

Appendix-9

用地買收費積算資料 (MOL)

NADI RIVER IMPROVEMENT



Ministry of Land-Geospatial Division,2015

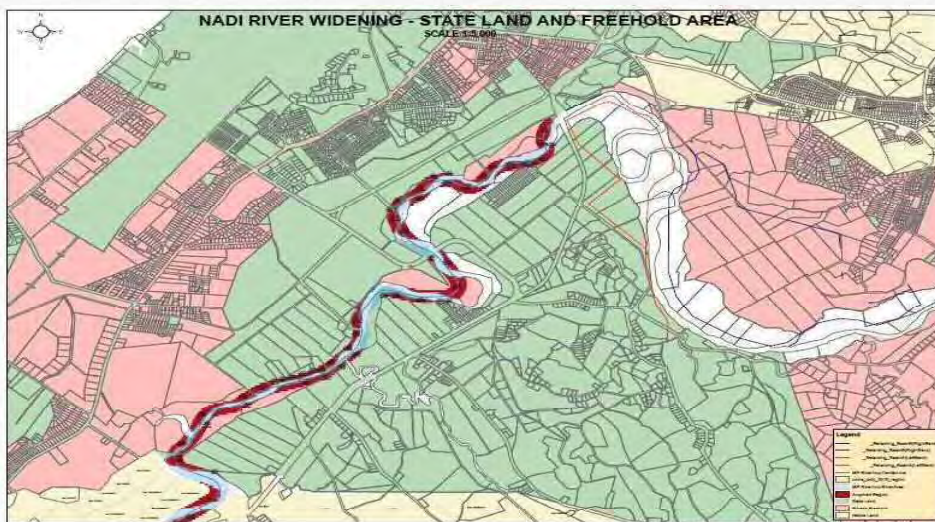
AREARS AFFECTED

- Native Land
- State Land
- Freehold

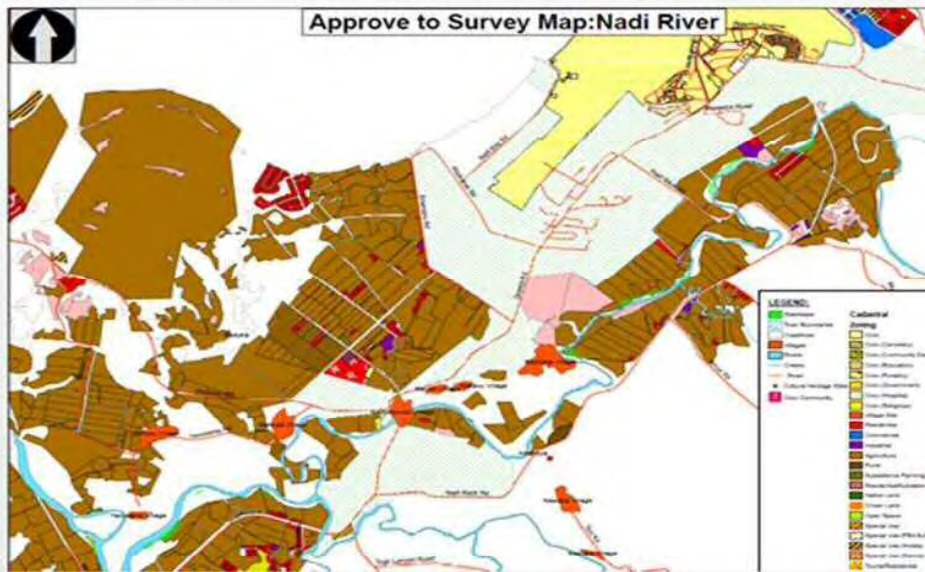
NATIVE LAND AREA



STATE LAND & FREEHOLD AREA



CLASSIFICATION



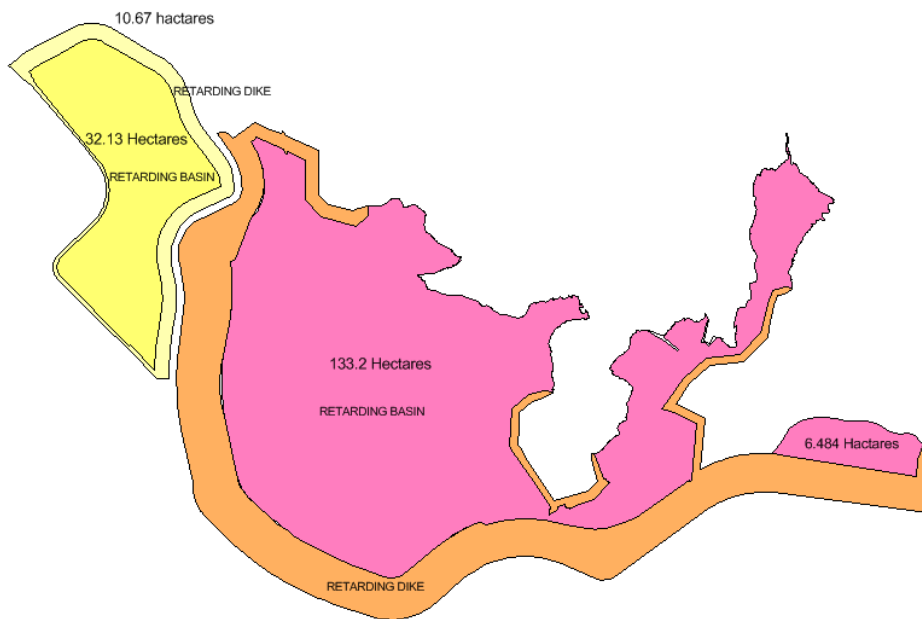
Land Use Classification



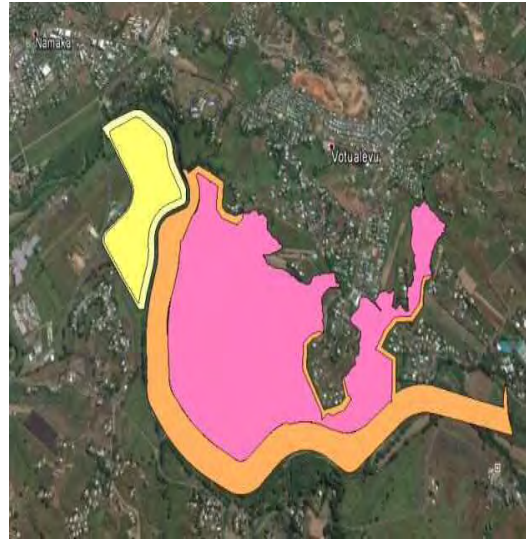
Votualevu Retarding Basin and Dykes



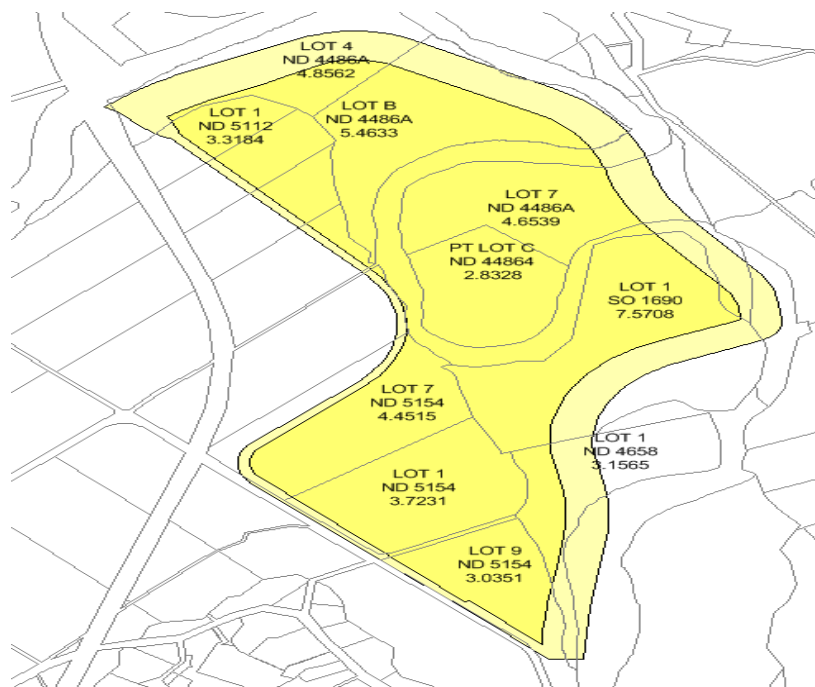
1. Polygon map of area affected (Hectares)

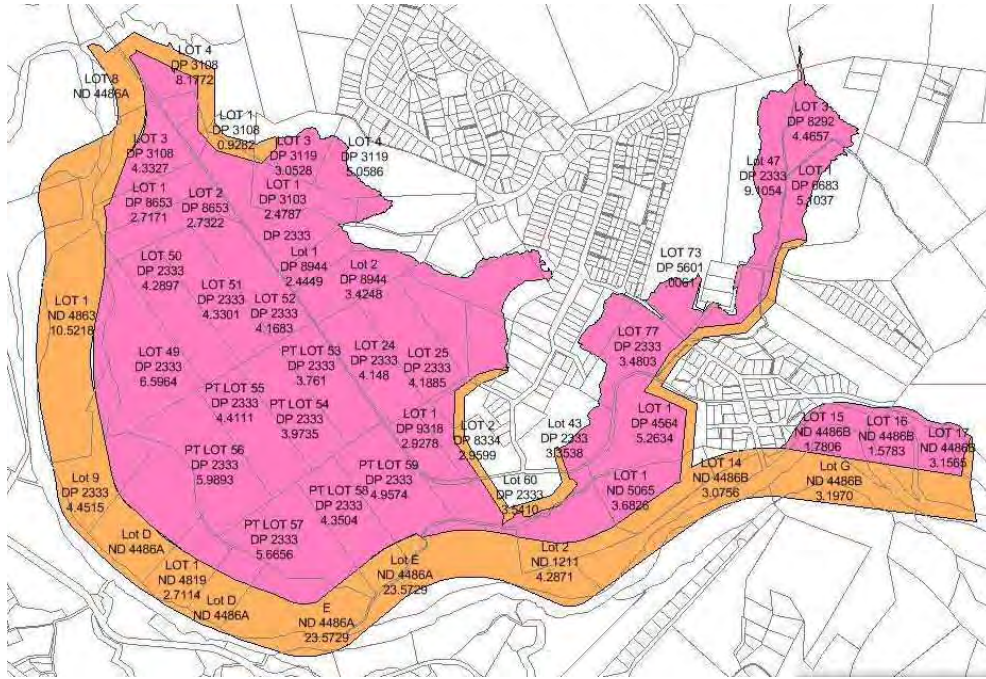


GOOGLE OVERLAY



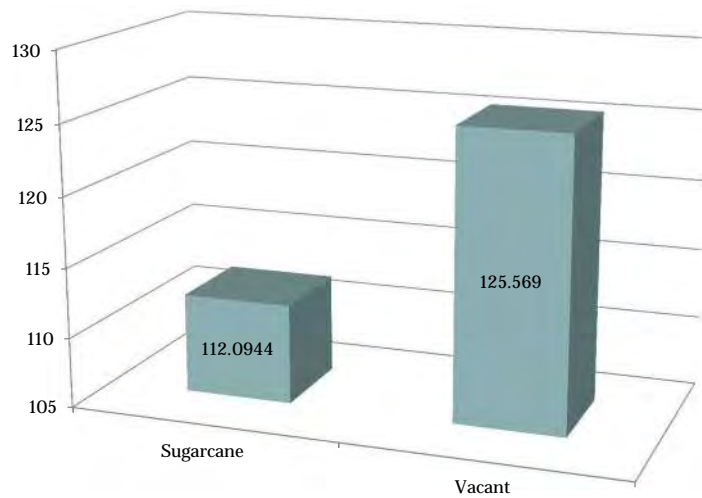
LOTS AFFECTED



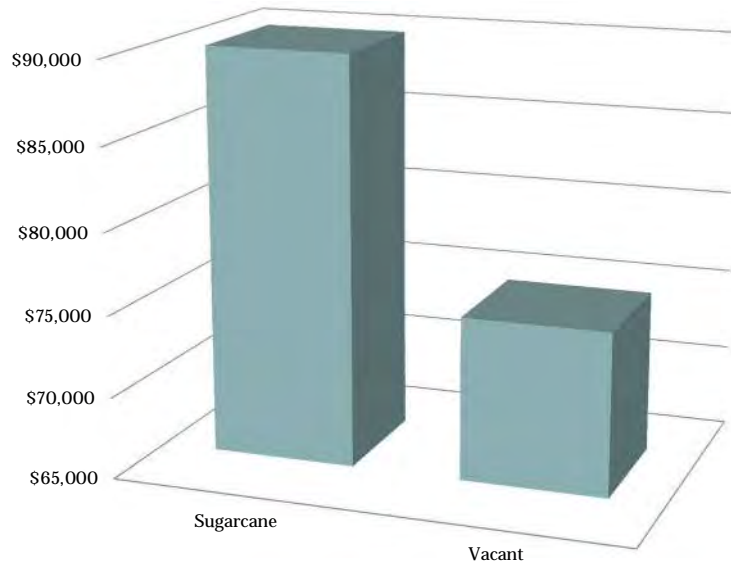


ANALYSIS

Land Use



Land Rates



ACQUISITION ESTIMATES

Retarding Basin A	32.13
Retarding Dike A	10.67
Retarding Basin B	139.684
Retarding Dike A	61.024
TOTAL AREA	243.508

Total Computed Acquisition Area	Land	237.6634
	Offset	= 243.508-237.6634
		5.8446 Ha

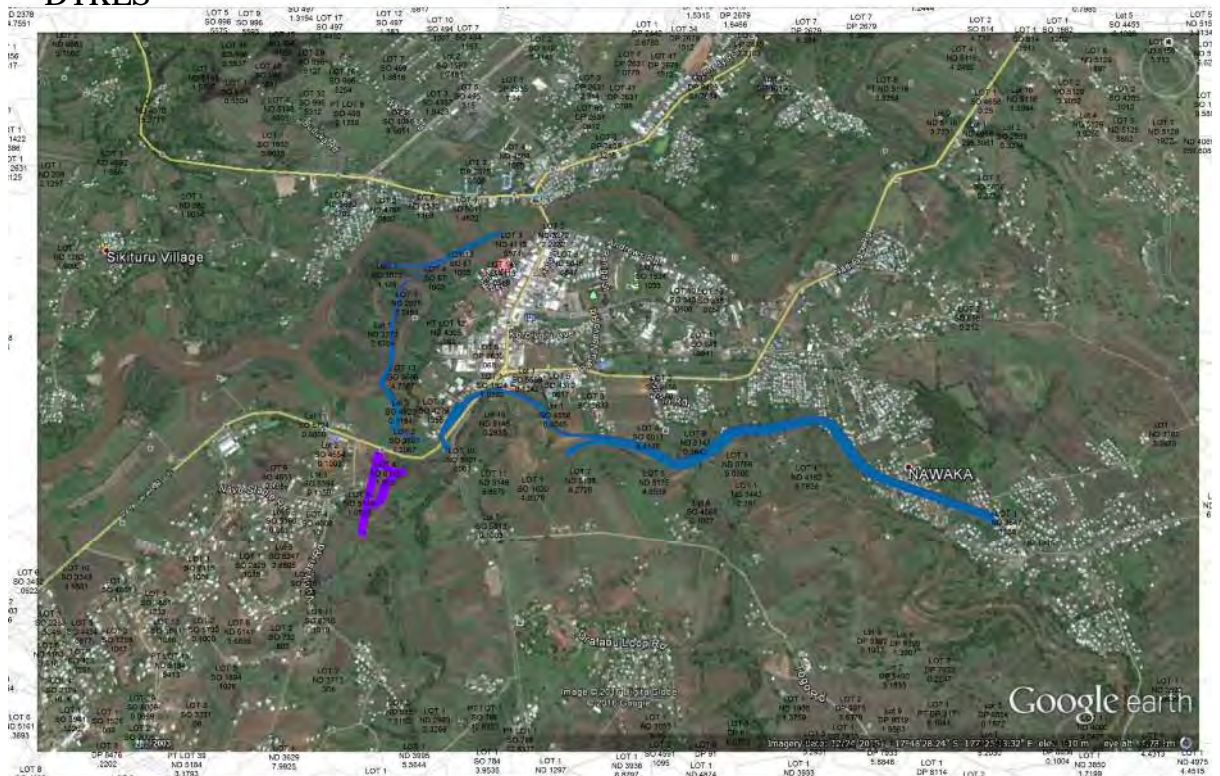
Sugarcane	112.094	@ \$90,000	\$10,088,496.00
Vacant	125.569	@ \$75,000	\$9,417,675.00

TOTAL ACQUISITION COST
\$19,506,171

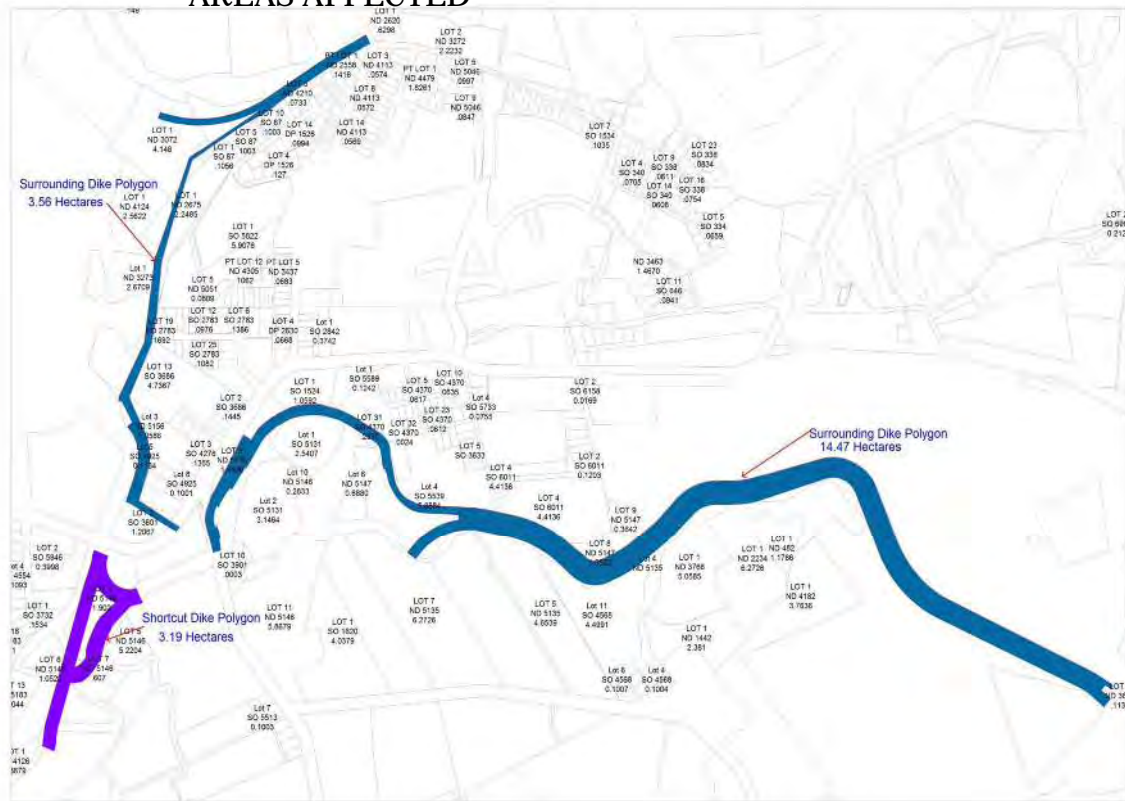
NADI TOWN, NAWAKA BACKROAD, DRATABU SHORTCUT AND MOALA DYKES



GOOGLE OVERLAY FOR NADI TOWN BACKROAD AND SHORTCUT DYKES



AREAS AFFECTED







NADI TOWN DYKES DESCRIPTIONS

NO.	IMAGE	LEGAL DESCRIPTIONS	FILE REFS	LESSOR	LESSEE	LEASE DETAILS	TOTAL AREA (SQM)	AREA AFFECTED (SQM)	CURRENT STATUS
1		NL 11284 Lot 7 ND 2563	4/10/2839	TLTB	DULCINEA LTD	Term: 75 years wef 1962 Rent: \$7000 wef 1/1/2014 Zoning: Com B Tenure: Native Landname: Vunalofo	1139	488.9	Subject improvement will be affected by the installation of the dyke. Exist at the site is a partial concrete/wooden building structure currently used as a restaurant.
2		NL 11840 Lot 6 ND 2562	4/10/2885	TLTB	TAPOO HOLDINGS LTD	Term: 75 years wef 1/10/1961 Rent: \$9,000 wef 2012 Zoning: Com B Tenure: Native Landname: Vunalofo	1189	456.9	Subject property will be affected by the installation of the dyke. Structure is a multi unit commercial complex which is currently let out to various businesses
3		Lot 5 ND 2561	4/10/2653	TLTB	SOO WAH KWONG & SOA MIE KWONG	Term: 75 years wef 1/7/74 Rent: \$9,380 wef 2012 Zoning: Com B Tenure: Native Landname: Vunalofo	1240	417.9	Dyke will take up portion of the rear lot which contains no improvement. Exist at the site is a commercial building which situated at the frontage approximately 30-40 meters away from the affected portion.

NADI TOWN DYKES DESCRIPTIONS




4		Lot 4 ND 2560	4/10/2883	TLTB	DHANSUKHLAL	Term: 75 years wef 1/1/1962 Current rent: \$9,000 wef 2013 Zoning: Com B Tenure: Native Landname: Vunablo	1390	380.3	Dyke will take up portion of the rear lot which contains no improvement. Exist at the site is a commercial building which situated at the frontage approximately 30-40 meters away from the affected portion.
5		NL 12342 Lot 1 & 2 ND 2558	4/10/11	TLTB	RAMAKRISHNA MISSION	Term: 75 years wef 1/1/1961 Rent: \$2,268.00 wef 2013 Zoning: Com B Tenure: Native Landname: Vunablo	1417	439.4	Subject improvement will be affected by the installation of the dyke. Exist at the site is an on going building construction right at the rear lot where the dyke is expected to be installed.
6		Lot 5 ND 4210	4/10/2507	TLTB	JACKS HANDICRAFT	Lease Type: MOL Exiry Date: 31/12/2104 Current rent: \$3,000 Zoning: Com Tenure: Native Landname: Wavudra pt of.	7330	131.3	Site currently used as Nadi Farmers Club. Dyke will be installed at the rear of the lot affecting the fencing structure of the the building.
7		Lot 14 SO 87	4/10/7915	TLTB	NAKOVACAKE DEVELOPMENT TRUST	Lease Type: Registered Lease Exiry Date: 30/6/2107 Current rent: \$3,000 Zoning: Com Tenure: Native Landname: Wavudra pt of.	2218	1317	Entire rear portion of this property will be affected by the dyke installation.

8		Lot 8 SO 87		TLTB	OPEN SPACE RESERVE	Term: Current rent: Zoning: Tenure: Native	3279	12486	Site is currently vacant and covered with grassland. Site seems to be neglected for sometime.
9		Lot 1 SO 6493	4/10/348	TLTB	SHARVIN SUBHARSH CHAND	Lease Type: Agreement for Lease Exiry Date: 30/12/2050 Current rent: \$400.00 Zoning: Res B Tenure: Native	1128	243.9	Site is currently vacant and covered with grassland. Site seems to be neglected for sometime.
10		Lot 1 ND 3072	4/10/6468	TLTB	ILJASERI VARO & SAVINACA WAQA	Lease Type: Instrument of Tenancy Exiry Date: 30/12/2050 Current rent: \$199.30 Zoning: Agriculture - Cane Tenure: Native	4148	0.435398867	Exist at the site is a 3 x 4 meters lean to wooden dwelling with pine post and a make shift toilet. Also at the site are sugar cane farms, coconut trees and subsistence farming for own consumption. Dyke will be installed approximately 30-40 meters away from the improvement partially affecting the sugar cane and the subsistence farming.
11		Lot 1 ND 2675	4/10/6846	TLTB	CHALLENGE ENGINEERING LTD	Lease Type: Instrument of Tenancy Exiry Date: 30/6/2050 Current rent: \$500 Zoning: Agriculture Tenure: Native	22485	0.553515018	Two structures exist within this lot but away from the dykes installation path. Dyke to be installed approximately 50-60 meters away from the two houses. Also seen at the site are subsistence farms, standing trees and grassland. Site is flood prone area.

NADI TOWN DYKES DESCRIPTIONS

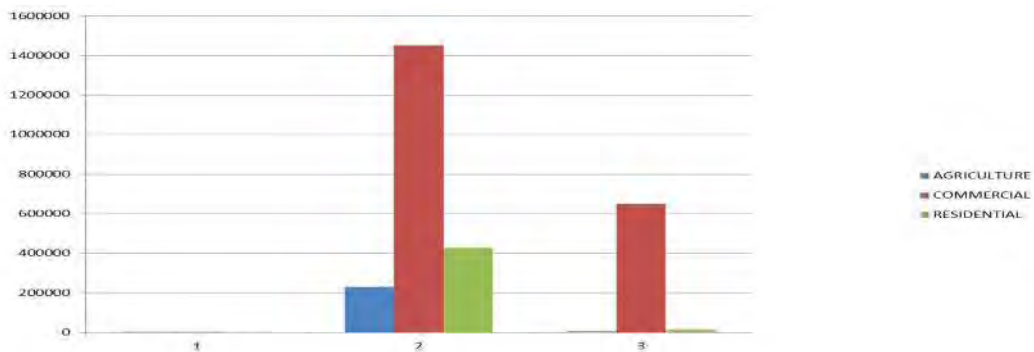
12		Lot 1 ND 4124	EXPIRED LEASE			25622	0.072204057	Site seems to be neglected for sometime due to floods. Lands belong to Dratabu village.
13		Lot 1 ND 3273	EXPIRED LEASE			26708	0.435645972	Site seems to be neglected for sometime. Lands belong to Dratabu village.
14		Lot 13 SO 3686	4/10/1527	Director Lands	Melbourne Place Ltd	47365	0.831013842	Dyke will take up portion of the rear lot which contains no improvement but swampy and covered with grassland.
15		Lot 3 ND 5156	4/10/1528			50585	3.207421846	Dyke will take up portion of the rear lot which contains no improvement but only palm trees and grassland.

NADI TOWN DYKES DESCRIPTIONS

16		Lot 5 SO 4925				1184	874	A partial damaged property located at the site that will entirely affected by the dyke.
17		Lot 4 SO 4925	4/10/4787			1340	1019	Currently vacant with chain link fencing around the boundary
18		Lot 1 SO 3601	EXPIRED LEASE			16701	0.534240834	Dyke will take up approximately 30 to 40% of this lot from the rear. Site is neglected for sometime.
19		Lot 2 SO 3601	4/10/2818			12064	0.359784762	Site is vacant and neglected for sometime.

NADI TOWN DYKES DESCRIPTIONS

SUMMARY	AREA	LAND	IMPROVEMENTS	TOTAL
AGRICULTURE	6.429225198	\$ 231,452.11	\$ 5,000.00	236,452.11
COMMERCIAL	3631.7	\$ 1,452,680.00	\$ 650,000.00	2,102,680.00
RESIDENTIAL	2136.9	\$ 427,380.00	\$ 15,000.00	442,380.00



NADI TOWN DYKES SUMMARY

NO.	IMAGE	LEGAL DESCRIPTIONS	TITLE/FILE REFS	LESSOR	LESSEE	LEASE DETAILS	TOTAL AREA	AREA AFFECTED	CURRENT STATUS
1		Lot 5 ND 5156	4/10/1525	Director of Lands	ESTATE OF SUBMMA	Term: Expired Last rent: \$630 Zoning: Agriculture Tenure: Crown	77371	3.207421846	Site is covered with grassland and overgrown trees. Also river bank reserve attached to this lot.
2		Lot 1 SO 1524	4/10/2001	Director of Lands	THE TRUSTEES OF INDIA IKYA (RELIGIOUS)	Term: 99 years wef 1984 Current rent: \$10 wef 1984 Zoning: Special Tenure: Crown	10592	365.9	At the rear of the Nadi Temple. The dykes will be installed along the river bank reserve probably affect the boundary fencing of the this property.
3		Lot 31 SO 437		Director of Lands		Term: 30 years wef 14/12/1990 Current rent: \$400 Zoning: Agriculture Tenure: Crown	2335	0.350888965	Hotel situated within this lot. The dykes will be installed along the river bank reserve probably affect the boundary fencing of the this property.

NAWAKA BACKROAD DESCRIPTIONS

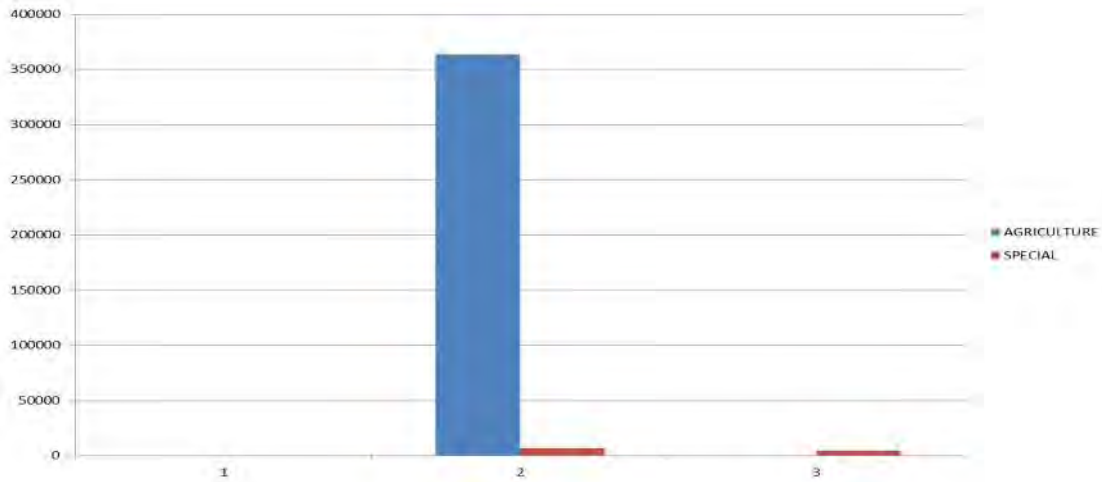
4		Lot 6 ND 5147	4/10/2396	Director of Lands	KK'S HARDWARE	Term: 30 years wef 14/12/1990 Current rent: \$400.00 Zoning: Agriculture Tenure: Crown	688	0.018243756	This is a farm site which seems to be abandoned by the owner. Dyke will run through this lot affecting the farmland.
5		Lot 4 SO 5539	4/10/1523	Director of Lands	RAJ WATI	Term: Expired Current rent: \$740.00 Zoning: Agriculture Tenure: Crown	58884	2.911637258	This is a farm site which seems to be abandoned by the owner. Dyke will run along the river bank partially affecting this farmland.
6		Lot 4 SO 6011 (Lot 7 ND 5147)	4/10/1522	Director of Lands	NARRAIN SINGH	Term: Expired Current rent: \$516.00 Zoning: Agriculture Tenure: Crown	44136	1.170783105	Sugar cane farming with a residential site. Dyke will affect part of the sugar cane field towards the river bank.

NAWAKA BACKROAD DYKES DESCRIPTIONS

7		Lot 8 ND 5147	4/10/1521	Director of Lands	JAI RAM & MOHIA LAL	Term: Expired Current rent: \$600.00 Zoning: Agriculture Tenure: Crown	10522	1.32374105	This is a farm site seems to be abandoned by the owner.
8		Lot 9 ND 5147		Director of Lands		Term: Current rent: Zoning: Agriculture Tenure: Crown	3642	0.044874253	This is a farm site which seems to be abandoned by the owner. Also river bank reserve attached to this lot.
9		Lot 5 ND 5135	4/10/1533	Director of Lands	MUHANNA	Term: Expired lease Current rent: Zoning: Agriculture Tenure: Crown	46539 (1831)	0.452449106	Sugar cane farming with a residential site. Dyke will affect part of the sugar cane field towards the river bank. Also river bank reserve attached to this lot.
10		Lot 4 ND 5135	4/10/1534	Director of Lands	NARAYAN DATT	Term: Expired lease Current rent: Zoning: Agriculture Tenure: Crown	51597 (2534.6)	0.626312127	Sugar cane farming with a residential site. Dyke will affect part of the sugar cane field towards the river bank. Also river bank reserve attached to this lot.

NAWAKA BACKROAD DYKES DESCRIPTIONS

SUMMARY	AREA	LAND	IMPROVEMENTS	TOTAL
AGRICULTURE	10.10635149	\$ 363,828.65	\$ -	\$ 363,828.65
SPECIAL	365.9	\$ 7,318.00	\$ 5,000.00	\$ 12,318.00

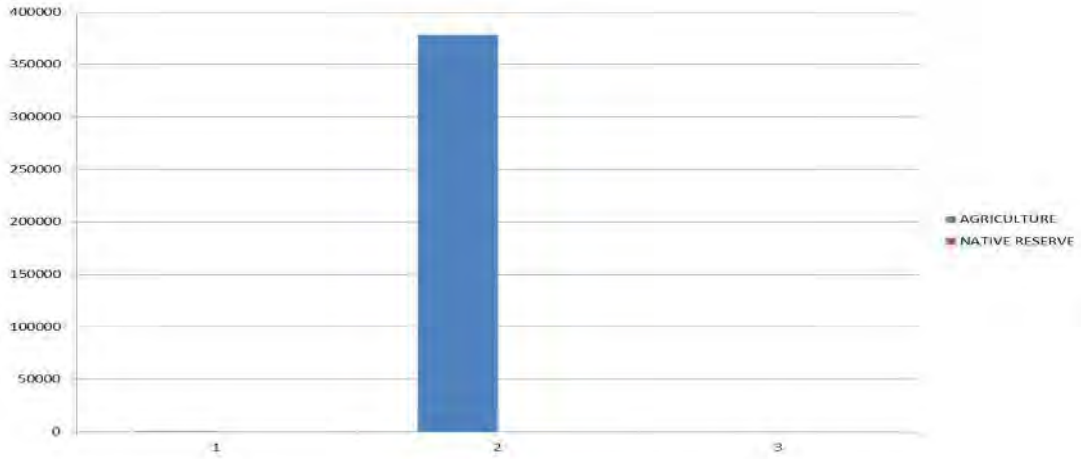


SUMMARY FOR NAWAKA BACKROAD DYKES

NO.	IMAGE	LEGAL DESCRIPTIONS	TITLE/FILE REFS	LESSOR	LESSEE	LEASE DETAILS	TOTAL AREA (SQM)	AREA AFFECTED (SQM)	CURRENT STATUS
1		Lot 5 ND 5146 CL. 8991	4/10/1544	Director of Lands	Chandra Hands as administrator	Term: 20 years wef 1/1/2000 Current rent: \$307 wef 1/1/2000 Zoning: Agriculture Tenure: Crown	52204 (1248)	0.308386939	2nd Class Arable land Currently covered with grassland
2		Lot 1 SO 380	4/10/2457	Director of Lands	Rajendra Kumar	Term: 30 years wef 26/8/1992 Current rent: \$380 wef 26/8/2007 Zoning: Agriculture(subsistence farming) Tenure: Crown	21144 (25110)	6.20480451	Site is currently abandoned by the owners for sometime. Also site is covered with grassland and overgrown trees.
3		Lot 6 ND 5146	4/10/2417	Director of Lands	Samnogan Mudakar	Term: 30 years 17/8/1987 Current rent: \$310 wef 1/1/1997 Zoning: Agriculture Tenure: Crown	10522 (1940)	0.479383542	2nd Class Arable land Covered with sugarcane farming
4		Lot 4 ND 5146	4/10/1543	Director of Lands	Gaagapia Rajan	Term: 45 years wef 1/4/978 Current rent: \$392 Zoning: Agriculture Tenure: Crown	60703 (11165)	2.758926418	2nd Class Arable land. Covered with sugarcane farming
5		Lot 7 ND 4156	4/10/1571	Director of Lands	Nazrin Nisha Rehman	Term: 30 years wef 1/7/2003 Current Rent: \$500 wef 1/7/2003 Zoning: Agriculture Tenure: Crown	3670 (3090.7)	0.763727172	2nd Class Arable land. Covered with sugarcane farming

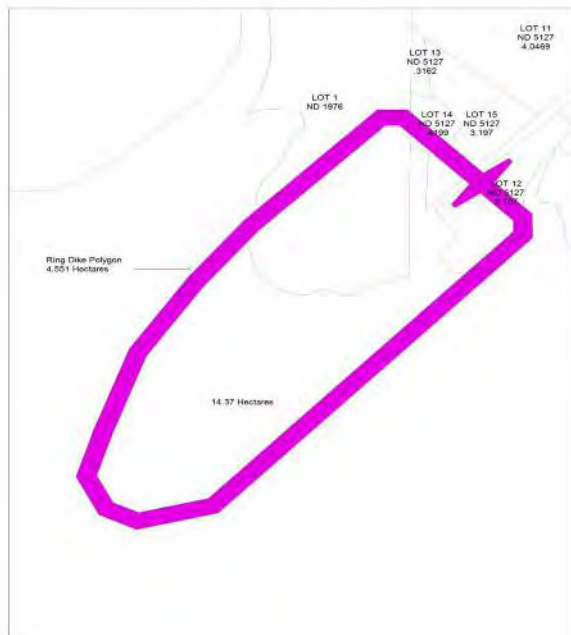
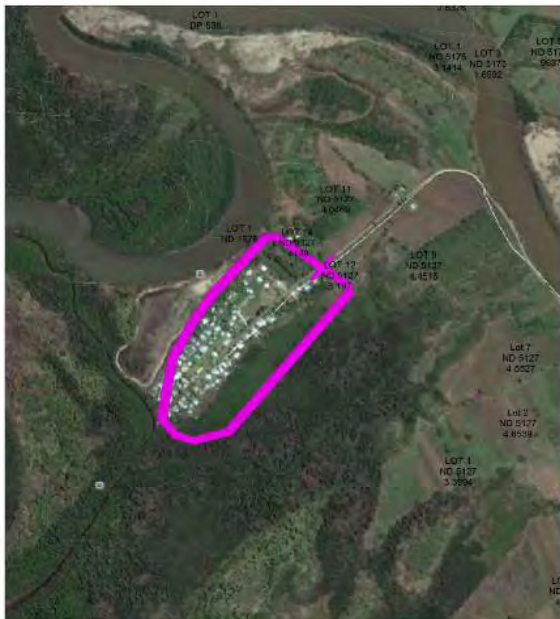
DRATABU SHORTCUT DYKES DESCRIPTIONS

SUMMARY	AREA	LAND	IMPROVEMENTS	TOTAL
AGRICULTURE	10.51522858	\$ 378,548.23	\$ -	\$ 378,548.23
NATIVE RESERVE		\$ 0	\$ -	\$ -



SUMMARY FOR DRATABU SHORTCUT DYKES

GOOGLE OVERLAY

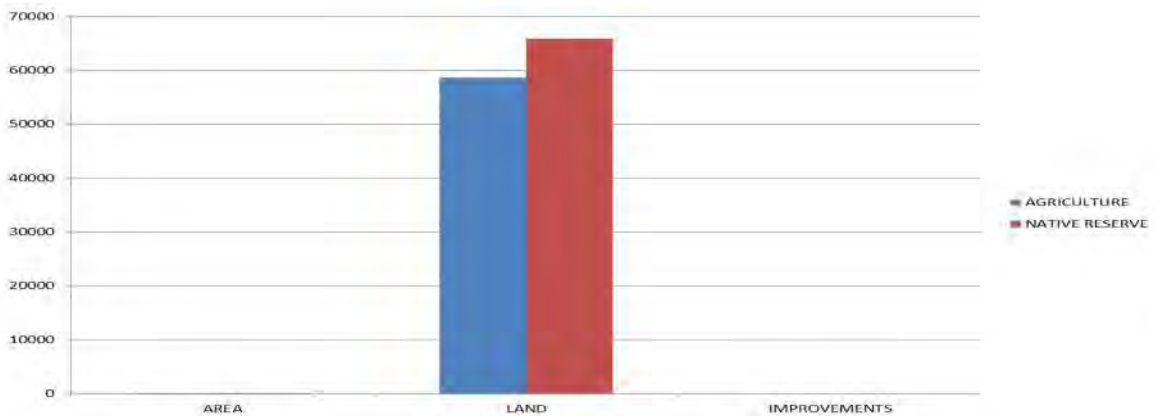


PLANS FOR MOALA DYKES

NO.	IMAGE	LEGAL DESCRIPTIONS	FILE REFS	LESSOR	LESSEE	LEASE DETAILS	TOTAL AREA	AREA AFFECTED	CURRENT STATUS	
1		LOT 12 ND 5127 CL 6775	4/10/1628	Director of Lands	Vinay Vikash Narayan	Term: 20 yrs wef 1/1/1998 Current rent: \$320 wef 1/1/2007 Zoning: Agriculture Tenure: Crown	31969 (3825)	0.945176314	Currently under court case Site covered with grassland and seems to be neglected by the lessee.	
2		LOT 14 ND 5127	4/10/1668	Director of Lands	Simone Rasala	Term: 20 yrs wef 01/01/1983 Current Rent: \$120 per annum Zoning: Agriculture Tenure: Crown	4198 (1324)	0.327166912	Lease is expired and currently abandoned. 2nd class Arable Classification	
3		LOT 15 ND 5127	4/10/1670	Director of Lands	Semesa Ramomo	Term: 20 yrs wef 01/01/1983 Current Rent: \$120 per annum Zoning: Agriculture Tenure: Crown	8498 (1450)	0.358302132	Lease is expired and currently abandoned.	
4		NATIVE LAND BELONG TO MOALA VILAGE								1.831541658

MOALA DYKES DESCRIPTIONS

SUMMARY	AREA	LAND	IMPROVEMENTS	TOTAL
AGRICULTURE	1.630645359	\$ 58,703.23	\$ -	\$ 58,703.23
NATIVE RESERVE	1.831541658	\$ 65,935.50	\$ -	\$ 65,935.50



SUMMARY FOR MOALA DYKES

Appendix-10

TOR (Draft) for Design and Supervision Consultant

for the Works

【日本語版のみ】

Terms of Reference
for
Design and Supervision Consultant for the Works
under
The Nadi River Flood Control Project
in the Republic of Fiji

(DRAFT)

Table of Contents

Chapter 1.	Background.....	1
1.1	Location of the Project	1
1.2	Executing Agency	2
1.3	Project Components	2
1.4	Implementation Period for the Project.....	2
1.5	Relevant Laws and Regulations,	2
Chapter 2.	Objectives of Consulting Services	3
Chapter 3.	Scope of Consulting Services	4
3.1	Detailed Design, Construction Plan and Cost Estimation	4
3.2	Tender Assistance for Selection of Contractor	4
3.3	Construction Supervision	5
3.4	Facilitation of Implementation of Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP) and Resettlement Action Plan (RAP)	6
3.5	Technology Transfer.....	7
Chapter 4.	Expected Time Schedule.....	9
Chapter 5.	Staffing (Expertise required).....	10
5.1	Qualification of Key Team Members	10
5.2	Scope of Works for the respective personnel.....	14
Chapter 6.	Reporting	21
Chapter 7.	Obligations of the Executing Agency	23

**Terms of Reference
for
Design and Supervision Consultant for the Works
under
The Nadi River Flood Control Project
in the Republic of Fiji**

Chapter 1. Background

The Government of the Republic of Fiji has received a loan from the Japan International Cooperation Agency (hereinafter referred to as "JICA") to finance the Nadi River Flood Control Project which is to mitigate flood damage in Nadi River Basin Area in order to realize the sustainable social and economic development. The Project comprises of the following components:

- Package1: River Widening
- Package2: Retarding Basin
- Package3: Ring Dike
- Package4: Surrounding Dike

The Government of Fiji intends to use part of the proceeds of the loan for eligible payments for consulting services for which this ToR is issued. The project is expected to be completed by 2024.

1.1 Location of the Project

The project sites are located in and around the Nadi River Basin Area as shown in Figure -1.

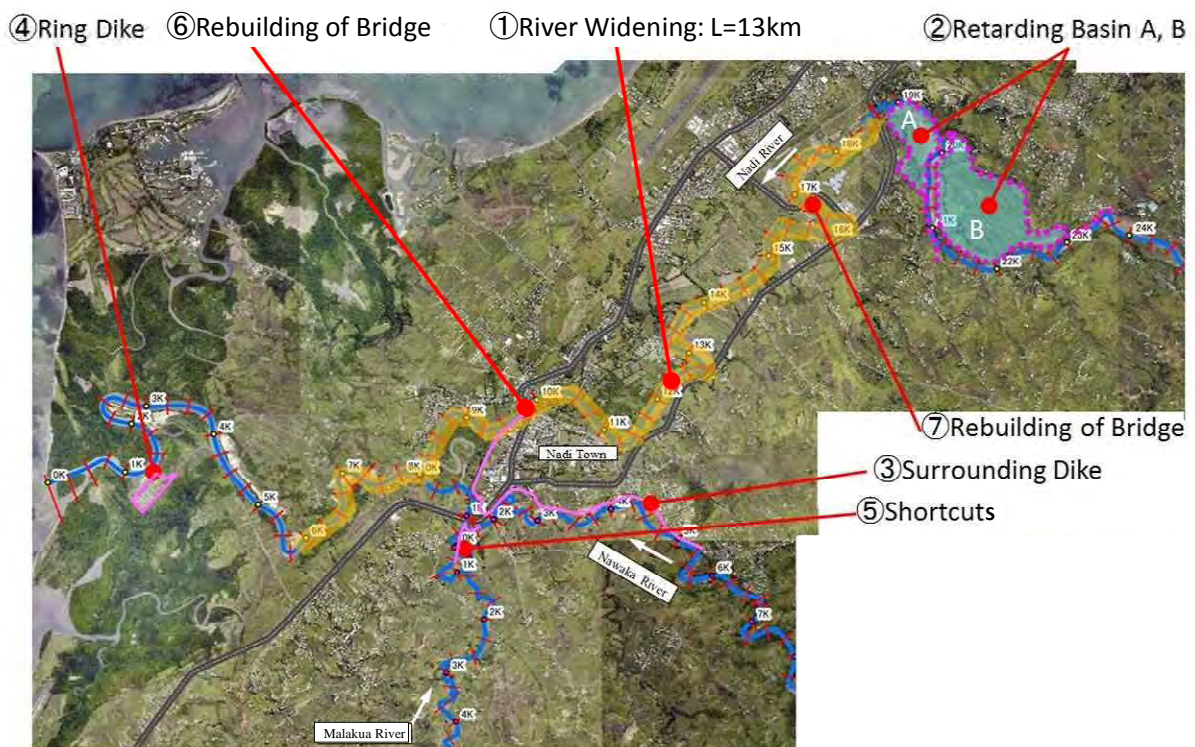


Figure-1 Project Sites

1.2 Executing Agency

Executing Agency: Implementation Agency

1.3 Project Components

The Project comprises of the following components shown in Table-1.

Table-1 Project Components

Package	Main components	Specification	Remarks
Package-1 River Widening	P1-1 River Widening	L=13km	
	(1) Excavation	V=3.9 mil. m3	
	(2) Embankment	Low area within 13km Approx. h=0.5m to 6m	
	(3) River Structures	1 LS	Flap Gates
	P1-2 Rebuilding of Bridges		
	(1) Rebuilding of Nadi Town Bridge	1 bridge, L=108m	PC Girder, 3span
	(2) Rebuilding of Old Queens Road Bridge	1 bridge, L=96m, incl. Sugarcane railway bridge	PC Girder, 3span
Package-2 Retarding Basin	P2-1 Retarding Basin A and B		
	(1) Excavation	V=1.3 mil. m3	
	(2) Embankment	L=9.2 km Approx. h=1.5m to 9m	
	(3) Drainage Sluice Gate	2 Locations	
	(4) River Structures	1 LS	Overflow dikes
Package-3 Ring Dike	P3-1 Ring Dike		
	(1) Excavation	V=6.5 thousand m3	
	(2) Embankment	L=1.8 km Approx. h=3.5m	
	(3) River Structures	1 LS	Drainage
Package-4 Surrounding Dike	P4-1 Surrounding Dike		
	(1) Excavation	V=290 thousand m3	
	(2) Embankment	L=4.5 km Approx. h=1.0m to 3.5m	
	(3) River Structures	1 LS	Flood Wall Gate
	P4-2 Shortcut of tributaries		
	(1) Excavation	V=24 thousand m3	
	(2) Back Filling	V=28 thousand m3	
(3) River Structures	1 LS	Gabion Protection	

1.4 Implementation Period for the Project

The Project is expected to be completed by 2024.

1.5 Relevant Laws and Regulations,

The Project shall be carried out in accordance with the terms and conditions of the Loan Agreement, Guidelines for Employment of Consultants and Procurement of Goods and Services by JICA and the rules and regulations relating to construction, investment and procurement in Fiji.

Chapter 2. Objectives of Consulting Services

The consulting services shall be provided by an international consulting firm (or any other relevant entity) (hereinafter referred to as "the Consultant") selected in compliance with Guidelines for the Employment of Consultants under Japanese ODA Loans, April 2012. The objective of the consulting services is to achieve the efficient and proper preparation and implementation of the Project through the following works:

- Detailed Design
- Tender Assistance
- Construction Supervision
- Facilitation of implementation of Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP) and Resettlement Action Plan (RAP)
- Technology Transfer

Chapter 3. Scope of Consulting Services

3.1 Detailed Design, Construction Plan and Cost Estimation

The reach of Nadi River under the Project stretches approx.24 kilometers between river mouth near Moala village and 24 kilometers upstream of the river mouth near Votualevu area. The River Improvement works is divided into 4 components,

Package-1:River Widening with 13km (from near Narewa Village to Back Road Bridge), Package-2:Retarding Basin (Retarding Basin A near Meiganiyah at left bank side of Nadi River and Retarding Basin B near Votualevu at right bank side of nadi River), Package-3:Ring Dike (at Moala Village) and Package-4:Surrounding Dike (Surrounding Nadi Town area from Nadi Town Bridge to Nawaka Village and shortcut of tributaries) as shown in Figure 1 and Table 1.

Package-1: River Widening and Package-2: Retarding Basin is proposed in order to eliminate inundation in the Important Protected Area. In Package-1, rebuilding of 2(two) bridges are included. Package-3: Ring Dike is installed in order to protect the community from inundation and mitigate negative impact by river widening. Package-4: Surrounding Dike is installed in order to protect Nadi Town from the flood by Nawaka and Malakua River and shortcuts is proposed in order to mitigate negative impact by surrounding dike in tributaries basin area.

Taking into account the above mentioned river improvement description, the Consultant shall:

- (1) Review and verify all available primary and secondary data collected during the JICA's preparatory survey for the Project.
- (2) Carry out all the required engineering surveys and investigations such as topographical survey, hydrological survey, geotechnical survey, material availability survey, etc. as applicable to the concerned project components.
- (3) Prepare detailed work plan, progress reports and implementation schedule for the Project to ensure effective monitoring and timely project outputs, and regularly update the same; and
- (4) Prepare the detailed design of the Project in sufficient detail to ensure clarity and understanding by Implementation Agency, contractors and other relevant stakeholders. All the design should be in conformity with the Fiji Standards (if available), or with the appropriate international standards. The detailed design will, as a minimum, include construction drawings, detailed cost estimates, necessary calculations to determine and justify the engineering details for the Project, associated contract documentation to include detailed specifications, bill of quantities (BOQ), and implementation schedule for the Project. Such detailed specifications will contain those in relation to i) quality control of plant materials and workmanship, ii) safety, and iii) protection of the environment. The detailed design shall be prepared in close consultation with, and to meet the requirements of Implementation Agency and will be incorporated into the detailed design report to be submitted for approval of Implementation Agency.

3.2 Tender Assistance for Selection of Contractor

< Assistance in Pre-Qualification (PQ)>

The Consultant shall:

- (1) Define technical and financial requirements, capacity and/or experience for PQ criteria taking into consideration technical feature of the Project;
- (2) Prepare PQ documents in accordance with the latest version of Standard Prequalification Documents under Japanese ODA Loans;
- (3) Assist Implementation Agency in PQ announcement, addendum/corrigendum, and clarifications to the applicants' queries;
- (4) Evaluate PQ applications in accordance with the criteria set forth in PQ documents; and

- (5) Prepare a PQ evaluation report for approval of the PQ evaluation committee.

< Assistance in the Bidding Procedures >

The Consultant shall:

- (1) Prepare bidding documents in accordance with the latest version of Standard Bidding Documents under Japanese ODA Loans for Procurement of Works together with all relevant specifications, drawings and other documents;
- (2) Prepare bidding documents which includes i) clauses stating that the Contractor is to comply with the requirement of the Environmental Management Plan (EMP) and JICA Guidelines for environmental and social considerations (April 2010) (JICA Environmental Guidelines), ii) the specification clearly stipulating the safety requirements in accordance with the laws and regulations in the country of the Borrower, relevant international standards (including guidelines of international organization), if any, iii) the requirement to furnish a safety plan to meet the safety requirements, iv) the requirement for the personnel for key positions to include an accident prevention officer.
- (3) Assist Implementation Agency in issuing bid invitation, conducting pre-bid conferences, issuing addendum/corrigendum, and clarifications to bidders' queries.
- (4) Evaluate bids in accordance with the criteria set forth in the bidding documents. In such evaluation, the Consultant shall carefully confirm that bidders' submissions in their technical proposal including, but not limited to; site organization, mobilization schedule, method statement, construction schedule, safety plan, and EMP, have been prepared in consistent with each other and meet requirements set forth in applicable laws and regulations, specifications and other parts of the bidding documents;
- (5) Prepare a bid evaluation report for approval of the bid evaluation committee;
- (6) Assist Implementation Agency in contract negotiation by preparing agenda and facilitating negotiations including preparation of minutes of negotiation meeting; and
- (7) Prepare a draft and final contract agreement.

3.3 Construction Supervision

The Consultant shall perform his duties during the construction period in accordance with the contracts to be executed between the Employer and the contractors. FIDIC MDB Harmonized Edition (2010) complemented with the Specific Provisions as included in the Standard Bidding Documents under Japanese ODA Loans for Procurement of Works will be applied to the civil works of this Project. In this context, the Consultant shall:

- (1) Act as the Engineer to execute construction supervision and contract administration services in accordance with the power and authority to be delegated by the Employer;
- (2) Provide assistance to the Employer concerning variations and claims which are to be ordered/issued at the initiative of the Employer. Advise the Employer on resolution of any dispute with the Contractor;
- (3) Issue instructions, approvals and notices as appropriate;
- (4) Provide recommendation to the Employer for acceptance of the Contractor's performance security, advance payment security and required insurances;
- (5) Provide commencement order to the Contractor;
- (6) Assess adequacy of all inputs such as materials, labor and equipment provided by the Contractor;
- (7) Check and approve the Contractor's method of work, including site organization, program of performance, quality assurance system, safety plan, and environmental monitoring plan so that the requirements set forth in the applicable laws and regulations, the specifications or other parts of the contract are to be duly respected;
- (8) Regularly monitor physical and financial progress, and take appropriate action to expedite progress if necessary, so that the time for completion set forth in the contract will be duly respected by the Contractor;

- (9) Explain and/or adjust ambiguities and/or discrepancies in the Contract Documents and issue any necessary clarifications or instructions. Issue further drawings and give instructions to the Contractor for any works which may not be sufficiently detailed in the contract documents, if any;
- (10) Review and approve the Contractor's working drawings, shop drawings and drawings for temporary works. Also review and approve, if any, design prepared by the Contractor for any part of the permanent works;
- (11) Liaise with the appropriate authorities to ensure that all the affected utility services are promptly relocated;
- (12) Carry out field inspections on the Contractor's setting out of the works in relation to original points, lines and levels of reference specified in the contract;
- (13) Organize, as necessary, management meetings with the Contractor to review the arrangements for future work. Prepare and deliver minutes of such meetings to the Employer and the Contractor;
- (14) Supervise the works so that all the contractual requirements are met by the Contractor, including those in relation to i) quality of the works, ii) safety and iii) protection of the environment. Confirm that an accident prevention officer proposed by the Contractor is duly assigned at the project site. Require the Contractor to take appropriate remedies if any questions are recognized regarding the safety measures;
- (15) Supervise field tests, sampling and laboratory test to be carried out by the Contractor;
- (16) Inspect the construction method, equipment to be used, workmanship at the site, and attend shop inspection and manufacturing tests in accordance with the specifications;
- (17) Survey and measure the work output performed by the Contractor verify statements submitted by the Contractor and issue payment certificates such as interim payment certificates and final payment certificate as specified in the contract;
- (18) Coordinate the works among different contractors employed for the Project;
- (19) Modify the designs, technical specifications and drawings, relevant calculations and cost estimates as may be necessary in accordance with the actual site conditions, and issue variation orders (including necessary actions in relation to the works performed by other contractors working for other projects, if any);
- (20) Carry out timely reporting to the Employer for any inconsistency in executing the works and suggesting appropriate corrective measures to be applied;
- (21) Inspect, verify and fairly determine claims issued by the parties to the contract (i.e. the Employer and Contractor) in accordance with the civil works contract;
- (22) Perform the inspection of the works, including Test on Completion, and to issue certificates such as the Taking-Over Certificate, Performance Certificate as specified in the contract;
- (23) Supervise commissioning and carry out tests during the commissioning, if applicable;
- (24) Provide periodic and/or continuous inspection services during defects notification period and if any defects are noted, instruct the Contractor to rectify;
- (25) Prepare as-built drawings for the parts of the works constructed in accordance with the design provided by the Employer. Check and certify as-built drawings for the parts of the works designed by the Contractor, if any; and
- (26) Prepare an operation and maintenance manual for the parts of the works constructed in accordance with the design provided by the Employer. Check and certify an operation and maintenance manual for the parts of the works designed by the Contractor, if any

3.4 Facilitation of Implementation of Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP) and Resettlement Action Plan (RAP)

The Consultant shall:

- (1) Update EMP as appropriate; incorporate necessary technical specifications with design and contract documentation;
- (2) During the preparation of bidding documents, clearly identify environmental responsibilities as explained in the EIA/IEE and EMP;
- (3) Assist Implementation Agency to review the Construction Contractor's Environmental Program

to be prepared by the contractor in accordance with EMP, relevant plans and JICA Environmental Guidelines and to make recommendations to Implementation Agency regarding any necessary amendments for its approval

- (4) Assist Implementation Agency to implement the measures identified in the EMP
- (5) Monitor the effectiveness of EMP and negative impacts on environment caused by the construction works and provide technical advice, including a feasible solution, so that Implementation Agency can improve situation when necessary;
- (6) Assist Implementation Agency in monitoring the compliance with conditions stated in the EPC and the requirements under EMP and JICA Environmental Guidelines;
- (7) Assist Implementation Agency in preparation of the answer to the request from JICA's advisory committee for environmental and social considerations if necessary
- (8) Assist Implementation Agency in the capacity building of Implementation Agency staff on environmental management through on-the-job training on environmental assessment techniques, mitigation measure planning, supervision and monitoring, and reporting.
- (9) Update and/or prepare RAP as necessary based on detailed design in accordance with the agreed resettlement framework, including entitlement matrix and compensation plan; coordinate with various agencies in preparing the procedures for timely land acquisition and disbursement of compensation to project affected persons (PAPs);
- (10) Assist Implementation Agency in identifying the eligible PAPs, and in preparation/updating of the list of eligible PAPs and 'Payment Statement' for individual eligible PAPs. The places where each eligible PAPs will relocate to are necessary to be recorded so that Implementation Agency could implement monitoring on income and living conditions of resettled persons;
- (11) Assist Implementation Agency in conducting social assessment during early stage of the detailed design stage and review the existing income restoration plan and special assistance plan for vulnerable PAPs and revise/update the contents of the plans if necessary based on priorities identified with support of relevant government agencies and Non-Governmental Organizations (NGOs). The following contents should be included in the plans;
 - i. Skills Training
 - ii. Project related Job Opportunities
 - iii. Provision of social welfare grant
 - iv. Provision of Agricultural Extension Services
 - v. Provision of the special allowance to vulnerable PAPs
- (12) Assist Implementation Agency to implement the measures identified in the revised RAP.
- (13) Monitor land acquisition and compensation activities being undertaken by Implementation Agency and/or competent authorities, and report the results in monthly progress reports;
- (14) Assist in procurement of Implementation NGO (INGO) and external monitoring agency (EMA). Sample ToR for INGO/EMA is attached as XX;
- (15) Assist Implementation Agency in facilitating stakeholder's participation (including focus group discussions for vulnerable PAPs) and providing feedback their comments on RAP;
- (16) Assist Implementation Agency in establishment of grievance redress mechanism including formation of Grievance Redress Committee;
- (17) Assist Implementation Agency to ensure that the PAPs are fully aware of the grievance redress procedure and the process of bringing their complaints, investigate the veracity of the complaints, and recommends actions/measures to settle them amicably, fairly and transparently before they go to the redress committee or the courts of law;
- (18) Provide technical services with grievance redress committee for keeping and updating records when necessary.

3.5 Technology Transfer

The Consultant shall carry out the technology transfer as an important aspect in design and supervision works. The Consultant shall provide the opportunity to Implementation Agency officers and staffs to be involved in the working team of the Consultant during the design, contract administration and

supervision works for their capacity building wherever possible. If requested by Implementation Agency, the Consultant shall brief and demonstrate the survey and design procedure, the construction supervision and contract management process and procedures. The Consultant shall assist Implementation Agency and its staff to build their capacity as a part of on the job training under the Project.

Chapter 4. Expected Time Schedule

The total duration of consulting services will be 72 months followed by 12 months of defects liability period. The implementation schedule expected is as shown in Table-2.

Table-2 Expected Implementation Schedule

Key Activities	Date	Duration in Months
Commencement of Consulting Services	1 April 2018	12
Completion of Detailed Design and Preparation of Documents	31 March 2019	
Tender Process including Prequalification	February 2019 to January 2020	12
Commencement of Civil Works	1 February 2020	50
Completion End of Civil Works	31 March 2024	
Defect Liability Period	1 April 2024 to 31 March 2025	12
Termination of Consulting Services	31 March 2024	-

Chapter 5. Staffing (Expertise required)

16 of Professional (A) consultants and 22 of Professional (B) consultants will be engaged, over 80 month' duration of consulting services, for a total of 255 man-months for Professional (A) and 447 man-months for Professional (B) consultants. Total consulting input is 702 man-months.

5.1 Qualification of Key Team Members

The qualification of key Team Members is shown in Table-3.

Table-3 Qualification of key Team Members

<Detailed Design, Tender Assistance & Construction Supervision>

Experts		Qualification
Professional (A)		
1	Team Leader	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in river engineering related field: 15 years or more • Experience of detailed design and construction supervision for river improvement projects in Japanese ODA loan, of which each contract amount is more than USD 50 Million • At least one experience of flood control project in the Pacific region • At least one experience of leading a consultants' team as the Team Leader or the Deputy Team Leader
2	River Engineer	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in river engineering related field: 12 years or more • Experience of detailed design of river works in ICB contract • At least three experiences of leading a consultants' team as the river engineer
3	River Structure Engineer	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in river engineering related field: 10 years or more • At least three experience of leading a consultants' team as the river engineer
4	Bridge Engineer (1)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in bridge related Field: 12 years or more • At least three experiences of leading a consultants' team as the bridge structural engineer
5	Bridge Engineer (2)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in bridge related Field: 7 years or more • Experience of detailed design of bridge works • At least three experiences of leading a consultants' team as the bridge structural engineer
6	Mechanical Engineer	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Mechanical/Physical/Civil/Mechanical Engineering/Applied Physics /Related Certificate <u>Experience:</u> <ul style="list-style-type: none"> • Experience in mechanical related Field: 10 years or more • At least three experiences of leading a consultants' team as mechanical engineering of gate

7	Hydrology & Hydraulic Engineer (1)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in hydrological or hydraulic related Field: 12 years or more • Experience of hydrological analysis,run-off analysis and flood control planning • At least three experiences of leading a consultants' team as the hydrologist
8	Hydrology & Hydraulic Engineer (2)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in hydrological or hydraulic related Field: 7 years or more • Experience of hydrological analysis,flood analysis and hydraulic analysis • At least three experiences of leading a consultants' team as the hydrologist
9	Geotechnical Engineer	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Geotechnical/Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 12 years or more • At least three experiences of leading a consultants' team as the geotechnical engineer
10	Construction Planner & Cost Estimator (1)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in construction plan or cost estimation for river works: 12 years or more • At least three experiences of leading a consultants' team as the construction planner & cost estimator
11	Construction Planner & Cost Estimator (2)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in construction plan or cost estimation for bridge works: 7 years or more • At least three experiences of leading a consultants' team as the construction planner & cost estimator
12	Environment & Social Environment Specialist	<u>Education:</u> Graduate in Environmental Management/Science <u>Experience:</u> <ul style="list-style-type: none"> • Environmental Management: 10 years or more • At least three experiences of leading a consultants' team as the environment & social environment specialist
13	Spec Writer & Bid Specialist	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Engineering/Construction Management <u>Experience:</u> <ul style="list-style-type: none"> • Experience in Procurement of Construction Works: 12 years or more • At least three experiences as a procurement specialist for ICB contract
14	Construction Engineer (1)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in construction works related Field: 12 years or more • Experience of construction supervision works in ICB contract • At least three experiences of leading a consultants' team as the construction engineer
15	Construction Engineer (2)	<u>Education:</u> <ul style="list-style-type: none"> • Graduate in Civil Engineering <u>Experience:</u> <ul style="list-style-type: none"> • Experience in construction works related Field: 7 years or more • Experience of construction supervision works in ICB contract • At least one experience of leading a consultants' team as the construction engineer

Professional (B)		
16	Co-Team Leader/River Engineer	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in river engineering related field: 15 years or more • Experience of construction supervision for river improvement projects • At least one experience of leading a consultants' team as the Team Leader or the Deputy Team Leader
17	Design Engineer B-1	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 10 years or more • At least two experiences of design of civil works of similar facilities such as river improvement and irrigation works etc.
18	Design Engineer B-2	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 10 years or more • At least two experiences of design of civil works of similar facilities such as river improvement and irrigation works etc.
19	Design Engineer B-3	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 10 years or more • At least two experiences of design of civil works of similar facilities such as river improvement and irrigation works etc.
20	Design Engineer B-4	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 10 years or more • At least two experiences of design of bridge works etc.
21	Survey Engineer	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 10 years or more • At least three experiences of leading a consultants' team as the survey engineer
22	GIS Specialist	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in GIS Related Field: 5 years or more • At least two experiences of GIS works
23	Geotechnical Engineer	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in Facility Related Field: 7 years or more • At least three experiences of leading a consultants' team as the geotechnical engineer
24	Mechanical Engineer	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in mechanical related Field: 10 years or more • At least one experience of leading a consultants' team as mechanical engineering of gate
25	Hydrology & Hydraulic Engineer B-1	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in hydrological or hydraulic related Field: 7 years or more • At least one experience of leading a consultants' team as the hydrologist
26	Hydrology & Hydraulic Engineer B-2	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in hydrological or hydraulic related Field: 5 years or more • At least one experience of leading a consultants' team as the hydrologist
27	Construction Planner & Cost Estimator B-1	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in construction plan or cost estimation related Field: 7 years or more • At least one experience of leading a consultants' team as the construction planner & cost estimator
28	Construction Planner & Cost Estimator B-2	<u>Experience:</u> <ul style="list-style-type: none"> • Experience in construction plan or cost estimation related Field: 5 years or more • At least one experience of leading a consultants' team as the construction planner & cost estimator

29	Social Environmentalist	<u>Experience:</u> • Experience in Environmental Management: 7 years or more
30	Spec Writer & Bid Specialist B-1	<u>Experience:</u> • Experience in Procurement of Construction Works: 7 years or more • At least one experience as a procurement specialist for ICB contract
31	Spec Writer & Bid Specialist B-2	<u>Experience:</u> • Experience in Procurement of Construction Works: 5 years or more • At least one experience as a procurement specialist
32	Construction Supervision Engineer (1)	<u>Experience:</u> • Experience in construction works for river improvement and similar works such as irrigation works related Field: 7 years or more • At least one experience of leading a consultants' team as the construction engineer
33	Construction Supervision Engineer (2)	<u>Experience:</u> • Experience in construction works for river improvement and similar works such as irrigation works related Field: 7 years or more • At least one experience of leading a consultants' team as the construction engineer
34	Construction Supervision Engineer (3)	<u>Experience:</u> • Experience in construction works for river improvement and similar works such as irrigation works related Field: 5 years or more • At least one experience of leading a consultants' team as the construction engineer
35	Construction Supervision Engineer (4)	<u>Experience:</u> • Experience in construction works for bridge works related Field: 5 years or more • At least one experience of leading a consultants' team as the construction engineer

<Project Management Unit Supporting>

Experts		Qualification
Professional (A)		
36	Deputy Team Leader/Project Management Specialist	<u>Education:</u> • Graduate in Civil Engineering/Engineering/Construction Management <u>Experience:</u> • Experience in river engineering related field: 15 years or more • Experience of construction supervision for river improvement projects in Japanese ODA Loan, of which each contract amount is more than USD 50 Million • At least one experience of flood control project in the Pacific region • At least one experience of leading a consultants' team as the Team Leader or the Deputy Team Leader
Professional (B)		
37	Co-Team Leader/Project Management Specialist	<u>Experience:</u> • Experience in river engineering related field: 10 years or more • Experience of construction supervision for river improvement projects in ICB contract • At least one experience of leading a consultants' team as the Team Leader or the Deputy Team Leader
38	River Engineer / Quality Inspector	<u>Experience:</u> • Experience in river engineering related field: 5 years or more • At least one experience of leading a consultants' team as the River Engineer, Inspector or Evaluator

Consultant may propose other experts and supporting staffs required to accomplish the tasks outlined in the ToR.

5.2 Scope of Works for the respective personnel

Detailed information on the major tasks and duties each member of the detailed engineering design team and the construction supervision team shall perform is provided as follows:

Table-4 Scope of Works for the respective personnel

Detailed Design, Tender Assistance & Construction Supervision			
No	Position	Professional*	Major Tasks and Duties
A-1	Team Leader	Pro-A	<ol style="list-style-type: none"> 1) To assume overall responsibility of the Consultant's team in the field for the satisfactory completion of the Project from technical and managerial. 2) To assist and organize directly for Head office support which is composed of Management team and technical support team for the smooth support implementation 3) To organize Consultant's team to achieve efficient assistance to the project office through smooth implementation in terms of engineering, institutional and financial aspects 4) To prepare a memorandum agreement or an addendum to the contract from time to time to adjust the consulting services to actual situation for efficient services 5) To prepare work schedule of the consulting services in collaboration with the sector leaders 6) To finalize and submit all the required reports such as progress report, study report, design report, tender document and completion report 7) To assist Implementation Agency in pre-qualification and selection through tender of the contractor for the Project 8) To assist Implementation Agency in monitoring and evaluation of the Project implementation including physical and financial progress 9) To assist Implementation Agency for preparation of implementation schedule and annual budgetary arrangement 10) To assist Implementation Agency to initiate the donor coordination for successful project implementation and for maximizing output of the Project
A-2	River Engineer	Pro-A	<ol style="list-style-type: none"> 1) To review of the preparatory reports of the Project and to provide advices for their improvement from a technical viewpoint, if necessary 2) To review the basic concept, design criteria and river facility plan, superintend of Detailed Design, and conduct Detailed Design of river improvement works and river facilities 3) To confirm the necessity and justifications of proposed components and specifications of the Project 4) To prepare technical specifications and to supervise sub-contracting works such as topographic survey and geotechnical investigations 5) To prepare the design report and design drawings
A-3	River Structure Engineer	Pro-A	<ol style="list-style-type: none"> 1) To review the basic concept, design criteria and river facility plan 2) To conduct Detailed Design of river improvement works and river facilities and calculate quantities 3) To prepare technical specifications and to supervise sub-contracting works of topographic survey 4) To prepare the design report and design drawings
A-4	Bridge Engineer (1)	Pro-A	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To review and justify the location and technical specifications of the proposed structures 3) To conduct the field investigation to examine the sites for construction 4) To conduct the detailed design of bridges and calculate quantities, especially for road bridges 5) To have meetings with related authorities 6) To prepare the design report and design drawings

No	Position	Professional*	Major Tasks and Duties
A-5	Bridge Engineer (2)	Pro-A	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To review and justify the location and technical specifications of the proposed structures 3) To conduct the field investigation to examine the sites for construction 4) To conduct the detailed design of bridges and calculate quantities, especially for sugar cane rail way bridge 5) To have meetings with related authorities 6) To prepare the design report and design drawings
A-6	Mechanical Engineer	Pro-A	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To conduct the field investigation to examine the necessity and capacity of a flood wall gate and drainage gates 3) To determine technical specifications, conduct the detailed design and calculate quantities 4) To have meetings with related authorities 5) To prepare the design report and design drawings
A-7	Hydrology & Hydraulic Engineer (1)	Pro-A	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project 2) To conduct the hydrological analysis for river improvement and prepare manuals for river management 3) To prepare report for hydrology and hydraulic
A-8	Hydrology & Hydraulic Engineer (2)	Pro-A	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project 2) To conduct the hydraulic analysis for river improvement and specify the profile of retarding basins 3) To prepare report for hydrology and hydraulic
A-9	Geotechnical Engineer	Pro-A	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project 2) To review the existing study regarding construction plan and cost estimate 3) To review/identify the existing river improvement or similar works. 4) To identify quarries and dumping sites as well as road conditions. 5) To identify meteorological conditions at the sites for the works. 6) To plan construction method and period for river works based on the survey 7) To collect and analyse the available data and information on construction facilities, materials and labour force locally, transportation and custom clearance available for project implementation and their prices 8) To estimate cost for civil / procurement works. 9) To prepare report for construction plan and cost estimate
A-10	Construction Planner & Cost Estimator (1)	Pro-A	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project 2) To collect and review the available data and previous investigation report 3) To prepare technical specifications and to supervise sub-contracting works of geotechnical investigations 4) To check the results of investigation and prepare the design conditions 5) To prepare report for geotechnical conditions
A-11	Construction Planner & Cost Estimator (2)	Pro-A	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project

No	Position	Professional*	Major Tasks and Duties
			<ol style="list-style-type: none"> 2) To review the existing study regarding construction plan and cost estimate 3) To review/identify the existing bridge works or similar works. 4) To identify quarries and dumping sites as well as road conditions. 5) To identify meteorological conditions at the sites for the works. 6) To plan construction method and period for bridge works based on the survey 7) To collect and analyse the available data and information on construction facilities, materials and labor force locally, transportation and custom clearance available for project implementation and their prices 8) To estimate cost for civil / procurement works. 9) To prepare report for construction plan and cost estimate 10) To assist Construction Planner & Cost Estimator (1)
A-12	Environment & Social Environment Specialist	Pro-A	<ol style="list-style-type: none"> 1) To review the existing study regarding environment & social environment 2) To update EMP, EMOP report and RAP as appropriate; incorporate necessary technical specifications with design and contract documentation. 3) To assist Implementation Agency to review the Construction Contractor's Environmental Program to be prepared by the contractor in accordance with EMP, EMOP, relevant plans and JICA Environmental Guidelines and to make recommendations to Implementation Agency regarding any necessary amendments for its approval. 4) To assist Implementation Agency to implement the measures identified in the EMP, EMOP and RAP. 5) To superintend monitoring of the effectiveness of EMP, EMOP and negative impacts on environment caused by the construction works and provide technical advice, including a feasible solution, so that Implementation Agency can improve situation when necessary. 6) To assist EMP, EMOP and RAP in monitoring with the requirements under the EIA and JICA Environmental Guidelines. 7) To assist Implementation Agency in preparation of the answer to the request from JICA's advisory committee for environmental and social considerations if necessary 8) To assist Implementation Agency in the capacity building of Implementation Agency staff on environmental management through on-the-job training on environmental assessment techniques, mitigation measure planning, supervision and monitoring, and reporting. 9) To prepare report for environment & social environment
A-13	Spec Writer & Bid Specialist	Pro-A	<ol style="list-style-type: none"> 1) To review of the preparatory survey reports of the Project and to provide advices for their improvement from a technical viewpoint, if necessary 2) To prepare pre-qualification documents, to assist in pre-qualification and its evaluation including preparation of pre-qualification evaluation reports 3) To prepare tender documents and review of other part of tender documents prepared by the assigned engineers of the consultant in terms of contractual consistency 4) To assist in evaluation of tenders submitted by pre-qualified tenderers 5) To assist in negotiation with tenderers 6) To assist in preparation of contract document between Implementation Agency and the contractor 7) To assist Implementation Agency to prepare the bid evaluation reports

No	Position	Professional*	Major Tasks and Duties
A-14	Construction Engineer (1)	Pro-A	<ol style="list-style-type: none"> 1) To review construction plan and construction method based on the detailed design especially for river works 2) To review construction conditions for each component. 3) To plan/identify supervision works and conduct the construction supervision for river works 4) To monitor environmental conditions for selected monitoring items periodically 5) To prepare report for construction supervision
A-15	Construction Engineer (2)	Pro-A	<ol style="list-style-type: none"> 1) To review construction plan and construction method based on the detailed design especially for bridge works 2) To review construction conditions for each component. 3) To plan/identify supervision works and conduct the construction supervision for bridge works 4) To monitor environmental conditions for selected monitoring items periodically 5) To prepare report for construction supervision 6) To assist Construction Engineer (1)
B-1	Co-Team Leader/River Engineer	Pro-B	<ol style="list-style-type: none"> 1) To organize Consultant's team for the satisfactory completion of the Project from technical, managerial and administrative viewpoints in collaboration with the Team Leader 2) To prepare work schedule of the consulting services by assisting Team Leader 3) To prepare all progress reports 4) To compile all required study report, design report, tender document and completion report 5) To assist the Consultant's team works, such as review of design, preparation of tendering documents and construction supervision 6) To assist Implementation Agency for preparation of implementation schedule and annual budgetary arrangement 7) To monitor tender progress, contracts, physical and financial progress generated by construction works, and to prepare a regular progress report.
B-2	Design Engineer B-1	Pro-B	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To conduct Detailed Design of river improvement works and river facilities and calculate quantities especially for river widening and retarding basin 3) To review and justify the location and technical specifications of the proposed structures 4) To conduct the field investigation to examine the sites for construction 5) To prepare the design report and design drawings
B-3	Design Engineer B-2	Pro-B	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To conduct Detailed Design of mechanical works and river facilities and calculate quantities especially for ring dike, surrounding dike and shortcut of tributaries 3) To review and justify the location and technical specifications of the proposed structures 4) To conduct the field investigation to examine the sites for construction 5) To prepare the design report and design drawings
B-4	Design Engineer B-3	Pro-B	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To conduct Detailed Design of bridge works and calculate quantities 3) To review and justify the location and technical specifications of the proposed structures 4) To conduct the field investigation to examine the sites for construction 5) To prepare the design report and design drawings

No	Position	Professional*	Major Tasks and Duties
B-5	Design Engineer B-4	Pro-B	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To conduct Detailed Design of railway bridge works and calculate quantities 3) To review and justify the location and technical specifications of the proposed structures 4) To conduct the field investigation to examine the sites for construction 5) To prepare the design report and design drawings
B-6	Survey Engineer	Pro-B	<ol style="list-style-type: none"> 1) To prepare the TOR of survey works 2) To supervise topographic survey 3) To check the survey result and report
B-7	GIS Specialist	Pro-B	<ol style="list-style-type: none"> 1) To analyze of GIS data such as Lidar data 2) To match data between Lidar survey data and topographical survey data (cad data) 3) To prepare GIS figures and conduct calculations
B-8	Geotechnical Engineer	Pro-B	<ol style="list-style-type: none"> 1) To collect and review the available data and previous investigation report 2) To prepare the technical specifications of the geo-technical investigation 3) To supervise the investigation activities at the proposed sites 4) To check the investigation reports 5) To prepare report for geotechnical conditions
B-9	Mechanical Engineer	Pro-B	<ol style="list-style-type: none"> 1) To review the existing study regarding detailed design 2) To conduct the field investigation to examine the necessity and capacity of a flood wall gate and drainage gates 3) To conduct the detailed design and calculate quantities 4) To have meetings with related authorities 5) To prepare the design report and design drawings
B-10	Hydrology & Hydraulic Engineer B-1	Pro-B	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project 2) To collect additional hydrological data and conduct the hydrological analysis 3) To assist A-7: Hydrology & Hydraulic Engineer (1) 4) To prepare report for hydrology and hydraulic
B-11	Hydrology & Hydraulic Engineer B-2	Pro-B	<ol style="list-style-type: none"> 1) To review and verify all available primary and secondary data collected during and after the JICA's preparatory study for the Project 2) To conduct the hydraulic analysis and specify the profile of retarding basins 3) To assist A-8: Hydrology & Hydraulic Engineer (2) 4) To prepare report for hydrology and hydraulic
B-12	Construction Planner & Cost Estimator B-1	Pro-B	<ol style="list-style-type: none"> 1) To prepare the construction program including construction schedule 2) To collect and analyze the available data and information on construction facilities, materials and labor force locally available for project implementation and their prices 3) To prepare unit price schedules for river works 4) To prepare the bill of quantities for river works 5) To estimate cost for river works / procurement works. 6) To prepare report for construction plan and cost estimate
B-13	Construction Planner & Cost Estimator B-2	Pro-B	<ol style="list-style-type: none"> 1) To prepare the construction program including construction schedule 2) To collect and analyze the available data and information on construction facilities, materials and labor force locally available for project implementation and their prices 3) To prepare unit price schedules for bridge works

No	Position	Professional*	Major Tasks and Duties
			<ul style="list-style-type: none"> 4) To prepare the bill of quantities for bridge works 5) To estimate cost for bridge works / procurement works. 6) To prepare report for construction plan and cost estimate
B-14	Social Environmentalist	Pro-B	<ul style="list-style-type: none"> 1) To collect and review the available data and previous investigation reports 2) To update EMP, EMOP and report and RAP as appropriate and assist Implementation Agency to implement the measures identified in the EMP, EMOP and and RAP 3) To carry out site reconnaissance survey 4) To identify environmental and social issues likely to be caused by the construction works 5) To formulate the social environment monitoring plan and management plan for anticipated negative impacts 6) To monitor the construction works in accordance with the above plans 7) To prepare the social environment monitoring report
B-15	Spec Writer & Bid Specialist B-1	Pro-B	<ul style="list-style-type: none"> 1) To prepare pre-qualification documents 2) To prepare tender documents including technical specifications of construction works and procurement of equipment for river works 3) To assist Implementation Agency to conduct the procurement of contractors 4) To assist Implementation Agency to prepare the bid evaluation reports
B-16	Spec Writer & Bid Specialist B-2	Pro-B	<ul style="list-style-type: none"> 1) To prepare pre-qualification documents 2) To prepare tender documents including technical specifications of construction works and procurement of equipment for bridge works 3) To assist Implementation Agency to conduct the procurement of contractors 4) To assist Implementation Agency to prepare the bid evaluation reports
B-17	Construction Engineer B-1	Pro-B	<ul style="list-style-type: none"> 1) To superintend the contractor's activities in terms of technical aspects for construction supervision 2) To monitor and control quality and progress of river works especially for river widening and retarding basin 3) To prepare the work progress reports 4) To check working drawings and construction program submitted by the contractor 5) To check and recommend certification of the payments to the contractors
B-18	Construction Engineer B-2	Pro-B	<ul style="list-style-type: none"> 1) To superintend the contractor's activities in terms of technical aspects for construction supervision 2) To monitor and control quality and progress of river works especially for ring dike, surrounding dike and shortcut of tributaries 3) To prepare the work progress reports 4) To check working drawings and construction program submitted by the contractor 5) To check and recommend certification of the payments to the contractors
B-19	Construction Engineer B-3	Pro-B	<ul style="list-style-type: none"> 1) To superintend the contractor's activities in terms of technical aspects for construction supervision 2) To monitor and control quality and progress of mechanical works 3) To prepare the work progress reports 4) To check working drawings and construction program submitted by the contractor 5) To check and recommend certification of the payments to the

No	Position	Professional*	Major Tasks and Duties
			contractors
B-20	Construction Engineer B-4	Pro-B	<ol style="list-style-type: none"> 1) To superintend the contractor's activities in terms of technical aspects for construction supervision 2) To monitor and control quality and progress of bridge works 3) To prepare the work progress reports 4) To check working drawings and construction program submitted by the contractor 5) To check and recommend certification of the payments to the contractors
Project Management Unit Supporting			
No	Position	Professional*	Major Tasks and Duties
A-16	Deputy Team Leader/Project Management Specialist	Pro-A	<ol style="list-style-type: none"> 1) To coordination for the smooth project implementation among Implementation Agency, Project Management Unit (PMU), JCC, JICA and other agencies 2) To organize consultant's team to achieve efficient assistance to the PMU 3) To assist PMU for smooth implementation of the project 4) To assist PMU for smooth procurement of the project 5) To prepare Monthly and Quarterly Progress Reports, Completion Report
B-21	Co-Team Leader/Project Management Specialist	Pro-B	<ol style="list-style-type: none"> 1) To coordination for the smooth project implementation among Implementation Agency, Project Management Unit (PMU), JCC, JICA and other agencies with the Team Leader 2) To organize consultant's team to achieve efficient assistance to the PMU with the Team Leader 3) To assist PMU for smooth implementation of the project by assisting Team Leader 4) To assist PMU for smooth procurement of the project by assisting Team Leader 5) To prepare Monthly and Quarterly Progress Reports, Completion Report
B-22	River Engineer / Quality Inspector	Pro-B	<ol style="list-style-type: none"> 1) To assist PMU to evaluate construction works 2) To inspect quality of construction 3) To prepare Monthly and Quarterly Progress Reports, Completion Report

*) Pro-A: International consultant, Pro-B: National consultant

Chapter 6. Reporting

Within the scope of consulting services, the Consultant shall prepare and submit reports and documents to Implementation Agency as shown in Table-5. The Consultant shall provide electronic copy of each of these reports.

Table-5 Reports and documents

Category	Type of Report	Timing	No. of Copies
Consultancy Services	Inception Report	Within 1 month after commencement of the services	10
	Monthly Progress Report	Every month	10
	Quarterly Progress Report	Every quarter	10
	Project Completion Report	At the end of Services	10
Detailed Design	Project Definition Report	In the 3rd month after the commencement of services	20
	Draft Detailed Design Report	In the 6th month after the commencement of services	20
	Cost Estimate Report	In the 7th month after the commencement of services	20
	Final Detailed Design Report	In the 10th month after the commencement of services	20
Tender Assistance	Pre-qualification Document Report	In the 5th month after the commencement of services	20
	Bidding Document Report	In the 7th month after the commencement of services	20
	Pre-qualification Evaluation Report	—	20
	Technical Evaluation Report	—	15
	Tender Evaluation Report	—	15
Construction Supervision	Quality Control Report	Every month	10
	Completion Report (and As-built Drawings, if any)	At the end of the Project	5
Environment and Social Safeguard	Environmental Monitoring Report	Every quarter	10
	Land Acquisition and Resettlement Monitoring Report	Every month	10
	Environmental and Social Safeguard Evaluation Report	At the end of the Project	20
Other Report	Technical Report	As required or upon request	As required

Contents to be included in key report are as follows:

- (1) Inception Report: To be submitted within 1 month after the commencement of the services, presenting the methodologies, schedule, organization, etc.
- (2) Monthly Progress Report: Describes briefly and concisely all activities and progress for the previous month by the 10th day of each month. Problems encountered or anticipated will be clearly stated, together with actions to be taken or recommendations on remedial measures for correction. Also indicates the work to be performed during the coming month.
- (3) Project Definition Report, to be submitted in the 3rd month after the commencement of services, presenting the design criteria and standards.
- (4) Draft Detailed Design Report, to be submitted in the 6th month after the commencement of services, presenting detailed engineering design.
- (5) Cost Estimate Report, to be submitted in the 7th month after the commencement of services, presenting detailed cost estimate.
- (6) Final Design Report, to be submitted in the 10th month after the commencement of services,

finalizing detailed design, cost estimate, bid plan, bid evaluation criteria, technical evaluation criteria and bidding documents through the incorporation of comments on the Draft Design Report, provided by and the Consultant.

- (7) Pre-qualification Document Report, to be submitted in the 5th month after the commencement of the services, presenting the pre-qualification documents and its evaluation criteria.
- (8) Bidding Document Report, to be submitted in the 7th month after the commencement of the services, presenting the bidding documents and bid evaluation criteria.
- (9) Pre-qualification Evaluation Report to present the results of the evaluation and to select the qualified applicants.
- (10) Technical Evaluation Report to present the results of technical evaluation and to recommend the qualified applicants.
- (11) Tender Evaluation Report to present the results of the tenders to select the most responsible contractors.
- (12) Environmental Monitoring Report to present the environmental impacts and implementation of environmental mitigation measures during and [at the completion of / after] the construction stage.
- (13) Land Acquisition and Resettlement Monitoring Report to present the situation of land acquisition and resettlement.
- (14) Environmental and Social Safeguard Evaluation Report to presenting the EMP, EMoP and RAP prepared.

Chapter 7. Obligations of the Executing Agency

A certain range of arrangements and services will be provided by the Executing Agency to the Consultant for smooth implementation of the Consulting Services. In this context, the Executing Agency will:

(1) Report and data

Make available to the Consultant existing reports and data related to the Project

(2) Office space

Provide an office space with necessary equipment, furniture and utility. However, the Consultant's requirement for office space, including necessary equipment, furniture and utilities, should be clearly stated in the proposal with its rental cost for the case where Implementation Agency would be unable to provide such facilities;

(3) Cooperation and counterpart staff

Appoint counterpart officials, agent and representative as may be necessary for effective implementation of the Consulting Services;

(4) Assistance and exemption

Use its best efforts to ensure that the assistance and exemption, as described in the Standard Request for Proposal issued by JICA, will be provided to the Consultant, in relation to

- work permit and such other documents;
- entry and exit visas, residence permits, exchange permits and such other documents
- clearance through customs;
- instructions and information to officials, agent and representatives of the Borrower's Government;
- exemption from any requirement for registration to practice their profession;
- privilege pursuant to the applicable law in the Borrower's Country.

Appendix-11

コスト縮減検討

【日本語版のみ】

1. 概略事業にかかるコスト縮減

本調査において FS の対象となる事業は河川工事の土工工事が主体であり、コスト縮減の可能性があるのは、発生土の有効活用として以下の2項目が考えられる。

- ① 掘削土砂の築堤材料としての転用
- ② 残土の埋土としての活用

2. 掘削土砂の築堤材料としての転用

掘削土量は 550 万 m³ であり、単純に考えると 550 万 m³ の残土処理が必要となる。ここで、掘削土砂の一部を埋戻し、盛土に用いることを考えると、埋戻し及び盛土に必要な土量は 275 万 m³ であり、残土の約半分が転用可能であり、残土量は 550-275=275 百万 m³ と約 50% の削減が可能であり、残土処理費の約 50% のコスト縮減が可能となる。ただし、実際の転用に際しては、築堤材料としての土砂材料の品質を確認する必要がある。

表一 1 FS 対象事業における土工量

Item	Main Works	Description	Unit	Package-1	Package-2	Package-3	Package-4		Total	Remarks
				River Widening Quantity	Retarding Basin A, B Quantity	Ring Dike Quantity	Surrounding Dike Quantity	Short cut of tributaries Quantity		
I. 建設工事数量										
本体工事数量										
	土工	普通床掘・掘削	m ³	3,928,181.0	1,257,034.5	6,446.0	290,737.0	23,431.0	5,505,829.5	
		埋戻し	m ³	868,327.0	-	21,606.0	34,398.0	-	924,331.0	
		盛土(敷均し+締固め)	m ³	328,936.0	1,159,681.3	57,364.0	251,216.0	27,725.0	1,824,922.3	
	残土処分	押し・積込	m ³	2,659,223.0	97,353.2	-	-	-	2,756,576.2	
		土砂等運搬	m ³	2,659,223.0	97,353.2	-	-	-	2,756,576.2	
		盛土工	m ³	2,659,223.0	97,353.2	-	-	-	2,756,576.2	

3. 残土の埋土への転用

上述した埋土の数量には、新しく建設する堤防の背後地の埋戻しを考慮している (Draft Final Report, Main Report II: Feasibility Study 「19.1.4(4)背後地の埋戻し」参照)。これは、ナンディ川沿いの地形は河岸段丘を呈し河川沿いは低位段丘を形成しており、堤防設置後にその背後地に低地・窪地が発生してしまう場合において、背後地の浸水防止とともに埋戻しによる発生土の有効活用を図るものである。表一 1 に示す埋土量の約 60% が背後地の埋戻しにあたる土量である。