

ASIAN DEVELOPMENT BANK

PCR:TON 24338

PROJECT COMPLETION REPORT
ON THE
TRANSPORT INFRASTRUCTURE PROJECT
(Loan No. 1303-TON [SF])

IN

TONGA

March 2001

CURRENCY EQUIVALENTS

Currency		–	Pa'anga (T\$)
		At Appraisal (May 1994)	At Project Completion (June 2000)
T\$1.00	=	US\$0.7500	US\$0.6070
US\$1.00	=	T\$1.3333	T\$1.6474

ABBREVIATIONS

AADT	–	annual average daily traffic
AusAID	–	Australian Agency for International Development
ICB	–	international competitive bidding
IS	–	international shopping
LCB	–	local competitive bidding
MAF	–	Ministry of Agriculture and Forestry
MOF	–	Ministry of Finance
MMP	–	Ministry of Marine and Ports
MOW	–	Ministry of Works
PAT	–	Port Authority Tonga
PCC	–	project coordination committee
PCE	–	project coordination engineer
PMS	–	pavement management system
TA	–	technical assistance
VOC	–	vehicle operating cost

NOTE

The fiscal year (FY) of the Government ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends. For example, FY2000 begins on 1 July 1999 and ends on 30 June 2000.

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BASIC DATA

A. Loan Identification

1.	Country	Kingdom of Tonga
2.	Loan Number	1303-TON (SF)
3.	Project Title	Transport Infrastructure Project
4.	Borrower	Government of Tonga
5.	Executing Agency	Ministry of Finance
6.	Amount of Loan	SDR 6,809,619.80 (US\$9,435,254.27)
7.	PCR Number	PCR: TON 614

B. Loan Data

1.	Appraisal	
	- Date Started	11 November 1993
	- Date Completed	8 December 1993
2.	Loan Negotiations	
	- Date Started	10 May 1994
	- Date Completed	11 May 1994
3.	Date of Board Approval	28 June 1994
4.	Date of Loan Agreement	28 June 1995
5.	Date of Loan Effectiveness	
	- In Loan Agreement	26 September 1995
	- Actual	2 August 1995
	- Number of Extensions	Nil
6.	Closing Date	
	- In Loan Agreement	31 December 1999
	- Actual	29 November 2000
	- Number of Extensions	1
7.	Terms of Loan	
	- Interest Rate	1 percent
	- Maturity (number of years)	40
	- Grace Period (number of years)	10

8. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
16 October 1995	29 November 2000	5 Years 1.5 months
Effective Date	Original Closing Date	Time Interval
2 August 1995	31 December 1999	4 Years 4 months

b. Amount

(\$ million)

Category	Original Allocation	Last Revised Allocation	Amount Cancelled	Net Amount Available	Amount Disbursed	Undisbursed Balance
Civil Works	6.27	7.44	0	7.44	7.44	0
Equipment	0.66	0.79	0	0.79	0.79	0
Consulting Services	1.34	1.11	0.15	0.96	0.96	0
Service Charge	0.40	0.38	0.14	0.24	0.24	0
Unallocated	1.33	0.00	0	0.00	0.00	0
Imprest		0.00	0	0.00	0.00	0
Total	10.00	9.72	0.29	9.43	9.43	0

C. Project Data

1. Project Cost

(\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange	10.00	9.43
Local Currency	2.50	3.88
Total	12.50	13.31

2. Financing Plan

(\$ million)

Item	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total
Implementation Costs						
Borrower-financed		2.50	2.50	0.00	3.88	3.88
ADB-financed	9.60		9.60	9.19	0.00	9.19
Other External Financing				0.00	0.00	0.00
Sub total	9.60	2.50	12.10	9.19	3.88	13.07
IDC Costs						
Borrower-financed						
ADB-financed	0.40	0	0.40	0.24	0	0.24
Sub total	0.40	0	0.40	0.24	0	0.24
Total	10.00	2.50	12.50	9.43	3.88	13.31

3. Cost Breakdown by Project Components

(\$ million)

Item	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
	Exchange	Currency	Cost	Exchange	Currency	Cost
Roads	5.50	1.50	7.00	5.18	2.05	7.23
Ports	4.50	1.00	5.50	4.25	1.83	6.08
Total	10.00	2.50	12.50	9.43	3.88	13.31

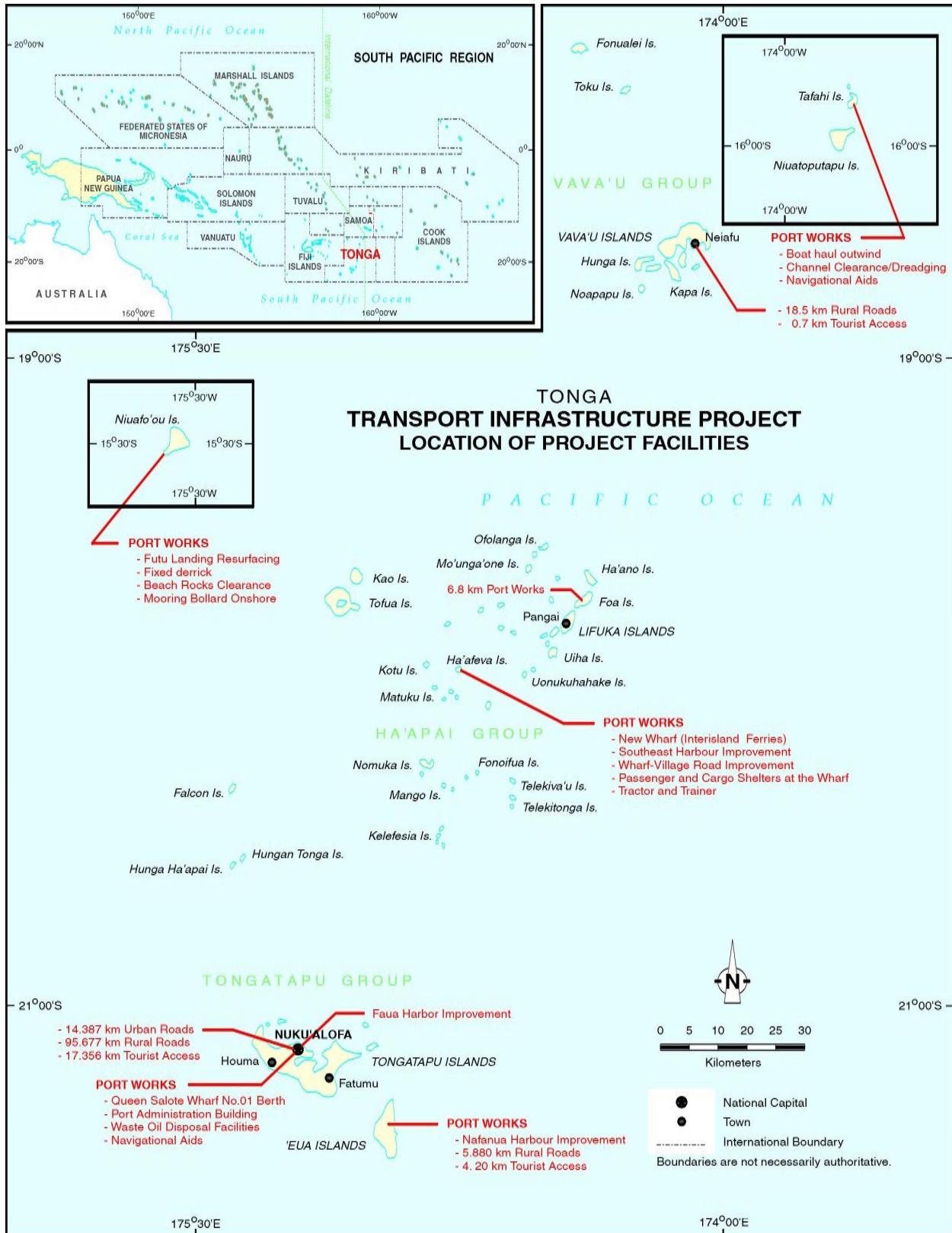
4. Project Schedule

Item	Appraisal Estimate	Actual
Project Coordination Engineer	July 1994	April 1995
Road Design and Supervision	July 1994	January 1995
Port Design and Supervision	July 1994	June 1995
Completion of Engineering Designs		
Civil Works Contract		
Queen Salote Wharf Berth No. 1		
Date of Award	June 1995	June 1996
Completion of Work	December 1996	July 1997
Port Administration Building construction		
Date of Award	December 1994	September 1996
Completion of Work	July 1995	July 1997
Other Marine Works		
Date of Award	March 1995	January 1997
Completion of Work	January 1996	June 2000
All Road Sections and Tourist Access		
Date of Award	January 1995	October 1995
Completion of Work	April 1999	June 2000
Equipment and Supplies		
Dates		
First Procurement	January 1995	October 1995
Last Procurement	January 1998	June 2000
Completion of Equipment Installation	March 1999	June 2000
Start of Operations		
Completion of Tests and Commissioning	June 1999	December 1999
Beginning of Start up	July 1999	February 2000

D. Data on Asian Development Bank Missions

Name of Mission ^a	Date	No. of Persons	No. of Person-days	Specialization of Members
Fact-Finding	12-23Aug1993	2	12	a,a,d
Appraisal	20Nov-8Dec1993	5	9	a,b,c,d,e
Inception	12-19May95	2	8	a,b
First Review	28Feb-3Mar95	1		a
Second Review	27Nov-1Dec95	1	6	b
Third Review	26Aug-6Sep96	1	6	a,b
Special Loan Administration	9-15 Nov96	2	11	a
Mid Term Review	16-27Jun97	1	14	a,a
Fourth Review	25Oct-5Nov97	2	11	a,a
Fifth Review	24Aug-4Sep98	1	13	a,e,h
Sixth Review	19-27Apr99	1	9	a
Seventh Review	23 – 30Nov 99	3	8	a
Eighth Review	4-15Apr00	1	12	a
Project Completion Mission	3-30Jun00	3	27	a,e,h

^a a-engineer, b-financial analyst, c-counsel, d-economist, e-consultant specialist, f-control officer, g-programs officer, h-project assistant



I. PROJECT DESCRIPTION

1. The primary objectives of the Project were to upgrade about 50 kilometers (km) of key urban and rural roads, one of the international berths at the main port of Nuku'alofa, and the facilities at eight interisland port sites in a cost-efficient, sustainable, and carefully prioritized manner. The Project also prepared a road safety strategy and supported institutional development of the port sector. The aim was to help generate sustainable and equitable economic growth by upgrading existing road and port infrastructure. The Project initiated policy reforms to ensure that an adequate maintenance budget was allocated by the Government, adequate safety standards were set and greater management autonomy was promoted in the port sector. During the country programming mission of the Asian Development Bank (ADB) in 1989, the Government requested technical assistance (TA) to examine the feasibility of a project to improve the marine infrastructure in the country. The TA was conducted throughout 1992.¹ During the 1993 country programming mission, the Government requested ADB assistance for a project to upgrade key sections of Tonga's main urban and rural road network. In June-July 1993, an ADB reconnaissance mission visited Tonga and prepared a feasibility study for road improvement under the combined road and marine-oriented Transport Infrastructure Project. The Project is in line with Government policies for the transport sector, which support the objectives of the sixth five-year national development plan (1991-1995) to promote agricultural and fisheries exports, and tourism; and bring rural and remote communities more closely into the mainstream of economic development.

2. Tonga's main transport hub is Nuku'alofa, the capital and international port. Nuku'alofa is located on the island of Tongatapu, where about 70 percent of the nation's population lives. Tongatapu has the main airport and supporting network of urban and rural roads. A secondary hub with a small international port is located in Vava'u, an island group in the northern Tongatapu. The interisland shipping trunk route between Nuku'alofa and the main interisland ports north of Tongatapu involve one Government-owned and two privately-owned ferries, each of which operates on a weekly schedule. However, services to the Niuas, in northern Tonga, are infrequent and unreliable: at least one of the eight scheduled visits per year is aborted because of bad weather. The second main interisland route is between Nuku'alofa and Nafanua Harbour on the nearby island of 'Eua, which is served by one Government-owned and four privately-owned ferries. The ferry services handle about 90 percent of Tonga's interisland cargo and passenger traffic. The interisland trunk ports of Ha'afeva, Neiafu, Nuku'alofa, and Pangai served by the ferries are also centers of fishing and informal transport activity for the small islands nearby.

3. The project had two components: roads and ports. Both components were supported by TAs for institutional strengthening. Each component comprised three subcomponents: civil works, equipment, and consultancy services.

4. **Roads.** The civil works involved upgrading and sealing the surfaces of about 40 km of rural trunk roads throughout Tonga and 10 km of urban main roads in Nuku'alofa, and providing improved access to places of tourist interest. Geotechnical and survey equipment was provided for the Project, subsequent road upgrading and other application; an assessment was made of subsurface conditions and two vehicles were provided for the Project. For this component the Project provided for a total of 42 person-months of consultancy services; 30 person-months by project coordination engineer (PCE)² and (12 person-months) by a road engineer for the detailed design of roads and supervision of road construction.

¹ TA 1528-TON: *Marine Infrastructure*, for US\$250,000, approved in June 1991.

² One PCE was engaged for a total of 48 person-months of services under the road and port components, for approximately 30 and 18 person-months, respectively.

5. **Ports.** The civil works comprised the rehabilitation and upgrading of outer island ports in the Niuaus (four sites) and Ha'afeva (two sites) small harbors at Fuaa (Nuku'alofa) and Nafanua ('Eua) and one of the two international berths at Queen Salote Wharf; and the construction of a new port administration building at Queen Salote Wharf in Nuku'alofa. The Project provided a boat, a tractor, a trailer, and other cargo handling equipment; office and computer equipment for port management improvements; navigational aids; and an oil disposal facility. For this component, the Project provided for a total of 33 person-months of consultancy services, comprising 18 person-months by a PCE² and 15 person-months by a port engineer for the detailed design of ports and supervision of port construction. The major events in project history are presented in Appendix 1.

II. EVALUATION OF IMPLEMENTATION

A. Project Components

6. Loan processing for the Project commenced during the execution of the TA for a marine infrastructure feasibility study³ in 1992 and an ADB reconnaissance mission in 1993 for a feasibility study for road improvement under the Project. The Fact-Finding Mission visited Tonga in August 1993 and discussed the Project, initiating a dialogue on key sector and policy issues and institutional development. ADB fielded the Appraisal Mission from 22 November to 8 December 1993; loan negotiations followed in May 1994; and ADB's Board approved the Project on 28 June 1994. The loan and TA agreements were signed on 28 June 1995 and the loan became effective on 2 August 1995. The signing of the agreements was delayed because, after ADB approval of the loan, it took several months for the Government and ADB to agree on changes to the Terms of Reference (TOR) for the consultant on road safety to be engaged under TA 2113-TON. Meanwhile, Parliament went into recess from October 1994 until June 1995, thus preventing submission of the proposed loan for the approval necessary for loans in excess of T\$10.0 million. Almost one year was lost because of the delay in loan signing. The Ministry of Finance (MOF), the Executing Agency for the Project, agreed to take all possible action to make up for the time lost.

7. The project office was established and the project director appointed in mid-1994. The physical implementation of the Project commenced with the recruitment of consultants under a retroactive financing provision of the loan. Consultants were fielded as follows: (i) the road engineer for detailed design and supervision of construction started work in March 1994; (ii) the PCE to assist the project manager to implement the road and port components of the Project started on 2 May 1995; and (iii) the marine engineering consultants for detailed design and supervision of the port components started in June 1995. The consultants prepared the designs and tender documentation for civil works, including buildings, wharves, and roads. Construction commenced in July 1995. The construction of the Queen Salote Wharf No. 1 (QSW1) began in August 1996.

8. The rural trunk roads and urban main roads were upgraded to reduce road user and maintenance costs in the light of road traffic growth projections of about 6 percent per annum. Ongoing institutional strengthening for the road sector was complemented by improved cost recovery and a safety strategy. About 50 km of roads were selected for upgrading primarily on the basis of traffic projections, economic and social benefits, and the potential for complementing the programs of other aid agencies. The roads comprised about 40 km of rural trunk roads connecting the principal villages on all the main islands with ports and airports and

³ TA 1528-TON: *Marine Infrastructure*, for US\$250,000, approved on 25 June 1991.

about 10 km of urban main roads in Nuku'alofa. In addition, access was to be provided to 17 sites of tourist interest, recreation value, and archeological importance throughout Tonga.⁴

9. The initial project road works in Nuku'alofa and Tongatapu were mostly completed by the end of 1997, including some priority roads from the Project's reserve list.⁵ Initial project road works in Vava'u were mostly completed by May 1998, after some delays. The Ha'apai road works, after some delays, were completed in December 1998. As the initial road works cost less than the amount allocated, part of the savings were used for upgrading more roads, including some roads that were appraised during ADB's September 1998 Review Mission.⁶ The cost of road works were lower than expected for three principal reasons: (i) more efficient construction techniques than anticipated; (ii) thinner overlay than planned; and (iii) narrower construction width than estimated. The actual overlay thickness used depended on the final road design, based on a revised vertical alignment; and the degree of pavement strengthening required, based on assessments of the existing pavement strength, estimated traffic volumes and composition, and standard pavement design techniques. The target width of construction adopted for the Project was 7 meters with a seal width of 6 meters. The actual width of construction was often less, depending on the width of the existing road. The final list of project roads covered 55 road segments totaling 163.5 km. Details of these road segments are outlined in Appendix 2.

10. Port infrastructure was upgraded based on a projected growth in international port traffic of 2.5 percent per annum and interisland port traffic of 5 percent per annum, and reduction in shipping delays and port user costs. Institutional strengthening was provided to improve port management. The project port sites in 'Eua, Fuaa, Ha'afeva and the Niuaas, are important links in the interisland transport network and QSW1 is one of only two international trade berths at the main port of Nuku'alofa. Without the Project, QSW1 would have been closed in 1997 because of damage by earthquakes and typhoons. Reconstruction of QSW1 under an international competitive bidding (ICB) contract was completed in July 1997 and the berth has been in constant use since then. The new port administration building constructed under a local competitive bidding (LCB) contract was completed in November 1997 and opened in December 1997. Civil works at the other ports were undertaken under force account mainly during 1999 and completion for all but the Fuaa Harbor entrance, Nuku'alofa extended into 2000.

11. The TA for institutional strengthening⁷ helped the Government review the institutional structure of the port sector. This review included an examination of the stevedoring services, the design and implementation of a management information system, commercially-orientated accounting and budget systems, preparation of an asset register, development and implementation of a cost-based tariff structure, and staff training. In addition, the TA consultants also reviewed the draft legislation to create an autonomous port entity, proposed revisions, and assisted the implementation process.

B. Implementation Arrangements

12. The implementation arrangements for the Project were closely aligned with the appraisal design. MOF was the Executing Agency and the deputy secretary of finance was the project director. A project coordination committee (PCC) was established chaired by the project director. The director of works, director of planning, and commander of police were nominated

⁴ These improvements were intended to encourage the tourist industry.

⁵ This is a list of roads, based on the Government's priorities, to be built from loan savings.

⁶ Asian Development Bank's *Loan No 1303-TON(SF) Tonga Transport Infrastructure Project: Staff Consultant Report for Project Review Mission*, 1998, SPRM.

⁷ TA 2114-TON: *Institutional Development of the Ports Sector*, for \$400,000, approved on 28 June 1994.

as members of the PCC and the secretary of marine and ports, project manager (deputy director of works), and PCE were coopted as members. The PCC met every three months during the early stages of the Project and less often later. The final meeting of the PCC was on 5 April 2000, about three months before the end of the period of loan utilization.

13. The Ministry of Works (MOW) was the implementing Agency for both components. MOW liaised with the Ministry of Marine and Ports (MMP) through the PCC. MOW was the Implementing Agency for the TA for road cost recovery and safety strategies⁸ and MMP for the TA for institutional development of the port sector. The PCE was appointed for a period of four years (48 person-months) to assist MOW with implementation.

C. Project Costs

14. The estimated cost of the Project at appraisal was US\$12.5 million including the service charge during construction, taxes, and duties. The cost of the road component was estimated at US\$7.0 million and the port component at US\$5.5 million. The foreign exchange cost was estimated at US\$10.0 million or 80 percent of the total project cost. The local currency cost was estimated at US\$2.5 million (US\$1.5 million for roads and US\$1.0 million for ports), or 20 percent of the total project cost, including approximately US\$1.3 million for taxes and duties (US\$0.8 million for roads and US\$0.5 million for ports). The appraisal estimate included physical contingencies at 7 percent and price contingencies at 3.1 percent for the foreign exchange and local currency costs of each component. The actual project cost was approximately US\$13.31 as shown in Appendix 3. Although the project cost was only a little above appraisal estimates, the unit costs for road works were substantially less than expected. The MOW's construction crews proved particularly skilled in road construction with most of the roads being constructed rapidly and very cost-efficiently (para. 8).

D. Project Schedule

15. It was envisaged at appraisal that the Project was scheduled to be implemented over five years, and would be completed by mid-1999 with a loan closing date of 31 December 1999. The implementation schedule provided for a guarantee survey following the completion of civil works and installation of equipment. The date for the completion of the physical components of the Project was extended twice with a final completion date of 30 June 2000, which coincided with the extended loan closing date. Appendix 4 compares the project schedule envisaged at appraisal with actual implementation.

16. Initially, project inception was delayed by difficulties in ratifying and signing the loan agreement (para. 6). The agreement was not signed until June 1995 and all activities, with the exception of road design, were delayed accordingly. The majority of project roads were built in the first three years. Performance varied considerably from island to island. Chip seal surfacing was still something of a novelty when the project began and resources for such works were stretched to the limit by the demands of the Project. Almost all the delays in road construction were caused by a shortage of surfacing aggregate or by difficulties with bitumen heating and spraying equipment. Nevertheless, the Project eventually constructed about three times the length of road originally planned.

17. The MOW marine construction team was engaged through force account on other work for the first two years of the Project and this part of the Project was always behind schedule. The largest subproject financed from the force account was the wharf at Ha'afeva. The start of

⁸ TA 2113-TON: *Road Cost Recovery and Safety Strategies*, for \$170,000, approved on 28 June 1994.

construction was delayed by political problems and the structure was damaged by a cyclone before it was completed. Equipment breakdowns also contributed to delays. These factors led to the cost of this subproject exceeding the estimate. Despite delays, the port component was almost complete at the end of the period of validity of the loan and only minor work at three locations remained to be completed.

E. Engagement of Consultants and Procurement of Goods and Services

18. All procurement under the Project was conducted in accordance with ADB's guidelines for procurement. The project engaged a PCE for 48 person-months of consulting services, a road engineer for 12 person-months, from a marine infrastructure specialist for 15 person-months. With ADB's approval, the roads design engineer was engaged in January 1995 before the loan agreement was signed. This allowed road construction to start in late August 1995.

19. Procurement details are shown in Appendix 5.

F. Performance of Consultants, Contractors, and Suppliers

20. The consultants performed satisfactorily. The work of the road engineer was completed in two visits to Tonga, totalling 13.5 person-months instead of the planned three visits and 12 person-months. The engineer who conducted the first field visit was not available for the second, so the consulting firm sent a different engineer to Tonga following approval by MOW and ADB. In all other respects, the consulting firm satisfactorily fulfilled the requirements of the road engineer's TOR. Some of the requirements of the port engineer's TOR were amended during project implementation. The civil works at QSW1 and the port administration building, preparation of bid documents, assistance in the procurement process, preparation of bid evaluation reports, and contract negotiations were largely devolved to the PCE and MOW. Reporting to ADB was not always in accordance with the requirements of the TOR particularly after the PCE stopped working full-time on the project. In all other respects, the PCE satisfactorily fulfilled the requirements of the TOR.

21. In general, the suppliers and contractors engaged under the Project performed satisfactorily. The contractor for the construction of QSW1 completed the work earlier than anticipated and the design and construction was very satisfactory. The contractor for the construction of the port administration building took longer than planned. While the performance was disappointing, there were mitigating circumstances and the supervising architect (from MOW) granted extensions for the time overrun, indicating the contractor performed as well as could be expected.

G. Conditions and Covenants

22. Compliance with the loan covenants was generally good. The Government and MOF complied with the majority of the general covenants but they have not complied with or partly complied with some important Project-specific covenants (Appendix 6).

23. The most important covenant relating to the ports component was the requirement to achieve a ratio of operating expenses to operating revenue of the ports sector of not more than 95 percent for FY1997 and 90 percent from FY 2001. While strict compliance with this condition could not be established during 1996-1998 (due to the late establishment of the Port Authority of Tonga [PAT] and accrual accounting in February 1999), the Project Completion Review Mission assessed it had been achieved from the financial year beginning 1 July 1996. Since PAT was established on 16 February 1999, the financial accounts covering Queen Salote port operations

have been prepared on an accrual basis and financial performance indicates compliance with. Even when company tax (20 percent of net profit) and dividends to Government (about 30 percent of net profit) are taken into account, the surplus still provides an operating ratio that more than meets the ADB requirements.

H. Disbursements

24. Disbursements were made following the direct payment, imprest account and statement of expenditure, and reimbursement procedures approved by ADB. The majority of works in both the road and port sectors were financed from a force account. Minor contracts were financed from the imprest fund, which was replenished by the periodic liquidation of advances. Despite the rapid progress in implementing the major part of the Project, loan utilization lagged considerably behind physical progress because: (i) the loan amount included substantial sums for contingencies and loan service charges; (ii) almost all subprojects cost was less than anticipated, (iii) applications for withdrawal from the loan lagged behind physical progress: at times, applications to liquidate the advance for works financed from the force account were prepared for periods of almost a year, which meant that progress in some months was not reflected in loan utilization for over a year; and (iv) the project administration and ADB were conservative about using savings and contingency funds for additional works under the Project. A comparison of appraisal and actual disbursements is shown in Appendix 7.

I. Environmental and Social Impacts

25. As envisaged at appraisal, the Project did not have a significant adverse effect on the local environment and ecosystem. The Project incorporated environmental controls in the design, construction, and operation of the project facilities. These controls were not limited to the mitigation measures recommended by the initial environmental examinations at Fuaa Harbour and Ha'afeva, but covered all subprojects. The roads construction component included building drains and a waste oil disposal facility was installed on Queen Salote Wharf as part of the port development subproject. The requirement to minimize the use of beach sand was observed: almost all the sand used for the Project was taken from beaches, but the use of beach sand was kept to a minimum extent as possible. Tonga has very few alternatives to beach sand. The only practical alternative is dust from rock crushers. Unfortunately, the feed material for the crushers is soft and weathered limestone and the dust produced by the crusher is fine grained and highly plastic. This precludes the use of the dust in most construction operations.

26. The social analysis conducted at the time of project preparation anticipated an increase in agricultural production and the export potential of the rural areas and outer islands as a result of the Project. As the outer island port infrastructure subprojects were completed in 2000, it was not possible at the time of the Project Completion Review Mission to determine whether a sustained development impetus has been generated. In addition, development will be reinforced by the ongoing ADB Outer Islands Project,⁹ which incorporates reorganization and institutional strengthening of the Ministry of Agriculture and Forestry (MAF), particularly the agricultural extension services. Positive impacts on the fishing industry and interisland shipping operations have been noted as a result of the small ports improvement. Access to tourist attractions has been improved. The most notable impact is the increases in traffic volume and flow on the completed project roads.

⁹ Loan 1412-TON (SF): *Outer Islands Agricultural Development Project*, for SDR2.434 million (\$3.635 million), approved on 12 December 1995.

J. Performance of the Borrower and the Executing Agency

27. The Government and MOW satisfactorily met their obligations under the loan agreement. MOW's construction crews proved particularly skilled in road construction, with most of the roads being constructed rapidly and very cost efficiently. However, MOW's marine construction team was engaged on other work for the first two years of the Project, so port construction remained behind schedule. MOW was not able to set up a benefit monitoring and evaluation (BME) system. The pavement management system (PMS) already in place has gathered much of the data required for BME and the PMS is being extended to include BME. MOW will continue to collect data for the BME and recalculate benefits each year.

28. MOF had some difficulties with submitting audited project accounts within the specified time. These difficulties were purely administrative. MOF has not complied with certain development covenants related to road cost recovery and safety strategies. The institutional development of the port sector was implemented successfully and resulted in establishing PAT which has been performing well financially since it was set up in February 1999.

K. Performance of the Asian Development Bank

29. The performance of ADB in designing the project was highly satisfactory. The terms of reference drawn up for consultants were clear and concise. Consultants were able to understand what was required of them and their performance was maximized as a result. On the design of the physical components, the Project did use specifications drawn up by MOW. The road component cost less than anticipated because of more efficient construction techniques than anticipated and the appropriate specifications of the final design.

30. ADB was well placed to respond to queries from the project authorities. The South Pacific Regional Mission is located within reach of Tonga and communications are easy. ADB's project officer, an engineer, visited the project regularly and was always available, often at short notice, to discuss any matters arising from the project. For this reason, ADB's responses to problems were excellent. The ADB project officer was also assigned to the Outer Islands Development Project, which facilitated frequent informal reviews.

31. ADB's guidelines, procedures and requirements are clear. The ADB project officer was always ready to explain which procedures or guidelines should be followed in any circumstances and the project authorities had no difficulties in following the guidelines, procedures and requirements.

III. TECHNICAL ASSISTANCE PROJECTS

32. Two TA grants were attached to the loan: (i) TA 2113-TON: Cost Recovery and Safety Strategies for the Road Sector, approved on 28 June 1994, for US\$170,000 with MOW, as the implementing agency; and (ii) TA 2114-TON: Institutional Development of the Port Sector approved on 28 June 1994, for US\$400,000 with MMP as the implementing agency. Both TAs were important to ensure the sustainability and efficient management of the project facilities, and facilitate a policy dialogue between the Government and ADB. TA 2113-TON originally provided for 4 person-months of consulting services from a transport economist to assist MOW in formulating measures to generate and sustain sufficient income and budgetary allocations to recover road maintenance costs. The same TA also provided for 2 person months of consulting services from a road safety expert to prepare a road safety strategy for Tonga. TA 2114-TON provided for 15 person-months of consulting services from a firm of management consultants to

assist the Government in reviewing the institutional structure of the port sector and review the draft legislation to create an autonomous port entity.

33. Progress with the introduction of a road cost recovery mechanism has proceeded slowly. The consultant's final report was submitted in August 1997 and was considered by the Government. The Government's development coordination committee and the Cabinet approved the implementation of recommendations in the consultant's report during July 1998. While MOW has set up the special road maintenance account, funds will only be credited to this account in the financial year commencing 1 July 2000. The Government has committed to credit T\$0.02 per liter of fuel tax to this account. An additional consultancy under the loan assessed the funding requirements for an optimal strategy for road maintenance at T\$1.6 million annually.¹⁰

34. An ADB-financed TA consultant submitted a report on road safety strategies in May 1997.¹¹ The Australian Agency for International Development (AusAID) agreed to fund a road safety program and a preliminary project design was completed in late 1997, which was approved by Government. The initial high priority for this project in the AusAID bilateral aid program was downgraded by the Tonga Government in March 1998 and the timing for implementation has been deferred to 2000.

35. The Ministry of Police reported to the Mission that they had put forward a submission to their Minister for implementation of key aspects of the road safety strategy involving increased funding for the Traffic Department. Cabinet has not yet provided a decision on this submission. Notwithstanding this, the Ministry of Police has upgraded the position of the head of the traffic department to Chief Superintendent, recruited 10 new constables for traffic duty, and proceeded with TV and radio road safety programs. Additional equipment expenditure under the Project has been directed toward road safety improvements including additional road signage, road marking, and radar speed detection devices.

36. A review of traffic accident data indicates there has been little change in the Fatality Index from 14.3 percent in FY 1995 to 14.5 percent in FY1999.¹² Deaths per 1,000 vehicles fell from a high level of 20 in 1993 to 8.3 in FY1995 and a lower 4.7 in 1998/99. These statistics suggest the Project has had a beneficial effect on road safety and the delay in fully implementing the road safety strategies has no serious safety or economic cost implications at this stage. The improved trend may well be a result of the focus on road safety, regardless of implementation. Details are provided in Appendix 8.

37. MAF advised that they had increased agriculture extension effort in the Niuas. Reviews of the Outer Island Project by the Mission and a staff consultant showed that while the economic activity induced by the Transport Infrastructure Project on the outer islands is not yet complete, significant improvement has been made.

38. Progress with the ports institutional strengthening program was delayed during 1997-1998 due to the time required to pass the legislation to allow the establishment of PAT. Overall, this TA component was successfully completed and provided valuable input to the PAT legislation and new port tariff schedule. The PAT legislation was reviewed by the Mission and found to be suitable and could serve as a model for other Pacific developing member countries (PDMCs).

¹⁰ Project consultants for reviewing the pavement management system.

¹¹ TA 2113-TON: *Road Cost Recovery and Safety Strategies*, for US\$170,000, approved on 28 June 1994.

¹² The proportion of injury accidents that results in death.

39. Privatization of the port operations was implemented broadly in accordance with the TA Port Consultant's recommendations. The contract for full port operations from shipside to shore delivery was awarded to Port Services Limited of Tonga and a 10 year contract started on the commencement of PAT on 16 February 1999. The contracting process appears to have been handled well and the Port Contractor Agreement is strongly performance orientated.

40. PAT now has the primary regulatory, operational, and contract control of port operations at the Queen Salote port and the Minister has limited involvement according to the legislation.

IV. EVALUATION OF INITIAL PERFORMANCE AND BENEFITS

A. Financial Performance

41. A comprehensive update of the financial appraisal for the ports component of the Project was prepared using updated and actual project data where possible. The methodology and underlying assumptions used for this revised financial internal rate of return (FIRR) are identical to those used during project appraisal. The revised FIRR for the ports component of the Project has been recalculated at 10.5 percent, considerably higher than the appraisal estimate of 3.7 percent and the higher 6.2 percent recalculated by the ADB's October 1998 Review Mission. The improved FIRR is due to cost savings on MMP employee salaries and increased tariff revenue associated with the new tariff schedule implemented in February 1999.¹³ The Mission concluded that the improved FIRR, despite the lower than forecasts for cargo handled at the Nuku'alofa Port, was due to benefits derived from the institutional arrangements resulting from the TA port consultants and the legislation enacted to establish PAT and administer a revised tariff schedule. The recalculated FIRR is outlined in Appendix 9. The Project's financial performance is rated successful.

B. Economic Performance

42. Economic internal rate of return (EIRR) for both components were recalculated using actual costs and current operational information that impacted on the benefit streams associated with the Project. The methodology and underlying assumptions used were identical to those used at the time of appraisal.

43. The overall recalculated EIRR for the road component of the Project yielded a base EIRR of 54.4 percent, which is significantly higher than the 17.4 percent calculated at appraisal and the 20.6 percent recalculated by the ADB's October 1998 Review Mission.¹⁴ The sensitivity analysis, similar in scope to the analysis at appraisal, showed a range of 34.3 percent to 50.2 percent (compared with 14.8 percent to 16.2 percent at appraisal). The improved EIRRs are a reflection of this Project delivering longer road segments for less expenditure under the roads component capital cost budget than was assumed at appraisal. In addition, the recalculated vehicle operating costs (VOCs) and road user benefits were significantly higher as a result of the higher annual average daily traffic (AADT) figures actually achieved in 2000 compared to appraisal estimate for the first year. Slightly higher VOC and travel time benefit levels calculated from the PMS results added to these higher road user benefit levels. A significant factor underpinning this increased benefit level was the growth in total registered vehicles (public and private) since 1995, which has been a significant 6.2 percent per annum. EIRRs were calculated

¹³ The tariff revenue was recommended under the institutional strengthening TA for the port sector.

¹⁴ The economic benefits of the road components include road maintenance cost savings, vehicle operating cost savings and time benefits. If the time benefits were excluded, which is not uncommon in developing countries, the EIRRs would be substantially lower.

for road categories and those that recorded the highest levels were in 'Eua (106 percent), rural Tongatapu (86.6 percent), tourist access (82.3 percent) and urban Nuku'alofa (65.7 percent). A summary of the recalculated EIRR for each road subproject and the overall road component of the Project is summarized in Appendix 10. The individual EIRR schedules for total roads component and major roads subproject outlining the annual levels of individual cost and benefit streams are incorporated in Appendix 11. Details from Appendix 10 are summarized in the Table.

Recalculated EIRR – Road Subproject

Item	Base Case EIRR
Urban Roads Nuku'alofa	65.7%
Rural Roads Tongatapu	86.6%
'Eua Road	106.0%
Ha'apai Road	40.5%
Vava'u Roads	34.5%
Tourist Access Roads	82.3%
Total Roads	65.3%
Total Road Subproject	54.4%

EIRR:

Source: Staff Consultant Report, PCR Mission 2000.

44. The overall recalculated EIRR for the port component of the Project yielded a base EIRR of 14.1 percent, which is slightly lower than the 15.8 percent calculated but higher than the 13.1 percent recalculated by ADB October 1998 Review Mission. The sensitivity analysis showed a range of 12.5 percent to 13.7 percent (compared with 13.0 percent to 14.6 percent at appraisal). EIRRs were calculated separately for the Queen Salote Port subproject and the base EIRR was a higher 16.2 percent and the sensitivity analysis indicated a range of 14.7 percent to 16.0 percent. The recalculated EIRR for the port component of the Project is outlined in Appendix 12.

45. The overall project EIRR for the base case was 39.7 percent, which is significantly higher than the 16.2 percent calculated at appraisal and the 17.4 percent recalculated by ADB's October 1998 Review Mission. The recalculated overall project EIRR is outlined in Appendix 13. The sensitivity analysis showed a range of 34.3 percent to 39.1 percent (compared with 13.6 percent to 14.9 percent at appraisal). The Mission regards these EIRRs highly acceptable and the evidence points to a successful and robust Project. It is concluded the Project will deliver economic benefits considerably higher than those outlined at appraisal in 1994, despite the decrease in international cargo handling at Nuku'alofa Port and with the inclusion of additional road subprojects. The economic performance component of this Project is rated successful.

C. Attainment of Benefits

46. The benefits outlined at appraisal report are likely to be exceeded and the Project will have been particularly successful. The derived financial and economic benefits illustrate a robust Project beneficial to the Tonga economy. The Project has led to reduced road and port user costs and road maintenance costs, greater efficiency and safety in Tonga's land and sea transport systems as a result of greater reliability of transport, and safer handling of maritime cargo and passengers. Rural and remote communities have greater opportunities for employment and income generation, particularly through increased agricultural production, improved access to health and education facilities, and integration into the mainstream of economic development.

47. The road upgrading benefits were derived from reductions of the required recurrent maintenance costs, reduced VOCs and time savings for the rural roads. Estimates of traffic composition and volumes were based on MOW traffic counts. All road component benefit streams were recalculated using the results of a PMS study that provided estimates of VOC, vehicle travel time costs and vehicle traffic composition in year 2000 values. Vehicle traffic composition estimates were available for each road subproject and the VOCs and vehicle time costs were specific to particular road network, varying according to vehicle traffic composition. The year 2000 AADT figures generally showed a significant increase over the assumed first year AADT figures included at appraisal. The Mission reviewed the higher AADT estimates provided for the year 2000 and were satisfied the numbers represented a realistic level, based on a review of the survey methodology, observation of current traffic volumes on subproject road sections and the growth rate in registered vehicles. Private registered vehicles in Tonga grew by a significant 7.3 percent annually from 1995 to 1999 and there is evidence of a trend toward larger vehicles in the form of small transporter type vans. The number of vehicles has increased noticeably on all outer islands visited by the Mission.

48. Port infrastructure upgrading benefits involved a reduction in shipping delays and port user costs. Institutional strengthening led to improved port management. As a result of the improved transport linkages, an anticipated increase in agricultural production and export potential in the rural areas and outer islands has begun to emerge. The project port sites in the 'Eua, Fuaa, Ha'afeva and Niua islands are important links in the interisland transport network and QSW1 is one of the only two foreign trade berths at the main port of Nuku'alofa. Without the Project, QSW1 would have been closed in 1997 because of deterioration due to damage by earthquakes and typhoons.

49. Benefits associated with QSW1 resulted from avoided waiting time of international trade vessels by retaining a two-berth facility. In addition, a 10 percent productivity improvement was built into the with-Project case, resulting from raised port productivity by managerial improvements that also reduced ship waiting time. The Nuku'alofa port international shipping statistics are detailed in Appendix 14.

50. As the outer island port infrastructure subprojects were completed only in 2000, it is not possible to determine whether a sustained development impetus has been generated. In addition, the resultant induced development will be reinforced by ADB's Outer Island Project, which incorporates reorganization and institutional strengthening of MAF, particularly the agriculture extension program. As the Outer Island Project has also only just been completed, the full benefits are not yet apparent. A preliminary assessment of the impact of the Outer Island Project was contained in a staff consultant review mission report, which notes that the impacts of the Outer Islands Project, though not complete, are observable.

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

51. Overall, the Project has been satisfactorily implemented and the derived benefits have exceeded expectations. The Project has delivered a significant upgrade in Tonga's transport infrastructure that will enhance and stimulate economic growth, particularly in selected outer island regions. The Project has been particularly successful and the derived financial and economic benefits illustrate a robust project beneficial to the Tonga economy. The Project provides a good example for successful project implementation in Pacific developing member countries.

52. A number of factors have contributed towards this successful Project.

- (i) Tonga has a well-developed and professionally competent public service with a high competence level in regional posts in the outer islands, particularly in MOF, MOW, and MMP;
- (ii) Tonga has a well-established outer islands development policy, adequately staffed outer island agencies, and an outer island community that shows a strong desire to participate in the productive cash economy rather than rely on subsistence agriculture. The private sector offers significant competitive services on main interisland shipping transport routes;
- (iii) MOW has a capacity to undertake regional transport infrastructure construction of a satisfactory standard;
- (iv) The TA consultants, the PCE in particular, delivered a quality service and worked particularly well with their local counterparts;
- (v) ADB review mission and supervisory work was provided by an officer with extensive knowledge of Tonga's transport infrastructure and the competence of the MOF, MOW and MMP; and
- (vi) ADB review missions were undertaken with sufficient duration and frequency, and involved regular outer island visits to inspect project sites and work in progress. Staff from MOF, MOW, and MMP participated in the inspections. As the ADB project officer visited Tonga on missions for other projects under implementation or fact-finding, additional opportunities were provided to monitor progress of the Project.

53. While the initial implementation of the project proceeded rapidly, progress faltered when the PCE was permitted by MOW to move from a full-time resident position to part-time resident with oversight from the consulting firm's home office in New Zealand. When the PCE was absent from Tonga, MOW work teams activity did not progress as rapidly or smoothly as during the initial period when the PCE was a permanent resident.

B. Lessons Learned

54. The most significant lesson to emerge from the Project is that ADB project officers should be selected on the basis of their indepth knowledge of the Project involved and where possible be involved with several projects in the same country, rather than similar projects in a number of countries. In addition, project officers should undertake regular six monthly reviews of sufficient duration to visit all project implementation sites, involving MOF, MOW and MMP personnel on such inspections, as well as informal reviews at six monthly intervals.

55. The PCE on similar major projects, particularly those involving outer island work, should be full-time permanent residents in the country.

56. Where a BME system is incorporated in a Project it is important to monitor implementation progress during the initial project period to ensure BME formulation and the collection of baseline data.

C. Recommendations

1. Further Monitoring

57. Progress in implementing the user pay charges for the road cost recovery strategy needs to be monitored closely.

58. Progress in implementing the road safety awareness program by AusAID based on ADB's TA study on a road safety strategy needs to be monitored closely.

59. Progress in the linkages of the PMS and BME systems as set up by MOW should also be monitored closely.

2. Covenants

60. The Government should ensure that the current status of compliance with the covenant relating to port operations (operating ratios) should be maintained or improved, and the covenants relating to road tax policy and the reporting of agricultural anticipated benefits should be fully complied with before the next financial year (FY 2002).

3. Further Action

61. The Government should ensure implementation of the plan for the sustainability of the project facilities and also pursue the road safety program planned for implementation by AusAID.

4. Additional Assistance

62. To promote sustainability, the Government should take measures to ensure (i) adequate funding for the maintenance of project facilities (ii) appropriate traffic management for the urban centers and (iii) an improvement in interislands shipping services and operations. The Government should consider seeking external assistance to examine options for (ii) and (iii) and to further strengthen MOW road maintenance capacity.

APPENDIXES

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PROJECT HISTORY OF MILESTONE EVENTS

A. Project Processing to Loan Effectiveness

12-23 August 1993	-	Fact-Finding Mission
10 November 1993	-	Management Review Meeting
22 November-8 December 1993	-	Appraisal Mission
30 March 1994	-	Staff Review Committee Meeting
10-11 May 1994	-	Loan Negotiations
28 June 1994	-	Loan Approval
28 June 1995	-	Loan Agreement Signing
2 August 1995	-	Loan Effectiveness

B. Consulting Services

1. Project Coordination Engineer

April 1995	-	The project coordination engineer (PCE) was engaged and started field work.
May 1995	-	The PCE replacement worked for 4 months in the field.
September 1995	-	The first PCE resumed assignment.
July 1996	-	The Ministry of Finance requested Asian Development Bank (ADB) approval for the PCE to supervise the Queen Salote Wharf 1 (QSW1) contract.
2 September 1997	-	The PCE ended the full-time assignment in favor of a two-weekly-visit every three months, or more frequently if required.
30 June 2000	-	The PCE completed the assignment.

2. Roads Engineer

January 1995	-	The road engineer (RE) was engaged and started work in the field.
August 1995	-	The road engineer completed the part of the assignment.
March to August 1996	-	The road engineer completed the second and final part of the assignments.

3. Ports Design Engineer

June 1995	-	The port design engineer (PDE) was engaged and started work.
September 1997	-	Most of the design work was completed.
December 1999	-	The port design engineer completed the assignment.

C. Procurement

1. Refurbishment of Queen Salote Wharf Berth No. 1 (QSW1) Contract

1 October 1995	-	Prequalification invitation
1 December 1995	-	Prequalification closed
1 March 1996	-	Bid invitation for QSW1 contract
24 May 1996	-	Bid closed for QSW1 contract
27 June 1996	-	ADB approves award of contract for QSW1

2. Supply of Steel

3 January 1996	-	Separate bid invitation for procurement of steel through international shopping (IS) procedures.
23 February 1996	-	Steel bids closed.
13 June 96	-	Steel supply contract awarded.

3. Contract for the Construction of the Ports Administration Department (PAD) Building

8 July 1996	-	Invitation of bids through the local competitive bid procedure.
9 August 1996	-	Bid opening.
12 September 1996	-	ADB approves award of contract
October 1996	-	Construction begins.
July 1997	-	Construction completed.
2 December 1997	-	Official opening of Ports Administration Department (PAD) building.

4. Supply of Tractor and Trailer for Ha'afeva

August 1996	-	Invitation of IS bids.
20 February 1997	-	Bid opening.
19 March 1997	-	ADB approves contract award.

5. Supply of Computer Equipment

November 1997	-	Invitation of IS bids.
5 December 1997	-	Bid opening.
16 April 1998	-	ADB approves contract award.

6. Supply of Waste Oil Disposal Facilities

February 1999	-	Invitation of IS bids.
July 1999	-	Contract awarded.
October 1999	-	Construction of civil works begins.
December 1999	-	Plant erected.
January 2000	-	Facilities commissioned.

D. General

- | | | |
|-----------------------------|---|---|
| 10 November 1992 | - | ADB approved a position paper for the proposed marine infrastructure project. The main objective of the project is to support the Government's Sixth Five-Year Development Plan (1991-1995) by upgrading key international and interisland port facilities and main highways. |
| January-February 1993 | - | The country programming mission identified the proposed project as one of the priorities of the Government. |
| 30 April 1993 | - | The Government informed South Pacific Regional Office (SPRO) of the scope of the proposed project. |
| 17 May 93 | - | ADB's Consulting Services Division selected a staff consultant for road engineer to assist the fact-finding mission. |
| 28–30 June 1993 | - | Reconnaissance mission on the financial aspects of ports component of the proposed transport infrastructure project conducted by SPRO senior financial analyst, and staff consultant (transport economist) in close consultation with the Transport and Communications Division (East) (IFTE). |
| 29 June 1993 | - | Government requested to prepare initial environmental examinations for prospective road sections under the project prior to fact-finding. |
| 12–23 August 1993 | - | The Fact-Finding Mission was fielded. |
| 10 November 1993 | - | The management review meeting was held. |
| 12 November 1993 | - | The Government concurrence to the appraisal mission. |
| 22 November–8 December 1993 | - | The Appraisal Mission was fielded. |
| 13 December 1993 | - | The Appraisal Mission reported that the total project cost has increased to US\$13.3 million and the proposed loan amount to US\$10.0 million as a result of the inclusion of an additional 14 kilometers of road upgrading and revised amounts for loan service charges and price contingencies. |
| 22 December 1993 | - | PAD received the report of the staff consultant and information systems expert, whose recommendations will be incorporated in the terms of reference (TOR) for the proposed advisory technical assistance (TA) for the institutional development of the ports section. |

- | | | |
|------------------|---|--|
| 25 January 1994 | - | ADB received a shortlist for the selection of the project coordination engineer and roads engineer. |
| 26 January 1994 | - | ADB asked the Government to submit summary evaluation sheet and narrative evaluation criteria for the consultants' selection. |
| 11 February 1994 | - | ADB forwarded to the Government revised consultants' terms of reference for project implementation. |
| 30 March 1994 | - | Staff review committee meeting was held. |
| 5 April 1994 | - | SPRO requested to finalize arrangements with the Government for loan negotiations from 25 to 27 April 1994. |
| 12 April 1994 | - | ADB Management authorized loan negotiations |
| 1 July 1994 | - | The Government set up a Ministry of Marine and abolished the positions of Director of Marine and Harbour Master effective 30 June. |
| 10–11 May 1994 | - | Loan negotiations were conducted in Tonga by senior SPRO economist (chief negotiator), senior project specialist, and counsel on behalf of ADB. |
| 17 May 1994 | - | The chief negotiator reported that (i) the ADB approved first-ranked consultants for project coordination engineer and roads engineer have already been invited by the Government to negotiate contract; (ii) the firm approved by ADB for detailed design and construction supervision for the port component has been invited to submit a technical proposal; and (iii) negotiated contracts with the individual consultants and evaluation of the technical proposals will be submitted to ADB by 15 June 1994. |
| 17 May 1994 | - | The chief negotiator submitted a back to office report (BTOR) on the loan negotiations to ADB. |
| 20 May 1994 | - | SPRO advised ADB that a memorandum of understanding (MOU) had been signed by the Ministry of Finance and the Ministry of Works. |
| 31 May 1994 | - | The ADB Management approved the circulation of Board documents related to the Project. |
| 7 June 1994 | - | ADB provided the Project Administration Memorandum to the Government and requested the Government to give a copy to consultants responsible for detailed design |

	-	The Government was advised that the administration of the project would be transferred to SPRO.
28 June 1994	-	The loan was approved.
8 August 1994	-	The loan was signed.
11–19 May 1995	-	The Inception Mission was undertaken by SPRM financial analyst and project officer.
12 June 1995	-	Parliament approved the loan for the Transport Infrastructure Project.
1 September 1995	-	The Government opened an imprest account for the project with ANZ Bank, Tonga.
27 November–December 1995	-	SPRM fielded the first review mission of the project.
March 1996	-	The road engineer's replacement completed the road designs.
26 August–6 September 1996	-	The second review mission was fielded.
6–15 November 1996	-	A special loan administration mission was fielded.
16–27 June 1997	-	The mid-term review mission was fielded.
7 August 1997	-	ADB approved the direct procurement of navigational lights for the ports component from a local based supplier.
25 October–5 November 1997	-	The forth review mission was fielded.
2 December 1997	-	The ADB-financed PAD building was officially opened.
24 April 1998	-	Government requested ADB approval to use savings under other categories to upgrade more roads.
11 May 1998	-	ADB approved the use of loan savings to upgrade additional roads.
22 September 1998	-	The first two audited financial statements FY 1996 and 1997 were received.
24 August–4 September 1998	-	The fifth review mission was fielded.
19–27 April 1999	-	The sixth review mission was fielded.
16 April 1999	-	ADB approved a second request for utilization of loan savings for additional roads.
15–28 September 1999	-	The seventh review mission was fielded.
7 December 1999	-	The Government requested ADB's approval for an extension of the loan closing date.
1 February 2000	-	ADB approved the extension of the loan closing date by six months, from 31 December 1999 to 30 June 2000.
4–15 April 2000	-	The eighth review mission was fielded.
3–30 June 2000	-	The project completion review mission was fielded.

List of Roads, Road Traffic Projections and Cost Estimates

Road Section	Location Type	Surface at Appraisal	Estimated Length (km)	AADT a/ AR b/	AADT 2000	Estimated Cost per km		Total Estimated Cost		Actual Length (km)	Actual Cost per km		Total Actual Cost		Completion Date Year
						T\$'000	US\$'000	T\$'000	US\$'000		T\$'000	US\$'000	T\$'000	US\$'000	
Nuku'alofa															
1 Fatafehi Road (Salote-Mateialona)	urban	chip seal	0.8	3,500	14,360	510	382.5	408	306	0.57	260	214	147	121	1996
2 Fatafehi Road (Bypass-Mateialona)	urban	chip seal	0.8	1,880	4,840	195	146.3	156	117	0.82	197	162	160	132	1996
3 Railway Road (Salote-Mateialona)	urban	chip seal	0.8	2,400	11,230	355	266.3	284	213	0.60	166	125	98	74	1998
4 Wellington Road (Vaha'akolo-Lavinia)	urban	chip seal	0.6	2,700	17,430	350	262.5	210	158	0.67	174	140	117	93	1997
5 Wellington Road (Vaha'akolo-Albert St.)	urban	chip seal	0.6	1,970	4,730	200	150.0	120	90	0.44	124	100	55	44	1997
6 Mateialona Road (Taufa'ahau- Fatafehi)	urban	chip seal	0.3	6,440	6,230	395	296.3	119	89	0.26	153	121	40	31	1997
7 Mateialona Road (Fatafehi-Tupoulahi)	urban	chip seal	0.4	4,070	3,600	225	168.8	90	68	0.42	153	121	58	46	1997
8 Salote Road (Taatefehi-Bypass)	urban	chip seal	2.5	4,100	7,450	150	112.5	375	281	2.13	168	137	377	309	1996
9 Vaha'akolo Road (Hihifo-urban Taufa'ahau)	urban	chip seal	0.5	1,620	5,880	180	135.0	90	68	3.57	72	54	255	192	1997
10 Tupoulahi Road (Vuna-Bypass)	urban	chip seal	1.5	2,120	2,960	150	112.5	225	169	1.43	115	93	164	132	1997
11 Laifone Road (Taufa'ahau-Tupoulahi)	urban	chip seal	0.6	1,390	3,750	175	131.3	105	79	0.63	156	123	98	77	1997
12 Sunia'akaveka Road (Vuna-Hihifo)	urban	coral	1.3	1,080	1,910	140	105.0	182	137	1.21	145	121	175	146	1996
Roads under Reserved List															
13 Albert Street (Vuna-Hihifo) Tongatapu	urban	chip seal	0.8	920	1,630					0.78	36	27	28	21	1996
14 Nualie-Folaha	rural	coral	2.7	350	840	100	75.0	270	203	4.47	65	54	273	226	1997
15 Holoipepe-Fatai	rural	coral	2.5	300	570	100	75.0	250	188	2.50	61	51	162	134	1996
16 Holoipepe-Matahau	rural	coral	2.5	200	700	80	60.0	200	150	2.65	61	50	153	126	1997
17 HihifoRoad-Puke	rural	coral	1.0	280	690	100	75.0	100	75	0.91	61	51	56	46	1996
Roads under Reserved List															
18 Folaha-Longoteme	rural	coral	2.2	180	200					1.36	35	22	67	42	1999
19 Houma Liahona	rural	coral	2.7	190	390					2.66	42	26	112	70	1999
20 Malapo-Hoi	rural	chip seal	7.0		2,320					6.41	42	30	267	191	1997
21 Hoi-Makaunga-Kolonga-Niutoa	rural	chip seal	7.0		1,320					10.48	42	29	437	309	1998
Eua															
22 'Ohonua-Nafanua Harbour-Kolomailae	rural	chip seal/coral	6.0	300	1,660	105	78.8	630	473	5.88	58	42	342	245	1998
Ha'apai															
23 Causeway-Faleloa	rural	coral	6.0	500	320	85	63.8	510	383	6.80	81	64	552	432	1998
Vava'u															
24 Mataika-Tu'anekeviale (cancelled)	rural	coral	7.0	300		140	105.0	-	-	-					
25 Neiafu-Makave	rural	coral	2.0	500	930	150	112.5	300	225	1.65	102	76	168	126	1998
26 Neiafu-Mataika	rural	coral	4.9	770	880	140	105.0	686	515	4.25	102	65	433	275	1998

a/ Annual average daily traffic

b/ Appraisal report

Source: Ministry of Works

Road Section	Location Type	Surface at Appraisal	Estimated Length (km)	AADT AR	AADT 2000	Estimated Cost per km		Total Estimated Cost		Actual Length (km)	Actual Cost per km		Total Actual Cost		Completion Date Year
						T\$'000	US\$'000	T\$'000	US\$'000		T\$'000	US\$'000	T\$'000	US\$'000	
Vava'u															
27 Tefisi-Tu'anuku (including Taao & Vaimalo Rd)	rural	coral	4.6	220	185	140	105.0	644	483	7.31	102	77	745	563	1998
28 Fatafehi (King Road-Fungamisi, Neiafu) (cancel)	urban		0.9												
29 King (Fatafehi-Siu'ilikutapu, Neiafu) (cancel)	urban		0.3												
30 Tapueluelu (King Road-Fangatongo Neiafu) (cancel)	urban		0.7												
31 Mateialona (Tapueluelu-Tefisi Road Neiafu) (cancel)	urban		0.6												
Additional Roads															
Nuku'alofa															
32 Hofoa-Sopu	urban	coral	1.0	370	820	80	60.0	80	60	0.85	165	103	140	88	2000
33 Popua-Vuna Road	urban	coral			940					1.41	46	29	70	44	1999
Tongatapu															
34 Fo'ui-Ha'atafu	rural	chip seal			790					5.94	40	26	235	155	
35 Pelehake-Lavengatonga	rural	coral	2.9	230	590	80	60.0	232	174	2.92	42	27	123	78	1999
36 Lavengatonga-Haveluliku	rural	coral			500					4.18	42	27	176	112	1999
37 Haveluliku-Tatakamotonga	rural	coral	2.9	120	490	80	60.0	232	174	2.91	42	27	123	78	2000
38 Matahau-Fo'ui	rural	coral			530					3.68	42	26	155	97	2000
39 Fo'ui-Houma	rural	chip seal			360					7.33	40	25	309	193	2000
40 Nukunuku-Vaotu'u	rural	coral			300					3.35	42	26	140	88	2000
41 Hoi-Kolonga	rural	coral			210					6.87	42	26	290	181	2000
42 Bird Park-Fua'amotu	rural	coral			110					10.42	42	26	440	275	2000
43 Haveluliku-Niutoua Vava'u	rural	coral			130					9.50	42	26	401	249	2000
44 Neiafu - Tefisi (reseal)	rural	chip seal			580					5.25	26	16	138	86	2000

- a/ Annual average daily traffic
b/ Appraisal report
c/ Ministry of Works

Road Section	Location Type	Surface at Appraisal	Estimated Length (km)	AADT AR	AADT 2000	Estimated Cost per km		Total Estimated Cost		Actual Length (km)	Actual Cost per km		Total Actual Cost		Completion Date Year
						T\$'000	US\$'000	T\$'000	US\$'000		T\$'000	US\$'000	T\$'000	US\$'000	
Tourist Access Roads															
Vava'u															
45 Halaika Beach**	rural	coral								0.77					1999
46 Anahulu Cave Road**	rural	coral								0.29					1999
47 Anahulu Beach Road**	rural	coral								0.32					1999
49 Mt Talau**	rural	coral								0.70					2000
Eua															
48 Houma/Anakula Lookout**	rural	coral								10.02					1998
Tongatapu															
50 Ha'atafu Beach	rural	coral			220					0.46	33	24	15	11	1998
51 Kolovai Beach	rural	coral			330					1.75	33	23	58	41	1998
52 Bird Park/Keleti Beach	rural	coral			370					6.05	49	31	298	187	2000
53 Blow Holes	rural	coral			570					3.14	40	26	125	83	1998
54 Princess Resort	rural	coral								0.70	30	19	22	13	2000
55 Vaini - Hufangalupe	rural	coral			140					3.89	42	26	164	103	2000
Subtotal Civil Works			78.9	39,000	104,985	4,405	3,304	6,498	4,873	163.5	3,653.0	2,734.0	8,961.0	6,365.0	

COST ESTIMATES/ACTUAL EXPENDITURES AND COMMITMENTS
(US\$ million)







Subproject	Original Cost Estimates			Foreign Cost %	Actual Cost		
	Foreign	Local	Total		Foreign	Local	Total
A. Roads Component							
1. Civil Works					4.31	1.98	6.29
Tonatapu	0.43	0.14	0.57				
Nuku'alofa	0.95	0.32	1.27				
Vava'u	1.33	0.40	1.73				
Ha'apai	0.37	0.10	0.47				
Eua	0.36	0.05	0.41				
Tourist Access	0.31	0.17	0.48				
Subtotal: Civil Works	3.75	1.18	4.93	76	4.31	1.98	6.29
2. Equipment							
Two Project Vehicles	0.04		0.04		0.04		0.04
Geotech/Survey	0.03		0.03		0.02		0.02
Additional Equipment					0.12		0.12
Subtotal: Equipment	0.07		0.07	100	0.18		0.18
3. Consultants							
PCE a/	0.44	0.01	0.45		0.28	0.07	0.35
Road Engineer	0.26	0.02	0.28		0.29		0.29
Subtotal: Consultants	0.70	0.03	0.73	98	0.57	0.07	0.64
Subtotal: Base Costs	4.52	1.21	5.73	75	5.06	2.05	7.11
4. Contingencies							
Physical Contingencies(7%)	0.31	0.09	0.40				
Price Contingencies (3.1% p.a.)	0.45	0.20	0.65				
Subtotal: Contingencies	0.76	0.29	1.05				
5. Loan Service Charge	0.22		0.22	100	0.12		0.12
Subtotal A	5.50	1.50	7.00	79	5.18	2.05	7.23
B. Ports Component							
1. Civil Works:					3.22	1.69	4.91
Niuas	0.12	0.01	0.13				
Ha'afeva	0.30	0.09	0.39				
Nafanua, Faua	0.18	0.10	0.28				
QSW1	1.52	0.42	1.94				
Port Administration Building	0.40	0.15	0.55				
Subtotal: Civil Works	2.52	0.77	3.29	76	3.22	1.69	4.91
2. Equipment:							
PAD Office Computers, etc.	0.06	0.01	0.07		0.08	0	0.08
Oil Disposal Facilities	0.07	0.01	0.08		0.15	0.01	0.16
Tractor/Trailer, Ha'afeva	0.04		0.04		0.03	0	0.03
Cranes/Niuas	0.06	0.01	0.07		0.03	0	0.03
Navais, Niuas, Ha'afeva, Nuku'alofa	0.30	0.01	0.31		0.09	0.01	0.10
Spare mooring buoy, Nuku'alofa	0.03	0.01	0.04		0.03	0.01	0.04
Boat/winch, Tafahi	0.03		0.03		0.01	0	0.01
Additional Equipment					0.09	0	0.09
Subtotal: Equipment	0.59	0.05	0.64	92	0.51	0.03	0.54
3. Consultants							
PCE a/	0.34	0.01	0.35		0.23	0.05	0.28
Ports	0.30	0.02	0.32		0.17	0.06	0.23
Subtotal: Consultants	0.64	0.03	0.67	96	0.40	0.11	0.51
Subtotal: Base Costs	3.75	0.85	4.60				
4. Contingencies							
Physical Contingencies (7%)	0.26	0.09	0.35				
Price Contingencies (3% p.a.)	0.31	0.06	0.37				
Subtotal: Contingencies	0.57	0.15	0.72				
5. Loan Service Charge	0.18		0.18	100	0.12		0.12
Subtotal B	4.50	1.00	5.50	81	4.25	1.83	6.08
Total	10.00	2.50	12.50	80	9.43	3.88	13.31

a/ Project Coordination Engineer

LOAN 1303-TON(SF): TRANSPORT INFRASTRUCTURE PROJECT IMPLEMENTATION SCHEDULE

PROJECT COMPONENTS		1994				1995				1996				1997				1998				1999				2000			
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6				YEAR 7			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1.	Civil Works																												
	(a) Ports																												
	(i) Queen Salote Wharf (QSW1)																												
	(ii) Ports Admin Building																												
	(iii) Small Ports																												
	(b) Goods																												
2.	Equipment																												
3.	Consultants																												
	(i) Project Management																												
	(i) Project Coordination Engineer (PCE)																												
	(ii) Road Design and Supervision																												
	(iii) Port Design and Supervision																												
	(b) Advisory Technical Assistance																												
	(i) Road Sector																												
	(ii) Ports Sector																												

LEGEND

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PROCUREMENT DETAILS

Category	Contract Number	Contract Description	Awarded	Contract Value US\$	Mode of a/ Procurement	Date of Procurement
A. Civil Works						
	0006	Construction of Queen Salote Wharf Berth No. 1	Downer Construction Co. Ltd., New Zealand	1,028,624	ICB	13 September 1996
	0007	Steel Works for Wharf Construction	Fletcher Challenge Steel	249,129	IS	26 September 1996
	0010	Construction of Port Administration Building	Loumaile & Vete	401,421	LCB	09 January 1997
	0013	Ha'afeva Wharf Construction	Holdings Ministry of Works	965,200	FA	26 March 1997
	various	Other Port Constructions	Ministry of Works	589,593	FA	01 October 1997
	various	Constructions of all Roads	Ministry of Works	5,166,101	FA	06 October 1995
B. Equipment						
	0002	Supply of two Project Vehicles	ASCO Motors, Tonga	35,729	IS	06 October 1995
	0011	Tractor for Ha'afeva	ASCO Motors, Tonga	27,987	IS	26 March 1997
	0012	Trailer for Ha'afeva	BON Pacific NZ	6,154	IS	26 March 1997
	0015	Buoys	Powerhouse Development, NZ	49,502	IS	18 February 1998
	0019	Supply of Computer Equipment	Dispersed Data Network Co. Ltd., NZ	13,794	IS	29 May 1998
	0020	Supply and Installation of Network	Dispersed Data Network Co. Ltd., NZ	26,102	IS	09 June 1998
	various	Supply and Installation of Waste Oil Disposal Facilities	Oregon Pacific Tonga Co. Ltd.	160,000	IS	July 1999
	0026	Supply of Port Equipment	Vital Mechanical and Machinery Export	68,153	IS	17 December 1999
	0027	Supply of Road Survey Equipment	Leica Geosystems PTY. LTD., NSW	10,120	DP	20 March 2000
	0030	Supply of Port Equipment	Naider & Biddle LTD NZ	241,750	IS	June 2000
	0036	Supply of Road Equipment	ASCO Motors, Tonga	93,507	DP	June 2000
C. Consulting Services						
	0003	Project Coordination Engineer	Works Consultants, NZ	619,249	ICB	April 1995
	0004	Road Engineer	SMEC, Australia	293,182	ICB	January 1995
	0005	Port Design Engineer	Kinhills Engineers PTY LTD, Australia	278,175	ICB	June 1995

a/ DP = direct purchase; FA = force account;
 ICB = international competitive bidding; IS = international shopping; and
 LCB = local competitive bidding
 Source: South Pacific Regional Mission, ADB

STATUS OF COMPLIANCE WITH MAIN LOAN COVENANTS

Item No.	Covenants	Remarks
1	<p>A senior official of the Ministry of Finance (MOF), the Project, Executing Agency, with the rank of not less than Deputy Secretary, will be appointed to serve as the project director throughout the period of project implementation.</p> <p>Loan Agreement (LA) Section 4.01 (b) Schedule 6 para. 1.</p>	Complied with.
2	<p>A Project Co-ordination Committee (PCC) will be established for the Project and maintained throughout the period of project implementation. The PCC will consist of the project director as the chairman, the commander of police; the director of planning; the secretary for lands, survey and natural resources; the secretary for marine and ports; and the director of works.</p> <p>LA Section 4.01 (b) Schedule 6 para. 2.</p>	Complied with.
3	<p>The Ministry of Works (MOW), the Implementing Agency, will establish and maintain a project management office. MOW will appoint a senior graduate civil engineer with adequate experience in supervising internationally-financed projects as the project manager.</p> <p>LA Section 4.01 (b) Schedule 6 para. 3.</p>	Complied with.
4	<p>The Government will take necessary action to:</p> <p>(i) introduce mechanisms to source and apply public funds to meet efficient road maintenance requirements; and</p> <p>(ii) establish a road safety strategy, consistent with the recommendations of the consultants engaged under the technical assistance for cost recovery and safety strategies for the road sector within 12 months after the submission of the consultants' final report.</p> <p>LA Section 4.01 (b) Schedule 6 para. 4.</p>	Partly complied with.

5 (i)	<p>The Government will take necessary action to increase the management autonomy, accountability and financial and operational efficiency of its port administrations consistent with the recommendations of the consultants engaged under the technical assistance on institutional development of the port sector and in accordance with an implementation schedule satisfactory to ADB.</p> <p>LA Section 4.01 (b) Schedule 6 para. 5.a.</p>	Complied with.
5 (ii)	<p>The Government will achieve and maintain for the port sector</p> <p>(i) an operating ratio not higher than 95 percent for each of its financial years beginning 1 July 1996, and</p> <p>(ii) an operating ratio not higher than 90 percent for each of its financial years beginning 1 July 2001.</p> <p>LA Section 4.01 (b) Schedule 6 para. 5.b and c.</p>	Complied with.
6 (i)	<p>The Government will ensure that suitable environmental controls are incorporated in the design, construction, and operation of the project facilities.</p> <p>LA Section 4.01 (b) Schedule 6 para. 6.</p> <p>The Government will adopt the environmental mitigation measures recommended by the summary initial environmental examinations conducted for Ha'afeva and Faua.</p> <p>LA Section 4.01 (b) Schedule 6 para. 6.</p>	<p>Partly complied with.</p> <p>Environmental mitigation measures were adopted, but no alternative was found to the use of beach sand during project implementation.</p> <p>Complied with.</p>
6 (ii)	<p>The Government will review all construction methods and quarry management practices currently in effect to minimize the use of beach sand.</p> <p>LA Section 4.01 (b) Schedule 6 para. 6.</p>	Partly complied with.
7 (i)	<p>The Government will take necessary action, including the reallocation of existing agricultural extension services, to stimulate agricultural and fisheries production in and around the project areas.</p> <p>LA Section 4.01 (b) Schedule 6 para. 7.</p>	Complied with.

7 (ii)	<p>The Government will report to ADB on such action and progress in achieving anticipated benefits not less than once every six months.</p> <p>LA Section 4.01 (b) Schedule 6 para. 7.</p>	Partly complied with.
8	<p>The Government will take all necessary action to expand the scope of the oil collection facility established at Nuku'alofa under the port component of the Project, including the collection of waste oil for disposal through recycling and or other appropriate means, consistent with the recommendation of the PCE.</p> <p>LA Section 4.01 (b) Schedule 6 para. 8.</p>	Complied with.
9	<p>The Government in consultation with the Forum Secretariat and ADB, will review its Shipping Act and adopt regulations implementing the Shipping Act no later than 31 December 1996.</p> <p>LA Section 4.01 (b) Schedule 6 para. 9.</p>	Partly complied with. Act was reviewed, but not adopted in the specified time-frame.
10	<p>The Government will:</p> <ul style="list-style-type: none"> (i) maintain separate accounts for the Project; (ii) have the project accounts and related financial statements audited annually; and (iii) furnish to ADB as soon as available but in any event not later than nine months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and the report of the auditors. <p>LA Section 4.01 (b) Schedule 6 para. 10.</p>	Complied with.
11	<p>The Government and ADB will conduct a midterm review of the Project at a mutually agreeable time, but in any event not later than 30 June 1997.</p> <p>LA Section 4.01 (b) Schedule 6 para. 10.</p>	Complied with.

COMPARISON OF APPRAISAL AND ACTUAL LOAN DISBURSEMENTS
(US\$'000)

Year	Quarter	Appraisal			Actual		
		Disbursed	Cumulative	%	Disbursed	Cumulative	%
1994		215	215	2.15	0	0	0.00
1995	I				0	0	0.00
	II				0	0	0.00
	III				0	0	0.00
	IV				942	942	10.13
1996		2,683	2,898	28.98		942	
	I				206	1,148	12.34
	II				31	1,179	12.68
	III				199	1,378	14.82
1997	IV				1,450	2,828	30.41
		4,667	7,565	75.65		2,828	30.41
	I				474	3,302	35.51
	II				416	3,718	39.98
1998	III				340	4,058	43.63
	IV				323	4,381	47.11
		1,544	9,109	91.09		4,381	47.11
	I				923	5,304	57.03
1999	II				62	5,366	57.70
	III				16	5,382	57.87
	IV				207	5,589	60.10
		846	9,955	99.55		5,589	60.10
2000	I				1,340	6,929	74.51
	II				70	6,999	75.26
	III				174	7,173	77.13
	IV				59	7,232	77.76
2000		45	10,000	100		7,232	77.76
	I				788	8,020	86.24
	II				99	8,119	87.30
	III				1,013	9,132	98.19
	IV				303	9,435	100.00
Total		10,000			9,435		

Source : ADB

Road Vehicle and Traffic Accident Data

Item	1995	1996	1997	1998	1999
<i>Registered Vehicles</i>					
Private	15,702	18,322	17,892	18,767	20,815
Government	1,196	1,277	651	652	690
Total	16,898	19,599	18,543	19,419	21,505
<i>Traffic Accidents</i>					
Accidents- no injury	276	272	589	324	312
Slightly injured	69	91	80	35	41
Seriously injured	15	39	17	21	18
Fatal pedestrian	7	2	6	2	2
Fatal passenger	4	3	7	6	7
Fatal driver	3		6	2	1
Total accidents	374	407	705	390	381
Total deaths	14	5	19	10	10
Injury accidents	98	135	97	98	69
Deaths/10,000 vehicles	8.3	2.6	10.2	5.1	4.7
Fatality Index	14.3%	3.7%	19.6%	10.2%	14.5%

Source: Ministry of Police

Financial Internal Rate of Return
Ports Component
(T\$'000s 2000 prices)

Year	Project Capital Expenditure	Annual Maintenance	Operating Cost Savings	Incremental Operating and Maintenance Costs	Incremental Cash Revenue	Net Cash Inflow (Outflow)
1995	301.57					(301.57)
1996	1,502.64					(1,502.64)
1997	2,353.43					(2,353.43)
1998	1,066.31	29.12		29.12		(1,095.44)
1999	1,081.81	29.12	109.00	-79.88	675.85	(326.08)
2000	1,463.70	29.12	109.00	-79.88	744.40	(639.43)
2001		45.29	109.00	-63.71	781.62	845.33
2002		45.29	109.00	-63.71	820.70	884.41
2003		45.29	109.00	-63.71	837.11	900.82
2004		45.29	109.00	-63.71	853.86	917.56
2005	45.68	45.29	109.00	-63.71	870.93	888.96
2006		45.29	109.00	-63.71	888.35	952.06
2007		45.29	109.00	-63.71	906.12	969.83
2008		45.29	109.00	-63.71	924.24	987.95
2009		45.29	109.00	-63.71	942.73	1,006.43
2010	45.68	45.29	109.00	-63.71	961.58	979.61
2011		45.29	109.00	-63.71	980.81	1,044.52
2012		45.29	109.00	-63.71	1,000.43	1,064.14
2013		45.29	109.00	-63.71	1,020.44	1,084.14
2014		45.29	109.00	-63.71	1,040.85	1,104.55
2015	53.99	45.29	109.00	-63.71	1,061.66	1,071.38
2016		45.29	109.00	-63.71	1,082.90	1,146.60
2017		45.29	109.00	-63.71	1,104.55	1,168.26
2018		45.29	109.00	-63.71	1,126.65	1,190.35
2019	(2531.25)	45.29	109.00	-63.71	1,149.18	3,744.13
					FIRR	10.5%

Source: Staff Consultant's Report of the Project Review Mission, July 2000.

Summary of Road Subproject EIRR Calculations

Road Section	AADT a/		Road Length		Total Cost				Economic Internal Rate of Return (EIRR)						
	RRP b/ Year 1	PMS c/ 2000	Estimated	Actual	Estimated		Actual		AR d/ 1994 Base Case	AM e/ 1998 Base Case	Base Case	10% Costs Increase	10% Benefit Reduction	2+3	Two Year Delay in Benefits
			(km)		T\$'000	US\$'000	T\$'000	US\$'000							
A. Nuku'alofa															
1 Fatafehi Road (Salote-Mateialona)	3,500	14,360	0.80	0.57	408	306	147	121	29.0%		56.8%	54.2%	53.9%	51.4%	39.8%
2 Fatafehi Road (Bypass-Mateialona)	1,880	4,840	0.80	0.82	156	117	160	132	19.0%		43.9%	40.8%	40.5%	37.7%	29.6%
3 Railway Road (Salote-Mateialona)	2,400	11,230	0.80	0.60	284	213	98	74	22.0%		114.6%	106.7%	105.9%	98.6%	57.6%
4 Wellington Road (Vaha'akolo-Lavinia)	2,700	17,430	0.60	0.67	210	158	117	93	21.0%		114.4%	107.2%	106.5%	99.7%	59.8%
5 Wellington Road (Vaha'akolo-Albert St.)	1,970	4,730	0.60	0.44	120	90	55	44	34.0%		36.8%	35.6%	35.5%	34.2%	29.9%
6 Mateialona Road (Taufa'ahau- Fatafehi)	6,440	6,230	0.30	0.26	119	89	40	31	102.0%		95.7%	89.1%	88.5%	82.4%	51.1%
7 Mateialona Road (Fatafehi-Tupoulahi)	4,070	3,600	0.40	0.42	90	68	58	46	52.0%		43.8%	40.7%	40.4%	37.5%	29.4%
8 Salote Road (Taatefehi-Bypass)	4,100	7,450	2.50	2.13	375	281	377	309	67.0%		60.4%	56.6%	56.3%	52.7%	38.6%
9 Vaha'akolo Road (Hihifo-urban Taufa'ahau)	1,620	5,880	0.50	3.57	90	68	255	192	29.0%		169.6%	156.1%	154.7%	142.4%	68.6%
10 Tupoulahi Road (Vuna-Bypass)	2,120	2,960	1.50	1.43	225	169	164	132	37.0%		48.0%	44.8%	44.4%	41.4%	31.9%
11 Laifone Road (Taufa'ahau-Tupoulahi)	1,390	3,750	0.60	0.63	105	79	98	77	22.0%		39.2%	36.5%	36.2%	33.7%	27.2%
12 Sunia'akaveka Road (Vuna-Hihifo)	1,080	1,910	1.30	1.21	182	137	175	146	27.0%		37.3%	34.5%	34.2%	31.7%	25.8%
B. Roads under Reserved List															
13 Albert Street (Vuna-Hihifo)	920	1,630	0.80	0.78	96	0	28	21	17.0%		100.7%	92.7%	91.9%	84.7%	50.2%
C. Tongatapu															
14 Nualie-Folaha	350	840	2.70	4.47	270	203	273	226	21.0%		63.0%	57.7%	57.2%	52.5%	36.5%
15 Holoiupepe-Fatai	300	570	2.50	2.50	250	188	162	134	20.0%		51.1%	46.5%	46.0%	42.0%	30.7%
16 Holoiupepe-Matahau	200	700	2.50	2.65	200	150	153	126	17.0%		54.0%	49.8%	49.4%	45.7%	33.6%
17 HihifoRoad-Puke	280	690	1.00	0.91	100	75	56	46	19.0%		54.2%	49.9%	49.5%	45.6%	33.4%
D. Roads under Reserved List															
18 Folaha-Longoteme	180	200	2.20	1.36	0	0	67	42	15.0%	17.3%	42.4%	38.6%	38.2%	34.9%	27.0%
19 Houma Liahona	190	390	2.70	2.66	0	0	112	70		18.5%	98.3%	88.0%	87.0%	78.1%	44.7%

a/ Annual Average Daily Traffic. b/ Report and Recommendation of the President

c/ Pavement Management System d/ Appraisal Report

e/ Project Review Mission

Source: Staff Consultant's Report of Project Review Mission, July 2000.

Road Section	AADT		Road Length		Total Cost				Economic Internal Rate of Return						
	RRP Year 1	PMS 2000	Estimated	Actual	Estimated		Actual		AR 1994 Base Case	AM 1998 Base Case	Base Case	10% Costs Increase	10% Benefit Reduction	2+3	Two Year Delay in Benefits
			(km)		T\$'000	US\$'000	T\$'000	US\$'000							
Tongatapu (continued)															
20 Malapo-Hoi	0	2,320	7.00	6.41	0	0	267	191			196.3%	179.1%	177.3%	161.8%	71.2%
21 Hoi-Makaunga-Kolonga-Niutoa	0	1,320	7.00	10.48	0	0	437	309			125.7%	115.0%	113.9%	104.3%	55.7%
Eua															
22 'Ohonua-Nafanua Harbour-Kolomaile	300	1,660	6.00	5.88	630	473	342	245	13.0%		106.0%	98.7%	98.0%	91.1%	54.0%
Ha'apai															
23 Causeway-Faleloa	500	320	6.00	6.80	510	383	552	432	12.0%		40.5%	36.9%	36.6%	33.4%	26.1%
Vava'u															
24 Mataika-Tu'anekeviale (cancelled)	300	0	7.00	-	-	-	0	0							
25 Neiafu-Makave	500	930	2.00	1.65	300	225	168	126	19.0%		51.7%	47.6%	47.2%	43.5%	32.1%
26 Neiafu-Mataika	770	880	4.90	4.25	686	515	433	275	19.0%		58.9%	53.6%	53.1%	48.4%	33.9%
27 Tefisi-Tu'anuku (incl. Taao & Vaimalo Rd)	220	185	4.60	7.31	644	483	745	563	18.0%		18.2%	16.7%	16.6%	15.2%	14.2%
Additional Roads															
Nuku'alofa															
32 Hofoa - Sopusu	370	820	1.00	0.85	80	60	140	88	23.0%		24.2%	22.3%	22.1%	20.4%	18.1%
33 Popua - Vuna Road	0	940		1.41	0	0	70	44			79.6%	72.1%	71.4%	64.8%	40.8%
Tongatapu															
34 Fo'ui - Ha'atafu	0	790		5.94	0	0	235	155			111.2%	101.8%	100.8%	92.3%	51.9%
35 Pelehake - Lavengatonga	230	590	2.90	2.92	232	174	123	78	19.0%	12.1%	119.1%	105.7%	104.4%	92.9%	48.2%
36 Lavengatonga - Haveluliku	0	500		4.18	0	0	176	112		15.0%	104.4%	92.7%	91.5%	81.6%	44.8%
37 Haveluliku - Tatakamotonga	120	490	2.90	2.91	232	174	123	78	11.0%	15.7%	119.1%	105.7%	104.4%	93.1%	48.5%
38 Matahau - Fo'ui	0	530		3.68	0	0	155	97		15.7%	87.6%	79.1%	78.2%	70.9%	43.0%
39 Fo'ui - Houma	0	360		7.33	0	0	309	193			47.2%	43.8%	43.4%	40.3%	30.9%
40 Nukunuku - Vaotu'u	0	300		3.35	0	0	140	88			101.1%	85.6%	84.3%	72.8%	40.0%
41 Hoi - Kolonga	0	210		6.87	0	0	290	181			43.6%	39.7%	39.3%	35.9%	27.6%
42 Bird Park - Fua'amotu	0	110		10.42	0	0	440	275			27.5%	25.1%	24.9%	22.7%	19.6%
43 Haveluliku - Niutoua	0	130		9.50	0	0	401	249			30.4%	27.7%	27.5%	25.1%	21.1%

Road Section	AADT		Road Length		Total Cost				Economic Internal Rate of Return						
	RRP Year 1	PMS 2000	Est.	Actual	Estimated		Actual		AR 1994 Base Case	AM 1998 Base Case	Base Case	10% Costs Increase	10% Benefit Reduction	2+3	Two Year Delay in Benefits
			(km)		T\$'000	US\$'000	T\$'000	US\$'000							
Vava'u															
44 Neiafu - Tefisi (reseal)	0	580		5.25	0	0	138	86			120.3%	110.2%	109.1%	100.0%	54.4%
Tourist Access Roads															
Vava'u															
45 Halaika Beach	0	0		0.77	0	0	0	0							
46 Anahulu Cave Road	0	0		0.29	0	0	0	0							
47 Anahulu Beach Road	0	0		0.32	0	0	0	0							
49 Mt Talau	0	0		0.70	0	0	0	0							
Eua															
48 Houma/Anakula Lookou*	0	0		10.02	0	0	0	0							
Tongatapu															
50 Ha'atafu Beach	0	220		0.46	0	0	15	11			44.1%	38.9%	38.4%	33.8%	24.5%
51 Kolovai Beach	0	330		1.75	0	0	58	41			123.5%	102.4%	100.5%	85.1%	41.4%
52 Bird Park/Keleti Beach	0	370		6.05	0	0	298	187			73.2%	66.4%	65.8%	59.8%	38.9%
53 Blow Holes	0	570		3.14	0	0	125	83			106.4%	94.9%	93.8%	83.9%	46.0%
54 Princess Resort	0	0		0.70	0	0	22	13			61.8%	56.1%	55.6%	50.6%	34.8%
55 Vaini - Hufangalupe	0	140		3.89	0	0	164	103			41.4%	37.7%	37.3%	34.1%	26.5%
Subtotal Civil Works			78.90	163.5											
Urban Roads Nuku'alofa		87,760									65.7%	61.7%	61.3%	57.5%	41.1%
Rural Roads Tongatapu											86.6%	79.1%	78.3%	71.5%	43.5%
Eua Road											106.0%	98.7%	98.0%	91.1%	54.0%
Ha'apai Road											40.5%	36.9%	36.6%	33.4%	26.1%
Vava'u Roads											34.5%	32.1%	31.9%	29.7%	24.8%
Tourist Access Roads											82.3%	72.6%	71.7%	63.7%	38.4%
Total Roads											65.3%	60.6%	60.2%	55.8%	38.8%
Total Road Subproject											54.4%	50.7%	50.3%	46.8%	34.5%

Economic Analysis of Total Roads Component and Individual Road Subprojects

Economic Internal Rate of Return								
Total Road Component								
(T\$'000s 2000 prices)								
Year	Economic Capital	Annual Maintenance	Total	Road Maintenance Saving	Vehicle Operating Cost Savings	Time Savings	Total	Net Benefits
1995	706.2		706.2	35.0			35.0	-671.2
1996	1,864.6		1,864.6	99.0	-87.5		11.5	-1,853.1
1997	1,649.1		1,649.1	184.8	200.7	20.9	406.4	-1,242.6
1998	1,181.4		1,181.4	247.2	1,643.6	475.4	2,366.3	1,184.9
1999	1,752.6		1,752.6	507.9	2,316.6	773.1	3,597.6	1,845.0
2000	2,381.0		2,381.0	589.7	3,282.0	1,183.1	5,054.8	2,673.8
2001			0.0	822.1	3,907.8	1,581.0	6,310.9	6,310.9
2002		15.6	15.6	904.5	4,142.3	1,675.8	6,722.6	6,707.1
2003		177.2	177.2	589.5	4,390.8	1,776.4	6,756.7	6,579.6
2004		128.0	128.0	969.1	4,654.3	1,883.0	7,506.3	7,378.3
2005		58.6	58.6	619.2	4,933.5	1,995.9	7,548.6	7,490.0
2006		197.4	197.4	645.5	5,229.5	2,115.7	7,990.7	7,793.4
2007				645.5	5,543.3	2,242.6	8,431.4	8,431.4
2008				645.5	5,875.9	2,377.2	8,898.6	8,898.6
2009				645.5	6,228.4	2,519.8	9,393.8	9,393.8
2010				645.5	6,539.9	2,645.8	9,831.2	9,831.2
2011				896.2	6,866.9	2,778.1	10,541.2	10,541.2
2012		15.6	15.6	978.6	7,210.2	2,917.0	11,105.9	11,090.3
2013		177.2	177.2	693.7	7,570.7	3,062.9	11,327.3	11,150.1
2014		128.0	128.0	1,043.6	7,949.3	3,216.0	12,208.9	12,080.9
2015		58.6	58.6	693.7	8,346.7	3,376.8	12,417.2	12,358.6
2016		197.4	197.4	731.2	8,764.1	3,545.6	13,040.9	12,843.6
2017				731.2	9,202.3	3,722.9	13,656.4	13,656.4
2018				731.2	9,662.4	3,909.1	14,302.7	14,302.7
2019				731.2	10,145.5	4,104.5	14,981.2	14,981.2
2020				731.2	10,551.3	4,268.7	15,551.2	15,551.2
2021				967.9	10,973.4	4,439.5	16,380.8	16,380.8
2022		15.6	15.6	1,050.4	11,412.3	4,617.0	17,079.7	17,064.1
2023		177.2	177.2	731.2	11,868.8	4,801.7	17,401.7	17,224.6
2024		69.7	69.7	1,081.1	12,343.5	4,993.8	18,418.5	18,348.8
2025	-33.7		-33.7	577.6	11,676.0	4,119.8	16,373.4	16,407.1
2026	137.7		137.7	495.9	6,889.9	3,792.9	11,178.8	11,041.1
2027	-71.7		-71.7	485.2	4,264.6	3,106.7	7,856.5	7,928.3
2028	-117.4		-117.4	431.5	2,817.6	2,097.6	5,346.7	5,464.1
2029	-59.9		-59.9	169.7	606.9	442.0	1,218.6	1,278.5
					EIRR			
					1. base case			
					54.4%			
					2. 10% remaining costs increase			
					50.7%			
					3. 10% benefit reduction			
					50.3%			
					4. 2+3			
					46.8%			
					5. Two year delay in benefits			
					34.5%			

Source: Staff Consultant's Report of Project Completion Review Mission, July 2000.

Economic Internal Rate of Return								
Total Roads Civil Works								
(T\$'000s 2000 prices)								
Year	Economic Capital	Annual Maintenance	Total	Road Maintenance Saving	Vehicle Operating Cost Savings	Time Savings	Total	Net Benefits
1995	378.2		378.2	35.0			35.0	- 343.2
1996	1,531.7		1,531.7	99.0	-87.5		11.5	-1,520.2
1997	1,421.1		1,421.1	184.8	200.7	20.9	406.4	-1,014.7
1998	1,132.8		1,132.8	247.2	1,643.6	475.4	2,366.2	1,233.4
1999	1,641.8		1,641.8	507.9	2,316.6	773.1	3,597.6	1,955.8
2000	1,882.8		1,882.8	589.7	3,282.0	1,183.1	5,054.8	3,172.0
2001				822.1	3,907.8	1,581.0	6,310.9	6,310.9
2002		15.6	15.6	904.5	4,142.3	1,675.8	6,722.6	6,707.0
2003		177.2	177.2	589.5	4,390.8	1,776.4	6,756.7	6,579.5
2004		128.0	128.0	969.1	4,654.3	1,883.0	7,506.4	7,378.4
2005		58.6	58.6	619.2	4,933.5	1,995.9	7,548.6	7,490.0
2006		197.4	197.4	645.5	5,229.5	2,115.7	7,990.7	7,793.3
2007				645.5	5,543.3	2,242.6	8,431.4	8,431.4
2008				645.5	5,875.9	2,377.2	8,898.6	8,898.6
2009				645.5	6,228.4	2,519.8	9,393.7	9,393.7
2010				645.5	6,539.9	2,645.8	9,831.2	9,831.2
2011				896.2	6,866.9	2,778.1	10,541.2	10,541.2
2012		15.6	15.6	978.6	7,210.2	2,917.0	11,105.8	11,090.2
2013		177.2	177.2	693.7	7,570.7	3,062.9	11,327.3	11,150.1
2014		128.0	128.0	1,043.6	7,949.3	3,216.0	12,208.9	12,080.9
2015		58.6	58.6	693.7	8,346.7	3,376.8	12,417.2	12,358.6
2016		197.4	197.4	731.2	8,764.1	3,545.6	13,040.9	12,843.5
2017				731.2	9,202.3	3,722.9	13,656.4	13,656.4
2018				731.2	9,662.4	3,909.1	14,302.7	14,302.7
2019				731.2	10,145.5	4,104.5	14,981.2	14,981.2
2020				731.2	10,551.3	4,268.7	15,551.2	15,551.2
2021				967.9	10,973.4	4,439.5	16,380.8	16,380.8
2022		15.6	15.6	1,050.4	11,412.3	4,617.0	17,079.7	17,064.1
2023		177.2	177.2	731.2	11,868.8	4,801.7	17,401.7	17,224.5
2024		69.7	69.7	1,081.1	12,343.5	4,993.8	18,418.4	18,348.7
2025	-33.7		-33.7	577.6	11,676.0	4,119.8	16,373.4	16,407.1
2026	137.7		137.7	495.9	6,889.9	3,792.9	11,178.7	11,041.0
2027	-71.7		-71.7	485.2	4,264.6	3,106.7	7,856.5	7,928.2
2028	-117.4		-117.4	431.5	2,817.6	2,097.6	5,346.7	5,464.1
2029	-59.9		-59.9	169.7	606.9	442.0	1,218.6	1,278.5
					EIRR			
					1. base case			
					65.3%			
					2. 10% remaining costs increase			
					60.6%			
					3. 10% benefit reduction			
					60.2%			
					4. 2+3			
					55.8%			
					5. Two year delay in benefits			
					38.8%			

Economic Internal Rate of Return Total Urban Roads - Nuku'alofa (T\$'000s 2000 prices)												
Year	AADT	Economic Capital Cost	Maintenance Costs			Vehicle Operating Costs			Time Benefits			Net Benefits
			Unimproved Road	Improved Road	Avoided Maintenance	Unimproved Road	Improved Road	Savings Benefit	Unimproved Road	Improved Road	Savings Benefit	
1995	1,145	91.7	8.7	0.0	8.7	96.0	96.0	0.0				-83.0
1996	33,253	802.6	9.7	0.0	9.7	1,850.2	1,937.8	-87.5				-880.5
1997	43,454	598.2	10.2	0.7	9.5	2,897.2	2,784.7	112.5				-476.2
1998	53,412	25.1	10.2	2.7	7.5	3,628.9	2,575.4	1,053.6				1,036.0
1999	68,542	116.6	26.5	2.8	23.7	4,667.9	3,348.6	1,319.3				1,226.4
2000	87,760	153.9	26.5	3.1	23.4	5,990.1	4,228.2	1,761.8				1,631.3
2001	93,026		263.2	3.3	259.9	6,356.8	4,462.9	1,893.9				2,153.8
2002	98,607		26.5	3.3	23.2	6,738.2	4,730.6	2,007.5				2,030.8
2003	104,524	69.4	26.5	3.3	23.2	7,142.5	5,014.5	2,128.0				2,081.8
2004	110,795		26.5	3.3	23.2	7,571.0	5,315.3	2,255.7				2,278.9
2005	117,443		26.5	3.3	23.2	8,025.3	5,634.3	2,391.0				2,414.2
2006	124,489	10.9	26.5	3.3	23.2	8,506.8	5,972.3	2,534.5				2,546.8
2007	131,959		26.5	3.3	23.2	9,017.2	6,330.6	2,686.5				2,709.8
2008	139,876		26.5	3.3	23.2	9,558.2	6,710.5	2,847.7				2,871.0
2009	148,269		26.5	3.3	23.2	10,131.7	7,113.1	3,018.6				3,041.8
2010	155,682		26.5	3.3	23.2	10,638.3	7,468.8	3,169.5				3,192.7
2011	163,466		263.2	3.3	259.9	11,170.2	7,842.2	3,328.0				3,587.9
2012	171,640		26.5	3.3	23.2	11,728.7	8,234.3	3,494.4				3,517.6
2013	180,221	69.4	26.5	3.3	23.2	12,315.2	8,646.0	3,669.1				3,623.0
2014	189,233		26.5	3.3	23.2	12,930.9	9,078.3	3,852.6				3,875.8
2015	198,694		26.5	3.3	23.2	13,577.5	9,532.3	4,045.2				4,068.4
2016	208,629	10.9	26.5	3.3	23.2	14,256.3	10,008.9	4,247.5				4,259.8
2017	219,060		26.5	3.3	23.2	14,969.1	10,509.3	4,459.8				4,483.1
2018	230,013		26.5	3.3	23.2	15,717.6	11,034.8	4,682.8				4,706.0
2019	241,514		26.5	3.3	23.2	16,503.5	11,586.5	4,917.0				4,940.2
2020	251,175		26.5	3.3	23.2	17,163.6	12,050.0	5,113.6				5,136.9
2021	261,222		263.2	3.3	259.9	17,850.2	12,532.0	5,318.2				5,578.1
2022	271,670		26.5	3.3	23.2	18,564.2	13,033.3	5,530.9				5,554.1
2023	282,537	69.4	26.5	3.3	23.2	19,306.7	13,554.6	5,752.2				5,706.0
2024	293,839		26.5	3.3	23.2	20,079.0	14,096.8	5,982.2				6,005.5
2025	305,592	-38.8	26.5	3.3	23.2	20,882.2	14,660.6	6,221.5				6,283.6
2026	33,571	-3.6	16.8	1.3	15.5	6,216.8	4,358.5	1,858.3				1,877.5
2027	6,629		16.3	0.4	15.9	588.4	391.5	196.9				212.7
2028	6,894	-8.7	16.3	0.4	15.9	611.9	407.1	204.8				229.4
								EIRR				
								1. base case				65.7%
								2. 10% costs increase				61.7%
								3. 10% benefit reduction				61.3%
								4. 2+3				57.5%
								5. Two year delay in benefits				41.1%

Economic Internal Rate of Return Total Rural Roads - Tongatapu (T\$'000s 2000 prices)												
Year	AADT	Economic Capital Cost	Maintenance Costs			Vehicle Operating Costs			Time Benefits			Net Benefits
			Unimproved Road	Improved Road	Avoided Maintenance	Unimproved Road	Improved Road	Savings Benefit	Unimproved Road	Improved Road	Savings Benefit	
1996	4,022	439.0	63.0	0.0	63.0	250.1	250.1	0.0	141.4	141.4	0.0	-375.9
1997	4,479	382.3	76.6	0.6	76.0	1,168.3	1,137.9	30.5	758.2	737.3	20.9	-254.9
1998	5,020	379.9	77.9	3.0	74.8	2,146.2	1,768.9	377.3	1,472.9	1,196.4	276.5	348.7
1999	9,268	934.5	250.8	4.9	245.9	3,481.7	2,803.2	678.4	2,452.4	1,959.0	493.4	483.3
2000	11,040	1,349.1	322.6	8.3	314.3	4,123.9	3,094.5	1,029.5	2,900.6	2,133.0	767.6	762.2
2001	11,702		322.6	10.5	312.1	4,371.4	3,039.9	1,331.4	3,074.6	2,080.7	993.9	2,637.4
2002	12,405	15.6	641.7	10.5	631.2	4,633.7	3,222.3	1,411.3	3,259.1	2,205.5	1,053.6	3,080.5
2003	13,149	58.5	322.6	10.5	312.1	4,911.7	3,415.7	1,496.0	3,454.6	2,337.9	1,116.8	2,866.3
2004	13,938	45.8	603.0	10.5	592.5	5,206.4	3,620.6	1,585.8	3,661.9	2,478.1	1,183.8	3,316.2
2005	14,774	38.7	352.2	10.5	341.7	5,518.8	3,837.9	1,680.9	3,881.6	2,626.8	1,254.8	3,238.7
2006	15,660	135.0	352.2	10.5	341.7	5,849.9	4,068.1	1,781.8	4,114.5	2,784.4	1,330.1	3,318.5
2007	16,600		352.2	10.5	341.7	6,200.9	4,312.2	1,888.7	4,361.4	2,951.5	1,409.9	3,640.3
2008	17,596		352.2	10.5	341.7	6,572.9	4,571.0	2,002.0	4,623.1	3,128.6	1,494.5	3,838.2
2009	18,652		352.2	10.5	341.7	6,967.3	4,845.2	2,122.1	4,900.5	3,316.3	1,584.2	4,048.0
2010	19,584		352.2	10.5	341.7	7,315.7	5,087.5	2,228.2	5,145.5	3,482.1	1,663.4	4,233.3
2011	20,564		352.2	10.5	341.7	7,681.5	5,341.8	2,339.6	5,402.8	3,656.2	1,746.5	4,427.8
2012	21,592	15.6	671.3	10.5	660.8	8,065.5	5,608.9	2,456.6	5,672.9	3,839.0	1,833.9	4,935.7
2013	22,671	58.5	386.4	10.5	375.9	8,468.8	5,889.4	2,579.4	5,956.5	4,031.0	1,925.6	4,822.4
2014	23,805	45.8	637.2	10.5	626.7	8,892.2	6,183.9	2,708.4	6,254.4	4,232.5	2,021.8	5,311.1
2015	24,995	38.7	386.4	10.5	375.9	9,336.9	6,493.0	2,843.8	6,567.1	4,444.2	2,122.9	5,303.9
2016	26,245	135.0	423.9	10.5	413.4	9,803.7	6,817.7	2,986.0	6,895.4	4,666.4	2,229.1	5,493.5
2017	27,557		423.9	10.5	413.4	10,293.9	7,158.6	3,135.3	7,240.2	4,899.7	2,340.5	5,889.3
2018	28,935		423.9	10.5	413.4	10,808.6	7,516.5	3,292.1	7,602.2	5,144.7	2,457.6	6,163.1
2019	30,382		423.9	10.5	413.4	11,349.0	7,892.3	3,456.7	7,982.3	5,401.9	2,580.4	6,450.5
2020	31,597		423.9	10.5	413.4	11,803.0	8,208.0	3,594.9	8,301.6	5,618.0	2,683.7	6,692.0
2021	32,861		423.9	10.5	413.4	12,275.1	8,536.4	3,738.7	8,633.7	5,842.7	2,791.0	6,943.2
2022	34,175	15.6	743.1	10.5	732.6	12,766.1	8,877.8	3,888.3	8,979.1	6,076.4	2,902.7	7,507.9
2023	35,543	58.5	423.9	10.5	413.4	13,276.7	9,232.9	4,043.8	9,338.2	6,319.5	3,018.8	7,417.5
2024	36,964	45.8	674.7	10.5	664.2	13,807.8	9,602.2	4,205.6	9,711.7	6,572.2	3,139.5	7,963.4
2025	38,443	-14.8	423.9	10.5	413.4	14,360.1	9,986.3	4,373.8	10,100.2	6,835.1	3,265.1	8,067.1
2026	29,841	115.4	348.1	8.6	339.5	12,894.0	8,986.3	3,907.7	9,026.3	6,122.2	2,904.0	7,035.8
2027	22,296	-32.1	347.3	7.5	339.8	9,495.0	6,541.0	2,954.0	6,733.1	4,507.7	2,225.4	5,551.3
2028	18,018	-98.6	346.1	5.6	340.5	6,086.1	4,088.2	1,997.9	4,433.6	2,888.4	1,545.3	3,982.2
2029	978	-32.0	143.5	0.8	142.7	726.5	489.3	237.2	475.0	318.9	156.0	567.9
								EIRR				
								1. base case				86.6%
								2. 10% costs increase				79.1%
								3. 10% benefit reduction				78.3%
								4. 2+3				71.5%
								5. Two year delay in benefits				43.5%

Economic Internal Rate of Return												
Total Vava'u Roads												
(T\$'000s 2000 prices)												
Year	AADT	Economic Capital Cost	Maintenance Costs			Vehicle Operating Costs			Time Benefits			Net Benefits
			Unimproved Road	Improved Road	Avoided Maintenance	Unimproved Road	Improved Road	Savings Benefit	Unimproved Road	Improved Road	Savings Benefit	
1995	1,521	232.6	38.2	11.9	26.3	165.3	165.3	0.0	128.6	128.6	0.0	-206.3
1996	1,607	129.5	38.2	11.9	26.3	172.1	172.1	0.0	133.7	133.7	0.0	-103.2
1997	1,687	117.7	38.2	0.0	38.2	182.1	182.1	0.0	140.6	140.6	0.0	-79.5
1998	1,778	310.7	68.8	30.6	38.2	471.3	407.4	63.9	336.9	284.8	52.1	-156.4
1999	1,880	406.3	68.8	0.7	68.1	485.2	417.1	68.2	346.5	291.4	55.1	-215.0
2000	2,575	124.2	69.4	1.5	67.9	728.7	562.9	165.8	511.8	387.4	124.5	234.0
2001	2,730		69.4	2.4	67.0	772.5	516.6	255.9	542.5	353.7	188.8	511.7
2002	2,893		69.4	2.4	67.0	818.8	547.6	271.2	575.1	375.0	200.1	538.3
2003	3,067		69.4	2.4	67.0	868.0	580.5	287.5	609.6	397.5	212.1	566.6
2004	3,251	21.0	168.6	2.4	166.1	920.0	615.3	304.7	646.2	421.3	224.9	674.7
2005	3,446	18.6	69.4	2.4	67.0	975.2	652.2	323.0	684.9	446.6	238.4	609.8
2006	3,653	22.9	95.7	2.4	93.3	1,033.7	691.4	342.4	726.0	473.4	252.7	665.4
2007	3,872		95.7	2.4	93.3	1,095.8	732.8	362.9	769.6	501.8	267.8	724.1
2008	4,104		95.7	2.4	93.3	1,161.5	776.8	384.7	815.8	531.9	283.9	761.9
2009	4,350		95.7	2.4	93.3	1,231.2	823.4	407.8	864.7	563.8	300.9	802.0
2010	4,568		95.7	2.4	93.3	1,292.8	864.6	428.2	908.0	592.0	316.0	837.5
2011	4,796		95.7	2.4	93.3	1,357.4	907.8	449.6	953.4	621.6	331.8	874.7
2012	5,036		95.7	2.4	93.3	1,425.3	953.2	472.1	1,001.0	652.7	348.4	913.8
2013	5,288		95.7	2.4	93.3	1,496.5	1,000.9	495.7	1,051.1	685.3	365.8	954.8
2014	5,552	21.0	194.9	2.4	192.5	1,571.4	1,050.9	520.5	1,103.6	719.6	384.1	1,076.0
2015	5,830	18.6	95.7	2.4	93.3	1,649.9	1,103.4	546.5	1,158.8	755.5	403.3	1,024.5
2016	6,121	22.9	95.7	2.4	93.3	1,732.4	1,158.6	573.8	1,216.8	793.3	423.4	1,067.6
2017	6,428		95.7	2.4	93.3	1,819.1	1,216.6	602.5	1,277.6	833.0	444.6	1,140.4
2018	6,749		95.7	2.4	93.3	1,910.0	1,277.4	632.6	1,341.5	874.6	466.8	1,192.8
2019	7,086		95.7	2.4	93.3	2,005.5	1,341.2	664.3	1,408.6	918.4	490.2	1,247.8
2020	7,370		95.7	2.4	93.3	2,085.7	1,394.9	690.8	1,464.9	955.1	509.8	1,293.9
2021	7,665		95.7	2.4	93.3	2,169.2	1,450.7	718.5	1,523.5	993.3	530.2	1,342.0
2022	7,971		95.7	2.4	93.3	2,255.9	1,508.7	747.2	1,584.4	1,033.0	551.4	1,391.9
2023	8,290		95.7	2.4	93.3	2,346.2	1,569.1	777.1	1,647.8	1,074.4	573.5	1,443.9
2024	8,622		194.9	2.4	192.5	2,440.0	1,631.8	808.2	1,713.7	1,117.3	596.4	1,597.0
2025	5,084	18.6	31.2	1.7	29.5	1,769.9	1,183.3	586.6	1,200.9	784.5	416.4	1,014.0
2026	5,287	22.9	31.2	1.7	29.5	1,840.7	1,230.6	610.1	1,248.9	815.9	433.1	1,049.7
2027	5,499	-14.9	31.2	1.7	29.5	1,914.3	1,279.8	634.5	1,298.9	848.5	450.4	1,129.3
2028	2,272		0.6	0.9	-0.3	893.1	597.1	296.0	606.0	395.9	210.1	505.8
2029	2,363	-16.1	0.6	0.9	-0.3	928.8	621.0	307.9	630.2	411.7	218.5	542.1
								EIRR				
								1. base case				34.5%
								2. 10% costs increase				32.1%
								3. 10% benefit reduction				31.9%
								4. 2+3				29.7%
								5. Two year delay in benefits				24.8%

Economic Internal Rate of Return												
Total Tourist Access Roads												
(T\$'000s 2000 prices)												
Year	AADT	Economic Capital Cost	Maintenance Costs			Vehicle Operating Costs			Time Benefits			Net Benefits
			Unimproved Road	Improved Road	Avoided Maintenance	Unimproved Road	Improved Road	Savings Benefit	Unimproved Road	Improved Road	Savings Benefit	
1997	930	15.9	12.6	0.0	12.6	35.6	35.6	0.0	25.9	25.9	0.0	-3.3
1998	990	154.9	36.9	0.0	36.9	160.5	160.5	0.0	99.8	99.8	0.0	-118.0
1999	1,569	182.7	82.9	2.6	80.4	330.3	273.5	56.8	260.4	224.2	36.2	-9.3
2000	1,850	247.5	96.9	2.6	94.3	414.6	350.3	64.3	339.4	298.2	41.2	-47.7
2001	1,961	0.0	96.9	3.7	93.3	439.5	289.1	150.4	359.8	226.4	133.4	377.1
2002	2,079	0.0	96.9	3.7	93.3	465.8	306.4	159.4	381.4	240.0	141.4	394.1
2003	2,203	36.4	101.1	3.7	97.4	493.8	324.8	169.0	404.3	254.4	149.9	379.9
2004	2,336	35.4	101.1	3.7	97.4	523.4	344.3	179.1	428.5	269.6	158.9	400.1
2005	2,476	1.3	101.1	3.7	97.4	554.8	364.9	189.9	454.3	285.8	168.5	454.4
2006	2,624	28.4	101.1	3.7	97.4	588.1	386.8	201.3	481.5	303.0	178.6	448.8
2007	2,782	0.0	101.1	3.7	97.4	623.4	410.0	213.3	510.4	321.1	189.3	500.0
2008	2,949	0.0	101.1	3.7	97.4	660.8	434.6	226.1	541.0	340.4	200.6	524.2
2009	3,126	0.0	101.1	3.7	97.4	700.4	460.7	239.7	573.5	360.8	212.7	549.8
2010	3,282	0.0	101.1	3.7	97.4	735.4	483.8	251.7	602.2	378.9	223.3	572.4
2011	3,446	0.0	115.1	3.7	111.4	772.2	507.9	264.3	632.3	397.8	234.5	610.2
2012	3,618	0.0	115.1	3.7	111.4	810.8	533.3	277.5	663.9	417.7	246.2	635.1
2013	3,799	36.4	115.1	3.7	111.4	851.4	560.0	291.4	697.1	438.6	258.5	624.9
2014	3,989	35.4	115.1	3.7	111.4	893.9	588.0	305.9	731.9	460.5	271.4	653.4
2015	4,189	1.3	115.1	3.7	111.4	938.6	617.4	321.2	768.5	483.5	285.0	716.3
2016	4,398	28.4	115.1	3.7	111.4	985.6	648.3	337.3	807.0	507.7	299.2	719.5
2017	4,618	0.0	115.1	3.7	111.4	1,034.8	680.7	354.2	847.3	533.1	314.2	779.8
2018	4,849	0.0	115.1	3.7	111.4	1,086.6	714.7	371.9	889.7	559.8	329.9	813.2
2019	5,091	0.0	115.1	3.7	111.4	1,140.9	750.5	390.5	934.2	587.8	346.4	848.3
2020	5,295	0.0	115.1	3.7	111.4	1,186.6	780.5	406.1	971.5	611.3	360.3	877.8
2021	5,507	0.0	115.1	3.7	111.4	1,234.0	811.7	422.3	1,010.4	635.7	374.7	908.4
2022	5,727	0.0	115.1	3.7	111.4	1,283.4	844.2	439.2	1,050.8	661.1	389.7	940.3
2023	5,956	36.4	115.1	3.7	111.4	1,334.7	877.9	456.8	1,092.8	687.6	405.2	937.0
2024	6,194	35.4	115.1	3.7	111.4	1,388.1	913.0	475.1	1,136.5	715.1	421.5	972.6
2025	6,442	1.3	115.1	3.7	111.4	1,443.6	949.6	494.1	1,182.0	743.7	438.3	1,042.5
2026	6,700	3.0	115.1	3.7	111.4	1,501.4	987.5	513.8	1,229.3	773.4	455.8	1,078.1
2027	5,725	-24.8	102.5	2.5	100.0	1,399.8	920.5	479.3	1,161.2	730.3	430.9	1,034.9
2028	2,859	-10.1	76.6	1.1	75.5	912.2	593.3	318.9	887.0	544.8	342.2	746.7
2029	570	-11.9	28.0	0.7	27.3	176.3	114.5	61.8	174.2	106.7	67.4	168.5
								EIRR				
								1. base case				82.3%
								2. 10% costs increase				72.6%
								3. 10% benefit reduction				71.7%
								4. 2+3				63.7%
								5. Two year delay in benefits				38.4%

Economic Analysis of Port Component

Economic Internal Rate of Return Ports Component (T\$'000s 2000 prices)							
Year	Costs			Benefits			Net Benefits
	Economic Capital	Annual Maintenance	Total	Incremental Agricultural Production	Shipping Operations	Total	
1995	271.41		271.41				-271.41
1996	1,352.37		1,352.37				-1,352.37
1997	2,118.09		2,118.09				-2,118.09
1998	959.68	26.21	985.89	110.00	552.24	662.24	-323.65
1999	973.63	26.21	999.84	173.00	583.45	756.45	-243.39
2000	1,317.33	26.21	1,343.54	210.00	599.05	809.05	-534.50
2001		40.76	40.76	220.00	639.61	859.61	818.84
2002		40.76	40.76	220.00	656.77	876.77	836.00
2003		40.76	40.76	220.00	700.45	920.45	879.68
2004		40.76	40.76	220.00	719.17	939.17	898.40
2005	41.11	40.76	81.88	220.00	765.97	985.97	904.09
2006		40.76	40.76	280.00	783.13	1,063.13	1,022.36
2007		40.76	40.76	320.00	795.61	1,115.61	1,074.84
2008		40.76	40.76	320.00	833.05	1,153.05	1,112.28
2009		40.76	40.76	320.00	854.89	1,174.89	1,134.12
2010	41.11	40.76	81.88	320.00	904.81	1,224.81	1,142.93
2011		40.76	40.76	320.00	920.41	1,240.41	1,199.65
2012		40.76	40.76	320.00	936.01	1,256.01	1,215.25
2013		40.76	40.76	320.00	998.41	1,318.41	1,277.65
2014		40.76	40.76	320.00	1,029.61	1,349.61	1,308.85
2015	48.59	40.76	89.35	320.00	1,092.01	1,412.01	1,322.66
2016		40.76	40.76	320.00	1,141.93	1,461.93	1,421.17
2017		40.76	40.76	320.00	1,170.01	1,490.01	1,449.25
2018		40.76	40.76	320.00	1,232.41	1,552.41	1,511.65
2019		40.76	40.76	320.00	1,279.21	1,599.21	1,558.45
2020	48.59	40.76	89.35	320.00	1,341.61	1,661.61	1,572.26
2021		40.76	40.76	320.00	1,372.81	1,692.81	1,652.05
2022		40.76	40.76	320.00	1,458.61	1,778.61	1,737.85
2023		40.76	40.76	320.00	1,528.81	1,848.81	1,808.05
2024	-2,278.12	40.76	-2,237.36	320.00	1,544.41	1,864.41	4,101.77
							EIRR
				1. base case			14.1%
				2. 10% remaining costs increase			13.7%
				3. 10% benefit reduction			12.7%
				4. 2+3			12.5%
				5. Two year delay in benefits			13.1%

Source: Staff Consultant's Report of Project Completion Review Mission, July 2000.

Economic Analysis of Total Project

Economic Internal Rate of Return										
Total Project										
(T\$'000s 2000 prices)										
	Costs			Benefits						
Year	Economic Capital	Annual Maintenance	Total	Road Maintenance Saving	Vehicle Operating Cost Savings	Time Savings	Incremental Agricultural Production	Shipping Operations	Total	Net Benefits
1995	978		978	35					35	-943
1996	3,217		3,217	99	-88				11	-3,205
1997	3,767		3,767	185	201	21			406	-3,361
1998	2,141	26	2,167	247	1,644	475	110	552	3,029	861
1999	2,726	26	2,752	508	2,317	773	173	583	4,354	1,602
2000	3,698	26	3,725	590	3,282	1,183	210	599	5,864	2,139
2001	0	41	41	822	3,908	1,581	220	640	7,170	7,130
2002	16	41	56	905	4,142	1,676	220	657	7,599	7,543
2003	177	41	218	590	4,391	1,776	220	700	7,677	7,459
2004	128	41	169	969	4,654	1,883	220	719	8,445	8,277
2005	100	41	141	619	4,934	1,996	220	766	8,535	8,394
2006	197	41	238	645	5,230	2,116	280	783	9,054	8,816
2007	0	41	41	645	5,543	2,243	320	796	9,547	9,506
2008	0	41	41	645	5,876	2,377	320	833	10,052	10,011
2009	0	41	41	645	6,228	2,520	320	855	10,569	10,528
2010	41	41	82	645	6,540	2,646	320	905	11,056	10,974
2011	0	41	41	896	6,867	2,778	320	920	11,782	11,741
2012	16	41	56	979	7,210	2,917	320	936	12,362	12,306
2013	177	41	218	694	7,571	3,063	320	998	12,646	12,428
2014	128	41	169	1,044	7,949	3,216	320	1,030	13,558	13,390
2015	107	41	148	694	8,347	3,377	320	1,092	13,829	13,681
2016	197	41	238	731	8,764	3,546	320	1,142	14,503	14,265
2017	0	41	41	731	9,202	3,723	320	1,170	15,146	15,106
2018	0	41	41	731	9,662	3,909	320	1,232	15,855	15,814
2019	0	41	41	731	10,145	4,105	320	1,279	16,580	16,540
2020	49	41	89	731	10,551	4,269	320	1,342	17,213	17,123
2021	0	41	41	968	10,973	4,439	320	1,373	18,074	18,033
2022	16	41	56	1,050	11,412	4,617	320	1,459	18,858	18,802
2023	177	41	218	731	11,869	4,802	320	1,529	19,251	19,033
2024	-2,208	41	-2,168	1,081	12,344	4,994	320	1,544	20,283	22,451
2025	-34			578	11,676	4,120			16,373	16,373
2026	138			496	6,890	3,793			11,179	11,179
2027	-72			485	4,265	3,107			7,857	7,857
2028	-117			432	2,818	2,098			5,347	5,347
2029	-60			170	607	442			1,219	1,219
						EIRR				
						1. base case				39.7%
						2. 10% remaining costs increase				39.1%
						3. 10% benefit reduction				36.5%
						4. 2+3				36.4%
						5. Two year delay in benefits				34.3%

Source: Staff Consultant's Report of Project Completion Review Mission, July 2000.

Nuku'alofa Port International Shipping Statistics

Nuku'alofa Port - International Ship Calls													
Vessels	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Jan-May 2000	Growth 1990-99	Growth 1994-99
Cruise	5	8	5	6	9	10	8	5	15	17	7	7.3%	13.6%
Cargo	121	133	128	122	137	158	141	149	119	134	51	3.2%	-0.4%
Squash							10	9	8	13			
Tanker	23	25	31	28	27	31	29	31	33	32	17	-1.3%	3.5%
Gas	6	6	13	11	14	12	16	14	15	17	7	6.1%	4.0%
Warship	17	17	7	14	5	7	5	8	9	9	6	6.7%	12.5%
Research	2				2	2			1		2		
Fishing	1	1	6	1			1		1	1			
Other					1	3	1	2	10	3	3		24.6%
Total	175	190	190	182	195	223	211	218	211	226	93	3.4%	3.0%
Yachts					369	266	242	256	1	14	9		
Squash/cargo vessels	121	133	128	122	137	158	151	158	127	147	51	4.3%	1.4%
Appraisal Forecast	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Cruise	5	8	5	5	4	4	4	4	4	4	4	4	4
Cargo	120	123	126	129	132	136	139	143	146	150	154	157	161
Squash													
Tanker	23	23	24	25	26	27	28	29	30	31	32	32	32
Gas	6	6	6	6	6	6	6	6	6	6	6	7	7
Warship/Research	20	18	20	20	20	20	20	20	20	20	20	20	20
Research													
Fishing													
Other													
Total	174	178	181	185	188	193	197	202	206	211	216	220	224
% variance to forecasts					3.2%	14.0%	6.1%	6.9%	-2.9%	5.2%			
% cargo vessel variance to forecasts					3.8%	16.2%	8.6%	10.5%	-13.0%	-2.0%			

Source: Statistic Department and Port Authority Tonga.

Nuku'alofa Port - International Cargo												
(revenue ton)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Jan-May 2000	Growth 1991-99
Actual Tonnage												
Imports		91,398	105,587	86,877	101,855	94,871	75,263	100,839	81,719	114,752	43,025	2.9%
Exports		29,903	14,833	23,795	21,772	13,930	21,362	20,264	11,002	23,341	3,156	-3.0%
Transshipment								5,960	4,416	2,250	1,655	
Subtotal (A)		121,301	120,420	110,672	123,627	108,801	96,625	127,063	97,137	140,343	47,836	1.8%
Forecast	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
('000s revenue tons)												
Imports												
Timber	3	3	3	3	3	3	3	3	3	3	3	4
Cement	8	8	9	9	10	10	10	10	10	10	10	11
Consumer Goods								111	116	118	123	125
Petroleum	23	23	23	24	24	24	25	25	25	26	26	26
Subtotal (B)	124	127	131	134	138	142	146	149	154	157	162	166
% variance to forecasts					-10.7%	-19.6%	-37.8%	-18.7%	-36.7%	-12.4%		
Exports												
Squash	6	20	18	21	21	21	21	22	22	23	23	23
Other Primary	4	4	4	4	4	4	5	5	5	5	5	5
Manufacturing	6	6	6	6	6	6	6	6	6	6	6	7
Empty Containers								5	6	6	6	6
Subtotal (C)	19	34	32	35	36	36	37	38	39	40	40	41
% variance to forecasts					-29.8%	-55.1%	-33.2%	-46.7%	-71.8%	-41.6%		
Total Cargo	143	161	163	169	174	178	183	187	193	197	202	207
Total Cargo excl. petroleum	120	138	140	145	150	154	158	162	168	171	176	181
% variance to forecasts					-17.6%	-29.4%	-38.8%	-21.6%	-42.2%	-17.9%		
Actual Cargo	1990	1991	1992	1993	Jul-Dec 1994	1995	1996	1997	1998	1999	Jan-May 2000	Growth 1991-99
Imports												
Dry Cargo	41,900	69,273	83,189	71,632	35,914	75,681	63,698	81,949	55,340	69,374	28,744	0.0%
Freezer		7,367	8,326	7,158	4,912	8,081	5,968	7,960	5,935	8,523	4,715	1.8%
Cement	6,800	7,169	10,027	5,292	5,294	7,593	3,630	6,547	6,364	8,811	3,121	2.6%
Timber	1,500	7,589	4,045	2,795	2,160	3,517	1,967	4,383	3,487	4,332	2,169	-6.8%
Transshipment								2,289	1,020	783	627	
Break bulk									2,186	3,844	1,412	
Vehicles									8,406	19,869	2,865	
Subtotal (D)	50,200	91,398	105,587	86,877	48,280	94,871	75,263	103,128	82,739	115,535	43,652	3.0%
Exports												
Dry Cargo	8,900	25,163	2,172	19,225	1,812	5,124	5,396	5,794	2,517	3,793	1,686	-21.1%
Freezer		733	10,179	1,587	954	1,367	1,673	2,464	1,386	2,835	1,175	18.4%
Cement							125					
Transshipment							660	3,671	3,396	1,467	1,028	
Squash	6,200				16,055	7,439	11,355	11,333	6,224	16,255		
Copra	1,000							673	570			
Break bulk									202	275.046	287	
Vehicles									103	182.68	9	
Subtotal (E)	16,100	25,896	12,351	20,812	18,821	13,930	19,209	23,935	14,397	24,808	4,184	-0.5%
Total												
Dry Cargo	50,800	94,436	85,361	90,857	37,726	80,805	69,094	87,743	57,858	73,167	30,429	-3.1%
Freezer		8,100	18,505	8,745	5,866	9,448	7,641	10,424	7,321	11,358	5,890	4.3%
Cement	6,800	7,169	10,027	5,294	5,294	7,593	9,026	6,547	6,364	8,811	3,121	2.6%
Timber	1,500	7,589	4,045	2,795	2,160	3,517	3,640	4,383	3,487	4,332	2,169	-6.8%
Transshipment							125	5,960	4,416	2,250	1,655	
Squash	6,200				16,055	7,439	11,355	11,333	6,224	16,255		
Copra	1,000							673	570			
Break bulk									2,388	4,119	1,698	
Vehicles									8,509	20,052	2,874	
Total	66,300	117,294	117,938	107,689	67,101	108,801	100,881	127,063	97,137	140,343	47,836	2.3%

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Jan-May 2000	Growth 1991-99
Containers												
Inwards – full	3,345	3,380	3,088	3,298		4,091	3,413	3,566	3,962	4,724	1,628	4.3%
Inwards – empty				4		55	52	69	56	24		36.4%
Inwards - total	3,411	3,382	3,103	3,302	3,885	4,146	3,465	3,635	4,018	4,748	1,628	4.3%
Outwards – full	543	453	317	387		381	483	513	498	612	236	3.8%
Outwards- empty				2,622		3,609	4,107	2,963	3,339	2,855	1,358	4.6%
Outwards - total				3,009	3,666	3,990	4,590	3,476	3,837	3,467	1,594	4.5%
Total – full	3,888	3,833	3,405	3,685		4,472	3,896	4,079	4,460	5,336	1,864	4.2%
Total – empty	2,994	1,993	2,770	2,626		3,664	4,159	3,032	3,395	2,879	1,358	4.7%
Total	6,882	5,826	6,175	6,311	7,551	8,136	8,055	7,111	7,855	8,215	3,222	4.4%
RRP Forecast	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
FCL/LCL	3,888	5,090	5,600	5,720	5,932	6,366	6,537	6,851	7,216	7500	7727	7881
Empty	2,994	4,000	4,400	4,480	4,768	4,734	5,263	5,449	5,784	6000	6173	6319
Total	6,882	9,090	10,000	10,200	10,700	11,100	11,800	12,300	13,000	13,500	13,900	14,200
% variance to forecasts					-29.4%	-26.7%	-31.7%	-42.2%	-39.6%	-39.1%		