciganda foundation, adjacent to the la Chantrea bridge on the right bank (compulsory purchase of 3 883 m²), with removal of fencing and planting of riverside species.
- Repair of existing points of erosion on the Playa de Alemanes, using a cement revetment and tarungars, with general access and embankment work.
- Building of a footbridge from the Alemanes (la Chantrea) to Aranzadi, including connection with existing path.
- Repair of the badly eroded section of an enclosure wall around the Capuchinos estate.
- Construction of a dry stone revetment supporting the entire base of the Errotazar embankment, with spreading of ground matting and subsequent planting of bushes and herbaceous plants over the embankment itself.
- Partial demolition, rebuilding and restoration of the San Pedro mill wheel.

4. *Project for general work on the riverbanks in the Rochapea Derecha river area*

The project plans environmental restoration and general work on the right bank taking in the entire river area between the Vergel and Cuatro Vientos bridges. An area of about 33 000 m² is to be covered.

The following measures are planned:

- General work on the riverbanks along this stretch of river, with reconstructive work on banks and embankments on certain sections, cleaning, clearance, selective felling and replanting using riverside species.
- Work on a pedestrian path running the length of the riverbank, with three planting and some park furniture.
- Demolition of structures near the Curtidores bridge, work on the ground cleared, and replanting.
- Addition of a new arch to the right-hand abutment of the Plazaola bridge. The pedestrian path will pass under the arch which will also help to manage excess flow when the river is in flood.

5. *Project for general work on the riverbanks in the Rochapea Izquierda river area*

This project involves stabilising and reinforcing the embankments, as well as environmental restoration and general work, along the entire left riverbank between the San Pedro weir and the Cuatro Vientos bridge. An area of about 30 000 m² is to be covered.

The following measures are planned:

- Creation of a pedestrian path, with the addition of some park furniture, connecting the road at San Pedro bridge with the road leading up to the Portal de Zumalacárregui and passing under the Vergel bridge.
- Reinforcement of the base of the existing dressed stone wall behind the Vergel bridge, with general cleaning and jointing.
- Shallow dredging of the island at the old Curtidores mill weir with creation of semi-permanent access to the river for future cleaning operations.
- Demolition of ruined buildings in Curtidores, landscaping and replanting of grounds.
- General cleaning operation, removal of fallen trees, selective felling and ground clearance on the banks and embankments with replanting of riverside species.

6. *Project to restore the Eugui gardens and general work on nearby riverbanks*

This project covers the restoration of the old Eugui gardens, which have all but disappeared, located at the beginning of the Avenida de San Jorge, near Cuatro Vientos. Environmental restoration and general work is furthermore planned along the right bank between the Cuatro

Vientos bridge and the 'pasarela de los tubos' bridge covering a total of about 20 000 m².

The following measures are planned:

- Creation of access to the river and environs, including a ramp and steps from the Avenida de San Jorge, near the Cuatro Vientos bridge.
- Cleaning operation in the Eugui gardens (approximately 10 000 m²), work on some of its architectural and horticultural elements.
- Creation of a pedestrian path, with some park furniture, running parallel to the river and connecting the Eugui gardens with the 'pasarela de los tubos' bridge and the San Jorge path.
- Work on the 'pasarela de los tubos' bridge, conserving the vertical structure and base supporting the supply and drainage pipes and covering them with a metal structure to support the base of the new footbridge.

7. *Project for general work on the banks in the San Jorge river area*

This project provides for environmental restoration and general work on all riverbanks between the Cuatro Vientos and Miluce bridges, except for the sections covered by the previous project (Eurgui). The project covers 125 000 m².

The following actions are planned:

- Creation of a permanent access point to the river downstream from the Cuatro Vientos bridge, with reconstructive work on the left bank, unblocking and cleaning of the arch of the bridge, and shallow dredging of the existing gravel island.
- Construction of a low dry stone revetment downstream from the Biurdana mill on the left bank, with reconstructive work on the embankment and replanting along the top of the revetment.
- General work on the Biurdana weir, with a slipway for the passage of vessels, and the creation of a permanent access point to river for future cleaning operations. Building of a nearby landing stage.
- General work on all riverbanks in the area, with reconstructive work on banks and embankments on some sections, removal of the existing dike path along the right bank before the San Jorge bridge. Subsequent cleaning operation with ground clearance, selective felling and replanting with riverside species.
- Dredging of the riverbed downstream from the Biurdana weir, with filling and banking of left shore before the San Jorge bridge.
- Work on pedestrian path along the right bank.

- Replacement with lines of native riverside trees of some of the poplar plantations on the right bank (at the Explanada de Biurdana and between the San Jorge and Miluce bridges), at present in a poor state of health.
- Creation of small dry stone revetments to combat points of erosion along both banks in the San Jorge and Berichitos areas.

8. *Project for general work on the banks in the Landaben river area*

This project covers environmental restoration and general work on both riverbanks (on the left bank as far as the Ilundáin mill and on the right as far as the junction with the pedestrian footbridge leading to the Barañáin industrial estate) between the Miluce bridge and city boundaries. About 100 000 m² will be covered.

The following measures are planned:

- Creation of a pedestrian path along the right bank with some park furniture, linking with the existing network of paths.
- General work on all of the riverbanks in the area, with reconstructive work on banks and embankments on some sections, a subsequent cleaning operation and planting with riverside species.
- Lowering of the rise at Viveros de Diputación, with subsequent reconstructive work on the embankment and planting.
- Minor work to combat erosion at various points along both banks.
- Creation of a point of passage for vessels in the weir at the Ilundáin mill.
- Aesthetic improvement of the Landaben industrial state area using plant screens.

6. *Objectives:*

- (a) The general aim of the measures planned by the City Council of Pamplona under the Arga General Plan is to conserve and improve the natural value of the river and its environs, and integrate them into the existing urban structure of Pamplona, in order to create a wealth and variety of land- and cityscapes.
- (b) The specific aims of this plan are:
 - to restore areas of the city bordering on the river which are at present in a very poor state, both environmentally and in regard to public use;

- to encourage the natural development of a river environment so that typical ecosystems can flourish. A natural corridor through a largely urban environment will thus be created for even the most sensitive species of fauna;

- to preserve the existing course of the river by prioritising 'soft' measures, thus conserving a characteristic feature of the city, valuable both aesthetically and as a public utility;

- to implement correct design and treatment of the river, its banks and environs, in accordance both with existing data and a planned hydraulic study, allowing proper drainage and management of flood water in order to minimise the negative effects of flooding;

- to allow access to and passage along all riverbank areas in the city; passage from one bank to another should be possible where direct linear progress is impeded.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	8.1.1998	31.12.1999

8. *Assessment of costs and socio-economic advantages:*

- (a) A cost/benefit analysis has been made based on the following premises:
 - operational life of investment: 25 years;
 - operating and maintenance costs;
 - evaluation of environmental benefits: this group of projects, seen within the global framework of the Arga General Plan, involves the comprehensive and coordinated restoration of the River Arga and its banks within the city of Pamplona. A number of associated auxiliary measures furthermore aim to improve the urban environs of the river: recovery of lands at present used for purposes incompatible with the plan, minimisation of the negative effects of ordinary and extraordinary rises in the water level, the creation of parks and gardens, improvement of pedestrian access to the areas in the north of the city, etc.

- (b) Number of inhabitants affected: 3 581 392
- (c) Internal rate of return: 65%; current net value at 6% discount rate = 6 206; cost/benefit ratio = 11,7.

9. *Environmental impact analysis:*

The planned group of projects is in line with other environmental projects contributing to the fulfilment of the aims of Article 130R of the EC Treaty since it refers specifically to one of the aims of the Fifth Community Programme of policy and action: improvement of the environmental quality of urban areas and raising levels of public health and safety.

It must also be seen within the framework of the following Community Directives:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora; Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds and the Bern Convention of 19 September 1979. The various projects have no environmental effect on any sensitive area; while it is true that the river as a whole is of natural interest, it cannot be considered as an area of natural interest in accordance with any of the categories defined by Community regulations, regardless of how broadly these are interpreted.

— Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water and Council Directive 78/659/EEC of 18 July 1978 on the quality of fresh waters needing protection or improvement in order to support fish life; these are not applicable given that the projects in no way aim to raise levels of water purity or to create bathing areas.

— Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment; the projects do not contain any measure requiring an Environmental Impact Analysis.

10. *Cost and assistance:*

Total cost:	ECU 6 383 465
Eligible cost (after 6 May 1997):	ECU 6 383 465
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 5 106 772

ANNEX

FINANCING PLAN

Project No: 97/11/61/019

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other		%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government				Other	
1=2+11													
1997	598 996	598 996	100	479 197	80	119 799	20		119 799				
1998	2 096 486	2 096 486	100	1 677 189	80	419 297	20		419 297				
1999	3 687 983	3 687 983	100	2 950 386	80	737 597	20		737 597				
Total	6 383 465	6 383 465	100	5 106 772	80	1 276 693	20		1 276 693				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/026

1. **Name:** Improvement of waste-water disposal system in the old town of Palma de Mallorca.
- total length of piping: 12 020 m
 area of surfacing concerned: 27 078 m²
 area drained: 43 ha
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Ayuntamiento de Palma
- 3.2. **Address:** Pza. Cort, 1
07001 Palma de Mallorca
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Province:** Balearic Islands
5. **Description:**
- a) **General**
- The purpose of this project is to renovate sanitation infrastructure in four districts in the historic centre of Palma: Bonaire-Concepció-Jaume III; Correos-Jaume II; Cort-Seu-Montisíon and Sindicat-Sant Miquel.
- It is planned to replace conduits of less than 300 mm diameter, and to install a separate sewer system in the streets where storm water and sewage are still carried in the same conduits. The new conduits will be laid at various depths, in separate trenches of a width of 1,20 m. The conduits will be made of PVC, with double walls, and comply with ISO DP-9971 standards and the general technical requirements for urban sanitary conduits established by the Moptma (Ministry of Public Works), and approved by the municipal firm EMAYA, responsible for the management of the sanitation network. The project also includes the renovation of drains, siphons and connections with private dwellings, to ensure that they are adapted to the new network.
- Conduit lengths in metres are as follows:
- waste water disposal: 6 594 m
 — storm water disposal: 5 426 m
- (b) **Detailed description**
- Quantitative data for each area are described below:
- District 1 — Bonaire-Concepció-Jaume III*
- Conduit lengths are as follows:
- waste water disposal: 1 392 m
 — storm water disposal: 737 m
 total length of piping: 2 129 m
 area of surfacing concerned: 4 267 m²
 area drained: 9,75 ha
- The total budget for District 1 is ESP 175 428 504.
- District 2 — Correos-Jaume II*
- Conduit lengths are as follows:
- waste water disposal: 1 609 m
 — storm water disposal: 1 320 m
 total length of piping: 2 929 m
 land area concerned: 6 890 m²
 area drained: 9,11 ha
- The total budget for District 2 is ESP 256 249 532.
- District 3 — Cort-Seu-Montisíon*
- Conduit lengths are as follows:
- waste water disposal: 2 057 m
 — storm water disposal: 1 871 m
 total length of piping: 3 928 m
 land area concerned: 8 536 m²
 area drained: 15,10 ha
- The total budget for District 3 is ESP 341 708 025.
- District 4 — Sindicat-Sant Miquel*
- Conduit lengths are as follows:
- waste water disposal: 1 536 m
 — storm water disposal: 1 498 m
 total length of piping: 3 034 m
 land area concerned: 7 205 m²
 area drained: 9,31 ha
- The total budget for District 4 is ESP 268 221 859.

6. **Objectives:**

The main objective is to improve conditions of sanitation in the old town, and the secondary objective is to restore the old town, which is losing inhabitants at an alarming rate.

7. **Work schedule:**

Category of work	Commencement	Completion
Construction	2.1.1997	30.7.1999

8. **Assessment of costs and socio-economic advantages:**

(a) A cost-benefit analysis has been carried out on the following basis:

- useful life of the investment: 25 years,
- operating and maintenance costs,
- charges for water supply and treatment (to cover operating and maintenance costs),
- assessment of environmental benefits: improvement in the urban environment, flood prevention, public health.

(b) The project will benefit 7 677 people.

(c) The internal rate of return is 7,8%, the net discounted value ESP 201 437 (using a discount rate of 6%), and the cost/benefit ratio is 1,2.

(d) Job creation:

in the implementation stage: 22 000 direct jobs; 4 400 indirect jobs.

9. **Environmental impact analysis:**

(a) These projects are related to the objectives of Community action on the environment laid down in Article 130R of the Treaty:

- preserving, protecting and improving the quality of the environment,
- protecting human health,
- prudent and rational utilisation of natural resources.

(b) The group of projects is intended to achieve the objectives laid down in the Fifth Action Programme:

- sustainable management of natural resources, by reducing pollution of water resources;
- appropriate management of water resources;
- improved quality of the urban environment;
- better public health and safety.

(c) The aim of the project is to control and collect urban waste water in accordance with Directive 91/271/EEC concerning urban waste-water treatment. It complies with the objectives and guidelines laid down in the national plan for treatment of waste water, and in the legislation transposing Directive 91/271/EEC into national law.

10. **Cost and assistance:**

Total cost:	ECU 6 239 191
Eligible cost (after 2 April 1996):	ECU 6 239 191
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 4 991 353

ANNEX

FINANCING PLAN

Project No: 97/11/61/026

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans	
		Total public expenditure			Cohesion Fund		National authorities			Other		%		
		2=4+6+10	3=2/1	%	4	5=4/2	6=8+9	7=6/2	8					9
1997	1 247 841	1 247 841	100	998 273	80	249 568	20		249 568					
1998	4 367 430	4 367 430	100	3 493 944	80	873 486	20		873 486					
1999	623 920	623 920	100	499 136	80	124 784	20		124 784					
Total	6 239 191	6 239 191	100	4 991 353	80	1 247 838	20		1 247 838					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/027

1. *Name:*

Improvement and expansion of infrastructure for the management and treatment of solid municipal waste in Getxo.

2. *Body responsible for the application:*

2.1. *Name:* Dirección General de Análisis y Programación Presupuestaria

2.2. *Address:* Paseo de la Castellana, 162
28071 Madrid

3. *Body responsible for implementation:*

3.1. *Name:* Ayuntamiento de Getxo

3.2. *Address:* Fueros, 8
48990 Getxo

4. *Location:*

4.1. *Member State:* Spain

4.2. *Region:* Basque country

5. *Description:*(a) *General*

The municipal tip of Getxo is to be expanded because it will soon be full. The acquisition of adjacent land will provide additional tipping capacity of 785 000 m³, which will prolong the working life of the tip by more than 15 years. The purchased land will cover some 74 000 m², so that additional land will be available to receive inert waste from minor works in the municipality of Getxo.

(b) *Specific*

— Expansion of the site: the present total area of the tip must be expanded to cater for future waste. An adjacent plot of land some 40 m wide and 320 m long on the north-east border will therefore be purchased, to provide an additional 12 800 m². In addition, it will be

necessary to purchase a plot of land covering an area of some 22 400 m³ to the east of the tip, which belongs to the Greater Bilbao water consortium.

- Access: access to the tips by the road between the Dominican Convent and the actual tip will be altered and improved to facilitate tipping from the upper platforms.

At the same time, the weighing control system will be adjusted. Unauthorised persons will be prevented from entering the tip area by an enclosure around the entire perimeter. The fence will be made of plastic-coated galvanised mesh 3 mm thick, with appropriate locks and security devices.

- Management of run-off water: perimeter drainage will be installed by making concrete trenches of adequate size to ensure that run-off water does not enter the tip. These perimeter trenches will empty into a chamber where the water quality can be checked before it is discharged. This chamber will also help equalise the flow.
- Management of leachates: All the leachates from the tip will be collected in a network independent of the run-off network. The quality of leachates will be monitored and will be appropriately treated before discharge if legal levels are exceeded.
- Biogas relief system: Biogas is generated by the fermentation of the organic matter in the waste. The degassing system will comprise equally spaced pits in which biogas will collect, connected to pipes and flares to burn off the gas. At a later date, the different alternatives for using the biogas, such as electricity generation, heating, etc. will be examined.
- Replanting and environmental rehabilitation: the creation of slopes, banks and working faces will simplify the task of replanting and rehabilitation once the tip is finally decommissioned. Local and fast-growing species available in nurseries will be chosen for replanting. It is planned to cover the entire area of the tip with topsoil and to carry out hydro-seeding.

Measures to be carried out on the rest of the land:

- Construction of a tip for inert waste generated within the municipality of Getxo by small-scale home renovation and shop-fitting.
- Construction of a transfer installation for the dispatch of waste to an energy generating plant; machinery storage areas, etc.

6. Objectives:

- To bring the tip into line with existing legislation and create ideal technical operating conditions.
- To extend the working life of the tip by 15 years.
- To install a tip for inert waste.
- To create other environmental infrastructure.

7. Work schedule:

Category of work	Commencement	Completion
Main work	1.5.1997	31.12.1998

8. Assessment of costs and socio-economic advantages:

- (a) A cost-benefit analysis was carried out on the following basis:
- investments for a working life of 15 years,
 - maintenance and operating costs, rehabilitation and sealing of the tip,
 - assessment of environmental benefits,
 - reduction of biogas emissions into the air, reduction of soil and water pollution caused by leaching from uncontrolled tips, recovery of land for alternative use following the sealing of uncontrolled tips and the tip in question at the end of its working life, extended as a result of this project.

- (b) The project will benefit 85 000 inhabitants.
- (c) Internal rate of return: 21,46%; net present value (at a discount rate of 6%): ESP 487 919 000; cost/benefit ratio (at a discount rate of 6%): 2,42.

- minimising the proportion of waste which is unusable by:
 - using waste as a fuel,
 - incineration,
 - disposal in controlled tips.

9. *Environmental impact analysis:*

These measures form part of the Community's environmental policy, complying with the Community Directives on the environment, in particular Directive 75/442/EEC (as amended by Directive 91/156/EEC) on solid urban waste, and with the Fifth Community Programme (new strategy for the environment and sustainable development) as regards the reduction of pollution of water resources, waste management, degradation of the urban environment and damage to natural resources and biodiversity.

This group of projects also meets the objectives of the Community Regulation on the Cohesion Fund and the Green Paper on the urban environment.

The measures also contribute to the objectives of the Community's policy on waste:

- preventing the production of waste,
- maximising the recycling and re-use of materials,

By contributing to these aims, the projects comply with the general objective of rational and sustainable use of resources.

The projects also comply with Directive 85/337/EEC of 5 July 1985 on environmental impact analysis.

10. *Cost and assistance:*

Total cost:	ECU 2 829 616
Eligible cost (after 6 May 1997):	ECU 2 829 616
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 2 263 693

ANNEX

FINANCING PLAN

Project No: 97/11/61/027

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government				8	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	182 694	182 694	100	146 155	80	36 539	20		36 539				
1998	2 646 922	2 646 922	100	2 117 538	80	529 384	20		529 384				
Total	2 829 616	2 829 616	100	2 263 693	80	565 923	20		565 923				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/028

1. **Name:**
Treatment of waste discharged into Mediterranean rivers and coastal areas in the Autonomous Community of Valencia.
 - (9) Collector sewers for the Safor Sur district (Gandia).
 - (10) Collector sewers and waste-water treatment plant at Jávea.
 2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
 - (11) Collector sewers and waste-water treatment plant at Calpe.
 - (12) Collector sewers and waste-water treatment plant at Orihuela-Litoral.
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
 3. **Body responsible for implementation:**
 - 3.1. **Name:** Entitat Pública de Sanejament d'Aigües
 - 3.2. **Address:** C/ General Elio nº 8
46010 Valencia
 4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Autonomous Community of Valencia
Municipalities: Nules, Castellón, Pinedo, Cullera, Gandia, Jávea, Calpe, Orihuela, Bétera, Segorbe, Utiel
 5. **Description:**
The group of projects includes the following work:
 - (1) Collector sewers and waste-water treatment plant at Nules.
 - (2) Expansion of Castellón waste-water treatment plant — second phase.
 - (3) Collector sewers and waste-water treatment plant at Segorbe.
 - (4) Expansion of Pinedo (Valencia) waste-water treatment plant — second phase.
 - (5) Collector sewers and waste-water treatment plant at Bétera.
 - (6) Collector sewers and waste-water treatment plant at Utiel.
 - (7) Collector sewers and waste-water treatment plant at Cullera.
 - (8) Waste-water treatment plant for the Safor Sur district (Gandia).
- 5.1. **Collector sewers and waste-water treatment plant at Nules and Villavicja**
- (a) *Collector sewers*
The system of collector sewers for Nules will collect rain water and waste water with required dilution.
The collector sewers are designed for a drainage capacity in the design year of up to 1 160 l/second, with overflow at Barranco de Juan de Mora before the waste water is treated. The collector sewers have an overall length of 1 392 m.
 - (b) *Waste-water treatment plant*
This project will provide treatment for a densely populated area with considerable industrial waste throughout the year.
The estimated average waste-water flow is 8 000 m³/day in winter and 9 000 m³/day in summer; given the small variation in seasonal flow, treatment will be similar throughout the year.
The flow will be treated in two lines by conventional biological processing using activated sludge at average loading with pre-treatment, primary sedimentation, and activation basin and grader and disinfection of effluent. The stabilised sludge produced in the biological process is subsequently thickened and dewatered, then re-used in agriculture or disposed of in a controlled tip.
The plant is designed for an activate sludge process at average loading, with stabilisation of sludge in an aerobic digester. It also has an automated integrated control system for operation, influent/effluent parameters and management, run from a central master computer and automated control panels using software specially configured for this plant.

5.2. Expansion of the Castellón treatment plant — second phase

The treatment system for the city of Castellón, provincial capital and fourth most populous city in the Autonomous Community of Valencia, is to be expanded.

At present the treatment system includes a complete plant with secondary treatment for 37 500 m³/day and primary treatment for another 37 500 m³/day; treated water that is not re-used is piped into the sea through an underwater outfall 2 700 m from the shore.

This project will provide secondary biological treatment for the 20 000 m³/day that currently receives only primary treatment, in order to make more water available for irrigation and to improve the quality of the underwater discharge.

The expansion involves a conventional treatment system using activated sludge at average loading.

The possibility is also being studied of filtering all of the water treated biologically in Castellón, both currently and after the expansion; this would provide a volume of up to 500 l/second of filtered disinfected water for irrigation.

The biological sludge produced will be digested anaerobically and then dewatered. It will be used in agriculture or disposed of in a controlled tip.

The appropriate control, automation and management equipment will also be installed.

5.3. Collector sewers and waste-water treatment plant at Segorbe

(a) *Collector sewers*

The collector sewer system will collect rain water and waste water, with suitable dilution, from the population centres of Geldo, Castellnovo, Altura, Segorbe and Peñalba (administratively belonging to Segorbe); it is also planned to include Navajas.

The treatment plant has a planned maximum flow of 305,6 l/second, with overflow into the Palancia river at the start of each stretch of collector sewers and prior to the Palancia river treatment plant. There is a total of 11 222 m of collector sewers (not including

the sewers for Navajas) of which only 1 692 m are force mains with two pump stations.

(b) *Waste-water treatment plant*

This project will provide treatment for a large zone almost co-extensive with the district of Alto Palancia, affecting water quality along the upper stretches of the river.

The estimated flow is 3 200 m³/day in winter and 5 800 m³/day in summer, so that the plant must be flexible enough to cover both seasons. The estimated population equivalent is 16 300 in winter and 30 000 in summer.

The flow will be treated in a biological line using activated sludge at low loading (oxidation channel), with a pre-treatment capacity of up to 1 100 m³/h. The effluent will then be disinfected before being discharged into the Palancia river or re-used in irrigation.

The sludge generated will be thickened and dewatered. It can be re-used in agriculture or disposed of in a controlled tip.

There will also be an integrated automatic control system, with all the necessary hard- and software specially configured for this plant.

5.4. Expansion of the Pinedo II treatment plant

The treatment system in the Pinedo II waste-water treatment plant is to be expanded. The plant serves the city of Valencia and a number of municipalities in its metropolitan area. At present it is equipped with primary treatment with flocculation and sedimentation, and an underwater outfall. This second expansion aims at providing biological treatment for 185 000 m³/day.

Once the Pinedo II plant has been equipped with biological treatment facilities, it will, together with the Pinedo I plant (which already has biological treatment), provide a total of 310 000 m³/day with secondary treatment.

Biological treatment will use a process of activated sludge at average loading, aeration using fine bubble diffusers, and suction sedimentation.

The possibility is also being studied of providing tertiary treatment for about a third of the flow, using flocculation, precipitation and filtering

prior to disinfecting; this water might then be used for supplying the lake of Albufera.

The fraction of water which does not receive tertiary treatment will be disinfected before being discharged through the outfall or re-used for irrigation.

The new sludge produced will be stabilised using anaerobic digestion and then dewatered by centrifugation prior to thermal drying. The sludge will finally be re-used in agriculture or disposed of in a controlled tip.

The plant will be provided with all necessary electrical and control equipment, automation, the soft- and hardware required for its operation and facilities for controlling environmental impact (mainly noise and odour).

5.5. Collector sewers and waste-water treatment plant at Bétera

(a) *Collector sewers*

The collector sewer system which will serve Bétera will collect rain and waste water, with suitable dilution.

The planned collector sewers will provide a drainage-capacity of 1 800 l/second by the design year, with overflow at Barranco del Carraixet prior to treatment. The total length of the collector sewers is 5 849 m.

(b) *Waste-water treatment plant*

This measure provides waste-water treatment for a densely populated area with the beginnings of year-round industrial activity; the estimated population equivalent is 15 000.

The estimated average year-round flow is 2 400 m³/day. There is little variation between summer and winter, so treatment is planned for a constant flow. The flow is treated with a conventional biological process in one line using activated sludge at low loading, with pre-treatment, an extended aeration basin and clarifier, and disinfecting of the effluent.

The biologically treated water will be used for irrigation or discharged into the Barranco del Carraixet.

The sludge produced in the extended aeration basin will subsequently be thickened and dewatered for re-use in agriculture or disposal in a controlled tip.

There will also be an automated integrated control system with a central master computer and automated control panels, as well as software suitable for this type of plant.

5.6. Collector sewers and waste-water treatment plant at Utiel

(a) *Collector sewers*

The collector sewer system which will serve Utiel will collect rain water and waste water, with suitable dilution.

It is planned that the collector sewers will progressively discharge into the Magro river, along which they run, so that only the diluted flow to be treated in the plant (202,54 l/second) will be pumped to the treatment plant on the other side of the river from the town.

In all there are 4 300 m of collector sewers, only 270 m of which are force mains from a single pump station.

(b) *Waste-water treatment plant*

This measure provides treatment for a population centre very much affected by pollution from dense agricultural industrialisation of a seasonal nature.

There is a two-stage in-line biological process for an average peak flow of 145,8 m³/h, preceded by pre-treatment for up to 729,6 m³/h and followed by disinfecting. The flow variation is due to a high dilution flow, since this is a single sewer system and a significant improvement in the quality of the river water is desired.

The sludge produced is stabilised using anaerobic digestion and thickened and dewatered before being re-used in agriculture or disposed of in a controlled tip.

The plant has an automated integrated control system.

5.7. Collector sewers and waste-water treatment plant at Cullera

(a) Collector sewers

The collector sewer network which will serve Cullera will collect rain water and waste water, with suitable dilution.

Collector sewers are planned with drainage capacity of 2 900 l/second by the design year, with overflow into the Júcar river prior to treatment.

There is a total of 12 045 m of collector sewers with three intermediate pump stations.

(b) Waste-water treatment plant

Treatment is planned for a densely populated area with a very large population increase in the summer because Cullera is a tourist resort. The resident population is 20 336; the population equivalent in summer is 100 000 in summer.

This is an exclusively urban measure for a densely populated area with all discharge into the bay of Cullera, which is a sensitive area for the purposes of Directive 91/271/EEC.

The plant has been designed with the only Orbal-type biological reactor capable of dealing with the expected flow variations, in a low-loading carousel system with nitrification-denitrification and biological elimination of phosphorus; the addition of thermic salts is planned if this should prove necessary.

The water treated biologically will be used for irrigation or discharged into the river.

The stabilised sludge produced in the biological process will be thickened and dewatered for re-use in agriculture or disposed of in a controlled tip.

There is also an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automatic switchboards, and relevant software specified for this type of plant.

5.8. Gandía-Safor Sur waste-water treatment plant

This measure provides for the drainage of a large densely populated area with a 50 % summer increase. The average population equivalent is 280 000.

The estimate waste water flows are 40 000 m³/day in winter and 60 000 m³/day in summer. Given the large seasonal variation, differentiated treatment is planned.

The 40 000 m³/day winter flow (and the same quantity of the summer flow) will be treated with a conventional line using activated sludge at average loading, with primary pre-treatment, activation basin, grading and disinfecting. The sludge will be anaerobically digested and then dewatered by centrifugation.

The additional 20 000 m³/day bringing the flow up to its summer average of 60 000 m³/day will receive pre-treatment with coagulation-flocculation and primary sedimentation. The sludge from this process will also be digested, then re-used in agriculture or disposed of in a controlled tip.

The biologically treated water will be used for irrigation or discharged into the Serpis river; summer peak flows which will have received only primary treatment will be discharged into the sea through the existing outfall.

There will also be an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automated control panels, and suitable software specifically configured for this plant.

5.9. General collector sewers for Gandía and Safor Sur

The project is composed of a general system of collector sewers connecting all the local municipal systems covered by the measure.

A single network of collector sewers is planned, with a system of overflows for rainwater into the local public waterways. Water is piped to the Gandía-Safor Sur plant for treatment. A total of 18 555 m of collector sewers is to be constructed, using various types of piping of diameters varying between 400 and 1 000 mm (47 % are large diameter = 1 000 mm).

The sewer system is designed to convey urban and industrial discharge from the municipalities covered by the measure to the treatment plant. The following measures are planned:

- Safor Sur general collector sewer;
- Safor Oeste general collector sewer;

- collector sewers linking the existing and planned waste-water treatment plants;
- interceptor sewer at Gandía;
- other collector sewers (secondary lines).

5.10 Collector sewers and waste-water treatment plant at Jávea

(a) Collector sewers

A total of 7 621 m of collector sewers with five intermediate pump stations is planned.

(b) Waste-water treatment plant

Waste-water treatment is planned for an area heavily affected by tourism, which more than doubles its population in summer. The design parameters are for a population equivalent of 39 200.

The planned flow for treatment is 4 200 m³/day in winter and 8 400 m³/day in summer. All waste water will receive biological treatment with elimination of nitrogen and phosphorus, since the bay of Jávea has been declared a sensitive area.

The plant has been designed for an activated sludge process at very low loading with stabilisation of sludge in the reactor itself and addition of metallic salts to control phosphorus.

Most of the treated water will be used for irrigation, so phosphorus removal will only be necessary for water discharged into the sea.

The stabilised sludge produced in the biological process will be thickened and dewatered for use in agriculture or disposed of in a controlled tip.

There will also be an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automated control panels, and suitable software specifically configured for this plant.

5.11. Collector sewers and waste-water treatment plant at Calpe

(a) Collector sewers

The system of collector sewers for Calpe will collect rain water and waste water, with suitable dilution.

A total of 6 279 m of collectors is planned, with diameters ranging between 400 and 800 mm. The network includes a pump station.

(b) Waste-water treatment plant

Waste-water treatment is to be provided for an area heavily affected by tourism, which more than doubles its population in summer.

The planned treatment flow is 5 600 m³/day in winter and 11 200 m³/day in summer, all treated biologically and with elimination of nitrogen and phosphorous, since the bay of Calpe has been declared a sensitive area.

The plant has been designed for an activated sludge process at very low loading, with stabilisation of sludge in the reactor itself and addition of metallic salts to control phosphorous.

Treated water will be discharged through the underwater outfall, though it would be suitable for irrigation if the need arose.

The stabilised sludge produced in the biological process is thickened and dewatered for use in agriculture or disposal in a controlled tip.

There is also an automated integrated system for control and operation, influent/effluent parameters and management, with a central master computer and automated control panels, and suitable software specifically configured for this plant.

5.12. Collector sewers and waste-water treatment plant at Orihuela-Litoral

(a) Collector sewers

The system of collector sewers for Orihuela is a single one which will collect rain water and waste water, with suitable dilution.

A total of 14 880 m of collectors is planned with five intermediate pump stations.

(b) Waste-water treatment plant

Orihuela is a large coastal area covering some 2 700 hectares, primarily a location for second homes, with a summer population of 90 000 and a winter population of 7 000.

Since the average annual rainfall in the area is under 300 mm, as much as possible of the treated water will be used for irrigation.

The treatment line will have a flow of 18 000 m³/day, of which 12 000 will be biological and 6 000 m³/day primary treatment only, with physical-chemical treatment for the peak demand periods in August.

The water receiving biological treatment with primary treatment, activated sludge at

average loading, disinfecting and aerobic sludge digestion will be used for irrigation, while the portion receiving only physical-chemical treatment will be discharged into the public waterways.

The stabilised sludge produced in the biological process will be thickened and dewatered for use in agriculture or disposed of in a controlled tip.

Sludge from the primary line will be stabilised with lime and sent to a tip.

6. Objectives:

The projects are in line with the master plan for waste-water disposal and treatment in the Autonomous Community of Valencia and contribute to the objectives of the section of the Spanish Government's national plan for waste-water treatment which applies to Valencia.

The main objective is to provide waste-water treatment to all population centres with more than 500 inhabitants, thereby complying more than adequately with Directive 91/271/EEC.

The present project aims to provide some form of treatment for 15 % of the population equivalent provided for in the national plan.

The main technical parameters of the population to be covered and the quality of the water to be obtained in each treatment station are:

	Nules	Castel-lón	Segorbe	Bétera	Pinedo 2 (Second expansion)	Utiel	Cullera	Gandia (plant)	Jávea	Calpe	Ori-huela-Litoral	Total
Present population	11 535	67 535	12 500	10 000	365 000	12 000	20 336	77 115	16 244	11 525	7 000	610 790
Seasonal population	10 000		12 000				100 000	150 000	23 000	31 000	83 000	409 000
Design population equivalent (p.e.)	30 000	146 250	35 000	20 000	478 225	46 000	100 000	280 020	39 200	42 500	90 000	1 307 195
BOD5 on entry	200	250	305	375	235	790	250	280	280	250	300	
BOD5 on exit	25	25	25	25	25	25	25	25	25	25	25	
SS on entry	300	300	350	450	240	567	300	270	250	300	350	
SS on exit	35	35	35	35	35	35	35	35	35	35	35	
Industrial waste	61 %	53 %	0	0	24 %	74 %	0	15 %	0	0	0	287 405

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.3.1995	30.6.1998
Purchase of land	30.6.1996	30.6.1998
Main work	17.12.1996	30.10.2000
Operational phase	31.1.1998	31.1.2001

8. *Assessment of costs and socio-economic advantages:*

A cost-benefit analysis has been carried out on the basis of the following assumptions:

- operational life of the treatment plants = 20 years,
- residual value = 0,
- discount rate = between 3 and 10%.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged,
- re-use of water.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The results obtained are:

- For an environmental sensitivity coefficient of 1,5, the internal rate of return obtained is 19% for the group of projects, the present discounted value being positive for discount rates below 7%.
- For an environmental sensitivity coefficient of 2, the IRR obtained is 22%, the present discounted value being positive for discount rates below 8%.

9. *Environmental impact analysis:*

- (1) The project is intended to improve the quality of water and provide sewer systems and waste-water treatment to municipalities

previously lacking them and allows water to be re-used for ecological purposes. The group of projects is therefore a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project also complies Directive 91/271/EEC.

The work involves the collection and treatment of waste water, preventing untreated discharge. Given its nature and location, this type of measure considerably increases the quality of water for bathing, even in population centres with a population equivalent of less than 150 000.

Since these are urban centres of great importance to tourism (Orihuela-Litoral, Calpe, Jávea, Gandía and Cullera), the measure has considerable impact on health and the use of natural resources for tourism.

The Pinedo measure, for example, will help re-supply water to the lake of Albufera, a sensitive area in the Autonomous Community of Valencia.

The measures are preventive in that they involve the construction of complete waste-water disposal systems (sewers and treatment plants) in municipalities which do not as yet have them or they expand secondary treatment in plants already operating.

- (2) The collector sewers planned in the project must be connected to a treatment plant before they are put into operation.

- (3) Sludge from the planned treatment plants used in agriculture must meet the requirements of Directive 86/278/EEC.

10. *Cost and assistance:*

Total cost: ECU 94 245 329

Eligible cost
(after 12 May 1997): ECU 93 764 644

Rate of assistance: 80%

Cohesion Fund grant: ECU 75 011 715

Breakdown of total eligible cost by project (in ECU):		Collector sewers and treatment plant at Utiel	5 563 232
Collector sewers and treatment plant at Nules	3 003 905	Collector sewers and treatment plant at Cullera	9 179 934
Expansion of Castellón treatment plant — second phase	6 608 591	Collector sewers and treatment plant at Safor Sur (Gandia)	14 918 288
Collector sewers and treatment plant at Segorbe	4 326 825	Collector sewers and treatment plant at Jávea	6 428 549
Expansion of Pinedo (Valencia) treatment plant — second phase	29 193 037	Collector sewers and treatment plant at Calpe	4 769 979
Collector sewers and treatment plant at Bétera	2 249 324	Collector sewers and treatment plant at Orihuela-Litoral	7 522 980

ANNEX

FINANCING PLAN

Project No: 97/11/61/028

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8				9	
1=2+11												13	
1997	11 411 913	11 411 913	100	9 129 530	80	2 282 383	20		2 282 383				
1998	30 814 245	30 814 245	100	24 651 397	80	6 162 848	20		6 162 848				
1999	38 952 028	38 952 028	100	31 161 622	80	7 790 406	20		7 790 406				
2000	12 586 458	12 586 458	100	10 069 166	80	2 517 292	20		2 517 292				
Total	93 764 644	93 764 644	100	75 011 715	80	18 752 929	20		18 752 929				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/030

1. *Name:*

Waste-water treatment in Andalusia.

2. *Body responsible for the application:*

2.1. *Name:* Dirección General de Análisis y Programación Presupuestaria

2.2. *Address:* Paseo de la Castellana, 162
28071 Madrid

3. *Body responsible for implementation:*

3.1. *Name:* Junta de Andalucía
Dirección General de Obras
Hidráulicas

3.2. *Address:* Avda. República Argentina 43,
2a. y 3a
41011 Seville

4. *Location:*

4.1. *Member State:* Spain

4.2. *Region:* Andalusia

5. *Description:*

The aim of the group of projects covered by this application is to reduce the impact of pollution from urban sewage on public waterways and on the coast, in the context of the general planning of the Junta de Andalucía in line with Community regulations in this sphere.

The first two projects concern the two main urban centres in Andalusia (Seville, Project 1 and Málaga, Project 2). Project 3 aims at collecting the waste water from both Cadiz and San Fernando, one of the largest centres in Andalusia in terms of population equivalent.

Projects 4, 5 and 6 (Linears, Andújar and Bailén) are located on the upper Guadalquivir river. The river authorities have been issuing continuous warnings on the precarious situation now existing along this stretch of river due to the establishment there of industries with a pollution potential and because of a number of medium-sized cities very nearby.

Project 7 (La Ballena) is located in an area only now opening up to tourism, but which has great tourist potential and cannot afford to be handicapped by coastal waters polluted by untreated sewage.

5.1. **Guadalhorce (Málaga) waste-water treatment plant second phase**

This plant currently treats half of all urban waste-water discharge for Málaga and its metropolitan area, and provides only pre-treatment. The project involves installing a conventional treatment plant using activated sludge at average loading.

The main elements of the planned expansion are described below:

- Expansion of the present grit and grease removal facility from six lines to seven.
- Primary sedimentation: 12 lines of rectangular settling basins, including 10 equipped with a rotating bridge, skimmers and bottom scrapers.
- Removal of primary sludge.
- Aeration tank: six parallel lines.
- Secondary sedimentation: 12 lines of rectangular settling basins with rotating bridge, skimmers and bottom scrapers.
- Recirculation of sludge and thickening of primary sludge in three gravity thickening lines.
- Removal and thickening of excess sludge.
- Mixing and pumping of thickened sludge.
- Anaerobic digestion in five digestors.
- Aerobic-anaerobic digestion in addition to the above during the summer season.
- Storage of thickened sludge.
- Storage of gas produced in sludge thickening process.
- Sludge dewatering
- Energy recovery.

5.2. **Expansion of Copero (Seville) waste-water treatment plant**

Although the existing plant treats waste water from a population equivalent of approximately one million, it provides only primary treatment. Inclusion of biological treatment and expansion of the sludge treatment facilities are therefore required.

The project includes the following:

- Aeration tank: eight parallel lines.
- Secondary sedimentation: eight lines of circular suction settling basins equipped with a diametric rotating bridge.
- Recirculation of sludge.
- Removal and thickening of excess sludge.
- Pumping of thickened sludge.
- Pumping to digestors.
- Anaerobic digestion in three digestors.
- Storage of digested sludge.
- Sludge dewatering.

5.3. Cadiz-San Fernando waste-water treatment plant

This is a new plant built to provide centralised treatment for these two coastal municipalities, using a conventional system using activated sludge at average loading.

The plant will include the following:

- Intake unit: reception tank with spillway and general by-pass.
- Solids removal: three lines for mechanical removal of coarse and fine solids with bar screens.
- Grit and grease removal: three longitudinal aerated channels.
- Primary sedimentation: three lines of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
- Removal of primary sludge.
- Pumping to the biological reactor.
- Aeration tank.
- Secondary sedimentation: three lines of circular settling basins.
- Recirculation of sludge.
- Removal and thickening of excess sludge.
- Thickening of primary sludge.
- Pumping of sludge to digestors.
- Anaerobic digestion: in two cylindrical digestors.

— Storage of digested sludge.

— Gasometer.

— Sludge dewatering.

5.4. Linares (Jaén) waste-water treatment plant

This project involves the construction of a new plant equipped with activated sludge technology for the treatment of waste-water discharged in this population centre. Its main elements include:

- Intake and lifting of raw sewage, reception chamber with spillway and general by-pass.
- Mechanically cleaned unit for removal of coarse solids.
- Solids removal: three fine screening lines with mechanical screens. Compression of residue.
- Grit and grease removal: two longitudinal aerated channels, grit grader and grease concentrator.
- Primary sedimentation: two lines of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
- Removal of primary sludge.
- Aeration tank: two parallel lines.
- Secondary sedimentation: two lines of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
- Recirculation of sludge.
- Removal and thickening of primary sludge.
- Pumping of sludge to digestors.
- Anaerobic digestion: mixing using biogas through a compressor.
- Storage of digested sludge.
- Gasometer.
- Sludge dewatering.

5.5. Andújar (Jaén) waste-water treatment plant

This project involves the construction of a new plant equipped with extended aeration or total oxidation technology. Its main elements are:

- Intake and lifting of raw sewage: reception chamber with spillway and general by-pass. Mechanically cleaned unit for removal of coarse solids.

- Solids removal: two fine screening lines with automatic screens and one auxiliary unit with manual screen.
- Grit and grease removal: two longitudinal aerated channels, grit grader and grease concentrator.
- Aeration tank: two parallel lines.
- Secondary sedimentation: two lines of circular settling basins equipped with a rotating bridge, skimmer and bottom scrapers.
- Recirculation of sludge.
- Removal and thickening of excess sludge.
- Sludge dewatering.

5.6. Bailén (Jaén) waste-water treatment plant

As in the previous project, this is a new plant with extended aeration, including the following main elements:

- Intake unit: reception chamber with spillway and general by-pass.
- Solids removal: one channel with mechanical bar screen for coarse solids and fine screening. An auxiliary channel with manual screen.
- Grit and grease removal: one longitudinal aerated channel, grit grader and grease concentrator.
- Aeration tank: one line.
- Secondary sedimentation: one line of circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.

- Disinfecting: chlorination unit, preparation and proportioning equipment.
- Recirculation of sludge.
- Removal and thickening of excess sludge.
- Sludge dewatering.

5.7. Expansion of La Ballena waste-water treatment plant, Rota (Cádiz)

This project involves providing a developing tourist complex with the necessary infrastructure to treat waste water in an extended aeration plant. The treated effluent will be re-used for irrigation.

The main elements of the expansion are:

- Aeration tank: two parallel lines.
- Secondary sedimentation: two circular settling basins equipped with a rotating bridge, skimmers and bottom scrapers.
- Tertiary treatment: filtration in three sand beds.
- Disinfecting using chlorine gas in the filtered-water tank.
- Equipment for preparing and proportioning the chlorine gas.
- Recirculation of sludge.
- Removal and thickening of excess sludge.
- Sludge dewatering.

6. Objectives:

The group of projects planned is in line with the measures provided for in the plan for water supply and waste-water disposal infrastructure for Andalusia, which in turn adopts the basic criteria of the Spanish Government's national plan for waste-water treatment.

The general aim of all of these projects thus covers the following priorities:

- to provide a response to large-scale pollution by capitals or large urban centres (Projects 1, 2 and 3);
- to solve the problem of the so-called 'critical points', or stretches of river which, because of their particular morphology or nearby industrial developments generating a high level of pollution, have suffered a serious decline in water quality (Projects 4, 5 and 6);
- to minimise coastal discharge of waste-water. Tourism, concentrated mainly along the coast, is one of the main sources of revenue for Andalusia and one of the main driving forces behind its economy (Project 7).

The main parameters relating to the population to be covered and the quality of water desired are as follows:

	Guadalhorce plant (second phase) (Malaga)	El Copero, Sur Plant (Seville)	Cadiz San Fernando plant	Linares plant	Andujar plant	Bailen plant	Costa Ballena plant
Present population	450 000	800 000	240 000	55 000	32 000	16 500	24 971
Present population equivalent (p.e.)	575 000	1 050 000	180 000	60 000	39 000	17 272	24 971
Design population	550 000	800 000	260 000	550 000	38 000	22 000	85 000
Design population equivalent (p.e.)	700 000	1 050 000	300 000	60 000	45 000	22 997	85 000
Total average BOD ₅ on entry (mg/l)	288	210	300	235	350	260	350
Total average BOD ₅ on exit (mg/l)	< 25	< 25	< 25	< 25	< 25	< 25	< 20
Total average SS on entry (mg/l)	308	90	300	313	360	320	350
Total average SS on exit (mg/l)	< 25	< 30	< 35	< 30	< 35	< 35	< 10
Average daily volume of water (m ³ /day)	175 350	255 000	75 000	11 873	9 418	5 549	17 700
Industrial waste (%)	21,74	23,81	14,29	8,33	17,95	4,47	0

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	July 1994	October 1997
Main work	December 1995	December 1999
Operational phase	Januar 2000	—

— financial estimate of the environmental benefit of reducing the level of pollutants discharged.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the basis of the following assumptions:

- operational life of the treatment plants = 20 years,
- residual value = 0,
- discount rate = 4 %.

The following asset factors were considered:

- water rates or charges,

The internal rates of return obtained vary between 7% for the Guadalhorce expansion project and 19,5% for the El Copero Sur waste-water treatment plant in Seville.

9. **Environmental impact analysis:**

This project improves the quality of water by providing treatment facilities to municipalities which lacked them or by expanding and improving existing facilities. It also permits the re-use of water for ecological ends in certain cases. The project is therefore a coherent one, consistent with the objectives set out in Article 130R of the

EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project also complies with Directive 91/271/EEC. The measures provided for in it are both preventive (voiding the possibility of environmental problems which might even affect human health) and palliative (reducing the pollution loading of discharge downstream of the treatment plants concerned).

10. *Cost and assistance:*

Total cost:	ECU 78 082 930
Eligible cost (after 14 May 1997):	ECU 66 623 551
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 53 298 841

ANNEX

FINANCING PLAN

Project No: 97/11/61/030

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	% 3=2/1	4	% 5=4/2	6=8+9	% 7=6/2	8	9				
1=2+11													
1997	35 672 935	35 672 935	100	28 538 348	80	7 134 587	20		7 134 587				
1998	27 195 795	27 195 795	100	21 756 636	80	5 439 159	20		5 439 159				
1999	3 754 821	3 754 821	100	3 003 857	80	750 964	20		750 964				
Total	66 623 551	66 623 551	100	53 298 841	80	13 324 710	20		13 324 710				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/031

1. **Name:**
Waste-water disposal and treatment in population centres in the network of protected natural areas in the Autonomous Community of Andalusia.
2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
 - 3.1. **Name:** Consejería de Medio Ambiente
Dirección General de Protección Ambiental
 - 3.2. **Address:** Avda. de Leonardo Da Vinci
s/n.
41011 Seville
4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Andalusia
5. **Description:**
The project aims to equip 55 population centres in 47 municipalities with waste-water treatment plants, together with the necessary collector sewer systems, discharge from which affects the network of protected areas declared under the laws of the Autonomous Community of Andalusia.

The main criteria taken into account in defining each of these individual projects are:
 1. To supply the respective population centres with collector systems (with weighting of technical and economic factors) and with relief systems in case of heavy rainfall based on acceptable dilution coefficients.
 2. To minimise the need for force mains and the installation of equipment.
 3. To use low-cost treatment technology.
 4. To provide simple systems for the treatment of sludge given the mainly domestic origin of the water to be treated.
5. All projects must ensure the secondary treatment of waste water.
6. All effluents discharged into natural water courses must comply with the relevant European Union requirements.

A brief description is given below of each individual project, giving its title, the population centre affected, its municipality and province, the protected area concerned, the treatment system and the work and equipment involved:
 - 5.1. **Waste-water treatment plant in Escullar**
 - Population centre (municipality/province): Escullar (Escullar/Almería).
 - Protected area: Parque Natural de Sierra Nevada.
 - Treatment system: peat beds.
 - Work and equipment: pre-treatment, peat beds and chlorination.
 - 5.2. **Waste-water treatment plant in Bayarcál**
 - Population centre (municipality/province): Bayarcál (Bayarcál/Almería).
 - Protected area: Parque Natural de Sierra Nevada.
 - Treatment system: peat beds.
 - Work and equipment: pre-treatment, peat beds and chlorination.
 - 5.3. **Waste-water treatment plant in Alhama de Almería**
 - Population centre (municipality/province): Alhama de Almería (Canjajar/Almería).
 - Protected area: Parque Natural de Sierra Nevada.
 - Treatment system: peat beds.
 - Work and equipment: pre-treatment, peat beds and chlorination.
 - 5.4. **Waste-water treatment plant in Abrucena**
 - Population centre (municipality/province): Abrucena (Abrucena/Almería).
 - Protected area: Parque Natural de Sierra Nevada.

- Treatment system: peat beds.
- Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.5. Waste-water treatment plant in Fiñana

- Population centre (municipality/province): Fiñana (Fiñana/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: peat beds and maturation lagoon.
- Work and equipment: earthworks, pre-treatment, peat beds, piping, maturation lagoon, surfacing, hut.

5.6. Collector sewer and urban sewage treatment plant project Ocaña-Doña María

- Population centre (municipality/province): Ocaña-Doña María (Fiñana/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: peat beds.
- Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.7. Waste-water treatment plant in Canjajar

- Population centre (municipality/province): Canjajar (Canjajar/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: peat beds.
- Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.8. Waste-water treatment plant in Ohanes

- Population centre (municipality/province): Ohanes (Ohanes/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: pre-treatment, peat bed, maturation lagoon.
- Work and equipment: collector sewers, pre-treatment, peat beds, maturation lagoon.

5.9. Collector sewer and urban sewage treatment plant project in Paterna del Río

- Population centre (municipality/province): Paterna del Río-Guarros (Paterna del Río/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: peat beds.
- Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.10. Collector sewer and urban sewage treatment plant in Laujar

- Population centre (municipality/province): Laujar de Andarax (Laujar de Andarax/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: peat beds.
- Work and equipment: pre-treatment, peat beds and maturation lagoon.

5.11. Waste-water treatment plant in Fondón

- Population centre (municipality/province): Fondón (Berja/Almería).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: peat beds, maturation lagoon.
- Work and equipment: pre-treatment, collector sewers, peat beds, maturation lagoons.

5.12. Waste-water treatment plant in Trevez

- Population centre (municipality/province): Trevez (Trevez/Granada).
- Protected area: Parque Natural de Sierra Nevada.
- Treatment system: aeration, sedimentation, sludge recirculation and thickening.
- Work and equipment: separate collector sewers and treatment plant.

5.13. Waste-water treatment plant in Pechina

- Population centre (municipality/province): Pechina (Pechina/Almería).
- Protected area: Parque Natural de la Sierra Alhamilla.
- Treatment system: lagooning.
- Work and equipment: pre-treatment, anaerobic and aerated lagooning.

5.14. Waste-water treatment plant in Tabernas

- Population centre (municipality/province): Tabernas (Tabernas/Almería).
- Protected area: Paraje Natural [natural site] Desierto de Tabernas.
- Treatment system: peat bed.
- Work and equipment: collector system; anaerobic and aerated lagooning.

5.15. Waste-water treatment plant in Sorbas

- Population centre (municipality/province): Sorbas (Sorbas/Almería).
- Protected area: Paraje Natural Karst en Yesos de Sorbas.
- Treatment system: peat bed.
- Work and equipment: collector system, peat bed system.

5.16. Waste-water treatment plant in Puente de la Cerrada

- Population centre (municipality/province): Puente de la Cerrada (Cazorla/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: sedimentation-digestion and bacterial bed.
- Work and equipment: reception chamber and by-pass, grease separation chamber, sedimentation-digestion basin and bacterial bed.

5.17. Waste-water treatment plant in Valdecazorra

- Population centre (municipality/province): Valdecazorra (Cazorla/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.

- Treatment system: sedimentation-digestion and bacterial bed.

- Work and equipment: inlet chamber and by-pass, grease separation chamber, sedimentation-digestion basin and bacterial bed.

5.18. Waste-water treatment plant in Veracruz

- Population centre (municipality/province): Veracruz (Úbeda/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.19. Waste-water treatment plant in Solana de Torralba

- Population centre (municipality/province): Solana de Torralba (Úbeda/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.20. Waste-water treatment plant in El Molar

- Population centre (municipality/province): El Molar (Cazorla/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.21. Waste-water treatment plant in Donadío

- Population centre (municipality/province): Donadío (Úbeda/Jaén).
- Protected area: Paraje Natural Alto Guadalquivir.

- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.22. Waste-water treatment plant in Aldeaquemada

- Population centre (municipality/province): Aldeaquemada (Aldeaquemada/Jaén).
- Protected area: Paraje Natural Cascada de Cimbarra.
- Treatment system: biological treatment with extended aeration in two lines.
- Work and equipment: pre-treatment with mechanical solids removal, compact tank for biological treatment, disinfecting unit and sludge tank.

5.23. Waste-water treatment plant in Chilluevar

- Population centre (municipality/province): Chilluevar (Chilluevar/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.
- Work and equipment: pre-treatment with manual solids removal, primary sedimentation basin, bacterial bed and secondary settling basins.

5.24. Waste-water treatment plant in Orcera

- Population centre (municipality/province): Orcera (Orcera/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.
- Work and equipment: pre-treatment with manual solids removal, primary sedimentation basin, bacterial bed and secondary sedimentation basins.

5.25. Waste-water treatment plant in Segura de la Sierra

- Population centre (municipality/province): Segura de la Sierra (Segura de la Sierra/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.

- Treatment system: bacterial bed and forced aeration.
- Work and equipment: pre-treatment, primary sedimentation basin, bacterial bed, forced aeration.

5.26. Waste-water treatment plant in Génave

- Population centre (municipality/province): Génave (Génave/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: bacterial bed.
- Work and equipment: solids removal, grease, stabilisation tank, biological treatment and secondary sedimentation.

5.27. Waste-water treatment plant in Fuente Segura

- Population centre (municipality/province): Fuente Segura (Santiago Pontones/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.
- Work and equipment: pre-treatment with manual solids removal, primary sedimentation basin, bacterial bed and secondary sedimentation basins.

5.28. Waste-water treatment plant in La Matea

- Population centre (municipality/province): La Matea (Santiago Pontones/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.
- Work and equipment: pre-treatment with manual solids removal, primary sedimentation basin, bacterial bed and secondary environment basins.

5.29. Waste-water treatment plant in Benatae

- Population centre (municipality/province): Benatae (Benatae/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.

- Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.
- Work and equipment: pre-treatment with manual solids removal, primary sedimentation basin, bacterial bed and secondary sedimentation basins.

5.30. Waste-water treatment plant in Hornos

- Population centre (municipality/province): Hornos (Hornos/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: biological treatment using bacterial beds with recirculation and forced aeration.
- Work and equipment: pre-treatment with manual solids removal, primary sedimentation basin, bacterial bed and secondary sedimentation basins.

5.31. Waste-water treatment plant in Huesa

- Population centre (municipality/province): Huesa (Huesa/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: bacterial bed.
- Work and equipment: pre-treatment, anaerobic lagoons, bacterial bed.

5.32. Collectors and waste-water treatment plant in Cortijos Nuevos

- Population centre (municipality/province): Cortijos Nuevos (Segura de la Sierra/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: extended aeration.
- Work and equipment: pre-treatment, aeration, secondary sedimentation, sludge thickener and drying beds.

5.33. Collector sewers and waste-water treatment plant in Hinojares

- Population centre (municipality/province): Hinojares (Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: extended aeration.

- Work and equipment: reception unit, solids removal, grease removal, anoxic chamber, aeration unit, sedimentation, thickener.

5.34. Waste-water treatment plant in Santo Tomé

- Population centre (municipality/province): Santo Tomé (Santo Tomé/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: extended aeration.
- Work and equipment: inlet unit, solids removal, grease removal, anoxic chamber, aeration unit, sedimentation, thickener.

5.35. Waste-water treatment plant in La Iruela

- Population centre (municipality/province): La Iruela (La Iruela/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: biological treatment with extended aeration.
- Work and equipment: pre-treatment, compact tank for biological treatment, disinfecting unit and sludge tank.

5.36. Waste-water treatment plant in Arroyo Frío

- Population centre (municipality/province): Arroyo Frío (La Iruela/Jaén).
- Protected area: Parque Natural de Cazorla, Segura y Las Villas.
- Treatment system: physico-chemical treatment.
- Work and equipment: pre-treatment, chemical process, sludge treatment.

5.37. Waste-water treatment plant in Huelma

- Population centre (municipality/province): Huelma (Huelma/Jaén).
- Protected area: Parque Natural de Sierra Mágina.
- Treatment system: extended aeration.
- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.38. Waste-water treatment plant in Pegalajar

- Population centre (municipality/province): Pegalajar (Pegalajar/Jaén).
- Protected area: Parque Natural de Sierra Mágina.
- Treatment system: extended aeration.
- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.39. Waste-water treatment plant in Bedmar

- Population centre (municipality/province): Bedmar (Bedmar/Jaén).
- Protected area: Parque Natural de Sierra Mágina.
- Treatment system: extended aeration.
- Work and equipment: pumping, pre-treatment, extended aeration, disinfecting and sludge thickening.

5.40. Waste-water treatment plant in Jimena

- Population centre (municipality/province): Jimena (Jimena/Jaén).
- Protected area: Parque Natural de Sierra Mágina.
- Treatment system: extended aeration.
- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.41. Waste-water treatment plant in Úbeda

- Population centre (municipality/province): Albánchez de Úbeda (Albánchez de Úbeda/Jaén).
- Protected area: Parque Natural de Sierra Mágina.
- Treatment system: extended aeration.
- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.42. Waste-water treatment plant in Jódar

- Population centre (municipality/province): Jódar (Jódar/Jaén).
- Protected area: Parque Natural de Sierra Mágina.

- Treatment system: extended aeration.

- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.43. Waste-water treatment plant in Cambil

- Population centre (municipality/province): Cambil (Cambil/Jaén).
- Protected area: Parque Natural de Sierra Mágina.

- Treatment system: extended aeration.

- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.44. Waste-water treatment plant in Carchelejo

- Population centre (municipality/province): Carchelejo (Carcheles/Jaén).
- Protected area: Parque Natural de Sierra Mágina.

- Treatment system: extended aeration.

- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.45. Waste-water treatment plant in Torres

- Population centre (municipality/province): Torres (Torres/Jaén).
- Protected area: Parque Natural de Sierra Mágina.

- Treatment system: extended aeration.

- Work and equipment: pre-treatment, extended aeration, disinfecting and sludge thickening.

5.46. Building of collector sewers and treatment plants

- Population centre (municipality/province): Castril, Fuente Vera and Las Almontaras (Castril/Granada).

- Protected area: Parque Natural de la Sierra de Castril.

- Treatment system: biological treatment using rotating biological contactors and Imhoff tanks.

- Work and equipment: desander, degreaser, Imhoff tank, biocylinders, secondary sedimentation basin and reservoir.
- 5.47. Waste-water treatment plant in Alcalá de los Gazules**
- Population centre (municipality/province): Alcalá de los Gazules (Alcalá de los Gazules/Cádiz).
 - Protected area: Parque Natural de los Alcornocales.
 - Treatment system: percolating filter.
 - Work and equipment: pre-treatment, anaerobic lagoons, percolating filter, secondary sedimentation.
- 5.48. Waste-water disposal for Pozo del Camino and la Redondela**
- Population centre (municipality/province): Isla Cristina (Isla Cristina/Huelva).
 - Protected area: Paraje Natural Marismas del Río Carrera.
- 5.49. Waste-water treatment plant in Aracena**
- Population centre (municipality/province): Aracena (Aracena/Huelva).
 - Protected area: Parque Natural de la Sierra de Aracena.
 - Treatment system: bacterial bed.
 - Work and equipment: pre-treatment, anaerobic lagoons, bacterial bed, secondary sedimentation basin.
- 5.50. Waste-water treatment plant for Jabugo, Los Romeros and El Repilado**
- Population centre (municipality/province): Jabugo, El Repilado y Los Romeros (Jabugo/Huelva).
 - Protected area: Parque Natural de la Sierra de Aracena.
 - Treatment system: extended aeration.
 - Work and equipment: pre-treatment, primary sedimentation, biological reactor, secondary sedimentation.
- 5.51. Waste-water treatment plant in Cumbres Mayores**
- Population centre (municipality/province): Cumbres Mayores (Cumbres Mayores/Huelva).
- Protected area: Parque Natural de la Sierra de Aracena.
 - Treatment system: peat bed.
 - Work and equipment: pre-treatment, anaerobic lagoons, peat bed.
- 5.52. Waste-water treatment plant in Cortegana**
- Population centre (municipality/province): Cortegana (Cortegana/Huelva).
 - Protected area: Parque Natural de la Sierra de Aracena.
 - Treatment system: peat bed.
 - Work and equipment: pre-treatment, anaerobic lagoons, peat bed.
- 5.53. Waste-water treatment plant in Cañada de Cañepla**
- Population centre (municipality/province): Cañada de Cañepla (María/Almería).
 - Protected area: Parque Natural de Sierra Cabrera-Bedar, Sierra María y Alhamilla.
 - Treatment system: peat bed.
 - Work and equipment: pre-treatment, peat beds, maturation lagoon.
- 5.54. Waste-water treatment plant in Piar de Abajo**
- Population centre (municipality/province): El Piar de Abajo (El Piar de Abajo/Almería).
 - Protected area: Parque Natural de Sierra María-Los Vélez.
 - Treatment system: physical-chemical treatment.
 - Work and equipment: pre-treatment, sedimentation, digestion.
- 5.55. Waste-water treatment plant in Bédar**
- Population centre (municipality/province): Bédar (Bédar/Almería).
 - Protected area: Parque Natural de Sierra Cabrera-Bedar, Sierra María y Alhamilla.
 - Treatment system: peat bed.
 - Work and equipment: pre-treatment, peat beds, maturation lagoon.

6. Objectives:

This project aims to comply with the Spanish national plan for waste-water treatment, established for the transposition of Council Directive 91/271/EEC and the provisions of the Andalusian environment plan relating to waste-water treatment and the preservation of protected areas.

The specific aims of the project are:

- to provide the above population centres with secondary waste-water treatment. This involves installing a treatment capacity of 1 224 m³/h,
- to equip these population centres with collector systems, involving the construction of 62 918 metres of collector sewers,
- the above measures will protect natural waterways and considerably improve the health levels of the areas they cover, directly benefiting a present population equivalent of 143 520.

The main parameters of the results to be obtained can be seen in the following tables:

Project	Design population	Design volume: (m ³ /hour)	Length of collector sewers (m)	BOD5 on entry (mg/l)	BOD5 on exit (mg/l)	SS on entry (mg/l)	SS on exit (mg/l)
1	800	6	800	300	25	450	30
2	920	8	1 600	300	25	450	30
3	900	6	700	300	25	450	30
4	2 560	21	1 346	230	25	241,25	35
5	4 650	39	1 625	320	25	180	25
6	518	6	2 380	275	25	320	25
7	2 862	15	928	390	25	475	35
8	1 698	32	337	204	25	155	35
9	400	15	3 673	300	25	300	35
10	3 196	23	928	59	25	61,2	30
11	3 782	27,57	4 845	371	25	450	35
12	807	12	3 204	300	25	450	25
13	3 500	29	674	282	25		35
14	4 100	30	1 850	394	25		35
15	2 000	15	560	343	25		35
16	100	1	0	300	25	450	25
17	100	1	0	300	25	450	25
18	300	4	0	300	25	450	25
19	425	6	0	300	25	450	25
20	600	9	0	300	25	450	25

Project	Design population	Design volume: (m ³ /hour)	Length of collector sewers (m)	BOD5 on entry (mg/l)	BOD5 on exit (mg/l)	SS on entry (mg/l)	SS on exit (mg/l)
21	300	4	0	300	25	450	25
22	1 200	17	0	300	25	450	25
23	1 523	13	1 025	430	40	550	40
24	3 301	83	844	300	25	360	25
25	862	7	698	395	40	475	40
26	1 249	11	1 955	300	25	450	25
27	119	1	1 113	260	25	200	25
28	952	8	3 728	262	40	451	40
29	1 300	10	240	375	25	350	25
30	280	2	240	440	40	545	40
31	2 428	38	1 394	300	40	360	40
32	2 000	16	474	300	25	360	25
33	836	9	216	260	25	346	25
34	5 300	55	1 536	300	25	360	25
35	1 091	9	0	360	40	360	40
36	1 600	12	216	250	25	305	25
37	7 152	54	46	380	25	400	25
38	5 800	33	29	380	25	400	25
39	4 000	20	0	492	25		25
40	3 112	22	0	353	25		35
41	1 000	5	29	380	25	400	25
42	15 614	117	806	333	25		35
43	4 000	22	0	588	25		35
44	2 574	17	872	380	25		35
45	2 000	7	1 536	380	25	400	25
46	3 221	25	1 390	213	40	299,7	40
47	6 000	50	674	213	25	240	35
48	4 500	76	4 230	—	—	—	—
49	8 000	83	500	90	25	450	25
50	4 000	29	4 000	300	25	450	25
51	4 000	30	3 000	300	25	450	25

Project	Design population	Design volume: (m ³ /hour)	Length of collector sewers (m)	BOD5 on entry (mg/l)	BOD5 on exit (mg/l)	SS on entry (mg/l)	SS on exit (mg/l)
52	7 000	59	2 500	300	25	450	25
53	623	5	1 923	460	25	298	35
54	600	10	0	250	25	305	25
55	1 365	11	2 254	300	25	274	35

1. Escullar, 2. Bayarcal, 3. Alhama de Almería, 4. Abruena, 5. Fiñana, 6. Ocaña-Dña. María, 7. Canjayar, 8. Ohanes, 9. Paterna del Río, 10. Laujar, 11. Fondón, 12. Trevezel, 13. La Pechina, 14. Tabernas, 15. Sorbas, 16. Puente de la Cerrada, 17. Valdecazorla, 18. Veracruz, 19. Solana de Torralba, 20. El Molar, 21. Donadío, 22. Aldequemada, 23. Chilluevar, 24. Orcera, 25. Segura de la Sierra, 26. Génave, 27. Fuente Segura, 28. La Matea, 29. Benatae, 30. Hornos, 31. Huesa, 32. Cortijos Nuevos, 33. Hinojares, 34. Santo Tomé, 35. La Iruela, 36. Arroyo Frío, 37. Huelma, 38. Pegalajar, 39. Bedmar, 40. Jimena, 41. Albalchez de Úbeda, 42. Jódar, 43. Cambil, 44. Carchelejo, 45. Torres, 46. Castril, Fuente Vera y Las Almontaras, 47. Alcalá de los Gazules, 48. Isla Cristina, 49. Aracena, 50. Jabugo-Los Romeros, El Repilado, 51. Cumbres Mayores, 52. Cortegana, 53. Cañada de Cañepla, 54. Piar de Abajo, 55. Bedar.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.2.1997	31.12.1999

8. *Economic and social cost-benefit analysis:*

A cost-benefit analysis has been carried out for each project on the basis of the following assumptions:

- working life of the treatment plants = 20 years,
- residual value = 0,
- discount rate = between 6 % and 3 %.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged,
- re-use of treated water.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

An analysis of the various indicators obtained from the economic analysis of the group of projects shows a positive present discounted value for all discount rates applied.

The internal rate of return (IRR) is 17,6 %, demonstrating the environmental benefits of

these projects, in view of how little revenue is generated by the re-use of the treated water.

9. *Environmental impact analysis:*

This group of projects improves the quality of water by providing treatment facilities to municipalities which lack them or expanding and improving existing facilities. It also permits water to be re-used for ecological purposes in certain cases. The group of projects is therefore coherent and consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project helps protect those environmental resources for which the protected areas were legally declared such from pollution from the waste water discharged by the population centres covered by the measures. It thus protects the quality of water resources and how they are used and significantly improves the quality of the environment.

In particular, the project makes a significant contribution to public health and safety by considerably reducing the level of pathogens in the population environment. By improving the quality of water resources, the channelling and treatment of waste water also contributes to the propagation and diversification of aquatic life, and thus also life in general.

The planned measures are both preventive (permitting the elimination of elements which directly threaten the environment and public health and safety) and palliative (permitting the recovery of natural waterways currently affected by urban waste which the project aims to eliminate).

10.	<i>Cost and assistance:</i>		Pechina	679 615
	Total cost:	ECU 25 906 239	Albanchez de Úbeda	270 710
	Eligible cost (after 14 May 1997):	ECU 25 868 323	Tabernas	582 524
	Rate of assistance:	80 %	Jódar	758 095
	Cohesion Fund grant:	ECU 20 694 658	Sorbas	382 830
	Breakdown of cost by project (in ECU):		Cambil	338 289
	Escullar	280 773	Puente Cerrada	14 616
	Benatae	206 306	Carchelejo	316 294
	Bayarcal	295 461	Valdecazorla	15 478
	Hornos	155 661	Torres	293 850
	Alhama de Almería	292 166	Veracruz	84 470
	Huesa	432 206	Castril	734 148
	Abrucena	628 621	Solana de Torralba	119 056
	Cortijos Nuevos	348 178	Alcalá de los Gazules	1 191 769
	Fiñana	916 404	El Molar	102 686
	Hinojares	222 060	Isla Cristina	1 295 491
	Ocaña-Doña María	419 088	Donadío	95 989
	Santo Tomé	682 526	Aracena	958 394
	Canjayar	545 793	Aldeaquemada	187 330
	La Iruela	439 412	Jabugo	658 896
	Ohanes	426 887	Chilluevar	432 709
	Arroyo Frío	303 811	Cumbres Mayores	479 197
	Paterna del Río	1 010 440	Orcera	476 334
	Huelma	597 792	Cortegana	658 896
	Laujar de Andarax	1 309 921	Segura de la Sierra	298 618
	Pegalajar	472 087	Cañada de Cañepla	411 810
	Fondón	1 108 328	Génave	545 979
	Bedmar	368 197	El Piar de Abajo	82 062
	Trevelez	391 097	Fuente Segura	184 946
	Jimena	281 342	Bedar	501 719
			La Matea	580 966
			Total	<u>25 868 323</u>

ANNEX

FINANCING PLAN

Project No: 97/11/61/031

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1=2+11													
1997	10 670 247	10 670 247	100	8 536 198	80	2 134 049	20		2 134 049				
1998	10 160 848	10 160 848	100	8 128 678	80	2 032 170	20		2 032 170				
1999	5 037 228	5 037 228	100	4 029 782	80	1 007 446	20		1 007 446				
Total	25 868 323	25 868 323	100	20 694 658	80	5 173 665	20		5 173 665				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/032

1. **Name:** Specifically, the waste-water treatment plant will consist of the following:
- Waste-water disposal for the catchment areas of the Guadarrama and Pantueña rivers and expansion of the waste-water treatment plants at Aranjuez and Algaete in the Autonomous Community of Madrid.
- Solids reception chamber with retaining bars and a bivalvular scraper.
 - Solids removal through three screened channels for coarse solids and three for fine solids, two of which will have a mechanical cleaning system; effluent weir for waste water extraction from solids removal unit.
 - Compact grit and grease removal units, with vertical pumps for grit removal; air flotation unit; grit-washing mechanism.
 - Mixing-flocculation of reagents for chemical precipitation, one line.
 - Separation of flow to primary sedimentation into five channels: two sealed for this phase, two for primary sedimentation, and one by-pass; two circular primary sedimentation basins, 19 m in diameter.
 - Biological treatment with aeration in two 3 250 m³ tanks; secondary sedimentation in two 24 m diameter basins equipped with scrapers.
 - Extraction of sludge from the primary and secondary sedimentation basins; differentiated thickening of excess primary and secondary sludge; a gravity thickener 12 m in diameter and a floater 9 m in diameter.
 - Thickened sludge pump and anaerobic digestion in a 2 500 m³ tank; sludge heating system; storage and thickening of digested sludge consisting of a 240 m³ post-thickener.
 - Dewatering of sludge and removal of dewatered sludge; extraction of digestion gas and storage in a gasometer consisting of a 560 m³ floating 0-bell; gas supply network for the sludge-heating circuit heaters and unit for burning off excess gas.
 - Computer systems for data collection and plant management.
 - Service facilities such as water, waste-water disposal, electricity, etc.
 - Buildings to house solids reception and removal, chemical reaction processes, laboratories, technical management and administration, etc.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Canal de Isabel II
- 3.2. **Address:** C/ Santa Engracia, 125
28003 Madrid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Autonomous Community of Madrid
Municipalities: Villaviciosa de Odón, Boadilla del Monte, Torreloñe, Galapagar, Mahadahonda, Aranjuez, El Escorial, Algete, Villalbilla, Torres de la Alameda, Loeches
5. **Description:**
- Building of three new waste-water treatment plants, expansion of four treatment plants and construction of collector sewers. The group of projects is made up of the following measures:
- 5.1. **New waste-water treatment plant at Boadilla del Monte**
- Building of a pump station and a force main to the new waste-water treatment plant. The work involves:
1. A pump station consisting of four 250 kW pumps each with a throughflow of 780 m³/h.
 2. 1 400 m of ductile iron pipes with a 600 mm diameter for the force main.
 3. Treatment plant with coagulation-flocculation physical-chemical treatment and a biological process using activated sludge at average loading.

5.2. New waste-water treatment plant at Villaviciosa de Odón

Building of a pump station, a force main to the new waste-water treatment plant. The work involves:

1. A pump station consisting of four 160 kW pumps each with a throughflow of 533 m³/h.
2. 1 250 m of ductile iron pipes with a 500 mm diameter for the force main. A 1 700 m gravity sewer with class D reinforced concrete pipes, 1 000 mm in diameter.
3. Treatment plant comprising a biological process using activated sludge at low loading, including nitrification and pre-denitrification phases using an anoxic area at the head of the reactor.

Specifically, the waste-water treatment plant will consist of the following:

- Solids reception unit equipped with retaining bars and a bivalvular scraper.
- Removal of fine solids through three systems, two of which are equipped with a mechanical cleaning system.
- Sedimentation and extraction of grit in two aerated-type grit and grease removal units.
- Two low-load biological reactors with an anoxic zone at the head and sludge stabilisation; secondary sedimentation in two circular basins.
- Gravity sludge thickener. Band-filter.
- Service facilities such as water, waste-water disposal, electricity, etc.
- Buildings to house solids removal, laboratories, technical management and administration, etc.

5.3. New waste-water treatment plant at Torreldones-Galapagar

Building of a new waste-water treatment plant and sewers to convey waste water to the plant. The work involves:

1. 1 750 m of sewers and collector sewers.
2. 2 450 m of force mains.
3. Treatment plant with a biological process using activated sludge with elimination of nutrients and sludge stabilisation.

Specifically, the waste-water treatment plant will consist of the following:

- Reception unit for coarse solids equipped with mechanically cleaned bars, followed by fine solids removal using mechanically cleaned screens.
- Grit and grease removal in two aerated units.
- Primary sedimentation basins with flocculant and coagulant proportioning.
- Biological treatment with secondary sedimentation.
- Sludge thickening; anaerobic digestion; dewatering; hopper for storage of dewatered sludge; system for recycling digestion gas for use.
- Service facilities such as water, waste-water disposal, electricity, telephone lines, etc.
- Buildings to house solids removal, laboratories, technical management and administration, etc.

5.4. Expansion of waste-water treatment plant at Arroyo de El Plantio

Expansion of waste-water treatment facilities:

- Building of a third primary settling unit.
- Conversion of the aerobic digester to a biological reactor.
- Building of a third secondary settling unit.

New sludge treatment facilities:

- New sludge line with sludge stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.5. Expansion of waste-water treatment plant at Aranjuez

Expansion of waste-water treatment facilities:

- Building of a third primary sedimentation basin.
- Conversion of the aerobic digester to a biological reactor.
- Building of a third secondary settling unit.

New sludge treatment facilities:

- New sludge line with stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.6. Expansion of waste-water treatment plant at Los Escoriales

Expansion of waste-water treatment facilities:

- Building of a third primary sedimentation basin.
- Conversion of the aerobic digester to a biological reactor.
- Building of a third secondary sedimentation basin.

New sludge treatment facilities:

- New sludge line with stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.7. Expansion of waste-water treatment plant at Algete

Expansion of waste-water treatment facilities:

- Building of a third primary sedimentation basin.
- Addition of another unit to the biological reactor.
- Building of a third secondary sedimentation basin.

6. Objectives:

The aim of the measures in this group of projects is to provide facilities to treat waste water discharged in the catchment areas of the Guadarrama and Pantueña rivers and to increase the treatment capacity of the plants in the municipalities of Aranjuez and Algete in the Autonomous Community of Madrid.

The group of projects complies with Directive 91/271/EEC, which sets 31 December 2000 as the deadline for construction of collector sewers and treatment plants in municipalities of more than 15 000 inhabitants equivalent.

These projects will also:

- contribute to urban development in the Guadarrama catchment area, where the new waste-water treatment plants will serve a present population equivalent of 205 000, with a further 45 000 present population equivalent served by expanding existing waste-water treatment plants.
- Contribute to urban development of the municipalities of Aranjuez and Algete by providing waste-water treatment for a further present population equivalent of 50 000 by expanding the existing treatment plants.
- to convey sewage discharged in the Pantueña catchment basin to the existing waste-water treatment plant in Velilla de San Antonio.

New sludge treatment facilities:

- New sludge line with stabilisation by oxygen injection.
- Building of a thickener.
- Building of a centrifugal unit to increase dewatering capacity.

5.8. Sewer from Villalbilla, Torres de la Alameda, Loeches to the Velilla de San Antonio waste-water treatment plant

This project concerns the conveyance of waste water from four municipalities via collector sewers and sewers to the Velilla de San Antonio waste-water treatment plant. The following collector sewers are used:

Class D reinforced concrete piping

Diameter (mm)	Length (m)
400	12 310
500	7 796
600	4 966
800	8 463
Total	33 535

The sludge produced in the treatment planned in items 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, and 5.7 must be treated and disposed of in a controlled tip or used in agriculture, in accordance with Directive 86/278/EEC.

	Boadilla del Monte	Villaviciosa de Odón	Torrelo-dones-Galapagar	Arroyo el Plantio	Aranjuez	Los Escoriales	Algete	Villalbilla, etc.
Present population (inhabitants)		60 000		40 000	60 000	50 000	12 000	
Present population equivalent (p.e.)								
Design population	60 000	120 000		60 000	90 000	75 000	32 000	
Design population equivalent (p.e.)			85 000					
Total average BOD5 on entry (mg/l)	240	262	200	300	186	300	325	
Total average BOD5 on exit (mg/l)	< 25	< 25	25	< 25	< 25	< 25	30	
Total average SS on entry (mg/l)	300	306	200	360	257	350	400	516
Total average SS on exit (mg/l)	< 35	< 35	38	< 35	< 35	< 35	< 35	
Average daily volume of water (m ³ /day)	15 000	30 000	15 000	15 000	30 000	18 750	8 000	
Industrial waste (%)		20						

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.7.1997	30.9.1997
Purchase of land	1.7.1997	31.12.1997
Main work	1.10.1997	30.9.1999

8. *Assessment of costs and socio-economic advantages:*

A cost-benefit analysis has been carried out on the basis of the following assumptions:

- working life of the treatment plants = 20 years,
- residual value = 35 %,
- discount rate = 7 %.

The following asset factors were considered:

- water rates or charges,

- financial estimate of the environmental benefit of reducing the level of pollutants discharged.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The results obtained are:

- internal rate of return = 26 % for the group of projects,
- internal rate of return = Boadilla 18 %; Villaviciosa 18 %; Torrelo-dones 23 %; El Plantio 29 %; Aranjuez 25 %; Los Escoriales 30 %; Algete 63 %, Villalbilla, Torres and Loeches outfalls 48 %.

9. *Environmental impact analysis:*

The group of projects in question is intended to improve the quality of the waste water discharged in the catchment areas of the Guadarrama and Pantueña rivers and increase the capacity of the treatment plants in the municipalities of Aranjuez

y Algete. The group of projects is therefore a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The measures as a whole comply with the plan for the collection and treatment of waste water of the Autonomous Community of Madrid (1995–2005), which aims to improve the quality of water and river ecosystems by full compliance with both the requirements and deadlines laid down for the treatment of urban waste water in Directive 91/271/EEC.

The planned measures preventive in that they reduce the pollution loading from the current discharge downstream of the treatment plants in question.

10. Cost and assistance:

Total cost:	ECU 28 518 203
Eligible cost (after 14 May 1997):	ECU 28 518 203
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 22 814 562

ANNEX

FINANCING PLAN

Project No: 97/11/61/032

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	% 3=2/1	4	% 5=4/2	Total 6=8+9	% 7=6/2	Central government 8				Other 9	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	598 996	598 996	100	479 197	80	119 799	20		119 799				
1998	13 357 612	13 357 612	100	10 686 089	80	2 671 523	20		2 671 523				
1999	14 561 595	14 561 595	100	11 649 276	80	2 912 319	20		2 912 319				
Total	28 518 203	28 518 203	100	22 814 562	80	5 703 641	20		5 703 641				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/035

1. **Name:** Integrated waste-treatment plant at Rubí (second phase).
 out non-biodegradable material, which is then transported to the thermolysis plant.
2. **Body responsible for the application:** Organic material is biodegraded in two stages, by hydrolysis and methanisation.
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria M.E.H. Anaerobic digestion comprises the following:
- 2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid
- *Weighing machine:* Entry and registration point for the organic fraction to be treated in the digestion plant.
 - *Unloading and feeding point:* Point where the organic fraction from selective waste collection is deposited.
 - *Sorting drum:* Separates bulky fragments or products arriving at the plant.
 - *Metallic separator:* Any impurities in the organic fraction (plastic, metal, etc.) are separated manually. The waste is then passed through a magnetic separator which removes any iron.
 - *Grinding:* The organic fraction is homogenised by grinding.
 - *Mixer:* The ground material is mixed with (mainly recirculated) water.
 - *Digestors:* These are used to methanise the organic fraction. The sealed containers are lagged to maintain optimum fermentation conditions.
 - *Biogas line and gasometer:* The biogas produced in the digestors is stored for subsequent use.
 - *Compressor and pressurisation:* Pressurisation and compressor systems ensure proper combustion.
 - *Steamheater and co-generator:* The plant is equipped to co-generate energy by burning biogas. The motors produce electricity and residual heat. The electricity is used in the plant (lighting, motors, pumps, etc.) and the heat is used to heat the mix and keep the digestors at a constant temperature.
 - *Separation of phases (solid-liquid):* This consists of various mechanical equipment to separate digested solids from water.
3. **Body responsible for implementation:**
- 3.1. **Name:** Generalitat de Catalunya
 Departamento de Medio Ambiente
 Junta de Residuos
- 3.2. **Address:** Provenza 204-208
 08036 Barcelona
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Catalonia
5. **Description:**
- This is the second phase of a project in the same location already financed by the Cohesion Fund.
- This phase involves installing an anaerobic digestion plant and a thermolysis plant to treat waste from Rubí and Sant Cugat del Vallés and expanding the tipping area.
- Anaerobic digestion plant**
- The anaerobic digestion plant will have facilities for pre-treatment and anaerobic biological treatment of organic material.
- Pre-treatment:**
- The organic fraction resulting from grading has a high moisture content (dry matter content of 20 to 30%) with little structural material; it is stored in a 200 m³ pit.
- The waste is taken from the pit by conveyor belt to a mill for fine grinding. The ground waste is sorted wet in a tank specially designed to separate

- *Process water tanks*: The effluent from separation is stored and re-used for the mix.
- *Feeder-conveyor belt*: The converted and separated solids are stored for subsequent use as fertilisers in the municipality (parks and gardens) and in the plant itself (garden area).

Thermolysis plant

Thermolysis is chemical degrading by the cracking of organic compounds (decomposition of hydrocarbons). It can be applied to both the perishable fraction of waste and plastic, paper, wood, etc. It consists of heat treatment at between 450 and 550°C at atmospheric pressure in a rotating reactor.

Thermolysis transforms the material into a powdered fuel with a calorific value similar to that of lignite. Metals and glass mixed in with the organic material are not transformed during treatment, merely heated. As the treatment does not involve combustion, metals are not oxidised. This is the difference between thermolysis and incineration.

Thermolysis is usually combined with a co-generation unit, i.e. a facility which converts the gases distilled and fuel produced in the thermoliser into energy.

In the Rubí thermolysis facility, the coarse waste fraction will be mass treated after grading.

A storage unit will be installed between the grading and thermolysis areas to contain any waste that cannot be treated in the event of 24-hour breakdown.

The waste will be finely ground and homogenised in a grinder or mill for transportation by the thermolysis equipment. A grapnel or bivalvular scraper will extract the waste from the storage area at the rate of processing and place it on a conveyor belt for transportation to the mill.

The waste will be dried prior to treatment, to reduce the moisture content to around 15%. Drying will be done by air heated by thermal exchange with the fumes from the distillation gases of the thermoliser.

The ground and dried waste will be treated for about two hours in the thermoliser.

A solid product extractor will extract the resultant fuel for subsequent refinement. This will include separation of metals by flotation and chlorine retention. These materials will then be re-used independently.

A vacuum pump will extract the distillation gases from the thermoliser, which will be filtered and then condensed if condensable, or burned if not.

Condensed water from cleaning will be treated by osmosis and ion exchange.

The plant will consist of:

- a reception pit for the waste mass,
- a mill for grinding the waste,
- a storage hopper for the milled waste,
- a drier,
- a thermoliser,
- a unit for purification of gases distilled by thermolysis,
- a settling unit for solids from thermolysis,
- a grading/re-use unit for settled metals and glass,
- a washing unit for solids from thermolysis,
- a co-generation unit,
- a water treatment unit.

Tipping area

The area will be sealed with an impermeable lining and equipped with a system to collect leachates, a leachate basin and all the features required for proper operation of the facility.

The tip will be equipped to receive waste from the thermolysis and anaerobic digestion processes and other waste from Rubí and environs suitable for disposal there.

6. Objectives:

This project provides advanced waste treatment facilities and completes the facilities for the proper treatment of waste initiated by the first phase of the project.

The anaerobic digestion plant has a design capacity of 23 000 tonnes/year. Assuming that the organic fraction entering the plant has a dry matter content of between 30 and 35 %, the following by-products will be obtained:

- biogas: 10 %,
- non-biodegradable material: 10 %,
- compostable organic material: 40 %,
- waste water: 40 %.

A 6 500 m² site is needed for plant, which will have a nominal power of 1 000 kW.

50 % of the energy produced as net biogas will be consumed in plant operation.

The thermolysis plant has a design capacity of 20 000 tonnes/year and will need a 2 375 m² site. Nominal power will be 750 kW.

Thermolysis allows waste to be converted into a carbon compound similar to lignite known as carbor, which can be used as a source of energy or as a solid material. Gas, water and hydrocarbons are also produced in smaller quantities. These secondary products are recirculated in the process. The carbor is used as an energy source in the treatment facilities themselves.

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.9.1997	30.11.1998

8. *Assessment of costs and socio-economic advantages:*

Economic analysis has been carried out for a 20 years period.

It is based on the following assumptions:

- Investment costs; operating costs are not considered since the relevant local taxes levied on households by the councils of Rubí and Sant Cugat will cover these costs exactly.

— Quantifiable benefits:

- reduction in the use of land for tipping by reducing the volume of waste, with a subsequent reduction in tip cleaning costs and leachate treatment;
- no expenditure on transport to dump.

Other social benefits may be added to these which are difficult to quantify, such as prolonging the working life of the tip, reducing petrol consumption and atmospheric pollution.

The internal rate of return is 11 %.

9. *Environmental impact analysis:*

1. The plant will minimise the space needed for tipping while recycling and re-using waste.

Given that the organic fraction entering the anaerobic digestion plant has a dry matter content of between 30 and 35 %, the following by-products will be obtained: biogas, non-biodegradable materials, compostable organic material, waste water. A further aim is the safe disposal of all waste which cannot be recycled or re-used, by means of heat treatment which converts the waste into a carbon compound similar to lignite, which can be usable as an energy source or a solid material.

2. Leachates will be treated in appropriate facilities.

10. *Cost and assistance:*

Total cost: ECU 10 015 951

Eligible cost
(after 14 May 1997): ECU 10 015 951

Rate of assistance: 80 %

Cohesion Fund grant: ECU 8 012 761

ANNEX

FINANCING PLAN

Project No: 97/11/61/035

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government				8	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	2 583 358	2 583 358	100	2 066 687	80	516 671	20		516 671				
1998	7 432 593	7 432 593	100	5 946 074	80	1 486 519	20		1 486 519				
Total	10 015 951	10 015 951	100	8 012 761	80	2 003 190	20		2 003 190				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/037

1. **Name:**
Watercourse restoration and forestry rehabilitation of Arás-Biescas torrent (first stage).
2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (MEH)
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
 - 3.1. **Name:** Dirección General de Conservación de la Naturaleza
Subdirección General de Política Forestal
 - 3.2. **Address:** Gran Vía de San Francisco, 4
28005 Madrid
4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Aragon
5. **Description:**
There have been several works projects in recent years to control this torrent. The correction system for the watercourse, designed to prevent flooding, failed to cope with the adverse weather conditions of August 1996, which had a heavy material and human cost.

The restoration project is intended to bring the correction system back into operation, but this time the dimensions of the work will be calculated on the basis of a flow volume which reflects the current situation. This is a two-stage project. The first stage, which is presented for financing, comprises the urgent works and structures needed to ensure basic safety in view of the flood risk. The second stage, which will be implemented later, will complete the correction of the watercourse through the ravine.

The first stage comprises the following:
 1. Drafting of the full correction project;
2. Implementation stage: correction of the watercourse in the bed of the Arás ravine:
 - repair and improvement of existing pipeline;
 - construction of a floodway to deflect water resulting from exceptionally heavy rainfall into the spillway;
 - adaptation of the spillway or overflow pipe to accommodate exceptionally large flows;
 - construction of three floodbanks and two sills with the following functions:
 - bank I: retention, buffer surface, directing water flows to the spillway and overflow pipe,
 - bank II and sill IIa: closure and retention of bed load,
 - bank III and sill IIIa: retention, consolidation of banks;
 - repair and reinforcement of seven floodbanks damaged by exceptionally high water;
 - rock filling at four points on the waterway for the protection and consolidation of embankments;
 - further work:
 - general cleaning and removal of bed load,
 - enhancement of environment and landscape,
 - access to structures.
6. **Objectives:**
The purpose of the project is to correct the watercourse in the Arás ravine, in the commune of Biescas. It is intended to reduce the risk of flooding in the debris cone of the ravine, which could damage the roadway and even lead to retention of the waters of the Gallego, thus endangering the population of Biescas.

Another objective of this project is to reduce bed load and suspended load, thus preventing sedimentation in the Sabiánigo reservoir,

with gradual reduction of its capacity, while at the same time improving water quality. In other words, the project is also intended to improve water resource management in terms of both quality and quantity.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	28.10.1996	30.6.1997
Main work	1.12.1996	31.12.1997

8. **Assessment of costs and socio-economic advantages:**

The benefits of this type of watercourse and forest restoration work are to be found in their long-term benefits to society, especially in this case, where the objective of the project is to restore a catchment area where serious floods occurred in August 1996 with disastrous consequences for the inhabitants.

The costs and benefits of the project are as follows:

- investment costs,
- quantified benefits:

- reduced risks of flooding;
- reduced loss of forest soil;
- reduced silting of reservoirs;
- increased general welfare.

The internal rate of return is 9,5%.

9. **Environmental impact analysis:**

The objective is to reduce the risk of flooding caused by exceptionally high rainfall, thus protecting people and amenities. At the same time, the project is intended to improve flow regulation and water quality, and to prevent silting of reservoirs.

10. **Cost and assistance:**

Total cost:	ECU 7 209 372
Eligible cost (after 23 May 1997):	ECU 6 722 740
Rate of assistance:	85 %
Cohesion Fund grant:	ECU 5 714 329

ANNEX

FINANCING PLAN

Project No: 97/11/61/037

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8				9	
1997	6 722 740	6 722 740	100	5 714 329	85	1 008 411	15	1 008 411					
Total	6 722 740	6 722 740	100	5 714 329	85	1 008 411	15	1 008 411					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/038

1. **Name:** Waste management in the Canary Islands, first phase.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Conserjería de Política Territorial de Canarias
Viceconsejería de Medio Ambiente
- 3.2. **Address:** C/Tomás Morales, nº 3
35003 Las Palmas de Gran Canarias
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Canary Islands
- 4.3. **Municipality:** Arico, Las Palmas de Gran Canarias, Gáldar-Guía
5. **Description:**
1. Environmental complex for the treatment of solid urban waste in Arico, Tenerife: the group of projects comprises the following:
- (a) Pressing plant: comprising three 40 tonnes/h presses with sufficient capacity to cope with the solid urban waste sent to Arico. The principal objective is to reduce the volume of waste deposited at the Arico tip, thus increasing its working life and at the same time reducing the production of leachates. The amount of volatile waste will also be reduced.
- (b) Extension of the existing Arico tip: the work will include a series of measures to divert the run-off from the Guasiegro gully by means of a channel and a rubble dam,
- (c) Inactivated-waste tip: the work will include preparing the land for the tip, sealing the ground and installing a drainage system, a leachate reservoir and pumping equipment.
- (d) Waste storage area: a partly enclosed covered area for the selective collection of domestic refuse, with access for lorries and space for the storage of recyclable material in bays with access for loading and unloading. The area will also have a baling press fed by a conveyor belt with a hopper and grab bucket.
2. Salto del Negro Environmental Complex (Gran Canaria). This will involve the following series of projects:
- (a) Improvement and extension of the Salto del Negro tip: various measures intended to turn the existing tip into an environmental complex capable of receiving, in addition to solid urban waste, inactivated waste, hospital waste, inert waste, etc. and housing the installations necessary for storing reusable materials.
- (b) Inactivated-waste tip: preparation of the tip area, sealing the ground and installation of a drainage system, a leachate reservoir and pumping equipment. The tip, similar to the Arico environmental complex, will take industrial waste whose composition permits it to be classified as urban waste or which is no longer toxic or hazardous following suitable treatment.
- (c) Selective collection storage area: a partly enclosed covered area for the selective collection of domestic refuse, with access for lorries and space for the storage of recyclable material in bays with access for loading and unloading. The area will also have a baling press fed by a conveyor belt with a hopper and grab bucket.
- The Salto del Negro and Arico environmental complexes will not accept toxic or hazardous waste. Hospital waste (non-hazardous) will receive special treatment, as will disposal of leachates.

3. Guía-Gáldar Transfer Centre (Gran Canaria)

The centre will be located near the northern highway between the municipalities of Gáldar and Sta Maria de Guía in Gran Canaria on 6 000 m² of land designated for industrial use and will comprise the transfer centre itself, waste-loading and unloading areas, access roads, etc.

The only infrastructures necessary for operation of the centre are an electricity supply, lighting, telephone lines and access roads.

The planned transfer centre will be of the fixed type with a hopper and stationary compactor equipped with a handling system for 38/40 m³ capacity containers permitting empty containers to be loaded without the need for container-handling vehicles, thus increasing the system's capacity. The handling system will also be suitable for selective collection since it will be able to handle specific containers for different types of waste which will then be filled by a single compactor.

Hazardous waste will be transferred immediately to special treatment centres and will not be stored.

6. Objectives:

The principal aims of the project are:

- the disposal of solid urban waste which cannot be recycled, thus preventing uncontrolled tipping, damage to the landscape and the pollution of land and water,
- suitable treatment for industrial waste which can be considered as urban waste and waste which must not be treated with solid urban waste,
- disposal of industrial waste from the toxic and hazardous waste inactivation plants,
- reduction of the cost of transporting solid urban waste.

Quantified objectives:

	Arico	Salto del Negro	Gáldar-Guía	Group of projects
Population affected	685 000	725 000	37 000	1 410 000
Solid waste (t/year)	350 000	300 000	50 000	700 000
Industrial waste which may be treated as urban waste (t/year)	5 000	5 000		10 000
Inactivated waste (t/year)	5 000	6 000		11 000

The purpose of the series of projects is to attain the objectives described in the previous section via the construction of environmental complexes complying with current Community rules and providing separate areas for different types of waste (urban and inactivated industrial waste and non-toxic, non-hazardous industrial waste whose physical characteristics make it unsuitable for treatment together with urban waste).

Each project aims to attain the said objectives by means of controlled tipping on each island, extending the existing tips on Tenerife and Gran

Canaria and creating storage areas for recyclable materials collected at recycling points.

The Tenerife and Gran Canaria environmental complexes will each have a suitable area for non-toxic, inactivated industrial waste from CEPESA and Unelco.

The transfer centre will considerably reduce and rationalise the cost of transporting solid urban waste from the densely populated north-western part of Gran Canaria.

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	23.5.1997	1.10.1997
Purchase of land	1.10.1997	1.3.1998
Main work	1.10.1997	31.12.1999

8. *Assessment of costs and socio-economic advantages:*

The cost-benefit analysis gives an internal rate of return of 9% for the group of projects as a whole.

The IRR for the Arico environmental complex is 9%, for Salto del Negro, 7% and for the Gáldar-Guía Transfer Centre, 4%.

The analysis took account of the following:

- a working life of 15 years,
- investment, operating and maintenance costs,
- income from charges and the sale of recyclable materials,
- prevention of pollution of land,
- improvement of the landscape,
- reclamation of land,
- reduction of pollution,
- savings on transport costs.

9. *Environmental impact analysis:*

The principal objectives laid down in Article 130R are the preservation, protection and improvement

of the environment and the protection of human health. The aims pursued by this group of projects are closely linked to the objectives concerned in that they will contribute to the disposal of solid urban waste and industrial waste, both that which can be treated together with urban waste and special industrial waste.

The Fifth Programme lays down a three-stage outline strategy for waste-management policy: reducing the production of waste, recovering the waste produced and the safe disposal of that waste. These projects contribute to the achievement of this latter objective via the creation or extension of environmental complexes, thus preventing the dispersion of waste and contributing to the conservation and protection of the environment and the efficient management of waste in the Canary Islands.

The projects comply with the following Directives:

- Directive 75/442/EEC of 15 July 1975, on waste, and amendments thereof,
- Directive 91/698/EEC of 12 December 1991, on hazardous waste, and amendments thereof,
- Directive 94/62/EC of 20 December 1994, on packaging and packaging waste.

10. *Cost and assistance:*

Total cost: ECU 16 775 992

Eligible cost
(after 23 May 1997): ECU 16 775 992

Rate of assistance: 80%

Cohesion Fund grant: ECU 13 420 794

ANNEX

FINANCING PLAN

Project No: 97/11/61/038

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government	Other				
1=2+11					6=8+9		8	9	10	11	12=11/1	13	
1997	1 122 423	1 122 423	100	897 938	80	224 485	20		224 485				
1998	6 897 467	6 897 467	100	5 517 974	80	1 379 493	20		1 379 493				
1999	8 756 102	8 756 102	100	7 004 882	80	1 751 220	20		1 751 220				
Total	16 775 992	16 775 992	100	13 420 794	80	3 355 198	20		3 355 198				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/039

1. **Name:**

Waste-water treatment in the Canary Islands.

 - basin for treated waste water: facility for storing waste water treated by the plant, which will serve at the same time to provide suction for the pumping units;
2. **Body responsible for the application:**
 - pump station: to pump treated water to the La Zamora equalising basin;
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
 - delivery from the treatment plant to La Zamora: double pipeline to carry treated water from the treatment plant to the equalising basin to be located at La Zamora (Los Realejos);
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
 - La Zamora equalising basin: double basin for equalising the flow pumped from the treatment plant and acting as the point of departure for re-use lines;
3. **Body responsible for implementation:**
 - westward line: pipeline over 12 400 m to carry treated waste water from the Orotava valley to the Icod district, feeding into the La Tabona distribution reservoir;
- 3.1. **Name:** Consejería de Obras Públicas
Viviendas y Aguas
Gobierno Autónomo de Canarias
 - La Tabona distribution reservoir: a control structure to be located in the municipality of La Guancha, below the La Tabona reservoir;
- 3.2. **Address:** Edificio de usos multiples
Las Palmas de Gran Canaria
 - general collector for Los Realejos: gravity sewer, mostly running along the same route as the re-use lines, for collecting waste-water from the urban centre of Los Realejos.
4. **Location:**
 - general collector for Los Realejos: gravity sewer, mostly running along the same route as the re-use lines, for collecting waste-water from the urban centre of Los Realejos.
- 4.1. **Member State:** Spain
- 4.2. **Region:** Canary Islands
5. **Description:**

Group of three projects concerning the treatment and re-use of waste water in order to eliminate the negative environmental effects of discharging waste water and to reduce removal from the aquifer, which is heavily over-exploited.

The project involves the construction of the infrastructure for the disposal and re-use of waste water in the Orotava Valley and the laying of general collectors, mostly along the same route as the pipelines carrying treated water for re-use.

The parts of the project to be implemented are:

 - receiving basin for sewage from all the general collector sewers in the valley, including the necessary screens;
- 5.1. **General collector sewers to carry waste water in the Orotava valley (Tenerife)**

Expanding the plant will require the installation of a new water treatment line to treat a through flow of 3 000 m³/day. This will include new primary and secondary settling basins, adaption of the aerobic digestors to serve as reactors, installation of an anaerobic sludge digester and improvements to the plant's existing facilities and equipment. Tertiary treatment facilities will be installed with a capacity of 1 000 m³/day, with two equalising tanks for untreated and treated water, and the offshore outfall will be expanded.

This will involve the installation of:

 - four basins (including the two settling basins),
- 5.2. **Expansion and improvement of the waste-water treatment plant at Guía-Gáldar (Gran Canaria)**

The Guía-Gáldar waste-water treatment plant was commissioned in 1989. The plant cannot cope with the additional flow of waste water now coming to it from new settlements, so the existing facilities are to be expanded and improved.

- 2 000 m of polyethylene pipeline with a diameter of 400 mm,
- 10 units of electromechanical equipment.

5.3. Expansion and improvement of the waste-water treatment plant for south-west Gran Canaria

The waste-water treatment plant for south-west Gran Canaria was commissioned in 1990. The population explosion in this district means that the plant can no longer treat the volumes of waste water coming to it. Hence the need to expand and improve it.

Expanding the plant will require the installation of a new water treatment line to treat a through flow of 6 000 m³/day, including expanding the inlet structure, a structure for distributing the flow for primary treatment, two aeration tanks or reactors, two primary settling basins, two secondary settling basins, a new sludge thickening basin and expansion of the gasometer, sludge dewatering facilities and additional facilities and structures, including an extension to the offshore outfall.

This will involve the installation of:

- seven basins (including the settling basins, reactors and thickening basin),
- 700 m of pipeline with a diameter of 800 mm,
- 20 units of electromechanical equipment

6. Objectives:

The aims vary according to the project:

General collector sewers to carry waste water in the Orotava valley: the aim is to bring the waste water generated by various settlements dispersed throughout the valley to the treatment plant and to build a system to distribute treated water for re-use in the neighbouring districts. The measure will benefit 100 000 inhabitants.

Expansion and improvement of the waste-water treatment plant at Guía-Gáldar: the aim is to enable the existing plant to meet the increased needs of the area and to provide it with tertiary treatment for 1 000 m³/day. The corresponding lifting capacity is also planned, as is the installation of a 3 000 m³ equalisation basin, to benefit 50 000 inhabitants.

Expansion and improvement of the waste-water treatment plant for south-west Gran Canaria: the aim is to increase the treatment capacity of the existing plant to meet the needs of the increased population. Installation of tertiary treatment facilities will mean that almost all the waste water can be re-used for agriculture. The measure will benefit 100 000 inhabitants.

7. Work schedule:

Category of work	Commencement	Completion
Project planning	1.2.1997	1.10.1997
Main work	1.12.1997	31.12.1999

8. Assessment of costs and socio-economic advantages:

The economic analysis was made for a working life of 18 years using the following factors:

- investment costs. The operating and maintenance costs will be covered by a treatment tax paid by users,
- environmental benefits:
 - improved water quality, valued in economic terms by the pollution load of the effluent, measured in pollution units,
 - re-use of the treated water will mean an equivalent volume will not have to be taken from the over-exploited aquifer. Economic evaluation of this saving takes account of the intrinsic value of water taken from the aquifer.

The internal rate of return for the set of projects is 11 %.

9. Environmental impact analysis:

The projects will lead to the re-use of 19 000 m³/day of water, with a reduction of the same volume in the extraction from the aquifer. This allows maximum use to be made of available resources, at the same time as preventing the pollution of ground and surface water by providing treatment for 21 000 m³/day of waste water.

The projects are included in the national waste-water treatment plant, the water quality plan for the Canary Islands and the island hydrological plans, all aimed at complying with Directive 91/271/EEC.

Rate of assistance: 80 %

Cohesion Fund grant: ECU 10 669 871

Sludge from treatment must be taken to a controlled tip or used in agriculture in accordance with Directive 86/287/EEC.

Breakdown of cost (in ECU):

10. *Cost and assistance:*

1. Collectors, Orotava valley, Tenerife 6 079 904

2. Guía-Gáldar treatment plant, Gran Canaria 2 721 538

Total cost: ECU 13 337 339

3. South-west Gran Canaria treatment plant 4 535 897

Eligible cost (after 23 May 1997): ECU 13 337 339

Total 13 337 339

ANNEX

FINANCING PLAN

Project No: 97/11/61/039

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	8				9	
1997	1 201 562	1 201 562	100	961 250	80	240 312	20		240 312				
1998	7 209 373	7 209 373	100	5 767 498	80	1 441 875	20		1 441 875				
1999	4 926 404	4 926 404	100	3 941 123	80	985 281	20		985 281				
Total	13 337 339	13 337 339	100	10 669 871	80	2 667 468	20		2 667 468				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/040

1. *Name:*

Supply and treatment of water on the Mediterranean coast of Andalusia.

2. *Body responsible for the application:*

2.1. *Name:* Dirección General de Análisis y Programación Presupuestaria

2.2. *Address:* Paseo de la Castellana, 162
28071 Madrid

3. *Body responsible for implementation:*

3.1. *Name:* Dirección General de Obras Hidráulicas

3.2. *Address:* Avda. República Argentina 43,
2º y 3a
41011 Seville

4. *Location:*

4.1. *Member State:* Spain

4.2. *Region:* Andalusia

5. *Description:*

The planned measures are grouped into three projects:

- (a) A distribution reservoir in Marbella for the supply of water to the western Costa del Sol (Malaga).
- (b) Pipeline from the Casasola dam to the supply line for the drinking-water treatment plants at El Atabal and Pilonos.
- (c) Water supply and waste-water disposal and treatment for the municipalities of the association of municipalities of the Costa Tropical de Granada. This project will be implemented jointly with other measures covered by a single contract for the management of water supply and waste-water disposal and treatment for the Costa Tropical de Granada and all relevant works. The project includes five treatment plants, two supply measures, and seven disposal measures.

The main work to be carried out for each project is described below:

5.1. **Distribution reservoir in Marbella (Malaga)**

The project includes:

- building a semi-subterranean reinforced concrete distribution reservoir for treated water, with a capacity of 20 000 m³;
- installing a 600 mm diameter ductile iron pipeline from the general supply system for the western Costa del Sol to the reservoir;
- installing 700/800 mm diameter ductile iron pipeline from the reservoir to the distribution network;
- works relating to the outlet, drainage and emptying of the reservoir and associated work (electricity, service repairs, etc.).

5.2. **Casasola-Pilonos Pipeline (Malaga)**

The project involves installing a pipeline from the Casasola dam to the supply canal for the left bank of the Guadalhorce river, with an overall length of 9 587 m and a diameter of 1 500 mm, except for the first 200 m, which will have a diameter of 1 000 mm. Work includes building a valve house and installing control systems, remote control and power supply.

5.3. **Water supply and waste-water disposal and treatment for the Costa Tropical de Granada**

This project consists of 14 measures involving treatment plants, water supply and waste-water disposal.

5.3.1. *Treatment plants*

(1) WASTE-WATER TREATMENT PLANTS AT LA HERRADURA AND CARCHUNA-CALAHONDA

Type of treatment: biological.

The main treatment phases include:

- (a) intake unit (settling pond),
- (b) solids removal (one mechanical line with a screen, one manual line with a rack),
- (c) grit and grease removal (fine bubble diffusers),
- (d) flow measurement,
- (e) biological reactor with nitrification/denitrification,

- (f) aeration system,
- (g) secondary sedimentation (two units),
- (h) dephosphatation (two lines),
- (i) sludge handling (removal, thickening, pumping, dewatering, storage),
- (j) other facilities (air network, drinking water, odour treatment; septic pond intake).

(2) CASTELL DE FERRO WASTE-WATER TREATMENT PLANT

Type of treatment: biological, extended aeration at low loading.

The main treatment phases include:

- (a) removal of coarse solids (two units),
- (b) screening,
- (c) grit removal (two static units),
- (d) grease removal (one unit),
- (e) biological reactor (extended aeration, four turbines),
- (f) secondary sedimentation (two units),
- (g) disinfecting,
- (h) sludge handling (removal, gravity thickening, band filter dewatering).
- (i) other facilities (power supply, drinking water, etc).

(3) ALBUÑOL WASTE-WATER TREATMENT PLANT

Type of treatment: biological.

The main treatment phases include:

- (a) removal of coarse solids (one unit),
- (b) screening (one unit),
- (c) grit removal,
- (d) secondary sedimentation (one unit),
- (e) dephosphatation (one line),
- (f) service work (power supply, controls).

(4) VELEZ DE BENAUDALLA TREATMENT PLANT

Type of treatment: peat bed.

The main treatment phases include:

- (a) channel for solids removal,

- (b) grit/grease removal (double unit),
- (c) peat screen; six basins with three layers:
 - 50 cm of peat,
 - 15 cm of sand,
 - 15 cm of gravel,
- (d) collector to the river,
- (e) associated work (service hut, access road, etc.).

5.3.2. *Water supply*

(1) SUPPLY BRANCH PIPELINE TO MOTRIL AND TORRENUOVA (PHASES I AND II)

- (a) Mains pipeline: from the Molvizar reservoir to the Salobreña and Almuñecar branch pipeline.
 - Diameter: 1 000 mm.
- (b) Mains pipeline: from the Salobreña-Almuñecar branch pipeline to the Motril and Torrenueva branch pipeline.
 - Diameter: 700 mm.
- (c) Pipeline to Motril:
 - Diameter: 500 mm.
- (d) Pipeline to Torrenueva:
 - Diameter: 400 mm.

(2) PHASE II OF THE MOLVIZAR PLANT

This phase expands the supply capacity by 100 000 inhabitants by the design year, with a planned supply of 250 litres per inhabitant per day.

This measure involves extending the filtering area of the treatment building to accommodate new filters, connecting these to the existing system and expanding the compressed air facilities, power supply and central control system.

5.3.3. *Waste-water disposal*

(1) CONVEYANCE OF WASTE WATER TO THE TREATMENT PLANT AT LA HERRADURA

- Pumping: four groups of pump-motor units.
- Pipeline: 3 400 m of 350 mm diameter.
- Minor work.

(2) CONVEYANCE OF WASTE WATER TO THE TREATMENT PLANT AT CARCHUNA-CALAHONDA

— Four force mains, including 17 pumps of varying power and associated piping.

— Length: 4 807 m; diameter: 100 to 350 mm.

(3) WASTE-WATER DISPOSAL FOR CARCHUNA AND LA CHUCHA

Includes 6 946 m of 300 mm diameter piping and 2 pumps.

(4) OFFSHORE OUTFALLS

Three new outfalls are to be build (Calahonda, Melicena and Los Yesos) and four pump stations are to be overhauled.

Main features:

(a) Carchuna-Calahonda outfall

— Land outfall: length: 1 557 m; diameter: 450 mm.

— Offshore outfall: length: 600 m; diffusers: 2475 mm diameter discharge spouts.

(b) Melicena outfall

— Length: 700 m.

— Diameter: 160 mm.

(c) Los Yesos outfall

— Length: 600 m.

— Diameter: 160 mm.

(d) Renovation of the pump stations at Castillo de Barrios, La Mamola, La Rabita and El Pozuelo.

The following renovation work will be carried out on each station:

1. Installation of self-cleaning rack.

2. Renovation of structure.

3. Overhaul and improvement of electro-mechanical equipment.

(5) WASTE-WATER PIPELINE TO THE CASTELL DE FERRO TREATMENT PLANT

1 640 m of piping and two pumps.

(6) ALBUÑOL SYSTEMS

(a) Drainage systems: 16 297 m of piping with diameters of between 200 and 300 mm.

(b) Supply systems: 8 600 m of piping with diameters of between 63 and 110 mm.

(7) CENTRALISING WASTE FROM JETE, LENTEJIL, LOS GUAJARES AND MOLVIZAR

Includes 2 436 m of 300 and 400 mm diameter piping.

6. Objectives:

This group of projects provides water supply and waste-water treatment infrastructure to a number of locations on the Mediterranean coast of Andalusia affected by both heavy tourist development and low rainfall.

These circumstances aggravate the water shortage throughout Andalusia, which calls for more efficient management of water resources and installation of costly infrastructure which cannot be paid for solely by the affected municipalities.

The previous section describes how each measure fits into the general strategy, relating either to the distribution, quantity and quality of water supplied to the population (supply measures), or the conveyance and treatment of waste-water and protection against environmental pollution (waste-water disposal networks, treatment plants and outfalls).

The specific aims of each project are presented in the following table:

Project	Inhabitants served	Supply (m ³ /day)	Treated (m ³ /day)
Marbella distribution reservoir	55 000	13 750	
Casasola-Pilones pipeline	600 000	50 000	
Costa Tropical Granada	300 000	25 000	18 550

The main parameters of the treatment plants in the project for the Costa Tropical de Granada are presented in the following table:

	La Herradura	Carchuna-Calahonda	Castell de Ferro	Albuñol	Velez de Benaudalla
Present population	43 000	17 800	8 500	2 500	2 400
Present population equivalent (p.e.)	43 000	17 800	8 500	2 500	2 400
Design population	51 000	21 000	10 000	4 000	4 000
Design population equivalent (p.e.)	51 000	21 000	10 000	4 000	4 000
Total average BOD5 on entry (mg/l)	435	300	250	300	240
Total average BOD5 on exit (mg/l)	< 35	< 35	< 20	< 35	< 120
Total average SS on entry (mg/l)	342	350	200	250	200
Total average SS on exit (mg/l)	< 35	< 35	< 25	< 35	< 35
Average daily volume of water (m ³ /day)	9 000	5 250	2 500	1 500	1 000
Industrial waste (%)	0,0	0,0	0,0	0,0	0,0

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project		March 1993
Main work	March 1997	December 1999
Operational phase	January 2000	

— evaluation of the improvement in supply to the population (savings in expenditure on alternative sources in the vent of supply problems),

— financial estimate of the environmental benefit of reducing the pollution loading of discharge in the case of disposal and treatment projects,

— revenue from re-use of treated water.

8. **Assessment of costs and socio-economic advantages:**

A cost-benefit analysis has been carried out on the following basis:

- utility value of the infrastructure = 20 years,
- net book value = 0,
- discount rate = 6 %.

The following asset factors were considered:

- sanitation tax,

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The results obtained are positive from a financial and environmental point of view.

— Internal rate of return = 22,49 %

— Present discounted value = ESP 10 431 million.

9. *Environmental impact analysis:*

1. The group of projects improves the management of water resources and water quality by providing sewer systems and treatment facilities to municipalities which lacked them. The group of projects is a coherent one and contributes to achieving the objectives of Article 130R of the EC Treaty and the Fifth Community programme of policy and action in relation to the environment and sustainable development.

The population of the (mostly coastal) municipalities covered by the projects sometimes trebles in summer, making it difficult to guarantee water supply. The negative effects of waste-water discharge into the sea must also be reduced as much possible. This and the question of environmental impact are of great importance for the development of tourism in the area and thus for its socio-economic development.

The project also complies with Directive 75/440/EEC concerning the quality required of

surface water intended for the abstraction of drinking water and Directive 91/271/EEC concerning urban waste-water treatment.

2. Effluent must receive secondary treatment before it is discharged through the Calahonda outfall. Discharge with primary treatment only will be permitted provided a study is carried out on dispersion in the discharge area, with positive results, and provided the area is identified as a less sensitive area in accordance with Directive 91/271/EEC.

10. *Cost and assistance:*

Total cost: ECU 23 848 825

Eligible cost
(after 23 May 1997): ECU 20 482 791

Rate of assistance: 80 %

Cohesion Fund grant: ECU 16 386 233

ANNEX

FINANCING PLAN

Project No: 97/11/61/040

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other	11	12=11/1	
		2=4+6+10	3=2/1	%	4	5=4/2	6=8+9	7=6/2	8				
1=2+11													
1997	4 552 370	4 552 370	100	3 641 896	80	910 474	20		910 474				
1998	9 488 458	9 488 458	100	7 590 767	80	1 897 691	20		1 897 691				
1999	6 441 963	6 441 963	100	5 153 570	80	1 288 393	20		1 288 393				
Total	20 482 791	20 482 791	100	16 386 233	80	4 096 558	20		4 096 558				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/041

1. **Name:** Conveyance and treatment of waste water for Oja-Tirón, Rioja, in Spain. plant via two collectors fitted with spillways to restrict access to the plant to a maximum of five times the average flow.
2. **Body responsible for the application:** Water treatment:
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
- 2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Desarrollo Autonómico, Administraciones Públicas y Medio Ambiente Dirección General Calidad Ambiental.
- 3.2. **Address:** Prado Viejo, 62bis 26071 Logroño, La Rioja
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Rioja
5. **Description:**

The project involves the construction of collector sewers and a treatment plant for residential waste water from the different communities discharging into the Oja and Tirón rivers which flow into the river Ebro.

Collector sewers

Two collectors are planned, the first covering a distance of 13 720 m from Cuzcurrita to Haro, via Tirgo, Cihuri and Aguciana and the second running for 12 078 m from Bañares to Cihuri, collecting sewage from Castañares de Rioja and Casalarreina. The two collectors will intercept at Cihuri, carrying the sewage from all the urban settlements in the area. As the sewage flow increases, the collector will increase in diameter, from 300 mm through 400, 500 and 600 to 800 mm.

Treatment plant

A biodisc process has been chosen. Waste water from the municipalities will arrive at the treatment

plant via two collectors fitted with spillways to restrict access to the plant to a maximum of five times the average flow.

Water treatment:

- grit chamber with bar screen to keep back the coarsest solids,
- four submersible pumps,
- two sand traps,
- two primary settling basins,
- biological treatment consisting of two lines of biodiscs, each with four stages,
- secondary sedimentation in two circular basins.

Plans have been made to expand the water-treatment capacity by adding more primary and secondary settling basins.

Sludge treatment:

- two covered gravity thickening basins,
- aerobic digestion,
- 120 m³ storage basin with mixer,
- dewatering units.

6. Objectives:

The project will contribute to the objectives of the sanitation law. Because of the area's strategic position in the region, the project will have a very positive impact on improving the quality of water resources.

	High season	Low season
Population	32 000	16 000
Average flow (m ³ /hour)	333	167
Peak flow (m ³ /hour)	584	312
SS concentration (mg/l)	360	360
SS loading (kg/day)	2 880	1 440
BOD concentration (mg/l)	260	260
BOD loading (mg/l)	2 080	1 040

The values on exit are:

- SS loading (kg/day) 35 ppm
- BOD concentration (mg/l) 25 ppm
- Dryness of sludge 25 %

— estimate of the environmental benefits of treating the waste water discharged into public water courses and the subsequent improvement in water resources.

The internal rate of return is 0,066 %.

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project	15.7.1997	15.12.1997
Purchase of land	15.12.1997	15.2.1998
Main work	1.1.1998	31.12.1999

8. Assessment of costs and socio-economic advantages:

The cost-benefit analysis was made for a period of 20 years, this being the average life span of treatment plants. The following parameters were taken into account:

- costs: investment, operation and maintenance,
- benefits:
 - sanitation tax,

9. Environmental impact analysis:

The installation of a conveyance system and treatment plant for waste water will have an appreciable impact in improving water resources, both surface water (the rivers Oja, Tirón and Ebro) and ground water (the local aquifer).

The project meets the requirements of Directive 91/271/EEC and the planned measures are preventive, since they concern the correction of water pollution caused by municipalities discharging waste water into public water courses.

10. Cost and assistance:

Total cost:	ECU 11 114 849
Eligible cost (after 23 May 1997):	ECU 11 114 849
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 8 891 879

ANNEX

FINANCING PLAN

Project No: 97/11/61/041

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8				9	
1997	252 696	252 696	100	202 156	80	50 540	20		50 540				
1998	5 431 076	5 431 076	100	4 344 861	80	1 086 215	20		1 086 215				
1999	5 431 077	5 431 077	100	4 344 862	80	1 086 215	20		1 086 215				
Total	11 114 849	11 114 849	100	8 891 879	80	2 222 970	20		2 222 970				

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/042

1. **Name:**
Water-supply facilities in various towns in the Autonomous Community of Castile-Leon.
2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
 - 3.1. **Name:** Consejería de Medio Ambiente y Ordenación del territorio
 - 3.2. **Address:** Nicolás Salmerón, 5
47071 Valladolid
4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Autonomous Community of Castile-Leon
5. **Description:**
There are six groups of projects.
 - 5.1. **Facilities for the supply of water to Segovia**
These involve the following projects:
 - 5.1.1. **Rancho El Feo**
Three supply conduits from Puente Alta, Valsain and La Aceveda to the Rancho El Feo drinking-water treatment plant.

Rancho El Feo drinking-water treatment plant, comprising a chamber for dosing reagents, two 13 m diameter sedimentation tanks, four 30 m² open filters, one 10 000 m³ reservoir and disinfection facilities using sodium hypochlorite and chlorine gas (pre- and postchlorination). The plant will be fully automated with central measurement of all variables.

Definition of the work necessary to supply water to the towns of Peñas de Erizo, Parque Robledo and Quitapesares from the regulating reservoir.
 - 5.1.2. **San Ildefonso, La Granja**
A pumping station and pressure conduits from the Pontón Alto Dam to the El Cuadrado Reservoir.
 - 5.1.3. **Mancomunidad de la Atalaya**
A pumping station and pressure conduits from the Pontón Alto Dam to the drinking-water treatment plant. Construction of the Atalaya drinking-water treatment plant.
 - 5.2. **Joint facilities for the supply of water to the Cerrato Sur and Alto Pisuerga Districts.**
 - 5.2.1. **Cerrato Sur**
85 m² intake well in the River Pisuerga and installation of pumps.

Pressure conduits from the well to the drinking-water treatment plant.

Drinking-water treatment plant: 150 m³ sedimentation tank, filtration system and 1 200 m³ reservoir for the storage of treated water.

Pumping station on the site of the drinking-water treatment plant with three pumps (each with a capacity of 20,8 l/s at 30 m).

Head reservoir.

Principal distribution network for the towns of Alba de Cerrato, Cevico de la Torre, Cevico Navero, Vertavillo, Valle de Cerrato, Villaconancio, Cubillas de Cerrato, Población de Cerrato and Hérmedes de Cerrato. Gravity conduits will be used except in the case of Hérmedes de Cerrato which will require two reservoirs and a pumping station.
 - 5.2.2. **Alto Pisuerga**
The work will involve the construction of various catchment and distribution systems:

Supplies to Caleda, Vañes, Rabanal, Valsadornin and Gamedo:
 - construction of two small dams on the Villar stream for intake,
 - conduit 1 056 m long to the existing Celada Reservoir,
 - conduit 2 140 m long from the Celada Reservoir to Rabanal,
 - three branch conduits 522 m, 2 780 m and 2 328 m long.
Supplies to Porquera de los Infantes and Villallano from Camesa:
 - distribution conduit from the Camesa Reservoir to the towns of Villallano and Porquera de los Infantes (total of 4 949 m of conduit),

- construction of a 30 m³ reservoir in Villallano and a 120 m³ reservoir in Porquera.

Supplies to Llanillo and Mundilla from Peña La Yedra:

- intake at the Peña La Yedra spring,
- 2 503 m of conduit to a 60 m³ reservoir for the use of both towns,
- distribution conduits to the towns of Llanillo (1 259 m) and Mundilla (1 703 m).

Supplies to Cillamayor:

5 280 m of conduit from the existing Matamorisca Reservoir to the Cillamayor Reservoir.

Supplies to Revilla de Pomar:

construction of a catchment dam and 1 360 m of conduit.

Supplies to Puentetoma from Fuentecaliente:

1 740 m of conduit.

Supplies to Villaescusa de las Torres:

construction of a small dam, a 16 m³ reservoir and conduit.

Supplies to Corvio, Quintanilla de las Torres, Canduela, Corralejo and Villavega de Aguilar:

construction of collecting ditches and improvements to the existing supply systems.

5.3. Facilities for the supply of water to the Upper Oca Valley (drinking-water treatment plant and conduit from the Alba Reservoir to Bureba District)

Conduit from the existing Alba Reservoir to the town of Briviesca. 25 km of 300 mm diameter ductile steel piping.

Treatment plant with a treatment capacity of 120 l/s. Sedimentation tank, filters with air and water backwashing, filtered water reservoir, treated water reservoir, dewatering of sludge on drying beds.

Branch supply conduits to the various towns in the Upper Oca Valley (21 800 m).

5.4. Facilities for the supply of water to Medina del Campo and Olmedo in the Valladolid area

The work involves the following:

- construction of a dam on the River Adaja (84,5 m),

- pumping unit (pumps with a capacity of 220 m³/h at 20 m),

- drinking-water treatment plant with a capacity of 8 850 m³/day consisting of a plate-type sedimentation tank, a gravity sand filter with air and water backwashing and installations for the recirculation and dewatering of sludge from the sedimentation tank,

- pumping to the Medina del Campo Reservoir; 6 676 m of 350 mm diameter piping. Pumping to the Olmedo Reservoir; 4 433 m of 200 mm diameter piping,

- reservoirs for treated water at Medina del Campo (8 550 m³) and Olmedo (1 852 m³),

- transport under gravity to the existing distribution systems in Medina (11 266 m of 500 mm diameter piping) and Olmedo (3 108 m of 300 mm diameter piping).

5.5. Facilities for the supply of water to areas on the left bank of the River Tormes (Reservoir in 'La Pinilla', Salamanca)

Construction of a rectangular, two basin regulatory reservoir of 65 000 m³ capacity in reinforced concrete faced with lightened, prestressed reinforced concrete sheets.

A high-level 1 000 m³ capacity reservoir to supply areas higher up.

Rectangular control building attached to the reservoir which will contain the pumps (four-unit pumping station), control valves, control panel, etc.

Distribution network: 171 m of 150 mm to 400 mm diameter piping; 267 m of 500 mm diameter piping; 162 m of 700 mm to 800 mm piping; 379 m of 900 mm piping.

Supply of electricity, site development, lighting, landscaping, etc.

5.6. Facilities for the supply of water to the districts of La Serrezuela and Cuerda del Calvitero

La Serrezuela

Two networks will be installed, in the upper and lower areas.

Upper area

Construction of a 200 000 m³ capacity reservoir on the Pasaderas stream in the Zapardiel basin.

20 874 m of 63 mm to 250 mm diameter PVC and polyethylene piping to supply Zapardiel de Cañadad, Martínez, Arevalillo, Aldealabad de Mirón, Mercadillo and Narrillos del Alamo in the Province of Ávila.

Lower area

Construction of a dam on the River Agudín in the municipality of Pascualcobo to create a 400 000 m³ capacity reservoir.

34 485 m of 63 mm to 250 mm diameter polyethylene and PVC piping to supply

Pascualcobo, San Miguel de la Serrezuela, Diego Alvaro and Carpio Medianero in Ávila and Chagarcía Medianero, Horcajo Medianero, Valjimina, Sanchopedro de Abajo, el Tomillar and Larodrigo in Salamanca.

Cuerda del Calvitero

Construction of a 92 000 m³ capacity reservoir on the Carteseja stream in Becejas. 26 650 m of 50 mm to 200 mm diameter ductile steel piping.

6. Objectives:

The aim of the group of projects is to improve water-supply infrastructures in various parts of the Autonomous Community of Castile-Leon in order to guarantee adequate supplies of quality drinking water.

The detailed objectives are given below:

Project No: 97/11/61/042	1	2	3	4	5	6	7
Current population (habitants)	56 471	6 914		9 875	23 781		8 145
Design population (habitants)	59 720		26 472	12 442	35 250	71 620	9 796
Supply m ³ /day (volume of reservoir)	17 916	830	6 118	3 733	10 575	66 000	2 449
Current daily consumption (l/hab.)	200	120		180	245		200
Design daily consumption (l/hab.)	300		250	300	300		250
Water source: surface, well, etc.	Reservoir	Surface	Surface	Reservoir	Surface		Surface

1. Segovia; 2. Cerrato Sur; 3. Alto Pisuerga; 4. Bureba; 5. Medina y Olmedo; 6. La Pinilla Reservoir; 7. Calvitero y Serrezuela.

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project	1.5.1993	28.2.1997
Purchase of land	1.3.1995	31.7.1997
Main work	1.5.1997	31.12.1999

8. Assessment of costs and socio-economic advantages:

The economic analysis was carried out for a period of 25 years, considered to be the working life of the facilities.

The cost-effectiveness of the group of projects was calculated by calculating cash flows on the basis of the difference between the following costs and benefits:

- costs: investment costs; operating costs were not included because these will be covered by the charges paid by users;
- benefits: income during droughts (in certain cases only) and the social benefits, expressed in terms of *per capita* income, deriving from the guarantee of adequate water supplies to permit an acceptable and sustainable level of development.

The internal rate of return for the group of projects is 11,85 %.

9.	Environmental impact analysis:	Cohesion Fund grant:	ECU 30 688 277
	Through a rational utilisation of natural resources, the group of projects will help satisfy the drinking-water requirements and protect the health of the populations concerned. It will permit the social and economic development of the area while protecting the environment.	Breakdown of costs (in ECU):	
		Segovia	7 191 594
		Cerrato-Pisuerga	6 883 621
		Alto Oca	3 828 843
10.	Cost and assistance:	Medina-Olmedo	9 146 583
	Total cost:	Salamanca	5 197 336
		Serrezuela	6 112 369
	Eligible cost (after 27 May 1997):	Total	38 360 346
	Rate of assistance:	80 %	

ANNEX

FINANCING PLAN

Project No: 97/11/61/042

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other	11	%	
		2=4+6+10	%	3=2/1	4	%	5=4/2	6=8+9	%				
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	6 924 749	6 924 749	100	5 539 800	80	1 384 949	20		1 384 949				
1998	15 876 858	15 876 858	100	12 701 486	80	3 175 372	20		3 175 372				
1999	15 558 739	15 558 739	100	12 446 991	80	3 111 748	20		3 111 748				
Total	38 360 346	38 360 346	100	30 688 277	80	7 672 069	20		7 672 069				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/043

1. **Name:** Waste-water treatment facilities for different settlements in Castile-León.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Medio Ambiente y Ordenación del territorio
- 3.2. **Address:** Nicolás Salmerón, 5
47071 Valladolid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Castile-León
5. **Description:**
- The following projects are included:
- 5.1. **Waste-water treatment plant for the city of Zamora**
- The Junta of Castile-Leon and the municipality of Zamora plan to finance the final collector sewers to the future treatment plant.
- The treatment plant involves activated sludge treatment at low load, comprising:
- Water treatment, three lines:
- pump station,
 - aerated sand and grease removal,
 - three circular primary settling basins (1 333 m³),
 - three biological reactors (3 960 m³ each) with an anoxic area of 1 510 m³,
 - three secondary settling basins with a diameter of 33 m.
- Sludge handling:
- primary sludge thickener,
 - secondary sludge thickener/float,
 - anaerobic digester,
 - belt filter press for dewatering.
- 5.2. **Waste-water treatment plants in the catchment area of the Carrión river**
- Various different types of treatment are planned, in three subprojects:
- Treatment plant at Guardo and additional work at the plant at Velilla del Río Carrión*
- Construction of the treatment plant at Guardo, using activated sludge at half load, and additional work at the plant at Velilla del Río Carrión.
- Treatment plants at Dueñas and Saldaña*
- Includes installation of the outfalls and construction of the Dueñas treatment plant using biofilm (biodiscs). Treatment comprises preliminary treatment, primary sedimentation, biological treatment using biodiscs and disinfection using chlorine. Sludge handling comprises thickening and dewatering, with anaerobic digestion.
- Construction of the Saldaña treatment plant, with biodiscs and secondary sedimentation.
- Treatment plants at Paredes de Nava and Frómista*
- The Paredes de Nava plant will involve treatment by activated sludge at half load. The Frómista plant will have an Imhoff tank with a bacterial bed.
- 5.3. **Waste-water treatment plants in protected areas**
- This measure comprises the following subprojects:
- Sierra de Gredos*
- Construction of collector sewers.
- Covers 19 villages served by various waste-water treatment systems comprising glass fibre modules, settling basins, bioreactors and clarifiers. The extracted sludge is dewatered before being taken to the tips at Barco de Avila (for the settlements in the northern watershed) and at Arenas de San Pedro (for the settlements in the southern watershed).

Picos de Europa

Overhaul, cleaning and improvement of 15 existing small waste-water treatment systems. Construction of 13 new treatment systems comprising a coarse grit chamber, fine screening, Imhoff tank, two bacteria beds and a clarifier. Sludge handling will be carried out at the Riaño treatment plant.

Sierra de Urbión

Water treatment for 21 settlements. Construction of collector sewers. Repair, expansion and construction of treatment plants. Three types of treatment: septic pits, oxidation tanks or activated sludge. Sludge handling in Vinuesa. A tip will be built for the disposal of treated sludge.

Cañon del Río Lobo

Water treatment for 12 settlements. Construction of collector sewers. Repair, expansion and construction of treatment plants. Two types of treatment:

- Imhoff tank with bacteria bed,
- settling tank-digester with biodiscs and secondary settling tank.

Sludge handling will be carried out at the San Leonardo de Yagüe facilities.

5.4. Waste-water treatment plants for the Eresma river

Waste-water treatment in various settlements in the Eresma catchment area.

Two projects have priority:

Treatment plant at Coca

Construction of collector sewers. Treatment plant using extended aeration.

Treatment plant at El Espinar

Construction of collector sewers. Treatment plant using extended aeration.

6. Objectives:

This group of projects aims at providing waste-water treatment facilities for various municipalities in Castile-León which discharge into the Duero river.

The projects all comply with Directive 91/271/EEC.

The quantified objectives are:

Project No: 97/11/61/043	Zamora	Carrión river	Protected areas	Eresma river
Present population (inhabitants)	65 610	39 288	68 924	16 000
Present population equivalent (p.e.)	80 000	51 074	89 602	21 266
Design population (inhabitants)	83 307	63 192	110 860	20 180
Design population equivalent (p.e.)	124 000	82 150	114 119	32 245
Total average BOD5 on entry (mg/l)	270	300	300	300
Total average BOD5 on exit (mg/l)	<25	<25	<25	<25
Total average SS on entry (mg/l)	354	350	350	350
Total average SS on exit (mg/l)	<30	<35	<35	<35
Average daily through-flow of water (m ³ /day)	22 244	14 300	13 440	8 506
Industrial waste (%)	15	10	5	10

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.1.1995	31.7.1997
Purchase of land	1.10.1995	1.10.1997
Main work	15.6.1996	31.12.1999

8. *Assessment of costs and socio-economic advantages:*

The financial analysis is based on a discount rate of 6% and a working life for facilities and plant of 24 years, as well as:

- investment costs: operating costs were not taken into account since these will be offset by the waste-water treatment tax paid by users once the facilities start operating;
- benefits: account was taken of the environmental benefits of improving water quality. No market price can be attached to such benefits, so shadow prices have had to be used. Calculations are based on the financial value of the difference in the polluting load of the discharge, measured in pollution units, before and after treatment in the treatment plants. In one case, account was taken of the benefit from the re-use of treated water.

The internal rate of return obtained for the group of projects is 6,7%.

9. *Environmental impact analysis:*

All the projects meet the following environmental objectives:

- preservation, protection and improvement of the quality of the environment,
- sustainable management and prudent and rational use of water resources,
- integrated pollution control,
- water management,
- improvement of the quality of the environment and protection of human health,
- management of treated sludge for possible use in agriculture.

10. *Cost and assistance:*

Total cost:	ECU 34 334 312
Eligible cost (after 27 May 1997):	ECU 34 035 295
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 27 228 236
Breakdown of cost (in ECU):	
Zamora treatment plant	10 423 891
Carrión river treatment plants	7 971 654
Treatment plants for protected areas	10 237 104
Treatment plants for Eresma river	5 402 645
Total	<u>34 035 295</u>

ANNEX

FINANCING PLAN

Project No: 97/11/61/043

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1997	4 474 651	4 474 651	100	3 579 721	80	894 930	20		894 930				
1998	15 371 931	15 371 931	100	12 297 545	80	3 074 386	20		3 074 386				
1999	14 188 713	14 188 713	100	11 350 970	80	2 837 743	20		2 837 743				
Total	34 035 295	34 035 295	100	27 228 236	80	6 807 059	20		6 807 059				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/044

1. **Name:** Treatment centres for solid urban waste and sealing of tips in Castile-Leon.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Medio Ambiente y Ordenación del Territorio
- 3.2. **Address:** Nicolás Salmerón, 5
47071 Valladolid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Castile-Leon
5. **Description:**
- The following projects are included:
- 5.1. **Building of a treatment centre and six transfer stations for solid urban waste in the province of Zamora**
- Treatment centre*
- The treatment centre will be located in the El Montero area. When choosing the site, account was taken of hydrogeological factors affecting the protection of surface and subterranean aquatic environments and environmental considerations relating to the site's location. The centre will consist of the following areas:
- Service area: office buildings, work bays, lecture hall for environmental training and a building to house the workshop and warehouse;
 - Recycling area: reception area with an unloading hopper, conveyor belts, sizing drum, magnetic separator, primary and secondary sorting, containers for storing selected materials and engine control centre;
- Composting area: conveyor belt carrying organic material from the recycling area, grading area, composting beds, sizing and refining units and storage tower;
 - Disposal of discarded material: the tip will be waterproofed with high density polyethylene geomembrane 2 mm thick. Once the sheet has been spread, it will be covered with 50 cm of earth from the preparatory earthworks for the tip. A drainage system will be installed at the bottom of the tip to collect leachates and channel them into a basin.
- The facility will have the equipment and procedures necessary to minimise environmental impact. The dumping of waste in the tip will be supervised; waste will be deposited, compacted and covered daily. The waste will be periodically sprinkled with the leachates produced.
- A 200 m³ collection point for bulky waste and two 3 000 m³ leachate basins will be built.
- The Zamora treatment centre will receive solid urban waste from the transfer stations listed below. The planned waste capacity is 1 500 000 m³.
- Transfer plants*
- These will be located in the following municipalities: Bermillo de Sayago, Castrogonzalo, Gallegos del Río, Palacios de Sanabria, San Martín de Valderaduey and Toro.
- The transfer plants will have the following features:
- general infrastructure and services, with all buildings and infrastructure required for operation and one closed and one open container each with a capacity of 40 m³;
 - transfer area:
 - compacting system: one compactor with a capacity of 50 t/hour,
 - feeder hoppers,
 - wind screens,
 - container transport: two semi-trailers and a tractor will be used to transport containers from the transfer plants to the treatment centre,
 - loading and unloading platforms,
 - access to platforms.

5.2. Building of a treatment centre and four transfer stations for solid urban waste in the province of Segovia

The project includes preparation of the tip in the municipality of El Espinar.

Treatment centre

The treatment will be located in the municipality of Los Huertos.

When choosing the site, account was taken of hydrogeological factors affecting the protection of surface and subterranean aquatic environments and environmental considerations relating to the site's location.

The centre will consist of the following areas:

- service area with office buildings and infrastructure required for the operation of the centre;
- recycling area: a reception area with an unloading hopper, conveyor belts, sizing drum, magnetic separator, primary and secondary sorting, containers for storing selected materials and an engine control centre;
- composting area: conveyor belt carrying organic material from the recycling area, grading area, composting beds, sizing and refining units and storage tower;
- disposal of discarded material: the tip, once prepared, will be waterproofed with a flexible high-density polyethylene geomembrane 2 mm thick. Once the sheet has been spread it will be covered with 50 cm of earth from the preparatory earthwork for the tip. A drainage system will be installed at the bottom of the tip to collect leachates channel them into a basin.

The tip will have a surface area of 100 000 m²

The facility will have the equipment and procedures necessary to minimise environmental impact. The dumping of waste in the tip will be supervised; waste will be deposited, compacted and covered daily. The waste will be periodically sprinkled with the leachates produced.

Waste will be selected mechanically, then ground and dumped in the tip.

The controlled tip in Segovia will receive solid urban waste from the transfer stations listed below.

The treatment centre will have a waste capacity of 1 250 000 m³.

Transfer plants

These will be located in the following municipalities: Boceguillas, Cantalejo, Cuéllar and

Nava de la Asunción and will comprise the following:

- general infrastructure and services, with all buildings and infrastructure required for operation, closed containers of 40 m³ and open containers of 30 m³;
- Transfer area:
 - compacting system: one compactor with a capacity of 50 t/hour,
 - feeder hoppers,
 - wind screens,
 - container transport: two semi-trailers and one tractor will be used for transporting containers to the tip,
 - loading and unloading platforms,
 - access to platforms.

It is also planned to adapt the tip in the municipality of El Espinar, by improving access ways, sealing the parts of the tip that are full, installing rainwater drains, gas vent chimneys and piping, carrying out earthworks and providing an enclosure.

5.3. Building of infrastructure for the treatment of solid urban waste in three districts of Castile-Leon

Waste treatment centre in Palencia

The waste treatment centre in Palencia will convert the present high-density tip into a centre equipped with the latest waste-recycling technology.

The present tip will be sealed and any biogas produced will be re-used. A waste selection plant will be installed and a small area of the tip prepared for waste which cannot be recycled.

The chosen system combines the selective collection of particular materials contained in the waste (paper, cardboard, glass, metal, plastic, etc.) with separation, in the sorting plant, for subsequent use. Organic material may be composted or disposed of in a controlled tip adjoining the recycling plant.

Features of the project:

- the present tip will be sealed and replaced by a selection plant;
- at the same time, selective collection campaigns will be launched;
- the present area will be adapted: a raised area will be built in which waste will be treated for the next two years until the expansion sites are

- put into use. Once the planned final elevation has been reached, the area will be closed and the biogas produced by the fermentation of the waste will be treated using a vertical gas release system;
- the treatment centre will be expanded to increase its capacity and to include the following facilities:
 - a system for the collection and treatment of leachates, comprising two basins and a pre-treatment plant,
 - a two-hectare section to be waterproofed with flexible high-density polyethylene geomembrane and protected by additional ground covering. A drainage system will be installed to collect leachates, as well as a run-off ditch.

Treatment centre at Cevico de la Torre (Palencia)

This treatment centre uses controlled tipping. The project was fully prepared by 1995 but has not been implemented due to lack of available funds.

The project is located on a nine-hectare site donated by the community it serves, and is made up of tips for the disposal of urban waste and industrial waste which can be considered as urban waste, both completely waterproofed with high-density polyethylene sheeting. It is equipped with leachate drainage systems and a leachate pit, lanes, a service area with weighing machine, gas release chimneys, a reinforced concrete pit for animal remains, offices, machinery bays and an enclosure around the entire site.

Treatment centre at Quintanilla de Onésimo (Valladolid)

A controlled tip is to be built at a site known as 'Los Cruceros', in an old limestone quarry.

The work involves:

- (a) preparing the operational area, which includes all buildings and infrastructure required for the operation of the centre;
- (b) preparing the tip site:
 - preparing the tip; enclosure ditch;
 - waterproofing the tip area with a flexible high-density polyethylene geomembrane;
 - installing a pit and basin for leachate storage;
 - installing a drainage system to collect and channel leachates;
 - installing interior access.

- (c) improving the access road to the tip and expanding it to a width of five metres with 0,50 m verges.

The three facilities described will have the equipment and procedures necessary to minimise environmental impact. The dumping of waste in the tip will be supervised; waste will be deposited, compacted and covered daily. The waste will be periodically sprinkled with the leachates produced so they can be eliminated by recirculation, failing which they will be conveyed to the nearest treatment plant.

5.4. Sealing of uncontrolled tips in Castile-Leon

This project involves sealing uncontrolled tips for solid urban waste and reclaiming contaminated sites. It includes 15 measures located in municipalities which already have waste management procedures. Once a controlled treatment centre is in place, the uncontrolled tip is sealed, closed and reclaimed.

The project includes the following measures:

- sealing of tips in Aranda de Duero, Medina de Pomar, Espinosa de los Monteros, Roa, Hontangas, Torresandino, Villalba de Duero and Gumiel de Hizán, all in the province of Burgos;
- sealing of tips in La Adrada, Piedralaves, Casillas, Casavieja and Arenas de San Pedro, in the province of Avila;
- sealing of tips in Iscar and Pedrajas de San Estéban, in the province of Valladolid.

The operations necessary for sealing are:

- pilling waste for subsequent depositing in a pit,
- digging a waste pit or dump,
- levelling and compacting the clay layer and laying high-density polyethylene sheeting,
- collecting and treating leachates with proper equipment for this type of waste,
- installing gas release chimneys,
- levelling, compacting and reclaiming the affected area,
- cleaning the area,
- replanting and reforestation on sites where this is considered appropriate.

6. **Objectives:**

- To create a structure for managing solid urban waste which will resolve current problems.
- To reduce the number of uncontrolled tips.

The quantified objectives of the group of projects are:

Building of a treatment centre and transfer stations for solid urban waste in the province of Zamora

This measure will meet the needs of a population of 211 213 and manage 78 397 tonnes of waste each year.

Building of a treatment centre and transfer stations for solid urban waste in the province of Segovia

Building a treatment centre in the environs of Segovia, upgrading the El Espinar tip and creating four transfer stations will meet the needs of 149 653 inhabitants and provide annual treatment of 50 000 tonnes of waste.

Building of infrastructure for the treatment of solid urban waste in three districts of Castile-Leon

Building treatment centres in Palencia, Cevico de la Torre and Quintanilla de Onésimo will meet the needs of three districts in Castile-Leon with a total population of 128 948. The centres will manage an annual total of 45 681 tonnes of waste.

Sealing of uncontrolled tips in Castile-Leon

The 15 measures making up this project will reclaim areas affected by uncontrolled tipping. Sealing the tips will improve the environment in the affected municipalities.

406 617 m³ of solid urban waste will be treated and 129 933 m² of land reclaimed.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	1.11.1994	31.12.1997
Main work	1.1.1997	30.11.1999

8. **Assessment of costs and socio-economic advantages:**

The cash flow for 10 years was calculated on the basis of the benefits identified and the total cost of the project, including the internal rate of return (IRR) and present discounted value, based on a discount rate of 6,5%.

The IRR is 19,25%.

The environmental benefits from soil and water protection have been estimated in financial terms.

Revenue to cover operating costs can be obtained through indirect taxation.

9. **Environmental impact analysis:**

- Integrated control of the pollution generated by uncontrolled tipping of solid urban waste (100%).
- Prevention of waste production.
- Health protection: the treatment of solid urban waste is centralised and controlled, avoiding uncontrolled tipping or unsuitable waste treatment.

10. **Cost and assistance:**

Total cost: ECU 21 004 906

Eligible cost (after 27 May 1997): ECU 20 607 382

Rate of assistance: 80%

Cohesion Fund grant: ECU 16 485 906

Breakdown of cost (in ECU):

1. Zamora treatment centre 7 305 578

2. Segovia treatment centre 5 690 463

3. Treatment centres for three districts 4 654 236

4. Sealing of tips 2 957 106

Total 20 607 382

ANNEX

FINANCING PLAN

Project No: 97/11/61/044

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1=2+11													
1997	5 600 026	5 600 026	100	4 480 021	80	1 120 005	20		1 120 005				
1998	7 947 241	7 947 241	100	6 357 793	80	1 589 448	20		1 589 448				
1999	7 060 115	7 060 115	100	5 648 092	80	1 412 023	20		1 412 023				
Total	20 607 382	20 607 382	100	16 485 906	80	4 121 476	20		4 121 476				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/045

1. **Name:** enclosed by a perimeter fence with access gates. Each enclosure will be divided into areas for different uses:
- Selective waste-collection centres in the main cities of Castile-Leon.
- Area for public use:
- area for large containers,
 - area for small containers.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)
- Operations area for the centre.
- Control buildings and amenities.
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
- Each centre will consist of the following:
- a billboard with the logos of the financing bodies,
 - access,
 - enclosure,
 - paving with rain-water drainage,
 - control buildings and amenities,
 - area for large containers: debris, tyres, bulky waste,
 - area for small containers: paper, board, glass, batteries, used motor oil, vegetable oil, solvents, paint, fluorescent lights, car batteries, used clothing, medicines,
 - electrical and sanitary facilities,
 - interior signs,
 - furniture,
 - green areas,
 - weighing machine.
3. **Body responsible for implementation:**
- 3.1. **Name:** Consejería de Medio Ambiente y Ordenación del territorio
- 3.2. **Address:** Nicolás Salmerón, 5
47071 Valladolid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Castile-Leon
5. **Description:**
- This group of projects concerns 23 selective collection centres for municipal waste. All the projects are the same, and can be described together.
- Two centres will be built in each of the region's main cities: Ávila, Burgos, León, Palencia, Salamanca, Segovia, Soria, Valladolid and Zamora (18 centres).
 - One centre will be built in each of the following municipalities (with more than 20 000 inhabitants): Aranda de Duero, Medina del Campo, Miranda de Ebro, Ponferrada and San Andrés del Rabanedo (five centres).
- The collection centres will be located on land provided by the local authorities, with an approximate area of 3 000 m². Each plot will be
6. **Objectives:**
- To establish a collection centre for every 100 000 inhabitants and a centre in municipalities with more than 20 000 inhabitants.
 - To encourage the selective collection of certain materials, normally disposed of in tips, which can be recycled or which require safer disposal which does not endanger the environment or public health.
 - To encourage recycling and re-use, and to obtain raw materials and energy from certain types of waste.

Collection centres	Number	Inhabitants	Tonnes of waste treated (per year)
Ávila	2	50 015	3 350
Burgos	2	166 732	11 170
León	2	147 780	9 900
Salamanca	2	167 316	11 210
Segovia	2	55 551	3 720
Soria	2	33 436	2 240
Valladolid	2	334 820	22 490
Zamora	2	66 017	4 420
Aranda de Duero	1	30 431	2 040
Medina del Campo	1	20 139	1 350
Miranda de Ebro	1	36 761	2 460
Ponferrada	1	61 829	4 140
San Andrés del Rabanedo	1	22 134	1 480
Total	23	1 272 828	85 320

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	2.6.1997	22.9.1997
Main work	4.10.1997	3.11.1999

8. **Assessment of costs and socio-economic advantages:**

The economic and financial analysis was carried out for a period of 11 years, based on the following:

- investment costs,
- benefits from minimising waste and from recycling glass, paper and board, plastics and metals.

Environmental benefits include savings in energy and raw materials, reduction of the volume of waste to be disposed of in tips, separation of hazardous domestic waste and prevention of uncontrolled tipping.

The internal rate of return is 14,7%.

9. **Environmental impact analysis:**

The centres will contribute to reducing the number of tips and recycling the resources otherwise disposed of there, thereby attaining the objectives of the relevant Community Directives. They will also help control the pollution caused by uncontrolled tipping of waste.

10. **Cost and assistance:**

Total cost: ECU 10 363 473

Eligible cost (after 27 May 1997): ECU 10 363 473

Rate of assistance: 80 %

Cohesion Fund grant: ECU 8 290 778

ANNEX

FINANCING PLAN

Project No: 97/11/61/045

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other		%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1=2+11													
1997	2 072 695	2 072 695	100	1 658 156	80	414 539	20		414 539				
1998	6 218 083	6 218 083	100	4 974 466	80	1 243 617	20		1 243 617				
1999	2 072 695	2 072 695	100	1 658 156	80	414 539	20		414 539				
Total	10 363 473	10 363 473	100	8 290 778	80	2 072 695	20		2 072 695				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/046

1. **Name:** Solid urban waste treatment plants and sealing of tips in Andalusia. objects and organic matter, secondary sorting, electromagnetic separator, second sorting belt, unloading of rejected material, belt and packer for recovered material, paper, plastic and scrap metal.
2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
 2. Compost line: spiral feeder and chain conveyor, screen, belt for removal of rejected material, densimetric separator with belt for removal of rejected material, exit belt to compost heap.
3. **Body responsible for implementation:**
 - 3.1. **Name:** Consejería de Medio Ambiente
Junta de Andalucía
 - 3.2. **Address:** Pabellón Nueva Zelanda, Avda. de las Acacias s/n
Seville
 3. Buildings: access control, service building, selection bay, workshop, garage, warehouse for recovered material: 2 197,1 m².
 4. Fermentation, maturation and drying park for compost: 13 700 m².
 5. Auxiliary tip (reserved area): 50 hectares.
4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Andalusia
 - 4.3. **Province:** Granada, Córdoba, Huelva, Jaén and Seville
 - 5.2. **Building of Cordoba plant**
The plant will serve the city of Cordoba.
Main features of project:
 - A. Reception and storage area: 3 736 m³.
 - B. Treatment area:
 1. Treatment line: travelling crane with hydraulic grapnel, line feeder for organic and inert matter, conveyor belt for bulky objects and organic matter, secondary sorting, electromagnetic separator, second selection belt, unloading of rejected material, belt and packer for recovered material, paper, plastic and scrap metal.
 2. Composted line: spiral feeder and chain conveyor, screen, belt for removal of rejected material, densimetric separator with belt for removal of rejected material, exit belt to compost heap: two treatment lines and one refining line.
 3. Buildings: access control, service building, sorting bay, workshop-warehouse, garage, warehouse for recovered material: 2 276 m².
 4. Fermentation, maturation and drying park for compost: 8 300 m².
 5. Auxiliary tip (reserved area).
5. **Description:**

The group of projects involves building two treatment plants to recycle and compost solid urban waste, expanding the treatment capacity of a plant in Villarrasa (Huelva) and sealing and reclaiming disused areas and sites formerly used for uncontrolled tipping of solid urban waste in various municipalities in the Autonomous Community of Andalusia which no longer permit this.

 - 5.1. **Building of a plant at Albendín (Granada)**
The plant will have sufficient capacity to service a total of 29 municipalities in La Vega and Valle de Lecrín and another group of municipalities served by the transfer stations at Granada, Alhama de Granada, Baza, Guadix, Huéscar, Iznalloz, Loja and Montefrío.
The plant will comprise:
 - A. Reception and storage area: 3 046 m³.
 - B. Treatment area:
 1. Treatment line: travelling crane with hydraulic grapnel, line feeder for organic and inert matter, conveyor belt for bulky

5.3. *Expansion of Villarrasa Plant (Huelva)*

This plant began operating in January 1995 and is an essential part of the waste treatment and disposal infrastructure in the province of Huelva, serving 30 municipalities. This project aims to correct problems which have arisen during this initial phase and will help to improve the plant's operation, increase its productivity, and possibly double the total treatment volume.

Main features of the project:

1. Repair and surfacing of access road to the auxiliary tip (1 500 m long, 7 m wide).
2. Work on tip: rainwater drainage, collection and piping of leachates, impermeable sealing for tip.
3. New treatment line: travelling crane with multi-valve grapnel, separation line feeder, sizing drum, improvement of power supply system (fine solids line, electromagnetic separator, conveyor belt to maturation park; unloading belt from grading line, electromagnetic separator, belt to containers of paper, glass, plastic matter, etc.).
4. Expansion of sorting buildings (99 m³).
5. Expansion of fermentation park (3 500 m²).
Covering of fermentation area (10 500 m²).

5.4. *Sealing of Cordoba solid urban waste tip*

The tip is located on a site known as 'El Lobatón', on the N-432 highway between Badajoz-Granada.

A protective barrier will be installed in the tip as a corrective measure against the possible escape of leachates, together with piping and a reception tank to permit proper treatment and disposal. Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The tip has been in operation since 1992 and is now in its terminal operational phase, hence the need to plan sealing and re-landscaping. The main measures involve:

- (a) collecting, spreading and levelling the surface of the tip,
- (b) earthworks (digging and transport) to seal the surface and build isolation embankments,

(c) drilling the reclaimed area after planting ground cover,

(d) preparing and improving the reclaimed area for use for other purposes, especially recreational.

5.5. *Sealing of Granada solid urban waste tip*

The tip is located near the Viznar road 10 km from Granada.

It is planned to cover an area of 35 000 m² with a 0,6 to 1 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will be covered with a second layer of between 0,20 and 0,25 m of topsoil and planted with native species.

A protective barrier will be installed in the tip as a corrective measure against the possible escape of leachates, together with piping and a reception tank to permit proper treatment and disposal. Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described for the previous tip.

5.6. *Sealing of Motril solid urban waste tip (Granada)*

The tip is located in the municipality of Motril near the Pontes ravine on a lane 1–2 km from the population centre.

It is planned to cover an area of 35 000 m² with a 0,5 to 0,8 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will also be covered with a second layer of between 0,20 to 0,25 m of topsoil and planted with native species.

A 300 m stretch of stream will be pipelined as one of a number of corrective measures to prevent the escape of leachates. Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described at point 5.4.

5.7. *Sealing of solid urban waste tips in the Province of Jaén*

The measure covers 11 tips situated in the municipalities of Alcalá La Real, Alcaudete,

Huelma, Jódar, Mancha Real, Pozo Alcón, Quesada, Torre del Campo, Torredonjimeno, Valdepeñas de Jaén and Villanueva del Arzobispo.

The tips are generally located close to the population centres.

It is planned to cover an area of 60 000 m² with a 0,5 to 0,8 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will also be covered with a second layer of between 0,20 and 0,25 m of earth and planted with native species.

Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described at point 5.4, depending on the requirements of each case.

5.8. *Sealing of solid urban waste tips in the Province of Seville*

The measure covers nine tips situated in the municipalities of: Alanís, Almadén, Cazalla de la Sierra, Constantina, Guadalcanal, Navas de la Concepción, El Pedroso, Real de la Jara and San Nicolás del Puerto.

The tips are generally located close to the population centres.

It is planned to cover an area of 60 000 m² with a 0,5 to 0,8 m thick impermeable sealing layer of a clay-like material. The entire area to be reclaimed will be covered with a second layer of between 0,20 and 0,25 m of earth and planted with native species.

Protection will be completed by drilling at various points in the waste mass to allow gases to escape.

The measures to be carried out are similar to those described at point 5.4, depending on the requirements of each case.

6. *Objectives:*

General aims

A. *Solid urban waste treatment plants*

1. Main aim:

More efficient solid urban waste treatment in order to:

- minimise end production of waste
- encourage waste recycling and re-use.

2. Secondary aims:

- to eliminate uncontrolled tipping,
- to re-use recycled material as raw materials and save energy,
- to improve the environment generally.

B. *Sealing of tips*

1. Main aim:

- to seal and reclaim areas used to tip solid urban waste,
- to eliminate pollution risks and negative side-effects on the surrounding area and the environment,
- to collect and control leachates and prevent their production where possible,
- to carry out drilling and other measures to make safe any gases accumulating in waste mass.

2. Secondary aim:

- to implement measures provided for in the territorial master plan for the management of waste in the Autonomous Community of Andalusia,
- to reclaim and improve affected areas or return them to their natural state,
- to drain and maintain all affected areas and maintain natural sites.

This group of projects continues the efforts of the Autonomous Community of Andalusia to eliminate uncontrolled tipping of solid urban waste, reclaim affected areas and return them to a natural state.

Specific objectives

6.1. *Specific objectives of the Alhendín (Granada) Plant*

In addition to the general objectives outlined above, this project has the following objectives:

- (a) proper management and treatment for an estimated 157 000 tonnes/year of solid urban waste, with annual selective recovery of 30 152 tonnes of glass containers, 1 108 tonnes of plastic containers, 3 500 tonnes

of scrap metal, 30 152 tonnes of paper/cardboard; production of 25 127 tonnes/year of organic fertiliser in the form of compost.

- (b) Once the plant is operational, all tipping will cease in former tips located within the affected area. These tips will then be sealed and closed, and the affected areas reclaimed.

6.2. Cordoba Plant

In addition to the general objectives outlined above, this project has the following objectives:

- (a) proper management and treatment for an estimated 115 000 tonnes/year of solid urban waste, with annual selective recovery of 2 800 tonnes of glass containers, 1 000 tonnes of plastic containers, 4 200 tonnes of scrap metal, 2 800 tonnes of paper/cardboard; production of 28 000 tonnes/year of organic fertiliser in the form of compost.
- (b) Once the plant is operational all tipping will cease in former tips located within the affected area. These tips will then be sealed and closed, and the affected areas reclaimed.

6.3. Villarrasa Plant (Huelva)

In addition to the general objectives outlined above, this project has the following objectives:

- (a) proper management and treatment for an estimated 108 000 tonnes/year of solid urban waste, with an annual selective recovery of 2 160 tonnes of glass containers, 756 tonnes of plastic containers, 3 546 tonnes of scrap metal, 2 160 tonnes of paper/cardboard; production of 20 520 tonnes/year of organic fertiliser in the form of compost.
- (b) Once the plant is operational all tipping will cease in former tips located within the affected area. These tips will then be sealed and closed, and the affected areas reclaimed.

6.4. Sealing of Cordoba solid urban waste tip

The relevant basic data are:

— Area reclaimed	190 000 m ²
— Volume of treated waste	140 000 m ³
— Area sealed with clay-like material	50 000 m ²

6.5. Sealing of Granada solid urban waste tip

The relevant basic data are:

— Area reclaimed	160 000 m ²
— Volume of treated waste	130 000 m ³
— Area sealed with clay-like material	60 000 m ²

6.6. Sealing of Motril solid urban waste tip (Granada)

The relevant basic data are:

— Area reclaimed	70 000 m ²
— Volume of treated waste	40 000 m ³
— Area sealed with clay-like material	25 000 m ²

6.7. Sealing solid urban waste tips in Jaén Province

The relevant basic data are:

— Area reclaimed	193 000 m ²
— Volume of treated waste	75 000 m ³
— Area sealed with clay-like material	60 000 m ²

6.8. Sealing of solid urban waste tips in Seville Province

The relevant basic data are:

— Area reclaimed	127 250 m ²
— Volume of treated waste	67 500 m ³
— Area sealed with clay-like material	60 000 m ²

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project	1.5.1997	31.12.1997
Main work	1.5.1997	31.12.1999

8. *Assessment of costs and socio-economic advantages:*

A cost-benefit analysis has been carried out based on the following assumptions:

- working life of the project: 20 years,
- investment, maintenance and operating costs,
- reduction of pollution,
- reclamation and improvement of areas affected by solid urban waste,
- savings in expenditure on urban waste management by recycling recoverable material,
- savings in raw materials, organic fertiliser and energy.

The internal rate of return for the group of projects is 11,69%; the IRR for the individual plants is: Alhendin: 9,9%; Villarrasa: 9,8%; Cordoba: 9,3%; the IRR for tip closures is: Cordoba: 17,08%; Granada: 17,37%; Motril: 19,4%; Javea: 17,5%; Seville: 17,7%.

9. *Environmental impact analysis:*

Implementation of the project will achieve the following environmental aims:

- control of soil, water and atmospheric pollution,
- environmental improvement in urban areas,
- improvement of public health,
- improvement in integrated management of urban waste,
- reduction in consumption of energy and natural resources.

10. *Cost and assistance:*

Total cost:	ECU 24 488 856
Eligible cost (after 27 May 1997):	ECU 24 488 856
Rate of assistance:	80 %
Cohesion Fund grant:	ECU 19 591 085

ANNEX

FINANCING PLAN

Project No: 97/11/61/046

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans			
		Total public expenditure			Cohesion Fund		National authorities			Other		%				
		2=4+6+10	%	3=2/1	4	%	5=4/2	6=8+9	%					7=6/2	8	9
1997	4 139 381	4 139 381	100	3 311 505	80	827 876	20		827 876							
1998	14 079 784	14 079 784	100	11 263 827	80	2 815 957	20		2 815 957							
1999	6 269 691	6 269 691	100	5 015 753	80	1 253 938	20		1 253 938							
Total	24 488 856	24 488 856	100	19 591 085	80	4 897 771	20		4 897 771							

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/054

1. **Name:**

General system of pumps and collector sewers, treatment plant and outfall for the coastal area of the municipality of Lluchmayor (Balearic Islands).

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General de Obras Hidráulicas
(Ministerio de Medio Ambiente)

3.2. **Address:** Paseo de la Castellana, 67
28071 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Balearic Islands

4.3. **Municipalities:** Lluchmayor

5. **Description:**

This project involves building a general system of collector sewers and pumps, a waste-water treatment plant and an outfall in the municipality of Lluchmayor (Balearic Islands).

The plant will have sufficient capacity to treat both the current level of discharge and the level estimated for the design year (2015), producing effluent within permissible limits in accordance with Directive 91/271/EEC for discharge into the sea.

5.1. **Collector sewers and pumps**a) **Branch pipelines**

Building of 6,5 km of branch pipelines, ranging in diameter from 125 to 500 mm, connecting the population centres of Sun Dorado, Bahía Grande, Bahía Azul, Sa Torre, Delta Maioris and El Arenal with the main collector sewer.

b) **Main collector sewer**

The main collector sewer starts at pump station No 1, situated at km 10 on the Cabo

Blanco main road next to the Bahía Grande development. Seven more sections of piping, four of which are force mains and the remainder gravity sewers, lead from this point to a manhole near the site where treatment plant is to be built. The branch line will run from this manhole. Total length is 8,2 km with diameters of the various sections ranging from 200 to 500 mm.

c) **Pump stations**

It is planned to build 13 pump stations comprising 18 pumps and 13 reserve pumps.

5.2. **Outfall**

The effluent from the new waste-water treatment plant will be discharged into the sea through a newly-built outfall consisting of two parts: the first running from the plant to the sea (terrestrial outlet); the second underwater, running from a regulating well on the beach and ending 1 500 m from the shore at a depth of 22 m.

For the effluent from the plant to reach the terrestrial outfall it will have to cross the depression created by the Son Veri stream. A pump station is therefore planned inside the treatment plant to pump the effluent across the depression through a force main. A fibre-cement gravity pipeline of 700 mm diameter will run 1 621 m from that point to the 7,5 m high regulating well located 180 m from the beach.

This well will regulate the flow of the effluent on its way to the diffusers of the underwater outfall, ensuring that the facility functions properly by preventing unwanted fluctuations caused by variations in the flow from the treatment plant.

The marine outfall, which will start at the regulating well, will be made of high density polyethylene piping 710 mm in diameter and will run 1 681 m to the diffusers.

5.3. **Waste-water treatment plant**

The treatment plant will contain the following facilities:

Water treatment

- Intake and by-pass with manually cleaned rack for very large solids.
- Removal of solids through two channels with mechanically cleaned screens and a third

by-pass or emergency channel with a manually cleaned rack for medium-sized solids.

- Aerated grit and grease removal (one unit).
- Measurement of flow in an open Parshall flume.
- Biological reactor (two units).
- Secondary gravity sedimentation (three units) with pumping of floating matter to pre-treatment.
- Tertiary treatment with the addition of polyelectrolytes, filtering through open sand beds (three units) and chlorination with bleaching soda.
- Recovery of treated water using (2 + 1) centrifugal horizontal pumps.

Sludge line

- Pumping of recirculated sludge using (3 + 1) submersible pumps.
- Pumping of excess sludge to aerobic digestion in summer and thickening in winter, using (2 + 1) submersible pumps.
- Aerobic digestion with aeration.
- Gravity thickening of sludge (three units).
- Pumping of thickened sludge in recirculation to digestion.
- Chemical treatment using polyelectrolytes and dewatering by centrifugation (two units).
- Storage of dewatered sludge in hopper.

6. *Objectives:*

The planned treatment plant is part of the Spanish Government's national waste-water treatment plan (1995–2005), the basic criteria of which are:

- to complete drainage and treatment infrastructure in compliance with Directive 91/271/EEC,
- to reduce pollution loading to comply with the quality objectives for coastal bathing water and/or re-use of treated water.

The main technical parameters relating to the population to be covered and the quality of water to be obtained are:

WASTE-WATER TREATMENT PLANT AT LLUCHMAYOR

Project No: 97/11/61/054	Winter	Summer
Present population	15 000	45 000
Present population equivalent (p.e.)	15 000	45 000
Design population	15 000	45 000
Design population equivalent (p.e.)	15 000	45 000
Total average BOD5 on entry (mg/l)	350	350
Total average BOD5 on exit (mg/l)	25	25
Total average SS on entry (mg/l)	300	300
Total average SS on exit (mg/l)	25	25
Total average daily volume of water (m ³ /day)	3 600	11 250
Industrial waste (%)	0	0

Other basic goals to be achieved are:

- good ratio of costs to objectives,
- use of systems with optimal performance,
- balance between initial investment and maintenance costs,
- ease of operation,
- low maintenance costs,
- pleasing aesthetic design of facility,
- minimisation of nuisance from noise and odour in the vicinity of the plant.

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.10.1997	31.10.1997
Main work	1.12.1997	30.9.1999
Operational phase	1.10.1999	

8. *Assessment of costs and socio-economic advantages:*

Cost-benefit analysis has been carried out based on the following assumptions:

- working life of the treatment plant = 20 years,
- residual value of the plant = 0,
- discount rate = 6%.

The following asset factors were considered:

- water rates or charges,
- financial estimate of the environmental benefit of reducing the level of pollutants discharged.

The following deficit factors were considered:

- initial investment,
- operating and maintenance costs.

The results obtained are:

- internal rate of return = 2,33 %.

Other benefits which must be taken into account have not been included in the above estimates as they are difficult to assess:

- increase in the well-being and quality of life of the local population,
- contribution to maintaining the quality of local beach areas, of importance to tourism.

9. *Environmental impact analysis:*

- 1) This project reduces the level of pollution in waste water before it is discharged into coastal waters or can leach into aquifers. The project is therefore a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and

sustainable development. The re-use of treated water will also help alleviate the acute water shortage affecting the Balearic Islands.

The project also complies with Directive 91/271/EEC and the measures provided for in it are both preventive (avoiding possible ecological problems in coastal areas which could even affect human health) and palliative (reducing the level of pollutants in waste water produced by a large population and reducing pollution in coastal waters).

- 2) The planned collector sewers must be connected to a treatment plant before they are put into operation.
- 3) The sludge from the treatment plant must receive treatment suited to its composition in accordance with the Community Directives on waste treatment. Sludge for agricultural use must meet the conditions laid down in Directive 86/278/EEC.

10. *Cost and assistance:*

Total cost:	ECU 10 041 486
Eligible cost (after 14 July 1997):	ECU 10 041 486
Rate of assistance:	85 %
Cohesion Fund grant:	ECU 8 535 263

ANNEX

FINANCING PLAN

Project No: 97/11/61/054

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other		%		
			%		%	Total	%	Central government				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	120 459	120 459	100	102 390	85	18 069	15		18 069				
1998	3 011 486	3 011 486	100	2 559 763	85	451 723	15		451 723				
1999	6 909 541	6 909 541	100	5 873 110	85	1 036 431	15		1 036 431				
Total	10 041 486	10 041 486	100	8 535 263	85	1 506 223	15		1 506 223				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/055

1. **Name:** Collector sewers and waste-water treatment plant for Novelda and Monforte del Cid and collector sewers and waste-water treatment plant for Sueca.
- Works to return treated water to the Vinalopó river.
 - By-pass and interconnections for proper functioning of the system.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General de Obras Hidráulicas (Ministerio de Medio Ambiente)
- 3.2. **Address:** Paseo de la Castellana, 67
28071 Madrid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Valencia
- 4.3. **Municipalities:** Novelda and Monforte del Cid; Sueca
5. **Description:**
- 5.1. **Collector sewers and waste-water treatment plant for Novelda and Monforte del Cid**
- This project concerns the works needed to construct the collector sewers and waste-water treatment plant for Novelda and Monforte del Cid (Alicante) and the treatment facilities needed to obtain effluent which meets the requirements of Directive 91/271/EEC, for both current volumes and those forecast for 2016, before it is discharged into the Vinalopó river.
- General description of the project:
- Works for the collection of sewage from the above-mentioned municipalities. Collector system, pumps and spillways.
 - Waste-water treatment plant for the municipalities of Novelda and Monforte del Cid.
- 5.1.1. *Sewer system, pumps and spillways*
- (a) Pipeline from Novelda:
Length: 1 730 m
Diameter: 700 mm.
- (b) Pipeline from Monforte del Cid:
Diameter: 300 mm.
- 5.1.2. *Waste-water treatment plant for Novelda and Monforte del Cid*
- Water treatment
- coarse solids removal 1 unit
 - spillway 1 unit
 - pumps 3 units
 - discharge and supply chamber for waste water from Monforte del Cid
 - screening of fine solids 3 units
 - by-pass channel with a manually cleaned screen 1 unit
 - spillway for excess flow 1 unit
 - aerated desanding and degreasing 2 units
 - sand sorter 1 unit
 - oil and grease concentrator 1 unit
 - flow meter (Parshall flume) 1 unit
 - distribution chamber and primary treatment bypass 1 unit
 - primary sedimentation 2 units
 - biological treatment with nitrification-denitrification 2 units
 - secondary sedimentation (clarification) 2 units

– effluent disinfecting chamber	1 unit	– initial lifting pump	3 + 1 unit
– reservoir for treated water	1 unit	– screening	2 units
– connection to general bypass and discharge into the Vinalopó river	1 unit	– screening bypass	1 unit
		– desanding-degreasing	2 units
		– flow meter	1 unit
Sludge treatment		– spillway	1 unit
– pumping of excess sludge	(1 + 1) unit	– biological treatment in oxidation ditch	2 units
– recirculation of activated sludge	(2 + 1) unit	– secondary settling basin	2 units
– gravity thickening	1 unit	– chlorination	1 unit
– pumping of sludge for dewatering	(1 + 1) unit		
– dewatering of sludge	(1 + 1) unit	Sludge treatment	
– pumping of dewatered sludge for storage	1 unit	– recirculation of activated sludge	3 units
– sludge storage hopper	1 unit	– removal of sludge from secondary settling basins	2 units
		– sludge thickening by gravity	1 unit

5.2. General collector sewers and waste-water treatment plant for Sueca

The waste-water treatment plant for Sueca will be able to treat both the current volume of waste and the volume forecast for the design year up to permissible limits in accordance with Directive 91/271/EEC before discharging into the receiving river.

5.2.1. General collector sewers

Work includes:

- localised work in urban Sueca
- perimeter sewer east of Sueca
- diversion of Los Arboles irrigation ditch
- diversion of current collector sewer
- perimeter sewer west of Sueca
- outlet to the treatment plant.

5.2.2. Waste-water treatment plant for Sueca

Water treatment

- coarse solids removal 1 unit
- screen for removal of large debris 1 unit

- polyelectrolite sludge conditioning
- dewatering of sludge on filter belt press 2 units

Buildings

- building for pumping and solids removal
- control building
- blower house
- processing building

Other facilities

- drinking water network
- irrigation network
- drainage network
- security and control systems

6. Objectives:

The planned waste-water treatment plants are part of measures included in the national waste-water plan (1995–2005) of the Spanish Government, the main aims of which are:

- to complete the waste-water removal and treatment infrastructure in compliance with Directive 91/271/EEC;

- to reduce the pollution level in the Vinalopó river in order to meet the quality objectives for bathing water on the Mediterranean coastline and in the Albufera region.

The main technical parameters concerning population and water quality are:

Project No: 97/11/61/055	Novelda and Monforte del Cid treatment plant	Sueca treatment plant
Present population (inhabitants)		
Present population equivalent (p.e.)		
Design population	30 000	28 000
Design population equivalent (p.e.)	41 900	40 333
Total average BOD ₅ on entry (mg/l)	300	200
Total average BOD ₅ on exit (mg/l)	25	25
Total average SS on entry (mg/l)	250	250
Total average SS on exit (mg/l)	35	35
Average daily through-flow (m ³ /day)	8 380	12 100
Industrial waste (%)		

7. *Work schedule:*

Category of work	Commencement	Completion
Main work	1.12.1997	31.12.1999

8. *Assessment of costs and socio-economic advantages:*

A cost-benefit analysis has been carried out on the following basis:

- useful life of the waste-water treatment plant: 20 years,
- net book value: 0,
- discount rate: 6%.

The following were put on the positive side of the equation:

- water charges,
- financial estimate of the environmental benefit of reducing the pollution loading of the discharge.

The following were put on the negative side:

- the initial investment,
- operating and maintenance costs.

The results for the group of projects are:

- IRR = 3%.

However, other benefits which are difficult to quantify were not taken into account:

- the increase in the local population's well-being and standard of living,
- the contribution to maintaining the quality of the beaches in the area visited by tourists.

9. *Environmental impact analysis:*

- 1) The project is intended to reduce pollution in the waste water from the towns concerned before it is discharged into the receiving rivers and can seep into aquifers. The project is a coherent one, consistent with the objectives set out in Article 130R of the EC Treaty and the Fifth Community Action Programme on the environment and sustainable development.

The project also complies with the obligations set out in Directive 91/271/EEC, and the measures provided for in it are both preventive (avoiding the possibility of environmental problems downstream from the towns concerned, which might even affect human health) and palliative (reducing the pollution loading of waste-water from large towns and the flow of discharge into the receiving rivers).

- 2) The planned collector sewers must be connected to a treatment plant before they are put into operation.
- 3) Sludge from the treatment plants must be treated according to its composition in accordance with the Community directives on the treatment of waste. Sludge intended for use in agriculture must meet the requirements of Directive 86/278/EEC.

10. *Cost and assistance:*

Total cost: ECU 11 661 111

Eligible cost (after 17 July 1997): ECU 11 661 111

Rate of assistance: 85%

Cohesion Fund grant: ECU 9 911 944

ANNEX

FINANCING PLAN

Project No: 97/11/61/055

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other	11	%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1997	120 459	120 459	100	102 390	85	18 069	15		18 069				
1998	5 119 526	5 119 526	100	4 351 597	85	767 929	15		767 929				
1999	6 421 126	6 421 126	100	5 457 957	85	963 169	15		963 169				
Total	11 661 111	11 661 111	100	9 911 944	85	1 749 167	15		1 749 167				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/058

1. **Name:**

Desalination plant for Almería.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Ayuntamiento Almería

3.2. **Address:** Plaza de la Constitución s/n
04003 Almería

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Andalusia

5. **Description:**

Construction of an inverse osmosis desalination plant for sea water with a production capacity of 50 000 m³/day, as a public works concession.

The water will be produced by seven lines, each with a capacity of 7 050 m³/day.

The plant will consist of the following:

- intake and pumping of sea water,
- pre-treatment,
- pressure filtration,
- inverse osmosis,
- high-pressure pumping,
- energy recovery,
- internal equalisation tank, 38 000 m³,
- exit pump,
- force mains and pipelines over a total length of 12 134 m ranging in diameter from 250 to 600, 700 and 800 mm,
- external equalisation tank, 55 000 m³,
- ancillary works.

6. **Objectives:**

The main objectives of the project are:

- to supply 50 000 m³/day of drinking water to 155 000 inhabitants currently suffering from the effects of drought,
- to build water-supply infrastructure of pipelines, pumping stations, tanks and ancillary facilities to permit sustainable growth of the city,
- to improve the urban water supply,
- to improve water quality,
- to improve the health conditions and living standards of the population concerned,
- to increase the availability of water by economising on and coordinating its use,
- to improve the management and use of water.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	31.5.1997	30.11.1997
Main work	1.1.1998	1.7.1999

8. **Assessment of costs and socio-economic advantages:**

The economic and financial analysis was carried out for a period of 20 years. The costs taken into account were the investment costs and the cost of operating the plant and replacing equipment, valued at 6% of the investment.

The following benefits were taken into account:

- Availability of water, with guaranteed service. The value of water to the population in terms of all the benefits of greater availability and guarantee of service, increased satisfaction and a higher standard of living is calculated on the basis of its marked price.
- Reduction of the over-exploitation of other water resources. This benefit was quantified using a unit price for the reserves of groundwater equal to the unit cost of dams or surface reservoirs.

An internal rate of return of 26,8 % was arrived at on the basis of the above costs and benefits.

9. *Environmental impact analysis:*

The project will contribute to:

- the conservation, protection and improvement of the environment,
- the management of water resources.

The project is included in the preliminary designs for the hydrological plan for the catchment area and in the national hydrological plan, ensuring consistency with national water management strategy.

The proposed project will provide populations currently suffering from water shortages with much needed infrastructure, thereby contributing to the priority objective of improving their standard of living.

10. *Cost and assistance:*

Total cost: ECU 38 203 461

Eligible cost (after 24 July 1997): ECU 38 203 461

Rate of assistance: 85 %

Cohesion Fund grant: ECU 32 472 942

ANNEX

FINANCING PLAN

Project No: 97/11/61/058

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities			Other				
			%		%	Total	%	Central government				Other	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	1 225 906	1 225 906	100	1 042 020	85	183 886	15	183 886					
1998	24 651 701	24 651 701	100	20 953 946	85	3 697 755	15	3 697 755					
1999	12 325 854	12 325 854	100	10 476 976	85	1 848 878	15	1 848 878					
Total	38 203 461	38 203 461	100	32 472 942	85	5 730 519	15	5 730 519					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/61/063

1. **Name:**

Desalination plant for Cartagena.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General de Obras Hidráulicas y Calidad de los Aguas
Ministerio de Medio Ambiente

3.2. **Address:** Pza San Juan de la Cruz s/n
28071 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Murcia

5. **Description:**

Construction of an inverse osmosis desalination plant for sea water with a production capacity of 65 000 m³/day of water from nine lines, each with a capacity of 7 295 m³/day. Public procurement will be carried out as a public works concession.

The plant will consist of the following:

- intake and pumping of sea water,
- pre-treatment,
- pressure filtration,
- inverse osmosis,
- high-pressure pumping,
- energy recovery,
- internal equalisation tank, 65 000 m³,
- exit pump,
- force mains and pipelines,
- lifting station carrying the water to the Nueva Canal de Cartagena,
- ancillary works.

6. **Objectives:**

- to supply 65 000 m³/day of drinking water to 200 000 inhabitants currently suffering from the effects of drought,
- to build water-supply infrastructure of pipelines, pumping stations, reservoirs and other ancillary facilities to permit sustainable growth of the city and its sphere of influence,
- to improve the urban water supply,
- to improve water quality,
- to improve the health conditions and living standards of the population concerned,
- to increase the availability of water by economising on and coordinating its use,
- to improve the management and use of water.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	1.1.1998	30.3.1998
Main work	1.4.1998	1.7.1999

8. **Assessment of costs and socio-economic advantages:**

The economic and financial analysis was carried out for a period of 20 years. The costs taken into account were the investment costs and the cost of operating the plant and replacing equipment, valued at 6 % of the investment.

The following benefits were taken into account:

- Availability of water, with guaranteed service. The value of water to the population in terms of all the benefits of greater availability and guarantee of service, increased satisfaction and a higher standard of living is calculated on the basis of its marked price.
- Reduction of the over-exploitation of other water resources. This benefit was quantified using a unit price for the reserves of groundwater equal to the unit cost of dams or surface reservoirs.

An internal rate of return of 32,1% was arrived at on the basis of the above costs and benefits.

These measures will also make it possible to prevent situations of such serious water scarcity from arising in future.

9. *Environmental impact analysis:*

The project is included in the preliminary designs for the hydrological plan for the catchment area and in the national hydrological plan, ensuring consistency with national water management strategy. Its effect will mainly be to mitigate the damage caused by the drought of recent years, since the Spanish Government is obliged to attend to the urgent needs of the affected areas.

10. *Cost and assistance:*

Total cost:	ECU 41 688 930
Eligible cost (after 4 September 1997):	ECU 41 688 930
Rate of assistance:	85 %
Cohesion Fund grant:	ECU 35 435 591

ANNEX

FINANCING PLAN

Project No: 97/11/61/063

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%		
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8				9	
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1998	25 013 360	25 013 360	100	21 261 356	85	3 752 004	15	3 752 004					
1999	16 675 570	16 675 570	100	14 174 235	85	2 501 335	15	2 501 335					
Total	41 688 930	41 688 930	100	35 435 591	85	6 253 339	15	6 253 339					

(¹) Total eligible cost of project.

PROJECT No: 97/11/61/064

1. **Name:**

Alicante desalination plant.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (M.E.H.)

2.2. **Address:** Pº de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General de Obras Hidráulicas y Calidad de los Aguas (MIMAM)

3.2. **Address:** Pza San Juan de la Cruz s/n
28071 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Autonomous community of Valencia

5. **Description:**

Sea-water desalination plant using reverse osmosis, with a production capacity of 50 000 m³ per day. The plant comprises seven water production lines, each with a capacity of 7 215 m³ per day. The contract will be awarded in the form of a public works concession.

The planned works involve:

- sea-water intake and pumping,
- pre-treatment,
- pressure filtration,
- reverse osmosis,
- high-pressure pumping,
- energy recovery,
- 50 000 m³ internal regulation reservoir,
- pumping out,
- outflow,
- related works.

6. **Objectives:**

— to provide drinking water (50 000 m³/day) to 180 000 inhabitants of Alicante and neighbouring areas in the autonomous community of Murcia, adversely affected by drought;

— to build a water supply network and several pumping stations, reservoirs and other related facilities to supply water and contribute to sustainable development of the town;

— to improve the urban water supply;

— to improve water quality;

— to improve health conditions and quality of life for the population concerned;

— to increase the availability of water through economical and coordinated use;

— to improve water management and use.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	1.1.1998	30.3.1998
Main work	1.4.1998	1.7.1999

8. **Assessment of costs and socio-economic advantages:**

Economic analysis has been carried out for a 20-year period. Costs taken into account comprise investment costs, operating costs and the cost of replacing equipment, evaluated at 6% of the investment cost.

The benefits of the project comprise the following:

- a guaranteed available water supply. The value to the population of the water supply has been assessed, taking account of improved availability, guaranteed service, increased satisfaction and improved quality of life, on the basis of the highest European tariffs for untreated water (ESP 120/m³), in view of

the specific geographical and hydrological conditions of the area, especially the shortage of water and the tendency to overexploit ground water;

- reduction in overexploitation of other water resources. This benefit has been quantified on the basis of a unit price for ground water resources equal to the unit cost of artificial lakes or surface water reserves.

On the basis of discounted flows of the above costs and benefits, the internal rate of return (IRR) is 24,1%, and the net discounted value is equal to ESP 14 416 million, with a discount rate of 6%.

9. *Environmental impact analysis:*

By providing water in an area where the population is seriously affected by the acute shortage of water, and by contributing to establishing the basis for sustainable development, this project is consistent with the objectives set out in Article 130R of the EC Treaty and with the Community's Fifth Action Programme for the

environment. It meets the requirements of Community Directives relating to water quality.

The project fits in with the preliminary projects in the water resource plan for the catchment area and in the national plan; this ensures consistency with the national strategy on water resources. Its main purpose is to remedy the damage caused by drought in recent years, which has obliged the Spanish Government to provide for the immediate necessities of the population. But the measures should also help to prevent such serious situations arising again in the future.

10. *Cost and assistance:*

Total cost:	ECU 41 579 856
Eligible cost (after 4 September 1997):	ECU 41 579 856
Rate of assistance:	85 %
Cohesion Fund grant:	ECU 35 342 878

ANNEX

FINANCING PLAN

Project No: 97/11/61/064

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	12=11/1		
		2=4+6+10	3=2/1	4	5=4/2	Total	%	Central govern-ment				Other	
1=2+11						6=8+9	7=6/2	8	9			13	
1998	27 719 902	27 719 902	100	23 561 917	85	4 157 985	15		4 157 985				
1999	13 859 954	13 859 954	100	11 780 961	85	2 078 993	15		2 078 993				
Total	41 579 856	41 579 856	100	35 342 878	85	6 236 978	15		6 236 978				

⁽¹⁾ Total eligible cost of project.

PROJECT No: 95/11/65/007

1. **Name:** High-speed rail link Madrid-Barcelona-French border. Sections: Calatayud-Ricla and Zaragoza-Lérida.
- The project is located in the municipalities of Saviñán and Morés in the province of Zaragoza. The largest works in this project are the tunnels:
- Tunnel 3:
km 14+240 to 14+800 Length = 560 m
- Tunnel 4:
km 16+060 to 16+934 Length = 874 m
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Planificación
- 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
- It also includes the following viaducts:
- Viaduct 1:
km 10+770 to 11+131 Length = 361 m
- Viaduct 2:
km 17+290,5 to 17+481,5 Length = 191 m
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General de Infraestructuras de Transporte Ferroviario
- 3.2. **Address:** Plaza de Sagrados Corazones 7
Madrid
- Calatayud-Ricla Subsection II*
- The section covered by this project runs from around Purroy (the outskirts of Morés) to Salillas de Jalón. It provides a double track alternative to the existing route and is designed for high-speed running.
- The section runs from km 17+540 and ends at the Salillas de Jalón station (km 38+000), a total length of 20,460 km. The route runs north-east, in part following the river Jalón. The main structures include:
- Tunnels:
- Las Minas tunnel (at km 18) 310 m
- Villanueva de Jalón tunnel (at km 19) 1 020 m
- Torrecilla tunnel (at km 25) 890 m
- Los Cortados tunnel (at km 26,5) 330 m
- Viaducts
- Viaduct at km 18+2, 270 m long at the crossing of the Jalón river
- Viaduct at km 24+3, 300 m long at the crossing of Aranda river
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Aragon and Catalonia
5. **Description:**
- The project comprises the construction of the Calatayud-Ricla and Zaragoza-Lérida sections (totalling 173 km) of the high-speed rail link from Madrid to Barcelona and the French border. This is one of the 14 transport priorities approved at the Essen European Council.
- This phase concerns only infrastructure work, i.e. up to completion of the track bed on the following sections:
- Calatayud-Ricla Subsection I A*
- The section runs from km 1+940 and follows the route of the preliminary project for about 9 km to finish at about km 10+740 of that preliminary project.
- The project is located in the municipalities of Saviñán and Morés in the province of Zaragoza. The largest works in this project are the tunnels:
- Tunnel 1:
km 4+434 to 4+935 Length = 501 m
- Tunnel 2:
km 6+120 to 10+685 Length = 4 565 m
- Calatayud-Ricla Subsection I B*
- The section runs from km 10+940 and follows the route of the preliminary project for about 7 km to finish at about km 17+540 of that preliminary project.
- LAV Zaragoza-Lérida Subsection I*
- These works extend over 15 km from the station of Miraflores at km 344+306 on the existing Madrid-Barcelona line via Caspe to 10 km before Puentes de Ebro. The whole section lies within the municipality of Zaragoza. The future route has planned as a straight line from the exit from the

tunnels at Miraflores station. However, the point of origin selected is the passenger building.

The main structures include:

Viaducts:

- between km 4+700 and km 5+230
- between km 6+980 and km 7+100
- between km 11+960 and km 12+180
- between km 13+020 and km 13+360
- between km 14+620 and km 14+840

Zaragoza-Lérida Subsection II

The works run from km 200 (equivalent to km 14+995,687 — end of subsection I) to km 217+565,537, a length of about 17,6 km.

From the beginning to km 206 where it crosses the Canal Imperial de Aragón the route runs west-east across difficult terrain.

The main structures in this area include:

Viaducts:

- Viaduct over the A-222
- Viaduct over the Val de Valdipuey
- Crossing over the Canal Imperial de Aragón
- Crossing over the future Fuente de Ebro by-pass on the N-232 at km 207-160
- Crossing over the Zaragoza-Tarragona railway line at km 208+030.
- Intersection with the present N-232 at km 207+634. A pergola-type bridge with a 16 m clear span is planned perpendicular to the road.
- Crossing over the N-II at km 215+828
- Crossing over the Fuente de Ebro, Quinto de Ebro and Pina de Ebro channels

Zaragoza-Lérida Subsection III

The project begins in the area between the intersections with the N-II and the A-2 motorway and links to the previous subsection (subsection II) at km 217+565,537.

The end of the project, which logically corresponds to the beginning of subsection IV, is at approximately km 58 of the A-2 motorway.

Subsection III is about 21,2 km long, ending at km 321+154,638. The most important works include:

- Viaduct over the A-2 motorway (km 301+695)

Zaragoza-Lérida Subsection IV

The route runs from km 400 to km 423+500, a total length of 23,5 km. The main works are intended to support the highest embankments between km 413+500 and km 423+460.

- Structure 1: km 419+074 to km 419+515
- Structure 2: km 421+219 to km 421+590
- Structure 3: km 423+008 to km 423+414

Zaragoza-Lérida Subsection V

The route runs for 20,6 km from the outskirts of Candanos. The main works are:

- one viaduct (of about 241 m) at km 514+715
- four bridges
- four overpasses
- six underpasses
- one 3 km tunnel (Hechiceras tunnel)

Zaragoza-Lérida Subsection VI

This project runs for about 17,1 km from near to the river Cinca, between Velilla de Cinca and Ballobar. The main works are:

- the Clamor viaduct (about 440 m)
- the Vall del Gallo viaduct (about 357 m)
- seven overpasses
- 18 underpasses.

Zaragoza-Lérida Subsection VII

This section runs for about 16 km from km 121 in the preliminary project after the crossing of the valley of the Vallmayá stream at Alcarrás and has only one large-scale structure, the bridge over the Canal de Aragón y Cataluña.

This bridge has three arches of 10 m, 15 m and 10 m respectively and a pre-stressed deck 1,6 m thick with four recesses 1,1 m in diameter.

Bridge over the river Ebro

This bridge is situated in the province of Zaragoza between Osera and Fuentes de Ebro. Its main dimensions are:

- Length: 330 m
- Width: 13,40 m
- Number of piles: 4
- Height of piles: 12 m

Zaragoza-Lérida. Bridge over the river Cinca

The works to be carried out are located in the province of Huesca over the river Cinca, in the municipalities of Ballobar and Zaidín, north of Fraga (near Lérida).

The main dimensions of the bridge are:

- Length: 830 m
- Total width of deck: 14 m
- Height of piles: (6,6 < h < 15,8) m
- Number of piles: 13.

6. *Objectives:*

Over Europe as a whole, high-speed rail travel is developing to offer a service different from that currently available, one which is more competitive and, by offering an alternative to air and road transport, able to capture a larger share of the passenger transport market. All these factors favour rail travel.

In the master plan for infrastructure, the Seville-Madrid-Barcelona-French border route is of central importance to high-speed rail travel in Spain.

Quantified objectives:

Route	Current time	Future time
Madrid — Zaragoza	2 h 59 min	1 h 35 min
Madrid — Lérida	4 h 35 min	2 h 00 min
Madrid — Barcelona	6 h 35 min	2 h 40 min

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	30.11.1992	30.7.1995
Purchase of land	30.7.1995	30.6.1996
Main work	30.11.1995	30.12.1999

8. *Assessment of costs and socio-economic advantages:*

Main indicators used:

- period of analysis: 20 years from the beginning of the works,
- proportion of international traffic: 6,85 %.

The socio-economic calculation includes direct costs and benefits (costs of preparation, construction and maintenance, time saved, running costs and changes in pollution).

Benefit	Unit cost	Total cost ESP million	% of total benefits
Time saved	(¹)	26 205	120,0
Running costs		- 5 714	-26,2
Changes in pollution		2 610	12,0

(¹) (ESP/hour in 1990): passenger train for work, ESP 2 311; passenger train for leisure, ESP 1 346; car, ESP 2 650 and ESP 2 218; air, ESP 4 056 and ESP 2 404; coach, ESP 1 638 and 1 062.

Without the project, traffic is expected to increase each year by 1,79 % on day trains and 1,33 % on night trains.

With the project, traffic is expected to increase each year by 3,82 % on day trains and 0,97 % on night trains.

Discount rate chosen: 5 %.

The residual value is not taken into account.

Result of the analysis:

- net present value: 0,
- internal rate of socio-economic return: 5 %,
- cost/benefit ratio: 1.

9. *Environmental impact analysis:*

The environmental impact assessment carried out in accordance with Directive 85/337/EEC has been approved and it was decided to start work on 2 June 1995.

The proportion of the total cost which it is estimated will be required for measures to offset the environmental impact or protect the environment is 2,8 %.

10. *Cost and assistance:*

Total cost: ECU 410 147 354

Eligible cost (after 7 April 1995): ECU 403 828 201

Cost taken into account for calculating the aid (after deduction of revenue): ECU 343 253 971

Rate of assistance: 85 %

Cohesion Fund grant: ECU 291 765 875

ANNEX

FINANCING PLAN

Project No: 95/11/65/007

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure		Cohesion Fund		National authorities				Other	11	%	
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government	Other	10			
1=2+11							8	9		12=11/1	13		
1995	608 320	517 072	85	439 511	85	56 011	11	56 011		21 550	4	91 248	15
1996	58 452 940	49 684 999	85	42 232 249	85	5 967 568	12	5 967 568		1 485 182	3	8 767 941	15
1997	159 090 772	135 227 156	85	114 943 083	85	16 085 894	12	16 085 894		4 198 179	3	23 863 616	15
1998	154 139 890	131 018 907	85	111 366 071	85	15 630 030	12	15 630 030		4 022 806	3	23 120 983	15
1999	31 536 279	26 805 837	85	22 784 961	85	3 748 593	14	3 748 593		272 283	1	4 730 442	15
Total	403 828 201	343 253 971	85	291 765 875	85	41 488 096	12	41 488 096		10 000 000	3	60 574 230	15

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/65/005

1. **Name:** Castilla motorway, Salamanca-Fuentes de Oñoro section, in Spain.
2. **Body responsible for the application:**
- 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (MEH)
- 2.2. **Address:** Paseo de la Castellana, 162 28071 Madrid
3. **Body responsible for implementation:**
- 3.1. **Name:** Dirección General de Carreteras Ministerio de Fomento
- 3.2. **Address:** Paseo de la Castellana, 67 28071 Madrid
4. **Location:**
- 4.1. **Member State:** Spain
- 4.2. **Region:** Castile-León
5. **Description:**
- This project involves the preparation of route plans and the construction of the Castile motorway from Salamanca to Fuentes de Oñoro, covering a distance of approximately 103,5 km.
- The project forms part of the trans-European transport networks in accordance with Parliament and Council Decision 1962/96/EC of 23 July 1996 and is included in the Infrastructure Master Plan for 1993–2007. Furthermore, the Salamanca-Fuentes de Oñoro section is part of the priority project linking Lisbon to the French border via Valladolid, which was approved at the European Council of Essen in December 1994. The project concerns the following sections:
- Salamanca-Aldehuela de la Bóveda: 23,7 km
 - Aldehuela de la Bóveda-Martín de Yeltes: 25,2 km
 - Martín de Yeltes-Ciudad Rodrigo: 32,9 km
 - Ciudad Rodrigo-Fuentes de Oñoro: 21,7 km.
- The main dimensions to be analysed for the various possible alternatives are:
- minimum radius 750 m
 - maximum gradient 4 %.
- The standard sections will consist of:
- a central reservation 13,00 m wide,
 - two carriage ways each 3,50 m wide,
 - hard shoulders 2,50 m wide outside and 1,00 m wide inside,
 - inner verge 1,00 m wide, outer verge 1,50 m wide.
- The project will be carried out on the basis of the studies done for the sections Salamanca to Martín de Yeltes and Martín de Yeltes-Fuentes de Oñoro.
6. **Objectives:**
- The main objective is to build a corridor connecting the Portuguese road network with the corridor to Irún and the French border.
- The road network which makes up the C-14 corridor, to which the section in question belongs, is included in the Road Plan for 1992–2000, which provides for the Tordesillas-Salamanca-Fuentes de Oñoro section to be completed with a motorway.
- All this will form a major international route (E-80) including the N-I, the N-630 and the N-620. Long-distance traffic will thus be properly channelled between Irún and Fuentes de Oñoro, contributing to the continuity of European road routes.
7. **Work schedule:**
- | Category of work | Commencement | Completion |
|------------------------|--------------|------------|
| Preparation of project | 1.12.1996 | 31.12.1998 |
8. **Assessment of costs and socio-economic advantages:**
- Main indicators used:
- current ADT (vehicles/day): 8 935, completion plus 20 years: 12 267,
- estimated growth in traffic:
- 1996-2000: 3,3 %
 - 2001-2010: 1,9 %
 - 2011: 0,8 %.
- The economic calculation includes direct costs and benefits (cost of drawing up the plan,

construction, maintenance time saving, accidents and running costs of vehicles).

Result of analysis:

- net present value (6%): ECU 79 million,
- internal economic rate of return: 8,9%,
- cost-benefit ratio: 1,4.

10. *Cost and assistance:*

(in ECU)

	Total cost	Eligible cost
Studies	4 934 227	4 934 227
Total	4 934 227	4 934 227

9. *Environmental impact analysis:*

Prior to implementation of the project, an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

Total eligible cost: ECU 4 934 227

Rate of assistance: 100%

Cohesion Fund grant: ECU 4 934 227

ANNEX

FINANCING PLAN

Project No: 96/11/65/005

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities			Other	11	%	
		2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9				
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	266 005	266 005	100	266 005	100								
1997	3 175 298	3 175 298	100	3 175 298	100								
1998	1 492 924	1 492 924	100	1 492 924	100								
Total	4 934 227	4 934 227	100	4 934 227	100								

(¹) Total eligible cost of project.

PROJECT No: 96/11/65/007

1. **Name:**

Madrid-Valencia motorway. Atalaya del Cañavate-Motilla del Palancar section.

 - bituminous base of 13 cm G-25 bituminous mix
 - sub-base course of 25 cm ZA-25 artificial aggregate.
2. **Body responsible for the application:**
 - 2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria (MEH)
 - 2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid
3. **Body responsible for implementation:**
 - 3.1. **Name:** Dirección General de Carreteras
Ministerio de Fomento
 - 3.2. **Address:** Paseo de la Castellana, 67
28071 Madrid
4. **Location:**
 - 4.1. **Member State:** Spain
 - 4.2. **Region:** Castile-La Mancha
5. **Description:**

The Atalaya del Cañavate-Motilla del Palancar section is part of the Madrid-Valencia motorway which will be completed with the sections from Motilla del Palancar to Minglanilla and from Minglanilla to Caudete de las Fuentes.

This project involves the construction of a section of motorway covering a distance of around 35 km. It runs from km 11 + 070 on the A-31 Levant motorway some 1 000 m north of Atalaya del Cañavate to km 35 + 009 at Motilla del Palancar. The standard cross section consists of two carriageways of 7 m with hard shoulders 1 m wide on the inside and 2,5 m wide on the outside, with the following interchanges, surfaces and structures:

 1. Interchanges: Atalaya del Cañavate
Tébar
Pozoseco
 2. Roadbase and surfacing of the main roadway
 - surface course of 6 cm S-20 bituminous mix
 - intermediate course of 6 cm G-20 bituminous mix
3. **Special structures**
 - Viaduct over the Tajo-Segura diversion
 - Viaduct over the river Júcar
 - Viaduct over the river Valdemembra
 - Bridge for the Valencia-Madrid sliproad over the Madrid Alicante motorway
 - Bridge over the A-31 motorway
 - Overpass for the Valencia-Ciudad Real sliproad over the Madrid-Valencia sliproad at km 2 + 400.

The road will run through the following municipalities: Atalaya, Tébar, Pozorrubielos, Cañadajuncosa, El Picazo, El Peral and Motilla del Palancar. The project is included in the master plan for the trans-European transport networks approved by Parliament and the Council.
6. **Objectives:**

The main objectives are:

 - To connect the cities of Madrid and Valencia, with their many trade, industrial, agricultural and tourism links, by means of a high capacity, high quality motorway.
 - To eliminate the traffic bottleneck which now occurs.
 - To increase the accessibility of this part of Spain.
 - To complete the motorway network in accordance with the trans-European road network as included in the master plan for infrastructures (PDI).

The most relevant aspect of the many benefits of completing this infrastructure is the improvement in road communications, which will improve the traffic flow and reduce travelling time:

Traffic flow: the current speed of light and heavy vehicles is around 70 and 57 km/h respectively. Once this project is completed speeds will increase to 108 and 87 km/h respectively.

Time-saving: the journey time on the Atalaya-Caudete section will be reduced by 24 minutes for light vehicles and 29 minutes for heavy vehicles.

7. *Work schedule:*

Category of work	Commencement	Completion
Preparation of project	1.1.1993	31.12.1995
Purchase of land	5.12.1995	31.12.1999
Main work	25.10.1996	31.12.1999
Operational phase	31.12.1999	

8. *Assessment of costs and socio-economic advantages:*

The economic analysis refers to the Atalaya del Cañavate-Caudete de las Fuentes section which includes the section concerned by this Decision. The following basic hypotheses were used:

- Traffic: normal increase in traffic from 1995–2000 is 3,3 %, from 2001–11 is 1,9 % and from 2011 on is 0,8 %.
- General transport costs: the operating costs analysed included depreciation, maintenance, fuel, lubricants, time and accidents both before and after construction of the new road.
- Road layout: analysis of the impact of the main geometric variables on the construction of the new infrastructure.
- Analysis of the hypotheses: normal, lower than normal growth, lower time savings.

The main results:

- internal rate of return: 7,8 %,

- net present value: ECU 41,9 million,
- cost-effectiveness ratio: 1,2.

9. *Environmental impact analysis:*

Prior to implementation of the project an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

The proportion of the total cost accounted for by measures to correct environmental effects or to protect the environment is 2,2 %.

The protective and corrective measures to be taken to minimise the impact of the new road on the environment and the countryside are: landscaping of slopes, replanting, anchoring of plants, underpasses for wildlife, etc.

10. *Cost and assistance:*

(in ECU)

	Total cost	Eligible cost
Purchase of land	2 414 453	2 110 232
Buildings and construction	114 698 586	114 698 586
Monitoring and supervision	3 060 319	3 060 319
Total	120 173 358	119 869 137

Total cost: ECU 120 173 358

Eligible cost (after 8 November 1996): ECU 119 869 137

Rate of assistance: 85 %

Cohesion Fund grant: ECU 101 888 766

ANNEX

FINANCING PLAN

Project No: 96/11/65/007

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans
		Total public expenditure			Cohesion Fund		National authorities				Other	%	
		Total		%	Total	%	Total	Central government	Other	Total			
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1996	966 989	966 989	100	821 941	85	145 048	15	145 048					
1997	30 994 332	30 994 332	100	26 345 182	85	4 649 150	15	4 649 150					
1998	53 564 034	53 564 034	100	45 529 429	85	8 034 605	15	8 034 605					
1999	34 343 782	34 343 782	100	29 192 215	85	5 151 567	15	5 151 567					
Total	119 869 137	119 869 137	100	101 888 766	85	17 980 371	15	17 980 371					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 96/11/65/008

1. *Name:*

Madrid-Valencia motorway: Minglanilla-Caudete de las Fuentes stretch.

Valencia motorway, which also includes the Atalaya-Motilla and Motilla-Minglanilla stretches, for which Cohesion Fund financing has already been granted.

2. *Body responsible for the application:*

2.1. *Name:* Dirección General de Análisis y Programación Presupuestaria
Ministerio de Economía y Hacienda

This stretch, of a total length of 30 128,199 m, runs east from its origin at KP 1+000, near CV-504 at Villapardo, 2 km from the urban centre of Minglanilla to KP 32+087,284, south-west of Caudete de las Fuentes, at the start of the by-pass.

2.2. *Address:* Paseo de la Castellana, 162
28071 Madrid

The main works are described below.

3. *Body responsible for implementation:*

3.1. *Name:* Dirección General de Carreteras
Ministerio de Fomento

— Typically, the cross-section comprises two 7 m carriageways, with 2,5 m external and 1 m internal hard shoulders, a 12 m central reservation between carriageways (except in a few exceptional cases), and a maximum incline of 6%.

3.2. *Address:* Paseo de la Castellana, 67
28071 Madrid

4. *Location:*

The structure of the main carriageway will be as follows:

4.1. *Member State:* Spain

— 4 cm open-textured surface course,

4.2. *Region:* Castile-La Mancha

— 8 cm binder course,

5. *Description:*

The stretch of motorway between Minglanilla-Caudete de las Fuentes is part of the Madrid-

— 18 cm bitumen base course,

— 25 cm sub-base of artificial aggregate.

Intersections:

- Minglanilla restricted access point,
- restricted access point from the present N-III,
- Villagordo interchange,
- Jaraguas interchange,
- Venta del Moro interchange.

Viaducts and tunnels:

- Contreras reservoir viaduct (405 m),
- Istmo viaduct (850 m),
- Barranco de la Vid viaduct (305 m),
- Rabo de la Sarten tunnel (220 m).

Over the stretch, there will be four pedestrian overpasses and one overpass for the present N-III, six pedestrian underpasses, four slip road underpasses, and two underpasses for the present N-III.

Traffic flow studies show the need for an additional lane on the upgrade between KP 9+680 and KP 14+520 in the Madrid-Valencia direction, and between KP 12+480 and KP 6+980 in the Valencia-Madrid direction. These lanes will be on the inside of the roadway, next to the central reservation, since they are intended for fast vehicles.

In addition to the main works, two link roads to the N-III will be built on either side of the Contreras reservoir.

6. Objectives:

- to provide a high-capacity, high-quality road link between the two large conurbations of Valencia and Madrid, which maintain close relations in terms of commerce, industry, agriculture, tourism, etc.
- to remove the present bottleneck;
- to improve the accessibility of this part of Spain;
- to reinforce the motorway network.

Among the many advantages of this infrastructure work, the most important is the improvement of road communications, reflected in greater traffic fluidity and time-saving.

Traffic fluidity: at present, the average speed is about 57 kmh for light vehicles, and 70 kmh for

heavy vehicles. This work will improve traffic fluidity, and raise these average speeds to 87 kmh and 108 kmh respectively.

Time-saving: it is estimated that light vehicles will save 12 minutes, and heavy vehicles 15 minutes.

7. Work schedule:

Category of work	Commencement	Completion
Preparation of project	1.1.1993	31.12.1995
Purchase of land	27.6.1996	31.12.1999
Main work	1.7.1996	31.12.2000
Operational phase	31.12.2000	

8. Assessment of costs and socio-economic advantages:

The economic analysis refers to the Atalaya del Cañavete-Caudete de las Fuentes stretch, which includes the stretch covered by this Decision. The analysis is based on the following main data:

- Traffic: the normal increase is 3,3 % from 1995 to 2000, 1,9 % from 2001 to 2011 and 0,8 % from 2011 onwards;
- General transport costs: analysis of operating costs, including depreciation, maintenance, fuel, lubricants, journey length and accidents;
- Roadway geometry: analysis of the influence of the major geometric variables on the completion of the new infrastructure;
- Analysis of assumptions: normal, growth below normal, penalty for time value.

Main results:

- internal rate of return: 7,8 %,
- present net discounted value: ECU 41,9 million,
- cost/benefit ratio: 1,2.

9. Environmental impact analysis:

Before implementation of this project, an environmental impact assessment was made in accordance with Directive 85/337/EEC.

Expenditure on measures to offset environmental effects or to protect the environment is estimated at 2,5 % of total cost. Corrective and protective measures to reduce the environmental impact of the new road to a minimum mainly involve landscaping, in particular treatment of embankments and cuttings, plantations, wildlife and livestock crossings, spreading of topsoil, etc.

(in ECU)

	Total cost	Eligible cost
Supervision and monitoring TA	2 693 680	2 693 680
Total	123 970 505	121 077 472

10. *Cost and assistance:*

Total cost: ECU 123 970 505

Total eligible cost
(after 13 November 1996): ECU 121 077 472

Rate of assistance: 85 %

Cohesion Fund grant: ECU 102 915 851

(in ECU)

	Total cost	Eligible cost
Purchase of land	3 002 318	2 726 705
Construction	118 274 508	115 657 087

ANNEX

FINANCING PLAN

Project No: 96/11/65/008

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Communi-ty loans	
		Total public expenditure		Cohesion Fund		National authorities			Other	11	%			
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	Central government	Other			10		
1=2+11												12=11/1	13	
1996	71 455	71 455	100	60 737	85	10 718	15	10 718						
1997	30 645 258	30 645 258	100	26 048 469	85	4 596 789	15	4 596 789						
1998	62 529 273	62 529 273	100	53 149 882	85	9 379 391	15	9 379 391						
1999	17 548 547	17 548 547	100	14 916 265	85	2 632 282	15	2 632 282						
2000	10 282 938	10 282 938	100	8 740 497	85	1 542 441	15	1 542 441						
Total	121 077 472	121 077 472	100	102 915 851	85	18 161 621	15	18 161 621						

(1) Total eligible cost of project.

PROJECT No: 96/11/65/009

1. **Name:**

Rías Bajas motorway. Benavente-Camarzana de Tera section.

2. **Body responsible for the application:**

2.1. **Name:** Dirección General de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General de Carreteras
Ministerio de Fomento

3.2. **Address:** Paseo de la Castellana, 67
28071 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Castile-León

5. **Description:**

The main project is the Rías Bajas motorway which will link Benavente with Porriño and will cover a distance of approximately 300 km.

This part of the project concerns the construction of a new section of motorway spanning about 30 km between Benavente and Camarzana de Tera. The road will have two carriageways, each 7 m wide, with hard shoulders 1 m wide on the inside and 2,5 m wide on the outside. The interchanges, surfaces and structures to be constructed are as follows:

1. Interchanges: Benavente, at the beginning of the section
Villabrázaro (one side only)
Manganeses la Polvorosa (one side only)
Quiruelas
Camarzana de Tera, at the end of the section.

2. Roadbase and surfacing of the main roadway

- 4 cm of draining surface course
- 8 cm of intermediate course
- 10 cm of bituminous base
- 20 cm of cement-stabilised soil
- 50 cm of selected soil CBR >20.

3. Structures:

- Viaduct over the river Orbigo
- Viaduct over the Almucera arroyo
- underpasses and overpasses.

This project completes the Rías Bajas motorway which is part of the master plan of the trans-European transport network.

6. **Objectives:**

The general aim is to fill in gaps in the road network and to smooth the flow of traffic, as well as to improve access to areas with poor infrastructure.

The main objectives of this project are:

1. to provide access to an especially remote and inaccessible area,
2. to improve communications in the Galician hinterland,
3. to fill in the motorway network,
4. to smooth traffic flows and save journey time.

Journey times over the 30 km will be reduced by 9,0 minutes for cars and 9,4 for heavy vehicles, their speeds being increased from 70 to 108 and from 57 to 81 km/h respectively.

7. **Work schedule:**

Category of work	Commencement	Completion
Preparation of project	1.1.1993	31.12.1995
Purchase of land	28.8.1996	31.12.1999
Main work	November 1996	31.12.1999
Operational phase	31.12.1999	

8. *Assessment of costs and socio-economic advantages:*

The economic analysis refers to the Benavente-Orense section which includes the section concerned by this Decision. The following basic hypotheses were used:

- Traffic: ADT (vehicles per day): 6 805,
- ADT forecast: 3,3 % in 1996–2000, 1,8 % in 2001–2010 and 0,8 % thereafter.
- General transport costs: the operating costs include depreciation, maintenance, fuel, lubricants, time and accidents both before and after construction of the new road.
- Road layout: analysis of the impact of the main geometric variables on the construction of the new infrastructure.
- Analysis of the hypotheses: normal, lower than normal growth, lower time savings.

The main results:

- internal rate of return 8,6 %,
- net present value (discount rate 6 %) ECU 154,3 million,
- Cost-effectiveness ratio 1,3.

9. *Environmental impact analysis:*

Prior to implementation of the project an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

The proportion of the total cost accounted for by measures to correct environmental effects or to protect the environment (ecological landscape management and environmental monitoring) is 2,5 %.

10. *Cost and assistance:*

(in ECU)

	Total cost	Eligible cost
Purchase of land	3 018 066	2 987 282
Buildings and construction	50 008 752	50 008 752
Monitoring and supervision	2 414 453	2 414 453
Total	55 441 271	55 410 487

Total cost: ECU 55 441 271

Eligible cost (after 8 November 1996): ECU 55 410 487

Rate of assistance: 85 %

Cohesion Fund grant: ECU 47 098 914

ANNEX

FINANCING PLAN

Project No: 96/11/65/009

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities			Other	11	12=11/1		
		2=4+6+10	3=2/1	4	5=4/2	Total	7=6/2	8				9	
1=2+11													
1996	461 160	461 160	100	391 986	85	69 174	15	69 174					
1997	14 637 621	14 637 621	100	12 441 978	85	2 195 643	15	2 195 643					
1998	25 794 808	25 794 808	100	21 925 587	85	3 869 221	15	3 869 221					
1999	14 516 898	14 516 898	100	12 339 363	85	2 177 535	15	2 177 535					
Total	55 410 487	55 410 487	100	47 098 914	85	8 311 573	15	8 311 573					

⁽¹⁾ Total eligible cost of project.

PROJECT No: 97/11/65/001

1. **Name:**

By-pass expressway for Las Palmas, Plaza de América — Nueva Paterna — Tamaraceite section.

2. **Body responsible for the application:**

2.1. **Name:** Dirección Gral de Análisis y Programación Presupuestaria

2.2. **Address:** Paseo de la Castellana, 162
28071 Madrid

3. **Body responsible for implementation:**

3.1. **Name:** Dirección General de Carreteras
Ministerio de Fomento

3.2. **Address:** Paseo de la Castellana, 67
28071 Madrid

4. **Location:**

4.1. **Member State:** Spain

4.2. **Region:** Canary Islands

5. **Description:**

The overall project involves building an expressway to by-pass Las Palmas. The phase presented here for part-financing by the Cohesion Fund concerns the sections of the expressway from Plaza de América to Nueva Paterna and from Nueva Paterna to Tamaraceite (the section from Nueva Paterna to Jinamar is not included in this phase). The work has the following specifications:

The standard section of the expressway consists of two carriageways 7 m wide. Each carriageway has two lanes 3,5 m wide, an inside hard shoulder of 1,5 m and an outside one of 2,5 m. The central reservation will be 11 m wide.

The slabs in the structures on the expressway will have a width equal to three lanes of 3,5 m and an outside hard shoulder of 2,5 m. Only viaducts 5 and 6 will have four lanes 3,5 m wide where the entry and exit sliproads feed in at the Tamaraceite and Almatriche interchanges.

The standard section for tunnels consists of three lanes 3,5 m wide with hard shoulders of 0,75 m and elevated 0,6 m. Total width will be 13,2 m.

The project comprises 16 structures, three pedestrian overpasses, two viaducts, two cut and cover tunnels and 14 walls.

Plaza de América — Nueva Paterna section

The section is 4 128 m long and has four interchanges, including both ends:

— Plaza de América at km 0 of the section

— Roundabout No 1 at km 0+700

— Escaleritas interchange at km 2+680

— Nueva Paterna interchange at the end of the section, where the three sections comprising the by-pass expressway meet.

Tamaraceite — Nueva Paterna section

This section is 4 862 m long. It starts at km 9,5 on the c-813 with intersection No 1 and ends at the Nueva Paterna interchange described above. Three interchanges are planned:

— at Teror, km 1+200

— at Tamaraceite, km 3+160

— at Almatriche, km 4+360

The largest engineering structure planned is a 320 m long viaduct.

6. **Objectives:**

The general objective is to channel traffic which is currently entering the city of Las Palmas and tends to bring traffic to a standstill because of high density. The increase in capacity and speed will reduce journey time. In addition, the project will:

— improve inner-city communications,

— supplement the island's main motorway network,

— improve traffic flow and save time.

The quantified objectives: journey times will be reduced by 9 minutes for cars and 7,9 minutes for heavy vehicles, their speeds being increased from 40 km/h to 90 and 76 km/h respectively on the initial stretch of 10,1 km and the final stretch of 9 km.

7. **Work schedule:**

Category of work	Commencement	Completion
Main work	25.11.1996	31.12.1999
Operational phase	31.12.1999	

8. *Assessment of costs and socio-economic advantages:*

The economic study was based on the following assumptions:

- Traffic (vehicles/day 1999): 34 078
- ADT forecast: 3,3 % in 1996–2000, 1,8 % in 2001–2010 and 0,8 % thereafter.
- General transport costs: the operating costs include depreciation, maintenance, fuel, lubricants, time and accidents both before and after construction of the new road.
- Road layout: analysis of the impact of the main geometric variables on the construction of the new infrastructure.
- Analysis of the hypotheses: normal, lower than normal growth, lower time savings.

The main results:

- internal rate of return: 43,6 %,
- net present value (discount rate 6 %): ECU 154,3 million
- cost-effectiveness ratio: 7,4.

9. *Environmental impact analysis:*

Prior to implementation of the project an environmental impact assessment has been carried out in accordance with Directive 85/337/EEC.

The proportion of the total cost accounted for by measures to correct environmental effects or to protect the environment (ecological landscape management and environmental monitoring) is 1,3 %.

10. *Cost and assistance:*

(in ECU)

	Total cost	Eligible cost
Buildings and construction	50 385 846	49 679 509
Monitoring and supervision	1 621 252	1 621 252
Total	52 007 098	51 300 760

Total cost: ECU 52 007 098

Eligible cost (after 29 April 1997): ECU 51 300 760

Rate of assistance: 85 %

Cohesion Fund grant: ECU 43 605 646

ANNEX

FINANCING PLAN

Project No: 97/11/65/001

(in ECU)

Year	Total cost ⁽¹⁾	Public expenditure									Private sector		Community loans
		Total public expenditure		Cohesion Fund		National authorities				Other			
			%		%	Total	%	Central government	Other				
1=2+11	2=4+6+10	3=2/1	4	5=4/2	6=8+9	7=6/2	8	9	10	11	12=11/1	13	
1997	16 512 748	16 512 748	100	14 035 836	85	2 476 912	15	2 476 912					
1998	22 517 383	22 517 383	100	19 139 776	85	3 377 607	15	3 377 607					
1999	12 270 629	12 270 629	100	10 430 035	85	1 840 594	15	1 840 594					
Total	51 300 760	51 300 760	100	43 605 646	85	7 695 114	15	7 695 114					

⁽¹⁾ Total eligible cost of project.