ASIAN DEVELOPMENT BANK

RRP: VIE 28315

REPORT AND RECOMMENDATION

OF THE

PRESIDENT

TO THE

BOARD OF DIRECTORS

ON A

PROPOSED LOAN

TO THE

SOCIALIST REPUBLIC OF VIET NAM

FOR THE

THIRD PROVINCIAL TOWNS WATER SUPPLY AND SANITATION PROJECT

November 2001

CURRENCY EQUIVALENTS

(as of 15 November 2001)

Currency Unit	–	Dong (D)
D1.00	=	$0.000066
$1.00	=	D15,053

For calculations in this Report, an exchange rate of D14,500 to $1.00 has been used. This was the rate prevailing at the time of the feasibility study.

ABBREVIATIONS

ADB	–	Asian Development Bank
AFD	–	Agence Francaise de Developpement
AIFC	–	average incremental financial cost
AIEC	–	average incremental economic cost
CESI	–	community environmental sanitation improvement
EA	–	executing agency
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
HCMC	–	Ho Chi Minh City
IEE	–	initial environmental examination
lpcd	–	liters per capita per day
M&E	–	monitoring and evaluation
MOC	–	Ministry of Construction
MOF	–	Ministry of Finance
NGO	–	nongovernment organization
O&M	–	operation and maintenance
PCU	–	project coordination unit
PHAP	–	public health awareness program
PPC	–	provincial people's committee
PPMU	–	provincial project management unit
PSC	–	provincial steering committee
PWC	–	public works company
SOE	–	state-owned enterprise
TA	–	technical assistance
UFW	–	unaccounted-for water
VWU	–	Vietnamese Women's Union
WACC	–	weighted average cost of capital
WHO	–	World Health Organization
WSC	–	water supply company

NOTES

(i) The fiscal year (FY) of the Government ends on 31 December.
(ii) In this report, "$" refers to US dollars.

CONTENTS

LOAN AND PROJECT SUMMARY

Borrower	Socialist Republic of Viet Nam
Project Description	The Project will improve water supply and sanitation systems in five provinces in central and southern Viet Nam where lack of safe water supply and sanitation facilities poses serious environmental and health risks and inhibits social and economic development.
Classification	Thematic: Human development
Environment Assessment	Category B Initial environmental examinations were undertaken, and their summary is a core appendix.
Rationale	The water supply and sanitation systems in the Project towns have been deteriorating because of lack of maintenance and investment. The inadequate water supply and sanitation systems in these towns have adversely affected the quality of life and health conditions of the people living in them. The five provincial towns are selected from among seven remaining provincial towns that have not received any external assistance in water supply and sanitation. Two district towns from two relatively poor provinces are included to balance the support to economic growth and the need to reach the poor. Access to safe water supply among these towns ranges from 18-55 percent among the provincial towns, and from 4-9 percent among the district towns. Similarly, septic tank coverage among the provincial towns ranges from 44-86 percent, and that among the district towns from 6-20 percent. Lack of access to safe water supply and sanitation facilities, combined with poor drainage systems, caused great health risks to the residents, especially the poor, who often live in flood-prone areas.
Objectives and Scope	The Project will improve water supply and sanitation systems in five provinces with total service area populations of about 1.2 million by 2010. The objectives are to (i) improve the health and quality of life of the people living in the project towns by constructing water supply, drainage, and sanitation facilities, and providing health and hygiene education; (ii) support community participation by developing community-based sanitation credit schemes for sanitation improvement; and (iii) improve the financial sustainability of the water supply companies (WSCs). The Project comprises four components: **Community Environmental Sanitation Improvement**. This includes the public health awareness program, and community environmental sanitation improvement. The first program aims at improving the communities' awareness of

the relationships between water, sanitation, and health, and motivating households to connect to piped water supply and convert to pour flush toilets with septic tanks; the second programs focus on small-scale environmental sanitation improvements not covered by the main construction contracts, and to meet demand for improvements generated arising from the first program.

Water Supply. This part will upgrade/expand water intakes, raw water transmission, water treatment plants, and distribution networks in the Project towns to meet the projected demand of 212,000 cubic meters (m^3) per day in the service areas by 2010.

Drainage and Sanitation. This part includes rehabilitation and cleaning of about 22 kilometers (km) of existing drains, and construction of 69 km of secondary and tertiary drains in the towns, and about 20,000 septic tanks in households and public areas.

Implementation Assistance and Capacity Building. This part includes (i) project orientation assistance, (ii) project implementation assistance, and (iii) capacity building for WSCs.

Cost Estimates

The total project cost is estimated at $98.0 million equivalent, of which $50.4 million (51.4 percent) is the foreign exchange cost, including $1.1 million in interest charges during construction, and $47.6 million equivalent (48.6 percent) is the local currency cost, including duties and taxes of about $5.6 million.

Financing Plan

($ million)

Source	Foreign Exchange	Local Currency	Total Cost	Percent
Asian Development Bank	41.4	18.6	60.0	61.2
Agence Francaise de Developpement	6.6	4.4	11.0	11.2
Provincial governments	0.0	23.5	23.5	24.0
Beneficiaries	2.4	1.1	3.5	3.6
Total	**50.4**	**47.6**	**98.0**	**100.0**
Percent	51.4	48.6	100.0	

Loan Amount and Terms

The equivalent of SDR46,945,000.00 ($60.0 million) will be provided in various currencies from Special Funds resources of the Asian Development Bank (ADB), for a term of 32 years, including a grace period of 8 years, and with an interest rate of 1.0 percent per annum during the grace period and 1.5 percent per annum thereafter.

Period of Utilization

Until 30 June 2008

Executing Agencies	Each provincial people's committee will be the executing agency (EA) in the province.
Implementation Arrangements	The EA in each province will set up a provincial steering committee (PSC), which, on behalf of the provincial people's committee (PPC), will have the overall responsibilities for project implementation. The PSC will be supported by a provincial project management unit (PPMU), which will be responsible for daily implementation activities. The Vietnam Women's Union will be responsible for the management of the sanitation credit schemes in the project towns. For overall project coordination, a central steering committee will be established and will be supported by a project coordination unit (PCU).
Procurement	Goods and services financed by ADB under the Project will be procured in accordance with ADB's *Guidelines for Procurement.* Civil works contracts valued at more than $1.0 million will be awarded following international competitive bidding procedures and contracts valued at or below $1.0 million will be awarded following local competitive bidding procedures. Procurement of equipment and vehicles will follow international competitive bidding procedures for contracts valued more than $500,000, international shopping procedures for contracts valued at $500,000 or less, and direct purchase procedures for contracts valued at $100,000 or less. Where special license is required or where there is no adequate competition, supply and installation contracts valued at or below $100,000 may be awarded following direct purchase procedures, subject to approval by ADB on a case by case basis. Minor works for the development and maintenance of project facilities may be carried out by WSCs on a force account basis. Civil works contracts for distribution networks to be financed by Agence Francaise de Developpement will follow local competitive bidding procedures.
Consulting Services	The consulting services financed by ADB will be procured in accordance with ADB's *Guidelines on the Use of Consultants,* and other arrangements satisfactory to ADB for the engagement of domestic consultants. A total of 1,480 person-months of consulting services (206 international and 1,274 domestic) will cover engineering design, construction supervision, financial management, and training.
Estimated Project Completion Date	31 December 2007
Project Benefits and Beneficiaries	The Project will benefit about 1.2 million people by 2010. Corresponding benefits include the time and cost savings from purchasing, fetching, treating, and storing water; improved public and family hygiene and health; reduced medical outlays; and increased productive days.

I. THE PROPOSAL

1. I submit for your approval the following Report and Recommendation on a proposed loan to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project.

II. INTRODUCTION

2. In recognition of the adverse impact of inadequate safe drinking water supply and poor sanitation conditions on human development in the urban centers, the Government asked the Asian Development Bank (ADB) for assistance in preparing an investment project covering water supply and sanitation in five provinces. In December 1999, ADB approved technical assistance (TA)[1] for the preparation of the Third Provincial Towns Water Supply and Sanitation Project. ADB missions[2] visited Viet Nam since the commencement of the TA in May 2000, reviewed the project feasibility study prepared by TA consultants, and reached an understanding with the Government on the scope, cost estimates, and financing and implementation arrangements of the proposed Project. This report is based on the findings of ADB missions, reports prepared by the TA consultants and other aid agencies, and discussions with central and provincial government agencies and international and bilateral aid agencies. The project framework is presented in Appendix 1.

III. BACKGROUND

A. Sector Description

1. Overview

3. Viet Nam is the 12th most populous country in the world, with a total population of 76.3 million in 1999, of which about 23 percent live in urban areas. The population is concentrated in two large river deltas. The Mekong River Delta is the most populous region, with 16.1 million people, or 21 percent of the total, followed by the Red River Delta, where Hanoi is located, with a population of 14.8 million or 19 percent of the total. The population grew at an average annual growth rate of 1.7 percent during 1989-1999. The regional distribution of population varies from 62 and 67 people per square kilometer (km^2) in mountainous provinces in the north and the central highlands, respectively, to 408 and 1,180 people/km^2 in the Mekong and the Red River Deltas, respectively, and 2,883 and 2,410 people/km^2 in the major urban cities of Hanoi and Ho Chi Minh City (HCMC), respectively. The majority (86 percent) of people are of Kinh ethnicity, with the remaining 14 percent representing some 53 minority ethnic groups including Cham, Khmer, Muong, and Thai. The main ethnic groups in the south (particularly Mekong Delta region) are Cham and Khmer.

4. Viet Nam's health indicators compare favorably with those of other countries at a comparable level of income. The average life expectancy is 67 years: 65 years for men and 70

[1] TA 3323-VIE: Third Provincial Towns Water Supply and Sanitation, for $1 million, approved on 3 December 1999.

[2] The Appraisal Mission comprised X. Ye, Senior Financial Analyst and Mission Leader, C. Wee, Senior Counsel, S. Price, Senior Social Development Specialist, S. Bando, Programs Officer; A. Perdiguero, Project Economist; L. D. Thang, Project Implementation Officer (VRM); and P. Cooper, Water Supply Engineer and Staff Consultant. The Agence Francaise de Developpement staff of P. Lecrinier, Charge de Mission, J. Pecresse, Vietnam Country Officer, and Y. Bensaid, Engineer, also joined the Appraisal Mission.

years for women. Maternal mortality is officially[3] 100 per 100,000 live births with infant mortality at 37 per 1,000 live births. Disparities exist between geographical regions, with the central highlands and northern mountainous regions having an infant mortality rate of 56 per 1,000 live births. Child malnutrition is very high at 39 percent as a result of poor nutritional intake, food shortages, and diarrhea caused by unsafe water and poor sanitation. Approximately 47 percent of the urban population and less than 20 percent of the rural population have access to safe water supply, and only 43 percent and 15 percent respectively have access to safe excreta disposal. Even those with access to the facilities may not use them properly and hygienically. Common diseases include tuberculosis, dengue fever, Japanese encephalitis, and malaria. The main causes of infant mortality are birth asphyxia, birth trauma, neonatal tetanus, pneumonia, congenital diseases, acute respiratory infections, and malaria.

5. Vietnam's per capita GDP is estimated at $401 for 2000. While the poverty ratios in the country vary substantially, depending on the methodologies used by various measuring agencies, poverty has been declining significantly over the past decade. The estimated poverty ratios in the project towns are: 13.4 percent for Rach Gia, 9.2 percent for Tay Ninh, 7.5 percent for Thu Dau Mot, 10.4 percent for Tuy Hoa, 20.7 percent for Chi Thanh, 7.9 percent for La Hai, and 27.0 percent for Phan Rang. The measurement of poverty based on a poverty line has its limit, because it does not take into account other dimensions of poverty, such as access to basic services.

6. In 1999, the labor force was estimated at 37.8 million, of which 68 percent were employed in agriculture, 13 percent in industry and construction, and 19 percent in the service sector. The urban unemployment rate was 6.7 percent in 1999, compared with 26.8 percent in the rural areas. With a high ratio of farmers to arable land, and about 1 million laborers entering the labor market every year, underemployment is common and is estimated as high as 57 percent in rural areas. The excessive rural labor force relative to available productive assets in the rural sector has led to a rapid rural-urban migration, which places increasing pressure on the urban infrastructure, causing deterioration of urban environment, exacerbation of urban poverty, and worsening of urban unemployment.

2. Classification of Urban Centers

7. The urban population increased by about 5.5 million people during 1989-1999, with an average annual increase of 3.6 percent. By 1999, the urban population reached 18 million and accounted for 24 percent of the total population, compared with 19.4 percent in 1989. The Government estimates that the rate of urbanization will increase to 45 percent of the population by 2020. Urban centers in Viet Nam are divided into six classes (Table 1). Currently there are four centrally governed cities, 61 provincial towns and 537 other urban townships.

3. Water Supply

8. Urban water supply systems are unable to meet the demand of the country's growing urban population for safe drinking water. Estimates indicate that only around 150 of the country's 600 urban centers have piped water supply systems, which serve some 47 percent of the urban population. Service coverage has risen only slightly since 1990, from an estimated 44 percent of the urban population. Apart from piped water supply, many urban residents rely on untreated water from shallow wells, rainwater collection, streams, canals, or ponds. These sources (except for rainwater) are potentially subject to serious pollution and therefore present a

[3] The World Health Organization estimates that maternal mortality could be as high as 160/100,000 live births.

major health risk to the urban populations. A significant proportion of the urban population purchase water for drinking and cooking from vendors at prices often 5-20 times existing tariffs for public water supply. Average per capita water consumption in the larger urban centers varies from 50 to 180 liters per capita per day (lpcd). Shortages of water and intermittent supply, usually 6-18 hours per day, are common in urban areas, although exact levels are difficult to establish because of poor metering systems.

Table 1: Classification of Urban Centers

Class	Type	Comment
1	National centers. Very large cities, which play an important role in national development. Population not less than 1 million.	Includes Hai Phong, Hanoi, and Ho Chi Minh City
2	Regional centers. Large cities, which play an important role in development of a territory. Population from 350,000 to 1,000,000.	Includes Can Tho , Da Nang, and Hue. Da Nang is managed by central authorities.
3	Provincial cities. Large-medium size towns, which play an important role in development of a province or sector in a territory. Population from 100,000 to 350,000.	Managed by provincial authorities.
4	Provincial towns. Small-medium size towns, which play an important role in development of a province. Population from 30,000 to 100,000.	Managed by provincial authorities. Includes Phan Rang, Rach Gia, Tay Ninh, Thu Dau Mot, and Tuy Hoa.
5	District towns. Small towns, which play an important role in development of a district. Population from 4,000 to 30,000 persons	Managed by district authorities.
Others	District towns and clusters.	Includes Chi Thanh and La Hai, which are managed by district authorities.

9. The physical conditions of urban water supply systems are generally poor, due to inadequate maintenance. Many water treatment plants, even those built recently, suffer from design and construction faults. Some urban centers have no treatment facilities and raw water is pumped directly to the distribution network, with suspended solids, iron, or high levels of contamination. The water supply systems, often patched up or expanded using a variety of incompatible equipment and tools from local sources, are of poor quality. Water supply companies (WSCs) are usually unable to meet the design and construction standards because of lack of appropriate equipment, high quality materials, management skills, and financial resources. Maintenance is inadequate to maintain an appropriate level of service. As a result, existing schemes are often difficult to operate, unreliable, and inefficient. Except for HCMC and Hanoi, the quality of water supplied in urban areas generally fails to meet the World Health Organization (WHO) standards or requirements of the drinking water quality guidelines of the Government. Although meters are generally used in urban centers, the quality and accuracy are usually poor. Unaccounted for water (UFW) is reported at 32-54 percent of water produced.

4. Drainage and Sanitation

10. The urban centers commonly discharge wastewater and storm water through combined systems to nearby watercourses, usually without treatment. Large sections of these combined networks, constructed decades ago, need rehabilitation due to lack of maintenance. Flooding is

common in urban centers in the wake of heavy rainfalls. Silted or inadequate drains overflow during storms, spreading excreta and garbage over the ground. Many drains were constructed without adequate grades for self-cleansing and there are often no design provisions for odor control or dry weather flow. There are few wastewater treatment plants, and untreated sewage and industrial wastewater are discharged directly into water bodies and streams in the surrounding areas and pose high risks to aquatic ecosystems.

11. Environmentally acceptable sanitation facilities in urban areas are generally unavailable. While around 40 percent of households in provincial towns have septic tanks, only a small portion of these septic tanks is connected to sewers or drains. In many urban areas, septic tank effluent or seepage contaminates the groundwater table in areas where water from wells is widely used for drinking. In general, households in district towns have fewer septic tanks than those in provincial towns, and some even lack basic toilet facilities. Those without access to any sanitation facilities have no organized system of wastewater collection, treatment, and disposal, and use open ground, local drains, and watercourses for disposal of excreta and wastewater.

12. Although most provincial and district towns have some form of solid waste facilities, the coverage is low, with only 47 percent collection. As a result, solid waste usually is burned or dumped into lakes, ponds, streets, vacant land or in drainage systems. Most solid waste comes from domestic activities, with only 30 percent generated by industries. Collected solid waste is generally brought to landfills. Current disposal sites in urban areas are not properly designed and do not operate as landfills but simply as dumpsites. Typically, the landfills are unlined with a high risk of leakage into groundwater aquifers. No city or town in Viet Nam has adequate facilities for disposing of hospital and toxic wastes, although in HCMC ADB's current Environmental Improvement Project[4] will address such issues.

5. Sector Institutions

13. Sector responsibilities for urban water supply and sanitation involve both the central and provincial government agencies. The central Government agencies are mainly responsible for policymaking, standards, and development. Provincial and local governments are mainly responsible for construction, supervision, and operation and maintenance (O&M) of the facilities, although they are becoming more active in development in response to the Government's decentralization initiatives.

14. Apart from urban water supply and sanitation, the Ministry of Construction (MOC) is mainly responsible for (i) urban and rural planning and policies; (ii) construction standards, rules and regulations; (iii) technical and financial guidelines for evaluating construction projects; (iv) research, and (v) human resource development for urban infrastructure investment and maintenance. MOC also involves in monitoring and administering major urban development projects. MOC has a minister and four vice ministers, and includes 8 departments, 4 centers, 5 institutes, 4 boards, 12 corporations, 20 companies, 2 universities, 5 colleges, and 6 training schools. MOC established the Management Board for Water Supply and Sanitation Development Projects in 1994 to manage externally assisted water supply and sanitation projects.

15. At the provincial level, provincial people's committees (PPCs) exercise executive authority over all functions. The line ministries have their corresponding departments in the

[4] Loan No. 1702-VIE: *Ho Chi Minh City Environmental Improvement Project*, for $70 million, approved on 7 October 1999.

structure of the provincial government. PPCs make use of boards and committees to facilitate cross-sectoral coordination. The administrative responsibility for urban water supply and sanitation is usually assigned to the department of construction, which then delegates the responsibility to a WSC, and that for drainage, solid waste, and sanitation to a public works company (PWC). In some cases, WSCs are responsible for both water supply and sanitation. Other key organizations related to the sector include the

(i) Ministry of Planning and Investment, which is responsible for advising the Government on investment planning and the utilization of externally funded assistance and direct foreign investment;

(ii) Ministry of Finance (MOF), which prepares and administers the budget and is responsible for the disbursement of externally funded projects;

(iii) Ministry of Science Technology and the Environment, which is responsible for environmental protection;

(iv) Ministry of Health, which is responsible for promoting environmental health education and for water quality testing;

(v) Viet Nam Women's Union (VWU), which is a Government-funded mass organization with central, provincial, and district level offices, and plays a major role in community mobilization and health education; and

(vi) Viet Nam Water Supply and Sewerage Association, which is a non-government business and professional organization established in 1987 with members from WSCs and related companies and organizations; and is active in developing and undertaking training courses for WSCs.

B. Government Policies and Plans

16. The Government's development framework and priorities are reflected in a series of development plans, policy statements, and ministerial decisions. For urban rehabilitation and development programs, the Government policy[5] emphasizes the need for reducing the gaps between urban and rural areas and developing and modernizing technical and social infrastructure to attract investment and improve people's living standards. The development targets and policies for urban water supply and sanitation are reflected in the Government's Orientation Plan for Development of Urban Water Supply to 2020, and the Draft Orientation Plan for Urban Drainage Development to 2020. For water supply, the targets by 2010 are (i) 100 percent coverage and 180 lpcd in Class 1 cities; (ii) 95 percent coverage and 150 lpcd in Class 2 cities; (iii) 90 percent coverage and 120 lpcd in Class 3,4, and 5 towns; and (iv) 80 percent coverage and 80-100 lpcd in district towns and clusters. The targets for drainage, sewerage, and urban environmental sanitation are to (i) improve and complete urban drainage and sewerage systems to ensure a minimum of 80-90 percent coverage by 2020; (ii) require enterprises to have on-site treatment for toxic liquid waste; (iii) eliminate pit latrines in urban areas by 2005; (iv) provide waste collection systems that treat solid and liquid wastes; and (v) gradually rehabilitate and clean the canal systems.

17. To achieve these development targets, the Government emphasizes the importance of institutional reforms in the development of efficient and sustainable water and sanitation sectors. Specifically, the orientation plans call for (i) restructuring MOC to refocus its functions in

[5] The Prime Minister's Decision on Urban Master Planning Guidelines up to 2020, 23 January 1998.

development planning, sector policy formulation, regulations, training, and technology transfer, and terminating its direct involvement in business activities; (ii) clearly defining the roles and responsibilities of various Government agencies involved in the water and sanitation sector and encouraging better cooperation among these sector agencies; (iii) making PPCs the responsible agencies for water supply, sanitation, and drainage development in the provinces; (iv) providing WSCs with training and capacity building on project implementation and O&M, and encouraging WSCs to become self-financing and progressively eliminate subsidies; (v) creating the legal basis for providing public urban services, with enhanced enforcement; (vi) promoting community education and awareness, particularly on drainage and sanitation issues; (vii) mobilizing additional financial resources; (viii) protecting water sources; (ix) upgrading technology and materials; and (x) developing human resources.

18. Reforms in the water supply sector were initiated in 1990 with the promulgation of Resolution 217, which delegated the authority for setting water tariffs from the central Government Pricing Committee to PPCs. It also reduced Government grants to small WSCs and eliminated such grants to large ones. Wider range reforms in the state-owned enterprises (SOE) were introduced in 1995 with the enactment of the Law on State Enterprises (LSE). The major objective of the LSE is to improve performance of SOEs. Apart from strengthening the role of PPCs in overseeing the operations of the SOEs, the LSE allows SOEs to retain all depreciation expenses instead of submitting them to the Government. This is of particular importance to WSCs. Under the LSE, WSCs have been designated as state public service enterprises, which are defined as SOEs that produce, distribute, and supply public services in accordance with state social policies. In general, the financial and managerial autonomy of the state public service enterprises is limited. For example, tariffs must be approved by the supervising PPC.

19. Complementing its water sector policies, the Government issued a strategy for the development of urban drainage in November 1998, which aims at reducing subsidies to the sector in the short term, and establishing financial mechanisms to ensure sustainability of urban drainage enterprises in the long term. While the policy objective is to reduce Government subsidies by collecting sufficient drainage tariffs to cover O&M costs and an increasing share of capital investment, the application of the policy in the project towns is still in its very early stage. There are presently no charges for drainage in any of the project towns. Following the Government's policy on cost recovery for water supply and sanitation, MOC and the Government Pricing Committee issued guidelines on water supply and drainage tariffs in June 1999, recommending that the water tariff cover the cost of water production and the resultant drainage, and generate pretax income approved by the PPC. The drainage charge should be no lower than 10 percent of the total water production cost. The decision to include a drainage charge in the water tariff provides the means to recover the costs of drainage and wastewater management.

20. Despite the Government's policies and reform initiatives over the past 10 years to make WSCs legally distinct and financially autonomous, the level of autonomy for WSCs, and particularly PWCs, remains limited. Government approval is required for key management and operating decisions, such as production level, staff salaries and benefits, capital and major maintenance expenditures, and senior staff appointments. Provincial governments generally set tariffs for water supply and sanitation on the basis of the perceived affordability and willingness to pay by the households, institutions, and commercial and industrial establishments. The tariffs are insufficient for WSCs to recover full cost and provide adequate levels of service. As a result, WSCs are unable to expand the services to households unconnected to the piped water supply

systems. Poor services in water supply also prevented industrial and commercial development, for which quality and reliability of water supply are far more important than the tariff level.

C. External Assistance to the Sector

21. External assistance has been a major source of funding for the rehabilitation and development of the country's urban water supply and sanitation. Over $800 million has been provided in the last decade for improving water supply and sanitation in 59 cities and provincial towns. Since 1993, ADB, a lead external funding agency in the sector, has approved three loans totaling $200 million for water supply and sanitation. The first loan, approved in 1993 for the HCMC Water Supply and Sanitation Rehabilitation Project[6], aimed at providing safe and reliable water supply, improved sanitation, sewerage, and drainage facilities in HCMC with institutional and management support. The subsequent two loans, approved in 1995 and 1997, respectively, were provided for improving water supply and sanitation in provincial towns.[7] The first one's objectives are expanding the piped water supply and sanitation facilities, reducing water losses, strengthening the institutional capabilities of WSCs, and helping to implement low-cost sanitation and community environmental health education programs. The second one is aimed at improving public health in the provincial towns, improving the urban environment, enhancing public awareness of hygiene and sanitation, and restructuring and strengthening existing sector institutions. ADB also funded the HCMC Environmental Improvement Project to improve drainage and solid waste in the city.[8] Apart from the TAs for preparing these projects, ADB also provided several advisory TAs,[9] whose recommendations have been accepted by the Government for developing the national water supply tariff guidelines, strengthening the WSCs, and enhancing community health awareness.

22. In addition to ADB, major external funding agencies active in the sector include the governments of Australia, Denmark, Finland, France, and Japan, as well as the World Bank. Details of external assistance to the sector are presented in Appendix 2. Their major assistance is as follows:

(i) Australia: (a) Five Towns Water Supply and Sanitation Project, 1995-2000; and (b) the feasibility studies, detailed design, preparation of contract documents, tender evaluation, and capacity building for a Da Nang water supply and sanitation project;
(ii) Denmark: (a) water supply projects for Da Lat, Hon Gai, Cam Pha and Buon Ma Thuot; (b) the national rural water supply strategy; (c) capacity building for sector institutions at the national level; (d) the Di An and Nam Binh Dung water supply projects; and (e) rural water supply and sanitation projects in Dac Lac, Ha Tinh and Nghe An;
(iii) Finland: (a) rehabilitation and upgrading of Hai Phong and Hanoi water supply systems, including master plans, feasibility studies, technical assistance,

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[6] Loan 1273-VIE: *Ho Chi Minh City Water Supply and Sanitation Rehabilitation Project*, for $65.0 million, approved on 29 November 1993.
[7] Loan 1361-VIE; *Provincial Towns Water Supply and Sanitation Project*, for $66.0 million, approved on 17 August 1995; and Loan 1514-VIE: *Second Provincial Towns Water Supply and Sanitation Project*, for $69.0 million, approved on 27 February 1997.
[8] Loan 1702-VIE: *Ho Chi Minh City Environmental Improvement Project*, for $70.0 million, approved on 7 October 1999.
[9] TA 1998-VIE: *National Water Tariff Policy Study*, TA 1999-VIE*: Institutional Strengthening of Ho Chi Minh City Water Supply Company*, and TA 2000-VIE*: Ho Chi Minh City Water Supply Mater Plan*; each for $600,000, and all approved on 29 November 1993. Additionally, TA 2375-VIE: *Capacity Building for Provincial Water Supply and Sanitation Planning and Management*, and TA No. 2376-VIE: *Community Environmental Health Improvements for the Provincial Towns*, for $700,000 and $500,000, respectively, were approved on 17 August 1995.

implementation and capacity building; and (b) technical assistance to the Hanoi WSC, and the national urban water supply strategy, and the national urban sanitation strategy;

(iv) France: (a) water supply projects in 15 towns; and (b) technical assistance for training of Hanoi WSC staff, and for Gia Lam training center in Hanoi;

(v) Japan: (a) rehabilitation and upgrading of water supplies in small to medium towns throughout Viet Nam; and (b) upgrading water supply services in Hanoi, a master plan for Hanoi sewerage, and a feasibility study for HCMC drainage and environmental sanitation; and

(vi) World Bank: (a) water supply and sanitation projects in Hanoi, Hai Phong, Da Nang, and Hon Gai/Cam Pha; (b) an environmental sanitation project in HCMC; and (c) TA for strengthening the Management Board for Water Supply and Sanitation Development Projects, and a strategy for district towns water supply.

D. Lessons Learned

23. Water supply and sanitation projects assisted by external funding agencies in the country have generally failed to follow their implementation schedules. This reflects partly the rigidity of the centrally controlled decision making process and partly poor understanding of the Government procedures and the resultant unrealistic expectations. The three ADB-assisted projects in the sector have suffered from (i) delay in loan signing (the Second Provincial Towns Water Supply and Sanitation Project) (ii) delays in loan effectiveness (the HCMC Water Supply and Sanitation Rehabilitation Project and the Second Provincial Towns Water Supply Project) and (iii) delays in contract awards and disbursements in all three ADB-assisted projects.

24. The lessons learned from ADB's assistance in the sector point to the need for a continued policy dialogue on delegation of more authority to lower level government agencies for project implementation. Delays could be significantly reduced if PPCs have the authority to approve project designs, bidding documents, bid evaluation, and contract awards and variations. The lessons also show the need for intensive assistance to the executing and implementing agencies in project planning and management at the early stage of implementation. Delays could be minimized by advance actions to recruit project management and engineering design consultants, establish a project implementation and management structure, and prepare for land acquisition and resettlement. Early and systematic training in Government and ADB procedures for all project stakeholders including consultants, counterpart staff, and representatives of community groups, will be essential to minimize delays.

25. Positive lessons have also been learned through ADB-assisted TA 2376-VIE: *Community Environmental Health Improvements for the Provincial Towns.*[10] These are (i) communities must decide their own priorities and technology choices to suit their capacity and financial means; (ii) transparency in funds transfers from the project and local government to the community for micro activities and awareness campaigns is essential to generate community support and trust; (iii) VWU has the network, experience, and mandate to work effectively at the grassroots level in environmental health improvement; (iv) community motivators must be paid as an incentive to carry out awareness activities; (v) WSCs must be involved in community activities, particularly public health awareness, early in the project as they have valuable technical information needed by the communities; (vi) PPCs need to be involved in community development activities as they control the budget and approve the work of lower levels

[10] for $500,000, approved on 17 August 1995.

agencies; and (vii) public health awareness activities need to coincide with the construction of major physical infrastructure.

E. ADB's Sector Strategy

26. ADB's operational strategy for Viet Nam is to support the Government's vision of economic modernization and poverty reduction by making economic growth and the structural transition pro-poor and sustainable. To this end, ADB will focus its operations on three pillars: pro-poor sustainable economic growth, social development, and good governance. In line with this overall operational strategy, ADB's strategy in the urban water and sanitation sector, therefore, will be to (i) support rehabilitation, upgrading, and expansion of water supply and sanitation system in urban centers to improve the investment environment; (ii) ensure equitable access to safe water supply and sanitation facilities and improve the health profile of the urban residents; and (iii) encourage policy changes and institutional reforms at central and provincial levels to enable sustainable development. The immediate sectoral objective of ADB is to make WSCs financially viable with adequate cost recovery. In the medium term, ADB seeks full autonomy of WSCs in financial and operational management, and the establishment of a suitable regulatory framework for the sector. The long-term objective will be to break the dominance of SOEs in the sector, including the related consulting services and civil works contracting, by creating a conducive environment for private sector participation. Operationally, ADB's assistance in the sector will gradually shift from large cities to provincial towns, and expand from provincial towns to district towns, assisting the Government in improving the basic urban infrastructure to mitigate the social and economic pressure arising from significant rural-urban migration.

F. Policy Dialogue

27. Policy dialogue with the Government has been carried out since the first ADB-assisted water supply and sanitation project in the country in 1995. One important aspect of the dialogue relates to the transition of WSCs from subsidized entities operating in a planned environment to commercial companies operating in a market economy, self-financing capital expansion and O&M through user charges, and accountable to owners and consumers. The dialogue led to the Government's permission for WSCs to retain funds accumulated through depreciation that were previously submitted to the PPCs. The dialogue, and ADB assistance, also enabled MOC to issue national water tariff guidelines based on the principle of full cost recovery. While Government policies support autonomy of WSCs and full cost recovery for water supply, and the MOC tariff guidelines set out the methodology for achieving this objective, existing tariff levels for virtually all WSCs are not sufficient for long-term financially sustainable operations. WSCs are generally under budgeted for adequate O&M, have no provisions for debt service, and make no allowance for income generation other than through depreciation. Apart from reducing necessary expenditures on O&M, WSCs have also been engaged in construction business to supplement their revenues from water sales. This distorts the real cost of water production and sales and creates excessive demand for water supply. The water tariffs in the project towns either have no progressive block structure or the volume of the lifeline block is too high to have any effect on demand management. The dialogue with the PPCs and WSCs has been focusing on the need to improve water tariff structure and increase the tariffs to a sustainable level. The dialogue also aims at improving WSCs' financial management, and separating water supply operations from the construction business to make transparent the cost of water supply and subsidies.

28. With respect to environmental sanitation, the dialogue focuses on the need to establish and enforce local regulations on sanitation standards, water source protection, wastewater treatment and discharge, and ground water licensing. Unless the regulations are established and enforced, the perceived benefits of water supply and sanitation projects may not be realized. Specifically, the regulations required are (i) connecting sullage drains and septic tanks to drains in high and medium density areas, and to drains or properly designed and constructed soakaways in low density areas; (ii) providing a septic tank that meets prescribed standards in each household or business location in high and medium density areas; (iii) allowing piped water supply connection only when sullage pipes discharging to drains or properly constructed soakaways are provided for; (iv) preventing pollution in the vicinity of surface intakes and borefields; (v) controling and monitoring activities in catchments upstream of water supply intakes and borefields; (vi) enforcing regulations on treatment and discharge of industrial wastewater; and (vii) licensing industrial, commercial, and domestic use of groundwater in sensitive areas, and banning industrial and commercial use of groundwater in areas where piped water supply is available. These regulations have been incorporated in the Project design.

29. Another major aspect of the policy dialogue focuses on improving the efficiency of sector institutions by delegating project implementation functions from MOC to PPCs. Such delegation will allow PPCs, which own the eventual infrastructure constructed and pay the debt service of external loans, to participate fully in the design, implementation, and O&M of the Project. The delegation will also reduce the layers of required approvals and hence the delays in project implementation. MOC, with overall responsibility for sector development, will focus on sector policy formulation, development planning, standards monitoring and enforcement, and training and capacity building. The dialogue has lead to more decentralized implementation arrangements under the proposed Project, where PPCs will be responsible for approval of feasibility study reports, project designs, bidding documents, bid evaluation, contract awards, and contract variations for the components within the administrative authority of the PPCs.

IV. THE PROPOSED PROJECT

A. Rationale

30. Water supply and sanitation are essential services in the urban centers to meet the basic human needs of the urban population, foster private investment, and sustain economic growth. Equitable access to these facilities is important for addressing the urban poverty. Consequently the Government gives high development priority to the improvement of these facilities in the urban centers. Substantial funds from external funding agencies have been directed toward these sectors. The provincial towns to be covered under the Project were selected from the seven remaining provincial towns that have not received any substantial funding assistance for the improvement of water supply and sanitation.

31. The water supply systems in the project towns[11] are in poor condition, due to lack of investment and inadequate O&M. The pipes are incompatible or unsuitable, treatment plants and equipment inefficient, and coverage low. Supply is intermittent in some towns, ranging from 5-6 hours a day in La Hai to 18 hours a day in Rach Gia and 24 hours a day in Thu Dau Mot. Estimated unaccounted-for water (UFW) ranges from 32 to 54 percent in the project towns. A

[11] These are Chi Thanh, La Hai, Phan Rang, Rach Gia, Tay Ninh, Thu Dau Mot, and Tuy Hoa; Chi Thanh and La Hai are district towns in Phu Yen province, of which Tuy Hoa is the provincial capital.

large proportion of the urban population use water from contaminated wells and surface sources, or purchase water from vendors at prices much higher than those of public water supply.

32. Sanitation in the project towns is also inadequate, with low coverage of piped drains and septic tank systems. There are no municipal wastewater treatment plants in any of the project towns, and partially treated or untreated wastewater from industries and hospitals is discharged directly to drainage canals or nearby waterways. About 40 percent of the households in the project towns have septic tanks, with a high proportion improperly designed and constructed, and unconnected to sewers, drains or soakaways. Households with flush toilets and septic tanks range from 6 percent in La Hai to 86 percent in Tuy Hoa, and approximately 46 percent of households discharge sullage water from kitchens and bathrooms to yards, gardens, or roads. The substandard water supplies and inadequate sanitation systems pose great health risks to the entire urban population, particularly the urban poor who often live in low-lying areas or at the extremities of the water supply system. The water supply and sanitation conditions in the project towns are summarized in Table 2.

Table 2: Water Supply and Sanitation Conditions in Project towns

Town	Service Area Population (2000)	Household Water Supply Coverage (%)	Population with Piped Water	Per Capita Consumption (lpcd)	Septic tanks (% of HH)
Chi Thanh	21,800	9	2,000	83	20
La Hai	9,400	4	400	70	6
Phan Rang	184,800	32	59,200	76	44
Rach Gia	176,300	55	97,500	106	52
Tay Ninh	101,000	25	25,400	111	67
Thu Dau Mot	262,000	18	48,100	137	>45
Tuy Hoa	95,000	22	20,500	126	86
Total	**850,300**	**30**	**253,200**	**107**	**<41**

HH = households.
Source: WSCs documents; ADB estimates.

33. All project towns have serious drainage problems. The drains have become heavily silted with sediment, sewage, and rubbish, leading to blockages, uncontrolled overflows, flooding, and bad odors. Many of the towns are on the river banks or the coast, and floods or high tides aggravate their drainage problems. Some parts of Rach Gia and Tuy Hoa are flooded several times annually because of inadequate drainage systems. Floodwaters mixed with wastewater expose residents to health risks, and damage property and infrastructure. In many project towns, it is difficult to discharge wastewater and stormwater effectively during floods or high tides, since river or sea levels are above drainage outlet levels, and many areas are inundated for long periods. Thus shallow wells become contaminated and the public is exposed to direct contact with pollutants from floodwaters.

34. The Project will assist the Government to achieve its development objectives for the sector as outlined in the Orientation Plan for Urban Water Supply to 2020, and will address the urgent need in the project towns for improved water supply and sanitation facilities. The Project will improve the urban environment and health profile of the urban residents. The Project will contribute to ADB's commitment to reduce poverty and substantially improve the living conditions of the poor in the towns. The Project, located in central and southern Viet Nam, will also support the Government's commitment to promote development in regions experiencing relatively lower rates of economic growth.

B. Objectives and Scope

35. The Project aims to improve water supply and environmental sanitation conditions in the project towns through integrating critically needed infrastructure developments with community awareness and participation, improved financial management and cost recovery by WSCs, and local regulations on sanitation, wastewater management, and water source protection. The scope of the Project includes the design, development, and delivery of (i) a community environmental sanitation improvement program in each project town; (ii) water supply systems to provide better quality water and greater coverage in the towns and adjoining districts; (iii) drainage and sanitation improvements; and (iv) project implementation assistance and capacity building. Details are as follows.

1. Part A: Community Environmental Sanitation Improvement.

36. This part of the Project has two subcomponents: (i) a public health awareness program (PHAP), and (ii) community environmental sanitation improvement (CESI). The PHAP aims at enhancing the communities' awareness of the relationships between water, sanitation, and health, and motivating households to connect to piped water supply and convert to pour flush toilets with septic tanks. The awareness activities will focus on economic and health benefits of piped water supply, basic hygiene practices, safe excreta disposal, and proper disposal of solid waste and wastewater to improve the environment and reduce personal health risks. In addition, the PHAP will include education on the need for adequate cost recovery and compliance with local sanitation regulations. The PHAP will inform the communities of the availability of financial support through the CESI.

37. The provincial VWU will be responsible for carrying out the PHAP and will utilize materials, manuals, and training methods developed under ADB's first Provincial Towns Water Supply and Sanitation Project.[12] These materials have been field-tested and subsequently used in some towns. Posters and leaflets will be modified to specifically target the smaller district centers and some ethnic minority groups such as the Cham and Khmer. Pilot wards or communes in each provincial town will be targeted for intensive health awareness planning, implementation, and impact monitoring. After an initial six-month period, the activities will expand to other wards or communes, as expertise and experience develop within provincial project management units (PPMUs) and provincial VWUs. For district towns, the entire town areas will be targeted for public health awareness activities. PPMUs will coordinate with administrative, community, health, and welfare organizations and nongovernment organizations (NGOs), in support of the provincial VWUs.

38. The CESI aims at providing small-scale environmental sanitation improvements not covered by the main construction contracts, to meet the demand for improvements generated through the PHAP. The CESI will establish procedures for community-based sanitation improvement, and define roles and responsibilities for the stakeholders such as WSCs, people's committees at all levels, NGOs, mass organizations, and the general communities with respect to sanitation improvement. It intends to stimulate community participation in planning and implementation. The exact scope of the CESI in each town will depend on community demand and the priorities established by town authorities. Items eligible for financing may include: (i) toilets with septic tanks at schools, aid posts, and public or communal residential areas; (ii) washbasins at schools, aid posts, people's committees, and other public locations; (iii) rubbish

[12] TA 2376-VIE: *Community Environmental Health Improvements for the Provincial Towns*, for $500,000, approved in August 1995.

bins and handcarts, collection depots, and collection and disposal systems; (iv) small-scale drainage linking to larger improvements under the Project; and (v) cleaning of unofficial public waste dumping areas, such as drains, canals, and other waterways, and public land.

39. For public sanitation improvement, CESI funds will be provided, in two tranches as grants, through the PPMU, to the town or district people's committees as matching funds to meet no more than 60 percent of the cost of the identified projects, and local people's committees will be responsible for financing the remaining 40 percent cost and for implementing and monitoring the activities. For household sanitation improvement, CESI will provide credit assistance through provincial VWUs to low-income groups for improving or constructing sanitation facilities, including septic tanks, bathrooms, and connections to drains or sewers. The credit will cover 50-80 percent of the cost depending on the level of incomes of the borrowers. Provincial VWUs, with assistance from the consultants and PPMU, will work with local governments to establish the terms and conditions for the credit scheme in each project town.

2. Part B: Water Supply

40. The water supply systems in the five provinces will be upgraded and expanded to the capacity of 220,000 cubic meters (m^3) per day in the service areas in 2010. The Project will upgrade and expand raw water systems, water treatment plants, pumping stations, and reservoirs in the project towns. It will install about 901 kilometers (km) of new pipes to augment and expand the transmission and distribution networks, including replacement of about 85 km of the existing treated water transmission and distribution mains, and add about 78,100 new service connections. The Project will also provide mechanical and electrical equipment as well as equipment for construction and O&M. In addition, an UFW program will be carried out in each project town to identify the main sources of technical and commercial losses, provide equipment and training for leak detection, and reduce UFW to optimum levels based on cost-benefit analyses.

41. In Tay Ninh and Thu Dau Mot, sludge lagoons will be constructed adjacent to the water treatment plants to receive backwash water and sludge from the existing and new sedimentation tanks. Surplus water from the lagoons will be discharged to the treatment plants' drainage systems. For Phan Rang and Rach Gia water treatment plants, sludge from sedimentation tanks and backwash water will be discharged to storage basins, and surplus water will be discharged through drains directly to the adjacent canal or river under suitable tide and streamflow conditions. For Chi Thanh, La Hai, and Tuy Hoa plants, backwash water will be conveyed to settling basins, with surplus water being discharged to drains or canals adjacent to the water treatment plants. The sludge that accumulates in sludge lagoons, storage basins, and settling basins will be dewatered and taken to the towns' landfills. Table 3 summarizes the expected outcome of the water supply and sanitation components of the Project by 2010.

3. Part C: Drainage and Sanitation

42. Part C has two subcomponents: drainage improvement and sanitation improvement. The drainage improvements will include the rehabilitation and cleaning of 22 km of existing drains, and construction of 69 km of secondary and tertiary drains in the towns. These works will improve existing drainage conditions, relieve flooding in selected critical areas, and provide basic drainage in high-density areas to ensure that wastewater can be discharged to drains without affecting health and environmental conditions. Equipment and tools for O&M of combined drainage systems will also be provided to WSCs or public works companies (PWCs) in the towns.

Table 3: Forecast Conditions After Project (Year 2010)

Town	Service Area Population (2010)	Household Water Supply Coverage (%)	Population with Piped Water	Per Capita Consumption (lpcd)	Septic tanks (% of HH)
Chi Thanh	26,300	49	12,800	100	50
La Hai	11,300	80	9,000	100	50
Phan Rang	256,600	81	208,800	111	60
Rach Gia	213,000	86	182,400	120	62
Tay Ninh	137,000	69	94,700	120	69
Thu Dau Mot	385,000	74	285,000	120	53
Tuy Hoa	117,100	87	102,000	115	87
Total	**1,146,300**	**78**	**894,700**	**117**	**61**

Source: ADB estimates.

43. Works under sanitation improvement will include (i) introducing septic tank management systems in project towns to control the design, construction, registration, and desludging of septic tanks, and a septic tank database to be integrated with the computerized billing system in each WSC, to monitor and manage the septic tanks maintenance in the communities; (ii) improving public sanitation facilities in markets, bus stations, railway stations, boat harbors, hospitals, and primary and secondary schools; and (iiii) supplying WSCs or PWCs with equipment for construction, and O&M of sanitation facilities. This subcomponent, combined with the CESI program of Part A, will construct about 20,000 septic tanks in the project areas.

4. Part D: Implementation Assistance and Capacity Building

44. Part D has two subcomponents: (i) project orientation assistance (POA), and (ii) project implementation assistance (PIA). The objective of POA is to provide institutional and managerial assistance to project coordination unit (PCU) and PPMUs prior to the commencement of the detailed designs. The POA will help establish PPMUs' functional procedures; set up project accounts and management information systems; and deliver intensive training to the PCU and PPMUs in project management, procurement, accounting, administration, reporting, monitoring and evaluation (M&E), and ADB and Agence Francaise de Developpement (AFD) procedures. The consultant will prepare project administration procedures, manuals, and related software. Experienced staff of MOC, MOF, Ministry of Planning and Investment, State Bank of Viet Nam, ADB, and AFD will be invited to provide training to members of the PCU, PPMUs, and related provincial and local organizations. Workshops, seminars, and training will be held in HCMC and the provinces.

45. PIA will comprise the consulting services for the engineering design and construction supervision for Parts B and C, as well as design and delivery of Part A. The PIA will also include assistance in capacity building for WSCs aimed at improving their long-term sustainability. It covers financial management, UFW management, and asset management. Financial management will focus on water tariff planning, billing, and collections; computerization of accounting systems; capital investment and budgeting, and management of accounts receivable. UFW management will identify the main sources of technical and commercial losses to reduce UFW to optimum levels, based on cost-benefit analyses. It will include leak detection, customer registration, and meter management. Asset management will assist WSCs in managing asset inventories, preparing O&M plans and guidelines, and budgeting for appropriate asset maintenance. The Project will also improve workshop and laboratory facilities, and provide equipment for construction and O&M of water and drainage facilities.

C. Cost Estimates

46. The total project cost is estimated at $98.0 million equivalent, comprising $50.4 million (51.4 percent) equivalent as foreign exchange cost, including about $1.1 million interest charges during construction; and $47.6 million equivalent (48.6 percent) as local currency cost, including duties and taxes of about $5.6 million. Table 4 summarizes the cost estimates; details are in Appendix 3.

Table 4: Summary of Project Cost Estimates
($ million)

	Item	Foreign Exchange[a]	Local Currency[e]	Total Cost
A.	Community Environmental Sanitation Improvement	0.24	1.51	1.75
B.	Water Supply	33.04	23.46	56.50
C.	Sanitation and Drainage	2.72	3.95	6.67
D.	Implementation Assistance & Capacity Building	4.04	5.12	9.16
	Total Base Cost[b]	**40.04**	**34.04**	**74.08**
E.	Contingencies			
	1. Physical Contingencies[c]	4.00	3.40	7.40
	2. Price Contingencies[d]	5.26	4.24	9.50
	Subtotal	**9.26**	**7.64**	**16.90**
F.	Interest and Service Charges	1.05	5.92	6.97
	Total	**50.35**	**47.60**	**97.95**

[a] Includes both direct and indirect foreign exchange costs. [b] At January 2001 prices. [c] 10% for all categories. [d] 2.4% per year for foreign exchange and local currency costs. [e] Includes duties and taxes estimated at $5.6 million.
Source: ADB estimates.

D. Financing Plan

47. It is proposed that ADB provide a loan of $60 million equivalent from its Special Funds resources to cover 61.2 percent of the total project cost, including $18.6 million equivalent of local currency cost. ADB financing of local currency cost is justified by the tight fiscal conditions of the provincial governments, which are responsible for providing the counterpart funds and the debt service payment of the Project. The ADB loan will have a maturity of 32 years with a grace period of 8 years, and an interest rate of 1 percent per annum during the grace period and 1.5 percent per annum thereafter. AFD will provide a loan of 12.4 million euro ($11.0 million) to cofinance on a parallel basis 11.2 percent of the total project cost. The AFD loan will have a maturity of 17 years with a grace period of 6 years, and an interest rate of 2.5 percent per annum.[13] The remaining $27 million, equivalent to 27.6 percent of the total project cost, is the local counterpart contribution, of which the PPCs will finance $23.5 million equivalent, and the project beneficiaries will contribute the remaining $3.5 million equivalent in the form of payment for water supply connections. The financing plan is summarized in Table 5.[14]

48. Part of the loan funds from ADB and AFD will be relent by the Government to WSCs through subsidiary loans in domestic currency to cover the cost of water supply systems upgrading and expansion, and part will be provided to PPCs as grants to cover the cost of other components. The terms of the subsidiary loans to WSCs will be based on the blended terms of

[13] The AFD loan's terms are adjusted annually at the beginning of each calendar year, and will be fixed for the entire maturity once approved by its board.
[14] The Government is requesting a grant from the Norwegian Agency for Development Cooperation (NORAD) to cofinance, on a parallel basis, the consulting services under POA. If the request is approved by NORAD, POA will be under NORAD financing instead of ADB loan.

ADB and AFD loans, and will have a maturity of 22 years with a grace period of 6 years, and a fixed interest rate of six percent per annum. The Government will assume the foreign exchange risk. All the taxes and duties will be paid by the provincial governments.

Table 5: Proposed Financing Plan

($ million)

Source	Foreign Exchange	Local Currency	Total Cost	Percent
Asian Development Bank	41.4	18.6	60.0	61.2
Agence Francaise de Developpement	6.6	4.4	11.0	11.2
Provincial governments	0.0	23.5	23.5	24.0
Beneficiaries	2.4	1.1	3.5	3.6
Total	**50.4**	**47.6**	**98.0**	**100.0**
Percent	51.4	48.6	100.0	

Source: ADB estimates.

E. Executing Agencies

49. The PPC in each project province will be the Executing Agency responsible for all the implementation issues in the province. In line with the Government's decentralization policy and as part of the state enterprise reform, the responsibility for operating public utilities, including water supply, has been assigned to PPCs. While PPCs have designated WSCs as the legal entities responsible for construction and O&M of urban water supply, PPCs have considerable influence on the WSCs' development activities, including setting targets for water production and distribution, and deciding on WSCs' financial policies including tariffs.

50. The provincial WSC will play significant roles in the implementation of the Project in each province. WSCs manage both district and provincial towns' water supply systems. As of 2000, the number of employees in the five provincial WSCs ranged from 43 in Phu Yen to 175 in Kien Giang. The number of employees per thousand connections varied from about 8 in Phu Yen and Ninh Thuan, to 11 in Kien Giang, and 17-19 in Tay Ninh and Binh Duong. By 2010, the ratio is expected to stabilize at about 10-15, which is typical for well-managed water supply systems in similar sized Asian towns, as a result of the improvement in management and increase in the number of connections. Staffing of the WSCs is summarized in Table 6.

Table 6: WSC Staffing Levels

Company WSC	Systems No.	Production (m^3/d)	Connections No.	Staff Numbers			Staff/1000 Connections	Prof. Staff (%)
				Prof.	Other	Total		
Kien Giang	6	15,800	16,700	12	163	175	10.5	7
Binh Duong	2	11,600	5,180	38	62	100	19.3	38
Tay Ninh	4	6,500	5,180	23	66	89	17.2	26
Phu Yen	6	7,400	5,790	17	26	43	7.4	40
Ninh Thuan	3	7,700	11,080	17	77	94	8.5	18

Notes:
1. Production and connections are based on figures for year 2000 and include all systems managed by the WSCs.
2. Staff numbers include all systems managed by the WSCs, but exclude construction teams.
3. Professional staff include engineers, accountants, economists, lawyers, hydrologists.

Source: provincial WSCs' documents.

51. As legally distinct business entities, WSCs retain all the revenues generated from their activities, less income and other taxes. However, the financial and management autonomy of

WSCs is limited due to the requirement for government approval of most key management and operating decisions. This includes the determination of tariff structures and levels, overall production levels, staff salary and benefit levels, capital expenditures, and senior staff appointments. The accounting and financial department of a WSC is responsible for preparing and maintaining core accounting systems of the company and for all external reporting. The number of accounting and financial department staff, including the chief accountant, in the project WSCs ranges from four in Ninh Thuan, Phu Yen, and Tay Ninh, to eight in Kieng Giang, and nine in Binh Duong. In addition to the accounting and financial department, three other departments within the WSC undertake financial management functions. The business department is responsible for customer billing and collections, including receivable management. The planning and procurement department is responsible for preparing plans for sales, operation, and capital expenditure, and for all procurement. The payroll and personnel department is responsible for payroll and personnel management.

52. Statutory requirements for accounting, reporting, and auditing in Viet Nam are established and regulated by the Ministry of Finance (MOF). The monitoring of WSCs' compliance with these requirements is normally delegated to the provincial departments of finance (DOFs) and tax bureaus. Current Vietnamese accounting standards, which became effective as of 1 January 1996 under Decision No. 1141-TC-CDKT, are referred to as the Viet Nam Accounting System - 1995 (VAS-1995). All SOEs, including the WSCs, are required to use VAS-1995, which is fairly consistent with international accounting standards. There is no statutory requirement for an audit of the WSCs accounts by an independent auditor. DOFs normally examine the financial statements and records on behalf of the PPCs to ensure that the capitals held by WSCs have been properly accounted for in accordance with all applicable Government regulations and to determine taxes payable.

F. Implementation Arrangements

1. Project Management Structure

53. The PPC in each province will set up a provincial steering committee (PSC),[15] which, on behalf of the PPC, will have the overall responsibilities for the project implementation. The PSC will comprise senior officials from the PPC, department of construction, DOF, department of planning and investment, town people's committees, district people's committees, provincial VWUs, and manager of the PPMU. The PSC will appoint PPMU staff and experts, provide policy guidance to the PPMU and consultants, and coordinate provincial agencies to ensure timely project implementation. Specifically, the PSC will have the following responsibilities: (i) advise the PPC on the implementation status of the Project in the province; (ii) assist the PPC in making decisions on issues related to project implementation within the authority of the provincial government; (iii) assist the PPC in approving key provincial project documents, including feasibility study reports, provincial bidding plans, bid documents, draft contracts, bid evaluation, and contract awards and variations; (iv) assist the PPC in approving the budget for counterpart funds and ensuring their timely release; (v) coordinate provincial organizations and PPMU in project implementation; and (vi) assist the PPC in approving other project documents submitted by the PPMU.

54. The PPC in each province will set up a PPMU with the director of WSC serving as its manager. The PPMU will be responsible for day-to-day project implementation in the province and will comprise staff from the WSC and provincial-, town- , or district-level agencies, with

[15] Except in Ninh Thuan province, where the PPC prefers to place PPMU under its direct control.

expertise in project management, water supply engineering, sanitary engineering, environmental management, accounting, and community education and development. The main tasks of the PPMU are to:

(i) supervise work schedules and performance of the consultants in the province, and review designs, bidding plans, bidding documents, and contracts and prepare recommendations for approvals by provincial authorities;
(ii) prequalify contractors and undertake contract negotiations, supervise the performance of contractors, certify the quality and quantity of their output, and authorize payments accordingly;
(iii) prepare withdraw applications for approval by MOF before submitting them to ADB;
(iv) approve payment through an imprest account and maintain disbursement records;
(v) prepare monthly and quarterly project progress reports to the PCU for consolidation before submission to the central steering committee (CSC) and ADB, and help prepare the project completion report;
(vi) maintain sound project accounts and ensure timely completion and submission of the account and financial statements of WSC for auditing;
(vii) coordinate all field-level activities of all provincial-, district-, and town-level agencies related to the Project;
(viii) supervise the compliance with the local sanitation regulations and recommend actions for PPCs for improvement;
(ix) prepare monitoring and evaluation (M&E) reports to PSC, PCU, and ADB; and
(x) supervise the implementation of resettlement plans approved under this Project.

55. The provincial VWU will be responsible for implementing and managing the PHAP and the sanitation credit scheme in the project towns. With assistance from consultants, and in consultation with the PPMU and district- and town-level government agencies, the provincial VWU will organize and carry out the PHAP. Through its lower level offices, the provincial VWU will promote public awareness about the credit scheme, identify poor households, establish credit terms and conditions, process credit applications, collect repayments, maintain accounts and records, and arrange for inspection and certification by the PPMU and other appropriate authorities. The provincial VWU will provide a quarterly report and a detailed annual report to the PPMU on credit scheme activities. The PPMU will be responsible for monitoring the credit schemes in the province. The accounts of the credit scheme will be subject to audit by the same project auditor to be appointed by the CSC and acceptable to ADB.

56. To ensure standards and quality in project implementation, monitoring, and report, a CSC will be established, comprising one senior official from MOC as chairperson and the five project provinces as members. The CSC may invite ADB or AFD staff as observers. The CSC will be assisted by a PCU comprising full-time professional staff with adequate project experience and proficiency in English language. The PCU will be responsible for selecting consultants and supervising their work programs and staffing schedules; preparing a consolidated project progress report for CSC and ADB; recording and reviewing withdrawal applications from PPMUs; preparing terms of reference for auditing all the project accounts; recommending a qualified auditing firm to the CSC for its approval and negotiating the contract; reviewing the audited statements of project accounts, and following up on the comments/recommendations of the auditor. Upon request from PPMUs, the PCU will assist in project implementation, with regard to ADB and AFD procedures, international and local competitive bidding processes, bid preparation and evaluation, and contract awards. The PCU

will also assist PPMUs in the design and implementation of training programs. The PCU will have its main office in HCMC.

2. Implementation Schedule

57. The Project will be implemented over six years commencing in 2002 and ending in 31 December 2007. An indicative project implementation schedule is presented in Appendix 4.

3. Advance Action

58. A major cause of delay in earlier ADB projects is the slow process for selecting the consultants. To speed up project implementation, ADB approved the request of the Government for advance action to engage consultants. The Government has been advised that approval of the advance action does not, in any way, commit ADB to finance the Project, and that the action should be carried out in accordance with ADB's *Guidelines on the Use of Consultants*.

4. Operation and Maintenance

59. WSCs will be responsible for O&M of the water supply systems. The consultants will help develop and implement O&M plans. Specialized O&M equipment will be procured and on-the-job and formal training on O&M will be provided for WSCs. Water tariffs will be adjusted to allow adequate funds for O&M. WSCs will establish, equip, and train permanent leak detection teams; install and regularly calibrate bulk water meters at treatment plants and at critical points in the network; introduce effective meter management, including transfer of meter ownership to WSCs, replacement of defective meters, and regular testing of consumer water meters; and monitor the UFW program. The PWC/WSC in each town will be responsible for O&M of the drainage and public sanitation facilities constructed under the Project, while the individual households will be responsible for the O&M of the private latrines and septic tanks. The VWU in each province will be responsible for the operation and administration of the sanitation credit schemes.

5. Procurement

60. Procurement under the Project will be carried out in accordance with ADB's *Guidelines for Procurement.* Civil works and supply contracts valued above $1.0 million and $0.5 million, respectively, will be procured under international competitive bidding procedures. This will include the civil works contracts for the water supply components and a supply contract for UFW equipment for the Project. Local competitive bidding contracts include minor civil works and supply contracts valued at or below the given thresholds. Where special license is required or where there is no adequate competition, supply and installation contracts valued at or below $100,000 may be awarded following direct purchase procedures, subject to approval by ADB on a case by case basis. This will include mainly contracts for supply and installation of power distribution lines and transformers. Force accounts will be used to clean and rehabilitate water supply pipelines and drains, and for service connections. Supply contracts for equipment and vehicles valued at $0.5 million or less per contract will be procured through international shopping procedures, and supply contracts valued at $100,000 or less will follow direct purchase procedures. AFD funds will be used to finance pipes, valves, fittings, and civil works for water supply distribution pipelines (50-200 millimeters in diameter) in each province under local competitive bidding procedures in accordance with the regulations of the Government.

61. For purposes of expediency, standardization, and cost effectiveness, the PCU will be responsible for the procurement of (i) specialized equipment and materials for UFW programs under one international competitive bidding contract; (ii) computer hardware under one international shopping contract; and (iii) software for WSC billing, accounting, and management information systems following direct purchase procedures. The procurement of vehicles, office equipment, and consumables for PPMUs, the PCU, and the consultants will be managed independently by each party within agreed budgets, using international shopping or direct purchase procedures, or according to the Government's standard procedures acceptable to ADB. Indicative procurement packaging is presented in Appendix 5.

6. Consulting Services

62. Consulting services will be provided under the loan to support project management and implementation. There will be two consulting service contracts: project orientation assistance, and project implementation assistance. A total of 1,480 person-months of consulting services (206 international and 1,274 domestic) will be required for assistance in such areas as project management, water supply engineering and design, sanitation engineering and design, UFW improvement, construction management, community development, sanitation credit scheme, training and capacity building, and technical support to the PPMUs and PCU. The consulting services will be provided by international consulting firms in association with domestic consultants. To minimize costs and facilitate access to the provinces, the consultants will be mainly located in HCMC and will have representatives stationed in each province to work with PPMUs during the project construction stage. PCU representatives will work with the consultants in their HCMC office. Consulting services will be procured in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB on the engagement of domestic consultants. The terms of reference for consulting services are presented in Appendix 6.

7. Land Acquisition and Resettlement

63. About 68 hectares of agricultural and residential land will be required for the Project. Some 71 households will be relocated to allow construction of reservoirs and water treatment plants. In addition, slightly more than 900 affected persons will be entitled to receive some form of compensation as a result of the Project. These are shown in Table 7.

Table 7: Assessments of Land Acquisition and Resettlement

Project Town	Permanent Land Acquisition (ha)	Temporary Land Acquisition (ha)	Number of Households to be Resettled	Number of Affected Persons
Chi Thanh	5.38	0.74	0	18
La Hai	0.20	0.00	0	5
Phan Rang	1.79	1.28	39	195
Rach Gia	16.01	17.10	14	195
Tay Ninh	2.02	0.00	8	220
Thu Dau Mot	30.00	0.00	10	86
Tuy Hoa	12.69	0.72	0	185
TOTAL	**68.09**	**19.84**	**71**	**904**

Note: In some provinces, these estimates may be revised once detailed designs are completed.
Source: Resettlement plans of project provinces.

64. Land acquisition, compensation, and relocation will be carried out in accordance with ADB policy on involuntary resettlement, Government laws, and approved resettlement plans. Public consultation has been carried out by WSCs, and compensation standards have been

revised accordingly. WSCs and PPCs are responsible for implementing the resettlement plans, compensating resettled households and affected persons, and carrying out the land acquisition and relocation support. The implementation status of resettlement plans will be reported by WSCs in project progress reports to be submitted to PPCs, PSCs, PCU, and ADB. WSCs will complete land acquisition, compensation, and resettlement processes, and obtain rights of entry to private properties for both construction and ongoing maintenance of the water supply pipelines and drains, before awarding water supply contracts. A summary of the land acquisition and resettlement plans for the five provinces is presented in Appendix 7.

8. Disbursement

65. An imprest account for the administrative expenditures of the CSC and PCU will be established at the central level and managed by the PCU. The administrative expenditures of the CSC and PCU will be shared by PPCs as part of their counterpart fund contributions. Each PPC will set up its own imprest account, at the provincial level, for disbursement of eligible funds relating to small contracts under local competitive bidding, direct purchase, international shopping, and incremental administrative expenses. The PCU and each PPMU will set up its imprest account with a commercial bank acceptable to the Government and ADB, and will be responsible for the use, management, replenishment, and liquidation of the imprest account, in accordance with ADB's *Loan Disbursement Handbook*. The initial amount to be deposited in each account will be limited to six months' projected disbursement, to be prepared by PCU and each PPMU, with the aggregated amount of the six imprest accounts not exceeding $3 million. Withdrawal applications, including imprest account replenishment requests, will be prepared by the PCU and PPMUs and sent to MOF for approval. MOF will forward the approved applications to ADB, with a copy to the PCU. ADB will transfer funds to the imprest accounts directly upon receiving the request from MOF. Funds for the sanitation credit schemes will be disbursed through PPMUs' imprest accounts to the provincial VWUs. The PCU and PPMUs may use the statement of expenditure procedure for replenishing the imprest accounts, including the expenditures incurred by the provincial VWUs, provided that each individual contract does not exceed the amount of $50,000.

9. Reports, Accounts, and Audit

66. Each PPMU will prepare quarterly project progress reports and submit them to the PCU for consolidation and reporting to the CSC and ADB. The reports will provide a narrative description of the progress during the reporting period, any modifications to the implementation schedule, details on land acquisition and resettlement, problems and difficulties experienced, remedial actions proposed, and the work to be carried out during the upcoming reporting period. The PPMU quarterly progress report will include a summary of expenditures during the quarter, year-to-date expenditures, and total expenditures to date. WSCs will prepare their annual financial statements, including (i) the balance sheet, (ii) income statement, and, (iii) cash flow statement. A project completion report will be submitted by each PPMU to the PCU for consolidation and submission to the CSC and ADB within three months of physical completion of the Project. The project completion report will highlight the development impacts achieved by the Project. All reports and the associated financial accounts and data will be presented to ADB in the English language.

67. PPMUs, with assistance from consultants for project orientation assistance, will set up the project accounts in accordance with Government regulations. The consultants will provide training and operating support to the PPMUs' accounting staff on the use of these accounts. The project accounts, including the imprest accounts, and financial statements of the WSCs will

be audited by auditors acceptable to ADB. The PPMUs will prepare the required information for audit in accordance with project auditing requirements of the Government and ADB. Auditing of the project accounts and financial statements of WSCs will be carried out annually, and audited statements of project accounts and WSCs' financial statements will be submitted to ADB within nine months of the close of the Government's fiscal year.

10. Loan Reviews

68. ADB will conduct loan reviews at least twice yearly. In addition, a comprehensive review will be carried out about 24 months after the effectiveness of loan agreement. The comprehensive review will evaluate the actual progress of each project component in each province; implementation procedures; monitoring and evaluation (M&E) activities; functions and performance of the CSC, PCU, PSCs, PPMUs, and provincial VWUs; subsidiary loan terms and performance; and the performance of the consultants. The financial performance and cost recovery of WSCs will also be evaluated. Remedial action will be taken to address any problems identified.

11. Monitoring and Evaluation

69. The Project includes an M&E system to ensure that water and sanitation systems are operating efficiently at design levels, and that consumers are deriving the envisaged benefits. Baseline conditions will be established prior to commissioning of project facilities. The design and establishment of the M&E system will be undertaken by PPMUs with assistance from the consultants. The M&E system will be based on that used for previous ADB projects, using the software developed specifically for this purpose. The PPMUs will be responsible for carrying out the M&E activities, including the establishment of benchmarks through initial physical and social surveys, data collection and analysis, and reporting to the PCU. The surveys will be undertaken annually to determine changes in the key indicators. The PCU will be responsible for submitting a detailed implementation plan for preparing benchmarks and benefit monitoring within six months of the arrival of the design consultants, and for consolidating and submitting the annual M&E reports to the CSC and ADB. Detailed M&E indicators are presented in Appendix 8.

G. Environmental and Social Measures

70. The Project is an environmental category B project. An initial environmental examination was carried out for each project town, and a supplementary analysis was conducted for the proposed raw water reservoir at Rach Gia. The examinations show that adverse environmental effects will be limited and can be mitigated through integrated corrective measures. A detailed environmental impact assessment is not required. The examinations indicate that a safe, clean, reliable water supply and improved sewage disposal systems in urban areas will significantly improve the public health and environmental conditions in the project towns. The existing problems of polluted pools of standing water, unpleasant odors, and health risks associated with increased quantities of wastewater will be improved because of the integration of water supplies with improved drainage and sanitation systems and heightened public health awareness. This will contribute to an improvement in the quality of life and community health profiles for the towns. The disposal of sludge in the project water treatment plants will be improved by providing sludge lagoons, storage basins, settlement basins, and drying beds in the treatment plants.

71. There are no known endangered varieties of flora or species of fauna, or sites of historical or cultural significance in the project areas that are likely to be affected. Land areas for the proposed water supply and sanitation development have been developed or disturbed

previously and have no forest or unusual vegetation cover. Major impacts of the Project will be temporary, including health and safety effects on communities during construction; turbidity, dust, and noise generated by construction equipment; and disposal of acidic sulfate soils. Approximately 71 households will be resettled to allow construction or expansion of water treatment plants and reservoirs. WSCs and PPCs will be responsible for implementing resettlement plans.

72. Mitigation measures have been proposed and incorporated in project design. Environmental management plans and monitoring programs are proposed for each project component to the PPCs for implementation. Environmental training programs will be provided to the staff of WSCs, PPMUs, and the departments of science, technology, and environment, to strengthen their capacities of addressing environmental concerns during the design and construction phases of the Project. The contractors will be required to prepare and implement their own environmental management plans, and carry out the construction work in line with international standards. Other measures to be implemented as part of the Project include (i) monitoring of groundwater quality and quantity; (ii) control and monitoring of activities in catchments upstream of water supply intakes and borefields; (iii) enforcement of regulations for treatment and discharge of industrial wastewater; (iv) licensing of industrial, commercial, and domestic use of groundwater in sensitive areas; and (vi) banning of the industrial and commercial use of groundwater in areas where piped water supply is available.

73. One major obstacle to poorer households connecting to piped water supply is the cost of connection, which varies between towns from D600,000 to over D1.0 million, depending on the distance from the reticulation pipes. To allow better access by the poor to piped water supply, the Project will take measures to allow low-income households to pay by installments over 18 months. The sanitation credit schemes will also alleviate the financial burdens of the low-income households wishing to improve their sanitation conditions. The Project will carry out PHAP in each project town to ensure that the change of hygiene behavior will complement the improved water supply and sanitation facilities. PPCs are required to provide early information to the public on the need to increase tariff and availability of credit for water supply connection and sanitation improvement to low-income households.

74. The CESI activities are aimed at maximizing the benefits of the Project. These activities have previously proven to be a significant factor in deriving additional benefits, including (i) improving the skills of WSCs and other local government organizations in communicating with the communities; (ii) improving WSCs' understanding of their customers and community preferences; (iii) greater openness and accountability of local governments; (iv) greater public participation in planning and decision making, leading to a higher level of ownership and public support for governments and WSCs; and (v) improving people's access to local authorities and community networks.

V. PROJECT JUSTIFICATION

A. Economic and Financial Analyses

1. Economic Analysis

75. An economic analysis has been undertaken for each project town as well as the overall Project. The analysis is based on the forecasts of water production and sales and capital and operating costs used in the financial analysis. The economic analysis is carried out using economic prices, derived from financial prices with adjustments for transfer payments including taxes, duties, and subsidies, and for any other market distortions. The analysis of the water

supply and sanitation subprojects in each of the seven project towns and the overall Project includes the following: (i) least cost analysis of alternative water supply development options, (ii) derivation of the economic price—the average incremental economic cost (AIEC) of water and wastewater services, (iii) calculation of the economic internal rate of return (EIRR) of each subproject and the overall Project, (iv) sensitivity analysis, (v) distribution analysis of project benefits, and (vi) poverty impact analysis. The detailed economic analysis is presented in Appendix 9.

76. The least cost analysis, where applicable, compares the expected capital and operating costs of alternative development options. For each option, capital and operating cost streams were compared and the net present values and AIEC calculated, using the social opportunity cost of capital (SOCC), assumed at 12 percent. The result indicates that the Project is the least cost option. The AIEC for the water supply and wastewater subproject provides a measure of the cost per cubic meter and the basis of tariffs for full cost recovery. The AIEC is the discounted value of incremental capital costs and operating costs (in economic prices) divided by the discounted volumes of incremental water sales as a result of the proposed investment. Capital and operating costs include the economic cost of water, sanitation, and drainage components. The AIEC for the overall Project is estimated at D8,135/m^3.

77. The calculation of the EIRRs for water supply components is based on the capital and O&M costs of the least cost alternative, including the cost of public sanitation facilities and any environmental degradation. The valuation of the nonincremental benefits is based on the average supply price of all sources in the without-project situation. This is used as the proxy for consumers' willingness to pay. These include water from tubewell supplies, surface wells, and river sources as well as water purchased year-round or during the dry season from water vendors or from households with piped supply. The EIRR for the overall project is 17.7 percent. The EIRR calculated for each project town ranges from 13.7 percent to 19.9 percent, all higher than the SOCC. The sensitivity of the EIRRs of the water supply and sanitation components was tested against adverse changes in key variables, and the EIRRs exceed the SOCC in all tests. The Project is most sensitive to delays in project completion, where a two-year delay will cause the average EIRR to decline to 14.4 percent.

78. An analysis has been undertaken to measure the distribution of the project benefits to different participants in the Project, including the government, WSC, consumers, and laborers. The analysis shows that while the Project has an overall economic net present value of D431 billion, the benefits mainly go to the consumers and laborers. A poverty impact analysis has been carried out to estimate the proportion of benefits accruing to the poor. A poverty impact ratio is derived by comparing the net economic benefits to the poor with the net economic benefits to the economy as a whole. The overall poverty impact ratio for the Project is 34.7 percent.

2. Financial Analysis

79. The financial analysis is undertaken to assess the (i) financial viability of each subproject and the overall Project, by comparing the financial internal rate of return (FIRR) with the weighted average cost of capital (WACC) used to finance each subproject as well as the overall Project; (ii) adequate tariffs required to achieve financial sustainability for the WSCs, and subsidies incurred, by comparing the average tariff with the average incremental financial cost

(AIFC); (iii) affordability of the proposed water tariffs; (iv) sensitivity of the FIRRs to adverse changes in the key variables; and (v) financial projections for the WSCs.

a. FIRR and AIFC

80. The overall FIRR for the Project water supply component is 3.2 percent, which is above the 2.0 percent WACC. Therefore, the Project is considered financially viable. The FIRRs for the individual subprojects in the five provincial towns all exceed their WACCs and are, therefore, considered financially viable. While the FIRR for the district town Chi Thanh is below the WACC, when the three subprojects in Phu Yen Province (Chi Thanh, La Hai, Tuy Hoa) are considered on a consolidated basis, the FIRR exceeds the WACC. Therefore, on a consolidated basis, the three Phu Yen subprojects are considered to be financially viable. The overall AIFC, which is the minimum tariff required for full cost recovery, for all project water supply components is D2,865/m^3 of water sold. For the individual subprojects, the AIFC ranges from a low of D2,790/m^3 in Phan Rang to a high of D3,930/m^3 in Chi Thanh. The cost of service in the district towns is higher than that for the provincial towns because the smaller population limits economies of scale. The analysis is summarized in Table 8 and details are presented in Appendix 10.

Table 8: Summary Results of the Financial Analysis

Subproject	FIRR (%)	WACC (%)	Average Water Tariff (D/m^3)		AIFC (D/m^3,	NPV
			Required[b]	Actual 2000	Cons. prices)	(D million)
Chi Thanh	0.0	1.8	3,460	1,897	3,930	-5,757
La Hai	2.5	1.8	3,460	1,897	3,300	1,533
Tuy Hoa	3.8	1.8	3,460	1,897	2,900	51,837
Phu Yen Province[a]	3.3	1.8	3,460	1,897	3,040	47,613
Phan Rang	3.0	1.7	3,080	3,100	2,790	40,494
Rach Gia	3.0	2.7	3,060	2,405	2,980	6,330
Tay Ninh	2.6	2.2	3,240	2,076	3,140	4,386
Thu Dau Mot	3.4	3.0	3,145	2,665	3,000	14,775
Total	**3.2**	**2.0**	**NM[c]**	**NM[c]**	**2,865**	**113,598**

[a] Including Chi Thanh, La Hai, and Tuy Hoa; [b] Average tariff, expressed in 2001 constant prices, required over the 2001–2014 period for WSCs to reach the financial targets; [c] NM =not meaningful.
Source: WSCs documents and ADB estimates.

b. Average Tariff Requirements, Affordability, and Willingness to Pay

81. As shown in Table 8, the average tariff requirements for the project towns are relatively similar, ranging from a low of D3,060/m^3 for Rach Gia to a high of D3,460/m^3 for the three towns in Phu Yen province. These average tariff requirements are expressed on a constant price basis. An affordability analysis has been undertaken to ensure that households, particularly those low-income groups, comprising households earning an amount at or below the average of the bottom 20th percentile of income distribution, can afford the proposed water tariffs. The tariffs are considered affordable if expenditure on water does not exceed 5 percent of household income. The tariffs are considered affordable for the median income households in all of the project towns over the 2002-2014 period. While the tariffs may appear high for the low-income households in La Hai during 2008-2010, this is partly a result of conservative assumption on the growth of their future incomes. Further, the piped water supply represents significant cost savings compared with other alternatives. The results of this analysis are summarized in Table 9.

Table 9: Affordability Analysis

Subproject Town	Percentage of Income to Pay Water Bill			
	2002	2008	2010	2014
Chi Thanh				
Median Income Household	2.2	3.7	3.7	3.4
Low Income Household	3.1	4.7	4.6	3.9
La Hai				
Median Income Household	2.8	4.8	4.8	4.4
Low Income Household	4.4	6.6	6.4	5.4
Phan Rang				
Median Income Household	2.6	3.0	2.8	2.4
Low Income Household	2.8	2.8	2.6	2.1
Rach Gia				
Median Income Household	2.2	2.7	2.8	3.0
Low Income Household	2.0	2.0	2.0	1.9
Tay Ninh				
Median Income Household	2.3	2.9	3.0	3.1
Low Income Household	2.6	2.7	2.7	2.5
Thu Dau Mot				
Median Income Household	1.5	1.6	1.6	1.5
Low Income Household	1.8	1.6	1.5	1.3
Tuy Hoa				
Median Income Household	1.6	2.6	2.7	2.4
Low Income Household	1.7	2.5	2.4	2.1

Source: ADB estimates.

82. An assessment of the willingness of consumers to pay the tariffs has also been undertaken on the basis of the socioeconomic survey carried out during the Project feasibility study. In general, for households presently connected to piped water supply, the willingness to pay was higher than those not connected. In Rach Gia, Thu Dau Mot, and Tuy Hoa the proposed tariffs for 2002 are generally within the existing willingness to pay for households presently having piped water connections. For the other towns, tariff requirements in 2002 exceed the willingness to pay by about 30 percent (Tay Ninh) to 100 percent (Chi Thanh, La Hai, Phan Rang). For those not presently connected, the projected tariff requirements exceed the existing willingness to pay in all towns.

83. The survey results likely underestimate the willingness to pay. In Phan Rang and Tay Ninh, current water bills for a typical household exceed the reported willingness to pay for those connected to the system and yet there appears to be little resistance to payment. Willingness to pay is also a function of present levels of service, which are low in all of the towns. For those not presently connected to the piped water supply system, it was observed during the socioeconomic survey that households often had difficulty estimating the total cost of their nonpiped water supply and, therefore, their willingness to pay for piped water. This indicates the importance of the PHAP, which is expected to increase the awareness of the households of the value of piped water supply.

c. Sensitivity Analysis

84. The sensitivity of the FIRRs is tested against adverse changes in selected key variables: (i) increases in capital costs, (ii) increases in O&M costs, (iii) reductions in revenues, (iv) reductions in savings from lower UFW; (v) reduction in projected number of water connections, and (vi) delays in the completion of the subproject. The FIRR is most sensitive to a reduction in incremental revenues derived from the water tariffs. These are presented in Table 10.

Table 10: FIRR Sensitivity Analysis

	Key Variable	Change	FIRR	SI[a]	SV[b]
	Base Case		3.16		
1.	Capital Cost	+10	2.33	2.63	+14.3
2.	O&M Costs	+10	2.74	1.33	+27.0
3.	Tariff Revenues/Water Sales	-10	1.85	4.15	-8.9
4.	UFW Cost Savings	-10	3.10	0.19	N/A[c]
5.	New Connections	-20	1.08	3.23	
6.	Project Completion Delay	1 Year	2.65		
		2 Years	2.18		

[a] SI = sensitivity indicator, the ratio of percentage change in FIRR to change in parameter;
[b] SV = switching value, the percentage change in parameter sufficient to reduce the FIRR to equal WACC;
[c] N/A = not applicable: the FIRR exceeds the WACC even if UFW cost savings are reduced to zero.
Source: ADB estimates.

d. Financial Projections of WSCs

85. Financial projections have been prepared for each of the five WSCs in order to assess the impact of the proposed Project on the financial viability and sustainability of the companies. The financial projections are based on the key financial performance objectives set for the WSCs over the projection period: (i) generating revenues sufficient to cover all cash O&M expenses and depreciation expense or debt repayment (whichever is greater), and a net income sufficient to cover bonus and welfare fund contributions; (ii) maintaining a cash balance at the end of each year equivalent to no less than 30 days worth of annual cash O&M expenditures plus debt service; (iii) maintaining a current ratio at no less than 1.0 as of the end of each year; and (iv) improving the financial positions to self-finance an increasing proportion of the annual capital expenditure requirements.

86. The financial performance of the WSCs improves over the 2000–2014 forecast period with the increase of water tariffs. However, due to the need for the phased implementation of the tariff increases and because of the impact of debt service obligations for the subprojects, all of the WSCs will experience short-term periods of weaker performance. With the exception of the Kien Giang WSC, the WSCs are not expected to achieve the financial objectives set out above in all years. However, the overall financial performance and position of the WSCs is expected to be sufficient to maintain adequate levels of cash during all periods. Therefore, the projected financial performance of the WSCs is considered satisfactory. Key performance indicators are shown in Table 11.

e. Subsidies

87. Water tariffs in the project towns are substantially below the full cost recovery levels. To support the Government policy of gradually reducing the subsidies to the water supply sector and achieving full cost recovery from beneficiaries, the Project will require PPCs under the Project to substantially increase water tariffs during 2004-2008. Further, the Project intends to make transparent the cross subsidies between the different revenue sources within a WSC. WSCs are required to establish separate accounting for costs and revenues from water sales and those from other sources, such as construction. To enable the low-income households to have private connections to the piped water supply, the WSCs will allow these households to pay the cost of house connection by installments. There is a hidden interest subsidy. Under the proposed sanitation credit schemes, the lending rate will be the same as those offered by the Bank for the Poor, which is lower than the prevailing market rates, reflecting a subsidy in the cost of funds to the low-income households. This is deemed acceptable considering the

affordability of low-income households, their need for improved living conditions, and the associated positive externalities.

Table 11: Key Performance Indicators of WSCs

	2001	2008	2014
Binh Duong WSDC			
Water Sales (m^3/d)	12,400	33,600	56,100
Cash Balance (D million)	6,400	23,300	55,100
Cash (Days Worth of Cash Obligations)	168	131	204
Current Ratio	1.2	3.0	6.9
Debt - Equity Ratio (%)	75	87	61
Self Financing Ratio (%) - Annual	3	788	124
Kien Giang WSDC			
Water Sales (m^3/d)	12,400	26,700	38,200
Cash Balance (D million)	6,100	35,300	75,500
Cash (Days Worth of Cash Obligations)	262	339	401
Current Ratio	6.2	6.9	9.6
Debt - Equity Ratio (%)	18	51	34
Self Financing Ratio (%) - Annual	22	451	140
Ninh Thuan WSC			
Water Sales (m^3/d)	5,500	13,700	38,200
Cash Balance (D million)	3,800	11,800	35,400
Cash (Days Worth of Cash Obligations)	350	126	191
Current Ratio	20.2	1.8	3.5
Debt - Equity Ratio (%)	0	156	93
Self Financing Ratio (%) - Annual	NA	164	296
Phu Yen WSC			
Water Sales (m^3/d)	5,800	12,700	26,700
Cash Balance (D million)	3,600	17,500	48,600
Cash (Days Worth of Cash Obligations)	471	207	378
Current Ratio	9.5	2.1	4.4
Debt - Equity Ratio (%)	0	113	80
Self Financing Ratio (%) - Annual	6	501	297
Tay Ninh WSDC			
Water Sales (m^3/d)	4,400	9,700	16,200
Cash Balance (D million)	1,300	11,100	19,900
Cash (Days Worth of Cash Obligations)	215	249	283
Current Ratio	26.3	3.7	5.9
Debt - Equity Ratio (%)	19	97	64
Self Financing Ratio (%) - Annual	7	619	150

m^3/d = cubic meter per day
Source: ADB estimates.

B. Environment

88. The water sources of most Project towns are of good quality and sufficient yield, while those of Rach Gia suffer from saline intrusion during dry season and of Chi Thanh from organic pollution resulting from agricultural and animal wastes. The raw water reservoir in Rach Gia and borefield in Chi Thanh will provide raw water of better quality, reduce the potential for pollution, and minimize water treatment costs. The Project is designed to deliver 24-hour, fully pressurized water supply systems, and thereby ensure the supply of safe drinking water by eliminating the risk of contamination of the water supply from groundwater infiltration under low pressure or vacuum condition. Higher supply pressures will also improve fire-fighting capabilities in the towns and reduce the cost of fire damage to buildings and property.

89. The project towns have combined drainage systems that carry both storm water and wastewater. However the coverage of drainage systems is limited and their functions are less than satisfactory due to poor design and maintenance. The systems will be cleaned and rehabilitated where necessary, and sewage pipes installed in high and medium density areas to supplement septic tanks and existing drains. In low-density areas, where adequate drains do not exist, septic tank effluent and sewage will be discharged to soakaways. Septic tank coverage will be raised through regulations, public health awareness programs, and sanitation credit schemes. Sanitation improvements will also be carried out in schools and public areas such as markets.

90. The groundwater in some project areas is contaminated by pit latrines, septic tanks, and drainage systems. While expanding the piped water supply system and sanitation improvements will not eliminate groundwater contamination, it will prevent further contamination of groundwater and improve its quality over time. In Thu Dau Mot, excessive exploitation of groundwater has substantially lowered the groundwater table, and saline intrusion in both surface water and groundwater is a problem in Rach Gia and Tuy Hoa. Improved piped water supply systems will reduce dependence on contaminated water sources, and minimize the potential for further lowering of water tables and salination of groundwater. Greater coverage of septic tanks, drainage improvements, and adoption of proper standards for septic tanks and soakaways will also help to reduce groundwater contamination. The summary initial environmental examination is presented in Appendix 11.

C. Social Dimensions and Impact on Poverty

91. Participatory methods, such as workshops, rapid assessment, focus groups discussions, and surveys, have been employed in formulating the Project throughout the feasibility study, to ensure that the needs and demands of the weaker social groups, such as women, ethnic minorities, and the poor, will be taken into consideration. During project implementation, WSCs will be trained in community consultation techniques, analysis of customer feedback, and other areas to improve participation. The public health awareness programs, the community environmental sanitation improvement programs, and the sanitation credit schemes will all use participatory approaches. Women will benefit from increased knowledge of safe water practices, personal hygiene, and awareness of the linkage between water, sanitation, and health. Conveniently available safe water will reduce the time spent by women on collecting water or caring for other household members who are ill from unsafe water or poor hygiene, allowing them to spend more time on improving their living conditions. Increased interaction with the VMU and other agencies will enhance their social contacts and reduce isolation.

92. The Project will have significant and positive impacts on the poor. Access to piped water will significantly reduce the time and cost of the poor in collecting and storing water. The poor often walk or cycle long distances (400–1,000 meters) daily or more to collect water for drinking if they have no safe and reliable source nearby, or when existing wells are dried up, become saline during the dry season, or are contaminated by flood water during the wet season. Piped water availability will result in increased water purchasing power for the same household budget. Greater use of piped water (including for washing dishes, bathing, and washing clothes) will improve health and reduce risk of infection or illness from polluted sources, and increase the time available for income generating, education, and health care. The sanitation credit schemes and water connection credits to poor households will help them improve their living conditions and reduce the risk of illness and incapacity. Other positive social impacts include (i) improving WSCs' understanding of their customers' and communities' needs and preferences; (ii) improving WSCs’ communication skills in consulting the communities; (iii) greater openness and

accountability of local governments; (iv) greater public participation in decision making and planning, leading to a high level of ownership and increased public support for the Project; (v) increased cooperation between authorities from different sectors e.g., health, education, community, town administration, and water supply. A summary social analysis is presented in Appendix 12.

D. Risks

93. The main risks related to the Project are (i) inadequate capacity of the PPCs and WSCs for implementing the Project; (ii) failure of WSCs to collect adequate tariffs to cover the O&M cost and debt service payments; and (iii) inadequate maintenance, affecting long-term sustainability of the completed project infrastructure. The limited capacity of provincial organizations could lead to delays and additional costs. None of the five provinces have experience with projects financed by multilateral aid agencies. The staff at WSCs and other provincial-level agencies generally lack knowledge of ADB procedures and the skills to implement the Project. To mitigate this risk, the Project will provide adequate initial training on project management, and will require that PPCs and WSCs ensure that skilled personnel and other resources are available in the province for the Project.

94. The key risks to the financial sustainability of the WSCs are uncertainty regarding tariff revenues and the number of water supply connections. Adequate tariff is particularly important over the 2008–2010 period when the WSCs are expected to commence debt service on the Project. PPCs are required to conduct public education on cost recovery and tariff increases. It is equally important that new customers be connected to the system as rapidly as possible. The public health awareness program will be essential in encouraging households to connect to the piped water supply system.

95. A major risk to the Project could stem from inadequate maintenance of the rehabilitated and new facilities. The Project will assist the WSCs to conduct asset inventories and prepare O&M plans and guidelines based on appropriate engineering practice. These plans and guidelines will be used by WSCs to ensure adequate budgetary allocation for proper preventive maintenance. O&M equipment provided under the Project and staff training will also assist the WSCs to ensure the sustainability of the water and sanitation systems.

VI. ASSURANCES

A. Condition for Loan Effectiveness

96. As a condition for the effectiveness of the Loan Agreement, ADB will be assured of the effectiveness of the loan agreement between the Government and AFD.

B. Specific Assurances

97. The Government has given the following assurances, in addition to the standard assurances, which have been incorporated in the legal documents:

(i) The Government agreed that (a) ADB and AFD funds will be relent to the WSCs in Vietnamese dong under subsidiary loan agreements, whose terms and conditions are acceptable to ADB and AFD; and (b) the Government will assume the foreign exchange risk, and the subsidiary loans will have a maturity of 22

years with a grace period of 6 years, and a fixed interest rate of 6 percent per annum.

(ii) PPCs and WSCs will ensure that the approved resettlement plans are carried out promptly and efficiently. After designs are finalized and before issuance of the tender documents for the construction works of the water supply components, WSCs will submit to ADB for approval detailed implementation plans showing, among others, the actual number of affected persons and asset inventories (Appendix 7, para. 3) and final budget. WSCs will ensure that the resettlement plans and any amendments, will be accessible by people affected, in the Vietnamese language.

(iii) Before awarding the contracts for the water supply components, the WSCs will have completed land acquisition, compensation, and resettlement processes, and obtained rights of entry to private properties for both construction and maintenance of the water supply pipelines.

(iv) PPCs will ensure that funds are provided according to the resettlement plans, and will meet any obligations in excess of the budgeted amounts as necessary to meet the resettlement objectives to restore or improve incomes and living standards of affected people.

(v) PPCs will ensure that there will be independent M&E of the implementation of the resettlement plans both during the implementation of the plans and one year after their completion. If any affected households are facing difficulty with livelihood restoration, the PPC will take additional mitigation measures and quickly resolve the problems.

(vi) WSCs will report quarterly the progress of the land acquisition and resettlement through the quarterly progress reports, and through a report to be submitted one year after the completion of the resettlement and five years thereafter.

(vii) By 31 December 2004, the PPCs will introduce sanitation regulations requiring, among others (a) connecting sullage drains and septic tanks to drains in high and medium density areas, and to drains or properly designed and constructed soakaways in low density areas; (b) providing a septic tank that meets prescribed standards in each household or business in high and medium density areas; (c) allowing piped water supply connection only when sullage pipes discharging to drains or properly constructed soakaways are provided for; (d) preventing pollution in the vicinity of surface intakes and borefields; (e) controlling and monitoring activities in catchments upstream of water supply intakes and borefields; (f) enforcing regulations on treatment and discharge of industrial wastewater; (g) licensing industrial, commercial, and domestic use of groundwater in sensitive areas; and (h) banning industrial and commercial use of groundwater in areas where piped water supply is available. The PPCs will enforce universal compliance with the sanitation regulations by 31 December 2006.

(viii) By 31 December 2002, the PPCs will have introduced the water tariff structure and increased water tariffs as agreed with ADB and reflected in the memorandum of understanding between ADB and each province. The tariffs will

be reviewed by project consultants and adjusted every two years. Recommendations from the consultants will be the basis for discussion between the PPCs, WSCs, and ADB with regard to further tariff adjustments.

(ix) PPCs and WSCs will take all measures to ensure proper management and effective O&M of sanitation and drainage systems, including (a) implementing a septic tank management system to ensure that all septic tanks in the water supply service area are registered, and are desludged at 2-3 year intervals; (b) provision of adequate desludging tankers and safe sludge disposal facilities; and (c) provision of adequate equipment for O&M of drains.

(x) WSCs will ensure that (a) leak detection teams will be established with adequate equipment and training, which will implement the UFW program; (b) bulk water meters will be installed at treatment plants and at critical points in the network, and will be regularly calibrated; and (c) UFW will be monitored and reported to WSC management on a monthly basis.

(xi) Within 6 months of loan effectiveness, the WSCs will have prepared a credit policy to allow low-income households to pay for house connection and the meter by installments over 18 months.

(xii) Within one year of the fielding of the design consultants, the WSCs will have separated the accounts of construction activities from those of water supply operations.

(xiii) PPCs and WSCs will take all measures to ensure financial sustainability and sound management, including (a) setting water tariffs at levels to cover O&M costs plus depreciation or debt service, whichever is higher, and generating a net income sufficient to cover bonus and welfare fund contributions; (b) increasing annual expenditures on O&M to match, at a minimum, the increase in the quantity of water produced and the domestic inflation; (c) maintaining a positive cash flow and a cash balance at the year end equivalent to no less than 30 days worth of annual cash O&M expenditures plus debt service; (d) maintaining a current ratio at no less than 1.0 as of the end of each year; (e) maintaining accounts receivable at no more than 45 days of sales equivalent; and (f) self-financing an increasing proportion of the annual capital expenditure requirements.

(xiv) Within six months of fielding of the design consultants, the PPMUs will have submitted to the PCU a detailed implementation plan for establishing M&E benchmarks. PPMUs will coordinate the M&E activities in the province and prepare and submit annual M&E reports to the PCU within six months of the close of each fiscal year.

(xv) Provincial VWUs, with assistance from consultants and in consultation with the PPMUs and local governments, will develop sanitation credit terms acceptable to ADB for the use of CESI funds in each project town, and will ensure that the terms are observed during project implementation.

VII. RECOMMENDATION

98. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and acting in the absence of the President, under the provisions of Article 35.1 of the Articles of Agreement of ADB, I recommend that the Board approve the loan in various currencies equivalent to Special Drawing Rights 46,945,000 to the Socialist Republic of Viet Nam for the Third Provincial Towns Water Supply and Sanitation Project, with a term of 32 years, including a grace period of 8 years, and with an interest charge at the rate of 1.0 percent per annum during the grace period and 1.5 percent per annum thereafter, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board.

MYOUNG-HO SHIN
Vice-President

20 November 2001

APPENDIXES

Supplementary Appendixes
(available on request)

PROJECT FRAMEWORK

Design Summary	Project Targets	Monitoring Mechanisms	Assumptions and Risks
Sector Goal			
Enhance human development and reduce poverty through sustainable improvement of the water supply and sanitation conditions in the project towns	Improved health conditions; higher rate of school attendance by children; increased productive time, particularly of women, in the project towns	Central and local government statistics and reports; studies or reports of bilateral and multilateral agencies and nongovernment organizations	Overall economic growth; effective implementation of the sector policies by the Government
Project Objectives			
Improve water supply and sanitation in project towns	By 2010, water supply coverage in project towns to be increased from current 30 percent to 78 percent; septic tank coverage from 41 percent to 61 percent; per capita water consumption from 107 liter per capita per day (lpcd) to 117 lpcd; and beneficiaries of piped water supply from 253,000 to 894,700.	Project progress reports, loan review missions, and monitoring and evaluation (M&E) indicators	Adequate budget will be provided for preventive maintenance of the constructed water supply and sanitation facilities Vietnam Women's Union (VWU) will effectively manage the sanitation credit schemes The credit schemes will recover sufficient funds and charges to be sustainable over the long term.
Support participation of communities in local sanitation improvement and self-help	extend the coverage of sanitation systems; improve the community environment;	Project progress reports, loan review missions, and postevaluations	Provincial people's committees (PPCs) will be able to increase the water tariffs over the project period as proposed, and WSCs will be able to collect the tariffs. PPCs will be able to introduce the local regulations proposed and enforce them.
Improve financial sustainability of the water supply companies (WSCs) in project provinces	collect adequate tariffs to cover costs of operation and maintenance plus debt service or depreciation, which ever is higher; separate construction business from water supply	Financial statements of WSCs, project progress reports, loan review missions, and postevaluations	
Introducing local regulations on sanitation and environment protection	local regulations on septic tank construction, wastewater discharge and treatment, water source protection, and ground water licensing	Project progress reports, loan review missions, and postevaluation	
Outputs			
Water supply	Upgrade/expand water intakes, raw water transmission mains, water treatment plants, and distribution networks in the project towns to meet projected daily demand for water of 212,000 cubic meter/day in the service areas in 2010 Unaccounted for water (UFW) reduction program in each Project town to reduce UFW from current 32-54 percent to 25-30 percent by 2010	Project progress reports, loan review missions, and postevaluation	PPCs will appoint qualified staff to the provincial project management units (PPMUs) Land acquisition and resettlement plans will be implemented PPCs will speed up approval procedures Timely recruitment of competent consultants

Design Summary	Project Targets	Monitoring Mechanisms	Assumptions and Risks
Sanitation and drainage	Rehabilitation/cleaning of 32 kilometers (km) of existing drains, construction of 67 kilometers (km) of new secondary and tertiary drains in the towns, and build 20,000 septic tanks	Project progress reports, loan review missions, and postevaluation	Available and timely release of counterpart funds Effective coordination between PPMUs, WSCs, provincial steering committees, VWU, and consultants
Community environmental sanitation improvement (CESI)	Increase public awareness of the linkage between safe water, sanitation, and health; expand the coverage of sanitation facilities; and establish micro credit systems in the local communities	Project progress reports, loan review missions, and postevaluation	Full support from PPCs, PPMUs, and consultants to VWU for establishing and operating sanitation credit schemes.
Capacity building and training	Improved skills in project management, improved financial planning and management by WSCs; sustainable sanitation credit schemes	Project progress reports, loan review missions, and postevaluation	

Activities	**Activities**	**Inputs**	**Cost** ('000)
Project coordination unit selects project orientation assistance consultants; selects detailed design consultants **Project Orientation Assistance** • PPMUs set up project management information system (MIS) and accounts • PPMUs finalize M&E systems • PPMUs receive training on implementation procedures, project accounting, MIS, and M&E <u>CESI</u> • Provincial VWUs prepare the public health awareness programs and carry out the programs in pilot wards • town people's committees identify small sanitation improvement projects, seek PPMUs' approval, and carry out the projects • provincial VWUs establish credit schemes for sanitation improvement, and administer the schemes	**Water Supply** PPMUs are responsible for • surveys, engineering design, prequalification, preparing bidding plans, tendering, bid evaluation, contract awards, construction supervision, commissioning inspection, and reporting; • designing and carrying out UFW reduction programs • carrying out training **Drainage and sanitation** PPMUs are responsible for: • surveys, engineering design, prequalification, preparation of bidding plans, tendering, bid evaluation, contract awards, construction supervision, commissioning inspection, and reporting • setting up septic tanks management systems • identifying and improving public sanitation facilities • carrying out training.	Civil works Equipment Materials Consulting services (excluding equipment) Incremental administration Land acquisition and resettlement **Total Base Cost** Interest charges during construction Price contingencies Physical contingencies **Total Project Cost**	$ 21,077 $ 11,039 $ 30,093 $ 6,986 $ 1,655 $ 3,230 **$74,080** $ 6,965 $ 9,500 $ 7,408 **$97,953**

EXTERNAL ASSISTANCE TO THE URBAN SECTOR, 1993 - 2000

Activity	Source	Year	Amount ($ million)
Capital Investment Project			
HCMC Water Supply and Sanitation Rehabilitation	ADB	1993	65.0
Provincial Towns Water Supply and Sanitation	ADB	1995	66.0
Second Provincial Towns Water Supply and Sanitation	ADB	1997	69.0
Five Provincial Towns Water Supplies Project	Australia	1995-2000	40.3
Water Supply System for Da Lat City	Denmark	1997-2000	8.1
Water Supply and Sanitation System for Buon Me Thuot	Denmark	1997-2001	15.4
Water Supply for Son Tay Town	Denmark	1998-2000	3.0
Rural Water Supply Pilot Project for Ha Tinh	Denmark	1998-2000	1.1
Rehabilitation of Old Pipelines	Denmark	1998-2001	1.5
Water Supplies for 6 Mountainous Districts	Denmark		2.6
Water Supply and Drainage for Ha Long City	Denmark	1995-1996	1.2
Water Supply and Drainage for Ha Long City	Denmark	1997	12.8
Water Supply for Ha Noi–Phase 3	Finland	1991-1996	31.7
Water Supply for Ha Noi–Phase 4	Finland	1991-2000	3.2
Ha Noi–Hai Phong Water Supply Project	Finland	1996-1997	1.2
Hai Phong Water Supply and Sanitation Project–Phase 3	Finland	1997-2000	7.8
Hai Phong Water Supply and Sanitation Project–Phase 4	Finland	1997-2004	4.8
Rehabilitation and Expansion of Towns Water Supplies	Finland	1999-2000	2.7
Water Supply for Tam Ky Town	Finland	1999-2002	2.0
Water Supply for Da Nang (Phase 1 & 2)	France	1993-1996	4.8
Water treatment plant in Can Tho	France	1993-1996	4.1
Upgrade 20 Filters at Thu Duc water treatment plant	France	1993-1998	1.3
Water Supply for Hoa Binh Town (Phase 1)	France	1994-1996	2.2
Ha Noi Water Management	France	1994-1997	1.4
Water Supply for Hue City	France	1994-1999	5.3
Water Supply for Dien Bien Town	France	1994-2000	3.2
Construction of water treatment plant in My Tho	France	1995-2000	3.5
Water Supply for Nam Dinh (Phase 1&2)	France	1996-1998	6.0
Water Supply for Hoa Binh Town (Phase 2)	France	1997-2000	2.4
Water Supply for Son La Town	France	1998-2000	3.8
Water Supply for Da Nang (Phase 3)	France	1998-2000	4.1
Water Supply System at Dong Xoai	France	1998-2000	1.6
Water Supply for Kon-Tum Town	France	1998-2002	3.1
Water Supply for Vung Tau	France	1999-2000	16.1
Water Supply for Nam Dinh Town – Phase III	France	1999-2000	4.6
Lang Son Water Supply	French	1995-2000	1.5
Towns Water Supplies (Phase 1)	French	1996-1997	2.7
Ha Giang Water Supply System	French	1997-2000	2.3
Rehabilitation and Expansion of Cao Bang WSS	French	1998-1999	2.4
Water Supply for Yen Binh Town	French	1998-2000	3.8
Water Supply for Thai Nguyen	French	1998-2000	16.0
Towns Water Supplies (Phase 2)	French	1998-2000	2.1
Water Supply for Viet Tri Town	Germany	1998-2000	16.4
Water Supply for Soc Trang	Holland	1995-1998	3.0
Water Supply for Cao Lanh Town	Holland	1995-1998	5.0
Gia Lam Water Supply Project	Japan	1993-1997	33.0
Domestic Water Supply for Ba Don District Town	Japan	1995-1996	0.5
Restoration of Towns Water Supply Systems	Japan	1995-1998	0.2
Water treatment plant in Tieu Can (Tra Vinh)	Japan	1996-1997	0.1
Towns Water Supply Project	Japan	1996-1998	0.4
Water Supply for Phuoc Long	Japan	1996-1998	0.2
Water treatment plant in Khanh Vinh District Town	Japan	1996-1999	0.3
Water Supply to Lam Ha District Town	Japan	1996-2000	0.2
Water Supply System Rehabilitation/Expansion in Sa Dec	Japan	1997-1999	0.2
Domestic Water Supply (Mong Cai, Uong Bi, Quang Yen)	Japan	1997-2000	1.3
Water Supply for Son La Town, Mai Son	Japan	1997-2000	1.0

Capital Investment Project	Source	Year	Amount ($million)
Hai Duong Water Supply Rehabilitation Project	Japan	1997-2001	26.0
Pho Lu–Bao Thang District Town Drinking Water Supply	Japan	1998-1999	0.2
Water Supply for Nghia Lo	Japan	1998-1999	0.4
Upgrade water treatment plant in Hoi An	Japan	1998-2001	4.0
Construction of Water Supply System at Nhon Trach	Japan	1998-2003	26.4
Water Supply and Sanitation at Phu My	Japan	1998-2003	21.1
Water Supply System in Dong Nai, Ba Ria–Vung Tau	Japan	1998-2003	47.5
Water treatment plants (Dong Trieu and Quang Ha)	Japan	1999-2000	1.5
water treatment plant at Vinh Chau	Japan	1999-2000	0.1
Water Supply for Hong Ngu District	Japan	1999-2000	0.2
Water Supply to Bao Loc Town	Japan	1999-2001	1.3
Upgrade water treatment plant in Thang Binh	Japan	2000-2001	0.8
Construction of water treatment plant at Thien Tan-Dong Nai	Korea	1995-2000	26.0
Rural Water Supplies (EAST French)	NGO	1997-2000	0.2
Rural Water Supplies	UNICEF	1996-2000	22.6
Four Cities Water Supplies Project	World Bank	1997-2002	98.6
Subtotal, Capital Investment Projects			**776.1**
Asian Development Bank Technical Assistance			**($'000)**
National Water Tariff Policy Study	ADB	Nov 1993	600
Institutional Strengthening of HCMC Water Supply Company	ADB	Nov 1993	600
HCMC Water Supply Masterplan	ADB	Nov 1993	600
HCMC Environmental Improvement Planning	ADB	Dec 1993	600
Second Provincial Towns Water Supply and Sanitation	ADB	Sep 1994	550
Urban Sector Strategy Study	ADB	Sep 1994	300
Capacity Building for Provincial Towns Water Supply and Sanitation Planning and Management	ADB	Aug 1995	700
Community Environmental Health Improvements for the Provincial Towns	ADB	Aug 1995	500
HCMC Environmental Improvement Planning	ADB	May 1997	600
Third Provincial Towns Water Supply and Sanitation	ADB	Dec 1999	1,000
Subtotal, Asian Development Bank Technical Assistance			**6,050**
Other Technical Assistance			**($'000)**
PTWSS Project (6 towns) Project Preparation	Australia	1994	600
Preparation of Design Guidelines and Project Processing	Australia	1995	600
Da Nang Water Supply Studies, D & S and Training	Australia	1995	7,640
Support to WB Program	Australia	1995	600
Quang Ninh Water Supply Studies, D & S and Training	Denmark	1995	3,500
Community Environmental Health Improvements	Denmark	1995	500
Buon Ma Thuot Water Supply & Sanitation Feasibility Study	Denmark	1996	800
TA National Strategy for Rural Water Supply and Sanitation	Denmark	1997	2.5
Assistant for Water Resources Management	Denmark	1997	6.85
Training for Ha Noi Water Sector Senior Staff	France	1996	0.72
National Urban Water Supply Strategy	Finland	1993	330
National Urban Sewerage and Drainage Strategies	Finland	1995	330
Hanoi Water Supply Studies, D&S and Training	Finland	1995	7,400
Haiphong Water Supply Studies, D&S and Training	Finland	1995	4,500
Institutional Strengthening of Hanoi and Haiphong WSC	Finland/WB	1995	1,700
Study on Sewerage and Drainage System in HCMC	Japan	1996	500
Industrial Pollution Reduction in HCMC	Sweden	1995	313
Institutional Strengthening of HCMC Urban Design and Mgt.	UNDP	1996	1,150
Strengthening Sectoral Management Bodies of National Level	WB/Australia	1996	800
Drainage System Feasibility Study for Nhieu Loc-Thi Nghe	World Bank	1997	1,000
Subtotal, Other Technical Assistance			**31,273**

D & S = design and supervision; FS = feasibility study; HCMC = Ho Chi Ming City; Mgt.= management; PTWSS = provincial towns water supply and sanitation; TA = technical assistance; WSC = water supply company; UNDP = United Nations Development Programme; UNICEF = United Nations Children's Fund; WB = World Bank

DETAILED PROJECT COST ESTIMATES
($'000)

Item	Foreign Exchange[a]	Local Currency[d]	Total Cost
A. Community Environmental Sanitation Improvement			
1. Public Health Awareness Program	131	369	500
2. Local Small Scale Sanitation	3	189	192
3. Sanitation Credit Scheme	98	887	985
4. Sullage Pipes	7	62	69
Subtotal	**239**	**1,507**	**1,746**
B. Water Supply			
1. Headworks	3,274	1,699	4,973
2. Water Treatment Plant	3,474	3,742	7,216
3. Transmission and Distribution Network	15,363	12,162	27,525
4. Service Connections and Meters	3,021	1,275	4,296
5. Mechanical & Electrical Equipment	7,144	1,568	8,712
6. Construction/O&M Equipment	763	114	877
7. Land Acquisition and Compensation	0	2,900	2,900
Subtotal	**33,039**	**23,460**	**56,499**
C. Drainage and Sanitation			
1. Drainage	1,497	2,779	4,276
2. Sanitation Improvements	487	729	1,216
3. Construction/O&M Equipment	741	111	852
4. Land Acquisition and Compensation	0	330	330
Subtotal	**2,725**	**3,949**	**6,674**
D. Implementation Assistance and Capacity Building			
1. Design and Construction Supervision	2,387	2,336	4,723
2. Project Orientation Assistance	616	431	1,047
3. Capacity Building for PPMUs and WSCs	299	317	616
4. Engineering Investigations and Survey	151	307	458
5. PCU Costs	84	533	617
6. PPMU Costs	341	1,058	1,399
7. Computer Hardware and Software	153	47	200
8. Training Programs	8	93	101
Subtotal	**4,039**	**5,122**	**9,161**
Total Base Cost (A-D)	**40,042**	**34,038**	**74,080**
E. Contingencies			
1. Physical Contingencies[b]	4,004	3,404	7,408
2. Price Contingencies[c]	5,261	4,239	9,500
Subtotal	**9,265**	**7,643**	**16,908**
F. Interest During Construction	**1,051**	**5,914**	**6,965**
Total Project Cost	**50,358**	**47,595**	**97,953**

O&M = operation and maintenance; PCU = project coordination unit; PPMU = provincial project management unit; WSC = water supply company.

[a] Includes both direct and indirect foreign exchange costs.

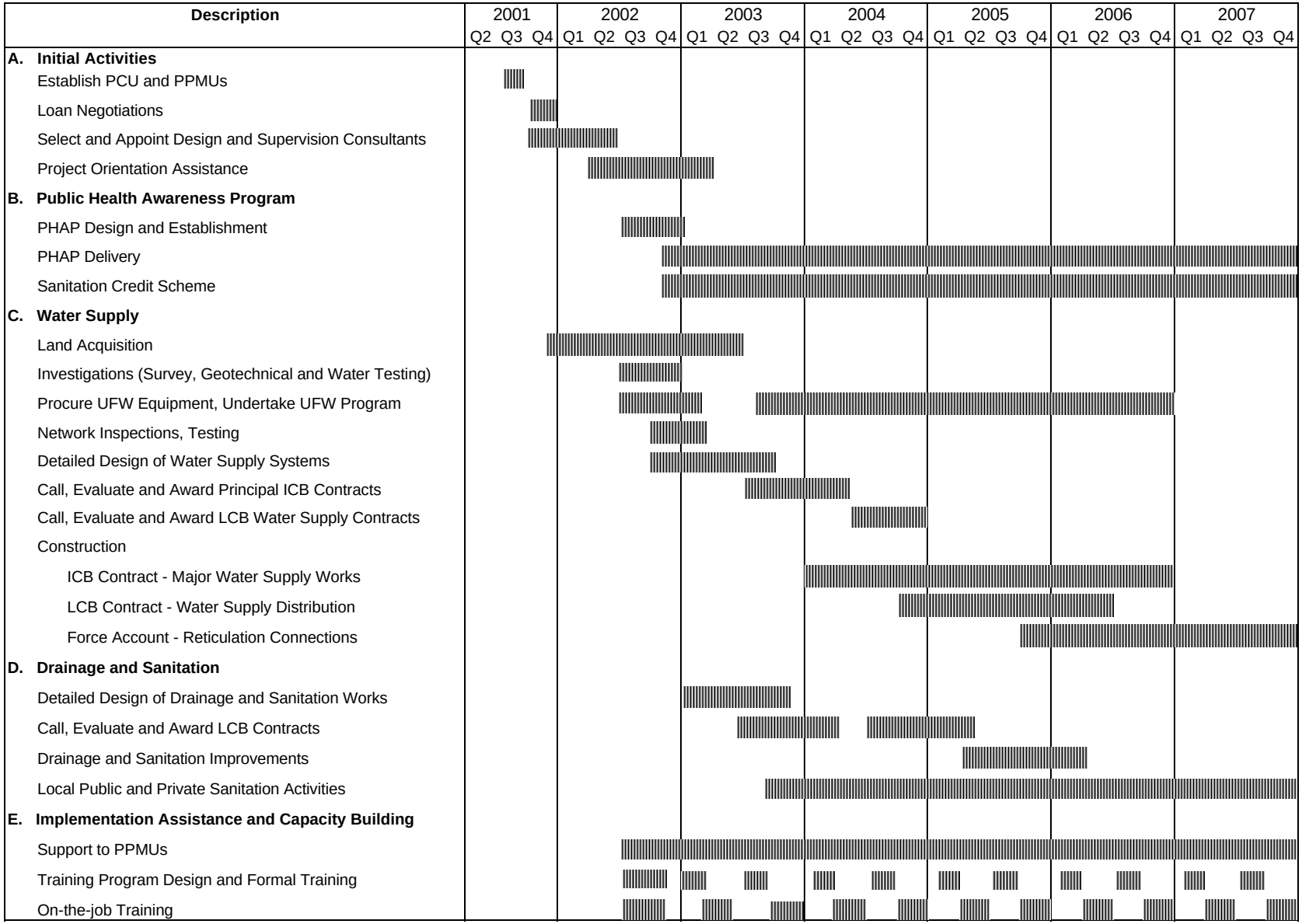
[b] 10% for all categories.

[c] 2.4% per year for foreign exchange and local currency costs.

[d] Includes duties and taxes estimated at $5.6 million.

Source: ADB estimates.

PROJECT IMPLEMENTATION SCHEDULE



ICB = international competitive bidding, LCB = local competitive bidding, PCU = project coordination unit, PHAP = public health awareness program, PPMU = provincial project management unit, UFW = unaccounted for water.

INDICATIVE PROCUREMENT PACKAGES

No	Description of Works	Package	Procured By	Mode of Procurement	Amount $'000
1	UFW Equipment	single contract for 5 provinces	PCU	ICB	387
2	Geotechnical investigations, survey, and water testing	5 contracts, one for each province	PPMU	LCB	458
3	Office equipment and vehicles for PCU, PPMU, and consultant.	7 separate contract each for PCU, Consultant and for 5 PPMUs.	PCU, Consultant & PPMUs	DP	407
4	Public health awareness program equipment	5 contracts, one for each province	PPMU	DP	54
5	Computer hardware and software for billing, accounting, and stores control for WSCs	one contract for hardware and one for software	PCU	IS/DP	200
6	Equipment, materials, and civil works for raw water pumping station, raw water reservoir, raw water transmission main, WTP, treated water pumping station, treated water reservoirs, treated water transmission mains, distribution mains (>200 millimeters (mm) diameter), and booster pumping station for Rach Gia. Supply of O&M equipment, minor construction equipment, meters and materials for service connections.	one contract for Kien Giang Province	PPMU	ICB	5,866
7	Pipes, valves, fittings and civil works for water supply distribution pipelines 50-200 mm diameter for Rach Gia.	one contract for Kien Giang Province	PPMU	LCB (AFD)	2,659
8	Equipment, materials and civil works for raw water pumping station, raw water transmission main, WTP, treated water pumping station, treated water reservoir, treated water transmission mains, and distribution mains (>200 mm diameter) for South Thu Dau Mot. Supply of O&M equipment, minor construction equipment, meters, and materials for service connections.	one contract for Binh Duong Province	PPMU	ICB	10,335
9	Pipes, valves, fittings, and civil works for water supply distribution pipelines 50-200 mm diameter for South Thu Dau Mot.	one contract for Binh Duong Province	PPMU	LCB (AFD)	3,076
10	Equipment, materials and civil works for raw water pumping station, raw water transmission main, WTP, treated water pumping station, treated water reservoir, treated water transmission mains, and distribution mains (>200 mm diameter) for Tay Ninh. Supply of O&M equipment, minor construction equipment, meters and materials for service connections.	one contract for Tay Ninh Province		ICB	4,036
11	Pipes, valves, fittings, and civil works for water supply distribution pipelines 50-200 mm diameter for Tay Ninh.	one contract for Tay Ninh Province	PPMU	LCB (AFD)	1,029

No	Description of Works	Package	Procured By	Mode of Procurement	Amount $'000
12	Equipment, materials and civil works for borefields, raw water transmission mains, WTPs, treated water pumping stations, treated water reservoirs, treated water transmission mains, and distribution mains (>200 mm diameter) for Tuy Hoa, La Hai and Chi Thanh. Supply of O&M equipment, minor construction equipment, meters and materials for service connections.	one contract for Phu Yen Province	PPMU	ICB	8,098
13	Pipes, valves, fittings, and civil works for water supply distribution pipelines 50-200mm diameter for Tuy Hoa, La Hai and Chi Thanh.	one contract for Phu Yen Province	PPMU	LCB (AFD)	3,694
14	Equipment, materials and civil works for borefields, raw water transmission mains, WTPs, treated water pumping stations, treated water reservoirs, booster pumping stations, treated water transmission mains, and distribution mains (>200 mm diameter) for Phan Rang. Supply of O&M equipment, minor construction equipment, meters, and materials for service connections.	one contract for Ninh Thuan Province	PPMU	ICB	9,097
15	Pipes, valves, fittings, and civil works for water supply distribution pipelines 50-200 mm diameter for Phan Rang.	one contract for Ninh Thuan Province	PPMU	LCB (AFD)	4,163
16	Equipment and materials, construction and commissioning of sanitation improvement works, including (i) toilets and septic tanks at schools, markets, bus stations, and public areas; and (ii) sludge lagoons and sludge disposal facilities. Supply of vacuum tankers, O&M equipment, and minor construction equipment for drainage and sanitation.	5 contracts, one for each province	PPMU	LCB	2,068
17	Civil works including equipment and materials for secondary and tertiary drains.	5 contracts, one for each province	PPMU	LCB	3,836
18	Supply and installation of power distribution lines and transformers.	5 contracts, one for each province	PPMU	LCB	386
19	Cleaning and rehabilitation water supply pipelines and drains; installation service connections and meters, using materials supplied through main ICB contract based on specified number of metered connections per town and typical reticulation and service connection design.	Force account - 5 WSCs	PPMU	FA	1,214
	TOTAL				**61,062**

AFD = Agence Francaise de Developpement; DP = direct purchase; FA = force account; ICB = international competitive bidding; IS = international shopping; LCB = local competitive bidding; PCU = project coordination unit; PPMU = provincial project management unit; O&M = operation and maintenance; UFW = unaccounted for water; WSC = water supply company; WTP = water treatment plant.
Note: Amounts are base costs including taxes, but excluding contingencies.

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES

A. Introduction

1. Consulting services are required to assist the project coordination unit (PCU), provincial people's committees (PPCs), and provincial project management units (PPMUs) to implement the Project in the five project provinces. The consultants will be based in Ho Chi Minh City (HCMC) and in the PPMU offices in the five project provinces. The two consulting service contracts will be for project orientation assistance (POA) and the project implementation assistance (PIA).

2. The scope of the POA includes establishing the PPMUs' functional procedures, setting up project accounts, and delivering intensive training to the PCU and PPMUs in project management, procurement, project accounting, administration, reporting, monitoring and evaluation (M&E), Asian Development Bank (ADB) and Agence Francaise de Developpement (AFD) procedures, computers, and the English language. The consultants will prepare project administration procedures, manuals, and software. Experienced staff of Ministry of Construction (MOC), Ministry of Finance (MOF), Ministry of Planning and Investment (MPI), State Bank of Viet Nam (SBV), Asian Development Bank (ADB), and Agence Francaise de Developpement (AFD) will be invited to provide necessary training to the staff of the PCU and PPMUs. The consultant will also provide necessary assistance to the PCU, if requested, in evaluating proposals for PIA consulting services.

3. The scope of PIA includes engineering studies, investigations, and designs for water supply, sanitation, and drainage systems; preparation of draft contracts and bid documents; construction supervision; and the commissioning of the water supply, sanitation, and drainage schemes. The consultants will also provide assistance for bid evaluation, M&E activities, environmental management and monitoring, community development and awareness activities, and sanitation credit schemes. In addition, the consultants will prepare and deliver training programs, and provide general engineering and management support to the PCU and PPMUs. Expertise required will include project management, civil engineering, hydrogeology, electrical and mechanical engineering, sewerage and drainage design, water treatment, financial management, resettlement, microcredit systems, and community awareness and health programs.

4. The consultants will comprise an international consulting firm in association with a domestic consulting firm for each contract. The international consultants will be responsible for (i) management of the consulting services, including quality assurance, capacity building, and support to the PCU and PPMUs; (ii) assist and to the PPMUs for community development activities; (iii) contract management; (iv) supervision of the domestic consultants; (v) project monitoring; and (vi) reporting to the PCU, PPCs, ADB and AFD. The domestic consultants will be responsible for detailed engineering investigations and data collection, detailed technical design, drafting, tender documentation, supervision of construction works, and support to the PPMUs. The domestic consultants will report to the international consultants.

B. Specific Tasks

5. For project orientation assistance, the consultants will do the following:

(i) Review all project-related documents, particularly the procedures of ADB, AFD, and the Government; reconfirm the POA program with stakeholders in Viet Nam through stakeholder workshops in HCMC and project provinces; and ensure clear understanding by the stakeholders of the objectives, scope, organization and work plan of the Project.

(ii) Review project procedures and manuals developed for the first and second ADB provincial towns water supply and sanitation projects; prepare standardized Project administration procedures, operation manuals, reporting format, and applicable software for PCU and PPMUs, suitable for the decentralized project implementation arrangements.

(iii) Prepare clear job descriptions for key positions in the PCU and PPMUs, consistent with the administration procedures. Assist the PCU and PPMUs to prepare operational budgets, disbursement projections, and withdrawal applications.

(iv) Assist the PPMUs in setting up the project accounts, in consultation with MOF.

(v) Design and manage an intensive training program for the PCU and PPMUs to enable the staff to comply with the required procedure and carry out the duties. Conduct training on administrative procedures, operational manuals, use of project accounts, procurement, report preparation, use of computers and applications, the English language, and ADB and AFD procedures. Identify available experts and coordinate the inputs from MOC, MPI, MOF, SBV, ADB, and AFD with respect to the above training.

(vi) Review the proposed project M&E system, test data availability, and revise the M&E system based on the test. Assist the PPMUs in collecting, recording, and analyzing baseline data in pilot areas. Provide necessary training to PPMU staff on the above activities.

6. For PIA, the consultants will do the following for engineering design and construction supervision:

(i) Review and update as necessary each provincial feasibility study report and prepare a detailed design report for each province.

(ii) Prepare the contract documents for the geotechnical and hydrogeological investigations and topographical surveys to confirm the site conditions, locations and types of intakes, treatment plants, pumping stations and storage reservoirs. Assist the PPMUs to prepare the investigation contracts and invitation documents. Evaluate the proposals. Administer the investigation and survey contracts.

(iii) Investigate and optimize the proposed raw water systems and design criteria for each intake and well field. Review water quality data, arrange additional testing where necessary, and confirm the water treatment process and chemical dosing to be adopted for subproject design.

(iv) Conduct a detailed network analysis of the proposed water transmission, distribution, and reticulation systems to determine the optimum location and capacity of proposed service reservoirs, transmission pipelines, and distribution and reticulation system.

(v) Assist the PPMUs to arrange contracts for mapping of all existing services at a scale of 1:1,000 and implement a system for accurately recording the location and details of existing and new pipelines and service connections on a computerized data base that is cross referenced to the maps.

(vi) Carry out detailed designs and prepare construction drawings and documentation for all works to be constructed, including water supply headworks, water treatment plants, water pumping stations, reservoirs, transmission and distribution mains, reticulation networks, and drainage and sanitation works.

(vii) Review the approved land acquisition and resettlement plans; prepare the land acquisition and resettlement implementation plans with updated information on project-affected persons, their affected assets and incomes, compensation, budgets, implementation schedules, and any other major information required by ADB's *Handbook on Resettlement*.
(viii) Prepare performance specifications and documentation for construction equipment, operation and maintenance (O&M) equipment, and leak detection equipment.
(ix) Prepare bills of quantities and bid documents in English and Vietnamese languages for each contract package, including technical specifications, conditions of contract, contract schedules, and appendixes.
(x) Prepare detailed cost estimates and assist the PCU and PPMUs in shortlisting suppliers and in the prequalification of contractors, establishment of bid evaluation procedures and criteria, bid evaluation, preparation of the tender evaluation report and draft contract, and the contract negotiations.
(xi) Prepare, monitor, and update as necessary design and construction schedules with recommendations on construction supervision and management, including the supervision of the work under force account.
(xii) Develop a quality assurance program for monitoring construction, equipment, materials, and services. Inspect materials and equipment delivered to construction sites and witness tests of materials and equipment to be incorporated in the works.
(xiii) Supervise, inspect, measure, and control the quality of the construction works and the installation of equipment to insure compliance with contract drawings and specifications.
(xiv) Assist the PCU and PPMUs to administer the construction and procurement contracts.
(xv) Assist water supply companies (WSCs) in commissioning and evaluating the performance of completed facilities and operation of new equipment.
(xvi) Prepare environmental management plans (EMPs) for construction and operation phases and incorporate EMPs in the civil construction contracts. Assist the WSCs and PPMUs in monitoring the EMPs during the construction.
(xvii) Assist WSCs in the supervision and monitoring of land acquisition and resettlement, in accordance with the approved provincial resettlement plans and ADB's policy on involuntary resettlement.
(xviii) Assist in and validate any design modification requested by the PPMUs.
(xix) Inspect completed works and make recommendations to the PPMU on the issuance of the certificates of completion.
(xx) Assist the PCU and PPMUs in the preparation of progress reports and project completion report.
(xxi) Assist WSCs and PPMUs to prepare M&E reports for the ADB, central steering committee and provincial steering committee.
(xxii) Assist WSCs in setting up a customer liaison unit, and prepare job descriptions and guidelines.

7. For PIA, the consultants will do the following for the public health awareness program and sanitation credit scheme:

(i) Discuss with the provincial Vietnam Women's Union (VWU) the objectives and scope of work of the public health awareness program aiming at (a) enhancing the awareness of communities about benefits of safe water, improved public and personal hygiene, ways of achieving these benefits, and availability of credit for water supply connections and sanitation improvement; (b) encouraging the

compliance with local sanitation regulations; and (c) reinforcing the concept of cost recovery.

(ii) Review the awareness materials and training manuals prepared under ADB financed technical assistance (TA) 2376-VIE: *Community Environmental Health Improvement for the Provincial Towns*. Adapt these materials and manuals to local conditions in consultation with local VWU offices, mass organizations, and health agencies.

(iii) Develop a public health awareness program for each project town, in consultation with local VWU offices, mass organizations, health agencies, and the PPMU. Prepare detailed terms of reference for the provincial VWUs. Define the methodology to be used, time and staff resources required, sequence of targeted areas in each town, monitoring indicators, and reporting requirements and formats. Prepare a budget for the program in each town for the PPMU.

(iv) Provide training to PPMU health personnel and provincial VWU (master trainers) in each province to enable them to effectively carry out the programs.

(v) Carry out a pilot public health awareness program in a selected area to test the methodology, materials, and adequacy of training, and identify areas for improvement. Conduct a workshop with participants from the health personnel of the PPMUs and provincial VWUs, to share and disseminate the lessons learned from the pilot program.

(vi) Provide subsequent support to provincial VWUs and PPMUs for implementing and monitoring the programs in each province. Monitor the overall progress and impact of health awareness activities on the project. Liaise with the PPMUs and other provincial agencies for the effective integration of the programs and infrastructure development.

(vii) Undertake a joint evaluation (with the PPMU) on the public health awareness program in each town.

(viii) Assist the provincial VWUs in preparing reports to the PPMUs and PCU on public health awareness activities.

(ix) Prepare guideline report formats for quarterly and annual reports to the PPMU and PCU.

(ix) Assist provincial VWUs in establishing a sanitation credit scheme with clearly defined credit terms and conditions, eligibility criteria, and application and approval procedures for each project town.

(x) Establish a standard computerized system to monitor and evaluate the performance of the credit schemes. Performance indicators may include the number of credit applications received, credit processed and disbursed, the number of certified constructions, the available funds and outstanding credit, administration costs, rate of repayment, and number and amount of credits in arrears.

(xi) Document all procedures that will be necessary for the provincial VWU to use for management and monitoring of the scheme.

(xii) Identify and engage a Vietnamese nongovernment organization (NGO) with experience in sanitation credit to provide training to provincial, town, and district-level VWU staff. Coordinate with the NGO for training in scheme operation, computerized accounting and bookkeeping, monitoring, and reporting.

(xiii) Assist PPMUs in finalizing the resettlement implementation plans with focus on community consultation, entitlement review, compensation assessment, and grievance procedures.

8. For PIA, the consultants will do the following for capacity building:

(i) Review the training programs and outcomes of the POA, in consultation with WSCs, PPMUs, and POA consultants, assess additional training needs of each WSC and PPMU for project management, accounting, budgeting, asset management, environmental planning and management, and resettlement.
(ii) Based on the assessment, design a capacity building program, with clearly defined scope, time, and monitorable targets, including on-the-job training and formal training, to cover the identified training needs. Discuss the program at a workshop with participants from PPCs, WSCs, PCU, and ADB. Help make arrangements with institutions for formal training programs.
(iii) Assist WSCs in establishing accounting policies and procedures suitable for commercial operations. Design accounting software consistent with the accounting policies and procedures. Assist WSCs in making financing projections and evaluate the adequacy of tariffs in terms of achieving financial targets agreed with ADB. Recommend the level and timing of tariff increases to ensure financial sustainability of the WSCs for submission to PPC, PCU, and ADB.
(iv) Design and install a computerized system for registration, control, and monitoring of all assets, including inventories, O&M and office equipment, spare parts, tools, vehicles, and furniture, with clearly defined accountability.
(v) Review equipment suppliers' O&M manuals. Help prepare "as-constructed" drawings. Develop system performance criteria for all equipment and project facilities, as well as existing water supply and sanitation facilities. Prepare O&M plans and O&M manuals for WSCs.
(vi) Assist WSC staff in (a) setting up manual maintenance programs and maintenance contracts with equipment suppliers for all facilities constructed under the Project, (b) preparing detailed maintenance budgets, and (c) implementing an annual maintenance program in each town.
(vii) Review the project accounting and reporting systems prepared under the POA. Provide training to PPMUs in meeting the project accounting and reporting requirements of ADB and Government. Provide ongoing support to the PPMUs in the O&M of the project accounting and reporting systems.
(viii) Assist in setting up leak detection teams in WSCs, provide training in unaccounted for water (UFW) reduction, manage a pilot UFW program in each town, and provide ongoing assistance with the UFW program. Manage a pressure testing program to identify pipes requiring replacement. Specify leak detection and pressure testing equipment, prepare documents, and assist the PCU to procure the equipment.
(ix) Assist in setting up procedures for managing and documenting land acquisition, compensation, and resettlement activities under the Project.

D. Input

9. The project is planned to extend over six years. It will require a team of international consultants for 206 person-months, consisting of professionals with expertise in the design and construction of large water supply and sanitation projects in the region, capacity building, project management, accounting and MIS, environmental management and monitoring, resettlement, sanitation credit systems, and developing and implementing community awareness and education programs to facilitate social acceptance of water supply and sanitation facilities. Domestic consultants will assist the international consultants in design, supervision, and capacity building activities, providing 1,274 person-months of services. About 565 person-months of support services (drafters, secretaries, translators, drivers) will be required. Tables A6.1 and A6.2 provide details of the inputs.

10. The WSC in each project province will provide suitable office accommodation for the consultants. Each PPC, PPMU, and WSC will make available to the consultants all relevant data, maps, and reports, and ensure access to all equipment purchased under the project at no cost to the consultants, including vehicles, computing, and communication equipment. The PCU and provincial authorities in each project town will provide counterpart and support staff to work with the consultants and will arrange necessary introductions to concerned government organizations, ministries, and departments. Each province will also provide translators and interpreters to work with the consultants.

E. Reporting

11. The consultants will produce the following reports in the English language:

(i) investigation reports on site locations for major structures such as intakes, borefields, water treatment plants, pumping stations, and water storage reservoirs, including the results of geotechnical, geophysical, and hydrogeological studies carried out under the Project, and budget implications;
(ii) a comprehensive design report on each system including cost estimates and the financial implications of the recommended works in each WSC's operations.
(iii) brief monthly progress reports to each PPMU and PCU, summarizing progress achieved, difficulties encountered, and issues to be resolved;
(iv) quarterly progress reports to each PPMU, PCU, and ADB, within two weeks of the end of each quarter;
(v) a final report on completion of consultant inputs to be submitted to the PPMUs, PCU, and ADB within one month of completion of consultant inputs; and
(vi) a project completion report, within three months of physical completion of the Project.

Table A6.1: Estimated Inputs for Engineering Design and Supervision

	Position	No. of Staff	Person Months			Air Travel		Per Diem
			Foreign	Local	Total	Int'l (Trips)	Domestic (Trips)	(days)
1.	**CONSULTANTS**							
a	**International Consultants**							
	Team Leader-Design/Construction	1	60		60	5	12	1,770
	Water Treatment Specialist	1	6		6	1		135
	Contracts Specialist	1	6		6	1	1	135
	Structural Engineer	1	3		3	1		90
	Mechanical Engineer	1	4		4	2		105
	Electrical Engineer	1	4		4	2		105
	Water Supply Design Engineer	1	6		6	1		180
	Construction Engineer	1	32		32	4		930
	Chief Drafter	1	4		4	1		120
	Subtotal		**125**		**125**	**18**	**13**	**3,570**
b	**Domestic**							
	Deputy Design Manager/ Deputy Team Leader	1		70	70		15	150
	Water Supply Engineers	7		126	126		5	350
	Sanitation/Drainage Engineers	3		54	54			250
	Structural Engineer	3		36	36			60
	Water Treatment Engineers	4		56	56			60
	Mechanical Engineers	2		28	28			60
	Electrical Engineers	2		28	28			60
	Hydrogeologist	1		2	2			20
	Geotechnical Engineer	1		3	3			20
	Construction Engineers	5		150	150			
	Project Accountant	1		70	70		5	360
	Construction Supervisors	18		540	540			
	Subtotal			**1,163**	**1,163**		**25**	**1,390**
	Subtotal, Consultants		**125**	**1,163**	**1,288**	**18**	**38**	**4,960**
2	**SUPPORT STAFF**							
	Draftpersons	11		231	231			90
	Secretary	2		140	140			
	Translator1	1		70	70		10	120
	Translator2	1		30	30			
	Driver	1		70	70			
	Subtotal			**541**	**541**		**10**	**210**

Table A6.2: Estimated Inputs for Other Consulting Services

	Position	No. of Staff	Person Months			Air Travel		Per Diem
			Foreign	Local	Total	Int'l (trips)	Domestic (trips)	(days)
1	**CONSULTANT**							
a	**Capacity Building for PPMUs and WSCs**							
	Capacity Building Specialist	1	3		3	1		90
	UFW Specialist	1	12		12	5		360
	Accounting-MIS Specialist	1	6		6	1		180
	Customer Relation Specialist	1	4		4	1		120
	Asset Management-O&M Specialist	1	5		5	1		150
	Financial Analyst (Tariff Review)	1	6		6	5	2	180
	Local Accounting Specialist	1		22	22			528
	Asset Management-O&M Adviser	1		12	12			360
	Environmental Management Expert	1		11	11			330
	Subtotal		**36**	**45**	**81**	**14**	**2**	**2,298**
b	**Project Orientation Assistance**							
	Program Manager-Principal Trainer	1	12		12	1	2	360
	Accounting-MIS Specialist	1	9		9	1	1	270
	Project Management-M&E Specialist	1	9		9	1		270
	Procurement Specialist	1	6		6	1		180
	Project Management Specialist	1		9	9			130
	Local Accounting Specialist	1		9	9			130
	Subtotal		**36**	**18**	**54**	**4**	**3**	**1,340**
c	**Community Environmental Sanitation Improvement**							
	Community Development Adviser	1	4		4	1	1	120
	Sanitation Credit Specialist	1	5		5	1	1	150
	NGO-Sanitation Credit Scheme	1		48	48		3	1,152
	Subtotal		**9**	**48**	**57**	**2**	**5**	**1,422**
	Subtotal for consultant		**81**	**111**	**192**	**20**	**10**	**5,060**
2	**SUPPORT STAFF**							
	Translators	1		12	12		3	120
	Secretary	1		12	12			
	Subtotal			**24**	**24**		**3**	**120**

SUMMARY OF LAND ACQUISITION AND RESETTLEMENT PLANS

A. Introduction

1. A resettlement plan (RP) has been prepared by the water supply company (WSC) in each province. This appendix summarizes the RPs for the five WSCs, including the resettlement impacts, the land required, the households to be relocated, the affected persons (APs), and the resettlement policy.

B. Resettlement Impacts

2. The Project will require a total of about 68 hectares (ha), mostly in small pieces (10 ha or less) for water treatment plants, transmission and distribution mains, and for one raw water reservoir, the single largest land acquisition required. Although only 71 households will need to be relocated, there will be about 900 APs. Most of changes will be disturbance to yards, not house demolition. Table A7.1 provides a summary of resettlement impacts of permanent and temporary land acquisition, for each project town.

Table A7.1: Assessments of Land Acquisition and Resettlement

Project Town	Permanent Land Acquisition (ha)	Temporary Land Acquisition (ha)	Number of Households to be Resettled	Number of Affected Persons
Chi Thanh	5.38	0.74	0	18
La Hai	0.20	0.00	0	5
Phan Rang	1.79	1.28	39	195
Rach Gia	16.01	17.10	14	195
Tay Ninh	2.02	0.00	8	220
Thu Dau Mot	30.00	0.00	10	86
Tuy Hoa	12.69	0.72	0	185
TOTAL	**68.09**	**19.84**	**71**	**904**

Note: In some provinces, these estimates may be revised once detailed designs are completed.
Source: Resettlement Plans of project provinces.

3. The WSC for each town will prepare an inventory for each stage of construction. Each inventory will include (i) baseline information; (ii) detailed compensation and other rehabilitation entitlements for each AP; (iii) location, area, and category of the replacement residential and agricultural land to be provided, if applicable; (iv) a time-bound action plan for implementation; and (v) a detailed budget and source of funding for the various compensation and rehabilitation measures. The baseline information for the RP will be completed one month prior to issuance of bid invitation for water supply contracts in each province. Specifically, the inventory will include:

(i) number of people and main occupation and level of income;
(ii) number, type, and area of the house acquired;
(iii) number and area of residential plot acquired;
(iv) number, category, and area of agricultural land acquired;
(v) quantity and types of crops and trees acquired;
(vi) quantity and category of other fixed assets affected by the Project; and
(vii) temporary damage to productive assets.

C. Socioeconomic Survey

4. A socioeconomic survey has been conducted among APs. The RP for each provincial project management unit (PPMU) includes summary findings of the baseline socioeconomic

survey based on a representative sample of affected households. It describes AP occupations, sources of income, and educational levels.

D. Poverty Alleviation Issues

5. The number of displaced people is small and the degree of impact on other APs is minor. Consequently, it was not appropriate to have special income restoration measures. Nonetheless, all households will be closely monitored to ensure their livelihoods are adequately restored as quickly as possible. Based on the results of monitoring for any household facing economic difficulties, the spell (PPC) will identify and take mitigation actions to resolve the problem. In some provinces, WSCs may offer direct employment.

E. Legal Framework

6. The legal framework governing the implementation of RPs is Article 27 of the 1993 Land Law and Decree No. 22/1998/ND-CP. The Land Law of 1993, a comprehensive land administration law, states that land belongs to the people, with the state as its sole administrator, reserving the right to allocate land and determine its usage. Families and individuals who have been allocated land have the right to exchange their land, transfer the use rights to others, rent the land for a period of three years, bequeath it, or use it as collateral. Decree No. 22 of 1998 sets out the policy and regulations governing compensation for damage when the state recovers land for public purposes. It defines the persons entitled to receive compensation, the method of calculating compensation for land and for property damage, provisions for temporary relocation, and support for permanent relocation. The decree also outlines the requirements for setting up resettlement areas; defines the responsibilities of central, provincial, and town level institutions for assessment and payment of compensation; and confirms the right of complaint for APs and the procedure for complaint resolution.

F. Resettlement Policy and Compensation Standards

7. A project-specific resettlement policy has been developed and is similar for each province. The RPs include summary details of the number and categories of APs, losses and compensation entitlements as negotiated and agreed with APs, and details of community consultations conducted. The specific compensation rates have been established and approved by each PPC. APs are entitled to the following types of compensation and rehabilitation measures: compensation for loss of property, land, and nonfarm commercial income; and rehabilitation measures. Procedures for determining compensation and rehabilitation measures are substantially in accordance with Decree No. 22/ND-CP.

G. Organizational Arrangements

8. The overall responsibility for enforcement of the resettlement policy rests with the PPC. In coordination with the town people's committees (TPC) and district people's committees (DPC), each WSC is responsible for preparing inventories and resettlement plans for implementation within their jurisdiction. The ward people's committees (WPCs) and commune people's committees (CPCs) will ensure the active and effective participation of APs in the preparation of the inventories and implementation of the resettlement plans. The PPCs will provide the funds necessary to implement these based on budgets established by the DPCs and TPCs. The WSCs will be responsible for implementing the RPs, under the direction of the PPCs. All WSCs and PPCs and some of the TPCs and DPCs, have recent experience in land acquisition and resettlement.

H. Consultation, Information Disclosure, and Grievance Procedures

9. WSCs have held public consultations with APs, providing full information concerning the provisions of the resettlement policy framework and the opportunity to voice concerns. Prior to payment, local government officials will ensure that each AP household has been fully informed by WSCs of their entitlements and rehabilitation choices. Complaints and grievances related to any aspect of the inventories and RPs, including the area to be acquired and the price of assets lost, will be handled as follows, with APs exempted from all administrative and legal fees:

(i) APs will present their complaints and grievances to the WPC or CPC (or to a specially established resettlement committee), which will have to provide a written response to the AP within 15 calendar days of receiving the complaint.
(ii) If not satisfied with the decision of the WPC or CPC, the AP may present the case to the DPC or TPC within 15 days of receiving a written response from the WPC or CPC.
(iii) If not satisfied with the decision of the DPC or TPC, the AP can appeal to the PPC.
(iv) If the AP is not satisfied with the decision of the PPC, the case may be submitted for consideration to the district court.

I. Cost Estimates

10. The RPs for the PPMUs contain detailed costs of compensation and other rehabilitation entitlements and relocation costs of APs, with a breakdown by agricultural land, residential land, structures, and other assets. The cost estimates have made adequate provision for contingencies.

J. Monitoring and Evaluation

11. Implementation of the Resettlement Plans will be regularly supervised and monitored by the PPMU in coordination with the people's committees. The findings will be recorded in quarterly reports to be furnished to the provincial steering committees (PSCs) and the (ADB), through the project coordination unit at the central level. An independent agency or agencies will be engaged to periodically carry out external monitoring and evaluation of the inventories and implementation of the resettlement plans. The independent monitor(s) will be academic or research institutes, nongovernment organizations, or independent consulting firms, all with qualified and experienced staff and terms of reference acceptable to ADB. The external monitoring agency will provide the PSCs with a monitoring and evaluation report every six months until the completion of all resettlement, and then a final evaluation report one year later. ADB will also conduct regular supervision to ensure that the provinces are in compliance with the agreed resettlement policy. Monitoring and evaluation will

(i) determine whether procedures for delivery of compensation and other rehabilitation entitlements have been done in accordance with the RPs;
(ii) assess if the objective of at least restoration of living standards and income levels of APs has been met;
(iii) gather qualitative indications of the social and economic impact of project implementation on the APs; and
(iv) suggest mitigating measures and modification in the implementation procedures of the RPs to achieve the principles and objectives of the ADB resettlement policy.

MONITORING AND EVALUATION INDICATORS

Objective	Activity	Indicator	Monitoring Mechanism
A. Water Supply			
Water Production improve water supply availability and reliability	• Increase raw water, treatment and distribution capacity by constructing new facilities • Rehabilitate existing water supply facilities • Reduce UFW by meter and mains replacement and unaccounted for water (UFW) program • Increase storage capacity • Increase water supply coverage	• Water production (cubic meter [m^3]) • No of connections in various categories • No of meters • Treatment plant and treated water pump station operating hours • Metered volume for various categories of consumers (m^3) • Population served • Availability of supply in each zone (hours/day) • Pressure (meters [m]) • Customer complaints • Reservoir storage volume (m^3) • UFW (%)	• Plant records • WSC records • Customer complaints records • Customer surveys
Water Quality improve water quality	• Increase treatment capacity and efficiency • Maintain adequate pressure	• Water production (m^3) • Pressure (m) • Customer complaints (#) • Water quality tests at treatment plant and in reticulation; no of bacteriological tests undertaken and failed • 24 hour delivery of drinking water meeting WHO guidelines • Appearance and taste	• Plant records • water supply company (WSC) laboratory and field tests • Ministry of Health (MOH) tests in reticulation • Inspection • Customer complaints records • Customer surveys
Health protect public health and minimize risk of contamination of water supply	• Increase treatment capacity and efficiency • Maintain adequate pressures • Install adequate standby plant	• Incidence of water-borne disease (#) • reduction of incidence of cases of infantile diarrhea (#) • Availability of treatment plant equipment (hours/day available) • Pressure (m) • Water quality tests at treatment plant and in reticulation	• Hospital records • Plant records • Water quality laboratory tests • MOH tests in reticulation
Water Supply Service Delivery improve efficiency and effectiveness of water supply service delivery	• Improve operation and maintenance (O&M) of plant and equipment • Reduce number of breaks and leaks • Provide maintenance store and improve maintenance facilities	• Availability of water supply pumps (hours/day) • Reported breaks and leaks (#) • Revenue received for water supply ($) • UFW (%) • Response time to breaks, leaks, or disruptions (average hours)	• Plant records • Water rates records • Customer complaints records • Leak repair reports

Objective	Activity	Indicator	Monitoring Mechanism
Environment Minimize environmental impact of water supply operations and improve environment of residents adjacent to treatment plants	• Construct sludge lagoons, safe management and disposal of water treatment plant (WTP) sludge	• Complaints from residents regarding WTP sludge (#) • Appearance of creeks and streams in vicinity of WTP	• Customer complaints records • Inspection
Coverage Increase water supply coverage	• Extend water supply system • Supply new customers in existing service areas	• Water production (m3) • No of meters (#) • Metered volume (m^3) • Persons served (#)	• Water rates records • Plant records
B. Sanitation			
Public Health Reduce risks to public health	• Rehabilitate and clean existing drains and construct new drains in critical areas • Increase coverage of septic tanks • Introduce septic tank management system • Legislate to replace pit latrines in high and medium density areas with septic systems, and upgrade inadequate septic tank standards • Implement sanitation credit scheme • Implement sanitation improvements in public areas and schools	• Incidence of water-borne disease–incidence of infantile diarrhea (#) • Septic tank coverage (#) • Septic tank registration (%) • Septic tank standards in place • Length of piped drains (m/capita/ward) • Sullage discharge to drains and septic tanks (%) • Customer complaints (#) • New regulations in place • Loans taken out for sanitation credit scheme (No & D) • Septic tanks in public areas (#) • Septic tanks in schools (No/student)	• Hospital records • Customer complaints records • Household survey • Provincial people's committee regulations • Viet Nam Women's Union records for sanitation credit scheme • WSC records
Urban Environment Improve urban environment, and living conditions	• Reduce ponding of sewage through drainage improvements • Increase coverage of septic tanks • Enforce regulations for pretreatment of industrial effluent	• Water quality in creeks and drains • Customer complaints • No of industries discharging effluent that does not comply with wastewater standards (#)	• Customer complaints records • Baseline survey of creeks and drains
Service Delivery Improve effectiveness and efficiency of service delivery	• Rehabilitate and clean existing drains	• Number of operating sludge tankers (#) • Volume of sludge removed tons/year • Customer complaints (#)	• Plant records • WSC and public works companies records

Objective	Activity	Indicator	Monitoring Mechanism
	• Provide sludge tankers and improve sludge disposal facilities	• Revenues received for sludge removal (D) • Drains cleaning (m/year)	• Customer complaints records
C. Community Education and Awareness			
Public Health To reduce risk to public health from wastewater discharges and ponding	• Implement community education and awareness program to improve knowledge of water and sanitation services and encourage people to connect to sewers	• Household awareness and knowledge of program (# of households [HH]) • Children's knowledge of program • Community coverage of program (# HH/income group %) • Community understanding • New sanitation connections (#) • Expenditure on community awareness programs	• Structured interviews • WSC and Ministry of Science Technology and Environment records • Provincial project management unit (PPMU) expenditure records
Sanitation Service Delivery Improve effectiveness and efficiency of sanitation service delivery	• Implement Community education and awareness program to minimize behavior that is detrimental to system operation	• Household awareness and knowledge of program (# HH) • Children's knowledge of program • Community coverage of program (# HH/income group %) • Community understanding • Drain blockages due to materials disposed to drains (#)	• Structured interviews • Septic tank management system records
D. Capacity Building			
Improve WSC's and PPMUs' capacity for project management	• Provide training for WSC and PPMU staff	• Training courses attended by various categories of staff (#) • Staff training (person-days) • Project management systems in place in PPMU	• WSC and PPMU budgets for training Inspection • WSC and PPMU budgets and expenditure records for training
Improve WSCs' capacity for O&M	• Provide training for WSC and PPMU staff • Supply O&M equipment • Undertake UFW reduction program • Prepare O&M plans and budgets	• UFW level (%) • Leak detection teams established and operating • Leaks repaired (#) • Meter management system operating • Bulk water meters installed and calibrated on regular basis (#) • Pressure zones established • O&M plans, schedules, and budgets in place ($/yr) • Staff training (person-days) • Asset inventories prepared • Staff salary and wages (D/yr) • Power/fuel (D/yr) • Chemicals (D/yr) • Total O&M cost (D/yr) • O&M staff (No/1,000 connections)	• O&M documents • WSC budgets and expenditure records for O&M • WSC and PPMU budgets and expenditure records for training • WSC asset list and revaluation

Objective	Activity	Indicator	Monitoring Mechanism
• Improve financial sustainability and performance of WSC	• Install new computer software and hardware for accounting, financial management, billing and collection • Provide training for WSC staff • Establish customer relations unit in WSC	• Training courses attended by accounting staff (#) • Amounts billed to various consumer categories (D) • Amounts collected from various consumer categories (D) • Collection efficiency (%) • Operating ratio (%) • Accounts receivable (days) • Consumption for various consumer categories liters per day (lpd) • Tariffs for various consumer categories (D/m^3) • Customer relations unit established • Total staff (No/1,000 connections)	• WSC documents and expenditure records • WSC accounts • Inspection of customer relations' activities and documents (complaints register, etc.)
Improve WSCs' capacity for environmental management	• Appoint environmental officer in PPMU • Prepare environmental management plan (EMP) for construction and operation phases of Project	• EMP prepared and adopted by WSC management • Understanding of environmental issues and process by WSC and PPMU staff • Environmental issues identified and mitigating measures adopted for investment project	• Interviews and questionnaires involving WSC environmental staff • Inspection of documents
E. Social Activities			
Public Health. Maintain public health through no increases in water-related diseases	• Construct water supply and sanitation projects • Operate and maintain system to design standards	• Health statistics – incidence of infantile diarrhea (#)	• Hospital and department of health (DOH) records
Satisfaction with Project Increased satisfaction with water and sanitation services due to new project and its performance	• Good delivery of service by WSC	• Satisfaction of target groups	• Survey of household and businesses
Social Impacts. Minimize social impacts of project	• Construction and O&M of water and sanitation projects	• People relocated or resettled due to infrastructure siting (#)	• Project records • Community survey
Restore livelihoods of adversely affected households.	• Displacement caused by permanent and temporary land acquisition	• Income and living standards of affected persons or improved	• Survey of affected households by external monitoring agency

PROJECT ECONOMIC ANALYSIS

A. Introduction

1. An economic analysis for the Project has been undertaken, based on projected water sales and capital and operating costs in the financial analysis, adjusted for market distortions and transfer payments including taxes, duties, or subsidies. The analysis includes the following: (i) least cost analysis of alternative water supply project options; (ii) derivation of the economic price—average incremental economic cost (AIEC) of water and wastewater services; (iii) calculation of the economic internal rate of return (EIRR) and net present value (NPV) for each subproject and the overall Project; (iv) sensitivity analysis; (v) distribution analysis of project benefits; and (vi) poverty impact analysis.

B. Economic Cost of Water

2. The AIEC for the water supply (and wastewater) subprojects provides a measure of the economic cost of water per cubic meter (m^3) of the Project. The AIEC is the discounted value of incremental capital costs and operating costs (in economic prices) divided by the discounted quantity of incremental water sales as a result of the Project. The discount rate used is the social opportunity cost of capital (SOCC) assumed at 12 percent. The AIEC ranges from D7,095/m^3 for La Hai to D9,160/ m^3 for Tay Ninh and an overall average of D8,135/m^3.

C. Economic Rate of Return

3. The EIRRs for water supply subprojects are based on the least cost alternatives including the cost of public sanitation facilities and any environmental degradation. The valuation of the nonincremental benefits is based on the average supply price of all sources in the without-Project situation, which is made up of water from tubewell, surface wells, rivers, water vendors, or households with piped supply. Incremental sales are valued at the proposed financial tariffs. The EIRR for the overall project is 17.7 percent. The EIRR calculated for the water supply component in each project town and the overall Project, together with the net present value (NPV) are summarized in Table A9.1. EIRRs of all the subprojects and the overall Project exceed the SOCC of 12 percent.

Table A9.1: Summary of EIRR of Projects Replace with Revised Table and Notes

WSC	Town	NPV (D million)	EIRR (%)	AIEC (D/m^3)
Binh Duong	Thu Dau Mot	153,451	19.0	8,630
Ken Giang	Rach Gia	147,462	19.9	7,579
Ninh Thuan	Phan Rang	36,549	15.4	7,692
Phu Yen	Chi Thanh	63,886	16.8	7,920
Phu Yen	La Hai	14,979	18.8	7,095
Phu Yen	Tuy Hoa	2,753	14.2	8,564
Tay Ninh	Tay Ninh	12,224	13.7	9,160
Overall Project		431,305	17.7	8,135

Notes: (i) taxes and duties deducted, tradable inputs adjusted by the shadow exchange rate factor of 1.11, and unskilled labor assumes a shadow wage rate factor of 0.65; (ii) nonincremental sales—domestic and institutional benefit valued at economic value of non-piped water, incremental sales—valued at the proposed financial tariffs; (iii) Tuy Hoa: assume in without-Project case a 20 percent decrease in water production from existing 7,000 m^3/d; (iv) Chi Thanh: assume existing system collapses, and in with-Project case, benefiting additional 800 m^3/d; (v) Tay Ninh: assume existing production of 500 m^3/d ceases in without-Project situation; (vi) 50% of UFW assumed to be consumed as nontechnical losses; (viii) willingness to pay for connection averages D400,000 per new connection.

D. Sensitivity Analysis

4. The sensitivity of the EIRR for each subproject and the weighted average EIRR of the overall Project was tested against adverse changes in key variables: (i) increases in capital costs; (ii) increases in operating and maintenance (O&M) costs; (iii) reductions in revenues; (iv) reductions in willingness to pay (expressed in terms of resource cost savings); (v) a reduction in the projected number of new water connections attributable to the subproject; and (vi) delays in the completion of subproject construction. In the case of reduced number of connections, there is a corresponding reduction in capital and operating costs. Table A9.2 shows that the Project is most sensitive to delays in project completion. However, the project EIRR exceeds the SOCC under all tests. Since the projected sales are mainly derived from the suppressed demand for water from existing consumers, changes in the rate of population growth have little impact on the EIRR. Similarly, changes in level of unaccounted for water had only a very minor impact on the EIRR.

Table A9.2: Summary of Project Sensitivity Analyses

KEY VARIABLE		EIRR %	SI %	SV %
Overall Project				
Base case		17.7		
1. Capital Costs	+10%	16.5	7.0	85
2. Operating Costs	+10%	17.6	0.5	600
3. Benefits	-10%	16.2	8.0	42
4. WTP (resource cost savings)	-20%	15.0		
5. New Connections	-20%	15.6		
6. Project Completion Delay	1 year	15.9		
	2 years	14.4		
Rach Gia				
Base case		15.4		
1. Capital Costs	+10%	14.1	8.4	30
2. Operating Costs	+10%	15.2	1.3	301
3. Benefits	-10%	13.9	9.7	21
4. WTP (resource cost savings)	-20%	13.5		
5. New Connections	-20%	13.9		
6. Project Completion Delay	1 year	13.8		
	2 years	12.5		
Thu Dau Mot				
Base case		19.0		
1. Capital Costs	+10%	17.8	6.3	80
2. Operating Costs	+10%	18.9	0.5	990
3. Benefits	-10%	17.6	7.4	42
4. WTP (resource cost savings)	-20%	16.8		
5. New Connections	-20%	17.2		
6. Project Completion Delay	1 year	17.0		
	2 years	15.5		
Tay Ninh				
Base case		13.7		
1. Capital Costs	+10%	12.6	8.0	16
2. Operating Costs	+10%	13.6	0.7	130
3. Benefits	-10%	12.3	10.2	12

4. WTP (resource cost savings)	-20%	11.0		
5. New Connections	-20%	11.6		
6. Project Completion Delay	1 year	12.4		
	2 years	11.3		
La Hai				
Base case		14.2		
1. Capital Costs	+10%	13.1	7.9	21
2. Operating Costs	+10%	14.0	2.3	85
3. Benefits	-10%	12.3	11.9	14
4. WTP (resource cost savings)	-20%	11.0		
5. New Connections	-20%	11.6		
6. Project Completion Delay	1 year	12.8		
	2 years	11.7		
Chi Tanh				
Base case		18.8		
1. Capital Costs	+10%	17.4	7.2	64
2. Operating Costs	+10%	18.6	0.6	460
3. Benefits	-10%	17.1	8.8	36
4. WTP (resource cost savings)	-20%	15.7		
5. New Connections	-20%	16.4		
6. Project Completion Delay	1 year	16.6		
	2 years	14.9		
Tuy Hoa				
Base case		16.8		
1. Capital Costs	+10%	15.6	7.1	50
2. Operating Costs	+10%	16.7	0.6	470
3. Benefits	-10%	15.3	8.9	31
4. WTP (resource cost savings)	-20%	13.9		
5. New Connections	-20%	14.5		
6. Project Completion Delay	1 year	15.1		
	2 years	13.7		
Phan Rang				
Base case		19.9		
1. Capital Costs	+10%	18.5	7.0	85
2. Operating Costs	+10%	19.8	0.5	600
3. Benefits	-10%	18.3	8.0	42
4. WTP (resource cost savings)	-20%	17.6		
5. New Connections	-20%	17.2		
6. Project Completion Delay	1 year	17.7		
	2 years	16.0		

EIRR = economic internal rate of return; SI = sensitivity indicator, % change in EIRR over 10% change in parameter; SV = switching value, % change in parameter to reduce EIRR to 12%; WTP = willingness to pay.

Source: ADB estimates.

E. Benefits Distribution and Poverty Impact Analyses

5. The following beneficiaries can be identified in the Project: (i) consumers, who will benefit from the lower cost of water and the increase in consumption, as well as from the economic value of nontechnical losses consumed; (ii) the Government and economy, which will lose where

economic costs exceed financial costs; (iii) labor, which will gain where the financial cost of labor exceeds its opportunity cost, both in the construction and operation phase of the project; (iv) the water supply company (WSC), which will lose because financial tariffs/revenues are less than economic benefits. The gains and losses to different participants in the Project are determined by the difference between financial and economic benefits and costs (at a discount rate of 12 percent). These gains and losses in part compensate for each other with the net gain being positive and equal to the economic NPV, which is D431 billion for the overall Project**.** While the WSC and economy lose from the Project (where tariffs are less than economic benefits), labor and consumers gain. Distribution of benefits for the overall project is shown in Table A9.3.

Table A9.3: Distribution of Net Economic Benefits
(D million)

Item	Financial Present Values	Economic Present Values	Economic less Financial	Distribution of Project Benefits				
				Utility	Economy	Labor	Consumers	Total
Total Benefits	329,883	1,252,199	922,316				922,316	922,316
Capital Costs	705,135	723,575	18,440		-32,740	14,300		-18,440
Operating costs	91,111	97,318	6,207		-7,760	1,553		-6,207
Total costs	796,247	820,894	24,647					
Net Benefits	-466,364	431,305	897,669	-466,364				-466,364
Gains/Losses				-46,6364	-40,500	15,853	922,316	431,305
Percentage of the Poor				12.6	12.6	75.0	21.9	
Gains/Losses to the Poor				-58,762	-5,103	11,890	201,760	149,785

Note: Proportion of poor/vulnerable in project area is about 20 percent; Proportion of gross domestic product received by the poor is estimated at 12.6 percent; 75 percent of the gains by labor goes to unskilled labor (poor); and an average of 21.9 percent of new connections are from the poor.

6. A poverty impact ratio is calculated by comparing the net economic benefits of the Project accruing to the poor with the net economic benefits of the Project to the economy. The results of the calculated project poverty impact ratios are summarized in Table A9.4.

Table A9.4: Summary of Poverty Impact Analysis

WSC	Town	% Poor in Town	% Poor of New Connections	ENPV D million	PIR
Binh Duong	Thu Dau Mot	7.5	23.6	153,451	34.3
Ken Giang	Rach Gia	27.0	17.8	147,462	23.0
Ninh Thuan	Phan Rang	13.4	29.4	36,549	70.7
Phu Yen	Tuy Hoa	10.4	14.3	63,886	19.0
Phu Yen	Chi Thanh	20.7	20.5	14,979	32.5
Phu Yen	La Hai	20.0	20.9	2,753	58.2
Tay Ninh	Tay Ninh	9.2	23.8	12,224	84.2
Average		20.0	21.9	431,305	34.7

ENPV = economic net present value; PIR = poverty impact ratio; WSC = water supply company.

PROJECT FINANCIAL ANALYSIS

A. Financial Analysis

1. **Objectives and Scope of Analysis:** The financial analysis is undertaken to ensure that each subproject and the overall Project generate revenues sufficient to cover capital and operation costs and with a rate of return that meets or exceeds the weighted average cost of capital (WACC) used to finance each subproject. This rate of return is expressed on the basis of the financial internal rate of return (FIRR) defined as the discount rate equalizing the present value of incremental subproject costs to the present value of incremental revenues. Each subproject is considered to be financially viable if the FIRR is equal to or greater than the WACC. To identify factors posing the greatest risk to the financial viability of each subproject, the sensitivity of FIRR to adverse changes in selected key variables is analyzed. The average water tariff required to achieve full cost recovery for the water supply components is estimated by calculating the average incremental financial cost (AIFC). The AIFC is defined as the present value of capital and operation costs divided by the present value of the volume of water sold each year over the life of the subproject, both discounted with the WACC. The AIFC is the minimum tariff required for full cost recovery. When the AIFC is higher than the actual average tariff, the difference represents a financial subsidy to water consumers from the water supply company (WSC).

2. **Major Assumptions:** The major assumptions employed in the financial analysis are: (i) the FIRR and AIFC are calculated over the 32 year period, from 2001 to 2032; (ii) all revenues and costs are expressed in local currency on an incremental basis in constant January 2001 prices; (iii) the overall WACC for the Project is estimated to be 2.0 percent, the WACC varies slightly between subprojects because of differences in the proportion of debt and equity contributions by the central and provincial governments and project beneficiaries; (iv) reduction in unaccounted for water (UFW) is included in calculating the FIRR; and (v) the projected incremental revenues attributable to each subproject are calculated as the projected incremental volume of water sold multiplied by the average water tariff, less an allowance for bad debts.

3. **FIRR and AIFC:** The results of the analysis are presented in Table A10.1. The overall FIRR for the water supply component is 3.2 percent, which is above the 2.0 percent WACC. Therefore, the Project is considered to be financially viable. The FIRRs of the subprojects in all the project towns exceed their WACCs except for Chi Thanh, where FIRR is slightly below the WACC. However, when the three subprojects in Phu Yen Province (Chi Tanh, La Hai, Tuy Hoa) are considered on a consolidated basis, the FIRR exceeds the WACC. As shown in Table A10.1, the average tariff requirements for the subprojects are relatively similar, ranging from a low of D3,060 per cubic meter (m^3) for Rach Gia to a high of D3,460/m^3 for the three Phu Yen towns. These average tariff requirements are expressed on a constant price basis.

4. Compared with the existing average tariffs, the largest required tariff increase is in Phu Yen (82 percent). The overall AIFC is D2,865/m^3 of water sold. For the individual subprojects, the AIFC ranges from a low of D2,790/m^3 in Phan Rang to a high of D3,930/m^3 in Chi Thanh. The cost of service in the district towns is higher than that for the provincial towns because the smaller service area limits economies of scale. The FIRRs for the subprojects in the two district towns in Phu Yen Province are calculated on the basis that the same water tariff structure and levels are applied by the provincial WSC in each subproject town.

Table A10.1 – Summary Results of Financial Analysis

Subproject	FIRR (%)	WACC (%)	Average Water Tariff (D/m^3)		AIFC (D/m^3)	NPV D million
			Required[b]	Actual 2000	Constant Prices	
Chi Thanh	0.0	1.8	3,460	1,897	3,930	(5,757)
La Hai	2.5	1.8	3,460	1,897	3,300	1,533
Tuy Hoa	3.8	1.8	3,460	1,897	2,900	51,837
Phu Yen Province[a]	3.3	1.8	3,460	1,897	3,040	47,613
Phan Rang	3.0	1.7	3,080	3,100	2,790	40,494
Rach Gia	3.0	2.7	3,060	2,405	2,980	6,330
Tay Ninh	2.6	2.2	3,240	2,076	3,140	4,386
Thu Dau Mot	3.4	3.0	3,145	2,665	3,000	14,775
Total Project	**3.2**	**2.0**	**NM[c]**	**NM[c]**	**2,865**	**113,598**

[a] Including Chi Thanh, La Hai, and Tuy Hoa; [b] Average tariff, expressed in 2001 constant prices, required over the 2001–2014 period for WSCs to reach the financial targets. [c] NM =not meaningful.
Source: WSCs documents and ADB estimates.

5. **Sensitivity Analysis:** The sensitivity of each subproject FIRR is analyzed to the following adverse changes: (i) increases in capital costs; (ii) increases in operating and maintenance (O&M) costs, (iii) reductions in revenues, (iv) reductions in savings from NRW, (v) a reduction in the projected number of new water connections attributable to the subproject, and (vi) delays in subproject construction. The FIRR is most sensitive to a reduction in incremental revenues derived from the water tariffs. Tariff revenues may be lower than that forecast as a result of a failure to increase tariffs to the proposed levels, which may arise from a limited willingness to pay and/or a lower rate of connection to the piped water system than assumed. The impact of a reduced rate of population growth on the FIRR was also assessed. However, since the focus of the Project is on satisfying the unmet demand for water from existing consumers, changes in the rate of population growth will have little or no impact on the FIRR. The detailed results of the sensitivity analysis are presented in Table A10.2.

Table 10.2: FIRR Sensitivity Analysis

	Key Variable	Change (%)	FIRR (%)	SI	SV (%)
Total Project					
	Base Case		3.16		
1.	Capital Cost	+10	2.33	2.63	+14.3
2.	O&M Costs	+10	2.74	1.33	+27.0
3.	Tariff Revenues/Water Sales	-10	1.85	4.15	-8.9
4.	UFW Cost Savings	-10	3.10	0.19	N/A[3/]
5.	New Connections	-20	1.08	3.23	
6.	Project Completion Delay	1 Year	2.65		
		2 Years	2.18		
Rach Gia					
	Base Case		2.98		
1.	Capital Cost	+10	2.10	2.95	+3.6
2.	O&M Costs	+10	2.53	1.51	+7.4
3.	Tariff Revenues/Water Sales	-10	1.67	4.40	-2.7
4.	UFW Cost Savings	-10	2.93	0.17	-70.4
5.	New Connections	-20	3.04	3.75	
6.	Project Completion Delay	1 Year	2.47		
		2 Years	2.02		

Thu Dau Mot					
	Base Case		3.44		
1.	Capital Cost	+10	2.57	2.53	+5.4
2.	O&M Costs	+10	3.08	1.05	+13.3
3.	Tariff Revenues/Water Sales	-10	2.34	3.20	-4.5
4.	UFW Cost Savings	-10	3.31	0.38	-37.2
5.	New Connections	-20	1.65	2.60	
6.	Project Completion Delay	1 Year	2.78		
		2 Years	2.44		
Tay Ninh					
	Base Case		2.55		
1.	Capital Cost	+10	1.68	3.41	+4.0
2.	O&M Costs	+10	2.19	1.41	+10.0
3.	Tariff Revenues/Water Sales	-10	1.36	4.67	-3.2%
4.	UFW Cost Savings	-10	2.52	0.12	N/A[3/]
5.	New Connections	-20	0.57	3.39	
6.	Project Completion Delay	1 Year	2.08		
		2 Years	1.65		
Phu Yen (Tuy Hoa, La Hai, Chi Thanh)					
	Base Case		3.32		
1.	Capital Cost	+10	2.43	2.68	+18.4
2.	O&M Costs	+10	2.93	1.18	+38.1
3.	Tariff Revenues/Water Sales	-10	2.04	3.86	-12.0
4.	UFW Cost Savings	-10	3.31	0.03	N/A[3/]
5.	New Connections	-20	1.07	3.39	
6.	Project Completion Delay	1 Year	2.79		
		2 Years	2.32		
Phan Rang					
	Base Case		3.04		
1.	Capital Cost	+10	2.08	3.16	+14.1
2.	O&M Costs	+10	2.53	1.68	+24.7
3.	Tariff Revenues/Water Sales	-10	1.61	4.70	-9.2
4.	UFW Cost Savings	-10	3.01	0.10	N/A[3/]
5.	New Connections	-20	0.76	3.75	
6.	Project Completion Delay	1 Year	2.50		
		2 Years	2.03		

NA = not applicable, FIRR exceeds WACC even if UFW cost savings are reduced to zero; SI = sensitivity indicator, % change in FIRR to change in parameter; SV = switching value, % change in parameter sufficient to reduce FIRR to equal WACC.

Source: ADB estimates.

B. Financial Performance of Project Water Supply Companies

6. **Objectives and Scope of Analysis:** Financial projections have been prepared for each WSC to assess the impact of each subproject on the financial viability and sustainability of the companies. The projections are based on the implementation of the water tariffs employed in the FIRR analysis and the estimated total operating, maintenance and capital expenditure requirements of the WSCs during 2000–2014. The financial projections incorporate only the water supply operations of the WSCs. Therefore, revenues and expenditures earned and incurred by the WSCs' construction services units are excluded.

7. **Financial Targets:** The preparation of the financial projections is based on a number of key financial targets set for the WSCs. The WSCs' ability to achieve these targets is then used as the basis for assessing the financial impact of each subproject on the WSCs and their capability to operate on a financially sustainable basis. These targets, particularly as they apply to each individual year, should not be regarded as absolute requirements. The targets are: (i)

each WSC should generate revenues in each year that are sufficient to cover all cash O&M expenses, including those for management and administration, depreciation or debt repayment, whichever is greater, all interest expense on debt, and a net income sufficient to cover normal obligations relating to bonus and welfare fund contributions; (ii) each WSC should hold at the end of each year over the forecast period a cash balance equivalent to no less than 30 days worth of annual cash O&M expenditures plus debt service; (iii) each WSC should maintain its current ratio (current assets divided by current liabilities) at no less than 1.0 as of the end of each year over the forecast period; and (iv) over the forecast period, the financial position of each WSC should improve so that it is able to self-finance an increasing proportion of its annual capital expenditure requirements.

8. **Major Assumptions:** The major assumptions employed in the financial analysis are: (i) the financial projections include all revenues and costs incurred by each WSC over the 2000–2014 forecast period; (ii) Projected capital costs, operating revenues, and operating expenses are presented in local currency and expressed in current prices; (iii) annual operating revenues for each WSC are calculated on the basis of the total volume of water billed in each year by each customer group (residential, institutional, industrial, commercial) and the average water tariff for each customer group; (iv) direct O&M costs include the following expense line items: (a) labor, (b) electricity, (c) materials and supplies, (d) maintenance, and (e) other expenses, and management and administration expenses are estimated by the following specific line items: (a) labor, (b) sales expense, and (c) other expenses; and (v) consistent with Ministry of Finance (MOF) regulations, depreciation expense is calculated on a straight line basis on the original cost of average gross fixed assets in operation.

9. **Projected Financial Performance:** A summary of the financial projections for WSCs is presented in tables A10.3 and A10.4. The financial performance of the WSCs improves during 2000–2014 due to increases in tariffs and water sales with the commissioning of the subprojects. However, due to the need for the phased implementation of the tariff increases and because of the shorter term impact of the debt service obligations for the subprojects, all of the WSCs will experience short-term weaker performance. With the exception of the Kien Giang WSC, the WSCs are not expected to achieve the financial targets set out above in all years. However, the overall financial performance and position of the WSCs is expected to be sufficient to maintain adequate levels of cash during these periods of weaker performance, and therefore is considered satisfactory.

10. During 2002–2006, the WSCs need to implement tariff increases to recover the full cost of existing water supply services, and eliminate their existing reliance on indirect subsidies from the construction services. Since the tariff increases need to be phased in over a number of years, four of the five WSCs are anticipated to incur net losses in at least one year during this phase-in period. Over the period of 2007-2009, with the commencement of subproject operations in 2008, there is a large and immediate increase in depreciation and interest expense on debt. However, the growth in water sales is spread out over a 3–6 year period as new customers are progressively connected to the system. Consequently, financial performance is expected to weaken over the 2008–2010 period. As shown in Table A10.3, three of the five WSCs are projected to incur net losses in 2008. All of the WSCs, except the Kien Giang WSC, are expected to incur a net loss in 2009. Over the period 2010–2014, the WSCs' financial performance is projected to progressively improve. Given that the recommended tariff increases are implemented, all of the WSCs will be able to generate a positive net income in each year of the period. The required tariff increases, to cover inflationary increases in costs and to generate cash for capital investments, are less significant than over the first two periods.

Table A10.3: Summary Financial Projections (D billion, current prices)

	2001	2004	2006	2008	2010	2012	2014
Binh Duong							
Revenue	14.7	37.9	50.9	74.7	105.0	126.7	138.0
Expenses	14.4	36.4	44.9	74.6	101.5	120.2	133.6
Net Income	0.3	1.5	6.1	0.2	3.5	6.5	4.4
Kien Giang							
Revenue	12.8	18.0	21.5	60.5	87.4	100.4	114.0
Expenses	11.2	16.3	18.7	55.5	77.4	88.9	102.4
Net Income	1.6	1.8	2.8	5.0	10.1	11.6	11.6
Ninh Thuan							
Revenue	6.1	9.3	12.0	29.9	68.2	89.1	93.1
Expenses	6.2	8.8	10.9	39.3	65.5	81.6	86.3
Net Income	(0.1)	0.5	1.1	(9.4)	2.7	7.4	6.8
Phu Yen							
Revenue	3.7	7.9	10.7	29.1	53.5	65.2	73.7
Expenses	4.5	7.6	10.0	36.3	52.9	60.7	66.7
Net Income	(0.8)	0.3	0.7	(7.2)	0.6	4.6	7.0
Tay Ninh							
Revenue	3.2	6.9	9.6	18.3	31.8	37.4	43.0
Expenses	3.3	6.5	8.6	19.5	29.2	33.0	37.1
Net Income	(0.1)	0.4	1.0	(1.2)	2.6	4.4	5.9

Source: ADB estimates.

Table A10.4: Key Performance Indicators

	2001	2008	2014
Binh Duong			
Water Sales (m^3/d)	12,400	33,600	56,100
Cash Balance (D million)	6,400	23,300	55,100
Cash (Days Worth of Cash Obligations)	168	131	204
Current Ratio	1.2	3.0	6.9
Debt - Equity Ratio (%)	75	87	61
Self Financing Ratio (%) - Annual	3	788	124
Kien Giang			
Water Sales (m^3/d)	12,400	26,700	38,200
Cash Balance (D million)	6,100	35,300	75,500
Cash (Days Worth of Cash Obligations)	262	339	401
Current Ratio	6.2	6.9	9.6
Debt - Equity Ratio (%)	18	51	34
Self Financing Ratio (%) - Annual	22	451	140
Ninh Thuan			
Water Sales (m^3/d)	5,500	13,700	38,200
Cash Balance (D million)	3,800	11,800	35,400
Cash (Days Worth of Cash Obligations)	350	126	191
Current Ratio	20.2	1.8	3.5
Debt - Equity Ratio (%)	0	156	93
Self Financing Ratio (%) - Annual	NA	164	296
Phu Yen			
Water Sales (m^3/d)	5,800	12,700	26,700

Cash Balance (D million)	3,600	17,500	48,600
Cash (Days Worth of Cash Obligations)	471	207	378
Current Ratio	9.5	2.1	4.4
Debt - Equity Ratio (%)	0	113	80
Self Financing Ratio (%) - Annual	6	501	297
Tay Ninh			
Water Sales (m^3/d)	4,400	9,700	16,200
Cash Balance (D million)	1,300	11,100	19,900
Cash (Days Worth of Cash Obligations)	215	249	283
Current Ratio	26.3	3.7	5.9
Debt - Equity Ratio (%)	19	97	64
Self Financing Ratio (%) - Annual	7	619	150

m^3/d = cubic meter per day.
Source: ADB estimates.

C. Tariff Requirements

11. **Tariff Requirements:** Tariff increases will be implemented every two years beginning in 2002. Recommended tariff structures and levels have been developed and are shown in Table A10.5 for 2002–2008. The recommended tariff levels for each customer group are indicative only. Actual tariffs for each group depend on the distribution of consumption, both between the customer groups as well as within the residential group. The existing tariff structure for nonresidential customers will be maintained, but with progressively higher tariff levels being applied over the 2002–2014 period, and the institutional, industrial, and commercial water users will pay a flat tariff for all consumption. The lifeline consumption block, covering the first 8 m^3/month, will be priced at 80 percent of the main residential block for consumption between 8 m^3 and 16 m^3. A third consumption block will cover consumption between 16 m^3 and 25 m^3 and be priced at 1.25 of the main residential block. The fourth consumption block, for consumption above 25 m^3/month will be priced at the same rate applied to commercial customers. This is intended to discourage excessive consumption as well as to reduce the incentive for misclassifying commercial users as being residential for the purposes of tariff application.

Table A10.5: Projected Tariff Requirements (D/m^3)

	Current Prices	Projected							
		Current Prices				Constant Prices			
	2000	2002	2004	2006	2008	2002	2004	2006	2008
Kien Giang WSDC									
A. Residential:									
Block 1: 0 - 8 m^3/mth		2,100	2,500	2,900	3,600	1,870	1,920	1,960	2,170
Block 2: > 8 - 16 m^3/mth		2,600	3,100	3,700	4,500	2,320	2,380	2,490	2,710
Block 3: > 16 - 25 m^3/mth		3,200	3,900	4,600	5,700	2,850	3,000	3,100	3,440
Block 4: > 25 m^3/mth		4,400	5,500	7,000	8,800	3,920	4,220	4,720	5,300
Average Residential	2,330	2,600	3,100	3,700	4,500	2,320	2,380	2,490	2,710
B. Institutional	2,330	3,000	3,700	4,600	5,700	2,680	2,840	3,100	3,440
C. Industrial	2,530	3,300	4,300	5,400	6,700	2,940	3,300	3,640	4,040
D. Commercial	3,330	4,400	5,500	7,000	8,800	3,920	4,220	4,720	5,300
Binh Duong WSDC									
A. Residential:									
Block 1: 0 - 8 m^3/mth		2,100	2,200	2,500	3,100	1,870	1,690	1,690	1,870
Block 2: > 8 - 16 m^3/mth		2,600	2,800	3,100	3,800	2,320	2,150	2,090	2,290
Block 3: > 16 - 25 m^3/mth		3,300	3,500	3,900	4,800	2,940	2,690	2,630	2,890
Block 4: > 25 m^3/mth		6,000	6,400	7,200	8,800	5,350	4,910	4,850	5,300
Average Residential	2,040	2,600	2,800	3,100	3,800	2,320	2,150	2,090	2,290
B. Institutional	2,625	3,300	3,500	3,900	4,800	2,940	2,690	2,630	2,890

C. Industrial	4,200	5,300	5,700	6,400	7,800	4,720	4,380	4,310	4,700
D. Commercial	4,725	6,000	6,400	7,200	8,800	5,350	4,910	4,850	5,300
Tay Ninh WSDC									
A. Residential:									
Block 1: 0 - 8 m^3/mth		2,200	2,700	3,100	3,900	1,960	2,080	2,090	2,350
Block 2: > 8 - 16 m^3/mth		2,800	3,300	3,900	4,900	2,500	2,540	2,630	2,960
Block 3: > 16 - 25 m^3/mth		3,400	4,100	4,800	6,100	3,030	3,150	3,240	3,680
Block 4: > 25 m^3/mth		4,600	5,600	6,600	8,900	4,100	4,300	4,450	5,360
Average Residential	2,000	2,800	3,300	3,900	4,900	2,500	2,540	2,630	2,960
B. Institutional	3,000	3,200	4,100	4,800	6,100	2,850	3,150	3,240	3,680
C. Industrial	3,000	4,200	5,200	6,100	7,900	3,740	3,990	4,110	4,760
D. Commercial	3,000	4,600	5,600	6,600	8,900	4,100	4,300	4,450	5,360
Phu Yen WSC									
A. Residential:									
Block 1: 0 - 8 m^3/mth		1,600	2,100	2,800	4,000	1,430	1,620	1,890	2,140
Block 2: > 8 - 16 m^3/mth		2,000	2,700	3,500	5,000	1,790	2,080	2,360	3,020
Block 3: > 16 - 25 m^3/mth		2,500	3,300	4,300	6,200	2,230	2,540	2,900	3,740
Block 4: > 25 m^3/mth		5,000	6,600	8,600	12,400	4,460	5,070	5,790	7,470
Average Residential	1,191	2,000	2,700	3,500	5,000	1,790	2,080	2,360	3,020
B. Institutional	2,000	3,000	3,800	5,000	7,200	2,680	2,920	3,370	4,340
C. Industrial	3,500	4,400	5,600	7,300	10,500	3,920	4,300	4,920	6,330
D. Commercial	4,000	5,000	6,600	8,600	12,400	4,460	5,070	5,790	7,470
Ninh Thuan WSC									
A. Residential:									
Block 1: 0 - 8 m^3/mth		2,400	2,800	3,400	4,100	2,140	2,150	2,290	2,470
Block 2: > 8 - 16 m^3/mth		2,900	3,500	4,200	5,200	2,590	2,690	2,830	3,140
Block 3: > 16 - 25 m^3/mth		3,700	4,400	5,200	6,400	3,300	3,380	3,500	3,860
Block 4: > 25 m^3/mth		6,900	8,300	10,000	12,300	6,150	6,370	6,730	7,410
Average Residential	2,750	2,900	3,500	4,200	5,200	2,590	2,690	2,830	3,140
B. Institutional	3,500	4,000	4,800	5,800	7,100	3,570	3,690	3,910	4,280
C. Industrial	4,500	5,200	6,300	7,500	9,200	4,640	4,840	5,050	5,540
D. Commercial	6,000	6,900	8,300	10,000	12,300	6,150	6,370	6,730	7,410

m^3/mth = cubic meter per month.
Source: ADB estimates.

12. **Affordability and Willingness to Pay:** An affordability has been analyzed to ensure that households, particularly those low-income groups, can afford the proposed water tariffs. The low-income group is defined as the household earning an amount equal to or less than the average of the bottom 20th percentile of income distribution. The tariffs are considered affordable if they do not exceed approximately 3-5 percent of household income. The results of this analysis are summarized in Table A10.6.

Table A10.6: Affordability Analysis

Subproject Town	Percentage of Income to Pay Water Bill			
	2002	2008	2010	2014
Chi Thanh				
Median Income Household	2.2	3.7	3.7	3.4
Low Income Household	3.1	4.7	4.6	3.9
La Hai				
Median Income Household	2.8	4.8	4.8	4.4
Low Income Household	4.4	6.6	6.4	5.4
Phan Rang				
Median Income Household	2.6	3.0	2.8	2.4
Low Income Household	2.8	2.8	2.6	2.1
Rach Gia				

Median Income Household	2.2	2.7	2.8	3.0
Low Income Household	2.0	2.0	2.0	1.9
Tay Ninh				
Median Income Household	2.3	2.9	3.0	3.1
Low Income Household	2.6	2.7	2.7	2.5
Thu Dau Mot				
Median Income Household	1.5	1.6	1.6	1.5
Low Income Household	1.8	1.6	1.5	1.3
Tuy Hoa				
Median Income Household	1.6	2.6	2.7	2.4
Low Income Household	1.7	2.5	2.4	2.1

Source: ADB estimates.

13. The willingness of consumers to pay the tariffs has also been assessed. The basis for this assessment is the social survey implemented under the ADB technical assistance that estimated median willingness to pay for households presently connected to the piped water system as well as for those presently not connected. In general, the willingness to pay for those presently connected was higher than those not connected. The one exception was in Phan Rang where, as a result of the high cost and limited availability of nonpiped sources, the willingness to pay for those not presently connected was higher. In Rach Gia, Thu Dau Mot, and Tuy Hoa the proposed tariffs for 2002 are generally within the existing willingness to pay for households presently having piped water connections. However, by 2008, the tariffs need to be set at levels that exceed the existing willingness to pay. For the other towns, tariff requirements in 2002 exceed the willingness to pay for households by between about 30 percent (Tay Ninh) and 100 percent (Phan Rang, Chi Thanh, La Hai). For those not presently connected, the projected tariff requirements exceed the existing willingness to pay in all towns.

14. **Willingness to Pay**: The survey results likely underestimate the willingness to pay. In Phan Rang and Tay Ninh, current water bills for a typical household exceed the reported willingness to pay for those connected to the system and yet there appears to be little resistance to payment. Willingness to pay is also a function of present levels of service, which are low in all of the towns. For those not presently connected to the piped water supply system, it was observed during the implementation of the socioeconomic survey that households often had difficulty estimating the total cost of their existing nonpiped supply and, therefore, their willingness to pay for piped water. As a result, the gap between tariff requirements and willingness to pay is likely to be less than that indicated by the survey results. However, there remains a need for public education aimed at improving willingness to pay and, therefore, willingness to connect to the piped water system.

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Introduction

1. In accordance with the Asian Development Bank's (ADB) guidelines, initial environmental examinations (IEEs) were carried out as an integral part of the project preparatory technical assistance. The IEEs analyzed the likely environmental consequences and impacts of the implementation of water supply, drainage, and sanitation improvements in the project towns. The Project aims to improve and sustain the water-related urban facilities in provincial towns Phan Rang, Rach Gia, Tay Ninh, Thu Dau Mot, and Tuy Hoa as well district towns of Chi Thanh and La Hai. One strategic project objective is environmental improvement. The Project is classified as environment category B, as per ADB's *Guidelines for Environmental Assessment of Project Impacts.* The IEEs are based on an analysis of the impacts of the proposed works, the socioeconomic survey conducted during project preparation, and a visual assessment of the project towns.

B. Description of the Project

2. The Project will improve the water and sanitation facilities in the seven towns. The details of the Project are given in the main text of the report.

C. Description of the Environment

1. Physical Resources

3. **Chi Thanh** is a district town on National Highway 1, approximately 30 kilometers (km) from Tuy Hoa and 1,128 km from Hanoi. The town is on the right bank of the Cai River, which also provides the town's water. The topography is undulating to hilly. The average annual rainfall is 1,670 millimeters (mm), which is concentrated in six months of the year from August to January. The area surrounding the town is largely rural.

4. **La Hai** is small district town in southeast Viet Nam, about 45 km to the north of Tuy Hoa. The town is on the left side of the Ky Loy River, which is also the source of the town's water. Most of the town lies on the sloping ground above the river, with only a small area on the flood plain. The terrain is hilly. Groundwater is used extensively for water supply. The area surrounding the town is largely rural.

5. **Phan Rang** is a coastal town on the left bank of the Cai River, which also provides the town's water. The town is about 334 km from Ho Chi Minh City. Most of the town lies on unconsolidated sediments, and its terrain is relatively flat. The area around the town is largely rural, although there is an industrial zone on the opposite bank of the Cai River. Annual rainfall is very low at 500–800 mm and mainly distributed from September to November.

6. **Rach Gia** is on the Rach Gia Gulf, at the southwest extremity of Viet Nam. It has an average annual rainfall of 1,980 mm, which is concentrated in the May–November period. The town lies on a coastal plain composed primarily of unconsolidated sediments, and its terrain is relatively flat and low-lying with many canals. The area around the town is largely rural. Groundwater is used extensively for water supply, but has high salinity in the dry season. Surface water in the canals also becomes saline during the dry season.

7. **Tay Ninh** is in southeast Viet Nam, about 90 km inland from Ho Chi Min City. Its average annual rainfall is 1,805 mm. The town is relatively flat, although there are hills and mountains located outside the town. The area around the town is largely rural.

8. **Thu Dau Mot** is in southeast Viet Nam, within 40 km of Ho Chi Minh City. The town is situated on the plain between two major rivers, the Saigon and Dong Nai. The average annual rainfall is 1,856 mm, most of which occurs from September to November. Groundwater is used extensively by households and industry, and is of good quality. However, overexploitation could lead to a substantial lowering of the groundwater table and deterioration of groundwater quality. The area surrounding the town is largely rural.

9. **Tuy Hoa** is a coastal town in Phu Yen Province in southeast Viet Nam, approximately 1,158 km from Hanoi. Most of the town area lies on alluvial sandy flats at the mouth of the Da Rang River, and the terrain is relatively flat. However, within the town is a large hill on which a service reservoir and communications tower have been constructed. The average rainfall is 2,300 mm, which is concentrated in six months of the year from July to December. The area surrounding the town is largely rural.

2. Ecology

10. There are no known endangered varieties of flora or fauna in the areas proposed for development in the Project. Land areas for the proposed water supply and sanitation development have been developed or disturbed previously and have no forest or unusual vegetation cover.

3. Human and Economic Development

11. The population of the provincial project towns varies from 43,000 in Tay Ninh to 198,000 in Tuy Hoa, while the two district towns, La Hai and Chi Thanh have 8,000-10,000 people. The urban areas of the project towns serve principally as service areas for the surrounding rural regions. Their economies are based on the provision of services to provincial or district populations, market trading, light industry, and in the case of Rach Gia, Tuy Hoa, and Phan Rang, a local fishing industry. Thu Dau Mot and Binh Duong province are undergoing rapid industrial development, and the districts adjacent to the town will be incorporated in the town in the near future. This rapid industrial growth is accompanied by development of high-density worker's accommodation in the form of low level and high-rise housing units. Light industry and food processing are becoming increasingly important to the town economies. The project towns have existing water supplies and combined drainage and sanitation systems, although coverage is low. Many suburban areas in the project towns have no piped drainage system, and even in the urban wards, piped drainage coverage is very low. All of the towns are accessible by road, all have power supply from the national grid and, all have Government offices.

4. Items of Archaeological Significance

12. There are no known sites of historical or cultural significance in the Project area that are likely to be affected during implementation. However, in the detailed investigation and design of water and sanitation works, particular care will be taken to identify historical and cultural sites, and appropriate steps will be taken to protect any such sites.

5. Quality of Life

13. Socioeconomic conditions vary widely between the seven project towns. Thu Dau Mot is the wealthiest town, while Chi Thanh and Phan Rang are the poorest. Average household occupancy varies from 4.2 persons in Tay Ninh to 5.1 in Rach Gia. In all of the Project towns, community health profiles are less than satisfactory and water supply and sanitation facilities are inadequate and pose an environmental health hazard.

D. Screening of Potential Environmental Impacts and Mitigation Measures

1. Project Sites

14. **Water Sources**. Thu Dau Mot and Tuy Hoa have inadequate yields and additional sources of supply are required to meet existing and projected demands. The water sources for Phan Rang and Tay Ninh are regulated by upstream storage and have adequate yields to support the water demands of the towns to 2010 and beyond. But the capacities of the raw water systems require augmentation. Rach Gia's surface water source has adequate yield; the capacity of the raw water system will require augmentation; however, water quality is affected by saline intrusion in the dry season. A large raw water reservoir will be constructed to ensure that adequate supplies of potable water are available during the dry season. Increased coverage of piped water supply will reduce town residents' exploitation of ground water, which becomes saline and unpleasant to drink during the dry season. Chi Thanh's surface water source suffers from organic pollution by agricultural and animal wastes, and will be replaced by a borefield in riverside alluvial deposits adjacent to the existing source. La Hai's existing borefield source has adequate yield and capacity to meet the town's water demands in 2010.

15. **Land Acquisition and Resettlement.** The Project facilities will require about 68 hectares (ha) of land, including 52 ha of agricultural and residential land to be acquired from private owners. Approximately 71 households will be resettled to allow construction of reservoirs and water treatment plants. There will be more than 900 affected persons entitled to receive compensation as a result of the Project. Most of the new major facilities such as treatment plants, borefields, and ground level storage will be constructed on Government land. Transmission and distribution mains will generally be constructed along roadways, but it will be necessary to run water supply pipelines through some private properties in most project towns. This will involve some temporary resettlement, as well as compensation and restoration costs. Details of the issues are presented in Appendix 7.

2. Design Aspects

16. Pollution of groundwater sources will be minimized by ensuring that modern well construction techniques are used to seal wells against infiltration of shallow groundwater. To safeguard water quality, all treated water reservoirs will be covered and ventilated and the systems operated to ensure that the distribution network is maintained under pressure to minimize the risk of contamination from polluted groundwater and backflow. Standby generators will be installed at all treatment plant and pumping station sites to ensue a continuous supply of water at adequate pressure. Backwash water from filters will be passed through a settlement trap to reduce turbidity prior to discharge to the environment. Sludge from water treatment will be discharged into lagoons and dried on sludge drying beds. Sludge and sediment from the settlement trap and from the drying beds will be disposed of at the town landfill sites. The Project includes investment in drainage and sanitation to ensure that there is no deterioration in existing conditions. These measures will be accompanied by improved septic tank management

systems, regulative initiatives, a public health awareness program, and activities directed at improving drainage and sanitation at the community level. As a precondition to connecting to piped supply, householders will be required to install sullage pipes discharging to drains or, in low density areas, to properly constructed soakaways. Noise generated by pumping stations and workshops will be minimized by providing thick foundations and bases for equipment, and solid sound-absorbing walls. For the proposed raw water reservoir at Rach Gia, it is proposed that a comprehensive study be carried out to assess the quantity of material affected by acid sulfate soils. In addition laboratory trials should be carried out using alternative neutralizing agents to determine necessary proportions and mixing methods to optimize the neutralization process where it is considered necessary.

3. Construction Stage

17. There will be no permanent or significant adverse environmental impacts arising from the construction stage. The community environment during the period of construction of the facilities and during ongoing operation will be assured by appropriate management plans, equipment specifications, and detailed design. During construction, the contractors will be required to prepare and implement environmental management plans (EMPs), and carry out the work according to international standards, including consulting with residents through paid community coordinators; providing safe and adequate temporary paths for residents and businesses; providing adequate safety to the public and workers; implementing effective measures to reduce erosion, turbidity, dust, and noise due to construction equipment; providing limited transportation and construction along the main roads in urban areas during rush hours and in residential areas at night and early morning; appropriately disposing of surplus soil and construction materials; and minimizing interruption to water supplies. During construction, provincial project management units, assisted by consultants, will cooperate with affected residents and take all measures needed to minimize the impacts on residents and the public.

4. Operation Stage

18. To ensure safe water is delivered, effective monitoring of the treatment processes, operation and maintenance (O&M) procedures and daily chlorine residual testing in the extremities of the distribution system will be instituted. Periodic microbiological testing of treated water will also be carried out in accordance with the tests and frequencies recommended in the World Health Organization (WHO) drinking water guidelines. Additional chlorination facilities will be provided at booster pumping stations within the distribution systems in several of the towns, in order to maintain chlorine residuals in the water. Where reliable microbiological testing facilities are available from the Ministry of Health or Ministry of Science, Technology and Environment (MOSTE), independent sampling and testing of supplied water will be carried out. Where these facilities are not currently available, the water supply companies' (WSCs) laboratories to be constructed or upgraded under the Project will be equipped with microbiological test equipment, and staff will be trained in its use. Appropriate planned preventive maintenance programs and budgets will be developed for all facilities constructed under the Project, and for existing facilities. On the job training and structured training courses will be given to O&M supervisory staff, and will include vocational training as well as occupational health and safety, particularly where this involves the use of potentially hazardous chemicals, such as chlorine gas. The Project will also provide O&M equipment necessary to enhance sustainability, including leak detection equipment, pipe cutting and threading equipment, and vacuum tankers (for septic tank sludge removal and transport).

E. Institutional Requirements and Environmental Monitoring Program

19. MOSTE administers the Environmental Protection Law (EPL-1993), through its Department of Natural Resources and Environment. The department is also responsible for recommendations on policy, rules, regulations and guidelines, including environmental quality standards and reviewing and approving environmental impact assessments. MOSTE is also responsible for supervising wastewater discharges to the environment. Provincial people's committees, assisted by the provincial environmental department (DOSTE) are responsible for implementing the EPL-1993 in the province, including monitoring and enforcement. DOSTE's usual role in each province is to review and approve the EMP, to review monitoring data provided by the WSC, and to periodically inspect the site to validate overall compliance.

20. The WSCs will be required to commission an EMP for each project component. The EMPs will summarize the mitigation measures proposed for the construction and operation of the components. Conformance with the EMP is the normal way to ensure that all mitigation measures are appropriately addressed. An EMP will also ensure that monitoring and validation will follow up predictions made in the IEE. This may require modification to design or construction aspects that are found to have any impact at variance with that predicted. A groundwater quality surveillance system will be established during the construction of the Rach Gia raw water reservoir and for its initial operating period to monitor any changes in groundwater levels and quality and to quantify any changes that occur. This will assist in validating the predictions that an improvement in groundwater quality is likely to result from the Project. A computerized billing system and management information system will be installed at each WSC. This may be used to monitor and manage the septic tanks in the communities, and serve as a maintenance management system. During the course of the Project, a database of the sanitation records for the town will be prepared. This will be used to identify septic tanks requiring desludging after the design period of 2-3 years, and will ensure that all septic tanks are properly managed and are cleaned of sludge before they overflow or fail.

F. Findings and Recommendations

21. The Project is designed to improve and sustain the urban environment in the project towns. Within the scope of the project components it will help these urban areas to cope with the development and population pressures that will arise as urbanization increases.

G. Conclusion

22. The Project's negative impacts will only be temporary, minor, and reversible, and can be mitigated through proper policy, planning, public relations, and good construction and supervision practices. The Project will have no significant adverse environmental impact and an environmental impact assessment is not necessary.

SUMMARY SOCIAL ANALYSIS

A. Scope and Information Sources

1. The social analysis in this Project covers poverty, gender, ethnicity, and community participation. It is based on several sources. First, a bibliographic search yielded a number of references, including substantial statistical information such as the 1998 Government Living Standards Survey and the 1999 World Bank Participatory Poverty Assessment. The statistical data was instrumental for the poverty analysis, while the gender and participation sections benefited from qualitative analysis, including a nongovernment organization paper on gender issues in Viet Nam. Most relevant to the Project is the socioeconomic survey (SES) that was carried out in June and July 2000, covering 2,160 households or about 10,500 people (about 1 percent of the beneficiaries). The SES was supplemented by project workshops and focus groups (both single sex and mixed sex groups) discussions. The project conducted more than 25 consultations to design the community development component.

B. Socioeconomic Characteristics of the Project Towns

2. **Population**. The population of the Project's proposed service area is about 850,000, including urban and suburban areas of the seven towns and adjoining districts. The five provincial towns have populations ranging from about 43,000 to 198,000, while the population of the two district towns is approximately 8,000-10,000. The annual national population growth rate is 1.7 percent according to the 1999 census, compared to the recent annual growth rates in the project towns of 1.3-4.2 percent. The projected population of the Project's proposed service area in 2010 is 1.15 million, based on the above growth rates.

3. **Location of Project Towns.** These are described in Section C, Appendix 11.

4. **Poverty.** To determine a project-defined level of poverty for each town, a conversion factor of the ratio between the World Bank poverty incidence (from surveys) and Ministry of Labor, Invalids, and Social Affairs (MOLISA) data, is applied to each town. The result shows that the percentage of the poor is 20.7 percent for Chi Thanh, 7.9 percent for La Hai, 27.0 percent for Phan Rang, 13.4 percent for Rach Gia, 9.2 percent for Tay Ninh, 7.5 percent for Thu Dau Mot, and 10.4 percent for Tuy Hoa. The household survey and consultations show that the age and size of the household have important impacts on poverty. The other dimension of poverty is access to basic services. Table A12.1 shows the access to basic services by income group.

5. **Employment.** The largest single source of income in the project towns was described as "own business," by 30-35 percent of the households. In La Hai, however, only 13 percent derived their income from this source. Other major sources of income in the project towns were agriculture and fishing, casual work, Government salaries, and pensions. Many houses had more than one source of income.

6. **Education.** Viet Nam's population has a high level of educational achievement as indicated by the national literacy rate of 88 percent. The household survey in the project towns show that 98 percent of household heads have at least some primary education, while up to 10 percent (in Thu Dau Mot) have attained some kind of tertiary education. The lowest level of tertiary education was observed in Chi Thanh, with only 2.5 percent. In other towns, the level ranged from 3 to 9 percent.

Table A12.1 - Poverty Profile for Project Towns

Indicator	Town	Lowest 20% Income	Highest 20% Income
Access to Piped Water (%)	Rach Gia	27.1	48.3
	Tay Ninh	11.9	23.3
	Thu Dau Mot	1.7	21.7
	Phan Rang	43.5	70.1
	Tuy Hoa	20.0	40.0
	Chi Thanh	7.5	52.5
	La Hai	0	2.3
Toilet Used (%)	Rach Gia	85.0	98.3
	Tay Ninh	95.0	100.0
	Thu Dau Mot	95.0	100.0
	Phan Rang	50.0	89.6
	Tuy Hoa	76.6	85.0
	Chi Thanh	22.5	87.5
	La Hai	13.6	38.6
Head of Household with Education to Secondary School Level (%)	Rach Gia	21.7	38.0
	Tay Ninh	23.7	43.3
	Thu Dau Mot	20.0	40.0
	Phan Rang	24.2	53.7
	Tuy Hoa	23.3	40.0
	Chi Thanh	12.5	57.5
	La Hai	4.5	22.7
Solid Waste Collection Service (%)	Rach Gia	51.6	63.3
	Tay Ninh	16.9	33.3
	Thu Dau Mot	8.3	70.0
	Phan Rang	51.6	65.7
	Tuy Hoa	55.0	61.7
	Chi Thanh	5.0	40.0
	La Hai	-	-
Own Business as Primary Source of Income (%)	Rach Gia	20.0	41.7
	Tay Ninh	27.1	60.0
	Thu Dau Mot	20.0	50.0
	Phan Rang	25.8	46.3
	Tuy Hoa	25.0	41.7
	Chi Thanh	12.5	37.5
	La Hai	9.1	25.0
Casual Work as Primary Source of Income (%)	Rach Gia	36.7	11.7
	Tay Ninh	22.0	1.6
	Thu Dau Mot	31.7	5.0
	Phan Rang	30.6	14.9
	Tuy Hoa	28.3	5.0
	Chi Thanh	20.0	2.5
	La Hai	2.3	2.3

– = no information available.

Source: Socioeconomic Survey carried out during the feasibility study of the Project.

7. **Health.** Viet Nam ranks below average among the least developed countries in terms of public access to safe water supplies. Lack of safe water and inadequate sanitation are the main causes of the country's above-average incidence of waterborne and hygiene-related diseases. The household surveys revealed that there are few serious outbreaks of contagious diseases, probably a result of improved public awareness. Waterborne diseases, such as dysentery and diarrhea, and eye diseases were reported in all towns, although records were poor. Other water-related diseases such as malaria, dengue, and typhoid (in Phan Rang and Tuy Hoa) were also reported.

8. **Ethnicity**. Each project town has a majority of the Kinh ethnic group, ranging from 91 percent in Tay Ninh to more than 99 percent in Chi Thanh and La Hai. The main ethnic minorities are the Chinese, which are present in all towns and comprise less than 1 percent in Tuy Hoa to 7 percent in Tay Ninh; Cham, which account for 2 percent in Tay Ninh and 5 percent in Phan Rang; and the Khmer minority, which is almost 7 percent of the population in Rach Gia. The Khmer are over-represented in Rach Gia's poor, having low levels of education, and poor living conditions, and lacking water supply, sanitation, and permanent well-paid jobs. Conditions for the Cham ethnic group vary between Tay Ninh and Phan Rang. In Tay Ninh the Cham are clustered into an area in ward 1 where language, customs, and religious practices keep them isolated from the outside world. This group has low incomes and poor living conditions (housing, water supply, and sanitation). In Phan Rang the Cham are a larger group dispersed through Phan Rang and neighboring Ninh Phuoc. Thanh Hai ward in Phan Rang has the highest percentage (54 percent) of households from the Cham ethnic group. These people are poor and have low incomes from subsistence agriculture and handicrafts, and inadequate water and sanitation. The settlement is also isolated from the rest of Phan Rang, by physical distance and accessibility, as well as language, customs and cultural mores.

9. **Water Supply.** In the project towns, the proportion of households with piped water supply ranges from 4 percent (La Hai) to 55 percent (Tay Ninh), and per capita consumption varies between 70 (La Hai) and 137 (Thu Dau Mot) liters per capita per day. Unaccounted-for-water averages 37 percent of water produced. A further 6-10 percent is lost in the water treatment process through backwash and sludge removal. Consumers are required to pay for water supplied to house and tap connections, while water is supplied free of charge at public taps. Water tariffs are based on metered consumption, but many meters are of poor quality and do not measure accurately. As a result, many customers are charged on the basis of estimated consumption. In most towns, customers have paid for and selected their water meter, and consider that it is their property.

10. **Sanitation, Drainage, and Electricity.** Sanitation and drainage conditions in all project towns are in a very poor state. Large areas of the provincial and district towns have no piped drainage system. The drainage system coverage in the towns is low. Electricity coverage is high throughout Viet Nam, but the service level varies by region. In all project towns, electricity is supplied from the national grid, but is unreliable, and electricity cuts are commonplace, particularly in Rach Gia, which is at the end of the national grid.

C. Needs and Demands of Target Beneficiaries

11. The needs and demands of low income and poor people are: (i) willing to pay a small amount to have water located more conveniently; (ii) like better water and toilets but cannot afford to connect or build; (iii) would share a connection between 6-10 households; (iv) prefer metered taps even if sharing between 4-5 households; (v) cannot afford to store water; (vi) want

improvement to the quality of piped water; (vii) need knowledge of how to improve sanitation; (viii) consider residential/public toilets are a high priority; (ix) need improved drainage; (x) consider solid waste collection is an important issue; (xi) would be able to contribute labor to build and maintain services, and could manage collection of money for water from a shared connection between poor households; (xii) need a repayment facility such as installments for water connections; and (xiii) need a credit scheme for toilets.

12. The needs and demands of women are: (i) greater convenience and less time in collecting water; (ii) need clean water as it is time consuming to filter water or clean storage tank; (iii) complained that piped water is only available for a few hours a day; (iv) would pay for better quality, convenient, and more reliable water; (v) prefer individual meters; (vi) worried about high water connection costs; (vii) needed toilets but cannot afford them; (viii) prefer own toilets; (ix) concerned about cost of removing waste from septic tank toilets; (x) want improved drainage to improve the environment; (xi) consider that solid waste a problem and collection service is needed; (xii) worried about getting sick; health is very important; (xiii) consider that installments are needed to pay for water connections; and (xiv) favor credit scheme for toilets (but need to know the terms).

D. Social Impacts of the Project

13. **Project Beneficiaries and Benefits.** The beneficiaries of the Project include women and children, households in general, poor households, small businesses, and schools. The benefits include convenient access to clean, reliable piped water; greater equity in the cost of water; reduction in time and energy spent collecting water from unsafe sources; reduction in waterborne diseases; less time and cost spent filtering, boiling, and storing piped water; and environmental improvements. In addition, institutions such as water supply companies (WSCs), the Vietnamese Women's Union, town People's Committee, and town health office will improve their ability and knowledge in working with the community on water and sanitation problems.

14. **Improve Access to Clean Water.** The poor often walk or cycle long distances (400–1,000 meters) daily or more to collect water for drinking if they have no safe and reliable source nearby, or when existing wells are dried up, become saline during the dry season, or are contaminated by flood water during the wet season. Access to piped water will mean significant increase the time available for more productive income generating work, education, and health care. Piped water availability will result in increased water purchasing power for the same household budget. Greater use of piped water (including for washing dishes, bathing, and washing clothes) will improve health and reduce risk of infection or illness from polluted sources such as wells.

15. **Credit Schemes.** The project provides sanitation credit schemes and water connection credits to poor households to help improve their living conditions and reduce the risk of illness and incapacity.

16. **Increased Employment Opportunities.** The Project could provide employment opportunities, including expansion of the labor force of WSCs or public works companies (PWCs), employment in water resource management, public or community toilet management, water tap management, handcart operation, and community motivation work.

17. **Improved Hygiene and Sanitation Practices Health Impacts**. The public health awareness program will have a significant impact on the poor. Improved hygiene and sanitation practices and awareness of safe sanitation will increase the impact of sanitation conditions and

lead to greater effectiveness of this component. Simple technical information on appropriate design and construction of sanitation facilities will provide valuable guidance to the poor, which is currently unavailable. Availability of piped water and proper excreta disposal will lead to health improvements by reducing risk of waterborne and water-related diseases including dengue fever, diarrhea, eye disease, skin disease, reproductive tract infections, typhoid, and cholera. Morbidity due to water-related illnesses has a major impact on the poor. Loss of a laborer has a devastating effect on a poor household and makes it more vulnerable to deeper poverty. The effect can be a downward spiral of loss of earnings, unexpected expenditure on medicines and health care, borrowing at high interest rates to pay for health care, increased indebtedness, withdrawal of children from school to work, and selling of assets to generate income. When children get sick, an adult is taken out of productive work to look after them. Children regularly suffering from diarrhea are more likely to be malnourished and have stunted growth and lower retention for learning. Health improvements will reduce the cost of health care and medicines to households, with the greatest impact experienced by the poorest section of society. A visit to a commune health center costs the poor the equivalent of 8 percent of their nonfood consumption, which is more than twice the 3 percent spent by the richest households. Hospital outpatient visits cost the poor around 26 percent of nonfood consumption (four times that of the rich); and in-patient admissions cost 45 percent (twice that of the rich).

E. Gender Analysis

18. **Gender in Water Supply and Sanitation**. In Viet Nam, women dominate tasks within the household, including preparing food, cooking, washing dishes and cooking utensils, washing clothes, bathing babies and children, caring for the elderly, caring for the sick, tending livestock, and cleaning house. In the project towns, where piped water is not available, women also have an important role in collecting water from other sources. In some communities (e.g., within Phan Rang) collection of water is a family or household responsibility, as all available labor is needed to cope with the task on a daily basis. Where children are involved, girls are twice as likely as boys to have responsibility for collecting water in La Hai and Phan Rang, compared to the other project towns where responsibility is evenly divided.

19. Throughout the project towns women play a lead role in semiformal water and sanitation services, which replicate their traditional roles within or just outside of the home sphere. Women are usually employed as street sweepers, rubbish collectors, and public latrine cleaners, rather than men. Community-managed standpipes in a project near Phan Rang were managed by women. These job opportunities arise because women spend a lot of time at home, but they also tend to keep women at home. Women are employed in the Project provincial WSCs, but mostly in a support role carrying out clerical or secretarial functions rather than technical roles, with the exception of a few women who are employed in specialist areas including as environmental scientists, laboratory technicians, and resettlement specialists.

20. **Decision Making.** Viet Nam has a high number of female-headed households (almost one third are female where the head of the household is 45 years or over). Two thirds of female-headed households have no male spouse in the household, with one third having a male spouse in the household, but the female is the registered head. Female-headed households were encountered in all of the project towns, and noticeably in poorer towns such as La Hai and Chi Thanh where male spouses have moved to other areas for employment. Despite this high number of female-household heads, women are not necessarily the primary decision makers, with influences from either the male spouse or male children affecting decisions. Direct decision making by women is restricted to household chores, child rearing, and expenses for daily meals, whereas men make more important decisions on major expenditures and the family. This role of

men extends beyond the family to the formal sector, where men make decisions about the use and allocation of water and sanitation services at the WSC and government level.

21. **Development Preferences**. The SES results show that water supply was a preference more for women than men in La Hai, Rach Gia, and Tay Ninh with the remaining towns evenly split except Tuy Hoa (41 percent of men compared to 21 percent of women). Women gave toilets a high priority in Phan Rang, Rach Gia, and Tay Ninh with them being more important to men in Chi Thanh and La Hai. Women also generally gave solid waste services, hospitals, and schools a higher priority for the project towns than did men.

22. **Project Gender Strategies.** The consultations and SES revealed different needs and roles of men and women that must be considered in the provision of improved water and sanitation services. Therefore the following strategies will be incorporated in project implementation: (i) meeting the needs of women consumers will be a special focus of the customer relations department of WSCs; (ii) WSC staff will be trained in effective community consultation and participation; (iii) WSCs and the provincial VMU will closely coordinate in the Project implementation; (iv) the VWU will be used for access to women at the grassroots level; (v) female community motivators will be used for the public health awareness program (PHAP); (vi) opportunities will be provided for women among the unskilled construction work; and (vii) participatory project evaluation will be done by men and women.

23. **Gender Impacts**. The Project will make water conveniently available to women, thus reducing their efforts, and time spent on collecting water and caring for other household members who are ill from unsafe water or poor hygiene. This will help women improve their own personal health. Drainage and sanitation will result in environmental improvements around the home, more pleasant living conditions, and less risk of illness. Women will also benefit from increased knowledge of safe water practices, personal hygiene, and awareness of the linkage between water, sanitation, and health. Increased interaction with support agencies such as the VWU will reduce the isolation of some women and bring outside influences into the home. The financial position of poor women will be improved by having more time for productive labor, and spending less on water purchased from informal sources.

F. Community Participation

24. Extensive consultation, undertaken during feasibility study, using project workshops, focus groups discussions, and survey methods, will continue during project implementation. WSCs will be trained in community consultation techniques, analysis of customer feedback, and other areas to improve participation. The PHAP, community environmental sanitation improvement (CESI) program, and sanitation credit scheme will all use participatory approaches. The PHAP, aimed at improving public awareness of water, sanitation, and health, has been developed after the model prepared by the Asian Development Bank-financed technical assistance 2376-VIE: Community Environmental Health Improvements, a successful participatory program implemented by VWU over three years. The TA final report has provided lessons for future improvements. The CESI's main objective is to support community-level demand for sanitation improvements generated through the PHAP, such as toilets, washbasins, rubbish bins and collection depots, small-scale drainage, waste dumping areas, and septic tanks. The sanitation credit scheme will provide credits to the urban poor for constructing house connections for drainage and septic tanks, and thereby allowing them to fully participate in the urban development and benefit from the improved urban services.