

## APPENDIX

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## APPENDIX - 1 MEMBER LIST OF THE SURVEY TEAM

### 1-1 Member List (Field Survey)

<u>FUNCTION</u>	<u>NAME</u>	<u>ORGANIZATION</u>
Leader	Mr. Yoshifusa SHIKAMA	Resident Representative, JICA Samoa Office
Project Coordinator	Mr. Tomoki KANENAWA	Technical Coordination and Examination Team, Office of Technical Coordination and Examination, Grant Aid Management Dept, J ICA
Chief Consultant / Sea transport Planning / Management and Maintenance Planning	Mr. Toyonori WATANABE	Fisheries Engineering Co., Ltd.
Hull and Machinery Design	Mr. Akio YAMADA	Fisheries Engineering Co., Ltd.
Outfit and Electric Design	Mr. Koji TAKESHITA	Fisheries Engineering Co., Ltd.
Equipment and Procurement planning / Cost estimate	Mr. Michio TORII	Fisheries Engineering Co., Ltd.

### 1-2 Member List (Consultation of Draft Report)

<u>FUNCTION</u>	<u>NAME</u>	<u>ORGANIZATION</u>
Leader	Mr. Atsushi NAKAGAWA	Transportation and Electric Power Team, Project Management Group I, Grant Aid Management Dept, J ICA
Chief Consultant / Sea transport Planning / Management and Maintenance Planning	Mr. Toyonori Watanabe	Fisheries Engineering Co., Ltd.
Hull and Machinery Design	Mr. Akio Yamada	Fisheries Engineering Co., Ltd.

## APPENDIX - 2 SURVEY ITINERARY

### 2-1 Survey Schedule (Field Survey)

No.	Date	Movement	Activities
			1. 2. 3. 4
1	Nov. 12 Mon	Dep. Tokyo(19:00)	
2	13 Tue	(Arr. Nandi)	1. 2. 3. 4
		(Dep. Nandi/Arr. Suva) (Dep. Suva/Arr. Nandi)Meeting with JICA Fiji Office	Stay in Nandi
		(Dep. Nandi ) Arr. Apia (00:50)	Meeting with JICA Samoa Office, Discussion and explanation on Inception Report, Questionnaire and tentative schedule with MWTI and SSC
3	14 Wed		Onboard survey of MV Lady Samoa II (LS2), Onsite survey of Mulifanua and Salelologa Ports.
4	15 Thu		Onsite survey of SSC Workshop, Review for current status on ISM and PMP, Collection of data on Questionnaire
5	16 Fri		Discussion on applicable rules and regulations with the Maritime Authority, Collection of data on Questionnaire
6	17 Sat		Onboard survey of MV Lady Samoa II (LS2)
7	18 Sun		Data collection
8	19 Mon	JICA: Arr. Apia (22:30)	Discussion and Confirmation on the contents of the Request with SSC and the Maritime Authority, Collection of data on Questionnaire, Onboard survey of MV Fotu-o-Samoa II
9	20 Tue		Meeting with JICA Samoa Office, Visit to MWTI, Maritime Authority and SSC and Discussion.
10	21 Wed		Onboard survey of MV Lady Samoa II (LS2), Data collection and analysis
11	22 Thu		Signing of the Minutes of Discussion (M/D) with MWTI , SSC and Ministry of Finance.
12	23 Fri		Interim report to JICA Samoa Office, Discussion with SSC, Onboard survey of MV Samoa Express
13	24 Sat	JICA: Dep. Apia (04:00)	Data analysis and Internal meeting
14	25 Sun		Data analysis and Internal meeting
15	26 Mon		1. 2. 3. 4
		Confirmation of the memorandum of discussion with Chief of Maritime Authority	Discussion on the plan vessel design with SSC
16	27 Tue		Discussion on the plan vessel design with SSC Onsite survey of SSC second Workshop

No.	Date	Movement	Activities
17	28 Wed		Explanation on the Project with directors of SSC Data collection and analysis
18	29 Thu		Data collection and analysis, Onboard survey of MV Lady Naomi Collection of supplemental information and data
19	30 Fri		Signing of the memorandum of discussion with SSC, Report the summary of the study to JICA Samoa Office
20	Dec. 1 Sat	Dep. Apia (05:35)	
21	2 Sun	(Arr. Nandi )	
22	3 Mon	(Dep. Nandi) Arr. Tokyo (18:00)	

## 2-2 Survey Schedule (Consultation of Draft Report)

No	Date		Activities		
			JICA	1.	2.
1	Mar. 29	Sat		Dep. Tokyo (19:00)	
2	30	Sun		(Arr./Dep Nandi/Arr. Suva)	
3	31	Mon	Dep. Tokyo (22:20)	Visit to JICA Fiji office Explanation on Draft Report.	Dep. Tokyo (18:15)
4	April 1	Tue	(Apr.1) Arr./Dep.Sydney/ Arr. Wellington ) (Aapri.2) Visit to Embassy of Japan to explain contents of the Draft Report (Dep. Auckland) (Apr.1) Arr. Apia (19:25)	(Dep.Suva/Arr./Dep.Nandi) Arr.Apia (00:50) Meeting with JICA Samoa Office,	(Arr./Dep. Auckland) Arr. Apia (23:10) Visit to SSC
5	2	Wed	Explanation about contents of the Draft Report with JICA Samoa Office, MWTI, SSC and Ministry of Finance.		
6	3	Thu	Onboard survey of MV Lady Samoa II, Discussion on the Minutes of Discussion		
7	4	Fri	Discussion on the Minutes of Discussion, Signing of the Minutes of Discussion		
8	5	Sat	Dep. Apia (01:45)		
9	6	Sun	(Arr./Dep. Auckland) Arr. Tokyo (16:40)		

1. Chief Consultant / Sea transport Planning / Management and Maintenance Planning
2. Hull and Machinery Design,    3. Outfit and Electric Design,
4. Equipment and Procurement planning / Cost estimate

MWTI: Ministry of Works, Infrastructure & Transport  
ISM: International Safety Management

SSC: Samoa Shipping Corporation Limited  
PMP: Preventive Maintenance Policy

## APPENDIX - 3 LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

### 3-1 Field Survey

<u>NAME</u>	<u>FUNCTION</u>
<b>MWTI</b>	
Hon. Tuisugaletaus A. S. Aveau	Minister, MWTI
Mr. Vaaelua Nofo Vaaelua	Chief Executive Officer, MWTI
Cap. Maselino Tominiko	Marine Division Chief, MWTI
<b>Ministry of Finance</b>	
Ms. Noumea Simi	Assistant Chief Executive Officer, Ministry of Finance
<b>SSC</b>	
Mr. Papali'i Willie Nansen	Managing Director, SSC
Mr. So'oalo Kuresa So'oalo	Financial Manager, SSC
Capt. Faaferai Faamatuainu	Maritime Manager, SSC
Capt. Tapuai Tofilau Soti Mapu	Operation Manager, SSC
Mr. Kitiona Liki	Workshop Manager, SSC
Mr. Kiyohiko Hamada	First Secretary, Embassy of Japan in New Zealand
Mr. Shinya Tamio	Assistant Resident Representative, JICA Fiji office
Mr. Yoshifusa Shikama	Resident Representative, JICA Samoa office
Mr. Yasuyuki Tomihara	Program Formulation Advisor, JICA Samoa office

### 2-2 Consultation of Draft Report

<u>NAME</u>	<u>FUNCTION</u>
<b>MWTI</b>	
Hon. Tuisugaletaus A. S. Aveau	Minister, MWTI
Mr. Vaaelua Nofo Vaaelua	Chief Executive Officer, MWTI
<b>Ministry of Finance</b>	
Ms. Noumea Simi	Assistant Chief Executive Officer, Ministry of Finance
Ms. Lusie Sefo Lea	Deputy Chief Executive Officer, Ministry of Finance
<b>SSC</b>	
Mr. Papali'i Willie Nansen	Managing Director, SSC
Mr. So'oalo Kuresa So'oalo	Financial Manager, SSC
Capt. Faaferai Faamatuainu	Maritime Manager, SSC
Mr. Kitiona Liki	Workshop Manager, SSC
Mr. Teiji Takeshita	Resident Representative, JICA Fiji office
Ms. Hiroko Sanomaru	Assistant Resident Representative, JICA Fiji office
Mr. Yoshifusa Shikama	Resident Representative, JICA Samoa office
Mr. Yasuyuki Tomihara	Program Formulation Advisor, JICA Samoa office

## APPENDIX - 4 MINUTES OF DISCUSSIONS

### 4-1 Field Survey

#### Minutes of Discussions on the Basic Design Study on the Project for Construction of Inter-Island Ferry

In response to a request from the Government of Independent State of Samoa (hereinafter referred to as "Samoa"), the Government of Japan decided to conduct a Basic Design Study on the Project for Construction of Inter-Island Ferry (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

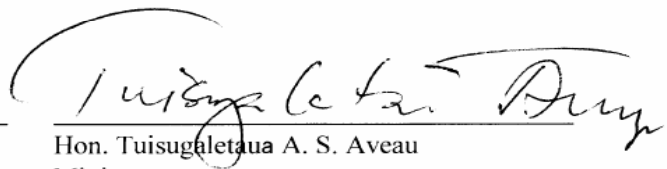
JICA sent the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Yoshifusa Shikama, Resident Representative of JICA Samoa Office, and is scheduled to stay in the country from November 13, 2007 to December 1, 2007.

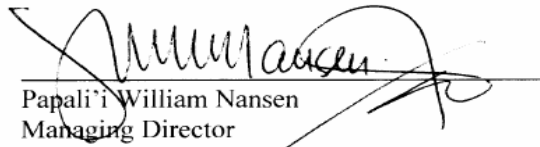
The Team held discussions with the officials concerned of the Government of Samoa and conducted a field survey at the study area.

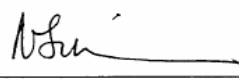
In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Apia, November 22, 2007

  
Yoshifusa Shikama  
Leader  
Basic Design Study Team  
Japan International Cooperation Agency

  
Hon. Tuisugaletua A. S. Aveau  
Minister  
Ministry of Works, Transport and Infrastructure  
Independent State of Samoa

  
Papali'i William Nansen  
Managing Director  
Samoa Shipping Corporation Limited  
Independent State of Samoa

  
Noumea Simi  
Assistant Chief Executive Officer  
Ministry of Finance  
Independent State of Samoa

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to construct an inter-island ferry for safety and reliability of domestic maritime transportation.

### 2. Project sites

The site is shown in Annex-1.

### 3. Responsible and Implementing Agency

3-1. The Responsible Agency is Ministry of Works, Transport and Infrastructure.

The Organization Chart of the Responsible Ministry is shown in Annex-2.

3-2. The Implementing Agency is Samoa Shipping Corporation Limited (SSC).

The Organization Charts of the Implementing Agency is shown in Annex-3.

### 4. Items requested by the Government of Samoa

After discussions with the Team, construction of a ferry for domestic transport was finally requested by the Samoan side. Specification of the ferry is described as follows:

- Length Overall: 46.70m;
- Passenger capacity: 508 persons;
- Gross tonnage: Approx. 990 tons

JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

### 5. Japan's Grant Aid Scheme

5-1. The Samoan side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-4.

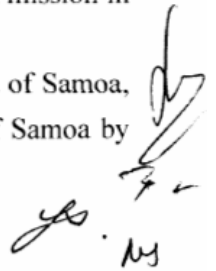
5-2. The Samoan side will take the necessary measures, as described in Annex-5, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

### 6. Schedule of the Study

6-1. The Consultants will proceed to further studies in Samoa until December 1, 2007.

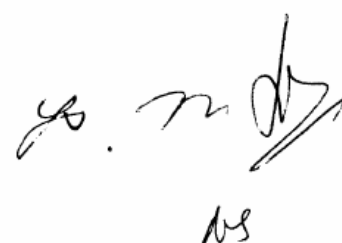
6-2. JICA will prepare the draft report and draft specification in English and dispatch a mission in order to explain their contents around March, 2008.

6-3. In case that the contents of the report is accepted in principle by the Government of Samoa, JICA will complete the final report in English and send it to the Government of Samoa by June, 2008.

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7. Other relevant issues

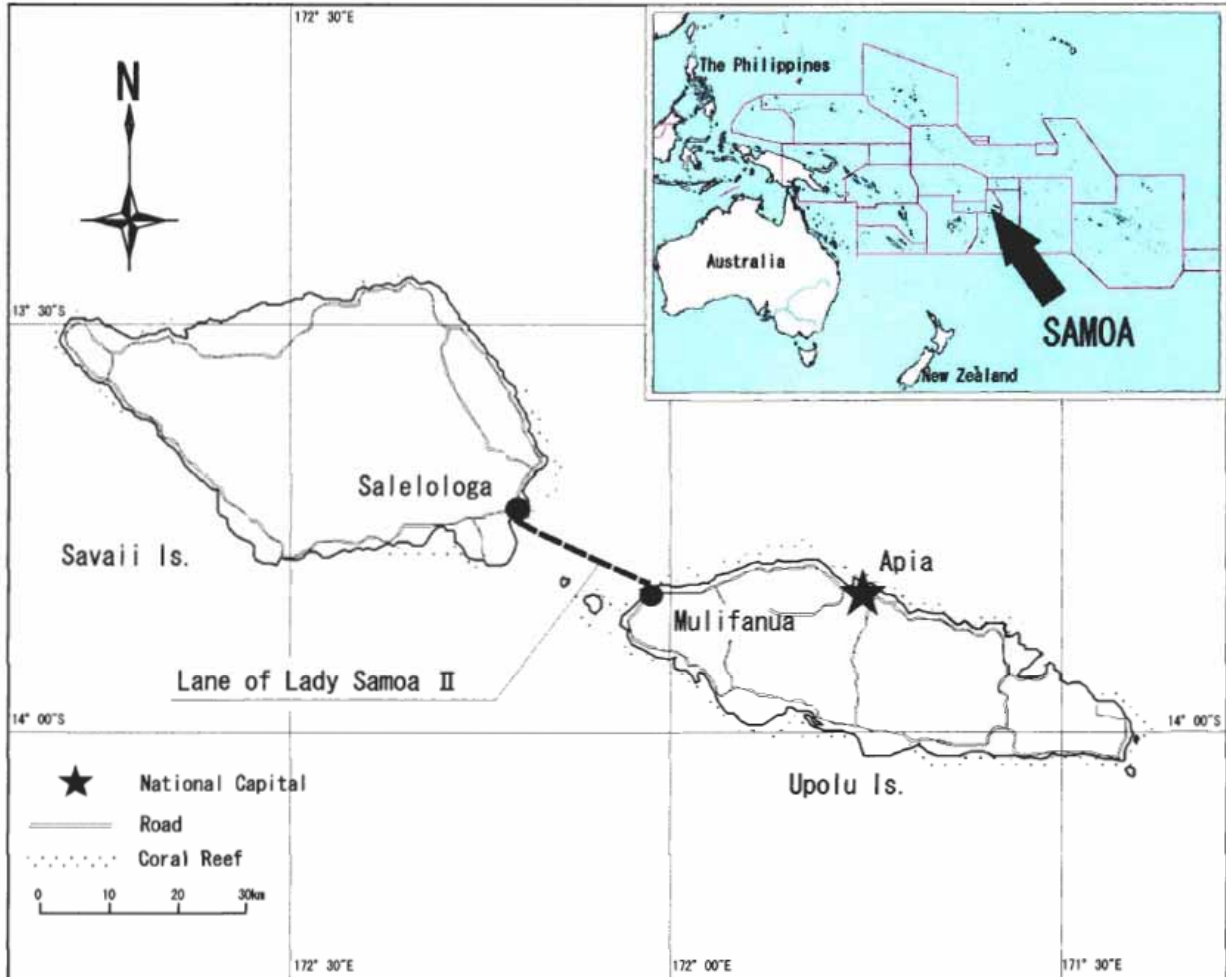
- 7-1. The Samoan side has established a new reserve fund system for replacement of the ferry from 2006. The fund amount annually reserved will be decided by the SSC board and managed jointly by the Samoan Government and the SSC for the sole purpose of the replacement of the ferry in future.
- 7-2. The Samoan side shall allocate the appropriate budget and conduct the undertakings in a timely manner for proper operation and maintenance of the ferry to be constructed under the Project.
- 7-3. The Samoan side explained that "Samoa Shipping Corporation Limited (SSC)" had been established as a Government Corporation providing sea transportation in Samoa and would not be privatized in the foreseeable future.
- 7-4. The Samoan side shall improve and/or rehabilitate wharf necessary for safe and smooth operation of the ferry at its own expenses, if necessary
- 7-5. The Samoan side explained utilization plan of the existing ferry "Lady Samoa II" after the construction of the new ferry under the Project, that:  
SSC will continue to utilize the services of Lady Samoa II during peak times and while new ferry undergo maintenance.
- 7-6 The Samoan side agreed to conduct the safety control and measures necessary for the smooth implementation of the Study during the stay in Samoa.
- 7-7. The Samoan side shall arrange and/or issue the permission for the members of the Team to enter the existing ferries and related sites and to take photographs in order to collect information necessary for Basic Design.
- 7-8. The Samoan side shall provide necessary number(s) of counterpart personnel to the Team during the Study in Samoa.
- 7-9. The Samoan side shall submit answers to the Questionnaire to the Team, which the Team handed to the Samoan side, by November 26, 2007.



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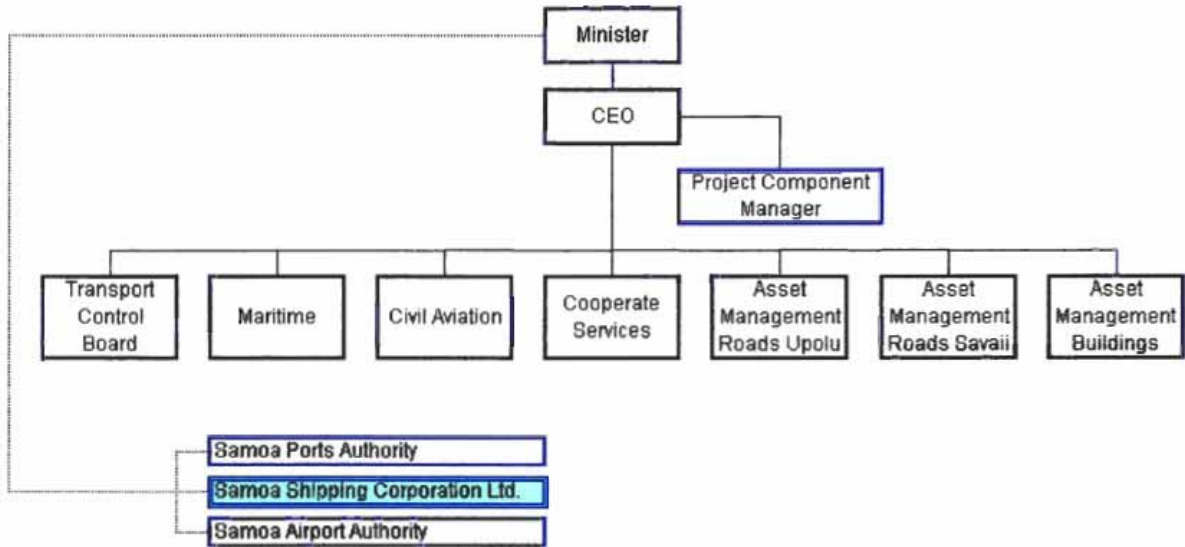
**Project Site**



The inter-island ferry links Mulifanua harbor of Upolu island and Salelologa harbor of Savaii island, distance about 21 km, in about one hour.

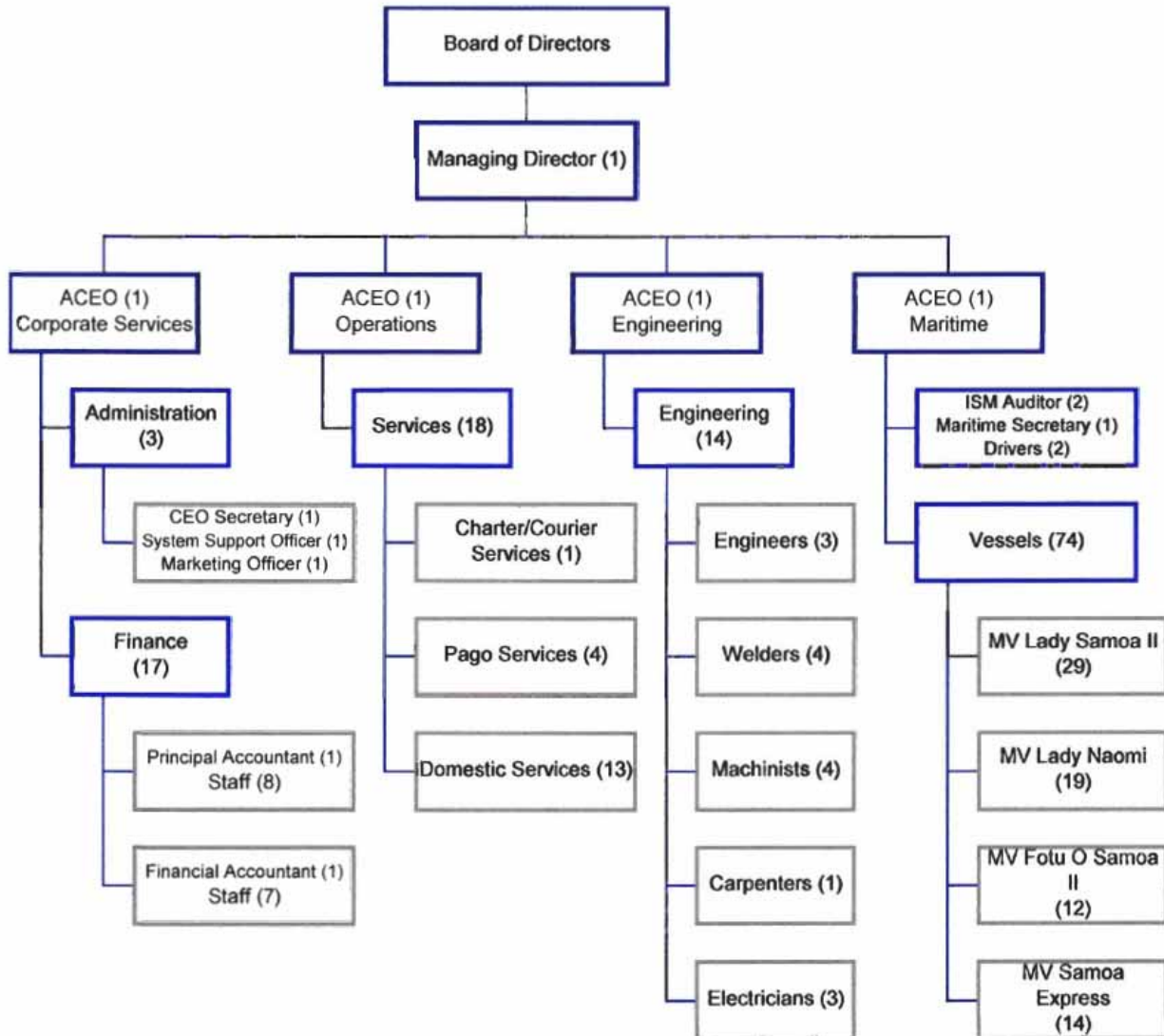
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**Organization Chart of the Ministry of Works, Transport and Infrastructure**



*yo Tm [Signature]*  
PS

**Organization Chart of the Samoa Shipping Corporation Limited**



*yo*  
*[Signature]*  
*bs*

Japan's Grant Aid Scheme for General Project

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request. If necessary, JICA send a Preliminary Study Team to the recipient country to confirm the contents of the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

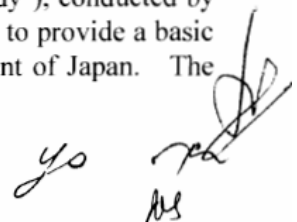
Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:



- a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and
- e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

## 2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates the Study and prepares a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

## 3. Japan's Grant Aid Scheme

### 1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

### 2) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

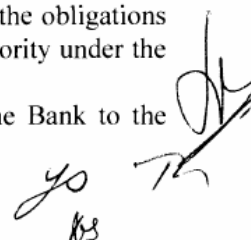
### 3) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

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When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 4) Necessity of "Verification"  
The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.
- 5) Undertakings required to the Government of the recipient country
  - a) to secure a lot of land necessary for the construction of the Project and to clear the site;
  - b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
  - c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
  - d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
  - e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
  - f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
  - g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.
- 6) "Proper Use"  
The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.
- 7) "Re-export"  
The products purchased under the Grant Aid shall not be re-exported from the recipient country.
- 8) Banking Arrangement (B/A)
  - a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
  - b) The payments will be made when payment requests are presented by the Bank to the

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Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commission to the Bank.


### Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	Design and Construction of the ferry	●	
2	Procurement of equipment to be covered under the Project	●	
3	Any items which are not covered under the Project, e.g. rehabilitation of existing wharf, etc.		●
4	Allocate the appropriate budget and conduct the undertakings in a timely manner necessary for proper operation and maintenance of the ships to be provided (procurement of fuel and spare parts, and overhaul of the ferry)		●
5	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
6	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
7	To accord Japanese nationals, whose service may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
8	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●
9	To maintain and use properly and effectively the facilities contracted and equipment provided under the Grant		●
10	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A : Banking Arrangement, A/P : Authorization to pay)



## 4-2 Consultation of Draft Report

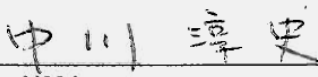
**Minutes of Discussions**  
**on Basic Design Study on the Project for Construction of Inter-Island Ferry**  
**in Independent State of Samoa**  
**(Explanation of Draft Report)**

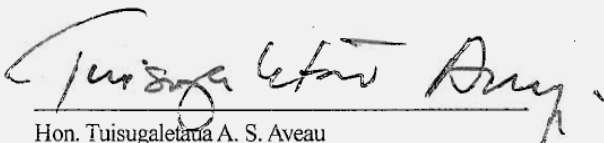
In November 2007, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Construction of Inter-Island Ferry (hereinafter referred to as "the Project") to Independent States of Samoa (hereinafter referred to as "Samoa"), and through discussions, field survey and technical examination of the results in Japan, JICA prepared a draft report of the study.

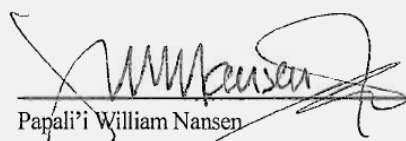
In order to explain and to consult with the concerned officials of the Government of Samoa on the contents of the draft report, JICA sent to Samoa the Basic Design Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Atsushi Nakagawa, Transport and Electric Power Team, Project Management Group I, Grant Aid Management Department, JICA, from April 1 to April 5, 2008.


As a result of discussions, both sides confirmed the main items described in the attached sheets.

Apia, April 4, 2008

  
\_\_\_\_\_  
Atsushi Nakagawa  
Leader  
Basic Design Explanation Team  
Japan International Cooperation Agency

  
\_\_\_\_\_  
Hon. Tuisugaletua A. S. Aveau  
Minister  
Ministry of Works, Transport and Infrastructure  
Independent States of Samoa

  
\_\_\_\_\_  
Papali'i William Nansen  
Managing Director  
Samoa Shipping Corporation Limited  
Independent States of Samoa

  
\_\_\_\_\_  
Lusia Sefo Leau  
Acting Chief Executive Officer  
Ministry of Finance  
Independent States of Samoa

## ATTACHMENT

### 1. Components of the Draft Report

The Samoan side agreed and accepted in principle the contents of the draft report of Basic Design Study and draft specification of equipment by the Team.

### 2. Cost Estimation

Both sides agreed that the Project Cost Estimation as attached in Annex-1 should never be disclosed to any third parties before the signing of all the contract(s) for the Project.

### 3. Japan's Grant Aid Scheme

The Samoan side has shown a full understanding of the Japan's Grant Aid scheme and the necessary measures to be taken by the Samoan side as explained by the Team and described in the Annex-4 and 5 of the Minutes of Discussions signed by both sides on November 22, 2007.

### 4. Schedule of the Study

JICA will complete the Final Report in English, in accordance with the confirmed items and send it to the Samoan side by the beginning of June, 2008.

### 5. Other Relevant Issues

#### 5-1. The Samoan side confirmed the following items shall be undertaken by the Samoan side:

- 5-1-1. Banking arrangements (with an authorized foreign exchange in Japan), issuance of authorization to pay and bearing commissions to the bank.
- 5-1-2. Acquisition of licenses and certificates from the Government of Samoa necessary for building and transporting the ferry, e.g. Provisional Certificate of Nationality.
- 5-1-3. Exemption of the ferry from custom duties, internal taxes and fiscal levies and prompt customs clearance.
- 5-1-4. Exemption of Japanese nationals from customs duties, internal taxes and fiscal levies for their services in Samoa.

#### 5-2. The Samoan side confirmed the reserve fund system for the replacement of the new ferry will be operated and managed properly as described in Clause 7 of Minutes of Discussions signed by both sides on November 22, 2007.

#### 5-3. The Samoan side shall allocate necessary budget to conduct the undertakings in a timely manner for a proper operation and maintenance of the new ferry.

Annex-1: Project Cost



## APPENDIX - 5 PASSENGER AND VEHICLE TRANSPORT STATISTICS

### 5-1 Outline of Island Link Ferry Operation

#### (1) Ferry operation

For the island link between Mulifanua wharf (Upolu Island) and Salelologa wharf (Savaii Island), MV Lady Samoa II (LS2) and MV Fotu-o-Samoa II (FOS2) work generally 3 round trips a day as shown in the timetable below. When a large number of passengers is expected, extra voyages are added. Especially at Easter, White Sunday (Children's day on the second Sunday of October), Christmas and New Year, very large numbers of people travel and all island link ferries serve four round trips to clear long queues of passengers and vehicles. Extra voyages are decided by the SSC head office, judging from the number of passengers and vehicles. To compensate for the absence of LS2 or FOS2 due to e.g. docking, and to provide back-up in high season, MV Samoa Express (SE) works as necessary.

Sailing time between islands is about 1h 10min for LS2 and about 1h 20min for FOS2 or SE.

Table A-1 Standard timetable

Vessel	Depart	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
LS	SL	06:00	06:00	06:00	06:00	06:00	06:00	---
LS	MF	08:00	---	08:00	08:00	08:00	08:00	---
LS	SL	10:00	---	10:00	10:00	10:00	10:00	10:00
LS	MF	12:00	---	12:00	12:00	12:00	12:00	12:00
LS	SL	14:00	---	14:00	14:00	14:00	14:00	14:00
LS	MF	16:00	16:00	16:00	16:00	16:00	16:00	16:00
FOS	MF	06:00	06:00	06:00	06:00	06:00	06:00	06:00
FOS	SL	08:00	08:00	08:00	08:00	08:00	08:00	08:00
FOS	MF	10:00	10:00	10:00	10:00	10:00	10:00	---
FOS	SL	12:00	12:00	12:00	12:00	12:00	12:00	---
FOS	MF	14:00	14:00	14:00	14:00	14:00	14:00	14:00
FOS	SL	16:00	16:00	16:00	16:00	16:00	16:00	16:00

MF : Mulifanua SL : Salelologa

#### (2) Typical service situations

LS2 voyage records of October 2007 are shown below: passenger data in Figure A-1 and vehicle data in Figure A-2.

It is clearly observed from the graph for passengers that on weekdays the number of passengers is low at 150 – 200, but before and after weekends LS2 is crowded, and further before and after the White Sunday holiday (second Sunday of October: children's day) LS2 carries an overflowing number of passengers. On White Sunday, LS2 is quiet with very few passengers on board.

The graph for vehicles shows a less clear crowding pattern than the passenger pattern. Demand for vehicle transport is basically greater than the LS2 capacity, and there are usually many vehicles which are left at the wharf.

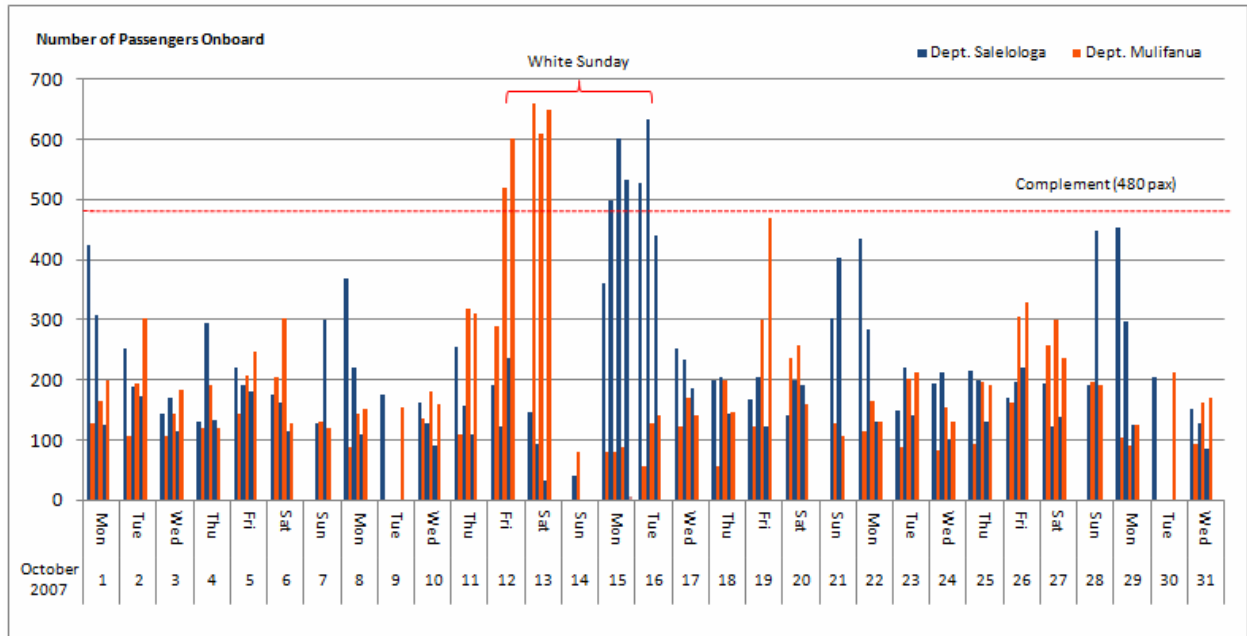


Figure A-1 Pax transport on board LS2, October 2007

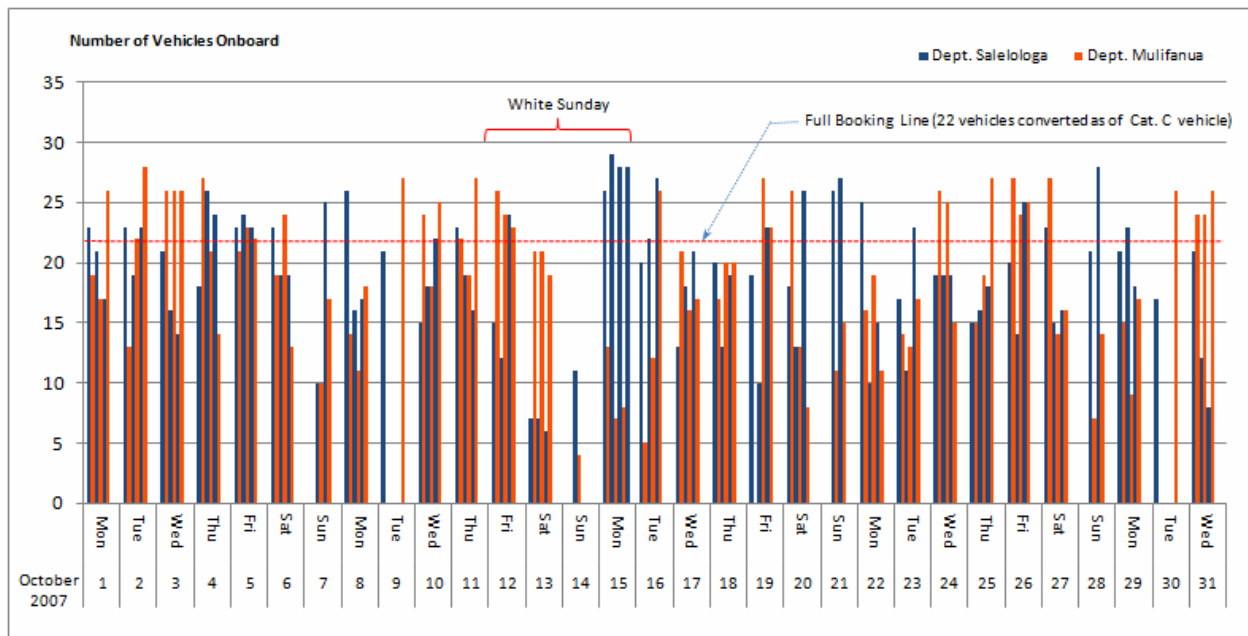


Figure A-2 Vehicle transport on board LS2, October 2007

### (3) Increase of passenger and vehicle transport

Figure A-3 shows passenger and vehicle transport results by all SSC island link ferries from 1966 to 2006. In these 11 years, the number of passengers increased from 429,873 to 576,433,

and the number of vehicles from 35,439 to 56,706, i.e. 34.1% and 60.0% respectively. The drop in 2003 is due to many voyage cancellations of Fotu-o-Samoa (the First) due to ageing. SSC evaluates that the background of the increase is growth of economic activity, population and foreign tourists.

The number of passengers does not include drivers, as the data are all from sold tickets.

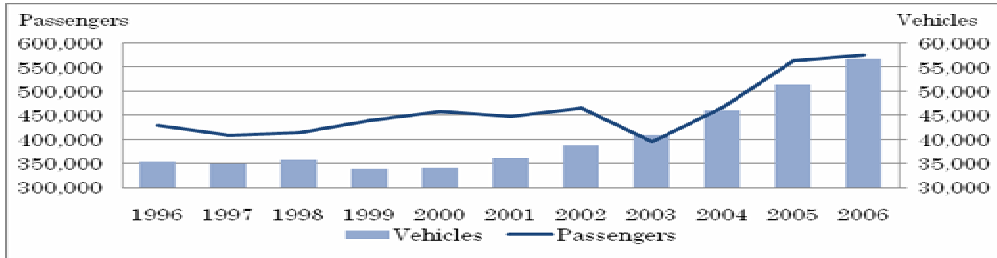


Figure A-3 Passenger and vehicle transport by all SSC vessels from 1996 to 2006

#### (4) Monthly data of passenger and vehicle transport

Figure A-4 and Figure A-5 show monthly data of passenger and vehicle transport respectively by all SSC vessels from January 2001 to October 2006. Monthly transport is greatest in December and January due to Christmas and end/new year, when the end/beginning of the school term adds movement of schoolboys and girls. On Mother's Day in May and on White Sunday in October, holidays of three consecutive days from Saturday to Monday, people movement is concentrated on Friday/Saturday and Monday/Tuesday. The Easter holiday is a little longer, four consecutive days, and concentration of people movement is not as sharp as in the White Sunday case.

#### (5) Fares

Table A-2 shows passenger and vehicle fares between Mulifanua and Salelologa (2007). Vehicle fare includes one driver. No round trip discount and no season-ticket system. Free for kids of less than five years.

Table A-2 Pax and vehicle fares (one way, 2007)

Category	Classification	Fare (Tala)	Example
Adult	13 and over	9.00	
Child	5 - 12	5.00	
Vehicle-A	8 ft – 12 ft	50.00	Suzuki Jeep Samurai, Side kick, Rocky-2doors, Small Sedans, Mini-Van (Suzuki), etc.
Vehicle-B	12 ft 1 inch – 16 ft	65.00	Vans-, 2WD Hilux Pickups, 4WD Pickups, Stout Pickups, Jeep Amigo, King Cab Pickups, 2WD D/Cab Pickups, etc.
Vehicle-C	16ft 1 inch – 20 ft	70.00	Light Trucks, SWB Dyna Trucks, Ford Pickups (F150), GMC Pickups, Chev. Pickups, Hearse Cadillac, American Vans, etc.
Vehicle-D	20 ft 1 inch – 24 ft	80.00	Medium Trucks, LWB Dyna Trucks, LWB Mazda Trucks, Dyna 300 series, LWB Nissan, etc.
Vehicle-E	24 ft 1 inch – 28 ft	100.00	Heavy Truck, Buses 6-7 Tons, Coaster Buses, Hiab Trucks, etc.
Vehicle-F	28 ft 1 inch – 34 ft	150.00	10 Wheelers (SWB/LWB), Crane Truck (7 tons), etc.

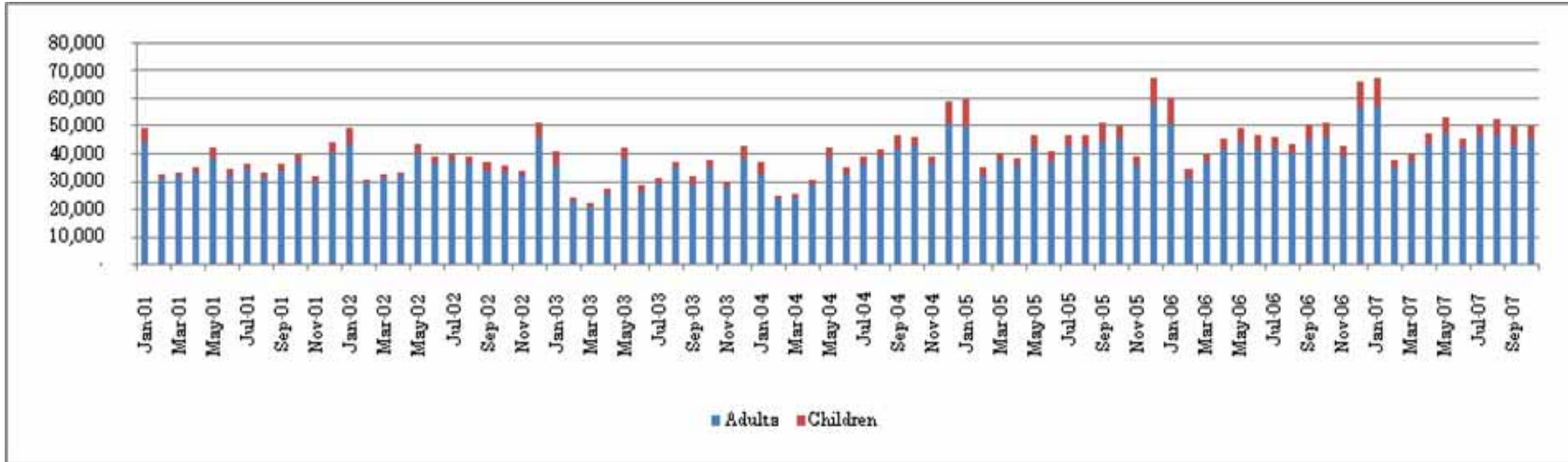


Figure A-4 Monthly data of passenger transport (all SSC vessels from January 2001 to October 2006)

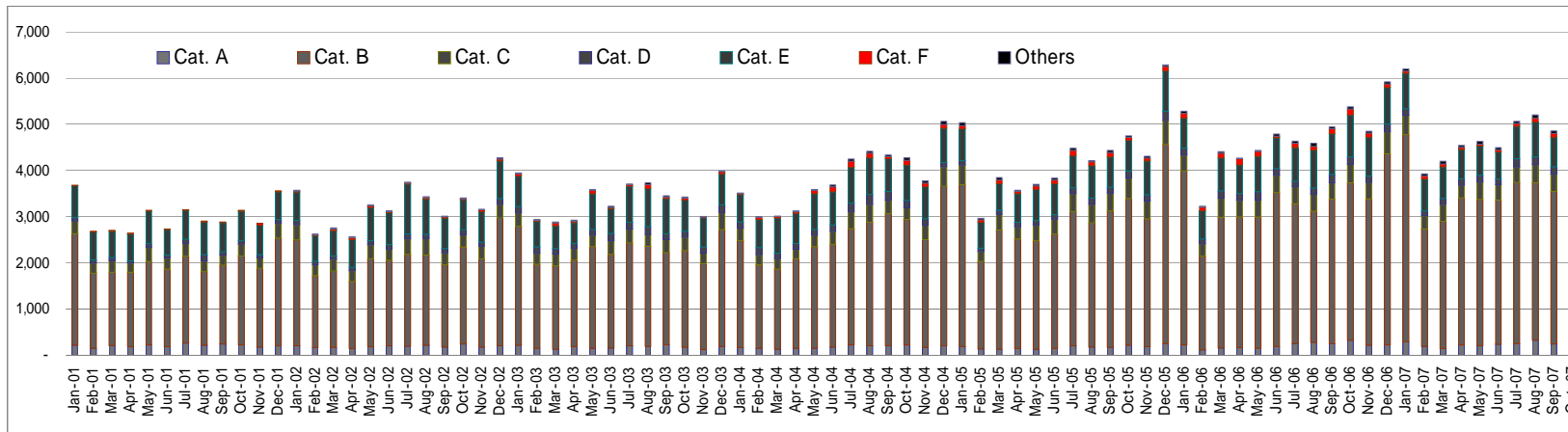


Figure A-5 Monthly data of vehicle transport (all SSC vessels from January 2001 to October 2006)

**(6) LS2 Statistics of passenger and vehicle transport**

Table A-3 shows annual statistics of LS2 to carry passengers and vehicles from 2003 to October 2007. Total number of passengers per annum and per month increases from year to year, but the change in the number of vehicles is almost flat.

In 2003, cancellation of FOS2 services lasting several days made vehicle transport on board LS2 greater.

In 2007, it is certain that the number of vehicles for the year will be more than the 2003 record.

Table A-3 LS2 service statistics

	2003	2004	2005	2006	2007*
Operation days	345	336	353	340	275
Number of voyages	1,841	1,812	1,877	1,814	1,660
Pax (adult)	316,922	330,337	345,544	339,759	350,679
Pax (child)	28,873	30,743	41,154	41,416	40,091
Pax (total)	345,795	361,080	386,698	381,175	390,770
Vehicle (Cat. A)	1,836	1,470	1,240	1,477	1,650
Vehicle (Cat. B)	21,969	20,292	21,580	23,078	23,558
Vehicle (Cat. C)	2,908	2,423	2,645	2,523	2,450
Vehicle (Cat. D)	1,446	1,177	773	946	891
Vehicle (Cat. E)	6,408	5,590	4,411	4,213	2,604
Vehicle (Cat. F)	214	246	162	176	89
Vehicle (Other)	153	123	86	125	159
Vehicle (total)	34,934	31,321	30,897	32,538	31,401
Total pax fare (tala)	2,333,946	2,561,008	3,315,666	3,264,911	3,354,146
Total vehicle fare (tala)	2,073,895	1,916,531	2,183,431	2,281,730	2,139,530
Total cargo fare (tala)	1,565	1,190	3,692	2,649	1,730
Total revenue (tala)	4,409,406	4,478,729	5,502,789	5,549,290	5,495,406
Mean pax on 1 voyage	185.9	199.3	206.0	210.1	217.6
Mean vehicles on 1 voyage	18.8	17.3	16.5	17.9	18.6

\* Data for 10 months up to October 31

Frequency distribution of no. of passengers (Figure A-6) shows high frequency in the 126 – 150 band in the past, but from 2006, 151 – 175 band frequency has become predominant.

Frequency of no. of passengers up to 275 persons occupies 80% of the total, and up to 450 persons occupies 95%. Whereas frequency of 150 persons or less gradually decreases from year to year, frequency of 251 persons or more tends to get higher. It is concluded that the number of passengers on one voyage is steadily increasing.

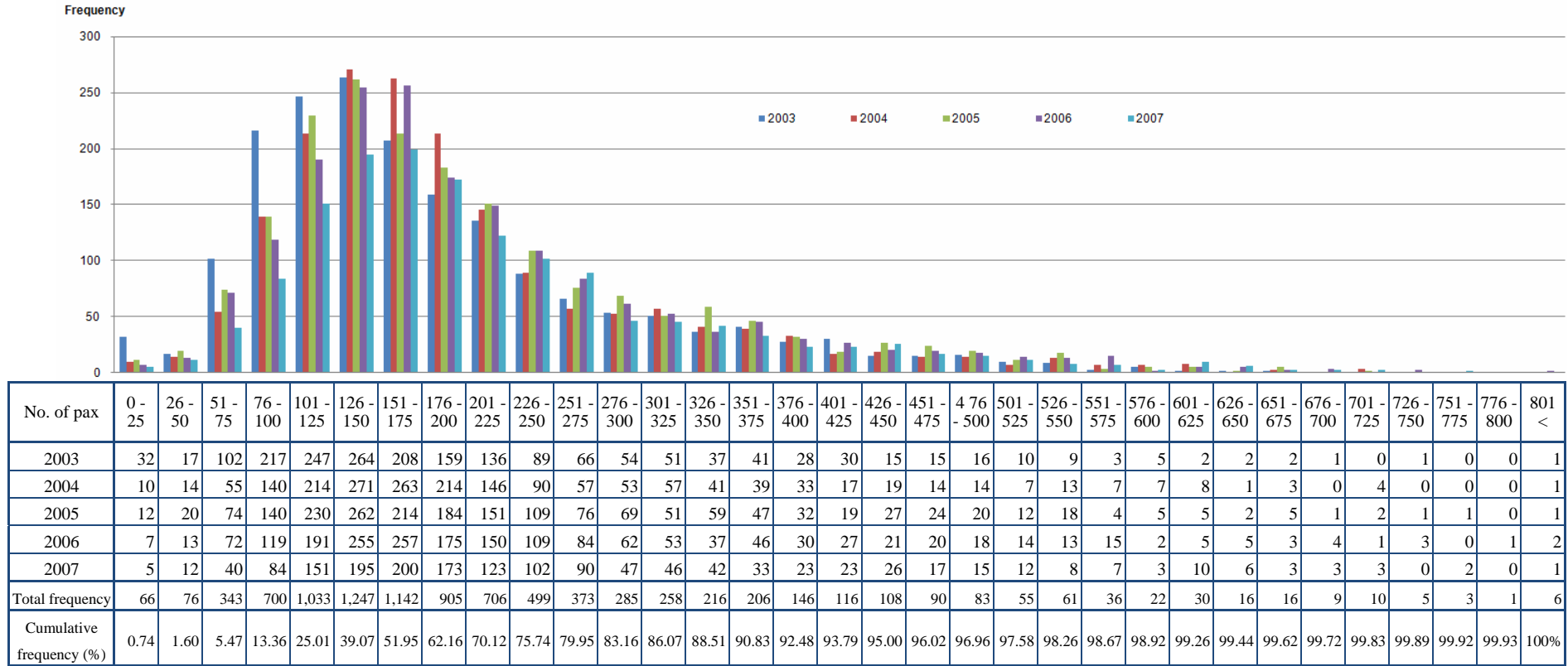
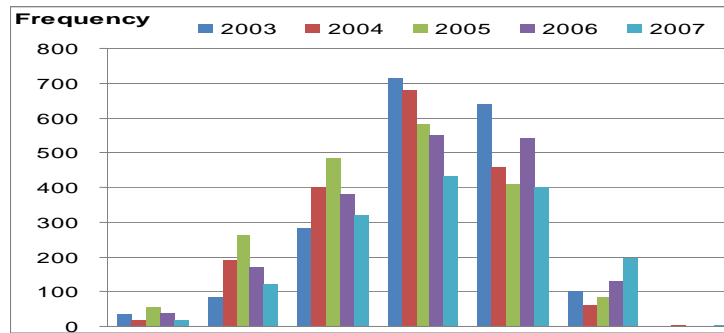


Figure A-6 Frequency distribution of no. of pax on board LS2



Frequency distribution of no. of vehicles is shown in Figure A-7 SSC closes reservations when the reservations reach 22 cars (category-C equivalent no.). When the vehicle deck has space for extra cars after loading all reserved cars, cars on the waiting list are taken on board. Vehicle reservations for voyages on Sunday and Monday from Salelologa and for voyages on Friday from Mulifanua are normally full. As the frequency of carrying 26 cars or more is increasing from year to year, vehicle transport capacity is close to the ceiling.



No. of vehicles	0 - 5	6 - 10	10 - 15	16 - 20	21 - 25	26 - 30	31 <
2003	36	84	283	714	641	102	0
2004	21	191	401	679	457	61	2
2005	54	262	484	582	411	83	1
2006	38	173	381	549	543	129	1
2007	21	125	323	433	401	199	3
Total frequency	170	835	1,872	2,957	2,453	574	7
Cumulative frequency (%)	1.92	11.33	32.44	65.79	93.45	99.92	100

Figure A-7 Frequency distribution of no. of vehicles on board LS2

## 5-2 Passenger Statistics

unit in number of persons

### 2003 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	345	186	142	135	153	118		180
MF	8:00	100	138	94	118	162	311		154
SL	10:00	283	216	192	173	194	140	208	201
MF	12:00	153	177	145	157	224	341	168	195
SL	14:00	196	165	146	144	170	122	391	191
MF	16:00	166	159	174	176	326	260	134	199
Average		207	173	149	150	205	215	225	187

### 2004 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	402	232	192	175	180	161		223
MF	8:00	96	102	121	118	165	293		149
SL	10:00	302	254	213	197	190	139	175	210
MF	12:00	162	159	162	177	263	356	147	204
SL	14:00	194	173	155	153	181	119	391	195
MF	16:00	185	173	176	186	340	248	139	207
Average		223	182	170	168	220	219	213	198

### 2005 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	411	272	199	172	201	159		236
MF	8:00	94	120	104	114	144	308		147
SL	10:00	326	332	224	205	198	149	194	232
MF	12:00	172	183	168	174	260	393	153	215
SL	14:00	186	199	143	161	177	123	389	197
MF	16:00	166	192	177	172	357	277	130	210
Average		226	216	169	166	223	235	217	206

### 2006 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	423	268	190	196	196	163		239
MF	8:00	85	110	120	113	153	276		143
SL	10:00	327	323	211	195	192	163	201	230
MF	12:00	177	180	175	204	273	399	187	228
SL	14:00	208	194	149	154	179	126	401	202
MF	16:00	168	189	167	209	354	253	133	210
Average		232	211	169	179	225	230	231	209

### 2007 (JAN - OCT)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	427	274	189	196	203	175		244
MF	8:00	99	106	113	112	160	307		150
SL	10:00	353	295	224	218	216	181	223	244
MF	12:00	157	193	167	211	255	413	172	224
SL	14:00	224	206	142	155	190	155	424	214
MF	16:00	170	202	160	197	374	268	167	220
Average		238	213	166	182	233	250	246	216

5-3 Vehicle Statistics

unit in number of vehicle

2003 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	20.8	20.0	18.4	18.2	18.5	17.8		18.9
MF	8:00	15.4	15.9	20.5	19.9	20.5	22.3		19.1
SL	10:00	21.3	18.9	18.8	18.6	19.0	15.7	20.6	19.0
MF	12:00	16.5	16.9	18.7	19.8	21.1	20.4	17.3	18.7
SL	14:00	19.8	17.6	19.2	19.3	20.8	16.6	23.6	19.6
MF	16:00	18.9	19.4	19.1	19.9	21.3	15.4	17.5	18.8
Average		18.8	18.1	19.1	19.3	20.2	18.1	19.8	19.0

2004 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	20.7	19.3	18.5	18.4	18.9	17.5		18.9
MF	8:00	11.2	15.2	18.9	17.2	17.0	19.6		16.5
SL	10:00	19.3	16.4	17.7	16.5	16.7	13.4	16.1	16.6
MF	12:00	14.4	18.6	17.8	17.9	20.4	18.4	13.3	17.3
SL	14:00	17.4	17.7	19.1	18.7	19.2	15.3	21.7	18.4
MF	16:00	16.9	18.5	17.9	16.3	19.1	11.7	14.1	16.4
Average		16.6	17.6	18.3	17.5	18.5	16.0	16.3	17.3

2005 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	20.6	20.8	18.7	18.5	18.2	15.6		18.7
MF	8:00	10.6	14.4	17.6	16.2	15.6	19.9		15.7
SL	10:00	17.6	16.5	13.7	13.9	15.1	11.4	14.7	14.7
MF	12:00	13.6	16.2	16.7	16.7	20.0	18.3	11.5	16.1
SL	14:00	16.1	16.5	17.7	18.6	19.9	15.9	21.2	18.0
MF	16:00	14.2	17.7	16.5	15.5	19.7	12.7	13.4	15.7
Average		15.4	17.0	16.8	16.6	18.1	15.6	15.2	16.5

2006 (JAN - DEC)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	21.8	21.4	19.2	19.0	18.0	17.8		19.5
MF	8:00	10.9	16.5	20.3	19.2	18.6	22.1		17.9
SL	10:00	18.8	18.8	15.3	15.0	15.8	11.9	18.7	16.3
MF	12:00	14.4	18.1	18.5	19.0	20.9	20.3	14.5	18.0
SL	14:00	18.0	17.9	19.1	19.8	22.2	16.6	23.0	19.5
MF	16:00	15.1	20.2	15.7	18.2	21.7	12.9	13.4	16.7
Average		16.5	18.8	18.0	18.4	19.5	17.0	17.4	18.0

2007 (JAN - OCT)

Terminal	Dep Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average
SL	6:00	22.9	20.7	18.6	19.4	19.4	17.4		19.7
MF	8:00	14.3	16.8	21.8	18.9	19.8	23.4		19.2
SL	10:00	19.3	18.2	16.7	16.1	17.0	12.0	18.6	16.8
MF	12:00	12.7	17.7	19.6	20.2	22.1	20.5	13.0	18.0
SL	14:00	19.2	19.7	18.4	20.1	22.9	17.3	25.0	20.4
MF	16:00	16.0	20.5	17.1	19.7	20.9	15.7	14.5	17.8
Average		17.4	18.9	18.7	19.1	20.4	17.7	17.8	18.6

**5-4 Statistical Analysis of Island Link Transport (Socioeconomic index vs. transport index)**

**(1) Socioeconomic index and transport index**

Table A-4, Figure A-8 and Figure A-9 show the statistics for island link transport and corresponding socioeconomic indexes for years 1996 to 2006.

Table A-4 Island link transport (by all SSC vessels) and corresponding socioeconomic indexes

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Pax	429,873	409,006	414,496	439,338	458,416	448,511	465,399	396,247	466,377	563,868	576,433
Vehicle	35,439	34,934	35,847	33,946	34,177	36,098	38,938	40,825	46,032	51,423	56,705
Tourist					87,688	88,263	88,971	92,486	98,155	101,807	78,928*a
Population*b	161,081	164,207	167,395	170,646	173,963	176,710	177,516	178,327	179,141	179,960	180,741
GDP	717,086	711,078	728,104	750,401	803,989	869,061	885,000	912,562	943,256	991,844	1,017,151

\*a January - September

\*b Data for 2001 and 2006 are based on census, and interpolated data otherwise.

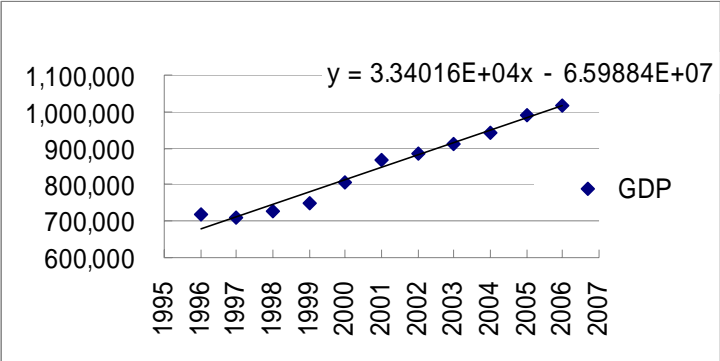


Figure A-8 GDP growth

Regression formula to obtain approximate GDP is expressed as  $GDP = 33,402 \times Year - 65,988,448$  (Regression-1), which will be used as base parameter to project future pax and vehicle transport.

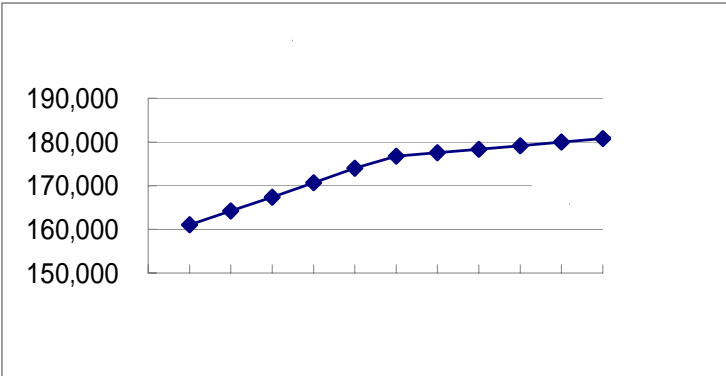


Figure A-9 Population growth

**(2) Regression analysis with single parameter**

Table A-5 shows the result of regression analysis for number of passengers and vehicles based on a single parameter, i.e. population, GDP or number of tourists from abroad.

Table A-5 Correlation between transport quantity and socioeconomic indexes

Relation	Correlation coefficient( <i>r</i> )	Appropriateness index*	Correlation appropriateness	Regression formula
Population - Pax	0.60	$r^2 > 0.307692$	+	$y = 5.219x - 445,402$
Population - Vehicle	0.68	$r^2 > 0.307692$	+	$y = 0.7777x - 94,622$
GDP - Pax	0.75	$r^2 > 0.307692$	++	$y = 0.39302x + 127,391$
GDP - Vehicle	0.88	$r^2 > 0.307692$	++	$y = 0.060361x - 10,798$
Tourist - Pax	0.68	$r^2 > 0.444444$	+	$y = 4.8195x + 21,156$

\* Simple index to judge appropriateness of correlation by Ueda: When *r* satisfies following inequality formula, then correlation is judged as appropriate.

$$r^2 > \frac{4}{(Nos.sampledata + 2)}$$

From the above, it is found that the socioeconomic indexes of Samoa have a reasonable correlation with the volume of transport. Transport has been growing along with economic growth. This tendency is conspicuous in the vehicle transport. Growth of population and tourists are also promoting growth of transport. Figure A-10 – Figure A-14 show graphs of the data points for each correlation. In these graphs, nos. of pax and vehicles are for all SSC vessels.

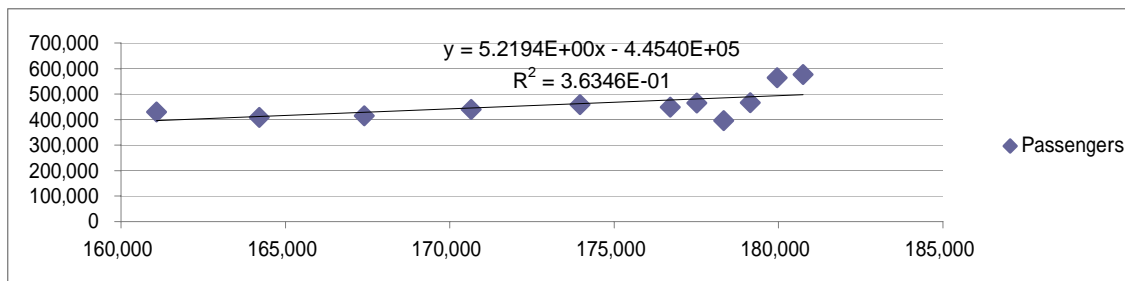


Figure A-10 Correlation between population and no. of pax

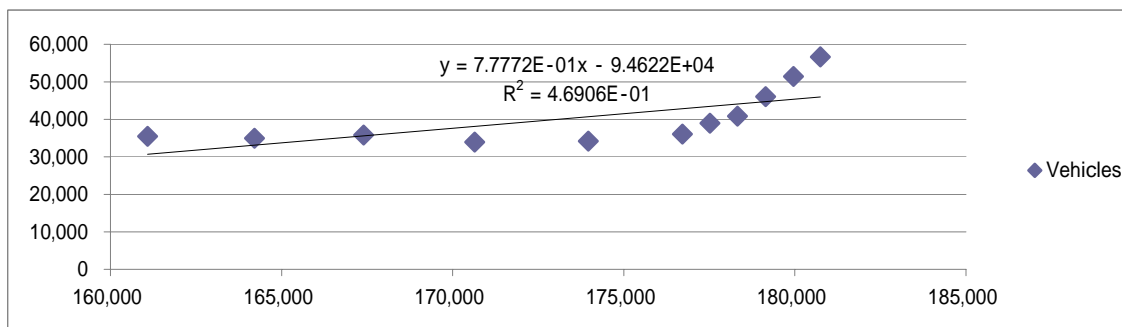


Figure A-11 Correlation between population and no. of vehicles

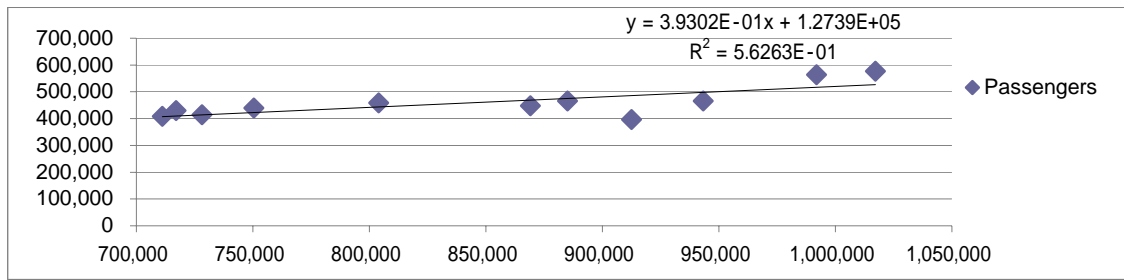


Figure A-12 Correlation between GDP and no. of pax

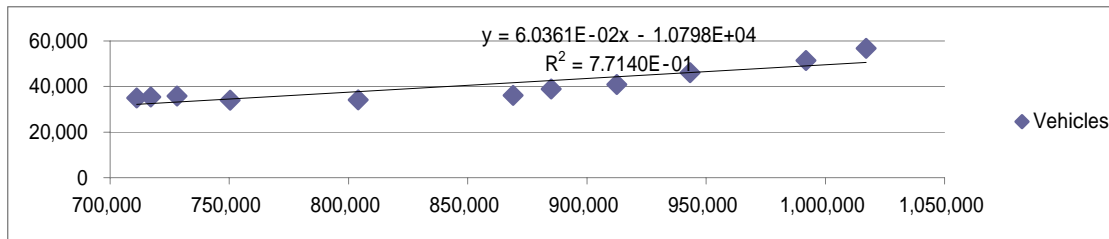


Figure A-13 Correlation between GDP and no. of vehicles

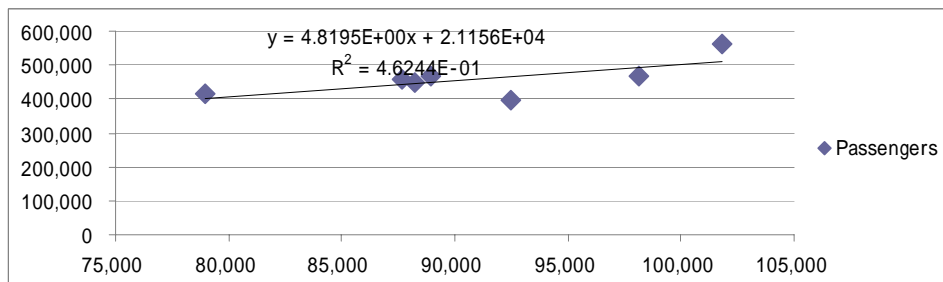


Figure A-14 Correlation between no. of tourists and no. of pax

Figure A-14 seems to show a positive correlation between number of tourists and number of vehicles. Considering that most tourists from abroad do not travel by car, the shown positive correlation must be false. Correlation using tourists as a parameter will be excluded in the further analysis.

Having found that growth of GDP and population closely correlate with passenger and vehicle transport, regression analysis with multi-parameters will be checked in the next paragraph.

### (3) Regression analysis with multi-parameters for the no. of passengers

Table A-6 Result of regression analysis with multi-parameters (pax on all SSC vessels)

Relation	Regression coefficient (R)	No. of data	Parameter	y intercept	GDP		Population		Appropriateness (Ru)	Judgment
					Reg. Coeff.	Risk rate (P-value)	Reg. Coeff.	Risk rate (P-value)		
GDP+ population	0.7949	11	2	915,254	0.7461	0.04	-6.263	0.26	0.36	+
GDP	0.7501	11	1	127,391	0.3930	0.01			0.37	++
Population	0.6029	11	1	-445,402			5.2194	0.05	0.08	?

\*Ru : Regression model giving maximum Ru value is deemed optimum, proposed by Ueda.

Above analysis suggests no. of passengers should be based on a single parameter, GDP only, rather than multi-parameters. Table A-7 shows that the error of approximation by applying the regression formula based on GDP is satisfactorily less than 10% except for 2003.

Table A-7 Approximation applying different regression formulae

Year	GDP	Population	Actual no. of pax	GDP +Population			GDP only			Population only		
				Approx-imation	Error	Error (%)	Approx-imation	Error	Error (%)	Approx-imation	Error	Error (%)
1996	717,086	161,081	429,873	441,404	-11,531	2.68	409,218	20,655	4.80	395,342	34,531	8.03
1997	711,078	164,207	409,006	417,345	-8,339	2.04	406,857	2,149	0.53	411,656	-2,650	0.65
1998	728,104	167,395	414,496	410,081	4,415	1.07	413,548	948	0.23	428,296	-13,800	3.33
1999	750,401	170,646	439,338	406,352	32,986	7.51	422,311	17,027	3.88	445,266	-5,928	1.35
2000	803,989	173,963	458,416	425,563	32,853	7.17	443,372	15,044	3.28	462,575	-4,159	0.91
2001	869,061	176,710	448,511	456,905	-8,394	1.87	468,947	-20,436	4.56	476,915	-28,404	6.33
2002	885,000	177,516	465,399	463,747	1,652	0.35	475,211	-9,812	2.11	481,123	-15,724	3.38
2003	912,562	178,327	396,247	479,235	-82,988	20.94	486,043	-89,796	22.66	485,353	-89,106	22.49
2004	943,256	179,141	466,377	497,033	-30,656	6.57	498,107	-31,730	6.80	489,605	-23,228	4.98
2005	991,844	179,960	563,868	528,155	35,713	6.33	517,202	46,666	8.28	493,879	69,989	12.41
2006	1,017,151	180,741	576,433	542,145	34,288	5.95	527,148	49,285	8.55	497,954	78,479	13.61
Mean error						5.68			5.97			7.04

\* Error (%) in 2003 exceeds 20%. This is because Fotu-o-Samoa had many stoppages that year and accordingly no. of pax carried dropped considerably.

According to above, the following regression formula is adopted to approximate the no. of passengers (on all SSC vessels) based on GDP. This formula will be used to approximate passenger demand for the island link after 2007.

$$\text{AnnualTotalPax} = 0.393017 \times \text{GDP} + 127,391 \quad (\text{Regression-2})$$

#### (4) Regression analysis with multi-parameters for the number of vehicles

Annual total number of vehicles correlated well with GDP growth. However, for voyages which were busy in vehicle transport, correlation with GDP and population was negative as shown in Table A-8. This shows that on those busy voyages, vessels were almost always full of vehicles.

Table A-8 Correlation of vehicle transport and socioeconomic index for 4 busy voyages

Relation	Correlation coefficient (r)	Appropriateness index	Correlation
Population - vehicle on Mon 06:00 from SL	0.65	$r^2 < 0.67$	Negative
Population - vehicle on Fri 14:00 from SL	0.49	$r^2 < 0.67$	Negative
Population - vehicle on Sat 08:00 from MF	-0.33	$r^2 < 0.67$	Negative
Population - vehicle on Sun 14:00 from SL	-0.29	$r^2 < 0.67$	Negative
GDP - vehicle on Mon 06:00 from SL	0.59	$r^2 < 0.67$	Negative
GDP - vehicle on Fri 14:00 from SL	0.48	$r^2 < 0.67$	Negative
GDP - vehicle on Sat 08:00 from MF	-0.04	$r^2 < 0.67$	Negative
GDP - vehicle on Sun 14:00 from SL	-0.33	$r^2 < 0.67$	Negative

Table A-9 shows regression analysis for number of vehicles with multi-parameters.

Table A-9 Result of regression analysis with multi-parameters (vehicles on all SSC vessels)

Relation	Regression coefficient (R)	No. of data	Parameters	y intercept	GDP		Population		Appropriateness (Ru)	Judgment
					Reg. Coeff.	Risk rate (P-value)	Reg. Coeff.	Risk rate (P-value)		
GDP+ Population	0.95152	11	2	132,902	0.12476	0.000298	-1.14232	0.009843	0.83443	++
GDP	0.87829	11	1	-10,798	0.06036	0.000375			0.6698	+
Population	0.68488	11	1	-94,622			0.77772	0.020054	0.23309	?

Table A-10 shows that the error of approximation by applying regression formula based on GDP and population is satisfactorily less than 10%.

Table A-10 Approximation applying different regression formulae

Year	GDP	Population	Actual no. of vehicles	GDP +Population			GDP only			Population only		
				Approximation	Error	Error (%)	Approximation	Error	Error (%)	Approximation	Error	Error (%)
1996	717,086	161,081	35,439	38,357	-2,918	8.23	32,486	2,953	8.33	30,654	4,785	13.50
1997	711,078	164,207	34,934	34,036	898	2.57	32,124	2,810	8.04	33,085	1,849	5.29
1998	728,104	167,395	35,847	32,519	3,328	9.28	33,151	2,696	7.52	35,565	282	0.79
1999	750,401	170,646	33,946	31,586	2,360	6.95	34,497	-551	1.62	38,093	-4,147	12.22
2000	803,989	173,963	34,177	34,484	-307	0.90	37,732	-3,555	10.40	40,673	-6,496	19.01
2001	869,061	176,710	36,098	39,463	-3,365	9.32	41,660	-5,562	15.41	42,809	-6,711	18.59
2002	885,000	177,516	38,938	40,531	-1,593	4.09	42,622	-3,684	9.46	43,436	-4,498	11.55
2003	912,562	178,327	40,825	43,044	-2,219	5.43	44,285	-3,460	8.48	44,067	-3,242	7.94
2004	943,256	179,141	46,032	45,942	90	0.19	46,138	-106	0.23	44,700	1,332	2.89
2005	991,844	179,960	51,423	51,069	354	0.69	49,071	2,352	4.57	45,337	6,086	11.84
2006	1,017,151	180,741	56,705	53,334	3,371	5.95	50,598	6,107	10.77	45,944	10,761	18.98
Mean error				4.87			7.71			11.14		

According to above, the following regression formula is adopted to approximate the number of vehicles (on all SSC vessels) based on GDP and population. This formula will be used to approximate vehicle demand for the island link after 2007.

$$\text{AnnualTotalVehicle} = 0.12476 \times \text{GDP} - 1.14232 \times \text{Population} + 132,902 \quad (\text{Regression-3})$$