No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR THE CONSTRUCTION
OF
THE UNIVERSITY OF THE SOUTH PACIFIC
INFORMATION AND COMMUNICATION TECHNOLOGY CENTRE
IN
THE REPUBLIC OF THE FIJI ISLANDS

JANUARY, 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request from the Government of the Republic of the Fiji Islands, the Government of Japan decided to conduct a basic design study on the Project for the Construction of the University of the South Pacific Information and Communication Technology Centre and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Republic of the Fiji Islands a study team from 8th February to 12th March, 2005.

The team held discussions with the officials concerned of the Government of the Republic of the Fiji Islands, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Fiji in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Fiji Islands for their close cooperation extended to the teams.

January, 2006

Seiji Kojima
Vice-President
Japan International Cooperation Agency

January, 2006

LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Project for the Construction of the University of the South Pacific Information and Communication Technology Centre in the Republic of the Fiji Islands.

This study was conducted by Azusa Sekkei Co., Ltd. under a contract to JICA, during the period from 2nd February, 2005 to 31st January, 2006. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Fiji and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Hiroyuki Koike
Project manager,
Basic design study team on
The Project for the Construction of
the University of the South Pacific
Information and Communication Technology Centre

Azusa Sekkei Co., Ltd.

LOCATION MAP

THE PROJECT FOR THE CONSTRUCTION OF THE UNIVERSITY OF THE SOUTH PACIFIC
INFORMATION AND COMMUNICATION TECHNOLOGY CENTRE IN THE REPUBLIC OF THE FIJI ISLANDS

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ABBREVIATIONS

Abbreviation	Original Name
AARNET	Australian Academic Research Network
ACS	Australia Computer Society
ADB	Asian Development Bank
AusAID	Australian Agency for International Development
CELT	Centre for the Enhancement of Learning and Teaching
CIO	Chief Information Officer
CROP	Council of Regional Organisations of the Pacific
CS	Computer Science
DFLT	Distance and Flexible Learning and Teaching
DFLSC	Distance and Flexible Learning Support Centre
FCS	Fiji Computer Society
FEA	Fiji Electric Authority
FTIB	Fiji Investment Trade Bureau
GIS	Geographical Information Systems
HOD	Head Of Departmeny
ICT	Information and Communication Technology
IP	Internet Protocol
IT	Information Technology
ITS	Information Technology Services
ITU	International Telecommunications Union
JICA	Japan International Cooperation Agency
LAN	Local Area Network
MaCs	Department of Mathematics and Computing Science
MDF	Main Distribution Frame
MoCBDI	Ministry of Commerce, Business Development and Investment
MoE	Ministry of Education
NGO	Non Governmental Organisation
NZAID	New Zealand Agency for International Development
PALM	Pacific Leaders Meeting
PIF	Pacific Islands Forum
PhD	Doctor of Philosophy
RDI	Research, Development and incubation
SOH	School of Humanities
SOL	School of Law
SOPAC	South Pacific Applied Geosciences Commission
SPAS	School of Pure and Applied Science
SPACS	South Pacific Computer Society
SPREP	South Pacific Regional Environmental Programme
SSED	School of Social and Economic Development
UN	United Nations
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNDP	United Nations Development Programme
USP	The University of the South Pacific
USPNet	USP Network
WSIS	World Summit on the Information Society

SUMMARY

SUMMARY

The Republic of the Fiji Islands (hereafter referred to as 'the Fiji Islands') is an island nation comprising approximately 330 islands and belongs to Melanesia, being located in the central part of the South Pacific Ocean (south latitude 15~22 degrees, east longitude 174 degrees ~ west longitude 177 degrees), and serves as a base for transportation, distribution and information for the Pacific island nations. The Fiji Islands have a population of 848,000 (according to the 2004 World Bank survey), 54.3% of whom are Fijians of Fiji origin, 38.2% Fijians of Indian origin, and 7.5% of other nationalities. English is the official language, but Fijian and Hindustani are also used. Approximately 75% of the overall population lives on Viti Levu Island, and the population of the capital city of Suva is around 77,000 (1996 survey).

A coup d'état that took place in May 2000 had sharp ramifications on the economy of Fiji, and the tourism industry and clothing industry were hit hard and directly. Where the GDP growth rate had been 8% or higher in 1999, it plunged to -2.8% in 2000 (initial predictions were for -8.2%). At the same time, however, following general elections in 2001, Fiji began gradually recovering the confidence of global society as the government began to stabilize. Economic activities began to settle down as well; an economic growth rate of 4.3% was recorded for 2001, rising to 4.4% for 2002. According to the World Bank survey in 2004, actual growth rate reached 3.8%, while the GNI per capita was 2,690 US dollars. The recovery in the tourism industry was particularly striking, with the number of tourists rising from 290,000 in 2000 to approximately 400,000 in 2002. The holding of the South Pacific Games there in 2003 also had an effect, and the number of tourists increased again, to approximately 430,000, so that the tourism industry is seen as providing the traction to pull the Fijian economy forward. Also, as the political situation stabilized, many large-scale construction projects such as hotels were initiated, and the construction industry is now in good shape as well. The sugar industry, which has long been a stalwart component supporting the Fijian economy, is facing numerous issues that need to be resolved; in addition to problems such as irresponsible factory management, shipping means and aging and deteriorating equipment, the industry is plagued by political problems such as disputes over agricultural land leases between landowners of Fiji origin and farmers of Indian origin. The industry is also struggling with large cumulative deficits and has deteriorated into a serious situation from which no outlet is visible.

The Pacific region has peculiar geographic conditions, with small islands being scattered amidst huge expanses of ocean, and there is a sharp information differential ('digital divide') in the region. Also, because the communications infrastructure itself is undeveloped, the development of human resources is problematic, and no industries utilizing IT have yet been developed. At the 'Pacific Island Summit Meeting' held in Japan in 2002, it was acknowledged that the 'IT-Promotion Project for the Pacific'

would mitigate the digital division among the island countries and would be indispensable for the development of the South Pacific Region.

The ‘Strategic Development Plan by Fiji Government 2003-2005' sets forth a vision of ‘Striving for a peaceful and prosperous Fiji, by rebuilding the self-confidence that will bring stability and growth’. According to the Strategic Development Plan, a ‘peaceful and prosperous Fiji’ means ‘peace, unity, and the harmonization of a multi-national state’ and ‘prosperity for all people, particularly prosperity for those living in extreme poverty’. The ‘National Information Communications Technology Development Plan 2003-2005’ sets forth a vision of Fiji becoming a central nation in powerful and dynamic Pacific Ocean information communication technology through a digitalized economy and a people with information communication capabilities, and comprises the four core programs noted below, along with a national information infrastructure. The four core programs are: e-Government (ICT Services), e-Commerce (Ministry of Commerce, Business Development and Investment), e-Personal (Ministry of Education and & Technology Structure) and ICT Industry (Fiji Investment Trade Bureau).

The 2004 White Paper Concerning the National Information Communications Technology Development Policy of the Communications and Media Bureau of the Fiji Ministry of Information states the following as its principal policy objectives.

- Freeing up latent potential and making the most effective use of ICT anywhere in the world
- Eliminating differences in the levels of living standards, education and the ‘digital divide’, and providing better work for the people of Fiji
- Participating in global markets
- Strategic investments and connections in private enterprise with newly identified viewpoints
- Maximizing economic competitiveness and specific market opportunities

The University of the South Pacific (hereinafter referred to as ‘USP’), which is at the centre of ICT education in the Pacific region, was jointly established in 1968 by twelve island nations (Fiji, the Cook Islands, Kiribati, the Marshall Islands, Nauru, Niue, the Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Samoa) for the purpose of meeting high-level education needs in the Pacific island nations, and is the highest international educational organization in the region. Voice-based distance education using shortwave radio transmission networks is being carried out by the USP. At the beginning of 1990, the USP introduced the first email system in the Pacific island nations, and in 2000, with support from JICA, completed the USPNet, a network using satellite communication that uses 64 Kbps voice and data lines and a 128 kps video line. Although the quality is somewhat rough at 10 to 15 frames per second, the network is being used to implement a distance education system.

In member countries other than Fiji, including Kiribati, the Solomon Islands, Tonga, Vanuatu and Samoa, a proactive relationship of cooperation with South Pacific island nations is an important basic national policy, and these countries are working to strengthen ties within the region. Like the Government of Fiji, these countries are interested in strengthening the activities of USP, which is keenly involved in human resources education; thus, establishing the University of the South Pacific Information and Communication Technology Centre (hereafter referred to as the 'ICT Centre') and procuring equipment and materials, which are the objectives of the Project, will mitigate the information differential in the region and contribute to promoting socio-economic development.

Given this background, the USP requested grant aid from the Government of Japan through the Government of Fiji for the purpose of building the various facilities of the ICT Centre, which is aimed at education, research and training, and to procure the computer software and acoustic materials needed for the facilities.

Based on this request, in July 2003 JICA implemented a Preliminary Study, and it was confirmed that the USP is a central presence in the promotion of IT in the Oceanic region. However, because the communication infrastructure supporting the USPNet and international telephone line network (Internet) was saturated, improvement of the infrastructure was made a condition of this project. Subsequently, detailed planning was formulated for upgrading the USPNet, and the network was connected to the AARNET (Australian Academic Research Network) with cooperation from the Government of Australia, and it was confirmed that connections to international telephone lines had been improved. Therefore, JICA made the decision to implement a Basic Design Study, and a team from the Japan International Cooperation Agency (JICA) was dispatched to conduct the Basic Design Study between February 7 and March 12, 2005. In the field study, the study team discussed and confirmed factors relating to the background and content of the Project with members of the Government of Fiji, as well as compiling documents. Additionally, the study team formulated a Basic Design Study Report, based on subsequent analysis conducted in Japan and on local briefings described in the Basic Design Overview that were implemented between August 15 and September 1, 2005.

The scale initially requested by USP side included a Common Area with two lecture halls that could accommodate 1,000 people and 500 people, respectively, a Department of Computer Science, an IT Service Division, a Research and Development Department, a Department of Engineering and a Geographical Information course. However, it was decided that the scale of the Project would include a Multi-purpose Lecture Theatre that could accommodate 300 people, a Common Area, a Computer Science Department, an IT Service Division, a Research and Development Department, and a Department of Engineering.

The Project was formulated based on the following indicators.

1) Gradation of scale and grade of assistance

Facilities were selected that were deemed necessary for the new ICT Centre from the ICT-related divisions of the existing facilities, and the facilities and contents of the Project were selected based on the following policies.

① To give priority to facilities held to be important in mitigating the information differential ('digital divide') and assisting the self-driven development of human resources.
② To give priority to laboratories where individual students would directly use and operate computers.
③ To give priority to facilities related to education, research, and development.
④ To include facilities to be used for creating and distributing digital contents related to the regional culture.
⑤ To exclude existing facilities that are presently usable.
⑥ To limit the use of air-conditioners to rooms where equipment and computers are provided.
⑦ To plan the building to allow easy access to the disabled despite the fact that the site is a sloped one.
⑧ To establish a grade and scale for the facility in consideration of easy operation and maintenance.

2) Basic policies for selecting the equipment

Planned equipment will be selected based on the following basic policies:

① The equipment should be assigned to facilities to be refurbished in this Project.
② The equipment should directly benefit the students of the USP.
③ The equipment should be coordinated with the direct contents of Centre activities.
④ Equipment with limited benefit effects will be eliminated.
⑤ Equipment used mostly for personal purposes will be eliminated.
⑥ Equipment used with less frequency will be eliminated.

The principal contents of the facilities are as noted below.

Building name Structure / no. of floors	Scale	Principal facility contents	Principal equipment
Building A Reinforced concrete, 4 floors	2,602 ㎡	Public areas (Centre director's office, core staff offices, visiting staff offices) IT Service Division (Help desk, server office, workshop, parts warehouse, staff offices, General Access Computer Lab, Dedicated Computer Lab) Department of Computer Science (research laboratory, instructors' offices)	Servers, personal computers, video-conferencing system
Building B Reinforced concrete, 3 floors	2,810 ㎡	Department of Computer Science (special computer laboratory, dedicated network laboratory, workshop) Department of Engineering (laboratories, computer laboratories, workshop) Connecting bridges (bridging corridors)	Server/rack sets, personal computers, various information communications-related testing practice systems for the Department of Engineering
Multi-purpose Lecture Theatre Reinforced concrete + steel, 3 floors	1,247 ㎡	Multi-purpose Lecture Theatre Foyer	Acoustic and video systems
Total	6,659 ㎡		

Principal contents of equipment

Target field	Equipment	Usage	Quantity
Common-use equipment	LCD projector (large)	Projection of Video Source at Multi-purpose Lecture Theatre	1
	Remote-controlled TV camera	For taking an image of participants in videoconferencing	1
	Audio system for Multi-purpose Lecture Theatre	Audio system at Multi-purpose Lecture Theatre	1
	Video system for Multi-purpose Lecture Theatre	Video system at Multi-purpose Lecture Theatre	1
	Audio-visual system for video-conferencing room	AV system for video-conference room	1
	Audio-visual system for conference room	AV system for conference room	1
Department of Computer Science	Server / rack set	Practical equipment for student of computer science department	1
	Personal computers	ditto	150

IT Service Division	Servers (advanced-function type)	Data management of USPNet	6
	Servers (ordinary-function type)	ditto	14
	Tape backup system	Data backup system for server	1
	Uninterruptible power supply unit	Safety Device for server	1
	Equipment rack	For mounting of server & other related equipment	1
	Personal computers	Practical PCs for all student in USP	120
	System for USP network control room	Control system for USPNet	1
Department of Engineering	Analog communications practice system	Practical equipment for student of engineering department	1
	Antenna technology practice system	ditto	1
	Micro-wave technology practice system	ditto	1
	Digital communications practice system	ditto	1
	Server / rack set	ditto	1

If the Project is implemented through grant aid from Japan, the total cost is estimated to be 2045.7 million yen (1871.5 million yen to be borne by the Japan side and 174.2 million yen by the Fiji side). The Project is expected to be implemented by means of A government bonds, and construction will take 18 months.

The cooperation target of the Project will be the construction of an 'ICT' Centre that will comprise a Common Area, a Department of Computer Science, an IT Service Division, a Department of Research and Development, and a Department of Engineering, as well as the refurbishment of equipment and materials. Implementing the Project will mitigate the digital divide in Fiji and the Pacific island nations as described below, and as a ripple effect, it is expected that implementation of the Project will contribute to promoting socio-economic development. The effects can be described as indicated below.

1) Direct effects

- The ICT educational environment will be improved by increasing the number of computers to be used by the growing number of new students, particularly in ICT and Accounting courses, from 402 to 742（including 446 units to be installed in the ICT Centre (285 of which are to be procured by Japan) and 296 units in the existing facilities）.
- The environment for the computers in the Department of Computer Science will be improved from the poor conditions in the wooden building which uses dangerous insulation materials for the sake of air-conditioning efficiency.

- The computer laboratories will be improved so that the number of curricula of the Department of Computer Science can be increased from 49 courses in 2004 to 88 courses per year.
- By constructing the Multi-purpose Lecture Theatre with an accommodation capacity of 300 persons, one of the three existing lecture halls, which constantly has a population density double its capacity of 242, will be improved.
- The capacity for ICT-related training courses designed for adults will be increased from 24 hours/week to 48 hours/week.
- The liability of the internal network environment in the university will be enhanced through improving the equipment and setting environment for the server of the IT Services Division.
- The internal communications within the University will be strengthened by improving the operational environment through facilitating the speeding-up of the USPnet.
- The R&D segment will be reinforced by developing the Department of Research and Development which can carry out joint researches and developments with external institutions.

(2) Indirect effects

- Setting up a core IT educational and research centre within the USP will encourage the Pacific Ocean island nations to fully participate in the global information society.
- Fiji and other Pacific island countries will lead the research and development in the ICT field by leveraging the Centre, and hence will be able to develop ICT potential to contribute to human resource development, education, environmental conservation, and development of society and culture in the field of media.
- The Department of Engineering to be newly established will resolve the lack of engineers in this field on the islands.
- The ICT educational environment will be strengthened thereby increasing the number of workers in the ICT-related fields.

For the reasons outlined in (1) through (5) below, the Project is considered to be an appropriate target for cooperation through grant aid from Japan.

(1) The USP was jointly established in 1969 by twelve island countries and regions (Fiji, the Cook Islands, Kiribati, the Marshall Islands, Nauru, Niue, the Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Samoa), and, as the highest international educational organization in the Pacific Region, provides benefits to Fuji and the entire Ocean region.

(2) Currently, the number of applicants in ICT-related departments at the University of the South Pacific is increasing, but because of insufficient facilities, including lecture halls and computer laboratories, the university is unable to provide satisfactory education to students. The

implementation of the Project is expected to augment the learning environment for students in ICT-related programs and to increase the number of students graduating in ICT-related fields.

(3) Following its transfer, the ICT Centre will not require particularly sophisticated technology in terms of either facilities or equipment and materials, and it will be possible to run it with the existing personnel. Moreover, judging from past budgets of the USP, sufficient operating budgets can be assured to comfortably run the facility following the transfer.

(4) Fiji has a vision of becoming a central nation in powerful and dynamic Pacific Ocean information communication technology through a digitalized economy and a people with information communication capabilities. Fiji and the South Pacific island nations regard their active cooperative relationship as an important basic national policy, and are working to strengthen the bonds within the region. Like the Government of Fiji, the South Pacific island nations are also deeply interested in strengthening the activities of the USP, which is keen to develop human resources. For this reason, building the ICT Centre and procuring equipment and materials, which are key components of the Project, will mitigate the information differential in the region and contribute to promoting socio-economic development.

(5) The Centre will be constructed on the USP campus, on land that was leased from the national government in 1968 under a 99-year lease, and thus it has been confirmed that there will be no obstacles to the Project construction. Removal of the existing buildings and site preparation will not impose an excessive burden on the USP side. Because the building will be located on the campus, no problems are foreseen in terms of infrastructure components that will present obstacles. Additionally, the Fiji Ministry of Education has been the recipient of grant aid cooperation from the Government of Japan in the past, and no particular difficulties are foreseen in implementing the project under the grant aid system of the Government of Japan.

In order to utilize the facilities built and the equipment and materials procured as a result of implementing the Project to the maximum limit, and to realize and sustain the results of the Project implementation, the following issues have been identified as those that must be addressed by the Government of Fiji and by the USP.

(1) Maintenance of the facilities and equipment

Financially, the university is not encumbered by deficits, and is maintaining a sound financial situation. In addition to the total amount required for heating and lighting expenses, communication expenses, maintenance control and building repair expenses being assured at approximately 10% of annual expenditures, the Department of Planning & Facilities oversees maintenance of the various facilities, with an organizational structure that involves around 70

persons in all. Thus, the management and maintenance control capability is regarded as being fully adequate.

With respect to IT equipment and materials, all IT equipment and materials are handled by the IT Service Division, and no problems are foreseen in terms of the ability to carry out management and maintenance control capability of facilities and equipment in the ICT Centre.

However, because the computer laboratory is at the core of this facility, it was found that the floor space devoted to air conditioning amounts to just under 60% of the overall facility. Taking the service life of the equipment into consideration, it is suggested that sufficient maintenance of the air-conditioning equipment will need to be carried out, and sufficient funds will need to be assured to cover the cost of electricity usage.

(2) Upgrading of the USPNet

The current system uses digital technology dating back to around 1995, so the frequency bandwidth is such that the channels for all of the USP branch schools are fixed. Consequently, the channels of countries with high demand do not provide sufficient speed and efficiency is poor. The USP is planning to upgrade the current USPNet to a system in which Internet technology can be used (higher speeds can be accommodated). Because the Project was designed on the assumption that this upgrade will be implemented, it is hoped that the upgrade of the USPNet can be completed by the time that the ICT Centre is completed, with cooperation from the USP.

(3) Internet environment

As a result of cooperation from the Government of Australia in 2005, connections were made to the AARNET (Australian Academic Research Network) through Southern Cross Cable on March 4, 2005, and the Internet connection environment was significantly improved, from 1 Mbps to 155 Mbps.

At the same time, however, in view of future advances in Internet technology, it is hoped that the Internet connection environment will continue to be augmented and strengthened following the opening of the ICT Centre.

Contents

[Appendices]

Chapter 1　BACKGROUND OF THE PROJECT

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The University of the South Pacific (hereinafter referred to as 'USP'), which is at the centre of ICT education in the Pacific region, was jointly established in 1968 by twelve island nations (Fiji, the Cook Islands, Kiribati, the Marshall Islands, Nauru, Niue, the Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Samoa) for the purpose of meeting high-level education needs in the Pacific island nations, and is the highest international educational organization in the region. The USPNet, which uses satellite communication, was completed in 2000 with support from JICA, and a distance learning system is being implemented.

In member countries other than Fiji, including Kiribati, the Solomon Islands, Vanuatu and Samoa, a proactive relationship of cooperation with South Pacific island nations is an important basic national policy, and these countries are working to strengthen ties within the region. Like the Government of Fiji, these countries are interested in strengthening the activities of the USP, which is keenly involved in human resources education; thus, building the University of the South Pacific Information and Communication Technology Centre (hereafter referred to as the 'ICT Centre') and procuring equipment and materials, which are the objectives of the Project, will mitigate the information differential in the region and contribute to promoting socio-economic development.

Given this background, the USP requested grant aid from the Government of Japan through the Government of Fiji for the purpose of building the various facilities of the ICT Centre, which is aimed at education, research and training, and to procure the computers, software and acoustic materials needed for the facilities.

The USP side initially requested the ICT Centre to be composed of a common area including two lecture halls with capacity of 1,000 and 500, a Department of Computer Science, an IT Service Division, a Department of Research and Development, a Department of Engineering, and a Geographical Information course. However, as a result of discussion, the two lecture halls were decided to be replaced by a multi-purpose lecture theatre with a capacity of 300 people.

The contents of the final request are as noted below.

1. **Facilities (targeted departments)**
   - A Common Area that includes a Multi-purpose Lecture Theatre accommodating 300 people, a Department of Computer Science, an IT Services Division, a Research and Development Department, a Department of Engineering and a Geographical Information course
2. **Equipment and materials**
   - Audio-visual equipment for the Multi-purpose Lecture Theatre, stage equipment and materials for the Multi-purpose Lecture Theatre, personal computer equipment for Department of Computer Science, servers and computer equipment for the IT Services Division, information communication equipment and materials for the Department of Engineering. Equipment and materials relating to research and development, and equipment and materials relating to geographic information systems